4.3 GREENHOUSE GAS EMISSIONS AND ENERGY

4.3.1 INTRODUCTION

The Greenhouse Gas Emissions and Energy section of the EIR describes the effects of the proposed project on the emission of greenhouse gases (GHGs) and the consumption of energy. The section includes a discussion of energy conservation, the existing GHG setting and applicable regulations, estimation of the amount of energy that would be consumed during project operation and GHG emissions that would be generated during both the construction and operational phases of the proposed project, comparison of the project's energy consumption and GHG emissions with relevant thresholds of significance, and identification of impacts and mitigation measures intended to reduce all impacts to the maximum extent feasible. The Greenhouse Gas Emissions and Energy section is primarily based on information, guidance, and analysis protocol provided by the Yolo-Solano Air Quality Management District (YSAQMD) per the *Handbook for Assessing and Mitigating Air Quality Impacts*,[1] as well as emissions projections obtained by means of the California Emissions Estimator Model (CalEEMod) version 2016.3.2.[2] In addition, the section uses information obtained from the *Davis General Plan*[3] associated EIR,[4] and the City of Davis' Climate Action and Adaptation Plan.[5]

4.3.2 EXISTING ENVIRONMENTAL SETTING

The following information provides an overview of the existing environmental setting in relation to GHG emissions, global climate change, and energy consumption within the proposed project area. Existing sources of GHG emissions, potential effects of global climate change, as well as energy consumption and supply in the project region are discussed below.

Greenhouse Gas Emissions

GHGs are gases that absorb and emit radiation within the thermal infrared range, trapping heat in the earth's atmosphere. Some GHGs occur naturally and are emitted into the atmosphere through both natural processes and human activities. Other GHGs are created and emitted solely through human activities. The principal GHGs that enter the atmosphere due to human activities are carbon

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1 Yolo-Solano Air Quality Management District. *Handbook for Assessing and Mitigating Air Quality Impacts*. July 11, 2007. Available at: http://www.ysaqmd.org/documents/CEQAHandbook2007.pdf. Accessed September 2016.

2 BREEZE Software, A Division of Trinity Consultants, in collaboration with South Coast Air Quality Management District and the California Air Districts. *California Emissions Estimator Model User's Guide Version 2016.3.2*. November 2017.

3 City of Davis. *Davis General Plan*. Adopted May 2001. Amended through January 2007.

4 City of Davis. *Program EIR for the City of Davis General Plan Update and Project EIR for Establishment of a New Junior High School*. January 2000.

5 City of Davis. *Climate Action and Adaptation Plan*. June 1, 2010.

dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated carbons. Other common GHGs include water vapor, ozone, and aerosols. The increase in atmospheric concentrations of GHG due to human activities has resulted in more heat being held within the atmosphere, which is the accepted explanation for global climate change.

The primary GHG emitted by human activities is CO_2, with the next largest components being CH_4 and N_2O. A wide variety of human activities result in the emission of CO_2. Some of the largest sources of CO_2 include the burning of fossil fuels for transportation and electricity, industrial processes including fertilizer production, agricultural processing, and cement production. The primary sources of CH_4 emissions include domestic livestock sources, decomposition of wastes in landfills, releases from natural gas systems, coal mine seepage, and manure management. The main human activities producing N_2O are agricultural soil management, fuel combustion in motor vehicles, nitric acid production, manure management, and stationary fuel combustion. Emissions of GHG by economic sector indicate that energy-related activities account for the majority of U.S. emissions. Electricity generation is the largest single-source of GHG emissions, and transportation is the second largest source, followed by industrial activities. The agricultural, commercial, and residential sectors account for the remainder of GHG emission sources.[6]

Emissions of GHG are partially offset by uptake of carbon and sequestration in trees, agricultural soils, landfilled yard trimmings and food scraps, and absorption of CO_2 by the earth's oceans. Additional emission reduction measures for GHG could include, but are not limited to, compliance with local, State, or federal plans or strategies for GHG reductions, on-site and off-site mitigation, and project design features. Attainment concentration standards for GHGs have not been established by the federal or State government.

Global Warming Potential

Global Warming Potential (GWP) is one type of simplified index (based upon radiative properties) that can be used to estimate the potential future impacts of emissions of various gases. According to the United States Environmental Protection Agency (USEPA), the global warming potential of a gas, or aerosol, to trap heat in the atmosphere is the "cumulative radiative forcing effects of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas." The reference gas for comparison is CO_2. GWP is based on a number of factors, including the heat-absorbing ability of each gas relative to that of CO_2, as well as the decay rate of each gas relative to that of CO_2. Each gas's GWP is determined by comparing the radiative forcing associated with emissions of that gas versus the radiative forcing associated with emissions of the same mass of CO_2, for which the GWP is set at one. Methane gas, for example, is estimated by the USEPA to have a comparative global warming potential 21 times greater than that of CO_2, as shown in Table 4.3-1.

[6] U.S. Environmental Protection Agency. *Sources of Greenhouse Gas Emissions.* Available at: https://19january2017snapshot.epa.gov/ghgemissions/sources-greenhouse-gas-emissions_.html. Accessed March 2018.

Table 4.3-1
Global Warming Potentials and Atmospheric Lifetimes of Select GHGs

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100-year time horizon)
Carbon Dioxide (CO_2)	50-200[1]	1
Methane (CH_4)	12	25
Nitrous Oxide (N_2O)	114	298
HFC-23	270	14,800
HFC-134a	14	1,430
HFC-152a	1.4	124
PFC: Tetrafluoromethane (CF_4)	50,000	7,390
PFC: Hexafluoroethane (C_2F_6)	10,000	12,200
Sulfur Hexafluoride (SF_6)	3,200	22,800

[1] For a given amount of carbon dioxide emitted, some fraction of the atmospheric increase in concentration is quickly absorbed by the oceans and terrestrial vegetation, some fraction of the atmospheric increase will only slowly decrease over a number of years, and a small portion of the increase will remain for many centuries or more.

Source: USEPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013, April 15, 2015.

As shown in the table, at the extreme end of the scale, sulfur hexafluoride is estimated to have a comparative GWP 22,800 times that of CO_2. The "specified time horizon" is related to the atmospheric lifetimes of such GHGs, which are estimated by the USEPA to vary from 50 to 200 years for CO_2, to 50,000 years for tetrafluoromethane. Longer atmospheric lifetimes allow GHG to buildup in the atmosphere; therefore, longer lifetimes correlate with the global warming potential of a gas. The common indicator for GHG is expressed in terms of metric tons of CO_2 equivalents ($MTCO_2e$), which is calculated based on the global warming potential for each pollutant.

Effects of Global Climate Change

Uncertainties exist as to exactly what the climate changes will be in various areas of the Earth. According to the Intergovernmental Panel on Climate Change's Working Group II Report, *Climate Change 2007: Impacts, Adaptation and Vulnerability*,[7] climate change impacts to North America may include:

- Diminishing snowpack;
- Increasing evaporation;
- Exacerbated shoreline erosion;
- Exacerbated inundation from sea level rising;
- Increased risk and frequency of wildfire;

[7] Intergovernmental Panel on Climate Change, 2014: Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1-32.

- Increased risk of insect outbreaks;
- Increased experiences of heat waves; and
- Rearrangement of ecosystems as species and ecosystems shift northward and to higher elevations.

For California, climate change has the potential to cause/exacerbate the following environmental impacts:

- Increased frequency, duration, and intensity of conditions conducive to air pollution formation (particularly ozone);
- Reduced precipitation, changes to precipitation and runoff patterns, reduced snowfall (precipitation occurring as rain instead of snow), earlier snowmelt, decreased snowpack, and increased agricultural demand for water;
- Increased growing season and increased growth rates of weeds, insect pests and pathogens;
- Inundation by sea level rise;
- Increased incidents and severity of wildfire events; and
- Expansion of the range and increased frequency of pest outbreaks.

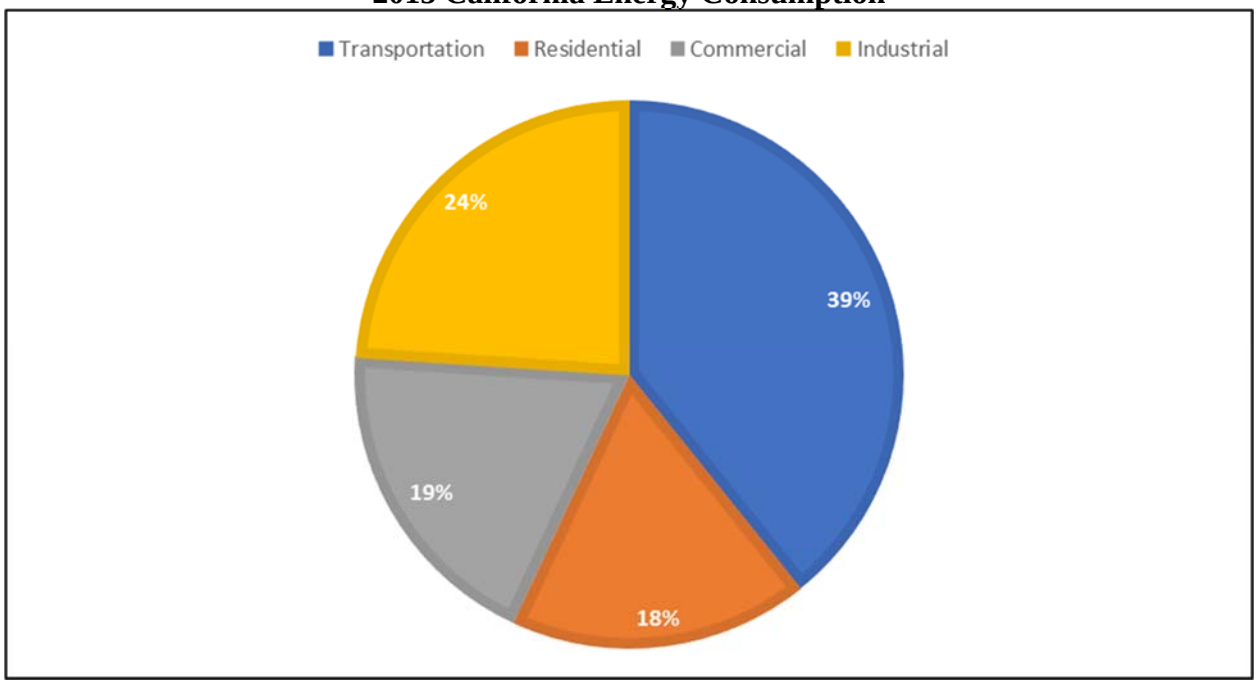
Energy Consumption

Energy consumption within California places the state as the one of the highest energy demanding states within the nation. Activities such as heating and cooling structures, lighting, the movement of goods, agricultural production, and countless other facets of daily life consume a variety of energy sources. Energy within the state is provided primarily by the combustion of fossil fuels such as natural gas, motor gasoline, diesel, jet fuel, and, to a lesser extent, coal. In addition to the fossil fuel-based energy sources, the state is ranked second in the nation in renewable energy generation, which includes solar, geothermal, wind, and biomass resources. In fact, California leads the nation in solar thermal electricity capacity, with 73 percent of the nation's total solar thermal capacity installed within the state.[8]

As shown in Figure 4.3-1, transportation-related activity consumes the largest share of energy within the State. Within the transportation sector, motor gasoline is the dominate form of energy, with jet fuel, diesel, natural gas, and electricity supplying the remaining portions of California's transportation sector energy demand.

