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OPERATIONS AND MAINTENANCE REPORT JANUARY 2022 TO DECEMBER 2022 MCCORMICK & BAXTER SUPERFUND SITE PORTLAND, OREGON

by
Haley & Aldrich, Inc.
Portland, Oregon

for
Oregon Department of Environmental Quality
Portland, Oregon

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OPERATIONS AND MAINTENANCE REPORT
JANUARY 2022 TO DECEMBER 2022
MCCORMICK & BAXTER SUPERFUND SITE
PORTLAND, OREGON

PREPARED FOR
OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
PORTLAND, OREGON

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ACB	articulated concrete block
AWQC	ambient water quality criteria
bgs	below the ground surface
BES	City of Portland, Bureau of Environmental Services
cPAHs	carcinogenic PAHs
DEQ	Oregon Department of Environmental Quality
DNAPL	dense non-aqueous phase liquid
EPA	U.S. Environmental Protection Agency
FWDA	Former Waste Disposal Area
gpm	gallons per minute
GSI	GSI Water Solutions, Inc.
ICs	institutional controls
IGA	Intergovernmental Agreement
LNAPL	light non-aqueous phase liquid
Metro	Metro Regional Government
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
NAPL	non-aqueous phase liquid
NAVD88	North American Vertical Datum of 1988
NOAA	National Oceanic and Atmospheric Administration
ng/L	nanograms per liter
O&M	Operation and Maintenance
PAH	polycyclic aromatic hydrocarbon
PCP	pentachlorophenol
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
RM	River Mile
ROD	Record of Decision
SAP	Sampling and Analysis Plan
Site	McCormick & Baxter Superfund Site
TEQ	toxic equivalency
TFA	Tank Farm Area
TRM	turf-reinforced matting
µg/L	micrograms per liter
USGS	U.S. Geological Survey

1. Introduction and Purpose

This Operation and Maintenance (O&M) Report has been prepared for the Oregon Department of Environmental Quality (DEQ) to document the O&M activities implemented at the McCormick & Baxter Superfund Site (the "Site") located in Portland, Oregon, between January 1, 2022 and December 31, 2022.

The Site is a former creosote wood treating facility that resulted in non-aqueous phase liquid (NAPL) releases to soil, groundwater, and sediment due to historical operations. All buildings associated with the former facility were demolished and the remedy was installed by 2005. The remedy consists of three elements: 1) a subsurface barrier wall to control groundwater flow, 2) a soil cap, and 3) a sediment cap in the Willamette River. The subsurface barrier wall was placed around 18 acres with areas of heavy NAPL impacts to prevent NAPL groundwater migration. The soil cap was placed over the upland area, consisting of 3 acres of permeable and 15 acres of impermeable cap areas. A Resource Conservation and Recovery Act (RCRA)-type impermeable cap was constructed within the 15-acre area inside of the barrier wall in the upland area. The remaining 3 acres within the barrier wall are covered by a permeable cap within the riparian zone. To manage precipitation infiltration, a perforated storm sewer line was installed above the impermeable cap layer to collect and direct infiltrated rainwater to an outfall along the shoreline. An 18-acre permeable soil cap was installed outside the barrier wall in the upland area with a drainage swale and infiltration basin to support rainfall drainage. A 22-acre sediment cap was placed along the shoreline and in the Willamette River to prevent NAPL migration to the river. The sediment cap extends to Willamette Cove located to the north of elevated railroad tracks that cross the Willamette River. O&M activities are performed to maintain the integrity and effectiveness of the remedies.

O&M activities are identified in the Final O&M Plan prepared by DEQ and the U.S. Environmental Protection Agency (EPA) (DEQ and EPA, 2014). The Final O&M Plan defines the administrative, financial, and technical details and requirements for inspecting, operating, and maintaining the remedial actions at the Site. DEQ and EPA reduced the scope and frequency of O&M activities conducted at the Site in 2010, from the frequency conducted at the Site from 2005 through 2010. The Final O&M Plan reflects that reduction of scope and frequency of O&M. The O&M Manual specifies the Sampling and Analysis Plan (SAP) procedures, quality assurance and quality control, technical information, and data necessary for implementing O&M activities. The O&M Manual is a living document that is modified periodically to reflect necessary monitoring and maintenance needs at the Site. Haley & Aldrich and GSI Water Solutions, Inc. (GSI) updated the O&M manual in 2023, (Haley & Aldrich and GSI, 2023).

The purpose of this O&M Report is to document the operation, monitoring, and maintenance activities that occurred in calendar year 2022. Figure 1-1 shows the location of the Site; Figure 1-2 presents the current Site layout and features; Figure 1-3 presents the Site capping components; Figure 1-4 presents the Site layout with surface elevations; Figure 1-5 presents the historical contaminant areas; and Figure 1-6 presents historical NAPL distribution. This report has been prepared by DEQ's contractor team of Haley & Aldrich and GSI.

The O&M performance standards and activities for the soil cap and sediment cap are discussed in Sections 2 and 3, respectively. The groundwater performance standards and activities are summarized in Section 4. Vegetation management is presented in Section 5. Section 6 discusses the remedy performance, and Section 7 presents recommendations for 2022. Section 8 provides references.

Appendix A provides a photograph log of Site activities and observations associated with O&M activities. Appendix B provides Site activity documentation, including the Site inspection meeting summaries and the sign-in logs. Appendix C provides a photograph log of vegetation observations.

Routine operation, monitoring, and maintenance activities in 2022 were implemented primarily by DEQ's contractor, Haley & Aldrich, and its teaming partner GSI (under subcontract to Haley & Aldrich). O&M activities were also performed by ACTenviro, American Backflow Services, and Ballard Marine Services.

Key personnel for implementation of O&M activities include:

- Sarah Miller: DEQ Project Officer
- Danielle Johnson: DEQ Contract Officer
- Jennifer Casler: Haley & Aldrich Program Manager
- Rick Ernst: GSI Deputy Program Manager
- Kevin Woodhouse: Haley & Aldrich Site Manager
- Chris Rhea: GSI Hydrogeology Manager

2. Soil Cap

This section presents a summary of soil cap performance standards, observations, and maintenance activities at the Site for the reporting period January 1, 2022, through December 31, 2022, and a summary of remedy performance as related to the performance standards. The Final O&M Plan provides a description of the remedial action objectives and the soil operable unit remedy. Table 2-1 provides the soil cap activities conducted in 2022.

2.1 SOIL CAP PERFORMANCE STANDARDS

Contaminated surface soil was removed, and an upland soil cap was constructed on approximately 40 acres of the Site in September 2005. Establishment of Institutional Controls (ICs) has not been completed for this portion of the Site. Soil beneath the soil cap remains contaminated with arsenic, pentachlorophenol (PCP), polycyclic aromatic hydrocarbons (PAHs), dioxins/furans, and NAPL and as such, the soil cap requires long-term monitoring and maintenance. The performance standards for the soil cap are as follows:

- Maintain contaminant concentrations in surface soil below the following risk-based cleanup goals, as specified in the Record of Decision (ROD) (EPA, 1996):
  - Arsenic: 8 milligrams per kilogram (mg/kg)
  - PCP: 50 mg/kg
  - Total carcinogenic PAHs: 1 mg/kg
  - Dioxins/furans: 0.00004 mg/kg
- Maintain the topsoil layer to within 50 percent of its design specification as follows:
  - Maintain a topsoil thickness of at least 6 inches for the area over the impermeable geomembrane cap.
  - Maintain a topsoil thickness of at least 12 inches for all areas except over the impermeable geomembrane cap.
- Minimize infiltration of rainwater within the subsurface barrier wall by maintaining the subsurface stormwater conveyance system.
- Minimize stormwater erosion and ponding outside the barrier wall by maintaining grading, surface stormwater conveyance, and native vegetation.
- Maintain native vegetation within the approximate 6-acre riparian zone for compliance with the National Marine Fisheries Service Biological Opinion (National Oceanic and Atmospheric Administration [NOAA], 2004).

2.2 SOIL CAP OBSERVATIONS

Soil cap observations were conducted according to the Final O&M Plan. Routine quarterly site inspections were conducted by DEQ, Haley & Aldrich, and GSI on March 2, June 10, September 19, and December 20, 2022. Observations of interest from the routine inspections are summarized on Figure 2-1 and are described in Section 2.2.1. Representative photographs of the Site taken in 2022 are presented

in Appendix A. Completed site inspection summary forms and a log of all visitors in 2022 was kept and is included in Appendix B.

During the 2022 summer season, Metro performed investigatory activities in the upland area of Willamette Cove. As there are no facilities in Willamette Cove, Metro requested to lease space in the paved storage area of the Site so their contractor could store vehicles and equipment for several months during their field activities. Metro, the property owner, and DEQ executed an access agreement and Metro leased space from approximately June through October 2022. This resulted in increased traffic to the site from Metro's subcontractors and routine security visits during this period.

2.2.1 Visual Inspection

The upland soil cap provides habitat for rabbits, ground squirrels, Canada geese and several other species of birds, and coyotes. Despite placing gravel to fill gaps under a fence that surrounds the upland portion of the Site, periodic burrowing continues to be observed under the fence and along the perimeter road. These burrows are filled as necessary and are not of major concern. Burrows were observed and filled sporadically throughout year.

Ground squirrel activity continues to be observed at several locations throughout the upland soil cap. Ground squirrels are common to the area, and burrows typically extend to approximately 1 foot below the ground surface (bgs). The ground squirrels use the surplus articulated concrete block (ACB) stockpiled at the Site, the paved roadway, and concrete well monuments as habitat. During 2022 inspections, no burrows greater than 6 inches deep were noted. Continued monitoring of burrows will be performed; however, no action will be taken to remove burrowing animals or to fill in the burrows less than 6-inches. If burrows deeper than 6 inches are observed, maintenance activities will be performed to fill them in. The soil cap continues to operate as designed, isolating Site contaminants from human and ecological receptors.

Avian wildlife was observed on the soil cap infrequently and mostly from a distance during site inspections in 2022, with the exception of a murder of crows that was observed during the March inspection (Appendix A, Photograph A1). Additionally, signs of bird foraging on the surface of the soil cap were observed in the spring and goose scat was observed throughout the soil cap over the course of the year indicating that substantial geese flocks periodically visit the Site. A coyote was observed along the eastern perimeter fence during the December inspection and immediately left the site as personnel were driving to the paved storage area. Coyote scat was also observed on the soil cap throughout the year, indicating frequent coyote visits.

In 2020, DEQ began using the entrance from North Van Houten Place as the primary entrance to the Site due to accessibility issues with the locks on the North Edgewater Road gate. The gate at the top of North Edgewater Road, located approximately 0.3 miles away from the Site's main gate, provides secondary access to the Site as well as primary access to the Willamette Cove property. This gate, which is secured with a multi-lock access device, provides access for two railroads, Northwest Natural Gas, Metro Regional Government (Metro), DEQ, and other agencies.

The Union Pacific Railroad tracks, which run parallel to the northwest of the Site and neighboring properties, are often used by the public to access the area. Access to the area generally does not affect security because of the surrounding fence and lighting at the Site; however, periodic acts of trespassing or vandalism occur. Cut locks occurred in December 2022 and were replaced upon discovery.

During the March 2022 inspection, field personnel observed what appeared to be a form of "art installation" by an unknown individual(s) in the riparian area of the soil cap (Appendix A, Photographs A2 and A3). The installation consisted of a fence gate cemented into the ground and covered with various bits of fabric and assorted decorations. The installation was removed during a subsequent O&M visit and is discussed in further detail in Section 2.3. The stormwater conveyance lines were functioning during the inspection and flow through the outfall occurred at an estimated 45 gallons per minute (gpm).

2.2.2 Soil Cap Subsidence

In June 2008, subsidence of the soil cap was observed near groundwater monitoring wells EW-1s and MW-23d. An upland site survey confirmed that the ground surface had subsided up to approximately 0.8 feet in a limited area around the wells between the time that the soil cap was installed in 2005 and 2008. A Subsidence in Upland Cap Memorandum (Hart Crowser and GSI, 2008) and an Additional Subsidence Monitoring Memorandum (Hart Crowser and GSI, 2010) present the results of the survey and additional investigation to determine the cause of the subsidence.

Based on elevated groundwater temperatures in well EW-1s (40°C) and the large amount of buried woody debris in the area, it was suspected that aerobic degradation of woody debris was occurring and causing the ground to subside. Decreasing groundwater levels within the barrier wall also may have contributed to the subsidence of the soil cap by opening a larger unsaturated zone to allow compaction. In 2009 EW-1s was sealed to reduce the amount of oxygen reaching the unsaturated zone. After the well was sealed, subsidence ceased. Since 2009, no additional subsidence has been observed. The groundwater temperature dropped to approximately 21 to 23°C and has remained stable for the past 12 years. Current temperatures in the well are approximately 19 to 20°C. This temperature remains higher than groundwater from surrounding wells (approximately 13°C) indicating that some heat is still being produced in the subsurface near well EW1s. This may be caused by anaerobic degradation, which generates less heat than aerobic degradation.

Ground surface subsidence is monitored by measuring the inner PVC casing at well MW-23d relative to the steel outer casing of the well. The inner casing extends to 182 feet bgs and is considered stable. In 2008, field staff noticed that the inner casing for MW-23d extended approximately 4 inches above the outer casing and interfered with the well monument lid closing correctly. In August 2008, the inner casing for MW-23d was trimmed down to approximately 4 inches below the outer casing. The outer casing is representative of the ground surface and if the casing (or ground surface) subsides, then the distance between the inner and outer casing decreases. Between November 2008 (first periodic measurement conducted) and 2010, the total distance between the inner and outer casing decreased by approximately 1.35 inches to a total distance of approximately 2.75 inches. Most of the decrease between the inner and outer casing occurred in 2009, with 0.5 inches of decrease occurring between November 2008 and January 2009. Since 2010, the distance has not changed, being measured at approximately 2.75 inches. Slight differences in the distance measured have been observed, within 0.10 inch for all events, and are likely due to variability in measuring equipment and field personnel.

Prior to 2008, the Site was last surveyed in 2005. An evaluation of the difference in ground surface elevations between the 2005 and 2008 surveys indicated ground surface subsidence of up to 0.8 feet in areas where wood debris is present (Hart Crowser and GSI, 2010). A topographic survey and storm sewer video inspection were performed in 2019 to collect data and evaluate if additional subsidence

had occurred from a previous similar survey in 2008 (additional measurements were collected for EW-1s and MW-23d in 2009). The results of the 2019 subsidence monitoring activities were discussed in the 2019 O&M Report and are presented in the Technical Memorandum - Subsidence Monitoring and Evaluation (Hart Crowser, 2020). Survey results indicated elevation decreases of 6.72 inches for EW-1s and 2.64 inches for MW-23d between 2009 and 2019. Two sags in the high-density polyethylene storm sewer pipe in the vicinity of EW-1s and MW-23d (between manholes SDMH-B and SDMH-C) were previously documented in 2008. The 2019 storm sewer inspection did not find any new sags or changes to the existing sags in the storm sewer pipe. No additional changes or impacts to the storm sewer pipe (e.g., cracking or root intrusion) were observed.

Subsidence monitoring was performed in 2022 to evaluate the continued effectiveness of EW-1s well sealing activities and to determine if additional settling had occurred since 2009. Measurements of the inner and outer well casing of MW-23d continue to remain at approximately 2.75 inches indicating additional subsidence has not occurred since 2010.

While not anticipated, additional settling in this area could affect performance of the stormwater conveyance system. The stormwater conveyance system is observed quarterly and continues to perform as designed with steady flow from the outfall during and immediately after rainfall events.

2.3 SOIL CAP MAINTENANCE ACTIVITIES

Routine maintenance activities performed at the Site in 2022 included checking for cut locks and chains, filling animal burrows beneath the perimeter fence, and monitoring vegetation. Non-routine maintenance performed in 2022 included removal of an “art installation”, water supply meter backflow testing, providing access to Portland General Electric (PGE) repair crews, replacing the sign in sheet document box, and emptying the trash dumpster onsite.

A vegetation assessment inspection on the soil cap was performed on May 25, 2022. The vegetation inspection results are described in further detail in Section 5.3.2. Trees and shrubs were healthy and did not show signs of drought stress; watering events were not necessary in 2022. Trees and shrubs are established and surviving the summer seasons; watering events are no longer needed and are not anticipated for 2023. The need for watering events may be reevaluated in the future should Site conditions change. Targeted weed removal and herbicide application was not necessary in 2022.

On June 17, 2022, Haley & Aldrich removed the “art installation”. Non-fastened items were removed from the installation and the metal poles that were embedded in concrete were flush cut with the ground surface. The holes in the metal pipe were filled with grout to seal the holes into the cap. Soil and sand from onsite stockpiles were then spread over the area to blend it back into its surroundings.

On September 19, 2022, American Backflow Services of Portland, Oregon, tested the Site’s water supply line backflow prevention valve. The backflow prevention valve met state regulation standards.

On November 9, 2022, Haley & Aldrich provided PGE access to the upland area to facilitate repairs to power lines adjacent to the perimeter fence.

On November 23, 2022, Haley & Aldrich replaced the visitor sign-in sheet document box attached to the storage building. The box had broken from frequent use by Metro’s subcontractors during their lease. A new document box was mounted with adhesives to the door of the storage building.

On December 12, 2022, Haley & Aldrich had Waste Management empty the trash dumpster in the storage area. Upon arrival at the site, Haley & Aldrich found the main entrance gate to North Edgewater Street, a gate from the paved storage area to the soil cap, and the secondary entrance gate to North Van Houten Place to be open with cut locks (Appendix A, Photograph 4). It appeared as if locks were cut to traverse the site, possibly due to train stoppages that occasionally occur at the railroad tracks crossing N. Van Houten Road or N. Edgewater Road. The locks and chains were replaced prior to departure.

2.4 SUMMARY OF SOIL CAP REMEDY PERFORMANCE

Overall, upland soil cap observations and inspections revealed no significant change in remedy performance or areas of concern. The soil cap continues to have a consistent layer of vegetative cover across the Site (Appendix A, Photograph A5). Future O&M activities will consist primarily of quarterly inspections and routine maintenance. Although gate locks are periodically cut and require replacement, there is no evidence that trespassers damage the integrity of the soil cap.

The upland soil cap subsidence near wells EW-1s and MW-23d currently is stable. Monitoring will continue in 2023 by taking inner and outer casing measurements at well MW-23d; by monitoring stormwater flow at the outfall during quarterly inspections; and by collecting and reviewing transducer data from EW-1s that measures groundwater temperature and elevation.

Institutional controls have not been fully implemented per the ROD (i.e., deed restrictions have not been implemented as the property has not yet transferred ownership). To date, no activities have occurred that could damage the soil cap or that would have been prohibited by deed restrictions.

3. Sediment Cap Performance Standards and Activities

This section summarizes sediment cap observation and maintenance activities for the reporting period January 1, 2022, through December 31, 2022. Site observations and maintenance activities were conducted according to the O&M Plan. Sediment cap inspections were conducted on March 2, June 10, September 19, and December 20, 2022, by DEQ, Haley & Aldrich, and GSI in conjunction with inspections for the entire Site. Observations of interest based on the routine inspections and site meetings are presented on Figure 2-1. Routine inspections are documented in site inspection summaries and are presented in Appendix B. Table 3-1 provides a summary of sediment cap activities conducted in 2022.

3.1 SEDIMENT CAP PERFORMANCE STANDARDS

The sediment remedy consists of a 23-acre cap over contaminated sediment within the Willamette River and includes ICs. The sediment cap remedy was completed in September 2005, and an Easement and Equitable Servitude was completed in 2006 to restrict sediment cap use and access. Sediment beneath the sediment cap remains contaminated with arsenic, PCP, PAHs, dioxins/furans, and NAPL. The performance standards for the sediment cap are as follows:

- Maintain contaminant concentrations in surface sediment below the following risk-based cleanup goals, as specified in the ROD (EPA, 1996).
  - Arsenic: 12 mg/kg, dry weight
  - PCP: 100 mg/kg, dry weight
  - Total carcinogenic PAHs: 2 mg/kg, dry weight
  - Dioxins/furans toxic equivalency (TEQ): $8x10^{-5}$ mg/kg, dry weight
  - Protection of benthic organisms based on sediment bioassay tests, resulting in impaired survival and growth (i.e., weight)
- Minimize contaminant releases from sediment that might result in contamination of the Willamette River in excess of the following federal and state Ambient Water Quality Criteria (AWQC):
  - Arsenic (III): 190 micrograms per liter (µg/L)
  - Chromium (III): 210 µg/L
  - Copper: 12 µg/L
  - Zinc: 110 µg/L
  - PCP: 13 µg/L
  - Acenaphthene: 520 µg/L
  - Fluoranthene: 54 µg/L
  - Naphthalene: 620 µg/L
  - Total carcinogenic PAHs (cPAHs): 0.031 µg/L
  - Dioxins/furans: 1.4x10-5 nanograms per liter (ng/L)

- Maintain the armoring layer to within 50 percent of the design specification throughout the cap. The design specifications are as follows:
  - 6-inch rock armoring: maintain at least 6 inches thick
  - 12-inch rock armoring: maintain at least 7.5 inches thick
  - 24-inch rock armoring: maintain at least 12 inches thick
- Maintain uniformity and continuity of ACB armoring.
- Assess performance of organophilic clay to ensure it is preventing the release of mobile NAPL to the Willamette River (potential assessment parameters include sorption capacity, measure of NAPL currently sorbed, and permeability).

AWQCs listed above were the surface water criteria in effect at the time of the ROD (EPA, 1996). Since completion of the ROD, additional recommended EPA water quality criteria were published in 2007, and more stringent AWQCs for human health were adopted by DEQ and approved by EPA in 2011. During meetings in August 2007 among stakeholders (DEQ, EPA, NOAA, Confederated Tribes of Warm Springs, and Yakama Nation), it was agreed that for comparison purposes, the following five criteria would be included in analytical results summary tables in Annual O&M Reports.

- Two AWQCs in effect at the time the ROD was issued:
  - 1996 criteria for chronic effects to aquatic life
  - 1996 criteria for human health based on fish consumption
- Two 2007 National Recommended Water Quality Criteria (NRWQCs):
  - 2007 criteria for chronic effects to aquatic life
  - 2007 criteria for human health (consumption of organisms)
- Current EPA maximum contaminant levels (MCLs)

The criteria above are for comparison only; the 1996 AWQCs remain as the regulatory screening criteria for the Site. Comparison criteria also include the EPA-approved 2011 AWQCs updated in 2017 for human health (DEQ, 2017), and other applicable AWQCs at the time of sediment cap water sampling events. The next scheduled sediment cap water sampling event is in 2025.

3.2 SEDIMENT CAP OBSERVATIONS

Routine sediment cap inspections were conducted during the four quarterly site inspections. Observations were made regarding habitat enhancement features, wildlife, vandalism, and/or trespassing. Representative photographs of the Willamette Cove and Willamette River shorelines taken in 2022 are presented in Appendix A. Sediment cap inspection documentation is included in Appendix B. In general, the sediment cap remains in good condition.

3.2.1 Shoreline Conditions

During the March 2022 inspection, large amounts of woody debris ranging from small branches to large tree trunks were observed along the Willamette River shoreline due to the high river stage (Appendix A, Photograph A6). The woody debris exacerbated existing tears in the turf reinforcement matting (TRM) planned for repairs in summer 2022. Buoys 1, 3, and 5 were first observed missing in 2021. Replacement of the buoys was initiated in 2021 however, the buoy replacement was not performed until May 2022

due to delays in equipment delivery. TRM repairs were performed in June 2022. Both activities are discussed in further detail in Section 3.3.

During the October 2018 site inspection, multiple 2- to 6-inch-wide voids and unconformities were observed in the ACB along the shoreline in the Willamette Cove during seasonal and tidal low water levels. The gaps were visible during the September 2021 and September 2022 inspections during low tide periods. In September 2022, minor undulations and unconformities were observed with gaps of approximately 6 inches between ACB mat sections present (Appendix A, Photograph A7). The source of the undulations and unconformities is unknown. As only qualitive observations have been made during the 2018, 2021, and 2022 inspections regarding displacement, height and spacing of undulations, etc., no determination regarding the rate of separation or displacement occurring could be made and will be evaluated using a more rigorous and quantitative approach.

Shoreline sheen and ebullition are monitored to determine if the sediment cap is performing as intended and if NAPL from creosote seeps is reaching the Willamette River. NAPL sheen was not observed during any site inspection in 2022. Ebullition was observed from the Willamette Cove and Willamette River shorelines during the September 2022 inspection and consisted of a single bubble approximately once every 10 to 20 seconds. Organic sheen was also observed in ACB depressions in Willamette Cove during the September 2022 inspection (Appendix A, Photograph A8). Ebullition is also monitored as a measure of granular organophilic clay integrity. Sediment cap evaluations performed 2008 through 2010 determined that total organic carbon decay resulted in methane gas production and ebullition in those areas. Ebullition observed in 2022 did not contain petroleum sheen.

During the September 2022 inspection, several small trees were observed growing in the ACB on the north end of the Willamette River shoreline next to the railroad bridge (Appendix A, Photograph A9). Roots and trunks can grow over time and removal of the tree saplings was warranted to prevent future damage to the ACB. The trees were removed in September during the next O&M visit and is discussed in further detail in Section 3.3.

3.2.2 Habitat Enhancement Features and Wildlife

Habitat enhancement features, such as boulder clusters and sand cover as a biotic layer, are design elements of the sediment cap. Driftwood also provides habitat enhancement along the shoreline and in the riparian area above the shoreline. The distribution of sand cover over the ACB is similar to previous years. Originally, sand was placed over a large portion of the shoreline and Willamette Cove ACB armoring, but high river flow conditions and wakes from passing boats had washed sand from the ACB where the bank slopes are steeper. Rounded 1.5-inch-minus gravel was placed within the ACB voids along a large portion of the shoreline and Willamette Cove in October 2012. Subsequent to gravel placement, some gravel has washed down from the steeper, upslope shoreline areas and has settled onto lower ACB surfaces where it has largely remained in place through 2022.

Large pieces of driftwood are deposited along the shoreline at higher elevations during high river-stage events (Appendix A, Photograph A6). The amount of driftwood moving through the Site appears to remain fairly consistent every year. Three areas of the shoreline appear to accumulate more woody debris than other areas:

- The south end of the shoreline near the City of Portland outfall.

- Along the shoreline near the former Tank Farm Area (TFA).
- The north end of the Site near the Burlington Northern Railroad bridge.

Boulder clusters placed during the sediment cap construction remained in place during 2022. Numerous wildlife species continue to be observed Site-wide; birds seen most frequently include Canada geese, gulls, cormorants, crows, pigeons, blue herons, ospreys, and hawks.

3.2.3 Public Use

The shoreline along the Site and Willamette Cove is publicly accessible and used for various forms of recreation. During the June 2022 inspection, a homeless encampment was observed in Willamette Cove and an abandoned vessel was observed along the side of a footpath leading to the shoreline. The vessel was approximately 10 feet long and very dilapidated. DEQ notified Metro of the abandoned vessel following the site inspection. Both the homeless encampment and the abandoned vessel were no longer present during the next site inspection in September 2022.

Numerous dilapidated boats (presumably used as dwellings) have been consistently observed anchored in Willamette Cove during recent years. Vessels were observed anchored in Willamette Cove during the March, September, and December 2022 site inspections and appeared to be different vessels during each inspection. All vessels appeared to be anchored beyond the sediment cap.

3.2.4 Buoys

In August 2011, five permanent buoys were installed along the perimeter of the sediment cap to warn boaters of navigational hazards. Buoys 1, 3, and 5 were not visible during the March 2021 site inspection when the river was at a high flow stage. Subsequent site inspections during low river level conditions in the summer 2021 confirmed the buoys were missing and not just submerged. The buoys were replaced in May 2022. Replacement activities are discussed further in the following section.

During the June 2022 site inspection, Buoy 2 was not observed. Buoy 4 was partially submerged during the inspection, an indication that Buoy 2 may have been submerged as well. Buoy 2 was observed during the next site inspection in September confirming that Buoy 2 was submerged during the previous inspection in June 2022.

3.3 SEDIMENT CAP MAINTENANCE ACTIVITIES

The sediment cap was designed to be generally maintenance free. Watering events for the riparian area were not needed during the summer months of 2022 as vegetation did not show signs of drought stress and are sufficiently established to tolerate periodic high heat weather events during summer. No signs of stressed vegetation were observed during summer month site visits from June through October 2022.

Buoy replacement activities were performed on May 2, 2022 to replace Buoys 1, 3, and 5 (Appendix A, Photographs A10 and A11). Ballard Marine Construction, LLC performed diving operations to locate the concrete anchor block on the river bottom. Once located, the diver removed old chain and shackle from the concrete anchor and attached new chain, shackle, and buoy to the anchor block. The anchor chain was set at a scope of 2:1 to account for river level fluctuations.

TRM repairs were performed in two compromised areas on August 19, 2022. Both areas were located at the top of the ACB and riparian area slope interface. The first repaired section was near monitoring well cluster MW-41 and consisted of a 120-foot section (Appendix A, Photograph A12). The damaged section was removed and an 8.5-foot wide by 120-foot-long roll of TRM was used to repair the area. The upper foot of the TRM was placed beneath the existing TRM to form a 12-inch overlap and was secured to the cap with 18-inch metal stakes into soil and with concrete anchors drilled into the ACB. The second repair area had minor damage and consisted mainly of sections that had ripped away from the original anchors. The loose sections were resecured with concrete anchors into the ACB. Both repair areas are depicted on Figure 2-1.

