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**STATE OF WASHINGTON
KING COUNTY SUPERIOR COURT**

STATE OF WASHINGTON,
DEPARTMENT OF ECOLOGY,

Plaintiff,

v.

TOC Seattle Terminal, LLC,

Defendant.

NO. 20-2-15215-3 SEA

PROSPECTIVE PURCHASER
CONSENT DECREE

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1 **I. INTRODUCTION**

2 A. The mutual objective of the State of Washington, Department of Ecology
3 (Ecology) and TOC Seattle Terminal, LLC (Defendant) under this Decree is to (1) resolve the
4 potential liability of Defendant for contamination at the Time Oil Bulk Terminal Site (Site), as
5 defined in Section IV.A below, arising from a release or threatened release of hazardous
6 substances, in advance of Defendant purchasing an ownership interest in the Site, and
7 (2) facilitate the cleanup of a portion of the Site (as described in Section IV.B of this Decree) for
8 redevelopment or reuse. This Decree requires Defendant to perform certain remedial actions in
9 the Remedial Action Area, as set forth in Exhibit C (Cleanup Action Plan), and Exhibit D
10 (Schedule of Deliverables), and to pay into the Cleanup Settlement Account (Fund) (Sediment
11 Settlement).

12 B. Ecology has determined that these actions are necessary to protect human health
13 and the environment.

14 C. The Complaint in this action is being filed simultaneously with this Decree. An
15 answer has not been filed, and there has not been a trial on any issue of fact or law in this case.
16 However, the Parties wish to resolve the issues raised by Ecology’s Complaint. In addition, the
17 Parties agree that settlement of these matters without litigation is reasonable and in the public
18 interest, and that entry of this Decree is the most appropriate means of resolving these matters.

19 D. By signing this Decree, the Parties agree to its entry and agree to be bound by its
20 terms.

21 E. By entering into this Decree, the Parties do not intend to discharge non-settling
22 parties from any liability they may have with respect to matters alleged in the Complaint. The
23 Parties retain the right to seek reimbursement, in whole or in part, from any liable persons other
24 than the Defendant for sums expended under this Decree.

25 F. This Decree shall not be construed as proof of liability or responsibility for any
26 releases of hazardous substances or cost for remedial action nor an admission of any facts;

1 provided, however, that Defendant shall not challenge the jurisdiction of Ecology in any
2 proceeding to enforce this Decree.

3 G. The Court is fully advised of the reasons for entry of this Decree, and good cause
4 having been shown:

5 Now, therefore, it is HEREBY ORDERED, ADJUDGED, AND DECREED as follows:

6 II. JURISDICTION

7 A. This Court has jurisdiction over the subject matter and over the Parties pursuant
8 to the Model Toxics Control Act (MTCA), RCW 70A.305.

9 B. Authority is conferred upon the Washington State Attorney General by
10 RCW 70A.305.040(4)(a) to agree to a settlement with any potentially liable person (PLP) if,
11 after public notice and any required public meeting, Ecology finds the proposed settlement
12 would lead to a more expeditious cleanup of hazardous substances. In addition, under
13 RCW 70A.305.040(5), the Attorney General may agree to a settlement with a person not
14 currently liable for remedial action at a facility who proposes to purchase, redevelop, or reuse
15 the facility, provided: the settlement will yield substantial new resources to facilitate cleanup;
16 the settlement will expedite remedial action consistent with the rules adopted under MTCA; and
17 Ecology determines based upon available information that the redevelopment or reuse of the
18 facility is not likely to contribute to the existing release or threatened release, interfere with
19 remedial actions that may be needed at the Site, or increase health risks to persons at or in the
20 vicinity of the Site. RCW 70A.305.040(4)(b) requires that such a settlement be entered as a
21 consent decree issued by a court of competent jurisdiction.

22 C. Ecology has determined that a release or threatened release of hazardous
23 substances has occurred at the Site that is the subject of this Decree, and that the remedial actions
24 required by this Decree are necessary to protect human health and the environment based on the
25 planned future use of the Site as contemplated by the Parties under this Decree.

1 D. Defendant has not been named a PLP for the Site, and Defendant has certified
2 under Section IX (Certification of Defendant) that it is not currently liable for the Site under
3 MTCA. However, Defendant has entered into an asset purchase agreement to acquire parcels
4 located at 2737, 2750 (also or formerly identified as 2752 and 2754), 2800, and 2805
5 W. Commodore Way as well as assume Washington State Department of Natural Resources
6 Aquatic Waterway Use Authorization No. 20-A-10919 (DNR Waterway Use Authorization)
7 from Edmund J. Wood as Chapter 7 Trustee of the Bankruptcy Estate of TOC Holdings Co.,
8 current owner of the Property. The Property comprises a portion of the Site. Defendant will incur
9 potential liability under RCW 70A.305.040(1)(a) at the time it acquires an interest in the Site for
10 performing remedial actions or paying remedial costs incurred by Ecology or third parties
11 resulting from past releases or threatened releases of hazardous substances at the Site. This
12 Decree settles Defendant's liability as described herein for this Site and for Salmon Bay
13 Sediments, defined below, in their entirety upon its purchase of the Property.

14 E. Ecology finds that this Decree will yield substantial new resources to facilitate
15 cleanup of the Site; will lead to a more expeditious cleanup of hazardous substances at the Site
16 in compliance with the cleanup standards established under RCW 70A.305.030(2)(e) and
17 WAC 173-340; will promote the public interest by facilitating the redevelopment or reuse of the
18 Site; and will not be likely to contribute to the existing release or threatened release at the Site,
19 interfere with remedial actions that may be needed at the Site, or increase health risks to persons
20 at or in the vicinity of the Site. In addition, Ecology has determined that this Decree will provide
21 a substantial public benefit by providing for the reuse of a vacant or abandoned manufacturing
22 or industrial facility currently owned by an entity undergoing a bankruptcy liquidation.

23 F. Defendant has agreed to undertake the actions specified in this Decree and
24 consents to the entry of this Decree under MTCA.

25 G. This Decree has been subject to public notice and comment.
26

1 **III. PARTIES BOUND**

2 This Decree shall apply to and be binding upon the Parties to this Decree, their successors
3 and assigns. The undersigned representative of each party hereby certifies that he or she is fully
4 authorized to enter into this Decree and to execute and legally bind such party to comply with
5 the Decree. Defendant agrees to undertake all actions required by the terms and conditions of
6 this Decree. No change in ownership or corporate status shall alter Defendant’s responsibility
7 under this Decree. Defendant shall provide a copy of this Decree to all agents, contractors, and
8 subcontractors retained to perform work required by this Decree, and shall ensure that all work
9 undertaken by such agents, contractors, and subcontractors complies with this Decree.

10 **IV. DEFINITIONS**

11 Unless otherwise specified herein, all definitions in RCW 70A.305.020 and
12 WAC 173-340-200 shall control the meanings of the terms in this Decree.

13 A. Site: The Site is referred to as the Time Oil Bulk Terminal Site and is generally
14 located along the industrial waterfront area of Salmon Bay on the Lake Washington Ship Canal
15 in the Magnolia neighborhood, and is within the Ballard Interbay North Manufacturing Industrial
16 Center. The Site is defined by where a hazardous substance, other than a consumer product in
17 consumer use, has been deposited, stored, disposed of, or placed or has otherwise come to be
18 located, and is generally located as shown in the General Site Vicinity diagram (Figure A-1,
19 Exhibit A). The Site includes the Property, defined below, and wherever a hazardous substance
20 released from the Property has come to be located, including throughout the Property, other
21 upland properties, in Salmon Bay Sediments, as defined in the Decree or otherwise, and releases
22 of hazardous substances from the entire historical footprint of the former TOC Seattle Terminal
23 operations on Commodore Way (including rail spur connections) to Salmon Bay Sediments as
24 well as the parcel (King County Tax Parcel No. 1125039113) containing the DNR Waterway
25 Use Authorization that Defendant intends to assume. The Site also includes releases from the
26 portions of the Burlington Northern Santa Fe Railway Company (BNSF) parcel and/or right of

1 way adjacent to the Property that is the subject of Agreed Order No. 18042 between Ecology
2 and BNSF. The Site constitutes a facility under RCW 70A.305.020(8).

3 B. Property: Refers to the parcels located at 2737, 2750 (also or formerly known as
4 2752 and 2754), 2800, and 2805 W. Commodore Way that Defendant intends to purchase. The
5 Property as defined in this Decree is approximately 10.5 acres and composed of four parcels,
6 identified as the “Bulk Terminal parcel” (King County Tax Parcel No. 1125039050); the “ASKO
7 parcel” (King County Tax Parcel No. 4237900405); the “East Waterfront parcel” (King County
8 Tax Parcel No. 1125039120); and the “West Waterfront parcel” (King County Tax Parcel
9 No. 1125039081).

10 The Bulk Terminal and ASKO parcels are located on the south side of W. Commodore
11 Way. The Bulk Terminal parcel is located at 2737 W. Commodore Way on 4.10 acres. The Bulk
12 Terminal parcel is bounded to the east by W. Fort Street and beyond by a multi-tenant warehouse
13 building. The ASKO parcel located at 2805 W. Commodore Way is adjacent to and west of the
14 Bulk Terminal parcel on 1.57 acres. The ASKO parcel is bound to the west by a multi-tenant
15 warehouse building currently owned by Century Twenty-One Promotions and beyond by 31st
16 Avenue West. Both parcels are bound to the south by the BNSF Railway Company (BNSF)
17 railroad parcel and beyond by W. Government Way.

18 The East Waterfront and West Waterfront parcels are located north of the Bulk Terminal
19 parcel and the ASKO parcel on the north side of W. Commodore Way. The East Waterfront
20 parcel is located at 2750 W. Commodore Way on 3.17 acres. The DNR Aquatic Waterway Use
21 parcel extends into Salmon Bay from the property boundary of the East Waterfront parcel. The
22 Maritime Industrial Center is located on the east adjacent parcel at 2700 W. Commodore Way.
23 The West Waterfront parcel is located at 2800 W. Commodore Way on 1.58 acres and is adjacent
24 to and west of the East Waterfront parcel. The West Waterfront parcel is bound to the west by
25 Lockhaven Apartments and Marina and other residential properties beyond.

1 A map depicting the Property is attached as Figure A-2 in Exhibit A. A legal description
2 of the Property is attached as Exhibit B. The Property comprises a portion of the Site.

3 C. Parties: Refers to the State of Washington, Department of Ecology (Ecology) and
4 TOC Seattle Terminal, LLC.

5 D. Defendant: Refers to TOC Seattle Terminal, LLC.

6 E. Consent Decree or Decree: Refers to this Prospective Purchaser Consent Decree
7 and each of the exhibits to the Decree. All exhibits are integral and enforceable parts of this
8 Prospective Purchaser Consent Decree. The terms “Consent Decree” or “Decree” shall include
9 all exhibits to this Prospective Purchaser Consent Decree.

10 F. Salmon Bay: Salmon Bay is defined generally as the area shown in Figure A-3 in
11 Exhibit A, west of Fisherman’s Terminal and east of the Ballard Locks.

12 G. Salmon Bay Sediments: Salmon Bay Sediments are defined as areas below the
13 ordinary high water mark within the aquatic Property to be purchased and the DNR Waterway
14 Use Authorization being assumed by Defendant and being addressed under this Consent Decree
15 along with the entirety of Salmon Bay and any sediment cleanup unit (or equivalent) located
16 within Salmon Bay, as defined herein.

17 H. TOC: TOC collectively refers to TOC Holdings Co. and any predecessor entity
18 including Time Oil Company.

19 I. TOC Seattle Terminal: TOC Seattle Terminal refers to the Property, defined
20 above, and the waterfront, including areas beyond the boundaries of the Property, along the south
21 shoreline of Salmon Bay on which TOC operated.

22 V. FINDINGS OF FACTS

23 Ecology makes the following findings of fact without any express or implied admissions
24 of such facts by Defendant.

25 A. The Site is located in Seattle, Washington. The Site is defined in Section IV.A,
26 above. A diagram generally depicting the Site is attached as Figure A-1 in Exhibit A.

1 B. Between approximately the 1930s to the present, the Property and surrounding
2 area was used by various industries for commercial and industrial purposes. As described in
3 greater detail below, contamination at the Site is related to historical operations, including bulk
4 petroleum product storage and loading; barrel filling and loading; drum storage; railroad
5 operations; pentachlorophenol (penta) mixing; marine and engine repair; boat repair that
6 included sandblasting; hydraulic repair; furniture manufacturing; and warehousing.

7 A brief summary of the operational history at each of the Property parcels is included
8 below. A more comprehensive history for each of the parcels is provided in the remedial
9 investigation (RI) reports prepared by SoundEarth Strategies, Inc. (SES 2014a, 2014b, and
10 2014c) and the *Supplemental Upland Remedial Investigation and Feasibility Study* prepared by
11 Floyd|Snider (Floyd|Snider 2020) referenced in Exhibit E. In 1943, the shipping terminal dock,
12 located within the DNR Aquatic Waterway Use parcel, was constructed for fueling transport
13 ships using the pipeline utilidor from the Bulk Terminal parcel. The current Waterway Use
14 Authorization No. 20-A10919 was first entered in October 1997, with a use term of twelve (12)
15 years with the option to renew for three (3) additional terms of four (4) years each (not to exceed
16 24 years in the aggregate). TOC exercised its options to renew the waterway use authorization
17 in 2009, 2013, and 2017. Waterway Use Authorization No. 20-A10919 authorized use of the
18 parcel as a fuel dock, primarily used to load or off-load ships and barges with various cargoes,
19 including petroleum products and petroleum-compatible products. (DNR Aquatic Waterway Use
20 Authorization; Floyd|Snider 2020). TOC's corporate predecessor, originally a local Seattle-
21 based oil distributor in the 1930s, became one of the largest petroleum products companies on
22 the West Coast by the late 1960s. TOC began its Seattle Terminal operations in the early 1940s
23 primarily to support World War II efforts. TOC was also a major distributor of fuel for the
24 military in Alaska. During that time TOC used a significant stretch of waterfront including areas
25 beyond the boundaries of the Property along the south shoreline of Salmon Bay for the storage
26 of fuel drums to be filled at the TOC Seattle Terminal and related activities and the DNR Aquatic

1 Waterway Use parcel. Barrels were filled at the TOC Seattle Terminal and loaded onto ships at
2 a shipping terminal dock. The terminal supported large quantities of fuel being stored and
3 distributed during and after World War II. (Calkins, R. H. 1950; Seattle Times 1953; Burchard,
4 Boyd 1968).

5 **Bulk Terminal Parcel**

6 The Bulk Terminal parcel, which extends from W. Commodore Way to the BNSF parcel
7 to the south, was originally two separate parcels owned by C.F. Anderson and H.D. Chaplin and
8 was first developed for residential use in 1905. In the 1920s and 1930s, the parcel was used for
9 furniture manufacturing by Salmon Bay Manufacturing Company and Rattan Furniture
10 Manufacturing Company (Rattan). Jobbers Petroleum Company (Jobbers), a distributor of
11 Hancock gasoline and other petroleum products, purchased the parcel in 1939. In March 1941,
12 Jobbers opened the company's new plant on the Bulk Terminal parcel. To support their
13 operations, Jobbers constructed a 500-foot pier to accommodate large oil tankers, a two-story
14 office building, and storage tanks for three million gallons of gasoline. (Calkins, R. H. 1941).
15 From 1941 until 2001, TOC owned and operated the Bulk Terminal parcel for the distribution
16 of gasoline, diesel, kerosene, and mineral spirits to be transported by vessel, rail, or truck. In
17 support of petroleum bulk storage operations, TOC constructed several buildings on the western
18 portion of the parcel. These included a 13,622-square-foot (SF) office building, a 7,200-SF
19 warehouse building, two Foamite sheds and associated smaller Foamite houses containing hoses
20 used for fire suppression, a boiler room, and a pump shed. The west side of the warehouse
21 building extended onto the ASKO parcel. (Floyd|Snider 2020).

22 Between 1941 and 1944, 14 above ground storage tanks (ASTs), and associated piping,
23 were constructed in the lower and upper tank yards, within the central and eastern portion of the
24 parcel. The storage capacity of the ASTs ranged between 219,450 to 966,000 gallons. Petroleum
25 products were transported by drum and pipelines from the ASTs on the Bulk Terminal parcel to
26 barreling sheds. There, 5-gallon containers and 55-gallon drums were filled and then transported

1 underneath W. Commodore Way to the East Waterfront parcel using two barrel inclines (former
2 west and east barrel inclines). Two barreling sheds were located on the Bulk Terminal parcel,
3 one on the western portion of the parcel east of the ASKO parcel and one on the central-western
4 portion of the parcel extending onto the ASKO parcel. In 1941, two overhead fuel loading racks
5 were constructed on the northern portion of the parcel adjacent to the lower tank yard.
6 (Floyd|Snider 2020).

7 Fuel distribution lines were connected from the ASTs to a manifold system and then to
8 overhead fuel loading racks. Petroleum was then either transported from the Bulk Terminal
9 parcel through the pipeline utilidor that extended underground from the lower tank yard to the
10 shipping terminal dock on the East Waterfront parcel for loading onto vessels, or pumped
11 directly into tanker trucks through the overhead fuel loading racks. Four rail spurs entered onto
12 the former TOC Seattle Terminal from the main BNSF line behind the former barreling shed;
13 one spur extended toward the south end of the upper tank yard. (Floyd|Snider 2020).

14 Sometime between 1941 and 1950, a 10,000-gallon former penta mixing AST and
15 associated piping was installed on the Bulk Terminal parcel. According to TOC employees, as
16 part of a military contract for a few months in 1967, wood preservatives were formulated near
17 the west wall of the lower tank yard. Penta crystals were mixed into heated diesel fuel in the
18 former penta mixing AST located south of the pump shed. After mixing, wood preservative was
19 then transferred via an underground pipeline to a barrel shed located on the ASKO parcel. From
20 there, 5-gallon containers and 55-gallon drums were loaded onto rail cars for shipment to
21 Vietnam. A solvent known as “B-6,” and reported to possibly be a mineral spirit, was used in
22 their formulation. However, based on the known petroleum products handled at the facility, it
23 was reported that diesel or stove oil was likely used by TOC in formulating their wood
24 preservative. (SES 2014c).

25 As reported in a Phase I Environmental Site Assessment completed by Foster Wheeler
26 Environmental Corporation (and based on interviews with TOC employees), large volumes of

1 fuel arrived on rail cars and was transferred from tanker cars via hoses to the tank farm. (Foster
2 Wheeler 2000). TOC operated the petroleum bulk storage facility until 2001, and the tank farm
3 and associated infrastructure was removed in 2006.

4 Currently, there are no active operations by the owner (the Trustee) located on the Bulk
5 Terminal parcel. The parcel is currently occupied by a vacant office building (former TOC
6 office), a marine retail facility, and warehouse space.

7 **ASKO Parcel**

8 The ASKO parcel was first developed for residential and agricultural use owned by
9 G. Anderson in 1905. By the 1930s, the residential properties were removed. Between 1946 and
10 1950, TOC acquired the parcel to support the Bulk Terminal parcel operations and constructed
11 drum storage, a barreling shed, and three 14,000-gallon ASTs used for storing lube oil and/or
12 motor oil. Other structures on the parcel included a 7,200-SF warehouse building constructed in
13 1947, a concrete platform constructed in 1948, and a 1,660-SF open-sided building constructed
14 in 1952. Four rail spurs entered the southern portion of the ASKO parcel from the BNSF railroad.
15 A fifth rail spur located next to the main line was used for extra storage of rail tanker cars. (SES
16 2014a. *Remedial Investigation Report, ASKO Hydraulic Property*. Prepared for TOC Holdings
17 Co. 23 May).

18 From 1960 until 1974, the parcel was used as a truck storage area and parking lot for the
19 Bulk Terminal parcel. In 1964, a 7,198-SF warehouse building was constructed on the northwest
20 portion of the parcel for servicing TOC vehicles. It was reported that a 550-gallon fuel oil
21 underground storage tank (UST) was located on the northeast side of the warehouse building. In
22 1974, TOC leased the warehouse to Precision Engineering Specialists, a marine and engine
23 repair facility. From approximately 1976 until 1980, Select Industries leased the warehouse,
24 where they operated a machine shop. In 1989, Select Industries reportedly became ASKO
25 Hydraulic Repair, later known as ASKO Industrial Repair, and began operating a hydraulic
26 repair shop on the parcel. The shop included oil and solvent storage and steam cleaning areas on

1 the east side of the building. ASKO Industrial Repair leased the parcel from TOC and operated
2 a hydraulic repair and machine shop until sometime between 2015 and 2017. (Floyd|Snider
3 2020).

4 Marine Service & Supply, a commercial fishing marine supply store, currently leases the
5 1947 warehouse building located on the southeast corner of the parcel for retail sales, storage,
6 and equipment repair. The eastern portion of this warehouse building extends onto the Bulk
7 Terminal parcel. (Floyd|Snider 2020).

8 **East Waterfront Parcel**

9 The East Waterfront parcel was first developed with a single structure, presumably a
10 residence, owned by G. and C.F. Anderson from 1905 until the early 1920s. Between 1930 and
11 1944, the parcel, still owned by C.F. Anderson, was used as part of the Rattan facility present on
12 the east adjacent parcel (the Maritime Industrial Center). During this time, a boiler room,
13 sawmill, dry kiln, and warehouse building associated with Rattan's operations were located on
14 the East Waterfront parcel. Houseboats were also present along the shoreline area, and the
15 northern portion of the parcel was used for log booming. (Floyd|Snider 2020).

16 TOC reportedly acquired the East Waterfront parcel in 1941. By the mid-1940s, all of
17 the structures associated with Rattan had been removed. In 1943, the shipping terminal dock
18 (located within the DNR Aquatic Waterway Use parcel) was constructed for fueling transport
19 ships using the pipeline utilidor from the Bulk Terminal parcel. Drums were filled with fuel from
20 the barreling sheds located on the Bulk Terminal and ASKO parcels and then transferred via the
21 drum incline from the Bulk Terminal parcel to the shipping terminal dock. During the 1950s,
22 TOC constructed buildings to support their operations, including a 6,400-SF general storage
23 warehouse building constructed on pilings with access to Salmon Bay, a 2,250-SF one-walled
24 shed/canopy, a 1,518-SF garage, and a 1,518-SF laboratory building used for paint storage and
25 quality testing of oil. It was also reported that a garage was used for vehicle repair and equipment
26 lubrication. In 1977 a small dock was added along the waterfront area. (Floyd|Snider 2020).

1 TOC leased the parcel to a marine supply business, George Broom's Sons, Inc., and a
2 seafood company, Icicle Seafoods, Inc. From 1972 until 2011, George Broom's Sons, Inc., a
3 supplier of tug and barge rigging and safety nets and slings, leased the warehouse building for
4 their sailing and rigging business. In 1980, TOC leased a portion of the East Waterfront parcel
5 located at 2752 W. Commodore Way to Icicle Seafoods, Inc., for use as a maintenance and repair
6 base for a portion of their fishing fleet, until they vacated the parcel in 1992. (TOC 1993).
7 Between 1980 and 1991, three docks were constructed along the shoreline area west of the
8 shipping terminal dock and supported Icicle Seafoods, Inc., operations. TOC reported that during
9 a site visit with Icicle Seafood, Inc., several small areas of surface soil staining were observed
10 attributed to the storage of "dismantled hydraulic equipment and auto maintenance activities."
11 Presumably, Icicle Seafoods, Inc., used sandblast grit during their operations, because three areas
12 of grit were located on the surface and in soil during previous environmental sampling and
13 subsequent excavation completed on the parcel in 1992 and 1993. (TOC 1993).

14 From 2005 until as recently as 2014, ASKO Selective Plating, a company that provides
15 electroplating of parts and equipment for aerospace, marine, electronics and commercial
16 industries, occupied a 1,920-SF storage warehouse building constructed in the 1970s. The
17 buildings on the parcel are currently vacant. (Floyd|Snider 2020).

18 **West Waterfront Parcel**

19 The West Waterfront parcel was vegetated and vacant until TOC purchased the parcel
20 sometime between 1946 and 1950. In 1946, vegetation was cleared, and several sheds were
21 constructed. Currently, and historically, the parcel is used for recreational boat moorage, storage,
22 and parking. It does not appear that any historical operations were conducted on this portion of
23 the Property. Three docks extend across the shoreline area from the West Waterfront parcel and
24 are currently leased by Lockhaven Marina for house boats. (Floyd|Snider 2020).

25 C. Numerous independent environmental investigations and interim remedial
26 actions have been completed at the Site, some with Ecology technical advice and assistance.

1 Comprehensive discussions of the data resulting from these investigations are presented in the
2 RI reports as well as the *Supplemental Upland Remedial Investigation and Feasibility Study*. In
3 addition, Defendant conducted sediment characterization activities on the Property and in the
4 vicinity of the Site in Salmon Bay. The results of the sediment sampling are provided in the
5 technical memorandum, *Sediment Data Summary Report*, prepared by Floyd|Snider, dated
6 August 5, 2019 (Floyd|Snider 2019c). The preceding descriptions of historical operations at the
7 various parcels provides a summary of known information. A list of References is provided in
8 Exhibit E; these references provide greater detail regarding the known information related to the
9 Site.

10 D. The contaminants of concern at the Site that exceed MTCA cleanup levels or
11 appropriate sediment management criteria include arsenic, barium, cadmium, chromium,
12 benzene, lead, selenium, silver, toluene, carcinogenic polycyclic aromatic hydrocarbons
13 (cPAHs), chlorinated dibenzo-p-dioxins, halogenated organics (tetrachloroethene [PCE],
14 trichloroethene [TCE], cis-1,2-dichloroethene [cis-1,2-DCE], trans-1,2-DCE, 1,2-
15 dichloroethane, vinyl chloride), pentachlorophenol (penta), petroleum hydrocarbons as diesel
16 and oil (i.e., total diesel-range organics [DRO] and oil-range organics [ORO]), and petroleum
17 hydrocarbons as gasoline (i.e., gasoline-range organics [GRO]) for Soil; arsenic, benzene,
18 halogenated organics (TCE, cis-1,2-DCE, vinyl chloride), penta, total DRO and ORO, and GRO
19 for Groundwater; and arsenic, chromium, nickel, copper, mercury, total PAHs, bis(2-
20 ethylhexyl)phthalate, di-n-octyl phthalate, carbazole, dibenzofuran, DRO, and tributyltin for
21 Sediment. Light non-aqueous-phase liquid (i.e., free product petroleum [LNAPL]) is present in
22 two areas beneath the Bulk Terminal parcel, including the vicinity of the former upper tank yard
23 to the south and the area of the former fuel loading racks to the north. The area of LNAPL to the
24 north extends into the adjacent W. Commodore Way right-of-way. Ecology is conducting a Site
25 Hazard Assessment and its results and any resulting hazard ranking will be published in the Site
26 Register pursuant to WAC 173-340-320 to -330.

1 E. The Property has been used for bulk petroleum product storage and loading;
2 barrel filling and loading; drum storage; railroad operations; penta mixing; marine and engine
3 repair; boat repair that included sandblasting; hydraulic repair; furniture manufacturing; and
4 warehousing purposes and is zoned industrial (IG1 U/45 or IG2 U/65) by the the City of Seattle.
5 The City of Seattle has conducted land use planning under RCW 36.70A.

6 F. On March 16, 2018, Defendant first entered into an asset purchase agreement
7 with Edmund J. Wood, Chapter 7 Trustee of the Bankruptcy Estate of TOC Holdings Co., the
8 current owner of the Property. The asset purchase agreement has been amended during the course
9 of due diligence assessment. Pursuant to this contract, as amended, Defendant intends to
10 purchase the Property on the effective date of this decree.

11 G. Defendant proposes to clean up a portion of the Site, within the Remedial Action
12 Area further described in the Cleanup Action Plan (CAP) (Exhibit C), and make it available for
13 redevelopment for commercial, industrial warehousing, offices, and water dependent use or
14 reuse, consistent with MTCA and its implementing regulations, WAC 173-340, and applicable
15 City of Seattle zoning provisions and comprehensive plan designations.

16 H. As documented in the CAP (Exhibit C), the cleanup action to be implemented at
17 the Remedial Action Area of the Site includes a combination of the following: excavation and
18 off-site disposal of contaminated soil; removal of LNAPL to the maximum extent practicable;
19 in situ solidification and stabilization (ISS) of contaminated soil; in situ treatment of
20 contaminated groundwater by permeable reactive barrier (PRB); in situ chemical reduction
21 (ISCR) and enhanced reductive dechlorination (ERD) technologies; placement of a cap and other
22 engineering controls; and implementation of institutional controls. The cleanup action also
23 includes provisions for periodic monitoring of groundwater conditions throughout the restoration
24 time frame to evaluate effectiveness of the implemented actions and determine if or when
25 contingency actions should be implemented to further reduce risks.

1 I. Preliminary cleanup levels for the Site were developed in the *Supplemental*
2 *Upland RI/FS* (Floyd|Snider 2020) and final cleanup levels are described in the CAP (Exhibit C).
3 Remediation levels for soil were also established for portions of the cleanup action in accordance
4 with WAC 173-340-355. The remediation levels are described in the CAP and will be used to
5 identify concentrations of indicator hazardous substances at which different cleanup action
6 components are implemented. The indicator hazardous substances for this Site are arsenic, GRO,
7 total DRO and ORO, benzene, TCE, vinyl chloride, and penta.

8 VI. WORK TO BE PERFORMED

9 This Decree contains a program designed to protect human health and the environment
10 from the known release, or threatened release, of hazardous substances or contaminants at, on,
11 or from the Site.

12 A. Defendant shall perform the remedial actions and compliance monitoring
13 specified in detail in the CAP (Exhibit C) and Draft Groundwater Monitoring Plan (Appendix A
14 of the CAP), and prepare reports and other documents according to the Schedule of Deliverables
15 (Exhibit D). These exhibits are incorporated by reference and are an integral and enforceable
16 part of this Decree. A summary of the work to be performed, which is identified more specifically
17 in Exhibit C, is as follows:

18 1. LNAPL in the area of the former upper tank yard on the Bulk Terminal
19 parcel will be removed to the maximum extent practicable using a combination of
20 excavation and vacuum extraction. Soil in this area exceeding remediation levels for
21 GRO, total DRO and ORO, and benzene will also be excavated and disposed off-site.
22 Excavation is expected to occur to depths ranging from 5 to 10 feet below grade in this
23 area.

24 2. LNAPL in the area of the former fuel loading racks at the north end of the
25 Bulk Terminal parcel and extending into the W. Commodore Way right-of-way will be
26 removed to the maximum extent practicable using a combination of excavation, vacuum

1 extraction, and ISS. Soil in this area exceeding remediation levels for GRO, total DRO
2 and ORO, and benzene will be addressed using a combination of excavation and in situ
3 treatment: the portion located within the Bulk Terminal parcel will be treated in situ using
4 ISS to an expected treatment depth of 23 feet below grade, and the portion located within
5 the W. Commodore Way right-of-way will be excavated to an expected depth of 15 feet
6 below grade and disposed off-site.

7 3. Soil exceeding remediation levels for GRO, total DRO and ORO,
8 benzene, and TCE in the vicinity of the former barreling sheds and west and east barrel
9 inclines (between and overlapping the ASKO and Bulk Terminal parcels) will be
10 excavated and disposed off-site. Excavation is expected to occur to a depth of 5 feet
11 below grade in this area.

12 4. Soil and groundwater exceeding cleanup levels for TCE, GRO, total DRO
13 and ORO, and benzene on the east portion of the ASKO parcel and immediately adjacent
14 to the BNSF parcel will be treated in situ using ISS to an expected treatment depth of
15 30 feet below grade. Some soil exceeding the cleanup level for TCE, but less than the
16 remediation level, is expected to remain at depths deeper than the treatment zone in this
17 area.

18 5. Soil exceeding cleanup levels for total DRO and ORO and arsenic in the
19 north-central portion of the ASKO parcel, in the vicinity of the former vehicle
20 maintenance and machine shop, will be excavated to an expected depth of 5 feet below
21 grade and disposed off-site.

22 6. Soil exceeding cleanup levels for GRO, total DRO and ORO, benzene,
23 and arsenic (and other collocated metals) on the East Waterfront parcel will be excavated
24 and disposed off-site. Excavation within the eastern portion of this parcel, in the vicinity
25 of the former barrel incline, former utilidor, and former warehouse and vehicle
26 maintenance building, is expected to occur to depths ranging from 3 to 12 feet below

1 grade. Excavation within the western portion of this parcel, in the vicinity of former
2 sandblast grit piles, is expected to occur to a depth of 1 foot below grade.

3 7. To address contaminated groundwater migrating onto the ASKO parcel
4 from the upgradient BNSF parcel, an interceptor trench with a PRB wall will be installed
5 along the edge of the ISS monolith at the ASKO/BNSF parcel boundary. The interceptor
6 trench will capture groundwater contaminated with halogenated organics and petroleum
7 hydrocarbons and will divert the contaminated groundwater to the PRB wall for in situ
8 treatment. Both the interceptor trench and PRB wall are expected to be installed to a
9 depth of 15 feet below grade using standard excavation and construction methods. The
10 PRB wall will be filled with granular zero-valent iron and will be designed with enough
11 residence time for dissolved contaminants to be treated to a minimum 90 percent
12 concentration reduction.

13 8. In situ groundwater treatment utilizing a combination of ISCR and ERD
14 technologies will be implemented to address groundwater contaminated with residual
15 benzene and halogenated organics within the northern portion of the ASKO parcel,
16 immediately upgradient of the W. Commodore Way right-of-way. Treatment fluids
17 containing sulfidated micro zero-valent iron and activated carbon, and augmented with a
18 microbial culture, will be injected through a series of direct-push borings to create a
19 passive treatment zone of chemical reduction and bioremediation. This treatment is
20 expected to accelerate natural degradation of TCE and vinyl chloride to reduce the
21 restoration time frame.

22 9. A cap will be placed on the ASKO and Bulk Terminal parcels following
23 remedial excavation and source removal activities to provide a barrier to contamination
24 remaining in soil at concentrations exceeding the cleanup levels, but less than the
25 remediation levels. Capping will be installed during redevelopment of the Property and
26 will include a combination of pavement, constructed landscape areas, and buildings. The

1 cap shall remain in place as long as contamination remains on the Property at
2 concentrations exceeding cleanup levels

3 10. Defendant shall prepare a Soil and Remedial Element Management Plan
4 (SREMP) to ensure that soils that remain at the Property at concentrations that exceed the
5 cleanup levels do not pose a threat to human health or environmental receptors. The
6 SREMP will identify the locations and depths of soils exceeding cleanup levels and best
7 management practices for soil handling and disposal and worker protection in the event
8 that future Property operational or construction activities disturb these soils. The SREMP
9 will also include: procedures for inspection, maintenance, and repair of the cap that will
10 be installed on a portion of the Property as an engineering control to be maintained with
11 an institutional control; procedures for inspection, protection, and maintenance of
12 remedial elements such as monitoring wells; and best management practices for unpaved
13 areas of the Property to prevent soil erosion to the storm drain system or directly to
14 sediment in Salmon Bay. The SREMP must include protocols for notifying Ecology of
15 planned (or proposed) ground disturbing activities as well as any instances in which a
16 site control measure fails, resulting in a release or new exposure pathway. The procedures
17 specified in the SREMP will be applicable to any future Property redevelopment or
18 maintenance that involves removal or disturbance of material below the surface cap or
19 disturbance of surface soils or other ground cover that may create a future erosion
20 pathway, if warranted based on post-remedial conditions.

21 11. While the preferred remedial alternatives are expected to reach cleanup
22 levels within the restoration time frame, the CAP outlines when additional contingency
23 actions will be required. These contingency actions may include additional investigation,
24 studies, plans, and/or adjustments to the remedial actions, as appropriate. Contingency
25 actions specified in the CAP address potential vapor intrusion risks and potential
26 remedial actions for groundwater. Contingency actions for mitigating vapor intrusion

1 risk will include an initial vapor intrusion assessment, implementation of engineering
2 controls if necessary, and post-construction vapor intrusion confirmation monitoring. An
3 initial assessment will be performed prior to Property redevelopment to evaluate the
4 potential for vapor intrusion for new buildings to be constructed. The initial assessment
5 will be completed when the footprints of planned buildings are known and vapor
6 intrusion risk from remaining soil and groundwater contamination can be assessed. The
7 results of the vapor intrusion assessment will determine whether engineering controls to
8 mitigate vapor intrusion will be installed during Property redevelopment. Contingency
9 actions for groundwater will be evaluated if post-construction groundwater monitoring
10 data indicate that contaminant concentrations are not declining at a rate sufficient to
11 achieve cleanup standards within the expected restoration time frame. The need for
12 groundwater contingency actions will be assessed during the 5-year Periodic Review and,
13 if necessary, at the 10-year Periodic Review. If determined necessary, the type and degree
14 of contingent groundwater action(s) will be subject to review and approval by Ecology
15 prior to implementation.

16 12. A compliance monitoring program will be implemented in accordance
17 with WAC 173-340-410 to evaluate the protectiveness of the cleanup action, assess
18 performance standards during and after remedial construction, and confirm long-term
19 effectiveness following completion of the cleanup action. Compliance monitoring plans
20 will be prepared prior to and following implementation of the cleanup action: a
21 Construction Compliance Monitoring Plan (CCMP) will be prepared during design and
22 engineering of the cleanup action that presents specific compliance monitoring
23 requirements for remedial construction; and a Long-Term Compliance Monitoring Plan
24 (LTCMP) will be prepared following completion of remedial construction that presents
25 specific compliance monitoring requirements during post-construction and post-
26 redevelopment.

1 13. Groundwater monitoring will be performed as part of compliance
2 monitoring for the Site. A groundwater monitoring program will be implemented in
3 general accordance with the Draft Groundwater Monitoring Plan (Exhibit C,
4 Appendix A) to observe and document remedy effectiveness following remedial
5 construction. This will include a period of performance groundwater monitoring events
6 until groundwater quality achieves the cleanup standards at the conditional point of
7 compliance defined in the CAP. Confirmation groundwater monitoring will then be
8 implemented to confirm the long-term effectiveness of the cleanup action after cleanup
9 standards have been attained. Confirmation monitoring events will be performed as
10 determined by Ecology.

11 B. The following naming conventions shall be used for documents: Agency Review
12 Draft (designation for the first time Ecology receives a document); Public Review Draft
13 (designates a document ready for public comment); Final (designation for a document after
14 public comment and Ecology approval).

15 C. Payment to the Cleanup Settlement Account (Sediment Settlement):

16 1. The Parties agree to a cash payment to the State, resolving all of
17 Defendant's MTCA liability, excluding only liability connected with new releases of
18 hazardous substances that occur wholly after the effective date of this Consent Decree,
19 for any releases of hazardous substances at the Site including the entire historical
20 footprint of the former TOC operations on Commodore Way (including rail spur
21 connections) to Salmon Bay Sediments, including contribution protection as provided
22 below, by payment to the Cleanup Settlement Account a total amount of \$1,500,000.00
23 according to the following schedule and terms:

- 24 a. An initial payment of \$300,000.00 will be made upon the last of the
25 following events occurrence: (i) final entry of the PPCD by a court and
26 (ii) closing of the bankruptcy trustee Property sale to Defendant.

1 b. The remaining \$1,200,000.00 will be paid no later than four (4) years
2 from the date of closing. The remaining \$1,200,000.00 may be made in
3 payments, but the entire amount must be paid in full by the final due date.

4 c. It is the intent of the Parties that this settlement as described herein
5 resolves all of Defendant's MTCA liability for Salmon Bay Sediments in
6 their entirety irrespective of whether Salmon Bay Sediments are part of
7 the Site as defined herein.

8 2. Defendant shall make payment to Ecology in the form a certified check
9 payable to the "Cleanup Settlement Account." Defendant shall send the check to:

10 Fiscal Cashier
11 Department of Ecology
12 PO Box 5128
13 Lacey, WA 98503

14 3. Notice of Payment: At the time of payment, Defendant shall send notice
15 that such payment has been made to Ecology's project coordinator.

16 D. Defendant agrees not to perform any remedial actions outside the scope of this
17 Decree unless the Parties agree to modify the CAP and Schedule of Deliverables (Exhibits C
18 and D) to cover these actions. All work conducted by Defendant under this Decree shall be done
19 in accordance with WAC 173-340 unless otherwise provided herein.

20 E. All plans or other deliverables submitted by Defendant for Ecology's review and
21 approval under the CAP and Schedule of Deliverables (Exhibits C and D) shall, upon Ecology's
22 approval, become integral and enforceable parts of this Decree.

23 **VII. DESIGNATED PROJECT COORDINATORS**

24 The project coordinator for Ecology is:

25 Mark Adams
26 Department of Ecology, Northwest Regional Office
 3190 160th Avenue SE
 Bellevue, WA 98008-5452
 425-649-7107
 Mark.Adams@ecy.wa.gov

1 The project coordinator for Defendant is:

2 Allison Geiselbrecht, PhD
3 601 Union Street, Suite 600
4 Seattle, WA 98101-2341
5 206-292-2078
6 Allison.Geiselbrecht@floydsnider.com

7 Each project coordinator shall be responsible for overseeing the implementation of this
8 Decree. Ecology's project coordinator will be Ecology's designated representative for the Site.
9 To the maximum extent possible, communications between Ecology and Defendant and all
10 documents, including reports, approvals, and other correspondence concerning the activities
11 performed pursuant to the terms and conditions of this Decree shall be directed through the
12 project coordinators. The project coordinators may designate, in writing, working level staff
13 contacts for all or portions of the implementation of the work to be performed required by this
14 Decree.

15 Any Party may change its respective project coordinator. Written notification shall be
16 given to the other Party at least ten (10) calendar days prior to the change.

17 **VIII. PERFORMANCE**

18 All geologic and hydrogeologic work performed pursuant to this Decree shall be under
19 the supervision and direction of a geologist or hydrogeologist licensed by the State of
20 Washington or under the direct supervision of an engineer registered by the State of Washington,
21 except as otherwise provided for by RCW 18.43 and 18.220.

22 All engineering work performed pursuant to this Decree shall be under the direct
23 supervision of a professional engineer registered by the State of Washington, except as otherwise
24 provided for by RCW 18.43.130.

25 All construction work performed pursuant to this Decree shall be under the direct
26 supervision of a professional engineer or a qualified technician under the direct supervision of a
professional engineer. The professional engineer must be registered by the State of Washington,
except as otherwise provided for by RCW 18.43.130.

1 Any documents submitted containing geologic, hydrologic, or engineering work shall be
2 under the seal of an appropriately licensed professional as required by RCW 18.43 and 18.220.

3 Defendant shall notify Ecology in writing of the identity of any engineer(s) and
4 geologist(s), contractor(s) and subcontractor(s), and others to be used in carrying out the terms
5 of this Decree, in advance of their involvement at the Site.

6 **IX. CERTIFICATION OF DEFENDANT**

7 Defendant represents and certifies that, to the best of its knowledge and belief, it has fully
8 and accurately disclosed to Ecology the information currently in its possession or control that
9 relates to the environmental conditions at and in the vicinity of the Site, or to Defendant's right
10 and title thereto.

11 Defendant represents and certifies that it did not cause or contribute to a release or
12 threatened release of hazardous substances at the Site and is not otherwise currently potentially
13 liable for the Site under RCW 70A.305.040(1).

14 **X. ACCESS**

15 Ecology or any Ecology authorized representative shall, after notice to Defendant or
16 Defendant's authorized representative, have access to enter and freely move about all property
17 at the Site that Defendant either owns, controls, or has access rights to at all reasonable times for
18 the purposes of, *inter alia*: inspecting records, operation logs, and contracts related to the work
19 being performed pursuant to this Decree; reviewing Defendant's progress in carrying out the
20 terms of this Decree; conducting such tests or collecting such samples as Ecology may deem
21 necessary; using a camera, sound recording, or other documentary type equipment to record
22 work done pursuant to this Decree; and verifying the data submitted to Ecology by Defendant.
23 Defendant shall make all reasonable efforts to secure access rights for those properties within
24 the Site not owned or controlled by Defendant where remedial activities or investigations will
25 be performed pursuant to this Decree.

1 Ecology or any Ecology authorized representative shall give reasonable notice before
2 entering any Site property owned or controlled by Defendant unless an emergency prevents such
3 notice. All Parties who access the Site pursuant to this section shall comply with any applicable
4 health and safety plan(s). Ecology employees and their representatives shall not be required to
5 sign any liability release or waiver as a condition of Site property access.

6 **XI. SAMPLING, DATA SUBMITTAL, AND AVAILABILITY**

7 With respect to the implementation of this Decree, Defendant shall make the results of
8 all sampling, laboratory reports, and/or test results generated by it or on its behalf available to
9 Ecology. Pursuant to WAC 173-340-840(5), all sampling data shall be submitted to Ecology in
10 accordance with Section XII (Progress Reports), Ecology's Toxics Cleanup Program Policy 840
11 (Data Submittal Requirements), and/or any subsequent procedures specified by Ecology for data
12 submittal.

