Greenhouse Gas Emissions Technical Report
for
Otay Ranch Village 14 and Planning Areas 16/19
San Diego County, California

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Summary of Appendix 2.7-1 Greenhouse Gas Technical Report Text Changes

Section (Page)	Change	Reason for Change
Executive Summary (ix)	Total construction related greenhouse gas emissions were updated.	Additional calculations captured in the Thematic Response to Blasting and Response to comment
1.2.3 (10)	Typographical updates to Table 1	Typographical error
1.2.3 (16)	Typographical corrections to the description of Perimeter Trail Option	Typographical error
1.2.5 (17)	Footnotes were revised	Updates/typographical errors
1.2.5 (18)	The following PDFs were added: PDF-AQ/GHG-6 Efficient Outdoor lighting, PDF-AQ/GHG-7 Energy Efficiency Education, PDF-AQ/GHG-8 Cool Roods, and PDF-AQ/GHG-9 Cool Pavements.	Response to comment
1.2.5 (19)	PDF-AQ/GHG-6 was changed to PDF-AQ/GHG-10	New PDFs AQ/GHG-6, 7, and 8 were added as a response to comment
1.2.5 (19)	PDF-AQ/GHG-10 was amended to include additional electrical vehicle charging infrastructure.	Response to comment
1.2.5 (19 - 20)	Additional text was added to PDF-TR-1 to ensure implementation and monitoring of the vehicle miles traveled reduction included in the project design feature.	Response to comment
1.2.5 (21)	Additional text was added to PDF-UT-4 to clarify the water reduction goals	Update
1.2.5 (21)	PDF-UT-5 Outdoor Watering was added.	Response to comment
4.2.2 (61)	Criteria air pollutant was changed to greenhouse gas	Typographical error
4.2.3 (65)	Utility installation duration changed.	Typographical error
4.2.6 (69)	Criteria air pollutant was changed to greenhouse gas	Typographical error
4.2.8 (71 – 72)	A discussion of blasting was added to the Technical Report.	Response to comment O-6-156
4.2.8 (73)	Footnote deleted because additional analysis was prepared specific to the Proposed Project	Response to Comment
4.6.3 (84)	Removed reference to recycled water.	Response to comment
4.6.3 (Table 17))	Table 17 was updated to reflect the new PDFs added in response to comments.	Consistency with edits made in response to various comments.
5.1.2 (Table 18)	Total construction related greenhouse gas emissions were updated.	Additional calculations captured in the Thematic Response to Blasting and Response to comment
5.1.3 (95)	Table reference changed from 15 to 16	Typographical error
5.1.3 (97)	Total GHG emissions changed from “16,384” to “16,348”. No change to any emissions calculations.	Typographical error

Summary of Appendix 2.7-1 Greenhouse Gas Technical Report Text Changes

Section (Page)	Change	Reason for Change
5.1.3 (98)	Emissions updated in Table 25 to reflect changes in Tables 20 and 23.	Update and consistency
5.1.4 (96)	Table reference changed from 15 to 16	Typographical error
5.1.4 (99)	Additional text was added to M-GHG-1 to clarify the geographic priority of carbon offsets.	Response to comment
5.1.4 (103)	M-GHG-4 updated to include the additional PDFs added in response to comments.	Response to comment
5.1.4 (103)	Total emissions updated	Additional calculations captured in the Thematic Response to Blasting and Response to comment.
5.1.4 (100; 104-105)	Typographical errors were corrected	Typographical errors
5.1.4 (100-101)	Additional text was added to M-GHG-2 to add a public review component to the “true-up” provision.	Response to comment
5.2.4 (113)	Total construction emissions updated	Additional calculations captured in the Thematic Response to Blasting and Response to comment.
6 (117-118; 120)	Three additional blasting citations were added.	Response to comment

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ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
°C	degrees Celsius
°F	degrees Fahrenheit
AB	Assembly Bill
CalEEMod	California Emissions Estimator Model
CALGreen	California Green Building Standards Code
CalRecycle	California Department of Resources Recycling and Recovery
CAP	Climate Action Plan
CARB	California Air Resources Board
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CH_4	methane
CNRA	California Natural Resources Agency
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
County	County of San Diego
CPUC	California Public Utilities Commission
CTMP	Community Trails Master Plan
DU	dwelling unit
EIR	environmental impact report
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EV	electric vehicle
EVSE	Electric Vehicle Supply Equipment
GDP/SRP	General Development Plan/Subregional Plan
General Plan	San Diego County General Plan
GHG	greenhouse gas
GWP	global warming potential
HCFC	hydrochlorofluorocarbon
HFC	hydrofluorocarbon
IPCC	Intergovernmental Panel on Climate Change
KBtu	kilo British thermal unit
kWh	kilowatt hour
MT	metric ton
MMBtu	million British thermal unit
MMT	million metric ton
N_2O	nitrous oxide
NHTSA	National Highway Traffic Safety Administration
O_3	ozone
PDF	project design feature
PDS	Planning & Development Services Department

Acronym/Abbreviation	Definition
PFC	perfluorocarbon
PHEV	plug-in hybrid electric vehicle
PV	photovoltaic
RMP	Otay Ranch Resource Management Plan
RPS	Renewables Portfolio Standard
RTP	Regional Transportation Plan
SANDAG	San Diego Association of Governments
SB	Senate Bill
SCS	Sustainable Communities Strategy
SDG&E	San Diego Gas and Electric
SF_6	sulfur hexafluoride
SF	square feet
SLCP	short-lived climate pollutants
SR	State Route
TDM	Transportation Demand Management
VMT	vehicle miles traveled
ZEV	Zero Emissions Vehicle
ZNE	zero net energy

EXECUTIVE SUMMARY

Project Overview

Otay Ranch Village 14 and Planning Areas 16/19 (Proposed Project) is part of the overall Otay Ranch, an approximately 23,000-acre master-planned community in southern San Diego County (County), designed as a series of villages and planning areas. The Proposed Project is located within Otay Ranch Village 14 and Planning Areas 16/19 in the Proctor Valley area of Otay Ranch.

Otay Ranch Village 14 is planned around a centrally located "Village Core." The Village Core is composed of a 7.2-acre Village Green Park (public park), a 1.7-acre mixed-use site with up to 10,000 square feet of commercial/retail uses, a 2.3-acre public safety site for a fire station and satellite sheriff's facility, and 9.7-acre elementary school site.[1] Additional public and private parks, swim clubs, trails, and recreational facilities would be situated throughout the three distinct areas of Village 14, referred to herein as South Village 14, Central Village 14, and North Village 14.

Approximately 994 homes will be located in South Village 14, Central Village 14, and North Village 14. Of this total, 878 will be single-family homes located in gated enclaves, and 116 will be detached courtyard homes. Twelve neighborhoods are planned, with approximate densities ranging from 0.2 to 10.0 dwelling units per acre. In addition to the homes in Village 14, there are 13 one-acre estate lots proposed in Planning Area 19, and 112 ranchettes averaging 3 acres located in Planning Area 16.

The Proposed Project would include numerous project design features (PDFs) that would reduce greenhouse gas (GHG) emissions. Energy-related PDFs include zero net energy (ZNE) design for the residential land uses, Energy Star or equivalent appliances, and solar water heating for the swimming pools at private recreation centers. Mobile-related strategies include implementation of a Transportation Demand Management (TDM) Program aimed at reducing vehicle miles traveled (VMT).

Impact Analysis Summary

This GHG emissions analysis evaluates the potential for the Proposed Project to generate GHG emissions during construction and operation that may have a significant impact on the environment, and the potential for the Proposed Project to conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. Principal GHGs

[1] The school may instead be developed as 97 residential units, which was used in this analysis due to the higher trip rates associated with housing to reflect a conservative estimate of greenhouse gas (GHG) emissions and potential impacts.

regulated under state and federal law include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). GHG emissions are measured in metric tons of CO_2 equivalent (MT CO_2e), which accounts for the weighted global warming potential factors for CH_4 and N_2O. Estimated annual emissions generated by the Proposed Project at full buildout in 2028 from area, energy, mobile, solid waste, and water/wastewater emissions sources; sequestered carbon; and amortized Proposed Project construction emissions were calculated using the California Emissions Estimator Model (CalEEMod) Version 2016.3.1 (CAPCOA 2016), consistent with the San Diego Air Pollution Control District guidance. [2, 3]

The significance criteria used to evaluate the Proposed Project's GHG emissions impacts are based on the recommendations provided in Appendix G of the California Environmental Quality Act (CEQA) Guidelines. For the purposes of this GHG emissions analysis, the Proposed Project would have a significant environmental impact if it would (14 CCR 15000 et seq.):

1. Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.
2. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

This GHG emissions analysis also considers the direction provided in CEQA Guidelines Section 15064.4(b), which provides that "a lead agency should consider the following factors, among others, when assessing the significance of impacts from greenhouse gas emissions on the environment: (1) the extent to which a project may increase or reduce GHG emissions as compared to the existing environmental setting; (2) whether project emissions exceed a threshold of significance that the lead agency determines applies to the project; and (3) the extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions."

[2] CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform to calculate construction and operational emissions from land use development projects.

[3] CalEEMod Version 2016.3.1 was the current version of CalEEMod when the Proposed Project analysis was initiated. In October 2017, CalEEMod Version 2016.3.2 was released, followed by CalEEMod Version 2016.3.2.25 in November 2017, which fixed a Windows security update issue in Version 2016.3.2. CalEEMod Version 2016.3.2 included five upgrades and ten bug fixes. The most notable upgrade and bug fix, respectively, is the incorporation of percent reductions in default energy consumption to reflect compliance with the 2016 Title 24, Part 6 Building Energy Efficiency Standards and fixing the bug that overestimated annual construction PM_{10} and $PM_{2.5}$ emissions from fugitive dust in multiple year scenario runs (SCAQMD 2017). All CalEEMod Version 2016.3.2 updates were reviewed, and it was determined that use of CalEEMod Version 2016.3.2 is not anticipated to result in greater GHG emissions compared to estimated Proposed Project emissions generated using CalEEMod Version 2016.3.1. Accordingly, use of CalEEMod Version 2016.3.1 is appropriate for the Proposed Project's GHG emissions analysis.

The "project life" is assumed to be 30 years, which is consistent with the 30-year project life time frame used by the South Coast Air Quality Management District's (SCAQMD's) GHG guidance (SCAQMD 2008).

Potential to Generate Significant Greenhouse Gas Emissions

Construction of the Proposed Project would result in GHG emissions primarily associated with the use of off-road construction equipment, on-road hauling and vendor (material delivery) trucks, and worker vehicles. GHG emissions generated by Proposed Project construction activities, including rock crushing, were estimated to be ~~11,463~~ 12,378 ~~metric tons of carbon dioxide equivalent (~~MT CO_2e~~)~~. Additionally, the one-time loss of sequestered carbon from land use conversion for the Proposed Project is 10,382 MT CO_2e. Total emissions generated by the Proposed Project were estimated to be ~~21,845~~22,760 MT CO_2e, or 759~~728~~ MT CO_2e per year when amortized over 30 years.

The Proposed Project would generate operational GHG emissions from area sources (hearths and landscape maintenance), energy sources (electricity and natural gas consumption), mobile sources (vehicle trips), water supply and wastewater treatment, and solid waste. Estimated annual operational GHG emissions at buildout of the Proposed Project in 2028 would be approximately 16,348 MT CO_2e per year. These emissions would be reduced by planting at least 8,000 new trees, which would result in the one-time sequestration of approximately 5,664 MT CO_2e (or 189 MT CO_2e per year when amortized over 30 years). Therefore, Proposed Project operational GHG emissions (16,348 MT CO_2e per year) minus the sequestered carbon (189 MT CO_2e per year) would result in annual Proposed Project emissions of 16,159 MT CO_2e per year. Due to the Proposed Project's increase in GHG emissions above existing levels, the Proposed Project would have a **potentially significant** impact, and mitigation is required.

Mitigation measures M-GHG-1 through M-GHG-4 are provided to reduce this impact and would require the Proposed Project to achieve carbon neutrality (i.e., a net zero emissions level). With mitigation, the Proposed Project's impacts would be reduced to **less than significant**.

Consistency with Applicable Greenhouse Gas Reduction Plans

Regarding consistency with the San Diego Association of Governments' (SANDAG) San Diego Forward: The Regional Plan (Regional Plan), as part of the Proposed Project's TDM Program, the Proposed Project would include design elements and PDFs to support the policy objectives of the Regional Plan and Senate Bill (SB) 375. The Proposed Project's TDM Program would work to reduce the Proposed Project's VMT through two primary strategies: land use and design measures that would create an environment that promotes alternative mode choice (e.g., land use

diversity and pedestrian/bicycle networks), and commute/travel services for residents that would reduce out-going single-occupant vehicle trips (e.g., ride-share, commute trip reduction marketing). Implementation of the Proposed Project's TDM Program and associated measures would achieve a 4.7% reduction in VMT for Village 14 and a 2.0% reduction in VMT for Planning Areas 16/19.

Regarding consistency with the San Diego County General Plan (General Plan), the Proposed Project would include PDFs that would reduce indoor and outdoor water consumption, include bike and pedestrian networks, and employ sustainable technology and energy-efficient design through ZNE homes with rooftop solar and electric vehicle chargers in the garages of half of the residential units. The Proposed Project, with mitigation, would also be consistent with the statewide GHG reduction target codified in SB 32 by achieving net-zero emissions. Therefore, the Proposed Project would not conflict with an applicable plan adopted for the purpose of reducing GHG emissions, and plan consistency impacts would be **less than significant**.

1 INTRODUCTION

1.1 Report Purpose and Scope

The purpose of this report is to estimate and evaluate the potential greenhouse gas (GHG) emissions impacts associated with construction and operation of the proposed Otay Ranch Village 14 and Planning Areas 16/19 (Proposed Project).

This introductory section provides a description of the Proposed Project. Section 2, Environmental Setting, describes the local environment. Section 3, Regulatory Setting, identifies relevant federal, state, and local regulations and policies regarding GHG emissions. Section 4, Significance Criteria and Analysis Methodologies, includes the thresholds of significance applied herein, which are based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines, and presents the methodology for estimating emissions and evaluating impacts. Section 5, Impact Analysis, evaluates the Proposed Project's potential impacts per the thresholds identified in Section 4. Section 6, References, includes a list of the references cited. Section 7, List of Preparers, includes a list of those who prepared this technical report.

1.2 Project Description

1.2.1 Overview and Background

The Proposed Project (defined below) is part of the overall Otay Ranch project, an approximately 23,000-acre master-planned community in southern San Diego County designed as a series of villages and planning areas. The Proposed Project addressed by this GHG emissions technical report is located within Otay Ranch Village 14 and Planning Areas 16/19 in the Proctor Valley area of Otay Ranch, as shown in Figure 1, Regional Map.

The underlying purpose of the Proposed Project is to implement the adopted Otay Ranch General Development Plan/Subregional Plan, Volume II (Otay Ranch GDP/SRP) (County of San Diego 1993) and complete the planned development within Jackson Pendo Development Company's (the applicant) ownership of Village 14 and Planning Areas 16/19. The Otay Ranch GDP/SRP is also a component of the San Diego County General Plan (County of San Diego 2011) and allows for a total of 2,132 homes in Otay Ranch Village 14 and Planning Areas 16/19.[4]

[4] The Otay Ranch GDP/SRP includes land owned by the state for conservation purposes. The parcels that are owned by the state are not expected to be developed; however, if the additional 1,014 units were to be built, population growth would remain in compliance with the General Plan and the San Diego Air Pollution Control District 2016 Regional Air Quality Strategy.

The Proposed Project is designed to be consistent with the Otay Ranch GDP/SRP's directive to provide a transitional community between the suburban densities and character of eastern Chula Vista and the more rural community of Jamul. The Proposed Project would construct 1,119 homes[5], of which 994 would be in Village 14 and 125 would be in Planning Areas 16/19.

1.2.2 Definitions

County. The "County" is the County of San Diego and its associated jurisdictional area.

Project Area. The "Project Area" is the applicant's ownership located within Otay Ranch Village 14 and Planning Areas 16/19, in addition to certain off-site areas for infrastructure, as depicted in Figure 1, Regional Map, and Figure 2, Vicinity Map. The Project Area covers approximately 1,243.6 acres owned by the applicant and an additional approximately 85.4 acres of off-site improvements.

Proposed Project. The "Proposed Project" includes the Otay Ranch Village 14 and Planning Areas 16/19 Specific Plan. The Proposed Project is further defined in Chapter 1.0 of the Proposed Project's Environmental Impact Report (EIR), which is incorporated herein by reference. The Proposed Project specifically excludes the State of California's ownership in Village 14 and Planning Areas 16/19, which remains approved for development per the County's General Plan and the Otay Ranch GDP/SRP. All underlying Otay Ranch GDP/SRP land uses on the state's property will remain unchanged. In addition, the "Inverted L" is excluded, as it is not owned by the applicant and is located within the City of Chula Vista; the property is owned by the Otay Water District and the U.S. Fish and Wildlife Service.

Otay Ranch Village 14. "Otay Ranch Village 14" or "Village 14" as referred to herein is a discrete subset of the Proposed Project and reflects approximately 723.7 acres of the applicant's ownership located exclusively within Village 14, as depicted in Figure 2, Vicinity Map. Approximately 994 homes are planned around a Village Core in this area, as shown in Table 1, Land Use Summary.

[5] The proposed 1,119 homes would include 97 residential units allocated to the school site at 10 dwelling units per acre, in accordance with Otay Ranch GDP/SRP policies in the event that the school is not constructed. This GHG emissions analysis evaluates the Proposed Project's impact assuming the more conservative land use, which includes the underlying allocated residential units.

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SOURCE: Hunsaker 2017

FIGURE 1

Regional Map

Otay Ranch Village 14 and Planning Areas 16/19

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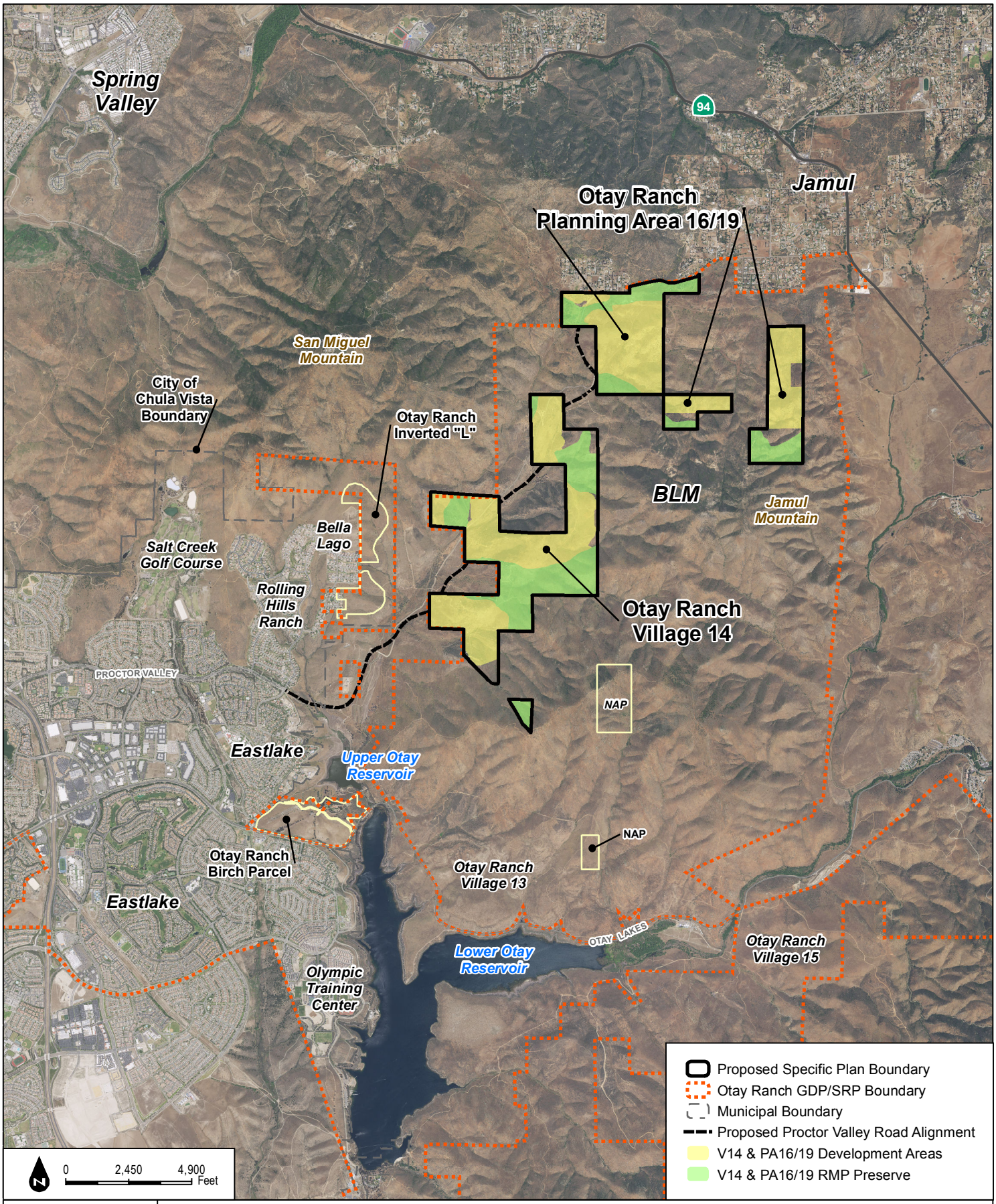

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SOURCE: NAIP 2016; Hunsaker 2017; County of San Diego 1997

FIGURE 2

Vicinity Map

Otay Ranch Village 14 and Planning Areas 16/19

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Otay Ranch Planning Areas 16/19. "Otay Ranch Planning Areas 16/19" or "Planning Areas 16/19" is a discrete subset of the Proposed Project and reflects approximately 559.8 acres of the applicant's ownership located exclusively within Planning Areas 16/19, as depicted in Figure 2. Approximately 125 homes are planned on 1-acre and 3-acre average lots in this area, as shown in Table 1. The 127.1 acres of Limited Development Area is defined below.

Limited Development Area. "Limited Development Area" (LDA) is a designated land use in the Otay Ranch GDP/SRP: "An open space easement will cover the areas designated as 'Limited Development Area' … These areas will be left as natural open space with the exception that roads and utilities are anticipated to cross or lie within these areas … LDAs may be included within private lots but would have the following set of restrictions. Removal of native vegetation would be prohibited except as necessary for construction of roads and utilities. There would be no buildings or other structure, agriculture, landscaping, livestock, grazing, horses, trash disposal of fences allowed within these areas" (City of Chula Vista and County of San Diego 1993). Fuel modification is allowed in the LDA as "brushing for fire control zones would conform to the local fire district regulations" (City of Chula Vista and County of San Diego 1993). A total of 127.1 acres of LDA occurs in Planning Areas 16/19; there is no LDA in Village 14.

Otay Ranch RMP and MSCP Preserve. The "Otay Ranch Resource Management Plan" (RMP) provides for the conservation, funding, and management of the entire 11,375-acre Otay Ranch RMP Preserve (City of Chula Vista and County of San Diego 2015). The Multiple Species Conservation Program (MSCP) County Subarea Plan Implementing Agreement (USFWS et al. 1998) describes the County's required contribution to the MSCP Preserve. The Implementing Agreement states that the required mitigation for Otay Ranch includes "protection of the areas identified as preserved in the boundaries of the Otay Ranch project, including approximately 11,375 acres" of the Otay Ranch RMP Preserve (USFWS et al. 1998). Therefore, the Otay Ranch RMP Preserve is a subset of the MSCP Preserve. The portion of the Proposed Project's land use designated as Otay Ranch RMP Preserve is, therefore, referred to as MSCP Preserve, which includes 270.2 acres in Village 14 and 156.5 acres in Planning Areas 16/19, for a total of 426.7 acres.

The portion of the Proposed Project's land use designated as Otay Ranch RMP Preserve, while considered a part of the MSCP County Subarea Plan Preserve, is unique to Otay Ranch because it specifically mitigates for direct and cumulative impacts associated with implementation of the Otay Ranch GDP/SRP. The Proposed Project includes 426.7 acres of Otay Ranch RMP Preserve, of which 270.2 acres is in Village 14 and 156.5 acres is in Planning Areas 16/19.

Preserve Conveyance Obligation. To satisfy assemblage of the 11,375-acre Otay Ranch RMP (MSCP) Preserve ranch-wide, a "Preserve Conveyance Obligation" was prescribed in the Otay

Ranch RMP (City of Chula Vista and County of San Diego 2015). The Preserve Conveyance Obligation is 1.188 acres of Otay Ranch RMP (MSCP) Preserve conveyed per 1 acre of development, as further defined in the adopted Otay Ranch RMP. This obligation, which is the primary basis of the Proposed Project's required mitigation, may be achieved through conveyance of either the applicant's RMP (MSCP) Preserve ownership, or through off-site acquisition within the 11,375-acre Otay Ranch RMP (MSCP) Preserve.

Conserved Open Space. "Conserved Open Space" refers to those areas with an Otay Ranch GDP/SRP land use designation other than MSCP Otay Ranch RMP Preserve that remain undisturbed; would be preserved on site; and would be added to the Otay Ranch RMP Preserve (through a future RMP Amendment), managed under a separate resource management plan, or used to mitigate impacts to the City of San Diego MSCP Cornerstone Lands. The approximately 72.4 acres of Conserved Open Space is composed of 31.9 acres within the 127.1 acres of LDA and 43.6 acres of residential land use designation in Planning Area 16/19 plus 36.9 acres of residential land use designation within Village 14. The Conserved Open Space areas are located adjacent to the Otay Ranch RMP Preserve and would be conserved by recording a biological open space easement over the land.

Development Footprint. The "Development Footprint" includes areas where there will either be permanent or temporary ground disturbance. The Development Footprint includes all on-site development, off-site improvements, graded LDA, and impacts resulting from infrastructure and other allowable uses within the MSCP Preserve, per Section 1.9.3 of the MSCP County Subarea Plan (County of San Diego 1997).

Off-Site Improvements. "Off-site Improvements" would total approximately 85.4 acres of temporary and permanent impacts, as shown in Table 1. Off-site improvements would include the following: Proctor Valley Road, including related wet and dry utilities, drainage facilities, and trails; access roads in Planning Area 16; an off-site sewer pump station in the southern reach of Proctor Valley Road; and off-site sewer facilities to connect to the Salt Creek Interceptor, as planned since 1994.

Proctor Valley Road improvements would include South Proctor Valley Road (0.25 miles in the City of Chula Vista and 0.2 acres privately owned in the County); South and Central Proctor Valley Road (1.5 miles in City of San Diego Cornerstone Land); Central Proctor Valley Road (0.4 miles in California Department of Fish and Wildlife (CDFW) Otay Ranch Village 14 land); and North Proctor Valley Road (0.75 miles in CDFW Otay Ranch land between Village 14 and Planning Areas 16/19).

Central and South Proctor Valley Road are proposed to be improved and classified as two-lane-with-median light collectors with a width ranging from 68 to 74 feet, plus an additional 20-foot-wide fuel modification/construction easement on each side. Proctor Valley Road North would be a two-lane interim road with a paved width of 28 feet in a 40-foot-wide right-of-way. Improvements in Proctor Valley Road would include those typically in roadways, including wet and dry utilities, a sewer pump station, drainage, landscape, culverts, and trails. Proctor Valley Road is an approved County General Plan Mobility Element road (County of San Diego 2011) and an approved facility in the MSCP County Subarea Plan (County of San Diego 1997).

In addition, there are three public off-site roads within Planning Area 16. These roads are located primarily within CDFW managed lands and are approved in the Otay Ranch GDP/SRP as facilities within designated development or LDA land use (and are also approved facilities per the MSCP County Subarea Plan, Section 1.9.3.3 (County of San Diego 1997)). Improvements in these off-site roads would include those typically in roadways, including wet and dry utilities, drainage, landscape, culverts, and trails.

1.2.3 Proposed Specific Plan

Summary

The adopted Otay Ranch GDP/SRP requires preparation of a Specific Plan, which includes a Site Utilization Plan, to describe the land uses for the Proposed Project. Figure 3 depicts the proposed Site Utilization Plan. Table 1, Land Use Summary, identifies the proposed land uses.

Approximately 994 homes are planned in Village 14, set in three distinct areas (referred to herein as the South, Central, and North Village 14). Of these, 878 homes would be single-family homes located in gated enclaves, and 116 would be detached courtyard homes. Twelve neighborhoods are planned with approximate densities ranging from 0.2 to 10.0 dwelling units per acre. Otay Ranch Village 14 is planned around a centrally located "Village Core." The Village Core would be composed of a 9.7-acre elementary school, a 7.2-acre Village Green (public park), a 1.7-acre Mixed-Use Site with up to 10,000 square feet of commercial/retail uses, and a 2.3-acre public safety site for a fire station and satellite sheriff's facility. Additional public and private parks, swim clubs, trails, and recreational facilities would be situated throughout South, Central, and North Village 14. See Table 1 for land uses in Village 14.

In addition to the homes in Village 14, there are 13 one-acre average sized estate lots proposed in Planning Area 19 and 112 three-acre average sized ranchettes proposed in Planning Area 16. Planning Areas 16/19 neighborhoods would not be gated. The LDA may include public infrastructure and/or be conserved within private lots with a conservation easement. See Table 1 for detailed land uses in Planning Areas 16/19.

The Proposed Project was designed around an active lifestyle and wellness recreation theme, and would include a park and recreation system that would include four public parks totaling approximately 15.2 acres. The remaining private recreation facilities would include three private swim clubs and numerous pocket parks totaling approximately 9.5 acres. An approximately 4.5-mile, 10-foot-wide decomposed granite Community Pathway is proposed along Proctor Valley Road from Chula Vista to Jamul. The Proposed Project would include approximately 27.6 acres of open space (exclusive of the 110.1 acres of open space included in the residential gross acres), 127.1 acres of LDA, and 426.7 acres of Otay Ranch RMP Preserve within the applicant's ownership. Approximately 72.4 acres of Conserved Open Space within the Project Area would be conserved by recording a biological open space easement.

