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December 18, 2025

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Vance Atkins, Site Manager
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Re: Comments on EFR/IVES PFAS Site Draft Interim Action Work Plan and SEPA
DNS/Checklist
Ecology Cleanup Site ID: 16581

Dear Ms. Wooten and Mr. Atkins:

Introduction

Sammamish Plateau Water and Sewer District (the District or Sammamish Plateau Water) is commenting on two related documents from the Department of Ecology (Ecology) related to the Eastside Fire and Rescue Headquarters and Issaquah Valley Elementary School cleanup site (EFR/IVES, Site ID: 16581). The first is the draft Interim Action (IA) work plan, and the second is the checklist and Determination of Nonsignificance (DNS) under the State Environmental Policy Act (SEPA).

Consistent with its previous comments on interim actions proposed for this Site, the District believes that the draft IA work plan and associated SEPA review documents lack sufficient information and evaluation on what appears intended to be part of the permanent remedial action for the Site. Specifically:

- They lack adequate information on the mass of PFAS present at the EFR headquarters site that is to be addressed by the interim action, and related evaluation of the effectiveness of the proposed sequestration treatments including effectiveness over time;
- They lack consideration and evaluation of alternatives to the proprietary treatments being proposed;
- They lack evaluation of the proposed treatment of vadose zone soils, which was not included in the pilot test;
- They lack evaluation of impact on remedial options in the event that the Interim Action fails, including through breakthrough or contaminant “roll over;” and
- They lack identification of or planning for potential contingencies in the event of remedy failure.

As a result, the draft IA work plan does not satisfy requirements of the Model Toxics Control Act (MTCA), and the SEPA review fails to provide information and evaluation required to support issuance of a DNS.

Accordingly, Ecology should not approve the draft IA work plan. Instead, Ecology should require revisions to address the comments and concerns raised in this letter and attachments. It should also withdraw the SEPA DNS and not revisit SEPA review until concerns raised here are addressed in a revised IA work plan. Given the significance of this proposed action for the Lower Issaquah Valley Aquifer (LIVA) and the many thousands of people who rely upon it for potable water supply, early scoping for SEPA review would be appropriate.¹

As always, the District remains available to collaborate with Ecology to ensure that any IA will in fact improve conditions at the Site without creating unintended risks that could adversely impact the LIVA or jeopardize later efforts to cleanup of the Site.

District’s June 2024 comments on LIVA PFAS Agreed Orders

As part of its ongoing engagement with Ecology, Eastside Fire and Rescue, and the City of Issaquah, the District submitted detailed comments in June 2024 on the Agreed Order for the EFR/IVES Site.²

¹ See WAC 197-11-262(1) (“The purpose of early scoping is to identify possible environmental issues prior to making a threshold determination.”).

² June 4, 2024 letter from John Krauss, Sammamish Plateau Water, to Brett Carp, Ecology, re Public Comment on Agreed Orders for the Lower Issaquah Valley PFAS Cleanup Sites Eastside Fire & Rescue Headquarters / Issaquah Valley Elementary Site (Site ID 16581) Rainier Trail & Memorial Field Site (Site ID 16582).

The letter explains the District's interests as a major public water purveyor that relies on the LIVA as its primary source of supply. As a result of PFAS contamination at two of the District's production wells (wells 7 and 8), the District stopped production from the wells in 2017, and in 2021 obtained authorization from Ecology to pump the authorized quantities for those wells from its well 9. Wells 7 and 8 continue to exhibit PFAS contamination well above applicable screening levels. Ecology has recognized the District's interests in the LIVA PFAS sites through its fact sheets and mailers, and through its water rights permitting process, all of which identify the District's south zone, and specifically, wells 7 and 8, as impacted by PFAS contamination associated with the EFR/IVES Site.³

Ecology is also working with the District to install a treatment system to address PFAS contamination in wells 7 and 8. Ecology is providing partial funding for the capital costs of installing treatment. However, the District and its customers are providing the majority of the funding for capital costs, and will be responsible for all ongoing O&M costs, which will be substantial.

