TECHNICAL MEMORANDUM

LANDAU ASSOCIATES
ENVIRONMENTAL | GEOTECHNICAL | NATURAL RESOURCES

TO: James Bet, The Boeing Company

FROM: Sarah Weeks and Jennifer Wynkoop

DATE: August 8, 2012

RE: SURFACE WATER INVESTIGATION
BOEING AUBURN FACILITY
AUBURN, WASHINGTON

INTRODUCTION

Landau Associates recently completed a surface water investigation on behalf of The Boeing Company (Boeing) near the Auburn Fabrication Division property (Auburn site) in Auburn, Washington. A number of surface water features including stormwater ditches and ponds overlie shallow groundwater where low-level volatile organic compounds (VOCs), including tetrachloroethene (PCE); trichloroethene (TCE); cis-1,2-dichloroethene (cis-1,2-DCE); and vinyl chloride have been detected. The investigation characterized water quality in these surface water features to help evaluate whether discharge of shallow groundwater to these features is impacting surface water. This investigation was conducted at the request of the Washington State Department of Ecology (Ecology) and the Washington State Department of Health (WDOH). Surface water sample locations and the shallow groundwater TCE and PCE plumes are presented on Figure 1 and Figure 2, respectively.

SAMPLE LOCATIONS

Surface water samples were collected in Mill Creek, Government Canal, the Chicago Avenue ditch, the Auburn 400 flood storage ponds, the wetlands north of State Route 18, and stormwater collection features on the SuperMall property[1]. The original surface water work plan (Landau 2012a) included five surface water sample locations (SW-1 through SW-4, SW-6) within or near the footprint of the currently defined TCE plume, west of the Auburn site. A sixth sample location, SW-5, was intended to be an upstream background sample of Mill Creek. Ecology's conditional approval of the draft *Surface Water Investigation Work Plan* included the addition of seven sampling locations (Ecology 2012). Surface water features and sampling locations are presented on Figure 3.

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[1] Spatial data for wetlands, water bodies and streams represented on figures in this document were obtained from the City of Auburn and King County geographic information system (GIS) data (http://www.kingcounty.gov/operations/GIS/GISData/GISDataDistribution.aspx; http://www.auburnwa.gov/about_auburn/maps.asp) and from interpretation of aerial photographs. The accuracy of the data sets varies. Samples were collected based on field inspections of the water feature locations.

Landau Associates personnel inspected all proposed sampling locations to verify the presence of surface water and evaluate accessibility during an initial survey (March 8, 2012) and again for additional locations requested by Ecology (June 7, 2012). The sample location recommended by Ecology in the wetland to the east of Lund Road was dry during the June 7, 2012 inspection and was eliminated from the sampling program. Based on the field surveys conducted, the final sampling program consisted of 12 locations (SW-1 through SW-12). These locations were identified in a work plan addendum submitted to and approved by Ecology (Landau 2012b). Prior to sampling, the City of Auburn and City of Algona were contacted for permission to access sampling locations on their respective municipal properties. During the sampling event, the Fana wetland (SW-12) was not sampled due to an inadequate depth of surface water[2]. In all, 11 surface water samples were collected.

FIELD INVESTIGATION

The field program took place on June 19 and 20, 2012. Sampling was conducted after a relatively dry period with only 0.16 inches of rain occurring in the previous 72 hours (Weather Underground 2012). Sampling was conducted using a peristaltic pump and dedicated tubing for each sample. Samples were collected no more than 2 inches above the substrate and at least 2 inches below the water surface. Low-flow sampling techniques were applied and field parameters (pH, conductivity, dissolved oxygen, temperature, and oxidation-reduction potential) were measured with a multi-parameter probe (YSI 556 MPS). Turbidity was measured with a turbidity meter and samples were examined for odor and sheen. Non-dedicated instrumentation was decontaminated with an Alconox® solution wash and a tap water rinse after each use.

Samples were collected in laboratory-provided 40 milliliter volatile organic analysis (VOA) glass vials preserved with hydrochloric acid. Six VOA vials were collected for each sample location[3]. Samples were preserved on ice and submitted under chain-of-custody protocols to Eurofins Lancaster Laboratories, Inc. (LLI) in Lancaster, Pennsylvania for delivery within 48 hours of collection. Samples were analyzed for VOCs by U.S. Environmental Protection Agency (EPA) Method 8260 and 8260 SIM. Trip blanks and a blind duplicate sample were analyzed for quality assurance. Decontamination and purge water was contained in labeled 5-gallon buckets provided by Boeing and transferred to a wastewater storage tote in the Boeing Auburn facility drum yard. Sampling locations were recorded with a global positioning system and photographed.

[2] The Fana wetland had only 2 inches of standing water at the time of the sampling program, July 20, 2012; a minimum of 4 inches is required for sampling (Landau 2012a).

