Appendix C

Air Quality and Greenhouse Gas Modeling and Calculations

Construction Emissions Summary

	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17
lbs/day															
ROG	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
NOX	24	25	26	20	15	21	21	17	17	17	17	17	17	17	13
CO(lbs/day)	24	25	26	20	15	21	21	17	17	17	17	17	17	17	13
CO2(lbs/day)	4033	5007	5828	4540	3736	5055	5055	4755	5270	5270	5270	5784	5631	5631	4562
PM10 (exhaust)	0.91	0.93	0.95	0.80	0.60	0.80	0.80	0.64	0.65	0.65	0.65	0.65	0.64	0.64	0.53
PM2.5 (exhaust)	0.97	1.03	1.08	0.83	0.64	0.83	0.83	0.69	0.70	0.70	0.70	0.70	0.68	0.68	0.56
PM10 (dust)	51.46	52.04	52.51	51.40	51.40	51.62	51.62	51.73	51.95	51.95	51.95	52.17	52.05	52.05	51.71
PM2.5 (dust)	5.146	5.204	5.251	5.140	5.140	5.162	5.162	5.173	5.195	5.195	5.195	5.217	5.205	5.205	5.171

	Phase 1 Max	Phase 2 Max
ROG(lbs/day)	2	1
NOX(lbs/day)	26	12
CO(lbs/day)	26	12
CO2(lbs/day)	5828	4494
PM10 exhaust (lbs/day)	1	0
PM2.5 exhaust (lbs/day)	1	1
PM10 dust (lbs/day)	53	52
PM2.5 dust (lbs/day)	5	5

GHG Summary

CO2

	Total (MT)	MT/yr	Buildout (2030)
All construction (3 yrs)	1240	413	89
Phase 1 (2 yrs)	884	442	
Phase 2 (1yr)	356	356	

20	days/month
2205	lbs/MT
240	work days/year

lbs/month	80661	100138	116553	90803	74727	101092	101092	95110	105399	105399	105399	115688	112626	112626	91235
MT/month	37	45	53	41	34	46	46	43	48	48	48	52	51	51	41

Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
13	13	12	12	7	9	8	7	7	7	9	10	11	11	12	12	10	10	11	12	12	6
13	13	12	12	7	9	8	7	7	7	9	10	11	11	12	12	10	10	11	12	12	6
3533	3276	3122	2865	2190	2028	1746	1632	1656	1266	2393	3110	3520	3673	4341	4494	2853	3006	3159	3514	3361	549
0.52	0.52	0.51	0.51	0.25	0.33	0.33	0.23	0.24	0.29	0.33	0.35	0.36	0.37	0.38	0.39	0.35	0.36	0.36	0.40	0.39	0.26
0.55	0.55	0.53	0.53	0.30	0.35	0.33	0.24	0.26	0.31	0.39	0.45	0.47	0.49	0.52	0.54	0.45	0.47	0.49	0.56	0.54	0.24
51.27	51.16	51.04	50.93	51.05	50.70	50.52	50.52	50.59	50.48	51.19	51.66	51.89	52.02	52.36	52.48	51.55	51.67	51.80	52.18	52.05	50.00
5.127	5.116	5.104	5.093	5.105	5.070	5.052	5.052	5.059	5.048	5.119	5.166	5.189	5.202	5.236	5.248	5.155	5.167	5.180	5.218	5.205	5.000
70657	65513	62450	57305	43792	40560	34925	32633	33124	25321	47862	62195	70402	73465	86817	89880	57050	60113	63176	70282	67219	10989
32	30	28	26	20	18	16	15	15	11	22	28	32	33	39	41	26	27	29	32	30	5

Operational (mobile) Emissions Summary

Calculation of Net Increase in Daily Trips	value	units	source
Gross daily trips by new jail on buildout	554	trips/day	Table 3.9-8 in Section 3.9, Transportation and Traffic
Proportion of trips to/from existing jail	3%	%	Table 3.9-9 in Section 3.9, Transportation and Traffic
Daily trips by new jail on buildout, not including trips to existing jail	537	trips/day	calculation
Size of new jail	494	rated beds	Table 2-2 in Section 2, Project Description
Size of existing jail	264	rated beds	Table 2-2 in Section 2, Project Description
Net increase in daily trips, not including trips to existing jail	250	trips/day	proration calculation
Trips to existing jail	17	trips/day	calculation
Net increase in daily trips	267	trips/day	summation

	Daily Trips	Annual Trips	Avg Trip Length[2]	Annual VMT	Daily VMT	
Gross Trips by New Jail	554	202,210	20	4,044,200	11,080	
Net Increase in Daily Trips	267	97,388	20	1,947,765	5,336	See Note 1

	Max. Daily (lb/day)[3]				Annual	
	ROG	**NOX**	**PM10 exh**	**PM2.5 exh**	**CO2 lb/yr**	**co2 MT/yr**
Gross Emissions	1.36	4.04	0.06	0.05	3,467,623	1,573
Net Increase in Emissions	0.65	1.95	0.03	0.03	1,670,075	758

Conversion Rates	
2205	lbs/MT

Notes

1 The net increase in daily trips is calculated above and is based on information from the traffic analysis.

2 Average trip length based on defaul value in CalEEMod for Napa County.

3 Emissions calculated based on emission rates on "On Road Exhst. Emfacs Worksheet"

Dust Emissions (on road + off road)

