ENERGY CALCULATIONS

APPENDIX E

to the
Alexandria Center for Life Science Project Draft EIR

Construction Energy Use

To support the Energy Analysis for the following project: Alexandria Center

Construction Equipment/Vehicles

	# of Vehicles	Hrs per Day	Horse-power	Load Factor	Days in Phase	horsepower-hour/BSFC per day	horsepower-hour per phase	fuel used per vehicle	Fuel Used (gallons)
Abatement (Phases 2 and 3)									
Air Compressors	1	6	78	0.48	60	224.64	13478.40	792.53	793
Forklifts	1	4	89	0.2	60	71.20	4272.00	251.19	251
Demolition (Phases 2 and 3)									
Air Compressors	2	8	78	0.48	50	299.52	14976.00	880.59	1,761
Concrete/Industrial Saws	4	4	81	0.73	50	236.52	11826.00	695.37	2,781
Crushing/Proc. Equipment	1	6	85	0.78	50	397.80	19890.00	1169.53	1,170
Excavators	2	8	158	0.38	50	480.32	24016.00	1270.45	2,541
Signal Boards	1	8	6	0.82	50	39.36	1968.00	115.72	116
Skid Steer Loaders	2	8	65	0.37	50	192.40	9620.00	565.66	1,131
Sweepers/Scrubbers	1	6	64	0.46	50	176.64	8832.00	519.32	519
Site Utilities									
Excavators	1	8	158	0.38	170	480.32	81654.40	4319.52	4,320
Sweepers/Scrubbers	1	2.1	64	0.46	170	61.82	10510.08	617.99	618
Trenchers	1	3.2	78	0.5	170	124.80	21216.00	1247.50	1,248
Grade Side									
Excavators	1	6	158	0.38	85	360.24	30620.40	1619.82	1,620
Rubber Tired Dozers	1	6	247	0.4	85	592.80	50388.00	2665.53	2,666
Scrapers	4	6	367	0.48	85	1056.96	89841.60	4752.62	19,010
Signal Boards	2	8	6	0.82	85	39.36	3345.60	196.72	393
Tractors/Loaders/Backhoes	2	8	97	0.37	85	287.12	24405.20	1435.03	2,870
Drill Displacement Piles									
Bore/Drill Rigs	1	6	221	0.5	120	663.00	79560.00	4208.72	4,209
Forklifts	1	2	89	0.2	120	35.60	4272.00	251.19	251
Rubber Tired Dozers	1	6	247	0.4	120	592.80	71136.00	3763.09	3,763
Signal Boards	1	8	6	0.82	120	39.36	4723.20	277.72	278
Sweepers/Scrubbers	1	2	64	0.46	120	58.88	7065.60	415.46	415
Dewatering									
Bore/Drill Rigs	1	8	221	0.5	4	884.00	3536.00	187.05	187
Shoring and Excavation									
Bore/Drill Rigs	1	8	221	0.5	35	884.00	30940.00	1636.73	1,637
Excavators	2	8	158	0.38	35	480.32	16811.20	889.31	1,779
Forklifts	1	2.5	89	0.2	35	44.50	1557.50	91.58	92
Concrete/rebar/waterproofing									
Cranes	1	6	231	0.29	60	401.94	24116.40	1275.76	1,276
Pumps	4	12	84	0.74	60	745.92	44755.20	2631.61	10,526
Skid Steer Loaders	1	8	65	0.37	60	192.40	11544.00	678.79	679
Sweepers/Scrubbers	1	12	64	0.46	60	353.28	21196.80	1246.37	1,246
Structural Steel									
Aerial Lifts	3	5.3	63	0.31	135	103.51	13973.72	821.65	2,465
Cranes	2	8	231	0.29	135	535.92	72349.20	3827.27	7,655
Forklifts	2	6	89	0.2	135	106.80	14418.00	847.78	1,696
Generator Sets	4	4.7	84	0.74	135	292.15	39440.52	2319.10	9,276
Signal Boards	2	8	6	0.82	135	39.36	5313.60	312.44	625
Sweepers/Scrubbers	1	1.8	64	0.46	135	52.99	7153.92	420.65	421
Welders	4	8	46	0.45	135	165.60	22356.00	1314.53	5,258
Concrete Decks									
Concrete/Industrial Saws	4	5	81	0.73	125	295.65	36956.25	2173.03	8,692
Forklifts	2	6	89	0.2	125	106.80	13350.00	784.98	1,570
Pumps	2	5.8	84	0.74	125	360.53	45066.00	2649.88	5,300
Signal Boards	2	8	6	0.82	125	39.36	4920.00	289.30	579
Fireproofing									
Forklifts	1	4	89	0.2	125	71.20	8900.00	523.32	523
Other General Industrial Equipment	1	6.4	88	0.34	125	191.49	23936.00	1407.44	1,407
Exterior Skin									
Aerial Lifts	4	8	63	0.31	165	156.24	25779.60	1515.84	6,063
Cranes	1	3.4	231	0.29	165	227.77	37581.39	1988.06	1,988
Forklifts	1	2.5	89	0.2	165	44.50	7342.50	431.74	432
Landscaping and Hardscapes									
Forklifts	1	0.5	89	0.2	160	8.90	1424.00	83.73	84
Pavers	1	1.8	130	0.42	160	98.28	15724.80	831.84	832
Pressure Washers	1	0.5	13	0.3	160	1.95	312.00	18.35	18
Pumps	1	2	84	0.74	160	124.32	19891.20	1169.60	1,170
Tractors/Loaders/Backhoes	1	8	97	0.37	160	287.12	45939.20	2701.22	2,701
MEP									
Cranes	1	6.4	231	0.29	25	428.74	10718.40	567.00	567
Forklifts	1	2.6	89	0.2	25	46.28	1157.00	68.03	68