[3] The draft *Surface Water Investigation Work Plan* states that five VOA vials would be collected per sample; however, six VOA vials were collected at each location as requested by the analytical laboratory to provide additional sample volume.

ANALYTICAL RESULTS

VOCs detected at low concentrations in surface water samples are PCE; TCE; cis-1,2-DCE; vinyl chloride; acetone; and toluene. The distribution of detections of each compound is discussed below.

TCE was detected in only one sample (SW-4), from the Chicago Avenue ditch, at a concentration of 1.2 micrograms per liter (µg/L). Vinyl chloride and cis-1,2-DCE were detected in two samples (SW-4 and SW-11), from the Chicago Avenue ditch and Auburn 400 north flood storage pond, respectively. Vinyl chloride concentrations were 0.3 µg/L and 0.087 µg/L, respectively; and cis-1,2-DCE concentrations were 1.4 µg/L and 0.5 µg/L, respectively.

PCE was detected at the five surface water sampling locations in and near the Auburn 400 flood storage and SuperMall stormwater ponds (SW-3, SW-4, SW-5, SW-10, and SW-11) at concentrations ranging from 0.020 µg/L to 0.10 µg/L. Acetone was detected at three locations in surface water (SW-1, SW-5, and SW-7) at concentrations ranging from 5.6 µg/L to 17 µg/L. Toluene was detected at seven surface water locations (SW-1, SW-3, SW-5, SW-7, SW-8, SW-9 and SW-11) at concentrations ranging from 0.4 µg/L to 4.2 µg/L.

Two samples, SW-2 (downgradient sample from Mill Creek) and SW-6 (Government Canal), were non-detect for all VOC compounds. VOC results for detected compounds are shown on Figure 3. Complete VOC results are presented in Table 1.

DISCUSSION

Discussion of the surface water sampling results is divided into three parts. The first section discusses local surface and subsurface hydrology. The second section presents screening levels for VOC constituents in surface water and evaluates VOC concentrations in relation to screening levels. The third section evaluates potential sources of VOCs detected in surface water.

Hydrologic Conditions

Surface water features northwest of the Auburn site include manmade stormwater collection and treatment structures, natural surface water features associated with Mill Creek, and wetlands. To help understand how the manmade stormwater structures interact with groundwater and their connections to Mill Creek, Landau Associates obtained design drawings for the north and south Auburn 400 flood storage ponds, the Fana wetland and stormwater pond, the SuperMall drainage ditches and stormwater ponds, and the City of Auburn's stormwater conveyance system.

None of the stormwater ponds mentioned above appear to be constructed with impervious lining. Additionally, the bottom elevations of these features, when compared with the groundwater elevations in nearby wells, suggest that they have the potential to intersect the groundwater table and that groundwater discharge may be occurring to these features. There is also evidence that the Chicago Avenue ditch intersects the water table. Although no design drawings were available for the ditch, water levels in the adjacent groundwater monitoring wells were above the bottom of the ditch the week prior to the sampling program. The ditch is approximately 5 feet (ft) deep and had approximately 1.5 ft of water in the bottom at the time of sampling. The water levels in adjacent wells were measured at approximately 2 and 3 ft below the ground surface (BGS)[4].

Stormwater system plans provided by the City of Auburn document the connections between the Chicago Avenue ditch, the Auburn 400 flood storage ponds, the SuperMall stormwater ponds, and Mill Creek. Water in the Chicago Avenue ditch flows north and enters the City of Auburn's piped stormwater system at Boundary Boulevard; from there, the water flows west to the Auburn 400 southern flood storage pond. The Auburn 400 flood storage ponds are designed to retain large amounts of stormwater runoff before discharging to Mill Creek. The southern storage pond captures stormwater from the Chicago Avenue ditch as well as Boundary Boulevard, and a large portion of the industrial area between Chicago Avenue and the Interurban Trail. The northern storage pond captures stormwater from 15th Street and the southern portion of the SuperMall complex. Water flows into the ponds on the east side and flows out on the west side before discharging to Mill Creek. Water from the SuperMall stormwater ponds flows out of the ponds in the southwest corner and apparently enters the Mill Creek system near the northwest outflow from the Auburn 400 northern flood storage pond. However, design drawings showing the exact connection were not available.

The hydraulic connection between the Chicago Avenue ditch and downstream surface water features is of interest because the Chicago Avenue ditch appears to act as a local discharge feature for shallow groundwater and may account for some of the westerly component of groundwater flow in the shallow aquifer zone observed west of the Auburn site. Capture of groundwater by the ditch would explain the detections of VOCs in the ditch at location SW-4. Water from the Chicago Avenue ditch eventually enters Mill Creek via the City of Auburn's stormwater system. However, the sample result from Mill Creek (SW-2) indicates that VOCs are not present in the creek. The lack of VOCs in the creek indicates that VOCs are not migrating from the Chicago Avenue ditch to Mill Creek and are not discharging directly from groundwater to Mill Creek. Figure 4 provides a diagram of the flow path from the Chicago Avenue ditch to Mill Creek[5].