	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19
PM10 (lbs/day)[1]	51	52	53	51	51	52	52	52	52	52	52	52	52	52	52	51	51	51	51	51	51	51	51	51	50	51	52	52	52	52	52	52	52	52	52	50
PM2.5 (lbs/day)[2]	5.1	5.2	5.3	5.1	5.1	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5	5.1	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5

Project Size (acres)

20

Daily Disturbance

5

Notes

1. Calulation using emission factor for PM10 for Bulldozing shown on "Dust EmFacs" worksheet and equipment hours for "Dozers/Scrapers" shown on "Equipment Hour Summar" worksheet.
2. Fugitive Dust PM2.5 was calculated based on a 0.1 ratio of PM2.5/PM10 as indicated in EPA 2006 AP-42 Background Document for Revisions to Fine Fraction Ratios used for AP-42 Fugitive Dust Emission Factors

Notes

Fugitive Dust PM2.5 was calculated based on a 0.1 ratio of PM2.5/PM10 as indicated in EPA 2006 AP 42 Background Document for Revisions to Fine Fraction Ratios used for AP-42 Fugitive Dust Emission Factors

Exhaust Emissions Summary

	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18
Total																							
ROG (lbs/day)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1
CO (lbs/day)	12	15	17	18	14	20	20	19	21	21	21	24	24	24	19	14	13	13	11	7	8	7	6
NOX (lbs/day)	24	25	26	20	15	21	21	17	17	17	17	17	17	17	13	13	13	12	12	7	9	8	7
PM10 (lbs/day)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
PM2.5 (lbs/day)[1]	0.83	0.86	0.88	0.74	0.55	0.74	0.74	0.59	0.60	0.60	0.60	0.60	0.59	0.59	0.49	0.48	0.48	0.47	0.47	0.23	0.31	0.30	0.21
CO2 (lbs/day)	4033	5007	5828	4540	3736	5055	5055	4755	5270	5270	5270	5784	5631	5631	4562	3533	3276	3122	2865	2190	2028	1746	1632

Notes

1. Exhaust PM2.5 is assumed to be 92% of PM10 based on Sacramento-Metropolitan Air Quality Management District's Roadway Construction Emissions Model, Version 7.2.1 (SMAQMD, 2011)

Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19
1	1	1	1	1	1	1	1	1	1	1	1	1	1
6	4	7	8	10	10	13	13	7	7	7	6	6	2
7	7	9	10	11	11	12	12	10	10	11	12	12	6
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.22	0.27	0.30	0.32	0.33	0.34	0.35	0.36	0.32	0.33	0.34	0.36	0.36	0.24
1656	1266	2393	3110	3520	3673	4341	4494	2853	3006	3159	3514	3361	549

On-Road Emissions

Worker Commute	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17
Daily Workforce[1]	10	30	50	50	50	70	70	80	100	100	100	120	120	120
Daily Worker Commute Trips (one-way)[2]	20	60	100	100	100	140	140	160	200	200	200	240	240	240
Worker Commute VMT (Daily)[3]	300	900	1500	1500	1500	2100	2100	2400	3000	3000	3000	3600	3600	3600
ROG(lbs/day)[4]	0.037	0.110	0.184	0.184	0.184	0.258	0.258	0.294	0.368	0.368	0.368	0.441	0.441	0.441
NOX(lbs/day)[4]	0.11	0.33	0.55	0.55	0.55	0.77	0.77	0.88	1.09	1.09	1.09	1.31	1.31	1.31
CO(lbs/day)[4]	1.3	3.9	6.5	6.5	6.5	9.1	9.1	10.4	13.0	13.0	13.0	15.6	15.6	15.6
CO2(lbs/day)[4]	257	772	1286	1286	1286	1801	1801	2058	2572	2572	2572	3087	3087	3087
PM10 exhaust (lbs/day)[4]	0.002	0.005	0.008	0.008	0.008	0.011	0.011	0.013	0.016	0.016	0.016	0.019	0.019	0.019
PM2.5 exhaust (lbs/day)[5]	0.001	0.004	0.007	0.007	0.007	0.010	0.010	0.012	0.015	0.015	0.015	0.018	0.018	0.018
PM10 dust (lbs/day)[6]	0.11	0.33	0.55	0.55	0.55	0.77	0.77	0.88	1.10	1.10	1.10	1.31	1.31	1.31
PM2.5 dust (lbs/day)[7]	0.01	0.03	0.05	0.05	0.05	0.08	0.08	0.09	0.11	0.11	0.11	0.13	0.13	0.13
Haul Trips														
Total Deliveries[8]	2	5	7	7	7	7	7	7	7	7	7	7	6	6
Demo Haul Trips[9]	9	9	9	0	0	0	0	0	0	0	0	0	0	0
Daily Trips (one-way)[10]	22	28	32	14	14	14	14	14	14	14	14	14	12	12
Haul Trip VMT (Daily)[11]	440	560	640	280	280	280	280	280	280	280	280	280	240	240
ROG(lbs/day)[4]	0.26	0.33	0.38	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.14	0.14
NOX(lbs/day)[4]	4.5	5.8	6.6	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.5	2.5
CO(lbs/day)[4]	1.17	1.49	1.70	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.64	0.64
CO2(lbs/day)[4]	1684.53	2143.95	2450.22	1071.97	1071.97	1071.97	1071.97	1071.97	1071.97	1071.97	1071.97	1071.97	918.83	918.83
PM10 exhaust (lbs/day)[4]	0.088	0.111	0.127	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.048	0.048
PM2.5 exhaust (lbs/day)[5]	0.081	0.103	0.117	0.051	0.051	0.051	0.051	0.051	0.051	0.051	0.051	0.051	0.044	0.044
PM10 dust (lbs/day)[6]	1.35	1.71	1.96	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.73	0.73
PM2.5 dust (lbs/day)[7]	0.135	0.171	0.196	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.073	0.073
Total (Worker Commute + Haul Trip)														
ROG(lbs/day)[4]	0.29	0.44	0.56	0.35	0.35	0.42	0.42	0.46	0.53	0.53	0.53	0.61	0.58	0.58
NOX(lbs/day)[4]	4.7	6.1	7.2	3.4	3.4	3.7	3.7	3.8	4.0	4.0	4.0	4.2	3.8	3.8
CO(lbs/day)[4]	2.5	5.4	8.2	7.2	7.2	9.8	9.8	11.1	13.7	13.7	13.7	16.3	16.2	16.2
CO2(lbs/day)[4]	1942	2916	3736	2358	2358	2873	2873	3130	3644	3644	3644	4159	4006	4006
PM10 exhaust (lbs/day)[4]	0.089	0.116	0.135	0.064	0.064	0.067	0.067	0.069	0.072	0.072	0.072	0.075	0.067	0.067
PM2.5 exhaust (lbs/day)[5]	0.136	0.176	0.203	0.093	0.093	0.096	0.096	0.098	0.101	0.101	0.101	0.104	0.091	0.091
PM10 dust (lbs/day)[6]	1.456	2.042	2.505	1.404	1.404	1.623	1.623	1.733	1.952	1.952	1.952	2.171	2.048	2.048
PM2.5 dust (lbs/day)[7]	0.146	0.204	0.251	0.140	0.140	0.162	0.162	0.173	0.195	0.195	0.195	0.217	0.205	0.205

