

**Cleanup Action Plan
Boeing Auburn Facility
Auburn, Washington**

**Washington Department of Ecology
Northwest Regional Office
Hazardous Waste and Toxics Reduction Program**

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TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	1-1
1.1 Purpose.....	1-2
1.2 Regulatory Framework	1-2
2.0 SITE DESCRIPTION	2-1
2.1 Site History	2-1
2.2 Site Geology and Hydrogeology	2-2
2.2.1 Geology	2-2
2.2.2 Groundwater Flow and Velocities	2-2
2.2.3 Stormwater and Surface Water Flow	2-3
2.3 Previous Studies	2-4
2.3.1 Areas of Concern and Previous Remedial Actions.....	2-5
2.3.1.1 AOC A-01	2-5
2.3.1.2 AOC A-09	2-6
2.3.1.3 AOC A-14	2-6
2.3.1.4 AOC A-15	2-8
2.4 Current Conditions and Potential Exposure Pathways.....	2-9
2.4.1 On-Facility Conditions and Exposure Pathways	2-9
2.4.2 Off-Facility Conditions and Exposure Pathways.....	2-10
3.0 CLEANUP STANDARDS	3-1
3.1 Regulatory Considerations	3-1
3.2 Contaminants of Concern.....	3-1
3.3 Cleanup Levels.....	3-2
3.4 Points of Compliance.....	3-2
4.0 CLEANUP ACTION ALTERNATIVES AND ANALYSIS	4-1
4.1 AOC A-01 Alternatives	4-1
4.2 AOC A-09 Alternatives	4-1
4.3 AOC A-14 Alternatives	4-2
4.4 AOC A-15 Alternatives	4-2
5.0 DESCRIPTION OF SELECTED REMEDY	5-1
5.1 AOC A-01 Remedy	5-1
5.1.1 Description of Cleanup Action.....	5-1
5.1.2 Cleanup Standards and Point of Compliance	5-2
5.1.3 Restoration Timeframe	5-2
5.1.4 Compliance Monitoring	5-2
5.2 AOC A-09 Remedy	5-3
5.2.1 Description of Cleanup Action.....	5-3

5.2.2	Cleanup Standards and Point of Compliance	5-4
5.2.3	Restoration Time frame	5-5
5.2.4	Compliance Monitoring	5-5
5.3	AOC A-14 Remedy	5-5
5.3.1	Description of Cleanup Action.....	5-6
5.3.2	Cleanup Standards and Point of Compliance	5-7
5.3.3	Restoration Time Frame.....	5-7
5.3.4	Compliance Monitoring	5-8
6.0	INSTITUTIONAL CONTROLS.....	6-1
7.0	PUBLIC PARTICIPATION.....	7-1
8.0	SCHEDULE FOR IMPLEMENTATION.....	8-1
9.0	REFERENCES.....	9-1

FIGURES

Figure	Title
1-1	Vicinity Map
2-1	Boeing Auburn Facility Map
2-2	Current Extent of the Site and Approximate Extent of Area 1 and Western Plumes
2-3	Stormwater and Surface Water Features
2-4	Boeing Auburn Facility Areas of Concern Evaluated in the Feasibility Study
2-5	AOC A-01: Building 17-06 Former Underground Storage Tanks (TAU-01 and TAU-02) Exploration Summary
2-6	AOC A-01: Building 17-06 Former Underground Storage Tanks (TAU-01 and TAU-02) Exploration Cross-Section
2-7	AOC A-09: Building 17-07 Acid Scrubber Drain Line Exploration Summary
2-8	AOC A-09: Building 17-07 Acid Scrubber Drain Line Exploration Cross-Section
2-9	AOC A-14: Shallow Zone Trichloroethene Concentrations June 2021
2-10	AOC A-14: Intermediate Zone Trichloroethene Concentrations June 2021
2-11	AOC A-14: Deep Zone Trichloroethene Concentrations June 2021
2-12	AOC A-14: Shallow Zone Vinyl Chloride Concentrations June 2021
2-13	AOC A-14: Intermediate Zone Vinyl Chloride Concentrations June 2021
2-14	AOC A-14: Deep Zone Vinyl Chloride Concentrations June 2021
2-15	Locations of Interim Remedial Action and Enhanced <i>In Situ</i> Bioremediation Pilot Test
2-16	Conceptual Site Model
5-1	AOC A-01: Conceptual Excavation Area
5-2	AOC A-09: Conceptual Future Excavation Area
5-3	AOC A-14: Conceptual EISB Algona Focus Area
5-4	AOC A-14: Conceptual Cleanup Action (Monitored Natural Attenuation and Algona Focus Area EISB)
6-1	Conceptual Boeing Auburn Facility Environmental Covenant Area

TABLES

<u>Table</u>	<u>Title</u>
3-1	Applicable or Relevant and Appropriate Requirements
3-2	Soil Cleanup Levels
3-3	Groundwater Cleanup Levels
3-4	Surface Water Cleanup Levels
5-1	Summary of Selected Cleanup Action Alternatives
5-2	Summary of ARARs for each AOC

APPENDICES

<u>Appendix</u>	<u>Title</u>
A	Conceptual Long-Term AOC A-14 Monitoring Plan

LIST OF ABBREVIATIONS AND ACRONYMS

µg/L	micrograms per liter
Algona	City of Algona
Agreed Order	Agreed Order No. 01HWTRNR-3345
AOC	area of concern
AMB	AMB Corporation/now Prologis
ARAR	applicable or relevant and appropriate requirement
Auburn	City of Auburn
bgs	below ground surface
Boeing	The Boeing Company
Boeing Auburn Plant	Auburn Fabrication Division Plant
CAP	Cleanup Action Plan
cDCE	cis-1,2-dichloroethene
COC	constituent of concern
CPOC	conditional point of compliance
CUL	Cleanup Level
CVOC	chlorinated volatile organic compound
DCA	disproportionate cost analysis
dCAP	draft Cleanup Action Plan
DWQS	drinking water quality standards
Ecology	Washington State Department of Ecology
EDR	Engineering Design Report
EISB	enhanced <i>in situ</i> bioremediation
FS	feasibility study
ft	feet, foot
ft/yr	feet per year
HASP	Health and Safety Plan
ID	identification
IRA	interim remedial action
JA	Junior Achievement
LAI	Landau Associates, Inc.
mg/kg	milligrams per kilogram
MNA	monitored natural attenuation
MTCA	Model Toxics Control Act
No.	Number
ORC	oxygen-releasing compound
POC	point of compliance
PSE	Puget Sound Energy
RCRA	Resource Conservation and Recovery Act

RCW	Revised Code of Washington
RI	remedial investigation
Safeway	Safeway Corporation
SFS	supplemental feasibility study
SWMU	solid waste management unit
SWQS	surface water quality standards
TCE	trichloroethene
TEE	terrestrial ecological evaluation
TOC	total organic carbon
TPH	total petroleum hydrocarbon
UST	underground storage tank
VC	vinyl chloride
WAC	Washington Administrative Code
WDOH	Washington State Department of Health
yd ³	cubic yards

1.0 INTRODUCTION

This Cleanup Action Plan (CAP) presents the cleanup actions for environmental releases from The Boeing Company's (Boeing's) Auburn Fabrication Division Plant (Boeing Auburn Plant) and associated properties (Boeing Auburn Facility). The Boeing Auburn Plant is located at 700 15th Street Southwest, Auburn, Washington (State Dangerous Waste Identification [ID] Number [No.] WAD041337130). The location and current extent of property that Boeing owns as part of the Boeing Auburn Plant is shown on Figure 1-1. The Boeing Auburn Site (Site) includes the Boeing Auburn Facility and all contiguous property affected by releases of hazardous substances that are confirmed or suspected to have originated at the Boeing Auburn Facility.

The Site is currently undergoing Resource Conservation and Recovery Act (RCRA) corrective action as required by Agreed Order No. 01HWTRNR-3345 (Agreed Order).¹ An agency review draft CAP (dCAP) was prepared by Boeing at Washington State Department of Ecology's (Ecology's) direction (Ecology 2021b) pursuant to the Agreed Order, in accordance with the Washington State Model Toxics Control Act (MTCA) regulation (WAC 173-340). Ecology revised that document to create the dCAP for public review. The dCAP provides the basis for Ecology to issue this final CAP after public comment in accordance with Washington Administrative Code (WAC) 173-340-380(1).

Under the Agreed Order, Boeing conducted remedial investigations (RI) to characterize releases from the Boeing Auburn Plant that affected soil, groundwater, and downgradient stormwater features as documented in the Ecology-approved RI report (Landau Associates, Inc.[LAI] 2017b). Boeing completed a draft feasibility study (FS; LAI 2019a) and draft supplemental FS (SFS; LAI 2020) to identify Areas of Concern (AOCs) requiring cleanup and to select cleanup actions for these AOCs. The AOCs are located both within the Boeing Auburn Plant and at affected downgradient properties. Boeing and Ecology agreed to the remedies for each of the AOCs requiring cleanup and agreed to proceed with preparation of the dCAP through a series of letters (Boeing 2021a, b; Ecology 2021a, c).

The four AOCs (AOC A-01, AOC A-09, AOC A-14, and AOC A-15) identified as requiring cleanup and the selected remedial actions for those AOCs are described in this CAP. Two of the AOCs (AOC A-01 and AOC A-09) are located on property owned and operated by Boeing at the Boeing Auburn Plant. This on-property contamination consists of small discreet areas of contaminated soil and groundwater that do not impact off-property groundwater. No complete exposure pathways to contamination exist for these two AOCs. The third AOC (AOC A-14) is Site-wide groundwater trichloroethene (TCE) and vinyl chloride (VC) contamination (groundwater plumes) that extends from the current or former Boeing owned properties to downgradient properties. The fourth AOC (AOC A-15) is an off-property AOC consisting of stormwater management features that intercept contaminated groundwater. The

¹ The agreed order was originally dated May 15, 2002 (Ecology 2002), and first amended on April 7, 2006 (Ecology 2006) and second amended on November 1, 2018 (Ecology 2018).

remedial actions selected for all four AOCs are reasonable and appropriate based on the nature and characteristics of the contamination and media impacted at these AOCs.

1.1 Purpose

The purpose of this CAP is to identify the proposed cleanup actions for the Site per WAC 173-340-380(1)(a)(i)-(ix) and to provide an explanatory document for public review. The following list summarizes the elements of this plan.

- Site description
- Summary of current Site conditions
- Summary of the cleanup action alternatives considered (in the FS and SFS)
- Description of the selected cleanup action for the Site and the rationale for selecting it
- Identifying Site-specific CULs and points of compliance for each hazardous substance in soil and groundwater for the proposed cleanup action
- Identifying applicable state and federal laws for the proposed cleanup action
- Identifying what residual contamination will remain after cleanup and a description of restrictions placed on the property to ensure continued protection of human health and the environment.
- Discussion of compliance monitoring requirements
- Presentation of a preliminary schedule for implementing the CAP.

1.2 Regulatory Framework

The Boeing Auburn Plant was issued a RCRA Permit for treatment, storage, and handling of hazardous waste in 1987. The RCRA permit required corrective action for releases of hazardous substances into the environment. Corrective action is being implemented under an Agreed Order between Boeing and Ecology issued in 2002 and amended in 2006 and 2018. In 2006, a new state dangerous waste permit was issued solely for corrective action since hazardous waste treatment and storage operations are no longer conducted at the Boeing Auburn Facility. That permit was reissued in 2018 and modified in 2022 to cover implementation of the CAP. The Agreed Order identified solid waste management units (SWMUs) and AOCs that required further investigation and outlined a process consistent with the MTCA to conduct an RI, an FS, and prepare a dCAP.

2.0 SITE DESCRIPTION

This section presents a regulatory overview, Site description, brief historical summary, remedial history, and current conditions.

2.1 Site History

The Boeing Auburn Plant is located within the City of Auburn (Auburn) and consists of 312 acres of industrial land. Historically, Boeing owned as much as 482 acres of land in this area (385 acres acquired from the General Services Administration in 1966 and an additional 97 acres of land along the southwest side of the original Boeing Auburn Plant). Boeing uses the Boeing Auburn Plant for airplane skin and spar manufacturing, machine fabrication, tooling, emergent manufacturing, welding, sheet metal work, process assembly, and other work related to the manufacturing of airplane tools and parts. Boeing sold approximately 105 acres of its Auburn property to the Safeway Corporation (Safeway) in 2003, donated about 22.5 acres of its property to the YMCA and Junior Achievement (JA) in 2004, and sold 0.91 acres featuring an electrical transfer station to Puget Sound Energy (PSE; shown as “Area 5” on Figure 2-1) in 2005. All three of these areas were removed from the RCRA permit definition of the “Facility” (see further discussion of the definition of the Boeing Auburn Facility below) before property transfer. Boeing also sold “Area 1,” the northern 41.3 acres of the Boeing Auburn Facility, in December 2005 to AMB Corporation (AMB; now Prologis). Area 1 remains a part of the permit definition of the Boeing Auburn Facility and, thus, the RCRA permit for corrective action was issued jointly to Boeing and AMB. The locations of the Safeway parcel, the PSE/Area 5 parcel, the YMCA parcel, the JA parcel, and the Prologis parcel are shown on Figure 2-1.

MTCA defines a “Facility” or “Site” as:

“any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, vessel, or aircraft; or any site or area where a hazardous substance, other than a consumer product in consumer use, has been deposited, stored, disposed of, or placed, or otherwise come to be located (WAC 173-340-200).”

However, to clarify discussions in this document, the following terms and definitions are used to describe and distinguish between the property currently owned by Boeing, property that is currently part of the RCRA Facility permit, and property that is part of the “Site” due to contaminant migration:

- The **Boeing Auburn Plant** or **Boeing Property** includes property currently owned and operated by Boeing that is used for manufacturing and other auxiliary purposes. Specifically, this does not include properties formerly owned by Boeing including Prologis (formerly AMB), Safeway distribution center, YMCA, JA, and PSE properties.
- The **Boeing Auburn Facility** includes properties owned by parties to the Agreed Order. This includes property currently owned by Boeing and property owned by Prologis (Figure 2-1). Specifically, this does not include Safeway distribution center, YMCA, JA, and PSE properties.

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- The **Boeing Auburn Site (Site)** includes the parcels on the Boeing Auburn Facility and all contiguous properties affected by releases of hazardous substances that are confirmed or suspected to have originated at the Boeing Auburn Facility. The approximate extent of the current Site is shown on Figure 2-2. The Site boundary may change over time as additional data is gathered. Because contamination is moving in the site groundwater, Boeing does not own most of the property over current groundwater contamination.

2.2 Site Geology and Hydrogeology

Site geology and hydrogeology are described in detail in the RI Report (LAI 2017b) and are summarized below.

2.2.1 Geology

The Site lies within the Auburn valley formed during the Vashon glaciation approximately 14,000 years ago. Approximately 5,700 years ago, an eruption of Mount Rainier sent a large lahar (the Osceola Mudflow) down the White River and into the Auburn valley. The Osceola Mudflow deposited a low-porosity layer of sands and gravels suspended in a silt and clay matrix. This layer forms the aquitard below the present day upper alluvial aquifer of the Auburn valley.

The upper aquifer is comprised of alluvial deposits from the White and Green Rivers (Qaw and Qag formations). The deposits consist of highly variable, but predominantly coarse, alluvial sands and gravels with occasional interbedded silt layers consistent with a relatively high energy, dynamic, alluvial depositional environment. Finer-grained deposits and peat, indicative of a lower energy depositional environment, are more prevalent in the northwest portion of the Site (toward the valley wall) where smaller water courses and overbank flooding probably contributed more significantly to the deposition. As a result, the northwest portion of the Site generally has higher concentrations of natural organic carbon in the aquifer.

For the purposes of Site investigation and discussion, groundwater within the upper aquifer is divided into three hydraulically interconnected zones, based on depth below ground surface (bgs):

- A shallow zone, from the water table to 35 feet (ft) bgs:
 - The shallowest wells within this zone are screened at or near the water table; water table data is considered a subset of the shallow zone data
- An intermediate zone, from 35 to 75 ft bgs
- A deep zone, from 75 ft bgs to the contact with the Osceola Mudflow (typically between 80 and 100 ft bgs):
 - The depth of the Osceola Mudflow varies based on location.

2.2.2 Groundwater Flow and Velocities

Contributions to groundwater in the upper aquifer primarily consist of infiltration from the White River with a smaller contribution from precipitation. Groundwater flow in the Auburn valley is

generally northward, parallel to the valley walls (PGG 1999), and discharges to the Green River. There is a northwesterly component to groundwater flow at the Site as a result of features on the west side of the valley that capture shallow groundwater. The features that capture shallow groundwater near the Site include stormwater and surface water features along the western portion of the Auburn valley, including wetland features, Mill Creek, and stormwater features like the Chicago Avenue ditch and the Auburn 400 stormwater retention basins. The Chicago Avenue ditch and Auburn 400 stormwater retention basins collect stormwater from local roads and parking lots but also intercept shallow groundwater.

Groundwater is generally shallow with depth to groundwater near the Boeing Auburn Facility in the range of 8 to 22 ft bgs. In the northwest portion of the Site, groundwater depths are shallower and generally range from 0 to 10 ft bgs. Differences in the depth of the water table across the Site are primarily due to changes in ground surface elevation. Seasonally, groundwater elevations fluctuate about 5 ft on average. Somewhat larger fluctuations are generally observed at the Boeing Auburn Facility, and smaller fluctuations are generally observed in the northwest portion of the Site where groundwater is shallower.

Groundwater velocities vary across the Site because of the heterogeneity of the alluvial deposits but are relatively high, in the range of 150 ft per year (ft/yr) to 700 ft/yr. Seepage velocities across the Site are estimated to average approximately 300 ft/yr. These relatively high seepage velocities reflect the relatively high hydraulic conductivity of the alluvium and the high rates of recharge to the aquifer system because of infiltration from the White River and underflow.

The coarse alluvial sands and gravels at the Site and fast-moving groundwater have a significant impact on contaminant fate and transport. Generally, the aquifer dynamics, the age of the original release[s], and natural attenuation resulted in chlorinated volatile organic compounds (CVOC) groundwater plumes—primarily trichloroethene (TCE) and its breakdown products cis-1,2-dichloroethene (cDCE) and vinyl chloride (VC)—that are at relatively low concentrations.

2.2.3 Stormwater and Surface Water Flow

A surface water divide is present in City of Algona (Algona) at approximately 4th Avenue North. Surface water north of 4th Avenue North flows to Mill Creek; surface water south of 4th Avenue North, including Government Canal, flows south to the White River. Water courses that drain to Mill Creek are discussed below. Surface water features and flow directions are presented on Figure 2-3.

Stormwater in the Chicago Avenue ditch flows north and enters the City of Auburn's piped stormwater system at Boundary Boulevard. Water from the O Street wetland is also channelized and flows into the City of Auburn's piped stormwater system at Boundary Boulevard. The piped water flows west to the Auburn 400 south stormwater retention basin, and then flows to the Auburn 400 north stormwater retention basin. The Auburn 400 north stormwater retention basin also captures stormwater from 15th Street Southwest and the southern portion of The Outlet Collection complex.

Water from The Outlet Collection stormwater basins flows into a ditch on the northwest side of the stormwater basins. This ditch combines with flow from the Auburn 400 north stormwater retention basin and flows through a culvert under State Route 167 to a wetland on the west side of the highway. The wetland carries water north, where it joins Mill Creek at the east end of Peasley Canyon Road. Mill Creek then flows northward through various wetland complexes before it joins the Green River several miles downstream.

2.3 Previous Studies

Boeing completed various investigation and cleanup activities (corrective actions) at the Boeing Auburn Facility prior to the 2002 Agreed Order. Beginning in 2003, Boeing began work on a comprehensive RI to investigate SWMUs and AOCs at the Boeing Auburn Facility. A series of investigations and interim cleanup actions were conducted at the Boeing Auburn Facility from 2003 through 2009. Corrective action activities for Area 1 were completed quickly to allow for the property sale in 2005. Area 1 activities included an environmental review (EPI 2005), an expedited RI (LAI 2004b), soil remediation activities (LAI 2005a, b, 2006, 2007), and indoor air evaluations (GeoEngineers 2005; LAI 2004b, e, f, g). An interim remedial action (IRA) for TCE releases to groundwater was also completed at the former Building 17-05 building (LAI 2004a, c, 2005c, d, 2008).

In 2009, Boeing discovered that groundwater contamination had moved off Boeing property. A series of iterative investigations to evaluate the extent of two groundwater plumes coming from the Boeing Auburn Facility ensued, culminating in 2015 with completion of the groundwater monitoring well network and delineation of the groundwater impacts both on and off Boeing property. Site-wide surface water and air quality investigations were also conducted between 2009 and 2015 to evaluate additional exposure pathways. Data collection for the RI was completed in 2015 and the Ecology-approved RI report was finalized in 2017 (Ecology 2017a; LAI 2017b).

In 2015, an enhanced natural attenuation pilot test was performed upgradient of an area where low concentrations (less than 5 micrograms per liter [$\mu\text{g}/\text{L}$]) of CVOCs in groundwater extend beneath the northeast corner of the Algona residential neighborhood (LAI 2017a, 2018). The purpose of the pilot test was to evaluate the potential to enhance natural attenuation of low concentrations of CVOCs through injection of electron donor substrates into groundwater and evaluate substrate injection design in preparation for the FS.

FS investigations took place between 2016 and 2019 to refine the extent of remaining contamination and collect the needed information to evaluate cleanup remedies at the Site. FS investigation results were presented in the draft FS report submitted in 2019 (LAI 2019a) and draft SFS report submitted in 2020 (LAI 2020).

2.3.1 Areas of Concern and Previous Remedial Actions

The focus of the RI was to identify and characterize potential releases from SWMUs and AOCs and to determine the nature and extent of these impacts above Site-specific screening levels. Data collected as part of the RI were sufficient to determine the nature and extent of contamination and recommend remedial actions for SWMUs and AOCs to be carried forward to the FS for evaluation. No individual SWMUs were carried forward to the FS for evaluation. Five AOCs were carried forward to the FS; specifically, three Boeing Auburn Facility AOCs (Figure 2-4) and two Site-wide AOCs. However, as part of the FS investigations, one of the Boeing Auburn Facility AOCs (AOC A-13: Building 17-06 petroleum hydrocarbon contamination) was determined to have contamination addressed through use of institutional controls to allow for Method C soil cleanup levels. The following four AOCs were identified as requiring cleanup:

- AOC A-01: Underground Storage Tanks (USTs) TAU-01 and TAU-02 northwest of Building 17-06
- AOC A-09: Building 17-07 Acid Scrubber Drain Line
- AOC A-14: Site-wide TCE and VC Soil and Groundwater Contamination
- AOC A-15: Site-wide TCE and VC contamination in surface water and stormwater collection, treatment, and conveyance features.

The Boeing Auburn Facility AOCs (AOC A-01 and AOC A-09) consist of localized areas with heavy metals, cyanide, and petroleum hydrocarbons in soil and groundwater within the Boeing property; the impacts do not extend off of Boeing property.

Boeing investigated two groundwater plumes caused by CVOCs coming from the Boeing Auburn Facility and extending off Boeing property to the north and northwest (AOC A-14). AOC A-14 was designated to address Site-wide CVOC contamination in groundwater, specifically TCE and VC; it also includes TCE soil contamination in the groundwater plume release areas at the Boeing Auburn Facility (VC is not detected in soil at the Boeing Auburn Facility). The approximate extent of the two groundwater plumes and the current monitoring well network are shown on Figure 2-2. Several stormwater drainage and collection features northwest of the Boeing Auburn Facility intercept the impacted groundwater and were designated AOC A-15. The stormwater and surface water features at the Site are shown on Figure 2-3.

2.3.1.1 AOC A-01

AOC A-01 (A-01) consists of two former 10,000-gallon fuel USTs that were installed near the northwest corner of Building 17-06 in 1967. UST TAU-01 was a diesel tank used to power emergency generators and UST TAU-02 was a gasoline tank. Historical releases from the A-01 USTs resulted in soil and groundwater petroleum hydrocarbon contamination downgradient (north and northwest) of the USTs. Both tanks and a fuel island were removed in 1990 and approximately 500 cubic yards (yd³) of contaminated soil was excavated from the former tank areas (Geomatrix 2003). In 2004, an additional 10 yd³ of soil was removed (LAI 2004d). Subsequent investigations indicated that some soil

contamination was left in place and low-level groundwater contamination is still present in a limited area at A-01. The extent of AOC A-01 and all exploration locations are presented on Figure 2-5. A cross-section of AOC A-01, including depths of the 1990 and 2004 excavations, is presented on Figure 2-6.

2.3.1.2 AOC A-09

AOC A-09 (A-09) is contamination from a leak in the acid scrubber drain line located on the south side of Building 17-07 near column C11 (outside of the building). The leak was discovered in 1996 during closure and removal of two waste holding tanks. During excavation activities to remove the waste holding tanks outside the building between scrubbers No. 2 and No. 3, seepage from the acid scrubber drain pipe was noted at about 5 ft bgs near a structural pier along the south wall of Building 17-07. A partial remedial excavation was completed in 1996 to the extent practicable; however, contamination was left in place under the footprint of the building and adjacent scrubber No. 3 pad foundation because of structural concerns. The remaining small area of soil contamination has caused a limited area of groundwater contamination. The 1996 excavation area and exploration locations associated with AOC A-09 are shown on Figure 2-7. A cross-section of AOC A-09, including the depth of the 1996 excavation, is presented on Figure 2-8.

2.3.1.3 AOC A-14

The groundwater plumes associated with AOC A-14 are identified as the “Area 1 Plume” (originating from the northern portion of the Boeing Auburn Facility, former Area 1) and the “Western Plume” (originating from the west side of the Boeing Auburn Facility in or near Building 17-07). These two plumes extend about 1 mile northwest of the Boeing Auburn Facility. The plumes are primarily comprised of TCE and its breakdown products cDCE and VC. Some localized areas of TCE soil contamination are also present at the identified TCE release areas at the Boeing Auburn Facility. Additionally, there are small detections of TCE and VC from non-Facility sources in groundwater upgradient and cross-gradient of the plume release areas that commingle with AOC A-14.²

The age/history of the original releases and the aquifer dynamics at the Site have resulted in these large, mature, low concentration CVOC groundwater plumes. The current horizontal extent of the Area 1 Plume and Western Plume is affected by aquifer heterogeneity and contaminant transport processes such as sorption, dispersion, and contaminant degradation from TCE to degradation products cDCE and VC. Plume maps for the shallow, intermediate, and deep groundwater zones for TCE and VC are presented on Figures 2-9 through 2-14.

² Upgradient/cross-gradient sources of contamination not associated with the Boeing Auburn Facility have been documented based on data or information collected as part of RI activities (LAI 2017b). These upgradient, off-Facility sources are commingling with and contributing to the extent of the Area 1 groundwater plume. Ecology acknowledged that some contribution to the Area 1 plume could be coming from other sources (Ecology 2016 and 2021a).

The bulk of the remaining contaminant mass is found downgradient of the release areas. Most recent (2021) sampling data show release area TCE concentrations of approximately 2 µg/L. The highest CVOC concentrations are currently observed in mid-plume areas. Most recent (2021) sampling data show highest CVOC concentrations are less than 10 µg/L (TCE of 9.5 µg/L and VC of 6.6 µg/L) downgradient of the Boeing Auburn Facility. The ongoing presence of low-level CVOC concentrations in these areas is attributed to back diffusion processes from fine-grained soils interbedded with the coarse sands and gravels of the heterogeneous Site aquifer where adsorption of higher CVOC concentrations occurred during the early stages of plume expansion.

CVOC degradation is a significant factor in attenuation of the plumes at the Site. The main degradation process occurring at the Site is microbially-mediated reductive dechlorination that occurs in anaerobic portions of the aquifer. Anaerobic aquifer conditions are present at the majority of the Site and reductive dechlorination is a well-documented process at the Site (LAI 2019b). Conditions at the Site support the biological, chemical, and physical natural attenuation processes that are occurring throughout the Site. Degradation significantly attenuates CVOC concentrations in the biologically active and organic carbon-rich zones near wetland areas at and near Mill Creek, resulting in concentrations degrading to non-detect in groundwater before entering surface water (as demonstrated by the absence of CVOCs in samples collected from the shallowest pore water samples in the hyporheic zone beneath/adjacent to Mill Creek and in samples collected in Mill Creek).

An IRA and a pilot test were previously performed at two separate Site locations using enhanced *in situ* bioremediation (EISB) in groundwater at the Site. The locations of the IRA and the pilot test are shown on Figure 2-15. A full description of the IRA is provided in the IRA reports (LAI 2004a, c, 2005c, d, 2008) and in the RI report (LAI 2017b). A full description of the pilot test is provided in the pilot test reports (LAI 2017a, 2018). Brief summaries of the IRA and the pilot test are provided below.

Former Building 17-05 Interim Remedial Action

An IRA was completed in former Building 17-05 in 2004 and 2005 for treatment of releases from SWMU S-12b (a former TCE degreaser) and AOC A-08 (a former tank line adjacent to the degreaser), that were determined to be contributing to the Area 1 groundwater plume. A full description of the IRA is provided in the IRA reports (LAI 2004a, c, 2005c, d, 2008) and in the RI report (LAI 2017b). The location of the IRA is shown on Figure 2-15.

The IRA consisted of injecting electron donor amendments (sodium lactate and emulsified vegetable oil) into the shallow and intermediate groundwater zones in the SWMU S-12b and AOC A-08 areas to enhance reductive dechlorination of TCE in groundwater. Three donor injections were completed in July 2004, January 2005, and October 2005. The donor injections created sulfate-reducing to methanogenic conditions that have persisted more than 15 years post-injection at some locations. The combination of injected electron donor and the highly reduced aquifer conditions resulted in highly effective reductive dechlorination of TCE, cDCE, and VC to the non-toxic end-product ethene. Even though the IRA was successful in decreasing total CVOCs in the injection area, concentrations of

VC in some wells in the injection area remain above the SWQS for groundwater. The SWMU S-12b and AOC A-08 release areas have been incorporated into AOC A-14 for Site-wide TCE and VC groundwater remediation.

Algona Enhanced Natural Attenuation Pilot Test

The enhanced natural attenuation pilot test was performed upgradient of an area where low concentrations (less than 5 µg/L) of CVOCs in groundwater extend beneath the northeast corner of the Algona residential neighborhood. A full description of the pilot test is provided in the pilot test reports (LAI 2017a, 2018). The location of the pilot test is shown on Figure 2-15.

The purpose of the pilot test was to evaluate the potential to enhance natural attenuation of low concentrations of CVOCs through injection of electron donor substrates into groundwater. The pilot test also evaluated substrate injection design. The enhanced natural attenuation pilot test injection was conducted in August and September 2015. Approximately 80,000 gallons of electron donor solution was injected into the shallow groundwater zone in five injection/extraction wells. Monitoring of the results following this pilot test injection is ongoing. The donor injection enhanced the moderate total organic carbon (TOC) and methanogenic redox conditions that were already present in the area. Total CVOC concentrations initially increased following the injection because of enhanced desorption, but then decreased substantially below concentrations prior to injection (baseline) because of mass destruction. Reduction of total CVOC concentrations related to the pilot test injection occurred up to 385 ft downgradient of the injection wells. TCE and cDCE concentrations are mostly below laboratory reporting limits at wells in the treatment area of the Algona pilot test injection. VC concentration trends increased following the injection because of the breakdown of parent compounds; however, concentrations are currently decreasing. The decreasing VC trends are expected to continue as cDCE concentrations are depleted. The pilot test was successful in reducing total CVOC concentrations in a limited area around the injection area; however, concentrations of VC in the injection area and downgradient continue to be up to two orders of magnitude above SWQS in groundwater. Degradation rates were approximately doubled by the Pilot Test injection.

2.3.1.4 AOC A-15

The most recent sampling data indicate that CVOCs from groundwater are entering into three stormwater features at the Site (Chicago Avenue Ditch, Auburn 400 north retention basin, and Auburn 400 south retention basin) causing detections of TCE (September 2021 concentrations less than 2 µg/L) and VC (September 2021 concentrations less than 0.2 µg/L). The concentrations detected in stormwater are much lower than the concentrations detected in groundwater. Due to concentrations in stormwater being a result of groundwater contamination, conditions at AOC A-15 are directly connected and attributed to conditions in AOC A-14; therefore, AOC A-15 is addressed by the cleanup action for AOC A-14.

2.4 Current Conditions and Potential Exposure Pathways

Results and data from the RI and FS investigations indicate that under current Site conditions there are negligible exposure risks to human and ecological receptors. Exposure pathways are characterized as complete (exposure is occurring under current conditions), potentially complete (exposure could occur in the future if conditions change), or incomplete (exposure is unlikely to occur in the future). For exposure to occur, a receptor must come in contact with contaminated media and the contaminants must enter the body through absorption (i.e., touching soil), ingestion (i.e., drinking water), or inhalation (i.e., breathing air). No complete exposure pathways have been identified either on or off the Boeing Auburn Facility. Potentially complete and incomplete exposure pathways differ on and off the Boeing Auburn Facility. The Boeing Auburn conceptual site model is presented on Figure 2-16.

2.4.1 On-Facility Conditions and Exposure Pathways

Identified release areas are located in the central to north portion of the Boeing Auburn Facility and are related to the release of contaminants to soil and groundwater at or near the ground surface. The current extent of contamination at AOC A-01 consists of petroleum hydrocarbons and associated volatile organic compounds in soil and groundwater and is limited in depth and lateral extent. Contaminated soil is located northwest of the former USTs in an area measuring approximately 15 ft by 30 ft. The depth of impacted soil ranges from about 12 to 20 ft bgs. The current extent of contamination at AOC-09 consists of heavy metals and cyanide in soil and groundwater and is limited in depth and lateral extent. Soil contamination is limited to an area approximately 40 ft by 25 ft. The depth of impacted soils is approximately 4 to 12 ft bgs inside the building, and from about 6 to 12 ft bgs outside the building. Soil concentrations are below industrial direct contact (MTCA Method C) exposure concentrations.

Site-wide groundwater contamination associated with AOC A-14 originated at the Boeing Auburn Facility, but the majority of the contamination is now present off-Facility and is described in greater detail in Section 2.4.2. Transport of contaminants from the release areas to groundwater occurred through dissolution. There are limited areas of soil TCE contamination at the former release areas at the Boeing Auburn Facility above CULs protective of groundwater. TCE soil concentrations are below MTCA Method C direct contact exposure concentrations. CVOC vapor intrusion is not a pathway of concern under current site conditions. Soil contamination outside the Boeing Auburn Facility release areas has not been identified.

Contaminated soil and groundwater at the Boeing Auburn Facility are covered by pavement or buildings, and potential exposure could only occur during subsurface construction or exploration activities. Groundwater at the Boeing Auburn Facility is not used for drinking water, and this exposure pathway is considered incomplete because all water is supplied by a municipal drinking water system. Air testing has confirmed that contaminants in soil gas are not migrating into the buildings or ambient air at measurable concentrations. There may be potential for exposure to occur during future

temporary construction, investigation, or remediation work, however, exposure will be minimized and mitigated through institutional controls established by an environmental covenant enacted under this CAP and proper health and safety measures and planning. At the majority of the Boeing Auburn Facility (except AOC A-01) soil concentrations are below Method C direct contact values. There are no current complete exposure pathways for receptors at the Boeing Auburn Facility (i.e., potential receptors are not currently being exposed to contaminants at the Boeing Auburn Facility).

Boeing evaluated the need for a terrestrial ecological evaluation (TEE) in accordance with MTCA (WAC 173-340-7490). TEEs address potential impacts on terrestrial plant and animal receptors from contaminated soil. The Site qualifies for an exemption from TEE because contaminated soil is located only on the Boeing Auburn Facility and all areas with contaminated soil are paved or covered by buildings, and the property is fenced as described in the exclusion under WAC 173-340-7491(1)(b). Boeing will place institutional controls where contamination is present on its property limiting future land use in compliance with the TEE exemption.

