Energy Assessment for the Columbia Heights Residential Development, County of Riverside, California

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1.0 INTRODUCTION

1.1 Project Description

The proposed project is to construct 36 new apartment units on 2.27 acres. The project would include 82 parking spaces, and roughly 0.8 acres of landscape area.

The proposed project is located at 25914 Columbia Street in the Hemet area of Riverside County. A vicinity map is provided as Exhibit 1, and the site plan is presented as Exhibit 2. Residences are located north and south of the site. The Desert Hills Memory Care Center is located north of the project. Residences are also located to the west across Columbia Street from the site.

This report focuses on the potential energy consumption associated with the construction and operation of this project. Consistency of the project with energy regulations is also evaluated.

2.0 REGULATORY REQUIREMENTS

Federal and state agencies regulate energy use and consumption through various means and programs. On the federal level, the United States Department of Transportation, the United States Department of Energy, and the United States Environmental Protection Agency are three federal agencies with substantial influence over energy policies and programs. At the state level, the PUC and the California Energy Commissions (CEC) are two agencies with authority over different aspects of energy. Relevant federal and state energy-related laws and plans are summarized below.

2.1 CEQA Requirements

Appendix F – Energy Conservation of the CEQA Guidelines identifies the EIR Contents for an energy assessment. The following items should be included; Project Description, Environmental Setting, Environmental Impacts, and Mitigation Measure, if necessary.

The Energy Section of the CEQA checklist consists of the following two questions.