May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18
100	60	50	50	40	40	30	25	25	20	10	30	40	50	50	70	70	30
200	120	100	100	80	80	60	50	50	40	20	60	80	100	100	140	140	60
3000	1800	1500	1500	1200	1200	900	750	750	600	300	900	1200	1500	1500	2100	2100	900
0.368	0.221	0.184	0.184	0.147	0.147	0.110	0.092	0.092	0.074	0.037	0.110	0.147	0.184	0.184	0.258	0.258	0.110
1.09	0.66	0.55	0.55	0.44	0.44	0.33	0.27	0.27	0.22	0.11	0.33	0.44	0.55	0.55	0.77	0.77	0.33
13.0	7.8	6.5	6.5	5.2	5.2	3.9	3.2	3.2	2.6	1.3	3.9	5.2	6.5	6.5	9.1	9.1	3.9
2572	1543	1286	1286	1029	1029	772	643	643	514	257	772	1029	1286	1286	1801	1801	772
0.016	0.010	0.008	0.008	0.006	0.006	0.005	0.004	0.004	0.003	0.002	0.005	0.006	0.008	0.008	0.011	0.011	0.005
0.015	0.009	0.007	0.007	0.006	0.006	0.004	0.004	0.004	0.003	0.001	0.004	0.006	0.007	0.007	0.010	0.010	0.004
1.10	0.66	0.55	0.55	0.44	0.44	0.33	0.27	0.27	0.22	0.11	0.33	0.44	0.55	0.55	0.77	0.77	0.33
0.11	0.07	0.05	0.05	0.04	0.04	0.03	0.03	0.03	0.02	0.01	0.03	0.04	0.05	0.05	0.08	0.08	0.03
5	5	5	4	4	5	3	2	2	3	2	5	7	7	7	7	7	2
0	0	0	0	0	0	0	0	0	0	1	2	3	4	5	6	7	8
10	10	10	8	8	10	6	4	4	6	6	14	20	22	24	26	28	20
200	200	200	160	160	200	120	80	80	120	120	280	400	440	480	520	560	400
0.12	0.12	0.12	0.09	0.09	0.12	0.07	0.05	0.05	0.07	0.07	0.16	0.23	0.26	0.28	0.31	0.33	0.23
2.1	2.1	2.1	1.7	1.7	2.1	1.2	0.8	0.8	1.2	1.2	2.9	4.1	4.5	5.0	5.4	5.8	4.1
0.53	0.53	0.53	0.42	0.42	0.53	0.32	0.21	0.21	0.32	0.32	0.74	1.06	1.17	1.27	1.38	1.49	1.06
765.70	765.70	765.70	612.56	612.56	765.70	459.42	306.28	306.28	459.42	459.42	1071.97	1531.39	1684.53	1837.67	1990.81	2143.95	1531.39
0.040	0.040	0.040	0.032	0.032	0.040	0.024	0.016	0.016	0.024	0.024	0.056	0.080	0.088	0.096	0.104	0.111	0.080
0.037	0.037	0.037	0.029	0.029	0.037	0.022	0.015	0.015	0.022	0.022	0.051	0.073	0.081	0.088	0.095	0.103	0.073
0.61	0.61	0.61	0.49	0.49	0.61	0.37	0.24	0.24	0.37	0.37	0.86	1.22	1.35	1.47	1.59	1.71	1.22
0.061	0.061	0.061	0.049	0.049	0.061	0.037	0.024	0.024	0.037	0.037	0.086	0.122	0.135	0.147	0.159	0.171	0.122
0.49	0.34	0.30	0.28	0.24	0.26	0.18	0.14	0.14	0.14	0.11	0.27	0.38	0.44	0.47	0.56	0.59	0.35
3.2	2.7	2.6	2.2	2.1	2.5	1.6	1.1	1.1	1.5	1.3	3.2	4.6	5.1	5.5	6.1	6.6	4.5
13.5	8.3	7.0	6.9	5.6	5.7	4.2	3.5	3.5	2.9	1.6	4.6	6.3	7.7	7.8	10.5	10.6	5.0
3338	2309	2052	1899	1641	1795	1231	949	949	974	717	1844	2560	2971	3124	3791	3945	2303
0.056	0.050	0.048	0.040	0.038	0.046	0.029	0.020	0.020	0.027	0.026	0.061	0.086	0.096	0.104	0.115	0.123	0.084
0.076	0.070	0.069	0.056	0.055	0.067	0.041	0.028	0.028	0.040	0.038	0.090	0.128	0.142	0.154	0.169	0.182	0.127
1.707	1.269	1.159	1.037	0.928	1.050	0.696	0.519	0.519	0.586	0.477	1.185	1.662	1.894	2.016	2.357	2.480	1.552
0.171	0.127	0.116	0.104	0.093	0.105	0.070	0.052	0.052	0.059	0.048	0.119	0.166	0.189	0.202	0.236	0.248	0.155

