Appendix M
Energy Calculation Worksheets

M-1 Construction without Project Design Features Energy

550 Shatto Place Project
Construction Energy Analysis

Annual Fuel Summary

Off-Road Heavy-Duty Construction Equipment	
92,771	Diesel Consumption (gal)
42,009	Annual Diesel Consumption (gal/year)
On-Road Construction Equipment	
	Haul Trucks
31,267	Diesel Consumption (gal)
14,159	Annual Diesel Consumption (gal/year)
	Vendor Trucks
50,527	Diesel Consumption (gal)
22,880	Annual Diesel Consumption (gal/year)
	Workers
65,412	Gas Consumption (gal)
29,620	Annual Gas Consumption (gal/year)
	Total On-Road
81,795	Total Diesel Consumption (gal)
37,039	Annual Diesel Consumption (gal/year)
65,412	Project Gas Consumption (gal)
29,620	Annual Gas Consumption (gal/year)
174,566	**Total Gallons Diesel**
65,412	**Total Gallons Gasoline**
239,978	**Total Gallons Fuel (Gas and Diesel)**

2.2	Estimated Project Construction Duration (years)
79,049	Annual Average Gallons Diesel
29,620	Annual Average Gallons Gasoline

Los Angeles County Fuel Consumption (2016) [1]			**Percent of Annual Project Compared to County**
Source	**Fuel Type**	**Gallons**	
Off-Road/Vendor/Haul Trucks	Diesel	580,769,231	0.01%
Workers	Gasoline	3,577,000,000	0.0008%

Annual Electricity Summary

	Construction Water and Equipment
22,761	kWh total
10,307	kWh annual average
	LADWP Electricity Sales (2016-2017) [2]
22,878,000,000	kWh annual
0.00005%	**Percent of Annual Project Compared to LADWP**

Notes:

1. California Energy Commission, California Retail Fuel Outlet Annual Reporting (CEC-A15) Results, 2016, http://www.energy.ca.gov/almanac/transportation_data/gasoline/2016_A15_Results.xlsx. Accessed September 2018. Diesel is adjusted to account for retail (52%) and non-retail (48%) diesel sales.
2. Los Angeles Department of Water and Power, 2016 Final Power Integrated Resource Plan, Appendix A, 2016.

550 Shatto Place Project
Operational Energy Analysis

Construction Water Energy Estimates

Source	CalEEMod Construction Water Use (Mgal/yr)	Total Water Use (Mgal/yr)	Electricity Demand from water Demand (kWh)
550 Shatto Place	1.748	1.748	22761
Net Total	**1.748**	**1.748**	**22761**

CalEEMod Water Electricity Factors	Electricity Intensity Factor To Supply (kWh/Mgal)	Electricity Intensity Factor To Treat (kWh/Mgal)	Electricity Intensity Factor To Distribute (kWh/Mgal)	Electricity Intensity Factor For Wastewater Treatment (kWh/Mgal)
550 Shatto Place	9727	111	1272	1911

Source: California Emissions Estimator Model (CalEEMod).

550 Shatto Place Project
Construction Energy Analysis

Off-Road Equipment

Equipment ≤ 50 hp		
pounds fuel/hp-hr (OFFROAD2011 model, ≤ 50 hp):	0.408	lb/hp-hr
diesel pounds/gallon (CARB density assumption):	7.07	lb/gal
diesel gallons/hp-hr:	0.0577	gal/hp-hr
Total <50	191,994	hp-hr
Total diesel gallons:	11,080	gal
Equipment > 50 hp		
pounds fuel/hp-hr (OFFROAD2011 model, > 50 hp):	0.367	lb/hp-hr
diesel pounds/gallon (CARB density assumption):	7.07	lb/gal
diesel gallons/hp-hr:	0.0519	gal/hp-hr
Total >50	1,573,724	hp-hr
Total diesel gallons:	81,691	gal
Total diesel gallons (off-road equipment):	**92,771**	**gal**