Table 1
Land Use Summary

Land Use	Acres	Units
Otay Ranch Village 14[a,b,c]		
Single-Family Residential	344.2	994[a]
Residential Subtotal[b]	*344.2*	*994*
Public Parks	13.8	N/A
Private Parks	4.5	N/A
Public Safety Site	2.3	N/A
Elementary School	9.7	N/A
Mixed-Use[d]	1.7	N/A
Circulation	12.7	N/A
Open Space	27.6	N/A
Conserved Open Space	36.9	N/A
Otay Ranch RMP	270.2	N/A
Non-Residential Subtotal[b]	*379.5*	*N/A*
Village 14 Subtotal[b]	**723.7**	**994**
Planning Areas 16/19[e,f]		
Planning Area 19 Estates Planning Area 16 Ranchettes[f]	14.3 350.5	13 112
Public Park	1.4	N/A
Circulation	0.8	N/A
Open Space	2.1	N/A
Conserved Open Space	35.5	N/A
Otay Ranch RMP	156.5	N/A
Planning Areas 16/19 Subtotal[b]	*559.8*	*125*
Otay Ranch Village 14 and Planning Areas 16/19 Total[b]	**1,283.5**	**1,119**
Off-Site Project Components		
South Proctor Valley Road – within City of Chula Vista, City of San Diego and County	32.7	N/A

Table 1
Land Use Summary

Land Use	Acres	Units
Central Proctor Valley Road – within City of San Diego and CDFW Otay Ranch	19.8	N/A
North Proctor Valley Road – within CDFW Otay Ranch ownership	17.1	N/A
Planning Areas 16/19 Roads – within CDFW Otay Ranch ownership	1.8	N/A
Total Off Site[b]	**85.4**	**N/A**

Notes:
RMP = Resource Management Plan; CDFW = California Department of Fish and Wildlife; N/A = not applicable.
[a] Residential gross acres in Village 14 includes 96.0 acres of related internal slopes, fuel modification, and/or preserve edge.
[b] Village 14 has 5 acres of private pocket parks (PPPs) included in the residential acreage; therefore the subtotal including PPP is 9.5 acres.
[c] Units allocated to school site at 10 dwelling units per acre per the Otay Ranch GDP/SRP policies. Should school site not be needed, 97 units may be built.
[d] Village 14 Mixed Use acreage includes 10,000 square feet of commercial use.
[e] Residential gross acres in Planning Area 16/19 includes 14.1 acres of related private lift and pump stations.
[f] Residential gross acres in Planning Area 16/19 includes 127.1 acres of Limited Development Area.

Circulation and Access

Regional access to Otay Ranch Village 14 would be provided by State Route (SR) 125, located approximately 3 miles to the west. Interstate (I) 805, approximately 8 miles to the west, would provide secondary north/south access. SR-54, located approximately 6 miles to the northwest, connects to SR-125 and I-805, and would provide regional east/west access. SR-94 runs northwest/southeast along the eastern side of the Project Area through Jamul, connecting the Project Area to Rancho San Diego to the north.

Proctor Valley Road would provide the main access to the Proposed Project. Four roundabouts in Village 14 and one roundabout in Planning Areas 16/19 would identify the entrance into each residential area and provide traffic calming at key internal intersections. The internal circulation plan also includes a series of collectors and residential streets to provide access to the residential neighborhoods, with Planning Areas 16/19 designed to County Rural Road Standards. A secondary access to the easternmost portion of Planning Area 16 is the planned extension of existing Whispering Meadows Road.

Proctor Valley Road is a two-lane road and is designated as a scenic corridor. The northern connection of Otay Ranch Village 14 to Jamul would remain substantially in the alignment of the existing, partially improved Proctor Valley Road, and will be paved with pervious asphalt to provide public access and secondary emergency access to both communities.

Public Services

A summary of the public services that would be provided is described below.

Sewer

Sewer capacity will be provided by the County through annexation into the County Sanitation District. Sewer transportation will be provided as planned for in the Salt Creek Interceptor, located in the City of Chula Vista, pursuant to agreements between the City of Chula Vista and the County. Sewer is allowed in Village 14 and Planning Areas 16/19 per the Otay Ranch GDP/SRP. Sewer trunk line extensions and pump stations are planned.

Water

The Proposed Project is located within the Otay Water District boundary and already accommodated for in the Otay Water District Master Plan. A 980 pressure zone water tank adjacent to Central Village 14 is planned on site. Water transmission lines and pump stations are also planned.

Law Enforcement

The County Sheriff's office will provide service and will have a storefront facility co-located with the fire station on the Proposed Project's public safety site in the Village Core.

Fire

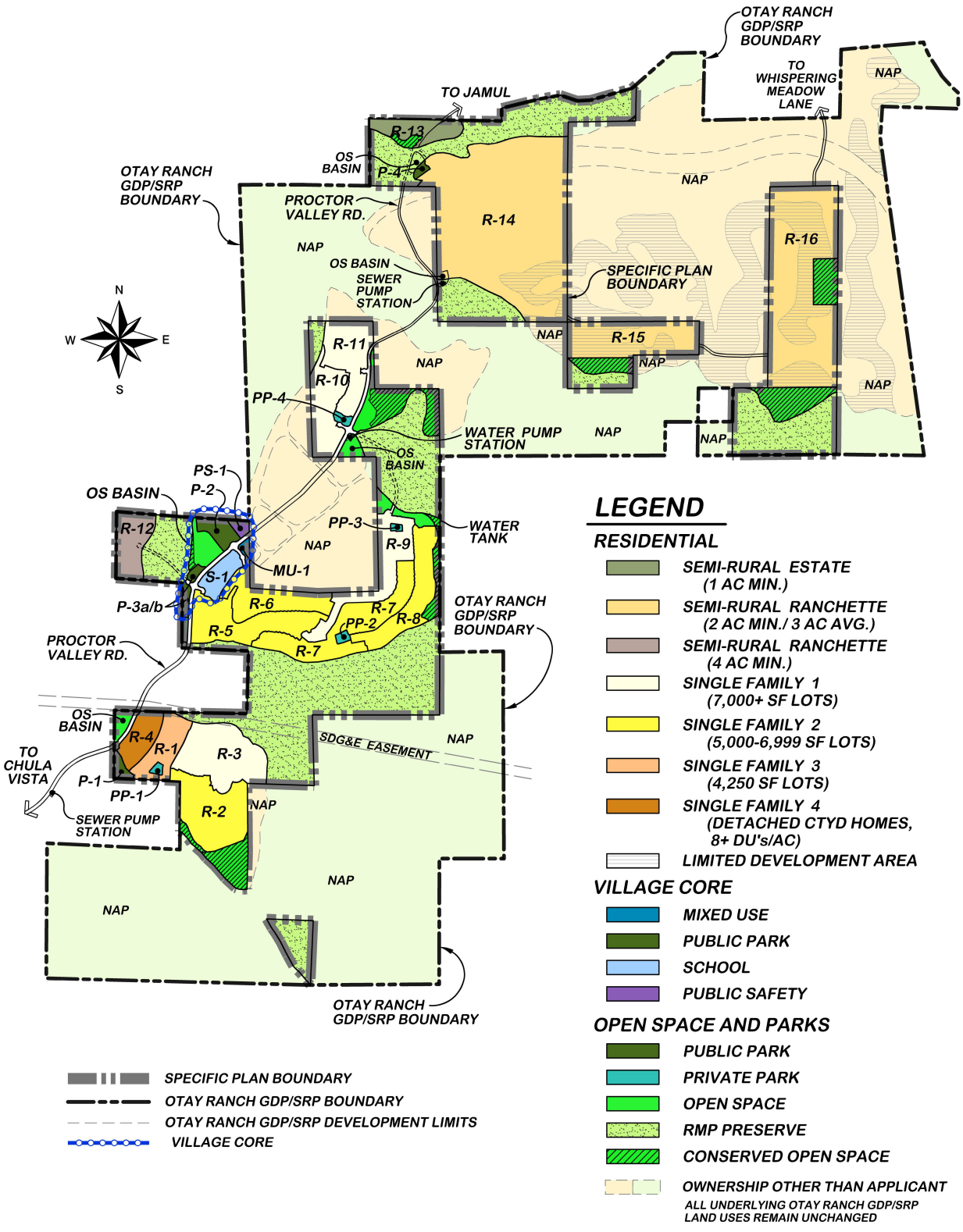
Fire service will be provided by the County from a fire station built within the Proposed Project's public safety site in the Village Core.

Stormwater/Drainage

Biofiltration basins are planned.

Schools

Village 14 is planned to be served by the Chula Vista Elementary School District and Sweetwater Union High School District. Planning Areas 16/19 are planned to be served by the Jamul/Dulzura Union School District and the Grossmont High School District as prescribed in the adopted Otay Ranch GDP/SRP Facilities Implementation Plan and consistent with County Board of Supervisors Policy I-109, Policy II.



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SOURCE: Hunsaker 2018

FIGURE 3

Proctor Valley Site Utilization Plan

Otay Ranch Village 14 and Planning Areas 16/19

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Options

The Proposed Project includes three options for internal circulation: (1) the Proctor Valley Road North Option, (2) the Preserve Trails Option, and (3) the Perimeter Trail Option. The Proposed Project's EIR assesses each of these options and their respective impacts. This will allow the County to select the option (or combination of options) it considers best for the Proposed Project and the environment. Each of these options is summarized below. For detailed descriptions with exhibits, see the Specific Plan Section VIII, Internal Circulation Options (RH Consulting 2018).

Proctor Valley Road North Option: The Proctor Valley Road North Option applies to the portion of Proctor Valley Road from Street AA in North Village 14 to Echo Valley Road, and includes two dedicated bike lanes (one on each side of the road) instead of the "sharrows"[6] proposed in street section 10 of the Proposed Project. Generally, the Proctor Valley Road North Option would increase the right-of-way width from 40 feet to 64 feet starting from the intersection of Street AA northward to the applicant's Village 14 ownership boundary; from 40 feet to 48 feet within the off-site improvement area owned by the state; and from 40 feet to 64 feet within the applicant's ownership north of the state's property to Echo Valley Road.

Preserve Trails Option: The Preserve Trails Option consists of two segments of existing, disturbed trails approximately 1 mile in length within the Project Area, east of the Development Footprint. These segments would be located within the Otay Ranch RMP Preserve. The Preserve Trails Option includes segments "A" and "B" as identified in the Otay Ranch GDP/SRP, which are also identified as segments 52 and 49 in the County of San Diego's Community Trails Master Plan (County of San Diego 2005). Segment "A"/"52" is 2,350 lineal feet, located at the northern terminus of the Proctor Valley Community Pathway and extending east through the on-site Otay Ranch RMP Preserve to the eastern edge of the Echo Valley loop (Community Trails Master Plan Trail 53). Segment "B"/"49" is 2,328 lineal feet and is located between South and Central Village 14 along an existing, historic ranch road. This trail is located within the on-site Otay Ranch RMP Preserve and bisects regional wildlife corridor R1. The Preserve Trails Option would retain these portions of trails in their existing conditions, which meet the Community Trails Master Plan primitive trail standard. No improvements to these Preserve Trails are anticipated with the Proposed Project.

Perimeter Trail Option: The Perimeter Trail Option is an approximately 3.6-mile-long perimeter trail located within the Development Footprint of South and Central Village 14. The Perimeter Trail Option is situated primarily within the Otay Ranch RMP 100-foot Preserve edge. The

[6] Sharrows are road markings that guide bicyclists to bike routes between neighborhoods and alert motorists to the presence of bicyclists within the shared travel lane.

Perimeter Trail Option is designed to Community Trails Master Plan primitive trail standards, and the trail tread would vary from 2 to 6 feet wide. Due to topography, trail grades would range from 2% to the maximum grade allowed of 30%. The Perimeter Trail Option would require construction of approximately 19,000 ~~lineal~~ square feet ~~(0.7 miles)~~ of 5 to-7-foot-high retaining walls due to steep topography and drainage constraints. The Perimeter Trail Option would be graded as part of overall Proposed Project, grading and would not encroach into the Otay Ranch RMP Preserve. The perimeter trail would be accessed at public parks and trailheads, and would be maintained by the County of San Diego.

These options are discussed herein.

1.2.4 Existing and Surrounding Land Uses

Existing Project Area Conditions

The entire Project Area is undeveloped, and on-site elevation ranges from 525 to 1,650 feet above mean sea level. The site is diverse in topography and contains a flat valley along Proctor Valley Road and rolling hills within the remainder of the site. The two eastern portions of Planning Area 16 are located within portions of the Jamul Mountains and contain the highest elevations.

Land Use Designations and Zoning

In the County's General Plan, the Project Area is designated as Rural and Semi-Rural regional categories, and has Specific Plan Area (SPA) and Open Space (Conservation) land use designations. The Project Area is zoned S80 (Open Space) and S88 (Specific Plan) by the County of San Diego Zoning Map. The Proposed Project does not propose any changes to the existing regional categories, land use designations, or zoning. Because the County formally adopted the Otay Ranch GDP/SRP to govern development within the Otay Ranch area, the land use designations specified in the Otay Ranch GDP/SRP take precedence over those in the County General Plan. A wide range of land use designations are specified in the Otay Ranch GDP/SRP for the Project Area: Very Low Density Residential (VL), Low Density Residential (L), Low Medium Village Density Residential (LMV), Medium Density Residential (MD), Medium High Residential (MH), Mixed Use (MU), Public/Quasi Public (P/QP), Park (P), and Open Space (OS).

Surrounding Land Uses

Existing surrounding development, including the master planned communities of Eastlake Woods, Bella Lago, Salt Creek Ranch, and Rolling Hills Ranch, is located approximately 1 mile to the southwest of the Project Area. Commercial centers are located in Eastlake and Rolling

Hills Ranch, and regional shopping is located in Otay Ranch. The proposed Village 13 Resort development is located south of the Project Area. The Otay Reservoir System is located south of the Project Area, along with the City of San Diego's Multiple Species Conservation Program "Cornerstone Lands," which are adjacent to the Project Area to the south. The Cornerstone Lands Multi-Habitat Planning Area Preserve areas include the lands surrounding the Otay Reservoir under the jurisdiction of the City of San Diego (more specifically, the Water Utilities Department). The community of Jamul is located approximately 1 mile north of the Project Area and is rural, as reflected by primarily large-lot estates and horse ranches. Rancho San Diego, which is more heavily developed, is located to the northwest.

1.2.5 Project Design Features

The following Project Design Features (PDFs) will be included in the Proposed Project, as organized by emissions source.[7, 8]

Area Sources

PDF-AQ/GHG-1 Wood Burning Stoves and Fireplaces. Prior to the issuance of residential building permits, the Proposed Project applicant or its designee shall submit building plans illustrating that no wood burning stoves or fireplaces would be utilized.

Energy Sources[9]

PDF-AQ/GHG-2 Zero Net Energy Development – Residential Land Uses. Prior to the issuance of residential building permits, the Proposed Project applicant or its designee shall submit building plans illustrating compliance with the zero net energy (ZNE) development standards defined by the California Energy Commission.

PDF-AQ/GHG-3 Non-Residential Energy Improvement Standards. Prior to the issuance of non-residential building permits, the Proposed Project applicant or its designee

[7] GHG emission sources are categorized in this analysis as area sources (landscape maintenance equipment, hearths), energy sources (building electricity and natural gas usage), mobile sources (vehicle trips), solid waste, and water and wastewater.

[8] Sections 4.3 and 5.1 discuss what PDFs are quantified in this analysis.

[9] Regarding PDF-AQ/GHG-2, Zero Net Energy Development – Residential Land Uses, key policy timelines for ZNE include that all new residential construction ~~will~~ would meet ZNE standards starting in 2020, and all new commercial ~~will~~ would meet ZNE standards starting in 2030. The Proposed Project incorporates ZNE for residential development only as it is foreseeable addition to the California Title 24 Building Code Standards. Furthermore, the majority of the Proposed Project would be residential development, and the Proposed Project as a whole would produce more electricity than the entire development would demand.

shall submit building plans illustrating that the Proposed Project's non-residential land uses shall achieve a 10% greater building energy efficiency than required by the 2016 state energy efficiency standards in Title 24, Part 6 of the California Code of Regulations.

PDF-AQ/GHG-4 **Energy Star Appliances**. All appliances (washer/dryers, refrigerators, and dishwashers) that will be installed by builders in residences and commercial businesses shall be Energy Star rated or equivalent.

PDF-AQ/GHG-5 **Solar Water Heating**. Prior to the issuance of private recreation center building permits, the Proposed Project applicant or its designee shall submit swimming pool heating design plans to San Diego County for review and approval. The design plans shall demonstrate that swimming pools located at private recreation centers in the Project Area are designed and shall be constructed to use solar water heating or other technology with an equivalent level of energy efficiency.

PDF-AQ/GHG-6 **Efficient Outdoor Lighting**. Prior to the issuance of permits, the Proposed Project applicant or its designee shall submit building plans that demonstrate that all outdoor lighting shall be (light emitting diodes) LED or other high efficiency lightbulbs

PDF-AQ/GHG-7 **Energy Efficiency Education**. All new home packets shall provide information on energy efficiency, energy efficient lighting and lighting control systems, energy management, and existing energy incentive programs.

PDF-AQ/GHG-8 **Cool Roofs**. Prior to the issuance of residential building permits, the Proposed Project applicant or its designee shall submit building plans illustrating that residential structures shall meet the U.S. Green Building Council standards for cool roofs. This is defined as achieving a three-year solar reflectance index (SRI) of 64 for a low-sloped roof and an SRI of 32 for a high--sloped roof.

Prior to the issuance of non-residential building permits, the Proposed Project applicant or its designee shall submit building plans illustrating non-residential structures shall meet the U.S. Green Building Council standards for cool roofs. This is defined as achieving a three-year SRI of 64 for a low-sloped roof and 32 for a high--sloped roof.

PDF-AQ/GHG-9 **Cool Pavements**. **Prior to the issuance of building permits, the Proposed Project applicant or its designee shall submit building plans illustrating that**

outdoor pavement, such as walkways and patios shall use paving materials with three-year SRI of 0.28 or initial SRI of 0.33.

Mobile Sources

PDF-AQ/GHG-106 Electric Vehicle Charging Stations. Prior to the issuance of residential building permits, the Proposed Project applicant or its designee shall submit plans for the installation of a dedicated 208/240 dedicated branch circuit will be included in each garage and one Level 2 electric vehicle (EV) charging station in the garage in half of all residential units to San Diego County for review and approval. Prior to the issuance of non-residential building permits, the applicant or its designee shall submit plans for the installation of ten (10) Level 2 EV charging stations in parking spaces located in the Village Core's commercial development area and P1 through P4 park areas to San Diego County for review and approval.

As part of the Proposed Project's Transportation Demand Management (TDM) Program, as described in the traffic impact analysis (Chen Ryan 2017a) and identified in the Proposed Project's EIR Section 2.9, Transportation and Traffic, the Proposed Project would employ PDF-TR-1 to reduce the number of vehicle trips generated by the Proposed Project, including alternative modes of transportation. As detailed below, the TDM Program would facilitate increased opportunities for transit, bicycling, and pedestrian travel, as well as provide the resources, means, and incentives for ridesharing and carpooling opportunities.

PDF-TR-1 Transportation Demand Management. The Proposed Project applicant ~~proposes~~ shall ~~implementation~~ implement ~~of~~ a Transportation Demand Management (TDM) Program to facilitate increased opportunities for transit, bicycling, and pedestrian travel, as well as provide the resources, means, and incentives for ridesharing and carpooling. The following components ~~are to~~ shall be included in the TDM Program:

- Develop a comprehensive pedestrian network designed to provide safe bicycle and pedestrian access between the various Proposed Project phases, land uses, parks/open spaces, schools, and the Village Core. Where approved by the appropriate jurisdiction, the pedestrian network would also provide connections to the various recreational trails/pathways and multi-modal facilities accessing the Project Area.
- Provide bicycle racks along main travel corridors adjacent to commercial developments and at public parks and open spaces within the Project Area.

- Coordinate with San Diego Association of Governments' (SANDAG's) iCommute program for carpool, vanpool, and rideshare programs that are specific to the Proposed Project.
- Promote available websites providing transportation options for residents and businesses.
- Create and distribute a "new resident" information packet addressing alternative modes of transportation.
- Coordinate with San Diego Metropolitan Transit System and SANDAG about the future siting of transit stops/stations within the Project Area.
- Provide a school carpool program by coordinating with the local school district and SANDAG. Provide dedicated parking space for the school carpool program at the Village Core.
- Implement a school bus program in coordination with the school district.
- Homeowner's associations (HOAs) within the Project Area would be required to coordinate with the local school district and partner with the on-site elementary school to create a "walking school bus program" for neighborhood students to safely walk to and from school. The Proposed Project applicant would also coordinate with the local school district to encourage the provision of bicycle storage facilities at the on-site elementary school.

To ensure that the TDM Program strategies are implemented and effective, a transportation coordinator (likely as part of a HOA) shall be established to monitor the TDM Program, and shall be responsible for developing, marketing, implementing, and evaluating the TDM Program.

Solid Waste

The Proposed Project would comply with solid waste diversion regulatory requirements; no additional voluntary waste reduction measures are proposed.

Water and Wastewater

The strategies identified in the Proposed Project's Water Conservation Plan would be implemented as part of the Proposed Project by way of the following PDFs to reduce potable water consumption, as identified in the Proposed Project's EIR Section 3.1.8 (Utilities and Service Systems):

PDF-UT-1 **Hot Water Pipe Insulation – Residential and Non-Residential.** All hot water pipes shall be insulated, and hot and cold water piping shall be separated.

PDF-UT-2 **Pressure Reducing Valves – Residential and Non-Residential.** The maximum service pressure shall be set to 60 pounds per square inch to reduce potential leakage and prevent excessive flow of water from all appliances and fixtures.

PDF-UT-3 **Water Efficient Dishwashers.** Water efficient dishwashers that carry the Energy Star label shall be installed in all residential units and commercial uses where appropriate.

PDF-UT-4 **Residential Landscaping.** All Proposed Project landscaping shall comply with the Model Water Efficient Landscape Ordinance, California Code of Regulations Title 23, Division 2, Chapter 2.7 (Section 490 et seq.). By complying with this ordinance, it is estimated that outdoor water use at single family residences will be reduced by approximately 10 percent. With an estimated total water use of 500 gpd per home and approximately 50 percent of this water used outdoors, the estimated annual water savings is 9,125 gallons per home. Residential water use can vary widely based on the size of lots; however, based on OWD factors for the Proposed Project, estimated water sue for a typical single family home is 435 gpd for densities of 3.0 to 10 units per acre, 700 gpd for densities of 1.0 to 3.0 units per acre, and 1,000 gpd for densities of less than 1.0 units per acre. With an estimated 50 percent of this water used outdoors, the estimated annual water savings is 7,940 gallons per single family residence where densities are from 3.0 to 10 units per acre, 12,775 gallons per single family residence where densities are from 1.0 to 3.0 units per acre, and 18,250 gallons per single family residence where densities are less than 1.0 units per acre based on these assumptions.

PDF-UT-5 **Outdoor Watering.** Home Owner's Associations shall appropriately regulate the use of water for cleaning outdoor surfaces and vehicles through the Covenants, Conditions, and Restrictions.

1.2.6 Proctor Valley Road North and Trails Options

The Proposed Project includes three options for internal circulation: (1) the Proctor Valley Road North Option, (2) the Preserve Trails Option, and (3) the Perimeter Trail Option. The Proposed Project's EIR assesses each of these options and their respective impacts. This will allow the County Board of Supervisors to select the option (or combination of options) it considers best for the Proposed Project and the environment. Each of the options is summarized in Section 1.2.3, above.

These three options are quantitatively or qualitatively evaluated in this GHG emissions report. Potential GHG emissions associated with implementation of the Proctor Valley Road North Option are quantified herein, as discussed in Section 4.2.6 and 5.1.2, because implementation is anticipated to require additional construction days. Implementation of the Perimeter Trail and Preserve Trail options are not anticipated to require additional construction activities than evaluated herein; therefore, potential construction of these two options is not anticipated to generate additional GHG emissions.

2 ENVIRONMENTAL SETTING

2.1 Climate Change Overview

Climate change refers to any significant change in measures of climate, such as temperature, precipitation, or wind patterns, lasting for an extended period of time (decades or longer). The Earth's temperature depends on the balance between energy entering and leaving the planet's system. Many factors, both natural and human, can cause changes in Earth's energy balance, including variations in the sun's energy reaching Earth, changes in the reflectivity of Earth's atmosphere and surface, and changes in the greenhouse effect, which affects the amount of heat retained by Earth's atmosphere (EPA 2017a).

The greenhouse effect is the trapping and build-up of heat in the atmosphere (troposphere) near the Earth's surface. The greenhouse effect traps heat in the troposphere through a threefold process as follows: Short-wave radiation emitted by the Sun is absorbed by the Earth; the Earth emits a portion of this energy in the form of long-wave radiation; and GHGs in the upper atmosphere absorb this long-wave radiation and emit it into space and toward the Earth. The greenhouse effect is a natural process that contributes to regulating the Earth's temperature and creates a pleasant, livable environment on the Earth. Human activities that emit additional GHGs to the atmosphere increase the amount of infrared radiation that gets absorbed before escaping into space, thus enhancing the greenhouse effect and causing the Earth's surface temperature to rise.

The scientific record of the Earth's climate shows that the climate system varies naturally over a wide range of time scales and that, in general, climate changes prior to the Industrial Revolution in the 1700s can be explained by natural causes, such as changes in solar energy, volcanic eruptions, and natural changes in GHG concentrations. Recent climate changes, in particular the warming observed over the past century, however, cannot be explained by natural causes alone. Rather, it is extremely likely that human activities have been the dominant cause of that warming since the mid-20th century and are the most significant driver of observed climate change (EPA 2017a; IPCC 2013). Human influence on the climate system is evident from the increasing GHG concentrations in the atmosphere, positive radiative forcing, observed warming, and improved understanding of the climate system (IPCC 2013). The atmospheric concentrations of GHGs have increased to levels unprecedented in the last 800,000 years, primarily from fossil fuel emissions and secondarily from emissions associated with land use changes (IPCC 2013). Continued emissions of GHGs will cause further warming and changes in all components of the climate system, which is discussed further in Section 2.6, Potential Effects of Climate Change.

2.2 Greenhouse Gases and other Climate Forcing Substances

A GHG is any gas that absorbs infrared radiation in the atmosphere; in other words, GHGs trap heat in the atmosphere. GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), ozone (O_3), water vapor, hydrofluorocarbons (HFCs), hydrochlorofluorocarbons (HCFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).[10] Some GHGs, such as CO_2, CH_4, and N_2O, occur naturally and are emitted to the atmosphere through natural processes and human activities. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Manufactured GHGs, which have a much greater heat-absorption potential than CO_2, include fluorinated gases, such as HFCs, HCFCs, PFCs, and SF_6, which are associated with certain industrial products and processes. A summary of the most common GHGs and their sources is included in the following text.[11] Also included is a discussion of other climate forcing substances.

Carbon Dioxide (CO_2). CO_2 is a naturally occurring gas and a by-product of human activities and is the principal anthropogenic GHG that affects the Earth's radiative balance. Natural sources of CO_2 include respiration of bacteria, plants, animals, and fungus; evaporation from oceans; volcanic out-gassing; and decomposition of dead organic matter. Human activities that generate CO_2 are from the combustion of fuels such as coal, oil, natural gas, and wood and changes in land use.

Methane (CH_4). CH_4 is produced through both natural and human activities. CH_4 is a flammable gas and is the main component of natural gas. Methane is produced through anaerobic (without oxygen) decomposition of waste in landfills, flooded rice fields, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.

Nitrous Oxide (N_2O). N_2O is produced through natural and human activities, mainly through agricultural activities and natural biological processes, although fuel burning and other processes also create N_2O. Sources of N_2O include soil cultivation practices (microbial processes in soil and water), especially the use of commercial and organic fertilizers, manure management, industrial processes (such as in nitric acid production, nylon production, and fossil-fuel-fired power plants), vehicle emissions, and using N_2O as a propellant (such as in rockets, racecars, and aerosol sprays).

[10] California Health and Safety Code 38505 identifies seven GHGs that the California Air Resources Board (CARB) is responsible to monitor and regulate to reduce emissions: CO_2, CH_4, N_2O, SF_6, HFCs, PFCs, and NF_3.

[11] The descriptions of GHGs are summarized from the Intergovernmental Panel on Climate Change (IPCC) Second Assessment Report (1995), IPCC Fourth Assessment Report (2007), CARB's Glossary of Terms Used in GHG Inventories (2015a), and EPA's Glossary of Climate Change Terms (2016).

Fluorinated Gases. Fluorinated gases (also referred to as F-gases) are synthetic powerful GHGs emitted from many industrial processes. Fluorinated gases are commonly used as substitutes for stratospheric ozone-depleting substances (e.g., CFCs, HCFCs, and halons). The most prevalent fluorinated gases include the following:

- **Hydrofluorocarbons (HFCs):** HFCs are compounds containing only hydrogen, fluorine, and carbon atoms. HFCs are synthetic chemicals used as alternatives to ozone-depleting substances in serving many industrial, commercial, and personal needs. HFCs are emitted as by-products of industrial processes and are used in manufacturing.
- **Perfluorocarbons (PFCs):** PFCs are a group of human-made chemicals composed of carbon and fluorine only. These chemicals were introduced as alternatives, with HFCs, to the ozone depleting substances. The two main sources of PFCs are primary aluminum production and semiconductor manufacturing. Since PFCs have stable molecular structures and do not break down through the chemical processes in the lower atmosphere, these chemicals have long lifetimes, ranging between 10,000 and 50,000 years.
- **Sulfur Hexafluoride (SF_6):** SF_6 is a colorless gas soluble in alcohol and ether and slightly soluble in water. SF_6 is used for insulation in electric power transmission and distribution equipment, semiconductor manufacturing, the magnesium industry, and as a tracer gas for leak detection.
- **Nitrogen Trifluoride (NF_3):** NF_3 is used in the manufacture of a variety of electronics, including semiconductors and flat panel displays.

Chlorofluorocarbons (CFCs). CFCs are synthetic chemicals that have been used as cleaning solvents, refrigerants, and aerosol propellants. CFCs are chemically unreactive in the lower atmosphere (troposphere) and the production of CFCs was prohibited in 1987 due to the chemical destruction of stratospheric O_3.

Hydrochlorofluorocarbons (HCFCs). HCFCs are a large group of compounds, whose structure is very close to that of CFCs—containing hydrogen, fluorine, chlorine, and carbon atoms—but including one or more hydrogen atoms. Like HFCs, HCFCs are used in refrigerants and propellants. HCFCs were also used in place of CFCs for some applications; however, their use in general is being phased out.

Black Carbon. Black carbon is a component of fine particulate matter, which has been identified as a leading environmental risk factor for premature death. It is produced from the incomplete combustion of fossil fuels and biomass burning, particularly from older diesel engines and forest fires. Black carbon warms the atmosphere by absorbing solar radiation, influences cloud formation, and darkens the surface of snow and ice, which accelerates heat absorption and melting.