Tree removal from ACB along the shoreline of the Willamette River was performed on September 28, 2022. Tree saplings were beginning to establish in an area immediately south of the railroad bridge. The saplings were flush cut to prevent continued growth and potential buckling of the ACB from root expansion.

3.4 SUMMARY OF SEDIMENT CAP REMEDY PERFORMANCE

Overall, the sediment cap observations and inspections during 2022 revealed no significant change in remedy performance or areas of concern. Future O&M activities primarily will consist of quarterly inspections and routine maintenance. Previously, several voids in the ACB were observed along Willamette Cove in 2018, 2021, and were observed again in 2022. Minor undulations of the ACB armoring also were observed in Willamette Cove. The voids do not show signs of impairment to the cap; however, Haley & Aldrich, GSI, and DEQ will develop a more rigorous evaluation of the voids and undulations in 2023 to determine if repairs to the sediment cap are required. The O&M Manual will be updated with the procedures used for evaluation.

Sand covers the shoreline at lower, less steep elevations, and significant amounts of large driftwood accumulated along the shoreline in 2022. This accumulated driftwood creates wildlife habitat. Numerous wildlife species continue to be observed; various birds including Canada geese, gulls, cormorants, crows, pigeons, blue herons, ospreys, and hawks were observed in 2022.

Rounded gravel used to fill voids within the ACB created a more stable substrate for wildlife and a consistent, safer walking surface for public use, although much of the gravel has been eroded from the upper potions of the ACB and deposited on the lower portion. Sediment cap conditions lower on the shoreline and in the intertidal zone show little change from construction conditions.

The public frequents the shoreline for recreation, most commonly for hiking or walking dogs. No homeless encampments were observed along the Willamette River shoreline during 2022, and one temporary encampment was observed in June 2022 in Willamette Cove.

4. Groundwater Performance Standards and Activities

This section summarizes groundwater performance standards and activities for the reporting period January 1, 2022 through December 31, 2022. Groundwater remedy observations and maintenance activities were conducted according to the O&M Manual (Haley & Aldrich and GSI, 2023). Manual measurements of NAPL and groundwater levels were collected during Site-wide semiannual monitoring events on June 23 and September 29, 2022. In April 2022, EPA performed a groundwater sampling separate from O&M activities performed at the site. The results of EPA's sampling will be documented in a report prepared by EPA.

4.1 GROUNDWATER FLOW DIRECTION AND GRADIENT ASSESSMENT

The current monitoring well network is shown on Figure 4-1. Ongoing groundwater monitoring consists of: 1) semiannual Site-wide manual measurements of NAPL and groundwater levels; and 2) continuous water level measurements in 11 Site wells via dedicated transducers. Groundwater levels measured during the 2022 period are consistent with water table measurements since 2003, when the barrier wall was installed. This section summarizes groundwater flow based on the 2022 water level measurements.

4.1.1 Horizontal Flow Direction and Gradients

Manual groundwater measurements were made during the falling limb of the hydrograph or immediately following low tide in the Willamette River. The semiannual groundwater elevation data are included in Table 4-1 (June 23, 2022) and Table 4-2 (September 29, 2022).

Shallow groundwater elevation contour maps were developed for each semiannual event during what is typically the seasonal high (June) and low (September) river stage. As shown in Figures 4-2 and 4-3, the shallow horizontal groundwater gradient within the subsurface barrier wall is independent of the gradient outside the barrier wall. The groundwater gradient inside the barrier wall remains flat (gradient ranging from approximately 0.001 to 0.004 feet per foot) compared to the steeper groundwater gradients observed outside the barrier wall (ranging from approximately 0.001 to 0.02 feet per foot). Note that during the 2021 monitoring period, an anomalously high-water level measurement (nearly 2 feet higher than nearby wells) was observed at well MW-17s, but manual readings collected in this well in 2022 coincided with nearby wells, and are consistent with previous measurements. The cause of the higher water level measurements observed in 2021 has not been identified and groundwater levels in the MW-17s area will continue to be monitored in 2023.

On the southeastern side of the barrier wall, groundwater flows southwest toward the Willamette River; while on the northern side of the barrier wall, groundwater flows to the west toward Willamette Cove. This demonstrates that the barrier wall has effectively cut off the horizontal hydraulic connection between the shallow groundwater zone inside and outside of its boundaries. Historically, the hydraulic separation is apparent from the paired monitoring well cluster MW-52s and MW-53s, located at the northeastern edge of the barrier wall. Limited groundwater elevation data was collected at MW-53s in 2022 due to pressure transducer failures. In August, the transducer at MW-52s malfunctioned and recorded erroneous pressure transducer data. However, the historical hydraulic separation trend was consistent during the June and September timeframe when synoptic measurements were collected at these wells (Figure 4-4). MW-52s will be repaired or replaced in 2023.

Comparison of groundwater levels for interior monitoring wells EW-1s, MW-52s, MW-36s, and MW-44s (Figure 4-5) illustrate groundwater gradients within the barrier wall are typically southwesterly (i.e., the water level in EW-1s is typically higher than MW-36s). However, during periods of peak flow in the Willamette River (e.g., January and April 2021), groundwater levels within the northwest corner of the barrier wall increase and cause a partial gradient reversal (i.e., the water level in MW-36s becomes higher than the levels in other interior wells; Figure 4-5). This partial reversal is caused by a deep hydraulic connection through a sand layer at the base of the western edge of the barrier wall; when the river level exceeds the groundwater level within the barrier wall area, an upward vertical gradient results. Vertical gradients are further discussed in Section 4.1.2.

The hydrographs in Figures 4-6 and 4-7 compare groundwater level elevations for selected well pairs to river stage elevation and precipitation data. River stage data were recorded every 30 minutes from U.S. Geological Survey (USGS) Station number 14211720 (USGS, 2022a). This Station is located on the upstream side of the Morrison Bridge (river mile [RM] 12.8), approximately 5.6 river miles from the Site. The river stage elevation data reported by USGS are in a datum unique to Portland, Oregon known as the Portland City Datum (PCD), approximately 5.1 feet lower than NAVD88 (EPA, 2016). This value was used to correct all stage data. Precipitation data were obtained from the Astor Elementary School rain gauge located approximately 0.5 mile from the Site. This rain gauge is part of the City of Portland Hydra Network (USGS, 2022b).

4.1.2 Vertical Flow Direction and Gradients

Willamette River stage differences directly influence groundwater elevations in the adjacent nearshore areas. Daily tidal fluctuations in river stage typically range from 2 to 5 feet during the late summer and fall months (July through September) when stage/discharge is lowest and from 1 to 2 feet during the spring months (April through June) when stage/discharge is highest.

Vertical gradients inside and outside the barrier wall along the Willamette River were assessed in monitoring well clusters MW-36/MW-37 and MW-44/MW-45 (Figure 4-1). Transducer batteries are checked twice a year during the semiannual monitoring events in June and September 2022. Hydrographs for these wells (Figures 4-6 and 4-7) indicate the deep groundwater zone is in direct hydraulic connection with the river. The deep zone both inside (MW-36d and MW-44d) and outside (MW-37d and MW-45d) of the barrier wall closely mimics the river stage, both in elevation and timing, with small vertical gradient changes that occur in response to the daily tidal changes and seasonal river stage trends. The exterior shallow well MW-45s (Figure 4-7), is also in hydraulic connection with the river and shows a dampened amplitude in comparison with the deeper wells (Figure 4-7). However, it was observed while processing the 2022 data that the pressure transducer at MW-37d and MW-45d may have been disturbed during the download event on June 23, 2022. This was recognized after a sudden change in apparent elevation was observed at both transducers. A correction involving the manual water level measurement taken on June 23, 2022 for MW-45d and September 29, 2022 for MW-37d was used to adjust the transducer installation depth value that is used to generate the groundwater elevation value.

Shallow groundwater levels at MW-36s (inside barrier wall) respond to tidal effects observed in the river but are muted in amplitude compared with the variations observed in the river stage. MW-44s (inside barrier wall) shows a negligible response to tidal effects and river levels (Figure 4-7). The muted amplitude or negligible response of interior shallow wells compared with the deep-zone wells indicates a hydraulic disconnect between most of the shallow aquifer within the barrier wall and the deeper

water-bearing zones. This disconnect is due to: 1) the presence of the barrier wall which prevents horizontal flow across it; and 2) the presence of a confining silt layer between the shallow and intermediate zones throughout most of the barrier wall area, including near the MW-44/MW-45 well cluster. The shallow interior response is greatest, but still significantly muted, in well MW-36s (Figure 4-6), where a hydraulic connection exists at the base of the barrier wall (which is completed in a sandy unit at depth). The timing of the groundwater oscillations in MW-37s (exterior shallow well) and MW-36s (interior shallow well) were closely linked, however the amplitude of the oscillations was muted inside the barrier wall at well MW-36s.

Although precipitation in the Willamette River watershed ultimately affects the stage of the river, direct precipitation appears to play a minor role in determining the water levels of wells within the barrier wall and along the river. The Resource Conservation and Recovery Act (RCRA)-type soil cap at the Site was designed to divert precipitation so that little infiltration occurs within the barrier wall. Although some infiltration occurs along the fringes of the soil cap and within the riparian zone, the volume of infiltration is minimal. Between the barrier wall and the river, precipitation inputs are overshadowed by the response of groundwater to variations in river stage. The shallow zone upgradient or cross-gradient from the barrier wall appears to react subtly to precipitation and is less connected to the river because of its distance from the river and the presence of the barrier wall, which is sealed into the underlying silt. One location where infiltration may influence groundwater elevation and flow path is in the retention pond (Figure 1-3) that receives diverted runoff from the soil cap. Historical water level data indicates that the groundwater gradient in this area is flat, but a slight groundwater mound east of the soil cap may be seasonally present.

4.2 NAPL GAUGING AND MONITORING ASSESSMENT

Between February 1993 and April 2011, approximately 6,550 gallons of NAPL were extracted from Site wells. Because recovery was slow and there was uncertainty about the benefits of ongoing recovery, a NAPL investigation in the former waste disposal area (FWDA) outside the barrier wall (the remaining area with active NAPL recovery) was conducted in 2011. Based on the findings from the NAPL investigation (Hart Crowser and GSI, 2011b) and extensive monitoring of the sediment cap (described in the Third Five-Year Review Report [DEQ and EPA, 2011]), DEQ and EPA decided to discontinue NAPL extraction on April 20, 2011. Subsequent monitoring of the post-extraction NAPL thickness in the FWDA was conducted in 2011 (Hart Crowser and GSI, 2011b). The results supported the regulatory decision and confirmed the residual NAPL in the FWDA is isolated and stable and does not pose a risk to the Willamette River. To confirm that this remains the case and to continue to evaluate the functional performance of the barrier wall and soil cap, NAPL presence and thickness continues to be monitored during the semiannual monitoring events.

Semiannual monitoring events were performed on June 23, and September 29, 2022. Measurable thicknesses of NAPL were present in 11 Site wells (EW-1s, EW-8s, EW-10s, EW-15s, EW-18s, EW-23s, MW-10r, MW-20i, MW-22i, MW-Ds, and MW-Gs). Figures 4-8 and 4-9 show the locations of wells with measurable quantities of light NAPL (LNAPL) and/or dense NAPL (DNAPL) during the June and September 2022 monitoring events, respectively. Tables 4-1 and 4-2 provide semiannual NAPL gauging measurements. Figures 4-10 through 4-20 show the NAPL and groundwater elevations versus time in individual wells that regularly had NAPL detections. The screened interval elevations and the well depth are also shown. The thickness of LNAPL can be calculated by subtracting the LNAPL elevation (when LNAPL is present) from the groundwater elevation. Similarly, the DNAPL thickness is represented by the difference between the DNAPL/water contact elevation and the well depth elevation.

Given that NAPL within the barrier wall is constrained laterally, NAPL observations within and outside of the barrier wall are discussed separately below.

4.2.1 Outside the Barrier Wall

Historically, NAPL has been primarily observed outside the barrier wall next to the northwest corner that corresponds to the FWDA (Figure 1-5). During the June 2022 monitoring event, measurable DNAPL was observed in four wells (EW-10s, MW-20i, MW-Ds, and MW-Gs) outside the northwestern corner of the barrier wall (Figure 4-8). During the September 2022 monitoring event, measurable DNAPL was observed in four wells (EW-10s, MW-20i, MW-Ds, and MW-Gs) (Figure 4-9).

As shown on Figures 4-10 through 4-13, the DNAPL thicknesses measured in wells EW-10s, MW-20i, MW-Ds, and MW-Gs in 2022 are generally consistent with measurements made since NAPL recovery was discontinued in April 2011 with one exception. DNAPL was observed in well MW-Ds, but only trace groundwater (0.01 feet) was observed in October 2022. There is typically 1 to 2 feet of groundwater and approximately 2 feet of DNAPL in this well; however, during the October 2022 monitoring event DNAPL thickness increased to approximately 4 feet thick. The cause for this is unknown, and DNAPL conditions at MW-Ds will continue to be evaluated. Additionally, DNAPL that was observed at well EW-2s in 2021 was not detected in 2022, but DNAPL conditions at well EW-2s will continue to be monitored. Overall, the 2022 observations are consistent with historical observations and support the conclusion that NAPL observed in the FWDA is localized and relatively stable. There is no evidence of NAPL mobility either across the barrier wall or to the Willamette River.

4.2.2 Inside the Barrier Wall

During the June 2022 monitoring event, measurable LNAPL was present in two wells (EW-15s and EW-23s) within the barrier wall (Figure 4-8). Measurable DNAPL was observed in four wells (EW-1s, EW-8s, EW-18s, and MW-22i) inside the barrier wall during the June monitoring event (Figure 4-8). During the September 2022 monitoring event, measurable LNAPL was observed in three wells (MW-10r, EW-15s, and EW-23s) within the barrier wall (Figure 4-10). Measurable DNAPL was observed in four wells (EW-1s, EW-8s, EW-18s, and MW-22i) inside the barrier wall during the September event (Figure 4-10).

Figures 4-14, 4-15, 4-16 and 4-20 show the elevations of LNAPL and shallow groundwater over time in wells EW-15s, EW-23s, EW-1s, and MW-56s respectively. As shown in these figures, the LNAPL thickness is generally greater when the groundwater elevation is low. This is the result of gravity drainage of LNAPL through the unsaturated zone when the water table drops. This pattern has been consistent since mid-2006 when LNAPL ceased being recovered inside of the barrier wall (i.e., LNAPL thickness was not disturbed by recovery). Although the LNAPL thickness varies cyclically with changes in the groundwater elevation, the overall LNAPL thickness in these wells has remained relatively stable, with slight increases during low groundwater levels.

Measurable DNAPL was present during the 2022 semiannual monitoring events within the barrier wall near the former TFA (Figure 1-5) in wells EW-1s, MW-22i, EW-8s, and EW-18s, as shown on Figures 4-16 through 4-19, respectively. After a temporary recovery period in April 2011, the DNAPL thickness in well EW-1s (Figure 4-18) increased to a thickness of approximately 8 feet by 2014; it has remained roughly the same, with the DNAPL thickness in EW-1s being 8.61 feet in September 2022. The DNAPL thickness

in well MW-22i is 7.23 feet thick (Figure 4-19). Approximately 2 feet of DNAPL is consistently present within the sump of well EW-8s, with occasional spikes in the DNAPL thickness. The DNAPL thickness in EW-18s has been generally stable at around 2 feet since 2012 (Figure 4-19).

Overall, both LNAPL and DNAPL appear to be stable except for the DNAPL at EW-8s (Figure 4-19). The pattern in DNAPL thickness at EW-8s is consistent with historical patterns, which vary seasonally. Given these observations, mobilization of LNAPL or DNAPL across either the barrier wall or the Willamette River is unlikely.

4.3 GROUNDWATER REMEDY MAINTENANCE ACTIVITIES

Table 4-3 provides the groundwater O&M activities conducted in 2022. Transducer data loggers were inspected during the semiannual monitoring events in 2022. MW-53s was replaced in 2022 and a maintenance event was performed in June 2022 prior to the well gauging and transducer download monitoring event.

During the October 2020 and June 2021 download events, the MW-53s transducer batteries were replaced and it was observed that the transducer battery life was declining drastically. Two weeks following the June 2021 download event and battery change, the transducer was rechecked for proper operation and was found with a dead battery. As the transducer appeared to be malfunctioning, it was pulled from the well and submitted to the manufacturer for evaluation and repair. The manufacturer determined that the circuit board for the transducer was damaged and required repair. Due to global supply chain issues at the time, repairs to the device were unable to be performed until March 2022. The repaired transducer was returned to Haley & Aldrich and the unit was replaced in MW-53s during the June 17, 2022 maintenance event.

A maintenance visit was performed on June 17, 2022 to check all transducers and reset transducer depths in select wells. Following the review of 2021 transducer data during preparation of the 2021 annual report, several wells had observable increases in water level measurements over time of approximately 0.5 feet, with the greatest being an almost 3-foot increase in water level elevation MW-45d. The affected wells were inspected to check if any changes in transducer placement had occurred that would correlate to the changes in recorded water levels. It was found that the MW-45dtransducer cable had slid down inside the retention collar. The transducer was reset at the correct depth and the transducer data was corrected based on the amount of drop the transducer experienced.

4.4 SUMMARY OF GROUNDWATER REMEDY PERFORMANCE

Hydraulic conditions are consistent with previous years, verifying that the remedy continues to function as designed. Groundwater monitoring data are used to understand groundwater flow conditions inside and outside of the barrier wall. This information is evaluated to determine whether the barrier wall and impermeable RCRA-type soil cap are functioning as designed.

DNAPL was measured in four wells outside the barrier wall. The DNAPL in the wells has remained stable with some variation due to temperature and pressure (coincident with water level variation). Based on the findings from the DNAPL Data Gap Investigation (Hart Crowser and GSI, 2011a), subsequent monitoring of the post-extraction NAPL thicknesses in wells in the FWDA, and extensive monitoring of the sediment cap and groundwater (described in the Third and Fourth Five-Year Review Reports

[DEQ/EPA, 2011; DEQ/EPA, 2016]), the decision to discontinue NAPL recovery was justified, and residual NAPL remaining in the FWDA does not pose a threat to the Willamette River.

Based on the evaluation of groundwater data from 2005 through 2022, the barrier wall and impermeable soil cap are functioning as designed to divert groundwater flow around NAPL source areas, minimize rainwater infiltration into NAPL source areas contained within the barrier wall, and prevent NAPL contained within the barrier wall from migrating to the Willamette River. Groundwater flow conditions across the Site are consistent with previous years.

5. Vegetation Management

This section summarizes the vegetation management and monitoring activities for the reporting period from January 1, 2022, through December 31, 2022. Vegetation management activities on the upland cap were conducted in accordance with the McCormick & Baxter Vegetation Management Plan (Hart Crowser and GSI, 2011c).

The upland cap was constructed during a 2-year period beginning in 2004 with the re-grading of the Willamette River riverbank. The 6-acre riparian area cap was installed and tied into the in-water sediment cap. In 2005, a 34-acre soil cap was constructed to complete the upland cap. The City of Portland Bureau of Environmental Services (BES) entered into an Intergovernmental Agreement (IGA) with DEQ to provide vegetation planning and vegetation management services for the upland cap from 2005 through 2010. In February 2006, the soil cap was planted with native grasses, plants, and trees, and an irrigation system was installed. After the fifth growing season, BES determined that the vegetation was fully established. The irrigation system was deactivated in 2009 and decommissioned in 2015. Overall, the planting and vegetation management goals have been met.

Semiannual noxious weed control activities, including herbicide application, were conducted from spring 2006 through spring 2013. Herbicide application was temporarily discontinued in June 2013 when nearby desirable native vegetation was observed to be stressed and dying. No herbicide was applied in 2014 and 2015 but was resumed in 2016 after noxious weeds appeared to be spreading. Spot treatment occurred once each in 2017 and 2019. No herbicide application was performed in 2018 and 2020 through 2022.

Rodents that inhabit the cap have damaged vegetation in the past; however, except for some earlier targeted damage to the grand fir (*Abies grandis*) seedlings (BES, 2010), there has been insignificant damage to other plantings. Rodent activities are monitored during quarterly site inspections and were not observed to be causing significant damage during site visits in 2022.

On July 19, 2018, a fire burned approximately 1 acre at the north end of the riparian area. On September 24, 2018, another fire burned approximately 1 acre along the northeast side of the Site, approximately 200 feet southeast of the Site maintenance building and along the inside of the fence line. Both fires were likely caused by human activities. Vegetation recovered in these areas by July 2019 and continues to do well.

5.1 VEGETATION MANAGEMENT COMPONENTS AND GOALS

The upland cap has five distinct components, each with corresponding goals and objectives for managing hydrology, soil, and wildlife habitat (Figure 5-1). These components are:

- Entrance Area
- Earthen Cap
- Stormwater Retention Pond and Drainage Swale
- Impermeable Cap
- Riparian Area

Performance standards to assess whether the planting goals in the DEQ/BES IGA for the entire upland cap are met include:

- Bare soil spaces are small and well dispersed.
- Soil movement, such as active rills or gullies and soil deposition around plants or in small basins, is absent or slight and local.
- Plant litter is well distributed and effective in protecting the soil with few or no litter dams present.
- Native woody and herbaceous vegetation and germination micro-sites are present and well distributed across the Site.
- Vegetation structure results in rooting throughout the available soil profile.
- Plants have normal, vigorous growth form and a high probability of remaining vigorous, healthy, and dominant over undesired competing vegetation.
- Stream banks have less than 5 percent exposed soil with margins anchored by deeply rooted vegetation or coarse-grained alluvial debris.
- A continuous corridor of shrubs and trees provides shade for the entire stream bank.

Specific goals were also set for planting the riparian area to create habitat, including elements such as large woody material, riparian vegetation for food, habitat cover and shelter, and shading (NOAA, 2004).

5.2 BASELINE CONDITIONS IN 2011

In 2010, BES determined that the vegetation had been fully established, as discussed in its final 2010 Vegetation Management Report (BES, 2010). Hart Crowser (now Haley & Aldrich, Inc.) assumed responsibility for the vegetation management at that time. On June 10, 2011, a Hart Crowser ecologist inspected the upland cap to confirm the vegetation conditions discussed in the report. The inspection included: visual observation of vegetation planting areas, species identification (native, non-native, and invasive), growth, density, general coverage, and relative health of vegetation throughout the Site. Photographs were taken to establish a baseline to evaluate the progress of the vegetation re-establishment and the qualitative observations at select Site locations. These locations or "Photograph Stations" are shown on Figure 5-1 and include Photograph Stations 1 through 9. The following sections summarize the initial conditions and observations made during the baseline visit in June 2011.

5.2.1 Riparian Area

The riparian area is divided into two components: upper and lower. Each component received similar vegetation treatments. The lower component is subject to Willamette River stage fluctuations, which influence vegetation conditions at its lower edge during high-water events. Vegetation, some weeds, and woody debris are present along the shoreline (Photograph Stations 7 and 9). Trees, shrubs, and herbaceous plants are present in the riparian area (Photograph Station 8).

Lower Component. The lower component originally was planted with a variety of native trees and shrubs including: Oregon ash (*Fraxinus latifolia*), Suksdorf's hawthorn (*Crataegus suksdorfii*), cascara (*Rhamnus purshiana*), hardhack (*Spiraea douglasii*), red-osier dogwood (*Cornus sericea*), Pacific ninebark (*Physocarpus capitatus*), swamp rose (*Rosa pisocarpa*), river willow (*Salix fluviatilis*), Sitka willow (*Salix sitchensis*), rigid willow (*Salix rigida*) [*sic:* taxonomic update -MacKenzie's willow (*S. prolixa)*], Piper's

willow (*Salix piperi*) [*sic: S. hookeriana*], and black twinberry (*Lonicera involucrata*). Groundcover species planted in the lower component included: California brome (*Bromus carinatus*), blue wildrye (*Elymus glaucus*), meadow barley (*Hordeum brachyantherum*), slender hairgrass (*Deschampsia elongata*), spike bentgrass (*Agrostis exerata*), globe gilia (*Gilia capitata*), lupine (*Lupinus albicaulis*), and Canada goldenrod (*Solidago canadensis*). Tree plantings were not installed at lower elevations in the lower component of the riparian area because of the potential for late season inundation from high river levels. Instead, appropriate shrubs, primarily willows, were installed along the lower edge of this component to provide food and shade.

In 2011, trees and shrubs within the lower component were observed to be well established and growing both vertically and laterally. No indications of stress were noted. Localized areas of exposed TRM were observed along the length of the lower edge of the TRM, likely because of river fluctuations and movement of large woody debris along the shoreline. Canada thistle (*Cirsium arvense*) was the most common noxious weed with lesser quantities of knapweed (*Centaurea* sp.) and butterfly bush (*Buddleia davidii*) present. A significant quantity of large woody debris was also observed along the entire length of the lower edge.

Upper Component. The upper component was planted with native vegetation including: red alder (*Alnus rubra*), big-leaf maple (*Acer macrophyllum*), Western red cedar (*Thuja plicata*), madrone (*Arbutus menziesii*), grand fir, Garry oak (*Quercus garryana*), Oregon ash, black hawthorn, cascara, red elderberry (*Sambucus racemosa*), blue elderberry (*Sambucus cerulea*), Nootka rose (*Rosa nutkana*), tall Oregon-grape (*Mahonia aquifolium*), snowberry (*Symphoricarpos albus*), red-flowering currant (*Ribes sanguineum*), oceanspray (*Holodiscus discolor*), red-osier dogwood, black twinberry, and Pacific ninebark. Groundcover species in the upper component are identical to those in the lower component. Similar to the lower component, trees and shrubs were well established and appeared healthy. In 2011, trees were 6 to 12 feet tall. Few areas containing bare ground were observed. Thistle and knapweed were present in small quantities among the groundcover plantings throughout the upper component.

Summary. In general, the riparian area components appeared to be performing well in 2011, with the installed trees and shrubs looking healthy and spreading. Groundcover species provided relatively good coverage of the soil, except for a few areas containing bare ground and observed TRM along the shoreline. In addition, large driftwood was present throughout the lower component and in smaller quantities within the upper component. Noxious weeds, including thistle, knapweed, and butterfly bush were present in small quantities within the riparian area.

5.2.2 Upland Area

The upland area is divided into three components: the earthen cap; the stormwater retention pond/ drainage swale; and the impermeable cap. The upland areas and photograph station locations are shown on Figure 5-1. A variety of native trees, shrubs, and herbaceous species are present on the earthen cap as shown in photographs captured at Photograph Stations 1, 2, 3, and 5 (Appendix C). Native shrubs and herbaceous species are present in the stormwater retention pond/ drainage swale (Photograph Station 4). Meadow grasses and herbs are present on the impermeable cap (Photograph Station 6).

Earthen Cap Component. Originally, this component was planted with a variety of native trees, shrubs, and grasses including: Garry oak, Ponderosa pine (*Pinus ponderosa*), black hawthorn (*Crataegus douglasii*), madrone, snowberry, blue elderberry (*Sambucus cerulea*), Oregon-grape, Nootka rose, red-

flowering currant, oceanspray, serviceberry (*Amelanchier alnifolia*), and mock orange (*Philadelphus lewisii*). Herbaceous species installed on the earthen cap included: chewings fescue (*Festuca rubra* var. *comutata*), California brome, meadow barley, slender hairgrass, Spanish clover (*Lotus purshiana*), claria (*Clarkia amoena*), globe gilia, meadow checkermallow (*Sidalcea campestris*), large-leaved lupine (*Lupinus polyphyllus*), and Canada goldenrod. By 2011, nearly all of these plant varieties remained on the earthen cap and appear to be well established and growing both vertically and laterally. Nootka rose had dominated the northwest corner of the earthen cap component; however, some of the Nootka rose appeared to have been highly stressed or had died, and most were regenerating. The black hawthorn had grown to 6 to 8 feet tall. Localized areas of moss were observed within the grasses and herbaceous vegetation. Small quantities of knapweed and thistle were also present.

Stormwater Retention Pond/Drainage Swale Component. This component was planted with a native shrub overstory consisting of hardhack, Sitka willow, and Piper's willow (Photograph Station 4). By 2011, volunteer red alder and black cottonwood (*Populus balsamifera*) were observed among the shrub plantings. Understory herbaceous species were planted in the pond and swale area based on anticipated inundation within the pond and swale area and included: water plantain (*Alisma plantago aquatica*), slough sedge (*Carex obnupta*), soft stem bulrush (*Schoenoplectus tabernaemontanii*), small-fruited bulrush (*Scirpus microcarpus*), Western sloughgrass (*Beckmania syzigachne*), Western mannagrass (*Glyeria occidentalis*), tufted hairgrass (*Deschapsia cespitosa*), slender hairgrass, meadow barley, spike bentgrass, meadow foxtail (*Alopecuris geniculatus*), self-heal (*Prunella vulgaris*), Spanish clover, and gumweed (*Grindelia integrifolia*). By 2011, the shrub plantings in the pond and swale area were well established and appeared healthy. Many of the grasses and herbs in the pond area did not survive because the infiltration of surface runoff limits moisture and the understory is dominated by sand and bare ground. Given that the shrubs were well established, the area is flat, and erosion generally was not occurring, replanting grasses and herbs was not recommended. No noxious weeds were observed in this component.

