4.6 ENERGY

This section describes the potential effects of the project on energy conservation. Information in this section is derived from the following sources:

- Energy Assessment prepared by ESA in February 2017 (see **Appendix H**)
- Circlepoint, Pantages Bay Residential Development Project. Final Environmental Impact Report, 2013
- California Public Utilities Commission, California Renewables Portfolio Standard. 2016
- Personal communication with Pacific Gas and Electric Company (PG&E)

For the purposes of this analysis, buildout of the project is conservatively assumed to occur over a 30-month period, which includes operation of the homes. However, the actual construction of the individual homes will be largely market-driven and may extend over a 10-year period. A 30-month construction period results in a conservative analysis as the assumed annual energy demand would be higher.

No comments regarding energy were submitted in response to the Notice of Preparation for this draft environmental impact report.

4.6.1 EXISTING CONDITIONS

Electrical and Gas Services

Electrical and gas services in the project area are provided by PG&E. PG&E obtains its energy supplies from power plants and natural gas fields in northern California, as well as from energy purchased outside its service area and delivered through high voltage transmission lines and pipelines. Power is generated from various sources, including fossil fuel, hydroelectric, nuclear, wind, and geothermal plants; and is fed into the electrical grid system serving Northern California.

PG&E updates all load forecasts for gas and electricity services every year. Load growth forecasts for this area are currently determined using load growth projection tools that use a number of sources of data including past peak loading, population, development characteristics, and temperature history information. If an update for the distribution area indicates that the load growth is different than forecasted, an expansion of the existing systems would be timed to match the faster or slower growth (Circlepoint, 2013).

The approximately 61-acre project site currently contains two residential buildings, a barn, horse pasture area, an office building, two abandoned walnut orchards, and adjacent open space. For the purposes of this analysis, the existing setting includes

occupancy of the office building, which has varied over time. While the permitted capacity and documented actual occupancy of the building for California Environmental Quality Act (CEQA) baseline purposes is the entire 20,700 square feet of the building, this analysis uses the 76 percent occupancy as its baseline. This choice is based on the historical record that the occupied capacity of the building is approximately 76 percent.

4.6.2 REGULATORY SETTING

State

California's Energy Efficiency Standards for Residential Buildings, Title 24

The Energy Efficiency Standards for Residential Buildings were established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods.

Examples of energy measures in the Title 24 standards and the CALGreen Code include energy efficiency metrics and performance standards for appliances, space-conditioning equipment (i.e., heating, ventilation and air conditioning [HVAC]), water heating systems, windows and doors, insulation, lighting, and roofing materials; indoor and outdoor water use efficiency and conservation performance metrics; and requirements to provide solar-ready buildings with a minimum solar zone area (solar zone is defined as a section of the roof designated and reserved for the future installation of a solar electric or solar thermal system).

Project Consistency Analysis

As required by law, the project would comply with the most recent Energy Efficiency Standards of Title 24 by incorporating 'green building' and energy saving measures. According to the California Energy Commission, the latest version of the Title 24 (2016) standards, which took effect on January 1, 2017, uses approximately 28 percent less energy for residential lighting, heating, cooling, ventilation, and water heating compared to the prior Title 24 (2013) standards.

California's Renewable Energy Portfolio Standard Program (Senate Bills 107 and 1078)

California's Renewables Portfolio Standard was established in 2002 under Senate Bill 1078, accelerated in 2006 under Senate Bill 107, and expanded in 2011 under Senate Bill 2. This 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.

Project Consistency Analysis

This regulation does not require an evaluation of project consistency; however, it is important to note as the project would receive electricity from PG&E which is required to meet the renewable energy goal. PG&E procured 23.8 percent of their energy from renewable sources in 2013, and is currently under contract to procure 31.3 percent of their energy from renewable sources by 2020 (California Public Utilities Commission, 2016).

California Air Resources Board On-Road and Off-Road Vehicle Regulations

In 2004, the California Air Resources Board (CARB) adopted an Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling in order to reduce public exposure to diesel particulate matter emissions (Title 13 California Code of Regulations Section 2485). The measure applies to diesel-fueled commercial vehicles with gross vehicle weight ratings greater than 10,000 pounds that are licensed to operate on highways, regardless of where they are registered. This measure does not allow diesel-fueled commercial vehicles to idle for more than five minutes at any given location. While the goal of this measure is primarily to reduce public health impacts from diesel emissions, compliance with the regulation also results in energy savings in the form of reduced fuel consumption from unnecessary idling.

