

CONSTRUCTION EMISSION CALCULATIONS

Road Construction Emissions Model, Version 7.1.4

Emission Estimates for -> MCP				Total	Exhaust	Fugitive Dust	Total	Exhaust	Fugitive Dust	CO2 (lbs/day)
Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	PM10 (lbs/day)	PM10 (lbs/day)	PM10 (lbs/day)	PM2.5 (lbs/day)	PM2.5 (lbs/day)	PM2.5 (lbs/day)	
Grubbing/Land Clearing	16.9	87.8	173.0	157.6	7.6	150.0	38.0	6.8	31.2	18,741.0
Grading/Excavation	34.9	172.5	396.9	167.8	17.8	150.0	46.9	15.7	31.2	48,844.7
Drainage/Utilities/Sub-Grade	16.4	95.2	147.1	157.9	7.9	150.0	38.3	7.1	31.2	19,564.1
Paving	8.3	67.9	67.6	3.7	3.7	-	3.3	3.3	-	12,330.7
Maximum (pounds/day)	34.9	172.5	396.9	167.8	17.8	150.0	46.9	15.7	31.2	48,844.7
Total (tons/construction project)	12.5	66.2	133.3	73.5	6.2	67.3	19.5	5.5	14.0	16,916.7

Notes: Project Start Year -> 2016
 Project Length (months) -> 48
 Total Project Area (acres) -> 500
 Maximum Area Disturbed/Day (acres) -> 15
 Total Soil Imported/Exported (yd³/day)-> 2000

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Emission Estimates for -> MCP				Total	Exhaust	Fugitive Dust	Total	Exhaust	Fugitive Dust	CO2 (kgs/day)
Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	PM10 (kgs/day)	PM10 (kgs/day)	PM10 (kgs/day)	PM2.5 (kgs/day)	PM2.5 (kgs/day)	PM2.5 (kgs/day)	
Grubbing/Land Clearing	7.7	39.9	78.6	71.6	3.4	68.2	17.3	3.1	14.2	8,518.6
Grading/Excavation	15.9	78.4	180.4	76.3	8.1	68.2	21.3	7.1	14.2	22,202.1
Drainage/Utilities/Sub-Grade	7.5	43.3	66.9	71.8	3.6	68.2	17.4	3.2	14.2	8,892.8
Paving	3.8	30.8	30.7	1.7	1.7	-	1.5	1.5	-	5,604.8
Maximum (kilograms/day)	15.9	78.4	180.4	76.3	8.1	68.2	21.3	7.1	14.2	22,202.1
Total (megagrams/construction project)	11.3	60.0	120.9	66.7	5.6	61.1	17.7	5.0	12.7	15,344.0

Notes: Project Start Year -> 2016
 Project Length (months) -> 48
 Total Project Area (hectares) -> 202
 Maximum Area Disturbed/Day (hectares) -> 6
 Total Soil Imported/Exported (meters³/day)-> 1529

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Road Construction Emissions Model

Version 7.1.4

Data Entry Worksheet

Note: Required data input sections have a yellow background.

Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.

The user is required to enter information in cells C10 through C25.



Input Type

Project Name	MCP	
Construction Start Year	2016	Enter a Year between 2009 and 2025 (inclusive)
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	48.0	months
Predominant Soil/Site Type: Enter 1, 2, or 3	2	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
Project Length	16	miles
Total Project Area	500.0	acres
Maximum Area Disturbed/Day	15.0	acres
Water Trucks Used?	1	1. Yes 2. No
Soil Imported	1000.0	yd ³ /day
Soil Exported	1000.0	yd ³ /day
Average Truck Capacity	15.0	yd ³ (assume 20 if unknown)

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C34 through C37.

Construction Periods	User Override of Construction Months	Program Calculated Months	2005		2006		2007	
			0.00	%	0.00	%	0.00	%
Grubbing/Land Clearing		4.80	0.00		0.00		0.00	0.00
Grading/Excavation		21.60	0.00		0.00		0.00	0.00
Drainage/Utilities/Sub-Grade		14.40	0.00		0.00		0.00	0.00
Paving		7.20	0.00		0.00		0.00	0.00
Totals	0.00	48.00						

NOTE: soil hauling emissions are included in the Grading/Excavation Construction Period Phase, therefore the Construction Period for Grading/Excavation cannot be zero if hauling is part of the project.