13 If requested by Ecology, Defendant shall allow Ecology and/or its authorized
14 representative to take split or duplicate samples of any samples collected by Defendant pursuant
15 to the implementation of this Decree. Defendant shall notify Ecology seven (7) days in advance
16 of any sample collection or work activity at the Site. Ecology shall, upon request, allow
17 Defendant and/or its authorized representative to take split or duplicate samples of any samples
18 collected by Ecology pursuant to the implementation of this Decree, provided that doing so does
19 not interfere with Ecology's sampling. Without limitation on Ecology's rights under Section X
20 (Access), Ecology shall notify Defendant prior to any sample collection activity unless an
21 emergency prevents such notice.

22 In accordance with WAC 173-340-830(2)(a), all hazardous substance analyses shall be
23 conducted by a laboratory accredited under WAC 173-50 for the specific analyses to be
24 conducted, unless otherwise approved by Ecology.

XII. PROGRESS REPORTS

Defendant shall submit to Ecology written quarterly Progress Reports that describe the actions taken during the previous quarter to implement the requirements of this Decree. The Progress Reports shall include the following:

- A. A list of on-site activities that have taken place during the quarter.
- B. Detailed description of any deviations from required tasks not otherwise documented in project plans or amendment requests.
- C. Description of all deviations from the CAP and Schedule of Deliverables (Exhibits C and D) during the current quarter and any planned deviations in the upcoming quarter.
- D. For any deviations from the schedule, a plan for recovering lost time and maintaining compliance with the schedule.
- E. All raw data (including laboratory analyses) received by Defendant during the past quarter (if not previously submitted to Ecology) and an identification of the source of the sample.
- F. A list of planned activities for the upcoming quarter.
- G. A list of deliverables for the upcoming quarter if different from the schedule.

Progress Reports will be submitted according to the following schedule:

- The progress report for the first quarter of the year is due April 15.
- The progress report for the second quarter of the year is due July 15.
- The progress report for the third quarter is due October 15.
- The progress report for the fourth quarter of the year is due January 15 of the following year.

The obligation to submit quarterly Progress Reports begins with the first completed quarter after the effective date of this Decree. Unless otherwise specified, Progress Reports and any other

1 documents submitted pursuant to this Decree shall be sent by electronic mail to Ecology's project
2 coordinator.

3 **XIII. RETENTION OF RECORDS**

4 During the pendency of this Decree, and for ten (10) years from the date this Decree is
5 no longer in effect as provided in Section XXIX (Duration of Decree), Defendant shall preserve
6 all records, reports, documents, and underlying data in its possession relevant to the
7 implementation of this Decree and shall insert a similar record retention requirement into all
8 contracts with project contractors and subcontractors. Upon request of Ecology, Defendant shall
9 make all records available to Ecology and allow access for review within a reasonable time.

10 Nothing in this Decree is intended by Defendant to waive any right it may have under
11 applicable law to limit disclosure of documents protected by the attorney work-product privilege
12 and/or the attorney-client privilege. If Defendant withholds any requested records based on an
13 assertion of privilege, Defendant shall provide Ecology with a privilege log specifying the
14 records withheld and the applicable privilege. No Site-related data collected pursuant to this
15 Decree shall be considered privileged.

16 **XIV. TRANSFER OF INTEREST IN PROPERTY**

17 No voluntary conveyance or relinquishment of title, easement, leasehold, or other interest
18 in any portion of the Site shall be consummated by Defendant without provision for continued
19 operation and maintenance of any containment system, treatment system, and/or monitoring
20 system installed or implemented pursuant to this Decree.

21 Prior to Defendant's transfer of any interest in all or any portion of the Site, and during
22 the effective period of this Decree, Defendant shall provide a copy of this Decree to any
23 prospective purchaser, lessee, transferee, assignee, or other successor in said interest. Upon
24 transfer of any interest, Defendant shall notify all transferees of the restrictions on the activities
25 and uses of the property under this Decree and incorporate any such use restrictions into the
26 transfer documents. Defendant shall notify Ecology of any transfer of interest at least thirty (30)

1 days prior to said transfer, provided that no such notice is required of leases to tenants, unless
2 the tenant is permitted to any activity that may be inconsistent with the CAP or potentially
3 disrupts any engineered or institutional controls implemented as part of the remedy.

4 **XV. RESOLUTION OF DISPUTES**

5 A. In the event that Defendant elects to invoke dispute resolution, Defendant must
6 utilize the procedure set forth below.

7 1. Upon the triggering event (receipt of Ecology's project coordinator's
8 written decision or an itemized billing statement), Defendant has fourteen (14) calendar
9 days within which to notify Ecology's project coordinator in writing of its dispute
10 (Informal Dispute Notice).

11 2. The Parties' project coordinators shall then confer in an effort to resolve
12 the dispute informally. The parties shall informally confer for up to fourteen (14)
13 calendar days from receipt of the Informal Dispute Notice. If the project coordinators
14 cannot resolve the dispute within those 14 calendar days, then within seven (7) calendar
15 days Ecology's project coordinator shall issue a written decision (Informal Dispute
16 Decision) stating: the nature of the dispute; the Defendant's position with regards to the
17 dispute; Ecology's position with regards to the dispute; and the extent of resolution
18 reached by informal discussion.

19 3. Defendant may then request regional management review of the dispute.
20 This request (Formal Dispute Notice) must be submitted in writing to the Northwest
21 Region Toxics Cleanup Section Manager within seven (7) calendar days of receipt of
22 Ecology's Informal Dispute Decision. The Formal Dispute Notice shall include a written
23 statement of dispute setting forth: the nature of the dispute; the disputing Party's position
24 with respect to the dispute; and the information relied upon to support its position.
25
26

1 4. The Section Manager shall conduct a review of the dispute and shall issue
2 a written decision regarding the dispute (Decision on Dispute) within thirty (30) calendar
3 days of receipt of the Formal Dispute Notice.

4 5. If Defendant finds Ecology's Regional Section Manager's decision
5 unacceptable, Defendant may then request final management review of the decision. This
6 request (Final Review Request) shall be submitted in writing to the Toxics Cleanup
7 Program Manager within seven (7) calendar days of Defendant's receipt of the Decision
8 on Dispute. The Final Review Request shall include a written statement of dispute setting
9 forth: the nature of the dispute; the disputing Party's position with respect to the dispute;
10 and the information relied upon to support its position.

11 6. Ecology's Toxics Cleanup Program Manager shall conduct a review of
12 the dispute and shall issue a written decision regarding the dispute (Final Decision on
13 Dispute) within thirty (30) calendar days of receipt of the Final Review Request. The
14 Toxics Cleanup Program Manager's decision shall be Ecology's final decision on the
15 disputed matter.

16 B. If Ecology's Final Decision on Dispute is unacceptable to Defendant, Defendant
17 has the right to submit the dispute to the Court for resolution. The Parties agree that one judge
18 should retain jurisdiction over this case and shall, as necessary, resolve any dispute arising under
19 this Decree. In the event Defendant presents an issue to the Court for review, the Court shall
20 review the action or decision of Ecology on the basis of whether such action or decision was
21 arbitrary and capricious and render a decision based on such standard of review.

22 C. The Parties agree to only utilize the dispute resolution process in good faith and
23 agree to expedite, to the extent possible, the dispute resolution process whenever it is used.
24 Where either party utilizes the dispute resolution process in bad faith or for purposes of delay,
25 the other party may seek sanctions.

1 D. Implementation of these dispute resolution procedures shall not provide a basis
2 for delay of any activities required in this Decree, unless Ecology agrees in writing to a schedule
3 extension or the Court so orders.

4 E. In case of a dispute, failure to either proceed with the work required by this
5 Decree or timely invoke dispute resolution may result in Ecology's determination that
6 insufficient progress is being made in preparation of a deliverable, and may result in Ecology
7 undertaking the work under Section XXVI (Implementation of Remedial Action).

8 **XVI. AMENDMENT OF DECREE**

9 The project coordinators may agree to minor changes to the work to be performed
10 without formally amending this Decree. Minor changes will be documented in writing by
11 Ecology.

12 Substantial changes to the work to be performed shall require formal amendment of this
13 Decree. This Decree may only be formally amended by a written stipulation among the Parties
14 that is entered by the Court, or by order of the Court. Such amendment shall become effective
15 upon entry by the Court.

16 When requesting a substantial change to the work to be performed, Defendant shall
17 submit a written request for amendment to Ecology for approval. Ecology shall indicate its
18 approval or disapproval in writing in a timely manner after the written request for amendment is
19 received. If the amendment to the Decree is a substantial change, Ecology will provide public
20 notice and opportunity for comment. Reasons for the disapproval of a proposed amendment to
21 the Decree shall be stated in writing. If Ecology does not agree to a proposed amendment, the
22 disagreement may be addressed through the dispute resolution procedures described in
23 Section XV (Resolution of Disputes).

24 **XVII. EXTENSION OF SCHEDULE**

25 A. An extension of schedule shall be granted only when a request for an extension
26 is submitted in a timely fashion, generally at least thirty (30) days prior to expiration of the

1 deadline for which the extension is requested, and good cause exists for granting the extension.

2 All extensions shall be requested in writing. The request shall specify:

- 3 1. The deadline that is sought to be extended.
- 4 2. The length of the extension sought.
- 5 3. The reason(s) for the extension.
- 6 4. Any related deadline or schedule that would be affected if the extension
7 were granted.

8 B. The burden shall be on Defendant to demonstrate to the satisfaction of Ecology
9 that the request for such extension has been submitted in a timely fashion and that good cause
10 exists for granting the extension. Good cause may include, but may not be limited to:

- 11 1. Circumstances beyond the reasonable control and despite the due
12 diligence of Defendant including delays caused by unrelated third parties or Ecology,
13 such as (but not limited to) delays by Ecology in reviewing, approving, or modifying
14 documents submitted by Defendant.
- 15 2. A shelter in place or work stoppage mandated by government order due
16 to public health and safety emergencies.
- 17 3. Acts of God, including fire, flood, blizzard, extreme temperatures, storm,
18 or other unavoidable casualty.
- 19 4. Endangerment as described in Section XVIII (Endangerment).

20 However, neither increased costs of performance of the terms of this Decree nor changed
21 economic circumstances shall be considered circumstances beyond the reasonable control of
22 Defendant.

23 C. Ecology shall act upon any written request for extension in a timely fashion.
24 Ecology shall give Defendant written notification of any extensions granted pursuant to this
25 Decree. A requested extension shall not be effective until approved by Ecology or, if required,
26

1 by the Court. Unless the extension is a substantial change, it shall not be necessary to amend this
2 Decree pursuant to Section XVI (Amendment of Decree) when a schedule extension is granted.

3 D. An extension shall only be granted for such period of time as Ecology determines
4 is reasonable under the circumstances. Ecology may grant schedule extensions exceeding
5 ninety (90) days only as a result of:

6 1. Delays in the issuance of a necessary permit which was applied for in a
7 timely manner.

8 2. Other circumstances deemed exceptional or extraordinary by Ecology.

9 3. Endangerment as described in Section XVIII (Endangerment).

10 XVIII. ENDANGERMENT

11 In the event Ecology determines that any activity being performed at the Site under this
12 Decree is creating or has the potential to create a danger to human health or the environment,
13 Ecology may direct Defendant to cease such activities for such period of time as it deems
14 necessary to abate the danger. Defendant shall immediately comply with such direction.

15 In the event Defendant determines that any activity being performed at the Site under
16 this Decree is creating or has the potential to create a danger to human health or the environment,
17 Defendant may cease such activities. Defendant shall notify Ecology's project coordinator as
18 soon as possible, but no later than twenty-four (24) hours after making such determination or
19 ceasing such activities. Upon Ecology's direction, Defendant shall provide Ecology with
20 documentation of the basis for the determination or cessation of such activities. If Ecology
21 disagrees with Defendant's cessation of activities, it may direct Defendant to resume such
22 activities.

23 If Ecology concurs with or orders a work stoppage pursuant to this section, Defendant's
24 obligations with respect to the ceased activities shall be suspended until Ecology determines the
25 danger is abated, and the time for performance of such activities, as well as the time for any other
26 work dependent upon such activities, shall be extended, in accordance with Section XVII

1 (Extension of Schedule), for such period of time as Ecology determines is reasonable under the
2 circumstances.

3 Nothing in this Decree shall limit the authority of Ecology, its employees, agents, or
4 contractors to take or require appropriate action in the event of an emergency.

5 **XIX. COVENANT NOT TO SUE**

6 A. Covenant Not to Sue: In consideration of Defendant's compliance with the terms
7 and conditions of this Decree, Ecology covenants not to institute legal or administrative actions
8 against Defendant regarding the release or threatened release of hazardous substances covered
9 by this Decree. This Covenant Not to Sue includes the release or threatened release of hazardous
10 substances at the Site, including releases to Salmon Bay, excluding only liability connected with
11 new releases of hazardous substances that occur wholly after the effective date of this Consent
12 Decree. This includes Salmon Bay Sediments in their entirety, irrespective of whether hazardous
13 substances from the Site have come to be located in Salmon Bay Sediments.

14 In entering into this Decree, the Parties took into consideration the information and data
15 contained in Ecology's possession and in the documents identified in Exhibit E (References).
16 Ecology determined that the Defendant has neither operated or owned the facility and has no
17 known potential liability for releases in any amount or toxicity at the facility. Ecology evaluated
18 the known information of the facility and the linear length of the waterfront at the East and West
19 Waterfront parcels to be purchased by Defendant, and applied a reasonable risk multiplier to
20 account for the uncertainty resulting from the limited sediment data currently available for
21 Salmon Bay Sediments. Ecology considered the following factors when entering into this
22 Decree: The prior, current, and future cleanups in Salmon Bay; no final cleanup levels have been
23 established for Salmon Bay Sediments; final cleanup levels for Salmon Bay Sediments will not
24 likely be established for several years; and that sediment data collected by others may reveal
25 contaminants of concern for Salmon Bay Sediments not identified in this Consent Decree or that
26 the spatial distribution of TOC contamination may be larger than currently understood in

1 reaching the Sediment Settlement amount set forth in this Decree. Ecology has determined that
2 the Sediment Settlement will yield substantial new resources to Ecology to facilitate
3 investigative and cleanup activities related to Salmon Bay Sediments and, by allowing Defendant
4 to resolve its potential prospective purchaser liability with Ecology, will facilitate the reuse of
5 adjacent upland parcels currently owned by an entity undergoing a bankruptcy liquidation.

6 Ecology retains all of its authority relative to any substance or area not covered by this
7 Decree. In addition, this Decree does not settle any potential liability Defendant may incur for
8 acquiring any further interest in the Site not addressed under this Decree.

9 This Covenant Not to Sue shall have no applicability whatsoever to:

- 10 1. Criminal liability.
- 11 2. Liability for damages to natural resources.
- 12 3. Any Ecology action, including cost recovery, against PLPs not a party to
13 this Decree.

14 The Covenant Not to Sue expressly requires Defendant (and successors) follow all
15 applicable laws and regulations when conducting over-water or in-water work on the existing
16 dock structure, including necessary sediment remediation if there are pilings removed and such
17 regulations require sediment remediation. Nothing in this Covenant shall limit the Washington
18 State Department of Natural Resources' management authority over state-owned aquatic lands,
19 including initiating enforcement proceedings to ensure compliance with all lawful requirements
20 for sediment remediation for the existing or future dock structures in the event of over-water or
21 in-water work.

22 B. Reopeners: Ecology specifically reserves the right to institute legal or
23 administrative action against Defendant to require it to perform additional remedial actions at
24 the Site and to pursue appropriate cost recovery, pursuant to RCW 70A.305.050 under the
25 following circumstances:
26

1 1. Upon Defendant's failure to meet the requirements of this Decree, but
2 only to enforce the existing requirements, including amendments, of the Decree.

3 2. Upon Ecology's determination that remedial action beyond the terms of
4 this Decree is necessary to abate an imminent and substantial endangerment to human
5 health or the environment.

6 3. Upon the availability of new information regarding factors previously
7 unknown to Ecology, including the nature or quantity of hazardous substances at the Site,
8 and Ecology's determination, in light of this information, that further remedial action is
9 necessary at the Site to protect human health or the environment.

10 4. Upon Ecology's determination that there is a failure of the remedial action
11 to meet the cleanup standard and/or additional remedial actions are necessary to achieve
12 cleanup standards, within the reasonable restoration time frame set forth in the CAP.

13 5. Upon Defendant's failure to meet the payment requirements set forth in
14 the Sediment Settlement section, Section VI.C, of this Decree.

15 C. Except in the case of an emergency, prior to instituting legal or administrative
16 action against Defendant pursuant to this section, Ecology shall provide Defendant with
17 fifteen (15) calendar days notice of such action.

18 **XX. CONTRIBUTION PROTECTION**

19 With regard to claims for contribution against Defendant, the Parties agree that
20 Defendant is entitled to protection against claims for contribution for matters addressed in this
21 Decree as provided by RCW 70A.305.040(4)(d).

22 **XXI. LAND USE RESTRICTIONS**

23 Where an environmental covenant is required, and in consultation with Defendant,
24 Ecology will prepare the Environmental (Restrictive) Covenant consistent with WAC 173-
25 340-440 and RCW 64.70. After approval by Ecology, Defendant shall record the Environmental
26 (Restrictive) Covenant with the office of the King County Recorder within ten (10) business

1 days of receipt of Ecology's written approval of the Environmental (Restrictive) Covenant.
2 Defendant and Ecology will consult on the specific requirements of the required Environmental
3 (Restrictive) Covenant upon completion of Remedial Action Performance Monitoring for soil
4 and upon completion of the first Periodic Review (as required by Section XXVII (Periodic
5 Review)) for groundwater. The Environmental (Restrictive) Covenant shall restrict future
6 activities and uses of the Site as agreed to by Ecology and Defendant. Defendant shall provide
7 Ecology with the original recorded Environmental (Restrictive) Covenant within thirty (30) days
8 of the recording date.

9 **XXII. FINANCIAL ASSURANCES**

10 Pursuant to WAC 173-340-440(11), Defendant shall maintain sufficient and adequate
11 financial assurance mechanisms to cover all costs associated with the long-term effectiveness
12 for the operation and maintenance of the remedial action to be conducted under this Decree at
13 the Site, including institutional controls, compliance monitoring, and corrective measures.

14 Within sixty (60) days of the effective date of this Decree, Defendant shall submit to
15 Ecology for review and approval an estimate of the costs that it will incur in carrying out the
16 terms of this Decree for operation and maintenance of the cleanup action, including institutional
17 controls, compliance monitoring, and corrective measures. Within sixty (60) days after Ecology
18 approves the aforementioned cost estimate, Defendant shall provide proof of financial
19 assurances sufficient to cover all such costs in a form acceptable to Ecology.

20 Defendant shall adjust the financial assurance coverage and provide Ecology's project
21 coordinator with documentation of the updated financial assurance for:

22 A. Inflation, annually, within thirty (30) days of the anniversary date of the entry of
23 this Decree; or if applicable, the modified anniversary date established in accordance with this
24 section, or if applicable, ninety (90) days after the close of Defendant's fiscal year if the financial
25 test or corporate guarantee is used.

1 B. Changes in cost estimates, within thirty (30) days of issuance of Ecology's
2 approval of a modification or revision to the CAP that result in increases to the cost or expected
3 duration of remedial actions. Any adjustments for inflation since the most recent preceding
4 anniversary date shall be made concurrent with adjustments for changes in cost estimates. The
5 issuance of Ecology's approval of a revised or modified CAP will revise the anniversary date
6 established under this section to become the date of issuance of such revised or modified CAP.

7 **XXIII. INDEMNIFICATION**

8 Defendant agrees to indemnify and save and hold the State of Washington, its employees,
9 and agents harmless from any and all claims or causes of action (1) for death or injuries to
10 persons, or (2) for loss or damage to property to the extent arising from or on account of acts or
11 omissions of Defendant, its officers, employees, agents, or contractors in entering into and
12 implementing this Decree. However, Defendant shall not indemnify the State of Washington nor
13 save nor hold its employees and agents harmless from any claims or causes of action to the extent
14 arising out of the negligent acts or omissions of the State of Washington, or the employees or
15 agents of the State, in entering into or implementing this Decree.

16 **XXIV. COMPLIANCE WITH APPLICABLE LAWS**

17 A. All actions carried out by Defendant pursuant to this Decree shall be done in
18 accordance with all applicable federal, state, and local requirements, including requirements to
19 obtain necessary permits, except as provided in RCW 70A.305.090. The permits or other federal,
20 state, or local requirements that the agency has determined are applicable and that are known at
21 the time of entry of this Decree have been identified in the CAP (Exhibit C).

22 B. Pursuant to RCW 70A.305.090(1), Defendant is exempt from the procedural
23 requirements of RCW 70.94, 70.95, 70.105, 77.55, 90.48, and 90.58 and of any laws requiring
24 or authorizing local government permits or approvals. However, Defendant shall comply with
25 the substantive requirements of such permits or approvals. The exempt permits or approvals and
26

1 the applicable substantive requirements of those permits or approvals, as they are known at the
2 time of entry of this Decree, have been identified in the CAP (Exhibit C).

3 Defendant has a continuing obligation to determine whether additional permits or
4 approvals addressed in RCW 70A.305.090(1) would otherwise be required for the remedial
5 action under this Decree. In the event either Defendant or Ecology determines that additional
6 permits or approvals addressed in RCW 70A.305.090(1) would otherwise be required for the
7 remedial action under this Decree, it shall promptly notify the other party of this determination.
8 Ecology shall determine whether Ecology or Defendant shall be responsible to contact the
9 appropriate state and/or local agencies. If Ecology so requires, Defendant shall promptly consult
10 with the appropriate state and/or local agencies and provide Ecology with written documentation
11 from those agencies of the substantive requirements those agencies believe are applicable to the
12 remedial action. Ecology shall make the final determination on the additional substantive
13 requirements that must be met by Defendant and on how Defendant must meet those
14 requirements. Ecology shall inform Defendant in writing of these requirements. Once established
15 by Ecology, the additional requirements shall be enforceable requirements of this Decree.
16 Defendant shall not begin or continue the remedial action potentially subject to the additional
17 requirements until Ecology makes its final determination.

18 C. Pursuant to RCW 70A.305.090(2), in the event Ecology determines that the
19 exemption from complying with the procedural requirements of the laws referenced in
20 RCW 70A.305.090(1) would result in the loss of approval from a federal agency that is necessary
21 for the state to administer any federal law, the exemption shall not apply and Defendant shall
22 comply with both the procedural and substantive requirements of the laws referenced in
23 RCW 70A.305.090(1), including any requirements to obtain permits.

24 **XXV. REMEDIAL ACTION COSTS**

25 Defendant shall pay to Ecology costs incurred by Ecology pursuant to this Decree and
26 consistent with WAC 173-340-550(2). These costs shall include work performed by Ecology or

1 its contractors for, or on, the Site under RCW 70A.305, including remedial actions and Decree
2 preparation, negotiation, oversight, and administration. These costs shall include work
3 performed both prior to and subsequent to the entry of this Decree. Ecology's costs shall include
4 costs of direct activities and support costs of direct activities as defined in WAC 173-340-550(2).
5 Additional technical assistance costs may accumulate and continue to be invoiced independently
6 pursuant to the separate Voluntary Cleanup Program (VCP) agreement. Ecology has
7 accumulated \$9,744.50 in non-VCP remedial action costs related to this facility as of May 31,
8 2020. Payment for this amount shall be submitted within thirty (30) days of the effective date of
9 this Decree. For all non-VCP costs incurred subsequent to May 31, 2020, Defendant shall pay
10 the required amount within thirty (30) days of receiving from Ecology an itemized statement of
11 costs that includes a summary of costs incurred, an identification of involved staff, and the
12 amount of time spent by involved staff members on the project. A general statement of work
13 performed will be provided upon request. Itemized statements shall be prepared quarterly.
14 Pursuant to WAC 173-340-550(4), failure to pay Ecology's costs within ninety (90) days of
15 receipt of the itemized statement of costs will result in interest charges at the rate of twelve
16 percent (12%) per annum, compounded monthly.

17 In addition to other available relief, pursuant to RCW 70A.305.060, Ecology has
18 authority to recover unreimbursed remedial action costs by filing a lien against real property
19 subject to the remedial actions.

20 **XXVI. IMPLEMENTATION OF REMEDIAL ACTION**

21 If Ecology determines that the Defendant has failed to make sufficient progress or failed
22 to implement the remedial action, in whole or in part, Ecology may, after notice to Defendant,
23 perform any or all portions of the remedial action or at Ecology's discretion allow the Defendant
24 opportunity to correct. The Defendant shall reimburse Ecology for the costs of doing such work
25 in accordance with Section XXV (Remedial Action Costs).

1 Except where necessary to abate an emergency situation, Defendant shall not perform
2 any remedial actions at the Site outside those remedial actions required by this Decree, unless
3 Ecology concurs, in writing, with such additional remedial actions pursuant to Section XVI
4 (Amendment of Decree).

5 **XXVII. PERIODIC REVIEW**

6 As remedial action, including groundwater monitoring, continues at the Site, the Parties
7 agree to review the progress of remedial action at the Site, and to review the data accumulated
8 as a result of monitoring the Site as often as is necessary and appropriate under the
9 circumstances. At least every five (5) years after the initiation of cleanup action at the Site the
10 Parties shall meet to discuss the status of the Site and the need, if any, for further remedial action
11 at the Site. At least ninety (90) days prior to each periodic review, Defendant shall submit a
12 report to Ecology that documents whether human health and the environment are being protected
13 based on the factors set forth in WAC 173-340-420(4). Under Section XIX (Covenant Not to
14 Sue), Ecology reserves the right to require further remedial action at the Site under appropriate
15 circumstances. This provision shall remain in effect for the duration of this Decree.

16 **XXVIII. PUBLIC PARTICIPATION**

17 A Public Participation Plan is required for this Site. Ecology shall review any existing
18 Public Participation Plan to determine its continued appropriateness and whether it requires
19 amendment, or if no plan exists, Ecology shall develop a Public Participation Plan alone or in
20 conjunction with Defendant.

21 Ecology shall maintain the responsibility for public participation at the Site. However,
22 Defendant shall cooperate with Ecology, and shall:

23 A. If agreed to by Ecology, develop appropriate mailing lists, prepare drafts of public
24 notices and fact sheets at important stages of the remedial action, such as the submission of work
25 plans, remedial investigation/feasibility study reports, cleanup action plans, and engineering
26

1 design reports. As appropriate, Ecology will edit, finalize, and distribute such fact sheets and
2 prepare and distribute public notices of Ecology's presentations and meetings.

3 B. Notify Ecology's project coordinator prior to the preparation of all press releases
4 and fact sheets, and before major meetings with the interested public and local governments.
5 Likewise, Ecology shall notify Defendant prior to the issuance of all press releases and fact
6 sheets, and before major meetings with the interested public and local governments. For all press
7 releases, fact sheets, meetings, and other outreach efforts by Defendant that do not receive prior
8 Ecology approval, Defendant shall clearly indicate to its audience that the press release, fact
9 sheet, meeting, or other outreach effort was not sponsored or endorsed by Ecology.

10 C. When requested by Ecology, participate in public presentations on the progress
11 of the remedial action at the Site. Participation may be through attendance at public meetings to
12 assist in answering questions, or as a presenter.

13 D. When requested by Ecology, arrange and/or continue an information repository
14 at the following location:

15 Ecology's Northwest Regional Office
16 3190 160th Avenue Southeast
Bellevue, WA 98008

17 At a minimum, copies of all public notices, fact sheets, and documents relating to public
18 comment periods shall be promptly placed in these repositories. A copy of all documents related
19 to this Site shall be maintained in the repository at Ecology's Northwest Regional Office in
20 Bellevue, Washington. Additional repositories may be established by Ecology based on public
21 health conditions and the availability of additional public facilities.

22 **XXIX. DURATION OF DECREE**

23 The remedial program required pursuant to this Decree shall be maintained and continued
24 until Defendant has received written notification from Ecology that the requirements of this
25 Decree have been satisfactorily completed. This Decree shall remain in effect until dismissed by
26 the Court. When dismissed, Section XIII (Retention of Records), Section XIX (Covenant Not to

1 Sue), and Section XX (Contribution Protection) shall survive. In the event Defendant assigns
2 this Decree and that successor in interest or assign becomes party to this Decree as specified in
3 Section XVI (Amendment of Decree), Section XIX (Covenant Not to Sue) and Section XX
4 (Contribution Protection) shall remain applicable to Defendant.

5 **XXX. CLAIMS AGAINST THE STATE**

6 Defendant hereby agrees that it will not seek to recover any costs accrued in
7 implementing the remedial action required by this Decree from the State of Washington or any
8 of its agencies; and further, that Defendant will make no claim against the State Toxics Control
9 Account or any local Toxics Control Account for any costs incurred in implementing this Decree.
10 Except as provided above, however, Defendant expressly reserves its right to seek to recover
11 any costs incurred in implementing this Decree from any other PLP. This section does not limit
12 or address funding that may be provided under WAC 173-322.

13 **XXXI. EFFECTIVE DATE**

14 This Decree is effective only upon the date (Effective Date) that title to the Property vests
15 in Defendant, following entry of this Decree by the Court. If Defendant does not purchase the
16 Property by December 31, 2020, this Decree shall be null and void, and Defendant will be under
17 no obligation to perform the work required by this Decree.

18 **XXXII. WITHDRAWAL OF CONSENT**

19 If the Court withholds or withdraws its consent to this Decree, it shall be null and void at

20 //
21 //
22 //
23 //
24 //
25 //

1 the option of any party and the accompanying Complaint shall be dismissed without costs and
2 without prejudice. In such an event, no party shall be bound by the requirements of this Decree.

3
4 STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

ROBERT W. FERGUSON
Attorney General

5 *s/ Rebecca S. Lawson*

s/ Allyson C. Bazan

6 _____
Rebecca Lawson
Interim Program Manager
7 Toxics Cleanup Program
360-407-7177

8 _____
Allyson C. Bazan, WSBA # 44221
Assistant Attorney General
360-586-3589

9 Date: 9/29/2020 _____

Date: 10/7/2020 _____

10 TOC Seattle Terminal, LLC

11 *s/ Doug Ciserella*

12 _____
Doug Ciserella
Manager
13 773-722-9200

14 Date: 10/9/2020 _____

15 ENTERED this _____ day of _____ 2020.

16
17
18 _____
JUDGE
King County Superior Court

King County Superior Court
Judicial Electronic Signature Page

Case Number: 20-2-15215-3
Case Title: State of Washington vs TOC Seattle Terminal
Document Title: Order
Signed By: Commissioner Henry Judson
Date: October 15, 2020



Judge/Commissioner: Commissioner Henry
Judson

This document is signed in accordance with the provisions in GR 30.

Certificate Hash: 8488D7F9F8F23124E7BC1614CC3139B488987284
Certificate effective date: 1/29/2020 8:12:28 AM
Certificate expiry date: 1/29/2025 8:12:28 AM
Certificate Issued by: C=US, E=kcscefiling@kingcounty.gov, OU=KCDJA,
O=KCDJA, CN="Henry Judson: WlbTSZRJ6RG2ju
+3jC11QQ=="



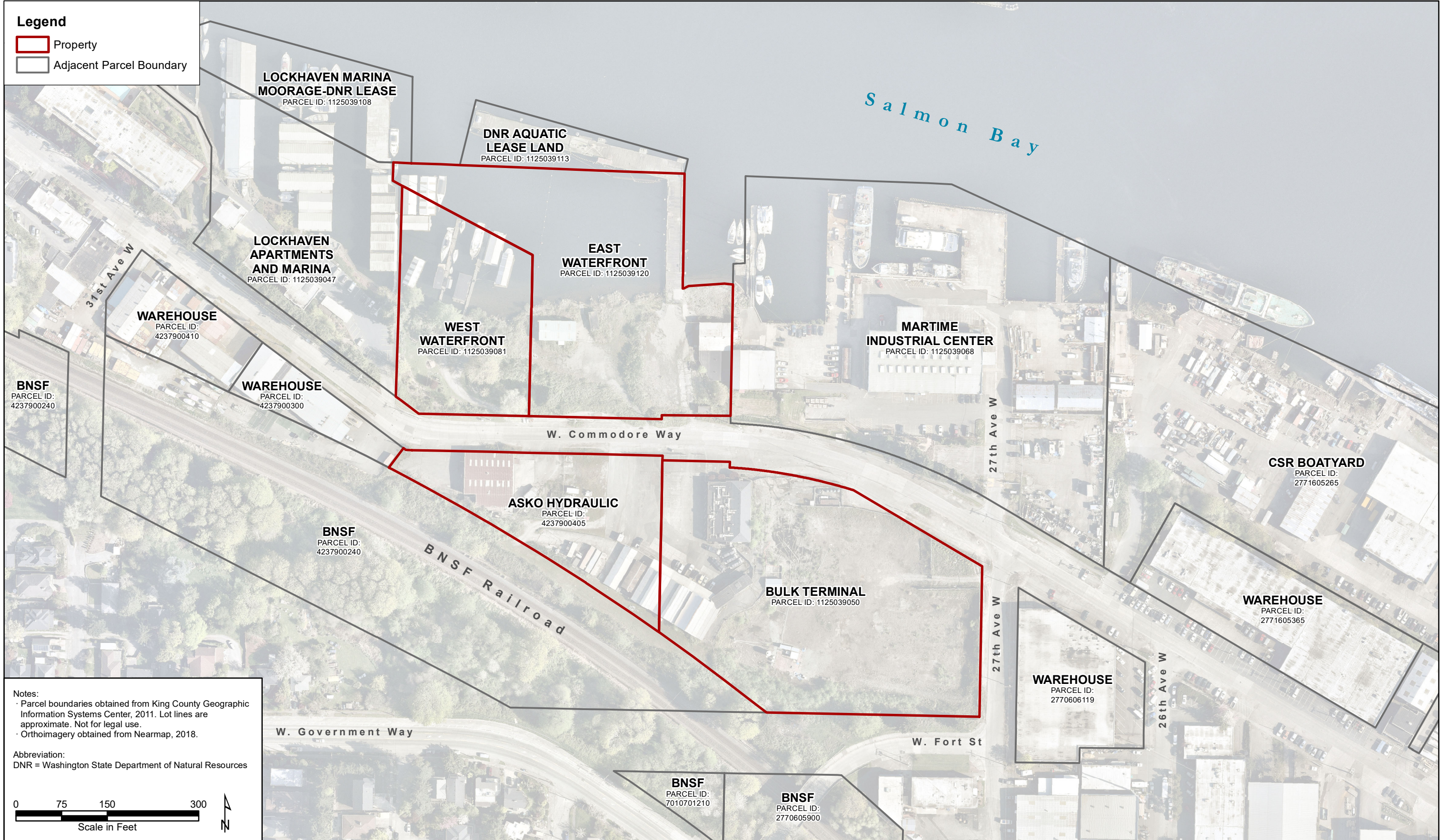
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**Prospective Purchaser
 Consent Decree
 Time Oil Bulk Terminal Site
 Seattle, Washington**

**Exhibit A-1
 General Site Vicinity**

Legend

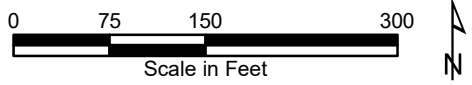
- Property
- Adjacent Parcel Boundary



Notes:

- Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
- Orthoimagery obtained from Nearmap, 2018.

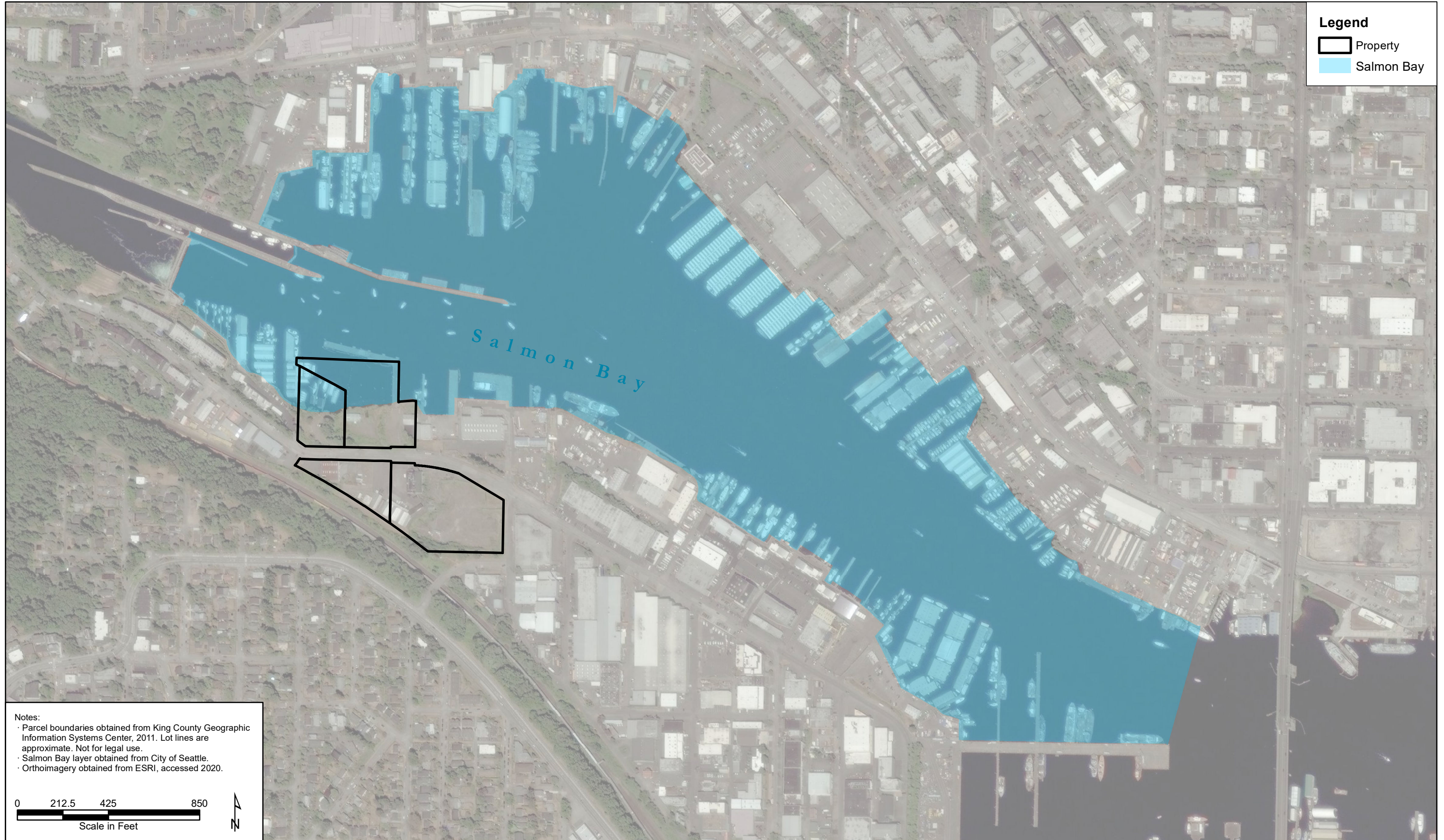
Abbreviation:
DNR = Washington State Department of Natural Resources



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**Prospective Purchaser Consent Decree
Time Oil Bulk Terminal Site
Seattle, Washington**

Exhibit A-2
Property



Legend

- Property
- Salmon Bay

Notes:

- Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
- Salmon Bay layer obtained from City of Seattle.
- Orthoimagery obtained from ESRI, accessed 2020.

0 212.5 425 850

Scale in Feet

N

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**Prospective Purchaser Consent Decree
 Time Oil Bulk Terminal Site
 Seattle, Washington**

Exhibit A-3
 Salmon Bay

EXHIBIT B

LEGAL DESCRIPTION

Parcel A

The easterly 78.025 feet of Lot 5 and all of Lots 6, 7, 8 and 9, Block 7, Seattle Tide Lands, in King County, Washington, as shown on the official maps on file in the office of the Commissioner of Public Lands at Olympia, Washington.

Parcel B

The east 111.04 feet of that portion of Government Lot 5 of Section 11, Township 25 North, Range 3 East, Willamette Meridian, in King County, Washington, lying north of West Commodore Way;

Together with that portion of Government Lot 5 of Section 11, Township 25 North, Range 3 East, Willamette Meridian, in King County, Washington, described as follows:

Beginning on the northerly line of Commodore Way as now established, at a point which is 111.004 feet west of the east line of said Government Lot;

Thence West along said north line of Commodore Way 219.00 feet;

Thence North parallel with the east line of said Government Lot to the southerly line of Block 7, Seattle Tide Lands;

Thence easterly along the southerly line of said Block to a point which is 111.004 feet west of the east line of said Government Lot;

Thence South to the point of beginning;

Except any portion thereof lying within the Seattle Tide Lands.

Parcel C

That portion of the east 111.04 feet Government Lot 5, Section 11, Township 25 North, Range 3 East, Willamette Meridian, in King County, Washington, lying south of Commodore Way and north of a line parallel to and 180.51 feet south of said south line of Commodore Way, measured along the east line of said Government Lot 5;

Except that portion thereof, if any, lying west of the east line of Block 5, Lawton Park, according to the plat thereof, recorded in Volume 12 of Plats, Page 56, in King County, Washington.

Parcel D

That portion of Government Lot 6, Section 11, Township 25 North, Range 3 East, Willamette Meridian, in King County, Washington, lying north of Fort Street (formerly Government Way), west of 27th Avenue West, and south of Commodore Way;

Except the following portion:

Beginning at the southwest corner of said tract; Thence North along the west line of said Lot 6 a distance of 50.40 feet; Thence southeasterly a distance of 84.5 feet to the north line of Fort Street (formerly Government Way); Thence West to the point of beginning.

PROSPECTIVE PURCHASER
CONSENT DECREE

EXHIBIT B

LEGAL DESCRIPTION

Parcel E

That portion of the east 111.04 feet of Government Lot 5, Section 11, Township 25 North, Range 3 East, Willamette Meridian, in King County, Washington, lying northeasterly of that portion of the east 111.04 feet of said Government Lot 5 conveyed to the Great Northern Railway Company by deed recorded in Volume 726 of Deeds, at Page 372, under recording number 652106, records of King County, Washington, and southerly of a line parallel to and 180.51 feet southerly of the southerly margin of Commodore Way measured along the east line of said Government Lot 5;

Except that portion thereof, if any, lying west of the east line of Block 5, Lawton Park, according to the plat thereof, recorded in Volume 12 of Plats, Page 56, in King County, Washington.

Parcel F

That portion of Blocks 3, 4 and 5, Lawton Park, according to the plat thereof, recorded in Volume 12 of Plats, Page 56, in King County, Washington, and of vacated streets and alleys adjoining, described as follows:

Beginning at a point on the southerly margin of West Commodore Way distant South 54°01'35" East 190 feet from the northwesterly line of Lot 1, Block 6, of said plat of Lawton Park; Thence South 35°58'25" West, parallel with said northwesterly line to the northeasterly margin of the Great Northern Railway right of way; Thence southeasterly along said margin 500 feet, more or less, to the east line of said Block 5; Thence North 00°00'50" West 300 feet, more or less, to the northeast corner of said Block 5, said point being on the south margin of West Commodore Way; Thence westerly along said south margin 400 feet, more or less, to the point of beginning.

Parcel G

That portion of Government Lot 5, Section 11, Township 25 North, Range 3 East, Willamette Meridian, in King County, Washington, described as follows:

Beginning on the north line of Commodore Way as established at a point which is 330.004 feet west of the east line of said Government Lot;

Thence West and northwesterly along said Way line to a point on a line which is parallel with and 550 feet west of the east line of said Government Lot;

Thence North along said parallel line to the southerly line of Block 7, Seattle Tide Lands;

Thence easterly along said Block 7 to a point which is 330.004 feet west of the east line of said Government Lot;

Thence South to the beginning.



DEPARTMENT OF
ECOLOGY
State of Washington

Cleanup Action Plan

Time Oil Bulk Terminal Seattle, WA

Facility Site ID: 75486194
Cleanup Site ID: 14604

September 28, 2020

Publication and Contact Information

This document is available on the Department of Ecology's Time Oil Bulk Terminal website at: <https://apps.ecology.wa.gov/gsp/Sitepage.aspx?csid=14604>. Other ways to access this document in electronic or hard copy form can be found at www.ecology.wa.gov.

ADA Accessibility

To request an ADA accommodation, contact Ecology by phone at (360) 407-6831 or visit <https://ecology.wa.gov/accessibility>. For Relay Service or TTY call 711 or 877-833-6341.

