APPENDIX 5.1A

Construction Emission Estimates

APPENDIX 5.1A

Construction Emission Estimates (Criteria and Greenhouse Gas)

Criteria Pollutant Worksheets

Tables 5.1A.1 through 5.1A.12 summarize the onsite construction emissions from power plant construction.

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Table 5.1A.2 Onsite Power Plant Construction Equipment VOC Emissions
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Table 5.1A.4 Onsite Power Plant Construction Equipment SO_x Emissions
Table 5.1A.5 Onsite Power Plant Construction Equipment PM_{10} Emissions
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Table 5.1A.7 Onsite Power Plant Construction Motor Vehicle CO Emissions
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Table 5.1A.9 Onsite Power Plant Construction Motor Vehicle SO_x Emissions
Table 5.1A.10 Onsite Power Plant Construction Motor Vehicle NO_x Emissions
Table 5.1A.11 Onsite Power Plant Construction Motor Vehicle PM_{10} Emissions
Table 5.1A.12 Onsite Power Plant Construction Motor Vehicle $PM_{2.5}$ Emissions

Tables 5.1A.13 through 5.1A.21 summarize the fugitive dust emissions from power plant construction.

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Tables 5.1A.28 through 5.1A.34 summarize the offsite vehicle emissions associated with power plant construction.

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Table 5.1A.33 Offsite Motor Vehicle PM_{10} Emissions
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Greenhouse Gas Worksheets

Tables 5.1A.35 through 5.1A.42 summarize the diesel-fueled and gasoline-fueled construction equipment greenhouse gas emissions from construction.

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Table 5.1A.36 Construction Diesel-Fueled Equipment CH_4 Emissions
Table 5.1A.37 Construction Diesel-Fueled Equipment N_2O Emissions
Table 5.1A.38 Construction Equipment Diesel Fuel Consumption
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Table 5.1A.40 Construction Gasoline-Fueled Equipment CH_4 Emissions
Table 5.1A.41 Construction Gasoline-Fueled Equipment N_2O Emissions
Table 5.1A.42 Construction Equipment Gasoline Fuel Consumption

Tables 5.1A.43 through 5.1A.53 summarize the onsite vehicle and offsite vehicle greenhouse gas emissions associated with construction.

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Table 5.1A.44 Onsite Power Plant Construction Motor Vehicle CH_4 Emissions
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Table 5.1A.46 Onsite Power Plant Construction Motor Vehicle Diesel Fuel Consumption
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Table 5.1A.1: Construction Equipment CO Emissions

	CO Emisisons													
Onsite Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Concrete Pump	0	0	20	20	20	20	0	0	0	0	0	0	0	0
Water Truck	29	29	29	29	29	29	29	29	29	29	0	0	0	0
Excavator	90	90	136	136	136	136	136	90	90	45	0	0	0	0
Grader	45	45	45	0	0	0	0	0	0	0	0	0	0	0
Cranes	68	68	68	68	68	136	136	102	102	34	34	34	34	34
Tractor/Loader/Backhoe	36	72	144	144	144	144	179	144	108	108	72	72	36	0
Bull Dozer	64	64	64	0	0	0	0	0	0	0	0	0	0	0
Welding Machine	11	16	16	11	11	11	11	16	16	11	11	11	11	11
Plate Compactor	0	0	0	0	25	25	13	13	0	0	0	0	0	0
Light Plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aerial Lift	0	0	0	20	20	40	40	79	79	79	40	40	20	20
Air Compressor	75	75	75	75	75	151	151	151	75	75	75	75	75	75
Forklift	23	23	23	23	45	45	45	68	45	45	23	23	23	23
Vibratory Roller	264	264	528	528	528	528	0	0	0	0	0	0	0	0
Total (lbs/month, E_m)	**705**	**746**	**1,147**	**1,052**	**1,100**	**1,263**	**739**	**691**	**545**	**427**	**255**	**255**	**199**	**163**
Onsite Total (lbs/month)	**523**	**596**	**999**	**1,052**	**1,100**	**1,103**	**588**	**539**	**439**	**427**	**255**	**255**	**199**	**163**
Offsite Total (lbs/month)	**182**	**151**	**148**	**0**	**0**	**160**	**150**	**152**	**107**	**0**	**0**	**0**	**0**	**0**
Total (lbs/day, E_d)	**32.0**	**33.9**	**52.1**	**47.8**	**50.0**	**57.4**	**33.6**	**31.4**	**24.8**	**19.4**	**11.6**	**11.6**	**9.0**	**7.4**
Onsite Total (lbs/day)	**23.8**	**27.1**	**45.4**	**47.8**	**50.0**	**50.1**	**26.7**	**24.5**	**19.9**	**19.4**	**11.6**	**11.6**	**9.0**	**7.4**
Offsite Total (lbs/day)	**8.3**	**6.8**	**6.7**	**0.0**	**0.0**	**7.3**	**6.8**	**6.9**	**4.8**	**0**	**0**	**0**	**0**	**0**

Table 5.1A.2: Construction Equipment VOC Emissions

	VOC Emisisons													
Onsite Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Concrete Pump	0	0	5.1	5.1	5.1	5.1	0.0	0.0	0.0	0.0	0.0	0	0	0
Water Truck	10	10	10	10	10	9.8	9.8	9.8	9.8	9.8	0.0	0.0	0.0	0
Excavator	32.9	32.9	49.3	49.3	49.3	49.3	49.3	32.9	32.9	16	0	0	0	0
Grader	15.9	15.9	15.9	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0
Cranes	19	19.0	19	19	19	38.1	38.1	28.5	28.5	9.5	9.5	9.5	9.5	9.5
Tractor/Loader/Backhoe	7	14	28	28	28	28	35	28	21	21	14	14	6.9	0.0
Bull Dozer	18.3	18.3	18.3	0	0	0	0	0	0	0	0	0	0	0
Welding Machine	4	6.2	6.2	4.1	4.1	4.1	4.1	6.2	6.2	4.1	4.1	4.1	4.1	4.1
Plate Compactor	0	0	0	0	0.6	0.6	0	0	0	0	0	0	0	0
Light Plant	0	0	0	0	0	0	0	0	0	0.01	0.01	0.01	0.01	0.01
Aerial Lift	0	0	0	0.7	0.7	1.4	1.4	2.7	2.7	2.7	1.4	1.4	0.7	0.7
Air Compressor	2.8	2.8	2.8	2.8	2.8	5.6	5.6	5.6	2.8	2.8	2.8	2.8	2.8	2.8
Forklift	0	0	0	0	0.5	0.5	0.5	0.8	0.5	0.5	0	0	0	0
Vibratory Roller	15.7	15.7	31.3	31.3	31.3	31.3	0	0	0	0	0	0	0	0
Total (lbs/month, E_m)	**126**	**135**	**186**	**150**	**151**	**174**	**144**	**115**	**104**	**67**	**32**	**32**	**24**	**17**
Onsite Total (lbs/month)	**93**	**108**	**162**	**150**	**151**	**152**	**114**	**89**	**84**	**67**	**32**	**32**	**24**	**17**
Offsite Total (lbs/month)	**32**	**27**	**24**	**0**	**0**	**22**	**29**	**25**	**20**	**0**	**0**	**0**	**0**	**0**
Total (lbs/day, E_d)	**5.7**	**6.1**	**8.4**	**6.8**	**6.9**	**7.9**	**6.5**	**5.2**	**4.7**	**3.0**	**1.5**	**1.5**	**1.1**	**0.8**
Onsite Total (lbs/day)	**4.2**	**4.9**	**7.4**	**6.8**	**6.9**	**6.9**	**5.2**	**4.1**	**3.8**	**3.0**	**1.5**	**1.5**	**1.1**	**0.8**
Offsite Total (lbs/day)	**1.5**	**1.2**	**1.1**	**0.0**	**0.0**	**1.0**	**1.3**	**1.1**	**0.9**	**0**	**0**	**0**	**0**	**0**

Table 5.1A.3: Construction Equipment NOx Emissions

	NOx Emissions													
Onsite Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Concrete Pump	0	0	66	66	66	66	0	0	0	0	0	0	0	0
Water Truck	88	88	88	88	88	88	88	88	88	88	0	0	0	0
Excavator	327	327	491	491	491	491	491	327	327	164	0	0	0	0
Grader	158	158	158	0	0	0	0	0	0	0	0	0	0	0
Cranes	182	182	182	182	182	364	364	273	273	91	91	91	91	91
Tractor/Loader/Backhoe	55	109	219	219	219	219	274	219	164	164	109	109	55	0
Bull Dozer	179	179	179	0	0	0	0	0	0	0	0	0	0	0
Welding Machine	18	28	28	18	18	18	18	28	28	18	18	18	18	18
Plate Compactor	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Light Plant	0	0	0	0	0	0	0	0	0	0.01	0.01	0.01	0.01	0.01
Aerial Lift	0	0	0	2	2	4	4	9	9	9	4	4	2	2
Air Compressor	4	4	4	4	4	8	8	8	4	4	4	4	4	4
Forklift	1	1	1	1	1	1	1	2	1	1	1	1	1	1
Vibratory Roller	40	40	80	80	80	80	0	0	0	0	0	0	0	0
Total (lbs/month, E_m)	**1,052**	**1,116**	**1,495**	**1,151**	**1,152**	**1,340**	**1,249**	**954**	**894**	**539**	**228**	**228**	**171**	**116**
Onsite Total (lbs/month)	**781**	**891**	**1,302**	**1,151**	**1,152**	**1,171**	**994**	**744**	**720**	**539**	**228**	**228**	**171**	**116**
Offsite Total (lbs/month)	**271**	**225**	**193**	**0**	**0**	**169**	**254**	**210**	**175**	**0**	**0**	**0**	**0**	**0**
Total (lbs/day, E_d)	**47.8**	**50.7**	**67.9**	**52.3**	**52.4**	**60.9**	**56.8**	**43.3**	**40.7**	**24.5**	**10.4**	**10.4**	**7.8**	**5.3**
Onsite Total (lbs/day)	**35.5**	**40.5**	**59.2**	**52.3**	**52.4**	**53.2**	**45.2**	**33.8**	**32.7**	**24.5**	**10.4**	**10.4**	**7.8**	**5.3**
Offsite Total (lbs/day)	**12.3**	**10.2**	**8.8**	**0.0**	**0.0**	**7.7**	**11.6**	**9.5**	**7.9**	**0**	**0**	**0**	**0**	**0**

