

APPENDIX O
ENERGY CALCULATIONS

CONSTRUCTION

**CONSTRUCTION ELECTRICITY CONSUMPTION FROM WATER USAGE
 – PROJECT AND FLEXIBILITY OPTION**

Phase	Duration (days)	Daily Acreage Disturbed ¹	Associated Water (gal) ²	Associated Electricity (kWh) ³
Demolition	47	0	0	0
Site Preparation	6	0.07	1,299	13
Grading	12	0.4	13,590	136
Building Construction	475	0	0	0
Paving	24	0	0	0
Architectural Coating	24	0	0	0
Total			14,889	149
Notes: gal = gallons; kWh = kilowatt hours 1 Based on the project-specific total acreage disturbed during each phase of construction divided by the number of days for that phase. 2 Water associated with dust control is based on an application rate of 3,020 gal/acre/day. Source: Air & Waste Management Association, Air Pollution Engineering Manual (1992 Edition). 3 Each gallon of delivered water for outdoor use in Southern California is associated with 0.009727 kWh of electricity. Source: CalEEMod. Source (table): EcoTierra Consulting, Inc., 2020.				

**CONSTRUCTION ELECTRICITY CONSUMPTION FROM EQUIPMENT
 (GENERATOR EQUIVALENCY)
 – PROJECT AND FLEXIBILITY OPTION**

Generator ¹	
Horse Power (kW)	84
Typical Load (%)	74
Average Output (kW)	62.16
Daily Usage (hours)	8
Average Daily Output (kWh/day)	497.28
Building Construction Duration (days)	475
Total (kWh)	236,208
Notes: kW = kilowatt; % = percent); kWh/day = kilowatt hours per day 1 Horse power rating, load factor, daily usage hours information is based on project-specific equipment assumptions contained in the CalEEMod sheets prepared for the air quality and greenhouse gas analyses. Source (table): EcoTierra Consulting, Inc., 2020.	

Subtotal Water	149 kWh
Subtotal Generator	236,208 kWh
Total Construction Electricity – Project and Flexibility Option	236,357 kWh

Construction Diesel Consumption From Off-Road Equipment – Project and Flexibility Option

OFFROAD2011 Consumption Rate:¹ 0.05 gallons per hp-hr

Total hp-hr: 968,793 hp-hr

Total Off-Road Diesel Consumption (Project and Flexibility Option): 48,440 gallons

1 California Air Resources Board, OFFROAD2017: average of <50 hp and >50 hp.

Construction Phase ¹	Equipment ¹	Number ¹	Hours/Day ¹	HP ¹	Load ¹	Days ¹	Total hp-hr
Demolition	Concrete/Industrial Saws	1	8	81	0.73	47	22233
Demolition	Rubber Tired Dozers	1	8	247	0.40	47	37149
Demolition	Tractors/Loaders/Backhoes	3	8	97	0.37	47	40484
Site Preparation	Graders	0	8	187	0.41	6	0
Site Preparation	Rubber Tired Dozers	0	7	247	0.40	6	0
Site Preparation	Tractors/Loaders/Backhoes	1	8	97	0.37	6	1723
Grading	Graders	1	6	187	0.41	12	5520
Grading	Rubber Tired Dozers	1	6	247	0.40	12	7114
Grading	Tractors/Loaders/Backhoes	1	7	97	0.37	12	3015
Building Construction	Cranes	1	6	231	0.29	475	190922
Building Construction	Forklifts	1	6	89	0.20	475	50730
Building Construction	Generator Sets	1	8	84	0.74	475	236208
Building Construction	Tractors/Loaders/Backhoes	1	6	97	0.37	475	102287
Building Construction	Welders	3	8	46	0.45	475	235980
Paving	Cement and Mortar Mixers	1	6	9	0.56	24	726
Paving	Pavers	1	6	130	0.42	24	9647
Paving	Paving Equipment	1	8	132	0.36	24	2563
Paving	Rollers	1	7	80	0.38	24	11935
Paving	Tractors/Loaders/Backhoes	1	8	97	0.37	24	5168
Architectural Coating	Air Compressors	1	6	78	0.48	24	5391
Total							968,793

Notes:

hp = horse power; hp-hr = horse power hours; gal = gallons

1 Equipment details based on project-specific assumptions. Source: CalEEMod data sheets prepared for the air quality and greenhouse gas analyses.

Source (table): EcoTierra Consulting, Inc., 2020.

