



Area Source Methodology Technical Documentation

Section 7.9 **Entrained Road Travel, Paved Road Dust**

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Area Source Improvement & Community Inventory Development Section
Air Quality Planning and Science Division

Emission Inventory Source Category

Miscellaneous Processes / Road Dust

Emission Inventory Codes (CES Codes) and Description

EIC Codes (CES Codes)	Description
640-635-5400-0000 (83618)	Paved Entrained Road Dust-Freeways
640-637-5400-0000 (83626)	Paved Entrained Road Dust-Major Streets
640-639-5400-0000 (83634)	Paved Entrained Road Dust-Collector Streets
640-641-5400-0000 (83642)	Paved Entrained Road Dust-Local Streets
640-636-5400-0000 (47456)	Paved Entrained Road Dust-Unspecified Paved Roads

Federal Sources Classification Codes and Description

SCC Codes	Description
2294000000	Mobile Sources, Paved Roads, All Paved Roads, Total: Fugitives

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Source Category Description

The paved road dust category includes emissions of particulate matter (PM) from resuspended road surface materials that are entrained by vehicular travel on public and industrial paved roads. Entrained paved road dust, or fugitive dust, contributes to airborne PM emissions throughout California. Since it is not feasible to directly measure region-wide emissions from travel on paved roads, the California Air Resources Board (CARB) computes emissions using the emission factor equation provided in the U.S. EPA's AP-42 document [1]. The emission factor equation was derived from regression analyses of 83 tests for particulate matter emissions less than or equal to 10 microns in diameter (PM_{10}) on public and industrial paved roads. Airborne PM emissions were closely correlated with vehicle weight and silt loading (the mass of material 75 microns or less per square meter of roadway). Inputs to the paved road dust emission factor equation were developed from California-specific roadway silt loading measurements [2] [3] [4] [5] and average vehicle weight data. This update estimates California paved road dust emissions for 2023. Data from CARB, air districts, and transportation planning agencies were used to estimate county-specific vehicle miles traveled (VMT) [6]. California Department of Transportation (Caltrans) Highway Performance Monitoring System (HPMS) data were used to estimate the fraction of travel on each of four road types in each county: freeway, major, collector, and local [7] [8]. Gridded precipitation data from gridMET, a high-resolution, daily meteorological dataset for the contiguous United States, were used to estimate the average number of days per year that each county received 0.01 inch or greater of precipitation during 2013-2023 [9].

Unspecified Paved Roads (EIC 640-636-5400-0000, CES 47456) represents entrained road dust emissions from paved roadway travel that cannot be classified under the four standard road types (Freeways, Major Streets, Collector Streets, Local Streets) used in the paved road dust methodology. In practice, this "Unspecified Paved Roads" category serves as a catch-all for any paved roads or vehicular travel surfaces not captured by those primary classifications, providing a mechanism to include region-specific paved road dust sources. However, no annual emission estimation method has been derived, or included in this methodology for the Unspecified Paved Roads category.

Overview of Estimation Methodology

PM_{10} emissions from resuspension of road surface material by vehicle travel on paved roads (entrained paved road dust) are computed using the emission factor equation in the U.S. EPA's AP-42 [1]. Total particulate matter emissions (PM) and particulate matter emissions less than or equal to 2.5 microns in diameter ($PM_{2.5}$) are computed using CARB's speciation profile #471 for paved road dust as described in the CARB Speciation Profile section below [10] [11] [12] [13] [14] [15] [16]. Emission estimates for dust from constructing new roads are provided in CARB's Road Construction Dust methodology [17]. The methodology does not include directly emitted motor vehicle emissions (exhaust, brake or tire wear), nor TOG, CO,

NO_x, SO_x, or PM exhaust emissions; these emissions are included in CARB's mobile source emission inventory [6].

Emission Estimation Methodology

The AP-42 emission factor equation [1] used to estimate paved road dust emissions for PM₁₀ is provided below, followed by a description of the inputs to the equation:

$$E = k \times sL^{0.91} \times W^{1.02} (1 - (P \div (4 \times N)))$$

Where:

E = the particulate emission factor in units of pounds of PM₁₀ per VMT,

k = the U.S. EPA AP-42 particle size multiplier (PM₁₀=0.0022 lb/VMT) [1],

sL = the roadway-specific silt loading in grams/square meter (g/m²) [2] [3] [4] [5],

W=the average weight of vehicles traveling the road (California statewide default =2.8 tons)

P=number of "wet" days, when at least one site per county received at least 0.01 inch of precipitation during the annual averaging period [9], and

N=the number of days in the annual averaging period (default=365).

Paved road dust emissions for Total PM and PM_{2.5} are calculated using particle size weight fractions from CARB's speciation profile #471 for paved road dust [10] [11] [12]. [13] [14] [15] [16].

Roadway Category Splits

The HPMS, a federally mandated inventory system and planning tool designed to assess the nation's highway system, is used by State and Federal governments and local agencies to analyze the system's condition and performance. HPMS provides data on VMT for seven functional systems, based on mobility and access considerations defined by the Federal Highway Administration (FHWA) [7] [8]. To calculate county-specific travel fractions for each roadway type, CARB apportioned 2022 Caltrans HPMS paved road VMT to four CARB roadway classifications (freeway, major, collector, and local), based on their anticipated usage, modes of usage, and silt loading potential [7]. Table 1 shows how HPMS functional systems are distributed to CARB road categories and also provides FHWA functional system characteristics. Table 2 presents total VMT (in millions of miles) for 2023 for each county, and the 2022 travel fractions used to distribute VMT to each roadway category.

Table 1 CARB Roadway Categories, Caltrans HPMS Functional Systems, and FHWA Functional System Characteristics.

CARB Category	HPMS Functional System	FHWA Functional System Characteristics
Freeway	Interstate	All designated routes of the Interstate System. Provides substantial interstate travel, highest overall travel speeds.
Freeway	Principal Arterial- Other Freeways and Expressways	Highest level of mobility, highest traffic volumes and travel speeds, controlled access routes. Serves longest trips and through-movement as well as access to major urban centers. Provides intra-area travel, intra-urban and inter-city bus routes. Integrates with major rural connections.
Major	Principal Arterial- Other	Provides substantial statewide travel, links cities and larger towns, links to interstates and inter-county service; relatively high travel speeds. Can also provide service to major traffic movements, uncontrolled access to adjacent land.
Major	Minor Arterial	Interconnects, augments urban principal arterial system, distributes travel to smaller geographic areas, may carry local bus routes. Serves trips of moderate length at somewhat lower mobility and speeds. Connects to rural collector roads.
Collector	Major Collector	Primarily intra-county; shorter distances and more moderate travel speeds than arterials.
Local	Minor Collector	Collects traffic from local roads, services smaller communities, links locally important traffic generators with remote areas.
Local	Local	Provides access to adjacent land over relatively short distances.

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Table 2 Roadway VMT Estimates for California with Travel Fractions for freeway, major, collector, and local.

County	VMT (x 10⁶/yr)	Freeway	Major	Collector	Local
Alameda	15314	0.63	0.25	0.07	0.04
Alpine	85	0.00	0.80	0.10	0.09
Amador	388	0.00	0.65	0.22	0.13
Butte	2012	0.02	0.67	0.17	0.13
Calaveras	497	0.00	0.63	0.20	0.17
Colusa	821	0.56	0.19	0.08	0.17
Contra Costa	8744	0.56	0.31	0.08	0.06
Del Norte	325	0.00	0.58	0.13	0.29
El Dorado	1890	0.22	0.54	0.12	0.12
Fresno	8620	0.39	0.27	0.21	0.13
Glenn	767	0.53	0.21	0.11	0.16
Humboldt	1717	0.00	0.69	0.18	0.13
Imperial	2865	0.31	0.51	0.13	0.05
Inyo	967	0.00	0.67	0.21	0.11
Kern	9013	0.44	0.36	0.10	0.10
Kings	1546	0.39	0.36	0.15	0.10
Lake	846	0.00	0.58	0.28	0.14
Lassen	614	0.00	0.66	0.11	0.23
Los Angeles	85093	0.49	0.40	0.08	0.04
Madera	1552	0.42	0.38	0.11	0.08
Marin	2415	0.56	0.18	0.19	0.07
Mariposa	183	0.00	0.60	0.11	0.29
Mendocino	1655	0.00	0.69	0.15	0.16
Merced	2811	0.42	0.37	0.12	0.09
Modoc	251	0.00	0.47	0.16	0.36
Mono	453	0.00	0.78	0.10	0.12
Monterey	3246	0.45	0.27	0.18	0.11
Napa	1163	0.21	0.53	0.21	0.06
Nevada	1293	0.35	0.35	0.15	0.15
Orange	29473	0.44	0.47	0.03	0.06
Placer	4282	0.43	0.30	0.14	0.13
Plumas	400	0.00	0.56	0.12	0.32
Riverside	23400	0.52	0.28	0.13	0.07
Sacramento	13032	0.46	0.38	0.10	0.07
San Benito	483	0.20	0.62	0.09	0.09
San Bernardino	23772	0.54	0.31	0.09	0.06
San Diego	31770	0.59	0.26	0.11	0.05

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County	VMT (x 10⁶/yr)	Freeway	Major	Collector	Local
San Francisco	3572	0.45	0.43	0.08	0.05
San Joaquin	6864	0.57	0.24	0.12	0.07
San Luis Obispo	2236	0.43	0.36	0.10	0.10
San Mateo	6275	0.65	0.27	0.06	0.03
Santa Barbara	4108	0.47	0.35	0.13	0.05
Santa Clara	15651	0.53	0.36	0.06	0.05
Santa Cruz	1526	0.41	0.33	0.18	0.07
Shasta	1940	0.38	0.45	0.08	0.09
Sierra	144	0.18	0.39	0.08	0.35
Siskiyou	1376	0.42	0.22	0.13	0.23
Solano	4908	0.70	0.20	0.07	0.04
Sonoma	4031	0.33	0.38	0.19	0.09
Stanislaus	4149	0.36	0.33	0.21	0.10
Sutter	256	0.24	0.53	0.11	0.13
Tehama	1454	0.55	0.23	0.12	0.10
Trinity	496	0.00	0.45	0.05	0.49
Tulare	3878	0.38	0.30	0.19	0.13
Tuolumne	701	0.00	0.50	0.18	0.32
Ventura	7097	0.44	0.43	0.08	0.06
Yolo	2251	0.60	0.24	0.09	0.07
Yuba	726	0.20	0.47	0.18	0.15
Statewide Total	357397	0.48	0.35	0.10	0.07

COABDIS-Level Distribution of VMT Fractions

The travel fractions for the CARB roadway categories in Table 2 are at county-level. To allocate these fractions at the COABDIS level, VMT fractions were calculated. Specifically, the fraction of a county's VMT within each COABDIS region was determined by dividing the EMFAC VMT for that COABDIS region by the county's EMFAC total VMT. Table 3 presents the resulting VMT distribution across COABDIS regions.