Given these critical interests, the District supports timely and efficient investigation and cleanup of the LIVA PFAS sites consistent with MTCA. Accordingly, the District's June 2024 comments expressed a number of concerns with the interim action proposed in the EFR/IVES Agreed Order, including that:

- Any proposal for a permeable reactive barrier (PRB) needs to demonstrate that it will not foreclose reasonable alternatives for permanent cleanup at the Site;
- The IA work plan should describe alternative interim actions considered and explain why they were not selected;
- The IA work plan should evaluate the impacts of injecting PFAS sequestration compounds deep into the aquifer, including performance effectiveness after the sequestration media in the PRB becomes saturated with PFAS;
- The IA work plan should evaluate the long-term effects of saturated media on the aquifer and groundwater quality; and
- The IA work plan should include appropriate contingency plans for responding to remedy failure, such as saturated media becoming a source of future groundwater contamination.

Ecology's August 2024 response to District's Agreed Order comments

Ecology responded to the District's comments in August 2024. Ecology acknowledged the District's engagement on the sites over time, including its submission of data on the

³ See, e.g., EFR HQ IVES Cleanup Site Fact Sheet, Publication 25-09-180 at Fig. 2 (Ecology, 2025), and Final Report of Examination for a Water Right Change, Change Application CG1-00289C@1 (Ecology, 2021).

District's wells to help with the overall understanding of the sites, and expressed Ecology's interest in continuing to work with the District "as the project progresses."⁴ With regard to the Interim Action, Ecology stated as follows:

We acknowledge that the language in Appendix C related to the permeable reactive barrier implied an Interim Action had already been selected, when it has not. We have updated the language accordingly. An Interim Action work plan will go out for public comment prior to the implementation of the Interim Action. We hope that document will answer many of the questions you raise in these comments, and we appreciate any additional comments you may have on the document at that time.

September 2025 EFR/IVES Site Interim Action Work Plan and SEPA DNS/Checklist

Based on Ecology's response to the District's comments on the Agreed Order discussed above, the District expected the draft Interim Action work plan would address the concerns the District has repeatedly raised about the reactive barrier employed in the pilot test and proposed for significant expansion in the Interim Action. Unfortunately, the draft IA work plan does not satisfy these expectations.

The District's consultants, CDM Smith, developed the attached detailed comments on the draft Interim Action work plan and the SEPA DNS/checklist. In sum, the District is concerned that the draft work plan and current SEPA checklist/DNS do not provide adequate information or evaluation of the many uncertainties associated with this significant project affecting the aquifer that tens of thousands of residents of the Issaquah Valley and Sammamish Plateau rely upon for their drinking water.

Before proceeding with this proposed interim action Ecology should pause, evaluate alternatives, and fully evaluate the effects of any action on the aquifer, the communities that rely upon it, and on future cleanup options. Ecology should also identify contingencies in the event that this relatively new proprietary treatment – the purpose of which is to indefinitely or permanently sequester PFAS in the aquifer – fails. The IA work plan should include contingency plans. Until these steps are taken, the Interim Action work plan and SEPA review are incomplete and inconsistent with MTCA⁵ and SEPA.⁶

⁴ Washington Department of Ecology, Responses to Comments, Draft Agreed Orders, Lower Issaquah Valley PFAS Cleanup Sites, August 2024, at p. 19.

⁵ See, e.g., WAC 173-340-430(3)(b) (interim action shall not foreclose reasonable alternatives for the final cleanup action); WAC 173-340-430(4)(a) ("[S]ufficient technical information must be available regarding the facility to ensure the interim action is appropriate and warranted."); and WAC 173-340-430(7)(b)(ii) (IA work plans must include "Alternative interim actions considered and an explanation of why the proposed alternative was selected.").

⁶ See, e.g., WAC 197-11-030(2)(c) (SEPA documents should be "...concise, clear, and ... supported by evidence that the necessary environmental analyses have been made."); and WAC 197-11-060(4)(c) (SEPA documents

Sammamish Plateau Water’s Continuing Concerns with Draft Interim Action Work Plan and SEPA DNS/Checklist

There are significant uncertainties and unknowns with the current site characterization and with the proposed permanent application of proprietary remedial action products as an “interim” action. The IA work plan and SEPA review needs to be supported with factual evidence (information/data) and include objective statements recognizing the large number of unknowns related to this interim action, some of which should be addressed with more preliminary design investigations, additional pilot and bench-scale testing, and ongoing monitoring evaluation of the previously implemented pilot test to improve the design before rushing into this action of such scale and permanency. These steps are fundamental to standard remedial design practices that are being overlooked for an action characterized by the qualified term “Interim,” but which is effectively permanent: it would be difficult if not impossible to reverse the injections into the aquifer in the event of remedy failure.