Black carbon is a short-lived species that varies spatially, which makes it difficult to quantify the global warming potential. Diesel particulate matter emissions are a major source of black carbon and are toxic air contaminants that have been regulated and controlled in California for several decades to protect public health. In relation to declining diesel particulate matter from the California Air Resources Board's (CARB) regulations pertaining to diesel engines, diesel fuels, and burning activities, CARB estimates that annual black carbon emissions in California have reduced by 70% between 1990 and 2010, with 95% control expected by 2020 (CARB 2014).

Water Vapor. The primary source of water vapor is evaporation from the ocean, with additional vapor generated by sublimation (change from solid to gas) from ice and snow, evaporation from other water bodies, and transpiration from plant leaves. Water vapor is the most important, abundant, and variable GHG in the atmosphere and maintains a climate necessary for life.

Ozone (O_3). Tropospheric O_3, which is created by photochemical reactions involving gases from both natural sources and human activities, acts as a GHG. Stratospheric O_3, which is created by the interaction between solar ultraviolet radiation and molecular oxygen (O_2), plays a decisive role in the stratospheric radiative balance. Depletion of stratospheric O_3, due to chemical reactions that may be enhanced by climate change, results in an increased ground-level flux of ultraviolet-B radiation.

Aerosols. Aerosols are suspensions of particulate matter in a gas emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light.

2.3 Global Warming Potential

Gases in the atmosphere can contribute to climate change both directly and indirectly. Direct effects occur when the gas itself absorbs radiation. Indirect radiative forcing occurs when chemical transformations of the substance produce other GHGs, when a gas influences the atmospheric lifetimes of other gases, and/or when a gas affects atmospheric processes that alter the radiative balance of the Earth (e.g., affect cloud formation or albedo) (EPA 2017b). The Intergovernmental Panel on Climate Change (IPCC) developed the global warming potential (GWP) concept to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The GWP of a GHG is defined as the ratio of the time-integrated radiative forcing from the instantaneous release of 1 kilogram of a trace substance relative to that of 1 kilogram of a reference gas (IPCC 2014). The reference gas used is CO_2; therefore, GWP-weighted emissions are measured in metric tons of carbon dioxide equivalent (MT CO_2e).

California Emissions Estimator Model (CalEEMod) (Version 2016.3.1) assumes that the GWP for CH_4 is 25 (so emissions of 1 MT of CH_4 are equivalent to emissions of 25 MT of CO_2), and the GWP for N_2O is 298, based on the IPCC Fourth Assessment Report (IPCC 2007).[12] The GWP values identified in CalEEMod were applied to the Proposed Project.

2.4 Sources of Greenhouse Gas Emissions

Global Inventory

Anthropogenic GHG emissions worldwide in 2014 (the most recent year for which data is available) totaled approximately 45,741 million metric tons (MMT) CO_2e, excluding land use change and forestry (WRI 2015). Six countries—China, the United States, the Russian Federation, India, Japan, and Brazil—and the European community accounted for approximately 65% of the total global emissions, approximately 29,920 MMT CO_2e (WRI 2015). Table 2 presents the top GHG-emissions-producing countries.

Table 2
Six Top GHG Producer Countries and the European Union

Emitting Countries	GHG Emissions (MMT CO_2e)
China	11,911.71
United States	6,371.10
European Union	4,053.66
India	3,079.81
Russian Federation	2,137.83
Japan	1,314.59
Brazil	1,051.00
Total	**29,919.70**

Source: WRI 2015.
Notes:
MMT CO_2e = million metric tons of carbon dioxide equivalent.
GHG emissions do not include land use change and forestry related GHG emissions.

National and State Inventories

Per the U.S. Environmental Protection Agency's (EPA) *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2015* (EPA 2017b), total United States GHG emissions were approximately 6,586.7 MMT CO_2e in 2015 (EPA 2017b). The primary GHG emitted by human activities in the United States was CO_2, which represented approximately 82.2% of total GHG emissions (5,411.4 MMT CO_2e). The largest source of CO_2, and of overall GHG emissions, was

[12] The default GWP values in CalEEMod Version 2016.3.2 are the same as assumed in CalEEMod Version 2016.3.1.

fossil-fuel combustion, which accounted for approximately 93.3% of CO_2 emissions in 2015 (5,049.8 MMT CO_2e). Relative to 1990, gross United States GHG emissions in 2015 are higher by 3.5%; down from a high of 15.5% above 1990 levels in 2007. GHG emissions decreased from 2014 to 2015 by 2.3% (153.0 MMT CO_2e), and overall, net emissions in 2015 were 11.5% below 2005 levels (EPA 2017b).

According to California's 2000–2015 GHG emissions inventory (2017 edition), California emitted 440.36 MMT CO_2e in 2015, including emissions resulting from out-of-state electrical generation (CARB 2017a). The sources of GHG emissions in California include transportation, industry, electric power production from both in-state and out-of-state sources, residential and commercial activities, agriculture, high GWP substances, and recycling and waste. The California GHG emissions source categories and their relative contributions in 2015 are presented in Table 3.

Table 3
GHG Emissions Sources in California

Source Category	Annual GHG Emissions (MMT CO_2e)	Percent of Total[a]
Transportation	164.63	37%
Industrial[b]	91.71	21%
Electricity generation[c]	83.67	19%
Residential and commercial uses	37.92	9%
Agriculture	34.65	8%
High global-warming potential substances	19.05	4%
Recycling and waste	8.73	2%
Totals	**440.36**	**100%**

Source: CARB 2017a.
Notes: Emissions reflect the 2015 California GHG inventory.
MMT CO_2e = million metric tons of carbon dioxide equivalent per year.
[a] Percentage of total has been rounded, and total may not sum due to rounding.
[b] The Aliso Canyon natural gas leak event released 1.96 MMT CO_2e of unanticipated emissions in 2015 and 0.52 MMT CO_2e in 2016. These leak emissions will be fully mitigated according to legal settlement and are tracked separately from routine inventory emissions.
[c] Includes emissions associated with imported electricity, which account for 33.74 MMT CO_2e annually.

During 2000 to 2015, per-capita GHG emissions in California have continued to drop from a peak in 2001 of 14.0 MT per person to 11.3 MT per person in 2015, representing a 19% decrease. In addition, total GHG emissions in 2015 were approximately 1.5 MMT CO_2e less than 2014 emissions. The declining trend in GHG emissions, coupled with programs that will continue to provide additional GHG reductions going forward, demonstrates that California is on track to meet the 2020 target of 431 MMT CO_2e (CARB 2017a).

According to the GHG inventory data compiled by the Energy Policy Initiative Center, in 2010, the County emitted 34.5 MMT CO_2e (EPIC 2013). As outlined in Table 4, San Diego County GHG Emissions by Sectors, on-road transportation created 42% of these emissions. Similar to emissions trends statewide, electricity generation is the second biggest emitter.

Table 4
San Diego County GHG Emissions by Sectors

Source Category	Annual GHG Emissions (MMT CO_2e)	Percent of Total
On-road transportation	14.4	42%
Electricity generation	8.3	24%
Natural gas end uses	2.9	8%
Off-road equipment and vehicles	1.4	4%
Civil aviation	1.9	5%
Industrial processes and products	1.8	5%
Waste	0.6	2%
Water-borne navigation	0.1	<1%
Rail	0.32	<1%
Other fuels	1.58	5%
Agriculture (livestock)	0.05	<1%
Wildfires	0.28	<1%
Development (loss of vegetation)	0.18	<1%
Sequestration from land cover	0.66	2%
Total	**34.5**	**100%**

Source: EPIC 2013.
MMT CO_2e = million metric tons of carbon dioxide equivalent per year.

2.5 Carbon Sequestration

Carbon sequestration is the process by which CO_2 is removed from the atmosphere and deposited into a carbon reservoir (e.g., vegetation). Trees and vegetation take in CO_2 from the atmosphere during photosynthesis, break down the CO_2, store the carbon within plant parts, and release the oxygen back into the atmosphere (CARB 2015c). A development that changes land use type results in potential release of sequestered carbon to the atmosphere as CO_2, which would not have been released had there been no land-type change. The planting of new trees and vegetation would store new carbon as their wood mass increases via normal growth. This GHG analysis estimates the loss of sequestered carbon associated with the proposed land use change and the gain of sequestered carbon associated with planting new trees.

2.6 Potential Effects of Climate Change

Globally, climate change has the potential to affect numerous environmental resources through uncertain impacts related to future air temperatures and precipitation patterns. The

2014 Intergovernmental Panel on Climate Change Synthesis Report indicated that warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. Signs that global climate change has occurred include warming of the atmosphere and ocean, diminished amounts of snow and ice, and rising sea levels (IPCC 2014).

In California, climate change impacts have the potential to affect sea-level rise, agriculture, snowpack and water supply, forestry, wildfire risk, public health, and electricity demand and supply (CCCC 2006). The primary effect of global climate change has been a 0.2 degrees Celsius (°C) rise in average global tropospheric temperature per decade, determined from meteorological measurements worldwide between 1990 and 2005. Scientific modeling predicts that continued emissions of GHGs at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. A warming of about 0.2°C (0.36 degrees Fahrenheit [°F]) per decade is projected, and there are identifiable signs that global warming could be taking place.

Although climate change is driven by global atmospheric conditions, climate change impacts are felt locally. A scientific consensus confirms that climate change is already affecting California. The average temperatures in California have increased, leading to more extreme hot days and fewer cold nights; shifts in the water cycle have been observed, with less winter precipitation falling as snow, and both snowmelt and rainwater running off earlier in the year; sea levels have risen; and wildland fires are becoming more frequent and intense due to dry seasons that start earlier and end later (CAT 2010).

An increase in annual average temperature is a reasonably foreseeable effect of climate change. Observed changes over the last several decades across the western United States reveal clear signals of climate change. Statewide average temperatures increased by about 1.7°F from 1895 to 2011, and warming has been greatest in the Sierra Nevada (CCCC 2012). By 2050, California is projected to warm by approximately 2.7°F above 2000 averages, a threefold increase in the rate of warming over the last century. By 2100, average temperatures could increase by 4.1°F to 8.6°F, depending on emissions levels. Springtime warming—a critical influence on snowmelt—will be particularly pronounced. Summer temperatures will rise more than winter temperatures, and the increases will be greater in inland California, compared to the coast. Heat waves will be more frequent, hotter, and longer. There will be fewer extremely cold nights (CCCC 2012). A decline of Sierra Nevada snowpack, which accounts for approximately half of the surface water storage in California and much of the state's water supply, by 30% to as much as 90% is predicted over the next 100 years (CAT 2006).

Model projections for precipitation over California continue to show the Mediterranean pattern of wet winters and dry summers with seasonal, year-to-year, and decade-to-decade variability. For the first time, however, several of the improved climate models shift toward drier conditions by the mid-to-late 21st century in central and, most notably, Southern California. By late-century, all projections show drying, and half of them suggest 30-year average precipitation will decline by more than 10% below the historical average (CCCC 2012).

A summary of current and future climate change impacts to resource areas in California, as discussed in the California Natural Resources Agency's (CNRA) Safeguarding California: Reducing Climate Risk (CNRA 2014), is provided below.

Agriculture. The impacts of climate change on the agricultural sector are far more severe than the typical variability in weather and precipitation patterns that occur year to year. The agriculture sector and farmers face some specific challenges that include more drastic and unpredictable precipitation and weather patterns; extreme weather events that range from severe flooding to extreme drought, to destructive storm events; significant shifts in water availably and water quality; changes in pollinator lifecycles; temperature fluctuations, including extreme heat stress and decreased chill hours; increased risks from invasive species and weeds, agricultural pests and plant diseases; and disruptions to the transportation and energy infrastructure supporting agricultural production. These challenges and associated short-term and long-term impacts can have both positive and negative effects on agricultural production. Nonetheless, it is predicted that current crop and livestock production will suffer long-term negative effects resulting in a substantial decrease in the agricultural sector if not managed or mitigated.

Biodiversity and Habitat. The state's extensive biodiversity stems from its varied climate and assorted landscapes, which have resulted in numerous habitats where species have evolved and adapted over time. Specific climate change challenges to biodiversity and habitat include species migration in response to climatic changes, range shift, and novel combinations of species; pathogens, parasites, and disease; invasive species; extinction risks; changes in the timing of seasonal life-cycle events; food web disruptions; and threshold effects (i.e., a change in the ecosystem that results in a "tipping point" beyond which irreversible damage or loss occurs). Habitat restoration, conservation, and resource management across California and through collaborative efforts among public, private, and nonprofit agencies has assisted in the effort to fight climate change impacts on biodiversity and habitat. One of the key measures in these efforts is ensuring species' ability to relocate as temperature and water availability fluctuate as a result of climate change, based on geographic region.

Energy. The energy sector provides California residents with a supply of reliable and affordable energy through a complex integrated system. Specific climate change challenges for the energy

sector include temperature, fluctuating precipitation patterns, increasing extreme weather events and sea-level rise. Increasing temperatures and reduced snowpack negatively impact the availability of a steady flow of snowmelt to hydroelectric reservoirs. Higher temperatures also reduce the capacity of thermal power plants since power plant cooling is less efficient at higher ambient temperatures. Increased temperatures will also increase electricity demand associated with air conditioning. Natural gas infrastructure in coastal California is threatened by sea-level rise and extreme storm events.

Forestry. Forests occupy approximately 33% of California's 100 million acres and provide key benefits such as wildlife habitat, absorption of carbon dioxide, renewable energy and building materials. The most significant climate change related risk to forests is accelerated risk of wildfire and more frequent and severe droughts. Droughts have resulted in more large scale mortalities and combined with increasing temperatures have led to an overall increase in wildfire risks. Increased wildfire intensity subsequently increases public safety risks, property damage, fire suppression and emergency response costs, watershed and water quality impacts and vegetation conversions. These factors contribute to decreased forest growth, geographic shifts in tree distribution, loss of fish and wildlife habitat, and decreased carbon absorption. Climate change may result in increased establishment of non-native species, particularly in rangelands where invasive species are already a problem. Invasive species may be able to exploit temperature or precipitation changes, or quickly occupy areas denuded by fire, insect mortality or other climate change effects on vegetation.

Ocean and Coastal Ecosystems and Resources. Sea-level rise, changing ocean conditions, and other climate change stressors are likely to exacerbate long-standing challenges related to ocean and coastal ecosystems, in addition to threatening people and infrastructure located along the California coastline and in coastal communities. Sea-level rise in addition to more frequent and severe coastal storms and erosion are threatening vital infrastructure such as roads, bridges, power plants, ports and airports, gasoline pipes, and emergency facilities, as well as negatively impacting the coastal recreational assets such as beaches and tidal wetlands. Water quality and ocean acidification threaten the abundance of seafood and other plant and wildlife habitats throughout California and globally.

Public Health. Climate change can impact public health through various environmental changes and is the largest threat to human health in the 21st century. Changes in precipitation patterns affect public health primarily through potential for altered water supplies, and extreme events such as heat, floods, droughts, and wildfires. Increased frequency, intensity, and duration of extreme heat and heat waves is likely to increase the risk of mortality due to heat-related illness and exacerbation of existing chronic health conditions. Other extreme weather events are likely to negatively impact air quality and increase or intensify respiratory illness such as asthma and

allergies. Additional health impacts that may be impacted by climate change include cardiovascular disease, vector-borne diseases, mental health impacts, and malnutrition injuries. Increased frequency of these ailments is likely to subsequently increase the direct risk of injury and/or mortality.

Transportation. Residents of California rely on airports, seaports, public transportation, and an extensive roadway network to gain access to destinations, goods, and services. While the transportation industry is a source of GHG emissions, it is also vulnerable to climate change risks. Particularly, sea-level rise and erosion threaten many coastal California roadways, airports, seaports, transit systems, bridge supports, and energy and fueling infrastructure. Increasing temperatures and extended periods of extreme heat threaten the integrity of the roadways and rail lines. High temperatures cause the road surfaces to expand, which leads to increased pressure and pavement buckling. High temperatures can also cause rail breakages, which could lead to train derailment. Other forms of extreme weather events, such as extreme storm events, can negatively impact infrastructure, which can impair movement of peoples and goods, or potentially block evacuation routes and emergency access roads. Increased wildfires, flooding, erosion risks, landslides, mudslides, and rockslides can all profoundly impact the transportation system and pose a serious risk to public safety.

Water. Water resources in California support residences, plants, wildlife, farmland, landscapes, and ecosystems, and bring trillions of dollars in economic activity. Climate change could seriously impact the timing, form, amount of precipitation, runoff patterns, and frequency and severity of precipitation events. Higher temperatures reduce the amount of snowpack and lead to earlier snowmelt, which can impact water supply availability, natural ecosystems, and winter recreation. Water supply availability during the intense dry summer months is heavily dependent on the snowpack accumulated during the winter time. Increased risk of flooding has a variety of public health concerns including water quality, public safety, property damage, displacement, and post-disaster mental health problems. Prolonged and intensified droughts can also negatively affect groundwater reserves and result in increased overdraft and subsidence. Droughts can also negatively impact agriculture and farmland throughout the state. The higher risk of wildfires can lead to increased erosion, which can negatively impact watersheds and result in poor water quality. Water temperatures are also prone to increase, which can negatively impact wildlife that rely on a specific range of temperatures for suitable habitat.

In March 2016, the CNRA released Safeguarding California: Implementation Action Plans, a document that shows how California is acting to convert the recommendations contained in the 2014 Safeguarding California plan into action (CNRA 2016). Additionally, in May 2017, CNRA released the draft Safeguarding California Plan: 2017 Update, which is a survey of

current programmatic responses for climate change and contains recommendations for further actions (CNRA 2017).

The CNRA released *Safeguarding California Plan: 2018 Update* in January 2018, which provides a roadmap for state agencies to protect communities, infrastructure, services, and the natural environment from climate change impacts. The 2018 Safeguarding California Plan includes 69 recommendations across 11 sectors and more than 1,000 ongoing actions and next steps developed by scientific and policy experts across 38 state agencies (CNRA 2018). As with previous state adaptation plans, the 2018 Update addresses the following: acceleration of warming across the state, more intense and frequent heat waves, greater riverine flows, accelerating sea level rise, more intense and frequent drought, more severe and frequent wildfires, more severe storms and extreme weather events, shrinking snowpack and less overall precipitation, and ocean acidification, hypoxia, and warming.

3 REGULATORY SETTING

3.1 Federal Activities

Massachusetts v. EPA. In *Massachusetts v. EPA* (April 2007), the U.S. Supreme Court directed the EPA administrator to determine whether GHG emissions from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In December 2009, the administrator signed a final rule with the following two distinct findings regarding GHGs under Section 202(a) of the federal Clean Air Act:

- The Administrator found that elevated concentrations of GHGs—CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6—in the atmosphere threaten the public health and welfare of current and future generations. This is the "endangerment finding."
- The Administrator further found the combined emissions of GHGs—CO_2, CH_4, N_2O, and HFCs—from new motor vehicles and new motor vehicle engines contribute to the GHG air pollution that endangers public health and welfare. This is the "cause or contribute finding."

These two findings were necessary to establish the foundation for regulation of GHGs from new motor vehicles as air pollutants under the Clean Air Act.

Energy Independence and Security Act. The Energy Independence and Security Act of 2007 (December 2007), among other key measures, would do the following, which would aid in the reduction of national GHG emissions (EPA 2007):

- Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard requiring fuel producers to use at least 36 billion gallons of biofuel in 2022.
- Set a target of 35 miles per gallon for the combined fleet of cars and light trucks by model year 2020 and direct National Highway Traffic Safety Administration (NHTSA) to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for work trucks.
- Prescribe or revise standards affecting regional efficiency for heating and cooling products and procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.

Federal Vehicle Standards. In response to the U.S. Supreme Court ruling discussed above, the Bush Administration issued Executive Order (EO) 13432 in 2007 directing the EPA, the Department of Transportation, and the Department of Energy to establish regulations that reduce

GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. In 2009, the NHTSA issued a final rule regulating fuel efficiency and GHG emissions from cars and light-duty trucks for model year 2011; and, in 2010, the EPA and NHTSA issued a final rule regulating cars and light-duty trucks for model years 2012–2016 (75 FR 25324–25728).

In 2010, President Obama issued a memorandum directing the Department of Transportation, Department of Energy, EPA, and NHTSA to establish additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, the EPA and NHTSA proposed stringent, coordinated federal GHG and fuel economy standards for model years 2017–2025 light-duty vehicles. The proposed standards projected to achieve 163 grams per mile of CO_2 in model year 2025, on an average industry fleet-wide basis, which is equivalent to 54.5 miles per gallon if this level were achieved solely through fuel efficiency. The final rule was adopted in 2012 for model years 2017–2021 (77 FR 62624–63200). On January 12, 2017, EPA finalized its decision to maintain the current GHG emissions standards for model years 2022–2025 cars and light trucks (EPA 2017c).

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011, the EPA and NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks for model years 2014–2018 (76 FR 57106–57513). The standards for CO_2 emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles. According to the EPA, this regulatory program will reduce GHG emissions and fuel consumption for the affected vehicles by 6% to 23% over the 2010 baselines.

In August 2016, the EPA and NHTSA announced the adoption of the phase two program related to the fuel economy and GHG standards for medium- and heavy-duty trucks. The phase two program will apply to vehicles with model year 2018 through 2027 for certain trailers, and model years 2021 through 2027 for semi-trucks, large pickup trucks, vans, and all types of sizes of buses and work trucks. The final standards are expected to lower carbon dioxide emissions by approximately 1.1 billion MT and reduce oil consumption by up to two billion barrels over the lifetime of the vehicles sold under the program (EPA and NHTSA 2016).

Clean Power Plan and New Source Performance Standards for Electric Generating Units. In October 2015, EPA published a final rule (effective December 2015) establishing the Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units (80 FR 64510–64660), also known as the Clean Power Plan. These guidelines prescribe how states must develop plans to reduce GHG emissions from existing fossil-fuel-fired electric generating units. The guidelines establish CO_2 emission performance rates representing the best system of emission reduction for two subcategories of existing fossil-fuel-fired electric

generating units: (1) fossil-fuel-fired electric utility steam-generating units and (2) stationary combustion turbines. Concurrently, the EPA published a final rule in October 2015 establishing Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units (80 FR 64661–65120). The rule prescribes CO_2 emission standards for newly constructed, modified, and reconstructed affected fossil-fuel-fired electric utility generating units. Implementation of the Clean Power Plan has been stayed by the U.S. Supreme Court pending resolution of several lawsuits; additionally, President Trump has called upon the EPA to review the Clean Power Plan.

3.2 State of California

The statewide GHG emissions regulatory framework is summarized below by category: state climate change targets, building energy, renewable energy and energy procurement, mobile sources, solid waste, water, and other state regulations and goals. The following text describes executive orders, legislation, regulations, and other plans and policies that would directly or indirectly reduce GHG emissions and/or address climate change issues.

State Climate Change Targets

***Executive Order S-3-05*.** EO S-3-05 (June 2005) established the following statewide goals: GHG emissions should be reduced to 2000 levels by 2010, GHG emissions should be reduced to 1990 levels by 2020, and GHG emissions should be reduced to 80% below 1990 levels by 2050.

Assembly Bill 32 and CARB's Climate Change Scoping Plan. In furtherance of the goals established in EO S-3-05, the Legislature enacted Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006. AB 32 requires California to reduce its GHG emissions to 1990 levels by 2020.

Under AB 32, CARB is responsible for and is recognized as having the expertise to carry out and develop the programs and requirements necessary to achieve the GHG emissions reduction mandate of AB 32. Under AB 32, CARB must adopt regulations requiring the reporting and verification of statewide GHG emissions from specified sources. This program is used to monitor and enforce compliance with established standards. CARB also is required to adopt rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emission reductions. AB 32 relatedly authorized CARB to adopt market-based compliance mechanisms to meet the specified requirements. Finally, CARB is ultimately responsible for monitoring compliance and enforcing any rule, regulation, order, emission limitation, emission reduction measure, or market-based compliance mechanism adopted.

In 2007, CARB approved a limit on the statewide GHG emissions level for year 2020 consistent with the determined 1990 baseline (427 MMT CO_2e). CARB's adoption of this limit is in accordance with Health and Safety Code Section 38550.

Further, in 2008, CARB adopted the Climate Change Scoping Plan: A Framework for Change (Scoping Plan) in accordance with Health and Safety Code Section 38561. The Scoping Plan establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions for various emission sources/sectors to 1990 levels by 2020. The Scoping Plan evaluates opportunities for sector-specific reductions, integrates all CARB and Climate Action Team early actions and additional GHG reduction features by both entities, identifies additional measures to be pursued as regulations, and outlines the role of a cap-and-trade program. The key elements of the Scoping Plan include the following (CARB 2008):

1. Expanding and strengthening existing energy efficiency programs as well as building and appliance standards.
2. Achieving a statewide renewable energy mix of 33%.
3. Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system and caps sources contributing 85% of California's GHG emissions.
4. Establishing targets for transportation-related GHG emissions for regions throughout California and pursuing policies and incentives to achieve those targets.
5. Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard.
6. Creating targeted fees, including a public goods charge on water use, fees on high GWP gases, and a fee to fund the administrative costs of the State of California's long-term commitment to AB 32 implementation.

In the Scoping Plan, CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of approximately 28.5% from the otherwise projected 2020 emissions level; i.e., those emissions that would occur in 2020, absent GHG-reducing laws and regulations (referred to as "business-as-usual"). For purposes of calculating this percent reduction, CARB assumed that all new electricity generation would be supplied by natural gas plants, no further regulatory action would impact vehicle fuel efficiency, and building energy efficiency codes would be held at 2005 standards.

In the 2011 Final Supplement to the Scoping Plan's Functional Equivalent Document, CARB revised its estimates of the projected 2020 emissions level in light of the economic recession and the availability of updated information about GHG reduction regulations. Based on the new economic data, CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of 21.7% (down from 28.5%) from the business-as-usual conditions. When the 2020 emissions level projection also was updated to account for newly implemented regulatory measures, including Pavley I (model years 2009–2016) and the Renewables Portfolio Standard (12% to 20%), CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of 16% (down from 28.5%) from the business-as-usual conditions.

In 2014, CARB adopted the First Update to the Climate Change Scoping Plan: Building on the Framework (First Update). The stated purpose of the First Update is to "highlight California's success to date in reducing its GHG emissions and lay the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80% below 1990 levels by 2050." The First Update found that California is on track to meet the 2020 emissions reduction mandate established by AB 32, and noted that California could reduce emissions further by 2030 to levels squarely in line with those needed to stay on track to reduce emissions to 80% below 1990 levels by 2050 if the state realizes the expected benefits of existing policy goals.

In conjunction with the First Update, CARB identified "six key focus areas comprising major components of the state's economy to evaluate and describe the larger transformative actions that will be needed to meet the state's more expansive emission reduction needs by 2050." Those six areas are energy, transportation (vehicles/equipment, sustainable communities, housing, fuels, and infrastructure), agriculture, water, waste management, and natural and working lands. The First Update identifies key recommended actions for each sector that will facilitate achievement of EO S-3-05's 2050 reduction goal.

Based on CARB's research efforts presented in the First Update, it has a "strong sense of the mix of technologies needed to reduce emissions through 2050." Those technologies include energy demand reduction through efficiency and activity changes; large-scale electrification of on-road vehicles, buildings, and industrial machinery; decarbonizing electricity and fuel supplies; and the rapid market penetration of efficient and clean energy technologies.

As part of the First Update, CARB recalculated the state's 1990 emissions level using more recent global warming potentials identified by the IPCC. Using the recalculated 1990 emissions level (431 MMT CO_2e) and the revised 2020 emissions level projection identified in the 2011 Final Supplement, CARB determined that achieving the 1990 emissions level by 2020 would

require a reduction in GHG emissions of approximately 15% (instead of 28.5% or 16%) from the business-as-usual conditions.

On January 20, 2017, CARB released The 2017 Climate Change Scoping Plan Update (Second Update) for public review and comment (CARB 2017b). This update proposes CARB's strategy for achieving the state's 2030 GHG target as established in Senate Bill (SB) 32 (discussed below), including continuing the Cap-and-Trade Program through 2030. The Second Update incorporates approaches to cutting short-lived climate pollutants (SLCPs) under the Short-Lived Climate Pollutant Reduction Strategy (a planning document that was adopted by CARB in March 2017), and acknowledges the need for reducing emissions in agriculture and highlights the work underway to ensure that California's natural and working lands increasingly sequester carbon. During development of the Second Update, CARB held a number of public workshops in the Natural and Working Lands, Agriculture, Energy, and Transportation sectors to inform development of the 2030 Scoping Plan Update (CARB 2016). When discussing project-level GHG emissions reduction actions and thresholds, the Second Update states, "Achieving net zero increases in GHG emissions, resulting in no contribution to GHG impacts, may not be feasible or appropriate for every project, however, and the inability of a project to mitigate its GHG emissions to net zero does not imply the project results in a substantial contribution to the cumulatively significant environmental impact of climate change under CEQA.." The Second Update was approved by CARB's Governing Board on December 14, 2017.

EO B-30-15. EO B-30-15 (April 2015) identified an interim GHG reduction target in support of targets previously identified under EO S-3-05 and AB 32. EO B-30-15 set an interim target goal of reducing statewide GHG emissions to 40% below 1990 levels by 2030 to keep California on its trajectory toward meeting or exceeding the long-term goal of reducing statewide GHG emissions to 80% below 1990 levels by 2050 as set forth in EO S-3-05. To facilitate achievement of this goal, EO B-30-15 calls for an update to CARB's Scoping Plan to express the 2030 target in terms of MMT CO_2e. The EO also calls for state agencies to continue to develop and implement GHG emission reduction programs in support of the reduction targets. EO B-30-15 does not require local agencies to take any action to meet the new interim GHG reduction target.

SB 32 and AB 197. SB 32 and AB 197 (enacted in 2016) are companion bills that set a new statewide GHG reduction targets; make changes to CARB's membership, and increase legislative oversight of CARB's climate change-based activities; and expand dissemination of GHG and other air quality-related emissions data to enhance transparency and accountability. More specifically, SB 32 codified the 2030 emissions reduction goal of EO B-30-15 by requiring CARB to ensure that statewide GHG emissions are reduced to 40% below 1990 levels by 2030. AB 197 established the Joint Legislative Committee on Climate Change Policies, consisting of at least three members of the Senate and three members of the Assembly, in order to provide

ongoing oversight over implementation of the state's climate policies. AB 197 also adds two members of the Legislature to CARB as nonvoting members; requires CARB to make available and update (at least annually via its website) emissions data for GHGs, criteria air pollutants, and toxic air contaminants from reporting facilities; and requires CARB to identify specific information for GHG emissions reduction measures when updating the Scoping Plan.