Impermeable Cap Component. This component was seeded with a grassland mixture including: chewings fescue, California brome, meadow barley, slender hairgrass, large-leaved collomia (*Collomia grandiflora*), globe gilia, large-leaved lupine, and Canada goldenrod. By 2011, these grassland species provided excellent cover of the impermeable cap. Moss was present in localized areas where grasses and herbs did not become established. Small quantities of knapweed, thistle, skeletonweed (*Chondrilla juncea*), and dandelion (*Taraxacum officinale*) were present within the southwestern portion of this component and did not appear to be encroaching on desirable vegetation.

Summary. In general, the upland area appeared to be performing well in 2011 (baseline conditions) with the installed trees and shrubs looking healthy and spreading on the earthen cap component, shrubs being well established within the stormwater retention pond/drainage swale component, and good soil coverage and vegetative diversity on the impermeable cap component. Groundcover species provided excellent coverage of the ground, except for a few sections containing bare ground and the relatively bare understory in the pond area. Limited quantities of noxious weeds were observed in the upland area and were primarily limited to the southwestern edge of the impermeable cap component.

5.3 VEGETATION OBSERVATIONS IN 2022

On May 25, 2022, Haley & Aldrich inspected the upland cap to assess the current conditions as compared to the baseline conditions observed in June 2011. Qualitative data were recorded on species composition, cover and density of vegetation, and effectiveness of previous noxious weed treatments. Photograph

Stations during this inspection were paired with photographs from previous reports to provide an understanding of vegetation changes. Photograph Stations are shown on Figure 5-1. Species nomenclature and nativity follows U.S. Department of Agriculture standards (U.S. Department of Agriculture, 2023). Baseline and current observations are summarized below.

5.3.1 Riparian Area

Lower Component. In 2022, dominant species were similar to 2011 conditions with Oregon ash, cascara, Pacific ninebark, black twinberry and several willow species growing well. Much of the herbaceous layer was characterized by wildrye, fescue (*Festuca pratensis*), downy brome (*Bromus tectorum*), and a variety of forbs that came up from the seed bank. A small portion of this lower area was unintentionally burned in 2018. The fire top-killed many of the shrubs. The hawthorn, twinberry, elderberry, ninebark, snowberry, and cascara have re-sprouted, and no evidence of the fire is present. Many of the woody plants survived the fire. In 2019, the newly exposed soil of the burned area had a higher density of turnip (*Brassica rapa*). As expected, many of the perennial grasses have re-spouted and are now competing with the annual, non-native grasses. The turnip had primarily disappeared. No indications of stress were noted.

Small, localized areas of TRM are visible along the length of the lower edge of the TRM, but adventive vegetation is continuing to cover the areas since repairs were made in December 2015. A significant quantity of driftwood was observed along the entire length of the lower component of the riparian area. Large driftwood pieces continue to accumulate along the shoreline to the middle of the bank near the break between the upper and lower components. Canada thistle has been the most common noxious weed with some knapweed and common St. Johns-wort (*Hypericum perfoliatum*) also present. The invasive butterfly bush had established in this area but was successfully removed in 2020 using cutting and stem spraying with herbicide.

In 2017, herbicide application was successful at treating the black mustard (*Brassica nigra*), scotch broom (*Cytisus scoparius*), knapweed, and Canada thistle; however, some thistle and scotch broom was observed in the lower portion of the riparian area. No herbicide treatment was performed in 2018. In 2019, several noxious weeds in the area were sprayed including Canada and bull thistle (*Cirsium vulgare*), butterfly bush, and false indigo bush (*Amorpha fruticosa*). Shiny-leaf geranium (*Geranium lucidum*) was also noted within the articulated block of the riparian zone. After the 2019 herbicide application, the butterfly bush and false indigo were eliminated and the thistle population was reduced. One young false indigo was observed in the ACB in 2022. The thistles and scotch broom were also observed indicating that populations are encroaching onto the site. Noxious weeds will continue to be monitored and are discussed in more detail below.

Upper Component. In 2022, trees and shrubs in the upper component were well established and were healthy. The area is fully vegetated, completely recovered from the fires and other earlier stressors. Invasive species have been reduced through periodic herbicide treatments.

Since 2016, the riparian area was watered once or twice in the summer if drought conditions or stressed vegetation is observed. Ponderosa pine, madrone, Nootka rose, snowberry, Oregon-grape, hawthorn, and blue elderberry appeared well established and performing best within this area. Approximately 80 to 90 percent of the grand fir perished during the 2015 summer drought. This species was not the best suited for this community. In July 2018, a fire burned approximately 1 acre at the north end of the riparian area and reduced the woody biomass but did not kill many of the woody species. Following a period of dry weather and the fire in the riparian area, approximately 2,500 gallons of water was used on August 8,

2018, to avoid excessive late season drought stress that was experienced in 2015 and to a lesser degree in 2016.

In 2020, shrubby species like oceanspray, cascara, twinberry, and Pacific ninebark, all stump sprouted well and are surviving. Taller species like bigleaf maple and madrone had lower branches burned by the fire and are doing well; however, coniferous species such as cedar and fir were a total loss. The area vacated by these species is quickly being invaded by other native species, especially snowberry, elderberry, and roses. The woody species now established fits the Site conditions well and are expected to survive the natural disturbances (i.e., drought, occasional fire) and are not expected to need additional human maintenance (i.e., watering or seeding). The herbaceous species planted are doing well locally. In some of the areas, these species are being replaced by the native shrubs. Areas still dominated by herbaceous species are found in the more southern portion of this zone. In this area, checkermallow, large-leaved and sicklekeel lupine, horsetail (*Equisetum arvense*), self-heal, and many species of grasses are present. Overall, this zone is doing very well and is completely covered by primarily native species. Many of these native species that came up from the seed bank like horsetail, gumweed, several species of cudweed (*Pseudognaphalium* sp.), and poison-oak (*Toxicodendron diversilobum*) provide good wildlife value.

Several B-list noxious weeds were also found within this zone that include Canada thistle, two knapweeds (*Centaurea diffusa* and *C. stoebe*), Scotch broom, common St. John's-wort, tansy ragwort (*Senecio jacobaea*), and a small amount of Himalayan blackberry (*Rubus armeniacus*). Also found was tansy (*Tanacetum vulgare*), an invasive species not found on the Oregon Noxious Plant List (Oregon Department of Agriculture, 2020). Tansy was included in the Site list because it is invasive in character, has started to form large patches at the Site, and is included on other states' lists as a noxious plant. In 2020, a rudimentary survey of the 2019 herbicide application effectiveness showed mixed results. Scotch broom, Himalayan blackberry, tansy ragwort and the knapweeds were significantly decreased or eliminated. Other aggressive perennial species like the St. John's-wort, Canada thistle, and tansy were less effected by the treatment. Some of these species were found to have started to increase again in 2021 and continue to increase in 2022.

5.3.2 Upland Area

The upland area is divided into three components: the earthen cap; the stormwater retention pond/ drainage swale; and the impermeable cap (Figure 5-1). A variety of native trees, shrubs, and herbaceous species are present on the earthen cap as shown in Photographs C1 through C6 (Appendix C). The stormwater retention pond/drainage swale and the vegetation coverage on the impermeable cap are shown on Photographs C7 and C8, and Photographs C11 and C12, respectively (Appendix C).

Earthen Cap Component. In 2022, the area was observed to be fully vegetated with sporadic patches of trees and shrubs with nearly all the originally planted varieties present. Tree and shrub plantings on the earthen cap are healthy and growing well (Appendix C, Photographs C9 and C10). Ponderosa pine, Oregon grape, blue elderberry, lupine, rose and serviceberry continue to perform the best. Nootka rose dominates the northwest portion of the earthen cap. Herbaceous species provide full coverage of the ground. During the May 2022 site visit, gumweed, three species of lupine, mullein (*Verbascum thapsus*), Canada goldenrod, and many species of grasses dominated the earthen cap. No indications of significant stress were observed.

Scattered areas of noxious weeds were located during 2022, including spotted knapweed, tree of heaven, Canada thistle, bull thistle, tansy ragwort, skeletonweed, Scotch broom, medusahead rye, and Himalayan

blackberry. The latter three species are beginning to increase at the Site. Most of these were treated through herbicide application in 2019. In 2020, the tree of heaven, bull thistle, Himalayan blackberry, and knapweed were greatly reduced in coverage. The Canada thistle, knapweed and blackberry are tough to control, and are starting to rebound.

Stormwater Retention Pond/Drainage Swale Component. In 2022, dense shrub and tree thickets were found to the north and east of the pond. The shrub plantings established well, although many of the grasses and herbs in the pond area did not survive because the infiltration of surface runoff limits moisture and the understory is dominated by sand and bare ground. The pond depression is too dry for successful wetland vegetation that were previously planted. The depression is primarily vegetated by annual grasses: silver hairgrass (*Aira caryopyllea*) and annual fescue (*Vulpia myuros*). A good shrubby edge around the pond and swale was present of Sitka and piper's willow up to 15-feet tall (Appendix C, Photographs C7 and C8), red-osier dogwood, black cottonwood, snowberry. The butterfly bush was sprayed in 2019. This was successfully eliminated from this area in 2020.

Impermeable Cap Component. In 2022, barley, hair grass, and lupine have performed the best of the species seeded in 2011. A recent survey of this area found these dominant species along with gumweed, velvet grass (*Holcus lantana*), sweet vernal grass (*Anthroxanthum odoratum*), and downy brome. Small populations of noxious weeds were present, including spotted knapweed, Canada and bull thistle, and skeletonweed. Larger populations of the B-listed noxious weed, medusahead rye, was in the more disturbed areas of the cap and along paths. This annual would be hard to eliminate and would be best controlled by an increased dominance of perennials. Spot treatment of knapweed and the two thistles in 2019 were able to reduce their presence without creating bare ground areas.

5.4 VEGETATION MAINTENANCE ACTIVITIES

The general planting goals continue to be met. A preventive control approach continues to be implemented as part of an ongoing effort to inhibit the spread of noxious weed species. Spot spraying was last completed over the entire Site in June 2019. This followed weed suppression efforts in spring and fall of 2016 and spot treatment of the Site in 2017. No herbicide treatment was applied in 2018, 2020, 2021 or 2022. Weed treatment will likely be needed in 2023 to prevent increases in noxious weed populations.

Due to exceptionally dry summer conditions, irrigation water was applied in the riparian area to help alleviate stressed vegetation in 2015, 2016, and 2017. In 2018, as a precautionary measure and to encourage plant growth in areas damaged by the July 2018 fire, one watering event was completed in August 2018. No watering events were needed in 2021 or 2022 due to the well-established plants and sporadic summer rainfall. As vegetation becomes well established in this area, watering events should be discontinued for the riparian area.

5.5 VEGETATION PERFORMANCE SUMMARY

Overall, the tree, shrub, and herbaceous plantings are well established and are spreading throughout the Site. Most of the woody vegetation that was planted or that came in through natural corridors is native. Much of the stormwater retention pond remains vegetated by non-native annual grasses or is unvegetated. Native willow and black cottonwood are growing in and around the depression and are spreading. Herbaceous and woody species are providing excellent coverage for the rest of the Site. Noxious weed coverage was reduced by the 2017 spring herbicide application, and again in 2019. During 2019, more B-listed noxious species were identified and treated than in 2017. The vegetation has

rebounded from the fires in 2018, and these areas have been observed to become fully vegetated in 2020 without the need for additional intervention. In May 2022 there were no significant changes in overall vegetation. The summer of 2021 had record high temperatures for the region that occurred after the yearly monitoring. It is expected that some signs of this extreme heat will be seen as dead branches or dead branch tips (new seasonal growth), and dead seedling trees. No signs of this extreme heat continued into the 2022 season and no replanting will be necessary. The maturing vegetation community is tolerant of such a disturbance and would persist through these extremely high temperatures. No new noxious weed species were observed in 2022. Also, noxious plant species will be monitored to determine if another round of herbicide treatments is necessary. The vegetation community will continue to be inspected in 2023, with the next inspection in May or June.

6. Summary of Overall Remedy Performance

Overall, the 2022 soil and sediment cap observations and inspections, and groundwater and NAPL level monitoring revealed no significant change in remedy performance or areas of concern. The remedy continues to perform as designed and is protective of human health and the environment.

7. Summary of Planned Activities for 2023

Table 7-1 presents the soil cap O&M activities planned through 2027. Soil cap O&M activities in 2023 will consist primarily of quarterly inspections and routine maintenance. Semiannual inspections will continue in 2023 to assess and monitor vegetation planting areas, species identification (native, non-native, and invasive), growth, density, and general coverage throughout the Site. The need for noxious weed control activities will be evaluated based on site and vegetation inspections; however, an herbicide event will likely be needed in 2023. Woody species have become established and appear able to weather periodic drought conditions that occur during summer seasons. As a result, watering events will be discontinued in 2023. However, if woody species experience drought significant enough to affect their health, the resumption of watering events will be evaluated.

Table 7-2 presents the sediment cap O&M activities planned through 2027. In 2023, routine activities will include quarterly inspections and routine maintenance, and cleanup of riparian area trash and dumpsites (if present). Non-routine activities to be performed in 2023 will include a Willamette Cove ACB unconformities assessment with future recommendations.

Groundwater O&M activities through September 2027 are summarized in Table 7-3. In 2023, routine activities will include quarterly inspections and semi-annual gauging of Site monitoring wells. Routine maintenance of the data logger transducers and barometric pressure transducers are also included as elements of groundwater O&M. EPA also performed a groundwater sampling event in the spring of 2023 to collect additional groundwater data separate from O&M activities to be performed at the site. EPA's groundwater sampling activities will be documented in reports to be prepared by EPA.

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TABLES

Table 2-1
Soil Cap O&M Activities in 2022
McCormick & Baxter Superfund Site
Portland, Oregon

O&M Activity	Frequency in 2022
Visual Inspections:	
Cap surface	March, June, September, December
Subsidence near EW-1s	March, June, September, December
Stormwater conveyance system	March, June, September, December
Security fencing	March, June, September, December
Warning signs	March, June, September, December
Abundance and survival of vegetation	March, May, June, September, December
Routine Maintenance and Monitoring:	
Manual removal of weeds and invasive plants	None
Targeted application of herbicides	None
Non-Routine Maintenance:	
"Art installation" removal from riparian zone	June
Replace cut locks	None
Utilities Service:	
Water (Backflow Testing)	September

Table 3-1
Sediment Cap O&M Activities in 2022
McCormick & Baxter Superfund Site
Portland, Oregon

O&M Activity	Frequency in 2022
Visual Inspections (from shore):	
Warning buoys	March, June, September, December
Cap surface	March, June, September, December
Habitat quality	March, June, September, December
Routine Monitoring:	
Surface Water, Inter-armor Porewater, and Sub-armor Porewater sampling	None
Crayfish tissue sampling	None
Organoclay core sampling	None
Non-Routine Monitoring:	
Multibeam bathymetric surveys, side-scan sonar survey	None
Non-Routine Maintenance:	
Buoy replacment	May
TRM repairs	August
Shrub tree removal from ACB	September

Table 4-1: Groundwater and NAPL Elevations: 23 June 2022
2022 O&M Annual Report
McCormick & Baxter Superfund Site

Well ID	Date	Time	Measuring Point Elevation (ft NAVD88)	Depth to LNAPL (ft below MP)	Depth to water (ft below MP)	Depth to DNAPL (ft below MP)	LNAPL Thickness (ft)	DNAPL Thickness (ft)	Groundwater Elevation (ft NAVD88)	Groundwater Elevation LNAPL corrected (ft NAVD88)
EW-1s	6/23/2022	9:55	39.54	-	26.05	38.67	-	8.75	13.49	13.49
EW-2s	6/23/2022	13:00	42.40	-	24.21	-	-	-	18.19	18.19
EW-8s	6/23/2022	10:55	40.55	-	26.86	43.59	-	11.19	13.69	13.69
EW-10s	6/23/2022	12:35	29.59	-	12.19	41.25	-	1.54	17.40	17.40
EW-15s	6/23/2022	11:10	43.00	27.97	30.15	-	2.18	-	12.85	14.99
EW-18s	6/23/2022	10:20	40.79	-	27.20	41.30	-	3.41	13.59	13.59
EW-19s	6/23/2022	12:45	25.97	-	8.47	-	-	-	17.50	17.50
EW-23s	6/23/2022	11:30	37.64	23.21	24.31	-	1.10	-	13.33	14.41
MW-1r	6/23/2022	14:00	37.81	-	22.63	-	-	-	15.18	15.18
MW-7 WC	NA	NA	36.69	-	NA	-	-	-	--	-
MW-10r	6/23/2022	9:40	41.85	-	28.30	-	-	-	13.55	13.55
MW-15s	6/23/2022	15:13	43.41	-	29.35	-	-	-	14.06	14.06
MW-17s	6/23/2022	16:11	41.34	-	27.08	-	-	-	14.26	14.26
MW-20i	6/23/2022	12:10	41.72	-	24.50	67.60	-	7.38	17.22	17.22
MW-22i	6/23/2022	9:23	42.34	-	25.32	47.75	-	11.27	17.02	17.02
MW-23d	6/23/2022	15:58	40.81	-	23.82	-	-	-	16.99	16.99
MW-32i	6/23/2022	9:30	39.45	-	24.60	-	-	-	14.85	14.85
MW-34i	6/23/2022	16:18	32.82	-	15.75	-	-	-	17.07	17.07
MW-35r	6/23/2022	12:20	32.27	-	14.83	-	-	-	17.44	17.44
MW-36d	6/23/2022	9:54	30.59	-	13.39	-	-	-	17.20	17.20
MW-36i	6/23/2022	9:48	30.30	-	12.80	-	-	-	17.50	17.50
MW-36s	6/23/2022	9:42	30.62	-	15.32	-	-	-	15.30	15.30
MW-37d	6/23/2022	10:19	26.19	-	9.04	-	-	-	17.15	17.15
MW-37i	6/23/2022	10:15	26.07	-	8.56	-	-	-	17.51	17.51
MW-37s	6/23/2022	10:05	24.98	-	7.47	-	-	-	17.51	17.51
MW-38d	6/23/2022	10:47	31.96	-	14.50	-	-	-	17.46	17.46
MW-38i	6/23/2022	11:05	32.15	-	14.67	-	-	-	17.48	17.48
MW-38s	6/23/2022	11:55	32.41	-	16.90	-	-	-	15.51	15.51
MW-39d	6/23/2022	11:25	29.93	-	12.51	-	-	-	17.42	17.42
MW-39i	6/23/2022	11:30	30.18	-	12.81	-	-	-	17.37	17.37
MW-39s	6/23/2022	11:55	29.88	-	12.05	-	-	-	17.83	17.83

Please refere to notes at the end of the table.

Table 4-1: Groundwater and NAPL Elevations: 23 June 2022
2022 O&M Annual Report
McCormick & Baxter Superfund Site

Well ID	Date	Time	Measuring Point Elevation (ft NAVD88)	Depth to LNAPL (ft below MP)	Depth to water (ft below MP)	Depth to DNAPL (ft below MP)	LNAPL Thickness (ft)	DNAPL Thickness (ft)	Groundwater Elevation (ft NAVD88)	Groundwater Elevation LNAPL corrected (ft NAVD88)
MW-40d	6/23/2022	12:55	28.81	-	11.76	-	-	-	17.05	17.05
MW-40i	6/23/2022	12:49	28.92	-	11.50	-	-	-	17.42	17.42
MW-40s	6/23/2022	12:44	28.53	-	14.53	-	-	-	14.00	14.00
MW-41d	6/23/2022	13:15	27.56	-	10.24	-	-	-	17.32	17.32
MW-41i	6/23/2022	13:10	27.22	-	9.88	-	-	-	17.34	17.34
MW-41s	6/23/2022	13:05	27.96	-	10.18	-	-	-	17.78	17.78
MW-42d	6/23/2022	12:15	32.26	-	15.36	-	-	-	16.90	16.90
MW-42i	6/23/2022	13:40	32.67	-	15.79	-	-	-	16.88	16.88
MW-42s	6/23/2022	13:50	32.42	-	18.53	-	-	-	13.89	13.89
MW-43d	6/23/2022	14:00	28.57	-	11.15	-	-	-	17.42	17.42
MW-43i	6/23/2022	14:08	30.49	-	13.16	-	-	-	17.33	17.33
MW-43s	6/23/2022	14:12	31.24	-	13.42	-	-	-	17.82	17.82
MW-44d	6/23/2022	15:05	29.55	-	12.40	-	-	-	17.15	17.15
MW-44i	6/23/2022	15:02	29.47	-	12.47	-	-	-	17.00	17.00
MW-44s	6/23/2022	14:33	29.90	-	16.06	-	-	-	13.84	13.84
MW-45d	6/23/2022	14:47	28.12	-	10.95	-	-	-	17.17	17.17
MW-45i	6/23/2022	14:44	28.05	-	10.76	-	-	-	17.29	17.29
MW-45s	6/23/2022	14:50	28.20	-	10.83	-	-	-	17.37	17.37
MW-46s	6/23/2022	15:18	35.51	-	21.62	-	-	-	13.89	13.89
MW-47s	6/23/2022	15:13	35.56	-	17.63	-	-	-	17.93	17.93
MW-48s	6/23/2022	15:50	38.58	-	24.75	-	-	-	13.83	13.83
MW-49s	6/23/2022	15:45	37.61	-	17.66	-	-	-	19.95	19.95
MW-50s	6/23/2022	14:04	39.12	-	25.65	-	-	-	13.47	13.47
MW-51s	6/23/2022	14:12	39.54	-	20.19	-	-	-	19.35	19.35
MW-52s	6/23/2022	14:28	40.70	-	27.27	-	-	-	13.43	13.43
MW-53s	6/23/2022	14:34	40.42	-	21.60	-	-	-	18.82	18.82
MW-54s	6/23/2022	14:51	41.78	-	28.16	-	-	-	13.62	13.62
MW-55s	6/23/2022	14:59	41.09	-	22.65	-	-	-	18.44	18.44
MW-56s	6/23/2022	10:35	43.45	-	28.38	-	-	-	15.07	15.07
MW-57s	6/23/2022	15:25	42.01	-	24.09	-	-	-	17.92	17.92
MW-58d	6/23/2022	11:43	41.43	-	24.34	-	-	-	17.09	17.09

Please refere to notes at the end of the table.

Table 4-1: Groundwater and NAPL Elevations: 23 June 2022
2022 O&M Annual Report
McCormick & Baxter Superfund Site

Well ID	Date	Time	Measuring Point Elevation (ft NAVD88)	Depth to LNAPL (ft below MP)	Depth to water (ft below MP)	Depth to DNAPL (ft below MP)	LNAPL Thickness (ft)	DNAPL Thickness (ft)	Groundwater Elevation (ft NAVD88)	Groundwater Elevation LNAPL corrected (ft NAVD88)
MW-58i	6/23/2022	11:34	40.99	-	24.10	-	-	-	16.89	16.89
MW-58s	6/23/2022	11:26	41.51	-	24.12	-	-	-	17.39	17.39
MW-59s	6/23/2022	15:38	35.85	-	16.63	-	-	-	19.22	19.22
MW-60d	6/23/2022	9:27	40.18	-	22.99	-	-	-	17.19	17.19
MW-61s	6/23/2022	10:15	43.65	-	25.63	-	-	-	18.02	18.02
MW-62i	6/23/2022	15:44	42.73	-	25.69	-	-	-	17.04	17.04
MW-As	6/23/2022	9:41	39.32	-	20.82	-	-	-	18.50	18.50
MW-Ds	6/23/2022	13:10	43.26	-	24.88	35.90	-	3.12	18.38	18.38
MW-Gs	6/23/2022	12:25	40.27	-	22.33	42.83	-	1.96	17.94	17.94
MW-Os	6/23/2022	13:17	40.96	-	21.84	-	-	-	19.12	19.12
PW-1d	6/23/2022	13:40	44.05	-	29.26	-	-	-	14.79	14.79
PW-2d	6/23/2022	12:57	41.83	-	26.97	-	-	-	14.86	14.86

Notes:

LNAPL specific gravity estimated as 0.981 g/cm^3.
Corrected groundwater elevation = [LNAPL thickness * LNAPL specific gravity] + groundwater elevation

Abbreviations and Acronyms:

DNAPL = dense non-aqueous phase liquid
ft = foot or feet
g/cm^3 = gram per cubic centimeter
LNAPL = light non-aqueous phase liquid
MP = measuring point
NAVD88 = North American Vertical Datum of 1988
NA = not available, not measured, or anomalous data

Please refere to notes at the end of the table.

Table 4-2: Groundwater and NAPL Elevations: 22 September 2022
2022 O&M Annual Report
McCormick & Baxter Superfund Site

Well ID	Date	Time	Measuring Point Elevation (ft NAVD88)	Depth to LNAPL (ft below MP)	Depth to water (ft below MP)	Depth to DNAPL (ft below MP)	LNAPL Thickness (ft)	DNAPL Thickness (ft)	Groundwater Elevation (ft NAVD88)	Groundwater Elevation LNAPL corrected (ft NAVD88)
EW-1s	9/29/2022	9:10	39.54	-	26.50	38.81	-	8.61	13.04	13.04
EW-2s	9/29/2022	10:33	42.40	-	33.91	-	-	-	8.49	8.49
EW-8s	9/29/2022	9:35	40.55	-	27.76	52.84	-	1.94	12.79	12.79
EW-10s	9/29/2022	11:05	29.59	-	21.17	40.95	-	1.84	8.42	8.42
EW-15s	9/29/2022	10:15	43.00	32.04	40.21	--	8.17	-	2.79	10.80
EW-18s	9/29/2022	9:17	40.79	-	27.97	42.77	-	1.94	12.82	12.82
EW-19s	9/29/2022	11:15	25.97	-	17.69	-	-	-	8.28	8.28
EW-23s	9/29/2022	10:25	37.64	27.09	30.84	-	3.75	-	6.80	10.48
MW-1r	9/29/2022	12:20	37.81	-	26.46	-	-	-	11.35	11.35
MW-7 WC	NA	NA	36.69	-	NA	-	-	-	--	-
MW-10r	9/29/2022	9:00	41.85	29.16	29.80	-	0.64	-	12.05	12.68
MW-15s	9/29/2022	10:39	43.41	-	30.94	-	-	-	12.47	12.47
MW-17s	9/29/2022	11:29	41.34	-	29.19	-	-	-	12.15	12.15
MW-20i	9/29/2022	10:43	41.72	-	33.03	68.52	-	6.46	8.69	8.69
MW-22i	9/29/2022	8:50	42.34	-	33.75	51.79	-	7.23	8.59	8.59
MW-23d	9/29/2022	8:42	40.81	-	31.44	-	-	-	9.37	9.37
MW-32i	9/29/2022	12:44	39.45	-	28.23	-	-	-	11.22	11.22
MW-34i	9/29/2022	10:54	32.82	-	24.39	-	-	-	8.43	8.43
MW-35r	9/29/2022	14:13	32.27	-	23.18	-	-	-	9.09	9.09
MW-36d	9/29/2022	9:59	30.59	-	21.66	-	-	-	8.93	8.93
MW-36i	9/29/2022	10:45	30.30	-	21.65	-	-	-	8.65	8.65
MW-36s	9/29/2022	9:43	30.62	-	20.17	-	-	-	10.45	10.45
MW-37d	9/29/2022	10:17	26.19	-	17.47	-	-	-	8.72	8.72
MW-37i	9/29/2022	10:39	26.07	-	17.45	-	-	-	8.62	8.62
MW-37s	9/29/2022	10:33	24.98	-	16.60	-	-	-	8.38	8.38
MW-38d	9/29/2022	11:02	31.96	-	23.46	-	-	-	8.50	8.50
MW-38i	9/29/2022	11:08	32.15	-	23.40	-	-	-	8.75	8.75
MW-38s	9/29/2022	11:15	32.41	-	21.37	-	-	-	11.04	11.04
MW-39d	9/29/2022	11:34	29.93	-	21.67	-	-	-	8.26	8.26
MW-39i	9/29/2022	11:27	30.18	-	21.83	-	-	-	8.35	8.35
MW-39s	9/29/2022	11:20	29.88	-	21.32	-	-	-	8.56	8.56

Please refere to notes at the end of the table.

