Appendix 8.1E

Construction Emissions and Impact Analysis

8.1E.1 Construction Phases and Estimated Emissions Sources

Construction of Eastshore, inclusive of startup and testing, is planned to last 18 months. The construction will occur in the following four main phases:

- Site preparation, including demolition of the existing structure;
- Foundation work;
- Construction/installation of major structures and equipment; and,
- Startup and testing of the equipment.

The project site is approximately 6.22 acres in size. Approximately 0.02 acres is estimated for linear facilities (e.g., transmission, gas, and water lines) associated with the project. The project site was previously used for metal stamping operations and currently includes a large (102,000 square foot) industrial building and paved parking, roadway access, and landscaping. A construction laydown area of up to 4.65 acres will be located across Clawiter Street and just to the south of the Eastshore site.

The site is essentially flat and as such, after demolition of the existing building, will require only minimum site preparation prior to construction of the power blocks, support systems, and site buildings. Site preparation includes finish grading, excavation of existing footings and foundations, and backfilling operations. After site preparation is finished, the construction of the foundations and structures will occur. Once the foundations and structures are finished, installation and assembly of the mechanical and electrical equipment are scheduled to commence.

Fugitive dust emissions from the construction of Eastshore will result from:

- Demolition to remove existing structures and pavement not utilized for the Eastshore project;
- Dust entrained during site preparation and finish grading/excavation at the construction site;
- Dust entrained during onsite travel on paved and unpaved surfaces;
- Dust entrained during aggregate and soil loading and unloading operations; and
- Wind erosion of areas disturbed during construction activities.

Combustion emissions during construction will result from:

- Exhaust from the diesel construction equipment used onsite for site preparation, grading, excavation, and construction of onsite structures;
- Exhaust from water trucks used onsite to control construction dust emissions;

- Exhaust from diesel-powered equipment used onsite such as welding machines, electric generators, air compressors, and water pumps;
- Exhaust from pickup trucks and diesel trucks used onsite to transport workers and materials around the construction site;
- Offsite exhaust from diesel trucks used to deliver concrete, fuel, and construction supplies to the construction site;
- Offsite exhaust from automobiles used by workers to commute to the construction site.

8.1E.2 Available Mitigation Measures

The following mitigation measures are proposed to control exhaust emissions from the diesel heavy equipment used during construction of Eastshore:

- Operational measures, such as limiting time spent with the engine idling by shutting down equipment when not in use;
- Regular preventive maintenance to prevent emission increases due to engine problems;
- Use of low sulfur and low aromatic fuel meeting California standards for motor vehicle diesel fuel; and
- Use of low-emitting gas and diesel engines meeting state and federal emissions standards (Tier I and II) for construction equipment, including, but not limited to catalytic converter systems and particulate filter systems.

The following mitigation measures are proposed to control fugitive dust emissions during construction of the project:

- Use of water application to control dust emissions from on-site unpaved road travel and unpaved parking areas;
- Use of periodic vacuum sweeping and/or water flushing of paved road surface to remove buildup of loose material to control dust emissions from travel on the paved access road (including adjacent public streets impacted by construction activities) and paved parking areas;
- Either covering all trucks hauling soil, sand, and other loose materials, and/or requiring them to maintain at least two feet of freeboard;
- Limiting traffic speeds on all unpaved site areas to 5 mph;
- Installing sandbags or other erosion control measures to prevent silt runoff to roadways;
- Replanting vegetation in disturbed areas as quickly as possible;
- Use of wheel washers or washing off tires of all trucks exiting construction site; and
- Mitigation of fugitive dust emissions from wind erosion of areas disturbed from construction activities (including storage piles) by application of either water or chemical dust suppressant.

8.1E.3 Estimation of Emissions with Mitigation Measures

Table 8.1E-1 shows the estimated maximum daily and annual emissions from heavy equipment exhaust and fugitive dust after inclusion of recommended mitigation measures. (Table 8.1E-2 presents the resulting modeled impacts.) Detailed emission calculations are included in Tables 8.1E-3 through 8.1E-5.

Table 8.1E-1
Summary of Construction Emissions

	PM10	PM2.5	NO_x	CO	VOC	SO_x
Maximum Daily Emissions of Fugitive Dust, lbs	3.8	0.8	NA	NA	NA	NA
Maximum Daily Onsite Exhaust Emissions, lbs	16.0	14.7	230.4	112.6	28.6	40.6
Maximum Daily Offsite Exhaust Emissions, lbs	0.44	0.41	13.9	48.1	5.4	0.043
Maximum Daily Paved Offsite Road Emissions, lbs	5.0	0.04	NA	NA	NA	NA
Total Daily Emissions, lbs	**25.2**	**15.9**	**244.3**	**160.7**	**34.0**	**40.6**
Annual Emissions of Fugitive Dust, tons	0.46	0.096	NA	NA	NA	NA
Annual Onsite Exhaust Emissions, tons	1.16	1.06	16.1	8.31	2.14	2.78
Annual Offsite Exhaust Emissions, tons	0.053	0.049	1.67	5.77	0.65	0.006
Annual Offsite Paved Road Emissions, tons	0.60	0.082	NA	NA	NA	NA
Total Annual Emissions, tons	**2.26**	**1.29**	**17.7**	**14.1**	**2.78**	**2.79**

Emissions were calculated using project-specific assumptions regarding the number and types of construction equipment present on site each month and number of construction workers and associated vehicle trips monthly for the duration of the project. Uncontrolled emission factors were based on standard EPA, CARB, and AQMD reference documents, and are referenced in the specific tables. Control factors for dust suppression were taken from similar references.

To determine the potential worst-case daily construction impacts, exhaust and dust emission rates have been evaluated for each source of emissions. Worst-case daily fugitive dust emissions are expected to occur during the first month of construction when site preparation occurs. The worst-case daily exhaust emissions are expected to occur during the middle of the construction schedule during the installation of the major mechanical equipment. Annual emissions are based on the average equipment mix during the 18 month construction period.

Several key assumptions have been made in this analysis. They include:

- 95% of the project area and approximately 50% of the laydown area are assumed to be disturbed over the entire construction duration for purposes of fugitive dust emission estimates.
- Demolition fugitive emissions are included in the factor for fugitive dust for site preparation and grading.
- Emissions control factors have been included only for site watering and for trackout area sweeping and cleaning. Specific control factors have not been included for other mitigation activities, making the controlled emission assumptions conservative.

8.1E.4 Analysis of Ambient Impacts from Facility Construction

Ambient air quality impacts from emissions during the construction of Eastshore were estimated using an air quality dispersion modeling analysis. The modeling analysis considers the construction site location, the surrounding topography, and the sources of emissions during construction, including vehicle and equipment exhaust emissions and fugitive dust.

8.1E.4.1 Existing Ambient Levels

As with the modeling analysis of project operating impacts (Section 8.1), monitoring stations delineated in Section 8.1.3 were used to establish the ambient background levels for the construction impact modeling analysis. Table 8.1-15 showed the maximum concentrations of NO_x, SO_2, CO and PM10/2.5 recorded for 2003 through 2005 at those monitoring stations.

8.1E.4.2 Dispersion Model

As in the analysis of project operating impacts, the USEPA-approved Industrial Source Complex Short Term (ISCST3) model was used to estimate ambient impacts from construction activities. A detailed discussion of the ISCST3 dispersion model is included in Section 8.1.8.

The emission sources for the construction site were grouped into three categories: main project site exhaust emissions, onsite fugitive dust emissions, and laydown area fugitive emissions. Emissions from offsite truck delivery and worker trip emissions were not included in modeling, since they do not occur onsite and are relatively small with respect to onsite emissions.

The following assumptions regarding equipment locations and specifics were made:

- Equipment exhaust emissions from construction equipment were assumed to occur at the main project site
- Exhaust emissions were modeled as one (1) point source uniformly distributed on the main project site, to more accurately estimate equipment emissions.
- An effective emission release height of 10 ft was used for all exhaust emissions, nominally representing a typical exhaust height for large diesel-fired equipments.
- For construction fugitive dust emissions, an effective plume height of 0.5 meters was used in the modeling analysis.

- Fugitive dust emissions were conservatively modeled as two area sources, one covering the total area of the main construction site and the second covering the laydown area.

We note that the ISCST3 model over-predicts construction emission impacts due to the cold plume (i.e., ambient temperature) effect of dust emissions. Most of the plume dispersion characteristics in the ISCST3 model are derived from observations of hot plumes associated with typical smoke stacks. The ISCST3 model does compensate for plume temperature; however, for ambient temperature plumes, the model assumes negligible buoyancy and dispersion. Consequently, the ambient concentrations in cold plumes remain high even at significant distances from a source, and the results are therefore conservative.

To determine the construction impacts with respect to short-term ambient standards (24 hours and less), the worst-case daily onsite construction emission levels shown in Tables 8.1E-1 were used. For pollutants with annual average ambient standards, the annual onsite emission levels shown in Table 8.1E-1 were used. As with the project operating impact analysis, the meteorological data set used for the construction emission impacts analysis is data collected from the BAAQMD Union City met station for 1990-1994.

The construction impacts modeling analysis used the same receptor locations within about 500 meters of the project site as were used for the project operating impact analysis. A detailed discussion of the selected receptor locations is included in Section 8.1.8. Additionally, the input and output modeling files are being provided electronically.

8.1E.4.3 Modeling Results

Based on the emission rates of NO_x, SO_2, CO, and PM10 and the meteorological data, the ISCST3 model calculates hourly and annual ambient impacts for each pollutant. As mentioned above, the modeled 1-hour, 3-hour, 8-hour, and 24-hour ambient impacts are based on the worst-case daily emission rates of NO_x, SO_2, CO, and PM10. The annual impacts are based on the annual emission rates of these pollutants.

The one-hour and annual average concentrations of NO_2 were computed following the revised USEPA guidance for computing these concentrations (August 9, 1995 Federal Register, 60 FR 40465). The one-hour average was adjusted using the Ozone Limiting Method. The annual average was calculated using the ambient ratio method (ARM) with the national default value of 0.75 for the annual average NO_2/NO_x ratio.

The modeling analysis results are shown in Table 8.1E-2. Also included in the table are the maximum background levels that have occurred in the last three years and the resulting total ambient impacts. As shown in Table 8.1E-2, construction impacts for all modeled pollutants are expected to be below the most stringent state and national standards. The state 24-hour PM10 standard is already exceeded in the absence of the construction emissions for Eastshore, and therefore, the total impact is above the state 24-hr standard.

TABLE 8.1E-2
Modeled Maximum Construction Impacts

Pollutant	Averaging Time	Maximum Construction Impacts ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
NO_2[a]	1-hour	267.6	142.9	410.5	470	-
	Annual	16.6	32.1	48.6	-	100
SO_2	1-hour	64.0	102.2	166.2	655	-
	3-hour	52.6	49.4	102.0	-	1300
	24-hour	19.4	23.6	43.0	105	365

	Annual	3.8	8.0	11.8	-	80
CO	1-hour 8-hour	177 123	3,680 2,178	3,857 2,300	23,000 10,000	40,000 10,000
PM10	24-hour Annual[b]	22.5 5.3	51.7 18.1	74.2 23.4	50 30	150 50

Notes:
[a] Ozone limiting method applied for 1-hour average, using maximum background O_3 and NO_2 level during the period from 2003-2005. ARM applied for annual average, using national default 0.75 ratio.
[b] Annual Arithmetic Mean.
[c] Based on maximum daily emissions.
[d] Based on maximum daily emissions.

Eastshore construction site impacts are not unusual in comparison to most construction sites; construction sites that use good dust suppression techniques and low-emitting vehicles, typically do not cause violation of air quality standards.

8.1E.5 Health Risk of Diesel Exhaust

The CEC licensing process requires the applicant to consider health impacts related to project air emission sources. Diesel combustion emissions from engines have been associated with long-term cancer and chronic health impacts. Although the project construction period will be relatively short compared with the long-term exposure periods that would be associated with chronic health impacts, a screening health risk assessment for construction equipment diesel combustion emissions was completed. The combustion portion of annual PM10 emissions at the main project site from Table 8.1E-1 was modeled separately to determine the long-term average diesel PM10 exhaust concentration for cancer risk calculations. The worst-case worker receptor was found to be immediately adjacent to the site at a nearby office building. The worst-case residential exposure was assumed to be that at the very edge of the receptor grid, as all receptors within the grid are in fact in areas zoned commercial. Impacts decrease with distance from the site. Therefore, the nearest residential receptor would be expected to have impacts even less than those used for this exposure analysis.

