

Project Information Form

Project Title:	Effectiveness of Sound Wall-Vegetation Combination Barriers as Near-Roadway Pollutant Mitigation Strategies
University:	University of California, Riverside
Principal Investigator:	Faraz Enayati Ahangar
PI Contact Information:	Fenay001@ucr.edu
Funding Source(s) and Amounts Provided (by each agency or organization):	NCST Graduate Fellowship - \$20,000
Total Project Cost:	\$20,000
Agency ID or Contract Number:	DOT DTRT13-G-UTC29
Start and End Dates:	June 26, 2016 – June 26, 2017
Brief Description of Research Project:	<p>This NCST graduate fellowship award enabled Faraz Ahangar to finish his project on the effect of sound walls and vegetation barriers on the dispersion of highway pollutants. This project examined the effects of road configurations and urban vegetation on the air quality impact of vehicle-related emissions and used this understanding to suggest methods to mitigate the impact of these emissions on urban air quality.</p> <p>During the NCST award year, Faraz was able to conduct a field study to estimate the incremental effect of tall vegetation on the mitigation caused by a solid barrier. The study was conducted in the vicinity of a highway in Sacramento, California. The road had two 500m stretches, one of which was a solid barrier, and the other has tall trees behind the barrier. This allowed the research team to make simultaneous measurements of vehicle-related species at several locations downwind of these two barrier types. The researchers observed that the addition of vegetation behind the solid barrier reduced turbulence levels in the entire sampling period. Their measurements also showed that vegetation behind a solid barrier could cause a reduction in concentrations in general; however, this was not the case for all of the observed data.</p> <p>The research findings are explained thoroughly in a final report to the California Air Resources Board (CARB). A software was also developed to model the impact of roads with roadside barriers on the surrounding communities.</p>
Describe Implementation of Research Outcomes (or why not implemented): Place any photos here	

<p>Impacts/Benefits of Implementation (actual, not anticipated):</p>	
<p>Web Links</p> <ul style="list-style-type: none"> • Reports • Project website 	<p>https://ncst.ucdavis.edu/graduate-student-research/</p> <p>CARB project link: https://www.arb.ca.gov/research/single-project.php?row%20id=65195</p> <p><u>Related publications and presentations:</u></p> <p>Lee, E.S., Ranasinghe, D., Ahangar, F.E., Amini, S., Mara, S., Choi, W., Paulson, S., Zhu, Y., 2018. Field Evaluation of Vegetation and Noise Barriers for Mitigation of Near-freeway Air Pollution Under Variable Wind Conditions. Atmos. Environ. 175, 92-99.</p> <p>Paulson, S.E., Zhu, Y., Venkatram, A., Lee, E.S., Ranasinghe, D.R., Enayati Ahangar, F., Amini, S., Frausto-Vicencio, I., Choi, W., Sum, W., 2017. Effectiveness of Sound Wall-Vegetation Combination Barriers as Near-Roadway Pollutant Mitigation Strategies (Final Report), California Air Resources Board.</p> <p>Ahangar, F.E., Amini, S., Venkatram, A., Using Vegetation to Enhance the Impact of Solid Barriers on Near-road Air Pollution, in A&WMA's 110th Annual Conference & Exhibition, June 5-8, 2017.</p> <p>Ahangar, F.E., Amini, S., Venkatram, A., Does Roadside Vegetation Barrier Reduce Near-road Air Pollution? in UCR MEGSA 8th Annual Research Symposium, May 19, 2017.</p> <p>Ahangar, F.E., Amini, S., Venkatram, A., The Effect of Roadside Vegetative Barrier on Near-road Air Pollution, in 11th Southern California Flow Physics Symposium, UCSD, April 22, 2017</p>