
APPENDIX C

ENERGY CALCULATIONS

| Construction Off-Road Equipment | | | | | | | | | | |
|---------------------------------|---------------------------|--------|----------------|------------------|-----------------------------|------------|-------------|------------------------------|-----------------|----------------------|
| Phase | Off-Road Equipment Type | Amount | Usage Hour/Day | Total Usage Days | Total Usage Hours/Equipment | Horsepower | Load Factor | Total Usage Hours/ Equipment | Horsepower-Hour | Fuel Usage (gallons) |
| Demolition | Concrete/Industrial Saws | 1 | 8 | 64 | 512 | 81 | 0.73 | 512 | 30274.56 | 1550.057472 |
| | Excavators | 3 | 8 | 64 | 1536 | 158 | 0.38 | 1536 | 92221.44 | 4721.737728 |
| | Rubber Tired Dozers | 2 | 8 | 64 | 1024 | 247 | 0.4 | 1024 | 101171.2 | 5179.96544 |
| Site Preparation | Rubber Tired Dozers | 3 | 8 | 15 | 360 | 247 | 0.4 | 360 | 35568 | 1821.0816 |
| | Tractors/Loaders/Backhoes | 4 | 8 | 15 | 480 | 97 | 0.37 | 480 | 17227.2 | 882.03264 |
| Grading | Excavators | 2 | 8 | 20 | 320 | 158 | 0.38 | 320 | 19212.8 | 983.69536 |
| | Graders | 1 | 8 | 20 | 160 | 187 | 0.41 | 160 | 12267.2 | 628.08064 |
| | Rubber Tired Dozers | 1 | 8 | 20 | 160 | 247 | 0.4 | 160 | 15808 | 809.3696 |
| | Scrapers | 2 | 8 | 20 | 320 | 367 | 0.48 | 320 | 56371.2 | 2886.20544 |
| | Tractors/Loaders/Backhoes | 2 | 8 | 20 | 320 | 97 | 0.37 | 320 | 11484.8 | 588.02176 |
| Building Construction | Cranes | 1 | 7 | 141 | 987 | 231 | 0.29 | 987 | 66119.13 | 3385.299456 |
| | Forklifts | 3 | 8 | 141 | 3384 | 89 | 0.2 | 3384 | 60235.2 | 3084.04224 |
| | Generator Sets | 1 | 8 | 141 | 1128 | 84 | 0.74 | 1128 | 70116.48 | 3589.963776 |
| | Tractors/Loaders/Backhoes | 3 | 7 | 141 | 2961 | 97 | 0.37 | 2961 | 106270.29 | 5441.038848 |
| | Welders | 1 | 8 | 141 | 1128 | 46 | 0.45 | 1128 | 23349.6 | 1195.49952 |
| Paving | Pavers | 2 | 8 | 15 | 240 | 130 | 0.42 | 240 | 13104 | 670.9248 |
| | Paving Equipment | 2 | 8 | 15 | 240 | 132 | 0.36 | 240 | 11404.8 | 583.92576 |
| | Rollers | 2 | 8 | 15 | 240 | 80 | 0.38 | 240 | 7296 | 373.5552 |
| Architectural Coating | Air Compressors | 1 | 6 | 70 | 420 | 78 | 0.48 | 420 | 15724.8 | 805.10976 |
| | | | | | | | | | Total | 39179.60704 |

Diesel

| Construction Truck and Construction Worker Vehicle Fuel Efficiency | | | | |
|--|---------------|--------------------------------------|-----------------|--------------------------------|
| Vehicle Type | Vehicle Class | EMFAC 2021 Outputs | | Fuel Efficiency (miles/gallon) |
| | | Fuel Consumption (1,000 gallons/day) | VMT (miles/day) | |
| Construction Truck | MHDT | 88.8 | 797273.2 | 9.0 |
| | HHDT | 711.5 | 4294976.0 | 6.0 |
| | HHDT/MHDT | - | - | 7.5 |
| Construction Worker Vehicle | LDA | 1140.9 | 33073440.0 | 29.0 |
| | LDT1 | 104.7 | 2503906 | 23.9 |
| | LDT2 | 561.9 | 13160213 | 23.4 |
| | Worker Mix | - | - | 26.3 |

Notes:

¹ For construction trucks assumes 50 percent HHDT and 50 percent MHDT vehicles, consistent with assumptions in CalEEMod for hauling trucks. For construction worker vehicles assumes 50 percent LDA, 25 percent LDT1, and 25 percent LDT2 vehicles, consistent with assumptions in CalEEMod for worker vehicles.

² EMFAC2021 was run for San Bernardino County for the construction year 2023. Data was aggregated over all vehicle model years and speed bins.