These impacts were used with the ARB-approved cancer slope factor of 1.1 mg/kg-day for a 70-year lifetime to estimate the potential cancer risk during construction at the maximum exposed offsite worker and residential locations. The 80th percentile breathing rate for the resident (302 L/kg-day) was used for the resident. For the offsite worker, a breathing rate of 149 L/kg-day was used. Exposure at both the maximum offsite worker and resident locations was adjusted by a factor of 1.5 years / 70 years, or 0.0214, representing the actual duration of construction. Cancer risk calculations followed procedures outlined in the current ARB Risk Assessment Guidelines. A cancer risk value greater than 10 in one million is considered significant

The maximum chronic hazard index (HI) value was calculated from the long-term average diesel PM10 at any offsite location, using the reference exposure level for diesel PM10 of 5 ug/m^3. The chronic HI is the ratio of the maximum offsite long-term diesel PM10 concentration divided by the reference exposure level. An HI greater than 1.0 is considered significant.

The maximum offsite worker and resident cancer risk values from equipment diesel PM10 exhaust are 6.7 in one million and 0.60 in one million, respectively. These values are below the significance level of 10 in one million. The maximum chronic HI value due to

equipment diesel PM10 exhaust is 0.30. This value is below the significance value of 1.0. These values are also summarized in Table 8.1E-3.

TABLE 8.1E-3
Summary of Health Risks from Desel Combustion

Cancer Risk	Chronic Hazard Index
Offsite worker – 6.7 in one million	Maximum offsite – 0.30
Resident – 0.60 in one million	Significance Threshold – 1.0
Significance Threshold – 10 in one million	

Attachment 8.1E-1
Detailed Emission and Impact Calculations

- Table 8.1E-4: Construction Emission Calculations and Criteria Pollutant Impacts
- Table 8.1E-5: SCAQMD EMFAC Data (Years 2005-2025)
- Table 8.1E-6: Construction Equipment Emissions Factors (CEC)
- Table 8.1E-7: Diesel Exhaust Health Risk Calculations

Table 8.1 E-4. Construction Emission Calculations

Construction Emission Totals

Construction Activity	lbs/day NOx	CO	VOC	SOx	PM10	PM2.5	tons per const period NOx	CO	VOC	SOx	PM10	PM2.5	tons per year NOx	CO	VOC	SOx	PM10	PM2.5
Main Site																		
Equipment Exhaust	230.4	112.6	28.6	40.6	16.0	14.7	24.1	12.5	3.21	4.17	1.73	1.59	16.1	8.31	2.14	2.78	1.16	1.06
Construction Dust					3.80	0.80					0.68	0.14					0.46	0.096
Site Delivery Exhaust	9.13	4.07	0.63	0.013	0.17	0.16	1.64	0.73	0.11	0.002	0.031	0.028	1.10	0.49	0.075	0.002	0.021	0.019
Worker Travel-Exhaust	4.74	44.0	4.74	0.030	0.27	0.25	0.85	7.92	0.85	0.005	0.049	0.045	0.57	5.28	0.57	0.004	0.032	0.030
Paved Roads					5.00	0.038					0.90	0.12					0.60	0.082
TOTALS	**244.3**	**160.7**	**34.0**	**40.6**	**25.2**	**15.9**	**26.6**	**21.1**	**4.18**	**4.18**	**3.40**	**1.94**	**17.7**	**14.1**	**2.78**	**2.79**	**2.26**	**1.29**
DPM is diesel particulate matter.				**DPM =**	16.14					**DPM =**	1.76					**DPM =**	1.18	

Table 8.1 E-4. Construction Emission Calculations (continued)

CONSTRUCTION PHASE-Main Project Site Equipment Emissions
Equipment Exhaust
Project: Eastshore Power Plant Project Projected Construction Year(s): 2007

Equip. Type	Avg # on Site	Avg. HP	Fuel Type	Avg.Load Factor %	Load Adj HP	Avg.Daily Hours	Max Daily Hours	Avg Days on Site	Hourly HP/Hrs	Daily HP/Hrs	Const Period HP/HRs
		(a)	(b)	(c)		(d)	(e)	(f)			
Dozers/front loaders	1	120	D	59.0	71	10	10.00	60	71	708	42480
Dozers/front loaders	1	175	D	46.5	81	10	10.00	60	81	813	48804
Landscape loader	1	175	D	46.5	81	10	10.00	60	81	814	48825
Loaders Other	1.2	175	D	46.5	81	10	12.00	200	98	977	195300
Scrapers	1	250	D	66.0	165	10	10.00	20	165	1650	33000
Graders	1.3	175	D	57.5	101	10	13.00	80	131	1308	104650
Cranes	2.4	175	D	43.0	75	10	24.00	320	180	1804	577382
Forklifts	3.7	120	D	30.0	36	10	37.00	360	133	1332	479520
Backhoe Loaders	3	50	D	46.5	23	10	30.00	180	70	697	125496
Dump Trucks	1.9	250	D	38.0	95	8	15.20	280	181	1444	404320
Water Trucks	1.2	175	D	38.0	67	10	12.00	180	80	798	143640
Service Trucks	1.6	175	D	38.0	67	10	16.00	360	106	1064	383040
Fuel/Lube/etc Trucks	1.4	175	D	38.0	67	8	11.20	160	93	745	119168
Boom Trucks	2.1	175	D	43.0	75	10	21.00	360	158	1579	568361
Air Compressors	2.2	50	D	48.0	24	8	17.60	300	53	422	126720
Generator, Constr Power	1.4	25	D	74.0	19	8	11.20	360	26	207	74592
Trenchers	2	120	D	69.5	83	8	16.00	120	167	1335	160174
Compaction Equipment	2.4	120	D	57.5	69	8	19.20	180	166	1325	238547
Asphalt Paver & Equipment	1	120	D	59.0	71	8	8.00	40	71	566	22656
Aerial Lifts	4.3	50	D	30.0	15	10	43.00	340	65	645	219300
Platform Lifts	1.5	50	D	30.0	15	10	15.00	240	23	225	54000
Rollers/Compactors	1.4	120	D	57.5	69	8	11.20	100	97	773	77280
Excavators	2	175	D	58.0	102	9	18.00	60	203	1827	109620
Pumps, Construction	1	50	D	74.0	37	8	8.00	360	37	296	106560
Misc Equip	6.6	25	D	46.5	12	4	26.40	60	77	307	18414
Boom Wrecking	1	120	D	78.0	94	8	8.00	20	94	749	14976
Misc Trucks	8.4	175	D	38.0	67	10	84.00	360	559	5586	2010960
Concrete Mixer Trucks	2.6	250	D	38.0	95	8	20.80	100	247	1976	197600

(a) Ref: South Coast AQMD-CEQA Handbook, Table A9-8-C, and updated CEC data.
(b) D=diesel, G=gasoline
(c) Ref: NTIS PB92-126960, EPA 460/3-91-02, EPA 21A-2001, and SCAQMD CEQA Manual, Table A9-8-D.
(d) Per Table A-1
(e) Max daily hours assuming operation at adjusted load.
(f) Total estimated days on site from construction schedule. Table A-1.

Table 8.1 E-4. Construction Emission Calculations (continued)

EMISSIONS FACTORS (h) Equipment Exhaust Data

Equip. Type	HP	lbs/hp-hr CO	g/hp-hr	lbs/hp-hr VOC	g/hp-hr	lbs/hp-hr NOx	g/hp-hr	lbs/hp-hr SOx	g/hp-hr	lbs/hp-hr PM10	g/hp-hr	CEC Eq. Category (g)
Dozers/front loaders	120	0.0041	1.9	0.0012	0.5	0.0083	3.8	0.0012	0.5	0.0008	0.4	5
Dozers/front loaders	175	0.0042	1.9	0.001	0.5	0.0094	4.3	0.0014	0.6	0.0006	0.3	5
Landscape loader	175	0.0033	1.5	0.0006	0.3	0.0065	2.9	0.0013	0.6	0.0004	0.2	21
Loaders Other	175	0.0033	1.5	0.0006	0.3	0.0065	2.9	0.0013	0.6	0.0004	0.2	21
Scrapers	250	0.0021	0.0	0.0007	0.3	0.0097	4.4	0.0017	0.8	0.0003	0.1	22
Graders	175	0.0038	1.7	0.0008	0.4	0.0079	3.6	0.0015	0.7	0.0005	0.2	11
Cranes	175	0.0026	1.2	0.0005	0.2	0.0052	2.4	0.001	0.5	0.0003	0.1	4
Forklifts	120	0.0021	1.0	0.0006	0.3	0.0039	1.8	0	0.0	0.0005	0.2	9
Backhoe Loaders	50	0.0094	4.3	0.0036	1.6	0.0071	3.2	0.0014	0.6	0.001	0.5	26
Dump Trucks	250	0.0015	0.7	0.0005	0.2	0.0075	3.4	0.0014	0.6	0.0003	0.1	13
Water Trucks	175	0.0042	1.9	0.0009	0.4	0.0086	3.9	0.0015	0.7	0.0006	0.3	13
Service Trucks	175	0.0042	1.9	0.0009	0.4	0.0086	3.9	0.0015	0.7	0.0006	0.3	13
Fuel/Lube/etc Trucks	175	0.0042	1.9	0.0009	0.4	0.0086	3.9	0.0015	0.7	0.0006	0.3	13
Boom Trucks	175	0.0034	1.5	0.0008	0.4	0.0078	3.5	0.0013	0.6	0.0004	0.2	14
Air Compressors	50	0.0067	3.0	0.0027	1.2	0.0061	2.8	0.0013	0.6	0.0007	0.3	14
Generator, Constr Power	25	0.002	0.9	0.0013	0.6	0.0036	1.6	0	0.0	0.0005	0.2	10
Trenchers	120	0.0034	1.5	0.0007	0.3	0.0059	2.7	0.0012	0.5	0.0005	0.2	27
Compaction Equipment	120	0.0031	1.4	0.0007	0.3	0.0056	2.5	0.0011	0.5	0.0005	0.2	18
Asphalt Paver & Equipment	120	0.0032	1.5	0.0009	0.4	0.0064	2.9	0.001	0.5	0.0006	0.3	16
Aerial Lifts	50	0.0067	3.0	0.0027	1.2	0.0061	2.8	0.0013	0.6	0.0007	0.3	14
Platform Lifts	50	0.0067	3.0	0.0027	1.2	0.0061	2.8	0.0013	0.6	0.0007	0.3	14
Rollers/Compactors	120	0.0031	1.4	0.0007	0.3	0.0056	2.5	0.0011	0.5	0.0005	0.2	18
Excavators	175	0.0034	1.5	0.0006	0.3	0.0064	2.9	0.0013	0.6	0.0004	0.2	8
Pumps, Construction	50	0.0067	3.0	0.0027	1.2	0.0061	2.8	0.0013	0.6	0.0007	0.3	14
Misc Equip	25	0.0023	1.0	0	0.0	0.0052	2.4	0	0.0	0.0004	0.2	14
Boom Wrecking	120	0.0029	1.3	0.0007	0.3	0.0053	2.4	0.0009	0.4	0.0006	0.3	4
Misc Trucks	175	0.0042	1.9	0.0009	0.4	0.0086	3.9	0.0015	0.7	0.0006	0.3	13
Concrete Mixer Trucks	250	0.0015	0.7	0.0005	0.2	0.0075	3.4	0.0014	0.6	0.0003	0.1	13

(g) see Emissions Factors for Construction Equipment (CEC) at the end of this appendix for equipment category data.
(h) Ref: Construction equipment emissions factors by equipment type and hp rating provided by CEC, August 2005.