Table 5.1A.4: Construction Equipment SOx Emissions

	SOx Emissions													
Onsite Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Concrete Pump	0.00	0.00	0.08	0.08	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0	0
Water Truck	0	0	0	0	0	0.10	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0
Excavator	0.47	0.47	0.70	0.70	0.70	0.70	0.70	0.47	0.47	0	0	0	0	0
Grader	0.19	0.19	0.19	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0
Cranes	0	0.16	0	0	0	0.33	0.33	0.24	0.24	0.08	0.08	0.08	0.08	0.08
Tractor/Loader/Backhoe	0	0	0	0	0	0	0	0	0	0	0	0	0.08	0.00
Bull Dozer	0.21	0.21	0.21	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0
Welding Machine	0	0.03	0.03	0.02	0.02	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.02	0.02
Plate Compactor	0	0	0	0	0.002	0.002	0	0	0	0	0	0	0	0
Light Plant	0	0	0	0	0	0	0	0	0	0.00002	0.00002	0.00002	0.00002	0.00002
Aerial Lift	0	0	0	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01
Air Compressor	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Forklift	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.003	0.002	0.002	0.001	0.001	0.001	0.001
Vibratory Roller	0.03	0.03	0.07	0.07	0.07	0.07	0	0	0	0	0	0	0	0
Total (lbs/month, E_m)	**1.3**	**1.4**	**1.9**	**1.5**	**1.5**	**1.6**	**1.6**	**1.2**	**1.1**	**0.7**	**0.3**	**0.3**	**0.2**	**0.1**
Onsite Total (lbs/month)	**0.9**	**1.1**	**1.6**	**1.5**	**1.5**	**1.4**	**1.3**	**0.9**	**0.9**	**0.7**	**0.3**	**0.3**	**0.2**	**0.1**
Offsite Total (lbs/month)	**0.3**	**0.3**	**0.2**	**0.0**	**0.0**	**0.2**	**0.3**	**0.3**	**0.2**	**0**	**0**	**0**	**0**	**0**
Total (lbs/day, E_d)	**0.058**	**0.062**	**0.085**	**0.067**	**0.067**	**0.075**	**0.072**	**0.055**	**0.051**	**0.032**	**0.013**	**0.013**	**0.009**	**0.005**
Onsite Total (lbs/day)	**0.043**	**0.050**	**0.074**	**0.067**	**0.067**	**0.065**	**0.057**	**0.043**	**0.041**	**0.032**	**0.013**	**0.013**	**0.009**	**0.005**
Offsite Total (lbs/day)	**0.015**	**0.013**	**0.011**	**0.000**	**0.000**	**0.009**	**0.015**	**0.012**	**0.010**	**0**	**0**	**0**	**0**	**0**

Table 5.1A.5: Construction Equipment PM_{10} Emissions

	PM_{10} Emissions													
Onsite Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Concrete Pump	0.00	0.00	2.00	2.00	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0	0	0
Water Truck	3	3	3	3	3	3.28	3.28	3.28	3.28	3.28	0.00	0.00	0.00	0
Excavator	11.16	11.16	16.74	16.74	16.74	16.74	16.74	11.16	11.16	6	0	0	0	0
Grader	5.78	5.78	5.78	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0
Cranes	6.91	6.91	7	7	7	13.83	13.83	10.37	10.37	3.46	3.46	3.46	3.46	3.46
Tractor/Loader/Backhoe	3.25	6	13	13	13	13	16	13	10	10	6	6	3	0
Bull Dozer	6.66	6.66	6.66	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0
Welding Machine	1.25	1.87	1.87	1.25	1.25	1.25	1.25	1.87	1.87	1.25	1.25	1.25	1.25	1.25
Plate Compactor	0	0	0	0	0.40	0.40	0.20	0.20	0	0	0	0	0	0
Light Plant	0	0	0	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.000
Aerial Lift	0	0	0	0.05	0.05	0.09	0.09	0.19	0.19	0.19	0.09	0.09	0.05	0.05
Air Compressor	0.04	0.04	0.04	0.04	0.04	0.08	0.08	0.08	0.04	0.04	0.04	0.04	0.04	0.04
Forklift	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
Vibratory Roller	0.28	0.28	0.55	0.55	0.55	0.55	0	0	0	0	0	0	0	0
Total (lbs/month, E_m)	**39**	**42**	**57**	**44**	**44**	**51**	**52**	**40**	**37**	**24**	**11**	**11**	**8**	**5**
Onsite Total (lbs/month)	**29**	**34**	**50**	**44**	**44**	**45**	**41**	**31**	**30**	**24**	**11**	**11**	**8**	**5**
Offsite Total (lbs/month)	**10**	**9**	**7**	**0**	**0**	**6**	**11**	**9**	**7**	**0**	**0**	**0**	**0**	**0**
Total (lbs/day, E_d)	**1.76**	**1.93**	**2.58**	**1.99**	**2.01**	**2.33**	**2.35**	**1.83**	**1.67**	**1.07**	**0.52**	**0.52**	**0.37**	**0.22**
Onsite Total (lbs/day)	**1.30**	**1.54**	**2.25**	**1.99**	**2.01**	**2.03**	**1.87**	**1.42**	**1.34**	**1.07**	**0.52**	**0.52**	**0.37**	**0.22**
Offsite Total (lbs/day)	**0.45**	**0.39**	**0.33**	**0.00**	**0.00**	**0.29**	**0.48**	**0.40**	**0.33**	**0**	**0**	**0**	**0**	**0**

Table 5.1A.6: Construction Equipment $PM_{2.5}$ Emissions

	$PM_{2.5}$ Emissions (lbs/month)													
Onsite Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Concrete Pump	0.00	0.00	1.78	1.78	1.78	1.78	0.00	0.00	0.00	0.00	0.00	0	0	0
Water Truck	3	3	3	3	3	2.92	2.92	2.92	2.92	2.92	0.00	0.00	0.00	0
Excavator	9.93	9.93	14.90	14.90	14.90	14.90	14.90	9.93	9.93	5	0	0	0	0
Grader	5.14	5.14	5.14	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0
Cranes	6	6.15	6.15	6.15	6.15	12.31	12.31	9.23	9.23	3.08	3.08	3.08	3.08	3.08
Tractor/Loader/Backhoe	3	6	12	12	12	12	14	12	9	9	6	6	2.89	0.00
Bull Dozer	5.93	5.93	5.93	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0
Welding Machine	1.11	1.66	1.66	1.11	1.11	1.11	1.11	1.66	1.66	1.11	1.11	1.11	1.11	1.11
Plate Compactor	0	0	0	0	0.36	0.36	0.18	0.18	0	0	0	0	0	0
Light Plant	0	0	0	0	0	0	0	0	0	0.0003	0.0003	0.0003	0.0003	0.0003
Aerial Lift	0	0	0	0.04	0.04	0.08	0.08	0.17	0.17	0.17	0.08	0.08	0.04	0.04
Air Compressor	0.03	0.03	0.03	0.03	0.03	0.07	0.07	0.07	0.03	0.03	0.03	0.03	0.03	0.03
Forklift	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
Vibratory Roller	0.25	0.25	0.49	0.49	0.49	0.49	0	0	0	0	0	0	0	0
Total (lbs/month, E_m)	**34**	**38**	**51**	**39**	**39**	**46**	**46**	**36**	**33**	**21**	**10**	**10**	**7**	**4**
Onsite Total (lbs/month)	**25**	**30**	**44**	**39**	**39**	**40**	**37**	**28**	**26**	**21**	**10**	**10**	**7**	**4**
Offsite Total (lbs/month)	**9**	**8**	**7**	**0**	**0**	**6**	**9**	**8**	**6**	**0**	**0**	**0**	**0**	**0**
Total (lbs/day, E_d)	**1.56**	**1.72**	**2.30**	**1.77**	**1.79**	**2.07**	**2.09**	**1.62**	**1.48**	**0.95**	**0.46**	**0.46**	**0.33**	**0.19**
Onsite Total (lbs/day)	**1.16**	**1.37**	**2.00**	**1.77**	**1.79**	**1.81**	**1.67**	**1.27**	**1.19**	**0.95**	**0.46**	**0.46**	**0.33**	**0.19**
Offsite Total (lbs/day)	**0.40**	**0.35**	**0.30**	**0.00**	**0.00**	**0.26**	**0.43**	**0.36**	**0.29**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Note: The fraction of total construction equipment emissions associated with onsite and offsite construction were estimated using a ratio of the number of plant construction workers to the number of offsite linear workers.

