

APPENDIX M: ASSESSMENT OF ENERGY USE AND IMPACTS TECHNICAL MEMORANDUM

**Assessment of Energy Use and Impacts Technical Memorandum
prepared by Ramboll US Consulting, Inc.**

MEMORANDUM

Date: August 20, 2024
To: Don Little and Tyler Higgins, Orchard Partners
From: Shari Libicki, Ph.D.
 Sarah Manzano
Subject: **Assessment of Energy Use and Impacts
 Guadalupe Quarry Redevelopment Project
 Brisbane, CA**

Ramboll conducted an assessment of energy use for the construction and operation of the Guadalupe Quarry Redevelopment Project (referred to hereafter as the "Proposed Project" or "Project") for Orchard Partners, LLC. The scope and methods used in this assessment are consistent with recommended analyses for projects requiring review under the California Environmental Quality Act (CEQA). The analysis in this report will be independently reviewed by the City of Brisbane, California (referred to as the "City") and peer reviewed by the City's environmental consultant for possible incorporation into the Environmental Impact Report (EIR) for the Project. Assumptions used herein are consistent with assumptions used in our Air Quality, Greenhouse Gas, Transportation, and Health Risk Assessment Technical Report for the Guadalupe Quarry Redevelopment Project.

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1. METHODOLOGY FOR DEVELOPMENT OF ENERGY PROJECTIONS

Table 1 lists the sources for which energy use estimates from the Project are quantified.

1.1 Baseline Energy Use

To evaluate the Proposed Project's energy consumption, energy consumption was estimated and presented under baseline and future operational conditions. Energy usage for baseline conditions on the Project site was calculated using a 5-year average from 2017 through 2021 as representative of normal operations. Existing land use at the Project site consists of quarry operations; sources of energy use for the existing quarry include equipment usage for quarry operations, mobile energy use for traffic associated with the quarry, building energy use for the existing buildings, and water energy use, as summarized in **Table 1**.

1.1.1 Baseline Equipment Energy Use

Energy use calculations associated with off-road quarry equipment are based on annual hours of use, type, and quantity as provided by the Project Applicant. All quarry equipment is diesel-fueled. Fuel use from

off-road quarry equipment is estimated using methodology consistent with Environmental Protection Agency (EPA) AP-42 Section 3.4 for Large Stationary and All Stationary Dual Fuel Engines. **Table 2** shows the fuel usage from quarry equipment for baseline conditions.

1.1.2 Baseline Natural Gas and Electricity Energy Use

Natural gas and electricity provide building energy for the existing quarry. Historic electricity usage rates at the quarry for 2016 (the most recent year available) were provided by the quarry operator. The electricity use for the baseline period of 2017 through 2021 was extrapolated from the 2016 data using the truck counts for the respective years, as shown in **Table 3**. Baseline energy usage was calculated as the average across 2017-2021 as a representative period. Natural gas was only used at the asphalt plant, which ceased operation in 2018. Therefore, it was assumed that no natural gas was used at the site after 2018.

1.1.3 Baseline Water Energy Use

Electricity is used to supply, treat, and distribute potable water and treat the resulting wastewater needed for Project operations. Water usage rates for baseline operations was provided by the Project Applicant. Energy use associated with water consumption and wastewater treatment was quantified using a methodology consistent with CalEEMod 2022.1. The electricity from water use is summarized in **Table 4**.

1.1.4 Baseline Mobile Energy Use

Fuel usage for baseline operations was estimated from on-road VMT by employees commuting to the Project site and haul trips transporting quarry material to and from the site. Trip generation rates were provided by the Project Applicant; total VMT was calculated using CalEEMod2022.1 default trip lengths for worker and haul trips.¹

Fuel usage for both baseline operations was estimated using an average miles-per-gallon (mpg) obtained from EMFAC2021 for the fleet mix corresponding to the vehicle category and fuel type (gasoline or diesel). **Table 5** shows detailed vehicle fuel usage estimates for the baseline.

1.2 Project Construction Energy Use

Construction activities related to the proposed Project includes the closure of the Guadalupe Quarry, which includes the demolition of all existing structures and removal of all existing equipment, construction of a warehouse facility and offsite improvements. Project construction of the warehouse and offsite improvements includes the grading of the site, followed by installation of site walls and utilities, vertical building construction, and site work.

There are existing stockpiles of aggregate onsite as a result of the existing quarry operations. Construction associated with the Project would include the grading of the site and the use of the existing aggregate stockpiles onsite as fill on other portions of the site. The Applicant anticipates that all of the aggregate stockpile material would be used as engineered fill onsite, as reflected in the grading maps and assumptions for onsite earthwork activities. This information was used to generate the expected equipment usage duration and type, which equipment types includes blades, scrapers, dozers, and compactors. However, this report conservatively assumes 1,830 cubic yards will be removed after final pre-construction soils investigation.² Thus, the analysis accounts for both the maximum amount of soils movement on-site as well as potential off-haul of a small portion of that same material.

Sources of energy use from construction are shown in **Table 1**. Energy use calculations associated with off-road construction equipment are based on the construction schedule, type and quantity of equipment and hours of operation for each piece of equipment based on

¹ The quarry operators confirmed the CalEEMod default trip lengths were reasonable estimates for trip lengths in absence of other data.

² Email communication titled "RE: Brisbane – off haul quantity estimate" from Scott Allin to Kelly Beggs. July 31, 2023

Project-specific information provided by the Project Applicant. All off-road construction equipment is diesel-fueled based on Project-specific information. Fuel use from off-road construction equipment is estimated using methodology consistent with Environmental Protection Agency (EPA) AP-42 Section 3.4 for Large Stationary and All Stationary Dual Fuel Engines. **Table 6** shows the anticipated fuel usage from off-road equipment for Project construction.³

Energy consumption from on-road construction vehicles, in the form of fuel use, was calculated based on the number of trips and vehicle miles travelled (VMT) along with fuel efficiency data derived from EMFAC2021. Fuel efficiency data for on-road construction vehicles was calculated by dividing fuel consumption by the VMT for each fleet, as reported by EMFAC2021. Passenger vehicles for construction workers are assumed to use gasoline. On-road construction vehicles such as vendors and trucks for demolition material, soil, and other material hauling are assumed to use diesel fuel. Trip counts were provided by the Project Applicant for hauling, worker and vendor trips, and California Emissions Estimator Model (CalEEMod®) defaults are used for worker, vendor, and haul trip lengths. **Table 7** shows the anticipated fuel consumption from on-road construction vehicles.

Water used for construction dust control and soil compaction has indirect electricity usage to supply, treat, and distribute the water. An estimate of water usage for construction was provided by the construction team for the Project Applicant and includes the assumption that two temporary construction water ponds will be constructed on-site to provide adequate water supply for construction activities. The electricity usage associated with water use was estimated using the electricity intensity to supply, treat, and distribute water from CalEEMod. Since the construction water use is outdoor water use, only electricity intensity for activities associated with outdoor water use were included. **Table 8** shows the electricity required for construction water usage.

Total construction energy use is summarized in **Table 9**.

1.3 Project Operational Energy Use

Detailed calculations for net Project operational energy uses are further explained below. Sources for operational energy use include building energy use, water energy use, mobile energy use, and stationary source energy use, as shown in **Table 1**.⁴

1.3.1 Building Energy Use

The warehouse building associated with the Project will receive its energy from electricity. Project building energy usage was estimated using CalEEMod 2022.1. Since the Project will use exclusively electricity, natural gas usage values from CalEEMod were converted to electricity usage values. **Table 10** shows the annual electricity and natural gas use for the baseline and Project buildings. This estimate of electricity use may not include all the electricity use that would be needed to charge electric vehicles, as described under Section 1.3.3. However, as discussed below, the fuel use estimates associated with passenger vehicles assume a low percentage of electric vehicles to provide conservative estimates of fossil fuels. However, if vehicles are electric instead of fossil fueled, fossil fuel will decrease at a rate of 0.034 gallons per mile and electricity would increase at a rate of 0.37 kWh per mile. Section 2.2.1.2.1

³ As mentioned in the Air Quality and GHG Technical Report, all the existing stockpiles are assumed to be used onsite as engineered fill and therefore, would not need to be transported offsite. However, this report conservatively assumes 1,830 cubic yards will be removed after final pre-construction soils investigation. Truck trips provided by the applicant were scaled up by 8.4% to account for the additional 306 trips associated with this offhaul.

