

Appendix D  
**Energy Calculations**

Construction Fuel

	MTCO <sub>2</sub> e	Gallons of Fuel <sup>4</sup>	2022 County Fuel	Percent Increase Countywide
<b>On-Site Diesel<sup>1</sup></b>				
Demolition	38	3,709		
Site Preparation/Grading	202	19,927		
Building Construction	161	15,852		
Paving	22	2,167		
Architectural Coating	7	690		
<b>Total</b>	<b>430</b>	<b>42,346</b>	<b>102,962,955.83</b>	<b>0.0411%</b>
<b>Off-Site Diesel<sup>1</sup></b>				
Demolition	47	4,631		
Site Preparation/Grading	43	4,187		
Building Construction	110	10,828		
Paving	0	0		
Architectural Coating	0	0		
<b>Total</b>	<b>199</b>	<b>19,645</b>	<b>102,962,955.83</b>	<b>0.0191%</b>
<b>Off-Site Gasoline<sup>2</sup></b>				
Demolition	1	114		
Site Preparation/Grading	5	521		
Building Construction	84	9,489		
Paving	1	114		
Architectural Coating	7	795		
<b>Total</b>	<b>97</b>	<b>11,032</b>	<b>604,762,380</b>	<b>0.0018%</b>
Total Diesel Fuel		<b>61,991</b>	<b>102,962,956</b>	<b>0.0602%</b>
Total Gasoline Fuel		<b>11,032</b>	<b>604,762,380</b>	<b>0.0018%</b>
Total Construction Fuel	726	<b>73,023</b>		

Construction Phase <sup>3</sup>	Demolition			Site Preparation			Grading		
	On-Site Diesel (Off-Road)	Off-Site Diesel (Hauling/Vendor)	Off-Site Gas (Worker)	On-Site Diesel (Off-Road)	Off-Site Diesel (Hauling/Vendor)	Off-Site Gas (Worker)	On-Site Diesel (Off-Road)	Off-Site Diesel (Hauling/Vendor)	Off-Site Gas (Worker)
2022	38	47	1	24	0	1	179	43	4
2023									
<b>Total</b>	<b>38</b>	<b>47</b>	<b>1</b>	<b>24</b>	<b>0</b>	<b>1</b>	<b>179</b>	<b>43</b>	<b>4</b>
Construction Phase <sup>3</sup>	Building Construction			Paving			Architectural Coating		
	On-Site Diesel (Off-Road)	Off-Site Diesel (Hauling/Vendor)	Off-Site Gas (Worker)	On-Site Diesel (Off-Road)	Off-Site Diesel (Hauling/Vendor)	Off-Site Gas (Worker)	On-Site Diesel (Off-Road)	Off-Site Diesel (Hauling/Vendor)	Off-Site Gas (Worker)
2022	35	25	19	0	0	0		0	
2023	126	85	65	22		1	7		7
<b>Total</b>	<b>161</b>	<b>110</b>	<b>84</b>	<b>22</b>	<b>0</b>	<b>1</b>	<b>7</b>	<b>0</b>	<b>7</b>

Notes:

<sup>1</sup> Fuel used for off-road, hauling, and vendor trips assumed to be diesel.

<sup>2</sup> Fuel used for worker trips assumed to be gasoline.

<sup>3</sup> MTCO<sub>2</sub>e rates from CalEEMod (3.0 Construction Details).

<sup>4</sup> For CO<sub>2</sub>e emissions, see Chapter 13 (page 94); Conversion Ratios: Climate Registry, General Reporting Protocol, 2016.

Operational Fuel

Vehicle Type	Percent <sup>1</sup>	Annual VMT <sup>2</sup>	MGP <sup>3</sup>	Annual Fuel	Fuel Type	County Gallons <sup>4</sup>	County Percent	Statewide	Statewide percent
Passenger Cars	0.5920	912,041	21.6	42,224	Gas	600,613,962	0.0070%	14,773,931,520	0.0003%
Light/Medium Trucks	0.15000	231,091	17.2	13,436	Diesel	103,122,398	0.0017%	3,625,305,260	0.0004%
Heavy Trucks/Other	0.26	397,477	6.1	65,160	Diesel	103,122,398	0.0081%		
<b>Total</b>	1.000	<b>1,540,609</b>		<b>78,596</b>		<b>806,858,758</b>	<b>0.0762%</b>		

Notes:

<sup>1</sup> Percent of vehicle trip distribution based on fleet mix from CalEEMod (4.4 Fleet Mix).