SB 605 and SB 1383. SB 605 (2014) requires CARB to complete a comprehensive strategy to reduce emissions of SLCPs in the state; SB 1383 (2016) required CARB to approve and implement the SLCP reduction strategy. SB 1383 also establishes specific targets for the reduction of SLCPs (40% below 2013 levels by 2030 for methane and HFCs, and 50% below 2013 levels by 2030 for anthropogenic black carbon), and provides direction for reductions from dairy and livestock operations and landfills. Accordingly, and as mentioned above, CARB adopted its Short-Lived Climate Pollutant Reduction Strategy (SLCP Reduction Strategy) in March 2017. The SLCP Reduction Strategy establishes a framework for the statewide reduction of emissions of black carbon, methane, and fluorinated gases.

Building Energy

Title 24, Part 6. Title 24 of the California Code of Regulations was established in 1978 and serves to enhance and regulate California's building standards. While not initially promulgated to reduce GHG emissions, Part 6 of Title 24 specifically establishes Building Energy Efficiency Standards that are designed to ensure new and existing buildings in California achieve energy efficiency and preserve outdoor and indoor environmental quality. These energy efficiency standards are reviewed every few years by the Building Standards Commission and the California Energy Commission (CEC) (and revised if necessary) (California Public Resources Code, Section 25402(b)(1)). The regulations receive input from members of industry, as well as the public, with the goal of "reducing of wasteful, uneconomic, inefficient, or unnecessary consumption of energy" (California Public Resources Code, Section 25402). These regulations are carefully scrutinized and analyzed for technological and economic feasibility (California Public Resources Code, Section 25402(d)) and cost effectiveness (California Public Resources Code, Sections 25402(b)(2) and (b)(3)). These standards are updated to consider and incorporate new energy efficient technologies and construction methods. As a result, these standards save energy, increase electricity supply reliability, increase indoor comfort, avoid the need to construct new power plants, and help preserve the environment.

The 2016 Title 24 standards are the currently applicable building energy efficiency standards, and became effective on January 1, 2017. In general, single-family homes built to the 2016 standards are anticipated to use about 28% less energy for lighting, heating, cooling, ventilation, and water

heating than those built to the 2013 standards, and non-residential buildings built to the 2016 standards will use an estimated 5% less energy than those built to the 2013 standards (CEC 2015a).

Title 24, Part 11. In addition to the CEC's efforts, in 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (Part 11 of Title 24) is commonly referred to as CALGreen, and establishes minimum mandatory standards as well as voluntary standards pertaining to the planning and design of sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and interior air quality. The CALGreen standards took effect in January 2011 and instituted mandatory minimum environmental performance standards for all ground-up, new construction of commercial, low-rise residential and state-owned buildings and schools and hospitals. The CALGreen 2016 standards became effective on January 1, 2017 (CALGreen 2016a). The mandatory standards require the following (24 CCR Part 11):

- Mandatory reduction in indoor water use through compliance with specified flow rates for plumbing fixtures and fittings.
- Mandatory reduction in outdoor water use through compliance with a local water efficient landscaping ordinance or the California Department of Water Resources' Model Water Efficient Landscape Ordinance.
- 65% of construction and demolition waste must be diverted from landfills.
- Mandatory inspections of energy systems to ensure optimal working efficiency.
- Inclusion of electric vehicle charging stations or designated spaces capable of supporting future charging stations.
- Low-pollutant emitting exterior and interior finish materials, such as paints, carpets, vinyl flooring, and particle boards.

The CALGreen standards also include voluntary efficiency measures that are provided at two separate tiers and implemented at the discretion of local agencies and applicants. CALGreen's Tier 1 standards call for a 15% improvement in energy requirements; stricter water conservation, 65% diversion of construction and demolition waste, 10% recycled content in building materials, 20% permeable paving, 20% cement reduction, and cool/solar-reflective roofs. CALGreen's more rigorous Tier 2 standards call for a 30% improvement in energy requirements, stricter water conservation, 75% diversion of construction and demolition waste, 15% recycled content in building materials, 30% permeable paving, 25% cement reduction, and cool/solar-reflective roofs.

The California Public Utilities Commission, CEC, and CARB also have a shared, established goal of achieving zero net energy (ZNE) for new construction in California. The key policy timelines include all new residential construction in California will be ZNE by 2020, and all new commercial construction in California will be ZNE by 2030 (CPUC 2013).[13] As most recently defined by the CEC in its 2015 Integrated Energy Policy Report, a ZNE code building is "one where the value of the energy produced by on-site renewable energy resources is equal to the value of the energy consumed annually by the building" using the CEC's Time Dependent Valuation metric (CEC 2015b).

Title 20. Title 20 of the California Code of Regulations requires manufacturers of appliances to meet state and federal standards for energy and water efficiency. Performance of appliances must be certified through the CEC to demonstrate compliance with standards. New appliances regulated under Title 20 include refrigerators, refrigerator-freezers, and freezers; room air conditioners and room air-conditioning heat pumps; central air conditioners; spot air conditioners; vented gas space heaters; gas pool heaters; plumbing fittings and plumbing fixtures; fluorescent lamp ballasts; lamps; emergency lighting; traffic signal modules; dishwaters; clothes washers and dryers; cooking products; electric motors; low voltage dry-type distribution transformers; power supplies; televisions and consumer audio and video equipment; and battery charger systems. Title 20 presents protocols for testing for each type of appliance covered under the regulations, and appliances must meet the standards for energy performance, energy design, water performance and water design. Title 20 contains three types of standards for appliances: federal and state standards for federally regulated appliances, state standards for federally regulated appliances, and state standards for non-federally regulated appliances.

SB 1. SB 1 (2006) established a $3 billion rebate program to support the goal of the state to install rooftop solar energy systems with a generation capacity of 3,000 megawatts through 2016. SB 1 added sections to the Public Resources Code, including Chapter 8.8 (California Solar Initiative), that require building projects applying for ratepayer-funded incentives for photovoltaic systems to meet minimum energy efficiency levels and performance requirements. Section 25780 established that it is a goal of the state to establish a self-sufficient solar industry in which solar energy systems are a viable mainstream option for both homes and businesses within 10 years of adoption, and to place solar energy systems on 50% of new homes within 13 years of adoption. SB 1, also termed "GoSolarCalifornia," was previously titled "Million Solar Roofs."

AB 1470. This bill established the Solar Water Heating and Efficiency Act of 2007. The bill makes findings and declarations of the Legislature relating to the promotion of solar water

[13] It is expected that achievement of the ZNE goal will occur via revisions to the Title 24 standards.

heating systems and other technologies that reduce natural gas demand. The bill defines several terms for purposes of the act. The bill requires the commission to evaluate the data available from a specified pilot program, and, if it makes a specified determination, to design and implement a program of incentives for the installation of 200,000 solar water heating systems in homes and businesses throughout the state by 2017.

AB 1109. Enacted in 2007, AB 1109 required the CEC to adopt minimum energy efficiency standards for general purpose lighting, to reduce electricity consumption 50% for indoor residential lighting and 25% for indoor commercial lighting.

Renewable Energy and Energy Procurement

***SB 1078*.** SB 1078 (2002) established the Renewables Portfolio Standard (RPS) program, which requires an annual increase in renewable generation by the utilities equivalent to at least 1% of sales, with an aggregate goal of 20% by 2017. This goal was subsequently accelerated, requiring utilities to obtain 20% of their power from renewable sources by 2010.

***SB 1368*.** SB 1368 (2006) requires the CEC to develop and adopt regulations for GHG emission performance standards for the long-term procurement of electricity by local publicly owned utilities. These standards must be consistent with the standards adopted by the California Public Utilities Commission. This effort will help protect energy customers from financial risks associated with investments in carbon-intensive generation by allowing new capital investments in power plants whose GHG emissions are as low as or lower than new combined-cycle natural gas plants by requiring imported electricity to meet GHG performance standards in California and by requiring that the standards be developed and adopted in a public process.

SB X1 2. SB X1 2 (2011) expanded the RPS by establishing that 20% of the total electricity sold to retail customers in California per year by December 31, 2013, and 33% by December 31, 2020, and in subsequent years be secured from qualifying renewable energy sources. Under the bill, a renewable electrical generation facility is one that uses biomass, solar thermal, photovoltaic, wind, geothermal, fuel cells using renewable fuels, small hydroelectric generation of 30 megawatts or less, digester gas, municipal solid waste conversion, landfill gas, ocean wave, ocean thermal, or tidal current, and that meets other specified requirements with respect to its location. In addition to the retail sellers previously covered by the RPS, SB X1 2 added local, publicly owned electric utilities to the RPS.

***SB 350*.** SB 350 (2015) further expanded the RPS by establishing that 50% of the total electricity sold to retail customers in California per year by December 31, 2030, be secured from qualifying renewable energy sources. In addition, SB 350 includes the goal to double the energy efficiency

savings in electricity and natural gas final end uses (such as heating, cooling, lighting, or class of energy uses on which an energy-efficiency program is focused) of retail customers through energy conservation and efficiency. The bill also requires the California Public Utilities Commission, in consultation with the CEC, to establish efficiency targets for electrical and gas corporations consistent with this goal.

Mobile Sources

AB 1493. In a response to the transportation sector accounting for more than half of California's CO_2 emissions, AB 1493 was enacted in July 2002. AB 1493 required CARB to set GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles determined by the state board to be vehicles that are primarily used for noncommercial personal transportation in the state. The bill required that CARB set GHG emission standards for motor vehicles manufactured in 2009 and all subsequent model years. CARB adopted the standards in September 2004. When fully phased in, the near-term (2009–2012) standards will result in a reduction of about 22% in GHG emissions compared to the emissions from the 2002 fleet, and the mid-term (2013–2016) standards will result in a reduction of about 30%.

EO S-1-07. Issued on January 18, 2007, EO S-1-07 sets a declining Low Carbon Fuel Standard for GHG emissions measured in CO_2e grams per unit of fuel energy sold in California. The target of the Low Carbon Fuel Standard is to reduce the carbon intensity of California passenger vehicle fuels by at least 10% by 2020. The carbon intensity measures the amount of GHG emissions in the lifecycle of a fuel, including extraction/feedstock production, processing, transportation, and final consumption, per unit of energy delivered. CARB adopted the implementing regulation in April 2009. The regulation is expected to increase the production of biofuels, including those from alternative sources, such as algae, wood, and agricultural waste.

SB 375. SB 375 (2008) addresses GHG emissions associated with the transportation sector through regional transportation and sustainability plans. SB 375 required CARB to adopt regional GHG reduction targets for the automobile and light-truck sector for 2020 and 2035. Regional metropolitan planning organizations are then responsible for preparing a Sustainable Communities Strategy within their Regional Transportation Plan. The goal of the Sustainable Communities Strategy is to establish a forecasted development pattern for the region that, after considering transportation measures and policies, will achieve, if feasible, the GHG reduction targets. If a Sustainable Communities Strategy is unable to achieve the GHG reduction target, a metropolitan planning organization must prepare an Alternative Planning Strategy demonstrating how the GHG reduction target would be achieved through alternative development patterns, infrastructure, or additional transportation measures or policies.

Pursuant to Government Code Section 65080(b)(2)(K), a sustainable communities strategy does not: (i) regulate the use of land; (ii) supersede the land use authority of cities and counties; or (iii) require that a city's or county's land use policies and regulations, including those in a general plan, be consistent with it. Nonetheless, SB 375 makes regional and local planning agencies responsible for developing those strategies as part of the federally required metropolitan transportation planning process and the state-mandated housing element process.

In 2010, CARB adopted the SB 375 targets for the regional metropolitan planning organizations. The targets for SANDAG are a 7% reduction in emissions per capita by 2020 and a 13% reduction by 2035.

SANDAG completed and adopted its 2050 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) in October 2011 (SANDAG 2011). In November 2011, CARB, by resolution, accepted SANDAG's GHG emissions quantification analysis and determination that, if implemented, the SCS would achieve CARB's 2020 and 2035 GHG emissions reduction targets for the region.

After SANDAG's 2050 RTP/SCS was adopted, a lawsuit was filed by the Cleveland National Forest Foundation and others. In July 2017, the California Supreme Court held that SANDAG's EIR did not have to use EO S-3-05's 2050 goal of an 80% reduction in GHG emissions from 1990 levels as a threshold because the EIR sufficiently informed the public of the potential impacts.

Although the EIR for SANDAG's 2050 RTP/SCS was pending before the California Supreme Court, in 2015, SANDAG adopted the next iteration of its RTP/SCS in accordance with statutorily mandated timelines, and no subsequent litigation challenge was filed. More specifically, in October 2015, SANDAG adopted San Diego Forward: The Regional Plan. Like the 2050 RTP/SCS, this planning document meets CARB's 2020 and 2035 reduction targets for the region (SANDAG 2015). In December 2015, CARB, by resolution, accepted SANDAG's GHG emissions quantification analysis and determination that, if implemented, the SCS would achieve CARB's 2020 and 2035 GHG emissions reduction targets for the region.

Advanced Clean Cars Program. In January 2012, CARB approved the Advanced Clean Cars program, a new emissions-control program for model years 2015 through 2025. The program combines the control of smog- and soot-causing pollutants and GHG emissions into a single coordinated package. The package includes elements to reduce smog-forming pollution, reduce GHG emissions, promote clean cars, and provide the fuels for clean cars (CARB 2011). To improve air quality, CARB has implemented new emission standards to reduce smog-forming emissions beginning with 2015 model year vehicles. It is estimated that in 2025 cars will emit 75% less smog-forming pollution than the average new car sold before 2012. To reduce GHG

emissions, CARB, in conjunction with the EPA and the NHTSA, has adopted new GHG standards for model year 2017 to 2025 vehicles; the new standards are estimated to reduce GHG emissions by 34% in 2025. The Zero Emissions Vehicle (ZEV) program will act as the focused technology of the Advanced Clean Cars program by requiring manufacturers to produce increasing numbers of ZEVs and plug-in hybrid EVs in the 2018 to 2025 model years.

EO B-16-12. EO B-16-12 (2012) directs state entities under the Governor's direction and control to support and facilitate development and distribution ZEVs. This EO also sets a long-term target of reaching 1.5 million ZEVs on California's roadways by 2025. On a statewide basis, EO B-16-12 also establishes a GHG emissions reduction target from the transportation sector equaling 80% less than 1990 levels by 2050. In furtherance of this EO, the governor convened an Interagency Working Group on ZEVs that has published multiple reports regarding the progress made on the penetration of ZEVs in the statewide vehicle fleet.

AB 1236. AB 1236 (2015) as enacted in California's Planning and Zoning Law, requires local land use jurisdictions to approve applications for the installation of EV charging stations, as defined, through the issuance of specified permits unless there is substantial evidence in the record that the proposed installation would have a specific, adverse impact upon the public health or safety, and there is no feasible method to satisfactorily mitigate or avoid the specific, adverse impact. The bill provides for appeal of that decision to the planning commission, as specified. The bill requires local land use jurisdictions with a population of 200,000 or more residents to adopt an ordinance, by September 30, 2016, that creates an expedited and streamlined permitting process for EV charging stations, as specified. Prior to this statutory deadline, in August 2016, the County Board of Supervisors adopted Ordinance No. 10437 (N.S.) adding a section to its County Code related to the expedited processing of EV charging stations permits consistent with AB 1236.

SB 350. In 2015, SB 350 – the Clean Energy and Pollution Reduction Act – was enacted into law. As one of its elements, SB 350 establishes a statewide policy for widespread electrification of the transportation sector, recognizing that such electrification is required for achievement of the state's 2030 and 2050 reduction targets (see Public Utilities Code Section 740.12).

EO B-48-18. EO B-48-18 (2018) launches an eight-year initiative to accelerate the sale of EVs through a mix of rebate programs and infrastructure improvements. The order also sets a new EV target of five million EVs in California by 2030. EO B-48-18 includes funding for multiple state agencies including the CEC to increase EV charging infrastructure and CARB to provide rebates for the purchase of new EVs and purchase incentives for low-income customers.

Solid Waste

AB 939 and AB 341. In 1989, AB 939, known as the Integrated Waste Management Act (Public Resources Code Sections 40000 et seq.), was passed because of the increase in waste stream and the decrease in landfill capacity. The statute established the California Integrated Waste Management Board, which oversees a disposal reporting system. AB 939 mandated a reduction of waste being disposed where jurisdictions were required to meet diversion goals of all solid waste through source reduction, recycling, and composting activities of 25% by 1995 and 50% by the year 2000.

AB 341 (2011) amended the California Integrated Waste Management Act of 1989 to include a provision declaring that it is the policy goal of the state that not less than 75% of solid waste generated be source-reduced, recycled, or composted by the year 2020, and annually thereafter. In addition, AB 341 required the California Department of Resources Recycling and Recovery (CalRecycle) to develop strategies to achieve the state's policy goal. CalRecycle has conducted multiple workshops and published documents that identify priority strategies that CalRecycle believes would assist the state in reaching the 75% goal by 2020 (CalRecycle 2015).

Water

EO B-29-15. In response to the ongoing drought in California, EO B-29-15 (April 2015) set a goal of achieving a statewide reduction in potable urban water usage of 25% relative to water use in 2013. The term of the EO extended through February 28, 2016, although many of the directives have since become permanent water-efficiency standards and requirements. The EO includes specific directives that set strict limits on water usage in the state. In response to EO B-29-15, the California Department of Water Resources has modified and adopted a revised version of the Model Water Efficient Landscape Ordinance that, among other changes, significantly increases the requirements for landscape water use efficiency and broadens its applicability to include new development projects with smaller landscape areas.

Other State Regulations and Goals

SB 97. SB 97 (Dutton) (August 2007) directed the Governor's Office of Planning and Research to develop guidelines under CEQA for the mitigation of GHG emissions. In 2008, the Office of Planning and Research issued a technical advisory as interim guidance regarding the analysis of GHG emissions in CEQA documents. The advisory indicated that the lead agency should identify and estimate a project's GHG emissions, including those associated with vehicular traffic, energy consumption, water usage, and construction activities (OPR 2008). The advisory further recommended that the lead agency determine significance of the impacts and impose all

mitigation measures necessary to reduce GHG emissions to a level that is less than significant. The CNRA adopted the CEQA Guidelines amendments in December 2009, which became effective in March 2010.

Under the amended CEQA Guidelines, a lead agency has the discretion to determine whether to use a quantitative or qualitative analysis or apply performance standards to determine the significance of GHG emissions resulting from a particular project (14 CCR 15064.4(a)). The CEQA Guidelines require a lead agency to consider the extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions (14 CCR 15064.4(b)). The CEQA Guidelines also allow a lead agency to consider feasible means of mitigating the significant effects of GHG emissions, including reductions in emissions through the implementation of project features or off-site measures. The adopted amendments do not establish a GHG emission threshold, instead allowing a lead agency to develop, adopt, and apply its own thresholds of significance or those developed by other agencies or experts. The CNRA also acknowledges that a lead agency may consider compliance with regulations or requirements implementing AB 32 in determining the significance of a project's GHG emissions (CNRA 2009).

With respect to GHG emissions, the CEQA Guidelines Section 15064.4(a) state that lead agencies should "make a good faith effort, to the extent possible on scientific and factual data, to describe, calculate or estimate" GHG emissions. The CEQA Guidelines note that an agency may identify emissions by either selecting a "model or methodology" to quantify the emissions or by relying on "qualitative analysis or other performance based standards" (14 CCR 15064.4(a)). Section 15064.4(b) states that the lead agency should consider the following when assessing the significance of impacts from GHG emissions on the environment: (1) the extent a project may increase or reduce GHG emissions as compared to the existing environmental setting; (2) whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; and (3) the extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions (14 CCR 15064.4(b)).

EO S-13-08. EO S-13-08 (November 2008) is intended to hasten California's response to the impacts of global climate change, particularly sea-level rise. Therefore, the EO directs state agencies to take specified actions to assess and plan for such impacts. The final 2009 California Climate Adaptation Strategy report was issued in December 2009 (CNRA 2009), and an update, Safeguarding California: Reducing Climate Risk, followed in July 2014 (CNRA 2014). To assess the state's vulnerability, the report summarizes key climate change impacts to the state for the following areas: Agriculture, Biodiversity and Habitat, Emergency Management, Energy, Forestry, Ocean and Coastal Ecosystems and Resources, Public Health, Transportation, and

Water. Issuance of the Safeguarding California: Implementation Action Plans followed in March 2016 (CNRA 2016). In January 2018, the CNRA released the Safeguarding California Plan: 2018 Update, which communicates current and needed actions that state government should take to build climate change resiliency (CNRA 2018).

2015 State of the State Address. In January 2015, Governor Brown in his inaugural address and annual report to the Legislature established supplementary goals which would further reduce GHG emissions over the next 15 years. These goals include an increase in California's renewable energy portfolio from 33% to 50%, a reduction in vehicle petroleum use for cars and trucks by up to 50%, measures to double the efficiency of existing buildings, and decreasing emissions associated with heating fuels.

2016 State of the State Address. In his January 2016 address, Governor Brown established a statewide goal to bring per capita GHG emission down to two tons per person, which reflects the goal of the Global Climate Leadership Memorandum of Understanding (Under 2 MOU) to limit global warming to less than two degrees Celsius by 2050. The Under 2 MOU agreement pursues emission reductions of 80% to 95% below 1990 levels by 2050 and/or reach a per-capita annual emissions goal of less than 2 MT by 2050. A total of 135 jurisdictions, including California, representing 32 countries and 6 continents, have signed or endorsed the Under 2 MOU (Under 2 2016).

3.3 Local Regulations

San Diego Air Pollution Control District

The San Diego Air Pollution Control District does not have established GHG rules, regulations, or policies.

County of San Diego

Climate Action Plan

The County has developed a Climate Action Plan (CAP) that is a comprehensive strategy to reduce GHG emissions in the unincorporated communities of San Diego County. A draft CAP was released on August 10, 2017, for public review. The plan includes six chapters (1) Introduction; (2) Greenhouse Gas Emissions Inventory, Projections, and Reductions Targets; (3) Greenhouse Gas Reduction Strategies and Measures; (4) Climate Change Vulnerability, Resiliency, and Adaptation; (5) Implementation and Monitoring; and (6) Public Outreach and Engagement. Concurrent with the release of the Draft CAP, the County published implementation tools for the County to use when conducting CEQA analysis. This includes a general plan land use conformity determination and CAP consistency review checklist. As the

CAP is in draft form it is not considered a qualified CAP for CEQA analysis (see CEQA Guidelines Section 15183.5). In January 2018, Planning Commission recommended adoption of the final CAP to the County Board of Supervisors. On February 14, 2018, the County Board of Supervisors adopted the CAP.

General Plan

The County's General Plan (County of San Diego 2011) includes smart growth and land use planning principles designed to reduce vehicle miles traveled (VMT) and result in a reduction in GHG emissions. As discussed in the General Plan, climate change and GHG reduction policies are addressed in plans and programs in multiple elements of the General Plan.

The strategies for reduction of GHG emissions in the General Plan are as follows (County of San Diego 2011):

- **Strategy A-1:** Reduce vehicle trips generated, gasoline/energy consumption, and GHG emissions.
- **Strategy A-2:** Reduce non-renewable electrical and natural gas energy consumption and generation (energy efficiency).
- **Strategy A-3:** Increase generation and use of renewable energy sources.
- **Strategy A-4:** Reduce water consumption.
- **Strategy A-5:** Reduce and maximize reuse of solid wastes.
- **Strategy A-6:** Promote carbon dioxide consuming landscapes.
- **Strategy A-7:** Maximize preservation of open spaces, natural areas, and agricultural lands.

The General Plan also includes climate adaptation strategies to deal with potential adverse effects of climate change. The climate adaptation strategies include the following (County of San Diego 2011):

- **Strategy B-1:** Reduce risk from wildfire, flooding, and other hazards resulting from climate change.
- **Strategy B-2:** Conserve and improve water supply due to shortages from climate change.
- **Strategy B-3:** Promote agricultural lands for local food production.
- **Strategy B-4:** Provide education and leadership.

The County has also implemented a number of outreach programs such as the Green Building Program, lawn mower trade-in program, and reduction of solid waste by recycling to reduce air quality impacts as well as GHG emissions.

The County General Plan's Conservation and Open Space Element includes goals and policies that are designed to reduce the emissions of criteria air pollutants, emissions of GHGs, and energy use in buildings and infrastructure, while promoting the use of renewable energy sources, conservation, and other methods of efficiency, as follows (County of San Diego 2011):

- **Goal COS-14, Sustainable Land Development.** Land use development techniques and patterns that reduce emissions of criteria pollutants and GHGs through minimized transportation and energy demands, while protecting public health and contributing to a more sustainable environment.
    - **Policy COS-14.1 Land Use Development Form.** Require that development be located and designed to reduce vehicular trips (and associated air pollution) by utilizing compact regional and community-level development patterns while maintaining community character.
    - **Policy COS-14.2 Villages and Rural Villages.** Incorporate a mixture of uses within Villages and Rural Villages that encourage people to walk, bicycle, or use public transit to reduce air pollution and GHG emissions.
    - **Policy COS-14.3 Sustainable Development.** Require design of residential subdivisions and non-residential development through "green" and sustainable land development practices to conserve energy, water, open space, and natural resources.
    - **Policy COS-14.4 Sustainable Technology and Projects.** Require technologies and projects that contribute to the conservation of resources in a sustainable manner, that are compatible with community character, and that increase the self-sufficiency of individual communities, residents, and businesses.
    - **Policy COS-14.5 Building Siting and Orientation in Subdivisions.** Require that buildings be located and oriented in new subdivisions and multi-structure non-residential projects to maximize passive solar heating during cool seasons, minimize heat gains during hot periods, enhance natural ventilation, and promote the effective use of daylight.
    - **Policy COS-14.6 Solar Access for Infill Development.** Require that property setbacks and building massing of new construction located within existing developed areas maintain an envelope that maximizes solar access to the extent feasible.

- **Policy COS-14.7 Alternative Energy Sources for Development Projects.** Encourage development projects that use energy recovery, photovoltaic, and wind energy.
- **Policy COS-14.8 Minimize Air Pollution.** Minimize land use conflicts that expose people to significant amounts of air pollutants.
- **Policy COS-14.9 Significant Producers of Air Pollutants.** Require projects that generate potentially significant levels of air pollutants and/or GHGs such as quarries, landfill operations, or large land development projects to incorporate renewable energy, and the best available control technologies and practices into the project design.
- **Policy COS-14.10 Low-Emission Construction Vehicles and Equipment.** Require County contractors and encourage other developers to use low-emission construction vehicles and equipment to improve air quality and reduce GHG emissions.
- **Policy COS-14.11 Native Vegetation.** Require development to minimize the vegetation management of native vegetation while ensuring sufficient clearing is provided for fire control.
- **Policy COS-14.12 Heat Island Effect.** Require that development be located and designed to minimize the "heat island" effect as appropriate to the location and density of development, incorporating such elements as cool roofs, cool pavements, and strategically placed shade trees.
- **Policy COS-14.13 Incentives for Sustainable and Low GHG Development.** Provide incentives such as expedited project review and entitlement processing for developers that maximize use of sustainable and low GHG land development practices in exceedance of State and local standards.

- **Goal COS-15, Sustainable Architecture and Buildings.** Building design and construction techniques that reduce emissions of criteria pollutants and GHGs, while protecting public health and contributing to a more sustainable environment.
  - **Policy COS-15.1 Design and Construction of New Buildings.** Require that new buildings be designed and constructed in accordance with "green building" programs that incorporate techniques and materials that maximize energy efficiency, incorporate the use of sustainable resources and recycled materials, and reduce emissions of GHGs and toxic air contaminants.
  - **Policy COS-15.2 Upgrade of Existing Buildings.** Promote and, as appropriate, develop standards for the retrofit of existing buildings to incorporate design elements, heating and cooling, water, energy, and other elements that improve their environmental sustainability and reduce GHG.

- **Policy COS-15.3 Green Building Programs.** Require all new County facilities and the renovation and expansion of existing County buildings to meet identified "green building" programs that demonstrate energy efficiency, energy conservation, and renewable technologies.
- **Policy COS-15.4 Title 24 Energy Standards.** Require development to minimize energy impacts from new buildings in accordance with or exceeding Title 24 energy standards.
- **Policy COS-15.5 Energy Efficiency Audits.** Encourage energy conservation and efficiency in existing development through energy efficiency audits and adoption of energy saving measures resulting from the audits.
- **Policy COS-15.6 Design and Construction Methods.** Require development design and construction methods to minimize impacts to air quality.

- **Goal COS-16, Sustainable Mobility.** Transportation and mobility systems that contribute to environmental and human sustainability and minimize GHG and other air pollutant emissions.
  - **Policy COS-16.1 Alternative Transportation Modes.** Work with SANDAG and local transportation agencies to expand opportunities for transit use. Support the development of alternative transportation modes, as provided by Mobility Element policies.
  - **Policy COS-16.2 Single-Occupancy Vehicles.** Support transportation management programs that reduce the use of single-occupancy vehicles.
  - **Policy COS-16.3 Low-Emissions Vehicles and Equipment.** Require County operations and encourage private development to provide incentives (such as priority parking) for the use of low- and zero-emission vehicles and equipment to improve air quality and reduce GHG emissions.
  - **Policy COS-16.4 Alternative Fuel Sources.** Explore the potential of developing alternative fuel stations at maintenance yards and other County facilities for the municipal fleet and general public.
  - **Policy COS-16.5 Transit-Center Development.** Encourage compact development patterns along major transit routes.
- **Goal COS-17, Sustainable Solid Waste Management.** Perform solid waste management in a manner that protects natural resources from pollutants while providing sufficient, long term capacity through vigorous reduction, reuse, recycling, and composting programs.

- **Policy COS-17.1 Reduction of Solid Waste Materials.** Reduce GHG emissions and future landfill capacity needs through reduction, reuse, or recycling of all types of solid waste that is generated. Divert solid waste from landfills in compliance with State law.
- **Policy COS-17.2 Construction and Demolition Waste.** Require recycling, reduction and reuse of construction and demolition debris.
- **Policy COS-17.3 Landfill Waste Management.** Require landfills to use waste management and disposal techniques and practices to meet all applicable environmental standards.
- **Policy COS-17.4 Composting.** Encourage composting throughout the County and minimize the amount of organic materials disposed at landfills.
- **Policy COS-17.5 Methane Recapture.** Promote efficient methods for methane recapture in landfills and the use of composting facilities and anaerobic digesters and other sustainable strategies to reduce the release of GHG emissions from waste disposal or management sites and to generate additional energy such as electricity.
- **Policy COS-17.6 Recycling Containers.** Require that all new land development projects include space for recycling containers.
- **Policy COS-17.7 Material Recovery Program.** Improve the County's rate of recycling by expanding solid waste recycling programs for residential and non-residential uses.
- **Policy COS-17.8 Education.** Continue programs to educate industry and the public regarding the need and methods for waste reduction, recycling, and reuse.

