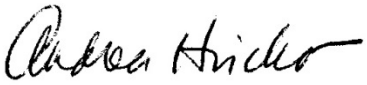
Keck School of Medicine of USC

ANDREA M. HRICKO
Professor

July 13, 2015

To: Honorable Members, Los Angeles City Council
Honorable Members, Los Angeles City Planning Commission
Michael LoGrande, Director, Department of City Planning
Mr. Raymond S. Chan, General Manager, Department of Building and Safety
200 N. Spring St., Fifth Floor
Los Angeles, CA 90012

From: Andrea Hricko, Prof. of Clinical Prev. Medicine, Keck School of Medicine at USC



RE: CF 11-0112

Dear City Council, Members of Planning Commission, Mr. LoGrande and Mr. Chan:

I am writing on behalf of faculty members at the Keck School of Medicine of the University of Southern California, who have been conducting research and/or community outreach on the health effects of near-roadway air pollution for more than a decade. I am a Professor of Clinical Preventive Medicine and direct community outreach and engagement for several environmental health centers based at USC.

We are greatly concerned about the health of residents who live, or will live, in homes and apartment/condo complexes that are being built in close proximity to freeways and busy roads in L.A., some in response to initiatives to build high density housing near transit stops while inadvertently sometimes building these same residences near freeways.

We recognize that some developers are building homes immediately adjacent to freeways in L.A., even with balconies looking over the freeway traffic, and our research leads us to believe that this is likely to have future health impacts on residents who live in that housing.

We detail our research and that of others below, which show that various studies document high exposures to pollutants or health effects in the area within 500-1000 feet of a busy road or freeway.

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Please note that we would be happy to have one of our scientists speak at an upcoming hearing on this topic.

The most health protective step

This ordinance is aimed, in part, at protecting residents from near-roadway air pollution. In our opinion, the most health protective step would be to not build housing in close proximity to freeways. We understand, however, that the recommendation from the City of L.A.'s Department of City Planning (DCP) is to install MERV 13 air filters in all new and expanded residential (except single family) buildings within 1000 feet of a freeway, and MERV 8 in commercial/industrial buildings, and further that this provision will come before the Planning & Land Use Management (PLUM) committee as part of a report by the Department of Building & Safety (DBS), made simultaneously with the DCP report and Draft Ordinance for CUGU. We are not prepared to comment on filters as part of your proposed ordinance at this time because we will need additional time to research the appropriateness of these alternatives versus installing filters of higher efficiency and pollutant removal as one possible step to attempt to mitigate exposures to residents.

We do note that ultrafine particles are of great concern and if filters are used as a mitigation measure, the removal of ultrafine particles is of utmost importance. Below, we provide information both on the levels of traffic pollutants near freeways and health effects from exposure to near-roadway air pollution. You will note that many different adverse health effects occur in those living near busy roads and freeways who are exposed to near-roadway traffic pollution. You will also note that many studies indicate that near-roadway pollutants usually are much higher right near freeways but decrease as one moves away from the freeway. Numerous studies show that ultrafine particles are back to normal by 300 meters (a little over 1000 feet).

The exposure estimates for near-roadway air pollution

A study done by UCLA and USC researchers measured levels of ultrafine particles in close proximity to the I-710 Freeway in SE Los Angeles. It found that the pollutants start to level off at about 150 meters from the freeway and are "back to background" in about 300 meters [985 feet] from the freeway. See diagram below from the study (Zhu et al, 2002).

