

Appendix C: Roadway Construction Emissions Model and CT-EMFAC Modeling Results

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Road Construction Emissions Model, Version 9.0.0

Daily Emission Estimates for -> 2648 El Camino Roadway Improvements Project													Total	Exhaust	Fugitive Dust	Total	Exhaust	Fugitive Dust	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Project Phases (Pounds)	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)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)									
Grubbing/Land Clearing	1.18	10.39	12.37	10.54	0.54	10.00	2.56	0.48	2.08	0.02	2,228.28	0.59	0.05	2,257.05									
Grading/Excavation	3.62	25.19	41.66	11.68	1.68	10.00	3.56	1.48	2.08	0.07	6,682.28	1.70	0.18	6,779.50									
Drainage/Utilities/Sub-Grade	2.99	25.68	29.98	11.36	1.36	10.00	3.33	1.25	2.08	0.05	5,109.91	1.00	0.08	5,157.55									
Paving	1.02	11.55	9.50	0.54	0.54	0.00	0.47	0.47	0.00	0.02	2,023.47	0.47	0.05	2,049.76									
Maximum (pounds/day)	3.62	25.68	41.66	11.68	1.68	10.00	3.56	1.48	2.08	0.07	6,682.28	1.70	0.18	6,779.50									
Total (tons/construction project)	0.18	1.44	1.97	0.65	0.08	0.56	0.19	0.08	0.12	0.00	329.19	0.08	0.01	333.31									

Notes:
 Project Start Year -> 2021
 Project Length (months) -> 6
 Total Project Area (acres) -> 15
 Maximum Area Disturbed/Day (acres) -> 1
 Water Truck Used? -> Yes

Phase	Total Material Imported/Exported Volume (yd ³ /day)		Daily VMT (miles/day)			
	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	0	0	0	280	40
Grading/Excavation	100	0	150	0	880	40
Drainage/Utilities/Sub-Grade	0	0	0	0	600	40
Paving	0	0	0	0	480	40

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

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1, 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> 2648 El Camino Roadway Improvements Project													Total	Exhaust	Fugitive Dust	Total	Exhaust	Fugitive Dust	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	PM10 (tons/phase)	PM10 (tons/phase)	PM10 (tons/phase)	PM2.5 (tons/phase)	PM2.5 (tons/phase)	PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)									
Grubbing/Land Clearing	0.01	0.07	0.08	0.07	0.00	0.07	0.02	0.00	0.01	0.00	14.71	0.00	0.00	13.51									
Grading/Excavation	0.10	0.66	1.10	0.31	0.04	0.26	0.09	0.04	0.05	0.00	176.41	0.04	0.00	162.37									
Drainage/Utilities/Sub-Grade	0.07	0.59	0.69	0.26	0.03	0.23	0.08	0.03	0.05	0.00	118.04	0.02	0.00	108.08									
Paving	0.01	0.11	0.09	0.01	0.01	0.00	0.00	0.00	0.00	0.00	20.03	0.00	0.00	18.41									
Maximum (tons/phase)	0.10	0.66	1.10	0.31	0.04	0.26	0.09	0.04	0.05	0.00	176.41	0.04	0.00	162.37									
Total (tons/construction project)	0.18	1.44	1.97	0.65	0.08	0.56	0.19	0.08	0.12	0.00	329.19	0.08	0.01	302.37									

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

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1, 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

File Name: San Diego (SD) - 2020 - Annual Existing.EC
 CT-EMFAC Version: 6.0.0.29548
 Run Date: 6/29/2020 10:29:08 AM
 Area: San Diego (SD)
 Analysis Year: 2020
 Season: Annual

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Vehicle Category      VMT Fraction      Diesel VMT Fraction
                   Across Category  Within Category
    Truck 1           0.020            0.578
    Truck 2           0.020            0.949
    Non-Truck         0.960            0.013
=====
    
```

```

Road Length:         0.8 miles
Volume:              3,713 vehicles per hour
Number of Hours:     1 hours
Avg. Idling Time:    0 minutes per vehicle
Tot. Idling Time:    0.00 hours
    
```

VMT Distribution by Speed (mph):

```

5           0.00%
10          0.00%
15          0.00%
20          0.00%
25          0.00%
30          0.00%
35          0.00%
40          0.00%
45          0.00%
50         100.00%
55          0.00%
60          0.00%
65          0.00%
70          0.00%
75          0.00%
    
