DEPARTMENT OF
ECOLOGY
State of Washington

CLEANUP ACTION PLAN

Uplands Portion of Snopac Property
Seattle, Washington

Facility Site ID: 1523145
Site Cleanup ID: 12463

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Contents

List of Tables

List of Figures

Acronyms

ARAR	applicable or relevant and appropriate requirement
Aspect	Aspect Consulting
bgs	below ground surface
BMP	best management practice
CAP	cleanup action plan
CFR	Code of Federal Regulations
City	City of Seattle
CMMP	contaminated media management plan
COC	contaminant of concern
Corps	U.S. Army Corps of Engineers
cPAHs	carcinogenic polycyclic aromatic hydrocarbons
CPOC	conditional point of compliance
CSGP	Construction Stormwater General Permit
CUL	cleanup level
DA	Discharge Authorization
DCA	disproportionate cost analysis
Ecology	Washington State Department of Ecology
EDR	Engineering Design Report
EPA	U.S. Environmental Protection Agency
FS	Feasibility Study
GCMP	groundwater compliance monitoring plan
IA	Interim Action
IAWP	Interim Action Work Plan
IC	Institutional Controls
LDW	Lower Duwamish Waterway
LDWG	Lower Duwamish Waterway Group
mg/kg	milligram per kilogram

MHHW	mean higher high water
MNA	monitored natural attenuation
MTCA	Model Toxics Control Act
NAVD88	North American Vertical Datum 1988
NPDES	National Pollutant Discharge Elimination System
OHWM	ordinary high water mark
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
PCBs	polychlorinated biphenyls
PCP	pentachlorophenol
PCUL	preliminary cleanup level
PQL	practical quantification limit
RAL	remedial action level
RAO	remedial action objective
RCW	Revised Code of Washington
RI	Remedial Investigation
ROD	Record of Decision
SAP	Sampling Analysis Plan
SBG	spent sandblast grit
SEPA	State Environmental Policy Act
TBT	tributyltin
TEQ	toxic equivalent concentration
TESC	temporary erosion and sedimentation controls
TPH	total petroleum hydrocarbon
µg/L	microgram per liter
USDOT	United States Department of Transportation
WAC	Washington Administrative Code
WISHA	Washington Industrial Safety and Health Act

Executive Summary

This Cleanup Action Plan (CAP) defines the cleanup action selected by the Washington State Department of Ecology (Ecology) for the upland portion of the Snopac Property (the Site), located in Seattle, Washington. The Site is located at 5055 and 5053 East Marginal Way South in Seattle, Washington (Property), and borders the eastern portion of Slip 1 of the Lower Duwamish Waterway (LDW). Site groundwater, soil, and Slip 1 sediments have been impacted by historical releases of hazardous substances from the Property and the cleanup activities are being performed under Agreed Order No. DE16300 (Agreed Order) between Ecology and 5055 Properties LLC.

Summary of Site Conditions

The Site, as defined by Washington State's Model Toxics Control Act (MTCA), includes all upland and in-water areas impacted by historical releases of hazardous substances from the Property. Multiple environmental investigations on the Property identified spent SBG-containing fill as the primary source of Site contaminants, which resulted in contaminants in uplands soil and groundwater exceeding respective preliminary cleanup levels (PCULs). Site contaminants of concern (COCs) in soil and/or groundwater were metals (arsenic, copper, lead, mercury, nickel, and zinc), polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), pentachlorophenol (PCP), tributyltin (TBT), and total petroleum hydrocarbons (TPHs) in limited areas of the uplands.

Interim Remedial Action

The interim remedial action implemented to remove contaminant source material at the Site uplands in 2020-2021 included the following components

- The one building on the Site was demolished to allow removal of adjacent contaminated soil;
- A shoring wall was installed along the shoreline; and
- Landward of the shoring wall, contaminated SBG-containing fill and wood pilings extending within the fill were excavated, with concurrent excavation dewatering. Once the interim action objectives were achieved, based on sampling within the excavation, the excavation was backfilled to restore Site grades.

Cleanup Objectives

The remedial action objectives (RAOs) established for the upland cleanup are as follows:

- **RAO 1:** Prevent direct human contact with contaminated Site soil and/or groundwater containing contaminants at concentrations above cleanup levels (CULs) defined in this CAP.
- **RAO 2:** Prevent discharge of Site groundwater contaminants to LDW surface water and sediments at concentrations above CULs.

- **RAO 3:** Prevent erosion of upland soil on the shoreface into LDW sediments.

Cleanup standards are established for COCs in upland soil and groundwater to be protective of human health and the environment via all applicable exposure pathways, including groundwater discharge to LDW surface water and soil erosion to LDW sediment. A groundwater conditional point of compliance (CPOC) is established at the southern end of the sheet pile wall, where upland groundwater discharges to the LDW. Ecology reserves the right to change the groundwater conditional point of compliance location subject to completing the removal of the remaining SBG-containing fill from the Site.

Remedial Alternatives Evaluated

The following three remedial alternatives for the Site uplands were developed and evaluated:

- **Alternative 1** consists of the following cleanup components:
  - Removal of SBG-containing fill located between the shoring wall and mean higher high water (MHHW). Wood pilings present within the excavation area would be removed to the top of the native soil beneath the SBG-containing fill; the deeper portion of the pilings within the native soil would be left in place.
  - Following the complete source removal, residual COCs in groundwater would be addressed by monitored natural attenuation (MNA).
  - Maintain institutional controls (ICs) (i.e., fencing and signage) to restrict human access and use of the shoreface and tidelands until the SBG-containing fill removal and the shoreface restoration are completed. If removal of the remaining SBG-containing fill does not comply with soil cleanup standards, a restrictive environmental covenant would be implemented to notify construction workers of residual contaminated materials and require appropriate worker protection measures. A contaminated media management plan (CMMP) would also be prepared to define handling requirements for residual contaminated soil and groundwater to be removed during subsequent upland redevelopment activities.
- **Alternative 2** consists of the Alternative 1 component plus full removal of the wood pilings in their entirety, including the portion within the native soil.
- **Alternative 3** consists of the Alternative 2 components plus active groundwater treatment to immobilize residual dissolved metals that can remain at concentrations exceeding cleanup levels (CULs) after SBG-containing fill seaward of the shoring wall is removed.

Based on the evaluations of these three alternatives, Ecology's selected alternative is Alternative 2.

Cleanup Action Selected

The selected cleanup action for the Site therefore consists of the following components:

- Removal and off-site landfilling of SBG-containing fill and complete removal of the wood pilings from within the area located between the shoring wall and MHHW. Because this uplands removal can only be practicably done during the Site in-water sediment cleanup (which will remove the SBG-containing fill located seaward of MHHW), the uplands removal action will be done with the in-water sediment removal action. This component of the cleanup will be done concurrently with the sediment cleanup for the LDW Lower Reach, estimated to start by 2030;
- MNA of residual COCs in groundwater; and
- ICs.

This Executive Summary should only be used in the context of the full report.

1 Introduction and Background

This Cleanup Action Plan (CAP) describes the cleanup action selected by the Washington State Department of Ecology (Ecology) for the upland portion of the Snopac Property (the Site), located in Seattle, Washington. The Site is located at 5055 and 5053 East Marginal Way South in Seattle, Washington (Property), and borders the eastern portion of Slip 1 of the Lower Duwamish Waterway (LDW; Figure 1). The Site, as defined by Washington State's Model Toxics Control Act (MTCA), includes all upland and in-water areas impacted by historical releases of hazardous substances from the Property. Site groundwater, groundwater seeps, soil, and Slip 1 sediments have been impacted by historical releases of hazardous substances from the Property. The Site with historical features is shown on Figure 2.

Cleanup activities at the Site are being performed under Agreed Order No. DE16300 (Agreed Order) between Ecology and 5055 Properties LLC, dated July 15, 2019. The Agreed Order requires the scope of this CAP to include the upland portion of the Site, which is divided from the in-water portion at the mean higher high water (MHHW) elevation. The portion of the Site below MHHW includes intertidal and subtidal sediments that are part of the LDW Superfund site regulated by the U.S. Environmental Protection Agency (EPA). The EPA's Record of Decision (ROD), that defined the cleanup action for the LDW, was finalized in November 2014 (EPA, 2014).

The Remedial Investigation (RI) Report for the Site (upland and in-water areas) and the Upland Feasibility Study (FS) of the Site, prepared to satisfy requirements of the Agreed Order and Washington Administrative Code (WAC) Sections 173-340-350 and 173-204-550(6), were finalized on December 21 and December 20, 2023, respectively, after the public comment period for the two documents held between August 28 and October 26, 2023. The RI report (Aspect, 2023a) evaluated the nature and extent of contamination in the upland and sediment portions of the Site. The Upland FS (Aspect, 2023b) was prepared to develop and evaluate remedial alternatives for the upland portion of the Site, to satisfy requirements of the Agreed Order and WAC Section 173-340-351.

While the RI/FS was underway, an interim action (IA) was completed for the Site uplands in 2021, in accordance with the Agreed Order and an Ecology-approved Interim Action Work Plan (IAWP; Aspect, 2020). The IA scope included construction of a sheet pile shoring wall (shoring wall), just inland of MHHW, which served as the western limit of the IA. The completed IA achieved the objectives in the IAWP of removing all spent sandblast grit (SBG[1])-containing fill landward of the shoring wall and complying with soil remediation levels, as reported in the Final Interim Action Report (Aspect, 2021).

In accordance with the Agreed Order, this CAP describes the final cleanup action selected by Ecology for the Site uplands and provides additional information in accordance with WAC 173-340-380. The selected cleanup action for the uplands includes removal of the spent SBG-containing fill seaward of the shoring wall above MHHW, groundwater monitored natural attenuation (MNA), and institutional controls (ICs).

[1] All of the sandblast grit placed in the Property was spent (used).

2 Site Description

2.1 Site History

The Site has a long industrial history that began with the construction of the LDW and Slip 1 at the beginning of the 1900s. Starting sometime in the 1970s, SBG-containing fill was disposed of directly on the bank at the head of Slip 1 on the west side of the Property, and then later behind the makeshift retaining wall present at the Property shoreface. Fill materials, composed of both soil and anthropogenic debris that includes spent SBG, railroad ties, coal fragments, glass shards, concrete, and brick or masonry fragments, were also placed behind the retaining wall to bring the shoreface area of the Property to current grade.

Ground surface elevation within the uplands is approximately 15 feet NAVD88[2]. A building formerly used as a warehouse existed on the Property during remedial investigations. This building was demolished in November 2020 to allow for the IA. The IA was completed in early 2021, and the Property is currently vacant, fenced, and stabilized for stormwater in accordance with the City of Seattle (City) construction permit (Aspect, 2023a).

Site groundwater, groundwater seeps, soil, and Slip 1 sediments have been impacted by historical releases of hazardous substances from the Property. Public and private Site investigations have been ongoing since 2004 and served as the findings of fact in the Agreed Order. For a detailed Site description, Site history, investigation summary, and environmental summary, see the RI and IAWP (Aspect, 2023b and 2020, respectively).

Four soil units occur at the Site, which from the surface down are: (1) fill materials (Fill Unit); (2) native unit consisting of estuarine deposits (Estuarine Unit); (3) native alluvium (Alluvium Unit); and (4) over-consolidated glacial deposits that underly the Alluvium Unit at a depth greater than 150 feet. Upland contamination occurred in the Fill Unit and is associated primarily with the SBG-containing fill.

The Fill Unit is a water table (unconfined) water-bearing unit that is hydraulically connected to and tidally influenced by the LDW. The Estuarine Unit functions as an aquitard, restricting vertical groundwater flow between the Fill Unit and underlying Alluvium Unit. A confined aquifer is present in the Alluvium Unit, which is also hydraulically connected to the LDW and has greater tidal influence than the Fill Unit. Inland from the shoreline, groundwater in the Fill Unit and Alluvium Unit flows generally westward toward the LDW. During high tidal stages in the LDW, groundwater near the shoreline in the Fill Unit and Alluvium Unit temporarily flows inland (eastward) a short distance; however, when averaged across the entire tidal cycle, groundwater in the Fill Unit and in the Alluvium, Unit flows westward with discharge to the LDW.

The shoring wall was installed to a depth of approximately 45 feet below grade to fully penetrate the Fill Unit and the shallow portion of the Alluvium Unit. Following completion of the IA, a tidal study was conducted to assess the hydraulic effect of the shoring wall on Site groundwater levels and flow directions. The tidal study involved

[2] All elevations in this CAP are relative to the North American Vertical Datum of 1988 (NAVD88).

installing pressure transducers in five Fill Unit wells and two Alluvium Unit wells to measure water levels at 5-minute intervals for approximately 72 hours, encompassing several full tidal cycles. Tidal stage in the LDW for the same time period was obtained from the National Oceanic and Atmospheric Administration tidal station located in Elliott Bay.

