

**APPENDIX D**

**ENERGY CALCULATIONS AND DATA**

# Energy Use Summary

<b>Construction Phase (gallons/construction period)</b>		<b>Gasoline</b>	<b>Diesel</b>		
Construction Vehicles		93	1,508		
Worker Trips		256	1		
Vendor Trips		31	0		
Haul Trucks		0	72		
<b>Total</b>		<b>381</b>	<b>1,581</b>		

  

<b>Operations Phase (gallons/year)</b>		<b>Gasoline</b>	<b>Diesel</b>	<b>Natural Gas (kBTU/yr)</b>	<b>Electricity (kWh/yr)</b>
Fast Food Restaurant with Drive Thru		110,363	9,395	10,809,840	3,512,760
	0	0	0	0	0
	0	0	0	0	0
	0	0	0	0	0
	0	0	0	0	0
	0	0	0	0	0
<b>All Land Uses</b>		<b>110,363</b>	<b>9,395</b>	<b>10,809,840</b>	<b>3,512,760</b>

Operations Onroad Energy Use

Vehicle Types	MPG by Fuel Type						Population by Fuel Type					
	1	2	3	4	5	6	7	8	9	10	11	12
	Gasoline	Diesel	Electricity	Natural Gas	Plug-in Hybrid		Gasoline	Diesel	Electricity	Natural Gas	Plug-in Hybrid	Total
LDA	29.3	41.2	0.4	0.000	28.2		5,451,205	15,009	284,963	0	152,879	5,903,856
LDT1	24.4	23.4	0.4	0.000	28.0		505,255	185	1,243	0	799	507,433
LDT2	23.9	31.9	0.4	0.000	27.9		2,551,917	8,409	16,572	0	21,729	2,598,626
LHDT1	13.6	20.5	0.6	0.000	0.0		205,772	107,344	793	0	0	313,909
LHDT2	11.9	17.3	0.6	0.000	0.0		32,210	47,494	205	0	0	79,909
MCY	41.5	0.0	0.0	0.000	0.0		248,270	0	0	0	0	248,270
MDV	19.5	23.7	0.4	0.000	27.6		1,622,854	20,420	18,088	0	13,081	1,674,443
MH	4.9	10.1	0.0	0.000	0.0		30,227	12,282	0	0	0	42,510
MHDT	5.2	8.9	1.0	8.3	0.0		25,496	117,140	365	1,506	0	144,526
HHDT	4.0	6.1	1.8	6.0	0.0		66	101,735	317	10,386	0	112,504
OBUS	5.1	7.0	1.1	8.8	0.0		5,427	3,049	12	487	0	8,975
SBUS	8.9	7.3	1.2	4.2	0.0		2,859	3,436	23	3,247	0	9,564
UBUS	7.0	6.6	2.1	3.2	0.0		894	14	132	5,035	0	6,076
							10682454.0	436517.7	322712.3	20680.7	188228.4	11650593.1

Trips/Day	Trips/day	Trips/day	Trips/day	Total	VT/Day	VT/Day	VT/Day	Trip Length						
Land Use	Weekday	Saturday	Sunday	Weekly	Weekday	Saturday	Sunday	0	1	2	3	4	5	6
Fast Food Restaurant with Drive Thru	929.991	1216.668	933.2107500000	6799.83375	7,764	10,158	7,791	8.35						
Parking Lot	0	0	0	0	0	0	0							
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Fleet Mix	HHDT	LDA	LDT1	LDT2	LHDT1	LHDT2	MCY	MDV	MH	MHDT	OBUS	SBUS	UBUS	Total
Fast Food Restaurant with Drive Thru	1%	50%	4%	23%	3%	1%	2%	14%	0%	2%	0%	0%	0%	100.0%
														0.0%
														0.0%
														0.0%
														0.0%

Vehicle Trips	HHDT	LDA	LDT1	LDT2	LHDT1	LHDT2	MCY	MDV	MH	MHDT	OBUS	SBUS	UBUS	Total
Fast Food Restaurant with Drive Thru	5	467	39	213	25	6	20	134	4	14	1	1	0	933
Parking Lot	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>5</b>	<b>467</b>	<b>39</b>	<b>213</b>	<b>25</b>	<b>6</b>	<b>20</b>	<b>134</b>	<b>4</b>	<b>14</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>933</b>