Table 8.1 E-4. Construction Emission Calculations (continued)

Construction Equipment Emissions

Equip. Type	CO lbs/hr	CO lbs/day	CO tons*	VOC lbs/hr	VOC lbs/day	VOC tons*	NOx lbs/hr	NOx lbs/day	NOx tons*	SOx lbs/hr	SOx lbs/day	SOx tons*	PM10 lbs/hr	PM10 lbs/day	PM10 tons*
Dozers/front loaders	0.29	2.90	0.09	0.08	0.85	0.03	0.59	5.88	0.18	0.08	0.85	0.03	0.06	0.57	0.02
Dozers/front loaders	0.34	3.42	0.10	0.08	0.81	0.02	0.76	7.65	0.23	0.11	1.14	0.03	0.05	0.49	0.01
Landscape loader	0.27	2.69	0.08	0.05	0.49	0.01	0.53	5.29	0.16	0.11	1.06	0.03	0.03	0.33	0.01
Loaders Other	0.32	3.22	0.32	0.06	0.59	0.06	0.63	6.35	0.63	0.13	1.27	0.13	0.04	0.39	0.04
Scrapers	0.35	3.47	0.03	0.12	1.16	0.01	1.60	16.01	0.16	0.28	2.81	0.03	0.05	0.50	0.00
Graders	0.50	4.97	0.20	0.10	1.05	0.04	1.03	10.33	0.41	0.20	1.96	0.08	0.07	0.65	0.03
Cranes	0.47	4.69	0.75	0.09	0.90	0.14	0.94	9.38	1.50	0.18	1.80	0.29	0.05	0.54	0.09
Forklifts	0.28	2.80	0.50	0.08	0.80	0.14	0.52	5.19	0.94	0.00	0.00	0.00	0.07	0.67	0.12
Backhoe Loaders	0.66	6.55	0.59	0.25	2.51	0.23	0.50	4.95	0.45	0.10	0.98	0.09	0.07	0.70	0.06
Dump Trucks	0.27	2.17	0.30	0.09	0.72	0.10	1.35	10.83	1.52	0.25	2.02	0.28	0.05	0.43	0.06
Water Trucks	0.34	3.35	0.30	0.07	0.72	0.06	0.69	6.86	0.62	0.12	1.20	0.11	0.05	0.48	0.04
Service Trucks	0.45	4.47	0.80	0.10	0.96	0.17	0.92	9.15	1.65	0.16	1.60	0.29	0.06	0.64	0.11
Fuel/Lube/etc Trucks	0.39	3.13	0.25	0.08	0.67	0.05	0.80	6.41	0.51	0.14	1.12	0.09	0.06	0.45	0.04
Boom Trucks	0.54	5.37	0.97	0.13	1.26	0.23	1.23	12.31	2.22	0.21	2.05	0.37	0.06	0.63	0.11
Air Compressors	0.35	2.83	0.42	0.14	1.14	0.17	0.32	2.58	0.39	0.07	0.55	0.08	0.04	0.30	0.04
Generator, Constr Power	0.05	0.41	0.07	0.03	0.27	0.05	0.09	0.75	0.13	0.00	0.00	0.00	0.01	0.10	0.02
Trenchers	0.57	4.54	0.27	0.12	0.93	0.06	0.98	7.88	0.47	0.20	1.60	0.10	0.08	0.67	0.04
Compaction Equipment	0.51	4.11	0.37	0.12	0.93	0.08	0.93	7.42	0.67	0.18	1.46	0.13	0.08	0.66	0.06
Asphalt Paver & Equipment	0.23	1.81	0.04	0.06	0.51	0.01	0.45	3.62	0.07	0.07	0.57	0.01	0.04	0.34	0.01
Aerial Lifts	0.43	4.32	0.73	0.17	1.74	0.30	0.39	3.93	0.67	0.08	0.84	0.14	0.05	0.45	0.08
Platform Lifts	0.15	1.51	0.18	0.06	0.61	0.07	0.14	1.37	0.16	0.03	0.29	0.04	0.02	0.16	0.02
Rollers/Compactors	0.30	2.40	0.12	0.07	0.54	0.03	0.54	4.33	0.22	0.11	0.85	0.04	0.05	0.39	0.02
Excavators	0.69	6.21	0.19	0.12	1.10	0.03	1.30	11.69	0.35	0.26	2.38	0.07	0.08	0.73	0.02
Pumps, Construction	0.25	1.98	0.36	0.10	0.80	0.14	0.23	1.81	0.33	0.05	0.38	0.07	0.03	0.21	0.04
Misc Equip	0.18	0.71	0.02	0.00	0.00	0.00	0.40	1.60	0.05	0.00	0.00	0.00	0.03	0.12	0.00
Boom Wrecking	0.27	2.17	0.02	0.07	0.52	0.01	0.50	3.97	0.04	0.08	0.67	0.01	0.06	0.45	0.00
Misc Trucks	2.35	23.46	4.22	0.50	5.03	0.90	4.80	48.04	8.65	0.84	8.38	1.51	0.34	3.35	0.60
Concrete Mixer Trucks	0.37	2.96	0.15	0.12	0.99	0.05	1.85	14.82	0.74	0.35	2.77	0.14	0.07	0.59	0.03
Totals	**12.1**	**112.6**	**12.5**	**3.07**	**28.6**	**3.21**	**25.0**	**230.4**	**24.1**	**4.38**	**40.6**	**4.17**	**1.74**	**16.0**	**1.73**
													PM2.5 =	**14.7**	**1.59**

*tons = tons emitted during construction phase

CARB-CEIDARS, Summmary of Overall Size Fractions for PM Profiles, 9-26-02: PM2.5 = 92% of PM10 : Diesel Vehicle Exhaust

Table 8.1 E-4. Construction Emission Calculations (continued)

CONSTRUCTION PHASE-Main Project Site Fugitive Dust Emissions **MRI Level 2 Analysis**

Total Site Acreage:	6.22	Avg Acres Subject to Construction Activity/Month:	5.909		
			95%		
Emission Factor:	0.0131	tons/acre/month of activity PM10 Uncontrolled (MRI Level 2 Adjusted Analysis Factor)			
	0.077	tons per const month (uncontrolled) PM10			
	1.393	tons per const period (uncontrolled) PM10			
	0.488	**ton per const period Controlled PM10 =**	0.03	tons/month	
	0.102	ton per const period Controlled PM2.5 =	0.01	tons/month	
Activity Levels			2.71	lbs/day PM10 controlled	
Hrs/Day:	10		0.57	lbs/day PM2.5 controlled	
Days/Wk:	5				
Day/Month:	20				
Worst Case Month:	3				
Annual Const Hours:	2400				
Total Construction Hrs:	3600				

PM10 Control Techniques *		
Type	Used	Avg. % PM10 Reduction
Watering	Yes	65
Surface Sealant	No	0
Dust Suppressant	No	0
Speed Control	Yes	0
	% Control:	65

Release Factor: 0.35

* Control techniques are additive.
Per SCAQMD CEQA Manual, 11/93.

Total Const Period: 18 months Control Technique: Watering
Control Factor, % 65

Months 1 - 3 will be worst case construction emissions months. After month 3, construction related dust emissions will be well below the max daily and max monthly values calculated above, probably on the order of less than 30% of the maximum values

Ref: MRI Report, South Coast AQMD Project No. 95040, March 1996, Level 2 Analysis Procedure.
MRI Report factor of 0.011 tons/acre/month is based on 168 hours per month of const activity. For a monthly activity rate of approx 200 hours, the adjusted factor would be 0.0131 tons/acre/month.
SCAQMD CEQA Manual: watering twice daily yields 50% reduction, watering three times daily yields 65% reduction, Table 11-4, 11/93.
Typical watering schedule for Eastshore activities is 3 times per day.
*** Although not all of the site area will disturbed on any one work day, due to the size of this site, the worst case assumption was made that at least 95% of the construction area would be disturbed over the entire construction period. Acreage does not include access roads.
CARB-CEIDARS, Summmary of Overall Size Fractions for PM Profiles, 9-26-02: PM2.5 = 21% of PM10 : Construction Dust

Table 8.1 E-4. Construction Emission Calculations (continued)

CONSTRUCTION PHASE-Laydown Area Fugitive Dust Emissions **MRI Level 2 Analysis**

Total Site Acreage:	4.65	Avg Acres Subject to Construction Activity/Month:		2.376	
				51%	
Emission Factor:	0.0131	tons/acre/month of activity PM10 Uncontrolled (MRI Level 2 Adjusted Analysis Factor)			
	0.031	tons per const month (uncontrolled) PM10			
	0.560	tons per const period (uncontrolled) PM10			
	0.196	**ton per const period Controlled PM10 =**	0.01	tons/month	
	0.041	ton per const period Controlled PM2.5 =	0.00	tons/month	
Activity Levels			1.09	lbs/day PM10 controlled	
Hrs/Day:	10		0.23	lbs/day PM2.5 controlled	
Days/Wk:	5				
Day/Month:	20				
Worst Case Month:	3				
Annual Const Hours:	2400				
Total Construction Hrs:	3600				

PM10 Control Techniques *		
Type	Used	Avg. % PM10 Reduction
Watering	Yes	65
Surface Sealant	No	0
Dust Suppressant	No	0
Speed Control	Yes	0

% Control: 65

Release Factor: 0.35

* Control techniques are additive.
Per SCAQMD CEQA Manual, 11/93.

Total Const Period: 18 months Control Technique: Watering
Control Factor, % 65

Months 1 - 3 will be worst case construction emissions months. After month 3, construction related dust emissions will be well below the max daily and max monthly values calculated above, probably on the order of less than 30% of the maximum values

Ref: MRI Report, South Coast AQMD Project No. 95040, March 1996, Level 2 Analysis Procedure.
MRI Report factor of 0.011 tons/acre/month is based on 168 hours per month of const activity. For a monthly activity rate of approx 200 hours, the adjusted factor would be 0.0131 tons/acre/month.
SCAQMD CEQA Manual: watering twice daily yields 50% reduction, watering three times daily yields 65% reduction, Table 11-4, 11/93.
Typical watering schedule for Eastshore activities is 3 times per day.
*** Although not all of the site area will disturbed on any one work day, due to the size of this site, the worst case assumption was made that at least 50% of the construction area would be disturbed over the entire construction period. Acreage does not include access roads.
CARB-CEIDARS, Summmary of Overall Size Fractions for PM Profiles, 9-26-02: PM2.5 = 21% of PM10 : Construction Dust

Table 8.1 E-4. Construction Emission Calculations (continued)

CONSTRUCTION PHASE - Truck Delivery and Site Support Vehicle Emissions

Avg # deliveries/day:	10	*		Emissions Factors (lbs/vmt)				
Avg Haul Distance (miles)	20	see note below	NOx	CO	VOC	SOx	PM10	
VMT/Day:	200		0.032442	0.005117	0.001133	0.000046	0.000598	Ref: SCAQMD Emfac 2002 Ver 2.2, 4-03
Work days/yr:	240			Daily Emissions (lbs)				On-Road Heavy Duty Diesels (1965-2008)
Total Const Work Days:	360		**NOx**	**CO**	**VOC**	**SOx**	**PM10**	**PM2.5**
			6.488	**1.023**	**0.227**	**0.009**	**0.120**	**0.110**
				Tons per Const Period				
			1.168	0.184	0.041	0.002	0.022	0.020

Site Support Vehicle Emissions

Total # of vehicles:	4	**NOx**	**CO**	**VOC**	**SOx**	**PM10**			**PM2.5**
# of Pickups (gas):	2	0.0014	0.013	0.0014	0.000009	0.00008	lbs/vmt*	gasoline	
# of Pickups (diesel):	2	0.025	0.0175	0.00261	0.000033	0.00044	lbs/vmt*	diesel	
Avg. pickup daily vmt:	50	**0.1400**	**1.3000**	**0.1400**	**0.0009**	**0.0080**	**lbs/day**	**gasoline**	**0.00744**
Total Gas VMT:	100	**2.5000**	**1.7500**	**0.2610**	**0.0033**	**0.0440**	**lbs/day**	**diesel**	**0.0405**
Total Diesel VMT:	100								
		0.0252	0.2340	0.0252	0.0002	0.0014	**tons/period**	**gasoline**	0.0013
		0.4500	0.3150	0.0470	0.0006	0.0079	**tons/period**	**diesel**	0.0073

Avg haul distance: one way distance from site to Alameda port and rail area.
* Large item deliveries only. Tractor-trailer type delivery vehicles, sea containers, etc.
These trucks will not be dedicated to the site, so backhaul distances are not included.

CARB EMFAC 2002 Summaries
Ref: SCAQMD Emfac 2002 Ver 2.2, 4-03
On Road Vehicles

CARB-CEIDARS, Summmary of Overall Size Fractions for PM Profiles, 9-26-02: PM2.5 = 92% of PM10 for Diesel Exhaust, and 93% for Gasoline Vehicles.

Table 8.1 E-4. Construction Emission Calculations (continued)

CONSTRUCTION PHASE - Worker Travel - Emissions

Max # of Workers/Day:	235	Month 11							
Avg # of Workers/Day:	125			Emissions Factors (lbs/VMT)					
Avg Occupancy/Vehicle:	1.106		NOx	CO	VOC	SOx	PM10		Ref: SCAQMD Emfac 2002 Ver 2.2, 4-03
Round Trips/Day:	113		0.0014	0.013	0.0014	0.000009	0.00008		On Road Vehicles
Avg Roundtrip Distance:	30	miles							
VMT/Day:	3383			**Avg. Daily Emissions (lbs)**					
VMT/Year:	812000		**NOx**	**CO**	**VOC**	**SOx**	**PM10**	**PM2.5**	
VMT/Const Period:	1218000		**4.737**	**43.983**	**4.737**	**0.030**	**0.271**	**0.252**	
Total Const Days:	360			**Tons per Const Period**					
			0.8526	**7.9170**	**0.8526**	**0.0055**	**0.0487**	**0.0453**	

Table 8.1 E-4. Construction Emission Calculations (continued)

CONSTRUCTION PHASE - Paved Road Travel - Particulate Emissions Including Trackout Emissions

Paved Road Length (miles):	0.05	estimated roundtrip distance			
Daily # of Vehicles:	127				
Avg Vehicle Weight (tons):	10		PM10	PM2.5	
Total Unadjusted VMT/day	6.3		0.224	0.224	
Particle Size Multipliers	PM10	PM2.5	6.086	6.086	
lb/VMT	0.016	0.0024	0.021	0.003	lb/VMT
C factor, lb/VMT	0.00047	0.00036	**0.050**	**0.007**	**tons/month**
Road Sfc Silt Loading (g/m^2):	0.2		**0.900**	**0.123**	**tons/const period**
# of Active Trackout Points:	1		**5.00**	**0.04**	**lbs/day**
Added Trackout Miles:	PM10	PM2.5			
Trackout VMT/day:	761	380			
Final Adjusted VMT/day	767	387			
Final Adjusted VMT/month	15340	7733			
Control Applied to Trackout:	Sweeping and Cleaning (Water washing)				
Control Efficiency, %	70	0.7	Release Factor =	0.3	
Total Const Days:	360				

EPA, AP-42, Section 13.2.1, draft dated 3-22-06. Silt load factor from Table 13.2.1-3, default value for low-mid volume ADT roads.