The tidal study determined that the shoring wall effects an 85 to 98 percent reduction in tidal efficiency[3] at nearshore well locations in the Fill Unit compared to earlier data collected prior to the IA (see Appendix A of Aspect, 2023b). After the shoring wall installation, the net (tidally averaged) groundwater flow direction in the Fill Unit is generally west, southwest towards the shoring wall and around its south end where it then discharges to the LDW (Figure 3). While the shoring wall reduces the hydraulic connection between upland groundwater and the LDW, all Site groundwater continues to discharge to the LDW following its installation.

2.2 Remedial Investigation

Significant environmental investigations occurred in the uplands prior to the 2019 Agreed Order with Ecology, and additional uplands characterization was performed in 2019 under the Agreed Order. Sediment investigations were performed by the EPA and their consultants in Slip 1 from 1997 to 1998 and 2004 to 2006, and then in 2015 and 2018 by 5055 Properties LLC to supplement EPA results and support the in-water sediment remedial action required by the LDW ROD (EPA, 2014).

The Site RI and Upland FS Report were finalized and approved by Ecology in 2023, following public comment (Aspect, 2023a, 2023b). Environmental investigations on the Property identified SBG-containing fill as the primary source of Site contaminants, which resulted in contaminants in uplands soil and groundwater exceeding respective preliminary cleanup levels (PCULs) provided in Ecology's LDW PCUL Workbook (Ecology, 2024b), which were applied as screening levels for the RI. Site contaminants of concern (COCs) in soil and/or groundwater were metals (arsenic, copper, lead, mercury, nickel, and zinc), polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), pentachlorophenol (PCP), tributyltin (TBT), and total petroleum hydrocarbons (TPHs) in limited areas of the uplands. Figure 4 displays the distribution of COCs in vadose-zone soil (above water table) and saturated-zone soil (below water table) that existed prior to the IA.

The extent of PCUL exceedances in uplands soil and groundwater generally coincided with the inferred extent of SBG-containing fill as seen on Figure 4. Inland of the SBG extent, including outside and within the footprint of the existing warehouse, fill soils exhibit isolated low-level concentrations of PAHs, PCBs, and metals that exceed PCULs but are typical of concentrations in urban fill soils. There is no historical process on Site that explains the sporadic low-level exceedances outside of the SBG-containing fill and, as such, there is no reason to suspect an additional on-Site source for these COC exceedances.

[3] Ratio of change in groundwater level to corresponding change in LDW tidal stage, expressed as a percentage.

2.3 Interim Remedial Action

The spent SBG-containing fill is a significant source of contaminants to upland groundwater discharging to the sediments and surface waters of the LDW. The removal of upland SBG-containing fill was conducted as an IA as defined in MTCA (WAC 173-340-430 (1)) and in accordance with the Agreed Order. The plan for the IA was approved by Ecology in an IAWP (Aspect, 2020).

The IA was a component of construction permitted by the City of Seattle (City) Construction Permit 66942-CN (construction permit) issued on May 26, 2020, as detailed in the IAWP. The construction permit included many activities required to conduct the IA including building demolition, shoring wall installation, contaminated soil excavation landward of the shoring wall, temporary dewatering, and backfill activities. Construction permit activities preceding remedial excavation began in August 2020. The IA soil removal activities started on December 26, 2020, and were completed on January 22, 2021. The IA Report (Aspect, 2021a) summarizes the details of the completed IA activities.

To summarize the IA, removal of SBG-containing fill required temporary excavation dewatering and night work during low tides the week of January 11, 2021. Performance monitoring in the form of excavation verification soil sampling was conducted in accordance with the IAWP. Based on the verification sampling results, removal of SBG-containing fill extended beyond the planned excavation limits at shallow depths (less than 4 feet below ground surface [bgs]). In total, 5,983 tons of SBG-containing fill material were removed from the final IA excavation limits shown on Figure 4. The IA achieved permanent removal of nearly 6,000 tons of contaminated soil from the Site uplands immediately adjacent to the LDW. In addition, nearly 80,000 gallons of groundwater were extracted during excavation, providing additional removal of contamination (in dissolved phase) from within the source area.

The IA excavation encountered a high density of wood pilings extending through the Estuarine Unit and into the Alluvium Unit. The wood pilings were cut at the bottom of the IA excavation, at the top of the Estuarine Unit, and removed from the Site and disposed with the contaminated soil.

The completed IA achieved the IAWP objectives of removing SBG-containing fill and meeting soil remediation levels within the Site uplands landward of the shoring wall. As such, the completed IA accomplished substantial contaminant source control along the LDW shoreline, thus contributing to the long-term protection of the adjacent LDW.

2.4 Post-IA Groundwater Monitoring

After completion of the IA, eight rounds of groundwater monitoring were completed to assess Site groundwater quality and verify the empirical demonstration of soil compliance with soil remediation levels for carcinogenic PAHs (cPAHs) and the non-carcinogenic PAH naphthalene, in accordance with the Ecology-approved Sampling and Analysis Plan for Groundwater Confirmation Monitoring (SAP; Aspect, 2021b). The monitoring well network included four new monitoring wells (MW-13 through MW-17) installed in June 2021 within the IA excavation footprint and two existing monitoring wells (MW-8 and MW-12) located upgradient of the IA excavation area (Figure 3). The

2021 wells MW-13, MW-15, and MW-16 were screened in the Fill Unit and located near the shoring wall to assess the quality of Fill Unit groundwater in the area as close as practicable to the LDW. Because it was known that the shoring wall would redirect flow of groundwater, Fill Unit wells MW-13 and MW-16 were positioned near the wall's southern and northern ends, respectively. The 2022 tidal study conducted with the new well network determined that Fill Unit groundwater flows around the southern end of the shoring wall at MW-13 where it discharges to the LDW (refer to Appendix A in the Upland FS; Aspect, 2023b). MW-14 is also located near the shoring wall and is screened in the Alluvium Unit. Fill Unit wells MW-12 and MW-17, and Alluvium Unit well MW-8, are located east (upgradient) of the completed IA area to assess the quality of groundwater entering the Site in the respective water-bearing units.

In accordance with the SAP, four groundwater monitoring events were initially conducted in June 2021, November 2021, January 2022, and April 2022. Four additional rounds of monitoring were later conducted in May 2023, August 2023, December 2023, and February 2024. The additional monitoring was conducted to assess whether compliance could be achieved with an additional year of monitoring following completion of the IA. Compliance is defined operationally for each analyte as four consecutive samples meeting PCULs. Table 1 presents the analytical data from the eight rounds of post-IA groundwater monitoring.

Following the eight rounds of monitoring, compliance with CULs defined in this CAP were demonstrated for all analytes in both Alluvium Unit wells (MW-8 and MW-14; Table 1).

For Fill Unit groundwater, compliance with PCULs was demonstrated at each well for organic contaminants TPH, PCP, PCBs, and non-carcinogenic PAHs including naphthalene, TBT, and the metals lead, mercury, and zinc. Compliance was also demonstrated for other metals at select wells.

Contaminants in Fill Unit wells that are currently not demonstrated to comply with PCULs are as follows (Table 1):

- Arsenic in shoreline wells MW-15 and MW-16
- Copper in shoreline wells MW-13 and MW-16
- Nickel in shoreline wells MW-15 and MW-16, and in well MW-12 located near the upgradient boundary of the Property and outside the zone of tidal influence
- cPAHs in well MW-12

Figure 3 illustrates the distribution of wells and their residual exceedances of groundwater CULs.

As described above, the IA accomplished complete removal of metals-contaminated source material (SBG-containing fill) landward of the shoring wall. Therefore, the residual groundwater metals exceedances detected at the shoreline wells can be attributable to tidal exchange (inland flow) of metals-contaminated groundwater from the SBG-containing fill remaining seaward of the shoring wall, via seams within the wall or around its edges.

2.5 Media and Contaminants of Concern

The impacted media in the Site uplands are soil and groundwater. Based on the post-interim action compliance results, the following are the residual upland COCs by media:

- Metals
  - Arsenic (soil and groundwater)
  - Copper (soil and groundwater)
  - Lead (soil only)
  - Mercury (soil only)
  - Nickel (groundwater only)
  - Zinc (soil only)
- PAHs
  - Non-carcinogenic PAHs (soil only)
  - Carcinogenic PAHs (soil and groundwater)
- Polychlorinated biphenyls (PCBs) (soil only)
- TBT (soil only)

Soils remaining landward of the shoring wall comply with PCULs following completion of the IA. The soil COCs are present in upland SBG-containing fill located seaward of the shoring wall.

3 Remedial Action Objectives

Remedial action objectives (RAOs) are specific goals to be achieved by remedial alternatives that meet cleanup standards and provide protection of human health and the environment under a specified land use. Ecology has the following objectives for the LDW source control program (Ecology, 2016):

- The near-term goal of source control is to address existing, ongoing sources of contamination to the LDW, so that in-waterway sediment cleanup can begin without the risk of recontamination above remedial action levels (RALs), as defined in EPA's ROD.
- The long-term goal is to minimize risk of re-contaminating sediments above the sediment cleanup standards established in the ROD.

These source control objectives were a basis for the completed IA and remain objectives for final cleanup of the Site uplands.

The RAOs established for the uplands are as follows:

- **RAO 1:** Prevent direct human contact with contaminated Site soil and/or groundwater containing contaminants at concentrations above CULs.

- **RAO 2:** Prevent discharge of Site groundwater contaminants to LDW surface water and sediments at concentrations above CULs.
- **RAO 3:** Prevent erosion of upland soil on the shoreface into LDW sediments.

RAOs are generally achieved by elimination of the associated exposure pathway. Pathway-specific exposure elimination can be accomplished through contaminant removal or treatment to meet chemical- and media-specific cleanup standards at specified points of compliance. Exposure elimination can also be accomplished using ICs.

4 Selected Cleanup Action

The cleanup action was developed through evaluation of the Site areas and media targeted for remediation and the assembly of applicable remedial technologies into remedial alternatives in the Upland FS (Aspect, 2023b). The remedial alternatives were evaluated with respect to minimum requirements, threshold requirements, and the relative cost-to-environmental-benefit ratio (disproportionate cost analysis; DCA) in accordance with MTCA (WAC 173-340-360) for each of the remedial alternatives.

4.1 Cleanup Action Components

The selected cleanup action for the Site includes the following components as shown on Figure 6

- Removal and off-site landfilling of all SBG-containing fill and wood pilings located between the shoring wall and MHHW;
- MNA of residual COCs in groundwater; and
- ICs.

The following sections describe each element of the selected cleanup action.

4.1.1 SBG-Containing Fill Removal

The spent SBG-containing fill seaward of the shoring wall will be removed and disposed of as non-dangerous special waste at an off-Site Subtitle D disposal facility, thus completing the removal of all SBG-containing fill from the Site. The removal of SBG-containing fill will encompass the remaining upland area inland of MHHW (estimated 2,400 cubic yards) and from the in-water area seaward of MHHW (estimated 1,955 cubic yards). The shoreface removal project will obtain the federal permits required for in-water work and will be conducted at the same time as the in-water sediment cleanup action, in accordance with the LDW ROD.

The limits for SBG-containing fill removal will extend to the maximum extent practicable, spanning the northern and southern Property boundaries. Removal depth is assumed as the top of the Estuarine Unit, consistent with the uplands IA, with an expected average depth of 11 feet bgs within the upland portion of the shoreface. The existing soil analytical results from the Estuarine Unit confirm that removal of SBG-containing fill above the Estuarine Unit will achieve soil CULs. Once the SBG-

containing fill is removed, the entire excavation surface will be below MHHW. The fill removal will include removing wood pilings in their entirety, including the portion in the Estuarine and Alluvium Units, and disposal of the removed pilings with the SBG-containing fill. It is assumed that the wood piling removal will be conducted using a crane with a vibratory hammer,

Following removal of the SBG-containing fill and wood pilings, backfill will re-establish stable slopes along the shoreface that both avoid a net fill below the ordinary high water mark (OHWM) and preserve upland land uses. Over-steepened and vertical sections will be replaced with stable slopes. The backfill surface will consist of the smallest substrate that would remain stable on the slopes. Where needed, rock will be used to improve erosion resistance and/or slope stability, and a surface layer of sandy gravel habitat mix will be applied over and between the rocks to improve the ecological function of the surface substrate. Above OHWM, the slope will be flattened to the extent practical up to the existing grade at the shoring wall. The restored shoreface area will be planted with a community of appropriate native trees, shrubs, and herbaceous species to increase riparian habitat function. In addition, the restoration will require cutting the top of the shoring wall to the restored grade, and penetrating the wall as needed to restore stormwater outfall(s). All of these elements of the shoreface removal project will be incorporated into the final design for the sediment cleanup of the LDW Lower Reach.