- **Goal COS-18, Sustainable Energy.** Energy systems that reduce consumption of non-renewable resources and reduce GHG and other air pollutant emissions while minimizing impacts to natural resources and communities.
  - **Policy COS-18.1 Alternate Energy Systems Design.** Work with San Diego Gas and Electric (SDG&E) and non-utility developers to facilitate the development of alternative energy systems that are located and designed to maintain the character of their setting.
  - **Policy COS-18.2 Energy Generation from Waste.** Encourage use of methane sequestration and other sustainable strategies to produce energy and/or reduce GHG emissions from waste disposal or management sites.
  - **Policy COS-18.3 Alternate Energy Systems Impacts.** Require alternative energy system operators to properly design and maintain these systems to minimize adverse impacts to the environment.

- **Goal COS-19, Sustainable Water Supply.** Conservation of limited water supply supporting all uses including urban, rural, commercial, industrial, and agricultural uses.
    - **Policy COS-19.1 Sustainable Development Practices.** Require land development, building design, landscaping, and operational practices that minimize water consumption.
    - **Policy COS-19.2 Recycled Water in New Development.** Require the use of recycled water in development wherever feasible. Restrict the use of recycled water when it increases salt loading in reservoirs.
- **Goal COS-20, Governance and Administration.** Reduction of local GHG emissions contributing to climate change that meet or exceed requirements of the *Global Warming Solutions Act of 2006*.
    - **Policy COS-20.1 Climate Change Action Plan.** Prepare, maintain, and implement a climate change action plan with a baseline inventory of GHG emissions from all sources; GHG emissions reduction targets and deadlines, and enforceable GHG emissions reduction measures.
    - **Policy COS-20.2 GHG Monitoring and Implementation.** Establish and maintain a program to monitor GHG emissions attributable to development, transportation, infrastructure, and municipal operations and periodically review the effectiveness of and revise existing programs as necessary to achieve GHG emission reduction objectives.
    - **Policy COS-20.3 Regional Collaboration.** Coordinate air quality planning efforts with federal and State agencies, SANDAG, and other jurisdictions.
    - **Policy COS-20.4 Public Education.** Continue to provide materials and programs that educate and provide technical assistance to the public, development professionals, schools, and other parties regarding the importance and approaches for sustainable development and reduction of GHG emissions.

Strategic Plan to Reduce Waste

The County of San Diego Strategic Plan to Reduce Waste outlines near, mid-, and long-term programs and policies to increase the County's solid waste diversion rate to meet state targets and support other County initiatives, such as the CAP. In April 2017, the County adopted a diversion goal of 75% by 2025 (County of San Diego 2017a).

Renewable Energy Plan

The County's Renewable Energy Plan researches and develops renewable energy options in the County. The planning effort covers the residential, commercial, and industrial sectors of the County, with a particular focus on unincorporated areas, and presents a comprehensive approach to renewable energy and energy efficiency (County of San Diego 2017b).

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4 SIGNIFICANCE CRITERIA AND ANALYSIS METHODOLOGIES

4.1 Significance Criteria

The significance criteria used to evaluate the Proposed Project's GHG emissions impacts are based on the recommendations provided in Appendix G of the CEQA Guidelines. For the purposes of this GHG emissions analysis, the Proposed Project would have a significant environmental impact if it would (14 CCR 15000 et seq.):

1. Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.
2. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

As stated in CEQA Guidelines Section 15064.4(b)(1)-(3), "a lead agency should consider the following factors, among others, when assessing the significance of impacts from GHG emissions on the environment: (1) the extent to which a project may increase or reduce GHG emissions as compared to the existing environmental setting; (2) whether project emissions exceed a threshold of significance that the lead agency determines applies to the project; and (3) the extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions."

Section 15064(h)(3) of the CEQA Guidelines also states that "A lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program…that provides specific requirements that will avoid or substantially lessen the cumulative problem within the geographic area in which the project is located."

The CEQA Guidelines do not prescribe specific methodologies for performing an assessment, do not establish specific quantitative thresholds of significance, and do not mandate specific mitigation measures. Rather, the CEQA Guidelines emphasize the lead agency's discretion to determine the appropriate methodologies and thresholds of significance consistent with the manner in which other impact areas are handled in CEQA (CNRA 2009a).

The Governor's Office of Planning and Research's Technical Advisory titled "CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act Review" states that "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" (OPR 2008). Furthermore, the advisory document indicates that "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."

Global climate change is a cumulative impact; a project participates in this potential impact through its incremental contribution combined with the cumulative increase of all other sources of GHGs. There are currently no established quantitative thresholds for assessing whether the GHG emissions of a project, such as the Proposed Project, would be considered a cumulatively considerable contribution to global climate change; however, all reasonable efforts should be made to minimize a project's contribution to global climate change. In addition, although GHG impacts are recognized exclusively as cumulative impacts (CAPCOA 2008), GHG emissions impacts must also be evaluated on a project level under CEQA.

4.2 Construction Emissions Methodology

4.2.1 Overall Schedule

Emissions from the construction phase of the Proposed Project were estimated using CalEEMod[14] Version 2016.3.1 (CAPCOA 2016).[15] Construction scenario assumptions, including phasing, equipment mix, and vehicle trips, were based on information provided by the Proposed Project applicant, and CalEEMod default values when Proposed Project specifics were not known.

[14] CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform to calculate construction and operational emissions from land use development projects. The model was developed for the California Air Pollution Control Officers Association in collaboration with multiple air districts across the state. Numerous lead agencies in the state, including the San Diego Air Pollution Control District, use CalEEMod to estimate GHG emissions in accordance with CEQA Guidelines Section 15064.4(a)(1).

[15] CalEEMod Version 2016.3.1 was the current version of CalEEMod when the Proposed Project analysis was initiated. In October 2017, CalEEMod Version 2016.3.2 was released, followed by CalEEMod Version 2016.3.2.25 in November 2017, which fixed a Windows security update issue in Version 2016.3.2. CalEEMod Version 2016.3.2 included five upgrades and ten bug fixes. The most notable upgrade and bug fix, respectively, is the incorporation of percent reductions in default energy consumption to reflect compliance with the 2016 Title 24, Part 6 Building Energy Efficiency Standards and fixing the bug that overestimated annual construction PM_{10} and $PM_{2.5}$ emissions from fugitive dust in multiple year scenario runs (SCAQMD 2017). All CalEEMod Version 2016.3.2 updates were reviewed and it was determined that use of CalEEMod Version 2016.3.2 is not anticipated to result in greater GHG emissions compared to estimated Proposed Project emissions generated using CalEEMod Version 2016.3.1. Accordingly, use of CalEEMod Version 2016.3.1 is appropriate for the Proposed Project's GHG emissions analysis.

For purposes of estimating Proposed Project emissions, and based on information provided by the Proposed Project applicant, it is assumed that construction of the Proposed Project would commence in July 2019[16] and would last approximately 9 years, ending in December 2027. The analysis contained herein is based on the following subset area schedule assumptions (duration of phases is approximate):

- South Village 14: July 2019 – September 2023
  - Residential: July 2019 – April 2023
  - Non-residential: April 2021 – January 2022
- Central Village 14: November 2020 – July 2026
  - Residential: November 2020 – July 2026
  - Non-residential: April 2023 – July 2026
- North Village 14: June 2022 – December 2025
  - Residential: June 2022 – June 2025
  - Non-residential: May 2024 – December 2025
- Planning Areas 16/19: April 2023 – December 2027
  - Residential: April 2023 – December 2027
- Off-Site Improvements: July 2019 – September 2023

For modeling purposes, site preparation and mass grading phases, which are discussed in detail in the following section, were included in the residential development construction scenario; as such, the construction duration associated with those phases are included in the residential duration estimates presented above.

4.2.2 Mass Project Area Grading

Cut-and-fill quantities would be balanced on site (within the Project Area), and no external soil export would be required. Soil balance would occur within each subset area, and hauling would not be required between subset areas. A total of approximately 8,350,000 cubic yards of cut and fill would occur within the Project Area, which is broken down by subset area in Table 5,

[16] The analysis assumes a construction start date of July 2019, which represents the earliest date construction would initiate. Assuming the earliest start date for construction represents the worst-case scenario for greenhouse gas ~~criteria air pollutant emissions~~ because equipment and vehicle emission factors for later years would be slightly less due to more stringent standards for in-use off-road equipment and heavy-duty trucks, and fleet turnover replacing older equipment and vehicles in later years.

Construction Grading Assumptions. Mass Project Area grading would also include construction and installation of retaining walls as needed.

With the exception of the construction of South Proctor Valley Road, as discussed below, all other balancing activities are anticipated to be performed primarily through the use of off-road construction equipment (e.g., excavators, graders, dozers, and scrapers). However, to present a conservative analysis, the use of haul trucks to transport a small portion (i.e., 2%) of the excavated soil within each subset area was assumed. This approach is considered conservative because moving of earth material to balance the site is anticipated to be performed using construction equipment, as assumed in CalEEMod. If haul trucks were used to transport earth material instead of construction equipment, it is thereby reasonable to anticipate that a reduction in construction equipment operation hours would occur. Assuming operation of both construction equipment and haul trucks to perform the same activity is considered a conservative emissions modeling approach. For modeling purposes, it was assumed that a total of approximately 166,155 cubic yards of soil would be relocated within the Project Area (Hunsaker and Associates 2017), which is broken down by area in Table 5.

To estimate emissions from trucks hauling excavated rock and soil to various portions of the Project Area, daily haul truck quantities were conservatively estimated using a hauling capacity of 12 cubic yards. Average travel distances were estimated based on internal site movement of soil for grading of individual subset areas.

Table 5
Construction Grading Assumptions

Subset Area	Grading Period (work days)	On-Site Soil Cut and Fill (cubic yards)	Assumed On-Site Soil Movement (cubic yards)	Average On-Site Haul Distance (miles)
South Village 14	66	1,408,000	28,160	0.5
Central Village 14	239	4,371,000	87,420	0.5
North Village 14	87	750,734	15,015	0.5
Planning Areas 16/19	129	1,778,000	35,560	0.5

Source: Hunsaker and Associates 2017a.
Note: It was assumed that 2% of the total on-site soil cut and fill would be relocated internally.

Off-site improvements are anticipated to result in 48 acres of disturbance (i.e., acres graded) over 122 days.

See Section 4.2.7, Vehicle Trips, for a discussion of haul trucks trip assumptions.

In order to construct South Proctor Valley Road, approximately 240,000 cubic yards of fill would be transported from South Village 14 to South Proctor Valley Road. For purposes of this analysis, 120,000 cubic yards (50%) of that total are assumed to be transported using 100-ton rock trucks, which are categorized as off-highway trucks in CalEEMod. These off-highway trucks would transport fill from South Village 14 to the farthest reaches of Proctor Valley Road, resulting in a one-way trip length between approximately 0.75 miles and 1.5 miles. Off-road construction equipment, such as graders and scrapers, would move the remaining 120,000 cubic yards (50%) of that total from South Village 14 to the closest portions of Proctor Valley Road, resulting in a one-way trip length between approximately 0.1 miles and 0.75 miles. The following paragraphs describe the methodologies used to estimate the emissions associated with this aspect of the Proposed Project's construction phase.

To estimate the daily number of 100-ton rock trucks required to transport 120,000 cubic yards over 19 days (the estimated duration of this construction activity), it was assumed that the each truck would have a capacity of 97 cubic yards, thereby requiring approximately 65 total round trip truck trips per day.[17] Assuming a speed of 15 miles per hour, an average one-way trip distance of 1.1 miles (2.2 miles round trip),[18] 30 minutes per round trip,[19] and an 8-hour operation day, each truck is estimated to complete a minimum of 16 round trips per day. Accordingly, four off-highway trucks operating at 8 hours per day was assumed to be required to transport 120,000 cubic yards over 19 days.[20]

As for the remaining 120,000 cubic yards of fill required for construction of South Proctor Valley Road that would be transported using off-road construction equipment, the operation of such equipment is captured by the off-site grading CalEEMod run (discussed above; see Appendix A). Accordingly, no additional off-road construction equipment was needed in the Proctor Valley Road CalEEMod run, which was modeled separately from the off-site grading CalEEMod run (see Appendix A). The Proctor Valley Road CalEEMod run evaluates emissions

[17] Calculation parameters:
120,000 cubic yards ÷ 19 days of construction activity = 6,315 cubic yards per day
6,315 cubic yards per day ÷ 97 cubic yards per truck = 65 truck trips

[18] The minimum one-way distance a rock truck would travel to transport fill material, versus transporting fill using off-road construction equipment, was assumed to be 0.75 miles. The maximum one-way distance a rock truck would travel to transport fill material was assumed to be 1.5 miles. Accordingly, an average one-way distance of 1.1 miles (0.75 + 1.5 = 2.25 miles; 2.25 miles ÷ 2 = 1.1 miles) was assumed for the rock truck (off-highway truck) travel.

[19] The estimated average 30-minute trip duration conservatively assumes 10 minutes total travel time per trip (5 minutes each direction traveling at 15 miles per hour and a 1.1-mile one-way trip length), 15 minutes for loading, and 5 minutes for unloading.

[20] Mathematically, four trucks completing 16 round trips a day would total 64 round trips per day. Because of the conservative assumptions regarding trip time and other averages used in the calculations, it is anticipated that four trucks can accomplish 65 round trips in one day.

associated with grading (off-highway, rock truck operation and fugitive dust), paving, and asphalt striping (see Appendix A).

4.2.3 Residential Development Phasing and Equipment

For each distinct subset area, including South Village 14, Central Village 14, and North Village 14, a mass initial site preparation phase was assumed that would entail clearing and grubbing activities (e.g., removal of vegetation). Following the initial site preparation phase, a mass grading phase would occur that would prepare the entire subset area for subsequent development activities (e.g., utilities, landscaping, paving, and building construction) (see Section 4.2.2 for grading assumptions). Utility installation and slope landscaping was assumed to occur after grading is complete, but in some subset areas, would occur concurrently with other post-grading construction phases such as paving and building construction. Utility installation would include trenching to install water, wastewater, sewer, and fiber-optic lines. Slope landscaping would include site improvement and fine grading, and other types of landscaping would include construction and planting of parks.

For each subset area, residential construction was broken down into distinct phases, each with an estimated number of housing products and total units developed. The total homes built within each phase would differ, but for emissions estimation purposes, it was assumed that each of the residential construction phases would occur over a 5-month period. Month 1 of the building construction phase would entail lot preparation where smaller grading-type equipment would perform minor residential site preparation activities (fine grading); residential utility lines would be installed; and a concrete pad would be poured for each of the lots identified in that phase. Months 2 through 4 would involve typical vertical construction of the residential buildings, including framing, wiring, and plumbing. Month 5 would include drywall and flooring installation, and lot finishing, such as driveway concrete pouring.

The architectural coating phase, which would involve application of paints and other finishes, would occur during months 3 and 4, concurrent with the vertical building construction phases. Although vertical construction and architectural coating would not occur simultaneously on the same residence, since dry wall construction would need to be completed prior to painting activities, it is reasonable to assume that architectural coating and building construction would occur concurrently in the 5-month phase because the construction crew could be working on two or more residential units concurrently. Since the construction crew would proceed from lot to lot in sequence, interior and/or exterior architectural coating could occur at one residential unit while construction of another unit on a different lot is in progress (e.g., construction crew would be painting residence 1 while framing residence 2).

Prior to each of the residential development phases, a paving phase would occur that would include internal circulation pavement installation (i.e., paving of neighborhood streets).

In summary, for residential development at each distinct subset area, the following general construction phases were assumed for residential development:

- Site preparation (Development Footprint): 1 month
- Grading (Development Footprint): ranging from 3 months to 11 months[21]
- Utility installation and slope landscaping (Development Footprint): ranging from 6~~5~~ to 8 months[22]
- Slope landscaping or park landscaping (Development Footprint): ranging from 6 to 8 months
- For each neighborhood phase:
  - Paving: 1 month
  - Building construction: 5 months total, which consists of the following:
    - Lot and pad site preparation: 1 month (month 1)
    - Vertical development: 3 months (months 2–4)
    - Finishing: 1 month (month 5)
  - Architectural coating: 2 months (months 3 and 4 of the "building construction" period)

General construction equipment assumptions were based on the anticipated activities associated with each type of construction phase (e.g., earth-moving and rough-grading activities during the grading phase) and the typical equipment used to perform those activities (e.g., graders, loaders, rollers, and scrapers for grading). Although subset areas would involve different residential unit totals and different non-residential land uses, the activities for each construction phase (i.e., site preparation, grading, utilities installation, slope landscaping, paving, building construction, architectural coating) are anticipated to be similar. The equipment mix anticipated for construction was based on information provided by the Proposed Project applicant and best engineering judgment. The equipment mix is meant to represent a reasonably conservative estimate of construction activity.

[21] Grading durations for South Village 14 would be 3 months, Central Village 14 would be 11 months, North Village 14 would be 8 months, and Planning Areas 16/19 would be 5 months.

[22] Utility and slope landscaping durations for South Village 14 would be 7 months, Central Village 14 would be 8 months, North Village 14 would be 6 months, and Planning Areas 16/19 would be 8 months.

General construction equipment modeling assumptions for residential development is provided in Table 6. Default values for horsepower and load factor as provided in CalEEMod were used for all construction equipment listed in Table 6. It was assumed that all equipment used during each construction subphase would be operating 8 hours per day, 5 days per week. Detailed construction equipment modeling assumptions are provided in Appendix A.

Table 6
General Residential Development Construction Equipment Assumptions

Construction Subphase	Off-Road Equipment	
	Type	*Quantity*
Site Prep	Rubber -Tired Dozer	3
	Tractor/Loader/Backhoe	4
	Other Construction Equipment (brush grinder)	1
Grading	Excavators	2
	Graders	1
	Rubber-Tired Dozers	1
	Scrapers	2
	Tractors/Loaders/Backhoes	2
Utilities and Slope Landscaping	Excavator	1
	Rubber-Tired Loader	1
Site Preparation (month 1)	Grader	1
	Skid Steer	1
	Trencher	1
	Pump	1
	Cement Mixer	1
Building Construction 1 (months 2-4)	Rough Terrain Forklift	1
	Backhoe	1
Building Construction 2 (month 5)	Rough Terrain Forklift	1
	Skid Steer	2
	Cement Mixer	1
Paving	Pavers	2
	Paving Equipment	2
	Rollers	2
Architectural Coating	Air Compressor	2

CalEEMod was used to estimate the number vendor (material delivery) trips and worker trips. Changes to any standard default values or assumptions are reported in the CalEEMod output (see Appendix A). Refer to Section 4.2.7 for vehicle trip assumptions.

Additional details of the construction schedule including hours of operation and duration for heavy construction equipment; worker, vendor (delivery), and internal hauling trips; and equipment mix are included in Appendix A.

4.2.4 Non-Residential Development Phasing and Equipment

For non-residential development at each distinct subset area, the following general construction phases were assumed for non-residential development land use (i.e., swimming pools, parks, public safety site, and commercial area)[23]:

- Site preparation: less than one week
- Grading (entire site): ranging from 1 to 7 days
- Building construction: ranging from 1 to 8 months
- Paving: ranging from two weeks to a month
- Architectural coating: ranging from 1 week to 9 months

General construction equipment modeling assumptions for non-residential development is provided in Table 7. Default values for horsepower and load factor as provided in CalEEMod were used for all construction equipment listed in Table 7. It was assumed all equipment used during each subphase would be operating 8 hours per day, 5 days per week. Detailed construction equipment modeling assumptions are provided in Appendix A.

Table 7
General Non-Residential Construction Equipment Assumptions

Construction Subphase	Off-Road Equipment	
	Type	*Quantity*
Site Preparation (all non-residential land uses)	Graders	1
	Rubber-Tired Dozers	1
	Tractors/Loaders/Backhoes	1
Grading (all non-residential land uses)	Excavators	1
	Graders	1
	Rubber-Tired Dozers	1
	Tractors/Loaders/Backhoes	1
Building Construction - Swimming Pools	Cranes	1
	Forklifts	1
	Generator Sets	1

[23] As discussed earlier in this report, 97 residential units in lieu of the school were modeled.

Table 7
General Non-Residential Construction Equipment Assumptions

Construction Subphase	Off-Road Equipment	
	Type	*Quantity*
	Tractors/Loaders/Backhoes	1
	Welders	3
Building Construction – Park	Forklift	1
	Tractor/Loader/Backhoe	1
	Welder	1
Building Construction – Public Safety Site	Cranes	1
	Forklifts	2
	Generator Sets	1
	Tractors/Loaders/Backhoes	3
	Welders	1
Building Construction – Commercial	Cranes	1
	Forklifts	1
	Generator Sets	1
	Tractors/Loaders/Backhoes	3
	Welders	1
Paving (all non-residential land uses)	Pavers	2
	Paving Equipment	2
	Rollers	2
Architectural Coating (all non-residential land uses)	Air Compressors	1
Landscaping (all non-residential land uses)	Skid Steer	2

CalEEMod was used to estimate the number vendor (material delivery) trips and worker trips; see Section 4.2.7 for vehicle trip assumptions. Additional details of the construction scenario assumptions are included in Appendix A.

4.2.5 Off-Site Improvements Phasing and Equipment

For off-site improvements, the following phases were assumed:

- Grading (all areas): 6 months
- Paving (all areas): 5 months
- Architectural coating (striping): 1 month
- Landscaping (all areas): 4 months

Table 8 presents the construction equipment modeling assumptions for the Proposed Project off-site improvements. Default values for horsepower and load factor as provided in CalEEMod were used for all construction equipment listed in Table 8. It was assumed all equipment used during each subphase would be operating 8 hours per day, 5 days per week.

Table 8
Off-Site Improvements Construction Equipment Assumptions

Construction Subphase	Off-Road Equipment	
	Type	*Quantity*
Grading	Excavators	2
	Graders	1
	Rubber Tired Dozers	1
	Scrapers	2
	Tractors/Loaders/Backhoes	2
Paving	Pavers	2
	Paving Equipment	2
	Rollers	2
Architectural Coating (striping)	Air Compressors	1
Landscaping	Skid Steer	2

CalEEMod was used to estimate the number vendor (material delivery) trips and worker trips; see Section 4.2.7 for vehicle trip assumptions. Additional details of the construction scenario assumptions are included in Appendix A.

4.2.6 Proctor Valley Road North and Trail Options

As explained in Section 1, the Proposed Project includes the Proctor Valley North Road Option for additional bike lanes to be constructed on Proctor Valley Road North if selected by the San Diego County Board of Supervisors. The construction of these bike lanes would require approximately 20,000 cubic yards of grading, 65,000 square feet of paving, and associated architectural coating for striping and bike lane signage. If constructed, it is expected that the additional grading, paving, and architectural coating associated with the bike lane option would use the same construction equipment used for off-site improvements, as presented in Table 9, and would result in a maximum of nine additional days of construction: two days for grading, five days for paving, and two days for architectural coating (striping and signage).[24] For

[24] It is anticipated that the additional construction associated with the Proctor Valley Road North Option would not occur as an independent construction phase, but instead slightly increase the duration of the grading, paving, and architectural coating phases. The nine construction days associated with the potential Proctor Valley Road North Option were modeled in CalEEMod to follow the overall construction of Proctor Valley Road North.

disclosure, the additional construction activities were modeled separately in CalEEMod to estimate potential additional emissions resulting from equipment operation and worker trips. No additional haul truck trips would be required for the Proctor Valley Road North Option.

The Perimeter Trail Option, if selected by the San Diego County Board of Supervisors, would provide for an improved trail around the Project Area. Because this Perimeter Trail Option would be graded during the Development Footprint mass grading phase, no additional grading is anticipated for this option and no additional GHG emissions are anticipated to occur.

The Preserve Trails Option would not result in any physical improvements; therefore, no ~~criteria air pollutant~~greenhouse gas emissions are anticipated from implementation of this option.

4.2.7 Vehicle Trips

Haul Truck Trips

As discussed in Section 4.2.2, Mass Project Area Grading, cut and fill would be balanced on site, and hauling would be limited to internal site movement within each village area. To provide a conservative estimate of emissions relating to hauling, it was assumed that 2% of cut and fill would be moved internally in medium-duty (12 cubic yard) haul trucks. Due to the size of the village sites (subset areas), haul truck trip length was assumed to be 0.5 miles. Table 9 presents estimated cubic yards of grading and associated haul truck trip by Village.

Table 9
Haul Truck Round Trip Estimates

Village	Total Graded Cubic Yards	Cubic Yard Hauled	Trucks (round trips)
South Village 14	1,408,000	28,160	2,347
Central Village 14	4,371,000	87,420	7,285
North Village 14	750,734	15,015	1,251
Planning Areas 16/19	1,778,000	35,560	2,963

Worker and Truck Trips

Construction worker and vendor trips were calculated using the methodology presented in CalEEMod Users Guide, Appendix A (CAPCOA 2016). In CalEEMod, the estimate of worker

More specifically it was assumed in CalEEMod, that the two additional grading days would be added on to the off-site improvements' 6-month grading phase, the five additional paving days would be added on to the off-site improvements' 5-month paving phase, and the two additional architectural coating days would be added on to the off-site improvements' 1-month architectural coating phase.

trips for site preparation, grading, paving, and trenching are based on 1.25 workers per each individual piece of equipment. The CalEEMod worker rate was used for all phases of construction to provide a consistent methodology between land uses,[25] with the exception of the building construction phases of single-family homes, which is presented in Table 10. This approach reflects a conservative analysis due to the detailed and extensive construction equipment list provided by the applicant. Table 10 presents the CalEEMod worker and vendor truck trip generation rates for single-family residences.

Table 10
Worker and Vendor Truck Trip Estimate Methodology

Land Use Subtype	Rate Metric	Worker Trip Rate	Vendor Trip Rate
Single-Family	Daily Trips per Dwelling Unit	0.36	0.1069

Source: CAPCOA 2016.

In addition, architectural coating worker trips are 20% of building construction phase trips. Vendor trips associated with building construction are based on the land uses and trip rate indicated in the table above. For phases with construction less than 1,000 square feet, two trips (one worker round trip) were assumed. Additional vendor trips were included in site preparation, grading, and paving. Four trips were assumed for site preparation and grading phases, while 10 vendor trips were assumed for paving to conservatively estimate material delivery to the site.

4.2.8 Blasting and Rock Crushing

Blasting

Blasting operations would be required for site preparation. Rock blasting is the controlled use of explosives to excavate, break down, or remove rock. The result of rock blasting is often known as a rock cut. The most commonly used explosives today are ammonium nitrate/fuel oil (ANFO)–based blends due to their lower cost compared to dynamite. The composition of ANFO is 6% fuel oil, which emits CO_2 when detonated. An emission factor of 10.35 kilograms of CO_2 per gallon of fuel oil *The Climate Registry 2018 Default Emission Factors* was used to estimate GHG emissions from blasting.[26]

It is anticipated that blasting operations would occur during the grading phase. An average of 8.25 tons of ANFO would be applied per blast (Revey Associates Inc. 2015). All blasting activity

[25] CalEEMod does not include default rates for workers and vendors for all non-residential building phases, such as park structures and recreational swimming pools, which would be represented in the Proposed Project.

[26] A conversion factor 7.41 pounds per gallon of fuel oil was utilized.

will comply with Section 96.1.5601.2 of the County of San Diego 2017 Consolidated Fire Code. The blasting information provided by the applicant and additional calculation assumptions are provided in Table 11.

Table 11
Blasting Characteristics

Activity	Proctor Valley Road North	South Village 14	Central Village 14	North Village 14	Planning Areas 16/19
Total Rock Requiring Blasting (cubic yards)	28,414	70,951	1,918,440	269,712	845,839
Rock Blasted per Blast (cubic yards per blast)	15,000	15,000	15,000	15,000	15,000
Maximum Blasts per Day (blasts per day)	1	1	1	1	1
Total Blasts (blasts per phase)	1 full 1 partial	4 full 1 partial	127 full 1 partial	18 full 0 partial	56 full 1 partial
Maximum Explosive per Blast (tons ANFO per blast)	8.25	8.25	8.25	8.25	8.25
Total Explosives Used (tons ANFO per phase)	15.63	39.04	1,055.14	148.34	465.21
Maximum Area Blasted per Day (square feet per day)	1,335	1,335	1,335	1,335	1,335
Total Area Blasted (square feet per phase)	2,528	6,312	170,680	23,996	75,253

Sources: Devenco and Revey 2017; Hunsaker & Associates 2017b.
ANFO = ammonium nitrate/fuel oil

Rock Crushing

Rock crushing would occur as part of the site preparation process. The crushing information provided by the Proposed Project applicant is listed below.

- Proctor Valley Road North – 36,938 tons crushed over 2 weeks
- South Village 14 – 92,236 tons crushed over 4 weeks
- Central Village 14 – 2,119,876 tons crushed over 29 weeks
- North Village 14 – 350,626 tons crushed over 14 weeks
- Planning Areas 16/19 – 1,099,591 tons crushed over 22 weeks

The rock crushing equipment was assumed to consist of a crusher, screen, and conveyor, and the crushed rock would be stockpiled for future use. While a single primary crusher and screen may be all that is required, use of a secondary crusher and additional screen would expedite this process. To generate a conservative emission estimate, it was assumed that a feed hopper, primary and secondary crushers, two screens, and several conveyors for transfers would be used. GHG emissions from the equipment were estimated using the CalEEMod. It was assumed that all equipment was operating 8 hours per day, 5 days per week, over each phase.

It is expected that the rock crushing equipment would be powered by a diesel engine-generator. It is assumed that the engine-generator would be rated at 750 kilowatts or approximately 1,000 horsepower. The engine-generator would operate up to 8 hours per day, 5 days per week. The GHG emissions from the diesel engine-generator were estimated using the off-road engine load factor and emission factors from the CalEEMod user's guide for a typical generator operating in 2019. It was assumed that the same equipment would be used for each phase; thus, the emission factors were based on the initial year of use (2019). Rock crushing emission calculations are provided in Appendix A.[27]

4.3 Operational Emissions Methodology

4.3.1 Area Sources

CalEEMod was used to estimate operational emissions from area sources, including emissions from hearths and landscape maintenance equipment. Emissions associated with natural gas usage in space heating, water heating, and stoves are calculated in the building energy use module of CalEEMod, as described in the following text.

