



EXECUTIVE SUMMARY

Farallon has prepared this Summary Report on behalf of Eastside Fire & Rescue to summarize the work performed and analytical results for the Lower Issaquah Valley Per- and Poly-Fluoroalkyl Substances (PFAS) Characterization Study performed August to October 2018 (Study). The Study was performed under two agreements: an Interagency Agreement between Eastside Fire & Rescue and the Washington State Department of Ecology; and an Interlocal Agreement between Eastside Fire & Rescue and the City of Issaquah. The overall purpose of the Study was to assess potential impacts of PFAS associated with aqueous film-forming foam (AFFF) training exercises to soil and groundwater in the Lower Issaquah Valley. The overall purpose of the Study was satisfied through the collection of soil, reconnaissance groundwater, and groundwater samples at, and down-gradient of, confirmed and/or suspected sources in areas of interest identified in the Lower Issaquah Valley, which in turn met the requirements of the specific Study objectives.

PFAS are a class of chemicals that were developed for a wide range of uses due to their high level of chemical stability, miscibility, and surface tension and friction reduction properties. PFAS, including perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS), were widely used in AFFF for fighting petroleum hydrocarbon and liquid fuel fires. The application of AFFF on fires and spraying in open areas as part of training exercises are now recognized as the primary mechanisms for the release of PFAS into the environment.

Since their invention and widespread use, concern has increased regarding PFAS toxicity and the risks associated with exposure to PFAS-impacted media. The U.S. Environmental Protection Agency established lifetime Health Advisory Levels for PFOS and PFOA in drinking water in 2016. PFAS are not currently regulated as hazardous substances in Washington State under the Model Toxics Control Act. For this investigation, Ecology (2018a) has developed Investigatory Levels that include numerical criteria based on exposure scenarios for groundwater (drinking water scenario), residential and industrial uses (soil contact), and concentrations in soil for protection of groundwater for unsaturated and saturated soil (see Section 2.7, Regulatory Criteria).

The Study evaluated five areas of interest where historical interviews and/or previous investigation results indicated AFFF had been released primarily through training exercises. The scope of work for the Study included:

- Collecting multi-incremental soil samples from 8 decision units at a depth interval of 0 to 6 inches below ground surface to evaluate the direct exposure pathway for surficial soil;
- Advancing 13 sonic drill rig borings and 1 hand-auger boring for discrete vadose zone soil sampling and/or shallow zone reconnaissance groundwater sampling to evaluate potential PFAS impacts to soil and groundwater;
- Installing, developing, and surveying 14 monitoring wells based on reconnaissance groundwater analytical results to evaluate groundwater quality and flow direction at five areas of interest; and
- Gauging and sampling 10 existing monitoring wells and the 14 new monitoring wells installed as part of the Study.



Concentrations of PFAS, including PFOA and PFOS, were less than the Investigatory Level for unrestricted (residential) direct contact in all soil samples analyzed. The analytical results indicate that soil sampled as part of this Study does not present a direct contact risk to human health; therefore, protective measures to address exposure to the soil that would occur during use of public spaces for sports, leisure, or other activities are not necessary.

Analytical data for samples collected during the Study confirm that shallow and/or vadose zone soil at all five areas of interest has been impacted with PFAS at concentrations that exceed the Investigatory Level for protection of groundwater for unsaturated soil. Analytical data for reconnaissance groundwater and groundwater samples confirm that the pathway for migration of PFAS from soil to shallow groundwater is complete for each area of interest. Confirmed groundwater impacts at concentrations that exceed the Investigatory Level are present in both shallow (10- to 60-foot-deep) and intermediate (60- to 120-foot-deep) groundwater at multiple locations on the western portion of the Lower Issaquah Valley.

PFOS initially was detected in groundwater samples collected between 2013 and 2018 from City of Issaquah Water Supply Well #4 (i.e., production well COI-PW04) at concentrations ranging between 0.296 and 0.6 microgram per liter ($\mu\text{g/l}$). PFOA was detected in production well COI-PW04 well water during the same period at concentrations that ranged from 0.00651 to 0.022 $\mu\text{g/l}$. Analytical results for intermediate groundwater samples collected during this Study indicate that concentrations of PFOS exceed the Investigatory Level in the west-central portion of the Lower Issaquah Valley from approximately Northwest Dogwood Street to north of Northwest Juniper Street. However, PFOS concentrations decline to less than the Investigatory Level in monitoring wells closer to production well COI-PW04. Preliminary groundwater sampling results from production well COI-PW05 indicate that PFAS concentrations, including PFOS, PFOA, and the sum of PFOS and PFOA, in deep groundwater pumped from the well are less than Investigatory Levels.