The removal of the remaining SBG-containing fill, wood pilings and subsequent restoration of the remaining shoreface, within the upland area (above MHHW) and in-water area (below MHHW), will be conducted concurrently with the sediment cleanup for the LDW Lower Reach, estimated to start by 2030.

4.1.2 Groundwater Monitored Natural Attenuation

As described in Section 2.4, groundwater in the Alluvium Unit complies with CULs, however, concentrations of COCs in some Fill Unit Wells do not comply with CULs. MNA is the selected action for residual COC concentrations exceeding CULs in Fill Unit groundwater. Natural attenuation of COCs in groundwater is already occurring at the Site as indicated by generally decreasing concentrations, and compliance with CULs for several contaminants, following the source control accomplished by the upland IA.

Groundwater MNA implementation, which is subject to preparation of the Groundwater Compliance Monitoring Plan (GCMP) concurrent with the SBG-containing removal design, is anticipated to include the following steps:

- Establish the final groundwater point of compliance, corresponding groundwater monitoring network (may include upland wells and/or seeps seaward of the shoring wall), analyte list, and schedule for MNA monitoring.
- Monitor groundwater until four consecutive results below the CULs are achieved at the point of compliance to verify upland groundwater compliance.
- Evaluate MNA progress toward compliance and each year prepare and submit to Ecology an Annual Groundwater MNA Report that includes a description of field activities and data quality review, an analysis of the monitoring data with respect to temporal trends and compliance with groundwater cleanup standards, and an update to the estimated time to achieve those standards.

4.1.3 Institutional Controls

The interim ICs implemented as part of the IA to restrict human access and use of the shoreface and tidelands (i.e., chain link fencing and signage around the south and east edges of the Property[4]) will be maintained at the Site until the SBG-containing fill removal and the shoreface restoration are completed. If uplands soil compliance is not achieved after the remaining SBG-containing fill is removed, a restrictive environmental covenant would be prepared and recorded to notify construction workers of residual contaminated materials and require appropriate protection measures to prevent worker exposure. A contaminated media management plan (CMMP) would also be prepared to provide the handling requirements for any residual contaminated soil and groundwater to be removed during subsequent upland redevelopment activities.

4.2 Other Remedial Alternatives Evaluated

The potentially applicable remedial technologies for the uplands were integrated into remedial alternatives evaluated in the Upland FS Report (Aspect, 2023b). The following remedial technologies were incorporated into FS remedial alternatives but were not included as an element of the selected cleanup action:

- **Partial Wood Piling Removal –** In this alternative, SBG-containing fill would be excavated completely and the wood pilings seaward of the shoring wall would be removed to the top of the Estuarine Unit (native soil) underlying the SBG-containing fill.
- **Active Groundwater Treatment –** In this alternative, the active treatment would target groundwater exceedances that remain after SBG-containing fill seaward of the shoring wall is removed. The groundwater treatment was assumed to use iron-media to immobilize residual dissolved metals. The iron would be emplaced in the subsurface through direct-push injections after the remaining SBG-containing fill was removed.

4.3 Rationale for Selecting Cleanup Action

The Upland FS included a DCA to assess the extent to which the remedial alternatives would use permanent solutions to the maximum extent practicable. The DCA quantified the environmental benefits of each alternative, and then compared incremental benefits versus incremental costs between alternatives. Under MTCA, costs are disproportionate to benefits if the incremental cost of a more permanent alternative over that of a lower-cost alternative exceeds the incremental benefits achieved by the more permanent alternative.

4.4 Compliance with WAC 173-340-360

The cleanup action selected for the uplands portion of the Site complies with the provisions of WAC 173-340-360 as outlined below.

[4] The northern Property boundary is the Federal Center South's facility fence line.

4.4.1 MTCA Requirements for Cleanup Actions

The cleanup action selected by Ecology for the Site uplands meets the following cleanup action requirements of WAC 173-340-360(3).

General Requirements
The selected cleanup action meets the following ten general requirements identified in WAC 173-340-360(3)(a):

- Protects human health and the environment, including vulnerable populations and overburdened communities.
- Complies with cleanup standards.
- Complies with applicable state and federal laws.
- Prevents or minimizes present and future releases and migration of hazardous substances in the environment.
- Provides resilience to climate change impacts that have a high likelihood of occurring and severely compromising its long-term effectiveness.
- Provides for compliance monitoring.
- Does not rely primarily on institutional controls and monitoring.
- Does not rely primarily on dilution or dispersion.
- Provides for a reasonable restoration time frame (see Section 4.4.2).
- Uses permanent solutions to the maximum extent practicable.

Action-Specific Requirements
The selected cleanup action complies with the following action-specific requirements identified in WAC 173-340-360(3)(b):

- Uses remediation levels in accordance with WAC 173-340-355. The soil remediation levels for naphthalene and total cPAH (TEQ) developed for the IA are now established as soil CULs (Section 5.1).
- Uses institutional controls in accordance with WAC 173-340-440.
- Provides financial assurances in accordance with WAC 173-340-440(11).
- Provides for periodic reviews in accordance with WAC 173-340-420(2).

Media-Specific Requirements
The selected cleanup action complies with the following media-specific requirements identified in WAC 173-340-360(3)(c):

- The soil cleanup action permanently removes upland contaminated soils to comply with unrestricted soil CULs.
- The complete source removal to be accomplished will prevent lateral and vertical expansion (migration) of contaminated groundwater. Site groundwater is not potable, and the Site is located within the City municipal water service area, thereby ensuring a reliable water supply for the long term.

Public Concerns and Tribal Rights and Interests
Through Ecology's public outreach and comment processes for the RI, Upland FS, and CAP, Ecology also considers public concerns in selecting the cleanup action. This includes the concerns of likely vulnerable populations and overburdened communities, as well as local Indian tribes' rights and interests, as identified in WAC 173-340-360(3)(d).

The population surrounding the Site includes a likely vulnerable population or overburdened community. This determination is based on tools identified in Ecology's *Implementation Memorandum No. 25: Identifying Likely Vulnerable Populations and Overburdened Communities under the Cleanup Regulations* (Ecology, 2024a), namely the U.S. Environmental Protection Agency's (EPA) EJScreen tool and the Washington Environmental Health Disparities (EHD) Index from their online EHD Map. According to Ecology (2024a), a potentially exposed population likely includes a vulnerable population or overburdened community if:

1. The population located in a census tract has a ranking of 9 or 10 on the EHD Index from DOH's EHD Map;
2. The potentially exposed population is located in a census tract that is at or above the 80th Washington state percentile of the Demographic Index from EPA's EJScreen; or
3. The potentially exposed population is located in a census tract that is at or above the 80th Washington state percentile of the Supplemental Demographic Index from EPA's EJScreen.

The Community Profile section of the Site Public Participation Plan (Ecology, 2025) presents demographics information, including the Demographic Index, for the Site area obtained from EPA's EJScreen. The Demographic Index for the Site is within the 71st percentile for the state and 59th percentile for the nation. Based on Washington DOH's EHD Map, the Site is located on the southern border of census tract 009300, which has a rank of 9 on the EHD Index. Census tract 010900 is just south of the Site and has a rank of 10 on the EHD Index. Based on the EHD Index ranking, the potentially exposed population for the Site includes a likely vulnerable population or overburdened community.

The selected upland cleanup action will accomplish full removal of upland contamination, the most permanent remedy that can be done, which, in turn, will best improve environmental conditions for the likely vulnerable population and overburdened community.

4.4.2 Restoration Time Frame

As documented in the FS Report (Aspect, 2023b), the cleanup action selected by Ecology for the Site provides for a reasonable restoration time frame as required by WAC 173-340-360(4). The completed IA removed all SBG-containing fill landward of the shoring wall, and the selected cleanup action will remove the remaining SBG-containing fill from the Site uplands on the seaward side of the shoring wall. Following the completed IA, groundwater quality has been gradually improving, although compliance with all CULs is not yet achieved at all well locations. Based on the post-IA groundwater monitoring

results, MNA will achieve groundwater compliance in a reasonable restoration time frame estimated to be 5 years after removal of the remaining SBG-containing fill from the uplands. The groundwater restoration time frame estimate will be updated in each Annual Groundwater MNA Report based on data at that time generated from the MNA monitoring program (see Section 4.1.2).

5 Cleanup Standards

The cleanup standards required under MTCA consist of CULs for hazardous substances present at a site, the location where CULs must be met (point of compliance), and other regulatory requirements that apply to a site (applicable state and federal laws). The soil and groundwater cleanup standards for the Site are outlined below. Applicable state and federal laws are described in Section 6.

5.1 Cleanup Levels

A cleanup level is a concentration of a COC in soil, water, air, or sediment that is determined to be protective of human health and the environment under specified exposure conditions.

Table 2 lists soil CULs for COCs in Site soils, two of which—for the PAHs naphthalene (0.056 milligrams per kilogram [mg/kg]) and total cPAH (TEQ[5]) (0.074 mg/kg)—are Site-specific. The soil CULs for naphthalene and total cPAH (TEQ) were initially developed as soil remediation levels for the IA based on empirical demonstrations that documented (1) sufficient time had elapsed for migration of COCs from the SBG-containing fill into Fill Unit groundwater, and (2) for both of the PAHs, groundwater concentrations below the CUL collocated with soils containing concentrations equal to the remediation levels. That information demonstrated empirically that the respective soil concentrations were protective of groundwater in accordance with MTCA (WAC 173-340-747(9)) (Aspect, 2021a).

As discussed in Section 2.4, naphthalene concentrations in Site groundwater comply with its CUL (four consecutive samples in each well with no exceedances; Table 1). The lack of naphthalene exceedances confirms that the 0.056 mg/kg soil naphthalene concentration is protective of leaching to groundwater in accordance with WAC 173-340-747(9).

Likewise, the 0.074 mg/kg total cPAH (TEQ) concentration is also considered protective of groundwater. The one well that does not comply with the groundwater CUL for total cPAH (TEQ) based on current data, MW-12, is located near the upgradient boundary of the Site, away from the Site's historical contaminant source areas. Furthermore, that well's detected cPAH exceedances have not been reproducible over time, with cPAHs being detected in only one of the last six samples collected (at a concentration of approximately 1 in 100 billion micrograms per liter [0.0112 µg/L] Table 1).

The 0.056 mg/kg naphthalene and 0.074 mg/kg total cPAH (TEQ) concentrations are also protective of the other applicable soil exposure pathways (unrestricted direct contact with

[5] TEQ = Total toxic equivalent concentration of benzo(a)pyrene calculated in accordance with MTCA (WAC 173-340-708(8)(e)).

soil, and soil erosion to sediment), and therefore are established as Site-specific soil CULs (Table 2).

The Final RI report (Aspect, 2023b) established that drinking water is not a practicable future use for groundwater at the Site; instead, the highest beneficial use of the groundwater is discharge to the LDW. The corresponding groundwater CULs are included in Table 3.

For cPAHs in groundwater and total PCBs in soil and groundwater, the analytical method reporting limit, which is the practical quantitation limit (PQL), is greater than the CUL. In accordance with MTCA (WAC 173-340-700(6)(d)), the media-specific CULs for those COCs are established at the respective PQL (Tables 2 and 3).

5.2 Points of Compliance

Under MTCA, the point of compliance is the location where the CULs must be attained in any specific media. Points of compliance for Site soil and groundwater are as follows:

Soil: Using CULs protective of the applicable exposure pathways, three soil points of compliance are identified:

- For protection of direct contact, the soil point of compliance is the upper 15 feet bgs throughout the uplands, based on a reasonable maximum depth of excavation and assumed placement of excavated soils at the surface where contact occurs.
- For protection of leaching of contaminants from the vadose soil[6] to groundwater, with subsequent discharge to LDW surface water and/or sediments, the point of compliance for vadose soil is the full vertical extent of the vadose zone.
- For protection of leaching of contaminants from the saturated soil to groundwater, with subsequent discharge to LDW surface water and/or sediments, the point of compliance for saturated soil is throughout the saturated zone.