⁴ Energy use was estimated based on a building size of 1,319,000 square feet, which has been slightly adjusted through design refinements. A difference of approximately 3,000 square feet, or approximately 0.2% of building size, would not result in a material change in emissions. Furthermore, the additional 3,000 square feet is mostly outdoor space on the second floor.

discusses the electric vehicle charging supplied by the Project.

The Project includes offsite improvements to connect the Project site to the Pacific Gas and Electric (PG&E) Martin/San Francisco Substation to provide 10 megawatts (MW) to the Project site to accommodate the energy demands of the building and electric vehicle charging.⁵

1.3.2 Water Energy Use

Water usage rates for Project operations were provided in the Water Supply Assessment (WSA) that was prepared for the City.⁶ Consistent with the methodology used in the baseline usage, energy use associated with water consumption and wastewater treatment was quantified using a methodology consistent with CalEEMod 2022.1. The electricity from water use is summarized in **Table 4**.

1.3.3 Mobile Energy Use

Fuel usage for Project operations was estimated from on-road VMT by employees commuting to the Project site, and trucks that transport goods to and from the Project site. Trip generation rates and total VMT for Project operation were prepared by the Transportation Engineer,⁷ as shown in **Table 11**.

Fuel usage for Project operations was estimated using an average miles-per-gallon (mpg) obtained from EMFAC2021 for the fleet mix corresponding to the vehicle category and fuel type (gasoline, diesel, compressed natural gas, or electricity). **Table 5** shows detailed vehicle fuel usage estimates for the Project.

1.3.4 Stationary Source Energy Use

Diesel fuel usage from diesel combustion resulting from testing and maintenance of emergency engines is included in this analysis. Project operation may include an emergency generator or fire pump; both are conservatively included in the analysis of operational Project energy use. Operation for routine maintenance and testing is conservatively assumed to be 50 hours per year for each emergency engine, consistent with the maximum allowed testing time from the Airborne Toxic Control Measures (ATCM) for Stationary Compression Ignition Engines (17 Cal. Code Regs. § 93115). Per guidance from Bay Area Air Quality Management District (BAAQMD), 100 hours of emergency use was also incorporated into the energy use estimates.

Fuel usage was estimated using methodology consistent with AP-42 Section 3.4 for Large Stationary and All Stationary Dual Fuel Engines, which provides the average brake-specific fuel consumption rates for large stationary diesel engines. Emergency engine size and tier were provided by the Project Applicant. **Table 12** provides details on fuel usage estimates from emergency engines.

1.3.5 Summary of Net Project Operational and Construction Energy Consumption

Summary Table A below summarizes the baseline energy use, operational energy use with the Project, and energy use associated with Project construction. More detail can be found in **Table 13**, which summarizes baseline Conditions and Full Project Buildout operational energy use by source and the change in energy use between the baseline conditions and Full Project Buildout. Construction details can be found in **Table 9**.

The total energy use for all energy sources in million British thermal units (MMBtu) is also summarized in Summary Table A below. Energy use from electricity, gasoline and diesel were

⁵ Pacific Gas and Electric. 2023. Preliminary Engineering Study Plan. Retail Large Load Interconnection. Crocker Logistics Center. March.

⁶ Water Supply Assessment for the Guadalupe Quarry Redevelopment Project. May 2023. EKI Environment and Water Inc.

⁷ Personal Communication between Kelly Beggs, Contract Senior Planner and Don Little, Orchard Partners. RE: Traffic model. November 28, 2022.

converted to MMBtu using the factors of 3.412 MMBtu/MWh, 0.12 MMBtu/gallon gasoline, and 0.14 MMBtu/gallon diesel, respectively. The total energy use during construction would be 54,795 MMBtu and the total net operational increase in energy use would be 141,992 MMBtu/yr.

Summary Table A. Summary of Net Project Energy Use					
	Electricity	Natural Gas	Gasoline	Diesel	Total Energy Use
Units for Baseline and Operations	(MWh/yr)	(MMBtu/yr)	(gallons/yr)	(gallons/yr)	(MMBtu/yr)
Baseline	742	4,390	1,074	88,069	19,151
Project Operations	15,682	0	169,733	634,932	161,143
Total Net Change	14,940	-4,390	168,659	546,862	141,992
Units for Construction	(MWh)	(MMBtu)	(gallons)	(gallons)	(MMBtu)
Total Project Construction	320	0	36,297	366,846	55,856

2. IMPACT ASSESSMENT

The following provides information on the Project’s energy use related to CEQA Appendix G Guidelines. This is provided by Ramboll as the Project Applicant’s independent consultant for informational purposes. The Environmental Impact Report will contain the final CEQA thresholds of significance and impact conclusions.

2.1 CEQA Guidelines Appendix G Standards of Significance

CEQA Guidelines Appendix G (as amended December 28, 2018) suggests two significance thresholds related to Energy as follows:

Would the project:

- A. Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?
- B. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

In addition, Appendix F, Energy Conservation, of the CEQA Guidelines provides guidance on energy conservation. Appendix F, Section I. states as follows:

“The goal of conserving energy implies the wise and efficient use of energy. The means of achieving this goal include:

1. decreasing overall per capita energy consumption,

2. decreasing reliance on natural gas and oil, and
3. increasing reliance on renewable energy resources.”

CEQA Guidelines Appendix F states that an EIR must discuss the potentially significant energy impacts of a project, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy. The avoidance of inefficient, wasteful, and unnecessary consumption of energy will be the standard of significance used to determine whether the Project would result in significant impacts to energy resources.

Appendix F, Section II lists possible energy impacts and potential conservation measures that should be considered in an EIR when they are “applicable or relevant to the project” and the impacts are “potentially significant.” Under Appendix F, Section II. C., an EIR’s impact analysis may include the following:

1. The project’s energy requirements and its energy use efficiencies;
2. The project’s effects on local and regional energy supplies and on requirements for additional capacity;
3. The project’s effects on peak-period and base-period energy demands;
4. The degree to which the project complies with existing energy standards;
5. The project’s effects on energy resources; and
6. The project’s projected transportation energy use and its overall use of efficient transportation alternatives.

For purposes of this analysis, impacts to energy resources will be considered to be significant if the Project would result in the wasteful, inefficient or unnecessary consumption of energy resources or conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

2.2 Environmental Analysis

2.2.1 Analysis of Factors Identified in CEQA Guidelines Appendix F

To determine whether a project would result in the wasteful, inefficient or unnecessary consumption of fuel or energy, and would incorporate renewable energy and energy efficiency measures into building design, equipment use, transportation or other project features, Appendix F of the CEQA Guidelines identifies six categories of potential energy- related environmental impacts, and five categories of potential mitigation measures that may be incorporated into the project. Construction, baseline and Project operations energy use are evaluated against these impacts and relevant mitigation categories identified in Appendix F below.

2.2.1.1 Construction

The Project’s construction activity, which includes reclamation of the existing quarry, requires energy in the forms of gasoline fuel for worker vehicle trips, diesel fuel for vendor and hauling trips and off-road equipment, and electricity for water supply, distribution, and treatment. These energy use requirements, consistent with CEQA Guidelines Appendix F, Section II.C.1 are summarized in **Table 9**.

Construction-related energy consumption would total 55,856 MMBtu and would be limited to the construction period, which is estimated to occur between June 2024 and February 2027. ⁸ The Project’s construction phasing and associated energy use for off- and on-road construction

⁸ This scheduled start date and equipment list are subject to change as Project details evolve. However, conservative construction durations and scheduling were analyzed to identify maximum impacts of Project construction.

vehicles are summarized in **Tables 6** and **7**. The Project would comply with state and local requirements designed to minimize idling and associated emissions, which also minimizes use of fuel. Specifically, idling of commercial vehicles and off-road equipment would be limited to five minutes in accordance with the Commercial Motor Vehicle Idling Regulation (title 13, CCR, section 2485) and the engine specifications of off-road equipment are regulated in the Off-Road Regulation (title 13, CCR, section 2449). Heavy duty tractors driven on a highway within California need to comply with the requirements of the Tractor-Trailer Greenhouse Gas Regulation (title 13, CCR section 1956), which reduces energy use by requiring aerodynamic performance to be improved and the rolling resistance to be reduced. Model year 2014 and newer tractors that pull box-style trailers are also subject to the federal Heavy-Duty Greenhouse Gas Regulation (EPA-HQ-OAR-2019-0055).