Table 8.1 E-5. SCAQMD EMFAC Data (Years 2005-2025)

Highest (Most Conservative) EMFAC 2002 (version 2.2, April 23, 2003) Emission Factors for On-Road Heavy Heavy Duty Diesel Trucks

Projects in the SCAQMD (Scenario Years 2005 - 2025)

Derived from Wintertime Emissions Inventory

Heavy Heavy Duty Diesel Trucks (33,001 to 60,000 pounds)

The following emission factors were compiled by running the California Air Resources Board's EMFAC2002 (version 2.2) Burden Model and extracting the Heavy Heavy Duty Diesel Truck (HHDT) Emission Factors. When calculating on-road mobile source emissions from HHDT, use the following equation:

Emissions (pounds per day) = N x TL x EF

where N = number of trips, TL = trip length (miles/day), and EF = emission factor (pounds per mile)

The emission factors account for all emissions from start, running and idling exhaust. In addition, the ROG emission factors take into account diurnal, hot soak, running and resting emissions, and PM10 emission factor takes into account the tire and brake wear.

Scenario Year: 2005 -- Model Years: 1965 to 2005

HHDT-DSL	(pounds/mile)
ROG	0.001403
CO	0.006308
NOx	0.041541
PM10	0.000774
SOx	0.000404

Scenario Year: 2006 -- Model Years: 1965 to 2006

HHDT-DSL	(pounds/mile)
ROG	0.001321
CO	0.005932
NOx	0.03893
PM10	0.00073
SOx	0.000405

Scenario Year: 2007 -- Model Years: 1965 to 2007

HHDT-DSL	(pounds/mile)
ROG	0.001227
CO	0.00552
NOx	0.035635
PM10	0.000644
SOx	4.57E-05

Scenario Year: 2008 -- Model Years: 1965 to 2008

HHDT-DSL	(pounds/mile)
ROG	0.001133
CO	0.005117
NOx	0.032442
PM10	0.000598
SOx	4.6E-05

Scenario Year: 2009 -- Model Years: 1965 to 2009

HHDT-DSL	(pounds/mile)
ROG	0.001042
CO	0.004738
NOx	0.029455
PM10	0.000559
SOx	4.61E-05

Scenario Year: 2010 -- Model Years: 1965 to 2010

HHDT-DSL	(pounds/mile)
ROG	0.000948
CO	0.004335
NOx	0.025802
PM10	0.000507
SOx	4.61E-05

Scenario Year: 2011 -- Model Years: 1966 to 2011

HHDT-DSL	(pounds/mile)
ROG	0.000888
CO	0.004069
NOx	0.022117
PM10	0.000475
SOx	4.61E-05

Scenario Year: 2012 -- Model Years: 1967 to 2012

HHDT-DSL	(pounds/mile)
ROG	0.000813
CO	0.003783
NOx	0.01938
PM10	0.000438
SOx	4.63E-05

Scenario Year: 2013 -- Model Years: 1968 to 2013

HHDT-DSL	(pounds/mile)
ROG	0.000749
CO	0.003551
NOx	0.017054
PM10	0.000408
SOx	4.66E-05

Scenario Year: 2014 -- Model Years: 1969 to 2014

HHDT-DSL	(pounds/mile)
ROG	0.000696
CO	0.003364
NOx	0.0151
PM10	0.000383
SOx	4.71E-05

Table 8.1 E-5. SCAQMD EMFAC Data (Years 2005-2025)

Highest (Most Conservative) EMFAC 2002 (version 2.2, April 23, 2003)
Emission Factors for On-Road Heavy Heavy Duty Diesel Trucks (concluded)

Scenario Year: 2015 -- Model Years: 1970 to 2015
HHDT-DSL (pounds/mile)

ROG	0.000651
CO	0.003217
NOx	0.013437
PM10	0.000362
SOx	4.62E-05

Scenario Year: 2016 -- Model Years: 1971 to 2016
HHDT-DSL (pounds/mile)

ROG	0.000615
CO	0.003102
NOx	0.012038
PM10	0.000344
SOx	4.7E-05

Scenario Year: 2017-- Model Years: 1972 to 2017
HHDT-DSL (pounds/mile)

ROG	0.000585
CO	0.003005
NOx	0.010831
PM10	0.00033
SOx	4.63E-05

Scenario Year: 2018-- Model Years: 1973 to 2018
HHDT-DSL (pounds/mile)

ROG	0.000558
CO	0.002928
NOx	0.009786
PM10	0.000317
SOx	4.71E-05

Scenario Year: 2019 -- Model Years: 1974 to 2019
HHDT-DSL (pounds/mile)

ROG	0.000536
CO	0.002862
NOx	0.00888
PM10	0.000305
SOx	4.65E-05

Scenario Year: 2020 -- Model Years: 1975 to 2020
HHDT-DSL (pounds/mile)

ROG	0.000518
CO	0.002807
NOx	0.008102
PM10	0.000295
SOx	4.73E-05

Scenario Year: 2021 -- Model Years: 1976 to 2021
HHDT-DSL (pounds/mile)

ROG	0.000512
CO	0.002807
NOx	0.007438
PM10	0.00029
SOx	4.72E-05

Scenario Year: 2022 -- Model Years: 1977 to 2022
HHDT-DSL (pounds/mile)

ROG	0.000501
CO	0.002782
NOx	0.006926
PM10	0.000283
SOx	4.7E-05

Scenario Year: 2023 -- Model Years: 1978 to 2023
HHDT-DSL (pounds/mile)

ROG	0.000492
CO	0.002759
NOx	0.006491
PM10	0.000278
SOx	4.68E-05

Scenario Year: 2024 -- Model Years: 1979 to 2024
HHDT-DSL (pounds/mile)

ROG	0.000483
CO	0.002737
NOx	0.006126
PM10	0.000273
SOx	4.65E-05

Scenario Year: 2025 -- Model Years: 1980 to 2025
HHDT-DSL (pounds/mile)

ROG	0.000477
CO	0.002716
NOx	0.005822
PM10	0.000269
SOx	4.62E-05

Table 8.1 E-6. Construction Equipment Emission Factors (CEC)

Emissions Factors for Construction Equipment (CEC)

