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**SUBJECT: MORENO VALLEY BUSINESS PARK – PHASE II ENERGY TABLES**

The following Energy Tables were prepared for the proposed Moreno Valley Business Park – Phase II development (referred to as “Project”) which is located in the City of Moreno Valley.

**CONSTRUCTION EQUIPMENT ELECTRICITY USAGE ESTIMATES**

Based on the 2021 *National Construction Estimator* (1), the typical power cost per 1,000 square feet of building construction per month is estimated to be \$2.37. The proposed development consists of 220,390 sf industrial building (Building 5) which will be evaluated assuming 154,270 square feet (sf) of warehousing use (70% of the overall sf), 33,060 sf of manufacturing use (15% of the overall sf), and 33,060 sf of high-cube cold storage warehouse use (15% of the overall sf) for a total of 220,390 sf of industrial uses. Table 1 estimates the total power cost of the on-site electricity usage during the construction of the proposed Project to be approximately \$11,336.07.

**TABLE 1: PROJECT CONSTRUCTION POWER COST**

Land Use	Power Cost (per 1,000 SF)	Size (1,000 SF)	Construction Duration (months)	Project Construction Power Cost
Manufacturing	\$2.37	33.060	11	\$861.87
Warehousing	\$2.37	154.270	11	\$4,021.82
High-Cube Cold Storage	\$2.37	33.060	11	\$861.87
Parking	\$2.37	41.076	11	\$1,070.85
Other Asphalt Surfaces	\$2.37	173.366	11	\$4,519.65
<b>CONSTRUCTION POWER COST</b>				<b>\$11,336.07</b>

The SCE’s general service rate schedule were used to determine the Project’s electrical usage. As of October 1, 2021, SCE’s general service rate is \$0.13 per kilowatt hours (kWh) of electricity for industrial services (2), the total electricity usage from on-site Project construction related activities is estimated to be approximately 90,406 kWh.

**TABLE 2: PROJECT CONSTRUCTION ELECTRICITY USAGE**

Land Use	Cost per kWh	Project Construction Electricity Usage (kWh)
Manufacturing	\$0.13	6,874
Warehousing	\$0.13	32,074
High-Cube Cold Storage	\$0.13	6,874
Parking	\$0.13	8,540
Other Asphalt Surfaces	\$0.13	36,045
<b>CONSTRUCTION ELECTRICITY USAGE</b>		<b>90,406</b>

**CONSTRUCTION EQUIPMENT FUEL ESTIMATES**

Fuel consumption estimates are presented in Table 3. The aggregate fuel consumption rate for all equipment is estimated at 18.5 hp-hr-gal., obtained from California Air Resources Board (CARB) 2018 Emissions Factors Tables and cited fuel consumption rate factors presented in Table D-24 of the Moyer guidelines (3). For the purposes of this analysis, the calculations are based on all construction equipment being diesel-powered which is standard practice consistent with industry standards. Diesel fuel would be supplied by existing commercial fuel providers serving the City and region. As presented in Table 3, Project construction activities would consume an estimated total of 57,616 gallons of diesel fuel over the approximately 11-month construction period.

**TABLE 3: CONSTRUCTION EQUIPMENT FUEL CONSUMPTION ESTIMATES**

Construction Activity	Duration (Days)	Equipment	HP Rating	Quantity	Usage Hours	Load Factor	HP-hrs/day	Total Fuel Consumption
Site Preparation	10	Crawler Tractors	212	4	8	0.43	2,917	1,577
		Rubber Tired Dozers	247	3	8	0.40	2,371	1,282
Grading	20	Crawler Tractors	212	3	8	0.43	2,188	2,365
		Excavators	158	1	8	0.38	480	519
		Graders	187	1	8	0.41	613	663
		Rubber Tired Dozers	247	1	8	0.40	790	854
Building Construction	230	Cranes	231	1	8	0.29	536	6,663
		Crawler Tractors	212	3	8	0.43	2,188	27,200
		Forklifts	89	3	8	0.20	427	5,311
		Generator Sets	84	1	8	0.74	497	6,182
		Welders	46	1	8	0.45	166	2,059
Paving	20	Pavers	130	2	8	0.42	874	944
		Paving Equipment	132	2	8	0.36	760	822
		Rollers	80	2	8	0.38	486	526
Architectural Coating	40	Air Compressors	78	1	8	0.48	300	648
<b>CONSTRUCTION FUEL DEMAND (GALLONS DIESEL FUEL)</b>								<b>57,616</b>

