

**Table EC-1**  
**Construction Energy Resources Use**  
**Oak Knoll Mixed Use Community Plan Project**  
**Oakland, California**

Source		Project Construction Usage
<b>Electricity</b>		
Project Water Consumption <sup>1</sup>	kWh	12,985
Project On-Road Construction Trips <sup>2</sup>	kWh	79,763
<b>Project Electricity Total</b>	<b>kWh</b>	<b>92,749</b>
<b>Diesel</b>		
Project On-Road Construction Trips <sup>2</sup>	gallons	653,621
Project Off-Road Construction Equipment <sup>3</sup>	gallons	535,747
<b>Project Diesel Total</b>	<b>gallons</b>	<b>1,189,368</b>
<b>Gasoline</b>		
Project On-Road Construction Trips <sup>2</sup>	gallons	972,797
<b>Project Gasoline Total</b>	<b>gallons</b>	<b>972,797</b>

**Notes:**

1. Construction water use estimated based on acres disturbed per day per construction phase, construction days per phase, and estimated water use per acre (AWMA 1992).
2. On-road mobile source fuel use based on trip rates and trip lengths as stated in the Air Quality assessment of construction and fleet-average fuel consumption in gallons per mile from EMFAC2014 for CY 2017 through 2023 in Alameda County. Electricity demand calculated average electric vehicle fuel economy for 2015 models (in kWh per mile) from the DOE Fuel Economy Guide.
3. Off-road mobile source fuel usage based on a fuel usage rate of 0.05 gallons of diesel per horsepower (hp)-hour, consistent with diesel conversion factors given in USEPA AP-42 Table 3.4.1.

**Abbreviations:**

AWMA: Air & Waste Management Association  
 CalEEMod®: California Emissions Estimator Model  
 CY: calendar year  
 DOE: United States Department of Energy  
 EMFAC2014: California Air Resources Board Emission FACTor model.  
 hp: horsepower  
 kWh: kilowatt-hour  
 USEPA: United States Environmental Protection Agency  
 VMT: vehicle miles traveled

**References:**

AWMA. 1992. Air Pollution Engineering Manual.  
 DOE. 2016. Fuel Economy Guide, Model Year 2015. Electric Vehicles. Available online at: <http://www.fueleconomy.gov/feg/printGuides.shtml>. Accessed January 2016.  
 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 January 2016.

**Construction Energy Use- Crushing Scenario**

**Table A1. Electricity Usage for Construction Water Usage  
Oak Knoll Mixed Use Community Plan Project**

Phase	Year	Construction Phase	Project Equipment	Off-Road Equipment Type <sup>1</sup>	Number of Units	Total Hours	Acres Disturbed/8-hour Day/Unit <sup>2</sup>	Total Acres Disturbed	Total Gallons of Water <sup>3</sup>	Total kWh <sup>4</sup>
1	2017	Site Preparation	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	4	1,280	0.5	80.0	241,600	846
1	2017	Grading	Graders	Graders	1	888	0.5	55.5	167,610	587
			Scrapers	Scrapers	2	1,776	1	222.0	670,440	2,347
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	1,776	0.5	111.0	335,220	1,173
<b>Phase 1, 2017 Subtotal</b>										<b>4,952</b>
2	2018	Site Preparation	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	4	1,376	0.5	86.0	259,720	909
2	2018	Grading	Graders	Graders	1	880	0.5	55.0	166,100	581
			Scrapers	Scrapers	2	1,760	1	220.0	664,400	2,325
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	1,760	0.5	110.0	332,200	1,163
<b>Phase 2, 2018 Subtotal</b>										<b>4,978</b>
3	2020	Site Preparation	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	4	928	0.5	58.0	175,160	613
3	2020	Grading	Graders	Graders	1	528	0.5	33.0	99,660	349
			Scrapers	Scrapers	2	1,056	1	132.0	398,640	1,395
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	1,056	0.5	66.0	199,320	698
<b>Phase 3, 2020 Subtotal</b>										<b>3,055</b>
<b>All Phases, Total</b>										<b>12,985</b>

**Notes**

1. Construction off-road equipment use, hours per day, and days per phase from project specific construction equipment list. Only the equipment types here are assumed to have associated water control.
2. Acres disturbed per 8 hour workday calculated from CalEEMod® Appendix D Table 3.7.
3. Gallons of water usage for dust control is calculated based on a minimum control efficiency of 66% (three times daily) with an application rate of 3,020 gallons/acre/day (AWMA 1992) and average of 26 construction days per month.
4. Calculated based on the CalEEMod® default Alameda County energy intensity of 0.0035 kWh per gallon for supply, distribution, and treatment of water.

**Abbreviation**

CalEEMod®: California Emissions Estimator Model  
kWh: kilowatt-hour

**Reference**

Air & Waste Management Association. 1992. Air Pollution Engineering Manual.

Construction Energy Use- Crushing Scenario

Table A2. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project

Diesel and Gasoline Usage									
Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
1	2017	Worker	LDA	Gas	49.24%	9,535	24.8	26.4	4,410
	2017	Worker	LDA	Diesel	0.47%	9,535	24.8	33.5	33
	2017	Worker	LDT1	Gas	24.93%	9,535	24.8	22.6	2,606
	2017	Worker	LDT1	Diesel	0.04%	9,535	24.8	25.6	4
	2017	Worker	LDT2	Gas	24.97%	9,535	24.8	19.9	2,972
	2017	Worker	LDT2	Diesel	0.03%	9,535	24.8	27.3	2
	2017	Vendor	MHDT	Gas	4.84%	2,156	14.6	6.2	245
	2017	Vendor	MHDT	Diesel	45.16%	2,156	14.6	8.2	1,730
	2017	Vendor	HHDT	Gas	0.31%	2,156	14.6	4.4	22
	2017	Vendor	HHDT	Diesel	49.69%	2,156	14.6	5.6	2,795
	2017	Hauling	HHDT	Gas	0.61%	0	40	4.4	0
	2017	Hauling	HHDT	Diesel	99.39%	0	40	5.6	0
<b>Phase 1, 2017 Subtotal</b>								<b>Gasoline</b>	<b>10,255</b>
								<b>Diesel</b>	<b>4,565</b>

Construction Energy Use- Crushing Scenario

**Table A2. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project**

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
1	2018	Worker	LDA	Gas	49.09%	140,068	24.8	27.1	62,862
	2018	Worker	LDA	Diesel	0.49%	140,068	24.8	34.4	493
	2018	Worker	LDT1	Gas	24.93%	140,068	24.8	23.2	37,348
	2018	Worker	LDT1	Diesel	0.04%	140,068	24.8	26.0	56
	2018	Worker	LDT2	Gas	24.97%	140,068	24.8	20.4	42,449
	2018	Worker	LDT2	Diesel	0.03%	140,068	24.8	27.9	40
	2018	Vendor	MHDT	Gas	4.64%	48,202	14.6	6.3	5,197
	2018	Vendor	MHDT	Diesel	45.36%	48,202	14.6	8.2	38,733
	2018	Vendor	HHDT	Gas	0.30%	48,202	14.6	4.5	475
	2018	Vendor	HHDT	Diesel	49.70%	48,202	14.6	5.7	61,813
	2018	Hauling	HHDT	Gas	0.61%	0	40	4.5	0
	2018	Hauling	HHDT	Diesel	99.39%	0	40	5.7	0
<b>Phase 1, 2018 Subtotal</b>								<b>Gasoline</b>	<b>148,330</b>
								<b>Diesel</b>	<b>101,135</b>

Construction Energy Use- Crushing Scenario

**Table A2. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project**

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
1	2019	Worker	LDA	Gas	48.86%	140,068	24.8	27.9	60,811
	2019	Worker	LDA	Diesel	0.51%	140,068	24.8	35.4	500
	2019	Worker	LDT1	Gas	24.94%	140,068	24.8	23.8	36,410
	2019	Worker	LDT1	Diesel	0.04%	140,068	24.8	26.5	52
	2019	Worker	LDT2	Gas	24.96%	140,068	24.8	21.0	41,230
	2019	Worker	LDT2	Diesel	0.04%	140,068	24.8	28.4	44
	2019	Vendor	MHDT	Gas	4.45%	48,202	14.6	6.3	4,944
	2019	Vendor	MHDT	Diesel	45.55%	48,202	14.6	8.3	38,732
	2019	Vendor	HHDT	Gas	0.30%	48,202	14.6	4.6	460
	2019	Vendor	HHDT	Diesel	49.70%	48,202	14.6	5.7	61,134
	2019	Hauling	HHDT	Gas	0.59%	0	40	4.6	0
	2019	Hauling	HHDT	Diesel	99.41%	0	40	5.7	0
<b>Phase 1, 2019 Subtotal</b>								<b>Gasoline</b>	<b>143,855</b>
								<b>Diesel</b>	<b>100,462</b>

Construction Energy Use- Crushing Scenario

**Table A2. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project**

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
1	2020	Worker	LDA	Gas	48.57%	140,515	24.8	28.7	58,919
	2020	Worker	LDA	Diesel	0.53%	140,515	24.8	36.4	506
	2020	Worker	LDT1	Gas	24.94%	140,515	24.8	24.4	35,552
	2020	Worker	LDT1	Diesel	0.04%	140,515	24.8	27.1	49
	2020	Worker	LDT2	Gas	24.96%	140,515	24.8	21.7	40,142
	2020	Worker	LDT2	Diesel	0.04%	140,515	24.8	29.0	46
	2020	Vendor	MHDT	Gas	4.34%	48,356	14.6	6.4	4,795
	2020	Vendor	MHDT	Diesel	45.66%	48,356	14.6	8.3	38,778
	2020	Vendor	HHDT	Gas	0.29%	48,356	14.6	4.6	452
	2020	Vendor	HHDT	Diesel	49.71%	48,356	14.6	5.8	60,592
	2020	Hauling	HHDT	Gas	0.59%	0	40	4.6	0
	2020	Hauling	HHDT	Diesel	99.41%	0	40	5.8	0
<b>Phase 1, 2020 Subtotal</b>								<b>Gasoline</b>	<b>139,859</b>
								<b>Diesel</b>	<b>99,971</b>

Construction Energy Use- Crushing Scenario

Table A2. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
1	2021	Worker	LDA	Gas	48.22%	79,770	24.8	29.6	32,226
	2021	Worker	LDA	Diesel	0.55%	79,770	24.8	37.5	288
	2021	Worker	LDT1	Gas	24.94%	79,770	24.8	25.2	19,558
	2021	Worker	LDT1	Diesel	0.04%	79,770	24.8	27.8	26
	2021	Worker	LDT2	Gas	24.96%	79,770	24.8	22.4	22,016
	2021	Worker	LDT2	Diesel	0.04%	79,770	24.8	29.8	28
	2021	Vendor	MHDT	Gas	4.24%	24,948	14.6	6.4	2,400
	2021	Vendor	MHDT	Diesel	45.76%	24,948	14.6	8.3	19,971
	2021	Vendor	HHDT	Gas	0.29%	24,948	14.6	4.7	228
	2021	Vendor	HHDT	Diesel	49.71%	24,948	14.6	5.9	30,864
	2021	Hauling	HHDT	Gas	0.58%	0	40	4.7	0
	2021	Hauling	HHDT	Diesel	99.42%	0	40	5.9	0
<b>Phase 1, 2021 Subtotal</b>								<b>Gasoline</b>	<b>76,428</b>
								<b>Diesel</b>	<b>51,176</b>
<b>Phase 1, 2017 to 2021 Subtotal</b>								<b>Gasoline</b>	<b>518,727</b>
								<b>Diesel</b>	<b>357,309</b>

Construction Energy Use- Crushing Scenario

**Table A2. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project**

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
2	2018	Worker	LDA	Gas	49.09%	34,667	24.8	27.1	15,558
	2018	Worker	LDA	Diesel	0.49%	34,667	24.8	34.4	122
	2018	Worker	LDT1	Gas	24.93%	34,667	24.8	23.2	9,244
	2018	Worker	LDT1	Diesel	0.04%	34,667	24.8	26.0	14
	2018	Worker	LDT2	Gas	24.97%	34,667	24.8	20.4	10,506
	2018	Worker	LDT2	Diesel	0.03%	34,667	24.8	27.9	10
	2018	Vendor	MHDT	Gas	4.64%	11,408	14.6	6.3	1,230
	2018	Vendor	MHDT	Diesel	45.36%	11,408	14.6	8.2	9,167
	2018	Vendor	HHDT	Gas	0.30%	11,408	14.6	4.5	112
	2018	Vendor	HHDT	Diesel	49.70%	11,408	14.6	5.7	14,629
	2018	Hauling	HHDT	Gas	0.61%	0	40	4.5	0
	2018	Hauling	HHDT	Diesel	99.39%	0	40	5.7	0
<b>Phase 2, 2018 Subtotal</b>								<b>Gasoline</b>	<b>36,651</b>
								<b>Diesel</b>	<b>23,942</b>



Construction Energy Use- Crushing Scenario

**Table A2. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project**

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
2	2019	Worker	LDA	Gas	48.86%	77,311	24.8	27.9	33,565
	2019	Worker	LDA	Diesel	0.51%	77,311	24.8	35.4	276
	2019	Worker	LDT1	Gas	24.94%	77,311	24.8	23.8	20,097
	2019	Worker	LDT1	Diesel	0.04%	77,311	24.8	26.5	29
	2019	Worker	LDT2	Gas	24.96%	77,311	24.8	21.0	22,757
	2019	Worker	LDT2	Diesel	0.04%	77,311	24.8	28.4	24
	2019	Vendor	MHDT	Gas	4.45%	28,796	14.6	6.3	2,954
	2019	Vendor	MHDT	Diesel	45.55%	28,796	14.6	8.3	23,138
	2019	Vendor	HHDT	Gas	0.30%	28,796	14.6	4.6	275
	2019	Vendor	HHDT	Diesel	49.70%	28,796	14.6	5.7	36,522
	2019	Hauling	HHDT	Gas	0.59%	0	40	4.6	0
	2019	Hauling	HHDT	Diesel	99.41%	0	40	5.7	0
<b>Phase 2, 2019 Subtotal</b>								<b>Gasoline</b>	<b>79,647</b>
								<b>Diesel</b>	<b>59,989</b>

