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FINAL REMEDIAL INVESTIGATION/ FEASIBILITY STUDY WORK PLAN/SAMPLING AND ANALYSIS PLAN ADDENDUM

BLAKELY HARBOR PARK SITE

Prepared for

Port Blakely Tree Farms
1501 Fourth Avenue, Suite 2150
Seattle, Washington 98101

Prepared by

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Project Number: PNG0900

August 19, 2022
(revised April 2023 to include Appendix B)

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For Submittal to

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Project Number: PNG0900

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ACRONYMS AND ABBREVIATIONS

ACM	asbestos-containing material
AO	Agreed Order
bgs	below ground surface
BI Parks	Bainbridge Island Metropolitan Parks and Recreation District
COPC	contaminant of potential concern
CSM	conceptual site model
DAHP	Department of Archaeology and Historic Preservation
DGPS	Differential Global Positioning System
DQOs	data quality objectives
Ecology	Washington State Department of Ecology
EDD	electronic data deliverable
EIM	Environmental Information Management
EPA	United States Environmental Protection Agency
FS	Feasibility Study
ft	feet
Geosyntec	Geosyntec Consultants, Inc.
GPS	global positioning system
HASP	Health and Safety Plan
IDP	Inadvertent Discovery Plan
mg/kg	milligrams per kilogram
MTCA	Model Toxics Control Act
NTUs	nephelometric turbidity units
PAH	polycyclic aromatic hydrocarbon
Port Blakely	Port Blakely Tree Farms
PSEP	Puget Sound Estuary Program
QAPP	Quality Assurance Project Plan
RCW	Revised Code of Washington
RI Report	Remedial Investigation Report
RI	Remedial Investigation
SAP	Sampling and Analysis Plan

SCUM	Sediment Cleanup User's Manual
SMS	Sediment Management Standards
SOPs	Standard Operating Procedures
SVOCs	semi-volatile organic compounds
the Site	Blakely Harbor Park Site
USCS	United Soil Classification System
WA DNR	Washington State Department of Natural Resources
WAC	Washington Administrative Code
Work Plan Addendum	RI/FS Work Plan Addendum
Work Plan	RI/FS Work Plan

1. INTRODUCTION

On June 24, 2020, the Washington State Department of Ecology (Ecology) entered an Agreed Order (AO) with Port Blakely Tree Farms (Port Blakely) (AO No. DE 16944; Ecology and Port Blakely Tree Farms, 2020) to conduct a remedial investigation and feasibility study (RI/FS) and prepare a draft cleanup action plan (DCAP) at the Blakely Harbor Park Site (the Site). The RI/FS is being conducted in accordance with the AO and with the Model Toxics Control Act (MTCA) Revised Code of Washington (RCW) 70A.305.050(1), Chapter 70A.305 RCW (MTCA Statute), Chapter 173-340 Washington Administrative Code (WAC) (MTCA Regulations), and Chapter 173-204 WAC (Sediment Management Standards [SMS] Regulations).

The RI/FS is being conducted by Geosyntec Consultants, Inc. (Geosyntec) on behalf of Port Blakely. On July 2021, Ecology provided conditional approval of the *RI/FS Work Plan* (Work Plan). Geosyntec completed the Phase 1 field investigation in September of 2021,[1] and Ecology approved the Final Work Plan in January 2022 (Geosyntec, 2022).

The purpose of this *RI/FS Work Plan/Sampling Analysis Plan* (SAP) *Addendum* is to fill data gaps identified in soil, groundwater, and sediment media after review of the Phase 1 RI data results collected in 2021. In February 2022, Geosyntec presented the preliminary results to Ecology and the Suquamish Tribe, and Ecology requested further Site characterization to complete the RI/FS.

1.1 Site Description

The Site is located on the southeast side of Bainbridge Island, Washington (Figure 1), located at the corner of Blakely Avenue and 3-T Road, Bainbridge Island, Washington 98110. The Site encompasses approximately 61 acres of the westernmost part of Blakely Harbor, including 4 acres of vacant and forested upland area, a 7.2-acre former mill pond, 7,500-linear feet (ft) of shoreline, and approximately 50 acres of intertidal and subtidal marine harbor. It is bounded to the east by submerged lands that are privately owned or managed by Washington State Department of Natural Resources (WA DNR), to the north and the west by the Blakely Harbor Park, and to the south by privately owned properties. The Facility/Site ID is 60939, and the Ecology Cleanup Site ID is 14770.

The Site has been divided in four sub-areas (Figure 2) for the purpose of the RI, each with unique physical features (e.g., mudline elevation, intertidal/subtidal, access pathways for equipment, presence of woody debris), substrate conditions, and access constraints. These sub-areas are:

- Upland area (northern and southern upland);
- Mill pond;
- Inner harbor; and
- Outer harbor.

[1] Bathymetry and Sediment Profile Imaging and Plan View Surveys were completed in 2020.

A pedestrian bridge was installed by Bainbridge Island Metropolitan Parks and Recreation District (BI Parks) in 2020 across the narrow inlet between the former mill pond and the inner harbor. This bridge connects the southern and northern shorelines of the harbor for park users.

1.2 Purpose of the Work Plan Addendum

This *RI/FS Work Plan/SAP Addendum* (Work Plan Addendum) describes the rationale for additional field investigations and proposed sampling and analysis activities needed to complete the RI/FS.

Phase 2 scope of work needed to fill these data gaps includes:

- ***Soil:*** further delineation of vertical and horizontal extent of contaminants of potential concern (COPCs), including semi-volatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), metals, and dioxin/furans.
- ***Groundwater:*** characterization of groundwater from permanent wells to confirm results from temporary wells and evaluate seasonal changes, and to assess the soil to groundwater transport pathway, particularly near the Site shoreline, for COPCs, including metals, TPH, dioxin/furans, and SVOCs.
- ***Sediment:*** further delineation of the vertical and horizontal extent of COPCs, including metals, SVOCs, dioxin/furans, and benthic toxicity.
- ***Debris:*** assess scattered slag deposits that were observed along the northern shore in 2021; this Work Plan Addendum includes an assessment of the extent, distribution, and type of slag along the shoreline.

This Work Plan Addendum also includes additions to the SAP portion of the Work Plan's Appendix A, *Sampling and Analysis Plan/Quality Assurance Project Plan* (QAPP), and its appendices:

- SAP/QAPP Tables 1 through 3 are updated with new project team members; summaries of sampling media; and proposed sampling locations.
- Standard Operating Procedures (SOPs) have been added for a visual slag assessment and monitoring well installation.
- Appendix B with the analysis and selection of screening levels for soil, groundwater, and sediment.
- Appendix C with additional exceedance figures for COPCs.

1.3 Project Team and Responsibility

The project team and responsibilities are described in Section 1.3 of the Work Plan. An updated list of the designated project team members and their contact information is provided in Table 1.

1.4 Data Quality Objectives

The purpose of this Work Plan Addendum is to address data gaps identified during Phase 1 field investigations and to complete the RI/FS, focusing on the following data quality objectives (DQOs) as they pertain to data gaps:

- DQO #1: Characterize the horizontal and vertical extent of COPCs in upland soil to delineate Site boundaries towards the northern and southern uplands.
- DQO #2: Confirm the presence/absence of COPCs in groundwater, seasonally, and determine if there is a potential transport pathway to sediment.
- DQO #3: Characterize the horizontal and vertical extent of COPCs in sediment to delineate Site boundaries towards the east (mill pond) and the west (outer harbor).
- DQO #4: Define the lateral and vertical extent of wood debris in sediment.
- DQO #5: Refine the conceptual site model by evaluating concentrations of COPCs in surface soil to determine the Site boundary; determining the extent of slag debris, and the potential correlation of slag with site impacts and risk; and evaluating sources and pathways; and collecting additional sediment toxicity data in the mill pond and nearshore areas.

The investigation approach to address these DQOs is described below.

2. PHASE 2 INVESTIGATION APPROACH

This section presents the additional investigation tasks designed to address the DQOs identified after the completion of Phase 1. Proposed sampling locations are presented in Figure 3, and proposed sampling locations with tax lot parcels are shown in Figure 4. Analytical suites and coordinates of proposed sampling locations are listed in Tables 2 and 3, respectively. The Phase 2 investigation approach includes additional surface and subsurface soil sampling, groundwater sampling (seasonal) from proposed monitoring wells, sediment sampling (grabs and cores), and a slag debris mapping survey.

2.1 Upland Soil Investigation

The upland soil investigation includes collection of shallow, surface soil samples (hand augers), and deep, subsurface soil samples (borings). Prior to sampling, a professional licensed surveyor will locate and mark the upland sampling locations.

Subsurface soil borings (direct-push drilling is the preferred method and was used in Phase 1) will be led by Geosyntec field personnel, who will be supervised by a State of Washington-licensed Professional Geologist with oversight by an archaeologist. Both the hand-auger and soil boring samples will be field logged by visual-manual methods using the United Soil Classification System (USCS). Detailed field sampling and analysis methods are provided in the SAP/QAPP (Appendix A of the Work Plan). Any deviation from the procedures described in the SAP/QAPP will be discussed by the field crew with the Project Manager or Project Coordinator and recorded in the field notes.

2.1.1 Shallow Surface Soil

Phase 2 surface soil samples will be collected from two sets of perimeter sampling locations during two mobilizations. The first set of perimeter samples will be collected at step-out locations to delineate the horizontal extent of COPCs detected during Phase 1. The second set of perimeter samples will be collected approximately 200 ft beyond the first round of step-outs. Shallow surface soil samples will be collected from the upper 2 ft of soil below the vegetative layer using a hand auger, shovel, and/or trowel. Proposed sampling locations are shown in Figures 3 and 4 and include the following:

Perimeter 1, mobilization 1:

- Five locations (HA-31, HA-32, HA-33, HA-34, and HA-35) to be sampled in the northern upland area (step-outs from Phase 1 locations HA-01, HA-07, HA-11, HA-12, and HA-16) to delineate the horizontal distribution of COPCs and define the Site boundary to the north.
- Two locations (HA-36 and HA-37) to be sampled in the southern upland area (step-outs from Phase 1 locations HA-02 and HA-03) to delineate the horizontal distribution of COPCs and define the Site boundary to the south.
- One location (HA-48) to be sampled in the western upland area to delineate the horizontal distribution of COPCs and define the Site boundary to the west.

Perimeter 2, mobilization 1:

- Four locations (HA-38, HA-39, HA-40, and HA-41) to be sampled in the northern upland area (step-outs from Perimeter 1 locations HA-31, HA-32, and HA-33) to delineate the horizontal distribution of COPCs and define the Site boundary to the north.
- Two locations (HA-42 and HA-43) to be sampled in the southern upland area (step-outs from Perimeter 1 location HA-36) to delineate the horizontal distribution of COPCs and define the Site boundary to the south.

Perimeter 2, mobilization 2:

- Two locations (HA-44 and HA-45) to be sampled in the northern upland area (step-outs from Perimeter 1 locations HA-34 and HA-35) to delineate the horizontal distribution of COPCs and define the Site boundary to the north. These samples will only be collected if the HA-34 and HA-35 results are above a COPC screening level and cannot be collected until we secure access agreements with the private property owners.
- Two locations (HA-46 and HA-47) to be sampled in the southern upland area (step-outs from Perimeter 1 locations HA-36 and HA-37) to delineate the horizontal distribution of COPCs and define the Site boundary to the south. These samples will only be collected if the HA-36 and HA-37 results are above a COPC screening level and cannot be collected until we secure access agreements with the private property owners.

Discrete soil samples will be collected at 0- to 1-ft and 1- to 2-ft depth intervals at each location. Perimeter 1 samples will be analyzed; Perimeter 2 samples will be held and archived until review of Perimeter 1 samples is complete. Collected samples will be processed and analyzed as described in the SAP/QAPP and Tables 2 and 3.

2.1.2 Subsurface Soil Samples

Phase 2 subsurface soil samples will be collected at eight step-out locations to delineate the horizontal and vertical extent of COPCs where preliminary soil COPCs were detected during Phase 1 sampling. To adequately characterize the extent of contamination, borings will be advanced to depths of approximately 15 ft below ground surface (bgs) or until the bottom of fill/native contact is reached. The native soil is described as a grey, silty gravel layer below the fill unit and was encountered at depths ranging from 8 to 15 ft bgs during Phase 1. Proposed Phase 2 sampling locations are shown in Figures 3 and 4 and include:

- Three soil borings (SB-28, GW/SB-29, SB-30) in the northern upland area, step-outs from Phase 1 locations: SB-20, SB-21, SB-22, and SB-23, to assess the vertical distribution of COPCs. A groundwater monitoring well will be installed in the borehole at location GW/SB-29 to characterize groundwater inflow to the northern upland area.
- Four soil borings along the northern upland shoreline to characterize the vertical distribution of COPCs and investigate potential transport pathways, as discussed below (GW/SB-24, SB-25, GW/SB-26, and GW/SB-27). Groundwater monitoring wells will be installed in three of these four boreholes.
- One soil boring (SB-38) in the southern upland area (peninsula) to characterize the depth of fill adjacent to the surface sample where asbestos-containing material (ACM) was positively identified and assess vertical distribution of COPCs (step-out from Phase 1 locations HA-02 and HA-03).

Three proposed borings (SC-50, SC-16, and SC-17 in Figure 4) will be completed from the shore during low-tide conditions; however, these borings are for collecting sediment samples, as described in Section 2.3.2.

Soil characterization and drill rig observations will be used with field screening to identify evidence of contamination based on sheen, odor, staining, and/or indications of non-soil materials (e.g., brick fragments, asbestos). Volatile organic compound presence may be measured with a photoionization detector. Soil samples will be collected based on stratigraphy or every 2 ft if the boring appears homogeneous. Based on low-volume sample recovery during Phase I, a larger diameter sampler will be used.

Collected samples will be processed and analyzed as described in the SAP/QAPP and Tables 2 and 3.

2.2 Groundwater Sampling and Well Installation

Four permanent groundwater monitoring wells will be installed in the northern upland area along the shoreline to assess the potential for contaminant migration from soil to groundwater. Proposed locations are shown in Figures 3 and 4. These wells will be sampled four times (i.e., quarterly) over the 2022/2023 period at low tide to evaluate seasonal trends.

The monitoring wells will be installed in the soil boreholes once target depths to native soil are achieved and depths to groundwater confirmed. The wells are targeting the unconfined aquifer in the fill unit above the native soil (approximately 8 to 15 ft bgs based on depths encountered during Phase 1). Monitoring wells will be constructed with 2-inch-diameter, schedule 40 polyvinyl chloride, and 5- to 10-ft-long,[2] 10-slot pre-packed screens. The screened interval is estimated to span the water table range from the bottom of the fill unit to the top of groundwater observed at high tide. Groundwater levels in the Phase 1 borings ranged from 6.9 to 10.6 ft bgs. Monitoring wells will be completed with aboveground steel monuments and steel protective bollards and fitted with locking, sealed caps. Wells will be installed in compliance with Chapter 173-160-400 WAC (Part Two – General Requirements for Resource Protection Well Construction and Geotechnical Soil Borings) and Appendix A, *Monitoring Well Construction – Standard Operating Procedure #106*.

Monitoring wells will be developed at least 48 hours after installation by pumping and surging until water clarity is less than 50 nephelometric turbidity units (NTUs) or at least 10 well volumes have been removed. Wells will be surveyed by a licensed professional surveyor to allow calculation of groundwater gradients and elevations.

Following installation, Geosyntec will collect groundwater samples using low-flow sampling methods at low tide, as described in the SAP. An additional three rounds of groundwater sampling events will be completed quarterly thereafter. Groundwater samples will be analyzed for the chemicals identified in Phase 1 that exceeded the preliminary screening levels (Table 3).

2.3 Sediment Investigation

The Phase 2 sediment field investigation will include collection of surface and subsurface sediment samples. The shoreline will also be inspected for presence of slag debris and the extent of slag will be mapped. Proposed sediment sampling locations are shown in Figures 3 and 4.

Detailed field sampling and analysis methods are provided in the SAP/QAPP (Appendix A of the Work Plan) and follow the Sediment Cleanup User's Manual (SCUM) and Puget Sound Estuary Program (PSEP) guidance documents (Ecology, 2019; PSEP, 1996).

2.3.1 Surface Sediment

A total of 12 additional surface sediment samples (0 to 10 centimeters) will be collected to fill data gaps identified during the 2021 Phase 1 sampling. Proposed Phase 2 sampling locations are needed to refine the horizontal extent of COPCs to the northeast, along the inner harbor shoreline, and within the mill pond (Figures 3 and 4) and include:

- Three samples (SG-43, SG-44, and SG-45) from the unnamed creek (located on the northwest shore of the mill pond) to assess sediment quality, further characterize the

[2] Phase 1 temporary wells reached native soil at a depths ranging from 8 ft (GW-19) to 15 ft (GW-17) bgs.

horizontal distribution of COPCs, and delineate the Site boundary to the west of the mill pond.

- Three samples (SG-46, SG-47, and SG-48) in the mill pond (step-outs from Phase 1 location SG-05) to assess sediment quality and potential benthic toxicity adjacent to a location where sediment toxicity exceeded SMS criteria in the juvenile polychaete bioassay (SG-05).
- Three samples (SC/SG-10, SC/SG-11, and SC/SG-49) along the shoreline of the inner harbor (two samples to reoccupy Phase 1 locations, SG-10 and SG-11, which were not previously tested for bioassays; and one step-out from Phase 1 location SG-15) to assess sediment quality and potential benthic toxicity in an area with locally elevated surface sediment COPC concentrations.
- Three samples (SC/SG-53, SC/SG-54, and SG-55) near the northeastern portion of the outer harbor and beyond the former wharf structure to delineate the horizontal extent of COPCs and refine the Site boundary.

Surface sediment samples will be collected either by hand or by using a stainless-steel grab sampler (Van Veen, power grab) deployed from a boat. Locations will be confirmed using a Differential Global Positioning System (DGPS). Multiple grab samples may be collected per station (within 25 ft of the proposed sampling location) and composited into one sample to achieve adequate volume requirements. During surface sediment sampling, the type and quantity of bottom debris (including woody debris, building debris, and slag remnants) and visual evidence of impacts (e.g., oil sheens) will be recorded.

Samples will be accepted, processed, and analyzed as described in the SAP/QAPP. The analyte list is provided in Tables 2 and 3. For the three samples collected as step-outs near SG-10 and SG-11, all three bioassay tests described in the SAP/QAPP (amphipod survival, larval bivalve development, and juvenile polychaete worm survival and growth) will be performed. For the three sediment samples collected from mill pond, only the juvenile polychaete worm survival and growth test will be performed to assess worm sensitivity (the other two bioassays met SMS criteria during Phase 1). A bioassay reference sample will also be collected by EcoAnalysts. For the 2021 bioassay sampling event, reference sediment was collected from Carr Inlet by EcoAnalysts. The reference sediment will be collected from the same general location in Carr Inlet as in 2022, pending grain size and TOC matches. Any deviation from the procedures described in the SAP/QAPP will be discussed by the field crew with the Project Manager or Project Coordinator and recorded in the field notes and RI Report.

2.3.2 Subsurface Sediment Cores

A total of 10 sediment cores will be advanced, using either direct-push drilling, vibracore, or hand-auger methods, to a depth of 10 ft below mudline or refusal. Core samples will be collected at approximately 2-ft intervals or according to stratigraphic changes and core recoveries. Collected samples will be used to fill the DQOs identified during the 2021 Phase 1 sampling. Proposed Phase 2 sampling locations are shown in Figures 3 and 4 and include:

- Two sediment cores will be advanced at Phase 1 sediment grab locations (SG-10 and SG-11) to determine the vertical extent of elevated COPC concentrations detected in surface sediment along the inner harbor shoreline. Cores will be placed within 10- to 20-ft of the surface grab location, depending on site access and water depth.
- One sediment core, SC-49, will be advanced near Phase 1 sediment grab location (SG-15) to determine the extent of elevated COPC concentrations detected in surface sediment near the mouth of the mill pond. Sediment grab and core (SG-49 and SC-49) will be placed within 10- to 20-ft of the Phase 1 surface grab location SG-15, depending on Site access and water depth.
- Three sediment core locations (SC-16, SC-17, and SC-50) will be accessed from the upland along the northern shoreline and sampled with upland drilling equipment. These cores will be advanced where two Phase 1 proposed core locations (SC-16 and SC-17) were not sampled, and at one location (SC-12) that was moved more than 100 ft from its original target because of limited boat access (presence of remnant pilings). Cores will be advanced as close as possible to the proposed Phase 1 sampling locations, as shown in Figures 3 and 4 (Phase 2 proposed sampling locations SC-50, SC-16, and SC-17). These stations are located within the footprint of the former mill structures and important areas to determine the vertical extent of COPCs detected in both historical surface grabs (SED-3, SED-5, and SED-6) and test pit samples (GeoEngineers, 2019; Anchor Environmental LLC, 2009).
- Two sediment cores (SC-51 and SC-52) will be advanced in the proximity of Phase 1 sediment sampling locations (SG-23 and SC-24) as step outs to further delineate the extent of COPC exceedances observed in co-located surface sediment samples. Cores will be collected within 10- to 20-ft of the surface grab location, depending on Site access and water depth. These Phase 2 sampling locations, SC-51 and SC-52, are shown in Figures 3 and 4.
- Two sediment cores will be advanced to the northeast of Phase 1 locations to further delineate elevated COPC concentrations detected in surface sediment samples (SG-41 and SG-42) along the inner harbor shoreline. These Phase 2 core locations, SC-53 and SC-54, and co-located grab samples, SG-53 and SG-54, are shown in Figures 3 and 4.

The preferred sampling method for sediment cores is a vibracore deployed by the research vessel at sampling stations SC-10, SC-11, SC-51, and SC-52. Cores will be advanced down 10 ft below mudline or until refusal is met, whichever comes first. The best of three attempts will be accepted. The sediment coring methodology employed may vary depending on field conditions, but will involve vibracoring, direct-push drilling, hand-augering, hand-drive slide-hammer coring, and/or similar methods depending on Site access and field conditions.

Boat access to the northern shoreline is limited due to presence of submerged former mill structures and pilings. Based on Site conditions encountered near Phase 1 proposed locations SC-12, SC-16, and SC-17, cores will be advanced from land using a direct-push drilling rig (the same rig used in Phase 1 by Cascade Drilling) during low tide period. If direct-push methods are unsuccessful, then hand-augering and/or hand-drive slide-hammer coring will be used.

After collection and retrieval, core tubes collected from the boat are planned to be cut open on a core-processing barge or other designated location. Subsurface sediment will be visually logged, and subsamples (approximately five per core) will be continuously collected over the drive interval based on stratigraphy and core recovery. If observed stratigraphy appears homogenous with depth, then subsamples will be collected at 2-ft intervals. If major stratigraphic contacts are observed, then these contacts will be used to define the sample depth intervals. Grain size, color, odor, sheen, presence of biota, wood debris, slag debris, and any other visual observation related to the character and depositional history of the substrate will be used to describe and section the cores. Sectioning will focus on substrate with similar characteristics with 1-ft minimum intervals.

Sediment cores and subsurface samples will be accepted, processed, and analyzed, as described in the SAP/QAPP and Tables 2 and 3. Any deviation from the procedures described in the SAP/QAPP will be discussed by the field crew with the Project Manager or Project Coordinator and recorded in the field notes.

2.3.3 Slag Mapping

Slag piles and scattered slag debris from historical mill operations were observed along the northern shoreline and in sediment samples during the Phase 1 shoreline inspection survey. Geosyntec field personnel noted slag remnants ranging in size from pebbles to cobbles up to boulders. The locations of larger slag piles were recorded using a handheld global positioning system (GPS); slag piles were photographed and mapped along the shoreline near the former foundry, machine shop, and blacksmith shop. Historical observations also indicated the presence of slag debris in the former mill pond (Shannon & Wilson, Inc., 1992). The relative proportion of slag to beach sediment was not determined during Phase 1 field work, and it was identified as a data gap for further investigation.

Slag is an anthropogenic waste product commonly generated during smelting and other foundry operations. It can be similar in appearance to volcanic rock or asphaltic debris; its form can be either massive or granular, depending on the way it was processed and cooled. Slag debris is not managed as a deleterious substance by Ecology in SCUM. However, slag is mentioned together with wood waste as a physical factor contributing to toxicity in sediment environments (Ecology, 2019).

During Phase 2, Geosyntec field personnel will survey the northern shoreline from the northeast side of the Power House to the northeast boundary of BI Park. Slag debris will be visually identified, photographed, and mapped. The locations of photographs and samples will be recorded using a GPS device. In addition, a visual semiquantitative estimate of the slag debris will be performed accordingly to the *Slag Visual Assessment – Standard Operating Procedure #107* (Appendix A).

SOP #107 provides the steps to visually describe and estimate slag percent coverage (by area); the field form attached to SOP #107 will be used by personnel to record their observations. Discrete sediment and soil samples collected during the Phase 2 sampling events will also be screened for the presence/absence of slag; if present, the amount of slag will be quantified accordingly to SOP #107.

For the RI Report, Geosyntec will develop a percent distribution map, identifying the presence and extent of remnant anthropogenic slag. This map will be compared with other COPC (i.e., metal) exceedances to assess potential correlation.

2.4 Field Quality Control

Field quality control, including collection of field duplicates, equipment blanks, and positioning controls, will be implemented as described in the SAP/QAPP (Appendix A to the Work Plan). A field duplicate and equipment blank will be collected for each quarterly groundwater monitoring event. Any deviation from the procedures described in the SAP/QAPP will be discussed by the field crew with the Project Manager or Project Coordinator and recorded.

2.5 Asbestos-Containing Material Monitoring

During Phase 1 investigations, ACMs were identified and confirmed at the Site. In response to these findings, Geosyntec created a response plan for the potential encounter of ACM (Appendix A-2 to the Work Plan). The procedures detailed in Section 3 of that document apply to this Phase 2 work.

2.6 Archaeological Monitoring

An archaeological excavation permit (per RCW 27.53) was obtained for the Phase 1 sampling, and it continues to be applicable for this Phase 2 work. Archaeological monitoring will be conducted by a qualified archaeologist for ground disturbing activities associated with the Washington State Department of Archaeology and Historic Preservation (DAHP)-permit-mapped area of the Site. The archeologist will be on standby for monitoring the upland areas outside of the DAHP-permit-mapped areas and in-water investigations. If potential artifacts are encountered by the field team, they will follow the procedures as described in the Inadvertent Discovery Plan (IDP; Appendix A-1 to the Work Plan). No culturally significant artifacts were encountered during the Phase 1 investigation in 2021. Additional coordination with DAHP will be conducted prior to the implementation of this Work Plan Addendum. An archaeological excavation permit (per RCW 27.53) was obtained for the Phase 1 sampling, and it continues to be applicable for this Phase 2 work.

2.7 Potential Access Issues and Contingent Actions

Field conditions that limit access to sampling locations may be encountered by field personnel. The SAP/QAPP discusses how potential contingencies will be handled. Additional access and contingency actions are discussed below.

Upland investigations will extend towards, and in some cases beyond, the boundary of the BI Park parcels, as shown in Figure 4. For both the northern and southern the shallow surface soil locations outside the park boundary, Port Blakely is attempting to secured access agreements with private landowners. For perimeter sampling locations, heavy vegetation and steep terrain may require that field personnel adjust sampling by 50 to 60 ft in either direction. These adjustments will be documented in daily field notes.

2.8 Investigation-Derived Waste

Investigation-derived waste will consist of soil cuttings and purge and decontamination water. It will be containerized, properly labeled, and staged on-site as described in SAP/QAPP Section 2.12 and Attachment C (*Management and Disposal of Investigation-Derived Waste – SOP #103)*. Investigation-derived waste will be characterized through laboratory analysis; transportation and disposal will be handled by the client.

2.9 Health and Safety

Site fieldwork will be performed in accordance with the Geosyntec's corporate Health and Safety standards and the project-specific Health and Safety Plan (HASP; Appendix B to the Work Plan). Completed in 2020, the HASP contains guidance for working safely during the COVID-19 pandemic. Vaccines are now available and local, state, and federal policies have been updated. Attachment A to the HASP allows for documenting amendments, and if needed, it will be updated to reflect the most recent COVID-19 policies prior to the commencement of this fieldwork.

3. DATA MANAGEMENT, EVALUATION, AND REPORTING

The data collected during this addendum to the RI/FS investigation will be included in the RI/FS Report to support a comprehensive evaluation of the nature and extent of COPCs at the Site. The data will also be used to refine the conceptual site model (CSM), identify additional COPCs in exceedance of risk-based or background-based screening levels, support development of Site-specific cleanup levels, and support the evaluation and selection of remedial alternatives and a cleanup action.

3.1 Data Management

A record of field surveys and procedures will be maintained and will include sampling locations, sample depths, sampling methods, sample handling procedures, preservation methods, and storage procedures. Dates and times of collection, preservation methods, and storage procedures will be recorded in daily field logs or sampling logs, along with any field circumstances potentially affecting sampling procedures. Field notes will also record the visual assessment of slag and other substrate conditions. Additional methods and procedures are described in the Work Plan (Geosyntec, 2021).

Analytical data will undergo Stage 2B (Stage IV for dioxins/furans) validation by the project chemist following national guidelines (United States Environmental Protection Agency [EPA], 2002). A data validation report detailing any data quality issues and additional qualifiers will be provided with the RI Report. The electronic data deliverable (EDD) will be provided with the final RI Report for uploading into the Environmental Information Management (EIM) database by Ecology.

Finalized and validated data will be formatted and submitted to Ecology for entry into the EIM system within 30 days of receipt of final validated data. Geosyntec will manage the overall project database and data management to incorporate appropriate qualifiers following acceptance of the data validation.

3.2 Reporting

The data collected during the Phase 2 investigations will be included in the RI Report. The RI Report will present a summary of field activities, data results, the nature and extent of Site impacts, and a revised CSM. It will provide the results from investigation tasks and refine the Site boundary, which will support the FS and the development of remedial alternatives, according to the RI Checklist (Ecology, 2020).

4. SCHEDULE

The initial field work associated with this *RI/FS Work Plan Addendum* is expected to take up to three weeks. This assumes that Geosyntec has access to sampling locations and subcontractors are available to conduct upland soil and sediment work simultaneously. If additional perimeter sampling is required, these mobilizations could require up to another week of sampling. The quarterly groundwater sampling will be completed over the next year. Geosyntec will provide a proposed schedule to Ecology when the Work Plan Addendum is approved. We anticipate work beginning in September or October; we will avoid weeks with holidays because of high park usage.