³ The fuel efficiency was calculated by dividing the VMT (miles/day) by the fuel consumption (gallons/day).

| Construction Vehicle Fuel Use - Diesel Vehicles | | | | | | |
|---|-----------|-------------|---------------------|-----------|---------------------------------------|---------------------------|
| Phase | Trip Type | Total Trips | Trip Length (miles) | Total VMT | Diesel Fuel Efficiency (miles/gallon) | Fuel Usage (gallons/year) |
| Demolition | Hauling | 880 | 20 | 17600 | 6.0 | 2933.3 |
| Grading | Hauling | 3060 | 20 | 61200 | 6.0 | 10200.0 |
| Building Construction | Vendor | 18048 | 6.9 | 124531.2 | 7.5 | 16604.2 |
| | | | | | Total | 29737.5 |

Diesel

¹ Assumes 100 percent HHDT vehicles for haul trucks and 50 percent HHDT/50 percent MHDT vehicles for MHDT, consistent with assumptions in CalEEMod.

² EMFAC2021 was run for San Bernardino County for the construction year 2023. Data was aggregated over all vehicle model years and speed bins.

³ The fuel efficiency was calculated by dividing the VMT (miles/day) by the fuel consumption (gallons/day).

| Construction Worker Vehicle Fuel Use - Gasoline Vehicles | | | | | | |
|--|-------------------------|------------|-------------|---------------------|--------------|---------------------------|
| Phase | Total One-Way Trips/Day | Total Days | Total Trips | Trip Length (miles) | Total VMT | Fuel Usage (gallons/year) |
| Demolition | 15 | 64 | 1920 | 14.7 | 28224 | 1073.2 |
| Site Preparation | 18 | 15 | 540 | 14.7 | 7938 | 301.8 |
| Grading | 20 | 20 | 800 | 14.7 | 11760 | 447.1 |
| Building Construction | 163 | 141 | 45966 | 14.7 | 675700.2 | 25692.0 |
| Paving | 15 | 15 | 450 | 14.7 | 6615 | 251.5 |
| Architectural Coating | 33 | 70 | 4620 | 14.7 | 67914 | 2582.3 |
| | | | | | Total | 30348.0 |

Gas

| | |
|--|----------------|
| Total Construction Gasoline Usage | 30348.0 |
| Total Construction Diesel Usage | 68917.1 |

| Proposed Project Operational Trips | | | |
|---|----------|---------------------|-------------------------------|
| Unrefrigerated Warehouse - Vehicle and Light Duty Truck Trips Fleet Mix | | | |
| Vehicle Class | CalEEMod | Total Project Trips | Total Trips per Vehicle Class |
| LDA | 0.437849 | 716 | 313.5 |
| LDT1 | 0.218925 | 716 | 156.8 |
| LDT2 | 0.218925 | 716 | 156.8 |
| MDV | 0 | 716 | 0.0 |
| LHD1 | 0.027933 | 716 | 20.0 |
| LHD2 | 0.027933 | 716 | 20.0 |
| MHD | 0.068436 | 716 | 49.0 |
| HHD | 0 | 716 | 0.0 |
| OBUS | 0 | 716 | 0.0 |
| UBUS | 0 | 716 | 0.0 |
| MCY | 0 | 716 | 0.0 |
| SBUS | 0 | 716 | 0.0 |
| MH | 0 | 716 | 0.0 |

| Proposed Project Operational Trips | | | |
|---|----------|---------------------|-------------------------------|
| Refrigerated Warehouse - Vehicle and Light Duty Truck Trips Fleet Mix | | | |
| Vehicle Class | CalEEMod | Total Project Trips | Total Trips per Vehicle Class |
| LDA | 0.363014 | 73 | 26.5 |
| LDT1 | 0.181507 | 73 | 13.3 |
| LDT2 | 0.181507 | 73 | 13.3 |
| MDV | 0 | 73 | 0.0 |
| LHD1 | 0.10274 | 73 | 7.5 |
| LHD2 | 0.10274 | 73 | 7.5 |
| MHD | 0.068493 | 73 | 5.0 |
| HHD | 0 | 73 | 0.0 |
| OBUS | 0 | 73 | 0.0 |
| UBUS | 0 | 73 | 0.0 |
| MCY | 0 | 73 | 0.0 |
| SBUS | 0 | 73 | 0.0 |
| MH | 0 | 73 | 0.0 |