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Table 3 VMT Fraction by COABDIS region.

Air Basin	County	Air District	VMT Fraction
GBV	Alpine	GBU	1.00
GBV	Inyo	GBU	1.00
GBV	Mono	GBU	1.00
LC	Lake	LAK	1.00
LT	El Dorado	ED	0.24
LT	Placer	PLA	0.09
MC	Amador	AMA	1.00
MC	Calaveras	CAL	1.00
MC	El Dorado	ED	0.76
MC	Mariposa	MPA	1.00
MC	Nevada	NSI	1.00
MC	Placer	PLA	0.13
MC	Plumas	NSI	1.00
MC	Sierra	NSI	1.00
MC	Tuolumne	TUO	1.00
MD	Kern	KER	0.17
MD	Los Angeles	AV	0.04
MD	Riverside	MOJ	0.02
MD	Riverside	SC	0.02
MD	San Bernardino	MOJ	0.37
NC	Del Norte	NCU	1.00
NC	Humboldt	NCU	1.00
NC	Mendocino	MEN	1.00
NC	Sonoma	NS	0.19
NC	Trinity	NCU	1.00
NCC	Monterey	MBU	1.00
NCC	San Benito	MBU	1.00
NCC	Santa Cruz	MBU	1.00
NEP	Lassen	LAS	1.00
NEP	Modoc	MOD	1.00
NEP	Siskiyou	SIS	1.00
SC	Los Angeles	SC	0.96
SC	Orange	SC	1.00
SC	Riverside	SC	0.76
SC	San Bernardino	SC	0.63
SCC	San Luis Obispo	SLO	1.00
SCC	Santa Barbara	SB	1.00
SCC	Ventura	VEN	1.00
SD	San Diego	SD	1.00

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Air Basin	County	Air District	VMT Fraction
SF	Alameda	BA	1.00
SF	Contra Costa	BA	1.00
SF	Marin	BA	1.00
SF	Napa	BA	1.00
SF	San Francisco	BA	1.00
SF	San Mateo	BA	1.00
SF	Santa Clara	BA	1.00
SF	Solano	BA	0.64
SF	Sonoma	BA	0.81
SJV	Fresno	SJU	1.00
SJV	Kern	SJU	0.83
SJV	Kings	SJU	1.00
SJV	Madera	SJU	1.00
SJV	Merced	SJU	1.00
SJV	San Joaquin	SJU	1.00
SJV	Stanislaus	SJU	1.00
SJV	Tulare	SJU	1.00
SS	Imperial	IMP	1.00
SS	Riverside	SC	0.20
SV	Butte	BUT	1.00
SV	Colusa	COL	1.00
SV	Glenn	GLE	1.00
SV	Placer	PLA	0.78
SV	Sacramento	SAC	1.00
SV	Shasta	SHA	1.00
SV	Solano	YS	0.36
SV	Sutter	FR	1.00
SV	Tehama	TEH	1.00
SV	Yolo	YS	1.00
SV	Yuba	FR	1.00

Silt Loading

CARB assigned silt loading values to four roadway types (freeway, major, collector, local based on HPMS roadway splits), assuming that more highly traveled roadways with fewer entrance and exit points (limited access roadways such as freeways) have less silt loading compared to roadways with multiple access and exit points, and that roads with similar configurations and usage have similar silt loadings statewide. While CARB understands the limitations to this assumption, especially in computing localized emissions, our current strategy is to use the best available California roadway silt loading data to estimate regional entrained road dust emissions. Table 4, presents the statewide default silt loading values for the four CARB roadway categories, as well as the derivation of several districts and county specific silt loadings. Table 5 presents the PM₁₀ emission factors, by roadway category, for each COABDIS region. A summary of the data used to develop the silt loadings is provided in the Appendix (Table A1 and Table A2). The basis for the silt loading values are as follows:

I. Statewide Default Silt Loadings

- Freeway-U.S. EPA AP-42 default [1].
- Major and Collector roadways-geometric mean of 31 California-specific silt measurements of roads with high average daily traffic (ADT) conducted by MRI [2] [5] and the University of California, Davis (UCD) [2] [3] [4].
- Local roadways-mean of 11 California-specific silt measurements of roads with low ADT conducted by MRI [2] [5].

II. County Specific Silt Loadings

- For Major, Collector and Local roads, the portion of Los Angeles County in the South Coast Air Quality Management District (SCAQMD) and all portions of Orange, Riverside and San Bernardino counties use silt loading values based on subsets of measurements collected in the SCAQMD and Riverside County [2] [5].

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Table 4 Silt loading values in California.

a. Default Statewide Silt Loading Values.

Roadway Category	Silt Loading (sL) (g/m ²)	Source of sL Value
Freeway	0.015	U.S. EPA default value [1]
Major	0.032	Geometric mean of 31 California samples [2] [3] [4] [5]
Collector	0.032	Geometric mean of 31 California samples [2] [3] [4] [5]
Local	0.32	Average of 11 California BACM* samples [5]

b.1 County Specific Silt Loading Values: Major, Collector.

Roadway Category	Silt Loading (sL) (g/m ²)	Source of sL Value
Los Angeles & Orange counties: Maj-Coll _[LA&OR]	0.013	0.013 = Mean of 3 of the 4 South Coast High ADT+ BACM sL* measurements [2] [5]
Riverside & San Bernardino counties: Maj-Coll _[RIV&SB]	0.08	0.08 = Mean of all South Coast Low ADT BACM sL measurements [2] [5]

b.2 County Specific Silt Loading Values: Major-Collector Scaling Ratio.

Roadway Category	Silt Loading (sL) (g/m ²)	Source of sL Value
Maj-Coll _[RIV&SB] /Maj-Coll _[LA&OR]	$(0.08/0.013) = 6.2$	6.2 is used below to scale sL Local _[LA&OR] to sL Local _[RIV&SB]

b.3 County Specific Silt Loading Values: Local.

Roadway Category	Silt Loading (sL) (g/m ²)	Source of sL Value
Los Angeles & Orange counties: Local _[LA&OR]	0.135	0.135=Geometric mean of 11 CA High ADT sL measurements [5]
Riverside & San Bernardino counties: Local _[RIV&SB]	Local _[LA&OR] x 6.2 = Local _[RIV&SB] 0.135 x 6.2 = 0.84	Local _[LA&OR] scaled using ratio of: Maj-Coll _[RIV&SB] / Maj-Coll _[LA&OR] [2] [5]

+ ADT, Average Daily Traffic

* BACM, Best Available Control Measure

× Silt Loading

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Table 5: PM₁₀ emission factors for entrained paved road dust estimates in California (2023). Values are calculated in lbs of PM₁₀ per 10⁶ VMT

Air Basin	County	Air District	Freeway	Major	Collector	Local
MC	Amador	AMA	129.10	257.25	257.25	2091.01
MD	Los Angeles	AV	133.67	117.34	117.34	987.14
SF	Alameda	BA	131.50	262.04	262.04	2129.95
SF	Contra Costa	BA	131.61	262.27	262.27	2131.78
SF	Marin	BA	130.72	260.49	260.49	2117.35
SF	Napa	BA	131.09	261.23	261.23	2123.38
SF	San Francisco	BA	131.42	261.89	261.89	2128.73
SF	San Mateo	BA	130.05	259.16	259.16	2106.51
SF	Santa Clara	BA	131.85	262.74	262.74	2135.60
SF	Solano	BA	131.80	262.63	262.63	2134.76
SF	Sonoma	BA	130.13	259.30	259.30	2107.71
SV	Butte	BUT	128.78	256.61	256.61	2085.82
MC	Calaveras	CAL	129.66	258.38	258.38	2100.17
SV	Colusa	COL	131.00	261.05	261.05	2121.86
LT	El Dorado	ED	127.42	253.91	253.91	2063.83
MC	El Dorado	ED	127.42	253.91	253.91	2063.83
SV	Sutter	FR	131.79	262.62	262.62	2134.68
SV	Yuba	FR	129.12	257.31	257.31	2091.47
GBV	Alpine	GBU	126.03	251.14	251.14	2041.38
GBV	Inyo	GBU	132.08	263.21	263.21	2139.42
GBV	Mono	GBU	128.48	256.03	256.03	2081.08
SV	Glenn	GLE	130.10	259.24	259.24	2107.20
SS	Imperial	IMP	135.31	269.63	269.63	2191.64
MD	Kern	KER	132.96	264.94	264.94	2153.54
LC	Lake	LAK	129.11	257.27	257.27	2091.16
NEP	Lassen	LAS	126.99	253.06	253.06	2056.96
NCC	Monterey	MBU	131.77	262.59	262.59	2134.38
NCC	San Benito	MBU	132.20	263.43	263.43	2141.25
NCC	Santa Cruz	MBU	131.38	261.81	261.81	2128.04
NC	Mendocino	MEN	128.22	255.50	255.50	2076.81
NEP	Modoc	MOD	126.18	251.45	251.45	2043.82
MD	Riverside	MOJ	134.36	616.36	616.36	5237.43
MD	San Bernardino	MOJ	132.85	609.45	609.45	5178.72
MC	Mariposa	MPA	130.47	259.99	259.99	2113.31
NC	Del Norte	NCU	124.27	247.63	247.63	2012.82
NC	Humboldt	NCU	126.59	252.26	252.26	2050.47
NC	Trinity	NCU	126.66	252.40	252.40	2051.61
NC	Sonoma	NS	130.13	259.30	259.30	2107.71

