



DEPARTMENT OF  
**ECOLOGY**  
State of Washington

**IAA No. C2100056**

**INTERAGENCY AGREEMENT (IAA)**

**BETWEEN**

**THE STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY**

**AND**

**EASTSIDE FIRE AND RESCUE**

**THIS INTERAGENCY AGREEMENT** (“Agreement” or “IAA”) is made and entered into by and between the state of Washington, Department of Ecology, hereinafter referred to as “**ECOLOGY**,” and the Eastside Fire and Rescue” (a joint operation of King County Fire Protection District No. 10, King County Fire Protection District No. 38, the City of Issaquah, the City of North Bend, and the City of Sammamish) hereinafter referred to as “**EFR**” pursuant to the authority granted by Chapter 39.34 RCW.

**THE PURPOSE OF THIS AGREEMENT** is to evaluate and perform pilot testing of feasible remedial technologies to clean up or contain Per- and Polyfluoroalkyl Substances (PFAS) in soil and groundwater at the aqueous film forming foam (AFFF) training area at 175 Newport Way Northwest (NWN AFFF training area), in Issaquah, Washington.

**WHEREAS**, **ECOLOGY** has legal authority under RCW 70A.305 and WAC 173-340 to identify, investigate, and cleanup facilities where a hazardous substance has come to be located, and to work with entities to expeditiously and effectively address the release of a hazardous substance. And whereas the **EFR** has legal authority under RCW 52.26.808 pursuant to Chapter 39.34 RCW that allows each entity to conduct the actions detailed in this Agreement. Each party is authorized to undertake the actions in this agreement.

**THEREFORE, IT IS MUTUALLY AGREED THAT:**

**1) SCOPE OF WORK**

**EFR** shall furnish the necessary personnel, equipment, material and/or service(s) and otherwise do all things necessary for or incidental to the performance of the work set forth in Appendix A, *Statement of Work and Budget*, attached hereto and incorporated herein.

**2) PERIOD OF PERFORMANCE**

The period of performance of this IAA will commence on the date of Ecology’s signature and be completed by **June 30, 2022**, unless the Agreement is terminated sooner as provided herein. Amendments extending the period of performance, if any, shall be at the sole discretion of **ECOLOGY**.

### 3) COMPENSATION

Compensation for the work provided in accordance with this IAA has been established under the terms of RCW 39.34.130 and RCW 39.26.180(3). This is a performance-based agreement, under which payment is based on the successful completion of expected deliverables.

State funds will be utilized for this agreement.

The parties have determined that the cost of accomplishing the work identified herein will not exceed \$300,000.00 dollars, including any indirect charges. Payment for satisfactory performance of the work shall not exceed this amount unless the parties mutually agree via an amendment to a higher amount. Compensation for services shall be based on the terms and tasks set forth in Appendix A, *Statement of Work and Budget*. ECOLOGY will not make payment until it has reviewed and accepted the work.

ECOLOGY may, at its sole discretion, terminate or suspend this Contract, or withhold payments claimed by EFR for services rendered, if EFR fails to satisfactorily comply with any term or condition of this Agreement.

### 4) BILLING AND PAYMENT PROCEDURE

Payment requests shall be submitted on state form, Invoice Voucher A19-1A. Invoice voucher shall reference the Agreement (IAA) number and clearly identify those items that relate to performance under this Agreement. Invoices shall describe and document to ECOLOGY's satisfaction a description of the work performed, the progress of the work, and related costs. Attach supporting documentation to the invoice.

Send invoices to:

State of Washington Department of Ecology Toxics Cleanup Program Attn: Angela Harkins P.O. Box 47600 Olympia, WA 98504-7600
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Payment requests may be submitted on a monthly basis. Upon expiration of this Agreement, any claim for payment not already made shall be submitted to ECOLOGY within 30 days after the expiration date or the end of the fiscal year, whichever is earlier.