Based on information provided by the applicant, each single-family unit was assumed to have a natural gas fireplace; courtyard homes were assumed to have no fireplace; and no woodstoves were included as a part of the development. The use of natural gas fireplaces was assumed to be included in the heating demand used in the Building Analysis (ConSol 2017). Fireplaces were not included separately in the CalEEMod area source calculations to avoid double counting.

Landscape maintenance includes fuel combustion emissions from equipment such as lawn mowers, rototillers, shredders/grinders, blowers, trimmers, chain saws, and hedge trimmers. The emissions associated from landscape equipment use are estimated based on CalEEMod default values for emission factors (grams per residential dwelling unit per day and grams per square

[27] Pursuant to EPA AP-42, Section 13.3 Explosives Detonation, there are no CO_2 and CH_4 emission factors for the explosive ANFO (composed of ammonium nitrate with 5.8% 8% fuel oil). Accordingly, GHG emissions associated with blasting is not included in this GHG analysis.

foot of non-residential building space per day) and number of summer days (when landscape maintenance would generally be performed) and winter days. While electric equipment for landscaping maintenance activities could be used by future residents and/or homeowners association landscape maintenance contractors, default CalEEMod assumptions were used in estimating emissions as a conservative estimate.

4.3.2 Energy Sources

As represented in CalEEMod, energy sources include emissions associated with building electricity and natural gas usage (non-hearth). Electricity use would contribute indirectly to GHGs, since GHG emissions occur at the site of the power plant, which is typically off site. Emissions were calculated by multiplying the energy use by the utility's carbon intensity (pounds of GHGs per megawatt-hour for electricity or 1,000 British thermal units for natural gas) for CO_2 and other GHGs. Annual natural gas (non-hearth) and electricity emissions were estimated in CalEEMod using the emissions factors for SDG&E, which would be the energy source provider for the Proposed Project. For the operational year 2028, the emission factors for SDG&E were adjusted to reflect SDG&E's compliance with the RPS standards. A renewable procurement percentage of 46.6% in 2028 was interpolated from the 2020 RPS goal of 33% and 2030 goal of 50%.

For residential land uses, Proposed Project–specific energy (electricity and natural gas) use data was used in place of CalEEMod default values (ConSol 2017). To calculate the total residential building energy input (i.e., electricity and natural gas use from regulated and unregulated loads[28]), Proposed Project–specific energy use data prepared by ConSol, which reflected energy use in residential development designed to meet the CEC's definition of ZNE buildings, was used. (ZNE buildings are designed to achieve enhanced energy efficiency in the building envelope and to use renewable energy sources, such as rooftop-mounted solar panels.) These data were calculated using the CEC's public-domain compliance software, known as CBECC-Res.[29] The prototype residence used in the ConSol analysis was a 3,652-square-foot, two-story, single-family residence, and the plans for this building were provided from ConSol's library of building plans.[30]

[28] For electricity in CalEEMod Version 2016.3.1, Title 24 uses include the major building envelope systems covered by Part 6 (California Energy Code) of Title 24 such as space heating, space cooling, water heating, and ventilation. Non-Title 24 uses include all other end uses, such as appliances, electronics, and other miscellaneous plug-in uses.

[29] "CBECC-Res" is shorthand for California Building Energy Code Compliance – Residential.

[30] The Proposed Project involves a variety of residential product types that may range from approximately 2,000 square feet to 4,500 square feet. The prototype residence studied in the ConSol report was selected to represent the approximate weighted average square footage of the residential product types, thereby providing a

For non-residential land uses, CalEEMod default values for energy consumption for each land use were applied for the Proposed Project analysis. The energy use for non-residential buildings is calculated in CalEEMod using energy intensity values (natural gas usage per square foot per year) assumptions, which were based on the California Commercial End-Use Survey database.

The current Title 24 building energy efficiency standards[31] are the 2016 Title 24 building energy efficiency standards, which became effective January 1, 2017. In general, non-residential buildings built to the 2016 standards will use an estimated 5% less energy than those built to the 2013 standards (CEC 2015a). CalEEMod default values assume compliance with the 2013 Title 24 standards, which became effective on July 1, 2014. In accordance with PDF-AQ/GHG-3, non-residential land uses were adjusted to be 10% more energy efficient than required by the 2016 Title 24 energy efficiency standards.

The energy use (electricity and natural gas) rates assumed in CalEEMod are presented in Table 11.

Table 11
Energy Use Rates

Land Use	Title 24 Electricity	Non-Title 24 Electricity	Lighting Electricity	Total Electricity	Title 24 Natural Gas	Non-Title 24 Natural Gas	Total Natural Gas
	kWh per unit per year				*kBtu per unit per year*		
Residential Units	971	2,371	993	5,406	22,000	4,500	26,500
Industrial Park (Public Safety Site)	4.17	4.97	3.34	12.48	13.74	4.2	17.94
Parking Lot	0.00	0	0.75	0.75	0.00	0	0.00
Regional Shopping Center	2.86	3.16	5.46	11.48	0.98	1.09	2.07

Source: ConSol 2017.
Notes:
kWh = kilowatt hour; kBtu = kilo British thermal unit.
Assumptions represent implementation of PDF-AQ/GHG-2 (Zero Net Energy Development – Residential Land Uses).
Title 24 electricity is the "regulated loads" kWh shown in ConSol 2017
Non-Title 24 electricity is the sum of "Appliance & Cooking kWh" and "Plug Load kWh" shown in ConSol 2017.
Lighting electricity is the sum of "Interior Lighting kWh" and "Exterior Lighting kWh" shown in ConSol 2017.
Title 24 natural gas is the "regulated loads" Therms shown in ConSol 2017.

reasonable representation of building energy consumption for purposes of this environmental analysis and specifically the estimation of the Proposed Project's emissions calculated in CalEEMod. While the calculated weighted average square footage is 3,400, use of a 3,652-square foot prototype residence reasonably represents the energy profile of a slightly larger home and is conservative in the sense that it likely serves to overestimate the energy demand profile of the Proposed Project by some small increment.

[31] Title 24, Part 6 of the California Code of Regulations.

Non-Title 24 natural gas is the "Appliance & Cooking Therms" shown in ConSol 2017.
Improvements on the 2016 code for non-residential uses were only applied to those regulated loads.

To meet ZNE design standards, each residential unit will be constructed with a rooftop photovoltaic (PV) system. The system's size was determined based on the estimated annual energy demand of a residence.

Private Swimming Pools

The Proposed Project would include three private swimming pools with an average size of 140,026 gallons each. Energy demand for swimming pools was estimated using a baseline demand in the SDG&E service area (SCE 2016). The swimming pools are assumed to use electricity for filters and pumps and natural gas for water heating. Table 12 shows the estimated energy use associated with heating the Proposed Project's swimming pools. The natural gas demand for heating would be completely offset through the implementation of PDF-AQ/GHG-5, which requires the installation of solar water heating on all recreational swimming pools. As shown in Table 12, pool heating would require 23,533 million British thermal units (MMBtu) annually, and thus the implementation of PDF-AQ/GHG-5 would reduce natural gas demand by 64.47 MMBtu.

Table 12
Swimming Pool Heating Demand

Facility Name	Pool Volume (gallons)	MMBtu/gallons/year	MMBtu/year
PP1	157,260	0.056	8,810
PP1	180,956		10,137
PP4	81,861		4,586
Average	*140,026*	*N/A*	*7,844*
Total	**420,077**	**N/A**	**23,533**

Sources: SCE 2016; DOE 2017.
Notes: MMBtu = million British thermal units.
Pool hours of operation assume 12 hours daily.
Pool heaters from the SDG&E study were assumed to use 78% efficient heaters (the minimum required by 10 CFR Part 431). Newer pools use heaters with 89%–95% efficiency (DOE 2017). Heaters in the Proposed Project were assumed to use 90% efficient heaters.

4.3.3 Mobile Sources

Mobile sources for the Proposed Project would primarily be motor vehicles (automobiles and light-duty trucks) traveling to and from the proposed land uses and would primarily include future residents. The anticipated Proposed Project trip generation, including the trip rates and total trips, is based on the Proposed Project's Transportation Impact Study prepared by Chen Ryan (Chen Ryan 2017a). CalEEMod was used to calculate the emissions resulting from on-road

mobile sources associated with residents as well as workers, customers, and delivery vehicles traveling to and from the proposed land use types.

The calculation of Proposed Project vehicle emissions is based on multiple variables, including trip rate, trip length, trip purpose, and trip type, which are all factors in estimating project-generated VMT and which are discussed in detail below.

Default trip generation rates and trip lengths included in CalEEMod for each analyzed Proposed Project land use in the buildout scenario were adjusted to match the average weekday trip rates and total weekday VMT data (107,130 VMT daily, discussed in detail below) provided in the Proposed Project's TDM Program Evaluation (Chen Ryan 2017b). In addition, Saturday and Sunday trip rates for the Proposed Project land uses were adjusted in proportion to the CalEEMod default trips rates and the Proposed Project's assumed weekday trip rate (Chen Ryan 2017b). The CalEEMod default and assumed Proposed Project trip rates are depicted in Table 13.

Table 13
CalEEMod Default Trip Rates and Assumed Project Trip Rates

Land Use Type	Size Metric	CalEEMod Default Trip Rates			Project Trip Rates[a]		
		Weekday Trip Rate	*Saturday Trip Rate*	*Sunday Trip Rate*	*Weekday Trip Rate*	*Saturday Trip Rate*	*Sunday Trip Rate*
Estate	Dwelling Unit	9.52	9.91	8.62	12	12.49	10.87
Single-Family Detached Housing	Dwelling Unit	9.52	9.91	8.62	10	10.41	9.05
Neighborhood/County Park (Undeveloped)	Acre	1.89	22.75	16.74	5	60.19	44.29
Public Safety Site	1,000 SF	6.38	2.49	0.73	1.88	0.73	0.22
Recreational Swimming Pool	1,000 SF	33.82	9.1	13.6	33	8.88	13.27
Mixed Use Commercial/Residential	1,000 SF	42.7	49.97	25.24	110	128.73	65.02

Sources: CAPCOA 2016; Chen Ryan 2017a.
SF = square feet
[a] Weekday trip rate provided in the Proposed Project's Traffic Impact Study and is not adjusted. Proposed Project Saturday and Sunday trips rates are adjusted based on the ratios of the CalEEMod default Saturday and Sunday trip rates to the CalEEMod default weekday trip rate.

The estimated daily and annual trips generated by the Proposed Project at build-out conditions in 2028, based on the trip rates depicted in Table 13, is presented in Table 14.

Table 14
Estimated Daily and Annual Proposed Project Trips at Build-Out (2028)

Land Use Type	Units	Size Metric	Trips per Day			Trips per Year		
			Weekday Trips	*Saturday Trips*	*Sunday Trips*	*Weekday Trips*	*Saturday Trips*	*Sunday Trips*
Estate	125	Dwelling Unit	1,500	1,561	1,358	390,000	81,172	70,616
Single-Family Detached Housing	994	Dwelling Unit	9,940	10,347	9,000	2,584,400	538,044	468,000
Neighborhood/County Park (Undeveloped)	13.9	Acre	70	837	616	18,200	43,524	32,032
Public Safety Site	8.5	1,000 SF	16	6	2	4,160	312	104
Recreational Swimming Pool	3	1,000 SF	132	36	53	34,320	1,872	2,756
Mixed Use Commercial/ Residential	10	1,000 SF	1,100	1,287	650	286,000	66,924	33,800
		Total	**12,758**	**14,074**	**11,679**	**3,317,080**	**731,848**	**607,308**
					Total Annual Trips	**4,656,236**		

Source: Chen Ryan 2017b.
SF = square feet

Implementation of PDF-TR-1 would result in reductions of Proposed Project VMT, which are presented in Table 15, Project Design Features that Reduce GHG Emissions. The estimated VMT reductions are based on the California Air Pollution Control Officers Association Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures (CAPCOA Quantification Report) (CAPCOA 2010) guidance document and the Proposed Project's TDM Program.

The CAPCOA Quantification Report notes that when determining the overall VMT reduction associated with a project, the VMT reduction for each individual strategy should be "dampened," that is adjusted to reflect the fact that some of the strategies may be redundant or applicable to the same populations (CAPCOA 2010). Based on the VMT reductions provided in Section 4.3.7, Village 14 would have a total VMT reduction of 4.7%. Similarly, based on the VMT reductions provided in Table 15, Planning Areas 16/19 would have a total VMT reduction of 2.0%. Before incorporation of VMT reductions associated with proposed TDM strategies, the estimated total daily VMT for the Proposed Project is 111,988 (Chen Ryan 2017b). As a result of implementation of the Proposed Project's TDM strategies (PDF-TR-1), there would be an overall reduction of 4,858 VMT per day, which represents a 4.3% total reduction in VMT. The estimated total daily VMT for the Proposed Project with implementation of the TDM Program is 107,130 (Chen Ryan 2017b).

In addition to trip rates (presented in Table 13), trip lengths, trip purpose, and trip type are factors in the calculation of Proposed Project VMT and associated vehicle-generated emissions. In general, CalEEMod determines an overall average trip length for primary, diverted, and pass-by trip link types[32] where primary trips are 100% of the trip length; diverted trips are 25% of the primary trip length; and pass-by trips are 0.1 mile (CAPCOA 2016). For this Proposed Project analysis, the CalEEMod default trip type percentages were adjusted so that the CalEEMod-generated VMT would mathematically match the overall weekday VMT data (i.e., 107,130 daily VMT) provided in the Proposed Project's TDM Program Evaluation (Chen Ryan 2017b). This simple mathematical adjustment was performed by assuming all trip lengths were the same and all trips were primary trips. This approach is consistent with the transportation modeling, which accounts for a full inventory of trip categories; that is, both primary and shorter trips are already assessed in the model (i.e., the modeled VMT estimates provided in the TDM Program Evaluation reflect primary trip, pass-by trips, and diverted trips). The CalEEMod default and adjusted trip lengths are depicted in Table 15.

Table 15
CalEEMod Default and Project Adjusted Trip Lengths

Land Use Type	CalEEMod Default Trip Lengths (Miles)			Adjusted Trip Lengths (Miles)		
Residential Trip Type	*Home-Work*	*Home-Shop*	*Home-Other*	*Home-Work*	*Home-Shop*	*Home-Other*
Estate	10.8	7.3	7.5	8.40	8.40	8.40
Single-Family Detached Housing	10.8	7.3	7.5	8.40	8.40	8.40
Commercial Trip Type	*Commercial-Customer*	*Commercial-Work*	*Commercial-Non-Work*	*Commercial-Customer*	*Commercial-Work*	*Commercial-Non-Work*
Neighborhood/County Park (Undeveloped)	7.3	9.5	7.3	8.40	8.40	8.40
Village Core Community Facility	7.3	9.5	7.3	8.40	8.40	8.40
Public Safety Site	7.3	9.5	7.3	8.40	8.40	8.40
Mixed-Use Commercial/Residential	7.3	9.5	7.3	8.40	8.40	8.40

Sources: Chen Ryan 2017a; CAPCOA 2016.

[32] Trip link types further describe the characteristics of the trip attracted to each land use, whether it is a primary trip, a diverted link trip, or a pass-by trip. For example, a commercial customer pass-by trip could be a person going from home to shop on the way to work. In addition, a commercial customer diverted-link trip could be a person going from home to work, and making a diversion to shop (CAPCOA 2016).

Finally, CalEEMod default emissions factors and vehicle fleet mix were conservatively used for the model inputs to estimate daily emissions from proposed vehicular sources.[33] Emission factors representing the vehicle mix and emissions for 2028 were used to estimate emissions associated with full build-out of the Proposed Project.

Electrical Vehicle Charging Infrastructure

The Proposed Project would include a multi-pronged approach to increasing EV adoption for residents of the Proposed Project. As part of this strategy: Level 2 Electric Vehicle Supply Equipment (EVSE) would be installed in the garages in half of all residential units[34] (560 units) and 10 parking spaces located in the Proposed Project's non-residential areas, including the Village Core and park areas.[35] These Proposed Project–specific strategies, in conjunction with market forces decreasing the cost and increasing the availability of EVs, regional charging initiatives decreasing range anxiety and increasing the share of miles driven by plug-in hybrid electric vehicles (PHEVs) in EV mode, and state targets fueling large programs and incentive pools making EV ownership more cost effective and appealing, will increase the market penetration of EVs and share of EV miles driven as a result of the Proposed Project.

The cornerstone of the Proposed Project's strategy to increase EV adoption by future residents is the availability of "fast-charging" through 240 volt Level 2 EVSE equipment. In a 2011 report investigating people's major decision-making factors in purchasing an EV, the highest percentage of respondents (63%) cited the ability to charge at home (Accenture 2011). Home charging is also the most commonly used method of charging, accounting for more than 70% of all charging (Holland 2016). Charging at home is often the most convenient, since cars are parked overnight, allowing them sufficient time to charge when they are not in use and when energy is priced at "super off-peak" and is the least expensive (SDG&E 2017).

Studies have found that the availability of charging at home increased the person's propensity to purchase both EVs and PHEVs (Hidrue et al. 2011; Tal et al. 2013). Additionally, the CEC identified home charging as a high-priority strategy to increase EV sales and increase the amount

[33] Motor vehicles may be fueled with gasoline, diesel, or alternative fuels. The default vehicle mix (vehicle class distribution including automobiles, trucks, buses, motorcycles) provided in CalEEMod 2016.3.1, which is based on CARB's Mobile Source Emissions Inventory model, EMFAC, version 2014, was applied.

[34] Providing EVSE to half of all Proposed Project residential units was chosen as an estimate of market demand. It is assumed that providing EVSE would incentivize homeowners to purchase EVs or provide an opportunity to homeowners who own EVs to have in-home chargers.

[35] To meet Governor Brown's goals, 15% of new car purchases in 2025 would need to be ZEVs; 3% of new car purchases in 2016 were ZEVs (CEC 2016). This adoption rate is anticipated to be slightly higher in urban areas with major destinations in typical EV range, which the Proposed Project's in-home EVSE would support. The non-residential spaces were determined to assist those with range anxiety and non-resident visitors to the site, as the entire Project is well within typical EV and PHEV range.

of miles driven by EVs (NREL 2014). The importance of charging EVs at home has been shown to be leveraged and made more appealing with the free installation of Level 2 EVSE. Of early EV owners surveyed in 2013, 56% of those respondents received a free or subsidized Level 2 charger, and almost 60% of those who received free or subsidized chargers cited the importance of that charger as either "a lot" or "a deciding factor" (CSE 2013). Of owners of PHEVs, 80% of them found the importance of the subsidy to install a Level 2 charger influential in their purchase (Krupa et al. 2014).

The Proposed Project's efforts to increase EV adoption is also supported by the charging infrastructure in the surrounding community. In the City of Chula Vista, there are over 20 public charging stations within 15 miles of the Project Area, and 140 public charging stations within the Greater San Diego Area (Plugshare 2017). This existing infrastructure is focused in areas where cars are parked for longer periods of time allowing for greater charging, such as shopping malls and downtowns. This infrastructure pattern allows for PHEVs to charge more frequently and achieve similar EV mode miles as full-EVs (INL 2016). Planned infrastructure in the San Diego region, notably at park and rides and the San Diego International Airport is congruent with strategies outlined by the National Energy Renewable Laboratory (NREL 2014; Trabish 2017).

Of EV owners surveyed, 94% live in households with two or more people, and most have access to a conventional gasoline or diesel car. For those households with both a conventional gas car and EV, the EV is used for over 85% of the household VMT, and the conventional car is used primarily used for vacation and long distance travel (CSE 2012, 2013). The development pattern of the Proposed Project would serve households similar to those existing owners and is well within EV range of existing employment and retail centers in the City of Chula Vista. Therefore, the Proposed Project's majority single-family product type and proximity to daily needs well within current EV range, make it well suited for EV adoption, and associated on-site mitigation would meaningfully reduce on-site GHG emissions. Substantial reduction in VMT-related emissions would be expected from the Proposed Project's facilitation of EV ownership; however, to provide a conservative estimate, no reductions were assumed.

4.3.4 Solid Waste

The Proposed Project would generate solid waste, and therefore, result in CO_2e emissions associated with landfill off-gassing. CalEEMod default values for solid waste generation were used to estimate GHG emissions associated with solid waste. A Proposed Project-wide waste disposal rate of 3.6 tons per day was assumed consistent Section 3.1.8, Utilities and Service Systems, of the Proposed Project's EIR.

4.3.5 Water and Wastewater

Supply, conveyance, treatment, and distribution of water for the Proposed Project require the use of electricity, which would result in associated indirect GHG emissions. Similarly, wastewater generated by the Proposed Project requires the use of electricity for conveyance and treatment, along with GHG emissions generated during wastewater treatment. Water consumption estimates for both indoor and outdoor water use and associated electricity consumption from water use and wastewater generation were estimated using the Proposed Project's water conservation plan.[36]

4.3.6 Regulatory Compliance Measures and Project Design Features that Reduce GHG Emissions

Table 16, Regulatory Compliance Measures that Reduce GHG Emissions, summarizes the regulatory measures that would be implemented to reduce the Proposed Project's operational GHG emissions.

Table 16
Regulatory Compliance Measures that Reduce GHG Emissions

Regulation Number	Regulatory Compliance Measure	Description	Quantification Details
		Energy	
REG-GHG-1	Compliance with Title 24 Building Energy Efficiency Standards	Title 24 of the California Code of Regulations serves to enhance and regulate California's building standards. The most recent amendments to Title 24, Part 6, referred to as the 2016 standards, became effective on January 1, 2017. CalEEMod Version 2016.3.1 assumes compliance with 2013 Title 24 Standards. In general, single-family homes built to the 2016 standards are anticipated to use about 28% less energy for lighting, heating, cooling, ventilation, and water heating than those built to the 2013 standards, and non-residential buildings built to the 2016 standards will use an estimated 5% less energy than those built to the 2013 standards (CEC 2015a).	Per PDF-AQ/GHG-2, the Proposed Project residential land uses would be ZNE, which exceeds the energy efficiency requirements of the 2016 Title 24 standards. Accordingly, no emission reduction associated with compliance with 2016 Title 24 building energy efficiency standards was assumed for residential land uses. For the Proposed Project's non-residential land uses, CalEEMod default energy values were conservatively assumed, which reflect compliance with 2013 Title 24 standards. Accordingly, no emission reduction associated with compliance with 2016 Title 24

[36] It was assumed that 50% of the Proposed Project's water usage would be indoor water use and 50% would be outdoor use for all land uses with the exception of parks. Park water usage is assumed to be 100% outdoor water use, with no indoor water use.

Table 16
Regulatory Compliance Measures that Reduce GHG Emissions

Regulation Number	Regulatory Compliance Measure	Description	Quantification Details
			building energy efficiency standards was assumed for non-residential land uses.
REG-GHG-2	Solar-Ready Units	Per CEC's *2016 Residential Compliance Manual* (CEC 2015c), all single-family homes constructed as part of the Proposed Project would be designed with pre-plumbing for solar water heaters and solar and/or wind renewable energy systems.	No reduction assumed.
REG-GHG-3	Renewables Portfolio Standards (RPS)	Implementation of the 20% RPS mandate by 2010 would reduce GHG emissions in the near-term. Implementation of the 33% target by 2020 would reduce GHG emissions by following full implementation of the RPS. Implementation of the 33% RPS would reduce GHG emissions by 27% below 2006 levels. Implementation of the 50% mandate by 2030 would reduce GHG emissions by an additional 17%.	The emissions intensity factors for utility energy use were adjusted in CalEEMod to account for implementation of RPS based on the SB 350, CalEEMod 2016.3.1, Appendix D, Table 1.2, and the SDG&E 2009 Power Content Label (actual; SDG&E 2009). The RPS for operational year 2028 was 46.6% interpolated from the 2020 and 2030 goals of 33 and 50% respectively. (See Appendix A.)
		Mobile Sources	
REG-GHG-4	Low Carbon Fuel Standard	The Low Carbon Fuel Standard is anticipated to achieve a 10% reduction in emissions from transportation fuels.	Conservatively, no reduction was taken for this regulation. Although the Low Carbon Fuel Standard would reduce emissions from transportation fuels, EMFAC 2014 (CARB 2015c) – which forms the platform for CalEEMod Version 2016.3.1's mobile source emissions factors – does not account for it.
REG-GHG-5	State and Federal Mobile Source Reduction Strategies	• Advanced Clean Cars (for model years 2016 and beyond) The Advanced Clean Car standards would result in approximately 3% more reductions from passenger vehicles than the Pavley standards by 2020, 12% by 2025, 19.5% by 2030, and 33% by 2050. • Truck and Bus Rule (2014 Amendment) • Heavy-Duty Greenhouse Gas Phase 1 (2013), which includes the 2013 Tractor-Trailer Greenhouse Gas Regulation Amendments and Federal Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles	Accounted for in EMFAC 2014 vehicle emission factors as part of CalEEMod Version 2016.3.1.

Table 16
Regulatory Compliance Measures that Reduce GHG Emissions

Regulation Number	Regulatory Compliance Measure	Description	Quantification Details
		• Pavley I federal standard for model years 2012 through 2016	
REG-GHG-6	Pre-Wiring for Electric Vehicle Charging Equipment	Per CALGreen, pre-wiring for the installation of electric vehicle (EV) charging equipment in the garages in all residential units and in the Village Core would be implemented (CALGreen 2016b and 2016c).	Conservatively, no reduction was taken for this regulation.
		Solid Waste	
REG-GHG-7	Curbside Recycling	Proposed Project-wide curbside recycling for residential units, school, commercial, and retail establishments would be required in accordance with the California Integrated Waste Management Act (AB 939) and AB 341.	Measure would contribute toward 75% diversion rate as required by AB 939 and AB 341. The solid waste generation rate developed for the Proposed Project includes diversion requirements. No additional reductions were assumed.
		Water Conservation	
REG-GHG-8	Low-Flow Fixtures	Indoor residential plumbing products would comply with the 2016 CALGreen Code, including future updates to CALGreen as these updates apply to homes in the Proposed Project built under the updated code.	Reductions accounted for in the Water Conservation Plan (Dexter Wilson 2017). No further reductions were assumed in emissions estimates.
REG-GHG-9	Reduction in Indoor Water Use	The Proposed Project would comply with EO B-29-15, which calls for a 25% reduction in total water use below 2013 levels. Otay Water District has adopted a 20% reduction in water use.	Reductions accounted for in Water Conservation Plan (Dexter Wilson 2017). No further reductions were assumed in emissions estimates.
REG-GHG-10	Reduction in Outdoor Water Use	The Proposed Project would comply with EO B-29-15, which calls for a 25% reduction in total water use below 2013 levels. To achieve this reduction, the Proposed Project would employ drought-tolerant landscaping ~~and recycled water for irrigation,~~ and may offer plumbing for grey water systems, if feasible. In addition, through the Proposed Project's plan process, and, in the case of individual homeowners, the Proposed Project's Covenants, Conditions, and Restrictions, the Proposed Project would be required to comply with the County of San Diego's	Reductions associated with EO B-29-15 and the County's Landscape Ordinance and Water Efficient Landscape Design Manual (County of San Diego 2016) were accounted for in water demand study (Dexter Wilson 2017). No further reductions were assumed in emissions estimates.

Table 16
Regulatory Compliance Measures that Reduce GHG Emissions

Regulation Number	Regulatory Compliance Measure	Description	Quantification Details
		Landscape Ordinance and Water Efficient Landscape Design Manual for all outdoor landscapes, including common areas, public spaces, parkways, medians, parking lots, parks, and all builder- and homeowner-installed private front yard and backyard landscaping.	

The Proposed Project also includes PDFs that would reduce GHG emissions through the design of the Project Area's uses, including the transportation network. Table 17 identifies the PDFs and associated quantification details, where applicable.

Table 17
Project Design Features that Reduce GHG Emissions

PDF Number	Strategy to Reduce GHG Emissions	Description	Quantification Details
Energy Efficiency Measures			
PDF-AQ/GHG-1	Wood Burning Stoves and Fireplaces	Prior to the issuance of residential building permits, the Proposed Project applicant or its designee shall submit building plans illustrating that no wood burning stoves or fireplaces would be constructed.	The number of wood burning stoves and fireplaces were set to zero in CalEEMod. Natural gas fireplace use was included in the natural gas consumption estimates in the energy module of CalEEMod.
PDF-AQ/GHG-2	Zero Net Energy Residences	Prior to the issuance of residential building permits, the Proposed Project applicant or its designee shall submit building plans illustrating compliance with the zero net energy (ZNE) design standards defined by the California Energy Commission.	Proposed Project-specific electricity and natural gas assumptions were incorporated into CalEEMod for the residential land uses based on the Jackson Pendo Development Company Building Analysis (ConSol 2017).
PDF-AQ/GHG-3	Non-Residential Energy Improvement Standards	Prior to the issuance of non-residential building permits, the Proposed Project applicant or its designee shall submit building plans illustrating that the Proposed Project's non-residential land uses shall achieve a 10% greater building energy efficiency than required by the 2016 State energy efficiency standards in Title 24, Part 6 of the California Code of Regulations.	CalEEMod default energy rates reflect 2013 standards. Accordingly, Title 24 energy use was adjusted to reflect the estimated 5% increase in efficiency for non-residential buildings (CEC 2015a), and then adjusted to reflect an additional 10% increase on

Table 17
Project Design Features that Reduce GHG Emissions

PDF Number	Strategy to Reduce GHG Emissions	Description	Quantification Details
			the calculated 2016 energy demand factors.
PDF-AQ/GHG-4	Energy Star Appliances	All appliances (washer/dryers, refrigerators, and dishwashers) that will be installed by builders in residences and commercial businesses shall be Energy Star rated or equivalent.	The following percent improvement in energy efficiency was assumed in CalEEMod based on default values: Clothes washers: 30% Dishwashers: 15% Fan: 50% Refrigerator: 15%
PDF-AQ/GHG-5	Solar Water Heating	Prior to the issuance of private recreation center building permits, the Proposed Project applicant or its designee shall submit swimming pool heating design plans to San Diego County for review and approval. The design plans shall demonstrate that swimming pools located at private recreation centers in the Project Area are designed and shall be constructed to use solar water heating or other technology with an equivalent level of energy efficiency.	Emission reduction was calculated based on Metering and Measuring of Multi-Family Pool Pumps, Final Report (SCE 2016) and Gas Swimming Pool Heaters (DOE 2017).
PDF-AQ/GHG-6	Efficient Outdoor Lighting	Prior to the issuance of permits, the Proposed Project applicant or its designee shall submit building plans that demonstrate that all outdoor lighting shall be (light emitting diodes) LED or other high efficiency lightbulbs	Conservatively, no credit was taken for distribution of New Resident Distribution Packets.
PDF-AQ/GHG-7	Energy Efficiency Education	All new home packets will provide information on energy efficiency, energy efficient lighting and lighting control systems, energy management, and existing energy incentive programs.	Conservatively, no credit was taken for distribution of New Resident Distribution Packets.
PDF-AQ/GHG-8	Cool Roofs	Prior to the issuance of residential building permits, the Proposed Project applicant or its designee shall submit building plans illustrating that residential structures shall meet the U.S. Green Building Council standards for cool roofs. This is defined as achieving a three-year solar reflectance index (SRI) of 64 for a low-sloped roof and an SRI of 32 for a high- sloped roof. Prior to the issuance of non-residential building permits, the Proposed Project applicant or its designee shall submit building plans illustrating non-residential structures shall meet the U.S. Green Building Council standards for cool roofs. This is defined as achieving a three-year SRI of 64 for a low-sloped roof and 32 for a high- sloped roof..	Conservatively, no credit was taken for implementation of cool roofs.