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Air Basin	County	Air District	Freeway	Major	Collector	Local
MC	Nevada	NSI	127.62	254.30	254.30	2067.04
MC	Plumas	NSI	127.25	253.57	253.57	2061.08
MC	Sierra	NSI	127.31	253.70	253.70	2062.15
LT	Placer	PLA	128.79	256.64	256.64	2086.07
MC	Placer	PLA	128.79	256.64	256.64	2086.07
SV	Placer	PLA	128.79	256.64	256.64	2086.07
SV	Sacramento	SAC	132.22	263.47	263.47	2141.56
SCC	Santa Barbara	SB	133.38	265.79	265.79	2160.42
MD	Riverside	SC	134.36	616.36	616.36	5237.43
SC	Los Angeles	SC	133.67	117.34	117.34	987.14
SC	Orange	SC	133.70	117.38	117.38	987.41
SC	Riverside	SC	134.36	616.36	616.36	5237.43
SC	San Bernardino	SC	132.85	609.45	609.45	5178.72
SS	Riverside	SC	134.36	616.36	616.36	5237.43
SD	San Diego	SD	133.02	265.07	265.07	2154.54
SV	Shasta	SHA	127.79	254.64	254.64	2069.78
NEP	Siskiyou	SIS	124.36	247.82	247.82	2014.35
SJV	Fresno	SJU	131.04	261.12	261.12	2122.47
SJV	Kern	SJU	132.96	264.94	264.94	2153.54
SJV	Kings	SJU	133.50	266.02	266.02	2162.32
SJV	Madera	SJU	130.28	259.62	259.62	2110.25
SJV	Merced	SJU	132.46	263.96	263.96	2145.53
SJV	San Joaquin	SJU	132.49	264.01	264.01	2145.98
SJV	Stanislaus	SJU	132.37	263.77	263.77	2144.00
SJV	Tulare	SJU	131.04	261.12	261.12	2122.47
SCC	San Luis Obispo	SLO	133.07	265.16	265.16	2155.30
SV	Tehama	TEH	128.44	255.94	255.94	2080.32
MC	Tuolumne	TUO	128.59	256.24	256.24	2082.76
SCC	Ventura	VEN	134.08	267.18	267.18	2171.72
SV	Solano	YS	131.80	262.63	262.63	2134.76
SV	Yolo	YS	131.81	262.66	262.66	2134.99

Vehicle Weight Estimates

The statewide average vehicle weight was estimated based on the statewide fleet database in EMFAC model, which leverages the vehicle registration data from the California Department of Motor Vehicles (DMV). The EMFAC 2021 fleet database categorizes vehicles into 13 groups, as shown in Table 6. Table 6 also provides the 2023 vehicle counts for each category, and the average vehicle weights were determined using various sources for each category.

For passenger cars, the average weight was updated based on a report from the USEPA [18]. For the light-duty and heavy-duty trucks in categories T1-T6, the population-weighted average of the mean value within the Gross Vehicle Weight range was used. The CalTrans project report, which analyzes Weight-in-motion (WIM) data, informed updates to the average weights for school buses, urban buses, all other buses, motor homes, and heavy-duty trucks with Gross Vehicle Rating (GVWR) greater than 33,000 lbs [19]. The average weight of motorcycles was updated after an extensive search of available online data [20]. As a result of this analysis the statewide average vehicle weight in California was updated from 2.4 tons to 2.8 tons.

Table 6 EMFAC vehicle categories, average weights and counts in 2023.

P	Passenger Cars	4400	13901542	[18]
T1	Light-duty trucks (GVWR <6000 lbs ETW ≤3750 lbs)	3750	1540411	*
T2	Light-duty trucks (GVWR <6000 lbs ETW 3751-5750 lbs)	4750.5	5989802	*
T3	Medium-duty vehicles (GVWR 6000-8500 lbs)	7250	4433543	*
T4	Light-heavy duty trucks (GVWR 8501-10000 lbs)	9250.5	947438	*
T5	Light-heavy duty trucks (GVWR 10001-14000 lbs)	12000.5	239607	*
T6	Medium-heavy duty trucks (GVWR 14001-33000 lbs)	23500.5	277151	*
T7	Heavy-heavy duty trucks (GVWR >33000 lbs)	50180	227860	WIM: Class 8-14 [19]
BS	School buses	29550	31764	WIM: Class 4 [19]
BT	Urban buses	29550	25212	WIM: Class 4 [19]
B	All other buses	29550	26841	WIM: Class 4 [19]
MH	Motor Homes	13460	162536	WIM: Class 5 [19]
MC	Motorcycles	700	719549	[20]
	Statewide Average Vehicle Weight	2.8 Tons	28523256	

* Population-weighted average of the mean GVWR

Rainfall Adjustment

Table 7 shows the average number of days per year each county within an air basin received 0.01 inches or more of precipitation during the 2013-2023 period. The rainfall days are assumed to be constant throughout the county.

Table 7 Annual rainfall days: Average days per year that California counties received 0.01 inches or greater precipitation over 2013-2023.

County	Annual Rainfall Days
Alameda	65.2
Alpine	123.2
Amador	90.7
Butte	94.1
Calaveras	84.7
Colusa	70.5
Contra Costa	64.0
Del Norte	141.9
El Dorado	108.5
Fresno	70.1
Glenn	80.1
Humboldt	117.3
Imperial	24.8
Inyo	59.0
Kern	49.8
Kings	44.0
Lake	90.6
Lassen	113.0
Los Angeles	42.2
Madera	78.1
Marin	73.5
Mariposa	76.1
Mendocino	100.0
Merced	55.0
Modoc	121.6
Mono	97.2
Monterey	62.3
Napa	69.5
Nevada	106.4
Orange	41.9
Placer	93.9
Plumas	110.3
Riverside	34.9

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County	Annual Rainfall Days
Sacramento	57.6
San Benito	57.8
San Bernardino	50.9
San Diego	49.1
San Francisco	66.0
San Joaquin	54.7
San Luis Obispo	48.6
San Mateo	80.6
Santa Barbara	45.3
Santa Clara	61.5
Santa Cruz	66.5
Shasta	104.6
Sierra	109.6
Siskiyou	140.9
Solano	62.1
Sonoma	79.8
Stanislaus	56.0
Sutter	62.1
Tehama	97.7
Trinity	116.5
Tulare	70.1
Tuolumne	96.1
Ventura	37.9
Yolo	61.9
Yuba	90.4

Particle Size Weight Fractions Carb Speciation Profiles

CARB’s database system maintains particulate emissions as Total PM (total particulate matter) using CARB’s speciation profile #471 for paved road dust (see Table 8, below), based on paved road dust sampling conducted in California and on evaluations conducted by CARB and MRI [10][11][12][13][14][15]. It is estimated that PM₁₀ is 45.72% of Total PM. Based on 2006 updates to CARB speciation profiles for PM_{2.5} (particulate matter less than 2.5 microns in diameter), PM_{2.5} is estimated to be 6.86% of Total PM, or 15% of PM₁₀.

$$\text{Total PM} = \text{PM}_{10} \div 0.4572$$

$$\text{PM}_{2.5} = \text{PM}_{10} \times (0.0686 \div 0.4572)$$

$$\text{PM}_{2.5} = \text{PM}_{10} \times 15\%$$

Table 8 CARB paved road dust Particulate Matter (PM) weight fractions: Speciation Profile #471

Particulate Matter	Size	Fraction of Total PM
PM _{2.5}	≤ PM _{2.5}	0.0686
PM ₁₀	≤ PM ₁₀	0.4572
PM	> PM ₁₀	0.5428
Total PM	All PM	1.0000

PM Emission Estimates from Paved Road Dust

Table 5 presents PM₁₀ emission factors by COABDIS region and roadway type. Table 9 Table 10, and Table 11 presents uncontrolled paved road dust Total PM, PM₁₀, and PM_{2.5} emissions for 2023, respectively by paved road category within a COABDIS region.