Payment will be made within thirty (30) days of submission of a properly completed invoice (form A19-1A) with supportive documentation. All expenses invoiced shall be supported with copies of invoices paid.

Payment will be issued through Washington State's Office of Financial Management's Statewide Payee Desk. To receive payment, EFR must register as a statewide vendor by submitting a statewide vendor registration form and an IRS W-9 form at website, <https://ofm.wa.gov/it-systems/statewide-vendorpayee-services>. For questions about the vendor registration process, contact Statewide Payee Help Desk at (360) 407-8180 or email [PayeeRegistration@ofm.wa.gov](mailto:PayeeRegistration@ofm.wa.gov).

### 5) ALTERATIONS AND AMENDMENTS

This Agreement may be amended by mutual agreement of the parties. Such amendments shall not be binding unless they are in writing and signed by personnel authorized to bind each of the parties.

**6) ASSIGNMENT**

The work to be provided under this Agreement, and any claim arising thereunder, is not assignable or delegable by either party in whole or in part, without the express prior written consent of the other party, which consent shall not be unreasonably withheld.

**7) ASSURANCES**

Parties to this Agreement agree that all activity pursuant to this agreement will be in accordance with all the applicable current federal, state, and local laws, rules, and regulations.

**8) CONFORMANCE**

If any provision of this Agreement violates any statute or rule of law of the state of Washington, it is considered modified to conform to that statute or rule of law.

**9) DISPUTES**

Parties to this Agreement shall employ every effort to resolve a dispute themselves without resorting to litigation. In the event that a dispute arises under this Agreement that cannot be resolved among the parties, it shall be determined by a Dispute Board in the following manner. Each party to this Agreement shall appoint one member to the Dispute Board. The members so appointed shall jointly appoint an additional member to the Dispute Board. The Dispute Board shall review the facts, agreement terms, and applicable statutes and rules, and then make a determination of the dispute. The determination of the Dispute Board shall be final and binding on the parties hereto, unless restricted by law. The cost of resolution will be borne by each party paying its own cost. As an alternative to this process, if state agencies, either of the parties may request intervention by the Governor, as provided by RCW 43.17.330, in which event the Governor's process will control. The parties may mutually agree to a different dispute resolution process.

**10) FUNDING AVAILABILITY**

ECOLOGYS ability to make payments is contingent on availability of funding. In the event funding from state, federal, or other sources is withdrawn, reduced, or limited in any way after the effective date and prior to completion or expiration date of this Agreement, ECOLOGY, at its sole discretion, may elect to terminate the Agreement, in whole or part, for convenience or to renegotiate the Agreement subject to new funding limitations and conditions. ECOLOGY may also elect to suspend performance of the Agreement until ECOLOGY determines the funding insufficiency is resolved. ECOLOGY may exercise any of these options with no notification restrictions, although ECOLOGY will make a reasonable attempt to provide notice.

In the event of termination or suspension, ECOLOGY will reimburse eligible costs incurred by EFR through the effective date of termination or suspension. Reimbursed costs must be agreed to by ECOLOGY and EFR. In no event shall ECOLOGY's reimbursement exceed ECOLOGY's total responsibility under the agreement and any amendments.

**11) GOVERNING LAW AND VENUE**

This Agreement is entered into pursuant to and under the authority granted by the laws of the state of Washington and any applicable federal laws. The provisions of this Agreement shall be construed to conform to those laws. This Agreement shall be construed and interpreted in accordance with the laws of the state of Washington, and the venue of any action brought hereunder shall be the Superior Court for Thurston County.

## **12) INDEPENDENT CAPACITY**

The employees or agents of each party who are engaged in the performance of this Agreement shall continue to be employees or agents of that party and shall not be considered for any purpose to be employees or agents of the other party.