Cleanup Action Plan

Time Oil Bulk Terminal Site Seattle, WA

Facility Site ID: 75486194
Cleanup Site ID: 14604

Toxics Cleanup Program
Washington State Department of Ecology
Northwest Regional Office
Bellevue, Washington

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Appendix A Draft Groundwater Monitoring Plan

List of Acronyms and Abbreviations

Acronym/ Abbreviation	Definition
AOC	Area of concern
APA	Asset purchase agreement
ASKO	ASKO Hydraulic
AST	Aboveground storage tank
bgs	Below ground surface
BNSF	BNSF Railway Company
CAA	Cleanup action area
Cantera	Cantera Development Group, LLC
CAP	Cleanup Action Plan
CCMP	Construction Compliance Monitoring Plan
CPOC	Conditional point of compliance
CSM	Conceptual Site Model
CUL	Cleanup level
cVOC	Chlorinated volatile organic compound
CY	Cubic yards
DCA	Disproportionate cost analysis
DNR	Washington State Department of Natural Resources
DRO	Diesel-range organics
Ecology	Washington State Department of Ecology
EDR	Engineering Design Report
FS	Feasibility Study
GMP	Groundwater Monitoring Plan
GRO	Gasoline-range organics
gZVI	Granular zero-valent iron
IC	Institutional control
IDP	Inadvertent Discovery Plan
IHS	Indicator hazardous substance
ISS	In situ solidification and stabilization
LNAPL	Light non-aqueous-phase liquid
LTCMP	Long-Term Compliance Monitoring Plan
mg/kg	Milligrams per kilogram
MNA	Monitored natural attenuation

Acronym/ Abbreviation	Definition
MTCA	Model Toxics Control Act
ORO	Oil-range organics
penta	Pentachlorophenol
POC	Point of compliance
PPCD	Prospective Purchaser Consent Decree
PRB	Permeable reactive barrier
Property	The parcels subject to an asset purchase agreement between the prospective purchaser and current owner (King County Parcel Nos. 1125039050, 1125039081, 1125039120, and 4237900405)
QAPP	Quality Assurance Project Plan
RAA	Remedial Action Area
RACR	Remedial Action Completion Report
RAO	Remedial Action Objective
RCW	Revised Code of Washington
REL	Remediation level
RI	Remedial Investigation
RI Work Plan	Supplemental Upland Remedial Investigation Work Plan
ROW	Right-of-way
SAP	Sampling and Analysis Plan
SES	SoundEarth Strategies, Inc.
Site	Time Oil Bulk Terminal Site
SMP	Soil Management Plan
SMS	Sediment Management Standards
SREMP	Soil and Remedial Element Management Plan
TBT	Tributyltin
TCE	Trichloroethene
TOC	TOC Holdings Co and any predecessor entity including Time Oil Company
TPH	Total petroleum hydrocarbons
UST	Underground storage tank
VI	Vapor intrusion
VCP	Voluntary Cleanup Program
WAC	Washington Administrative Code
WBZ	Water-bearing zone

1.0 Introduction

This document presents the Cleanup Action Plan (CAP) for certain portions of the Time Oil Bulk Terminal Site (**Site**) located in Seattle, Washington (Figure 1.1). Time Oil Company and its derivatives (collectively **TOC**) operated a bulk fuel storage and distribution facility (TOC Seattle Terminal) within the Site.

1.1 General Facility Information and Site/Property Definitions

Site Name: Time Oil Bulk Terminal

Facility Site ID No.: 75486194¹

Cleanup Site ID No.: 14604

Property Address: 2701–2805 W. Commodore Way, Seattle, 98199

Parcel Numbers: 112503-9050, -9081, -9113, -9120 and 423790-0405

Owner: Chapter 7 Trustee of the Bankruptcy Estate of TOC Holdings Co.

The Site, as defined under the Model Toxics Control Act (MTCA; Washington Administrative Code [WAC] 1730-340), is generally defined by where a hazardous substance, other than a consumer product in consumer use, has been deposited, stored, disposed of, or placed, or has otherwise come to be located. The Site includes multiple parcels where hazardous substances were released or have come to be located from industrial operations. Investigations show that multiple releases have commingled.

Multiple parcels within the Site are the subject of an asset purchase agreement (APA) between Cantera Development Group, LLC (Cantera) and Edmund J. Wood, Chapter 7 Trustee of the Bankruptcy Estate of TOC Holdings Co. (TOC), the current owner of the parcels. It is expected that Cantera will be assigning its rights to the parcels under the APA to a new entity, TOC Seattle Terminal, LLC, at the time of closing. The parcels subject to the APA are the Bulk Terminal parcel, the ASKO Hydraulic (ASKO) parcel, the East Waterfront parcel, and the West Waterfront parcel² (Figure 1.2). These parcels are collectively termed the **Property** for purposes of this CAP.

The Site also includes adjoining BNSF Railway Company (BNSF) property (BNSF parcel) and a Washington State Department of Natural Resources (DNR) Aquatic Waterway Use parcel (DNR parcel), and other potentially impacted areas including sediment in Salmon Bay (Figure 1.2). Cleanup of the BNSF parcel will be the subject of a separate legal agreement between BNSF and

¹ This Site comprises multiple previously listed Sites associated with various Facility Site ID numbers and Cleanup Site ID numbers. See Section 1.4 for more information on the regulatory history.

² In previous documents these parcels were identified as the Bulk Terminal Property, ASKO Property, East Waterfront Property, and West Waterfront Property.

Ecology. Cleanup actions for sediment areas of Salmon Bay, including the DNR parcel, are not included in this CAP.

1.2 Purpose

This document is a requirement of MTCA, RCW Chapter 70.105D, and WAC Chapter 173-340. The purpose of the CAP is to identify the proposed cleanup action at the Site; to establish the actions required to achieve a reasonable restoration time frame at the RAA, including engineered and institutional controls; and to identify the necessary requirements of engineering and monitoring plans, as further described in this document.

Specific MTCA requirements for CAPs are set forth in WAC 173-340-380(1). Consistent with these requirements, this CAP provides the following:

- Cleanup standards and remediation levels (RELs) for each hazardous substance in each medium of concern
- Summary of the remedial action alternatives considered in the Supplemental Upland Remedial Investigation (RI) and Feasibility Study (FS) for the RAA (Floyd|Snider 2020)
- Description of the proposed cleanup action, including justification for selection of the proposed cleanup action
- Implementation schedule
- Institutional controls (ICs)
- Restoration time frame
- Applicable state and federal laws
- Descriptions of the types, levels, and amounts of hazardous substances remaining in the RAA, and the measures that will be used to prevent migration and contact with those substances
- A preliminary determination that the proposed cleanup action will comply with WAC 173-340-360

In addition, this CAP includes an appended draft Groundwater Monitoring Plan (GMP) and describes contingency planning requirements.

1.3 Preliminary Determination

Ecology has made a preliminary determination that the cleanup described in this CAP will comply with the requirements for selection of a remedy under WAC 173-340-360. Specifically these requirements include a cleanup action that will be protective of human health and the environment, attain federal and state requirements that are applicable or relevant and

appropriate, comply with cleanup standards, provide for compliance monitoring, use permanent solutions to the maximum extent practicable, provide for a reasonable restoration time frame, and consider public concerns.

1.4 Project Background and Regulatory Overview

Documented investigation and remediation activities began at the Property in the early 1990s and have continued intermittently since then. TOC entered the Property into Ecology's Voluntary Cleanup Program (VCP) for technical advice and assistance on independent remedial actions for a period of time between approximately 2002 and 2007, and re-enrolled portions of the Property in the VCP in 2015. For administrative purposes, Ecology listed the parcels separately on the Confirmed and Suspected Sites List when TOC re-enrolled into VCP. The parcels were identified as follows:

- Bulk Terminal parcel (listed as Time Oil Co Seattle Terminal)
Facility Site ID No. 75486194
Cleanup Site ID No. 7123
VCP No. NW2948
- ASKO parcel (listed as Time Oil Co ASKO Property)
Facility Site ID No. 78837111
Cleanup Site ID No. 12548
VCP No. NW2950
- East Waterfront parcel (listed as Time Oil 2754 Commodore)
Facility Site No. 7417688
Cleanup Site ID No. 7740
VCP No. NW2949

SoundEarth Strategies, Inc. (SES) had previously prepared separate RI and FS reports for each of these parcels, which were submitted to Ecology in 2015 (SES 2014a, 2014b, 2014c, 2014d, 2014e, 2014f). Ecology responded with opinion letters on each parcel. SES conducted further investigation and remediation activities until mid-2016, when TOC filed for bankruptcy and terminated its VCP contract. The Property is currently owned by the Bankruptcy Estate of TOC Holdings, managed by a court-appointed Chapter 7 Trustee.

Cantera is currently in a due diligence process to evaluate environmental contamination and other feasibility issues associated with the Property. As part of the due diligence process, Cantera enrolled the Property into the VCP in July 2018. Ecology accepted the VCP application on July 10, 2018, and identified the Site as Time Oil Bulk Terminal with VCP Project No. NW3201.

A draft Supplemental Upland RI Work Plan (RI Work Plan) was submitted to Ecology by Cantera in October 2018. The RI Work Plan was finalized in March 2019 and approved by Ecology in

correspondence dated April 8, 2019 (Floyd|Snider 2019). The RI Work Plan focused on RAA investigations.

The supplemental upland RI field investigation collected groundwater and soil data between March and August 2019 to fill the remaining data gaps necessary to complete the Supplemental Upland RI/FS for the Property. A draft Supplemental Upland RI/FS was submitted by Cantera in September 2019 and a final draft submitted in June 2020 for public review and comment. The Supplemental Upland RI/FS was subsequently finalized in September 2020.

The RIs and FSs prepared by SES, the Supplemental Upland RI/FS prepared by Floyd|Snider, and other previously prepared remedial reports are the technical basis for the cleanup actions to be conducted at the RAA.

2.0 Site Location and Background

2.1 Location and Definition

2.1.1 Site Location

The Site is located on the south shore of Salmon Bay, part of the Lake Washington Ship Canal, and within the Interbay commercial/industrial district (Figure 1.1). This district includes the Port of Seattle's nearby Fishermen's Terminal. A large residential area, the Magnolia neighborhood occupies the upland area south of the Property.

The freshwater Salmon Bay terminates at the Hiram Chittenden locks, the closest portion of which is approximately 200 feet west of the Property. The marine waters of Shilshole Bay, part of Puget Sound, are on the west side of the locks at an elevation approximately 20 feet lower than the elevation of Salmon Bay.

Land use near the Property is residential to the west and commercial/industrial to the east. The area to the south is occupied by the BNSF railroad and beyond that a forested hillside bordering the Magnolia neighborhood.

2.1.2 Property Description

The Property encompasses a total of 10.42 acres, with 5.67 acres south of W. Commodore Way and 4.75 acres north of the roadway and along the Salmon Bay shoreline. W. Commodore Way, a dedicated easement to the City of Seattle right of way (ROW), runs between the Bulk Terminal and ASKO parcels and the East Waterfront and West Waterfront parcels (Figure 1.2).

The Property is composed of four King County tax parcels as mentioned before: Bulk Terminal parcel (No. 1125039050); ASKO parcel (No. 4237900405); East Waterfront parcel (No. 1125039120); and West Waterfront parcel (No. 1125039081).

The 4.10-acre Bulk Terminal parcel on the south side of W. Commodore Way at 2737 W. Commodore Way is bounded to the east by W. Fort Street and beyond by a multi-tenant warehouse building. An active BNSF mainline borders the Bulk Terminal parcel on the south.

The 1.57-acre ASKO parcel located on the south side of W. Commodore Way at 2805 W. Commodore way is bounded to the west by a multi-tenant warehouse building and beyond by 31st Avenue West. The BNSF mainline also borders this parcel on the south.

The 3.17-acre East Waterfront parcel located on the north side of W. Commodore Way at 2750 W. Commodore Way is bounded to the east by the Port of Seattle Maritime Industrial Center. Its northern boundary is within Salmon Bay.

The 1.58-acre West Waterfront parcel north of W. Commodore Way at 2800 W. Commodore Way is bounded to the west by the Lockhaven Apartments and Marina.

2.1.3 Zoning

The Property and immediately surrounding area have mixed industrial zoning designations. The East Waterfront and West Waterfront parcels are zoned by the City of Seattle as IG1 (focus on marine/rail industrial uses), and the Bulk Terminal and ASKO parcels are zoned IG2 (broader range of industrial function, including commercial). The City of Seattle prohibits residential use in all industrial zones.

2.2 Historical and Current Property Use

2.2.1 Historical Property Use

Former Property features and operational areas are shown on Figures 2.1a and 2.1b. A brief summary of the operational history of the Property is provided below.

Former TOC operations date back to 1941. The Bulk Terminal, ASKO, and East Waterfront parcels housed bulk petroleum storage and distributed petroleum products via ships, rail, and trucks. While primarily consisting of aboveground storage tanks (ASTs), there were also a few underground storage tanks (USTs) on the Property. Bulk petroleum was supplied to the facility primarily via railcar.

Key features of the Property during the historical operations included:

- A bulk petroleum tank farm containing 14 large-volume ASTs and a connecting complex of pipelines
- An additional 3 ASTs on the ASKO parcel
- An oil and solvent storage area, with adjoining steam cleaning area
- Railroad spur lines
- Barreling sheds where petroleum products were placed into barrels for shipment
- Two barrel inclines that carried filled barrels of petroleum products under W. Commodore Way to be loaded onto ships at the East Waterfront parcel
- Overhead loading racks that were used to fill tanker trucks with petroleum products
- An underground pipeline utilidor that extended beneath W. Commodore Way to the East Waterfront parcel
- Various vehicle and equipment maintenance facilities
- Pentachlorophenol mixing facilities

Beginning in the 1970s, TOC also leased a warehouse on the ASKO parcel to a series of hydraulic repair shops that conducted machine shop operations until sometime between 2015 and 2017.

On the East Waterfront parcel, TOC leased a portion of the Property to Icicle Seafoods who performed hydraulic equipment maintenance and was presumed to conduct sandblasting between 1980 and 1992 (TOC 1993).

An overview of the historical operations at the Property indicate that the West Waterfront parcel was not used for petroleum handling or other industrial operations, although historical aerial photos appear to show activity on the East Waterfront parcel extending onto the West Waterfront parcel at certain times. The West Waterfront parcel is developed with storage sheds and piers for recreational and houseboat moorage.

As noted previously, a BNSF rail line borders the south side of the Property. Four rail spurs formerly entered onto the Property from the main BNSF line (Figure 2.1a). One spur extended to the southeast end of the tank farm on the Bulk Terminal parcel. Large volumes of fuel reportedly arrived on rail cars and were transferred from tanker cars via hoses to the tank farm (Foster Wheeler 2000).

2.2.2 Current Property Condition, Utilities, and Use

Many of the historical structures/facilities noted in the previous section have been demolished and removed. In 2006, the large bulk petroleum ASTs and associated piping and infrastructure were removed by TOC. Also removed at different times were several USTs, the overhead loading racks, the barrel inclines, a solvent storage AST, and the utilidor piping.

The Property currently has a vacant office building, several unused sheds that were used to house stormwater and groundwater treatment systems during and after TOC operations, and remnant 1940s-era commercial/warehouse buildings (Figure 2.2). Other buildings include a former maintenance/machine shop, a storage building, a garage/shed, and a former laboratory.

The only active use of the Property is by Marine Service & Supply, a fishing marine supply retail operation. This company leases a portion of the commercial/warehouse space and uses existing asphalt paved areas for vehicle access and parking.

Areas not covered by buildings are paved with asphalt in poor to good condition or are unpaved and overgrown with grasses, blackberries, and other vegetation. Exceptions include areas in the former tank farm area within the Bulk Terminal parcel and within the East Waterfront parcel that were extensively disturbed during former demolition/remedial excavation efforts—these areas have native or fill soil at the surface. The Salmon Bay shoreline bank is covered with a heavily vegetated mix of soil and concrete/rock armoring.

The surface elevation of the Property drops approximately 45 feet downward from the south Property line to the shoreline at Salmon Bay. Slopes within the Property vary from nearly level to steeply dipping.

There is little or no stormwater run-on to the Property, and rain falling on the Property mostly infiltrates rather than entering into a storm drain system or discharging to Salmon Bay. In

particular, infiltration predominates in the former tank farm area (Bulk Terminal parcel) where the ground surface is relatively flat. Stormwater runoff that does occur in this area is captured in a permitted collection system that discharges to the sanitary sewer.

For areas west of the office building on the Bulk Terminal and ASKO parcels, runoff drains as sheet flow across paved and unpaved vegetated surfaces down towards W. Commodore Way, or is captured in catch basins located around the former maintenance/machine shop. In both instances, the flows enter the municipal storm drain system. Conditions are similar at the East Waterfront parcel, where any sheet flow that occurs drains down toward Salmon Bay; however direct discharge into the bay has not been observed.

Observations made during storm events indicate soil erosion and transport in stormwater runoff is not occurring, except potentially in the former tank farm area where bare soils are exposed; however, as noted above, runoff in this area is captured and discharged to the sanitary sewer.

The Property currently has connections for power, water, and sewer that extend to utility lines in the W. Commodore Way ROW. Utilities in the ROW include a large-diameter sewer main (Figure 2.2) constructed in the early 1900s. The sewer main is a 30- to 40-foot deep, 12-foot-diameter brick-lined tunnel that discharges westerly to the West Point treatment plant. An equally large-diameter sewer trunk line from the Magnolia neighborhood joins the main line from the south near the west edge of the ASKO parcel, and a smaller sewer trunk line joins where 27th Avenue W. meets W. Commodore Way (Figure 2.2).

2.2.3 Future Property Use

The mixed industrial zoning prohibits residential development, absent zoning changes in the future. Future use will, therefore, be limited to commercial and industrial development. This development and the remedial action will likely require that the RAA be cleared of all existing improvements and vegetation, along with significant excavation and grading.

2.3 Previous Studies and Interim Actions

Environmental investigations and actions that have been completed at the Property are summarized as follows:

- Phased soil and groundwater investigations were completed at the Property by the Foster Wheeler Corporation between 1999 and 2002. These investigations were focused primarily on the Bulk Terminal and East Waterfront parcels and included installation of 112 soil borings and 36 monitoring wells. Soil samples were collected during all soil boring installation events, and several rounds of groundwater monitoring at Property wells were completed between 1999 and 2005.
- Multiple RIs were completed by SES for the Bulk Terminal, ASKO, and East Waterfront parcels between 2006 and 2013. The scope of these RIs included installation and sampling

of 269 additional soil borings and installation and sampling of 85 additional monitoring wells. An additional 24 groundwater monitoring events for the RIs were completed for one or more parcels. The RIs also included aquifer testing and limited soil vapor sampling.

- Supplemental soil and groundwater investigations were completed by SES between 2014 and 2015, subsequent to the RIs. These investigations included installation and sampling of 35 additional soil borings and additional groundwater monitoring at existing wells.
- Supplemental RI field work was completed by Floyd|Snider in 2019. This investigation included installation of 17 additional monitoring wells, focused soil sampling, and Property-wide groundwater monitoring.

There have been numerous targeted interim cleanup actions completed at the Property, dating back as early as 1991 (Figure 2.3). Specifically, there have been numerous excavations at the Bulk Terminal and East Waterfront parcels that targeted removal of petroleum hydrocarbon-, pentachlorophenol (penta)/dioxin/furan-, and metals-impacted soils. In addition, a groundwater and light non-aqueous-phase liquid (LNAPL) treatment and recovery system operated on the Bulk Terminal parcel for approximately 5 years. The interim actions left concentrations of penta greater than the interim action level of 2.5 milligrams per kilogram (mg/kg) in soil, and the MTCA Method B cleanup level (CUL) of 0.05 mg/kg (see Table 3.1), and monitored natural attenuation (MNA) was the remaining phase of the remedy. Additional active cleanup for penta is not proposed in this CAP, and the remaining penta will continue to be monitored in groundwater.

2.4 Conceptual Site Model

A conceptual site model (CSM) of contaminant sources and migration at the Property is illustrated in Figure 2.4 and discussed below. Figures 2.5 and 2.6 provide additional cross-sections illustrating the extent and distribution of contaminants in soil and groundwater.

Soils at the Property consist of 2 to 5 feet of surface fill underlain by interglacial sediments to the depth explored, 20 to 60 feet. The fill is composed of sand, silty sand, and gravel. The interglacial sediments are composed of stiff silts interbedded with sands and silty sands.

Shallow groundwater occurs within the silty sands under perched, water table, and slightly confined conditions, and four water-bearing zones (WBZs) have been identified within the depth explored: the Perched WBZ, Shallow WBZ, Intermediate WBZ, and Deep WBZ. The top of the saturated zone for the Shallow WBZ, effectively the water table, ranges from less than 5 feet below ground surface (bgs) at the Salmon Bay shoreline to nearly 30 feet bgs at the upper south end of the Property.

Horizontal groundwater flow directions in the Perched and Shallow WBZs are to the north and west toward Salmon Bay. Vertical leakage downward also appears to be occurring between the four WBZs, and from groundwater in the Shallow WBZ into or along the sewer main in W. Commodore Way. The WBZs ultimately discharge into Salmon Bay and potentially Shilshole Bay.

Known past industrial operations and releases on the Bulk Terminal, ASKO, and East Waterfront parcels caused or contributed to the contamination at the Property. Sources of contamination include leaks and spills from:

- Petroleum storage and handling on the Bulk Terminal, ASKO, and East Waterfront parcels, including operation of USTs and ASTs; transfer of petroleum to barrels; and transportation of petroleum via loading racks, a barrel incline, and the underground pipeline utilidor
- Mixing diesel with penta in an AST on the Bulk Terminal parcel
- Machine shop and steam cleaning operations on the ASKO parcel
- Vehicle maintenance on the eastern portion of the East Waterfront parcel
- Icicle Seafood maintenance operations on the East Waterfront parcel including sandblasting and vehicle maintenance
- BNSF railroad product loading and off-loading operations

As a result of these releases, the primary contaminants at the Property consist of petroleum products (gasoline, diesel, oil), benzene, penta, chlorinated solvents (trichloroethene [TCE] and vinyl chloride [VC]), and heavy metals. It is also possible tributyltin (TBT) associated with boat maintenance activities may be present in soils within the East Waterfront parcel.

Leaks and spills of the contaminants referenced above have migrated downward through the soil to groundwater, creating contaminant plumes. Because the releases were from surface or near-surface sources and because of existing hydrogeologic conditions, most of the petroleum-contaminated soil is within 20 to 25 feet of ground surface, and most of the TCE-contaminated soil is within 30 to 40 feet of ground surface. The metals contamination, by contrast, is generally close to the surface. The lateral spread of contaminants in soil have been largely defined, except for metals in soil on the East Waterfront parcel.

The bulk of the groundwater contamination resulting from the leaks and spills referenced above also appears to be relatively shallow within the upper two WBZs (Perched and Shallow), although the Intermediate WBZ is impacted in some areas. In addition, two areas of petroleum LNAPL are present at measured thicknesses up to 5 feet on the Bulk Terminal parcel and the adjacent W. Commodore Way ROW. The primary petroleum hydrocarbon contaminant in groundwater is total diesel- plus oil-range organics (Total DRO+ORO), although gasoline-range organics (GRO) and other petroleum constituents (e.g., benzene) are also present. The primary chlorinated compounds are TCE and VC.

A total petroleum hydrocarbon (TPH) plume in the Shallow WBZ extends from the Bulk Terminal parcel to the north and northwest toward W. Commodore Way, where it generally terminates. It appears that plume migration beyond the ROW is generally prevented by leakage into or along the sewer main. However, in one area, the TPH plume may extend beyond the ROW. Further plume evaluation will be completed as part of post-remedy groundwater monitoring. The TPH

plume also appears to extend to the southeast/southwest periodically in response to the reversal of groundwater flow associated with mounding in the central part of the former tank farm.

A chlorinated solvent (TCE and VC) plume in the Shallow WBZ (and Perched WBZ) is present on the ASKO parcel, where it begins at the southern Property boundary and ends within the W. Commodore Way ROW. The Intermediate WBZ is also impacted, although to a much lesser extent than the Shallow WBZ. Data from the BNSF parcel indicate that at least part of the chlorinated solvent plume originates on that property. Like the TPH plume, leakage into or along the sewer main in the street ROW appears to be preventing the chlorinated solvent plume from migrating further downgradient toward Salmon Bay, except potentially at one location. At this location, additional groundwater sampling will be conducted post-remedy to confirm that the plume does not extend across the ROW.

2.5 Areas of Concern

Due to the large size of the Property and the RAA, it was divided into areas of concern (AOCs) for the purposes of defining remedial actions (Figure 2.7). The Upland AOC consists of the Bulk Terminal parcel and ASKO parcel and includes the W. Commodore Way ROW to the north of both properties. The Shoreline AOC consists of the East Waterfront parcel. The BNSF AOC is located upgradient of the Upland AOC and will be addressed under a separate agreement between Ecology and BNSF.

The West Waterfront parcel is not within an AOC or the RAA and does not appear to be impacted by historical operations. There are no known significant industrial operations in this area, and no known or suspected former or current potential sources of contamination. However, soil and groundwater sampling was not conducted to confirm the lack of contaminant impact throughout this parcel. This undeveloped parcel will likely require characterization and potential cleanup action if contamination greater than Site CULs is found during future development. This CAP requires comprehensive soil management and contingency plans that will protect human health and the environment prior to and during any development of the West Waterfront parcel.

The media of concern for each AOC include soil, groundwater, and air (soil vapor).

3.0 Indicator Hazardous Substances and Cleanup Standards

3.1 Indicator Hazardous Substances

Chemicals of interest identified in the Supplemental Upland RI/FS were based on Property data and historical operations. These were evaluated to select indicator hazardous substances (IHSs), chemicals that pose the greatest overall threat to human health and the environment due to their toxicity, spatial distribution, and/or concentrations present at the Property. The IHSs identified in soil and groundwater at the Property include arsenic, GRO, DRO, ORO, benzene, TCE, VC (groundwater only), and penta.

Dioxins/furans were formerly present in soils at the Property in significant concentrations and volumes. Given their toxicity, this compound group would normally be considered an IHS for purposes of cleanup. However, most of the soils contaminated with dioxins/furans were excavated during a series of previous removal actions, leaving a relatively small residual. In addition, the dioxins/furans are collocated with the penta-contaminated soils. Penta was, therefore, selected as the IHS representing both.

The nature and extent of these IHSs has been sufficiently delineated through the former RIs and the Supplemental Upland RI/FS to investigate the Property and determine the RAA, thus providing the basis for selection of a cleanup action in accordance with MTCA and its implementing regulations (WAC 173-340-350(1)).

3.2 Cleanup Standards

Cleanup standards are defined under MTCA as a CUL combined with a point of compliance (POC) where the CUL must be met, in conjunction with any additional regulatory requirements that apply (WAC 173-340-200).

In addition, the following Property-specific considerations guided the selection of cleanup standards:

- A single CUL is provided for each analyte in each medium.
- Soil CULs protective of leaching to groundwater are based on saturated conditions.
- The Property is zoned for mixed commercial/industrial use and will remain so for the foreseeable future.
- Soil CULs will be protective of industrial worker exposure; therefore, ICs will apply where industrial CULs are used (WAC 173-340-440 (4)(c)).
- The final CUL chosen is the most conservative value when there are multiple transport/exposure pathways and multiple possible CULs.

- Contaminated soils will remain in place as part of the selected cleanup action (Upland AOC portion of the RAA), requiring that these soils be isolated with a surface cap, and that ICs be implemented to maintain the integrity of the cap. The ICs will include a Soil Management Plan and an Environment Covenant.
- Shallow groundwater at the Property has been determined to be potable in accordance with MTCA requirements (WAC 173-340-720(2)), requiring that ICs be implemented to prohibit groundwater withdrawal or use.

CULs for Property IHSs were developed for all relevant current or potential future transport/exposure pathways, (see Table 3.1 below). The relevant transport pathways include leaching from soil to groundwater, transport of groundwater to surface water and sediment, bioaccumulation from surface water or sediment into seafood, and vaporization from soil or groundwater to air. The relevant exposure pathways include contact with soil or sediment by humans or ecological receptors, consumption of groundwater or surface water by humans, consumption of seafood by humans or ecological receptors, and inhalation of air by humans.

Applicable standards considered in the development of CULs included National Primary Drinking Water Standards, state primary and secondary maximum contaminant levels, national recommended water quality criteria under the Clean Water Act, Water Quality Standards for Surface Waters of the State of Washington, MTCA, and Sediment Management Standards (SMS).

Soil erosion and transport to freshwater sediment via overland flow, bank wash, or discharge to a storm drain (and subsequently to Salmon Bay) does not appear to be a current pathway. RI field observations indicate the soil erosion to sediment pathway is not currently active at the Property. Future controls will be required to manage upland soils so that a release does not occur to surface water or sediment in Salmon Bay.

POCs for groundwater and soil were established in accordance with MTCA (WAC 173-340-720) as follows:

- **Air:** The POC for air is throughout the Site, both outdoors and indoors, including subsurface structures or other structures large enough to fit a person.
- **Groundwater:** The standard POC under MTCA is throughout the Site to the maximum depth of potentially impacted groundwater. However, the planned remedial action will not result in groundwater meeting CULs within a reasonable restoration time frame at the standard POC. Because it has been demonstrated under WAC 173-340-350 through -390 that it is not practicable to meet the CUL throughout the Site within a reasonable restoration time frame, a conditional POC (CPOC) is appropriate and must be set as close as practicable to the source of contamination. Because the intent is to completely clean up soil and groundwater in the Shoreline AOC within a reasonable restoration time frame, the groundwater CPOC will be at the downgradient edge of the Upland AOC within the W. Commodore Way ROW (see Figure 5.1).

- Soil:** The standard POC for soil based on protection of groundwater is throughout the Site. Cleanup actions for unrestricted land use that rely on containment will often not achieve CULs at the standard POC. Pursuant to MTCA, Ecology can determine that a cleanup action complies with cleanup standards provided certain conditions are met. Among these are the selection of a remedy that is permanent to the maximum extent practicable, the cleanup action is protective of human health and terrestrial ecological receptors, ICs are put in place to protect the remedy, and compliance monitoring and periodic reviews are required to ensure that the containment remains protective (WAC 173-340-740 [6][f]).

The Supplemental Upland RI/FS proposed one TPH CUL for Total DRO+ORO for protection of human health. A subsequent terrestrial ecological evaluation re-evaluation indicated the need for additional DRO and ORO CULs for protection of terrestrial species (Ecology 2020).

Table 3.1: Summary of Cleanup Standards for Indicator Hazardous Substances

Proposed IHS	Cleanup Standard		
	Value	Basis	Point of Compliance
Groundwater			
Arsenic	5 µg/L	Statewide natural background	Conditional— At W. Commodore Way
GRO	800 µg/L	Protection of drinking water	
Total DRO+ORO	500 µg/L	Protection of drinking water	
Benzene	0.44 µg/L	Protection of surface water	
TCE	0.5 µg/L	Protection of surface water (PQL-based)	
Vinyl chloride	0.2 µg/L	Protection of surface water (PQL-based)	
Penta	0.2 µg/L	Protection of surface water (PQL-based)	
Soil^(a)			
Arsenic	7.3 mg/kg	Natural background	Regulatory Determination
GRO	30 mg/kg	Protection of groundwater	
DRO	570 mg/kg	Protection of terrestrial species	
ORO	1,600 mg/kg	Protection of terrestrial species	
Total DRO+ORO	2,000 mg/kg	Protection of groundwater	
Benzene	0.02 mg/kg	Protection of surface water (PQL-based)	
TCE	0.02 mg/kg	Protection of surface water (PQL-based)	
Penta	0.05 mg/kg	Protection of surface water (PQL-based)	
Air^(b)			
GRO+DRO ^(c)	140 µg/m ³	Inhalation (Implementation Memo 18)	Indoor and Outdoor Air Throughout Site
Benzene	0.32 µg/m ³	Inhalation (MTCA Eq. 750-2)	
TCE	0.33 µg/m ³	Inhalation (MTCA Eq. 750-2 modified for early life exposure)	
Vinyl chloride	0.28 µg/m ³	Inhalation (MTCA Eq. 750-2)	

Notes:

- µg/L Micrograms per liter
- mg/kg Milligrams per kilogram
- µg/m³ Micrograms per cubic meter
- PQL Practical quantitation limit
- (a) A soil CUL will be established for tributyltin (TBT), if soils tested for this compound, as described below (Section 3.4), detect TBT at concentrations at or above the 26 mg/kg Method B CUL for protection of human direct contact.
- (b) If site-specific measurements of outdoor background air concentrations exceed these health-based levels, the cleanup levels must be adjusted up to the outdoor background air concentrations.
- (c) The CUL provided for GRO and DRO is the generic indoor air cleanup level for total petroleum hydrocarbons (TPH) provided in Ecology’s Implementation Memo 18 for Petroleum Vapor Intrusion. A site-specific CUL for TPH will be established during vapor intrusion assessment using Site petroleum hydrocarbon data in accordance with Appendix B of Implementation Memo 18 or the most current Ecology guidance at the time of assessment.

3.3 Remediation Levels

In accordance with WAC 173 340-200, a REL “means a concentration of a hazardous substance in soil, air, water, or sediment above which a particular cleanup action component will be required as part of a cleanup action at a site.” RELs may be developed as a tool at sites where a combination of cleanup action components are used to achieve CULs. RELs are not the same as CULs but define the concentration or other method of identification of an IHS above which a contaminated medium must be remediated in some manner. RELs exceed CULs but provide a level at which a particular cleanup action component will be used. A cleanup action that uses RELs must meet the requirements of MTCA, including a cleanup action that uses permanent solutions to the maximum extent practicable and provides for a reasonable restoration time frame. Soil RELs have been established for this cleanup action as presented in Table 3.2 below.

RELs are appropriate for the Upland AOC portion of the RAA where implementation of multiple aggressive removal or treatment technologies will be necessary to achieve proposed CULs for groundwater at the proposed CPOC. In the Upland AOC, the contamination is more severe and widespread, and thus it was demonstrated in the FS that RELs were necessary for the cleanup action. RELs are not used in the cleanup of soils in the Shoreline AOC portion of the RAA or for groundwater.

Table 3.2: Summary of Remediation Levels

Indicator Hazardous Substance	Upland AOC Soil Remediation Level	Point of Compliance
GRO	5,000 mg/kg	Upland AOC
Total DRO+ORO	12,000 mg/kg	
Benzene	GRO compliance with soil REL	
TCE	1.0 mg/kg	
LNAPL	No visible LNAPL	

The use of RELs is expected to result in remediation of approximately 80 percent of the volume of contaminated soil exceeding the CULs in the Upland AOC. The proposed RELs, in combination with ICs, will achieve the short-term remediation goals of worker protection and reduction of contaminants in soil vapor, as well as the long-term goal of achieving compliance with the groundwater CULs at the CPOC.

3.4 Other Contaminants

TBT, an organometallic paint additive, could be present in shallow soils on the East Waterfront parcel. If present in the soil, its release would likely be associated with former boat hull maintenance activities, including sandblasting. Additional soil sampling will be necessary as part of pre-remedial design investigations to confirm if TBT is present and, if so, the nature and extent of the contamination.

The following approach is appropriate to manage potential TBT contamination at the Property. Soils containing TBT could pose a risk to humans through direct contact or to benthic species if soils erode into Salmon Bay.

1. TBT will be analyzed in soils during the pre-remedial design investigation. Sampling locations will be set, in part, on the assumption they may be collocated with metals, which will also be further evaluated as part of a separate pre-remedial design data gap investigation.
 - a. If TBT concentrations are greater than the MTCA Method B human direct contact CUL (24 mg/kg³), the lateral and vertical extent of soil exceeding the MTCA Method B CUL to a depth of 15 feet must be defined.
 - b. If TBT concentrations are less than the MTCA Method B CUL, the lateral and vertical extent of soil exceeding a targeted REL⁴ of 0.047 mg/kg⁵ to a depth of 2 feet bgs must be defined. Soils within this depth interval are considered potentially erodible.
2. Cleanup actions to remediate TBT found exceeding CULs are as follows:
 - a. If the TBT is completely collocated with areas of elevated metals concentrations (greater than the CUL), TBT cleanup will occur when the metals are cleaned up.

³ Based on MTCA Method B standard formula value for tributyltin oxide, non-carcinogenic, for unrestricted land use.

⁴ In this context, the use of a targeted REL for TBT applies to pre-design data collection and evaluation and provides a lower limit to be used for the approach outlined in this section, specifically to determine whether additional actions are necessary as outlined in item 3 of this approach.

⁵ This value was established to provide a lower limit that is protective of the bank erosion pathway, should it become a complete pathway in the future.

- b. If the TBT is not collocated or is incompletely collocated with metals, additional cleanup of areas with TBT concentrations exceeding the MTCA Method B CUL will be necessary. Additional FS may be necessary to determine cleanup action alternatives.
3. If TBT is detected at concentrations greater than the targeted REL of 0.047 mg/kg but less than the MTCA Method B CUL, then either of the following will be required:
 - a. Soil will be cleaned up to meet the targeted REL of 0.047 mg/kg, which is protective of a future erosion pathway.
 - b. A Soil Management Plan will be developed and implemented and will include the elements described in Section 6.1.8.

4.0 Cleanup Action Areas

Due to the large size of the RAA and the various plumes and source areas, seven cleanup action areas (CAAs) are defined within the AOCs where the IHSs in soil are similar and can be remediated by the same technologies. The CAA vertical and horizontal boundaries are generally based on distinct source areas where IHS concentrations in soil are greater than the proposed CULs. Refer to Figure 4.1 for the CAA boundaries, and the following figures for IHS concentrations relative to CAA boundaries: Figures 4.2 (arsenic), 4.3 (GRO), 4.4 (DRO and ORO), 4.5 (benzene), 4.6 (TCE), 4.7 (VC), and 4.8 (penta).

4.1 Upland Area of Concern

Within the Upland AOC, there are five CAAs with distinct IHS distributions and depths of contamination, as shown on Figure 4.9. Isolated soil samples outside a source area with concentrations greater than a proposed CUL, but surrounded by samples with concentrations less than the proposed CUL, were not included in a CAA. A summary of the Upland AOC CAAs follows.

- **CAA-1** is on the Bulk Terminal parcel within the footprint of the former tank farm and along the southern and southeastern edge of the 2012 excavation area. CAA-1 is separated into two subareas: CAA-1.a and CAA-1.b. CAA-1.a is characterized by shallow and discontinuous soil CUL exceedances (less than 5 feet bgs) of GRO, Total DRO+ORO, and benzene. CAA-1.b is characterized by more continuous contamination in shallow soil (less than 10 feet bgs) with some deeper, discontinuous CUL exceedances. CAA-1.a has LNAPL along its northwest boundary, which was measured at thicknesses of 2.8 to 4.4 feet during the April/May 2019 groundwater monitoring event. CAA-1 includes a primary ongoing source of petroleum (TPH and benzene) to groundwater in the Upland AOC.
- **CAA-2** is on the Bulk Terminal parcel and under the W. Commodore Way ROW. This CAA is within the area of the former gasoline and diesel USTs, former pump island, and former utilidor. CAA-2 is divided into two subareas, CAA-2.a and CAA-2.b, to differentiate between the Bulk Terminal parcel and the portion under the W. Commodore Way ROW, respectively. CAA-2 encompasses the larger LNAPL area, which was measured at a maximum thickness of 5.2 feet during the April/May 2019 groundwater monitoring event. CAA-2 has fairly continuous soil impacts greater than the proposed CULs for GRO, Total DRO+ORO, and benzene throughout the CAA to a depth of 20 feet bgs, with the majority of contamination between 0 to 15 feet bgs. There are also a limited number of penta soil exceedances collocated with TPH exceedances near the 2012 interim action excavation extent that are greater than the proposed CUL. CAA-2 is within the GRO, Total DRO+ORO, and benzene groundwater plumes. CAA-2 includes a primary ongoing source of petroleum (TPH and benzene) to groundwater in the Upland AOC.

- **CAA-3** is located on the Bulk Terminal and ASKO parcels within the footprint of the former barrel inclines and former barreling sheds. This CAA is characterized by scattered GRO and Total DRO+ORO CUL exceedances in soil shallower than 7.5 feet bgs. There are also limited exceedances of benzene and TCE in this CAA that are collocated with GRO and Total DRO+ORO. Soil contamination in CAA-3 does not appear to be a primary contributor to groundwater contaminant plumes.
- **CAA-4** is located on the ASKO parcel and includes an area of TCE contamination that originates on the former rail spur in the BNSF AOC and extends from the BNSF property line northward across a large portion of the ASKO parcel (Figure 4.9). CAA-4 is characterized primarily by soil CUL exceedances of TCE from 2 to 30 feet bgs. CAA-4 is broken into two subareas, CAA-4.a and CAA-4.b, to distinguish between the western portion of the CAA where the majority of contamination exists between 5 and 20 feet bgs and the larger eastern portion of the CAA where most of the source mass is between 5 and 28 feet bgs. CAA-4 also has limited and discontinuous exceedances of GRO, Total DRO+ORO, and benzene, primarily in shallow vadose zone soil, that are all located within the footprint of TCE contamination. CAA-4 includes a primary ongoing source of chlorinated volatile organic compounds (cVOCs; TCE and VC) and petroleum (TPH and benzene) to groundwater in the Upland AOC.
- **CAA-5** is near the former oil and solvent storage barrel racks and steam cleaning area on the ASKO parcel. CAA-5 is characterized primarily by shallow (less than 8 feet bgs) soil exceedances of the CULs for GRO and Total DRO+ORO. There are also limited collocated arsenic exceedances. Localized soil contamination in CAA-5 appears to contribute to limited arsenic and petroleum impacts in groundwater only in the Perched WBZ. CAA-5 also lies within the deeper TCE and VC groundwater plume below 10 to 15 feet bgs.

4.2 Shoreline Area of Concern

Within the Shoreline AOC, there are two CAAs as shown on Figure 4.10, each defined by a distinct footprint of IHSs, as described below. The majority of TPH impacts in soil in the Shoreline AOC were previously excavated as part of an independent interim action in 2013. Limited soil and groundwater impacts remain in this AOC, and the boundaries of the CAAs in this area are intended to encompass all remaining soils that contain TPH and metals concentrations greater than CULs, except for a few isolated outliers.

Note that the full extent of metals exceeding CULs has yet to be determined, and there remains the possibility that TBT is present at concentrations that would warrant cleanup, as described earlier in this document. In addition, the actual boundary of the area exceeding the TPH CULs will be determined during the remedial action and is likely to vary slightly from that shown on Figure 4.10. A summary of the CAAs in this area follows.

- **CAA-6** is located on the East Waterfront parcel in the vicinity of the former barrel incline, former utilidor, and former warehouse and garage/vehicle maintenance building. The CAA extends north to the Salmon Bay shoreline. The area is characterized by shallow soil impacts of GRO, Total DRO+ORO, and benzene. CAA-6 is broken into subareas CAA-6.a and CAA-6.b. The depth of soil impacts varies across the CAA in accordance with depth to groundwater; deeper CUL exceedances extend to approximately 12 feet bgs in the southern portion of the CAA (CAA-6.a) and shallower impacts are limited to less than 3 feet bgs in the northern portion closest to the shoreline (CAA-6.b). CAA-6 also contains localized groundwater impacts of GRO, Total DRO+ORO, benzene, and arsenic. CAA-6.a includes a localized ongoing continuous source of petroleum (TPH and benzene) to groundwater in the Shoreline AOC; scattered and shallow soil impacts in CAA-6.b do not appear to be contributing to groundwater contamination.
- **CAA-7** is located on the western shoreline edge of the East Waterfront parcel in an area with documented former sandblast grit piles. This area contains exceedances of the proposed CUL for arsenic in surface soil (less than 1 feet bgs) and a portion of the arsenic groundwater plume. Arsenic in soil appears to be a localized source of impacts to groundwater along the shoreline. Additional metals and TBT could be associated with sandblast grit and, therefore, if present, collocated with arsenic exceeding CULs. Metals and TBT will be further delineated during remedial design.

5.0 Remedial Alternatives Evaluation and Selection

5.1 Alternatives Considered

Six remedial action alternatives were evaluated in the Supplemental Upland RI/FS to address both soil and groundwater contamination at the Property. The alternatives included a range of potentially applicable technologies and cleanup action options for each of the CAAs and varied to some degree between the parcels, based on the nature and extent of IHSs.

For the Upland AOC, not all technologies that are applicable to the ASKO parcel are applicable to the Bulk Terminal parcel. Cleanup action options were, therefore, evaluated separately for each parcel before determining combined approaches for the Upland AOC as a whole.

For the Shoreline AOC, an alternatives analysis was not necessary because soil excavation and offsite disposal was the alternative proposed. This is a permanent solution under MTCA.