5. REFERENCES

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TABLES

Table 1. Project Team, Role, and Contact Information
Blakely Harbor Park Site RI/FS Work Plan/SAP Addendum

Role (a)	Name	Firm	Address	Phone	Email
Ecology Project Coordinator	Bonnie Brooks	Washington State Department of Ecology Toxics Cleanup Program	300 Desmond Drive Lacey, Washington 98504-7600	(360) 407-6285	bonnie.brooks@ecy.wa.gov
Port Blakely Technical Advisor (Primary Project Consultant)	Anne Fitzpatrick, LHG	Geosyntec Consultants, Inc.	520 Pike Street, Suite 2600 Seattle, Washington, 98101	(206) 496-1461	afitzpatrick@geosyntec.com
Port Blakely Project Coordinator	Cindy Bartlett, LG WA	Geosyntec Consultants, Inc.	920 SW Sixth Avenue, Suite 600 Portland, Oregon 97204	(503) 505-4145	cbartlett@geosyntec.com
President of United States Forestry for Port Blakely Tree Farms	Mike Warjone	Port Blakely Tree Farms	8133 River Dr SE Olympia, Washington, 98501	(360) 596-9417	mwarjone@portblakely.com
Legal Counsel for Port Blakely Tree Farms	Lynn Tadlock Manolopoulos	Davis Wright Tremaine LLP	929 108th Avenue NE, Suite 1500, Bellevue, Washington 98004	(425) 646-6146	lynnmanolopoulos@DWT.com
Subcontractors					
Archaeologist	Stacy Bumback	Jacobs	1100 112th Ave NE, Suite 500, Bellevue, Washington	(206) 453-1648	Stacy.Bumback@jacobs.com
Vessel Operator (vibracore and grab sampler)	Shawn Hinz	Gravity Marine Consulting	32617 SE 44th ST Fall City, Washington 98024	(425) 281-1471	shawn@gravitymarine.com
Upland Drilling Operators	Kasey Gobel	Cascade	1210 Eastside St SE Suite 200 Olympia, Washington 98501	(360) 459-4670	kgoble@cascade-env.com
GPS and Well Survey	Jack Seeds	Pace	11255 Kirkland Way, Suite 300 Kirkland, Washington 98033	(425) 827-2014	Jacks@paceengrs.com
Laboratory and Analytical Services	Kelly Frances Bottem	Analytical Resources, Inc. (ARI)	4611 S 134th Place, Suite 100, Tukwila, Washington 98168	(206) 695-6211	kelly.bottem@arilabs.com
Laboratory and Analytical Services	Nicholas P. Corso	SGS AXYS Analytical Services Ltd. (dioxins/furans)	2045 Mills Road West Sidney, British Columbia, Canada V8L 5X2	(888) 373-0881	NICHOLAS.CORSO@sgs.com
Laboratory and Analytical Services	Michelle Knowlen	EcoAnalysts, Inc. (Bioassay)	4729 NE View Drive, PO Box 216 Port Gamble, Washington 98264	(360) 297-6040 ext. 6056	mknowlen@ecoanalysts.com

Notes:
(a) Team member roles are updated from original work plan (Geosyntec, 2022).

Acronyms:
GPS = global positioning satellite

Table 2. Summary of Sampling Media, Sample Counts, and Analyses

Sampling Event	# of Locations	Sample Depth	Analyte Group									Bioassays
			Metals (a)	PAHs	Phenols/ Phthalates	TPH	Dioxins/ Furans	TOC	Total Solids	Grain Size	Conventionals (b)	
Subsurface Soil Borings (Drill rig/Hand Auger)	8	0 to 15 ft; and 0 to 20 ft (c)	X	X	X	X	X	NA	X	X	NA	NA
Surface Soil Sampling (Hand Auger Perimeter 1)	8	0 to 2 ft	X	X	X	X	X	NA	X	X	NA	NA
Perimeter, Surface Soil Sampling (Hand Auger Perimeter 2)	10	0 to 2 ft	X	X	X	X	X	NA	X	X	NA	NA
Groundwater Well Samples	4	tbd	X	X	X	X	X	X	NA	NA	X	NA
Surface Sediment Sampling (by hand along creek)	3	0 to 10 cm	X	X	NA	NA	X	X	X	X	X	X
Surface Sediment Sampling (by hand in mill pond)	3	0 to 10 cm	X	X	NA	NA	X	X	X	X	X	X
Surface Sediment Sampling (by boat in harbor)	6	0 to 10 cm	X	X	NA	NA	X	X	X	X	X	X
Subsurface Sediment Sampling (Drill Rig/Hand Auger)	3	0 to 10 ft	X	X	X	NA	X	X	X	X	NA	NA
Subsurface Sediment Sampling (by boat)	7	0 to 10 ft	X	X	X	NA	X	X	X	X	NA	NA
TOTAL No. OF STATIONS	**48**											

Notes:

(a) Groundwater samples will be analyzed for total and dissolved metals (field filtered 0.45 micron).

(b) Conventionals include: ammonia, sulfides, total volatile solids (TVS), and acid volatile sulfides/simultaneous extracted metals (AVS/SEM) for surface sediment. Ammonia and sulfides are included as conventionals for groundwater.

(c) One subsurface soil boring in the south jetty will be advanced up to 20 feet below ground surface to delineate the depth of fill material and characterize soil near a location where asbestos-containing material was positively identified.

Acronyms:

cm = centimeters; EPA = Environmental Protection Agency; ft = feet; NA = not applicable; PAHs = polycyclic aromatic hydrocarbons; SIM = selected ion monitoring; SM = standard method; tbd = to be decided; TOC = total organic carbon; TPH = Total Petroleum Hydrocarbons

Table 3. Proposed Sampling Locations, ID, Depth, and Analyses

Sample Station ID	Sample Location ID	Proposed Washington State Plane (a)		# of Samples	Analyte											
		Easting	Northing		Field Parameters (i)	Metals EPA 6020B (j)	Phenols and Phthalates EPA 8270E (full scan)	PAHs EPA 8270E SIM	Total Petroleum Hydrocarbons	Dioxins/ Furans	Grain Size (k)	Total Solids	TOC EPA 9060A	Conventionals (l)	Bioassays (m)	Archive Jar (n)
Subsurface Soil (0 to 15 ft) (b)																
24	GW/SB-24	1225286	222375	8	X	X	X	X	X	X	X	X				
25	SB-25	1225222	222166	8	X	X	X	X	X	X	X	X				
26	GW/SB-26	1225398	222222	8	X	X	X	X	X	X	X	X				
27	GW/SB-27	1225718	222299	8	X	X	X	X	X	X	X	X				
28	SB-28	1225320	222512	8	X	X	X	X	X	X	X	X				
29	GW/SB-29	1225438	222430	8	X	X	X	X	X	X	X	X				
30	SB-30	1225635	222351	8	X	X	X	X	X	X	X	X				
38	SB-38	1225118	221823	10	X	X	X	X	X	X	X	X				
Surface Soil (0 to 2 ft) (c)																
31	HA-31	1224838	222650	2	X	X	X	X	X	X	X	X				
32	HA-32	1225183	222759	2	X	X	X	X	X	X	X	X				
33	HA-33	1225583	222798	2	X	X	X	X	X	X	X	X				
34	HA-34	1225796	222703	2	X	X	X	X	X	X	X	X				
35	HA-35	1226084	222404	2	X	X	X	X	X	X	X	X				
36	HA-36	1224866	221737	2	X	X	X	X	X	X	X	X				
37	HA-37	1225098	221689	2	X	X	X	X	X	X	X	X				
48	HW-48	1224516	222221	2	X	X	X	X	X	X	X	X				
Perimeter Surface Soil (0 to 2 ft) (d)																
38	HA-38	1224712	222920	2	X											X
39	HA-39	1225182	222978	2	X											X
40	HA-40	1225468	222975	2	X											X
41	HA-41	1225741	222892	2	X											X
42	HA-42	1224574	221759	2	X											X
43	HA-43	1224782	221639	2	X											X
44	HA-44	1225980	222728	2	X											X
45	HA-45	1226204	222554	2	X											X
46	HA-46	1224909	221486	2	X											X
47	HA-47	1225172	221509	2	X											X
Groundwater Monitoring Wells (e)																
24	GW/SB-24	1225286	222375	1	X	X	X	X	X	X			X	X		
26	GW/SB-26	1225398	222222	1	X	X	X	X	X	X			X	X		
27	GW/SB-27	1225718	222299	1	X	X	X	X	X	X			X	X		
29	GW/SB-29	1225438	222430	1	X	X	X	X	X	X			X	X		
Surface Sediment Creek (f)																
43	SG-43	1224277	222428	1	X	X		X		*(f*)*	X	X	X	X		X
44	SG-44	1224362	222409	1	X	X		X		*(f*)*	X	X	X	X		X
45	SG-45	1224462	222410	1	X	X		X		X	X	X	X	X		X
Surface Sediment Mill Pond (f)																
46	SG-46	1224894	222261	1	X	X		X		X	X	X	X	X	X	X
47	SG-47	1225019	222254	1	X	X		X		X	X	X	X	X	X	X
48	SG-48	1224958	222186	1	X	X		X		X	X	X	X	X	X	X
Surface Sediment Harbor (f)																
10	SG-10	1225204	222000	1	X	X		X		X	X	X	X	X	X	X
11	SG-11	1225307	222045	1	X	X		X		X	X	X	X	X	X	X
49	SC/SG-49	1225338	221911	1	X	X		X		X	X	X	X	X	X	X
53	SC/SG-53	1227515	222172	1	X	X		X		X	X	X	X	X		X
54	SC/SG-54	1227686	221993	1	X	X		X		X	X	X	X	X		X
55	SG-55	1227772	222282	1	X	X		X		X	X	X	X	X		X
Sediment Cores (g)																
50	SC-50	1225518	222149	5	X	X	X	X		X	X	X	X			X
16	SC-16	1225642	222046	5	X	X	X	X		X	X	X	X			X
17	SC-17	1225794	222201	5	X	X	X	X		X	X	X	X			X
Sediment Cores (h)																
10	SC-10	1225204	222000	5	X	X	X	X		X	X	X	X			X
11	SC-11	1225307	222045	5	X	X	X	X		X	X	X	X			X
49	SC/SG-49	1225338	221911	5	X	X	X	X		X	X	X	X			X
51	SC-51	1225933	221988	5	X	X	X	X		X	X	X	X			X
52	SC-52	1226128	222089	5	X	X	X	X		X	X	X	X			X
53	SC/SG-53	1227515	222172	5	X	X	X	X		X	X	X	X			X
54	SC/SG-54	1227686	221993	5	X	X	X	X		X	X	X	X			X
TOTAL No. of SAMPLES				***188***	***168***	***168***	***156***	***168***	***86***	***166***	***164***	***164***	***66***	***16***	***6***	***102***

Notes:

(a) Washington State Plane, North Zone coordinate system, using the North American Datum of 1983, 1991 adjustment, based on High Accuracy Reference Network (HARN).

(b) Subsurface soil samples will be collected in the following default intervals: 0-2 ft; 2-4 ft; 4-6 ft; 6-8 ft; 8-10 ft;10-12 ft;12-14ft; and 14-15ft. SB-38 will have samples collected from 14-16ft; 16-18ft; and 18-20ft. Final sample depths will be determined in the field based on stratigraphy and visual observations.

(c) Hand auger sample depths are 0-1 ft and 1-2 ft. Analyze all samples.

(d) Perimeter surface soil samples will be collected and archived pending results of hand auger samples, except HA-44 through HA-47, which will be collected in a second mobilization only if needed.

(e) Groundwater sample depths will depend on field conditions.

(f) Surface sediment grab samples will target 0 to 10 cm. *(f*)* Samples SG-43 and SG-44 will be sent to the laboratory but have dioxin/furan analysis held.

(g) Sediment cores will be collected via drill rig/hand auger from shoreline. Cores will be advanced to 10 feet and sediment samples will be collected in the following default intervals: 0-2 ft; 2-4 ft; 4-6 ft; 6-8 ft; and 8-10 ft. Final sample depths will be determined in the field based on stratigraphy and visual observations.

(h) Sediment cores will be collected via vessel from harbor. Cores will be advanced to 10 feet and sediment samples will be collected in the following default intervals: 0-2 ft; 2-4 ft; 4-6 ft; 6-8 ft; and 8-10 ft. Final sample depths will be determined in the field based on stratigraphy and visual observations.

(i) Field parameters, depending on the media, may include: wood debris and/or slag assessment if encountered, and DO, turbidity, salinity, redox, and RPD depth, conductivity, and pH.

(j) Metals analysis includes arsenic, cadmium, chromium, copper, lead, mercury, and zinc for soil; arsenic, cadmium, chromium, copper, lead, mercury, zinc (total and dissolved by lab filtration) for groundwater; arsenic, antimony, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc for sediment.

(k) Grain sizes will be determined using the ASTM D6913 method for soils and the ASTM D422 method for sediments.

(l) Conventionals analyses are media and depth specific. Surface sediment samples will be analyzed for ammonia, sulfides, TVS, and AVS/SEM. Groundwater samples will be tested for ammonia, total volatiles, total dissolved solids, total suspended solids and sulfides.

(m) Bioassay tests for sediment grabs SG-46, SG-47, and SG-48, include the juvenile polychaete worm survival and growth test will be performed. All three bioassay tests will be performed for SG-10, SG-11, and SG-49, including amphipod survival, larval bivalve development, and juvenile polychaete worm survival and growth.

(n) An archive jar will be collected for contingent testing at selected sampling locations.

Acronyms:

ASTM = American Society for Testing and Materials; AVS/SEM = acid volatile sulfides/simultaneously extracted metals; cm = centimeters; DO = dissolved oxygen; EPA = Environmental Protection Agency; ft = feet; PAHs = polycyclic aromatic hydrocarbons; RPD = redox potential discontinuity; SIM = selected ion monitoring; SM = standard method; TOC = total organic carbon; TVS = total volatile solids

FIGURES

Legend

Approximate Site Boundary

Notes:
1. Approximate Site Boundry provided by Department of Ecology; it will be adjusted after completion of the remedial investigation work.

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

N

0 2,000 Feet

Vicinity Map
RI/FS Work Plan/SAP Addendum
Blakely Harbor Park Site
(Bainbridge Island, WA)

Geosyntec consultants

MVI/Sea | August 2022

Figure 1

P:\Projects\Blakely Harbor\PNG0900 (Pt Blakely)\900 GIS and CAD\MXDs\RI_FS Workplan Addendum\Figure 1 Site Location Map.mxd 4/14/2022 12:17:59 PM

Legend

- Approximate Site Boundary
- Site Subarea Boundary
- Road

Notes:
1. Approximate Site Boundry provided by Department of Ecology; it will be adjusted after completion of the remedial investigation work.
Imagery source: Google Earth, 2015.

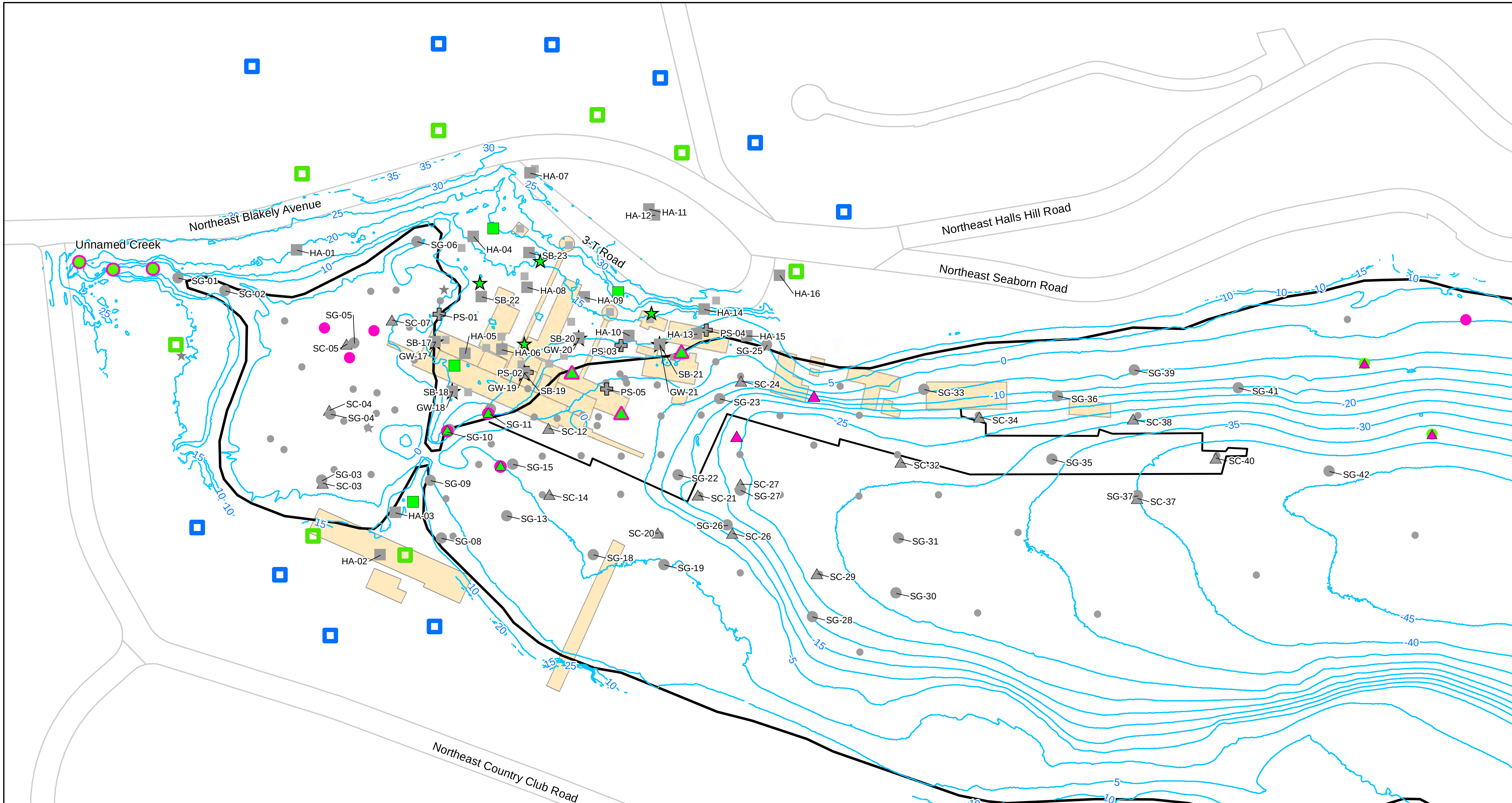
Blakely Harbor Park Site
RI/FS Work Plan/SAP Addendum
Blakely Harbor Park Site
(Bainbridge Island, WA)

Geosyntec consultants

MVI/Sea | August 2022

Figure 2

P:\Projects\Blakely Harbor\PNG0900 (Pt Blakely)\900 GIS and CAD\MXDs\RI_FS Workplan Addendum\Figure 2 Blakely Harbor Park Site Boundary.mxd 4/14/2022 12:16:24 PM



Legend

Proposed Sample Locations
- Hand Auger Boring Location
- Perimeter Hand Auger Boring Location
- Soil Boring/Monitoring Well Location; Complete From Land
- Soil Boring Location
- Sediment Core Sample Location; Complete From Harbor
- Sediment Core Sample Location; Complete From Land
- Sediment Grab Sample Location; Complete From Land
- Sediment Grab Sample Location; Complete From Harbor
- Sediment Grab/Core/Bioassay Location; Complete From Harbor
- Sediment Grab/Core Location; Complete From Harbor

2021 Sample Location
- Sediment Core
- Sediment Grab
- Soil
- Water
- Pile Scraping

Historical Sample Location
- Soil
- Sediment
- Water
- Shoreline
- Contour (5 foot MLLW)
- Historical Wharf Structure
- Road
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019

N

0 250 Feet

Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Background soil sample locations are approximate and may be adjusted based on field conditions.

Proposed Phase 2 Sample Locations

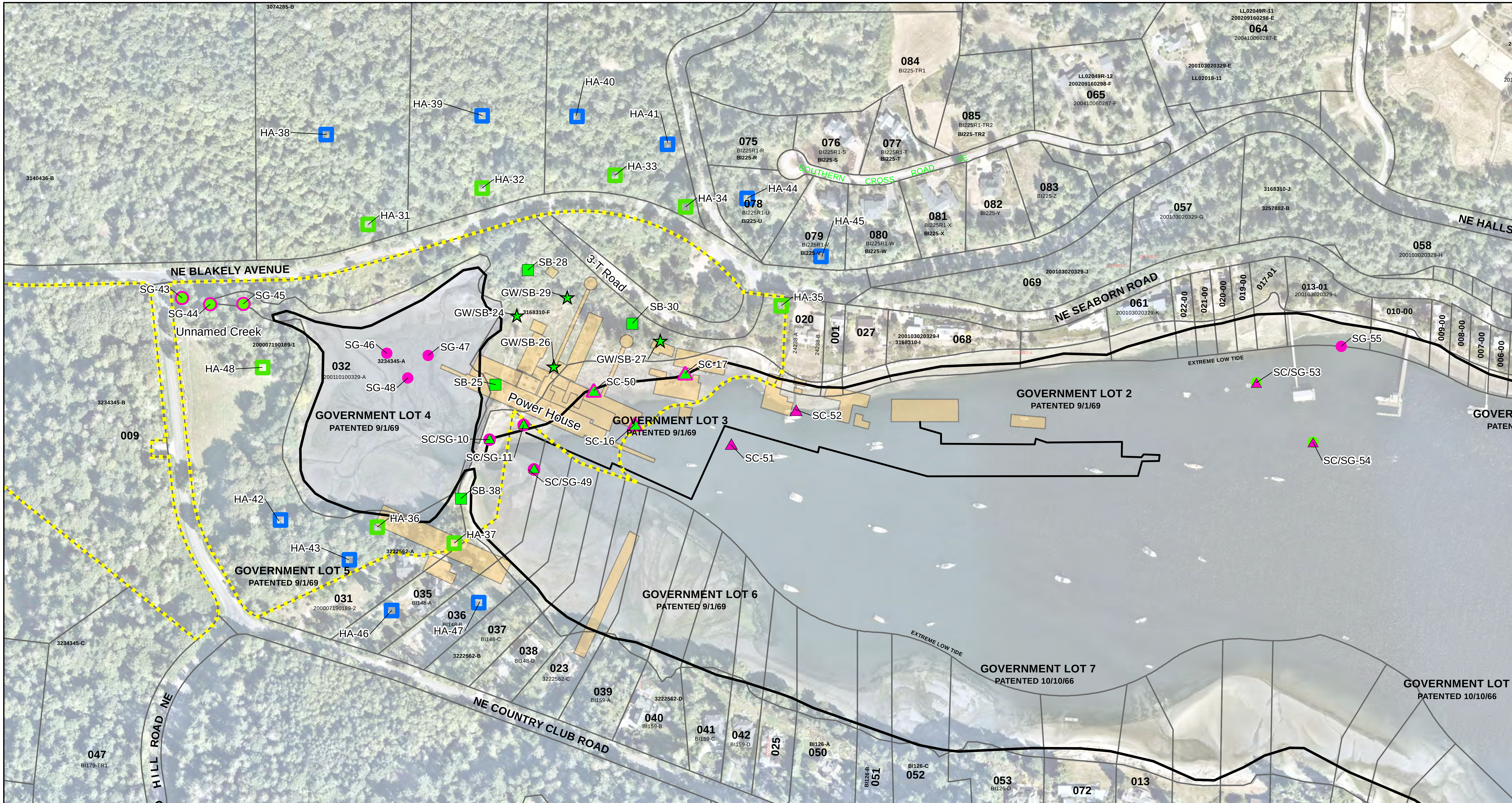
RI/FS Work Plan/SAP Addendum
Blakely Harbor Park Site
(Bainbridge Island, WA)

Geosyntec consultants

MVI/Sea | August 2022

Figure 3

P:\Projects\Blakely Harbor\PNG0900 (Pt Blakely)\900 GIS and CAD\MXDs\RI_FS Workplan Addendum\Figure 3 Draft Proposed Sample Locations.mxd 8/11/2022 10:05:45 AM



Legend

Proposed Sample Locations

- Hand Auger Boring Location
- Perimeter Hand Auger Boring Location
- Soil Boring/Monitoring Well Location; Complete From Land
- Soil Boring Location
- Sediment Core Sample Location; Complete From Harbor
- Sediment Core Sample Location; Complete From Land
- Sediment Grab Sample Location; Complete From Land
- Sediment Grab Sample Location; Complete From Harbor
- Sediment Grab/Core/Bioassay Location; Complete From Harbor
- Sediment Grab/Core Location; Complete From Harbor
- Shoreline
- Historical Wharf Structure
- Parcel Boundary
- Structures From 1917 Map and Figure in GeoEngineers, 2019
- Bainbridge Island Parks (BI Parks) Parcel Boundary

Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Taxlot boundary provided by Kitsap County.
4. Background soil sample locations are approximate and may be adjusted based on field conditions.

N

0 280 Feet

Proposed Phase 2 Sample Locations on Parcel Bounds

RI/FS Work Plan/SAP Addendum
Blakely Harbor Park Site
(Bainbridge Island, WA)

Geosyntec consultants

Figure 4

MVI/Sea | August 2022

P:\Projects\Blakely Harbor\PNG0900 (Pt Blakely)\900 GIS and CAD\MXDs\RI_FS Workplan Addendum\Figure 4 Draft Proposed Sample Locations Parcels.mxd 8/11/2022 10:09:18 AM

APPENDIX A

Standard Operating Procedures

STANDARD OPERATING PROCEDURE NO. 106

CONSTRUCTION OF MONITORING WELLS

SECTION 1.0 INTRODUCTION

This Standard Operating Procedure (SOP) was prepared to provide instructions for field personnel on the methods for monitoring well installation and construction.

1.1 Referenced Documents

- Remedial Investigation/Feasibility Study (RI/FS) Work Plan (Work Plan)
- Health and Safety Plan (HASP)
- Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP)
- SOPs #102 (Decontamination Procedure for Sampling Equipment) and #103 (Management and Disposal of Investigation Derived Waste) (Attachments to the SAP/QAPP)
- RI/FS Work Plan/SAP Plan Addendum (Work Plan Addendum)
- Washington Administrative Code (WAC) 173-160-420 (the general construction requirements for resource protection wells)
- WAC 173-160-450 (well seal requirements)
- WAC 173-160-451 (minimum standards for direct push resource protection wells)
- WAC 173-160-990 (Well construction illustrations)

1.2 Equipment

- Well completion diagram (Attachment A)
- Weighted measuring device
- Water level tape
- Calculator
- Well specifications for total well depth and screened interval, filter pack sand type, length, and construction (Work Plan Addendum)
- Appropriate personal protective equipment (PPE) and air monitoring equipment as required by the HASP

SECTION 2.0 FIELD PROCEDURES

An underground utility check will be performed prior to subsurface work, including contacting public utility notification centers.

Upon completion of drilling and/or geophysical logging, the boring will be sounded with a weighted measuring tape to verify the total depth of the boring. The depth of groundwater will be measured in the borehole using an electronic water level meter. If groundwater is tidally influenced, several measurements will be collected to confirm the depth to water. The total depth of the boring and geological conditions will be used to determine the depth of the well, and the groundwater elevations and potential tidally-influenced range will be used to determine the length of the well screen.

Wells will be installed by state-Licensed drillers. Once target depths are reached in boreholes, the monitoring wells will be constructed either through drilling casing or, if conditions allow, in the open borehole.

2.1 Monitoring Well Installation and Construction

The field personnel will work with the driller to inventory the well construction materials prior to the start of well construction. If sufficient materials are not on-site and/or are in unacceptable condition, well construction will not begin until all appropriate materials are on-site. Proposed monitoring wells will be constructed from materials specified in the Work Plan Addendum. Well materials shall be new and clean.

Monitoring wells will be constructed of 2-inch-diameter (inner diameter), schedule 40 polyvinyl chloride (PVC) riser pipe with 2.5-foot to 5-foot-long[1] sections of schedule 40 PVC, 10-slot, pre-packed screens. The slotted screens will have a sand filter pack appropriate for the aquifer/formation materials, such as 10/20 or 20/40 silica sand with stainless steel or PVC mesh on the outside. The screened sections will provide flow between the target zone and the well, allowing efficient well development and representative sample collection from the aquifer.

To install the pre-packed well, the driller will assemble a fitted, secure bottom-end cap to the pre-packed screens and riser and lower this assembly into the base of the borehole or casing. Once lowered to the bottom of the borehole, supplemental filter pack sand will be tremied to fill in the annular space up to 1 to 2-feet above the top of the pre-packed well screen. The casing will be retracted to a point above the screen, and the depth to the top of the filter pack will be verified by the driller using a weighted tape.

Once the screen and filter pack are in place, a minimum 1-foot bentonite seal will be placed above the filter pack, either by pouring bentonite chips or using a tremie method to place bentonite grout. If bentonite is placed below groundwater, a bentonite grout or slurry shall be used instead of granular bentonite (WAC 173-160-451). The completed bentonite transition seal will be allowed to hydrate for at least 30 minutes. The depth to the top of the bentonite seal will be verified using a weighted tape. Bentonite chips, bentonite grout, neat cement, or neat cement grout will be placed

[1] Phase 1 temporary wells reached native soil at depths ranging from 10 feet (GW-19) to 15 feet (GW-17) and depth to water (dtw) levels of approximately 1.0 foot (GW-21) to 6.75 feet (GW-18) below ground surface. The drilling subcontractor may use combinations of 2.5-foot to 5-foot-long screens to accomplish a total screen length of 5 feet to 10 feet, depending on observed geological conditions.

from the top of the bentonite seal to the ground surface. The grout must be tremied if water is present in the borehole. Typical specifications of grout mixtures include the following:

- Bentonite slurry with a minimum solids content of 20% or greater (bentonite shall be certified by National Sanitation Foundation/American National Standards Institute [NSF/ANSI] approval standards);
- Unhydrated bentonite (pellets, chips) designed for sealing;
- Neat cement grout composed of Type I, II, III or high-alumina cement mixed with not more than six gallons of potable water per bag (1 cubic foot or 94 pounds) of cement; or
- Neat cement grout composed of neat cement with up to 5% bentonite clay added (by dry weight of bentonite) to improve flow quality and compensate for shrinkage.