[8] U.S. Energy Information Administration. *California: State Profile and Energy Estimates*. Available at: https://www.eia.gov/state/index.php?sid=CA. Accessed March 2018.

Figure 4.3-1
2015 California Energy Consumption



Source: U.S. Energy Information Administration. California: State Profile and Energy Estimates. Accessible at: https://www.eia.gov/state/index.php?sid=CA. Accessed March 2018.

Electricity is provided to California consumers through a mix of sources including natural gas, hydroelectric, non-hydroelectric renewable sources, nuclear, coal, and petroleum. Of the foregoing sources of electricity, natural gas provided the greatest amount of electricity at approximately 52 percent of California's statewide supply. Meanwhile, non-hydroelectric based sources of renewable energy provided an additional 25 percent of the state's energy, with hydroelectric and nuclear providing 12 and 11 percent respectively. Coal and petroleum contributed less than one percent of the State's total electricity supply.[9] The foregoing sources of electricity supply provided for the consumption of a statewide total of 12,289.37 gigawatt hours (GWh) in the year 2016.[10] Of the total electricity supplied to the State, Yolo County consumed approximate1y 1,705.45 GWh, which constitutes approximately 13.88 percent of the total energy consumed within the State.[11]

In addition to the natural gas combusted to produce electricity within California, natural gas is provided to developments for a variety of uses including industrial, commercial, and residential applications. Natural gas is extracted from underground deposits throughout California and the United States and is distributed through transmission lines. The Pacific Gas and Electric Company (PG&E) provides natural gas service to the City of Davis. Within PG&E's 70,000 square mile

[9] U.S. Energy Information Administration. *California: State Profile and Energy Estimates*. Available at: https://www.eia.gov/state/index.php?sid=CA. Accessed March 2018.

[10] U.S. Energy Information Administration. *Electricity: California Electricity Profile 2016*. Available at: https://www.eia.gov/electricity/state/california/. Accessed April 2018.

[11] California Energy Commission. *Electricity Consumption by County*. Available at: http://ecdms.energy.ca.gov/elecbycounty.aspx. Accessed April 2018

service area, PG&E maintains approximately 48,700 miles of gas pipelines, which service 15 million people. A total of 2,177,467 million cubic feet (approximately 22,580 million Therms) of natural gas was consumed in California in 2016 for all uses including electricity generation.[12] In 2016, direct natural gas consumption within Yolo County equaled 56.41 million Therms, which represents approximately 0.25 percent of the State's total natural gas consumption.

City of Davis Electricity Providers

Historically, electricity and natural gas supplies to the City of Davis have been supplied by PG&E. However, on October 25, 2016, the Davis City Council adopted Resolution Number 16-153, Series 2016, which approved the Joint Exercise of Powers Agreement with Yolo County to form the Valley Clean Energy Alliance, now referred to as Valley Clean Energy (VCE). The resolution adopted by the City, along with similar resolutions adopted by the City of Woodland and Yolo County, led to the formation of the VCE Joint Powers Authority. Beginning in June 2018, the VCE began serving the electricity needs of the Cities of Woodland and Davis, as well as unincorporated areas of Yolo County. Customers within the participating areas have the opportunity to continue receiving service from PG&E or to receive energy from VCE. VCE plans to provide energy with a higher renewable content and lower associated GHG emissions than PG&E. While VCE supplies the energy for customers enrolled in the VCE program, VCE electricity is transmitted through PG&E owned and operated distribution and power lines. PG&E will continue to provide natural gas supplies to the City.

4.3.3 REGULATORY CONTEXT

GHG emissions and energy consumption are monitored and regulated through the efforts of various international, federal, State, and local government agencies. Agencies work jointly and individually to improve air quality through legislation, regulations, planning, policy-making, education, and a variety of programs. The agencies responsible for regulating and improving the air quality within the City of Davis area are discussed below.

Federal Regulations

The most prominent federal regulation related to GHG emissions is the Federal Clean Air Act (FCAA), which is implemented and enforced by the USEPA.

FCAA and USEPA

The FCAA requires the USEPA to set NAAQS and designate areas with air quality not meeting NAAQS as nonattainment. The USEPA is responsible for enforcement of NAAQS for atmospheric pollutants and regulates emission sources that are under the exclusive authority of the federal government including emissions of GHGs. The USEPA's air quality mandates are drawn primarily from the FCAA, which was signed into law in 1970. Congress substantially amended the FCAA

[12] U.S. Energy Information Administration. *Natural Gas: Natural Gas Consumption by End Use*. Available at: https://www.eia.gov/electricity/state/california/. Accessed April 2018.

in 1977 and again in 1990. The USEPA has adopted policies consistent with FCAA requirements demanding states to prepare SIPs that demonstrate attainment and maintenance of the NAAQS.

The USEPA has been directed to develop regulations to address the GHG emissions of cars and trucks. The Mandatory Reporting of Greenhouse Gases Rule requires reporting of GHG emissions from large sources and suppliers in the U.S., and is intended to collect accurate and timely emissions data to inform future policy decisions. Under the rule, suppliers of fossil fuels or industrial GHG, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions are required to submit annual reports to the USEPA. To track the national trend in emissions and removals of GHG since 1990, USEPA develops the official U.S. GHG inventory each year.

On December 7, 2009, USEPA issued findings under Section 202(a) of the CAA concluding that GHGs are pollutants that could endanger public health. Under the so-called Endangerment Finding, USEPA found that the current and projected concentrations of the six key, well-mixed GHGs – CO_2, CH_4, N_2O, PFCs, SF_6, and HFCs – in the atmosphere threaten the public health and welfare of current and future generations. These findings do not, by themselves, impose any requirements on industry or other entities.

Energy Star Program

Enacted under the FCAA, the Energy Star Program was launched by the USEPA in 1992. The program, which is now jointly managed by the USEPA and the US Department of Energy, provides consumers and businesses with information regarding the energy efficiency of a wide variety of appliances and products. The Energy Star Program includes partnerships with public and private entities to disseminate information and encourage the efficient use of energy throughout the nation.

Energy Policy and Conservation Act

The Energy Policy and Conservation Act was originally enacted in 1975 with the intention of ensuring that all vehicles sold in the U.S. meet established fuel economy standards. Following congressional establishment of the original set of fuel economy standards the U.S. Department of Transportation was tasked with establishing additional on-road vehicle standards and making revisions to such standards as necessary. Compliance with established standards is based on manufacturer fleet average fuel economy, which originally applied to both passenger cars and light trucks but did not apply to heavy-duty vehicles exceeding 8,500 pounds in gross vehicle weight. The fuel economy program implemented under the Energy Policy and Conservation Act is known as the Corporate Average Fuel Economy (CAFE) Standards. Updates to the CAFE standards since original implementation have increased fuel economy requirements and begun regulation of medium- and heavy-duty vehicles.

Energy Policy Act of 2005

The Energy Policy Act of 2005 addressed energy production in the United States from various sources. In particular, the Energy Policy Act of 2005 included tax credits, loans, and grants for the implementation of energy systems that would reduce GHG emissions related to energy production.

State Regulations

California has adopted a variety of regulations aimed at reducing GHG emissions. The adoption and implementation of the key State legislation described in further detail below demonstrates California's leadership in addressing global climate change. Only the most prominent and applicable California GHG-related legislation are included below; however, an exhaustive list and extensive details of California air quality legislation can be found at the California Air Resources Board (CARB) website.[13]

AB 1007

AB 1007, State Alternative Fuels Plan (Pavley, Chapter 371, Statutes of 2005), required development and adoption of a State plan to increase the use of alternative fuels. The final *State Alternative Fuels Plan* was adopted on December 5, 2007 and presents strategies and actions California must take to increase the use of alternative, non-petroleum fuels in a manner that minimizes costs to California and maximizes the economic benefits of in-state production. The plan assessed various alternative fuels and developed fuel portfolios to meet California's goals to reduce petroleum consumption, increase alternative fuels use, reduce GHG emissions, and increase in-state production of biofuels without causing a significant degradation of public health and environmental quality. The Plan recommends goals for alternative fuel use of nine percent by 2012, 11 percent by 2017, and 26 percent by 2022, and lays a foundation for building a multi-fuel transportation energy future for California by 2050.

AB 1493

California AB 1493 (Stats. 2002, ch. 200) (Health & Safety Code, §42823, 43018.5), known as Pavley I, was enacted on July 22, 2002. AB 1493 requires that the CARB develop and adopt regulations that achieve "the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty truck and other vehicles determined by the CARB to be vehicles whose primary use is noncommercial personal transportation in the state." On June 30, 2009, the USEPA granted a waiver of CAA preemption to California for the State's GHG emission standards for motor vehicles, beginning with the 2009 model year. Pursuant to the CAA, the waiver allows for the State to have special authority to enact stricter air pollution standards for motor vehicles than the federal government's. On September 24, 2009, the CARB adopted amendments to the Pavley regulations (Pavley I) that reduce GHG emissions in new passenger vehicles from 2009 through 2016. The second phase of the Pavley regulations (Pavley II) is expected to affect model year vehicles from 2016 through 2020. The CARB estimates that the regulation would reduce GHG emissions from the light-duty passenger vehicle fleet by an estimated 18 percent in 2020 and by 27 percent in 2030.

[13] California Air Resources Board. *Laws and Regulations*. Available at: http://www.arb.ca.gov/html/lawsregs.htm. Accessed February 2018.

Renewable Portfolio Standard (RPS)

Established in 2002 under Senate Bill (SB) 1078, accelerated in 2006 under SB 107, and expanded in 2011 under SB 2, California's Renewables Portfolio Standard (RPS) is one of the most ambitious renewable energy standards in the country. The RPS program requires investor-owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 33 percent of total procurement by 2020. In 2015, SB 350 was signed into law by Governor Jerry Brown; SB 350 extended the State's RPS program by requiring that publicly owned utilities procure 50 percent of their electricity from renewable energy sources by 2030.