Table 17
Project Design Features that Reduce GHG Emissions

PDF Number	Strategy to Reduce GHG Emissions	Description	Quantification Details
PDF-AQ/GHG-9	Cool Pavements	Prior to the issuance of building permits, the Proposed Project applicant or its designee shall submit building plans illustrating that outdoor pavement, such as walkways and patios shall use paving materials with three-year SRI of 0.28 or initial SRI of 0.33.	Conservatively, no credit was taken for implementation of cool pavement.
Mobile Emissions Reductions			
PDF-AQ/GHG-10~~6~~	Electric Vehicle Charging Stations	Prior to the issuance of residential building permits, the Proposed Project applicant or its designee shall submit plans for the installation of a dedicated 208/240 dedicated branch circuit will be included in each garage and one Level 2 electric vehicle (EV) charging station in the garage in half of all residential units to San Diego County for review and approval.	Conservatively, no credit was taken for implementation for EV chargers.
PDF-TR-1	Bus Pull-Ins	Bus pull-ins will be constructed throughout the Project Area.	Conservatively, no credit was taken for implementation for bus-pull-ins.
	Improve Design of Development	The Proposed Project will include improved design elements to enhance walkability and connectivity. Improved street network characteristics within a neighborhood include street accessibility, usually measured in terms of average block size, proportion of four-way intersections, or number of intersections per square mile. Design is also measured in terms of sidewalk coverage, building setbacks, street widths, pedestrian crossings, presence of street trees, and a host of other physical variables that differentiate pedestrian-oriented environments from auto-oriented environments.	Conservatively, no credit was taken for implementation of improvement of design.
	Locate Project Near Bike Path/Bike Lane	The Proposed Project will be located within 1/2 mile of an existing Class I path or Class II bike lane. The Proposed Project design should include a comparable network that connects the Proposed Project uses to the existing off-site facilities.	A 0.63% reduction in VMT from Village 14 was assumed based on the Proposed Project's TDM Program Evaluation (Chen Ryan 2017b).
	Provide Pedestrian Network Improvements	The Proposed Project will provide a pedestrian access network that internally links all uses and connects to all existing or planned external streets and pedestrian facilities contiguous with the Project Area. The Proposed Project will minimize barriers to pedestrian access and interconnectivity. Physical barriers such as walls, landscaping, and slopes that impede pedestrian circulation will be eliminated.	A 2% reduction in VMT from Village 14 was assumed based on the Proposed Project's TDM Program Evaluation (Chen Ryan 2017b).
	Provide Traffic Calming Measures	Proposed Project design will include pedestrian/bicycle safety and traffic calming measures in excess of jurisdiction requirements.	A 0.63% reduction in VMT from Village 14 and Planning Areas 16/19 was assumed

Table 17
Project Design Features that Reduce GHG Emissions

PDF Number	Strategy to Reduce GHG Emissions	Description	Quantification Details
		Roadways will be designed to reduce motor vehicle speeds and encourage pedestrian and bicycle trips with traffic calming features. Traffic calming features may include: marked crosswalks, count-down signal timers, curb extensions, speed tables, raised crosswalks, raised intersections, median islands, tight corner radii, roundabouts or mini-circles, on-street parking, planter strips with street trees, chicanes/chokers, and others.	based on the Proposed Project's TDM Program Evaluation (Chen Ryan 2017b).
	Dedicate Land for Bike Trails	Larger projects may be required to provide for, contribute to, or dedicate land for the provision of off-site bicycle trails linking the Proposed Project to designated bicycle commuting routes in accordance with an adopted citywide or countywide bikeway plan.	A 0.10% reduction in VMT from Village 14 was assumed based on the Proposed Project's TDM Program Evaluation (Chen Ryan 2017b).
	Provide Ride-Sharing Programs	The Proposed Project will include a ride-sharing program as well as a permanent transportation management association membership and funding requirement. Funding may be provided by Community Facilities, District, or County Service Area, or other non-revocable funding mechanism. The Proposed Project will promote ride-sharing programs through a multi-faceted approach such as: • Designating a certain percentage of parking spaces for ride sharing vehicles • Designating adequate passenger loading and unloading and waiting areas for ride-sharing vehicles • Providing a website or message board for coordinating rides	A 0.75% reduction in VMT from Village 14 and Planning Areas 16/19 was assumed based on the Proposed Project's TDM Program Evaluation (Chen Ryan 2017b).
	Implement Commute Trip Reduction Marketing	The Proposed Project will implement marketing strategies to reduce commute trips. Information sharing and marketing are important components to successful commute trip reduction strategies. Implementing commute trip reduction strategies without a complementary marketing strategy will result in lower VMT reductions. Marketing strategies may include: • New employee orientation of trip reduction and alternative mode options • Event promotions • Publications	A 0.40% reduction in VMT from Village 14 and Planning Areas 16/19 was assumed based on the Proposed Project's TDM Program Evaluation (Chen Ryan 2017b).
	Implement a School Pool Program	This Proposed Project will create a ridesharing program for school children. Most school districts provide busing	A 0.24% reduction in VMT from Village 14 and Planning Areas

Table 17
Project Design Features that Reduce GHG Emissions

PDF Number	Strategy to Reduce GHG Emissions	Description	Quantification Details
		services to public schools only. School Pool helps match parents to transport students to private schools, or to schools where students cannot walk or bike but do not meet the requirements for bussing.	16/19 was assumed based on the Proposed Project's TDM Program Evaluation (Chen Ryan 2017b).
	Required Project Contributions to Transportation Infrastructure Improvement Projects	The Proposed Project should contribute to traffic-flow improvements or other multi-modal infrastructure projects that reduce emissions and are not considered as substantially growth inducing. The local transportation agency should be consulted for specific needs.	Conservatively, no credit was taken for Proposed Project contributions to transportation infrastructure improvements.
Water Reduction Measures			
PDF-UT-1	Hot Water Pipe Insulation – Residential and Non-Residential	All hot water pipes shall be insulated and hot and cold water piping shall be separated.	Estimated annual water savings of 2,400 gallons per unit. Reduction included in water-use estimates. No additional reduction assumed.
PDF-UT-2	Pressure Reducing Valves – Residential and Non-Residential	The maximum service pressure shall be set to 60 pounds per square inch to reduce potential leakage and prevent excessive flow of water from all appliances and fixtures.	Estimated annual water savings of 1,800 gallons per unit. Reduction included in water-use estimates. No additional reduction assumed.
PDF-UT-3	Water Efficient Dishwashers	Water efficient dishwashers that carry the Energy Star label shall be installed in all residential units and commercial uses where appropriate.	Estimated annual water savings of 650 gallons per unit. Reduction included in water use estimates. No additional reduction assumed.
PDF-UT-4	Residential Landscaping	All Proposed Project landscaping shall comply with the Model Water Efficient Landscape Ordinance, California Code of Regulations Title 23, Division 2, Chapter 2.7 (Section 490 et seq.). By complying with this ordinance, it is estimated that outdoor water use at single family residences will be reduced by approximately 10 percent. With an estimated total water use of 500 gpd per home and approximately 50 percent of this water used outdoors, the estimated annual water savings is 9,125 gallons per home. Residential water use can vary widely based on the size of lots; however, based on OWD factors for the Proposed Project, estimated water sue for a typical single family home is 435 gpd for densities of 3.0 to 10 units per acre, 700 gpd for densities of 1.0 to 3.0 units per acre, and 1,000 gpd for densities of less than 1.0 units per acre. With an estimated 50 percent of this water used outdoors, the estimated annual water savings is 7,940 gallons per single family	Estimated that outdoor water use at single-family residences will be reduced by approximately 10%. Reduction included in water use estimates. No additional reduction assumed.

Table 17
Project Design Features that Reduce GHG Emissions

PDF Number	Strategy to Reduce GHG Emissions	Description	Quantification Details
		residence where densities are from 3.0 to 10 units per acre, 12,775 gallons per single family residence where densities are from 1.0 to 3.0 units per acre, and 18,250 gallons per single family residence where densities are less than 1.0 units per acre based on these assumptions.	
PDF-UT-5	Outdoor Watering	Home Owner's Associations shall appropriately regulate the use of water for cleaning outdoor surfaces and vehicles through the Covenants, Conditions, and Restrictions.	Conservatively, no credit was taken for implementation for reduced outdoor watering.

Note: PDF = project design feature

As provided in Tables 15 and 16, the emission reduction benefits of regulatory compliance measures and PDFs are not always readily quantifiable. As such, the emissions inventory estimates presented in this report provide a conservative representation of Proposed Project emissions.

4.4 Land Use Change and Vegetation Carbon Sequestration

4.4.1 Loss of Sequestered Carbon

The calculation methodology and default values provided in CalEEMod (CAPCOA 2016) were used to calculate potential CO_2 emissions associated with the one-time change in carbon sequestration capacity of a vegetation land use type. The calculation of the one-time loss of sequestered carbon is the product of the converted acreage value and the carbon content value for each land use type (vegetation community). The mass of sequestered carbon per unit area (expressed in units of MT of CO_2 per acre) is dependent on the specific land use type. Assuming that the sequestered carbon is released as CO_2 after removal of the vegetation, annual CO_2 is calculated by multiplying total biomass (MT of dry matter per acre) from IPCC data by the carbon fraction in plant material, and then converting MT of carbon to MT of CO_2 based on the molecular weights of carbon and CO_2.

It is conservatively assumed that all sequestered carbon from the removed vegetation will be returned to the atmosphere; that is, the wood from the trees and vegetation communities would not be re-used in a solid form or another form that would retain carbon. GHG emissions generated during construction activities, including clearing, tree removal, and grading, are estimated in the construction emissions analysis.

CalEEMod calculates GHG emissions resulting from land conversion and uses six[37] general IPCC land use classifications for assigning default carbon content values (in units of MT CO_2/acre). CalEEMod default carbon content values were assumed to estimate the loss of sequestered carbon (release of CO_2) from the removal of the scrub (14.3 MT CO_2/acre), forest (111 MT CO_2/acre), and grassland (4.31 MT CO_2/acre) vegetation categories, which are based on data and formulas provided in the IPCC reports. The Proposed Project would permanently disturb a total of 810.15 acres with varying carbon content values.

4.4.2 Gain of Sequestered Carbon

The calculation methodology and default values provided in CalEEMod were also used to estimate the one-time carbon-stock change from planting new trees. Trees sequester CO_2 while they are actively growing and the amount of CO_2 sequestered depends on the type of tree. Thereafter, the accumulation of carbon in biomass slows with age, and is assumed to be offset by losses from clipping, pruning, and occasional death. Active growing periods are subject to, among other things, species, climate regime, and planting density; however, for modeling purposes, CalEEMod assumes the IPCC active growing period of 20 years (CAPCOA 2016).

The sequestered carbon from new trees modeling does not include CO_2 emissions estimates associated with planting, care, and maintenance activities (e.g., tree planting and care vehicle travel and maintenance equipment operation). Landscape maintenance equipment emissions, which are anticipated to be minimal, were included in the area source emission estimates included in the operational GHG emissions calculations. Conservatively, this analysis does not consider carbon sequestration associated with land preservation or conservation.

CalEEMod calculates GHG sequestration that results from planting of new trees and has default carbon content values (in units of MT CO_2/tree/year) for 10 different general tree species and a miscellaneous tree category.[38] As the types of tree species that will be planted within the Project Area are currently unknown, the CO_2 sequestration rate of 0.0354 MT CO_2/tree/year for the miscellaneous tree species category was assumed in this analysis. It is assumed that all 8,000 trees will grow for a minimum of 20 years.

[37] Forest land (scrub), forest land (trees), cropland, grassland, wetlands, and other.
[38] Aspen, soft maple, mixed hardwood, hardwood maple, juniper, cedar/larch, Douglas fir, true fir/hemlock, pine, spruce, and miscellaneous.

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5 PROJECT IMPACT ANALYSIS

5.1 Potential to Generate Significant GHG Emissions

5.1.1 Guideline for Determining Significance

Based on Appendix G of the CEQA Guidelines, the Proposed Project would have a significant impact if it would:

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

5.1.2 Construction-Related GHG Emissions

Table 18, Estimated Annual Construction GHG Emissions, shows the estimated annual GHG construction emissions associated with the Proposed Project by year.

Table 18
Estimated Annual Construction GHG Emissions

Year	CO_2	CH_4	N_2O	CO_2e
	Metric Tons per Year			
2019	793.65 ~~784.49~~	0.17	0.00	793.82 ~~797.55~~
2020	1,360.67 ~~1,342.98~~	0.37	0.00	1,361.04 ~~1,352.22~~
2021	2,949.77 ~~2,339.79~~	0.41~~39~~	0.00	2,960.02 ~~2,349.56~~
2022	1,838.84 ~~1,813.98~~	0.38~~37~~	0.00	1,848.46 ~~1,823.22~~
2023	2,201.61 ~~2,088.40~~	0.34	0.00	2,210.16 ~~2,097.23~~
2024	1,394.70 ~~1,234.14~~	0.31	0.00	1,402.63 ~~1,241.83~~
2025	1,023.88	0.24	0.00	1,029.85
2026	586.25	0.13	0.00	589.45
2027	181.24	0.04	0.00	182.32
Total	12,330.62 ~~**11,395.13**~~	2.40 ~~**2.36**~~	0.00~~**0.00**~~	12,377.74 ~~**11,463.22**~~

Notes:
CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2e = carbon dioxide equivalent.
See Appendix A for complete results.
Includes rock crushing emissions (2019, 2020, 2021, 2022, 2023, 2024). Includes blasting emissions (2019, 2020, 2021, 2022, 2023) See Appendix A for detailed emissions.

As shown in Table 18, estimated total Proposed Project construction GHG emissions are approximately ~~11,463~~ 12,378 MT CO_2e over 9 years (2019 through 2027). In 2022, emissions would increase by 9.27 MT CO_2e if the Proctor Valley Road North Option is selected.

Neither the Perimeter Trails Option of Preserve Trails Option would require additional construction; therefore, construction of these options would not result in additional GHG emissions.

As discussed in Section 4.4.1, the loss of sequestered carbon is estimated based on the carbon content for each vegetation land use type (MT CO_2 per acre) and the initial and final acreage of the vegetation land use type. The Proposed Project would permanently impact 699.9 acres of scrub land, 0.2 acres of trees, and 85.5 acres of grasslands. The Proposed Project would also permanently impact 1.5 acres of wetlands and 27.05 acres of disturbed or developed land, which do not have carbon value per CalEEMod (CAPCOA 2016), but are presented for completeness. The loss of sequestered carbon associated with the Proposed Project's land use change is presented in Table 19.

Table 19
Vegetation Removal – Estimated Loss of Sequestered Carbon

Vegetation Type	CalEEMod Vegetation Land Use Category	CO_2 Emissions Factor (MT CO_2/acre)	Initial (acres)	Final (acres)	Net Loss (acres)	Loss of Sequestered Carbon (MT CO_2)
Forest Land	Scrub	14.3	1,216.50	516.60	699.90	10,009
Forest Land	Trees	111	3.40	0.20	0.20	22
Grassland	Grassland	4.31	111.50	30.00	81.50	351
Wetlands	Wetlands	0	8.30	6.80	1.50	0
Others	Others	0	31.10	4.05	27.05	0
		Total	**1,370.80**	**557.65**	**810.15**	**10,382**

Source: CAPCOA 2016.
Notes:
MT CO_2 = metric tons carbon dioxide.
See Appendix A for complete results.

As shown in Table 19, the estimated total one-time loss of sequestered carbon from land use conversion for the Proposed Project is 10,382 MT CO_2. The "project life" is assumed to be 30 years, which is consistent with the 30-year project life time frame used by the South Coast Air Quality Management District's GHG guidance (SCAQMD 2008). Accordingly, the loss of sequestered carbon amortized over 30 years is approximately 346 MT CO_2e per year.

As shown in Table 20, the total construction emissions for the Proposed Project were ~~11,463~~ 12,378 MT CO_2e. The combined emissions for the construction period including the loss of carbon due to vegetation removal was ~~21,845~~22,760 MT CO_2e. The amortized construction GHG emissions over the lifetime of the Proposed Project (30 years) would be approximately ~~728~~ 759 MT CO_2e per year.

Construction-related GHG mitigation measures are provided in Section 5.1.4.

Table 20
Estimated Total Construction and Vegetation Removal GHG Emissions

Emission Source	CO_2	CH_4	N_2O	CO_2e
	Metric Tons per Year			
Construction Emissions	12,330.62~~-11,395.13~~	2.40~~-2.36~~	0.00	12,377.74~~-11,463~~
Vegetation Removal	10,382	0.00	0.00	10,382
			Total Emissions	**~~21,845~~22,760**
			Emissions Amortized Over 30 Years	**~~728~~759**

Notes:
CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2e = carbon dioxide equivalent.
See Appendix A for complete results.

Because there is no separate GHG threshold for construction, the evaluation of significance is discussed in the operational emissions analysis below.

5.1.3 Operational GHG Emissions

As discussed in Section 4.3, the Proposed Project would generate operational GHG emissions from area sources (hearths and landscape maintenance), energy sources (electricity and natural gas consumption), mobile sources (vehicle trips), water supply and wastewater treatment, and solid waste. In regards to energy use, as discussed in Section 4.3.2, the Proposed Project would produce on-site renewable solar energy, which would reduce GHG emissions that would otherwise be generated using non-renewable energy sources. Table 21 presents the GHG reduction from the total solar production. Energy demand on site was adjusted for the stringent efficiency standards of ZNE and reflected in the CalEEMod, but no reductions in demand from on-site solar CalEEMod were taken for the use of solar on site. Therefore, for the purpose of this analysis, all solar energy produced on site is assumed to be sold onto the SDG&E grid regardless if it is consumed on or off site. The CO_2 intensity of SDG&E energy in 2028 is assumed to be 427.49 pounds of CO_2 per megawatt hour as interpolated from the 2009 CO_2 intensity of non-renewable sources and the RPS standards.[39] Solar produced on site is assumed to be carbon neutral.

[39] The use of 2009 as baseline was chosen consistent with CalEEMod. SDG&E 2009 power mix was assumed to be 10% as specified in the SDG&E power content label and were removed to create an artificial baseline with no renewable power (SDG&E 2009).

Table 21
Greenhouse Gas Offset from On-Site Residential Solar Energy Production

Land Use	Rated Solar PV Production[a] (kW/system)	Number of Dwelling Units (DU)	Annual Renewable Energy Generated[b] (kWh/year/system)	Total Annual Renewable Energy Generated (kWh/year)	Total Annual Solar PV[c] CO_2 Reduction (MT CO_2/year)
Zero Net Energy	5.0	1,119	8,093.30	9,056,403	1,760

Source: ConSol 2017.
Notes:
kW = kilowatt; DU = dwelling units; MT CO_2/year = metric tons carbon dioxide per year
[a] Based on ConSol study to achieve CEC definition of ZNE design for residences. For the Proposed Project, a 2-story 3,652-square-foot home constructed to ZNE design standards would need a 5.0 kW solar power system to reach ZNE in Climate Zone 10, Chula Vista.
[b] Annual renewable energy generated per unit from ConSol Building Analysis (ConSol 2017).
[c] Annual PV GHG reduction is based on the CO_2e emission factor for SDG&E in 2028, assuming 46.6% RPS.

Table 22 presents the operational GHG emissions for the Proposed Project's consumption and generation (offset) of energy.

Table 22
Estimated Annual Operational Energy GHG Emissions (2028)

Energy Source	CO_2	CH_4	N_2O	CO_2e
	Metric Tons per Year			
General Energy Demand	2,867.31	0.12	0.05	2,884.26
Reduction from Rooftop Solar	(1,760)	0.00	0.00	(1,760)
Energy Demand from Pools	1,270.57	0.02	0.02	1,278.65
Reduction from Solar Pool Heating	(1,257.91)	(0.02)	(0.02)	(1,265.94)
Energy (Net) Total	**1,119.97**	**0.12**	**0.05**	**1,136.97**

Notes:
CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2e = carbon dioxide equivalent.
Numbers in parentheses represent negative numbers (i.e., a reduction in emissions).
See Appendix A for complete results.

Table 23 presents the long-term operational GHG emissions for the Proposed Project. See Table ~~15~~ 16 for a description of what PDFs were quantitatively included in the Proposed Project operational emission estimates.

Table 23
Estimated Annual Operational GHG Emissions (2028)

Emissions Source	CO_2	CH_4	N_2O	CO_2e
	Metric Tons per Year			
Area	13.58	0.01	0.00	13.91

Table 23
Estimated Annual Operational GHG Emissions (2028)

Emissions Source	CO_2	CH_4	N_2O	CO_2e
	Metric Tons per Year			
Energy (Net)	1,119.97	0.12	0.05	1,136.97
Mobile	13,466.72	0.71	0.00	13,484.49
Solid Waste	266.73	15.76	0.00	660.81
Water and Wastewater	873.00	5.49	0.14	1,051.97
			Total	**16,34884**

Notes:
CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2e = carbon dioxide equivalent.
Implementation of PDF-AQ/GHG-2 would result in an annual energy savings of 1,760 of CO_2e annually.
Numbers may not add exactly due to rounding.
See Appendix A for complete results.

As discussed in Section 4.4.2, this GHG analysis also estimates the gain of sequestered carbon that would result from planting and growth of trees on site. The gain of sequestered carbon resulting from planting and growth of approximately 8,000 miscellaneous trees on site is estimated based on the carbon sequestration rate for the tree species, the number of new trees, and the growing period. Table 24 presents the estimated one-time carbon-stock change resulting from proposed planting of new trees.

Table 24
Planted Trees – Estimated Gain of Sequestered Carbon

Proposed Project Tree Category/Species	Tree Category	Growing Period (year)	Number of Trees (trees)	Tree CO_2 Sequestered Factor (MT CO_2/Tree/Year)	Gain of Sequestered CO_2 (MT CO_2)
Unknown	Miscellaneous	20	8,000	0.0354	5,664
				Total	**5,664**

Source: CAPCOA 2016.
Notes: MT CO_2 = metric tons carbon dioxide.
See Appendix A for calculations and references.

As presented in Table 24, the gain in sequestered carbon resulting from planting 8,000 trees would be approximately 5,664 MT CO_2. To interpret an annual sequestration, the total sequestered CO_2 was divided by the Proposed Project life time of 30 years, resulting in 188.8 MT CO_2 annually.

Table 25 presents estimated annual net GHG emissions from amortized construction and loss of sequestered carbon from vegetation removal, annual operational emissions, and amortized gain of sequestered carbon from tree plantings.

Table 25
Estimated Annual Net GHG Emissions (2028)

Emission Source	CO_2e
Total Construction Emissions (MT)	12,378~~11,463~~
Loss of Carbon from Vegetation Removal (MT)	10,382
Subtotal (MT)	*22,760~~21,845~~*
Amortized Over 30 Years (MT/Year)	*759~~728~~*
Operational Emissions (MT/year)	~~16,384~~16,348
Annual Gain from Sequestered Carbon (Amortized Over 30 Years) (MT/Year)	(189)
Subtotal (MT/Year)	*16,159~~16,195~~*
Total Annual Operational Emissions (MT/Year)	**~~16,943~~16,918**

Notes:
CO_2e = carbon dioxide equivalent; MT – metric tons.
Numbers in parentheses represent negative numbers.

As shown in Tables 24 and 25, the total Proposed Project emissions during operation were estimated to be approximately 16,348~~16,384~~ MT CO_2e per year. The planting of trees sequestered carbon and thus reduced the amount of operational emissions by an estimated 189 MT CO_2e per year resulting in an overall operational GHG impact of 16,159~~195~~ MT CO_2e per year. As such, the Proposed Project's emissions prior to mitigation would be **potentially significant**.

The emissions presented in Table 25 are conservative because the Proposed Project's GHG emissions are expected to decrease beyond the estimates presented here due – in part – to reasonably foreseeable improvements in fuel efficiency, fleet turnover, and other technological improvements related to transportation and energy. It also is anticipated that CARB, the CEC and other state, regional and local agencies will enact new or enhanced regulations prior to the Proposed Project's build-out year to reduce GHG emissions in furtherance of the state's GHG reduction policy goals. The full extent of such reductions cannot be quantified or estimated at this time due to the uncertainties regarding the precise technological and regulatory advancements and the corresponding modeling limitations.

CARB recommends that "lead agencies prioritize on-site design features and direct investments in GHG reductions in the vicinity of the project" (CARB 2017). CARB also recognizes that "[w]here further project design or regional investments are infeasible or not proved to be effective, it may be appropriate and feasible to mitigate project emissions through purchasing and retiring carbon credits issued by a recognized and reputable accredited carbon registry" (CARB 2017). Similarly, the California Attorney General's Office, Addressing Climate Change at the Project Level (California Attorney General's Office 2010), states that if, after analyzing and requiring all reasonable and feasible on-site GHG emission reducing strategies for avoiding

or reducing GHG-related impacts, the lead agency determines that additional mitigation is required, the agency may consider additional off-site mitigation. Examples of off-site mitigation include participation in GHG reduction projects or programs and the purchase of verifiable carbon "credits" from another entity that will undertake mitigation.

5.1.4 Mitigation Measures

For purposes of this analysis, Table 16~~15~~, Project Design Features to Reduce GHG Emissions, lists the Proposed Project's on-site features and measures to reduce GHG emissions. The County has determined that additional on-site and off-site mitigation can further reduce impacts from GHG emissions to a less-than-significant level through the implementation of GHG emission reduction strategies, as well as purchase of carbon offsets. Collectively, implementation of mitigation measures M-GHG-1 through M-GHG-4, as set forth below, would result in the Proposed Project offsetting 100% of its annual GHG emissions in order to achieve carbon neutrality (i.e., a net zero emissions level). The use of carbon offsets to mitigate GHG emissions is expressly authorized by CEQA Guidelines Section 15126.4(c)(3)-(c)(4), and would reduce impacts associated with GHG emissions to a **less-than-significant level**.

M-GHG-1 As to construction greenhouse gas (GHG) emissions, prior to the County of San Diego's (County) issuance of each grading permit, the Proposed Project applicant or its designee shall purchase and retire carbon offsets in a quantity sufficient to offset 100% of the Proposed Project's construction emissions (including sequestration loss from vegetation removal) associated with each such grading permit, consistent with the performance standards and requirements set forth below.

First, "carbon offset" shall mean an instrument issued by any of the following: (i) the Climate Action Reserve, the American Carbon Registry, and Verra ~~the~~(previously, Verified Carbon Standard~~;~~); (ii) any registry approved by the California Air Resources Board (CARB) to act as a registry under the state's cap-and-trade program; or (iii) if no registry is in existence as identified in options (i) and (ii), above, then any other reputable registry or entity that issues carbon offsets~~.~~ that is acceptable to the Director of the Planning & Development Services Department. Prior to use of option (iii), it shall be demonstrated that the other reputable registry or entity follows accounting, quantification and monitoring protocols, as well as eligibility and procedural performance standards, that are comparable to those used by the registries identified in option (i).

Second, any carbon offset used to reduce the Proposed Project's ~~greenhouse gas (~~GHG~~)~~ emissions shall be a carbon offset that represents the past reduction or

sequestration of one metric ton of carbon dioxide equivalent that is "not otherwise required" (CEQA Guidelines Section 15126.4(c)(3)).

Third, "Proposed Project applicant" shall mean Jackson Pendo Development Company~~'s~~ or its designee.

Fourth, as to construction and from vegetation removal GHG emissions, prior to the County's issuance of each grading permit, the Proposed Project applicant or its designee shall provide evidence to the satisfaction of the Director of the Planning & Development Services Department (PDS) that the Proposed Project applicant has purchased and retired carbon offsets in a quantity sufficient to offset 100% of the construction GHG emissions and sequestration loss from vegetation removal generated by the Proposed Project, as associated with each such grading permit. The emissions reduction obligation associated with each grading permit shall be calculated by reference to the certified environmental impact report's Greenhouse Gas Emissions Technical Report (Appendix 2.7-1), which determined total construction-related emissions as equaling ~~21,845~~22,760 metric tons of carbon dioxide equivalent (MT CO_2e). This would increase to ~~21,854~~22,769 MT CO_2e if the Proctor Valley Road North Option is selected.

Fifth, the purchased carbon offsets used to reduce construction and vegetation removal GHG emissions shall achieve real, permanent, quantifiable, verifiable, and enforceable reductions (California Health & Safety Code Section 38562(d)(1)).

Sixth, ~~the County of San Diego Planning & Development Services shall consider,~~ the Proposed Project applicant or its designee shall demonstrate, ~~–~~to the satisfaction of the Development Services Director~~ of PDS~~, that the following geographic priorities for ~~GHG reduction features, and GHG reduction projects and programs~~carbon offsets have been met: (1) ~~project design features/on-site reduction measures; (2)~~ off-site within the unincorporated areas of the County of San Diego; (~~3~~2) off-site within the County of San Diego; (3~~4~~) off-site within California; (4~~5~~) off-site within the United States; and (5~~6~~) off-site internationally. As listed, geographic priorities would focus first on local reduction features (including projects and programs that would reduce GHG emissions) to ensure that reduction efforts achieved locally would provide cross-over benefits related to air quality criteria pollutant reductions within the San Diego Air Basin, and to aid in San Diego County jurisdictions' efforts to meet their GHG reduction goals. The Proposed Project applicant or its designee shall first pursue offset projects and programs locally within unincorporated areas of the County of San Diego to

the extent such offset projects and programs are financially competitive in the global offset market. The Proposed Project applicant or its designee shall submit proof to the County that offsets are unavailable and/or fail to meet the feasibility factors defined in CEQA Guidelines Section 15364 in a higher priority category before seeking offsets from the next lower priority category.