Uncertainties and unknowns that should be investigated, evaluated and presented before implementing this very large and permanent “interim” action include:

- **The presence (in terms of mass) of PFAS precursor chemicals.** PFAS precursor constituents likely exist in soils at the Site that are planned to be left in place post interim action. These precursors can, over time, transform into PFAS constituents at concentrations of regulatory concern. Further sampling and characterization should be conducted to estimate the mass of PFAS at the Site, including precursor chemicals.
- **The effectiveness of the current pilot tested barrier wall.** A critical and objective review on the performance of the EFR/IVES pilot test and any effectiveness issues and lessons learned from this smaller scale pilot test is crucial to informing the design of this Interim Action, which proposes using the same construction methods and coagulated activated carbon (CAC)-based proprietary product on a more expansive scale. For example, the draft Interim Action work plan proposes a line of injection locations to increase the thickness of the pilot test barrier wall. This suggests that predesign calculations, models, and/or estimates were lacking, or that observations from the pilot have not been effectively communicated. The District has previously raised concerns about contaminant breakthrough and believes the IA work plan requires a much more detailed analysis before proceeding.

require careful consideration of “...the range of probable impacts, including short-term, long-term, direct, indirect and potential cumulative effects.”).

- **The constructability, necessity and impacts (good/bad) of injecting the CAC into the vadose zone.** As pointed out in the attached detailed comments on the Interim Action work plan, injection of CAC into the vadose zone was not performed in the pilot test and is a significant unknown. A separate small-scale pilot test should be performed to evaluate and inform the design before performing this at the scale proposed in the Interim Action. Relevant and tangible performance metrics need to be assigned to the vadose zone injection to confirm delivery of CAC and reductions in vadose zone to groundwater leaching. Currently, no performance metrics are presented or considered to evaluate this significant unknown and the necessity of this injection to the vadose has not been demonstrated, which is a requirement for Interim Actions under MTCA.⁷
- **Bench Testing of other media types.** The current plan and design for soil stabilization and expanded aquifer injections is proposing to use CAC. There are several other media that may be more economical and effective. These should be considered through bench testing before moving forward with the CAC-based product sold by the same vendor (Regenesis) that is playing a significant role in the design.
- **A contingency plan to address any issues or failure of the interim action.** The current IAWP is void of any descriptions of logical contingency plans in the event the interim action is found (through performance monitoring) to be failing or underperforming relative to design objectives. This should be developed with iterative logic that addresses any failures of the design components critical for meeting interim action objectives over the period of the time the remedy components are intended to be performing, which for the permeable reactive barrier wall (PBR) is indefinite. This contingency planning is critical for the proposed PBR due to the potential that, at some point in time, the concentrating PFAS within the barrier wall could lead to higher concentrations in groundwater downgradient of the barrier wall due to competitive desorption by other constituents in groundwater (something colloquially referred to as “roll over”).

⁷ See WAC 173-340-430(1)(a) (interim action is “A remedial action that is technically necessary to reduce a threat to human health or the environment by eliminating or substantially reducing one or more pathways for exposure to a hazardous substance at a facility.”)

Conclusion

As Ecology is aware, the District supports timely and efficient investigation and cleanup of the LIVA PFAS sites consistent with MTCA.⁸ We know Ecology shares these goals, as expressed in part through Ecology's funding for much of the work being performed at the EFR/IVES Site. We therefore look forward to Ecology working to revise the Interim Action work plan and associated SEPA review to address the District's significant comments and concerns.

We also look forward to continuing to collaborate with Ecology on these important efforts. As has always been the case, the District would be happy to make its consultants available to Ecology to discuss the proposed Interim Action, our comments, and any other technical concerns related to the LIVA PFAS sites.

