

Energy Summary

Construction Energy			
Source	Diesel (gallons)	Gasoline (gallons)	Total MMBTU
Off-Road Construction Vehicles	4,958.04	0.00	686.639
On-Road Construction Vehicles	504.03	394.67	118.876
Total	5,462.07	394.67	805.515

Operation Energy				
Source	Diesel (gallons)	Gasoline (gallons)	Electricity (MW hr/yr)	MMBTU/Year
On-Road Operation Vehicles	336,138.52	4,187.91	-	47,072.549
Off-Road Operation Vehicles	43,109.95	0.00	-	5,970.296
Mine Electricity Use	-	-	756.19	2,580.119
Total	379,248.47	4,187.91	756.19	55,622.965

Notes:

1. Energy content for fuel: 1 gallon gasoline/E10 = 124,340 BTU; 1 gallon low sulfur diesel = 138,490 BTU; 1 pound compressed natural gas = 22,543 BTU; 1 MW-hr electricity = 3,414,000 BTU (US Department of Energy, Alternative Fuels Data Center, 2014, https://afdc.energy.gov/fuels/fuel_comparison_chart.pdf).

Project Construction Fuel Use

Off-Road Construction Vehicles										
Phase	Equipment	Fuel	HP	Load Factor	Equipment Count	Hours/Day	Work Days	Gallon /HP-Hr	Gallons /Hour	Gallons /Day
Site Access	Grader	Diesel	187	0.41	1	8.0	15	0.021144	1.62109	12.969
Site Access	Rubber Tired Dozers	Diesel	247	0.4	1	8.0	15	0.020513	2.02671	16.214
Site Access	Tractors/Loaders/Backhoes	Diesel	97	0.37	1	8.0	15	0.019127	0.68648	5.492
Site Preparation	Rubber Tired Dozers	Diesel	247	0.4	1	8.0	10	0.020513	2.02671	16.214
Site Preparation	Tractors/Loaders/Backhoes	Diesel	97	0.37	1	8.0	10	0.019127	0.68648	5.492
Willow Glen Imp. Demolition	Concrete/Industrial Saws	Diesel	81	0.73	1	8.0	2	0.041757	2.46912	19.753
Willow Glen Imp. Demolition	Grader	Diesel	187	0.41	1	8.0	2	0.021144	1.62109	12.969
Willow Glen Imp. Demolition	Off-Highway Trucks	Diesel	402	0.38	1	4.0	2	0.019755	3.01775	12.071
Willow Glen Imp. Grading	Crwaler Tractors	Diesel	212	0.43	1	8.0	15	0.022160	2.02011	16.161
Willow Glen Imp. Grading	Off-Highway Trucks	Diesel	402	0.38	1	8.0	15	0.019755	3.01775	24.142
Willow Glen Imp. Grading	Rollers	Diesel	80	0.38	1	8.0	15	0.019404	0.58989	4.719
Willow Glen Imp. Grading	Skid Steer Loaders	Diesel	65	0.37	1	8.0	15	0.019061	0.45841	3.667
Willow Glen Imp. Paving	Pavers	Diesel	130	0.42	1	8.0	2	0.021527	1.17539	9.403
Willow Glen Imp. Paving	Paving Equipment	Diesel	132	0.36	1	8.0	2	0.018333	0.87116	6.969
Willow Glen Imp. Paving	Rollers	Diesel	80	0.38	1	8.0	2	0.019404	0.58989	4.719
Willow Glen Imp. Striping	Cranes	Diesel	231	0.29	1	4.0	2	0.014885	0.99714	3.989
Willow Glen Imp. Striping	Off-Highway Trucks	Diesel	402	0.38	1	8.0	2	0.019755	3.01775	24.142
Grading	Excavator	Diesel	158	0.38	1	8.0	20	0.019757	1.18623	9.490
Grading	Grader	Diesel	187	0.41	1	8.0	20	0.021144	1.62109	12.969
Grading	Rubber Tired Dozers	Diesel	247	0.4	1	8.0	20	0.020513	2.02671	16.214
Grading	Tractors/Loaders/Backhoes	Diesel	97	0.37	3	8.0	20	0.019127	0.68648	16.476
Phase 1 Demolition	Concrete/Industrial Saws	Diesel	81	0.73	1	8.0	20	0.041757	2.46912	19.753
Phase 1 Demolition	Excavators	Diesel	158	0.38	1	8.0	20	0.019757	1.18623	9.490
Phase 1 Demolition	Rubber Tired Dozers	Diesel	247	0.4	1	8.0	20	0.020513	2.02671	16.214
Phase 2 Demolition	Concrete/Industrial Saws	Diesel	81	0.73	1	8.0	10	0.041757	2.46912	19.753
Phase 2 Demolition	Excavators	Diesel	158	0.38	1	8.0	10	0.019757	1.18623	9.490
Phase 2 Demolition	Rubber Tired Dozers	Diesel	247	0.4	1	8.0	10	0.020513	2.02671	16.214
Phase 3 Demolition	Concrete/Industrial Saws	Diesel	81	0.73	1	8.0	20	0.041757	2.46912	19.753
Phase 3 Demolition	Excavators	Diesel	97	0.38	1	8.0	20	0.019757	0.72825	5.826
Phase 3 Demolition	Rubber Tired Dozers	Diesel	247	0.4	1	8.0	20	0.020513	2.02671	16.214
Total										

