

Operation Energy Demand Summary Worksheet

Land Use	Year 2020		Year 2033	
	Electricity (kWh/Yr)	Natural Gas (kBTU/Yr)	Electricity (kWh/Yr)	Natural Gas (kBTU/Yr)
<b>Existing</b>				
<i>Residential</i>	3,116,140	9,115,220	3,116,140	9,115,220
<i>Amenities and Education</i>	283,153	447,084	283,153	447,084
<i>Services/Administration</i>	400,812	327,172	400,812	327,172
<i>Retail</i>	93,366	10,647	93,366	10,647
<i>Parking Lot (Assumes Enclosed Parking Structure)</i>	1,401,920	0	1,401,920	0
<b>Sub-Total</b>	<b>5,295,391</b>	<b>9,900,123</b>	<b>5,295,391</b>	<b>9,900,123</b>
<b>Existing Remaining</b>				
<i>Residential</i>	n/a	n/a	2,269,560	6,638,830
<i>Amenities and Education</i>	n/a	n/a	29,469	46,530
<i>Services/Administration</i>	n/a	n/a	290,322	236,982
<i>Retail</i>	n/a	n/a	93,366	10,647
<i>Parking Lot (Assumes Enclosed Parking Structure)</i>	n/a	n/a	984,040	0
<b>Sub-Total</b>	<b>n/a</b>	<b>n/a</b>	<b>3,666,757</b>	<b>6,932,989</b>
<b>New Proposed</b>				
<i>Residential</i>	n/a	n/a	3,016,800	9,994,540
<i>Amenities and Education</i>	n/a	n/a	1,000,040	1,652,320
<i>Services/Administration</i>	n/a	n/a	600,960	494,880
<i>Retail</i>	n/a	n/a	222,530	27,710
<i>Parking Lot (Assumes Enclosed Parking Structure)</i>	n/a	n/a	1,113,840	0
<b>Sub-Total</b>	<b>n/a</b>	<b>n/a</b>	<b>5,954,170</b>	<b>12,169,450</b>
<b>Full Buildout</b>				
<i>Residential</i>	n/a	n/a	5,286,360	16,633,370
<i>Amenities and Education</i>	n/a	n/a	1,029,509	1,698,850
<i>Services/Administration</i>	n/a	n/a	891,282	731,862
<i>Retail</i>	n/a	n/a	315,896	38,357
<i>Parking Lot (Assumes Enclosed Parking Structure)</i>	n/a	n/a	2,097,880	0
<b>Sub-Total</b>	<b>n/a</b>	<b>n/a</b>	<b>9,620,927</b>	<b>19,102,439</b>
<b>Net Change</b>				
<i>Residential</i>	n/a	n/a	2,170,220	7,518,150
<i>Amenities and Education</i>	n/a	n/a	746,356	1,251,766
<i>Services/Administration</i>	n/a	n/a	490,470	404,690
<i>Retail</i>	n/a	n/a	222,530	27,710
<i>Parking Lot (Assumes Enclosed Parking Structure)</i>	n/a	n/a	695,960	0
<b>Sub-Total</b>	<b>n/a</b>	<b>n/a</b>	<b>4,325,536</b>	<b>9,202,316</b>

Source: California Emissions Estimator Model, Version 2016.3.2.

## Construction-Related Fuel/Energy Usage

Fuel usage from construction activities are based on EMFAC2017 model for Year 2021 for the most conservative results.

### Worst-Case Phase

#### CONSTRUCTION WORKER COMMUTE

Year	Gas		Diesel		Electricity	
	VMT	Gallons	VMT	Gallons	VMT	kWh
2023	171,369	6,057	1,159	27	2,653	866
2024	207,835	7,165	1,465	33	3,882	1,256
<b>Total</b>	<b>379,204</b>	<b>13,222</b>	<b>2,624</b>	<b>60</b>	<b>6,535</b>	<b>2,122</b>

#### CONSTRUCTION VENDOR TRIPS

Year	Gas		Diesel	
	VMT	Gallons	VMT	Gallons
2023	3,920	767	44,625	5,294
2024	3,193	615	36,976	4,324
<b>Total</b>	<b>7,112</b>	<b>1,382</b>	<b>81,601</b>	<b>9,618</b>