In addition to limiting exhaust from idling trucks, CARB also promulgated emission standards for off-road diesel construction equipment of greater than 25 horsepower such as bulldozers, loaders, backhoes and forklifts, as well as many other self-propelled off-road diesel vehicles. The In-Use Off-Road Diesel-Fueled Fleets regulation adopted by CARB on July 26, 2007 aims to reduce emissions by installation of diesel soot filters and encouraging the retirement, replacement, or repower of older, dirtier engines with newer emission controlled models (13 California Code of Regulations Section 2449). The compliance schedule requires full implementation by 2023 in all equipment for large and medium fleets and by 2028 for small fleets.

Project Consistency Analysis

All on-road and off-road construction and commercial equipment used during project construction would comply with the CARB On-Road and Off-Road Vehicle Regulations. Neither on-road nor off-road equipment would be allowed to idle for more than five minutes at a time. While intended to reduce construction criteria pollutant emissions, compliance with anti-idling and emissions reduction regulations would also minimize wasteful and unnecessary energy consumption during construction.

California Assembly Bill No. 1493 (AB 1493, Pavley), (Chapter 200, Statutes of 2002)

Authored by Assembly Member Fran Pavley and enacted on July 22, 2002, these standards are intended to reduce GHG emissions for passenger vehicles, light duty trucks, and other vehicles whose primary use is noncommercial personal transportation manufactured in and after 2009. However, they also have the associated benefit of reducing energy consumption from the transportation sector by improving fuel economy and reducing fuel consumption as a means to reduce emissions. Referred to as the Pavley standards, implementation of AB 1493 was delayed due to litigation, but ultimately upheld by the Supreme Court. The standards established tailpipe GHG emissions standards for model year 2012 through 2016 light-duty vehicles under Phase I and model year 2017 through 2025 light-duty vehicles under Phase II.

The United States Environmental Protection Agency and United States Department of Transportation adopted federal equivalent standards for model year 2012 through 2016 light-duty vehicles and model year 2017 through 2025 light-duty vehicles. The federal standards are slightly different from the Pavley Phase I and Phase II standards, but the State of California has agreed not to contest these standards, in part due to the fact that while the national standard would achieve slightly lower reductions in California, it would achieve greater reductions nationally and is stringent enough to meet state GHG emission reduction goals (CARB 2016). On November 15, 2012, CARB approved an amendment that allows manufacturers to comply with the national standards to meet state law.

Project Consistency Analysis

Construction related light-duty trucks would be required to meet state GHG emission laws either through adherence to the Pavley standards or federal standards.

Local

Contra Costa County General Plan

The Conservation Element of the General Plan contains the following goal related to energy conservation:

Goal 8-L: Reduce energy use in the County to avoid risks of air pollution and energy shortages which prevent orderly development.

Project Consistency Analysis

As required by law, the project would incorporate 'green building' and energy saving measures pursuant to the Energy Efficiency Standards of Title 24 and the new California Green Building Code. These same measures would reduce the potential energy use of the project, thereby ensuring consistency with Goal 8-L of the General Plan.

4.6.3 IMPACTS AND MITIGATION MEASURES

Significance Criteria

The potential for energy usage impacts is based on thresholds derived from Appendix F of the State CEQA Guidelines. Appendix F recommends the following considerations for evaluating energy impacts:

- 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. If appropriate, the energy intensiveness of materials maybe discussed.
- 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.

In consideration of the above factors, the following threshold is utilized to determine if the project would result in potentially significant impacts on energy resources:

- Would the project result in wasteful, inefficient, and unnecessary consumption of energy during project construction and operation, including transportation energy; result in energy demand substantially affecting local and regional energy supplies and capacity; or substantially conflict with existing energy standards?

Discussion of Less-than-Significant Impacts

Would the project result in wasteful, inefficient, and unnecessary consumption of energy during project construction and operation, including transportation energy; result in energy demand substantially affecting local and regional energy supplies and capacity; or substantially conflict with existing energy standards?

Construction Period

In February 2017, ESA prepared the Energy Assessment to evaluate energy usage related to the project (see **Appendix H**). For the purposes of this analysis, project construction is assumed to occur over a 30-month period. Though the completion of 35 individual homes would be market-driven and could extend over a 10-year period, a 30-month construction period reflects the most conservative analysis as the assumed annual energy demand would be higher.

Energy consumption during construction would result primarily from transportation fuels (e.g., diesel and gasoline) used for haul trucks, heavy-duty construction equipment, and construction workers traveling to and from the project site. The Energy Assessment used project-level construction information, traffic data, and standard fuel consumption rates to estimate the maximum gasoline and diesel consumption for the purposes of evaluating the associated impacts on energy resources.