a) *Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?*

b) *Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?*

Exhibit 1 - Vicinity Map

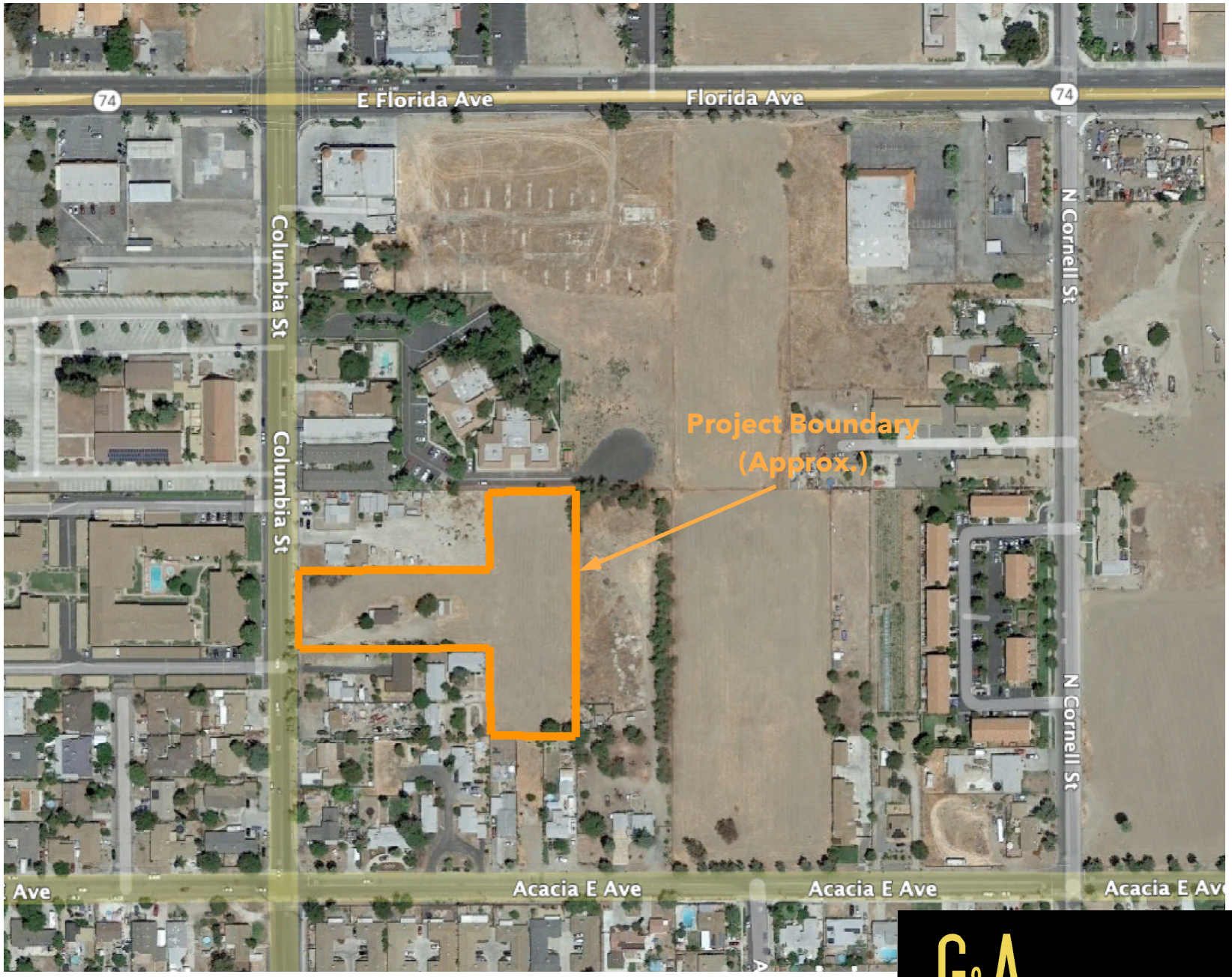

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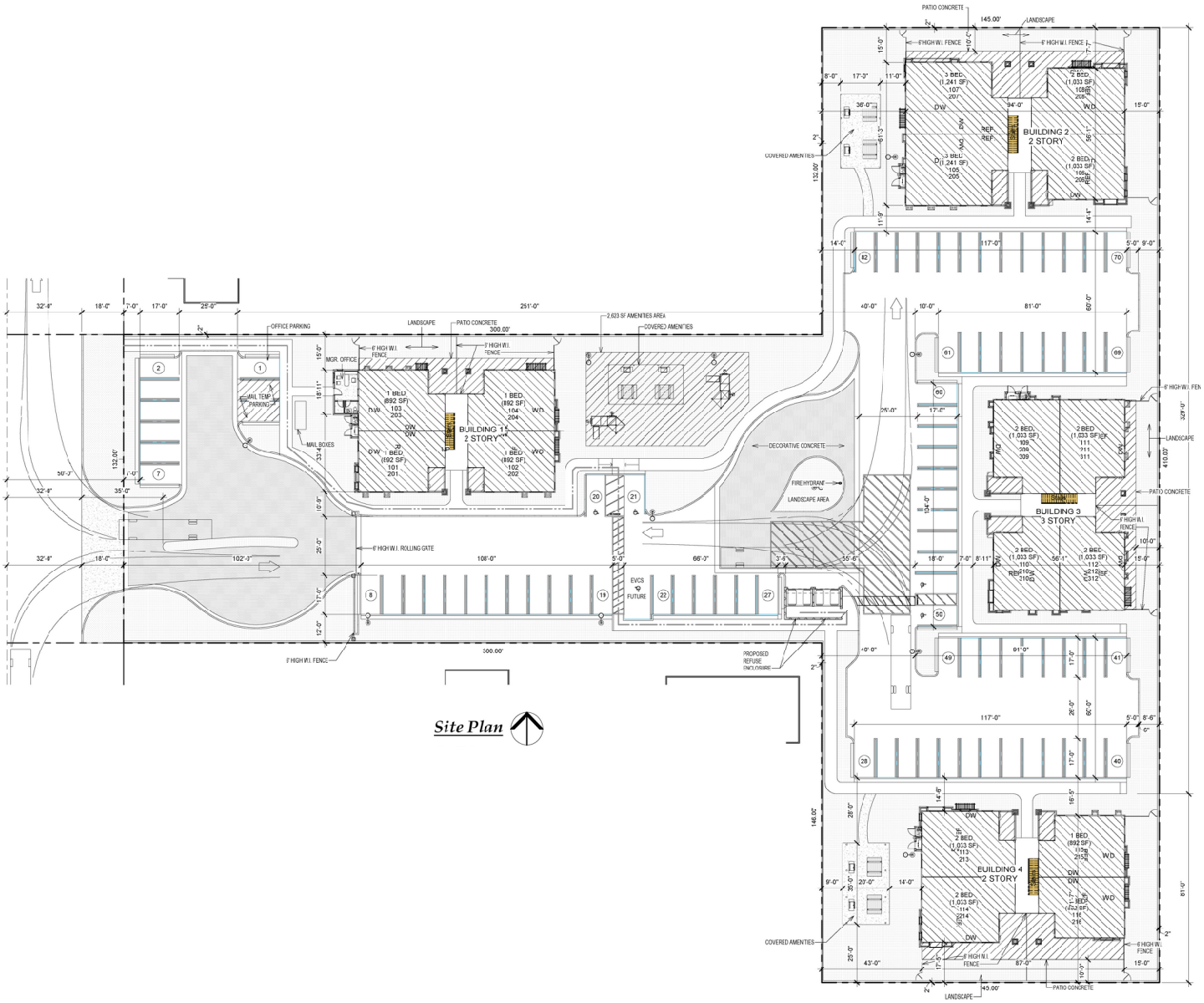
Exhibit 2 - Site Plan