Notes:

- Equipment types and horsepower from CalEEMod defaults.
- Equipment count and hours from CalEEMod defaults, and professional judgement.
- Fuel consumption factors from CARB OFFROAD2017- ORION Web Database, for San Diego County, aggregate model years for 2021.
- 1 Gallon of diesel = 138,490 BTU; MMBTU = 1 million BTU.

On-Road Construction Vehicles										
Phase	Trip Type (Fleet Mix)	Trips	Distance (miles)	Work Days	VMT	Gallons Diesel/VMT	Total Diesel Gallons	Gallons Gas/VMT	Total Gasoline Gallons	Total MMBtu
Site Access	Worker (LDA, LDT1, LDT2)	8	10.8	20	1728	0.000110948	0.19	0.04012847	69.34	8.65
Site Preparation	Worker (LDA, LDT1, LDT2)	5	10.8	10	540	0.000110948	0.06	0.04012847	21.67	2.70
Grading	Worker (LDA, LDT1, LDT2)	15	10.8	20	3240	0.000110948	0.36	0.04012847	130.02	16.22
Grading	Hauling (HHDT)	15	20		300	0.175852809	52.76	9.9835E-05	0.03	7.31
Phase 1 Demolition	Worker (LDA, LDT1, LDT2)	8	10.8	20	1728	0.000110948	0.19	0.04012847	69.34	8.65
Phase 1 Demolition	Hauling (HHDT)	14	20		280	0.175852809	49.24	9.9835E-05	0.03	6.82
Phase 2 Demolition	Worker (LDA, LDT1, LDT2)	8	10.8	10	864	0.000110948	0.10	0.04012847	34.67	4.32
Phase 2 Demolition	Hauling (HHDT)	9	20		180	0.175852809	31.65	9.9835E-05	0.02	4.39
Phase 3 Demolition	Worker (LDA, LDT1, LDT2)	8	10.8	20	1728	0.000110948	0.19	0.04012847	69.34	8.65
Phase 3 Demolition	Hauling (HHDT)	105	20		2100	0.175852809	369.29	9.9835E-05	0.21	51.17
Total					12,688		504.03		394.67	118.88

Notes:

- Fleet mix and trip distances from CalEEMod defaults.
- Fuel consumption factors weighted average for fleet mix from CARB EMFAC2107, for San Diego County, aggregate model years for 2021, aggregate speeds.
- 1 Gallon of diesel = 138,490 BTU; 1 gallon of gasoline = 124,340 BTU; MMBTU = 1 million BTU.