Construction Energy Use- Crushing Scenario

**Table A2. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project**

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
2	2020	Worker	LDA	Gas	48.57%	77,558	24.8	28.7	32,521
	2020	Worker	LDA	Diesel	0.53%	77,558	24.8	36.4	279
	2020	Worker	LDT1	Gas	24.94%	77,558	24.8	24.4	19,623
	2020	Worker	LDT1	Diesel	0.04%	77,558	24.8	27.1	27
	2020	Worker	LDT2	Gas	24.96%	77,558	24.8	21.7	22,156
	2020	Worker	LDT2	Diesel	0.04%	77,558	24.8	29.0	26
	2020	Vendor	MHDT	Gas	4.34%	28,888	14.6	6.4	2,864
	2020	Vendor	MHDT	Diesel	45.66%	28,888	14.6	8.3	23,166
	2020	Vendor	HHDT	Gas	0.29%	28,888	14.6	4.6	270
	2020	Vendor	HHDT	Diesel	49.71%	28,888	14.6	5.8	36,198
	2020	Hauling	HHDT	Gas	0.59%	0	40	4.6	0
	2020	Hauling	HHDT	Diesel	99.41%	0	40	5.8	0
<b>Phase 2, 2020 Subtotal</b>								<b>Gasoline</b>	<b>77,434</b>
								<b>Diesel</b>	<b>59,696</b>

Construction Energy Use- Crushing Scenario

Table A2. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
2	2021	Worker	LDA	Gas	48.22%	77,311	24.8	29.6	31,233
	2021	Worker	LDA	Diesel	0.55%	77,311	24.8	37.5	279
	2021	Worker	LDT1	Gas	24.94%	77,311	24.8	25.2	18,955
	2021	Worker	LDT1	Diesel	0.04%	77,311	24.8	27.8	25
	2021	Worker	LDT2	Gas	24.96%	77,311	24.8	22.4	21,337
	2021	Worker	LDT2	Diesel	0.04%	77,311	24.8	29.8	27
	2021	Vendor	MHDT	Gas	4.24%	28,796	14.6	6.4	2,770
	2021	Vendor	MHDT	Diesel	45.76%	28,796	14.6	8.3	23,051
	2021	Vendor	HHDT	Gas	0.29%	28,796	14.6	4.7	263
	2021	Vendor	HHDT	Diesel	49.71%	28,796	14.6	5.9	35,624
	2021	Hauling	HHDT	Gas	0.58%	0	40	4.7	0
	2021	Hauling	HHDT	Diesel	99.42%	0	40	5.9	0
<b>Phase 2, 2021 Subtotal</b>								<b>Gasoline</b>	<b>74,558</b>
								<b>Diesel</b>	<b>59,006</b>

Construction Energy Use- Crushing Scenario

Table A2. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
2	2022	Worker	LDA	Gas	47.83%	17,784	24.8	30.5	6,912
	2022	Worker	LDA	Diesel	0.56%	17,784	24.8	38.6	64
	2022	Worker	LDT1	Gas	24.94%	17,784	24.8	26.1	4,216
	2022	Worker	LDT1	Diesel	0.04%	17,784	24.8	28.6	5
	2022	Worker	LDT2	Gas	24.96%	17,784	24.8	23.2	4,735
	2022	Worker	LDT2	Diesel	0.04%	17,784	24.8	30.7	6
	2022	Vendor	MHDT	Gas	4.03%	4,968	14.6	6.5	452
	2022	Vendor	MHDT	Diesel	45.97%	4,968	14.6	8.4	3,979
	2022	Vendor	HHDT	Gas	0.29%	4,968	14.6	4.7	45
	2022	Vendor	HHDT	Diesel	49.71%	4,968	14.6	5.9	6,062
	2022	Hauling	HHDT	Gas	0.58%	0	40	4.7	0
	2022	Hauling	HHDT	Diesel	99.42%	0	40	5.9	0
<b>Phase 2, 2022 Subtotal</b>								<b>Gasoline</b>	<b>16,359</b>
								<b>Diesel</b>	<b>10,116</b>
<b>Phase 2, 2018 to 2022 Subtotal</b>								<b>Gasoline</b>	<b>284,650</b>
								<b>Diesel</b>	<b>212,749</b>

Construction Energy Use- Crushing Scenario

**Table A2. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project**

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
3	2020	Worker	LDA	Gas	48.57%	9,554	24.8	28.7	4,006
	2020	Worker	LDA	Diesel	0.53%	9,554	24.8	36.4	34
	2020	Worker	LDT1	Gas	24.94%	9,554	24.8	24.4	2,417
	2020	Worker	LDT1	Diesel	0.04%	9,554	24.8	27.1	3
	2020	Worker	LDT2	Gas	24.96%	9,554	24.8	21.7	2,729
	2020	Worker	LDT2	Diesel	0.04%	9,554	24.8	29.0	3
	2020	Vendor	MHDT	Gas	4.34%	1,913	14.6	6.4	190
	2020	Vendor	MHDT	Diesel	45.66%	1,913	14.6	8.3	1,534
	2020	Vendor	HHDT	Gas	0.29%	1,913	14.6	4.6	18
	2020	Vendor	HHDT	Diesel	49.71%	1,913	14.6	5.8	2,396
	2020	Hauling	HHDT	Gas	0.59%	0	40	4.6	0
	2020	Hauling	HHDT	Diesel	99.41%	0	40	5.8	0
<b>Phase 3, 2020 Subtotal</b>								<b>Gasoline</b>	<b>9,360</b>
								<b>Diesel</b>	<b>3,971</b>

Construction Energy Use- Crushing Scenario

**Table A2. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project**

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
3	2021	Worker	LDA	Gas	48.22%	115,497	24.8	29.6	46,659
	2021	Worker	LDA	Diesel	0.55%	115,497	24.8	37.5	416
	2021	Worker	LDT1	Gas	24.94%	115,497	24.8	25.2	28,318
	2021	Worker	LDT1	Diesel	0.04%	115,497	24.8	27.8	37
	2021	Worker	LDT2	Gas	24.96%	115,497	24.8	22.4	31,876
	2021	Worker	LDT2	Diesel	0.04%	115,497	24.8	29.8	40
	2021	Vendor	MHDT	Gas	4.24%	26,605	14.6	6.4	2,559
	2021	Vendor	MHDT	Diesel	45.76%	26,605	14.6	8.3	21,297
	2021	Vendor	HHDT	Gas	0.29%	26,605	14.6	4.7	243
	2021	Vendor	HHDT	Diesel	49.71%	26,605	14.6	5.9	32,914
	2021	Hauling	HHDT	Gas	0.58%	0	40	4.7	0
	2021	Hauling	HHDT	Diesel	99.42%	0	40	5.9	0
<b>Phase 3, 2021 Subtotal</b>								<b>Gasoline</b>	<b>109,656</b>
								<b>Diesel</b>	<b>54,705</b>

Construction Energy Use- Crushing Scenario

Table A2. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
3	2022	Worker	LDA	Gas	47.83%	53,147	24.8	30.5	20,656
	2022	Worker	LDA	Diesel	0.56%	53,147	24.8	38.6	191
	2022	Worker	LDT1	Gas	24.94%	53,147	24.8	26.1	12,600
	2022	Worker	LDT1	Diesel	0.04%	53,147	24.8	28.6	16
	2022	Worker	LDT2	Gas	24.96%	53,147	24.8	23.2	14,149
	2022	Worker	LDT2	Diesel	0.04%	53,147	24.8	30.7	19
	2022	Vendor	MHDT	Gas	4.03%	12,198	14.6	6.5	1,109
	2022	Vendor	MHDT	Diesel	45.97%	12,198	14.6	8.4	9,769
	2022	Vendor	HHDT	Gas	0.29%	12,198	14.6	4.7	110
	2022	Vendor	HHDT	Diesel	49.71%	12,198	14.6	5.9	14,883
	2022	Hauling	HHDT	Gas	0.58%	0	40	4.7	0
	2022	Hauling	HHDT	Diesel	99.42%	0	40	5.9	0
<b>Phase 3, 2022 Subtotal</b>								<b>Gasoline</b>	<b>48,624</b>
								<b>Diesel</b>	<b>24,878</b>

Construction Energy Use- Crushing Scenario

Table A2. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
3	2023	Worker	LDA	Gas	47.39%	2,075	24.8	31.5	775
	2023	Worker	LDA	Diesel	0.57%	2,075	24.8	39.8	7
	2023	Worker	LDT1	Gas	24.95%	2,075	24.8	27.1	474
	2023	Worker	LDT1	Diesel	0.03%	2,075	24.8	29.5	1
	2023	Worker	LDT2	Gas	24.95%	2,075	24.8	24.1	532
	2023	Worker	LDT2	Diesel	0.05%	2,075	24.8	31.6	1
	2023	Vendor	MHDT	Gas	3.93%	0	14.6	6.5	0
	2023	Vendor	MHDT	Diesel	46.07%	0	14.6	8.5	0
	2023	Vendor	HHDT	Gas	0.30%	0	14.6	4.7	0
	2023	Vendor	HHDT	Diesel	49.70%	0	14.6	6.2	0
	2023	Hauling	HHDT	Gas	0.59%	0	40	4.7	0
	2023	Hauling	HHDT	Diesel	99.41%	0	40	6.2	0
<b>Phase 3, 2023 Subtotal</b>								<b>Gasoline</b>	<b>1,781</b>
								<b>Diesel</b>	<b>9</b>
<b>Phase 3, 2020 to 2023 Subtotal</b>								<b>Gasoline</b>	<b>169,420</b>
								<b>Diesel</b>	<b>83,562</b>



Construction Energy Use- Crushing Scenario

Table A2. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project

Electricity Usage									
Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips		Vehicle Efficiency <sup>3</sup>	Electricity Usage
								(kWh/mile)	(kWh)
1	2017	Worker	LDA	Electric	0.29%	9,535	24.8	0.33	226
	2017	Worker	LDT1	Electric	0.02%	9,535	24.8	0.33	19
<b>Phase 1, 2017 Subtotal</b>									<b>245</b>
1	2018	Worker	LDA	Electric	0.42%	140,068	24.8	0.33	4,834
	2018	Worker	LDT1	Electric	0.02%	140,068	24.8	0.33	279
<b>Phase 1, 2018 Subtotal</b>									<b>5,114</b>
1	2019	Worker	LDA	Electric	0.63%	140,068	24.8	0.33	7,195
	2019	Worker	LDT1	Electric	0.02%	140,068	24.8	0.33	273
<b>Phase 1, 2019 Subtotal</b>									<b>7,468</b>
1	2020	Worker	LDA	Electric	0.90%	140,515	24.8	0.33	10,329
	2020	Worker	LDT1	Electric	0.02%	140,515	24.8	0.33	266
<b>Phase 1, 2020 Subtotal</b>									<b>10,595</b>
1	2021	Worker	LDA	Electric	1.23%	79,770	24.8	0.33	8,011
	2021	Worker	LDT1	Electric	0.02%	79,770	24.8	0.33	144
<b>Phase 1, 2021 Subtotal</b>									<b>8,154</b>
<b>Phase 1, 2017 to 2020 Subtotal</b>									<b>31,576</b>
2	2018	Worker	LDA	Electric	0.42%	34,667	24.8	0.33	1,197
	2018	Worker	LDT1	Electric	0.02%	34,667	24.8	0.33	69
<b>Phase 2, 2018 Subtotal</b>									<b>1,266</b>
2	2019	Worker	LDA	Electric	0.63%	77,311	24.8	0.33	3,971
	2019	Worker	LDT1	Electric	0.02%	77,311	24.8	0.33	150
<b>Phase 2, 2019 Subtotal</b>									<b>4,122</b>
2	2020	Worker	LDA	Electric	0.90%	77,558	24.8	0.33	5,701
	2020	Worker	LDT1	Electric	0.02%	77,558	24.8	0.33	147
<b>Phase 2, 2020 Subtotal</b>									<b>5,848</b>

Construction Energy Use- Crushing Scenario

**Table A2. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project**

2	2021	Worker	LDA	Electric	1.23%	77,311	24.8	0.33	7,764
	2021	Worker	LDT1	Electric	0.02%	77,311	24.8	0.33	139
<b>Phase 2, 2021 Subtotal</b>									<b>7,903</b>
2	2022	Worker	LDA	Electric	1.61%	17,784	24.8	0.33	2,337
	2022	Worker	LDT1	Electric	0.02%	17,784	24.8	0.33	31
<b>Phase 2, 2022 Subtotal</b>									<b>2,368</b>
<b>Phase 2, 2018 to 2022 Subtotal</b>									<b>21,507</b>
3	2020	Worker	LDA	Electric	0.90%	9,554	24.8	0.33	702
	2020	Worker	LDT1	Electric	0.02%	9,554	24.8	0.33	18
<b>Phase 3, 2020 Subtotal</b>									<b>720</b>
3	2021	Worker	LDA	Electric	1.23%	115,497	24.8	0.33	11,598
	2021	Worker	LDT1	Electric	0.02%	115,497	24.8	0.33	208
<b>Phase 3, 2021 Subtotal</b>									<b>11,806</b>
3	2022	Worker	LDA	Electric	1.61%	53,147	24.8	0.33	6,985
	2022	Worker	LDT1	Electric	0.02%	53,147	24.8	0.33	92
<b>Phase 3, 2022 Subtotal</b>									<b>7,077</b>
3	2023	Worker	LDA	Electric	2.04%	2,075	24.8	0.33	345
	2023	Worker	LDT1	Electric	0.02%	2,075	24.8	0.33	3
<b>Phase 3, 2023 Subtotal</b>									<b>7,077</b>
<b>Phase 3, 2020 to 2023 Subtotal</b>									<b>26,681</b>
<b>All Phases, Total</b>									<b>79,763</b>

## Construction Energy Use- Crushing Scenario

**Table A2. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project**

### **Notes**

1. CalEEMod® default vehicle mix of light-duty auto (LDA), light-duty truck type 1 (LDT1), and light-duty truck type 2 (LDT2) for worker trips, mix of medium heavy-duty vehicles (T6) and heavy heavy-duty trucks (T7) for vendor trips, and all heavy heavy-duty trucks (T7) for hauling trips.
2. Based on EMFAC2014 output. See Table A6.
3. Average electric vehicle fuel economy for 2015 models (in kWh per mile) from the 2015 DOE Fuel Economy Guide.