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Table 9 Total PM emissions from paved road dust (2023) in tons per year

Air Basin	County	Air District	Freeway TPM Emissions	Major TPM Emissions	Collector TPM Emissions	Local TPM Emissions	Total PM Emissions
MC	Amador	AMA	0.00	71.27	23.64	115.36	210.27
MD	Los Angeles	AV	236.07	168.74	34.37	134.08	573.26
SF	Alameda	BA	1381.86	1118.79	322.63	1573.43	4396.72
SF	Contra Costa	BA	699.24	774.81	201.04	1127.07	2802.17
SF	Marin	BA	193.97	122.14	129.78	402.44	848.34
SF	Napa	BA	34.28	174.95	69.74	157.26	436.23
SF	San Francisco	BA	229.90	438.32	77.83	397.46	1143.51
SF	San Mateo	BA	576.47	481.96	99.91	389.68	1548.02
SF	Santa Clara	BA	1189.27	1631.67	282.57	1729.91	4833.43
SF	Solano	BA	313.79	177.13	58.34	297.56	846.82
SF	Sonoma	BA	154.57	356.26	176.93	686.62	1374.39
SV	Butte	BUT	6.82	380.04	95.94	609.21	1092.01
MC	Calaveras	CAL	0.00	88.06	28.02	197.30	313.37
SV	Colusa	COL	65.88	44.89	18.47	321.96	451.20
LT	El Dorado	ED	14.10	68.66	15.28	124.12	222.16
MC	El Dorado	ED	44.03	214.35	47.69	387.47	693.56
SV	Sutter	FR	8.78	38.69	8.13	75.13	130.73
SV	Yuba	FR	20.34	95.13	37.44	254.36	407.26
GBV	Alpine	GBU	0.00	18.76	2.44	17.54	38.74
GBV	Inyo	GBU	0.00	187.59	59.49	254.83	501.91
GBV	Mono	GBU	0.00	99.09	12.95	119.38	231.41
SV	Glenn	GLE	57.98	45.08	23.01	274.56	400.63
SS	Imperial	IMP	129.85	431.16	112.59	344.49	1018.08
MD	Kern	KER	99.93	160.85	45.40	350.93	657.11
LC	Lake	LAK	0.00	137.57	66.07	278.78	482.42
NEP	Lassen	LAS	0.00	112.42	18.23	318.84	449.49
NCC	Monterey	MBU	208.48	248.94	169.62	798.26	1425.30
NCC	San Benito	MBU	14.29	86.73	12.09	96.95	210.06
NCC	Santa Cruz	MBU	90.19	144.45	80.42	263.25	578.31
NC	Mendocino	MEN	0.00	321.17	68.12	594.99	984.27
NEP	Modoc	MOD	0.00	32.68	11.17	204.60	248.45
MD	Riverside	MOJ	42.01	102.58	49.98	218.64	413.21
MD	San Bernardino	MOJ	702.91	1830.08	525.73	3044.01	6102.73
MC	Mariposa	MPA	0.00	31.27	5.48	123.23	159.98
NC	Del Norte	NCU	0.00	50.94	11.31	208.50	270.74
NC	Humboldt	NCU	0.00	328.25	83.45	504.52	916.22
NC	Trinity	NCU	0.00	62.24	7.16	548.41	617.81
NC	Sonoma	NS	36.32	83.71	41.57	161.34	322.95

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Air Basin	County	Air District	Freeway TPM Emissions	Major TPM Emissions	Collector TPM Emissions	Local TPM Emissions	Total PM Emissions
MC	Nevada	NSI	63.47	126.84	53.20	430.96	674.46
MC	Plumas	NSI	0.00	62.37	13.39	285.46	361.22
MC	Sierra	NSI	3.68	15.47	3.28	113.17	135.61
LT	Placer	PLA	22.41	30.42	14.68	107.82	175.32
MC	Placer	PLA	34.40	46.69	22.53	165.51	269.13
SV	Placer	PLA	204.64	277.78	134.02	984.60	1601.03
SV	Sacramento	SAC	864.78	1420.40	361.95	2026.63	4673.76
SCC	Santa Barbara	SB	282.17	412.75	155.72	514.37	1365.01
MD	Riverside	SC	29.94	73.11	35.62	155.83	294.51
SC	Los Angeles	SC	5811.21	4153.68	845.95	3300.56	14111.39
SC	Orange	SC	1888.91	1793.31	109.27	1871.35	5662.85
SC	Riverside	SC	1352.60	3302.90	1609.28	7039.74	13304.52
SC	San Bernardino	SC	1172.49	3052.66	876.94	5077.54	10179.62
SS	Riverside	SC	361.45	882.63	430.04	1881.22	3555.34
SD	San Diego	SD	2708.10	2371.67	989.54	3672.75	9742.06
SV	Shasta	SHA	103.23	240.85	43.22	409.87	797.17
NEP	Siskiyou	SIS	78.15	83.66	47.80	697.59	907.19
SJV	Fresno	SJU	480.08	668.79	525.99	2520.58	4195.44
SJV	Kern	SJU	481.84	775.59	218.90	1692.11	3168.44
SJV	Kings	SJU	88.00	161.82	65.75	381.37	696.93
SJV	Madera	SJU	93.64	168.28	50.46	287.64	600.02
SJV	Merced	SJU	171.69	296.35	99.24	598.38	1165.66
SJV	San Joaquin	SJU	563.99	483.61	236.35	1121.05	2405.00
SJV	Stanislaus	SJU	217.38	391.73	248.03	1007.95	1865.09
SJV	Tulare	SJU	208.58	334.83	207.99	1210.60	1961.99
SCC	San Luis Obispo	SLO	140.76	233.96	66.79	545.41	986.93
SV	Tehama	TEH	111.87	91.97	50.31	339.61	593.77
MC	Tuolumne	TUO	0.00	97.72	35.65	513.80	647.17
SCC	Ventura	VEN	453.20	882.72	161.59	1025.54	2523.05
SV	Solano	YS	179.17	101.15	33.31	169.91	483.54
SV	Yolo	YS	194.57	153.66	58.49	378.82	785.54
		Statewide Total	24917.72	34150.84	10939.30	58234.18	128242.04

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Table 10: PM₁₀ emissions from paved road dust (2023) in tons per year

Air Basin	County	Air District	Freeway PM₁₀ Emissions	Major PM₁₀ Emissions	Collector PM₁₀ Emissions	Local PM₁₀ Emissions	Total PM₁₀ Emissions
MC	Amador	AMA	0.00	32.59	10.81	52.74	96.14
MD	Los Angeles	AV	107.93	77.15	15.71	61.30	262.09
SF	Alameda	BA	631.78	511.51	147.51	719.37	2010.18
SF	Contra Costa	BA	319.69	354.25	91.92	515.30	1281.15
SF	Marin	BA	88.68	55.84	59.34	184.00	387.86
SF	Napa	BA	15.67	79.99	31.89	71.90	199.44
SF	San Francisco	BA	105.11	200.40	35.58	181.72	522.81
SF	San Mateo	BA	263.56	220.35	45.68	178.16	707.75
SF	Santa Clara	BA	543.73	746.00	129.19	790.92	2209.84
SF	Solano	BA	143.46	80.99	26.67	136.04	387.17
SF	Sonoma	BA	70.67	162.88	80.89	313.92	628.37
SV	Butte	BUT	3.12	173.76	43.86	278.53	499.27
MC	Calaveras	CAL	0.00	40.26	12.81	90.20	143.27
SV	Colusa	COL	30.12	20.53	8.44	147.20	206.29
LT	El Dorado	ED	6.45	31.39	6.98	56.75	101.57
MC	El Dorado	ED	20.13	98.00	21.81	177.15	317.09
SV	Sutter	FR	4.01	17.69	3.72	34.35	59.77
SV	Yuba	FR	9.30	43.49	17.12	116.29	186.20
GBV	Alpine	GBU	0.00	8.58	1.12	8.02	17.71
GBV	Inyo	GBU	0.00	85.77	27.20	116.51	229.47
GBV	Mono	GBU	0.00	45.30	5.92	54.58	105.80
SV	Glenn	GLE	26.51	20.61	10.52	125.53	183.17
SS	Imperial	IMP	59.37	197.13	51.47	157.50	465.47
MD	Kern	KER	45.69	73.54	20.76	160.45	300.43
LC	Lake	LAK	0.00	62.90	30.21	127.46	220.56
NEP	Lassen	LAS	0.00	51.40	8.33	145.77	205.51
NCC	Monterey	MBU	95.32	113.81	77.55	364.97	651.65
NCC	San Benito	MBU	6.53	39.65	5.53	44.33	96.04
NCC	Santa Cruz	MBU	41.23	66.04	36.77	120.36	264.40
NC	Mendocino	MEN	0.00	146.84	31.14	272.03	450.01
NEP	Modoc	MOD	0.00	14.94	5.11	93.54	113.59
MD	Riverside	MOJ	19.21	46.90	22.85	99.96	188.92
MD	San Bernardino	MOJ	321.37	836.71	240.36	1391.72	2790.17
MC	Mariposa	MPA	0.00	14.29	2.51	56.34	73.14
NC	Del Norte	NCU	0.00	23.29	5.17	95.33	123.78
NC	Humboldt	NCU	0.00	150.08	38.15	230.67	418.89
NC	Trinity	NCU	0.00	28.45	3.27	250.73	282.46
NC	Sonoma	NS	16.61	38.27	19.01	73.76	147.65