2.4 Surface Completion, Well Tags, and Well Reports

Monitoring wells will be completed according to well construction specifications in WAC 173-160-420. Aboveground steel monuments will be placed around the well extending below the ground surface into the bentonite, grout sor cement seal, to a minimum depth of 2 feet. The aboveground monument will be surrounded by three steel protective bollards. Once constructed, locking, sealed well caps will be fitted onto the wells and the monument will be fitted with a locking, external lid. The well tag with unique well identification number will be applied to the monument. The driller will file a well completion report with the State after construction.

2.5 Documentation

During well construction, Geosyntec field personnel will record depths to groundwater, depths and volumes/quantifies of well construction materials, and complete a well completion diagram form (Attachment A) for each well. Well installation and construction data will be summarized in the Daily Field Log/Daily Field Report (Attachment D; Work Plan SAP/QAPP).

ATTACHMENT A

Well Construction Diagram

Geosyntec consultants

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WELL COMPLETION DIAGRAM

Well ID ______________

Location:		**Project Number:**	
Start Date and Time:	Finish Date and Time:	Total Depth Drilled (ft bgs):	
Drilling Method:	Drilling Contractor:	Total Well Casing Depth (ft bgs):	
Drill Rig:	Boring Diameter:	Well Diameter:	
Depth to Water (ft bgs):	Ground Surface Elevation (ft MSL):	Coordinates (X,Y):	
Comments:		Logger:	Reviewer:

WELL COMPLETION DIAGRAM

SURFACE COMPLETION

- ☐ Flush Mount
- ☐ Above Ground
- ☐ Protective Casing
  - ☐ Traffic Bollard/s
- ☐ Surface
  - ☐ Concrete ☐ Asphalt

CENTRALIZERS

☐ Yes ☐ No

Number Used ______________

Depths ______________

WELL CASING

Type ______________

Length ______________

Diameter

ID ______ OD ______

Product ______________

Mfd. By ______________

WELL SCREEN

Type ______________

Length ______________

Diameter

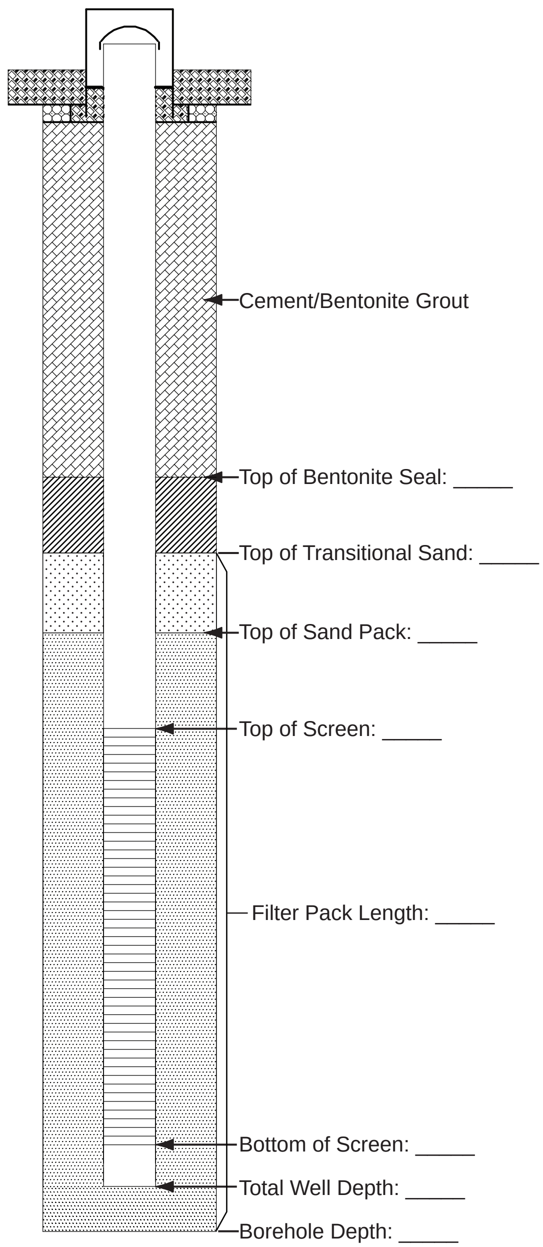
ID ______ OD ______

Slot Size ______________

Slot Type ______________

Product ______________

Mfd. By ______________



ANNULAR SEAL

Amount Calculated ________

Amount Used ________

☐ Grout Formula

Cement Type ________

Pounds of Cement ______

Pounds of Bentonite ____

Gallons of Water ______

☐ Prepared Mix

Product ______________

Mfd. By ______________

Method Installed

☐ Poured ☐ Tremie

BENTONITE SEAL

Amount Calculated ________

Amount Used ________

☐ Pellets, Size ________

☐ Chips, Size ________

Product ______________

Mfd. By ______________

SAND PACK

Amount Calculated ________

Amount Used ________

Sand Size ______________

Product ______________

Mfd. By ______________

Method Installed

☐ Poured ☐ Tremie

STANDARD OPERATING PROCEDURE NO. 107
VISUAL ASSESSMENT AND ESTIMATE OF SLAG PERCENTAGES IN SEDIMENT AND SOIL SAMPLES
For the Blakely Harbor Park Site

SECTION 1.0 INTRODUCTION

This Standard Operating Procedure (SOP) was prepared to help field personnel identify the presence of slag in soil and sediment samples and/or surface substrate, describe slag characteristics, and quantify its extent. Slag is an anthropogenic waste product commonly generated during smelting and other foundry operations. It can be similar in appearance to volcanic rock or asphaltic debris, and it is either massive or granular, depending on the way it was processed and cooled. Slag debris is not managed as deleterious substance by the Washington State Department of Ecology (Ecology). However, slag is mentioned together with wood waste as a physical factor contributing to toxicity in sediment environments (Ecology, 2021).

1.1 Objective

The mapping of slag will be conducted to support the conceptual site model and determine if site risks are correlated with the presence and amounts of slag debris. The objective of slag mapping is to:

1. provide procedures for field personnel to identify slag visually,
2. describe the type of slag present at a site, and
3. complete a semiquantitative estimate of the percentages of slag debris in sediment and soil (by surface area or volume).

This SOP describes visual assessment (percent cover) procedures at two scales:

- **Large**: substrate ground surface (soil or sediment) exposed at low tide and divided into 10-foot by 10-foot square, and
- **Small**: sample size, an aliquot of sample will be placed into a 1-foot by-1-foot quadrant square.

Methodology

A “quadrant method” will be used to provide a visual percentage of small and large slag by surface area and will be applied to the accessible shoreline and to sediment or soil samples. The areal percent content of slag will be assessed visually after dividing an area into four quadrants (see Figure 1).

The quantity of debris or other anthropogenic material in a soil or sediment matrix is often expressed as percent cover, and this method can also used to describe ecological plant communities and biomass. Cover is often measured as basal or ground cover (the ground area covered by debris, fragment, or other items of interest). Percent cover can be measured with a variety of techniques and equipment (e.g. plot/quadrant method) and is expressed as % of area. This SOP describes the relatively quick visual field estimate method.

To reduce potential observer bias, the SOP recommends two or more observers (two pairs of eyes) estimating the percent cover of the same sample. Field staff "calibrate" their eyes using a diagram tool that provides examples of different cover levels ranging from 5% to 90% (Figure 1). The area is estimated or measured in quadrat plots[1].

1.2 Referenced Documents

- Health and Safety Plan (HASP)
- Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP)
- SOP # 104 (Wood Waste Visual Assessment, Attachment C to the SAP/QAPP)
- Percent cover chart (Munsell Chart, 1992; John Muirs Laws, 2021)

SECTION 2.0 VISUAL ASSESSMENT OF SLAG AND SLAG DESCRIPTORS

At the Site, slag exists along the northern shoreline and intertidal sediments of the inner harbor. Field personnel will walk along the shoreline in transects parallel to shore at two elevation contours (one at about +8 ft high tide elevation and +2 ft low tide elevation), confirm the presence/absence of slag debris (see the field form in Attachment A), and visually describe the slag, if present (see Attachment B for site photos). Field observations will be approximately 50 to 100 ft spacing along each transect. The presence of slag will be recorded in the field notebook at each transect location and the x/y survey coordinates will also be recorded.

Visual descriptors that may help identify and describe slag include:

- Structure/Shape – angular, subangular, bulky, ropy, chunky, blocky, voids
- Particle size – sand, gravel, cobble (> 3 inches), boulder (> 12 inches) (see ASTM visual-manual classification D2487-93))
- Color – black, gray, multi-colored streaks, iridescent
- Texture – vesicular, smooth, ragged, brittle, massive, describe any inclusions, asphaltic-like, weathered
- Weight and Density – slag is typically heavy, dense, medium dense

Slag debris previously observed at the Site were reported as:

- "Rounded asphalted chunk", indicating small fragments contained in surface sediments (field sample log form, location SG-23)

[1] Other methods may be points, intercept along lines, plots (measured in quadrats).

- slag observed along the nearshore was described as: ”Slag pile up to 25 ft long and 18 ft wide” (see Attachment B for Site photos).

Previously collected field observations will be used as guidance although it does not exclude the possibility of finding slag debris with different characteristics than those observed during previous field events.

SECTION 3.0 VISUAL ESTIMATE OF SLAG PERCENT COVER IN SOIL AND SEDIMENT

If slag is determined to be present, visually semiquantitative estimates of slag percentages (by ground cover area) in sediment and soil substrate along the shoreline will be performed.

3.1 Ground Cover Method (Large Scale)

The survey location will be divided into approximate 10-foot by 10-foot squares. As field conditions allow, these squares will be placed in the field by using yard sticks and/or survey tape. Within each square, the presence of slag debris will be evaluated using the following steps:

1. Set the yard sticks 10 feet apart at the four corners of a square (or rectangle).
2. Use the survey tape (or equivalent) to mark out four equal areas on the sediment/soil surface (either connecting opposite corners to create two diagonals [four equal area triangles] or finding the 5-foot mid-point along each side and creating quadrants). Additional yard sticks may be used to secure the survey tape during these operations. Field staff may use Polyvinyl Chlorid (PVC) markers consisting of connected PVC pipes to delimit the corners of the survey grid.
3. Inspect the shoreline substrate, photograph the four equal areas (include a scale within the photograph [i.e., measuring tape]), and use the field form (Attachment A) to record descriptions, attributes, and conditions of the slag. Using the Percent Cover by Surface Area Guidance in Figure 1, estimate the percent of slag present in each quadrant separately. Make at least three separate estimates, preferably by two field personnel to help control for visual bias, and record on the field form under “replicate.”
4. Adequately dispose of any consumables (i.e., the survey tape) and retrieve yard sticks and/or measuring tape.

3.2 Soil/Sediment Sample Method (Small Scale)

Discrete sediment and soil samples will be evaluated in the field to visually estimate the percent coverage (by area) of slag in the sample matrix using the following procedures:

1. Put on a pair of disposable gloves.
2. Collect an aliquot of the homogenized sediment or soil sample and place it in a rectangular shallow pan. Use a pan size that ensures the surface area is entirely covered by a

0.5-inch-thick layer of sample; pan size selection should be made based on available sample volume collected (10-inch square pan filled with 1 cup of soil/sediment sample was found to be effective in previous investigations).

3. Depending on sample conditions (e.g., saturated sediment and/or soil with fine slag debris), consider wet sieving prior to performing the assessment to evaluate finer-grained material (see *SOP #104 Visual Assessment of Wood Waste Percentage and Description in Sediment and Soil Sample*s for a detailed description of the wet sieving procedure).
4. Shake or spread the sediment/soil using a stainless-steel spatula or spoon until evenly spread out in a thin layer in the pan. Shaking the pan from side to side is acceptable, but care must be taken not to lose any material out of the pan. The goal is to have a clear view of all material.
5. Place a quadrant frame centered over the pan and photograph the four quadrants.
6. Use the field form (Attachment A) to record descriptions, attributes, and conditions of the slag. Using the Percent Cover by Surface Area Guidance in Figure 1, estimate the percent of slag in each quadrant separately. Make at least three separate estimates, preferably by varying field personnel, and record on the field form under “replicate.”
7. Adequately dispose of the sample and decontaminate sampling equipment with water. Use detergent if any sheen is observed.

SECTION 4 EQUIPMENT

- General
  - Writing tools (pencils, Sharpie)
  - GPS
  - Camera
  - Disposal gloves
  - Yard sticks (or equivalent) for creating 10-foot by 10-foot quadrant
  - Surveyor tape (or equivalent)
  - Measuring tape
  - PVC pipes and connectors
  - 10- to 12- inch Rectangular shallow pan (size may be adjusted based on available sample volume)
  - 12-inch square Quadrant frame
  - 1 stainless steel measuring cup and spatula/knife (for measurement of volume)
  - Squirt bottle
  - Rinse water for decontamination

- Wet sieving (if slag is fine-grained)
    - No. 200 sieve (stainless-steel is preferred)
    - 1 stainless steel cup and spatula/knife (for measurement of volume)
    - 500 milliliter (ml) and 1000 ml graduated cylinders with leveling edge at the top
    - Squirt bottle
    - Rinse water for helping the material pass through sieve

SECTION 5.0 REFERENCES

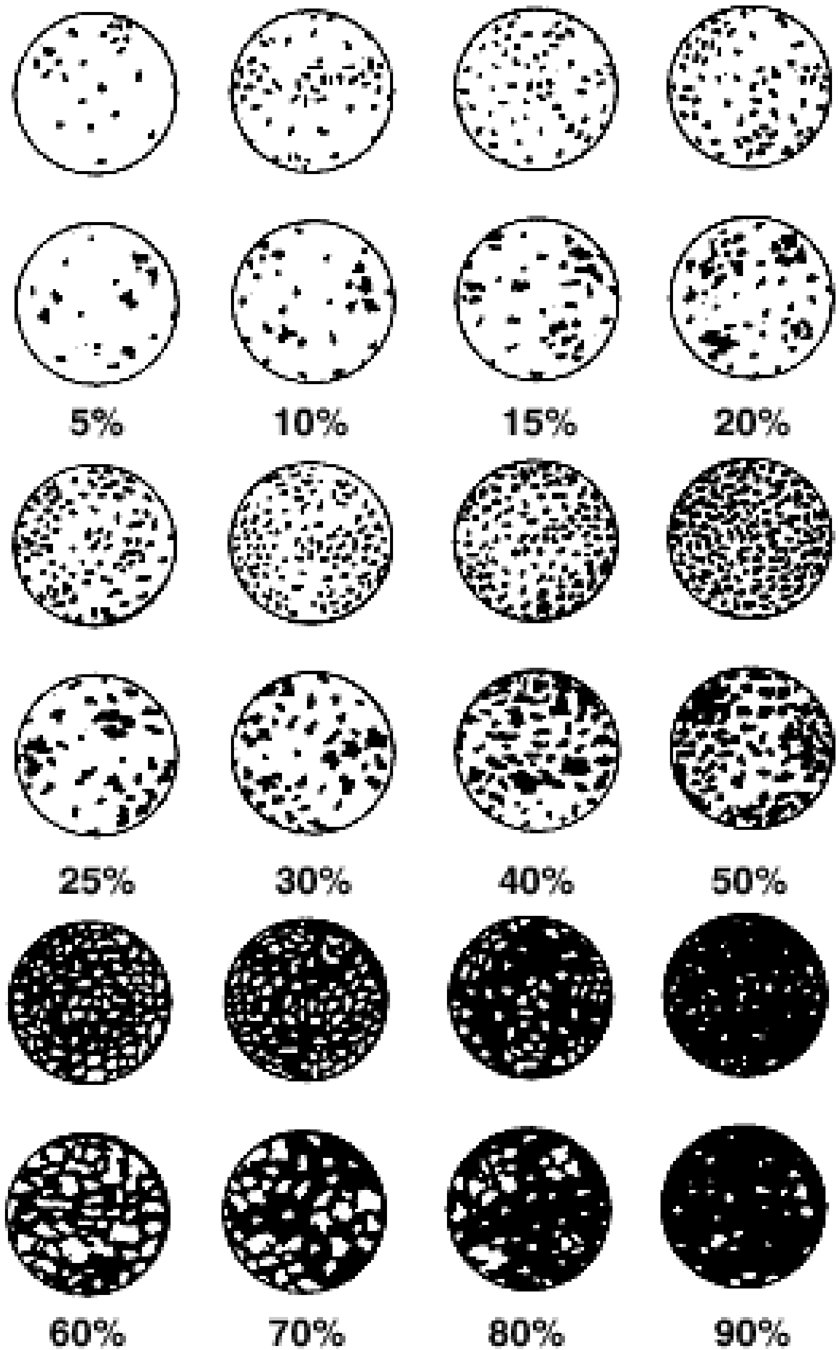
ASTM. Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System USCS). D2487-93.

Munsell Chart, P.T.C., 1992. Munsell® Soil Color Book.

John Muir Laws, 2021. Percent Cover Diagram. https://johnmuirlaws.com/product/percent-cover-stickers/.

Washington State Department of Ecology (Ecology), 2019. Sediment Cleanup User's Manual (SCUM). Guidance for Implementing the Cleanup Provisions of the Sediment Management Standards, Chapter 173-204 WAC. Publication No. 12-09-057. Second Revision December 2019.Publication No, 12-09-057.

FIGURE 1. PERCENT COVER BY SURFACE AREA DIAGRAM



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ATTACHMENT A

Slag Visual Assessment and Description Log Field Form

Blakely Harbor Park Site
PNG0900
Location ID:

Slag Visual Assessment
Field Form

Geosyntec consultants

Date: ____/____/2022 **Time:** ___:___ **(24h)**	**Sampling Personnel:**
Location Coordinates (ft) **Northing:** ______________ **Easting:** ______________ **Datum:**__________________	**Sampling Tools:** **Pan Size** **Quadrant Size**
Accuracy: **# satellites:** **Weather Conditions:** **Tide (ft):** **Sample Type** Soil Sediment Ground Cover	**Approximate Location Figure**

Visual Assessment of Percent Cover				**Visual Assessment of Percent Cover**					
Replicate	**Volume (soil/sed)**		**Initials**	**Q1**	**Q2**	**Q3**	**Q4**	**Average**	**Notes:**
# 1		cup__mL__							
		cup__mL__							
		cup__mL__							
		cup__mL__							

Sample Description	
Type (dimensions, size, color)	
Physical Attributes (structure or layering, marks)	
Description of Soil/Sediment Matrix (note if slag debris > 50% of the matrix)	
Notes: if less than < 5%; no visual estimate is needed but complete the description.	

Common Descriptors

Structure/Shape – angular, subangular, bulky, ropy, chunky, blocky, voids, concoidal fractures

Particle size – sand, gravel, cobble (> 3 inches), boulder (> 12 inches) (see ASTM visual-manual classification D2487-93)

Color – black, gray, multi-colored streaks, iridescent

Apperance and Texture – vesicular, smooth, ragged, brittle, massive, describe any inclusions, asphaltic-like, glassy or vitric, weathered, oxidized (rusty parts), magnetic

Weight and Density – slag is typically heavy, dense, medium dense

Revised by_____________(initials) Date:___/___/2022
SOP#107 Attachment A

ATTACHMENT B

Blakely Harbor Park Site Photos of Slag Debris

GEOSYNTEC CONSULTANTS
SOP #107 – Attachment B
Representative Pictures of Slag Piles

Geosyntec consultants

Client: Port Blakely Tree Farms	**Project Number: PNG0900/02/2.05**
Site Name: Blakely Harbor Park Site	**Site Location: Bainbridge Island, WA**

Slag Debris

Cobble size slag debris, with layering of red and black intrusions, vesicles (likely gas bubbles), and what appear to be oxidized surface

https://th.bing.com/th/id/R.0f6509aa747a4f811cbbf98daba9b3ec?rik=XSTPaiGpJMoO%2fQ&riu=http%3a%2f%2fwww.dawnmist.org%2f197.jpg&ehk=l6ZrX%2fItvSbpfBehK3anBUUgmkaEXp%2fFWH9xTHBHH50%3d&risl=&pid=ImgRaw&r=0

Blakely Harbor Slag Pile

Conical shape with diameter of approximately 7 feet.

Approximate dimensions (length, width, height in feet): 7, 7, 4

GEOSYNTEC CONSULTANTS
SOP #107 – Attachment B
Representative Pictures of Slag Piles

Client: Port Blakely Tree Farms	**Project Number: PNG0900/02/2.05**
Site Name: Blakely Harbor Park Site	**Site Location: Bainbridge Island, WA**

Blakely Harbor Slag Pile **Description: Approximate dimensions (length, width, height in feet): 8, 7, 5.3**	
Blakely Harbor Slag Pile **Comments: Approximate dimensions (length, width, height in feet): 17, 10, 5**	

APPENDIX B

Analysis and Selection of Screening Levels

Table B.1. Soil Screening Level Derivation

PNG0900 Blakely Harbor Park Site
Attachment B to the Work Plan Addendum

Chemical Parameter	CAS #	Units	Preliminary Screening Level Selected for Soil for COC Identification	Basis	MTCA CLARC[1]								MTCA Terrestrial TEE T749[2]			Natural Background Soil		
					Protection of Human Health				Protection of Groundwater to Surface Water Leaching Pathway and Beneficial Use				Ecological					
					Method A Unrestricted	Method A Industrial	Method B Cancer	Method B Noncancer	Groundwater Saturated Zone	Groundwater Vadose Zone @ 13°C	Groundwater to Marine Surface Water Saturated Zone	Groundwater to Marine Surface Water Vadose Zone @ 13°C	Soil Biota[3]	Plants[4]	Wildlife[5]	Puget Sound[6] 90th%	State Wide[6] 90th%	Natural Background[7]
Metals																		
Arsenic	7440-38-2	mg/kg	7	Natural Background	20	20	0.67	24	0.15	2.9	0.15	2.9			7	7	7	
Cadmium	7440-43-9	mg/kg	1	Natural Background	2	2		80	0.035	0.69	0.055	1.1	20	4	14	1	1	
Chromium	7440-47-3	mg/kg	48	Natural Background									42	42	67	48	42	
Chromium (III)	16065-83-1	mg/kg	2000	Method A	2000	2000		120000	24000	480000	240000	4900000						
Chromium (IV)	18540-29-9	mg/kg	0.00089	Protection of Groundwater - Saturated	19	19	0.38	240	0.00089	0.018	0.025	0.51						
Copper	7440-50-8	mg/kg	36	Natural Background				3200	14	280	0.069	1.4	50	100	217	36	36	
Lead	7439-92-1	mg/kg	50	Ecological - Plants	250	1000			150	3000	81	1600	500	50	118	24	17	
Mercury	7439-97-6	mg/kg	0.07	Natural Background	2	2			0.1	2.1	0.0013	0.026	0.1 [(7)]	0.3 [(7)]	5.5 [(7)]	0.07	0.07	
Zinc	7440-66-6	mg/kg	85	Natural Background				24000	300	6000	5	100	200	86	360	85	86	
Petroleum Hydrocarbons																		
Diesel Range Organics (DRO)	--	mg/kg	200	MTCA TEE Soil Biota	2000	2000							200		2000			
Polycyclic Aromatic Hydrocarbons (PAHs)																		
1-Methylnaphthalene	90-12-0	mg/kg	0.0042	Protection of Groundwater - Saturated			34	5600	0.0042	0.082								
2-Methylnaphthalene	91-57-6	mg/kg	0.088	Protection of Groundwater - Saturated				320	0.088	1.7								
Acenaphthene	83-32-9	mg/kg	0.16	Protection of Marine Surface Water				4800	2.5	49	0.16	3.1		20				
Anthracene	120-12-7	mg/kg	2.4	Protection of Marine Surface Water				24000	57	1100	2.4	47						
Fluorene	86-73-7	mg/kg	0.08	Protection of Marine Surface Water				3200	2.6	51	0.08	1.6	30					
Naphthalene	91-20-3	mg/kg	0.24	Protection of Groundwater - Saturated	5	5		1600	0.24	4.5	7.3	140						
Benzo(a)anthracene	56-55-3	mg/kg	0.000057	Protection of Marine Surface Water							0.000057	0.0011						
Benzo(a)pyrene	50-32-8	mg/kg	0.000016	Protection of Marine Surface Water	0.1	2	0.19	24	0.19	3.9	0.000016	0.00031			12			
Benzo(b)fluoranthene	205-99-2	mg/kg	0.000096	Protection of Marine Surface Water							0.000096	0.0019						
Benzo(k)fluoranthene	207-08-9	mg/kg	0.00094	Protection of Marine Surface Water							0.00094	0.019						
beta-chloronaphthalene	91-58-7	mg/kg	0.28	Protection of Marine Surface Water				6400	1.8	34	0.28	5.4						
Chrysene	218-01-9	mg/kg	0.0029	Protection of Marine Surface Water							0.0029	0.058						
Dibenzo(a,h)anthracene	53-70-3	mg/kg	0.000029	Protection of Marine Surface Water							0.000029	0.00057						
Fluoranthene	206-44-0	mg/kg	0.3	Protection of Marine Surface Water				3200	32	630	0.3	5.9						
Indeno(1,2,3-c,d)pyrene	193-39-5	mg/kg	0.00031	Protection of Marine Surface Water							0.00031	0.0062						
Pyrene	129-00-0	mg/kg	0.55	Protection of Marine Surface Water				2400	16	330	0.55	11						
Dibenzofuran	132-64-9	mg/kg	0.076	Protection of Groundwater - Saturated				80	0.076	1.5								
Total cPAHs TEQ (ND = 0)[8]	--	mg/kg	0.000016	Protection of Marine Surface Water			0.19	24										
Total cPAHs TEQ (ND = 1/2 RDL)[8]	--	mg/kg	0.000016	Protection of Marine Surface Water			0.19	24										
Phenols																		
2,4,5-Trichlorophenol	95-95-4	mg/kg	1.1	Protection of Marine Surface Water				8000	3	58	1.1	22	9	4				
2,4,6-Trichlorophenol	88-06-2	mg/kg	0.00019	Protection of Marine Surface Water			91	80	0.0053	0.092	0.00019	0.0033	10					
2,4-Dichlorophenol	120-83-2	mg/kg	0.0043	Protection of Marine Surface Water				240	0.021	0.33	0.0043	0.069						
2,4-Dimethylphenol	105-67-9	mg/kg	0.076	Protection of Marine Surface Water				1600	0.25	4.4	0.076	1.3						
2,4-Dinitrophenol	51-28-5	mg/kg	0.0092	Protection of Groundwater - Saturated				160	0.0092	0.13	0.029	0.4		20				
2-Chlorophenol	95-57-8	mg/kg	0.011	Protection of Marine Surface Water				400	0.027	0.47	0.011	0.2						
2-Methylphenol (o-Cresol)	95-48-7	mg/kg	0.47	Protection of Groundwater - Saturated				4000	0.47	8.1								
4,6-Dinitro-2-methylphenol	534-52-1	mg/kg	0.0013	Protection of Groundwater - Saturated				6.4	0.0013	0.024	0.0073	0.13						
4-Chloro-3-Methylphenol	59-50-7	mg/kg	0.028	Protection of Marine Surface Water				8000	1.2	22	0.028	0.5						
4-Methylphenol (p-Cresol)	106-44-5	mg/kg	0.94	Protection of Groundwater - Saturated				8000	0.94	16								
Phenol	108-95-2	mg/kg	2.3	Protection of Marine Surface Water				24000	2.3	37	33	540	30	70				
Pentachlorophenol	87-86-5	mg/kg	0.0000018	Protection of Groundwater - Saturated			2.5	400	0.00088	0.016	0.0000018	0.000032	6	3	4.5			

Table B.1. Soil Screening Level Derivation
PNG0900 Blakely Harbor Park Site
Attachment B to the Work Plan Addendum

Chemical Parameter	CAS #	Units	Preliminary Screening Level Selected for Soil for COC Identification	Basis	MTCA CLARC[1]								MTCA Terrestrial TEE T749[2]			Natural Background Soil		
					Protection of Human Health				Protection of Groundwater to Surface Water Leaching Pathway and Beneficial Use				Ecological					
					Method A Unrestricted	Method A Industrial	Method B Cancer	Method B Noncancer	Groundwater Saturated Zone	Groundwater Vadose Zone @ 13°C	Groundwater to Marine Surface Water Saturated Zone	Groundwater to Marine Surface Water Vadose Zone @ 13°C	Soil Biota[3]	Plants[4]	Wildlife[5]	Puget Sound[6] 90th%	State Wide[6] 90th%	Natural Background[7]
Phthalates																		
bis(2-Ethylhexyl)phthalate	117-81-7	mg/kg	0.0051	Protection of Marine Surface Water			71	1600	0.67	13	0.0051	0.1						
Butylbenzyl phthalate	85-68-7	mg/kg	0.00018	Protection of Marine Surface Water			530	16000	0.65	13	0.00018	0.0036						
Diethyl phthalate	84-66-2	mg/kg	0.074	Protection of Marine Surface Water				64000	4.7	72	0.074	1.1		100				
Dimethyl phthalate	131-11-3	mg/kg	0.19	Protection of Marine Surface Water							0.19	2.8	200					
Di-n-butyl phthalate	84-74-2	mg/kg	0.015	Protection of Marine Surface Water				8000	3	57	0.015	0.28		200				
Di-n-octyl phthalate	117-84-0	mg/kg	23	Protection of Groundwater - Saturated				800	23	450								
Dioxins and Furans																		
2,3,7,8 Tetrachlorodibenzodioxin (TCDD)	1746-01-6	mg/kg	0.0000000013	Protection of Surface Water			0.000013	0.000093	8.40E-07	1.70E-05	1.30E-09	2.50E-08						
1,2,3,4,7,8 Hexachlorodibenzodioxin (HxCDD)	39227-28-6	mg/kg	0.0000098	Protection of Groundwater - Saturated			0.00016		0.0000098	0.0002								
Chlorinated dibenzofurans (total)[9]	--	mg/kg	0.000002	MTCA TEE Wildlife											0.000002			
Chlorinated dibenzo-p-dioxins (total)[9]	--	mg/kg	0.000002	MTCA TEE Wildlife											0.000002			
Tetrachlorodibenzo-p-dioxin (TCDD) TEQ[7,10]	--	mg/kg	0.0000052	Natural Background											0.00000315			0.0000052

Footnotes:

1. Washington State Department of Ecology (Ecology) 2023. Cleanup Levels and Risk Calculation (CLARC) Compendium of technical information related to calculating cleanup levels under Washington's Cleanup Rule, the Model Toxics Control Act (MTCA) Regulation, Chapter 173-340 WAC.
2. Ecology 2017. Terrestrial Ecological Evaluations (TEE) under the Model Toxics Control Act. Publication no. 19-09-051, available at: https://apps.ecology.wa.gov/publications/documents/1909051.pdf. Table 5.1. February, 2017.
3. Based on benchmarks published in Toxicological Benchmarks for Potential Contaminants of Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process, Oak Ridge National Laboratory, 1997.
4. Based on benchmarks published in Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Terrestrial Plants: 1997 Revision, Oak Ridge National Laboratory, 1997.
5. Calculated using the exposure model provided in Table 749-4 and chemical-specific values provided in Table 749-5. Where both avian and mammalian values are available, the wildlife value is the lower of the two.
6. Ecology, 1994. Natural Background Soil Metals Concentrations in Washington State. Puget Sound Region. Ecology Publication No. 94-115, available at https://fortress.wa.gov/ecy/publications/summarypages/94115.html .
7. Ecology, 2010. Natural Background for Dioxins/Furans in Washington State Soils, Technical Memorandum #8. August 2010. Publication No. 10-09-053. Toxic Equivalents Quotient (TEQ) value.
8. The carcinogenic polycyclic aromatic hydrocarbons were calculated by summing the product of the Toxicity Equivalency Factors referenced from the Washington Ecology Implementation Memorandum #10 for the following COPCs: Benzo(a)pyrene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene, and Indeno(1,2,3-cd)pyrene.
9. The Model Toxics Control Act Terrestrial Ecological Evaluations wildlife values for Chlorinated dibenzofurans (total) and Chlorinated dibenzo-p-dioxins (total) are presented and data will be screened against the presented values; however, identification of dioxin/furan as a COC for ecological receptors will be based on the TCDD TEQ screening results.
10. The value presented as the Model Toxics Control Act Terrestrial Ecological Evaluation wildlife TCDD TEQ screening level is based on a mammalian receptor and is referenced from Efroymson, R.A., G.W. Suter, II, B.E. Sample, and D.S. Jones. 1997c. Preliminary Remediation Goals for Ecological Endpoints. Oak Ridge National Laboratory, Oak Ridge, TN. 50 pp. ES/ER/TM-162/R2 http://www.esd.ornl.gov/programs/ecorisk/documents/tm162.