Property-wide alternatives evaluated during the FS are summarized in Table 5.1 and include the following common elements:

- LNAPL removal and/or in situ solidification and stabilization (ISS) at CAA-1 and CAA-2
- Installation of a permeable reactive barrier (PRB) at CAA-4 to address elevated cVOC concentrations in Perched WBZ groundwater migrating onto the ASKO parcel from the upgradient BNSF parcel
- Capping and ICs for all CAAs within the Upland AOC
- Excavation and offsite disposal of all soil exceeding CULs for the CAAs within the Shoreline AOC
- MNA of groundwater outside of active treatment areas
- Compliance monitoring
- Contingency planning, including specific triggers to evaluate whether groundwater will attain CULs within the established restoration time frame

For the Upland AOC, the six alternatives varied as follows:

- Alternative A.1 – Excavation and offsite disposal of all soil exceeding CULs throughout the RAA
- Alternative A.2 – Excavation and offsite disposal of soil exceeding RELs in CAA-1, CAA-2, CAA-3, and CAA-4
- Alternative B – Excavation and offsite disposal of soil exceeding RELs in CAA-1, CAA-2.b, and CAA-3; ISS to treat soil exceeding RELs in CAA-2.a and CAA-4; and excavation and offsite disposal of all soil exceeding CULs in CAA-5

- Alternative C – Excavation and offsite disposal of soil exceeding RELs in CAA-1, CAA-2.b, and CAA-3; ISS to treat soil exceeding RELs in CAA-2.a and CAA-4; “hot spot” excavation and offsite disposal of soil exceeding CULs in CAA-5; and in situ treatment of groundwater in CAA-5
- Alternative D – Excavation and offsite disposal of soil exceeding RELs in CAA-1.a and CAA-2; and electrical resistance heating to treat cVOCs in soil and groundwater in CAA-4
- Alternative E – Excavation and offsite disposal of soil exceeding RELs in CAA-1.a and CAA-2.b; and ISS to treat soil exceeding RELs in CAA-2.a and CAA-4.

Essentially, for the Upland AOC, variable amounts of excavation and LNAPL removal were considered for the TPH in CAA-1,-2, and -3, and various types of treatment methods were considered for the cVOCs/TPH in CAA-4 and -5.

Each of the RAA-wide alternatives were screened relative to MTCA threshold and other requirements in accordance with WAC 173-340-360(2)(a) and (2)(b), and evaluated according to disproportionate cost analysis (DCA) procedures in WAC 173-340-360(3)(e). Results of the evaluation identified Alternative C as the preferred alternative, because it meets threshold requirements, uses permanent solutions to the maximum extent practicable, considers public concerns, and provides a reasonable restoration time frame.

5.2 Selected Remedy

Following consideration of the FS and technical consultations, Ecology has determined that the cleanup action for the RAA consists of multiple elements, as illustrated in Figure 5.1. The selected remedy consists of the following elements, plus the common elements listed in Section 5.1:

- **East Waterfront parcel.** Soil excavation for TPH and metals, evaluation and potential excavation of TBT with a contingency for a Soil Management Plan if TBT remains at concentrations greater than the targeted REL.
- **Bulk Terminal parcel.** Soil excavation and ISS for TPH, LNAPL removal or encapsulation, pavement and ICs (including Soil and Remedial Element Management Plan [SREMP]).
- **ASKO parcel.** Minor soil excavation coupled with ISS for cVOCs and TPH. This parcel also includes a passive in situ groundwater treatment zone to treat cVOCs in groundwater near the CPOC, a PRB to treat cVOCs in groundwater entering the RAA from the BNSF parcel, pavement, and ICs (including SREMP).

CAA-specific cleanup actions are itemized as follows:

- Excavation of soil with IHS concentrations greater than RELs to the maximum extent practicable in CAA-1, CAA-2.b, and CAA-3
- Removal and ISS of LNAPL in CAA-1.a and CAA-2

- ISS to address source area soil with IHS concentrations greater than RELs in CAA-2.a and CAA-4
- Installation of an interceptor trench and PRB wall along the upgradient edge of CAA-4 to capture and treat groundwater containing IHSs greater than the CULs from the adjacent BNSF parcel
- Hot spot excavation and focused groundwater treatment in CAA-5
- Excavation and offsite disposal of contaminated soil with IHS concentrations greater than CULs in CAA-6 and CAA-7
- Capping and ICs for the Upland AOC

Implementation of this cleanup action is expected to remove or encapsulate approximately 90,000 gallons of LNAPL and effectively remove or treat an estimated 36,000 cubic yards (CY) of soil containing IHSs at concentrations greater than the RELs or CULs. More details regarding the cleanup action and implementation are included in Section 6.0.

5.3 Justification for Selection of Remedy

The cleanup action is a comprehensive final remedy for the RAA that complies with all the applicable remedy selection requirements under MTCA. Specifically, the cleanup action meets the minimum requirements under WAC 173-340-360(2)(a) as follows:

- **Protects Human Health and the Environment.** The selected remedy will protect human health and the environment in both the short- and long-term. The remedy will permanently reduce the identified risks presently posed to human health and the environment through a combination of source area removal and stabilization, in situ groundwater treatment, and natural attenuation.
- **Complies with Cleanup Standards.** The selected remedy is expected to comply with the cleanup standards for groundwater and soil at the POCs within a reasonable time frame.
- **Complies with Applicable State and Federal Laws.** The selected remedy is expected to comply with all state and federal laws and regulations.
- **Provides Compliance Monitoring.** The selected remedy will include compliance monitoring for soil and groundwater to assess the effectiveness and permanence of each remedy element.

The cleanup action also meets the other requirements under WAC 173-340-360(2)(b), as follows:

- **Uses Permanent Solutions to the Maximum Extent Practicable.** The selected remedy utilizes LNAPL removal in conjunction with excavation and ISS technologies, which will

remove or immobilize a large portion of the existing contaminant mass in the subsurface and effectively eliminate a significant source of contamination to groundwater.

- **Provides for Reasonable Restoration Time Frame.** The restoration time frame for RAA groundwater with the selected remedy is estimated to be 15 years, based on the expected time for groundwater to achieve compliance with CULs at the CPOC. A shorter restoration time frame of 5 years is anticipated for the Shoreline AOC.

Compliance with the soil cleanup standards will be met when the Property is developed, the ground surface capped, and ICs implemented. These actions are expected to occur in less than 15 years. Compliance with the soil cleanup standards is expected to occur immediately after remedy implementation in the Shoreline AOC.

- **Considers Public Concerns.** A draft of this document was presented to the public and stakeholders for public review and comment. The Supplemental Upland RI/FS was also presented for public comment. Comments were received, reviewed by Ecology, and addressed in a responsiveness summary. Ecology determined that no changes to either of the documents were required.

Because this remedy relies on a CPOC due to the impracticality of attaining CULs throughout the Upland AOC, it is not considered a permanent groundwater cleanup action under WAC 173 340-360(2)(c)(i). However, the selected remedy does meet the following requirements for nonpermanent groundwater cleanup actions under WAC 173-340-360(2)(c)(ii):

- **Treatment or Removal of the Source Including LNAPL.** Source area soil and LNAPL will be treated or removed in the RAA and, therefore, remove or reduce ongoing sources to groundwater.
- **Groundwater Containment, Including Barriers, to Avoid Spreading of the Groundwater Plume.** The interceptor trench, PRB wall, and other technology will be implemented to provide in situ treatment of contaminated groundwater to reduce IHS concentrations and minimize spreading of the plume. Specifically, the interceptor trench and PRB wall will capture and treat contaminated groundwater migrating onto the Property from the upgradient BNSF parcel, effectively reducing the potential for recontamination.

6.0 Description of the Cleanup Action

As discussed in Section 5.2, the cleanup action comprises a combination of cleanup actions, which are described below. More specific plans will be developed in the Engineering Design Report (EDR), which will be prepared prior to implementation of the cleanup action.

6.1 Cleanup Action Components

6.1.1 LNAPL Removal/Immobilization

Multiple methods will be used to address LNAPL. At CAA-1.a, in the area of the former tank farm, and at CAA-2.b in the W. Commodore Way ROW, LNAPL will be removed using a combination of excavation and vacuum extraction. At CAA-2.a, LNAPL will be immobilized by encapsulation using ISS technology, as described in Section 6.1.3.

Standard excavation means and methods will be used to remove soil containing LNAPL from areas CAA-1.a and CAA-2.b. In addition, a vacuum truck will be used to extract any LNAPL that accumulates in the excavated areas during the soil removal activities. LNAPL and associated soils removed from these areas will be transported offsite to a permitted facility for disposal.

These activities are expected to remove (or encapsulate) approximately 13,000 gallons of LNAPL from CAA-1 and approximately 77,000 gallons of LNAPL from CAA-2.

Groundwater encountered while removing LNAPL will also be removed and disposed of off-Property or through a permitted discharge to sanitary sewer.

6.1.2 Soil Excavation with Offsite Disposal

Contaminated soil will be excavated from CAA-1, CAA-2.b, CAA-3, CAA-5, CAA-6, and CAA-7, as shown on Figure 5.1, using standard excavation means and methods. The proposed excavation boundaries and depths shown on Figure 5.1 are subject to change and may differ than those shown. The final excavation limits (horizontal and vertical) will be determined based on the results of pre-remedial design sampling and excavation performance sampling indicating compliance with the RELs or CULs. It should be noted that there are areas beneath buildings at the Property that have not been sampled. Areas of unexpected contamination may be encountered when the buildings are demolished and the underlying soil exposed. The EDR must outline contingency procedures for further actions if unexpected contamination is encountered.

Excavated soil must be transported offsite to a permitted Subtitle D landfill for disposal. Once the final limits are reached, the excavated areas on the Property will be backfilled with clean imported material and temporarily restored with a gravel surface until planned redevelopment and other restoration activities can begin. The excavated area within the W. Commodore Way ROW will also be backfilled with clean imported fill and restored with a pavement section meeting City of Seattle requirements.

The following is a summary of the estimated volumes and anticipated depths expected for contaminated soil removal at each area.

- **CAA-1:** Approximately 1,300 CY of soil will be excavated to 5 feet bgs at CAA-1.a and approximately 800 CY of soil will be excavated to 10 feet bgs at CAA-1.b to remove GRO, Total DRO+ORO, and benzene at concentrations greater than the RELs.
- **CAA-2.b:** Approximately 2,100 CY of soil will be excavated to 15 feet bgs to remove GRO, Total DRO+ORO, and benzene at concentrations greater than the RELs.
- **CAA-3:** Approximately 800 CY of soil will be excavated to 5 feet bgs to remove GRO, Total DRO+ORO, and TCE at concentrations greater than the RELs. Removal of this soil will also remove collocated benzene concentrations greater than the CUL.
- **CAA-5:** Approximately 200 CY of soil will be excavated to 5 feet bgs to remove Total DRO+ORO and arsenic at concentrations greater than the CULs.
- **CAA-6:** Approximately 1,000 CY of soil will be excavated to 6 feet bgs, with a small portion to 12 feet bgs, at CAA-6.a to remove GRO, Total DRO+ORO, and benzene at concentrations greater than the CULs. At CAA-6.b, approximately 300 CY of soil will be excavated to a depth of 3 feet bgs to remove GRO, Total DRO+ORO, benzene, and arsenic at concentrations greater than the CULs.
- **CAA-7:** Approximately 60 CY of surficial soil will be excavated to 1 foot bgs to remove arsenic and other collocated metals (and TBT, if present) at concentrations greater than the CULs. As noted previously, this volume could increase once the full extent of metals contamination has been determined during the pre-remedial design investigation.

6.1.3 In Situ Solidification and Stabilization

ISS will be implemented at CAA-2.a and CAA-4 to encapsulate source area soil and a portion of the LNAPL remaining at the RAA. ISS will necessarily key into the lower permeability silt layer in the treatment areas to provide stability. Anticipated treatment depths and estimated volumes of contaminated material to be treated by ISS in each area are summarized as follows:

- **CAA-2.a:** ISS will key into a depth of 23 feet bgs to treat approximately 10,200 CY of soil contaminated with GRO, Total DRO+ORO, and benzene at concentrations greater than the proposed RELs.
- **CAA-4:** ISS will key into a depth of 30 feet bgs to treat approximately 5,900 CY of soil in CAA-4.a and approximately 11,300 CY of soil in CAA-4.b contaminated with TCE, GRO, Total DRO+ORO, and benzene at concentrations greater than the proposed RELs.

Pre-design data may be warranted to determine the lateral extent of ISS treatment in CAA-4; additional data needs will be evaluated by the engineer as part of design.

ISS treatment will consist of mixing contaminated media with grout in overlapping columns or cells to create a homogenous monolith that encapsulates and solidifies contaminants. The conceptual ISS layout as presented on Figure 5.1 presents a proposed arrangement of ISS mixing columns and cells in CAA-4 and CAA-2.a, respectively. Appropriate equipment and methods will be selected as part of design and will be based on subsurface lithology and vertical limits for the ISS treatment. In addition to mechanical ISS mixing equipment, ancillary equipment is expected include reagent storage silos, a temporary reagent batch plant for mixing grout, grout pumps, crane mats, generator, forklift, personnel lift, hydraulic sampling device, and support excavator.

A grout mixture will be prepared in batches then pumped to the ISS treatment areas where it will be mechanically mixed with the contaminated soils (including LNAPL) using a drill-mounted auger, excavator bucket, or excavator-mounted rotary equipment. Mixing will be conducted from the surface to the bottom treatment elevation.

Due to the added volume of grout, swell material is expected to be approximately 30 percent of the total ISS volume. Swell material may be managed through benching of the ISS treatment areas prior to ISS implementation (i.e., excavation of surface soils to allow swell management within the treatment area) and/or use as backfill or grading material during redevelopment of the Property. Because the swell material is expected to be highly contaminated, any excess volume not managed within the ISS area will need to be consolidated into one or a few locations, rather than distributed around the Property. Management of this material will be assessed during the engineering design phase. In addition, necessary performance testing will be determined as part of the engineering design phase and will be included in the EDR and Construction Compliance Monitoring Plan (CCMP).

6.1.4 Groundwater Treatment

In situ groundwater treatment will be conducted north of the proposed excavation area in CAA-5 to address the TCE and VC plume and residual dissolved benzene on the ASKO parcel immediately upgradient of the W. Commodore Way ROW. Treatment fluids will be injected into the subsurface through a series of direct-push borings to create a passive treatment zone of chemical reduction and bioremediation. Fluids will be injected at each location under low pressure using a direct-push drill rig to provide even distribution within the target treatment zone. Injection depths are expected to be in the range of 20 to 30 feet bgs within the Shallow WBZ. The proposed in situ treatment zone will be approximately 160 feet long and 15 feet wide, as shown on Figure 5.1.

REGENESIS® remediation products are proposed for the in situ groundwater treatment, and include the following:

- **PlumeStop®**: a colloidal liquid activated carbon that allows sorption of dissolved-phase contaminants and create an in situ flow-through passive treatment zone.

- **S-MicroZVI®**: a sulfidated micro ZVI that promotes in situ chemical reduction processes to destroy dissolved contaminants and limit the amount of daughter products produced as part of the reductive dechlorination process.
- **Bio-Dechlor INOCULUM Plus®**: an enriched natural microbial consortium containing species of *Dehalococcoides sp.* bacteria capable of stimulating rapid dechlorination of TCE and associated daughter products.

The combined use of these products is expected to result in a relatively rapid reduction of dissolved contaminant concentrations in the groundwater plume. Additional consideration will be given to the use of these or other products in the EDR.

Pre-design data will be necessary to evaluate mass flux zones, which are areas of elevated hydraulic conductivity, to better define the target treatment zones and to improve the overall design. In addition, the engineer will determine if additional soil or groundwater data are necessary to determine the required volume of reagent to be used and confirm treatment injection locations.

6.1.5 Interceptor Trench and Permeable Reactive Barrier Wall

An interceptor trench with a PRB wall will be installed at the ASKO/BNSF boundary to capture and treat impacted groundwater migrating within the Perched WBZ onto the ASKO parcel from the BNSF parcel. The trench will be installed along the southwestern edge of the ISS monolith in CAA-4 and the PRB wall will be installed at the northwestern (downgradient) end of the interceptor trench (refer to Figure 5.1). The low permeability of the ISS monolith and the high permeability of the interceptor trench will divert the captured groundwater to the PRB wall for in situ flow-through treatment.

The interceptor trench will be constructed with a total length of approximately 120 feet and will be approximately 3 feet wide and 15 feet deep. The PRB wall will be approximately 15 feet long, 3 feet wide, and 15 feet deep and will be designed with enough residence time for IHSs to be treated to a minimum 90 percent concentration reduction.

Both the interceptor trench and PRB wall will be installed using typical excavation means and methods. Immediately following excavation, the interceptor trench will be backfilled with drain rock from the bottom of the trench to approximately 2 feet bgs, then backfilled to approximately 6 inches bgs with sand. The excavation for the PRB wall will be backfilled with granular zero-valent iron (gZVI) from the bottom of the wall to approximately 2 to 4 feet bgs to create an effective vertical treatment zone of approximately 11 to 13 feet. The wall will then be backfilled with sand over the gZVI to approximately 6 inches bgs. Both the interceptor trench and PRB wall will be sealed at the top with pavement when capping is installed during redevelopment of the Property.

6.1.6 Capping and RAA Stabilization/Restoration

Placement of a cap will be required for the Upland AOC to mitigate direct contact exposures to contaminants that will remain in place (to 15 feet bgs) above the CULs following implementation of the above-described actions. Capping in the Upland AOC is expected to include a combination of pavement, constructed landscape areas, and buildings to be installed during Property development. In conjunction with the cap, ICs that require maintenance of the cap as a physical barrier in perpetuity will be implemented as described in Section 6.1.8.

Because cleanup of the Shoreline AOC is intended to fully achieve the soil CULs, a protective cap is not required as part of the remedy in this area. Following soil excavation and ground surface restoration, best management practices will be employed to maintain surface gravel and any existing pavement and vegetation that remains on the East Waterfront parcel as a stabilization measure to control soil erosion until redevelopment occurs. Future development will include measures to prevent erosion if warranted based on post-remedy soil concentrations.

6.1.7 Monitored Natural Attenuation

MNA for groundwater is a component of the cleanup action after LNAPL and source soils are addressed via excavation and ISS and after implementing focused groundwater treatment. MNA will utilize post-remedy groundwater monitoring, with a network of new and existing monitoring wells located throughout the RAA. The groundwater monitoring will be performed in accordance with a GMP, a draft of which is appended to this CAP (Appendix A). Note that the GMP will be part of the Long-Term Compliance Monitoring Plan (LTCMP), as described in Section 7.0.

6.1.8 Institutional and Other Property Controls

ICs are measures undertaken to limit or prohibit activities that may interfere with the integrity of the cleanup action or that may result in exposures to hazardous substances at the Site. ICs in the form of an Environmental Covenant will be required for the Upland AOC parcels. The Environmental Covenant will impose restrictions on future uses of the ASKO and Bulk Terminal parcels consistent with industrial land use and will prohibit the use of groundwater as drinking water. It is anticipated the Environmental Covenant will be for any areas where a cap is present to limit direct contact with contaminated soils that will remain in place at concentrations greater than CULs.

Ecology will prepare the Environmental Covenant consistent with WAC 173-340-440 and RCW 64.70 and in consultation with the grantor or other parties.

In addition to the Environmental Covenant, Property controls will include a SREMP for any future ground-disturbing activities on the Property. This plan will also be part of the LTCMP and will be prepared upon completion of active cleanup action construction activities, prior to Property redevelopment. The SREMP will contain at least the following elements:

- A description of soil conditions on the Property including identification of specific areas and depths where contamination remains in place and at what concentration(s)
- Specific soil handling and management procedures for future subsurface work in areas within the Upland AOC where contaminated soils will remain in place beneath the cap
- Procedures for identifying, processing, and disposing of contaminated soils encountered during development activities in areas not expected to be contaminated
- Best management practices to prevent soil erosion to the storm drain system or directly to sediment in Salmon Bay, if warranted by post-remediation conditions
- Health and safety protocols specific to the soil handling and management procedures
- Protocols for notifying Ecology of planned (or proposed) ground-disturbing activities as well as any instances in which a site control measure fails resulting in a release or new exposure pathway
- Protocols for providing necessary data to agencies involved in environmental permitting for future construction activities
- A description of remedial elements (e.g., pavement and monitoring wells) that will require routine inspection and maintenance

The procedures specified in the SREMP will be applicable to any future Property redevelopment or maintenance that involves removal or disturbance of material below the surface cap or disturbance of surface soils or other ground cover that may create a future erosion pathway, if warranted based on post-remedial conditions.

In conjunction with the ICs and Upland AOC capping, other engineering controls may be implemented to prevent potential exposure to hazardous substances remaining in place following remedy implementation. This may include mitigation measures to minimize exposures to vapor intrusion (VI). The VI pathway will be evaluated following remedial construction, but prior to Property redevelopment, for any proposed buildings in the Upland AOC where volatile constituents will remain in soil and groundwater at concentrations exceeding the CULs. Refer to Section 7.2.1 for additional details regarding contingencies for VI.

6.2 Applicable Local, State, and Federal Laws

The cleanup action must comply with MTCA cleanup regulations (WAC 173-340), SMS (WAC 173-204-570), federal laws, and substantive requirements of applicable local and state laws. Under WAC 173-340-350 and WAC 173-340-710, the term “legally applicable requirements” refers to regulatory cleanup standards; standards of control; and other environmental requirements, criteria, or limitations established under state or federal law that specifically address a remedial action, location, chemical of concern, or other circumstance at the Property. The “relevant and appropriate requirements” are regulatory requirements or guidance that do not apply to the RAA

under law but have been determined to be appropriate for use by Ecology. These requirements are often categorized as location-specific, action-specific, or chemical-specific.

The cleanup action complies with all applicable local, state, and federal laws that are outlined in Table 6.1. Chemical-specific requirements will be met through compliance with applicable CUL criteria. Location-specific requirements will be met through compliance with all applicable state, federal, and local regulations in place for the physical location of the Property. Applicable action-specific requirements will be met through implementation of construction activities in compliance with all applicable construction-related requirements, such as health and safety restrictions, Property use and other local permits, and disposal requirements for excavated soil.

6.3 Compliance with Remedial Action Objectives

Remedial action objectives (RAOs) for the RAA include the following:

- Address public concerns by facilitating the cleanup and redevelopment of an underutilized property located in a prime industrial shoreline setting.
- Address soil contamination to protect human health and the environment (ecological receptors) from exposure to hazardous substances via direct contact.
- Reduce concentrations of IHSs in soil on the Property that are long-term sources of continuing groundwater contamination.
- Remediate LNAPL from the Bulk Terminal parcel and the adjacent W. Commodore Way ROW to improve groundwater and air quality.
- Reduce concentrations of volatile compounds in soil and groundwater to reduce or eliminate the potential for VI.
- Reduce concentrations of IHSs in groundwater to protect surface water quality in Salmon Bay.
- Eliminate potential future contaminated soil erosion into Salmon Bay sediment.
- Comply with local, state, and federal laws and site-specific cleanup standards.
- Provide for compliance monitoring and contingency plans to ensure continued protection of human health and the environment following active cleanup actions.

The cleanup action described herein will meet all of these RAOs.

Excavation and ISS in the Upland AOC will reduce the direct contact pathway risk, reduce significant sources of IHSs to groundwater to improve groundwater quality, and reduce volatile compounds in soil and groundwater to reduce the risk of VI. LNAPL will also be removed or encapsulated through excavation and ISS on the Bulk Terminal parcel, and in situ groundwater treatment on the ASKO parcel will reduce dissolved-phase mass and improve groundwater quality.

Contaminated soil that will remain in place in the Upland AOC that could pose a risk to the direct contact and VI pathways will be controlled through ICs and a cap, and potentially other engineering controls, if warranted, as part of Property redevelopment.

Remedial excavation on the Shoreline AOC will address all contaminated soil exceeding the CULs on the East Waterfront parcel and eliminate the direct contact pathway to human health and ecological receptors. This will also reduce sources of IHSs to groundwater to improve groundwater quality. In addition, post-remedy construction soil management procedures will be established prior to redevelopment. These procedures will prevent soil erosion to sediments and protect the surrounding environment by establishing best management practices for erosion control.

This cleanup action also includes provisions for compliance monitoring, as discussed in Section 7.1.

6.4 Restoration Time Frame

The restoration time frame for the cleanup action is 15 years, which is the estimated time for all media to achieve compliance with the cleanup standards at all relevant POCs. In particular, 15 years is the estimate for groundwater to meet CULs at the CPOC. Restoration time frames will be less for some media and in some areas of the RAA as follows.

- Soils within the Upland AOC will meet RELs within 4 to 6 months upon completion of excavation and ISS activities, but will not meet CULs within a reasonable time frame. Compliance with the soil cleanup standards will be met when the Property is developed, the ground surface capped, and ICs implemented. Property development is expected to take less than 15 years.
- Groundwater within the Upland AOC is expected to meet the CULs at the CPOC within 15 years following completion of the Upland AOC remedial construction activities.
- Soils within the Shoreline AOC are expected to meet cleanup standards upon completion of soil excavation activities, which are expected to take 1 month.
- Groundwater within the Shoreline AOC is expected to meet CULs within 5 years following completion of the Shoreline AOC remedial construction.
- Air. It is uncertain whether air is currently exceeding CULs within some of the buildings remaining at the RAA. However, air would meet CULs within 1 month of completing the Upland AOC remedial construction activities, which will include the demolition and removal of existing buildings. Construction of new buildings within the Upland AOC will include provisions for VI engineering controls to protect future indoor air quality, if necessary.

6.5 Hazardous Substances Remaining Following Remedial Action

This section provides an estimate of the residual hazardous substances that will remain as part of the containment remedy within the Upland AOC. None is expected to remain within the Shoreline AOC. The volume estimates noted below do not account for the discontinuous nature of the contamination and, therefore, are likely to be high. Remaining contamination below an upland cap or within ISS-stabilized masses is anticipated to be as follows:

- CAA-1.a: Approximately 1,500 CY of contaminated soil with hazardous substance concentrations greater than CULs would remain in place. The detected maximum IHS concentrations remaining will be 940 mg/kg GRO, 12,000 mg/kg Total DRO+ORO, and 14 mg/kg benzene.
- CAA-1.b: Approximately 1,100 CY of contaminated soil with hazardous substances concentrations greater than CULs and, to an extent, RELs would remain in place. The detected maximum IHS concentrations remaining will be 2,800 mg/kg GRO, 2,700 mg/kg Total DRO+ORO, and 40 mg/kg benzene.
- CAA-2: Approximately 4,700 CY of contaminated soil with hazardous substance concentrations greater than CULs would remain in place. The detected maximum IHS concentrations remaining will be 4,300 mg/kg GRO, 11,000 mg/kg Total DRO+ORO, and 7.7 mg/kg benzene.
- CAA-3: Approximately 1,800 CY of contaminated soil with hazardous substance concentrations greater than CULs and, to an extent, RELs would remain in place. The detected maximum IHS concentrations remaining will be 9,700 mg/kg GRO, 8,300 mg/kg Total DRO+ORO, 0.25 mg/kg benzene, and 4.4 mg/kg TCE.
- CAA-4: Approximately 4,300 CY of contaminated soil with hazardous substance concentrations greater than CULs would remain in place. The detected IHS maximum concentrations remaining will be 1,600 mg/kg GRO, 3,200 mg/kg Total DRO+ORO, 0.61 mg/kg benzene, and 0.82 mg/kg TCE.
- CAA-5: Approximately 1,100 CY of contaminated soil with IHS concentrations greater than CULs and, to an extent, RELs would remain in place. The detected maximum IHS concentrations remaining will be 4,700 mg/kg GRO, 5,300 mg/kg Total DRO+ORO, 5.4 mg/kg TCE, and 14 mg/kg arsenic.
- Outside CAA Boundaries: Approximately 3,000 CY of contaminated soil with hazardous substance concentrations greater than CULs would remain in place. The detected maximum IHS concentrations remaining will be 1,500 mg/kg GRO (north boundary of the Bulk Terminal parcel east of CAA-2); 11,000 mg/kg Total DRO+ORO (in W. Commodore Way ROW); 1.4 mg/kg benzene (north of CAA-2 in W. Commodore Way); 0.21 mg/kg TCE (east of CAA-4); and 14 mg/kg arsenic (southeast corner of Bulk Terminal parcel).

- ISS Treatment Areas: The existing contamination in these areas will remain encapsulated within the solidified mass. Section 6.1.3 details anticipated treatment volumes.

7.0 Cleanup Action Monitoring and Contingency Actions

Compliance monitoring for soil and groundwater will be conducted within the RAA as described in general terms in the following sections. Contingency actions are also identified should groundwater CULs not be met in the predicted restoration time frame.

7.1 Compliance Monitoring

Compliance monitoring to ensure the protectiveness of the cleanup action will be implemented in accordance with WAC 173-340-410, Compliance Monitoring Requirements. These regulations call out three types of monitoring – Protection, Performance, and Confirmation. Each will be implemented at the Property as part of the cleanup actions in the RAA.

The required Protection, Performance, and Confirmation monitoring will include a number of compliance monitoring elements. These will be detailed in two separate documents: the CCMP and the LTCMP.

The CCMP will be prepared as part of final design, prior to remedial construction. As such, this document will be applicable during the remedial construction work and will describe performance, confirmation, and compliance monitoring that will be necessary during construction, including all necessary construction plans (see below). Results of compliance monitoring during construction will be documented in Remedial Action Completion Reports (RACRs).

The LTCMP will be applicable during post-construction and post-property development and will include a revised GMP, SREMP, and VI Contingency Plan. The LTCMP must be prepared after the remedial construction is complete and will be revised, as needed, after development. Results of long-term compliance monitoring will be documented in LTCMP Annual Reports.

7.1.1 Protection Monitoring

Two periods of protection monitoring will be required. The first will be for health and safety protection during remedial construction. The second will be after remedial construction.

- Remedial construction protection will be described in a Health and Safety Plan submitted as part of the CCMP.
- Post-remedial construction protection will be described in the SREMP portion of the LTCMP. This document will be applicable to activities conducted at the RAA following remedy implementation that have the potential to disturb capped areas. The SREMP will include health and safety protocols that describe worker protection monitoring requirements specific to post-remedy soil handling and management procedures. The

SREMP must include mitigation or measures to maintain protection from soil VI, depending on the development.

7.1.2 Performance Monitoring

As with protection monitoring, two periods of performance monitoring will be required. The first will occur during remedial construction; the second after remedial construction is complete.

During remedial construction—soil excavation, LNAPL removal, ISS. Measures required to confirm that the cleanup action has attained remedial construction performance standards will be described in the CCMP. This document will include two separate plans, a Sampling and Analysis Plan (SAP)/Quality Assurance Project Plan (QAPP) and an Inadvertent Discovery Plan (IDP).

The SAP/QAPP will include the following:

- Remedial sampling to more accurately assess the areal extent and depth of soil contamination requiring excavation and to better inform the groundwater treatment area and reagent quantities. This sampling will augment the performance monitoring that is typically conducted during remedy construction. Completing this monitoring in advance of design will allow for a more accurate remedial design, leading to cost and time savings.
- Excavation base and sidewall sampling during remedy construction to ensure that the cleanup action meets the soil RAOs.
- Construction quality control and quality assurance testing during ISS to ensure that the treatment meets applicable performance standards for strength and hydraulic conductivity.
- The use of field kits, if necessary, to identify the presence of LNAPL (either residually trapped or mobile) in soil samples during excavation. Field kits would be used in concert with visual observations to confirm removal of LNAPL from the RAA.
- Quality control monitoring for construction activities, such as survey confirmation of excavation limits and volumes and extent of ISS treatment areas.

The IDP will include procedures for identifying, handling, and reporting unexpected cultural or historical artifacts encountered during remedial construction.

After remedial construction—groundwater. A groundwater monitoring program will be implemented to observe and document remedy effectiveness after construction. Initially this will be a performance monitoring effort, because groundwater will not have attained CULs at the CPOC. As areas in the RAA reach CULs (in particular, groundwater within the East Waterfront parcel), monitoring in those areas will transition to confirmation monitoring.

The groundwater monitoring program will be outlined in the GMP, part of the LTCMP. A draft of the GMP is appended, as noted previously, and will be finalized after remedial construction is

completed. Ecology has not made a final determination as to the adequacy of the locations, frequencies, or analytical schedule provided in the draft GMP. Therefore, the final version prepared after remedial construction is complete will likely differ from the draft. The GMP may also need to be revised as part of Property development to accommodate changes created by the development or other factors. It should be noted the GMP may also be revised at multiple points in the future based on development or other impacts at the Site.

After remedial construction—VI. Given that volatile contaminants will remain in soil and groundwater in the Upland AOC, a vapor intrusion (VI) evaluation will be necessary for the Property, as discussed in Section 7.2.1 below. This VI evaluation, which will be conducted following Ecology guidance, may lead to additional performance monitoring. If necessary, this performance monitoring plan will be delivered as part of the LTCMP. In addition, based on the results of the additional VI monitoring, contingency actions may be necessary and will also be included within the LTCMP.

7.1.3 Confirmation Monitoring

Confirmation monitoring is used to confirm the long-term effectiveness of the cleanup action after cleanup standards or applicable RELs have been attained.

Soil. For soil, confirmation monitoring will be necessary once the remedial construction is complete and the required controls are in place for long-term operation and maintenance in accordance with this CAP and required deliverables, including the EDR. The long-term effectiveness will be confirmed through an ongoing monitoring and maintenance program that will be defined in the SREMP portion of the LTCMP. Future development may require revisions to the confirmation monitoring for soil.

Groundwater. Confirmation monitoring is expected to start first at the East Waterfront parcel where groundwater is expected to attain CULs within 5 years. Although the type and timing of development are not known for this area, a provisional confirmation monitoring plan is included in the draft GMP (Appendix A) for this area, given how quickly groundwater is expected to meet CULs. If redevelopment occurs within the 5-year period, the provisional plan will likely need to be modified.

For the rest of the RAA, the time frame to reach CULs is predicted to be 15 years. A provisional confirmation monitoring plan is included in the draft GMP (Appendix A) that includes a provision for adaptive management that allows for subsequent revisions and alterations of the frequency, locations, and analytes. It is uncertain when the transition from performance to confirmation monitoring will occur; therefore, the specific confirmation monitoring scope will not be established until groundwater begins to approach CULs at the CPOC. This kind of monitoring program typically utilizes a subset of the monitoring wells used for performance monitoring.

Soil Vapor. As noted previously, the potential for VI in the Upland AOC will be evaluated after the remedial construction is completed. If a performance monitoring program has been

instituted as a result of this evaluation and has shown that soil vapor concentrations have declined such that screening levels protective of the VI pathway have been met, a confirmation monitoring program may be instituted to confirm that soil vapor concentrations remain below the screening levels. The scope of confirmation monitoring will be developed, if necessary, at the close of the performance monitoring period.

7.2 Contingency Actions

Contingency actions may be required if additional risk reduction measures are needed after remedy implementation.

7.2.1 Contingency for VI Engineering Controls

The need for implementing VI engineering controls will be evaluated in the Upland AOC where planned buildings are to be located in or near remaining contamination in the RAA and are intended to be occupied by workers. VI risks will be assessed after the completion of soil excavation, LNAPL removal, and ISS and prior to redevelopment of the ASKO and Bulk Terminal parcels. The initial assessment will be completed when the footprints of planned buildings are known and VI risk from remaining soil and groundwater contamination can be assessed. VI assessment will be conducted in accordance with *Ecology's Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action* (Ecology 2009) and subsequent updates to the guidance (Ecology 2016, 2018, and 2019) and will include the following:

- An initial assessment will be performed to determine whether contaminant concentrations in soil or groundwater exceed the applicable screening levels at locations sufficiently close to the planned building(s) to pose a potential risk for VI. The applicable screening levels and horizontal and vertical boundaries for their application will be based on the most current Ecology guidance at the time of the evaluation.
- If the initial assessment indicates that there is a potential risk for VI, sampling will be conducted to measure contaminant concentrations in soil gas in the location of the planned building(s). Soil gas samples will be collected and analyzed according to the most current Ecology guidance and will be compared to the applicable and appropriate screening levels at the time of the evaluation.

The results of the VI assessment will be used to assess whether engineering controls will be necessary during building construction to mitigate the VI risk. Engineering controls may include alteration of the building design to avoid higher concentrations of soil gas, installation of a vapor barrier, or installation of passive or active sub-slab vapor mitigation systems. Protocols to evaluate the efficacy of these controls will be developed as appropriate and would likely include collection of indoor air samples after installation and comparison of data to appropriate MTCA CULs.

Results from the VI assessment(s) will be included in the LTCMP Annual Reports(s) or a separate VI memorandum depending on timing of this assessment.

7.2.2 Contingency Remedial Actions for Groundwater

The potential exists that groundwater will not meet CULs at the CPOC within 15 years. If extrapolations from the groundwater compliance monitoring data indicate that IHS concentrations are not declining at a rate sufficient to reach CULs within 15 years, contingency action(s) will be evaluated and undertaken as directed by Ecology to correct the situation. If a contingency evaluation is necessary, consideration will be given to factors such as the severity of predicted CUL exceedance and volumetric proportion of groundwater not expected to reach CULs. The decision point for determining whether to implement contingency measures will be 5 years from the end of remedial construction, or Property development, if the latter causes a potentially significant disruption of the groundwater recharge and flow regime.

Procedures for groundwater monitoring data analysis are discussed in the appended draft GMP. If a contingency evaluation is necessary, it can be included in the annual report for that year or a separate document.

The appropriate type and degree of contingent action will be subject to review and approval by Ecology. Possible contingent situations include, but are not limited to, the following:

- If degradation appears to be occurring based on downward contaminant concentration trends but at rates too slow to reliably meet CULs within the predicted restoration time frame, geochemical parameters could be evaluated upgradient and downgradient of the CPOC and new materials used to accelerate or augment natural attenuation (e.g., edible oil or sulfate salts).
- If degradation is not apparent or occurring at a very low rate suggesting the restoration time frame will not be met, an untreated ongoing source of contamination or less than ideal degradation conditions may be present. In this case, additional upgradient evaluations/investigations might be undertaken to identify and mitigate the potential source or enhance the degradation process. Possible mitigations include direct source removal or in situ application of products to mineralize or bind contaminants such as zero-valent iron or activated carbon.

8.0 Implementation Schedule

Implementation of the remedial action defined in this CAP is expected to occur over the next several years in conjunction with Property redevelopment, with the Shoreline AOC cleanup first, followed by the Upland AOC cleanup. Property development may also occur in phases, with a relatively short period of time between phases. An extended period of compliance monitoring will follow the remediation/development work.

The following table outlines a generalized schedule for the remedial action based on the expected chronology of key activities and deliverables.

Table 8.1: Schedule of Deliverables and Activities

Implementation Step or Deliverable	Due Date ⁶ or Time Frame
Pre-Construction Design Activities	Currently underway
Submit Agency Review Draft Pre-Remedial Design Work Plan	Within 30 days of effective date of Prospective Purchaser Consent Decree (PPCD)
Finalize Pre-Remedial Design Work Plan	30 days after receipt of Ecology's final comments
Implement Pre-Remedial Design Work Plan	Initiate within 45 days of Ecology approval of final Work Plan
Submit Agency Review Draft EDR	Within 180 days of effective date of PPCD
Finalize EDR	90 days after receipt of Ecology final comments
Acquire project permits	Prior to start of remedial action construction
Remedial Action Construction	Initiate within 90 days of Ecology approval of the EDR or after permit acquisition
Submit Agency Review Draft RACRs	150 days following construction completion for each phase of remedial action construction ⁷
Submit Final RACRs	45 days after receipt of Ecology's final comments
Submit Agency Review Draft LTCMP	90 days following remedial construction completion
Finalize LTCMP ⁸	45 days following receipt of Ecology's final comments on LTCMP
Implement Final LTCMP	In accordance with schedules established in the Final LTCMP. Groundwater compliance monitoring to begin no later than 1 year after remedial construction completion.
Property Development	After remedial action construction. Timeline and ownership uncertain. Expected to be in phases.
Revise LTCMP	Following Property redevelopment, if appropriate and with Ecology concurrence.
Submit LTCMP Annual Monitoring Reports	March 1 for the prior calendar year
Submit Quarterly Progress Reports	15 days after the end of each quarter

⁶ Schedule is in calendar days.

⁷ The placement of pavement or buildings as part of the Upland AOC remedy will occur during Property redevelopment. Remedy implementation will not be considered complete for the Upland AOC until redevelopment is complete.

⁸ The LTCMP will be a "living" document and may be modified as deemed appropriate with Ecology concurrence.

9.0 References

- Floyd|Snider. 2019. *Supplemental Upland Remedial Investigation Work Plan*. Final. Prepared for Cantera Development Group, LLC. March.
- _____. 2020. *Supplemental Upland Remedial Investigation/Feasibility Study*. Prepared for Cantera Development Group, LLC. September.
- Foster Wheeler Environmental Corporation (Foster Wheeler). 2000. *Environmental Property Assessment: Phase I, at 2737 West Commodore Way, Seattle, Washington*. Prepared for Time Oil Company. 25 August.
- _____. 2014a. *Remedial Investigation Report, ASKO Hydraulic Property*. Prepared for TOC Holdings Co. 23 May.
- _____. 2014b. *Remedial Investigation Report, East Waterfront parcel*. Prepared for TOC Holdings Co. 10 June.
- _____. 2014c. *Remedial Investigation Report, Bulk Terminal parcel*. Prepared for TOC Holdings Co. 13 June.
- _____. 2014d. *Feasibility Study, ASKO Hydraulic Property*. Prepared for TOC Holding Co. 9 June.
- _____. 2014e. *Feasibility Study, East Waterfront parcel*. Prepared for TOC Holdings Co. 12 June.
- _____. 2014f. *Feasibility Study, Bulk Terminal parcel*. Prepared for TOC Holdings Co. 17 June.
- Time Oil Co. (TOC). 1993. *Independent Remedial Action Conducted at Time Oil Co. Property Leased to Icicle Seafoods, Inc., 2752 Commodore Way; Seattle, Washington*. Letter report from Scott Sloan and Kevin Murphy, Time Oil Co., to Joe Hickey, Washington State Department of Ecology. 24 November.
- Washington State Department of Ecology (Ecology). 2009. *Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action*. Toxics Cleanup Program. Publication No. 09-09-047. October. Revised February 2016 and April 2018.
- _____. 2016. *Updated Process for Initially Assessing the Potential for Petroleum Vapor Intrusion*. Implementation Memorandum No. 14. Toxics Cleanup Program. Publication No. 16-09-046. 31 March.
- _____. 2018. *Petroleum Vapor Intrusion (PVI): Updated Screening Levels, Cleanup Levels, and Assessing PVI Threats to Future Buildings*. Implementation Memorandum No. 18. Toxics Cleanup Program. Publication No. 17-09-043. 10 January.
- _____. 2019. *Vapor Intrusion (VI) Investigations and Short-Term Trichloroethene (TCE) Toxicity*. Implementation Memorandum No. 22. Toxics Cleanup Program. Publication No. 18-09-047. 1 October.

_____. 2020. *Time Oil Site: Upland Ecological Risk Assessment*. Memorandum from Arthur Buchan, Washington State Department of Ecology, to Mark Adams, Washington State Department of Ecology. 26 June.