2.4.2 Off-Facility Conditions and Exposure Pathways

Site-wide groundwater contamination associated with AOC A-14 originated at the Boeing Auburn Facility, but the majority of the contamination is now present downgradient of the Boeing Auburn Facility. The current extent of AOC A-14 consists of groundwater contamination in the upper aquifer (from the water table to the Osceola Mudflow aquitard) from the Boeing Auburn Facility to approximately 1 mile downgradient (Figure 2-2). The current extent of AOC A-15 consists of areas where stormwater features at the Site, including the Chicago Avenue ditch and the Auburn 400 stormwater retention basins (Auburn 400 north and south basins), intercept contaminated groundwater.

Outside of the Boeing Auburn Facility, potential exposure pathways include exposure to contaminated groundwater (incidental ingestion), stormwater (ingestion or absorption), or air (inhalation). Site groundwater is not used for drinking water, and this exposure pathway is considered incomplete because drinking water is not being extracted from the impacted portion of the aquifer. Water in the area is supplied by municipal drinking water systems that draw groundwater from the lower aquifer and cross-gradient of the Boeing Auburn Facility. In addition, the groundwater plumes are outside of the footprint of the water supply well capture zones. Contact with contaminated groundwater would only occur during subsurface construction or investigation activities.

TCE and VC concentrations in stormwater features (stormwater ditches and basins) are below risk-based human health screening levels where workers or children³ may have incidental contact with the water (LAI 2013; Washington State Department of Health [WDOH] 2013; WDOH 2014). However, TCE

³ Site-specific risk assessments conducted by Washington State Department of Health (WDOH) on behalf of Ecology indicate that the populations with the most potential for exposure are workers who clean the ditches and children who may play in the ditches. The general adult population is not expected to have significant exposure to ditch water.

and VC concentrations in stormwater features are detected above surface water quality standards (SWQS) for freshwater beneficial uses (drinking water and eating organisms) per WAC 173-201A (Site surface water CULs). Based on results of air testing in commercial and residential buildings outside the Boeing Auburn Facility, vapor intrusion of TCE and VC is not occurring. Site-specific evaluation of current conditions has determined that human exposure to contaminants at levels expected to cause adverse health effects is not currently occurring at the Site.

CVOC concentrations in groundwater and where groundwater enters stormwater features are below health-based screening criteria for human health and the environment, so there are no unacceptable risks to potential human or ecological receptors at the Site. Groundwater and surface water sampling data has demonstrated that CVOCs in groundwater degrade to non-detect concentrations before reaching Mill Creek as evidenced by the absence of TCE in groundwater from shallow pore water samples in the hyporheic zone adjacent to/beneath Mill Creek and in Mill Creek surface water.

3.0 CLEANUP STANDARDS

Cleanup standards consist of three distinct components: 1) regulatory requirements that apply to the Site (applicable state and federal laws; WAC 173-340-700); 2) CULs for hazardous substances present at the Site; and 3) the location where the CULs must be met (point of compliance [POC]) for each media of concern for the Site.

3.1 Regulatory Considerations

In accordance with MTCA, all cleanup actions must comply with applicable state and federal laws (WAC 173-340-710[1]). MTCA defines applicable state and federal laws to include applicable or relevant and appropriate requirements (ARARs). The MTCA cleanup regulation (WAC 173-340) outlines requirements for the development of cleanup standards and procedures for development and implementation of a cleanup. MTCA and the other ARARs that may be applicable to the development of cleanup standards or implementation of cleanup actions are presented in Table 3-1. Chemical-, location-, and action-specific ARARs for the remedies for each AOC are presented in Section 5.0.

3.2 Contaminants of Concern

The following types of hazardous substance comprise the contaminants of concern (COCs) for the Boeing Auburn Site for each AOC requiring cleanup as part of this CAP:

- AOC A-01:⁴
 - Soil: Total Petroleum Hydrocarbons (TPH), Ethylbenzene, Total Xylenes
 - Groundwater: TPH (gasoline-range organics and diesel-range organics), Ethylbenzene, Total Xylenes
- AOC A-09:⁵
 - Soil:⁶ Cadmium, Copper
 - Groundwater: Cadmium, Copper, Cyanide
- AOC A-14:
 - Soil: TCE
 - Groundwater: TCE and VC
- AOC A-15:
 - Stormwater/Surface water: TCE and VC.

⁴ Benzene and Toluene in soil and groundwater were included as a COC in the remedial investigation but do not require remedial actions in the CAP because concentrations of these constituents do not exceed CULs (CUL).

⁵ Nickel in soil and groundwater was included as a COC in the remedial investigation, but does not require remedial actions in the CAP because concentrations of this constituent do not exceed CULs.

⁶ Cyanide in soil does not require remedial action because concentrations in soil in the vadose zone do not exceed CULs.

3.3 Cleanup Levels

CULs were developed for COCs identified in soil, groundwater, and surface water. Preliminary cleanup levels were presented in the draft FS and SFS (LAI 2019a, 2020). The regulatory basis for the CULs for each media of concern at each AOC are described for the Site below and provided in Table 3-2 (soil), Table 3-3 (groundwater), and Table 3-4 (surface water). Section 5.0 provides further description for each AOC.

- **Soil:** Contaminated soils at the Site are only present at the Boeing Auburn Facility portion of the Site. The Boeing Auburn Facility meets the MTCA definition of an industrial property (WAC 173-340-200). Method C industrial soil cleanup levels under WAC 173-340-745(5) are used as the CULs for the Boeing Auburn Facility. Standard Method C industrial soil CULs are based on direct contact exposure of industrial workers or protection of groundwater.⁷
- **Groundwater:** Groundwater CULs are based on standard Method B CULs. Groundwater CULs for AOC A-01 and AOC A-09 are based on human health protection of groundwater as drinking water (as groundwater contamination at these AOCs does not extend off the Boeing Auburn Facility). Groundwater CULs at AOC A-14 are based on groundwater protection of surface water beneficial uses.
- **Surface Water:** Method B surface water CULs are based on applicable state and federal laws using water quality criteria published in the water quality standards for surface waters of the State of Washington in WAC 173-201A.

3.4 Points of Compliance

The POCs under MTCA are the point or points at a site where the CULs must be attained to achieve cleanup standards.

- **Soil:** The POC for soil COCs with CULs based on protection of groundwater is throughout the Site under WAC 173-340-745(7); WAC 173-340-740(6)(b). The POC for soil COCs with CULs based on protection of human health via direct contact is from ground surface to 15 ft bgs in accordance with WAC 173-340-745(7); WAC 173-340(6)(d).
- **Groundwater:** A conditional point of compliance (CPOC) will be established, not to exceed to the Boeing Auburn Facility boundary for AOC A-14 per WAC 173-340-720(8)(c). A standard POC throughout groundwater will be established for AOC A-01 and AOC A-09 per WAC 173-340-720(8)(b).
- **Surface water:** The surface water POC is where hazardous substances are released into surface water bodies in the Chicago Avenue ditch and the Auburn 400 stormwater retention basins per 173-340-730(6).

⁷ Protection of groundwater may be determined based on an empirical demonstration under WAC 173-340-747(3)(f).

4.0 CLEANUP ACTION ALTERNATIVES AND ANALYSIS

Cleanup action alternatives were developed during the FS and SFS to support cleanup of contaminated soil and groundwater. For the purposes of the FS, the cleanup action alternatives for each AOC were designated with distinct alphanumeric identifiers to avoid confusion between numbered alternatives for each AOC. For example, remedial alternatives for AOC A-01 have designations beginning with “A” (e.g., Alternative A1) and remedial alternatives for AOC A-14 have designations beginning with “D” (e.g., Alternative D1)). These identifiers are used again below for discussion purposes. Evaluation of the alternatives was presented in the FS and SFS; the findings are summarized below for each of the AOCs requiring cleanup.

4.1 AOC A-01 Alternatives

AOC A-01 consists of petroleum hydrocarbon contamination in soil and groundwater associated with releases from the former USTs northeast of Building 17-06. Ecology has developed model remedies for sites with petroleum impacts to soil and groundwater (Ecology 2017b,c). A Model remedy is a set of technologies, procedures, and monitoring protocols identified by Ecology for use in routine types of cleanup projects that have common features and lower risk to human health and the environment. Model remedies are developed in accordance with MTCA 173-340-390 and where a model remedy is chosen as the cleanup action, an analysis of the feasibility of alternative remedies is not required (Revised Code of Washington [RCW] 70.105D.030[k][i][C][iii]). A model remedy was chosen for the treatment of residual petroleum hydrocarbon contamination in groundwater in AOC A-01 and consists of excavation of the petroleum hydrocarbon soil contamination and emplacement of oxygen-releasing compound (ORC), or other similar or equivalent oxidant, in the saturated/seasonally saturated portion of the excavation backfill (and supplemental MNA as necessary). Model remedy number 11⁸ (Ecology 2017c) is expected to be completed for AOC A-01 by meeting Method C soil CULs and meeting Method A groundwater CULs.

4.2 AOC A-09 Alternatives

AOC A-09 consists of cadmium, copper, and cyanide contaminations in soil and groundwater associated with the former acid scrubber drain line leak at Building 17-07. The area is currently contained under pavement and by the building slab; and groundwater impacts are localized in a relatively small area, are not migrating downgradient, and concentrations of COCs in groundwater are generally declining. The cleanup action alternatives evaluated as part of the FS for AOC A-09 included:

- Alternative B1: monitored containment and MNA
- Alternative B2: *in situ* groundwater treatment

⁸ The FS/SFS proposed a model remedy based on Method A soil cleanup levels. However, with Method C soil CULs determined to be appropriate, Model Remedy Number 11 (Ecology 2017c) is proposed in this CAP.

-
- Alternative B3: future excavation (including monitored containment until the excavation occurs).

Alternative B3 was selected as the preferred remedy for AOC A-09. Alternative B3 includes future excavation of soil contamination when the area is accessible without disrupting operations, likely when Building 17-07 is demolished, and monitored containment until that time. The results of the disproportionate cost analysis (DCA) in the FS identified Alternative B1 as the alternative that is permanent to the maximum extent practicable; however, Boeing selected Alternative B3, a more permanent remedy, as the preferred alternative. Additional details about the selection of Alternative B3 and comparisons of the alternatives are presented in the FS (LAI 2019a).

4.3 AOC A-14 Alternatives

AOC A-14 consists of TCE and VC in Site-wide groundwater and TCE in soil at the Boeing Auburn Facility. Because at this time there is no known remedial technology or combination of technologies that result in cleanup of the entire plume to the groundwater CULs selected by Ecology, MNA is a component of each alternative described for AOC A-14.

The cleanup action alternatives evaluated as part of the FS and SFS for AOC A-14 included:

- Alternative D1: MNA
- Alternative D2: Soil vapor extraction and EISB at release areas and MNA
- Alternative D3: Soil vapor extraction and dynamic groundwater recirculation at release areas and MNA
- Alternative D4: Permeable reactive barriers at the Boeing Auburn Facility boundary and MNA
- Alternative D5: Soil vapor extraction and EISB at release areas, EISB at focus areas, and MNA
- Alternative D6: EISB at Algona Focus Area and MNA
- Alternative D7: EISB at Algona and 17-07 property boundary focus areas and MNA
- Alternative D8: EISB at Algona, 17-07 property boundary, The Outlet Collection focus areas, and MNA.

Alternative D1 was selected as the preferred remedial action alternative for the Site in the draft FS and SFS. Additional details about the selection of Alternative D1 and comparisons of the alternatives are presented in the FS (LAI 2019a) and SFS (LAI 2020). However, based on additional discussions with Ecology, Boeing agreed to implement Alternative D6 as the final remedy for AOC A-14 (Ecology 2021a, d; Boeing 2021b) to address potential public concerns and to reduce CVOC concentrations in groundwater contamination beneath the residential Algona neighborhood.

4.4 AOC A-15 Alternatives

AOC A-15 was designated to address CVOC contamination in stormwater features and surface water, specifically TCE and VC from groundwater flow into these features, and potential impacts to the

surface water in Mill Creek. AOC A-15 is defined as the stormwater management, conveyance, and treatment features within the Cities of Auburn and Algona (i.e., Chicago Avenue ditch, Auburn 400 north and south stormwater retention basins), where contaminated groundwater enters or is present in these features and surface water (i.e., Mill Creek), to where contaminated groundwater may potentially flow. There are no alternatives evaluated specifically to address AOC A-15 because remediation of Site-wide groundwater (AOC A-14) would also result in meeting the surface water CULs. Additionally, as Site-wide groundwater meets drinking water standards, it is anticipated that surface water features would meet surface water CULs because the plume is expected to recede away from the surface water (and stormwater) features with time and there is significant attenuation of contaminants that occurs in the hyporheic zone within and immediately below the sediments (as demonstrated by the absence of TCE in the hyporheic zone and within Mill Creek surface water). Therefore, the preferred/selected alternative for AOC A-14 (i.e., Alternative D6; see Section 4.3) will also provide cleanup for AOC A-15.

5.0 DESCRIPTION OF SELECTED REMEDY

The following sections describe the proposed cleanup action for each AOC requiring cleanup at the Site. Descriptions of technical and engineering design elements will be provided in an engineering design report (EDR) and a compliance monitoring plan in accordance with the schedule described in Section 8.0. A summary of the selected remedy for each AOC is presented in Table 5-1. ARARs applicable to the cleanup for each AOC are summarized in Table 5-2. Cleanup levels for the Site are provided in Tables 3-2 to 3-4 and are summarized for each AOC in the applicable sections below.

Compliance monitoring will be conducted as summarized below in adherence to an Ecology-approved compliance monitoring plan. The compliance monitoring plan will include the required elements of protection monitoring, performance monitoring, and confirmational monitoring as defined per WAC 173-340-410.

A compliance monitoring plan will be prepared including or in conjunction with:

- A Site-Specific Health and Safety Plan (HASP) to address monitoring for protection of worker safety and health. The HASP will address protection monitoring, including potential physical and chemical hazards associated with Site cleanup activities consistent with the requirements of WAC 173-340-810,
- A sampling and analysis plan, and
- A quality assurance project plan.

The anticipated elements of the EDR and compliance monitoring for each AOC are also described below.

5.1 AOC A-01 Remedy

AOC A-01 consists of petroleum hydrocarbon contamination in soil and groundwater associated with releases from the former USTs northeast of Building 17-06. The current conditions and extent of contamination for AOC A-01 are described in Section 2.4.1. There are no complete exposure pathways other than potential construction worker exposure to COCs in soil and groundwater. COCs are prevented from direct contact by pavement. Additional details regarding exposure pathways are also included in Section 2.4.1.

5.1.1 Description of Cleanup Action

The selected cleanup action for AOC A-01 includes Model Remedy Number 11 (Method C soil direct contact CULs are met and groundwater CULs are assumed to be met after cleanup) for sites with petroleum impacts to groundwater (Ecology 2017c). Cleanup action includes excavation of petroleum contamination above CULs to address impacted soil, and emplacement of ORC, or other similar or equivalent oxidant, in the saturated/seasonally saturated portion of the excavation backfill to stimulate destruction and enhance aerobic microbial degradation processes to address impacted

groundwater. If necessary, supplemental MNA, will be performed for treatment of residual petroleum hydrocarbon contamination in groundwater. The conceptual remedial excavation area is presented on Figure 5-1. Specifics of the excavation activities and emplacement of ORC/oxidant in the backfill for *in situ* treatment will be described in the EDR. If Boeing can prove to Ecology’s satisfaction that not all soil contamination for the POC can be removed, Ecology may approve use of Model Remedy Number 12 (Ecology 2017c), which includes an environmental covenant to address soil concentrations that exceed Method C direct contact CULs, instead of Model Remedy Number 11.

5.1.2 Cleanup Standards and Point of Compliance

Cleanup standards for the Site are described in Section 3.0. Based on the nature and extent of contamination at AOC A-01 and potential current and future complete exposure pathways, CULs for the media of concern consist of the following:

Analyte	Soil CUL (mg/kg)	Regulatory Basis for CUL (WAC 173-340-745)	Groundwater CUL (µg/L)	Regulatory Basis for CUL (WAC 173-340-720)
Ethylbenzene	5.9/350,000	Soil protective of groundwater/Method C non-cancer direct contact	700	Federal/State MCL
Total Xylenes	14/350,000	Soil protective of groundwater/Method C non-cancer direct contact	1,600	Method B Non-Cancer
TPH	1,500	Generic Method C TPH CUL	500/800/1,000 ^(a)	Method A

Notes:

^(a) 500 µg/L is for DRO, 800 µg/L is for GRO where benzene is present, and 1,000 µg/L is for GRO where no detectable benzene is present in groundwater.

µg/L = micrograms per liter

CUL = cleanup level

MCL = maximum contaminant level

mg/kg = milligram per kilogram

An environmental covenant will be instated to ensure industrial land use, as required for Method C soil CULs. The soil POC will be throughout the Site and extending from the ground surface to 15 ft bgs once groundwater meets CULs. The groundwater POC will be throughout the Site for constituents related to AOC A-01.

5.1.3 Restoration Timeframe

The estimated restoration time frame for this alternative is approximately 2 years from when excavation occurs to demonstrate that groundwater CULs are met.

5.1.4 Compliance Monitoring

Compliance monitoring will be conducted for soil and groundwater during and following excavation activities to confirm cleanup has been completed.

Performance Monitoring

Soil field monitoring will occur as excavation activities are carried out to ensure that contaminated soil is removed to the extent practicable. Groundwater performance monitoring will include ongoing groundwater sampling until CULs are met near AOC A-01, as described in the EDR.

Confirmational Monitoring

Confirmational monitoring will include final excavation soil sampling. Final soil samples will be collected from the bottom and sidewalls of the excavation to confirm Method C CULs have been met. Once groundwater CULs are met, soil CULs will be required to meet the Method C direct contact CUL, since soil concentrations will be empirically demonstrated to be protective of groundwater.

A monitoring well or wells installed near AOC A-01 will be used to demonstrate compliance with groundwater CULs. Groundwater confirmational monitoring will likely include 4 quarters of TPH monitoring at a representative monitoring well or wells near AOC A-01 after CULs are met in groundwater. The specific location(s) used for confirmational monitoring will be identified in the Ecology-approved compliance monitoring plan.

5.2 AOC A-09 Remedy

AOC A-09 is defined as contamination resulting from a leak from the acid scrubber drain line located on the south side of Building 17-07 near column C11 (outside of the building). The current conditions and extent of contamination for AOC A-09 are described in Section 2.4.1. Contamination was left in place under the footprint of the building and adjacent scrubber No. 3 pad foundation due to structural concerns. COCs from AOC A-09 are metals (cadmium and copper) in soil and groundwater and cyanide in groundwater.

The soil contamination that is currently under structures at AOC A-09 is assumed to be the source of ongoing low-level concentrations of contaminants in groundwater. Soil concentrations do not exceed Method C direct contact values. There are no complete exposure pathways other than potential construction worker exposure to COCs in groundwater. The area is covered by asphalt pavement or concrete structure for Building 17-07. Additional details regarding exposure pathways are also included in Section 2.4.1.

5.2.1 Description of Cleanup Action

The selected cleanup action for AOC A-09 includes future excavation of soil contamination and monitored containment until that time.

The excavation (or more feasible remedial action) portion of the remedy is a requirement of the final remedy but will not occur until (1) Boeing determines implementation of the remedy will not impact facility operations and (2) Ecology determines excavation is appropriate at that time and will result in either (a) a reduction in post-remedy monitoring or (b) a finding from Ecology that no further

remedial action will be necessary after the excavation or (c) significant reduction in subsurface soil contamination and therefore a reduced threat to human health and the environment. Boeing will assess its current and projected operations (“operational assessment”) in the AOC A-09 area and will provide Ecology with statements describing the results of the operational assessment and implementability of soil excavation in appropriate reports as described in the compliance monitoring plan. However, Ecology may require Boeing to conduct immediate excavation by stating in writing the agency’s decision that such action is necessary because the containment cap is no longer functioning to protect human health or the environment. Ecology’s decision that immediate excavation is necessary may be subject to Dispute Resolution.

The cleanup action includes institutional controls to maintain the asphalt/concrete cap and continued monitoring of the groundwater contamination (monitored containment) until future excavation is completed. An environmental covenant will be instated to ensure industrial land use, as required for Method C soil CULs. Specifics of the ongoing monitoring for AOC A-09 will be described in the compliance monitoring plan.

When the area is available for excavation, Boeing and Ecology will determine the extent of the excavation based on current concentrations in soil and groundwater. The excavation details will be determined in a specific AOC A-09 EDR developed when the area becomes accessible for excavation activities (if excavation is necessary). The contaminated soil exceeding CULs will be removed and transported to an appropriate, licensed, offsite disposal facility. Compliance groundwater monitoring will then be conducted to demonstrate that the removal action has resulted in groundwater COC concentrations being reduced below CULs. The conceptual excavation area is presented on Figure 5-2.

5.2.2 Cleanup Standards and Point of Compliance

Cleanup standards for the Site are described in Section 3.0. Based on the nature and extent of contamination at AOC A-09 and potential current and future complete exposure pathways, CULs for the media of concern for this AOC consist of the following:

Analyte	Soil CUL (mg/kg)	Regulatory Basis for CUL (WAC 173-340-745)	Groundwater CUL (µg/L)	Regulatory Basis for CUL (WAC 173-340-720)
Cadmium	1.0/3,500	Soil protection of groundwater adjusted for natural background/Method C non-cancer direct contact.	5.0	Federal/State MCL
Copper	280/140,000	Soil protective of groundwater/Method C non-cancer direct contact.	640	Method B Non-Cancer
Cyanide	N/A		10	Method B Non-Cancer

An environmental covenant will be instated to ensure industrial land use, as required for Method C soil CULs. The soil POC will be throughout the Site and extending from the ground surface to 15 ft bgs

once groundwater meets CULs. The groundwater POC will be throughout the Site for constituents related to AOC A-09.

5.2.3 Restoration Time frame

The estimated restoration time frame for this alternative is approximately 2 years from when the future excavation occurs to demonstrate that groundwater CULs are met. Institutional controls would be implemented, and periodic monitoring of groundwater would be performed to confirm Site conditions are adequately protective until future excavation occurs.

5.2.4 Compliance Monitoring

Compliance monitoring will be conducted prior to and during excavation activities (if excavation is required) to confirm cleanup has been completed.

Performance Monitoring

Performance monitoring will include ongoing groundwater sampling for COCs until groundwater CULs are met or the cleanup action (if necessary) can occur. The specific locations and frequencies of performance monitoring will be provided in the compliance monitoring plan. If excavation activities occur, performance monitoring will include soil field monitoring to ensure that contaminated soil is removed to the extent practicable.

Confirmational Monitoring

Confirmational monitoring will include final excavation soil sampling, if excavation is required (i.e., if groundwater concentrations exceed CULs at the time when excavation can occur). Excavation soil samples would be collected from the bottom and sidewalls of the excavation to ensure soil CULs protective of groundwater are met.

A monitoring well or wells located near AOC A-09 will be used to demonstrate compliance with groundwater CULs. Groundwater confirmational monitoring will likely include 4 quarters of monitoring at a representative monitoring well or wells near AOC A-09 after CULs are met in groundwater. The specific location(s) used for confirmational monitoring will be identified in the Ecology-approved compliance monitoring plan.

5.3 AOC A-14 Remedy

AOC A-14 consists of TCE and VC in Site-wide groundwater and TCE in soil at the Boeing Auburn Facility. The area of soil contamination is located at limited areas on the Boeing Auburn Facility. AOC A-15 consists of stormwater management, conveyance, and treatment facilities within the Cities of Auburn and Algona (i.e., Chicago Avenue ditch, Auburn 400 north and south stormwater retention basins), where contaminated groundwater from AOC A-14 enters or is present in these features and surface water (i.e., Mill Creek) to where contaminated groundwater may potentially flow. Because

concentrations in stormwater are a result of groundwater contamination, conditions at AOC A-15 are directly connected and attributed to conditions in AOC A-14; therefore, AOC A-15 is addressed as part of the cleanup action for AOC A-14. The current conditions and extent of contamination for AOC A-14 and AOC A-15 are described in Section 2.3.1.

Soil TCE concentrations do not exceed Method C direct contact values and all soil at the Boeing Auburn Facility is covered by pavement or buildings. Contaminated groundwater and stormwater are not being used for drinking water at the Site. Potential construction worker exposure to COCs in groundwater, and potential child or worker incidental contact exposure to contaminated water in stormwater features would be with water that has TCE concentrations below risk-based human health screening levels.

No complete exposure pathways have been identified either on or off the Boeing Auburn Facility associated with AOC A-14 or AOC A-15. Under current Site conditions, there are minimal exposure risks to human and ecological receptors. Additional details regarding exposure pathways are also included in Section 2.4.2.

5.3.1 Description of Cleanup Action

The selected cleanup action for AOC A-14 includes EISB at the Algona Focus Area and MNA. Conditions at AOC A-15 are directly connected and attributed to conditions in AOC A-14. Therefore, cleanup of AOC A-14 will result in achieving cleanup standards in AOC A-15. MNA monitoring will continue to be conducted for both AOC A-14 and AOC A-15. Details of the cleanup action for AOC A-14 (and AOC A-15) will be described in the EDR and the compliance monitoring plan.

EISB in the Algona Focus Area will be described and detailed in the EDR. The EISB conceptual remedy design for the Algona neighborhood will extend the existing pilot test injection locations to the north to create an approximately 980-ft-long injection row. Injections will occur up to three times approximately every 4 years. Existing monitoring wells will be used downgradient of the injection area to monitor the injection remedy. The conceptual design currently includes a total of 29 single injection wells⁹ installed on 35-ft centers to target the shallow groundwater zone. However, as part of the EDR, horizontal injection wells will also be evaluated as a potential design option. A conceptual layout of the injection row and possible monitoring wells is shown on Figure 5-3.

Upon completion of the EISB remedial action, MNA would be implemented for cleanup of Site-wide groundwater remaining above CULs. A conceptual layout of monitoring locations for MNA is shown on Figure 5-4.

⁹ Five of the injection wells were already installed during the pilot test; an additional 24 wells would be installed for full-scale implementation.

5.3.2 Cleanup Standards and Point of Compliance

Cleanup standards for the media of concern for AOC A-14 and AOC A-15 are described in Section 3.0. Based on the nature and extent of contamination at AOC A-14 (and consequently AOC A-15) and potential current and future complete exposure pathways, CULs for the media of concern for these AOCs consist of the following:

Analyte	Soil CUL (mg/kg)	Regulatory Basis for CUL (WAC 173-340-745)	CUL for Drinking Water Beneficial Use (µg/L)	Regulatory Basis for CUL (WAC 173-340-720)	CUL for Surface Water Beneficial Use (µg/L)	Regulatory Basis for CUL (WAC 173-201A)
TCE	0.025/ 1,800	Soil protective of groundwater/ Method C non-cancer direct contact.	4.0	DWQS; Method B Non-Cancer	0.38	SWQS; Human Health Fresh Water
VC	N/A	N/A	0.29	DWQS; Method B Cancer, adjusted to cancer risk 10-5 based on MCL rule	0.02	SWQS; Human Health Fresh Water

Notes:

DWQS = drinking water quality standards

SWQS = surface water quality standards

An environmental covenant will be placed on the affected Boeing Auburn Facility parcels upgradient of the CPOC to restrict groundwater use for drinking water. The proposed location for the CPOC is shown on Figure 5-4. The POC for surface water will be throughout surface water at the Site and in the Chicago Avenue ditch and the Auburn 400 stormwater retention basins at the Site.

5.3.3 Restoration Time Frame

It is assumed that the EISB injections in the Algona Focus Area would maintain effectiveness for approximately 20 years (12 years of active treatment followed by up to 10 years of sustained treatment due to endogenous decay and enhanced contaminant desorption and back diffusion). Estimated restoration time frames for Site-wide cleanup were determined based on evaluation of individual well point attenuation rates and corresponding restoration time frames from TCE and VC concentrations over time (data from 2011 through 2018) as described in the SFS (LAI 2020). Site-wide restoration time frames for AOC A-14 are estimated to be approximately 30 years to meet DWQS and approximately 100 years to meet groundwater CUL. The restoration time frame for AOC A-15 surface water to meet CULs is anticipated to be at or before DWQS are met in groundwater downgradient of the Boeing Auburn Facility.

5.3.4 Compliance Monitoring

Performance monitoring will be conducted to evaluate operation of EISB at the Algona Focus Area and then MNA monitoring after the EISB at the Algona Focus Area is completed.

EISB Performance Monitoring

EISB monitoring will include quarterly groundwater monitoring for the year after each injection, transitioning to semiannual monitoring between injection events, annual monitoring for 2 years, and biannual monitoring to track sustained treatment after active treatment ends.

No additional monitoring wells are proposed to be added to the extensive existing well network for the downgradient plumes as part of EISB implementation. Quarterly groundwater monitoring is to be performed for the year after each injection to monitor the effectiveness of the injection activities (3 years of quarterly monitoring) and is to then transition to semiannual monitoring (9 years of semiannual monitoring). Annual monitoring will continue for two years and biannual monitoring for the 10 years of sustained treatment after active treatment ends (six monitoring events). The monitoring frequency may be adjusted based on conditions in the Algona Focus Area and with Ecology's concurrence. The specific locations used for EISB performance monitoring and timing of monitoring will be identified in the compliance monitoring plan and/or EDR.

MNA Performance Monitoring

An outline of the general plan for selecting groundwater monitoring locations and the rationale for changes over time as monitoring progresses are described below. A conceptual long-term monitoring plan (LAI 2021) was approved by Ecology (Ecology 2021b). The plan is provided in Appendix A. Details of the long-term MNA monitoring plan will be described in the compliance monitoring plan. Monitoring frequency will be adjusted in the future based on data and with Ecology's concurrence.

- Boeing Auburn Facility monitoring:
 - Select locations on the Boeing Auburn Facility will be monitored for CVOCs every 5 years.
 - Select locations along the Boeing Auburn Facility CPOC boundary will be monitored for CVOCs every 2 years.
- The following general rules apply for groundwater monitoring downgradient of the CPOC:
 - Annual groundwater monitoring will occur in the Algona Focus Area. This monitoring will be used to supplement the monitoring conducted as part of the EISB injection activities, which will be described in the EDR.
 - Select locations with concentrations greater than DWQS and selected boundary locations will be monitored annually.
 - Select locations with exceedances of SWQS will be monitored every 5 years.

-
- MNA parameters will be monitored at select wells every 5 years (except where more frequent monitoring will occur in the Algona area as part of the Algona Focus Area EISB).
 - Once a monitoring location reaches CULs the location will be sampled one additional time to ensure CULs are met and then that location will be removed from the monitoring program (unless it is identified as a boundary well).
 - Once concentrations decrease below DWQS at all wells monitored downgradient of the CPOC, monitoring and reporting will be reduced to every 5 years.

Confirmational Monitoring

Site-wide groundwater CULs will be considered met when groundwater monitoring wells achieve cleanup standards or as applicable using statistical analysis evaluation of groundwater data in compliance with MTCA (WAC 173-340-720[9][d]). The specific location(s) used for confirmational monitoring and appropriate statistical analysis for CUL compliance will be identified in the Ecology-approved compliance monitoring plan.

6.0 INSTITUTIONAL CONTROLS

In accordance with MTCA requirements (WAC 173-340-440), institutional controls will be implemented to limit or prohibit activities that may result in exposure to hazardous substances at the Site. Soil and groundwater institutional controls will only apply to the Boeing Auburn Facility (both parcels owned by Boeing and Prologis). Institutional controls will include an environmental covenant to restrict the land use to industrial in order to apply Method C soil CULs at affected parcels on the Boeing Auburn Facility and prohibit use of groundwater at the Boeing Auburn Facility as a potable water supply.

Institutional Controls include:

- Establishing environmental covenants to restrict Boeing-owned property to industrial land uses as that term is defined in the rules promulgated under Chapter 70A.305 RCW.
- Establishing environmental covenants to prohibit the use of groundwater or surface water on Boeing-owned property as a potable water supply.
- Restrictions on intrusive activities on Boeing-owned property in areas with impacted groundwater that would put workers in contact with contaminated groundwater.
- Requirements that proper safety measures and construction practices be implemented on Boeing-owned property as part of any project involving disturbance of contaminated soils and/or at depths that may encounter contaminated groundwater.

The environmental restrictive covenants required for affected parcels at the Site will be recorded on the deeds registered with King County, Washington. The covenants may be removed at Boeing's request, once Boeing shows that the conditions at the Site requiring use of institutional controls no longer exists, Ecology holds a public notice and comment opportunity, and Ecology agrees with Boeing's claim. A covenant is already in place on the Prologis portion of the Boeing Auburn Facility that prohibits the extraction, supply, or use of groundwater from the property and limits use of the property to industrial land use; Boeing will work with Prologis to add an appropriate Ecology-reviewed environmental restrictive covenant for the Prologis property. The parcels proposed to be included in the environmental covenant are presented on Figure 6-1.

7.0 PUBLIC PARTICIPATION

Members of the public were invited to review and comment on the dCAP during a formal public comment period. Comments received during this period were entered into the Site's formal record, considered by cleanup staff, and responded to in a responsiveness summary before the cleanup action plan was finalized.

Notice for this comment period included mailings to nearby businesses and residents, email notification distributed to an email listserv, posting in Ecology's Site Register, website updates, and radio and newspaper advertisements. Boeing is committed to public participation for the Boeing Auburn Site.

8.0 SCHEDULE FOR IMPLEMENTATION

Following finalization of the CAP and completion of an Enforcement Order with Ecology, the cleanup will be implemented in phases, including institutional controls and environmental covenants, engineering and design, and performance and compliance monitoring. The planned implementation sequence is summarized as follows:

- A compliance monitoring plan for long-term monitoring (at AOC A-09 and AOC A-14) will be prepared.
- Institutional controls will be implemented, and an Environmental Covenant will be filed, after the CAP and new Enforcement Order are finalized.
- An engineering and design report for AOC A-01 and AOC A-14 will be prepared along with compliance monitoring plans for AOC A-01.
- An engineering and design report for AOC A-09 will be prepared at a future time, if still necessary, when access at AOC A-09 is available for excavation activities.
- Restoration time frames for AOC A-14 will be re-evaluated periodically during implementation of MNA.