Table 4-2: Groundwater and NAPL Elevations: 22 September 2022
2022 O&M Annual Report
McCormick & Baxter Superfund Site

Well ID	Date	Time	Measuring Point Elevation (ft NAVD88)	Depth to LNAPL (ft below MP)	Depth to water (ft below MP)	Depth to DNAPL (ft below MP)	LNAPL Thickness (ft)	DNAPL Thickness (ft)	Groundwater Elevation (ft NAVD88)	Groundwater Elevation LNAPL corrected (ft NAVD88)
MW-40d	9/29/2022	12:20	28.81	-	21.06	-	-	-	7.75	7.75
MW-40i	9/29/2022	12:15	28.92	-	20.45	-	-	-	8.47	8.47
MW-40s	9/29/2022	12:06	28.53	-	17.23	-	-	-	11.30	11.30
MW-41d	9/29/2022	12:45	27.56	-	19.66	-	-	-	7.90	7.90
MW-41i	9/29/2022	12:38	27.22	-	19.20	-	-	-	8.02	8.02
MW-41s	9/29/2022	12:30	27.96	-	19.57	-	-	-	8.39	8.39
MW-42d	9/29/2022	13:06	32.26	-	24.54	-	-	-	7.72	7.72
MW-42i	9/29/2022	13:09	32.67	-	24.80	-	-	-	7.87	7.87
MW-42s	9/29/2022	13:14	32.42	-	19.82	-	-	-	12.60	12.60
MW-43d	9/29/2022	13:24	28.57	-	20.72	-	-	-	7.85	7.85
MW-43i	9/29/2022	13:21	30.49	-	22.66	-	-	-	7.83	7.83
MW-43s	9/29/2022	13:14	31.24	-	22.99	-	-	-	8.25	8.25
MW-44d	9/29/2022	13:47	29.55	-	21.74	-	-	-	7.81	7.81
MW-44i	9/29/2022	14:08	29.47	-	21.50	-	-	-	7.97	7.97
MW-44s	9/29/2022	14:05	29.90	-	16.93	-	-	-	12.97	12.97
MW-45d	9/29/2022	14:15	28.12	-	20.42	-	-	-	7.70	7.70
MW-45i	9/29/2022	14:30	28.05	-	20.46	-	-	-	7.59	7.59
MW-45s	9/29/2022	14:23	28.20	-	19.99	-	-	-	8.21	8.21
MW-46s	9/29/2022	14:55	35.51	-	22.76	-	-	-	12.75	12.75
MW-47s	9/29/2022	15:05	35.56	-	27.27	-	-	-	8.29	8.29
MW-48s	9/29/2022	16:00	38.58	-	24.39	-	-	-	14.19	14.19
MW-49s	9/29/2022	16:05	37.61	-	20.15	-	-	-	17.46	17.46
MW-50s	9/29/2022	9:03	39.12	-	25.92	-	-	-	13.20	13.20
MW-51s	9/29/2022	9:06	39.54	-	22.18	-	-	-	17.36	17.36
MW-52s	9/29/2022	10:07	40.70	-	28.02	-	-	-	12.68	12.68
MW-53s	9/29/2022	10:23	40.42	-	24.11	-	-	-	16.31	16.31
MW-54s	9/29/2022	12:19	41.78	-	29.19	-	-	-	12.59	12.59
MW-55s	9/29/2022	12:14	41.09	-	28.04	-	-	-	13.05	13.05
MW-56s	9/29/2022	11:53	43.45	-	32.15	-	-	-	11.30	11.30
MW-57s	9/29/2022	11:57	42.01	-	32.87	-	-	-	9.14	9.14
MW-58d	9/29/2022	13:43	41.43	-	33.98	-	-	-	7.45	7.45

Please refere to notes at the end of the table.

Table 4-2: Groundwater and NAPL Elevations: 22 September 2022
2022 O&M Annual Report
McCormick & Baxter Superfund Site

Well ID	Date	Time	Measuring Point Elevation (ft NAVD88)	Depth to LNAPL (ft below MP)	Depth to water (ft below MP)	Depth to DNAPL (ft below MP)	LNAPL Thickness (ft)	DNAPL Thickness (ft)	Groundwater Elevation (ft NAVD88)	Groundwater Elevation LNAPL corrected (ft NAVD88)
MW-58i	9/29/2022	13:30	40.99	-	33.02	-	-	-	7.97	7.97
MW-58s	NA	NA	41.51	-	NA	-	-	-	--	-
MW-59s	9/29/2022	16:15	35.85	-	21.62	-	-	-	14.23	14.23
MW-60d	9/29/2022	9:00	40.18	-	30.91	-	-	-	9.27	9.27
MW-61s	9/29/2022	13:04	43.65	-	30.30	-	-	-	13.35	13.35
MW-62i	9/29/2022	11:09	42.73	-	34.37	-	-	-	8.36	8.36
MW-As	9/29/2022	12:48	39.32	-	22.43	-	-	-	16.89	16.89
MW-Ds	9/29/2022	11:25	43.26	-	34.39	34.40	-	4.62	8.87	8.87
MW-Gs	9/29/2022	10:53	40.27	-	31.85	42.82	-	1.97	8.42	8.42
MW-Os	9/29/2022	9:33	40.96	-	23.57	-	-	-	17.39	17.39
PW-1d	9/29/2022	9:46	44.05	-	32.95	-	-	-	11.10	11.10
PW-2d	9/29/2022	9:27	41.83	-	30.64	-	-	-	11.19	11.19

Notes:

LNAPL specific gravity estimated as 0.981 g/cm^3.
Corrected groundwater elevation = [LNAPL thickness * LNAPL specific gravity] + groundwater elevation

Abbreviations and Acronyms:

DNAPL = dense non-aqueous phase liquid
ft = foot or feet
g/cm^3 = gram per cubic centimeter
LNAPL = light non-aqueous phase liquid
MP = measuring point
NAVD88 = North American Vertical Datum of 1988
NA = not available, not measured, or anomalous data

Table 4-3
Groundwater O&M Activities in 2022
McCormick & Baxter Superfund Site
Portland, Oregon

O&M Activity	Frequency in 2022
NAPL Monitoring:	
Manual gauging of site wells	June, September
Groundwater Monitoring:	
Groundwater Sampling (by EPA from select wells)	April
Downloading continuous water level data from transducers	June, September
Manual water level measurements from site wells	June, September
Routine Maintenance of Equipment:	
Transducers	June, September
Non-Routine Maintenance:	
Changed batteries in transducers (as needed)	June, September

Table 7-1
Soil Cap O&M Activities Planned through 2027
McCormick & Baxter Superfund Site
Portland, Oregon

O&M Activity	Frequency
Visual Inspections:	
Cap surface	Quarterly
Subsidence near EW-1s	Quarterly
Stormwater conveyance system	Quarterly
Security fencing	Quarterly
Warning signs	Quarterly
Abundance and survival of vegetation	Quarterly
Routine Maintenance and Monitoring:	
Manual removal of invasive plants	Semiannually, if necessary
Targeted application of herbicides	Semiannually, if necessary
Non-Routine Maintenance:	
Repairs of fence	As needed
Replacement of warning signs	As needed
Repairs of gravel roads	As needed
Filling of potential animal burrow into the earthen cap	As needed
Removing sediments from manholes	As needed
Irrigation	As needed
Replanting unsuccessful trees and shrubs	As needed
Utilities Service:	
Water, electric, and solid waste	Continuous

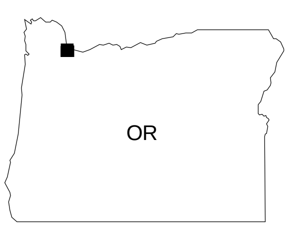
Table 7-2
Sediment Cap O&M Activities Planned through 2027
McCormick & Baxter Superfund Site
Portland, Oregon

O&M Activity	Frequency
Visual Inspections (from shore):	
Warning buoys	Quarterly
Cap surface	Quarterly
Habitat quality	Annually
Routine Monitoring:	
Water column and inter-armoring water sampling	Every 5 years (next event in 2025)
Organoclay core sampling	Not performed in 2020; additional sampling will be reconsidered during subsequent Five Year Reviews.
Non-Routine Monitoring:	
Multibeam bathymetric surveys, side-scan sonar survey	After unforeseen natural event, if needed; Every 10 years, starting in 2020
Diver inspection	Every 10 years, starting in 2020; after bathymetry, if necessary
Non-Routine Maintenance:	
Replacement of buoys	As needed
Additional armoring placement	After unforeseen natural event, if needed; As needed based on inspections
Additional organoclay capping	As needed
Articulated concrete block grouting or armoring void space maintenance (habitat gravel)	Every 5 years , or as needed based on site inspections

Table 7-3
Groundwater O&M Activities Planned through 2027
McCormick & Baxter Superfund Site
Portland, Oregon

O&M Activity	Frequency
NAPL Monitoring:	
Manual gauging of site wells	Semiannually
Manual extraction from exterior wells	None
Groundwater Monitoring:	
Downloading continuous water level data from transducers	Semiannually
Manual water level measurements from site wells	Semiannually
Groundwater Sampling:	
Site-wide	Frequency to be determined
Infiltration pond (MW-59s)	Fall 2025 (every 5 years)
Routine Maintenance of Equipment:	
Interface probes, pumps, vehicle, data loggers / transducers, etc.	As needed

FIGURES



MAP SOURCE: ESRI
SITE COORDINATES: 45°34'43"N, 122°44'24"W

HALEY ALDRICH

GSI Water Solutions, Inc.

MCCORMICK & BAXTER SUPERFUND SITE
6900 N EDGEWATER STREET
PORTLAND, OREGON

VICINITY MAP

APPROXIMATE SCALE: 1 IN = 2000 FT
MARCH 2022

FIGURE 1-1

GIS: \\haleyaldrich.com\share\pdx_data\Notebooks\150002005_DEQ_McCormick_and_Baxter_Soil_and_Sed_O_and_M\GIS\150002005_01-1_VicinityMap.mxd - khensen - 3/23/2022 9:46:25 AM

SUPPORT FACILITY
(ASPHALT PAVEMENT)

UNION PACIFIC RAILROAD

BNSF RAILWAY

WILLAMETTE COVE

WILLAMETTE RIVER

RIPRAP AND 10" MINUS ROCK
OVER SAND PLACED AT SCOUR
HOLE AROUND BRIDGE PIER

1
2
3
4
5

LEGEND

- BUOY LOCATIONS
- SUBSURFACE BARRIER WALL
- SEDIMENT CAP BOUNDARY
- GRANULAR ORGANOCLAY
- ORGANOCLAY MAT (DOUBLE LAYER)
- ORGANOCLAY MAT (SINGLE LAYER)
- HOT SPOT TREATMENT (THICKENED SAND LAYER)
- BOULDER CLUSTERS/ROCK MOUND
- RIPRAP ARMOR
- ARTICULATED CONCRETE BLOCK
- 6-INCH MINUS ROCK ARMOR
- 10-INCH MINUS ROCK ARMOR
- IMPERMEABLE CAP
- EARTHEN SOIL CAP BOUNDARY

NOTES

1. ALL FEATURES ARE APPROXIMATE
2. AERIAL IMAGERY SOURCE: NEARMAP, 13 APRIL 2021

0 250 500
SCALE IN FEET

HALEY ALDRICH

GSI Water Solutions, Inc.

MCCORMICK & BAXTER SUPERFUND SITE
6900 N EDGEWATER STREET
PORTLAND, OREGON

CURRENT SITE LAYOUT AND FEATURES

MARCH 2022

FIGURE 1-2

GIS: \\haleyaldrich.com\share\pdx_data\Notebooks\150002005_DEQ_McCormick_and_Baxter_Soil_and_Sed_O_and_M\GIS\150002005_01-2_SitePlan.mxd - khensen - 3/28/2022 1:49:53 PM

LEGEND

- Stormwater Discharge Manhole
- Underground Storm Drain Line
- Elevation Contour, 1 ft. Interval (NAVD 88)
- Riparian Area (Vegetated)
- Sediment Cap Boundary
- Earthen Soil Cap Boundary
- Subsurface Barrier Wall
- Impermeable Cap

PROPERTY LINE

FENCE (TYP.)

UNION PACIFIC RAILROAD

GRAVEL ROAD

PERFORATED COLLECTION PIPING

SDMH-A

SDMH-B

SDMH-C

SDMH-D

SDMH-E

HIGH POINT

DRAINAGE SYSTEM

INFILTRATION POND

12" MINUS ROCK

8" CORRUGATED HDPE (HIGH DENSITY POLYETHYLENE)

12" PVC OUTFALL

SPILLWAY

BNSF RAILWAY

ROCK PILE

SAND PILE

DSL EASEMENT (#31530-EA)

WILLAMETTE COVE

WILLAMETTE RIVER

0 200 400

SCALE IN FEET

NOTES

1 BATHYMETRIC SURVEY CONDUCTED BY DAVID EVANS AND ASSOCIATES, INC., 2018.

2. UPLAND SITE SURVEYED BY WESTLAKE CONSULTANTS, 09/18/2019.

3. HORIZONTAL DATUM: NORTH AMERICAN DATUM OF 1983 - 91 ADJ. (NAD83/91), STATE PLANE COORDINATE SYSTEM, OREGON NORTH ZONE. UNITS: INTERNATIONAL FEET.

4. VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88)

5. CONTOUR INTERVAL: ONE-FOOT. BATHYMETRIC CONTOURS WERE DERIVED FROM A DIGITAL TERRAIN MODEL BASED ON A 3-FOOT GRID OF MULTIBEAM DATA.

6. ALL FEATURES ARE APPROXIMATE.

HALEY ALDRICH

GSI Water Solutions, Inc.

MCCORMICK & BAXTER SUPERFUND SITE
6900 N EDGEWATER STREET
PORTLAND, OREGON

SITE CAPPING COMPONENTS

MARCH 2022

FIGURE 1-3

GIS: \\haleyaldrich.com\share\pdx_data\Notebooks\150002005_DEQ_McCormick_and_Baxter_Soil_and_Sed_O_and_M\GIS\150002005_01-3_SITE_CAPPING_COMPONENTS.mxd - khensen - 3/28/2022 2:02:01 PM

LEGEND

- ELEVATION CONTOUR, 1 FT. INTERVAL (NAVD 88)
- BOULDER CLUSTERS/ROCK MOUND
- RIPRAP ARMOR
- GRANULAR ORGANOCLAY
- ORGANOCLAY MAT (DOUBLE LAYER)
- ORGANOCLAY MAT (SINGLE LAYER)
- HOT SPOT TREATMENT (THICKENED SAND LAYER)
- ARTICULATED CONCRETE BLOCK
- 6-INCH MINUS ROCK ARMOR
- 10-INCH MINUS ROCK ARMOR
- TURF REINFORCEMENT MAT OVER EARTHERN CAP
- SEDIMENT CAP BOUNDARY
- EARTHEN SOIL CAP BOUNDARY
- SUBSURFACE BARRIER WALL
- IMPERMEABLE CAP

PROPERTY LINE
FENCE (TYP.)
UNION PACIFIC RAILROAD
GRAVEL ROAD
PERFORATED COLLECTION PIPING
BURLINGTON NORTHERN RALROAD
SDMH-A
SDMH-B
SDMH-C
SDMH-D
SDMH-E
STORM DRAIN SAG 1
STORM DRAIN SAG 2
HIGH POINT
DRAINAGE SYSTEM
INFILTRATION POND
12" MINUS ROCK
8" CORRUGATED HDPE (HIGH DENSITY POLYETHYLENE)
12" PVC OUTFALL
SPILLWAY
ROCK PILE
SAND PILE
DSL EASEMENT (#31530-EA)
WILLAMETTE COVE
WILLAMETTE RIVER

0 200 400
SCALE IN FEET

NOTES

1 BATHYMETRIC SURVEY CONDUCTED BY DAVID EVANS AND ASSOCIATES, INC., 2018.

2. UPLAND SITE SURVEYED BY WESTLAKE CONSULTANTS, 09/18/2019.

3. HORIZONTAL DATUM: NORTH AMERICAN DATUM OF 1983 - 91 ADJ. (NAD83/91), STATE PLANE COORDINATE SYSTEM, OREGON NORTH ZONE. UNITS: INTERNATIONAL FEET.

4. VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88)

5. CONTOUR INTERVAL: ONE-FOOT. BATHYMETRIC CONTOURS WERE DERIVED FROM A DIGITAL TERRAIN MODEL BASED ON A 3-FOOT GRID OF MULTIBEAM DATA.

6. ADDITIONAL ROCK WAS PLACED AT THE 6" MINUS ROCK PLACEMENT AREAS ON 06/26/2007. THESE AREAS HAVE NOT BEEN SURVEYED AND THE CONTOURS OF THIS FIGURE DO NOT REFLECT THE ADDITIONAL ROCK PLACEMENT.

7. ALL FEATURES ARE APPROXIMATE.

HALEY ALDRICH
GSI Water Solutions, Inc.

MCCORMICK & BAXTER SUPERFUND SITE
6900 N EDGEWATER STREET
PORTLAND, OREGON

CURRENT SITE LAYOUT WITH SURFACE ELEVATIONS

MARCH 2022

FIGURE 1-4

GIS: \\haleyaldrich.com\share\pdx_data\Notebooks\150002005_DEQ_McCormick_and_Baxter_Soil_and_Sed_O_and_M\GIS\150002005_01-4_CURRENT_SITE_LAYOUT_WITH_SURFACE_ELEVATIONS.mxd - khensen - 3/28/2022 2:10:23 PM

LEGEND

- OUTFALL
- FENCE
- SHORELINE
- FORMER FEATURE
- HISTORICAL CONTAMINANT SOURCE AREA

Residential Area

Site Entrance

North Edgewater Street

Bunker Oil Area

Parking Lot

Treated Log Storage

Treated Log Storage

Office

Paint Shed

Gravel Driveway

Central Process Area

Water Treatment Plant

Retort 2 Pit

Retort 1 Pit

Lab

Former Tank Farm

Butt Tank 1

Southeast Disposal Trench Area

Stacker Shed

Butt Tank 1

Retort 3 Pit

Cellon Wash Area

Tank Farm Area (TFA)

Treated Log Storage

Framing Shed

Retort 4 Pit

PCP Mixing Shed

Former Creosote Tank 4

UNION PACIFIC RAILROAD

BNSF RAILWAY

Former Disposal Location

Rail Spurs

Former Waste Disposal Area (FWDA)

OUTFALL 001 (Former Cooling Water)

OUTFALL 003 (Stormwater)

OUTFALL 004 (Stormwater)

OUTFALL 002 (Stormwater Treated Water)

Sandy Beach

Creosote Dock

WILLAMETTE COVE

WILLAMETTE RIVER

0 200 400

SCALE IN FEET

HALEY ALDRICH

GSI Water Solutions, Inc.

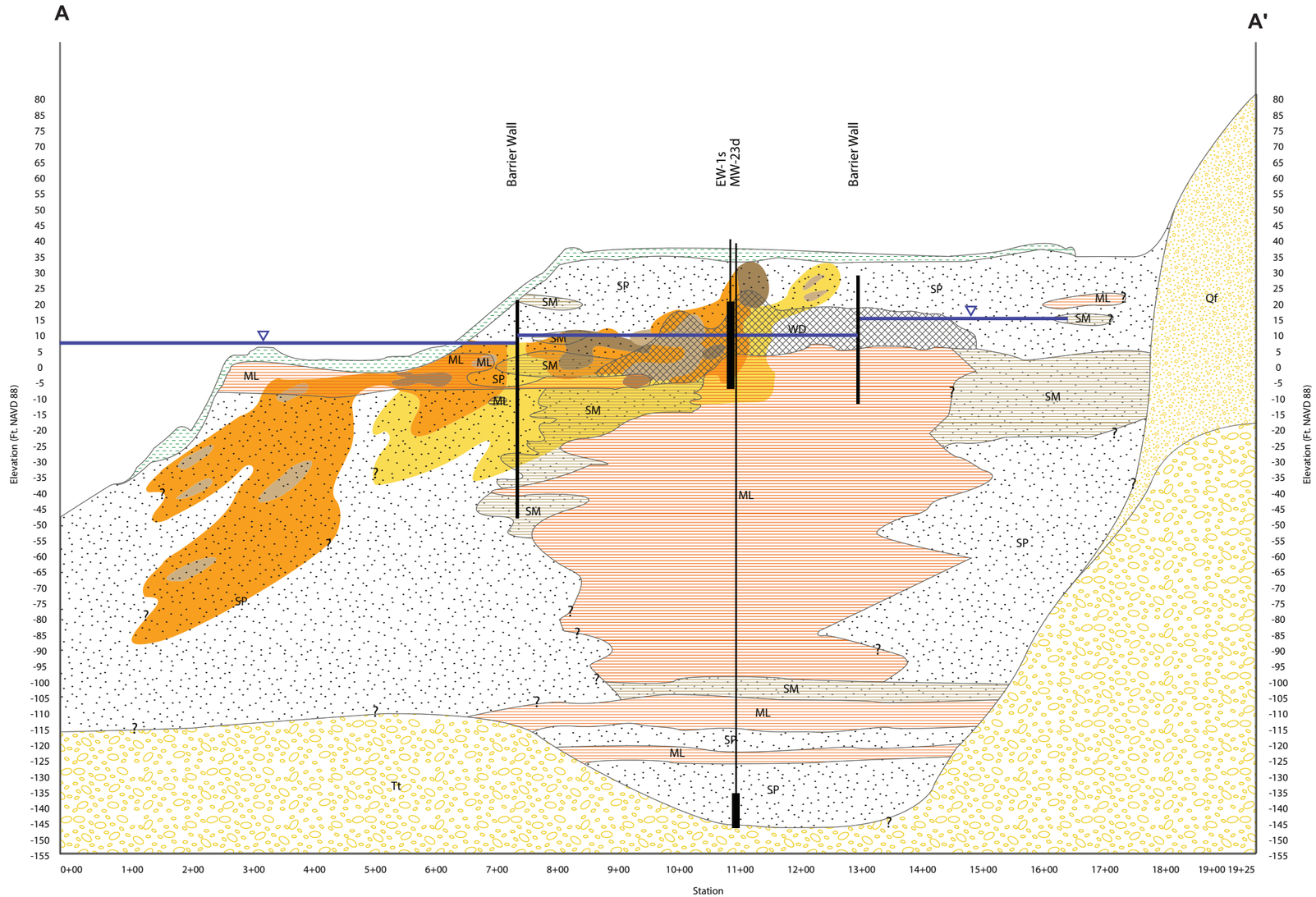
MCCORMICK & BAXTER SUPERFUND SITE
6900 N EDGEWATER STREET
PORTLAND, OREGON

HISTORICAL CONTAMINANT SOURCE AREAS

MARCH 2022

FIGURE 1-5

GIS: \\haleyaldrich.com\share\ptx_data\Notebooks\1500\02005_DEQ_McCormick_and_Baxter_Soil_and_Sed_O_and_M\GIS\1500\02005_001-5_HISTORICAL_CONTAMINANT_SOURCE_AREAS.mxd - khensen - 3/23/2022 9:34:43 AM



LEGEND

- SP- Sand, Fine to Medium, Poorly Graded
- SM- Silt Sand, or Thin Interbeds of Silt and Sand
- ML- Clayey Silt or Silty Clay
- WD- Wood Debris, Chips or Sawdust Occasionally
- Qf- Catastrophic Flood Deposits Consisteing of Gravels and Sands
- Tt- Troutdale Formation
- Sediment/Soil Cap
- Approximate Average Water Level 2008
- Creosote Odor
- Strong Creosote Odor
- Heavy Sheen
- Saturated

NOTE: Refer to Figure 1-4 for Plan View of Cross Section Location.

Horizontal Scale in Feet
0 200 400
0 40 80
Vertical Scale in Feet
Vertical Exaggeration = 5x

HALEY ALDRICH

MCCORMICK & BAXTER SUPERFUND SITE
6900 N EDGEWATER STREET
PORTLAND, OREGON

GSI Water Solutions, Inc.

HISTORICAL NAPL DISTRIBUTION CROSS SECTION

MARCH 2022

FIGURE 1-6

AI — AUTHOR: KHENSEN — OFFICE: XXX

LEGEND

- STORMWATER DISCHARGE MANHOLE
- VAULT BOX INSTALLED AT CLEANOUT
- MONITORING WELL
- BUOY LOCATION
- MISSING AND REPLACED BUOY
- BOULDER CLUSTERS/ROCK MOUND
- RIPRAP ARMOR
- GRANULAR ORGANOCLAY
- ORGANOCLAY MAT (DOUBLE LAYER)
- ORGANOCLAY MAT (SINGLE LAYER)
- HOT SPOT TREATMENT (THICKENED SAND LAYER)
- ARTICULATED CONCRETE BLOCK
- 6-INCH MINUS ROCK
- 10-INCH MINUS ROCK
- TURF REINFORCEMENT MAT OVER EARTHERN CAP
- SEDIMENT CAP BOUNDARY
- EARTHEN SOIL CAP BOUNDARY
- GRAVEL LAYER
- SUBSURFACE BARRIER WALL
- IMPERMEABLE CAP

REPAIRED CUT LOCK ON GATE
REPAIRED CUT LOCK ON GATE
PROPERTY LINE
FENCE (TYP.)
UNION PACIFIC RAILROAD
GRAVEL ROAD
PERFORATED COLLECTION PIPING
RODENT BURROW IDENTIFIED AND FILLED IN THIS AREA
REPAIRED CUT LOCK ON GATE
SDMH-A
STORM DRAIN SAG 1
STORM DRAIN SAG 2
SDMH-C
SDMH-D
DRAINAGE SYSTEM
INFILTRATION POND
SDMH-B
HIGH POINT
SDMH-E
12" MINUS ROCK
8" CORRUGATED HDPE (HIGH DENSITY POLYETHYLENE)
BNSF RAILWAY
ROCK PILE
12" PVC OUTFALL
SPILLWAY
HABITAT GRAVEL PILE
SAND PILE
COP OUTFALL
UNEVEN ACB
TRM REPAIR AREA
TRM REPLACEMENT REPAIR AREA
TREE REMOVAL FROM ACB AREA
DSL EASEMENT (#31530-EA)
WILLAMETTE RIVER
1
2
3
4
5
0
250
500
SCALE IN FEET

Location ID Figure 2.5	Buoy Label	Longitude			Latitude		
		Degree	Minute	Second	Degree	Minute	Second
1	Danger Rocks	-122	44	27.9115188	45	34	33.7505887
2	Danger Rocks	-122	44	34.6730244	45	34	36.3603940
3	Danger Rocks	-122	44	41.5979124	45	34	39.0343156
4	Danger Rocks	-122	44	47.5345212	45	34	43.8265931
5	Danger Rocks	-122	44	53.2295880	45	34	47.1865397

NOTES

1. ALL LOCATIONS ARE APPROXIMATE.
2. HORIZONTAL DATUM: NORTH AMERICAN DATUM OF 1983 - 91 ADJ. (NAD83/91), STATE PLANE COORDINATE SYSTEM, OREGON NORTH ZONE. UNITS: INTERNATIONAL FEET.
3. VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88)
4. AREIAL IMAGERY SOURCE: NEARMAP, 13 APRIL 2021

HALEY ALDRICH

GSI Water Solutions, Inc.

MCCORMICK & BAXTER SUPERFUND SITE
6900 N EDGEWATER STREET
PORTLAND, OREGON

SITE OBSERVATION SUMMARY

JULY 2023

FIGURE 2-1

G:\S:\haleyaldrich.com\share\pdx_data\Notebooks\150002005_DEQ_McCormick_and_Baxter_Soil_and_Sed_O_and_M\GIS\2023_06\150002005_02-1_SITE_OBSERVATION_SUMMARY.mxd - mschweitzer - 7/28/2023 11:46:12 AM

FIGURE 4-1

Groundwater Monitoring Well Location Map

McCormick & Baxter Superfund Site
Portland, Oregon

LEGEND

- Groundwater Monitoring Well
- Groundwater Monitoring Well with Transducer
- Subsurface Barrier Wall

Date: April 7, 2023
Data Sources: City of Portland Imagery (Summer 2022)

N

0 100 200 300
Feet

HALEY ALDRICH

GSI Water Solutions, Inc.

Document Path: Y:\2060_McCormick_Baxter\Source_Figures\002_GW_Remedy\2022_Annual_Report\Figure4-1_Monitoring_Well_Location_Map.mxd

FIGURE 4-2

Groundwater Contour Map for June 2022 Monitoring Event

McCormick & Baxter Superfund Site
Portland, Oregon

LEGEND

- Shallow Groundwater Monitoring Well
- Groundwater Monitoring Well with Transducer
- Groundwater Elevation Contour (dashed where inferred)
- Willamette River Water Level During Sampling Event (17.27 feet)
- Subsurface Barrier Wall

NOTES

1. Groundwater elevation measurements collected at wells screened in the shallow water table. See tables for groundwater elevations at intermediate and deep intervals.
2. Elevations shown in NAVD88.
3. Aerial photo taken summer of 2022.
4. Water levels measured between 9:00 a.m. and 4:30 p.m on 6/23/2022.
5. Willamette River at 2:30 p.m. elevation: 17.27 feet NAVD88.

NM = Not Measured

Date: May 8, 2023
Data Sources: City of Portland Imagery (Summer 2022)

N

0 100 200 300
Feet

HALEY ALDRICH

GSI Water Solutions, Inc.

Document Path: Y:\2060_McCormick_Baxter\Source_Figures\002_GW_Remedy\2022_Annual_Report\Figure4-2_GW_Elevations_June2022.mxd

FIGURE 4-3

Groundwater Contour Map for September 2022 Monitoring Event

McCormick & Baxter Superfund Site
Portland, Oregon

LEGEND

- Shallow Groundwater Monitoring Well
- Groundwater Monitoring Well with Transducer
- Groundwater Elevation Contour (dashed where inferred)
- Willamette River Water Level During Sampling Event (6.49 feet)
- Subsurface Barrier Wall

NOTES

1. Groundwater elevation measurements collected at wells screened in the shallow water table. See tables for groundwater elevations at intermediate and deep intervals.
2. Elevations shown in NAVD88.
3. Aerial photo taken summer of 2022.
4. Water levels measured between 9:00 a.m. and 4:30 p.m.
5. Willamette River low tide at 4:00 p.m. river elevation: 6.49 feet NAVD88.

NM = Not Measured

Date: May 8, 2023
Data Sources: City of Portland Imagery (Summer 2022)

N

0 100 200 300
Feet

HALEY ALDRICH

GSI Water Solutions, Inc.