Additionally, the Project will minimize construction hauling truck trips by utilizing excavated material that is suitable for reuse from the site as fill material,⁹ thereby reducing unnecessary vehicular fuel usage and complying with the CALGreen construction waste reduction goal of diverting at least 65 percent of nonhazardous construction and demolition waste generated at the site.¹⁰

Therefore, construction energy consumption is not wasteful, inefficient, or unnecessary.

2.2.1.2 Operation

Operation of the Project would result in the consumption of electricity for building energy use, electric vehicle charging, the supply, distribution, and treatment of water, diesel fuel use for operational truck trips, and emergency engine operation. Operation of the Project would also result in the removal of energy consumption associated with the baseline. Baseline energy consumption includes: diesel fuel use for off-road equipment and hauling vehicles; electricity from building energy use and the supply, treatment, and distribution of water; natural gas energy use; and gasoline from worker vehicle trips. Baseline and Project energy consumption, consistent with Section II.C.1, CEQA Guidelines Appendix F, are summarized in **Table 13**.

As shown in **Table 13**, noted above, natural gas consumption is eliminated with the Project compared to the baseline since the Project would not use natural gas. Operational electricity, diesel, and gasoline requirements are projected to increase from the baseline to the Project due to the increase in activity associated with the Project's uses. However, the Project would remove older, less energy efficient equipment operating at the quarry. The primary source of energy consumption for the Project operations is from truck travel. Trucks and passenger vehicles would be required to comply with local efficiency requirements, as discussed below. Similarly, the building energy use will be required to comply with Title 24 and the City's Reach Code.

2.2.1.2.1 Mobile Energy Use

The Project would create a new state of the art warehouse facility positioned in a central location near the San Francisco International Airport and the Port of San Francisco, adjacent to the City of San Francisco, which has a population of 815,201 and within San Mateo County, which has a population of 737,888. A new warehouse in this location could potentially reduce trip lengths for the delivery of goods compared to a warehouse in a less central location, which would reduce demand for transportation fuels. If a tenant moves into this facility, the same tenant would likely not move into another facility farther away from this central location for the transportation of the same goods in general. As a result, the siting of the Project is generally

⁹ Based on the evaluations of the soil, most, if not all of the soil is suitable for reuse onsite.

¹⁰ California Building Standards Commission. 2022. 2022 California Green Building Standards Code, Title 24, Part 11. Available online at: https://codes.iccsafe.org/content/CAGBC2022P1/appendix-a5-nonresidential-voluntary-measures#CAGBC2022P1_AppxA5_SecA5.408. Accessed on May 23, 2023.

expected to minimize transportation energy consumption, consistent with mitigation measure II.D.2, CEQA Guidelines Appendix F.

The Project would also eliminate the existing quarry. As shown in the baseline equipment calculations in the **Air Quality, Greenhouse Gas, and Health Risk Assessment Technical Report**, most of the equipment used at the existing quarry has lower engine tiers, indicating that the equipment is older and less efficient.

The Project's mobile energy use would primarily be from trucks and passenger vehicles. As discussed above in Section 2.2.1.1, trucks are regulated by the state and federal government with the Commercial Motor Vehicle Idling Regulation, Tractor-Trailer Greenhouse Gas Regulation, and Heavy-Duty Greenhouse Gas Regulation. Trucks are required to comply with the Tractor-Trailer Greenhouse Gas Regulation and the Heavy-Duty Greenhouse Gas Regulation to obtain registration; therefore, the Project would comply with these regulations. The trucks visiting the site will comply with the idling regulations as well.

The state and federal government regulate fuel efficiency in passenger vehicles. In 2022, the State of California passed the Advanced Clean Cars II regulation, which requires new passenger vehicles purchased after 2035 to be zero emission vehicles and makes emission standards for gasoline cars and heavier passenger trucks more stringent. The vehicles that travel to and from the Project will be registered at the Department of Motor Vehicles. Vehicles need to comply with applicable regulations to obtain registration. Therefore, the Project would comply with relevant vehicle efficiency standards.

The Project also supports facilitating the recently adopted Advanced Clean Cars II regulation by making electric vehicle (EV) chargers available. The Project would comply with the City of Brisbane's Reach Code pertaining to EV charging, which requires 50% of required parking spaces to be ready for EV charging, including 15% of spaces with chargers installed. As discussed above, the Project would include updating the power to the site to provide 10 MW of electrical power to support EV charging.

EVs convert more electrical energy from the grid to power vehicles and EVs are more efficient than conventional gasoline vehicles.¹¹ The Project has committed to providing on-site EV charging stations to support the expanded use of electric vehicles consistent with the City's Reach Code. The Project would provide Level 2 Electric Vehicle Charging Stations for 15% of spaces (210 stalls), Level 2 EV Ready Circuits for 10% of required spaces (140 stalls) and parking spaces which are Level 1 EV Capable totaling 25% of parking spaces (349 stalls). The Project's EV charging stations would help facilitate the Advanced Clean Cars II regulation by providing additional availability of charging stations. Therefore, the Project's EV charging stations would contribute to the reduction of fuel use and GHG emissions by assisting Californians in the shift from fossil-fueled vehicles to electric vehicles. The fossil fuels needed to produce electricity for charging continues to decrease with regulations to decrease carbon emissions in electricity production. As shown in the **Air Quality, Greenhouse Gas, and Health Risk Assessment Technical Report**, by 2027, a conventional passenger vehicle is expected to emit 258 grams of Carbon Dioxide Equivalent (CO_{2e}) per mile, while the indirect electricity emissions for an EV charged with carbon-free electricity is 0. Therefore, for every mile that is driven in an EV rather than in a gasoline or diesel car, GHG emissions are reduced by 258 grams, and corresponding fuel use decreases.

2.2.1.2.2 Building Energy Use

Consistent with section II.C.4, CEQA Guidelines Appendix F, which suggests energy impacts may

¹¹ United States Department of Energy. All-Electric Vehicles. Office of Energy Efficiency and Renewable Energy. www.fueleconomy.gov. Available online at: <https://www.fueleconomy.gov/feg/evtech.shtml>. Accessed February 10, 2023.

include the degree to which the project complies with existing energy standards, the Project will comply with increasingly stringent Title 24 Building Energy Efficiency and Green Building standards.

New building construction is subject to California's Title 24, Building Energy Efficiency Standards. California's Title 24 reduces energy use in buildings through progressive updates to both the Green Building Standards Code (Title 24, Part 11) and the Energy Efficiency Standards (Title 24, Part 6). Provisions include consideration and possible incorporation of new energy efficiency technologies and methods for building features such as space conditioning, water heating, lighting, and whole envelope, as well as construction waste diversion goals.

Additionally, some standards focus on larger energy saving concepts such as reducing loads at peak periods and seasons, improving the quality of energy-saving installations, and performing energy system inspections. Compliance with the 2022 standards would further reduce the Project's electricity consumption. The 2022 Building Energy Efficiency Standards were approved in December 2021 and went into effect on January 1, 2023. The 2022 standards improve upon the 2019 standards and focus on four key areas in new nonresidential construction: (1) encouraging electric heat pump technology and use, (2) establishing electric-ready requirements when natural gas is installed, (3) expanding solar photovoltaic system and battery storage standards by requiring 160 square feet of roof space be allocated to "solar zones" for roofs greater than 10,000 square feet, and (4) strengthening ventilation standards to improve indoor air quality.¹² Future updates, which occur every 3 years, are expected to further reduce high-rise residential and non-residential electricity consumption.

The Project would comply with the onsite energy generation requirements per the 2022 Building Energy Efficiency Standards. The third level roof will be preloaded with photovoltaic panels as required via California Energy Code Section 140.10. Per chapter 9 of the 2022 Nonresidential and Multifamily Compliance Manual for the 2022 Energy code, the required size of the photovoltaic system is based off the conditioned floor area of the building. The warehouse is unconditioned, so photovoltaic panels are not required for this square footage. The office conditioned floor area is 81,217 square feet. Per Factor A in Table 140.10-A in the Energy Code, this would equate to 210.35 kW of solar photovoltaic panels needed. At a rate of 350 Watts per panel and 21.39 square feet per panel, this equates to a minimum of 12,856 square feet of photovoltaic panels. The Project would provide a minimum of 13,000 square feet of photovoltaics, which meets the requirement of the Energy Code.

The Energy Code also requires battery storage. Table 140.10-B of the Energy Code requires a factor of 1.68 Wh/W Storage to PV Ratio. For 210.35 kW of solar photovoltaic panels, 395.11 kWh of battery storage at 80% efficiency would be required. The Project would supply a minimum of this amount of battery storage.