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Air Basin	County	Air District	Freeway PM₁₀ Emissions	Major PM₁₀ Emissions	Collector PM₁₀ Emissions	Local PM₁₀ Emissions	Total PM₁₀ Emissions
MC	Nevada	NSI	29.02	57.99	24.32	197.03	308.36
MC	Plumas	NSI	0.00	28.52	6.12	130.51	165.15
MC	Sierra	NSI	1.68	7.07	1.50	51.74	62.00
LT	Placer	PLA	10.25	13.91	6.71	49.30	80.16
MC	Placer	PLA	15.73	21.35	10.30	75.67	123.05
SV	Placer	PLA	93.56	127.00	61.27	450.16	731.99
SV	Sacramento	SAC	395.38	649.41	165.48	926.57	2136.84
SCC	Santa Barbara	SB	129.01	188.71	71.20	235.17	624.08
MD	Riverside	SC	13.69	33.43	16.29	71.25	134.65
SC	Los Angeles	SC	2656.88	1899.06	386.77	1509.02	6451.73
SC	Orange	SC	863.61	819.90	49.96	855.58	2589.05
SC	Riverside	SC	618.41	1510.09	735.76	3218.57	6082.83
SC	San Bernardino	SC	536.06	1395.68	400.94	2321.45	4654.12
SS	Riverside	SC	165.26	403.54	196.62	860.09	1625.50
SD	San Diego	SD	1238.14	1084.33	452.42	1679.18	4454.07
SV	Shasta	SHA	47.20	110.11	19.76	187.39	364.46
NEP	Siskiyou	SIS	35.73	38.25	21.85	318.94	414.77
SJV	Fresno	SJU	219.49	305.77	240.48	1152.41	1918.16
SJV	Kern	SJU	220.30	354.60	100.08	773.63	1448.61
SJV	Kings	SJU	40.23	73.99	30.06	174.36	318.64
SJV	Madera	SJU	42.81	76.94	23.07	131.51	274.33
SJV	Merced	SJU	78.50	135.49	45.37	273.58	532.94
SJV	San Joaquin	SJU	257.85	221.11	108.06	512.54	1099.57
SJV	Stanislaus	SJU	99.38	179.10	113.40	460.83	852.72
SJV	Tulare	SJU	95.36	153.08	95.09	553.48	897.02
SCC	San Luis Obispo	SLO	64.36	106.97	30.54	249.36	451.22
SV	Tehama	TEH	51.15	42.05	23.00	155.27	271.47
MC	Tuolumne	TUO	0.00	44.68	16.30	234.91	295.89
SCC	Ventura	VEN	207.20	403.58	73.88	468.88	1153.54
SV	Solano	YS	81.92	46.24	15.23	77.68	221.08
SV	Yolo	YS	88.96	70.25	26.74	173.19	359.15
		Statewide Total	11392.38	15613.76	5001.45	26624.67	58632.26

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Table 11 PM_{2.5} emissions from paved road dust (2023) in tons per year.

Air Basin	County	Air District	Freeway PM_{2.5} Emissions	Major PM_{2.5} Emissions	Collector PM_{2.5} Emissions	Local PM_{2.5} Emissions	Total PM_{2.5} Emissions
MC	Amador	AMA	0.00	4.89	1.62	7.91	14.42
MD	Los Angeles	AV	16.19	11.58	2.36	9.20	39.33
SF	Alameda	BA	94.80	76.75	22.13	107.94	301.61
SF	Contra Costa	BA	47.97	53.15	13.79	77.32	192.23
SF	Marin	BA	13.31	8.38	8.90	27.61	58.20
SF	Napa	BA	2.35	12.00	4.78	10.79	29.93
SF	San Francisco	BA	15.77	30.07	5.34	27.27	78.44
SF	San Mateo	BA	39.55	33.06	6.85	26.73	106.19
SF	Santa Clara	BA	81.58	111.93	19.38	118.67	331.57
SF	Solano	BA	21.53	12.15	4.00	20.41	58.09
SF	Sonoma	BA	10.60	24.44	12.14	47.10	94.28
SV	Butte	BUT	0.47	26.07	6.58	41.79	74.91
MC	Calaveras	CAL	0.00	6.04	1.92	13.53	21.50
SV	Colusa	COL	4.52	3.08	1.27	22.09	30.95
LT	El Dorado	ED	0.97	4.71	1.05	8.51	15.24
MC	El Dorado	ED	3.02	14.70	3.27	26.58	47.58
SV	Sutter	FR	0.60	2.65	0.56	5.15	8.97
SV	Yuba	FR	1.40	6.53	2.57	17.45	27.94
GBV	Alpine	GBU	0.00	1.29	0.17	1.20	2.66
GBV	Inyo	GBU	0.00	12.87	4.08	17.48	34.43
GBV	Mono	GBU	0.00	6.80	0.89	8.19	15.87
SV	Glenn	GLE	3.98	3.09	1.58	18.83	27.48
SS	Imperial	IMP	8.91	29.58	7.72	23.63	69.84
MD	Kern	KER	6.86	11.03	3.11	24.07	45.08
LC	Lake	LAK	0.00	9.44	4.53	19.12	33.09
NEP	Lassen	LAS	0.00	7.71	1.25	21.87	30.83
NCC	Monterey	MBU	14.30	17.08	11.64	54.76	97.78
NCC	San Benito	MBU	0.98	5.95	0.83	6.65	14.41
NCC	Santa Cruz	MBU	6.19	9.91	5.52	18.06	39.67
NC	Mendocino	MEN	0.00	22.03	4.67	40.82	67.52
NEP	Modoc	MOD	0.00	2.24	0.77	14.04	17.04
MD	Riverside	MOJ	2.88	7.04	3.43	15.00	28.35
MD	San Bernardino	MOJ	48.22	125.54	36.07	208.82	418.65
MC	Mariposa	MPA	0.00	2.14	0.38	8.45	10.97
NC	Del Norte	NCU	0.00	3.49	0.78	14.30	18.57
NC	Humboldt	NCU	0.00	22.52	5.72	34.61	62.85
NC	Trinity	NCU	0.00	4.27	0.49	37.62	42.38
NC	Sonoma	NS	2.49	5.74	2.85	11.07	22.15

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Air Basin	County	Air District	Freeway PM_{2.5} Emissions	Major PM_{2.5} Emissions	Collector PM_{2.5} Emissions	Local PM_{2.5} Emissions	Total PM_{2.5} Emissions
MC	Nevada	NSI	4.35	8.70	3.65	29.56	46.27
MC	Plumas	NSI	0.00	4.28	0.92	19.58	24.78
MC	Sierra	NSI	0.25	1.06	0.23	7.76	9.30
LT	Placer	PLA	1.54	2.09	1.01	7.40	12.03
MC	Placer	PLA	2.36	3.20	1.55	11.35	18.46
SV	Placer	PLA	14.04	19.06	9.19	67.54	109.83
SV	Sacramento	SAC	59.32	97.44	24.83	139.03	320.62
SCC	Santa Barbara	SB	19.36	28.31	10.68	35.29	93.64
MD	Riverside	SC	2.05	5.02	2.44	10.69	20.20
SC	Los Angeles	SC	398.65	284.94	58.03	226.42	968.04
SC	Orange	SC	129.58	123.02	7.50	128.37	388.47
SC	Riverside	SC	92.79	226.58	110.40	482.93	912.69
SC	San Bernardino	SC	80.43	209.41	60.16	348.32	698.32
SS	Riverside	SC	24.80	60.55	29.50	129.05	243.90
SD	San Diego	SD	185.78	162.70	67.88	251.95	668.31
SV	Shasta	SHA	7.08	16.52	2.96	28.12	54.69
NEP	Siskiyou	SIS	5.36	5.74	3.28	47.85	62.23
SJV	Fresno	SJU	32.93	45.88	36.08	172.91	287.81
SJV	Kern	SJU	33.05	53.21	15.02	116.08	217.36
SJV	Kings	SJU	6.04	11.10	4.51	26.16	47.81
SJV	Madera	SJU	6.42	11.54	3.46	19.73	41.16
SJV	Merced	SJU	11.78	20.33	6.81	41.05	79.96
SJV	San Joaquin	SJU	38.69	33.18	16.21	76.90	164.98
SJV	Stanislaus	SJU	14.91	26.87	17.01	69.15	127.95
SJV	Tulare	SJU	14.31	22.97	14.27	83.05	134.59
SCC	San Luis Obispo	SLO	9.66	16.05	4.58	37.42	67.70
SV	Tehama	TEH	7.67	6.31	3.45	23.30	40.73
MC	Tuolumne	TUO	0.00	6.70	2.45	35.25	44.40
SCC	Ventura	VEN	31.09	60.55	11.09	70.35	173.08
SV	Solano	YS	12.29	6.94	2.29	11.66	33.17
SV	Yolo	YS	13.35	10.54	4.01	25.99	53.89
		Statewide Total	1709.36	2342.75	750.44	3994.86	8797.40

Temporal Activity

Total annual entrained paved road dust emissions are allocated monthly. During the wet winter months , determined from the 2013-2023 meteorological data, the relative contribution of paved road emissions is reduced compared to non-rainy months. Table 12 presents the temporal adjustments used to reflect seasonal rainfall patterns for each county.