Boeing will follow the schedule below:

Activity	Approximate Anticipated Schedule
Submit Agency Review Compliance Monitoring Plan (for long-term monitoring at AOC A-09 and AOC A-14) to Ecology	4 months after the effective date of the Enforcement Order
Submit Final Compliance Monitoring Plan (for long-term monitoring) to Ecology	3 months after Ecology review comments for Agency Review Compliance Monitoring Plan, document will be considered “final” after Ecology approval
Submit Agency Review Environmental Covenants to Ecology for Boeing Auburn Facility	4 months after the effective date of the Enforcement Order
Environmental Covenants for Boeing Auburn Facility Finalized and Filed with King County	12 months following Ecology approval of Environmental Covenants
Submit Agency Review Engineering Design Report for AOC A-01 and AOC A-14 to Ecology	6 months after the effective date of the Enforcement Order
Submit Final Engineering Design Report (AOC A-01 and A-14) to Ecology	3 months after Ecology review comments for Agency Review Engineering Design Report, document will be considered “final” after Ecology approval
Excavation at AOC A-01	The first Dry season (July - September) at least 6 months, after Ecology-approval of the final EDR
Submit Engineering Design Report to Ecology for AOC A-09 remedy	When building is removed/demolished or Boeing property operations allows access for excavation, See section 5.2.1

Activity	Approximate Anticipated Schedule
Perform Future Excavation at AOC A-09	The first dry season (July – September) at least 6 months after Ecology’s approval of the final EDR for AOC A-09
EISB Implementation and Performance Monitoring at Algona Focus Area	The first Dry season (July - September) at least 3 months after Ecology-approval of the final EDR. Occurs every 4 years for up to 3 injection events (Total of 12 years)
MNA for Site-wide Groundwater CVOC Contamination	Beginning after Ecology’s approval of the compliance monitoring plan

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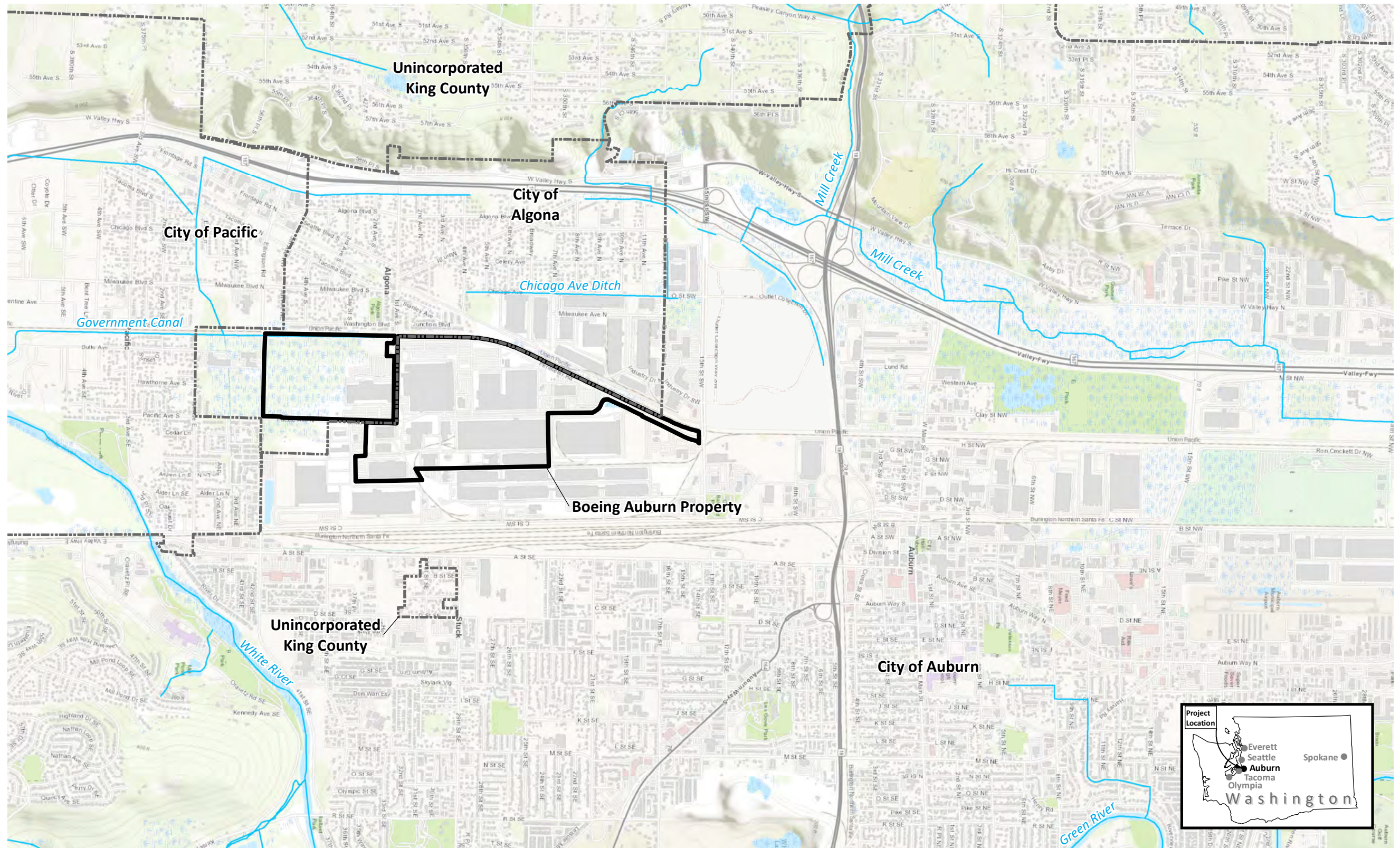
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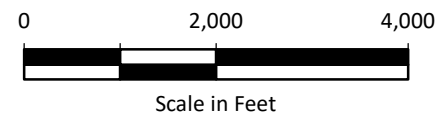


Legend

- Boeing Property
- City Limits
- Waterways
- Water Bodies
- Wetland Areas

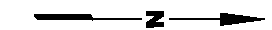
Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.



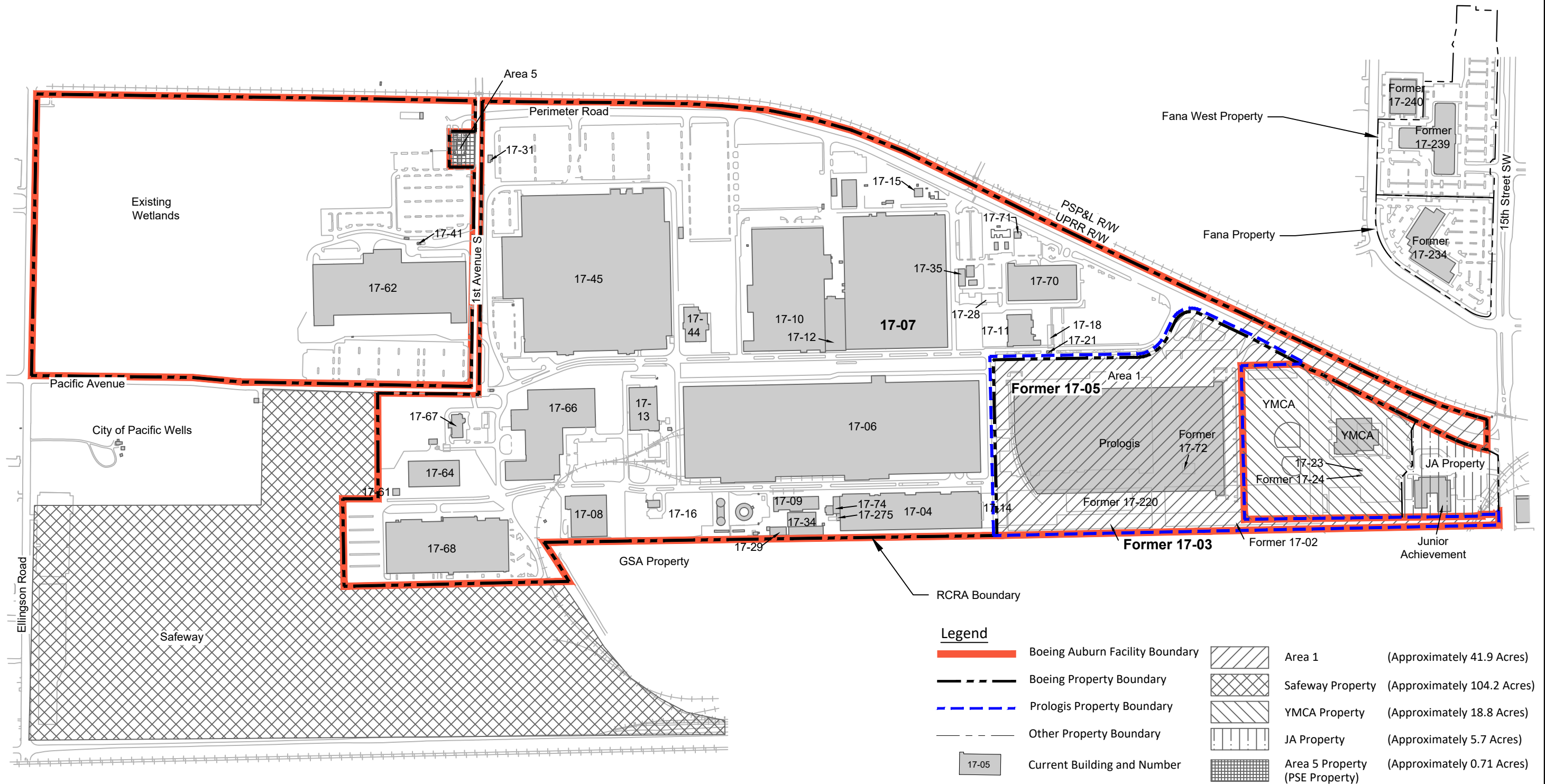
Data Source: Esri World Topo Map

Boeing Auburn
Cleanup Action Plan
Auburn, Washington



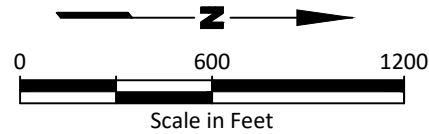
Vicinity Map

Figure
1-1



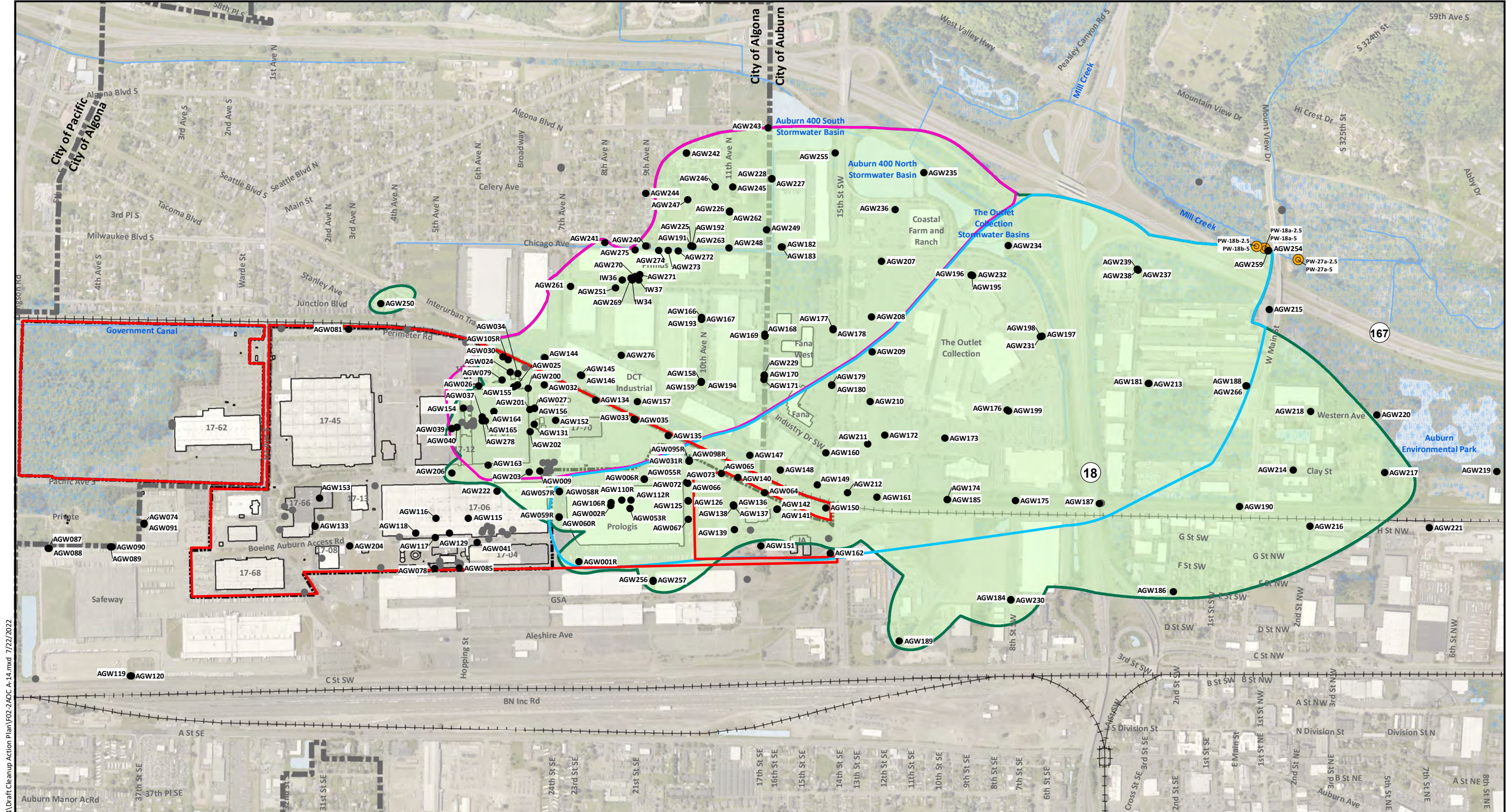
Notes

1. Former Building Numbers 17-234, 17-239 and 17-240 are currently owned by Fana.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.



Base map source: Geomatrix 2003

Legend	
	Boeing Auburn Facility Boundary
	Boeing Property Boundary
	Prologis Property Boundary
	Other Property Boundary
	Current Building and Number
	Area 1 (Approximately 41.9 Acres)
	Safeway Property (Approximately 104.2 Acres)
	YMCA Property (Approximately 18.8 Acres)
	JA Property (Approximately 5.7 Acres)
	Area 5 Property (PSE Property) (Approximately 0.71 Acres)



Notes

1. Monitoring well labels are included for wells in the current monitoring well network sampled for chlorinated volatile organic compounds (cVOCs).
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Monitoring Well
- Monitoring Well not Currently Sampled for cVOCs
- ⊙ Pore Water Sample Location
- City Limits
- ▬ Boeing Auburn Facility Boundary
- ▬ Boeing Property
- Area 1 Plume
- Western Plume
- TCE/VC Plume Extent - June 2021
- Wetland Areas
- Water Bodies
- Waterways

0 1,000 2,000

Scale in Feet

Data Source: King County GIS.

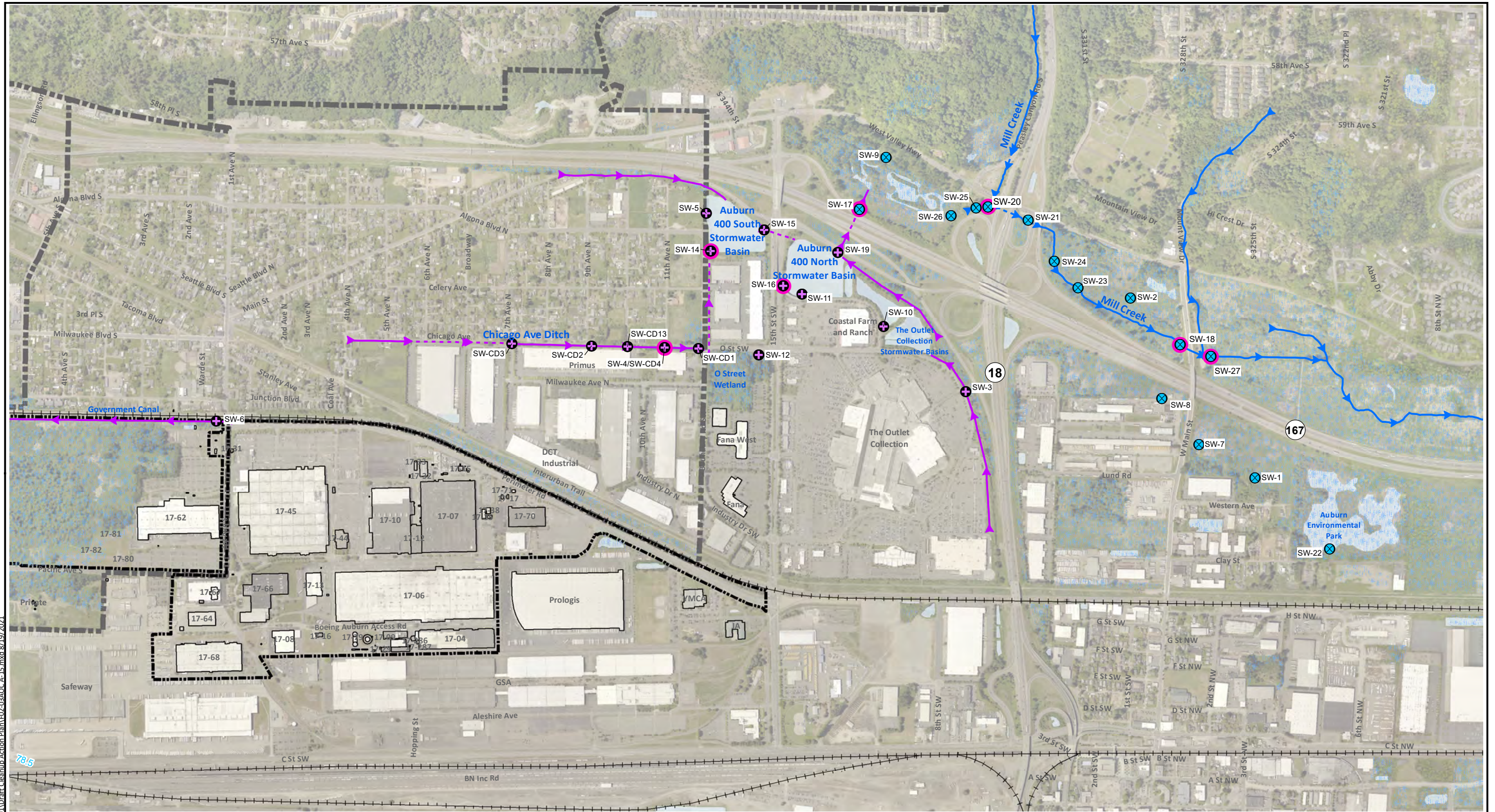
Boeing Auburn
Cleanup Action Plan
Auburn, Washington

**Current Extent of the Site and
Approximate Extents of Area 1
and Western Plumes**

Figure
2-2

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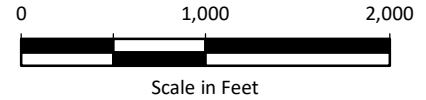
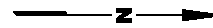
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Legend

- ⊕ Stormwater Sample Location
- ⊗ Surface Water Sample Location
- Ongoing Sample Location
- Open Surface Water Channel
- Open Stormwater Ditch
- Piped Surface Water Conveyance
- Piped Stormwater Conveyance
- Wetland Areas
- Boeing Property
- City Limits

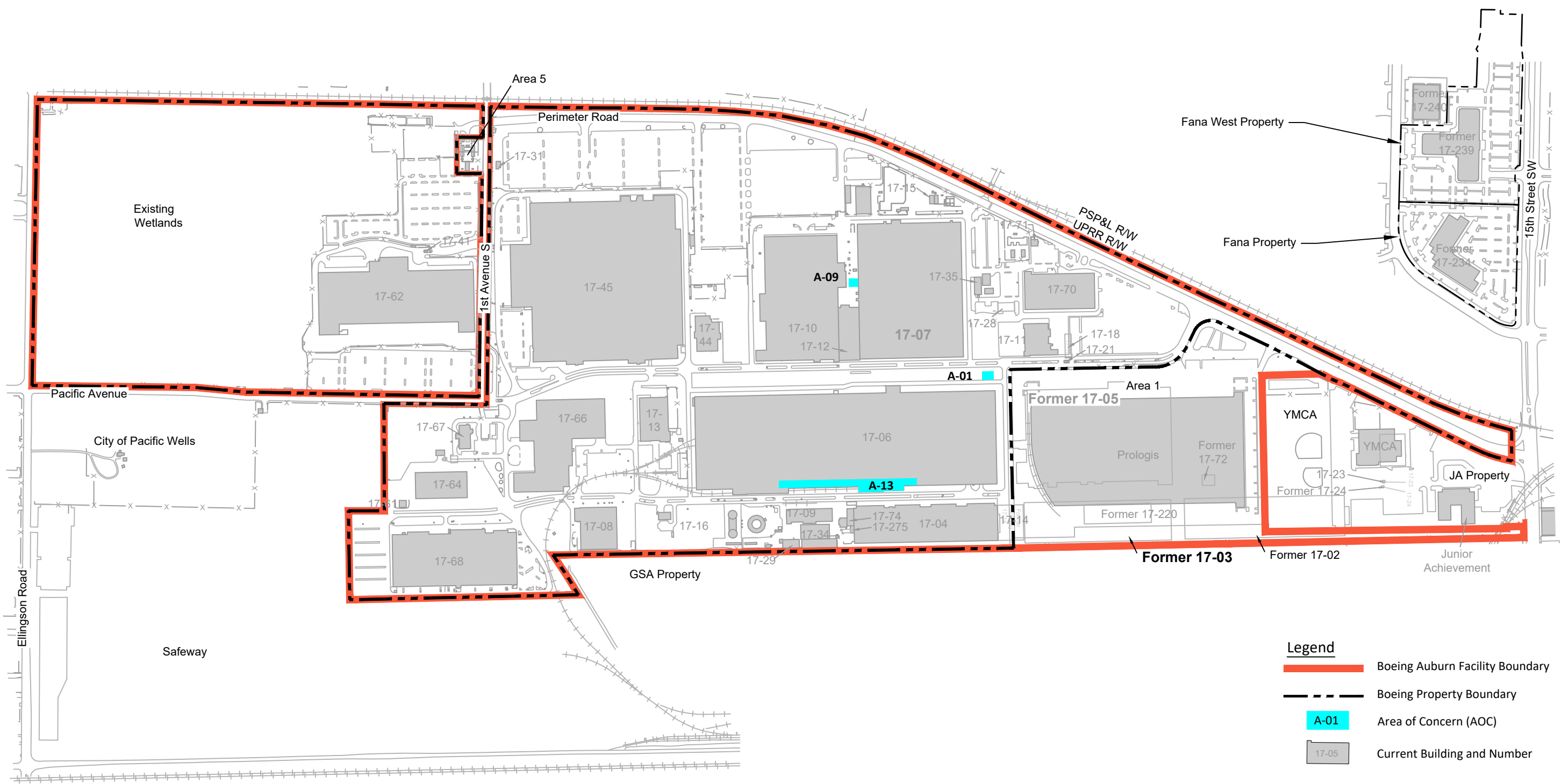
Notes

1. Surface water sampling locations are designated by SW.
2. The locations of stormwater/surface water features are approximate.
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.



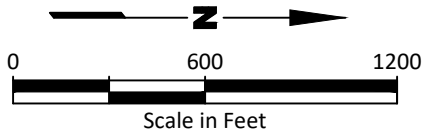
Data Source: King County GIS.

Boeing Auburn Cleanup Action Plan Auburn, Washington	Stormwater and Surface Water Features	Figure 2-3
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Notes

1. Former Building Numbers 17-234, 17-239 and 17-240 are currently owned by Fana.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.



Base map source: Geomatrix 2003

Boeing Auburn Cleanup Action Plan Auburn, Washington	Boeing Auburn Facility Areas of Concern Evaluated in the Feasibility Study	Figure 2-4
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17-07

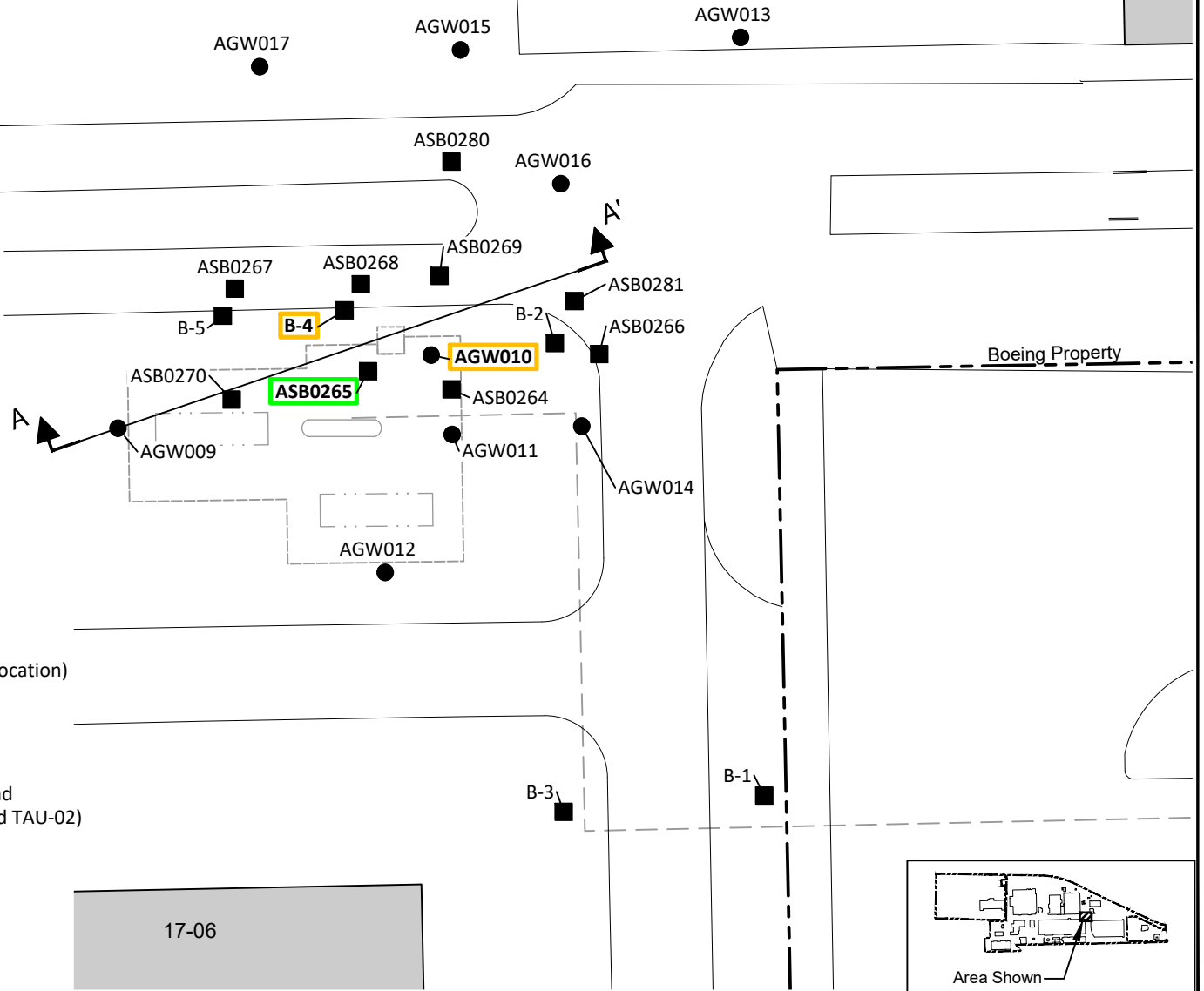
17-11

Notes

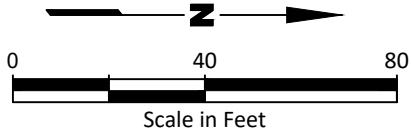
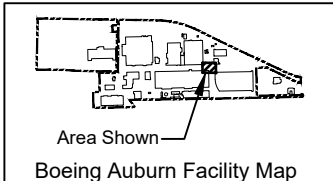
1. Soil samples collected 1990, 1991, and 2017.
2. Groundwater samples are most recent as of December 2018.
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- AGW012 ● Monitoring Well Location
- ASB0267 ■ Boring Location
- AGW010 Groundwater CUL Exceedance
- ASB0265 Soil CUL Exceedance
- - - Abandoned Piping (Approximate Location)
- 17-06 Current Building and Number
- Former Fuel Island Location
- Former 10,000-Gallon Underground Storage Tank Location (TAU-01 and TAU-02)
- 1990 Excavation Area
- 2004 Excavation Area
- A A' Cross Section Location



Boeing Property



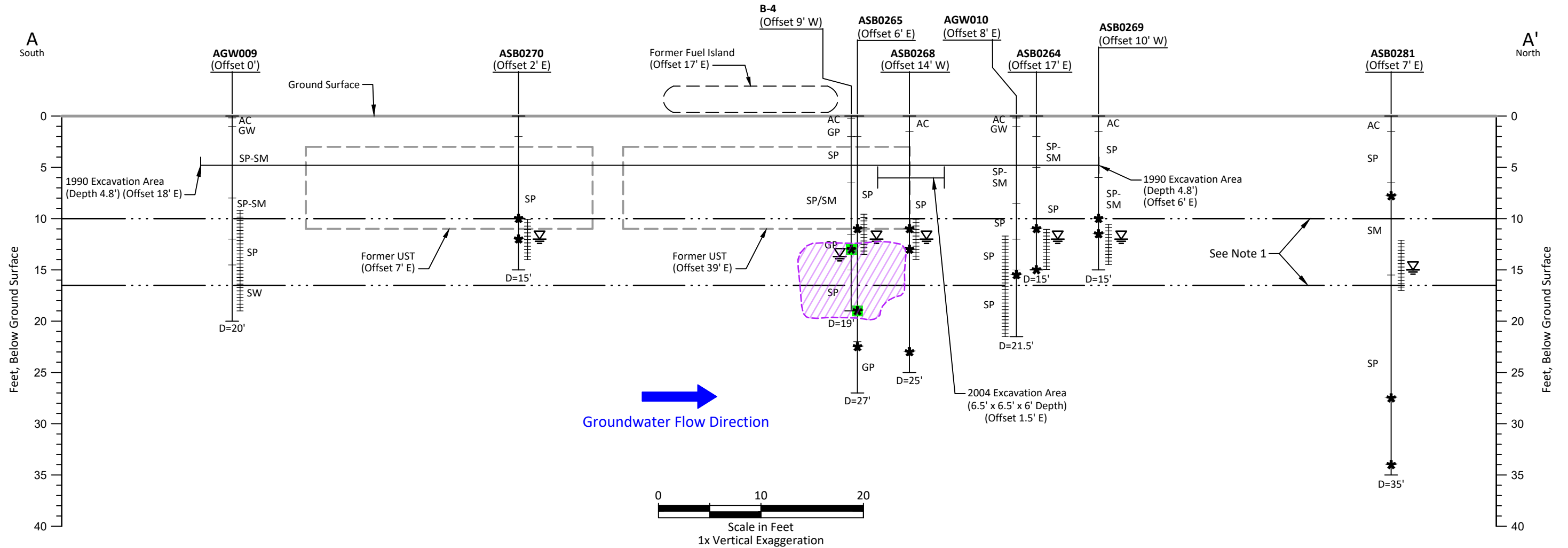
Base map source: Geomatrix 2003

Boeing Auburn
Cleanup Action Plan
Auburn, Washington

**AOC A-01: Building 17-06 Former
Underground Storage Tanks (TAU-01
and TAU-02) Exploration Summary**

Figure
2-5





Legend

- ASB0281 (offset: 7' E) — Exploration Designation
- Top of Exploration
- * = Soil sample (Analytes = Not detected above CULs)
- = Soil sample (Analytes = Detected above CULs)
- SM — Unified Soil Classification Symbol (USCS)
- ▽ — Water Level (At Time of Drilling)
- Screen Interval
- D=35' — Depth of Exploration (feet)
- ▨ = Analytes detected above CULs in soil

USCS Soil Legend

- AC = asphalt/concrete pavement
- GP = poorly graded gravel; gravel/sand mixture(s); little or no fines
- GW = well-graded gravel; gravel/sand mixture(s); little or no fines
- SM = silty sand; sand/silt mixture(s)
- SP = poorly graded sand; gravelly sand; little or no fines
- SW = well-graded sand; gravelly sand; little or no fines

Acronyms / Abbreviations

- AOC = area of concern
- DRO = diesel-range organics
- GRO = gasoline-range organics
- mg/kg = milligrams per kilogram
- CUL = cleanup level
- µg/L = micrograms per liter
- UST = underground storage tank

Notes

1. Lines indicated show the maximum and minimum water level elevation measured from AGW009 or AGW010 from December 2003 to December 2018.
2. B-4, AGW009, and AGW010 were completed August 1991, and borings in the "ASB" series were completed June or August 2017.
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

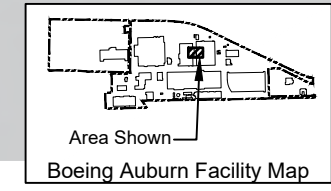
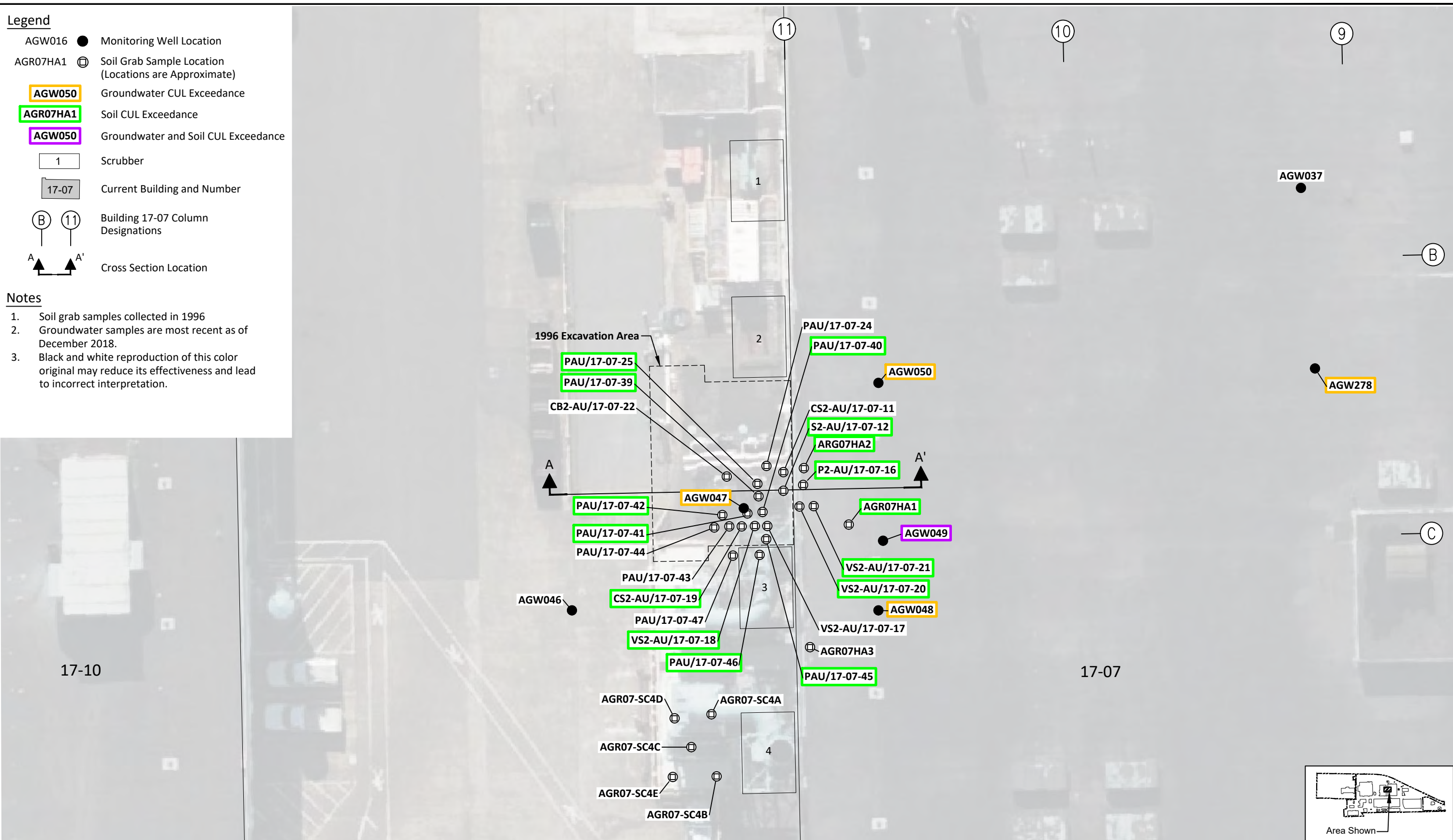
Legend

- AGW016 ● Monitoring Well Location
- AGR07HA1 ⊕ Soil Grab Sample Location (Locations are Approximate)
- AGW050 Groundwater CUL Exceedance
- AGR07HA1 Soil CUL Exceedance
- AGW050 Groundwater and Soil CUL Exceedance
- 1 Scrubber
- 17-07 Current Building and Number
- ⓑ ⓑⓑ Building 17-07 Column Designations
- A A' Cross Section Location

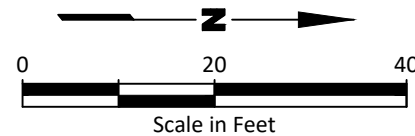
Notes

1. Soil grab samples collected in 1996
2. Groundwater samples are most recent as of December 2018.
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