Nov-18	Dec-18	Jan-19	Feb-19				
30	30	20	20	Assumptions			
60	60	40	40				
900	900	600	600	*Worker Commute*	value	source	
0.110	0.110	0.074	0.074	trips per worker	2	would not leave the site for lunch and therefore only make 2 trips/day	
0.33	0.33	0.22	0.22	worker trip length (one-way)	15	default value from CalEEMod	
3.9	3.9	2.6	2.6	portion of trip on paved surfaces	100%	assumption	
772	772	514	514	portion of trip on unpaved surfaces	0%	assumption	
0.005	0.005	0.003	0.003				
0.004	0.004	0.003	0.003	*Material Hauling*			
0.33	0.33	0.22	0.22	trips per delivery	2	assumption	
0.03	0.03	0.02	0.02	haul trip length (one-way)	20	default value from CalEEMod	
				portion of trip on paved surfaces	100%	assumption	
				portion of trip on unpaved surfaces	0%	assumption	
2	2	5	3				
9	10	11	12				
22	24	32	30	Notes			
440	480	640	600	1	daily workforce provided by project proponent		
0.26	0.28	0.38	0.35	2	daily workforce was multiplied by 2 trips/worker shown under "Assumptions"		
4.5	5.0	6.6	6.2	3	daily VMT was calculated by multiplying daily workers by average worker trip length shown under "Assumptions"		
1.17	1.27	1.70	1.59	4	calculated based on emissions rates obtained from "On-Road Exhst. Emfacs worksheet" and daily VMT		
1684.53	1837.67	2450.22	2297.09	5	Model, Version 7.2.1 (SMAQMD, 2011)		
0.088	0.096	0.127	0.119	6	calculated based on emissions rates obtained from "Dust Emfacs worksheet" and daily VMT		
0.081	0.088	0.117	0.110	7	Ratios used for AP-42 Fugitive Dust Emission Factors		
1.35	1.47	1.96	1.84	8	daily two-way deliveries provided by project proponent		
0.135	0.147	0.196	0.184	9	Demo trips based on assumptions provided in the "Construction Phasing" worksheet		
				10	daily two-way deliveries was multiplied by 2 trips/deliver shown under "Assumptions"		
				11	daily VMT was calculated by multiplying daily one-way trips by average haul truck trip length shown under "Assumptions"		
0.37	0.39	0.45	0.43				
4.9	5.3	6.8	6.4				
5.1	5.2	4.3	4.2	**Notes**			
2456	2609	2965	2812	1	Daily Truck Hauling trips based on total material import/export required for each alternative		
0.092	0.100	0.131	0.123	2	Based on aerials of the site it was assumed that all truck hauling ad worker commute trips would occur on paved roads		
0.139	0.151	0.199	0.187	3	was assumed for both sites. All trips were divided equally amoung the two locations		
1.675	1.797	2.177	2.055	4	Average trip length obtained from CalEEMod 2011		
0.167	0.180	0.218	0.205	5	Daily VMT by workers = # workers * trips per worker * trip length		

Off-Road (Heavy-Duty Equipment) Dust Emissions

Construction Activity (grading/scraping/earthmoving)

Grading Equipment (Dozer/Scraper/Dozer)

