TACOMA HARBOR, WA
FEASIBILITY STUDY
PIERCE COUNTY, WASHINGTON

APPENDIX H – PHASE I ENVIRONMENTAL SITE ASSESSMENT

April 2022

US Army Corps of Engineers®
Seattle District

Port of Tacoma

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Tacoma Harbor Deep Draft Navigational General Investigation
Blair Waterway
Tacoma, Washington

PHASE I
ENVIRONMENTAL SITE ASSESSMENT

December 2019

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ACRONYMS & ABBREVIATIONS

ASTM	American Society for Testing and Materials
BT	Bioaccumulation Trigger
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
Corps	U.S Army Corps of Engineers, Seattle District
cPAHs	Carcinogenic Polycyclic Aromatic Hydrocarbons
CSL	Cleanup Screening Level
CY	Cubic Yards
DDT	Dichlorodiphenyltrichloroethane
DMMP	Dredged Material Management Program
DO	Dissolved Oxygen
Ecology	Washington Department of Ecology
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
GI	General Investigation
HPHA	High molecular weight polycyclic aromatic hydrocarbons
HTRW	Hazardous, Toxic, or Radioactive Waste
MLLW	Mean Lower Low Water
MTCA	Model Toxics Control Act
NPL	National Priorities List
OU	Operable Unit
PCBs	Polychlorinated Biphenyls
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Conditions
RI	Remedial Investigation
ROD	Record of Decision
SL	Screening Level
SVOC	Semi-volatile organic compound
TBT	Tributyltin
TEQ	Toxic Equivalency
TSS	Total Suspended Solids
VOC	Volatile organic compound

1.0 INTRODUCTION

This Phase I Environmental Site Assessment (Phase 1 ESA) is part of the Tacoma Harbor Deep Draft Navigation General Investigation (GI). The U.S. Army Corps of Engineers, Seattle District (Corps) has prepared a final Integrated Feasibility Report and Environmental Assessment, which documents the process of developing potential solutions to evaluate the environmental impact of deepening the Blair Waterway. A critical part of the feasibility analysis is the evaluation of known and suspected hazardous, toxic, or radioactive waste (HTRW) conditions with potential to impact project planning, design, and implementation. This Phase 1 ESA identifies all known and suspected HTRW releases, and focuses only on Blair Waterway. A separate Phase I Site Assessment for the Saltchuk beneficial use site is complete.

1.1 Purpose

The purpose of conducting this Phase 1 ESA is to determine the environmental condition of the proposed project area. This ESA fulfils the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Community Environmental Response Facilitation Act (CERFA). This report identifies known and potential sources of environmental risk or liability on the proposed project site, and in the surrounding areas. This information will assist the Corps' design team to manage and avoid HTRW hazards at the project site.

1.2 Description of the Project Area and Proposal for Federal Action

Blair Waterway is approximately 2.75 miles long, including the turning basin. The waterway is located in Tacoma, Washington. The authorized dimensions are 520 feet wide from the mouth to 11th Street, 345 feet wide through the 11th Street reach, 520 feet from 11th Street to Lincoln Avenue, 330 feet from Lincoln Avenue to the turning basin, and a 1300 feet turning basin, all to a depth of -51 feet MLLW (Mean Lower Low Water).

The proposed deepening is considering the costs and impacts of alternatives ranging in depths from -51 feet MLLW to -58 feet MLLW.

1.3 Scope of Work

The scope of work for this assessment was in general accordance with the ASTM International (ASTM) Standard Practices for Environmental Site Assessments: Phase I Environmental Site Assessment Process (ASTM E1527 - 13). These methodologies are described as representing good commercial and customary practice for conducting a Phase I ESA of a property to identify *recognized environmental conditions* (RECs). The project effort includes the following tasks:

- Conduct a record search and review all reasonably attainable federal, state, and local government information and records to determine possible onsite sources of hazardous substances and environmental condition of the project area.
- Review of all reasonably attainable federal, state, and local government records of adjacent facilities with the potential to release contamination to determine possible offsite sources of hazardous substances.
- Analysis of historical data on prior uses of the project site(s) and the surrounding area.
- Interviews with adjacent property owners and/or tenants or other knowledgeable sources.
- Visual site inspection of the project area to identify possible hazardous substance sources.

- Identify contamination sources using data gathered and evaluate what risk they pose and the effect to the categorization of the environmental condition of the project area.
- Identify all ongoing actions that may affect the environmental conditions of the project area.
- Determine the environmental condition of the project area.
- Determine the extent to which *recognized environmental conditions* may impact, or pose a risk to, the proposed project

The scope of this report did not include an audit of environmental regulatory compliance issues or permits, wetland delineation, or collection and testing of environmental samples, including those for radon gas, lead-based paint, polychlorinated biphenyls (PCBs), asbestos, soil, and/or groundwater condition.

2.0 SITE DESCRIPTION & PHYSICAL SETTING

2.1 General Location

The federally authorized Tacoma Harbor navigation project is located at the mouth of the Puyallup River in Puget Sound's Commencement Bay, at Tacoma, Washington. The Tacoma Harbor federal navigation project consists of Hylebos waterway, Blair Waterway, two training walls at the mouth of the Puyallup River, and the City Waterway (now called Thea Foss Waterway) (Figure 1). Action associated with the Tacoma Harbor Deep Draft Navigation GI is limited to the boundaries of Blair Waterway, thus the focus of this Phase I Environmental Site Assessment is limited to Blair Waterway and the associated turning basin.

Figure 1: Project Location

2.2 Site Description

Blair Waterway is approximately 2.75 miles long, including the turning basin. The authorized dimensions are 520 feet wide from the mouth to 11th Street, 345 feet wide through the 11th Street reach, 520 feet from 11th Street to Lincoln Avenue, 330 feet from Lincoln Avenue to the turning basin, and a 1300 feet turning basin, all to a depth of -51 feet MLLW (Mean Lower Low Water).

The proposed deepening is considering the costs and impacts of alternatives ranging in depths from -51 feet MLLW to -58 feet MLLW.

2.3 Hydraulics and Geomorphology

The Puyallup discharges sediment into Commencement Bay at an estimated rate of 1,000,000 tons per year (Czuba and others, 2010). Depths in Commencement Bay can reach over 600 feet.

Tides in Commencement Bay are the mixed semidiurnal type. The mean diurnal tidal range for Tacoma published by the National Ocean Survey is 8.06 feet. The great diurnal tidal range for Tacoma is 11.77 feet.

Blair Waterway has no water inflow/outflow other than tidal influence. As such, currents in the area are generally less than 0.5 knots (0.82 feet per second) during all tidal phases. The stronger currents are occur at the mouth of the Puyallup River and Hylebos Waterway. At the Blair Waterway, the currents move parallel to the waterway with the stronger currents being around 0.1 knots (0.16 feet per second) at the mouth of the channel and around 0 knots (0.32 feet per second) at the head near Pierce County Terminals.

Saltchuk lies within the northwest quadrant of Commencement Bay. Currents move along this shoreline at the lower speeds of the 0 to .5 knots range. Sediment migration will depend on several factors including sediment particle size, current speed, and site configuration. For example, island creation may decrease already low current speeds further. If any sediment migration occurs, it can be expected to occur alongshore towards the existing marina or towards the mouth of the Hylebos.

2.4 Regional Climate

The central Puget Sound area has a temperate climate. The average annual precipitation for the region is 39.25 inches of rainfall. The majority of this rainfall occurs from October through May. Average winter temperatures for the area range from 36.5 degrees to 48.5 degrees Fahrenheit, and average summer temperatures range from 55 degrees to 75 degrees Fahrenheit. (US Climate Data. 2019)

2.5 Water Quality and Salinity

Under the Clean Water Act, Washington Department of Ecology (Ecology) establishes standards for physical parameters of water such as temperature, pH level, dissolved oxygen (DO), and chemical concentrations. Waters that do not meet standards are considered “polluted waters” and placed on a 303(d) list that Ecology publishes regularly (in reference to Section 303(d) of the Clean Water Act). Waters with signs of diminished health but still meet standards are “waters of concern” on the 303(d) list.

Portions of Commencement Bay are on Ecology’s 303(d) list of threatened and impaired waters, listed as “polluted” for specific parameters, although the trend for water quality in the action area is one of overall improvement (Ecology 2012). Inner Commencement Bay is listed for Bis(2-Ethylhexyl)phthalate, polychlorinated biphenyls (PCBs). Within the inner bay, Thea Foss Waterway is listed for PCBs and Hylebos Waterway is listed for dieldrin, PCBs, chlorinated pesticides, dichlorodiphenyltrichloroethane (DDT), and high molecular weight polycyclic aromatic hydrocarbons (HPAH). The Blair Waterway is not on the 303(d) list, but benzene, tetrachloroethylene, and trichloroethylene levels list it under “waters of concern”. Outer Commencement Bay is listed for bacteria, DO, PCBs, and Bis(2-Ethylhexyl)phthalate.

Turbidity refers to the clarity or clearness of the water. The greater the amount of total suspended solids in the water, the murkier it appears and the higher the measured turbidity. In general, long-term increases in turbidity can result in the decreased health in fish, invertebrates, and aquatic plants. Multiple dredge seasons can increase tissue concentrations or decrease fish health with repeatable turbidity cycles. Sometimes, large ships entering the Blair Waterway create turbidity due to the proximity of the propellers to the bottom of the waterway. Sediment can be disturbed and suspended, temporarily creating a plume of turbidity. The White River, a tributary, glacially feeds the Puyallup River. High amounts of glacial flour from the White River in the summer can generate turbidity in the Puyallup River and into Commencement Bay (Puyallup River Watershed Council 2014).

DO in marine waters is essential for aquatic life. If levels are too low, it can be a sign of human-induced impacts such as excessive runoff or nutrients, or of natural causes such as seasonal variations. Conditions for aquatic life are healthy when DO is above 5.0 milligrams per liter (mg/L). Concentrations between 5.0 mg/L and 3.5 mg/L are acceptable, except for the most sensitive species. When concentrations fall below 3.5 mg/L, conditions become unhealthy. DO in December 1980 were about 6.4 to 7.7 mg/L in the Blair Waterway (Dames and Moore 1981). Outer Commencement Bay is recognized as impaired for DO because samples taken from 1993-2008 were below 6 mg/L (Ecology 2018). Commencement Bay is part of the Puget Sound Nutrient Source Reduction Project to address human sources of nutrients that may lower DO (Ecology 2019).

