



# AIR POLLUTION IN THE ORCHARD SCHOOL DISTRICT & THE CHARCOT EXTENSION PROJECT: A RESPONSE

Katherine Angell, Olivia Fitzpatrick, Cory Gong, & Juliette Levy



Environmental Studies & Sciences: Environmental and Food Justice Capstone, Santa Clara University

## INTRODUCTION

Clean air is important for the physical and cognitive development of children. Many schools, especially those serving low-income and non-white communities, are situated next to major roadways (Pastor et al., 2006). One in every 11 public schools in the U.S. is located within 500 ft. of roads with significant traffic, exposing roughly 4.4 million students to toxic air pollution that can have major negative health impacts (Hopkins, 2017). Moreover, schools where more than 75% of the students are racial minorities and/or are eligible for free or reduced-price lunches are 3x more likely to be located near a busy road than schools where demographics are reversed (Hopkins, 2017). Many schools across the nation are creating movements demanding mitigation of such injustices. One such school is Orchard School District (OSD) in San José, CA. OSD consists of 94% students of color, 46% of its students qualify for free or reduced lunch, and it is squeezed in between highway 880 and Oakland Road, a major arterial 7-lanes wide.

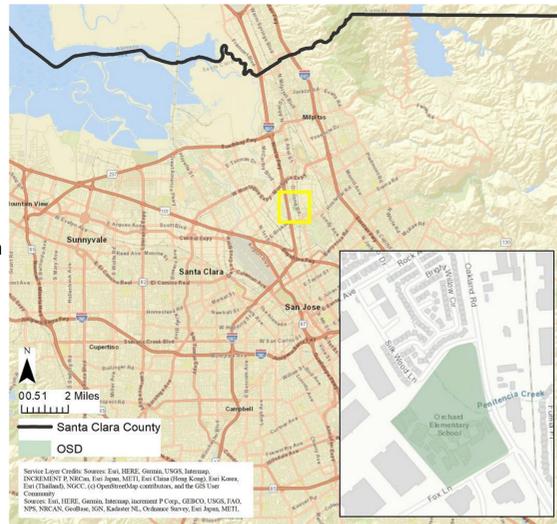


Figure 1A: Orchard School District Location.

The City of San José plans to build the Charcot Avenue Extension project, a new city road expansion. Implementing this project would cut through the school, bring an additional 14,000 cars next to the school, increase air pollution, and contribute to noise and safety issues (Figure 1B). In response, The Bay Area Air Quality Management District found that the City's Environmental Impact Report may significantly underestimate cancer risk, PM<sub>2.5</sub> concentrations, and many others because "the modeling underestimated the exposure duration [and] used inconsistent breathing rates" (Hilken, 2019). This project analyzes air pollution levels, demographics, and mitigation perceptions held by the OSD community. This research helps build local knowledge and resilience to the Charcot Extension Project, air pollution, and environmental injustice.

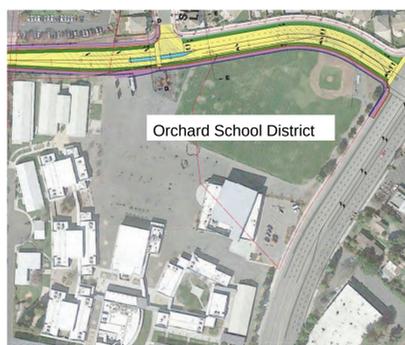


Figure 1B: Charcot Extension (yellow) (EIR, 2019, p. 7)

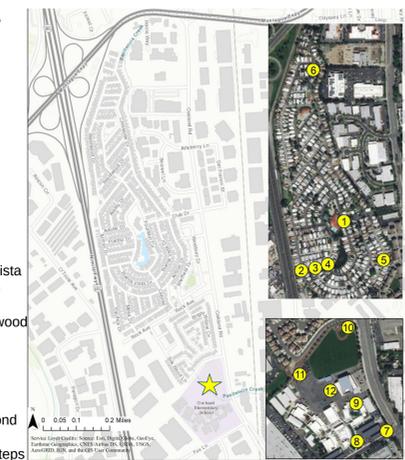


Figure 2: Air Pollution Data Collection Sites at Orchard School District and Casa de Lago.