Acronyms:

COC = Contaminant of Concern
mg/kg = Miligrams per Kilogram
RDL = Reporting Detection Limit
TEE = Terrestrial Ecological Evaluation

Revised 4.18.23

Table B.2. Groundwater Screening Level Derivation
PNG0900 Blakely Harbor Park Site
Attachment B to the Work Plan Addendum

Chemical Parameter	CAS #	Units	Preliminary Screening Level Selected for Groundwater COC Identification	Basis	MTCA CLARC[1]						Natural Background Groundwater
					Protection of Human Health and Beneficial Use			Applicable Relevant and Appropriate Requirements Drinking Water Maximum Contaminant Level (MCL)			
					Method A	Method B Cancer	Method B Non Cancer	MCL Goal (MCLG) [2]	Federal MCL [3]	State MCL [4]	Puget Sound [5]
Metals											
Arsenic	7440-38-2	µg/L	8	Natural Background	5	0.058	4.8	0	10	10	8
Cadmium	7440-43-9	µg/L	5	MTCA Method A - MCL	5		8	5	5	5	
Chromium	7440-47-3	µg/L	50	MTCA Method A	50			100	100	100	
Copper	7440-50-8	µg/L	640	MTCA Method B Non Cancer			640	1300	1300	1300	
Lead	7439-92-1	µg/L	15	MTCA Method A - MCL	15			0	15	15	
Mercury	7439-97-6	µg/L	2	MTCA Method A - MCL	2			2	2	2	
Zinc	7440-66-6	µg/L	4800	MTCA Method B Non Cancer			4800				
Petroleum Hydrocarbons											
Diesel Range Organics (DRO)	--	µg/L	500	MTCA Method A	500						
Motor Oil Range Organics (ORO)	--	µg/L	500	MTCA Method A	500						
Polycyclic Aromatic Hydrocarbons (PAHs)											
1-Methylnaphthalene	90-12-0	µg/L	1.5	MTCA Method B Cancer		1.5	560				
2-Methylnaphthalene	91-57-6	µg/L	32	MTCA Method B Non Cancer			32				
Acenaphthene	83-32-9	µg/L	480	MTCA Method B Non Cancer			480				
Anthracene	120-12-7	µg/L	2400	MTCA Method B Non Cancer			2400				
Fluorene	86-73-7	µg/L	320	MTCA Method B Non Cancer			320				
Naphthalene	91-20-3	µg/L	160	MTCA Method B Non Cancer	160		160				
Benzo(a)anthracene	56-55-3	µg/L	--	--							
Benzo(a)pyrene	50-32-8	µg/L	0.023	MTCA Method B Cancer	0.1	0.023	4.8	0	0.2	0.2	
Benzo(b)fluoranthene	205-99-2	µg/L	--	--							
Benzo(k)fluoranthene	207-08-9	µg/L	--	--							
beta-chloronaphthalene	91-58-7	µg/L	640	MTCA Method B Non Cancer			640				
Chrysene	218-01-9	µg/L	--	--							
Dibenzo(a,h)anthracene	53-70-3	µg/L	--	--							
Fluoranthene	206-44-0	µg/L	640	MTCA Method B Non Cancer			640				
Indeno(1,2,3-c,d)pyrene	193-39-5	µg/L	--	--							
Pyrene	129-00-0	µg/L	240	MTCA Method B Non Cancer			240				
Dibenzofuran	132-64-9	µg/L	8	MTCA Method B Non Cancer			8				

Table B.2. Groundwater Screening Level Derivation
PNG0900 Blakely Harbor Park Site
Attachment B to the Work Plan Addendum

Chemical Parameter	CAS #	Units	Preliminary Screening Level Selected for Groundwater COC Identification	Basis	MTCA CLARC[1]						Natural Background Groundwater
					Protection of Human Health and Beneficial Use			Applicable Relevant and Appropriate Requirements Drinking Water Maximum Contaminant Level (MCL)			
					Method A	Method B Cancer	Method B Non Cancer	MCL Goal (MCLG) [2]	Federal MCL [3]	State MCL [4]	Puget Sound [5]
Phenols											
2-Chlorophenol	95-57-8	µg/L	40	MTCA Method B Non Cancer			40				
2-Methylphenol (o-Cresol)	95-48-7	µg/L	800	MTCA Method B Non Cancer			800				
2,4-Dichlorophenol	120-83-2	µg/L	48	MTCA Method B Non Cancer			48				
2,4-Dimethylphenol	105-67-9	µg/L	320	MTCA Method B Non Cancer			320				
2,4-Dinitrophenol	51-28-5	µg/L	32	MTCA Method B Non Cancer			32				
2,4,5-Trichlorophenol	95-95-4	µg/L	1600	MTCA Method B Non Cancer			1600				
2,4,6-Trichlorophenol	88-06-2	µg/L	8	MTCA Method B Cancer		8	16				
4-Chloro-3-Methylphenol	59-50-7	µg/L	1600	MTCA Method B Non Cancer			1600				
4-Methylphenol (p-Cresol)	106-44-5	µg/L	1600	MTCA Method B Non Cancer			1600				
4,6-Dinitro-2-methylphenol	534-52-1	µg/L	1.3	MTCA Method B Non Cancer			1.3				
Phenol	108-95-2	µg/L	4800	MTCA Method B Non Cancer			4800				
Pentachlorophenol	87-86-5	µg/L	0.22	MTCA Method B Cancer		0.22	80	0	1	1	
Phthalates											
bis(2-Ethylhexyl)phthalate	117-81-7	µg/L	6	MTCA Method B Non Cancer		6.3	320	0	6	6	
Butylbenzyl phthalate	85-68-7	µg/L	46	MTCA Method B Cancer		46	3200				
Diethyl phthalate	84-66-2	µg/L	13000	MTCA Method B Non Cancer			13000				
Di-n-butyl phthalate	84-74-2	µg/L	1600	MTCA Method B Non Cancer			1600				
Di-n-octyl phthalate	117-84-0	µg/L	160	MTCA Method B Non Cancer			160				
Dioxins											
2,3,7,8 Tetrachlorodibenzodioxin (TCDD)	1746-01-6	µg/L	0.00000034	MTCA Method B Cancer		3.40E-07	5.60E-06	0	0.00003	0.00003	
1,2,3,4,7,8 Hexachlorodibenzodioxin (HxCDD)	39227-28-6	µg/L	0.000014	MTCA Method B Cancer		0.000014					

Footnotes:

1. Washington State Department of Ecology (Ecology) 2023. Cleanup Levels and Risk Calculation (CLARC) Compendium of technical information related to calculating cleanup levels under Washington's Cleanup Rule, the Model Toxics Control Act (MTCA) Regulation, Chapter 173-340 WAC.

2. There are some MCL goals presented equal to 0 which are provided to be comprehensive but are not considered in the selection of a screening level.

3. United States Environmental Protection Agency (EPA) 1975. 40 CFR 141. Title 40 - Protection of Environment, Chapter I, Subchapter D, Water Programs, Part 141, National Primary Drinking Water Regulations. January 2023.

4. Washington Administrative Code (WAC), 2021. Title 246 Department of Health, Chapter 290 Group A Public Water Supplies.

5. Ecology 2022. Natural Background Groundwater Arsenic Concentrations in Washington State Study Results Publication. Prepared by Charles San Juan, LHG. For the Toxics Cleanup Program Washington State Department of Ecology Olympia, Washington. January. Publication No. 14-09-044.

Acronyms:

COC = Contaminant of Concern

µg/L = Micrograms per Liter

MCL = maximum contaminant level

MCLG= maximum contaminant level goal

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Table B.3. Sediment Screening Level Derivation

PNG0900 Blakely Harbor Park Site

Attachment B to the Work Plan Addendum

Chemical Parameter (all concentrations are in mg/kg with few exception, see footnotes)	CAS #	Units	Bio accumulative[1]	Preliminary Screening Level Selected for Sediment COC Identification	Basis[2]	Human Health Criteria - Direct Contact (Marine)[3]						Benthic Criteria[4]				Bioaccumulative SCO Natural Background
						Beach Play (Child)		Clamming (Adult)		Netfishing (Adult)		AET (mg/kg dw)		SMS[5] (mg/kg-dw or -OC)		SCUM [6] (90/90 UTL dw)
						Cancer	Non Cancer	Cancer	Non Cancer	Cancer	Non Cancer	Marine SCO	Marine CSL	Marine SCO	Marine CSL	Natural Background[7]
Metals																
Arsenic	7440-38-2	mg/kg dw	Yes	11	Bioaccumulative SCO	2.08	80.3	0.822	370	1.87	843	57	93	57	93	11
Cadmium	7440-43-9	mg/kg dw	Yes	0.8	Bioaccumulative SCO		223		1070		2490	5.1	6.7	5.1	6.7	0.8
Chromium	7440-47-3	mg/kg dw	No	260	Benthic SCO							260	270	260	270	62
Copper	7440-50-8	mg/kg dw	No	390	Benthic SCO		26,700		91,300		184,000	390	390	390	390	45
Lead	7439-92-1	mg/kg dw	Yes	21	Bioaccumulative SCO							450	530	450	530	21
Mercury	7439-97-6	mg/kg dw	Yes	0.2	Bioaccumulative SCO							0.41	0.59	0.41	0.59	0.2
Silver	7440-22-4	mg/kg dw	No	6.1	Benthic SCO/CSL		3,340		11,400		23,000	6.1	6.1	6.1	6.1	0.24
Zinc	7440-66-6	mg/kg dw	No	410	Benthic SCO		200,000		684,000		1,380,000	410	960	410	960	93
Polycyclic Aromatic Hydrocarbons (PAHs)/Carcinogenic PAHs (cPAHs)																
2-Methylnaphthalene	91-57-6	mg/kg OC	No	38	Benthic SCO		357		1,950		4,890	0.67	0.67	38	64	
Acenaphthene	83-32-9	mg/kg OC	No	16	Benthic SCO		5,350		29,200		73,400	0.5	0.5	16	57	
Acenaphthylene	208-96-8	mg/kg OC	No	66	Benthic SCO/CSL							1.3	1.3	66	66	
Anthracene	120-12-7	mg/kg OC	Yes	220	Benthic SCO		26,800		146,000		367,000	0.96	0.96	220	1200	
Fluorene	86-73-7	mg/kg OC	No	23	Benthic SCO		3,570		19,500		48,900	0.54	0.54	23	79	
Naphthalene	91-20-3	mg/kg OC	No	99	Benthic SCO		1,780		9,740		24,500	2.1	2.1	99	170	
Phenanthrene	85-01-8	mg/kg OC	No	100	Benthic SCO							1.5	1.5	100	480	
Benzo(a)anthracene	56-55-3	mg/kg OC	No	110	Benthic SCO							1.3	1.6	110	270	
Benzo(a)pyrene	50-32-8	mg/kg OC	No	99	Benthic SCO		26.8		146		367	1.6	1.6	99	210	
Benzo(b)fluoranthene	205-99-2	--	Yes	--	--											
Benzo(g,h,i)perylene[8]	191-24-2	mg/kg OC	Yes	31	Benthic SCO							0.67	0.72	31	78	
Benzo(j)fluoranthene	205-82-3	--	Yes	--	--											
Benzo(k)fluoranthene	207-08-9	--	Yes	--	--											
Total Benzofluoranthenes[8]	--	mg/kg OC	Yes	230	Benthic SCO							3.2	3.6	230	450	
Chrysene	218-01-9	mg/kg OC	No	110	Benthic SCO							1.4	2.8	110	460	
Dibenzo(a,h)anthracene[8]	53-70-3	mg/kg OC	Yes	12	Benthic SCO							0.23	0.23	12	33	
Fluoranthene[8]	206-44-0	mg/kg OC	Yes	160	Benthic SCO		3,570		19,500		48,900	1.7	2.5	160	1200	
Indeno(1,2,3-c,d)pyrene[8]	--	mg/kg OC	Yes	34	Benthic SCO							0.6	0.69	34	88	
Pyrene[8]	--	mg/kg OC	Yes	1000	Benthic SCO		2,680		14,600		36,700	2.6	3.3	1000	1400	
Total LPAHs[9]	--	mg/kg OC	No	370	Benthic SCO							5.2	5.2	370	780	
Total HPAHs[10]	--	mg/kg OC	Yes	960	Benthic SCO							12	17	960	5300	
Total PAHs	--	--	--	--	--											
Total cPAHs TEQ (ND = 0)[11]	--	mg/kg dw	Yes	0.021	Bioaccumulative SCO	0.174	26.8	0.12	146	0.15	367					0.021
Total cPAHs TEQ (ND = 1/2 RDL)	--	mg/kg dw	Yes	0.021	Bioaccumulative SCO	0.174	26.8	0.12	146	0.15	367					0.021
Chlorinated Organics																
1,2,4-Trichlorobenzene	120-82-1	mg/kg OC	No	0.81	Benthic SCO	269	6680	78.7	22800	159	46000	0.031	0.051	0.81	1.8	
1,2-Dichlorobenzene	95-50-1	mg/kg OC	No	2.3	Benthic SCO/CSL		60,100		205,000		414,000	0.035	0.05	2.3	2.3	
1,4-Dichlorobenzene	106-46-7	mg/kg OC	No	3.1	Benthic SCO	1,440	46,700	422	160,000	852	322,000	0.11	0.11	3.1	9	
Hexachlorobenzene	118-74-1	mg/kg OC	Yes	0.38	Benthic SCO	4.87	534	1.43	1,830	2.88	3,680	0.022	0.07	0.38	2.3	
Hexachlorobutadiene	--	mg/kg OC	Yes	3.9	Benthic SCO	100	668	29	2,280	59	4,600	0.011	0.12	3.9	6.2	
Organic Chemicals/Phenols																
2,4-Dimethylphenol	105-67-9	mg/kg dw	No	0.029	Benthic SCO/CSL		2,230		11,900		29,500	0.029	0.029	0.029	0.029	
2-Methylphenol (o-Cresol)	--	mg/kg dw	No	0.063	Benthic SCO/CSL		5,580		29,700		73,600	0.063	0.063	0.063	0.063	
4-Methylphenol (p-Cresol)	--	mg/kg dw	No	0.67	Benthic SCO/CSL		11,200		59,500		147,000	0.67	0.67	0.67	0.67	
Benzoic acid	65-85-0	mg/kg dw	No	0.65	Benthic SCO/CSL		446,000		2,380,000		5,890,000	0.65	0.65	0.65	0.65	
Benzyl alcohol	100-51-6	mg/kg dw	No	0.057	Benthic SCO		11,200		59,500		147,000	0.057	0.073	0.057	0.073	
Dibenzofuran	132-64-9	mg/kg OC	No	15	Benthic SCO		268		1,230		2,810	0.54	0.54	15	58	
n-Nitrosodiphenylamine	86-30-6	mg/kg OC	No	11	Benthic SCO/CSL	266		121		301		0.028	0.04	11	11	

Table B.3. Sediment Screening Level Derivation

PNG0900 Blakely Harbor Park Site

Attachment B to the Work Plan Addendum

Chemical Parameter (all concentrations are in mg/kg with few exception, see footnotes)	CAS #	Units	Bio accumulative[1]	Preliminary Screening Level Selected for Sediment COC Identification	Basis[2]	Human Health Criteria - Direct Contact (Marine)[3]						Benthic Criteria[4]				Bioaccumulative SCO Natural Background
						Beach Play (Child)		Clamming (Adult)		Netfishing (Adult)		AET (mg/kg dw)		SMS[5] (mg/kg-dw or -OC)		SCUM[6] (90/90 UTL dw)
						Cancer	Non Cancer	Cancer	Non Cancer	Cancer	Non Cancer	Marine SCO	Marine CSL	Marine SCO	Marine CSL	Natural Background[7]
Organic Chemicals/Phenols																
Pentachlorophenol	87-86-5	mg/kg dw	Yes	0.36	Benthic SCO	1.45	248.00	0.71	1,410	1.82	3,650	0.36	0.69	0.36	0.69	
Phenol	108-95-2	mg/kg dw	No	0.42	Benthic SCO		33,500		178,000		442,000	0.42	1.2	0.42	1.2	
Phthalates																
bis(2-Ethylhexyl)phthalate	117-81-7	mg/kg OC	No	47	Benthic SCO	93	2,230	43	11,900	105	29,500	1.3	1.9	47	78	
Butylbenzyl phthalate	85-68-7	mg/kg OC	No	4.9	Benthic SCO	685	22,300	313	119,000	775	295,000	0.063	0.9	4.9	64	
Diethyl phthalate	84-66-2	mg/kg OC	No	61	Benthic SCO		89,200		476,000		1,180,000	0.2	1.2	61	110	
Dimethyl phthalate	131-11-3	mg/kg OC	No	53	Benthic SCO							0.071	0.16	53	53	
Di-n-butyl phthalate	84-74-2	mg/kg OC	No	220	Benthic SCO		11,200		59,500		147,000	1.4	1.4	220	1700	
Di-n-octyl phthalate	117-84-0	mg/kg OC	No	58	Benthic SCO		1,120		5,950		14,700	6.2	6.2	58	4500	
Dioxins and Furans																
2,3,7,8 Tetrachlorodibenzodioxin (TCDD)	--	mg/kg dw	Yes	0.000004	Bioaccumulative SCO	0.0000286	0.000223	0.0000121	0.0011	0.0000286	0.0026					0.000004
Tetrachlorodibenzo-p-dioxin (TCDD) TEQ (ND = 0)	--	mg/kg dw	Yes	0.000004	Bioaccumulative SCO	0.0000286	0.000223	0.0000121	0.0011	0.0000286	0.0026					0.000004
Tetrachlorodibenzo-p-dioxin (TCDD) TEQ (ND = 1/2 RDL)	--	mg/kg dw	Yes	0.000004	Bioaccumulative SCO	0.0000286	0.000223	0.0000121	0.0011	0.0000286	0.0026					0.000004

Footnotes:

1. List of bioaccumulative compounds as per Dredge Material Management Plan, 2021. Prepared for U.S. Army Corps of Engineers, Environmental Protection Agency, Washington State Department of Natural Resources, Washington State Department of Ecology. July.

2. For nonbioaccumulative chemicals, the selected screening level is the SMS SCO value, adjusted up to natural background as appropriate. For bioaccumulative chemicals, the screening level is the natural background; when no natural background is present, the same criteria as per nonbioaccumulative chemicals is applied. When no risk-based value or natural background is available, a screening level will be selected after data collection has been completed and a representative PQL can be selected. In the instances where the total organic for a sample is outside the range 0.5 to 3 %, the minimum AET SCO will be used in place of the SMS SCO when no natural background value is available.

3. Values calculated by using Appendix K to the SCUM (Ecology, 2021) and relevant parameters from the CLARC tables (January 2023). Concentrations are based on a target cancer risk of 1×10^{-6} and a target Hazard Quotient of 1.

4. Benthic Criteria as reported in SCUM (Ecology, 2021). Table 8-1.

5. SMS for organic compounds (PAHs, chlorinated organics, organic chemicals/phenols, and phthalates) are reported normalized per organic carbon content.

6. Ecology, 2021. SCUM III, Table 10-1. Calculated values (90/90 UTL) for marine sediment natural background from the datasets in Appendix I and Bold Study (DMMP 2009).

7. Dioxin/furan TEQ concentration of 4 ng/kg is also the Disposal Site Management Objective for volume-weighted concentrations based on the upper bound estimate of the distribution of dioxin in sediments from non-urban areas of Puget Sound.

8. Bioaccumulative PAHs for which the benthic SCO criteria has been selected as screening levels are included either in the cPAH or the HPAH totals.

9. The Low Molecular Weight Polycyclic Aromatic Hydrocarbon value is calculated by summing the following chemicals: Acenaphthene, Acenaphthylene, Anthracene, Fluorene, Naphthalene, and Phenanthrene.

10. The High Molecular Weight Polycyclic Aromatic Hydrocarbon value is calculated by summing the following chemicals: Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b+j+k)fluoranthene, Benzo(g,h,i)perylene, Chrysene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-c,d)pyrene, and Pyrene.

11. The carcinogenic polycyclic aromatic hydrocarbons were calculated by summing the product of the Toxicity Equivalency Factors referenced from the Washington Ecology Implementation Memorandum #10 for the following COPCs: Benzo(a)pyrene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene, and Indeno(1,2,3-cd)pyrene.

Acronyms:

AET = Apparent Effects Threshold
CSL = Cleanup Screening Level
DL = detection limit
dw = Dry Weight
mg/kg = Miligrams per Kilogram
ND = Non Detected
OC = Organic Carbon
RDL = Reporting Detection Limit
SCO = Sediment Cleanup Objective
SCUM = Sediment Cleanup Users Manual
SMS = Sediment Management Standards
TEQ = Toxic Equivalents
UTL = Upper Tolerance Limit

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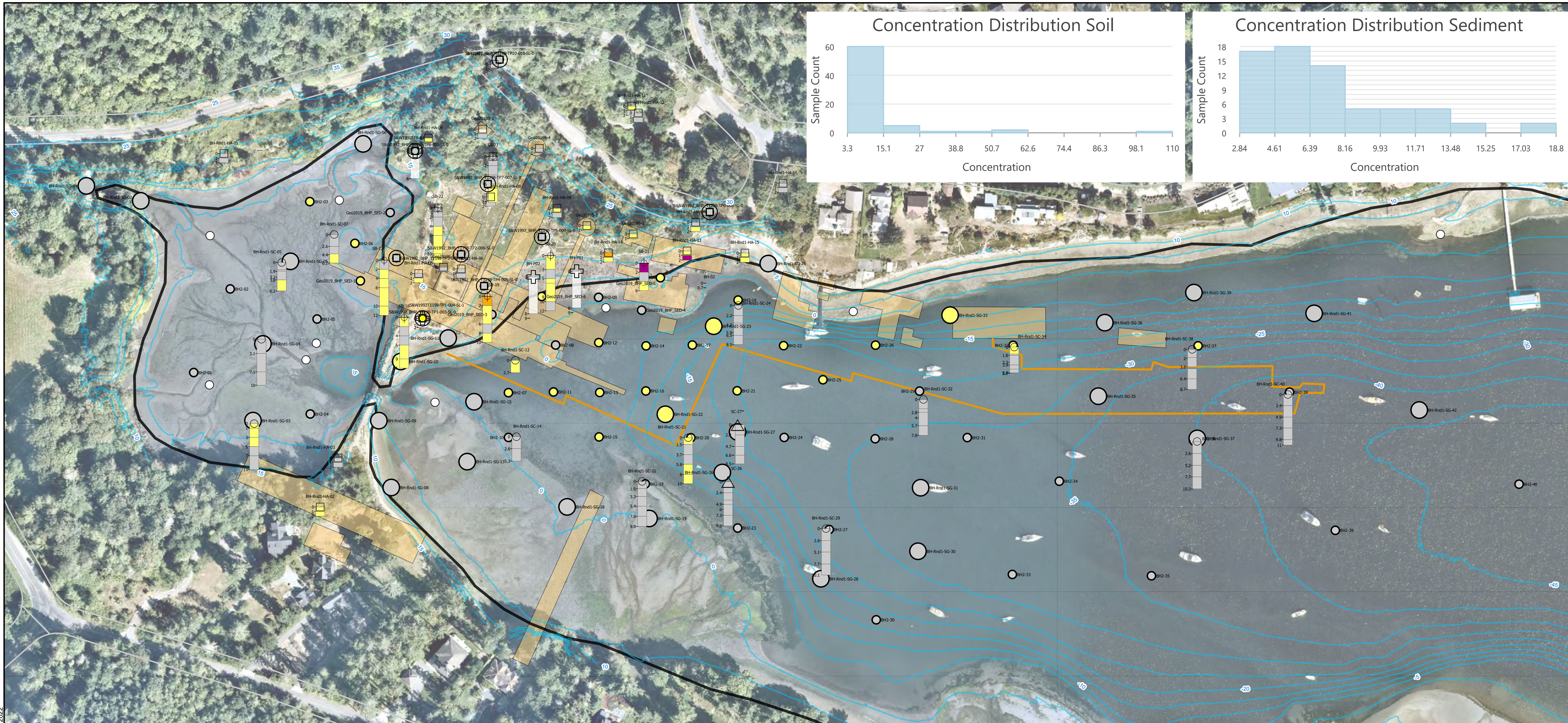
APPENDIX C

Exceedances of Chemicals of Potential Concern (COPCs) in Soil and Sediment

DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:

1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

0 200 Feet

Concentration in Soil
- < 7 mg/kg (SNB)
- > 7 to 20 mg/kg (CMA)
- > 20 to 40 mg/kg (2xCMA)
- > 40 mg/kg

Concentration in Sediment
- < 11 mg/kg (MNB)
- > 11 to 57 mg/kg (SCO)
- > 57 to 97 mg/kg (CSL)
- > 97 mg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Approximate Site Boundary
- Shoreline
- Historical Wharf Structure

SNB - Puget Sound 90% Soil Background Value, CMA - Cleanup Levels and Risk Calculator Method A
MNB - SCUM Marine Sediment Natural Background, SCO - Sediment Cleanup Objective

Depths in feet
*Boring hit refusal
Concentrations in mg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

Arsenic in Soil/Sediment
Blakely Harbor

Geosyntec consultants

PNG0900	5/30/2022	Figure 1

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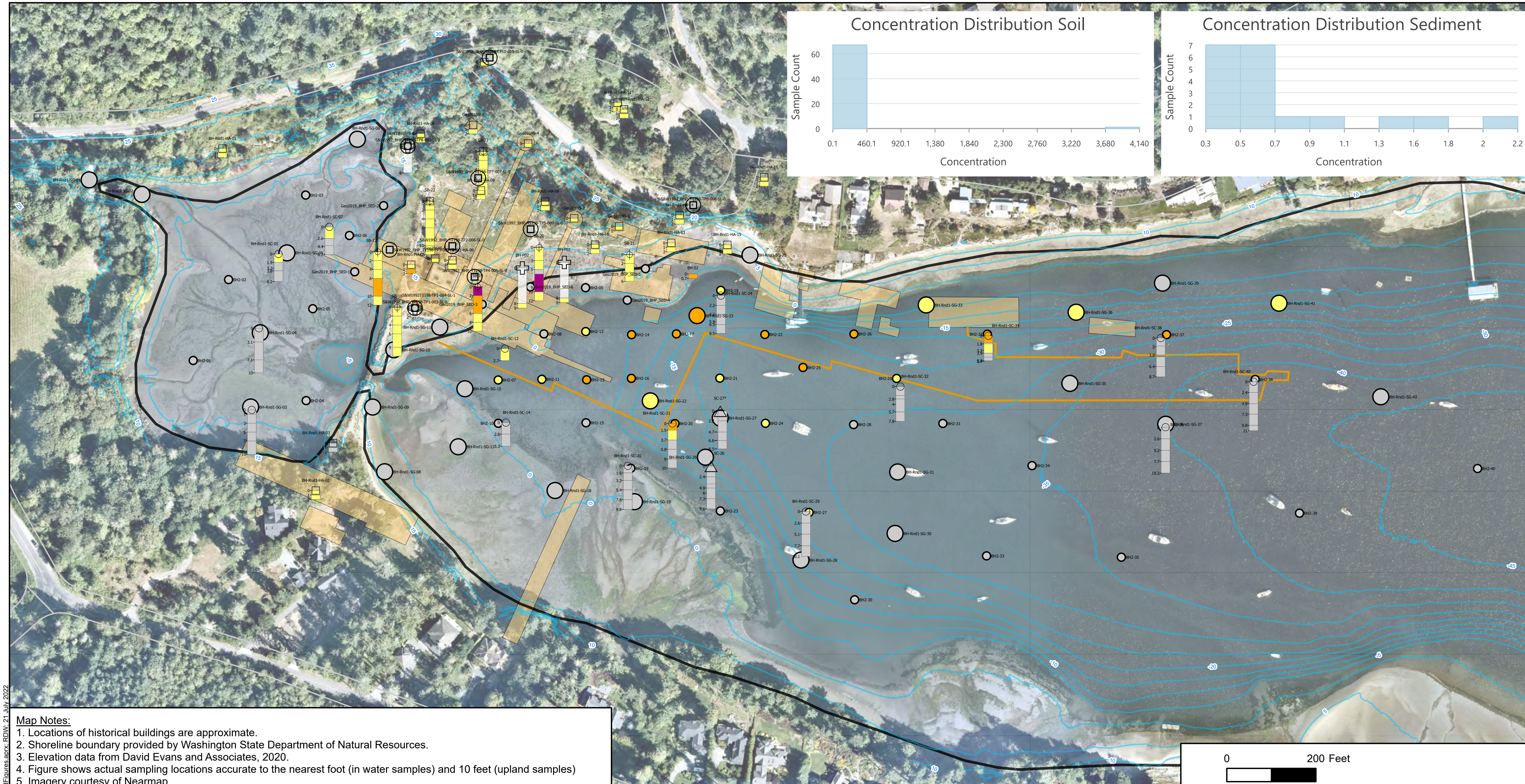
DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:

1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

Concentration in Soil
- < 0.055 mg/kg (SW)
- > 0.055 to 1 mg/kg (SNB)
- > 1 to 2 mg/kg (CMA)
- > 2 mg/kg

Concentration in Sediment
- < 0.8 mg/kg (MNB)
- > 0.8 to 1.6 mg/kg (2xMNB)
- > 1.6 to 5.1 mg/kg (SCO)
- > 5.1 mg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Shoreline
- Historical Wharf Structure

SW - Soil Protective of Groundwater to Marine Surface Water; SNB - Puget Sound 90% Soil Background Value; CMA - Cleanup Levels and Risk Calculator Method A

MNB - SCUM Marine Sediment Natural Background; SCO - Sediment Cleanup Objective

Depths in feet

*Boring hit refusal

Concentrations in mg/kg

Sediment data are not OC normalized

Cadmium in Soil/Sediment

Blakely Harbor

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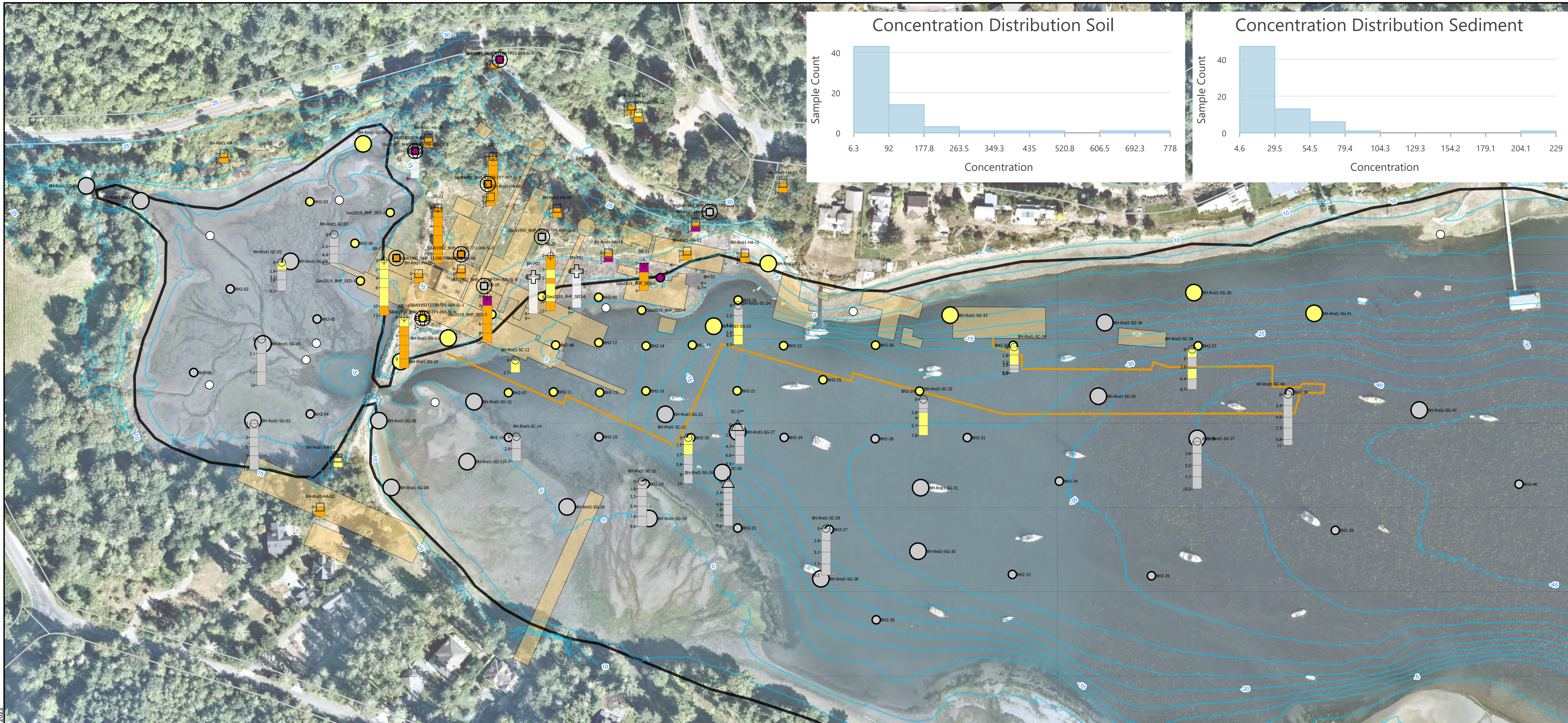
Figure **2**

PNG0900 | 7/22/2022

P:\GIS\BlakelyHarbor\GIS\Blakely_SedFigures\Blakely_SedFigures.aprx; RDW; 21 July 2022

DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:

1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

0 200 Feet

Concentration in Soil

- < 0.069 mg/kg (SW)
- > 0.069 to 36 mg/kg (SNB)
- > 36 to 360 mg/kg (10xSNB)
- > 360 mg/kg

Concentration in Sediment

- < 45 mg/kg (MNB)
- > 45 to 390 mg/kg (SCO/CSL)
- > 390 to 780 mg/kg (2xSCO/CSL)
- > 780 mg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Approximate Site Boundary
- Shoreline
- Historical Wharf Structure

SW - Soil Protective of Groundwater to Marine Surface Water, SNB - Puget Sound 90% Soil Background Value
MNB - SCUM Marine Sediment Natural Background, SCO - Sediment Clean Objective, CSL - Sediment Cleanup Screening Level

Depths in feet
*Boring hit refusal
Concentrations in mg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

Copper in Soil/Sediment
Blakely Harbor

Geosyntec consultants

Figure 3

PNG0900 | 5/30/2022

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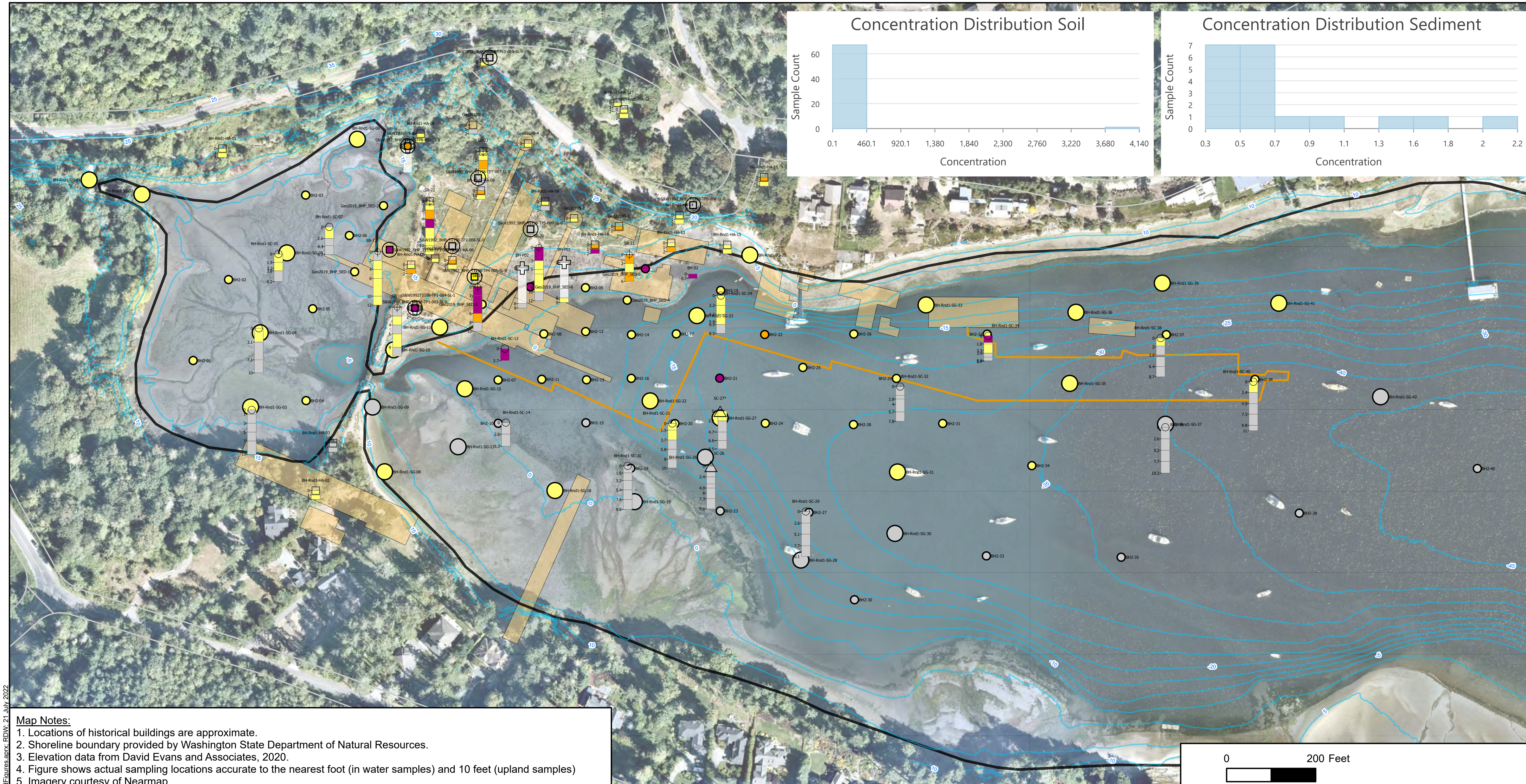
DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

0 200 Feet

Concentration in Soil
- <24 mg/kg (SNB)
- > 24 to 250 mg/kg (CMA)
- > 250 to 750 mg/kg (5xCMA)
- > 750 mg/kg

Concentration in Sediment
- < 21 mg/kg (MNB)
- > 21 to 450 mg/kg (SCO)
- > 450 to 530 mg/kg (CSL)
- > 530 mg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Shoreline
- Historical Wharf Structure

SNB - Puget Sound 90% Soil Background Value, CMA - Cleanup Levels and Risk Calculator Method A
MNB - SCUM Marine Sediment Natural Background, SCO - Sediment Cleanup Objective, CSL - Sediment Cleanup Screening Level

Depths in feet
*Boring hit refusal
Concentrations in mg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

Lead in Soil/Sediment
Blakely Harbor

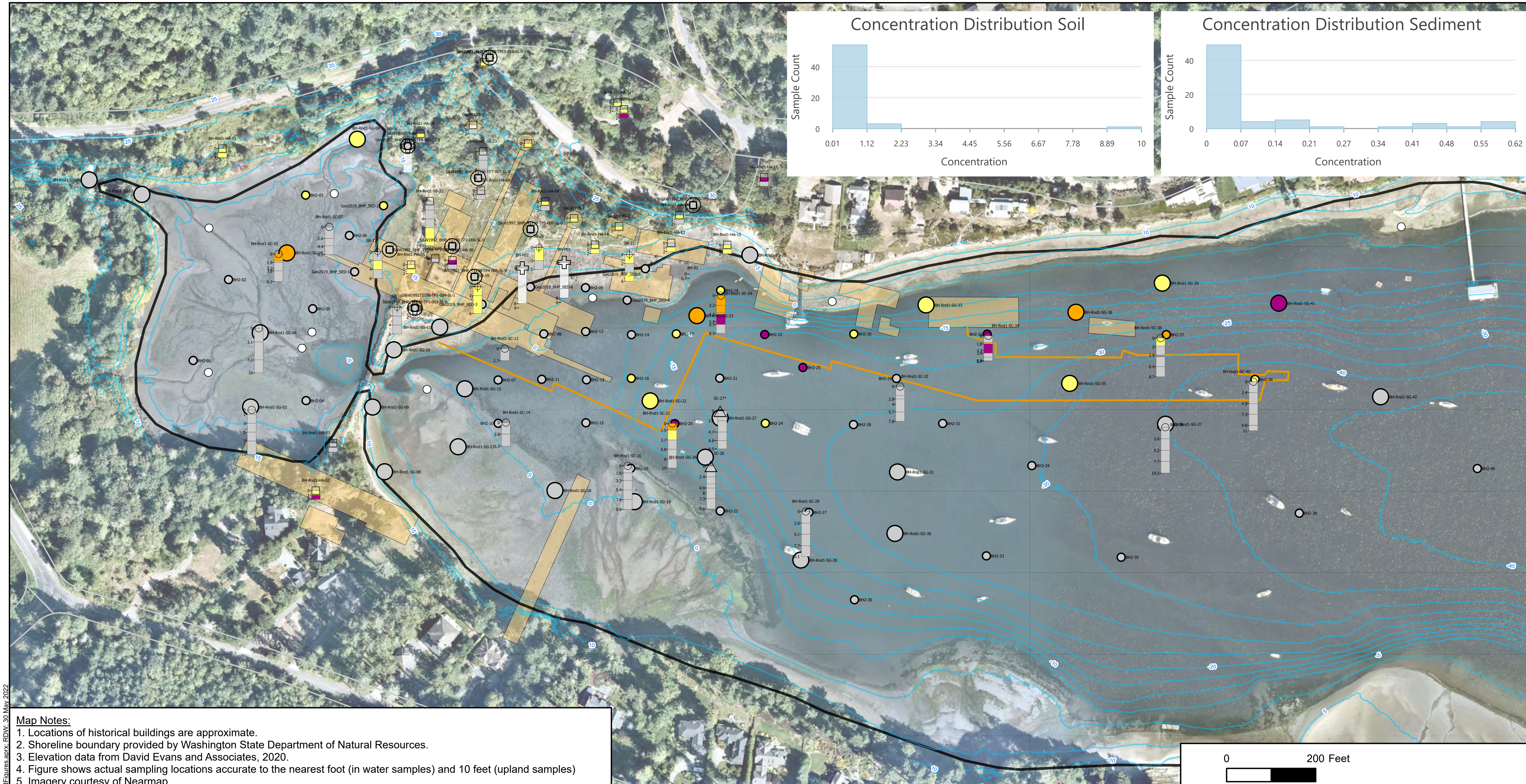
Geosyntec consultants

Figure 4

PNG0900 | 7/21/2022

P:\GIS\BlakelyHarbor\GIS\Blakely_SedFigures\Blakely_SedFigures.aprx; RDW; 21 July 2022

DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

0 200 Feet

Concentration in Soil
- < 0.07 mg/kg (SNB)
- > 0.07 to 0.35 mg/kg (5xSNB)
- > 0.35 to 0.7 mg/kg (5xSNB)
- > 0.7 mg/kg

Concentration in Sediment
- < 0.2 mg/kg (MNB)
- >0.2 to 0.41 mg/kg (SCO)
- > 0.41 to 0.59 mg/kg (CSL)
- > 0.59 mg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Approximate Site Boundary
- Shoreline
- Historical Wharf Structure

SNB - Puget Sound 90% Soil Background Value
MNB - SCUM Marine Sediment Natural Background, SCO - Sediment Clean Objective, CSL - Sediment Cleanup Screening Level

Depths in feet
*Boring hit refusal
Concentrations in mg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

Mercury in Soil/Sediment
Blakely Harbor

Geosyntec consultants

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Figure 5

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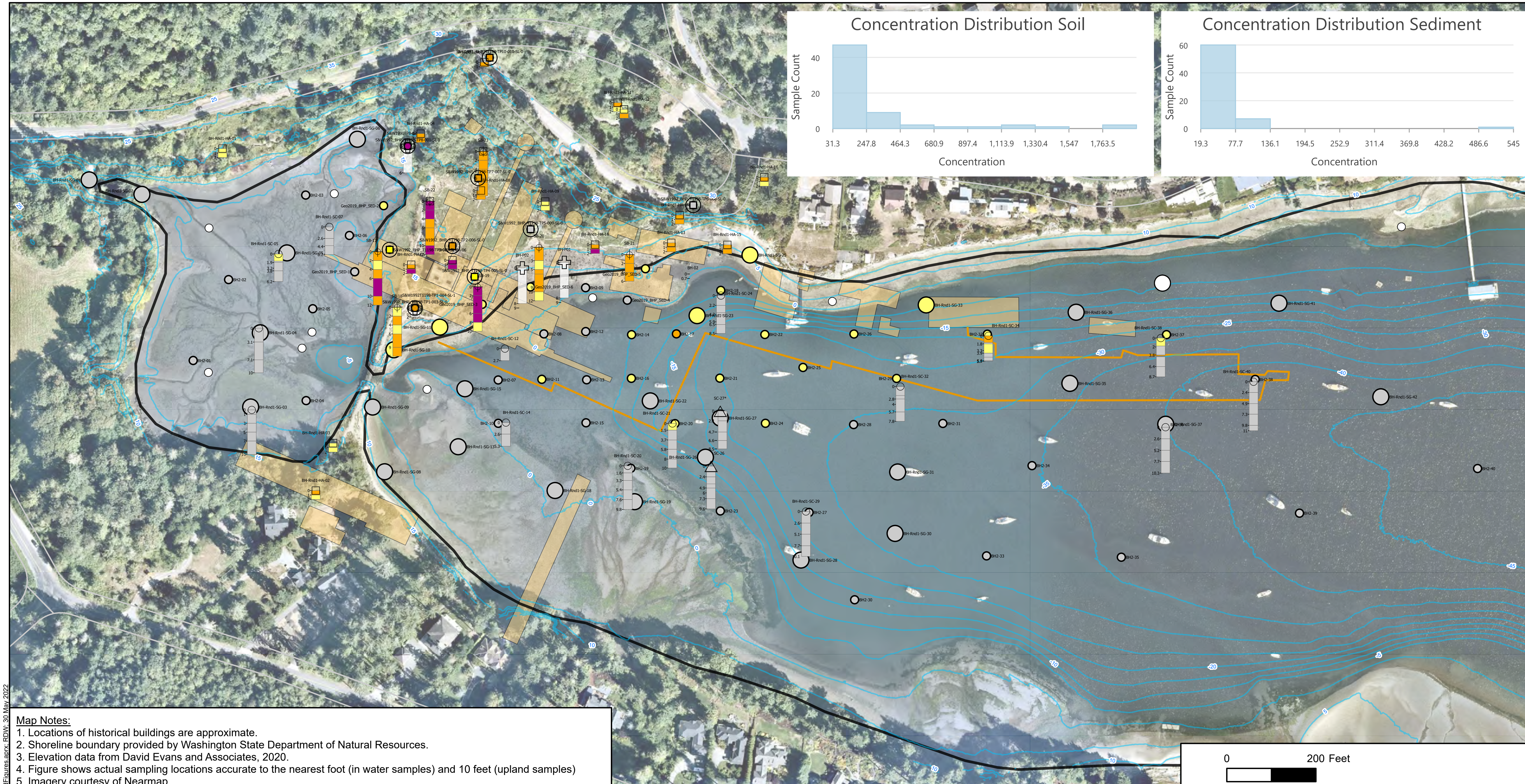
DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:

1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

0 200 Feet

Concentration in Soil

- <5 mg/kg (SW)
- > 5 to 85 mg/kg (SNB)
- > 85 to 425 mg/kg (5xSNB)
- > 425 mg/kg

Concentration in Sediment

- < 93 mg/kg (MNB)
- > 93 to 410 mg/kg (SCO)
- > 410 to 960 mg/kg (CSL)
- > 960 mg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Approximate Site Boundary
- Shoreline
- Historical Wharf Structure

SW - Soil Protective of Groundwater to Marine Surface Water, SNB - Puget Sound 90% Soil Background Value
SCO - Sediment Clean Objective

Depths in feet
*Boring hit refusal
Concentrations in mg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

Zinc in Soil/Sediment
Blakely Harbor

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Figure 6

PNG0900	5/30/2022

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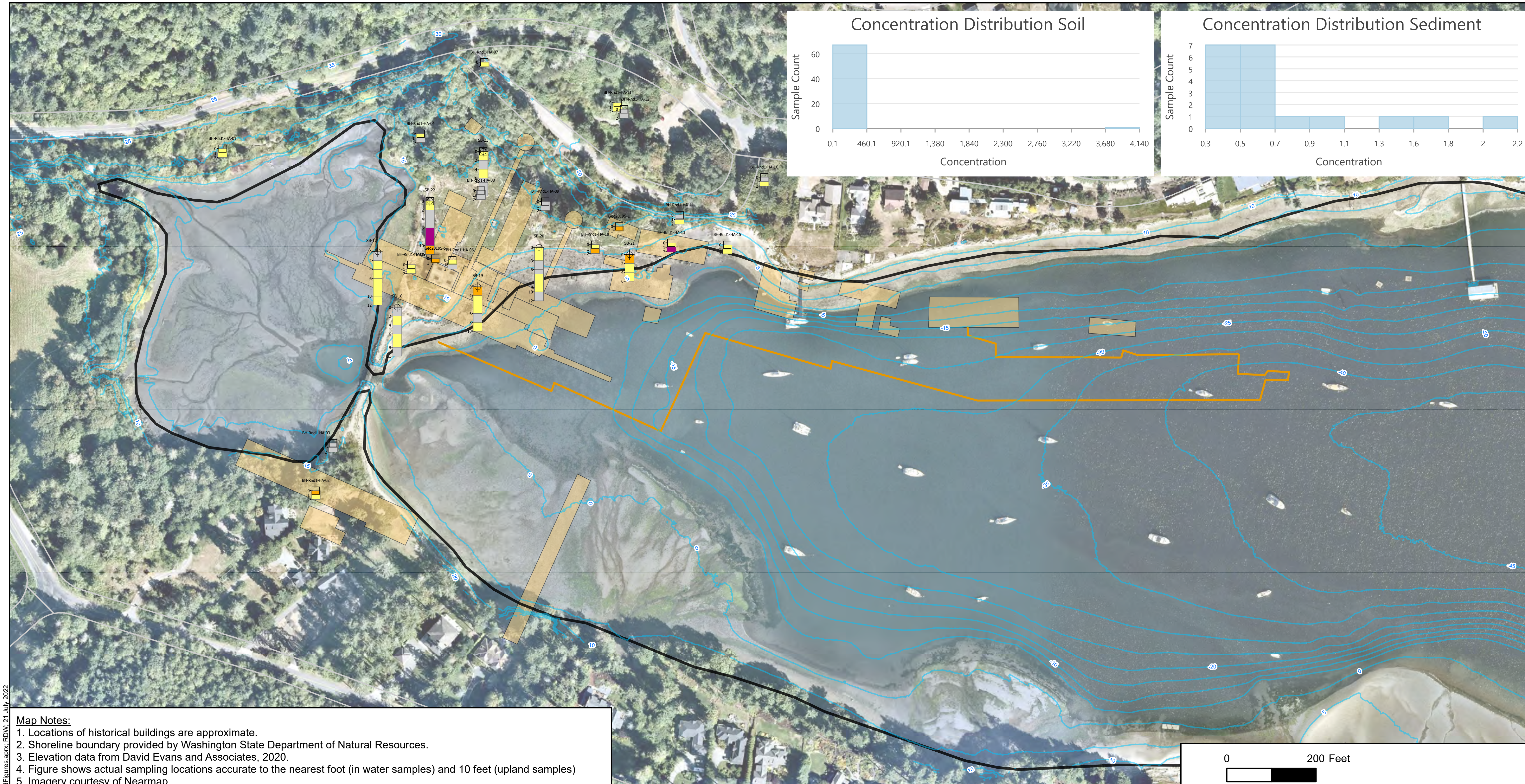
DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

0 200 Feet

Concentration in Soil
- < 4.2 µg/kg (GW)
- > 4.2 to 42 µg/kg (10xGW)
- > 4.2 to 420 µg/kg (100xGW)
- > 420 µg/kg

- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Shoreline
- Historical Wharf Structure

GW - Soil Protection of Saturated Groundwater

Depths in feet
*Boring hit refusal
Concentrations in µg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

1-Methylnaphthalene in Soil

Blakely Harbor

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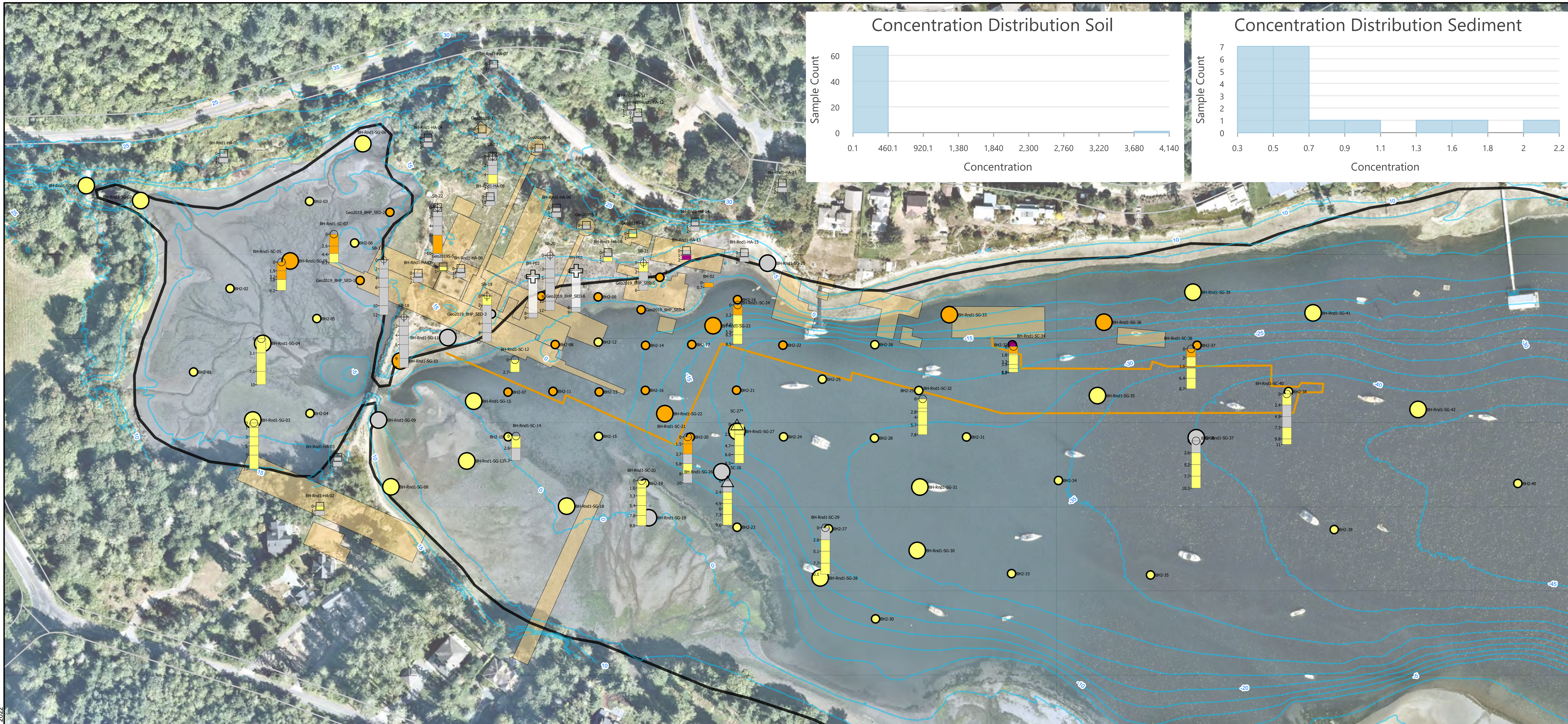
Figure 7

PNG0900 | 7/22/2022

DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:

1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

Concentration in Soil

- < 88 µg/kg (GW)
- > 88 to 440 µg/kg (5xGW)
- > 440 to 880 µg/kg (10xGW)
- > 880 µg/kg

Concentration in Sediment

- < 4.6 µg/kg (MB)
- > 4.6 to 46 (10xMB)
- > 46 to 670 µg/kg (SCO/CSL)
- > 670 µg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Shoreline
- Historical Wharf Structure

GW - Soil Protection of Saturated Groundwater
MB - Puget Sound OVS Bold Dataset Marine BTV; SCO - Sediment Cleanup Objective, CSL - Sediment Cleanup Screening Level

Depths in feet
*Boring hit refusal
Concentrations in µg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

