



Recommended Methods for Screening and Modeling Local Risks and Hazards

Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109

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Version 1.0

1.2 CEQA Thresholds

Under the CEQA guidance, the District developed thresholds of significance for air pollutants for which a project's individual emissions would be cumulatively considerable. The goal of the thresholds is to ensure that no source creates, or receptor endures, a significant adverse impact from any individual project, and that the total of all nearby directly emitted risk and hazard emissions is also not significantly adverse. If a project exceeds the identified significance thresholds, its emissions in concert with contributions from all nearby sources may result in significant adverse air quality impacts to the community's existing air quality conditions.

The thresholds for local risks and hazards from TAC and PM2.5 are intended to apply to all sources of emissions, including both permitted stationary sources and on- and off-road mobile sources, such as sources related to construction, busy roadways, or freight movements. The thresholds of significance for TAC and PM2.5 are listed in Table 1.

Table 1. Threshold of Significance for Local Community Risk and Hazard Impacts

Analysis	New Source	New Receptor
Individual Project	<p>Compliance with qualified community risk reduction plan</p> <p>OR</p> <p>To the nearest receptor (worker and/or resident) regardless of distance:</p> <p>Cancer Risk > 10 in a million Chronic and Acute Hazard Index > 1.0 PM2.5 concentration > 0.3 ug/m³</p>	<p>Compliance with qualified community risk reduction plan</p> <p>OR</p> <p>From the highest emitting sources within 1,000 foot radius of the receptor:</p> <p>Cancer Risk > 10 in a million Chronic and Acute Hazard Index > 1.0 PM2.5 concentration > 0.3 ug/m³</p>
Cumulative Impacts	<p>Compliance with qualified community risk reduction plan</p> <p>OR</p> <p>Major sources within 1,000 foot radius of the individual project modeled to the maximum likely exposed individual (worker and/or resident) based on the individual source analysis:</p> <p>Cancer Risk > 100 in a million Chronic Hazard Index > 10.0 PM2.5 concentration > 0.8 ug/m³</p>	<p>Compliance with qualified community risk reduction plan</p> <p>OR</p> <p>Major sources within 1,000 foot radius of the receptor:</p> <p>Cancer Risk > 100 in a million Chronic Hazard Index > 10.0 PM2.5 concentration > 0.8 ug/m³</p>

Table 2. East-West Roadway Screening Table for PM2.5 for San Francisco County

EAST OR WEST OF SAN FRANCISCO COUNTY HIGHWAY					
Highway	Distance East or West of freeway - PM2.5 Concentrations (ug/m ³)				
	100 feet	200 feet	500 feet	700 feet	1,000 feet
1	0.50	0.28	0.12	0.096	0.060
35	0.14	0.11	0.032	0.020	0.016
80	1.0	0.64	0.30	0.20	0.15
101	1.1	0.72	0.34	0.26	0.17
280	0.80	0.60	0.28	0.19	0.13

A similar methodology can be applied to cancer risk, chronic non-cancer hazard and acute hazard. In this example, the project in San Francisco did not exceed the PM2.5 threshold. However, if the thresholds for either cancer risk or hazard were exceeded, the project sponsor can determine whether additional modeling is warranted or implementation of mitigation measures is appropriate. If the project sponsors choose to conduct a more refined modeling analysis, the District recommends the following general procedures outlined in Section 4.

3.1.3 Surface Streets

Emissions from highways dramatically decline beyond 500 feet. Proximity to the roadway and the vehicle traffic on that roadway are key factors in determining whether the impact from a local surface street is significant. To determine the impact from local surface streets, the District developed generic surface street screening tables based on the AADT on a roadway. The tables were developed using the following methodology:

- The District averaged all nine Bay Area county VMT and emissions, developed from the highway analysis using CARB's EMFAC model. PM2.5 concentrations were estimated using base year 2010. For the 70 year risk analysis, yearly VMT and emissions were estimated using EMFAC for 2010 through 2040. Because EMFAC does not estimate emissions beyond 2040, the VMT and emissions from year 2040 where then applied to remaining years (2041 through 2080).
- Modeling was completed for AADT ranging from 10,000 to 100,000 vehicles per day. The AADT were scaled to develop hourly traffic volumes. The scaling factor was developed by dividing each hourly VMT by the total VMT estimated for the day. The AADT was then multiplied by the scaling factor for each hour to develop hourly vehicle volumes.
- Hourly vehicle volume and emissions were input into roadway model, CAL3QHCR, to estimate annual average concentrations.
- Meteorological data collected from the District's monitoring stations were also inputs to the CAL3QHCR model. Various meteorological data sets were tested for the modeling, but air concentrations predicted using the Livermore Laboratory data from 2005 produced the most conservative PM2.5 concentrations. This station had a higher percentage of recorded calm

wind conditions, below one mile per hour, resulting in less mixing and higher downwind concentrations.

