

Appendix E

Energy Modeling Data

Energy Calculations Summary

Operational Fuel Use Summary

Vehicle Class	Diesel Gallons	Gasoline Gallons
Passenger	62	9,504
Truck	3,463	8,265
Bus	115	260
Other	9	46
Total	3,649	18,075

1. Fleet mix calculated from CalEEMod default values.
2. Gallons per mile calculated from EMFAC 2014.
3. Annual VMT obtained from CalEEMod output file.

Operational Energy Consumption Summary

Land Use	Electricity (MW/h)	Natural Gas
General Office	6,906	0
Total	6,906	0

1. Electricity consumption derived from CalEEMod

Energy Calculations Summary

Construction Fuel Usage Summary

Construction Phase	Diesel	Gasoline	Diesel	Diesel
	Off-road Equipment (gallons)	On-road (gallons)	On-road (gallons)	Total
2022	668	141	44,628	45,296
2023	13,725	19,095	24,603	38,328
2024	8,459	10,838	13,532	21,990
TOTAL	22,852	30,073	82,763	105,615

Total Gasoline	30,073	gallons
Total Diesel	105,615	gallons

2022 Construction Offroad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor	Number of days	Diesel Fuel Usage
Demolition	Concrete/Industrial Saws	1	8	81	0.73	31	733
Demolition	Rubber Tired Dozers	1	1	247	0.4	31	153
Demolition	Tractors/Loaders/B ackhoes	2	6	97	0.37	31	668
Demolition	Cranes	1	8	231	0.29	31	831
Site Preparation	Graders	1	8	187	0.41	3	92
Site Preparation	Tractors/Loaders/B ackhoes	1	8	97	0.37	3	43
Building Construction	Cranes	1	4	231	0.29	226	3,028
Building Construction	Forklifts	2	6	89	0.20	226	2,414
Building Construction	Tractors/Loaders/B ackhoes	2	8	97	0.37	226	6,489
TOTAL							668

Notes: Equipment assumptions are consistent with CalEEMod. Fuel usage average of 0.05 gallons of diesel fuel per horsepower-hour is from the SCAQMD CEQA Air Quality Handbook, Table A9-3E.

Trips and VMT

Phase Name	Daily Worker Trip	Daily Vendor Trip	Daily Hauling Trip	Days per Year	Total Worker Trips	Total Vendor Trips	Total Haul Trips	Worker Trip Length (miles)	Vendor Trip Length (miles)	Haul Trip Length (miles)	Total Worker Trip Length (miles)	Total Vendor Trip Length (miles)	Total Haul Trip Length (miles)	Total gallons of gasoline	Total gallons of diesel
Demolition	13	0	534	31	403	0	16,554.00	10.00	6.50	20.00	4030	0	331,080.00	141	44,628
Site Prep	5	0	0	3	15	0	-	10.00	6.50	20.00	150	0	-	5	0
Building Construction	210	108	0	226	47460	24408	-	10.00	6.50	20.00	474600	158652	-	16,598	21,386
TOTAL													141	44,628	

Notes: Consistent with CalEEMod, worker vehicles assumed to be gasoline and 50% LDA, 25% LDT1, and 25% LDT2. Vendor and haul trips are assumed to be 100% diesel Heavy-Duty Trucks (T7).

Number of Days Adjusted as demolition would occur over 2 years, but not at same degree year round

Phase 2 Construction Offroad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor	Number of days	Diesel Fuel Usage
Building Construction	Cranes	1	4	231	0.29	260	3,483
Building Construction	Forklifts	2	6	89	0.20	260	2,777
Building Construction	Tractors/Loaders/Back hoes	2	8	97	0.37	260	7,465
TOTAL							13,725

Notes: Equipment assumptions are consistent with CalEEMod. Fuel usage average of 0.05 gallons of diesel fuel per horsepower-hour is from the SCAQMD CEQA Air Quality Handbook, Table A9-3E.