2-Methylnaphthalene in Soil/Sediment
Blakely Harbor

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PNG0900 | 7/22/2022

Figure 8

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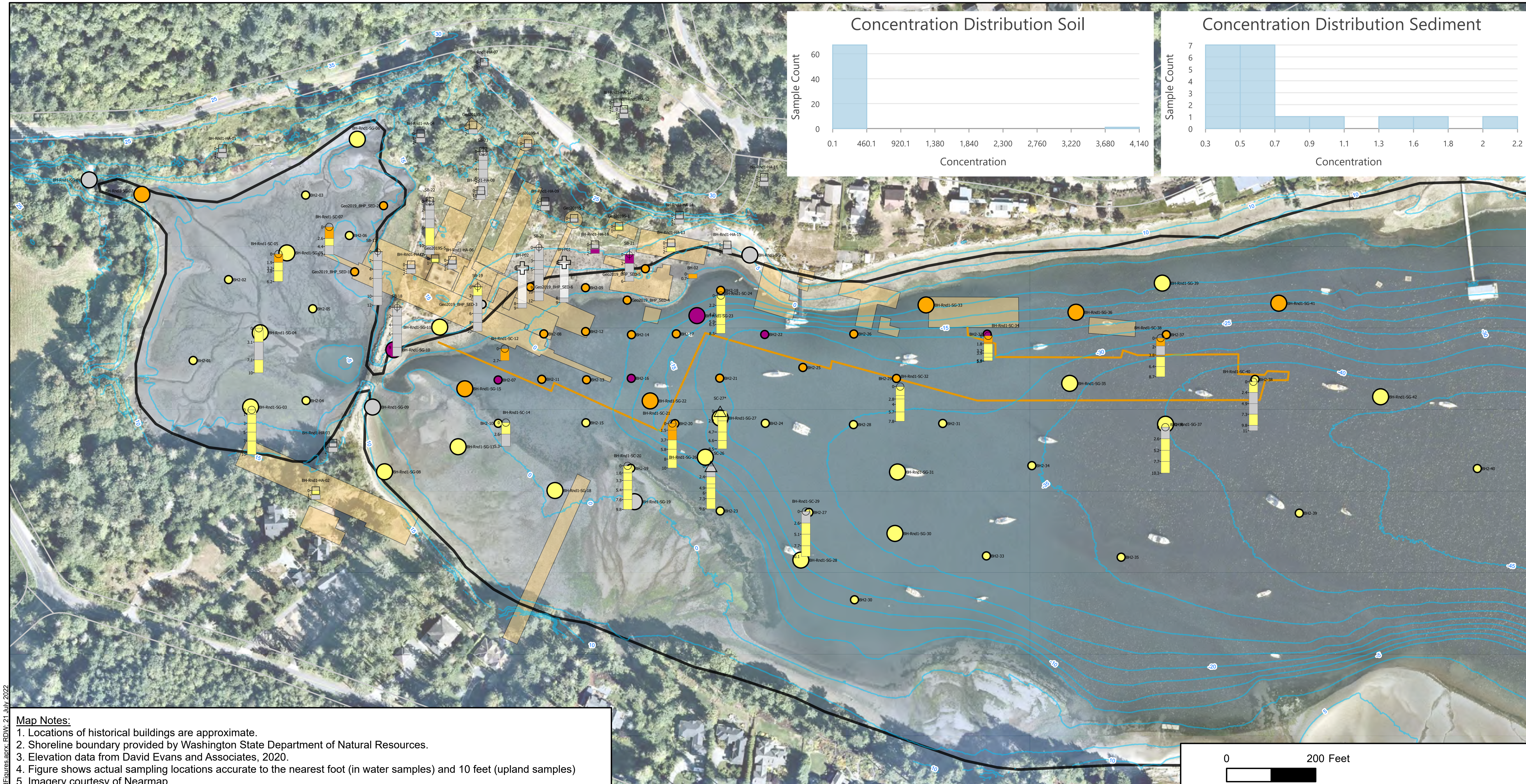
DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

Concentration in Soil
- < 160 µg/kg (SW)
- > 160 to 800 µg/kg (5xSW)
- > 800 to 1600 µg/kg (10xSW)
- > 1600 µg/kg

Concentration in Sediment
- < 4.6 µg/kg (MB)
- > 4.6 to 46 (10xMB)
- > 46 to 500 µg/kg (SCO/CSL)
- > 500 µg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Shoreline
- Historical Wharf Structure

SW - Soil Protective of Groundwater to Marine Surface Water
MB - Puget Sound OVS Bold Dataset Marine BTV; SCO - Sediment Cleanup Objective, CSL - Sediment Cleanup Screening Level

Depths in feet
*Boring hit refusal
Concentrations in µg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

Acenaphthene in Soil/Sediment
Blakely Harbor

Geosyntec consultants

Figure 9

PNG0900 | 7/22/2022

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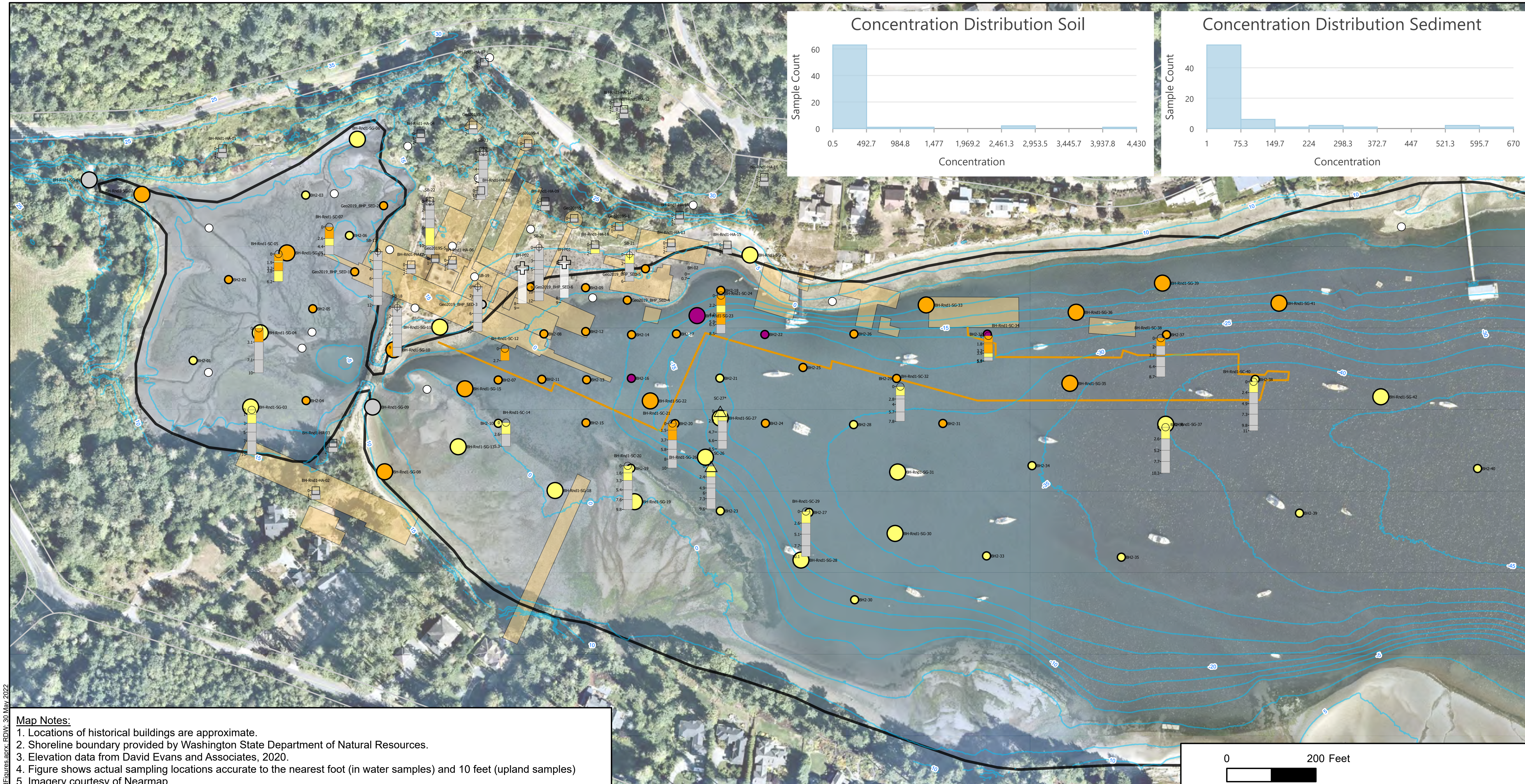
DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

Concentration in Soil
- < 2400 µg/kg (SW)
- > 2400 to 12000 µg/kg (5xSW)
- > 12000 to 24000 µg/kg (10xSW)
- > 24000 µg/kg

Concentration in Sediment
- < 5 µg/kg (HHDC)
- > 5 to 50 µg/kg (10xHHDC)
- > 50 to 960 µg/kg (SCO/CSL)
- > 960 µg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Approximate Site Boundary
- Shoreline
- Historical Wharf Structure

SW - Soil Protective of Groundwater to Marine Surface Water
HHDC - Human Health Direct Contact, SCO - Sediment Cleanup Objective, CSL - Cleanup Screening Level

Depths in feet
*Boring hit refusal
Concentrations in µg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

Anthracene in Soil/Sediment
Blakely Harbor

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Figure 10

PNG0900 | 5/30/2022

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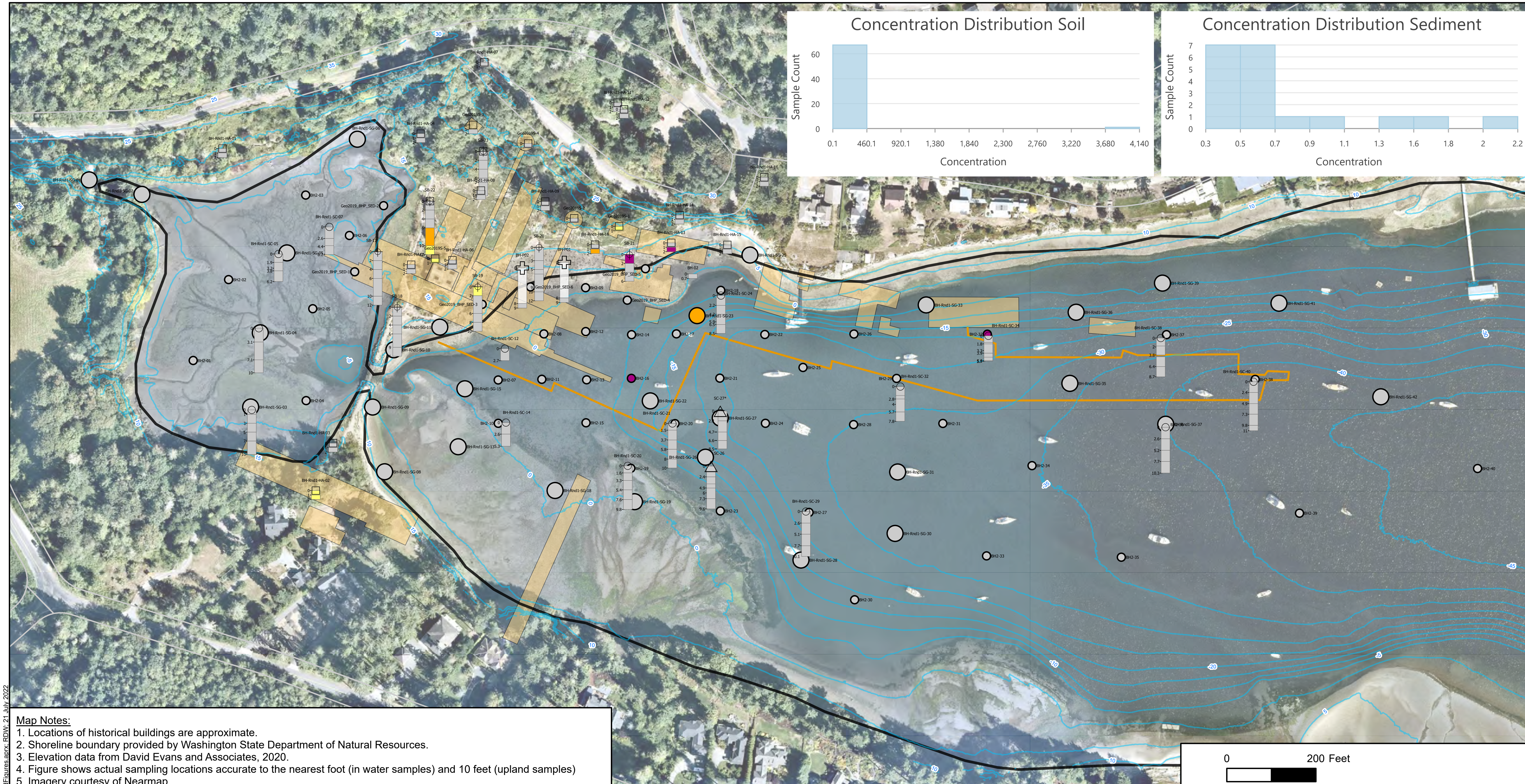
DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

0 200 Feet

Concentration in Soil
- < 80 µg/kg (SW)
- > 80 to 800 µg/kg (10xSW)
- > 800 to 1600 µg/kg (20xSW)
- > 1600 µg/kg

Concentration in Sediment
- < 540 µg/kg (SCO/CSL)
- > 540 to 810 µg/kg (1.5xSCO/CSL)
- > 810 to 1080 µg/kg (2xSCO/CSL)
- > 1080 µg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Shoreline
- Historical Wharf Structure

SW - Soil Protective of Groundwater to Marine Surface Water
SCO - Sediment Cleanup Objective, CSL - Sediment Cleanup Screening Level

Depths in feet
*Boring hit refusal
Concentrations in µg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

Fluorene
in Soil/Sediment
Blakely Harbor

Geosyntec consultants

Figure 11

PNG0900 | 7/22/2022

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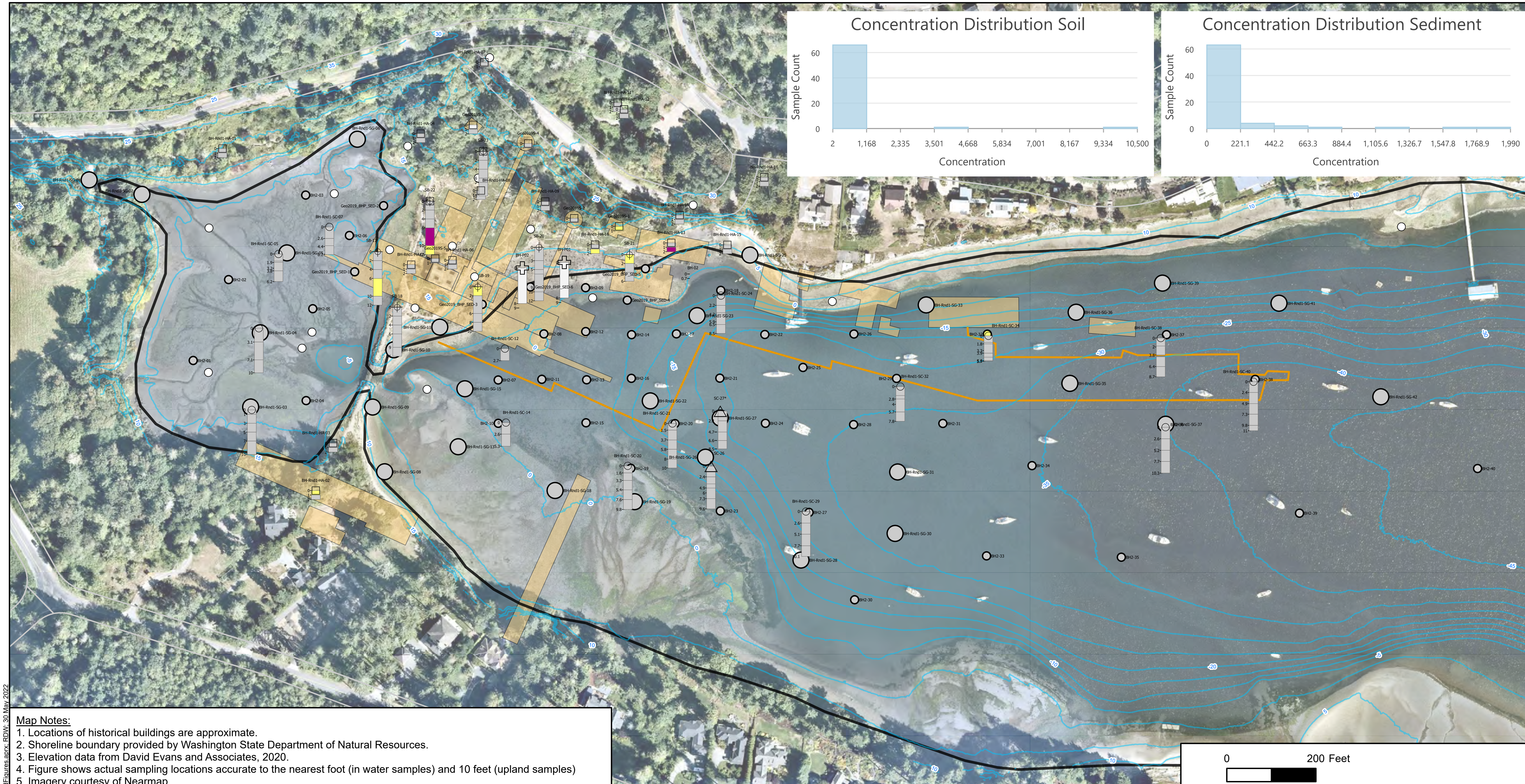
DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

P:\GIS\BlakelyHarbor\GIS\Blakely_SedFigures\Blakely_SedFigures.aprx, RDW, 30 May 2022

Concentration in Soil
- < 240 µg/kg (GW)
- > 240 to 1200 µg/kg (5xGW)
- > 1200 to 2400 µg/kg (10xGW)
- > 2400 µg/kg

Concentration in Sediment
- < 2100 µg/kg (SCO/CSL)
- > 2100 to 10500 µg/kg (5xSCO/CSL)
- > 10500 to 21000 µg/kg (10xSCO/CSL)
- > 21000 µg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Approximate Site Boundary
- Shoreline
- Historical Wharf Structure

GW - Soil Protection of Saturated Groundwater
SCO - Sediment Clean Objective, CSL - Sediment Cleanup Screening Level

Depths in feet
*Boring hit refusal
Concentrations in µg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

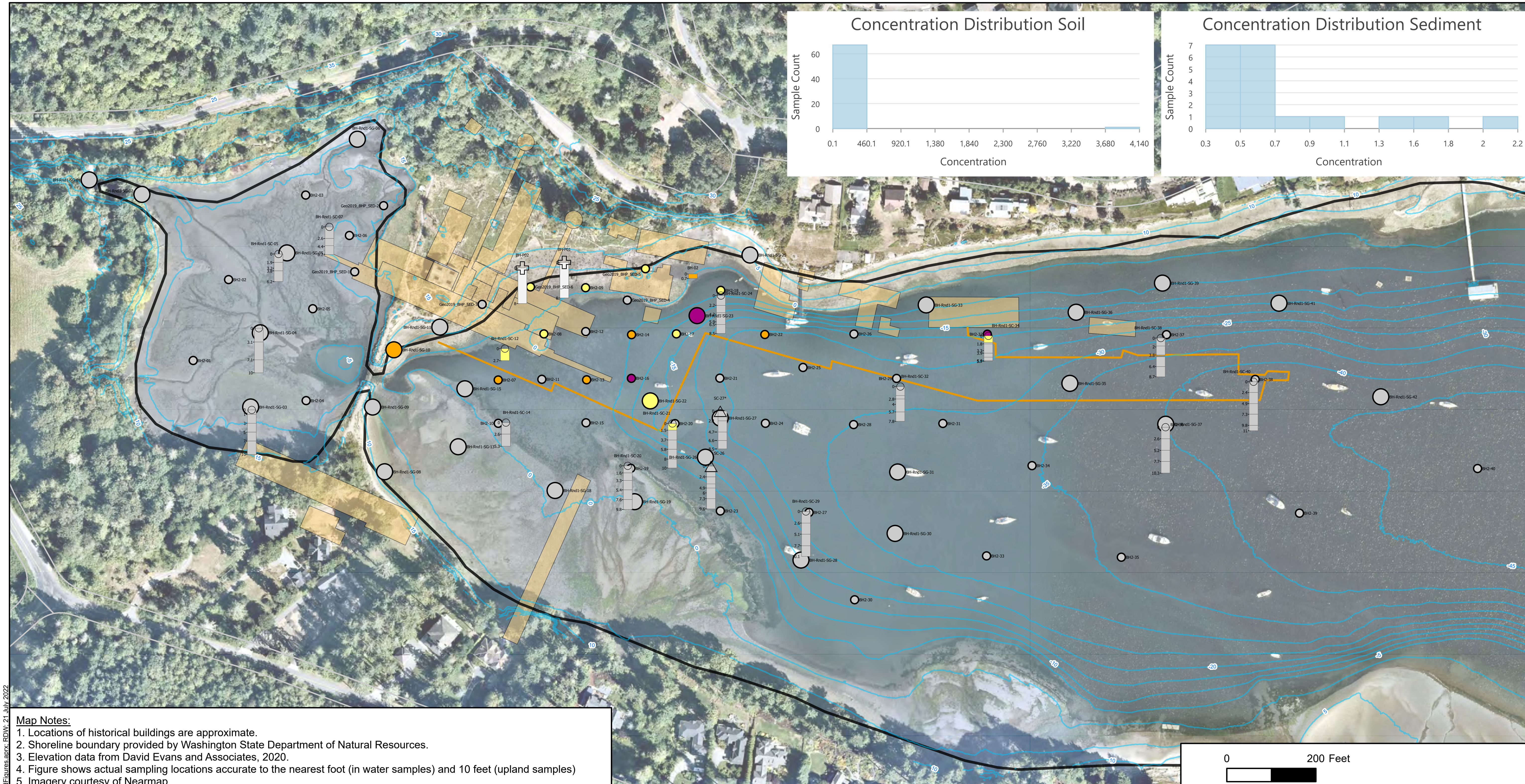
Naphthalene in Soil/Sediment
Blakely Harbor

Geosyntec consultants

Figure 12

PNG0900 | 5/30/2022

DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

Concentration in Sediment

- < 1500 µg/kg (SCO/CSL)
- > 1500 to 3000 µg/kg (2xSCO/CSL)
- > 3000 to 6000 µg/kg (4xSCO/CSL)
- > 6000 µg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- 2021 Sediment Core Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Shoreline
- Historical Wharf Structure

SCO - Sediment Cleanup Objective, CSL - Sediment Cleanup Screening Level

Depths in feet
*Boring hit refusal
Concentrations in µg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

0 200 Feet

Phenanthrene in Sediment

Blakely Harbor

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Figure 13

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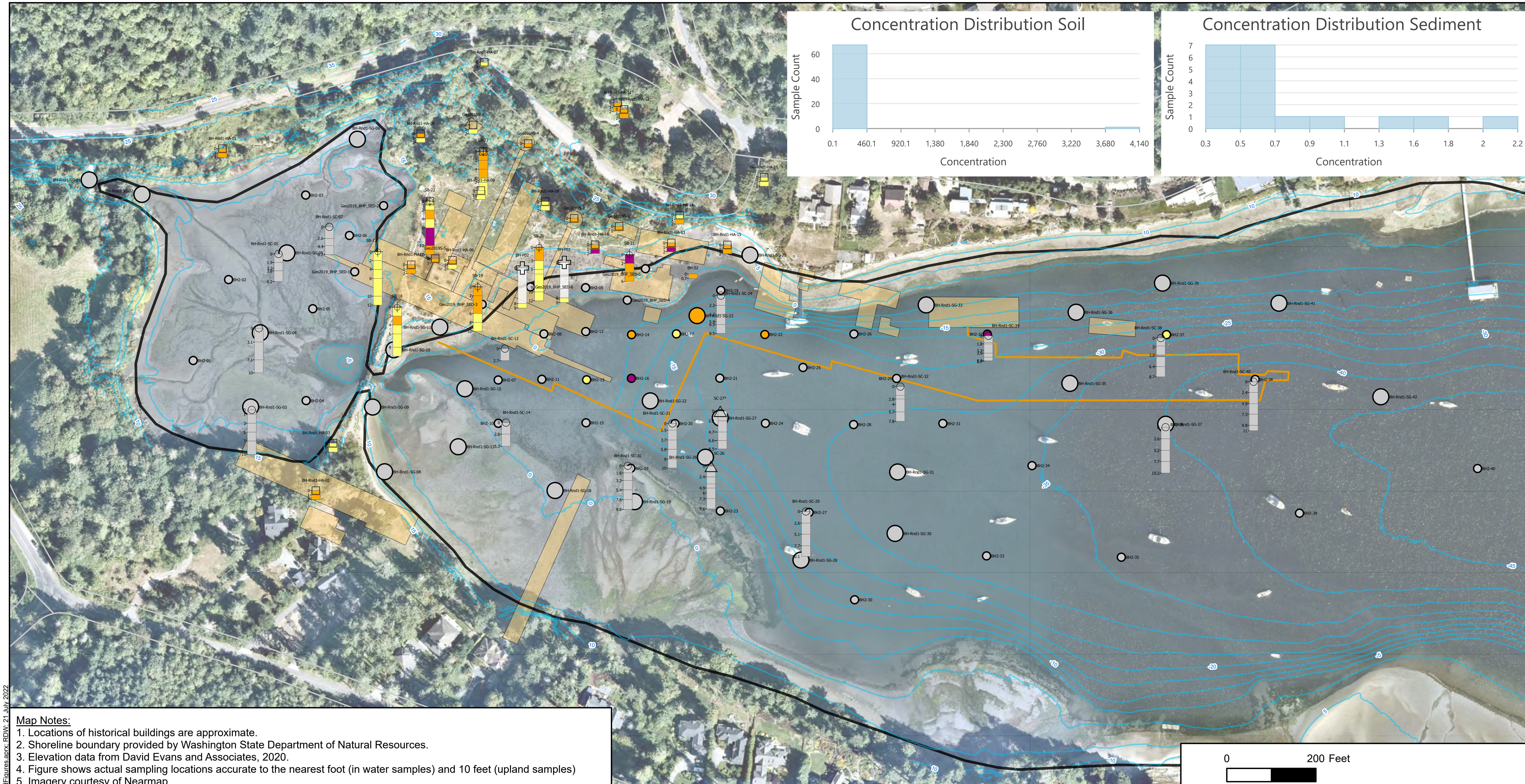
DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

0 200 Feet

Concentration in Soil
- < 0.057 μg/kg (SW)
- > 0.057 to 57 μg/kg (1000xSW)
- > 57 to 5700 μg/kg (1000000xSW)
- > 5700 μg/kg

Concentration in Sediment
- < 1300 μg/kg (SCO)
- > 1300 to 1600 μg/kg (CSL)
- > 1600 to 3200 μg/kg (2xCSL)
- > 3200 μg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Shoreline
- Historical Wharf Structure

SW - Soil Protective of Groundwater to Marine Surface Water
SCO - Sediment Cleanup Objective, CSL - Sediment Cleanup Screening Level

Depths in feet
*Boring hit refusal
Concentrations in μg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

Benzo(a)anthracene in Soil/Sediment
Blakely Harbor

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Figure 14

PNG0900 | 7/22/2022

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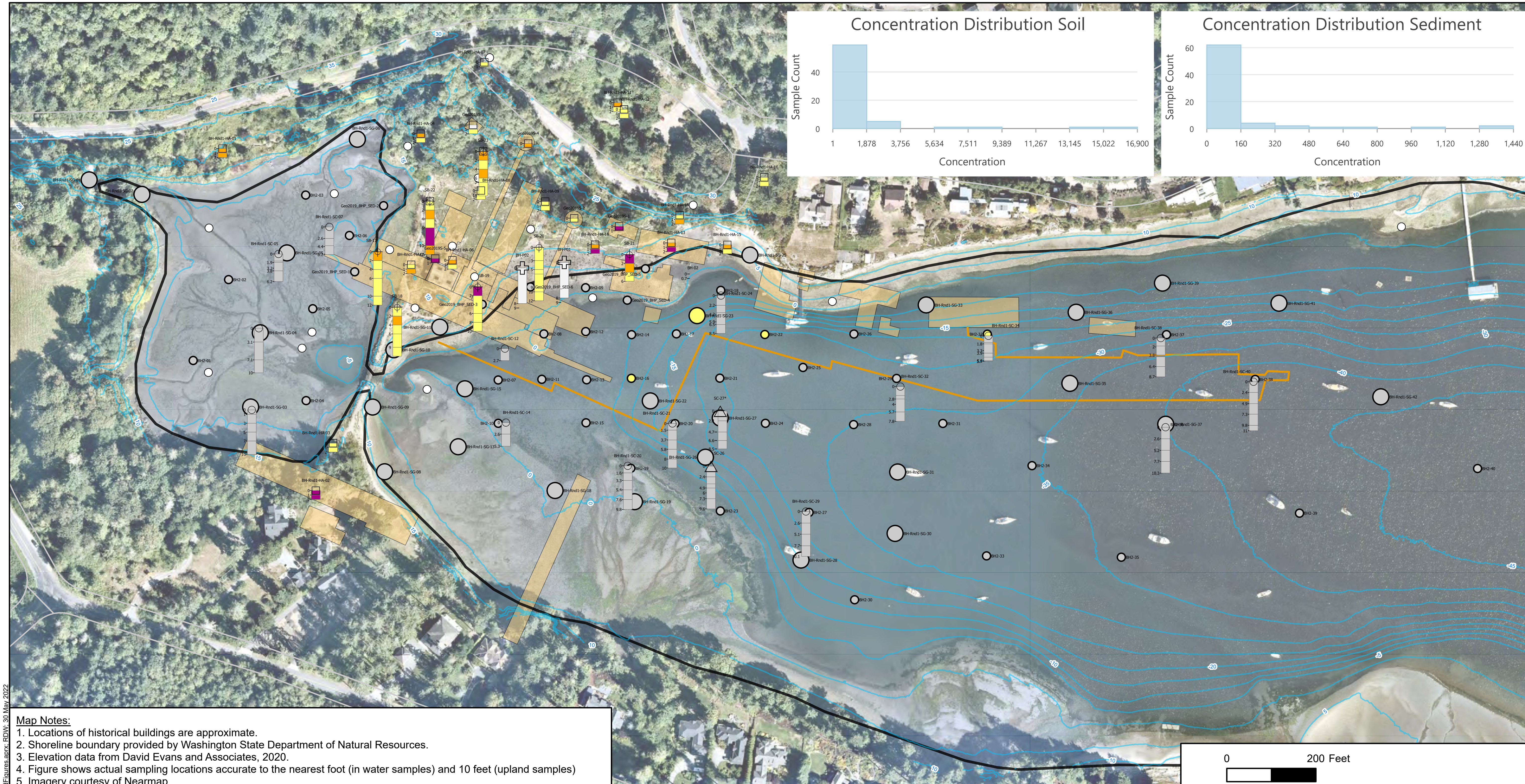
DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

P:\GIS\BlakelyHarbor\GIS\Blakely_SedFigures\Blakely_SedFigures.aprx; RDW; 30 May 2022

Concentration in Soil
- < 0.016 µg/kg (SW)
- > 0.016 to 160 µg/kg (10000xSW)
- > 160 to 1600 µg/kg (100000xSW)
- > 1600 µg/kg

Concentration in Sediment
- < 1600 µg/kg (SCO/ CSL)
- > 1600 to 8000 µg/kg (5xSCO)
- > 8000 to 16000 µg/kg (10xSCO)
- > 16000 µg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Approximate Site Boundary
- Shoreline
- Historical Wharf Structure

SW - Soil Protective of Groundwater to Marine Surface Water
SCO - Sediment Clean Objective, CSL - Sediment Cleanup Screening Level

Depths in feet
*Boring hit refusal
Concentrations in µg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