Saturday Trips	HHDT	LDA	LDT1	LDT2	LHDT1	LHDT2	MCY	MDV	MH	MHDT	OBUS	SBUS	UBUS	Total
Fast Food Restaurant with Drive Thru	7	611	51	279	33	8	26	175	5	18	1	1	0	1,217
Parking Lot	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>7</b>	<b>611</b>	<b>51</b>	<b>279</b>	<b>33</b>	<b>8</b>	<b>26</b>	<b>175</b>	<b>5</b>	<b>18</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>1,217</b>

Sunday Trips	HHDT	LDA	LDT1	LDT2	LHDT1	LHDT2	MCY	MDV	MH	MHDT	OBUS	SBUS	UBUS	Total
Fast Food Restaurant with Drive Thru	5	469	39	214	25	6	20	135	4	14	1	1	0	933
Parking Lot	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>5</b>	<b>469</b>	<b>39</b>	<b>214</b>	<b>25</b>	<b>6</b>	<b>20</b>	<b>135</b>	<b>4</b>	<b>14</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>933</b>

Gallons of Fuel

Gasoline	HHDT	LDA	LDT1	LDT2	LHDT1	LHDT2	MCY	MDV	MH	MHDT	OBUS	SBUS	UBUS	Total
Fast Food Restaurant with Drive Thru	2	46,720	5,086	27,750	3,851	683	1,536	21,200	1,671	1,530	215	95	22	110,363
Land Use	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>2</b>	<b>46,720</b>	<b>5,086</b>	<b>27,750</b>	<b>3,851</b>	<b>683</b>	<b>1,536</b>	<b>21,200</b>	<b>1,671</b>	<b>1,530</b>	<b>215</b>	<b>95</b>	<b>22</b>	<b>110,363</b>

Diesel	HHDT	LDA	LDT1	LDT2	LHDT1	LHDT2	MCY	MDV	MH	MHDT	OBUS	SBUS	UBUS	Total
Fast Food Restaurant with Drive Thru	2,364	91	2	69	1,334	697	0	219	326	4,065	87	140	0	9,395
Land Use	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>2,364</b>	<b>91</b>	<b>2</b>	<b>69</b>	<b>1,334</b>	<b>697</b>	<b>0</b>	<b>219</b>	<b>326</b>	<b>4,065</b>	<b>87</b>	<b>140</b>	<b>0</b>	<b>9,395</b>

Electricity	HHDT	LDA	LDT1	LDT2	LHDT1	LHDT2	MCY	MDV	MH	MHDT	OBUS	SBUS	UBUS	Total
Fast Food Restaurant with Drive Thru	25	185,408	791	11,175	362	93	0	11,914	0	108	2	6	11	209,894
Land Use	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>25</b>	<b>185,408</b>	<b>791</b>	<b>11,175</b>	<b>362</b>	<b>93</b>	<b>0</b>	<b>11,914</b>	<b>0</b>	<b>108</b>	<b>2</b>	<b>6</b>	<b>11</b>	<b>209,894</b>

Natural Gas	HHDT	LDA	LDT1	LDT2	LHDT1	LHDT2	MCY	MDV	MH	MHDT	OBUS	SBUS	UBUS	Total
Fast Food Restaurant with Drive Thru	245	0	0	0	0	0	0	0	0	57	11	229	279	821
Land Use	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>245</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>57</b>	<b>11</b>	<b>229</b>	<b>279</b>	<b>821</b>

# Utilities

	<b>Natural Gas Use</b>	<b>Electricity Use</b>
Land Use	kBTU/yr	kWh/yr
Fast Food Restaurant with Drive	10809840	3512760
<b>Total</b>	<b>10,809,840</b>	<b>3,512,760</b>