Groundwater: Discharge to surface water is the highest beneficial use of groundwater for the Site. MTCA allows for a CPOC for groundwater discharging to a surface water receiving body, under specific conditions. A groundwater CPOC established at the Site shoreline, adjacent to the point of discharge, complies with applicable MTCA requirements (WAC 173-340-720(8)(c)) as follows:

- **It is not practicable to meet the CUL throughout the site (MTCA standard point of compliance) within a reasonable restoration time frame.** There is a high certainty that a shorter restoration time frame would be accomplished for a shoreline CPOC than at the standard point of compliance encompassing the entire upland area of the Site. Furthermore, there would be negligible environmental benefit (risk reduction) from meeting marine-based groundwater CULs at monitoring wells located tens to hundreds of feet inland from the point of groundwater discharge (point of environmental exposure for which the groundwater CULs were established). As such, any incremental cost to conduct

[6] Soils located at depths above the groundwater table are termed vadose; soils at depths below the water table are termed saturated.

remediation to achieve groundwater CULs more quickly throughout the entire uplands (i.e., at the standard point of compliance) would be disproportionate to the incremental environmental benefit of doing so, relative to less-expensive alternatives that achieve groundwater CULs at a shoreline CPOC.

- **The CPOC shall be as close as practicable to the source of contaminants and not exceed the Property boundary.** A shoreline CPOC is within the historical footprint of the SBG-containing fill and is therefore as close as practicable to the source of contaminants, and it does not exceed the Property boundary.
- **All practicable methods of treatment are to be used in the Site cleanup.** "All practicable methods of treatment" means all technologies and/or methods currently available and demonstrated to work under similar site circumstances or through pilot studies, and applicable to the site at reasonable cost (WAC 173-340-200). The Uplands FS evaluated a full range of currently available cleanup technologies applicable to the Site and assembled applicable technologies into remedial alternatives. Based on the comparative evaluation of remedial alternatives relative to MTCA criteria including reasonable cost, the Uplands FS DCA determined that the selected alternative—including full removal of SBG-containing fill from the uplands (complete source control)—will be permanent to the maximum extent practicable. The DCA determined that the cost to implement an alternative adding an active groundwater remediation technology would not be reasonable (i.e., incremental cost would be disproportionate to the incremental environmental benefit achieved). Therefore, the selected cleanup action, involving complete removal of the COC source material, meets the criterion for all practicable methods of treatment being used in the cleanup.

Based on the information in the IA Report (Aspect, 2021a), post-IA Fill Unit groundwater flow directions, with discharge at the southern end of the sheet pile wall, well MW-13 is positioned close to the location of groundwater discharge from the Site uplands. This flow pattern will continue once the SBG-containing fill seaward of the shoring wall is removed during the final cleanup action. MW-13 will serve as the CPOC monitoring location. Ecology reserves the right to change the groundwater CPOC location subject to completing the removal of SBG-containing fill seaward of the shoring wall.

6 Applicable State and Federal Laws

In addition to the cleanup standards discussed in Section 5, MTCA requires that cleanup actions comply with applicable state and federal laws, which include legally applicable requirements as well as requirements that Ecology determines are relevant and appropriate. The applicable or relevant and appropriate requirements (ARARs) for cleanup actions may include various construction-related permits, air emission requirements, water discharge requirements, off-site disposal requirements, etc.

The Site uplands cleanup action will be performed under legal agreement with Ecology, and it is therefore exempt from the procedural requirements of Chapters 70.94 (Washington Clean Air Act), 70.95 (Solid Waste Management Act), 70.105 (Hazardous

Waste Management Act), 90.48 (Water Pollution Control), and 90.58 (Shoreline Management Act) of the Revised Code of Washington (RCW), and of laws requiring or authorizing local government permits or approvals. However, the cleanup action must still comply with the substantive requirements of such permits or approvals (WAC 173-340-520).

The uplands cleanup action is not exempt from obtaining federal permits. The SBG-containing fill seaward of the shoring wall will be removed during the Site in-water cleanup action, which will be subject to U.S. Army Corps of Engineers (Corps) permitting. Federal permitting for the Site-related in-water work may be conducted under the Nationwide 38 permit program, or, alternatively, under a Clean Water Act Section 404 permit. Additional permitting requirements include Clean Water Act Section 401 (Water Quality Certification), the Endangered Species Act (agency consultation), and other state or local approvals.

In addition, if construction-generated dewatering water or stormwater from the cleanup action is discharged to surface waters of the state (e.g., the LDW), such discharge would need to comply with requirements of a federal National Pollutant Discharge Elimination System (NPDES; 40 Code of Federal Regulations [CFR] 122, 125) Construction Stormwater General Permit (CSGP). Ecology administers the federal NPDES program in Washington State and would issue the CSGP. Because the cleanup action involves handling contaminated materials, Ecology would impose a project-specific Administrative Order on the CSGP that includes contaminant indicator levels, which construction-generated water must comply with prior to discharge to surface waters, as well as robust monitoring and reporting requirements to verify that compliance.

Beyond federal permit requirements, the starting point for ARARs is the MTCA regulation (Chapter 173-340 WAC) that addresses implementation of a cleanup and defines cleanup standards under the MTCA statute (Chapter 70A.305 RCW). Other ARARs for the uplands cleanup action include the following:

- The State Environmental Policy Act (SEPA) (Chapter 197-11 WAC) and the SEPA procedures (Chapter 173-802 WAC) ensure that state and local government officials consider environmental values when making decisions. The SEPA process begins when an application for determination is submitted to an agency, or an agency proposes to take some official action, such as implementing a MTCA Cleanup Action Plan. A SEPA determination by Ecology would be submitted prior to initiating the sediment cleanup for the LDW Lower Reach.
- The City Shoreline Master Program Regulations (SMC 23.60A), prepared pursuant to the state Shoreline Management Act (RCW 90.58; Chapters 173-18 and -27 WAC), impose requirements and standards for work conducted within 200 feet of the shoreline, including standards for achieving no net loss of ecological functions, shoreline stabilization, dredging, filling/grading, and vegetation and impervious surface management.
- The Washington Dangerous Waste Regulations (Chapter 173-303 WAC), Hazardous Waste Management statute (Chapter 70A.300 RCW), and federal Land Disposal Restrictions (40 CFR 268) would apply if dangerous wastes are

generated during the cleanup action. The Washington Solid Waste Handling Standards (Chapter 173-350 WAC) and Solid Waste Management statute (Chapter 70A.205 RCW) regulate handling, treatment, or off-site disposal of nonhazardous solid waste. The United States Department of Transportation (USDOT) Hazardous Materials Regulations (49 CFR Parts 171-180) would apply if regulated material is transported off-site as part of the cleanup action.

- A King County Industrial Water Program Discharge Authorization (DA) would be required if cleanup-generated stormwater or groundwater from excavation dewatering were discharged to the City /King County sanitary sewer system. The DA would impose maximum instantaneous rate and daily volume limits and numerical water quality limits for wastewater discharged. It would also require monitoring of the quantities and chemical quality of water discharged and submittal of the monitoring data to King County to demonstrate permit compliance.
- Soil excavations exceeding 50 cubic yards are subject to a City Grading Permit from the City Department of Construction and Inspections (Seattle Municipal Code 22.170). Substantive requirements of the grading permit include temporary erosion and sedimentation controls (TESC), which will be addressed by implementation of appropriate construction best management practices (BMPs).
- The Washington Clean Air Act (RCW 70.94) and its implementing regulations (Chapters WAC 173-400 and -460) are applicable to the cleanup action. The substantive requirements would include not creating conditions that would significantly degrade the ambient air quality or cause exceedance of applicable air quality standards.
- The Archeological and Historical Preservation Act (16 USCA 496a-1) will be applicable if cultural materials are discovered during grading and excavation activities. An Inadvertent Discovery Plan will be prepared to guide monitoring and notifications requirements for potential discovery of cultural materials during ground-disturbing cleanup activities.
- The Occupational Safety and Health Administration (OSHA) and Washington Industrial Safety and Health Act (WISHA) regulations (29 CFR 1910.120; Chapter 296-62 WAC) governs worker safety and health during cleanup implementation. Compliance will be achieved through preparation and implementation of Site-specific health and safety plan(s) with appropriate controls, worker training and certifications, and occupational monitoring.

7 Cleanup Implementation Schedule

The removal of SBG-containing fill remaining in the Site uplands (above MHHW and seaward of the shoring wall) can only be practicably removed during the Site in-water

sediment cleanup, and therefore will be conducted concurrently with the sediment cleanup for the LDW Lower Reach, tentatively estimated to start by 2030[7].

An Engineering Design Report (EDR) will be prepared to document the engineering concepts and design criteria used for design of the upland cleanup action. The EDR will also provide sufficient information for the development and review of Construction Plans and Specifications. Because the removal of SBG-containing fill in the uplands and in-water areas will be done together as one project, the project Construction Plans and Specifications will include both areas. Following completion of the fill removal project, an Uplands Removal Action Completion Report will be prepared to document the uplands removal methods and achievement of cleanup objectives.

A GCMP will be developed during design of the SBG-containing fill removal and in-water sediment cleanup. Because the remaining SBG-containing fill is likely continuing to impact nearshore groundwater quality landward of the shoring wall, no additional groundwater monitoring is planned until implementation of the in-water cleanup program.

The interim ICs will be maintained at the Site until the SBG-containing fill removal and the shoreface restoration are completed. If uplands soil compliance is not achieved after the remaining SBG-containing fill is removed, a restrictive environmental covenant will be prepared and recorded to notify construction workers of residual contaminated materials and require appropriate protection measures to prevent worker exposure. A CMMP will be prepared to provide the handling requirements for any soil and groundwater removed during redevelopment activities.

The uplands cleanup-related deliverables and their relative time frames are listed below. Absolute dates will be determined in conjunction with timing for EPA's design of the in-water cleanup action for the LDW Lower Reach which includes the Site In-Water Area.

[7] The sediment cleanup work for the Upper Reach of the LDW is starting in 2024. The Lower Duwamish Waterway Group (LDWG), conducting the cleanup, estimates cleanup of the Middle Reach will start in 2027 (https://ldwg.org/our-work/current-work/). Therefore, 2030 is estimated for start of the Lower Reach cleanup.

Deliverable	Relative Time Frame for Preparation
Engineering Design Report	Concurrent with EPA's Remedial Design Work Plan
Groundwater Compliance Monitoring Plan	Concurrent with the Engineering Design Report
Construction Plans and Specifications	Combined with Construction Plans and Specifications for In-Water Cleanup Action
Removal Action Completion Report	Six months following completion of the removal action
Annual Groundwater Monitored Natural Attenuation Report	Three months following receipt of analytical data for each year of MNA monitoring (the MNA monitoring starts following completion of the removal action)
Contaminated Media Management Plan	Concurrent with Construction Plans and Specifications for In-Water Cleanup Action
Environmental Covenant (if needed)	Following completion of the removal action

Note:
All deliverables will be submitted as a draft for Ecology review, and then finalized to incorporate Ecology comments. The environmental covenant, if needed, would be prepared by the Attorney General's Office in consultation with 5055 Properties LLC.

8 References

Aspect Consulting, LLC (Aspect), 2020, Final Interim Action Work Plan, Snopac Property, Seattle, Washington, March 10, 2020.

Aspect Consulting, LLC (Aspect), 2021a, Final Interim Action Report, Snopac Property, Seattle Washington, September 16, 2021.

Aspect Consulting, LLC (Aspect), 2021b, Sampling and Analysis Plan for Groundwater Confirmation Monitoring, Snopac Property Uplands, Seattle Washington, July 2, 2021.

Aspect Consulting, LLC (Aspect), 2023a, Final Remedial Investigation Report, Snopac Property, Seattle, Washington, December 21, 2023.

Aspect Consulting, LLC (Aspect), 2023b, Upland Feasibility Study, Snopac Property, Seattle, Washington, December 20, 2023.

U.S. Environmental Protection Agency (EPA), 2014, Record of Decision, Lower Duwamish Waterway Superfund Site.

Washington State Department of Ecology (Ecology), 2016, Revised Policy Memorandum on groundwater cleanup levels for upland sites bordering the LDW, March 2016.

Washington State Department of Ecology (Ecology), 2024a, Implementation Memo No. 25: Identifying Likely Vulnerable Populations and Overburdened Communities Under the Cleanup Regulations, Publication 24-09-044, January 2024.

Washington State Department of Ecology (Ecology), 2024b, Preliminary Cleanup Levels for Lower Duwamish Waterway, March 2024, available at https://apps.ecology.wa.gov/cleanupsearch/site/1643#site-documents.