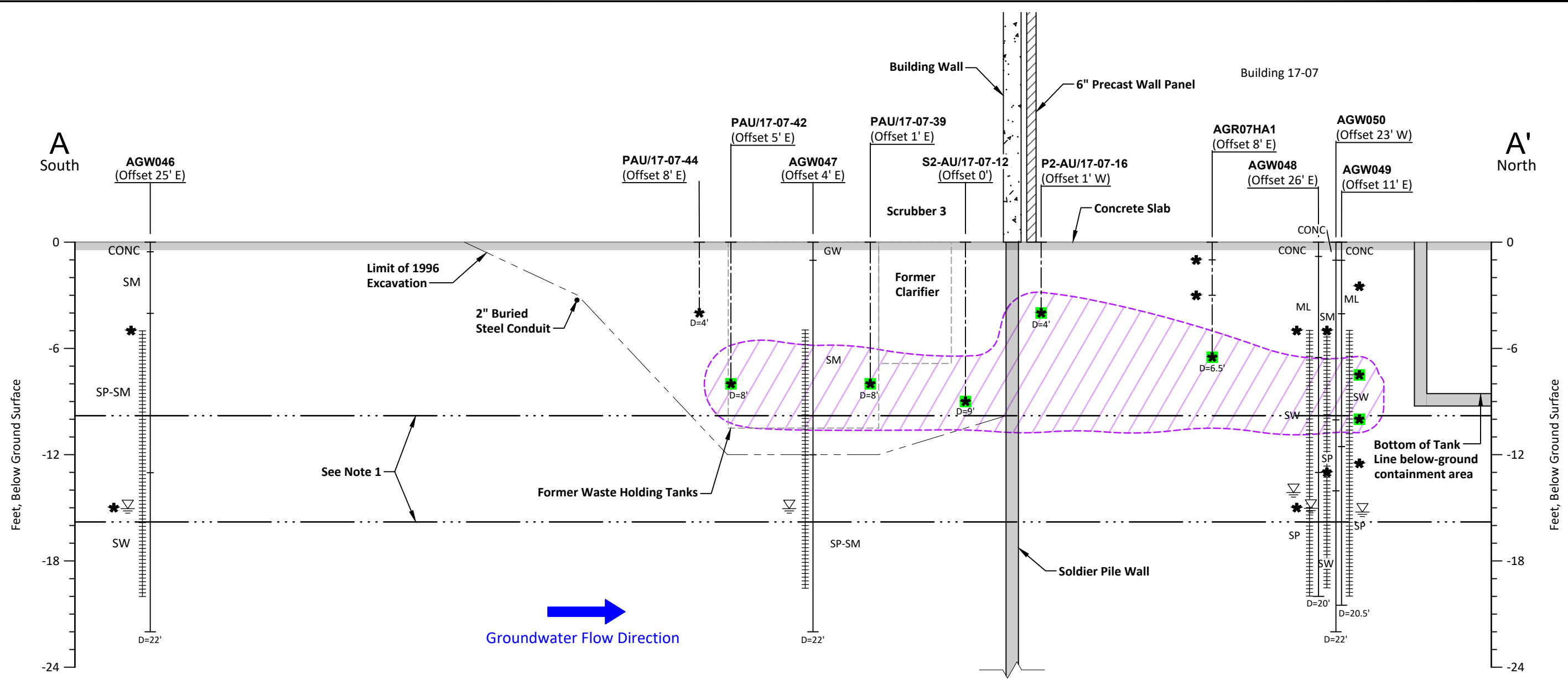
Landau Associates | G:\Projects\025\164\180\301\Draft_Cleanup Action Plan\F02-07 A-09 Summary.dwg | 1/6/2022 3:13 PM | EZICK



Sources: AGI Technologies, Figure 4, 1996; ©Bing, 2019



Landau Associates | G:\Projects\025\164\180\301\Draft Cleanup Action Plan\F02-08 A-09 CrossSection.dwg | 1/3/2022 5:12 PM | EZICK



Legend

- AGW046 — Exploration Designation (Offset: 25' E)
- Top of Exploration
- ★ = Soil sample (Analytes = Not detected above CULs)
- = Soil sample (Analytes = Detected above CULs)
- SM — Unified Soil Classification Symbol (USCS)
- ▽ — Water Level (At Time of Drilling)
- Screen Interval / Sampling Interval
- D=4' — Depth of Exploration (feet)
- D=22' — Depth of Exploration (feet)

 = Analytes detected above CULs in soil

USCS Soil Legend

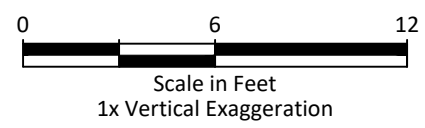
- Conc = Concrete
- GW = Well-graded gravel; gravel/sand mixture(s); little or no fines
- ML = Silt
- SM = Silty sand; sand/silt mixture(s)
- SP = Poorly graded sand; gravelly sand; little or no fines
- SW = Well-graded sand; gravelly sand; little or no fines

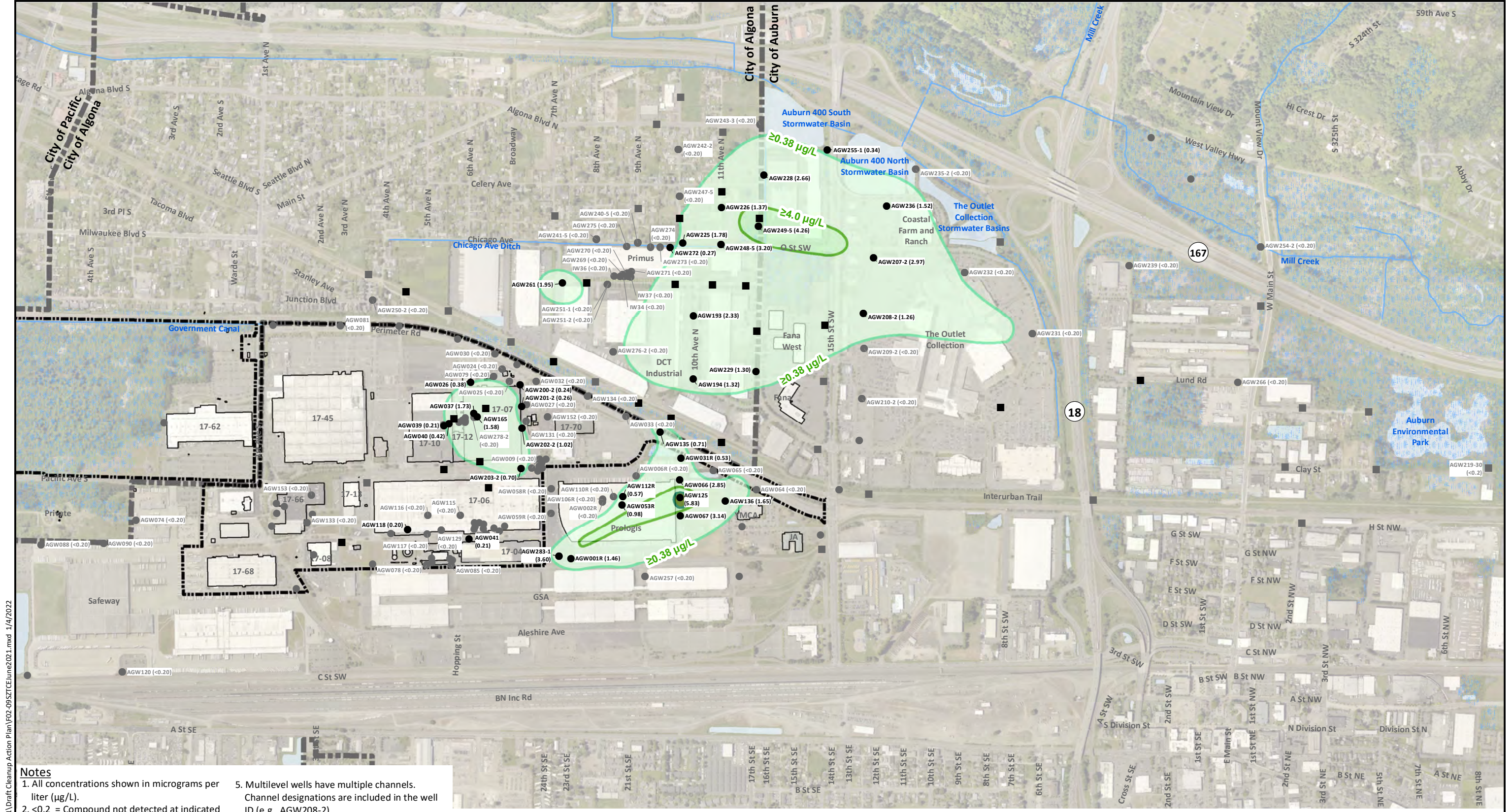
Acronyms / Abbreviations

- AOC = area of concern
- mg/kg = milligrams per kilogram
- CUL = cleanup level
- µg/L = micrograms per liter

Notes

1. Lines indicated show the maximum and minimum water level elevation measured from AGW047-AGW050 from August 2004 to December 2018.
2. All borings and wells shown on this figure were completed in July, August, and September 1996.
3. The limits of the 1996 excavation may not extend to 12 feet below ground surface at all locations. Soil samples shown were collected from soil remaining in place.
4. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.



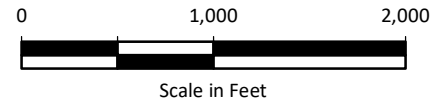


- Notes**
1. All concentrations shown in micrograms per liter (µg/L).
 2. <0.2 = Compound not detected at indicated reporting limit.
 3. Monitoring well results are the most recent.
 4. Black well and boring symbols indicate locations where the compound was detected. Gray well and boring symbols indicate locations where the compound was not detected.
 5. Multilevel wells have multiple channels. Channel designations are included in the well ID (e.g., AGW208-2).
 6. Wells with no results shown are no longer sampled.
 7. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Monitoring Well Location
- Historical Borehole Grab Sample Location
- Non-Detect or No Longer Sampled
- City Limits
- Boeing Property
- Wetland Areas
- Water Bodies
- Waterways

TCE Contour (≥5.0 µg/L)
 TCE Contour (≥4.0 µg/L)
 TCE Contour (≥0.38 µg/L)



Data Source: King County.

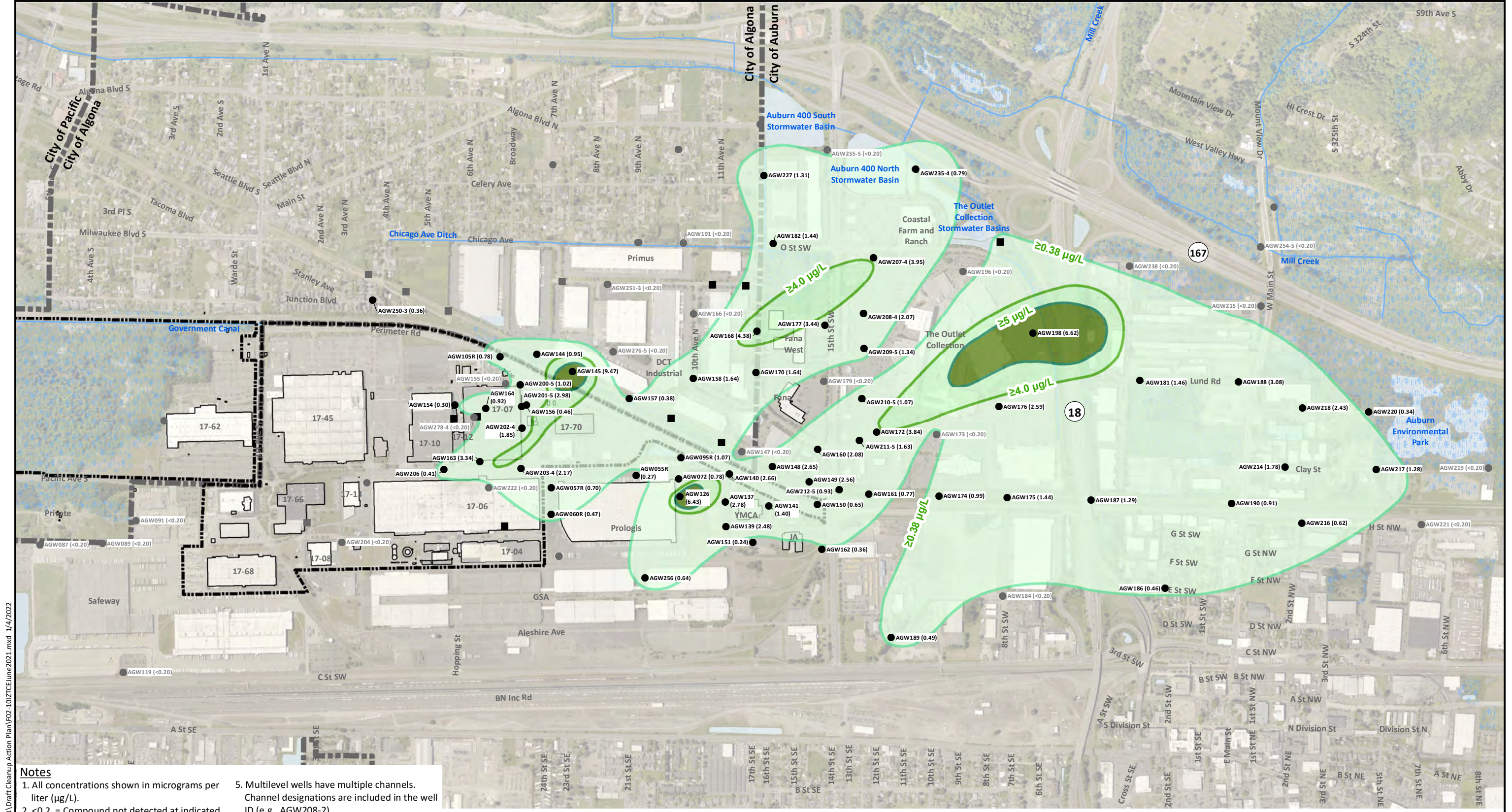
Boeing Auburn
Cleanup Action Plan
Auburn, Washington

**AOC A-14: Shallow Zone
Trichloroethene Concentrations
June 2021**

Figure
2-9

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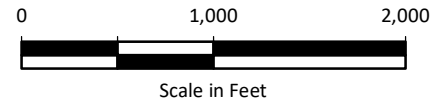




- Notes**
1. All concentrations shown in micrograms per liter (µg/L).
 2. <0.2 = Compound not detected at indicated reporting limit.
 3. Monitoring well results are the most recent.
 4. Black well and boring symbols indicate locations where the compound was detected. Gray well and boring symbols indicate locations where the compound was not detected.
 5. Multilevel wells have multiple channels. Channel designations are included in the well ID (e.g., AGW208-2).
 6. Wells with no results shown are no longer sampled.
 7. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Monitoring Well Location
- Historical Borehole Grab Sample Location
- Non-Detect or No Longer Sampled
- TCE Contour (≥5.0 µg/L)
- TCE Contour (≥4.0 µg/L)
- TCE Contour (≥0.38 µg/L)
- ▬ City Limits
- ▬ Boeing Property
- Wetland Areas
- Water Bodies
- Waterways



Data Source: King County GIS.

Boeing Auburn
Cleanup Action Plan
Auburn, Washington

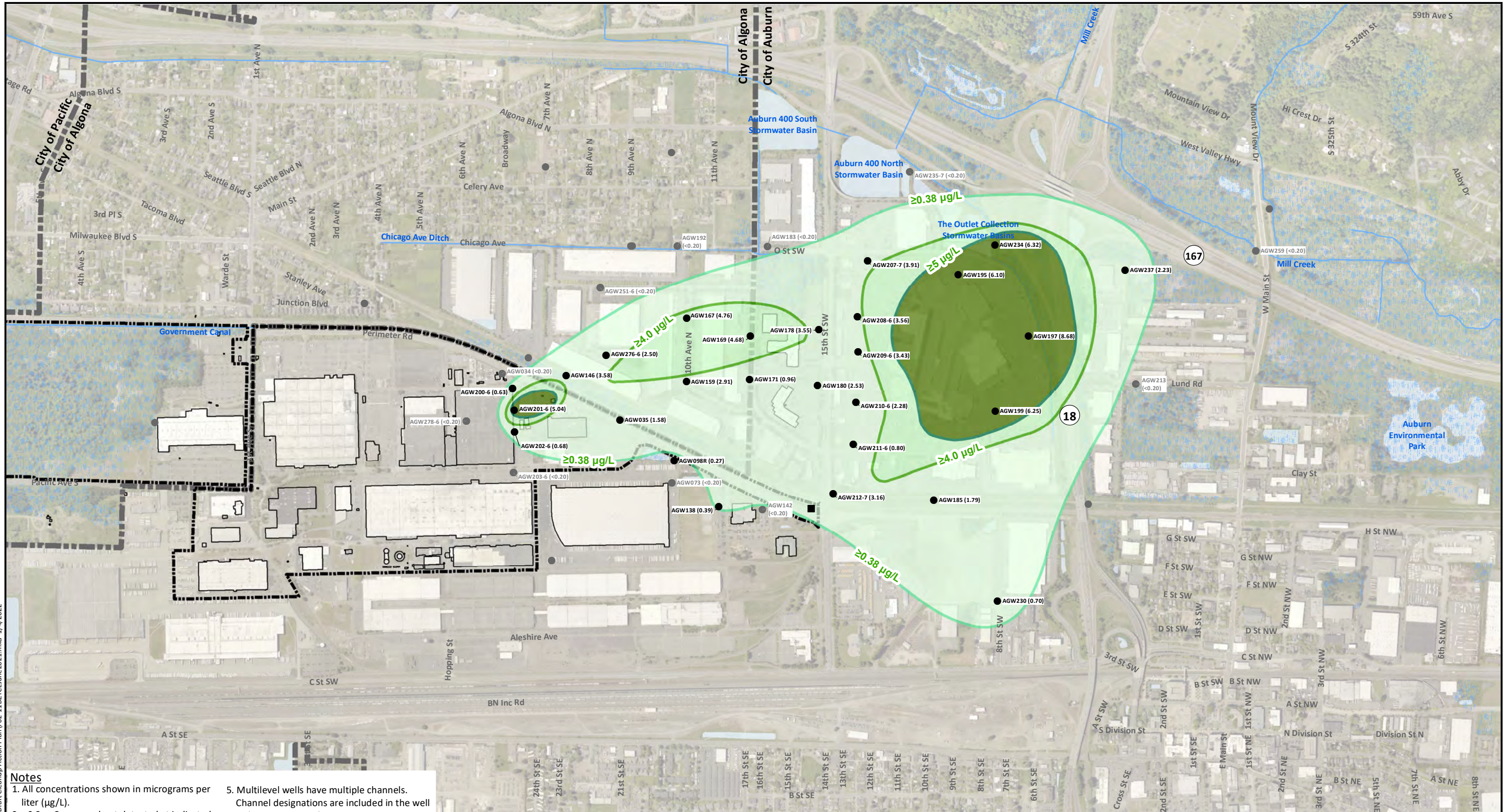
AOC A-14: Intermediate Zone
Trichloroethene Concentrations
June 2021

Figure
2-10

G:\Projects\02511641301\Draft Cleanup Action Plan\F02-10\TCEJune2021.mxd 1/4/2022



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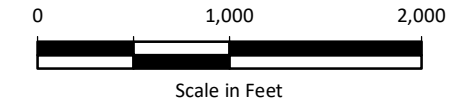


Notes

1. All concentrations shown in micrograms per liter (µg/L).
2. <0.2 = Compound not detected at indicated reporting limit.
3. Monitoring well results are the most recent.
4. Black well and boring symbols indicate locations where the compound was detected. Gray well and boring symbols indicate locations where the compound was not detected.
5. Multilevel wells have multiple channels. Channel designations are included in the well ID (e.g., AGW208-2).
6. Wells with no results shown are no longer sampled.
7. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Monitoring Well Location
- Historical Borehole Grab Sample Location
- Non-Detect or No Longer Sampled
- TCE Contour (>=5.0 µg/L)
- TCE Contour (>=4.0 µg/L)
- TCE Contour (>=0.38 µg/L)
- City Limits
- - - Boeing Property
- Wetland Areas
- Water Bodies
- Waterways



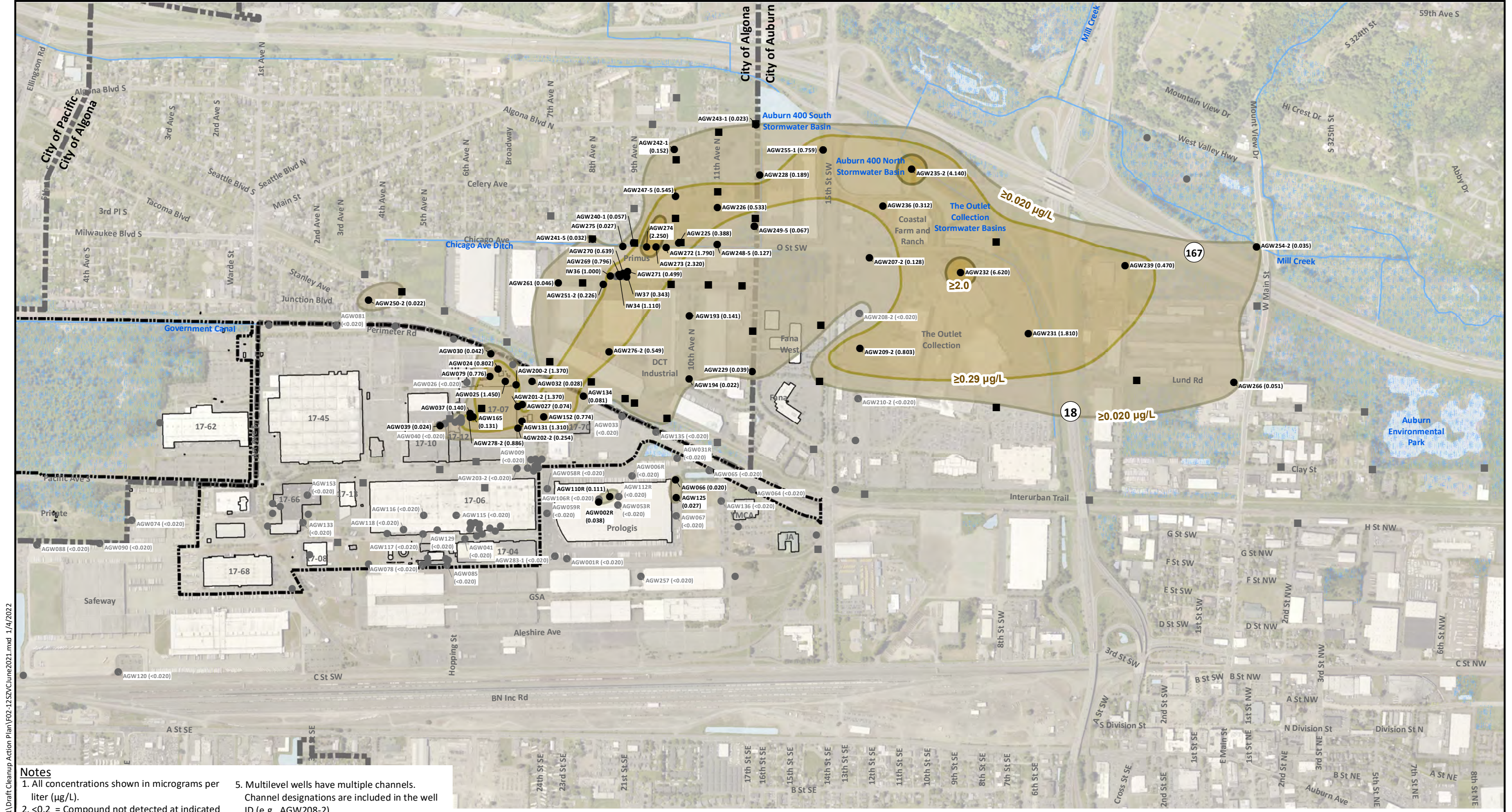
Data Source: King County GIS.

Boeing Auburn
Cleanup Action Plan
Auburn, Washington

**AOC A-14: Deep Zone
Trichloroethene Concentrations
June 2021**

Figure
2-11

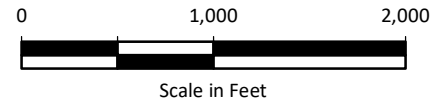




- Notes**
1. All concentrations shown in micrograms per liter (µg/L).
 2. <0.2 = Compound not detected at indicated reporting limit.
 3. Monitoring well results are the most recent.
 4. Black well and boring symbols indicate locations where the compound was detected. Gray well and boring symbols indicate locations where the compound was not detected.
 5. Multilevel wells have multiple channels. Channel designations are included in the well ID (e.g., AGW208-2).
 6. Wells with no results shown are no longer sampled.
 7. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Monitoring Well Location
- Historical Borehole Grab Sample Location
- Non-Detect
- Vinyl Chloride Contour (≥2.0 µg/L)
- Vinyl Chloride Contour (≥0.29 µg/L)
- Vinyl Chloride Contour (≥0.020 µg/L)
- ▬ City Limits
- ▬ Boeing Property
- Wetland Areas
- Water Bodies
- ▬ Waterways



Data Source: King County GIS.

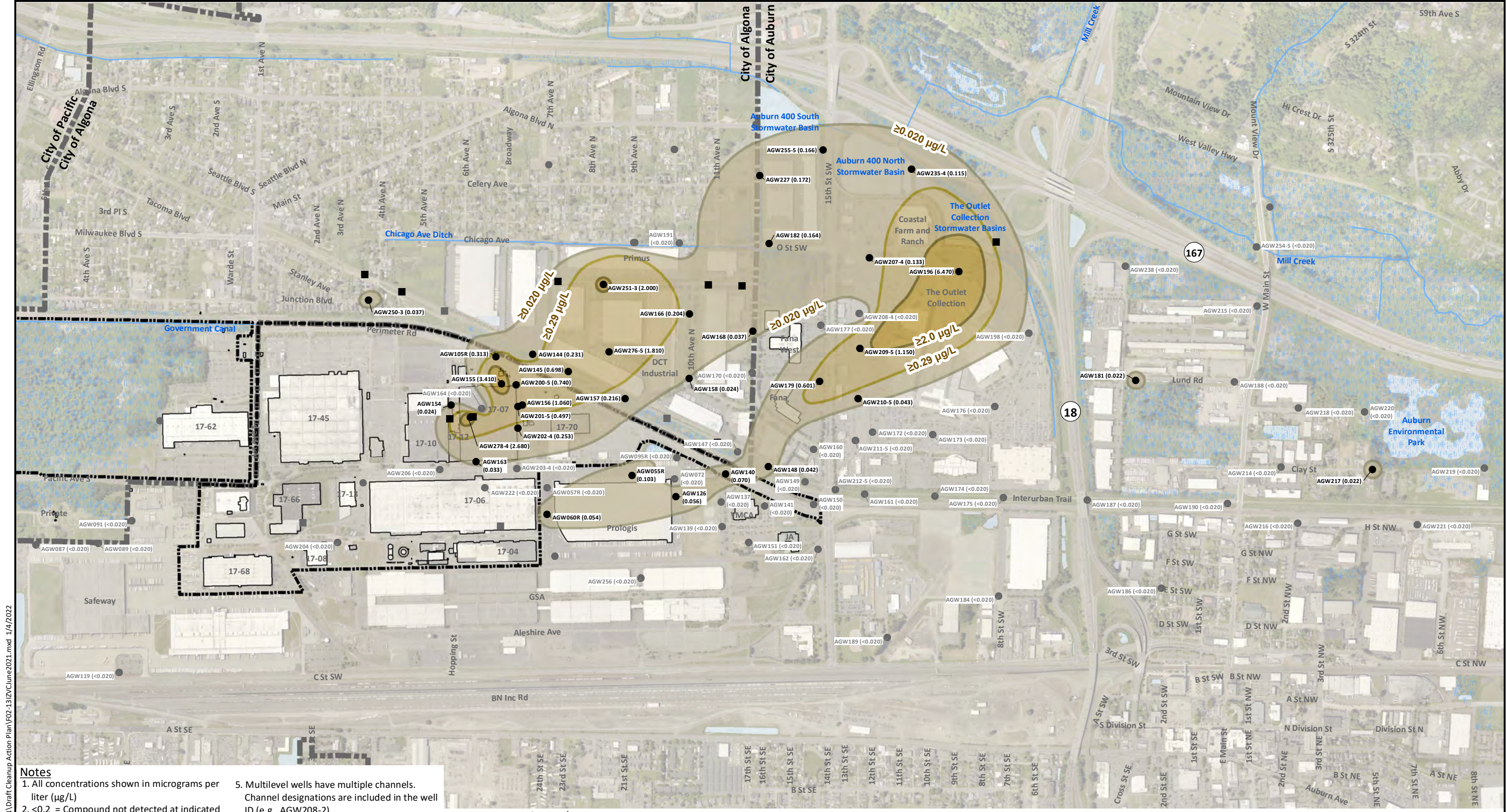
Boeing Auburn
Cleanup Action Plan
Auburn, Washington

**AOC A-14: Shallow Zone
Vinyl Chloride Concentrations
June 2021**

Figure
2-12

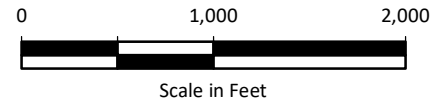
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- Notes**
1. All concentrations shown in micrograms per liter (µg/L)
 2. <0.2 = Compound not detected at indicated reporting limit.
 3. Monitoring well results are the most recent.
 4. Black well and boring symbols indicate locations where the compound was detected. Gray well and boring symbols indicate locations where the compound was not detected.
 5. Multilevel wells have multiple channels. Channel designations are included in the well ID (e.g., AGW208-2).
 6. Wells with no results shown are no longer sampled.
 7. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

- Legend**
- Monitoring Well Location
 - Historical Borehole Grab Sample Location
 - Non-Detect or No Longer Sampled
 - Vinyl Chloride Contour (≥2.0 µg/L)
 - Vinyl Chloride Contour (≥0.29 µg/L)
 - Vinyl Chloride Contour (≥0.020 µg/L)
 - ▬ City Limits
 - ▬ Boeing Property
 - Wetland Areas
 - Water Bodies
 - Waterways



Data Source: King County GIS.

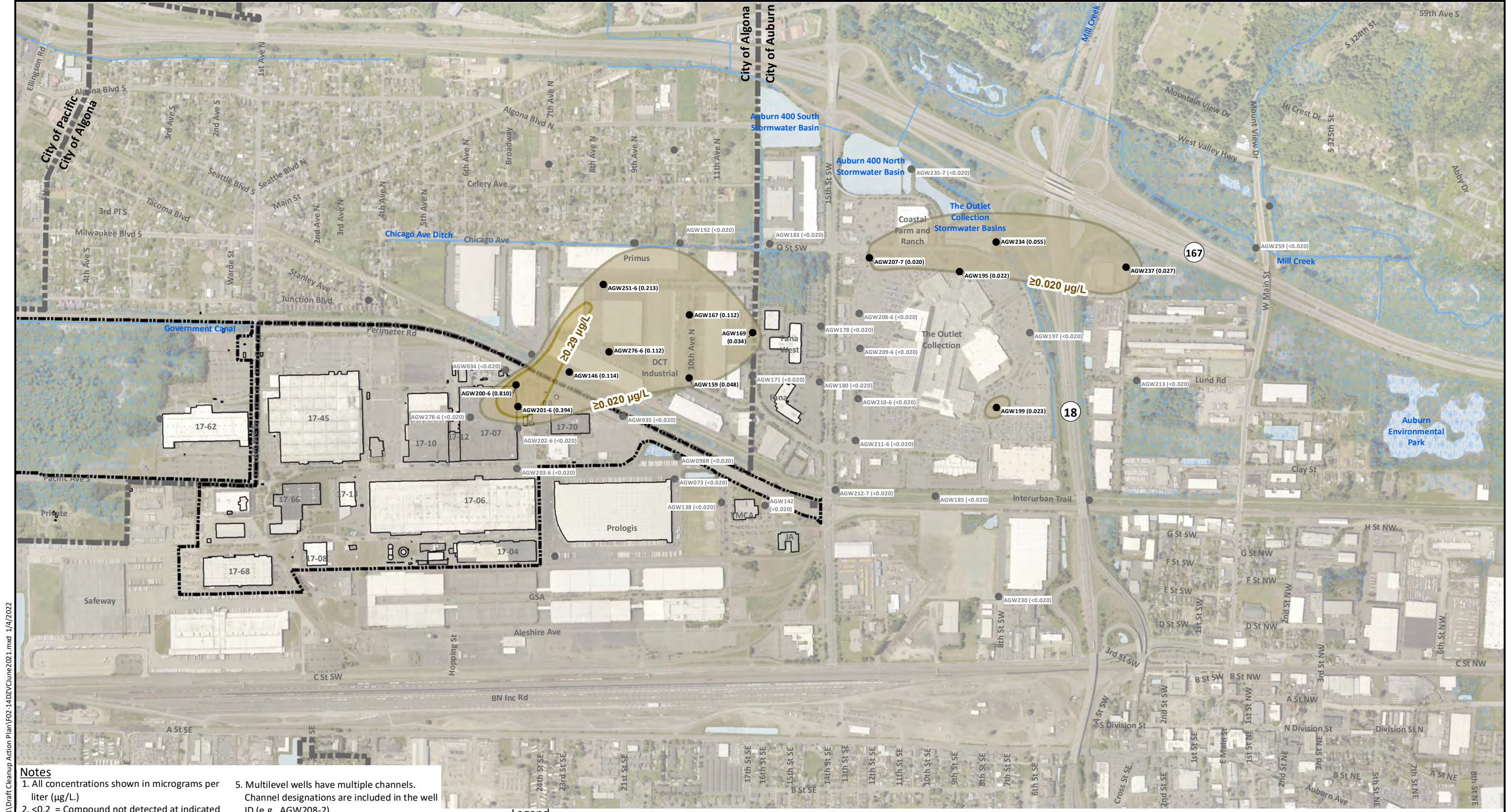
Boeing Auburn
Cleanup Action Plan
Auburn, Washington

AOC A-14: Intermediate Zone
Vinyl Chloride Concentrations
June 2021

Figure
2-13

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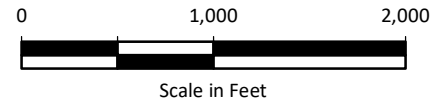




- Notes**
- All concentrations shown in micrograms per liter (µg/L).
 - <0.2 = Compound not detected at indicated reporting limit.
 - Monitoring well results are the most recent.
 - Black well and boring symbols indicate locations where the compound was detected. Gray well and boring symbols indicate locations where the compound was not detected.
 - Multilevel wells have multiple channels. Channel designations are included in the well ID (e.g., AGW208-2).
 - Wells with no results shown are no longer sampled.
 - Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Monitoring Well Location
- Historical Borehole Grab Sample Location
- Non-Detect or No Longer Sampled
- Vinyl Chloride Contour (≥2.0 µg/L)
- Vinyl Chloride Contour (≥0.29 µg/L)
- Vinyl Chloride Contour (≥0.020 µg/L)
- ▬ City Limits
- ▬ Boeing Property
- Wetland Areas
- Water Bodies
- Waterways



Data Source: King County GIS.