Temperature has a strong influence on the aquatic organisms that can survive and thrive in any particular habitat and can affect numbers, sizes, and distributions of biota. Temperatures in October 1980 in the Blair Waterway were about 15 °C at the surface to 12 °C at the bottom, while temperatures in December were about 10 °C throughout the water column (Dames and Moore 1981). Long-term temperature data are not available for Puget Sound specifically; however, other Pacific Northwest locations indicate a long-term warming trend with an increase of 1°C from 1950 to 2005 (Snover et al. 2005).

3.0 ENVIRONMENTAL DATA BASE REVIEW

3.1 Regulatory Agency Databases Records Search

A search of *Standard Environmental Records Sources* as defined in ASTM E-1527 - 13 was performed to identify *recognized environmental conditions.* Reviews of records related to the Property and nearby properties kept by both Federal and State regulatory agencies were conducted. This review was used to help identify known or potential sources of contamination that could adversely affect the Property. Table 1 provides a summary of the ASTM standard environmental records sources databases searched and corresponding radii and quantitative results of the record search corresponding to databases. More than one database may list findings.

Given the highly industrialized nature of the study area, and the bounded nature of the potential navigation deepening in Blair Waterway, the reduced search radius expanded beyond what suggested measurements are in the ASTM standard. Table 1specifies the modified search radii.

Table 1. Source Lists and Associated Number of Sites for Blair Waterway

Agency	Description	Search Radius (miles)	Results
US EPA	National Priorities List (NPL)	0.5	4[3]
US EPA	Delisted NPL Sites	0.5	0[4]
US EPA	CERCLA	0.5	4
US EPA	RCRA Generators	Property and adjoining properties only	0
US EPA	RCRA Treatment, Storage, or Disposal Facilities	0.25	0
US EPA	RCRA Corrective Action Sites	0.5	6
US EPA	Institutional Controls Registry	Property only	0
US EPA	Toxic Release Inventory	Pierce County, WA	36
USCG	Emergency Response Notification System	Property only	1
WA Ecology	State and Tribal Cleanup Sites[1]	.5	43
WA Ecology	State Landfills and Waste Treatment/Disposal Plants	0.25	0
WA Ecology	State and Tribal Brownfield's	0.25	0
WA Ecology	State and Tribal Leaking Underground Storage Tanks	0.25	0[5]
WA Ecology	State and Tribal Registered or Suspected Underground Storage Tanks[2]	Property and adjoining properties only	71
WA Ecology	State and Tribal Environmental Covenants Registry	Commencement Bay, Tacoma, WA	22
WA Ecology	Emergency Spill Response	0.25	1

[1] Includes active cleanups, either started or awaiting cleanup. Does not include No Further Action (NFA) sites.
[2] Includes USTs classified as operational, closed in place, or temporarily closed.
[3] Includes the Blair Waterway TCRA for TBT contaminated sediments
[4] The boundaries of one of the Operable Units (OUs) of Commencement Bay Nearshore Tideflats have been changed to reflect partial delistings, but the OU itself has not been delisted.
[5] State and Tribal Leaking Underground Storage Tanks are incorporated into results for State and Tribal Cleanup Sites

3.2 Known Environmental Conditions

There are 43 MTCA sites surrounding Blair Waterway, along with 6 RCRA sites, 4 CERCLA sites, and 4 NPL sites (Table 1). Fifteen of these sites have known contaminated groundwater and are located immediately next to Blair Waterway. As design progresses for the deepening project, potential side slope impacts should be evaluated relative to groundwater. The depth and flow regime of any adjacent groundwater plumes should be evaluated to determine if adverse impacts, specifically redirecting contaminated groundwater flow towards the channel, result from actions in the waterway. An additional 5 sites are located one block further away from Blair. Two of the NPL sites listed, Commencement Bay Nearshore Tideflats and Glenn Springs Holdings, are among the contaminated groundwater sites immediately next to, but not overlapping, Blair Waterway.

Commencement Bay was placed on the National Priorities List in 1981. The Record of Decision was issued in September 1989. Blair Waterway was originally included as a component of the Commencement Bay/Nearshore Tideflats Superfund Site. The Operable Units (OUs) associated with Blair Waterway include the Commencement Bay/Nearshore Tideflats Sediments OU (OU1) and the Commencement Bay/Nearshore Tideflats Source OU (OU5). The U.S. EPA issued a partial deletion in 1996 pertaining to the portions of the two separate OUs addressing sediments contained in and properties draining to the Blair Waterway (EPA, 2014).

Separate from the Superfund action, a Time Critical Removal Action at Pier4 (aka Husky Terminal) occurred in 2015 to remove tributyl tin contaminated sediments. The Port of Tacoma dredged approximately 71,000 cubic yards of TBT contaminated sediment from the site under the direction of the US EPA. Construction was completed in 2016. The site was dredged to clean and no additional action was required (Floyd Snider, 2016).

Other State cleanup actions in the uplands have occurred adjacent to the waterway, including Occidental Chemical Corporation (Glenn Spring Holdings), a historic chemical manufacturing facility. Chlorinated volatile organic compounds, hexachlorobenzene, PCBs, and metals in both soil and groundwater contaminate the site. The Washington State Department of Ecology manages the site and in October 2018 finalized a Feasibility Study. While impacted soils, sediment, and groundwater do not directly overlap with the Blair Waterway project footprint, it is notable given its size and the degree of contamination (Ecology, 2019c). Borehole data indicates geologic material consists of dense sand and silty sand with layers of clay (Washington Geological Information Portal, 2019). The material at -51 to -57 feet consists predominately of dense sand and has the potential to transmit contaminated groundwater. While the presence of the groundwater plume is more concentrated north of the Blair Waterway, confirmation should be performed as design of the deepening progresses to ensure no impacts to the plume result from construction.

TruGrit Abrasives Incorporated is another site managed by the Washington State Department of Ecology under the MTCA program for upland soils and sediment contaminated with metals. The study is currently in the feasibility phase. The shoreline bounds the metal contamination in the sediment and does not overlap with the proposed navigation channel. The deepening study design needs confirmation to ensure side slopes do not intersect with the site (Ecology, 2019c).

Remediation at the Former Lincoln Avenue Ditch site occurred under the U.S. EPA's Puyallup Land Transfer Consent Decree. As part of that remediation, institutional controls are in place due to contamination remaining in place along the shoreline below elevation 12 ft MLLW and extending approximately 30ft water-ward from top of bank. These institutional controls set limitations on any future construction and uncontrolled release of contaminated materials resulting from the construction. Soil and sediments contaminated with arsenic, dioxin, and PCBs above relevant MTCA thresholds are present. Contaminated groundwater is also present. Borehole data taken south of

the Lincoln Avenue ditch indicate substrate material consists of silty sand and clay layers (Washington Geological Information Portal, 2019). Higher permeable materials such as sands can transmit groundwater more readily than lower permeable clay material. Borehole data indicates materials -51 to -57 feet primarily consists of dense sand and has the potential to transmit contaminated groundwater. This location overlaps with side slopes associated with the proposed navigation channel. Given this overlap and presence of institutional controls, coordination with the U.S. EPA will be required (Ecology, 2019c).

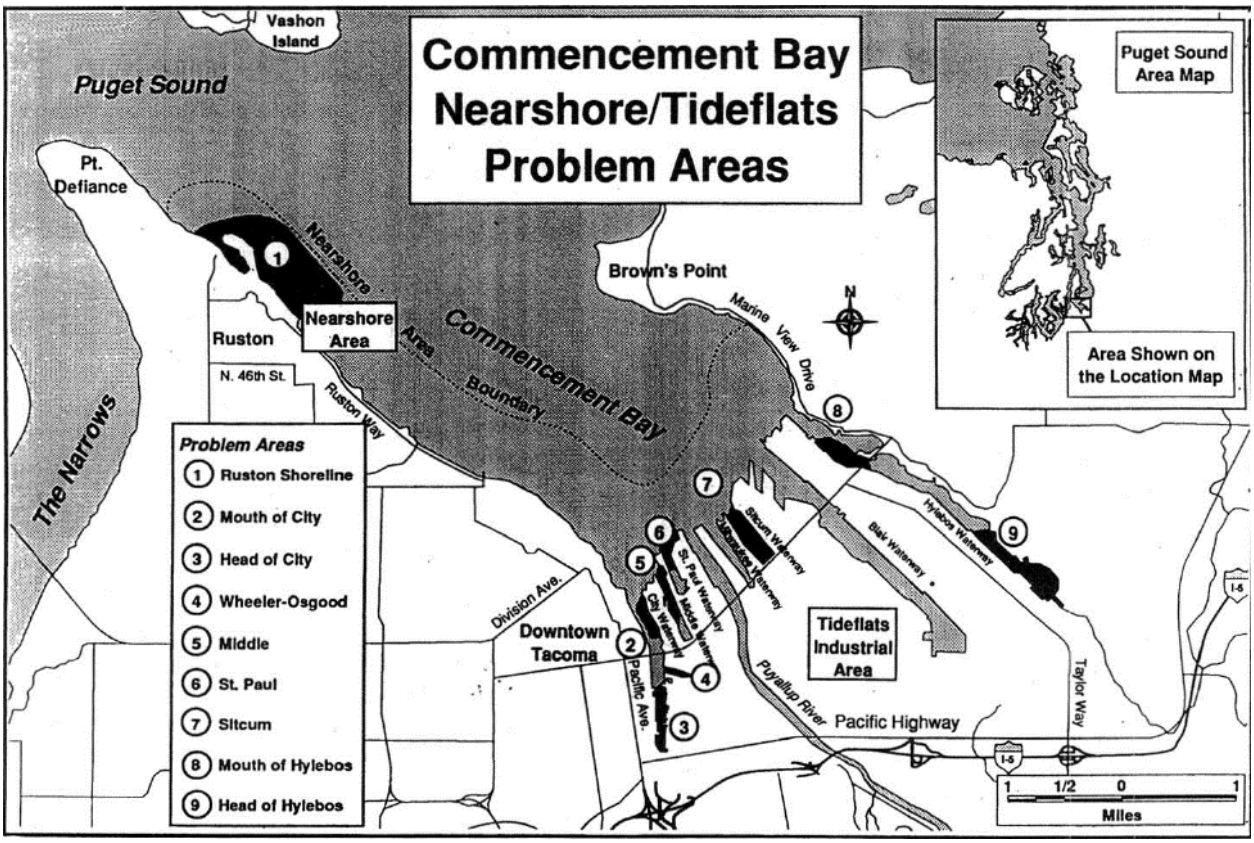

Figure 2. Map of the Commencement Bay Nearshore/Tideflats Superfund Site from the 1989 ROD. Problem Areas are where remedial action was required to address the presence of contamination.

