TECHNICAL MEMORANDUM

LANDAU ASSOCIATES
ENVIRONMENTAL | GEOTECHNICAL | NATURAL RESOURCES

TO: Jim Bet, The Boeing Company

FROM: Jennifer Wynkoop and Eric Weber

DATE: February 13, 2014

RE: ALGONA NEIGHBORHOOD DIRECT-PUSH BORING INVESTIGATION
BOEING AUBURN FACILITY
AUBURN, WASHINGTON

INTRODUCTION

The Boeing Company (Boeing) is currently undergoing corrective action at their Auburn Fabrication Division property (site) located in Auburn, Washington (Figure 1). Corrective action requirements are documented in an Agreed Order (Order; No. DE 01HWTRNR-3345) dated August 14, 2002 and the First Amended Agreed Order dated February 21, 2006 both with Washington State Department of Ecology (Ecology). The Order includes a requirement to conduct a remedial investigation (RI) under Ecology's oversight.

This technical memorandum presents and evaluates shallow groundwater data collected from direct-push borings in and around the Algona residential neighborhood (Figure 1) located west of the site. This investigation was conducted as part of the RI in accordance with the Ecology-approved *Work Plan, Direct-Push Probe Investigation Winter 2013 Boeing Auburn Facility* (Landau Associates 2013a). Ecology approved the work plan on March 25, 2013.

Background

Boeing has been implementing RI activities to characterize the nature and extent of two trichloroethene (TCE) groundwater plumes: the Area 1 plume (Plume 1) and the western plume (Plume 2)that occur beneath the northern portion of the site and extend off site to the north and northwest. Groundwater investigation work conducted in December 2012 included the installation of three shallow monitoring wells and one new intermediate well in and adjacent to the Algona neighborhood (Figure 2). Results from the three Algona neighborhood shallow wells (AGW225, AGW226, and AGW228) indicated that volatile organic compound (VOC) impacts to groundwater extend west from the site to the northeast corner of the Algona neighborhood.[1] Results from these three shallow wells were reported to Ecology in *Status Report: No. 41* (Landau Associates 2013b). Based on results from these wells, Boeing determined that the direct-push groundwater investigation documented in this technical memorandum was

[1] At well AGW225, TCE was detected at a concentration of 1.6 micrograms per liter (µg/L) and vinyl chloride (VC) was detected at 0.55 µg/L. At well AGW226, TCE was detected at 4.4 µg/L and VC was detected at 0.66 µg/L. At well AGW228, TCE was detected at 2.1 µg/L and VC was detected at 0.35 µg/L

needed to further characterize the westerly extent of shallow groundwater contamination in this area and to further evaluate the potential for vapor intrusion in the Algona neighborhood. Direct push technology was selected for the groundwater investigation because this approach allows collection of a large number of samples in a relatively short time period and collection of samples at multiple depths.

VOCs in shallow groundwater may pose a risk to indoor air of occupied buildings above the plume. In a 2012 health consultation, Washington State Department of Health (WDOH) recommended that Boeing conduct additional vapor intrusion assessment in areas where groundwater concentrations at the water table indicate the potential for vapor intrusion to occur (WDOH 2012). Ecology concurred and requested additional water table data in the residential area. In 2012, Boeing developed conservative vapor intrusion shallow groundwater screening criteria for VOCs including TCE and breakdown products (Landau Associates 2012). The vapor intrusion shallow groundwater screening criteria is used to evaluate where vapor intrusion has the potential to unacceptably impact the indoor air of occupied buildings and could potentially result in unacceptable risk to human health. The December 2012 VOC concentrations in groundwater at the Algona neighborhood shallow wells suggested a potential for vapor intrusion to occur and that additional data was needed to define the area with potentially unacceptable risk due to vapor intrusion. Furthermore, because groundwater in the Algona neighborhood is very shallow [approximately 1 to 6 feet (ft) below ground surface (BGS)], Ecology requested that Boeing develop alternative vapor intrusion screening criteria for water table groundwater concentrations protective of indoor air, termed preliminary concern levels (PCLs). These PCLs are based on a more conservative vapor attenuation factor for vapors above the water table, representative of the local shallow water table. Boeing submitted the PCLs to Ecology in a *Draft Residential Neighborhood Vapor Intrusion Work Plan* (Landau Associates 2013c). The PCLs are 1 µg/L for TCE and 0.23 µg/L for VC[2]. Water table data in this technical memorandum, as it relates to vapor intrusion, is presented in the context of the PCLs.