Executive Order S-03-05

On June 1, 2005, then-Governor Schwarzenegger signed Executive Order S-03-05, which established total GHG emission targets. Specifically, emissions are to be reduced to year 2000 levels by 2010, 1990 levels by 2020, and to 80 percent below 1990 levels by 2050. The Executive Order directed the Secretary of the California Environmental Protection Agency (Cal-EPA) to coordinate a multi-agency effort to reduce GHG emissions to the target levels. The Secretary is also directed to submit biannual reports to the governor and state legislature describing: (1) progress made toward reaching the emission targets; (2) impacts of global warming on California's resources; and (3) mitigation and adaptation plans to combat these impacts.

To comply with the Executive Order, the Secretary of the Cal-EPA created a Climate Act Team (CAT) made up of members from various State agencies and commissions. In March 2006, CAT released their first report. In addition, the CAT has released several "white papers" addressing issues pertaining to the potential impacts of climate change on California.

Assembly Bill 32

In September 2006, Assembly Bill (AB) 32, the California Climate Solutions Act of 2006, was enacted (Stats. 2006, ch. 488) (Health & Saf. Code, §38500 et seq.). AB 32 delegated the authority for its implementation to the CARB and directs CARB to enforce the State-wide cap. Among other requirements, AB 32 required CARB to (1) identify the State-wide level of GHG emissions in 1990 to serve as the emissions limit to be achieved by 2020, and (2) develop and implement a Scoping Plan. Accordingly, the CARB has prepared the *Climate Change Scoping Plan* (Scoping Plan) for California, which was approved in 2008 and updated in 2014 and 2017.[14] The following sections present further information regarding plans and programs that have been introduced in order to meet the statutory requirements of AB 32.

California Scoping Plan

The 2008 Scoping Plan identified GHG reduction measures that would be necessary to reduce statewide emissions as required by AB 32. Many of the GHG reduction measures identified in the

[14] California Air Resources Board. *AB 32 Scoping Plan.* Accessible at: https://www.arb.ca.gov/cc/scopingplan/scopingplan.htm. Accessed February 2018.

2008 Scoping Plan have been adopted, such as the Low Carbon Fuel Standard, Pavley, Advanced Clean Car standards, RPS, and the State's Cap-and-Trade system.

Building upon the 2008 Scoping Plan, the 2013 and 2017 Scoping Plan Updates introduced new strategies and recommendations to continue GHG emissions reductions. The 2013 Scoping Plan Update created a framework for achievement of 2020 GHG reduction goals and identified actions that may be built upon to continue GHG reductions past 2020, as required by AB 32. Following the 2013 Scoping Plan, the 2017 Scoping Plan sets a path for the achievement of California's year 2030 GHG reduction goals.

California GHG Cap-and-Trade Program

California's GHG Cap-and-Trade Program was originally envisioned in the 2008 Scoping Plan as a key strategy to achieve GHG emissions reductions mandated by AB 32. The Cap-and-Trade Program is intended to put California on the path to meet the GHG emission reduction goal of 1990 levels by the year 2020, and ultimately achieving an 80 percent reduction from 1990 levels by 2050. Under cap-and-trade, an overall limit on GHG emissions from capped sectors has been established and facilities or industries subject to the cap are be able to trade permits (allowances) to emit GHGs. The CARB designed the California Cap-and-Trade Program to be enforceable and to meet the requirements of AB 32.[15] The Program started on January 1, 2012, with an enforceable compliance obligation beginning with the 2013 GHG emissions. On January 1, 2014 California linked the state's cap-and-trade plan with Quebec's, and on January 1, 2015 the program expanded to include transportation and natural gas fuel suppliers.[16] AB 398 was adopted by the State's legislature in July 2017, which reauthorized the Cap-and-Trade program through December 31, 2030. The reauthorization and continued operation of the Cap-and-Trade program represents a key strategy within the State's 2017 Scoping Plan Update for the achievement of California's year 2030 GHG reduction goals.

California Energy Commission

The CEC is the State's primary energy policy and planning agency. Created by the Legislature in 1974, the Commission has seven major responsibilities: forecasting future energy needs; promoting energy efficiency and conservation by setting the State's appliance and building energy efficiency standards; supporting energy research that advances energy science and technology through research, development, and demonstration projects; developing renewable energy resources; advancing alternative and renewable transportation fuels and technologies; certifying thermal power plants 50 MW and larger; and planning for and directing State response to energy emergencies.[17]

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[15] California Air Resources Board. *Overview of ARB Emissions Trading Program*. Available at: https://www.arb.ca.gov/cc/capandtrade/guidance/cap_trade_overview.pdf. Accessed February 2018.

[16] California Air Resources Board. *Overview of ARB Emissions Trading Program*. Available at: https://www.arb.ca.gov/cc/capandtrade/guidance/cap_trade_overview.pdf. Accessed February 2018.

[17] California Energy Commission. *About the California Energy Commission*. Available at: http://www.energy.ca.gov/commission/index.html. Accessed January 2015.

California Public Utilities Commission

The CPUC regulates privately owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies. The CPUC is responsible for ensuring that customers have safe, reliable utility service and infrastructure at reasonable rates, regulating utility services, stimulating innovation, and promoting competitive markets.[18]

Executive Order S-01-07

On January 18, 2007, then-Governor Schwarzenegger signed Executive Order S-01-07, which mandates that a State-wide goal be established to reduce carbon intensity of California's transportation fuels by at least 10 percent by 2020. The Order also requires that a Low Carbon Fuel Standard (LCFS) for transportation fuels be established for California.

SB 97

As amended, SB 97, signed in August 2007, acknowledges that climate change is an important environmental issue that requires analysis under CEQA. The bill directed the Governor's Office of Planning and Research (OPR) to prepare, develop, and transmit to the Resources Agency guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. As directed by SB 97, the OPR amended the CEQA Guidelines to provide guidance to public agencies regarding the analysis and mitigation of GHG emissions and the effects of GHG emissions in CEQA documents. The amendments included revisions to the *Appendix G Initial Study Checklist* that incorporated a new subdivision to address project-generated GHG emissions and contribution to climate change. The new subdivision emphasizes that the effects of GHG emissions are cumulative and should be analyzed in the context of CEQA's requirements for cumulative impacts analysis. Under the revised CEQA Appendix G checklist, an agency should consider whether a project would generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, and whether a project conflicts with an applicable plan, policy, or regulation adopted for the purpose of reducing emission of GHGs.

Further guidance based on SB 97 suggests that the lead agency make a good-faith effort, based on available information, to describe, calculate, or estimate the amount of GHG emissions resulting from a project. When assessing the significance of impacts from GHG emissions on the environment, lead agencies should consider the extent to which the project may increase or reduce GHG, as compared to the existing environmental setting, whether the project emissions exceed a threshold of significance determined applicable to the project, and/or the extent to which the project complies with adopted regulations or requirements to implement a state wide, regional, or local plan for the reduction or mitigation of GHG emissions. Feasible mitigation under SB 97 includes on-site and off-site measures, such as GHG emission-reducing design features and GHG sequestration.

[18] California Public Utilities Commission. *California Public Utilities Commission*. Available at: http://www.cpuc.ca.gov/puc/. Accessed January 2015.

SB 375

In September 2008, SB 375, known as the Sustainable Communities and Climate Protection Act of 2008, was enacted, which is intended to build on AB 32 by attempting to control GHG emissions by curbing sprawl. SB 375 enhances CARB's ability to reach goals set by AB 32 by directing CARB to develop regional GHG emission reduction targets to be achieved by the State's 18 metropolitan planning organizations (MPOs), including the Sacramento Area Council of Governments (SACOG). Under SB 375, MPOs must align regional transportation, housing, and land-use plans and prepare a "Sustainable Communities Strategy" (SCS) to reduce the amount of vehicle miles traveled in their respective regions and demonstrate the region's ability to attain its greenhouse gas reduction targets. SB 375 provides incentives for creating walkable and sustainable communities and revitalizing existing communities, and allows home builders to get relief from certain environmental reviews under CEQA if they build projects consistent with the new sustainable community strategies. Furthermore, SB 375 encourages the development of alternative transportation options, which will reduce traffic congestion.

Executive Order S-13-08

Then-Governor Arnold Schwarzenegger issued Executive Order S-13-08 on November 14, 2008. The Executive Order is intended to hasten California's response to the impacts of global climate change, particularly sea level rise, and directs state agencies to take specified actions to assess and plan for such impacts, including requesting the National Academy of Sciences to prepare a Sea Level Rise Assessment Report, directing the Business, Transportation, and Housing Agency to assess the vulnerability of the State's transportation systems to sea level rise, and requiring the Office of Planning and Research and the Natural Resources Agency to provide land use planning guidance related to sea level rise and other climate change impacts.

The order also required State agencies to develop adaptation strategies to respond to the impacts of global climate change that are predicted to occur over the next 50 to 100 years. The adaption strategies report summarizes key climate change impacts to the State for the following areas: public health; ocean and coastal resources; water supply and flood protection; agriculture; forestry; biodiversity and habitat; and transportation and energy infrastructure. The report recommends strategies and specific responsibilities related to water supply, planning and land use, public health, fire protection, and energy conservation.

AB 197 and SB 32

On September 8, 2016, AB 197 and SB 32 were enacted with the goal of providing further control over GHG emissions in the State. SB 32 built on previous GHG reduction goals by requiring that the CARB ensure that statewide GHG emissions are reduced to 40 percent below the 1990 level by the year 2030. Additionally, SB 32 emphasized the critical role that reducing GHG emissions would play in protecting disadvantaged communities and the public health from adverse impacts of climate change. Enactment of SB 32 was predicated on the enactment of AB 197, which seeks to make the achievement of SB 32's mandated GHG emission reductions more transparent to the public and responsive to the Legislature. Transparency to the public is achieved by AB 197 through the publication of an online inventory of GHG and TAC emissions from facilities required to report

such emissions pursuant to Section 38530 of California's Health and Safety Code. AB 197 further established a six-member Joint Legislative Committee on Climate Change Policies, which is intended to provide oversight and accountability of the CARB, while also adding two new legislatively-appointed, non-voting members to the CARB. Additionally, AB 197 directs the CARB to consider the "social costs" of emission reduction rules and regulations, with particular focus on how such measures may impact disadvantaged communities.