**CONSTRUCTION WORKER FUEL ESTIMATES**

It is assumed that all construction worker trips are from light duty autos (LDA) along area roadways. Data regarding Project related construction worker trips were based on CalEEMod 2020.4.0 model defaults utilized within the AQIA. Vehicle fuel efficiencies for LDAs were estimated using information generated within the 2017 version of the EMFAC developed by the CARB. Table 4 provides an estimated annual fuel consumption resulting from the Project generated by LDAs related to construction worker trips. Based on Table 4, it is estimated that 21,840 gallons of fuel will be consumed related to construction worker trips over the approximately 11-month construction period .

**TABLE 4: CONSTRUCTION WORKER FUEL CONSUMPTION ESTIMATES (1 OF 2)**

Year	Construction Activity	Duration (Days)	Worker Trips/Day	Trip Length (miles)	VMT	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
2022	LDA						
	Site Preparation	10	9	14.7	1,323	32.77	40
	Grading	20	8	14.7	2,352	32.77	72
	Building Construction	80	92	14.7	108,192	32.77	3,302
	LDT1						
	Site Preparation	10	5	14.7	735	27.55	27
	Grading	20	4	14.7	1,176	27.55	43
	Building Construction	80	46	14.7	54,096	27.55	1,963
	LDT2						
	Site Preparation	10	5	14.7	735	26.03	28
	Grading	20	4	14.7	1,176	26.03	45
	Building Construction	80	46	14.7	54,096	26.03	2,078
2023	LDA						
	Building Construction	150	92	14.7	202,860	33.79	6,004
	Paving	20	8	14.7	2,352	33.79	70
	Architectural Coating	40	19	14.7	11,172	33.79	331
	LDT1						
	Building Construction	150	46	14.7	101,430	28.38	3,574
	Paving	20	4	14.7	1,176	28.38	41
	Architectural Coating	40	10	14.7	5,880	28.38	207

**TABLE 4: CONSTRUCTION WORKER FUEL CONSUMPTION ESTIMATES (2 OF 2)**

Year	Construction Activity	Duration (Days)	Worker Trips/Day	Trip Length (miles)	VMT	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
2023	LDT2						
	Building Construction	150	46	14.7	101,430	27.02	3,754
	Paving	20	4	14.7	1,176	27.02	44
	Architectural Coating	40	10	14.7	5,880	27.02	218
<b>TOTAL CONSTRUCTION WORKER FUEL CONSUMPTION</b>							<b>21,840</b>

**CONSTRUCTION VENDOR FUEL ESTIMATES**

It is assumed that 50% of all vendor trips are from Medium-Heavy-Duty-Trucks (MHDT) and 50% are from Heavy-Heavy-Duty Trucks (HHDT). These assumptions are consistent with the CalEEMod 2020.4.0 defaults utilized within the within the AQIA. Vehicle fuel efficiencies for MHDTs and HHDTs were estimated using information generated within EMFAC2017. Table 5 shows the estimated fuel economy of MHDTs and HHDTs accessing the Project site. Based on Table 5, fuel consumption from construction trips will total approximately 11,880 gallons over the approximately 11-month construction period .