Project Operations Fuel Use

Off-Road Operation Vehicles										
Use Area	Equipment	Fuel	HP	Load Factor	Equipment Count	Hours/Day	Work Days	Gallons /HP-Hr	Gallons /Hour	Gallons /Day
Mine Pit	Extraction Loader (Cat 988K)	Diesel	541	0.36	2	8.0	260	0.01864	3.63052	58.088
Mine Pit	Excavator (Cat 349F)	Diesel	396	0.38	1	6.4	260	0.01971	2.96623	18.984
Rough Grading	Dozer (Cat D8T)	Diesel	354	0.43	1	6.4	260	0.02217	3.37508	21.600
Plant/Loading	Highway Truck Loader (Cat 988K)	Diesel	541	0.36	1	6.4	260	0.01864	3.63052	23.235
Plant/Loading	Highway Truck Loader (Cat 966M-BR)	Diesel	276	0.36	1	1.6	260	0.01866	1.85449	2.967
Variety Clean-up/Reclamation	Skid Steer Loader (Cat 246D)	Diesel	74	0.37	1	4.0	260	0.01906	0.52180	2.087
On-Site Haul Route	Off-Road Haul Truck (Cat 740EJ)	Diesel	496	0.38	1	3.2	260	0.01978	3.72787	11.929
On-Site Haul Route	Supervisor/Maintenance Truck	Diesel	450	0.34	2	1.2	260	0.01978	3.02613	7.263
On-Site Haul Route	Water Truck (Freightliner M2106)	Diesel	350	0.38	1	6.0	260	0.01978	2.63056	15.783
Finish Grading	Grader	Diesel	171	0.41	1	2.4	260	0.02114	1.48239	3.558
Reclamation	Seeding Truck	Diesel	450	0.38	1	8.0	3	0.01978	3.38214	27.057
Total										

Notes:

- Equipment , horsepower, count, and hours from ENVIOMine project description (2018).
- Fuel consumption factors from CARB OFFROAD2017- Web Database, for San Diego County, aggregate model years for 2023. <https://arb.ca.gov/emfac/emissions-inventory/>
- 1 Gallon of diesel = 138,490 BTU; MMBTU = 1 million BTU.

On-Road Operation Vehicles							
Source	Fleet Mix	VMT	Gallons Diesel/VMT	Total Diesel Gallons	Gallons Gas/VMT	Total Gasoline Gallons	MMBTU/yr
Phase 1 Worker & Vendor	CalEEMod Fleet Mix	94,545	0.00234474	221.68	0.04253637	4,021.59	530.75
Phase 1 Delivery Trucks	HHDT	732,160	0.17328163	126869.88	0.00008579	62.82	17,578.02
Phase 1 Import Trucks	HHDT	1,206,400	0.17328163	209046.96	0.00008579	103.50	28,963.78
Total		2,033,105		336,138.52		4,187.91	47,072.55

Notes:

- Worker and vendor fleet mix and VMT from CalEEMod defaults, delivery truck fleet mix = HHDT.
- Annual VMT the same for all mining phases, only the highest annual consumption (Phase 1) calculated.
- Fuel consumption factors weighted average for fleet mix from CARB EMFAC2017, for San Diego County, aggregate model years for 2023, aggregate speeds. <https://arb.ca.gov/emfac/emissions-inventory/>.
- 1 Gallon of diesel = 138,490 BTU; 1 gallon of gasoline = 124,340 BTU; MMBTU = 1 million BTU.

Project Operations Electricity and Natural Gas Use

Operational Electricity Use		
Equipment	MW-hr/yr	MMBTU/yr
Feed Hopper	28.28	96.48
Groundline Conveyor 825'	282.77	964.80
Groundline Conveyor 375'	33.93	115.78
Groundline Conveyor 200'	28.28	96.48
Truss Frame Conveyor	56.55	192.96
Triple Deck Screen	56.55	192.96
Blade Mill	113.11	385.92
Fine Material Washer	56.55	192.96
Radial Stacker 80'	28.28	96.48
Radial Stacker 100'	33.93	115.78
Water pumping	18.36	62.64
Office, control room	10.80	36.85
Security lighting	8.80	30.03
Total	756.19	2,580.12

Notes:

1. Sand conveyance and processing equipment from ENVIROMine project description (2018).
2. Electrical use calculation from the project AQ Report (2021).
3. Project operations would not use natural gas.
4. 1 MW-hr = 3,412,000 BTU; MMBTU = 1 million BTU.'