Construction Phase	Equipment	Number	Hours/Day	HP	Load	Days	Total hp-hr
Demolition	Concrete/Industrial Saws	1	8	81	0.73	53	25,071
Demolition	Rubber Tired Dozers	1	8	247	0.4	53	41,891
Demolition	Tractors/Loaders/Backhoes	3	8	97	0.37	53	45,652
Grading/Excavation	Bore/Drill Rigs	1	8	221	0.5	128	113,152
Grading/Excavation	Excavators	2	8	158	0.38	128	122,962
Grading/Excavation	Rubber Tired Dozers	1	8	247	0.4	128	101,171
Grading/Excavation	Sweepers/Scrubbers	1	8	64	0.46	128	30,147
Grading/Excavation	Tractors/Loaders/Backhoes	2	8	97	0.37	128	73,503
Utilities/Trenching	Sweepers/Scrubbers	1	8	64	0.46	80	18,842
Utilities/Trenching	Tractors/Loaders/Backhoes	1	8	97	0.37	80	22,970
Foundations	Cranes	1	8	231	0.29	70	37,514
Foundations	Forklifts	1	8	89	0.2	70	9,968
Foundations	Pumps	3	8	84	0.74	70	104,429
Foundations	Sweepers/Scrubbers	1	8	64	0.46	70	16,486
Foundations	Tractors/Loaders/Backhoes	1	8	97	0.37	70	20,098
Building Construction	Cranes	1	8	231	0.29	385	206,329
Building Construction	Forklifts	1	8	89	0.2	385	54,824
Building Construction	Generator Sets	1	8	84	0.74	385	191,453
Building Construction	Tractors/Loaders/Backhoes	1	8	97	0.37	385	110,541
Building Construction	Welders	3	8	46	0.45	385	191,268
Architectural Coating/Finishing	Air Compressors	1	8	78	0.48	140	41,933
Paving	Cement and Mortar Mixers	1	8	9	0.56	18	726
Paving	Pavers	1	8	130	0.42	18	7,862
Paving	Paving Equipment	1	8	132	0.36	18	6,843
Paving	Rollers	1	8	80	0.38	18	4,378
Renovation of Existing Use	Aerial Lifts	1	8	63	0.31	153	23,905
Renovation of Existing Use	Forklifts	1	8	89	0.2	153	21,787
Renovation of Existing Use	Generator Sets	1	8	84	0.74	153	76,084
Renovation of Existing Use	Tractors/Loaders/Backhoes	1	8	97	0.37	153	43,929
						Total >50	1,573,724
						Total <50	191,994

550 Shatto Place Project
Construction Energy Analysis

On-Road Haul Trucks

EMFAC2014 Diesel Fuel Consumption Factor:[1]	0.1645	gallons/mile	miles/gallon
Total Haul Truck VMT:	186,200	miles	6.08
Total VMT diesel gallons (on-road haul trucks):	**30,629**		
EMFAC2014 Diesel Fuel Consumption Factor:[2]	0.8225	gallons/hour	
Total Haul Truck Idle-Hours per Year:	776	hours	
Total Idling diesel gallons (on-road haul trucks):	**638**		
Total diesel gallons (on-road haul trucks):	**31,267**	gal	

1. California Air Resources Board, EMFAC2014 (South Coast Air Basin; T7 Single Construction; Annual; CY 2019; Aggregate MY; Aggregate Speed)
2. California Air Resources Board, EMFAC2014 (South Coast Air Basin; T7 Single Construction; Annual; CY 2019; Aggregate MY; 5 miles per hour converted to hourly rate)

Phase	Days	Total One-Way Trips	Miles/Trip	VMT	Idle Hours
Demolition	53	220	20	4,400	18
Grading/Excavation	128	8000	20	160,000	667
Utilities/Trenching	80	0	20	-	-
Foundations	70	1090	20	21,800	91
Building Construction	385	0	20	-	-
Architectural Coating/Finishing	140	0	20	-	-
Paving	18	0	20	-	-
Renovation of Existing Use	153	220	20	4,400	18
			Total Haul Truck VMT:	186,200	
			Total Idle-Hours:	776	