Eq Type	HP	2005 CO lb/hr	2005 CO lb/hp-hr	2005 NOx lb/hr	2005 NOx lb/hp-hr	2005 PM10 lb/hr	2005 PM10 lb/hp-hr	2005 SOx lb/hr	2005 SOx lb/hp-hr	2005 VOC lb/hr	2005 VOC lb/hp-hr	2006 CO lb/hr	2006 CO lb/hp-hr	2006 NOx lb/hr	2006 NOx lb/hp-hr	2006 PM10 lb/hr	2006 PM10 lb/hp-hr	2006 SOx lb/hr	2006 SOx lb/hp-hr	2006 VOC lb/hr	2006 VOC lb/hp-hr	2007 CO lb/hr	2007 CO lb/hp-hr	2007 NOx lb/hr	2007 NOx lb/hp-hr	2007 PM10 lb/hr	2007 PM10 lb/hp-hr	2007 SOx lb/hr	2007 SOx lb/hp-hr	2007 VOC lb/hr	2007 VOC lb/hp-hr
Bore/Drill Rigs	15	0.0350	0.0023	0.0700	0.0047	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0690	0.0046	0.0690	0.0046	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0690	0.0046	0.0690	0.0046	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	25	0.0670	0.0027	0.1230	0.0049	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0780	0.0031	0.1560	0.0062	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0770	0.0031	0.1550	0.0062	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	50	0.2280	0.0046	0.2800	0.0056	0.0270	0.0005	0.0730	0.0015	0.0580	0.0012	0.2070	0.0041	0.2720	0.0054	0.0250	0.0005	0.0750	0.0015	0.0380	0.0008	0.1900	0.0038	0.2630	0.0053	0.0210	0.0004	0.0750	0.0015	0.0380	0.0008
	120	0.4710	0.0039	0.8220	0.0069	0.0720	0.0006	0.1660	0.0014	0.1010	0.0008	0.4550	0.0038	0.7550	0.0063	0.0560	0.0005	0.1670	0.0014	0.0750	0.0006	0.4440	0.0037	0.6980	0.0058	0.0430	0.0004	0.1670	0.0014	0.0500	0.0004
	175	0.6930	0.0040	1.2950	0.0074	0.0620	0.0004	0.2910	0.0017	0.1090	0.0006	0.6930	0.0040	1.1650	0.0067	0.0510	0.0003	0.2940	0.0017	0.0810	0.0005	0.6880	0.0039	1.0230	0.0058	0.0430	0.0002	0.2940	0.0017	0.0540	0.0003
	250	0.3160	0.0013	1.6320	0.0065	0.0380	0.0002	0.3880	0.0016	0.0630	0.0003	0.3130	0.0013	1.4980	0.0060	0.0380	0.0002	0.3930	0.0016	0.0630	0.0003	0.3110	0.0012	1.3320	0.0053	0.0370	0.0001	0.3930	0.0016	0.0620	0.0002
	500	0.5160	0.0010	2.2940	0.0046	0.0600	0.0001	0.5630	0.0011	0.0850	0.0002	0.5160	0.0010	2.0720	0.0041	0.0590	0.0001	0.5630	0.0011	0.0710	0.0001	0.5170	0.0010	1.7700	0.0035	0.0590	0.0001	0.5630	0.0011	0.0700	0.0001
	750	1.0350	0.0014	4.8060	0.0064	0.1110	0.0001	1.1460	0.0015	0.1230	0.0002	1.0370	0.0014	4.2800	0.0057	0.1100	0.0001	1.1450	0.0015	0.1220	0.0002	1.0250	0.0014	3.6070	0.0048	0.1090	0.0001	1.1450	0.0015	0.1210	0.0002
Cement and Mortar Mixers	15	0.0320	0.0021	0.0580	0.0039	0.0050	0.0003	0.0000	0.0000	0.0120	0.0008	0.0410	0.0027	0.0700	0.0047	0.0060	0.0004	0.0000	0.0000	0.0120	0.0008	0.0400	0.0027	0.0650	0.0043	0.0050	0.0003	0.0000	0.0000	0.0110	0.0007
	25	0.1160	0.0046	0.1800	0.0072	0.0130	0.0005	0.0000	0.0000	0.0000	0.0000	0.1150	0.0046	0.2040	0.0082	0.0130	0.0005	0.0000	0.0000	0.0000	0.0000	0.1140	0.0046	0.2030	0.0081	0.0130	0.0005	0.0000	0.0000	0.0000	0.0000
Concrete/Industrial Saws	25	0.0000	0.0000	0.1430	0.0057	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1420	0.0057	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1410	0.0056	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	50	0.3540	0.0071	0.3370	0.0067	0.0440	0.0009	0.0800	0.0016	0.1770	0.0035	0.3430	0.0069	0.3260	0.0065	0.0440	0.0009	0.0770	0.0015	0.1760	0.0035	0.3580	0.0072	0.3230	0.0065	0.0440	0.0009	0.0770	0.0015	0.0870	0.0017
	120	0.5290	0.0044	1.0990	0.0092	0.1010	0.0008	0.1610	0.0013	0.1510	0.0013	0.5210	0.0043	1.0720	0.0089	0.1000	0.0008	0.1610	0.0013	0.1500	0.0013	0.5170	0.0043	1.0390	0.0087	0.0940	0.0008	0.1610	0.0013	0.1490	0.0012
	175	1.0290	0.0059	2.3530	0.0134	0.0000	0.0000	0.2940	0.0017	0.0000	0.0000	1.0140	0.0058	2.0290	0.0116	0.0000	0.0000	0.2820	0.0016	0.0000	0.0000	1.0070	0.0058	2.0140	0.0115	0.0000	0.0000	0.2820	0.0016	0.0000	0.0000
Cranes	50	0.3130	0.0063	0.2520	0.0050	0.0340	0.0007	0.0550	0.0011	0.1360	0.0027	0.2980	0.0060	0.2470	0.0049	0.0300	0.0006	0.0530	0.0011	0.1010	0.0020	0.2820	0.0056	0.2380	0.0048	0.0300	0.0006	0.0530	0.0011	0.1010	0.0020
	120	0.3620	0.0030	0.6980	0.0058	0.0760	0.0006	0.1090	0.0009	0.1050	0.0009	0.3580	0.0030	0.6610	0.0055	0.0720	0.0006	0.1080	0.0009	0.0970	0.0008	0.3530	0.0029	0.6300	0.0053	0.0670	0.0006	0.1080	0.0009	0.0880	0.0007
	175	0.4560	0.0026	1.0240	0.0059	0.0650	0.0004	0.1670	0.0010	0.1080	0.0006	0.4550	0.0026	0.9680	0.0055	0.0610	0.0003	0.1670	0.0010	0.1000	0.0006	0.4540	0.0026	0.9040	0.0052	0.0570	0.0003	0.1670	0.0010	0.0900	0.0005
	250	0.2600	0.0010	1.3100	0.0052	0.0420	0.0002	0.2330	0.0009	0.0850	0.0003	0.2490	0.0010	1.2520	0.0050	0.0390	0.0002	0.2330	0.0009	0.0780	0.0003	0.2410	0.0010	1.1760	0.0047	0.0370	0.0001	0.2330	0.0009	0.0730	0.0003
	500	0.4050	0.0008	1.8800	0.0038	0.0620	0.0001	0.3260	0.0007	0.1170	0.0002	0.3820	0.0008	1.7520	0.0035	0.0580	0.0001	0.3260	0.0007	0.1070	0.0002	0.3690	0.0007	1.6050	0.0032	0.0550	0.0001	0.3260	0.0007	0.1020	0.0002
	750	0.6640	0.0009	3.2590	0.0043	0.1030	0.0001	0.5600	0.0007	0.1720	0.0002	0.6400	0.0009	3.0450	0.0041	0.1020	0.0001	0.5560	0.0007	0.1710	0.0002	0.6160	0.0008	2.8010	0.0037	0.0930	0.0001	0.5560	0.0007	0.1690	0.0002
Crawler Tractors	50	0.3540	0.0071	0.2840	0.0057	0.0470	0.0009	0.0550	0.0011	0.1580	0.0032	0.3520	0.0070	0.2820	0.0056	0.0470	0.0009	0.0530	0.0011	0.1560	0.0031	0.3500	0.0070	0.2800	0.0056	0.0470	0.0009	0.0530	0.0011	0.1550	0.0031
	120	0.5010	0.0042	1.0430	0.0087	0.1030	0.0009	0.1420	0.0012	0.1530	0.0013	0.4960	0.0041	1.0120	0.0084	0.1010	0.0008	0.1420	0.0012	0.1470	0.0012	0.4940	0.0041	0.9900	0.0083	0.1000	0.0008	0.1420	0.0012	0.1430	0.0012
	175	0.7350	0.0042	1.7520	0.0100	0.1060	0.0006	0.2510	0.0014	0.1840	0.0011	0.7290	0.0042	1.6980	0.0097	0.1040	0.0006	0.2510	0.0014	0.1770	0.0010	0.7270	0.0042	1.6520	0.0094	0.1020	0.0006	0.2510	0.0014	0.1720	0.0010
	250	0.5990	0.0024	2.2560	0.0090	0.0950	0.0004	0.3450	0.0014	0.1790	0.0007	0.5620	0.0022	2.1830	0.0087	0.0900	0.0004	0.3450	0.0014	0.1680	0.0007	0.5360	0.0021	2.1210	0.0085	0.0860	0.0003	0.3450	0.0014	0.1610	0.0006
	500	1.5020	0.0030	3.2180	0.0064	0.1310	0.0003	0.4690	0.0009	0.2430	0.0005	1.3610	0.0027	3.0810	0.0062	0.1240	0.0002	0.4690	0.0009	0.2290	0.0005	1.2460	0.0025	2.9650	0.0059	0.1190	0.0002	0.4690	0.0009	0.2200	0.0004
	750	2.4700	0.0033	5.8190	0.0078	0.2290	0.0003	0.8600	0.0011	0.4330	0.0006	2.2540	0.0030	5.5990	0.0075	0.2210	0.0003	0.8570	0.0011	0.4290	0.0006	2.0720	0.0028	5.4100	0.0072	0.2120	0.0003	0.8570	0.0011	0.3640	0.0005
Crushing/Proc. Equipment	50	0.6360	0.0127	0.5120	0.0102	0.0710	0.0014	0.1040	0.0021	0.2440	0.0049	0.6280	0.0126	0.5040	0.0101	0.0700	0.0014	0.1050	0.0021	0.2420	0.0048	0.6280	0.0126	0.5000	0.0100	0.0700	0.0014	0.1050	0.0021	0.2290	0.0046
	120	0.6340	0.0053	1.3220	0.0110	0.1310	0.0011	0.1800	0.0015	0.1940	0.0016	0.6290	0.0052	1.2830	0.0107	0.1280	0.0011	0.1790	0.0015	0.1880	0.0016	0.6260	0.0052	1.2550	0.0105	0.1270	0.0011	0.1790	0.0015	0.1830	0.0015
	175	1.0180	0.0058	2.4260	0.0139	0.1470	0.0008	0.3460	0.0020	0.2540	0.0015	1.0100	0.0058	2.3520	0.0134	0.1430	0.0008	0.3480	0.0020	0.2420	0.0014	1.0070	0.0058	2.2890	0.0131	0.1410	0.0008	0.3480	0.0020	0.2410	0.0014
	250	0.8880	0.0036	3.3350	0.0133	0.1380	0.0006	0.5130	0.0021	0.2960	0.0012	0.8330	0.0033	3.2340	0.0129	0.1270	0.0005	0.5150	0.0021	0.2940	0.0012	0.7880	0.0032	3.1230	0.0125	0.1260	0.0005	0.5150	0.0021	0.1950	0.0008
	500	2.1900	0.0044	4.6490	0.0093	0.1900	0.0004	0.6750	0.0014	0.3480	0.0007	1.9810	0.0040	4.4530	0.0089	0.1800	0.0004	0.6780	0.0014	0.3280	0.0007	1.8130	0.0036	4.2860	0.0086	0.1720	0.0003	0.6780	0.0014	0.3260	0.0007
	750	3.1480	0.0042	7.2220	0.0096	0.1850	0.0002	0.9260	0.0012	0.0000	0.0000	2.7520	0.0037	7.1560	0.0095	0.1830	0.0002	1.0530	0.0014	0.0000	0.0000	2.7270	0.0036	6.9090	0.0092	0.1820	0.0002	1.0530	0.0014	0.0000	0.0000
Dumpers/Tenders	25	0.0450	0.0018	0.0780	0.0031	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0440	0.0018	0.0770	0.0031	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0440	0.0018	0.0770	0.0031	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Excavators	25	0.0490	0.0020	0.1130	0.0045	0.0070	0.0003	0.0000	0.0000	0.0700	0.0028	0.0630	0.0025	0.1610	0.0064	0.0070	0.0003	0.0000	0.0000	0.0000	0.0000	0.0620	0.0025	0.1460	0.0058	0.0070	0.0003	0.0000	0.0000	0.0000	0.0000
	50	0.2660	0.0053	0.2540	0.0051	0.0310	0.0006	0.0600	0.0012	0.0940	0.0019	0.2540	0.0051	0.2460	0.0049	0.0300	0.0006	0.0590	0.0012	0.0850	0.0017	0.2430	0.0049	0.2410	0.0048	0.0280	0.0006	0.0590	0.0012	0.0760	0.0015
	120	0.4970	0.0041	0.9170	0.0076	0.0960	0.0008	0.1590	0.0013	0.1350	0.0011	0.4910	0.0041	0.8780	0.0073	0.0890	0.0007	0.1590	0.0013	0.1220	0.0010	0.4840	0.0040	0.8390	0.0070	0.0810	0.0007	0.1590	0.0013	0.1080	0.0009
	175	0.5960	0.0034	1.2910	0.0074	0.0760	0.0004	0.2330	0.0013	0.1280	0.0007	0.5970	0.0034	1.2210	0.0070	0.0700	0.0004	0.2330	0.0013	0.1150	0.0007	0.5970	0.0034	1.1250	0.0064	0.0640	0.0004	0.2330	0.0013	0.1020	0.0006
	250	0.3120	0.0012	1.6810	0.0067	0.0470	0.0002	0.3290	0.0013	0.0960	0.0004	0.3020	0.0012	1.6030	0.0064	0.0440	0.0002	0.3290	0.0013	0.0880	0.0004	0.2960	0.0012	1.4910	0.0060	0.0410	0.0002	0.3290	0.0013	0.0810	0.0003