Title 24 performance-based compliance also requires building energy modeling through computer software that calculates energy use and reductions by incorporating building orientation and climate data; it penalizes buildings that are oriented in a way that will increase energy consumption, as such buildings would be required to achieve additional energy efficiency features to reach the target energy design ratings. Therefore, the Project is incentivized to site and orient its buildings in a way that maximizes energy efficiency or will implement additional energy efficiency to reduce demand. The site is designed to promote efficient heating and cooling. The natural slope of the quarry directs the orientation of the building toward northern exposure. The glazing in the office building is located facing north to minimize solar heat gain and minimize use of active cooling systems in the office spaces while

¹² CEC. 2021. 2022 Building Energy Efficiency Standards. Available online at: <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2022-building-energy-efficiency>. Accessed February 10, 2023.

providing daylighting to reduce energy use for lighting. The photovoltaic panels on the roof of the third-floor warehouse would be installed with the correct orientation and appropriate tilt to maximize solar exposure and produce maximal energy. Therefore, the Project is consistent with mitigation provided in section II.D.2 of CEQA Guidelines Appendix F.

The Project would also comply with the City of Brisbane’s Reach Code, which amends Section 15.04.010 Title 15 of the Brisbane Municipal Code to require all new buildings to not install natural gas infrastructure and to install electric vehicle charging infrastructure in 50% of parking spaces. Compliance with the EV charging requirements is discussed above in Section 2.2.1.2.1. Per City Ordinance 675, Municipal Code section 15.81 Onsite Energy Generation has been deleted in its entirety and superseded by the 2022 Building Energy Efficiency Standards. Compliance with the Building Energy Efficiency Standards is discussed above.

2.2.1.2.3 Local and Regional Energy Supply and Demand

The Project will not have a substantial impact on the local or regional energy supplies or require additional electricity generation capacity to be constructed. While the Project’s total energy use would exceed the energy use of the baseline, the use of renewable energy, compliance with energy efficiency standards, and electric vehicle charging infrastructure would reduce the Project’s impacts on local and regional energy supply. Furthermore, the Project provides a more intensive use of the site compared to the baseline activity and provides infrastructure to accommodate the transition to electric vehicles and zero-out the natural gas use at the site.

The Project would include a new, upgraded connection to the Martin/San Francisco Substation to supply 10 MW of power to the site for the all-electric building and to prepare for future electric vehicle charging demand to replace the antiquated connection to the grid that currently exists. The anticipated 10 MW of power demand for the Project was estimated based on the anticipated demand of the warehouse building, parking garage, and the power needed to supply the electric vehicle chargers required by the Reach Code. This upgrade that is part of the Project facilitates the Project’s transition to more renewable, energy efficient energy sources. The upgraded connection to the Substation allows for the building to be entirely powered by electricity, which results in the elimination of the fossil fuel natural gas use. The upgraded connection also allows for the electric vehicle charging capacity, which aides in the reduction of fossil fuel use in cars and trucks.

The need for this electrical demand is being coordinated with PG&E to ensure there is adequate electricity generation capacity to meet its current and future loads. PG&E performed a Preliminary Engineering Study Plan (PES) for the interconnection.¹³ As part of this PES, PG&E performed a Power Flow Analysis to ensure that the transmission system remains in full compliance with the North American Reliability Corporation (NERC) reliability standards with the proposed interconnection. As part of the evaluation, any existing equipment requiring upgrades will be identified and the interconnection will not occur without ensuring compliance with reliability standards.

Senate Bill 100 requires the electricity used in the State of California to be 100 percent renewable and carbon free by 2045 with interim renewable energy targets of 44%, 50%, 52%, and 60% by 2024, 2026, 2027, and 2030, respectively. In 2021, the electricity used in the State of California was 33.6 percent renewable (e.g., solar and wind), 3 percent coal, 9.2 percent large hydroelectric, 37.9 percent natural gas, 9.3 percent nuclear, and 7 percent other or unspecified power.¹⁴ The Project will be served by Peninsula Clean Energy (PCE). PCE has a goal of procuring 100 percent renewable energy by 2025. In 2021, the last year with energy

¹³ Pacific Gas and Electric. 2023. Preliminary Engineering Study Plan. Retail Large Load Interconnection. Crocker Logistics Center. March.

¹⁴ Peninsula Clean Energy. Power Mix. Available at: <https://www.peninsulacleanenergy.com/power-mix/>. Accessed May 22, 2023.

mix available, the basic power plan that customers are automatically enrolled in is 49.2 percent renewable sources (e.g., biomass/biowaste, solar and wind) and 50.8 percent large hydroelectric.¹⁵ By providing onsite solar photovoltaics and energy storage, the Project helps the State of California meet its regulatory target of 100 percent carbon free by 2045 and PCE meet its goal of 100 percent renewable by 2025.

The transition toward electricity for on-site vehicles and 100 percent electric building will result in an increase in calculated total electricity usage compared to the baseline. However, this increase would not significantly impact overall electricity supplies according to PG&E. The Martin/San Francisco Substation has the capacity to accommodate the Project's additional 10 MW with the addition of transformer sections, which are included in the Project. In 2021, Californians consumed 280,738 gigawatt hour (GWh) of electricity, of which San Mateo County consumed 4,157 GWh.¹⁶ California Energy Commission (CEC) estimates that state-wide electricity demand will reach 340,000 GWh by 2035, an average annual growth rate of 1.8%.¹⁷ The Project's anticipated increase in electricity usage from 744 megawatt-hours (MWh) for baseline conditions to 15,680 MWh by Full Buildout reflects an increase of 14,935 MWh in electricity usage. This increase represents approximately 0.0053% of the total 2021 state-wide electricity usage and 0.36% of San Mateo County 2021 electricity usage.

As discussed above, the electricity usage calculated herein does not fully take into account the need for EV charging since these vehicles are assumed to be fossil fueled to generate conservative estimates of the Project's fossil fuel usage. However, the Project would likely experience an increased demand for electric vehicles with time, which is accounted for in the estimate of 10 MW load demand requested from PG&E. This trend of increased demand for electric vehicles is a statewide trend and is not project specific. Therefore, the state-wide and county electricity usage would likely increase, regardless of the Project, to accommodate the increase in demand for EV charging. Therefore, the Project percentage of total electricity use compared to state-wide and county wide usage would likely remain similar in the future when incorporating electric vehicle charging.

The Project will not have a substantial impact on the peak and base period demands for electricity or other forms of energy. The Project's base energy consumption compared to regional and statewide energy consumption is discussed above. In 2021, California's peak grid demand was 43,982 megawatts (MW). On the same day, PG&E reached a maximum demand of 20,118 MW.¹⁸ In 2022, California's peak grid demand increased to 52,061 MW.¹⁹ In comparison, the Project's maximum demand is expected to be 10 MW. This also conservatively excludes the benefits of improvements in demand response due to compliance with the Title 24 energy standards, which would further reduce peak demand. Therefore, the Project peak demand represents less than 0.05 percent of PG&E's peak demand. This is a conservative estimate because the Project's peak may not occur at the same time as the utility or statewide peak. Therefore, the Project would likely have a negligible effect on state-wide peak demands.

Therefore, the Project will not require additional generation capacity or cause the need for more

¹⁵ Peninsula Clean Energy. Power Mix. Available at: <https://www.peninsulacleanenergy.com/power-mix/>. Accessed May 22, 2023.

¹⁶ California Energy Commission. 2021. Energy Consumption Data Management Service. Electricity Consumption by County. Available online at: <http://www.ecdms.energy.ca.gov/elecbycounty.aspx>. Accessed February 10, 2023.

¹⁷ California Energy Commission. 2022. Final 2021 Integrated Energy Policy Report, Volume IV: California Energy Demand Forecast. Available online at: <https://efiling.energy.ca.gov/GetDocument.aspx?tn=241581>. Accessed February 10, 2023.

¹⁸ California ISO. 2022. 2021-2021 Transmission Plan. Available online at: <http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=08F98ACE-2944-455A-A15C-0DBDF54C6670>. Accessed February 10, 2023.

¹⁹ California ISO. 2022. California ISO Peak Load History 1998 through 2022. Available online at: <https://www.caiso.com/documents/californiaisopeakloadhistory.pdf>. Accessed February 10, 2023

generation capacity beyond that anticipated by the California mandate for electric vehicles, which will generate a state-wide expansion of electricity usage. The installation of the upgraded connection to the substation allows for the Project to comply with the City and State's goals for electrification of buildings and vehicles.