- Each roadway was modeled assuming a link length of one kilometer.

Tables are provided for PM_{2.5} concentrations, cancer risks, chronic non-cancer hazards, and acute non-cancer hazards based on the AADT greater than 10,000 vehicles per day. Each table presents concentrations for north/south or east/west roadway configurations. These sets of tables correspond to projects located upwind or downwind of the roadway with respect to the prevailing wind direction. Concentrations were estimated 100 feet, 200 feet, 500 feet, 700 feet, and 1,000 feet from the edge of the roadway (farthest lane) closest to the project. Roadways with less than 10,000 vehicles per day are consider minor, low-impact sources and inclusion of these roads in CEQA evaluation is not warranted.

It should be noted that these screening tables are conservative because they are based on very calm meteorological conditions. Scaling similar to that shown in Section 3.1.2 can be used to estimate concentrations for milepost specific AADT that does not match those provided in the screening tables.

3.2 Permitted Sources

The District has developed a geographical database of risks, hazards, and PM2.5 concentrations for most stationary sources permitted by the District in the year 2008. This database is in the form of a set of compressed Keyhole Markup Language (kmz) files that can be viewed with the Google Earth™ software package. The values represent concentrations near the fence-line of the facility.

Note that the screening-level impacts for health risk and PM2.5 concentration in the permitted source geographical database are upper-bound estimates. **These values do not represent the true risk values from a facility.** Rather, because the estimates are conservative by design, if a facility passes screening, it can be assumed that it would pass a more site-specific, detailed modeling analysis.

3.2.1 Permitted Sources Screening Tables

The permitted source screening table contains all the facilities in the Bay Area that have permits to operate and that emit one or more toxic air contaminants. The types of permitted sources include, but are not limited to: refinery sources, gasoline dispensing facilities, dry cleaners, diesel internal combustion engines, natural gas turbines, crematories, landfills, waste water treatment facilities, hospitals and coffee roasters. The screening table contains the following information:

- Plant Number the District uses to identify facilities
- District identification number for gasoline dispensing facilities only (GDF Number)
- Facility name
- Geocoded location for the facility

Surface Streets Screening Tables Cancer Risk and Noncancer Hazards Generated from Roadways

LIFETIME EXCESS CANCER RISK

NORTH-SOUTH DIRECTIONAL ROADWAY						EAST-WEST DIRECTIONAL ROADWAY					
Annual Average Daily Traffic	Distance East or West of freeway - Cancer Risk (1 x 10 ⁶)					Distance North or South of freeway - Cancer Risk (1 x 10 ⁶)					
	100 feet	200 feet	500 feet	700 feet	1,000 feet	100 feet	200 feet	500 feet	700 feet	1,000 feet	
1,000	No analysis required										
5,000	No analysis required										
10,000	7.5	3.9	0.041	0.031	0.020	7.6	0.09	0.031	0.023	0.014	
20,000	15	7.7	0.082	0.06	0.041	15	0.17	0.06	0.05	0.03	
30,000	22	12	0.12	0.09	0.061	23	0.26	0.09	0.07	0.04	
40,000	30	15	0.16	0.12	0.081	30	0.34	0.12	0.09	0.06	
50,000	37	19	0.21	0.15	0.10	38	0.43	0.15	0.12	0.07	
60,000	45	23	0.25	0.18	0.12	46	0.51	0.18	0.14	0.08	
70,000	52	27	0.29	0.21	0.14	53	0.60	0.21	0.16	0.10	
80,000	60	31	0.33	0.24	0.16	61	0.69	0.24	0.18	0.11	
90,000	67	35	0.37	0.27	0.18	68	0.77	0.27	0.21	0.13	
100,000	75	39	0.41	0.31	0.20	76	0.86	0.31	0.23	0.14	

NONCANCER CHRONIC HAZARD INDEX

NORTH-SOUTH DIRECTIONAL ROADWAY						EAST-WEST DIRECTIONAL ROADWAY					
Annual Average Daily Traffic	Distance East or West of freeway - Chronic Noncancer Hazard					Distance North or South of freeway - Chronic Noncancer Hazard					
	100 feet	200 feet	500 feet	700 feet	1,000 feet	100 feet	200 feet	500 feet	700 feet	1,000 feet	
1,000	No analysis required										
5,000	No analysis required										
10,000	0.049	0.025	0.0	0.0	0.0	0.049	0.0	0.0	0.0	0.0	
20,000	0.10	0.050	0.0	0.0	0.0	0.098	0.0	0.0	0.0	0.0	
30,000	0.15	0.075	0.0	0.0	0.0	0.15	0.0	0.0	0.0	0.0	
40,000	0.20	0.10	0.0	0.0	0.0	0.20	0.0	0.0	0.0	0.0	
50,000	0.24	0.12	0.0	0.0	0.0	0.24	0.0	0.0	0.0	0.0	
60,000	0.29	0.15	0.0	0.0	0.0	0.29	0.0	0.0	0.0	0.0	
70,000	0.34	0.17	0.0	0.0	0.0	0.34	0.0	0.0	0.0	0.0	
80,000	0.39	0.20	0.0	0.0	0.0	0.39	0.0	0.0	0.0	0.0	
90,000	0.44	0.22	0.0	0.0	0.0	0.44	0.0	0.0	0.0	0.0	
100,000	0.49	0.25	0.0	0.0	0.0	0.49	0.0	0.0	0.0	0.0	