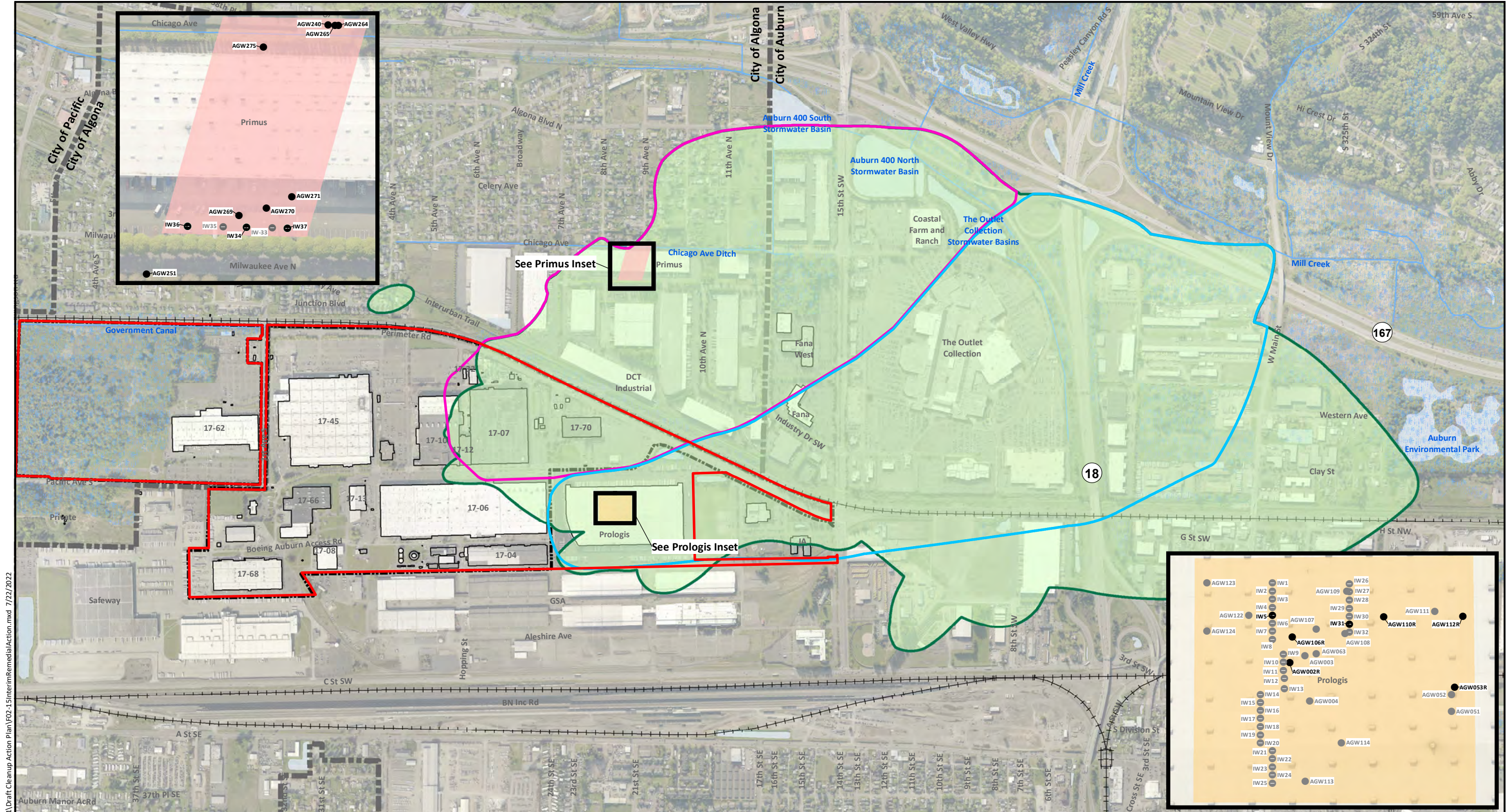
Boeing Auburn
Cleanup Action Plan
Auburn, Washington

AOC A-14: Deep Zone
Vinyl Chloride Concentrations
June 2021

Figure
2-14

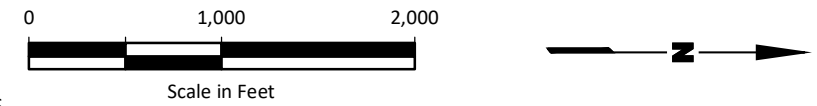
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Notes
 1. The current monitoring well network is shown.
 2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

- Legend**
- Monitoring Well
 - Injection Well
 - Injection Well (Decommissioned)
 - Monitoring Well (Decommissioned)
 - Pore Water Sample Location
 - Area 1 Plume
 - Western Plume
 - TCE/VC Plume Extent - June 2021
 - Area 1 IRA
 - Pilot Test Area
 - City Limits
 - Boeing Auburn Facility Boundary
 - Boeing Property
 - Wetland Areas
 - Water Bodies
 - Waterways

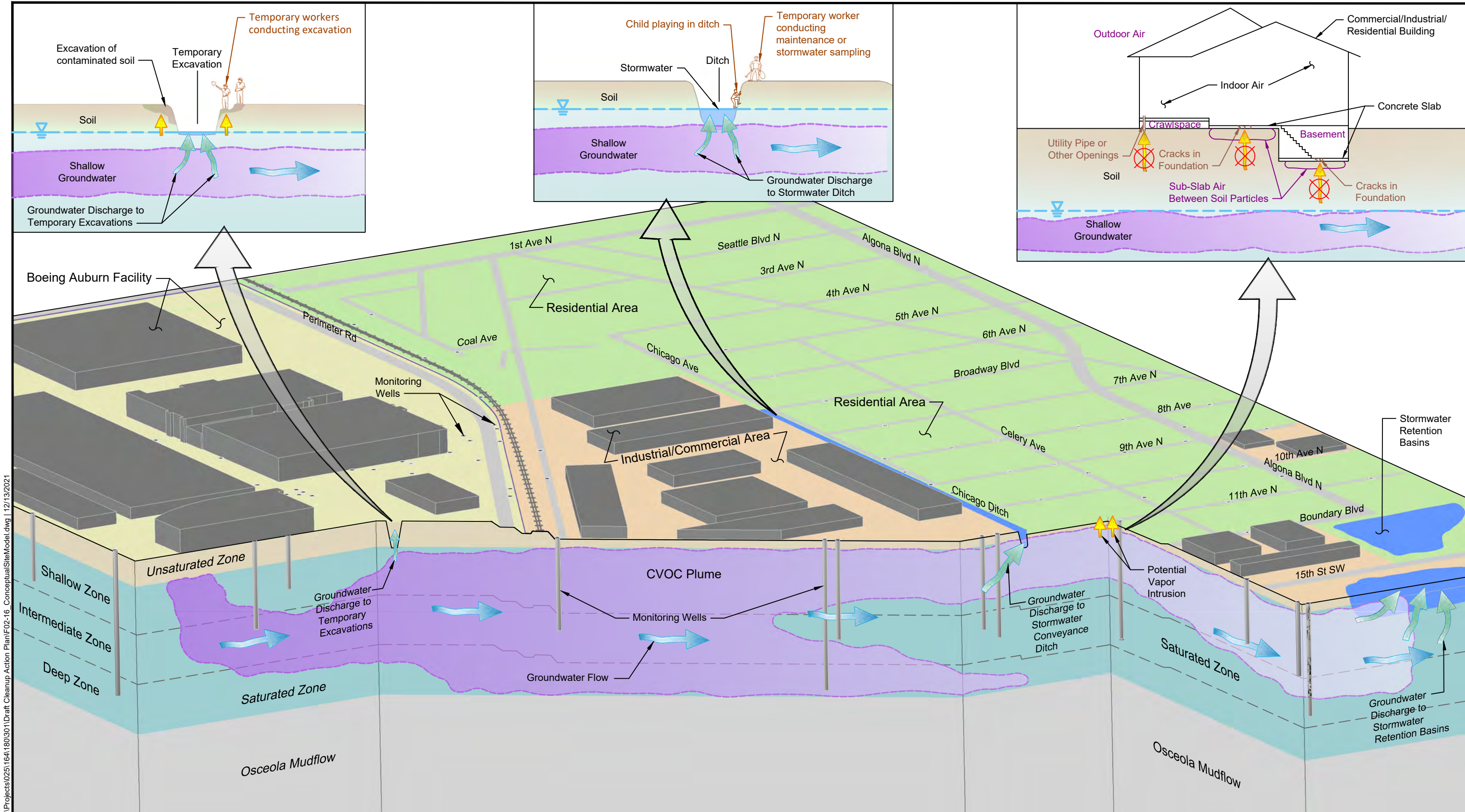


Data Source: King County GIS.

Boeing Auburn Cleanup Action Plan Auburn, Washington	Locations of Interim Remedial Action and Enhanced In Situ Bioremediation Pilot Test	Figure 2-15
------------------------------------------------------------	------------------------------------------------------------------------------------------------	-----------------------

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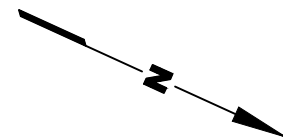
Landau Associates | C:\Projects\025116A\18013011\Draft Cleanup Action Plan\F02-16_ConceptualSiteModel.dwg | 12/13/2021

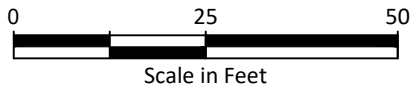
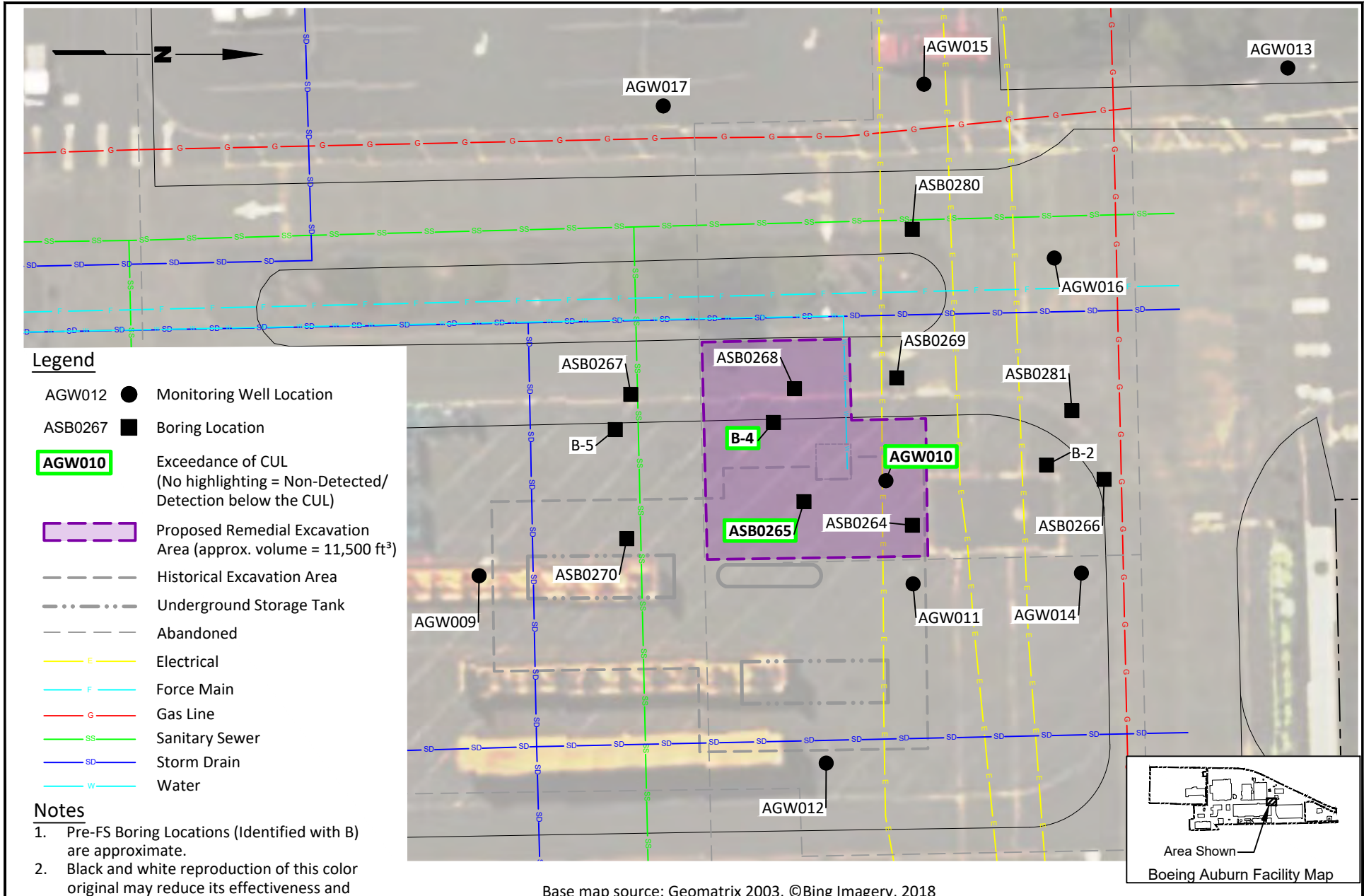
Legend

- Groundwater Flow
- Stormwater/Surface Water Discharge
- Potential Vapor Migration/Intrusion
- Incomplete exposure pathway based on RI/FS data

Notes

1. Not to scale.
 2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.
- CVOC = chlorinated volatile organic compounds





Boeing Auburn
Cleanup Action Plan
Auburn, Washington

AOC A-01: Conceptual Excavation Area

Figure
5-1

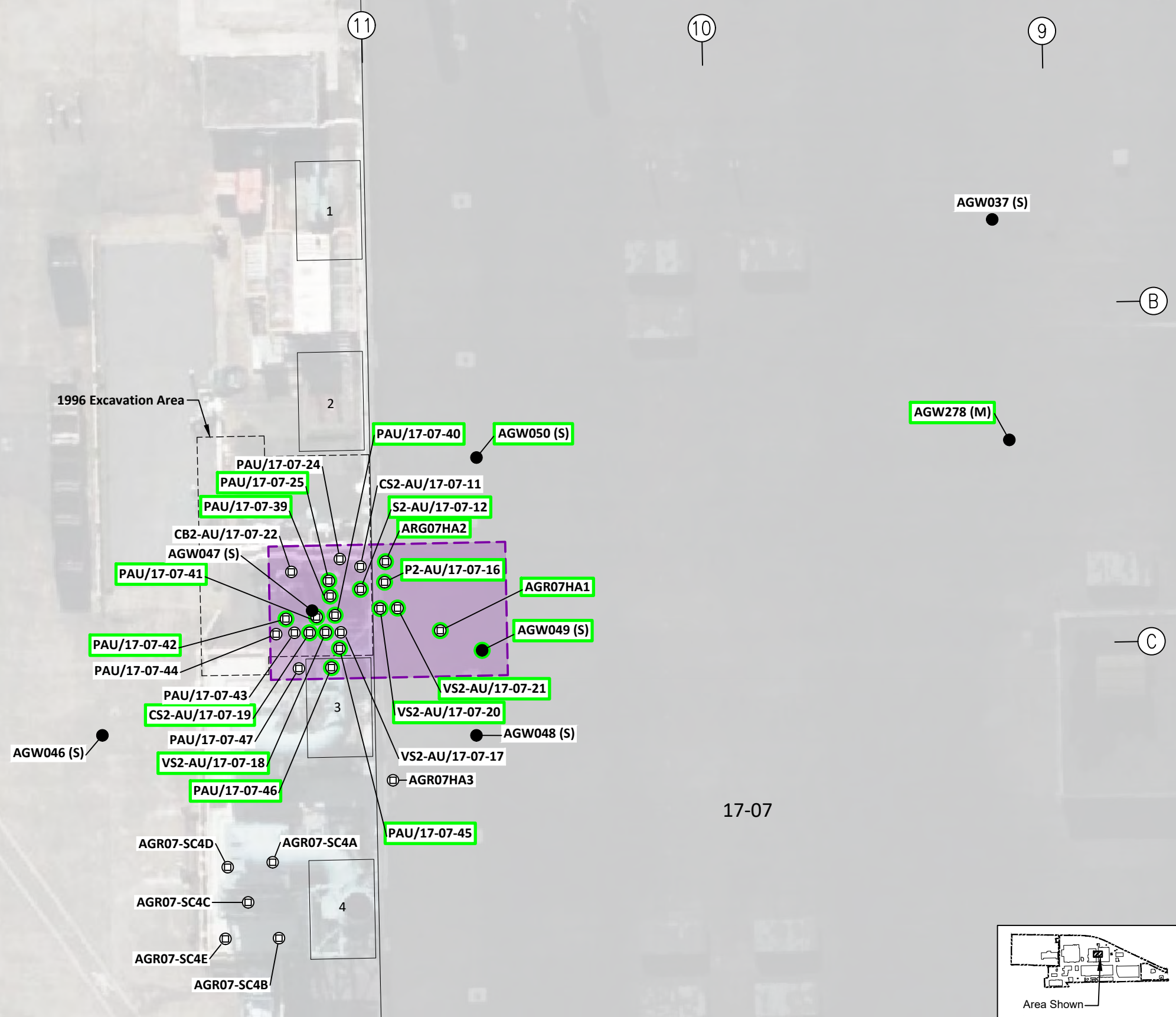
Landau Associates | G:\Projects\025\164\180\301\Draft Cleanup Action Plan\F05-02_A-09_excavation.dwg | 1/6/2022 5:14 PM | EZICK

Legend

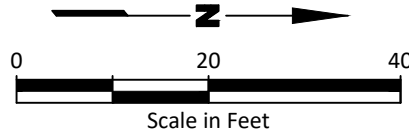
- AGW016 ● Monitoring Well Location
- AGR07HA1 ⊕ Pre-RI Grab Sample Location (Locations are Approximate)
- AGW010** Exceedance of CUL (No highlighting = Non-Detected/ Detection below the CUL)
- Proposed Remedial Excavation Area (approx. volume = 9,200 ft³)
- ⊕ ● = Highlighted symbol identifies where soil contamination above CULs was left in place.
- 1 Scrubber
- 17-07 Current Building and Number
- B 11 Building 17-07 Column Designations

Notes

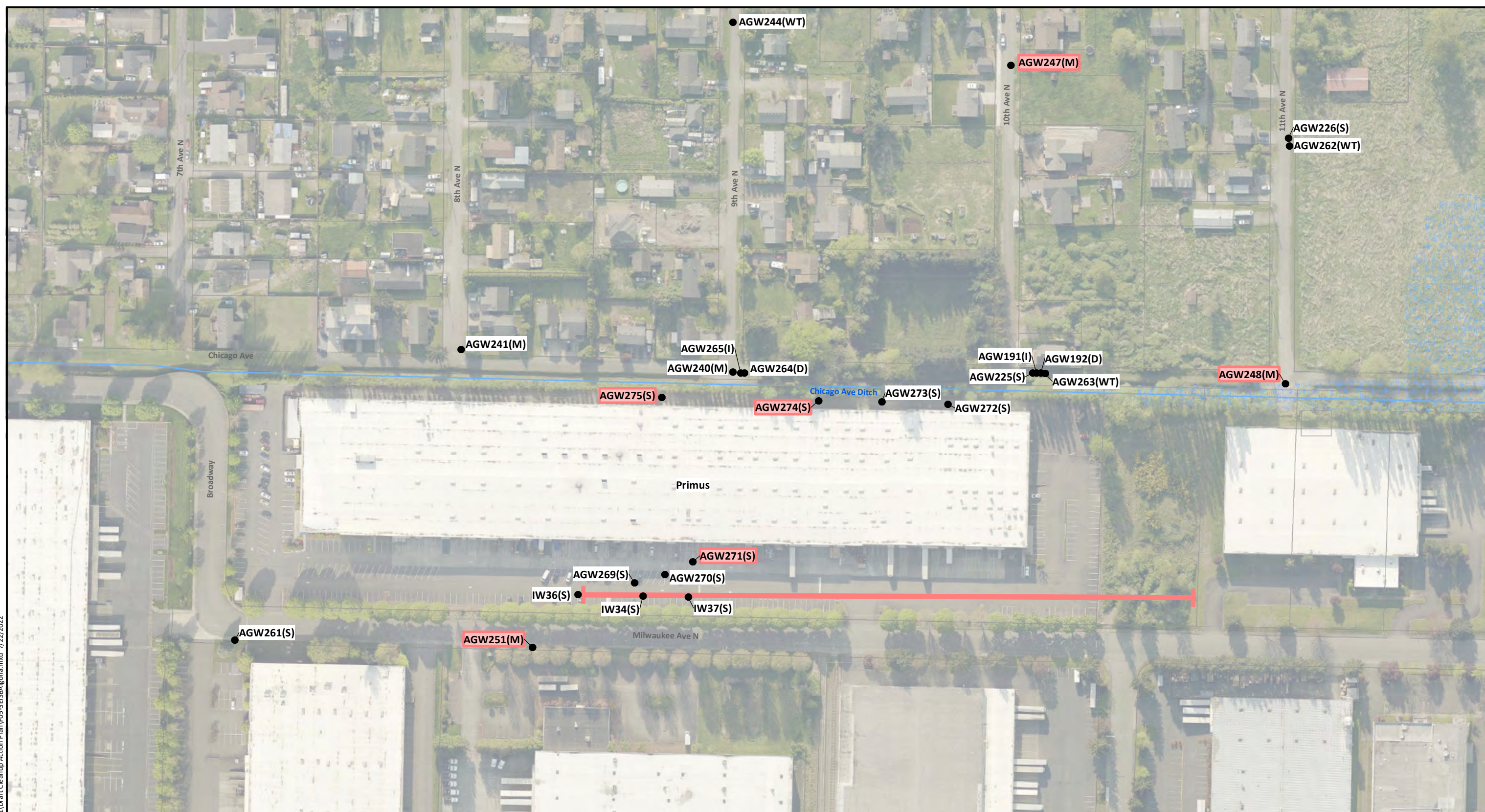
1. Groundwater wells are identified by the AGW prefix. The designations behind the identifications indicate the zone. (S) = shallow zone, (I) = intermediate zone, (D) = deep zone, (M) = multi-level well; screens in multiple groundwater zones.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.



Sources: AGI Technologies, Figure 4, 1996; ©Bing, 2019



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- Notes**
1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.
 2. The designations behind the well identifications indicate the zone.
 (WT) = water table
 (S) = shallow zone (water table to 35 ft bgs)
 (I) = intermediate zone (35 to 75 ft bgs)
 (D) = deep zone (75 to 100 ft bgs).

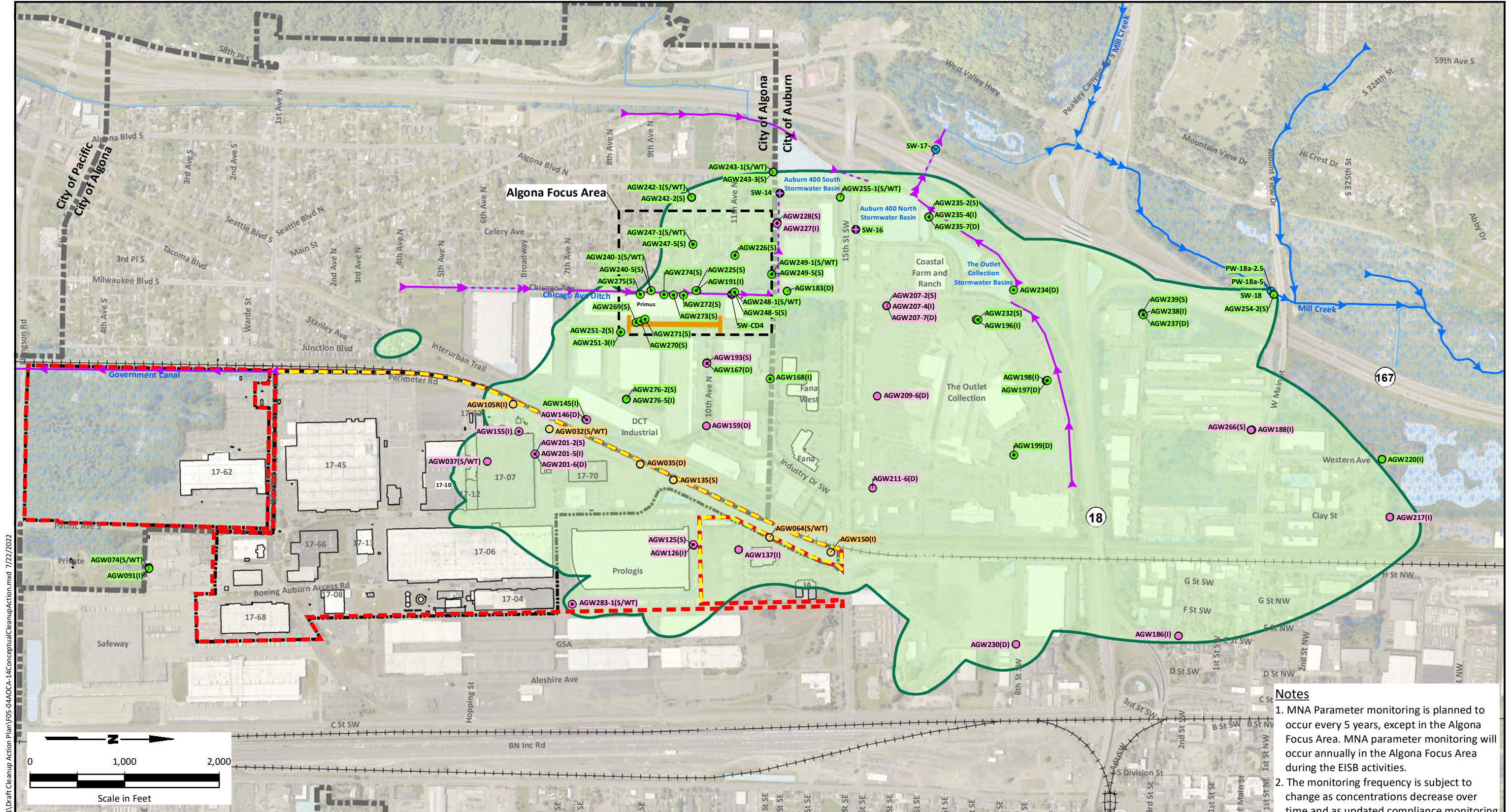
- Legend**
- Monitoring Well
 - Wetland Areas
 - Water Bodies
 - Waterways
 - H Algona Injection Row
 - AGW251 Conceptual EISB Monitoring Location

Data Source: King County GIS.

0 150 300
Scale in Feet

North Arrow





G:\Projects\025\164\180\30\1\Draft\Cleanup Action Plan\F05-04\OCA-14\ConceptualCleanupAction.mxd 7/22/2022

Legend

- Monitoring Well Proposed for Long-Term VOC Monitoring
- ⊙ Monitoring Well Proposed for Long-Term VOC and MNA Parameter Monitoring
- ⊕ Stormwater Sample Location Proposed for Long-Term VOC Monitoring
- ⊗ Surface Water Sample Location Proposed for Long-Term VOC Monitoring

Sampling Frequency

- Annual
- Every 2 Years
- Every 5 Years

- ▭ TCE/VC Plume Extent - June 2021
- ▭ City Limits
- ▭ Boeing Property
- ▭ Wetland Areas
- ▭ Water Bodies
- ▭ Waterways

- ▬ Open Surface Water Waterway
- ▬ Open Stormwater Waterway
- ▬ Piped Surface Water Waterway
- ▬ Piped Stormwater Waterway
- ▬ Algona Focus Area Conceptual Enhanced In Situ Bioremediation (EISB) Injection Row

- ▭ Boeing Auburn Facility Boundary
- ▭ Boeing Auburn Facility Boundary Conditional Point of Compliance

Data Source: King County GIS.

Notes

1. MNA Parameter monitoring is planned to occur every 5 years, except in the Algona Focus Area. MNA parameter monitoring will occur annually in the Algona Focus Area during the EISB activities.
2. The monitoring frequency is subject to change as concentrations decrease over time and as updated compliance monitoring plans are approved by Ecology.
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

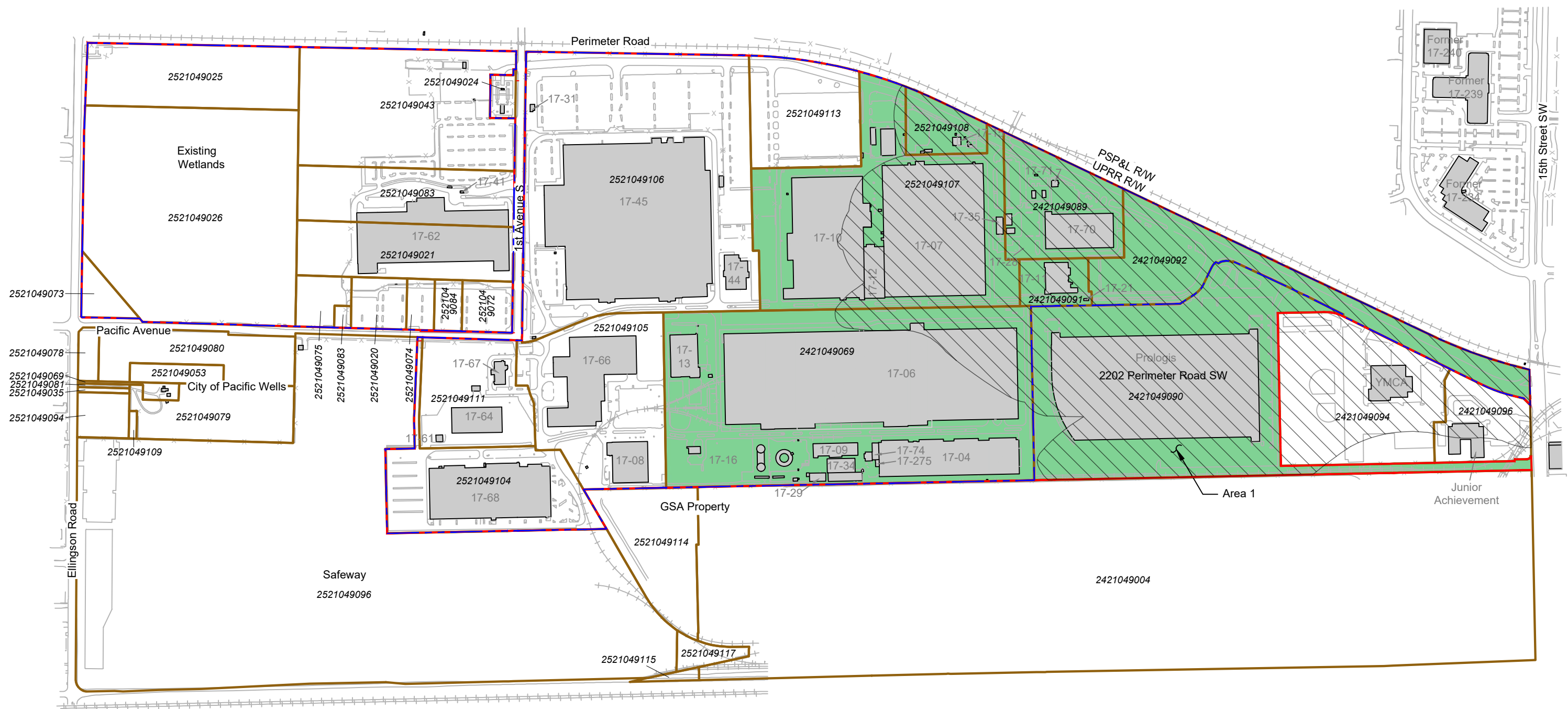
Boeing Auburn
Cleanup Action Plan
Auburn, Washington

**AOC A-14: Conceptual Cleanup Action
(Monitored Natural Attenuation and
Algona Focus Area EISB)**

Figure
5-4



Landau Associates | G:\Projects\025164180\301\Draft Cleanup Action Plan\F06-01 Facility RC Area.dwg | 7/22/2022 | Jeff Valluzzi



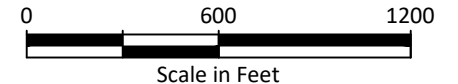
Legend

- | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| A-01 Parcels where an Environmental Covenant will be Applied | Property Boundary |
| TCE/VC Plume Extent - June 2021 | Boeing Auburn Facility Boundary |
| 17-68 Current Building and Number | Parcel Boundary |

Notes:

1. Specific restrictions and requirements will be defined in the Environmental Covenants.
2. Buildings formerly identified as 17-234, 17-239, and 17-240 are currently owned by Fana.
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Base map source: Geomatrix 2003



Boeing Auburn Cleanup Action Area Auburn, Washington	Conceptual Boeing Auburn Facility Environmental Covenant Area	Figure 6-1
------------------------------------------------------------	--------------------------------------------------------------------------	-----------------------

**Table 3-1
Applicable or Relevant and Appropriate Requirement
Boeing Auburn Draft Cleanup Action Plan
Auburn, Washington**

ARARs for Development of Cleanup Levels	Source	Description/Rationale
Model Toxics Control Act	WAC 173-340	Establishes administrative processes and standards in Washington State to identify, investigate, and clean up facilities where hazardous substances have come to be located.
Washington State Surface Water Quality Standards	WAC 173-201A	Establishes water quality standards for surface waters of the state of Washington consistent with public health and public enjoyment of the waters and the propagation and protection of fish, shellfish, and wildlife, pursuant to the provisions of chapter 90.48 RCW.
Federal Clean Water Act Water Quality Standards	40 CFR 131 and 40 CFR 131.45	Establishes the requirements and procedures for developing, reviewing, revising, and approving water quality standards by the States as authorized by section 303(c) of the Clean Water Act. Promulgates human health criteria for priority toxic pollutants in surface waters in Washington.
Washington State Maximum Contaminant Levels in Drinking Water	WAC 246-290-320	Establishes maximum contaminant levels allowed in public drinking water systems in Washington State.
National Primary Drinking Water Regulations	40 CFR 141	Establishes primary drinking water regulations pursuant to section 1412 of the Public Health Service Act, as amended by the Safe Drinking Water Act (Pub. L. 93-523); and related regulations applicable to public water systems.
Potential Action Specific ARARs	Source	Description/Rationale
Washington Hazardous Waste Management Act and implementing regulations: Dangerous Waste Regulations	RCW 70.105; WAC 173-303	These regulations establish a comprehensive statewide framework for the planning, regulation, control, and management of dangerous waste. The regulations designate those solid wastes that are dangerous or extremely hazardous to human health and the environment. The management of excavated contaminated soil from the Site would be conducted in accordance with these regulations to the extent that any dangerous wastes are discovered or generated during the cleanup action.
Washington Solid Waste Management Act and its implementing regulation: Criteria for Municipal Solid Waste Landfills	RCW 70.95; WAC 173-351	These regulations establish a comprehensive statewide program for solid waste management including proper handling and disposal. The management of any contaminated soil removed from the Site would be conducted in accordance with these regulations to the extent that this soil could be managed as solid waste instead of dangerous waste.
Hazardous Waste Operations	WAC 296-843	Establishes safety requirements for workers conducting investigation and cleanup operations at sites containing hazardous materials. These requirements would be applicable to onsite cleanup activities and would be addressed in a Site health and safety plan prepared specifically for these activities.
Federal NPDES Permit and State Construction Stormwater General Permit	WAC 173-220	Construction activities that disturb one or more acres of land typically need to obtain an NPDES Construction Stormwater General Permit from Ecology. A substantive requirement would be to prepare a SWPPP prior to earthwork activities. The SWPPP would document planned procedures designed to prevent stormwater pollution by controlling erosion of exposed soil and by containing soil stockpiles and other materials that could contribute pollutants to stormwater.
Clean Water Act, Section 401, Water Quality Certification	33 USC 1340; WAC 173-225-010	Section 401 of the Federal Water Pollution Control Act provides that applicants for a license or permit from the federal government relating to any activity that may result in any discharge into the navigable waters shall obtain a certification from the state that the water quality standards will be met. Ecology's Water Quality Section would review any Nationwide Permit No. 38 issued by the US Army Corps of Engineers. Ecology would also review any associated draft and final design of the chosen cleanup action alternative to document substantive compliance with the Washington State Water Pollution Control Act requirements.
State Environmental Policy Act	RCW 43.21.036; WAC 173-11-250 through 268	Under the SEPA rules, MTCA and SEPA processes are to be combined to reduce duplication and improve public participation (WAC 97-11-250). Ecology is the lead agency for implementing the substantive requirements of SEPA as described in WAC 197-11-253. Ecology is likely to determine that it will act as the lead agency for implementing the requirements of SEPA for cleanup actions at the Site. A SEPA checklist will be completed and attached to the draft Cleanup Action Plan. It is expected that a determination of non-significance will be issued, as the alternatives evaluated in this FS are unlikely to have a significant adverse environmental impact.
Washington Minimum Standards for Construction and Decommissioning	WAC 173-160-381	Ecology or its delegated authority establishes requirements for the installation and decommissioning of monitoring wells.
Underground Injection Control Program	WAC 173-218	UIC registration would be required for the injection of any materials below ground surface for the purposes of groundwater cleanup. This would include injection of reducing agents such as zero valent iron, electron donor substrates for bioremediation, oxidants for chemical oxidation, or other chemical activation agents or catalysts; or reinjection of treated groundwater.
Uniform Environmental Covenants Act	RCW 64.70	Regulation that addresses recording environmental covenants on the Boeing Auburn facility. Institutional controls; an environmental covenant will be a required element of the final remedy selected.
Right-of-Way Use and Construction	AubMC Chapter 12.60 and 12.66; AlgMC Chapter 14.04	Requires a written permit for any proposed activities that use ROW, including construction activities and movement of equipment. It may be necessary to install additional wells in ROWs.
Fire Hydrant Access	AubMC Chapter 13.16; AlgMC Chapter 13.02	Specifies an application and approval process for connecting to the City of Auburn water supply system. Fire hydrant access is possibly needed for injections.
Environmentally Critical Areas	AubMC Chapter 16.10; AlgMC Chapter 16.18	Specifies development standards for actions affecting environmentally critical areas, including wellhead protection areas, streams and riparian zones, wetlands, geological hazard areas, landslide areas, and erosion or seismic hazard areas.

