



Agenda Bill

City Council Regular Business Meeting - 19 Oct 2020

Department

City Manager

Staff Contact

Brian Wilson, City Manager

Agenda Bill Title

Funding of Phase I of a University of Washington Study in partnership with the Cities of Des Moines, Federal Way, Normandy Park, and SeaTac - School Resilience to Air Pollution

Summary**Specific Aims of the Study – School Resilience to Air Pollution**

Increasing evidence has highlighted outdoor impacts of ultrafine particles on communities living in proximity to aircraft descent paths, both within the United States and internationally. The recently completed MOV-UP study in WA State identified a clear, aircraft associated footprint of ultrafine particles associates with aircraft activities. 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.

Resiliency in a community is improved when vulnerable members are provided with interventions designed to mitigate or remove their sources of exposure. In partnership with MOV-UP advisory board members, researchers at the University of Washington identified school children as particularly vulnerable to indoor exposures to ultrafine particles from aircraft sources. Currently, it is not well understood how ultrafine particles from aircraft sources may infiltrate into indoor environments. Experimental and theoretical simulations of particle movement suggest a wide range of possible infiltration factors from 10-70% infiltration into indoor spaces. Important determining variables include a) building type, b) ventilation system parameters including central vs local units, filter type, and manufacturer as well as c) building management strategies.

Existing literature supports that in-class performance of students is directly impacted by the air quality within the classroom environment. In Los Angeles, researchers studied how changes in ambient air pollution concentrations affected the performance of second through sixth grade students on standardized tests between 2002-2008. Comparisons were made between different cohorts within

the same school, to minimize confounder. Researchers found that a lower concentration of outdoor particulate matter significantly increased mathematics and reading test scores. Similar associations between testing scores and short-term air pollution concentrations have been observed nationally and internationally.

The impact of interventions to remove air pollutants in indoor spaces is more limited. A researcher in Texas examined the impact of rolling IAQ (Improved Air Quality) improvements at nearly every school in a single school district. This quasi-natural experiment indicated that student performance on standardized tests significantly improved following improvements in IAQ. Rough calculations suggest that IAQ-renovations may be a more cost-effective way to improve standardized test scores than class size reductions. Similarly, preliminary results from another quasi-natural experiment in California, where HEPA air filters were installed in every classroom, office, and common area for all schools within five miles of a potential gas leak (but not beyond) found that air filter exposure led to a 0.20 standard deviation increase in mathematics and English scores, with test score improvements persisting into the following year.

This proposed study/project aims to test the feasibility, in two phases, to demonstrate the effectiveness and measure the impact of intervening within a school environment to reduce exposures to airborne particles of outdoor and indoor origin. The specific aims of the study/project are as follows:

Phase 1 (\$62,500):

Aim 1: Identify the filtration efficiency of current air handling approaches in a selection of five (5) schools located north and south of the airport

- a. Determine the size resolved ratio of indoor to outdoor particles in selected unoccupied classrooms
- b. Quantify the current ability of ventilation solutions to remove indoor generated particles (half-life). Do current air quality handling systems adequately remove particles that might contain COVID-19 particles?
- c. Describe the current air exchange rate (AER) of existing filtration systems under different MERV rating filters.
- d. Based on the experimental measures, describe the infiltration capacity of 1) ultrafine particles of aircraft origin 2) ultrafine particles of traffic origin and 3) wildfire smoke.

Phase 2 (\$250,000):

Aim 2: Intervene in selected schools north and south of Sea-Tac Airport by increasing within classroom particle filtration capacity.

- a. Randomize classrooms to receive an IAQ intervention, based on testing results from Aim 1.
- b. Measure IAQ impacts of intervention under different aircraft flow conditions.

Aim 3: Observe medium-term impacts on students receiving IAQ interventions

- a. Quantify impact of IAQ intervention on school absenteeism.
- b. Quantify impact of IAQ intervention on quarterly student achievement scores.

This study/project is designed to provide guidance and recommendations to communities impacted by a variety of outdoor air pollution sources to increase resilience within a school setting by identifying

impactful interventions, testing deployment, and measuring impact. It is expected that the intervention proposed to reduce indoor exposures to outdoor pollutants associated with aircraft traffic will also be effective in reducing exposures to wildfire smoke and roadway traffic. The methods developed will also explicitly test the effectiveness of the filtration strategy in reducing indoor generated particles, potentially decreasing the risk of COVID-19 transmission within classroom settings.