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[4] Water levels in groundwater monitoring wells AGW191(I) and AGW192(D) were measured during the annual groundwater sampling event on June 13, 2012 at 1.91 ft BGS and 2.93 ft BGS, respectively.

[5] Sampling location SW-2 is not shown on this figure. This location is downstream and north of the area shown on this figure.

Surface Water Screening Levels

Surface water screening levels were developed for comparison to surface water analytical results. The screening levels were developed for both potable (used as drinking water) and non-potable (not used as drinking water) surface water in accordance with WAC-173-340-730. The screening levels for the detected constituents are presented below and on the analytical results table (Table 1).

Compound	PCE	TCE	cis-1,2-DCE	Vinyl Chloride	Acetone	Toluene
Screening level non-potable surface water (µg/L)	3.3	12.7	16	2.4	7,200	15,000
Screening level potable surface water (µg/L)	0.69	2.5*	16	0.025	7,200	640

* MTCA allows cleanup levels for carcinogens to be adjusted to an excess cancer risk of one in one hundred thousand (1 x 10^{-5}). This adjustment for TCE would result in a Method B formula value greater (less protective) than the national recommended water quality criteria (EPA 2012) National Recommended Water Quality Criteria (NRWQC) value; therefore the NRWQC value is used.

MTCA defines the point of compliance for groundwater discharging to surface water as the point at which impacted groundwater is released to surface water [WAC-173-340-730(6)]. Sample results indicate two potential areas, the Chicago Avenue ditch and the Auburn 400 stormwater ponds, where VOC impacted groundwater may be entering surface water. (A more detailed discussion of surface water results is provided in the next section). Both the Chicago Avenue ditch and the Auburn 400 flood storage ponds are constructed stormwater collection features; it is unlikely that water from these features is consumed by people; therefore, non-potable surface water screening levels are proposed for use at the site. Concentrations of VOCs do not exceed non-potable surface water screening levels for any constituent.

Mill Creek is considered a domestic water source (i.e. potable, WAC-173-201A-602); however, sample results indicate that VOC impacted groundwater is not discharging to the creek system, and is not entering the creek via surface water connections.

Volatile Organic Compound Results

Detections of TCE; cis-1,2-DCE; and vinyl chloride in sample SW-4 (Chicago Avenue ditch) appear to be related to discharge of shallow groundwater based on contaminant concentrations in nearby shallow wells. Detections of cis-1,2-DCE; and vinyl chloride in sample SW-11 (Auburn 400 northern flood storage pond) also appear to be related to shallow groundwater discharge based on nearby shallow well data.

It is possible that PCE detected in samples at SW-4 and SW-11, is also related to groundwater discharge based on nearby well data. However, the wider distribution of PCE at sample locations SW-3, SW-5, and SW-10 is likely related to releases from other anthropogenic sources such as stormwater runoff and not groundwater discharge. A U.S. Geological Survey (USGS) study found that PCE was commonly detected in stormwater runoff in urban areas (Lopez 1998). Furthermore, PCE was not detected in shallow groundwater samples collected during drilling of monitoring wells near SW-3 and SW-10. Sample SW-5 was collected from an upstream location on Mill Creek; although no nearby shallow groundwater data are available, this location is outside the current known extent of the VOC plume associated with the Auburn site.

Acetone and/or toluene were detected at various locations (SW-1, SW-3, SW-5, SW-7, SW-8, SW-9, SW-11) and do not appear to be related to shallow groundwater discharge since these constituents are generally not detected in shallow groundwater northwest of the Auburn site. Acetone and Toluene can be formed biogenically through fermentation and other microbial processes (NCASI 2011). Wetland environments typically have high microbial activity, anoxic conditions, and high biomass input that would be conducive to both acetone and toluene formation. In addition to formation though microbial processes, acetone is also formed as a byproduct of metabolism in plants and animals (ATSDR 1994). Formation of toluene has been observed in natural aqueous systems (NCASI 2011). One study observed an increased mass of toluene in a lake system during summer months when water was warmer and anoxic conditions were present in the lake (Jüttner and Henatsch 1986). A related study demonstrated that toluene could be generated by microorganisms in anoxic freshwater sediment (Jüttner 1991).

Another possible source of the acetone and toluene detected in various samples is stormwater. In a study done by the USGS, toluene was the most commonly detected VOC in stormwater (Lopez 1998). Acetone is known to be present in automobile exhaust which could result in its deposition on roadways and subsequently in stormwater (ATSDR 1994).

CONCLUSIONS AND RECOMMENDATIONS

Low levels of VOCs were detected in surface water at concentrations below the non-potable surface water screening criteria. Low levels of acetone, toluene, and PCE were detected in a number of locations that do not appear to be associated with VOC impacted groundwater. Other sources of these compounds include biogenic formation and stormwater runoff.