Table 5.1A.7: Onsite Power Plant Construction Motor Vehicle CO Emissions

	CO Emissions													
Vehicle Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Onsite Pick up Truck	0.036	0.036	0.036	0.036	0.036	0.072	0.072	0.072	0.072	0.036	0.036	0.036	0.036	0.036
Onsite Fuel/Lube Truck	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350
Onsite Dump Truck	0.476	0.476	0.476	0.095	0.095	0.095	0.095	0.095	0.095	0.000	0.000	0.000	0.000	0.000
Total (lbs/day)	**0.86**	**0.86**	**0.86**	**0.48**	**0.48**	**0.52**	**0.52**	**0.52**	**0.52**	**0.39**	**0.39**	**0.39**	**0.39**	**0.39**
Onsite Pick up Truck	0.79	0.79	0.79	0.79	0.79	1.57	1.57	1.57	1.57	0.79	0.79	0.79	0.79	0.79
Onsite Fuel/Lube Truck	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71
Onsite Dump Truck	10.47	10.47	10.47	2.09	2.09	2.09	2.09	2.09	2.09	0.00	0.00	0.00	0.00	0.00
Total (lbs/month)	**18.96**	**18.96**	**18.96**	**10.59**	**10.59**	**11.38**	**11.38**	**11.38**	**11.38**	**8.50**	**8.50**	**8.50**	**8.50**	**8.50**

Table 5.1A.8: Onsite Power Plant Construction Motor Vehicle VOC Emissions

	VOC Emisisons													
Vehicle Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Onsite Pick up Truck	0.0027	0.0027	0.0027	0.0027	0.0027	0.0054	0.0054	0.0054	0.0054	0.0027	0.0027	0.0027	0.0027	0.0027
Onsite Fuel/Lube Truck	0.0362	0.0362	0.0362	0.0362	0.0362	0.0362	0.0362	0.0362	0.0362	0.0362	0.0362	0.0362	0.0362	0.0362
Onsite Dump Truck	0.2418	0.2418	0.2418	0.0484	0.0484	0.0484	0.0484	0.0484	0.0484	0.0000	0.0000	0.0000	0.0000	0.0000
Total (lbs/day)	**0.281**	**0.281**	**0.281**	**0.087**	**0.087**	**0.090**	**0.090**	**0.090**	**0.090**	**0.039**	**0.039**	**0.039**	**0.039**	**0.039**
Onsite Pick up Truck	0.059	0.059	0.059	0.059	0.059	0.118	0.118	0.118	0.118	0.059	0.059	0.059	0.059	0.059
Onsite Fuel/Lube Truck	0.796	0.796	0.796	0.796	0.796	0.796	0.796	0.796	0.796	0.796	0.796	0.796	0.796	0.796
Onsite Dump Truck	5.321	5.321	5.321	1.064	1.064	1.064	1.064	1.064	1.064	0.000	0.000	0.000	0.000	0.000
Total (lbs/month)	**6.18**	**6.18**	**6.18**	**1.92**	**1.92**	**1.98**	**1.98**	**1.98**	**1.98**	**0.85**	**0.85**	**0.85**	**0.85**	**0.85**

Table 5.1A.9: Onsite Power Plant Construction Motor Vehicle SOx Emissions

	SOx Emissions													
Vehicle Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Onsite Pick up Truck	0.000049	0.000049	0.000049	0.000049	0.000049	0.000097	0.000097	0.000097	0.000097	0.000049	0.000049	0.000049	0.000049	0.000049
Onsite Fuel/Lube Truck	0.000060	0.000060	0.000060	0.000060	0.000060	0.000060	0.000060	0.000060	0.000060	0.000060	0.000060	0.000060	0.000060	0.000060
Onsite Dump Truck	0.000772	0.000772	0.000772	0.000154	0.000154	0.000154	0.000154	0.000154	0.000154	0.000000	0.000000	0.000000	0.000000	0.000000
Total (lbs/day)	**0.00088**	**0.00088**	**0.00088**	**0.00026**	**0.00026**	**0.00031**	**0.00031**	**0.00031**	**0.00031**	**0.00011**	**0.00011**	**0.00011**	**0.00011**	**0.00011**
Onsite Pick up Truck	0.00107	0.00107	0.00107	0.00107	0.00107	0.00213	0.00213	0.00213	0.00213	0.00107	0.00107	0.00107	0.00107	0.00107
Onsite Fuel/Lube Truck	0.00131	0.00131	0.00131	0.00131	0.00131	0.00131	0.00131	0.00131	0.00131	0.00131	0.00131	0.00131	0.00131	0.00131
Onsite Dump Truck	0.01698	0.01698	0.01698	0.00340	0.00340	0.00340	0.00340	0.00340	0.00340	0.00000	0.00000	0.00000	0.00000	0.00000
Total (lbs/month)	**0.0194**	**0.0194**	**0.0194**	**0.0058**	**0.0058**	**0.0068**	**0.0068**	**0.0068**	**0.0068**	**0.0024**	**0.0024**	**0.0024**	**0.0024**	**0.0024**

Table 5.1A.10: Onsite Power Plant Construction Motor Vehicle NOx Emissions

Vehicle Type	NOx Emissions													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Onsite Pick up Truck	0.0029	0.0029	0.0029	0.0029	0.0029	0.0059	0.0059	0.0059	0.0059	0.0029	0.0029	0.0029	0.0029	0.0029
Onsite Fuel/Lube Truck	0.0189	0.0189	0.0189	0.0189	0.0189	0.0189	0.0189	0.0189	0.0189	0.0189	0.0189	0.0189	0.0189	0.0189
Onsite Dump Truck	0.8140	0.8140	0.8140	0.1628	0.1628	0.1628	0.1628	0.1628	0.1628	0.0000	0.0000	0.0000	0.0000	0.0000
Total (lbs/day)	**0.836**	**0.836**	**0.836**	**0.185**	**0.185**	**0.188**	**0.188**	**0.188**	**0.188**	**0.022**	**0.022**	**0.022**	**0.022**	**0.022**
Onsite Pick up Truck	0.065	0.065	0.065	0.065	0.065	0.129	0.129	0.129	0.129	0.065	0.065	0.065	0.065	0.065
Onsite Fuel/Lube Truck	0.416	0.416	0.416	0.416	0.416	0.416	0.416	0.416	0.416	0.416	0.416	0.416	0.416	0.416
Onsite Dump Truck	17.908	17.908	17.908	3.582	3.582	3.582	3.582	3.582	3.582	0.000	0.000	0.000	0.000	0.000
Total (lbs/month)	**18.39**	**18.39**	**18.39**	**4.06**	**4.06**	**4.13**	**4.13**	**4.13**	**4.13**	**0.48**	**0.48**	**0.48**	**0.48**	**0.48**

Table 5.1A.11: Onsite Power Plant Construction Motor Vehicle PM_{10} Emissions

Vehicle Type	PM_{10} Emissions													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Onsite Pick up Truck	0.00037	0.00037	0.00037	0.00037	0.00037	0.00075	0.00075	0.00075	0.00075	0.00037	0.00037	0.00037	0.00037	0.00037
Onsite Fuel/Lube Truck	0.00031	0.00031	0.00031	0.00031	0.00031	0.00031	0.00031	0.00031	0.00031	0.00031	0.00031	0.00031	0.00031	0.00031
Onsite Dump Truck	0.05584	0.05584	0.05584	0.01117	0.01117	0.01117	0.01117	0.01117	0.01117	0.00000	0.00000	0.00000	0.00000	0.00000
Total (lbs/day)	**0.0565**	**0.0565**	**0.0565**	**0.0119**	**0.0119**	**0.0122**	**0.0122**	**0.0122**	**0.0122**	**0.0007**	**0.0007**	**0.0007**	**0.0007**	**0.0007**
Onsite Pick up Truck	0.0082	0.0082	0.0082	0.0082	0.0082	0.0165	0.0165	0.0165	0.0165	0.0082	0.0082	0.0082	0.0082	0.0082
Onsite Fuel/Lube Truck	0.0068	0.0068	0.0068	0.0068	0.0068	0.0068	0.0068	0.0068	0.0068	0.0068	0.0068	0.0068	0.0068	0.0068
Onsite Dump Truck	1.2285	1.2285	1.2285	0.2457	0.2457	0.2457	0.2457	0.2457	0.2457	0.0000	0.0000	0.0000	0.0000	0.0000
Total (lbs/month)	**1.244**	**1.244**	**1.244**	**0.261**	**0.261**	**0.269**	**0.269**	**0.269**	**0.269**	**0.015**	**0.015**	**0.015**	**0.015**	**0.015**

Table 5.1A.12: Onsite Power Plant Construction Motor Vehicle $PM_{2.5}$ Emissions

Vehicle Type	$PM_{2.5}$ Emissions													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Onsite Pick up Truck	0.00029	0.00029	0.00029	0.00029	0.00029	0.00058	0.00058	0.00058	0.00058	0.00029	0.00029	0.00029	0.00029	0.00029
Onsite Fuel/Lube Truck	0.00024	0.00024	0.00024	0.00024	0.00024	0.00024	0.00024	0.00024	0.00024	0.00024	0.00024	0.00024	0.00024	0.00024
Onsite Dump Truck	0.00240	0.00240	0.00240	0.00048	0.00048	0.00048	0.00048	0.00048	0.00048	0.00000	0.00000	0.00000	0.00000	0.00000
Total (lbs/day)	**0.0029**	**0.0029**	**0.0029**	**0.0010**	**0.0010**	**0.0013**	**0.0013**	**0.0013**	**0.0013**	**0.0005**	**0.0005**	**0.0005**	**0.0005**	**0.0005**
Onsite Pick up Truck	0.0064	0.0064	0.0064	0.0064	0.0064	0.0128	0.0128	0.0128	0.0128	0.0064	0.0064	0.0064	0.0064	0.0064
Onsite Fuel/Lube Truck	0.0052	0.0052	0.0052	0.0052	0.0052	0.0052	0.0052	0.0052	0.0052	0.0052	0.0052	0.0052	0.0052	0.0052
Onsite Dump Truck	0.0529	0.0529	0.0529	0.0106	0.0106	0.0106	0.0106	0.0106	0.0106	0.0000	0.0000	0.0000	0.0000	0.0000
Total (lbs/month)	**0.065**	**0.065**	**0.065**	**0.022**	**0.022**	**0.029**	**0.029**	**0.029**	**0.029**	**0.012**	**0.012**	**0.012**	**0.012**	**0.012**

Table 5.1A.13: Onsite Power Plant Construction Fugitive Dust Monthly Activity Levels

	Monthly Activity Levels													
Source	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Grading (acres)*	10.0	5.0	5.0	0	0	0	0	0	0	0	0	0	0	0

*Assumes the entire 10 acre area to be graded in the 1st month of construction. Assumes 5 acre laydown area graded for each of the remaining months with at least one grader.