California Building Standards Code

California's building codes (California Code of Regulations [CCR], Title 24) are published on a triennial basis, and contain standards that regulate the method of use, properties, performance, or types of materials used in the construction, alteration, improvement, repair, or rehabilitation of a building or other improvement to real property. The California Building Standards Commission (CBSC) is responsible for the administration and implementation of each code cycle, which includes the proposal, review, and adoption process. Supplements and errata are issued throughout the cycle to make necessary mid-term corrections. The 2016 code has been prepared and became effective January 1, 2017. The California building code standards apply State-wide; however, a local jurisdiction may amend a building code standard if the jurisdiction makes a finding that the amendment is reasonably necessary due to local climatic, geological, or topographical conditions.

California Green Building Standards Code

The 2016 California Green Building Standards Code, otherwise known as the CALGreen Code (CCR Title 24, Part 11), is a portion of the CBSC, which became effective with the rest of the CBSC on January 1, 2017. The purpose of the CALGreen Code is to improve public health, safety, and general welfare by enhancing the design and construction of buildings through the use of building concepts having a reduced negative impact or positive environmental impact and encouraging sustainable construction practices. The provisions of the code apply to the planning, design, operation, construction, use, and occupancy of every newly constructed building or structure throughout California.

The CALGreen Code encourages local governments to adopt more stringent voluntary provisions, known as Tier 1 and Tier 2 provisions, to further reduce emissions, improve energy efficiency, and conserve natural resources. If a local government adopts one of the tiers, the provisions become mandates for all new construction within that jurisdiction. The City of Davis has adopted Tier 1 standards as mandatory for all new construction within the City.

Building Energy Efficiency Standards

The 2016 Building Energy Efficiency Standards is a portion of the CBSC, which expands upon energy efficiency measures from the 2013 Building Energy Efficiency Standards resulting in a 28 percent reduction in energy consumption from the 2013 standards for residential structures. Energy reductions relative to previous Building Energy Efficiency Standards would be achieved through various regulations including requirements for the use of high efficacy lighting, improved water heating system efficiency, and high-performance attics and walls.

Local Regulations

The following are the regulatory agencies and regulations pertinent to the proposed project on a local level.

YSAQMD

Various local, regional, State and federal agencies share the responsibility for air quality management in Yolo County. The YSAQMD operates at the local level with primary responsibility for attaining and maintaining the federal and State AAQS in Yolo County. The YSAQMD is tasked with implementing programs and regulations required by the FCAA and the CCAA, including preparing plans to attain federal and State AAQS. The YSAQMD works jointly with the USEPA, CARB, SACOG, other air districts in the region, county and city transportation and planning departments, and various non-governmental organizations to improve air quality through a variety of programs. Programs include the adoption of regulations, policies and guidance, extensive education and public outreach programs, as well as emission reducing incentive programs.

Nearly all development projects in the region have the potential to generate air pollutants that may increase the difficulty of attaining federal and State AAQS. Therefore, for most projects, evaluation of air quality impacts is required to comply with CEQA. In order to help public agencies evaluate air quality impacts, the YSAQMD has developed the *Handbook for Assessing and Mitigating Air Quality Impacts*.[19] The YSAQMD's handbook includes screening methodology and recommended thresholds of significance, including mass emission thresholds for construction-related and operational criteria pollutants. Although the YSAQMD's handbook includes emissions thresholds and analysis methodology for criteria pollutants, the YSAQMD has not yet established or adopted methodology or thresholds for the assessment of impacts related to GHG emissions. In the absence of District-adopted methodology or thresholds for assessing GHG emissions, the YSAQMD is currently recommending GHG analysis consistent with the SMAQMD adopted thresholds of significance.

City of Davis

In addition to the City's General Plan goals and policies, the City of Davis has various strategies for reducing the City's GHG emissions. In 1999, Davis joined a small group of cities calling for local action and a national policy on climate change. In 2006, the City joined the US Conference of Mayors Climate Protection Agreement that called for local and national action to reduce GHG emissions. In a follow-up action in spring 2007, the Davis City Council unanimously adopted a strategy to reduce the City's GHG emissions. Based on the City Council action, the City joined the *Cities for Climate Protection* (CCP) program along with hundreds of other communities across the globe to reduce GHG emissions at the local level. The program is designed to educate and empower local governments to take action on climate change. The CCP is a performance-oriented campaign that offers a framework for local governments to reduce greenhouse gas emissions and

[19] Yolo-Solano Air Quality Management District. *Handbook for Assessing and Mitigating Air Quality Impacts*. July 11, 2007. Available at: http://www.ysaqmd.org/documents/CEQAHandbook2007.pdf. Accessed September 2016.

improve livability within their municipalities. As part of this effort, the City of Davis has undertaken various actions to reduce GHG emissions within the City of Davis, including the adoption of the *Davis Climate Action and Adaptation Plan* (CAAP), as well as adoption of local GHG reduction targets, carbon budgets, and carbon allowances for residential land uses.

City of Davis General Plan

The Transportation Element of the City's General Plan includes the following applicable goals, performance objectives, and policies related to GHG emissions.

Goal #2 The Davis transportation system will evolve to improve air quality, reduce carbon emissions, and improve public health by encouraging usage of clean, energy-efficient, active (i.e. human powered), and economically sustainable means of travel.

Performance Objective #2.1 Reduce carbon emissions from the transportation sector by 61 percent by 2035.

Performance Objective #2.2 Reduce vehicle miles traveled (VMT) 39 percent by 2035.

Policy TRANS 1.5 Strive for carbon-neutrality or better from the transportation component of new residential development.

Policy TRANS 1.6 Reduce carbon emissions from the transportation system in Davis by encouraging the use of non-motorized and low carbon transportation modes.

Policy TRANS 1.7 Promote the use of electric vehicles and other low-polluting vehicles, including Neighborhood Electric Vehicles (NEV).

Policy TRANS 1.8 Develop and maintain a work trip-reduction program designed to reduce carbon emissions, criteria pollutants, and local traffic congestion.

Policy TRANS 3.3 Require new development to be designed to maximize transit potential.

Policy TRANS 4.4 Provide pedestrian and bicycle amenities.

Policy TRANS 4.5 Establish and implement bicycle parking standards for new developments and significant redevelopment.

The Energy Section of the City's General Plan includes the following applicable goals and policies:

Goal ENERGY 1. Reduce per capita energy consumption in Davis.

Policy ENERGY 1.3 Promote the development and use of advanced energy technology and building materials in Davis

Policy ENERGY 1.5 Encourage the development of energy-efficient subdivisions and buildings.

Davis Climate Action and Adaptation Plan

The CAAP is designed to place the community on a path to achieve the GHG emission reduction targets adopted by the City Council in November 2008. The targets were based on a range that uses the State of California targets as a minimum goal and deeper reductions as the desired outcome. The City adopted this range in recognition that emission reductions are not precise and that many scientists believe that a reduction of 80 percent below 1990 levels by 2050 may not be adequate. The City's GHG emission reduction targets per the CAAP are summarized in Table 4.3-2 below.[20]

Table 4.3-2
City of Davis and State GHG Reduction Targets

Year	Target Range[1]	
	State (City minimum target)	**City of Davis (desired target)[2]**
2010	2000 levels[3]	1990 levels
2020	1990 levels[4]	28% below 1990 levels
2030	40% below 1990 levels[5]	N/A
2040	N/A[6]	80% below 1990 levels
2050	80% below 1990 levels[7]	Carbon neutral[8]

Notes:
1 Davis anticipates to achieve reductions within the range of the State targets (minimum) and local targets (desired).
2 Due to residency time of GHGs in the atmosphere, early GHG reduction is generally more beneficial for mitigation of the most severe impacts of climate change.
3 EO S-03-05, June 1, 2005.
4 EO S-03-05, June 1, 2005, and AB 32, September 2006.
5 SB 32, September 08, 2016.
6 A formal State target for 2040 does not exist; however, an average reduction of 2.66 percent per year from 2020 to 2050 (assuming the State target of 1990 levels by 2020 has been met) would be required in order to achieve 80 percent below 1990 levels by 2050 (Davis CAAP, June, 2010).
7 EO S-03-05, June 1, 2005.
8 i.e., net zero GHG emissions.

Source: City of Davis. Staff Report: "Adoption Davis Climate Action and Adaptation Plan." June 1, 2010.

20 City of Davis. Staff Report: "*Adoption Davis Climate Action and Adaptation Plan*." June 1, 2010.

Preparation of the CAAP was guided by a community-based public input process executed by the Davis Climate Action Team, the Natural Resources Commission, and staff. Based on community input, analysis of best practices adopted by other communities, and contributions from subject matter experts, the plan utilizes a systems-based approach to address local GHG emissions. The plan identifies objectives and actions for the first five years after adoption in 2010 that were intended to reverse local GHG emission growth and establish a foundation for deeper, longer-term reductions beyond 2015. The plan includes objectives and actions in nine sectors, including: (1) Mobility; (2) Energy; (3) Land use and buildings; (4) Consumption and waste; (5) Food and agriculture; (6) Community engagement; (7) Government operations; (8) Advocacy; and (9) Climate change preparation (adaptation).

Adoption of the Davis CAAP addresses the City's goal of conserving natural resources and protecting the environment. Specifically, plan adoption implements the City Council's objective of addressing global warming and reducing the carbon footprint of Davis.

City of Davis Municipal Code

Section 8.01.090 of the Municipal Code requires mandatory compliance with Tier 1 standards of the CALGreen Code, which would otherwise be voluntary under the CBSC.

South Davis Specific Plan

The South Davis Specific Plan does not contain any goals, objectives, or policies specifically related to GHG emissions or energy.

4.3.4 Impacts and Mitigation Measures

The standards of significance and methodology utilized to analyze and determine the proposed project's potential project-specific and cumulative impacts related to GHG emissions and energy are described below. A discussion of the project's impacts, as well as mitigation measures where necessary, is also presented.

Standards of Significance

Based on the recommendations of YSAQMD, City of Davis standards, and consistent with Appendices G and F of the CEQA Guidelines, the proposed project would result in a significant impact related to GHG emissions and energy if the project would result in any of the following:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment;
- Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs;
- Result in significant adverse impacts related to project energy requirements, energy use inefficiencies, and/or energy intensiveness of materials by amount and fuel type for each stage of the project including construction, operations, maintenance, and/or removal;

- Result in significant adverse impacts on local and regional energy supplies and on requirements for additional capacity;
- Result in significant adverse impacts on peak and base period demands for electricity and other forms of energy;
- Fail to comply with existing energy standards;
- Result in significant adverse impacts on energy resources; or
- Result in significant adverse impacts related to transportation energy use requirements of the project and use of transportation alternatives.