Detections of PCE; TCE; cis-1,2-DCE; and vinyl chloride at SW-4 in the Chicago Avenue ditch and detections of PCE; cis-1,2-DCE; and vinyl chloride at SW-11 in the Auburn 400 flood storage pond may be the result of shallow, VOC-impacted groundwater discharging to surface water. Further sampling is necessary to evaluate shallow groundwater discharge and VOC impacts to surface water.

Additional characterization of VOCs in the Chicago Avenue ditch should include both spatial and temporal sampling. Samples should be collected at two additional locations along the ditch to evaluate spatial variability in contaminant levels during the dry season when stormwater runoff contributions are at a minimum. Additionally, quarterly sampling for four quarters at one location along the ditch is recommended to evaluate seasonal variation in VOC contaminant levels. Flow in the ditch should be measured during each of the four quarterly sampling events to evaluate groundwater discharge for incorporation into the site conceptual model and future groundwater flow analysis. Additional samples from the Auburn 400 flood storage ponds may be useful in evaluating how VOC-impacted water is entering the ponds (via groundwater discharge or from the surface water connection to the Chicago Avenue ditch).

Additional characterization of shallow groundwater near potential surface water discharge points (Chicago Avenue Ditch and Auburn 400 flood storage ponds) is also recommended. Boeing plans to install an additional multilevel well west of AGW207 near the Auburn 400 northern flood storage pond. A shallow groundwater monitoring well is recommended along the Chicago Avenue ditch and near the Auburn 400 southern flood storage pond. Information from existing monitoring wells will be used in conjunction with the surface water results to identify appropriate well locations and a proposal for the installation of additional monitoring wells in the area will be presented in the next drilling work plan. A separate work plan for additional surface water sampling will be submitted to Ecology for review.

Lastly, the Fana wetland may be important in evaluating groundwater discharge because of its location in relationship to the groundwater VOC plumes. The wetland had insufficient water during the June sampling event; sampling should be re-attempted in winter 2012 or spring 2013 when groundwater elevations are higher and more water is present in the wetland.

SW/JWW/jrc

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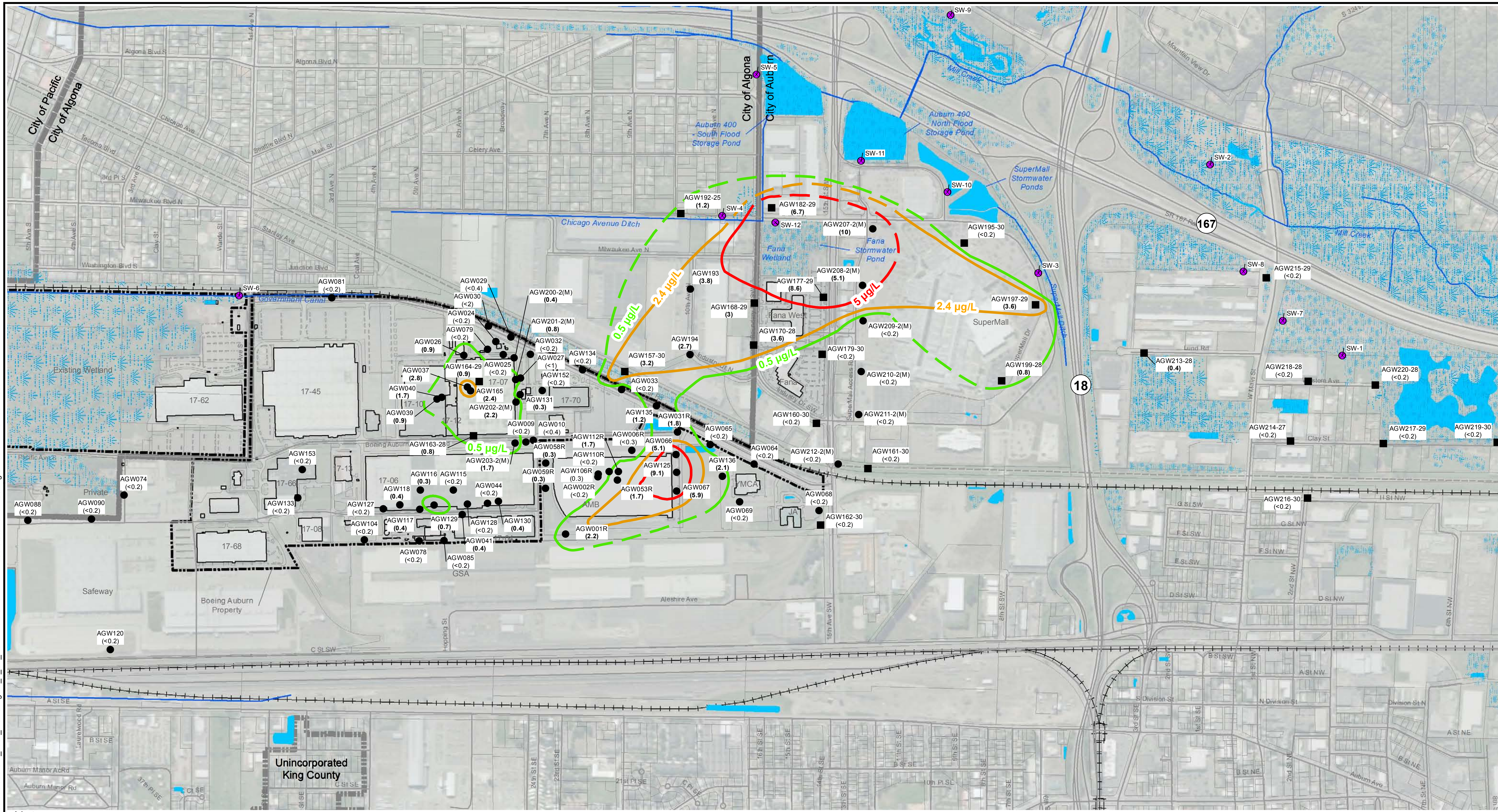
ATTACHMENTS