550 Shatto Place Project
Construction Energy Analysis

On-Road Vendor Trucks

EMFAC2014 Diesel Fuel Consumption Factor:[1]	0.1521	gallons/mile	miles/gallon
Total Vendor Truck VMT:	295,265	miles	6.6
Total VMT diesel gallons (on-road vendor trucks):	**44,902**		
EMFAC2014 Diesel Fuel Consumption Factor:[2]	0.7645	gallons/hour	
Total Haul Truck Idle-Hours per Year:	7,358	hours	
Total Idling diesel gallons (on-road haul trucks):	**5,625**		
Total diesel gallons (on-road haul trucks):	**50,527**	gal	

1. California Air Resources Board, EMFAC2014 (South Coast Air Basin; HHDT and MHDT; Annual; CY 2019; Aggregate MY; Aggregate Speed)
2. California Air Resources Board, EMFAC2014 (South Coast Air Basin; HHDT and MHDT; Annual; CY 2019; Aggregate MY; 5 miles per hour converted to hourly rate)

Phase	Days	Trips/Day	Miles/Trip	VMT	Idle Hours
Demolition	53	6	6.9	2,194	27
Grading/Excavation	128	6	6.9	5,299	64
Utilities/Trenching	80	50	6.9	27,600	333
Foundations	70	50	6.9	24,150	875
Building Construction	385	50	6.9	132,825	4,813
Architectural Coating/Finishing	140	50	6.9	48,300	583
Paving	18	0	6.9	-	-
Renovation of Existing Use	153	52	6.9	54,896	663
			Total Vendor Truck VMT:	295,265	
			Total Idle-Hours:		7,358

550 Shatto Place Project
Construction Energy Analysis

On-Road Workers (LDA, LDT1, LDT2)

EMFAC2014 Gasoline Fuel Consumption Factor:[1]	0.0408	gallons/mile	miles/gallon
Total Worker VMT:	1,601,918	miles	24.5
Total VMT gasoline gallons (workers):	**65,412**		

1. California Air Resources Board, EMFAC2014 (South Coast Air Basin; LDA, LDT1, LDT2; CY 2019; Aggregate MY; Aggregate Speed)

Phase	Days	One-Way Trips/Day	Miles/Trip	VMT
Demolition	53	14	14.7	10,907
Grading/Excavation	128	8	14.7	15,053
Utilities/Trenching	80	100	14.7	117,600
Foundations	70	100	14.7	102,900
Building Construction	385	200	14.7	1,131,900
Architectural Coating/Finishing	140	50	14.7	102,900
Paving	18	14	14.7	3,704
Renovation of Existing Use	153	52	14.7	116,953
			Total Worker VMT:	**1,601,918**

M-2 Construction with Project Design Features Energy

550 Shatto Place
Construction Energy Analysis

Annual Fuel Summary

Off-Road Heavy-Duty Construction Equipment	
64,581	Diesel Consumption (gal)
29,807	Annual Diesel Consumption (gal/year)
On-Road Construction Equipment	
	Haul Trucks
31,267	Diesel Consumption (gal)
14,431	Annual Diesel Consumption (gal/year)
	Vendor Trucks
50,527	Diesel Consumption (gal)
23,320	Annual Diesel Consumption (gal/year)
	Workers
65,412	Gas Consumption (gal)
30,190	Annual Gas Consumption (gal/year)
	Total On-Road
81,795	Total Diesel Consumption (gal)
37,751	Annual Diesel Consumption (gal/year)
65,412	Project Gas Consumption (gal)
30,190	Annual Gas Consumption (gal/year)
146,376	**Total Gallons Diesel**
65,412	**Total Gallons Gasoline**
211,788	**Total Gallons Fuel (Gas and Diesel)**

2.2 Estimated Project Construction Duration (years)

67,558 Annual Average Gallons Diesel
30,190 Annual Average Gallons Gasoline
-27,128 Net Annual Average Gasoline
61,932 Net Annual Average Diesel

Los Angeles County Fuel Consumption (2016)[1]			**Percent of Annual Project Compared to County**
Source	**Fuel Type**	**Gallons**	
Off-Road/Vendor/Haul Trucks	Diesel	580,800,000	0.0107%
Workers	Gasoline	3,577,000,000	-0.0008%

