

# 2021 Legislative Session

## Requested Local Community Project Information Form

**Important Notes:** This is not a formal grant program. This form provides information for House and Senate members to request a separate appropriation in the capital budget for this project. Funding any project is at the discretion of the Legislature.

**This document may be subject to disclosure under the Public Records Act (Chapter 42.56 RCW).**

**Funds are available on a reimbursement basis only and cannot be advanced.**

**All capital construction projects and land acquisition projects require [Governors Executive Order 05-05](#) review.**

**Projects may be subject to state prevailing wage law (Chapter 39.12 RCW).** Requesting organization are encouraged to consult the Industrial Statistician (Jim Christensen: 360-902-5330 or Jim.Christensen@Lni.wa.gov) at the Washington State Department of Labor Industries to determine whether prevailing wages must be paid.

**High-performance building requirements (Chapter 39.35D RCW) and Executive Order 13-03 regarding life cycle and operating costs in public works projects may also apply.**

### Healthy Schools; A School Based Air Quality Intervention \$912,810

**Sponsor(s):** Orwall, Rep. Tina, Johnson, Rep. Jesse

#### Where is the project physically located?

**Address:** , SeaTac, Des Moines, Federal Way, Normandy Park and Burien King

**District(s):** 33 30, 37

**Coordinates:** ,

#### Project Contact

**Contact:** Elena Austin , Assistant Professor

**Organization:** Department of Environmental and Occupational Health Sciences, University of Washington

**Website:** <https://deohs.washington.edu/>

**Phone:** 206-221-6301

**E-mail:** [elaustin@uw.edu](mailto:elaustin@uw.edu)

**Address:** Hans Rosling Center for Population Health, Box 351618 3980 15th Avenue NE, Seattle, WA 98195

**Is the organization that will manage the funding different from the project contact organization?**

No

**If it is different, please provide the name of the organization or fiscal agent that will manage the funding.**

## **Organization Information**

**Is the requesting organization registered with the state as a non-profit organization?**

No

**If answered no, is the applicant a local government?** No

## **Project Information:**

### **(1) Briefly describe the goal of the project.**

This project aims to demonstrate the effectiveness and measure the impact of intervening within a school environment to reduce exposures to airborne particles of outdoor origin. Objectives: 1. Pilot a classroom-based deployment of HEPA based portable air cleaners (PAC) with the aim of reducing exposure to outdoor air pollution from transportation and smoke sources across 20 Washington State schools. 2. Evaluate the impact of these PAC units in improving indoor air quality, perceptions of indoor air quality and student performance. 3. Engage with participating school districts and local health agencies to evaluate the feasibility of implementing a wide-scale intervention in future years that effectively improves school environments. 4. Develop a mobile monitoring sampling protocol developed by the Department of Environmental and Occupational Health Sciences at the University of Washington in partnership with local, State and Federal stakeholders. 5. Characterize the unique mixtures of outdoor pollutants impacting the schools participating in this intervention using a mobile monitoring approach. Approach: University of Washington (UW DEOHS) air pollution researchers will partner with selected School Districts, serving a diverse population including Hispanic youth and BIPOC youth. The project enhances existing efforts taking place in WA State to identify evidence-based solutions to improve indoor air quality in schools. The project will recruit 20 schools, based on a gradient of exposure to outdoor air pollutants. A detailed model predicting size-fractionated infiltration rates will be developed based on repeated 24-hour measures at all participating schools. Evaluation of the intervention effectiveness will be based on real-time measurements, mobile monitoring and modeled exposures under a variety of outdoor exposures. Expected results: 1) Direct evaluation of the efficacy of reducing exposure to outdoor particles using an appropriately sized PAC with auto-mode in classroom settings. 2) A model of size-fractionated particle infiltration in schools that considers building-type, ventilation parameters and existing filtration type. 3) Measures of the association between indoor air quality and perceptions of air quality and student learning performance measures. 4) Long-term estimates of traffic related air pollutants at 10 of the participating school sites and comparison to long-term estimates from a fixed site monitoring site operated by the Puget Sound Clean Air Agency.

### **(2) Describe coordination with local officials to include city or county planning and permit offices.**

Cities of SeaTac, Des Moines, Federal Way, Normandy Park, and Burien funded a 2021 pilot project (on-going) to investigate current air quality conditions and potential remediation in local schools. The pilot project is collecting measurements of indoor air quality in 5 schools within the Highline and Federal Way School districts and is designed to provide schools with actionable information. The team's preliminary tests in classroom visits last fall showed wide variability in how ultrafine particles infiltrated different schools. Surprisingly, the preliminary trends didn't seem to relate to the age of the building or HVAC system. The team plans to report their results to participating schools and cities later this year. More information on this effort can be found here: <https://deohs.washington.edu/hsm-blog/monitoring-air-quality-schools>

### **(3) Describe consultation with affected tribes: current and future consultations necessary to start work on this project.**

Project not located on tribal land.