<sup>2</sup> Total annual operational VMT based on mitigated annual VMT from CalEEMod (4.2 Trip Summary Information).

<sup>3</sup> Average fuel economy derived from Department of Transportation.

<sup>4</sup> Total annual county fuel per EMFAC 2017 model of projected operational fuel usage.

Electricity and Natural Gas

	Mitigated Project Annual Energy	County Annual Energy <sup>3</sup>	Percentage Increase
Electricity (kWh/yr)	1,174,491	16,664,460,569	0.0070%
Electricity (MWh/yr)	1,174	16,664,461	0.0070%
Electricity (GWh/yr)	1	16,664	0.0070%
Adjusted Electricity (GWh/yr)	3	16,664	0.0181%
Natural Gas (million therms)		440	
Natural Gas (kBTU/yr)	2,264,526	45,972,076,400	0.0049%
Natural Gas (therms)	22,645	459,720,764.00	0.0049%

Land Use	Electricity <sup>1</sup> (kWh/yr)		Natural Gas <sup>2</sup> (kBTU/yr)	
	Unmitigated	Mitigated	Unmitigated	Mitigated
Manufacturing	530453	530453	1.71E+06	1.71E+06
Parking Lot	84397.9	84397.9	0	0
Warehouse	559640	559640	550046	550046
<b>Total Energy</b>	<b>1,174,491</b>	<b>1,174,491</b>	<b>2,264,526</b>	<b>2,264,526</b>

Notes:

<sup>1</sup> Electricity use per CalEEMod (5.3 Energy by Land Use).

<sup>2</sup> Natural Gas use per CalEEMod (5.2 Natural Gas by Land Use).

<sup>3</sup> County total energy values from California Energy Commission energy reports available through [ecdms.energy.ca.gov](http://ecdms.energy.ca.gov).

Construction Water

Daily Soil Disturbance <sup>1</sup>	<b>195</b>	acres
Days of Soil Disturbance <sup>2</sup>	<b>20</b>	days
Water Concentration <sup>3</sup>	3,020	gallons/acre
Water Energy Intensity <sup>4</sup>	3,500	kWh/MG
Total Construction Water	<b>11.78</b>	million gallons
Construction Water Energy	<b>41,223</b>	kWh
	0.4122	GWh
Percentage Increase Countywide	0.002474%	

Notes:

- <sup>1</sup> Total daily acres disturbed from offroad equipment per CalEEMod (3.0 Construction Detail) and maximum SCAQMD LST values for soil-disturbing equipment.
- <sup>2</sup> Number of days of construction with soil-disturbing equipment per CalEEMod (3.0 Construction Detail).
- <sup>3</sup> Water application rate per Air and Waste Management Association's Air Pollution Engineering Manual.
- <sup>4</sup> Water energy intensity factor for county subarea per CalEEMod User Guide, Appendix D, page D-343.

Operational Water

Mitigated Indoor	52	million gallons
Indoor Energy Intensity Factor <sup>1</sup>	5,411	kWh/MG
Mitigated Outdoor	0	million gallons
Outdoor Energy Intensity Factor <sup>2</sup>	3,500	kWh/MG
Operational Water Energy	281372	kWh
Operational Water Energy	281.372	MWh
Operational Water Energy	0.281372	GWh
Percentage Countywide	0.0017%	
Total water use	52	million gallons

Land Use <sup>3</sup>	Unmitigated (MG)		Mitigated (MG)	
	Indoor	Outdoor	Indoor	Outdoor
Manufacturing	15	0	15	0
Parking Lot	0	0	0	0
Warehouse	37	0	37	0
<b>Total Operational Water</b>	<b>52</b>	<b>0</b>	<b>52</b>	<b>0</b>

Notes:

<sup>1</sup> Indoor water energy intensity factor for county subarea per CalEEMod User Guide, Appendix D, page D-343. Factor includes supply, treatment, distribution, and wastewater.

<sup>2</sup> Outdoor water energy intensity factor for county subarea per CalEEMod User Guide, Appendix D, page D-343. Factor includes supply, treatment, and distribution.

<sup>3</sup> Operational water use values per CalEEMod (7.2 Water by Land Use).