2.2 County of Riverside Climate Action Plan (CAP)

In November 2019, the County of Riverside adopted the "Climate Action Plan Update." Although the plan's focus is on reducing greenhouse gas emissions, a large part of the plan is directed at reducing energy consumption within the County. The County is responsible for enforcing California's building efficiency standards which are updated regularly to incorporate new energy efficiency technologies. The plan also identifies eleven "R2 Energy Measures" which can be incorporated into existing residential and non-residential buildings or new development projects to achieve a State-aligned reduction target. These measures include such things as home energy evaluations, energy efficiency training, and increasing business participation in existing energy efficiency programs. The plan contains measure R2-EE5 titled "Exceed Energy Efficiency Standards in New Residential Units." This measure "would educate County staff to encourage and implement energy efficiency measures beyond those required in current Title 24 standards."

2.3 California Regulations

Integrated Energy Policy Report. Senate Bill 1389 (Bowen, Chapter 568, Statutes of 2002) requires the California Energy Commission to prepare a biennial integrated energy policy report that assesses major energy trends and issues facing the state's electricity, natural gas, and transportation fuel sectors and provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the state's economy; and protect public health and safety (Public Resources Code § 25301a]). The Energy Commission prepares these assessments and associated policy recommendations every two years, with updates in alternate years, as part of the Integrated Energy Policy Report.

The latest Integrated Energy Policy Report (2021 IEPR) was published in February 2022, and continues to work towards improving electricity, natural gas, and transportation fuel energy use in California. The 2021 IEPR focuses on a variety of topics such as including the environmental performance of the electricity generation system, landscape-scale planning, transportation fuel supply reliability issues, updates on Southern California electricity reliability, methane leakage, climate adaptation activities for the energy sector, climate and sea level rise scenarios, and the California Energy Demand Forecast. Electricity would be provided to the project by Southern California Edison (SCE). SCE's Clean Power and Electrification Pathway (CPEP) white paper builds on existing state programs and policies. The project is consistent with, and would not otherwise interfere with, nor obstruct implementation the goals presented in the IEPR.

State of California Energy Plan. The CEC is responsible for preparing the State Energy Plan, which identifies emerging trends related to energy supply, demand, conservation, public health and safety, and the maintenance of a healthy economy. The Plan calls for the state to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the Plan identifies a number of strategies, including

assistance to public agencies and fleet operators and encouragement of urban designs that reduce vehicle miles traveled and accommodate pedestrian and bicycle access. The project site is located near major transportation corridors with proximate access to the Interstate freeway system. The project supports urban design and planning processes identified under the State of California Energy Plan, is consistent with, and would not otherwise interfere with, nor obstruct implementation of the State of California Energy Plan.

California Code Title 24, Part 6, Energy Efficiency Standards. California Code Title 24, Part 6 (also referred to as the California Energy Code), was promulgated by the CEC in 1978 in response to a legislative mandate to create uniform building codes to reduce California's energy consumption. To these ends, the California Energy Code provides energy efficiency standards for residential and nonresidential buildings. According to the CEC, the Energy Commission's energy efficiency standards have saved Californians billions in reduced electricity bills since 1977.

The newest 2022 version of Title 24 was adopted by the California Energy Commission (CEC) and will become effective in 2023. Over the next 30 years, the 2022 Energy Code is estimated to provide $1.5 billion in consumer benefits and reduce 10 million metric tons of GHGs, equivalent to taking nearly 2.2 million cars off the road for a year.

The project would be designed, constructed and operated in a manner consistent with the Title 24 Energy Standards. Compliance with the energy standards is enforced by the County of Riverside. On this basis, the project is determined to be consistent with, and would not interfere with, nor otherwise obstruct implementation of Title 24 Energy Efficiency Standards.