Sincerely,



John C. Krauss
General Manager

Cc:

Kristen Forkeutis, Ecology
Scott Coffey, CDM Smith
Matt Wells, Foster Garvey

Attachment: CDM Smith December 18, 2025 Review and Comments on Draft Interim Action Work Plan for EFR/IVES Site and Associated SEPA DNS/Checklist, Ecology Cleanup Site ID: 16581

25-12-37

⁸ See, e.g., December 17, 2025 letter from John Krauss, Sammamish Plateau Water, to Vance Atkins, Ecology, re Lower Issaquah Valley PFAS Site Remedial Investigation Work Plans, Ecology Cleanup Site ID: 16581 – Follow up and Request for Meeting.



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December 18, 2025

Jay Krauss
General Manager
Sammamish Plateau Water
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Subject: CDM Smith Review and Comments on Draft Interim Action Work Plan for EFR/IVES
Site and Associated SEPA DNS/Checklist
Ecology Cleanup Site ID: 16581

This letter transmits CDM Smith review comments on the Draft Interim Action Work Plan proposed for the EFR/IVES site and the associated State Environmental Policy Act Determination of Nonsignificance and Checklist for the proposed Interim Action. These comments were prepared by CDM Smith staff with extensive experience with PFAS evaluation and remediation, including subject matter expert Jeffrey McDonough, MS, PE.

Please let me know if you have any questions regarding this transmittal. We appreciate the continued opportunity to work with Sammamish Plateau Water on this matter.

Sincerely,

A handwritten signature in blue ink, appearing to read "Scott Coffey".

Scott Coffey, LHG
Project Technical Lead
CDM Smith Inc.

Encl.



Comments on the EFR/IVES Interim Action Work Plan

1.0 Introduction, Page 1-1, 1st sentence, 1st paragraph: The text states that Farallon Consulting prepared this IAWP; however, it appears that Regensis performed significant portions of the design as evidenced by their branding on several of the appendices. It should be clearly stated that Regensis performed portions of the design (e.g., ISS and PRB), and that no other comparable remedial products were evaluated or considered.

1.0 Introduction, Page 1-1, 3rd & 4th paragraphs: Historical releases of AFFF have impacted source area soil, source area groundwater, and downgradient groundwater - The City withdraws groundwater as mentioned, but so does the District and this should be acknowledged.

1.3 Regulatory Interactions, Page 1-3, 2nd sentence, 1st paragraph: The text should be revised to specify that MTCA classifies 6 specific PFAS compounds (PFOA, PFOS, PFNA, PFHxS, PFBS, and HFPO-DA), not the entire class of PFAS. Note: It is confusing and imprecise to use the word "list" in reference to hazardous substances as it implies RCRA.

1.4 Abbreviated Class B AFFF Background, Page 1-5, 3rd sentence, 1st paragraph: Note: "PFAS-free AFFF" is a misnomer. For term consistency, the author should refer to the ITRC fact sheet on AFFF (ITRC, September 2023, link: https://pfas-1.itrcweb.org/wp-content/uploads/2023/10/AFFF_PFAS_FactSheet_Sept2023_final.pdf); all AFFF contain PFAS. This is important as the text suggests EFR transitioned to a PFAS-free AFFF, and there may be confusion if training continues to use "PFAS free-AFFF" (which still contains PFAS) and in doing so could compromise the effectiveness of the interim action.

1.4 Abbreviated Class B AFFF Background, Page 1-5, 2nd paragraph: An estimate of historical AFFF discharged onto the EFR site soils should be determined as it is an important factor in understanding the residual PFAS precursors not targeted by current analytical method 1633A that will transform, over time, into PFAS of regulatory concern.

2.1 Lower Issaquah Valley Regional Setting, Page 2-1, 1st paragraph: The District's extraction of groundwater for potable municipal supply should also be mentioned in this section.

2.5.3.2 Beneficial Use, Page 2-10, 1st paragraph: This appears to be the first mention of Sammamish Plateau Water & Sewer District groundwater extraction, with a statement that no migration pathway is confirmed. The District's groundwater extraction for municipal water supply purposes should be mentioned earlier in Section 2.1 and evidence should be provided to support the statement "unconfirmed migration pathway", as a migration pathway is suspected. (See Sammamish Plateau Water's December 17, 2025 comment letter to Ecology on the EFR/IVES Remedial Investigation Work Plan)

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3.3 Summary of Pilot Test Results, Page 3-2, 1st paragraph: PlumeStop reagent was observed in groundwater at NWN-MW10 and therefore this well should no longer be considered representative of downgradient conditions. See also comments below on Table 7.