Table 12 Temporal profiles for paved road dust emissions based on monthly days of rain

Air Basin	County	Air District	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
MC	Amador	AMA	0.079	0.081	0.076	0.082	0.082	0.088	0.090	0.090	0.087	0.086	0.081	0.078
MD	Los Angeles	AV	0.077	0.079	0.075	0.085	0.085	0.089	0.090	0.087	0.086	0.086	0.084	0.075
SF	Alameda	BA	0.076	0.080	0.074	0.083	0.087	0.090	0.091	0.090	0.089	0.087	0.080	0.073
SF	Contra Costa	BA	0.075	0.080	0.075	0.083	0.087	0.090	0.091	0.090	0.089	0.086	0.081	0.073
SF	Marin	BA	0.075	0.081	0.077	0.083	0.087	0.090	0.090	0.090	0.088	0.085	0.081	0.074
SF	Napa	BA	0.075	0.081	0.076	0.083	0.087	0.090	0.091	0.090	0.089	0.086	0.080	0.073
SF	San Francisco	BA	0.076	0.080	0.075	0.083	0.087	0.090	0.090	0.090	0.089	0.086	0.080	0.073
SF	San Mateo	BA	0.077	0.081	0.075	0.084	0.086	0.090	0.089	0.089	0.088	0.087	0.081	0.075
SF	Santa Clara	BA	0.076	0.079	0.074	0.083	0.087	0.090	0.091	0.091	0.089	0.087	0.080	0.073
SF	Solano	BA	0.075	0.080	0.075	0.083	0.087	0.090	0.091	0.091	0.089	0.086	0.081	0.073
SF	Sonoma	BA	0.075	0.081	0.076	0.083	0.086	0.090	0.091	0.090	0.088	0.085	0.081	0.074
SV	Butte	BUT	0.077	0.081	0.075	0.082	0.084	0.088	0.091	0.090	0.088	0.086	0.081	0.076
MC	Calaveras	CAL	0.079	0.081	0.075	0.082	0.083	0.088	0.090	0.090	0.087	0.086	0.081	0.078
SV	Colusa	COL	0.075	0.081	0.076	0.084	0.084	0.089	0.091	0.090	0.088	0.085	0.081	0.075
LT	El Dorado	ED	0.080	0.081	0.077	0.083	0.083	0.088	0.088	0.087	0.086	0.085	0.082	0.078
MC	El Dorado	ED	0.080	0.081	0.076	0.083	0.082	0.088	0.089	0.089	0.087	0.085	0.082	0.078
SV	Sutter	FR	0.076	0.080	0.075	0.083	0.086	0.089	0.091	0.090	0.089	0.086	0.080	0.074
SV	Yuba	FR	0.076	0.082	0.075	0.083	0.084	0.089	0.091	0.090	0.088	0.085	0.081	0.076
GBV	Alpine	GBU	0.081	0.082	0.078	0.083	0.083	0.087	0.087	0.086	0.086	0.085	0.082	0.079
GBV	Inyo	GBU	0.080	0.082	0.079	0.084	0.083	0.087	0.084	0.084	0.087	0.087	0.084	0.079
GBV	Mono	GBU	0.081	0.082	0.079	0.084	0.082	0.087	0.084	0.085	0.087	0.086	0.083	0.080
SV	Glenn	GLE	0.076	0.081	0.077	0.083	0.084	0.089	0.090	0.090	0.088	0.085	0.081	0.075
SS	Imperial	IMP	0.077	0.083	0.083	0.087	0.088	0.090	0.085	0.078	0.082	0.084	0.086	0.077
MD	Kern	KER	0.076	0.080	0.075	0.085	0.085	0.089	0.090	0.088	0.088	0.087	0.082	0.076
LC	Lake	LAK	0.076	0.082	0.076	0.083	0.085	0.089	0.091	0.090	0.088	0.085	0.081	0.075
NEP	Lassen	LAS	0.080	0.082	0.079	0.083	0.082	0.086	0.088	0.088	0.087	0.086	0.083	0.077
NCC	Monterey	MBU	0.076	0.079	0.074	0.084	0.086	0.090	0.090	0.090	0.089	0.087	0.080	0.073

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Air Basin	County	Air District	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
NCC	San Benito	MBU	0.075	0.080	0.073	0.084	0.086	0.090	0.090	0.090	0.090	0.087	0.080	0.073
NCC	Santa Cruz	MBU	0.076	0.080	0.075	0.083	0.086	0.089	0.090	0.090	0.089	0.086	0.081	0.075
NC	Mendocino	MEN	0.077	0.081	0.076	0.083	0.085	0.089	0.090	0.090	0.088	0.085	0.080	0.076
NEP	Modoc	MOD	0.080	0.082	0.079	0.082	0.082	0.087	0.089	0.088	0.087	0.086	0.082	0.078
MD	Riverside	MOJ	0.077	0.083	0.082	0.087	0.089	0.089	0.083	0.077	0.084	0.085	0.086	0.078
MD	San Bernardino	MOJ	0.079	0.082	0.081	0.086	0.086	0.089	0.082	0.079	0.084	0.085	0.086	0.080
MC	Mariposa	MPA	0.079	0.080	0.075	0.082	0.083	0.088	0.089	0.089	0.087	0.086	0.082	0.078
NC	Del Norte	NCU	0.079	0.081	0.079	0.082	0.085	0.087	0.090	0.089	0.087	0.083	0.080	0.078
NC	Humboldt	NCU	0.079	0.081	0.078	0.082	0.084	0.088	0.090	0.090	0.087	0.084	0.081	0.077
NC	Trinity	NCU	0.078	0.081	0.077	0.083	0.084	0.088	0.089	0.089	0.088	0.085	0.081	0.078
NC	Sonoma	NS	0.076	0.081	0.076	0.082	0.086	0.090	0.090	0.090	0.088	0.085	0.081	0.075
MC	Nevada	NSI	0.079	0.082	0.077	0.082	0.082	0.087	0.089	0.088	0.087	0.086	0.082	0.078
MC	Plumas	NSI	0.079	0.082	0.077	0.082	0.082	0.087	0.089	0.088	0.087	0.086	0.082	0.079
MC	Sierra	NSI	0.079	0.082	0.078	0.082	0.082	0.087	0.089	0.088	0.087	0.086	0.082	0.078
LT	Placer	PLA	0.080	0.082	0.077	0.083	0.083	0.088	0.089	0.088	0.087	0.085	0.081	0.078
MC	Placer	PLA	0.079	0.081	0.077	0.082	0.083	0.087	0.089	0.089	0.087	0.086	0.082	0.078
SV	Placer	PLA	0.076	0.081	0.076	0.084	0.085	0.090	0.091	0.090	0.088	0.086	0.080	0.074
SV	Sacramento	SAC	0.076	0.081	0.075	0.083	0.086	0.090	0.091	0.091	0.089	0.086	0.081	0.073
SCC	Santa Barbara	SB	0.075	0.078	0.073	0.085	0.085	0.089	0.090	0.090	0.088	0.087	0.083	0.075
MD	Riverside	SC	0.076	0.083	0.083	0.086	0.088	0.090	0.081	0.077	0.083	0.087	0.087	0.080
SC	Los Angeles	SC	0.077	0.078	0.075	0.085	0.084	0.089	0.090	0.089	0.087	0.085	0.084	0.077
SC	Orange	SC	0.079	0.080	0.075	0.084	0.083	0.088	0.090	0.089	0.087	0.086	0.082	0.077
SC	Riverside	SC	0.079	0.081	0.076	0.084	0.083	0.089	0.088	0.086	0.086	0.085	0.084	0.079
SC	San Bernardino	SC	0.079	0.081	0.077	0.084	0.083	0.089	0.087	0.085	0.086	0.086	0.084	0.080
SS	Riverside	SC	0.078	0.080	0.078	0.086	0.086	0.090	0.084	0.084	0.084	0.086	0.085	0.078
SD	San Diego	SD	0.078	0.080	0.077	0.084	0.084	0.090	0.087	0.087	0.086	0.085	0.083	0.078
SV	Shasta	SHA	0.078	0.082	0.077	0.082	0.083	0.087	0.090	0.090	0.087	0.085	0.081	0.078
NEP	Siskiyou	SIS	0.080	0.081	0.079	0.083	0.083	0.087	0.088	0.089	0.087	0.085	0.081	0.078

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Air Basin	County	Air District	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SJV	Fresno	SJU	0.079	0.081	0.074	0.083	0.083	0.088	0.089	0.089	0.088	0.087	0.082	0.078
SJV	Kern	SJU	0.075	0.080	0.073	0.084	0.085	0.089	0.090	0.090	0.088	0.087	0.083	0.075
SJV	Kings	SJU	0.075	0.080	0.073	0.084	0.086	0.090	0.089	0.090	0.090	0.087	0.083	0.073
SJV	Madera	SJU	0.078	0.080	0.074	0.083	0.083	0.088	0.088	0.090	0.088	0.086	0.082	0.078
SJV	Merced	SJU	0.076	0.080	0.073	0.083	0.086	0.091	0.091	0.090	0.090	0.086	0.081	0.073
SJV	San Joaquin	SJU	0.076	0.080	0.075	0.082	0.087	0.090	0.091	0.091	0.090	0.086	0.080	0.072
SJV	Stanislaus	SJU	0.076	0.079	0.074	0.083	0.086	0.091	0.091	0.091	0.089	0.087	0.080	0.073
SJV	Tulare	SJU	0.078	0.080	0.075	0.083	0.083	0.088	0.088	0.087	0.089	0.087	0.084	0.079
SCC	San Luis Obispo	SLO	0.076	0.080	0.073	0.084	0.086	0.090	0.091	0.090	0.089	0.088	0.081	0.073
SV	Tehama	TEH	0.077	0.082	0.076	0.082	0.083	0.088	0.090	0.090	0.088	0.085	0.081	0.077
MC	Tuolumne	TUO	0.080	0.081	0.077	0.083	0.082	0.087	0.087	0.088	0.087	0.086	0.083	0.079
SCC	Ventura	VEN	0.076	0.079	0.073	0.086	0.084	0.089	0.090	0.089	0.088	0.087	0.084	0.075
SV	Solano	YS	0.075	0.080	0.074	0.084	0.087	0.090	0.091	0.091	0.089	0.086	0.081	0.072
SV	Yolo	YS	0.075	0.081	0.075	0.084	0.085	0.090	0.091	0.091	0.089	0.086	0.081	0.073

Growth Forecasting

In the 1997 methodology, freeways and major roads were grown based on increases in roadway centerline mileage, and local and collector roads were grown based on increases in VMT. For the 2018 update, based on discussions with U.S. EPA Region IX staff, growth for all four roadway categories was assumed to be proportional to changes in VMT. The current 2026 methodology update uses the same VMT methodology as the 2018 update to estimate growth on roadway categories [2].

As with previous versions of this methodology, the current 2026 methodology update presents uncontrolled paved road dust emissions.