Document Path: Y:\2060_McCormick_Baxter\Source_Figures\002_GW_Remedy\2022_Annual_Report\Figure4-3_GW_Elevations_Sept2022.mxd

Current Top of Wall elevation at 31.0 ft NAVD88

Elevation (feet NAVD88)

35
30
25
20
15
10
5
0

Daily Precipitation (inches)

10
8
6
4
2
0

10/1/2021
11/1/2021
12/1/2021
1/1/2022
2/1/2022
3/1/2022
4/1/2022
5/1/2022
6/1/2022
7/1/2022
8/1/2022
9/1/2022
10/1/2022

Legend

- MW-52s (Interior)
- MW-53s (Exterior)
- River
- Precipitation

Notes:
MW-52s is located inside the barrier wall and MW-53s is located outside the barrier wall.

Due to a pressure transducer failure, there is no data available for MW-53s until 6/17/2022, and there is no date for MW-52s after 08/22/2022. Data gaps in the Willamette River elevation are due to erroneous data.

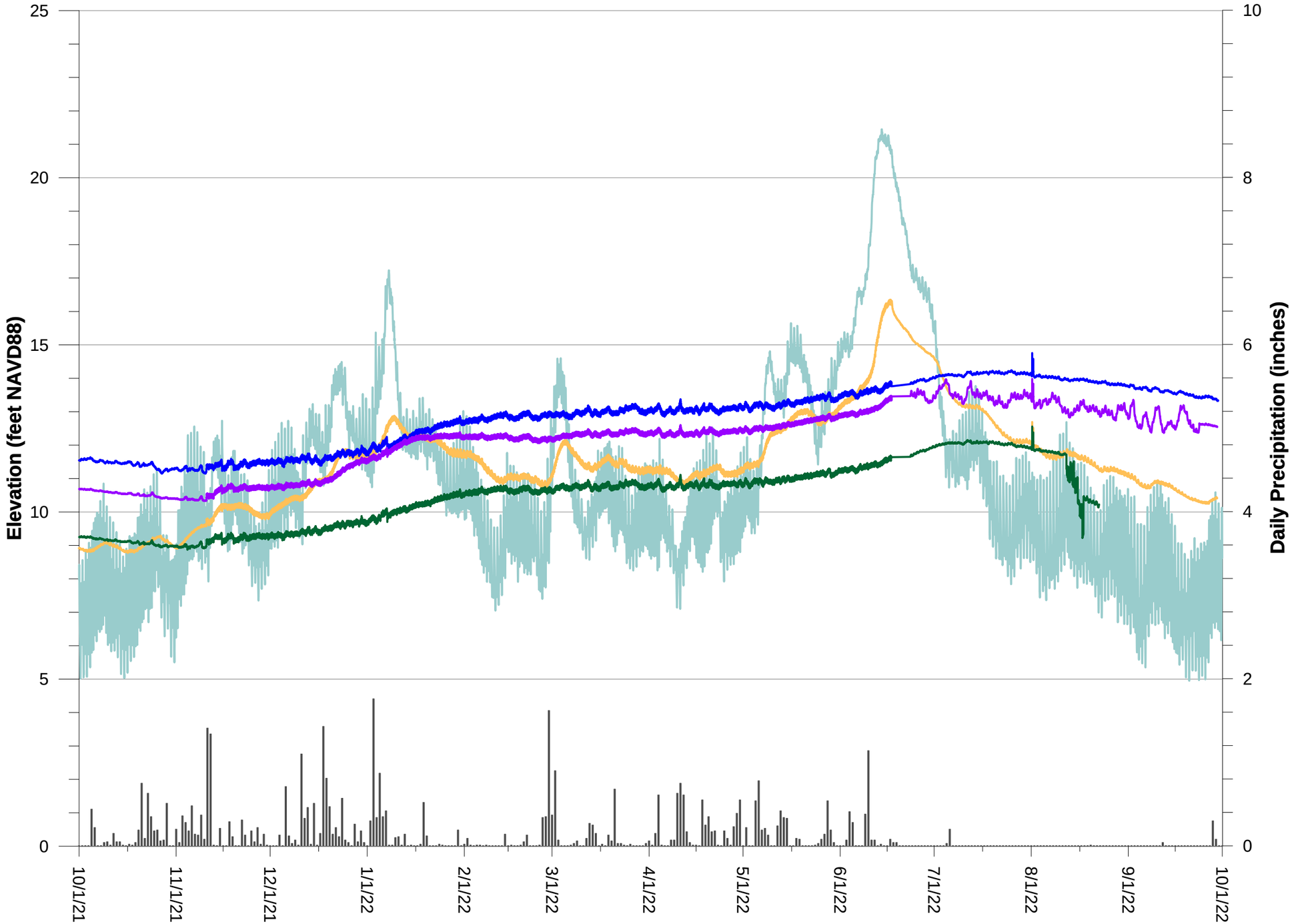
McCormick and Baxter Superfund Site
Portland, Oregon

2022 Groundwater Elevations in Monitoring Wells MW-52s and MW-53s

HALEY ALDRICH

GSI Water Solutions, Inc.

Figure
4-4



Legend

- EW-1s
- MW-36s
- MW-44s
- MW-52s
- River
- Precipitation

Notes:
Monitoring wells EW-1s, MW-36s, MW-44s, and MW-52s are located inside the barrier wall.

Due to a pressure transducer failure, there is no data for MW-52s after 08/22/2022. Data gaps in the Willamette River elevation are due to erroneous data.Data gaps in the Willamette River elevation are due to erroneous data.

McCormick and Baxter Superfund Site
Portland, Oregon

2022 Groundwater Elevations within the Barrier Wall

HALEY ALDRICH

GSI Water Solutions, Inc.

Figure

4-5

Current Top of Wall Elevation at 22.15 ft NAVD88

Elevation (feet NAVD88)

25
20
15
10
5
0

Daily Precipitation (inches)

10
8
6
4
2
0

10/1/21
11/1/21
12/1/21
1/1/22
2/1/22
3/1/22
4/1/22
5/1/22
6/1/22
7/1/22
8/1/22
9/1/22

Legend

- MW-36s (Interior)
- MW-36d (Interior)
- MW-37s (Exterior)
- MW-37d (Exterior)
- River
- Precipitation

Notes:
MW-36 well cluster is located inside the barrier wall and MW-37 well cluster is located outside the barrier wall.

Data gaps in the Willamette River elevation are due to erroneous data.

Correction applied to MW-37D from 06/23/2022 - 09/29/2022 due to a disturbance to the transducer during the June download event.

McCormick and Baxter Superfund Site
Portland, Oregon

2022 Groundwater Elevations in Monitoring Wells MW-36 and MW-37

HALEY ALDRICH

GSI Water Solutions, Inc.

Figure

4-6

Current Top of Wall elevation at 23.35 ft NAVD88

Elevation (feet NAVD88)

Daily Precipitation (inches)

25
20
15
10
5
0

10
8
6
4
2
0

10/1/21
11/1/21
12/1/21
1/1/22
2/1/22
3/1/22
4/1/22
5/1/22
6/1/22
7/1/22
8/1/22
9/1/22
10/1/22

Legend

- MW-44s (Interior)
- MW-44d (Interior)
- MW-45s (Exterior)
- MW-45d (Exterior)
- River
- Precipitation

Notes:
MW-44 well cluster is located inside the barrier wall and MW-45 well cluster is located outside the barrier wall.

Data gaps in the Willamette River elevation are due to erroneous data.

Correction applied to MW-45D from 06/22/2022 - 09/21/2022 due to a disturbance to the transducer during the June download event.

McCormick and Baxter Superfund Site
Portland, Oregon

2022 Groundwater Elevations in Monitoring Wells MW-44 and MW-45

HALEY ALDRICH

GSI Water Solutions, Inc.

Figure
4-7

FIGURE 4-8

Measureable LNAPL and DNAPL Distribution Map for June 2022 Sampling Event

McCormick & Baxter Superfund Site
Portland, Oregon

LEGEND

- Subsurface Barrier Wall

Groundwater Monitoring Wells (Thickness, feet, of LNAPL or DNAPL)

- Well with Measureable LNAPL
- Well with Measureable DNAPL
- Well without Measureable LNAPL or DNAPL

Date: April 28, 2023
Data Sources: City of Portland Imagery (Summer 2021)

N

0 100 200 300
Feet

HALEY ALDRICH

GSI Water Solutions, Inc.

Document Path: Y:\2060_McCormick_Baxter\Source_Figures\002_GW_Remedy\2022_Annual_Report\Figure4-8_LNAPL_and_DNAPL_Map_June2022.mxd

FIGURE 4-9

Measureable LNAPL and DNAPL Distribution Map for September 2022, Sampling Event

McCormick & Baxter Superfund Site
Portland, Oregon

LEGEND

- Subsurface Barrier Wall

Groundwater Monitoring Wells (Thickness, feet, of LNAPL or DNAPL)

- Well with Measureable LNAPL
- Well with Measureable DNAPL
- Well without Measureable LNAPL or DNAPL

Date: April 28, 2023
Data Sources: City of Portland Imagery (Summer 2022)

N

0 100 200 300
Feet

HALEY ALDRICH

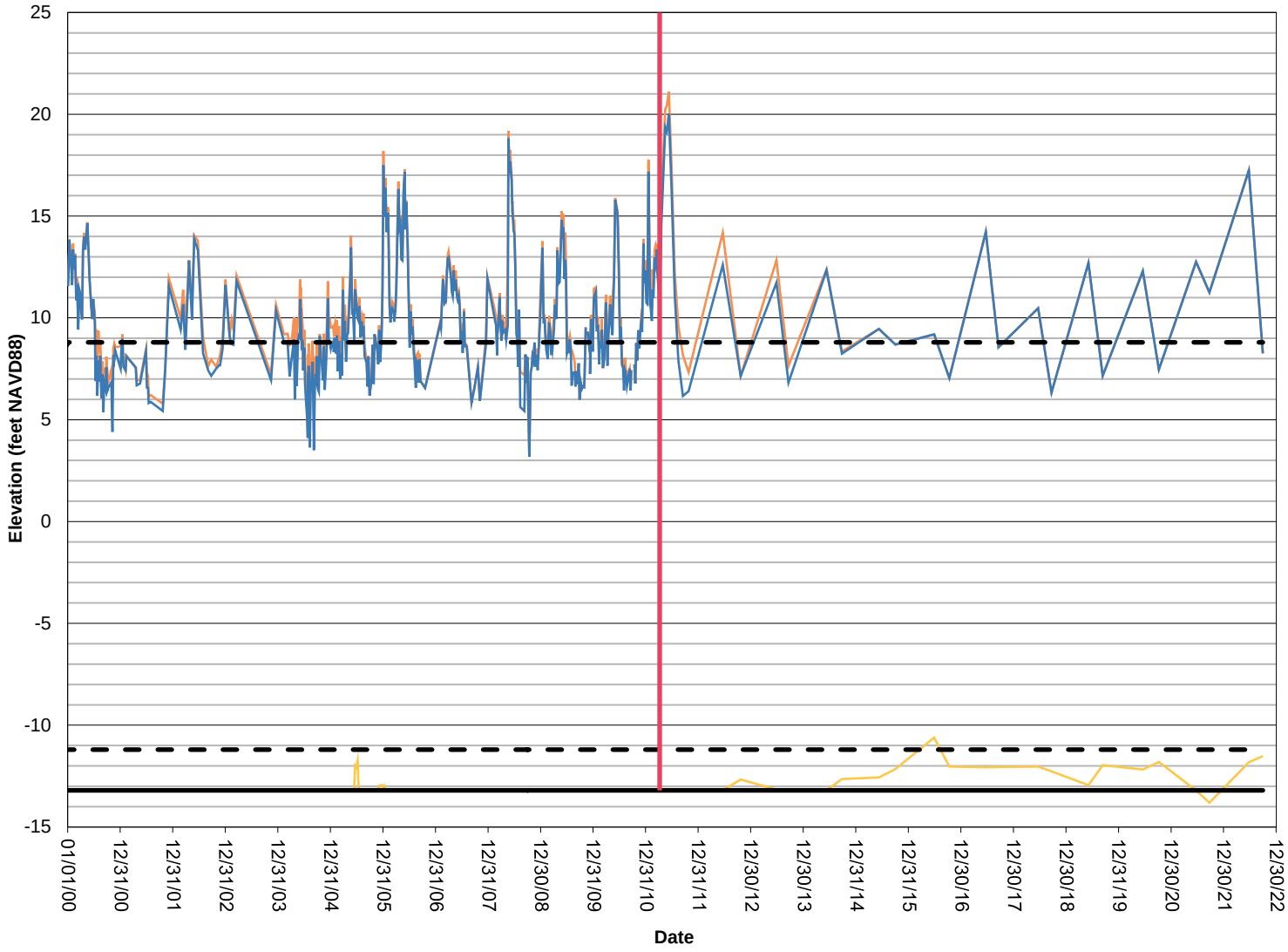
GSI Water Solutions, Inc.

Document Path: Y:\2060_McCormick_Baxter\Source_Figures\002_GW_Remedy\2022_Annual_Report\Figure4-9_LNAPL_and_DNAPL_Map_Sept2022.mxd

FIGURE 4-10

1999 to 2022 NAPL Thickness Plot for Well EW-10s

McCormick & Baxter Superfund Site
Portland, Oregon



LEGEND

- LNAPL
- Groundwater
- DNAPL
- Well Screen (Top and Bottom)[1]
- Well Depth[2]
- End NAPL Recovery[3]

NOTES

- Barrier wall completed on 06/30/03.
- Grouting completed on 7/2004.

1. Top of well screen is at 8.80 ft NAVD88, and bottom of well screen is at -11.20 ft NAVD88.
2. Existing well depth is at -13.20 ft NAVD88.
3. NAPL recovery terminated 4/21/11.

HALEY ALDRICH

GSI Water Solutions, Inc.

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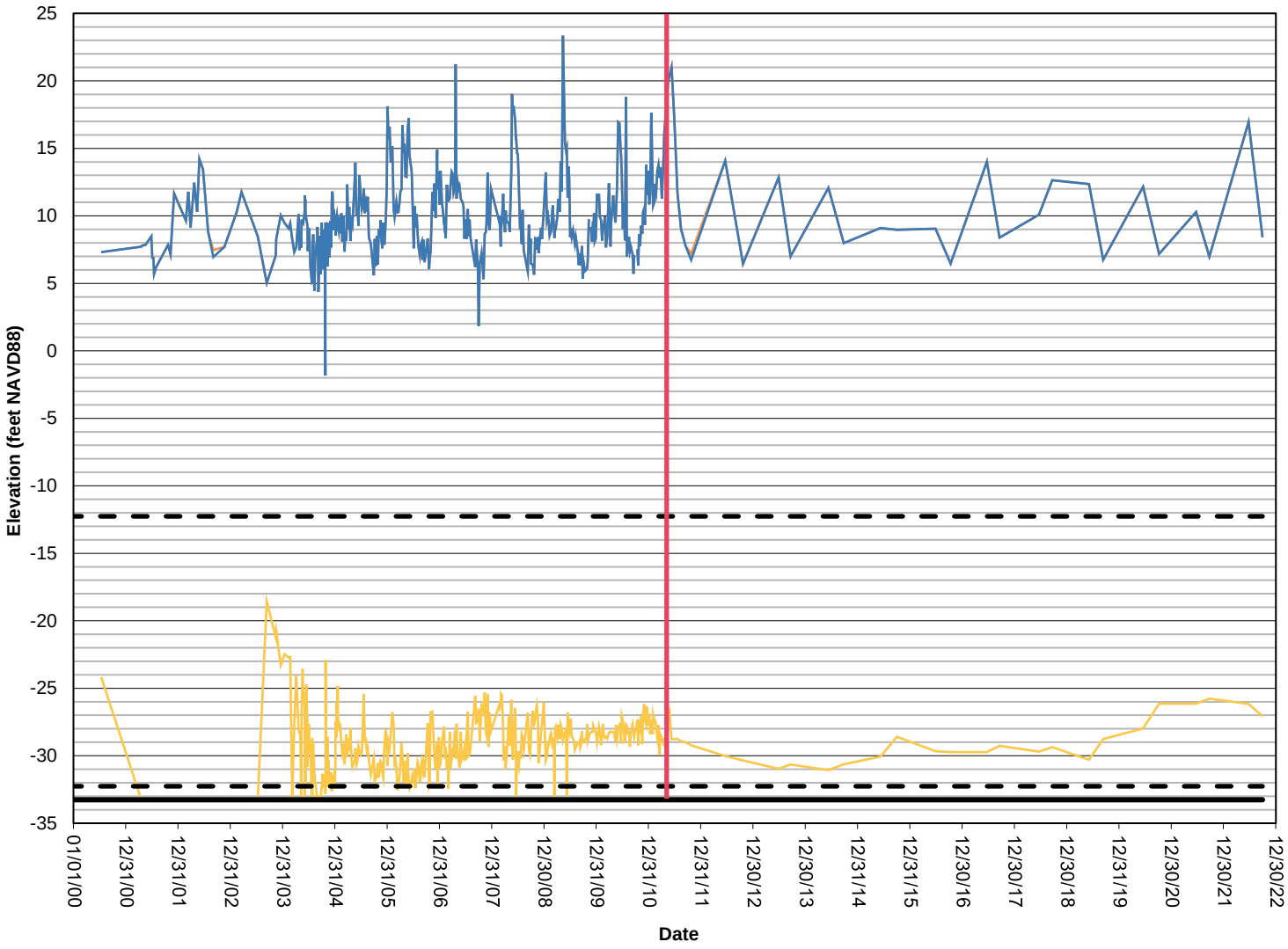
FIGURE 4-11

2001 to 2022 NAPL Thickness Plot for Well MW-20i

McCormick & Baxter Superfund Site
Portland, Oregon



LEGEND

- LNAPL
- Groundwater
- DNAPL
- Well Screen (Top and Bottom)[1]
- Well Depth[2]
- End of NAPL Recovery[3]

NOTES

- Barrier wall completed on 06/30/03.
- Grouting completed on 7/2004.

1. Top of well screen is at -12.26 ft NAVD88, and bottom of well screen is at -32.26 ft NAVD88.
2. Existing well depth is at -33.26 ft NAVD88.
3. NAPL recovery terminated on 4/21/11.

DNAPL recovery was attempted in July 2007 but the extracted liquid appeared to be water with speck sized globules of DNAPL (with a creosote odor), rather than a distinct layer, suggesting that the DNAPL thicknesses measured may not accurately reflect the amount of DNAPL in the well.

HALEY ALDRICH

GSI Water Solutions, Inc.

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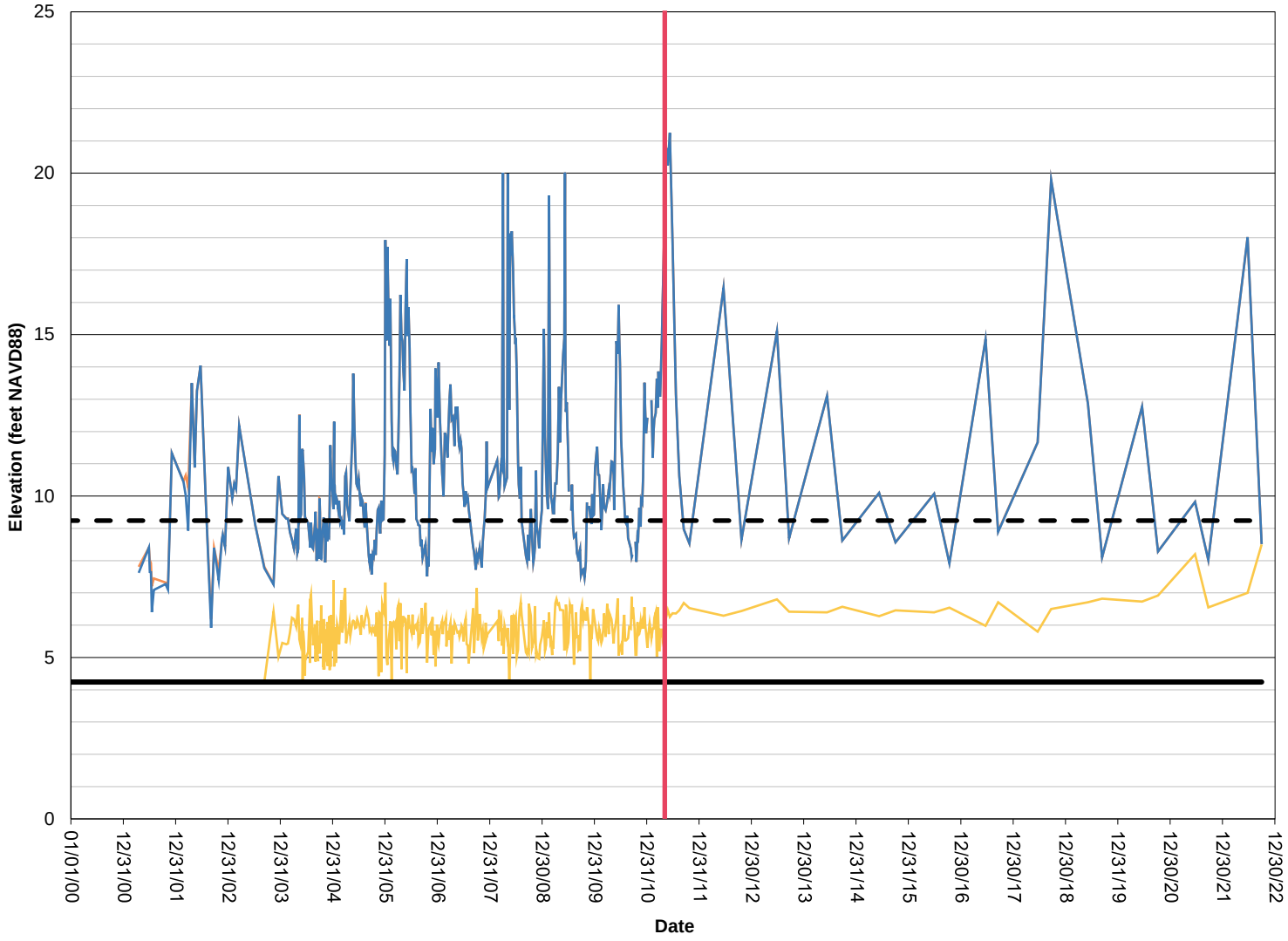
FIGURE 4-12

2001 to 2022 NAPL Thickness Plot for Well MW-Ds

McCormick & Baxter Superfund Site
Portland, Oregon



LEGEND

- LNAPL
- Groundwater
- DNAPL
- Well Screen (Top and Bottom)[1]
- Well Depth[2]
- End of NAPL Recovery[3]

NOTES

- Barrier wall completed on 06/30/03.
- Grouting completed on 7/2004.

1. Top of well screen is at 9.24 ft NAVD88, and bottom of well screen is at 4.24 ft NAVD88.
2. Existing well depth is at 4.24 ft NAVD88.
3. NAPL Recovery terminated on 4/21/11.

HALEY ALDRICH

GSI Water Solutions, Inc.

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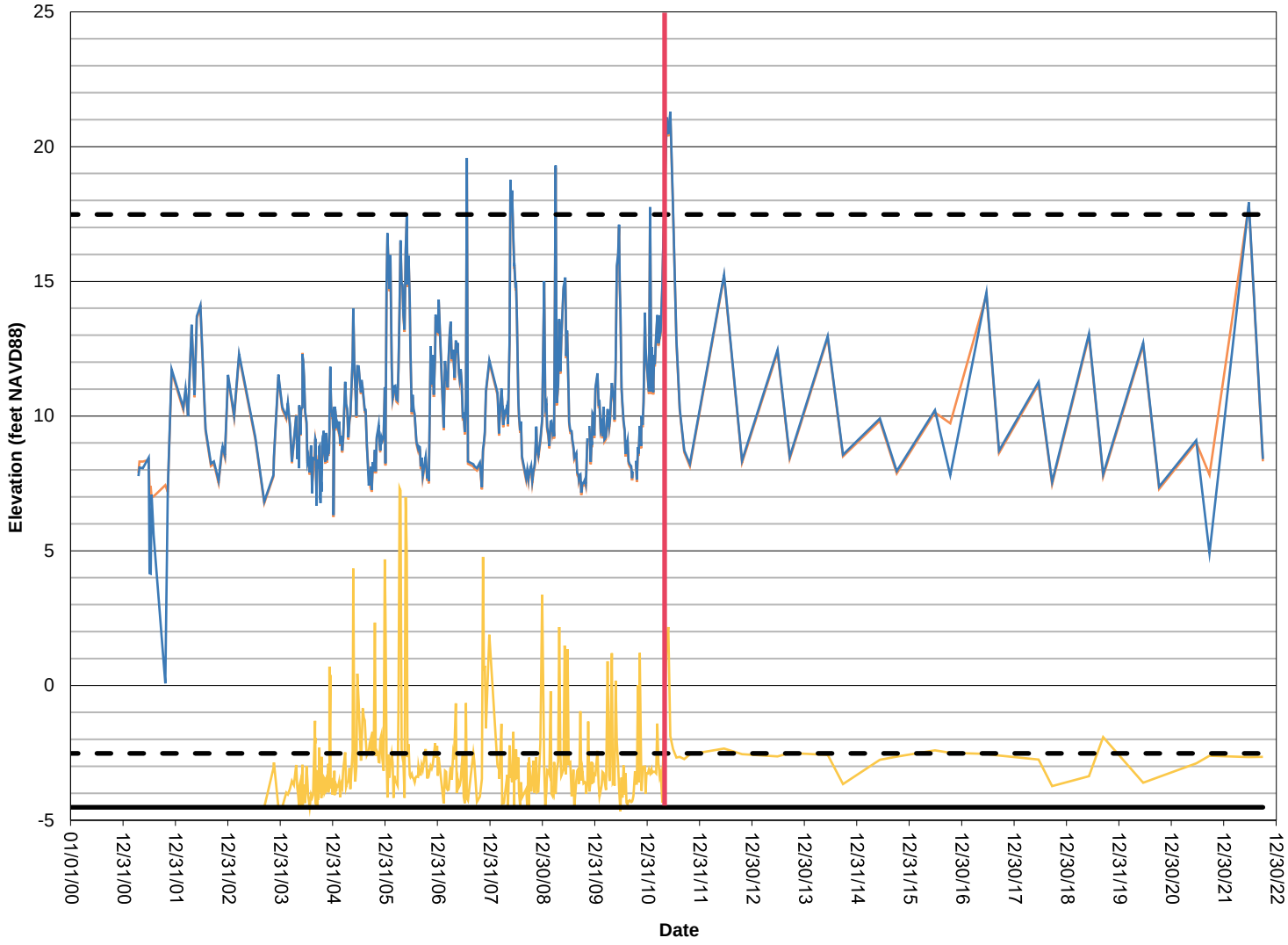
FIGURE 4-13

2001 to 2022 NAPL Thickness Plot for Well MW-Gs

McCormick & Baxter Superfund Site
Portland, Oregon



LEGEND

- LNAPL
- Groundwater
- DNAPL
- Well Screen (Top and Bottom)[1]
- Well Depth[2]
- End of NAPL Recovery[3]

NOTES

- Barrier wall completed on 06/30/03.
- Grouting completed on 7/2004.

1. Top of well screen is at 17.48 ft NAVD88, and bottom of well screen is at -2.52 ft NAVD88.
2. Existing well depth is at -4.52 ft NAVD88.
3. NAPL recovery terminated on 4/21/11.

HALEY ALDRICH

GSI Water Solutions, Inc.

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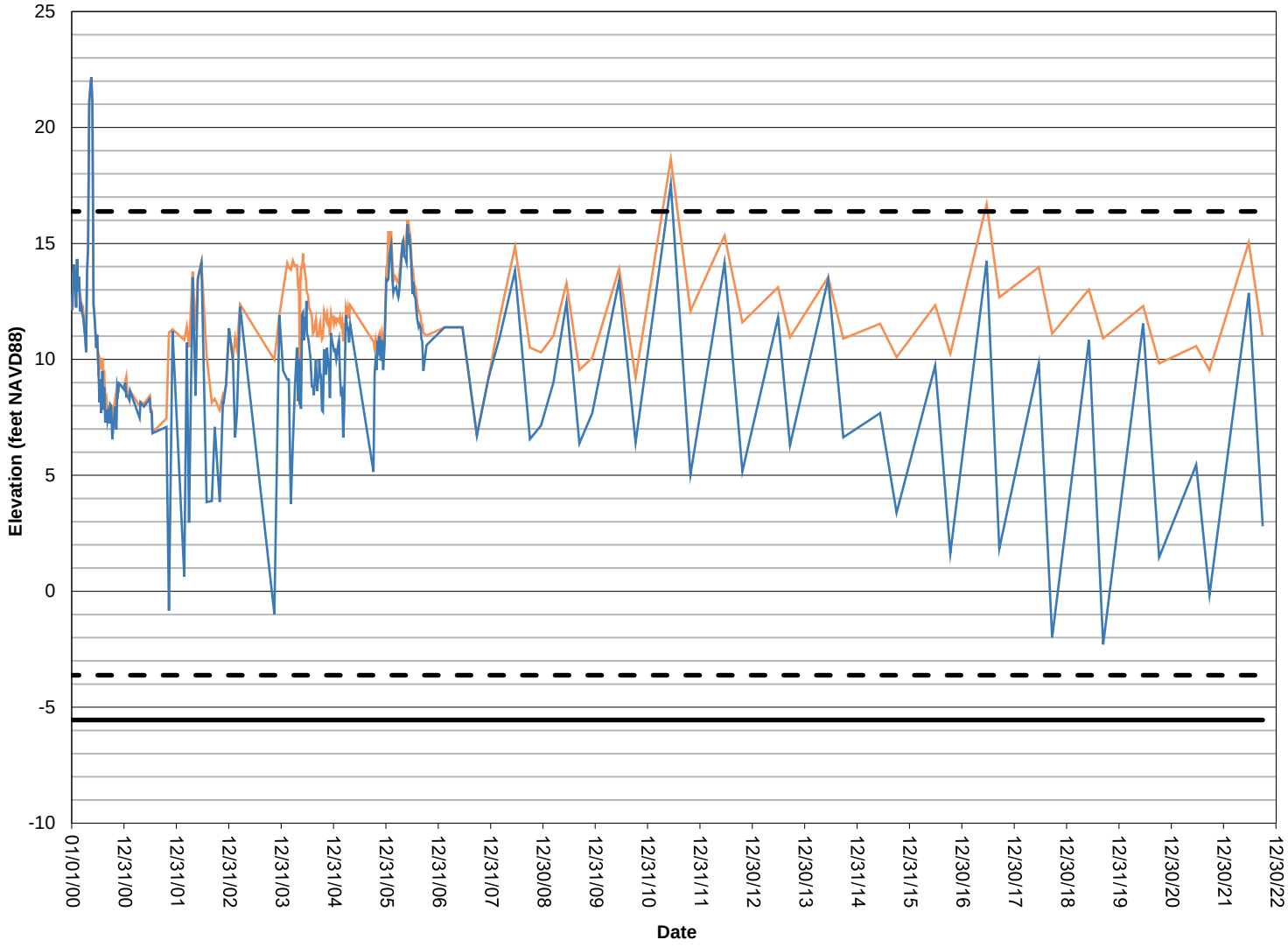
FIGURE 4-14

1999 to 2022 NAPL Thickness Plot for Well EW-15s

McCormick & Baxter Superfund Site
Portland, Oregon



LEGEND

- LNAPL
- Groundwater
- Well Screen (Top and Bottom)[1]
- Well Depth[2]

NOTES

- Barrier wall completed on 06/30/03.
- Grouting completed on 7/2004.