Earth Moving/Ground Disturbance	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19
Acres/Day	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
PM10 (lbs/day)[1]	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
PM2.5 (lbs/day)[2]	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Assumptions

project site	20.0 acres
daily disturbance	5.0 acres

Notes

1. Calulation using emission factor for PM10 for Bulldozing shown on "Dust EmFacs" worksheet and equipment hours for "Dozers/Scrapers" shown on "Equipment Hour Summar" worksheet.
2. Fugitive Dust PM2.5 was calculated based on a 0.1 ratio of PM2.5/PM10 as indicated in EPA 2006 AP-42 Background Document for Revisions to Fine Fraction Ratios used for AP-42 Fugitive Dust Emission Factors

Notes

Fugitive Dust PM2.5 was calculated based on a 0.1 ratio of PM2.5/PM10 as indicated in EPA 2006 AP-42 Background Document for Revisions to Fine Fraction Ratios used for AP-42 Fugitive Dust Emission Factors

Off-Road Equipment Exhaust Emissions

	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18
Fork Lift																							
Equipment Hours/Day	0.0	0.0	0.0	2.4	2.4	2.4	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ROG (lbs/day)	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CO (lbs/day)	0.0	0.0	0.0	0.8	0.8	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NOX (lbs/day)	0.0	0.0	0.0	1.2	1.2	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PM10 (lbs/day)	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PM2.5 (lbs/day)[1]	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CO2 (lbs/day)	0.0	0.0	0.0	154.4	154.4	154.4	154.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane																							
Equipment Hours/Day	0.0	0.0	0.0	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	0.0
ROG (lbs/day)	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0
CO (lbs/day)	0.0	0.0	0.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.0
NOX (lbs/day)	0.0	0.0	0.0	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	0.0
PM10 (lbs/day)	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
PM2.5 (lbs/day)[1]	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
CO2 (lbs/day)	0.0	0.0	0.0	114.6	114.6	114.6	114.6	114.6	114.6	114.6	114.6	114.6	114.6	114.6	114.6	114.6	114.6	114.6	114.6	114.6	114.6	114.6	0.0
Trucking																							
Equipment Hours/Day	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
ROG (lbs/day)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
CO (lbs/day)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
NOX (lbs/day)	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
PM10 (lbs/day)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PM2.5 (lbs/day)[1]	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
CO2 (lbs/day)	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4
Loader																							
Equipment Hours/Day	3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	3.0	3.0
ROG (lbs/day)	0.2	0.2	0.2	0.2	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2
CO (lbs/day)	1.9	1.9	1.9	1.9	0.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	0.0	0.0	0.0	0.0	0.0	0.0	1.9	1.9	1.9
NOX (lbs/day)	2.9	2.9	2.9	2.9	0.0	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	0.0	0.0	0.0	0.0	0.0	0.0	2.9	2.9	2.9
PM10 (lbs/day)	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
PM2.5 (lbs/day)[1]	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
CO2 (lbs/day)	401.9	401.9	401.9	401.9	0.0	401.9	401.9	401.9	401.9	401.9	401.9	401.9	401.9	401.9	0.0	0.0	0.0	0.0	0.0	0.0	401.9	401.9	401.9
Backhoe																							
Equipment Hours/Day	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ROG (lbs/day)	0.2	0.2	0.2	0.2	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CO (lbs/day)	1.9	1.9	1.9	1.9	0.0	1.9	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NOX (lbs/day)	2.9	2.9	2.9	2.9	0.0	2.9	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PM10 (lbs/day)	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PM2.5 (lbs/day)[1]	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CO2 (lbs/day)	401.9	401.9	401.9	401.9	0.0	401.9	401.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Dozer/Scraper																							
Equipment Hours/Day	3.1	3.1	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ROG (lbs/day)	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CO (lbs/day)	1.4	1.4	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NOX (lbs/day)	4.6	4.6	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PM10 (lbs/day)	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PM2.5 (lbs/day)[1]	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CO2 (lbs/day)	302.0	302.0	302.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Concrete Pump																							
Equipment Hours/Day	0.0	0.0	0.0	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	0.0	0.0	0.0	0.0
ROG (lbs/day)	0.0	0.0	0.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0
CO (lbs/day)	0.0	0.0	0.0	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	0.0	0.0	0.0	0.0
NOX (lbs/day)	0.0	0.0	0.0	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	0.0	0.0	0.0	0.0
PM10 (lbs/day)	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0
PM2.5 (lbs/day)[1]	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0
CO2 (lbs/day)	0.0	0.0	0.0	828.8	828.8	828.8	828.8	828.8	828.8	828.8	828.8	828.8	828.8	828.8	828.8	828.8	828.8	828.8	828.8	0.0	0.0	0.0	0.0
Jackhammer																							
Equipment Hours/Day	4.0	4.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ROG (lbs/day)	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CO (lbs/day)	1.9	1.9	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NOX (lbs/day)	2.7	2.7	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PM10 (lbs/day)	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PM2.5 (lbs/day)[1]	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CO2 (lbs/day)	477.6	477.6	477.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grader																							
Equipment Hours/Day	3.2	3.2	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ROG (lbs/day)	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CO (lbs/day)	1.2	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NOX (lbs/day)	3.5	3.5	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PM10 (lbs/day)	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PM2.5 (lbs/day)[1]	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CO2 (lbs/day)	227.5	227.5	227.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total																							
ROG (lbs/day)	2	2	2	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0
CO (lbs/day)	9	9	9	10	7	10	10	8	8	8	8	8	8	8	6	6	6	6	6	1	3	3	3
NOX (lbs/day)	19	19	19	17	11	17	17	13	13	13	13	13	13	13	10	10	10	10	10	4	7	7	6
PM10 (lbs/day)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
PM2.5 (lbs/day)[1]	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
CO2 (lbs/day)	2091	2091	2091	2182	1378	2182	2182	1626	1626	1626	1626	1626	1626	1626	1224	1224	1224	1224	1224	395	797	797	682