### **Abbreviations**

CalEEMod®: California Emissions Estimator Model

DOE: United States Department of Energy

EMFAC2014: On-Road Vehicle Emission FACTors Model

gal: gallon

kWh: kilowatt-hour

LDA: light-duty auto

LDT1: light-duty truck, type 1

LDT2: light-duty truck, type 2

mpg: miles per gallon

MHDT: medium heavy-duty vehicles

HHDT: heavy heavy-duty trucks

### **Sources:**

DOE. 2016. Fuel Economy Guide, Model Year 2015. Electric Vehicles. Available online at: <http://www.fueleconomy.gov/feg/printGuides.shtml>. Accessed January 2016.

Construction Energy Use- Crushing Scenario

Table A3. Fuel Usage of Off-road Construction Diesel Equipment for Phase 1  
Oak Knoll Mixed Use Community Plan Project

Phase	Phase Name	Project Equipment	Fuel Type	Hp	LF	Quantity	Total Hours	Calendar Year	Hp-Hour <sup>1</sup>	Fuel Usage <sup>2</sup> (gal)	Fuel Usage Subtotals (gal)
1	Demolition	Concrete/Industrial Saws	Diesel	81	1	1	960	2017	56,765	2,899.8	
1	Demolition	Crushing/Proc. Equipment	Diesel	340	1	1	960	2017	254,592	13,005.5	
1	Demolition	Excavators	Diesel	162	0	4	3,840	2017	236,390	12,075.7	
1	Demolition	Generator Sets	Diesel	134	1	1	960	2017	95,194	4,862.8	
1	Demolition	Off-Highway Trucks	Diesel	400	0	1	960	2017	145,920	7,454.1	
1	Demolition	Rubber Tired Dozers	Diesel	255	0	2	1,920	2017	195,840	10,004.2	
1	Demolition	Rubber Tired Loaders	Diesel	199	0	1	960	2017	68,774	3,513.3	
1	Demolition	Skid Steer Loaders	Diesel	64	0	1	960	2017	22,733	1,161.3	
1	Site Preparation	Rubber Tired Dozers	Diesel	255	0	3	960	2017	97,920	5,002.1	
1	Site Preparation	Tractors/Loaders/Backhoes	Diesel	97	0	4	1,280	2017	45,939	2,346.7	
1	Grading	Excavators	Diesel	162	0	2	1,776	2017	109,331	5,585.0	
1	Grading	Graders	Diesel	174	0	1	888	2017	63,350	3,236.1	
1	Grading	Rubber Tired Dozers	Diesel	255	0	1	888	2017	90,576	4,627.0	
1	Grading	Scrapers	Diesel	361	0	2	1,776	2017	307,745	15,720.8	
1	Grading	Tractors/Loaders/Backhoes	Diesel	97	0	2	1,776	2017	63,741	3,256.1	
1	Building Construction	Cranes	Diesel	226	0	1	98	2017	6,423	328.1	
1	Building Construction	Forklifts	Diesel	89	0	3	336	2017	5,981	305.5	
1	Building Construction	Generator Sets	Diesel	84	1	1	112	2017	6,962	355.6	
1	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0	3	294	2017	10,552	539.0	
1	Building Construction	Welders	Diesel	46	0	1	112	2017	2,318	118.4	
<b>Phase 1, 2017 Subtotal</b>											<b>96,397</b>
1	Building Construction	Cranes	Diesel	226	0	1	2,191	2018	143,598	7,336	
1	Building Construction	Forklifts	Diesel	89	0	3	7,512	2018	133,714	6,831	
1	Building Construction	Generator Sets	Diesel	84	1	1	2,504	2018	155,649	7,951	
1	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0	3	6,573	2018	235,905	12,051	
1	Building Construction	Welders	Diesel	46	0	1	2,504	2018	51,833	2,648	
<b>Phase 1, 2018 Subtotal</b>											<b>36,816</b>
1	Building Construction	Cranes	Diesel	226	0	1	2,191	2019	143,598	7,336	
1	Building Construction	Forklifts	Diesel	89	0	3	7,512	2019	133,714	6,831	
1	Building Construction	Generator Sets	Diesel	84	1	1	2,504	2019	155,649	7,951	
1	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0	3	6,573	2019	235,905	12,051	
1	Building Construction	Welders	Diesel	46	0	1	2,504	2019	51,833	2,648	
<b>Phase 1, 2019 Subtotal</b>											<b>36,816</b>
1	Building Construction	Cranes	Diesel	226	0	1	2,198	2020	144,057	7,359	
1	Building Construction	Forklifts	Diesel	89	0	3	7,536	2020	134,141	6,852	
1	Building Construction	Generator Sets	Diesel	84	1	1	2,512	2020	156,146	7,977	
1	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0	3	6,594	2020	236,659	12,089	

**Construction Energy Use- Crushing Scenario**

**Table A3. Fuel Usage of Off-road Construction Diesel Equipment for Phase 1  
Oak Knoll Mixed Use Community Plan Project**

Phase	Phase Name	Project Equipment	Fuel Type	Hp	LF	Quantity	Total Hours	Calendar Year	Hp-Hour <sup>1</sup>	Fuel Usage <sup>2</sup> (gal)	Fuel Usage Subtotals (gal)
1	Building Construction	Welders	Diesel	46	0	1	2,512	2020	51,998	2,656	
<b>Phase 1, 2020 Subtotal</b>											<b>36,934</b>
1	Building Construction	Cranes	Diesel	226	0	1	1,134	2021	74,322	3,797	
1	Building Construction	Forklifts	Diesel	89	0	3	3,888	2021	69,206	3,535	
1	Building Construction	Generator Sets	Diesel	84	1	1	1,296	2021	80,559	4,115	
1	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0	3	3,402	2021	122,098	6,237	
1	Building Construction	Welders	Diesel	46	0	1	1,296	2021	26,827	1,370	
1	Paving	Pavers	Diesel	125	0	2	1,200	2021	63,000	3,218	
1	Paving	Paving Equipment	Diesel	130	0	2	1,200	2021	56,160	2,869	
1	Paving	Rollers	Diesel	80	0	2	1,200	2021	36,480	1,864	
1	Architectural Coating	Air Compressors	Diesel	78	0	1	450	2021	16,848	861	
<b>Phase 1, 2021 Subtotal</b>											
<b>Phase 1 Total</b>											<b>234,829</b>

**Notes**

1. HP-Hour is the basis for the fuel calculation. HP-Hour is calculated using the following formula:  

$$\text{HP-Hour} = \text{Total Hours} \times \text{LF} \times \text{HP}$$
2. Off-road mobile source fuel usage is calculated using a fuel usage rate of 0.05 gallons of diesel per horsepower (HP)-hour, based the heating value of diesel (AP-42).

**Abbreviations**

- Gal: gallon
- HP: horsepower
- LF: load factor

**Sources**

USEPA. 1996. AP-42 Emission Factors. Chapter 3.4 Large Stationary Diesel And All Stationary Dual-fuel Engines, <https://www3.epa.gov/ttn/chief/ap42/ch03/final/c03s04.pdf>.

Construction Energy Use- Crushing Scenario

Table A4. Fuel Usage of Off-road Construction Diesel Equipment for Phase 2  
Oak Knoll Mixed Use Community Plan Project

Phase	Phase Name	Project Equipment	Fuel Type	Hp	LF	Quantity	Total Hours	Calendar Year	Hp-Hour <sup>1</sup>	Fuel Usage <sup>2</sup> (gal)	Fuel Usage Subtotals (gal)
2	Demolition	Concrete/Industrial Saws	Diesel	81	1	1	568	2018	33,586	1,715.7	
2	Demolition	Excavators	Diesel	162	0	3	1,704	2018	104,898	5,358.6	
2	Demolition	Rubber Tired Dozers	Diesel	255	0	2	1,136	2018	115,872	5,919.2	
2	Site Preparation	Rubber Tired Dozers	Diesel	255	0	3	1,032	2018	105,264	5,377.3	
2	Site Preparation	Tractors/Loaders/Backhoes	Diesel	97	0	4	1,376	2018	49,385	2,522.8	
2	Grading	Excavators	Diesel	162	0	2	1,760	2018	108,346	5,534.7	
2	Grading	Graders	Diesel	174	0	1	880	2018	62,779	3,207.0	
2	Grading	Rubber Tired Dozers	Diesel	255	0	1	880	2018	89,760	4,585.3	
2	Grading	Scrapers	Diesel	361	0	2	1,760	2018	304,973	15,579.1	
2	Grading	Tractors/Loaders/Backhoes	Diesel	97	0	2	1,760	2018	63,166	3,226.8	
2	Building Construction	Cranes	Diesel	226	0	1	434	2018	28,444	1,453.0	
2	Building Construction	Forklifts	Diesel	89	0	3	1,488	2018	26,486	1,353.0	
2	Building Construction	Generator Sets	Diesel	84	1	1	496	2018	30,831	1,575.0	
2	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0	3	1,302	2018	46,729	2,387.1	
2	Building Construction	Welders	Diesel	46	0	1	496	2018	10,267	524.5	
<b>Phase 2, 2018 Subtotal</b>											<b>60,319</b>
2	Building Construction	Cranes	Diesel	226	0	1	2,191	2019	143,598	7,336	
2	Building Construction	Forklifts	Diesel	89	0	3	7,512	2019	133,714	6,831	
2	Building Construction	Generator Sets	Diesel	84	1	1	2,504	2019	155,649	7,951	
2	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0	3	6,573	2019	235,905	12,051	
2	Building Construction	Welders	Diesel	46	0	1	2,504	2019	51,833	2,648	
<b>Phase 2, 2019 Subtotal</b>											<b>36,816</b>
2	Building Construction	Cranes	Diesel	226	0	1	2,198	2020	144,057	7,359	
2	Building Construction	Forklifts	Diesel	89	0	3	7,536	2020	134,141	6,852	
2	Building Construction	Generator Sets	Diesel	84	1	1	2,512	2020	156,146	7,977	
2	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0	3	6,594	2020	236,659	12,089	
2	Building Construction	Welders	Diesel	46	0	1	2,512	2020	51,998	2,656	
<b>Phase 2, 2020 Subtotal</b>											<b>36,934</b>
2	Building Construction	Cranes	Diesel	226	0	1	2,191	2021	143,598	7,336	
2	Building Construction	Forklifts	Diesel	89	0	3	7,512	2021	133,714	6,831	

**Construction Energy Use- Crushing Scenario**

**Table A4. Fuel Usage of Off-road Construction Diesel Equipment for Phase 2  
Oak Knoll Mixed Use Community Plan Project**

Phase	Phase Name	Project Equipment	Fuel Type	Hp	LF	Quantity	Total Hours	Calendar Year	Hp-Hour <sup>1</sup>	Fuel Usage <sup>2</sup> (gal)	Fuel Usage Subtotals (gal)
2	Building Construction	Generator Sets	Diesel	84	1	1	2,504	2021	155,649	7,951	
2	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0	3	6,573	2021	235,905	12,051	
2	Building Construction	Welders	Diesel	46	0	1	2,504	2021	51,833	2,648	
<b>Phase 2, 2021 Subtotal</b>											<b>36,816</b>
2	Building Construction	Cranes	Diesel	226	0	1	378	2022	24,774	1,266	
2	Building Construction	Forklifts	Diesel	89	0	3	1,296	2022	23,069	1,178	
2	Building Construction	Generator Sets	Diesel	84	1	1	432	2022	26,853	1,372	
2	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0	3	1,134	2022	40,699	2,079	
2	Building Construction	Welders	Diesel	46	0	1	432	2022	8,942	457	
2	Paving	Pavers	Diesel	125	0	2	1,248	2022	65,520	3,347	
2	Paving	Paving Equipment	Diesel	130	0	2	1,248	2022	58,406	2,984	
2	Paving	Rollers	Diesel	80	0	2	1,248	2022	37,939	1,938	
2	Architectural Coating	Air Compressors	Diesel	78	0	1	468	2022	17,522	895	
<b>Phase 2, 2022 Subtotal</b>											
<b>Phase 2 Total</b>											<b>186,400</b>

**Notes**

1. HP-Hour is the basis for the fuel calculation. HP-Hour is calculated using the following formula:  

$$\text{HP-Hour} = \text{Total Hours} \times \text{LF} \times \text{HP}$$
2. Off-road mobile source fuel usage is calculated using a fuel usage rate of 0.05 gallons of diesel per horsepower (HP)-hour, based the heating value of diesel (AP-42).

**Abbreviations**

Gal: gallon  
 HP: horsepower  
 LF: load factor

**Sources**

USEPA. 1996. AP-42 Emission Factors. Chapter 3.4 Large Stationary Diesel And All Stationary Dual-fuel Engines, <https://www3.epa.gov/ttn/chief/ap42/ch03/final/c03s04.pdf>.