Hauling emission default values can be overridden in cells C45 through C46.

Soil Hauling Emissions		User Override of					
User Input	Soil Hauling Defaults	Default Values					
Miles/round trip		30					
Round trips/day		133					
Vehicle miles traveled/day (calculated)				4000			
Hauling Emissions	ROG	NOx	CO	PM10	PM2.5	CO2	
Emission rate (grams/mile)	0.15	7.62	0.67	0.16	0.09	1658.55	
Emission rate (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00	
Pounds per day	1.3	67.1	5.9	1.4	0.8	14612.8	
Tons per construction period	0.31	15.95	1.41	0.33	0.19	3472.00	

Worker commute default values can be overridden in cells C60 through C65.

Worker Commute Emissions		User Override of Worker					
	Commute Default Values	Default Values					
Miles/ one-way trip		20					
One-way trips/day		2					
No. of employees: Grubbing/Land Clearing		48					
No. of employees: Grading/Excavation		75					
No. of employees: Drainage/Utilities/Sub-Grade		73					
No. of employees: Paving		59					
	ROG	NOx	CO	PM10	PM2.5	CO2	
Emission rate - Grubbing/Land Clearing (grams/mile)	0.147	0.194	1.744	0.047	0.020	443.650	
Emission rate - Grading/Excavation (grams/mile)	0.136	0.178	1.601	0.047	0.020	443.740	
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.117	0.150	1.363	0.047	0.020	443.166	
Emission rate - Paving (grams/mile)	0.112	0.140	1.291	0.047	0.020	441.739	
Emission rate - Grubbing/Land Clearing (grams/trip)	0.505	0.323	4.200	0.004	0.003	95.592	
Emission rate - Grading/Excavation (grams/trip)	0.469	0.295	3.878	0.004	0.003	95.634	
Emission rate - Draining/Utilities/Sub-Grade (gr/trip)	0.404	0.246	3.307	0.004	0.003	95.748	
Emission rate - Paving (grams/trip)	0.382	0.228	3.101	0.004	0.003	95.822	
Pounds per day - Grubbing/Land Clearing	0.829	0.948	9.056	0.198	0.084	1896.691	
Tons per const. Period - Grub/Land Clear	0.044	0.050	0.478	0.010	0.004	100.145	
Pounds per day - Grading/Excavation	1.209	1.369	13.140	0.312	0.132	2995.395	
Tons per const. Period - Grading/Excavation	0.287	0.325	3.122	0.074	0.031	711.706	
Pounds per day - Drainage/Utilities/Sub-Grade	1.008	1.113	10.817	0.301	0.128	2891.960	
Tons per const. Period - Drain/Util/Sub-Grade	0.160	0.176	1.713	0.048	0.020	458.086	
Pounds per day - Paving	0.777	0.844	8.287	0.244	0.103	2336.136	
Tons per const. Period - Paving	0.062	0.067	0.656	0.019	0.008	185.022	
tons per construction period	0.552	0.618	5.970	0.152	0.064	1454.959	

Water truck default values can be overridden in cells C91 through C93 and E91 through E93.

Water Truck Emissions	User Override of	Program Estimate of	User Override of Truck	Default Values			
	Default # Water Trucks	Number of Water Trucks	Miles Traveled/Day	Miles Traveled/Day			
Grubbing/Land Clearing - Exhaust		3		120			
Grading/Excavation - Exhaust		3		120			
Drainage/Utilities/Subgrade		2		80			
	ROG		NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.16		8.25	0.70	0.17	0.10	1679.86
Emission rate - Grading/Excavation (grams/mile)	0.15		7.62	0.67	0.16	0.09	1658.55
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.15		6.40	0.68	0.16	0.09	1615.24
Pounds per day - Grubbing/Land Clearing	0.12		6.54	0.56	0.13	0.08	1332.04
Tons per const. Period - Grub/Land Clear	0.03		1.55	0.13	0.03	0.02	316.49
Pound per day - Grading/Excavation	0.12		6.04	0.53	0.13	0.07	1315.15
Tons per const. Period - Grading/Excavation	0.03		1.44	0.13	0.03	0.02	312.48
Pound per day - Drainage/Utilities/Subgrade	0.05		2.26	0.24	0.05	0.03	569.25
Tons per const. Period - Drainage/Utilities/Subgrade	0.01		0.36	0.04	0.01	0.00	90.17

Fugitive dust default values can be overridden in cells C110 through C112.