## **13) ORDER OF PRECEDENCE**

In the event of an inconsistency in the terms of this Agreement, or between its terms and any applicable statute or rule, the inconsistency shall be resolved by giving precedence in the following order:

- a. Applicable federal and state of Washington statutes, regulations, and rules.
- b. Mutually agreed upon written amendments to this Agreement.
- c. This Agreement, number C2100056.
- d. Appendix A, *Statement of Work and Budget*.
- e. Any other provisions or term of this Agreement, including materials incorporated by reference or otherwise incorporated.

## **14) RECORDS MAINTENANCE**

The parties to this Agreement shall each maintain books, records, documents, and other evidence that sufficiently and properly reflect all direct and indirect costs expended by either party in the performance of the service(s) described herein. These materials shall be subject to inspection, review, or audit by personnel of both parties, other personnel duly authorized by either party, the Office of the State Auditor, and federal officials so authorized by law. All books, records, documents, and other materials relevant to this Agreement must be retained for six years after expiration of this Agreement. The Office of the State Auditor, federal auditors, and any persons duly authorized by the parties shall have full access and the right to examine any of these materials during this period. Each party will utilize reasonable security procedures and protections for all materials related to this Agreement. All materials are subject to state public disclosure laws.

## **15) RESPONSIBILITIES OF THE PARTIES**

Each party of this Agreement hereby assumes responsibility for claims and/or damages to persons and/or property resulting from any act or omissions on the part of itself, its employees, its officers, and its agents. Neither party will be considered the agent of the other party to this Agreement.

## **16) RIGHTS IN DATA**

Unless otherwise provided, data which originates from this Agreement shall be "work made for hire" as defined by the United States Copyright Act, Title 17 U.S.C. section 101 and shall be owned by state of Washington, ECOLOGY. Data shall include, but not be limited to, reports, documents, pamphlets, advertisements, books magazines, surveys, studies, computer programs, films, tapes, and/or sound reproductions. Ownership includes the right to copyright, patent, and register these items, and the ability to transfer these rights.

## **17) SEVERABILITY**

If any provision of this Agreement or any provision of any document incorporated by reference shall be held invalid, such invalidity shall not affect the other provisions of this Agreement which can be given effect without the invalid provision, if such remainder conforms to the requirements of applicable law and the fundamental purpose of this Agreement, and to this end the provisions of this Agreement are declared to be severable.

## **18) SUBCONTRACTORS**

EFR agrees to take complete responsibility for all actions of any Subcontractor used under this Agreement for the performance. When federal funding is involved there will be additional contractor and subcontractor requirements and reporting.

Prior to performance, all subcontractors who will be performing services under this Agreement must be identified, including their name, the nature of services to be performed, address, telephone, WA State Department of Revenue Registration Tax number (UBI), federal tax identification number (TIN), and anticipated dollar value of each subcontract. Provide such information to ECOLOGY's Agreement manager.

**19) SUSPENSION FOR CONVENIENCE**

ECOLOGY may suspend this Agreement or any portion thereof for a temporary period by providing written notice to EFR a minimum of seven (7) calendar days before the suspension date. EFR shall resume performance on the first business day following the suspension period unless another day is specified in writing by ECOLOGY prior to the expiration of the suspension period.

**20) TERMINATION FOR CAUSE**

If for any cause, either party does not fulfill in a timely and proper manner its obligations under this Agreement, or if either party violates any of these terms and conditions, the aggrieved party will give the other party written notice of such failure or violation. The responsible party will be given the opportunity to correct the violation or failure within fifteen (15) business days. If failure or violation is not corrected, this Agreement may be terminated immediately by written notice of the aggrieved party to the other.

**21) TERMINATION FOR CONVENIENCE**

Either party may terminate this Agreement without cause upon thirty (30) calendar day prior written notification to the other party. If this Agreement is so terminated, the parties shall be liable only for performance rendered or costs incurred in accordance with the terms of this Agreement prior to the effective date of termination.