Investigation Scope and Objectives

The scope of investigation consisted of 49 direct-push probe explorations with borehole groundwater samples collected from temporary well screens. Water table samples were collected at an approximate depth of 5 ft BGS at all locations; some locations were sampled slightly deeper due to a deeper water table at those locations. Sixteen of the explorations were multiple-depth borings advanced to 25 ft BGS, with additional samples collected at 15 and 25 ft BGS. At eight locations, split samples were collected as requested by Ecology, using both peristaltic and bladder pump methods.

[2] Screening levels and PCLs were not developed for cis-1,2-dichloroethene (cis-1,2-DCE) because health-based cleanup levels are not available for this compound. TCE and VC are the more toxic compounds and the drivers for human health risk assessment.

The 49 exploration locations were located in and around the Algona residential neighborhood. Forty-one borings were spaced in a grid bounded to the south by 8th Avenue North, to the north by Boundary Boulevard (approximately), to the east by Chicago Avenue, and to the west by State Route 167. Of the remaining eight borings, four were located south of 8th Avenue between Celery Avenue and Chicago Avenue, and four were located on Junction Boulevard and Washington Boulevard between 4th Avenue North and 3rd Avenue South. Sample locations and results for the primary contaminants of concern: TCE, cis-1,2-DCE, and VC are presented on Figures 3 and 4. Figure 3 shows the 45 locations north of 4th Avenue North, while Figure 4 shows the four locations further south.

Data from this investigation is used to satisfy two primary objectives:

1. To determine the area of the Algona residential neighborhood where additional vapor intrusion assessment is warranted.
2. To determine the need for additional shallow groundwater assessment and the placement of additional permanent monitoring wells in Algona.

SUMMARY OF FIELD INVESTIGATION ACTIVITIES

The direct-push field investigation was conducted in accordance with the work plan (Landau Associates 2013a). All borings were located in public rights-of-way; the City of Algona issued a permit for 47 of the borings on March 29, 2013 and City of Auburn issued a permit for two of the borings on April 3, 2013. The direct-push field investigation was conducted between April 3, 2013 and April 30, 2013.

Direct-Push Borings

The 49 direct-push borings (ASB0181 through ASB0229) were sampled using a direct-push probe drill rig operated by Cascade Drilling, Inc. of Woodinville, Washington. Water samples were collected from single depth borings at 5 ft BGS or just below the water table, where groundwater was deeper. Multiple-depth borings were sampled just below the water table (approximately 5 ft BGS), 15 ft BGS, and 25 ft BGS.

In addition to groundwater sampling, soil was collected at 5-ft intervals from each boring for lithologic logging and photoionization detector screening for VOCs. The lithology of soil cores was described in accordance with the United Soil Classification System [ASTM International (ASTM) D2487] using the visual-manual procedure for describing soils (ASTM D2488). Soil was sampled from single-depth borings to either 5 or 10 ft BGS, depending on the depth to water, and the 16 multi-depth borings were sampled to 25 ft BGS. Soil samples were extracted from the direct-push casing prior to placement of temporary well screens and collection of groundwater samples. Investigation-derived waste

consisting of soil cuttings, decontamination water, and purge water, was transported back to the site and managed by Boeing according to applicable regulations.