## RESEARCH QUESTIONS

1. What are current levels of air pollution at Orchard School and in the surrounding neighborhood?
2. What are local perceptions of air quality and the Charcot Extension Project?
3. How can Orchard school, local community members, and community based partners continue to build a space for community knowledge on, participation in, and resilience to the Charcot Extension Project, air pollution, and environmental injustice?

## ACKNOWLEDGMENTS

Many thanks to Judianne Ganschow & Robin Roemer with Orchard School District, Vanessa Talania with Breathe California, our Orchard student volunteers, Dr. Christopher Bacon, and the Santa Clara University Environmental Studies & Sciences Department.

## METHODS

### Community-Based Participatory Action Research

#### Participatory

- Collaborated with **OSD community members** throughout the project and will present our findings at a school meeting.
- Six **OSD student volunteers** aided in choosing locations and data collection.
- **Breathe California** staff and interns aided in data collection.

#### Action

- Providing **resources** for OSD and the local community on current air quality, traffic density, perceptions on air pollution in the locality, the Charcot Extension, and health impacts, and possible mitigation strategies.
- Allows for **further action** that is community driven, evidence-based, and multi-sectional.

### Research- Mixed Methods

- **Air Pollution** - CPC 3007 devices used to measure ultrafine particulate matter (particles/cm<sup>3</sup>). Data collected at six sites in Orchard School District and six sites in the Casa de Lago Mobile Home Park (Figure 2). Data was collected for ten minutes at each site, five times a week (two morning, two afternoon, and one evening), for three weeks.
- **Traffic Counts** - Vehicles passing each OSD and Casa de Lago site recorded during the same air pollution time interval. Recorded in only one direction.
- **Survey** - 25-question survey distributed virally to parents of schoolchildren, OSD faculty, and other community members. Questions included perceptions of air pollution, health impacts and personal experiences regarding air pollution, opinions of present and traffic density, and demographic details.

## FINDINGS, CONTINUED - Surveys

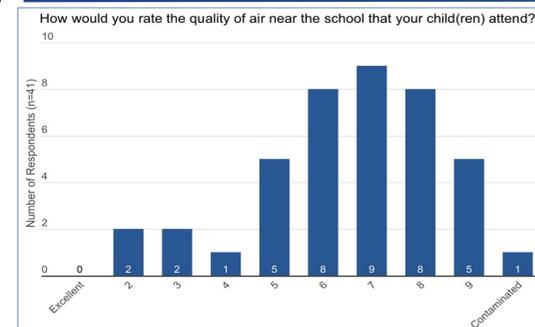


Figure 5: Air Quality Perception

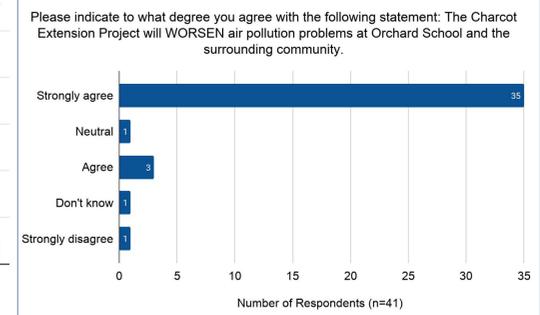


Figure 6: Charcot Extension Perception

"This project will bring unnecessary traffic that is not part of our community right through our close knit neighborhood taking some of the school property which affects our students and creates a dangerous environment. This project is very much outdated, and should not be considered any longer." -OSD Community Member

"Since students will be affected during recess and P.E., the best way to mitigate the effects is to stop them from happening. The project needs an alternate route further away from the school." -OSD Community Member