Notes

1. Exhaust PM2.5 is assumed to be 92% of PM10 based on Sacramento-Metropolitan Air Quality Management District's Roadway Construction Emissions Model, Version 7.2.1 (SMAQMD, 2011)

Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19
0.0	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
0.0	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.0	154.4	154.4	154.4	154.4	154.4	154.4	154.4	154.4	154.4	154.4	154.4	154.4	154.4
0.0	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
0.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
0.0	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.0	114.6	114.6	114.6	114.6	114.6	114.6	114.6	114.6	114.6	114.6	114.6	114.6	114.6
3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4	280.4
3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
401.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

0	1	1	1	1	1	1	1	1	1	1	1	1	1
3	2	2	2	2	2	2	2	2	2	2	2	2	2
6	6	6	6	6	6	6	6	6	6	6	6	6	6
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
682	549	549	549	549	549	549	549	549	549	549	549	549	549

Construction Equipment

Construction Activities Schedule

	Usage Factor	Phase 1																							Phase 2[3]											
		Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19
Number of Equipment Onsite[1]																																					
Fork Lift	0.3				1	1	1	1																		1	1	1	1	1	1	1	1	1	1	1	1
Crane	0.29				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			1	1	1	1	1	1	1	1	1	1	1	1
Trucking	0.38	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
loader	0.37	1	1	1	1		1	1	1	1	1	1	1	1	1							1	1	1	1													
Backhoe	0.37	1	1	1	1		1	1																													
Dozer/Scraper	0.39	1	1	1																																	
Concrete Pump	0.74				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																	
Jackhammer	0.5	1	1	1																																	
Grader	0.4	1	1	1																																	
Equipment Hours/Day[2]																																					
Fork Lift		0.0	0.0	0.0	2.4	2.4	2.4	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Crane		0.0	0.0	0.0	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	0.0	0.0	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Trucking		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
loader		3.0	3.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Backhoe		3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dozer/Scraper		3.1	3.1	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Concrete Pump		0.0	0.0	0.0	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jackhammer		4.0	4.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grader		3.2	3.2	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Assumptions	Hours
work days/month	20
work hours/day	8

Notes:

1.Daily equipment based on construction information provided in the project description

2. * hour work days were assumed and load factors for each piece of equipment were applied based on CARB'S Offroad Guidance documents for adjustments to CalEEmod 2011.

3. To represent a worst case construction year, the 160 bed expansion was assumed to occur immediately after the initial construction

Heavy-Duty Contstruction Equipment Exhaust Emission Factors Year 2016[1]

Project Equipt.	ROG (g/hr)	ROG (lbs/hr)	CO (g/hr)	CO (lbs/hr)	NOX (g/hr)	NOX (lbs/hr)	PM10 (g/hr)	PM10 (lbs/hr)	CO2 (g/hr)	CO2 (lbs/hr)	Comparable OFFROAD Equipment
Fork Lift	20.87	0.05	142.10	0.31	227.61	0.5018	11.20	0.02	29,187	64	Fork Lift
Crane	33.16	0.07	111.88	0.25	336.04	0.7408	18.20	0.04	22,405	49	Crane
Trucking	37.60	0.08	126.67	0.28	388.95	0.8575	16.74	0.04	41,838	92	Off-Highway Truck
Front End Loader	35.05	0.08	288.43	0.64	446.71	0.9848	15.46	0.03	61,588	136	tractors/loaders/backhoes
Backhoe Loader	35.05	0.08	288.43	0.64	446.71	0.9848	15.46	0.03	61,588	136	tractors/loaders/backhoes
Dozer/Scraper	64.22	0.14	205.36	0.45	666.79	1.4700	32.97	0.07	43,901	97	rubber tired dozer
Concrete Pumper	47.80	0.11	333.67	0.74	435.87	0.9609	20.62	0.05	63,502	140	pump
Jackhammer	21.04	0.05	217.59	0.48	302.97	0.6679	8.89	0.02	54,162	119	Drill/Bore
Grader	51.24	0.11	167.32	0.37	498.82	1.0997	28.02	0.06	32,245	71	Grader

Mass Conversion Rates	Unit	Source
453.59	g/lb	google.com

Source

1. SMAQMD 2011. SMAQMD Road Construction Emissions Model, Version 7.1.2 for construction year 2016

Fugitive Dust Emission Factors

1 **Travel on Paved Roads (Heavy Duty Trucks and Worker Commute)**[4]