4.2 Contaminants of Potential Concern, Page 4.2, Bulleted lists: Lists of detectable PFAS are limited because the majority of PFAS in fluorotelomer AFFF are not detected via targeted methods, but represent precursors that will transform into PFAS of regulatory concern. Some acknowledgement of the limits of this list should be made.

4.2 Contaminants of Potential Concern, Page 4.2, Bulleted lists: Currently available extraction methods for soils can quantify a small amount of PFAS in comparison to what is typically encountered at AFFF sites. Some acknowledgement of this limitation should be made, with potential reference to Nickerson et al., 2020 and Gonda et al., 2024. Links provided as follows: (<https://pubs.acs.org/doi/10.1021/acs.est.0c00792>) (<https://link.springer.com/article/10.1007/s00216-024-05585-2>). See also comment below re Section 6.2.

5.2.1 Description of Work Elements and Sequence of Activities, Page 5-2, 1st Bullet and all subsequent references to total PFAS: In reference to 1 mg/kg total PFAS; total would include nontarget analysis and appropriate extraction to understand PFAS associated with soil. Without base-acid sequential extraction and TOP Assay / Total Organofluorine, it is not possible to say total PFAS. It is likely this means Σ PFAS40 from the 1633A method list and should be caveated accordingly or, ideally, proper characterization should be performed.

5.2.2.1 Soil, Page 5-2, Last paragraph: Some acknowledgement should be made that the proposed remediation level of PFAS \leq 1 mg/kg, which exceeds screening levels that are protective of human health and the environment, will result in soils above screening levels remaining in situ and insufficiently characterized due to method limitations. Also, asphalt has a degree of permeability and should not be referred to as impervious.

5.2.3 Expansion of PRB, Page 5-3, 1st Sentence: The interim action report, as written, seems presumptive of Regenesys' PlumeStop as the selected product for full scale implementation regardless of the results of the bench testing. This may turn out to be at a greater cost because of the reliance upon a single option. The use of i.e., (or "namely") seems to impose bias towards PlumeStop at a time when all remedial options should be considered; using e.g., (or "for example") and then listing a technology provider's specific product would be more appropriate. Importantly, for injected adsorbents, there are other options that should be evaluated before proceeding with the interim action.

5.2.4 Bench Testing and 6.2 Soil Performance Monitoring, Pages 5-3 and 6-1, Whole Section; 2nd paragraph, last sentence: If a bench-test is to be performed, other products should be considered instead of favoring only one proprietary product. There are several

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options for stabilizing agents that could be incorporated into the bench-testing for an unbiased assessment, and in a way that minimizes additional laboratory costs.

5.2.4 Bench Testing and 6.2 Soil Performance Monitoring, Pages 5-3 and 6-1, Whole Section; 2nd paragraph, last sentence: At the proposed allowable soil concentration of 1 ppm, leaching at 95% would result in groundwater concentrations of 50,000 ppt. This is several orders of magnitude greater than groundwater screening levels in Table 2. More effective leaching inhibition is achievable when considering other stabilizing agents such as RemBind, FluoroSorb, and zeolytes.

5.2.6 Excavation and In Situ Stabilization of PFAS Contaminated Soil, Page 5-4, 2nd sentence, 1st paragraph: Please specify the name and location of the Subtitle C TSDf for verification of requirements in accordance with 2024 EPA Destruction and Disposal Guidance.

6.2 Soil Performance Monitoring, Page 6-1, 1st sentence, 1st paragraph: Some acknowledgement should be given that standard target methods were used which are known to underestimate PFAS associated with soils impacted by historical use of AFFF

6.3 Soil Confirmation Monitoring and Appendix B, Section 6.3, Page 6-1: Performance for ISS is based on achieving homogeneous and uniform distribution of the stabilizing agent throughout the treated area. While PFAS analytical performance monitoring data is likely not necessary due to pre-design bench-testing, confirmatory monitoring throughout the implementation that shows homogeneous and uniform distribution of the stabilizing agent was achieved is warranted and should be detailed in these sections

Figure 13, Fig 13, Legend: It is presumptive to refer to the interim PRB as the "Full Scale PRB." Interim action language should be maintained.