Trips and VMT

Phase Name	Daily Worker Trip	Daily Vendor Trip	Daily Haul Trip	Days per Year	Total Worker Trips	Total Vendor Trips	Total Haul Trips	Worker Trip Length (miles)	Vendor Trip Length (miles)	Haul Trip Length (miles)	Total Worker Trip Length (miles)	Total Vendor Trip Length (miles)	Total Haul Trip Length (miles)	Total gallons of gasoline	Total gallons of diesel
Building Construction	210	108	0	260	54,600	28,080	0	10.00	6.50	20.00	546,000.00	182,520.00	-	19,095	24,603
TOTAL													19,095	24,603	

Notes: Consistent with CalEEMod, worker vehicles assumed to be gasoline and 50% LDA, 25% LDT1, and 25% LDT2. Vendor and haul trips are assumed to be 100% diesel Heavy-Duty Trucks (T7).

Phase 3 Construction Offroad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor	Number of days	Diesel Fuel Usage
Building Construction	Cranes	1	4	231	0.29	143	1,916
Building Construction	Forklifts	2	6	89	0.20	143	1,527
Building Construction	Tractors/Loaders/Balckhoes	2	8	97	0.37	143	4,106
Paving	Cement and Mortar Mixerts	4	6.00	9	0.56	16	97
Paving	Pavers	1	6.00	130	0.42	16	262
Paving	Rollers	1	7.00	80	0.38	16	170
Paving	Tractors/Loaders/Balckhoes	1	7.00	97	0.37	16	201
Architectural Coating	Air Compressors	1	6.00	78	0.48	16	180
TOTAL							8,459

Notes: Equipment assumptions are consistent with CalEEMod. Fuel usage average of 0.05 gallons of diesel fuel per horsepower-hour is from the SCAQMD CEQA Air Quality Handbook, Table A9-3E.

Trips and VMT

Phase Name	Daily Worker Trip	Daily Vendor Trip	Daily Haul Trip	Days per Year	Total Worker Trips	Total Vendor Trips	Total Haul Trips	Worker Trip Length (miles)	Vendor Trip Length (miles)	Haul Trip Length (miles)	Total Worker Trip Length (miles)	Total Vendor Trip Length (miles)	Total Haul Trip Length (miles)	Total gallons of gasoline	Total gallons of diesel
Building Construction	210	108	0	143	30,030	15,444	0	10.00	6.50	20.00	300,300.00	100,386.00	-	10,502	13,532
Paving	18	0	0	16	288	0	0	10.00	6.50	20.00	2,880.00	0.00	-	101	0
Architectural Coating	42	0	0	16	672	0	0	10.00	6.50	20.00	6,720.00	0.00	-	235	0
TOTAL													10,838	13,532	

Notes: Consistent with CalEEMod, worker vehicles assumed to be gasoline and 50% LDA, 25% LDT1, and 25% LDT2. Vendor and haul trips are assumed to be 100% diesel Heavy-Duty Trucks (T7).

EMFAC2017 (v1.0.2) Emissions Inventory

Region Type: County

Region: Sacramento

Calendar Year: 2022

Season: Annual

Vehicle Classification: EMFAC2011 Categories

Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	CalYr	VehClass	MdYr	Speed miles/hr	Fuel	Population vehicles	VMT miles/day	Trips trips/day	Fuel gas 1,000 gallons/day	Diesel gas 1,000 gallons/day	Miles per gallon	Gasoline miles per gallon	Diesel miles per gallon
Sacramento	2022	LDA	Aggregated	Aggregated	GAS	591545.26	21127372.04	2764927.853	673.142382	0.00	31.39	28.59	7.42
Sacramento	2022	LDT1	Aggregated	Aggregated	GAS	64366.141	2129386.502	292380.935	79.27891431	0.00	26.86		
Sacramento	2022	LDT2	Aggregated	Aggregated	GAS	206880.89	7073751.275	955128.7989	285.8595601	0.00	24.75		
Sacramento	2022	T7 tractor	Aggregated	Aggregated	DSL	836.83148	113851.5548	10627.75974	0.00	15.34673242	7.42		

Notes: Consistent with CalEEMod, worker vehicles assumed to be gasoline and 50% LDA, 25% LDT1, and 25% LDT2. Vendor trips are assumed to be 100% diesel Heavy-Duty Trucks (T7).