**22) WAIVER**

A failure by either party to exercise its rights under this Agreement shall not preclude that party from subsequent exercise of such rights and shall not constitute a waiver of any other rights under this Agreement unless stated to be such in a written amendment to this Agreement signed by an authorized representative of the parties.

**23) AGREEMENT MANAGEMENT**

The representative for each of the parties shall be responsible for and shall be the contact person for all communications, notifications, and billings questions regarding the performance of this Agreement. The parties agree that if there is a change in representatives, they will promptly notify the other party in writing of such change, such changes do not need an amendment.

The ECOLOGY Representative is:	The EFR Representative is:
Name: Priscilla Tomlinson Address: PO Box 47600 Olympia, WA 98504-7600 Phone: (425) 749-7135 Email: ptom461@ecy.wa.gov	Name: Jeff Clark Address: 175 Newport Way NW Issaquah, WA 98027 Phone: 425.313.3201 Email: jclark@esf-r.org Fax: 425.313.3254

**24) ALL WRITINGS CONTAINED HEREIN**

This Agreement contains all the terms and conditions agreed upon by the parties. No other understandings, oral or otherwise, regarding the subject matter of this Agreement shall be deemed to exist or to bind any of the parties hereto.

State of Washington, Department of Ecology  
IAA No. C2100056  
Eastside Fire and Rescue

The signatories to this Agreement represent that they have the authority to bind their respective organizations to this Agreement.

IN WITNESS WHEREOF, the parties below, having read this Agreement in its entirety, including all attachments, do agree in each and every particular as indicated by their signatures below.

**State of Washington  
Department of Ecology**

**Eastside Fire and Rescue**  
(a joint operation of King County Fire Protection District No. 10, King County Fire Protection District No. 38, the City of Issaquah, the City of North Bend, and the City of Sammamish)

By: \_\_\_\_\_  
Signature Date

Heather R. Bartlett

Deputy Director

By: *Jeff Clark* 3-14-21  
Signature Date

JEFF CLARK  
Print Name:  
FIRE CHIEF

Title:

## APPENDIX A STATEMENT OF WORK AND BUDGET

This scope of work and estimated budget has been prepared to evaluate and perform pilot testing of feasible remedial technologies to clean up or contain Per- and Polyfluoroalkyl Substances (PFAS) in soil and groundwater at the aqueous film forming foam (AFFF) training area at 175 Newport Way Northwest (NWN AFFF training area), in Issaquah, Washington. Project background for the Lower Issaquah Valley PFAS Characterization Study<sup>1</sup> and initial findings for the NWN AFFF training area are provided below. A detailed scope of work that provides individual tasks and deliverables to be completed is provided in the following section.

### PROJECT BACKGROUND

The Washington State Department of Ecology (ECOLOGY), Eastside Fire & Rescue (EFR), and City of Issaquah (City) (collectively referred to as the Parties) are in the process of characterizing the nature and extent of PFAS found in the Lower Issaquah Valley impacting the underlying aquifer and identifying source remedial action(s) that when implemented will benefit groundwater quality of this important drinking water resource. The primary suspected mechanism for release of PFAS to soil and groundwater in the Lower Issaquah Valley is the historical use of AFFF during fire-fighting training exercises.

Confirmed releases of AFFF have resulted in concentrations of PFAS in soil and groundwater that exceed current Ecology Investigatory Levels (Investigatory Levels) at the following locations:

- 175 Newport Way Northwest (current EFR Headquarters facility);
- Issaquah Valley Elementary West Playfield;
- Issaquah Valley Elementary East Ballfields (Dodd Fields Park);
- North of 190 East Sunset Way (Memorial Field); and
- West of 135 East Sunset Way on the former rail grade (Rainier Trail Area; soil only).

These areas with confirmed impacts to soil and groundwater are collectively referred to as “areas of interest” (Figure 1). For discussion purposes, previous reporting and this scope of work have divided the aquifer in the Lower Issaquah Valley in the vicinity of the areas of interest into three (3) water-bearing zones:

- Shallow groundwater,
- Intermediate groundwater, and
- Deep groundwater.