Tables

**Table 5.1
Alternative Evaluation**

Cleanup Action Area (CAA)	Alternative A.1	Alternative A.2	Alternative B	Alternative C	Alternative D	Alternative E
Upland AOC—Bulk Terminal (includes CAA-3)						
CAA-1.a	Excavate to CULs (2,800 CY, 5 ft bgs) Remove LNAPL to maximum extent practicable.	Excavate to RELs (2,200 CY, 5 ft bgs) Remove LNAPL to maximum extent practicable.	Excavate to RELs (2,200 CY, 5 ft bgs) Remove LNAPL to maximum extent practicable.	Excavate to RELs (1,300 CY, 5 ft bgs) Remove LNAPL to maximum extent practicable.	Excavate to RELs (600 CY, 5 ft bgs) Remove LNAPL to maximum extent practicable.	Excavate to RELs (600 CY, 5 ft bgs) Remove LNAPL to maximum extent practicable.
CAA-1.b	Excavate to CULs (1,900 CY, 10 ft bgs)	Excavate to RELs (1,600 CY, 10 ft bgs)	Excavate to RELs (1,600 CY, 10 ft bgs)	Excavate to RELs (800 CY, 10 ft bgs)	No Action	No Action
CAA-2	Excavate to CULs (13,400 CY, 15 ft bgs) Remove LNAPL to maximum extent practicable.	Excavate to RELs (8,800 CY, 15 ft bgs) Remove LNAPL to maximum extent practicable.	ISS to RELs in CAA-2.a (10,200 CY, 23 ft bgs) Excavate to RELs in CAA-2.b (2,100 CY, 15 ft bgs) and remove LNAPL	ISS to RELs in CAA-2.a (10,200 CY, 23 ft bgs) Excavate to RELs in CAA-2.b (2,100 CY, 15 ft bgs) and remove LNAPL	Excavate to RELs (7,900 CY, 20 ft bgs) Remove LNAPL to maximum extent practicable.	ISS to RELs in CAA-2.a (10,200 CY, 23 ft bgs) Excavate to RELs in CAA-2.b (2,100 CY, 15 ft bgs) and remove LNAPL
CAA-3	Excavate to CULs (2,600 CY, 5 ft bgs)	Excavate to RELs (1,700 CY, 5 ft bgs)	Excavate to RELs (800 CY, 5 ft bgs)	Excavate to RELs (800 CY, 5 ft bgs)	No Action	No Action
CAA-4.a	Excavate to CULs (4,000 CY, 20 ft bgs) Install PRB Wall along BNSF AOC boundary.	Excavate to CULs (4,000 CY, 20 ft bgs) Install PRB Wall along BNSF AOC boundary.	ISS to RELs (5,900 CY, 30 ft bgs) Install interceptor trench and PRB wall along BNSF AOC boundary.	ISS to RELs (5,900 CY, 30 ft bgs) Install interceptor trench and PRB wall along BNSF AOC boundary.	Thermal to RELs (4,000 CY to 20 ft bgs)	ISS to RELs (5,900 CY, 30 ft bgs) Install interceptor trench and PRB wall along BNSF AOC boundary.
CAA-4.b	Excavate to CULs (14,800 CY, 28 ft bgs) Install PRB Wall along BNSF AOC boundary.	Excavate to RELs (10,500 CY, 28 ft bgs) Install PRB Wall along BNSF AOC boundary.	ISS to RELs (11,300 CY, 30 ft bgs) Install interceptor trench and PRB wall along BNSF AOC boundary.	ISS to RELs (11,300 CY, 30 ft bgs) Install interceptor trench and PRB wall along BNSF AOC boundary.	Thermal to RELs (7,500 CY to 20 ft bgs)	ISS to RELs (11,300 CY, 30 ft bgs) Install interceptor trench and PRB wall along BNSF AOC boundary.
CAA-5	Excavate to CULs (1,300 CY, 5 ft bgs)	No Action	Excavate to CULs (1,300 CY, 5 ft bgs)	Excavate to CULs (200 CY, 5 ft bgs) ERD Treatment (gw only)	No Action	No Action
CAA-6	Excavate to CULs (1,300 CY)	Excavate to CULs (1,300 CY)	Excavate to CULs (1,300 CY)	Excavate to CULs (1,300 CY)	Excavate to CULs (1,300 CY)	Excavate to CULs (1,300 CY)
CAA-7	Excavate to CULs (60 CY)	Excavate to CULs (60 CY)	Excavate to CULs (60 CY)	Excavate to CULs (60 CY)	Excavate to CULs (60 CY)	Excavate to CULs (60 CY)
Upland AOC	Cap with pavement or buildings. Implement groundwater monitoring plan. Implement institutional controls that would restrict groundwater withdrawal, require maintenance of the cap, and require a Soil Management Plan.					
Restoration Timeframe	10 years	15 years	15 years	15 years	15 years	15 years
Cost	\$16,151,000	\$12,244,000	\$8,251,000	\$7,821,000	\$7,404,000	\$6,725,000
Total Soil Excavation or Treatment	42,160	30,160	36,760	33,960	21,360	31,460

Note:

 Preferred Sitewide Remedial Alternative

Abbreviations:

- | | |
|--|--|
| AOC Area of Concern | ft Feet |
| bgs Below ground surface | gw Groundwater |
| BNSF BNSF Railway Company | ISS In situ solidification and stabilization |
| CUL Cleanup level | LNAPL Light non-aqueous-phase liquid |
| CY Cubic yard | PRB Permeable reactive barrier |
| Ecology Washington State Department of Ecology | REL Remediation level |
| ERD Enhanced reductive dechlorination | |

Table 6.1
Applicable Local, State, and Federal Laws for the Selected Cleanup Alternative

Standard, Requirement, or Limitation ⁽¹⁾	Description
Location-Specific Requirements ⁽²⁾	
State Environmental Policy Act (RCW 43.21C; WAC 197-10)	SEPA review is required for MTCA cleanup actions; Ecology will be the lead agency for this effort.
Washington Shoreline Management Act (RCW 90.58; WAC 173-14)	The Washington Shoreline Management Act, authorized under the federal Coastal Zone Management Act, establishes requirements for substantial development occurring within the waters of Washington or within 200 feet of a shoreline.
Seattle Shoreline Master Program (SMC 23.60A)	Implements the requirements imposed on the City of Seattle by the Washington Shoreline Management Act (RCW 90.58) and ensures that development under the program will not cause a net loss of ecological functions. Applies to areas with 200 feet of a waterbody regulated by the program.
Seattle Critical Areas Regulations (SMC 25.09)	This chapter establishes regulations pertaining to the development within or adjacent to critical areas, which include areas that provide a variety of biological and physical functions that benefit the City of Seattle and its residents, including water quality protection, fish and wildlife habitat, and food chain support.
Endangered Species Act (16 USC 1531 et seq.; 50 CFR 17, 225, and 402) Migratory Bird Treaty Act (16 USC 742a-j and 40 CFR 10.13)	These statutes regulate the incidental take of migratory birds (such as Canada geese) and other endangered species by facility operations and construction activities.
Native American Graves Protection and Repatriation Act (25 USC 3001 through 3013; 43 CFR 10) Washington's Indian Graves and Records Law (RCW 27.44)	These statutes prohibit the destruction or removal of Native American cultural items and require written notification of inadvertent discovery to the appropriate agencies and Native American tribe. These programs are applicable to the remedial action if cultural items are found. The activities must cease in the area of the discovery; a reasonable effort must be made to protect the items discovered; and notice must be provided.
Archaeological Resources Protection Act (16 USC 470aa et seq.; 43 CFR 7)	This program sets forth requirements that are triggered when archaeological resources are discovered. These requirements only apply if archaeological items are discovered during implementation of the selected remedy.
National Historic Preservation Act (16 USC 470 et seq.; 36 CFR parts 60, 63, and 800)	This program sets forth a national policy of historic preservation and provides a process that must be followed to ensure that impacts of actions on archaeological, historic, and other cultural resources are protected.
Action-Specific Requirements ⁽³⁾	
State Environmental Policy Act (RCW 43.21C, WAC 197-11)	Establishes the state's policy for protection and preservation of the natural environment. Applies to cleanup actions conducted under MTCA.
Resource Conservation and Recovery Act (42 USC 6921-6949a; 40 CFR Part 268, Subtitles C and D)	Establishes requirements for the identification, handling, and disposal of hazardous and non-hazardous waste.
Dangerous Waste Regulations (RCW 70.105; WAC 173-303)	Establishes regulations that are the state equivalent of RCRA requirements for determining whether a solid waste is a state dangerous waste. This regulation also provides requirements for the management of dangerous wastes.
Solid Waste Disposal Act (42 USC Sec. 6901-6992; 40 CFR 257-258) Federal Land Disposal Requirements (40 CFR 268)	Protects health and the environment and promotes conservation of valuable material and energy resources. The Solid Waste Disposal Act establishes a framework for regulation of solid waste disposal. Federal land disposal requirements promulgated under the authority of the Solid Waste Disposal Act set minimum safety requirements for landfills including limitations on storage and land disposal for hazardous substances.
Department of Transportation Hazardous Materials Regulations (49 CFR 172)	Regulates the safe and secure transportation of hazardous materials, including documentation and handling requirements for shipping.
Washington Minimum Functional Standards for Solid Waste Handling (WAC 173-304)	Sets minimum functional standards for the proper handling of all solid waste materials originating from residences, commercial, agricultural, and industrial operations, as well as other sources.
Washington Solid Waste Handling Standards (RCW 70.95 and WAC 173-350)	Establishes minimum standards for handling and disposal of solid waste. Solid waste includes wastes that are likely to be generated as a result of site remediation, including contaminated soils, construction and demolition wastes, and garbage.
Washington Water Pollution Control Law (RCW 90.48; WAC 173-216, WAC 173-220) National Pollution Discharge Elimination System (CWA Part 402)	Washington has been delegated authority to issue NPDES permits. CWA Section 301, 302, and 303 require states to adopt water quality standards and implement a NPDES permitting process. The Washington Water Pollution Control Law and regulations address this requirement.
Noise Control Act of 1974 (RCW 70.107, WAC 173-60)	Establishes maximum noise levels.
Washington State Underground Injection Control Program (WAC 173-218)	Washington is authorized under CWA Sections 144 through 147 to administer a statewide Underground Injection Control program to protect groundwater by regulating the discharge of fluid from injection wells including temporary injection points.
City of Seattle Traffic Code (SMC 11.1)	The City of Seattle code regulates construction use and permitting in the right of way.

**Table 6.1
Applicable Local, State, and Federal Laws for the Selected Cleanup Alternative**

Standard, Requirement, or Limitation ⁽¹⁾	Description
Action-Specific Requirements ⁽³⁾ (cont.)	
City of Seattle Construction Codes for Grading (SMC 22.170)	Required for the excavation or addition of material within an Environmentally Critical Area, movement of more than 500 cubic yards of material, and in-place modification of the ground (soil remediation).
Seattle of Seattle Construction Codes for Demolition (Seattle Building Code Chapter 33)	Regulates the demolition of any structures within an Environmentally Critical Area or greater than 120 square feet in size.
National Electrical Code (NFPA 70) and the Seattle Electric Code Supplement for Class 1 Division 2 Environments.	Establishes restrictions and guidelines for temporary and/or permanent electrical installations.
City of Seattle Water Utilities Code (SMC 21.04)	Establishes rules for hydrant water use.
King County Industrial Waste Program	The King County Industrial Waste Program monitors discharge of liquid waste to the wastewater (sanitary sewer) system. Any discharges during construction to the wastewater system must be approved by King County prior to discharge. The King County Industrial Waste Program monitors volume and water quality of liquid waste discharged to the system.
Federal, State, and Local Air Quality Protection Programs State Implementation of Ambient Air Quality Standards NWAPA Ambient and Emission Standards Regional Standards for Fugitive Dust Emissions Toxic Air Pollutants	Regulations promulgated under the federal Clean Air Act (42 USC 7401) and the Washington State Clean Air Act (RCW 70.94) govern the release of airborne contaminants from point and non-point sources. Local air pollution control authorities such as PSCAA have also set forth regulations for implementing these air quality requirements. These requirements may be applicable to the Site for the purposes of demolition or dust control. PSCAA requires notification prior to demolition of any building with asbestos-containing material. Both PSCAA (under Regulation III) and WAC 173-460 establish ambient source impact levels for arsenic.
Chemical-Specific Requirements ⁽⁴⁾	
Model Toxics Control Act (WAC 173-340)	Establishes Washington administrative processes and standards to identify, investigate, and clean up facilities where hazardous substances are located.
Drinking Water Standards—State MCLs (WAC 246-290-310)	Establishes standards for contaminant levels in drinking water for water system purveyors.
Water Quality Standards for Groundwaters of the State of Washington (WAC 173-200)	Implements the Water Pollution Control Act and the Water Resources Act of 1971 (90.54 RCW).
National Recommended Water Quality Standards (40 CFR 131) Washington Maximum Contaminant Levels (WAC 246-290-310)	These water quality standards define the water quality goals of the water body by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses. States adopt water quality standards from 40 CFR 131 to protect public health or welfare, enhance the quality of water, and serve the purposes of the CWA. Washington water quality standards (MCLs) are presented in WAC.

Notes:

- Projects conducted under a consent decree are exempt from the procedural requirements of most state and local permits (RCW 70.105D.090); however, the remedial actions must still comply with the substantive requirements of the exempt permits. Therefore, for exempt permits, the statutory review timelines do not apply; actual timelines will be based on negotiations with the jurisdiction or agency, which should result in an expedited review timeline.
- Location-specific requirements are applicable to the specific area where the Site is located, and can restrict the performance of activities, including cleanup actions, solely because they occur in specific locations.
- Action-specific requirements are applicable to certain types of activities that occur or technologies that are used during the implementation of cleanup actions.
- Chemical-specific requirements are applicable to the types of contaminants present at the Site. The cleanup of contaminated media at the Site must meet the CULs developed under MTCA; these CULs are considered chemical-specific requirements.

Abbreviations:

- CFR Code of Federal Regulations
- CUL Cleanup level
- CWA Clean Water Act
- Ecology Washington State Department of Ecology
- MCL Maximum Contaminant Level
- MTCA Model Toxics Control Act
- NPDES National Pollutant Discharge Elimination System
- NWAPA Northwest Air Pollution Authority
- PSCAA Puget Sound Clean Air Agency
- RCRA Resource Conservation and Recovery Act
- RCW Revised Code of Washington
- SEPA State Environmental Policy Act
- SMC Seattle Municipal Code
- USC U.S. Code
- WAC Washington Administrative Code

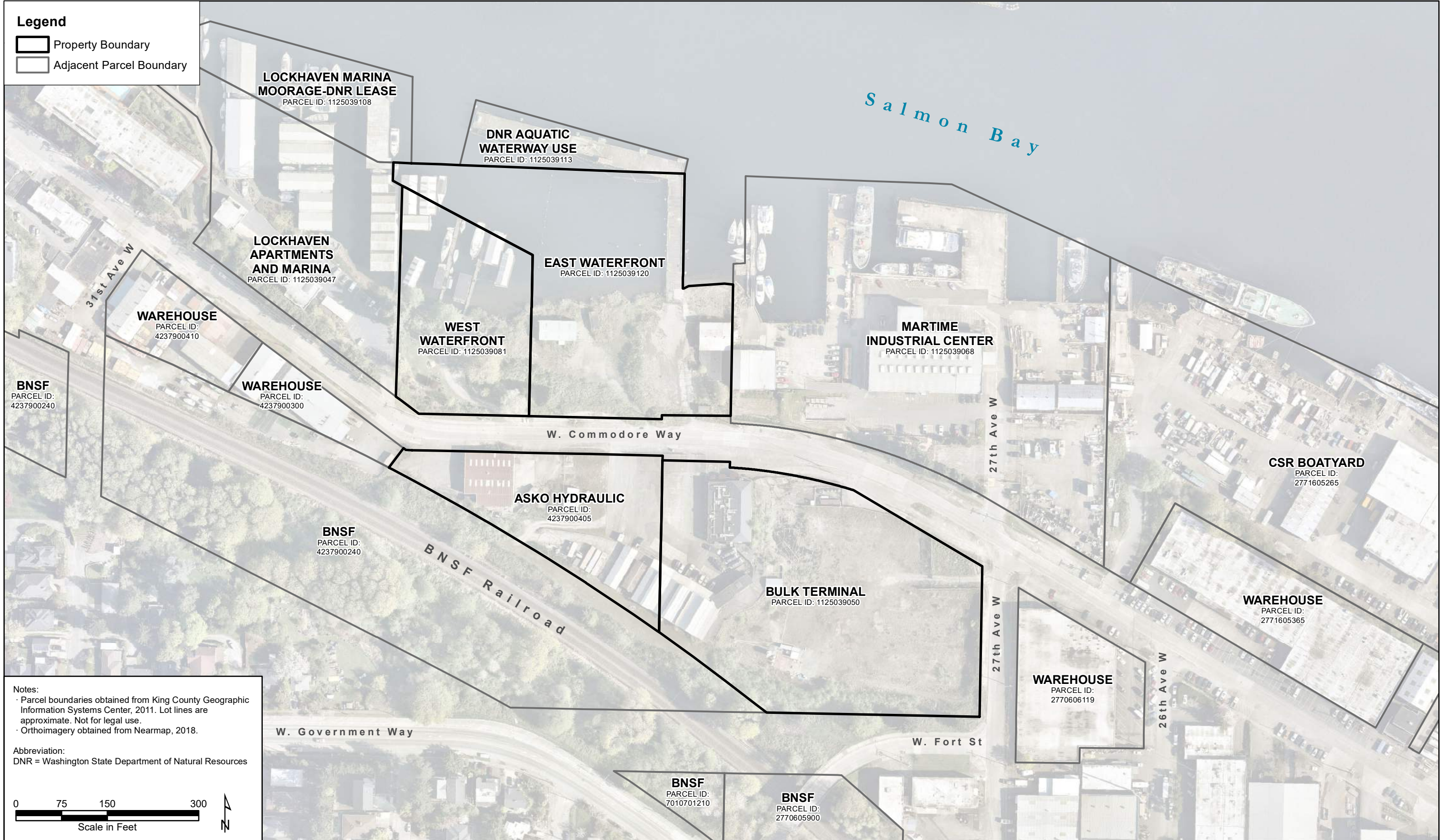
Figures



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**Cleanup Action Plan
 Time Oil Bulk Terminal Site
 Seattle, Washington**

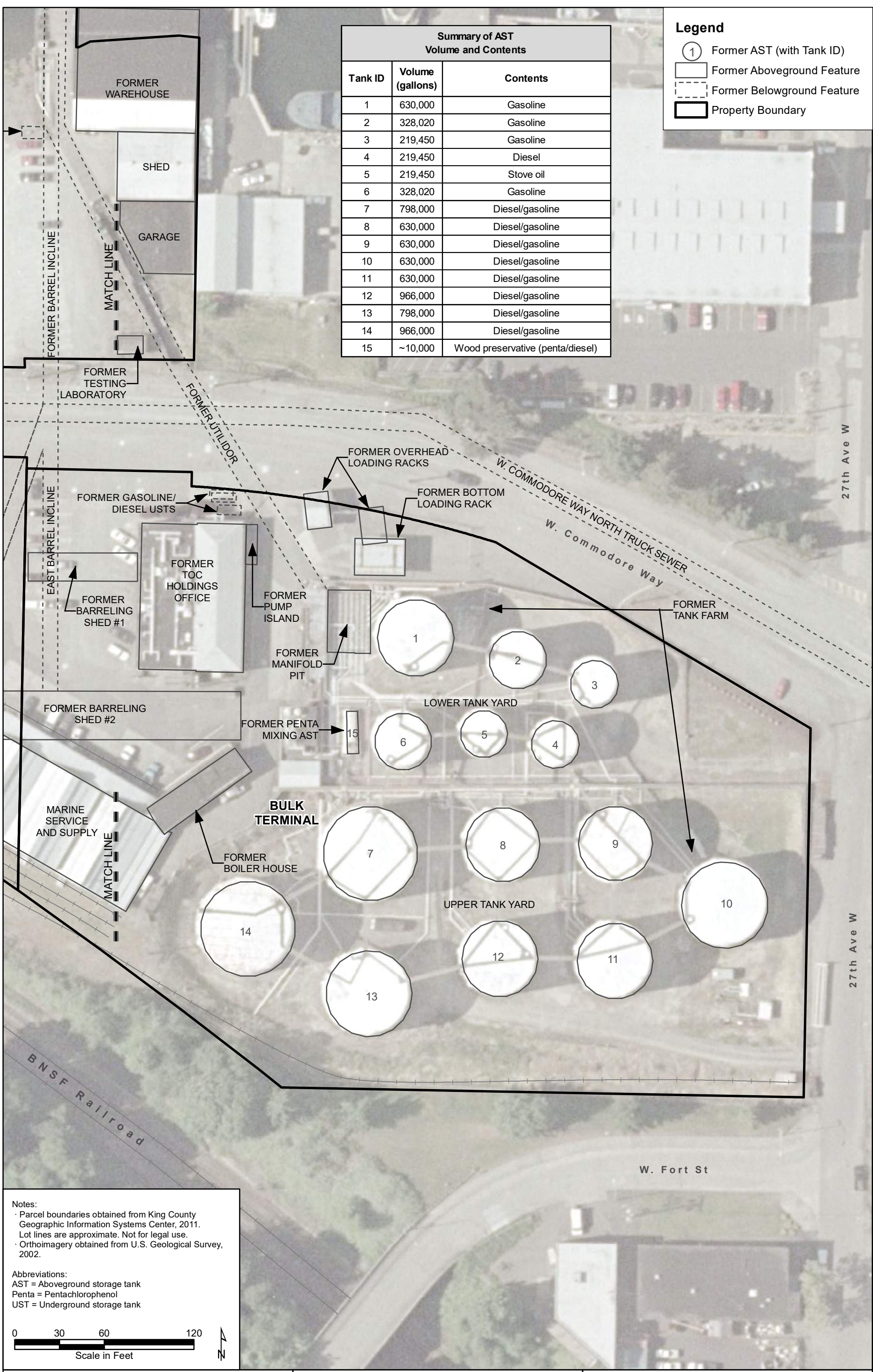
Figure 1.1
 Property Location



Legend

- ① Former AST (with Tank ID)
- ◻ Former Aboveground Feature
- - - Former Belowground Feature
- ▭ Property Boundary

Summary of AST Volume and Contents		
Tank ID	Volume (gallons)	Contents
1	630,000	Gasoline
2	328,020	Gasoline
3	219,450	Gasoline
4	219,450	Diesel
5	219,450	Stove oil
6	328,020	Gasoline
7	798,000	Diesel/gasoline
8	630,000	Diesel/gasoline
9	630,000	Diesel/gasoline
10	630,000	Diesel/gasoline
11	630,000	Diesel/gasoline
12	966,000	Diesel/gasoline
13	798,000	Diesel/gasoline
14	966,000	Diesel/gasoline
15	~10,000	Wood preservative (penta/diesel)



Notes:

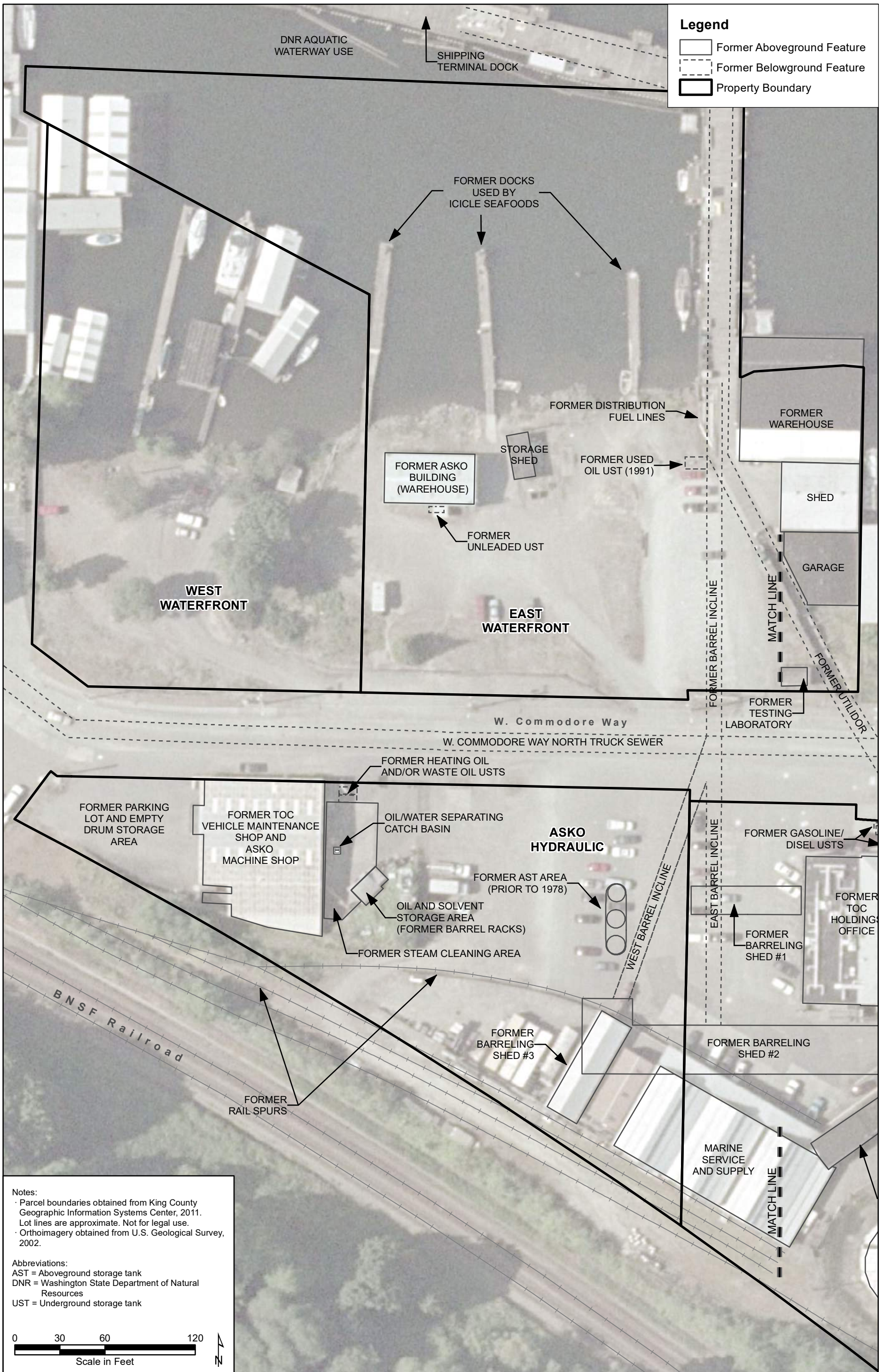
- Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
- Orthoimagery obtained from U.S. Geological Survey, 2002.

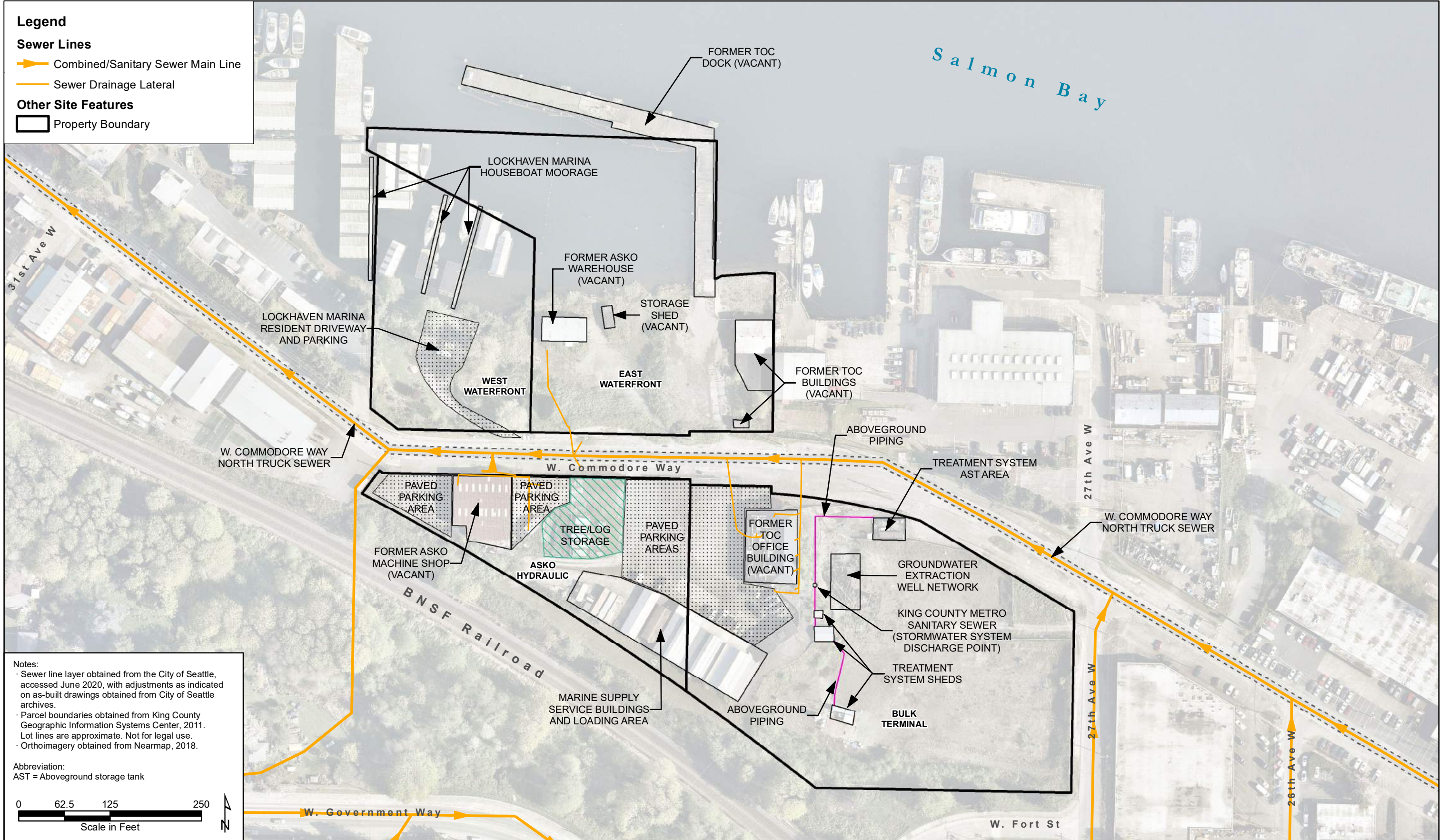
Abbreviations:

- AST = Aboveground storage tank
- Penta = Pentachlorophenol
- UST = Underground storage tank

0 30 60 120
Scale in Feet

I:\GIS\Projects\Cantera-TOC\MXD\CAP\CAP 2019\Figure 2.1a Former Property Features-East.mxd
9/11/2020





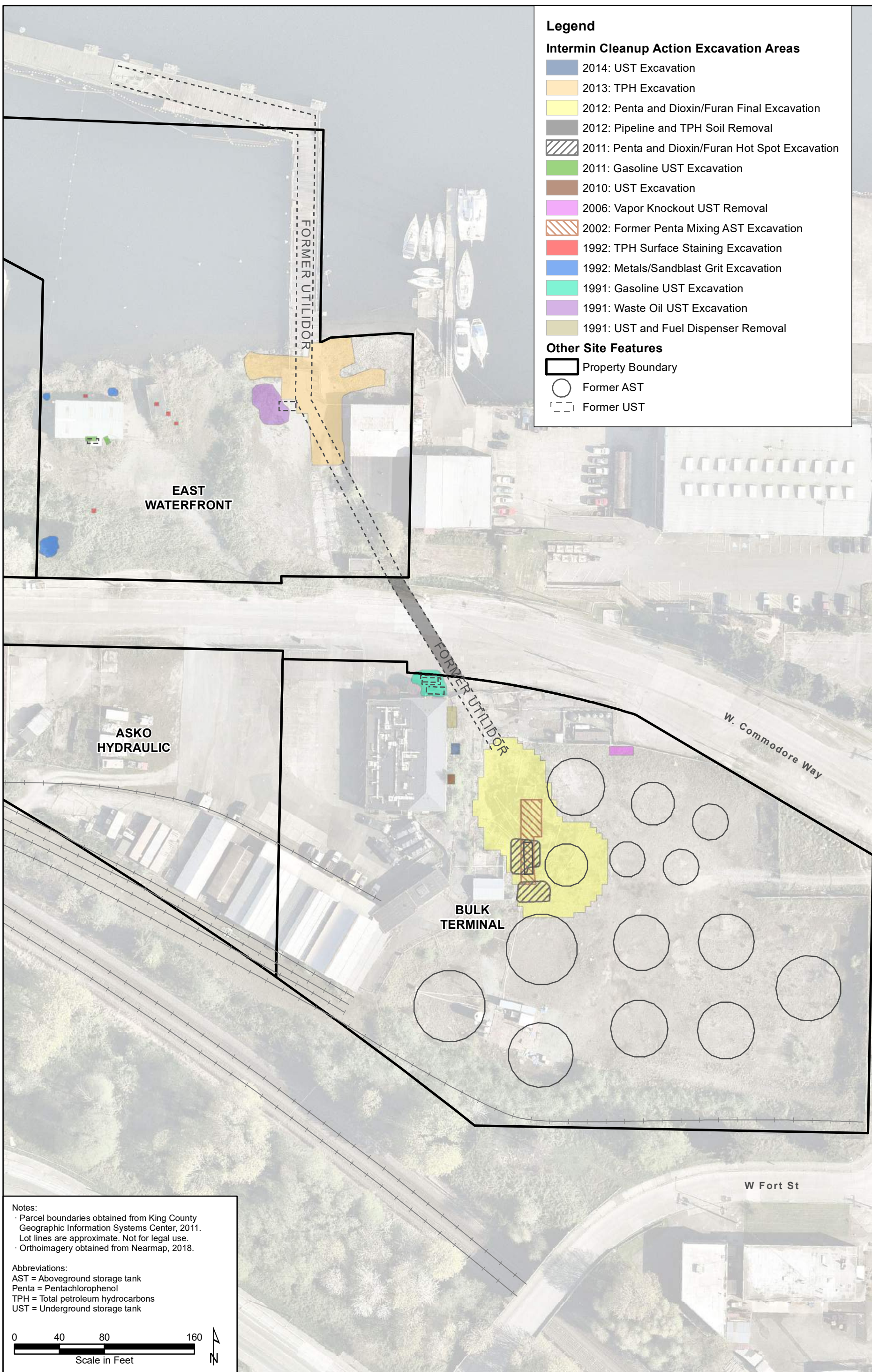
Legend

Intermin Cleanup Action Excavation Areas

- 2014: UST Excavation
- 2013: TPH Excavation
- 2012: Penta and Dioxin/Furan Final Excavation
- 2012: Pipeline and TPH Soil Removal
- 2011: Penta and Dioxin/Furan Hot Spot Excavation
- 2011: Gasoline UST Excavation
- 2010: UST Excavation
- 2006: Vapor Knockout UST Removal
- 2002: Former Penta Mixing AST Excavation
- 1992: TPH Surface Staining Excavation
- 1992: Metals/Sandblast Grit Excavation
- 1991: Gasoline UST Excavation
- 1991: Waste Oil UST Excavation
- 1991: UST and Fuel Dispenser Removal

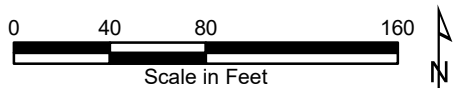
Other Site Features

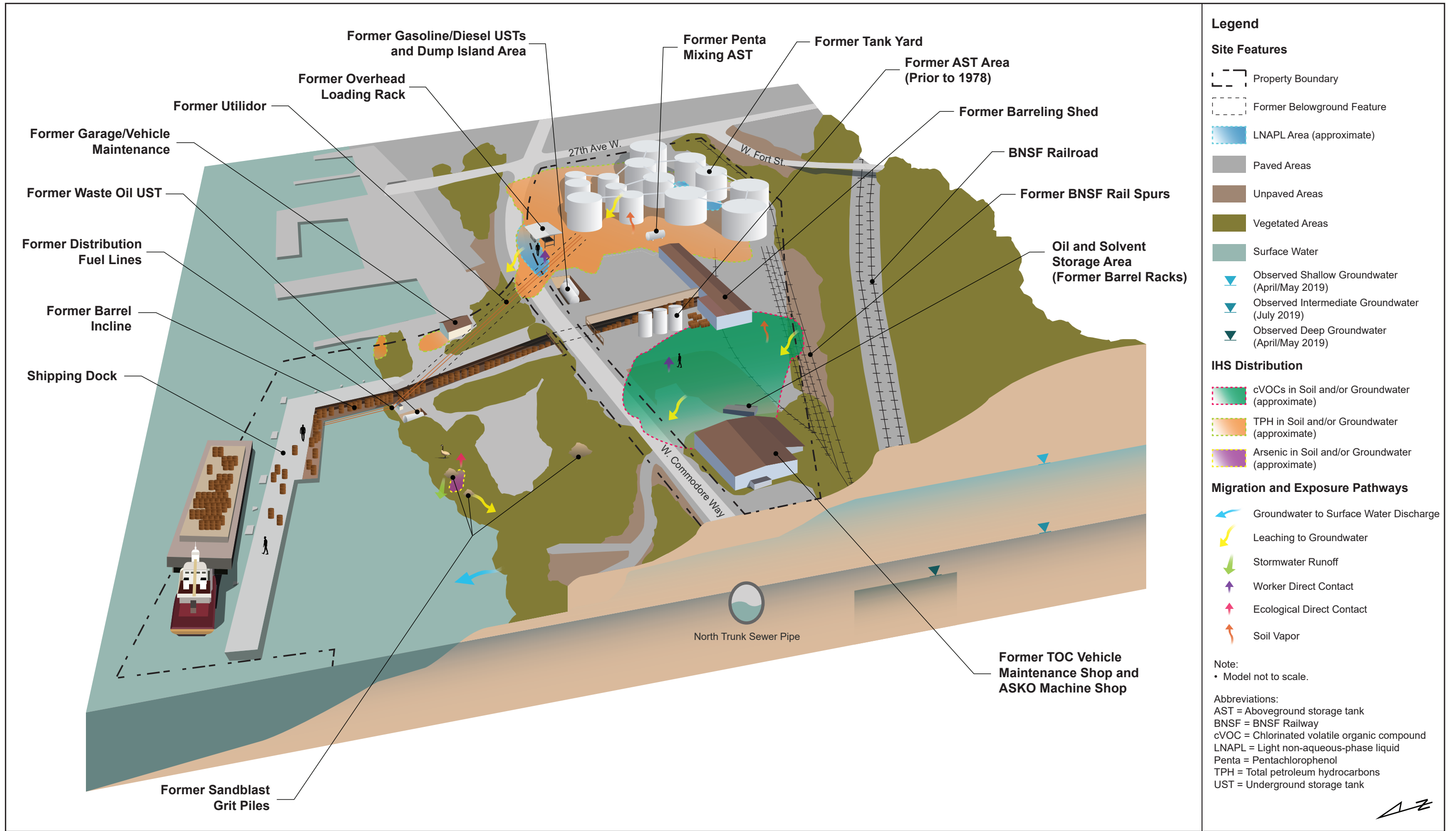
- Property Boundary
- Former AST
- Former UST

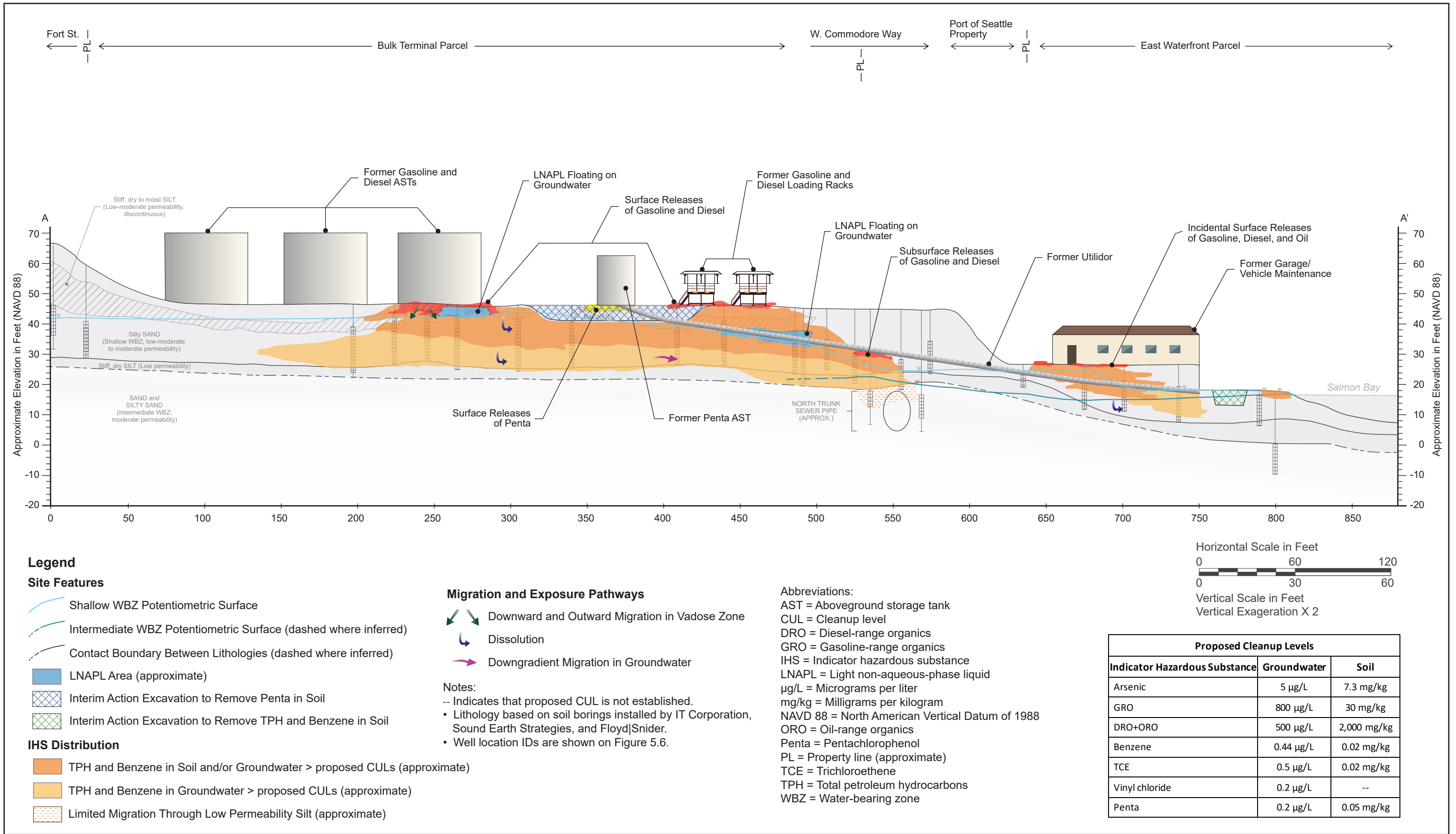


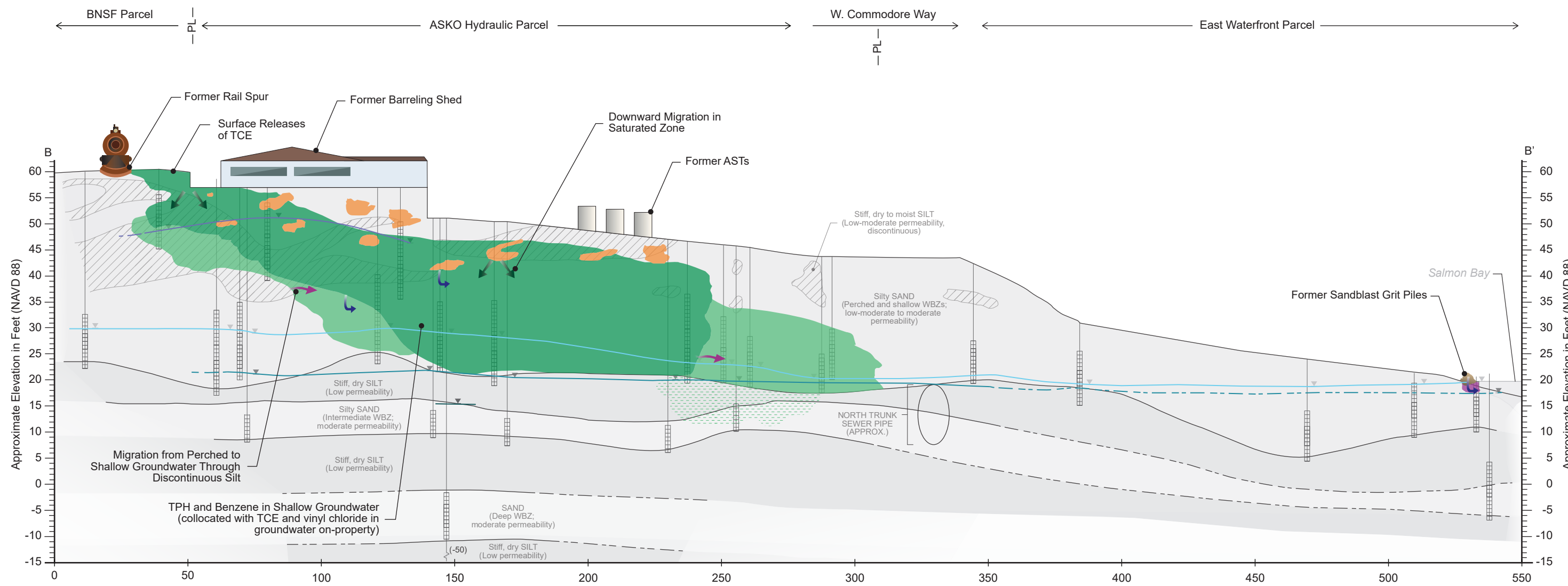
Notes:
 · Parcel boundaries obtained from King County Geographic Information Systems Center, 2011.
 · Lot lines are approximate. Not for legal use.
 · Orthoimagery obtained from Nearmap, 2018.