The Project would not use natural gas, thereby creating a net reduction in natural gas demand.

The Project's annual natural gas consumption is estimated to decrease by 4,390 Million British Thermal Unit (MMBtu) from baseline conditions, since the proposed warehouse would not include natural gas infrastructure. California's natural gas demand in 2021 was 1,192,270,564 MMBtu, and San Mateo County's natural gas demand in 2021 was approximately 20,514,278 MMBtu.²⁰

Gasoline and diesel are provided by California's transportation fuels supplier network, as the majority of gasoline and diesel fuels are used for transportation to and from the Project.

Based on the small increases in overall energy demand, the Project will not have a substantial impact on the local or regional energy supplies or require additional capacity to be constructed beyond the commitments of the Project.

2.3 Summary

In summary, based on the analysis of the factors identified in CEQA Guidelines Appendix F, the Project is not expected to result in wasteful, inefficient or unnecessary consumption of fuel or energy, and conversely to fail to incorporate renewable energy or energy efficiency measures into building design, equipment use, transportation or other project features.

²⁰ California Energy Commission. 2021. Gas Consumption by County. Available online at: <http://www.ecdms.energy.ca.gov/gasbycounty.aspx>. Accessed February 10, 2023.

Table 1
Energy Use Sources
Guadalupe Quarry Redevelopment Project
Brisbane, CA

Type	Source	Description
Baseline	Off-Road Equipment	Diesel fuel use of off-road quarry equipment
	On-Road Mobile Sources	Diesel hauling vehicle fuel use, and gasoline worker vehicle fuel use
	Building Energy Use	Electricity and natural gas used in existing buildings
	Water	Electricity use for supply, distribution, and treatment
Construction	Off-Road Equipment	Diesel fuel use of off-road construction equipment
	On-Road Mobile Sources	Diesel hauling and vendor vehicle fuel use, and gasoline worker vehicle fuel use
	Water	Electricity use for water supply, distribution, and treatment
Operations	Building Energy Use	Electricity use in buildings
	On-Road Mobile Sources	Electricity, diesel, and gasoline fuel use for vehicles
	Water	Electricity use for water supply, distribution, and treatment
	Standby Emergency Engines	Diesel fuel use by emergency engines

**Table 2
Baseline Off-Road Equipment Fuel Use
Guadalupe Quarry Redevelopment Project
Brisbane, CA**

Equipment Type ¹	CalEEMod Equipment Category	Number ¹	Horsepower ¹	Engine Load Factor ²	Annual Usage Hours ¹					Average Usage Hours	Average Gallons of Diesel ³
					2017	2018	2019	2020	2021		
Excavator	Excavators	1	286	0.38	1,062	1,001	916	136	55	634	3,520
Excavator	Excavators	1	286	0.38	1,041	1,024	971	138	1,520	939	5,212
Rubber Tired Loader	Rubber Tired Loaders	1	246	0.36	2,248	2,064	1,831	260	1,140	1,509	6,825
Rubber Tired Loader	Rubber Tired Loaders	1	304	0.36	2,337	2,201	1,927	243	199	1,381	7,723
Rubber Tired Loader	Rubber Tired Loaders	1	402	0.36	2,095	1,937	1,812	285	0	1,226	9,062
Crawler Tractor	Crawler Tractors	1	475	0.43	1,684	1,447	1,349	235	124	968	10,098
Water Trucks	Off-Highway Trucks	1	300	0.38	1,794	1,621	1,482	201	1,441	1,308	7,616
Graders	Graders	1	135	0.41	720	699	675	74	23	438	1,239
Skid Steer	Skid Steer Loaders	1	80	0.37	680	601	626	94	78	416	629
Skid Steer	Skid Steer Loaders	1	54	0.37	541	584	505	84	61	355	362
Cranes	Cranes	1	210	0.29	32	64	114	16	7	47	145
Total											52,431

Notes:

1. Equipment type, count, and annual usage hour information provided by the Project Applicant.
2. The engine load factor for each piece of equipment is assigned based on the CalEEMod equipment type.
3. Fuel usage is calculated by taking the horsepower-hours for each piece of equipment (calculated as horsepower * usage hours * load factor) and multiplying it by the gallons of diesel consumption per horsepower-hour consistent with USEPA AP-42 diesel fuel data in Table 3.4.1, which cites an average brake-specific fuel consumption (BSFC) of 7,000 BTU/hp-hr, a heating value of 19,300 BTU/lb, and density of 7.1 lb/gal.

Abbreviation:

- BTU - British thermal unit
- CalEEMod - CALifornia Emissions Estimator MODEL
- gal - gallon
- lb - pound
- * - multiplication

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at <http://www.caleemod.com/>

Table 3
Baseline Operational Energy Usage
Guadalupe Quarry Redevelopment Project
Brisbane, CA

Year ¹	Natural Gas ²	Electricity	Number of Truck Trips per Year ³
	Therms	kWh	
2016	186,085	1,081,843	13,284
2017	219,523	1,276,239	15,671
2018	0	889,483	10,922
2019	0	1,061,646	13,036
2020	0	249,612	3,065
2021	0	194,315	2,386
Average Baseline Energy Usage - 2017-2021	43,905	734,259	--

Notes:

1. Natural gas and electricity use provided by the quarry operator for 2016. To estimate energy usage during the baseline period of 2017-2021, 2016 usage was scaled by the ratio of truck trips
2. Natural gas was only used at the asphalt plant, which ceased operation in 2018. Therefore, it was assumed that no natural gas was used at the site after 2018.
3. Number of annual truck trips for baseline operations were provided by the quarry operator.

Abbreviations:

kWh - Kilowatt Hours

Table 4
Water Energy Use for Project Operations and Baseline Uses
Guadalupe Quarry Redevelopment Project
Brisbane, CA

Water Use Scenario	Location	Water Use ¹	Energy Use ²	Energy Use
		MGY	kWh/yr	MWh/yr
Baseline	Outdoor	1.6	7,894	7.9
Project	Indoor	5.4	34,969	35
	Outdoor	1.5	7,218	7.2

Electricity Intensity Factor ²	kWh/Mgal
Supply	1,182
Treat	754
Distribute	2,998
Wastewater Treatment	1,542
Sum	6,476

Notes:

1. Water use for Baseline conditions and the Project were provided provided in the Water Supply Assessment created for the City. Baseline water use is based upon average water use from 2017 to 2021. Water use for Baseline conditions is conservatively assumed to be outdoor water use.
2. Energy use for Baseline conditions and the Project were calculated by multiplying the Electricity Intensity Factor and the Water use. Electricity Intensity Factors by activity are CalEEMod defaults obtained from Appendix G.

Abbreviations:

- gal - gallon
- kWh - kilowatt hour
- MGY - Million Gallons per Year
- MWh - Megawatt-hour
- yr - year

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1.0. Available online at <http://www.caleemod.com/>

Table 5
Operational Mobile Fuel Consumption
Guadalupe Quarry Redevelopment Project
Brisbane, California

Year	Fleet Type	Annual VMT ¹	Percent Gasoline Vehicle Miles ^{2,3}	Gasoline Miles per Gallon ^{2,3}	Percent Diesel Vehicle Miles ²	Diesel Miles per Gallon ²	Percent Electric Vehicle Miles ^{2,3}	Electric Mile per kWh ^{2,3}	Annual Fuel Consumption ⁴		
		VMT/year							Gallons of Gasoline	Gallons of Diesel	kWh
Baseline - Average 2017-2021	Worker	26,768	100.0%	25	--	--	--	--	1,074	0	0
	Truck	180,320	--	--	100.0%	5.1	--	--	0	35,639	0
Total - Project									1,074	35,639	0
Project Operations - 2027	Heavy Duty Trucks	3,390,157	--	--	100.0%	5.6	--	--	0	604,502	0
	Medium Duty Trucks	197,100	--	--	100.0%	9	--	--	0	23,018	0
	Passenger Vehicles	5,463,247	92.3%	30	0.2%	39	7.4%	2.7	169,733	321	149,860
Total - Project									169,733	627,842	149,860

Notes:

1. Project VMT and fleet mixes are based on data provided by The Transportation Engineer as shown in Tables 27 and 28 of the AQTM. Baseline VMT is calculated by information provided by the Project Applicant as shown in Table 5 of the AQTM.
2. The percent of each fuel type for a given fleet and the fuel efficiency (miles per gallon, diesel miles per gallon, mile/kWh) were calculated based on EMFAC2021 for San Mateo County.
3. Plug-in hybrid vehicles in the employees fleet are calculated into gasoline and electric fuel percentages by fleet and fuel economy by considering both fuel and energy consumption from plug-in hybrids. Fuel efficiency for electric and gas employees fleets are weighted by the plug-in hybrid electric or combustion VMT against the VMT from all electric or all gasoline vehicles in the employees fleet.
4. Fuel consumption is calculated by multiplying the VMT by the fuel efficiency and percent of vehicles for each fuel type.