Borehole Groundwater Samples

Groundwater samples were collected using a groundwater sampler that consisted of an approximately 4-ft long decontaminated, stainless steel screen covered with a protective sheath which was driven to each respective sample depth. Upon reaching the sample depth, the sheath was retracted to expose the screen to the surrounding formation and groundwater was purged and sampled. A decontaminated sampler was used for each sample, including depth-discrete samples at the multi-depth borings.

Depth to water was measured from the ground surface at each boring prior to purging and sample collection. All water levels were measured using an electronic water level indicator and recorded to the nearest 0.1 ft on a Groundwater Sample Collection form.

Purging and sampling was performed primarily using a peristaltic pump attached to single-use disposable polyethylene tubing. At eight locations, a split sample was also collected using a non-dedicated mechanical bladder pump. The split samples were collected at the shallowest sample depth at each of the eight explorations. Bladder pump samples were denoted with a "b" following the depth identifier in the sample identification. The mechanical bladder pump was constructed of stainless steel with the exception of the polyethylene bladder and rubber o-rings. Between samples, the bladder and o-rings were replaced and all stainless steel parts were decontaminated using an Alconox® wash followed by a de-ionized water rinse. The temporary well was purged and sampled using a peristaltic pump first. The peristaltic pump tubing was then removed from the temporary well and the bladder pump inserted to approximately the same depth as the peristaltic pump tubing. The bladder pump was then purged for a short time until the field parameters approximately correlated to those collected during peristaltic pump purging; a sample was then collected with the bladder pump.

The temporary screens were purged for 30 minutes or until the water was clear. During purging, groundwater was monitored for the following field parameters: pH, conductivity, dissolved oxygen, temperature, oxidation reduction potential and turbidity. Groundwater samples were placed in laboratory-supplied 40-milliliter glass volatile organic analysis containers preserved with hydrochloric acid. Sample data was recorded on a Groundwater Sample Collection form including sample number and time collected; the observed physical characteristics of the sample (e.g., color, turbidity, etc.); and field parameters. Upon completion of drilling and sampling, the borehole was decommissioned by backfilling with bentonite clay and a cement surface seal in general accordance with the requirements of Washington Administrative Code 173-160.

All samples were stored in coolers on ice and shipped using proper chain-of-custody procedures to Eurofins Lancaster Laboratories, Inc. of Lancaster, Pennsylvania. VOC samples were analyzed by Environmental Protection Agency Method 8260. Selected ion monitoring analysis was performed for TCE and VC for the lowest achievable reporting limits.

Groundwater samples were analyzed on a 3-day turnaround time. Once results were received, data quality assurance and validation were performed to evaluate laboratory accuracy and precision, and then data were tabulated and provided to Ecology on a weekly basis. In accordance with the work plan (Landau Associates 2013a), a complete table of results, boring logs, and figures were provided to Ecology in advance of this report on May 9, 2013.

INVESTIGATION RESULTS

Investigation results provide additional information on localized geology/hydrogeology and on contaminant distribution.

Geology and Hydrogeology

The investigation area is located on the west side of the Green River valley in an alluvial flood plain. The typical soil profile observed in collected soil samples consisted of 0.5 ft to 1.5 ft of fill over alluvial deposits. Fill material was typically brown sandy gravel. Alluvial deposits consisted of fine sands and silts with interbedded peat and sandy gravel layers. Complete boring logs are presented in Attachment A.

Groundwater measurements provide general information on depth to water, but were not intended for use in developing groundwater contours. Groundwater was encountered at the time of drilling (various dates during April 2013) between 0.9 and 5.5 ft BGS. Boring locations were not surveyed for elevation and water levels were not determined to be at equilibrium. Groundwater depths vary spatially depending on ground surface topography, local subsurface conditions, weather, and other factors. Groundwater levels also fluctuate seasonally, with maximum groundwater levels generally occurring during the winter and early spring months. Depth to groundwater measurements are presented on boring logs (Figures A-2 through A-50) and on Figure 5 for the bulk of the borings which are located north of 6th Avenue North.