On-Road Vehicle Fuel Consumption Factor Calculations

Source: EMFAC2021 (v1.0.1) Emissions Inventory

Region Type: Sub-Area

Region: San Diego (SD)

Calendar Year: 2022, 2023

Season: Annual

Vehicle Classification: EMFAC2007 Categories

Units: miles/year for CVMT and EVMT, trips/year for Trips, kWh/year for Energy Consumption, tons/year for Emissions, 1000 gallons/year

Construction On-Road								
Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	VMT	Fuel Consumption (1000 Gal.)	Gallons/Fleet VMT
Worker (LDA, LDT1, LDT2)								
San Diego (SD)	2022	LDA	Aggregate	Aggregate	Diesel	71385405.15	1811.3300220	
San Diego (SD)	2022	LDT1	Aggregate	Aggregate	Diesel	387986.22	17.2695801	
San Diego (SD)	2022	LDT2	Aggregate	Aggregate	Diesel	28759933.32	997.6504656	
Diesel total						100533324.68	2826.2500676	0.000110948
San Diego (SD)	2022	LDA	Aggregate	Aggregate	Gasoline	16188216860.91	598120.2912411	
San Diego (SD)	2022	LDT1	Aggregate	Aggregate	Gasoline	1614009175.23	71877.2392451	
San Diego (SD)	2022	LDT2	Aggregate	Aggregate	Gasoline	7570797857.76	352217.3349005	
Gas Total						25373023893.90	1022214.8653867	0.040128470
Total Fleet VMT						25473557218.58		
Hauling (HHDT)								
San Diego (SD)	2022	HHDT	Aggregate	Aggregate	Diesel	565285789.07	99440.3165175	0.175852809
San Diego (SD)	2022	HHDT	Aggregate	Aggregate	Gasoline	188923.14	56.4541438	0.000099835
Total Fleet VMT						565474712.21		

Operational On-Road								
Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	VMT	Fuel Consumption (1000 Gal.)	Gallons/Fleet VMT
Worker and Vendors (CalEEMod Fleet Mix)								
San Diego (SD)	2023	LDA	Aggregate	Aggregate	Diesel	65704207.72	1659.0572092	
San Diego (SD)	2023	LDT1	Aggregate	Aggregate	Diesel	345484.32	15.3699073	
San Diego (SD)	2023	LDT2	Aggregate	Aggregate	Diesel	29751952.58	1019.7839352	
San Diego (SD)	2023	LHDT1	Aggregate	Aggregate	Diesel	385036056.51	24051.6422596	
San Diego (SD)	2023	LHDT2	Aggregate	Aggregate	Diesel	153179543.95	11592.5353235	
San Diego (SD)	2023	MDV	Aggregate	Aggregate	Diesel	83791574.43	3783.6700477	
San Diego (SD)	2023	MH	Aggregate	Aggregate	Diesel	13096808.43	1394.7058651	
San Diego (SD)	2023	MHDT	Aggregate	Aggregate	Diesel	231574130.01	27520.8102460	
San Diego (SD)	2023	OBUS	Aggregate	Aggregate	Diesel	13756144.60	2042.9342642	
San Diego (SD)	2023	SBUS	Aggregate	Aggregate	Diesel	14878143.38	1845.9313716	
Diesel Total						991114045.93	74926.4404293	0.002344744
San Diego (SD)	2023	LDA	Aggregate	Aggregate	Gasoline	16261075946.75	591231.2711409	
San Diego (SD)	2023	LDT1	Aggregate	Aggregate	Gasoline	1577647448.01	69388.7901789	
San Diego (SD)	2023	LDT2	Aggregate	Aggregate	Gasoline	7695838509.36	351090.7959359	
San Diego (SD)	2023	LHDT1	Aggregate	Aggregate	Gasoline	542794799.97	57248.8342147	
San Diego (SD)	2023	LHDT2	Aggregate	Aggregate	Gasoline	75127985.36	8905.6014140	
San Diego (SD)	2023	MCY	Aggregate	Aggregate	Gasoline	150534118.04	3871.6903600	
San Diego (SD)	2023	MDV	Aggregate	Aggregate	Gasoline	4536057997.27	251425.0884462	
San Diego (SD)	2023	MH	Aggregate	Aggregate	Gasoline	32236097.71	7311.2953427	
San Diego (SD)	2023	MHDT	Aggregate	Aggregate	Gasoline	63919290.60	13669.0945472	
San Diego (SD)	2023	OBUS	Aggregate	Aggregate	Gasoline	19421333.99	4101.2893284	
San Diego (SD)	2023	SBUS	Aggregate	Aggregate	Gasoline	5011510.92	510.6476978	
San Diego (SD)	2023	UBUS	Aggregate	Aggregate	Gasoline	4282414.25	497.9976733	
Gas Total						30963947452.25	1359252.3962800	0.042536372
Total Fleet VMT						31955061498.18		
Delivery Trucks (HHDT)								
San Diego (SD)	2023	HHDT	Aggregate	Aggregate	Diesel	573034920.59	99326.1844813	0.173281632
San Diego (SD)	2023	HHDT	Aggregate	Aggregate	Gasoline	171732.20	49.1780288	0.000085795
Total Fleet VMT						573206652.79		