#### CONSTRUCTION TRUCK HAUL TRIPS

Year	Gas		Diesel	
	VMT	Gallons	VMT	Gallons
2023	3	1	3,709	530
2024	3	1	3,385	477
<b>Total</b>	<b>6</b>	<b>1</b>	<b>7,095</b>	<b>1,006</b>

#### CONSTRUCTION OFF-ROAD EQUIPMENT

Year	Gasoline gallons	Diesel gallons
2023	0	23,264
2024	4,367	0
<b>Total</b>	<b>4,367</b>	<b>23,264</b>

#### TOTALS

	Gas		Diesel		Electricity	
	VMT	Gallons	VMT	Gallons	VMT	kWh
	386,322	18,973	91,320	33,948	6,535	2,122
<b>Total</b>	<b>386,322</b>	<b>18,973</b>	<b>91,320</b>	<b>33,948</b>	<b>6,535</b>	<b>2,122</b>

**Full Buildout**

**CONSTRUCTION WORKER COMMUTE**

Year	Gas		Diesel		Electricity	
	VMT	Gallons	VMT	Gallons	VMT	kWh
<b>Total</b>	<b>4,550,447</b>	<b>158,664</b>	<b>31,488</b>	<b>717</b>	<b>78,425</b>	<b>25,460</b>

**CONSTRUCTION VENDOR TRIPS**

Year	Gas		Diesel	
	VMT	Gallons	VMT	Gallons
<b>Total</b>	<b>85,349</b>	<b>16,589</b>	<b>979,214</b>	<b>115,418</b>

**CONSTRUCTION TRUCK HAUL TRIPS**

Year	Gas		Diesel	
	VMT	Gallons	VMT	Gallons
<b>Total</b>	<b>73</b>	<b>17</b>	<b>85,135</b>	<b>12,074</b>

**CONSTRUCTION OFF-ROAD EQUIPMENT**

Year	Gasoline gallons	Diesel gallons
<b>Total</b>	<b>52,403</b>	<b>279,169</b>

**TOTALS**

	Gas		Diesel		Electricity	
	VMT	Gallons	VMT	Gallons	VMT	kWh
	<b>4,635,870</b>	<b>227,673</b>	<b>1,095,837</b>	<b>407,377</b>	<b>78,425</b>	<b>25,460</b>

## Operation-Related Vehicle Fuel/Energy Usage

### Existing Conditions

#### EXISTING COMMUTE- BASELINE YEAR

Vehicle Type	Gas		Diesel		CNG		Electricity	
	VMt	Gallons	VMt	Gallons	VMt	Gallons	VMt	kWh
All Vehicles	14,988,202	614,254	676,769	63,739	26,762	7,379	154,382	51,567
<b>Total</b>	<b>14,988,202</b>	<b>614,254</b>	<b>676,769</b>	<b>63,739</b>	<b>26,762</b>	<b>7,379</b>	<b>154,382</b>	<b>51,567</b>

### Existing Conditions - Year 2033

#### EXISTING COMMUTE- YEAR 2033

Vehicle Type	Gas		Diesel		CNG		Electricity	
	VMt	Gallons	VMt	Gallons	VMt	Gallons	VMt	kWh
All Vehicles	14,379,172	429,882	791,688	54,188	20,741	5,837	654,507	196,424
<b>Total</b>	<b>14,379,172</b>	<b>429,882</b>	<b>791,688</b>	<b>54,188</b>	<b>20,741</b>	<b>5,837</b>	<b>654,507</b>	<b>196,424</b>

### Proposed Project -- Passenger Vehicles

#### PROPOSED COMMUTE

Vehicle Type	Gas		Diesel		CNG		Electricity	
	VMt	Gallons	VMt	Gallons	VMt	Gallons	VMt	kWh
All Vehicles	23,147,479	693,379	1,414,115	101,752	38,033	10,828	1,053,088	316,042
<b>Total</b>	<b>23,147,479</b>	<b>693,379</b>	<b>1,414,115</b>	<b>101,752</b>	<b>38,033</b>	<b>10,828</b>	<b>1,053,088</b>	<b>316,042</b>