Annual Electricity Summary

	Construction Water and Equipment
347,223	kWh total
160,257	kWh annual average
56,954	kWh net annual average
	LADWP Electricity Sales (2016-2017)[2]
22,878,000,000	kWh annual
0.00025%	**Percent of Annual Project Compared to LADWP**

Annual Natural Gas Summary

	Construction Equipment
452,747	cubic foot total
208,960	cubic foot annual average
66,147	net annual average cubic feet
	SoCalGas Sales (2016-2017)
958,125,000,000	cubic feet annual
0.00001%	**Percent of Annual Project Compared to SoCalGas**

Notes:

1. California Energy Commission, California Retail Fuel Outlet Annual Reporting (CEC-A15) Results, 2016, http://www.energy.ca.gov/almanac/transportation_data/gasoline/2016_A15_Results.xlsx. Accessed March 2018. Diesel is adjusted to account for retail (52%) and non-retail (48%) diesel sales.
2. Los Angeles Department of Water and Power, 2016 Final Power Integrated Resource Plan, Appendix A, 2016.

550 Shatto Place
Operational Energy Analysis

Construction Water Energy Estimates

Source	CalEEMod Construction Water Use (Mgal/yr)	Total Water Use (Mgal/yr)	Electricity Demand from water Demand (kWh)	
550 Shatto Place	1.748	1.748	22761	10504.94215
Net Total	**1.748**	**1.748**	**22761**	

CalEEMod Water Electricity Factors	Electricity Intensity Factor To Supply (kWh/Mgal)	Electricity Intensity Factor To Treat (kWh/Mgal)	Electricity Intensity Factor To Distribute (kWh/Mgal)	Electricity Intensity Factor For Wastewater Treatment (kWh/Mgal)
550 Shatto Place	9727	111	1272	1911

Source: California Emissions Estimator Model (CalEEMod).

Electric-powered Construction Equipment

kWh/hp-hr	BTU/hp-hr	cf/hp-hr
0.7457	2,545	2.459

Electric Equipment	Number	Hours/Day	Horsepower	Load Factor	Number Days	Total hp-hr	kWh	kWh/yr
Cranes (Foundations)	**1**	**8**	**231**	**0.29**	**70**	**37,514**	**27,974.49**	12,911
Cranes (Building Construction)	1	8	231	0.29	385	206,329	153,860	71,012
Welders (Building Construction)	3	8	46	0.45	385	191,268	142,628.55	65,829
Total	-	-	-	-	-	**435,112**	**324,463**	**149,752**
Natural Gas Equipment	**Number**	**Hours/Day**	**Horsepower**	**Load Factor**	**Number Days**	**Total hp-hr**	**Cubic Feet**	**Cubic Feet/yr**
Forklifts	3	8	89	0.2	431	184,123	452,747.39	208,960

Notes:

1. Cranes horsepower and load factors taken from CalEEMod

2. Conversion factor taken from University of North Carolina Unit Conversion Dictionary; Source: http://www.unc.edu/~rowlett/units/dictH.html

550 Shatto Place
Construction Energy Analysis

Off-Road Equipment

Equipment ≤ 50 hp		
pounds fuel/hp-hr (OFFROAD2011 model, ≤ 50 hp):	0.408	lb/hp-hr
diesel pounds/gallon (CARB density assumption):	7.07	lb/gal
diesel gallons/hp-hr:	0.0577	gal/hp-hr
Total <50	726	hp-hr
Total diesel gallons:	42	gal
Equipment > 50 hp		
pounds fuel/hp-hr (OFFROAD2011 model, > 50 hp):	0.367	lb/hp-hr
diesel pounds/gallon (CARB density assumption):	7.07	lb/gal
diesel gallons/hp-hr:	0.0519	gal/hp-hr
Total >50	1,243,301	hp-hr
Total diesel gallons:	64,539	gal
Total diesel gallons (off-road equipment):	**64,581**	**gal**