Table 7 NWN-MW10 Data: This "downgradient" location of the pilot test had evidence of PlumeStop in the well as of October 2021. Recent data provided for 2023 (within 2 years) suggests PFAS concentrations may be increasing. If more recent data is available, it should be provided. Evaluating this pilot test data objectively is important for understanding the long-term effectiveness of this interim action and its design.

Table 9 NWN-MW10 Data: The field parameters appear to show a definitive shift (Dec 2022 and Feb 2023) suggesting that something is influencing the results or the effectiveness of the PRB is decreasing. This should be discussed when considering expanding the pilot test to an interim action.

Appendix B, Section 4, Page 4-1: Some justification should be provided for why colloidal activated carbon was selected over reasonable equivalent options. It seems unfairly presumptive to only discuss colloidal activated carbon when a proper feasibility study has not yet been performed.

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Appendix B, Section 5.1, Page 5-1, 1st sentence, 1st paragraph: Using "or equivalent" when a specific product is specified is incorrect. More appropriate terminology would be "or approved equal;" however, it appears no formal pragmatic comparison was performed and PlumeStop is the presumptive remedy.

Appendix B, Section 5.2, Page 5-2, 2nd sentence, 2nd paragraph: 10% for swell seems low, especially with a higher percentage of silts/clays in the shallower soils. Some justification in a design should be provided, or some geotechnical consideration should be given before specifying an approximate swell attributable to both stabilizer addition and clay hydration.

Appendix B, Section 5.5, Page 5-5, 1st paragraph, 2nd sentence: The term "full-scale" is used for this interim action and seems inappropriate, especially since a feasibility study has not been performed.

Appendix B, Section 5.5, Page 5-5, 3rd bullet: Extending the injected PRB into the unsaturated/infrequently saturated zone is a deviation from the pilot study and this should be specifically stated to avoid confusion that the interim action for the PRB is merely an extension of the pilot test.

Appendix B, Section 5.5, Page 5-5, 3rd bullet: The performance monitoring plan, as described, does not seem to have a way of assessing the **technical necessity** of extending the injected PRB into the unsaturated zone. This represents an expanded scope as part of an interim action that does not meet the objectives defined in the Agreed Order, which states "*...an interim action is a remedial action that is technically necessary to reduce a threat to human health or the environment by eliminating or substantially reducing one or more pathways for exposure to a hazardous substance, that corrects a problem that may become substantially worse or cost substantially more to address if the remedial action is delayed, or that is needed to provide for completion of a site hazard assessment, remedial investigation/feasibility study, or design of a cleanup action plan.*" (see Ecology Agreed Orders for EFR/IVES and MF/RT, Section 6.7, emphasis added).

Appendix B, Section 5.5.1, Page 5-6, Middle of 3rd paragraph: The statement "...higher volume of injectate solution will be required in unsaturated than saturated..." while seemingly intuitive that unsaturated zone injections may vertically accommodate more fluid resulting in localized mounding, some parameter based justification for this is necessary. Injected fluid within the saturated zone should be volumetrically equivalent, but may require more pressure to achieve displacement of liquid versus air in the unsaturated zone.

Appendix B, Section 5.5.1, Page 5-7, 1st paragraph: First, an injection concentration is specified in Table 8 for both the vadose injection and saturated injection. Second, the design does not appear to have been collaboratively developed if the reagent manufacturer is free to specify whatever injection concentration they decide with no design basis specified.

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Appendix B, Section 5.5.1, Page 5-6, 1st paragraph: This section needs to include the design calculations supporting the length, width, and depth of the PRB. In Section 5.5.2 (page 5-7), it seems like 12 additional injection points are being added to increase the thickness of the PRB from the pilot test, which may indicate that the groundwater migration was not appropriately considered during the pilot test and should be confirmed for the interim action plan.

Appendix B, Section 5.5.1, Page 5-6, 3rd paragraph: The text needs to specify if any changes were made to the effective porosity assumptions based on pilot test observations.