E(lbs/VMT)=(k)(sL)^.91 (W)^1.02-C

Where:	PM10	Unit	Source
k= Particle Size Multiplier:	0.0022	lbs/VMT	AP-42 Chapter 13.2.1, Table 13.2.1-1, PM10 emissions
sL= road surface silt loading	0.06	g/m^2	AP-42 Chapter 13.2.1, Table 13.2.1-2
C= exhaust, break, tire wear	0.00047	lbs/VMT	AP-42 Chapter 13.2.1, Background Documentation Pg 2-5
W=Vehicle Weight	2.1	tons	Worker Commute Vehicle Weight Calculation shown below
W=Vehicle Weight	17	tons	Average weight of loaded and unloaded truck: assumed empty truck weights 2 tons, 20 CY truck capacity and 1 CY of fill equals 1.6 tons ((2+(20cy*1.6 tons+2))/2)
	0.003	lbs/VMT	Heavy Duty Haul Trucks
	0.00037	lbs/VMT	Worker Commute Vehicles

1a **Correction for Natural Precipitation**[5]

E(ext)=E[(1-P/4N)]

Where:		Unit	Source
P=#days/yr with>=0.01 precip	83	inches	CalEEMod for Shasta County
N=# days in aversaging period	365	days	
	0.003	lbs/VMT	Heavy Duty Haul Trucks
	0.0003	lbs/VMT	Worker Commute Vehicles

Worker Commute Vehicle Weight Calculation

Parameters and Calculations for Worker Commute Trips (i.e., passenger vehicles)

		Source
Vehicle class for worker trips	LDA, LDT1, LDT2	default value in CalEEMod's tab for Trips and VMT in the Construction module
Weight	4230 lb	average of vehicle categoriy weight (LDA-3,190 lbs, LDT1-3,750 lbs, LDT2-5,750 lbs) from EMFAC2011
Mass conversion	2000 lb/ton	google.com
Weight	2.12 ton	calculation

2 **Earth Moving**[6]

Emissions factor is applied to the total site acreage for which grading, earth moving, and site preparation would occur

PM10	
10	lbs/acre

Sources

1 EPA 2006.AP-42, Chapter 13.2.4 Miscellaneous Sources, Aggregate Storage Piles, Equation 1
2 EPA 2006. AP-42, Chapter 13.2.4 Miscellaneous Sources, Upaved Roads, Equation 1a
3 EPA 2006. AP-42, Chapter 13.2.4 Miscellaneous Sources, Upaved Roads, Equation 2
4 EPA 2011. AP-42, Chapter 13.2.4 Miscellaneous Sources, Paved Roads, Equation 1
5 EPA 2011. AP-42, Chapter 13.2.4 Miscellaneous Sources, Paved Roads, Equation 2
6 URBEMIS 2011-emission factor for fugitive dust emissions grom ground distubance

On-Road (Commute and Haul Trip) Exhaust Emission Factors

EMFAC2011 Emission Rates
Region Type: County
Region: Sacramento
Calendar Year: 2016
Season: Summer

Raw Emission Factors from EMFAC2011[1]

Veh	Fuel	Pop	VMT	Trips	Running Exhaust Emission Rates (g/mile)						
		(Vehicles)	(Miles/day)	(Trips/day)	ROG_RUNEX	NOX_RUNEX	PM10_RUNEX	PM2_5_RUNEX	CO_RUNEX	SOX_RUNEX	CO2_RUNEX
LDA	GAS	61491.2385	2492697.123	386752.964	0.042	0.114	0.002	0.002	1.519	0.004	353.448
LDA	DSL	399.852294	15393.15659	2388.64496	0.040	0.542	0.029	0.026	0.218	0.003	342.627
LDT1	GAS	9732.22637	389661.5229	58719.275	0.135	0.355	0.005	0.005	4.297	0.004	404.611
LDT1	DSL	11.0318605	437.1141469	59.717914	0.078	0.700	0.065	0.060	0.346	0.003	353.309
LDT2	GAS	22139.1801	913541.8029	138795.7	0.058	0.219	0.002	0.002	2.211	0.005	480.465
LDT2	DSL	12.1051255	495.2291952	70.8047591	0.056	0.646	0.044	0.041	0.283	0.003	346.607
T7 CAIRP construction	DSL	6.16415822	1434.186473	0	0.266	4.686	0.090	0.083	1.205	0.017	1736.567
Total			3,813,660								

Veh	Fuel	Ratio of Vehicle/Fuel Type to Total VMT
LDA	GAS	65%
LDA	DSL	0.4%
LDT1	GAS	10%
LDT1	DSL	0.01%
LDT2	GAS	24%
LDT2	DSL	0.01%

Exhaust Emission Rates for Composite Light Duty Vehicles[2]

ROG (g/mile)	ROG (lbs/mile)[3]	NOX (g/mile)	NOX (lbs/mile)[3]	PM10 (g/mile)	PM10 (lbs/mile)[3]	PM2.5 (g/mile)	PM2.5 (lbs/mile)[3]	CO (g/mile)	CO (lbs/mile)[3]	SOX (g/mile)	SOX (lbs/mile)[3]	CO2 (g/mile)	CO2 (lbs/mile)[3]
0.056	0.00012	0.165	0.00036	0.002	0.000005	0.002	0.000005	1.962	0.004	0.004	0.00001	388.924	0.85743117

Exhaust Emission Rates for Heavy-Duty Haul Trucks (lbs/mile)[4]