Volatile Organic Compounds

The direct-push groundwater data confirms a localized area of VOC-impacted groundwater in the northeast corner of the Algona neighborhood near monitoring wells, AGW225, AGW226 and AGW228. TCE and VC were not detected in 34 of 49 borings. TCE and/or VC concentrations in shallow

groundwater samples exceeded the PCLs in only 6 of 49 borings. VOCs were not detected in any borings south of 8th Avenue North, with the exception of low concentrations at 25 ft BGS at boring ASB0215. The extent of VOC detections and the extent of TCE and/or VC concentrations exceeding the PCLs are shown on Figures 3 and 4. Direct-push boring groundwater results are presented in Table 1.

The westward extent of detected VC is slightly greater than the extent of TCE detections (e.g., borings ASB0200 and ASB0203); this is consistent with TCE natural attenuation through a common biologically mediated process known as reductive dechlorination (Pankow and Cherry 1996). TCE is reductively dechlorinated to cis-1,2-DCE, then to VC, then to non-toxic end products ethene and ethane. VC and cis-1,2-DCE are commonly detected at the same borings. In some cases, (ASB0188 and ASB0192) cis-1,2-DCE is higher than either TCE or VC.

At most direct-push locations near the Chicago Avenue ditch where multiple-depth samples were collected, VOC concentrations are higher in deeper samples than in the water table samples. For example, the two highest TCE concentrations detected during the direct-push drilling program were detected at 15 ft (12 µg/L) and 25 ft (7.6 µg/L) at ASB0182, compared to the water table sample at this location (2.4 µg/L). Lower VOC concentrations near the surface are interpreted to result from stronger natural attenuation (e.g., reductive dechlorination) and dilution resulting from infiltrating precipitation. VOC concentrations depth profiles are presented on Figure 3.

Elevated PID readings were recorded for a number of boring samples (eg 202, 203, 204), which did not coincide with contaminant concentrations in groundwater samples from those borings. PID readings are sensitive to moisture and elevated readings may be the result of high moisture in the meter intake.

Comparison of Split-Sample Results

A comparison of the split-sample results was performed to evaluate if the two techniques have produced appreciably different VOC results. Results were generally equivalent as shown on the Figure 6 plot of bladder pump vs. peristaltic pump concentrations. With a few minor exceptions, results fall along the 1:1 ratio line. In the instances where results were higher by one of the methods, results were not biased toward either method (i.e., there were instances of higher results by both sampling methods). The observed minor variability in sample results is attributed to variations in the depth of the pump intakes and the fact that both pump types could not be purged at the same time. Where there is variation, it is of a similar magnitude as is commonly observed for laboratory duplicate samples collected by the same methods.

Based on these highly comparable results, Landau Associates recommends continue use of the peristaltic pump for groundwater sampling. The peristaltic pump does not contact the sample and use of

dedicating sample tubing eliminates pump decontamination and reduces the risk of sample cross-contamination. Split-sample data for TCE, cis-1,2-DCE, and VC analyses are presented in Table 2.

CONCLUSIONS AND RECOMMENDATIONS

The results presented above meet the objectives of the direct-push groundwater investigation. The resulting further delineation of the extent of shallow groundwater VOC impacts allows determination of the area of the Algona residential neighborhood where additional vapor intrusion assessment is warranted. The results also allow determination of the need for additional shallow groundwater assessment and the placement of additional permanent monitoring wells in the Algona neighborhood. The recommendations for the next phases of vapor intrusion and groundwater investigation are described below.

Vapor Intrusion Assessment

Boeing is implementing a tiered approach to vapor intrusion assessment recommended by Ecology's *Vapor Intrusion Assessment Guidance* (Ecology 2009). The direct-push investigation fulfilled a Tier I evaluation requirement to identify areas where VOC concentrations at the water table surface exceed applicable vapor intrusion screening criteria (PCLs). As a subsequent step, a Tier II evaluation, including building specific sampling of indoor air and/or sub-slab soil vapor, will be conducted at those residences where groundwater at the water table exceeds the PCLs to evaluate human health risk associated with vapor intrusion to indoor air.