Fugitive Dust	User Override of Max	Default	PM10	PM10	PM2.5	PM2.5
	Acreage Disturbed/Day	Maximum Acreage/Day	pounds/day	tons/per period	pounds/day	tons/per period
Fugitive Dust - Grubbing/Land Clearing		15	150.0	7.9	31.2	1.6
Fugitive Dust - Grading/Excavation		15	150.0	35.6	31.2	7.4
Fugitive Dust - Drainage/Utilities/Subgrade		15	150.0	23.8	31.2	4.9

Off-Road Equipment Emissions

Grubbing/Land Clearing		Default Number of Vehicles	ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	Program-estimate	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3	Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
		Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
4.00		Other Construction Equipment	2.76	14.39	29.24	1.54	1.41	2616.77
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
3.00		Rubber Tired Loaders	1.57	9.35	19.54	0.67	0.61	1987.86
6.00		Scrapers	8.73	43.53	106.18	4.28	3.94	9648.13
8.00	32	Signal Boards	2.90	10.92	10.56	0.76	0.70	1259.47
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
		Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grubbing/Land Clearing	pounds per day	16.0	78.2	165.5	7.2	6.7	15512.2
	Grubbing/Land Clearing	tons per phase	0.8	4.1	8.7	0.4	0.4	819.0

Grading/Excavation		Default	ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	Number of Vehicles <i>Program-estimate</i>	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2	Cranes	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
6.00	5	Excavators	2.30	16.73	24.57	1.21	1.11	3436.75
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
4.00		Generator Sets	1.92	11.89	14.77	1.02	0.94	1948.26
8.00	3	Graders	8.05	27.80	77.92	4.38	4.03	5356.98
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
4.00		Other Construction Equipment	2.64	14.38	27.74	1.46	1.35	2616.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
	4	Rollers	1.30	6.04	11.62	0.84	0.78	1117.90
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
4.00		Rubber Tired Dozers	4.94	17.67	52.43	2.44	2.24	3777.61
6.00	3	Rubber Tired Loaders	3.00	18.69	36.71	1.25	1.15	3976.20
	4	Scrapers	5.51	29.02	66.30	2.66	2.45	6432.16
8.00	32	Signal Boards	2.65	10.68	10.26	0.70	0.64	1259.47
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	4	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grading/Excavation	pounds per day	32.3	152.9	322.3	16.0	14.7	29921.3
	Grading	tons per phase	7.7	36.3	76.6	3.8	3.5	7109.3

Drainage/Utilities/Subgrade Override of Default Number of Vehicles	Default		ROG	CO	NOx	PM10	PM2.5	CO2
	Number of Vehicles <i>Program-estimate</i>		pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
2.00		Excavators	0.61	5.58	6.12	0.30	0.27	1145.46
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
2.00	3	Generator Sets	0.82	5.90	6.69	0.43	0.40	974.13
4.00	3	Graders	3.39	13.85	32.25	1.81	1.67	2668.92
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
2.00		Other Construction Equipment	1.13	7.19	11.68	0.61	0.57	1307.82
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
4.00	3	Plate Compactors	0.16	0.84	1.00	0.04	0.04	137.79
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3	Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
	4	Scrapers	4.64	29.03	54.47	2.14	1.97	6433.50
8.00	32	Signal Boards	2.16	10.23	9.70	0.57	0.53	1259.47
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
2.00	4	Tractors/Loaders/Backhoes	0.54	3.14	5.09	0.35	0.33	669.89
4.00		Trenchers	1.94	8.38	16.71	1.27	1.17	1505.95
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Drainage	pounds per day	15.4	84.1	143.7	7.5	6.9	16102.9
	Drainage	tons per phase	2.4	13.3	22.8	1.2	1.1	2550.7