Abbreviations:
 AST = Aboveground storage tank
 Penta = Pentachlorophenol
 TPH = Total petroleum hydrocarbons
 UST = Underground storage tank









Legend

Site Features

- Perched WBZ Potentiometric Surface (dashed where inferred)
- Shallow WBZ Potentiometric Surface
- Intermediate WBZ Potentiometric Surface (dashed where inferred)
- Deep WBZ Potentiometric Surface
- Contact Boundary Between Lithologies (dashed where inferred)

IHS Distribution

- TPH and Benzene in Soil > Proposed CULs (approximate)
- Arsenic in Soil and/or Groundwater > Proposed CULs (approximate)
- TCE in Soil and/or Groundwater > Proposed CULs (approximate)
- TCE and Breakdown Products (Vinyl Chloride) in Groundwater > Proposed CULs (approximate)
- Limited Migration Through Low Permeability Silt > Proposed CULs (approximate)

Migration and Exposure Pathways

- Downward and Outward Migration in Vadose Zone
- Dissolution
- Downgradient Migration in Groundwater

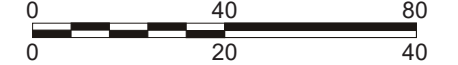
Notes:

- Indicates that proposed CUL is not established.
- Lithology based on soil borings installed by IT Corporation, Sound Earth Strategies, and Floyd|Snider.
- Well location IDs are shown on Figure 5.7.

Abbreviations:

- AST = Aboveground storage tank
- CUL = Cleanup level
- DRO = Diesel-range organics
- GRO = Gasoline-range organics
- IHS = Indicator hazardous substance
- LNAPL = Light non-aqueous-phase liquid
- µg/L = Micrograms per liter
- mg/kg = Milligrams per kilogram
- NAVD 88 = North American Vertical Datum of 1988
- ORO = Oil-range organics
- Penta = Pentachlorophenol
- PL = Property line (approximate)
- TCE = Trichloroethene
- TPH = Total petroleum hydrocarbons
- WBZ = Water-bearing zone

Horizontal Scale in Feet

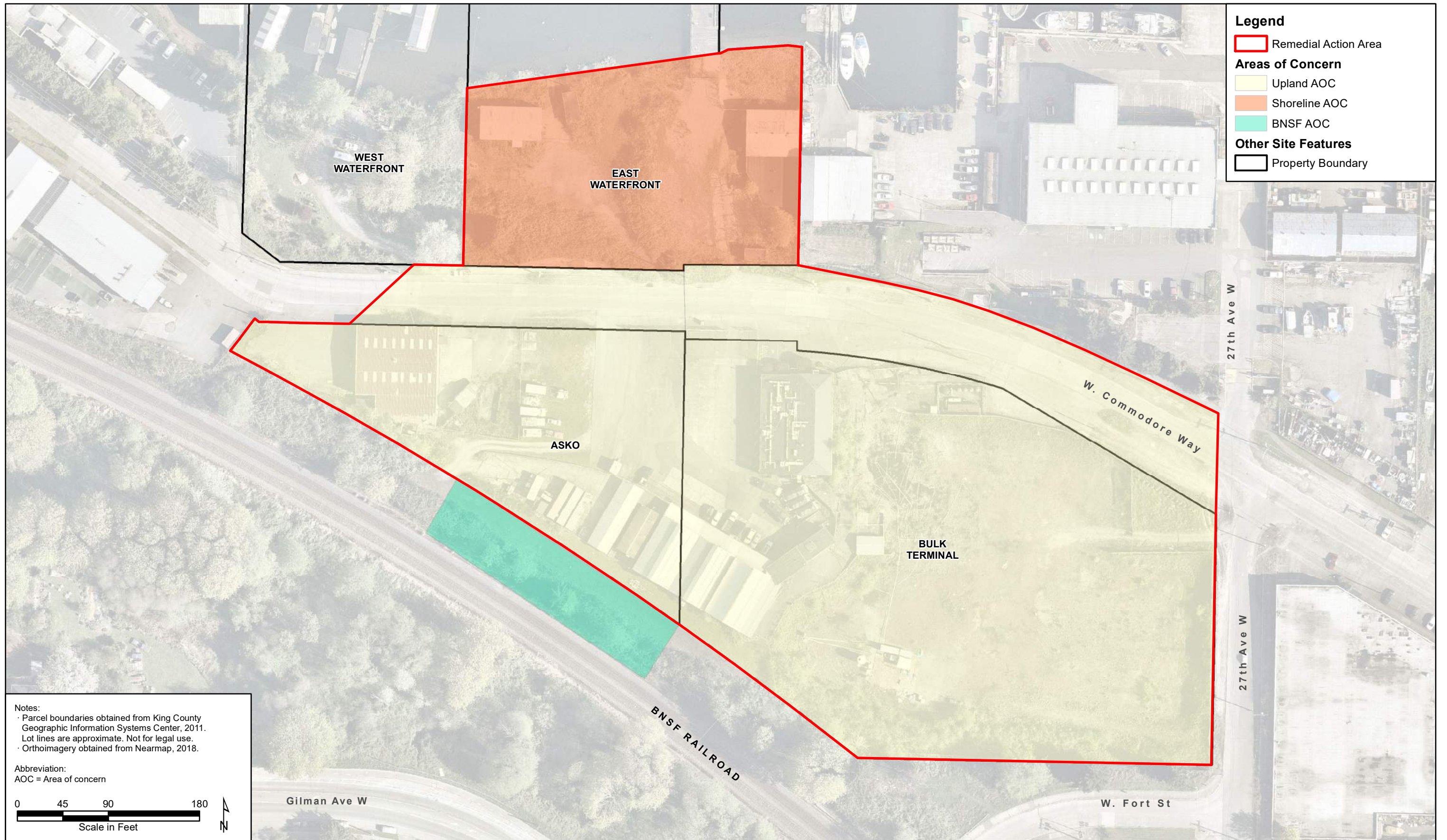


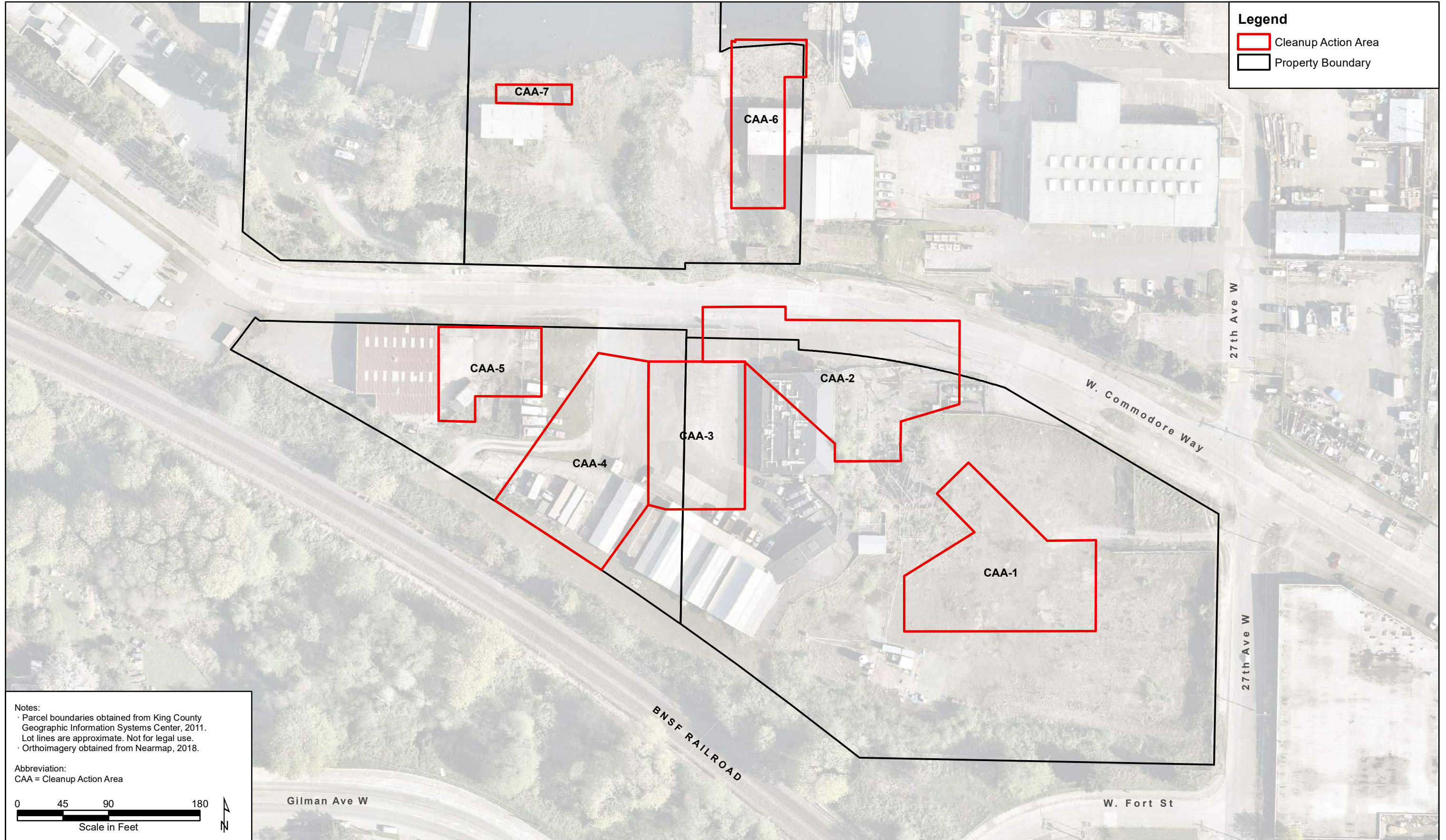
Vertical Scale in Feet

Vertical Exaggeration X 2

Proposed Cleanup Levels		
Indicator Hazardous Substance	Groundwater	Soil
Arsenic	5 µg/L	7.3 mg/kg
GRO	800 µg/L	30 mg/kg
DRO+ORO	500 µg/L	2,000 mg/kg
Benzene	0.44 µg/L	0.02 mg/kg
TCE	0.5 µg/L	0.02 mg/kg
Vinyl chloride	0.2 µg/L	--
Penta	0.2 µg/L	0.05 mg/kg

I:\GIS\Projects\Cantera-TOCA\IDraft Cleanup Action Plan\Figure 2.6 Conceptual Site Model Cross-Section B-B'_2020-0622.ai
06/22/2020

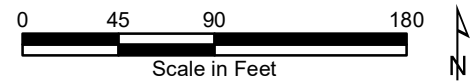




- Legend**
- Cleanup Action Area
 - Property Boundary

Notes:
 · Parcel boundaries obtained from King County Geographic Information Systems Center, 2011.
 · Lot lines are approximate. Not for legal use.
 · Orthoimagery obtained from Nearmap, 2018.

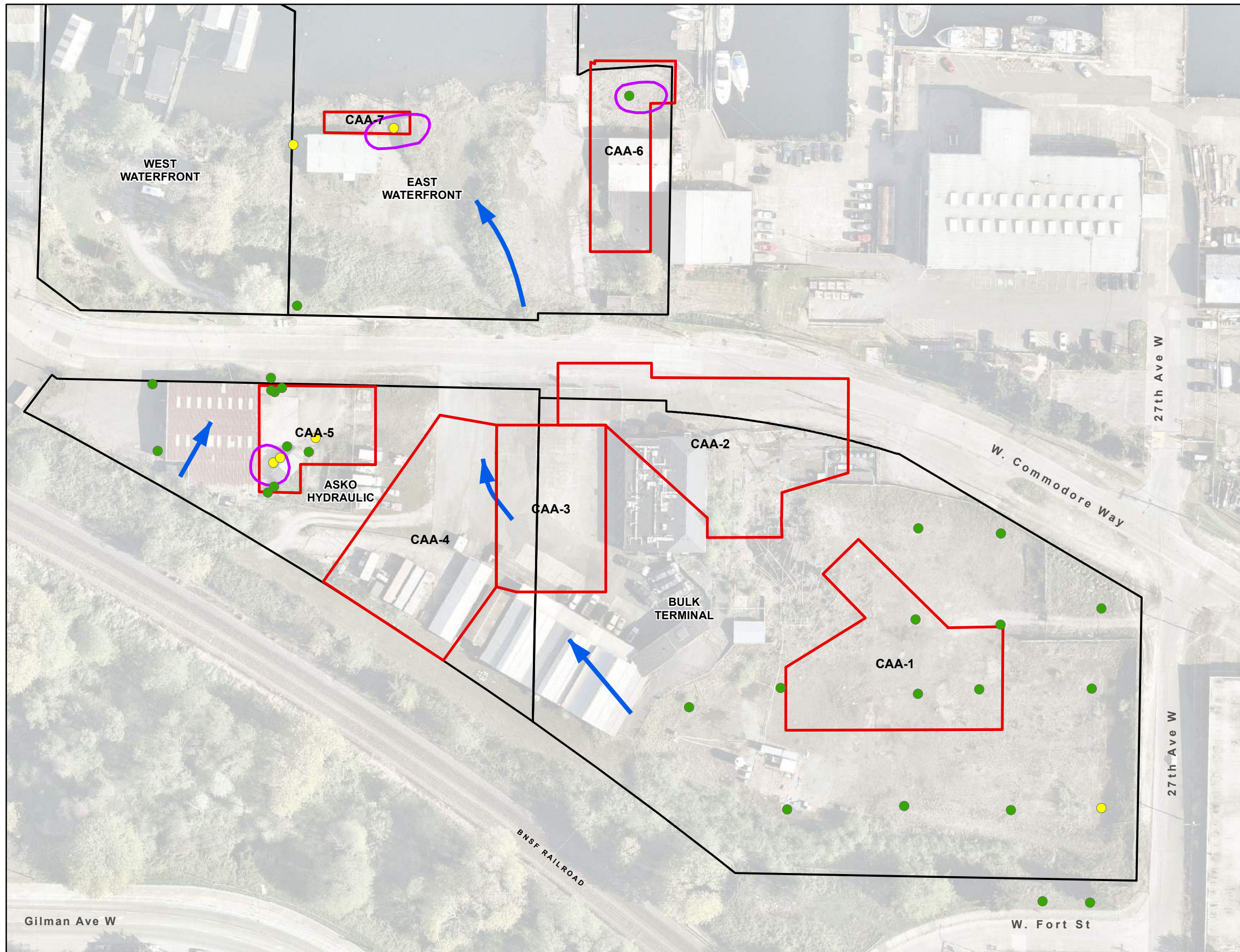
Abbreviation:
 CAA = Cleanup Action Area



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**Cleanup Action Plan
 Time Oil Bulk Terminal Site
 Seattle, Washington**

Figure 4.1
 Cleanup Action Areas



Legend

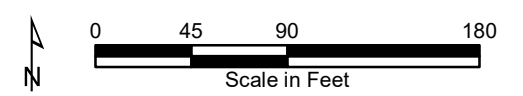
- Cleanup Action Area
- Soil Sample Results**
- All Results Less Than CUL
- One or More Results Greater Than
- Approximate Extent of IHS Exceeding CUL in Groundwater**
- Arsenic >5.0 µg/L
- Other Site Features**
- ← Predominant Shallow Groundwater Flow Direction (April/May 2019)
- Property Boundary

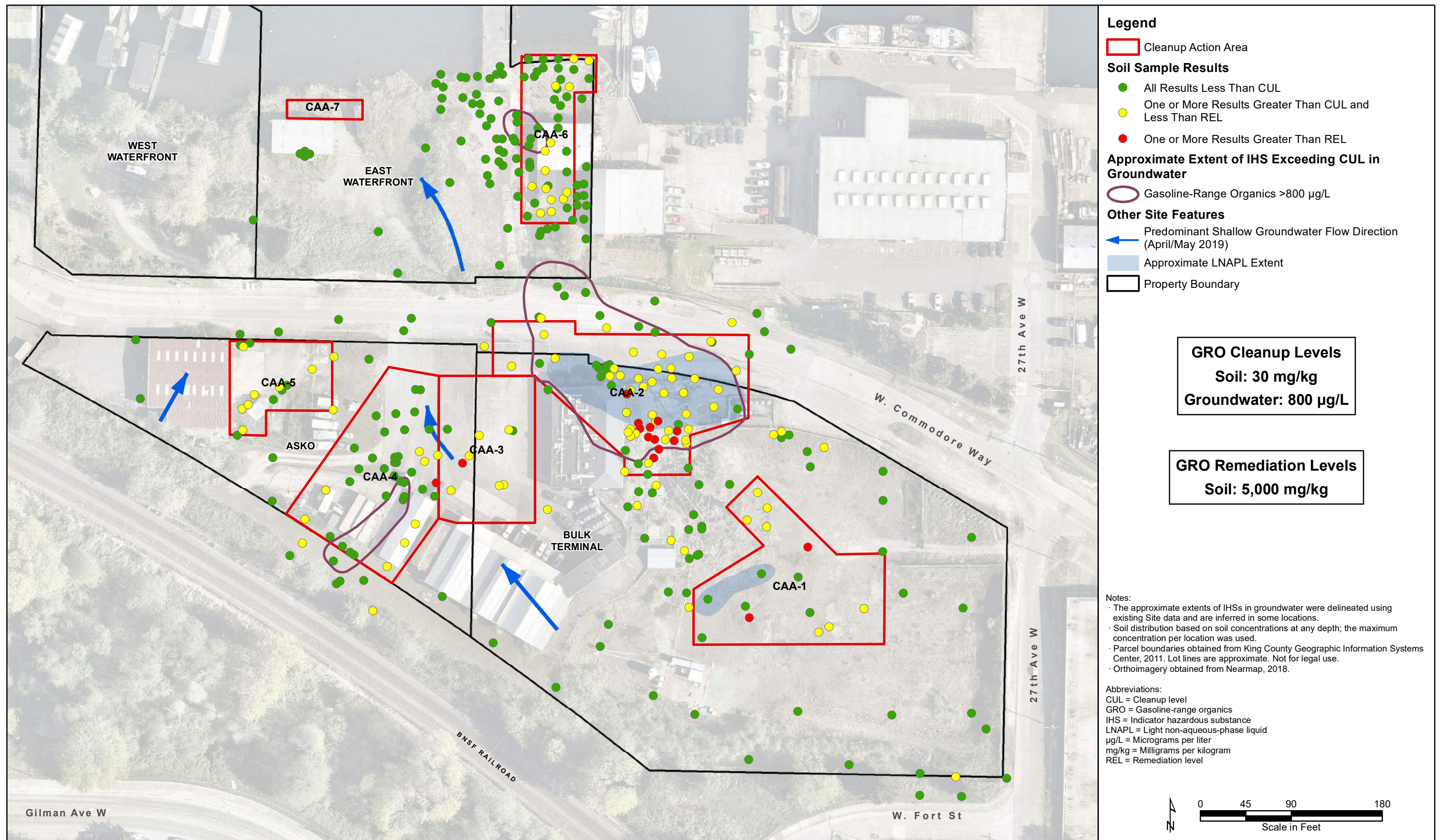
Arsenic Cleanup Levels
 Soil: 7.3 mg/kg
 Groundwater: 5.0 µg/L

Notes:

- The approximate extents of IHSs in groundwater were delineated using existing Site data and are inferred in some locations.
- Soil distribution based on soil concentrations at any depth; the maximum concentration per location was used.
- Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
- Orthoimagery obtained from Nearmap, 2018.

Abbreviations:
 CUL = Cleanup level
 IHS = Indicator hazardous substance
 µg/L = Micrograms per liter
 mg/kg = Milligrams per kilogram





- Legend**
- Cleanup Action Area
 - Soil Sample Results**
 - All Results Less Than CUL
 - One or More Results Greater Than CUL and Less Than REL
 - One or More Results Greater Than REL
 - Approximate Extent of IHS Exceeding CUL in Groundwater**
 - Gasoline-Range Organics >800 µg/L
 - Other Site Features**
 - ← Predominant Shallow Groundwater Flow Direction (April/May 2019)
 - Approximate LNAPL Extent
 - Property Boundary

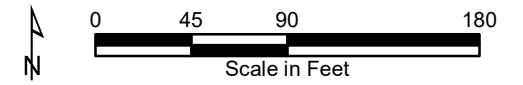
GRO Cleanup Levels
Soil: 30 mg/kg
Groundwater: 800 µg/L

GRO Remediation Levels
Soil: 5,000 mg/kg

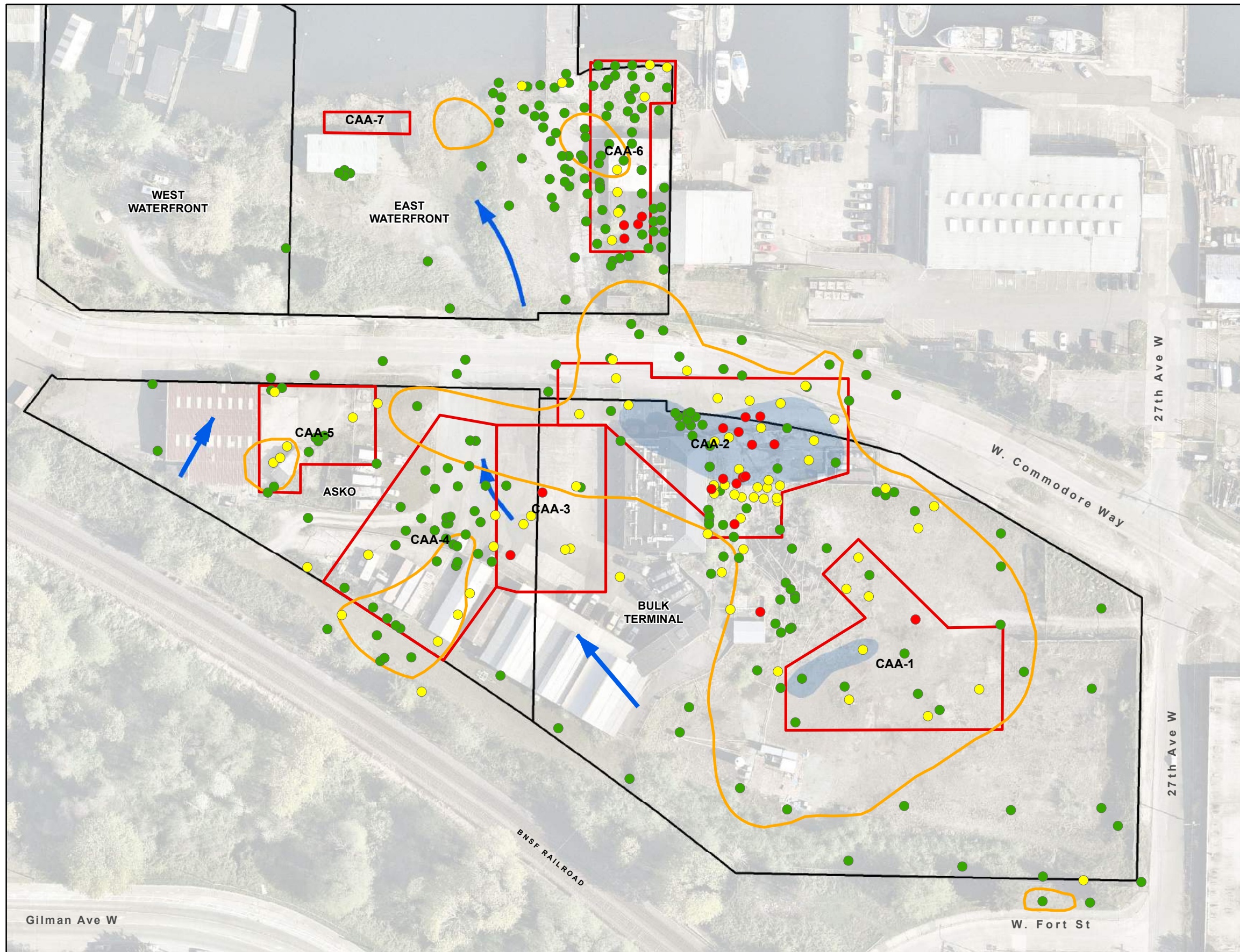
Notes:

- The approximate extents of IHSs in groundwater were delineated using existing Site data and are inferred in some locations.
- Soil distribution based on soil concentrations at any depth; the maximum concentration per location was used.
- Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
- Orthoimagery obtained from Nearmap, 2018.

Abbreviations:
 CUL = Cleanup level
 GRO = Gasoline-range organics
 IHS = Indicator hazardous substance
 LNAPL = Light non-aqueous-phase liquid
 µg/L = Micrograms per liter
 mg/kg = Milligrams per kilogram
 REL = Remediation level



H:\GIS\Projects\Cantera-TOC\IMXD\CAP\CAP 2019\Figure 4.3 GRO Occurrence in Soil and Groundwater.mxd
 9/11/2020



Legend

- Cleanup Action Area

Soil Sample Results

- All Results Less Than CUL
- One or More Results Greater Than CUL and Less Than REL
- One or More Results Greater Than REL

Approximate Extent of IHS Exceeding CUL in Groundwater

- Diesel- and Oil-Range Organics >500 µg/L

Other Site Features

- ← Predominant Shallow Groundwater Flow Direction (April/May 2019)
- Approximate LNAPL Extent
- Property Boundary

DRO+ORO Cleanup Levels

Soil Cleanup Levels

DRO: 570 mg/kg

ORO: 1,600 mg/kg

DRO+ORO: 2,000 mg/kg

Groundwater Cleanup Levels

DRO+ORO: 500 µg/L

DRO+ORO Remediation Levels

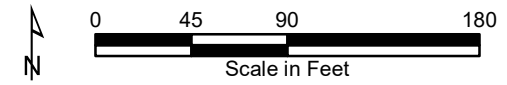
Soil: 12,000 mg/kg

Notes:

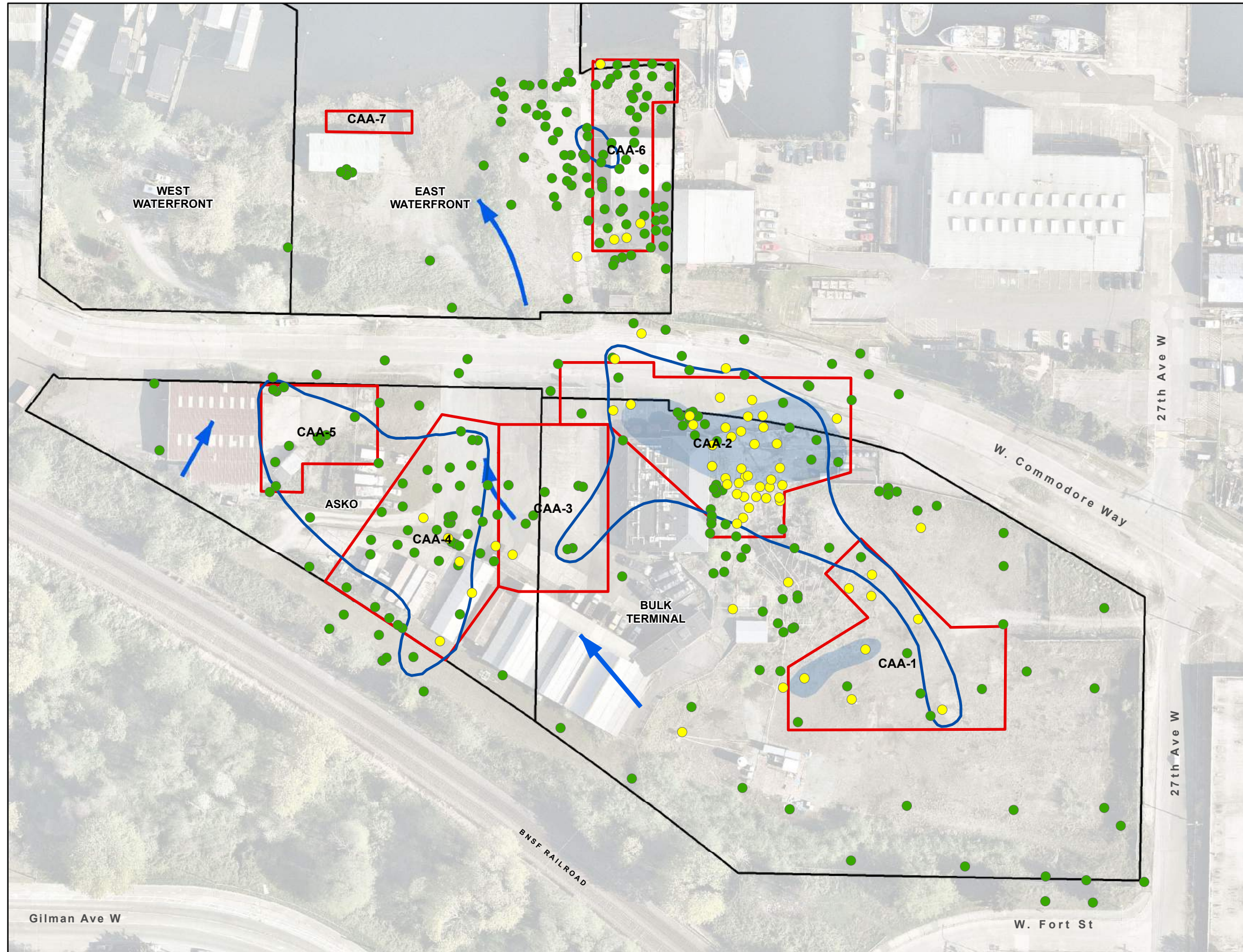
- A single TPH soil CUL for DRO+ORO was proposed in the Supplemental Upland RI/FS for protection of human health. A subsequent review of the terrestrial ecological evaluation by Ecology indicated the need for additional DRO and ORO soil CULs for protection of terrestrial species. Therefore, the final CULs selected by Ecology in the CAP include both individual CULs for DRO and ORO and a combined DRO+ORO CUL.
- The approximate extents of IHSs in groundwater were delineated using existing Site data and are inferred in some locations.
- Soil distribution based on soil concentrations at any depth; the maximum concentration per location was used.
- Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
- Orthoimagery obtained from Nearmap, 2018.

Abbreviations:

CUL = Cleanup level	mg/kg = Milligrams per kilogram
DRO = Diesel-range organics	ORO = Oil-range organics
IHS = Indicator hazardous substance	REL = Remediation level
LNAPL = Light non-aqueous-phase liquid	
µg/L = Micrograms per liter	



H:\GIS\Projects\Cantera-TOC\IMXD\CAP\CAP 2019\Figure 4.4 DRO and ORO Occurrence in Soil and Groundwater.mxd
9/11/2020



Legend

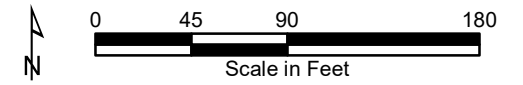
- Cleanup Action Area
- Soil Sample Results**
- All Results Less Than CUL
- One or More Results Greater Than CUL
- Approximate Extent of IHS Exceeding CUL in Groundwater**
- Benzene >0.44 µg/L
- Other Site Features**
- ← Predominant Shallow Groundwater Flow Direction (April/May 2019)
- Approximate LNAPL Extent
- Property Boundary

Benzene Cleanup Levels
Soil: 0.020 mg/kg
Groundwater: 0.44 µg/L

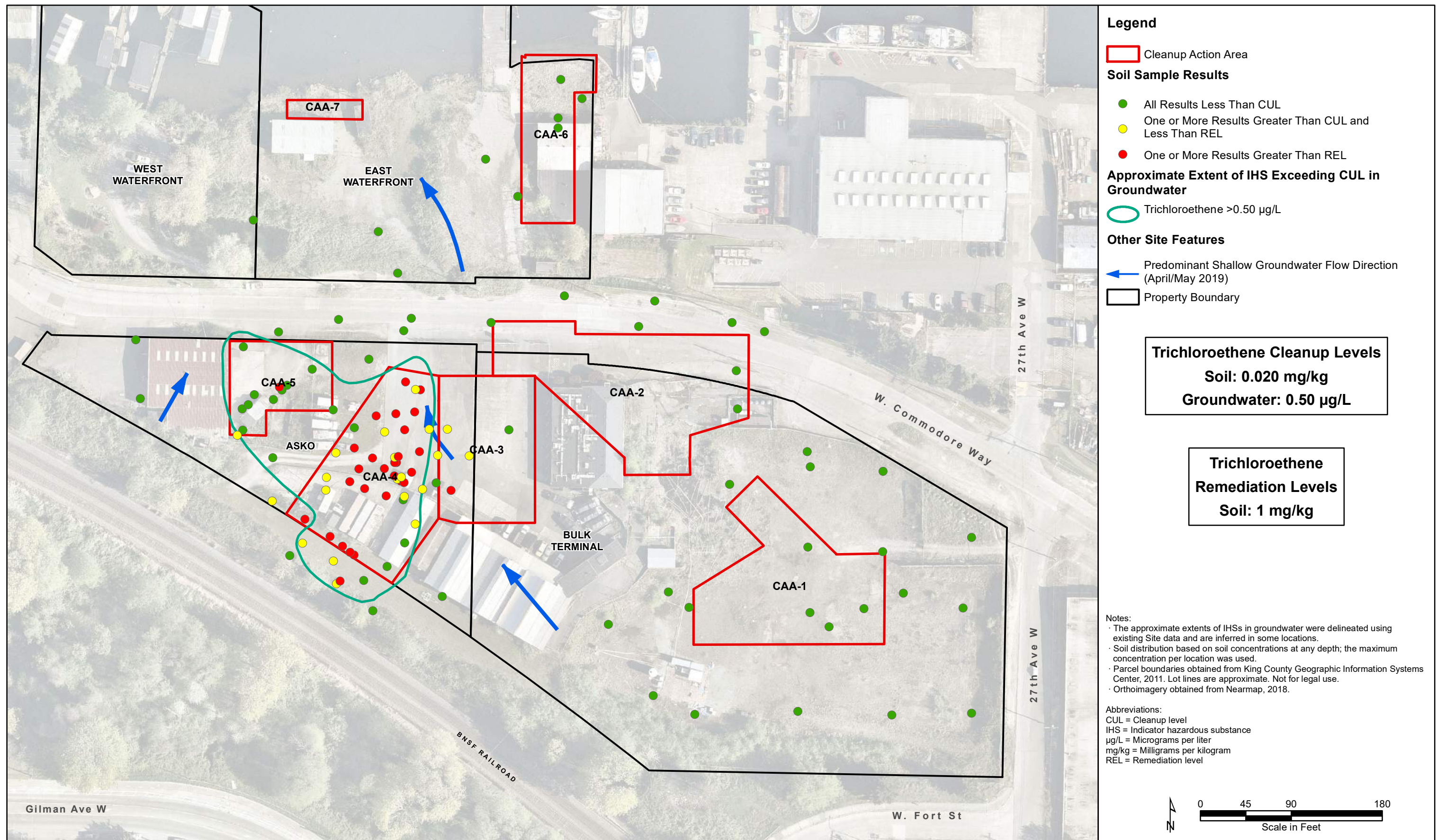
Notes:

- The approximate extents of IHSs in groundwater were delineated using existing Site data and are inferred in some locations.
- Soil distribution based on soil concentrations at any depth; the maximum concentration per location was used.
- Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
- Orthoimagery obtained from Nearmap, 2018.

Abbreviations:
 CUL = Cleanup level
 IHS = Indicator hazardous substance
 LNAPL = Light non-aqueous-phase liquid
 µg/L = Micrograms per liter
 mg/kg = Milligrams per kilogram



H:\GIS\Projects\Cantera-TOC\IMXD\CAP\CAP 2019\Figure 4.5 Benzene Occurrence in Soil and Groundwater.mxd
 9/11/2020



Legend

Cleanup Action Area

Soil Sample Results

- All Results Less Than CUL
- One or More Results Greater Than CUL and Less Than REL
- One or More Results Greater Than REL

Approximate Extent of IHS Exceeding CUL in Groundwater

Trichloroethene >0.50 µg/L

Other Site Features

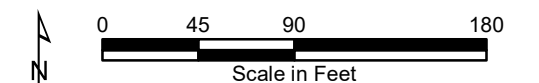
- ← Predominant Shallow Groundwater Flow Direction (April/May 2019)
- Property Boundary

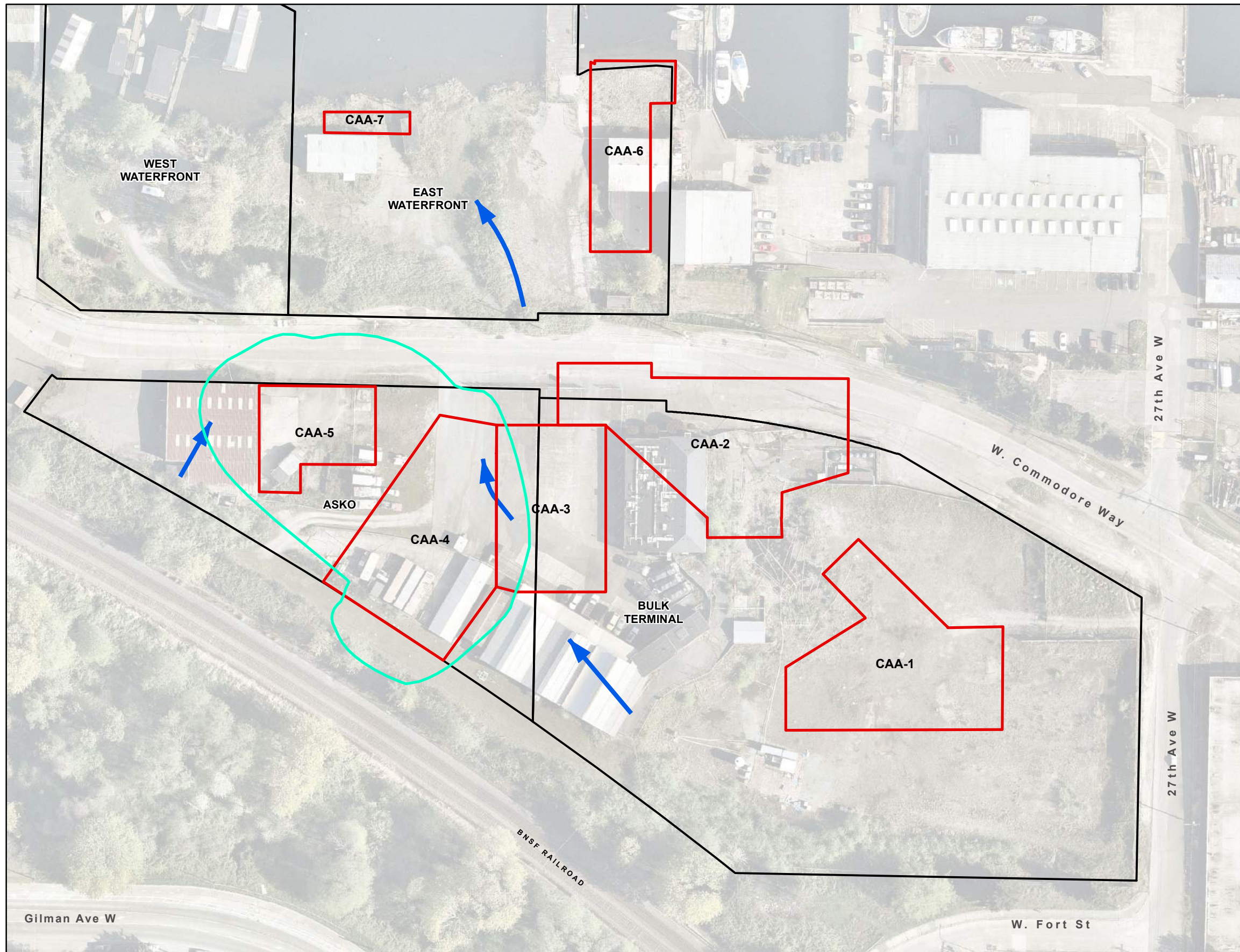
Trichloroethene Cleanup Levels
Soil: 0.020 mg/kg
Groundwater: 0.50 µg/L

Trichloroethene Remediation Levels
Soil: 1 mg/kg

Notes:
 · The approximate extents of IHSs in groundwater were delineated using existing Site data and are inferred in some locations.
 · Soil distribution based on soil concentrations at any depth; the maximum concentration per location was used.
 · Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
 · Orthoimagery obtained from Nearmap, 2018.

Abbreviations:
 CUL = Cleanup level
 IHS = Indicator hazardous substance
 µg/L = Micrograms per liter
 mg/kg = Milligrams per kilogram
 REL = Remediation level





Legend

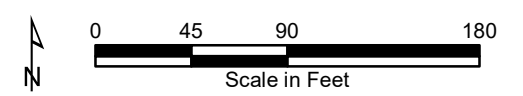
- Cleanup Action Area
- Approximate Extent of IHS Exceeding CUL in Groundwater**
- Vinyl Chloride >0.20 µg/L
- Other Site Features**
- ← Predominant Shallow Groundwater Flow Direction (April/May 2019)
- Property Boundary

**Vinyl Chloride Cleanup Level
Groundwater: 0.20 µg/L**

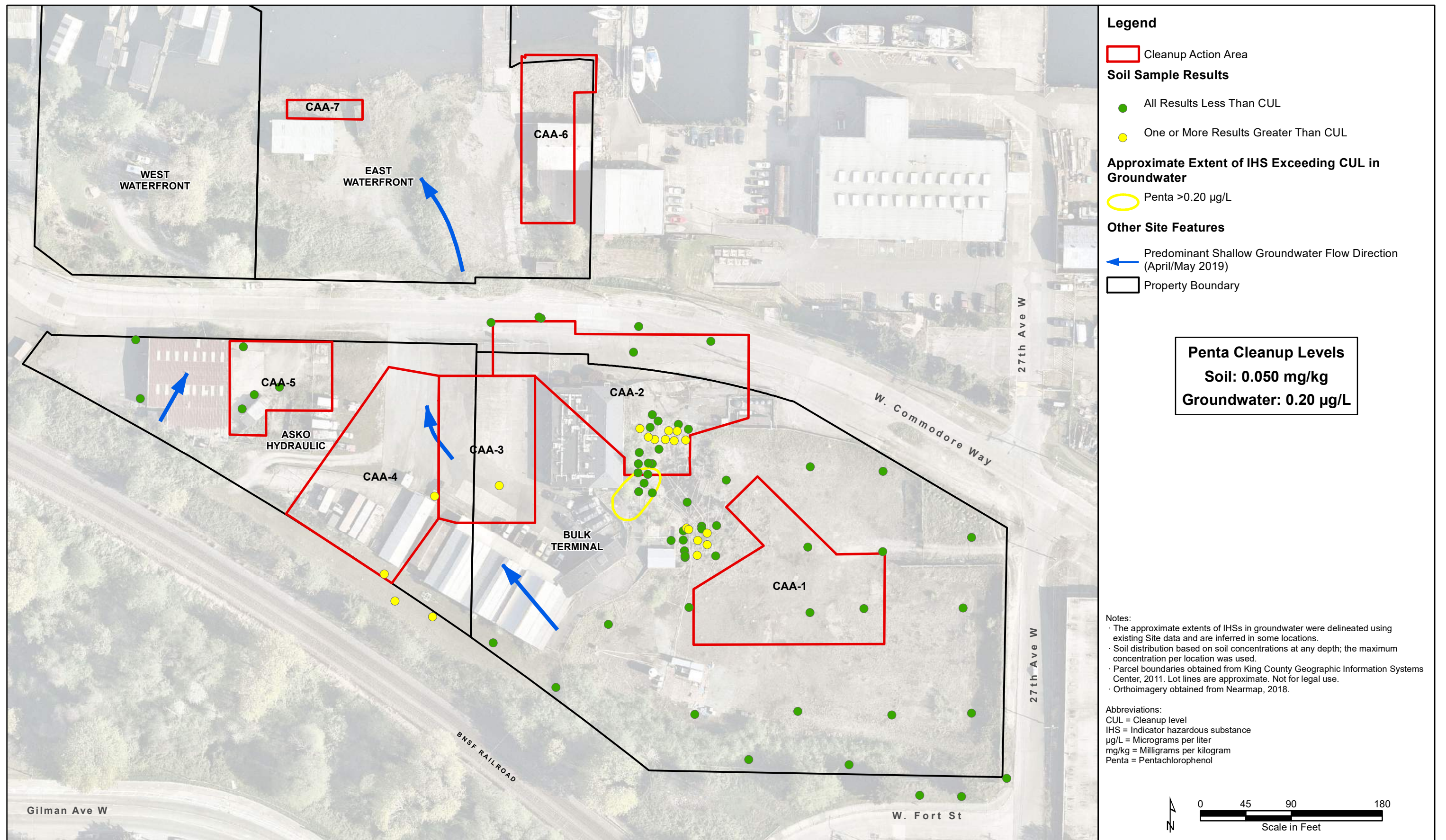
Notes:

- The approximate extents of IHSs in groundwater were delineated using existing Site data and are inferred in some locations.
- Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
- Orthoimagery obtained from Nearmap, 2018.