1100 E. 5th Street Project
Energy Calculation Worksheets

Construction Diesel Consumption From On-Road Equipment – Project and Flexibility Option

EMFAC2017 Diesel Fuel Consumption Factor – Vendor:¹ 17.65 miles per gallon
 Total On-Road Vendor VMT: 262,200 miles
 Total Vendor Diesel Consumption (Project and Flexibility Option): 14,851 gallons

EMFAC2017 Diesel Fuel Consumption Factor – Hauler:² 6.99 miles per gallon
 Total On-Road Hauler VMT: 14,620 miles
 Total Hauler Diesel Consumption (Project and Flexibility Option): 2,093 gallons

Total On-Road Diesel (Project and Flexibility Option): 16,944 gallons

- 1 California Air Resources Board, EMFAC2017: Los Angeles County, 2023 (construction year), Season: Annual, Vehicles: LHDT1, LHDT2, MHDT, Model Year: Aggregate, Speed: Aggregate.
- 2 California Air Resources Board, EMFAC2017: Los Angeles County, 2023 (construction year), Season: Annual, Vehicles: HHDT, Model Year: Aggregate, Speed: Aggregate.

Phase ¹	Days ¹	Vendor			Hauler		
		Trips ¹	Miles/Trip ¹	VMT	Trips ¹	Miles/Trip ¹	VMT
Demolition	47	0	6.9	0	161	20	3220
Site Preparation	6	0	6.9	0	0	20	0
Grading	12	0	6.9	0	380	30	11400
Building Construction	475	80	6.9	262,200	0	20	0
Paving	24	0	6.9	0	0	20	0
Architectural Coating	24	0	6.9	0	0	20	0
Total				262,200			14,620
1 Equipment details based on project-specific assumptions. Source: CalEEMod data sheets prepared for the air quality and greenhouse gas analyses. Source (table): EcoTierra Consulting, Inc., 2020.							

Subtotal Off-Road 48,440 gallons
 Subtotal On-Road 16,944 gallons
Total Construction Diesel – Project and Flexibility Option 65,383 gallons

Construction Gasoline Consumption From On-Road Equipment – Project

EMFAC2017 Gasoline Fuel Consumption Factor – Worker:¹ 27.70 miles per gallon
 Total On-Road Worker VMT: 1,153,259 miles
Total Worker Gasoline Consumption (Project): 41,634 gallons

- 1 California Air Resources Board, EMFAC2017: Los Angeles County, 2023 (construction year), Season: Annual, Vehicles: LDA, LDT1, LDT2, Model Year: Aggregate, Speed: Aggregate.

Phase ¹	Days ¹	Trips ¹	Miles/Trip ¹	VMT
Demolition	47	13	14.7	8982
Site Preparation	6	3	14.7	265
Grading	12	30	14.7	5292
Building Construction	475	160	14.7	1117200
Paving	24	13	14.7	4586
Architectural Coating	24	48	14.7	16934
Total				1,153,259
<p>¹ Equipment details based on project-specific assumptions. Source: CalEEMod data sheets prepared for the air quality and greenhouse gas analyses. Source (table): EcoTierra Consulting, Inc., 2020.</p>				

Construction Gasoline Consumption From On-Road Equipment – Flexibility Option

EMFAC2017 Gasoline Fuel Consumption Factor – Worker:¹ 27.70 miles per gallon

Total On-Road Worker VMT: 1,152,906 miles

Total Worker Gasoline Consumption (Flexibility Option): 41,622 gallons

- 1 California Air Resources Board, EMFAC2017: Los Angeles County, 2023 (construction year), Season: Annual, Vehicles: LDA, LDT1, LDT2, Model Year: Aggregate, Speed: Aggregate.

Phase ¹	Days ¹	Trips ¹	Miles/Trip ¹	VMT
Demolition	47	13	14.7	8982
Site Preparation	6	3	14.7	265
Grading	12	30	14.7	5292
Building Construction	475	160	14.7	1117200
Paving	24	13	14.7	4586
Architectural Coating	24	47	14.7	16582
Total				1,152,906
<p>¹ Equipment details based on project-specific assumptions. Source: CalEEMod data sheets prepared for the air quality and greenhouse gas analyses. Source (table): EcoTierra Consulting, Inc., 2020.</p>				

OPERATION

1100 E. 5th Street Project
Energy Calculation Worksheets

ANNUAL ENERGY CONSUMPTION SUMMARY – PROJECT

Land Use	Direct Electricity Consumption (kWh/yr) ¹	Indirect Water-Related Electricity Consumption (kWh/yr) ²	Total Electricity Consumption (kWh/yr)	Natural Gas Consumption (kBTU/yr) ³	Natural Gas Consumption (cf/yr) ⁴	VMT (miles) ⁵	Gasoline Consumption (gal/yr) ⁶	Diesel Consumption (gal/yr) ⁷
Apartments – Low Rise	834886	215184	1,050,070	2371110	2432759	--	--	--
Enclosed Parking with Elevator	802386	0	802,386	0	0	--	--	--
General Office Building	257526	58455	315,981	230686	236684	--	--	--
High Turnover (Sit Down Restaurant)	813071	56552	869,623	4524970	4642619	--	--	--
Other Non-Asphalt Surfaces	0	0	0	0	0	--	--	--
Regional Shopping Center	101922	10037	111,959	14971.6	15361	--	--	--
Weekday VMT Only	--	--	--	--	--	4,664,400	143,766	15,050
Weekend VMT Only	--	--	--	--	--	1,088,395	33,546	3,512
Total:	2,809,791	340,228	3,150,019	7,141,738	7,327,423	5,752,795	177,312	18,561