2.4 Federal Regulations

Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) promoted the development of inter-modal transportation systems to maximize mobility as well as address national and local interests in air quality and energy. ISTEA contained factors that Metropolitan Planning Organizations (MPOs) were to address in developing transportation plans and programs, including some energy-related factors. To meet the new ISTEA requirements, MPOs adopted explicit policies defining the social, economic, energy, and environmental values guiding transportation decisions. Transportation and access to the project site is provided primarily by the local and regional roadway systems. The project would not interfere with, nor otherwise obstruct intermodal transportation plans or projects that may be realized pursuant to the ISTEA because SCAG is not planning for intermodal facilities on or through the project site.

The Transportation Equity Act for the 21st Century (TEA-21). The Transportation Equity Act for the 21st Century (TEA-21) was signed into law in 1998 and builds upon the initiatives established in the ISTEA legislation, discussed above. TEA-21 authorizes highway, highway safety, transit, and other efficient surface transportation programs. TEA-21 continues the program structure established for highways and transit under ISTEA, such as flexibility in the use of funds, emphasis on measures to improve the environment, and focus on a strong

planning process as the foundation of good transportation decisions. TEA-21 also provides for investment in research and its application to maximize the performance of the transportation system through, for example, deployment of Intelligent Transportation Systems, to help improve operations and management of transportation systems and vehicle safety. The project site is located along major transportation corridors with proximate access to the Interstate freeway system. The site selected for the project facilitates access, acts to reduce vehicle miles traveled, takes advantage of existing infrastructure systems, and promotes land use compatibilities. The project supports the strong planning processes emphasized under TEA-21. The project is therefore consistent with, and would not otherwise interfere with, nor obstruct implementation of TEA-21.

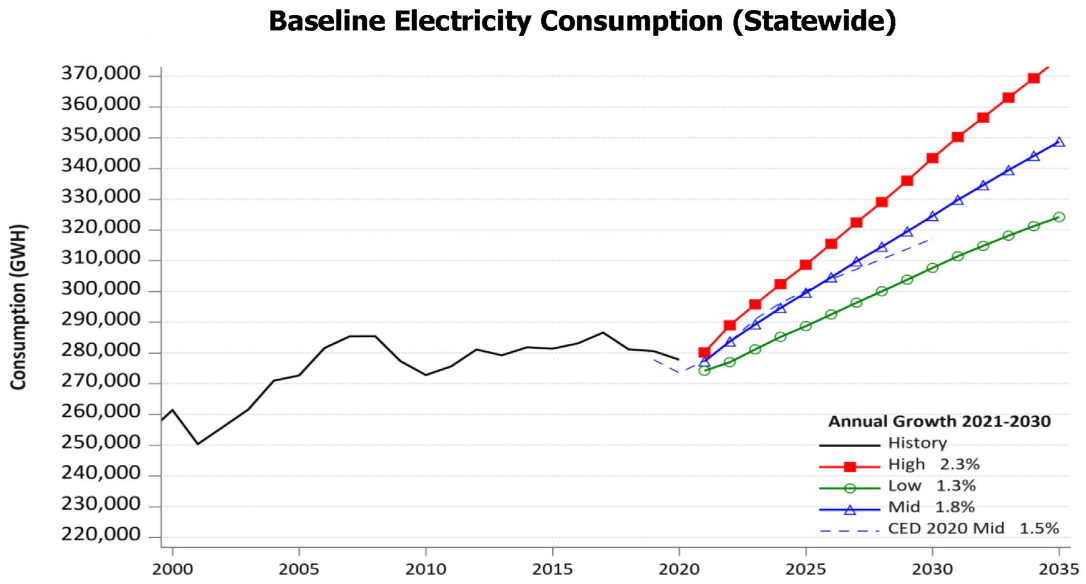
The project was evaluated in light of the Riverside County CAP, the California Integrated Energy Project, the California Energy Plan, the California Energy Efficiency Standards, the Federal Intermodal Surface Transportation Efficiency Act, and the Federal Transportation Equity Act for the 21st Century. The project will comply with all State and Federal regulations as well as, being consistent with the City's CAP. Therefore, the response to the second CEQA Checklist question would be "No Impact" because the project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency?"