M-GHG-2 As to operational greenhouse gas (GHG) emissions, prior to the County of San Diego's (County) issuance of building permits for each implementing Site Plan ("D" Designator), the applicant or its designee shall purchase and retire carbon offsets for the incremental portion of the Proposed Project within the Site Plan in a quantity sufficient to offset, for a 30-year period, the operational greenhouse gas (GHG) emissions from that incremental amount of development to net zero, consistent with the performance standards and requirements set forth below.

First, "carbon offset" shall have the same meaning as set forth in M-GHG-1.

Second, any carbon offset used to reduce the Proposed Project's GHG emissions shall be a carbon offset that represents the past reduction or sequestration of 1 metric ton of carbon dioxide equivalent that is "not otherwise required" (CEQA Guidelines Section 15126.4(c)(3)).

Third, "the Proposed Project applicant" shall have the same meaning as set forth in M-GHG-1.

Fourth, as to operational emissions, prior to the County of San Diego's issuance of building permits for each implementing Site Plan ("D" Designator), the Proposed Project applicant or its designee shall provide evidence to the satisfaction of the Director of Planning & Development Services Department (PDS) that it has purchased and retired carbon offsets for the incremental portion of the Proposed Project within the Site Plan in a quantity sufficient to offset, for a 30-year period, the operational GHG emissions from the incremental amount of development to net zero. The "project life" is 30 years. This methodology is consistent with the 30-year project life time frame used by the South Coast Air Quality Management District's GHG guidance (SCAQMD 2008). The emissions reduction obligation associated with each building permit shall be calculated by reference to the certified environmental impact report's (EIR) Greenhouse Gas Emissions Technical Report (Appendix 2.7-1), which determined total operational~~construction~~-related emissions as equaling ~~16,159~~ 16,195 metric tons of carbon dioxide equivalent (MT CO_2e) annually, which equates to ~~484,770~~485,850 MT CO_2e over 30 years.

Fifth, the purchased carbon offsets used to reduce operational GHG emissions shall achieve real, permanent, quantifiable, verifiable, and enforceable reductions (California Health & Safety Code Section 38562(d)(1)).

Sixth, the amount of carbon offsets required for each implementing Site Plan shall be based on the GHG emissions with the implementing Site Plan, and shall include operational GHG emissions as identified in the approved Greenhouse Gas Emissions Technical Report.

Seventh, each implementing Site Plan shall include a tabulation that identifies the overall carbon offsets required to mitigate the entire Proposed Project's GHG emissions, and shall identify the amount of carbon offsets purchased to date, as well as the remaining carbon offsets required to reduce the Proposed Project's emissions to net zero. Such tabulation and tracking shall be to the satisfaction of the Director of PDS.

For clarity, the following example is provided to illustrate the Proposed Project's operational GHG emissions purchase and retirement strategy. If 100 single-family residential units are proposed to be developed in conjunction with an implementing Site Plan ("D" Designator), GHG emissions for those land uses would be calculated and carbon offsets for those emissions would be secured for a 30-year period. To facilitate implementation of this strategy, the Proposed Project's total emissions have been allocated on a per dwelling unit basis; this methodological approach ensures that, when each dwelling unit is developed, the emissions from the Proposed Project's resident-serving non-residential facilities will also be offset. Thus, the 100-single family-residential units contemplated by this example would be multiplied by 15.81 MT CO_2e/dwelling unit (total project emissions / total # of dwelling units = 16,159 MT CO_2e /yr / 1,022 dwelling units = 15.81 MT CO_2e /yr/DU). This value would then be multiplied by 30, to calculate the total carbon offsets required for that phase of development (e.g., 100 single-family residential units × 15.81 MT CO_2e /du × 30 = 47,430 MT CO_2e of carbon offsets).

Eighth, this EIR acknowledges that the Proposed Project's GHG emissions estimates are conservative because the Proposed Project's GHG emissions are expected to decrease beyond the estimates presented in the EIR's analysis, in part, due to reasonably foreseeable improvements in fuel efficiency, vehicle fleet turnover, technological improvements related to transportation and energy, and updates to emissions models and methodologies. Thus, subject to County oversight,

and the processes described below, the operational emission estimates that govern implementation of this Proposed Project are subject to a "true up" at the election of the Proposed Project applicant (as defined above) or its designee and subject to the satisfaction of the ~~Director of PDS~~County's Board of Supervisors, as considered pursuant to a noticed public hearing process that accords with applicable legal requirements, including those set forth in CEQA for the post-approval modification of mitigation implementation parameters.

Specifically, if the Project applicant elects to process ~~and~~ a "true-up" exercise subsequent to the County's certification of the Final EIR and approval of the Proposed Project, the Proposed Project applicant shall provide an operational GHG emissions inventory of the Proposed Project's operational emissions for the "true up" operational conditions, including emissions from mobile sources, energy, area sources, water consumption, and solid waste. Subject to the satisfaction of the ~~Director of PDS~~Board of Supervisors, these calculations shall be conducted using a County-approved model and/or methodology and must validate the continuing adequacy of modeling inputs used in the EIR that are not proposed to be altered as part of the "true-up" exercise. The inclusion of the validation requirement ensures that any updated operational GHG emissions inventories for the Project fully account for then-existing information that is relevant to the emissions modeling. Alternatively, the Proposed Project applicant may purchase all carbon offset credits to reduce operational GHG emissions at issuance of the first building permit.

The "true up" operational GHG emissions inventory, if conducted, will be provided in the form of a project-specific Updated Emissions Inventory and Offset Report to the County's ~~Director of PDS~~Board of Supervisors (or its designee) prior to the issuance of building permits for the next build-out phase. The subject technical documentation shall be prepared by a County-approved, qualified air quality and greenhouse gas technical specialist. ~~If the Director of PDS (or its designee) tentatively determines that the technical documentation demonstrates that the quantity of project-related GHG emissions would be lower than the quantity identified in the certified Final EIR for the Proposed Project, and finds that the technical documentation is supported by substantial evidence, the Director shall notice the tentative decision by providing a 15-day notice in a newspaper of general circulation in the San Diego region, as well as posting notice on the County's PDS website. The notice shall provide a 15-day period to review and comment on the Director's tentative decision and the project-specific Updated Emissions Inventory and Offset Report, which shall be posted to the County's~~

~~PDS website and made available upon request at the County's PDS office for ease of reference. Upon the close of the 15-day review period, the Director shall consider any comments submitted on the tentative decision and Project-specific Updated Emissions Inventory and Offset Report. Upon reaching a final decision that such Planning Director may~~ authorizes a reduction in the total carbon offsets ~~value required for the Proposed Project, the Director shall notice the final decision via the same procedures described above (i.e., inclusion in a newspaper of general circulation and website posting).~~

In all instances, substantial evidence must confirm that any reduction to the total carbon offsets value as identified in the certified Final EIR for the Proposed Project is consistent with the Proposed Project commitment to achieve and maintain carbon neutrality (i.e., net zero emissions) for the 30-year life of the Proposed Project.

Ninth, ~~the County of San Diego Planning & Development Services shall consider,~~ the Proposed Project applicant or its designee shall demonstrate, ~~to~~ to the satisfaction of the Development Services Director ~~of PDS~~, that the following geographic priorities for ~~GHG reduction features, and GHG reduction projects and programs~~ carbon offsets have been met: (1) ~~project design features/on-site reduction measures; (2)~~ off-site within the unincorporated areas of the County of San Diego; (~~3~~2) off-site within the County of San Diego; (~~4~~3) off-site within California; (~~5~~4) off-site within the United States; and (~~6~~5) off-site internationally. As listed, geographic priorities would focus first on local reduction features (including projects and programs that would reduce GHG emissions) to ensure that reduction efforts achieved locally would provide cross-over benefits related to air quality criteria pollutant reductions within the San Diego Air Basin, and to aid in San Diego County jurisdictions' efforts to meet their GHG reduction goals. The Proposed Project applicant or its designee shall first pursue offset projects and programs locally within unincorporated areas of the County of San Diego to the extent such offset projects and programs are financially competitive in the global offset market. The Proposed Project applicant or its designee shall submit proof to the County that offsets are unavailable and/or fail to meet the feasibility factors defined in CEQA Guidelines Section 15364 in a higher priority category before seeking offsets from the next lower priority category.

M-GHG-3 Prior to the issuance of residential building permits, the applicant or its designee shall provide evidence to the County of San Diego that the design plans for residential structures include electrical outlets in the front and rear of the structure to facilitate use of electrical lawn and garden equipment.

M-GHG-4 To reduce greenhouse gas (GHG) emissions, the applicant or its designee shall provide evidence to the County of San Diego that the following project design features (PDFs) identified for the Proposed Project herein will be implemented: PDF-AQ/GHG-1, PDF-AQ/GHG-2, PDF-AQ/GHG-3, PDF-AQ/GHG-4, PDF-AQ/GHG-5, PDF-AQ/GHG-6, PDF-AQ/GHG-7, PDF-AQ/GHG-8, PDF-AQ/GHG-9, PDF-AQ/GHG-10, PDF-TR-1, PDF-UT-1, PDF-UT-2, PDF-UT-3, and PDF-UT-4.

As a result of M-GHG-1 and M-GHG-2, the applicant would be required to purchase a total of ~~484,774~~507,530 MT CO_2e of carbon offset credits, representing 30 years of operation with an annual emissions rate of 16,159 MT CO_2e and construction emissions of ~~21,845~~22,760 MT CO_2e (see Table 26). The implementation of M-GHG-1 and M-GHG-2 would ensure that the Proposed Project would not increase GHG emissions as compared to the existing environmental setting (see CEQA Guidelines Section 15064.4(b)(1)). All three mitigation measures have been incorporated into the Proposed Project's Mitigation Monitoring and Reporting Program to ensure implementation and enforceability.

Table 26
Estimated Net GHG Emissions With Mitigation Measures (2028)

Emission Source	CO_2e Metric Tons per Year
Construction Emissions (one time)	~~21,845~~22,760
Reductions from M-GHG-1	*(~~21,845~~22,760)*
Annual Operational Emissions	16,159
Project Life Operational Emissions (30 years)	484,770~~484,775~~
Reductions from M-GHG-2	*(484,770~~484,775~~)*
Net Emissions After Mitigation	**0**

Notes:
CO_2e = carbon dioxide equivalent.
Numbers in parentheses represent negative numbers.
Construction emissions include land conversion. Operational emissions include gain of carbon sequestration. M-GHG-3 is not quantified. M-GHG-4 is included in annual operational emissions.

5.1.5 Conclusion

The use of offsets to mitigate GHG emissions is expressly recognized in CEQA Guidelines Section 15126.4(c)(3)-(c)(4), and would reduce Proposed Project impacts associated with GHG emissions to a level that is **less than significant**.

5.2 Consistency with Applicable Plans, Policies and Regulations Adopted for the Purpose of Reducing GHG Emissions

5.2.1 Guideline for Determining Significance

Based on Appendix G of the CEQA Guidelines, the Proposed Project would have a significant impact if it would:

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

5.2.2 Consistency with SANDAG'S San Diego Forward: The Regional Plan

Regarding consistency with SANDAG's Regional Plan, the Proposed Project would include PDFs developed to support the policy objectives of the RTP and SB 375. For example, the Proposed Project includes an integrated walking and bicycling trail system that will connect the various components of the Proposed Project. Traffic calming design and dedicated space for non-automotive traffic will create safe and appealing environments for all residents to use. The convenient availability of walking and bicycling trails and parks will serve to reduce VMT. The Proposed Project would include parks and recreational facilities within safe walking or biking distance for residence, reducing the amount of car trips needed for recreation. Ride sharing and commute programs would decrease the number of trips for single occupancy vehicles for daily trips outside of the Proposed Project to regional transportation hubs and job centers in adjacent Chula Vista. Additionally, on-site generation of energy for electricity and water heating, along with EVSE equipment in the garage in half of all residential units and public charging stations will support environmental stewardship in everyday operations of the Proposed Project.

Table 27 illustrates the Proposed Project's consistency with applicable goals and policies of San Diego Forward: The Regional Plan (SANDAG 2015).

Table 27
San Diego Forward: The Regional Plan Consistency Analysis

Category	Policy Objective or Strategy	Consistency Analysis
The Regional Plan – Policy Objectives		
Mobility Choices	Provide safe, secure, healthy, affordable, and convenient travel choices between the places where people live, work, and play.	*Consistent*. The Proposed Project's internal circulation features provide residents the opportunity to access recreational and commercial uses via multiple modes of transportation. Proposed Project travel demand measures will provide ride-sharing services and contribute to off-site improvements to reduce single-occupancy vehicle trips.
Mobility Choices	Take advantage of new technologies to make the transportation system more efficient and environmentally friendly.	*Consistent.* The Proposed Project would include lane and intersection design configuration modifications where necessary, as well as installation of signalization where required per the Traffic Impact Study (Chen Ryan 2017a). Additionally, the Proposed Project would not impair SANDAG's ability to employ new technologies to make travel more reliable and convenient.
Habitat and Open Space Preservation	Focus growth in areas that are already urbanized, allowing the region to set aside and restore more open space in our less developed areas.	*Consistent.* The Proposed Project would be located near major urban and employment centers, including the City of Chula Vista. The Proposed Project would conserve 426.7 acres as Otay Ranch RMP Preserve and designate 127.1 acres as Limited Development Area.
Habitat and Open Space Preservation	Protect and restore our region's urban canyons, coastlines, beaches, and water resources.	*Consistent*. The Proposed Project would conserve 426.7 acres as Otay Ranch RMP Preserve and designate 127.1 acres as Limited Development Area.
Regional Economic Prosperity	Invest in transportation projects that provide access for all communities to a variety of jobs with competitive wages.	*Not Applicable*. The Proposed Project would not impair the ability of SANDAG to invest in transportation projects available to members of the Community.
Regional Economic Prosperity	Build infrastructure that makes the movement of freight in our community more efficient and environmentally friendly.	*Not Applicable*. The Proposed Project does not involve regional freight movement, nor would it impair SANDAG's ability to preserve and expand options for regional freight movement.

Table 27
San Diego Forward: The Regional Plan Consistency Analysis

Category	Policy Objective or Strategy	Consistency Analysis
Partnerships/Collaboration	Collaborate with Native American tribes, Mexico, military bases, neighboring counties, infrastructure providers, the private sector, and local communities to design a transportation system that connects to the mega-region and national network, and works for everyone and fosters a high quality of life for all.	*Not Applicable*. The Proposed Project would not impair the ability of SANDAG to provide transportation choices to better connect the San Diego region with Mexico, neighboring counties, and tribal nations. Furthermore, the Proposed Project has coordinated with Native American tribes and neighboring jurisdictions.
Partnerships/Collaboration	As we plan for our region, recognize the vital economic, environmental, cultural, and community linkages between the San Diego region and Baja California.	*Not Applicable*. The Proposed Project would not impair the ability of SANDAG to provide transportation choices to better connect the San Diego region with Mexico.
Healthy and Complete Communities	Create great places for everyone to live, work, and play.	*Consistent*. The Proposed Project's internal circulation features would provide residents the opportunity to access recreational and commercial uses via multiple modes of transportation. The Proposed Project would encourage non-vehicular modes of transportation through the inclusion of an extensive walking and bicycling network.
Healthy and Complete Communities	Connect communities through a variety of transportation choices that promote healthy lifestyles, including walking and biking.	*Consistent*. The Proposed Project would encourage non-vehicular modes of transportation through the inclusion of bike lanes and an extensive walking and bicycling network. These will connect the Proposed Project with on-site and off-site amenities.
Environmental Stewardship	Make transportation investments that result in cleaner air, environmental protection, conservation, efficiency, and sustainable living.	*Consistent*. The Proposed Project would encourage non-vehicular modes of transportation through the inclusion of bike lanes and an extensive walking and bicycling network.
Environmental Stewardship	Support energy programs that promote sustainability.	*Consistent*. The Proposed Project would include on-site renewable energy production through solar photovoltaic rooftop systems for all residential units.
Sustainable Communities Strategy (SCS) – Strategies		
Strategy #1	Focus housing and job growth in urbanized areas where there is existing and planned transportation infrastructure, including transit.	*Consistent.* The Proposed Project would be located near major urban and employment centers, including the City of Chula Vista. The Project Area is not located next to existing or planned transit stop. Proposed Project travel demand measures will provide ride-sharing services and contribute to off-site improvements to reduce single occupancy vehicle trips.

Table 27
San Diego Forward: The Regional Plan Consistency Analysis

Category	Policy Objective or Strategy	Consistency Analysis
Strategy #2	Protect the environment and help ensure the success of smart growth land use policies by preserving sensitive habitat, open space, cultural resources, and farmland.	*Consistent.* The Proposed Project's design would designate 426.7 acres as Otay Ranch RMP Preserve and 127.1 acres as Limited Development Area. Development would be concentrated and include parks, commercial areas, and a public safety site.
Strategy #3	Invest in a transportation network that gives people transportation choices and reduces GHG emissions.	*Consistent.* The Proposed Project would encourage non-vehicular modes of transportation through the inclusion of bike lanes and an extensive walking and bicycling network.
Strategy #4	Address the housing needs of all economic segments of the population.	*Consistent.* A variety of housing types would be developed, including a range of single-family and higher density courtyard homes.
Strategy #5	Implement the Regional Plan through incentives and collaboration.	*Not Applicable.* The Proposed Project would not impair the ability of SANDAG to implement the RTP through incentives and collaborations.

Source: SANDAG 2015

As shown in Table 27, the Proposed Project is consistent with applicable Policy Objectives and Strategies from the Regional Plan.

5.2.3 Consistency Analysis with County of San Diego General Plan

The Proposed Project also would be consistent with the goals set forth in the County's Conservation and Open Space Element of the General Plan that are designed to reduce the emissions of GHGs; reduce energy use in buildings and infrastructure; and promote the use of renewable energy sources, conservation, and other methods of efficiency. Table 28 outlines the Proposed Project's consistency with applicable General Plan goals.

Table 28
County of San Diego General Plan – Proposed Project Consistency Analysis

Goal	Consistency Analysis
Conservation and Open Space Element	
COS-4.1 Water Conservation. Require development to reduce the waste of potable water through use of efficient technologies and conservation efforts that minimize the County's dependence on imported water and conserve groundwater resources.	*Consistent*. The Proposed Project would implement drought-tolerant landscaping and fully comply with the San Diego County Model Water Efficiency Landscape Ordinance. The Proposed Project would also install low-flow fixtures in each residence in accordance with CALGreen.

Table 28
County of San Diego General Plan – Proposed Project Consistency Analysis

Goal	Consistency Analysis
COS-4.2 Drought-Efficient Landscaping. Require efficient irrigation systems and in new development encourage the use of native plant species and non-invasive drought tolerant/low water use plants in landscaping.	*Consistent*. The Proposed Project would implement drought-tolerant landscaping.
COS-4.5 Recycled Water. Promote the use of recycled water and grey water systems where feasible.	*Not Applicable*. Because of the Proposed Project's proximity to the Otay Reservoir, a drinking water source for the City of San Diego, recycled and grey water systems would not be used in the Project Area.
COS-14.1 Land Use Development Form. Require that development be located and designed to reduce vehicular trips (and associated air pollution) by utilizing compact regional and community-level development patterns while maintaining community character.	*Consistent*. The Proposed Project would encourage non-vehicular modes of transportation through the inclusion of a bike lanes and pedestrian network. These features would help reduce vehicle trips and associated air pollution and GHG emissions through Community-level development patterns. The Proposed Project would include a mix of land uses including recreational and commercial uses and potentially would also include a school site. PDF-TR-1 would reduce VMT associated with the Proposed Project through implementation of a TDM Program.
COS-14.2 Villages and Rural Villages. Incorporate a mixture of uses within Villages and Rural Villages that encourage people to walk, bicycle, or use public transit to reduce air pollution and GHG emissions.	*Consistent*. The Proposed Project would encourage non-vehicular modes of transportation through the inclusion of bike lanes and pedestrian network. These features would help reduce air pollution and GHG emissions. PDF-TR-1 would reduce VMT associated with the Proposed Project through implementation of a TDM Program.
COS-14.3 Require design of residential subdivisions and non-residential development through "green" and sustainable land development practices to conserve energy, water, open space, and natural resources.	*Consistent*. The Proposed Project's residences would meet ZNE design standards; in furtherance of ZNE, solar installations will be provided on all residential units. Additionally, the private community pools would be heated through solar-water heating systems and would not require natural gas. The Proposed Project would also include the installation of EV charging equipment in the garages of half of all residential units, the installation of charging stations in the Village Core. Moreover, the Proposed Project would be consistent with the most recent Title 24 standards, would offer drought-tolerant landscaping, and would offer other design features designed to conserve energy, water, open space, and natural resources.
COS-14.4 Sustainable Technology and Projects. Require technologies and projects that contribute to the conservation of resources in a sustainable manner, that are compatible with community character, and that increase the self-sufficiency of individual communities, residents, and businesses.	*Consistent*. The Proposed Project's residences would meet ZNE design standards as defined by the CEC. The Proposed Project would also include the installation of EV charging equipment in the garages in half of all residential units and ten charging stations in non-residential areas in the Village Core and park areas. Additionally, the Proposed Project would also meet the most recent Title 24 standards, and would feature drought-tolerant landscaping. These Proposed Project features would contribute to the conservation of resources; would be compatible with community character; and would increase the self-sufficiency of individual communities, residents, and businesses.
COS-14.7 Alternative Energy Sources for Development Projects. Encourage development projects that use energy recovery, photovoltaic, and wind energy.	*Consistent*. All Proposed Project residences will meet ZNE design standards, as defined by the CEC, and use rooftop PV in furtherance of that standard. The Proposed Project would also include the installation of EV charging equipment in the garage in half of all residential units. The Proposed Project would also include the installation of charging stations in the Village Core.

Table 28
County of San Diego General Plan – Proposed Project Consistency Analysis

Goal	Consistency Analysis
COS-14.9 Significant Producers of Air Pollutants. Require projects that generate potentially significant levels of air pollutants and/or GHGs such as quarries, landfill operations, or large land development projects to incorporate renewable energy, and the best available control technologies and practices into the project design.	*Consistent*. Photovoltaic panels would be used on all residences to achieve ZNE design. The Proposed Project would also implement other best available control technologies and practices to minimize air pollutants and/or GHGs. The Proposed Project would also include the installation of EV charging equipment in the garage in half of all residential units and ten non-residential parking spaces in the Village Core and park areas.
COS-14.10 Low Emission Construction Vehicles and Equipment. Require County contractors and encourage other developers to use low emission construction vehicles and equipment to improve air quality and reduce GHG emissions.	*Consistent*. Site grading was designed to be balanced, which would reduce off-site truck trips during construction of the Proposed Project. Additionally, Tier 4 construction equipment would be employed during construction activities when feasible and commercially available at the regional level.
COS-15.1 Design and Construction of New Buildings. Require that new buildings be designed and constructed in accordance with "green building" programs that incorporate techniques and materials that maximize energy efficiency, incorporate the use of sustainable resources and recycled materials, and reduce emissions of GHGs and toxic air contaminants.	*Consistent*. The Proposed Project would use solar panels on all residential units, and would not include wood burning fire places. Also, by conforming to the ZNE and CALGreen standards (PDF-AQ/GHG-2), the Proposed Project would require that new buildings be designed and constructed in accordance with "green building" programs that incorporate techniques and materials that maximize energy efficiency, incorporate the use of sustainable resources and recycled materials, and reduce emissions of GHGs and toxic air contaminants. The Proposed Project would also include the installation of EV charging equipment in the garage in half of all residential units.
COS-15.4 Title 24 Energy Standards. Require development to minimize energy impacts from new buildings in accordance with or exceeding Title 24 energy standards.	*Consistent*. The Proposed Project would meet ZNE design standards as defined by the CEC.
COS-16.1 Alternative Transportation Modes. Work with SANDAG and local transportation agencies to expand opportunities for transit use. Support the development of alternative transportation modes, as provided by Mobility Element policies.	*Consistent*. The Proposed Project would encourage alternative modes of transportation through bike lanes and pedestrian networks. These features would help reduce air pollution and GHG emissions. PDF-TR-1 would reduce VMT associated with the Proposed Project through implementation of a TDM Program.
COS-16.2 Single-Occupancy Vehicles. Support transportation management programs that reduce the use of single-occupancy vehicles.	*Consistent*. The Proposed Project would encourage alternative modes of transportation through the inclusion of bike lanes and pedestrian networks. PDF-TR-1 would reduce VMT associated with the Proposed Project through implementation of a TDM Program.
COS-16.3 Low-Emissions Vehicles and Equipment. Require County operations and encourage private development to provide incentives (such as priority parking) for the use of low- and zero-emission vehicles and equipment to improve air quality and reduce GHG emissions. [Refer also to Policy M- 9.3 (Preferred Parking) in the Mobility Element.]	*Consistent*. The Proposed Project would include the installation of EV charging equipment in the garages of half of all residential units, and the installation of charging stations in the Village Core and park parking areas.

Table 28
County of San Diego General Plan – Proposed Project Consistency Analysis

Goal	Consistency Analysis
COS-16.5 Transit-Center Development. Encourage compact development patterns along major transit routes.	*Not Applicable*. The Proposed Project would not include development along a major transit route; however, the proposed project is incorporating design features within the Village Core to accommodate future transit stops.
COS-17.1 Reduction of Solid Waste Materials. Reduce GHG emissions and future landfill capacity needs through reduction, reuse, or recycling of all types of solid waste that is generated. Divert solid waste from landfills in compliance with state law.	*Consistent*. AB 341 requires a diversion of 75% of solid waste by 2020, and the Proposed Project would comply with all requirements of state law.
COS-17.6 Recycling Containers. Require that all new land development projects include space for recycling containers.	*Consistent*. The Proposed Project would include space for recycling containers in mixed-use and public use areas.
COS-19.1 Sustainable Development Practices. Require land development, building design, landscaping, and operational practices that minimize water consumption.	*Consistent*. The Proposed Project would have drought-tolerant landscaping, and would not allow front lawns/turf. Through these PDFs, the Proposed Project would minimize water consumption.

Source: County of San Diego 2011.

As shown in Table 28, the Proposed Project would be consistent with applicable and goals and policies of the County's General Plan to the extent feasible.

5.2.4 Consistency with EO S-3-05 and SB 32

- **EO S-3-05.** This EO establishes the following goals: GHG emissions should be reduced to 2000 levels by 2010, to 1990 levels by 2020, and to 80% below 1990 levels by 2050.
- **SB 32.** This bill establishes for a statewide GHG emissions reduction target whereby CARB, in adopting rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emissions reductions, shall ensure that statewide GHG emissions are reduced to at least 40% below 1990 levels by December 31, 2030.

This section evaluates whether the GHG emissions trajectory after Proposed Project completion would impede the attainment of the 2030 and 2050 GHG reduction goals identified in EOs B-30-15 and S-3-05.

To begin, CARB has expressed optimism with regard to both the 2030 and 2050 goals. It states in the First Update to the Climate Change Scoping Plan that "California is on track to meet the near-term 2020 GHG emissions limit and is well positioned to maintain and continue reductions beyond 2020 as required by AB 32" (CARB 2014, p. ES2). With regard to the 2050 target for reducing GHG emissions to 80% below 1990 levels, the First Update to the Climate Change Scoping Plan states the following (CARB 2014, p. 34):

> This level of reduction is achievable in California. In fact, if California realizes the expected benefits of existing policy goals (such as 12,000 megawatts of renewable distributed generation by 2020, net zero energy homes after 2020, existing building retrofits under AB 758, and others) it could reduce emissions by 2030 to levels squarely in line with those needed in the developed world and to stay on track to reduce emissions to 80% below 1990 levels by 2050. Additional measures, including locally driven measures and those necessary to meet federal air quality standards in 2032, could lead to even greater emission reductions.

In other words, CARB believes that the state is on a trajectory to meet the 2030 and 2050 GHG reduction targets set forth in AB 32, EO B-30-15, and EO S-3-05. This is confirmed in the Second Update which states (CARB 2017b, p. 7):

> The Proposed Plan builds upon the successful framework established by the Initial Scoping Plan and First Update, while also identifying new, technologically feasibility and cost-effective strategies to ensure that California meets its GHG reduction targets in a way that promotes and rewards innovation, continues to foster economic growth, and delivers improvements to the environment and public health, including in disadvantaged communities. The Proposed Plan is developed to be consistent with requirements set forth in AB 32, SB 32, and AB 197.

As discussed in Section 5.1, total Proposed Project emissions, including operation and amortized construction, would be approximately ~~20,340~~22,760 MT CO_2e per year. As such, the Proposed Project (without mitigation) would generate GHG emissions that may interfere with the implementation of GHG reduction goals for 2030 and 2050. Therefore, the Proposed Project would potentially conflict with plans, policies, or regulations adopted for the purpose of reducing GHG emissions, and could result in a **potentially significant impact**.

5.2.5 Mitigation Measures

The Proposed Project was shown to be consistent with SANDAG's Regional Plan and the San Diego County General Plan, and would not require mitigation.

Implementation of M-GHG-1 through M-GHG-4 would be required to reduce impacts related to the potential for the Proposed Project to conflict with SB 32 and EO S-3-05. No mitigation measures in addition to M-GHG-1 through M-GHG-4 would be required.

5.2.6 Conclusion

The Proposed Project would not conflict with SANDAG's Regional Plan and the San Diego County General Plan, resulting in a less-than-significant impact without mitigation.

With implementation of the Proposes Project's PDFs and M-GHG-1 and M-GHG-2, the Proposed Project would achieve carbon neutrality (i.e., a net zero emissions level) thereby resulting in no increase in GHG emissions relative to existing environmental conditions. Therefore, the Proposed Project would not interfere with implementation of any of the GHG reduction goals for 2030 or 2050 (described in Section 5.2.4) with implementation of mitigation. This is consistent with CARB's 2017 Climate Change Scoping Plan Update, which notes that achieving no net increase in carbon emissions is the correct overall objective (CARB 2017b).[40] Furthermore, the Proposed Project emissions estimates presented are a conservative representation of Proposed Project emissions due to the reasonably foreseeable and anticipated technological and regulatory advancements that will continue to advance the state's GHG policies. The Proposed Project would be consistent with SB 32 and EO S-3-05 with implementation of mitigation.

With implementation of M-GHG-1 through M-GHG-4, the Proposed Project would not conflict with any plans adopted with the purpose of reducing GHG emissions; therefore, the Proposed Project's impacts on GHG emissions would be **less than significant with mitigation**.

[40] CARB's 2017 Climate Change Scoping Plan Update is not requiring all projects to achieve no net increase.

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