Off-Road Vehicle Fuel Consumption Factor Calculations

Model Output: OFFROAD2017 (v1.0.1) Emissions Inventory
Region Type: Sub-Area
Region: San Diego (SD)
Calendar Year: 2022, 2023
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2017 Equipment Types
Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Construction Equipment										
Region	CalYr	VehClass	MdlYr	HP_Bin	Fuel	Fuel_gpy	Total_Activity_hpy	Total_Population	Horsepower_Hours_hhpy	Gallons/HP-Hr
San Diego (SD)	2022	ConstMin - Cranes	Aggregate	300	Diesel	131378.96	40011.23	84.88	8826350.23	0.01488486
San Diego (SD)	2022	ConstMin - Crawler Tractors	Aggregate	300	Diesel	180270.86	39590.15	88.72	8134953.24	0.02216004
San Diego (SD)	2022	ConstMin - Excavators	Aggregate	175	Diesel	390620.20	135389.45	228.89	19770957.54	0.01975727
San Diego (SD)	2022	ConstMin - Graders	Aggregate	300	Diesel	503156.02	109922.67	144.76	23796957.47	0.02114371
San Diego (SD)	2022	ConstMin - Off-Highway Trucks	Aggregate	600	Diesel	1180060.23	158856.15	116.70	59735196.43	0.01975486
San Diego (SD)	2022	ConstMin - Pavers	Aggregate	175	Diesel	51639.14	15192.30	39.36	2398785.31	0.02152721
San Diego (SD)	2022	ConstMin - Paving Equipment	Aggregate	175	Diesel	21950.29	8245.97	17.92	1197337.91	0.01833257
San Diego (SD)	2022	ConstMin - Rollers	Aggregate	100	Diesel	124614.28	73567.69	221.70	6422022.25	0.01940421
San Diego (SD)	2022	ConstMin - Rubber Tired Dozers	Aggregate	300	Diesel	17301.60	3812.48	5.43	843434.30	0.02051328
San Diego (SD)	2022	ConstMin - Skid Steer Loaders	Aggregate	75	Diesel	317961.28	236408.58	661.95	16681372.26	0.01906086
San Diego (SD)	2022	ConstMin - Tractors/Loaders/Backhoes	Aggregate	100	Diesel	1914739.32	1203674.54	1922.37	100104539.93	0.01912740
San Diego (SD)	2022	OFF - ConstMin - Concrete/Industrial Saws	Aggregate	50	Diesel	3566.05	2587.85	4.46	85399.05	0.04175749

Operation Equipment										
Region	CalYr	VehClass	MdlYr	HP_Bin	Fuel	Fuel_gpy	Total_Activity_hpy	Total_Population	Horsepower_Hours_hhpy	Gallons/hour
San Diego (SD)	2023	ConstMin - Crawler Tractors	Aggregate	600	Diesel	663721.44	77608.66	161.64	29934630.95	0.02217236
San Diego (SD)	2023	ConstMin - Excavators	Aggregate	600	Diesel	933120.17	139838.75	215.66	47338194.13	0.01971178
	2023	ConstMin - Graders	Aggregate	300	Diesel	503156.02	109922.67	144.76	23796957.47	0.02114371
San Diego (SD)	2023	ConstMin - Off-Highway Trucks	Aggregate	600	Diesel	1243814.53	167331.35	121.34	62886849.37	0.01977861
San Diego (SD)	2023	ConstMin - Rubber Tired Loaders	Aggregate	300	Diesel	980184.31	251967.65	233.73	52516247.07	0.01866440
San Diego (SD)	2023	ConstMin - Rubber Tired Loaders	Aggregate	600	Diesel	1272447.45	206852.95	209.84	68260760.63	0.01864098
San Diego (SD)	2023	ConstMin - Skid Steer Loaders	Aggregate	75	Diesel	339599.74	252166.06	698.93	17819563.50	0.01905769