ROG (g/mile)	ROG (lbs/mile)[3]	NOX (g/mile)	NOX (lbs/mile)[3]	PM10 (g/mile)	PM10 (lbs/mile)[3]	PM2.5 (g/mile)	PM2.5 (lbs/mile)[3]	CO (g/mile)	CO (lbs/mile)[3]	SOX (g/mile)	SOX (lbs/mile)[3]	CO2 (g/mile)	CO2 (lbs/mile)[3]
0.266	0.001	4.686	0.010	0.090	0.0002	0.083	0.00018	1.205	0.0027	0.0166	0.000037	1736.567	3.828

Mass Conversion Rate	453.59	g/lb	onlineconversion.com/weight_common.htm

Notes

1 Raw emission factors obtained from EMFAC 2011.

2 Emission factors calculated based on the composite mix light duty vehicles (LDA, LDT1, LDT2) and the ratio of vehicle/fuel type to total VMT

3 Emission factors converted from grams/mile based on mass conversion rate shown above

4 CalEEMod assumes that Heavy-Heavy Diesel Trucks (HHDT) are used to haul materials and equipment during construction. Therefore, haul truck emissions are estimated using EMFAC2011 emission factors for a Heavy-Heavy Duty Diesel CA International Registration Plan Construction Truck (T7 CAIRP construction).

Construction Phasing

Phase 1	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18
month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
equipt	5	5	5	5	5	5	5	2	2	2	2	2	2	2	1	1	1	1	1	1	3	3	1	1
Truck Deliveries	2	5	7	7	7	7	7	7	7	7	7	7	6	6	5	5	5	4	4	5	3	2	2	3
Daily Workers	10	30	50	50	50	70	70	80	100	100	100	120	120	120	100	60	50	50	40	40	30	25	25	20

Demo is assumed to take 3 months and overlap mobilization, site work, and foundation. Demo would result in 9 material haul trips/day/month based on assumptions in CalEEMod

160-bed expansion	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19
equipt	2	2	2	2	2	2	2	0	0	2	2	0	0
truck deliveries	2	5	7	7	7	7	7	2	2	2	5	3	2
daily workers	10	30	40	50	50	70	70	30	30	30	20	20	10

the 160-bed expansion would occur sometime in the future, before 2030. For modeling purposes construction year 2019 was chosen as a worst-case scenario. In addition, the 160-bed expansion construction scenario would be more construction intensive than two 80-bed construction scenarios so this analysis assumes the worst-case construction scenario.

Indirect GHG Emissions Summary[1]

Indirect Emissions From Electricity Consumption

	Project Components	Unit
Annual electricity consumption[2]	3,180,800	kWh/year
Annual electricity consumption	3,181	MWh/year
Utility's CO2-e emission factor	0.293	MT/MWh
GHG Emissions from Electricity (CO2e MT/year)		931

Indirect Emissions From Water Demand

	Project Components	Units
Annual water demand[2]	63	acre-feet/year
Water conversion	18	million gallons/acre-feet
Electricity Demand	98,859	KWh/million gallons
Electricity conversion	99	MHh/year
Utility's CO2-e emission factor	0.293	MT/MWh
GHG Emissions from Water Demand (CO2e MT/year)		29
Indirect GHG Emissions Total (MT/yr)		960

Utility Intensity Factor (lb/MWh)[3]		**Global Warming Potential[4]**	
CO2	641.35	CO2	1
CH4	0.029	CH4	21
N20	0.011	N20	310

Conversion Factors

CO2e	645.4	lb/MWh
CO2e	0.293	MT/MWh
Weight	2204.62	lb/MT
Water Units	0.3	million gallons/acre-feet
Electricity for Water Use	5,411	KWh/million gallons[5]
Electricity	1000	KWh/MWh

Notes

1 Mobile-source GHG emissions were calculated seperately and are shown in the Operational (mobile) Emissions Summary sheet

2 Annual energy and water consumption provided by project applicant

3 Intensity factors obtained from CalEEmod 2011. California Emissions Estimator Mode (CalEEMod) 2011. South Coast Air Quality Management District. Devloped by ENVIRON

4 United Nations Framework Convention on Climate Change (UNFCC). 2012. Global Warming Potentials. Available http://unfccc.int/ghg_data/items/3825.php

5 Electricity requirement for Indoor water consumption in Northern California. California Energy Commission [CEC] 2006 (December). Refining Estimates of Water-Related Energy Use in California. CEC-500-2006-118

GHGs from Natural Gas Consumption

	value	units	source
Annual consumption of natural gas	100,800	therms/year	Section 3.10, Utilities and Service Systems
energy conversion factor	0.10	MMBtu/therm	www.onlineconversion.com/energy.htm
Annual consumption of natural gas	10,080	MMBtu/year	conversion calculation

Emission Rates by GHG	Emission Factor (kg/MMBtu)	GWP
CO2	53.06	1
CH4	0.001	21
N2O	0.0001	310

Source: California Climate Action Registry, General Reporting Protocol Version 3.1 (January 2009), pages 53, 94

	value	units	source
CO2-e Emission Rate	53.112	kg/MMBtu	sumproduct calculation
Annual CO2e from natural gas consumption	535,369	kg/year	calculation
mass conversion factor	1,000	kg/MT	www.onlineconversion.com/weight.htm
Annual CO2e from natural gas consumption	535	MT/year	conversion calculation