Paving	Default		ROG	CO	NOx	PM10	PM2.5	CO2	
	Override of Default Number of Vehicles	Number of Vehicles <i>Program-estimate</i>	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	
			Aerial Lifts	0.00	0.00	0.00	0.00	0.00	
			Air Compressors	0.00	0.00	0.00	0.00	0.00	
			Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	
			Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	
			Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	
			Cranes	0.00	0.00	0.00	0.00	0.00	
			Crawler Tractors	0.00	0.00	0.00	0.00	0.00	
			Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	
			Excavators	0.00	0.00	0.00	0.00	0.00	
			Forklifts	0.00	0.00	0.00	0.00	0.00	
			Generator Sets	0.00	0.00	0.00	0.00	0.00	
			Graders	0.00	0.00	0.00	0.00	0.00	
			Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	
			Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	
			Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	
			Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	
			Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	
	6.00	3	Pavers	1.73	17.04	17.92	0.88	0.81	2892.89
	6.00	3	Paving Equipment	1.30	16.16	13.20	0.66	0.60	2557.54
			Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
			Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
			Pumps	0.00	0.00	0.00	0.00	0.00	0.00
	6.00	5	Rollers	1.41	9.05	13.35	0.88	0.81	1676.63
			Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
			Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
			Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
	1.00		Scrapers	1.10	7.25	12.78	0.50	0.46	1608.00
	8.00	32	Signal Boards	1.97	10.06	9.47	0.52	0.48	1259.47
			Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
			Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
			Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	4	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
			Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
			Welders	0.00	0.00	0.00	0.00	0.00	0.00
		Paving	pounds per day	7.5	59.6	66.7	3.4	3.2	9994.5
		Paving	tons per phase	0.6	4.7	5.3	0.3	0.3	791.6
Total Emissions all Phases (tons per construction period) =>				11.6	58.5	113.4	5.6	5.2	11270.6

Equipment default values for horsepower and hours/day can be overridden in cells C289 through C322 and E289 through E322.

Equipment	Default Values Horsepower	Default Values Hours/day
Aerial Lifts	63	8
Air Compressors	106	8
Bore/Drill Rigs	206	8
Cement and Mortar Mixers	10	8
Concrete/Industrial Saws	64	8
Cranes	226	8
Crawler Tractors	208	8
Crushing/Proc. Equipment	142	8
Excavators	163	8
Forklifts	89	8
Generator Sets	66	8
Graders	175	8
Off-Highway Tractors	123	8
Off-Highway Trucks	400	8
Other Construction Equipment	172	8
Other General Industrial Equipment	88	8
Other Material Handling Equipment	167	8
Pavers	126	8
Paving Equipment	131	8
Plate Compactors	8	8
Pressure Washers	26	8
Pumps	53	8
Rollers	81	8
Rough Terrain Forklifts	100	8
Rubber Tired Dozers	255	8
Rubber Tired Loaders	200	8
Scrapers	362	8
Signal Boards	20	8
Skid Steer Loaders	65	8
Surfacing Equipment	254	8
Sweepers/Scrubbers	64	8
Tractors/Loaders/Backhoes	98	8
Trenchers	81	8
Welders	45	8

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END OF DATA ENTRY SHEET

Road Construction Emissions Model - Mitigated Emissions (Tier 2&3 Equipment)

Emission Estimates for -> MCP											
Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	CO2 (lbs/day)	
Grubbing/Land Clearing	5.7	87.8	101.8	155.4	5.4	150.0	36.1	4.9	31.2	18,741.0	
Grading/Excavation	11.9	172.5	259.9	162.3	12.3	150.0	41.8	10.6	31.2	48,844.7	
Drainage/Utilities/Sub-Grade	6.3	95.2	107.4	156.5	6.5	150.0	37.0	5.8	31.2	19,564.1	
Paving	4.0	67.9	65.0	4.6	4.6	-	4.1	4.1	-	12,330.7	
Maximum (pounds/day)	11.9	172.5	259.9	162.3	12.3	150.0	41.8	10.6	31.2	48,844.7	
Total (tons/construction project)	4.5	66.2	90.5	71.9	4.6	67.3	18.0	4.0	14.0	16,916.7	
Notes:											
Project Start Year ->	2016										
Project Length (months) ->	48										
Total Project Area (acres) ->	500										
Maximum Area Disturbed/Day (acres) ->	15										
Total Soil Imported/Exported (yd ³ /day)->	2000										
PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.											
Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.											
Emission Estimates for -> MCP											
Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	Total PM10 (kgs/day)	Exhaust PM10 (kgs/day)	Fugitive Dust PM10 (kgs/day)	Total PM2.5 (kgs/day)	Exhaust PM2.5 (kgs/day)	Fugitive Dust PM2.5 (kgs/day)	CO2 (kgs/day)	
Grubbing/Land Clearing	2.6	39.9	46.3	70.7	2.5	68.2	16.4	2.2	14.2	8,518.6	
Grading/Excavation	5.4	78.4	118.1	73.8	5.6	68.2	19.0	4.8	14.2	22,202.1	
Drainage/Utilities/Sub-Grade	2.8	43.3	48.8	71.1	2.9	68.2	16.8	2.6	14.2	8,892.8	
Paving	1.8	30.8	29.5	2.1	2.1	-	1.9	1.9	-	5,604.8	
Maximum (kilograms/day)	5.4	78.4	118.1	73.8	5.6	68.2	19.0	4.8	14.2	22,202.1	
Total (megagrams/construction project)	4.0	60.0	82.1	65.3	4.2	61.1	16.4	3.7	12.7	15,344.0	
Notes:											
Project Start Year ->	2016										
Project Length (months) ->	48										
Total Project Area (hectares) ->	202										
Maximum Area Disturbed/Day (hectares) ->	6										
Total Soil Imported/Exported (meters ³ /day)->	1529										
PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.											
Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.											