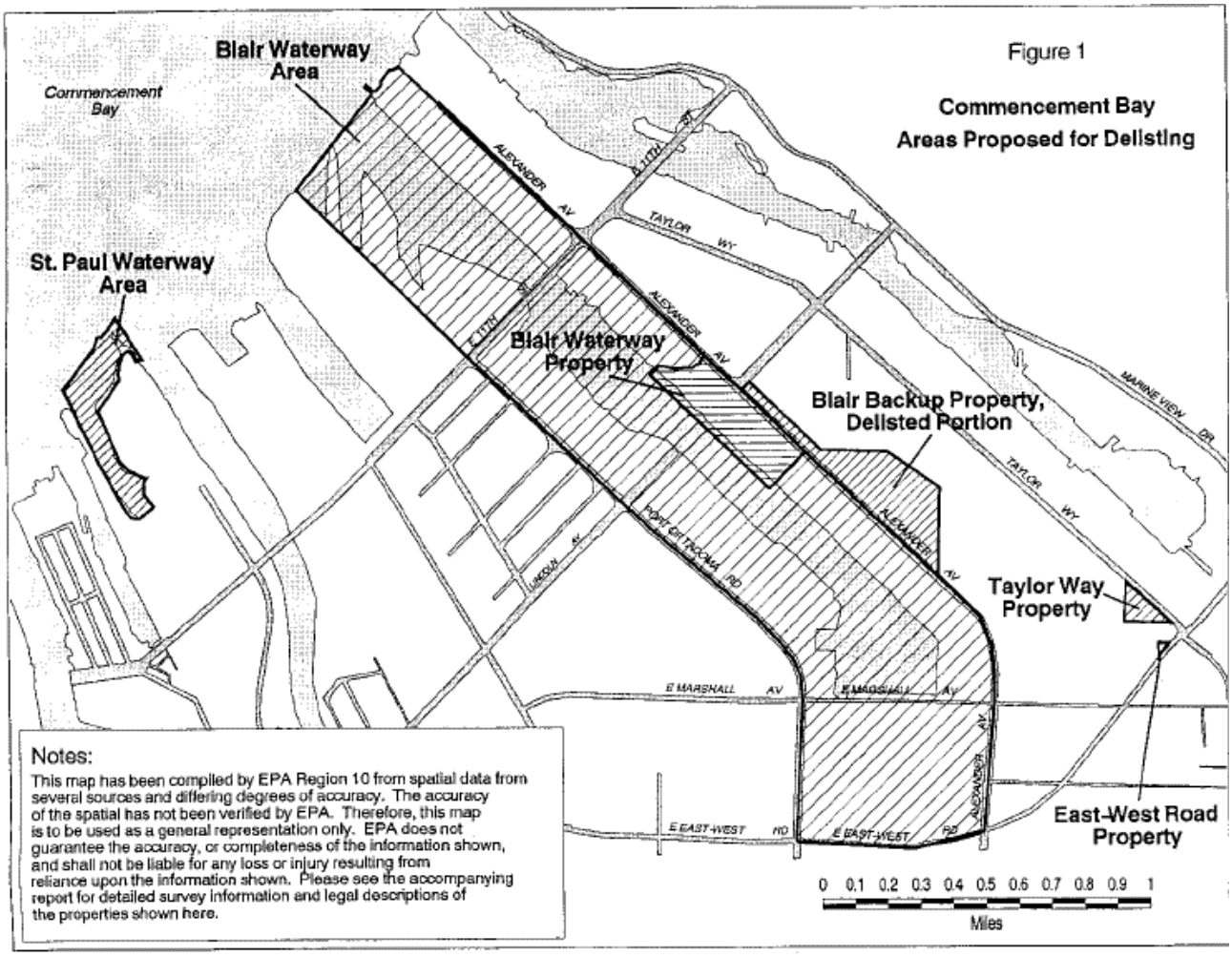

Figure 3. Boundaries of partial delisting for Blair Waterway sediments and sources, as presented in the 1996 Federal Register.

Figure 4a. Location of the Former Lincoln Ave Ditch Site along Blair Waterway.

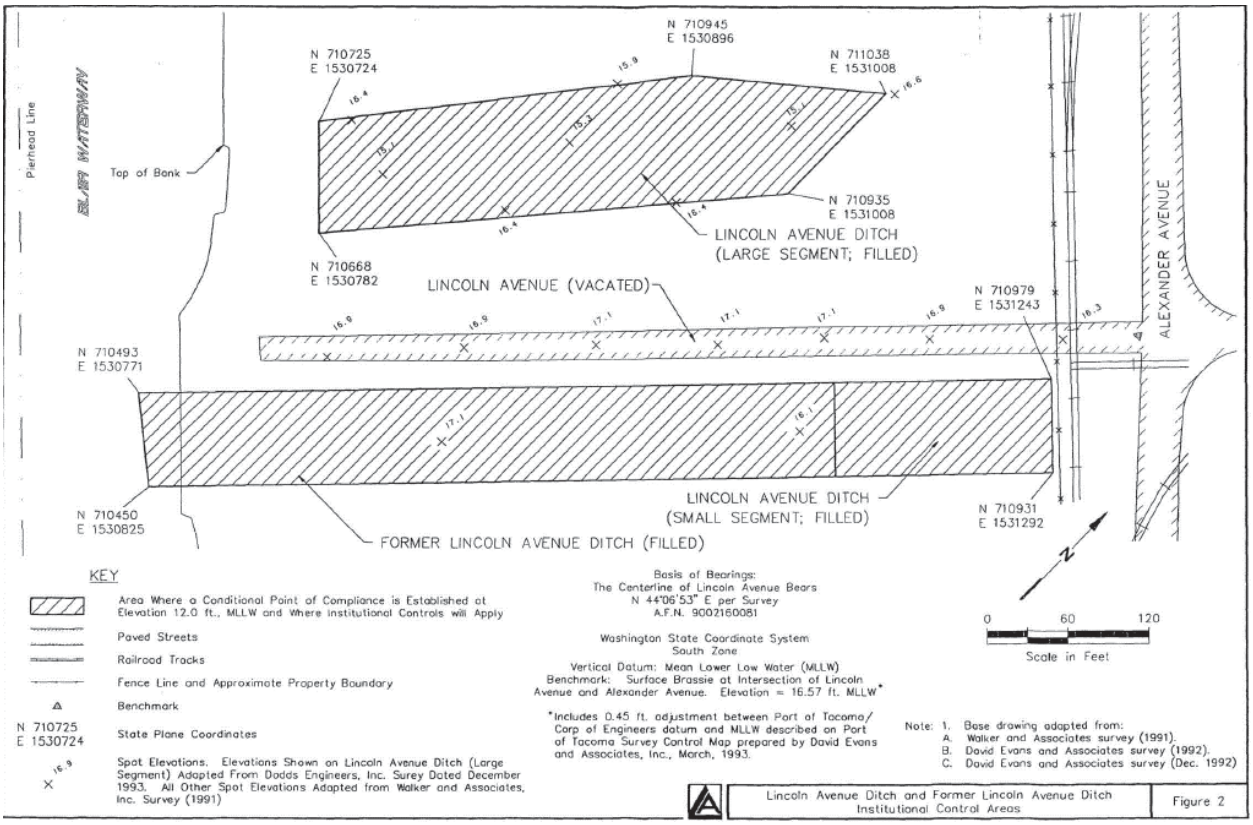

Figure 4b. Map of institutional controls locations at the Former Lincoln Avenue Ditch site.