3.0 ENVIRONMENTAL SETTING

3.1 Electric Consumption

The California Energy Commission provides full forecasts for electricity and natural gas demand every two years as part of the Integrated Energy Policy Report (IEPR) process. The forecast includes three demand cases designed to capture a reasonable range of demand outcomes over the next 10 years. The high energy demand case incorporates relatively high economic/demographic growth, relatively low electricity and natural gas rates, and relatively low committed efficiency program, self-generation, and climate change impacts. The low energy demand case includes lower economic/demographic growth, higher assumed rates, and higher committed efficiency program and self-generation impacts. The mid case uses input assumptions at levels between the high and low cases. The forecasts include estimates of the effects of new legislation and trends in electric consumption such as the use of zero-emission automobiles. Additionally, changes to the Title 24 building standards are included in the forecasts.

The figure below, taken from the 2021 IEPR, shows the electric consumption from 2000 to current with forecasts through 2035. The graphic shows relatively stable consumption rates from 2005 through 2020, with an increase in consumption beginning in 2020.

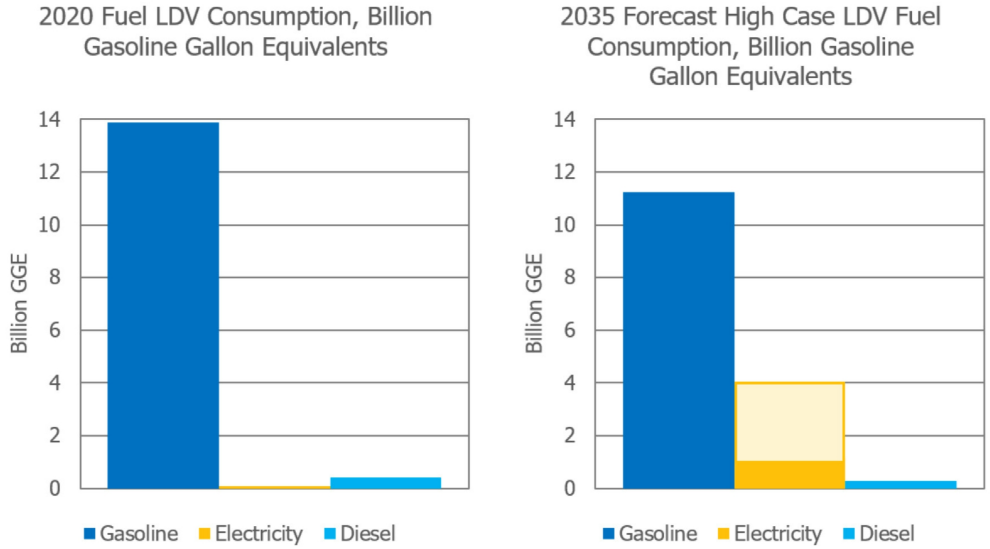


3.2 Transportation Energy

California is home to 30 million registered cars, trucks, buses, and other motorized on-road vehicles. The state's history has been, in part, a history of the automobile and the associated impacts on personal mobility, land-use planning, and air quality. In recognition of these challenges, California has enacted a suite of policies and goals to shift the transportation sector toward cleaner, sustainable fuels and more efficient technology vehicles.

The figure below, taken from the 2021 IEPR, shows the fuel demand forecast fuel forecasts for 2020 and 2035 for light duty autos. The graphic shows decreased usage of gasoline and diesel with an increase reliance on electricity. The demand for gasoline is expected to wane over time, primarily due to increases in fuel efficiency and electrification.

Light-Duty Vehicle Energy Consumption for 2020 and 2035 (High Case)