Construction Energy Use- Crushing Scenario

Table A5. Fuel Usage of Off-road Construction Diesel Equipment for Phase 3  
Oak Knoll Mixed Use Community Plan Project

Phase	Phase Name	Project Equipment	Fuel Type	Hp	LF	Quantity	Total Hours	Calendar Year	Hp-Hour <sup>1</sup>	Fuel Usage <sup>2</sup> (gal)	Fuel Usage Subtotals (gal)
1	Demolition	Concrete/Industrial Saws	Diesel	81	1	1	352	2020	20,814	1,063.2	
1	Demolition	Excavators	Diesel	162	0	3	1,056	2020	65,007	3,320.8	
1	Demolition	Rubber Tired Dozers	Diesel	255	0	2	704	2020	71,808	3,668.2	
1	Site Preparation	Rubber Tired Dozers	Diesel	255	0	3	696	2020	70,992	3,626.5	
1	Site Preparation	Tractors/Loaders/Backhoes	Diesel	97	0	4	928	2020	33,306	1,701.4	
1	Grading	Excavators	Diesel	162	0	2	1,056	2020	65,007	3,320.8	
1	Grading	Graders	Diesel	174	0	1	528	2020	37,668	1,924.2	
1	Grading	Rubber Tired Dozers	Diesel	255	0	1	528	2020	53,856	2,751.2	
1	Grading	Scrapers	Diesel	361	0	2	1,056	2020	182,984	9,347.5	
1	Grading	Tractors/Loaders/Backhoes	Diesel	97	0	2	1,056	2020	37,900	1,936.1	
1	Building Construction	Cranes	Diesel	226	0	1	315	2020	20,645	1,054.6	
1	Building Construction	Forklifts	Diesel	89	0	3	1,080	2020	19,224	982.0	
1	Building Construction	Generator Sets	Diesel	84	1	1	360	2020	22,378	1,143.1	
1	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0	3	945	2020	33,916	1,732.6	
1	Building Construction	Welders	Diesel	46	0	1	360	2020	7,452	380.7	
<b>Phase 3, 2020 Subtotal</b>											<b>37,953</b>
1	Building Construction	Cranes	Diesel	226	0	1	2,191	2021	143,598	7,336	
1	Building Construction	Forklifts	Diesel	89	0	3	7,512	2021	133,714	6,831	
1	Building Construction	Generator Sets	Diesel	84	1	1	2,504	2021	155,649	7,951	
1	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0	3	6,573	2021	235,905	12,051	
1	Building Construction	Welders	Diesel	46	0	1	2,504	2021	51,833	2,648	
<b>Phase 3, 2021 Subtotal</b>											<b>36,816</b>



**Construction Energy Use- Crushing Scenario**

**Table A5. Fuel Usage of Off-road Construction Diesel Equipment for Phase 3  
Oak Knoll Mixed Use Community Plan Project**

Phase	Phase Name	Project Equipment	Fuel Type	Hp	LF	Quantity	Total Hours	Calendar Year	Hp-Hour <sup>1</sup>	Fuel Usage <sup>2</sup> (gal)	Fuel Usage Subtotals (gal)
1	Building Construction	Cranes	Diesel	226	0	1	2,009	2022	131,670	6,726	
1	Building Construction	Forklifts	Diesel	89	0	3	6,888	2022	122,606	6,263	
1	Building Construction	Generator Sets	Diesel	84	1	1	2,296	2022	142,719	7,291	
1	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0	3	6,027	2022	216,309	11,050	
1	Building Construction	Welders	Diesel	46	0	1	2,296	2022	47,527	2,428	
1	Paving	Pavers	Diesel	125	0	2	416	2022	21,840	1,116	
1	Paving	Paving Equipment	Diesel	130	0	2	416	2022	19,469	995	
1	Paving	Rollers	Diesel	80	0	2	416	2022	12,646	646	
<b>Phase 3, 2022 Subtotal</b>											<b>36,514</b>
1	Paving	Pavers	Diesel	125	0	2	400	2023	21,000	1,073	
1	Paving	Paving Equipment	Diesel	130	0	2	400	2023	18,720	956	
1	Paving	Rollers	Diesel	80	0	2	400	2023	12,160	621	
1	Architectural Coating	Air Compressors	Diesel	78	0	1	306	2023	11,457	585	
<b>Phase 3, 2023 Subtotal</b>											<b>3,235</b>
<b>Phase 3 Total</b>											<b>114,518</b>

**Notes**

1. HP-Hour is the basis for the fuel calculation. HP-Hour is calculated using the following formula:  

$$\text{HP-Hour} = \text{Total Hours} \times \text{LF} \times \text{HP}$$
2. Off-road mobile source fuel usage is calculated using a fuel usage rate of 0.05 gallons of diesel per horsepower (HP)-hour, based the heating value of diesel (AP-42).

**Abbreviations**

Gal: gallon  
 HP: horsepower  
 LF: load factor

**Sources**

USEPA. 1996. AP-42 Emission Factors. Chapter 3.4 Large Stationary Diesel And All Stationary Dual-fuel Engines, <https://www3.epa.gov/ttn/chief/ap42/ch03/final/c03s04.pdf>.

**Construction Energy Use- Crushing Scenario**

**Table A6. Vehicle Fuel Efficiency Calculation based on EMFAC2014 output**

**Oak Knoll Mixed Use Community Plan Project**

EMFAC2014 (v1.0.7) Emissions Inventory

Region Type: County

Region: Alameda

Calendar Year: 2017, 2018, 2019, 2020, 2021, 2022, 2023

Season: Annual

Vehicle Classification: EMFAC2007 Categories

Calendar Year	Vehicle Class	Fuel	Population	VMT	Fuel Consumption	Miles/Gallon
2017	HHDT	GAS	72	9,857	2.22	4.44
2017	HHDT	DSL	11,634	1,645,107	293.98	5.60
2017	LDA	GAS	605,757	22,270,741	843.52	26.40
2017	LDA	DSL	5,726	222,225	6.64	33.48
2017	LDA	ELEC	3,571	192,153	0.00	0.00
2017	LDT1	GAS	52,877	1,821,824	80.52	22.62
2017	LDT1	DSL	92	1,897	0.07	25.61
2017	LDT1	ELEC	53	1,798	0.00	0.00
2017	LDT2	GAS	197,525	7,837,407	394.50	19.87
2017	LDT2	DSL	228	11,475	0.42	27.29
2017	LHDT1	GAS	14,258	471,666	49.34	9.56
2017	LHDT1	DSL	8,993	341,755	20.11	16.99
2017	LHDT2	GAS	2,176	82,889	9.63	8.60
2017	LHDT2	DSL	3,104	132,488	8.71	15.20
2017	MCY	GAS	28,175	230,288	6.32	36.46
2017	MDV	GAS	130,997	4,595,337	304.23	15.10
2017	MDV	DSL	1,444	66,990	3.23	20.75
2017	MH	GAS	3,150	27,474	4.24	6.48
2017	MH	DSL	666	6,457	0.68	9.53
2017	MHDT	GAS	1,549	80,677	12.95	6.23
2017	MHDT	DSL	14,453	791,591	96.34	8.22
2017	OBUS	GAS	623	38,133	5.94	6.42
2017	OBUS	DSL	544	43,878	6.21	7.07

**Construction Energy Use- Crushing Scenario**

**Table A6. Vehicle Fuel Efficiency Calculation based on EMFAC2014 output**

**Oak Knoll Mixed Use Community Plan Project**

EMFAC2014 (v1.0.7) Emissions Inventory

Region Type: County

Region: Alameda

Calendar Year: 2017, 2018, 2019, 2020, 2021, 2022, 2023

Season: Annual

Vehicle Classification: EMFAC2007 Categories

Calendar Year	Vehicle Class	Fuel	Population	VMT	Fuel Consumption	Miles/Gallon
2017	SBUS	GAS	100	5,293	0.46	11.56
2017	SBUS	DSL	166	6,333	0.88	7.16
2017	UBUS	GAS	132	20,804	4.26	4.88
2017	UBUS	DSL	745	117,280	28.71	4.08
2018	HHDT	GAS	72	10,110	2.25	4.50
2018	HHDT	DSL	11,774	1,686,553	298.08	5.66
2018	LDA	GAS	603,765	22,412,837	826.24	27.13
2018	LDA	DSL	6,002	233,260	6.78	34.41
2018	LDA	ELEC	5,203	284,432	0.00	0.00
2018	LDT1	GAS	50,961	1,780,690	76.79	23.19
2018	LDT1	DSL	85	1,771	0.07	26.04
2018	LDT1	ELEC	50	1,678	0.00	0.00
2018	LDT2	GAS	197,229	7,892,076	386.27	20.43
2018	LDT2	DSL	255	12,516	0.45	27.86
2018	LHDT1	GAS	13,565	441,905	46.11	9.58
2018	LHDT1	DSL	9,014	341,528	19.90	17.16
2018	LHDT2	GAS	2,114	80,764	9.32	8.66
2018	LHDT2	DSL	3,176	135,969	8.82	15.41
2018	MCY	GAS	28,404	231,519	6.34	36.52
2018	MDV	GAS	130,398	4,579,852	296.65	15.44
2018	MDV	DSL	1,622	73,893	3.48	21.23
2018	MH	GAS	3,023	26,671	4.09	6.53
2018	MH	DSL	668	6,474	0.68	9.57

**Construction Energy Use- Crushing Scenario**

**Table A6. Vehicle Fuel Efficiency Calculation based on EMFAC2014 output**

**Oak Knoll Mixed Use Community Plan Project**

EMFAC2014 (v1.0.7) Emissions Inventory

Region Type: County

Region: Alameda

Calendar Year: 2017, 2018, 2019, 2020, 2021, 2022, 2023

Season: Annual

Vehicle Classification: EMFAC2007 Categories

Calendar Year	Vehicle Class	Fuel	Population	VMT	Fuel Consumption	Miles/Gallon
2018	MHDT	GAS	1,530	80,620	12.82	6.29
2018	MHDT	DSL	14,949	815,783	98.99	8.24
2018	OBUS	GAS	637	38,998	6.02	6.47
2018	OBUS	DSL	560	45,224	6.37	7.10
2018	SBUS	GAS	108	5,712	0.49	11.66
2018	SBUS	DSL	165	6,345	0.88	7.18
2018	UBUS	GAS	138	21,698	4.40	4.93
2018	UBUS	DSL	678	106,608	25.83	4.13
2019	HHDT	GAS	72	10,324	2.27	4.55
2019	HHDT	DSL	12,070	1,737,477	303.67	5.72
2019	LDA	GAS	601,832	22,503,731	806.28	27.91
2019	LDA	DSL	6,274	243,646	6.88	35.40
2019	LDA	ELEC	7,754	428,151	0.00	0.00
2019	LDT1	GAS	49,332	1,744,761	73.34	23.79
2019	LDT1	DSL	79	1,658	0.06	26.54
2019	LDT1	ELEC	47	1,563	0.00	0.00
2019	LDT2	GAS	196,879	7,937,565	377.39	21.03
2019	LDT2	DSL	281	13,494	0.47	28.43
2019	LHDT1	GAS	12,928	415,199	43.20	9.61
2019	LHDT1	DSL	9,033	341,018	19.68	17.33
2019	LHDT2	GAS	2,056	78,816	9.04	8.72
2019	LHDT2	DSL	3,249	139,202	8.91	15.62
2019	MCY	GAS	28,620	232,658	6.36	36.57

**Construction Energy Use- Crushing Scenario**

**Table A6. Vehicle Fuel Efficiency Calculation based on EMFAC2014 output**

**Oak Knoll Mixed Use Community Plan Project**

EMFAC2014 (v1.0.7) Emissions Inventory

Region Type: County

Region: Alameda

Calendar Year: 2017, 2018, 2019, 2020, 2021, 2022, 2023

Season: Annual

Vehicle Classification: EMFAC2007 Categories

Calendar Year	Vehicle Class	Fuel	Population	VMT	Fuel Consumption	Miles/Gallon
2019	MDV	GAS	129,784	4,563,218	288.82	15.80
2019	MDV	DSL	1,796	80,292	3.70	21.71
2019	MH	GAS	2,918	25,990	3.96	6.57
2019	MH	DSL	669	6,477	0.67	9.61
2019	MHDT	GAS	1,516	80,749	12.74	6.34
2019	MHDT	DSL	15,502	843,616	101.94	8.28
2019	OBUS	GAS	651	39,754	6.10	6.52
2019	OBUS	DSL	588	46,819	6.56	7.13
2019	SBUS	GAS	116	6,131	0.52	11.74
2019	SBUS	DSL	166	6,357	0.88	7.20
2019	UBUS	GAS	145	22,680	4.57	4.96
2019	UBUS	DSL	638	100,120	24.16	4.14
2020	HHDT	GAS	73	10,550	2.29	4.61
2020	HHDT	DSL	12,325	1,784,246	308.08	5.79
2020	LDA	GAS	600,760	22,545,631	784.82	28.73
2020	LDA	DSL	6,536	252,877	6.94	36.41
2020	LDA	ELEC	11,143	611,430	0.00	0.00
2020	LDT1	GAS	47,974	1,714,286	70.13	24.44
2020	LDT1	DSL	74	1,560	0.06	27.10
2020	LDT1	ELEC	45	1,457	0.00	0.00
2020	LDT2	GAS	197,153	7,986,410	368.56	21.67
2020	LDT2	DSL	306	14,350	0.49	29.03
2020	LHDT1	GAS	12,295	389,659	40.42	9.64

**Construction Energy Use- Crushing Scenario**

**Table A6. Vehicle Fuel Efficiency Calculation based on EMFAC2014 output**

**Oak Knoll Mixed Use Community Plan Project**

EMFAC2014 (v1.0.7) Emissions Inventory

Region Type: County

Region: Alameda

Calendar Year: 2017, 2018, 2019, 2020, 2021, 2022, 2023

Season: Annual

Vehicle Classification: EMFAC2007 Categories

Calendar Year	Vehicle Class	Fuel	Population	VMT	Fuel Consumption	Miles/Gallon
2020	LHDT1	DSL	9,047	340,124	19.45	17.48
2020	LHDT2	GAS	2,006	77,078	8.78	8.78
2020	LHDT2	DSL	3,324	142,184	9.00	15.80
2020	MCY	GAS	28,818	233,551	6.38	36.62
2020	MDV	GAS	129,267	4,546,334	280.79	16.19
2020	MDV	DSL	1,965	86,110	3.88	22.19
2020	MH	GAS	2,825	25,368	3.84	6.61
2020	MH	DSL	669	6,467	0.67	9.64
2020	MHDT	GAS	1,507	80,910	12.67	6.39
2020	MHDT	DSL	15,863	869,331	104.57	8.31
2020	OBUS	GAS	665	40,487	6.17	6.56
2020	OBUS	DSL	616	48,337	6.74	7.17
2020	SBUS	GAS	125	6,549	0.55	11.82
2020	SBUS	DSL	167	6,368	0.88	7.22
2020	UBUS	GAS	152	23,669	4.74	4.99
2020	UBUS	DSL	601	93,987	22.59	4.16
2021	HHDT	GAS	75	10,737	2.31	4.65
2021	HHDT	DSL	12,735	1,850,340	315.41	5.87
2021	LDA	GAS	600,220	22,547,931	761.65	29.60
2021	LDA	DSL	6,784	261,043	6.96	37.49
2021	LDA	ELEC	15,318	827,648	0.00	0.00
2021	LDT1	GAS	46,900	1,689,915	66.99	25.23
2021	LDT1	DSL	68	1,466	0.05	27.83