Notes:

kWh/yr = kilowatt hours per year; kBTU/yr = kilo-British thermal unit per year; cf/yr = cubic feet; gal = gallons

- 1 Source: CalEEMod data sheets prepared for the air quality and greenhouse gas analyses.
- 2 Based on size- and land use-specific yearly consumption rates for indoor and outdoor water use. The delivery, treatment, and distribution of water within Southern California requires 0.0111 kWh of electricity per indoor gallon and 0.009727 kWh of electricity per outdoor gallon. Source: CalEEMod.
- 3 Source: CalEEMod data sheets prepared for the air quality and greenhouse gas analyses.
- 4 1 kBTU/yr = 1.026 cf/yr.
- 5 Source: CalEEMod data sheets prepared for the air quality and greenhouse gas analyses.
- 6 Based on a county-specific percentage of VMT by gasoline-powered fleet of 90.74 percent and a county-specific gasoline mpg weighted for associated percentage of VMT of 29.44 mpg for 2025 (the operation year). Source: EMFAC2017; Season: Annual, Vehicles: All, Model Year: Aggregate, Speed: Aggregate.
- 7 Based on a county-specific percentage of VMT by diesel-powered fleet of 6.82 percent and a county-specific diesel mpg weighted for associated percentage of VMT of 21.14 mpg for 2025 (the operation year). Source: EMFAC2017; Season: Annual, Vehicles: All, Model Year: Aggregate, Speed: Aggregate.

Source (table): EcoTierra Consulting, Inc., 2020.

1100 E. 5th Street Project
Energy Calculation Worksheets

ANNUAL ENERGY CONSUMPTION SUMMARY – FLEXIBILITY OPTION

Land Use	Direct Electricity Consumption (kWh/yr) ¹	Indirect Water-Related Electricity Consumption (kWh/yr) ²	Total Electricity Consumption (kWh/yr)	Natural Gas Consumption (kBTU/yr) ³	Natural Gas Consumption (cf/yr) ⁴	VMT (miles) ⁵	Gasoline Consumption (gal/yr) ⁶	Diesel Consumption (gal/yr) ⁷
Apartments – Low Rise	758988	195621	954,609	2155560	2211605	--	--	--
Enclosed Parking with Elevator	802386	0	802,386	0	0	--	--	--
General Office Building	460490	104539	565,029	412496	423221	--	--	--
High Turnover (Sit Down Restaurant)	813071	56552	869,623	4524970	4642619	--	--	--
Other Non-Asphalt Surfaces	0	0	0	0	0	--	--	--
Regional Shopping Center	101922	10037	111,959	14971.6	15361	--	--	--
Weekday VMT Only	--	--	--	--	--	4,781,400	147,372	15,427
Weekend VMT Only	--	--	--	--	--	1,061,575	32,720	3,425
Total:	2,936,857	366749	3,303,606	7,107,998	7,292,806	5,842,975	180,091	18,852

Notes:

kWh/yr = kilowatt hours per year; kBTU/yr = kilo-British thermal unit per year; cf/yr = cubic feet; gal = gallons

- 1 Source: CalEEMod data sheets prepared for the air quality and greenhouse gas analyses.
- 2 Based on size- and land use-specific yearly consumption rates for indoor and outdoor water use. The delivery, treatment, and distribution of water within Southern California requires 0.0111 kWh of electricity per indoor gallon and 0.009727 kWh of electricity per outdoor gallon. Source: CalEEMod.
- 3 Source: CalEEMod data sheets prepared for the air quality and greenhouse gas analyses.
- 4 1 kBTU/yr = 1.026 cf/yr.
- 5 Source: CalEEMod data sheets prepared for the air quality and greenhouse gas analyses.
- 6 Based on a county-specific percentage of VMT by gasoline-powered fleet of 90.74 percent and a county-specific gasoline mpg weighted for associated percentage of VMT of 29.44 mpg for 2025 (the operation year). Source: EMFAC2017; Season: Annual, Vehicles: All, Model Year: Aggregate, Speed: Aggregate.
- 7 Based on a county-specific percentage of VMT by diesel-powered fleet of 6.82 percent and a county-specific diesel mpg weighted for associated percentage of VMT of 21.14 mpg for 2025 (the operation year). Source: EMFAC2017; Season: Annual, Vehicles: All, Model Year: Aggregate, Speed: Aggregate.

Source (table): EcoTierra Consulting, Inc., 2020.