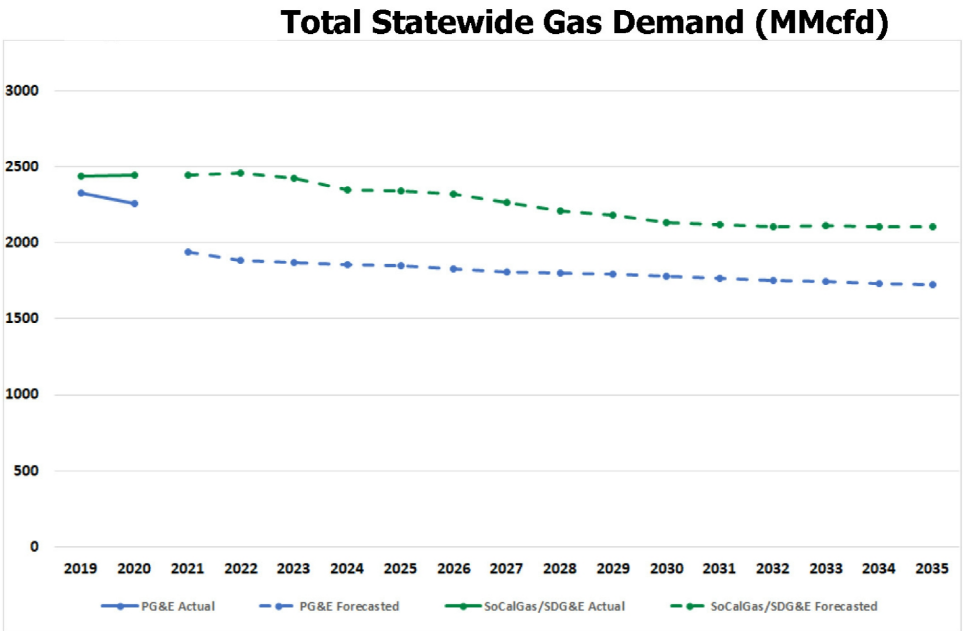


3.3 Natural Gas

Natural gas is a large and important energy source for California. It provides energy to heat homes, cook food, and generate electricity. Some portion of this will likely remain so even as California moves away from fossil fuels to meet climate goals. Currently in California, natural gas serves more than 10.5 million homes, about 445,000 businesses, about 37,000 factories and industrial consumers, and more than 640 electric generating units.

The greatest consumers of natural gas in decreasing order of usage are electric power generation, residential, industrial, mining, commercial, and other. In California since 1990, natural gas demand has remained relatively flat in all but the electric power sector which has steadily increased. This is despite adding 9.2 million additional residents, a 31 percent population growth.

The figure below, taken from the 2021 IEPR, generally show a decreasing reliance on natural gas. The results show that, with the implementation of increased preferred resources and energy efficiency, natural gas generation decreases between 2017 and 2024.



3.4 Local Suppliers of Energy

Southern California Edison (SCE) is the electrical utility provider for the County of Riverside. SCE provides electrical power to homes and businesses, in addition to providing information on energy efficiency, rotating outages, emergency preparedness, electrical safety tips, and tree planting guidelines to ensure non-interference with electrical utility lines.

Southern California Gas Company (The Gas Company) is the provider of natural gas to those residing or operating a business in the County of Riverside. The Gas Company also provides customers with appliance services, an energy efficiency and rebate program, and information on emergency preparedness and air quality.

4.0 PROJECT ENERGY DEMANDS

4.1 Construction Energy Demands

The energy usage during construction is presented in this section. Electrical energy during construction, fuel consumed by construction equipment, and fuel consumed by employees and vendors are considered.

Power cost from on-site electricity consumption during construction of the proposed project is based on the 2017 National Construction Estimator, Richard Pray (2017). The typical power cost per 1,000 square feet of building construction per month is estimated to be $2.32. The proposed project consists of the construction 30,600 square feet of residences over the course of approximately 10 months. The total electricity usage from on-site project construction related activities is estimated to be approximately 14,448 kWh. (Spreadsheet provided in Appendix.)

Fuel consumed by construction equipment would be the primary energy resource expended over the course of project construction. Project construction activity timeline estimates, construction equipment schedules, equipment power ratings, load factors, and associated fuel consumption estimates were determined by the CalEEMod model (refer to the Air Quality Assessment for the Project). The aggregate fuel consumption rate for all equipment is estimated at 18.5 hp-hr-gal., obtained from California Air Resources Board (ARB) Emissions Factors Tables. For the purposes of this analysis, the calculations are based on all construction equipment being diesel-powered which is standard practice consistent with industry standards. Diesel fuel would be supplied by existing commercial fuel providers serving the County and region. The project construction activities would consume an estimated 28,591 gallons of diesel fuel. (Spreadsheet provided in Appendix.)

