

Appendix D

Energy Calculations

Whittier Murphy Reservoir

Last Updated: 10/18/21

Compression-Ignition Engine Brake-Specific Fuel Consumption (BSFC) Factors [1]:

HP: 0 to 100	0.0588	HP: Greater than 100	0.0529
--------------	--------	----------------------	--------

Values above are expressed in gallons per horsepower-hour/BSFC.

CONSTRUCTION EQUIPMENT

Construction Equipment	#	Hours per		Load Factor	Construction Phase	Fuel Used (gallons)
		Day	Horsepower			
Excavators	3	8	158	0.38	Demolition Phase	1,523.35
Off-Highway Trucks	1	8	402	0.38	Demolition Phase	1,291.96
Rubber Tired Dozers	2	8	247	0.4	Demolition Phase	1,671.19
Tractors/Loaders/Backhoes	1	8	97	0.37	Demolition Phase	337.45
Excavators	1	8	158	0.38	Grading Phase	507.78
Off-Highway Trucks	1	8	402	0.38	Grading Phase	1,291.96
Rollers	1	8	80	0.38	Grading Phase	285.83
Rubber Tired Dozers	1	8	247	0.4	Grading Phase	835.59
Tractors/Loaders/Backhoes	3	8	97	0.37	Grading Phase	1,012.34
Aerial Lifts	1	8	63	0.31	Building Construction Phase	449.88
Air Compressors	1	6	78	0.48	Building Construction Phase	646.84
Cranes	1	7	231	0.29	Building Construction Phase	1,214.57
Forklifts	3	8	89	0.2	Building Construction Phase	1,230.10
Other Material Handling Equipment	1	8	168	0.4	Building Construction Phase	1,392.43
Generator Sets	1	8	84	0.74	Building Construction Phase	1,431.89
Off-Highway Trucks	1	8	402	0.38	Building Construction Phase	3,165.30
Air Compressors	1	6	78	0.48	Architectural Coating Phase	264.02
Pavers	2	8	130	0.42	Paving Phase	923.55
Paving Equipment	2	8	132	0.36	Paving Phase	803.80
Rollers	2	8	80	0.38	Paving Phase	571.66
Total Fuel Used						20,851.50
						(Gallons)

Construction Phase Days of Operation

Demolition Phase	20
Grading Phase	20
Building Construction Phase	49
Paving Phase	20
Architectural Coating Phase	20
Total Days	129

WORKER TRIPS

Constuction Phase	MPG [2]	Trips	Trip Length (miles)	Fuel Used (gallons)
Demolition Phase	24.4	18	14.7	216.89
Grading Phase	24.4	18	14.7	216.89
Building Construction Phase	24.4	99	14.7	2922.53
Paving Phase	24.4	15	14.7	180.74
Architectural Coating Phase	24.4	20	14.7	240.98
Total				3,778.02

HAULING AND VENDOR TRIPS

Trip Class	MPG [2]	Trips	Trip Length (miles)	Fuel Used (gallons)
HAULING TRIPS				
Demolition Phase	7.5	161	20.0	429.33
Grading Phase	7.5	500	20.0	1333.33
Building Construction Phase	7.5	0	20.0	0.00
Paving Phase	7.5	0	20.0	0.00
Architectural Coating Phase	7.5	0	20.0	0.00
Total				1,762.67
VENDOR TRIPS				
Demolition Phase	7.5	0	6.9	0.00
Grading Phase	7.5	0	6.9	0.00
Building Construction Phase	7.5	39	6.9	1758.12
Paving Phase	7.5	0	6.9	0.00
Architectural Coating Phase	7.5	0	6.9	0.00
Total				1,758.12
Total Gasoline Consumption (gallons)				3,778.02
Total Diesel Consumption (gallons)				24,372.29

Sources:

[1] United States Environmental Protection Agency. 2018. *Exhaust and Crankcase Emission Factors for Nonroad Compression-Ignition Engines in MOVES2014b*. July 2018. Available at: <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100UXEN.pdf>.

[2] United States Department of Transportation, Bureau of Transportation Statistics. 2019. *National Transportation Statistics 2019*. Available at: <https://www.bts.gov/topics/national-transportation-statistics>.