Abbreviations:
 CUL = Cleanup level
 IHS = Indicator hazardous substance
 µg/L = Micrograms per liter



H:\GIS\Projects\Cantera-TOC\IMXD\CAP\CAP 2019\Figure 4.7 Vinyl Chloride Occurrence in Groundwater.mxd
 9/11/2020



Legend

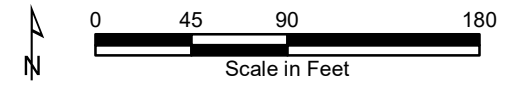
- Cleanup Action Area
- Soil Sample Results**
- All Results Less Than CUL
- One or More Results Greater Than CUL
- Approximate Extent of IHS Exceeding CUL in Groundwater**
- Penta > 0.20 µg/L
- Other Site Features**
- ← Predominant Shallow Groundwater Flow Direction (April/May 2019)
- Property Boundary

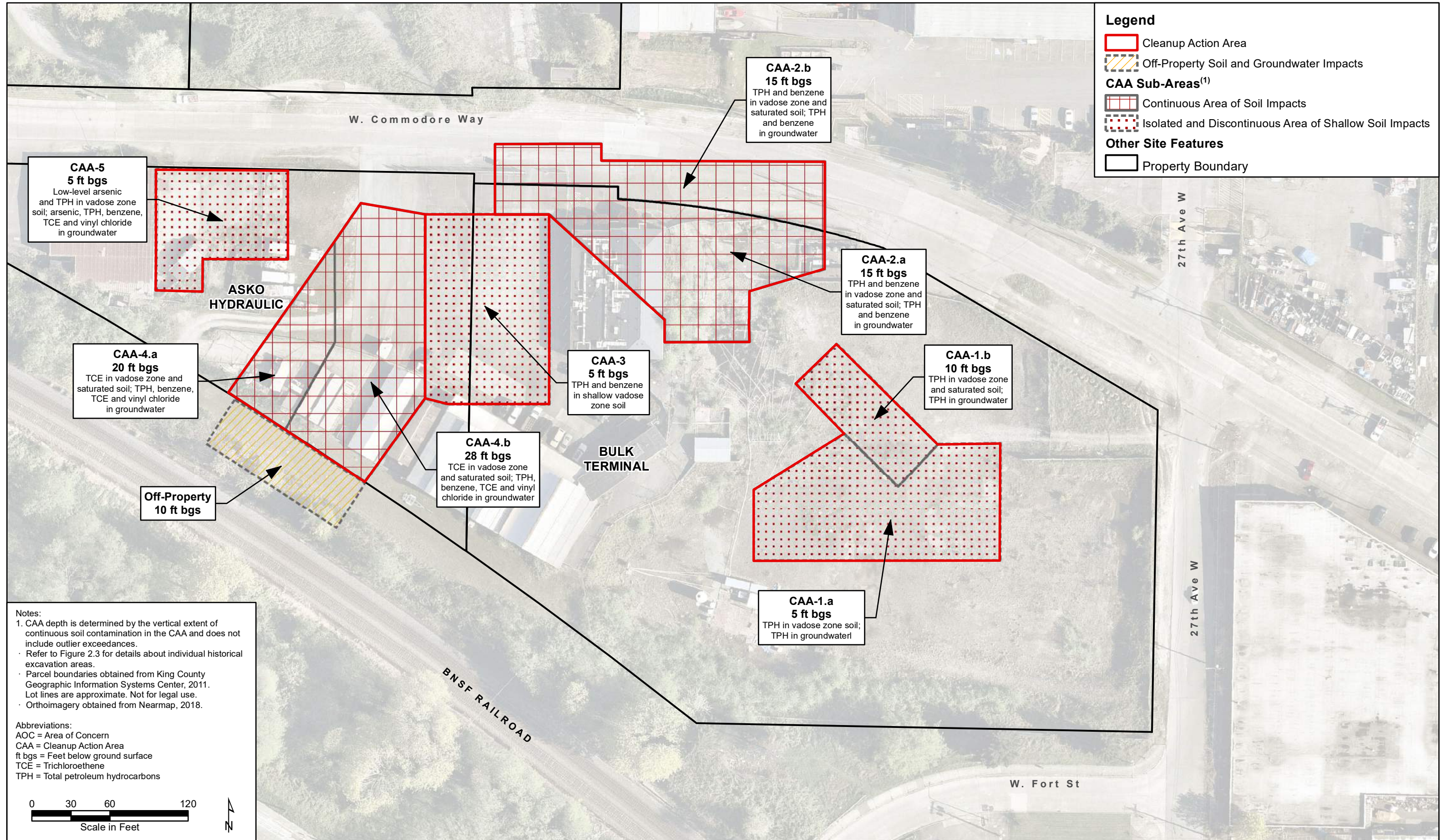
Penta Cleanup Levels
Soil: 0.050 mg/kg
Groundwater: 0.20 µg/L

Notes:

- The approximate extents of IHSs in groundwater were delineated using existing Site data and are inferred in some locations.
- Soil distribution based on soil concentrations at any depth; the maximum concentration per location was used.
- Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
- Orthoimagery obtained from Nearmap, 2018.

Abbreviations:
 CUL = Cleanup level
 IHS = Indicator hazardous substance
 µg/L = Micrograms per liter
 mg/kg = Milligrams per kilogram
 Penta = Pentachlorophenol



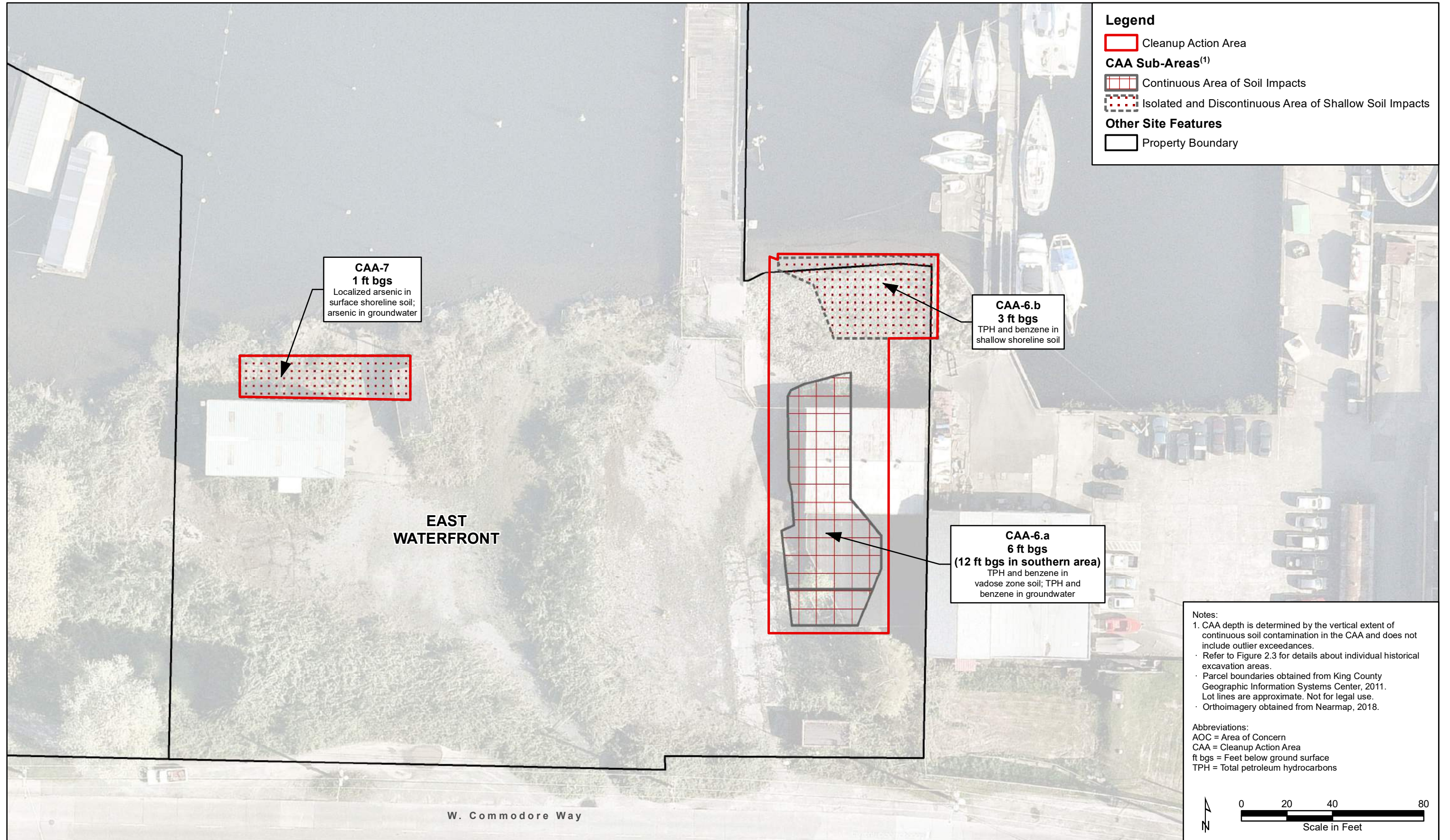


Notes:
 1. CAA depth is determined by the vertical extent of continuous soil contamination in the CAA and does not include outlier exceedances.
 · Refer to Figure 2.3 for details about individual historical excavation areas.
 · Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
 · Orthoimagery obtained from Nearmap, 2018.








Abbreviations:
 AOC = Area of Concern
 CAA = Cleanup Action Area
 ft bgs = Feet below ground surface
 TCE = Trichloroethene
 TPH = Total petroleum hydrocarbons

0 30 60 120
 Scale in Feet







H:\GIS\Projects\Cantera-TOC\MXD\CAP\CAP 2019\Figure 4.9 Upland AOC CAA and Contaminant Depths_Distributions.mxd
 9/11/2020

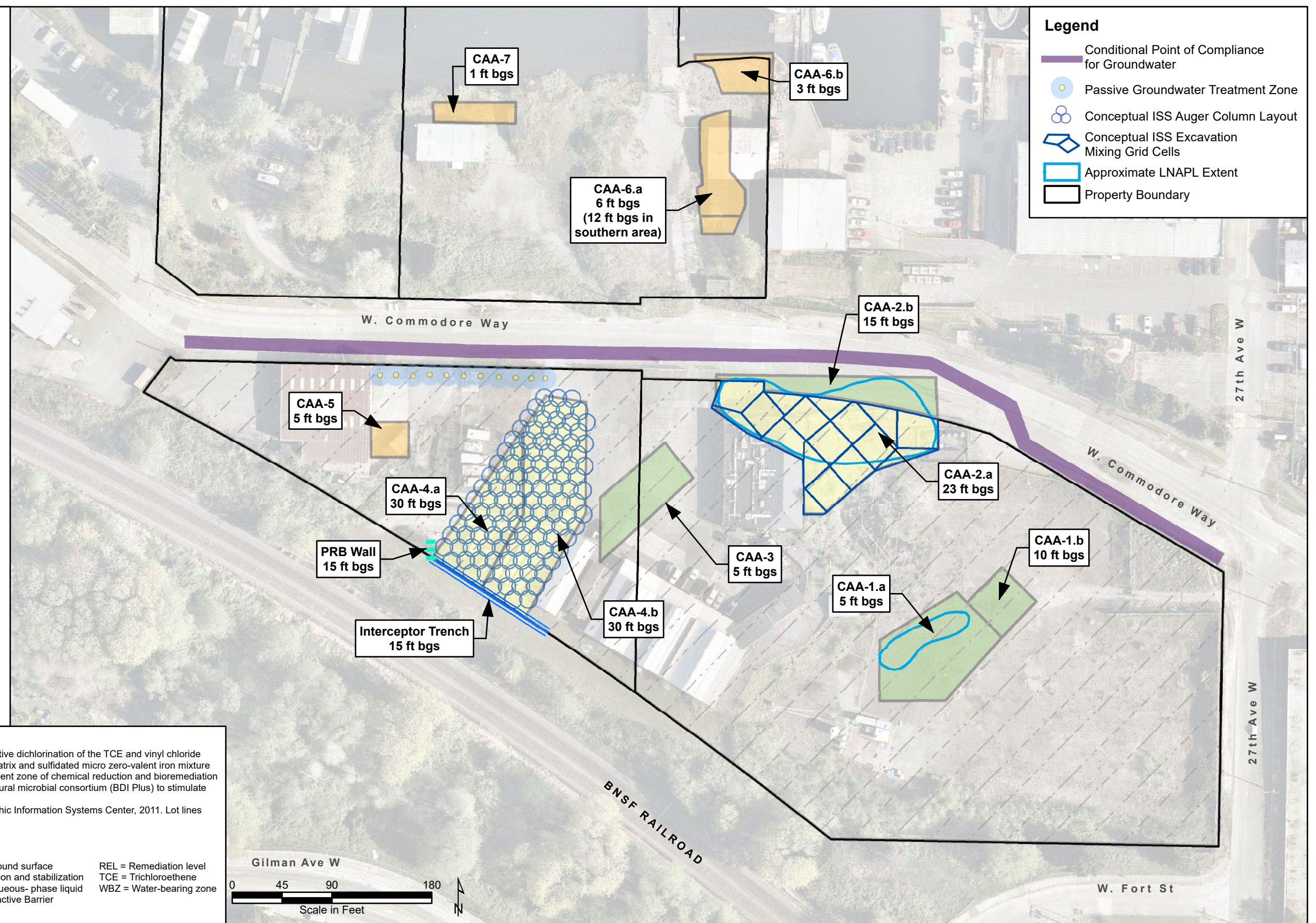


Preferred Remedial Alternative

-  **Capping with Pavement or Buildings**
Upland AOC
-  **Excavation to CULs**
CAA-5 Hotspot
5 ft bgs (200 CY)
CAA-6.a
6 ft bgs (700 CY)
12 ft bgs (300 CY)
CAA-6.b
3 ft bgs (300 CY)
CAA-7
1 ft bgs (60 CY)
Total Volume Addressed
1,560 CY
-  **Excavation to RELs**
CAA-1.a
5 ft bgs (1,300 CY)
LNAPL Removal
CAA-1.b
10 ft bgs (800 CY)
CAA-2.b
15 ft bgs (2,100 CY)
LNAPL Removal
CAA-3
5 ft bgs (800 CY)
Total Volume Addressed
5,000 CY
-  **In Situ Stabilization/Solidification**
CAA-2.a
23 ft bgs (10,200 CY)
CAA-4.a
30 ft bgs (5,900 CY)
CAA-4.b
30 ft bgs (11,300 CY)
Total Volume Addressed
27,400 CY
-  **In Situ Groundwater Treatment⁽¹⁾**
CAA-5
-  **Interceptor Trench**
CAA-4
-  **PRB Wall with ZVI**
CAA-4

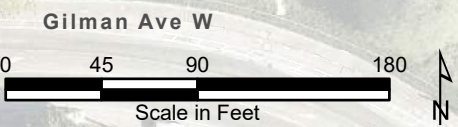
Legend

-  Conditional Point of Compliance for Groundwater
-  Passive Groundwater Treatment Zone
-  Conceptual ISS Auger Column Layout
-  Conceptual ISS Excavation Mixing Grid Cells
-  Approximate LNAPL Extent
-  Property Boundary



Notes:
 1. In situ groundwater treatment includes enhanced reductive dichlorination of the TCE and vinyl chloride groundwater plume using a trademarked colloidal biomatrix and sulfidated micro zero-valent iron mixture (PlumeStop and S-MicroZVI) to create a passive treatment zone of chemical reduction and bioremediation in the Shallow WBZ and the addition of an enriched natural microbial consortium (BDI Plus) to stimulate rapid dichlorination of TCE.
 · Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
 · Orthoimagery obtained from Nearmap, 2018.

Abbreviations:
 AOC = Area of concern
 BDI = Bio-Dechlor INOCULUM
 CAA = Cleanup Action Area
 CUL = Cleanup level
 CY = Cubic yards
 ft bgs = Feet below ground surface
 ISS = In situ solidification and stabilization
 LNAPL = Light non-aqueous- phase liquid
 PRB = Permeable Reactive Barrier
 REL = Remediation level
 TCE = Trichloroethene
 WBZ = Water-bearing zone



I:\GIS\Projects\Cantera-TOC\MXD\CAP\CAP 2019\Figure 5.1 Property Cleanup Summary.mxd
 9/11/2020

Appendix A

Draft Groundwater Monitoring Plan

Time Oil Bulk Terminal Site

Groundwater Monitoring Plan

Prepared for

Cantera Development Group, LLC
2753 West 31st Street
Chicago, IL 60608

September 2020

Draft

Certified



Corporation



100% Recycled
Paper

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LIMITATIONS

This report has been prepared for the exclusive use of Cantera Development Group, LLC, their authorized agents, and regulatory agencies. It has been prepared following the described methods and information available at the time of the work. No other party should use this report for any purpose other than that originally intended, unless Floyd|Snider agrees in advance to such reliance in writing. The information contained herein should not be utilized for any purpose or project except the one originally intended. Under no circumstances shall this document be altered, updated, or revised without written authorization of Floyd|Snider.

The interpretations and conclusions contained in this report are based in part on previous site characterization data collected by others and Floyd|Snider cannot assure the accuracy of this information.

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List of Acronyms and Abbreviations

Acronym/ Abbreviation	Definition
AOC	Area of concern
ASKO	ASKO Hydraulic
BMP	Best management practice
BNSF	BNSF Railway Company
CAP	Cleanup Action Plan
CPOC	Conditional point of compliance
CUL	Cleanup Level
cVOC	Chlorinated volatile organic compound
DO	Dissolved oxygen
DRO	Diesel-range organics
Ecology	Washington State Department of Ecology
GMP	Groundwater Monitoring Plan
GRO	Gasoline-range organics
IHS	Indicator hazardous substance
ISS	In situ solidification and stabilization
LTCMP	Long-Term Compliance Monitoring Plan
ORO	Oil-range organics
Owner	Property Owner
penta	Pentachlorophenol
POC	Point of compliance
Property	The parcels subject to an asset purchase agreement between the prospective purchaser and current owner (King County Parcel Nos. 1125039050, 1125039081, 1125039120, and 4237900405)
QAPP	Quality Assurance Project Plan
SAP	Sampling and Analysis Plan
Site	Time Oil Bulk Terminal Site
TCE	Trichloroethene
TPH	Total petroleum hydrocarbons
WAC	Washington Administrative Code
WBZ	Water-bearing zone

1.0 Introduction

This draft Groundwater Monitoring Plan (GMP) is presented as an appendix to the Cleanup Action Plan (CAP) for the Time Oil Bulk Terminal Site (Site). The Site is the location of the former Time Oil Company (TOC) Seattle Terminal facility located on W. Commodore Way in Seattle, Washington (Property). For the purposes of this document, the Property is defined as the four separate upland parcels within the Site commonly identified as the Bulk Terminal, ASKO Hydraulic (ASKO), East Waterfront, and West Waterfront. Three of the four parcels (all but the West Waterfront) are subject to cleanup actions and associated compliance monitoring.

This draft GMP provides the basis for groundwater monitoring that will be necessary after implementation of remedial actions at the Property that are specified in the CAP to evaluate effectiveness of the remedial actions and to determine compliance with Site cleanup levels (CULs) for indicator hazardous substances (IHSs; arsenic, gasoline-range organics [GRO], total diesel-range organics [DRO] and oil-range organics [ORO], benzene, trichloroethene [TCE], vinyl chloride, and pentachlorophenol [penta]) specified in the CAP at the applicable point of compliance (POC). Cleanup standards are defined as a CUL combined with a POC where the CUL applies. A conditional POC (CPOC) has been established for the Property, as shown on Figure A.1. This draft GMP also establishes the proposed monitoring well network and provides detail regarding compliance monitoring, proposed sample analyses, data evaluation, and contingency actions.

This draft GMP will be updated and included as part of the Long-Term Compliance Monitoring Plan (LTCMP) for the Property that will be established post-remedy. The LTCMP will describe required monitoring during and after remedy implementation to ensure the long-term protectiveness of the remedy.

The objectives of compliance monitoring as stated in Washington Administrative Code (WAC) 173-340-410 include protection monitoring, performance monitoring, and confirmation monitoring. The proposed GMP will fulfill the objectives of performance and confirmation monitoring as described below:

- **Performance Monitoring** is used to confirm that the cleanup action has attained cleanup standards and other performance standards. Short-term performance monitoring will be conducted for the first 2 years following remedy construction to document that remedial goals are being achieved. Long-term performance monitoring will be conducted until cleanup standards have been attained, which is defined as meeting CULs at the CPOC and downgradient of the CPOC.
- **Confirmation Monitoring** is used to confirm the long-term effectiveness of the cleanup action after completion of the preferred remedy once cleanup standards have been attained. Confirmation monitoring will include long-term groundwater monitoring to confirm that IHS concentrations remain less than the CULs at the CPOC and downgradient of the CPOC.

Specific details provided in this draft GMP are subject to change based on finalization of the CAP, engineering design, post-remedy conditions, and plans for Property redevelopment. It is anticipated that the changes will be relatively minor, such as specific location of proposed monitoring wells after further modeling is completed as part of engineering design and more specificity regarding the analytical schedule, but the overall GMP will be generally consistent with this draft. The specific monitoring locations and analytical schedule may also be adjusted during implementation of this plan in coordination with the Washington State Department of Ecology (Ecology) if needed to meet the objectives of performance monitoring and compliance monitoring as described above. Implementation of this plan will be the responsibility of the Property Owner (Owner).

A Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) for the groundwater monitoring will be prepared as part of the final GMP and LTCMP.

2.0 Proposed Well Decommissioning and Installation Plan

A monitoring well network will be established at the Property to assess performance of the cleanup action and compliance with the CULs for groundwater specified in the CAP. This network will include monitoring wells located at the CPOC for the Property and downgradient of the CPOC to measure compliance with cleanup standards, wells upgradient of the CPOC to measure and quantify the effects of remediation, and sentinel wells to monitor the nature and extent of contaminants in groundwater when CULs have not been achieved at the CPOC or to evaluate plume boundary conditions.

The existing network of monitoring wells will be used for groundwater monitoring to the extent possible; however, many wells will require decommissioning due to their location (i.e., within ground-disturbing remediation areas) or their construction. Additional monitoring wells will be installed after remedy implementation to replace certain decommissioned wells and fill remaining gaps in the monitoring well network. The proposed pre-construction well decommissioning and post-construction well installation is described in the following sections and presented in Table A.1. The locations of monitoring wells that are proposed to be decommissioned and installed are shown on Figure A.1. The proposed short-term performance monitoring includes monitoring well locations as shown on Figure A.2 and is discussed in further detail in Section 3.0. The proposed long-term monitoring includes monitoring well locations as shown on Figure A.3. The long-term monitoring, which includes a sentinel well monitoring network, is discussed in further detail in Sections 4.0. The proposed network may be adjusted as part of finalization of the GMP and preparation of the LTCMP.

2.1 MONITORING WELL DECOMMISSIONING

Existing monitoring wells that are located within or immediately adjacent to areas with planned ground-disturbing remediation will be decommissioned by a licensed driller in accordance with Washington State Minimum Standards (WAC 173-160) prior to construction. Wells to be decommissioned prior to construction as summarized on Figure A.1 and Table A.1 include:

- Wells within or immediately adjacent to the planned in situ solidification and stabilization (ISS) and excavation areas that will be disturbed by construction.
- Wells that are determined to be in locations that will not yield critical data for performance or compliance, which will be decommissioned as a best management practice (BMP) to limit the number of potential pathways for contamination to groundwater at the Property.
- Wells that were constructed to span two water-bearing zones (WBZs), do not contact any WBZs and have insufficient water or are dry, or are irreparably damaged.

It should also be noted that additional wells may require decommissioning and relocation if future development activities are likely to damage the wells or render them inaccessible. Decommissioning and replacement of additional wells is discussed in the short-term and long-term monitoring plans presented in Sections 3.0 and 4.0.

2.2 MONITORING WELL INSTALLATION

New monitoring wells will be installed after construction to replace existing key wells that will be decommissioned for remedy construction and to complete the monitoring well network for comprehensive monitoring of IHSs. Wells to be installed include the following:

- Replacement of key Bulk Terminal wells that will be decommissioned for remedy construction (01MW11R, 01MW19R, 01MW24R, 01MW49R, 01MW87R, and 01MW90R)
- Replacement of key ASKO wells that will be decommissioned for remedy construction (01MW45R, MW03R, and MW04R)
- Additional wells to complete the downgradient well network for the ASKO parcel (01MW112 and 01MW113)
- Replacement of key East Waterfront well 02MW04R that will be decommissioned for remedy construction

2.3 COMPLIANCE MONITORING WELL NETWORK

The compliance monitoring well network will include various locations to fulfill the objectives of performance and confirmation monitoring, and will consist of the following types of wells as shown on Figures A.2 and A.3:

- **Quarterly and Semiannual Performance:**
 - These locations will be routinely monitored during the short-term monitoring period to assess remedy performance.
- **Contingency:**
 - These locations will be monitored as needed (i.e., to evaluate flow pattern changes) throughout short-term monitoring to gather performance data.
- **Confirmation:**
 - These locations are located at the CPOC and downgradient of the CPOC and will be routinely monitored during the long-term monitoring period to assess remedy performance.
 - Once cleanup standards are met, monitoring at these locations will transition from performance to confirmation and will be monitored to confirm that the cleanup standards continue to be met.
- **Performance:**
 - These locations will be routinely monitored during the long-term monitoring period and are located upgradient and downgradient of the CPOC in key locations for assessing remedy performance.
- **Sentinel:**
 - These locations will be used to gather information on the contaminant plume extents during long-term monitoring and will be monitored only as needed throughout long-term monitoring.

3.0 Short-Term Performance Monitoring

Post-remediation short-term performance monitoring to assess remedy effectiveness within and downgradient of active treatment areas will include assessment of the natural attenuation processes, groundwater flow patterns, and groundwater quality trends following active remediation. Performance monitoring will be initiated within 1 year after completion of remedial construction and will be conducted for a period of 2 years for the Shoreline Area of Concern (AOC) and 4 years for the Upland AOC. Performance monitoring will be conducted semiannually during the wet and dry seasons, and a subset of the performance monitoring wells located at the downgradient boundaries of the pre-construction contaminant plumes will be sampled on a quarterly basis for at least eight quarters as shown on Figure A.2. A SAP/QAPP will be prepared as part of the LTCMP and will include specific details regarding sample collection procedures, analytical methods, and reporting limits for the short-term performance monitoring.

Short-term performance monitoring wells will be sampled for relevant IHSs and parameters that are indicators of natural attenuation of organic compounds (dissolved oxygen [DO], nitrates, ferrous iron, sulfate, chlorides, methane, dissolved organic carbon, alkalinity, and oxidation-reduction potential) as specified in Table A.2. Water levels will be measured at accessible Property wells during each event in order to establish post-remedy flow patterns as further described in Section 3.2.

During short-term performance monitoring, wells that are not long-term compliance wells and have sample results for relevant IHSs at concentrations less than the CULs for three consecutive events may be omitted from further sampling or sampled at a lesser frequency (refer to Section 6.0 for additional details regarding modifications to sampling). Additional contingency performance monitoring wells or other wells in the existing network, as shown on Figure A.2, may be sampled for performance monitoring as needed to assess remedy performance. Wells that may be affected by property development during the short-term performance monitoring period will be assessed on a case-by-case basis; the Owner may elect to replace the well or monitor an alternate nearby well if additional data are necessary to assess short-term remedy performance, or the Owner may elect to decommission the well without replacement if performance data are no longer needed at that location.

3.1 SHORT-TERM PERFORMANCE MONITORING WELL NETWORK

Short-term performance monitoring on the Bulk Terminal parcel will include the following:

- Quarterly monitoring of wells downgradient of the property at the edges of the current total petroleum hydrocarbon (TPH) plume (01MW35 and 01MW84) and adjacent to the ISS monolith (01MW19R) for eight quarters followed by 2 years of semiannual monitoring;
- Semiannual monitoring of wells within the groundwater contaminant plumes and downgradient of planned ISS and excavation areas (01MW24R, 01MW40, and 01MW90R); and

- Contingency monitoring of wells in the downgradient edges of the TPH plume (01MW42, 01MW105, and 01MW86) and within the on-property penta groundwater plume (01MW66) as needed to assess performance.

Short-term performance monitoring on the ASKO parcel will include the following:

- Quarterly monitoring of wells downgradient of the property at the edges of the current chlorinated volatile organic compound (cVOC) plume (01MW53 and 01MW85) and adjacent to the ISS monolith and downgradient of the permeable reactive barrier (PRB) wall located on the northern parcel boundary (01MW58) for eight quarters followed by 2 years of semiannual monitoring;
- Semiannual monitoring of wells upgradient and adjacent to planned ISS treatment area, downgradient of interceptor trench (01MW60), and immediately downgradient of planned treatment areas (01MW45R, 01MW56, 01MW108, MW03R, and MW04R); and
- Contingency monitoring of other wells within the groundwater contaminant plume (01MW80 and MW06) and downgradient of the contaminant plume (01MW89, 01MW112, 01MW113, MW02) as needed to assess performance. It is expected that groundwater samples would be collected from the contingency wells located closest to the in situ remedial areas during the initial short-term monitoring event to evaluate baseline conditions for the post-remedy plume.

Monitoring wells in the BNSF Railway Company (BNSF) AOC (refer to Figure A.2) will also be maintained and monitored under a separate Ecology agreement with BNSF. Monitoring data from BNSF AOC wells may also be used as needed to assess upgradient groundwater quality and remedy performance on the ASKO parcel.

Short-term performance monitoring on the East Waterfront parcel will include the following:

- Quarterly monitoring of wells within the groundwater contaminant plumes and downgradient of the planned excavation areas (02MW04R and 02MW19) and other wells within the groundwater TPH plume (02MW07) for eight quarters; and
- Contingency monitoring of property wells outside the contaminant plumes (02MW03, 02MW17, and 02MW20) as needed to assess performance.

3.2 GROUNDWATER FLOW PATTERN ANALYSIS

Groundwater flow directions and gradients will be evaluated by collecting depth to groundwater measurements in accessible Shallow WBZ and Intermediate WBZ wells during short-term performance monitoring. If changes to flow patterns are observed, or it is determined that additional data are needed to understand flow patterns and potential contaminant migration with respect to the CPOC or other characteristics of the aquifer, additional elevation measurements will be collected as needed during long-term monitoring.

4.0 Long-Term Compliance Monitoring

After completion of the short-term post-remediation performance monitoring, Shallow and/or Intermediate WBZ wells will be sampled for long-term compliance monitoring throughout the restoration time frame, which is estimated to be 5 years for the Shoreline AOC and 15 years for the Upland AOC. Long-term compliance monitoring will be conducted semiannually during the dry and wet season, or annually if individual wells demonstrate stable or decreasing trends in IHS concentrations during short-term monitoring. Additional wells will be transitioned to annual monitoring during the long-term monitoring as they achieve stable or decreasing IHS trends. Annual monitoring will be performed during the season (wet or dry) that had overall greater contaminant concentrations during semiannual performance monitoring, or if there do not appear to be seasonal trends, then the annual sampling will be completed in the early part of the dry season (i.e., May or June). A SAP/QAPP will be prepared as part of the LTCMP and will include specific details regarding sample collection procedures and analytical methods and reporting limits for long-term monitoring.

Long-term compliance monitoring samples will consist of both performance and confirmation monitoring and will be analyzed for the Site IHSs identified in the CAP. The proposed long-term compliance monitoring plan is presented in Table A.3 and summarized below.

- Petroleum compounds including GRO, Total DRO and ORO, and benzene are present in the Shallow WBZ and Intermediate WBZ Property-wide and will be analyzed in samples from confirmation monitoring wells during the first 2 years of long-term monitoring to determine compliance.
- TCE and vinyl chloride exceed CULs in the Shallow WBZ and Intermediate WBZ on the ASKO portion of the Upland AOC.¹ These compounds will be analyzed in samples collected from confirmation monitoring wells at the CPOC on the ASKO parcel.
- Arsenic exceeds the CUL in the Shallow WBZ in the Shoreline AOC. Arsenic will be analyzed in samples collected from Shallow WBZ shoreline confirmation monitoring wells in the Shoreline AOC.
- Penta exceeds the CUL in the Shallow WBZ on the Bulk Terminal portion of the Uplands AOC. Penta will be analyzed in samples collected from select Shallow WBZ confirmation monitoring wells at the CPOC on the Bulk Terminal parcel.

Sentinel monitoring wells, which lie upgradient of areas of contamination or outside the anticipated lateral and vertical post-remediation groundwater contaminant plume boundaries, may also be monitored to further assess remedy performance or boundary conditions if determined to be necessary by the Owner. Sentinel wells will be maintained to the extent practical but may be decommissioned by the Owner if they are determined not necessary to evaluate remedy performance or as a BMP if future development would render them

¹ These compounds also exceed Site CULs on the BNSF AOC, which will be addressed under a separate Agreed Order issued to BNSF.

inaccessible. Sentinel wells will not be replaced if decommissioned. The proposed confirmation, performance, and sentinel well networks are described in the following sections and shown on Figure A.3.

Water levels may also be measured at accessible wells as needed during each monitoring event to determine ongoing groundwater flow patterns.

4.1 LONG-TERM MONITORING WELL NETWORK

Long-term monitoring will be performed annually, or semiannually if needed as described above, to confirm that the remedy results in groundwater quality that meets the Site cleanup standards within the predicted restoration time frame. The long-term monitoring well network includes wells at the CPOC in the Upland AOC, wells downgradient of the CPOC in the Shoreline AOC, and key wells upgradient of the CPOC that yield information about remedy performance. Long-term performance monitoring will be conducted until cleanup standards have been attained and will be followed by confirmation monitoring to confirm that IHS concentrations remain less than the CULs at the CPOC and downgradient of the CPOC. Sequencing from performance monitoring to confirmation monitoring will occur throughout long-term compliance monitoring on a well by well basis.

The CPOC adjacent to the western portion of the Bulk Terminal parcel is the centerline of W. Commodore Way, and the CPOC adjacent to the eastern portion of the Bulk Terminal parcel is the northern parcel boundary as shown on Figure A.3. A confirmation monitoring well network will be established to the south of the centerline of W. Commodore Way and will include the following monitoring wells:

- Shallow WBZ: 01MW03, 01MW09, 01MW11R, 01MW86, and 01MW87R
- Intermediate WBZ: 01MW51

The CPOC adjacent to the ASKO parcel is the centerline of W. Commodore Way. A confirmation monitoring well network will be established along this property line and will include the following wells:

- Shallow WBZ: 01MW53, 01MW85, and 01MW89
- Intermediate WBZ: 01MW112

Downgradient of the CPOC in the Shoreline AOC (East Waterfront parcel) long-term confirmation monitoring wells are located in the Shallow WBZ along the shoreline and in the property interior:

- 02MW04R, 02MW07, 02MW17, 02MW19, and 02MW20

Additional key wells for performance monitoring upgradient and downgradient of the CPOC include the following:

- Shallow WBZ well 01MW58 on the ASKO parcel downgradient of the PRB
- Shallow WBZ wells adjacent to excavation and ISS areas on the Bulk Terminal parcel (01MW90R, 01MW19R) and downgradient of the excavation area in W. Commodore Way (01MW84)

The compliance monitoring well network will be maintained throughout long-term monitoring to the extent practical. If a confirmation monitoring well at the CPOC or downgradient of the CPOC is deemed to be no longer necessary, it may be removed from the long-term monitoring program and decommissioned with Ecology concurrence as further described in Section 6.0.

Sentinel monitoring wells are not designated for regular long-term monitoring but may be sampled as necessary to assess the extents of contaminant plumes and remedy performance. Sentinel wells are summarized in Table A.3, shown on Figure A.3, and include the following:

- Wells in the Shallow WBZ on the upgradient portion of the Bulk Terminal parcel at the edges of the pre-remediation contaminant plume (01MW17, 01MW39, 01MW42, 01MW115, 01MW110) and downgradient of the CPOC north of the Bulk Terminal parcel boundary in the Shallow WBZ (01MW30, 01MW34, 01MW35, 01MW101, 01MW102, 01MW103, 01MW109, 01MW110) and the Intermediate WBZ (01MW48, 01MW104, 01MW111);
- Wells in the Shallow WBZ on the upgradient portion of the ASKO parcel (01MW61), Shallow WBZ wells along the western ASKO parcel boundary (01MW113, MW02), and Shallow WBZ wells downgradient of the CPOC north of the ASKO parcel boundary (01MW83, 01MW106, 01MW107); and
- Wells in the Shallow WBZ on the upgradient portion of the East Waterfront parcel along the edge of the pre-remediation contaminant plume on the Bulk Terminal parcel (02MW08), Shallow WBZ wells along the East Waterfront parcel boundaries (02MW14, 02MW16, 02MW18) and Intermediate WBZ wells along the shoreline of the East Waterfront parcel (02MW21 and 02MW22).

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5.0 Data Evaluation and Reporting

After 5 years following remedy implementation Ecology will perform the first 5-year periodic review for the Property. The need for contingency actions will be evaluated at that time, as described in Section 5.5. After 10 years following remedy implementation, Ecology will perform the 10-year periodic review, consistent with the 5-year review. Annual monitoring and periodic 5-year reviews will be performed until cleanup standards are achieved and Ecology determines that the Property is eligible for closure. Modifications to the monitoring well network or monitoring frequency may be adjusted at any time throughout this process in coordination with Ecology (refer to Section 5.5) and may include increased monitoring (locations or frequency) or discontinuing monitoring of compliance wells with three or more consecutive results less than CULs.

For each periodic review, Ecology will be provided with comprehensive data as well as analysis of current and predicted future groundwater quality trends. Data evaluation will be performed to assess compliance with cleanup standards, determine whether indications of organic contaminant degradation are present, and identify long-term groundwater quality trends and flow patterns as described in the following sections.

5.1 COMPLIANCE WITH CLEANUP STANDARDS

Cleanup standards are defined as a CUL combined with a POC where the CUL applies. Compliance with the CULs will be assessed for all confirmation monitoring wells at the CPOC and downgradient of the CPOC. The Property will be determined to be in compliance for an IHS when groundwater concentrations are less than the CUL at all confirmation monitoring well locations for three consecutive events or when statistical compliance is achieved for each IHS in accordance with the Model Toxics Control Act (WAC 173-340-740(7)(c)).

It is expected that wells located in the Shoreline AOC will achieve CULs within a restoration time frame of 5 years. Compliance will be assessed separately for this AOC, and confirmation monitoring will be discontinued in the Shoreline AOC once compliance is achieved as described above. The anticipated restoration time frame for the Upland AOC is 15 years, and Property-wide compliance with cleanup standards will be determined when groundwater in the Upland AOC also achieves compliance.

5.2 ASSESSMENT OF NATURAL ATTENUATION

Natural attenuation parameters do not have applicable CULs and are not used to determine compliance, but rather are a tool to gather geochemical information to evaluate remedy performance. The occurrence of natural attenuation will be assessed by measurement of chemical parameters associated with the microbial degradation of organic contaminants in accordance with Ecology's *Guidance on Remediation of Petroleum-Contaminated Ground Water*

by *Natural Attenuation* (Ecology 2005).² It is assumed that the primary method of contaminant degradation is anaerobic due to the low-to-moderate porosity of Property soils and depth to groundwater. The following parameters may indicate the occurrence of natural attenuation:

- reduced DO and nitrate (DO <0.5 milligrams per liter [mg/L] and nitrate <1 mg/L)
- conversion of ferric to ferrous iron (ferrous iron >1 mg/L)
- depletion of sulfate and creation of sulfides (sulfate <20 mg/L)
- creation of methane (methane >0.5 mg/L)
- increasing alkalinity (>2x background)
- lower oxidation-reduction potential values in the downgradient portion of the plume versus upgradient (<-100 millivolts)
- chloride (for chlorinated organics; >2x background)

Measurement of natural attenuation parameters will help inform the assessment of the need for contingency actions as described in in Section 5.5. Additional detail regarding natural attenuation assessment and site-specific performance metrics will be included in the LTCMP.

5.3 CONCENTRATION TREND ANALYSIS

Concentration trends for IHSs will be assessed for compliance monitoring wells at the CPOC and downgradient of the CPOC. Trends will be assessed by plotting the natural log of the contaminant concentrations versus time and using statistical software to determine a line of best fit. The trendline will be projected in the future to determine whether compliance with the cleanup standards is predicted within the 15-year restoration time frame predicted in the Feasibility Study. Additional trend analyses may be performed, as warranted, and will be reported in the LTCMP Annual Monitoring Reports described in Section 5.5.

5.4 CONTINGENCY ACTIONS

The necessity for contingency actions at the Property will be assessed during the 5- year, 10-year, and all additional Ecology periodic review periods. Contingency remedial actions for groundwater may be considered in coordination with Ecology if long-term trend analysis indicates that one or more IHSs will not reach CULs within the restoration time frame at the relevant POC. Contingency actions may also be evaluated if one or more of the following criteria are true:

- The CULs have been achieved at few locations at the CPOC and downgradient of the CPOC and 95 percent upper confidence limits for IHSs remain significantly elevated relative to the CUL.
- Monitored natural attenuation parameters indicate that the geochemical conditions of groundwater may limit further microbial degradation of organic IHSs.

² This guidance concerns remediation of sites that are contaminated primarily with TPH and associated petroleum constituents; however, the principles of natural attenuation are also applicable to other organic compounds such as cVOCs.

Contingency actions are more fully described in the CAP and may include focused groundwater treatment or enhanced natural attenuation and will be more specifically described in the LTCMP.

5.5 REPORTING

Groundwater monitoring data evaluation results will be presented to Ecology in LTCMP Annual Monitoring Reports and will include assessment of compliance with CULs and cleanup standards, indications of organic contaminant degradation, and long-term groundwater quality trends and flow patterns. LTCMP Annual Reports will be submitted on March 1 for the prior year and will also include a summary of other monitoring components described in the LTCMP. Eventually, and with Ecology concurrence, the reporting frequency could be reduced to every 5 years, to coincide with Ecology periodic reviews.

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6.0 Plan Finalization and Modification

This draft GMP presents the proposed groundwater monitoring that has been determined to be necessary to monitor the effectiveness of the remedy for the Property and long-term compliance with groundwater cleanup standards. It was prepared using the hydrogeologic and chemical data available at the time of the preparation of the CAP. The final GMP will be presented as an appendix to a Long-Term Monitoring Plan, which will be prepared after remedy implementation. The final GMP will consider additional groundwater modeling and hydrogeologic studies that will be completed for remedial engineering design and/or during remedy implementation. As such, monitoring well locations and frequencies presented in this draft GMP may be adjusted in the final GMP to account for potential flow pattern changes that may result from remedy implementation, such as ISS monoliths. In addition, Ecology has not fully concurred with the number and location of monitoring wells subject to performance monitoring or the sampling frequency outlined in this draft plan. The draft GMP will, therefore, likely see some modifications based on future Ecology input.

Additionally, throughout all phases of monitoring, adaptive management of the Property will be performed. Data will continually be assessed to ensure that the monitoring program fulfills the goals of assessing remedy performance and evaluating compliance with cleanup standards. The Owner may elect to adjust the performance monitoring program as needed to assess remedy performance (i.e., sample contingency or sentinel wells) without Ecology concurrence, however, reduction of sampling frequency or elimination of a performance or confirmation well from the monitoring plan will require Ecology notification. Ecology may also require modifications to the compliance monitoring plan if increased frequency or locations are warranted (i.e., increasing trend in IHS concentrations). Notification of modifications to the compliance monitoring plan will be included in the LTCMP Annual Reports prior to implementing the change.

Lastly, the LTCMP is intended to be a living document that may warrant revisions if conditions at the Property change, such as changes in Property use or Property ownership. The LTCMP, including the GMP, will be reviewed and updated as needed if any significant change occurs.

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7.0 References

Washington State Department of Ecology (Ecology). 2005. *Guidance on Remediation of Petroleum-Contaminated Ground Water by Natural Attenuation*. Toxics Cleanup Program. Publication No. 05-09-091. July.