## Offroad Construction Equipment Energy Use

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per	Hours Per Day	Horsepower	Load Factor	Horsepower Category	Num Days	Year	Fuel Consumption Rate (gal/hour)	Fuel Type	Total Fuel Consumption (gal/construction period)	
Demolition	Excavators	Diesel	Average	1	8	36	0.38	175	16	2024	2.9	Diesel	140	
Demolition	Skid Steer Loaders	Diesel	Average	2	8	71	0.37	50	16	2024	0.9	Diesel	88	
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	1	8	84	0.37	100	6	2024	1.6	Diesel	28	
Grading	Tractors/Loaders/Backhoes	Diesel	Average	1	7	84	0.37	100	11	2024	1.6	Diesel	45	
Grading	Excavators	Diesel	Average	1	8	36	0.38	175	11	2024	2.9	Diesel	97	
Grading	Skid Steer Loaders	Diesel	Average	1	8	71	0.37	50	11	2024	0.9	Diesel	30	
Building Construction	Cranes	Diesel	Average	1	4	367	0.29	300	61	2024	3.3	Diesel	231	
Building Construction	Forklifts	Diesel	Average	3	6	82	0.2	100	61	2024	2.0	Diesel	440	
Building Construction	Cement and Mortar Mixers	Diesel	Average	1	6	10	0.56	25	61	2024	0.4	Gasoline	79	
Building Construction	Rough Terrain Forklifts	Diesel	Average	1	8	96	0.4	100	61	2024	0.9	Diesel	167	
Paving	Cement and Mortar Mixers	Diesel	Average	1	6	10	0.56	25	11	2024	0.4	Gasoline	14	
Paving	Pavers	Diesel	Average	1	7	81	0.42	100	11	2024	1.7	Diesel	56	
Paving	Rollers	Diesel	Average	1	7	36	0.38	100	11	2024	1.7	Diesel	50	
Paving	Sweepers/Scrubbers	Diesel	Average	1	8	36	0.46	75	11	2024	1.7	Diesel	68	
Architectural Coating	Air Compressors	Diesel	Average	1	6	37	0.48	100	6	2024	1.3	Diesel	23	
Architectural Coating	Paving Equipment	Diesel	Average	1	8	89	0.36	100	6	2024	1.6	Diesel	28	
Architectural Coating	Rough Terrain Forklifts	Diesel	Average	1	8	96	0.4	100	6	2024	0.9	Diesel	16	
												<b>Total</b>	<b>Gasoline</b>	<b>93</b>
												<b>Total</b>	<b>Diesel</b>	<b>1,508</b>
														<b>1,602</b>

# Onroad Construction Energy Use

Year 2024

Vehicle Types	MPG by Fuel Type					Population by Fuel Type					
	Gasoline	Diesel	Electricity	Natural Gas	Plug-in Hybrid	Gasoline	Diesel	Electricity	Natural Gas	Plug-in Hybrid	Total
LDA	29.3	41.2	0.4	0.000	28.2	5,451,205	15,009	284,963	0	152,679	5,903,856
LDT1	24.4	23.4	0.4	0.000	28.0	505,255	186	1,243	0	739	507,423
LDT2	23.9	31.9	0.4	0.000	27.9	2,551,917	8,409	16,572	0	21,729	2,598,626
LHDT1	13.6	20.5	0.6	0.000	0.0	205,772	107,344	793	0	0	313,909
LHDT2	11.9	17.3	0.6	0.000	0.0	32,210	47,494	205	0	0	79,909
MCY	41.5	0.0	0.0	0.000	0.0	248,270	0	0	0	0	248,270
MDV	19.5	23.7	0.4	0.000	27.6	1,622,854	20,420	18,088	0	13,081	1,674,443
MH	4.9	10.1	0.0	0.000	0.0	30,227	12,282	0	0	0	42,510
MHDT	5.2	8.9	1.0	8.3	0.0	25,496	117,140	365	1,526	0	144,526
HHDT	4.0	6.1	1.8	6.0	0.0	66	101,735	317	10,386	0	112,504
OBUS	5.1	7.0	1.1	8.8	0.0	5,427	3,049	12	487	0	8,975
SBUS	8.9	7.3	1.2	4.2	0.0	2,859	3,436	23	3,247	0	9,564
UBUS	7.0	6.6	2.1	3.2	0.0	894	14	132	5,035	0	6,076
						10,682,454	436,518	322,712	20,681	188,228	11,650,593

Daily Trips						
Phase Name	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length
Site Preparation	3	0	4	18.5	10.2	20
Grading	8	0	0	18.5	10.2	20
Building Construction	2	1	0	18.5	10.2	20
Paving	10	0	0	18.5	10.2	20
Architectural Coating	0	0	0	18.5	10.2	20
<b>Total Trips</b>						
Site Preparation	18	0	24	18.5	10.2	20
Grading	88	0	0	18.5	10.2	20
Building Construction	122	61	0	18.5	10.2	20
Paving	110	0	0	18.5	10.2	20
Architectural Coating	0	0	0	18.5	10.2	20
<b>Total</b>						

Gasoline Consumption			Diesel Consumption		
Worker	Vendor	Haul	Worker	Vendor	Haul
14	0	0	0	0	72
67	0	0	0	0	0
93	31	0	0	0	0
83	0	0	0	0	0
0	0	0	0	0	0
<b>256</b>	<b>31</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>72</b>