Figure 1: Shallow Zone TCE Concentrations and Surface Water Sampling Locations
Figure 2: Shallow Zone PCE Concentrations and Surface Water Sampling Locations
Figure 3: Surface Water Detections
Figure 4: Stormwater Conveyance
Table 1: Surface Water Sampling Event Results



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Notes

1. The location of surface water features are approximate.
2. All concentrations shown in µg/L.
3. <0.2 = Compound not detected at indicated reporting limits.
4. Well designations ending in (M) indicate multilevel wells.
5. TCE was collected during June 2012, borehole grab samples were collected at the time of drilling.
6. **Bold** text indicates TCE detected in sample.
7. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Surface Water Sampling Location
- Monitoring Well Location
- Borehole Grab Sample Location
- Waterways
- TCE Contour = ≥ 5 µg/L
- TCE Contour = ≥ 2.4 µg/L
- TCE Contour = ≥ 0.5 µg/L
- Wetland Areas
- Water Bodies

Base map source: Geometrix 2003; Aerial Photo Source: I3_Imagery_Prime_World_2D; Parcel Data Source: King County GIS 2010

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Boeing Auburn
Auburn, Washington

Shallow Zone TCE Concentrations and Surface Water Sampling Locations

Figure 1

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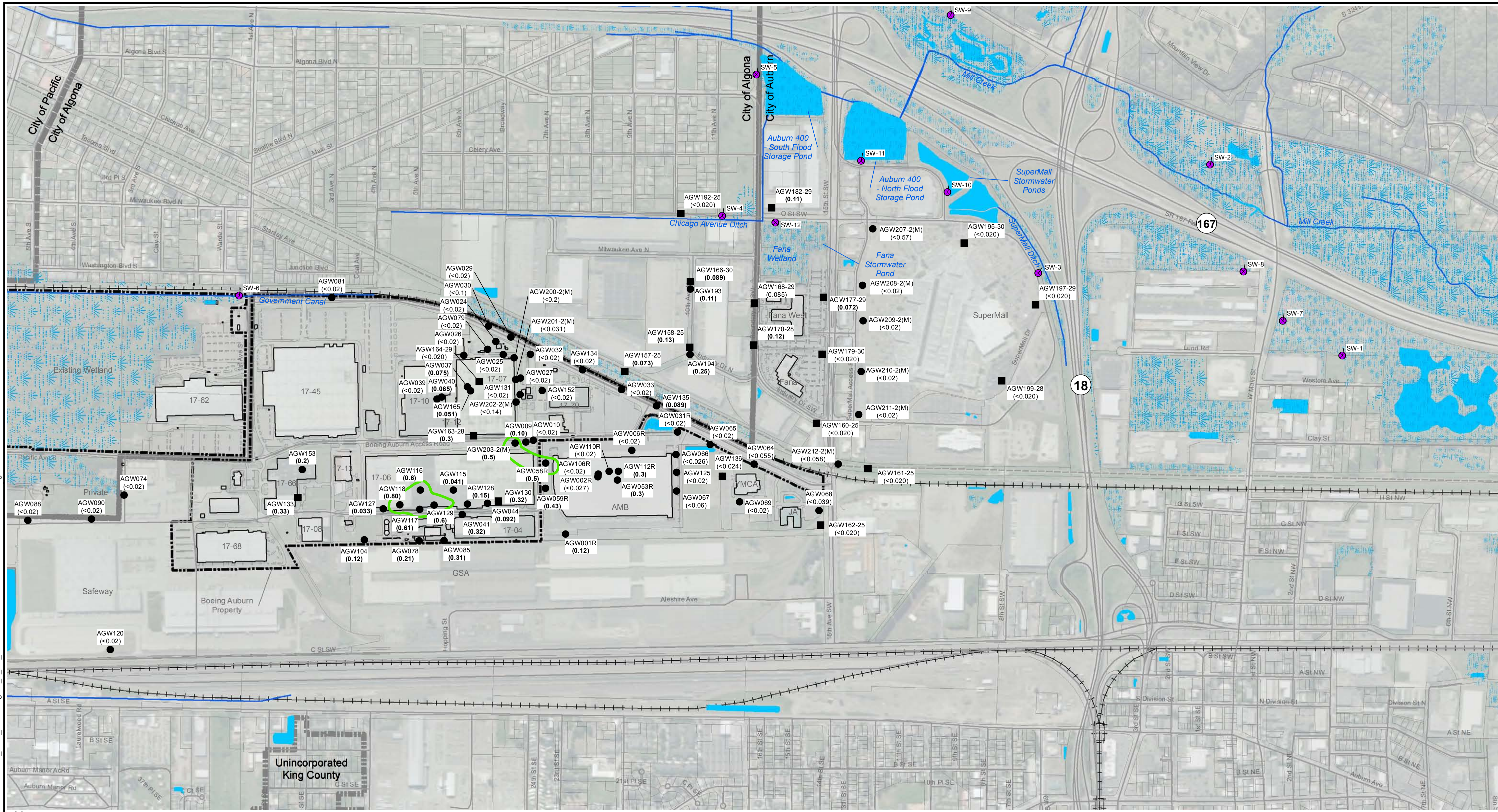