EMFAC2014 (v1.0.7) Emissions Inventory

Region Type: County

Region: Sacramento

Calendar Year: 2035

Season: Annual

Vehicle Classification: EMFAC2007 Categories

Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	CalYr	VehClass	Class	MdYr	Speed	Fuel	Population	VMT (mi/day)	Trips	Fuel_Consumption (1000 gal/day)
Sacramento	2025	HHDT	Truck	Aggregated	Aggregated	GAS	3.79919	436.9138529	76.01420156	0.092454631
Sacramento	2025	HHDT	Truck	Aggregated	Aggregated	DSL	11070.84	872315.1557	84804.22994	129.6422103
Sacramento	2025	LDA	Passenger	Aggregated	Aggregated	GAS	635993.9	22083309.1	2975296.709	646.2925243
Sacramento	2025	LDA	Passenger	Aggregated	Aggregated	DSL	6649.442	234801.7456	31098.57445	4.264579094
Sacramento	2025	LDT1	Truck	Aggregated	Aggregated	GAS	67470.71	2184625.242	307534.2504	75.11737391
Sacramento	2025	LDT1	Truck	Aggregated	Aggregated	DSL	140.8336	2204.901274	499.9570507	0.099277736
Sacramento	2025	LDT2	Truck	Aggregated	Aggregated	GAS	216827.9	7183351.656	1000201.342	262.0448109
Sacramento	2025	LDT2	Truck	Aggregated	Aggregated	DSL	1470.049	56082.31935	7131.619396	1.380795867
Sacramento	2025	LHDT1	Truck	Aggregated	Aggregated	GAS	15746.14	503892.4636	234594.066	58.51976343
Sacramento	2025	LHDT1	Truck	Aggregated	Aggregated	DSL	14028.14	464430.9455	176456.4006	24.82646121
Sacramento	2025	LHDT2	Truck	Aggregated	Aggregated	GAS	2210.576	71705.82859	32934.29175	9.497474869
Sacramento	2025	LHDT2	Truck	Aggregated	Aggregated	DSL	4892.829	165165.4512	61545.62986	9.863233728
Sacramento	2025	MCY	Passenger	Aggregated	Aggregated	GAS	31111.12	202614.2099	62222.23519	5.414776221
Sacramento	2025	MDV	Truck	Aggregated	Aggregated	GAS	149939.7	4660429.496	680430.6375	209.4058019
Sacramento	2025	MDV	Truck	Aggregated	Aggregated	DSL	3616.435	131507.616	17290.97515	4.29993583
Sacramento	2025	MH	Other	Aggregated	Aggregated	GAS	2782.086	23872.59918	278.3198551	4.795984996
Sacramento	2025	MH	Other	Aggregated	Aggregated	DSL	1089.629	9237.041194	108.9629127	0.913185248
Sacramento	2025	MHDT	Truck	Aggregated	Aggregated	GAS	1977.284	91588.29974	39561.49385	18.61689153
Sacramento	2025	MHDT	Truck	Aggregated	Aggregated	DSL	14051	687650.2433	109803.271	69.14698109
Sacramento	2025	OBUS	Bus	Aggregated	Aggregated	GAS	530.339	21755.56783	10611.02318	4.461708783
Sacramento	2025	OBUS	Bus	Aggregated	Aggregated	DSL	553.9268	37592.68085	5333.49325	4.609390949
Sacramento	2025	SBUS	Bus	Aggregated	Aggregated	GAS	140.3978	6621.707083	561.5912187	0.670481449
Sacramento	2025	SBUS	Bus	Aggregated	Aggregated	DSL	1017.715	31735.71784	11744.2882	3.9088362
Sacramento	2025	UBUS	Bus	Aggregated	Aggregated	GAS	223.5493	16877.78971	894.1970716	3.887577899
Sacramento	2025	UBUS	Bus	Aggregated	Aggregated	DSL	0.928071	76.34290744	3.712282218	0.008737484