Further discussion of the above thresholds is provided below.

GHG Emissions

With respect to establishing significance thresholds for GHG emissions, CEQA Guidelines Section 15064.4 states:

> (a) The determination of the significance of GHG emissions calls for a careful judgment by the lead agency consistent with the provisions in Section 15064. A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of GHG emissions resulting from a project.
> (b) 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 the 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;
> (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. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of GHG emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

Thus, one threshold that is commonly used to analyze a project's GHG emissions is whether the project would conflict with or obstruct the goals, strategies, or governing regulation (Health & Safety Code, § 38500-38599) of the California Global Warming Solutions Act of 2006 (AB 32) or the GHG reduction targets in SB 32.

The YSAQMD, in their *Handbook for Assessing and Mitigating Air Quality Impacts*, acknowledges that new emissions generated by development projects could potentially conflict with existing GHG emissions reductions targets, and thus, a need for development of GHG emissions thresholds exists. However, the YSAQMD has not yet established or adopted any such thresholds. The YSAQMD is currently recommending GHG analysis consistent with the SMAQMD adopted thresholds of significance. While SMAQMD recognizes that emissions from

a single project cannot be determined to substantially impact overall GHG emissions levels in the atmosphere, an emissions threshold is useful to trigger further project review and assess mitigation. As such, SMAQMD designed emissions thresholds to ensure that 90 percent of new GHG emissions related to land use projects would be reviewed and assessed for mitigation. Thus, projects exceeding SMAQMD's thresholds would constitute the vast majority of GHG emissions, and exceedance of the thresholds would allow for further project review contributing to the emissions reductions goals of AB 32, SB 32, the Scoping Plan, and relevant Executive Orders. SMAQMD has established a threshold for both construction and operational GHG emissions of 1,100 $MTCO_2e$/yr. It should be noted that the nearby Placer County Air Pollution Control District has independently adopted an operational threshold of 1,100 $MTCO_2e$/yr, for use in project GHG analysis, while the El Dorado County Air Pollution Control District similarly recommends use of SMAQMD's 1,100 $MTCO_2e$/yr threshold.

The 2008 document, *City of Davis Greenhouse Gas Emissions Inventory & Forecast Update*, includes an estimation of citywide 2010 emissions levels, which form the basis of the City's GHG reduction target thresholds.[21] The 2010 emissions levels were then used to generate emissions reduction targets, which were adopted by the City on November 18, 2008. The emissions reductions goals provide a desired rate of reduction, which is more ambitious than AB 32 or SB 32, and includes achievement of citywide carbon neutrality by 2050. In addition to the aggressive, desired reduction targets, the City also adopted minimum reduction targets equal to the State mandated reductions levels. By adopting two reductions targets, the City created a range of acceptable emissions reductions, where the minimum reductions target would achieve statewide reductions goals based on AB 32, while the desired reduction level would surpass the state minimum. The reductions targets adopted by the City are presented in Table 4.3-3.

To ensure that new developments within the City would not impede the City's progress towards the emissions reductions targets presented in Table 4.3-3, the City identified carbon allowances for new developments. The carbon allowances set a maximum emissions level for the operation of new developments,[22] while maintaining the City's emissions reductions goals.[23]

Based on the report prepared by Deb Niemeier (Ph.D., P.E, Director John Muir Institute of the Environment, UC Davis), staff developed Table 4.3-3 below, showing the average baseline GHG "allowance" for each Davis resident, and by extension, each Davis household. The methodology behind the summary table uses peer reviewed state wide GHG emission totals broken down to the local level and factors in regional growth assumptions and foreseeable statewide initiatives designed to reduce GHG emissions (e.g. low carbon fuel standard). Using the adopted City GHG targets (and State targets), staff has calculated the allowances for key target years. This table forms the basis for establishing GHG emissions standards for new residential development projects.[24]

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21 City of Davis Department of Community Development and Sustainability. *City of Davis Greenhouse Gas Emissions Inventory & Forecast Update*. June 2008.

22 City of Davis. *Staff Report: Adoption Davis Climate Action and Adaptation Plan*. June 2, 2010.

23 Niemeier, Deb. *Carbon Development Allowances*. September 2008.

24 City of Davis. *Staff Report: GHG Emissions Thresholds and Standards for New Residential Development*. April 21, 2009.

The proposed project includes two potential site plans, the Preferred Site Plan, which would result in development and operation of 225 units, and Alternative B, which would result in the development and operation of 188 units. The proposed project is anticipated to be operational for a portion of the year 2020, with the year 2021 being the first full year of operations. Because the proposed project would first commence operations in the year 2020, the 2020 carbon allowance, presented in Table 4.3-3, will be applied to per unit emissions from the proposed project.

Table 4.3-3
Carbon Allowances for New Residential Developments

Target Year Minimum/Desired	Target	Carbon Allowance[1]		
		Per Unit ($MTCO_2e$/yr)	Per Person ($MTCO_2e$/yr)	Percent Reduction Over Existing (%)
Existing/Base Year (2010)	N/A	16.5	6.6	0
2012 (Minimum)	1998 level	15.0	6.0	9
2012 (Desired)	7% below 1990	8.6	3.4	48
2020 (Minimum)	1990 level	9.25	3.7	44
2020 (Desired)	28% below 1990	6.7	2.7	59
2030 (Minimum)	28% below 1990	6.7	2.7	59
2030 (Desired)	53% below 1990	4.35	1.75	74
2040 (Minimum)	53% below 1990	4.35	1.75	74
2040 (Desired)	80% below 1990	1.85	0.75	89
2050 (Minimum)	80% below 1990	1.85	0.75	89
2050 (Desired)	Carbon Neutral	Net 0		100

[1] Assumes 2.5 persons/dwelling unit and an annual growth rate of 1 percent per year

Source: Niemeier, Deb. Carbon Development Allowances. September 2008.

The carbon allowance for the year 2020 requires the project to achieve emissions rates at least as low as 9.25 $MTCO_2e$ per year per unit with a desired emissions level of 6.7 $MTCO_2e$ per year per unit. Therefore, the proposed project would be considered to conflict with the City's GHG reduction targets and CAAP, if the project would result in operational GHG emissions in excess of 9.25 $MTCO_2e$ per year per unit.

For the purposes of this analysis, the CEQA Guidelines Appendix G thresholds are utilized for the GHG significance determination, with the understanding that these general thresholds are to be understood within the context of the YSAQMD and the City of Davis. The Appendix G thresholds are as follows:

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

With respect to the first threshold, the potential regional impacts and the SMAQMD thresholds, recommended for use in GHG analysis by SMAQMD, will be considered. With respect to the second threshold, the project's potential to conflict with an applicable plan, policy or regulation related to reducing emissions of GHGs will be analyzed in relation to the most applicable local regulations, which is the City of Davis' CAAP, and the specific GHG thresholds presented in Table 4.3-3 above.

It is important to note that the proposed project is consistent with SACOG's Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) and is eligible for CEQA streamlining. One benefit of the CEQA streamlining process is that projects that are consistent with the MTP/SCS do not have to consider project specific or cumulative impacts involving vehicle emissions related to the project on global warming.[25] Therefore, this EIR does not include analysis of mobile source GHG emissions in regards to either the City of Davis' standards or the YSAQMD-recommended SMAQMD standards. Nevertheless, GHG emissions from all other sources, such as energy consumption, wastewater treatment, water consumption, and area sources, have been considered throughout this analysis.

Method of Analysis

The proposed project's GHG emissions and energy consumption were estimated using the California Emissions Estimator Model (CalEEMod) version 2016.3.2 software - a statewide model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify air quality emissions, including GHG emissions, from land use projects. Furthermore, guidance from YSAQMD, SMAQMD, and the City of Davis was used to analyze the proposed project's GHG emissions.

Construction Emissions

Short-term construction emissions resulting from implementation of either the Preferred Site Plan or Alternative B were estimated using CalEEMod. The model applies inherent default values for various land uses, including trip generation rates based on the ITE Manual, vehicle mix, trip length, average speed, etc. However, where project-specific data was available, such data was input into the model. Although the Preferred Site Plan and Alternative B include different site plans, much of the construction information related to the length of the overall construction period, intensity of demolition, and site preparation would remain the same during implementation of either site plan. Therefore, based on information provided by the project engineer, the following assumptions were made for the construction modeling:

- Construction was assumed to commence in January 2019 and would occur over approximately 15 months;
- 53,000 sf of on-site existing structures would be demolished;

[25] Sacramento Area Council of Governments. *SB 375 CEQA Streamlining*. Available at: http://www.sacog.org/sb-375-ceqa-streamlining. Accessed May 2018.

- An estimated 3,500 cubic yards of material would be exported during the site preparation; and
- A total of 7.4 acres would be disturbed during the grading phase.

The results of emissions estimations were compared to the standards of significance discussed above in order to determine the associated level of impact. All CalEEMod modeling results are included in Appendix F to this EIR.

Operational Emissions

The operational emissions of GHGs and the amount of energy that would be consumed by operation of either site plan were estimated using CalEEMod. Based on the construction information provided by the project applicant, the proposed project is anticipated to be operational by 2020, with the first full year of operations occurring in 2021. The modeling performed for the proposed project included compliance with YSAQMD rules and regulations (i.e., low-VOC [volatile organic compounds] paints and low-VOC cleaning supplies). All buildings within the State of California are required to comply with the mandatory standards within the currently effective CALGreen Code and Building Energy Efficiency Standards.

In addition, the City has adopted Tier 1 provisions of the CALGreen Code as mandatory for all buildings subject to the CALGreen Code. Therefore, compliance with the Tier 1 provisions of the 2016 CALGreen Code has been assumed for analysis purposes within this EIR. The project's compliance with the Tier 1 provisions would result in a 30 percent reduction in indoor water use. In addition to water efficiency improvements, Tier 1 standards include various measures that reduce energy consumption through increased energy efficiency. While all structures included in the Preferred Site Plan and Alternative B would be subject to the additional energy efficiency requirements within CALGreen Tier 1 standards, the improvement of the Tier 1 standards beyond the existing requirements of the Building Energy Efficiency Standards is currently unknown. Therefore, while the 30 percent reduction in indoor water use was applied to CalEEMod to capture the project's compliance with the Tier 1 standards, the project's increased energy efficiency due to such compliance was not included in CalEEMod emissions estimations. Considering that Tier 1 energy efficiency measures were not included in CalEEMod emissions estimations for the project, the analysis presented within this chapter likely overestimates the energy that would be consumed during operation of the proposed project and the resulting GHG emissions, thereby providing a conservative analysis.