Representative Orwall will be seeking \$250,000 in State of Washington capital funds during the 2021 legislative session for Phase 2 of this study/project.

The Highline School District has 19,287 (Pre-K-12) enrolled students and 1,125 classroom teachers. Schools located north and south of Sea-Tac Airport are within the Highline School District and in the City of Federal Way. With school buildings not currently occupied with students and air traffic down, this is a good time to baseline air quality inside school facilities.

Working with Representative Tina Orwall, what is proposed is for the cities of Burien, Des Moines, Federal Way, Normandy Park, and SeaTac to fund Phase I of this study with the University of Washington. Each city would contribute \$12,500 for Phase I of the study and administrative costs.

Options

1. Authorize the City Manager to enter into an ILA (Interlocal Agreement) with the cities of Des Moines, Federal Way, Normandy Park, and SeaTac to fund Phase I of the University of Washington Indoor Air Quality Study for \$62,500 (\$12,500 for each City).
2. Recommend not approving the ILA and/or funding Phase I of this project/study.

Administrative Recommendation

This proposed study/project will be presented to the Airport Committee for review on October 20, 2020.

City Manager recommends the signing of the ILA with the cities of Des Moines, Federal Way, Normandy Park, and Sea-Tac for Phase 1 of this project/study with a funding contribution of \$12,500.

Suggested Motion

I move to place this item on the Consent Agenda for November 2, 2020 authorizing the City Manager to enter into an Interlocal Agreement to fund Phase I of a University of Washington indoor air quality study for schools located north and south of the airport.

Fiscal Impact

Funds for this study/project (\$12,500) will be expended from the City Manager, Professional Services account.

Attachments

Air Quality ILA October 2010 Draft #1

**INTERLOCAL AGREEMENT BETWEEN THE CITIES OF BURIEN,
DES MOINES, FEDERAL WAY, NORMANDY PARK, AND SEATAC FOR
A STUDY RELATED TO SCHOOL ~~RESILANCE~~-RESILIENCE TO AIR
POLLUTION**

Pursuant to RCW 39.34, the Interlocal Cooperation Act, dated October 1, 2020, (the "Effective Date"), this Agreement is entered into between the City of Burien, a municipal corporation, hereinafter referred to as "Burien," the City of Des Moines, a municipal corporation hereinafter referred to as "Des Moines," the City of Federal Way, a municipal corporation hereinafter referred to as "Federal Way," the City of Normandy Park, a municipal corporation hereinafter referred to as "Normandy Park," and the City of SeaTac, a municipal corporation hereinafter referred to as "SeaTac," and all five cities collectively referred to as the "Parties."

1. Study Description. A study will be conducted by the University of Washington pertaining to School Resilience to Air Pollution (the "Study"). The Study aims to test the feasibility, in two phases, to demonstrate the effectiveness and measure the impact of intervening within a school environment to reduce exposures to airborne particles of outdoor and indoor origin. Further description of the Study is attached as Exhibit #1.

2. Study Phases. ~~It is the intent of the Parties~~The Parties intend to contract with the University of Washington to perform the Study in two phases. The first phase is intended to identify the filtration efficiency of current air handling approaches in a selection of five schools North and South of the Seattle-Tacoma International Airport (the "Airport"). The second phase of the Study is intended to intervene in selected schools north and south of the Airport by increasing within classroom particle filtration capacity, and observe medium-term impacts on students receiving IAQ interventions.

3. Proposed Budget. The first phase of the study will have a budget of \$XXXXXXX, and the second phase of the Study will have a budget of \$250,000.

4. Phase 1 Funding. The Parties agree to collectively provide \$60,000 to fund Phase 1 of the Study. Each Party shall equally pay \$12,500 for its share of the Phase 1 funding in a lump sum to the Fiscal Manager upon execution of a Contract with the University of Washington. ~~The funds will be managed as management of these funds will be as~~ described in Section 8.

5. Phase 2 Funding. Representative Orwall intends to request a budget proviso during the 2021 Legislative Session to fund Phase 2 of the Study. *It is not the intent of this Agreement to commit the Parties to provide funding for Phase 2 of the Study.*

6. Contract and Contract Administration. Any contract between the Parties and the University of Washington shall be approved by each Party-party and will be administered by the City of XXXX ("Contract Administrator"). These responsibilities of the Contract Administrator include monitoring and periodically informing the Parties of the status of work performed under the contract and coordinating with the Fiscal Manager for payment of contract invoices.