### Proposed Project -- Passenger Vehicles

#### PROPOSED COMMUTE

Vehicle Type	Gas		Diesel		CNG		Electricity	
	VMt	Gallons	VMt	Gallons	VMt	Gallons	VMt	kWh
Existing - Year 2033	14,379,172	429,882	791,688	54,188	20,741	5,837	654,507	196,424
Full Buildout	23,147,479	693,379	1,414,115	101,752	38,033	10,828	1,053,088	316,042
<b>Total</b>	<b>8,768,307</b>	<b>263,497</b>	<b>622,427</b>	<b>47,565</b>	<b>17,292</b>	<b>4,991</b>	<b>398,581</b>	<b>119,618</b>

**Construction Worker Trips Fuel Usage Worksheet**

Note: Worker vehicles are "LD\_Mix", which is 50% LDA, 25% LDT1, and 25% LDT2

Activity <sup>1</sup>	Daily trips <sup>1,2</sup>	Trip miles <sup>2</sup>	Trip days <sup>1</sup>	Annual VMT
<b>2023</b>				
Building Demolition	30	14.7	60	26,460
Building Demolition Haul	20	14.7	40	11,760
Site Preparation	10	14.7	5	735
Site Preparation Soil Haul	10	14.7	10	1,470
Rough Grading	10	14.7	10	1,470
Geopiers/Foundation	20	14.7	60	17,640
Utility Trenching	40	14.7	60	35,280
Building Construction	100	14.7	55	80,850
<b>2024</b>				
Building Construction	100	14.7	105	154,350
Architectural Coating	30	14.7	60	26,460
Asphalt Demolition	20	14.7	5	1,470
Asphalt Demolition Haul	20	14.7	5	1,470
Paving	20	14.7	20	5,880
Fine Grading	10	14.7	5	735
Finishing/Landscaping	40	14.7	40	23,520

10/15/2023 12/31/2023 55  
1/1/2024 5/24/2024 105

<sup>1</sup> Assumes that fuel usage would be based on EMFAC2017 model for Year 2021 for the most conservative results.  
<sup>2</sup> Based on CalEEMod defaults.

Year	LDA VMT	LDT1 VMT	LDT2 VMT	Gasoline <sup>1</sup>						Diesel <sup>1</sup>						Electricity <sup>1</sup>			
				LDA mpg	LDA gallons	LDT1 mpg	LDT1 gallons	LDT2 mpg	LDT2 gallons	LDA mpg	LDA gallons	LDT1 mpg	LDT1 gallons	LDT2 mpg	LDT2 gallons	LDA m/kWh	LDA kWh	LDT1 m/kWh	LDT1 kWh
2023	87,833	43,916	43,916	31.12	2,727	26.80	1,620	25.20	1,710	48.57	17	22.08	1	35.74	9	3.07	705	3.07	160
2024	106,943	53,471	53,471	31.86	3,227	27.38	1,924	25.98	2,014	49.63	21	22.29	1	36.53	12	3.09	1,010	3.09	246

Gasoline		Diesel		Electricity	
VMT	Gallons	VMT	Gallons	VMT	kWh
171,369	6,057	1,159	27	2,653	866
207,835	7,165	1,465	33	3,882	1,256
<b>379,204</b>	<b>13,222</b>	<b>2,624</b>	<b>60</b>	<b>6,535</b>	<b>2,122</b>

<sup>1</sup> EMFAC2017 v1.0.2.

Year	VMT from gasoline			VMT from diesel			VMT from electricity		
	LDA	LDT1	LDT2	LDA	LDT1	LDT2	LDA	LDT1	
2023	96.62%	98.85%	98.14%	0.92%	0.03%	0.76%	2.46%	1.12%	
2024	96.13%	98.55%	97.89%	0.96%	0.03%	0.80%	2.92%	1.42%	

**Appendix C: Evidence Used to Define the Average Number of KWH Required to Displace a Gallon of Gasoline**

Table A 3: Evidence from U.S. Department of Energy and U.S. Environmental Protection Agency's fuel economy website<sup>[32]</sup>

Vehicle	Model year	Electric consumption	Gasoline fuel economy	Number of kWh that are equivalent to 1 gallon
Ford Fusion Energi & Ford C-Max Energi	2013	0.34 kWh per mile	43 mpg	14.6
Chevrolet Volt	2013	0.35 kWh per mile	37 mpg	12.9
Chevrolet Volt	2012	0.36 kWh per mile	37 mpg	13.3
Fisker Karma	2012	0.62 kWh per mile	20 mpg	12.4
Toyota Prius	2013	0.29 kWh per mile & 0.2 gal	50 mpg	13.1
Average for five models	-	-	-	13.3 +/- 0.8