| Proposed Project Operational Trips – Fuel Efficiency | | | | | |
|--|---------------|--------------------------------|---------------------------------|-----------------|---|
| Fuel | Vehicle Class | EMFAC2021 Outputs ¹ | | | |
| | | Fleet Mix (%) ² | Consumption (1,000 gallons/day) | VMT (miles/day) | Fuel Efficiency ³ (miles/gallon) |
| Gas | LDA | 55% | 1,118.2 | 33,024,788.0 | 29.5 |
| | LDT1 | 4% | 101.1 | 2,460,565.0 | 24.3 |
| | LDT2 | 22% | 565.3 | 13,590,074.0 | 24.0 |
| | MDV | 16% | 511.4 | 9,933,878.0 | 19.4 |
| | LHD1 | 2% | 83.8 | 1,118,103.0 | 13.4 |
| | MCY | 0% | 5.5 | 228,527.3 | 41.5 |
| | MH | 0% | 11.8 | 56,940.1 | 4.8 |
| | Fleet Mix | – | – | – | 26.1 |
| Diesel | LHD2 | 7% | 21.5 | 367,558.8 | 17.1 |
| | MHDT | 15% | 90.2 | 809,994.5 | 9.0 |
| | HHDT | 79% | 716.5 | 4,383,825.0 | 6.1 |
| | Fleet Mix | – | – | – | 7.3 |

16.1
1.0
5.4
3.2
0.2
0.2
0.0
26.1
1.1
1.3
4.8
7.3

Notes:

¹ EMFAC2021 was run for San Bernardino County for the operational year 2024. Data was aggregated over all vehicle model years and speed bins.

² Fleet mix is based on assumptions made in CalEEMod for the proposed project.

³ The fuel efficiency was calculated by dividing the VMT (miles/day) by the fuel consumption (gallons/day).

| Proposed Project Operational Trips – Fuel Usage | | | | | | |
|---|--|-----------|-----------------------------------|-------------------------------|--|---------------------------|
| Land Use | Total Annual VMT ² (miles/year) | Fuel Type | Portion of Fleet ³ (%) | VMT by Fuel Type (miles/year) | Fleet Mix Efficiency ⁴ (miles/gallon) | Fuel Usage (gallons/year) |
| Unrefrigerated Warehouse (vehicles and light duty trucks) | 3,068,444 | Gas | 90% | 2772744 | 26.1 | 106047.4 |
| | | Diesel | 10% | 295703 | 7.3 | 40732.5 |
| Refrigerated Warehouse (vehicles and light duty trucks) | 313,020 | Gas | 83% | 2543028 | 26.1 | 97261.6 |
| | | Diesel | 17% | 525419 | 7.3 | 72375.5 |
| Unrefrigerated Warehouse (heavy heavy duty trucks) | 2,026,348 | Diesel | 100% | 2026348 | 6.1 | 331182.8 |
| Refrigerated Warehouse (heavy heavy duty trucks) | 313,602 | Diesel | 100% | 313602 | 6.1 | 51254.6 |
| | | | | | Total Gasoline/year | 203309.0 |
| | | | | | Total Diesel/year | 495545.4 |

Notes:

¹ Calculated for operational year 2024 only. Future years will likely use less fuel due to more efficient cars.

² Total VMT is based on project's trip generation and trip lengths.

³ Fleet distribution is based on EMFAC2021 output and CalEEMod assumptions.

⁴ Fuel efficiency is based on fuel consumption and VMT data from EMFAC2021 for San Bernardino County and total VMT.

| Electricity Usage | |
|--------------------------------|------------------|
| Electricity by Land Use | kWh/year |
| Unrefrigerated Warehouse | 412164 |
| Refrigerated Warehouse | 786442 |
| City Park | 0 |
| Parking Lot | 37,380 |
| Total | 1,235,986 |

| Natural Gas Usage | | | |
|--------------------------------|------------------|----------------------|--------------------|
| Natural Gas by Land Use | kBTU/year | BTU/year | therms/year |
| Unrefrigerated Warehouse | 357,091 | 357,091,000 | 3,571.8 |
| Refrigerated Warehouse | 1,021,100 | 1,021,100,000 | 10,213.4 |
| City Park | 0 | - | 0 |
| Parking Lot | 0 | - | 0 |
| Total | 1,378,191 | 1,378,191,000 | 13,785.2 |

| Existing Uses Operational Trips | | | |
|---------------------------------|----------|---------------------|-------------------------------|
| Unrefrigerated Warehouse | | | |
| Vehicle Class | CalEEMod | Total Project Trips | Total Trips per Vehicle Class |
| LDA | 0.341319 | 919 | 313.7 |
| LDT1 | 0.055593 | 919 | 51.1 |
| LDT2 | 0.17199 | 919 | 158.1 |
| MDV | 0.141576 | 919 | 130.1 |
| LHD1 | 0.027719 | 919 | 25.5 |
| LHD2 | 0.007281 | 919 | 6.7 |
| MHD | 0.057 | 919 | 52.4 |
| HHD | 0.172 | 919 | 158.1 |
| OBUS | 0 | 919 | 0.0 |
| UBUS | 0 | 919 | 0.0 |
| MCY | 0.025522 | 919 | 23.5 |
| SBUS | 0 | 919 | 0.0 |
| MH | 0 | 919 | 0.0 |