Notes

1. The location of surface water features are approximate.
2. All concentrations shown in µg/L.
3. <0.2 = Compound not detected at indicated reporting limits.
4. Well designations ending in (M) indicate multi-level wells.
5. PCE was collected during June 2012, borehole grab samples were collected at the time of drilling.
6. **Bold** text indicates PCE detected in sample.
7. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Surface Water Sampling Location
- Monitoring Well Location
- Borehole Grab Sample Location
- PCE contour = ≥ 0.5 µg/L
- Waterways
- Wetland Areas
- Water Bodies

N

0 1,000 2,000

Scale in Feet

Base map source: Geometrix 2003; Aerial Photo Source: I3_Imagery_Prime_World_2D; Parcel Data Source: King County GIS 2010

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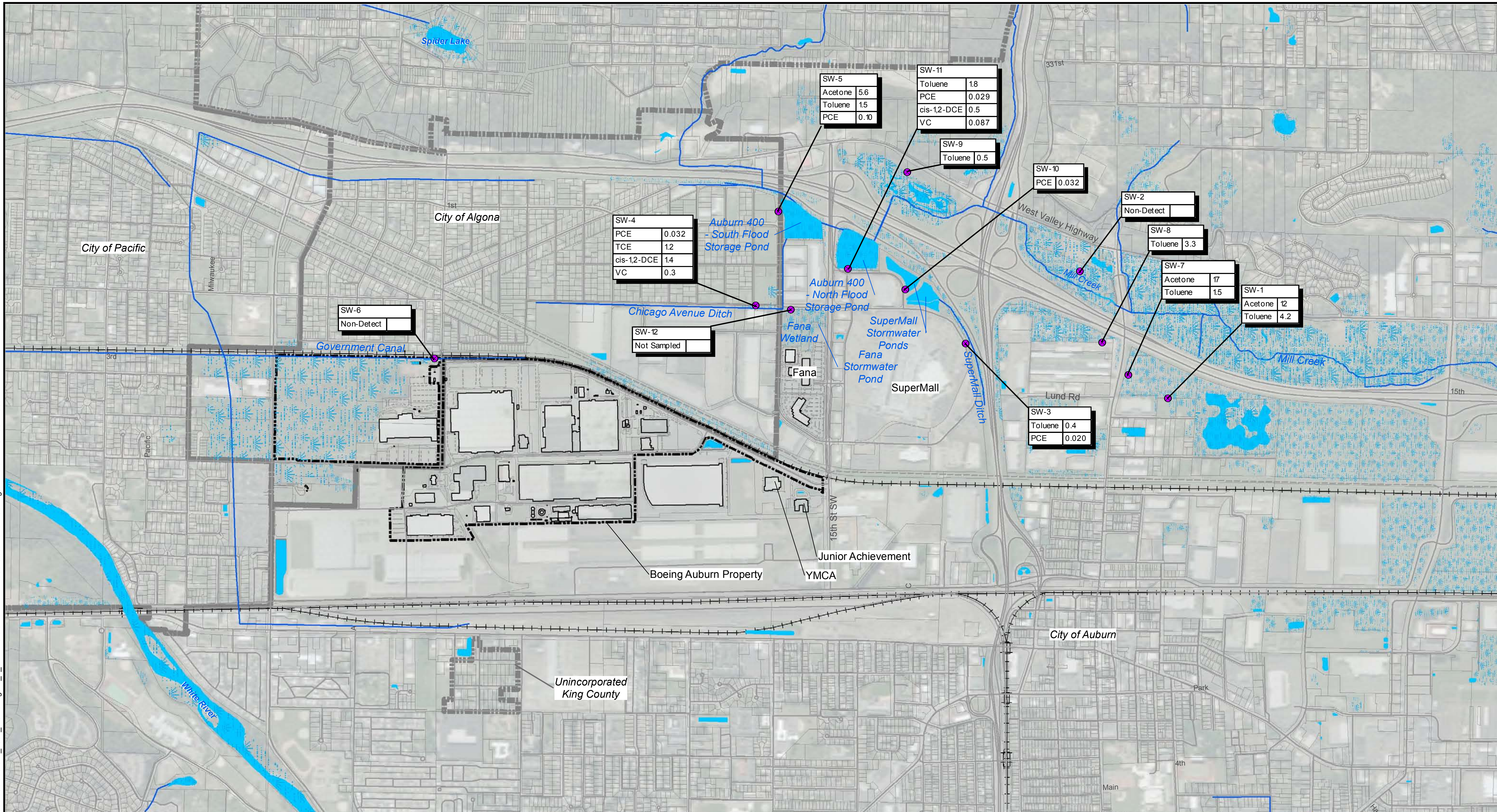
Boeing Auburn
Auburn, Washington