Table 5.1A.14: Onsite Power Plant Construction Fugitive PM_{10} Emissions

	Fugitive PM_{10} Emissions (lb/month)													
Source	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Grading (acres)	100.0	50.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0
Total (lbs/month)	**100.0**	**50.0**	**50.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0**	**0**	**0**
Total (lbs/day)	**4.5**	**2.3**	**2.3**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0**	**0**	**0**

[a] Calculation based on highest (controlled) grading emission factor of 10 lb/acre.
[b] Based on 22 days/month

Table 5.1A.15: Onsite Power Plant Construction Fugitive $PM_{2.5}$ Emissions

	Fugitive $PM_{2.5}$ Emissions (lb/month)													
Source	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Grading (acres)	20.8	10	10	0	0	0	0	0	0	0	0	0	0	0
Total (lbs/month)	**20.8**	**10**	**10**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total (lbs/day)	**0.9**	**0.5**	**0.5**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0**	**0**	**0**

[a] Calculation based on assumption that 20.8% of PM_{10} is $PM_{2.5}$ for construction fugitive dust emissions. Reference: SCAQMD CEQA Handbook, Appendix A, Table A.
[b] Based on 22 days/month

Table 5.1A.16: Onsite Power Plant Construction Motor Vehicle Fugitive PM_{10} Emissions

	Daily Fugitive PM_{10} Emissions (lb/day) for Each Month													
Vehicle Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Onsite Pickup Truck	1.52	1.52	1.52	1.52	1.52	3.03	3.03	3.03	3.03	1.52	1.52	1.52	1.52	1.52
Onsite Fuel/Lube Truck	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Onsite Dump Truck	7.58	7.58	7.58	1.52	1.52	1.52	1.52	1.52	1.52	0.00	0.00	0.00	0.00	0.00
Total (lbs/day)	9.9	**9.9**	**9.9**	**3.8**	**3.8**	**5.3**	**5.3**	**5.3**	**5.3**	**2.3**	**2.3**	**2.3**	**2.3**	**2.3**
	Monthly Fugitive PM_{10} Emissions (lb/month)													
Vehicle Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Onsite Pickup Truck	33.3	33.3	33.3	33.3	33.3	66.7	66.7	66.7	66.7	33.3	33.3	33.3	33.3	33.3
Onsite Fuel/Lube Truck	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7
Onsite Dump Truck	166.7	166.7	166.7	33.3	33.3	33.3	33.3	33.3	33.3	0.0	0.0	0.0	0.0	0.0
Total (lb/month)	217	**217**	**217**	**83**	**83**	**117**	**117**	**117**	**117**	**50**	**50**	**50**	**50**	**50**

[a] Calculation based on highest (controlled) unpaved road emission factor of 0.76 lb/mi for PM_{10}.
[b] Based on 22 days/month

Table 5.1A.17: Onsite Power Plant Construction Vehicle Fugitive $PM_{2.5}$ Emissions

	Daily Fugitive $PM_{2.5}$ Emissions (lb/day) for Each Month													
Vehicle Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Onsite Pickup Truck	0.152	0.152	0.15	0.15	0.15	0.30	0.30	0.30	0.30	0.15	0.15	0.15	0.15	0.152
Onsite Fuel/Lube Truck	0.076	0.076	0.076	0.076	0.076	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.076
Onsite Dump Truck	0.76	0.76	0.76	0.15	0.15	0.15	0.15	0.15	0.15	0.00	0.00	0.00	0.00	0.00
Total (lbs/day)	**0.99**	**0.99**	**0.99**	**0.38**	**0.38**	**0.53**	**0.53**	**0.53**	**0.53**	**0.23**	**0.23**	**0.23**	**0.23**	**0.23**
	Monthly Fugitive $PM_{2.5}$ Emissions (lb/month)													
Vehicle Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Onsite Pickup Truck	3.33	3.33	3.33	3.33	3.33	6.67	6.67	6.67	6.67	3.33	3.33	3.33	3.33	3.33
Onsite Fuel/Lube Truck	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67
Onsite Dump Truck	16.67	16.67	16.67	3.33	3.33	3.33	3.33	3.33	3.33	0.00	0.00	0.00	0.00	0.00
Total (lb/month)	**21.7**	**21.7**	**21.7**	**8.3**	**8.3**	**11.7**	**11.7**	**11.7**	**11.7**	**5.0**	**5.0**	**5.0**	**5.0**	**5.0**

[a] Calculation based on highest (controlled) unpaved road emission factor of 0.08 lb/mi for $PM_{2.5}$.
[b] Based on 22 days/month

Table 5.1A.18: Onsite Power Plant Construction Motor Vehicle Activity

Vehicle Type	Miles/Day	Working Days per Month
Onsite Pickup Truck	1	22
Onsite Fuel/Lube Truck	1	22
Onsite Dump Truck	2	22

Table 5.1A.19: Fugitive PM_{10} Emission Factors for Grading

Grading

Emission Factor (Uncontrolled)	20	lb/acre
Controlled Emission Factor	10	lb/acre

Reference: URBEMIS2007, Appendix A, Table A-4

Table 5.1A.20: Fugitive PM_{10} Emission Factors for Unpaved Roads

Motor Vehicles and Equipment on Unpaved Surfaces

Emission Factor [lb/mi] = 1.5 x (silt content [%] / 12)$^{0.9}$ x (average vehicle weight [tons] / 3)$^{0.45}$
Reference: AP-42, Section 13.2.2, November 2006

Parameter	PM_{10}
Average Vehicle Weight (tons) by month	16.50
Silt Content (%)	8.5
Emission Factor (Uncontrolled, lb/mile)	2.37
Reduction from Watering Twice/Day	68%
Controlled Emission Factor (lb/mile)	0.76

Average vehicle weight assumes that medium/heavy duty trucks weigh 16.5 tons.

Reference for Silt Content: AP-42, Section 13.2.2, Table 13.2.2-1, Average for a Construction Site, Scraper Route
Reference for Control Efficiency: SCAQMD CEQA Handbook, Table 11-4

Table 5.1A.21: Fugitive $PM_{2.5}$ Emission Factors for Unpaved Roads

Motor Vehicles and Equipment on Unpaved Surfaces

Emission Factor [lb/mi] = 0.15 x (silt content [%] / 12)$^{0.9}$ x (average vehicle weight [tons] / 3)$^{0.45}$
Reference: AP-42, Section 13.2.2, November 2006

Parameter	$PM_{2.5}$
Average Vehicle Weight (tons) by month	16.50
Silt Content (%)	8.5
Emission Factor (Uncontrolled, lb/mile)	0.24
Reduction from Watering Twice/Day	68%
Controlled Emission Factor (lb/mile)	0.08

Reference for Silt Content: AP-42, Section 13.2.2, Table 13.2.2-1, Average for a Construction Site, Scraper Route
Reference for Control Efficiency: SCAQMD CEQA Handbook, Table 11-4

Table 5.1A.22: Equations Used to Calculate Emissions

Emission Source	Pollutant(s)	Equation	Variables
Construction Equipment Exhaust	CO, VOC, NOx, SOx, PM_{10} and $PM_{2.5}$	$E_m = N * EF * H * 22$	E_m = Emissions (lb/month) N = number of pieces of equipment EF = emission factor (lb/hr) H = daily hours of operation, assumed to be 10 hr/day 22 = 22 construction days per month
		$E_d = E_m / 22$	E_d = Emissions (lb/day) E_m = Emissions (lb/month) 22 = 22 construction days per month
		$Et = \Sigma E_m / 2000$	E_t = Emissions (ton/yr) E_m = Emissions (lb/month) 2000 = conversion from lbs to tons
Onsite and Offsite Motor Vehicle Exhaust and Unpaved Road Fugitive PM_{10} and $PM_{2.5}$	CO, VOC, NOx, SOx, PM_{10}, $PM_{2.5}$	$E_d = N * VMT * EF$	E_d = Emissions (lb/day) N = number of vehicles VMT = vehicle miles traveled per day (miles/day) EF =EMFAC2007 emission factor (lb/mile). For fugitive PM_{10} and $PM_{2.5}$, Unpaved road dust emission factor based on equation in AP-42, ch. 13.2.2, November 2006 (lb/mile). See Tables 5.1A.20 and 5.1A.21.
		$E_m = E_d * D$	E_m = Emissions (lb/month) E_d = Emissions (lb/day) D = number of construction days (days/month)

Table 5.1A.23: Number of Onsite Power Plant Construction Equipment

Onsite Equipment	Month													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Concrete Pump	0	0	1	1	1	1	0	0	0	0	0	0	0	0
Water Truck	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Excavator	2	2	3	3	3	3	3	2	2	1	0	0	0	0
Grader	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Cranes	2	2	2	2	2	4	4	3	3	1	1	1	1	1
Tractor/Loader/Backhoe	1	2	4	4	4	4	5	4	3	3	2	2	1	0
Bull Dozer	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Welding Machine	2	3	3	2	2	2	2	3	3	2	2	2	2	2
Plate Compactor	0	0	0	0	2	2	1	1	0	0	0	0	0	0
Light Plant	0	0	0	0	0	0	0	0	0	1	1	1	1	1
Aerial Lift	0	0	0	1	1	2	2	4	4	4	2	2	1	1
Air Compressor	1	1	1	1	1	2	2	2	1	1	1	1	1	1
Forklift	1	1	1	1	2	2	2	3	2	2	1	1	1	1
Vibratory Roller	1	1	2	2	2	2	0	0	0	0	0	0	0	0