| Existing Uses Operational Trips | | | |
|---------------------------------|----------|---------------|-------------------------------|
| Single Family Home | | | |
| Vehicle Class | CalEEMod | Total Project | Total Trips per Vehicle Class |
| LDA | 0.534251 | 9 | 4.8 |
| LDT1 | 0.055593 | 9 | 0.5 |
| LDT2 | 0.17199 | 9 | 1.5 |
| MDV | 0.141576 | 9 | 1.3 |
| LHD1 | 0.027719 | 9 | 0.2 |
| LHD2 | 0.007281 | 9 | 0.1 |
| MHD | 0.011628 | 9 | 0.1 |
| HHD | 0.017336 | 9 | 0.2 |
| OBUS | 0.000569 | 9 | 0.0 |
| UBUS | 0.000257 | 9 | 0.0 |
| MCY | 0.025522 | 9 | 0.2 |
| SBUS | 0.000954 | 9 | 0.0 |
| MH | 0.005323 | 9 | 0.0 |

| Existing Uses Operational Trips – Fuel Efficiency | | | | | |
|---|---------------|--------------------------------|---------------------------------|-----------------|---|
| Fuel | Vehicle Class | EMFAC2021 Outputs ¹ | | | |
| | | Fleet Mix (%) ² | Consumption (1,000 gallons/day) | VMT (miles/day) | Fuel Efficiency ³ (miles/gallon) |
| Gas | LDA | 56% | 1,157.5 | 32,956,006.0 | 28.5 |
| | LDT1 | 4% | 108.0 | 2,538,748.0 | 23.5 |
| | LDT2 | 21% | 554.6 | 12,649,675.0 | 22.8 |
| | MDV | 16% | 527.1 | 9,789,367.0 | 18.6 |
| | LHD1 | 2% | 88.0 | 1,109,722.0 | 12.6 |
| | MCY | 0% | 5.6 | 228,447.3 | 41.0 |
| | MH | 0% | 13.3 | 64,090.3 | 4.8 |
| | Fleet Mix | – | – | – | 25.1 |
| Diesel | LHD2 | 7% | 21.4 | 360,763.4 | 16.8 |
| | MHDT | 15% | 87.3 | 783,257.2 | 9.0 |
| | HHDT | 79% | 703.5 | 4,194,213.0 | 6.0 |
| | Fleet Mix | – | – | – | 7.1 |

15.8
1.0
4.9
3.1
0.2
0.2
0.0
25.1
1.1
1.3
4.7
7.1

Notes:

¹ EMFAC2021 was run for Los Angeles County for the operational year 2024. Data was aggregated over all vehicle model years and speed bins.

² Fleet mix is based on assumptions made in CalEEMod for the proposed project.

³ The fuel efficiency was calculated by dividing the VMT (miles/day) by the fuel consumption (gallons/day).

| Existing Uses Operational Trips – Fuel Usage | | | | | | |
|--|--|-----------|-----------------------------------|-------------------------------|--|---------------------------|
| Land Use | Total Annual VMT ² (miles/year) | Fuel Type | Portion of Fleet ³ (%) | VMT by Fuel Type (miles/year) | Fleet Mix Efficiency ⁴ (miles/gallon) | Fuel Usage (gallons/year) |
| Unrefrigerated Warehouse | 3,938,478 | Gas | 76% | 3007890 | 25.1 | 119624.4 |
| | | Diesel | 24% | 930588 | 7.1 | 130363.2 |
| Single Family Home | 32,224 | Gas | 96% | 3795724 | 25.1 | 150956.7 |
| | | Diesel | 4% | 142750 | 7.1 | 19997.4 |
| | | | | | Total Gasoline/year | 270581.1 |
| | | | | | Total Diesel/year | 150360.6 |

Notes:

¹ Calculated for operational year 2024 only. Future years will likely use less fuel due to more efficient cars.

² Total VMT is based on project's trip generation and trip lengths.

³ Fleet distribution is based on EMFAC2021 output and CalEEMod assumptions.

⁴ Fuel efficiency is based on fuel consumption and VMT data from EMFAC2021 for Los Angeles County and total VMT.

| Existing Uses Electricity Usage | |
|--|-----------------|
| Electricity by Land Use | kWh/year |
| Unrefrigerated Warehouse | 615231 |
| Single Family Home | 7967.72 |
| Total | 623,199 |

| Existing Uses Natural Gas Usage | | | |
|--|------------------|--------------------|--------------------|
| Natural Gas by Land Use | kBTU/year | BTU/year | therms/year |
| Unrefrigerated Warehouse | 485,607 | 485,607,000 | 4,857.2 |
| Single Family Home | 36,858 | 36,857,700 | 368.7 |
| Total | 522,465 | 522,464,700 | 5,225.9 |