Abbreviations and Acronyms:

AlgMC = Algona Municipal Code
 AubMC = Auburn Municipal Code
 ARARs = Applicable or relevant and appropriate requirements
 CFR = Code of Federal Regulations
 Ecology = Washington State Department of Ecology
 MTCA = Model Toxics Control Act Cleanup Regulation
 NPDES = National Pollutant Discharge Elimination System
 Pub = publication

RCW = Revised Code of Washington
 ROW = right-of-way
 SEPA = State Environmental Policy Act
 Site = Boeing Auburn Plant
 SWPPP = stormwater pollution prevention plan
 WAC = Washington Administrative Code
 UIC = underground injection control
 USC = United States Code

**Table 3-2
Soil Cleanup Levels
Boeing Auburn Draft Cleanup Action Plan
Auburn, Washington**

Analyte	RI Soil SL (mg/kg)	Method B		Constituent Exceeds pCUL in Groundwater	Soil Protective of Groundwater Vadose at 13°C	Method C		Background Soil Metals Concentration (a)	Soil CUL (mg/kg)	Basis for CUL
		Method B Non-Cancer Direct Contact	Method B Cancer Direct Contact			Method C Non-Cancer Direct Contact	Method C Cancer Direct Contact			
VOLATILES										
Trichloroethene	0.00357	40	12	X	0.025	1,800	2,900	N/A	0.025/1,800	Soil protective of groundwater. Once groundwater pCUL is met, cleanup level will be adjusted to Method C non-cancer direct contact.
TOTAL PETROLEUM HYDROCARBONS AND ASSOCIATED VOLATILES										
Ethylbenzene	6.05	8,000	--	X	5.9	350,000	--	N/A	5.9/350,000	Soil protective of groundwater. Once groundwater pCUL is met, cleanup level will be adjusted to Method C non-cancer direct contact.
Total Xylenes	14.6	16,000	--	X	14	700,000	--	N/A	14/700,000	Soil protective of groundwater. Once groundwater pCUL is met, cleanup level will be adjusted to Method C non-cancer direct contact.
Petroleum Hydrocarbons	30/100/2,000 (b)	1,500 (c)		X		1,500 (c)			1,500	Generic Method C cleanup level
METALS AND CYANIDE										
Cadmium	1.0	80	--	X	0.69	3,500	--	1.0	1.0/3,500	Protection of groundwater adjusted for natural background. Once groundwater pCUL is met, cleanup level will be adjusted to Method C non-cancer direct contact.
Copper	284	3,200	--	X	280	140,000	--	36	280/140,000	Soil protective of groundwater. Once groundwater pCUL is met, cleanup level will be adjusted to Method C non-cancer direct contact.
Cyanide (d)	48	50	--	X	(e)	2,200	--	N/A	2,200	Method C non-cancer direct contact.

Abbreviations and Acronyms:

- = not listed
- °C = degrees Celsius
- CLARC = Cleanup Levels and Risk Calculation
- COC = constituent of concern
- CUL = cleanup level
- DRO = diesel-range organics
- GRO = gasoline-range organics
- mg/kg = milligrams per kilogram
- MTCA = Model Toxics Control Act
- N/A = not applicable
- ORO = oil-range organics
- pCUL = preliminary cleanup level
- RI = remedial investigation
- SL = screening level
- TPH = total petroleum hydrocarbons

Notes:

- CULs based on Feb. 2021 CLARC Updates (<https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Contamination-clean-up-tools/CLARC>)
- Grey Shading = contaminant eliminated as a COC in media identified based on no exceedances of pCUL in the FS but is a COC in groundwater.

- (a) Puget Sound Region 90th percentile value (Ecology. 1994. Natural Background Soil Metals Concentrations in Washington State. Publication #94-115. Washington State Department of Ecology. October. <https://fortress.wa.gov/ecy/publications/documents/94115.pdf>.)
- (b) MTCA Method A values used for SL. 30/100 is the SL for GRO (30 mg/kg is used if benzene is detected; 100 mg/kg is used if benzene is not detected). 2,000 is the SL for DRO/ORO
- (c) Method B/C generic TPH cleanup level (Ecology. 2017. Model Remedies for Sites with Petroleum Impacts to Groundwater. Publication No. 16-09-057. Washington State Department of Ecology. December. <https://apps.ecology.wa.gov/publications/documents/1609057.pdf>)
- (d) Cyanide CULs are evaluated based on free cyanide.
- (e) Soil samples collected were in the vadose zone. There is no CUL for soil protective of groundwater vadose. The CUL for soil protective of groundwater saturated is 0.1 mg/kg.

**Table 3-3
Groundwater Cleanup Levels
Boeing Auburn Draft Cleanup Action Plan
Auburn, Washington**

Analyte	RI GW SL	ARAR Federal MCL	ARAR WA State MCL	Method A	Method B (Non-Cancer)	Method B (Cancer)	Adjusted 10-5	Groundwater CUL protective of Drinking Water Beneficial Use (µg/L)	Basis	Groundwater CUL protective of Surface Water Beneficial Use (µg/L)
VOLATILES										
Trichloroethene	0.54	5.0	5.0	N/A	4.0	0.54	5.4	4.0	Method B Non-Cancer	0.38 (a)
Vinyl Chloride	0.029	2.0	2.0	N/A	24	0.029	0.29	0.29	Method B Cancer, adjusted to cancer risk 10 ⁻⁵ based on MCL rule.	0.02 (a)
TOTAL PETROLEUM HYDROCARBONS AND ASSOCIATED VOLATILES										
Ethylbenzene	700	700	700	N/A	800	--	N/A	700	Federal/State MCL	N/A
Total Xylenes	1,600	10,000	10,000	N/A	1,600	--	N/A	1,600	Method B Non-Cancer	N/A
Diesel-Range Organics	500	--	--	500	(b)	(b)	N/A	500	Method A	N/A
Gasoline-Range Organics	800	--	--	800/1,000 (c)	(b)	(b)	N/A	800/1,000 (c)	Method A	N/A
METALS AND CYANIDE										
Cadmium	5.0	5.0	5.0	N/A	8.0	--	--	5.0	Federal/State MCL	N/A
Copper	640	1,300	1,300	NA	640	--	--	640	Method B non-cancer	N/A
Cyanide (d)	9.6	200	200	N/A	10	--	--	10	Method B non-cancer	N/A

Abbreviations and Acronyms:

-- = not Listed
 µg/L = micrograms per liter
 ARARs = applicable or relevant and appropriate requirements
 CLARC = Cleanup Levels and Risk Calculation
 COC = constituent of concern
 CUL = cleanup level
 GW = groundwater

MCL = maximum contaminant level
 N/A = not applicable
 RI = remedial investigation
 SL = screening level
 WA = Washington
 WAC = Washington Administrative Code

Notes:

CULs based on Feb. 2021 CLARC Updates (<https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Contamination-clean-up-tools/CLARC>)
 (a) Human Health Fresh Water WAC 173-201A. Ecology has required that SWQS, which are applicable only for the protection of surface water beneficial uses, be used as groundwater CULs for TCE and VC.
 (b) Method B values were not calculated.
 (c) 800 µg/L is used if benzene is detected; 1,000 µg/L is used if benzene is not detected.
 (d) Cyanide CUL evaluated based on free cyanide.

**Table 3-4
Surface Water Cleanup Levels
Boeing Auburn Draft Cleanup Action Plan
Auburn, Washington**

	RI GW SL (a)	Federal ARAR Human Health - Fresh Water CWA 304	WA State ARAR Human Health - Fresh Water WAC 173-201A	Method B Non-cancer	Method B Cancer	Surface Water CUL	Basis
VOLATILES							
Trichloroethene	0.3	0.6	0.38	120	4.9	0.38	WA State ARAR WAC 173-201A
Vinyl Chloride	0.02	0.022	0.02	6,600	3.7	0.02	WA State ARAR WAC 173-201A

Notes:

CULs based on Feb. 2021 CLARC Updates (<https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Contamination-clean-up-tools/CLARC>)
 (a) SLs were provided for different areas in the RI report. The most conservative SLs are presented here.

Abbreviations and Acronyms:

- ARAR = applicable or relevant and appropriate requirement
- CLARC = Cleanup Levels and Risk Calculation
- CWA = Clean Water Act
- GW = groundwater
- CUL = cleanup level
- RI = remedial investigation
- SL = screening level
- WA = Washington
- WAC = Washington Administrative Code

**Table 5-1
Summary of Selected Remedial Alternatives
Boeing Auburn Draft Cleanup Action Plan
Auburn, Washington**

AOC	Building	Description	Impacted Media	Selected Remedy	Description of Selected Remedy	COCs Exceeding CULs	Point of Compliance (Soil)	Point of Compliance (Groundwater)	Point of Compliance (Stormwater/surface Water)
A-01	17-06	Former USTs (TAU-01 and TAU-02)	Soil, Groundwater	A1: Excavation and Chemical Oxidation	Excavation of soil contamination; Application of <i>in situ</i> groundwater chemical treatment to excavation backfill. Periodic groundwater sampling after soil is removed until groundwater concentrations are below CULs.	Soil: TPH, Ethylbenzene, Total Xylenes Groundwater: TPH, Ethylbenzene, Total Xylenes	Standard; Site-Wide (with ICs for Method C soil CULs)	CPOC at Facility Boundary	N/A
A-09	17-07	Acid Scrubber Drain Line	Soil, Groundwater	B3: Future Excavation (and Monitored Containment)	Future excavation of soil contamination when Building 17-07 is demolished. Periodic groundwater sampling after soil is removed until groundwater concentrations are below CULs. Until excavation can occur, containment of contaminated soil and groundwater will continue by maintaining the asphalt/concrete, routine inspection and reporting of containment and periodic groundwater sampling of existing monitoring wells.	Soil: Cadmium, Copper Groundwater: Cadmium, Copper, Cyanide	Standard; Site-Wide (with ICs for Method C soil CULs)	Standard; Site-Wide	N/A
A-14	Site-wide	Site-wide TCE and VC contamination in soil and groundwater	Soil, Groundwater	D6: EISB at the Algona Focus Area and Site-Wide MNA	Enhanced <i>in situ</i> bioremediation injection at Algona Focus Area. Remediation of groundwater through naturally occurring biotic and abiotic degradation and other attenuation processes (MNA). Continue to monitor concentrations in groundwater with periodic groundwater sampling.	Soil: TCE Groundwater: TCE, VC	Standard; Site-Wide (with ICs for Method C soil CULs)	Standard; Site-Wide	N/A
A-15	Site-wide	Site-wide TCE and VC in stormwater and/or surface water	Stormwater	Remediation will be completed with AOC A-14		TCE, VC	N/A	N/A	Standard: Throughout Site Surface Water (and Chicago Avenue ditch and Auburn 400 basins)

Abbreviations and Acronyms:

AOC = area of concern

CPOC = conditional point of compliance

CUL = cleanup levels

EISB = enhanced *in situ* bioremediation

IC = Institutional Controls

MNA = monitored natural attenuation

N/A = not applicable

TCE = trichloroethene

TPH = total petroleum hydrocarbon

UST = underground storage tank

VC = vinyl chloride

**Table 5-2
Summary of ARARs for Each AOC
Boeing Auburn Cleanup Action Plan
Auburn, Washington**

AOC	Description	Chemical-Specific ARARs				Location-Specific ARARs		Action-Specific ARARs							
		Soil	Groundwater		Surface Water	WAC 173-201A, Water Quality Standards for Surface Waters of State of Washington	Uniform Environmental Covenants Act	Washington Hazardous Waste Management Act and implementing regulations: Dangerous Waste Regulations	Washington Solid Waste Management Act and its implementing regulation: Criteria for Municipal Solid Waste Landfills	Hazardous Waste Operations	State Environmental Policy Act	Washington Minimum Standards for Construction and Decommissioning	Underground Injection Control Program	Right-of-Way Use and Construction	Fire Hydrant Access
		MTCA Method C	MTCA Method A	MTCA Method B	MTCA Method B										
A-01	Former USTs (TAU-01 and TAU-02)	X	X			X	X	X	X	X	X				
A-09	Acid Scrubber Drain Line	X		X		X	X	X	X	X	X				
A-14/A-15	Site-wide TCE and VC contamination in soil and groundwater and stormwater and/or surface water	X		X	X	X	X			X	X	X	X	X	X

Abbreviations and Acronyms:

AOC = area of concern
 CPOC = conditional point of compliance
 CUL = cleanup levels
 EISB = enhanced *in situ* bioremediation
 IC = Institutional Controls

MNA = monitored natural attenuation
 N/A = not applicable
 TCE = trichloroethene
 UST = underground storage tank
 VC = vinyl chloride

Conceptual Long-Term AOC A-14 Monitoring Plan

Technical Memorandum

TO: Li Ma, Washington State Department of Ecology

CC: Deborah Taege, The Boeing Company
James Swortz, The Boeing Company

FROM: Sarah Fees, LG

DATE: November 10, 2021

RE: **AOC A-14: Conceptual Long-term Groundwater Monitoring Plan
Boeing Auburn Facility
Auburn, Washington
Project No. 0025164.180.301**

Introduction

Landau Associates, Inc. (LAI) has prepared this technical memorandum, which presents the plan for the Site-wide groundwater monitoring program for monitored natural attenuation (MNA) cleanup of volatile organic compounds (VOCs) associated with previous releases from The Boeing Company's (Boeing's) Auburn Facility.¹ This monitoring plan will specifically address monitoring of the MNA remedy for Area of Concern (AOC) A-14 and does not address monitoring of other cleanup actions at the Boeing Auburn Site² (Site). The Boeing Auburn Plant is located at 700 15th Street Southwest, Auburn, Washington (State Dangerous Waste Identification [ID] Number WAD041337130). The Site is undergoing Resource Conservation and Recovery Act (RCRA) corrective action as required by Agreed Order Number 01HWTRNR-3345 (Agreed Order).³

The conceptual cleanup action for Site-wide trichloroethene (TCE) and vinyl chloride (VC) in groundwater (AOC A-14) was agreed upon by the Washington State Department of Ecology (Ecology) and Boeing as part of its Feasibility Study and Supplemental Feasibility Study. The cleanup action will consist of MNA throughout the Site and enhanced *in situ* bioremediation (EISB) in the northern residential area of Algona (Algona Focus Area). The conceptual cleanup action for AOC A-14 is shown on Figure 1. The cleanup action will be described in the Cleanup Action Plan (CAP) and will include groundwater sampling to monitor the effectiveness of the cleanup remedies.

Boeing is presenting this conceptual Long-term Groundwater Monitoring Plan to build consensus with Ecology on the groundwater monitoring plan requirements for AOC A-14 in an effort to expedite remedy implementation upon completion of the CAP. A final compliance monitoring plan will be submitted to Ecology following the completion of the CAP.

¹ The Facility includes the current boundaries of the Boeing Auburn Plant and the adjacent Prologis property, as defined in the Agreed Order.

² The Site includes the Facility and all contiguous property affected by releases of hazardous substances that are confirmed or suspected to have originated at the Facility.

³ The agreed order was originally dated May 15, 2002 (Ecology 2002), and first amended on April 7, 2006 (Ecology 2006) and second amended on November 1, 2018 (Ecology 2018).

Cleanup Standards

Ecology required cleanup levels developed for TCE and VC at the Site to use surface water quality standards (SWQS) as groundwater cleanup levels. In its September 14, 2021 letter (Ecology 2021), Ecology determined that cleanup levels identified as SWQS for VOCs in groundwater shall be met at a conditional point of compliance (CPOC) for the Site, specifically the Facility boundary. An environmental covenant will be placed on the affected Facility parcels upgradient of the CPOC to restrict groundwater use for drinking water. The proposed location for the CPOC is shown on Figure 1.

Groundwater Monitoring Plan Outline

An outline of the general plan for selection of groundwater monitoring locations and the rationale for changes over time as monitoring progresses are described below. Monitoring frequency will be adjusted in the future based on data and with Ecology's concurrence. SWQS have been identified as the overall groundwater CULs for the area downgradient of the CPOC; however, drinking water quality standards (DWQS) or other project milestones will be used to adjust monitoring frequency as remediation progresses.

- Facility monitoring:
 - Select locations on the Facility will be monitored for VOCs every 5 years.
 - Select locations along the Facility CPOC boundary will be monitored for VOCs every 2 years.
- The following general rules apply for groundwater monitoring downgradient of the CPOC:
 - Annual groundwater monitoring will occur in the Algona focus area. This monitoring will be used to supplement the monitoring conducted as part of the EISB injection activities, which will be described in the engineering design report (EDR).
 - Select locations with concentrations greater than DWQS and selected boundary locations would be monitored annually.
 - Select locations with exceedances of SWQS would be monitored every 5 years.
 - MNA parameters would be monitored at select wells every 5 years (except where monitored more frequently in the Algona area as part of the Algona focus area EISB).
 - Once a monitoring location reaches CULs (SWQS) it would be removed from the monitoring program (unless identified as a boundary well).
- Once concentrations decrease below DWQS at all wells monitored downgradient of the CPOC, monitoring and reporting would be reduced to every 5 years.

Groundwater Monitoring Plan

The proposed groundwater monitoring plan is described below. Table 1 provides the proposed sampling matrix for VOCs and MNA parameters. Monitoring locations were selected based on discussions with Ecology, concentrations of TCE and VC, and to provide spatial representation throughout at the Site. The

planned monitoring locations are shown on Figure 2. The planned locations are also included on plume concentration contours on Figures 3 through 8.

City of Pacific Sentry Wells

Two monitoring wells are selected for continued monitoring as sentry wells for the City of Pacific well field. AGW074 and AGW091, located between the well field and the Facility, will be monitored annually to verify that VOC concentrations remain below laboratory reporting limits. There have been no detections of VOCs (tetrachloroethene, TCE, cis-1,2-dichloroethene, and VC) at any of the City of Pacific sentry wells during the last 16 years of monitoring.

Facility Monitoring Wells

Eight wells at the Facility related to the former release areas will be monitored every 5 years. Facility monitoring wells include AGW037, AGW155, AGW201-2, AGW201-5, and AGW201-6 near Building 17-07 (former Western Plume release area) and AGW125, AGW126, and AGW283-1 near the Prologis building (former Area 1 plume release area). Seven of the wells will also be monitored for MNA parameters every 5 years.

CPOC Boundary Monitoring Wells

Per Ecology's request, six monitoring wells along the CPOC boundary will be monitored every 2 years. As indicated during discussions between Boeing and Ecology, if the concentrations in these wells continue to decrease over time, monitoring frequency will be decreased to every 5 years consistent with the other Facility monitoring wells. CPOC boundary monitoring wells include AGW032, AGW035, AGW064, AGW105R, AGW135, and AGW150.

Downgradient Monitoring Wells

Select locations downgradient of the Facility where concentrations are greater than DWQS will be monitored annually until concentrations reach DWQS. Once DWQS are reached, monitoring frequency will be adjusted to every 5 years. Select locations that exceed SWQS will be monitored every 5 years until concentrations meet SWQS. Once SWQS are met, the well will be removed from the monitoring network.

- Twelve monitoring wells that are currently greater than DWQS will be monitored annually. Nine of these wells will also be monitored for MNA parameters every 5 years.
- Seventeen monitoring wells that currently exceed SWQS will be monitored every 5 years. Five of these wells will also be monitored for MNA parameters every 5 years.

Algona Monitoring Wells

Select wells will be monitored more frequently as part of the EISB remedy, to be determined as part of the EDR. However, monitoring wells in the Algona Focus area will initially be monitored on an annual basis to provide additional data to supplement the EISB treatment. Twenty wells will be monitored annually during the EISB injection activities with monitoring to include both VOCs and MNA parameters. The sampling at

these Algona monitoring wells may be adjusted depending on the EISB injection and monitoring design. Annual monitoring will be discontinued after completion of EISB injection activities.

Boundary Locations

Monitoring wells and surface water, stormwater, and pore water boundary locations have been identified for monitoring the downgradient extents of the plumes. These boundary locations may change over time as the VOC-impacted area shrinks. Boundary monitoring locations include:

- Thirteen monitoring wells;
- Five stormwater/surface water locations; and
- Two pore water locations.

Six of the 13 monitoring wells will also be monitored for MNA parameters every five years.

Conclusions and Next Steps

The proposed monitoring plan will maintain sufficient data quality to allow for continued monitoring of the VOC-impacted groundwater over time. This plan outlines general monitoring activities and steps for modifications as appropriate. A final compliance monitoring plan will be submitted after finalization of the CAP. Any future modifications to the plan will be discussed with and approved by Ecology.

Use of This Technical Memorandum

This Technical Memorandum has been prepared for the exclusive use of The Boeing Company and Washington State Department of Ecology for specific application to the Boeing Auburn Facility. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of Landau Associates. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau Associates, shall be at the user's sole risk. Landau Associates warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. LAI makes no other warranty, either express or implied.

LANDAU ASSOCIATES, INC.



Sarah Fees, LG
Associate Geologist

SEF/KMG/kjg

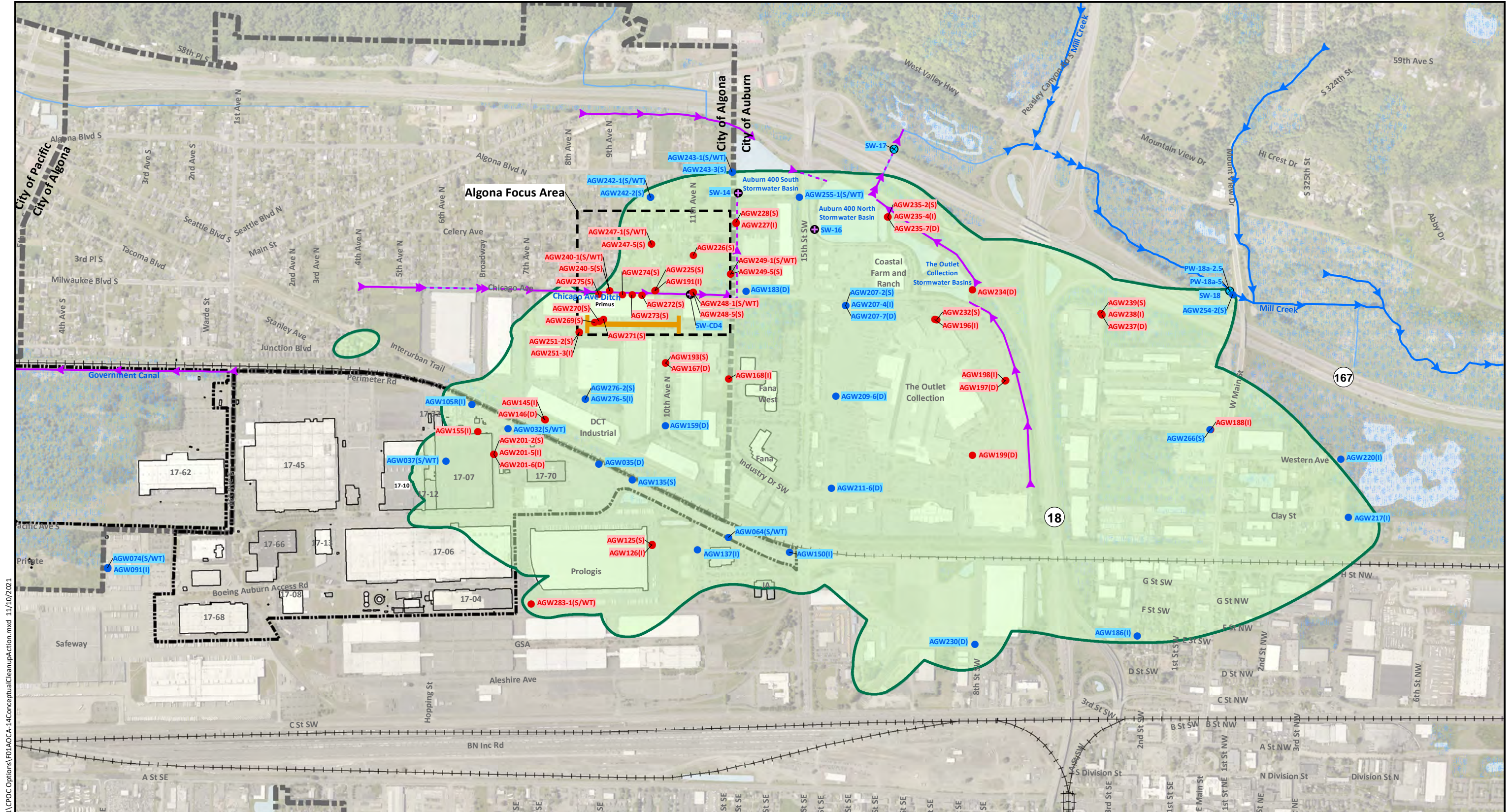
[Y:\025\164\R\DCAP\MONITORING PLAN\SITE-WIDE GROUNDWATER MONITORING PLAN_NOV2021.DOCX]

References

- Ecology. 2002. Agreed Order No. 01HWTRNR-3345. Washington State Department of Ecology. August 14.
- Ecology. 2006. First Amended Agreed Order No. 01HWTRNR-3345; In the Matter of Remedial Action by: The Boeing Company and AMB Property Corporation, to The Potentially Liable Parties. State of Washington Department of Ecology. April 7.
- Ecology. 2018. Second Amended Agreed Order No. 01HWTRNR-3345. In the Matter of Remedial Action by The Boeing Company and Prologis to The Potentially Liable Person(s). Washington State Department of Ecology. November 1.
- Ecology. 2021. Letter: Conditional Point of Compliance Request; Boeing Auburn Facility; Agreed Order No. 01HWTRNR-3345. From Li Ma, to The Boeing Company. September 14.

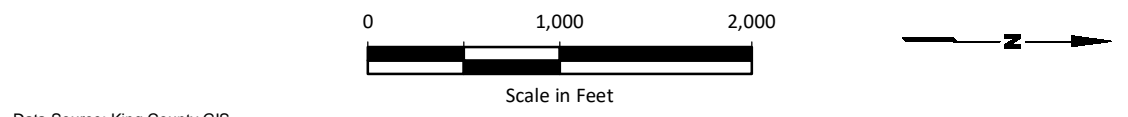
Attachments

- Figure 1: AOC A-14: Conceptual Cleanup Action (MNA and Algona Focus Area EISB)
- Figure 2: AOC A-14: Proposed Monitoring Plan – VOC Sampling Frequency
- Figure 3: AOC A-14: Shallow Zone Trichloroethene Concentrations June 2021
- Figure 4: AOC A-14: Shallow Zone Vinyl Chloride Concentrations June 2021
- Figure 5: AOC A-14: Intermediate Zone Trichloroethene Concentrations June 2021
- Figure 6: AOC A-14: Intermediate Zone Vinyl Chloride Concentrations June 2021
- Figure 7: AOC A-14: Deep Zone TCE Concentrations June 2021
- Figure 8: AOC A-14: Deep Zone Vinyl Chloride Concentrations June 2021
- Table 1: AOC A-14 Sampling Matrix



Notes
 1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

- Legend**
- Monitoring Well Proposed for Long-Term VOC Monitoring
 - Monitoring Well Proposed for Long-Term VOC and MNA Parameter Monitoring
 - ⊕ Stormwater Sample Location Proposed for Long-Term VOC Monitoring
 - ⊗ Surface Water Sample Location Proposed for Long-Term VOC Monitoring
 - ▭ TCE/VC Plume Extent - June 2021
 - ▭ City Limits
 - ▭ Boeing Property
 - ▭ Wetland Areas
 - ▭ Water Bodies
 - ▭ Waterways
 - ▭ Open Surface Water Waterway
 - ▭ Open Stormwater Waterway
 - ▭ Piped Surface Water Waterway
 - ▭ Piped Stormwater Waterway
 - ▭ Algona Focus Area Conceptual Enhanced In Situ Bioremediation (EISB) Injection Row

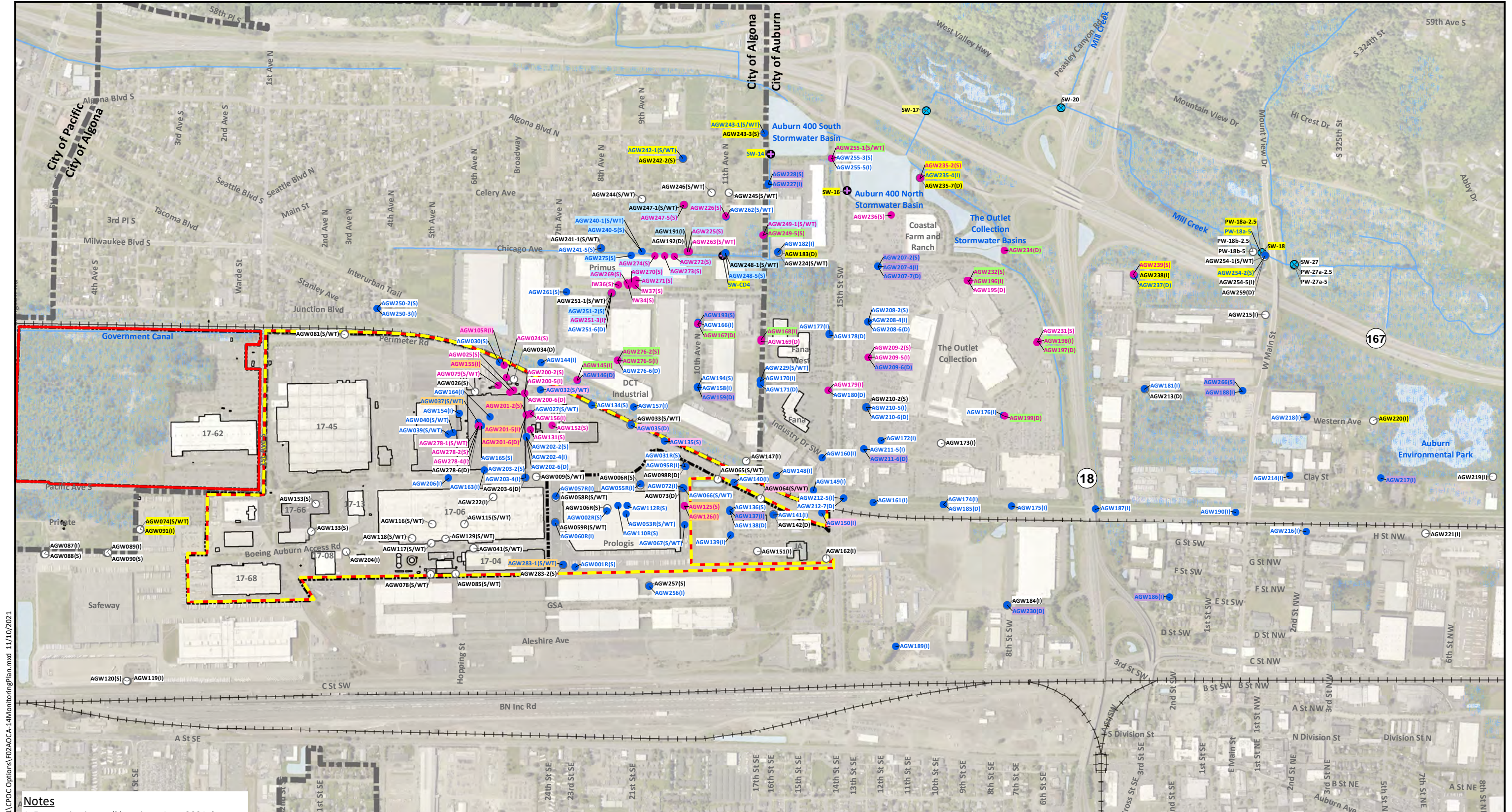


Data Source: King County GIS.

Boeing Auburn Cleanup Action Plan Auburn, Washington	AOC A-14: Conceptual Cleanup Action (Monitored Natural Attenuation and Algona Focus Area EISB)	Figure 1
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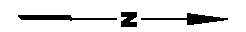
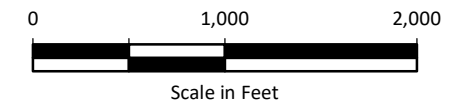




Notes

1. For monitoring well locations, June 2021 data are used. For pore water, stormwater feature, and surface water feature locations, September 2021 data are used.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

- Legend**
- Exceedance of SWQS (TCE>0.38 µg/L and/or VC>0.20 µg/L)
 - Greater than DWQS (TCE>4 µg/L and/or VC>0.29 µg/L)
 - No Exceedance
 - ⊕ Ongoing Stormwater Sample Location
 - ⊗ Ongoing Surface Water Sample Location
 - Facility Boundary
 - City Limits
 - Boeing Property
 - Wetland Areas
 - Water Bodies
 - Waterways
 - AGWXXX City of Pacific Sentry/Plume Boundary Location (Annual Monitoring)
 - AGWXXX Annual Monitoring (Currently Greater than DWQS)
 - AGWXXX Every 5 Year Monitoring (Currently Exceeds SWQS)
 - AGWXXX Algona EISB Wells (Initially Annual Monitoring)
 - AGWXXX CPOC Boundary Well (Every 2 Year Monitoring)
 - AGWXXX Facility Well (Every 5 Year Monitoring)

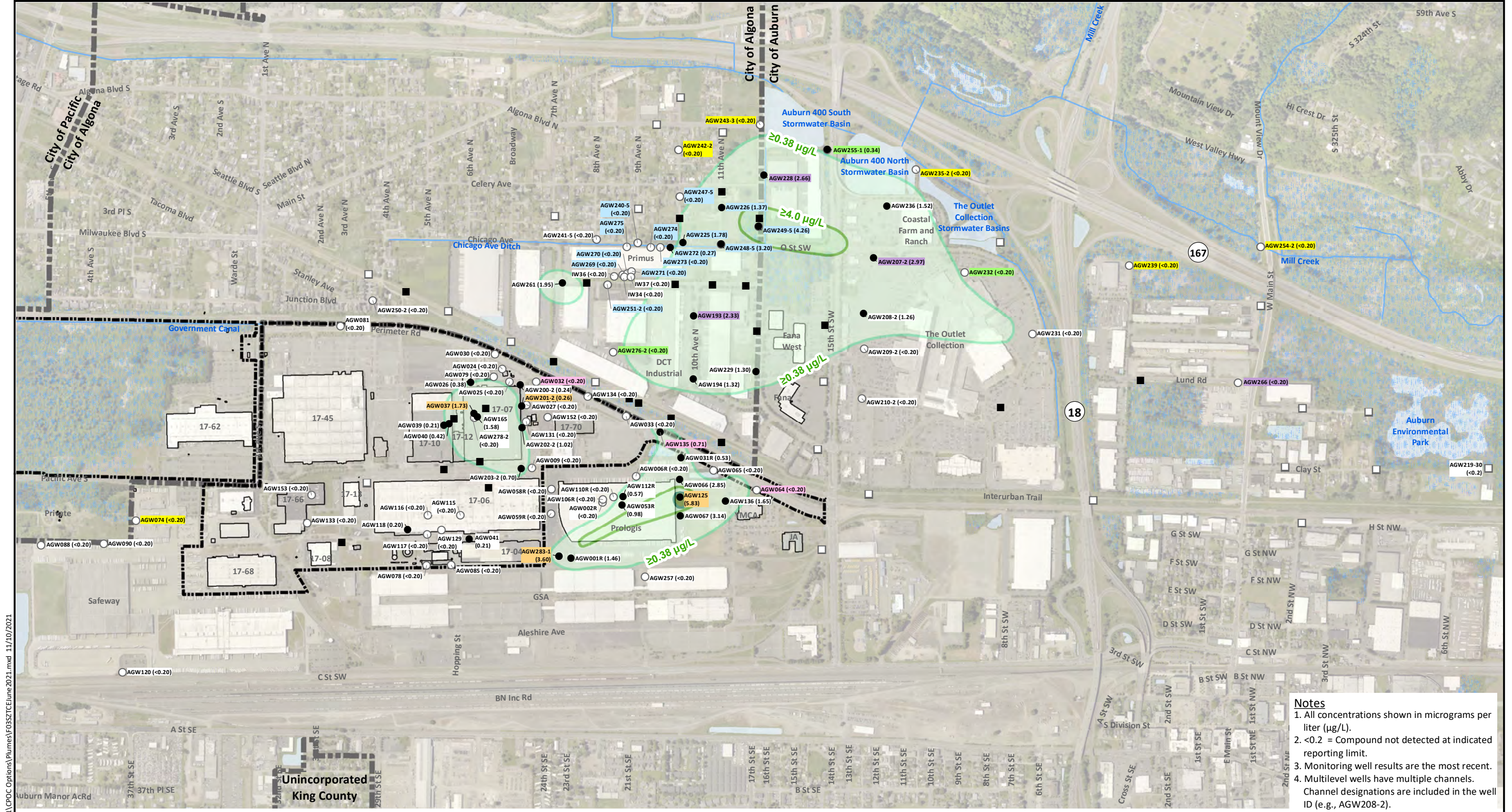


Data Source: King County GIS.