Assumptions and Limitations

1. The current U.S. EPA AP-42 emission factor equation assumes that entrained paved road dust emissions are proportional to VMT, roadway silt loading, and average vehicle weight.
2. The methodology assumes that roadway silt loading varies by road type, quickly reaches an equilibrium condition, and is adequately characterized by a roadway-specific silt loading factor. Thus, the emission factor varies by the type of road.
3. The Major, Collector and Local roadway silt loadings are based on a total of 42 silt loading measurements collected from 1995 to 1997 in the South Coast Air Basin, Coachella Valley, Bakersfield and Sacramento. This does not fully represent the variability in California silt loading.
4. It is assumed that the U.S. EPA PM₁₀ particle size multiplier (i.e., the 'k' factor in the AP-42 equation) reasonably represents the size distribution of California paved road dust.
5. CARB's speciation profile for entrained paved road dust is based on six measurements collected in the San Joaquin Valley and in Imperial and Mono counties and may not fully reflect the variability of particle size distributions throughout California.
6. The average vehicle fleet weight is assumed to be 2.8 tons statewide. County specific variations are not accounted for.
7. Caltrans HPMS VMT data by county for 2022 are assumed to accurately represent actual California roadway travel and thus the travel fractions for each roadway type.

8. It is assumed that the average number of days per year of precipitation >0.01 inches, based on precipitation data for 2013-2023 period, remains constant for each county for all future years.
9. It is assumed that the temporal profile, based on count specific monthly days of rainfall, provides appropriate adjustments to allocate paved road dust emissions monthly.
10. This methodology informs CARB's CEIDARS database and is the basis of the process and emission transaction files. It assumes that on-road motor vehicles see peak activity at 7 AM and 4 PM, with uniform activity on weekdays (Monday through Friday) and reduced activity on weekends (Saturday and Sunday), 52 weeks a year.

Sample Calculations

The steps below summarize the data computations necessary to estimate the annual tons of paved road dust PM emissions in El Dorado County within the Lake Tahoe Air Basin. Sample emission calculation values are provided below in Table 13. Note that emissions shown in Table 13 will slightly differ from emissions in Table 9, Table 10, and Table 11 due to rounding.

Step 1: Note down the road-specific travel fractions from Table 2.

Step 2: Note down the county level VMT from Table 2 and then calculate the VMT for each road category by multiplying the county level VMT by the associated travel fraction.

$$\text{Total VMT} \times \text{Road Type Specific Travel Fraction} = \text{Road Specific County VMT}$$

Step 3: Note down the VMT fraction from Table 3.

Step 4: Calculate the COABDIS VMT by multiplying the VMT fraction with the road specific County VMT from Step 2.

$$\text{Road Specific County VMT} \times \text{VMT Fraction} = \text{Road Specific COABDIS VMT}$$

Step 5: Enter the emission factor for each road type from Table 5. PM₁₀ Emission factors (EF, lbs /10⁶ VMT/year) were calculated using the U.S. EPA AP-42 PM₁₀ emission factor equation shown below, with k=0.0022 lb PM₁₀/VMT, roadway silt loadings (sL) from Table 4 and default average vehicle weight (W) of 2.8 tons from Table 6, 108.5 days of annual rainfall (P) from Table 7, and 365 days/year (N).

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

Step 6: Multiply each emission factor from Step 3 by the COABDIS VMT data from Step 4 to compute annual pounds of PM₁₀ emissions for each road type; divide by 2,000 to calculate

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the annual tons of PM₁₀/year from paved road dust for each roadway type. Sum roadway emissions for total paved road dust emissions.

$$EF \times COABDIS \text{ VMT} / 2000 = PM_{10} \text{ Road Emissions}$$

Step 7: Calculate PM_{2.5} emissions using particle size fractions for CARB's speciation profile #471, shown in Table 8

$$PM_{10} \text{ Road Emissions} \times (0.0686/0.4572) = PM_{2.5} \text{ Road Emissions}$$

Step 8: Calculate Total PM emissions using particle size fractions from CARB's speciation profile #471, shown in Table 8

$$PM_{10} \text{ Road Emissions} / 0.4572 = \text{Total PM Road Emissions}$$

Table 13 Estimating paved road dust emissions in El Dorado County within the Lake Tahoe Air Basin in tons per year

Steps	Values	Source	Freeway	Major	Collector	Local	Totals
1	Travel Fractions	Table 2	0.22	0.54	0.12	0.12	1.00
2	County VMT, 10 ⁶ /yr	Table 2	415.80	1020.60	226.80	226.80	1890.00
3	VMT Fraction	Table 3					0.24
4	COABDIS VMT, 10 ⁶ /yr	Step 2	99.79	244.94	54.43	54.43	453.60
5	PM ₁₀ EF, lbs/10 ⁶ VMT	Table 5	127.42	253.91	253.91	2063.83	
6	PM ₁₀ Emissions, tons/yr	Table 10	6.36	31.01	6.91	56.17	100.45
7	PM _{2.5} Emissions, tons/yr	Table 11	0.95	4.65	1.03	8.42	15.05
8	PM Emissions, tons/yr	Table 9	13.91	67.83	15.11	122.86	219.71

Changes in Methodology

There were several revisions in the paved road dust emission estimates for this update. These include:

1. Updated VMT data based on EMFAC2021 and the latest available activity data from the transportation planning agencies for the year 2023 [6].
2. Updated fractions of vehicle miles traveled on Freeway, Major, Collector, and Local roads (travel fractions) to reflect 2022 Caltrans HPMS data [7] [8].
3. Updated statewide average vehicle weights from 2.4 tons to 2.8 tons. [18] [19] [20]
4. Updated average number of days per year that each county received 0.01 inches or more of precipitation during 2013-2023 using gridMET precipitation data [9].
5. Updated entrained road dust emissions for total PM, PM₁₀ and PM_{2.5}, by COABDIS.

The above changes decreased statewide PM₁₀ emissions for entrained paved road dust by about 3% from the previously published inventory estimates.

Comments and Recommendations

There are ongoing studies that are evaluating the use of vehicle speeds instead of silt loading to determine emissions. When available, the studies will be evaluated and incorporated as appropriate into this methodology. Effort is also needed to better account for the variability in dust emissions based on population density, adjacent land uses, and geographic location.

Silt Loading. This methodology assumes that silt loading values vary by roadway type. Additional research is needed to fully characterize the relationship between roadway type and silt loading values. Also, additional county-specific silt loading measurements are needed to more accurately reflect the variability of silt loading throughout California.

Fleet Vehicle Weight. The fleet vehicle weight is assumed to be constant throughout California. This parameter can vary spatially, and efforts are needed to account for this variability in future updates.

Calculating Paved Road PM_{2.5}. The Final Section of the U. S. EPA's January 2011

AP-42 for paved roads assigns a particle size fraction of 25% to PM_{2.5} ($PM_{2.5} = PM_{10} \times 25\%$) [1]. This fraction is based on test conditions that include heavy vehicles traveling at very slow speeds (less than 5 mph) at corn processing facilities in the Midwest and are not representative of typical travel on public and industrial paved roads in California. The January 2011 PM_{2.5} fraction is 60% greater than the PM_{2.5} particle size fraction of 15% used in the previous update of AP-42.

For this update, paved road $PM_{2.5}$ is calculated using CARB speciation profile #471, which was derived from testing conducted in the San Joaquin Valley and in Imperial and Mono counties [10] [11] [12]. CARB updated their $PM_{2.5}$ fugitive dust profiles in 2006, after a review of recent Western Regional Air Partnership (WRAP) studies and CARB's emission inventory vs. ambient air quality measurement data indicated that $PM_{2.5}$ from these sources was overestimated in California [13] [14] [15] [21]. The paved road $PM_{2.5}/PM_{10}$ fraction was updated from 16.9% to 15% to more accurately reflect measured $PM_{2.5}$ emissions [13].

Temporal Profiles. In 2001, under the sponsorship of the Central California Ozone Study (CCOS), researchers developed temporal profiles for a number of area and off-road emission sources, including paved roads [22]. On a statewide basis, the temporal profile proposed by the CCOS study allocated an average of up to 75% of annual emissions to the summer months. However, full documentation was not provided for their derivation, and CARB could not re-create the results. Based on newer research that shows minimal seasonal variation for paved road dust emissions, CARB developed relatively flat monthly allocations of annual paved road dust emissions for this update [23] [24] [25].

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April 2014

Revised By

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November 2016

Updated statewide emissions to reflect 2012 VMT from EMFAC 2014 and transportation planning agencies. Minor editorial changes.

Tiffanie Be
March 2018
Updated Table 7. Minor editorial changes.

Alejandra Cervantes & Victoria Villa
March 2021

Updated statewide emissions to reflect 2017 VMT from EMFAC2017 and the latest available activity data from transportation planning agencies. Updated fractions of vehicle miles traveled on Freeway, Major, Collector, and Local roads (travel fractions) to reflect 2017 Caltrans HPMS data. Updated annual average days of rain per month for counties receiving more than 0.01 in of rainfall based on rainfall data for 2007-2017 from gridMET. Minor editorial and structural changes.

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June 2025

Updated statewide emissions to reflect 2023 VMT from EMFAC2021 and the latest available activity data from transportation planning agencies. Updated fractions of vehicle miles traveled on Freeway, Major, Collector, and Local roads (travel fractions) to reflect 2022 Caltrans HPMS data. Updated statewide average vehicle weights to 2.8 tons. Updated annual average days of rain per month for counties receiving more than 0.01 in of rainfall based on rainfall data for 2013-2023 from gridMET. Computed VMT fractions to distribute county emissions to COABDIS. Editorial changes and structural changes.

