

Letter of intent (LOI)

Interested parties should submit a Letter of Intent (LOI) on or before February 28, 2023 for each individual proposal. Letter of intent should include applicant contact information and seven questions about proposed study. More details about SAM study selection process, eligibility and funding availability can be found in SAM REF guidelines in SAM Effectiveness webpage.

The respondent's email (**shelly.basketfield@Seattle.gov**) was recorded on submission of this form.

Applicant contact information

Applicant Full Name *

Shelly Basketfield

Organization *

City of Seattle/Seattle Public Utilities

Phone number *

12068492531

Proposed Study Information

1. Proposed Study Title *

Measuring street sweeping 6PPD-q whole environment load reductions

2. Which topic(s) from the SWG's priority list do you propose to address? *

The proposed study topic should be in the SWG's priority list

9. Study street sweeping and/or line cleaning to get more information about 6PPD/q removal.

3. Select type of project being proposed *

- Survey
- Literature Review & Synthesis
- Environmental Sampling Study
- Other

4. Short Description of the Proposed Study *

250 word limit: describe how results will assess effectiveness and advance regional understanding and permittees' implementation of specific stormwater management approaches

All permittees sweep their streets to reduce stormwater impacts associated with runoff. Increasing street sweeping activities may be a first action permittees can take to address 6PPD-quinone (6PPD-q), a tire preservative, which has been shown to be lethal to returning adult coho salmon in urban streams.

Navickis-Brasch et al (2022) reported that tire tread wear particles have potential to leach 6PPD-q until removed from the environment. Exposure to tire tread wear particle leachate has been shown to cause acute mortalities of coho salmon (McIntyre et al 2021). Järnskog et al (2021) found concentrations of 6PPD in street sweeping wash water. Preliminary results from a 2022 City of Seattle pilot study detected 6PPD-q concentrations in "sweepings", the roadway-deposited sediment consisting of trash, leaves, debris and attached pollutants picked up by the street sweeper.

Based on those studies, our working hypothesis theorizes that regularly scheduled street sweeping will remove tire and road wear particles (TRWP) generated by the friction of tires on the road pavement, therefore reducing the amount of 6PPD-q available to wash or blow off roadways and ultimately enter nearby surface waters.

Measuring operational-scale street sweeping 6PPD-q pollutant load reductions will inform permittees how to better incorporate street sweeping into their programs, reducing the amount of 6PPD-q entering the environment sooner rather than later.

5. What type information will be collected or analyzed for this proposed study? *

If existing permittees' data are needed, specify the type, and the expected timing of a request for existing information from Permittees.

During the 3-year study period, the City would sweep around 18,000 broom miles annually, about 55% draining to the MS4, under typical operating conditions (e.g., arterials swept mostly at night on a weekly to biweekly schedule without parking enforcement). Each year, at least 40 composite samples of sweeping debris would be collected every other week at two locations, one representing north Seattle and the other south Seattle.

The composite samples would be split and analyzed as follows:

- Split #1 Primary Environmental Sample, representing the source control or whole environment load reduction: fecal coliform bacteria, grain size, pH, total phosphorus, total kjeldahl nitrogen, total organic carbon, total solids, metals (arsenic, cadmium, chromium, copper, lead, nickel, silver, zinc, mercury), total petroleum hydrocarbons, polychlorinated biphenyls (PCBs), and 6PPD-quinone.
- Split #2, sieved to <250 um, representing the direct wash-off reduction to waterways: total phosphorus, metals (arsenic, cadmium, chromium, copper, lead, nickel, silver, zinc, mercury), Polychlorinated biphenyls (PCBs), and 6PPD-quinone.

6. What are the anticipated measurable outcomes and key deliverables that will be produced by the proposed study, and how will they be used by Permittees and the Washington State Department of Ecology? *

Measurable Outcomes: The results will represent arterial load reductions for Western Washington. Dry season results may reflect conditions found in Eastern Washington. Outcomes will include:

- 6PPD-q concentrations for the whole sample and less than 250-micron particles
- 6PPD-q pickup rates (ug/broom-mile)
- 6PPD-q unit costs (\$ per ug removed)
- 6PPD-q load reductions (ug) partitioned by direct and indirect wash-off to stormwater

Key Deliverables:

- Quality Assurance Project Plan (QAPP). The QAPP may be used by Permittees and Ecology as a basis for planning additional studies around the effectiveness of street sweeping to reduce 6PPD-q loads to the environment.
- Final Report. The final report will inform Permittees and Ecology how to adapt their stormwater programs to integrate street sweeping to optimize capture of 6PPD-Q.

7. Permittees or agencies you are proposing to coordinate with (provide staff names and contact information, if known) *

Enter "NA" if not applicable.

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