**Construction Energy Use- Crushing Scenario**

**Table A6. Vehicle Fuel Efficiency Calculation based on EMFAC2014 output**

**Oak Knoll Mixed Use Community Plan Project**

EMFAC2014 (v1.0.7) Emissions Inventory

Region Type: County

Region: Alameda

Calendar Year: 2017, 2018, 2019, 2020, 2021, 2022, 2023

Season: Annual

Vehicle Classification: EMFAC2007 Categories

Calendar Year	Vehicle Class	Fuel	Population	VMT	Fuel Consumption	Miles/Gallon
2021	LDT1	ELEC	42	1,354	0.00	0.00
2021	LDT2	GAS	197,913	8,036,848	358.35	22.43
2021	LDT2	DSL	330	15,128	0.51	29.81
2021	LHDT1	GAS	11,679	365,819	37.82	9.67
2021	LHDT1	DSL	9,057	338,955	19.22	17.63
2021	LHDT2	GAS	1,957	75,428	8.53	8.84
2021	LHDT2	DSL	3,397	144,844	9.07	15.97
2021	MCY	GAS	29,062	234,292	6.39	36.65
2021	MDV	GAS	128,769	4,528,775	271.70	16.67
2021	MDV	DSL	2,127	91,368	4.01	22.80
2021	MH	GAS	2,738	24,782	3.73	6.65
2021	MH	DSL	668	6,449	0.67	9.68
2021	MHDT	GAS	1,501	81,119	12.61	6.43
2021	MHDT	DSL	16,211	905,339	108.47	8.35
2021	OBUS	GAS	678	41,180	6.24	6.60
2021	OBUS	DSL	633	49,740	6.89	7.22
2021	SBUS	GAS	134	6,989	0.59	11.88
2021	SBUS	DSL	168	6,379	0.88	7.24
2021	UBUS	GAS	158	24,569	4.89	5.02
2021	UBUS	DSL	566	88,234	21.10	4.18
2022	HHDT	GAS	76	10,894	2.32	4.70
2022	HHDT	DSL	13,073	1,909,952	321.10	5.95
2022	LDA	GAS	600,277	22,479,924	736.57	30.52

**Construction Energy Use- Crushing Scenario**

**Table A6. Vehicle Fuel Efficiency Calculation based on EMFAC2014 output**

**Oak Knoll Mixed Use Community Plan Project**

EMFAC2014 (v1.0.7) Emissions Inventory

Region Type: County

Region: Alameda

Calendar Year: 2017, 2018, 2019, 2020, 2021, 2022, 2023

Season: Annual

Vehicle Classification: EMFAC2007 Categories

Calendar Year	Vehicle Class	Fuel	Population	VMT	Fuel Consumption	Miles/Gallon
2022	LDA	DSL	7,012	267,576	6.93	38.61
2022	LDA	ELEC	20,215	1,066,289	0.00	0.00
2022	LDT1	GAS	46,020	1,666,809	63.88	26.09
2022	LDT1	DSL	65	1,396	0.05	28.60
2022	LDT1	ELEC	39	1,265	0.00	0.00
2022	LDT2	GAS	199,166	8,074,643	347.34	23.25
2022	LDT2	DSL	351	15,755	0.51	30.67
2022	LHDT1	GAS	11,083	343,499	35.39	9.71
2022	LHDT1	DSL	9,060	337,417	18.98	17.78
2022	LHDT2	GAS	1,914	73,932	8.31	8.89
2022	LHDT2	DSL	3,468	147,142	9.13	16.12
2022	MCY	GAS	29,285	234,733	6.40	36.68
2022	MDV	GAS	128,328	4,504,118	261.89	17.20
2022	MDV	DSL	2,282	95,879	4.09	23.46
2022	MH	GAS	2,656	24,224	3.62	6.69
2022	MH	DSL	667	6,426	0.66	9.71
2022	MHDT	GAS	1,499	81,381	12.57	6.47
2022	MHDT	DSL	17,094	937,710	111.90	8.38
2022	OBUS	GAS	693	41,829	6.30	6.64
2022	OBUS	DSL	656	50,965	7.02	7.26
2022	SBUS	GAS	143	7,445	0.62	11.93
2022	SBUS	DSL	168	6,391	0.88	7.26
2022	UBUS	GAS	165	25,457	5.04	5.05



**Construction Energy Use- Crushing Scenario**

**Table A6. Vehicle Fuel Efficiency Calculation based on EMFAC2014 output**

**Oak Knoll Mixed Use Community Plan Project**

EMFAC2014 (v1.0.7) Emissions Inventory

Region Type: County

Region: Alameda

Calendar Year: 2017, 2018, 2019, 2020, 2021, 2022, 2023

Season: Annual

Vehicle Classification: EMFAC2007 Categories

Calendar Year	Vehicle Class	Fuel	Population	VMT	Fuel Consumption	Miles/Gallon
2022	UBUS	DSL	538	83,382	19.87	4.20
2023	HHDT	GAS	78	11,027	2.32	4.74
2023	HHDT	DSL	13,004	1,967,285	317.50	6.20
2023	LDA	GAS	600,853	22,415,158	712.11	31.48
2023	LDA	DSL	7,215	273,441	6.87	39.78
2023	LDA	ELEC	25,828	1,330,053	0.00	0.00
2023	LDT1	GAS	45,326	1,649,692	60.98	27.05
2023	LDT1	DSL	60	1,327	0.04	29.53
2023	LDT1	ELEC	37	1,184	0.00	0.00
2023	LDT2	GAS	200,852	8,125,489	336.58	24.14
2023	LDT2	DSL	371	16,322	0.52	31.62
2023	LHDT1	GAS	10,508	322,700	33.13	9.74
2023	LHDT1	DSL	9,066	335,772	18.74	17.92
2023	LHDT2	GAS	1,876	72,567	8.11	8.95
2023	LHDT2	DSL	3,535	149,051	9.17	16.26
2023	MCY	GAS	29,463	234,954	6.40	36.71
2023	MDV	GAS	128,071	4,486,717	252.33	17.78
2023	MDV	DSL	2,429	100,041	4.14	24.18
2023	MH	GAS	2,587	23,735	3.53	6.72
2023	MH	DSL	667	6,396	0.66	9.74
2023	MHDT	GAS	1,499	81,649	12.54	6.51
2023	MHDT	DSL	17,562	968,969	114.52	8.46
2023	OBUS	GAS	705	42,383	6.36	6.67

**Construction Energy Use- Crushing Scenario**

**Table A6. Vehicle Fuel Efficiency Calculation based on EMFAC2014 output**

**Oak Knoll Mixed Use Community Plan Project**

EMFAC2014 (v1.0.7) Emissions Inventory

Region Type: County

Region: Alameda

Calendar Year: 2017, 2018, 2019, 2020, 2021, 2022, 2023

Season: Annual

Vehicle Classification: EMFAC2007 Categories

Calendar Year	Vehicle Class	Fuel	Population	VMT	Fuel Consumption	Miles/Gallon
2023	OBUS	DSL	648	52,143	7.06	7.39
2023	SBUS	GAS	153	7,895	0.66	11.97
2023	SBUS	DSL	169	6,403	0.88	7.27
2023	UBUS	GAS	171	26,287	5.19	5.07
2023	UBUS	DSL	511	78,805	18.71	4.21

**Notes**

1. CalEEMod® default vehicle mix of light-duty auto (LDA), light-duty truck type 1 (LDT1), and light-duty truck type 2 (LDT2) for worker trips, mix of medium heavy-duty vehicles (T6) and heavy heavy-duty trucks (T7) for vendor trips, and all heavy heavy-duty trucks (T7) for hauling trips.
2. EMFAC2014 annual output for Alameda County aggregated vehicle model years and speeds.

**Abbreviations**

CalEEMod®: California Emissions Estimator Model

EMFAC2014: On-Road Vehicle Emission FACTors Model

LDA: light-duty auto

LDT1: light-duty truck, type 1

LDT2: light-duty truck, type 2

T6: medium heavy-duty vehicles

T7: heavy heavy-duty trucks

VMT: vehicle miles traveled

**Table EC-2**  
**Construction Energy Resources Use**  
**Oak Knoll Mixed Use Community Plan Project**  
**Oakland, California**

Source		Project Construction Usage
<b>Electricity</b>		
Project Water Consumption <sup>1</sup>	kWh	12,985
Project On-Road Construction Trips <sup>2</sup>	kWh	79,735
<b>Project Electricity Total</b>	<b>kWh</b>	<b>92,720</b>
<b>Diesel</b>		
Project On-Road Construction Trips <sup>2</sup>	gallons	683,390
Project Off-Road Construction Equipment <sup>3</sup>	gallons	497,241
<b>Project Diesel Total</b>	<b>gallons</b>	<b>1,180,631</b>
<b>Gasoline</b>		
Project On-Road Construction Trips <sup>2</sup>	gallons	971,849
<b>Project Gasoline Total</b>	<b>gallons</b>	<b>971,849</b>

**Notes:**

1. Construction water use estimated based on acres disturbed per day per construction phase, construction days per phase, and estimated water use per acre (AWMA 1992).
2. On-road mobile source fuel use based on trip rates and trip lengths as stated in the Air Quality assessment of construction and fleet-average fuel consumption in gallons per mile from EMFAC2014 for CY 2017 through 2023 in Alameda County. Electricity demand calculated average electric vehicle fuel economy for 2015 models (in kWh per mile) from the DOE Fuel Economy Guide.
3. Off-road mobile source fuel usage based on a fuel usage rate of 0.05 gallons of diesel per horsepower (hp)-hour, consistent with diesel conversion factors given in USEPA AP-42 Table 3.4.1.

**Abbreviations:**

AWMA: Air & Waste Management Association  
 CalEEMod®: California Emissions Estimator Model  
 CY: calendar year  
 DOE: United States Department of Energy  
 EMFAC2014: California Air Resources Board Emission FACTor model.  
 hp: horsepower  
 kWh: kilowatt-hour  
 USEPA: United States Environmental Protection Agency  
 VMT: vehicle miles traveled

**References:**

AWMA. 1992. Air Pollution Engineering Manual.  
 DOE. 2016. Fuel Economy Guide, Model Year 2015. Electric Vehicles. Available online at: <http://www.fueleconomy.gov/feg/printGuides.shtml>. Accessed January 2016.  
 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 January 2016.

Construction Energy- Hauling Scenario

Table A7. Electricity Usage for Construction Water Usage  
Oak Knoll Mixed Use Community Plan Project

Phase	Year	Construction Phase	Project Equipment	Off-Road Equipment Type <sup>1</sup>	Number of Units	Total Hours	Acres Disturbed/8-hour Day/Unit <sup>2</sup>	Total Acres Disturbed	Total Gallons of Water <sup>3</sup>	Total kWh <sup>4</sup>
1	2017	Site Preparation	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	4	1,280	0.5	80.0	241,600	846
1	2017	Grading	Graders	Graders	1	888	0.5	55.5	167,610	587
			Scrapers	Scrapers	2	1,776	1	222.0	670,440	2,347
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	1,776	0.5	111.0	335,220	1,173
<b>Phase 1, 2017 Subtotal</b>										<b>4,952</b>
2	2018	Site Preparation	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	4	1376	0.5	86.0	259,720	909
2	2018	Grading	Graders	Graders	1	880	0.5	55.0	166,100	581
			Scrapers	Scrapers	2	1760	1	220.0	664,400	2,325
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	1760	0.5	110.0	332,200	1,163
<b>Phase 2, 2018 Subtotal</b>										<b>4,978</b>
3	2020	Site Preparation	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	4	928	0.5	58.0	175,160	613
3	2020	Grading	Graders	Graders	1	528	0.5	33.0	99,660	349
			Scrapers	Scrapers	2	1056	1	132.0	398,640	1,395
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	1056	0.5	66.0	199,320	698
<b>Phase 3, 2020 Subtotal</b>										<b>3,055</b>
<b>All Phases, Total</b>										<b>12,985</b>

**Notes**

1. Construction off-road equipment use, hours per day, and days per phase from project specific construction equipment list. Only the equipment types here are assumed to have associated water control.
2. Acres disturbed per 8 hour workday calculated from CalEEMod® Appendix D Table 3.7.
3. Gallons of water usage for dust control is calculated based on a minimum control efficiency of 66% (three times daily) with an application rate of 3,020 gallons/acre/day (AWMA 1992) and average of 26 construction days per month.
4. Calculated based on the CalEEMod® default Alameda County energy intensity of 0.0035 kWh per gallon for supply, distribution, and treatment of water.

**Abbreviation**

CalEEMod®: California Emissions Estimator Model  
kWh: kilowatt-hour

**Reference**

Air & Waste Management Association. 1992. Air Pollution Engineering Manual.