Road Construction Emissions Model - Mitigated Emissions (Tier 2&3 Equipment) Data Entry Worksheet

Note: Required data input sections have a yellow background.

Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.

The user is required to enter information in cells C10 through C25.

Input Type

Project Name	MCP	
Construction Start Year	2016	Enter a Year between 2009 and 2025 (inclusive)
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	48.0	months
Predominant Soil/Site Type: Enter 1, 2, or 3	2	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
Project Length	16	miles
Total Project Area	500.0	acres
Maximum Area Disturbed/Day	15.0	acres
Water Trucks Used?	1	1. Yes 2. No
Soil Imported	1000.0	yd3/day
Soil Exported	1000.0	yd3/day
Average Truck Capacity	15.0	yd3 (assume 20 if unknown)

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C34 through C37.

Construction Periods	User Override of Construction Months	Program Calculated Months	2005		2006		2007	
				%		%		%
Grubbing/Land Clearing		4.80	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation		21.60	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade		14.40	0.00	0.00	0.00	0.00	0.00	0.00
Paving		7.20	0.00	0.00	0.00	0.00	0.00	0.00
Totals	0.00	48.00						

NOTE: soil hauling emissions are included in the Grading/Excavation Construction Period Phase, therefore the Construction Period for Grading/Excavation cannot be zero if hauling is part of the project.

Hauling emission default values can be overridden in cells C45 through C46.

Soil Hauling Emissions		User Override of					
User Input		Soil Hauling Defaults	Default Values				
Miles/round trip			30				
Round trips/day			133				
Vehicle miles traveled/day (calculated)				4000			
Hauling Emissions	ROG	NOx	CO	PM10	PM2.5	CO2	
Emission rate (grams/mile)	0.15	7.62	0.67	0.16	0.09	1658.55	
Emission rate (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00	
Pounds per day	1.3	67.1	5.9	1.4	0.8	14612.8	
Tons per construction period	0.31	15.95	1.41	0.33	0.19	3472.00	

Worker commute default values can be overridden in cells C60 through C65.