Sweepers/Scrubbers	1	8	64	0.46	25	235.52	5888.00	346.21	346
Roofing									
Cranes	1	0.7	231	0.29	50	46.89	2344.65	124.03	124
Other Construction Equipment	1	6	172	0.42	50	433.44	21672.00	1146.45	1,146
Framing/Drywall									
Cranes	1	6.4	231	0.29	25	428.74	10718.40	567.00	567
Forklifts	1	2.9	89	0.2	25	51.62	1290.50	75.88	76
Sweepers/Scrubbers	1	8	64	0.46	25	235.52	5888.00	346.21	346
Elevators									
Forklifts	1	0.6	89	0.2	50	10.68	534.00	31.40	31
Sweepers/Scrubbers	1	4	64	0.46	50	117.76	5888.00	346.21	346
Welders	2	8	46	0.45	50	165.60	8280.00	486.86	974
Other Interior Finishes									
Cement and Mortar Mixers	2	6	9	0.56	50	30.24	1512.00	88.91	178
Forklifts	1	1.9	89	0.2	50	33.82	1691.00	99.43	99
Sweepers/Scrubbers	1	4	64	0.46	50	117.76	5888.00	346.21	346
Startup & Commissioning									
Forklifts	1	4	89	0.2	10	71.20	712.00	41.87	42
Total Fuel Used for Construction Equipment/Vehicles Phase 1									**123,094**
Total Fuel Used for Construction Equipment/Vehicles Phase 2									**134,157**
Total Fuel Used for Construction Equipment/Vehicles Phase 3									**134,157**
All Phases									**391,407** (diesel)

Compression-Ignition Engine Brake-Specific Fuel Consumption (BSFC) Factors [1] used in the above calculations are
(in gallons per horsepower-hour/BSFC)

0.0588 <100 horsepower
0.0529 >100 horsepower

Worker Trips Phase 1

Phase	MPG [2]	Trips	Trip Length (miles)	Total Miles per Day	Days in Phase	Totel Miles in Phase		Fuel Used (gallons)
Site Utilities	24	8	10.8	86.4	170	14688		612
Grade Slide	24	25	10.8	270	85	22950		956
Drill Displacement Piles	24	13	10.8	140.4	120	16848		702
Dewatering	24	3	10.8	32.4	4	129.6		5
Shoring and Excavation	24	10	10.8	108	35	3780		158
Concrete/Rebar/Waterproofing	24	431	10.8	4654.8	60	279288		11,637
Structural Steel	24	431	10.8	4654.8	135	628398		26,183
Concrete Decks	24	431	10.8	4654.8	125	581850		24,244
Fireproofing	24	431	10.8	4654.8	125	581850		24,244
Exterior Skin	24	86	10.8	928.8	165	153252		6,386
Landscaping and Hardscape	24	13	10.8	140.4	160	22464		936
MEP	24	431	10.8	4654.8	25	116370		4,849
Roofing	24	431	10.8	4654.8	50	232740		9,698
Framing/Drywall	24	431	10.8	4654.8	25	116370		4,849
Elevators	24	431	10.8	4654.8	50	232740		9,698
Other Interior Finishes	24	86	10.8	928.8	50	46440		1,935
Startup & Commissioning	24	3	10.8	32.4	10	324		14
Total Fuel Used for Construction Worker Trips							Total	**127,103** (gasoline)