7. Fiscal Management. Management of fiscal matters associated with this Agreement shall

Commented [MJ1]: I took this out of the Specific Aim document.

Commented [MJ2]: The Specific Aims states \$50,000, but that was before the UW "overhead" costs. Do we have a revised number?

Commented [MJ3]: We need to see if this is enough, or whether Rep. Orwall will need to ask for additional funds to pay the "overhead."

be administered by the City of XXXXX (“Fiscal Manager”). These responsibilities of the Fiscal Manager include collecting each Party’s Phase 1 funding commitment as outlined in Section 5, processing contract payments as required, and provide copies of all invoices to each ~~Party-party~~ for review. Additionally, should the Washington State Legislature provide funding for Phase 2 of the Study, the Fiscal Manager shall manage all aspects of obtaining these funds from the State, ~~in order~~ to make payment for Phase 2 of the Study.

8. **Administration of Agreement.** Supervision and administration of this Agreement shall be the responsibility of each Parties’ City Manager (or for the City of Federal Way, its Mayor) or his/her ~~respective~~ designee.

9. **Duration.** This Agreement shall be effective upon ~~execution by each party~~ the Effective Date provided above and shall remain in full force and effect through completion of the Study or June 30, 2022. This Agreement may be extended upon mutual agreement of all Parties.

Commented [MJ4]: I wanted to put a specific end date. If there is legislative funding, that won't happen until mid-2021, so I used June, 2022 as an end date.

10. **Termination.** Any party may withdraw from this Agreement, effective upon thirty (30) days written notice to the other ~~parties~~ Parties. However, the withdrawing ~~Party-party~~ shall still be responsible for the payment of its funding obligation as set forth in Section 5.

11. **Modification.** This Agreement may be modified by further written agreement upon mutual acceptance by all ~~parties~~ Parties.

12. **Alternative Dispute Resolution.** If a dispute arises from or relates to this Agreement or the breach thereof and if the dispute cannot be resolved through direct discussions, the ~~parties~~ Parties agree to endeavor first to settle the dispute ~~in an amicable manner~~ amicably by mediation administered by a mediator under JAMS Alternative Dispute Resolution service rules or policies before resorting to arbitration. The mediator may be selected by agreement of the ~~parties~~ Parties or through JAMS.

13. **Written Notice.** All communications regarding this Agreement shall be sent ~~via~~ by electronic communication to the ~~parties~~ Parties at the email addresses listed on the signature page of the Agreement, unless notified to the contrary.

14. **Hold Harmless.** Each party to this Agreement shall defend, indemnify and hold the other party, its appointed and elected officers, agents, counsel, and employees, harmless from claims, actions, injuries, damages, losses, or suits including reasonable attorneys’ fees, arising or alleged to have arisen directly or indirectly out of or in consequence of the performance of this Agreement to the extent caused by the fault or negligence of the indemnitor, its appointed or elected officials, counsel, employees, officers, agents, assigns, volunteers or representatives.

15. **Non-Discrimination.** The Parties shall not discriminate in any manner related to this Agreement ~~on the basis of~~ based on race, color, national origin, gender, gender preference, gender orientation, sex, sexual orientation, religion, age, marital status, or disability in employment or the provision of services.

16. **Severability.** If any provision of the Agreement shall be held invalid, the remainder of

this Agreement shall not be affected thereby if such remainder would then continue to serve the purposes and objectives of both parties.

17. Entire Agreement. This Agreement constitutes the entire agreement between the partiesParties.

CITY OF BURIEN:

CITY OF DES MOINES:

Brian J. Wilson, City Manager
Email: _____
Date: _____

Michael Matthias, City Manager
Email: _____
Date: _____

APPROVED AS TO FORM:

APPROVED AS TO FORM:

Name: Garmon Newsom II
Title: City Attorney

Name: Tom George
Title: City Attorney

CITY OF NORMANDY PARK:

CITY OF DES MOINES:

Mark E. Hoppen, City Manager
Email: _____
Date: _____

Carl C. Cole, City Manager
Email: ccole@seatacwa.gov
Date: _____

APPROVED AS TO FORM:

APPROVED AS TO FORM:

Name: James Haney
Title: City Attorney

Name: Mary E. Mirante Bartolo
Title: City Attorney

CITY OF FEDERAL WAY:

Jim Farrell, City Manager
Email: _____
Date: _____

APPROVED AS TO FORM:

Name: _____
Title: City Attorney

Exhibit A

Specific Aims – School Resilience to Air Pollution

Increasing evidence has highlighted outdoor impacts of ultrafine particles on communities living in proximity to aircraft descent paths, both within the United States and internationally. The recently completed MOV-UP study in WA State identified a clear, aircraft associated footprint of ultrafine particles associated with aircraft activities. 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.

Resiliency in a community is improved when vulnerable members are provided with interventions designed to mitigate or remove their sources of exposure. In partnership with MOV-UP advisory board members, researchers at the University of Washington identified school children as particularly vulnerable to indoor exposures to ultrafine particles from aircraft sources. Currently, it is not well understood how ultrafine particles from aircraft sources may infiltrate into indoor environments. Experimental and theoretical simulations of particle movement suggest a wide range of possible infiltration factors from 10-70% infiltration into indoor spaces. Important determining variables include a) building type, b) ventilation system parameters including central vs local units, filter type and manufacturer as well as c) building management strategies.

Existing literature supports that in-class performance of students is directly impacted by the air quality within the classroom environment. In Los Angeles, researchers studied how changes in ambient air pollution concentrations affected the performance of second through sixth grade students on standardized tests between 2002-2008. Comparisons were made between different cohorts within the same school, to minimize confounder. Researchers found that a lower concentrations of outdoor particulate matter significantly increased mathematics and reading test scores. Similar associations between testing scores and short-term air pollution concentrations have been observed nationally and internationally.

The impact of interventions to remove air pollutants in indoor spaces is more limited. A researcher in Texas examined the impact of rolling IAQ improvements at nearly every school in a single school district. This quasi-natural experiment indicated that student performance on standardized tests significantly improved following improvements in IAQ. Rough calculations suggest that IAQ-renovations may be a more cost-effective way to improve standardized test scores than class size reductions. Similarly, preliminary results from another quasi-natural experiment in California, where HEPA air filters were installed in every classroom, office and common area for all schools within five miles of a potential gas leak (but not beyond) found that air filter exposure led to a 0.20 standard deviation increase in mathematics and English scores, with test score improvements persisting into the following year.

This project aims to test the feasibility, in two phases, to demonstrate the effectiveness and measure the impact of intervening within a school environment to reduce exposures to airborne particles of outdoor and indoor origin. Our specific aims are to:

Phase 1 (50k):

Aim 1: Identify the filtration efficiency of current air handling approaches in a selection of five schools North and South of the airport

- a. Determine the size resolved ratio of indoor to outdoor particles in selected unoccupied classrooms
- b. Quantify the current ability of ventilation solutions to remove indoor generated particles (half-life). Do current air quality handling systems adequately remove particles that might contain COVID-19 particles?
- c. Describe the current air exchange rate (AER) of existing filtration systems under different MERV rating filters.
- d. Based on the experimental measures, describe the infiltration capacity of 1) ultrafine particles of aircraft origin 2) ultrafine particles of traffic origin and 3) wildfire smoke

Phase 2 (250k):

Aim 2: Intervene in selected schools N/S of airport by increasing within classroom particle filtration capacity.

- a. Randomize classrooms to receive an IAQ intervention, based on testing results from Aim 1.
- b. Measure IAQ impacts of intervention under different aircraft flow conditions.

Aim 3: Observe medium-term impacts on students receiving IAQ interventions

- a. Quantify impact of IAQ intervention on school absenteeism
- b. Quantify impact of IAQ intervention on quarterly student achievement scores

This project is designed to provide guidance and recommendations to communities impacted by a variety of outdoor air pollution sources to increase resilience within a school setting by identifying impactful interventions, testing deployment, and measuring impact. We expect that the intervention proposed to reduce indoor exposures to outdoor pollutants associated with aircraft traffic will also be effective in reducing exposures to wildfire smoke and roadway traffic. The methods developed will also explicitly test the effectiveness of the filtration strategy in reducing indoor generated particles, potentially decreasing the risk of COVID-19 transmission within classroom settings.