



Protecting Sensitive Uses from Roadway Air Pollution Hot Spots

Article 38 of the San Francisco Health Code (2008)

Frequently Asked Questions

Why is air pollution near roadways a public health problem?

Air pollutant exposures and health effects are much higher for people living near freeways and other busy roadways. Public health research has consistently demonstrated that children living within 200 meters of freeways or busy roadways have poorer lung function and more asthma and respiratory symptoms than those living further from freeways. For example, a recent study in the San Francisco Bay Area found that children living within 75 meters of a freeway had almost four times the prevalence of asthma when compared to children living more than 300 meters away from freeways.

Do state and federal air quality rules protect residents from such hazards?

No. Air pollution hot spots from traffic are not prevented by current state and federal air quality regulations. In 2005, the California Air Resources Board issued guidance recommending that localities avoid placing new sensitive uses within 500 feet of freeways; however, this guidance is voluntary. San Francisco is the first jurisdiction in the country to create a law to protect future residents from roadway air pollution hotspots.

What does the new law require?

The law requires that sponsors of new developments take the following actions to avoid health impacts to residents when they propose to place new residential uses near freeways and other busy roadways:

- Assessment of air pollution from traffic, using modeling tools, at project sites
- Design of the building or ventilation systems to preserve good indoor air quality

Who is sponsoring the new law?

Supervisor Tom Ammiano introduced the ordinance in July 2008. The San Francisco Asthma Task Force and the Bay Area Clean Air Task Force have both endorsed the new law. The Planning Department and Department of Public Health, who collectively developed procedures and guidance for the protection of sensitive uses from roadway air pollution hot spots in 2007, provided technical support for the legislation.

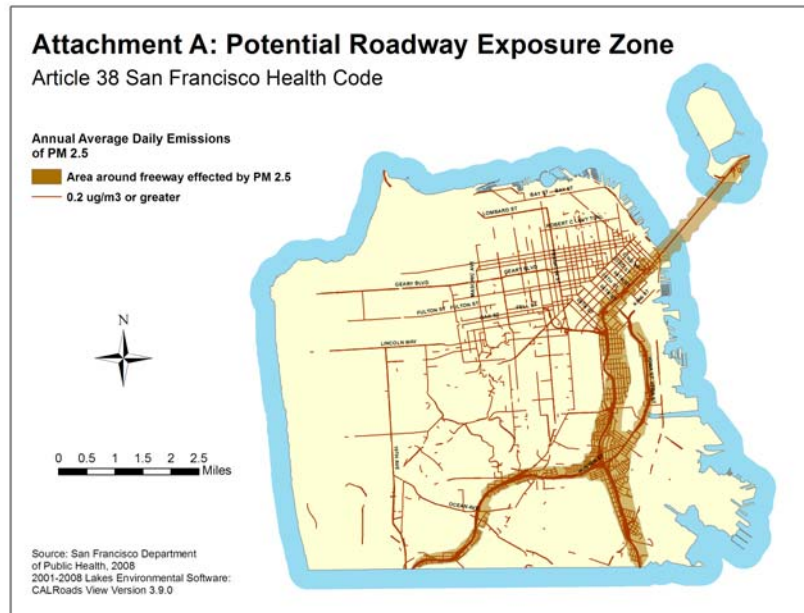
What are the health and social benefits of the legislation?

The legislation will prevent avoidable lung disease and premature death in residents living near busy roadways. The ventilation requirements can also help reduce indoor allergen levels for people with

sensitive conditions like asthma. In addition, implementation of ventilation system enhancements and maintenance requirements will provide assurance of safety for residents of developments near busy roadways.

What must developers do to meet the requirements of the legislation?

The procedures required by this legislation are analogous to the existing health code requirements for clean-up of sites with contaminated soil and water. The legislation requires an assessment of traffic-related contributions to air pollution at potential sites for residential projects of 10 or more units in certain traffic pollution impacted zones of the City (See Map for Traffic Impacted Areas). The legislation further requires that traffic-attributable air pollution levels be compared against a specified action-level; if pollutant levels are above this action level, the building must be designed to reduce the outdoor PM 2.5 levels by 80% in indoor spaces.