**TABLE 5: CONSTRUCTION VENDOR FUEL CONSUMPTION ESTIMATES**

Year	Construction Activity	Duration (Days)	Vendor Trips/Day	Trip Length (miles)	VMT	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
2022	MHDT						
	Site Preparation	10	2	6.9	138	10.34	13
	Grading	20	3	6.9	414	10.34	40
	Building Construction	80	32	6.9	17,664	10.34	1,709
	HHDT						
	Site Preparation	10	2	6.9	138	7.06	20
	Grading	20	3	6.9	414	7.06	59
2023	MHDT						
	Building Construction	150	32	6.9	33,120	10.74	3,084
	HHDT (Vendor)						
	Building Construction	150	32	6.9	33,120	7.44	4,454
<b>TOTAL CONSTRUCTION VENDOR FUEL CONSUMPTION</b>							<b>11,880</b>

**TRANSPORTATION ENERGY DEMANDS**

Energy that would be consumed by Project-generated traffic is a function of total VMT and estimated vehicle fuel economies of vehicles accessing the Project site. Table 6 presents the estimated annual fuel consumption from project-generated traffic.

**TABLE 6: PROJECT-GENERATED TRAFFIC ANNUAL FUEL CONSUMPTION**

Vehicle Type	Average Vehicle Fuel Economy (mpg)			Annual VMT			Estimated Annual Fuel Consumption (gallons)
	Diesel	Gasoline	Natural Gas	Diesel	Gasoline	Natural Gas	
LDA	53.41	33.01	0.00	7,080	677,031	0	20,641
LDT1	26.18	28.13	0.00	18	72,336	0	2,572
LDT2	40.32	26.71	0.00	1,595	221,436	0	8,330
MDV	29.54	21.15	0.00	4,620	177,971	0	8,572
MCY	0.00	37.90	0.00	31,357	0	0	0
LHDT1	21.21	10.93	0.00	121,570	113,707	0	16,138
LHDT2	19.39	9.56	0.00	47,627	17,039	0	4,239
MHDT	11.65	5.34	0.00	279,869	21,757	0	28,088
HHDT	7.53	4.33	2.41	770,381	191	4,691	104,263
TRUs							16
<b>TOTAL (ALL VEHICLES)</b>				<b>2,587,545</b>			<b>192,858</b>

**FACILITY ENERGY DEMANDS**

Project building operations and Project site maintenance activities would result in the consumption of natural gas and electricity. Natural gas would be supplied to the Project by Southern California Gas (SoCalGas) and electricity would be supplied to the Project by SCE. Annual natural gas and electricity demands of the Project are summarized in Table 7.

**TABLE 7: PROJECT ANNUAL OPERATIONAL NATURAL GAS AND ELECTRICITY DEMAND SUMMARY**

<b>Land Use</b>	<b>Natural Gas Demand (kBTU/year)</b>	<b>Electricity Demand (kWh/year)</b>
Manufacturing	1,068,830	327,955
Warehousing	310,083	357,906
High-Cube Cold Storage	1,710,190	1,317,110
Parking	0	14,377
Other Asphalt Surfaces	0	0
<b><i>TOTAL PROJECT ENERGY DEMAND</i></b>	<b><i>3,089,103</i></b>	<b><i>2,017,348</i></b>

## REFERENCES

1. **Pray, Richard.** *2021 National Construction Estimator.* Carlsbad : Craftsman Book Company, 2021.
2. **Southern California Edison.** Schedule GS-1 General Service. *Regulatory Information - Rates Pricing.* [Online] [https://library.sce.com/content/dam/sce-doclib/public/regulatory/tariff/electric/schedules/general-service-&-industrial-rates/ELECTRIC\\_SCHEDULES\\_GS-1.pdf](https://library.sce.com/content/dam/sce-doclib/public/regulatory/tariff/electric/schedules/general-service-&-industrial-rates/ELECTRIC_SCHEDULES_GS-1.pdf).
3. **California Air Resources Board.** *Methods to Find the Cost-Effectiveness of Funding Air Quality Projects For Evaluating Motor Vehicle Registration Fee Projects And Congestion Mitigation and Air Quality Improvement (CMAQ) Projects, Emission Factor Tables.* 2018.