Shallow groundwater is encountered from the water table to sixty (60) feet below ground surface (bgs). Intermediate groundwater is encountered at depths between approximately sixty (60) and one-hundred and twenty (120) feet bgs. Deep groundwater is encountered at depths greater than one-hundred and twenty (120) feet bgs.

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<sup>1</sup> Complete findings of the study through December, 2020 are provided in *the Per- and Poly-Fluoroalkyl Substances Additional Characterization Study Summary Report Lower Issaquah Valley Issaquah, Washington* prepared by Farallon for Eastside Fire and Rescue currently available in draft format.

## 175 NEWPORT WAY NORTHWEST PREVIOUS CHARACTERIZATION

Analytical results for soil and groundwater obtained through previous characterization work indicate that some of the highest reported concentrations of PFAS in soil and shallow groundwater are on the western portion of the 175 Newport Way Northwest area of interest in the NWN AFFF training area where historical AFFF training was performed over a period of approximately twenty (20) years on a monthly basis.

Previous characterization of the 175 Newport Way Northwest area of interest was performed under scopes of work described in Interagency Agreement (IAA) Nos. C1800181 dated July 10, 2018 and C2000071 dated December 3, 2019. Key preliminary findings under the scopes of these two IAAs include:

- Concentrations of PFAS in soil, including perfluorooctane sulfonic acid<sup>2</sup> (PFOS) and perfluorooctanoic acid (PFOA), generally decrease with depth below the AFFF training area to a depth of approximately fifteen (15) feet bgs.
- Reported concentrations of PFAS in soil at a depth of fifteen (15) feet bgs in the vadose zone are typically at least an order of magnitude less than those observed in the interval from ground surface to a depth of five (5) feet bgs in the vadose zone (Figures 2 and 3).
- Subsurface stratigraphy under the NWN AFFF training area comprises a surficial silty sand and sand unit overlying a sand and gravel unit followed by a low-permeability hard gray silt first encountered at a depth of approximately fifteen (15) feet bgs on the western portion of the NWN AFFF training area and approximately thirty (30) feet bgs on the eastern portion of the NWN AFFF training area.
- The hard gray silt basement unit has the characteristics to act as a low-permeability aquiclude. No lower groundwater-bearing unit has been identified below the hard gray silt (Figure 4).
- Although hydraulic testing was not performed, the characteristics of the sand and gravel unit suggest it is highly conductive.
- Reported concentrations of PFOS and PFOA in shallow groundwater suggest additional PFAS-impacted soil and groundwater are present west of the NWN AFFF training area.
- Reported concentrations of PFOS and PFOA in shallow groundwater are the same order of magnitude in monitoring wells NWN-MW04, NWN-MW07, and NWN-MW03 (west to east, respectively) before beginning to decline on the eastern portion of the area of interest (Figure 3).
- Downward vertical gradients were observed from shallow to intermediate groundwater using well pairs NWN-MW03/NWN-MW09 and NWN-MW02/NWN-MW08.

## EVALUATION OF FEASIBLE REMEDIATION TECHNOLOGIES

EFR performed a preliminary screening of currently available remediation technologies for PFAS in soil and groundwater. Although potential remedial technologies and associated cleanup actions are not subject to a formal feasibility study at this time, the technology screening was performed based on preliminary evaluation of the criteria identified in MTCA Section 173-340-360(3) to identify permanent solutions to the maximum extent practicable, including:

- Protectiveness,
- Permanence,
- Cost,
- Long-term effectiveness,
- Management of short-term risks,

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<sup>2</sup> Conventional product chemical names are provided here consistent with the acronyms and terminology used in the Ecology Draft Chemical Action Plan (2020). Individual chemicals are most commonly encountered in the environment in an ionic form.