	500	0.4460	0.0009	2.1680	0.0043	0.0630	0.0001	0.4230	0.0008	0.1170	0.0002	0.4320	0.0009	2.0010	0.0040	0.0590	0.0001	0.4230	0.0008	0.1080	0.0002	0.4230	0.0008	1.8020	0.0036	0.0560	0.0001	0.4230	0.0008	0.1000	0.0002
	750	0.7220	0.0010	3.7830	0.0050	0.0950	0.0001	0.7220	0.0010	0.1900	0.0003	0.7150	0.0010	3.5180	0.0047	0.0940	0.0001	0.7210	0.0010	0.1880	0.0003	0.7070	0.0009	3.1440	0.0042	0.0740	0.0001	0.7210	0.0010	0.1860	0.0002
Forklifts	50	0.2710	0.0054	0.1820	0.0036	0.0290	0.0006	0.0000	0.0000	0.1090	0.0022	0.2620	0.0052	0.1780	0.0036	0.0280	0.0006	0.0000	0.0000	0.1030	0.0021	0.2520	0.0050	0.1730	0.0035	0.0270	0.0005	0.0000	0.0000	0.0960	0.0019
	120	0.2570	0.0021	0.5210	0.0043	0.0600	0.0005	0.0000	0.0000	0.0840	0.0007	0.2530	0.0021	0.4940	0.0041	0.0570	0.0005	0.0000	0.0000	0.0790	0.0007	0.2500	0.0021	0.4680	0.0039	0.0550	0.0005	0.0000	0.0000	0.0740	0.0006
	175	0.3620	0.0021	0.8630	0.0049	0.0590	0.0003	0.0010	0.0000	0.1000	0.0006	0.3600	0.0021	0.8150	0.0047	0.0570	0.0003	0.0010	0.0000	0.0950	0.0005	0.3580	0.0020	0.7660	0.0044	0.0540	0.0003	0.0010	0.0000	0.0890	0.0005
	250	0.2710	0.0011	1.1030	0.0044	0.0480	0.0002	0.0010	0.0000	0.0910	0.0004	0.2540	0.0010	1.0420	0.0042	0.0450	0.0002	0.0010	0.0000	0.0850	0.0003	0.2370	0.0009	0.9810	0.0039	0.0410	0.0002	0.0010	0.0000	0.0790	0.0003
	500	0.5100	0.0010	1.4150	0.0028	0.0620	0.0001	0.0010	0.0000	0.1130	0.0002	0.4610	0.0009	1.3270	0.0027	0.0580	0.0001	0.0010	0.0000	0.1060	0.0002	0.4120	0.0008	1.2390	0.0025	0.0550	0.0001	0.0010	0.0000	0.1000	0.0002
Generator Sets	15	0.0370	0.0025	0.0670	0.0045	0.0080	0.0005	0.0000	0.0000	0.0170	0.0011	0.0350	0.0023	0.0630	0.0042	0.0070	0.0005	0.0000	0.0000	0.0160	0.0011	0.0330	0.0022	0.0580	0.0039	0.0070	0.0005	0.0000	0.0000	0.0150	0.0010
	25	0.0570	0.0023	0.1010	0.0040	0.0130	0.0005	0.0000	0.0000	0.0360	0.0014	0.0530	0.0021	0.0960	0.0038	0.0130	0.0005	0.0000	0.0000	0.0340	0.0014	0.0490	0.0020	0.0900	0.0036	0.0130	0.0005	0.0000	0.0000	0.0330	0.0013
	50	0.3130	0.0063	0.3300	0.0066	0.0370	0.0007	0.0000	0.0000	0.1160	0.0023	0.3090	0.0062	0.3260	0.0065	0.0360	0.0007	0.0000	0.0000	0.1120	0.0022	0.3060	0.0061	0.3220	0.0064	0.0360	0.0007	0.0000	0.0000	0.1080	0.0022
	120	0.5290	0.0044	1.1080	0.0092	0.0940	0.0008	0.0010	0.0000	0.1520	0.0013	0.5250	0.0044	1.0740	0.0090	0.0920	0.0008	0.0010	0.0000	0.1460	0.0012	0.5200	0.0043	1.0410	0.0087	0.0890	0.0007	0.0010	0.0000	0.1400	0.0012
	175	0.7660	0.0044	1.8420	0.0105	0.0960	0.0005	0.0020	0.0000	0.1780	0.0010	0.7620	0.0044	1.7800	0.0102	0.0930	0.0005	0.0020	0.0000	0.1710	0.0010	0.7580	0.0043	1.7190	0.0098	0.0910	0.0005	0.0020	0.0000	0.1640	0.0009
	250	0.6660	0.0027	2.5880	0.0104	0.0900	0.0004	0.0020	0.0000	0.1850	0.0007	0.6350	0.0025	2.4990	0.0100	0.0860	0.0003	0.0020	0.0000	0.1760	0.0007	0.6040	0.0024	2.4110	0.0096	0.0830	0.0003	0.0020	0.0000	0.1670	0.0007
	500	1.3330	0.0027	3.8530	0.0077	0.1340	0.0003	0.0030	0.0000	0.2650	0.0005	1.2470	0.0025	3.7030	0.0074	0.1290	0.0003	0.0030	0.0000	0.2520	0.0005	1.1630	0.0023	3.5550	0.0071	0.1230	0.0002	0.0030	0.0000	0.2380	0.0005
	750	2.1570	0.0029	6.3560	0.0085	0.2180	0.0003	0.0050	0.0000	0.4410	0.0006	2.0170	0.0027	6.1130	0.0082	0.2090	0.0003	0.0050	0.0000	0.4180	0.0006	1.8790	0.0025	5.8730	0.0078	0.2010	0.0003	0.0050	0.0000	0.3950	0.0005
Graders	50	0.3390	0.0068	0.3010	0.0060	0.0250	0.0005	0.0750	0.0015	0.1260	0.0025	0.3240	0.0065	0.2870	0.0057	0.0250	0.0005	0.0730	0.0015	0.1250	0.0025	0.3090	0.0062	0.2850	0.0057	0.0250	0.0005	0.0730	0.0015	0.1240	0.0025
	120	0.5210	0.0043	1.0290	0.0086	0.1030	0.0009	0.1620	0.0014	0.1480	0.0012	0.5150	0.0043	0.9770	0.0081	0.0970	0.0008	0.1620	0.0014	0.1370	0.0011	0.5080	0.0042	0.9260	0.0077	0.0920	0.0008	0.1620	0.0014	0.1250	0.0010
	175	0.6760	0.0039	1.5620	0.0089	0.0920	0.0005	0.2570	0.0015	0.1590	0.0009	0.6730	0.0038	1.4760	0.0084	0.0870	0.0005	0.2570	0.0015	0.1470	0.0008	0.6720	0.0038	1.3770	0.0079	0.0820	0.0005	0.2570	0.0015	0.1340	0.0008
	250	0.4140	0.0017	1.9880	0.0080	0.0640	0.0003	0.3570	0.0014	0.1300	0.0005	0.3790	0.0015	1.8890	0.0076	0.0580	0.0002	0.3570	0.0014	0.1160	0.0005	0.3640	0.0015	1.7800	0.0071	0.0540	0.0002	0.3570	0.0014	0.1070	0.0004
	500	0.5650	0.0011	2.4260	0.0049	0.0780	0.0002	0.4140	0.0008	0.1570	0.0003	0.5020	0.0010	2.2500	0.0045	0.0720	0.0001	0.4180	0.0008	0.1250	0.0003	0.4730	0.0009	2.0730	0.0041	0.0680	0.0001	0.4180	0.0008	0.1240	0.0002
	750	0.9760	0.0013	5.3660	0.0072	0.0000	0.0000	0.7320	0.0010	0.0000	0.0000	0.9640	0.0013	5.0600	0.0067	0.0000	0.0000	0.9200	0.0012	0.0000	0.0000	0.9410	0.0013	4.2350	0.0056	0.0000	0.0000	0.9200	0.0012	0.0000	0.0000
Off-Highway Tractors	120	0.6000	0.0050	1.4000	0.0117	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5940	0.0050	1.3860	0.0116	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5880	0.0049	1.3730	0.0114	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	175	0.7790	0.0045	1.8580	0.0106	0.1110	0.0006	0.2700	0.0015	0.1940	0.0011	0.7730	0.0044	1.8010	0.0103	0.1080	0.0006	0.2700	0.0015	0.1850	0.0011	0.7710	0.0044	1.7510	0.0100	0.1060	0.0006	0.2700	0.0015	0.1810	0.0010
	250	0.4610	0.0018	1.7450	0.0070	0.0720	0.0003	0.2700	0.0011	0.1370	0.0005	0.4330	0.0017	1.6890	0.0068	0.0680	0.0003	0.2700	0.0011	0.1280	0.0005	0.4130	0.0017	1.6400	0.0066	0.0650	0.0003	0.2700	0.0011	0.1220	0.0005
	750	2.8960	0.0039	7.0290	0.0094	0.2740	0.0004	1.0520	0.0014	0.5140	0.0007	2.6420	0.0035	6.7680	0.0090	0.2600	0.0003	1.0510	0.0014	0.4900	0.0007	2.4410	0.0033	6.5320	0.0087	0.2500	0.0003	1.0510	0.0014	0.4660	0.0006
Off-Highway Trucks	175	0.7430	0.0042	1.7120	0.0098	0.1130	0.0006	0.2580	0.0015	0.1830	0.0010	0.7400	0.0042	1.6170	0.0092	0.1060	0.0006	0.2580	0.0015	0.1820	0.0010	0.7400	0.0042	1.5070	0.0086	0.1000	0.0006	0.2580	0.0015	0.1640	0.0009
	250	0.4430	0.0018	2.0870	0.0083	0.0740	0.0003	0.3450	0.0014	0.1470	0.0006	0.4040	0.0016	1.9810	0.0079	0.0670	0.0003	0.3450	0.0014	0.1320	0.0005	0.3870	0.0015	1.8670	0.0075	0.0630	0.0003	0.3450	0.0014	0.1220	0.0005
	500	0.7420	0.0015	3.0620	0.0061	0.1110	0.0002	0.4930	0.0010	0.2090	0.0004	0.6520	0.0013	2.8450	0.0057	0.1010	0.0002	0.4930	0.0010	0.1880	0.0004	0.6090	0.0012	2.6230	0.0052	0.0950	0.0002	0.4930	0.0010	0.1780	0.0004
	750	1.1720	0.0016	5.0690	0.0068	0.1790	0.0002	0.8190	0.0011	0.3410	0.0005	1.0380	0.0014	4.7350	0.0063	0.1640	0.0002	0.8190	0.0011	0.3060	0.0004	0.9760	0.0013	4.3780	0.0058	0.1550	0.0002	0.8190	0.0011	0.2950	0.0004
Other Construction Equipment	15	0.0390	0.0026	0.0620	0.0041	0.0060	0.0004	0.0010	0.0001	0.0260	0.0017	0.0620	0.0041	0.0940	0.0063	0.0060	0.0004	0.0020	0.0001	0.0090	0.0006	0.0610	0.0041	0.0860	0.0057	0.0060	0.0004	0.0020	0.0001	0.0090	0.0006
	25	0.0470	0.0019	0.1050	0.0042	0.0100	0.0004	0.0000	0.0000	0.0520	0.0021	0.0620	0.0025	0.1300	0.0052	0.0100	0.0004	0.0000	0.0000	0.0000	0.0000	0.0570	0.0023	0.1290	0.0052	0.0100	0.0004	0.0000	0.0000	0.0000	0.0000
	50	0.3380	0.0068	0.3070	0.0061	0.0410	0.0008	0.0680	0.0014	0.1360	0.0027	0.3290	0.0066	0.3080	0.0062	0.0370	0.0007	0.0660	0.0013	0.1360	0.0027	0.3330	0.0067	0.3030	0.0061	0.0370	0.0007	0.0660	0.0013	0.1350	0.0027
	120	0.5780	0.0048	1.2060	0.0101	0.1110	0.0009	0.1750	0.0015	0.1650	0.0014	0.5720	0.0048	1.1690	0.0097	0.1060	0.0009	0.1750	0.0015	0.1630	0.0014	0.5680	0.0047	1.1420	0.0095	0.1050	0.0009	0.1750	0.0015	0.1620	0.0014
	175	0.6050	0.0035	1.4500	0.0083	0.0810	0.0005	0.2210	0.0013	0.1500	0.0009	0.6000	0.0034	1.4060	0.0080	0.0790	0.0005	0.2200	0.0013	0.1340	0.0008	0.5990	0.0034	1.3630	0.0078	0.0770	0.0004	0.2200	0.0013	0.1330	0.0008
	500	1.2030	0.0024	3.0110	0.0060	0.1120	0.0002	0.4590	0.0009	0.2120	0.0004	1.0980	0.0022	2.8800	0.0058	0.1050	0.0002	0.4600	0.0009	0.1980	0.0004	1.0150	0.0020	2.7680	0.0055	0.1020	0.0002	0.4600	0.0009	0.1900	0.0004
Pavers	25	0.0920	0.0037	0.2140	0.0086	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1210	0.0048	0.2120	0.0085	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0910	0.0036	0.2110	0.0084	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	50	0.2870	0.0057	0.2860	0.0057	0.0340	0.0007	0.0660	0.0013	0.1020	0.0020	0.2720	0.0054	0.2770	0.0055	0.0320	0.0006	0.0670	0.0013	0.0910	0.0018	0.2600	0.0052	0.2690	0.0054	0.0300	0.0006	0.0670	0.0013	0.0800	0.0016
	120	0.4580	0.0038	0.8650	0.0072	0.0860	0.0007	0.1500	0.0013	0.1230	0.0010	0.4520	0.0038	0.8240	0.0069	0.0800	0.0007	0.1500	0.0013	0.1120	0.0009	0.4470	0.0037	0.7890	0.0066	0.0740	0.0006	0.1500	0.0013	0.1000	0.0008
	175	0.6670	0.0038	1.4720	0.0084	0.0830	0.0005	0.2660	0.0015	0.1430	0.0008	0.6680	0.0038	1.3960	0.0080	0.0780	0.0004	0.2660	0.0015	0.1310	0.0007	0.6680	0.0038	1.2980	0.0074	0.0710	0.0004	0.2660	0.0015	0.1170	0.0007
	250	0.3890	0.0016	2.0570	0.0082	0.0580	0.0002	0.4010	0.0016	0.1150	0.0005	0.3780	0.0015	1.9650	0.0079	0.0540	0.0002	0.4010	0.0016	0.1150	0.0005	0.3640	0.0015	1.8400	0.0074	0.0510	0.0002	0.4010	0.0016	0.1140	0.0005
	500	0.4570	0.0009	2.2080	0.0044	0.0650	0.0001	0.4240	0.0008	0.1120	0.0002	0.4430	0.0009	2.0500	0.0041	0.0610	0.0001	0.4250	0.0009	0.1110	0.0002	0.4290	0.0009	1.8640	0.0037	0.0550	0.0001	0.4250	0.0009	0.1110	0.0002

