



CONFORMITY ANALYSIS DATA

Paved Road Re-entrained PM10 Emissions in Rillito PM10 nonattainment area

EPA Compilation of Air Pollutant Emission Factors, AP-42, emission factors were used to calculate PM₁₀ emissions from re-entrained dust produced by vehicles traveling on paved roads in the Rillito PM₁₀ nonattainment area for analysis years 1990, 2029, 2035 and 2045. Equation 2 from section 13.2.1.3 was used to account for annual precipitation. The 1990 baseline input values were derived from ADEQ’s 1994 Rillito SIP submittal. The “Action” scenario input values and 1990 silt loading values were derived from ADEQ’s 2004 Rillito Nonattainment Area Emissions Inventory used in the [Rillito Moderate PM10 Limited Maintenance Plan and Request for Redesignation to Attainment Request](#). ADEQ is in the process of completing an updated emissions inventory as part of the SIP development process, which will provide for updated inputs once they become available. VMT were derived from the 1994 SIP and latest TDM.

$$E_{ext} = [k(sL)^{0.91} \times (W)^{1.02}] (1 - P/4N)$$

where:

E_{ext} = annual average particulate emission factor in the same units as k

k = particle size multiplier for particle size range and units of interest (1.00 g/mi)

sL = road surface silt loading (0.020 g/m² for freeways, 0.085 g/m² for arterial, collector & local)

W = average weight of the vehicles traveling the road (derived from 1994 SIP and latest TDM)

P = number of "wet" days with at least 0.254 mm (0.01 in) of precipitation during the averaging period, and

N = number of days in the averaging period

Paved Road Re-entrained PM₁₀ Emission Factors

		k (g/mi)	sL (g/m ²)	W (tons)	P (wet days)	N (days/yr)	E _{ext} (g/mi)
1990 Baseline	Freeway	1.00	0.020	3.18	30	365	0.0907
	Art, Col & Loc	1.00	0.085	3.18	30	365	0.3382
2029 Action	Freeway	1.00	0.020	3.137	35	365	0.0891
	Art, Col & Loc	1.00	0.085	2.346	35	365	0.247
2035 Action	Freeway	1.00	0.020	3.137	35	365	0.886
	Art, Col & Loc	1.00	0.085	2.346	35	365	0.248
2045 Action	Freeway	1.00	0.020	3.137	35	365	0.0881
	Art, Col & Loc	1.00	0.085	2.346	35	365	0.249

Annual VMT on Paved Roads in Rillito PM₁₀ nonattainment area

	1990 Baseline	2029 Action	2035 Action	2045 Action
Freeway	182,109,815	527,414,492	573,131,330	655,563,460
Arterial & Collector	51,707,725	364,733,634	382,269,344	425,772,395
Local Residential	9,903,545	32,276,898	32,129,904	33,803,462
Total	243,721,085	924,425,025	987,530,577	1,115,139,317

Uncontrolled Paved Road PM₁₀ Emissions in Rillito PM₁₀ nonattainment area (U.S. tons/year)

	1990 Baseline	2029 Action	2035 Action	2045 Action
Freeway	18.20	51.80	55.96	63.69
Arterial & Collector	19.28	99.37	104.69	116.80
Local residential	3.69	8.79	8.80	9.27
Total	41.17	159.96	169.45	189.77

Control Measure Reductions (U.S. tons/year)

	2029	2035	2045
PAG Travel Reduction Program	1.2	1.2	1.4
PDEQ Voluntary No-Drive Day/Clean Air Program	0.3	0.3	0.3
Total	1.4	1.5	1.7

Unpaved Road Re-entrained PM₁₀ Emissions in Rillito PM₁₀ nonattainment area

EPA Compilation of Air Pollutant Emission Factors, AP-42, emission factors were used to calculate PM₁₀ emissions from re-entrained dust produced by vehicles traveling on unpaved roads in the Rillito PM₁₀ nonattainment area for analysis years 2029, 2035 and 2045. Equation 1b from section 13.2.2 was used and modified to account for annual precipitation. The 1990 baseline emission values were derived from ADEQ's 1994 Rillito SIP submittal. The "Action" scenario input values were derived from ADEQ's 2004 Rillito Nonattainment Area Emissions Inventory used in the [Rillito Moderate PM10 Limited Maintenance Plan and Request for Redesignation to Attainment Request](#). ADEQ is in the process of completing an emissions inventory as part of the SIP development process, which will provide for updated inputs once they become available. VMT were derived from TDM.

$$E = \left[\frac{k(s/12)^1(S/30)^{0.5}}{(M/0.5)^{0.2}} - C \right] (1 - P/N)$$

where:

E = annual average particulate emission factor in the same units as *k*

k = particle size multiplier for particle size range and units of interest (1.8 lb/mi)

s = surface material silt content (3.51%)

S = mean vehicle speed mph (15 mph for local residential, 25 mph for collectors)

M = surface material moisture content (0.64%)

C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear (0.00047 lb/mi)

P = number of "wet" days with at least 0.254 mm (0.01 in) of precipitation during the averaging period, and

N = number of days in the averaging period

Unpaved Road Re-entrained PM₁₀ Emission Factors

		<i>k</i> (g/mi)	<i>s</i> (%)	<i>S</i> (mph)	<i>M</i> (%)	<i>C</i> (lb/mi)	<i>P</i> (wet days)	<i>N</i> (days/yr)	<i>E</i> (g/mi)
2029	Collector	1.8	3.51	25	0.64	0.00047	35	365	0.41
	Local residential	1.8	3.51	15	0.64	0.00047	35	365	0.32
2035	Collector	1.8	3.51	25	0.64	0.00047	35	365	0.41
	Local residential	1.8	3.51	15	0.64	0.00047	35	365	0.32
2045	Collector	1.8	3.51	25	0.64	0.00047	35	365	0.41
	Local residential	1.8	3.51	15	0.64	0.00047	35	365	0.32

Annual VMT on Unpaved Roads in Rillito PM₁₀ nonattainment area

	2029 Action	2035 Action	2045 Action
Collector	311,748	312,188	357,754
Local residential	2,157,301	2,536,756	3,095,970
Total	2,469,049	2,848,944	3,453,724

Uncontrolled Unpaved Road PM₁₀ Emissions in Rillito PM₁₀ nonattainment area (U.S. tons/year)

	1990 Baseline	2029 Action	2035 Action	2045 Action
Collector	4.58	0.14	0.14	0.16
Local residential	803.12	0.76	0.89	1.09
Total	807.70	0.90	1.04	1.25

Control Measure Reductions (U.S. tons/year)

	2029	2035	2045
PAG Travel Reduction Program	0.007	0.007	0.009
PDEQ Voluntary No-Drive Day/Clean Air Program	0.001	0.002	0.002
Total	0.008	0.009	0.011