Worker Trips Phase 2

Phase	MPG [2]	Trips	Trip Length (miles)	Total Miles per Day	Days in Phase	Totel Miles in Phase		Fuel Used (gallons)
Abatement	24	5	10.8	54	60	3240		135
Demolition	24	33	10.8	356.4	50	17820		743
Site Utilities	24	8	10.8	86.4	170	14688		612
Grade Slide	24	25	10.8	270	85	22950		956
Drill Displacement Piles	24	13	10.8	140.4	120	16848		702
Dewatering	24	3	10.8	32.4	4	129.6		5
Shoring and Excavation	24	10	10.8	108	35	3780		158
Concrete/Rebar/Waterproofing	24	374	10.8	4039.2	60	242352		10,098
Structural Steel	24	374	10.8	4039.2	135	545292		22,721
Concrete Decks	24	374	10.8	4039.2	125	504900		21,038
Fireproofing	24	374	10.8	4039.2	125	504900		21,038
Exterior Skin	24	75	10.8	810	165	133650		5,569
Landscaping and Hardscape	24	13	10.8	140.4	160	22464		936
MEP	24	374	10.8	4039.2	25	100980		4,208
Roofing	24	374	10.8	4039.2	50	201960		8,415
Framing/Drywall	24	374	10.8	4039.2	25	100980		4,208
Elevators	24	374	10.8	4039.2	50	201960		8,415
Other Interior Finishes	24	75	10.8	810	50	40500		1,688
Startup & Commissioning	24	3	10.8	32.4	10	324		14
Total Fuel Used for Construction Worker Trips							Total	**111,655** (gasoline)

Worker Trips Phase 3

Phase	MPG [2]	Trips	Trip Length (miles)	Total Miles per Day	Days in Phase	Totel Miles in Phase	Fuel Used (gallons)
Abatement	24	5	10.8	54	60	3240	135
Demolition	24	33	10.8	356.4	50	17820	743
Site Utilities	24	8	10.8	86.4	170	14688	612
Grade Slide	24	25	10.8	270	85	22950	956
Drill Displacement Piles	24	13	10.8	140.4	120	16848	702
Dewatering	24	3	10.8	32.4	4	129.6	5
Shoring and Excavation	24	10	10.8	108	35	3780	158
Concrete/Rebar/Waterproofing	24	206	10.8	2224.8	60	133488	5,562
Structural Steel	24	206	10.8	2224.8	135	300348	12,515
Concrete Decks	24	206	10.8	2224.8	125	278100	11,588
Fireproofing	24	206	10.8	2224.8	125	278100	11,588
Exterior Skin	24	41	10.8	442.8	165	73062	3,044
Landscaping and Hardscape	24	13	10.8	140.4	160	22464	936
MEP	24	206	10.8	2224.8	25	55620	2,318
Roofing	24	206	10.8	2224.8	50	111240	4,635
Framing/Drywall	24	206	10.8	2224.8	25	55620	2,318
Elevators	24	206	10.8	2224.8	50	111240	4,635
Other Interior Finishes	24	41	10.8	442.8	50	22140	923
Startup & Commissioning	24	3	10.8	32.4	10	324	14
Total Fuel Used for Construction Worker Trips						Total	**63,383** (gasoline)