- **Off-road equipment:** Heavy-duty construction equipment such as backhoes, dozers, excavators, and rollers would be required during project construction. Based on the amount and type of equipment required for project construction, the duration of construction activities, and standard fuel consumption factors, off-road equipment would consume approximately 24,482 gallons of diesel, or 9,793 gallons of diesel per year over the 30-month construction period.

- **Trucks:** Trucks would be used to haul material and deliver supplies. Based on the estimated vehicle miles required for material hauling and delivery and standard fuel consumption factors, construction-related trucks would consume approximately 7,867 gallons of diesel, or 3,147 gallons of diesel per year over the 30-month construction period.

- **Construction Worker Vehicle Trips:** Construction workers would be expected to drive to and from the project site on workdays throughout the construction period. Based on the construction duration and engineering estimates, construction workers would travel approximately 100,514 vehicle miles throughout the construction period. Travelling this distance would require approximately 4,038 gallons of fuel, or approximately 1,615 gallons of fuel per year. For the purposes of this analysis, construction worker vehicles are expected to use gasoline.

Based on these above estimates, project construction would require approximately 12,940 gallons of diesel and 1,615 gallons of gasoline on an annual average basis during the 30-month (i.e., 2.5-year) construction timeframe. California's total annual consumption of gasoline is 14.4 billion gallons for the transportation sector. The state's total annual consumption of diesel for the transportation sector is 3.4 billion gallons (ESA, 2017). The estimated annual average construction fuel usage for the project represents a very small fraction of the State's annual fuel usage (approximately 0.0004 percent of the statewide annual diesel consumption and 0.00001 percent of the statewide annual gasoline consumption). This represents a negligible amount of fuel consumption on a statewide level.

Construction of the project is not expected to require substantial electricity usage. Electricity use during construction would be variable depending on lighting needs and the use of electric-powered equipment and would be temporary for the duration of construction activities. If electric-powered construction equipment or vehicles are used, they would replace the diesel- and gasoline-fueled equipment assumed in this assessment. Therefore, it is expected that construction electricity use would generally be considered as temporary and negligible and accounted for in the fuel estimates discussed above.

As discussed in **Subsection 4.6.2**, the project would be required to comply with CARB On-Road and Off-Road Vehicle Regulations to limit vehicle idling. While intended to reduce construction criteria pollutant emissions, compliance with this anti-idling regulation would also result in efficient use of construction-related energy and the minimization or elimination of wasteful and unnecessary consumption of energy. The project would utilize construction contractors that demonstrate compliance with applicable CARB regulations governing the accelerated retrofitting, repowering, or replacement of heavy duty diesel equipment. Ultimately, the estimated project energy savings from the foregoing construction measures would result in diesel fuel savings of 1,875 gallons (see **Appendix H**).

Finally, because project construction will entail energy demands largely associated with equipment and transportation fuels, construction of the project would not increase demands on the electric power network during peak and base period demand periods. As a result, construction energy impacts would be considered less than significant.

Operational Period

Operational energy consumption would occur from the proposed residences and transportation fuels (e.g., diesel and gasoline) used for vehicles traveling to and from the site.

Proposed Residences

Operation of the 35 proposed single-family residences would require electricity and natural gas. Based on the proposed development and engineering estimates, the project would have an electricity demand of approximately 289,280 kilowatt-hours (kWh) per year, and a natural gas demand of approximately 1,358,180 kilo British thermal units (kBtu) per year. Based on historical energy demand factors, existing structures on the project site currently generate demand for approximately 262,000 kWh and 453,000 kBtu per year. Since these existing structures would be removed from the project site, the project's net annual energy usage upon operation would be 27,280 kWh and 905,180 kBtu.

In 2015, Contra Costa County consumed approximately 2.8 billion kWh of electricity (CEC, 2017a) and approximately 15.3 billion kBtu of natural gas (CEC, 2017b). The project's net demand would represent approximately 0.001 percent of the County's electricity consumption and approximately 0.01 percent of the County's natural gas consumption. In addition, PG&E's infrastructure accounts for increases in energy demand and load growth by annually updating load forecasts for gas and electricity services. If an increase or decrease in load growth is realized, an expansion of existing systems would be timed appropriately. The project would also incorporate energy and water efficient designs consistent with energy efficiency standards in the applicable Title 24 standards and the CALGreen Code.