Appendix B, Section 5.5.1, Pages 5-6 to 5-7: No discussion or consideration of the site geochemistry appears to have been included as a design parameter. Naturally occurring species (like organic carbon) will compete with PFAS to sorb onto the injected remedial product and can directly influence its useful life prior to PFAS breakthrough.

Appendix B, Section 5.5.1, Pages 5-6 to 5-7: It is well known that an injected sorbent will have an upper threshold for PFAS adsorption that is expected to be exhausted eventually. Data from the pilot test (and the apparent increasing PFAS concentrations at NWN-MW10) should be used to provide some estimate of when PFAS will breakthrough the PRB. Further, it should be clearly stated that breakthrough concentrations of PFAS may exceed the maximum influent concentrations due to "roll over" or desorption of previously sorbed PFAS, threatening downgradient receptors.

Appendix B, Section 5.5.2, Page 5-7, 3rd paragraph, Last sentence,: Given Mohr's circle and the propensity for fracture propagation in porous media to parabolically migrate upwards to ground surface, a "bottom up" approach should at least be considered for more reliable distribution. Injection contractors prefer top down because if surface at the annulus of the borehole is observed, advancing the injection rods strengthens the "seal" around the injection point, but this short-changes the designated injection interval. Furthermore, 20 to 100 psi is sufficient to initiate hydraulic fractures within porous media with a high sand content at depths of 6 to 26 feet because of the friction angle (i.e., not purely based on the mass of overburden soils).

Appendix B, Section 5.6.1, Page 5-10, 2nd full paragraph, 1st sentence: It seems like a presumptive decision has already been made to use PlumeStop, and now SourceStop. Alternatively, SourceStop could be one product fairly considered at the bench-scale versus other options that could be more economical and have equal or superior performance.

Appendix B, Section 5.6.1, Page 5-10, Last paragraph: While bench-testing will ultimately provide a design basis for selecting a stabilizer concentration, a minimum stabilizer concentration of 1 percent by dry soil weight should be required because anything less can present too much uncertainty for justifying the cost of mobilizing to do the work. Insufficient dosing can end up sacrificing effectiveness or costing the project more money to remobilize and remix the soil.

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Appendix B, Section 5.6.1, Page 5-10, Last paragraph: SourceStop (and activated carbon regardless of particle size) is an adsorptive process, not an absorptive process. This is important to specify because a weakness of injected sorbents is a limit of surface area and eventual desorption of concentrated PFAS in light of continued mass flux.

Appendix B, Section 5.6.1, Page 5-10, Last paragraph: No discussion or consideration of the site geochemistry appears to have been included as a design parameter. Naturally occurring species (like organic carbon) will compete with PFAS to sorb onto the stabilizing agent.

Appendix B, Section 5.6.2, Page 5-11, 1st full paragraph on page: SPLP is unrepresentative of leaching conditions in real-world scenarios and may create an unfavorable leaching condition given unrealistic disturbance and soil to liquid ratio. It presents a very aggressive leaching condition. An alternative may be LEAF 1314, 1315, or 1316, which are a series of leaching approaches that are more realistic and have been considered/tailored for PFAS recently.

Appendix B, Section 5.6.2, Page 5-11, 1st full paragraph on page: TCLP is an inappropriate tool to assess PFAS leaching for waste disposal criteria. TCLP uses an acidic pH, which promotes anionic sorption to soil and underepresents the leaching potential. SPLP would be a better assessment than TCLP, but LEAF 1314 may be the most realistic.

Appendix B, Section 5.6.2, Page 5-11, 1st paragraph: We suggest including particle size distribution and Atterberg limits into the bench-testing work as these results from these analyses will be informative for the design.

Appendix B, Section 5.6.5, Page 5-13, 2nd paragraph: Relying upon Regensis for protocols for soil mixing is ill advised. They are a product supplier. A qualified geotechnical engineer should specify soil mixing protocols to apply requisite force and qualitative performance monitoring (like particle size reduction and mix uniformity) for assessment. Regensis will evidently provide concentration (which may likely be in the 2% to 3% per dry weight range), but they should not be entrusted to specify soil mixing protocols unless they are provided by a Regensis licensed geotechnical engineer.