Construction Energy Use, Continued

Vendor Trips Phase 1

Phase	MPG [2]	Trips	Trip Length (miles)	Total Miles per Day	Days in Phase	Totel Miles in Phase	Fuel Used (gallons)
Site Utilities	7.4	0	7.3	0	170	0	0
Grade Slide	7.4	0	7.3	0	85	0	0
Drill Displacement Piles	7.4	0	7.3	0	120	0	0
Dewatering	7.4	0	7.3	0	4	0	0
Shoring and Excavation	7.4	0	7.3	0	35	0	0
Concrete/Rebar/Waterproofing	7.4	190	7.3	1387	60	83220	11,246
Structural Steel	7.4	190	7.3	1387	135	187245	25,303
Concrete Decks	7.4	190	7.3	1387	125	173375	23,429
Fireproofing	7.4	190	7.3	1387	125	173375	23,429
Exterior Skin	7.4	0	7.3	0	165	0	0
Landscaping and Hardscape	7.4	0	7.3	0	160	0	0
MEP	7.4	190	7.3	1387	25	34675	4,686
Roofing	7.4	190	7.3	1387	50	69350	9,372
Framing/Drywall	7.4	190	7.3	1387	25	34675	4,686
Elevators	7.4	190	7.3	1387	50	69350	9,372
Other Interior Finishes	7.4	0	7.3	0	50	0	0
Startup & Commissioning	7.4	0	7.3	0	10	0	0
Total Fuel Used for Vendor Trips							**111,522** (diesel)

Vendor Trips Phase 2

Phase	MPG [2]	Trips	Trip Length (miles)	Total Miles per Day	Days in Phase	Totel Miles in Phase	Fuel Used (gallons)
Abatement	7.4	0	7.3	0	60	0	0
Demolition	7.4	0	7.3	0	50	0	0
Site Utilities	7.4	0	7.3	0	170	0	0
Grade Slide	7.4	0	7.3	0	85	0	0
Drill Displacement Piles	7.4	0	7.3	0	120	0	0
Dewatering	7.4	0	7.3	0	4	0	0
Shoring and Excavation	7.4	0	7.3	0	35	0	0
Concrete/Rebar/Waterproofing	7.4	190	7.3	1387	60	83220	11,246
Structural Steel	7.4	190	7.3	1387	135	187245	25,303
Concrete Decks	7.4	190	7.3	1387	125	173375	23,429
Fireproofing	7.4	190	7.3	1387	125	173375	23,429
Exterior Skin	7.4	0	7.3	0	165	0	0
Landscaping and Hardscape	7.4	0	7.3	0	160	0	0
MEP	7.4	190	7.3	1387	25	34675	4,686
Roofing	7.4	190	7.3	1387	50	69350	9,372
Framing/Drywall	7.4	190	7.3	1387	25	34675	4,686
Elevators	7.4	190	7.3	1387	50	69350	9,372
Other Interior Finishes	7.4	0	7.3	0	50	0	0
Startup & Commissioning	7.4	0	7.3	0	10	0	0

Total Fuel Used for Vendor Trips **111,522** (diesel)

Vendor Trips Phase 3

Phase	MPG [2]	Trips	Trip Length (miles)	Total Miles per Day	Days in Phase	Totel Miles in Phase	Fuel Used (gallons)
Abatement	7.4	0	7.3	0	60	0	0
Demolition	7.4	0	7.3	0	50	0	0
Site Utilities	7.4	0	7.3	0	170	0	0
Grade Slide	7.4	0	7.3	0	85	0	0
Drill Displacement Piles	7.4	0	7.3	0	120	0	0
Dewatering	7.4	0	7.3	0	4	0	0
Shoring and Excavation	7.4	0	7.3	0	35	0	0
Concrete/Rebar/Waterproofing	7.4	103	7.3	751.9	60	45114	6,096
Structural Steel	7.4	103	7.3	751.9	135	101506.5	13,717
Concrete Decks	7.4	103	7.3	751.9	125	93987.5	12,701
Fireproofing	7.4	103	7.3	751.9	125	93987.5	12,701
Exterior Skin	7.4	0	7.3	0	165	0	0
Landscaping and Hardscape	7.4	0	7.3	0	160	0	0
MEP	7.4	103	7.3	751.9	25	18797.5	2,540
Roofing	7.4	103	7.3	751.9	50	37595	5,080
Framing/Drywall	7.4	103	7.3	751.9	25	18797.5	2,540
Elevators	7.4	103	7.3	751.9	50	37595	5,080
Other Interior Finishes	7.4	0	7.3	0	50	0	0
Startup & Commissioning	7.4	0	7.3	0	10	0	0
Total Fuel Used for Vendor Trips							**60,457** (diesel)