Boeing Auburn Cleanup Action Plan Auburn, Washington	AOC A-14 Proposed Monitoring Plan - VOC Sampling Frequency	Figure 2
------------------------------------------------------------	-----------------------------------------------------------------------	--------------------

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Legend

- Monitoring Well Location
- Historical Borehole Grab Sample Location
- Non-Detect
- City Limits
- Boeing Property
- Wetland Areas
- Water Bodies
- Waterways
- AGWXXX City of Pacific Sentry/Plume Boundary Location (Annual Monitoring)
- AGWXXX Annual Monitoring (Currently Greater than DWQS)
- AGWXXX Every 5 Year Monitoring (Currently Exceeds SWQS)
- AGWXXX Algona EISB Wells (Initially Annual Monitoring)
- AGWXXX CPOC Boundary Well (Every 2 Year Monitoring)
- AGWXXX Facility Well (Every 5 Year Monitoring)

Notes

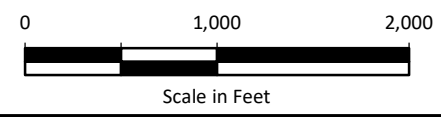
1. All concentrations shown in micrograms per liter (µg/L).
2. <0.2 = Compound not detected at indicated reporting limit.
3. Monitoring well results are the most recent.
4. Multilevel wells have multiple channels. Channel designations are included in the well ID (e.g., AGW208-2).
5. Wells with no results shown are no longer sampled.
6. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

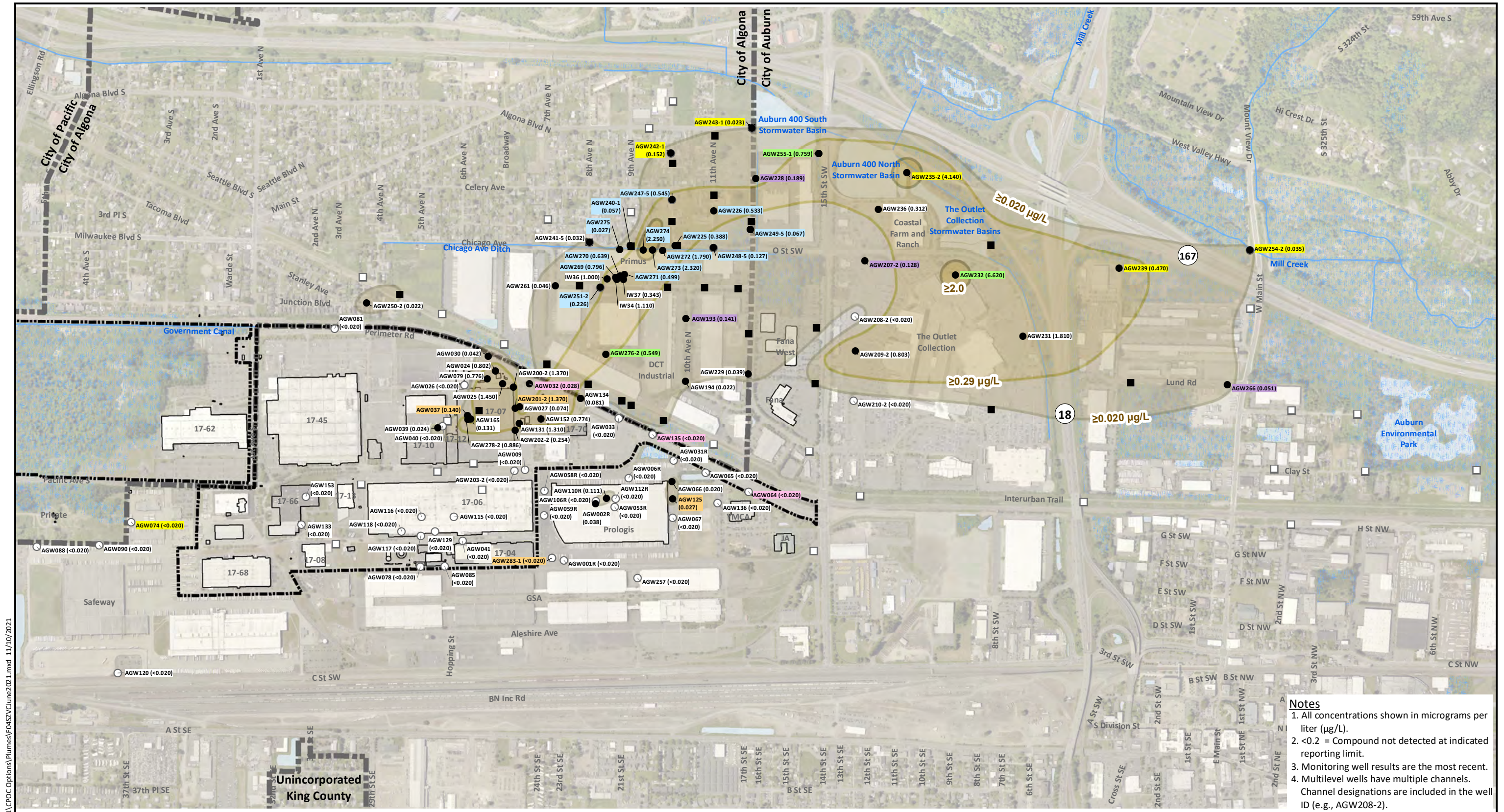
Data Source: King County.

Boeing Auburn
Cleanup Action Plan
Auburn, Washington

**AOC A-14: Shallow Zone
Trichloroethene Concentrations
June 2021**

Figure
3





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Legend

- Monitoring Well Location
- Historical Borehole Grab Sample Location
- ○ Non-Detect
- Vinyl Chloride Contour (≥2.0 µg/L)
- Vinyl Chloride Contour (≥0.29 µg/L)
- Vinyl Chloride Contour (≥0.020 µg/L)
- City Limits
- Boeing Property
- Wetland Areas
- Water Bodies
- Waterways
- AGWXXX City of Pacific Sentry/Plume Boundary Location (Annual Monitoring)
- AGWXXX Annual Monitoring (Currently Greater than DWQS)
- AGWXXX Every 5 Year Monitoring (Currently Exceeds SWQS)
- AGWXXX Algona EISB Wells (Initially Annual Monitoring)
- AGWXXX CPOC Boundary Well (Every 2 Year Monitoring)
- AGWXXX Facility Well (Every 5 Year Monitoring)

Data Source: King County GIS.

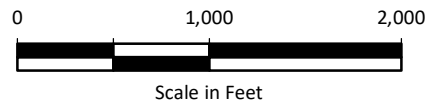
Boeing Auburn
Cleanup Action Plan
Auburn, Washington

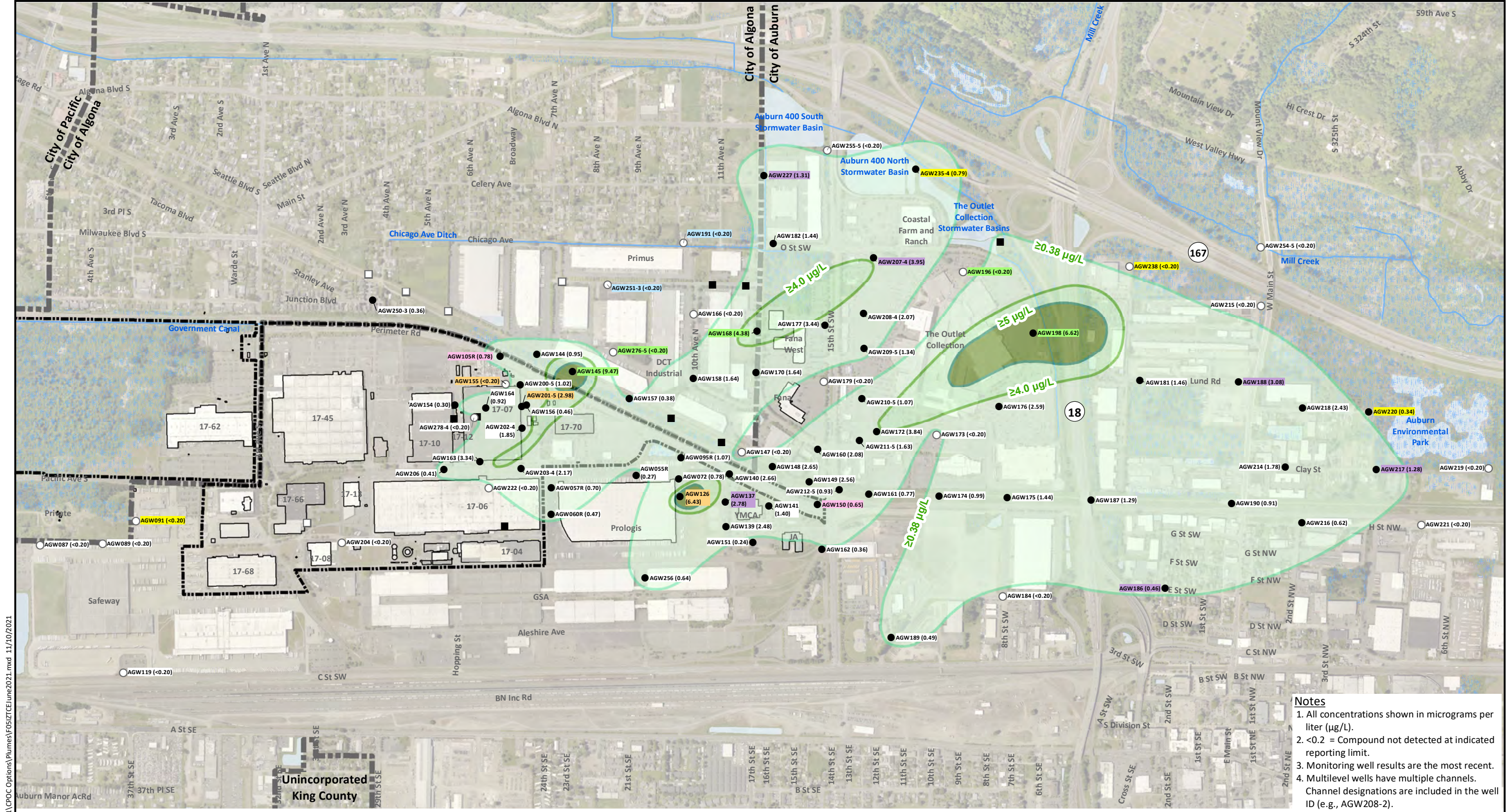
AOC A-14: Shallow Zone
Vinyl Chloride Concentrations
June 2021

Figure
4

Notes

1. All concentrations shown in micrograms per liter (µg/L).
2. <0.2 = Compound not detected at indicated reporting limit.
3. Monitoring well results are the most recent.
4. Multilevel wells have multiple channels. Channel designations are included in the well ID (e.g., AGW208-2).
5. Wells with no results shown are no longer sampled.
6. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.



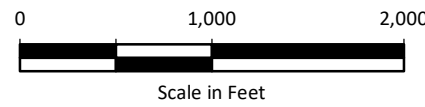


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Legend

- Monitoring Well Location
- Historical Borehole Grab Sample Location
- Non-Detect
- City Limits
- Boeing Property
- Wetland Areas
- Water Bodies
- Waterways

- AGWXXX City of Pacific Sentry/Plume Boundary Location (Annual Monitoring)
- AGWXXX Annual Monitoring (Currently Greater than DWQS)
- AGWXXX Every 5 Year Monitoring (Currently Exceeds SWQS)
- AGWXXX Algona EISB Wells (Initially Annual Monitoring)
- AGWXXX CPOC Boundary Well (Every 2 Year Monitoring)
- AGWXXX Facility Well (Every 5 Year Monitoring)



Data Source: King County GIS.

Boeing Auburn
Cleanup Action Plan
Auburn, Washington

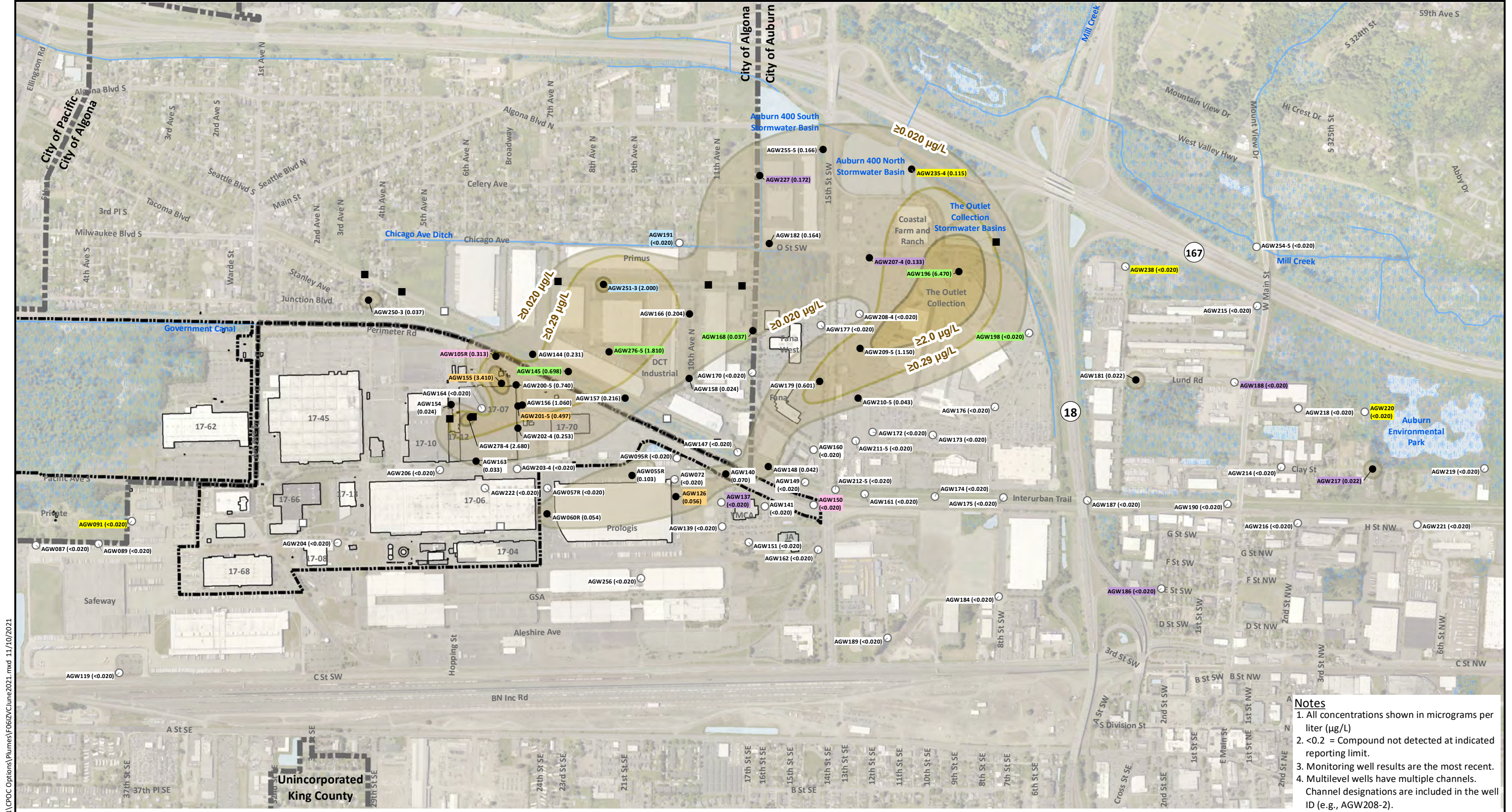
AOC A-14: Intermediate Zone
Trichloroethene Concentrations
June 2021

Figure
5

Notes

1. All concentrations shown in micrograms per liter (µg/L).
2. <0.2 = Compound not detected at indicated reporting limit.
3. Monitoring well results are the most recent.
4. Multilevel wells have multiple channels. Channel designations are included in the well ID (e.g., AGW208-2).
5. Wells with no results shown are no longer sampled.
6. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.



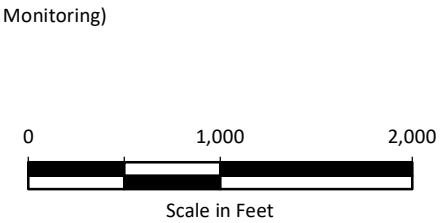


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Legend

- Monitoring Well Location
- Historical Borehole Grab Sample Location
- Non-Detect
- Vinyl Chloride Contour (≥2.0 µg/L)
- Vinyl Chloride Contour (≥0.29 µg/L)
- Vinyl Chloride Contour (≥0.020 µg/L)
- City Limits
- Boeing Property
- Wetland Areas
- Water Bodies
- Waterways
- AGWXXX City of Pacific Sentry/Plume Boundary Location (Annual Monitoring)
- AGWXXX Annual Monitoring (Currently Greater than DWQS)
- AGWXXX Every 5 Year Monitoring (Currently Exceeds SWQS)
- AGWXXX Algona EISB Wells (Initially Annual Monitoring)
- AGWXXX CPOC Boundary Well (Every 2 Year Monitoring)
- AGWXXX Facility Well (Every 5 Year Monitoring)



Data Source: King County GIS.

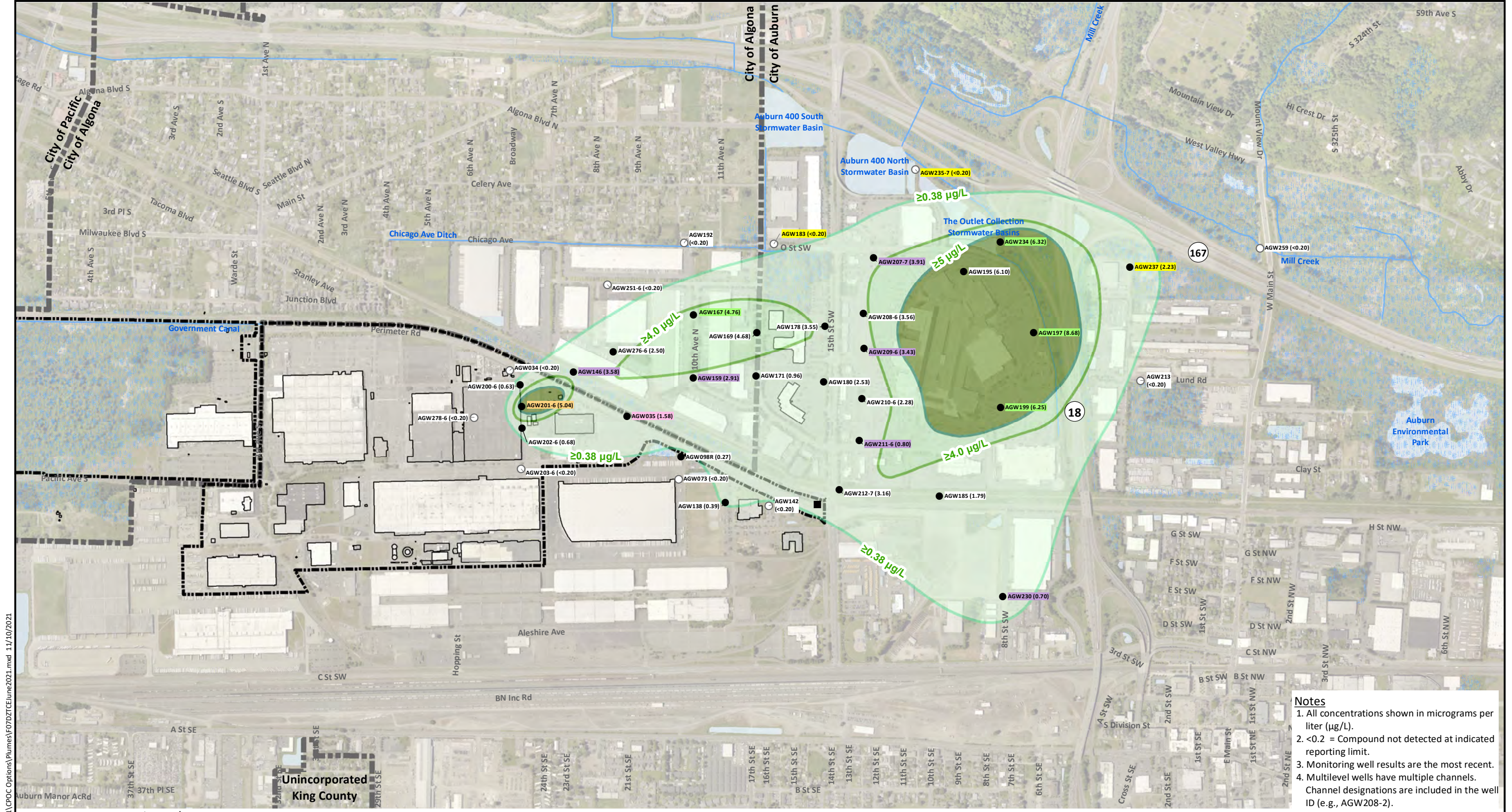
Boeing Auburn
Cleanup Action Plan
Auburn, Washington

AOC A-14: Intermediate Zone
Vinyl Chloride Concentrations
June 2021

Figure
6

Notes

1. All concentrations shown in micrograms per liter (µg/L)
2. <0.2 = Compound not detected at indicated reporting limit.
3. Monitoring well results are the most recent.
4. Multilevel wells have multiple channels. Channel designations are included in the well ID (e.g., AGW208-2).
5. Wells with no results shown are no longer sampled.
6. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.



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Legend

- Monitoring Well Location
- Historical Borehole Grab Sample Location
- Non-Detect
- TCE Contour (≥5.0 µg/L)
- TCE Contour (≥4.0 µg/L)
- TCE Contour (≥0.38 µg/L)
- City Limits
- Boeing Property
- Wetland Areas
- Water Bodies
- Waterways
- AGWXXX City of Pacific Sentry/Plume Boundary Location (Annual Monitoring)
- AGWXXX Annual Monitoring (Currently Greater than DWQS)
- AGWXXX Every 5 Year Monitoring (Currently Exceeds SWQS)
- AGWXXX Algona EISB Wells (Initially Annual Monitoring)
- AGWXXX CPOC Boundary Well (Every 2 Year Monitoring)
- AGWXXX Facility Well (Every 5 Year Monitoring)

Notes

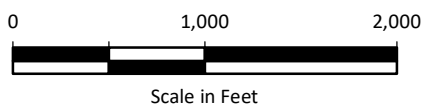
1. All concentrations shown in micrograms per liter (µg/L).
2. <0.2 = Compound not detected at indicated reporting limit.
3. Monitoring well results are the most recent.
4. Multilevel wells have multiple channels. Channel designations are included in the well ID (e.g., AGW208-2).
5. Wells with no results shown are no longer sampled.
6. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

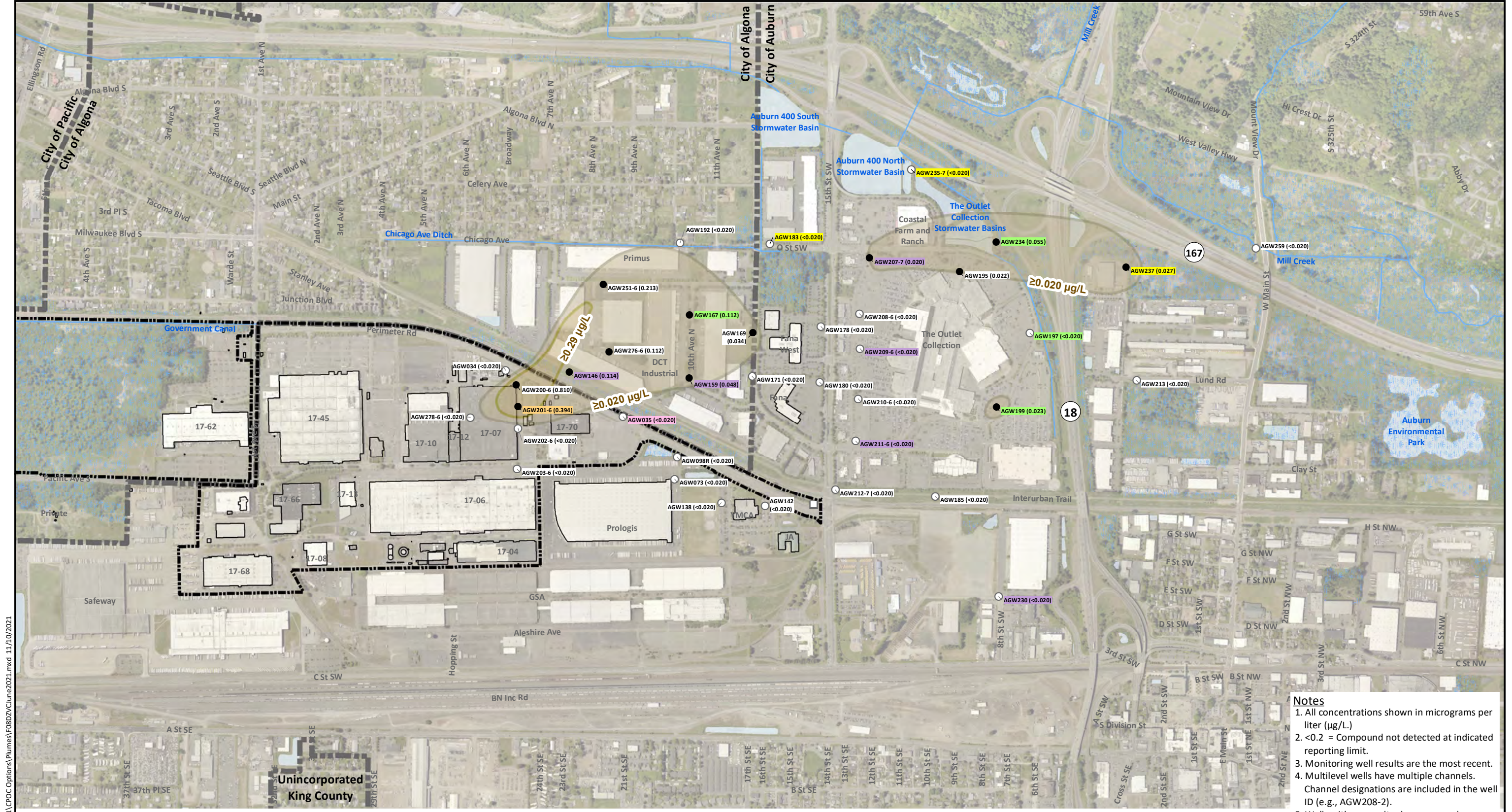
Data Source: King County GIS.

Boeing Auburn
Cleanup Action Plan
Auburn, Washington

AOC A-14: Deep Zone
Trichloroethene Concentrations
June 2021

Figure
7

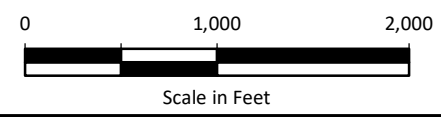
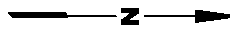




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Legend

- Monitoring Well Location
- Historical Borehole Grab Sample Location
- Non-Detect
- Vinyl Chloride Contour (≥2.0 µg/L)
- Vinyl Chloride Contour (≥0.29 µg/L)
- Vinyl Chloride Contour (≥0.020 µg/L)
- City Limits
- Boeing Property
- Wetland Areas
- Water Bodies
- Waterways
- AGWXXX City of Pacific Sentry/Plume Boundary Location (Annual Monitoring)
- AGWXXX Annual Monitoring (Currently Greater than DWQS)
- AGWXXX Every 5 Year Monitoring (Currently Exceeds SWQS)
- AGWXXX Algona EISB Wells (Initially Annual Monitoring)
- AGWXXX CPOC Boundary Well (Every 2 Year Monitoring)
- AGWXXX Facility Well (Every 5 Year Monitoring)



Data Source: King County GIS.

Boeing Auburn
Cleanup Action Plan
Auburn, Washington

AOC A-14: Deep Zone
Vinyl Chloride Concentrations
June 2021

Figure
8

- Notes**
1. All concentrations shown in micrograms per liter (µg/L.)
 2. <0.2 = Compound not detected at indicated reporting limit.
 3. Monitoring well results are the most recent.
 4. Multilevel wells have multiple channels. Channel designations are included in the well ID (e.g., AGW208-2).
 5. Wells with no results shown are no longer sampled.
 6. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

**Table 1
AOC A-14 Sampling Matrix
Boeing Auburn Facility
Auburn, Washington**

Sample ID	Groundwater Zone	Sampling Method (c)	Description	Location	Proposed Sampling Frequency - VOCs (a)	Proposed Sampling Frequency - MNA (b)	Recommendation for Sampling Frequency
AGW001R	S	PDB	On Facility (Prologis; Former Building 17-03)	Southeast of Prologis Building; South End of Area 1	--	--	Remove; SWQS exceedance; Adjacent to AGW283
AGW002R	S	Low Flow	On Facility (Prologis; Former Building 17-05)	In Prologis Building; Area 1	--	--	Remove; SWQS exceedance; 17-05 IRA Location
AGW006R	S	PDB	On Facility (Prologis; Former Building 17-05)	West of Prologis Building; Area 1	--	--	Remove; ND
AGW009	S	PDB	On Facility (Boeing Auburn)	Northwest of Building 17-06	--	--	Remove; ND
AGW024	S	PDB	On Facility (Boeing Auburn)	WWPTP	--	--	Remove; Greater than DWQS
AGW025	S	PDB	On Facility (Boeing Auburn)	East of WWPTP	--	--	Remove; Greater than DWQS
AGW026	S	PDB	On Facility (Boeing Auburn)	West of Building 17-07	--	--	Remove; ND
AGW027	S	PDB	On Facility (Boeing Auburn)	North of Building 17-07	--	--	Remove; SWQS exceedance
AGW030	S	PDB	On Facility (Boeing Auburn)	West of WWPTP; Property Boundary	--	--	Remove; SWQS exceedance
AGW031R	S	PDB	On Facility (Boeing Auburn)	Northwest of Prologis Building; Property Boundary	--	--	Remove; SWQS exceedance
AGW032	S	PDB	On Facility (Boeing Auburn)	North of WWPTP; Property Boundary	BE	--	CPOC Monitoring; SWQS exceedance
AGW033	S	PDB	On Facility (Boeing Auburn)	North of Building 17-70; Property Boundary	--	--	Remove; ND
AGW034	D	PDB	On Facility (Boeing Auburn)	WWPTP; Property Boundary	--	--	Remove; ND
AGW035	D	PDB	On Facility (Boeing Auburn)	North of Building 17-70; Property Boundary	BE	--	CPOC Monitoring; SWQS exceedance
AGW037	S	PDB	On Facility (Boeing Auburn)	South Part of Building 17-07	QE	--	Every 5 years; SWQS exceedance
AGW039	S	PDB	On Facility (Boeing Auburn)	North Part of Building 17-10	--	--	Remove; SWQS exceedance
AGW040	S	PDB	On Facility (Boeing Auburn)	North Part of Building 17-10	--	--	Remove; SWQS exceedance
AGW041	S	PDB	On Facility (Boeing Auburn)	East of Building 17-06	--	--	Remove; ND

Table 1
AOC A-14 Sampling Matrix
Boeing Auburn Facility
Auburn, Washington

Sample ID	Groundwater Zone	Sampling Method (c)	Description	Location	Proposed Sampling Frequency - VOCs (a)	Proposed Sampling Frequency - MNA (b)	Recommendation for Sampling Frequency
AGW053R	S	PDB	On Facility (Prologis)	In Prologis Building; Area 1	--	--	Remove; SWQS exceedance
AGW055R	I	PDB	On Facility (Prologis)	West of Prologis Building; Area 1	--	--	Remove; SWQS exceedance
AGW057R	I	PDB	On Facility (Prologis)	South of Prologis Building; South End of Area 1	--	--	Remove; SWQS exceedance
AGW058R	S	PDB	On Facility (Prologis)	South of Prologis Building; South End of Area 1	--	--	Remove; ND
AGW059R	S	PDB	On Facility (Prologis)	South of Prologis Building; South End of Area 1	--	--	Remove; ND
AGW060R	I	PDB	On Facility (Prologis)	South of Prologis Building; South End of Area 1	--	--	Remove; SWQS exceedance
AGW064	S	PDB	Downgradient (YMCA)	West of YMCA Building; Area 1	BE	--	CPOC Monitoring; ND
AGW065	S	PDB	Downgradient (YMCA)	South of YMCA Building; Area 1	--	--	Remove; ND
AGW066	S	PDB	On Facility (Prologis)	North of Prologis Building; Area 1	--	--	Remove; SWQS exceedance
AGW067	S	PDB	On Facility (Prologis)	N of Prologis Bldg; Area 1	--	--	Remove; SWQS exceedance
AGW072	I	PDB	On Facility (Prologis)	Northwest of Prologis Building; Area 1	--	--	Remove; SWQS exceedance
AGW073	D	PDB	On Facility (Prologis)	Northwest of Prologis Building; Area 1	--	--	Remove; ND
AGW074	S	PDB	City of Pacific Sentry Well	North of City of Pacific Wells	A	--	Annual; City of Pacific Sentry Well
AGW078	S	PDB	On Facility (Boeing Auburn)	Building 17-34 South; Property Boundary	--	--	Remove; ND
AGW079	S	PDB	On Facility (Boeing Auburn)	South of Building 17-15	--	--	Remove; Greater than DWQS
AGW081	S	PDB	On Facility (Boeing Auburn)	Perimeter Road West of Building 17-45; Property Boundary	--	--	Remove; ND
AGW085	S	PDB	On Facility (Boeing Auburn)	East of Building 17-34; Property Boundary	--	--	Remove; ND
AGW087	I	PDB	City of Pacific Sentry Well	East of City of Pacific Wells	--	--	Remove; ND