Benzo(a)pyrene in Soil/Sediment
Blakely Harbor

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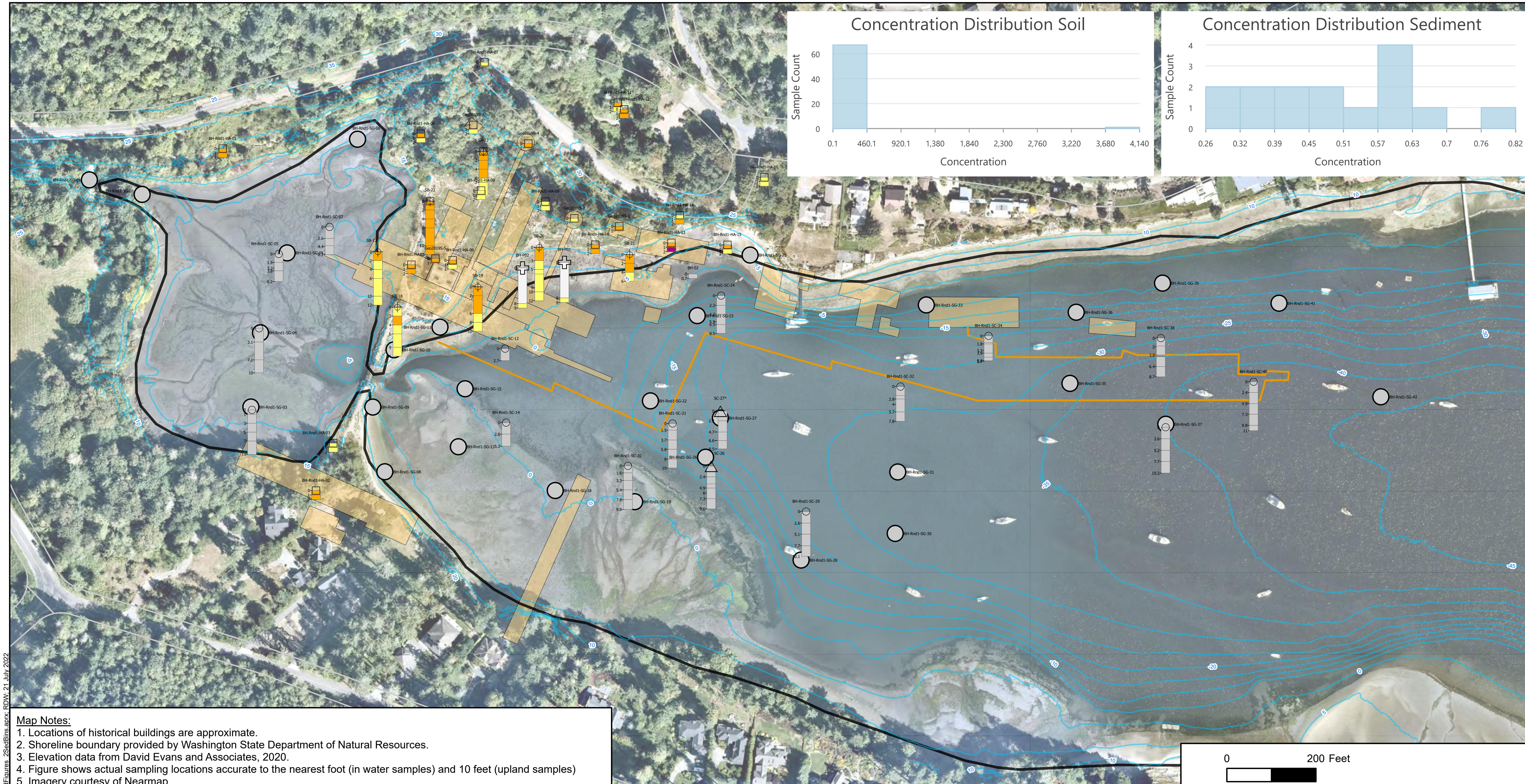
Figure 15

DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

Concentration in Soil
- < 0.096 µg/kg (SW)
- > 0.096 to 96 µg/kg (1000xSW)
- > 96 to 9600 µg/kg (100000xSW)
- > 9600 µg/kg

Concentration in Sediment
- < 6500 µg/kg (HH)
- > 6500 µg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Shoreline
- Historical Wharf Structure

SW - Soil Protective of Groundwater to Marine Surface Water
HH - Human Health Clamming Direct Contact

Depths in feet
*Boring hit refusal
Concentrations in µg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

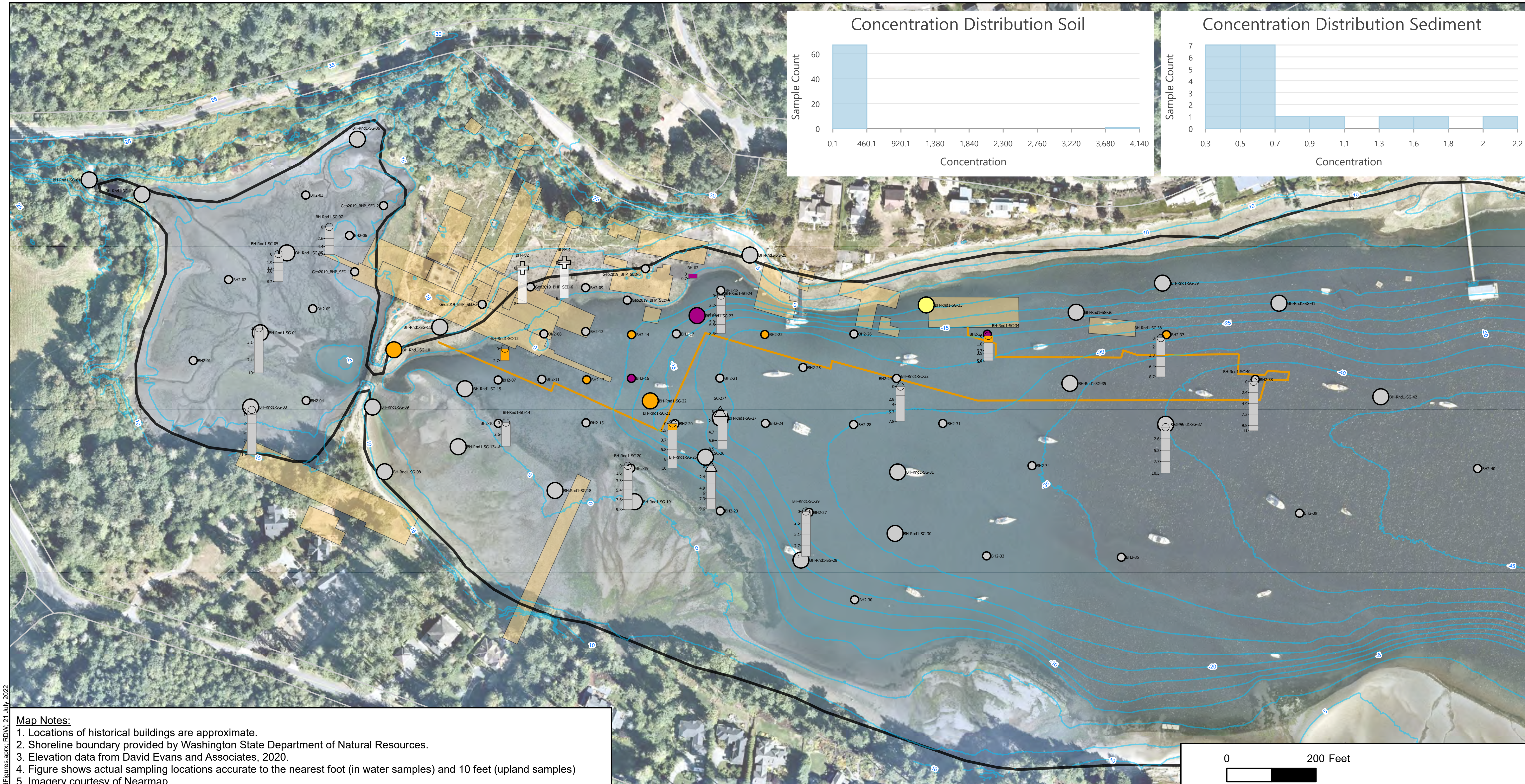
Benzo(b)fluoranthene in Soil/Sediment
Blakely Harbor

Geosyntec consultants

Figure 16

PNG0900 | 7/22/2022

DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

P:\GIS\BlakelyHarbor\GIS\Blakely_SedFigures\Blakely_SedFigures.aprx; RDW; 21 July 2022

Concentration in Sediment
- < 670 µg/kg (SCO)
- > 670 to 720 µg/kg (CSL)
- > 720 to 1440 µg/kg (2xCSL)
- > 1440 µg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- 2021 Sediment Core Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Shoreline
- Historical Wharf Structure

SCO - Sediment Cleanup Objective, CSL - Sediment Cleanup Screening Level

Depths in feet
*Boring hit refusal
Concentrations in µg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

Benzo(g,h,i)perylene in Sediment

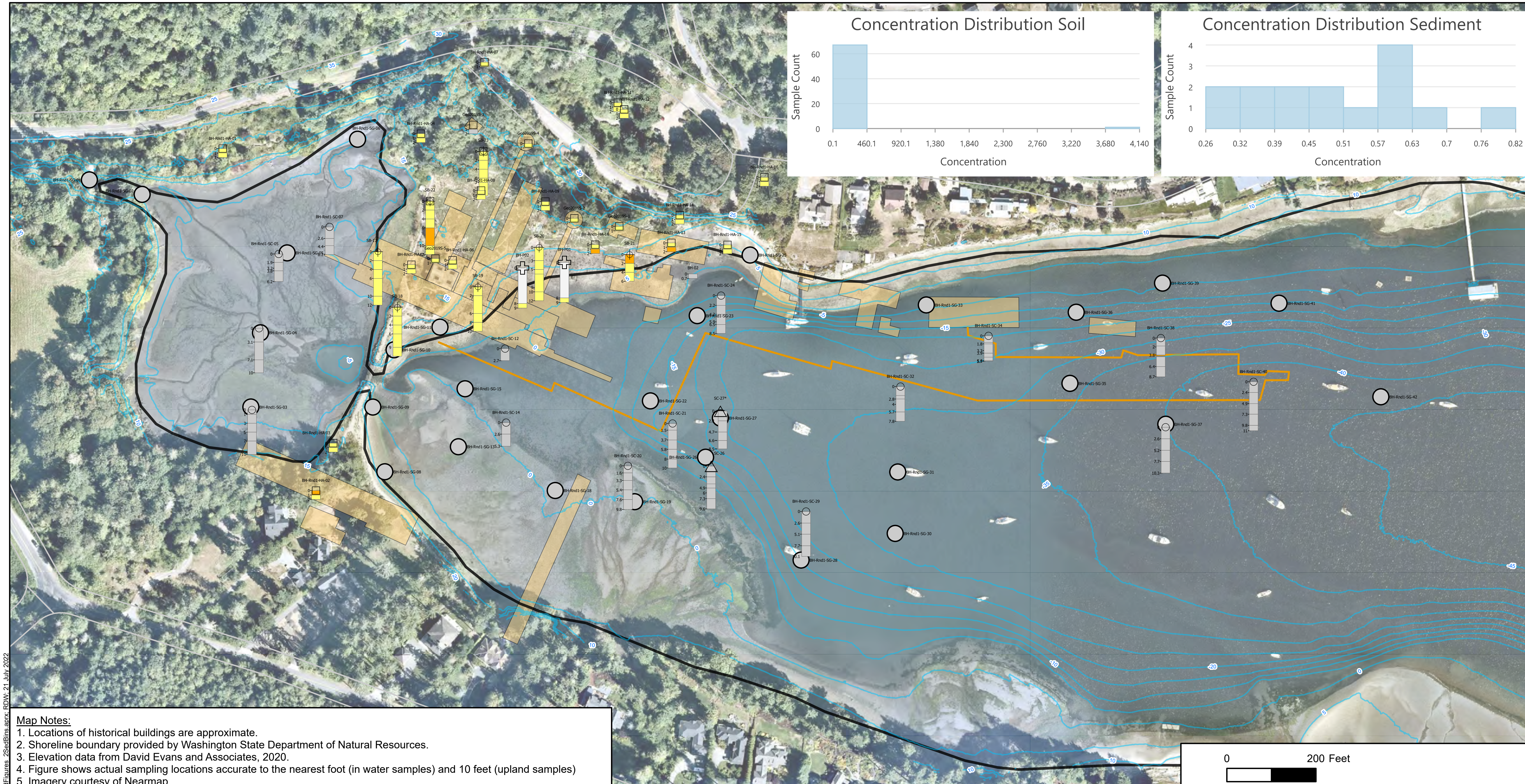
Blakely Harbor

Geosyntec consultants

Figure 17

PNG0900 | 7/22/2022

DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

P:\GIS\BlakelyHarbor\GIS\Blakely_SedFigures\Blakely_SedFigures_2SedBins.aprx; RDW; 21 July 2022

Concentration in Soil
- < 0.94 µg/kg (SW)
- > 0.94 to 940 µg/kg (1000xSW)
- > 940 to 9400 µg/kg (10000xSW)
- > 9400 µg/kg

Concentration in Sediment
- < 65000 µg/kg (HH)
- > 65000 µg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Shoreline
- Historical Wharf Structure

SW - Soil Protective of Groundwater to Marine Surface Water
HH - Human Health Clamming Direct Contact

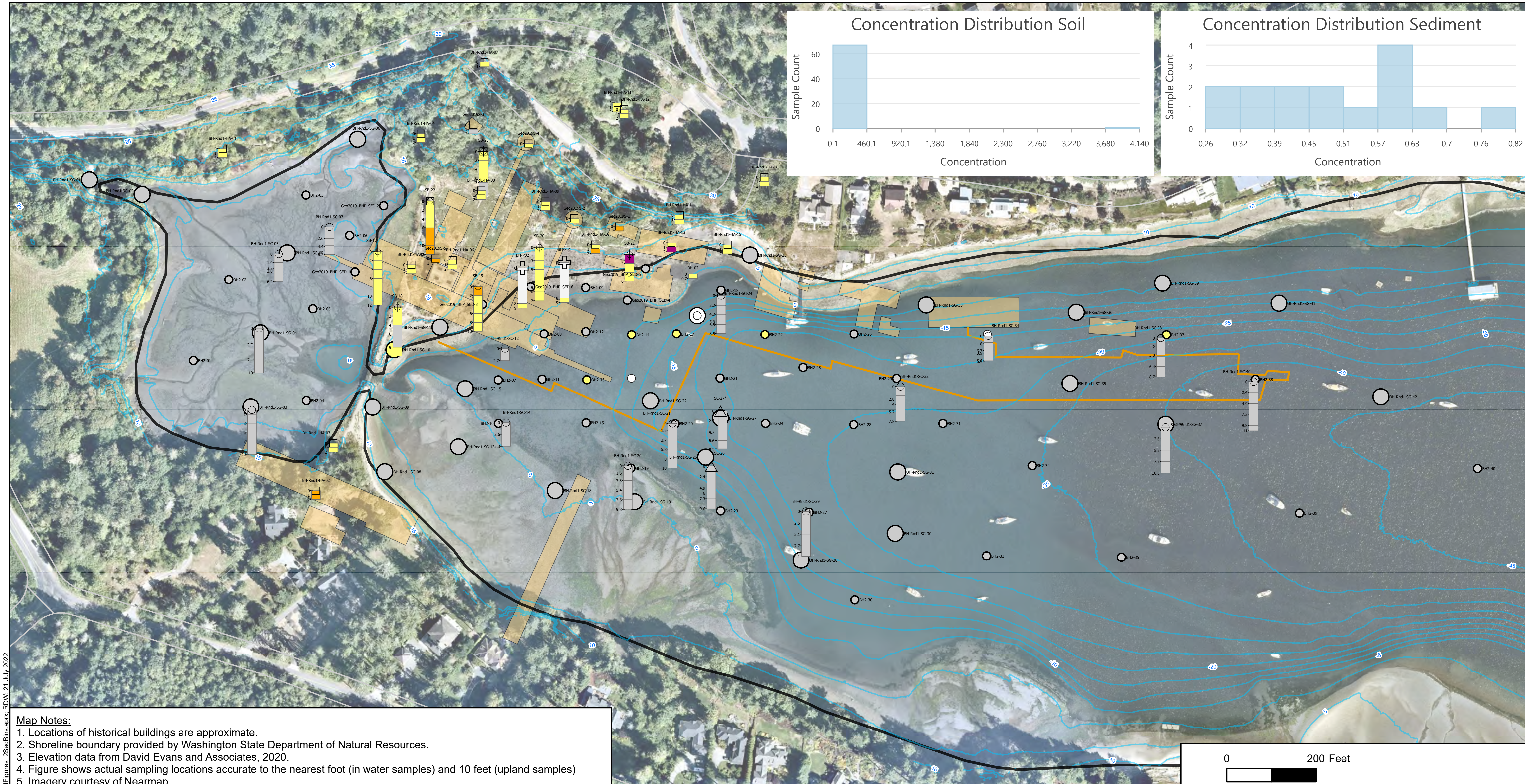
Depths in feet
*Boring hit refusal
Concentrations in µg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

Benzo(k)fluoranthene in Soil/Sediment
Blakely Harbor

Geosyntec consultants

PNG0900	7/22/2022	Figure 18

DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

Concentration in Soil
- < 2.9 µg/kg (SW)
- > 2.9 to 580 µg/kg (200xSW)
- > 580 to 11600 µg/kg (4000xSW)
- > 11600 µg/kg

Concentration in Sediment
- < 1400 µg/kg (SCO)
- > 1400 to 2800 µg/kg (CSL)

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Shoreline
- Historical Wharf Structure

SW - Soil Protective of Groundwater to Marine Surface Water
SCO - Sediment Cleanup Objective, CSL - Sediment Cleanup Screening Level

Depths in feet
*Boring hit refusal
Concentrations in µg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

Chrysene in Soil/Sediment
Blakely Harbor

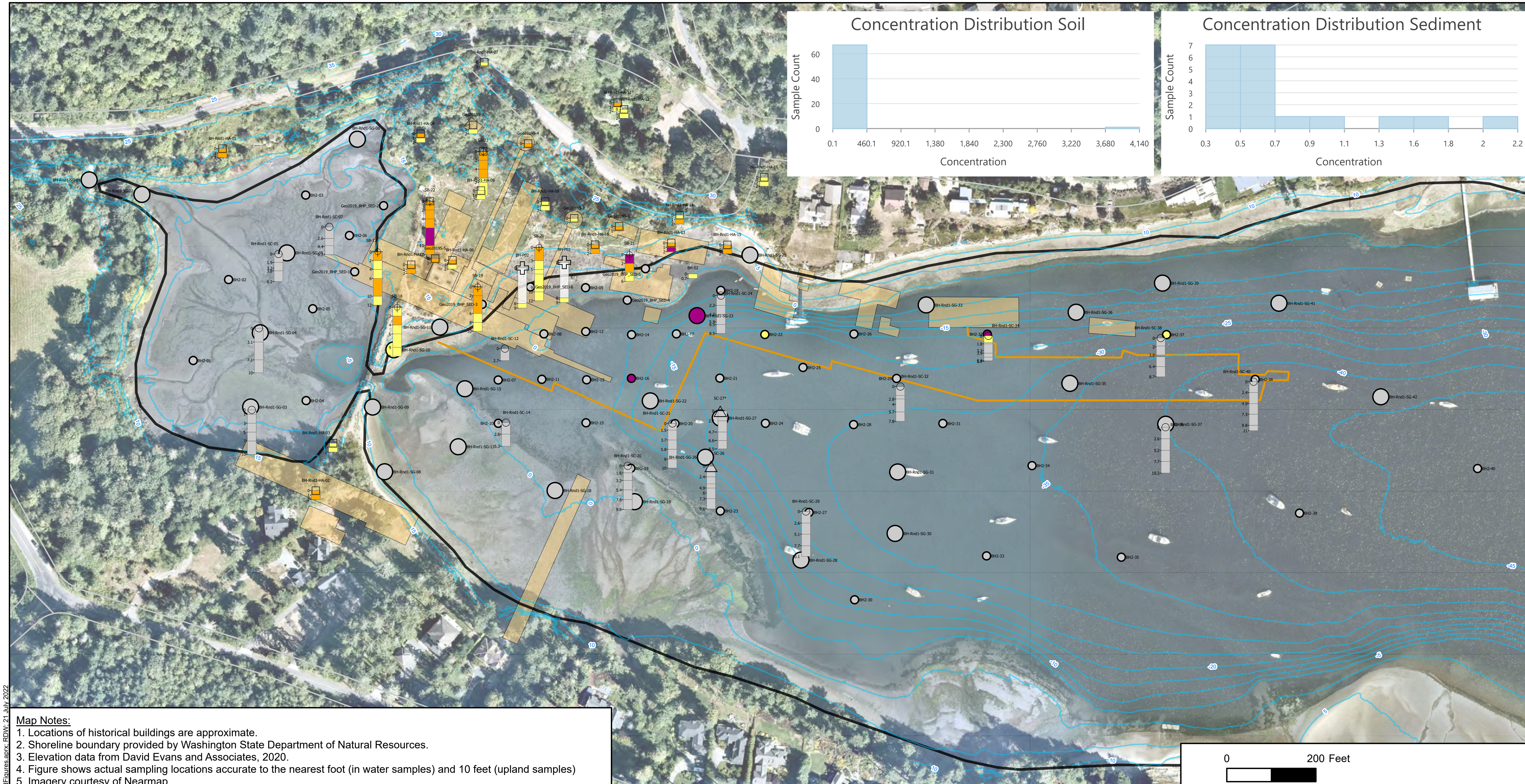
Geosyntec consultants

Figure 19

PNG0900 | 7/22/2022

P:\GIS\BlakelyHarbor\GIS\Blakely_SedFigures\Blakely_SedFigures_2SedBins.aprx; RDW; 21 July 2022

DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:

1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

P:\GIS\BlakelyHarbor\GIS\Blakely_SedFigures\Blakely_SedFigures.aprx; RDW; 21 July 2022

Concentration in Soil

- < 0.029 µg/kg (SW)
- > 0.029 to 29 µg/kg (1000xSW)
- > 29 to 1450 µg/kg (50000xSW)
- > 1450 µg/kg

Concentration in Sediment

- < 230 µg/kg (SCO/CSL)
- > 230 to 345 µg/kg (1.5xSCO/CSL)
- > 345 to 460 µg/kg (2xSCO/CSL)
- > 460 µg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Shoreline
- Historical Wharf Structure

SW - Soil Protective of Groundwater to Marine Surface Water
SCO - Sediment Cleanup Objective, CSL - Sediment Cleanup Screening Level

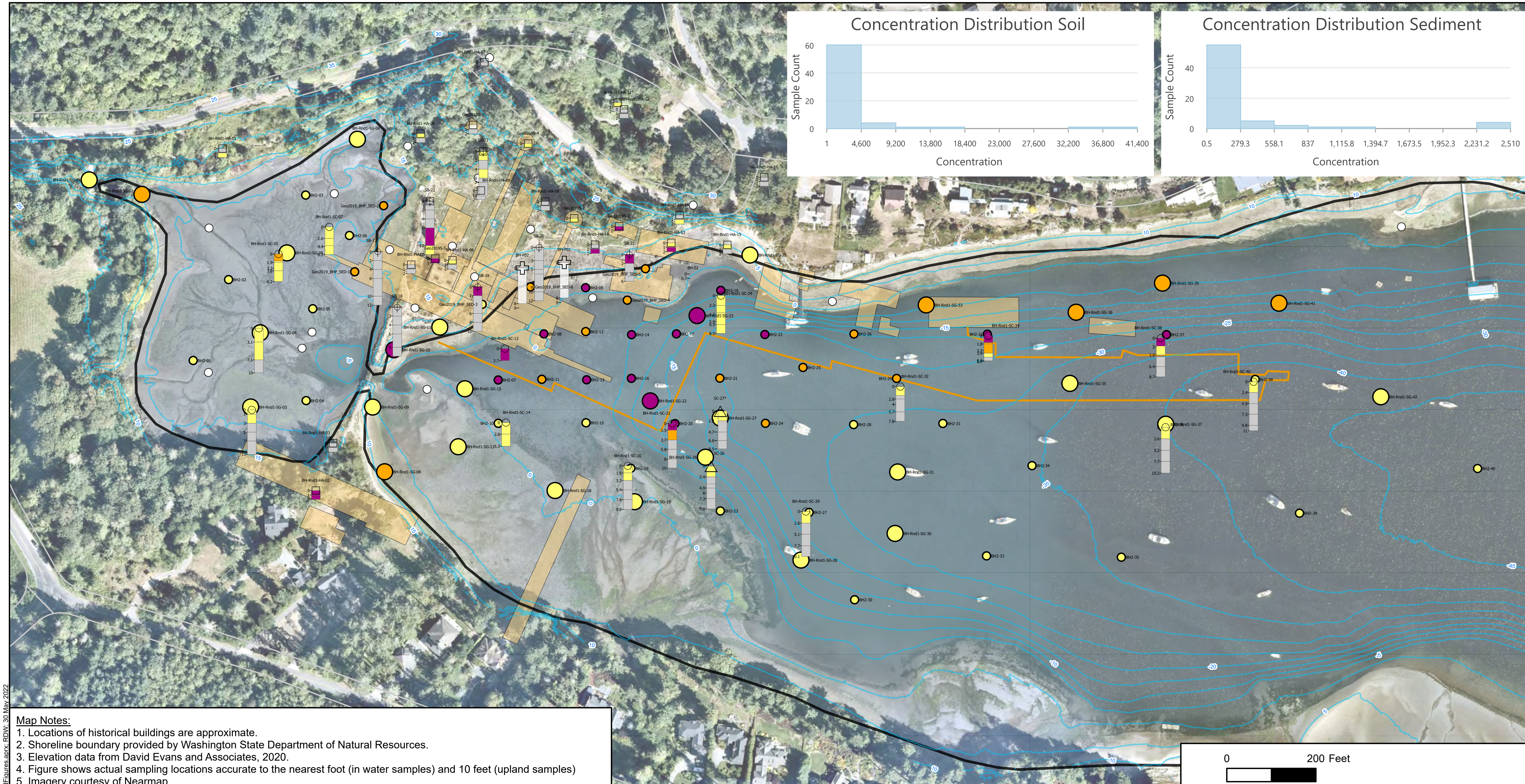
Depths in feet
*Boring hit refusal
Concentrations in µg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

Dibenz(a,h)anthracene in Soil/Sediment
Blakely Harbor

Geosyntec consultants

PNG0900 | 7/22/2022

Figure 20



Map Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

0 200 Feet

Concentration in Soil
- < 300 µg/kg (SW)
- > 300 to 1500 µg/kg (5xSW)
- > 1500 to 3000 µg/kg (10xSW)
- > 3000 µg/kg

Concentration in Sediment
- < 5 µg/kg (HHDC)
- > 5 to 500 µg/kg (100xHHDC)
- 500 to 1700 µg/kg (SCO)
- > 1700 µg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Approximate Site Boundary
- Shoreline
- Historical Wharf Structure

SW - Soil Protective of Groundwater to Marine Surface Water
HHDC - Human Health Direct Contact, SCO - Sediment Cleanup Objective

Depths in feet
*Boring hit refusal
Concentrations in µg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

Fluoranthene in Soil/Sediment
Blakely Harbor

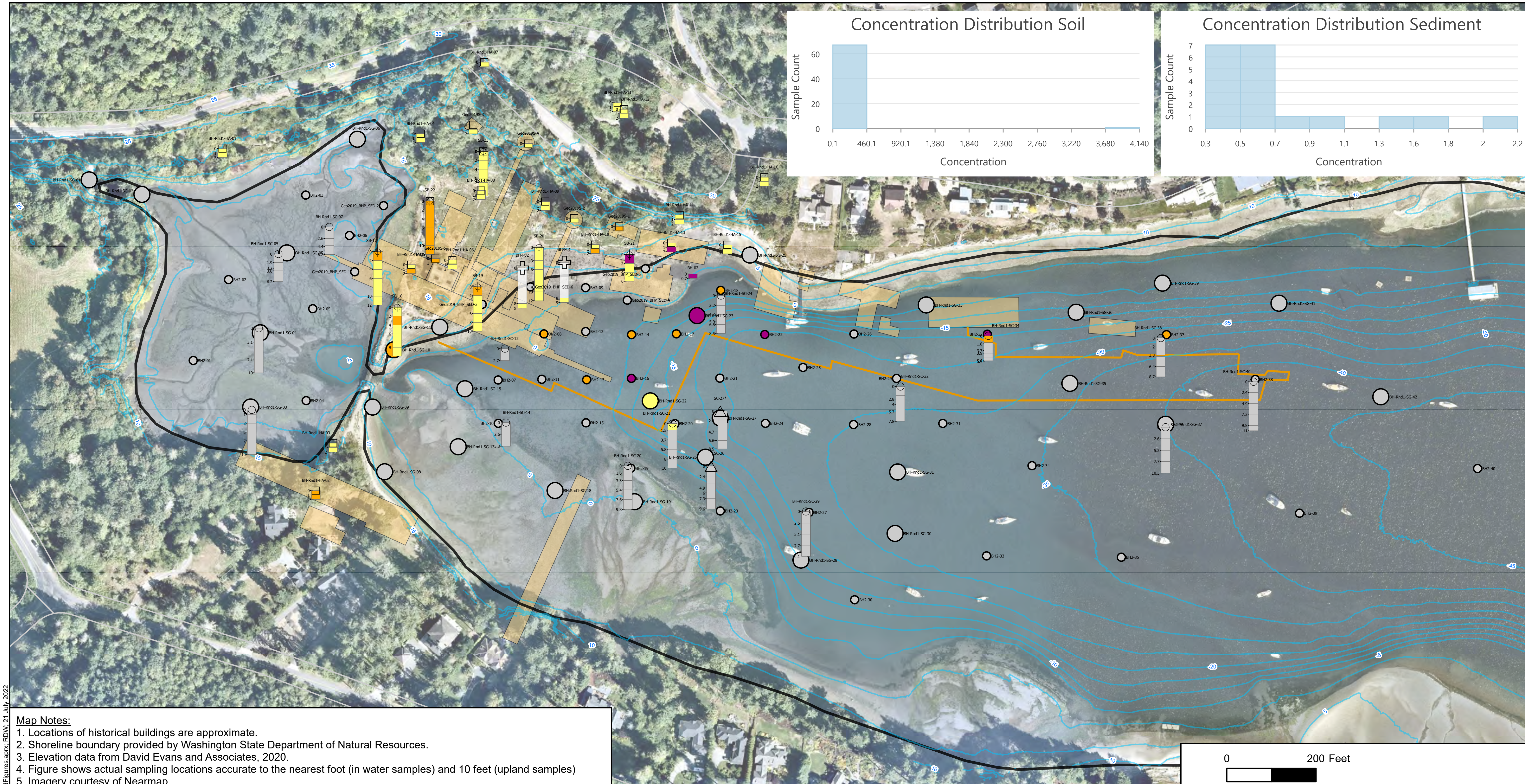
Geosyntec consultants

PNG0900 | 5/30/2022

Figure 21

P:\GIS\BlakelyHarbor\GIS\Blakely_SedFigures\Blakely_SedFigures.aprx; RDW; 30 May 2022

DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

0 200 Feet

Concentration in Soil
- < 0.31 µg/kg (SW)
- > 0.31 to 310 µg/kg (1000xSW)
- > 310 to 9300 µg/kg (30000xSW)
- > 9300 µg/kg

Concentration in Sediment
- < 600 µg/kg (SCO)
- > 600 to 690 µg/kg (CSL)
- > 690 to 1380 µg/kg (2xCSL)
- > 1380 µg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Shoreline
- Historical Wharf Structure

SW - Soil Protective of Groundwater to Marine Surface Water
SCO - Sediment Cleanup Objective, CSL - Sediment Cleanup Screening Level

Depths in feet
*Boring hit refusal
Concentrations in µg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

Indeno(1,2,3-c,d)pyrene in Soil/Sediment
Blakely Harbor

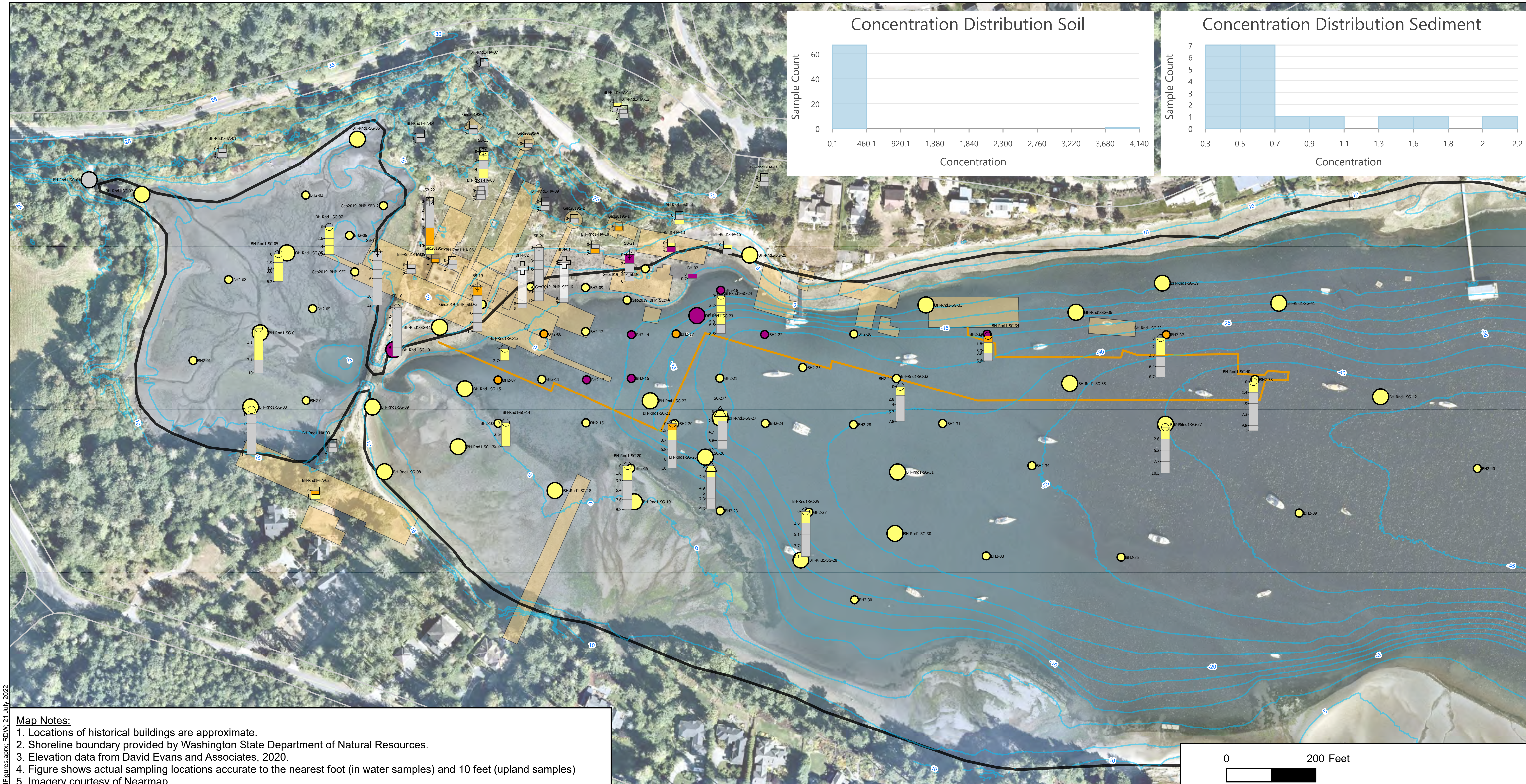
Geosyntec consultants

Figure 22

PNG0900 | 7/22/2022

P:\GIS\BlakelyHarbor\GIS\Blakely_SedFigures\Blakely_SedFigures.aprx RDW: 21 July 2022

DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

Concentration in Soil
- < 550 µg/kg (SW)
- > 550 to 5500 µg/kg (10xSW)
- > 5500 to 33000 µg/kg (GW)
- > 33000 µg/kg

Concentration in Sediment
- < 12 µg/kg (MB)
- > 12 to 2600 µg/kg (SCO)
- > 2600 to 3300 µg/kg (SCL)
- > 3300 µg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Shoreline
- Historical Wharf Structure

SW - Soil Protective of Groundwater to Marine Surface Water; GW - Soil Protection of Saturated Groundwater
MB - Puget Sound OVS Bold Dataset Marine BTV; SCO - Sediment Cleanup Objective, CSL - Sediment Cleanup Screening Level

Depths in feet
*Boring hit refusal
Concentrations in µg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

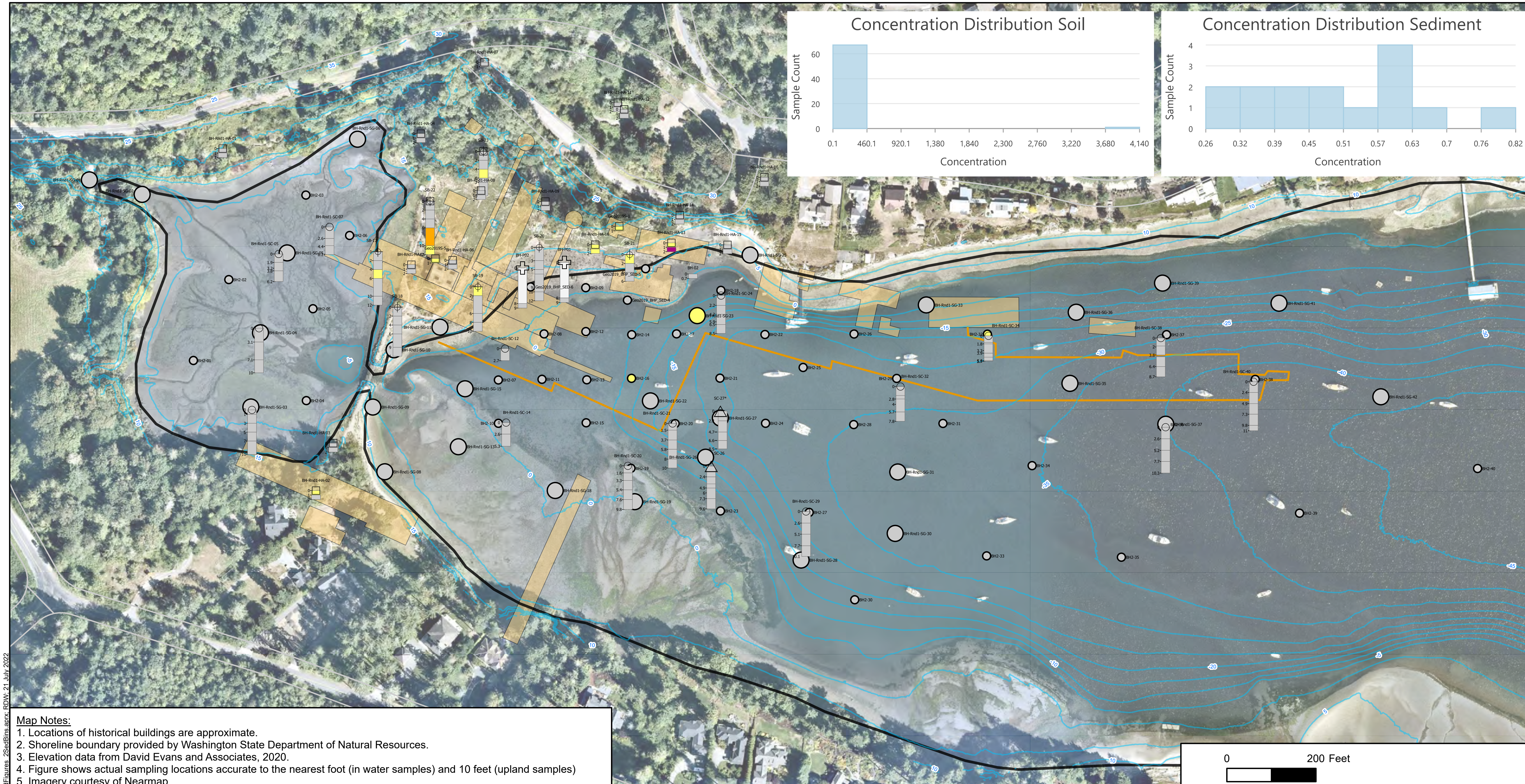
Pyrene in Soil/Sediment
Blakely Harbor

Geosyntec consultants

PNG0900	7/22/2022	Figure 23

P:\GIS\BlakelyHarbor\GIS\Blakely_SedFigures\Blakely_SedFigures.aprx; RDW; 21 July 2022

DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

0 200 Feet

P:\GIS\BlakelyHarbor\GIS\Blakely_SedFigures\Blakely_SedFigures_2SedBins.aprx; RDW; 21 July 2022

Concentration in Soil

- < 76 µg/kg (GW)
- > 76 to 760 µg/kg (10xGW)
- > 760 to 1520 µg/kg (20xGW)
- > 1520 µg/kg

Concentration in Sediment

- < 540 µg/kg (SCO/CSL)
- > 540 µg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Shoreline
- Historical Wharf Structure

GW - Soil Protection of Saturated Groundwater
SCO - Sediment Cleanup Objective, CSL - Sediment Cleanup Screening Level

Depths in feet
*Boring hit refusal
Concentrations in µg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

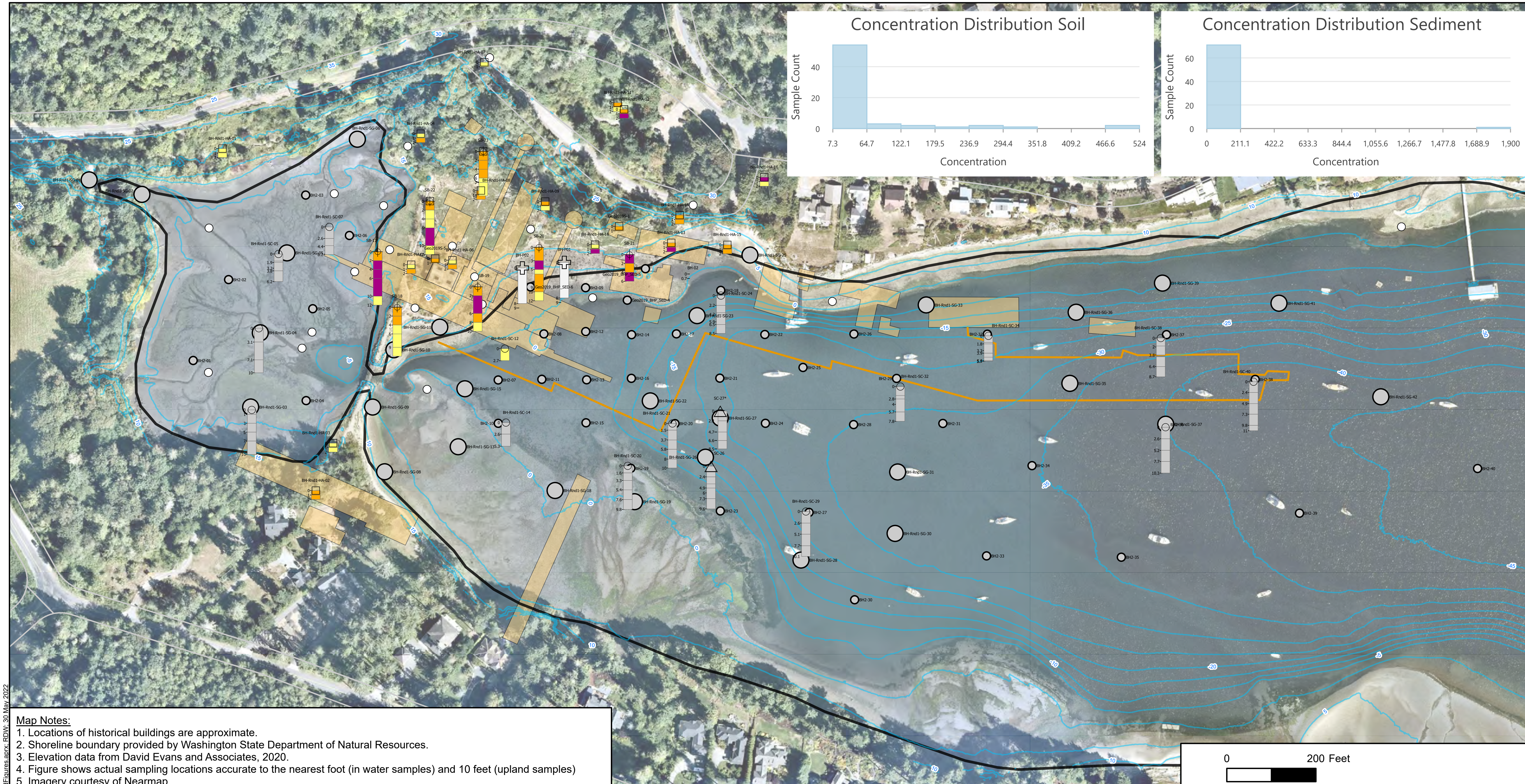
Dibenzofuran in Soil/Sediment
Blakely Harbor

Geosyntec consultants

PNG0900 | 7/22/2022

Figure 24

DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

Concentration in Soil
- < 5.1 µg/kg (SW)
- > 5.1 to 25.5 µg/kg (5xSW)
- > 25.5 to 51 µg/kg (10xSW)
- > 51 µg/kg

Concentration in Sediment
- < 1300 µg/kg (SCO)
- > 1300 to 1900 µg/kg (CSL)
- > 1900 to 3800 µg/kg (2xCSL)
- > 3800 µg/kg

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Approximate Site Boundary
- Shoreline
- Historical Wharf Structure

SW - Soil Protective of Groundwater to Marine Surface Water
SCO - Sediment Clean Objective, CSL - Sediment Cleanup Screening Level

Depths in feet
*Boring hit refusal
Concentrations in µg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

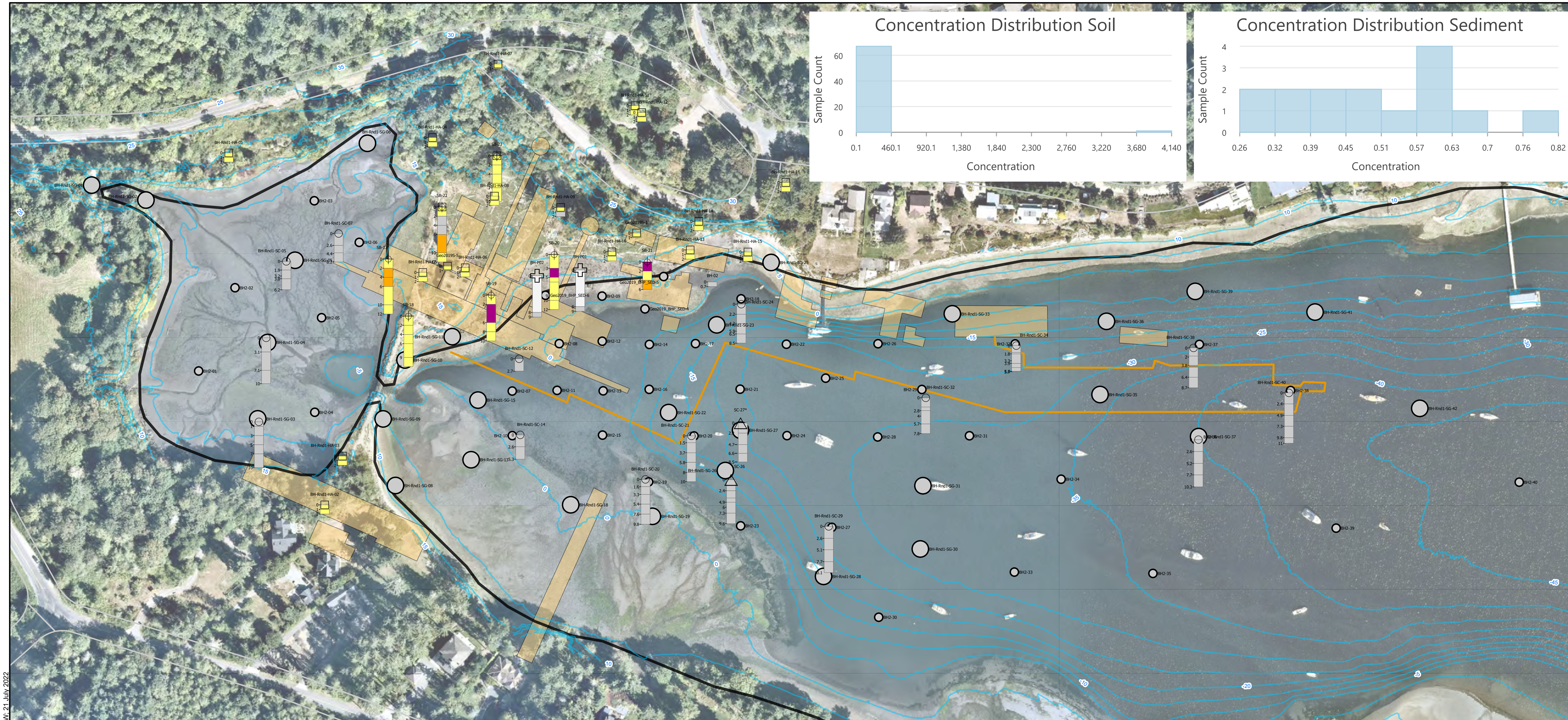
Bis(2-Ethylhexyl)phthalate in Soil/Sediment
Blakely Harbor

Geosyntec consultants

PNG0900	5/30/2022	Figure 25

P:\GIS\BlakelyHarbor\GIS\Blakely_SedFigures\Blakely_SedFigures.aprx; RDW; 30 May 2022

DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:

1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

Concentration in Soil

- < 15 µg/kg (SW)
- > 15 to 75 µg/kg (5xSW)
- > 75 to 150 µg/kg (10xSW)
- > 150 µg/kg (10xSW)

Concentration in Sediment

- < 1400 µg/kg (SCO/CSL)
- > 1400 µg/kg (SCO/CSL)

- Historical Test Pit Location
- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Shoreline
- Historical Wharf Structure

SW - Soil Protective of Groundwater to Marine Surface Water
SCO - Sediment Cleanup Objective, CSL - Sediment Cleanup Screening Level

Depths in feet
*Boring hit refusal
Concentrations in µg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth

Di-n-butyl phthalate in Soil/Sediment
Blakely Harbor

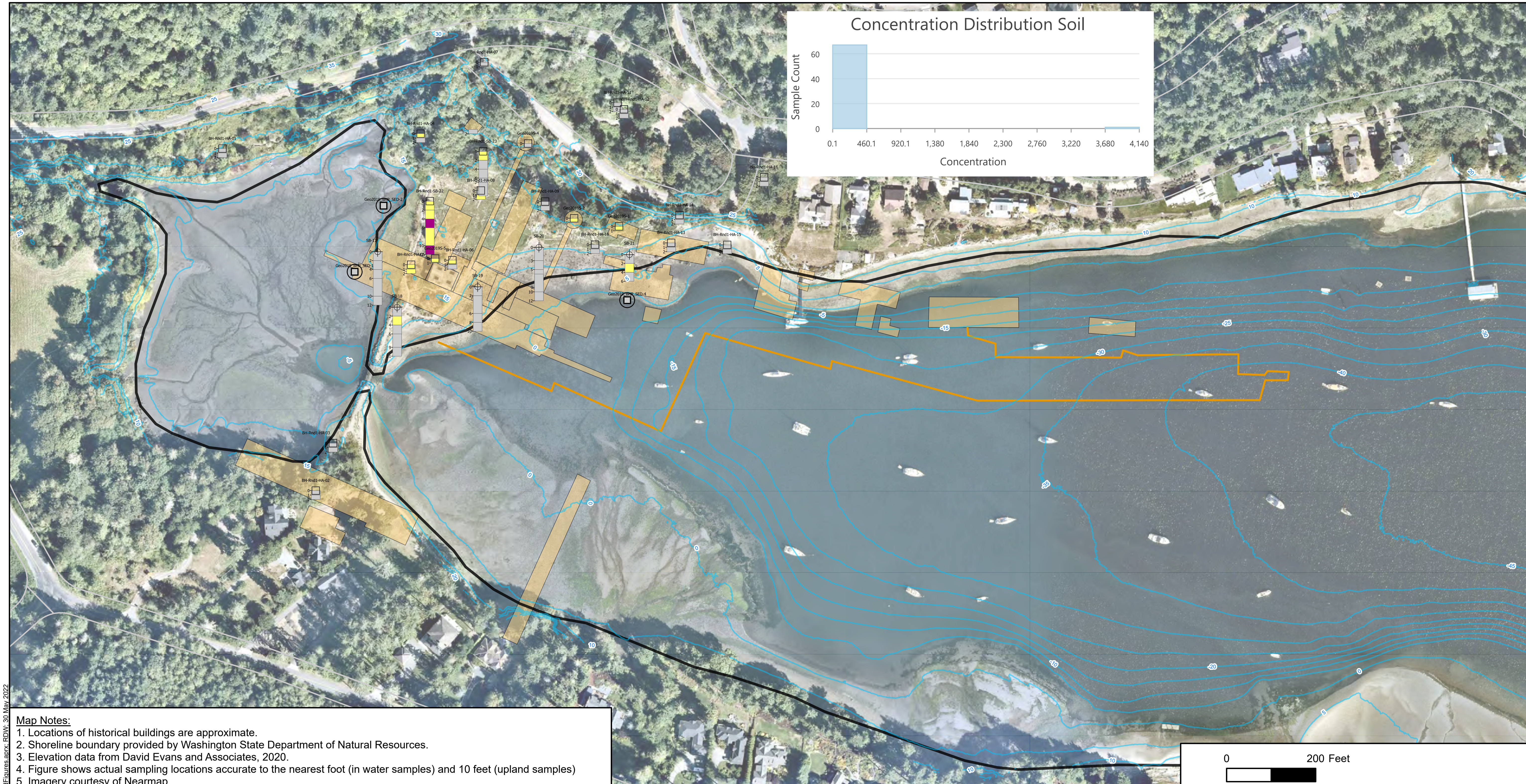
Geosyntec consultants

Figure 26

PNG0900 | 7/22/2022

P:\GIS\BlakelyHarbor\GIS\Blakely_SedFigures\Blakely_SedFigures_2SedBins.aprx; RDW; 21 July 2022

DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

0 200 Feet

Concentration in Soil

- < 9.8 ng/kg (SW)
- > 9.8 ng/kg to 49 (5xSW)
- > 49 to 98 ng/kg(10xSW)
- > 98 ng/kg

- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Approximate Site Boundary
- Shoreline
- Historical Wharf Structure

SW - Soil Protective of GW to Marine SW

Depths in feet
*Boring hit refusal
Concentrations in ng/kg

1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD) in Soil
Blakely Harbor

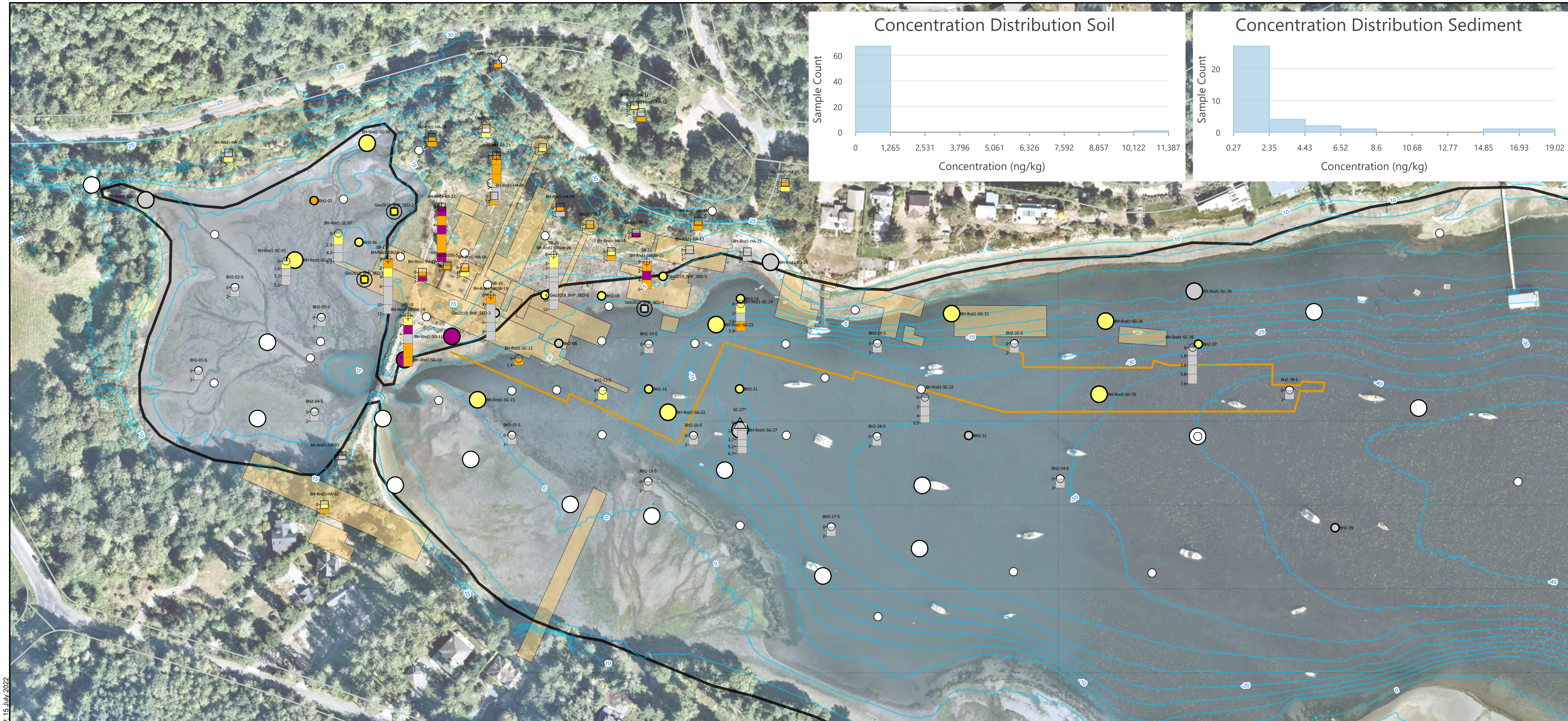
Geosyntec consultants

PNG0900	5/30/2022

Figure 27

P:\GIS\BlakelyHarbor\GIS\Blakely_SedFigures\Blakely_SedFigures.aprx; RDW; 30 May 2022

DRAFT FIGURE FOR DISCUSSION - PRELIMINARY DATA THAT HAS NOT BEEN FULLY VALIDATED



Map Notes:
1. Locations of historical buildings are approximate.
2. Shoreline boundary provided by Washington State Department of Natural Resources.
3. Elevation data from David Evans and Associates, 2020.
4. Figure shows actual sampling locations accurate to the nearest foot (in water samples) and 10 feet (upland samples)
5. Imagery courtesy of Nearmap

P:\GIS\BlakelyHarbor\GIS\Blakely_SedFigures\Blakely_SedFigures_DFTEQ.aprx; RDW; 15 July 2022

Concentration in Soil
- < 5.21 ng/kg (SNB)
- >5.21 to 10.42 ng/kg (2xSNB)
- > 10.42 to 93 ng/kg (MTCA Method B NC)
- > 93 ng/kg

Concentration in Sediment
- < 4 ng/kg (MNB)
- > 4 to 15 ng/kg (HHDC)
- >15 to 30 ng/kg (2xHHDC)
- >30 ng/kg

- Historical Sediment Sample Location
- Historical Soil Sample Location
- 2021 Soil Boring Location
- 2021 Sediment Core Location
- 2021 Sediment Grab Location
- Bathymetric Contour (5 foot MLLW)
- Structures From 1917 Map and Figure 2 in GeoEngineers, 2019
- Road
- Approximate Site Boundary
- Shoreline
- Historical Wharf Structure

° -The total dioxin/furan TEQs were calculated by summing the product of the mammal Toxicity Equivalency referenced from the Van den Berg, et al. 2006 with the 17 Dioxin/Furan congener listed in the table;
SNB - Soil Natural Background, MTCA Method B NC - MTCA Method B noncarcinogenic direct contact screening level
MNB - Marine Sediment Natural Background, HHDC - Human Health Direct Contact

Depths in feet
*Boring hit refusal
Concentrations in µg/kg
Sediment data are not OC normalized
White symbol indicates that no data is available at the specified depth
Non-Detects set at 0 for summation

Total Dioxin/Furan TEQ in Soil/Sediment°

Blakely Harbor

Geosyntec consultants

PNG0900 | 7/15/2022

Figure 28