• Screening tables based on meteorological data collected from the Livermore Laboratory in 2005.

Surface Streets Screening Tables Cancer Risk and Noncancer Hazards Generated from Roadways

NONCANCER ACUTE HAZARD INDEX

		NORTH-SOUTH DIRECTIONAL ROADWAY					EAST-WEST DIRECTIONAL ROADWAY				
Annual Average Daily Traffic	1,000 5,000	Distance East or West of freeway - Acute 1 Hour Noncancer Hazard					Distance North or South of freeway - Acute 1 Hour Noncancer Hazard				
		100 feet	200 feet	500 feet	700 feet	1,000 feet	100 feet	200 feet	500 feet	700 feet	1,000 feet
		No analysis required									
10,000		0.067	0.034	0.0	0.0	0.0	0.067	0.0	0.0	0.0	0.0
20,000		0.13	0.069	0.0	0.0	0.0	0.13	0.0	0.0	0.0	0.0
30,000		0.20	0.10	0.0	0.0	0.0	0.20	0.0	0.0	0.0	0.0
40,000		0.27	0.14	0.0	0.0	0.0	0.27	0.0	0.0	0.0	0.0
50,000		0.34	0.17	0.0	0.0	0.0	0.34	0.0	0.0	0.0	0.0
60,000		0.40	0.21	0.0	0.0	0.0	0.40	0.0	0.0	0.0	0.0
70,000		0.47	0.24	0.0	0.0	0.0	0.47	0.0	0.0	0.0	0.0
80,000		0.54	0.27	0.0	0.0	0.0	0.54	0.0	0.0	0.0	0.0
90,000		0.61	0.31	0.0	0.0	0.0	0.61	0.0	0.0	0.0	0.0
100,000		0.67	0.34	0.0	0.0	0.0	0.67	0.0	0.0	0.0	0.0

• Screening tables based on meteorological data collected from the Livermore Laboratory in 2005.

Surface Streets Screening Tables

Particulate Matter less than 2.5 microns (ug/m³) Generated from Roadways

How to use the screening tables:

- Distance is from the edge of the nearest highway travel lane to the facility or development
- When two or more highways are within the influence area, sum the contribution from each freeway

NORTH-SOUTH DIRECTIONAL ROADWAY						
Average Annual Daily Traffic	Distance East or West of Roadway - PM2.5 Concentrations (ug/m ³)					
	100 feet	200 feet	500 feet	700 feet	1,000 feet	
1,000	No analysis required					
5,000	No analysis required					
10,000	0.057	0.040	0.019	0.012	0.0083	
20,000	0.11	0.080	0.037	0.025	0.017	
30,000	0.17	0.12	0.056	0.037	0.025	
40,000	0.23	0.16	0.074	0.050	0.033	
50,000	0.29	0.20	0.093	0.062	0.041	
60,000	0.34	0.24	0.11	0.075	0.050	
70,000	0.40	0.28	0.13	0.087	0.058	
80,000	0.46	0.32	0.15	0.099	0.066	
90,000	0.51	0.36	0.17	0.11	0.075	
100,000	0.57	0.40	0.19	0.12	0.083	

EAST-WEST DIRECTIONAL ROADWAY						
Average Annual Daily Traffic	Distance North or South of Roadway - PM2.5 Concentrations (ug/m ³)					
	100 feet	200 feet	500 feet	700 feet	1,000 feet	
1,000	No analysis required					
5,000	No analysis required					
10,000	0.10	0.033	0.013	0.0090	0.0066	
20,000	0.20	0.066	0.025	0.018	0.013	
30,000	0.30	0.10	0.038	0.027	0.020	
40,000	0.40	0.13	0.050	0.036	0.026	
50,000	0.50	0.16	0.063	0.045	0.033	
60,000	0.60	0.20	0.075	0.054	0.039	
70,000	0.70	0.23	0.088	0.063	0.046	
80,000	0.80	0.26	0.10	0.072	0.053	
90,000	0.90	0.30	0.11	0.081	0.059	
100,000	1.00	0.33	0.13	0.090	0.066	

• Screening tables based on meteorological data collected from the Livermore Laboratory in 2005.