**(4) Describe coordination with Department of Archaeology & Historic Preservation.**

N/A

**(5) Describe coordination with the Department of Ecology necessary to meet requirements of SEPA.**

N/A

**(6) Will the entire project be completed after this funding request? Yes**

**(a) Describe the estimated cost and schedule for each remaining phase of the project.**

OVERALL TOTAL: The total expenditures associated with this bill would be as follows: FY22: \$665,729.80 FY23: \$247,079.80 GOODS AND SERVICES: -Sharp FPA80U Air Purifier with True HEPA (\$36,850 per year; 110 units per year at \$335/unit). Each air cleaner is evaluated by the AHAM institute to provide 293 CADR for smoke and 303 CADR for dust and provide adequate filtration for large living spaces. -Replacement air filters (\$20,000 per year; 200 per year at \$100/each). Replacement of filters are recommended every 6-24 months. - Outdoor/indoor sensor packages (\$27,500 in FY22, \$4,400 in FY23; 50 sensors in FY22 and 8 sensors in FY23 at \$550/unit) developed by Thingy of Bellevue, WA. These low-cost air quality sensors will be GSM connected, include measures of PM2.5, PM10, CO2 and NO2. -Assembly for sampling manifold tubing and junctions (\$2,000 in FY22). This includes conductive 1/2" tubing, brass Y connectors and a solenoid 3-way valve to allow for indoor/outdoor sampling. -Assembly for monitoring sampling manifold (\$15,000 in FY22) for outdoor air quality exposure assessment. -25mm Omnipore Membrane Filters (\$1050 in FY22; 3 boxes at \$350 each). These filters can be used for size-fractionated sampling of outdoor PM2.5 using the DLPI+ (Dekati). -37mm PTFE membrane filters (\$1100 in FY22; 3 boxes at \$366 each) for use in the HPEM PM2.5 impactors used to collect integrated indoor/outdoor samples during wildfire events. -Gill UltraSonic Anemometers (\$2,000 in FY22; 2 at \$1,000 each) for measuring weather parameters. -GlobalSat DG-500 Columbus V-990 GPS Data Loggers (\$240 in FY22; 3 at \$80 each). FY22: \$105,196 FY23: \$61,250 TRAVEL: UCAR rental to allow research staff to visit sampling locations to set-up and take-down sampling equipment, PAC and implement outdoor air quality monitoring. FY22: \$7868 for 150 days of SUV rental @ 52.45\$/day FY23: \$7868 for 150 days of SUV rental @ 52.45\$/day CAPITAL OUTLAYS: -TSI Fast Mobility Particle Sizer (FMPS) Spectrometers Model 3091 (\$180,000 in FY22; 2 at \$90,000 each) for measuring size-fractionated UFP. -Aerodynamic Particle Sizers (\$60,000 in FY22; 2 at \$30,000 each) for measuring PM2.5 and PM10 pollutants. -Aethlab MA200 (\$22,000 in FY22; 2 at \$11,000 each) for measuring black carbon. -CAPS – NO2 Monitor by Aerodyne Research (\$50,000 in FY22; 2 at \$25,000 each) for measuring nitrogen dioxide. -Ecotech Serinus 30 (\$24,200 in FY22; 2 at \$12,100 each) for measuring carbon monoxide. -LiCor Li-850 (\$10,000 in FY22; 2 at \$5,000 each) for measuring carbon dioxide. -Teledyne API T700 with GPT and UV Photometer (\$24,000 in FY22; 1 at \$24,000 each) for measuring gas calibration. PROFESSIONAL SERVICE CONTRACTS: -One school based consultant (\$5,000 per year; 200 hours per year at \$25/hour). This science teacher will be recruited from one of the participating schools. The consultant's role will be to provide input on adapting the intervention to existing school environments and work with participating schools to communicate air quality findings to students. -Filter analysis (\$8,000 in FY22, \$4,000 in FY23; \$40/filter analyzed for 200 filters in FY22 and 100 filters in FY23). This will be used to analyze collected indoor/outdoor PM2.5 filters and outdoor size-fractionated Dekati DLPI+ low-pressure impactor filter samples from wildland smoke events (5 days of size-fractionated samples and 15 days of indoor/outdoor PM2.5). These filters will be collected and stored in the refrigerator until sample analysis is completed. We use a GC/MS instrument to characterize PAHs concentrations as well as markers of woodsmoke (e.g. levoglucosan) on collected filter samples. The NIEHS EABES core will additionally cover the technician time to analyze these samples. FTEs FY22 Assistant Professor – 0.15 FTE Associate Professor – 0.05 FTE Research Scientist – 1.3 FTE TOTAL = 1.5 FTE FY23 Assistant Professor – 0.15 FTE Associate Professor – 0.05 FTE Research Scientist – 1.3 FTE TOTAL = 1.5 FTE