An area of the Algona neighborhood has been identified for the initial phase of building-specific vapor intrusion sampling, which includes and extends beyond all borings locations where TCE and/or VC exceeded the PCLs. There are 23 residential structures recommended for indoor air sampling based on their proximity to areas where groundwater concentrations exceed PCLs (Figure 7). Additional residences may be selected for sampling in the future depending on 1) initial sampling results from the 23 residences, and/or 2) future groundwater data exceeding vapor intrusion screening criteria (see proposed groundwater monitoring wells below).

Additional Shallow Groundwater Assessment

Based on direct-push data, additional groundwater monitoring wells are recommended in the Algona residential neighborhood and additional shallow groundwater investigation is recommended in the Algona industrial area located between the site and the Algona neighborhood. Figures 8 and 9 show the direct-push TCE and VC results (respectively) in the context of the overall shallow groundwater plumes.

Boeing plans to submit a work plan to Ecology detailing the locations and scope of this additional groundwater investigation work. A summary of the additional proposed work is provided below.

Landau Associates recommends installation of up to seven additional shallow monitoring wells in the Algona residential neighborhood. The wells would be located between Boundary Boulevard and 8th Avenue in the north-south direction and between Algona Boulevard and Chicago Avenue in the east-west direction. It is anticipated that three wells would target long-term monitoring of areas where direct-push data demonstrated TCE and/or VC concentrations above the PCLs. It is anticipated that the remaining four wells would target long-term monitoring of the plume boundary.

The direct-push data has also identified a data gap in the shallow groundwater characterization of the Algona industrial area west of the site between Perimeter Road and Chicago Avenue. Limited shallow-zone data has been collected in this area from existing monitoring wells. An additional direct-push shallow groundwater investigation is recommended in this area. The objective of the direct-push investigation would be to further characterize the plume in this area guide the installation of additional shallow monitoring wells, as needed. Recommended direct-push work includes a row of up to nine locations along the interurban trail and six locations along Milwaukee Avenue in the area shown on Figures 8 and 9.

JWW/CLJ/jrc

REFERENCES

Ecology. 2009. *Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action, Review DRAFT.* Toxics Cleanup Program, Washington State Department of Ecology. Publication No. 09-09-047. October.

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Landau Associates. 2013c. Draft Report: *Agency Review Draft Work Plan Algona Residential Neighborhood Vapor Intrusion Assessment Boeing Auburn Facility Auburn, Washington*. Prepared for The Boeing Company, Auburn, Washington. April 30.

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Pankow, J.F. and J.A. Cherry. 1996. *Dense Chlorinated Solvents and other DNAPLs in Groundwater*. Waterloo Press, Portland, Oregon.