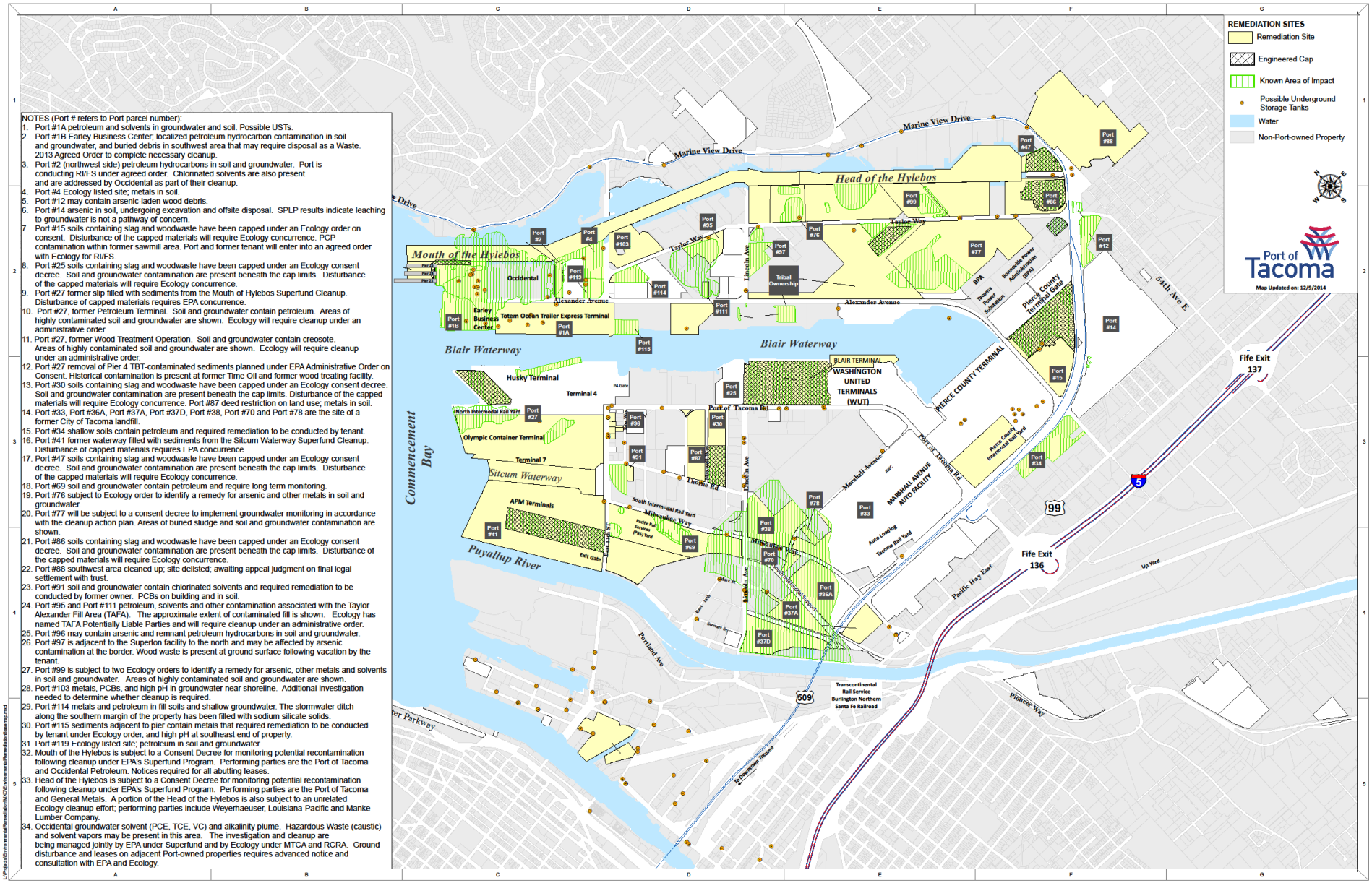

Figure 5. Port of Tacoma 2014 Environmental Remediation Sites

In order to provide conceptual level cost estimates for dredged material disposal during the feasibility phase, USACE conducted a preliminary suitability determination to provide information on sediment characterization and inform disposal options. This preliminary suitability determination only performed a subset of the number of samples that would be required under a full suitability determination (to be conducted during the pre-construction, engineering, and design phase). Twenty-five sediment cores were collected throughout the waterway in February 2019. Analyzed sediment cores occurred in a series of two-foot depth intervals for the standard Dredge Material Management Program (DMMP) conventional constituents, grain size, metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAHs), pesticides, dioxin/furans, and polychlorinated biphenyls (PCBs). Results of the analyses concluded that the majority of samples were all below Screening Levels (SLs), with limited SL exceedances in seven cores, mostly concentrated in the middle section of the waterway. PCBs only exceeded the SL in one surface sample. Dioxins exceedances were more notable, but even so, only three cores exceeded the Bioaccumulation Trigger of 10 ng/kg TEQ. PAHs were all less than DMMP SLs.

Historic operation of the Asarco Company copper smelter resulted in widespread contamination across the Puget Sound region. The smelter was in operation for nearly 100 years, resulting in air pollution that deposited arsenic, lead, and other metals in surface sediment and soils over an area greater than 1,000 square miles. The impact of the Asarco smelter plume has led to elevated concentrations of metals, particularly arsenic, on a regional basis (Ecology, 2019b). These historic operations and resulting contamination provide context for ubiquitous arsenic contamination throughout the Puget Sound region, including Blair Waterway.

4.0 PROPERTY HISTORY

4.1 Property History

Information on the historic conditions and development of Commencement Bay is largely summarized from the Commencement Bay Cumulative Impact Study (Corps 1993) and is incorporated herein by reference.

The earliest photos and maps indicate that prior to 1877, the main habitat types of Commencement Bay were 2,085 acres of intertidal mudflats and about 3,894 acres of salt/brackish marsh. There was limited development before 1877 and likely began with the Northern Pacific Railroad that crossed salt marsh from the City of Puyallup to Tacoma at Foss Waterway in 1874.

Development began to increase mostly on the west side of Commencement Bay over the next 20 years by building wharves, piers, and warehouses to store and transfer cargo to or from ships and the growing railroad system. Excavated mudflats created log storage ponds and associated wharfs for the growing lumber industry. Dredged material included millions of cubic yards from 1894 to 1907 for further development and the creation of Foss Waterway and Middle Waterway. Flooding and heavy sedimentation from the Puyallup River lead to dredging in the river and relocation attempts that altered the river delta and modified the intertidal areas by obstructing the outflow and increasing deposition. By 1907, there were 1,469 acres of mudflat and 3,495 acres of salt/brackish marsh.

Shoreline development on the east side of Commencement Bay began to increase around 1907. To expand the Port of Tacoma, dredging occurred on the Milwaukee Slip, Middle Waterway, and Hylebos Waterway. Mostly lumber trade vessels called at Hylebos Waterway. The North Pacific

Railroad owned and serviced the grain and freight warehouses, ocean freight, coalbunkers, and the Oriental Dock along the waterfront. Flourmills and lumber mills expanded to the north with grain elevators, conveyors, and log storage ponds while the Tacoma Smelting Company used slag to fill in Commencement Bay. Around this time, dikes, ditches, and tide gates installation occurred to convert land for agriculture. The lack of tidal influence and continued input of freshwater from the Puyallup River reduced salinity and converted saltmarsh to brackish or freshwater marsh habitat; this continued into the 1950s.

In 1917, dredging occurred on the Blair Waterway, named Wapato Waterway for Wapato Creek at the head of the waterway, for the first time up to South 11th Street. The sidecast material used to create land for piers, wharves, and other infrastructure. In the 1920s, the industrial footprint multiplied with additional freight storage and transit terminals, grain and flourmills, lumber mills, oil and coal bunkering, the vegetable oil trade, and shipbuilding plants and wharves. At this time, usage of the Blair Waterway included lumber, heavy freight, freight storage, and a marine repair plant. Construction focused on wharves along the Hylebos Waterway.

From 1927-1941 many of the existing waterways were extended, widened, and/or deepened. This included Hylebos, Blair, and Sitcum Waterways; and excavation of the St. Paul Waterway, an old log storage pond. The Blair Waterway was extended in the 1950's and the turning basin was created with Navy shipyards on the east side, a grain elevator on the bay end, and two piers for general cargo, a public moorage pier, and two wharves for marine repair and lumber on the west side.

4.2 Aerial Photographs and Maps

Figure 6: Nautical Chart of Tacoma Bay, late 1800s, from NOAA's Office of Coast Survey Historical Map & Chart Collection (source: https://historicalcharts.noaa.gov)

Figure 7: 1946 Aerial of Blair Waterway (source: USACE)

Figure 8: 1970 Aerial of Blair Waterway (source: USACE)

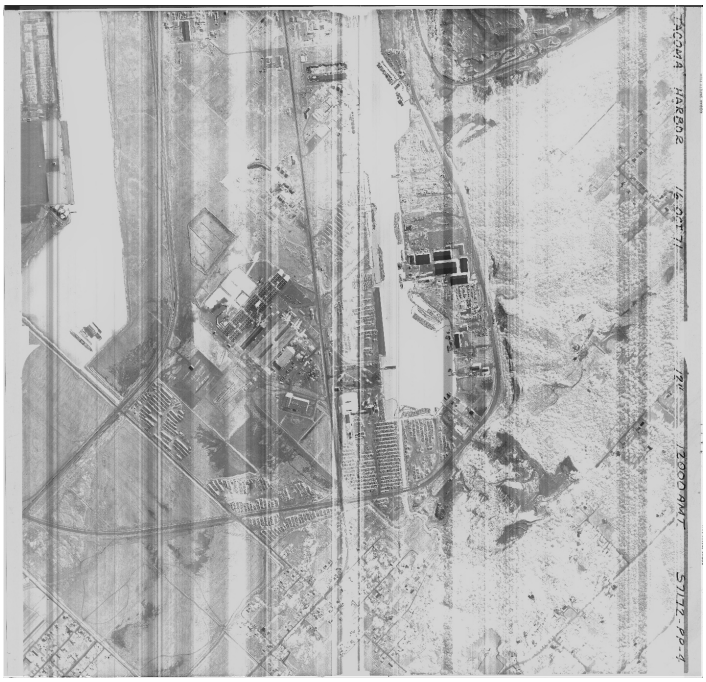

Figure 9: 1971 Aerial of Blair and Hylebos Waterway Turning Basins (source: USACE)

Figure 10: 1990 Aerial of Blair Waterway (source: Google Earth, 2019)

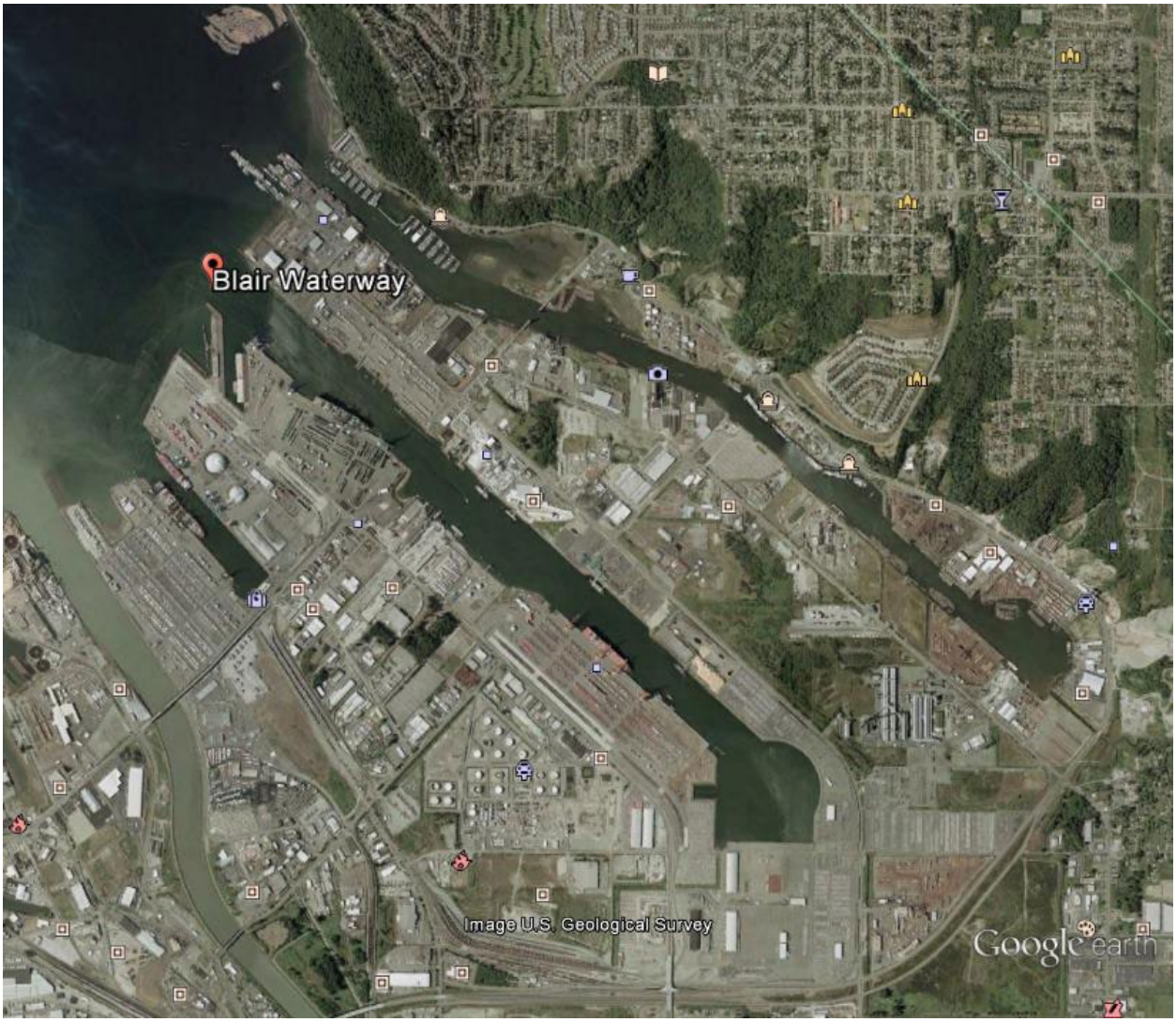

Figure 11: 2002 Aerial of Blair Waterway (source: Google Earth, 2019)