If required, mitigating traffic related pollutants is feasible using available technology. The performance standard required by the law can be accomplished in several ways using existing building technologies:

1. Using lower floors for commercial use and upper for residential
2. Setback of buildings from roadway air pollution source
3. Location of fresh air ventilation sources at a non-polluted site
4. Filtration of fresh air ventilation sources
5. Recirculation and filtration of indoor air

The above requirements in the new law mirror those in current San Francisco Department of Public Health procedures to analyze and prevent negative health impacts associated with locating new residential uses near busy roads.

Does the legislation have any economic impacts?

Yes, but the net economic impacts for San Francisco as a whole are positive. The law will prevent avoidable health care spending, for example, for hospital charges for prevented asthma attacks. Additional costs created by requirements for filtration of air add only marginally to the cost of ventilation systems because existing residential construction standards already require some form of mechanical fresh air ventilation to address issues of traffic noise. The Office of the Controller has

determined that the legislation has neutral to positive impacts on the economy, the development community, and future residents of the City. Depending on the system, costs for the developer and the resident for installation and maintenance range from approximately \$50-700 per year per unit. The economic benefit of the reduction of premature death is approximately \$2,100 per unit per year. The Controller has determined that the net economic benefit of the rules is \$1,400 per unit per year.

Who can conduct the air quality assessments?

Air quality assessments can be conducted using well established air quality modeling tools used by many environmental assessment professionals. The Department of Public Health (SFPDH) has conducted air quality assessments for developers for a modest fee (\$1560) to meet these assessment requirements. In 2007, the San Francisco Planning Department began requiring developers of sensitive uses near busy roadways to conduct air quality site assessment and mitigate air pollution impacts under SFPDH guidance.

Are ventilation systems required in all areas identified in the potential hazard map?

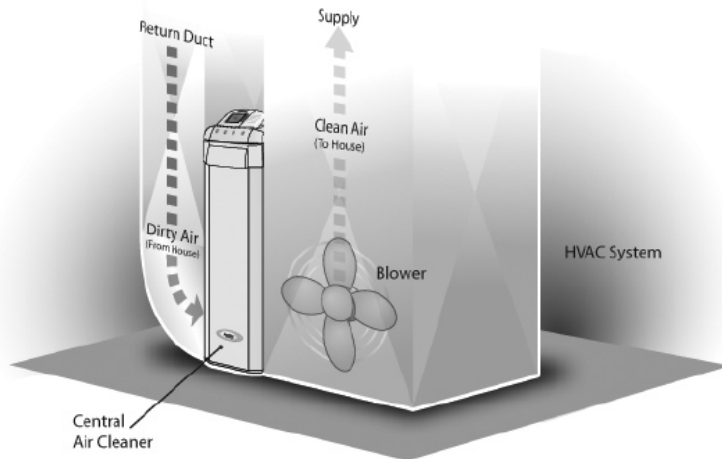
No. Special ventilation/filtration systems or alternative forms of mitigation would be required only if air quality assessment indicates that roadway-attributable fine particulate air pollution is in excess of 0.2 micrograms per cubic meter. This will occur only in a subset of the area indicated in the map above. Of the 20 projects that SFPDH has evaluated to date, we have found that only about 25% of the locations evaluated actually exceed the action level.

How can filtration systems be installed with conventional heating, cooling, and ventilation systems?