Building Phase	Construction Phase	Equipment	Number	Hours/Day	HP	Load	Days	Total hp-hr
	Demolition	Concrete/Industrial Saws	1	8	81	0.73	53	25,071
	Demolition	Rubber Tired Dozers	1	8	247	0.4	53	41,891
	Demolition	Tractors/Loaders/Backhoes	3	8	97	0.37	53	45,652
	Grading/Excavation	Bore/Drill Rigs	1	8	221	0.5	128	113,152
	Grading/Excavation	Excavators	2	8	158	0.38	128	122,962
	Grading/Excavation	Rubber Tired Dozers	1	8	247	0.4	128	101,171
	Grading/Excavation	Sweepers/Scrubbers	1	8	64	0.46	128	30,147
	Grading/Excavation	Tractors/Loaders/Backhoes	2	8	97	0.37	128	73,503
	Utilities/Trenching	Sweepers/Scrubbers	1	8	64	0.46	80	18,842
	Utilities/Trenching	Tractors/Loaders/Backhoes	1	8	97	0.37	80	22,970
	Foundations	Cranes	0	8	231	0.29	70	-
	Foundations	Forklifts	0	8	89	0.2	70	-
	Foundations	Pumps	3	8	84	0.74	70	104,429
	Foundations	Sweepers/Scrubbers	1	8	64	0.46	70	16,486
	Foundations	Tractors/Loaders/Backhoes	1	8	97	0.37	70	20,098
	Building Construction	Cranes	0	8	231	0.29	385	-
	Building Construction	Forklifts	0	8	89	0.2	385	-
	Building Construction	Generator Sets	1	8	84	0.74	385	191,453
	Building Construction	Tractors/Loaders/Backhoes	1	8	97	0.37	385	110,541
	Building Construction	Welders	0	8	46	0.45	385	-
	Architectural Coating/Finishing	Air Compressors	1	8	78	0.48	140	41,933
	Paving	Cement and Mortar Mixers	1	8	9	0.56	18	726
	Paving	Pavers	1	8	130	0.42	18	7,862
	Paving	Paving Equipment	1	8	132	0.36	18	6,843
	Paving	Rollers	1	8	80	0.38	18	4,378
	Renovation of Existing Use	Aerial Lifts	1	8	63	0.31	153	23,905
	Renovation of Existing Use	Forklifts	0	8	89	0.2	153	-
	Renovation of Existing Use	Generator Sets	1	8	84	0.74	153	76,084
	Renovation of Existing Use	Tractors/Loaders/Backhoes	1	8	97	0.37	153	43,929
							Total >50	1,243,301
							Total <50	726

550 Shatto Place
Construction Energy Analysis

On-Road Haul Trucks

EMFAC2014 Diesel Fuel Consumption Factor:[1]	0.1645	gallons/mile	miles/gallon	
Total Haul Truck VMT:	186,200	miles	6.08	
Total VMT diesel gallons (on-road haul trucks):	**30,629**			
				Estimated Fuel Savings from
EMFAC2014 Diesel Fuel Consumption Factor:[2]	0.8225	gallons/hour		*Anti-Idling Regulation (64 percent based on*
Total Haul Truck Idle-Hours per Year:	776	hours		*estimated CARB emissions reductions):* [3]
Total Idling diesel gallons (on-road haul trucks):	**638**			*1,773*
Total diesel gallons (on-road haul trucks):	**31,267**	gal		

1. California Air Resources Board, EMFAC2014 (South Coast Air Basin; T7 Single Construction; Annual; CY 2017; Aggregate MY; Aggregate Speed)
2. California Air Resources Board, EMFAC2014 (South Coast Air Basin; T7 Single Construction; Annual; CY 2017; Aggregate MY; 5 miles per hour converted to hourly rate)
3. Source: California Air Resources Board (CARB), 2004. Staff Report: Initial Statement of Reasons for Proposed Rulemaking, Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling, Appendix F, July 2004, https://www.arb.ca.gov/regact/idling/idling.htm, accessed November 2016.