Washington State Department of Ecology (Ecology), 2025, Public Participation Plan, Snopac Property, 5055 East Marginal Way South, Seattle, Washington 98108.

TABLES

Table 1. Post-Interim Action Groundwater Quality Data (2021 through 2024)

Project No. 150054, Snopac Property Site, Seattle, WA

			Fill Unit								
		Sample Location:	MW-12								
		Sample Date:	06/25/2021	06/29/2021	11/10/2021	01/17/2022	04/13/2022	05/22/2023	08/23/2023	12/05/2023	02/29/2024
Analyte	Unit	PCUL[1]									
Metals, dissolved											
Arsenic	ug/L	8	**23.7**	--	**4.46**	**2.22**	**2.09**	1 U	**2.18**	1 U	**1.2**
Copper	ug/L	3.1	1 U	--	2 U	**3.2**	3 U	2.4 U	2.4 U	3 U	3 U
Lead	ug/L	5.6	1 U	--	1 U	1 U	1 U	--	--	--	--
Mercury	ug/L	0.025	0.01 U	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Nickel	ug/L	8.2	**14.1**	--	**13.2**	**10.8**	**4.24**	**9.46**	**11.2**	**3.12**	**7.1**
Zinc	ug/L	81	**1.99 J**	--	5 U	**6.36**	5 U	**3.7 J**	5 U	5 U	5 U
Organometallic											
Tributyltin	ug/L		--	0.35 U	0.35 U	0.35 U	0.32 UJ	--	--	--	--
PAHs											
1-Methylnaphthalene	ug/L	800	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
2-Methylnaphthalene	ug/L	14	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Acenaphthene	ug/L	5.3	--	**0.007**	**0.091**	0.005 U	**0.006**	0.005 U	**0.011**	0.005 U	0.005 U
Acenaphthylene	ug/L		--	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Anthracene	ug/L	2.1	--	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(g,h,i)perylene	ug/L		--	0.01 U	**0.01**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Fluoranthene	ug/L	1.8	--	**0.029**	**0.024**	0.005 U	0.005 U	**0.0077**	**0.017**	0.005 U	0.005 U
Fluorene	ug/L	3.7	--	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Naphthalene	ug/L	1.4	--	**0.016**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Phenanthrene	ug/L		--	**0.022**	**0.016 J**	**0.0076**	**0.0077**	**0.0071 J**	**0.017 J**	0.005 U	0.005 U
Pyrene	ug/L	2	--	**0.031**	**0.028**	0.005 U	0.005 U	**0.0099**	**0.015**	0.005 U	0.005 U
Benz(a)anthracene	ug/L		--	**0.012**	**0.012**	0.005 U	0.005 U	0.005 U	**0.0058**	0.005 U	0.005 U
Benzo(a)pyrene	ug/L		--	**0.015**	**0.014**	0.005 U	0.005 U	0.005 U	**0.008**	0.005 U	0.005 U
Benzo(b)fluoranthene	ug/L		--	**0.02**	**0.018**	0.005 U	0.005 U	0.005 U	**0.011**	0.005 U	0.005 U
Benzo(k)fluoranthene	ug/L		--	**0.007**	**0.0063**	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chrysene	ug/L		--	**0.013**	**0.014**	0.005 U	0.005 U	0.005 U	**0.0067**	0.005 U	0.005 U
Dibenzo(a,h)anthracene	ug/L		--	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Indeno(1,2,3-cd)pyrene	ug/L		--	**0.0065**	**0.011**	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Total cPAHs TEQ (ND=1)(2,3)	ug/L	0.008	--	**0.02018**	**0.01937**	0.00755 U	0.00755 U	0.00755 U	**0.0112**	0.00755 U	0.005 U
Other SVOCs											
Pentachlorophenol	ug/L	0.05	--	--	--	--	--	--	--	--	--
PCBs											
Total PCBs (Sum of Aroclors)	ug/L	0.005	--	0.005 U	0.005 U	0.005 U	0.005 U	--	--	--	--
TPHs											
Diesel Range Organics	ug/L	500	--	--	--	--	--	--	--	--	--
Motor Oil Range Organics	ug/L	500	--	--	--	--	--	--	--	--	--
Diesel and Oil Extended Range Organics	ug/L	500	--	--	--	--	--	--	--	--	--
Field Parameters											
Temperature	deg C		15.6	--	15.5	12.7	12.2	15.23	17.33	14.55	12.19
Specific Conductance	uS/cm		1230	--	3505	1521	1057	1172.5	839.04	686.6	906.16
Dissolved Oxygen	mg/L		0.32	--	1.37	0.86	0.85	0.85	4.59	1.6	3.52
pH	pH units		6.48	--	6.73	6.88	6.67	6.43	7.19	6.5	6.67
Oxidation Reduction Potential	mV		100.7	--	-47.7	7.7	-25.9	106.1	193	123.1	-12.5
Turbidity	NTU		11.7	--	11.9	7.85	8.05	15.7	15.8	11	12.3

Table 1. Post-Interim Action Groundwater Quality Data (2021 through 2024)

Project No. 150054, Snopac Property Site, Seattle, WA

			Fill Unit							
		Sample Location:	MW-13							
		Sample Date:	06/25/2021	11/11/2021	01/18/2022	04/14/2022	05/22/2023	08/22/2023	12/04/2023	02/29/2024
Analyte	Unit	PCUL[1]								
Metals, dissolved										
Arsenic	ug/L	8	**2.97**	**2.43**	1 U	1 U	1 U	**1.04**	1 U	1 U
Copper	ug/L	3.1	**4.03 J**	**2.58**	2.5 U	3 U	**3.72 J**	**4.49**	**3.14**	3 U
Lead	ug/L	5.6	1 U	1 U	1 U	1 U	--	--	--	--
Mercury	ug/L	0.025	0.01 U	0.01 U	0.01 U	0.01 U	--	--	--	--
Nickel	ug/L	8.2	**42.6**	**35.3**	**6.57**	**2.92**	**3.36 J**	**6.03**	**2.84**	**2.8**
Zinc	ug/L	81	**161 J**	**147**	**26**	**6.45**	**6.58 J**	**14**	5 U	5 U
Organometallic										
Tributyltin	ug/L		0.33 U	0.34 U	0.37 U	0.31 UJ	--	--	--	--
PAHs										
1-Methylnaphthalene	ug/L	800	**0.072**	**0.55**	**0.62**	**0.072**	0.05 U	**0.22**	0.05 U	0.05 U
2-Methylnaphthalene	ug/L	14	0.05 U	**0.19**	**0.088**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Acenaphthene	ug/L	5.3	**3.4**	**1.3**	**1.8**	**0.55**	**0.024**	**0.6**	**0.012**	**0.1**
Acenaphthylene	ug/L		**0.08**	**0.028**	**0.035**	**0.012**	0.005 U	**0.0092**	0.005 U	0.005 U
Anthracene	ug/L	2.1	**0.095**	**0.034**	**0.029**	**0.011**	0.005 U	**0.037**	**0.0075**	**0.0071**
Benzo(g,h,i)perylene	ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Fluoranthene	ug/L	1.8	**0.86**	**0.058**	**0.035**	**0.013**	0.005 U	**0.028**	**0.007**	0.005 U
Fluorene	ug/L	3.7	**1.1**	**0.26**	**0.5**	**0.05**	0.005 U	**0.36**	0.005 U	**0.02**
Naphthalene	ug/L	1.4	**0.005**	**1.5**	**0.71**	**0.37**	0.05 U	**0.31**	0.05 U	**0.06**
Phenanthrene	ug/L		**0.014**	**0.038 J**	**0.2**	**0.027**	0.005 U	**0.27**	0.005 U	**0.013**
Pyrene	ug/L	2	**0.56**	**0.034**	**0.024**	**0.01**	0.005 U	**0.017**	0.005 U	0.005 U
Benz(a)anthracene	ug/L		**0.019**	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(a)pyrene	ug/L		0.005 U	**0.0056**	**0.0083**	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(b)fluoranthene	ug/L		0.005 U	**0.0073**	**0.012**	**0.0056**	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(k)fluoranthene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chrysene	ug/L		**0.019**	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Dibenzo(a,h)anthracene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Indeno(1,2,3-cd)pyrene	ug/L		0.005 U	0.005 U	**0.0073**	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Total cPAHs TEQ (ND=1)(2,3)	ug/L	0.008	**0.00909**	**0.00838**	**0.01178**	**0.00761**	0.00755 U	0.00755 U	0.00755 U	0.005 U
Other SVOCs										
Pentachlorophenol	ug/L	0.05	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--
PCBs										
Total PCBs (Sum of Aroclors)	ug/L	0.005	0.005 U	0.005 U	0.005 U	0.005 U	--	--	--	--
TPHs										
Diesel Range Organics	ug/L	500	**230 X**	**230 X**	**220 X**	**210 X**	--	--	--	--
Motor Oil Range Organics	ug/L	500	250 U	250 U	250 U	250 U	--	--	--	--
Diesel and Oil Extended Range Organics	ug/L	500	**230 X**	**230 X**	**220 X**	**210 X**	--	--	--	--
Field Parameters										
Temperature	deg C		15.3	15	9.7	11.2	12.66	17.53	12.67	9.77
Specific Conductance	uS/cm		5498	1371	771	729	585.7	142.1	516.11	680.05
Dissolved Oxygen	mg/L		0.17	4.71	5.39	1.64	2.32	0.49	3.31	2.64
pH	pH units		6.47	7.04	7.27	7	6.86	6.65	6.84	7.26
Oxidation Reduction Potential	mV		122.6	30.7	19.3	6.2	177.7	217.7	177.3	90.1
Turbidity	NTU		1.76	6.46	5.75	3.63	5.29	1.78	4.13	0.96

Table 1. Post-Interim Action Groundwater Quality Data (2021 through 2024)

Project No. 150054, Snopac Property Site, Seattle, WA

			Fill Unit							
		Sample Location:	MW-15							
		Sample Date:	06/25/2021	11/11/2021	01/18/2022	04/14/2022	05/22/2023	08/22/2023	12/04/2023	02/29/2024
Analyte	Unit	PCUL[1]								
Metals, dissolved										
Arsenic	ug/L	8	**5.55**	**3.63**	**1.04**	**5.28**	**12.4**	**17.7**	**22**	**17**
Copper	ug/L	3.1	**3.76 J**	**4.78**	**5.55**	**3.92**	2.4 U	**2.83**	3 U	3 U
Lead	ug/L	5.6	1 U	1 U	1 U	1 U	--	--	--	--
Mercury	ug/L	0.025	0.01 U	0.01 U	**0.01**	0.01 U	--	--	--	--
Nickel	ug/L	8.2	**12.9**	**14.8**	**7.05**	**9.51**	**7.8**	**11.7**	**6.58**	**5.4**
Zinc	ug/L	81	**4.57 J**	5 U	**4.64**	5 U	**8.65 J**	5 U	5 U	5 U
Organometallic										
Tributyltin	ug/L		0.35 U	0.32 U	0.37 U	0.32 UJ	--	--	--	--
PAHs										
1-Methylnaphthalene	ug/L	800	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
2-Methylnaphthalene	ug/L	14	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Acenaphthene	ug/L	5.3	**0.013**	0.005 U	**0.0051**	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Acenaphthylene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Anthracene	ug/L	2.1	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(g,h,i)perylene	ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Fluoranthene	ug/L	1.8	**0.012**	0.005 U	**0.012**	0.005 U	**0.0061**	0.005 U	**0.0051**	0.005 U
Fluorene	ug/L	3.7	**0.005**	0.005 U	**0.0058**	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Naphthalene	ug/L	1.4	**0.011 J**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Phenanthrene	ug/L		**0.016**	**0.0069 J**	**0.025**	0.005 U	**0.0075 J**	**0.0061 J**	**0.0065**	0.005 U
Pyrene	ug/L	2	**0.012**	0.005 U	**0.011**	0.005 U	**0.0061**	0.005 U	0.005 U	0.005 U
Benz(a)anthracene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(a)pyrene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(b)fluoranthene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(k)fluoranthene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chrysene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Dibenzo(a,h)anthracene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Indeno(1,2,3-cd)pyrene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Total cPAHs TEQ (ND=1)(2,3)	ug/L	0.008	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.005 U
Other SVOCs										
Pentachlorophenol	ug/L	0.05	--	--	--	--	--	--	--	--
PCBs										
Total PCBs (Sum of Aroclors)	ug/L	0.005	0.005 U	0.005 U	0.005 U	0.005 U	--	--	--	--
TPHs										
Diesel Range Organics	ug/L	500	--	--	--	--	--	--	--	--
Motor Oil Range Organics	ug/L	500	--	--	--	--	--	--	--	--
Diesel and Oil Extended Range Organics	ug/L	500	--	--	--	--	--	--	--	--
Field Parameters										
Temperature	deg C		15.5	14.8	9.5	9.9	12.87	21.45	12.6	10
Specific Conductance	uS/cm		6796	1940	3601	3987	1837	2376.3	1904.1	1446.6
Dissolved Oxygen	mg/L		2.96	0.68	0.58	0.84	0.89	2.40	0.58	0.43
pH	pH units		7.18	7.41	7.17	6.99	7.21	7.60	7.01	7.2
Oxidation Reduction Potential	mV		131.2	8.9	39.2	-29	120.2	44.6	-6.1	13.3
Turbidity	NTU		5.91	28.3	2.62	5	3.33	12.3	0.82	8.39