Construction Energy- Hauling Scenario

Table A8. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project

Diesel and Gasoline Usage									
Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
1	2017	Worker	LDA	Gas	49.24%	8,410	24.8	26.4	3,890
	2017	Worker	LDA	Diesel	0.47%	8,410	24.8	33.5	29
	2017	Worker	LDT1	Gas	24.93%	8,410	24.8	22.6	2,298
	2017	Worker	LDT1	Diesel	0.04%	8,410	24.8	25.6	4
	2017	Worker	LDT2	Gas	24.97%	8,410	24.8	19.9	2,622
	2017	Worker	LDT2	Diesel	0.03%	8,410	24.8	27.3	2
	2017	Vendor	MHDT	Gas	4.84%	2,156	14.6	6.2	245
	2017	Vendor	MHDT	Diesel	45.16%	2,156	14.6	8.2	1,730
	2017	Vendor	HHDT	Gas	0.31%	2,156	14.6	4.4	22
	2017	Vendor	HHDT	Diesel	49.69%	2,156	14.6	5.6	2,795
	2017	Hauling	HHDT	Gas	0.61%	4,191	40	4.4	231
2017	Hauling	HHDT	Diesel	99.39%	4,191	40	5.6	29,774	
<b>Phase 1, 2017 Subtotal</b>								<b>Gasoline</b>	<b>9,307</b>
								<b>Diesel</b>	<b>34,334</b>

Construction Energy- Hauling Scenario

Table A8. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
1	2018	Worker	LDA	Gas	49.09%	140,068	24.8	27.1	62,862
	2018	Worker	LDA	Diesel	0.49%	140,068	24.8	34.4	493
	2018	Worker	LDT1	Gas	24.93%	140,068	24.8	23.2	37,348
	2018	Worker	LDT1	Diesel	0.04%	140,068	24.8	26.0	56
	2018	Worker	LDT2	Gas	24.97%	140,068	24.8	20.4	42,449
	2018	Worker	LDT2	Diesel	0.03%	140,068	24.8	27.9	40
	2018	Vendor	MHDT	Gas	4.64%	48,202	14.6	6.3	5,197
	2018	Vendor	MHDT	Diesel	45.36%	48,202	14.6	8.2	38,733
	2018	Vendor	HHDT	Gas	0.30%	48,202	14.6	4.5	475
	2018	Vendor	HHDT	Diesel	49.70%	48,202	14.6	5.7	61,813
	2018	Hauling	HHDT	Gas	0.61%	0	40	4.5	0
2018	Hauling	HHDT	Diesel	99.39%	0	40	5.7	0	
<b>Phase 1, 2018 Subtotal</b>								<b>Gasoline</b>	<b>148,330</b>
								<b>Diesel</b>	<b>101,135</b>

Construction Energy- Hauling Scenario

**Table A8. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project**

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
1	2019	Worker	LDA	Gas	48.86%	140,068	24.8	27.9	60,811
	2019	Worker	LDA	Diesel	0.51%	140,068	24.8	35.4	500
	2019	Worker	LDT1	Gas	24.94%	140,068	24.8	23.8	36,410
	2019	Worker	LDT1	Diesel	0.04%	140,068	24.8	26.5	52
	2019	Worker	LDT2	Gas	24.96%	140,068	24.8	21.0	41,230
	2019	Worker	LDT2	Diesel	0.04%	140,068	24.8	28.4	44
	2019	Vendor	MHDT	Gas	4.45%	48,202	14.6	6.3	4,944
	2019	Vendor	MHDT	Diesel	45.55%	48,202	14.6	8.3	38,732
	2019	Vendor	HHDT	Gas	0.30%	48,202	14.6	4.6	460
	2019	Vendor	HHDT	Diesel	49.70%	48,202	14.6	5.7	61,134
	2019	Hauling	HHDT	Gas	0.59%	0	40	4.6	0
2019	Hauling	HHDT	Diesel	99.41%	0	40	5.7	0	
<b>Phase 1, 2019 Subtotal</b>								<b>Gasoline</b>	<b>143,855</b>
								<b>Diesel</b>	<b>100,462</b>

Construction Energy- Hauling Scenario

**Table A8. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project**

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
1	2020	Worker	LDA	Gas	48.57%	140,515	24.8	28.7	58,919
	2020	Worker	LDA	Diesel	0.53%	140,515	24.8	36.4	506
	2020	Worker	LDT1	Gas	24.94%	140,515	24.8	24.4	35,552
	2020	Worker	LDT1	Diesel	0.04%	140,515	24.8	27.1	49
	2020	Worker	LDT2	Gas	24.96%	140,515	24.8	21.7	40,142
	2020	Worker	LDT2	Diesel	0.04%	140,515	24.8	29.0	46
	2020	Vendor	MHDT	Gas	4.34%	48,356	14.6	6.4	4,795
	2020	Vendor	MHDT	Diesel	45.66%	48,356	14.6	8.3	38,778
	2020	Vendor	HHDT	Gas	0.29%	48,356	14.6	4.6	452
	2020	Vendor	HHDT	Diesel	49.71%	48,356	14.6	5.8	60,592
	2020	Hauling	HHDT	Gas	0.59%	0	40	4.6	0
2020	Hauling	HHDT	Diesel	99.41%	0	40	5.8	0	
<b>Phase 1, 2020 Subtotal</b>								<b>Gasoline</b>	<b>139,859</b>
								<b>Diesel</b>	<b>99,971</b>



Construction Energy- Hauling Scenario

**Table A8. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project**

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
1	2021	Worker	LDA	Gas	48.22%	79,770	24.8	29.6	32,226
	2021	Worker	LDA	Diesel	0.55%	79,770	24.8	37.5	288
	2021	Worker	LDT1	Gas	24.94%	79,770	24.8	25.2	19,558
	2021	Worker	LDT1	Diesel	0.04%	79,770	24.8	27.8	26
	2021	Worker	LDT2	Gas	24.96%	79,770	24.8	22.4	22,016
	2021	Worker	LDT2	Diesel	0.04%	79,770	24.8	29.8	28
	2021	Vendor	MHDT	Gas	4.24%	24,948	14.6	6.4	2,400
	2021	Vendor	MHDT	Diesel	45.76%	24,948	14.6	8.3	19,971
	2021	Vendor	HHDT	Gas	0.29%	24,948	14.6	4.7	228
	2021	Vendor	HHDT	Diesel	49.71%	24,948	14.6	5.9	30,864
	2021	Hauling	HHDT	Gas	0.58%	0	40	4.7	0
2021	Hauling	HHDT	Diesel	99.42%	0	40	5.9	0	
<b>Phase 1, 2021 Subtotal</b>								<b>Gasoline</b>	<b>76,428</b>
								<b>Diesel</b>	<b>51,176</b>
<b>Phase 1, 2017 to 2021 Subtotal</b>								<b>Gasoline</b>	<b>517,779</b>
								<b>Diesel</b>	<b>387,078</b>

Construction Energy- Hauling Scenario

Table A8. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
2	2018	Worker	LDA	Gas	49.09%	34,667	24.8	27.1	15,558
	2018	Worker	LDA	Diesel	0.49%	34,667	24.8	34.4	122
	2018	Worker	LDT1	Gas	24.93%	34,667	24.8	23.2	9,244
	2018	Worker	LDT1	Diesel	0.04%	34,667	24.8	26.0	14
	2018	Worker	LDT2	Gas	24.97%	34,667	24.8	20.4	10,506
	2018	Worker	LDT2	Diesel	0.03%	34,667	24.8	27.9	10
	2018	Vendor	MHDT	Gas	4.64%	11,408	14.6	6.3	1,230
	2018	Vendor	MHDT	Diesel	45.36%	11,408	14.6	8.2	9,167
	2018	Vendor	HHDT	Gas	0.30%	11,408	14.6	4.5	112
	2018	Vendor	HHDT	Diesel	49.70%	11,408	14.6	5.7	14,629
	2018	Hauling	HHDT	Gas	0.61%	0	40	4.5	0
2018	Hauling	HHDT	Diesel	99.39%	0	40	5.7	0	
<b>Phase 2, 2018 Subtotal</b>								<b>Gasoline</b>	<b>36,651</b>
								<b>Diesel</b>	<b>23,942</b>

Construction Energy- Hauling Scenario

**Table A8. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project**

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
2	2019	Worker	LDA	Gas	48.86%	77,311	24.8	27.9	33,565
	2019	Worker	LDA	Diesel	0.51%	77,311	24.8	35.4	276
	2019	Worker	LDT1	Gas	24.94%	77,311	24.8	23.8	20,097
	2019	Worker	LDT1	Diesel	0.04%	77,311	24.8	26.5	29
	2019	Worker	LDT2	Gas	24.96%	77,311	24.8	21.0	22,757
	2019	Worker	LDT2	Diesel	0.04%	77,311	24.8	28.4	24
	2019	Vendor	MHDT	Gas	4.45%	28,796	14.6	6.3	2,954
	2019	Vendor	MHDT	Diesel	45.55%	28,796	14.6	8.3	23,138
	2019	Vendor	HHDT	Gas	0.30%	28,796	14.6	4.6	275
	2019	Vendor	HHDT	Diesel	49.70%	28,796	14.6	5.7	36,522
	2019	Hauling	HHDT	Gas	0.59%	0	40	4.6	0
2019	Hauling	HHDT	Diesel	99.41%	0	40	5.7	0	
<b>Phase 2, 2019 Subtotal</b>								<b>Gasoline</b>	<b>79,647</b>
								<b>Diesel</b>	<b>59,989</b>

Construction Energy- Hauling Scenario

**Table A8. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project**

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
2	2020	Worker	LDA	Gas	48.57%	77,558	24.8	28.7	32,521
	2020	Worker	LDA	Diesel	0.53%	77,558	24.8	36.4	279
	2020	Worker	LDT1	Gas	24.94%	77,558	24.8	24.4	19,623
	2020	Worker	LDT1	Diesel	0.04%	77,558	24.8	27.1	27
	2020	Worker	LDT2	Gas	24.96%	77,558	24.8	21.7	22,156
	2020	Worker	LDT2	Diesel	0.04%	77,558	24.8	29.0	26
	2020	Vendor	MHDT	Gas	4.34%	28,888	14.6	6.4	2,864
	2020	Vendor	MHDT	Diesel	45.66%	28,888	14.6	8.3	23,166
	2020	Vendor	HHDT	Gas	0.29%	28,888	14.6	4.6	270
	2020	Vendor	HHDT	Diesel	49.71%	28,888	14.6	5.8	36,198
	2020	Hauling	HHDT	Gas	0.59%	0	40	4.6	0
2020	Hauling	HHDT	Diesel	99.41%	0	40	5.8	0	
<b>Phase 2, 2020 Subtotal</b>								<b>Gasoline</b>	<b>77,434</b>
								<b>Diesel</b>	<b>59,696</b>

Construction Energy- Hauling Scenario

**Table A8. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project**

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
2	2021	Worker	LDA	Gas	48.22%	77,311	24.8	29.6	31,233
	2021	Worker	LDA	Diesel	0.55%	77,311	24.8	37.5	279
	2021	Worker	LDT1	Gas	24.94%	77,311	24.8	25.2	18,955
	2021	Worker	LDT1	Diesel	0.04%	77,311	24.8	27.8	25
	2021	Worker	LDT2	Gas	24.96%	77,311	24.8	22.4	21,337
	2021	Worker	LDT2	Diesel	0.04%	77,311	24.8	29.8	27
	2021	Vendor	MHDT	Gas	4.24%	28,796	14.6	6.4	2,770
	2021	Vendor	MHDT	Diesel	45.76%	28,796	14.6	8.3	23,051
	2021	Vendor	HHDT	Gas	0.29%	28,796	14.6	4.7	263
	2021	Vendor	HHDT	Diesel	49.71%	28,796	14.6	5.9	35,624
	2021	Hauling	HHDT	Gas	0.58%	0	40	4.7	0
2021	Hauling	HHDT	Diesel	99.42%	0	40	5.9	0	
<b>Phase 2, 2021 Subtotal</b>								<b>Gasoline</b>	<b>74,558</b>
								<b>Diesel</b>	<b>59,006</b>

Construction Energy- Hauling Scenario

**Table A8. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project**

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
2	2022	Worker	LDA	Gas	47.83%	17,784	24.8	30.5	6,912
	2022	Worker	LDA	Diesel	0.56%	17,784	24.8	38.6	64
	2022	Worker	LDT1	Gas	24.94%	17,784	24.8	26.1	4,216
	2022	Worker	LDT1	Diesel	0.04%	17,784	24.8	28.6	5
	2022	Worker	LDT2	Gas	24.96%	17,784	24.8	23.2	4,735
	2022	Worker	LDT2	Diesel	0.04%	17,784	24.8	30.7	6
	2022	Vendor	MHDT	Gas	4.03%	4,968	14.6	6.5	452
	2022	Vendor	MHDT	Diesel	45.97%	4,968	14.6	8.4	3,979
	2022	Vendor	HHDT	Gas	0.29%	4,968	14.6	4.7	45
	2022	Vendor	HHDT	Diesel	49.71%	4,968	14.6	5.9	6,062
	2022	Hauling	HHDT	Gas	0.58%	0	40	4.7	0
2022	Hauling	HHDT	Diesel	99.42%	0	40	5.9	0	
<b>Phase 2, 2022 Subtotal</b>								<b>Gasoline</b>	<b>16,359</b>
								<b>Diesel</b>	<b>10,116</b>
<b>Phase 2, 2018 to 2022 Subtotal</b>								<b>Gasoline</b>	<b>284,650</b>
								<b>Diesel</b>	<b>212,749</b>

Construction Energy- Hauling Scenario

**Table A8. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project**

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
3	2020	Worker	LDA	Gas	48.57%	9,554	24.8	28.7	4,006
	2020	Worker	LDA	Diesel	0.53%	9,554	24.8	36.4	34
	2020	Worker	LDT1	Gas	24.94%	9,554	24.8	24.4	2,417
	2020	Worker	LDT1	Diesel	0.04%	9,554	24.8	27.1	3
	2020	Worker	LDT2	Gas	24.96%	9,554	24.8	21.7	2,729
	2020	Worker	LDT2	Diesel	0.04%	9,554	24.8	29.0	3
	2020	Vendor	MHDT	Gas	4.34%	1,913	14.6	6.4	190
	2020	Vendor	MHDT	Diesel	45.66%	1,913	14.6	8.3	1,534
	2020	Vendor	HHDT	Gas	0.29%	1,913	14.6	4.6	18
	2020	Vendor	HHDT	Diesel	49.71%	1,913	14.6	5.8	2,396
	2020	Hauling	HHDT	Gas	0.59%	0	40	4.6	0
2020	Hauling	HHDT	Diesel	99.41%	0	40	5.8	0	
<b>Phase 3, 2020 Subtotal</b>								<b>Gasoline</b>	<b>9,360</b>
								<b>Diesel</b>	<b>3,971</b>