Building Phase	Phase	Days	Total One-Way Trips	Miles/Trip	VMT	Idle Hours
	Demolition	53	220	20	4,400	18
	Grading/Excavation	128	8000	20	160,000	667
	Utilities/Trenching	80	0	20	-	-
	Foundations	70	1090	20	21,800	91
	Building Construction	385	0	20	-	-
	Architectural Coating/Finishing	140	0	20	-	-
	Paving	18	0	20	-	-
	Renovation of Existing Use	153	220	20	4,400	18
						-
				Total Haul Truck VMT:	186,200	
				Total Idle-Hours:	776	

550 Shatto Place
Construction Energy Analysis

On-Road Vendor Trucks

			miles/gallon
EMFAC2014 Diesel Fuel Consumption Factor:[1]	0.1521	gallons/mile	6.6
Total Vendor Truck VMT:	295,265	miles	
Total VMT diesel gallons (on-road vendor trucks):	**44,902**		
			Estimated Fuel Savings from
EMFAC2014 Diesel Fuel Consumption Factor:[2]	0.7645	gallons/hour	*Anti-Idling Regulation (64 percent based on*
Total Haul Truck Idle-Hours per Year:	7,358	hours	*estimated CARB emissions reductions):*[3]
Total Idling diesel gallons (on-road haul trucks):	**5,625**		*15,625*
Total diesel gallons (on-road haul trucks):	**50,527**	gal	

1. California Air Resources Board, EMFAC2014 (South Coast Air Basin; HHDT and MHDT; Annual; CY 2017; Aggregate MY; Aggregate Speed)
2. California Air Resources Board, EMFAC2014 (South Coast Air Basin; HHDT and MHDT; Annual; CY 2017; Aggregate MY; 5 miles per hour converted to hourly rate)
3. Source: California Air Resources Board (CARB), 2004. Staff Report: Initial Statement of Reasons for Proposed Rulemaking, Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling, Appendix F, July 2004, https://www.arb.ca.gov/regact/idling/idling.htm, accessed November 2016.

Building Phase	Phase	Days	Trips/Day	Miles/Trip	VMT	Idle Hours
	Demolition	53	6	6.9	2,194	27
	Grading/Excavation	128	6	6.9	5,299	64
	Utilities/Trenching	80	50	6.9	27,600	333
	Foundations	70	50	6.9	24,150	875
	Building Construction	385	50	6.9	132,825	4,813
	Architectural Coating/Finishing	140	50	6.9	48,300	583
	Paving	18	0	6.9	-	-
	Renovation of Existing Use	153	52	6.9	54,896	663
				Total Vendor Truck VMT:	295,265	
				Total Idle-Hours:		7,358

550 Shatto Place
Construction Energy Analysis

On-Road Workers (LDA, LDT1, LDT2)

EMFAC2014 Gasoline Fuel Consumption Factor:[1]	0.0408	gallons/mile	miles/gallon
Total Worker VMT:	1,601,918	miles	24.5
Total VMT gasoline gallons (workers):	**65,412**		

1. California Air Resources Board, EMFAC2014 (South Coast Air Basin; LDA, LDT1, LDT2; CY 2017; Aggregate MY; Aggregate Speed)

Building Phase	Phase	Days	One-Way Trips/Day	Miles/Trip	VMT
	Demolition	53	14	14.7	10,907
	Grading/Excavation	128	8	14.7	15,053
	Utilities/Trenching	80	100	14.7	117,600
	Foundations	70	100	14.7	102,900
	Building Construction	385	200	14.7	1,131,900
	Architectural Coating/Finishing	140	50	14.7	102,900
	Paving	18	14	14.7	3,704
	Renovation of Existing Use	153	52	14.7	116,953
				Total Worker VMT:	**1,601,918**

M-3 Existing Operational Energy

550 Shatto Place Project
Existing Operational Energy Analysis

Electricity	kWh/yr	GWh/yr
Elementary School	84,138	0.084
Total	**84,138**	**0.084**
Total (including water, see below)	**103,303**	**0.103**

Source: California Air Resources Board, CalEEMod, Version 2016.3.2.

Water	Mgal/yr
Elementary School	1.472
Total	**1.472**

Electricity Intensity Factors	kWh/Mgal
Electricity Factor - Supply	9,727
Electricity Factor - Treat	111
Electricity Factor - Distribute	1,272
Electricity Factor - Wastewater Treatment	1,911

Electricity from Water Demand	kWh/yr	GWh/yr
Total	**19,165**	**0.019**

Source: California Air Resources Board, CalEEMod, Version 2016.3.2.