Shallow Zone PCE Concentrations and Surface Water Sampling Locations

Figure 2



Notes

1. Samples collected on June 19 and 20, 2012.
2. All concentrations expressed in units of micrograms per liter (µg/L). Only detected constituents are presented.
3. The location of surface water features are approximate.
4. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Surface Water Sampling Location
- Waterways
- Wetland Areas
- Water Bodies

N

0 1,500 3,000

Scale in Feet

Data Source: City of Auburn GIS; King County GIS; National Wetland Inventory GIS; Bing Maps Aerial Image; Field Investigations by Landau Associates, Inc.

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Boeing Auburn
Auburn, Washington

Surface Water Detections

Figure 3

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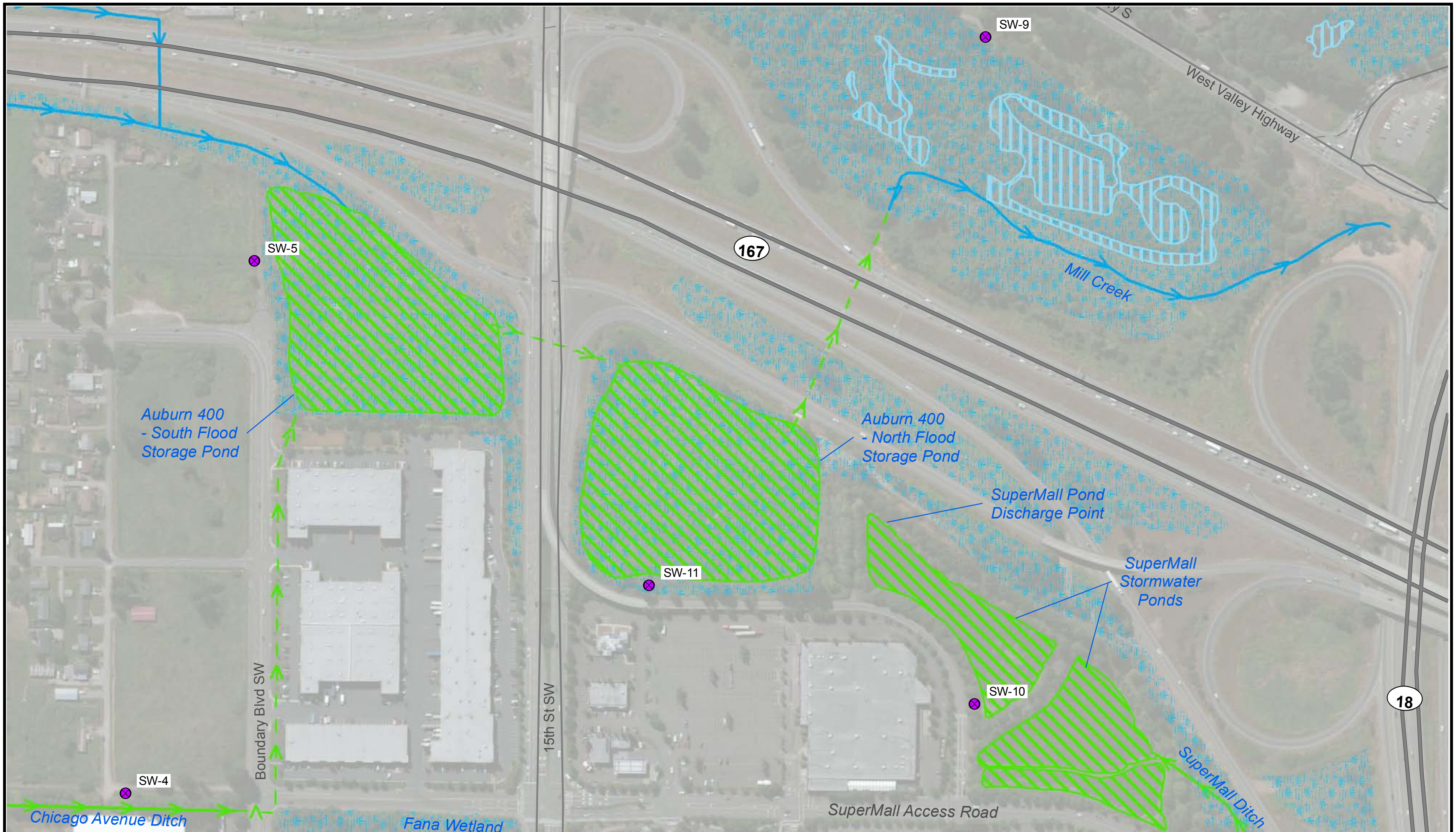