Hauling Trips Phase 1

Phase	MPG [2]	Trips in Phase	Trip Length (miles)	Total Miles in Phase	Totel Miles in Phase	Fuel Used (gallons)
Site Utilities	7.4	0	20	0		0
Grade Slide	7.4	15948	20	318960		43,103
Drill Displacement Piles	7.4	0	20	0		0
Dewatering	7.4	0	20	0		0
Shoring and Excavation	7.4	0	20	0		0
Concrete/Rebar/Waterproofing	7.4	9531	20	190620		25,759
Structural Steel	7.4	0	20	0		0
Concrete Decks	7.4	0	20	0		0
Fireproofing	7.4	0	20	0		0
Exterior Skin	7.4	0	20	0		0
Landscaping and Hardscape	7.4	151	20	3020		408
MEP	7.4	0	20	0		0
Roofing	7.4	0	20	0	0	0
Framing/Drywall	7.4	0	20	0	0	0
Elevators	7.4	0	20	0	0	0
Other Interior Finishes	7.4	0	20	0	0	0
Startup & Commissioning	7.4	0	20	0	0	0
Total Fuel Used for Hauling Trips						**69,270** (diesel)

Hauling Trips Phase 2

Phase	MPG [2]	Trips in Phase	Trip Length (miles)	Total Miles in Phase	Totel Miles in Phase	Fuel Used (gallons)
Abatement	7.4	0	20	0	0	0
Demolition	7.4	474	20	9480	0	1,281
Site Utilities	7.4	0	20	0		0
Grade Slide	7.4	15948	20	318960		43,103
Drill Displacement Piles	7.4	0	20	0		0
Dewatering	7.4	0	20	0		0
Shoring and Excavation	7.4	0	20	0		0
Concrete/Rebar/Waterproofing	7.4	9531	20	190620		25,759
Structural Steel	7.4	0	20	0		0
Concrete Decks	7.4	0	20	0		0
Fireproofing	7.4	0	20	0		0
Exterior Skin	7.4	0	20	0		0
Landscaping and Hardscape	7.4	151	20	3020		408
MEP	7.4	0	20	0		0
Roofing	7.4	0	20	0	0	0
Framing/Drywall	7.4	0	20	0	0	0
Elevators	7.4	0	20	0	0	0
Other Interior Finishes	7.4	0	20	0	0	0
Startup & Commissioning	7.4	0	20	0	0	0
Total Fuel Used for Hauling Trips						**70,551** (diesel)

Hauling Trips Phase 3

Phase	MPG [2]	Trips in Phase	Trip Length (miles)	Total Miles in Phase	Totel Miles in Phase	Fuel Used (gallons)
Abatement	7.4	0	20	0	0	0
Demolition	7.4	1526	20	30520	0	4,124
Site Utilities	7.4	0	20	0		0
Grade Slide	7.4	15948	20	318960		43,103
Drill Displacement Piles	7.4	0	20	0		0
Dewatering	7.4	0	20	0		0
Shoring and Excavation	7.4	0	20	0		0
Concrete/Rebar/Waterproofing	7.4	5062	20	101240		13,681
Structural Steel	7.4	0	20	0		0
Concrete Decks	7.4	0	20	0		0
Fireproofing	7.4	0	20	0		0
Exterior Skin	7.4	0	20	0		0
Landscaping and Hardscape	7.4	144	20	2880		389
MEP	7.4	0	20	0		0
Roofing	7.4	0	20	0	0	0
Framing/Drywall	7.4	0	20	0	0	0
Elevators	7.4	0	20	0	0	0
Other Interior Finishes	7.4	0	20	0	0	0
Startup & Commissioning	7.4	0	20	0	0	0
Total Fuel Used for Hauling Trips						**61,297** (diesel)

Fuel Use Converted to MMBtu

	Total Construction Fuel Use (gallons)	Conversion Factor Btu/gallon	Source	Fuel Converted to Energy Use
Diesel	**876,027**	137,381	[3]	**120,350** MMBtu
Gasoline	**302,142**	109,786	[4]	**33,171** MMBtu
Total Energy Use from Construction Fuel				**153,520** MMBtu