It is assumed that all construction worker trips are from light duty autos (LDA) along area roadways. With respect to estimated VMT, the construction worker trips would generate an estimated 137,798 VMT per the CalEEMod modeling. Vehicle fuel efficiencies for LDA were estimated using information generated within the 2021 version of the Emissions Factor model (EMFAC) developed by the Air Resources Board (ARB). EMFAC 2021 is a computer model that was developed to calculate emission rates, fuel consumption, and VMT from motor vehicles that operate on highways, freeways, and local roads in California. EMFAC 2021 was run for the LDA vehicle class within the California sub-area. As generated by EMFAC 2021, an aggregated fuel economy of LDAs is estimated to have a fuel efficiency of 25.4 miles per gallon (mpg). Therefore, it is estimated that 5,425 gallons of fuel will be consumed related to construction worker trips during full construction of the proposed project.

A similar approach was used to estimate diesel fuel usage for medium-heavy duty trucks and heavy-heavy duty trucks involved in vendor trips and haul trips during construction. Fuel consumption from construction vendor trips (medium and heavy-duty trucks) will total approximately 1,929 gallons. (Spreadsheets provided in Appendix.)

4.2 Operational Energy Demands

Energy consumption related to the project operations would include fuel usage by vehicles associated with the project, natural gas consumption used for water and space heating, and electric consumption used for lighting and appliances.

CalEEMod provides an estimate of VMT. The project would generate an estimated 896,622 annual VMT along area roadways for all passenger cars. As generated by EMFAC2021, an aggregated fuel economy for automobiles is estimated to have a fuel usage of 25.4 mpg. Therefore, it is estimated that 35,300 gallons of gasoline will be consumed from project generated vehicular trips. (Spreadsheets provided in the Appendix.)

Residents would consume natural gas and electricity. Natural gas would be supplied to the project by Southern California Gas; electricity would be supplied to the project by Southern

California Edison. Annual natural gas usage is estimated by CalEEMod and projected to be 759,599 kBTU per year. Electricity demands of the project were also projected with CalEEMod with a total estimate of 190,535 kWh per year. (Spreadsheets provided in the Appendix.)

4.3 Summary of Energy Usage

The energy usage for the project is summarized in Table 1. Both energy usage during construction and operation of the project is shown.

Table 1 Summary of Energy Usage

Construction (Total Energy Used)		
Electricity	14,448	kWh
Construction Equipment	28,591	Gallons of diesel fuel
Vendor Trips	1,929	Gallons of diesel fuel
Total Diesel Fuel	30,521	Gallons of diesel fuel
Worker Trips	5,415	Gallons of gasoline
Operational (Annual Energy Consumption)		
Vehicular Travel	35,300	Gallons of gasoline
Electricity	190,535	kWh
Natural Gas	759,599	kBTU

4.4 CEQA Checklist Questions

The following are suggested responses to the energy related CEQA Checklist questions.

a) Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

The project would not be wasteful, inefficient, or unnecessarily consume energy resources during construction or operation. The project would comply with all state, federal, and city regulations which control the use of energy consumption. The project will comply with the latest building code which includes energy conservation measures.

b) Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

The project is consistent with state and local energy plans, and therefore, would not obstruct plans for energy efficiency.

5.0 MITIGATION MEASURES

No impacts are identified and mitigation measures will not be needed.

6.0 UNAVOIDABLE SIGNIFICANT IMPACTS

Impacts will be less than significant.

7.0 REFERENCES

"California Emissions Estimator Model (CalEEMod)," online at http://www.caleemod.com

"CEQA, The California Environmental Quality Act, Appendix F, Energy Conservation," http://resources.ca.gov/ceqa/guidelines/Appendix_F.html

"Final 2021 Integrated Energy Policy Report," California Energy Commission Staff, February 2022.

"Climate Action Plan Update," County of Riverside, November 2019.

"Title 24, Part 6, of the California Code of Regulations. California's Energy Efficiency Standards for Residential and Nonresidential Buildings," State of California http://www.energy.ca.gov/title24/.