The following are examples of the modifications to conventional systems required:

| Type of Heating and Ventilation System | Modification(s) Required |
|--|---|
| Radiant floor heat or electric wall heat with make up fresh air via z-duct | Ventilation system fan; supply/return ducts; MERV 13 filter on return air: outside makeup air upstream from MERV 13 filtration. |
| Forced air gas heat make up fresh air provided via z-duct | Install MERV 13 filter on return air, outside makeup air upstream from MERV 13 filter; fan upgrade. |
| Heat pump with makeup from z-duct | Install MERV 13 filter on return air outside makeup air upstream from MERV 13 filter; fan upgrade |
| Central mechanical ventilation, heating and cooling system for building | Install MERV 13 filter on return air & filter make up air. |

All filter installations require fan enclosure. Ensuring a tight building envelope will reduce infiltration and increase energy efficiency. The following figure illustrates a conventional forced air heating system with return air filtration and filtration of make up.



Systems capable of meeting the requirements of the new air quality legislation are presently produced by a variety of national manufacturers including: Lennox, American Standard, Fantech, Honeywell, Trane, Carrier, and Aprilaire.

Do ventilation systems require maintenance to insure proper function?

Yes. These systems would be maintained in the same manner as existing filtration systems on forced air furnaces. It is the responsibility of the property owner or owners to maintain the system. Failure to change the filters would result in decreased air movement due to filter pressure loss. Pressure gauges can be installed with the ventilation system to monitor filter loading and indicate when filter replacement is necessary.

Are there examples of residential developments in the United States that have installed such ventilation systems?

There are numerous examples listed below of residential buildings with whole house ventilation coupled with filtration found in residential green building projects across the United States. Examples include the Solaire in Battery Park City, New York, City Center Condos in Salt Lake City-HEPA filtration, the Kalihari Condos in Harlem, New York City, the Brookside Green Condos in Bourne Massachusetts, and the Ecos on Delaware, in Kansas City, Missouri.

Does the new law support San Francisco “green building” goals and requirements?

Healthful indoor air quality is fundamental to green building goals, and the adequate ventilation and, if necessary, air filtration should be integral part of any residential green building program. San

Francisco's Green Building Ordinance does not contain any requirements for protection against air quality hot spots; however, the United States Environmental Protection Agency (EPA) recognizes the importance of whole house ventilation and air filtration as they impact indoor air quality in its "Energy Star Program". In the EPA's "Energy Star Specifications" the ventilation and filtration guidance is as follows:

- **Sec. 4.15 Provide mechanical whole-house ventilation meeting all ASHRAE 62.2 requirements.**
- **Sec. 4.18 HVAC filters shall be rated MERV 8 or higher at 295 feet per minute according to ASHRAE 52.2.**

Will the new law affect developers' responsibilities under the California Environmental Quality Act?

Typically, all large scale residential developments undergo some form of environmental review under CEQA, and the new law may reduce the need or scope of environmental review. As part of environmental review, the San Francisco Planning Department currently requires all residential projects that are potentially subject to air quality hot spots to assess and mitigate exposures, including through ventilation system changes. The new ordinance provides a uniform mitigation procedure which could help a developer avoid producing a timely and expensive Environmental Impact Report.

Will existing ventilation requirements for noise control be affected by the new law?

Most areas in the potential air quality hazard zone also have existing environmental noise levels that trigger requirements under Title 24 for acoustical insulation. These acoustical standards found in the California Building Code, Section 1207.12, Airborne Sound Insulation, create separate but similar demands for fresh air ventilation systems.

"If interior allowable noise levels are met by requiring that windows be unopenable or closed, the design for the structure must also specify a ventilation or air-conditioning system to provide a habitable interior environment. The ventilation system must not compromise the dwelling unit or guest room noise reduction"

Requirements for filtration under the new law are generally consistent with the ventilation requirements under this standard.

Does the California Building Code require ventilation systems for all residential buildings?

Not currently. After July 2009, Title 24 will require mechanical ventilation, apart from window ventilation, for all low-rise residential construction in part to reduce energy loss related to heating and cooling.

"Ventilation for Indoor Air Quality. All dwelling units shall meet the requirements of ANSI/ASHRAE Standard 62.2. Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings. Window operation is not a permissible method of providing the Whole Building Ventilation required in Section 4 of that Standard"