Table A 5: Average power consumption per mile traveled over time for different PEV categories

Year range	2012- 2020	2020-2030	2030-2040	2040-2050	2050
Efficiency improvement per year	0.3%	0.8%	0.9%	0.9%	
Year	2012	2020	2030	2040	2050
Relative energy efficiency	1.000	0.976	0.901	0.823	0.752

[https://www.fhwa.dot.gov/environment/climate\\_change/mitigation/publications\\_and\\_tools/ev\\_deployment/page08.cfm](https://www.fhwa.dot.gov/environment/climate_change/mitigation/publications_and_tools/ev_deployment/page08.cfm)

Year	Estimated Electric Consumption
2013	0.34
2014	0.34
2015	0.34
2016	0.34
2017	0.34
2018	0.34
2019	0.34
2020	0.33
2021	0.33
2022	0.33
2023	0.33
2024	0.32
2025	0.32
2026	0.32
2027	0.32
2028	0.31
2029	0.31
2030	0.31
2031	0.31
2032	0.30
2033	0.30
2034	0.30
2035	0.29
2036	0.29
2037	0.29
2038	0.29
2039	0.28
2040	0.28

**Vendor Trips Fuel Usage Worksheet**

Note: Hauling vehicles are "HDT\_Mix", which is 50% HHDT (T7), and 50% MHDT (T6)

Activity <sup>1</sup>	Daily trips <sup>1,2</sup>	Trip miles <sup>2</sup>	Trip days <sup>1</sup>	Annual VMT
2023				
Building Demolition	24	6.9	60	9,936
Building Demolition Haul	4	6.9	40	1,104
Site Preparation	6	6.9	5	207
Site Preparation Soil Haul	2	6.9	10	138
Rough Grading	6	6.9	10	414
Geopiers/Foundation	44	6.9	60	18,216
Utility Trenching	10	6.9	60	4,140
Building Construction	40	6.9	55	15,180
2024				
Building Construction	40	6.9	105	28,980
Architectural Coating	10	6.9	60	4,140
Asphalt Demolition	14	6.9	5	483
Asphalt Demolition Haul	4	6.9	5	138
Paving	10	6.9	20	1,380
Fine Grading	6	6.9	5	207
Finishing/Landscaping	20	6.9	40	5,520

<sup>1</sup> Assumes that fuel usage would be based on EMFAC2017 model for Year 2021 for the most conservative results.

<sup>2</sup> Based on CalEEMod defaults.

Year	HHDT (T7) VMT	MHDT (T6) VMT	Gasoline <sup>1</sup>				Diesel <sup>1</sup>			
			HHDT (T7) mpg	HHDT (T7) gallons	MHDT (T6) mpg	MHDT (T6) gallons	HHDT (T7) mpg	HHDT (T7) gallons	MHDT (T6) mpg	MHDT (T6) gallons
2023	24,668	24,668	4.20	5	5.12	762	7.00	3,406	11.00	1,888
2024	20,424	20,424	4.30	4	5.19	611	7.10	2,777	11.15	1,547

<sup>1</sup> EMFAC2017 v1.0.2.

Year	VMT from gasoline		VMT from diesel	
	HHDT (T7)	MHDT (T6)	HHDT (T7)	MHDT (T6)
2023	0.08%	15.81%	96.71%	84.19%
2024	0.08%	15.55%	96.59%	84.45%

VENDOR			
Gasoline		Diesel	
VMT	Gallons	VMT	Gallons
3,920	767	44,625	5,294
3,193	615	36,976	4,324
<b>7,112</b>	<b>1,382</b>	<b>81,601</b>	<b>9,618</b>

## Truck Haul Trips Fuel Usage Worksheet

Note: Hauling vehicles are HHDT (T7)

Activity	Total Trips <sup>1</sup>	Mi/Trip <sup>1</sup>	Annual VMT
2023			
Building Demolition Haul	74	15.1	1,117
Site Preparation Soil Haul	74	35.9	2,657
			0
2024			
Asphalt Demolition Haul	96	36	3,446

<sup>1</sup> Based on information provided.

<sup>2</sup> Based on CalEEMod defaults.