Abbreviations:

- VMT - Vehicle miles traveled
- AQTM - Air Quality Technical Memo
- kWh - kilowatt-hour

References:

California Air Resources Board. EMFAC2021. Available at: <https://arb.ca.gov/emfac/>

**Table 6
Construction Off-Road Equipment Energy Use
Guadalupe Quarry Redevelopment Project
Brisbane, CA**

Construction Phase	Construction Subphase	Equipment Type ¹	CalEEMod Equipment Category	Fuel	Number ¹	Horsepower ²	Load Factor	Hours/Day ¹	Number of Equipment Days ¹	Gallons of Diesel ³
Rough Grading	Onsite	Cat 14G Blade	Graders	Diesel	1	238	0.41	8	122	4,865
		Cat 657 Scraper	Scrapers	Diesel	8	473	0.48	8	122	90,558
		Cat 825 Compactor	Other Construction Equipment	Diesel	2	405	0.42	8	122	16,962
		Cat 345 Excavator	Excavators	Diesel	1	346	0.38	4	122	3,278
		Cat 950 Loader	Rubber Tired Loaders	Diesel	1	250	0.36	4	122	2,244
		Cat D10 Dozer	Rubber Tired Dozers	Diesel	1	600	0.40	8	122	11,966
		Cat D8 Dozer	Rubber Tired Dozers	Diesel	2	354	0.40	8	122	14,120
		Cat 420 Backhoe	Tractors/Loaders/Backhoes	Diesel	1	110	0.37	8	2	33
		Peterbilt 335 10 wheel Dump	Off-Highway Trucks	Diesel	1	425	0.38	8	2	132
	Water Truck	Off-Highway Trucks	Diesel	2	300	0.38	8	122	11,368	
	Offsite	Cat 14G Blade	Graders	Diesel	1	238	0.41	8	5	199
		Cat 657 Scraper	Scrapers	Diesel	8	473	0.48	8	5	3,711
		Cat 825 Compactor	Other Construction Equipment	Diesel	2	405	0.42	8	5	695
		Cat 345 Excavator	Excavators	Diesel	1	346	0.38	4	5	134
		Cat 950 Loader	Rubber Tired Loaders	Diesel	1	250	0.36	4	5	92
		Cat D10 Dozer	Rubber Tired Dozers	Diesel	1	600	0.40	8	5	490
		Cat D8 Dozer	Rubber Tired Dozers	Diesel	2	354	0.40	8	5	579
		Water Truck	Off-Highway Trucks	Diesel	2	300	0.38	8	5	466
Bob cat		Skid Steer Loaders	Diesel	1	71	0.37	8	95	1,020	
Site Walls	Onsite	Cat Mini Excavator (30K #)	Excavators	Diesel	1	70	0.38	8	95	1,025
		66" Vib Sheepfoot Compactor	Rollers	Diesel	1	99	0.38	6	95	1,095
		Cat D5 Dozer	Rubber Tired Dozers	Diesel	1	170	0.40	6	95	1,980
		Gradall Forklift	Forklifts	Diesel	1	82	0.20	8	95	637
		Drill Rig	Bore/Drill Rigs	Diesel	1	221	0.50	4	15	339
Site Utilities	Onsite	Kobelco 500LC Excavator	Excavators	Diesel	1	363	0.38	7	45	2,220
		Kobelco 230SR Excavator	Excavators	Diesel	1	166	0.38	8	90	2,320
		Kobelco 350LC-9 Excavator	Excavators	Diesel	1	286	0.38	7	45	1,749
		Kobelco SK210-Hybrid Exc	Excavators	Diesel	1	166	0.38	8	90	2,320
		Cat 420 Backhoe	Tractors/Loaders/Backhoes	Diesel	1	110	0.37	4	90	748
		John Deere 644 Loader	Rubber Tired Loaders	Diesel	1	253	0.36	8	90	3,350
		John Deere 644 Loader	Rubber Tired Loaders	Diesel	1	253	0.36	8	90	3,350
		Peterbilt 348 10 wheel Dump	Off-Highway Trucks	Diesel	1	400	0.38	8	45	2,795
		Kenworth 2600 Crew Truck	Off-Highway Trucks	Diesel	1	225	0.38	8	90	3,145
		Kobelco 350LC-9 Excavator	Excavators	Diesel	1	286	0.38	7	25	972
		Kobelco SK210-Hybrid Exc	Excavators	Diesel	1	166	0.38	8	25	644
		Takeuchi TB153FR Excavator	Excavators	Diesel	1	38	0.38	4	25	74
		John Deere 644 Loader	Rubber Tired Loaders	Diesel	1	253	0.36	8	25	931
		John Deere 644 Loader	Rubber Tired Loaders	Diesel	1	253	0.36	8	25	931
		Peterbilt 348 10 wheel Dump	Off-Highway Trucks	Diesel	1	400	0.38	8	25	1,553
		Peterbilt 335 10 wheel Dump	Off-Highway Trucks	Diesel	1	425	0.38	8	25	1,650
		Kenworth 2600 Crew Truck	Off-Highway Trucks	Diesel	1	225	0.38	8	25	874

**Table 6
Construction Off-Road Equipment Energy Use
Guadalupe Quarry Redevelopment Project
Brisbane, CA**

Construction Phase	Construction Subphase	Equipment Type ¹	CalEEMod Equipment Category	Fuel	Number ¹	Horsepower ²	Load Factor	Hours/Day ¹	Number of Equipment Days ¹	Gallons of Diesel ³
Site Utilities	Quarry Road	Kobelco 230SR Excavator	Excavators	Diesel	1	166	0.38	8	15	387
		Kobelco 230SR Excavator	Excavators	Diesel	1	166	0.38	8	10	258
		Cat 420 Backhoe	Tractors/Loaders/Backhoes	Diesel	1	110	0.37	4	15	125
		Komatsu WA380-7 Loader	Rubber Tired Loaders	Diesel	1	97	0.36	8	15	214
		John Deere 644 Loader	Rubber Tired Loaders	Diesel	1	253	0.36	8	10	372
		Peterbilt 348 10 wheel Dump	Off-Highway Trucks	Diesel	1	400	0.38	8	15	932
		Peterbilt 335 10 wheel Dump	Off-Highway Trucks	Diesel	1	425	0.38	8	10	660
		Kenworth 2600 Crew Truck	Off-Highway Trucks	Diesel	1	225	0.38	8	15	524
		Kobelco 350LC-9 Excavator	Excavators	Diesel	1	286	0.38	7	65	2,526
		Kobelco 230SR Excavator	Excavators	Diesel	1	166	0.38	8	65	1,676
		Cat 420 Backhoe	Tractors/Loaders/Backhoes	Diesel	1	110	0.37	4	65	541
		Komatsu WA380-7 Loader	Rubber Tired Loaders	Diesel	1	97	0.36	8	65	928
		John Deere 644 Loader	Rubber Tired Loaders	Diesel	1	253	0.36	8	65	2,419
		Peterbilt 348 10 wheel Dump	Off-Highway Trucks	Diesel	1	400	0.38	8	45	2,795
		Kenworth 2600 Crew Truck	Off-Highway Trucks	Diesel	1	225	0.38	8	65	2,271
		Site Utilities	Quarry Road	Kobelco SK210-Hybrid Exc	Excavators	Diesel	1	166	0.38	8
Takeuchi TB153FR Excavator	Excavators			Diesel	1	38	0.38	4	10	30
John Deere 644 Loader	Rubber Tired Loaders			Diesel	1	253	0.36	8	10	372
Peterbilt 348 10 wheel Dump	Off-Highway Trucks			Diesel	1	400	0.38	8	10	621
Boom Truck	Off-Highway Trucks			Diesel	1	376	0.38	8	10	584
Kenworth 2600 Crew Truck	Off-Highway Trucks		Diesel	1	225	0.38	8	10	349	
Access Road	Kobelco 230SR Excavator		Excavators	Diesel	1	166	0.38	7	25	564
	Kobelco 230SR Excavator		Excavators	Diesel	1	166	0.38	7	30	677
	Cat 420 Backhoe		Tractors/Loaders/Backhoes	Diesel	1	110	0.37	4	35	291
	Komatsu WA380-7 Loader		Rubber Tired Loaders	Diesel	1	97	0.36	8	35	499
	John Deere 644 Loader		Rubber Tired Loaders	Diesel	1	253	0.36	8	25	931
	Peterbilt 348 10 wheel Dump		Off-Highway Trucks	Diesel	1	400	0.38	8	25	1,553
	Peterbilt 335 10 wheel Dump		Off-Highway Trucks	Diesel	1	425	0.38	8	30	1,980
	Kenworth 2600 Crew Truck		Off-Highway Trucks	Diesel	1	225	0.38	8	35	1,223
	Kobelco 350LC-9 Excavator		Excavators	Diesel	1	286	0.38	7	45	1,749
	Kobelco 230SR Excavator		Excavators	Diesel	1	166	0.38	7	45	1,015
	Cat 420 Backhoe	Tractors/Loaders/Backhoes	Diesel	1	110	0.37	4	45	374	
Komatsu WA380-7 Loader	Rubber Tired Loaders	Diesel	1	97	0.36	8	45	642		
John Deere 644 Loader	Rubber Tired Loaders	Diesel	1	253	0.36	8	45	1,675		
Peterbilt 348 10 wheel Dump	Off-Highway Trucks	Diesel	1	400	0.38	8	30	1,864		
Kenworth 2600 Crew Truck	Off-Highway Trucks	Diesel	1	225	0.38	8	45	1,572		
Vertical Construction	All Vertical Construction	Forklift	Forklifts	Diesel	1	63	0.20	3	407	786
		Gradall	Excavators	Diesel	2	89	0.38	2	407	2,813
		Water Truck	Off-Highway Trucks	Diesel	1	300	0.38	8	407	18,961
		Drill Rig	Bore/Drill Rigs	Diesel	2	221	0.50	8	20	1,806
	Columns/BRB Erection/Panel Welding	Crane	Cranes	Diesel	1	231	0.29	8	18	493