- Technical and administrative implementability, and
- Consideration of public concerns.

### **Eliminated Technologies**

Potential remedial technologies for PFAS that were eliminated fell into one of the following categories:

- Technologies that have been demonstrated to be ineffective for PFAS such as:
  - Soil vapor extraction, and
  - Air sparging.
- Technologies that are still experimental or have not been proven at a commercial scale such as:
  - Ball milling,
  - Ethanol flushing, and
  - Advanced oxidation/reduction for soil; and
  - Sonication, or bioremediation for groundwater.
- Technologies that preliminary evaluation indicated were unsuitable for conditions identified at the areas of interest such as:
  - Deep excavation below the water table,
  - Dynamic groundwater flushing, or
  - Pump-and-treat systems to provide hydraulic control for high-concentration PFAS-impacted groundwater.
- Technologies that preliminary evaluation indicated would be cost-prohibitive for the volumes of soil and groundwater under consideration, including:
  - Off-site incineration,
  - Soil washing; and
  - Reverse osmosis or filtration technology.

### **Retained Soil Technologies**

Treatment technologies that were retained included proven, commercially available technologies that preliminary evaluation indicated would support development of remedial actions that are both protective of human health and the environment and cost-effective to implement. Retained technologies for soil include:

- Direct excavation and off-site disposal of higher-concentration shallow PFAS-impacted soil;
- Installation of engineering controls such as physical barriers at the surface to reduce or eliminate infiltration of precipitation through unsaturated soil;
- Solidification of contaminated soil to reduce infiltration of precipitation and PFAS mobility;
- In-situ treatment or amendment with activated carbon additives for unsaturated and saturated soil to reduce or eliminate PFAS mobility in the subsurface; and
- Subsurface barriers or structures to enhance treatment or isolate higher-concentration media such as cutoff walls and/or vaults.

### **Retained Groundwater Technologies**

Retained technologies for groundwater include:

- Activated carbon treatment using either direct injection technology or direct installation for shallow groundwater to create permeable reaction barriers or retain PFAS in-situ at the point of direct-treatment;
- Subsurface barriers or structures to enhance treatment or isolate higher-concentration media such as:
  - Cutoff walls,
  - Flume-and-gate structures, and similar treatment systems;
  - Localized low-volume hydraulic control using pump-and-treat systems for high-concentration groundwater to prevent:
    - Migration,
    - Dispersion, and
    - Dilution that may contaminate larger down-gradient volumes of water.

### **Recommended Soil Technologies**

Based on the reported distribution of PFAS in the subsurface and lithologies present, remedial technologies recommended for further evaluation at the 175 Newport Way Northwest area of interest are:

- Direct excavation of soil with high concentrations of PFAS to a maximum depth of approximately fifteen (15) feet bgs or the top of shallow groundwater;
- Capping,
- Solidification, or amendment with activated carbon of unsaturated (vadose zone) soil with elevated concentrations of PFAS; and
- Injection treatment of the saturated sand and gravel interval overlying the hard gray silt.

Based on the assessment of the NWN AFFF training area performed to date, adequate information is available to develop a plan for pilot testing of appropriate remedial technology at the NWN AFFF training area. Some limited additional characterization sufficient to support bench testing of potential treatment products and to evaluate performance of pilot-scale treatment of the NWN AFFF training area is recommended. Based on the results of the bench- and pilot-scale testing, a preliminary full-scale remedial design should be developed.

### **Recommended Groundwater Technologies**

Based on the reported distribution of PFAS in shallow and intermediate groundwater, remedial technologies recommended for further evaluation at the 175 Newport Way Northwest area of interest are:

- Direct injection treatment of shallow groundwater below the NWN AFFF training area;
- Construction of a subsurface vault keyed into the hard gray silt to isolate soil and shallow groundwater with the highest reported concentrations of PFAS; and
- Construction of a passive treatment system with activated carbon such as a funnel-and-gate system keyed into the hard gray silt to enhance treatment of shallow groundwater prior to migration and dispersion out of the NWN AFFF training area and ultimately into intermediate groundwater.