Table 5.1A.24: Number of Onsite Power Plant Construction Motor Vehicles

Vehicle Type	Month													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Onsite Pick up Truck	2	2	2	2	2	4	4	4	4	2	2	2	2	2
Onsite Fuel/Lube Truck	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Onsite Dump Truck	5	5	5	1	1	1	1	1	1	0	0	0	0	0

Table 5.1A.25: Power Plant Construction Equipment Emission Factors

Equipment	Fuel Type	Percent Usage	Hours per Month[a]	Emission Factors, EF (lb/hr)[b]				
				CO	VOC	NO_X	SO_X	PM_{10}
Concrete Pump	diesel	15%	33	0.59	0.15	1.99	0.0023	0.06
Water Truck	diesel	50%	110	0.27	0.09	0.80	0.0010	0.03
Excavator	diesel	85%	187	0.24	0.09	0.87	0.0013	0.03
Grader	diesel	80%	176	0.26	0.09	0.90	0.0011	0.03
Cranes	diesel	65%	143	0.24	0.07	0.64	0.0006	0.02
Tractor/Loader/Backhoe	diesel	55%	121	0.30	0.06	0.45	0.0007	0.03
Bull Dozer	diesel	80%	176	0.36	0.10	1.01	0.0012	0.04
Welding Machine	diesel	70%	154	0.04	0.01	0.06	0.0001	0.004
Plate Compactor	gasoline	60%	132	0.09	0.002	0.002	0.00001	0.002
Light Plant	gasoline	30%	66	0.01	0.0002	0.0001	0.0000003	0.0000055
Aerial Lift	gasoline	70%	154	0.13	0.00	0.01	0.00004	0.0003
Air Compressor	gasoline	80%	176	0.43	0.02	0.02	0.00004	0.0002
Forklift	gasoline	75%	165	0.14	0.00	0.00	0.000006	0.00004
Vibratory Roller	gasoline	70%	154	1.71	0.10	0.26	0.0002	0.002

[a] Hours per month assumes 10 work hours per day and 22 days per month.

[b] Table 5.1A.26 below summarizes the horsepower, load factors, and emission factors (g/ bhp hr) used to derive the lb/hr emission factors.

Table 5.1A.26: Derivation of Construction Equipment Emission Factors

Equipment	Horsepower[a]	Load Factor[b]	Emission Factors, EF (g/bhp hr)[b]					
			CO	VOC	NO_X	SO_X	PM_{10}	$PM_{2.5}$[c]
Diesel Fueled								
Concrete Pump	350	0.74	1.041	0.27	3.489	0.004	0.106	0.0943
Water Truck	300	0.48	0.84	0.282	2.529	0.003	0.094	0.0837
Excavator	250	0.57	0.769	0.28	2.785	0.004	0.095	0.0846
Grader	200	0.61	0.949	0.336	3.344	0.004	0.122	0.1086
Cranes	300	0.43	0.833	0.234	2.240	0.002	0.085	0.0757
Tractor/Loader/Backhoe	135	0.55	1.812	0.35	2.763	0.004	0.164	0.1460
Bull Dozer	300	0.59	0.929	0.267	2.600	0.003	0.097	0.0863
Welding Machine	25	0.45	1.432	0.537	2.415	0.003	0.163	0.1451
Equipment	**Horsepower[a]**	**Load Factor[b]**	**Emission Factors, EF (lb/ hr)[d]**					
			CO	**VOC**	**NO_X**	**SO_X**	**PM_{10}**	**$PM_{2.5}$[c]**
Gasoline Fueled								
Plate Compactor	7.5	0.43	0.095	0.002	0.002	0.00001	0.002	0.001
Light Plant	25	0.48	0.007	0.0002	0.0001	0.0000003	0.00001	0.000005
Aerial Lift	75	0.46	0.129	0.004	0.015	0.00004	0.0003	0.0003
Air Compressor	50	0.48	0.428	0.016	0.021	0.00004	0.0002	0.0002
Forklift	40	0.30	0.137	0.002	0.003	0.00001	0.00004	0.00003
Vibratory Roller	125	0.56	1.714	0.102	0.259	0.00022	0.002	0.002

[a] Construction equipment horsepower provided by DGC.

[b] Offroad mobile source load and emission factors from URBEMIS2007 version 9.2 Handbook Appendices G and I. The emission factors for the year 2011 were used for the construction equipment exhaust emission calculations.

[c] $PM_{2.5}$ emission factors were calculated following the SCAQMD Particulate Matter (PM) 2.5 Significance Thresholds and Calculation Methodology, October 2006. For offroad combustion sources, 89% of the PM_{10} would be $PM_{2.5}$.

Table 5.1A.27: Motor Vehicle Emission Factors *

Vehicle Type	Vehicle Class	CO Exhaust lb/mi	VOC Exhaust lb/mi	SO_X Exhaust lb/mi	NO_X Exhaust lb/mi	PM_{10} Exhaust lb/mi	PM_{10} Paved Road lb/mi	$PM_{2.5}$ Exhaust lb/mi	$PM_{2.5}$ Paved Road lb/mi
Onsite Pickup Truck	Light-duty Truck	0.0179	0.0013	0.0000	0.0015	0.0002	NA	0.00015	NA
Onsite Fuel/Lube Truck	Heavy-Duty Gasoline	0.3504	0.0362	0.0001	0.0189	0.0003	NA	0.00024	NA
Onsite Dump Truck	Heavy-Duty Diesel	0.0476	0.0242	0.0001	0.0814	0.0056	NA	0.00024	NA
Offsite Delivery Trucks	Heavy-Duty Diesel	0.0066	0.0013	0.0000	0.0291	0.0011	0.0102	0.00089	0.00161
Construction Worker Commu	Light-duty Auto	0.0042	0.0001	0.0000	0.0004	0.0001	0.0102	0.00003	0.00161

* All emission factors were derived from the emission factors [g/mi] from EMFAC2007 for calendar year 2011 for Alameda County. For this model, a speed of 5 mph was assumed for onsite vehicles. A speed of 45 mph was assumed for offsite vehicles and worker commutes.

Derivation of Paved Road Emission Factor

Paved Roads emission factor from AP-42, Section 13.2.1: P*aved Roads* (11/06)

$$E = [k(sL/2)^{0.65} * (W/3)^{1.5}] - C$$

where:	PM10	PM2.5	
k =	7.3	1.1	particle size multiplier, g/VMT [Table 13.2-1.1]
sL =	0.03	0.03	road surface silt loading (g/m^2) [Table 13.2.1-3, for Ubiquitous Baseline Roadway with ADT >10,000]
W =	14	14	tons [Average vehicle weight, assumes truck weight = 17 tons and construction worker vehicle weight = 2.5 tons
C =	0.2119	0.1617	emission factor for 1980's vehicle fleet exhaust, brake wear, and tire wear, g/VMT [Table 13.2.1-2 for PM_{10}]
$E_{(PM10/2.5)}$=	4.640	0.731	g/VMT

Table 5.1A.28: Offsite Motor Vehicle Usage during Construction

Vehicle Type	Number per Month													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Offsite Delivery Trucks[a]	70	136	234	250	309	356	354	264	210	184	119	67	50	34
Construction Worker Commute[b]	39	69	109	105	130	166	177	136	108	83	56	34	26	17

[a] Included Standard Deliveries and Heavy Haul Deliveries as Offsite Delivery Trucks.

[b] Assumed 1 commute per 1 worker.

Table 5.1A.29: Offsite Motor Vehicle CO Emissions

Vehicle Type	Emissions (lbs/month)													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Offsite Delivery Trucks	46.31	89.84	154.76	165.60	204.52	235.86	234.53	174.95	138.98	121.72	78.58	44.30	33.12	22.77
Construction Worker Commute	9.78	17.52	27.41	26.40	32.81	41.96	44.61	34.39	27.13	20.82	14.20	8.64	6.63	4.29
Total (lbs/month)	**56.1**	**107.4**	**182.2**	**192.0**	**237.3**	**277.8**	**279.1**	**209.3**	**166.1**	**142.5**	**92.8**	**52.9**	**39.7**	**27.1**
Total (ton/yr)	**1.00**													

Table 5.1A.30: Offsite Motor Vehicle VOC Emissions

Vehicle Type	Emissions (lbs/month)													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Offsite Delivery Trucks	9.27	17.97	30.96	33.13	40.92	47.19	46.92	35.00	27.81	24.35	15.72	8.86	6.63	4.56
Construction Worker Commute	0.28	0.50	0.78	0.75	0.93	1.19	1.26	0.97	0.77	0.59	0.40	0.24	0.19	0.12
Total (lbs/month)	**9.54**	**18.47**	**31.74**	**33.88**	**41.85**	**48.38**	**48.18**	**35.98**	**28.57**	**24.94**	**16.12**	**9.11**	**6.81**	**4.68**
Total (ton/yr)	**0.169**													

Table 5.1A.31: Offsite Motor Vehicle SOx Emissions

Vehicle Type	Emissions (lbs/month)													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Offsite Delivery Trucks	0.25	0.48	0.82	0.88	1.09	1.26	1.25	0.93	0.74	0.65	0.42	0.24	0.18	0.12
Construction Worker Commute	0.0154	0.0275	0.0431	0.0415	0.0516	0.0660	0.0701	0.0541	0.0427	0.0327	0.0223	0.0136	0.0104	0.0067
Total (lbs/month)	**0.26**	**0.51**	**0.87**	**0.92**	**1.14**	**1.32**	**1.32**	**0.99**	**0.78**	**0.68**	**0.44**	**0.25**	**0.19**	**0.13**
Total (ton/yr)	**0.0047**													