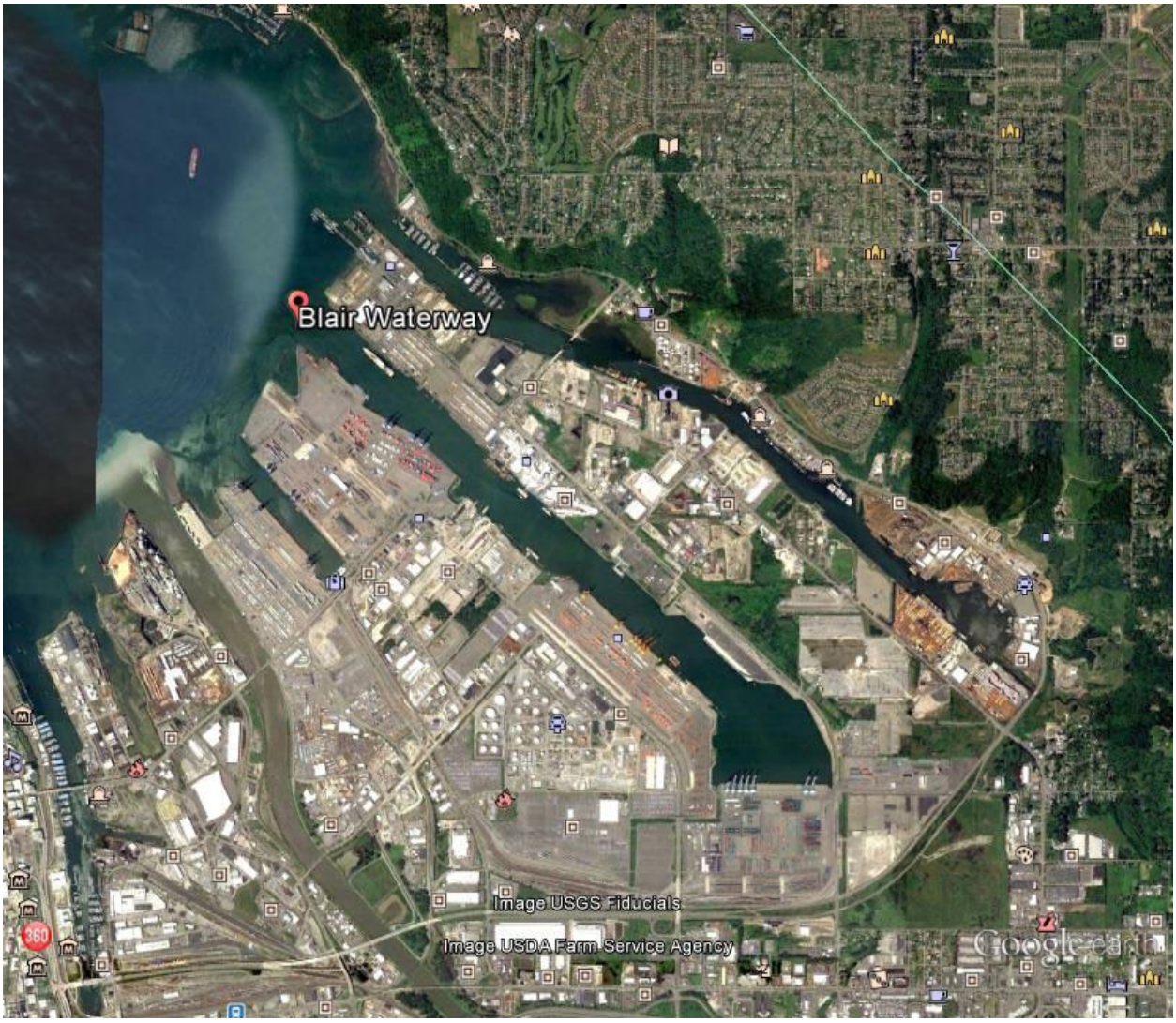

Figure 12: 2010 Aerial of Blair Waterway (source: Google Earth, 2019)

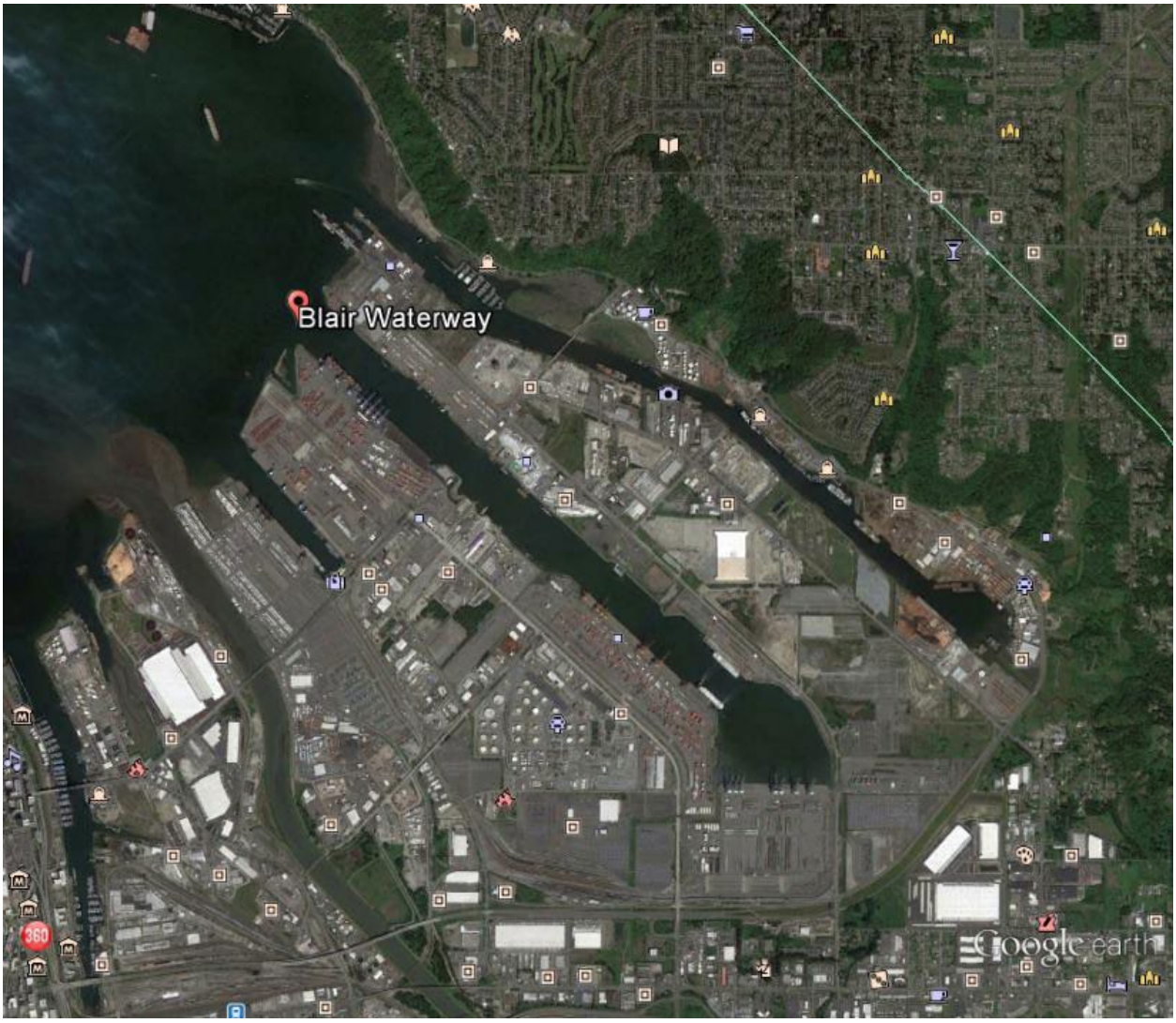

Figure 13: 2018 Aerial of Blair Waterway (source: Google Earth, 2019)

4.3 Records Review

The Blair Waterway is located in a highly industrialized area that has served industrial and marine purposes since the early 20th century. In order to help determine current environmental conditions, review of records pertaining to the Blair Waterway occurred. Records for all adjacent properties were not practical to review due to the number of adjacent properties. However, a document review occurred for the Commencement Bay Nearshore/Tideflats Superfund Site, Operable Units 1 (Commencement Bay Nearshore/Tideflats Sediments) and 5 (Commencement Bay Nearshore/Tideflats Sources), as they relate to Blair Waterway. Information pertaining to this site has a direct impact on the sediment quality in Blair Waterway. The reference section of this report lists all documents reviewed. Information from these sources pertaining to this Phase 1 ESA is located in Sections 3 and 7 in order to better describe environmental conditions and conclusions made.

5.0 ADJOINING PROPERTY

Given the nature of the project site, the Environmental Database Review (Section 3.0) captures the adjoining properties directly adjacent to the Blair Waterway. The properties that are directly adjacent to the waterway were evaluated for their potential to contribute as an uncontrolled source to the Blair Waterway. The most notable impact from these adjoining properties results from overlapping project footprints (i.e. side slopes intersecting with properties associated with known or suspected contamination).

6.0 RESULTS OF VISUAL RECONNAISSANCE

A visual reconnaissance occurred on September 12, 2018. USACE and Port of Tacoma personnel accessed the site by water. This section provides a subset of photographs from the visual reconnaissance.

Figure 2: Rip rap shoreline with decommissioned outfall

Figure 3: Concrete pilings

Figure 4: Industrial Facility with materials processing and loading to/from barge

7.0 SUMMARY OF FINDINGS AND CONCLUSIONS

A Phase I ESA of the project area performed in conformance with the scope and limitations of ASTM Standard E1527 – 13 occurred. A significant amount of existing data regarding contamination in and around the Blair Waterway, along with recent dredge material characterization, provides a thorough characterization for most of the project area. However, given the direct project footprint overlap at the area of the Former Lincoln Ave Ditch and associated institutional controls, supplemental information is needed for this specific area, including the nearby groundwater plume. Additionally, the Corps needs to coordinate with the owner of the TrueGrit Site as the project design progresses to ensure design compatibility for both projects. For the Occidental Chemical Corporation site, confirmation during design is needed to ensure the groundwater plume is not impacted by deepening activities

APPENDIX A

A summary of sites near Blair Waterway with a known or suspected release of contaminants to groundwater is provided in the table below.