Table 1. Post-Interim Action Groundwater Quality Data (2021 through 2024)

Project No. 150054, Snopac Property Site, Seattle, WA

			Fill Unit							
		Sample Location:	MW-16							
		Sample Date:	06/25/2021	11/11/2021	01/18/2022	04/14/2022	05/22/2023	08/22/2023	12/04/2023	02/29/2024
Analyte	Unit	PCUL[1]								
Metals, dissolved										
Arsenic	ug/L	8	**24.1**	**8.93**	**2.25**	**1.39**	**3.27 J**	**14.1**	**7.23**	**3.1**
Copper	ug/L	3.1	**4.54 J**	**4.63**	**6.49**	**3.27**	**2.59 J**	**5.07**	**3.32**	**3.2**
Lead	ug/L	5.6	1 U	1 U	1 U	1 U	--	--	--	--
Mercury	ug/L	0.025	0.01 U	0.01 U	**0.011**	0.01 U	--	--	--	--
Nickel	ug/L	8.2	**10**	**20.6**	**7.65**	**4.9**	**8.25**	**33.8**	**7.93**	**6.7**
Zinc	ug/L	81	**5.07 J**	5 U	**4.56**	**18.3**	3.4 U	5 U	5 U	5 U
Organometallic										
Tributyltin	ug/L		0.35 U	0.32 U	0.36 U	0.31 UJ	--	--	--	--
PAHs										
1-Methylnaphthalene	ug/L	800	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
2-Methylnaphthalene	ug/L	14	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Acenaphthene	ug/L	5.3	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Acenaphthylene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Anthracene	ug/L	2.1	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(g,h,i)perylene	ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Fluoranthene	ug/L	1.8	**0.0065**	0.005 U	**0.005**	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Fluorene	ug/L	3.7	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Naphthalene	ug/L	1.4	0.005 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Phenanthrene	ug/L		**0.014 J**	**0.0066 J**	**0.01**	0.005 U	0.005 U	**0.0052 J**	0.005 U	0.005 U
Pyrene	ug/L	2	**0.008**	0.005 U	**0.005**	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benz(a)anthracene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(a)pyrene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(b)fluoranthene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(k)fluoranthene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chrysene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Dibenzo(a,h)anthracene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Indeno(1,2,3-cd)pyrene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Total cPAHs TEQ (ND=1)(2,3)	ug/L	0.008	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.005 U
Other SVOCs										
Pentachlorophenol	ug/L	0.05	--	--	--	--	--	--	--	--
PCBs										
Total PCBs (Sum of Aroclors)	ug/L	0.005	0.005 U	0.005 U	0.005 U	0.005 U	--	--	--	--
TPHs										
Diesel Range Organics	ug/L	500	--	--	--	--	--	--	--	--
Motor Oil Range Organics	ug/L	500	--	--	--	--	--	--	--	--
Diesel and Oil Extended Range Organics	ug/L	500	--	--	--	--	--	--	--	--
Field Parameters										
Temperature	deg C		16.2	14.5	9.6	9.3	13.21	20.68	12.97	10.05
Specific Conductance	uS/cm		17840	7262	1006	623.2	2270.2	2690.5	2493.8	1492.9
Dissolved Oxygen	mg/L		5.75	4.21	3.84	2.79	4.09	3.98	7.34	4.32
pH	pH units		7.08	7.71	7.78	7.62	7.5	7.42	7.72	7.85
Oxidation Reduction Potential	mV		9.8	40.6	42.7	-17.4	188.1	76.9	10.4	124.1
Turbidity	NTU		4.42	57.8	13.8	7.03	3.59	2.76	9.81	2.96

Table 1. Post-Interim Action Groundwater Quality Data (2021 through 2024)

Project No. 150054, Snopac Property Site, Seattle, WA

			Fill Unit						
		Sample Location:	MW-17						
		Sample Date:	06/25/2021	11/10/2021	01/17/2022	04/13/2022	05/22/2023	08/22/2023	12/05/2023
Analyte	Unit	PCUL[1]							
Metals, dissolved									
Arsenic	ug/L	8	1 U	**1.92**	1 U	**1.03**	1 U	**3.77**	1 U
Copper	ug/L	3.1	1 U	**2.19**	**7.2**	3 U	2.4 U	2.4 U	3 U
Lead	ug/L	5.6	1 U	1 U	**3.43**	1 U	--	--	--
Mercury	ug/L	0.025	0.01 U	0.01 U	0.01 U	0.01 U	--	--	--
Nickel	ug/L	8.2	**2.19**	**2.03**	**1.36**	**1.98**	**2.43 J**	**2.57**	**3.41**
Zinc	ug/L	81	**5.85 J**	5 U	**23.1**	5 U	3.4 U	5 U	5 U
Organometallic									
Tributyltin	ug/L		0.35 U	0.35 U	0.36 U	0.33 UJ	--	--	--
PAHs									
1-Methylnaphthalene	ug/L	800	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
2-Methylnaphthalene	ug/L	14	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Acenaphthene	ug/L	5.3	**0.0067**	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Acenaphthylene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Anthracene	ug/L	2.1	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(g,h,i)perylene	ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Fluoranthene	ug/L	1.8	**0.0065**	0.005 U	**0.0055**	0.005 U	0.005 U	0.005 U	0.005 U
Fluorene	ug/L	3.7	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Naphthalene	ug/L	1.4	**0.015 J**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Phenanthrene	ug/L		**0.012**	**0.0072 J**	**0.0082**	0.005 U	0.005 U	**0.0054 J**	0.005 U
Pyrene	ug/L	2	**0.006**	0.005 U	**0.0053**	0.005 U	0.005 U	0.005 U	0.005 U
Benz(a)anthracene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(a)pyrene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(b)fluoranthene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(k)fluoranthene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chrysene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Dibenzo(a,h)anthracene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Indeno(1,2,3-cd)pyrene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Total cPAHs TEQ (ND=1)(2,3)	ug/L	0.008	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Other SVOCs									
Pentachlorophenol	ug/L	0.05	--	--	--	--	--	--	--
PCBs									
Total PCBs (Sum of Aroclors)	ug/L	0.005	0.005 U	0.005 U	0.005 U	0.005 U	--	--	--
TPHs									
Diesel Range Organics	ug/L	500	--	--	--	--	--	--	--
Motor Oil Range Organics	ug/L	500	--	--	--	--	--	--	--
Diesel and Oil Extended Range Organics	ug/L	500	--	--	--	--	--	--	--
Field Parameters									
Temperature	deg C		17	14.1	9.8	11	13.73	18.32	14.31
Specific Conductance	uS/cm		564.4	165.8	115.6	216.7	266.31	347.46	387.43
Dissolved Oxygen	mg/L		1.92	1.53	4.58	0.79	0.55	2.68	1.91
pH	pH units		6.56	6.98	6.81	6.5	6.72	7.11	6.67
Oxidation Reduction Potential	mV		-48.4	10	5.1	14.1	63.2	34.4	113.3
Turbidity	NTU		--	60	44.6	10	9.61	15.0	2.7

Table 1. Post-Interim Action Groundwater Quality Data (2021 through 2024)

Project No. 150054, Snopac Property Site, Seattle, WA

			Alluvium Unit				Alluvium Unit						
Sample Location:			MW-8				MW-14						
Sample Date:			06/25/2021	11/10/2021	01/17/2022	04/13/2022	06/25/2021	11/10/2021	01/17/2022	04/13/2022	05/22/2023	08/22/2023	12/04/2023
Analyte	Unit	PCUL[1]											
Metals, dissolved													
Arsenic	ug/L	8	**1.17**	**1.19**	1 U	1 U	**1.03**	**1.15**	**1.08**	1 U	**1.44 J**	1 U	1 U
Copper	ug/L	3.1	1 U	2 U	2.5 U	3 U	1 U	**18.2**	2.5 U	3 U	2.4 U	2.4 U	3 U
Lead	ug/L	5.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	--	--	--
Mercury	ug/L	0.025	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--	--	--
Nickel	ug/L	8.2	**1.74**	**2.49**	**2.77**	**1.63**	**2.79**	**7.07**	**4.96**	**3.43**	**1.65 J**	**1.34**	**1.28**
Zinc	ug/L	81	1 UJ	5 U	**6.49**	5 U	**1.62 J**	**12.9**	**6.09**	5 U	3.4 U	5 U	5 U
Organometallic													
Tributyltin	ug/L		0.34 U	0.36 U	0.36 U	0.32 UJ	0.34 U	0.7 U	0.36 U	0.33 UJ	--	--	--
PAHs													
1-Methylnaphthalene	ug/L	800	0.05 U	0.05 U	0.05 U	0.05 U	**0.12**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
2-Methylnaphthalene	ug/L	14	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Acenaphthene	ug/L	5.3	0.005 U	0.005 U	0.005 U	0.005 U	**0.87**	**0.98**	**1.3**	**1.1**	**1.1**	**0.44**	**1.1**
Acenaphthylene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	**0.0055**	0.005 U	**0.0081**	**0.0068**	**0.008**	0.005 U	**0.0084**
Anthracene	ug/L	2.1	0.005 U	0.005 U	0.005 U	0.005 U	**0.039**	**0.034**	**0.027**	**0.028**	**0.01**	**0.01**	**0.0089**
Benzo(g,h,i)perylene	ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Fluoranthene	ug/L	1.8	0.005 U	0.005 U	0.005 U	0.005 U	**0.11**	**0.18**	**0.16**	**0.21**	**0.065**	**0.11**	**0.13**
Fluorene	ug/L	3.7	0.005 U	0.005 U	0.005 U	0.005 U	**0.1**	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Naphthalene	ug/L	1.4	**0.0068 J**	0.05 U	0.05 U	0.05 U	**0.62**	**0.11**	0.05 U	0.05 U	**0.16**	**0.064**	0.05 U
Phenanthrene	ug/L		**0.0085**	0.005 U	**0.0065**	0.005 U	**0.092**	**0.04**	**0.056**	**0.053**	**0.011 J**	**0.013 J**	**0.0063**
Pyrene	ug/L	2	0.005 U	0.005 U	0.005 U	0.005 U	**0.11**	**0.14**	**0.12**	**0.16**	**0.06**	**0.15**	**0.15**
Benz(a)anthracene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(a)pyrene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(b)fluoranthene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(k)fluoranthene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chrysene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Dibenzo(a,h)anthracene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Indeno(1,2,3-cd)pyrene	ug/L		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Total cPAHs TEQ (ND=1)(2,3)	ug/L	0.008	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Other SVOCs													
Pentachlorophenol	ug/L	0.05	--	--	--	--	--	--	--	--	--	--	--
PCBs													
Total PCBs (Sum of Aroclors)	ug/L	0.005	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	**0.0168 J**	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
TPHs													
Diesel Range Organics	ug/L	500	--	--	--	--	--	--	--	--	--	--	--
Motor Oil Range Organics	ug/L	500	--	--	--	--	--	--	--	--	--	--	--
Diesel and Oil Extended Range Organics	ug/L	500	--	--	--	--	--	--	--	--	--	--	--
Field Parameters													
Temperature	deg C		16	15.7	14.4	13	15.1	15.1	12.7	11.3	13.62	14.97	13.29
Specific Conductance	uS/cm		1375	1997	1994	1795	1270	1653	2271	1649	1885.2	895.72	789.8
Dissolved Oxygen	mg/L		0.19	0.46	0.28	0.75	4.91	0.17	0.23	1.18	0.27	0.11	0.18
pH	pH units		6.59	6.78	6.74	6.65	6.47	6.49	6.52	6.35	6.61	6.75	6.45
Oxidation Reduction Potential	mV		71.4	-78.9	-58.8	-119.2	-24.7	-21.2	8.8	-31.6	109.1	-1.4	-47.2
Turbidity	NTU		9.6	3.57	0.7	1.32	8.06	2.44	7.43	1.89	21.4	0.96	2.82

Table 1. Post-Interim Action Groundwater Quality Data (2021 through 2024)

Project No. 150054, Snopac Property Site, Seattle, WA

Notes:

Bold - detected

Blue Shaded - Detected result or non-detected RL exceeded PCUL

UJ - Analyte not detected and the Reporting Limit (RL) is an estimate

J - Result value estimated

TBT results UJ due to assorted low-bias QC issues. Non-detects may not be definitive.