While not required by the CALGreen Tier 1 standards, the project applicant has committed to implementing outdoor water use efficiency improvements that would reduce the project's water demand by 50 percent. Such water use efficiency improvements have been included within the CalEEMod emissions estimation for the proposed project.

As discussed previously, the City of Davis has recently joined the VCE along with the City of Woodland and Yolo County. As of June 2018, the VCE has begun serving the electricity needs of the Cities of Woodland, Davis, and unincorporated areas of Yolo County. VCE plans to provide energy with a higher renewable content and lower resulting GHG emissions than PG&E. Should VCE electricity be produced through a greater proportion of renewable energy sources than PG&E,

energy consumed under the VCE program would result in fewer GHG emissions than an equivalent amount of energy provided by PG&E. Although VCE is providing energy for the City of Davis, individual properties and customers may opt-out of the VCE program, which would return the customer to service from PG&E. Considering that future residents of the proposed project may opt-out of the VCE program, and PG&E provided electricity would be more GHG intensive (i.e. consumption of electricity provided by PG&E would result in greater emissions than consumption of an equivalent amount of electricity provided by VCE), the energy provider for the proposed project was assumed to be PG&E. Thus, the analysis within this chapter presents a conservative approach to estimating potential GHG emissions related to energy demand from the proposed project.

Furthermore, the project applicant has indicated that on-site solar photovoltaic (PV) panels would be installed and operated in conjunction with the multi-family component of the proposed project. On May 9, 2018, the California Energy Commission adopted building standards that require new low-rise residential developments constructed under the forthcoming 2019 Building Energy Efficiency Standards to include PV systems to meet 100 percent of the electricity needs of the residence. The effective date for the 2019 Building Energy Efficiency Standards is January 1, 2020; thus, all low-rise residences constructed after January 1, 2020 would be required to include PV systems sufficient to meet the updated standards. Although the proposed multi-family structures included in the Preferred Site Plan and Alternative B would not be considered low-rise residential structures and, thus, would not be subject to the aforementioned PV requirements, the proposed single-family units included in Alternative B would be required to meet the 2019 Building Energy Efficiency Standards should construction occur after January 1, 2020.

Accordingly, development of either the Preferred Site Plan or Alternative B would be anticipated to include PV systems associated with the multi-family residences and, should construction of the proposed project be initiated after January 1, 2020, the proposed structures would be required to meet the 2019 Building Energy Efficiency Standards. However, as discussed above, construction of the proposed project is anticipated to begin in 2019, which would be prior to the effective date of the 2019 Building Energy Efficiency Standards. Furthermore, the extent to which on-site PV systems would be included within the multi-family portion of the proposed project was unknown at the time of environmental analysis. Considering the uncertainty regarding the extent to which on-site PV would be included in the proposed project, on-site renewable energy generation was not included in the analysis within this EIR. Thus, the analysis presented within this EIR represents a conservative approach as actual operations of either the Preferred Site Plan or Alternative B would be anticipated to result in a less intense demand on energy from the grid and fewer emissions related to energy consumption, as a portion of the energy consumed by operations would be produced through on-site renewable sources.

Finally, while the Preferred Site Plan would include 225 total units, the analysis presented within this EIR assumes that the Preferred Site Plan would only include 222 units, a difference of three units. Operation of the three additional units would involve energy and vehicle usage, both of which would have the potential to result in the emission of GHGs and the consumption of energy resources. Although the analysis within this chapter of the EIR considers a Preferred Site Plan including 222 units, the addition of three units to the project would not be anticipated to substantially alter the conclusions of this EIR as presented below. For instance, as discussed in a

memorandum prepared by KD Anderson & Associates, Inc. regarding the effect of the three additional units on the traffic study prepared for the proposed project, KD Anderson & Associates, Inc. concluded that the three additional units would not be anticipated to result in any substantial changes to the anticipated daily VMT of the proposed project.[26] Furthermore, the three additional units would be subject to the same energy efficiency standards as discussed above. As such, while the analysis of this chapter is based on 222 units being included within the Preferred Site Plan, the inclusion of three additional units would not be considered a substantial change to the proposed project and would not have the potential to alter the conclusions presented in this EIR.

The results of emissions and energy consumption estimations were compared to the standards of significance discussed above in order to determine the associated level of impact. All CalEEMod modeling results are included in Appendix F to this EIR.

Energy Demand

The CalEEMod modeling results include estimations for annual electricity and natural gas consumption, which were used for the energy analysis. Annual electricity and natural gas consumption for both the Preferred Site Plan and the Alternative B were prepared separately using CalEEMod.

Project-Specific Impacts and Mitigation Measures

Global climate change is, by nature, a cumulative impact. Emissions of GHG contribute, on a cumulative basis, to the significant adverse environmental impacts of global climate change (e.g., sea level rise, impacts to water supply and water quality, public health impacts, impacts to ecosystems, impacts to agriculture, and other environmental impacts). While GHG emissions from a project in combination with other past, present, and future projects contribute to the world-wide phenomenon of global climate change and the associated environmental impacts, a single project could not generate enough GHG emissions to contribute noticeably to a change in the global average temperature. Because the effects of GHG emissions are cumulative by nature, separate discussions for project-level and cumulative-level impacts for the proposed project are not necessary for this section of the EIR.

Cumulative Impacts and Mitigation Measures

Although the geographical context for global climate change is the Earth, for analysis purposes under CEQA and due to the regulatory context pertaining to GHG emissions and global climate change applicable to the proposed project, the geographical context for global climate change in this EIR is limited to the State of California.

The following discussion of GHG emissions and energy impacts is based on implementation of the proposed project in comparison to the standards of significance presented above.

[26] KD Anderson & Associates, Inc. *Memorandum: Unit Increase – 3820 Chiles Road*. May 30, 2018.

4.3-1 Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. Based on the analysis below, the proposed project's incremental contribution to this significant cumulative impact would be *less than cumulatively considerable.*

An individual project's GHG emissions are at a micro-scale level relative to global emissions and effects to global climate change; however, an individual project could result in a cumulatively considerable incremental contribution to a significant cumulative macro-scale impact. As such, impacts related to emissions of GHG are inherently considered cumulative impacts.

Operation of either the Preferred Site Plan or Alternative B, in combination with other proposed and pending projects in the region would significantly contribute to the State of California GHG emissions and effects of global climate change, resulting in an overall significant cumulative impact. Implementation of either project alternative included in the proposed project would contribute to the cumulative increase in GHG emissions that are associated with global climate change. Estimated GHG emissions attributable to future development would be primarily associated with increases of CO_2 and, to a lesser extent, other GHG pollutants, such as CH_4 and N_2O. Sources of GHG emissions include area sources, utilities (electricity and propane), water usage, wastewater generation, and the generation of solid waste.

As discussed earlier in this section, although the YSAQMD has not officially adopted any thresholds of significance for GHG emissions, the YSAQMD currently recommends use of the SMAQMD's adopted GHG emissions thresholds of significance. The threshold of significance for both construction and operational GHG emissions is 1,100 $MTCO_2e$/yr. Therefore, if either the Preferred Site Plan or Alternative B would result in GHG emissions in excess of 1,100 $MTCO_2e$/yr, the proposed project would be considered to generate GHG emissions that may have a significant impact on the environment.

The short-term construction-related and long-term operational GHG emissions resulting from implementation of either the Preferred Site Plan or Alternative B are described in further detail below.

Construction-Related GHG Emissions

Construction-related GHG emissions are a one-time release and are, therefore, not typically expected to generate a significant contribution to global climate change, as global climate change is inherently a cumulative effect that occurs over a long period of time and is quantified on a yearly basis. However, construction-related GHG emissions have been estimated for implementation of either the Preferred Site Plan or Alternative B and such emissions have been compared to the applicable threshold of significance, as presented below in Table 4.3-4. Construction-related emissions were modeled using CalEEMod under the assumptions described in the Method of Analysis section above.

Table 4.3-4 Unmitigated Construction-Related GHG Emissions ($MTCO_2e$/yr)		
Construction Year	**Preferred Site Plan Annual Emissions**	**Alternative B Annual Emissions**
2019	801.79	782.04
2020	64.23	39.15
Total	**866.02**	**821.19**
Applicable Threshold of Significance	**1,100**	**1,100**
Source: CalEEMod, April 2018 (see Appendix F).		

As shown in Table 4.3-4, construction-related activities associated with implementation of the Preferred Site Plan would result in maximum annual emissions of 801.79 $MTCO_2e$/yr, which would be below the applicable threshold of significance of 1,100 $MTCO_2e$/yr. Additionally, total construction GHG emissions resulting from buildout of the Preferred Site Plan would be 866.02 $MTCO_2e$/yr, which would also be below the applicable threshold of significance of 1,100 $MTCO_2e$/yr. Construction-related emissions resulting from buildout of Alternative B would similarly result in emissions below the applicable threshold of significance of 1,100 $MTCO_2e$/yr, with maximum annual emissions of 782.04 $MTCO_2e$/yr and total construction related emissions of 821.19 $MTCO_2e$/yr, both of which are below 1,100 $MTCO_2e$/yr.

Because the maximum annual and total construction GHG emissions for either the Preferred Site Plan or Alternative B would be below the applicable threshold of significance, the proposed project would not be considered to generate construction-related GHG emissions that would have a significant impact on the environment.

Operational GHG Emissions

The proposed project's annual operational GHG emissions are presented in Table 4.3-5 below. Project operational emissions were modeled using CalEEMod under the assumptions described above in the Method of Analysis section above. As discussed in the Method of Analysis section of this chapter, considering the project's compliance with the MTP/SCS and SB 375, the proposed project is within an MTP/SCS identified Transit Priority Area and is considered a Transit Priority Project, and, as such, is eligible for CEQA streamlining. Projects eligible for CEQA streamlining do not need to analyze mobile source GHG emissions. Thus, in compliance with CEQA streamlining provisions and SB 375, Table 4.3-5 presents emissions related to operation of both the Preferred Site Plan and Alternative B from all emissions sources excluding mobile emissions.

As shown in Table 4.3-5, operation of either the Preferred Site Plan or Alternative B would result in GHG emissions well below the applicable threshold of significance of 1,100 $MTCO_2e$/yr.

Table 4.3-5 Unmitigated Operational GHG Emissions ($MTCO_2e$/yr)		
Emission Source	**Preferred Site Plan Annual GHG Emissions**	**Alternative B Annual GHG Emissions**
Area	2.76	2.40
Energy	241.55	217.09
Solid Waste	51.36	46.24
Water	23.17	20.14
Total Annual GHG Emissions	**318.84**	**285.87**
Applicable Threshold of Significance	**1,100**	**1,100**
Source: CalEEMod, April 2018 (see Appendix F).		

