REGION 10
SEATTLE, WA 98101

April 18, 2024

MEMORANDUM

SUBJECT: EPA Comments on the Evaluation of Flux Rates for Use in Chemical Isolation Modeling
Crawford Street South, Portland, Oregon
ECSI # 2363
February 27, 2024

FROM: Laura Hanna, RG, Remedial Project Manager
Superfund and Emergency Management Division

TO: Kevin Dana, Project Manager
Northwest Region Cleanup Program, Oregon Department of Environmental Quality

The following are the U.S. Environmental Protection Agency's (EPA's) comments on the document titled *Evaluation of Flux Rates for Use in Chemical Isolation Modeling* (Memorandum). The Memorandum was prepared by GeoEngineers for Crawford Street South (Site). The Site is located at 8524 North Crawford Street in Portland, Oregon and listed as Environmental Cleanup Site Information (ECSI) #2363. The Site is located on the eastern side of Willamette River between the Willamette Cove and Cathedral Park remedial design project areas within the Portland Harbor Superfund Site (PHSS). The Memorandum focuses on groundwater and riverbank upland source contaminant transport pathways.

Design of a riverbank source control measure (RBSCM) is currently being implemented for the Site. EPA understands the primary objective of the Memorandum is to assess currently available flux rate data for use in CapSim modeling being conducted in support of the chemical isolation modeling for the RBSCM cap design. EPA's comments are categorized as "Primary," which identify concerns that must be resolved to achieve the objective; and "To Be Considered," which, if addressed or resolved, would reduce uncertainty, improve confidence in the document's conclusions, and/or best support the objectives.

Primary Comments

1. **Documentation of Calculations.** The Memorandum is currently missing calculation documentation which is necessary for the reader to understand and follow all flux calculations,

including all data and sources used. A future deliverable like a CapSim model report should include calculation documentation of the December 2023 data set as an attachment to the Memorandum, following the format of and content of Memorandum Appendix A (i.e., Appendix H of the *Preliminary (30%) Design Report Riverbank Source Control* Measure [PDR; GeoEngineers, 2023]). Additionally, attach the Coastal Monitoring Associates (CMA) seepage data report from Appendix L of the *Draft Willamette Cove Supplemental Pre-Design Investigation Evaluation Report* (WC SPDIER; GSI, 2023) to support results presented from the seepage study. The CMA report should be provided as the data source for the flux rates that were not calculated.

2. **Station A-02**. The high Station A-02 flux rate should be included in a future deliverable so that the Willamette Cove seepage rates are not artificially biased downwards. However, area-specific seepage rates may be used in cap design at the Site if Cathedral Park and Willamette Cove seepage data are demonstrably different. For example, if the Cathedral Park data does not also have a flux rate similar to that of Station A-02, the downstream portion of the Site may use a different, but still conservative, flux rate range.

   The Memorandum classifies this station as anomalous due to its flux rate being two orders of magnitude higher than that of other stations. However, Section 4.5.2 of the WC SPDIER (GSI, 2023) states that this station was an outlier but "did not notate any reason to reject the data." Additionally, the WC SPDIER states that the high discharge may be associated with possible faulting or a high permeability subsurface lens. Furthermore, the *Portland Harbor Remedial Investigation/Feasibility Study* (CDM Smith, 2016) includes flux rates of a similar magnitude (maximum 74 cm/day) to Station A-02, indicating the high result may be possible at the Site.

   This station should not be disregarded. Revise the Memorandum or in a future deliverable to acknowledge that no data quality issues were identified and that the flux rate at this station may be the result of preferential flow within the subsurface soils. Additionally, revise the flux rate assessment to include Station A-02's result. Provide summary statistics for the available seepage rate data, including a box and whisker plot complete with quartiles and upper bound values (e.g., 90^{th} and 95^{th} percentiles). The CapSim modeling should incorporate a reasonably conservative upper bound value, which would require the inclusion of Station A-02.

3. **Using All Available and Relevant Seepage Data.** EPA provided Crawford the Final UltraSeep Survey – Cathedral Park and Fund-Lead Project Areas 3, 9, 10, and 11 report (CMA 2023). EPA believes these data should be included and is currently unsure exactly how and when these data will be incorporated. EPA agrees that likely an additional seepage study is not needed, however this conclusion should not be made until the Cathedral Park seepage data is included and evaluated. EPA recommends that the Cathedral Park data be incorporated into a revised memorandum or future deliverable for the seepage rate calculations and chemical isolation studies.

4. **CapSim Input Parameters.** The proposed flux range for sensitivity analysis (i.e., 0.2 to 2 cm/day) should be revised in a future deliverable. Per primary comment #2 above, Station A-02 should be

included, as appropriate. Additionally, Table K-1 of the PDR (GeoEngineers, 2023) notes that the source of the groundwater flux rate is the "maximum estimated flux rate at the Site plus approximately 10%." For consistency with the PDR and in accordance with primary comment #2, the high end of the range should be calculated with this 10% factor resulting in the upper range to be 85.8 cm/day (maximum rate 78 cm/day plus 10%). To clarify:

- The 78 cm/d seepage rate should be included in sensitivity analyses.
- It is not expected that 78 cm/d will be the design seepage rate; a different upper-bound statistic such as 75th, 90th, or 95th percentile could be used to identify the design seepage rate based on the sensitivity analysis.
- The design seepage rates can be different for different portions of the Crawford St area based on the Willamette Cove (upstream) and Cathedral Park (downstream) seepage data.

To Be Considered

1. **Memorandum Purpose.** The introduction states that the purpose of the Memorandum is to "establish that the one elevated flux rate measurement" is "anomalous and is not applicable to the Site." The current introduction implies that a conclusion was established before the data was adequately evaluated. Revise the purpose statement to state that "This memorandum assesses the currently available flux rate data to: (1) evaluate the flux rate data usability at the Site, and (2) identify the appropriate range of flux rates to use in CapSim modeling being conducted in support of the chemical isolation modeling for the RBSCM cap design."

2. **Chemical Isolation Study Background.** The text describes assumptions of the chemical isolation study and various other qualities of the study but does not provide sufficient background on the purpose of the study and its composition. Detail what the chemical isolation study will entail and why flux rates must be considered, along with the implications of high vs low flux rates.

References

Coastal Monitoring Associates, LLC. (CMA). 2023. UltraSeep Survey – Cathedral Park and Fund-Lead Project Areas 3, 9, 10, and 11. Final. December.

CDM Smith. 2016. *Portland Harbor Remedial Investigation/Feasibility Study, Final.*

GSI Water Solutions, Inc. 2023. *Draft Willamette Cove Supplemental Pre-Design Investigation Evaluation Report, Willamette Cove Project Area.* November.

GeoEngineers. 2023. *Preliminary (30%) Design Report Riverbank Source Control Measure, Crawford Street South Site.* June.

cc: Dave Lacey, DEQ
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