Construction Energy- Hauling Scenario

**Table A8. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project**

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
3	2021	Worker	LDA	Gas	48.22%	115,497	24.8	29.6	46,659
	2021	Worker	LDA	Diesel	0.55%	115,497	24.8	37.5	416
	2021	Worker	LDT1	Gas	24.94%	115,497	24.8	25.2	28,318
	2021	Worker	LDT1	Diesel	0.04%	115,497	24.8	27.8	37
	2021	Worker	LDT2	Gas	24.96%	115,497	24.8	22.4	31,876
	2021	Worker	LDT2	Diesel	0.04%	115,497	24.8	29.8	40
	2021	Vendor	MHDT	Gas	4.24%	26,605	14.6	6.4	2,559
	2021	Vendor	MHDT	Diesel	45.76%	26,605	14.6	8.3	21,297
	2021	Vendor	HHDT	Gas	0.29%	26,605	14.6	4.7	243
	2021	Vendor	HHDT	Diesel	49.71%	26,605	14.6	5.9	32,914
	2021	Hauling	HHDT	Gas	0.58%	0	40	4.7	0
2021	Hauling	HHDT	Diesel	99.42%	0	40	5.9	0	
<b>Phase 3, 2021 Subtotal</b>								<b>Gasoline</b>	<b>109,656</b>
								<b>Diesel</b>	<b>54,705</b>



Construction Energy- Hauling Scenario

**Table A8. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project**

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
3	2022	Worker	LDA	Gas	47.83%	53,147	24.8	30.5	20,656
	2022	Worker	LDA	Diesel	0.56%	53,147	24.8	38.6	191
	2022	Worker	LDT1	Gas	24.94%	53,147	24.8	26.1	12,600
	2022	Worker	LDT1	Diesel	0.04%	53,147	24.8	28.6	16
	2022	Worker	LDT2	Gas	24.96%	53,147	24.8	23.2	14,149
	2022	Worker	LDT2	Diesel	0.04%	53,147	24.8	30.7	19
	2022	Vendor	MHDT	Gas	4.03%	12,198	14.6	6.5	1,109
	2022	Vendor	MHDT	Diesel	45.97%	12,198	14.6	8.4	9,769
	2022	Vendor	HHDT	Gas	0.29%	12,198	14.6	4.7	110
	2022	Vendor	HHDT	Diesel	49.71%	12,198	14.6	5.9	14,883
	2022	Hauling	HHDT	Gas	0.58%	0	40	4.7	0
2022	Hauling	HHDT	Diesel	99.42%	0	40	5.9	0	
<b>Phase 3, 2022 Subtotal</b>								<b>Gasoline</b>	<b>48,624</b>
								<b>Diesel</b>	<b>24,878</b>

Construction Energy- Hauling Scenario

Table A8. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project

Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips	Round Trip Length	Fuel Efficiency <sup>2</sup>	Fuel Usage
							(mile)	(mpg)	(gal)
3	2023	Worker	LDA	Gas	47.39%	2,075	24.8	31.5	775
	2023	Worker	LDA	Diesel	0.57%	2,075	24.8	39.8	7
	2023	Worker	LDT1	Gas	24.95%	2,075	24.8	27.1	474
	2023	Worker	LDT1	Diesel	0.03%	2,075	24.8	29.5	1
	2023	Worker	LDT2	Gas	24.95%	2,075	24.8	24.1	532
	2023	Worker	LDT2	Diesel	0.05%	2,075	24.8	31.6	1
	2023	Vendor	MHDT	Gas	3.93%	0	14.6	6.5	0
	2023	Vendor	MHDT	Diesel	46.07%	0	14.6	8.5	0
	2023	Vendor	HHDT	Gas	0.30%	0	14.6	4.7	0
	2023	Vendor	HHDT	Diesel	49.70%	0	14.6	6.2	0
	2023	Hauling	HHDT	Gas	0.59%	0	40	4.7	0
2023	Hauling	HHDT	Diesel	99.41%	0	40	6.2	0	
<b>Phase 3, 2023 Subtotal</b>								<b>Gasoline</b>	<b>1,781</b>
								<b>Diesel</b>	<b>9</b>
<b>Phase 3, 2020 to 2023 Subtotal</b>								<b>Gasoline</b>	<b>169,420</b>
								<b>Diesel</b>	<b>83,562</b>

Construction Energy- Hauling Scenario

Table A8. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project

Electricity Usage										
Phase	Year	Trip Type <sup>1</sup>	Vehicle Type <sup>1</sup>	Fuel	% of Fleet <sup>2</sup>	Total Round Trips		Vehicle Efficiency <sup>3</sup>		Electricity Usage
								(kWh/mile)	(kWh)	
1	2017	Worker	LDA	Electric	0.29%	8,410	24.8	0.33	199	
	2017	Worker	LDT1	Electric	0.02%	8,410	24.8	0.33	17	
<b>Phase 1, 2017 Subtotal</b>									<b>216</b>	
1	2018	Worker	LDA	Electric	0.42%	140,068	24.8	0.33	4,834	
	2018	Worker	LDT1	Electric	0.02%	140,068	24.8	0.33	279	
<b>Phase 1, 2018 Subtotal</b>									<b>5,114</b>	
1	2019	Worker	LDA	Electric	0.63%	140,068	24.8	0.33	7,195	
	2019	Worker	LDT1	Electric	0.02%	140,068	24.8	0.33	273	
<b>Phase 1, 2019 Subtotal</b>									<b>7,468</b>	
1	2020	Worker	LDA	Electric	0.90%	140,515	24.8	0.33	10,329	
	2020	Worker	LDT1	Electric	0.02%	140,515	24.8	0.33	266	
<b>Phase 1, 2020 Subtotal</b>									<b>10,595</b>	
1	2021	Worker	LDA	Electric	1.23%	79,770	24.8	0.33	8,011	
	2021	Worker	LDT1	Electric	0.02%	79,770	24.8	0.33	144	
<b>Phase 1, 2021 Subtotal</b>									<b>8,154</b>	
<b>Phase 1, 2017 to 2020 Subtotal</b>									<b>31,547</b>	
2	2018	Worker	LDA	Electric	0.42%	34,667	24.8	0.33	1,197	
	2018	Worker	LDT1	Electric	0.02%	34,667	24.8	0.33	69	
<b>Phase 2, 2018 Subtotal</b>									<b>1,266</b>	
2	2019	Worker	LDA	Electric	0.63%	77,311	24.8	0.33	3,971	
	2019	Worker	LDT1	Electric	0.02%	77,311	24.8	0.33	150	
<b>Phase 2, 2019 Subtotal</b>									<b>4,122</b>	
2	2020	Worker	LDA	Electric	0.90%	77,558	24.8	0.33	5,701	
	2020	Worker	LDT1	Electric	0.02%	77,558	24.8	0.33	147	
<b>Phase 2, 2020 Subtotal</b>									<b>5,848</b>	

Construction Energy- Hauling Scenario

**Table A8. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project**

2	2021	Worker	LDA	Electric	1.23%	77,311	24.8	0.33	7,764
	2021	Worker	LDT1	Electric	0.02%	77,311	24.8	0.33	139
<b>Phase 2, 2021 Subtotal</b>									<b>7,903</b>
2	2022	Worker	LDA	Electric	1.61%	17,784	24.8	0.33	2,337
	2022	Worker	LDT1	Electric	0.02%	17,784	24.8	0.33	31
<b>Phase 2, 2022 Subtotal</b>									<b>2,368</b>
<b>Phase 2, 2018 to 2022 Subtotal</b>									<b>21,507</b>
3	2020	Worker	LDA	Electric	0.90%	9,554	24.8	0.33	702
	2020	Worker	LDT1	Electric	0.02%	9,554	24.8	0.33	18
<b>Phase 3, 2020 Subtotal</b>									<b>720</b>
3	2021	Worker	LDA	Electric	1.23%	115,497	24.8	0.33	11,598
	2021	Worker	LDT1	Electric	0.02%	115,497	24.8	0.33	208
<b>Phase 3, 2021 Subtotal</b>									<b>11,806</b>
3	2022	Worker	LDA	Electric	1.61%	53,147	24.8	0.33	6,985
	2022	Worker	LDT1	Electric	0.02%	53,147	24.8	0.33	92
<b>Phase 3, 2022 Subtotal</b>									<b>7,077</b>
3	2023	Worker	LDA	Electric	2.04%	2,075	24.8	0.33	345
	2023	Worker	LDT1	Electric	0.02%	2,075	24.8	0.33	3
<b>Phase 3, 2023 Subtotal</b>									<b>7,077</b>
<b>Phase 3, 2020 to 2023 Subtotal</b>									<b>26,681</b>
<b>All Phases, Total</b>									<b>79,735</b>

**Table A8. Fuel and Electricity Usage from Construction On-road Mobile Sources  
Oak Knoll Mixed Use Community Plan Project**

**Notes**

1. CalEEMod® default vehicle mix of light-duty auto (LDA), light-duty truck type 1 (LDT1), and light-duty truck type 2 (LDT2) for worker trips, mix of medium heavy-duty vehicles (T6) and heavy heavy-duty trucks (T7) for vendor trips, and all heavy heavy-duty trucks (T7) for hauling trips.
2. Based on EMFAC2014 output. See Table A6.
3. Average electric vehicle fuel economy for 2015 models (in kWh per mile) from the 2015 DOE Fuel Economy Guide.

**Abbreviations**

CalEEMod®: California Emissions Estimator Model

DOE: United States Department of Energy

EMFAC2014: On-Road Vehicle Emission FACTors Model

gal: gallon

kWh: kilowatt-hour

LDA: light-duty auto

LDT1: light-duty truck, type 1

LDT2: light-duty truck, type 2

mpg: miles per gallon

MHDT: medium heavy-duty vehicles

HHDT: heavy heavy-duty trucks

**Sources:**

DOE. 2016. Fuel Economy Guide, Model Year 2015. Electric Vehicles. Available online at: <http://www.fueleconomy.gov/feg/printGuides.shtml>. Accessed January 2016.

Construction Energy- Hauling Scenario

Table A9. Fuel Usage of Off-road Construction Diesel Equipment for Phase 1  
Oak Knoll Mixed Use Community Plan Project

Phase	Phase Name	Project Equipment	Fuel Type	Hp	LF	Quantity	Total Hours	Calendar Year	Hp-Hour <sup>1</sup>	Fuel Usage <sup>2</sup> (gal)	Fuel Usage Subtotals (gal)
1	Demolition	Concrete/Industrial Saws	Diesel	81	0.7300	1	720	2017	42,574	2,174.8	
1	Demolition	Crushing/Proc. Equipment	Diesel	85	0.7800	0	0	2017	0,000	0.0	
1	Demolition	Excavators	Diesel	162	0.3800	3	2,160	2017	132,970	6,792.6	
1	Demolition	Generator Sets	Diesel	84	0.7400	0	0	2017	0,000	0.0	
1	Demolition	Off-Highway Trucks	Diesel	400	0.3800	0	0	2017	0,000	0.0	
1	Demolition	Rubber Tired Dozers	Diesel	255	0.4000	2	1,440	2017	146,880	7,503.2	
1	Demolition	Rubber Tired Loaders	Diesel	199	0.3600	0	0	2017	0,000	0.0	
1	Demolition	Skid Steer Loaders	Diesel	64	0.3700	0	0	2017	0,000	0.0	
1	Site Preparation	Rubber Tired Dozers	Diesel	255	0.4000	3	960	2017	97,920	5,002.1	
1	Site Preparation	Tractors/Loaders/Backhoes	Diesel	97	0.3700	4	1,280	2017	45,939	2,346.7	
1	Grading	Excavators	Diesel	162	0.3800	2	1,776	2017	109,331	5,585.0	
1	Grading	Graders	Diesel	174	0.4100	1	888	2017	63,350	3,236.1	
1	Grading	Rubber Tired Dozers	Diesel	255	0.4000	1	888	2017	90,576	4,627.0	
1	Grading	Scrapers	Diesel	361	0.4800	2	1,776	2017	307,745	15,720.8	
1	Grading	Tractors/Loaders/Backhoes	Diesel	97	0.3700	2	1,776	2017	63,741	3,256.1	
1	Building Construction	Cranes	Diesel	226	0.2900	1	98	2017	6,423	328.1	
1	Building Construction	Forklifts	Diesel	89	0.2000	3	336	2017	5,981	305.5	
1	Building Construction	Generator Sets	Diesel	84	0.7400	1	112	2017	6,962	355.6	
1	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0.3700	3	294	2017	10,552	539.0	
1	Building Construction	Welders	Diesel	46	0.4500	1	112	2017	2,318	118.4	
<b>Phase 1, 2017 Subtotal</b>											<b>57,891</b>
1	Building Construction	Cranes	Diesel	226	0.2900	1	2,191	2018	143,598	7,336	
1	Building Construction	Forklifts	Diesel	89	0.2000	3	7,512	2018	133,714	6,831	
1	Building Construction	Generator Sets	Diesel	84	0.7400	1	2,504	2018	155,649	7,951	
1	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0.3700	3	6,573	2018	235,905	12,051	
1	Building Construction	Welders	Diesel	46	0.4500	1	2,504	2018	51,833	2,648	
<b>Phase 1, 2018 Subtotal</b>											<b>36,816</b>

Construction Energy- Hauling Scenario

Table A9. Fuel Usage of Off-road Construction Diesel Equipment for Phase 1  
Oak Knoll Mixed Use Community Plan Project