**Table 7
Construction On-Road Vehicle Fuel Use
Guadalupe Quarry Redevelopment Project
Brisbane, CA**

Construction Phase	Construction Subphase	Year	One-Way Trips Per Phase ¹			Annual VMT ¹			Gallons of Fuel Consumption ²		
			Worker	Vendor	Hauling	Worker	Vendor	Hauling	Worker (Gasoline)	Vendor (Diesel)	Hauling (Diesel)
Rough Grading	Onsite	2024	4,880	--	104	62,562	--	2,083	2,329	--	391
	Offsite	2024	200	--	4.3	2,564	--	85	95	--	16
Site Walls	Onsite	2024	3,880	--	423	49,742	--	8,458	1,852	--	1,588
Site Utilities	Onsite	2024	261	810	--	3,346	5,913	--	125	906	--
	Onsite	2025	609	1,890	--	7,807	13,797	--	284	2,088	--
	Quarry Road	2024	210	438	--	2,692	3,197	--	100	490	--
	Quarry Road	2025	490	1,022	--	6,282	7,461	--	229	1,129	--
	Access Road	2024	192	405	--	2,461	2,957	--	92	453	--
	Access Road	2025	448	945	--	5,743	6,899	--	209	1,044	--
	Vertical Construction	All Vertical Construction	2024	750	0.74	--	9,615	5.4	--	358	0.82
All Vertical Construction		2025	39,150	38	--	501,903	281	--	18,275	43	--
All Vertical Construction		2026	21,150	21	--	271,143	152	--	9,672	23	--
SOG Construction		2024	--	741	--	--	5,407	--	--	828	--
SOG Construction		2025	--	6,073	--	--	44,335	--	--	6,709	--
Columns/BRB Erection/Panel Welding		2025	--	144	--	--	1,052	--	--	159	--
Columns/BRB Erection/Panel Welding		2026	--	5.8	--	--	43	--	--	6.4	--
3rd Floor Construction		2025	--	110	--	--	803	--	--	122	--
Single Ply Roof Install		2025	--	1.4	--	--	10	--	--	1.6	--
Single Ply Roof Install		2026	--	2.6	--	--	19	--	--	2.8	--
Interior Buildout		2025	--	8.9	--	--	65	--	--	10	--
Interior Buildout		2026	--	23	--	--	169	--	--	25	--
Exterior Archt. Finishes & Storefronts		2025	--	63	--	--	462	--	--	70	--
Exterior Archt. Finishes & Storefronts		2026	--	53	--	--	385	--	--	58	--
Site Work		Onsite	2026	1,659	--	4,785	21,270	--	95,702	759	--
	Onsite	2027	567	--	1,635	7,267	--	32,698	254	--	5,830
	Offsite	2026	250	--	679	3,211	--	13,575	115	--	2,464
	Offsite	2027	86	--	232	1,097	--	4,638	38	--	827
Offsite Improvements	Electrical Routing	2024	2,432	17	1,036	31,178	126	20,727	1,161	19	3,891
	Electrical Routing	2025	384	2.7	164	4,923	20	3,273	179	3.0	604
	Substation Improvements	2024	360	--	2.0	4,615	--	40	172	--	7.5
Totals									36,297	14,188	32,987

Notes

- ¹ Total miles based on trip generation provided by Project Applicant and CalEEMod default trip distance by trip type. Total one-way hauling trips associated with horizontal construction have been scaled by a 8.4% increase to account for the additional 306 truck trips needed to offhaul 1,830 cy of affected soil from on the project site. This update is not reflected in any input tables.
- ² Fuel usage based on VMT data and fleet-average fuel consumption in gallons per mile from EMFAC2021 for CY 2024 through 2027 in San Mateo County. Consistent with CalEEMod, Hauling assumes 100% HHDT, Vendor assumes 50% HHDT and 50% MHDT, and Worker assumes 25% LDA, 50% LDT1, and 25% LDT2 vehicles. It is assumed that worker vehicles use gasoline while vendor and hauling vehicles use diesel.

Abbreviations:

CalEEMod - California Emissions Estimator Model	LDA - light duty auto	MHDT - medium-heavy duty truck	VMT - vehicle miles traveled
EMFAC2021 - California Air Resources Board Emission FACTor model	LDT - light duty truck	HHDT - heavy-heavy duty truck	CY - calendar year

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1.0. Available online at <http://www.caleemod.com/>
California Air Resources Board. EMFAC2021. Available at: <https://arb.ca.gov/emfac/>

Table 8
Electricity for Construction Water Usage
Guadalupe Quarry Redevelopment Project
Brisbane, CA

Construction Phase	Construction Subphase	Year	Total Water Usage ¹	Electricity Usage ²
			gallons	MWh
Horizontal Construction	All Horizontal Construction	2024	45,794,560	226
		2025	18,980,640	94
Vertical Construction	All Vertical Construction	2024	1,500	0.0074
		2025	78,300	0.39
		2026	42,300	0.21
Total			320	

Notes:

1. Construction water usage was provided by the Project Applicant. For the purpose of this analysis to calculate total energy consumption, water usage for horizontal construction is assumed to be spread over 2024 and 2025 based on the number of days of horizontal construction in the construction schedule. Water usage for vertical construction assumes 300 gallons per day, assuming 5 days in 2024, 261 days in 2025, and 141 days in 2026.
2. Energy usage is calculated by applying the electric intensity factor for outdoor water to total water usage. An electric intensity factor of 4,934 kWh/million gallons was taken from Appendix G of the CalEEMod User's Guide as the sum of supply water, treat water and distribute water electric intensity factors. Since the water use reported here is only for construction fugitive dust control, operational indoor water use-related emissions and wastewater treatment-related emissions are not estimated here. Please refer to Table 4 for information regarding operational water usage.