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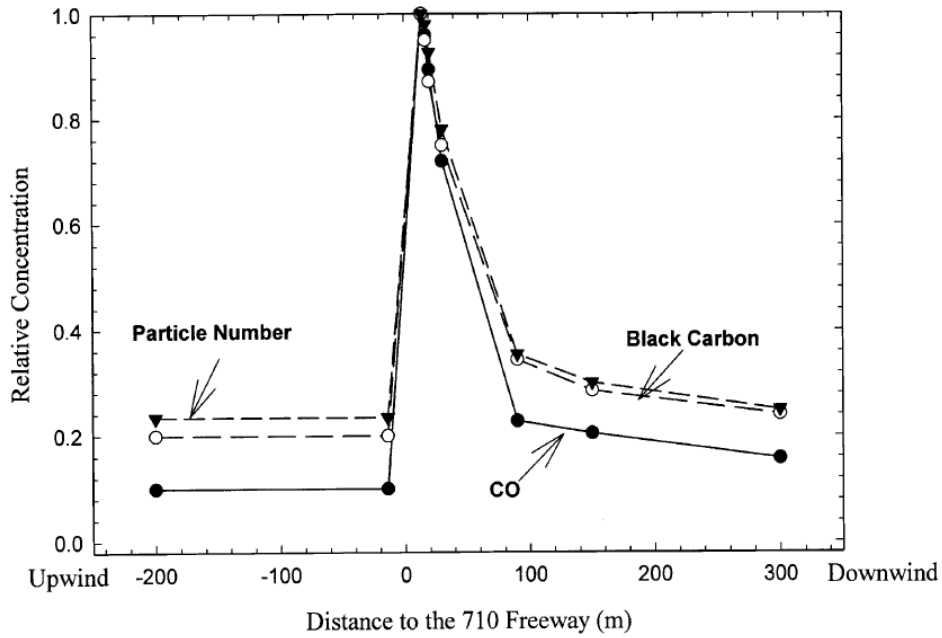

Fig. 8. Relative particle number, BC, CO concentrations versus distance from the 710 freeway.

These researchers found that at night time when winds shifted, the pollutant levels of ultrafine particles were higher, not reaching background until 500 meters [1640 feet] from the freeway (Zhu et al, 2006). See diagram below.

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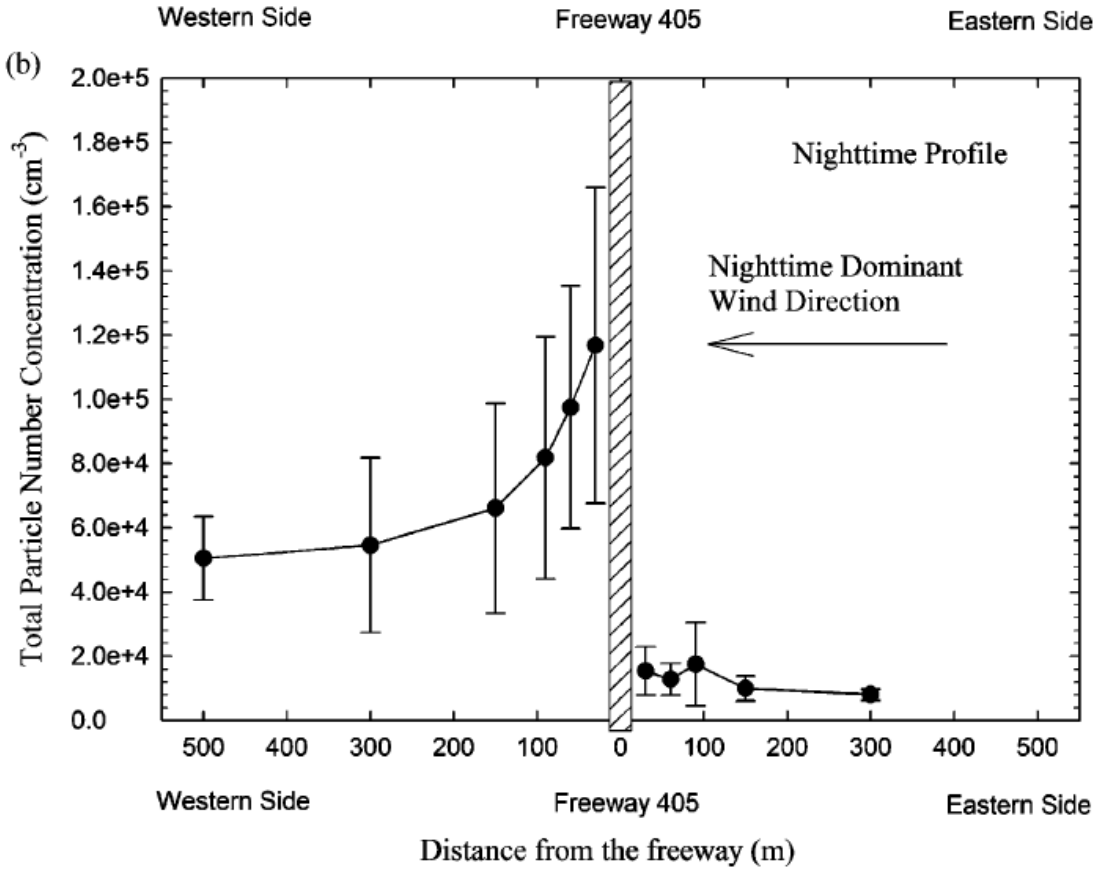

FIGURE 3. Spatial variations of total particle number concentration near freeway I-405 (a) during the day and (b) at night.