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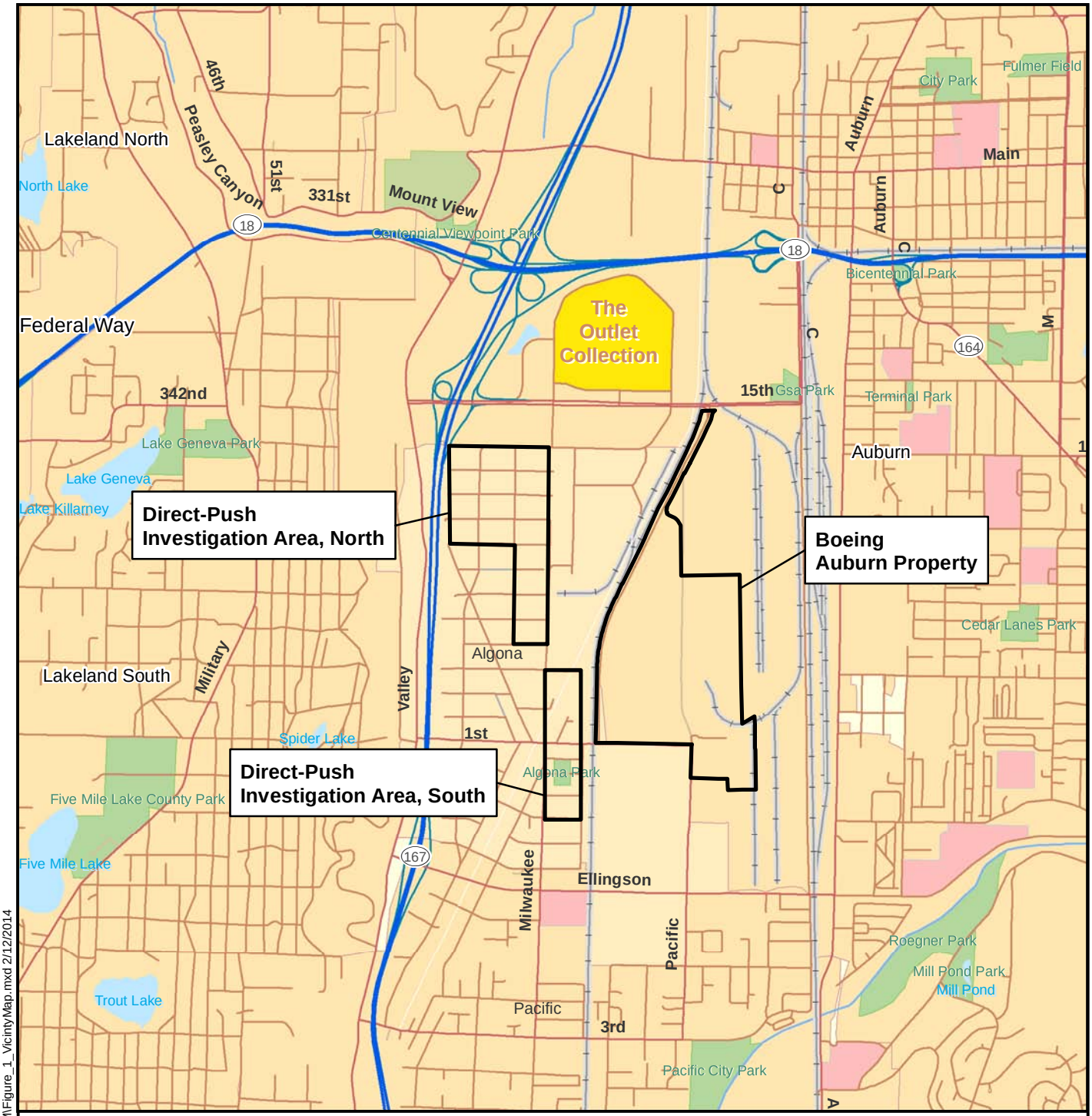
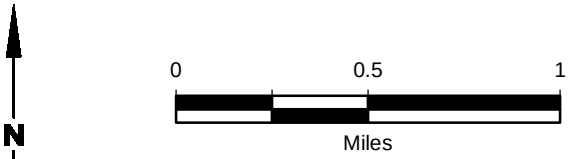
ATTACHMENTS

Figure 1: Vicinity Map
Figure 2: Current Monitoring Well network
Figure 3: Direct-Push Drilling Results – Algona North
Figure 4: Direct-Push Drilling Results – Algona South
Figure 5: Depth to Water Measurements
Figure 6: Comparison of VOC Concentrations by Sampling Method
Figure 7: Tier II Vapor Intrusion Assessment Area
Figure 8: Shallow Zone TCE Plumes
Figure 9: Shallow Zone Vinyl Chloride Plumes

Table 1: Borehole Groundwater Analytical Results
Table 2: Comparison of VOC Concentrations by Sampling Method