Legend

- Surface Water Sampling Location
- Open Stormwater Collection
- Piped Stormwater Collection
- Stream
- Wetland Areas
- Stormwater Ponds
- Water Bodies

N

0 400 800

Scale in Feet

Notes

1. The location of surface water features are approximate.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Data Source: Auburn GIS 2011, King County GIS 2010, ESRI 2008, Bing Maps Aerial Imagery 2012

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Boeing Auburn Auburn, Washington	**Stormwater Conveyance**	Figure 4

TABLE 1
SURFACE WATER SAMPLING EVENT RESULTS
JUNE 2012
BOEING AUBURN

Sample ID: / LLI SDG: / Lab ID: / Sample Date:	Screening Level (SW incl DW)	Screening Level (SW not incl DW)	SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	SW-8	SW-8-Dup SW-900	SW-9	SW-10	SW-11
LLI SDG:			1317481	1317481	1317481	1317481	1317481	1317481	1317481	1317481	1317481	1317481	1317481	1317481
Lab ID:			6696860	6696857	6696861	6696856	6696863	6696855	6696859	6696866	6696867	6696858	6696862	6696864
Sample Date:			6/19/2012	6/19/2012	6/20/2012	6/20/2012	6/20/2012	6/20/2012	6/19/2012	6/19/2012	6/19/2012	6/19/2012	6/19/2012	6/19/2012
VOLATILES (µg/L)														
Method SW8260C														
Acetone	7200 (a)	7200 (a)	**12**	5.0 U	5.0 U	5.0 U	**5.6**	5.0 U	**17**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Benzene			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromodichloromethane			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform			0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Bromomethane			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone			5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon Disulfide			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chlorobenzene			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloromethane			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethene			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	16 (a)	16 (a)	0.2 U	0.2 U	0.2 U	**1.4**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**0.5**
trans-1,2-Dichloroethene			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloropropane			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,3-Dichloropropene			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Ethylbenzene			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Hexanone			5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-Pentanone (MIBK)			5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methylene Chloride			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Tetrachloroethene	0.69 (b)	3.3 (b)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	640 (c)	15000 (b)	**4.2**	0.2 U	**0.4**	0.2 U	**1.5**	0.2 U	**1.5**	**3.3**	**3.2**	**0.5**	0.2 U	**1.8**
1,1,2-Trichloro-1,2,2-trifluoroethane			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichloroethene	2.5 (d)	12.7 (e)	0.2 U	0.2 U	0.2 U	**1.2**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichlorofluoromethane			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Acetate			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	0.025 (b)	2.4 (b)	0.2 U	0.2 U	0.2 U	**0.3**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
m,p-Xylene			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-Xylene			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
VOLATILES (µg/L)														
Method 8260C SIM														
Tetrachloroethene	0.69 (b)	3.3 (b)	0.02 U	0.02 U	**0.020**	**0.032 J**	**0.10 J**	0.02 U	0.04 U	0.02 U	0.02 U	0.04 U	**0.032**	**0.029**
Vinyl Chloride	0.025 (b)	2.4 (b)	0.02 U	0.02 U	0.02 U	**0.28**	0.02 U	0.02 U	0.04 U	0.02 U	0.02 U	0.04 U	0.02 U	**0.087**

Bold = Detected compound
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
(a) Screening level based on Method B value for protection of fresh surface water that is also drinking water. No data available for protection of fresh surface water that is not drinking water.
(b) Screening level based on National Recommended Water Quality Criteria, which is less than or equal to the Method B standard formula value.
(c) Screening level based on Method B standard formula value for drinking water.
(d) Screening level based on National Recommended Water Quality Criteria, which is less than 10 times the Method B standard formula value for carcinogens.
(e) Screening level based on Method B standard formula value for surface water.