Abbreviations:

CalEEMod - CALifornia Emissions Estimator MODEL

kWh - kilowatt-hours

MWh - megawatt-hours

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1.0. Available online at <http://www.caleemod.com/>

Table 9
Summary of Total Construction Energy Use
Guadalupe Quarry Redevelopment Project
Brisbane, CA

Source		Units	Project Construction Usage	MMBtu ⁴
Electricity	Water Consumption ¹	MWh	320	1,093
Diesel	On-Road Construction Trips ²	gallons	47,175	6,481
	Off-Road Construction Equipment ³	gallons	319,671	43,917
Gasoline	On-Road Construction Trips ²	gallons	36,297	4,366
Total				55,856

Notes:

- ¹. Construction water use based on project-specific estimate provided by Project Applicant. See Table 5 for more details on the methodology.
- ². On-road mobile source fuel use based on vehicle miles traveled (VMT) for all years of construction and fleet-average fuel consumption in gallons per mile from EMFAC2021 for CY 2024 through 2027 in San Mateo County. See Table 4 for more details on the methodology.
- ³. Off-road equipment diesel fuel usage was calculated using a fuel usage rate of 0.051 gallons of diesel per horsepower (hp)-hour, consistent with diesel conversion factors given in USEPA AP-42 Table 3.4.1. See Table 3 for more details on the methodology.
- ⁴. MWh of electricity, gallons of diesel, and gallons of gasoline were converted to MMBtu using a factor of 3.412 MMBtu/MWh, 0.14 MMBtu/gallon diesel, 0.12 MMBtu/gallon gasoline respectively.

Abbreviations:

- CY - calendar year
- EMFAC2021 - California Air Resources Board Emission FACTor model
- hp - horsepower
- MMBtu - metric million British thermal unit
- MWh - megawatt-hour
- USEPA - United States Environmental Protection Agency
- VMT - vehicle miles traveled

References:

USEPA. 1996. AP 42. Compilation of Air Pollutant Emission Factors, Volume 1. Fifth Edition. Chapter 3.4, Large Stationary Diesel and All Stationary Dual-fuel Engines. Available online at: <http://www.epa.gov/ttn/chief/ap42/ch03/final/c03s04.pdf>. Accessed March 2019.

Table 10
Operational Building Energy Use
Guadalupe Quarry Redevelopment Project
Brisbane, CA

CalEEMod Land Use Subtype	Electricity Use ^{1,2}	Natural Gas Use ^{1,2}	Total Energy Use ³
	kWh/yr	kBtu/yr	kWh/yr
Unrefrigerated Warehouse-No Rail	13,181,979	7,876,920	15,489,917

Notes:

1. Electricity and Natural Gas usage rates were estimated using CalEEMod.
2. CalEEMod was ran using a building size equal to 1,305,493 square feet to estimate energy use, but energy usages were scaled up by the ratio of square footages to represent emissions for 1,319,000 square feet.
3. Since the Proposed Project will only use electricity, natural gas values from CalEEMod were converted from kBTU to kWh, using the conversion factor 0.293 kWh per 1 kBtu, then added to estimated kWh energy use for electricity. This is conservative because the natural gas usage is a measure of input energy whereas the electricity is a measure of useful energy.

Abbreviations:

kBTU - one-thousand British thermal units
 kWh - Kilowatt hours

yr - year

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1.0. Available online at <http://www.caleemod.com/>

Table 11
Trips and VMT for Project Operations
Guadalupe Quarry Redevelopment Project
Brisbane, California

Fleet Type	Trip Rates ^{1,2}		Average Trip Length ¹	Total VMT ^{2,3}	
	Daily	Annual		Daily	Annual
	Trips/day	Trips/year	Miles/trip	Miles/day	Miles/year
Heavy Duty Trucks	317	115,705	29.3	9,288	3,390,157
Medium Duty Trucks	50	18,250	10.8	540	197,100
Passenger Vehicles	1,117	407,705	13.4	14,968	5,463,247

Notes:

- ¹ Daily Project trip rates and average trip length were provided by the Transportation Engineer.
- ² Annual trips and VMT are calculated assuming 365 days of operation per year for all fleets, which is consistent with guidance from the Transportation Engineer.
- ³ VMT is calculated by multiplying the number of trips by the average trip lengths by fleet.

Abbreviations:

VMT - Vehicle miles traveled

Table 12
Operational Emergency Engine Fuel Consumption
Guadalupe Quarry Redevelopment Project
Brisbane, CA

Fuel Consumption Parameters for Large Stationary Diesel Engines¹

Parameter	Value	Unit
Density of Diesel	7.1	lb/gal
HHV of Diesel	19,300	Btu/lb
Brake Specific Fuel Consumption (BSFC)	7,000	Btu/hp-hr

Emergency Engine Parameters²

Engine Type	Horsepower	Annual Hours of Operation	Fuel Consumption
	hp	hrs/yr	gal/yr
Generator	469	150	3,596
Fire Pump	456	150	3,494
Total			7,090

Notes:

- ¹. Density and HHV of diesel and average BSFC for large stationary diesel engines used from USEPA AP-42, Table 3.4-1.
- ². Emergency engine parameters such as engine type, horsepower and annual hours of operation provided by the Project Applicant.

Abbreviations:

Btu - British Thermal Unit	hr - hour
gal - gallon	lb - pound
HHV - high heating value	yr - year
hp - horsepower	

References:

USEPA. AP-42, Vol. I, 3.4: Large Stationary Diesel and All Stationary Dual Fuel Engines. Available at: <https://www3.epa.gov/ttnchie1/ap42/ch03/final/c03s04.pdf>

Table 13
Summary of Baseline and Operational Energy Use
Guadalupe Quarry Redevelopment Project
Brisbane, CA

Summary Operational Energy Usage

Operational Energy Use	Baseline				Project				Net Operational Energy Use ¹			
	Electricity	Natural Gas	Gasoline	Diesel	Electricity	Natural Gas	Gasoline	Diesel	Electricity	Natural Gas	Gasoline	Diesel
	MWh	MMBtu	gallon	gallons	MWh	MMBtu	gallons	gallons	MWh	MMBtu	gallons	gallons
Offroad Equipment ²	--	--	--	52,431	--	--	--	--	--	--	--	-52,431
Building Energy Use ³	734	4,390	--	--	15,490	0	--	--	14,756	-4,390	--	--
Water Energy Use ⁴	7.9	--	--	--	42	--	--	--	34	--	--	--
Mobile Energy Use ⁵	--	--	1,074	35,639	150	--	169,733	627,842	150	--	168,659	592,203
Stationary Source Energy Use ⁶	--	--	--	--	--	--	--	7,090	--	--	--	7,090
Total	742	4,390	1,074	88,069	15,682	0	169,733	634,932	14,940	-4,390	168,659	546,862

Summary Operational Energy Usage in MMBtu⁷

Operational Energy Use	Baseline				Project				Net Operational Energy Use ¹			
	Electricity	Natural Gas	Gasoline	Diesel	Electricity	Natural Gas	Gasoline	Diesel	Electricity	Natural Gas	Gasoline	Diesel
	MMBtu											
Offroad Equipment ²	--	--	--	7,203	--	--	--	--	--	--	--	-7,203
Building Energy Use ³	2,505	4,390	--	--	52,852	0	--	--	50,346	-4,390	--	--
Water Energy Use ⁴	27	--	--	--	144	--	--	--	117	--	--	--
Mobile Energy Use ⁵	--	--	129	4,896	511	--	20,408	86,254	511	--	20,279	81,357
Stationary Source Energy Use ⁶	--	--	--	--	--	--	--	974	--	--	--	974
All Sources	19,151				161,143				141,992			

Notes:

- Net operational energy use is calculated as Project energy use minus Baseline energy use.
- Baseline offroad equipment fuel use can be found in Table 2.
- Building energy use for baseline and operations was calculated using CalEEMod, as summarized in the Air Quality, Greenhouse Gas, and Health Risk Assessment Technical Report. The project will not use any natural gas for building energy or water use; as a result, all project natural gas usage calculated using CalEEMod has been converted to electricity usage.
- Energy use from water for both the Baseline and Project conditions were calculated using the Electricity Intensity Factors (kWh/Mgal) from CalEEMod and water usage (MGY) from the Water Supply Assessment provided by the City. The energy use in kWh was converted to MWh, as shown in Table 4.
- Mobile energy use calculations are summarized in Table 8.
- Stationary sources for the project include two emergency engines: one generator and one fire pump. Diesel usage from emergency engines is based on emergency engine hours of operation, horsepower, and USEPA default parameters for large stationary diesel engines, as summarized in Table 9.
- MWh of electricity, gallons of diesel, and gallons of gasoline were converted to MMBtu using a factor of 3.412 MMBtu/MWh, 0.14 MMBtu/gallon diesel, 0.12 MMBtu/gallon gasoline respectively.

Abbreviations

CalEEMod - California Emissions Estimator Model	MMBtu - Metric Million British Thermal Units
kWh - kilowatt-hour	MWh - Megawatt-hour
Mgal - million gallons	yr - year

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1.0. Available online at <http://www.caleemod.com/>