Sum of above

Total Construction Energy Use 153,520 MMBtu

Operational Energy Use

Operational Vehicular Fuel Use

Gross Annual VMT	32,339,504

Fleet Class	Fleet Mix	VMT per Class	Fuel Ecomony [5]	Fuel Consumption (gallons)		
Light Duty Auto (LDA)	0.392953	12707905	30.9	411259.07		
Light Duty Truck 1 (LDT1)	0.03814	1233428.7	26.63	46317.26		
Light Duty Truck 2 (LDT2)	0.309697	10015447	24.36	411143.16		
Medium Duty Vehicle (MDV)	0.182164	5891093.4	20.2	291638.29		
Motorcycle (MCY)	0.004493	145301.39	37.06	3920.71	Total Gasoline	1,164,278
Light Heavy Duty 1 (LHD1)	0.036329	1174861.8	18.23	64446.62		gallons
Light Heavy Duty 2 (LHD2)	0.008412	272039.91	16.24	16751.23		
Medium Heavy Duty (MHD)	0.012807	414172.03	9.43	43920.68		
Heavy Heavy Duty (HHD)	0.007315	236563.47	6.42	36847.89		
Other Bus (OBUS)	0.004719	152610.12	8.26	18475.80		
Urban Bus (UBUS)	0.001823	58954.916	5.17	11403.27		
School Bus (SBUS)	0.000442	14294.061	7.25	1971.59		
Motorhome (MH)	0.000706	22831.69	9.91	2303.90	Total Diesel	196,121
						gallons

Note that the above numbers represent gross fuel consumption. Gross Annual VMT incorporates the 20% reduction required from

	Total Fuel Use (gallons)	Conversion Factor Btu/gallon	Source	Fuel Converted to Use	Energy
Diesel	196,121	137,381	[3]	26,943	MMBtu
Gasoline	1,164,278	109,786	[4]	127,821	MMBtu
Total Energy Use from Operational Fuel				**154,765**	MMBtu

Operational Built Environment

Type of Energy	Annual Usage	Units	Converted to MMBtu
Electricity	1.56E+07	kWh	53325
Natural Gas	0	kBtu	0.00

Sum of above

Total Annual Operational Energy Use **208,090** **MMBtu**

Existing and Net Energy Use

Net Operational Vehicular Fuel Energy Use

To determine the net increase in fuel usage, fuel usage of the existing uses at the site can be subtracted from the gross consumption above. The following number also incorporates the TDM reduction identified in the Operational calculations.

Existing Use VMT:	3,458,684	
Resultant Net Annual Gasoline Use:	1,039,760	gallons
Resultant Net Annual Diesel Use:	175,146	gallons

	Net Fuel Use (gallons)	Conversion Factor Btu/gallon	Source	Fuel Converted to Energy Use	
Diesel	175,146	137,381	[3]	24,062	MMBtu
Gasoline	1,039,760	109,786	[4]	114,151	MMBtu
Total Energy Use from Net Operational Fuel				**138,213**	MMBtu

Existing and Net Operational Built Environment

	Existing			Net
Type of Energy	Annual Usage	Units	Converted to MMBtu	Energy Use in MMBtu
Electricity	2.38E+06	kWh	8114	45211
Natural Gas	4.18E+06	kBtu	4175.05	-4175
Total			12289	**41036**

Sum of above

Total Net Annual Operational Energy Use	**179,249**	**MMBtu**

Sources

Unless otherwise noted, information in these calculations is from the project-specific Air Quality/Emissions Assessment for the project, including CalEEMod output tables.

[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-anddata/national-transportation-statistics/223001/ntsentire2018q4.pdf.

https://www.eia.gov/totalenergy/data/monthly/archive/00352205.pdf

[4] California Air Resources Board, CA-GREET 2.0 Supplemental Document and Tables of Changes, Appendix C, Supplement to the LCFS CA-GREET 2.0 Model, 12/15/2014 , page C-24, Table 10. Available at: https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2015/lcfs2015/lcfs15appc.pdf

[5] California Air Resources Board (CARB), EMFAC2021 v1.0.0., 2021. Available at https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-modeling-tools-emfac-software-and

[6] Anticipated TDM reduction information is from the the project-specific CEQA Transportation Analysis.

Acronyms used include:

Btu = British Thermal Units
hrs = hours
kBtu = Thousand British Thermal Units
kWH = kilowatt hours
MMBtu = Million British Thermal Units
MPG = miles per gallon
TDM = Transportation Demand Management
VMT = vehicle miles traveled