Worker Commute Emissions		User Override of Worker					
		Commute Default Values	Default Values				
Miles/ one-way trip			20				
One-way trips/day			2				
No. of employees: Grubbing/Land Clearing			48				
No. of employees: Grading/Excavation			75				
No. of employees: Drainage/Utilities/Sub-Grade			73				
No. of employees: Paving			59				
	ROG	NOx	CO	PM10	PM2.5	CO2	
Emission rate - Grubbing/Land Clearing (grams/mile)	0.147	0.194	1.744	0.047	0.020	443.650	
Emission rate - Grading/Excavation (grams/mile)	0.136	0.178	1.601	0.047	0.020	443.740	
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.117	0.150	1.363	0.047	0.020	443.166	
Emission rate - Paving (grams/mile)	0.112	0.140	1.291	0.047	0.020	441.739	
Emission rate - Grubbing/Land Clearing (grams/trip)	0.505	0.323	4.200	0.004	0.003	95.592	
Emission rate - Grading/Excavation (grams/trip)	0.469	0.295	3.878	0.004	0.003	95.634	
Emission rate - Draining/Utilities/Sub-Grade (gr/trip)	0.404	0.246	3.307	0.004	0.003	95.748	
Emission rate - Paving (grams/trip)	0.382	0.228	3.101	0.004	0.003	95.822	
Pounds per day - Grubbing/Land Clearing	0.829	0.948	9.056	0.198	0.084	1896.691	
Tons per const. Period - Grub/Land Clear	0.044	0.050	0.478	0.010	0.004	100.145	
Pounds per day - Grading/Excavation	1.209	1.369	13.140	0.312	0.132	2995.395	
Tons per const. Period - Grading/Excavation	0.287	0.325	3.122	0.074	0.031	711.706	
Pounds per day - Drainage/Utilities/Sub-Grade	1.008	1.113	10.817	0.301	0.128	2891.960	
Tons per const. Period - Drain/Util/Sub-Grade	0.160	0.176	1.713	0.048	0.020	458.086	
Pounds per day - Paving	0.777	0.844	8.287	0.244	0.103	2336.136	
Tons per const. Period - Paving	0.062	0.067	0.656	0.019	0.008	185.022	
tons per construction period	0.552	0.618	5.970	0.152	0.064	1454.959	

Water truck default values can be overridden in cells C91 through C93 and E91 through E93.

		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00	
	4	Rollers	0.37	6.04	7.46	0.64	0.59	1117.90	
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	
4.00		Rubber Tired Dozers	1.07	17.67	21.37	1.07	0.98	3777.61	
6.00	3	Rubber Tired Loaders	1.15	18.69	22.94	1.15	1.06	3976.20	
	4	Scrapers	1.85	29.02	36.92	1.85	1.70	6432.16	
8.00	32	Signal Boards	0.62	10.68	12.42	0.67	0.61	1259.47	
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	
0.00	4	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00	
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	
		Welders	0.00	0.00	0.00	0.00	0.00	0.00	
		Grading/Excavation	pounds per day	9.3	152.9	185.4	10.5	9.6	29921.3
		Grading	tons per phase	2.2	36.3	44.0	2.5	2.3	7109.3

Drainage/Utilities/Subgrade	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
			Override of Default Number of Vehicles	Program-estimate	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
2.00		Excavators	0.33	5.58	6.57	0.48	0.44	1145.46
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
2.00	3	Generator Sets	0.48	5.90	9.61	0.51	0.47	974.13
4.00	3	Graders	0.76	13.85	15.11	0.76	0.70	2668.92
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
2.00		Other Construction Equipment	0.38	7.19	7.54	0.55	0.51	1307.82
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
4.00	3	Plate Compactors	0.07	0.84	1.36	0.07	0.07	137.79
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3	Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00

		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	4	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Paving	pounds per day	3.2	59.6	64.1	4.4	4.0	9994.5
	Paving	tons per phase	0.3	4.7	5.1	0.3	0.3	791.6
Total Emissions all Phases (tons per construction period) =>			3.5	58.5	70.6	4.1	3.7	11270.6

Equipment default values for horsepower and hours/day can be overridden in cells C289 through C322 and E289 through E322.

Equipment	Default Values	
	Horsepower	Hours/day
Aerial Lifts	63	8
Air Compressors	106	8
Bore/Drill Rigs	206	8
Cement and Mortar Mixers	10	8
Concrete/Industrial Saws	64	8
Cranes	226	8
Crawler Tractors	208	8
Crushing/Proc. Equipment	142	8
Excavators	163	8
Forklifts	89	8
Generator Sets	66	8
Graders	175	8
Off-Highway Tractors	123	8
Off-Highway Trucks	400	8
Other Construction Equipment	172	8
Other General Industrial Equipment	88	8
Other Material Handling Equipment	167	8
Pavers	126	8
Paving Equipment	131	8
Plate Compactors	8	8
Pressure Washers	26	8
Pumps	53	8
Rollers	81	8
Rough Terrain Forklifts	100	8
Rubber Tired Dozers	255	8
Rubber Tired Loaders	200	8
Scrapers	362	8
Signal Boards	20	8
Skid Steer Loaders	65	8
Surfacing Equipment	254	8

Sweepers/Scrubbers	64		8
Tractors/Loaders/Backhoes	98		8
Trenchers	81		8
Welders	45		8

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END OF DATA ENTRY SHEET