```

Summary of Project Emissions

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Pollutant Name      Running Exhaust  Idling Exhaust  Running Loss      Tire Wear      Brake Wear      Total      Total
                   (grams)          (grams)          (grams)           (grams)        (grams)         (grams)     (US tons)
    HC                104.8            0.0              92.0              -              -              196.9       <0.001
    ROG               83.9            0.0              98.4              -              -              182.3       <0.001
    TOG               115.3           0.0              98.4              -              -              213.7       <0.001
    CO                2,446.9         0.0              -                 -              -              2,446.9     0.003
    NOx               592.7           0.0              -                 -              -              592.7       <0.001
    CO2              879,835.6       0.0              -                 -              -              879,835.6   0.970
    CH4                27.1            0.0              -                 -              -              27.1        <0.001
    PM10               6.8             0.0              -                 25.0          120.3          152.1       <0.001
    PM2.5              6.4             0.0              -                 6.2           51.6           64.2        <0.001
    Benzene            2.7             0.0              1.0              -              -              3.7         <0.001
    Acrolein           0.1             0.0              -                 -              -              0.1         <0.001
    Acetaldehyde       1.4             0.0              -                 -              -              1.4         <0.001
    Formaldehyde       3.7             0.0              -                 -              -              3.7         <0.001
    Butadiene          0.6             0.0              0.0              -              -              0.6         <0.001
    Naphthalene       <0.1            0.0              0.1              -              -              0.2         <0.001
    POM                0.1             0.0              -                 -              -              0.1         <0.001
    Diesel PM          3.2             0.0              -                 -              -              3.2         <0.001
    DEOG              13.1            0.0              -                 -              -              13.1        <0.001
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File Name: San Diego (SD) - 2040 - Annual Build.EC
 CT-EMFAC Version: 6.0.0.29548
 Run Date: 6/29/2020 10:37:44 AM
 Area: San Diego (SD)
 Analysis Year: 2040
 Season: Annual

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=====
Vehicle Category      VMT Fraction      Diesel VMT Fraction
                   Across Category  Within Category
    Truck 1           0.020            0.692
    Truck 2           0.020            0.951
    Non-Truck         0.960            0.013
=====
    
```

```

Road Length:      0.8 miles
Volume:          4,048 vehicles per hour
Number of Hours: 1 hours
Avg. Idling Time: 0 minutes per vehicle
Tot. Idling Time: 0.00 hours
    
```

```

VMT Distribution by Speed (mph):
5           0.00%
10          0.00%
15          0.00%
20          0.00%
25          0.00%
30          0.00%
35          0.00%
40          0.00%
45          0.00%
50         100.00%
55          0.00%
60          0.00%
65          0.00%
70          0.00%
75          0.00%
    
```

Summary of Project Emissions

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=====
Pollutant Name      Running Exhaust  Idling Exhaust  Running Loss    Tire Wear      Brake Wear      Total          Total
                   (grams)          (grams)         (grams)         (grams)        (grams)         (grams)        (US tons)
    HC               63.0            0.0            43.1            -              -              106.1         <0.001
    ROG              50.6            0.0            46.1            -              -              96.7          <0.001
    TOG              68.7            0.0            46.1            -              -              114.8         <0.001
    CO               1,274.6         0.0            -               -              -              1,274.6       0.001
    NOx              159.4           0.0            -               -              -              159.4         <0.001
    CO2              625,022.8      0.0            -               -              -              625,022.8    0.689
    CH4              15.7            0.0            -               -              -              15.7          <0.001
    PM10             2.2            0.0            -               27.2           130.0          159.4         <0.001
    PM2.5            2.0            0.0            -               6.8            55.7           64.5          <0.001
    Benzene          1.7            0.0            0.5            -              -              2.1           <0.001
    Acrolein         <0.1           0.0            -               -              -              <0.1          <0.001
    Acetaldehyde     0.7            0.0            -               -              -              0.7           <0.001
    Formaldehyde     2.0            0.0            -               -              -              2.0           <0.001
    Butadiene        0.4            0.0            0.0            -              -              0.4           <0.001
    Naphthalene     <0.1           0.0            <0.1            -              -              0.1           <0.001
    POM              <0.1           0.0            -               -              -              <0.1          <0.001
    Diesel PM        0.6            0.0            -               -              -              0.6           <0.001
    DEOG             5.8            0.0            -               -              -              5.8           <0.001
    
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=====END=====

File Name: San Diego (SD) - 2040 - No Build Annual.EC
 CT-EMFAC Version: 6.0.0.29548
 Run Date: 6/29/2020 10:30:58 AM
 Area: San Diego (SD)
 Analysis Year: 2040
 Season: Annual

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Vehicle Category	VMT Fraction	
	Across Category	Diesel VMT Fraction Within Category
Truck 1	0.020	0.692
Truck 2	0.020	0.951
Non-Truck	0.960	0.013

=====

Road Length: 0.8 miles
 Volume: 4,048 vehicles per hour
 Number of Hours: 1 hours
 Avg. Idling Time: 0 minutes per vehicle
 Tot. Idling Time: 0.00 hours

VMT Distribution by Speed (mph):

5	0.00%
10	0.00%
15	0.00%
20	0.00%
25	0.00%
30	0.00%
35	0.00%
40	0.00%
45	0.00%
50	100.00%
55	0.00%
60	0.00%
65	0.00%
70	0.00%
75	0.00%

=====

Summary of Project Emissions

Pollutant Name	Running Exhaust (grams)	Idling Exhaust (grams)	Running Loss (grams)	Tire Wear (grams)	Brake Wear (grams)	Total (grams)	Total (US tons)
HC	63.0	0.0	43.1	-	-	106.1	<0.001
ROG	50.6	0.0	46.1	-	-	96.7	<0.001
TOG	68.7	0.0	46.1	-	-	114.8	<0.001
CO	1,274.6	0.0	-	-	-	1,274.6	0.001
NOx	159.4	0.0	-	-	-	159.4	<0.001
CO2	625,022.8	0.0	-	-	-	625,022.8	0.689
CH4	15.7	0.0	-	-	-	15.7	<0.001
PM10	2.2	0.0	-	27.2	130.0	159.4	<0.001
PM2.5	2.0	0.0	-	6.8	55.7	64.5	<0.001
Benzene	1.7	0.0	0.5	-	-	2.1	<0.001
Acrolein	<0.1	0.0	-	-	-	<0.1	<0.001
Acetaldehyde	0.7	0.0	-	-	-	0.7	<0.001
Formaldehyde	2.0	0.0	-	-	-	2.0	<0.001
Butadiene	0.4	0.0	0.0	-	-	0.4	<0.001
Naphthalene	<0.1	0.0	<0.1	-	-	0.1	<0.001
POM	<0.1	0.0	-	-	-	<0.1	<0.001
Diesel PM	0.6	0.0	-	-	-	0.6	<0.001
DEOG	5.8	0.0	-	-	-	5.8	<0.001

=====END=====