

Appendix L  
**Energy Calculations**

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# APPENDIX L: PROJECT ENERGY CALCULATIONS

## Construction Energy

Annual Construction Energy Consumption				
	<i>Fuel</i>	<i>CO<sub>2</sub> LBs per year</i>	<i>Gallons per year</i>	<i>Million BTU</i>
<b>Years 1-5 (2018-2022)</b>				
<i>Construction Equipment</i>	Diesel	437,092	19,418	2,514
<i>Construction Equipment</i>	Gasoline	9,523	492	56
<i>Haul Trucks</i>	Diesel	-	35,563	4,605
<i>Worker Commute</i>	Gasoline	-	21,016	2,394
<b>Total Per Year</b>		<b>446,615</b>	<b>76,489</b>	<b>9,570</b>
<b>Total 5-Year Period</b>		<b>2,233,075</b>	<b>382,446</b>	<b>47,849</b>
<b>Years 6-10 (2023-2027)</b>				
<i>Construction Equipment</i>	Diesel	463,271	20,581	2,665
<i>Construction Equipment</i>	Gasoline	10,981	567	65
<i>Haul Trucks</i>	Diesel	-	40,547	5,250
<i>Worker Commute</i>	Gasoline	-	24,031	2,738
<b>Total Per Year</b>		<b>474,253</b>	<b>85,727</b>	<b>10,718</b>
<b>Total 5-Year Period</b>		<b>2,371,263</b>	<b>428,633</b>	<b>53,589</b>
<b>Years 11-15 (2028-2032)</b>				
<i>Construction Equipment</i>	Diesel	531,474	23,611	3,057
<i>Construction Equipment</i>	Gasoline	12,630	652	74
<i>Haul Trucks</i>	Diesel	-	48,820	6,322
<i>Worker Commute</i>	Gasoline	-	29,640	3,377
<b>Total Per Year</b>		<b>544,104</b>	<b>102,724</b>	<b>12,830</b>
<b>Total 5-Year Period</b>		<b>2,720,521</b>	<b>513,620</b>	<b>64,151</b>
<b>Years 16-20 (2033-2037)</b>				
<i>Construction Equipment</i>	Diesel	646,963	28,742	3,722
<i>Construction Equipment</i>	Gasoline	14,563	752	86
<i>Haul Trucks</i>	Diesel	-	55,835	7,230
<i>Worker Commute</i>	Gasoline	-	33,978	3,871
<b>Total Per Year</b>		<b>661,527</b>	<b>119,307</b>	<b>14,908</b>
<b>Total 5-Year Period</b>		<b>3,307,634</b>	<b>596,537</b>	<b>74,542</b>
<b>Years 21-25 (2038-2042)</b>				
<i>Construction Equipment</i>	Diesel	740,168	32,883	4,258
<i>Construction Equipment</i>	Gasoline	16,782	867	99
<i>Haul Trucks</i>	Diesel	-	63,885	8,272
<i>Worker Commute</i>	Gasoline	-	38,956	4,438
<b>Total Per Year</b>		<b>756,950</b>	<b>136,590</b>	<b>17,067</b>
<b>Total 5-Year Period</b>		<b>3,784,749</b>	<b>682,952</b>	<b>85,336</b>

<b>Years 25-30 (2043-2047)</b>				
<i>Construction Equipment</i>	Diesel	841,774	37,397	4,842
<i>Construction Equipment</i>	Gasoline	19,318	998	114
<i>Haul Trucks</i>	Diesel	-	69,038	8,940
<i>Worker Commute</i>	Gasoline	-	41,272	4,702
<b>Total Per Year</b>		<b>861,092</b>	<b>148,705</b>	<b>18,598</b>
<b>Total 5-Year Period</b>		<b>4,305,459</b>	<b>743,527</b>	<b>92,989</b>

CO<sub>2</sub> = carbon dioxide  
 Lb = pound  
 Million = 1,000,000  
 BTU = British Thermal Unit

<b>Energy Construction Consumption Over 30 Years</b>				
	<i>Fuel</i>	<i>CO<sub>2</sub> LBs</i>	<i>Gallons</i>	<i>Million BTU</i>
<b>Total Over 30 Years</b>		<b>18,722,701</b>	<b>3,347,715</b>	<b>418,456</b>

### Operational Energy

<b>Annual Operational Energy Consumption</b>				
	<i>Fuel</i>	<i>CO<sub>2</sub> LBs per year</i>	<i>Gallons per year</i>	<i>Million BTU</i>
<i>Maintenance Worker Trips</i>	Gasoline	-	10,623	1,376
<b>Total Per Year</b>		<b>-</b>	<b>10,623</b>	<b>1,376</b>

<b>Energy Operational Consumption Over 30 Years</b>				
	<i>Fuel</i>	<i>CO<sub>2</sub> LBs</i>	<i>Gallons</i>	<i>Million BTU</i>
<b>Total Over 30 Years</b>		<b>-</b>	<b>318,690</b>	<b>41,280</b>

## Conversion Factor Table

Kg to lb	2.20462
Kg of CO <sub>2</sub> per gallon of diesel fuel <sup>1</sup>	10.21
Kg of CO <sub>2</sub> per gallon of gasoline <sup>1</sup>	8.78
Lbs of CO <sub>2</sub> per gallon of diesel fuel	22.5
Lbs of CO <sub>2</sub> per gallon of gasoline	19.4
BTUs per gallon of gasoline <sup>2</sup>	113,927
BTUs per gallon of diesel fuel <sup>2</sup>	129,448

Source 1: The Climate Registry 2017

Source 2: United States Department of Energy 2014

Kg = kilogram

Lb = pound

CO<sub>2</sub> = carbon dioxide

BTU = British Thermal Unit