Table 5.1A.32: Offsite Motor Vehicle NOx Emissions

Vehicle Type	Emissions (lbs/month)													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Offsite Delivery Trucks	203.57	394.92	680.28	727.95	899.02	1036.80	1030.96	769.05	610.95	535.05	345.41	194.73	145.59	100.09
Construction Worker Commute	1.04	1.85	2.90	2.79	3.47	4.44	4.72	3.64	2.87	2.20	1.50	0.92	0.70	0.45
Total (lbs/month)	**204.61**	**396.78**	**683.18**	**730.75**	**902.50**	**1041.24**	**1035.68**	**772.69**	**613.82**	**537.25**	**346.92**	**195.64**	**146.29**	**100.55**
Total (ton/yr)	**3.73**													

Table 5.1A.33: Offsite Motor Vehicle PM_{10} Emissions (includes exhaust and paved road emissions)

Vehicle Type	Emissions (lbs/month)													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Offsite Delivery Trucks	78.90	153.07	263.67	282.15	348.46	401.86	399.60	298.08	236.80	207.38	133.88	75.48	56.43	38.80
Construction Worker Commute	23.93	42.85	67.06	64.59	80.27	102.66	109.14	84.13	66.38	50.94	34.73	21.15	16.21	10.50
Total (lbs/month)	**102.83**	**195.92**	**330.73**	**346.74**	**428.73**	**504.52**	**508.74**	**382.21**	**303.18**	**258.32**	**168.61**	**96.62**	**72.64**	**49.29**
Total (ton/yr)	**1.814**													

Table 5.1A.34: Offsite Motor Vehicle PM2.5 Emissions (includes exhaust and paved road emissions)

Vehicle Type	Emissions (lbs/month)													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Offsite Delivery Trucks	9.68	17.34	27.13	26.13	32.48	41.53	44.15	34.04	26.85	20.61	14.05	8.56	6.56	4.25
Construction Worker Commute	3.82	6.84	10.70	10.31	12.81	16.39	17.42	13.43	10.60	8.13	5.54	3.38	2.59	1.68
Total (lbs/month)	**13.50**	**24.18**	**37.83**	**36.44**	**45.29**	**57.92**	**61.57**	**47.47**	**37.45**	**28.74**	**19.60**	**11.93**	**9.14**	**5.92**
Total (ton/yr)	**0.211**													

Vehicle Type	Roundtrip Miles per Day
Offsite Delivery Trucks	100
Construction Worker Commute	60

Table 5.1A.35: Construction Diesel-Fueled Equipment CO_2 Emissions

	Monthly Emissions													
Onsite Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Concrete Pump	0	0	5.2	5.2	5.2	5.2	0	0	0	0	0	0	0	0
Water Truck	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	0	0	0	0
Excavator	27.3	27.3	40.9	40.9	40.9	40.9	40.9	27.3	27.3	13.6	0	0	0	0
Grader	14.0	14.0	14.0	0	0	0	0	0	0	0	0	0	0	0
Cranes	23.7	23.7	23.7	23.7	23.7	47.5	47.5	35.6	35.6	11.9	11.9	11.9	11.9	11.9
Tractor/Loader/Backhoe	5.7	11.3	22.7	22.7	22.7	22.7	28.4	22.7	17.0	17.0	11.3	11.3	5.7	0
Bull Dozer	21.6	21.6	21.6	0	0	0	0	0	0	0	0	0	0	0
Welding Machine	2.2	3.3	3.3	2.2	2.2	2.2	2.2	3.3	3.3	2.2	2.2	2.2	2.2	2.2
Total (metric tons/month, E_m)	**102.9**	**109.7**	**139.9**	**103.3**	**103.3**	**127.0**	**127.5**	**97.4**	**91.7**	**53.2**	**25.4**	**25.4**	**19.8**	**14.1**
Annual Average (metric tons/year, E_a)	**1,107**													
Total (metric tons/year, E_t)	**1,141**													

Table 5.1A.36: Construction Diesel-Fueled Equipment CH_4 Emissions

	Monthly Emissions													
Onsite Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Concrete Pump	0	0	0.0003	0.0003	0.0003	0.0003	0	0	0	0	0	0	0	0
Water Truck	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0	0	0	0
Excavator	0.0016	0.0016	0.0023	0.0023	0.0023	0.0023	0.0023	0.0016	0.0016	0.0008	0	0	0	0
Grader	0.0008	0.0008	0.0008	0	0	0	0	0	0	0	0	0	0	0
Cranes	0.0014	0.0014	0.0014	0.0014	0.0014	0.0027	0.0027	0.0020	0.0020	0.0007	0.0007	0.0007	0.0007	0.0007
Tractor/Loader/Backhoe	0.0003	0.0006	0.0013	0.0013	0.0013	0.0013	0.0016	0.0013	0.0010	0.0010	0.0006	0.0006	0.0003	0
Bull Dozer	0.0012	0.0012	0.0012	0	0	0	0	0	0	0	0	0	0	0
Welding Machine	0.0001	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001
Total (metric tons/month, E_m)	**0.006**	**0.0063**	**0.0080**	**0.0059**	**0.0059**	**0.0073**	**0.0073**	**0.0056**	**0.0052**	**0.0030**	**0.0015**	**0.0015**	**0.0011**	**0.0008**
Annual Average (metric tons/year, E_a)	**0.06**													
Total (metric tons/year, E_t)	**0.07**													

Table 5.1A.37: Construction Diesel-Fueled Equipment N_2O Emissions

Onsite Equipment	Monthly Emissions													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Concrete Pump	0	0	0.0001	0.0001	0.0001	0.0001	0	0	0	0	0	0	0	0
Water Truck	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0	0	0	0
Excavator	0.0007	0.0007	0.0010	0.0010	0.0010	0.0010	0.0010	0.0007	0.0007	0.0003	0	0	0	0
Grader	0.0004	0.0004	0.0004	0	0	0	0	0	0	0	0	0	0	0
Cranes	0.0006	0.0006	0.0006	0.0006	0.0006	0.0012	0.0012	0.0009	0.0009	0.0003	0.0003	0.0003	0.0003	0.0003
Tractor/Loader/Backhoe	0.0001	0.0003	0.0006	0.0006	0.0006	0.0006	0.0007	0.0006	0.0004	0.0004	0.0003	0.0003	0.0001	0.0000
Bull Dozer	0.0006	0.0006	0.0006	0	0	0	0	0	0	0	0	0	0	0
Welding Machine	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Total (metric tons/month, E_m)	**0.0026**	**0.0028**	**0.0036**	**0.0026**	**0.0026**	**0.0033**	**0.0033**	**0.0025**	**0.0023**	**0.0014**	**0.0007**	**0.0007**	**0.0005**	**0.0004**
Annual Average (metric tons/year, E_a)	**0.028**													
Total (metric tons/year, E_t)	**0.029**													

Table 5.1A.38: Construction Equipment Diesel Fuel Consumption

Onsite Equipment	Fuel Consumption													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Concrete Pump	0	0	516	516	516	516	0	0	0	0	0	0	0	0
Water Truck	831	831	831	831	831	831	831	831	831	831	0	0	0	0
Excavator	1,582	1,582	2,373	2,373	2,373	2,373	2,373	1,582	1,582	791	0	0	0	0
Grader	859	859	859	0	0	0	0	0	0	0	0	0	0	0
Cranes	1,800	1,800	1,800	1,800	1,800	3,599	3,599	2,699	2,699	900	900	900	900	900
Tractor/Loader/Backhoe	508	1,016	2,033	2,033	2,033	2,033	2,541	2,033	1,525	1,525	1,016	1,016	508	0
Bull Dozer	1,331	1,331	1,331	0	0	0	0	0	0	0	0	0	0	0
Welding Machine	156	234	234	156	156	156	156	234	234	156	156	156	156	156
Total (gallons/month)	**7,066**	**7,653**	**9,976**	**7,708**	**7,708**	**9,507**	**9,500**	**7,379**	**6,871**	**4,202**	**2,072**	**2,072**	**1,564**	**1,056**
Total (gallons/project)	**84,333**													

Table 5.1A.39: Construction Gasoline-Fueled Equipment CO_2 Emissions

	Monthly Emissions													
Onsite Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Plate Compactor	0	0	0	0	1.0	1.0	0.5	0.5	0	0	0	0	0	0
Light Plant	0	0	0	0	0	0	0	0	0	0.8	0.8	0.8	0.8	0.8
Aerial Lift	0	0	0	3.9	3.9	7.8	7.8	15.6	15.6	15.6	7.8	7.8	3.9	3.9
Air Compressor	3.4	3.4	3.4	3.4	3.4	6.8	6.8	6.8	3.4	3.4	3.4	3.4	3.4	3.4
Forklift	2.3	2.3	2.3	2.3	4.7	4.7	4.7	7.0	4.7	4.7	2.3	2.3	2.3	2.3
Vibratory Roller	6.3	6.3	12.6	12.6	12.6	12.6	0	0	0	0	0	0	0	0
Total (metric tons/month, E_m)	**12.04**	**12.04**	**18.35**	**22.26**	**25.60**	**32.90**	**19.79**	**29.94**	**23.71**	**24.51**	**14.35**	**14.35**	**10.45**	**10.45**
Annual Average (metric tons/year, E_a)	**250**													
Total (metric tons/year, E_t)	**271**													