Cleanup Site ID	Facility Site ID	Cleanup Site Name	Address	City	Site Status
604	37982391	Clean Care Corp	1510 Taylor Wy	Tacoma	Awaiting Cleanup
12552	14814	Gardner-Fields, Inc	2132 Taylor Way	Tacoma	Awaiting Cleanup
12490	82621489	EMERALD SERVICES INC ALEXANDER AVE	1825 Alexander Ave	Tacoma	CC-O&M/Monitoring
3635	1219	ATOFINA CHEM 3009 TAYLOR WAY LOG YARD	3009 Taylor Way	Tacoma	CC-Perf. Monitoring
3801	30005	1920 PORT OF TACOMA ROAD TACOMA	1920 Port Of Tacoma Rd	Tacoma	Cleanup Started
743	1377	Alexander Avenue Petroleum Tank Facilities	709 Alexander Ave	Tacoma	Cleanup Started
3406	1233	Burlington Environmental LLC Tacoma	1701 E Alexander Ave	Tacoma	Cleanup Started
4329	1239	Pacific Functional Fluids LLC Tacoma	2244 Port Of Tacoma Rd	Tacoma	Cleanup Started
3255	1245	Petroleum Reclaiming Service Inc	3003 Taylor Way	Tacoma	Cleanup Started
3642	1215	Portac Inc Tacoma	4215 Sr 509 E Frontage Rd	Tacoma	Cleanup Started
2240	1770486	PROLOGIS DEVELOPMENT SERVICES INCORPORAT	2000 Taylor Way	Tacoma	Cleanup Started
3438	68593938	SSA Containers Inc	3320 Lincoln Ave E	Tacoma	Cleanup Started
2096	2776343	SUPERLON PLASTICS CO INC	2116 Taylor Way	Tacoma	Cleanup Started
2395	9762715	Tacoma Port Earley Business Center	401 Alexander Ave Business Center	Tacoma	Cleanup Started
2215	38	TACOMA PORT OF - Kaiser	3400 Taylor Way	Tacoma	Cleanup Started
4692	1403183	TAYLOR WAY & ALEXANDER AVE FILL AREA	1500 Block Taylor Way E	Tacoma	Cleanup Started
5003	1260	USG Taylor Way Plant Site	2301 Taylor Way	Tacoma	Cleanup Started

Cleanup Site ID	Facility Site ID	Cleanup Site Name	Address	City	Site Status
4326	1212	OCCIDENTAL CHEMICAL CORP	605 Alexander Ave	Tacoma	Cleanup Started
1294	1206878	Tru-Grit Abrasives Inc	1110 E Alexander Ave	Tacoma	Cleanup Started
3405	1220	ARKEMA INC	2901 Taylor Way	Tacoma	Cleanup Started
3075	1211	MURRAY PACIFIC 2	2407 Port Of Tacoma Rd	Tacoma	CC-Perf. Monitoring
3254	1242	CASCADE POLE MCF SITCUM	1002 Port Of Tacoma Rd	Tacoma	Cleanup Started
1750	54221181	US ARMY WSMC Pier 23	401 E Alexander Ave	Tacoma	Cleanup Started
4330	1246	Glenn Springs Holdings Inc	709 Alexander Ave	Tacoma	Cleanup Started
12597	6505	Pier 4 Port of Tacoma	Pier 4 Port Of Tacoma Rd	Tacoma	Tracked by EPA
113	212	PUYALLUP LAND SETTLEMENT E	250-368 Alexander Ave E	Tacoma	Tracked by EPA
653	213	PUYALLUP LAND SETTLEMENT F	3100 Taylor Way	Tacoma	Tracked by EPA
3363	8632033	PIER 24-25	401 Alexander Ave Shoreline Sediments	Tacoma	Tracked by EPA
3032	42	COMMENCEMENT BAY NEARSHORE TIDEFLATS	Commencement Bay	Tacoma	Cleanup Started
12401	5147833	TACOMA PORT SITCOM PLAZA	1 Sitcom Plaza	Tacoma	Awaiting Cleanup
7616	63973251	TACOMA PORT OF 802 PORT CENTER RD	802 Port Center Rd	Tacoma	CC-O&M/Monitoring
6974	97814788	AUTO WAREHOUSING CO TACOMA	3715 E West Rd	Tacoma	Cleanup Started
9215	44261344	CENEX AG INC	1801 Taylor Way	Tacoma	Cleanup Started
6095	44479366	GP GYPSUM CORP TACOMA PLANT	1240 E Alexander Ave	Tacoma	Cleanup Started
9393	47969128	J L DARLING CORPORATION	2212 Port Of Tacoma Rd	Tacoma	Cleanup Started
5965	36991327	TACOMA CITY FIRE STATION 12	2316 E 11th St	Tacoma	Cleanup Started
-	EPA ID: 110014328245	STERICYCLE ENVIRONMENTAL SOLUTIONS	1701 E ALEXANDER AVE TACOMA, WA 98421	Tacoma	
-	EPA ID: 110000620588	EMERALD SERVICES	1825 E ALEXANDER AVE TACOMA, WA 98421	Tacoma	

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SIGNATURE & QUALIFICATION PAGE

I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in 312.10 of 40 Code of Federal Register (CFR) 312 and the ASTM Standard.

I have the specific qualifications, based on education, training, and experience to assess a property of the nature, history, and setting of the Property. I have developed and performed the Phase I ESA in conformance with the ASTM and CERCLA standards and practices set forth in 40 CFR 312 and the ASTM standard.

PREPARED BY:

KRISTEN KERNS
Toxicologist

ASSESSORS PROFESSIONAL EXPERIENCE

Education:
Bachelors of Science, Environmental Science, Western Washington University
Masters of Science, Environmental Health, University of Washington

Brief Summary of Relevant Experience:
Kristen has over 10 years of experience working on environmental restoration and remediation sites. Her areas of expertise include human health risk assessment and remediation of contaminated sediment sites. She has worked on all phases of remediation projects from preliminary investigation through construction and long term monitoring. Kristen has completed numerous Phase I environmental site assessments, including those for other deep draft navigation projects.

Tacoma Harbor Deep Draft Navigational General Investigation
Saltchuk Beneficial Use Site
Tacoma, Washington

PHASE I
ENVIRONMENTAL SITE ASSESSMENT

December 2019

Prepared By
U.S. Army Corps of Engineers
Seattle District
Environmental Engineering & Technology Section

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ACRONYMS & ABBREVIATIONS

ASTM	American Society for Testing and Materials
BT	Bioaccumulation Trigger
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
Corps	U.S Army Corps of Engineers, Seattle District
cPAHs	Carcinogenic Polycyclic Aromatic Hydrocarbons
CY	Cubic Yards
DO	Dissolved Oxygen
Ecology	Washington Department of Ecology
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
GI	General Investigation
HTRW	Hazardous, Toxic, or Radioactive Waste
MLLW	Mean Lower Low Water
MTCA	Model Toxics Control Act
NPL	National Priorities List
OU	Operable Unit
PCBs	Polychlorinated Biphenyls
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Conditions
RI	Remedial Investigation
ROD	Record of Decision
SL	Screening Level
TSS	Total Suspended Solids

1.0 INTRODUCTION

This Phase I Environmental Site Assessment (Phase 1 ESA) is part of the Tacoma Harbor Deep Draft Navigation General Investigation (GI). The U.S. Army Corps of Engineers, Seattle District (Corps) has prepared a final Integrated Feasibility Report and Environmental Assessment, which documents the process of developing potential solutions to evaluate the environmental impact of deepening the Blair Waterway. A critical part of the feasibility analysis is the evaluation of known and suspected hazardous, toxic, or radioactive waste (HTRW) conditions with potential to impact project planning, design, and implementation. This Phase 1 ESA identifies all known and suspected HTRW releases, and focuses only on the Saltchuk beneficial use site. A separate Phase I ESA for Blair Waterway is complete.

1.1 Purpose

The purpose of conducting this Phase 1 ESA is to determine the environmental condition of the proposed project area. This ESA fulfils the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by Community Environmental Response Facilitation Act (CERFA). This report identifies known and potential sources of environmental risk or liability on the proposed project site, and in the surrounding areas. This information will assist the Corps' design team to manage and avoid HTRW hazards at the project site.

1.2 Description of the Project Area and Proposal for Federal Action

The Saltchuk beneficial use site occupies approximately 64 acres acres in the northeast portion of Commencement Bay. The site is located southwest of Marine View Drive, north of the limit of sediment placement extending to between approximately -35 and -50 feet MLLW, east of the marina, and west of the limit of the Port owned property. The project will improve over 2,000 linear feet of shoreline. Historically, the area stored logs, and woody debris covers approximately 13% (8acres) of the 64 acre site. Existing site elevations range from about +10 feet MLLW to about -50 feet MLLW. Sections of the site are to be filled to a depth of -10 feet to -4 feet MLLW with dredged material from Blair Waterway.

1.3 Scope of Work

The scope of work for this assessment was in general accordance with the ASTM International (ASTM) Standard Practices for Environmental Site Assessments: Phase I Environmental Site Assessment Process (ASTM E1527 - 13). These methodologies are described as representing good commercial and customary practice for conducting a Phase I ESA of a property to identify *recognized environmental conditions* (RECs). The project effort includes the following tasks:

- Conduct a record search and review all reasonably attainable federal, state, and local government information and records to determine possible onsite sources of hazardous substances and environmental condition of the project area.
- Review of all reasonably attainable federal, state, and local government records of adjacent facilities with the potential to release contamination to determine possible offsite sources of hazardous substances.
- Analysis of historical data on prior uses of the project site(s) and the surrounding area.
- Interviews with adjacent property owners and/or tenants or other knowledgeable sources.
- Visual site inspection of the project area to identify possible hazardous substance sources.

- Identify contamination sources using data gathered and evaluate what risk they pose and the effect to the categorization of the environmental condition of the project area.
- Identify all ongoing actions that may affect the environmental conditions of the project area.
- Determine the environmental condition of the project area.
- Determine the extent to which *recognized environmental conditions* may impact, or pose a risk to, the proposed project

The scope of this report did not include an audit of environmental regulatory compliance issues or permits, wetland delineation, or collection and testing of environmental samples, including those for radon gas, lead-based paint, polychlorinated biphenyls (PCBs), asbestos, soil, and/or groundwater condition.