**(b) Describe what discrete phase of the project will be completed with the funding from this request and how this phase will benefit the public.**

Expected outputs: • 2 fully equipped mobile monitoring platforms, developed to characterize school level exposures to air pollutant mixtures. • Evidence based recommendations for implementing school-based air

quality interventions using a portable air cleaner approach including the measured effectiveness over a range of outdoor air pollutant sources. • Process for engaging with communities and cities to prioritize mobile and fixed site monitoring and develop strategies to capture long-term trends using mobile monitoring approach. • Coordination with air quality agencies and identification of long-term sustainability of the sampling approach developed. • Strengthening of partnerships to develop and evaluate evidence-based solutions to shared concerns regarding infiltration of wildfire smoke, transportation sources and other outdoor combustion sources of particles into indoor classroom spaces. This partnership will ensure that the study methods and results will be relevant for policy prioritization and decision making regarding future school infrastructure improvements. Benefits and Importance of this Project: Previous work has highlighted outdoor impacts of traffic related pollutants, including ultrafine particles, on communities living in proximity to aircraft descent paths within the United States and internationally. The recently completed MOV-UP study in King County, Washington identified a clear, aircraft-associated footprint of ultrafine particles under flight paths. Elevated concentrations of ultrafine particles have been consistently observed in Boston, Los Angeles and other international airport locations including London, Amsterdam Airport Schiphol and Frankfurt. Evidence is emerging that exposure to aircraft emissions is associated with negative health impacts. A recent 10-year retrospective population-based study in Los Angeles found a significant increase of pre-term births in women exposed to aircraft related pollution during gestation, and this effect was found to be independent of the effect of roadway traffic pollution. This, as well as previous work demonstrating short-term increases in inflammation in adults exposed to community air pollution in aircraft impacted locations, demonstrates the need to implement measures to increase resilience in communities and establish long-term monitoring. In WA State, health studies conducted by the King County Department of Health concluded that people living within 10 miles of SeaTac airport face higher rates of premature birth and low birthweight, hospitalization for asthma, COPD, heart disease and diabetes as well as lower life expectancy compared to the rest of the county. The report highlights important health and social disparities within this community and recommends expanded monitoring of indoor and outdoor pollutant exposures as well as implementing mitigations strategies including air filtration. This project aims to demonstrate the effectiveness and measure the impact of intervening within the school environment to reduce exposures to airborne particles of outdoor origin.

**(7) Start and Completion Dates:**

July 2021 - June 2023

**(8) Eligible Project Type or Phase**

Land Acquisition	\$0
Demolition and Site Preparation	\$0
Design	\$0
NewConstruction	\$0
Renovation	\$0
Other - Air pollution intervention in schools	\$0
<b>Total Funding Requested</b>	<b>\$912,810</b>

NOTE: **Total Funding** includes a mandatory **Commerce Administrative Fee** of up to 3% (up to \$50,000)

**(9) Is this a joint project?** No

**(a) If yes, has a joint operating agreement been signed?** No

**(b) If yes, list the partners for the project.**

**(10) Is the site owned, optioned for purchase, or under a lease?** Evaluating HEPA filter interventions in schools

**(11) Does the applicant understand and agree that any and all real property owned, optioned for purchase,**

or under a lease, that is acquired, constructed, or otherwise improved using state funds approved by the Legislature must be held and used for the purposes stated in this application for at least ten years from the date of the final payment made for the project? Yes

**(12) What amount and what percentage of local, federal and state funding has the applicant secured to date?**

\$50,000 (direct costs) from the cities of SeaTac, Des Moines, Federal Way, Normandy Park, and Burien

**(13) Besides the amount being requested, what amount of local, federal or other state funding does the applicant plan on securing in the future in order to complete the project? Please list by program.**

**(14) Please list all past efforts to obtain state funding through the member requested local community project form, including the legislative session and the amount of funding obtained.**

**(15) Once completed, how will the project fund its ongoing maintenance and operation?**

**(16) Will this project have a revenue-generating component that would have community and state economic benefit? Please describe and quantify.**

**(17) Please quantify any long-term job creation that will result from this project.**

**(18) Are there any existing or anticipated community concerns about this project (i.e. conflict with land use, neighborhood concerns, other) that would prevent it from moving forward?**