Year	VMT	Gasoline <sup>1</sup>		Diesel <sup>1</sup>	
		HHDT (T7) mpg	HHDT (T7) gallons	HHDT (T7) mpg	HHDT (T7) gallons
2023	3,774	4.20	1	7.00	530
2024	3,446	4.30	1	7.10	477

<sup>1</sup> EMFAC2017 v1.0.2.

Year	VMT from gasoline	VMT from diesel
2023	0.08%	98.29%
2024	0.09%	98.22%

Gasoline		Diesel	
VMT	Gallons	VMT	Gallons
3	1	3,709	530
3	1	3,385	477
<b>6</b>	<b>1</b>	<b>7,095</b>	<b>1,006</b>





Finishing/Landscaping													
Forklifts	1	89	100	Diesel	40	8	320	0.00	0	0.98	314	0.00	0
Select Equipment Type			25	Select Fuel Type	40		0	0.00	0	0.00	0	0.00	0
Select Equipment Type			25	Select Fuel Type	40		0	0.00	0	0.00	0	0.00	0
Select Equipment Type			25	Select Fuel Type	40		0	0.00	0	0.00	0	0.00	0
Select Equipment Type			25	Select Fuel Type	40		0	0.00	0	0.00	0	0.00	0
Select Equipment Type			25	Select Fuel Type	40		0	0.00	0	0.00	0	0.00	0
Select Equipment Type			25	Select Fuel Type	40		0	0.00	0	0.00	0	0.00	0
Select Equipment Type			25	Select Fuel Type	40		0	0.00	0	0.00	0	0.00	0
							<b>TOTAL</b>		<b>4,367</b>		<b>9,111</b>		<b>0</b>

<sup>1</sup> Based on information provided.

<sup>2</sup> OFFROAD2017 v.1.0.1

**Off-Road Operation Equipment Fuel Usage Worksheet**

Year	Total Gasoline	Total Diesel	Total Natural Gas
		Gallons	
Year 1	0	0	0

Equipment Type <sup>1</sup>	Number of Equipment <sup>1</sup>	Horsepower	OFFROAD2017 Horsepower Category	Fuel Type	Working days <sup>1</sup>	Hours Per Day	Total Hours of Operation	Gasoline Gal/Hr <sup>2</sup>	Total Gasoline gallons	Diesel Gal/Hr <sup>2</sup>	Total Diesel gallons	Natural Gas Gal/Hr <sup>2</sup>	Total Natural Gas gallons
<b>Activity 1 (rename to actual)</b>													
Select Equipment Type			25	Select Fuel Type	0		0	0.00	0	0.000	0	0.00	0
Select Equipment Type			25	Select Fuel Type	0		0	0.00	0	0.000	0	0.00	0
Select Equipment Type			25	Select Fuel Type	0		0	0.00	0	0.00	0	0.00	0
Select Equipment Type			25	Select Fuel Type	0		0	0.00	0	0.00	0	0.00	0
Select Equipment Type			25	Select Fuel Type	0		0	0.00	0	0.00	0	0.00	0
Select Equipment Type			25	Select Fuel Type	0		0	0.00	0	0.00	0	0.00	0
Select Equipment Type			25	Select Fuel Type	0		0	0.00	0	0.00	0	0.00	0
Select Equipment Type			25	Select Fuel Type	0		0	0.00	0	0.00	0	0.00	0
<b>Activity 2 (rename to actual)</b>													
Select Equipment Type			25	Select Fuel Type	0		0	0.00	0	0.00	0	0.00	0
Select Equipment Type			25	Select Fuel Type	0		0	0.00	0	0.00	0	0.00	0
Select Equipment Type			25	Select Fuel Type	0		0	0.00	0	0.00	0	0.00	0
Select Equipment Type			25	Select Fuel Type	0		0	0.00	0	0.00	0	0.00	0
Select Equipment Type			25	Select Fuel Type	0		0	0.00	0	0.00	0	0.00	0
Select Equipment Type			25	Select Fuel Type	0		0	0.00	0	0.00	0	0.00	0
Select Equipment Type			25	Select Fuel Type	0		0	0.00	0	0.00	0	0.00	0
Select Equipment Type			25	Select Fuel Type	0		0	0.00	0	0.00	0	0.00	0
<b>TOTAL</b>									<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	

<sup>1</sup> Based on information provided.

<sup>2</sup> OFFROAD2017 v.1.0.1