2.0 SITE DESCRIPTION & PHYSICAL SETTING

2.1 General Location

The Saltchuk beneficial use site is located in the northeast portion of Puget Sound's Commencement Bay, at Tacoma, Washington. The site is located north of the federally authorized Tacoma Harbor navigation project (Figure 1). The Tacoma Harbor federal navigation project consists of Hylebos Waterway, Blair Waterway, two training walls at the mouth of the Puyallup River, and the City Waterway (now called Thea Foss Waterway). Action associated with the Tacoma Harbor Deep Draft Navigation GI is limited to the boundaries of the Blair Waterway and to the boundaries of the beneficial use site to place sediment dredged from Bair Waterway. The focus of this Phase I is limited to the Saltchuk beneficial use site because the Blair Waterway is discussed in a separate Phase I analysis.

Figure 1: Project Location

2.2 Site Description

The Saltchuk beneficial use site occupies over 70 acres in the northeast portion of Commencement Bay. The site is located southwest of Marine View Drive, north of the limit of sediment placement extending to between approximately -35 and -50 feet MLLW, east of the marina, and west of the limit of the Port owned property. The project will improve over 2,000 linear feet of shoreline. Historically the area stored logs, and so woody debris litters the seabed. Existing site elevations range from about +10 feet MLLW to about -50 feet MLLW. Sections of the site are to be filled to a depth of -10 feet to -4 feet MLLW and this elevation will extend approximately to the end of the marina. All areas not filled to -10 to -4 feet MLLW are to be filled with a nominal three-foot layer of sediment to cover existing wood debris and enhance subtidal habitat. The three-foot layer is not designed or constructed as a formal sediment cap, nor will the sediment be monitored long term to ensure a minimum thickness is maintained.

2.3 Hydraulics and Geomorphology

The Puyallup discharges sediment into Commencement Bay at an estimated rate of 1,000,000 tons per year (Czuba and others, 2010). Depths in Commencement Bay can reach over 600 feet.

Tides in Commencement Bay are the mixed semidiurnal type. The mean diurnal tidal range for Tacoma published by the National Ocean Survey is 8.06 feet. The great diurnal tidal range for Tacoma is 11.77 feet.

Blair Waterway has no water inflow/outflow other than tidal influence. As such, currents in the area are generally less than 0.5 knots (0.82 feet per second) during all tidal phases. The stronger currents are occur at the mouth of the Puyallup River and Hylebos Waterway. At the Blair Waterway, the currents move parallel to the waterway with the stronger currents being around 0.1 knots (0.16 feet per second) at the mouth of the channel and around 0 knots (0.32 feet per second) at the head near Pierce County Terminals.

Saltchuk lies within the northwest quadrant of Commencement Bay. Currents move along this shoreline at the lower speeds of the 0 to .5 knots range. Sediment migration will depend on several factors including sediment particle size, current speed, and site configuration. For example, island creation may decrease already low current speeds further. If any sediment migration occurs, it can be expected to occur alongshore towards the existing marina or towards the mouth of the Hylebos.

2.4 Regional Climate

The central Puget Sound area has a temperate climate. The average annual precipitation for the region is 39.25 inches of rainfall. The majority of this rainfall occurs from October through May. Average winter temperatures for the area range from 36.5 degrees to 48.5 degrees Fahrenheit, and average summer temperatures range from 55 degrees to 75 degrees Fahrenheit. (US Climate Data. 2019)

2.5 Water Quality and Salinity

Under the Clean Water Act, Washington Department of Ecology (Ecology) establishes standards for physical parameters of water such as temperature, pH level, dissolved oxygen (DO), and chemical concentrations. Waters that do not meet standards are considered “polluted waters” and placed on a 303(d) list that Ecology publishes regularly (in reference to Section 303(d) of the Clean Water Act). Waters with signs of diminished health but still meet standards are “waters of concern” on the 303(d) list.

Portions of Commencement Bay are on Ecology's 303(d) list of threatened and impaired waters, listed as "polluted" for specific parameters, although the trend for water quality in the action area is one of overall improvement (Ecology 2012). Inner Commencement Bay, which includes the Saltchuk beneficial use site, is listed for Bis(2-Ethylhexyl)phthalate, polychlorinated biphenyls (PCBs). Within the inner bay, Thea Foss Waterway is listed for PCBs and Hylebos Waterway is listed for dieldrin, PCBs, chlorinated pesticides, dichlorodiphenyltrichloroethane (DDT), and high molecular weight polycyclic aromatic hydrocarbons (HPAH). The Blair Waterway is not on the 303(d) list, but benzene, tetrachloroethylene, and trichloroethylene levels list it under "waters of concern". Outer Commencement Bay is listed for bacteria, DO, PCBs, and Bis(2-Ethylhexyl)phthalate.

Turbidity refers to the clarity or clearness of the water. The greater the amount of total suspended solids in the water, the murkier it appears and the higher the measured turbidity. Regulating turbidity pertains to healthy habitat for fish, invertebrates, and aquatic plants. Sometimes large ships entering the Blair Waterway create turbidity due to the proximity of the propellers to the bottom of the waterway. Sediment can be disturbed and suspended, temporarily creating a plume of turbidity. The White River, a tributary, glacially feeds the Puyallup River. High amounts of glacial flour from the White River in the summer can generate turbidity in the Puyallup River and into Commencement Bay (Puyallup River Watershed Council 2014).

DO in marine waters is essential for aquatic life. If levels are too low, it can be a sign of human-induced impacts such as excessive runoff or nutrients, or of natural causes such as seasonal variations. Conditions for aquatic life are healthy when DO is above 5.0 milligrams per liter (mg/L). Concentrations between 5.0 mg/L and 3.5 mg/L are acceptable, except for the most sensitive species. When concentrations fall below 3.5 mg/L, conditions become unhealthy. DO in December 1980 were about 6.4 to 7.7 mg/L in the Blair Waterway (Dames and Moore 1981). Outer Commencement Bay is recognized as impaired for DO because samples taken from 1993-2008 were below 6 mg/L (Ecology 2018). Commencement Bay is part of the Puget Sound Nutrient Source Reduction Project to address human sources of nutrients that may lower DO (Ecology 2019).

Temperature has a strong influence on the aquatic organisms that can survive and thrive in any particular habitat and can affect numbers, sizes, and distributions of biota. Temperatures in October 1980 in the Blair Waterway were about 15 °C at the surface to 12 °C at the bottom, while temperatures in December were about 10 °C throughout the water column (Dames and Moore 1981). Long-term temperature data are not available for Puget Sound specifically; however, other Pacific Northwest locations indicate a long-term warming trend with an increase of 1°C from 1950 to 2005 (Snover et al. 2005).

3.0 ENVIRONMENTAL DATA BASE REVIEW

3.1 Regulatory Agency Databases Records Search

A search of *Standard Environmental Records Sources* as defined in ASTM E-1527 - 13 was performed to identify *recognized environmental conditions.* Reviews of records related to the Property and nearby properties kept by both Federal and State regulatory agencies were conducted. This review was used to help identify known or potential sources of contamination that could adversely affect the Property. Table 1 provides a summary of the ASTM standard environmental records sources databases searched and corresponding radii and quantitative results of the record search corresponding to databases. More than one database may list findings.

Given the highly industrialized nature of the study area, the reduced search radius expanded beyond what suggested measurements are in the ASTM standard. Table 1specifies the modified search radii.

Table 1: Source Lists and Associated Number of Sites for Saltchuk beneficial use site

Agency	Description	Search Radius (miles)	Results
US EPA	National Priorities List (NPL)	1	1
US EPA	Delisted NPL Sites	1	0[3]
US EPA	CERCLA	1	1
US EPA	RCRA Generators	1	0
US EPA	RCRA Treatment, Storage, or Disposal Facilities	1	0
US EPA	RCRA Corrective Action Sites	1	1
US EPA	Institutional Controls Registry	Property only	0
US EPA	Toxic Release Inventory	Pierce County, WA	36
USCG	Emergency Response Notification System	Property only	0
WA Ecology	State and Tribal Cleanup Sites[1]	1	4
WA Ecology	State Landfills and Waste Treatment/Disposal Plants	1	0
WA Ecology	State and Tribal Brownfield's	1	0
WA Ecology	State and Tribal Leaking Underground Storage Tanks	1	0[4]
WA Ecology	State and Tribal Registered Underground Storage Tanks[2]	Property and adjoining properties only	0
WA Ecology	State and Tribal Environmental Covenants Registry	Property and adjoining properties only	0
WA Ecology	Emergency Spill Response	1	0

[1] Includes active cleanups, either started or awaiting cleanup. Does not include No Further Action (NFA) sites.
[2] Includes USTs classified as operational, closed in place, or temporarily closed.
[3] The boundaries of one of the Operable Units (OUs) of Commencement Bay Nearshore Tideflats have been changed to reflect partial delistings, but the OU itself has not been delisted.
[4] State and Tribal Leaking Underground Storage Tanks are incorporated into results for State and Tribal Cleanup Sites

3.2 Known Environmental Conditions

Saltchuk beneficial use site is located within one mile of 4 MTCA sites, 1 RCRA site, 2 CERCLA sites, and 2 NPL sites.

Commencement Bay was placed on the National Priorities List (NPL) in 1981. The Record of Decision was issued in September 1989 (EPA, 2004). Saltchuk beneficial use site is not located within any of the Operable Units (OUs).

Historic operation of the Asarco Company copper smelter resulted in widespread contamination across the Puget Sound region. The smelter was in operation for nearly 100 years, resulting in air pollution that deposited arsenic, lead, and other metals in surface sediment and soils over an area greater than 1,000 square miles. The impact of the Asarco smelter plume has led to elevated concentrations of metals, particularly arsenic, on a regional basis. (Ecology, 2019b)

The Crow's Nest Marina, northwest of the Saltchuk beneficial use site, has uplands soil and groundwater contaminated with metals, petroleum, Phenolic Compounds, PCB's, and Polycyclic Aromatic Hydrocarbons (PAH's). The site is awaiting cleanup under MTCA, and has a rank of 1, for highest assessed risk. (Ecology, 2019c)

4.0 PROPERTY HISTORY

4.1 Property History

Information on the historic conditions and development of Commencement Bay has been largely summarized from Commencement Bay Cumulative Impact Study (Corps 1993), and is incorporated herein by reference.