1. Top of well screen is at 16.38 ft NAVD88, and bottom of well screen is at -3.62 ft NAVD88.
2. Existing well depth is at -5.55 ft NAVD88.

HALEY ALDRICH

GSI Water Solutions, Inc.

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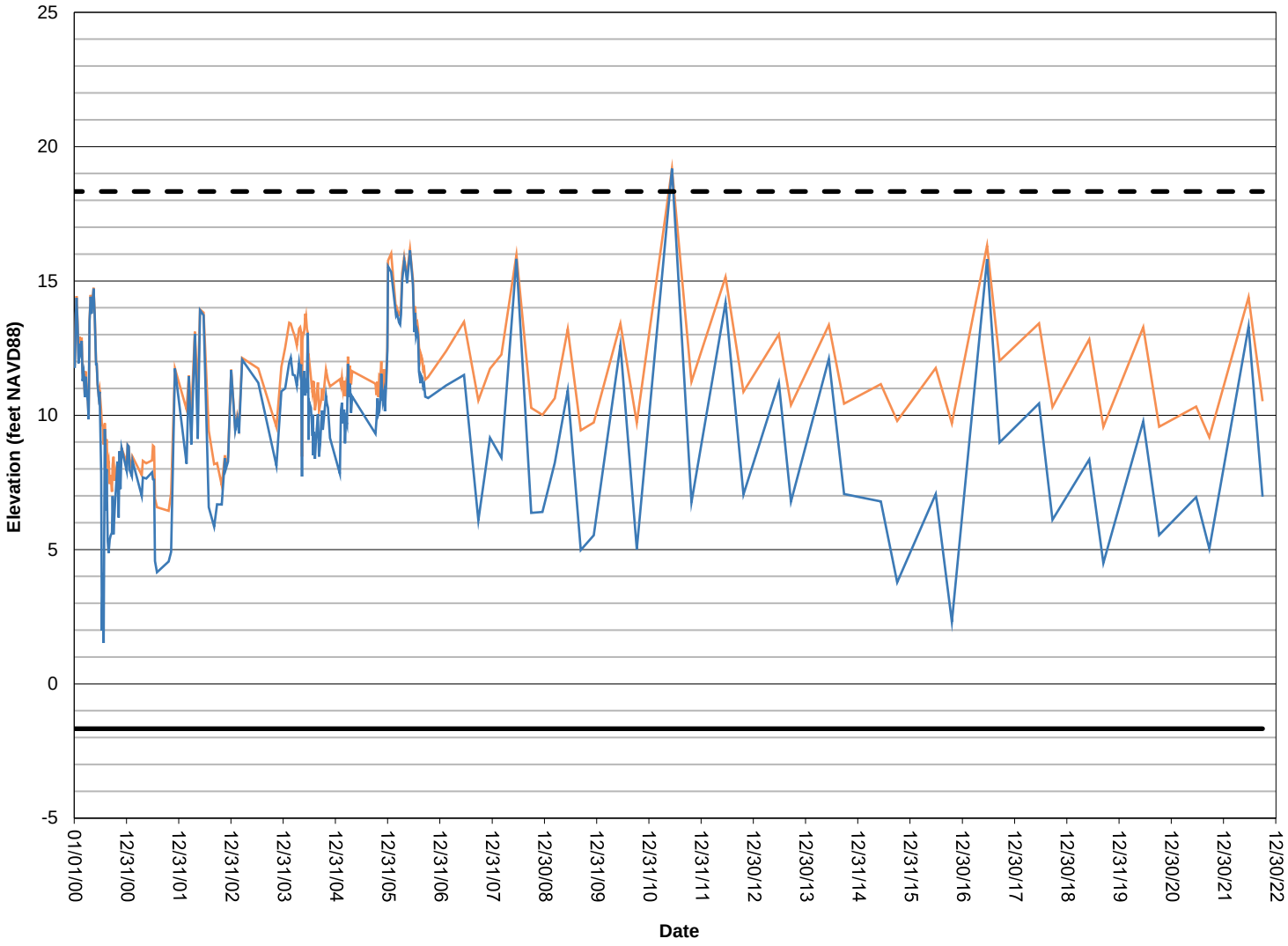
FIGURE 4-15

1999 to 2022 NAPL Thickness Plot for Well EW-23s

McCormick & Baxter Superfund Site
Portland, Oregon



LEGEND

- LNAPL
- Groundwater
- Well Screen (Top and Bottom)[1]
- Well Depth[2]

NOTES

- Barrier wall completed on 06/30/03.
- Grouting completed on 7/2004.

1. Top of well screen is at 18.33 ft NAVD88, and bottom of well screen is at -1.67 ft NAVD88.
2. Existing well depth is at -1.67 ft NAVD88.

HALEY ALDRICH

GSI Water Solutions, Inc.

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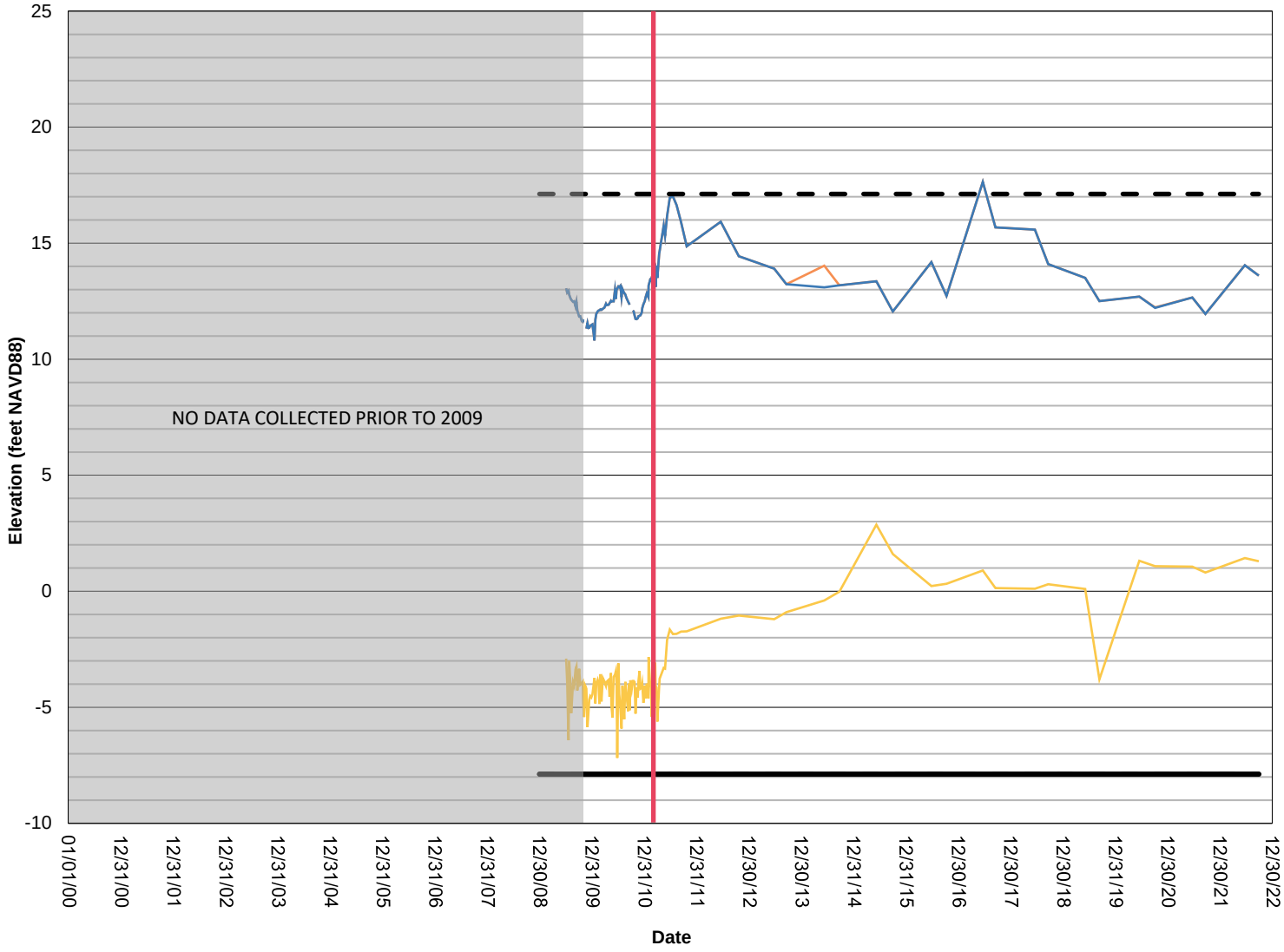
FIGURE 4-16

2009 to 2022 NAPL Thickness Plot for Well EW-1s

McCormick & Baxter Superfund Site
Portland, Oregon



LEGEND

- LNAPL
- Groundwater
- DNAPL
- Well Screen (Top and Bottom)[1]
- Well Depth[2]
- End of NAPL Recovery[3]

NOTES

1. Top of well screen is at 17.12 ft NAVD88, and bottom of well screen is at -7.88 ft NAVD88.
2. Existing well depth is at -7.88 ft NAVD88.
3. NAPL recovery terminated 4/21/11.

Ground subsidence has been observed in the vicinity of EW-1s and the well casing has sunk over time. The screened interval and total well depth have been referenced to the most recent ground survey from September 2009. Given that the elevations are changing with time, the elevations shown are approximate.

HALEY ALDRICH

GSI Water Solutions, Inc.

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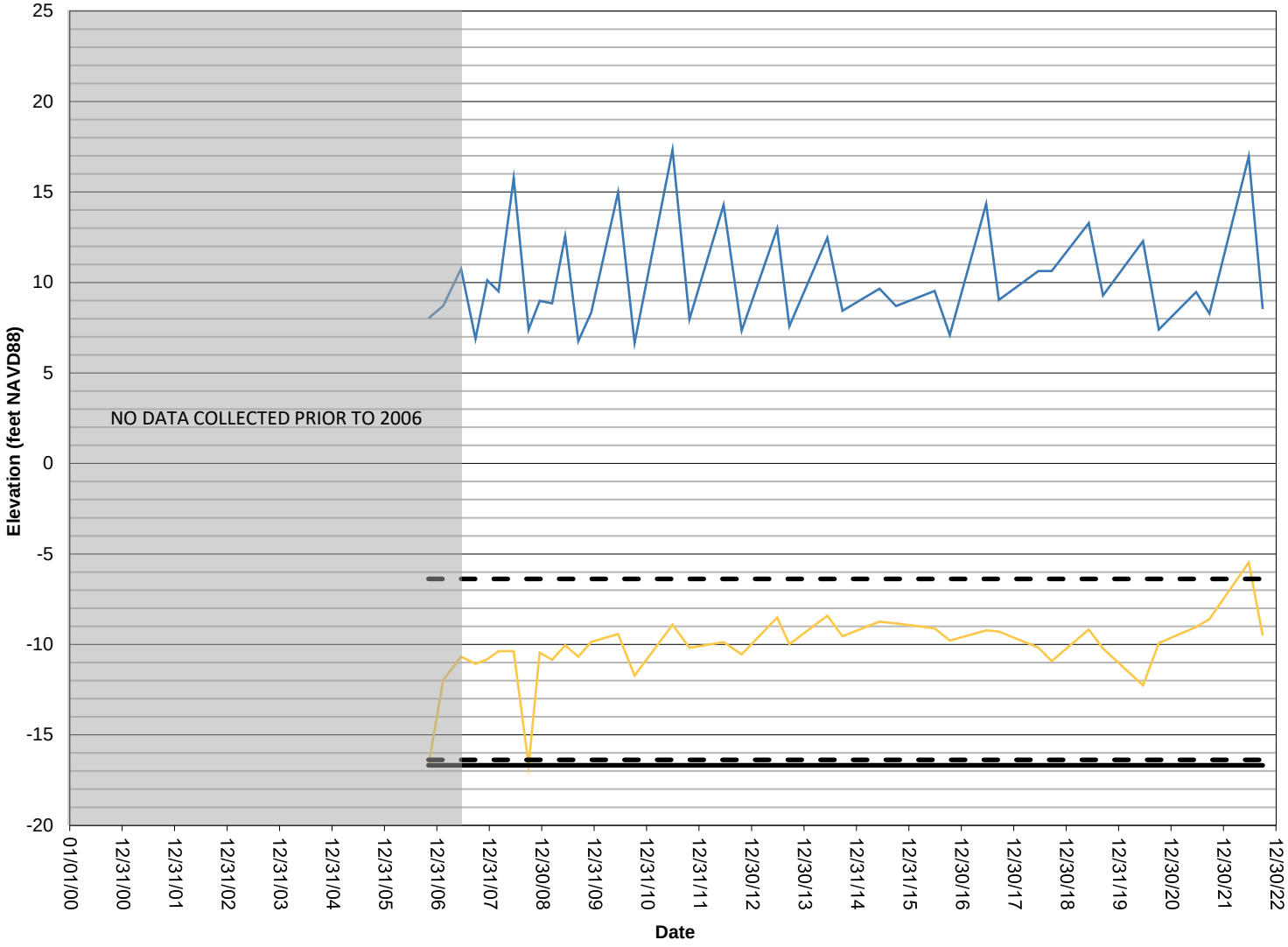
FIGURE 4-17

2006 to 2022 NAPL Thickness Plot for Well MW-22i

McCormick & Baxter Superfund Site
Portland, Oregon



LEGEND

- LNAPL
- Groundwater
- DNAPL
- Well Screen (Top and Bottom)[1]
- Well Depth[2]

NOTES

1. Top of well screen is at -6.38 ft NAVD88, and bottom of well screen is at -16.38 ft NAVD88.
2. Existing well depth is at -16.68 ft NAVD88.

HALEY ALDRICH

GSI Water Solutions, Inc.

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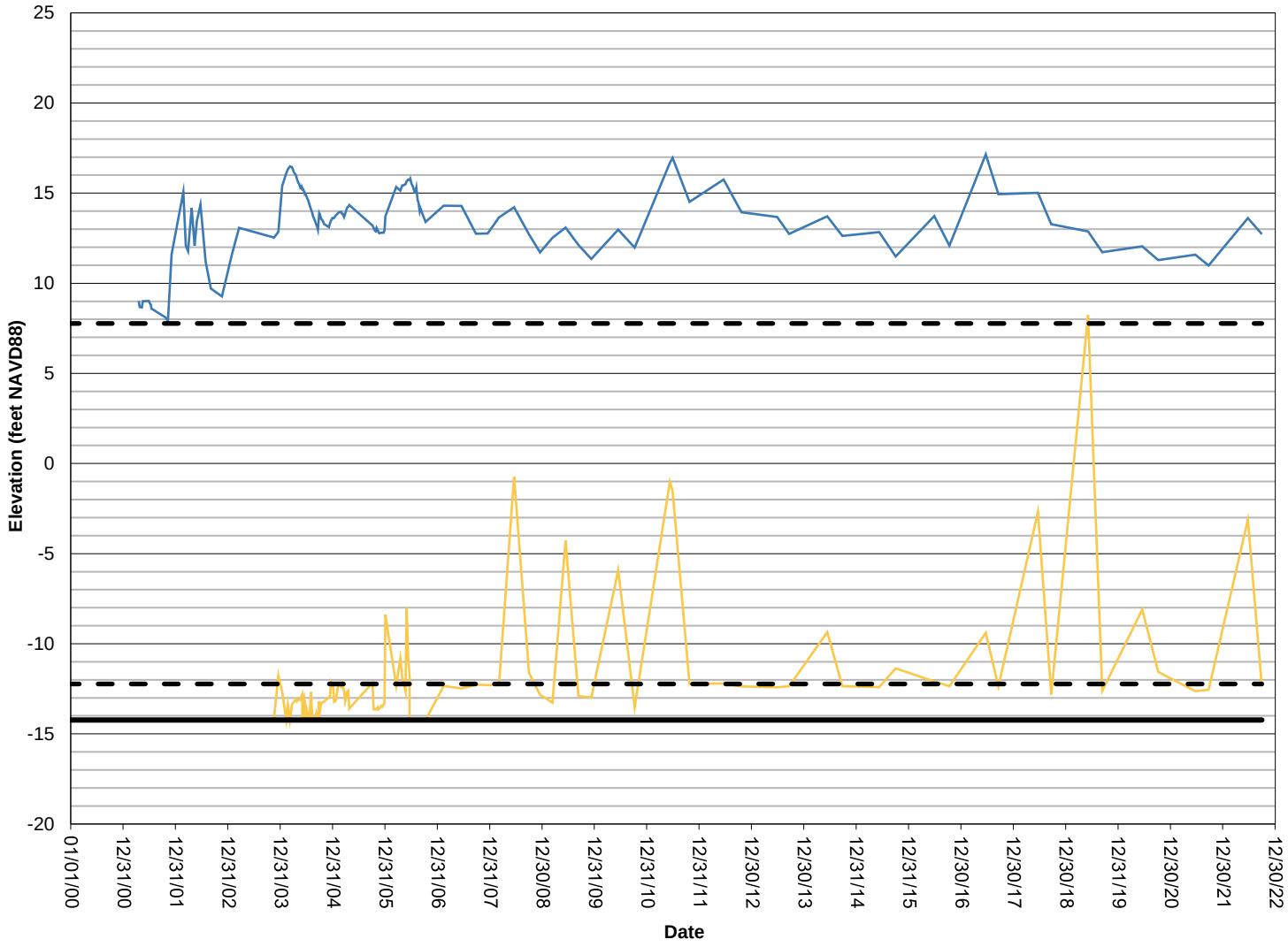
FIGURE 4-18

2001 to 2022 NAPL Thickness Plot for Well EW-8s

McCormick & Baxter Superfund Site
Portland, Oregon



LEGEND

- Groundwater
- DNAPL
- Well Screen (Top and Bottom)[1]
- Well Depth[2]

NOTES

- Barrier wall completed on 06/30/03.
- Grouting completed on 7/2004.

1. Top of well screen is at 7.77 ft NAVD88, and bottom of well screen is at -12.23 ft NAVD88.
2. Existing well depth is at -14.23 ft NAVD88.

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GSI Water Solutions, Inc.

Y:\0205_OR_DEQ\Source_Figures\003_003_M_B\2021_Annual_Report

LEGEND

- PHOTOGRAPH STATION, NUMBER, AND DIRECITON TAKEN
- FENCE
- ROCK
- SAND
- RIPARIAN AREA
- SUBSURFACE BARRIER WALL
- EARTHEN SOIL CAP BOUNDARY
- SEDIMENT CAP BOUNDARY
- IMPERMEABLE CAP
- PROPERTY LINE

NOTES

1. ALL FEATURES ARE APPROXIMATE
2. AERIAL IMAGERY SOURCE: NEARMAP, 13 APRIL 2021

0 250 500
SCALE IN FEET

HALEY ALDRICH

GSI Water Solutions, Inc.

MCCORMICK & BAXTER SUPERFUND SITE
6900 N EDGEWATER STREET
PORTLAND, OREGON

PHOTO STATION LOCATION MAP

APRIL 2022

FIGURE 5-1

GIS: \\haleyaldrich.com\share\pdx_data\Notebooks\150002005_DEQ_McCormick_and_Baxter_Soil_and_Sed_O_and_M\GIS\150002005_05-1_PHOTO_STATION_LOCATION_LOG.mxd - mschweitzer - 4/1/2022 11:20:31 AM

APPENDIX A
Photograph Log - Site Activities and Observations

Photograph A1: A murder of crows foraging on the soil cap. View from center of soil cap facing south. March 2022.

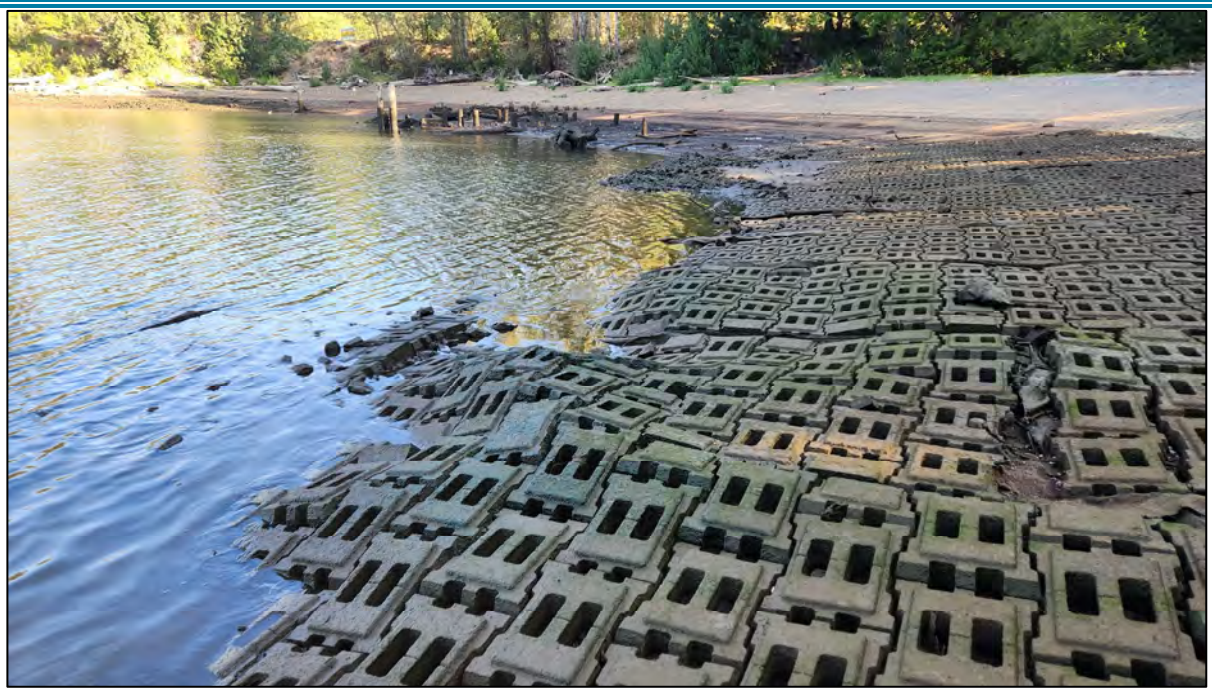
Photograph A2: An apparent "art installation" installed in the riparian zone. March 2022.

Photograph A3: A portion of the "art installation" that was cemented into the soil cap. March 2022.

Photograph A4: Main entrance gate found unlocked and open upon arrival to the site for trash dumpster emptying. December 2022.

Photograph A5: Vegetative cover across the upland cap area. June 2022.

Photograph A6: Woody debris along Willamette River shoreline. March 2022.



Photograph A7: Undulations and unconformities in ACB in Willamette Cove. September 2022

Photograph A8: Organic sheen observed in ACB depressions along Willamette Cove shoreline. September 2022.

Photograph A9: Trees growing in the ACB on the northern end of the Willamette River Shoreline. September 2022.

Photograph A10: Replacement buoys on the work barge. May 2022.

Photograph A11: Replacement buoy for station 3**.** May 2022.

Photograph A12: TRM replacement repair area along Willamette River Shoreline. September 2022.

APPENDIX B
Site Activity Documentation

McCormick & Baxter Operational & Functional Determination Period Status Meeting Summary

Wednesday, 3/2/2022, 10:00
6900 N. Edgewater Street
Portland, OR 97203

Meeting called by:	Oregon Department of Environmental Quality (DEQ)	Type of Meeting:	Quarterly Progress Meeting
Facilitator:	Sarah Miller	Note Taker:	Kevin Woodhouse
Attendees:	Sarah Miller Kevin Woodhouse Chris Rhea	Project Officer Site Manager Hydrogeologist	DEQ Haley & Aldrich (H&A GSI Water Solutions, Inc. (GSI).

Meeting Summary

Site Walk and Inspection

Kevin Woodhouse arrived onsite at 09:30 and performed minor O&M tasks such as setting up a sump pump in the secondary containment area to pump out water and checking locks on gates to see if they were cut. Sarah Miller and Chris Rhea arrived onsite at 10:00 at the paved parking and storage building area at the site. Attendees discussed project related items inside the storage building and then began site inspection.

The following items were discussed before starting the inspection.

- Upcoming EPA groundwater sampling event tentatively scheduled for Aprill11, 2022.
- Site maintenance items.
- Prospective purchaser agreement updates.
- Buoy replacement schedule. ETA from manufacturer is that buoys will ship on March 11 and Ballard Marine (Ballard) will schedule replacement work as soon as they are received.
- Transducer drift check and calibration. Based on looking at transducer readings year over year, there appears to be drift creeping into the readings. Kevin and Chris plan to get out in the next week or two to field check the readings and recalibrate transducers as needed.
- TRM repairs. This task has been tentatively planned for completion since late fall last year but has been hindered by the buildup of large pieces of woody debris from the large rain events that occurred in November and December 2021. Continued rain events have piled up more debris. We will wait until the spring or summer to perform the TRM repairs with the hope that high river levels will remove the woody debris enough to do repairs. If not, then performing in late spring or in summer will remove the chance if we remove the debris that is there now, more won't pile up during the next major rain event.
- Annual report status. GSI has completed review of the groundwater portion of the report and sent to H&A. H&A will combine with report text and get that to DEQ in the next few weeks.

The site inspection concluded at 12:00 and all attendees departed the site after closing up gates and storage building. The weather was rainy for the duration of the site inspection.

Shoreline Inspection

The following items were inspected along the shoreline:
Shoreline:

- Willamette River and Willamette Cove shoreline conditions
- ACB condition
- Gravel overlay on ACB
- Buoy locations
- Stormwater discharge
- Ebullition from sediment cap
- Shoreline vegetation

The Willamette River tides at the time of inspection (between 10:00 and 12:00) were at 13.50 feet NAVD88/ 8.40 feet COP and 13.27 feet NAVD88/ 8.17 feet COP. The daily high tide was at 07:05 with an elevations of 13.89 feet NAVD88/ 8.79 feet COP. The daily low tide was at 13:25 with elevations of 13.19 feet NAVD88/ 8.09 feet COP.

Increased amounts of large logs and woody debris continue to be present at the high tide line and copious amounts of smaller woody debris are present along the Willamette River shoreline (Photographs 1, 2, and 3). Tide levels were high during the site inspection due to the heavy rains that have occurred over the last few days.

The ACB unconformities in Willamette Cover were unable to be observed due to the high river levels.

A transient vessel was observed to be anchored in Willamette Cove. The vessel appeared to be anchored off the sediment cap (Photograph 3).

Shoreline repairs to ACB voids completed in 2017 and 2020 were unable to be observed due to the high river levels. The ACB will continue to be monitored during quarterly inspections.

Several seams of the TRM were loose in the middle section of the Willamette River shoreline and several tears/rips were present from snags by woody debris. H&A has procured replacement TRM material to repair the damaged sections and repairs will be implemented in a future O&M visit (see meeting summary section for further details).

No ebullition was observed from the organoclay layers in Willamette River or Willamette Cove. Rainfall was occurring at the time of the shoreline inspection and also prevented attendees from discerning ebullition bubbles from rainfall impacts on the water's surface.

Buoys 1, 3 and 4 were observed missing during the first quarter inspection in March 2021 and remained missing during this inspection. H&A has subcontracted Ballard to perform the repairs and is awaiting delivery of the replacement buoys from the manufacturer.

Stormwater discharge was occurring and estimated at 45-60 gallons per minute (gpm). Discharge was estimated by capturing water with a 5-gallon bucket. Approximately 1.5 to 2 gallons was collected in 2 seconds from the outfall and the flow rate in gpm was calculated.