Time Oil Bulk Terminal Site
Groundwater Monitoring Plan

Tables

Draft

Table A.1
Well Decommissioning and Installation Plan

Well ID	Water-Bearing Zone	Location	Screened Interval (feet below TOC)	Rationale
Wells to be Decommissioned				
01MW01	Shallow	BT	10-25	Remediation Area
01MW02	Shallow	BT	10-25	Remediation Area
01MW04	Shallow	BT	10-25	Remediation Area
01MW05	Shallow	BT	10-25	Remediation Area
01MW10	Shallow	BT	10-25	Remediation Area
01MW13	Shallow	BT	5-20	Remediation Area
01MW16	Shallow	BT	10-20	Remediation Area
01MW18	Shallow	BT	5-20	Remediation Area
01MW19	Shallow	BT	5-20	Remediation Area
01MW20	Shallow	BT	5-20	Remediation Area
01MW24	Shallow	BT	4-19	Remediation Area
01MW27	Shallow	BT	4-19	Remediation Area
01MW28	Shallow	BT	5-22	Remediation Area
01MW29	Shallow	BT	5-19	Remediation Area
01MW33	Shallow	BT	5-20	Remediation Area
01MW43	Shallow/Intermediate	BT	7-22	Remediation Area
01MW59	Shallow/Intermediate	BT	13-28	Remediation Area
01MW67	Shallow	BT	9-24	Remediation Area
01MW68	Shallow	BT	6.5-22	Remediation Area
01MW69	Shallow	BT	9-24	Remediation Area
01MW72	Shallow	BT	3-12	Remediation Area
01MW73	Shallow	BT	2.5-21	Remediation Area
01MW75	Shallow	BT	3-18	Remediation Area
01MW87	Shallow	BT	11-21	Remediation Area
01MW90	Shallow	BT	3-18	Remediation Area
01MW91	Shallow	BT	3-18	Remediation Area
01MW07	Shallow	ASKO	8-18	Remediation Area
01MW44	Shallow	ASKO	15-30	Remediation Area
01MW45	Shallow	ASKO	12-27	Remediation Area
01MW54	Intermediate	ASKO	38-43	Remediation Area
01MW55	Shallow	ASKO	16-31	Remediation Area
01MW62	Shallow	ASKO	24-39	Remediation Area
01MW63	Shallow	ASKO	19.5-31.5	Remediation Area
01MW64	Shallow	ASKO	25-40	Remediation Area
01MW65	Deep	ASKO	52-62	Remediation Area
01MW70	Perched	ASKO	5-20	Remediation Area
01MW71	Perched	ASKO	5-20	Remediation Area
01MW76	Intermediate	ASKO	35-40	Remediation Area
01MW77	Intermediate	ASKO	36-41	Remediation Area
01MW78	Intermediate	ASKO	45-50	Remediation Area
01MW79	Perched	ASKO	4-19	Remediation Area
MW03	Perched	ASKO	7-13.5	Remediation Area
MW04	Shallow	ASKO	18-28	Remediation Area
02MW04	Shallow	EW	10-20	Remediation Area
02MW06	Shallow	EW	9-19	Remediation Area
01MW06	Shallow	BT	10-25	BMP
01MW08	Shallow	BT	9-25	BMP
01MW12	Shallow	BT	4-19	BMP
01MW36	Shallow	BT	10-20	BMP
01MW47	Shallow	BT	6-21	BMP
01MW74	Shallow	BT	4-21.5	BMP
01MW88	Shallow	BT	11-21	BMP
01MW99	Shallow	BT	20-30	BMP
01MW100	Shallow	BT	20-30	BMP
01MW15	Shallow	ASKO	10-30	BMP
01MW46	Shallow	ASKO	13-28	BMP
01MW52	Shallow	ASKO	14-24	BMP
01MW57	Intermediate	ASKO	35.5-40.5	BMP
01MW81	Shallow	ASKO	19.5-28.5	BMP
01MW82	Shallow	ASKO	19-27	BMP
MW01	Shallow	ASKO	18-28	BMP
MW05	Shallow	ASKO	19-29	BMP
02MW01	Shallow	EW	10-20	BMP
02MW05	Intermediate	EW	20-35	BMP
02MW10	Shallow	EW	2.5-7.5	BMP
02MW13	Shallow	EW	5-15	BMP
02MW15	Shallow	EW	5-15	BMP

Table A.1
Well Decommissioning and Installation Plan

Well ID	Water-Bearing Zone	Location	Screened Interval (feet below TOC)	Rationale
Wells to be Decommissioned (cont.)				
01MW11	Shallow/Intermediate	BT	15–30	2-zone well
01MW31	Shallow	BT	5–15	Dry Well
01MW32	Shallow/Intermediate	BT	17–27	2-zone well
01MW37	Shallow/Intermediate	BT	7.5–22.5	2-zone well
01MW38	Shallow/Intermediate	BT	7.5–22.5	2-zone well
01MW49	Shallow/Intermediate	BT	15–25	2-zone well
01MW50	Shallow/Intermediate	BT	15–25	2-zone well
02MW09	Shallow	EW	7–12	Damaged
Wells to be Installed				
01MW11R	Shallow	BT	10–20 (approx)	Replace 01MW11
01MW19R	Shallow	BT	10–20 (approx)	Replace 01MW19
01MW24R	Shallow	BT	10–20 (approx)	Replace 01MW24
01MW49R	Intermediate	BT	24–34 (approx)	Replace 01MW49
01MW87R	Shallow	BT	10–20 (approx)	Replace 01MW87
01MW90R	Shallow	BT	5–15 (approx)	Replace 01MW90
01MW45R	Shallow	ASKO	12–27 (approx)	Replace 01MW45
01MW112	Intermediate	ASKO	30–35 (approx)	New downgradient well
01MW113	Shallow	ASKO	12–27 (approx)	New downgradient well
MW03R	Perched	ASKO	7–13.5 (approx)	Replace MW03
MW04R	Shallow	ASKO	18–28 (approx)	Replace MW04
02MW04R	Shallow	EW	10–20 (approx)	Replace 02MW04

Abbreviations:

- ASKO ASKO Hydraulic parcel
- BMP Best Management Practice
- BT Bulk Terminal parcel
- EW East Waterfront parcel
- TOC Top of casing

Table A.2
Short-Term Monitoring Plan

Well ID	Water-Bearing Zone	Screened Interval (feet below TOC)	Frequency	Proposed Monitoring							
				MNA Parameters	Arsenic	GRO	Total DRO+ORO	Benzene	TCE	Vinyl Chloride	Penta
Bulk Terminal Parcel Wells											
01MW35	Shallow	10–20	Quarterly ⁽¹⁾	X		X	X	X			
01MW84	Shallow	17–23	Quarterly ⁽¹⁾	X		X	X	X			
01MW19R	Shallow	new	Quarterly ⁽¹⁾			X	X	X			
01MW24R	Shallow	new	Semiannual	X		X	X	X			
01MW40	Shallow	7–22	Semiannual	X		X	X	X			
01MW49R	Intermediate	new	Semiannual			X	X	X			
01MW90R	Shallow	new	Semiannual			X	X	X			
01MW42	Shallow	7–22	Contingency	X		X	X	X			
01MW66	Shallow	12–22	Contingency			X	X	X			X
01MW86	Shallow	14–24	Contingency			X	X	X			
ASKO Parcel Wells											
01MW53	Shallow	16–26	Quarterly ⁽¹⁾	X					X	X	
01MW85	Shallow	18–27	Quarterly ⁽¹⁾	X					X	X	
01MW58	Shallow	25.5–35.5	Quarterly ⁽¹⁾	X					X	X	
01MW45R	Shallow	new	Semiannual	X		X	X	X	X	X	
01MW56	Shallow	16–26	Semiannual	X					X	X	
01MW80	Shallow	20–28	Semiannual						X	X	
01MW108	Intermediate	30–35	Semiannual						X	X	
MW03R	Perched	new	Semiannual		X	X	X	X	X	X	
MW04R	Shallow	new	Semiannual		X	X	X	X	X	X	
01MW60	Shallow	24.5–39.5	Contingency	X					X	X	
01MW89	Shallow	18–26	Contingency	X					X	X	
01MW112	Intermediate	new	Contingency						X	X	
MW02	Intermediate	18–28	Contingency						X	X	
MW06	Shallow	18–28	Contingency						X	X	
BNSF Wells⁽²⁾											
01MW98	Perched	5–15	--	--	--	--	--	--	--	--	--
01MW97	Perched	5–15	--	--	--	--	--	--	--	--	--
01MW96	Perched	5–15	--	--	--	--	--	--	--	--	--
01MW95	Shallow	27–37	--	--	--	--	--	--	--	--	--
01MW94	Shallow	28–40	--	--	--	--	--	--	--	--	--
01MW93	Shallow	23.5–38.5	--	--	--	--	--	--	--	--	--
01MW92	Perched	6–16	--	--	--	--	--	--	--	--	--
East Waterfront Parcel Wells											
02MW04R	Shallow	new	Quarterly ⁽¹⁾	X		X	X	X			
02MW19	Shallow	3–13	Quarterly ⁽¹⁾		X	X	X	X			
02MW07	Shallow	1.5–11.5	Quarterly ⁽¹⁾	X	X	X	X	X			
02MW03	Shallow	10–20	Contingency	X		X	X	X			
02MW17	Shallow	1–11	Contingency		X	X	X	X			
02MW20	Shallow	new	Contingency	X	X	X	X	X			

Notes:

-- Not accessible for sampling.

- Quarterly monitoring will be performed for eight quarters (2 years). In the Upland Area of Concern, quarterly monitoring will be followed by 2 years of semiannual performance monitoring; in the Shoreline Area of Concern, quarterly monitoring will be followed by long-term annual confirmation monitoring.
- It is assumed that wells on the BNSF Property will be maintained and sampled under a separate agreement with the Washington State Department of Ecology. Data from these wells may be used to assess remedy performance, if available.

Abbreviations

- DRO Diesel-range organics
- GRO Gasoline-range organics
- MNA Monitored Natural Attenuation
- ORO Oil-range organics
- penta Pentachlorophenol
- TCE Trichloroethylene
- TOC Top of casing

**Table A.3
Long-Term Monitoring Plan**

Well ID	Water-Bearing Zone	Screened Interval (feet below TOC)	Designation	Proposed Monitoring						
				Arsenic	GRO	Total DRO+ORO	Benzene	TCE	Vinyl Chloride	Penta
Bulk Terminal Parcel Wells										
01MW03	Shallow	10-25	Confirmation		X	X	X			X
01MW09	Shallow	17-23	Confirmation		X	X	X			X
01MW11R	Shallow	new	Confirmation		X	X	X			
01MW51	Intermediate	29-39	Confirmation		X	X	X			
01MW86	Shallow	14-24	Confirmation		X	X	X			X
01MW87R	Shallow	new	Confirmation		X	X	X			
01MW19R	Shallow	new	Performance		X	X	X			
01MW84	Shallow	17-23	Performance		X	X	X			
01MW90R	Shallow	new	Performance		X	X	X			
01MW17	Shallow	20-30	Sentinel							
01MW30	Shallow	15-28	Sentinel							
01MW34	Shallow	10-20	Sentinel							
01MW35	Shallow	10-20	Sentinel							
01MW39	Shallow	7-22	Sentinel							
01MW42	Shallow	7-22	Sentinel							
01MW48	Intermediate	28-32	Sentinel							
01MW101	Shallow	17-21	Sentinel							
01MW102	Shallow	10-20	Sentinel							
01MW103	Shallow	7-17	Sentinel							
01MW104	Intermediate	28-33	Sentinel							
01MW105	Shallow	5-15	Sentinel							
01MW109	Shallow	8-18	Sentinel							
01MW110	Shallow	11-21	Sentinel							
01MW111	Intermediate	30-35	Sentinel							
ASKO Parcel Wells										
01MW53	Shallow	14-24	Confirmation		X	X	X	X	X	
01MW85	Shallow	15-25	Confirmation		X	X	X	X	X	
01MW89	Shallow	17-27	Confirmation		X	X	X	X	X	
01MW112	Intermediate	new	Confirmation					X	X	
01MW58	Shallow	25.5-35.5	Performance					X	X	
01MW61	Shallow	22-37.5	Sentinel							
01MW83	Shallow	14-24	Sentinel							
01MW106	Shallow	15-25	Sentinel							
01MW107	Shallow	17-27	Sentinel							
01MW113	Shallow	new	Sentinel							
MW02	Shallow	18-28	Sentinel							
East Waterfront Parcel Wells										
02MW04R	Shallow	new	Confirmation		X	X	X			
02MW07	Shallow	1.5-11.5	Confirmation	X	X	X	X			
02MW17	Shallow	1-11	Confirmation	X	X	X	X			
02MW19	Shallow	3-13	Confirmation	X	X	X	X			
02MW20	Shallow	1-11	Confirmation	X	X	X	X			
02MW08	Shallow	13-22	Sentinel							
02MW14	Shallow	5-15	Sentinel							
02MW16	Shallow	5-15	Sentinel							
02MW18	Shallow	4-14	Sentinel							
02MW21	Intermediate	18-28	Sentinel							
02MW22	Intermediate	17-27	Sentinel							

Note:

Sentinel wells are not designated for routine monitoring and may be sampled for indicator hazardous substances as needed to assess remedy performance.

Abbreviations:

- DRO Diesel-range organics
- GRO Gasoline-range organics
- ORO Oil-range organics
- penta Pentachlorophenol
- TCE Trichloroethylene
- TOC Top of casing

Time Oil Bulk Terminal Site
Groundwater Monitoring Plan

Figures

Draft

Legend

Previous Investigation Monitoring Well Locations

- Shallow WBZ Monitoring Well
- Shallow/Intermediate WBZ Monitoring Well
- Intermediate WBZ Monitoring Well
- Deep WBZ Monitoring Well
- Angled Shallow WBZ Monitoring Well
- Perched WBZ Monitoring Well

Proposed Well Network

- Decommission
- Shallow WBZ Monitoring Well to be Installed
- Intermediate WBZ Monitoring Well to be Installed
- Perched WBZ Monitoring Well to be Installed

Proposed Monitoring Plan

- Conditional Point of Compliance

Cleanup Action Remedy

- Cleanup Action Area
- Capping with Pavement or Buildings
- Excavation to CULs
- Excavation to RELs
- In Situ Stabilization/Solidification
- ERD Injection Point with Area of Influence
- Interceptor Trench
- PRB Wall for Trench

Other Site Features

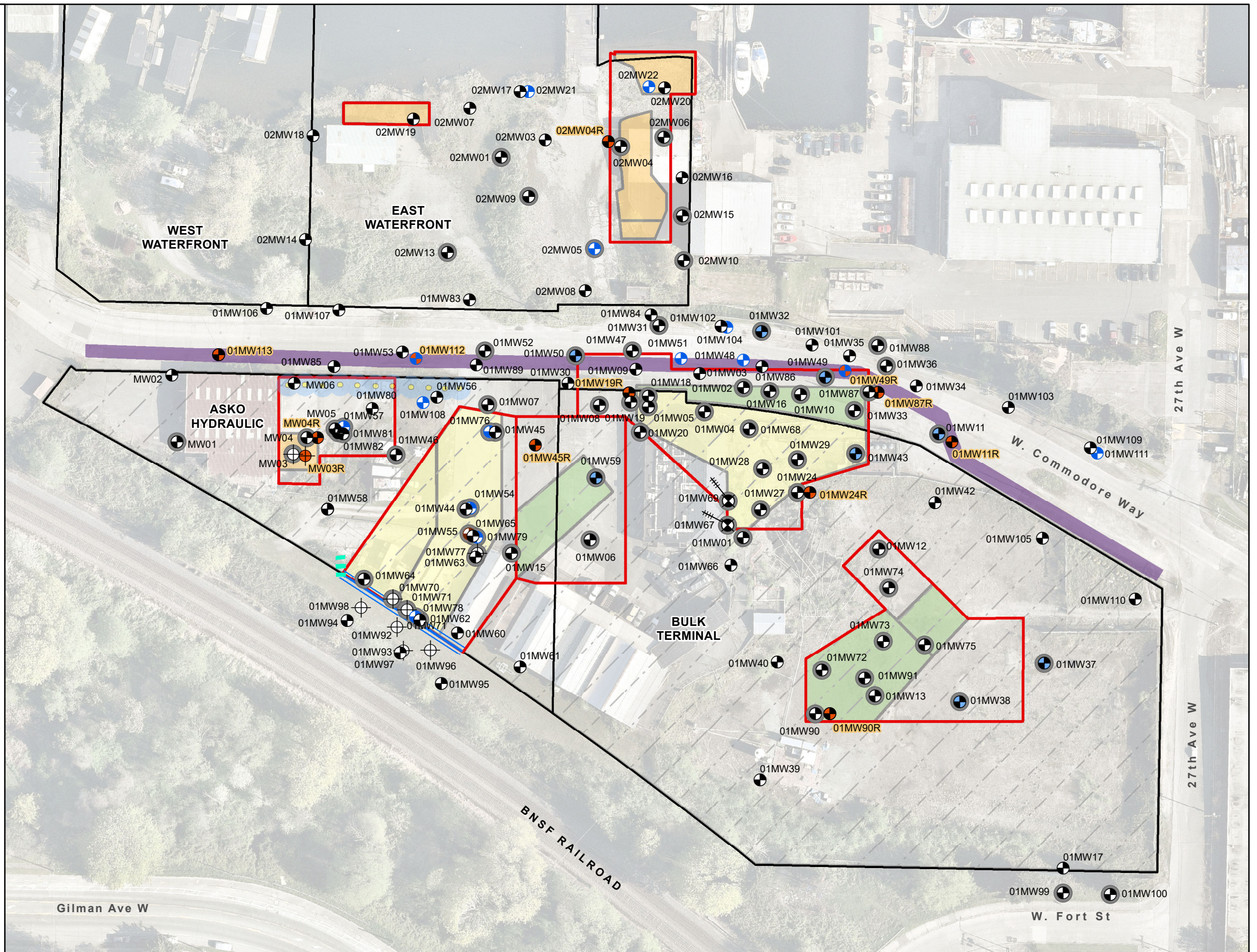
- Property Boundary for the Former TOC Seattle Terminal

Notes:

- Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
- Orthoimagery obtained from Nearmap, 2018.

Abbreviations:

- AOC = Area of concern
- CUL = Cleanup level
- ERD = Enhanced Reductive Dechlorination
- PRB = Permeable Reactive Barrier
- REL = Remediation level
- TOC = TOC Holdings Co. and any predecessor entity including Time Oil Company
- WBZ = Water-bearing zone



Legend

Previous Investigation Monitoring Well Locations

- Shallow WBZ Monitoring Well
- Shallow/Intermediate WBZ Monitoring Well
- Intermediate WBZ Monitoring Well
- Perched WBZ Monitoring Well

Proposed Monitoring Plan

- Quarterly Performance⁽¹⁾
- Semiannual Performance
- Contingency Performance
- Conditional Point of Compliance

Cleanup Action Remedy

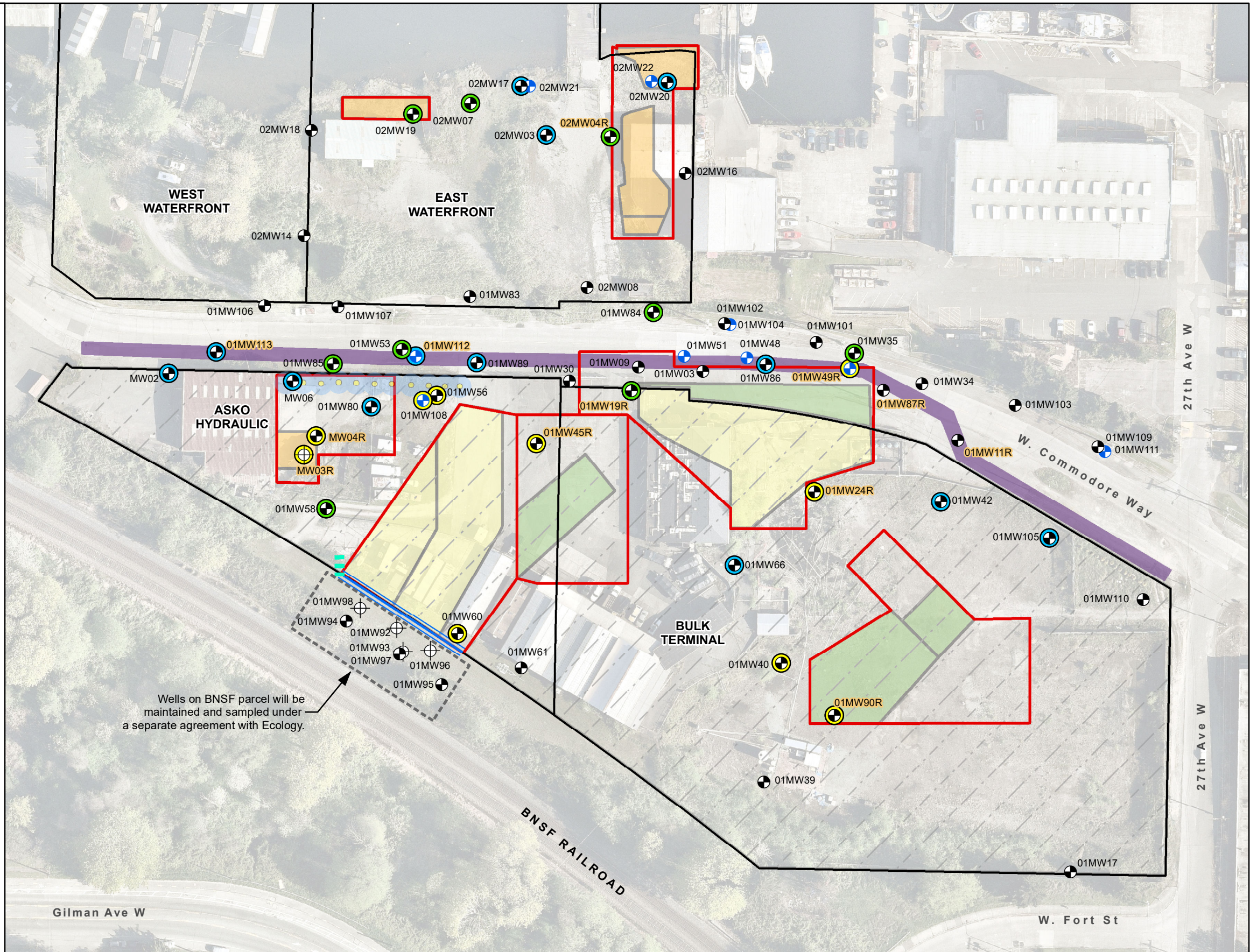
- Cleanup Action Area
- Capping with Pavement or Buildings
- Excavation to CULs
- Excavation to RELs
- In Situ Stabilization/Solidification
- ERD Injection Point with Area of Influence
- Interceptor Trench
- PRB Wall for Trench

Other Site Features

- Property Boundary for the Former TOC Seattle Terminal

Notes:
 1. Quarterly monitoring will be performed for eight quarters (2 years). In the Upland AOC, quarterly monitoring will be followed by 2 years of semiannual performance monitoring; in the Shoreline AOC, quarterly monitoring will be followed by long-term semiannual or annual confirmation monitoring.
 · Contingency performance wells may also be sampled for performance monitoring as needed to assess remedy performance.
 · Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
 · Orthoimagery obtained from Nearmap, 2018.

Abbreviations:
 AOC = Area of concern
 BNSF = BNSF Railway Company
 CUL = Cleanup level
 Ecology = Washington State Department of Ecology
 ERD = Enhanced Reductive Dechlorination
 PRB = Permeable Reactive Barrier
 REL = Remediation level
 TOC = TOC Holdings Co. and any predecessor entity including Time Oil Company
 WBZ = Water-bearing zone



Wells on BNSF parcel will be maintained and sampled under a separate agreement with Ecology.

Legend

Previous Investigation Monitoring Well Locations

- Shallow WBZ Monitoring Well
- Shallow/Intermediate WBZ Monitoring Well
- Intermediate WBZ Monitoring Well
- Perched WBZ Monitoring Well

Proposed Monitoring Plan

- Performance
- Confirmation
- Sentinel
- Conditional Point of Compliance

Cleanup Action Remedy

- ▭ Cleanup Action Area
- ▭ Capping with Pavement or Buildings
- ▭ Excavation to CULs
- ▭ Excavation to RELs
- ▭ In Situ Stabilization/Solidification
- ERD Injection Point with Area of Influence
- Interceptor Trench
- ▭ PRB Wall for Trench

Other Site Features

- ▭ Property Boundary for the Former TOC Seattle Terminal

Notes:

- Confirmation and sentinel monitoring wells may also be sampled for performance monitoring as needed to assess remedy performance.
- Confirmation wells will be used to demonstrate compliance at the CPOC and in the Shoreline AOC. These wells will transition from performance to confirmation after the CULs have been attained. Performance wells are wells that will be used to track groundwater plume conditions and trends.
- Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
- Orthoimagery obtained from Nearmap, 2018.

Abbreviations:

- AOC = Area of concern
- BNSF = BNSF Railway Company
- CUL = Cleanup level
- CPOC = Conditional point of compliance
- Ecology = Washington State Department of Ecology
- ERD = Enhanced Reductive Dechlorination
- PRB = Permeable Reactive Barrier
- REL = Remediation level
- TOC = TOC Holdings Co. and any predecessor entity including Time Oil Company
- WBZ = Water-bearing zone

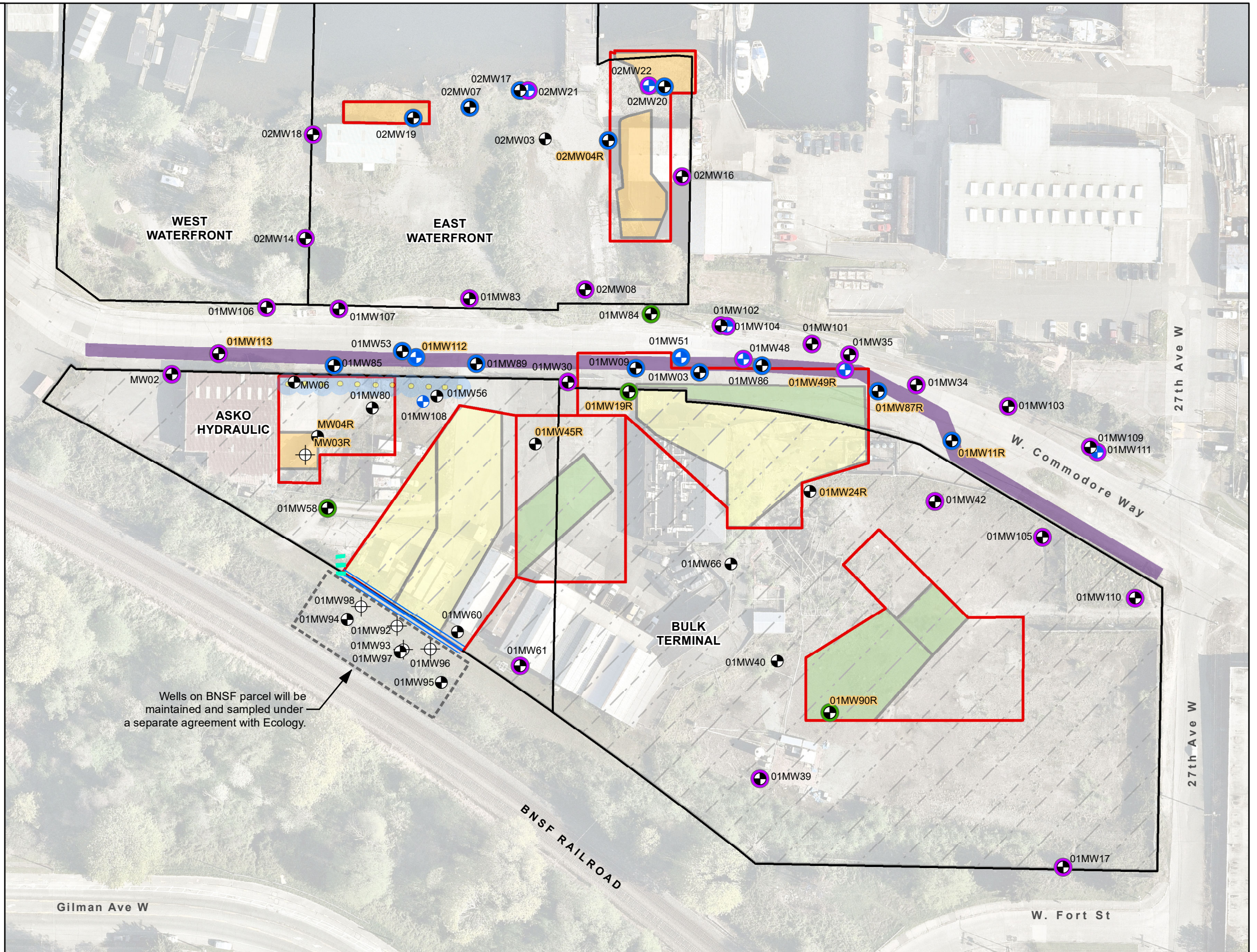


Exhibit D
Schedule of Deliverables

Deliverable	Due Date¹ or Timeframe
Submit Agency Review Draft Pre-Remedial Design Work Plan	Within 30 days of effective date of PPCD
Finalize Pre-Remedial Design Work Plan	30 days after receipt of Ecology's final comments on draft
Submit Agency Review Draft Engineering Design Report	Within 180 days of effective date of PPCD
Finalize Engineering Design Report	90 days after receipt of Ecology's final comments on draft
Submit Agency Review Remedial Action Completion Reports (RACRs)	150 days following construction completion for each phase of remedial action construction ²
Submit Final RACRs	45 days after receipt of Ecology's final comments on draft
Submit Agency Review Draft Long Term Compliance Monitoring Plan (LTCMP)	90 days following remedial action construction completion
Finalize LTCMP ³	45 days following receipt of Ecology's final comments on draft
Submit LTCMP Annual Monitoring Reports	Annually on March 1
Submit Quarterly Progress Reports	15 days after the end of each quarter

¹ Schedule is in calendar days. Deliverable due date may be modified with Ecology concurrence without amendment to the PPCD.

² The placement of pavement or buildings as part of the Upland AOC remedy will occur during Property redevelopment. Remedy implementation will not be considered complete for the Upland AOC until redevelopment is complete.

³ The LTCMP will be a "living" document and may be modified as deemed appropriate with Ecology concurrence.

Exhibit E References¹

- Alaska Statement of Cooperation Working Group. 2006. *Maximum Allowable Concentration, Residual Saturation, and Free-Product Mobility: Technical Background Document and Recommendations*. Prepared by Geosphere, Inc., and CH2M Hill. September.
- Avocet Consulting. 2003. *Phase II Report: Development and Recommendations for SQVs for Freshwater Sediments in Washington State*. Prepared for Washington State Department of Ecology. Publication No. 03-09-088. September.
- Booth, D. B., and B. Goldstein. 1994. "Patterns and Processes of Landscape Development by the Puget Lobe Ice Sheet." *Washington Division of Geology and Earth Resources Bulletin* 80: 207–218.
- Brown and Caldwell. 1958. *Metropolitan Seattle Sewerage and Drainage Survey*. Prepared for the City of Seattle, King County, and the State of Washington. March.
- Burchard, Boyd. 1968. "Time Oil Ticks to Computer." *The Seattle Times*, April 9, 1968: p. 20.
- The Burke Museum. 2019. *The Archaeology of West Point*, Online Exhibit, website last accessed May 16. <http://www.burkemuseum.org/static/westpoint/>
- Calkins, R. H. 1941. "Tanker Coney Marks Opening of New Plant." *The Seattle Times*, March 26, 1941: p. 24.
- _____. 1950. "Workhorse of Fleet." *The Seattle Times*, April 30, 1950: p. 14.
- Converse Davis Dixon Associates, Inc. 1976. *Report of Geotechnical Exploration, North Truck Sewer –Rehab IV, Seattle, Washington*. Reviewed at the King County Transportation and Natural Resources Library. 14 June.
- Cruz, Jerome. 2003. Email message "Time Oil DPE CAP" to Scott Sloan, Time Oil Company. 4 August.
- Floyd|Snider. 2018. *Surface Sediment Quality Evaluation Sampling and Analysis Plan/Quality Assurance Project Plan*. Prepared for Cantera Development Group, LLC. July.
- _____. 2019a. *Addendum to the Surface Sediment Quality Evaluation Sampling and Analysis Plan/Quality Assurance Project Plan*. Prepared for Cantera Development Group, LLC. February

¹ General academic publications, agency guidance documents, and site-specific materials that were referenced in reports for the Site or reproduced in full in those reports are not included in this reference list.

- _____. 2019b. *Supplemental Upland Remedial Investigation Work Plan*. Final. Prepared for Cantera Development Group, LLC. March.
- _____. 2019c. *Sediment Data Summary Report*. Memorandum from Lynn Grochala and Allison Geiselbrecht, Floyd|Snider, to Mark Adams, Washington State Department of Ecology. 5 August.
- _____. 2020. *Supplemental Upland Remedial Investigation and Feasibility Study*. Draft. June.
- Floyd Snider McCarthy, Inc., Shannon & Wilson, Inc., and Urban Redevelopment LLC. 2003. *North BINMIC Hydrogeologic and Environmental Settings Report: Ballard Interbay North Manufacturing Industrial Center USEPA Brownfields Pilot Project*. Prepared for the BINMIC Technical Committee of the Ballard Interbay North Manufacturing Industrial Center. August.
- Foster Wheeler Environmental Corporation. 2000. *Environmental Site Assessment: Phase I, at 2737 West Commodore Way, Seattle, Washington*. Prepared for Time Oil Company. 25 August.
- _____. 2001a. *Final Environmental Site Assessment: Phase II at 2805 West Commodore Way, Seattle, Washington*. 6 April.
- _____. 2001b. *Phase III Environmental Site Assessment, 2737 and 2750 West Commodore Way Properties, Seattle, Washington*. December.
- _____. 2002a. *Final Environmental Site Assessments and RBCA Evaluation at 2805 West Commodore Way, Seattle, Washington*. October.
- _____. 2002b. *Final Limited Soil Removal Report at the Former PCP/Diesel Mixing Area at 2737 West Commodore Way, Seattle, Washington*. 18 December.
- _____. 2003. *Final Cleanup Action Plan for Petroleum-Impacted Soil and Groundwater, 2737 West Commodore Way, Seattle, Washington*. May.
- IT Corporation. 2000. *Site Assessment Report, TOC Holdings Co. Site 2750, 2750 West Commodore Way, Seattle, Washington*. 8 March.
- King County Department of Metropolitan Services (King County DMS). 1995. *Water Pollution Control Department, Steward of the Waters: A Retrospective on Wastewater Treatment at Seattle's West Point*, Seattle, WA.
- Landau Associates, Inc. 2005. *Annual Event/Fourth Quarter 2005 Groundwater Monitoring Event, Site # 01-600, Seattle, Washington*. 20 December.

- Masscheleyn, P. H., R. D. Delaune, and W. H. Patrick Jr. 1991. "Effect of Redox Potential and pH on Arsenic Speciation and Solubility in a Contaminated Soil." *Environmental Science & Technology* 25(8): 1414–1419.
- Morissette, H. E. 1967. *GSA bid for 55,250 5-gal. pails of Wood Preservative going to Viet Nam*. Letter from H. E. Morissette to J. W. Barnet and Newton Lesh, Time Oil Company, and George Mills, J. M. Montgomery, R. M. Morriss, Dick Miller, C. F. Grafton, and H. Struessel. 11 July.
- Mullineaux, D. R. 1970. *Geology of the Renton, Auburn, and Black Diamond Quadrangles, King County, Washington*. Geological Survey Professional Paper 672. Washington, DC: U.S. Government Printing Office.
- Municipality of Metropolitan Seattle. 1989. *Fort Lawton Parallel Tunnel Project, Contract w/F16-89, Part E – Geotechnical Report, Vol. 4*. October.
- Savage, W. Z., M. M. Morrissey, and R. L. Baum. 2000. *Geotechnical Properties for Landslide-Prone Seattle-Area Glacial Deposits*. U.S. Geological Survey. Open-File Report 00-228.
- Seattle Times. 1953. "Oil for Alaska." *The Seattle Times*, November 15, 1953: p. 6.
- Sound Environmental Strategies Corporation. 2008. *Technical Memorandum Regarding Sediment Quality, TOC Holdings Facility No. 01-426 and 01-600, 2737, 2750, and 2805 West Commodore Way, Seattle, Washington*. From Thomas Cammarata at SES. To Christopher Maurer, PE at Washington State Department of Ecology. June 17.
- SoundEarth Strategies, Inc. 2012. *Pipeline System Removal and Soil Sampling Report, 2737 West Commodore, Way, Seattle, Washington*. Letter report from Pete Kingston and Timothy Brown, SoundEarth Strategies, Inc., to Jennifer Anderson, Seattle Department of Transportation, Capital Projects & Roadway Structures Division. _____. 2014a. *Remedial Investigation Report, ASKO Hydraulic Property*. Prepared for TOC Holdings Co. 23 May.
- _____. 2014b. *Remedial Investigation Report, East Waterfront Property*. Prepared for TOC Holdings Co. 10 June.
- _____. 2014c. *Remedial Investigation Report, Bulk Terminal Property*. Prepared for TOC Holdings Co. 13 June.
- _____. 2014d. *Feasibility Study, ASKO Hydraulic Property*. Prepared for TOC Holding Co. 9 June.
- _____. 2014e. *Feasibility Study, East Waterfront Property*. Prepared for TOC Holdings Co. 12 June.
- _____. 2014f. *Feasibility Study, Bulk Terminal Property*. Prepared for TOC Holdings Co. 17 June.
- _____. 2015a. *Subsurface Investigation Report, Bulk Terminal Property Southern Property Line*. Prepared for TOC Holdings Co. 3 August.

- _____. 2015b. *Subsurface Investigation Report, East Waterfront Property*. Prepared for TOC Holdings Co. 2 December.
- _____. 2016a. *Vapor Intrusion Assessment, Bulk Terminal Property, 2737 West Commodore Way, Seattle, Washington*. Letter report from Jessica Brown and Timothy Brown, SoundEarth Strategies, Inc., to Mark Chandler, TOC Holdings Co. 15 February.
- _____. 2016b. *Vapor Intrusion Assessment, ASKO Hydraulic Property, 2805 West Commodore Way, Seattle, Washington*. Letter report from Timothy Brown and Peter Kingston, SoundEarth Strategies, Inc., to Mark Chandler, TOC Holdings Co. 17 February.
- _____. 2016c. *Groundwater Monitoring Report, 2016 Annual Event, East Waterfront Property*. Prepared for TOC Holdings Co. 6 October.
- _____. 2016d. *Groundwater Monitoring Report, 2016 Annual Event, Bulk Terminal Property*. Prepared for TOC Holdings Co. 7 October.
- _____. 2016e. *Groundwater Monitoring Report, 2016 Annual Event, ASKO Hydraulic Property*. Prepared for TOC Holdings Co. 10 October.
- Tetra Tech FW, Inc. 2003. *Letter Regarding Results of Ground Penetrating Radar and Electromagnetic Survey for Time Oil Company at 2737 West Commodore Way, Seattle, Washington*. From Bryan S. Graham, Project Manager at Tetra Tech FW, Inc. To Scott B. Sloan at Time Oil Company. 17 September.
- _____. 2004. *Final Quarterly Groundwater Sampling Report for July 2004 at 2737 West Commodore Way and 2750 West Commodore Way, Seattle, Washington*. November.
- _____. 2005. *Draft Quarterly Groundwater Sampling Report for November 2004 at 2737 West Commodore Way and 2750 West Commodore Way, Seattle, Washington*. March.
- Time Oil Co. 1991. *Underground Storage Tank Site Check/Site Assessment at Seattle Terminal, 2737 West Commodore Way, Seattle, Wa – Property No. 01-228*. Letter from Liam J. Russell, Time Oil Company, to Joe Hickey, Washington State Department of Ecology. 30 December.
- _____. 1992. *Excavating Activities Conducted at Former Waste Oil Tank Location Former Time Oil Co. Vehicle Maintenance Facility, 2750 Commodore Way; Seattle, Washington*. Letter from Scott B. Sloan, Time Oil Company, to Joe Hickey, Washington State Department of Ecology. 22 September.
- _____. 1993. *Independent Remedial Action Conducted at Time Oil Co. Property Leased to Icicle Seafoods, Inc., 2752 Commodore Way; Seattle, Washington*. Letter report from Scott Sloan and Kevin Murphy, Time Oil Co., to Joe Hickey, Washington State Department of Ecology. 24 November.

- Troost, K. G., D. B. Booth, A. P. Wisher, and S. A. Shimel. 2005. *The Geologic Map of Seattle – A Progress Report*. U.S. Geological Survey. April.
- U.S. Environmental Protection Agency. 2017a. *National Functional Guidelines for Inorganic Superfund Methods Data Review*. Prepared by the Office of Superfund Remediation and Technology Innovation. EPA-540-R-2017-001/OLEM 9355.0-135. January.
- _____. 2017b. *National Functional Guidelines for Organic Superfund Methods Data Review*. Prepared by the Office of Superfund Remediation and Technology Innovation. EPA-540-R-2017-002/OLEM 9355.0-136. January.
- Washington State Department of Archaeology and Historic Preservation. 2019. Washington Information System for Architectural and Archaeological Records Data (WISAARD). Accessed secured site requiring credentials. <https://dahp.wa.gov/project-review/wisaard-system/the-secure-side-of-wisaard>
- Washington State Department of Ecology. 1994. *Natural Background Soil Metals Concentrations in Washington State*. Toxics Cleanup Program. Publication No. 94-115. October.
- _____. 1996. *Chemical Contaminants in Salmon Bay Sediments, Results of Phase II Sampling*. Publication No. 96-343. November.
- _____. 1997. *Analytical Methods for Petroleum Hydrocarbons*. Toxics Cleanup Program and Ecology Environmental Laboratory. Publication No. 97-602. June.
- _____. 2000a. *Saltwater Intrusion in Salmon Bay and Lake Union Sediments*. Publication No. 00-03-032. August.
- _____. 2000b. *Concentrations of Chemical Contaminants and Bioassay Response to Sediments in Salmon Bay, Seattle, Results of Phase III Sampling*. Publication No. 00-03-053. December.
- _____. 2001. *Concise Explanatory Statement for the Amendments to the Model Toxics Control Act Cleanup Regulation*. Publication No. 01-09-043. Toxics Cleanup Program. 12 February.
- _____. 2009. *Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action*. Toxics Cleanup Program. Publication No. 09-09-047. October. Revised February 2016 and April 2018.
- _____. 2010. *Natural Background for Dioxins/Furans in WA Soils—Technical Memorandum #8*. Toxics Cleanup Program. Publication No. 10-09-053. 9 August.
- _____. 2011. *Urban Seattle Area Soil Dioxin and PAH Concentration Initial Summary Report*. Publication No. 11-09-049. September.
- _____. 2013. *Sediment Management Standards, Chapter 173-204 WAC*. Publication No. 13-09-055. September.

- _____. 2015a. *Opinion pursuant to WAC 173-340-515(5) on Proposed Remedial Action for following Hazardous Waste Site: Time Oil Co Seattle Terminal*. Letter from Heather Vick, Washington State Department of Ecology, to Mark Chandler, TOC Holdings Co. 25 November.
- _____. 2015b. *Opinion pursuant to WAC 173-340-515(5) on Proposed Remedial Action for following Hazardous Waste Site: Time Oil Co ASKO Property*. Letter from Heather Vick, Washington State Department of Ecology, to Mark Chandler, TOC Holdings Co. 24 November.
- _____. 2015c. *Opinion pursuant to WAC 173-340-515(5) on Proposed Remedial Action for following Hazardous Waste Site: Time Oil 2754 Commodore*. Letter from Heather Vick, Washington State Department of Ecology, to Mark Chandler, TOC Holdings Co. 8 October.
- _____. 2015d. *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. March. Revised December 2017 and December 2019.
- _____. 2018. *Preliminary Determination of Liability for Release of Hazardous Substances at the following Contaminated Site: Time Oil Bulk Terminal PPA*. Letter from Mark Adams, Washington State Department of Ecology, to Carl Ice and Shane DeGross, BNSF Railway Company. 27 August.
- _____. 2019a. *Final Determination of Liability for Release of Hazardous Substances at the following Contaminated Site: Time Oil Bulk Terminal PPA*. Letter from Robert Warren, Washington State Department of Ecology, to Carl Ice and Shane DeGross, BNSF Railway Company. 5 March.
- _____. 2019b. *Soil Cleanup Levels to Protect Groundwater*. Supporting material for Cleanup Levels and Risk Calculation (CLARC). Toxics Cleanup Program. April.
- _____. 2020. *Time Oil Site: Upland Ecological Risk Assessment*. Memorandum. Arthur Buchan. 26 June
- _____. ND. Environmental Information Management System. <https://ecology.wa.gov/Research-Data/Data-resources/Environmental-Information-Management-database>
- Williams, David B. 2017. Lake Washington ship Canal (Seattle). HistoryLink.org Essay 1444. <https://www.historylink.org/File/1444>
- Yount, J. C., G. R. Dembroff, and G. M. Barats. 1985. *Map Showing Depth to Bedrock in the Seattle 30' by 60' Quadrangle, Washington*. Miscellaneous Field Studies Map 1692. U.S. Geological Survey.