Appendix B - Energy Calculations

Construction-Related Petroleum Fuels

The off-road construction equipment fuel usage was calculated through use of the off-road equipment assumptions utilized in the CalEEMod model run provided in Appendix A and the fuel usage calculations provided in the 2017 Off-road Diesel Emission Factors spreadsheet, prepared by CARB (https://ww3.arb.ca.gov/msei/ordiesel.htm). The Spreadsheet provides the following formula to calculate fuel usage from off-road equipment:

Fuel Used = Load Factor x Horsepower x Total Operational Hours x BSFC / Unit Conversion

Where:

Load Factor - Obtained from CalEEMod default values

Horsepower – Obtained from CalEEMod default values

Total Operational Hours – Calculated by multiplying CalEEMod default daily hours by the estimated number of working days for each phase of construction

BSFC – Brake Specific Fuel Consumption (pounds per horsepower-hour) – If less than 100 Horsepower = 0.408, if greater than 100 Horsepower = 0.367

Unit Conversion – Converts pounds to gallons = 7.109

The Following Table shows the off-road construction equipment fuel calculations based on the above formula, which shows that the off-road equipment utilized during construction of the proposed project would consume 37,226 gallons of fuel.

Off-Road Construction Equipment Modeled in CalEEMod and Fuel Used

Equipment Type	Equipment Quantity	Horse-Power	Load Factor	Operating Hours Per Day	Total Operational Hours[1]	Fuel Used (gallons)
Site Preparation						
Rubber Tired Dozer	3	247	0.4	8	240	1,224
Tractors/Loaders/Backhoes	4	97	0.37	7	320	659
Grading						
Excavator	1	158	0.38	8	160	496
Grader	1	187	0.41	8	160	633
Rubber Tired Dozer	1	247	0.4	8	160	816
Tractors/Loaders/Backhoes	3	97	0.37	8	480	989
Building Construction						
Crane	1	231	0.29	7	1,610	5,568
Forklifts	3	89	0.2	8	5,520	5,639
Generator Set	1	84	0.74	8	1,840	6,564

Equipment Type	Equipment Quantity	Horse-Power	Load Factor	Operating Hours Per Day	Total Operational Hours[1]	Fuel Used (gallons)
Tractors/Loaders/Backhoes	3	97	0.37	7	4,830	9,949
Welders	1	46	0.45	8	1,840	2,186
Paving						
Pavers	2	130	0.42	8	320	902
Paving Equipment	2	132	0.36	8	320	785
Rollers	2	80	0.38	8	320	558
Architectural Coatings						
Air Compressor	1	78	0.48	6	120	258
Total Off-Road Equipment Fuel used during Construction of the Proposed Project (gallons)						**37,226**

Notes:

[1] Based on 10 days for Site Preparation, 20 days for Grading , 230 days for Building Construction, 20 days for Paving, and 20 days for Architectural Coatings.

Source: CalEEMod Version 2020.4.0, CARB, 2018.

The on-road construction-related vehicle trips fuel usage was calculated through use of the default construction vehicle trip assumptions from the CalEEMod model run. The calculated total construction miles were then divided by the fleet average for Ventura County miles per gallon rates for the year 2023 that were calculated through use of the EMFAC2017 model (https://www.arb.ca.gov/emfac/2017/) and the EMFAC2017 model printouts are attached. The following Table shows the on-road construction vehicle trips modeled in CalEEMod and the fuel usage calculations, which shows that the on-road construction-related vehicle trips would consume 14,806 gallons of fuel for the proposed Project.

On-Road Construction Vehicle Trips Modeled in CalEEMod and Fuel Used

Vehicle Trip Types	Daily Trips	Trip Length (miles)	Total per Day (miles)	Total per Phase (miles)	Fleet Average Miles per Gallon	Fuel Used (gallons)
Site Preparation						
Worker Trips	18	10.8	194	1,944	27.6	71
Grading						
Worker Trips	15	10.8	162	3,240	27.6	118
Building Construction						
Worker Trips	90	10.8	972	223,560	27.6	8,109
Vendor Trips	35	7.3	256	58,765	9.4	6,250
Paving						
Worker Trips	15	10.8	162	3,240	27.6	118
Architectural Coatings						
Worker Trips	18	10.8	194	3,888	27.6	141
Total On-Road Vehicle Fuel used during Construction of the Proposed Project (gallons)						**14,806**

Notes:

Vehicle Trip Types	Daily Trips	Trip Length (miles)	Total per Day (miles)	Total per Phase (miles)	Fleet Average Miles per Gallon	Fuel Used (gallons)

[1] Based on 10 days for Site Preparation, 20 days for Grading, 230 days for Building Construction, 20 days for Paving, and 20 days for Architectural Coatings..

Source: CalEEMod Version 2020.4.0, CARB, 2018.

Operations-Related Petroleum Fuels

The on-road operations-related vehicle trips fuel usage was calculated through use of the total annual vehicle miles traveled assumptions from the CalEEMod model run provided in Appendix A, which found that operation of the proposed project would generate 571,396 vehicle miles traveled per year. The calculated total operational miles were then divided by the Ventura County fleet average rate of 27.6 miles per gallon, which was calculated through use of the EMFAC2017 model for year 2023. The EMFAC2017 model printouts are attached to this Appendix. Based on the above calculation methodology, the operation of the proposed Project would consume 20,727 gallons of petroleum fuels per year.