µg/L = microgram per liter

mV – millivolts

µS/cm = microSiemens per centimeter

deg C = degrees Celsius

PCUL = Preliminary Cleanup Level (1)

1. PCULs are the most-stringent screening levels for groundwater (GWs #2-5) established by the Lower Duwamish Waterway Preliminary Cleanup Level Workbook.

2. The Laboratory Method Reporting Limit (MRL) is the Practical Quantitation Limit (PQL), as per WAC 173-340-700(6)(d), for purposes of this monitoring program. In accordance with WAC 173-340-700(6)(d), the groundwater PCULs are established at the PQL.

3. TEQ: Total toxic equivalent concentration of benzo(a)pyrene, calculated in accordance with WAC 173-340-708(8)(e). The total cPAH TEQ PCUL incorporates TEF values for each individual cPAH and is set at the PQL.

4. Total PCBs is the sum of detected Aroclor concentrations.

Table 2. Soil Cleanup Levels for Upland Contaminants of Concern

Snopac Property, Seattle, Washington

Constituent	Most Stringent PCUL[1]		Practical Quantitation Level (PQL)	Soil Cleanup Levels	
	Vadose Zone Soil	Saturated Zone Soil		Vadose Zone Soil	Saturated Zone Soil
Metals					
Arsenic	7.3	7.3	1	7.3	7.3
Copper	36	36	1	36	36
Lead	50	50	1	50	50
Mercury	0.07	0.07	0.01	0.07	0.07
Zinc	86	85	1	86	85
Organotin Compounds					
Tributyltin Ion	0.12	0.12	0.1	0.12	0.12
Polycyclic Aromatic Hydrocarbons (PAH)					
1-Methylnaphthalene	34	34	0.002	34	34
2-Methylnaphthalene	0.67	0.67	0.002	0.67	0.67
Acenaphthene	0.5	0.028	0.002	0.5	0.028
Acenaphthylene	1.3	1.3	0.002	1.3	1.3
Anthracene	0.96	0.051	0.002	0.96	0.051
Fluoranthene	1.7	0.09	0.002	1.7	0.09
Fluorene	0.54	0.029	0.002	0.54	0.029
Naphthalene[2]	0.039	0.0021	0.002	0.056	0.056
Phenanthrene	1.5	1.5	0.002	1.5	1.5
Pyrene	2.6	0.14	0.002	2.6	0.14
Total cPAHs TEQ[2,3]	0.00031	0.000016	0.003	0.074	0.074
Polychlorinated Biphenyls (PCB)[3]					
Total PCB Aroclors[4]	0.000043	0.0000022	0.002	0.002	0.002

Notes:

All concentrations are in milligrams per kilogram (mg/kg).

1. Most stringent preliminary cleanup levels (PCULs) established in the PCUL Workbook for the Lower Duwamish Waterway (Ecology, 2024).
2. Cleanup level based on empirical demonstration of groundwater protection in accordance with WAC 173-340-747(9) (refer to explanation in Section 5.1).
3. TEQ: Total toxic equivalent concentration of benzo(a)pyrene, calculated in accordance with WAC 173-340-708(8)(e).
4. Cleanup level is adjusted to the practical quantitation limit (PQL) in accordance with WAC 173-340-700(6)(d).

Table 3. Groundwater Cleanup Levels for Upland Contaminants of Concern

Snopac Property, Seattle, Washington

Constituent	Most Stringent PCUL[1]	Practical Quantification Limit (PQL)	Groundwater Cleanup Level
Metals - Dissolved			
Arsenic	8	1	8
Copper	3.1	1	3.1
Nickel	8.2	1	8.2
Polycyclic Aromatic Hydrocarbons (PAHs)			
Total cPAHs TEQ[2,4]	0.000016	0.008[3]	0.008

Notes:

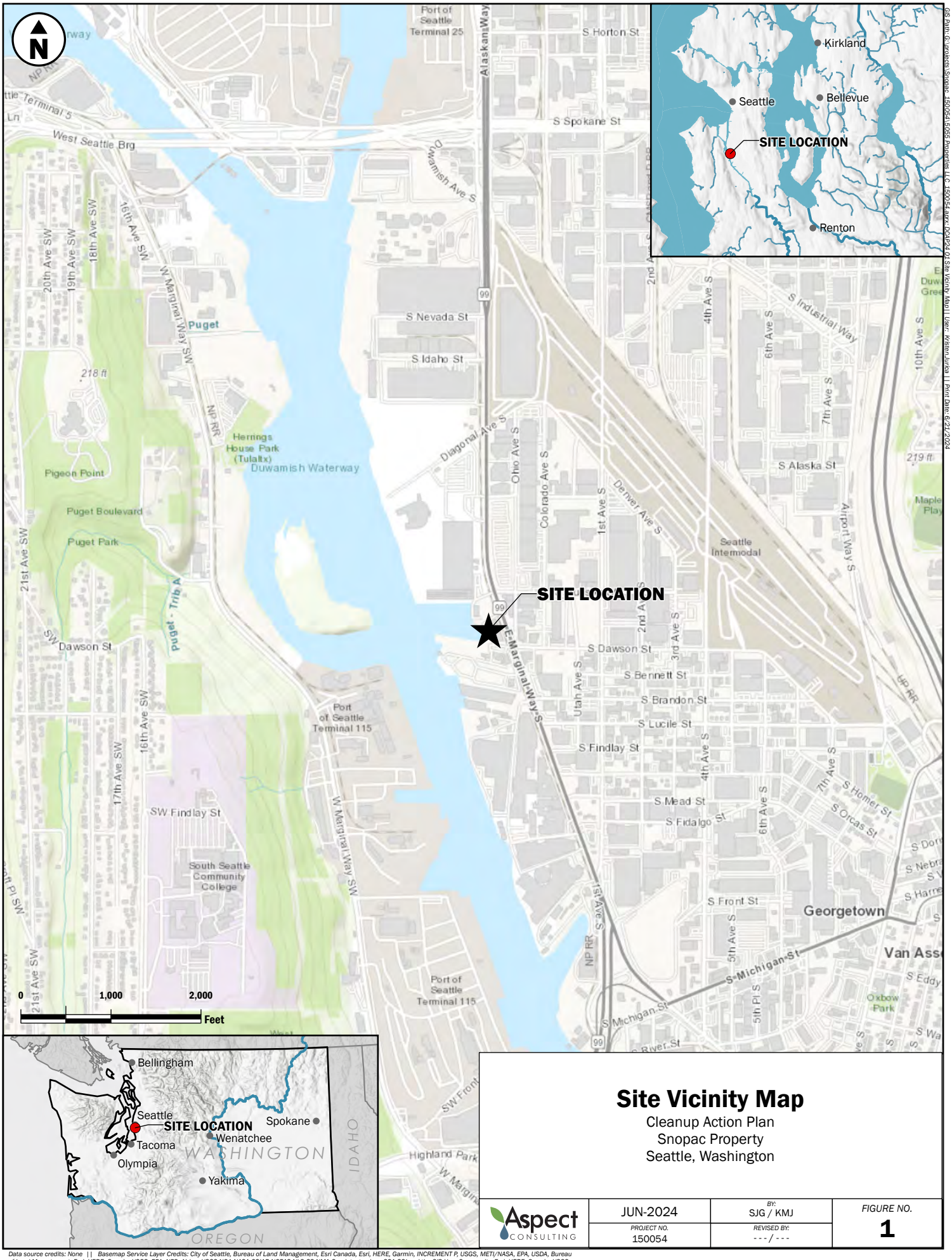
All concentrations are in micrograms per liter (ug/L).

1. Most stringent preliminary cleanup levels (PCULs) for non-potable groundwater established in the PCUL Workbook for the Lower Duwamish Waterway (Ecology, 2024).

2. TEQ: Total toxic equivalent concentration of benzo(a)pyrene, calculated in accordance with WAC 173-340-708(8)(e).

3. The total cPAH TEQ PQL incorporates TEF values for each individual cPAH.

FIGURES



GIS Path: G:\projects\Snopac_150054\150055 Properties LLC_150054.aprx | DAP24.01 Site Vicinity Map | User: Kristen Jurica | | Print Date: 6/21/2024

Site Vicinity Map

Cleanup Action Plan
Snopac Property
Seattle, Washington

Aspect CONSULTING	JUN-2024	BY: SJG / KMJ	FIGURE NO. 1
	PROJECT NO. 150054	REVISED BY: ---/---	

Data source credits: None | | Basemap Service Layer Credits: City of Seattle, Bureau of Land Management, Esri Canada, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA, Bureau of Land Management, Esri, HERE, Garmin, USGS, EPA, NPS, Airbus,USGS,NGA,NASA,CGIAR,NCEAS,NLS,OS,NMA,Geodatastyrelsen,GSA,GSI and the GIS User Community, Esri, HERE, Garmin, USGS, EPA, NPS

FEDERAL CENTER SOUTH

4601 DIAGONAL AVE S
3573200975

Historical 1,000 gallon Diesel UST

Historical Pioneer Towing Co. Building

Historical Coal Burner

Historical 2,500 gallon Diesel UST

Historical Coal Burner

Historical Building (Demolished prior to Interim Action in 2020)

Historical 8,000 gallon Diesel UST

5053 E MARGINAL WAY S
3573201061

Slip 1

EAST MARGINAL WAY S

OHIO AVE S

5209 E MARGINAL WAY S
1924049041

1924049067

KING COUNTY PROPERTY
LEASED TO MANSON CONSTRUCTION

- In-Water Project Area
- Sheet Pile Shoring Wall
- Extent of Uplands SBG - Containing Fill Inferred in RI Report (Aspect, 2020b)
- Property Boundary
- Mean Higher High Water (+9 ft, NAVD88)
- King County Tax Parcel