Another study, by UC Davis researchers looked at a number of studies with regard to concentrations from the roadways (Karner et al, 2010). They conclude: '*In general, concentrations decay to background within a few hundred meters downwind of a road, although studies measuring pollutants solely in the evening hours indicate that higher concentrations persist beyond 500 m (1640 feet)" (citing Zhu et al, 2006).* See graph below from the UC Davis study which shows that many pollutants do not reach background level until 1000 feet or more (Karner et al, 2010).

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TABLE 1. Summary of Background Normalized Data

group	pollutant	approximate multiplier above background concentration at edge-of-road	approximate distance required to reach background concentration (m)[a]
rapid: >50% drop by 150 m	CO	21[b]	—[c]
	metal deposition	2.9	161
	UF1 particle no.	4.0	189
less rapid or gradual decay/change	benzene	2.1	280
	EC	1.7	420[d]
	NO	3.3	565[e]
	NO_2	2.9	380[f]
	NO_X	1.8	570[e]
	PM_{10}	1.3	176
	UF2 particle no.	4.8	910[e]
	VOC1	2.0	270

[a] The approximate distances were derived from an expanded version of Figure 2; the distance point at which the smoothed line reached a value of one on the *y*-axis is cited here as background. [b] Near-road CO concentrations extended outside of the range plotted in Figure 2. [c] CO concentrations did not reach background within the 285 m for which data were measured. [d] Background normalized concentrations attained an approximate minimum value of 1.1 at this distance from the road. [e] Reached background concentrations outside of the range plotted in Figure 2. [f] Background normalized concentrations attained an approximate minimum value of 1.08 at this distance from the road.

The authors concluded that *"background normalized results suggest that a range of approximately 160-400 meters [525-1312 feet] is sufficient to reach background concentrations for the majority of pollutants."* Thus, a choice of 1000 feet as a buffer zone for reducing near-roadway exposures of residents is supported by this scientific literature.

Concerns about ultrafine particles

Ultrafine particles (UFP; aerodynamic diameter < 0.1 micrometers) are a ubiquitous exposure in the urban environment and are elevated near highways (Fuller et al, 2012; Zhu et al, 2002a; Zhu et al 2002b; Zhu et al 2006). These particles are considered especially toxic because they can enter the lung, and stay there or get into the systemic circulation (Zhu et al, 2014). Thus, when considering filters it is particularly important that this toxic constituent be removed or dramatically reduced in any traffic pollution that enters a home.

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The health effects of near-roadway air pollution

Exposure to near-roadway traffic pollution has been linked to a number of health effects, including:

- **Exacerbation of asthma and new cases of asthma** *(Gauderman et al. 2005; McConnell et al, 2006; McConnell et al, 2007; Jerrett et al, 2008; Perez L et al , 2012).*
- **Reduced lung function** *(Gauderman et al, 2007; Urman et al, 2014)*
- **Cardiovascular heart disease** *(*Brook et al, 2010; Gan et al. 2010, 2011; Hoffmann et al. 2006; Kan et al. 2008: *Ghosh et al, 2015);*
- **Preterm birth, low birth weight and pregnancy disorders** *(Wu et al, 2009, 2011); Wilhelm et al, 2012)*
- **Autism** *(Volk et al, 2011, 2013***)**
- **Aging of the brain** *(Chen et al, 2015)*
- **Possibly obesity and Type 2 diabetes (***Weinmayr, G et al, 2015; McConnell et al, 2015).*

A large number of these studies have been done in southern California by USC, UCLA or UCI researchers.

Because the above studies (and many more in other countries) document health impacts from those living in close proximity to busy roads (especially within 1000 feet), it is critically important to protect residents living in close proximity to roads. One of our scientists will be pleased to testify or provide additional comments at one of your hearings on this ordinance if additional information is needed – and once we have more time to evaluate the filters that the Planning Department/Commission is considering.

Thank you for your consideration.

CC:
Hagu Solomon-Cary, Department of City Planning
Osama Younan, Chief, Assistant Deputy Superintendent Building II

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