Operations-Related Electricity Use

The operations-related electricity usage was calculated in the CalEEMod model run provided in Appendix A that depicts the electricity use from each land use that are shown below in kilo-watt hours (kWh) per year:

- Parking Lot (Truck Loading Area, Driveways, and Parking Lots) – 45,738 kWh/year
- Unrefrigerated Warehouse – 330,321 kWh/year
- General Office – 53,960 kWh/year

Based on the above, it is anticipated that the proposed project would utilize 430,019 kWh per year of electricity.

Operations-Related Natural Gas Use

The operations-related natural gas usage was calculated in the CalEEMod model run provided in Appendix A that depicts the natural gas use from each land use that are shown below in kilo British Thermal Units (kBTU) per year:

- Parking Lot (Truck Loading Area, Driveways, and Parking Lots) – 0 kBTU/year
- Unrefrigerated Warehouse – 313,402 kBTU/year
- General Office – 36,200 kBTU/year

Based on the above, it is anticipated that the proposed project will use 349,602 kBTU per year, which is equivalent to 350 mega-British Thermal units (MBTU) per year of natural gas.

EMFAC2017 (v1.0.2) Emissions Inventory
Region Type: County
Region: VENTURA
Calendar Year: 2023
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption. Note 'day' in the unit is operation day.

Region	Calendar Y	Vehicle Ca	Model Yea	Speed	Fuel	Population	VMT	Trips	Fuel Consumption
VENTURA	2023	HHDT	Aggregate	Aggregate	GAS	1.584942	213.73213	31.71152	0.0467988
VENTURA	2023	LDA	Aggregate	Aggregate	GAS	291891	11389118	1372309	346.27487
VENTURA	2023	LDT1	Aggregate	Aggregate	GAS	32016.85	1160417.4	145081.3	41.858074
VENTURA	2023	LDT2	Aggregate	Aggregate	GAS	94375.81	3558570.1	437475.2	137.07261
VENTURA	2023	LHDT1	Aggregate	Aggregate	GAS	7709.39	276213.66	114858.4	25.841707
VENTURA	2023	LHDT2	Aggregate	Aggregate	GAS	1384.262	48905.246	20623.44	5.264898
VENTURA	2023	MCY	Aggregate	Aggregate	GAS	16218.89	80979.401	32437.78	2.2482873
VENTURA	2023	MDV	Aggregate	Aggregate	GAS	72044.43	2428532.4	327382.3	116.43824
VENTURA	2023	MH	Aggregate	Aggregate	GAS	2962.397	25120.172	296.3582	4.9266156
VENTURA	2023	MHDT	Aggregate	Aggregate	GAS	731.8971	37757.685	14643.8	7.1568797
VENTURA	2023	OBUS	Aggregate	Aggregate	GAS	238.7227	8995.1471	4776.363	1.7473959
VENTURA	2023	SBUS	Aggregate	Aggregate	GAS	71.82497	2854.4575	287.2999	0.3063043
VENTURA	2023	UBUS	Aggregate	Aggregate	GAS	59.38871	4428.2148	237.5548	0.8189129

vehicle miles per day (All Categories)	19022106	690	1,000 gall per day
		690,002	gallons per day
Fleet Avg Miles per gallon	27.6		

EMFAC2017 (v1.0.2) Emissions Inventory
Region Type: County
Region: VENTURA
Calendar Year: 2023
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption. Note 'day' in the unit is operation day.

Region	Calendar Y	Vehicle Ca	Model Yea	Speed	Fuel	Population	VMT	Trips	Fuel Consumption
VENTURA	2023	HHDT	Aggregate	Aggregate	DSL	3189.254	346461.53	31284.61	48.25642
VENTURA	2023	LDA	Aggregate	Aggregate	DSL	3485.115	135978.93	16275.22	2.709975
VENTURA	2023	LDT1	Aggregate	Aggregate	DSL	24.24519	419.44513	78.03768	0.017157
VENTURA	2023	LDT2	Aggregate	Aggregate	DSL	673.5368	28721.979	3261.94	0.778107
VENTURA	2023	LHDT1	Aggregate	Aggregate	DSL	7767.324	291844.62	97703.17	13.78099
VENTURA	2023	LHDT2	Aggregate	Aggregate	DSL	2819.574	107185.9	35466.7	5.558593
VENTURA	2023	MDV	Aggregate	Aggregate	DSL	1701.253	67577.393	8180.928	2.409239
VENTURA	2023	MH	Aggregate	Aggregate	DSL	1090.161	9548.5315	109.0161	0.905546
VENTURA	2023	MHDT	Aggregate	Aggregate	DSL	5608.331	359036.92	57227.45	31.54999
VENTURA	2023	OBUS	Aggregate	Aggregate	DSL	143.201	8919.232	1273.734	0.912332
VENTURA	2023	SBUS	Aggregate	Aggregate	DSL	286.7253	8901.3913	3308.77	1.209614
VENTURA	2023	UBUS	Aggregate	Aggregate	DSL	33.42634	2717.9618	133.7053	0.451184

Diesel Truck (HHDT, MDV, MHDT) vehicle miles per day	773,076	82	1,000 gall per day
		82,216	gallons per day
Diesel Truck Fleet Avg Miles per gallon	9.4		