At the southern end of the shoreline, a presumed art installation was found approximately 50 feet from the shoreline in the riparian zone (Photographs 4 and 5). The installation included chain link fence gate section and posts that were embedded in concreted trenches. Various pieces of rope, fabric, and random decoration were affixed to the posts and fence fabric. Per discussion with DEQ, H&A will flush cut any embedded poles and remove all materials from the surface. As the concrete serves the same function as the cap to restrict access to underlying soil, it doesn't need to be removed but will be covered in dirt once aboveground removal of items has been completed. Removal activities will be scheduled for the next O&M site visit.

Upland Inspection

The following items were inspected during the upland site walk and inspection:

- Site perimeter and fence, and drainage basin
- Subsurface drainage – Manholes and drainage
- Soil cap integrity (burrows, erosion, etc.) and filled burrows
- EW-1s and MW-23d area of subsidence
- Fence integrity
- Weeds and invasive vegetation.

The locks on all gates were intact and functioning during the inspection.

The impermeable cap and soil cap were in good condition (Photographs 6 and 7). Grass vegetation was in stubble and taller shrubs were dormant and bare of leaves. Two geese were observed near the western fence of the upland cap and a murder of crows was observed in the center of the soil cap.

The drainage basin was functioning properly during the site inspection and no standing water was observed in the basin. Standing water was observed just to the east of the surface trace of the barrier wall between MW-51s and MW-53s (Photograph 8).

The distance between the inner and outer casing of MW-23d was measured and remains at 2.75 inches.

Action Items and Schedule:	**Person Responsible**	**Deadline**
■ Site Maintenance – Replace locks if any found to be cut, fill-in burrows along the fence line, perform shop maintenance (e.g. mouse traps, check equipment).	Kevin Woodhouse	Quarterly
■ Continue to Monitor MW-23d inner/outer casing relationship for movement.	Kevin Woodhouse	Quarterly
■ Monitor burned holes (approximately 3-inch diameter) in the TRM in brush fire area.	Kevin Woodhouse	Quarterly
■ Quarterly Site Inspections	Kevin Woodhouse	Quarterly
■ Maintenance Activities	Kevin Woodhouse	As needed
■ TRM repairs	Kevin Woodhouse	Spring or Summer 2022
■ Annual O&M Report	Kevin Woodhouse Chris Rhea	March 2022
■ Buoy Replacement	Kevin Woodhouse	When buoys are received (estimated for March or April 2022)

Site Activities / Miscellaneous Field Activities Performed Since Last Inspection
O&M site visits: ■ No Site visits have been performed since the December 7, 2021 fourth quarter site inspection.
Deliverables
■ Data Management Plan submitted on January 15, 2022.
Budget Status: Currently within the anticipated budget.

Photos:

Photograph 1: High-river level conditions along Willamette River shoreline. View from northern end of shoreline next to railroad bridge and looking southeast.

Photograph 2: High-river level conditions along Willamette River shoreline. View from middle section of shoreline at the site and looking southeast.

Photograph 3: High-river levels in Willamette Cove. Transient houseboat anchored in the background of frame. View facing southwest.

Photograph 4: A presumed art installation piece installed at the southern end of the shoreline in the riparian zone.

Photograph 5: The presumed art installation base with poles concreted into the soil cap.

Photograph 6: View of the soil cap from the center of the cap facing west.

Photograph 7: View of the soil cap from the center of the cap facing southeast.

Photograph 8: Standing water on the soil cap just to the east of the surface trace of the barrier wall between MW-51s and MW-53s.

McCormick & Baxter Operational & Functional Determination Period Status Meeting Summary

Friday, 6/10/2022, 09:00
6900 N. Edgewater Street
Portland, OR 97203

Meeting called by:	Oregon Department of Environmental Quality (DEQ)	Type of Meeting:	Quarterly Progress Meeting
Facilitator:	Sarah Miller	Note Taker:	Kevin Woodhouse
Attendees:	Sarah Miller Kevin Woodhouse Chris Rhea	Project Officer Site Manager Hydrogeologist	DEQ Haley & Aldrich (H&A GSI Water Solutions, Inc. (GSI).

Meeting Summary

Site Walk and Inspection

Kevin Woodhouse, Sarah Miller, and Chris Rhea arrived onsite at 09:00 at the paved parking and storage building area at the site. Attendees discussed project related items in the parking area from 09:00 to 09:30.

The following items were discussed before starting the inspection.

- EPA groundwater sampling event was performed on April 12 to 18, 2022 and generated 2 drums of purgewater. H&A will schedule to have it removed by IDW subcontractor (ACTenviro). DEQ received draft groundwater results from EPA.
- Port of Portland will be doing work in Willamette Cove and made a request to DEQ to use the paved parking area to store some equipment and allow their workers to park personal vehicles. Requested timeframe for access is May to September 2022.
- Site maintenance items are scheduled for June 17, 2022 and will include art installation removal and transducer calibration.
- Project team discussed the O&M manual update. It has been pending input from several items that may not be available for years so H&A will finalize the manual with items that are in place. One outstanding question is whether the EPA will update the O&M Plan (included as an attachment in the O&M manual or will that be something that EPA updates.
- Buoys 1, 3, and 5 were replaced in May. They will be looked at as part of inspection.
- TRM repairs are tentatively slated for July or whenever river levels are at a lower stage and not limiting access along the shoreline.

Following the discussion, the project team performed the inspection from 09:30 to 10:30 and had a brief post-inspection discussion from 10:30 to 10:45. Sarah Miller and Chris Rhea departed the site at 10:50 and Kevin Woodhouse departed at 11:10 after taking a phone call. The weather was overcast and cool for the duration of the site inspection.

Shoreline Inspection

The following items were inspected along the shoreline:
Shoreline:

- Willamette River and Willamette Cove shoreline conditions
- ACB condition
- Gravel overlay on ACB
- Buoy locations
- Stormwater discharge
- Ebullition from sediment cap
- Shoreline vegetation

The Willamette River tides at the time of inspection (between 09:00 and 10:50) were at 17.26 feet NAVD88/ 12.16 feet Portland River Datum (PRD) and 17.98 feet NAVD88/ 12.88 feet PRD. Watershed input caused river level rise throughout the day and no low tide had been observed by the end of the day; river level at 17:00 was 13.18 feet PRD

River levels are high (Photograph 1, 4, and 5) and has resulted in increased amounts of large logs to be deposited along the shoreline (Photograph 4) along with trash and debris being washed up on the shoreline (Photograph 5)

The ACB unconformities in Willamette Cover were unable to be observed due to the high river levels.

An abandoned vessel was observed on the roadway leading down to Willamette Cove. The vessel was approximately 10-15 feet long and in a very dilapidated state. The vessel registration number was recorded however no hull identification number could be located. DEQ will relay the info to Metro and the City of Portland.

An active homeless encampment was observed in Willamette Cove and had at least one person in the campsite when we approached. For safety reasons, we didn't go through the encampment to reach the shoreline. From the project team's perspective, we were able to see one shipped anchored in Willamette Cove and it appeared to be anchored beyond the sediment cap.

Shoreline repairs to ACB voids completed in 2017 and 2020 were unable to be observed due to the high river levels. The ACB will continue to be monitored during quarterly inspections.

Several seams of the TRM were loose in the middle section of the Willamette River shoreline and several tears/rips were present from snags by woody debris. H&A has procured replacement TRM material to repair the damaged sections and repairs will be implemented in a future O&M visit when river levels are lower (see meeting summary section for further details).

Ebullition monitoring was not performed as the river levels were too high and the typical spots that ebullition has been observed were not accessible.

Buoys 1, 3 and 5 were replaced in May 2022. Buoy 2 was not observed during the site inspection. It is unknown if the buoy was submerged due to the high river level or if it went missing after buoy replacement activities were performed. Buoy 4 (one of the 2 buoys that was not replaced in May 2022) was partially submerged during the inspection. Buoy 2 will be inspected during the next inspection at lower river levels and if still missing it will be presumed lost and H&A will initiate replacement activities.

Stormwater discharge was occurring and estimated at 6-9 gallons per minute (gpm). Discharge was estimated by capturing water with a 5-gallon bucket. Approximately 1 to 1.5 gallons was collected in 10 seconds from the outfall and the flow rate in gpm was calculated.

At the southern end of the shoreline, a presumed art installation was found during the first quarter inspection. The installation was still present during the inspection and is scheduled to be removed during the upcoming O&M event scheduled for June 17, 2022.

Upland Inspection

The following items were inspected during the upland site walk and inspection:

- Site perimeter and fence, and drainage basin
- Subsurface drainage – Manholes and drainage
- Soil cap integrity (burrows, erosion, etc.) and filled burrows
- EW-1s and MW-23d area of subsidence
- Fence integrity
- Weeds and invasive vegetation.

The locks on all gates were intact and functioning during the inspection.

The impermeable cap and soil cap were in good condition. Grass vegetation was growing strong with the spring rains. A shrub tree was overgrown near MW-51s and needs to be pruned back as it is encompassing the well monument.

The drainage basin was functioning properly during the site inspection and no standing water was observed in the basin.

The distance between the inner and outer casing of MW-23d was measured and remains at 2.75 inches.

Action Items and Schedule:	**Person Responsible**	**Deadline**
■ Site Maintenance – Replace locks if any found to be cut, fill-in burrows along the fence line, perform shop maintenance (e.g. mouse traps, check equipment).	Kevin Woodhouse	Quarterly
■ Continue to Monitor MW-23d inner/outer casing relationship for movement.	Kevin Woodhouse	Quarterly
■ Monitor burned holes (approximately 3-inch diameter) in the TRM in brush fire area.	Kevin Woodhouse	Quarterly
■ Quarterly Site Inspections	Kevin Woodhouse	Quarterly
■ O&M and transducer calibration	Kevin Woodhouse Chris Rhea	June 17, 2022
■ June Low-tide monitoring	Max Elias Olivia Marshall Rodrigo Prugue	June 23, 2022
■ TRM repairs	Kevin Woodhouse	Summer 2022

Site Activities / Miscellaneous Field Activities Performed Since Last Inspection

- EPA performed groundwater sampling event from April 18 to 22, 2022.
- Buoy replacement was performed on May 5, 2022.
- Tim Walters performed the vegetation on May 25, 2022.

Deliverables
■ Draft 2021 Annual O&M Report submitted on April 4, 2022. ■ Final 2021 Annual O&M Report submitted on May 6, 2022.
Budget Status: Currently within the anticipated budget.

Photos:

Photograph 1: High-river level conditions along Willamette Cove shoreline. Homeless encampment present along shoreline. View facing southwest.

Photograph 2: Impermeable cap conditions with spring grass growth. View facing northeast.

Photograph 3: Stormwater outfall flow at approximately 6 to 9 gallons per minute. View facing northeast.

Photograph 4: High-river level conditions along Willamette River shoreline. View facing southeast.

Photograph 5: Trash washed up on Willamette River shoreline. View facing southeast.

McCormick & Baxter Operational & Functional Determination Period Status Meeting Summary

Monday, 9/19/2022, 09:00
6900 N. Edgewater Street
Portland, OR 97203

Meeting called by:	Oregon Department of Environmental Quality (DEQ)	Type of Meeting:	Quarterly Progress Meeting
Facilitator:	Sarah Miller	Note Taker:	Kevin Woodhouse
Attendees:	Sarah Miller Kevin Woodhouse Chris Rhea	Project Officer Site Manager Hydrogeologist	DEQ Haley & Aldrich (H&A GSI Water Solutions, Inc. (GSI).

Meeting Summary

Site Walk and Inspection

Kevin Woodhouse, Sarah Miller, and Chris Rhea arrived onsite at 08:55 at the paved parking and storage building area at the site. Attendees discussed project related items in the parking area from 09:00 to approximately 09:25.

The following items were discussed before starting the inspection.

- Team members discussed the status of the Prospective Purchasers Agreement. No major updates have occurred and DEQ is still in discussions/negotiations with the prospective purchaser and property owner.
- Team members discussed the status of the Budget and Assumptions Proposal (BAP) that was submitted on September 7, 2022. DEQ will have a meeting on September 20, 2022, to discuss what EPA's needs are for the upcoming year. This will potentially affect the budget included in the BAP and DEQ will need that information before they can approve the BAP. Haley & Aldrich will submit a no-cost extension request for the Task Order through November 30, 2022.
- Backflow testing will be performed by American Backflow Testing between 10:00 to 11:00. Kevin will have to break away for a short bit when the testing technician arrives.
- TRM repairs were completed in August. One section had deteriorated further since the repairs were scoped last fall due to additional damage from driftwood during the high river levels this past winter. The entire roll was used in one area and the other two smaller spots that were slated for patching were able to be resecured without needing to be patched.

Following the discussion, the project team performed the inspection from 09:30 to 10:30 and had a brief post-inspection discussion from 10:30 to 10:50. Kevin Woodhouse broke away from 10:05 to 10:25 to bring the backflow testing technician into the site and get him started. Kevin then rejoined Sarah and Chris to finish the site inspection.

Sarah Miller and the backflow technician departed the site at 10:55. Kevin and Chris departed the site at 11:10 after remounting the barometer to the exterior of the storage building. During the inspection debrief, an Apex technician (Apex is leasing storage spacing in the paved storage area) notified Kevin that their security guard found the barometer on the ground.

The weather during the inspection was sunny and in the 70's F.

Shoreline Inspection

The following items were inspected along the shoreline:
Shoreline:

- Willamette River and Willamette Cove shoreline conditions
- ACB condition
- Gravel overlay on ACB
- Buoy locations
- Stormwater discharge
- Ebullition from sediment cap
- Shoreline vegetation

The Willamette River tides at the time of inspection (between 09:00 and 10:50) were at 5.04 feet NAVD88/ -0.04 feet Portland River Datum (PRD) and 5.10 feet NAVD88/ 0.00 feet PRD. The river level was at low tide during the inspection.

The homeless encampment in Willamette Cove observed during the previous site inspection wasn't present; however, trash and debris was present indicating there is some transient activity still occurring, but no overnight camping. One ship was also observed to be anchored in Willamette Cove and appeared to be anchored beyond the sediment cap (Photograph 1 background).

River levels were low during the inspection (Photograph 1). ACB unconformities in Willamette Cove were able to be observed during this site visit. Unconformities were last observed during the third quarter inspection of September 2021 when river levels were also low enough. Unconformities were observed in the same spots (Photographs 2 and 3), however, the degree of potential shifting or sinking relative to the previous inspection was unable to be determined qualitatively based solely on visual observation. Team members discussed potential ways of measuring ACB shifting in a quantitative manner by surveying fixed points on the ACB yearly to measure elevations over time.

Shoreline repairs to ACB voids completed in 2017 and 2020 were able to be observed and continued to be functioning as intended. The ACB will continue to be monitored during quarterly inspections.

Ebullition was observed along the shoreline in Willamette Cove and along the Willamette River. Organic sheen was observed in shallow depressions of the ACB in Willamette Cove (Photograph 4).

Buoy 2 was not observed during the previous site inspection in June 2022. All buoys were observed to be present during this site inspection indicating the buoy was completely submerged due to the high river levels during the last inspection.

There were several small shrub trees that grew between blocks of the ACB matting near the railroad bridge overcrossing. They will be scheduled to be cut and removed during an upcoming site visit.

TRM repairs were performed to replace one section of the TRM (Photograph 5) and resecure loose end pieces in two other sections. No additional repairs are needed.

Stormwater discharge from the outfall did not occur during the site inspection.

The "art installation" that was removed in June 2022, showed no further issues at the site.

Upland Inspection

The following items were inspected during the upland site walk and inspection:

- Site perimeter and fence, and drainage basin
- Subsurface drainage – Manholes and drainage
- Soil cap integrity (burrows, erosion, etc.) and filled burrows
- EW-1s and MW-23d area of subsidence
- Fence integrity
- Weeds and invasive vegetation.

The locks on all gates were intact and functioning during the inspection.

The impermeable cap and soil cap were in good condition.

The drainage basin was functioning properly during the site inspection and no standing water was observed in the basin.

The distance between the inner and outer casing of MW-23d was measured and remains at 2.75 inches.

Action Items and Schedule:	**Person Responsible**	**Deadline**
■ Site Maintenance – Replace locks if any found to be cut, fill-in burrows along the fence line, perform shop maintenance (e.g. mouse traps, check equipment).	Kevin Woodhouse	Quarterly
■ Continue to Monitor MW-23d inner/outer casing relationship for movement.	Kevin Woodhouse	Quarterly
■ Monitor burned holes (approximately 3-inch diameter) in the TRM in brush fire area.	Kevin Woodhouse	Quarterly
■ Quarterly Site Inspections	Kevin Woodhouse	Quarterly
■ September low-tide monitoring	Kevin Woodhouse Chris Rhea	September 2022
■ Shrub tree removal on ACB	Kevin Woodhouse	Fall 2022

Site Activities / Miscellaneous Field Activities Performed Since Last Inspection

- Maintenance was performed at the site to remove the “art installation” from the riparian area on June 17, 2022.
- The June low-tide monitoring event was performed on June 23, 2022.
- IDW disposal for purge-water from the EPA April 2022 sampling event was transported offsite on July 14, 2022.
- TRM repair activities were initiated on August 10, 2022, with removal of driftwood form the shoreline on top of the repair area and completed on August 19, 2022, with repairs to the TRM.

Deliverables
■ No deliverables have been submitted during the reporting period.
Budget Status: Currently within the anticipated budget. A BAP was submitted on September 7, 2022, for the upcoming project year (October 1, 2022, through September 31, 2023).

Photos:

Photograph 1: Low-river level conditions along Willamette Cove shoreline. View facing southwest.

Photograph 2: ACB unconformity with largest amount of observed deflection on eastern end of ACB in Willamette Cove. View facing northeast.

Photograph 3: ACB armoring with unconformities shown along Willamette Cover Shoreline. View facing north.

Photograph 4: Organic sheen observed in small depressions of the ACB in Willamette Cove.

Photograph 5: TRM repair area in on northern end of Willamette River shoreline at the site. View facing north.

McCormick & Baxter Operational & Functional Determination Period Status Meeting Summary

Tuesday, 12/20/2022, 09:00
6900 N. Edgewater Street
Portland, OR 97203

Meeting called by:	Oregon Department of Environmental Quality (DEQ)	Type of Meeting:	Quarterly Progress Meeting
Facilitator:	Sarah Miller	Note Taker:	Kevin Woodhouse
Attendees:	Sarah Miller Kevin Woodhouse Chris Rhea	Project Officer Site Manager Hydrogeologist	DEQ Haley & Aldrich (H&A GSI Water Solutions, Inc. (GSI).

Meeting Summary

Site Walk and Inspection

Kevin Woodhouse, Sarah Miller, and Chris Rhea arrived onsite at 09:00 at the paved parking and storage building area at the site. Attendees discussed project related items in the parking area from 09:00 to approximately 09:30.

The following items were discussed before starting the inspection.

- Team members discussed the status of the Prospective Purchasers Agreement. No major updates have occurred and DEQ is still in discussions/negotiations with the prospective purchaser and property owner.
- Team members discussed the status of the Budget and Assumptions Proposal (BAP) that was submitted on September 7, 2022. DEQ and EPA have not executed the Cooperative Agreement yet to provide funds for groundwater work under the O&F Task Order. With the contract renewal to occur in February 2023, DEQ, Haley & Aldrich, and GSI discussed not issuing a Task Order amendment but instead issuing it as a new Task Order under the new contract to be executed in February 2023. DEQ and Haley & Aldrich will let the current O&F Task Order expire on 13 December, 2022. This will result in a delay for the preparation of the groundwater portion of the 2022 Annual O&M Report until approximately May or June 2023.
- Additionally, the O&M task order work period end date is in February 2023. There are additional items that DEQ would like added to the scope including obtaining additional data on the ACB unconformities in Willamette Cove. These activities will be included in the Task Order to be issued under the new contract.
- Haley & Aldrich briefly discussed activities that have been performed at the site since the last site inspection.

Following the discussion, the project team performed the inspection from 09:30 to 10:30 and departed the site at 10:45.

The weather during the inspection was overcast with light on and off rain. The temperature was in the low 40's.

Shoreline Inspection

The following items were inspected along the shoreline:
Shoreline:

- Willamette River and Willamette Cove shoreline conditions
- ACB condition
- Gravel overlay on ACB
- Buoy locations
- Stormwater discharge

- Ebullition from sediment cap
- Shoreline vegetation

The Willamette River tides at the time of inspection (between 09:00 and 10:45) were at 7.14 feet NAVD88/ 2.07 feet Portland River Datum (PRD) and 7.34 feet NAVD88/ 2.24 feet PRD. The river level was at low tide during the inspection.

Trash and debris continues to be observed in Willamette Cove. No homeless encampments were observed; however, there was one boat anchored in the cove (Photograph 1). The boat did not appear to be anchored on the sediment cap.

Shoreline repairs to ACB voids completed in 2017 and 2020 were not able to be observed during this inspection. The ACB will continue to be monitored during quarterly inspections. Void spaces in the ACB were inspected and multiple spots did not have any sand or river rock present (Photograph 2). This will be monitored and evaluated to see if future additions of material are needed.

Ebullition was not observed along the shoreline in Willamette Cove or along the Willamette River.

All buoys were observed to be present during this site inspection.

There were several small shrub trees that grew between blocks of the ACB matting near the railroad bridge overcrossing. They were cut and removed during the O&M site visit on September 28, 2022. Photograph 3 shows the area where trees were removed.

Stormwater discharge from the outfall occurred at an approximate rate of approximately 20-30 gpm during the site inspection (Photograph 4). This was estimated by measuring the flow at a rate of 1 gallon every 2-3 seconds.

Upland Inspection

The following items were inspected during the upland site walk and inspection:

- Site perimeter and fence, and drainage basin
- Subsurface drainage – Manholes and drainage
- Soil cap integrity (burrows, erosion, etc.) and filled burrows
- EW-1s and MW-23d area of subsidence
- Fence integrity
- Weeds and invasive vegetation.

The locks on all gates were intact and functioning during the inspection.

The impermeable cap and soil cap were in good condition.

The drainage basin was functioning properly during the site inspection and no standing water was observed in the basin (Photograph 5).

The distance between the inner and outer casing of MW-23d was measured and remains at 2.75 inches.

Action Items and Schedule:	Person Responsible	Deadline
■ Site Maintenance – Replace locks if any found to be cut, fill-in burrows along the fence line, perform shop maintenance (e.g. mouse traps, check equipment).	Kevin Woodhouse	Quarterly
■ Continue to Monitor MW-23d inner/outer casing relationship for movement.	Kevin Woodhouse	Quarterly
■ Quarterly Site Inspections	Kevin Woodhouse	Quarterly
■ Prepare draft 2022 Annual O&M Report	Kevin Woodhouse	April/May 2022

Site Activities / Miscellaneous Field Activities Performed Since Last Inspection

- Maintenance, shrub tree removal on September 28, 2022.
- Low-tide monitoring on September 29, 2022.
- Maintenance, provide access to PGE tree trimming crew on November 9, 2022.
- Maintenance, replace sign-in sheet document box on November 23, 2022.
- Maintenance, trash emptying and resecure site on December 12, 2022.

Deliverables

- No deliverables have been submitted during the reporting period.

Budget Status: O&M task order is within anticipated budget. O&F budget was reached at the end of September. H&A submitted a BAP for the next year of work however DEQ and EPA have not executed a Cooperative Agreement for funds. The task order has been issued NCEs through the end of the year (December 31, 2022) and will then be allowed to expire. No work can be performed for groundwater tasks under the O&F TO until the Cooperative Agreement is executed. O&F work will then be performed under a task order issued to GSI under the upcoming Price Agreement.

Photos:

Photograph 1: A vessel anchored in Willamette Cove off of the sediment cap

Photograph 2: ACB in Willamette Cove with no sand or river rock occupying the void space.

Photograph 3: ACB matting where shrub trees were removed during O&M visit. View facing west southwest.

Photograph 4: Water flow (estimated at 20-30 gpm) from the stormwater outfall.

Photograph 5: Drainage basin on southern portion side of the soil cap. View facing north.

Table 2.2
Example Site Visitation Record
McCormick and Baxter Creosoting Company
Portland, Oregon

SITE VISIT LOG

VISITORS AND WORKERS MUST CHECK IN AND OUT

Date	Time IN	a.m./ p.m.?	Time OUT	a.m./ p.m.?	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
3/22/22	0730		1150		Kevin Woodhouse	H+A	Site inspection
3/22/22	0755		1150		Sarah Miller	DEQ	site inspection
3/22/22	0755		1150		Chris Rhen	GSI	Site Inspection
4/18/22	0755		11:30am		Kevin Woodhouse	H+A	Sampling Kickoff
4/18/22	820		6:00pm		Jed Jansch	EPA	Sampling
4/18/22	820		9.30am		Sarah Miller	DEQ	Site Sampling Kick off
4/18/22	820		6:00pm		Brent Richmond	EPA	SAMPLING WELLS
4/18/22	8 20		6:00 pm		Anne Christopher	EPA	sampling gw
4/18/22	8:30		6:00pm		Meghan Dunn	EPA	sampling
4/19/22	7:30		7pm		Anne Christopher	EPA	Sampling
4/19/22	7.30	am	7pm		Jed Jansch	EPA	Sampling
4/19/22	7:30	am	7pm		Meghan Dunn	EPA	sampling
4/19/22	0730	am	7pm		Brent Richmond	EPA	Sampling
4/20/22	7.30	am	7pm		Brent Richmond, Jed Jansch Meghan Dunn Anne Christopher	EPA	sampling
4/21/22	7:30	am	7pm		Brent Richmond, Jed Jansch, Anne Christopher	EPA	sampling
4/22/22	11:00	am	1 pm		Brent Richmond, Anne Christopher	EPA	packing gear
5/24/22	1300		1430		Sarah Miller	DEQ	Site visit

5/24/22 Rob Amdal Rastercap

SITE VISIT LOG

VISITORS AND WORKERS MUST CHECK IN AND OUT

Date	Time IN	Time OUT	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
6/10/2022	0900	1050	Kevin Woodhouse	H+A	Site inspection
6/10/2022	0900	1050	Sarah Miller	DEQ	" "
6/10/2022	0900	1050	CHRIS RHEA	GSI	" "
6/17/2022	0800	~~0755~~ KW 1320	Kevin Woodhouse	H+A	O+M.
6/17/2022	0805	1320	Chris Rhea	GSI	O+M
6/17/~~2022~~ 2022 KW	0812	1300	Steve Mahoney	H+A	O+M
6/17/2022	0812	1300	Max Elias	H+A	O+M
6/23/22	0800	1100	Kevin Woodhouse	H+A	LTM / O+M
06/23/22	0800		Rodrigo Prugue	GSI	LTM
6/23/22	0800		Olivia Marshall	H&A	LTM
6/23/22	0800		Max Elias	H&A	LTM
7/12/22	0950		Steve Misner	Apex	WC upland sampling.
7/12/22	0956		Robert Schethler	Apex	" " "
7/12/2022	0956		ALEXIS TAKARA	APEX	" " "
7/12/22	0957		Brittney Breen	Apex	" "
7/12/22	0957		Jacob Swanson	Apex	" "
7/12/22	0957		Jake Munsey	Earth Engineers	" "
7/13/22	1300	1330	Sarah Miller	DEQ	Haz Waste Disposal
7/13/22	1300	1330	Kevin Woodhouse	H+A	IDW pickup
7/13/22	1300	1320	Glen Murr	Arcenviro	IDW pickup

SITE VISIT LOG

VISITORS AND WORKERS MUST CHECK IN AND OUT

Date	Time IN	Time OUT	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
7/14/22	0745	0825	Kevin Woodhouse	H+A	IDW pickup
7/14/22	0750	0825	Glen Murk	ACTenviro	IDW pickup
7/14/22	0810	0825	Sarah Miller	DEQ	IDW pickup
7/14/22	0930		Andrew Gregg	Restorcap	~~Reuse~~ Reuse
			Rob Marinai	"	
			Richard Loney	"	
			Adam Kafafge	"	
7/14/22	09:30		Michael Halaburda	"	Reuse
7/10/22	08:23	16:30	ALEXIS TAKARA	APEX	Will. Cove. Sampling
7/18/22	08:23	17:00	Jacob Swanson	APEX	Sampling
7/18/22	08:23	1700	Steve Misner	Apex	Sampler
7/18/22	09:23	1200	Robert Sebetich	Apex	Sampling
7-18-22	08:20	1700	Jason Genn	AEC	Excavation
7-18-22	09:20	0940	Dan Walker	AEC	excavation
7-18-22	0830	1100	Jake Munsey	Earth Engineers	sampling
7/19/22	08:22		ALEXIS TAKARA	APEX	SAMPLING
7/19/22	04:22		Robert Sebetich	Apex	Sampling
7/19/22	08:20		Jacob Swanson	Apex	Sampling
7/19/22	0830		Steve Misner	Apex	Sampling