Transportation Fuels

Project operation would result in consumption of transportation fuels, primarily gasoline and diesel. Based on average fuel economy for passenger vehicles in the San Francisco Bay Area and the project's maximum estimated annual vehicle miles travelled (VMT), passenger vehicles would use approximately 28,150 gallons of gasoline and 174 gallons of diesel per year. Currently, approximately 10,464 gallons of gasoline and 655 gallons of diesel are consumed per year for trips to existing uses on the project site. Since these existing structures would be removed from the project site, the project's net annual fuel usage upon operation would be 17,686 gallons of gasoline and 109 gallons of diesel per year.

In 2015, California consumed a total of 14.4 billion gallons of gasoline and 3.4 billion gallons of diesel in the transportation sector. Given that the population of California in 2015 was estimated to be 39,144,818 people,[1] this represents a per capita consumption of approximately 368 gallons of gasoline and 87 gallons of diesel. In comparison, the net per capita transportation fuel demand from operational vehicle trips for this project would be approximately 168 gallons of gasoline and 1 gallon of diesel.[2]

[1] United States Census Bureau, 2016

[2] As discussed in **Section 4.14, Population and Housing**, the project is expected to generate a direct population increase of 105 people.

The location of the project is also ideal for limiting transportation-related energy impacts. The project site is located east of the EBRPD-managed Madrone Trail, which commences at the existing terminus of Camille Avenue, and approximately 0.25 mile away from the Iron Horse Regional Trail. The project site would provide residents with convenient access to these trails for recreational use. The project site would also provide residents with convenient access to other nearby uses Rancho Romero Elementary School approximately 0.3 mile to the north, San Ramon Valley High School approximately 1 mile to the southeast, and Hap Magee Ranch Park approximately 0.5 mile to the northeast. Suburban commercial centers with retail, restaurant, office, and other commercial uses are located approximately 1 mile to the north in Alamo and approximately 1.5 miles to the southeast in Danville, including employment centers.

As a result, the project would provide nearby access to a range of destinations. According to the California Air Pollution Control Officer's Association (CAPCOA) guidance document *Quantifying Greenhouse Gas Mitigation Measures*, projects with accessibility to destinations result in reductions in VMT. According to the CAPCOA guidance, factors that contribute to VMT reductions based on destination accessibility include the distance to a downtown or job center, and expected VMT reductions range from approximately 6.7 percent to 20 percent (CAPCOA 2010). Thus, the project would be expected to result in transportation fuel savings of approximately 1,886 gallons of gasoline per year and 12 gallons of diesel per year.

Further, as discussed in **Section 4.11, Land Use and Planning**, the project site is located entirely within the Urban Limit Line and would be adjacent to similar residential areas. This means that the development would be located in an area that already has infrastructure to serve a residential community. As discussed in **Section 4.15, Public Services and Recreation** and **Section 4.17, Utilities and Service Systems**, the project site is currently served by public safety, school systems, and infrastructure.

Lastly, the project would also include the installation of electric vehicle supply equipment (EVSE) in garages, pursuant to the CALGreen Code. The project would include the installation of dedicated circuits to accommodate at least one electric vehicle per dwelling unit. Alternative-fueled, electric, and hybrid vehicles, to the extent these types of vehicles would be utilized by passengers, would reduce the project's consumption of gasoline and diesel; however, the effect may be minimal in the current vehicle market. According to the EMFAC2014 model, electric vehicles are predicted to account for 2.0 percent of passenger vehicle VMT in 2020 in the SFBAAB region. Based on the estimate above, this would translate to a fuel savings of up to approximately 572 gallons of fuel (primarily gasoline, assuming electric vehicles replace gasoline-fueled passenger vehicles) per year. Plug-in electric vehicles would generally obtain battery power from utilities are required to provide an increasing share of electricity from renewable sources (i.e., 33 percent by 2020

and 50 percent by 2030) under the State's Renewables Portfolio Standard. Therefore, while plug-in electric vehicles would replace traditional transportation fuels (i.e., gasoline) with utility provided electricity, the electricity would be provided by an increasing share of renewable sources resulting in an overall reduction in energy resource consumption.

Given the above, project operation would not result in wasteful, inefficient, or unnecessary energy usage, and would result in a less-than-significant impact to energy resources.

4.6.1 CUMULATIVE IMPACTS

The cumulative setting for energy impacts is the regional energy distribution systems that serve the project site and County. Development proposed as part of the build out of the General Plan within the County could increase energy demands on these systems. PG&E has indicated that the distribution systems serving the County are designed to adequately serve the energy demands from projected development within the ULL (Carr, 2015). As such, the project in combination with the other development in the County would not result in cumulative impacts to energy.

4.6.4 REFERENCES

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