APPENDIX

Construction Electricity Consumption	
Power Cost per 1000 sf per month	$2.32
Building Size (1000 sf)	36.328
Construction Duration (months)	12
Total Power Cost	$1,011.37
Cost per kWH	$0.07
Construction Electricity Usage (kWh)	14,448

Construction Equipment Fuel Consumption

Activity	Duration (days)	Equipment	HP Rating	Quantity	Hours/Day	Load Factor	HP-hrs/Day	Fuel Usage (hp-hr/gal)	Diesel Consumption (gallons)
Demolition	20	Concrete Saws	81	1	8	0.73	473	18.5	511
	20	Excavators	158	3	8	0.37	1,403	18.5	1,517
	20	Rubber Tired Dozers	247	1	8	0.40	790	18.5	854
Site Preparation	3	Graders	187	1	8	0.41	613	18.5	99
	3	Scrapers	367	1	8	0.48	1,409	18.5	229
	3	Tractors/Loaders/Backhoes	97	1	7	0.37	251	18.5	41
Grading	6	Graders	187	1	8	0.41	613	18.5	199
	6	Rubber Tired Dozers	247	1	8	0.40	790	18.5	256
	6	Tractors/Loaders/Backhoes	97	2	7	0.37	502	18.5	163
Building Construction	220	Cranes	231	1	8	0.29	536	18.5	6,373
	220	Forklifts	89	2	7	0.20	249	18.5	2,963
	220	Generator Sets	84	1	8	0.74	497	18.5	5,914
	220	Tractors/Loaders/Backhoes	97	1	6	0.37	215	18.5	2,561
	220	Welders	46	3	8	0.45	497	18.5	5,908
Paving	10	Cement and Motar Mixers	9	1	8	0.56	40	18.5	22
	10	Pavers	130	1	8	0.42	437	18.5	236
	10	Paving Equipment	132	1	8	0.36	380	18.5	205
	10	Rollers	80	2	8	0.38	486	18.5	263
	10	Tractors/Loaders/Backhoes	97	1	8	0.37	287	18.5	155
Architectural Coating	10	Air Compressors	78	1	6	0.48	225	18.5	121
								GRAND TOTAL	**28,591**

Construction Worker Fuel Consumption						
Activity	**Duration**	**Worker Trips/Day**	**Trip Length (mi)**	**VMT**	**Fuel Rate (mpg)**	**Gasoline Consumption (gal.)**
Demolition	20	13	14.7	3,822	25.4	150
Site Preparation	3	8	14.7	353	25.4	14
Grading	6	10	14.7	882	25.4	35
Building Construction	220	40	14.7	129,360	25.4	5,093
Paving	10	15	14.7	2,205	25.4	87
Architectural Coating	10	8	14.7	1,176	25.4	46
			Grand Totals	**137,798**		**5,425**

Construction Truck Fuel Consumption								
VENDOR TRIPS		% MHD =	50%	%HHD =	50%			
Activity	**Duration**	**Vendor Trips/Day**	**Trip Length (mi)**	**VMT**	**MHD Fuel Rate (mpg)**	**HHD Fuel Rate (mpg)**	**Combined Fuel Rate (mpg)**	**Diesel Consumption (gal.)**
Demolition	20	0	6.9	0	10.14	6.39	8.27	0
Site Preparation	3	0	6.9	0	10.14	6.39	8.27	0
Grading	6	0	6.9	0	10.14	6.39	8.27	0
Building Construction	220	9	6.9	13,662	10.14	6.39	8.27	1,653
Paving	10	0	6.9	0	10.14	6.39	8.27	0
Architectural Coating	10	0	6.9	0	10.14	6.39	8.27	0
							Total	1,653
HAULING TRIPS		% MHD =	0%	%HHD =	100%			
Activity	**Duration**	**Haul Trips/Day**	**Trip Length (mi)**	**VMT**	**MHD Fuel Rate (mpg)**	**HHD Fuel Rate (mpg)**	**Combined Fuel Rate (mpg)**	**Diesel Consumption (gal.)**
Demolition	20	7	20	2,800	10.14	6.39	6.39	276
Site Preparation	3	0	20	0	10.14	6.39	6.39	0
Grading	6	0	20	0	10.14	6.39	6.39	0
Building Construction	220	0	20	0	10.14	6.39	6.39	0
Paving	10	0	20	0	10.14	6.39	6.39	0
Architectural Coating	10	0	20	0	10.14	6.39	6.39	0
							Total	276
					Total Diesel Consumption (gallons)			**1,929**

Operational Energy Consumption		
Traffic Annual Fuel Usage		
Annual VMT	**Avg Fuel Rate (mpg)**	**Annual Fuel Consumption (gal.)**
896,622	25.4	35,300
Natural Gas Consumption		
		kBTU/yr
Direct from CalEEMod		759,599
Electric Consumption		
		kWh/yr
Direct from CalEEMod		190,535