Project VMT (mi/yr)	562,092	From CalEEMod output
Project Mobile Emissions (MT/yr)	204	From CalEEMod output

	Gas (gal)	Diesel (gal)
Passenger	9,504	62
Truck	8,265	3,463
Bus	260	115
Other	46	9
Total	18,075	3,649

Fuel (gal/day)	mi/gal	CO2_RUNEX (tons/day)	CO2 (lb/day)	% of vehicle class EMFAC	% vehicle class CalEEMod	% vehicle class project	VMT by project vehicle class (mi/yr)	Gallons of fuel
92.45463113	4.725710844	0.872132682	1,744	0.000500616	0.026318	1.31752E-05	7.405684638	1.567104904
129642.2103	6.728635325	1349.213083	2,698,426	0.999499384	0.026318	0.026304825	14785.73157	2197.433931
646292.5243	34.16921637	5953.880105	11,907,760	0.989479318	0.578893	0.572802651	321967.7876	9422.744265
4264.579094	55.0585979	47.85047224	95,701	0.010520682	0.578893	0.006090349	3423.336521	62.17623861
75117.37391	29.08282236	690.8801815	1,381,760	0.998991736	0.033999	0.03396472	19091.29742	656.4458285
99.27773636	22.20942333	1.113940312	2,228	0.001008264	0.033999	3.428E-05	19.26848834	0.867581659
262044.8109	27.41268423	2409.561132	4,819,122	0.992253218	0.21284	0.211191175	118708.8699	4330.435825
1380.795867	40.61593801	15.49314313	30,986	0.007746782	0.21284	0.001648825	926.7914293	22.81841746
58519.76343	8.6106374	547.4713024	1,094,943	0.520376208	0.010628	0.005530558	3108.682597	361.0281623
24826.46121	18.70709408	276.5009382	553,002	0.479623792	0.010628	0.005097442	2865.231179	153.1628144
9497.474869	7.549988769	88.873873	177,748	0.302720653	0.004325	0.001309267	735.9284088	97.47410643
9863.233728	16.74556801	109.5256714	219,051	0.697279347	0.004325	0.003015733	1695.119491	101.2279482
5414.776221	37.41875963	47.0394329	94,079	1	0.005392	0.005392	3030.800064	80.99680732
209405.8019	22.25549365	1922.113334	3,844,227	0.972556481	0.104491	0.101623399	57121.69975	2566.633688
4299.93583	30.58362291	48.24719052	96,494	0.027443519	0.104491	0.002867601	1611.855423	52.70322051
4795.984996	4.977621739	45.42891462	90,858	0.721016565	0.000566	0.000408095	229.3871461	46.08368375
913.1852478	10.1151888	10.24634422	20,493	0.278983435	0.000566	0.000157905	88.75692594	8.774618811
18616.89153	4.919634386	173.5604232	347,121	0.117535639	0.018736	0.002202148	1237.809618	251.6060181
69146.98109	9.944761614	753.3871604	1,506,774	0.882464361	0.018736	0.016533852	9293.546094	934.516729
4461.708783	4.876061816	41.73947027	83,479	0.366574723	0.001852	0.000678896	381.6022282	78.26033438
4609.390949	8.155672032	50.18123106	100,362	0.633425277	0.001852	0.001173104	659.3921558	80.85074452
670.4814492	9.876048161	5.946047279	11,892	0.17263169	0.000598	0.000103234	58.02686531	5.875514615
3908.8362	8.118968465	39.68552184	79,371	0.82736831	0.000598	0.000494766	278.1041507	34.2536311
3887.577899	4.341466627	36.74303479	73,486	0.995497092	0.001362	0.001355867	762.1220155	175.5448287
8.737484024	8.737401663	0.098038453	196	0.004502908	0.001362	6.13296E-06	3.447288507	0.394543898

Gasoline Sum	18,075
Diesel Sum	3,649