Base water demand is based on rates provided in City of Los Angeles Department of Public Works, Sewage Facilities Charge, Sewage Generation Factor for Residential and Commercial Categories, 2012.

Natural Gas	kBtu/yr	cubic foot (cf)
Elementary School	147,811	142,813
Total	**147,811**	**142,813**

Source: California Air Resources Board, CalEEMod, Version 2016.3.2.

Conversion factor of 1,035 Btu per cubic foot based on United States Energy Information Administration data (see: USEIA, Natural Gas, Heat Content of Natural Gas Consumed, February 28, 2018, https://www.eia.gov/dnav/ng/ng_cons_heat_a_EPG0_VGTH_btucf_a.htm. Accessed September 2018.

550 Shatto Place Project
Existing Operational Energy Analysis

Fuel Usage from VMT

Annual VMT (All): 1,236,218 miles/year (from CalEEMod)

(With trip and VMT reductions from land use characteristics and proximity to public transit.)

Fuel Type:[1]	GAS	DSL	ELEC
Percent:	95.84%	3.57%	0.58%
Miles per Gallon Fuel:	20.67	7.85	-
Annual VMT by Fuel Type (miles):	1,184,833	44,165	7,220
Annual Fuel Usage (gallons):	57,318	5,626	-
Annual Fuel Savings from Electric Vehicles:[2]	-	-	349

Notes:

1. California Air Resources Board, EMFAC2014 (Los Angeles County; Annual; 2018, Aggregate Fleet).
2. Assumes electric vehicles would replace traditional gasoline-fueled vehicles.

M-4 Project Operational Emissions

550 Shatto Place Project
Operational Energy Analysis

Electricity		kWh/yr	GWh/yr
Project Residential/Commercial/Restaurant		2,379,034	2.379
EV Charging (see worksheet)		132,094	0.132
	Total	**2,511,128**	**2.511**
	Total (including water, see below)	**2,882,684**	**2.883**
	Existing Site Energy Consumption (including water)	103,303	0.103
	Project Net Energy Consumption	**2,779,381**	**2.78**

Source: California Air Resources Board, CalEEMod, Version 2016.3.2.

Electricity	GWh/yr
LADWP 2021-2022 Total Energy Sales	26,835
Project Annual	2.883
Existing Annual	0.103
Net Project Annual	2.779
Percent Net Project of LADWP	0.01036%

Source: Los Angeles Department of Water and Power,
2016 Final Power Integrated Resource Plan, Appendix A, 2016.

Water		Mgal/yr
Project Residential/Commercial/Restaurant		28.535
	Total	**28.535**

Electricity Intensity Factors	kWh/Mgal
Electricity Factor - Supply	9,727
Electricity Factor - Treat	111
Electricity Factor - Distribute	1,272
Electricity Factor - Wastewater Treatment	1,911

Electricity from Water Demand		kWh/yr	GWh/yr
	Total	**371,556**	**0.372**

Source: California Air Resources Board, CalEEMod, Version 2016.3.2.
Base water demand is based on rates provided in City of Los Angeles Department of Public Works,
Sewage Facilities Charge, Sewage Generation Factor for Residential and Commercial Categories, 2012.

Natural Gas		kBtu/yr	cubic foot (cf)	
Project Residential/Commercial/Restaurant		5,376,835	5,195,010	**Per day Usage**
	Project Total	**5,376,835**	**5,195,010**	14,232.90
	Existing Natural Gas Consumption	147,811	142,813	391.27
	Project Net Total	**5,229,024**	**5,052,197**	**13,842**

Natural Gas	million cubic foot (cf)
SoCalGas 2021	1,377,875
Project Annual	5.195
Existing Annual	0.143
Net Project Annual	5.052197
Percent Net Project of SoCalGas	0.0004%

Source: California Gas and Electric Utilities, 2018 California Gas
Report, p. 102, 2018.