Note: SBG = Sandblast Grit

0 20 40 Feet

N

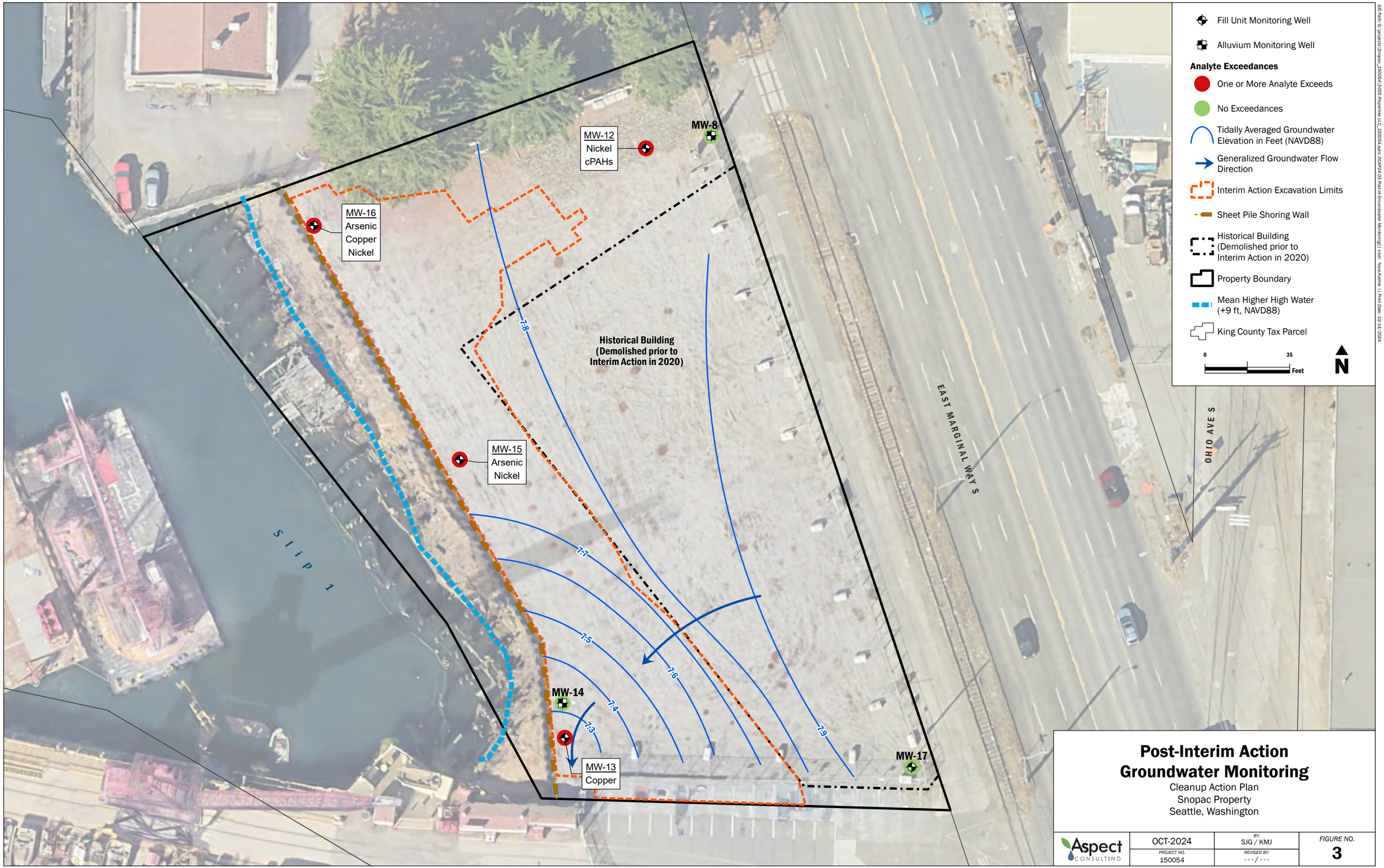
Site Plan with Historical Features

Cleanup Action Report
Snopac Property
Seattle, Washington

Aspect CONSULTING	JUN-2024	BY: SJG / KMJ	FIGURE NO. 2
	PROJECT NO. 150054	REVISED BY: ---/---	

Data source credits: MLK / TDR || Basemap Service Layer Credits: EagleView Technologies, Inc.

GIS Path: G:\projects\Snopac_150054\150552 Properties, LLC_150054.aprx\DC4\P24 02 Site Plan with Historical Features || User: Kristen.Larkin || Print Date: 6/21/2024



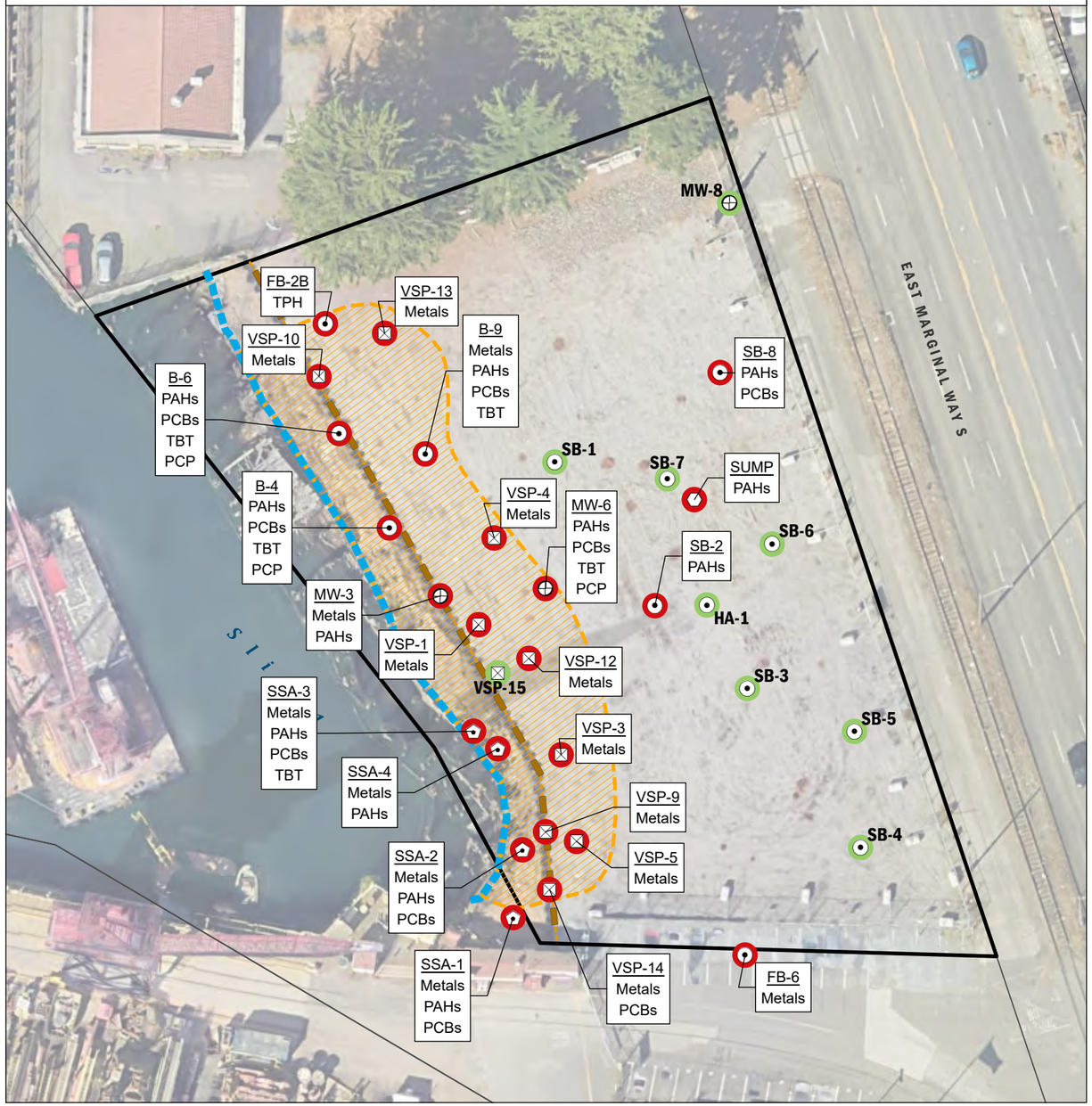
GIS Path: G:\projects\Snopac_150054\15055 Properties, LLC_150054.aprx\DC4P24 03 Post-IA Groundwater Monitoring\|| User: Nora.Kolotie || Print Date: 10/14/2024

Post-Interim Action Groundwater Monitoring

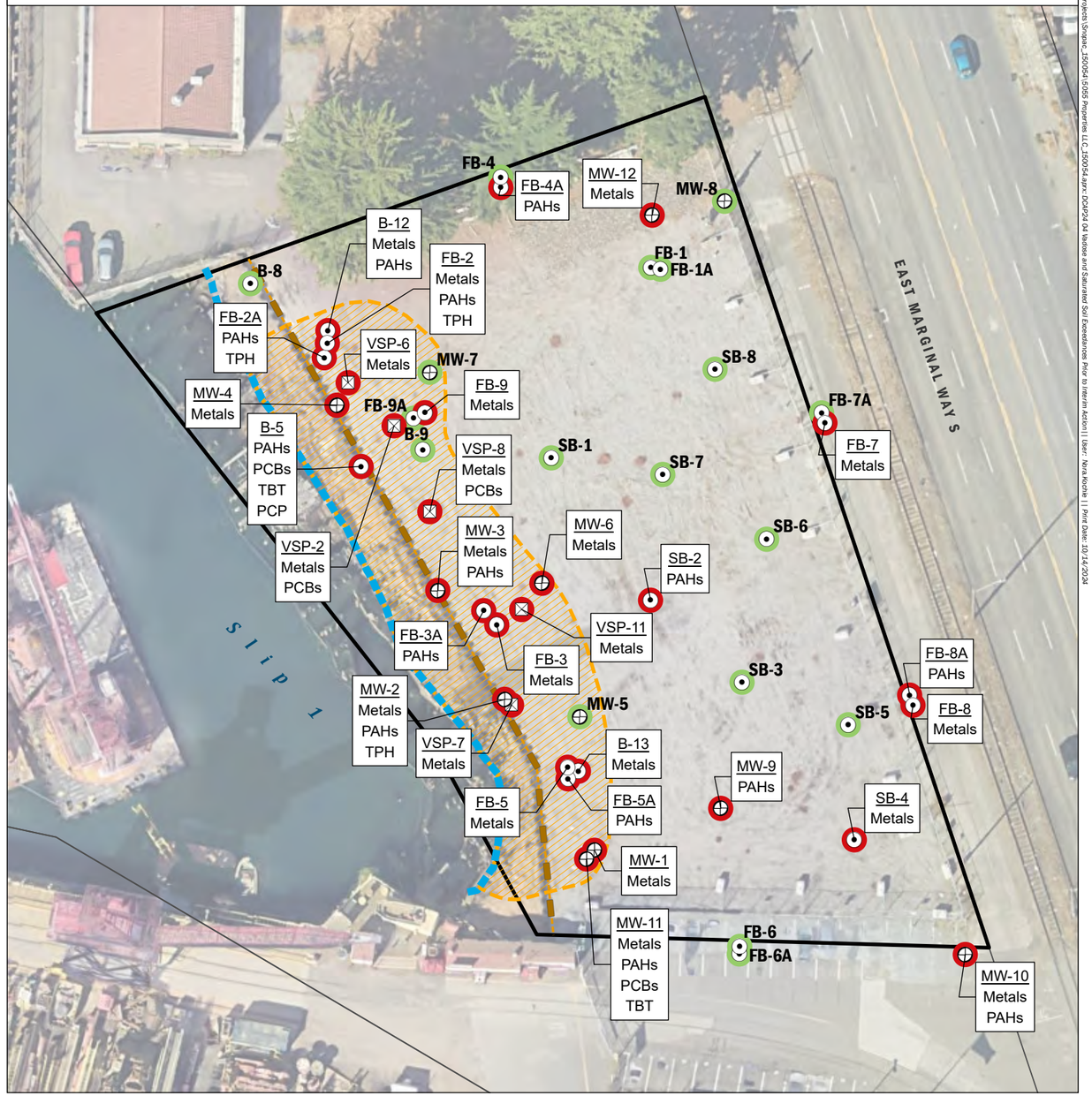
Cleanup Action Plan
Snopac Property
Seattle, Washington

Aspect CONSULTING	OCT-2024	BY: SJG / KMJ	FIGURE NO. 3
	PROJECT NO. 150054	REVISED BY: ---/---	

VADOSE SOIL EXCEEDANCE SUMMARY



SATURATED SOIL EXCEEDANCE SUMMARY



Analyte Groups with Exceedances include:
cPAHs
PCBs
TBT
Metals (including Arsenic, Copper, Lead, Mercury, Zinc)
PCP
TPH

Notes: *Exceedances represent detected concentration greater than the most stringent media-specific PCUL (Tables 5 and 6). Only analytes or analyte groups which have exceedances are labeled. Visible sandblast grit was found at locations B-4, B-5, B-6, MW-6, and VSP-12 to VSP-14.*

Exploration Type
- Upland Soil Samples
- Waste Characterization Test Pit
- Boring
- Monitoring Well
- Sump

Analyte Group Exceedances
- One or More Analyte Groups Exceed
- No Exceedances
- Extent of Uplands SBG - Containing Fill Inferred in RI Report (Aspect, 2020b)
- Mean Higher High Water (+9 ft, NAVD88)
- Sheet Pile Shoring Wall
- Property Boundary
- King County Tax Parcel

N

0 25 50 Feet

Vadose and Saturated Soil Exceedances Prior to Interim Action

Cleanup Action Plan
Snopac Property
Seattle, Washington

Aspect Consulting	OCT-2024	BY: SJC / NLK	FIGURE NO. 4
	PROJECT NO. 150054	REVISED BY: ---/---	

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GIS Path: G:\Projects\Snopac_150054\1055 Properties LLC_150054.aprx\DOAP04 05 Interim Action Completion | | User: None Kophe | | Print Date: 10/14/2024

Interim Action Completion

Cleanup Action Plan
Snopac Property
Seattle, Washington

Aspect CONSULTING	OCT-2024	BY: SJG / KMJ	FIGURE NO. 5
	PROJECT NO. 150054	REVISED BY: ---/---	

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Selected Cleanup Action

Cleanup Action Plan
Snopac Property
Seattle, Washington

Aspect Consulting	OCT-2024	BY: SJG / KMJ	FIGURE NO. 6
	PROJECT NO. 150054	REVISED BY: ---/---	

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GIS Path: G:\projects\Snopac_150054\15055 Properties LLC_150054.aprx\DCAP24 06 Selected Cleanup Action\| | User: Nina Kivihe | | Print Date: 10/14/2024