## FINDINGS - Air Pollution

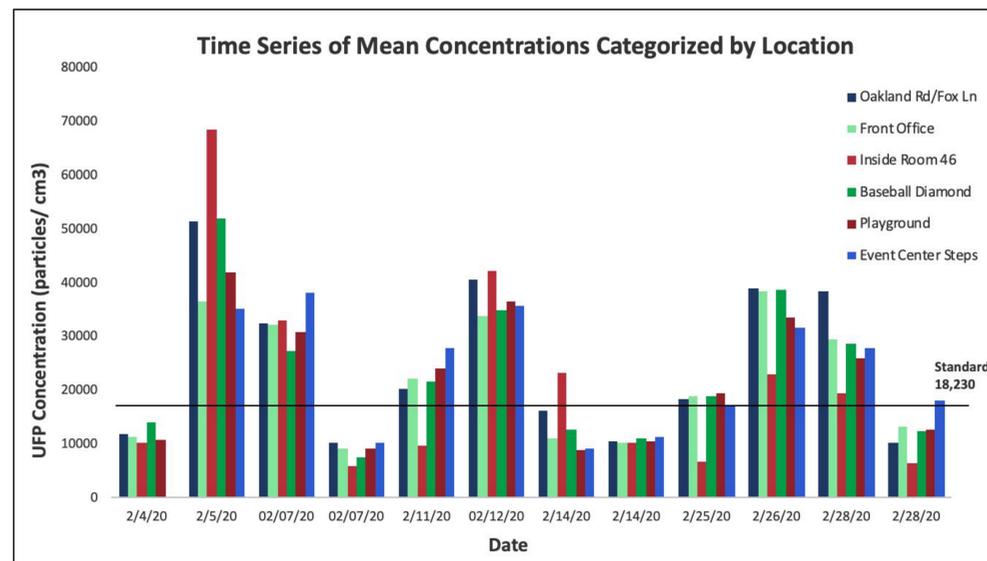


Figure 3: Pollution Averages by Date and Location

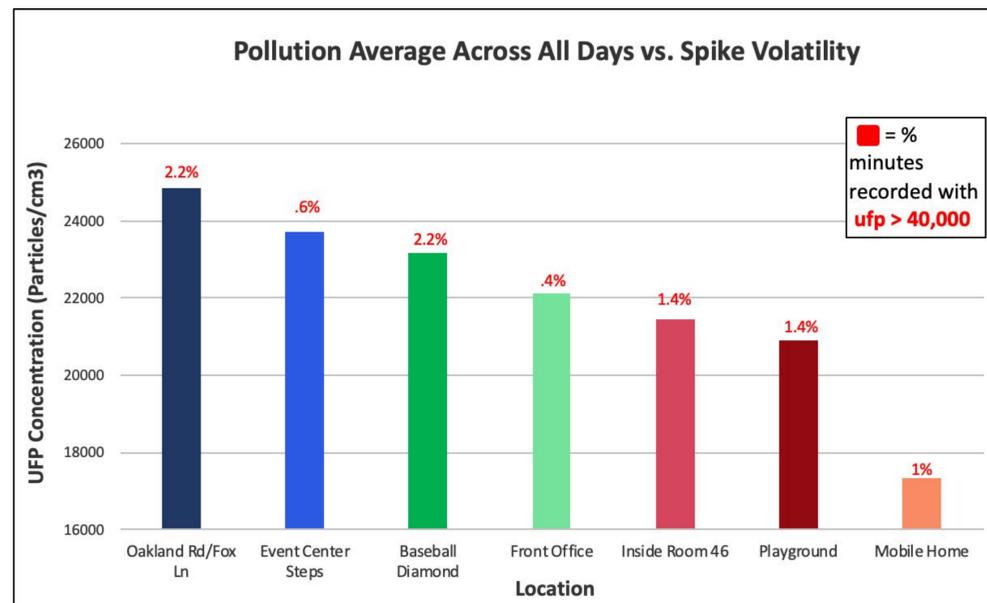


Figure 4: Pollution Total Averages by Location vs. Spike Count

## DISCUSSION & MITIGATION

### Air pollution findings

- Measurements of UFP concentrations above the threshold derived from a study showing that average concentrations of 18,230 #/cc or above impact children's asthma rates at school (Heinzerling et al., 2016).
- Average concentrations per sampling locations at Orchard School exceeded 20,000 #/cc.
- Some locations with lower averages still experienced higher volatility in spikes that exceeded 40,000 #/cc.
- Mobile Home Park averaged lowest UFP levels compared to all locations studied.