Source: California Air Resources Board, CalEEMod, Version 2016.3.2.
Conversion factor of 1,035 Btu per cubic foot based on United States Energy Information Administration data
(see: USEIA, Natural Gas, Heat Content of Natural Gas Consumed, February 28, 2018,
https://www.eia.gov/dnav/ng/ng_cons_heat_a_EPG0_VGTH_btucf_a.htm. Accessed September 2018.)

550 Shatto Place Project
Operational Energy Analysis

Estimated Electricity demand from Electric Vehicle Supply Equipment (EVSE)

Land Use Type	Number of EVSE Charging Spaces	Percent of Electric Vehicles	Average Charge (kWh/day) [a]	Days/Year	Electricity Demand (kWh/yr)
For Immediate Use[b]	16	100.0%	4.4	365	26,419
Future Use[c]	66	100.0%	4.4	365	105,675
Total	**82**	**100.0%**	**4.4**	**365**	132,094

Notes:

a. Estimated based on reference sources listed below.

b. Project would install EV charing spaces for 5 percent of its parking capacity for immediate use

c. Project would install pre-wiring forEV charing spaces for 20 percent of its parking capacity for future use.

Sources:

US Department of Energy. Alternative Fuels Data Center, 2016. Hybrid and Plug-In Electric Vehicle Emissions Data Sources and Assumptions.
Available at: https://www.afdc.energy.gov/vehicles/electric_emissions_sources.html.

US Department of Energy. Smith, Margaret, 2016. Level 1 Electric Vehicle Charging Stations at the Workplace.
Available at: https://www.afdc.energy.gov/uploads/publication/WPCC_L1ChargingAtTheWorkplace_0716.pdf.

UCLA Luskin Center for Innovation. Williams, Brett and JR deShazo, 2013. Pricing Workplace Charging: Financial Viability and Fueling Costs.
Available at: http://luskin.ucla.edu/sites/default/files/Luskin-WPC-TRB-13-11-15d.pdf.

550 Shatto Place Project
Operational Energy Analysis

Fuel Usage from VMT

Annual VMT (All): 3,244,636 miles/year (from CalEEMod)

(With trip and VMT reductions from land use characteristics and proximity to public transit.)

Fuel Type:[1]	GAS	DSL	ELEC
Percent:	94.50%	3.88%	1.62%
Miles per Gallon Fuel:	22.49	8.20	-
Annual VMT by Fuel Type (miles):	3,066,260	125,860	52,516
Annual Fuel Usage (gallons):	**136,338**	**15,351**	-
Annual Fuel Usage with Emer.Gen. (gallons):		18,438	
Existing Land Use Fuel Consumption	**57,318**	**5,626**	
Project Net Fuel Consumption	**79,020**	**12,811**	
Annual Fuel Savings from Electric Vehicles:[2]	-	-	2,335

	Los Angeles County Fuel Consumption [3]	
	Gasoline	Diesel
Los Angeles County:	3,577,000,000	580,769,231
Project Annual:	136,338	18,438
Existing Annual:	57,318	5,626
Net Project Annual:	79,020	12,811
Percent Net Project of Los Angeles County:	0.0022%	0.0022%

Notes:

1. California Air Resources Board, EMFAC2014 (Los Angeles County; Annual; 2021, Aggregate Fleet).
2. Assumes electric vehicles would replace traditional gasoline-fueled vehicles.
3. California Energy Commission, California Retail Fuel Outlet Annual Reporting (CEC-A15) Results, 2016, http://www.energy.ca.gov/almanac/transportation_data/gasoline/2016_A15_Results.xlsx. Accessed March 2018.
   Diesel is adjusted to account for retail (52%) and non-retail (48%) diesel sales.

550 Shatto Place Project
Operational Energy Analysis

Fuel Consumption	Total CO_2 (MT/yr)	Fuel Type	Fuel Factor ($kgCO_2$/gal)	Gallons
Emergency Generator	31.32	Diesel	10.15	3,086

Assumptions

10.15	diesel	KgCO2/gallon[1]
1	MT = 1,000 kilograms	

Notes:

1. California Climate Action Registry, General Reporting Protocol v2.2, Tables C.3, C.5, and C.6, March 2007. Accessed September 2018.