It should be noted that the project applicant has indicated that both the Preferred Site Plan and Alternative B would include the installation and operation of on-site renewable energy infrastructure in the form of PV panels. The incorporation of PV panels into the proposed project would reduce GHG emissions related to project operations by meeting some of the project's energy demand through carbon free sources. Thus, actual emissions related to implementation of either site plan would likely be less than the emissions presented in Table 4.3-5.

Conclusion

Because implementation of either the Preferred Site Plan or Alternative B would result in construction-related and operational GHG emissions below the applicable threshold of significance of 1,100 $MTCO_2e$/yr, the proposed project would not be considered to generate GHG emissions, directly or indirectly, that would have a significant impact on the environment. Therefore, the proposed project's incremental contribution to this significant cumulative impact would be ***less than cumulatively considerable***.

Mitigation Measure(s)
None required.

4.3-2 Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. Based on the analysis below, the proposed project's incremental contribution to this significant cumulative impact would be *less than cumulatively considerable.*

Proposed projects resulting in carbon emissions equal to or less than the carbon allowances presented in Table 4.3-3 above would not interfere with the City's GHG emissions reductions goals and would be considered consistent with the City's CAAP. The proposed project is anticipated to be completed by the year 2020; therefore, the carbon allowance for year 2020 would apply (see Table 4.3-3). The City's carbon allowance for 2020 requires that GHG emissions from new residential development do not exceed 9.25 $MTCO_2e$/yr/unit, with a preferred emissions level not to exceed 6.7 $MTCO_2e$/yr/unit.

As shown in Table 4.3-5 above the Preferred Site Plan would result in operational emissions of 318.84 $MTCO_2e$/yr, while Alternative B would result in operational emissions of 285.87 $MTCO_2e$/yr. Table 4.3-6 presents the resulting emissions per residential unit in each of the foregoing alternatives and compares such per unit emissions to the City's adopted carbon allowances.

With a total of 222 proposed units, operation of the Preferred Site Plan would result in GHG emissions of 1.44 $MTCO_2e$/yr/unit and operation of the 193 units included in Alternative B would result in the emission of 1.48 $MTCO_2e$/yr/unit. It should be noted that the Preferred Site Plan has been updated to include operation of 225 units; however, as discussed in the Method of Analysis section above, the inclusion of three additional units would not be considered a substantial change to the proposed project and would not be anticipated to result in a substantial change in the emissions per unit presented above for the Preferred Site Plan. As shown in Table 4.3-6, the foregoing per unit emissions rates would be well below the maximum and desired carbon allowances for the year 2020. In fact, operational emissions from either site plan would be below the maximum carbon allowance through the year 2050.

Table 4.3-6
Project GHG Emissions and Carbon Allowance ($MTCO_2e$/yr/unit)

	Preferred Site Plan	Alternative B
Operational Emissions Per Unit	**1.44**	**1.48**
2020 Maximum Carbon Allowance	9.25	9.25
2020 Desired Carbon Allowance	6.7	6.7
2030 Maximum Carbon Allowance	6.7	6.7
2030 Desired Carbon Allowance	4.35	4.35
2040 Maximum Carbon Allowance	4.35	4.35
2040 Desired Carbon Allowance	1.85	1.85
2050 Maximum Carbon Allowance	1.85	1.85
2050 Desired Carbon Allowance	Net 0	Net 0

Sources:
- *CalEEMod, April 2018 (see Appendix F).*
- *Niemeier, Deb. Carbon Development Allowances. September 2008.*

The City's minimum allowance of 1.85 $MTCO_2e$/yr per unit for developments in 2050 is designed to achieve an 80 percent reduction in GHG emissions from 1990 levels (see Table 4.3-2). Achievement of an 80 percent reduction in GHG emissions by 2050 would comply with the State's goal of reducing GHG emissions by 80 percent below 1990 levels by 2050. Therefore, the proposed project would be in compliance with the City's GHG reduction targets, which would also place the project in compliance with the State's reduction targets per SB 32.

Based on the above, the operation of either the Preferred Site Plan or Alternative B would achieve the GHG emissions reductions target required by the City of Davis and would result in GHG emissions below the per unit carbon allowance for new residential developments in the year 2020 through the year 2050 (maximum). Because the City's

CAAP is based on achievement of the City's GHG reduction targets, the proposed project would not be considered to interfere with the City's adopted CAAP or GHG emissions targets. As such, the proposed project would not be considered to conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs, and the proposed project's incremental contribution to this significant impact would be ***less than cumulatively considerable***.

Mitigation Measure(s)
None required.

4.3-3 Result in the inefficient or wasteful use of energy associated with construction. Based on the analysis below, the impact is *less than significant.*

In order to ensure energy implications are considered in project decisions, Appendix F of CEQA Guidelines requires a discussion of the potential energy impacts of a project, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy. Appendix F identifies several potential sources of energy conservation impacts, including the project's construction energy requirements and energy use efficiencies by amount and fuel type. Construction of the proposed project would result in a temporary increase in energy consumption in the area.

For analysis purposes, construction of the proposed project would occur over approximately 15 months. As discussed above, construction is assumed to commence in January 2019. All construction equipment and operation thereof would be regulated per the CARB In-Use Off-Road Diesel Vehicle Regulation, which includes measures to reduce emissions from vehicles by subjecting fleet owners to retrofit or accelerated replacement/repower requirements, and imposing idling limitations on owners, operators, renters, or lessees of off-road diesel vehicles. Project construction would also be required to comply with all applicable YSAQMD rules and regulations, such as Rule 2.16 related to operation of stationary generators. Such regulations promote the use of efficient, modern equipment, which often results in the consumption of less fuel. As a result, construction equipment operating at the project site would occur over a relatively short duration in comparison to the operational lifetime of the proposed project and would be subject to relevant CARB and YSAQMD regulations promoting efficient energy use.

The CARB has recently prepared the *2017 Climate Change Scoping Plan Update* (2017 Scoping Plan),[27] which builds upon previous efforts to reduce GHG emissions and is designed to continue to shift the California economy away from dependence on fossil fuels. Appendix B of the 2017 Scoping Plan includes examples of local actions (municipal code changes, zoning changes, policy directions, and mitigation measures) that would support the State's climate goals. The examples provided include, but are not limited to, enforcing idling time restrictions for construction vehicles, utilizing existing grid power for electric energy rather than operating temporary gasoline/diesel-powered generators, and increasing use of electric and renewable fuel-powered construction equipment. The regulations

[27] California Air Resources Board. *The 2017 Climate Change Scoping Plan Update.* January 20, 2017.

described above, with which the proposed project must comply, would be consistent with the intention of the 2017 Scoping Plan and the recommended actions included in Appendix B of the 2017 Scoping Plan.

Nonetheless, construction of the proposed project would involve on-site energy demand and consumption related to use of oil in the form of gasoline and diesel fuel for construction worker vehicle trips, hauling and materials delivery truck trips, and operation of off-road construction equipment. In addition, diesel-fueled portable generators may be necessary to provide additional electricity demands for temporary on-site lighting, welding, and for supplying energy to areas of the site where energy supply cannot be met via a hookup to the existing electricity grid. Project construction is not anticipated to involve the use of natural gas appliances or equipment. Construction activities would be limited to 7:00 AM and 7:00 PM Monday through Friday and between the hours of 8:00 AM and 8:00 PM Saturdays and Sundays per Chapter 24 of the City's Municipal Code, Noise Regulations.

Electricity Demand

Typically, at construction sites, electricity from the existing grid is used to power portable and temporary lights or office trailers. Because grid electricity would be used primarily for steady sources such as lighting, not sudden, intermittent sources such as welding or other hand-held tools, the increase in electricity usage at the site during construction would not be expected to cause any substantial peaks in demand. Construction of the project would occur over a relatively short duration in comparison to the operational lifetime of the proposed project and electricity demand from the site would occur intermittently throughout the buildout period of the project. As the site develops, operational electricity demand would become the dominant demand source. Operational electricity demand would be much greater than construction and is discussed in Impact 4.3-4 below. It should be noted that standards or regulations specific to construction-related electricity usage do not currently exist.

Pacific Gas and Electric (PG&E) currently supplies electricity to the project site. As discussed in the Method of Analysis section above, while the City of Davis is anticipated to switch to VCE electricity, the potential remains that future residents would rely on PG&E provided energy demand. Under PG&E electricity would be provided from a variety of PG&E-owned sources including hydropower, natural-gas-fired generators, and renewable energy sources.[28] VCE plans to provide energy through renewable and non-RPS carbon free energy sources; however, during the initial stages of VCE implementation, some power is anticipated to originate from fossil fueled sources. Construction of the proposed project, which would result in temporary increases in electricity demand, would not cause a permanent or substantial increase in demand that would exceed PG&E's or VCE's demand projections, and the temporary increase in electricity demand would not exceed the ability of PG&E's existing infrastructure to handle such an increase. Therefore, project construction would not result in any significant impacts on local or regional

[28] California Energy Commission. *Power Source Disclosure*. Available at: http://www.energy.ca.gov/pcl/. Accessed January 2018.

electricity supplies, the need for additional capacity, or on peak or base period electricity demands. As such, the temporary increase in electricity demand due to project construction activities would not be considered an inefficient, wasteful, and unnecessary consumption of energy, and significant adverse impacts on electricity resources would not occur.

Oil Demand

Construction of the proposed project would involve vehicle trips to and from the project site by workers, delivery vehicles, and hauling trucks. Worker vehicle trips are assumed to utilize gasoline, and delivery and hauling trucks are assumed to utilize diesel fuel. Diesel fuel would also be used to power the construction and off-road equipment necessary for construction activities, including rubber-tired dozers, tractors, excavators, cranes, and other types of equipment. In addition, diesel-fueled portable generators may be used where electricity from the grid cannot be provided or where more immediate electricity is needed, such as for welding or other hand tools. Overall, operation of construction equipment at the project site would occur over a relatively short duration in comparison to the operational lifetime of the proposed project and would be intermittent over the period of construction for the project. Operational oil demand would be much greater than construction and is discussed in Impact 4.3-4 below.