### Survey results

- Fears regarding air pollution's effects on children's health, specifically cognitive development respiratory ailments, and academic performance.
- Residents believe the project would make air pollution and traffic-pedestrian issues worse.

### Mitigation Strategies

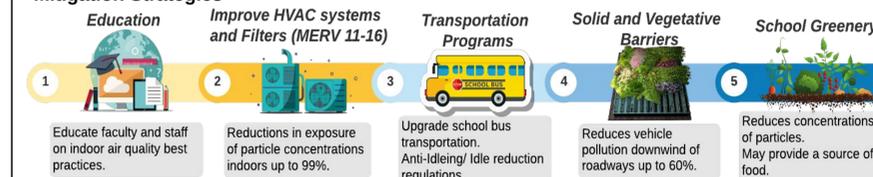


Figure 7: Strategies Orchard Elementary could implement to reduce existing air pollution & additional pollution if the Charcot Extension passes. While more exist, these have been considered by community members, the researchers, and an EPA guide as pertinent (EPA, 2015).

## CONCLUSION

- Current levels of air pollution (e.g., UFPs) at Orchard School **exceed the threshold** associated with known health impacts in children.
- Although Mobile Home Park was expected to have highest location average, our study found that the intersection of Oak Rd/Fox Ln has the **highest averages and highest exposure** to spikes.
- Community members of Orchard School have **negative perceptions** on air pollution, and are aware of **health issues** that this can bring.
- Community members are aware of the Charcot Extension Project, understand its goals and plans, and are **adamantly against** its construction.
- The community of Orchard School will continue to **facilitate a space** with local partners (e.g., Breathe CA, BAAQMD, and SCU) to share knowledge and express opinions on the Charcot Extension Project.
- We recommend that Orchard School begins to further research and integrate **mitigation strategies** now to better the current air quality.

## REFERENCES

City of San Jose. (2019). Charcot Avenue Extension Project. Retrieved from: <https://www.sanjoseca.gov/your-government/department-directory/planning-building-code-enforcement/planning-division/environmental-planning/environmental-review/active-eirs/charcot-avenue-extension-project>  
EPA. (2015). Best practices for reducing near-road pollution exposure at schools. Retrieved from: [https://www.epa.gov/sites/production/files/2015-10/documents/ochp\\_2015\\_near\\_road\\_pollution\\_booklet\\_v16\\_508.pdf](https://www.epa.gov/sites/production/files/2015-10/documents/ochp_2015_near_road_pollution_booklet_v16_508.pdf)  
Heinzerling, A., Hsu, J., & Yip, F. (2016). Respiratory health effects of ultrafine particles in children: A literature review. *Water, Air, & Soil Pollution*, 227(1), 32.  
Hilken, H. (2019) RE: Charcot Avenue Extension Project - Draft Environmental Impact Report. [Letter]. Retrieved From: <https://www.baaqmd.gov/-/media/files/planning-and-research/ceqa-letters/2019/comment-letter-for-charcot-avenue-extension-project-deir.pdf?la=en>  
Hopkins, J. (2017). The invisible hazard affecting thousands of schools. *The Center for Public Integrity*. Retrieved from: <https://publicintegrity.org/environment/the-invisible-hazard-affecting-thousands-of-schools/>  
Pastor, M., Morello-Frosch, R., & Sadd, J. L. (2006). Breathless: Schools, air toxics, and environmental justice in California. *Policy Studies Journal*, 34(3), 337-362.