Localized hydraulic control for shallow groundwater may be possible at the NWN AFFF training area given the boundary conditions that are present. However, this approach is unlikely to be cost effective when compared with a passive treatment system over the long term for control of PFAS in shallow groundwater.

It is ECOLOGY's intention to fund Tasks 1 through 4 as part of this pilot test. Ecology will receive regular updates from EFR on the progress of all currently funded tasks conducted in this project.

Tasks **currently funded** by ECOLOGY through this agreement:

- Task 1: Pilot Test Work Plan;
- Task 2: NWN AFFF Training Area Data Collection and Monitoring;
- Task 3: Pilot Testing; and
- Task 4: Summary Reporting.

### **TASK 1: PILOT TEST WORK PLAN**

Task 1 includes preparing a Pilot Test Work Plan as an update to the existing Lower Issaquah Valley Per- and Poly-Fluoroalkyl Substances Characterization Study Work Plan (Work Plan) that will identify additional sampling to be performed prior to and in conjunction with pilot testing. EFR will update the associated Quality Assurance and Program Plan (QAPP) as needed to address the tasks described in this scope of work<sup>3</sup> and will ensure compliance with cultural and archeological requirements, including the development of an Inadvertent Discovery Plan.

The updated Work Plan and QAPP will describe the final scope of work to be performed, including:

- Sample locations and types;
- Standard operating procedures for work to be performed;
- Quality control measures;
- Analytical methods and laboratories;
- Applicable Investigatory Levels; and
- Other project information as appropriate.

#### **Task 1 Deliverables:**

1. Draft Pilot Test Work Plan due to ECOLOGY for review thirty (30) days after the date the funds are secured.
2. Final Pilot Test Work Plan addressing ECOLOGY comments, due to Ecology fifteen (15) days after receipt of comments from ECOLOGY.

### **TASK 2: NWN AFFF TRAINING AREA DATA COLLECTION AND MONITORING**

Task 2 includes additional collection of soil and groundwater analytical data at the NWN AFFF training area to support the design of the planned pilot test and bench-scale testing of soil amendments or injected product for NWN AFFF training area soils. The data collection will be used to refine the extent of impacts to soil and to confirm that observed impacts to shallow groundwater correspond to known areas with elevated PFAS concentrations in soil at the NWN AFFF training area (i.e., that there do not appear to be unknown sources in soil causing impacts to shallow groundwater).

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<sup>3</sup> Preparation of a third addendum to the original Work Plan and QAPP is anticipated to reduce total labor for Task 2 by incorporating the previously approved documents by reference.

The data collected under Task 2 will be used to support the Pilot Test that will be completed under Task 3. Additional characterization includes:

- Advancing six (6) direct-push borings into the shallow zone (up to 20 feet bgs) or, at select locations, to the hard gray silt (20 to 30 feet bgs) at the NWN AFFF training area and central portion of the 175 Newport Way Northwest area of interest (Figures 2 and 3);
- Completion of the six (6) borings as new shallow monitoring wells;
- Collection of twenty (20) soil and six (6) quality control samples during drilling activities at depths of three (3), five (5), ten (10), and/or fifteen (15) feet bgs or at intervals selected by the field personnel based on field observations during drilling and for analysis by Modified EPA Method 537;
- Performing one (1) groundwater monitoring event with the new and existing groundwater monitoring wells (15 groundwater samples, 2 quality control samples); and
- Excavating a five (5-foot) deep test pit proximate to borings NWN-R06 and STTA01 to collect two (2) soil samples for bench testing and coordination with select remediation contractors for bench-scale testing of treatment media to evaluate product<sup>4</sup> effectiveness and appropriate dosing.