Phase	Phase Name	Project Equipment	Fuel Type	Hp	LF	Quantity	Total Hours	Calendar Year	Hp-Hour <sup>1</sup>	Fuel Usage <sup>2</sup> (gal)	Fuel Usage Subtotals (gal)
1	Building Construction	Cranes	Diesel	226	0.2900	1	2,191	2019	143,598	7,336	
1	Building Construction	Forklifts	Diesel	89	0.2000	3	7,512	2019	133,714	6,831	
1	Building Construction	Generator Sets	Diesel	84	0.7400	1	2,504	2019	155,649	7,951	
1	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0.3700	3	6,573	2019	235,905	12,051	
1	Building Construction	Welders	Diesel	46	0.4500	1	2,504	2019	51,833	2,648	
<b>Phase 1, 2019 Subtotal</b>											<b>36,816</b>
1	Building Construction	Cranes	Diesel	226	0.2900	1	2,198	2020	144,057	7,359	
1	Building Construction	Forklifts	Diesel	89	0.2000	3	7,536	2020	134,141	6,852	
1	Building Construction	Generator Sets	Diesel	84	0.7400	1	2,512	2020	156,146	7,977	
1	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0.3700	3	6,594	2020	236,659	12,089	
1	Building Construction	Welders	Diesel	46	0.4500	1	2,512	2020	51,998	2,656	
<b>Phase 1, 2020 Subtotal</b>											<b>36,934</b>
1	Building Construction	Cranes	Diesel	226	0.2900	1	1,134	2021	74,322	3,797	
1	Building Construction	Forklifts	Diesel	89	0.2000	3	3,888	2021	69,206	3,535	
1	Building Construction	Generator Sets	Diesel	84	0.7400	1	1,296	2021	80,559	4,115	
1	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0.3700	3	3,402	2021	122,098	6,237	
1	Building Construction	Welders	Diesel	46	0.4500	1	1,296	2021	26,827	1,370	
1	Paving	Pavers	Diesel	125	0.4200	2	1,200	2021	63,000	3,218	
1	Paving	Paving Equipment	Diesel	130	0.3600	2	1,200	2021	56,160	2,869	
1	Paving	Rollers	Diesel	80	0.3800	2	1,200	2021	36,480	1,864	
1	Architectural Coating	Air Compressors	Diesel	78	0.4800	1	450	2021	16,848	861	
<b>Phase 1, 2021 Subtotal</b>											
<b>Phase 1 Total</b>											<b>196,323</b>

Construction Energy- Hauling Scenario

**Table A9. Fuel Usage of Off-road Construction Diesel Equipment for Phase 1  
Oak Knoll Mixed Use Community Plan Project**

Phase	Phase Name	Project Equipment	Fuel Type	Hp	LF	Quantity	Total Hours	Calendar Year	Hp-Hour <sup>1</sup>	Fuel Usage <sup>2</sup> (gal)	Fuel Usage Subtotals (gal)
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**Notes**

1. HP-Hour is the basis for the fuel calculation. HP-Hour is calculated using the following formula:

$$\text{HP-Hour} = \text{Total Hours} \times \text{LF} \times \text{HP}$$

2. Off-road mobile source fuel usage is calculated using a fuel usage rate of 0.05 gallons of diesel per horsepower (HP)-hour, based the heating value of diesel (AP-42).

**Abbreviations**

Gal: gallon

HP: horsepower

LF: load factor

**Sources**

USEPA. 1996. AP-42 Emission Factors. Chapter 3.4 Large Stationary Diesel And All Stationary Dual-fuel Engines, <https://www3.epa.gov/ttn/chief/ap42/ch03/final/c03s04.pdf>.



Construction Energy- Hauling Scenario

Table A10. Fuel Usage of Off-road Construction Diesel Equipment for Phase 2  
Oak Knoll Mixed Use Community Plan Project

Phase	Phase Name	Project Equipment	Fuel Type	Hp	LF	Quantity	Total Hours	Calendar Year	Hp-Hour <sup>1</sup>	Fuel Usage <sup>2</sup> (gal)	Fuel Usage Subtotals (gal)	
2	Demolition	Concrete/Industrial Saws	Diesel	81	0.7300	1	568	2018	33,586	1,715.7		
2	Demolition	Excavators	Diesel	162	0.3800	3	1,704	2018	104,898	5,358.6		
2	Demolition	Rubber Tired Dozers	Diesel	255	0.4000	2	1,136	2018	115,872	5,919.2		
2	Site Preparation	Rubber Tired Dozers	Diesel	255	0.4000	3	1,032	2018	105,264	5,377.3		
2	Site Preparation	Tractors/Loaders/Backhoes	Diesel	97	0.3700	4	1,376	2018	49,385	2,522.8		
2	Grading	Excavators	Diesel	162	0.3800	2	1,760	2018	108,346	5,534.7		
2	Grading	Graders	Diesel	174	0.4100	1	880	2018	62,779	3,207.0		
2	Grading	Rubber Tired Dozers	Diesel	255	0.4000	1	880	2018	89,760	4,585.3		
2	Grading	Scrapers	Diesel	361	0.4800	2	1,760	2018	304,973	15,579.1		
2	Grading	Tractors/Loaders/Backhoes	Diesel	97	0.3700	2	1,760	2018	63,166	3,226.8		
2	Building Construction	Cranes	Diesel	226	0.2900	1	434	2018	28,444	1,453.0		
2	Building Construction	Forklifts	Diesel	89	0.2000	3	1,488	2018	26,486	1,353.0		
2	Building Construction	Generator Sets	Diesel	84	0.7400	1	496	2018	30,831	1,575.0		
2	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0.3700	3	1,302	2018	46,729	2,387.1		
2	Building Construction	Welders	Diesel	46	0.4500	1	496	2018	10,267	524.5		
<b>Phase 2, 2018 Subtotal</b>												<b>60,319</b>
2	Building Construction	Cranes	Diesel	226	0.2900	1	2,191	2019	143,598	7,336		
2	Building Construction	Forklifts	Diesel	89	0.2000	3	7,512	2019	133,714	6,831		
2	Building Construction	Generator Sets	Diesel	84	0.7400	1	2,504	2019	155,649	7,951		
2	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0.3700	3	6,573	2019	235,905	12,051		
2	Building Construction	Welders	Diesel	46	0.4500	1	2,504	2019	51,833	2,648		
<b>Phase 2, 2019 Subtotal</b>											<b>36,816</b>	
2	Building Construction	Cranes	Diesel	226	0.2900	1	2,198	2020	144,057	7,359		
2	Building Construction	Forklifts	Diesel	89	0.2000	3	7,536	2020	134,141	6,852		
2	Building Construction	Generator Sets	Diesel	84	0.7400	1	2,512	2020	156,146	7,977		
2	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0.3700	3	6,594	2020	236,659	12,089		
2	Building Construction	Welders	Diesel	46	0.4500	1	2,512	2020	51,998	2,656		
<b>Phase 2, 2020 Subtotal</b>											<b>36,934</b>	
2	Building Construction	Cranes	Diesel	226	0.2900	1	2,191	2021	143,598	7,336		
2	Building Construction	Forklifts	Diesel	89	0.2000	3	7,512	2021	133,714	6,831		
2	Building Construction	Generator Sets	Diesel	84	0.7400	1	2,504	2021	155,649	7,951		
2	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0.3700	3	6,573	2021	235,905	12,051		
2	Building Construction	Welders	Diesel	46	0.4500	1	2,504	2021	51,833	2,648		
<b>Phase 2, 2021 Subtotal</b>											<b>36,816</b>	

Construction Energy- Hauling Scenario

**Table A10. Fuel Usage of Off-road Construction Diesel Equipment for Phase 2 Oak Knoll Mixed Use Community Plan Project**

Phase	Phase Name	Project Equipment	Fuel Type	Hp	LF	Quantity	Total Hours	Calendar Year	Hp-Hour <sup>1</sup>	Fuel Usage <sup>2</sup> (gal)	Fuel Usage Subtotals (gal)
2	Building Construction	Cranes	Diesel	226	0.2900	1	378	2022	24,774	1,266	
2	Building Construction	Forklifts	Diesel	89	0.2000	3	1,296	2022	23,069	1,178	
2	Building Construction	Generator Sets	Diesel	84	0.7400	1	432	2022	26,853	1,372	
2	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0.3700	3	1,134	2022	40,699	2,079	
2	Building Construction	Welders	Diesel	46	0.4500	1	432	2022	8,942	457	
2	Paving	Pavers	Diesel	125	0.4200	2	1,248	2022	65,520	3,347	
2	Paving	Paving Equipment	Diesel	130	0.3600	2	1,248	2022	58,406	2,984	
2	Paving	Rollers	Diesel	80	0.3800	2	1,248	2022	37,939	1,938	
2	Architectural Coating	Air Compressors	Diesel	78	0.4800	1	468	2022	17,522	895	
<b>Phase 2, 2022 Subtotal</b>											
<b>Phase 2 Total</b>											<b>186,400</b>

**Notes**

1. HP-Hour is the basis for the fuel calculation. HP-Hour is calculated using the following formula:

$$\text{HP-Hour} = \text{Total Hours} \times \text{LF} \times \text{HP}$$

2. Off-road mobile source fuel usage is calculated using a fuel usage rate of 0.05 gallons of diesel per horsepower (HP)-hour, based the heating value of diesel (AP-42).

**Abbreviations**

Gal: gallon

HP: horsepower

LF: load factor

**Sources**

EPA. 1996. AP-42 Emission Factors. Chapter 3.4 Large Stationary Diesel And All Stationary Dual-fuel Engines, <https://www3.epa.gov/ttn/chief/ap42/ch03/final/c03s04.pdf>.

Construction Energy- Hauling Scenario

Table A11. Fuel Usage of Off-road Construction Diesel Equipment for Phase 3  
Oak Knoll Mixed Use Community Plan Project

Phase	Phase Name	Project Equipment	Fuel Type	Hp	LF	Quantity	Total Hours	Calendar Year	Hp-Hour <sup>1</sup>	Fuel Usage <sup>2</sup> (gal)	Fuel Usage Subtotals (gal)
1	Demolition	Concrete/Industrial Saws	Diesel	81	0.7300	1	352	2020	20,814	1,063.2	
1	Demolition	Excavators	Diesel	162	0.3800	3	1,056	2020	65,007	3,320.8	
1	Demolition	Rubber Tired Dozers	Diesel	255	0.4000	2	704	2020	71,808	3,668.2	
1	Site Preparation	Rubber Tired Dozers	Diesel	255	0.4000	3	696	2020	70,992	3,626.5	
1	Site Preparation	Tractors/Loaders/Backhoes	Diesel	97	0.3700	4	928	2020	33,306	1,701.4	
1	Grading	Excavators	Diesel	162	0.3800	2	1,056	2020	65,007	3,320.8	
1	Grading	Graders	Diesel	174	0.4100	1	528	2020	37,668	1,924.2	
1	Grading	Rubber Tired Dozers	Diesel	255	0.4000	1	528	2020	53,856	2,751.2	
1	Grading	Scrapers	Diesel	361	0.4800	2	1,056	2020	182,984	9,347.5	
1	Grading	Tractors/Loaders/Backhoes	Diesel	97	0.3700	2	1,056	2020	37,900	1,936.1	
1	Building Construction	Cranes	Diesel	226	0.2900	1	315	2020	20,645	1,054.6	
1	Building Construction	Forklifts	Diesel	89	0.2000	3	1,080	2020	19,224	982.0	
1	Building Construction	Generator Sets	Diesel	84	0.7400	1	360	2020	22,378	1,143.1	
1	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0.3700	3	945	2020	33,916	1,732.6	
1	Building Construction	Welders	Diesel	46	0.4500	1	360	2020	7,452	380.7	
<b>Phase 3, 2020 Subtotal</b>											<b>37,953</b>
1	Building Construction	Cranes	Diesel	226	0.2900	1	2,191	2021	143,598	7,336	
1	Building Construction	Forklifts	Diesel	89	0.2000	3	7,512	2021	133,714	6,831	
1	Building Construction	Generator Sets	Diesel	84	0.7400	1	2,504	2021	155,649	7,951	
1	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0.3700	3	6,573	2021	235,905	12,051	
1	Building Construction	Welders	Diesel	46	0.4500	1	2,504	2021	51,833	2,648	
<b>Phase 3, 2021 Subtotal</b>											<b>36,816</b>
1	Building Construction	Cranes	Diesel	226	0.2900	1	2,009	2022	131,670	6,726	
1	Building Construction	Forklifts	Diesel	89	0.2000	3	6,888	2022	122,606	6,263	
1	Building Construction	Generator Sets	Diesel	84	0.7400	1	2,296	2022	142,719	7,291	
1	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0.3700	3	6,027	2022	216,309	11,050	
1	Building Construction	Welders	Diesel	46	0.4500	1	2,296	2022	47,527	2,428	
1	Paving	Pavers	Diesel	125	0.4200	2	416	2022	21,840	1,116	
1	Paving	Paving Equipment	Diesel	130	0.3600	2	416	2022	19,469	995	
1	Paving	Rollers	Diesel	80	0.3800	2	416	2022	12,646	646	

Construction Energy- Hauling Scenario

Table A11. Fuel Usage of Off-road Construction Diesel Equipment for Phase 3  
Oak Knoll Mixed Use Community Plan Project

Phase	Phase Name	Project Equipment	Fuel Type	Hp	LF	Quantity	Total Hours	Calendar Year	Hp-Hour <sup>1</sup>	Fuel Usage <sup>2</sup> (gal)	Fuel Usage Subtotals (gal)
<b>Phase 3, 2022 Subtotal</b>											<b>36,514</b>
1	Paving	Pavers	Diesel	125	0.4200	2	400	2023	21,000	1,073	
1	Paving	Paving Equipment	Diesel	130	0.3600	2	400	2023	18,720	956	
1	Paving	Rollers	Diesel	80	0.3800	2	400	2023	12,160	621	
1	Architectural Coating	Air Compressors	Diesel	78	0.4800	1	306	2023	11,457	585	
<b>Phase 3, 2023 Subtotal</b>											<b>3,235</b>
<b>Phase 3 Total</b>											<b>114,518</b>

Construction Energy- Hauling Scenario

**Table A11. Fuel Usage of Off-road Construction Diesel Equipment for Phase 3  
Oak Knoll Mixed Use Community Plan Project**

Phase	Phase Name	Project Equipment	Fuel Type	Hp	LF	Quantity	Total Hours	Calendar Year	Hp-Hour <sup>1</sup>	Fuel Usage <sup>2</sup> (gal)	Fuel Usage Subtotals (gal)
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**Notes**

1. HP-Hour is the basis for the fuel calculation. HP-Hour is calculated using the following formula:

$$\text{HP-Hour} = \text{Total Hours} \times \text{LF} \times \text{HP}$$

2. Off-road mobile source fuel usage is calculated using a fuel usage rate of 0.05 gallons of diesel per horsepower (HP)-hour, based the heating value of diesel (AP-42).

**Abbreviations**

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**Sources**

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