Table 5.1A.40: Construction Gasoline-Fueled Equipment CH_4 Emissions

	Monthly Emissions													
Onsite Equipment	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Plate Compactor	0	0	0	0	0.0001	0.0001	0.0000	0.0000	0	0	0	0	0	0
Light Plant	0	0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000
Aerial Lift	0	0	0	0.0002	0.0002	0.0004	0.0004	0.0009	0.0009	0.0009	0.0004	0.0004	0.0002	0.0002
Air Compressor	0.0002	0.0002	0.0002	0.0002	0.0002	0.0004	0.0004	0.0004	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Forklift	0.0001	0.0001	0.0001	0.0001	0.0003	0.0003	0.0003	0.0004	0.0003	0.0003	0.0001	0.0001	0.0001	0.0001
Vibratory Roller	0.0004	0.0004	0.0007	0.0007	0.0007	0.0007	0	0	0	0	0	0	0	0
Total (metric tons/month, E_m)	**0.001**	**0.0007**	**0.0010**	**0.0013**	**0.0015**	**0.0019**	**0.0011**	**0.0017**	**0.0013**	**0.0014**	**0.0008**	**0.0008**	**0.0006**	**0.0006**
Annual Average (metric tons/year, E_a)	**0.01**													
Total (metric tons/year, E_t)	**0.02**													

Table 5.1A.41: Construction Gasoline-Fueled Equipment N_2O Emissions

Onsite Equipment	Monthly Emissions													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Plate Compactor	0	0	0	0	0.00002	0.00002	0.00001	0.00001	0	0	0	0	0	0
Light Plant	0	0	0	0	0	0	0	0	0	0.00002	0.00002	0.00002	0.00002	0.00002
Aerial Lift	0	0	0	0.00010	0.00010	0.00020	0.00020	0.00039	0.00039	0.00039	0.00020	0.00020	0.00010	0.00010
Air Compressor	0.00008	0.00008	0.00008	0.00008	0.00008	0.00017	0.00017	0.00017	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008
Forklift	0.00006	0.00006	0.00006	0.00006	0.00012	0.00012	0.00012	0.00018	0.00012	0.00012	0.00006	0.00006	0.00006	0.00006
Vibratory Roller	0.00016	0.00016	0.00032	0.00032	0.00032	0.00032	0	0	0	0	0	0	0	0
Total (metric tons/month, E_m)	**0.0003**	**0.0003**	**0.0005**	**0.0006**	**0.0006**	**0.0008**	**0.0005**	**0.0007**	**0.0006**	**0.0006**	**0.0004**	**0.0004**	**0.0003**	**0.0003**
Annual Average (metric tons/year, E_a)	**0.006**													
Total (metric tons/year, E_t)	**0.007**													

Table 5.1A.42: Construction Equipment Gasoline Fuel Consumption

Onsite Equipment	Fuel Consumption													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Plate Compactor	0	0	0	0	114	114	57	57	0	0	0	0	0	0
Light Plant	0	0	0	0	0	0	0	0	0	182	182	182	182	182
Aerial Lift	0	0	0	380	380	760	760	1,521	1,521	1,521	760	760	380	380
Air Compressor	289	289	289	289	289	578	578	578	289	289	289	289	289	289
Forklift	213	213	213	213	425	425	425	638	425	425	213	213	213	213
Vibratory Roller	614	614	1,228	1,228	1,228	1,228	0	0	0	0	0	0	0	0
Total (gallons/month)	**1,115**	**1,115**	**1,729**	**2,109**	**2,435**	**3,105**	**1,820**	**2,793**	**2,235**	**2,417**	**1,444**	**1,444**	**1,064**	**1,064**
Total (gallons/project)	**25,890**													

Table 5.1A.43: Onsite Power Plant Construction Motor Vehicle CO_2 Emissions

Vehicle Type	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Onsite Pickup Truck	0.04	0.04	0.04	0.04	0.04	0.08	0.08	0.08	0.08	0.04	0.04	0.04	0.04	0.04
Onsite Fuel/Lube Truck	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Onsite Dump Truck	0.80	0.80	0.80	0.16	0.16	0.16	0.16	0.16	0.16	0	0	0	0	0
Total (metric tons/month)	**0.86**	**0.86**	**0.86**	**0.23**	**0.23**	**0.26**	**0.26**	**0.26**	**0.26**	**0.07**	**0.07**	**0.07**	**0.07**	**0.07**
Annual Average (metric tons/year, E_a)	**4.30**													
Total (metric tons/year, E_t)	**4.43**													

Table 5.1A.44: Onsite Power Plant Construction Motor Vehicle CH_4 Emissions

Vehicle Type	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Onsite Pickup Truck	0.0000007	0.0000007	0.0000007	0.0000007	0.0000007	0.0000014	0.0000014	0.0000014	0.0000014	0.0000007	0.0000007	0.0000007	0.0000007	0.0000007
Onsite Fuel/Lube Truck	0.0000003	0.0000003	0.0000003	0.0000003	0.0000003	0.0000003	0.0000003	0.0000003	0.0000003	0.0000003	0.0000003	0.0000003	0.0000003	0.0000003
Onsite Dump Truck	0.0000028	0.0000028	0.0000028	0.0000006	0.0000006	0.0000006	0.0000006	0.0000006	0.0000006	0	0	0	0	0
Total (metric tons/month)	**0.0000038**	**0.0000038**	**0.0000038**	**0.0000016**	**0.0000016**	**0.0000023**	**0.0000023**	**0.0000023**	**0.0000023**	**0.0000010**	**0.0000010**	**0.0000010**	**0.0000010**	**0.0000010**
Annual Average (metric tons/year, E_a)	**0.000027**													
Total (metric tons/year, E_t)	**0.000029**													

Table 5.1A.45: Onsite Power Plant Construction Motor Vehicle N_2O Emissions

Vehicle Type	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Onsite Pickup Truck	0.0000004	0.0000004	0.0000004	0.0000004	0.0000004	0.0000009	0.0000009	0.0000009	0.0000009	0.0000004	0.0000004	0.0000004	0.0000004	0.0000004
Onsite Fuel/Lube Truck	0.0000002	0.0000002	0.0000002	0.0000002	0.0000002	0.0000002	0.0000002	0.0000002	0.0000002	0.0000002	0.0000002	0.0000002	0.0000002	0.0000002
Onsite Dump Truck	0.0000005	0.0000005	0.0000005	0.0000001	0.0000001	0.0000001	0.0000001	0.0000001	0.0000001	0	0	0	0	0
Total (metric tons/month)	**0.0000012**	**0.0000012**	**0.0000012**	**0.0000008**	**0.0000008**	**0.0000012**	**0.0000012**	**0.0000012**	**0.0000012**	**0.0000007**	**0.0000007**	**0.0000007**	**0.0000007**	**0.0000007**
Annual Average (metric tons/year, E_a)	**0.000012**													
Total (metric tons/year, E_t)	**0.000013**													

Table 5.1A.46: Onsite Power Plant Construction Motor Vehicle Diesel Fuel Consumption

	Fuel Consumption													
Vehicle Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Onsite Dump Truck	16	16	16	3	3	3	3	3	3	0	0	0	0	0
Total (gallons/month)	**16**	**16**	**16**	**3**	**3**	**3**	**3**	**3**	**3**	**0**	**0**	**0**	**0**	**0**
Total (gallons/project)	**66**													

Table 5.1A.47: Onsite Power Plant Construction Motor Vehicle Gasoline Consumption

	Fuel Consumption													
Vehicle Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Onsite Pickup Truck	4	4	4	4	4	9	9	9	9	4	4	4	4	4
Onsite Fuel/Lube Truck	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Total (gallons/month)	**8**	**8**	**8**	**8**	**8**	**12**	**12**	**12**	**12**	**8**	**8**	**8**	**8**	**8**
Total (gallons/project)	**123**													

Table 5.1A.48: Offsite Motor Vehicle Usage During Construction

Vehicle Type	Number per Month													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Offsite Delivery Trucks[a, b]	70	136	234	250	309	356	354	264	210	184	119	67	50	34
Construction Worker Commute[c]	39	69	109	105	130	166	177	136	108	83	56	34	26	17

[a] Includes deliveries for both power plant construction and offsite linears.
[b] Assumed each offsite delivery truck makes 1 delivery.
[c] Assumed 1 commute per 1 worker and includes both labor for both power plant construction and offsite linear construction.

Table 5.1A.49: Offsite Motor Vehicle CO_2 Emissions

Vehicle Type	Monthly Emissions													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Offsite Delivery Trucks	10.14	19.67	33.88	36.26	44.78	51.64	51.35	38.31	30.43	26.65	17.20	9.70	7.25	4.99
Construction Worker Commute	1.14	2.04	3.19	3.07	3.82	4.88	5.19	4.00	3.16	2.42	1.65	1.01	0.77	0.50
Total (metric tons/month)	**11.28**	**21.71**	**37.07**	**39.33**	**48.60**	**56.52**	**56.54**	**42.31**	**33.59**	**29.07**	**18.86**	**10.70**	**8.02**	**5.48**
Annual Average (metric tons/year, E_a)	**406**													
Total (metric tons/year, E_t)	**419**													

Table 5.1A.50: Offsite Motor Vehicle CH_4 Emissions

Vehicle Type	Monthly Emissions													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Offsite Delivery Trucks	0.00004	0.00007	0.00012	0.00013	0.00016	0.00018	0.00018	0.00013	0.00011	0.00009	0.00006	0.00003	0.00003	0.00002
Construction Worker Commute	0.00003	0.00006	0.00010	0.00009	0.00011	0.00015	0.00016	0.00012	0.00009	0.00007	0.00005	0.00003	0.00002	0.00001
Total (metric tons/month)	**0.00007**	**0.00013**	**0.00021**	**0.00022**	**0.00027**	**0.00033**	**0.00034**	**0.00025**	**0.00020**	**0.00017**	**0.00011**	**0.00006**	**0.00005**	**0.00003**
Annual Average (metric tons/year, E_a)	**0.0024**													
Total (metric tons/year, E_t)	**0.0025**													