Monitoring wells will be completed with 2-inch Schedule 40 polyvinyl chloride casings with 0.020-inch slotted screen openings and 10/20 Colorado Silica Sand filter pack. A licensed surveyor will survey the top-of-casing elevations and locations of each completed monitoring well and provide the coordinates in Washington State Plane North (feet) and elevations in North American Vertical Datum of 1988. The resulting data will be evaluated to characterize the residual source at the AFFF training area for soil removal and/or stabilization to reduce mass leaching to groundwater and migration of PFAS down-gradient of the 175 Newport Way Northwest area of interest.

Investigation derived waste will be disposed of by EFR in accordance with applicable rules and regulations at an appropriately licensed disposal facility. ECOLOGY is not responsible for disposal of investigation derived waste and investigation derived waste disposal is not part of this IAA.

**Task 2 Deliverables:**

1. Boring logs and survey data to be submitted to ECOLOGY for review thirty (30) days after completion of drilling; and
2. Field sampling summary analytical data tables and laboratory reports due to ECOLOGY via email within six (6) weeks of receipt from the analytical laboratory.

**TASK 3: PILOT TESTING**

Task 3 includes the labor and direct costs to:

- Design the layout for up to two full-scale direct-injection events,
- Perform the direct-injection events,
- Manage the design and performance of the direct-injection program,
- Observe and document the injections that are performed at the NWNW AFFF training area; and
- Monitor groundwater following injection events to evaluate treatment efficacy.

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<sup>4</sup> Current products under consideration include PlumeStop and AquaGate-RemBind.

For this scope of work, the assumed pilot test will include up to two (2) full-scale injection events using a product selected based on the results of the bench-scale testing performed under Task 2. EFR will prepare a pilot test preliminary design that includes:

- Drawing of the injection field,
- Target depths,
- Estimated target injection masses,
- An injection and monitoring schedule, and
- Other relevant information.

Pilot test oversight will include:

- Field observation and data collection,
- Performance monitoring, and
- Documentation of any deviations from the preliminary design that are observed.

The cost estimate for this task assumes twelve (12) groundwater samples will be collected following each injection event to evaluate treatment performance and observed changes in PFAS concentrations in groundwater.

### **Task 3 Deliverables:**

1. Preliminary:
  - a. Design drawings,
  - b. Injection tables, and
  - c. Monitoring schedule; and
  - d. Summary tables of total mass injected and updated performance monitoring data thirty (30) days after analytical data is received for the last monitoring event.
    - i. This preliminary deliverable is due for ECOLOGY review thirty (30) days following the final injection event.

### **TASK 4: SUMMARY REPORTING**

Task 4 includes preparation of a summary report documenting additional characterization analytical results generated under Task 2 and pilot test design and performance information generated under Task 3.

Summary reporting performed under Task 4 will include:

- Preparation of summary figures drawn to an approximate scale;
- Preparation of summary tables, including:
  - Characterization and groundwater monitoring analytical results,
  - Groundwater elevations, and
  - Target and final injection masses;
- Evaluation of the pilot test performance;
- Further evaluation of the conceptual site model for 175 Newport Way Northwest based on reported performance data; and
- Pilot testing design documents and other supporting information prepared under Task 3.

### **Task 4 Deliverables:**

1. Draft Summary Report due to ECOLOGY for review sixty (60) days after the submittal date of the Task 3 deliverables; and
2. Final Summary Report addressing ECOLOGY comments, due to ECOLOGY fifteen (15) days after receipt of comments from Ecology.

**BUDGET**

<b>Task</b>	<b>Description</b>	<b>Cost</b>
1	Pilot Test Work Plan	\$16,800.00
2	NWN AFFF Training Area Data Collection	\$53,400.00
3	Pilot Testing	\$211,100.00
4	Summary Reporting	\$18,700.00
		<b>Total = \$300,000.00</b>

**Note:** Task budgets may be moved between tasks without a formal amendment.