SITE VISIT LOG

VISITORS AND WORKERS MUST CHECK IN AND OUT

Date	Time IN	Time OUT	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
7/19/22	0820		Jake Munsey	Apex	Sampling
7/19/22	0800	1645	Jason Genn	AEC	Sampling
7-20-22	0730	1645	Jason Genn	AEC	Sampling
7/20/22	0800	1630	Jacob Swanson	APEX	Sampling
7/20/22	0900	1630	ALEXIS TAKATA	APEX	SAMPLING
7/20/22	0800	1630	Robert Schettler	Apex	Sampling
7-21-22	0745	1630	Jason Genn	AEC	Sampling
7-21-22	0810	1630	Jake Munsey	APEX	Sampling
7/21/22	0810	1630	Robert Schettler	Apex	Sampling
7/21/22	0810	1630	ALEXIS TAKATA	APEX	SAMPLING
7/21/22	0810	1630	Jacob Swanson	Apex	Sampling
7/22/22	0800	1630	Robert Schettler	Apex	Sampling
7/22/22	0900	1600	ALEXIS TAKATA	APEX	SAMPLING
7-22-22	0730	1600	Jason Genn	AEC	Sampling
7/22/22	0800	1600	Jacob Swanson	APEX	Sampling
7/22/22	0800	1600	Jake Munsey	Apex	Sampling
7/25/22	0700	1600	Jacob Swanson	Apex	Sampling
7/25/22	0700	1600	ALEXIS TAKATA	APEX	SAMPLING
7-25-22	0645	1600	Jason Genn	AEC	Sampling

SITE VISIT LOG

VISITORS AND WORKERS MUST CHECK IN AND OUT

Date	Time IN	Time OUT	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
7/25/22	6:45	1600	Robert Schettler	Apex	Sampling
7/26/22	6:45	1545	Robert Schettler	Apex	Sampling
7/26/22	7:00	01545	Jacob Swanson	Apex	Sampling
7/26/22	0700	1545	ALEXIS TAKARA	APEX	SAMPLING
7-26-22	0645	1545	Jason Genn	AEC	Sampling
7/26/22	0900	1000	Kevin Woodhouse	H+A	Site visit
7/26/22	0900	0950	Steve Misner	Apex	Site visit
7/26/22	0920	1000	Dan Walker	AEC	Site Visit
7/26/22	5PM	7PM	Dan	Arrakis	Security
7-27-22	0640	1530	Jason Genn	AEC	Sampling
7/27/22	0700	1530	ALEXIS TAKARA	APEX	SAMPLING
7/27/22	0700	1530	Jacob Swanson	Apex	Sampling
7/27/22	0702	1530	Jake Mungey	Apex	sampling.
7/27/22	0700	1530	Robert Schettler	Apex	Sampling
7/27/22	5PM	1536	Jason	Arrakis	Security
7/28/22	0700	1536	Robert Schettler	Apex	Sampling
7/28/22	0700	1536	Jacob Swanson	Apex	Sampling
7/28/22	7:00	1536	Brittney Brean	Apex	Sampling
7/29/22	07:00	1536	ALEXIS TAKARA	APEX	SAMPLING

SITE VISIT LOG

VISITORS AND WORKERS MUST CHECK IN AND OUT

Date	Time IN	Time OUT	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
7/28/22	5PM	7am	Arrakis	Security	Arrakis
7/29/22	5PM	8am	Arrakis	Security	Arrakis
7/30/22	8am	8PM	Arrakis	Arrakis	Security
7/30/22	8PM	8am	Arrakis	Arrakis	Security
7/31/22	8a	8PM	Arrakis	Arrakis	Security
7/31/22	8pm	7am	Arrakis	Arrakis	Security
8/1/22	6am	7:30am	Jason	Alco	Electrical
8-1-22	6AM	7:30AM	Brian	ALCO	ELECTRICAL
8-1/22	5P	7am	Arrakis	Arrakis	Security
8/2/22	5P	7am	Arrakis	Arrakis	Security
8/3/22	5P	7am	Arrakis	Arrakis	Security
8/4/22	5P	7am	Arrakis	Arrakis	Security
8/5/22	5P	7am	Arrakis	Arrakis	Security
8/6/22	7am	8PM	Arrakis	Arrakis	Security
8/6/22	8pm	8am	Arrakis	Arrakis	Security
8/7/22	8am	8pm	Arrakis	Arrakis	Security
8/8/22	8pm	7am	Arrakis	Arrakis	Security
8/8/22	5PM	7am	Arrakis	Arrakis	Security
8/9/22	5PM	7am	Arrakis	Arrakis	Security

SITE VISIT LOG

VISITORS AND WORKERS MUST CHECK IN AND OUT

Date	Time IN	Time OUT	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
7/28/22	0702	1530	Jake Mussey	APEX	Sampling
7/28/22	0630	1530	Jason Glenn	AEL	Sampling
7/29/22	0700	536	Robert Schettler	Apex	Sampling
7/29/22	0710		Jake Mussey	APEX	Sampling
7/29/22	0700		ALEXIS TAKARA	APEX	SAMPLING
7/29/22	0700		Jacob Swanson	Apex	Sampling
7/29/22	0630		Jason Glenn	AEL	Sampling
7/29/22	0700		Brittney Breen	Apex	Sampling
8/1/22	0706	1530	Robert Schettler	Apex	Sampling
8/01/2022	0700		ALEXIS TAKARA	APEX	SAMPLING
8/01/2022	0700		Brittney Breen	APEX	Sampling
8/01/22	0600		Jason Glenn	AEL	Sampling
8-1-22	0600		Wes Noel	AEL	Sampling
8/1/22	0715		Jake Mussey	APEX	Sampling
8/2/22	0700	153-	Jacob Swanson	Apex	Sampling
8/2/22	0700		Brittney Breen	Apex	Sampling
8/02/2022	0700		ALEXIS TAKARA	APEX	SAMPLING
8/2/2022	0712		Jake Mussey	APEX	Sampling
8-2-22	0700		Wes Noel	AEL	Sampling
8-2-22	1030		Robert Schettler	Apex	Sampling

SITE VISIT LOG

VISITORS AND WORKERS MUST CHECK IN AND OUT

Date	Time IN	Time OUT	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
8/10/22	5pm	7am	Arrakis	Arrakis	Security
8/11/22	5pm	7am	Arrakis	Arrakis	Security
8/12/22	5pm	7am	Arrakis	Arrakis	Security
8/13/22	7am	8pm	Arrakis	Arrakis	Security
8/13/22	8pm	8am	Arrakis	Arrakis	Security
8/14/22	8am	8pm	Arrakis	Arrakis	Security
8/14/22	8pm	7am	Arrakis	Arrakis	Security
8/15/22	5pm	7am	Arrakis	Arrakis	Security
8/16/22	5pm	7am	Arrakis	Arrakis	Security
8/17/22	5pm	7am	Arrakis	Arrakis	Security
8/18/22	5pm	7am	Arrakis	Arrakis	Security
8/19/22	5pm	7am	Arrakis	Arrakis	Security
8/20	8am	5PM	Arrakis	Arrakis	Security
8/20	8pm	8a	Arrakis	Arrakis	Security
8/21	8am	8pm	Arrakis	Arrakis	Security
8/21	8pm	7am	Arrakis	Arrakis	Security
8/22	5pm	7am	Arrakis	Arrakis	Security
8/23	5pm	7am	Arrakis	Arrakis	Security
8/24	5pm	7am	Arrakis	Arrakis	Security

Site Visit Log

McCormick & Baxter Creosoting Company, Willamette Cove Upland Facility

VISITORS AND WORKERS MUST SIGN IN AND OUT

Date	Time IN	Time OUT	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
8/09/2022	0700	1536	ALEXIS TAKARA	APEX	SAMPLING
8/8/22	0700	1530	Robert Schettler	Apex	Sampling
8/08/22	0700	1530	Brittney Breen	Apex	Sampling
8/8/22	0700	1530	Wesley Noel	AEC	Sampling
8/8/22	0720	1530	Jake Mugsey	FEI	sampling.
8/8/22	0700	1530	Jacob Swanson	Apex	Sampling
8/8/22	0700	1530	Alex Evernden	Apex	Sampling
8/09/2022	0700	1536	ALEXIS TAKARA	APEX	SAMPLING
8/9/22	0700	1536	Robert Schettler	Apex	Sampling
8/9/22	0700	1536	Jacob Swanson	Apex	Sampling
8/9/22	0700	1536	Jake Mugsey	FEI	sampling.
8/9/22	0700	1536	Brittney Breen	Apex	Sampling
8/10/22	0700	1530	Robert Schettler	Apex	Sampling
8/10/2022	0700	1536	ALEXIS TAKARA	APEX	SAMPLING
8/10/2022	0700	1536	Brittney Breen	Apex	Sampling
8/10/2022	0700	1536	Jacob Swanson	Apex	Sampling
8/10/2022	0700	1536	Alex Evernden	Apex	Sampling
8/10/2022	0712	1536	Jake Mugsey	FEI	sampling
8/10/22	0700	1530	Wes Noel	AEC	Sampling
8/11/22	0645	1536	Robert Schettler	Apex	Sampling
8/11/2022	0700	1536	ALEXIS TAKARA	APEX	SAMPLING
8/11/2022	0700	1536	Jake Mugsey	Apex	sampling
8/11/2022	0700	1536	Brittney Breen	Apex	Sampling
8/11/22	0700	1530	Wes Noel	Apex	Sampling
8/12/22	0645	1530	Robert Schettler	Apex	Sampling
8/12/2022	0700	1536	ALEXIS TAKARA	APEX	SAMPLING
8/12/2022	0700	1536	Brittney Breen	Apex	Sampling
8/12/22	0700	1536	Alex Evernden	Apex	Sampling
8/12/22	0700	1530	Jake Mugsey	FEI	sampling.
8.12.22	0700	1536	Wes Noel	AEC	sampling
8/17/22	0700	1530	Jacob Swanson	Apex	Sampling
8/25/22	0845	1220	Steve Misner	Apex	Sampling Rebound Sample

Site Visit Log

McCormick & Baxter Creosoting Company, Willamette Cove Upland Facility

VISITORS AND WORKERS MUST SIGN IN AND OUT

Date	Time IN	Time OUT	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
8/05/2022	0700	1526	ALEXIS TAKARA	APEX	SAMPLING
8/05/2022	0700	1530	Brittney Breen	APEX	Sampling
8/05/2022	0700	1536	Alex Evernden	Apex	Sampling
8-30-2022	0700	1536	Giles Noel	AEC	Sampling
8/30/2022	0700	1536	Jacob Svanson	Apex	Sampling
8/30/2022	0700	1536	Brittney Breen	Apex	Sampling

Site Visit Log

McCormick & Baxter Creosoting Company, Willamette Cove Upland Facility

VISITORS AND WORKERS MUST SIGN IN AND OUT

Date	Time IN	Time OUT	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
8/15/22	0700	1530	Robert Schettler	Apex	Sampling
8/15/22	0705	1536	Jake Munsey	EEI	Sampling
8/15/2022	0700	1536	ALEXIS TAKARA	APEX	SAMPLING
8/15/2022	0700	1536	Brittney Breen	Apex	Sampling
8/15/2022	0700	1536	Jacob Swanson	Apex	Sampling
8/15/22	0700	1530	Wes Noel	AEC	Sampling
8/16/22	0700	1530	Robert Schettler	Apex	Sampling
8/16/22	0709	1536	Jake Munsey	Apex	Sampling
8/16/2022	0700	1536	ALEXIS TAKARA	APEX	SAMPLING
8/16/2022	0700	1536	Brittney Breen	Apex	Sampling
8/16/2022	0700	1536	Jacob Swanson	Apex	Sampling
8-16-22	0600	1536	Wes Noel	AEC	Sampling
8/17/22	0700	1530	Robert Schettler	Apex	Sampling
8/17/22	0700	1536	Brittney Breen	Apex	Sampling
8/17/22	0700	1536	Jacob Swanson	Apex	Sampling
8/17/22	0708	1536	Jake Munsey	Apex	Sampling
8/17/22	0700	1530	Wes Noel	AEC	Sampling
8/18/22	0700	1530	Robert Schettler	Apex	Sampling
8/18/22	0700	1536	Brittney Breen	Apex	Sampling
8/18/22	0700	1530	Wes Noel	AEC	Sampling
8/18/22	0700	1530	Jacob Swanson	Apex	Sampling
8/19/22	0700	1536	Jacob Swanson	Apex	Sampling
8/19/22	0700	1536	Wes Noel	AEC	Sampling
8/19/22	0700	1536	Brittney Breen	Apex	Sampling
8/19/22	0700	1530	Robert Schettler	Apex	Sampling
8/29/22	0700	1536	Robert Schettler	Apex	Sampling
8/29/2022	0700	1530	ALEXIS TAKARA	APEX	SAMPLING
8/29/2022	0700	1536	Jacob Swanson	Apex	Sampling
8/30/22	0700	1536	Robert Schettler	Apex	Sampling
8/30/2022	0700	1530	ALEXIS TAKARA	APEX	SAMPLING

Site Visit Log

McCormick & Baxter Creosoting Company, Willamette Cove Upland Facility

VISITORS AND WORKERS MUST SIGN IN AND OUT

Date	Time IN	Time OUT	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
8-29-22	7:00	15:30	Wes Noel	AEC	Sampling
8-29-22	7:00	8:00	Dale Haller	AEC	site visit
8/31/2022	0700	1530	ALEXIS TAKARA	APEX	SAMPLING
8/31/2022	0700	1530	Robert Schiffler	Apex	Sampling
8/31/2022	0700	1530	Jacob Swanson	Apex	Sampling
9/1/22	0700	1530	Robert Schiffler	Apex	Sampling
9/01/2022	0700	1530	ALEXIS TAKARA	APEX	SAMPLING
9/01/2022	0700	1530	Jacob Swanson	Apex	Sampling
9/01/2022	0700	1530	Brittney Breen	Apex	Sampling
9-1-22	0700	1530	Wes Noel	AEC	Sampling
9/2/22	0700	1530	Robert Schiffler	Apex	Sampling
9/2/22	0700	1530	Jacob Swanson	Apex	Sampling
9/02/2022	0700	1530	ALEXIS TAKARA	APEX	SAMPLING
9-2-22	0700	1530	Wes Noel	AEC	Sampling
9/02/22	0700	1530	Brittney Breen	Apex	Sampling
9/6/22	0700	1530	Robert Schiffler	Apex	Sampling
9/06/2022	0700	1530	ALEXIS TAKARA	APEX	SAMPLING
9/6/22	0700	1530	Wes Noel	AEC	Sampling
9/6/22	0700	1530	Jacob Swanson	Apex	Sampling
9/6/22	0700	1530	Brittney Breen	Apex	Sampling
9/7/22	0700	1530	Robert Schiffler	Apex	Sampling
9/07/2022	0700	1530	ALEXIS TAKARA	APEX	SAMPLING
9/07/2022	0700	1530	Jacob Swanson	Apex	Sampling
9/7/22	0700	1530	Wes Noel	AEC	Sampling
9/8/22	0700	1530	Robert Schiffler	Apex	Sampling
9/08/2022	0700	1530	ALEXIS TAKARA	APEX	SAMPLING
9/08/2022	0700	1530	Brittney Breen	Apex	Sampling
9/08/2022	0700	1530	Jacob Swanson	Apex	Sampling
9-8-22	0700	1530	Wes Noel	AEC	Sampling

Site Visit Log

McCormick & Baxter Creosoting Company, Willamette Cove Upland Facility

VISITORS AND WORKERS MUST SIGN IN AND OUT

Date	Time IN	Time OUT	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
8/25	5PM	7am	Arrakis	Arrakis	Security
8/26	5PM	7am	Arrakis	Arrakis	Security
8/27	5am	5PM	Arrakis	Arrakis	Security
8/27	5PM	5am	Arrakis	Arrakis	Security
8/28	5am	5PM	Arrakis	Arrakis	Security
8/28	5PM	7am	Arrakis	Arrakis	Security
8/29	5PM	7am	Arrakis	Arrakis	Security
8/30	5PM	7am	Arrakis	Arrakis	Security
8/31	5PM	7am	Arrakis	Arrakis	Security
9/1	5PM	7am	Arrakis	Arrakis	Security
9/2	5PM	7am	Arrakis	Arrakis	Security
9/3	7am	5PM	Arrakis	Arrakis	Security
9/3	5PM	5am	Arrakis	Arrakis	Security
9/4	5am	5PM	Arrakis	Arrakis	Security
9/4	5PM	7am	Arrakis	Arrakis	Security
9/5	5PM	7am	Arrakis	Arrakis	Security
9/6	5PM	7am	Arrakis	Arrakis	Security
9/7	4PM	7am	Arrakis	Arrakis	Security
9/8	4PM	7am	Arrakis	Arrakis	Security
9/09	0800		ALEXIS TAKARA	APEX	SITE MAPPING
9/09	0845		BRITTNEY BREEN	APEX	SITE MAPPING
9/9	5PM	5am	Arrakis	Arrakis	Security
9/10	5am	5PM	Arrakis	Arrakis	Security
9/10	5PM	5am	Arrakis	Arrakis	Security
9/11	5am	5PM	Arrakis	Arrakis	Security
9/11	5PM	7am	Arrakis	Arrakis	Arrakis
9/12	5PM	7am	Arrakis	Arrakis	Security
9/13	5PM	7am	Arrakis	Arrakis	Security
9/14	5PM	7am	Arrakis	Arrakis	Security

Site Visit Log

McCormick & Baxter Creosoting Company, Equipment Staging area

VISITORS AND WORKERS MUST SIGN IN AND OUT

Date	Time IN	Time OUT	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
9/12/22	0700	1530	Robert Scheffler	Apex Company	Sampling
9/12/22	0700	1530	Wes Noel	AEC	Sampling
9/12/2022	0700	1530	ALEXIS TAKARA	APEX	SAMPLING
9/12/2022	0700	1530	Brittney Breen	Apex	Sampling
9/12/2022	0700	1530	Alex Evernden	Apex	Sampling
9/13/22	0700	1530	Robert Scheffler	Apex	Sampling
9/13/22	0700	1530	Wes Noel	AEC	Sampling
9/13/2022	0700	1530	ALEXIS TAKARA	APEX	SAMPLING
9/13/2022	0700	1530	Brittney Breen	Apex	Sampling
9/14/22	0700	1530	Robert Scheffler	Apex	Sampling
9/14/22	0700	1530	Wes Noel	AEC	Sampling
9/14/22	0700	1530	Brittney Breen	Apex	Sampling
9/14/2022	0700	1530	ALEXIS TAKARA	APEX	SAMPLING
9/15/22	0700	1530	Robert Scheffler	Apex	Sampling
9/15/2022	0700	1530	ALEXIS TAKARA	APEX	SAMPLING
9/15/22	0700	1530	Wes Noel	AEC	Sampling
9/15/22	0700	1530	Alex Evernden	Apex	Sampling
9/15/22	0700	1530	Brittney Breen	Apex	Sampling
9/16/22	0700	1530	Robert Scheffler	Apex	Sampling
9/16/22	0700	1530	Alex Evernden	Apex	Sampling
9/16/22	0700	1530	Brittney Breen	Apex	Sampling
9/16/22	0700	1530	Wes Noel	AEC	Sampling
9/19/22	0700	1530	Robert Scheffler	Apex	Sampling
9/19/22	0700	15	Brittney Breen	Apex	Sampling
9/19/2022	0700	1530	ALEXIS TAKARA	APEX	SAMPLING
9/19/22	0700	15X	Wes Noel	AEC	Sampling
9/					

Site Visit Log

McCormick & Baxter Creosoting Company, Willamette Cove Upland Facility

VISITORS AND WORKERS MUST SIGN IN AND OUT

Date	Time IN	Time OUT	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
9/20/22	0700	1536	Brittney Breen	Apex	Sampling
9/20/2022	0700	1536	ALEXIS TAKARA	APEX	SAMPLING
9/20/22	0700	1530	Wes Noel	AEC	Sampling
9/20/22	0700	1530	Jake Mugsey	Apex	sampling.
9/20/22	0700	1530	Alex Evernden	Apex	Sampling
9/21/2022	0700	1536	ALEXIS TAKARA	APEX	SAMPLING
9/21/2022	0700	1530	Brittney Breen	Apex	Sampling
9/21/2022	0730	1536	Jake Mugsey	Apex	sampling
9/21/22	0700	1536	Wes Noel	AEC	Sampling
9/22/22	0700	1536	Wes Noel	AEC	Sampling
9/22/2022	0700	1536	ALEXIS TAKARA	APEX	SAMPLING
9/22/2022	0700	1530	Alex Evernden	Apex	Sampling
9/22/22	0700	1536	Jake Mugsey	Apex	sampling
9/22/22	0700	1530	Brittney Breen	Apex	Sampling
9/26/22	0700	1530	Robert Sellar	Apex	Sampling
9/26/22	0700	1536	Wes Noel	AEC	Sampling
9/26/22	0700	1530	Alex Evernden	Apex	Sampling
9/26/22	0700	1536	ALEXIS TAKARA	APEX	SAMPLING
9/26/22	0700	1536	Brittney Breen	Apex	Sampling
9/27/22	0700	1536	Alex Evernden	Apex	Sampling
9/27/2022	0700	1536	ALEXIS TAKARA	APEX	SAMPLING
9/27/22	0700	1536	Wes Noel	AEC	Sampling
9/27/22	0700	1530	Brittney Breen	Apex	Sampling
9/28/22	0700	1536	Robert Sellar	Apex	Sampling
9/28/2022	0700	1536	ALEXIS TAKARA	APEX	SAMPLING
9/28/2022	0700	1536	Brittney Breen	Apex	Sampling
9/28/22	1700	1536	Wes Noel	AEC	Sampling
9/29/2022	0700	1536	Alex Evernden	Apex	Sampling
9/29/22	0700	1536	Brittney Breen	Apex	Sampling
9/29/2022	0700	1536	ALEXIS TAKARA	APEX	SAMPLING
9/29/2022	0700	1536	Wes Noel	AEC	Sampling

Site Visit Log

McCormick & Baxter Creosoting Company, Equipment Staging area

VISITORS AND WORKERS MUST SIGN IN AND OUT

Date	Time IN	Time OUT	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
9/30/22	0700	1530	Robert Schettler	Apex	Sampling
9/3, 3?	0700	1530	Wes Noel	AEC	Sampling
9/30/2022	0700	1530	ALEXIS TAKARA	APEX	SAMPLING
9/30/2022	0700	1530	Brittney Breen	Apex	Sampling
10/03/22	0700	1530	Robert Schettler	Apex	Sampling
10/4/22	0700	1530	Wes Noel	AEC	Sampling
10/03/22	0700	1530	Brittney Breen	Apex	Sampling
10/03/2022	0700	1530	ALEXIS TAKARA	APEX	SAMPLING
10/4/2022	0700	1530	Alex Evernden	Apex	Sampling
10/4/22	0700	1530	Wes Noel	AEC	Sampling
10/04/22	0700	1530	Brittney Breen	Apex	Sampling
10/04/2022	0700	1530	ALEXIS TAKARA	APEX	SAMPLING
10/5/22	0700	1530	Wes Noel	AEC	Sampling
10/05/2022	0700	1530	ALEXIS TAKARA	APEX	SAMPLING
10/5/2022	0700	1530	Alex Evernden	Apex	Sampling
10/05/2022	0700	1530	Brittney Breen	Apex	Sampling
10/05/22	0700	1530	Robert Schettler	Apex	Sampling
10/6/22	0700	1530	Wes Noel	AEC	Sampling
10/06/22	0700	1530	Robert Schettler	Apex	Sampling
10/6/22	0700	1530	Alex Evernden	Apex	Sampling
10/06/22	0700	1530	Brittney Breen	Apex	Sampling
10/07/22	0700	1530	Robert Schettler	Apex	Sampling
10/7/22	0700	1530	Alex Evernden	Apex	Sampling
10/07/22	0700	1530	Brittney Breen	Apex	Sampling
10/7/22	0700	1530	Wes Noel	AEC	Sampling
10/10/22	0700		Wes Noel	AEC	Sampling
10/10/22	0700		Alex Evernden	Apex	Sampling
10/10/22	0700		Robert Schettler	Apex	Sampling
10/10/2022	0700		ALEXIS TAKARA	APEX	SAMPLING
10/11/2022	0700		ALEXIS TAKARA	APEX	

Site Visit Log

McCormick & Baxter Creosoting Company, Willamette Cove Upland Facility

VISITORS AND WORKERS MUST SIGN IN AND OUT

Date	Time IN	Time OUT	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
10/10/22	0700		Brittney Breen	Apex	Sampling
10/11/22	0700		Alex Evernden	Apex	Sampling
10/11/22	0700		Wes Noel	AE<	Sampling
10/11/22	0700		Brittney Breen	Apex	Sampling
10/12/22	0700		Alex Evernden	Apex	Sampling
10/12/22	0700		Brittney Breen	Apex	Sampling
10/12/2022	0700		ALEXIS TAKARA	APEX	SAMPLING
10/13/2022	0700		ALEXIS TAKARA	APEX	SAMPLING
10/13/22	0700		Brittney Breen	Apex	Sampling
10/18/22	0700		Alex Evernden	Apex	Sampling
10/14/22	0700		Alex Evernden	Apex	Sampling
10/14/2022	0700		ALEXIS TAKARA	APEX	SAMPLING
10/14/22	0700		Brittney Breen	Apex	Sampling
10/17/2022	0700		ALEXIS TAKARA	APEX	SAMPLING
10/17/22	0700		Wes Noel	AE<	Sampling
10/17/22	0700		Alex Evernden	Apex	Sampling
10/18/2022	0700		ALEXIS TAKARA	APEX	SAMPLING
10/18/2022	0700		Alex Evernden	Apex	Sampling
10/18/22	0700		Wes Noel	AE<	Sampling
10/19/22	0700		Wes Noel	AE<	Sampling
10/19/22	0700		Alex Evernden	Apex	Sampling
10/19/2022	0700		ALEXIS TAKARA	APEX	SAMPLING

Site Visit Log

11/2022

McCormick & Baxter Creosoting Company, Equipment Staging area

VISITORS AND WORKERS MUST SIGN IN AND OUT

Date	Time IN	Time OUT	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
10/17/22	0700	1530	Robert Schuyler	Anchor	Sampling
11/29/22	0900	1500	Robert Schuyler	Anchor	Sampling
11/29/22	1045	1136	Guy Gibbon	TA cut ABOVE	Coring
11/29/22	1045	1130	Gabe Waterworth	A cut Above	Coring

Site Visit Log

McCormick & Baxter Creosoting Company, Equipment Staging area

VISITORS AND WORKERS MUST SIGN IN AND OUT

Date	Time IN	Time OUT	Name	Name of Company, Agency, or Organization	Comment (Purpose of Visit, etc.)
9/19/2022	0900	1110	Kevin Woodhouse	H+A	Site Inspection
9/19/2022	~~1055~~ 0900	1055	Sarah Miller	DEQ	" "
9/19/2022	0900	1110	Chris Rhea	GSI	" "
9/19/2022	1020	1055	Trevor	American backflow Testing	Backflow testing
10/19	1130	1140	Steve Misner	~~Apex~~	dip sample supplies
12/20/2022	0900	1045	Kevin Woodhouse	H+A	Site inspection
12/20/2022	0900	1045	Sarah Miller	DEQ	" "
12/20/2022	0900	1045	Chris Rhea	GSI	" "

APPENDIX C
Photograph Log - Vegetation Inspection

Photograph C1: Earthen cap and drainage swale in the foreground with the impermeable cap in the background. Taken looking south from Photograph Station 1 comparing baseline and conditions in 2014. (Left - June 2011, Right – June 2014).

Photograph C2: Tree and shrub plantings on the earthen cap. Taken looking southeast from Photograph Station 2 (May 2022).

Photograph C3: Tree and shrub plantings on the earthen cap are healthy and spreading. Taken from Photograph Station 2 looking southeast (October 2012).

Photograph C4: Tree and shrub plantings on the earthen cap are healthy and spreading. Taken from Photograph Station 2 looking southeast (May 2022).

Photograph C5: Eastern edge of the earthen cap with perimeter road in foreground. Taken from Photograph Station 3 looking west (October 2012).

Photograph C6: Eastern edge of the earthen cap with perimeter road in foreground. Taken from Photograph Station 3 looking west (May 2022).

Photograph C7: Stormwater pond dominated by willow and alder. Taken from Photograph Station 4 looking northeast (October 2012).

Photograph C8: Stormwater pond dominated by willow and alder. Taken from Photograph Station 4 looking northeast (May 2022).

Photograph C9: Willow plantings on the earthen cap. Taken from Photograph Station 5 looking northeast (October 2012).

Photograph C10: Willow plantings on the earthen cap. Taken from Photograph Station 5 looking northeast (May 2022).

Photograph C11: Impermeable cap dominated by grasses and herbaceous vegetation in the early summer (left) and fall (right). Taken from Photograph Station 6 looking east (Left – May 2012; right – October 2012).

Photograph C12: Impermeable cap dominated by grasses and herbaceous vegetation. Taken from Photograph Station 6 looking east (May 2022).

Photograph C13: Vegetation growth within the lower riparian component. Taken from Photograph Station 7 looking south (May 2012).

Photograph C14: Vegetation growth and wood debris within the lower riparian component and along the shoreline. Taken from Photograph Station 7 looking southeast (May 2022).

Photograph C15: Upper riparian component with trees, shrubs, and herbaceous plants. Taken from Photograph Station 8 looking southwest (Left – May 2012; right – October 2012).

Photograph C16: Upper riparian component with trees, shrubs, and herbaceous plants. Taken from Photograph Station 8 looking southwest (May 2022).

Photograph C17: Lower riparian component with large wood along the edge. Taken from Photograph Station 9 looking northwest (Left – May 2012; right – October 2012).

Photograph C18: Lower riparian component with large wood along the edge. Taken from Photograph Station 9 looking northwest (May 2022).