Table 8.1 E-6. Construction Equipment Emission Factors (CEC)

Emissions Factors for Construction Equipment (CEC)

		2005														2006										2007					
		lb/hr	lb/hp-hr	lb/hr	lb/hp-hr	lb/hr	lb/hp-hr	lb/hr	lb/hp-hr	lb/hr	lb/hp-hr	lb/hr	lb/hp-hr	lb/hr	lb/hp-hr	lb/hr	lb/hp-hr	lb/hr	lb/hp-hr	lb/hr	lb/hp-hr	lb/hr	lb/hp-hr	lb/hr	lb/hp-hr	lb/hr	lb/hp-hr	lb/hr	lb/hp-hr	lb/hr	lb/hp-hr	lb/hr	lb/hp-hr
Eq Type	HP	CO		NOx		PM10		SOx		VOC		CO		NOx		PM10		SOx		VOC		CO		NOx		PM10		SOx		VOC	
Paving Equipment	25	0.0490	0.0020	0.0980	0.0039	0.0100	0.0004	0.0000	0.0000	0.0410	0.0016	0.0570	0.0023	0.1240	0.0050	0.0100	0.0004	0.0000	0.0000	0.0140	0.0006	0.0570	0.0023	0.1180	0.0047	0.0090	0.0004	0.0000	0.0000	0.0140	0.0006
	50	0.2910	0.0058	0.2650	0.0053	0.0340	0.0007	0.0540	0.0011	0.1120	0.0022	0.2860	0.0057	0.2630	0.0053	0.0320	0.0006	0.0600	0.0012	0.1110	0.0022	0.2840	0.0057	0.2610	0.0052	0.0330	0.0007	0.0600	0.0012	0.1100	0.0022
	120	0.3900	0.0033	0.8150	0.0068	0.0750	0.0006	0.1180	0.0010	0.1140	0.0010	0.3870	0.0032	0.7910	0.0066	0.0730	0.0006	0.1180	0.0010	0.1100	0.0009	0.3850	0.0032	0.7720	0.0064	0.0720	0.0006	0.1180	0.0010	0.1060	0.0009
	175	0.5770	0.0033	1.3790	0.0079	0.0770	0.0004	0.2100	0.0012	0.1380	0.0008	0.5720	0.0033	1.3360	0.0076	0.0750	0.0004	0.2100	0.0012	0.1320	0.0008	0.5700	0.0033	1.2980	0.0074	0.0740	0.0004	0.2100	0.0012	0.1280	0.0007
	250	0.4070	0.0016	1.5660	0.0063	0.0610	0.0002	0.2540	0.0010	0.1170	0.0005	0.3820	0.0015	1.5160	0.0061	0.0570	0.0002	0.2540	0.0010	0.1070	0.0004	0.3640	0.0015	1.4690	0.0059	0.0550	0.0002	0.2540	0.0010	0.1060	0.0004
Plate Compactors	15	0.0180	0.0012	0.0290	0.0019	0.0020	0.0001	0.0000	0.0000	0.0090	0.0006	0.0260	0.0017	0.0410	0.0027	0.0020	0.0001	0.0000	0.0000	0.0090	0.0006	0.0260	0.0017	0.0390	0.0026	0.0020	0.0001	0.0000	0.0000	0.0090	0.0006
Rollers	15	0.0250	0.0017	0.0390	0.0026	0.0040	0.0003	0.0010	0.0001	0.0160	0.0011	0.0390	0.0026	0.0590	0.0039	0.0040	0.0003	0.0010	0.0001	0.0080	0.0005	0.0380	0.0025	0.0540	0.0036	0.0040	0.0003	0.0010	0.0001	0.0080	0.0005
	25	0.0510	0.0020	0.1030	0.0041	0.0090	0.0004	0.0010	0.0000	0.0380	0.0015	0.0600	0.0024	0.1310	0.0052	0.0080	0.0003	0.0020	0.0001	0.0190	0.0008	0.0580	0.0023	0.1250	0.0050	0.0080	0.0003	0.0020	0.0001	0.0190	0.0008
	50	0.2590	0.0052	0.2640	0.0053	0.0310	0.0006	0.0620	0.0012	0.0900	0.0018	0.2460	0.0049	0.2550	0.0051	0.0290	0.0006	0.0620	0.0012	0.0810	0.0016	0.2350	0.0047	0.2480	0.0050	0.0270	0.0005	0.0620	0.0012	0.0710	0.0014
	120	0.3870	0.0032	0.7320	0.0061	0.0710	0.0006	0.1270	0.0011	0.1040	0.0009	0.3820	0.0032	0.6960	0.0058	0.0670	0.0006	0.1280	0.0011	0.0940	0.0008	0.3770	0.0031	0.6670	0.0056	0.0610	0.0005	0.1280	0.0011	0.0840	0.0007
	175	0.5580	0.0032	1.2310	0.0070	0.0690	0.0004	0.2240	0.0013	0.1190	0.0007	0.5580	0.0032	1.1670	0.0067	0.0640	0.0004	0.2240	0.0013	0.1070	0.0006	0.5580	0.0032	1.0850	0.0062	0.0590	0.0003	0.2240	0.0013	0.0950	0.0005
	250	0.3060	0.0012	1.6060	0.0064	0.0440	0.0002	0.3170	0.0013	0.0890	0.0004	0.2950	0.0012	1.5360	0.0061	0.0420	0.0002	0.3180	0.0013	0.0880	0.0004	0.2860	0.0011	1.4360	0.0057	0.0410	0.0002	0.3180	0.0013	0.0780	0.0003
	500	0.4280	0.0009	2.0610	0.0041	0.0610	0.0001	0.3970	0.0008	0.1130	0.0002	0.4120	0.0008	1.9140	0.0038	0.0550	0.0001	0.3960	0.0008	0.0980	0.0002	0.3990	0.0008	1.7410	0.0035	0.0510	0.0001	0.3960	0.0008	0.0830	0.0002
Rough Terrain Forklifts	50	0.3930	0.0079	0.3560	0.0071	0.0460	0.0009	0.0810	0.0016	0.1430	0.0029	0.3720	0.0074	0.3440	0.0069	0.0410	0.0008	0.0810	0.0016	0.1280	0.0026	0.3550	0.0071	0.3360	0.0067	0.0410	0.0008	0.0810	0.0016	0.1130	0.0023
	120	0.4300	0.0036	0.8100	0.0068	0.0850	0.0007	0.1350	0.0011	0.1190	0.0010	0.4250	0.0035	0.7710	0.0064	0.0800	0.0007	0.1350	0.0011	0.1090	0.0009	0.4190	0.0035	0.7390	0.0062	0.0740	0.0006	0.1350	0.0011	0.0980	0.0008
	175	0.6750	0.0039	1.4870	0.0085	0.0890	0.0005	0.2590	0.0015	0.1510	0.0009	0.6750	0.0039	1.4110	0.0081	0.0830	0.0005	0.2590	0.0015	0.1360	0.0008	0.6760	0.0039	1.3120	0.0075	0.0770	0.0004	0.2590	0.0015	0.1240	0.0007
	250	0.3660	0.0015	1.8690	0.0075	0.0540	0.0002	0.3540	0.0014	0.1250	0.0005	0.3470	0.0014	1.7900	0.0072	0.0540	0.0002	0.3580	0.0014	0.0830	0.0003	0.3330	0.0013	1.6790	0.0067	0.0490	0.0002	0.3580	0.0014	0.0820	0.0003
	500	0.5210	0.0010	2.4960	0.0050	0.0770	0.0002	0.4630	0.0009	0.1290	0.0003	0.5050	0.0010	2.3190	0.0046	0.0700	0.0001	0.4600	0.0009	0.1280	0.0003	0.4950	0.0010	2.1000	0.0042	0.0630	0.0001	0.4600	0.0009	0.1270	0.0003
Rubber Tired Dozers	175	0.6600	0.0038	1.3960	0.0080	0.0750	0.0004	0.2640	0.0015	0.1890	0.0011	0.6740	0.0039	1.3300	0.0076	0.0750	0.0004	0.2730	0.0016	0.1870	0.0011	0.6700	0.0038	1.1910	0.0068	0.0370	0.0002	0.2730	0.0016	0.1860	0.0011
	250	0.6560	0.0026	2.4750	0.0099	0.1030	0.0004	0.3800	0.0015	0.1930	0.0008	0.6160	0.0025	2.3950	0.0096	0.0980	0.0004	0.3800	0.0015	0.1840	0.0007	0.5870	0.0023	2.3260	0.0093	0.0930	0.0004	0.3800	0.0015	0.1750	0.0007
	500	1.5030	0.0030	3.2710	0.0065	0.1320	0.0003	0.4790	0.0010	0.2460	0.0005	1.3630	0.0027	3.1310	0.0063	0.1240	0.0002	0.4790	0.0010	0.2290	0.0005	1.2490	0.0025	3.0140	0.0060	0.1200	0.0002	0.4790	0.0010	0.2220	0.0004
	750	2.0790	0.0028	4.9570	0.0066	0.1910	0.0003	0.7380	0.0010	0.3420	0.0005	1.9010	0.0025	4.7750	0.0064	0.1830	0.0002	0.7390	0.0010	0.3380	0.0005	1.7460	0.0023	4.6100	0.0061	0.1810	0.0002	0.7390	0.0010	0.3350	0.0004
Rubber Tired Loaders	25	0.0600	0.0024	0.1340	0.0054	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0890	0.0036	0.1630	0.0065	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0880	0.0035	0.1470	0.0059	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	50	0.3770	0.0075	0.3300	0.0066	0.0440	0.0009	0.0740	0.0015	0.1370	0.0027	0.3590	0.0072	0.3200	0.0064	0.0410	0.0008	0.0740	0.0015	0.1260	0.0025	0.3430	0.0069	0.3120	0.0062	0.0390	0.0008	0.0740	0.0015	0.1110	0.0022
	120	0.4120	0.0034	0.7750	0.0065	0.0830	0.0007	0.1270	0.0011	0.1160	0.0010	0.4070	0.0034	0.7380	0.0062	0.0780	0.0007	0.1270	0.0011	0.1060	0.0009	0.4020	0.0034	0.7070	0.0059	0.0720	0.0006	0.1270	0.0011	0.0960	0.0008
	175	0.5840	0.0033	1.2840	0.0073	0.0790	0.0005	0.2210	0.0013	0.1320	0.0008	0.5840	0.0033	1.2180	0.0070	0.0740	0.0004	0.2210	0.0013	0.1210	0.0007	0.5840	0.0033	1.1330	0.0065	0.0680	0.0004	0.2210	0.0013	0.1090	0.0006
	250	0.3190	0.0013	1.6580	0.0066	0.0500	0.0002	0.3090	0.0012	0.1010	0.0004	0.3080	0.0012	1.5840	0.0063	0.0470	0.0002	0.3090	0.0012	0.0940	0.0004	0.2970	0.0012	1.4810	0.0059	0.0440	0.0002	0.3090	0.0012	0.0860	0.0003
	500	0.4880	0.0010	2.3320	0.0047	0.0730	0.0001	0.4290	0.0009	0.1370	0.0003	0.4720	0.0009	2.1660	0.0043	0.0680	0.0001	0.4290	0.0009	0.1260	0.0003	0.4560	0.0009	1.9700	0.0039	0.0640	0.0001	0.4290	0.0009	0.1180	0.0002
	750	0.9890	0.0013	4.9650	0.0066	0.1500	0.0002	0.9040	0.0012	0.3000	0.0004	0.9580	0.0013	4.6340	0.0062	0.1430	0.0002	0.9050	0.0012	0.2470	0.0003	0.9290	0.0012	4.2340	0.0056	0.1370	0.0002	0.9050	0.0012	0.2440	0.0003
Scrapers	120	0.6900	0.0058	1.4040	0.0117	0.1470	0.0012	0.2020	0.0017	0.2100	0.0018	0.6890	0.0057	1.3610	0.0113	0.1420	0.0012	0.2030	0.0017	0.2090	0.0017	0.6840	0.0057	1.3060	0.0109	0.1330	0.0011	0.2030	0.0017	0.1660	0.0014
	175	0.8570	0.0049	2.0530	0.0117	0.1260	0.0007	0.3070	0.0018	0.2190	0.0013	0.8540	0.0049	1.9800	0.0113	0.1220	0.0007	0.3070	0.0018	0.2080	0.0012	0.8500	0.0049	1.8670	0.0107	0.1170	0.0007	0.3070	0.0018	0.1930	0.0011
	250	0.6380	0.0026	2.6920	0.0108	0.1020	0.0004	0.4350	0.0017	0.2010	0.0008	0.5880	0.0024	2.5900	0.0104	0.0940	0.0004	0.4350	0.0017	0.1860	0.0007	0.5310	0.0021	2.4360	0.0097	0.0850	0.0003	0.4350	0.0017	0.1660	0.0007
	500	1.1660	0.0023	3.7680	0.0075	0.1420	0.0003	0.5820	0.0012	0.2700	0.0005	1.0270	0.0021	3.5700	0.0071	0.1320	0.0003	0.5820	0.0012	0.2480	0.0005	0.8890	0.0018	3.3010	0.0066	0.1190	0.0002	0.5820	0.0012	0.2230	0.0004
	750	1.9120	0.0025	6.5950	0.0088	0.2480	0.0003	1.0300	0.0014	0.4770	0.0006	1.6980	0.0023	6.2780	0.0084	0.2310	0.0003	1.0310	0.0014	0.4250	0.0006	1.4800	0.0020	5.8300	0.0078	0.2010	0.0003	1.0310	0.0014	0.3730	0.0005
Signal Boards	15	0.0240	0.0016	0.0370	0.0025	0.0040	0.0003	0.0010	0.0001	0.0130	0.0009	0.0380	0.0025	0.0530	0.0035	0.0040	0.0003	0.0010	0.0001	0.0060	0.0004	0.0380	0.0025	0.0490	0.0033	0.0040	0.0003	0.0010	0.0001	0.0050	0.0003
	50	0.4150	0.0083	0.3900	0.0078	0.0490	0.0010	0.0730	0.0015	0.2440	0.0049	0.4120	0.0082	0.3870	0.0077	0.0480	0.0010	0.0940	0.0019	0.2420	0.0048	0.3850	0.0077	0.3850	0.0077	0.0480	0.0010	0.0940	0.0019	0.2400	0.0048
	120	0.5660	0.0047	1.1790	0.0098	0.1070	0.0009	0.1720	0.0014	0.1590	0.0013	0.5590	0.0047	1.1420	0.0095	0.1030	0.0009	0.1730	0.0014	0.1580	0.0013	0.5570	0.0046	1.1170	0.0093	0.1010	0.0008	0.1730	0.0014	0.1570	0.0013
	175	0.8650	0.0049	2.0760	0.0119	0.1140	0.0007	0.3190	0.0018	0.2100	0.0012	0.8610	0.0049	2.0090	0.0115	0.1090	0.0006	0.3220	0.0018	0.2080	0.0012	0.8570	0.0049	1.9490	0.0111	0.1080	0.0006	0.3220	0.0018	0.1840	0.0011
	250	0.6880	0.0028	2.6650	0.0107	0.0980	0.0004	0.4480	0.0018	0.2180	0.0009	0.6400	0.0026	2.5600	0.0102	0.0980	0.0004	0.4440	0.0018	0.2170	0.0009	0.6250	0.0025	2.5010	0.0100	0.0970	0.0004	0.4440	0.0018	0.2160	0.0009
Skid Steer Loaders	25	0.0470	0.0019	0.1010	0.0040	0.0100	0.0004	0.0020	0.0001	0.0400	0.0016	0.0600	0.0024	0.1330	0.0053	0.0090	0.0004	0.0020	0.0001	0.0150	0.0006	0.0580	0.0023	0.1270	0.0051	0.0080	0.0003	0.0020	0.0001	0.0140	0.0006
	50	0.2160	0.0043	0.2410	0.0048	0.0260	0.0005	0.0610	0.0012	0.0710	0.0014	0.2040	0.0041	0.2340	0.0047	0.0240	0.0005	0.0610	0.0012	0.0590	0.0012	0.1910	0.0038	0.2280	0.0046	0.0220	0.0004	0.0610	0.0012	0.0480	0.0010
	120	0.2710	0.0023	0.4870	0.0041	0.0470	0.0004	0.0920	0.0008	0.0670	0.0006	0.2660	0.0022	0.4600	0.0038	0.0410	0.0003	0.0920	0.0008	0.0570	0.0005	0.2600	0.0022	0.4330	0.0036	0.0350	0.0003	0.0920	0.0008	0.0460	0.0004
Surfacing Equipment	50	0.1590	0.0032	0.1430	0.0029	0.0160	0.0003	0.0320	0.0006	0.0000	0.0000	0.1580	0.0032	0.1420	0.0028	0.0160	0.0003	0.0310	0.0006	0.0000	0.0000	0.1570	0.0031	0.1410	0.0028	0.0160	0.0003	0.0310	0.0006	0.0000	0.0000
	120	0.5300	0.0044	0.9850	0.0082	0.0760	0.0006	0.1520	0.0013	0.0000	0.0000	0.5240	0.0044	0.8990	0.0075	0.0000	0.0000	0.1460	0.0012	0.0000	0.0000	0.5200	0.0043	0.8920	0.0074	0.0000	0.0000	0.1460	0.0012	0.0000	0.0000
	175	0.5050	0.0029	1.2120	0.0069	0.0000	0.0000	0.2020	0.0012	0.0000	0.0000	0.5000	0.0029	1.1000	0.0063	0.0000	0.0000	0.1950	0.0011	0.0000	0.0000	0.4950	0.0028	1.0890	0.0062	0.0000	0.0000	0.1950	0.0011	0.0000	0.0000
	250	0.4520	0.0018	1.7090	0.0068	0.0500	0.0002	0.3020	0.0012	0.0000	0.0000	0.4500	0.0018	1.6500	0.0066	0.0500	0.0002	0.2920	0.0012	0.0000	0.0000	0.3980	0.0016	1.5920	0.0064	0.0500	0.0002	0.2920	0.0012	0.0000	0.0000
	500	1.0140	0.0020	2.6020	0.0052	0.1010	0.0002	0.4030	0.0008	0.1890	0.0004	0.9250	0.0019	2.4950	0.0050	0.0940	0.0002	0.4010	0.0008	0.1880	0.0004	0.8510	0.0017	2.3910	0.0048	0.0810	0.0002	0.4010	0.0008	0.1860	0.0004
	750	1.4560	0.0019	4.1750	0.0056	0.1460	0.0002	0.6310	0.0008	0.0000	0.0000	1.3430	0.0018	3.9330	0.0052	0.1440	0.0002	0.5960	0.0008	0.0000	0.0000	1.2800	0.0017	3.7910	0.0051	0.1420	0.0002	0.5960	0.0008	0.0000	0.0000
Tractors/Loaders/Backhoes	25	0.0790	0.0032	0.1380	0.0055	0.0130	0.0005	0.0000	0.0000	0.0500	0.0020	0.0850	0.0034	0.1640	0.0066	0.0120	0.0005	0.0000	0.0000	0.0330	0.0013	0.0750	0.0030	0.1560	0.0062	0.0120	0.0005	0.0000	0.0000	0.0170	0.0007
	50	0.4760	0.0095	0.3600	0.0072	0.0520	0.0010	0.0720	0.0014	0.1850	0.0037	0.4710	0.0094	0.3550	0.0071	0.0520	0.0010	0.0720	0.0014	0.1810	0.0036	0.4720	0.0094	0.3530	0.0071	0.0520	0.0010	0.0720	0.0014	0.1790	0.0036
	120	0.4080	0.0034	0.8490	0.0071	0.0870	0.0007	0.1120	0.0009	0.1270	0.0011	0.4040	0.0034	0.8240	0.0069	0.0860	0.0007	0.1120	0.0009	0.1230	0.0010	0.4030	0.0034	0.8070	0.0067	0.0850	0.0007	0.1120	0.0009	0.1200	0.0010
	175	0.6380	0.0036	1.5170	0.0087	0.0960	0.0005	0.2100	0.0012	0.1630	0.0009	0.6330	0.0036	1.4710	0.0084	0.0940	0.0005	0.2100	0.0012	0.1570	0.0009	0.6320	0.0036	1.4330	0.0082	0.0930	0.0005	0.2100	0.0012	0.1540	0.0009
	250	0.6480	0.0026	2.4410	0.0098	0.1000	0.0004	0.3490	0.0014	0.2490	0.0010	0.6180	0.0025	2.3240	0.0093	0.0990	0.0004	0.3610	0.0014	0.2470	0.0010	0.5650	0.0023	2.2850	0.0091	0.0980	0.0004	0.3610	0.0014	0.2460	0.0010
Trenchers	15	0.0360	0.0024	0.0510	0.0034	0.0040	0.0003	0.0000	0.0000	0.0400	0.0027	0.0510	0.0034	0.0750	0.0050	0.0040	0.0003	0.0000	0.0000	0.0000	0.0000	0.0510	0.0034	0.0620	0.0041	0.0040	0.0003	0.0000	0.0000	0.0000	0.0000
	25	0.1100	0.0044	0.2420	0.0097	0.0260	0.0010	0.0000	0.0000	0.0760	0.0030	0.1430	0.0057	0.3190	0.0128	0.0230	0.0009	0.0000	0.0000	0.0380	0.0015	0.1380	0.0055	0.2990	0.0120	0.0220	0.0009	0.0000	0.0000	0.0370	0.0015
	50	0.2960	0.0059	0.3220	0.0064	0.0360	0.0007	0.0780	0.0016	0.1010	0.0020	0.2820	0.0056	0.3120	0.0062	0.0340	0.0007	0.0790	0.0016	0.0890	0.0018	0.2690	0.0054	0.3060	0.0061	0.0320	0.0006	0.0790	0.0016	0.0790	0.0016
	120	0.4160	0.0035	0.7710	0.0064	0.0740	0.0006	0.1400	0.0012	0.1090	0.0009	0.4100	0.0034	0.7370	0.0061	0.0680	0.0006	0.1400	0.0012	0.0970	0.0008	0.4050	0.0034	0.7050	0.0059	0.0620	0.0005	0.1400	0.0012	0.0850	0.0007
	175	0.7260	0.0041	1.5770	0.0090	0.0850	0.0005	0.2980	0.0017	0.1520	0.0009	0.7260	0.0041	1.4910	0.0085	0.0780	0.0004	0.2990	0.0017	0.1300	0.0007	0.7270	0.0042	1.3740	0.0079	0.0710	0.0004	0.2990	0.0017	0.1160	0.0007
	250	0.4060	0.0016	2.2430	0.0090	0.0550	0.0002	0.4610	0.0018	0.1560	0.0006	0.4030	0.0016	2.1490	0.0086	0.0540	0.0002	0.4600	0.0018	0.0780	0.0003	0.3930	0.0016	1.9880	0.0080	0.0540	0.0002	0.4600	0.0018	0.0770	0.0003
	500	0.5650	0.0011	2.7830	0.0056	0.0730	0.0001	0.5650	0.0011	0.1220	0.0002	0.5490	0.0011	2.5700	0.0051	0.0720	0.0001	0.5640	0.0011	0.1210	0.0002	0.5390	0.0011	2.3190	0.0046	0.0660	0.0001	0.5640	0.0011	0.1200	0.0002
	750	0.8450	0.0011	5.9150	0.0079	0.0000	0.0000	0.8450	0.0011	0.0000	0.0000	0.8450	0.0011	5.0700	0.0068	0.0000	0.0000	1.0810	0.0014	0.0000	0.0000	0.8330	0.0011	4.7220	0.0063	0.0000	0.0000	1.0810	0.0014	0.0000	0.0000
Welders	15	0.0430	0.0029	0.0790	0.0053	0.0070	0.0005	0.0000	0.0000	0.0160	0.0011	0.0410	0.0027	0.0770	0.0051	0.0070	0.0005	0.0000	0.0000	0.0150	0.0010	0.0400	0.0027	0.0740	0.0049	0.0070	0.0005	0.0000	0.0000	0.0150	0.0010
	25	0.0730	0.0029	0.1120	0.0045	0.0110	0.0004	0.0000	0.0000	0.0350	0.0014	0.0710	0.0028	0.1100	0.0044	0.0110	0.0004	0.0000	0.0000	0.0350	0.0014	0.0680	0.0027	0.1070	0.0043	0.0110	0.0004	0.0000	0.0000	0.0350	0.0014
	50	0.3210	0.0064	0.2910	0.0058	0.0370	0.0007	0.0000	0.0000	0.1230	0.0025	0.3190	0.0064	0.2880	0.0058	0.0360	0.0007	0.0000	0.0000	0.1200	0.0024	0.3160	0.0063	0.2850	0.0057	0.0360	0.0007	0.0000	0.0000	0.1170	0.0023
	120	0.2850	0.0024	0.5960	0.0050	0.0550	0.0005	0.0000	0.0000	0.0860	0.0007	0.2830	0.0024	0.5790	0.0048	0.0540	0.0005	0.0000	0.0000	0.0830	0.0007	0.2820	0.0024	0.5620	0.0047	0.0530	0.0004	0.0000	0.0000	0.0800	0.0007
	175	0.5710	0.0033	1.3490	0.0077	0.0630	0.0004	0.0010	0.0000	0.1430	0.0008	0.5720	0.0033	1.3070	0.0075	0.0630	0.0004	0.0010	0.0000	0.1390	0.0008	0.5720	0.0033	1.2660	0.0072	0.0630	0.0004	0.0010	0.0000	0.1350	0.0008

