

# Appendix C.2

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Energy Calculations

# Olsen Chandler Specific Plan

Last Updated: August 28, 2019

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

HP: 0 to 100	0.0588	HP: Greater than 100	0.0529
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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			
Concrete/Industrial Saw	1	8	81	0.73	Demolition	138.99
Excavators	3	8	158	0.38	Demolition	380.84
Dozers	2	8	247	0.40	Demolition	417.80
Dozers	3	8	247	0.40	Site Preparation	2,882.80
Tractors/Loaders/Backhoes	4	8	97	0.37	Site Preparation	1,552.26
Excavators	2	8	158	0.38	Grading	4,417.73
Graders	1	8	187	0.41	Grading	2,820.68
Dozers	1	8	247	0.40	Grading	3,634.84
Scrapers	2	8	367	0.48	Grading	12,961.80
Tractors/Loaders/Backhoes	2	8	97	0.37	Grading	2,935.79
Cranes	1	7	231	0.29	Building Construction	19,408.35
Forklifts	3	8	89	0.20	Building Construction	19,656.49
Generator Sets	1	8	84	0.74	Building Construction	22,881.04
Tractors/Loaders/Backhoes	3	7	97	0.37	Building Construction	34,679.08
Welders	1	8	46	0.45	Building Construction	7,619.65
Air Compressor	1	6	78	0.48	Arch Coating	8,897.34
Pavers	2	8	130	0.42	Paving	2,077.99
Paving Equipment	2	8	132	0.36	Paving	1,808.54
Rollers	2	8	80	0.38	Paving	1,286.23
<b>Total Fuel Used</b>						<b>150,458.24</b> (Gallons)

Construction Phase	Days of Operation
Demolition	5
Site Preparation	23
Grading	87
Building Construction	783
Paving	45
Architectural Coating	674

WORKER TRIPS				
Constuction Phase	MPG [2]	Trips	Trip Length (miles)	Fuel Used (gallons)
Demolition	24.0	15	13.0	40.63
Site Preparation	24.0	18	13.0	224.25
Grading	24.0	20	13.0	942.50
Building Construction	24.0	3,813	13.0	1,617,188.63
Paving	24.0	15	13.0	365.63
Architectural Coating	24.0	763	13.0	278,558.58
<b>Total</b>				<b>1,897,320.21</b>

VENDOR TRIPS				
Constuction Phase	MPG [2]	Trips	Trip Length (miles)	Fuel Used (gallons)
Demolition	7.4	-	5.0	-
Site Preparation	7.4	-	5.0	-
Grading	7.4	-	5.0	-
Building Construction	7.4	1,413	5.0	747,553.38
Paving	7.4	-	5.0	-
Architectural Coating	7.4	-	5.0	-
<b>Total</b>				<b>747,553.38</b>

## HAULING TRIPS

Trip Class	MPG [2]	Trips	Trip Length (miles)	Fuel Used (gallons)
Demolition	7.4	15	20.00	40.54
<b>Total</b>				<b>40.54</b>

<b>Total Gasoline Consumption (gallons)</b>	<b>1,897,320.21</b>
<b>Total Diesel Consumption (gallons)</b>	<b>898,052.16</b>

### 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. 2018. *National Transportation Statistics 2018*. Available at: <https://www.bts.gov/sites/bts.dot.gov/files/docs/browse-statistical-products-and-data/national-transportation-statistics/223001/ntsntire2018q4.pdf>.

# Olsen Chandler Specific Plan

Last Updated: June 28, 2019

Populate one of the following tables (Leave the other blank):

<b>Residential Annual VMT</b>	<b>OR</b>	<b>Daily Vehicle Trips</b>
Residential Annual VMT: 25,033,354		Daily Vehicle Trips: Average Trip Distance:

Fleet Class	Fleet Mix	Fuel Economy (MPG)	
Light Duty Auto (LDA)	0.600000	Passenger Vehicles	24.0
Light Duty Truck 1 (LDT1)	0.150000	Light-Med Duty Trucks	17.4
Light Duty Truck 2 (LDT2)	0.185000	Heavy Trucks/Other	7.4
Medium Duty Vehicle (MDV)	0.050000	Motorcycles	43.9
Light Heavy Duty 1 (LHD1)	0.001000		
Light Heavy Duty 2 (LHD2)	0.001000		
Medium Heavy Duty (MHD)	0.002000		
Heavy Heavy Duty (HHD)	0.002000		
Other Bus (OBUS)	0.001000		
Urban Bus (UBUS)	0.003000		
School Bus (SBUS)	0.001000		
Motorhome (MH)	0.004000		
Motorcycle (MCY)	0.001000		

Fleet Mix					
Vehicle Type	Percent	Fuel Type	Annual VMT: VMT	Vehicle Trips: VMT	Fuel Consumption (Gallons)
Passenger Vehicles	60.00%	Gasoline	15,020,012	0.00	625,833.85
Light-Medium Duty Trucks	38.50%	Gasoline	9,637,841	0.00	553,898.92
Heavy Trucks/Other	1.50%	Diesel	375,500	0.00	50,743.29
Motorcycle	0.10%	Gasoline	25,033	0.00	570.24

<b>Total Gasoline Consumption (gallons)</b>	<b>1,180,303.01</b>
<b>Total Diesel Consumption (gallons)</b>	<b>50,743.29</b>

# Olsen Chandler Specific Plan

Last Updated: June 28, 2019

Populate one of the following tables (Leave the other blank):

<b>Nonresidential Annual VMT</b>	<b>OR</b>	<b>Daily Vehicle Trips</b>
Nonresidential Annual VMT: 2,601,506		Daily Vehicle Trips: Average Trip Distance:

Fleet Class	Fleet Mix	Fuel Economy (MPG)	
Light Duty Auto (LDA)	0.588806	Passenger Vehicles	24.0
Light Duty Truck 1 (LDT1)	0.027737	Light-Med Duty Trucks	17.4
Light Duty Truck 2 (LDT2)	0.198305	Heavy Trucks/Other	7.4
Medium Duty Vehicle (MDV)	0.114471	Motorcycles	43.9
Light Heavy Duty 1 (LHD1)	0.022249		
Light Heavy Duty 2 (LHD2)	0.005748		
Medium Heavy Duty (MHD)	0.012759		
Heavy Heavy Duty (HHD)	0.019721		
Other Bus (OBUS)	0.002316		
Urban Bus (UBUS)	0.001163		
School Bus (SBUS)	0.000758		
Motorhome (MH)	0.001192		
Motorcycle (MCY)	0.004776		

## Fleet Mix

Vehicle Type	Percent	Fuel Type	Annual VMT: VMT	Vehicle Trips: VMT	Fuel Consumption (Gallons)
Passenger Vehicles	58.88%	Gasoline	1,531,782	0.00	63,824.26
Light-Medium Duty Trucks	34.05%	Gasoline	885,847	0.00	50,910.72
Heavy Trucks/Other	6.59%	Diesel	171,455	0.00	23,169.57
Motorcycle	0.48%	Gasoline	12,425	0.00	283.02

<b>Total Gasoline Consumption (gallons)</b>	<b>115,018.01</b>
<b>Total Diesel Consumption (gallons)</b>	<b>23,169.57</b>