A number of federal, State, and local standards and regulations exist that require improvements in vehicle efficiency, fuel economy, cleaner-burning engines, and emissions reductions. For example, as noted above, CARB has adopted the In-Use Off-Road Diesel Vehicle Regulation, which is intended to reduce emissions from in-use, off-road, heavy-duty diesel vehicles in California by imposing limits on idling, requiring all vehicles to be reported to CARB, restricting the addition of older vehicles into fleets, and requiring fleets to reduce emissions by retiring, replacing, or repowering older engines, or installing exhaust retrofits. Implementation of the In-Use Off-Road Diesel Vehicle Regulation will help to improve fuel efficiency and reduce fuel consumption on a statewide basis. Any licensed contractor for the project and equipment would have to be in compliance with all applicable regulations, such as the in-use, off-road, heavy-duty vehicle regulation. Thus, the proposed project would comply with existing standards related to construction fuel efficiency. Technological innovations and more stringent standards are being researched, such as multi-function equipment, hybrid-fueled equipment, or other design changes, which could help to reduce demand on oil and emissions associated with construction.

Therefore, the temporary increase in gasoline and diesel consumption due to project construction activities would not be an inefficient, wasteful, and unnecessary consumption of energy, and a significant adverse impact on oil resources would not occur.

Conclusion

Construction of the proposed project would result in a temporary increase in demand for energy resources. However, the temporary increase would not result in a significant increase in peak or base demands or require additional capacity from local or regional energy supplies. In addition, the proposed project would be required to comply with all

applicable regulations related to energy conservation and fuel efficiency, which would help to reduce the temporary increase in demand. As such, the project would not result in an inefficient, wasteful, and unnecessary consumption of energy, and, the proposed project would result in a ***less-than-significant*** impact on energy resources during construction.

Mitigation Measure(s)
None required.

4.3-4 Result in the inefficient or wasteful use of energy associated with project operations. Based on the analysis below, the impact is *less than significant.*

In order to ensure energy implications are considered in project decisions, Appendix F of CEQA Guidelines requires a discussion of the potential energy impacts of project, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy. Appendix F identifies several potential sources of energy conservation impacts, which are listed as follows and discussed in further detail below, with the exception of the project's construction-related energy requirements and energy use efficiencies, which are discussed under Impact 4.3-3 above:

- The project's energy requirements and its energy use efficiencies by amount and fuel type for each stage of the project including construction, operation, maintenance and/or removal.
- The effects of the project on local and regional energy supplies and on requirements for additional capacity.
- The effects of the project on peak and base period demands for electricity and other forms of energy.
- The degree to which the project complies with existing energy standards.
- The effects of the project on energy resources.
- The project's projected transportation energy use requirements and its overall use of efficient transportation alternatives.

The following analysis considers project-related impacts on multiple types of energy resources, including electricity, natural gas, and vehicle fuels such as gasoline and diesel.

Building Energy

The project site is currently developed with a 53,000 square foot office structure that was built in the 1960s. At the time of issuance of the Notice of Preparation, the structure was not being used.

Electricity and natural gas in the project area is currently provided by PG&E, and VCE will begin providing electricity starting in June 2018. PG&E relies on a variety of electricity sources including hydropower, natural-gas-fired generators, and renewable

energy sources to provide electricity to customers,[29] while VCE intends on providing the majority of electricity from renewable and carbon free sources.[30] Following implementation of the proposed project, PG&E or VCE would represent the source of electricity provided to the project site and PG&E would continue to provide natural gas to the project site. Energy use associated with operation of the proposed project would be typical of residential uses, requiring electricity and natural gas for interior and exterior building lighting, heating, ventilation, and air conditioning (HVAC), electronic equipment, refrigeration, appliances, food preparation activities, security systems, and more. In addition, maintenance activities during operations, such as landscape maintenance, would involve the use of electric or gas-powered equipment.

The potential project demand for electricity and natural gas was estimated using CalEEMod and is presented in Table 4.3-7.

Table 4.3-7
Estimated Electricity and Natural Gas Consumption

	Electricity (kWh/yr)	Natural Gas (kBTU/yr)
Preferred Site Plan	944,934	2,164,080
Alternative B	842,433	1,961,813

Source: CalEEMod April 2018 (Appendix F).

The proposed project would increase the intensity of development within the project site and result in energy demands as shown in Table 4.3-7. In 2016, residential development within Yolo County consumed a total of 508.11 GWh of electricity and 23.20 million therms of natural gas. The Preferred Site Plan's energy demands presented in Table 4.3-7 would represent 0.19 percent of Yolo County's total annual electricity consumption and 0.09 percent of the County's total natural gas consumption. Alternative B would represent 0.17 percent of Yolo County's total annual electricity consumption and 0.08 percent of the County's total annual natural gas consumption. Such energy demands would represent a small proportion of total energy demand within the County. Furthermore, increased energy and natural gas demand does not necessarily mean that a project would have an impact related to energy resources. Based on Appendix F of the CEQA Guidelines, a proposed project would result in an impact related to energy resources if a project would result in the inefficient use or waste of energy.

Structures built under either the Preferred Site Plan or Alternative B would be subject to all relevant provisions of the CBSC effective at the time of construction, including the Building Energy Efficiency Standards. Adherence to the most recent CALGreen and the Building Energy Efficiency Standards would ensure that the proposed structures would consume energy efficiently through the incorporation of such features as efficient water heating systems, high performance attics and walls, and high efficacy lighting. Furthermore, as discussed in the Method of Analysis section above, the project's

[29] California Energy Commission. *Power Source Disclosure*. Accessible at http://www.energy.ca.gov/pcl/. Accessed January 2018.

[30] Valley Clean Energy Alliance. *Community Choice Aggregation Implementation Plan and Statement of Intent*. October 12, 2017.

compliance with Tier 1 of the CALGreen code would result in further energy efficiency improvements beyond what would otherwise be required by the Building Energy Efficiency Standards. Thus, the energy consumption rates presented in Table 4.3-7 represent a conservative estimation of energy consumption, and operation of either the Preferred Site Plan or Alternative B would be anticipated to result in energy consumption below the amount presented in Table 4.3-7.

Moreover, future updates to the CBSC, such as the update anticipated for 2019, will likely provide increasingly stringent efficiency standards, and structures built in compliance with future CBSC would be increasingly more energy efficient. For example, as discussed in the Method of Analysis section above, low-rise residential structures, such as the single-family residences included in Alternative B, built under the 2019 CBSC will be required to incorporate PV systems able to meet 100 percent of the proposed residences' electricity demand. As such, the proposed project would not result in the inefficient or wasteful consumption of electricity or natural gas.

It should be noted that the project applicant has indicated that both the Preferred Site Plan and Alternative B would include the installation and operation of on-site renewable energy infrastructure in the form of carport PV panels. It is part of the applicant's intent for the project to achieve a level of LEED Gold equivalency. The general sustainability strategies were previously mentioned in Section 3 of this EIR (Project Description). Specific project measures and details would need to be identified, but would be expected to have energy efficiency benefits. The incorporation of PV panels into the proposed project would reduce demand on energy from the grid, as a portion of the energy required for operation of either site plan would be generated from within the project site. Thus, while the proposed project would continue to consume the same amount of energy as shown in Table 4.3-7, some of the energy consumed would be produced within the project site. On-site production of energy would reduce the project's overall demand on regional energy resources.

Considering the above, operation of either the Preferred Site Plan or Alternative B would represent a relatively minor increase in energy demand within the County. While either site plan would result in an increase in energy demand within the City, the proposed project would be required to incorporate energy efficiency measures in compliance with the Building Energy Efficiency Standards and CalGreen Tier 1 provisions in place at the time of improvement plan approval. Thus, operation of either the Preferred Site Plan or Alternative B would not include the inefficient or wasteful use of energy.

Transportation Energy

The Davis CAAP includes objectives for mobility within the City with priorities to reduce VMT, improve efficiency of the transportation network, improve energy efficiency of the vehicle fleet by implementing more advanced technologies, and reduce the carbon content of fuels through the use of alternative fuels. As the City implements the CAAP objectives, the City's overall dependence on oil would be expected to be reduced, including project-related consumption of gasoline.

Project-specific per capita VMT was provided for the proposed project within the *Traffic Impact Analysis* prepared for the proposed project.[31] As further discussed in Section 4.7, Transportation and Circulation, of this EIR, the future VMT per resident of the proposed project is estimated to equal 12.2 miles per day in the existing setting and 12.3 miles per day in the cumulative setting. The City of Davis/UC Davis Area-generated VMT is estimated to equal approximately 18.0 VMT per capita per day. Thus, the estimated VMT for the proposed project represents an approximately 32 percent reduction in per capita VMT. Furthermore, SACOG's 2016 MTP/SCS indicates that regional per capita VMT averaged 24.5 in 2012 and is expected to be 24.2 in 2036; thus, the project's cumulative per capita VMT would be approximately 49 percent lower than SACOG's regional average for 2036.

In addition, the State of California has committed to increasing the efficiency of vehicles within the State through efforts such as the Advanced Clean Cars Program (AACP). The AACP encourages the control of emissions from passenger vehicles, such as cars and trucks, through the use of low emissions or zero emissions vehicles. Vehicles promoted by the AACP include hybrid and electric vehicles that either augment the efficient use of gasoline through the use of electric motors or forego the use of fossil fuels and solely rely on electric motors. Hydrogen-fueled vehicles also qualify for the AACP. The use of such hybrid, electric, and hydrogen-fueled vehicles not only transfers vehicle use away from fossil fuels, but also ensures that the most efficient, least polluting technologies are implemented, as such vehicles are typically more efficient than standard fossil fuel powered vehicles. Therefore, while the increased use of electric vehicles may increase demand for electricity supplies, such energy would be more efficiently used than the energy used by traditional fossil fueled vehicles.

Considering the above, the proposed project would contribute to the City's CAAP objective of reducing overall VMT. By resulting in lower than average VMT, the proposed project would result in a reduced overall demand for transportation energy.

It should further be noted that the SACOG MTP/SCS anticipates a certain amount of growth in the region and includes the associated vehicle trips. The proposed project would fulfill a portion of the anticipated growth in the region. Thus, the vehicle trips associated with the proposed project were included in the MTP/SCS. Therefore, the proposed project would not be considered to result in a substantial increase in demand for regional fuel supplies, or a requirement for substantial additional fuel capacity, and a less-than-significant impact related to transportation energy use would occur.

Conclusion

As discussed above, the proposed project operations would involve an increase in energy consumption. However, the proposed project would comply with all applicable standards and regulations regarding energy conservation and fuel efficiency, which would ensure that the future uses would be designed to be energy efficient to the maximum extent practicable.

[31] KD Anderson & Associates, Inc. *Traffic Impact Analysis for 3820 Chiles Road, Davis, CA.* May 1, 2018.

Accordingly, the proposed project would not be considered to result in a wasteful, inefficient, or unnecessary usage of energy, and impacts related to operational energy would be considered ***less than significant***.

Mitigation Measure(s)
None required.