Table 8.1 E-7. Diesel Exhaust Health Risk Calculations

PM10 Concentration Data:

Resident Max. Annual Avg. PM10 Concentration (ug/m3):[1]	0.088
Worker Max. Annual Avg. PM10 Concentration (ug/m3):[2]	0.85
Maximum Offsite PM10 Concentration (ug/m3)[3]	1.49

[1]Resident location is highest on grid edge in direction of a resident (at 578250,4165770).

[2]Worker location is to the south of the main project site (at 577690,4165700).

[3]The maximum offsite location is located on the eastern main site property line.

Exposure Data:

Residential breathing rate (L/kg-day)	302
Worker breathing rate (L/kg-day):	149
Exposure duration adjustment, resident:[3]	0.021
Exposure duration adjustment, worker:[4]	0.014
Annual concentration adjustment, worker:[5]	3.36
Diesel particulate matter (DPM) cancer slope factor (mg/kg-day)	1.1
Diesel particulate matter (DPM) chronic REL (ug/m3):	5.0

[3]Calculated as 1.5 / 70 (years) x 50 / 52 (weeks/year).

[4]Calculated as 1.5 / 70 (years) x 49 / 52 (weeks/year) x 5 / 7 (days/week).

[5]Calculated as 7/5 for day-of-week adjustment x 24/10 for hour-of-day adjustment.

Health Risk Calculations:

	Risk	Standard	Exceed?
Residential Cancer Risk:	6.0E-07	1.0E-05	NO
Worker Cancer Risk:	6.7E-06	1.0E-05	NO
Max. Chronic Hazard Index:	0.30	1.0	NO