References

- [1] US Environmental Protection Agency, "Compilation of Air Pollutant Emissions Factors, AP-42, Section 13.2.1, Paved Roads," [Online]. Available: https://www.epa.gov/sites/default/files/2020-10/documents/13.2.1_paved_roads.pdf.
- [2] California Air Resources Board, "Emission Estimation Methodology: Paved Road Dust," March 2021. [Online]. Available: https://ww3.arb.ca.gov/ei/areasrc/fullpdf/2021_paved_roads_7_9.pdf.
- [3] L. L. Ashbaugh, R. G. Flocchini, D. Chang, V. Garza, O. F. Carvacho, T. A. James and R. T. Matsumura, "Traffic Generated PM₁₀ "Hot Spots"," California Department of Transportation, 1996.
- [4] L. L. Ashbaugh, R. G. Flocchini, R. T. Matsumura, T. A. James, O. F. Carvacho, C. K. Tsubamoto and M. Brown, "Wintertime Traffic Generated PM₁₀ Hot Spots," California Department of Transportation, 1998.
- [5] G. Muleski, "Improvement of Specific Emission Factors (BACM Project No. 1)," 1996.
- [6] California Air Resources Board, "EMFAC2021, Version 1.0.2-mpo011," [Online]. Available: <https://arb.ca.gov/emfac/>.
- [7] . California Department of Transportation, "High Performance Monitoring System (HPMS) Vehicle Miles Traveled (VMT) per Day by County and Roadway Functional Classification for 2022," 2023.
- [8] U.S. Department of Transportation, Federal Highway Administration, "FHWA Functional Classification Guidelines," 2023. [Online]. Available: https://rosap.nhtl.bts.gov/view/dot/72430/dot_72430_DS1.pdf.
- [9] California Air Resources Board, "gridMET".
- [10] California Air Resources Board, "Speciation Profiles Used in CARB Modeling," [Online]. Available: <https://ww2.arb.ca.gov/speciation-profiles-used-carb-modeling>.

- [11] J. E. Houck, J. C. Chow, J. G. Watson, C. A. Simons, L. C. Pritchett, J. M. Goulet and C. A. Frazier, "Determination of Particle Size Distribution and Chemical Composition of Particulate Matter from Selected Sources in California," California Air Resources Board, 1989.
- [12] J. C. Chow, J. G. Watson, L. L. Ashbaugh and K. L. Magliano, "Similarities and differences in PM₁₀ chemical source profiles for geological dust from the San Joaquin Valley, California," *Atmospheric Environment*, vol. 37, no. 9-10, pp. 1317-1340, 3 2003.
- [13] P. Gaffney, "Updating the CARB PM_{2.5} Size Speciation Profiles for Fugitive Dust Sources," California Air Resources Board, 2006.
- [14] Countess Environmental, "Western Regional Air Partnership's (WRAP) Fugitive Dust Handbook," Western Governors' Association, WGA Contract No. 30204-111, 2006.
- [15] C. Cowherd, "Background Document for Revisions to Fine Fraction Ratios Used for AP-42 Fugitive Dust Emission Factors," Western Governors' Association, Western Regional Air Partnership. MRI Project No. 110397, 2006.
- [16] California Air Resources Board, "CRPAQS PM₁₀ Samples from 1997," [Online]. Available:
https://ww3.arb.ca.gov/ei/speciate/r01t20/rf13doc/refnum13.htm?_ga=2.165106872.661865671.1597077884-1697201361.1589242323.
- [17] P. Gaffney, "Road Construction Dust," California Air Resources Board, August 1997. [Online]. Available: <https://ww3.arb.ca.gov/ei/areasrc/fullpdf/full7-8.pdf>.
- [18] United States Environmental Protection Agency, "The 2022 EPA Automotive Trends Report," December 2022. [Online]. Available:
<https://www.epa.gov/system/files/documents/2022-12/420s22001.pdf>.
- [19] C. Kim, J. D. Lea, V. Kannekanti and J. T. Harvey, "Updating Weigh-in-Motion (WIM) Spectra in Pave M," California Department of Transportation, 2022.
- [20] J. D. Power, "How Much Do Motorcycles Weigh?," 23 July 2019. [Online]. [Accessed 27 March 2025].

- [21] C. Cowherd, J. Donaldson, G. Muleski and M. A. Grelinger, "Analysis of the Fine Fraction of Particulate Matter in Fugitive Dust," Western Governors' Association Western Regional Air Partnership (WARP), 2005.
- [22] Sonoma Technology, "Revised Temporal Allocation Factors for Area and Off-Road Emissions Sources," 2001.
- [23] Mid-Atlantic Regional Air Management Association, Inc. (MARAMA), "Paved Road Area Source Category Calculation Methodology Sheet," 2004.
- [24] H. Kuhns, V. Etyemezian, M. Green, K. Hendrickson, M. McGown, K. Barton and M. Pitchford, "Vehicle-based road dust emission measurement—Part II: Effect of precipitation, wintertime road sanding, and street sweepers on inferred PM₁₀ emission potentials from paved and unpaved roads," *Atmospheric Environment*, vol. 37, no. 32, pp. 4573-4582, 2003.
- [25] ENVIRON International Corp., "WRAP Mobile Source Emission Inventories Update," Western Governors' Association, 2006.
- [26] California Air Resources Board, "Report on Updates to the California Integrated Transportation Network (ITN)," 2021.

Appendix

Table A1. 1995-1997 Silt Loading Values HIGH Average Daily Traffic (ADT) Roads (> 5,000 vehicle passes/day)

Location	Date	Silt Loading (g/m ²)	Sampling Location	Researcher ¹
South Coast	Apr-95	0.012	Composite of 4 roads of same class	MRI
South Coast	Jun-95	0.015	Repeat sample of above roads	MRI
South Coast	Jun-95	0.011	Composite of 4 roads of same class	MRI
South Coast	Jun-95	0.046	Composite of 4 roads of same class	MRI
Bakersfield	Apr-95	0.054	Composite of 4 roads of same class	MRI
Bakersfield	Jul-95	0.015	Repeat sample of above roads	MRI
Bakersfield	Jul-95	0.051	Composite of 4 roads of same class	MRI
Bakersfield	Jul-95	0.039	Composite of 4 roads of same class	MRI
Coachella Valley	Apr-95	0.027	Composite of 4 roads of same class	MRI
Coachella Valley	Jul-95	0.037	Repeat sample of above roads	MRI
Coachella Valley	Jul-95	0.082	Composite of 4 roads of same class	MRI
Coachella Valley	Jul-95	0.03	Composite of 4 roads of same class	MRI
Sacramento	1997	0.0332	Sunrise Crosswalk North	UCD
Sacramento	1997	0.0261	Sunrise Crosswalk south	UCD
Sacramento	1997	0.0184	Greenback Crosswalk West	UCD
Sacramento	1997	0.0136	Greenback Crosswalk East	UCD
Sacramento	8/23/1995	0.0543	Florin Rd East	UCD
Sacramento	8/23/1995	0.0034	Florin Road West	UCD
Sacramento	8/23/1995	0.0016	Stockton Blvd South	UCD
Sacramento	8/23/1995	0.002	Stockton Blvd North	UCD
Riverside	3/18/1997	0.065	Canyon Crest Drive	UCR
Riverside	6/5/1997	0.085	Canyon Crest Drive	UCR
Riverside	6/19/1996	0.00593	Main Street	UCR
Riverside	9/3/1996	0.00593	Main Street	UCR
Riverside	3/17/1997	0.2	Riverside Street	UCR
Riverside	5/29/1997	0.17	Riverside Street	UCR
Riverside	3/19/1997	0.19	Riverside Street	UCR
Riverside	6/4/1997	0.085	Riverside Street	UCR
Riverside	5/27/1997	0.38	Fogg Street	UCR
Riverside	3/26/1997	0.13	Fogg Street	UCR
Riverside	6/3/1997	0.14	Fogg Street	UCR

Geometric mean of high ADT roads=0.032 g/m², used as California statewide default silt loading for Major and Collector roads. See Tables 3 for information on deriving statewide, district and county specific silt loading values.

¹ MRI=Midwest Research Institute (<http://www.arb.ca.gov/ei/areasrc/arbmiscprocpaverddstbkgrnd.pdf>)
 UCR=Univ. of California, Riverside (<http://aqp.engr.ucdavis.edu/Documents/DraftRoadDustreport.pdf>)
 UCD=Univ. of California, Davis (http://aqp.engr.ucdavis.edu/Documents/pm10_hotspot_Sunrise.pdf)

Section 7.9
Paved Road Dust

Table A2. 1995-1997 Silt Loading Values LOW ADT Roads (< 5,000 vehicle passes/day)

Location	Date	Silt Loading (g/m²)	Sampling Location	Researcher
South Coast	Apr-95	0.18	Composite of 4 roads of same class	MRI
South Coast	Jun-95	0.05	Repeat sample of above roads	MRI
South Coast	Jun-95	0.17	Composite of 4 roads of same class	MRI
South Coast	Jun-95	0.14	Composite of 4 roads of same class	MRI
Bakersfield	Apr-95	0.52	Composite of 4 roads of same class	MRI
Bakersfield	Jul-95	0.19	Repeat sample of above roads	MRI
Bakersfield	Jul-95	0.94	Composite of 4 roads of same class	MRI
Bakersfield	Jul-95	0.41	Composite of 4 roads of same class	MRI
Coachella Valley	Jul-95	0.42	Repeat sample of above roads	MRI
Coachella Valley	Jul-95	0.35	Composite of 4 roads of same class	MRI
Coachella Valley	Jul-95	0.2	Composite of 4 roads of same class	MRI

Mean of low ADT roads=0.32 g/m², used as California statewide default silt loading for Local roads. See Tables 3 for information on deriving statewide, district and county specific silt loading values