Table 5.1A.51: Offsite Motor Vehicle N_2O Emissions

Vehicle Type	Monthly Emissions													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Offsite Delivery Trucks	0.00003	0.00007	0.00011	0.00012	0.00015	0.00017	0.00017	0.00013	0.00010	0.00009	0.00006	0.00003	0.00002	0.00002
Construction Worker Commute	0.00002	0.00003	0.00005	0.00005	0.00006	0.00008	0.00008	0.00006	0.00005	0.00004	0.00003	0.00002	0.00001	0.00001
Total (metric tons/month)	**0.00005**	**0.00010**	**0.00016**	**0.00017**	**0.00021**	**0.00025**	**0.00025**	**0.00019**	**0.00015**	**0.00013**	**0.00008**	**0.00005**	**0.00004**	**0.00002**
Annual Average (metric tons/year, E_a)	**0.0018**													
Total (metric tons/year, E_t)	**0.0019**													

Table 5.1A.52: Offsite Motor Vehicle Fuel Consumption

Vehicle Type	Fuel Consumption													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Offsite Delivery Trucks	999	1,938	3,338	3,572	4,412	5,088	5,059	3,774	2,998	2,626	1,695	956	714	491
Construction Worker Commute	129	231	362	349	433	554	589	454	358	275	188	114	88	57
Total (gallons/month)	**1,128**	**2,169**	**3,700**	**3,921**	**4,845**	**5,642**	**5,648**	**4,228**	**3,356**	**2,901**	**1,883**	**1,070**	**802**	**548**
Total Diesel (gallons/project)	**37,660**													
Total Gasoline (gallons/project)	**4,181**													
Total (gallons/project)	**41,841**													

Table 5.1A.53: Offsite Motor Vehicle Miles Traveled

Vehicle Type	Roundtrip Miles per Delivery
Offsite Delivery Trucks	100
Construction Worker Commute	60

Table 5.1A.54: Equations Used to Calculate Emissions

Emission Source	Pollutant(s)	Equation	Variables
Construction Equipment	CO2, CH4, N2O	$E_m = N * FC * EF * H * 22 * 0.001$	E_m = Emissions (Mton/month)
			N = Number of pieces of equipment
			FC = Fuel Consumption (gal/hr)
			EF = Emission factor (kg/gal)
			H = Daily hours of operation, assumed to be 10 hr/day
			22 = 22 construction days per month
			0.001 = Conversion from kg to Mton
		$E_t = \Sigma E_m$	E_t = Total Emissions (Mton/yr)
			E_m = Emissions (Mton/month)
		$E_a = \Sigma E_m$ for Worst-Case Months	E_a = Annual Average Emissions (Mton/yr)
			E_m = Emissions (Mton/month)
Onsite and Offsite Motor Vehicle	CO2	$E_m = N * VMT * 22 * EF * 0.001 / FE$	E_m = Emissions (Mton/month)
			N = Number of vehicles or Number of deliveries
			VMT = Vehicle miles traveled per day (miles/day)
			FE = Fuel Economy (miles/hr)
			22 = 22 construction days per month
			0.001 = Conversion from kg to Mton
			EF = Emission Factor (kg/gal)
		$E_t = \Sigma E_m$	E_t = Total Emissions (Mton/yr)
			E_m = Emissions (Mton/month)
		$E_a = \Sigma E_m$ for Worst-Case Months	E_a = Annual Average Emissions (Mton/yr)
			E_m = Emissions (Mton/month)
Onsite and Offsite Motor Vehicle	CH4, N2O	$E_m = N * VMT * 22 * EF * 0.000001$	E_m = Emissions (Mton/month)
			N = Number of vehicles or Number of deliveries
			VMT = Vehicle miles traveled per day (miles/day)
			22 = 22 construction days per month
			0.000001 = Conversion from g to Mton
			EF = Emission Factor (g/mile)
		$E_t = \Sigma E_m$	E_t = Total Emissions (Mton/yr)
			E_m = Emissions (Mton/month)
		$E_a = \Sigma E_m$ for Worst-Case Months	E_a = Annual Average Emissions (Mton/yr)
			E_m = Emissions (Mton/month)

Reference: California Climate Action Registry General Reporting Protocol, Version 3.1, January 2009.

Table 5.1A.55: Number of Construction Equipment

Equipment	Month													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Concrete Pump	0	0	1	1	1	1	0	0	0	0	0	0	0	0
Water Truck	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Excavator	2	2	3	3	3	3	3	2	2	1	0	0	0	0
Grader	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Cranes	2	2	2	2	2	4	4	3	3	1	1	1	1	1
Tractor/Loader/Backhoe	1	2	4	4	4	4	5	4	3	3	2	2	1	0
Bull Dozer	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Welding Machine	2	3	3	2	2	2	2	3	3	2	2	2	2	2
Plate Compactor	0	0	0	0	2	2	1	1	0	0	0	0	0	0
Light Plant	0	0	0	0	0	0	0	0	0	1	1	1	1	1
Aerial Lift	0	0	0	1	1	2	2	4	4	4	2	2	1	1
Air Compressor	1	1	1	1	1	2	2	2	1	1	1	1	1	1
Forklift	1	1	1	1	2	2	2	3	2	2	1	1	1	1
Vibratory Roller	1	1	2	2	2	2	0	0	0	0	0	0	0	0

Table 5.1A.56: Number of Onsite Power Plant Construction Motor Vehicles

Vehicle Type	Month													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Onsite Pickup Truck	2	2	2	2	2	4	4	4	4	2	2	2	2	2
Onsite Fuel/Lube Truck	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Onsite Dump Truck	5	5	5	1	1	1	1	1	1	0	0	0	0	0

Table 5.1A.57: Construction Equipment Fuel Consumption

Equipment Type	Fuel Type	Percent Usage	Hours per Month[a]	Fuel Consumption, EF (gal/hr)[b]		
				CO_2	CH_4	N_2O
Concrete Pump	diesel	15%	33	15.63	15.63	15.63
Water Truck	diesel	50%	110	7.55	7.55	7.55
Excavator	diesel	85%	187	7.19	7.19	7.19
Grader	diesel	80%	176	7.81	7.81	7.81
Cranes	diesel	65%	143	8.18	8.18	8.18
Tractor/Loader/Backhoe	diesel	55%	121	4.62	4.62	4.62
Bull Dozer	diesel	80%	176	12.10	12.10	12.10
Welding Machine	diesel	70%	154	0.71	0.71	0.71
Plate Compactor	gasoline	60%	132	0.43	0.43	0.43
Light Plant	gasoline	30%	66	1.38	1.38	1.38
Aerial Lift	gasoline	70%	154	2.88	2.88	2.88
Air Compressor	gasoline	80%	176	2.19	2.19	2.19
Forklift	gasoline	75%	165	1.61	1.61	1.61
Vibratory Roller	gasoline	70%	154	4.65	4.65	4.65

[a] Hours per month assumes 10 work hours per day and 22 days per month.

[b] Fuel Consumption based on consumption in the OFFROAD2007 model for the BAAQMD in the year 2011.

Table 5.1A.58: Motor Vehicle Fuel Economy

Vehicle Type	Fuel Type	Fuel economy (miles per gallon) *
Onsite Pickup Truck	Gasoline	10
Onsite Fuel/Lube Truck	Gasoline	7
Onsite Dump Truck	Diesel	7
Offsite Delivery Trucks	Diesel	7
Construction Worker Commute	Gasoline	18

* Fuel economy for trucks based on assumptions from the California Climate Action Registry, General Reporting Protocol, January 2009. Onsite pickup truck and construction worker commute vehicle fuel economy based on assuming workers would drive model year 2000 or newer passenger cars and fuel economy data from EPA (www.fueleconomy.gov).

Table 5.1A.59: Greenhouse Gas Emission Factors

	Emission Factor	Emission Factor Units	Emission Factor Source
Mobile Combustion			
Gasoline	8.81	kg CO2/gallon	California Climate Action Registry General Reporting Protocol, Version 3.1, Table C.3, January 2009.
Diesel	10.15	kg CO2/gallon	California Climate Action Registry General Reporting Protocol, Version 3.1, Table C.3, January 2009.
Mobile Combustion			
Gasoline Passenger Car Model Year 2005-Present	0.0079	g N2O/mile	California Climate Action Registry General Reporting Protocol, Version 3.1, Table C.4, January 2009.
Gasoline Truck Model Year 2005-Present	0.0101	g N2O/mile	California Climate Action Registry General Reporting Protocol, Version 3.1, Table C.4, January 2009.
Diesel Heavy Duty Trucks Model Year 1996-Present	0.0048	g N2O/mile	California Climate Action Registry General Reporting Protocol, Version 3.1, Table C.4, January 2009.
Diesel Off-road Vehicles	0.00026	kg N2O/ gallon	California Climate Action Registry General Reporting Protocol, Version 3.1, Table C.6, January 2009.
Gasoline Off-road Vehicles	0.00022	kg N2O/ gallon	California Climate Action Registry General Reporting Protocol, Version 3.1, Table C.6, January 2009.
Mobile Combustion			
Gasoline Passenger Car Model Year 2005-Present	0.0147	g CH4/mile	California Climate Action Registry General Reporting Protocol, Version 3.1, Table C.4, January 2009.
GasolineTruck Model Year 2005-Present	0.0157	g CH4/mile	California Climate Action Registry General Reporting Protocol, Version 3.1, Table C.4, January 2009.
Diesel Heavy Duty Trucks Model Year 1996-Present	0.0051	g CH4/mile	California Climate Action Registry General Reporting Protocol, Version 3.1, Table C.4, January 2009.
Diesel Off-road Vehicles	0.00058	kg CH4/ gallon	California Climate Action Registry General Reporting Protocol, Version 3.1, Table C.6, January 2009.