Over approximately 120 years, almost all the natural habitat in Commencement Bay was lost to human development. The earliest photos and maps indicate that prior to 1877, the main habitat types of Commencement Bay were 2,085 acres of intertidal mudflats and about 3,894 acres of salt/brackish marsh. There was limited development before 1877 and likely began with the Northern Pacific Railroad that crossed salt marsh from the City of Puyallup to Tacoma at Foss Waterway in 1874.

Development began to increase mostly on the west side of Commencement Bay over the next 20 years by building wharves, piers, and warehouses to store and transfer cargo to or from ships and the growing railroad system. Excavated mudflats created log storage ponds and associated wharfs for the growing lumber industry. Dredged material included millions of cubic yards from 1894 to 1907 for further development and the creation of Foss Waterway and Middle Waterway. Flooding and heavy sedimentation from the Puyallup River lead to dredging in the river and relocation attempts that altered the river delta and modified the intertidal areas by obstructing the outflow and increasing deposition. By 1907, there were 1,469 acres of mudflat and 3,495 acres of salt/brackish marsh. (Earthcorps, 2015a)

Shoreline development on the east side of Commencement Bay began to increase around 1907 and the next decade would see the loss of 542 acres of mudflat habitat and 100 acres of salt/brackish marsh habitat. To expand the Port of Tacoma, dredging occurred on the Milwaukee Slip, Middle

Waterway, and Hylebos Waterway. Mostly lumber trade vessels called at Hylebos Waterway. The North Pacific Railroad owned and serviced the grain and freight warehouses, ocean freight, coalbunkers, and the Oriental Dock along the waterfront. Flourmills and lumber mills expanded to the north with grain elevators, conveyors, and log storage ponds while the Tacoma Smelting Company used slag to fill in Commencement Bay. Around this time, dikes, ditches, and tide gates installation occurred to convert land for agriculture. The lack of tidal influence and continued input of freshwater from the Puyallup River reduced salinity and converted saltmarsh to brackish or freshwater marsh habitat; this continued into the 1950s.

By 1927, conversion completed of another 75 acres of salt/brackish marsh and 162 acres of mudflat for industrial use. From 1927-1941 many of the existing waterways were extended, widened, and/or deepened. This included Hylebos, Blair, and Sitcum Waterways; and excavation of the St. Paul Waterway, an old log storage pond. In this period, 1,587 acres of salt/brackish marsh and 445 acres of mudflat habitat were lost. Between 1996 and 2010, Commencement Bay NRDA restoration sites have restored about 12 acres of emergent marsh and 26 acres of mudflat habitat throughout the Puyallup River Watershed. One of these sites is Skookum Wulge, a 1.35 acre area southeast of the Saltchuk beneficial use site that was set aside in 1999 to preserve an area of shoreline for intertidal juvenile salmon habitat (EarthCorps, 2015b). Additionally, the Saltchuk beneficial use site stored log rafts from the logging industry until 2016 (Google Earth Pro 2019). Over the years, large amounts of woody debris from these log rafts has sunk to the bottom of the site.

4.2 Aerial Photographs and Maps

Figure 2: Nautical Chart of Tacoma Bay, late 1800s, from NOAA's Office of Coast Survey Historical Map & Chart Collection (source: https://historicalcharts.noaa.gov)

Figure 3: 1946 Aerial of Saltchuk beneficial use site (source: USACE)

Figure 4: 1990 Aerial of Saltchuk beneficial use site (source: Google Earth, 2019)

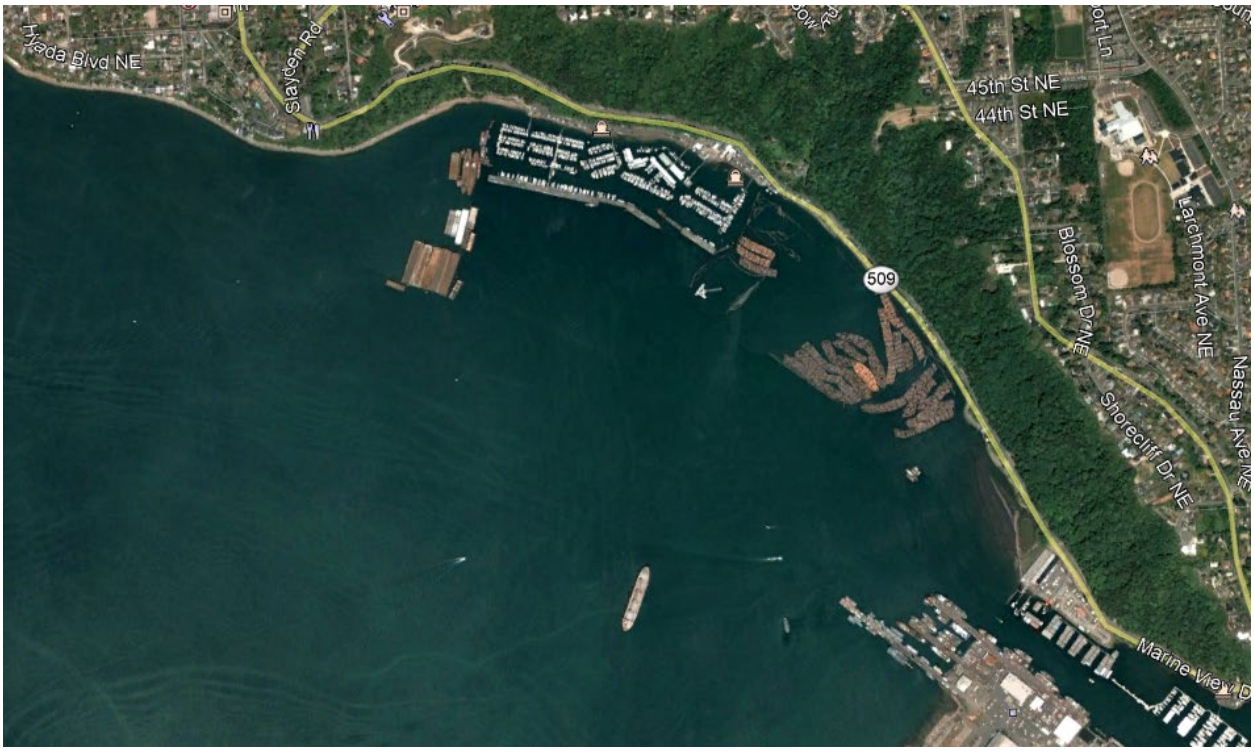

Figure 5: 2002 Aerial of Saltchuk beneficial use site (source: Google Earth, 2019)

Figure 6: 2015 Aerial of Saltchuk beneficial use site (source: Google Earth, 2019)

Figure 7: 2018 Aerial of Saltchuk beneficial use site (source: Google Earth, 2019)

4.3 Records Review

The Saltchuk beneficial use site is located in a highly industrialized area that has served industrial and marine purposes since the early 20th century. In order to help determine current environmental conditions, review of records pertaining to the Saltchuk beneficial use site occurred. A document review was performed for properties located within a one-mile radius of Saltchuk beneficial use site to determine nearby environmental conditions. A smaller search radius than suggested in the ASTM standard was utilized due to the highly industrialized nature of the area. The reference section of this report lists all documents reviewed. Information from these sources pertaining to this Phase 1 ESA is located in Sections 3 and 7 in order to better describe environmental conditions and conclusions made.

5.0 ADJOINING PROPERTY

Given the limited footprint of this site, along with the highly industrialized nature of Commencement Bay, the scope of the database search as refines such that adjoining properties are included in Section 3.

6.0 RESULTS OF VISUAL RECONNAISSANCE

A visual reconnaissance occurred on September 12, 2018. USACE and Port of Tacoma personnel accessed the site by water. This section provides a subset of photographs from the visual reconnaissance.

Figure 8: Saltchuk beneficial use site, looking northeast (source: USACE, 2018)

Figure 9: Saltchuk beneficial use site, looking east (source: USACE, 2018)

Figure 10: Saltchuk beneficial use site, looking northwest (source: USACE, 2018)

7.0 SUMMARY OF FINDINGS AND CONCLUSIONS

A Phase I ESA of the project area performed in conformance with the scope and limitations of ASTM Standard E1527 – 13 occurred. Due to the significant amount of existing data about contamination in the Commencement Bay, including Blair Waterway, additional sampling will not provide new information that affects the project. Because the environmental condition of the project area sediments are extensively documented in CERCLA and other documents, the Corps does not recommend that a Phase II Environmental Site Assessment be completed.

APPENDIX A

A summary of sites near Saltchuk beneficial use site with a known or suspected release of contaminants to groundwater is provided in the table below.

Cleanup Site ID	Facility Site ID	Cleanup Site Name	Address	City	Site Status
3819	3860548	Crow's Nest Marina	5410 Marine View Drive	Tacoma	awaiting cleanup
1750	54221181	US ARMY WSMC Pier 23	401 E Alexander Ave	Tacoma	Cleanup Started
8919	37184365	NORTH SHORE GOLF AND COUNTRY CLUB	4101 North Shore Blvd	Tacoma	NFA
8359	23171843	Meeker Junior High	1526 51st NE	Tacoma	NFA
3363	8632033	Pier 24-25	401 Alexander Ave	Tacoma	tracked by EPA
2395	9762715	Tacoma Port Early Business Center	401 Alexander Ave	Tacoma	Cleanup Started
3032	42	Commencement Bay Nearshore Tideflats	Commencement Bay	Tacoma	Cleanup Started
4326	1212	Occidental Chemical Corp	605 Alexander Ave	Tacoma	Cleanup Started
WAD980725568	-	USARMY NG WATERCRAFT SUPPORT MAINT CTR	321 E Alexander	Tacoma	State led, not on NPL

REFERENCES

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SIGNATURE & QUALIFICATION PAGE

I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in 312.10 of 40 Code of Federal Register (CFR) 312 and the ASTM Standard.

I have the specific qualifications, based on education, training, and experience to assess a property of the nature, history, and setting of the Property. I have developed and performed the Phase I ESA in conformance with the ASTM and CERCLA standards and practices set forth in 40 CFR 312 and the ASTM standard.

PREPARED BY:

KRISTEN KERNS
Toxicologist

ASSESSORS PROFESSIONAL EXPERIENCE

Education:
Bachelors of Science, Environmental Science, Western Washington University
Masters of Science, Environmental Health, University of Washington

Brief Summary of Relevant Experience:
Kristen has over 10 years of experience working on environmental restoration and remediation sites. Her areas of expertise include human health risk assessment and remediation of contaminated sediment sites. She has worked on all phases of remediation projects from preliminary investigation through construction and long term monitoring. Kristen has completed numerous Phase I environmental site assessments, including those for other deep draft navigation projects.