**Table 1
AOC A-14 Sampling Matrix
Boeing Auburn Facility
Auburn, Washington**

Sample ID	Groundwater Zone	Sampling Method (c)	Description	Location	Proposed Sampling Frequency - VOCs (a)	Proposed Sampling Frequency - MNA (b)	Recommendation for Sampling Frequency
AGW088	S	PDB	City of Pacific Sentry Well	East of City of Pacific Wells	--	--	Remove; ND
AGW089	I	PDB	City of Pacific Sentry Well	Northeast of City of Pacific Wells	--	--	Remove; ND
AGW090	S	PDB	City of Pacific Sentry Well	Northeast of City of Pacific Wells	--	--	Remove; ND
AGW091	I	PDB	City of Pacific Sentry Well	North of City of Pacific Wells	A	--	Annual; City of Pacific Sentry Well
AGW095R	I	PDB	On Facility (Prologis)	Northwest of Prologis Building; Area 1	--	--	Remove; SWQS exceedance
AGW098R	D	PDB	On Facility (Prologis)	Northwest of Prologis Building; Area 1	--	--	Remove; SWQS exceedance
AGW105R	I	PDB	On Facility (Boeing Auburn)	Perimeter Road West of WWPTP; Property Boundary	BE	--	CPOC Monitoring; Greater than DWQS
AGW106R	S	Low Flow	On Facility (Prologis)	In Prologis Building; Area 1	--	--	Remove; ND
AGW110R	S	Low Flow	On Facility (Prologis)	In Prologis Building; Area 1	--	--	Remove; SWQS exceedance; 17-05 IRA Location
AGW112R	S	PDB	On Facility (Prologis)	In Prologis Building; Area 1	--	--	Remove; SWQS exceedance; 17-05 IRA Location
AGW115	S	PDB	On Facility (Boeing Auburn)	In Building 17-06	--	--	Remove; ND
AGW116	S	PDB	On Facility (Boeing Auburn)	In Building 17-06	--	--	Remove; ND
AGW117	S	PDB	On Facility (Boeing Auburn)	In Building 17-06	--	--	Remove; ND
AGW118	S	PDB	On Facility (Boeing Auburn)	In Building 17-06	--	--	Remove; ND
AGW119	I	PDB	City of Pacific Sentry Well	East Side of Safeway Property	--	--	Remove; ND
AGW120	S	PDB	City of Pacific Sentry Well	East Side of Safeway Property	--	--	Remove; ND
AGW125	S	PDB	On Facility (Prologis)	North of Prologis Building; Area 1	QE	QE	Facility Monitoring; Greater than DWQS
AGW126	I	Low Flow	On Facility (Prologis)	North of Prologis Building; Area 1	QE	QE	Facility Monitoring; Greater than DWQS

Table 1
AOC A-14 Sampling Matrix
Boeing Auburn Facility
Auburn, Washington

Sample ID	Groundwater Zone	Sampling Method (c)	Description	Location	Proposed Sampling Frequency - VOCs (a)	Proposed Sampling Frequency - MNA (b)	Recommendation for Sampling Frequency
AGW129	S	PDB	On Facility (Boeing Auburn)	In Building 17-06	--	--	Remove; ND
AGW131	S	PDB	On Facility (Boeing Auburn)	North of Building 17-07	--	--	Remove; Greater than DWQS
AGW133	S	PDB	On Facility (Boeing Auburn)	East of Building 17-66	--	--	Remove; ND
AGW134	S	PDB	On Facility (Boeing Auburn)	Perimeter Road West of Building 17-70; Property Boundary	--	--	Remove; SWQS exceedance
AGW135	S	PDB	On Facility (Boeing Auburn)	Perimeter Road North of Building 17-70; Property Boundary	BE	--	CPOC Monitoring; SWQS exceedance
AGW136	S	PDB	Downgradient (YMCA)	South of YMCA Building; Area 1	--	--	Remove; SWQS Exceedance
AGW137	I	PDB	Downgradient (YMCA)	South of YMCA Building; Area 1	QE	--	Every 5 years; SWQS Exceedance
AGW138	D	PDB	Downgradient (YMCA)	South of YMCA Building; Area 1	--	--	Remove; SWQS exceedance
AGW139	I	PDB	Downgradient (YMCA)	Southeast of YMCA Building; Area 1	--	--	Remove; SWQS exceedance
AGW140	I	PDB	Downgradient (YMCA)	Southwest of YMCA Building; Area 1	--	--	Remove; SWQS exceedance
AGW141	I	PDB	Downgradient (YMCA)	North of YMCA Building; Area 1	--	--	Remove; SWQS exceedance
AGW142	D	PDB	Downgradient (YMCA)	North of YMCA Building; Area 1	--	--	Remove; ND
AGW144	I	PDB	Downgradient (Facility Boundary)	Interurban Trail, Northwest of WWPTP	--	--	Remove; SWQS exceedance
AGW145	I	PDB	Downgradient (Facility Boundary)	Interurban Trail, Northwest of WWPTP	A	QE	Annual; Greater than DWQS
AGW146	D	PDB	Downgradient (Facility Boundary)	Interurban Trail, Northwest of WWPTP	QE	QE	Every 5 years; SWQS Exceedance
AGW147	I	PDB	Downgradient (Facility Boundary)	Interurban Trail, West of YMCA/JA	--	--	Remove; ND
AGW148	I	PDB	Downgradient (Facility Boundary)	Interurban Trail, West of YMCA/JA	--	--	Remove; SWQS exceedance
AGW149	I	PDB	Downgradient (Facility Boundary)	Interurban Trail, West of YMCA/JA	--	--	Remove; SWQS exceedance

**Table 1
AOC A-14 Sampling Matrix
Boeing Auburn Facility
Auburn, Washington**

Sample ID	Groundwater Zone	Sampling Method (c)	Description	Location	Proposed Sampling Frequency - VOCs (a)	Proposed Sampling Frequency - MNA (b)	Recommendation for Sampling Frequency
AGW150	I	PDB	On Facility (Boeing Auburn)	West of YMCA/JA	BE	--	CPOC Monitoring; SWQS exceedance
AGW151	I	PDB	Downgradient (YMCA)	East of YMCA Building; Area 1	--	--	Remove; Below SWQS
AGW152	S	PDB	On Facility (Boeing Auburn)	North of Building 17-07	--	--	Remove; Greater than DWQS
AGW153	S	PDB	On Facility (Boeing Auburn)	In Building 17-66	--	--	Remove; ND
AGW154	I	PDB	On Facility (Boeing Auburn)	South of Building 17-07; South of Former Vapor Degreaser in Building 17-07	--	--	Remove; SWQS exceedance
AGW155	I	PDB	On Facility (Boeing Auburn)	West of Building 17-07	QE	QE	Facility Monitoring; Greater than DWQS
AGW156	I	PDB	On Facility (Boeing Auburn)	North of Building 17-07	--	--	Remove; Greater than DWQS
AGW157	I	PDB	Downgradient (Facility Boundary)	Northwest of Building 17-21; Property Boundary	--	--	Remove; SWQS exceedance
AGW158	I	PDB	Downgradient (Commercial Algona)	10th Street Southwest	--	--	Remove; SWQS exceedance
AGW159	D	PDB	Downgradient (Commercial Algona)	10th Street Southwest	QE	--	Every 5 years; SWQS Exceedance
AGW160	I	PDB	Downgradient (Commercial Auburn)	West of YMCA/JA - Industry Drive	--	--	Remove; SWQS exceedance
AGW161	I	PDB	Downgradient (Commercial Auburn)	Interurban Trail, North of 15th Street Southwest	--	--	Remove; SWQS exceedance
AGW162	I	PDB	Downgradient (YMCA/JA)	Northeast corner of YMCA/JA	--	--	Remove; Below SWQS
AGW163	I	PDB	On Facility (Boeing Auburn)	East of Building 17-07, near large door	--	--	Remove; SWQS exceedance
AGW164	I	PDB	On Facility (Boeing Auburn)	Building 17-07, near column A7	--	--	Remove; SWQS exceedance
AGW165	S	PDB	On Facility (Boeing Auburn)	Building 17-07, near column B9	--	--	Remove; SWQS exceedance
AGW166	I	PDB	Downgradient (Commercial Algona)	10th Street Southwest	--	--	Remove; SWQS exceedance
AGW167	D	PDB	Downgradient (Commercial Algona)	10th Street Southwest	A	QE	Annual; Greater than DWQS

**Table 1
AOC A-14 Sampling Matrix
Boeing Auburn Facility
Auburn, Washington**

Sample ID	Groundwater Zone	Sampling Method (c)	Description	Location	Proposed Sampling Frequency - VOCs (a)	Proposed Sampling Frequency - MNA (b)	Recommendation for Sampling Frequency
AGW168	I	PDB	Downgradient (Commercial Algona)	Boundary Boulevard	A	QE	Annual; Greater than DWQS
AGW169	D	PDB	Downgradient (Commercial Algona)	Boundary Boulevard	--	--	Remove; Greater than DWQS
AGW170	I	PDB	Downgradient (Commercial Algona)	Boundary Boulevard	--	--	Remove; SWQS exceedance
AGW171	D	PDB	Downgradient (Commercial Algona)	Boundary Boulevard	--	--	Remove; SWQS exceedance
AGW172	I	PDB	Downgradient (Outlet Collection)	Southeast corner of Outlet Collection Lot	--	--	Remove; SWQS exceedance
AGW173	I	PDB	Downgradient (Outlet Collection)	East side of Outlet Collection Lot	--	--	Remove; ND
AGW174	I	PDB	Downgradient (Commercial Auburn)	Interurban Trail, North of 15th Street Southwest	--	--	Remove; SWQS exceedance
AGW175	I	Low Flow	Downgradient (Commercial Auburn)	Interurban Trail, North of 15th Street Southwest	--	--	Remove; SWQS exceedance
AGW176	I	PDB	Downgradient (Outlet Collection)	Northeast corner of Outlet Collection Lot	--	--	Remove; SWQS exceedance
AGW177	I	PDB	Downgradient (Commercial Auburn)	Western Fana Property	--	--	Remove; SWQS exceedance
AGW178	D	PDB	Downgradient (Commercial Auburn)	Western Fana Property	--	--	Remove; SWQS exceedance
AGW179	I	PDB	Downgradient (Commercial Auburn)	Eastern Fana Property	--	--	Remove; Greater than DWQS
AGW180	D	PDB	Downgradient (Commercial Auburn)	Eastern Fana Property	--	--	Remove; SWQS exceedance
AGW181	I	PDB	Downgradient (Commercial Auburn)	South end of Lund Road	--	--	Remove; SWQS Exceedance
AGW182	I	PDB	Downgradient (Commercial Auburn)	O Street at Boundary Boulevard	--	--	Remove; SWQS exceedance
AGW183	D	PDB	Downgradient (Commercial Auburn)	O Street at Boundary Boulevard	A	--	Annual; Boundary Location
AGW184	I	PDB	Downgradient (Commercial Auburn)	8th Street at cul-de-sac	--	--	Remove; ND
AGW185	D	PDB	Downgradient (Commercial Auburn)	Interurban Trail, East of Outlet Collection	--	--	Remove; SWQS exceedance

**Table 1
AOC A-14 Sampling Matrix
Boeing Auburn Facility
Auburn, Washington**

Sample ID	Groundwater Zone	Sampling Method (c)	Description	Location	Proposed Sampling Frequency - VOCs (a)	Proposed Sampling Frequency - MNA (b)	Recommendation for Sampling Frequency
AGW186	I	PDB	Downgradient (Commercial Auburn)	E Street and 3rd	QE	--	Every 5 years; SWQS exceedance
AGW187	I	PDB	Downgradient (Commercial Auburn)	Interurban Trail, North side of SR 18	--	--	Remove; SWQS exceedance
AGW188	I	Low Flow	Downgradient (Commercial Auburn)	Lund Road at Main Street	QE	QE	Every 5 years; SWQS Exceedance
AGW189	I	PDB	Downgradient (Commercial Auburn)	City of Auburn Maintenance Facility	--	--	Remove; SWQS exceedance
AGW190	I	PDB	Downgradient (Commercial Auburn)	Interurban Trail at Main Street	--	--	Remove; SWQS exceedance
AGW191	I	PDB	Downgradient (Residential Algona)	Chicago Avenue and 10th Avenue, Algona	A	A	Annual; Algona EISB
AGW192	D	PDB	Downgradient (Residential Algona)	Chicago Avenue and 10th Avenue, Algona	--	--	Remove; ND
AGW193	S	PDB	Downgradient (Commercial Algona)	10th Street Southwest, Algona	QE	QE	Every 5 years; SWQS Exceedance
AGW194	S	PDB	Downgradient (Commercial Algona)	10th Street Southwest, Algona	--	--	Remove; SWQS exceedance
AGW195	D	PDB	Downgradient (Outlet Collection)	Outlet Collection-delivery area, West side	--	--	Remove; Greater than DWQS
AGW196	I	PDB	Downgradient (Outlet Collection)	Outlet Collection-delivery area, West side	A	QE	Annual; Greater than DWQS
AGW197	D	PDB	Downgradient (Outlet Collection)	Outlet Collection-West of Sam's Club	A	QE	Annual; Greater than DWQS
AGW198	I	PDB	Downgradient (Outlet Collection)	Outlet Collection-West of Sam's Club	A	QE	Annual; Greater than DWQS
AGW199	D	PDB	Downgradient (Outlet Collection)	Outlet Collection-North of Marshalls	A	QE	Annual; Greater than DWQS
AGW200-2	S	Low Flow	On Facility (Boeing Auburn)	Outside Building 17-07 Northwest Corner	--	--	Remove; Greater than DWQS
AGW200-5	I	Low Flow	On Facility (Boeing Auburn)	Outside Building 17-07 Northwest Corner	--	--	Remove; Greater than DWQS
AGW200-6	D	Low Flow	On Facility (Boeing Auburn)	Outside Building 17-07 Northwest Corner	--	--	Remove; Greater than DWQS
AGW201-2	S	Low Flow	On Facility (Boeing Auburn)	Outside Building 17-07 North Central	QE	QE	Facility Monitoring; Greater than DWQS

**Table 1
AOC A-14 Sampling Matrix
Boeing Auburn Facility
Auburn, Washington**

Sample ID	Groundwater Zone	Sampling Method (c)	Description	Location	Proposed Sampling Frequency - VOCs (a)	Proposed Sampling Frequency - MNA (b)	Recommendation for Sampling Frequency
AGW201-5	I	Low Flow	On Facility (Boeing Auburn)	Outside Building 17-07 North Central	QE	QE	Facility Monitoring; Greater than DWQS
AGW201-6	D	Low Flow	On Facility (Boeing Auburn)	Outside Building 17-07 North Central	QE	QE	Facility Monitoring; Greater than DWQS
AGW202-2	S	Low Flow	On Facility (Boeing Auburn)	Outside Building 17-07 East Central	--	--	Remove; SWQS exceedance
AGW202-4	I	Low Flow	On Facility (Boeing Auburn)	Outside Building 17-07 East Central	--	--	Remove; SWQS exceedance
AGW202-6	D	Low Flow	On Facility (Boeing Auburn)	Outside Building 17-07 East Central	--	--	Remove; SWQS exceedance
AGW203-2	S	Low Flow	On Facility (Boeing Auburn)	Staging area between Buildings 17-07 and 17-06	--	--	Remove; SWQS exceedance
AGW203-4	I	Low Flow	On Facility (Boeing Auburn)	Staging area between Buildings 17-07 and 17-06	--	--	Remove; SWQS exceedance
AGW203-6	D	Low Flow	On Facility (Boeing Auburn)	Staging area between Buildings 17-07 and 17-06	--	--	Remove; ND
AGW204	I	PDB	On Facility (Boeing Auburn)	In grass Northwest of Bldg 17-08	--	--	Remove; ND
AGW206	I	PDB	On Facility (Boeing Auburn)	In parking area, East of Building 17-10	--	--	Remove; SWQS exceedance
AGW207-2	S	Low Flow	Downgradient (Outlet Collection)	Outlet Collection parking lot, Southwest corner	QE	--	Every 5 years; SWQS Exceedance
AGW207-4	I	Low Flow	Downgradient (Outlet Collection)	Outlet Collection parking lot, Southwest corner	QE	--	Every 5 years; SWQS Exceedance
AGW207-7	D	Low Flow	Downgradient (Outlet Collection)	Outlet Collection parking lot, Southwest corner	QE	--	Every 5 years; SWQS Exceedance
AGW208-2	S	Low Flow	Downgradient (Outlet Collection)	Outlet Collection parking lot across from Taco Del Mar	--	--	Remove; SWQS exceedance
AGW208-4	I	Low Flow	Downgradient (Outlet Collection)	Outlet Collection parking lot across from Taco Del Mar	--	--	Remove; SWQS exceedance
AGW208-6	D	Low Flow	Downgradient (Outlet Collection)	Outlet Collection parking lot across from Taco Del Mar	--	--	Remove; SWQS exceedance
AGW209-2	S	Low Flow	Downgradient (Outlet Collection)	Outlet Collection parking lot across from Starbucks	--	--	Remove; Greater than DWQS
AGW209-5	I	Low Flow	Downgradient (Outlet Collection)	Outlet Collection parking lot across from Starbucks	--	--	Remove; Greater than DWQS

Table 1
AOC A-14 Sampling Matrix
Boeing Auburn Facility
Auburn, Washington

Sample ID	Groundwater Zone	Sampling Method (c)	Description	Location	Proposed Sampling Frequency - VOCs (a)	Proposed Sampling Frequency - MNA (b)	Recommendation for Sampling Frequency
AGW209-6	D	Low Flow	Downgradient (Outlet Collection)	Outlet Collection parking lot across from Starbucks	QE	--	Every 5 years; SWQS Exceedance
AGW210-2	S	Low Flow	Downgradient (Outlet Collection)	Outlet Collection parking lot across from IHOP	--	--	Remove; ND
AGW210-5	I	Low Flow	Downgradient (Outlet Collection)	Outlet Collection parking lot across from IHOP	--	--	Remove; SWQS exceedance
AGW210-6	D	Low Flow	Downgradient (Outlet Collection)	Outlet Collection parking lot across from IHOP	--	--	Remove; SWQS exceedance
AGW211-5	I	Low Flow	Downgradient (Outlet Collection)	Outlet Collection parking lot across from Red Robin	--	--	Remove; SWQS exceedance
AGW211-6	D	Low Flow	Downgradient (Outlet Collection)	Outlet Collection parking lot across from Red Robin	QE	--	Every 5 years; SWQS Exceedance
AGW212-5	I	Low Flow	Downgradient (Commerical Auburn)	Interurban Trail at 15th Street Southwest	--	--	Remove; SWQS exceedance
AGW212-7	D	Low Flow	Downgradient (Commerical Auburn)	Interurban Trail at 15th Street Southwest	--	--	Remove; SWQS exceedance
AGW213	D	PDB	Downgradient (Commerical Auburn)	South End of Lund Road	--	--	Remove; ND
AGW214	I	Low Flow	Downgradient (Commerical Auburn)	Sputh end of Clay Street, West side of street in parking lane next to driveway	--	--	Remove; SWQS exceedance
AGW215	I	Low Flow	Downgradient (Commerical Auburn)	West Main Street access Road, North side of road	--	--	Remove; ND
AGW216	I	Low Flow	Downgradient (Commerical Auburn)	H Street, intersection with 2nd Street, West side	--	--	Remove; SWQS exceedance
AGW217	I	Low Flow	Downgradient (Commerical Auburn)	Clay Street, halfway up West side	QE	--	Every 5 years; SWQS Exceedance
AGW218	I	Low Flow	Downgradient (Commerical Auburn)	Western Avenue, West side, in grass next to sidewalk North of driveway	--	--	Remove; SWQS Exceedance
AGW219	I	PDB	Downgradient (Commerical Auburn)	Clay Street, West side of cul-de-sac at North end	--	--	Remove; ND
AGW220	I	Low Flow	Downgradient (Commerical Auburn)	Western Avenue, North end	A	--	Annual; Boundary Location
AGW221	I	Low Flow	Downgradient (Commerical Auburn)	H Street instersection with 6th, West side in gravel	--	--	Remove; ND
AGW222	I	PDB	On Facility (Boeing Auburn)	In Building 17-06	--	--	Remove; ND

**Table 1
AOC A-14 Sampling Matrix
Boeing Auburn Facility
Auburn, Washington**

Sample ID	Groundwater Zone	Sampling Method (c)	Description	Location	Proposed Sampling Frequency - VOCs (a)	Proposed Sampling Frequency - MNA (b)	Recommendation for Sampling Frequency
AGW225	S (WT)	Low Flow	Downgradient (Residential Algona)	Chicago Avenue and 10th Avenue, Algona	A	A	Annual; Algona EISB
AGW226	S (WT)	Low Flow	Downgradient (Residential Algona)	11th Avenue, Algona	A	A	Annual; Algona EISB
AGW227	I	PDB	Downgradient (Commerical Algona/Auburn)	West end of Boundary Boulevard	QE	QE	Every 5 years; SWQS Exceedance
AGW228	S	Low Flow	Downgradient (Commerical Algona/Auburn)	West end of Boundary Boulevard	QE	QE	Every 5 years; SWQS Exceedance
AGW229	S (WT)	PDB	Downgradient (Commercial Algona)	Boundary Boulevard	--	--	Remove; SWQS exceedance
AGW230	D	PDB	Downgradient (Commerical Auburn)	8th Street at cul-de-sac	QE	--	Every 5 years; SWQS Exceedance
AGW231	S	PDB	Downgradient (Outlet Collection)	Outlet Collection-North of Marshalls	--	--	Remove; Greater than DWQS
AGW232	S	PDB	Downgradient (Outlet Collection)	Outlet Collection-delivery area, West side	A	QE	Annual; Greater than DWQS
AGW234	D	PDB	Downgradient (Outlet Collection Stormwater Ponds)	Access road to Outlet Collection stormwater ponds	A	QE	Annual; Greater than DWQS
AGW235-2	S	Low Flow	Downgradient (Outlet Collection Stormwater Ponds)	Access road to Outlet Collection stormwater ponds	A	QE	Annual; Boundary Location
AGW235-4	I	Low Flow	Downgradient (Outlet Collection Stormwater Ponds)	Access road to Outlet Collection stormwater ponds	A	QE	Annual; Boundary Location
AGW235-7	D	Low Flow	Downgradient (Outlet Collection Stormwater Ponds)	Access road to Outlet Collection stormwater ponds	A	QE	Annual; Boundary Location
AGW236	S	Low Flow	Downgradient (Coastal Farm&Ranch)	Coastal Farm & Ranch Parking Lot	--	--	Remove; Greater than DWQS
AGW237	D	PDB	Downgradient (Commerical Auburn)	Auburn School District, Northwest corner of property	A	QE	Annual; Boundary Location
AGW238	I	PDB	Downgradient (Commerical Auburn)	Auburn School District, Northwest corner of property	A	QE	Annual; Boundary Location
AGW239	S	Low Flow	Downgradient (Commerical Auburn)	Auburn School District, Northwest corner of property	A	QE	Annual; Boundary Location
AGW240-1	S (WT)	Low Flow	Downgradient (Residential Algona)	Chicago Avenue and 9th Avenue, Algona	A	A	Annual; Algona EISB
AGW240-5	S	Low Flow	Downgradient (Residential Algona)	Chicago Avenue and 9th Avenue, Algona	A	A	Annual; Algona EISB

**Table 1
AOC A-14 Sampling Matrix
Boeing Auburn Facility
Auburn, Washington**

Sample ID	Groundwater Zone	Sampling Method (c)	Description	Location	Proposed Sampling Frequency - VOCs (a)	Proposed Sampling Frequency - MNA (b)	Recommendation for Sampling Frequency
AGW241-1	S (WT)	Low Flow	Downgradient (Residential Algona)	Chicago Avenue and 8th Avenue, Algona	--	--	Remove; ND
AGW241-5	S	Low Flow	Downgradient (Residential Algona)	Chicago Avenue and 8th Avenue, Algona	--	--	Remove; SWQS exceedance
AGW242-1	S (WT)	Low Flow	Downgradient (Residential Algona)	10th Avenue North and Algona Boulevard, Algona	A	--	Annual; Boundary Location
AGW242-2	S	Low Flow	Downgradient (Residential Algona)	10th Avenue North and Algona Boulevard, Algona	A	--	Annual; Boundary Location
AGW243-1	S (WT)	Low Flow	Downgradient (Residential Algona)	Boundary Boulevard and Algona Boulevard, Algona	A	--	Annual; Boundary Location
AGW243-3	S	Low Flow	Downgradient (Residential Algona)	Boundary Boulevard and Algona Boulevard, Algona	A	--	Annual; Boundary Location
AGW244	S (WT)	Low Flow	Downgradient (Residential Algona)	Celery Avenue and 9th Avenue, Algona	--	--	Remove; ND
AGW245	S (WT)	PDB	Downgradient (Residential Algona)	11th Avenue between Algona Boulevard and Celery Avenue, Algona	--	--	Remove; ND
AGW246	S (WT)	PDB	Downgradient (Residential Algona)	Celery Avenue between 11th Avenue and 10th Avenue, Algona	--	--	Remove; ND
AGW247-1	S (WT)	Low Flow	Downgradient (Residential Algona)	10th Avenue East of Algona Boulevard, Algona	A	A	Annual; Algona EISB
AGW247-5	S	Low Flow	Downgradient (Residential Algona)	10th Avenue East of Algona Boulevard, Algona	A	A	Annual; Algona EISB
AGW248-1	S (WT)	Low Flow	Downgradient (Residential Algona)	Chicago Avenue and 11th Avenue, Algona	A	A	Annual; Algona EISB
AGW248-5	S	Low Flow	Downgradient (Residential Algona)	Chicago Avenue and 11th Avenue, Algona	A	A	Annual; Algona EISB
AGW249-1	S (WT)	Low Flow	Downgradient (Residential Algona)	Boundary Boulevard, Algona	A	A	Annual; Algona EISB; Greater than DWQS
AGW249-5	S	Low Flow	Downgradient (Residential Algona)	Boundary Boulevard, Algona	A	A	Annual; Algona EISB; Greater than DWQS
AGW250-2	S	Low Flow	Downgradient (Residential Algona - Junction Blvd)	Junction Boulevard, Algona	--	--	Remove; SWQS exceedance
AGW250-3	I	Low Flow	Downgradient (Residential Algona - Junction Blvd)	Junction Boulevard, Algona	--	--	Remove; SWQS exceedance
AGW251-1	S (WT)	Low Flow	Downgradient (Commercial Algona)	Milwaukee Boulevard, Algona	--	--	Remove; ND

**Table 1
AOC A-14 Sampling Matrix
Boeing Auburn Facility
Auburn, Washington**

Sample ID	Groundwater Zone	Sampling Method (c)	Description	Location	Proposed Sampling Frequency - VOCs (a)	Proposed Sampling Frequency - MNA (b)	Recommendation for Sampling Frequency
AGW251-2	S	Low Flow	Downgradient (Commercial Algona)	Milwaukee Boulevard, Algona	A	A	Annual; Algona EISB
AGW251-3	I	Low Flow	Downgradient (Commercial Algona)	Milwaukee Boulevard, Algona	A	A	Annual; Algona EISB
AGW251-6	D	Low Flow	Downgradient (Commercial Algona)	Milwaukee Boulevard, Algona	--	--	Remove; SWQS exceedance
AGW254-1	S (WT)	Low Flow	Downgradient (Auburn - Mill Creek)	South Access Road, West Main Street	--	--	Remove; ND
AGW254-2	S	Low Flow	Downgradient (Auburn - Mill Creek)	South Access Road, West Main Street	A	--	Annual; Boundary Location
AGW254-5	I	Low Flow	Downgradient (Auburn - Mill Creek)	South Access Road, West Main Street	--	--	Remove; ND
AGW255-1	S (WT)	Low Flow	Downgradient (Auburn - Stormwater Basins)	15th Street Southwest, North of O Street	A	--	Annual; Greater than DWQS
AGW255-3	S	Low Flow	Downgradient (Auburn - Stormwater Basins)	15th Street Southwest, North of O Street	--	--	Remove; SWQS exceedance
AGW255-5	I	Low Flow	Downgradient (Auburn - Stormwater Basins)	15th Street Southwest, North of O Street	--	--	Remove; SWQS exceedance
AGW256	I	PDB	Upgradient (GSA)	GSA, South of Northwest Building	--	--	Remove; SWQS exceedance
AGW257	S	PDB	Upgradient (GSA)	GSA, South of Northwest Building	--	--	Remove; ND
AGW259	D	PDB	Downgradient (Auburn - Mill Creek)	S Access Road, West Main Street	--	--	Remove; ND
AGW261	S	PDB	Downgradient (Commercial Algona)	South end of Milwaukee Boulevard, Algona	--	--	Remove; SWQS exceedance
AGW262	S (WT)	PDB	Downgradient (Residential Algona)	11th Avenue, Algona	--	--	Remove; SWQS exceedance
AGW263	S (WT)	PDB	Downgradient (Residential Algona)	Chicago Avenue and 10th Avenue, Algona	--	--	Remove; Greater than DWQS
AGW266	S	PDB	Downgradient (Commercial Auburn)	Lund Road at Main Street	QE	--	Every 5 years; SWQS exceedance
AGW269	S	Low Flow	Downgradient (Commercial Algona)	Primus, East of Warehouse	A	A	Annual; Algona EISB
AGW270	S	Low Flow	Downgradient (Commercial Algona)	Primus, East of Warehouse	A	A	Annual; Algona EISB

**Table 1
AOC A-14 Sampling Matrix
Boeing Auburn Facility
Auburn, Washington**

Sample ID	Groundwater Zone	Sampling Method (c)	Description	Location	Proposed Sampling Frequency - VOCs (a)	Proposed Sampling Frequency - MNA (b)	Recommendation for Sampling Frequency
AGW271	S	Low Flow	Downgradient (Commercial Algona)	Primus, East of Warehouse	A	A	Annual; Algona EISB
AGW272	S	Low Flow	Downgradient (Commercial Algona)	Primus, West of Warehouse	A	A	Annual; Algona EISB
AGW273	S	Low Flow	Downgradient (Commercial Algona)	Primus, West of Warehouse	A	A	Annual; Algona EISB
AGW274	S	Low Flow	Downgradient (Commercial Algona)	Primus, West of Warehouse	A	A	Annual; Algona EISB
AGW275	S	Low Flow	Downgradient (Commercial Algona)	Primus, West of Warehouse	A	A	Annual; Algona EISB
AGW276-2	S	Low Flow	Downgradient (Commercial Algona)	DCT Industrial	A	--	Annual; Greater than DWQS
AGW276-5	I	Low Flow	Downgradient (Commercial Algona)	DCT Industrial	A	--	Annual; Greater than DWQS
AGW276-6	D	Low Flow	Downgradient (Commercial Algona)	DCT Industrial	--	--	Remove; SWQS exceedance
AGW278-1	S (WT)	Low Flow	On Facility (Boeing Auburn)	South Part of Building 17-07	--	--	Remove; Greater than DWQS
AGW278-2	S	Low Flow	On Facility (Boeing Auburn)	South Part of Building 17-07	--	--	Remove; Greater than DWQS
AGW278-4	I	Low Flow	On Facility (Boeing Auburn)	South Part of Building 17-07	--	--	Remove; Greater than DWQS
AGW278-6	D	Low Flow	On Facility (Boeing Auburn)	South Part of Building 17-07	--	--	Remove; Greater than DWQS
AGW283-1	S (WT)	Low Flow	On Facility (Prologis)	Southeast of Prologis Building	QE	QE	Facility Monitoring; SWQS exceedance
AGW283-2	S	Low Flow	On Facility (Prologis)	Southeast of Prologis Buidling; South End of Area 1	--	--	Remove; ND

Table 1
AOC A-14 Sampling Matrix
Boeing Auburn Facility
Auburn, Washington

Sample ID	Groundwater Zone	Sampling Method (c)	Description	Location	Proposed Sampling Frequency - VOCs (a)	Proposed Sampling Frequency - MNA (b)	Recommendation for Sampling Frequency
IW34	S	Low Flow	Downgradient (Commercial Algona)	Primus, East of Warehouse	--	--	Remove; Greater than DWQS
IW36	S	Low Flow	Downgradient (Commercial Algona)	Primus, East of Warehouse	--	--	Remove; Greater than DWQS
IW37	S	Low Flow	Downgradient (Commercial Algona)	Primus, East of Warehouse	--	--	Remove; Greater than DWQS
SW-CD4	Stormwater	Low Flow	Chicago Avenue Ditch	11th Avenue and Chicago Avenue	A	--	Annual; Boundary Location
SW-14	Stormwater	Low Flow	Auburn 400 South Basin	Stormwater inlet structure discharge pipe located at southeast corner of basin.	A	--	Annual; Boundary Location
SW-16	Stormwater	Low Flow	Auburn 400 North Basin	Southeastern edge of basin where access allows.	A	--	Annual; Boundary Location
SW-17	Stormwater	Low Flow	Wetland north of Auburn 400 North Basin Outflow	Stormwater outflow culvert to the wetland on the west side of SR 167.	A	--	Annual; Boundary Location
SW-18	Surface Water	Low Flow	Mill Creek	Beneath the south side of West Main Street via a box culvert.	A	--	Annual; Boundary Location
SW-20	Surface Water	Low Flow	Wetlands west of SR 167 to Mill Creek	South of the intersection of Peasley Canyon Road South with the West Valley Highway near SR 18.	--	--	Remove; ND
SW-27	Surface Water	Low Flow	Mill Creek	North side of West Main Street adjacent to PW-27.	--	--	Remove; ND
PW-18a-2.5	Pore Water	Low Flow	Mill Creek	Beneath the south side of West Main Street via a box culvert.	A	--	Annual; Boundary Location
PW-18a-5	Pore Water	Low Flow	Mill Creek	Beneath the south side of West Main Street via a box culvert.	A	--	Annual; Boundary Location
PW-18b-2.5	Pore Water	Low Flow	Mill Creek	Approximately 50 meters south of West Main Street, on east side of Mill Creek.	--	--	Remove; ND
PW-18b-5	Pore Water	Low Flow	Mill Creek	Approximately 50 meters south of West Main Street, on east side of Mill Creek.	--	--	Remove; ND
PW-27-2.5	Pore Water	Low Flow	Mill Creek	North side of West Main Street.	--	--	Remove; ND
PW-27-5	Pore Water	Low Flow	Mill Creek	North side of West Main Street.	--	--	Remove; ND

Table 1
AOC A-14 Sampling Matrix
Boeing Auburn Facility
Auburn, Washington

Notes:

(a) VOCs by Method 8260D; collect three 40-mL VOAs (HCl); Method 8260 LL or SIM may alternatively be used to meet screening levels, if needed. VOC analyte list will include: 1,1-DCE, cis-1,2-DCE, PCE, trans-1,2-DCE, TCE, and VC.

(b) MNA Parameters include Ethene/Ethane/Methane by RSKSOP-175 modified, Sulfate By EPA Method 300.0, TOC by SM 5310 C-2000, and DO/ORP/Iron II field measurements.

(c) The bottom of each PDB is placed 2 feet from the bottom of the well screen except for PDBs at AGW227 and AGW237, which are placed 6 feet from the bottom of the well screen, and all water table wells that are 2 feet from the top of the lowest recorded DTW.

MS/MSDs will be collected at least 1 per 20 samples per analysis. A field duplicate will be collected at least 1 per 20 samples per analysis. One trip blank per cooler will be run for VOCs and TPH-G.

Abbreviations and Acronyms:

CPOC = Conditional Point of Compliance

DCE = dichloroethene

DO = dissolved oxygen

DTW = Depth to Water

DWQS = Drinking water quality standards

EISB = enhanced *in situ* bioremediation

EPA = US Environmental Protection Agency

GSA = General Services Administration

HCl = hydrochloric acid

ID = Identification

IHOP = International House of Pancakes

IRA = Interim Remedial Action

JA = Junior Achievement

mL = milliliter

MNA = monitored natural attenuation

MS = matrix spike

MSD - matrix spike duplicate

NA = natural attenuation

ND = not detected

ORP = oxygen reduction potential

PCE = tetrachloroethene

PDB = passive diffusion bag

SIM = select ion monitoring

SR = State Route

SWQS = Surface water quality standards

TCE = trichloroethene

TOC = total organic carbon

VC = vinyl chloride

VOA = volatile organic analysis

VOC = volatile organic compound

WWTP = Wastewater Pre-Treatment Plant

YMCA = Young Men's Christian Association

Groundwater Zone

S(WT) = Water Table

S = Shallow

I = Intermediate

D = Deep

Frequency

A = Annually (June)

BE = Biennial; Every 2 years (June)

QE = Quinquennial; Every 5 Years (June)