Appendix B, Section 5.6.6, Page 5-13 to 5-14: Prior to installing the asphalt cap and after compaction testing is complete, it may be advisable to wait a few weeks to a couple months for self-settlement - especially if added liquid is required during soil mixing. ~10 to 12 feet of soil mixing (even following compaction) could result in inches worth of settlement resulting in depressions within the asphalt cap

Appendix B, Section 5.10, Page 5-4: An excavation of this size with staged spoil piles in the Pacific Northwest may need some consideration for precipitation and runoff concerns (tarps, earthen berms, etc.). This is not the same as Section 5.6.7 which appropriately plans for increased runoff following the installation of the cap; this is for earthwork if a rainstorm is encountered.

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Appendix B, Section 5.12.1, Page 5-6, 1st paragraph: Unsaturated zone excavation has the potential to create dust that needs to be managed by the Contractor. OSHA specifications should be used, and a dust monitoring plan is needed. The language here is too flexible and requires quantitative metrics for exposure concerns.

References:

Gonda et al., 2024, Quantitative assessment of poly- and perfluoroalkyl substances (PFASs) in aqueous film forming foam (AFFF)-impacted soils: a comparison of analytical protocols. *Anal Bioanal Chem* 416, 6879–6892 (2024).

ITRC, September 2023, Aqueous Film-Forming Foam Fact Sheet

Nickerson et al., 2020, Enhanced Extraction of AFFF-Associated PFASs from Source Zone Soils, American Chemical Society.

Comments on the SEPA DNS/Checklist for EFR/IVES Interim Remedial Action

Section B.1.e, Page 7, Vadose Zone Source Treatment: The statement "...PFAS constituents with applicable screening levels are above 1 mg/kg in soil..." ignores the fact that precursors to these compounds can exist and transform into PFAS constituents at concentrations of regulatory concern, and that these precursors cannot be evaluated without sequential basic and acidic extraction analytical methods that do not appear to be considered in this work plan.

Section B.1.e, Page 8, Vadose Zone Source Treatment (via soil stabilization): Ecology should consider whether it is appropriate for a vendor of a specific product to have informed the design where it appears to be biasing the treatment product to a CAC-based product which this vendor provides.

The bench scale test should consider non-CAC products (e.g., FluoroSorb, RemBind, Zeolites) that may be more cost efficient and effective.

Anything less than 1% by dry soil weight may be an improper balance of the mobilization cost versus the certainty of treatment (i.e., no less than 1% by dry soil weight should be evaluated at the bench).

Section B.1.e, Page 9, Backfilling and Compaction: With regards to treated soil and imported structural backfill material placed with 95% compaction, there is no solidifying agent specified in the work plan and no description of how post-mixing consolidation will be considered to prevent future settling.

Section B.1.f, Page 10, Erosion concerns: It is contradictory that the opening statement definitively states no erosion will occur because of clearing, construction or use, yet an erosion and sediment control plan and BMPs are planned to be implemented. This statement should be revised to correct the contradiction.

Section B.3.a, Page 11, Surface water: The statement "no surface water bodies in the vicinity of EFR HQ Source Area" needs more clarification on what is being defined as "vicinity" because the main fork of Issaquah Creek is only 500 feet west of the project area.

Section B.3.b and c, Page 11-12, Ground water: The checklists' discussion of potential impacts to groundwater is completely inadequate. The checklist fails to disclose that the purpose of the PRB is to sequester PFAS in the aquifer itself. It also fails to disclose how this sequestered PFAS will behave in the aquifer over time, including how it could become a continuing source of groundwater contamination for decades to come.

Section B.8.a, Page 17, Land and shoreline use: It is technically incorrect to say "The proposed interim action intends to treat the PFAS concentrations found in vadose zone soil and

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shallow groundwater at the NWN AFFF Training Area and will not affect current land uses on nearby or adjacent properties" (emphasis added).

To clarify, the actions being proposed will not treat the PFAS constituents in the media at the EFR HQ source area. They will only remove and temporally, for an uncertain period of time, trap (**not treat**) the PFAS constituents. It is important to be transparent and factual with the treatment process of this permeable barrier wall. There is a high degree of uncertainty of how long the barrier wall will trap and prevent breakthrough and migration of the PFAS contamination from the source area which is not acknowledged in the in the SEPA DNS/Checklist.