Attachment A: Boring Logs





Data Source: ESRI 2008

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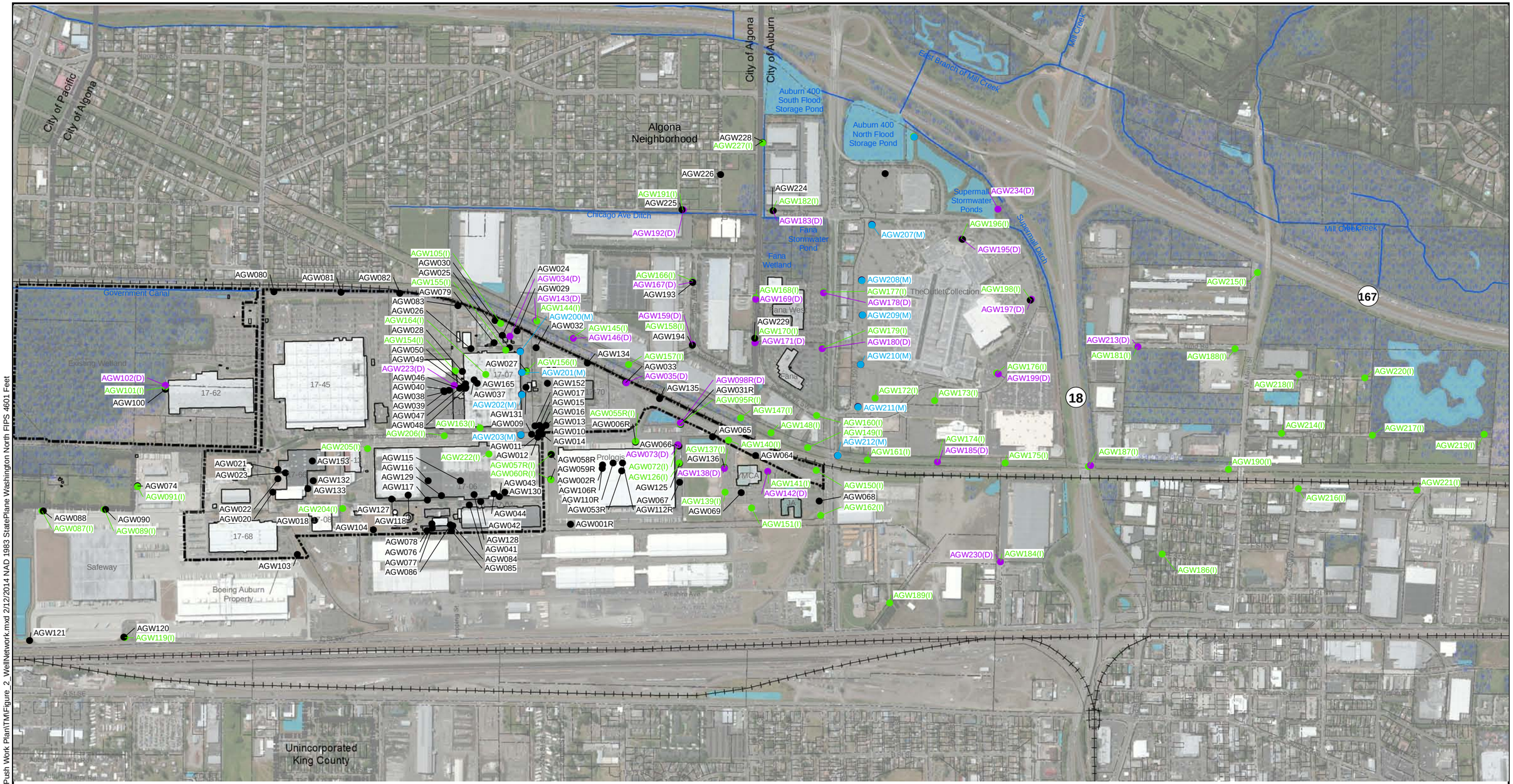
Boeing Auburn Auburn, Washington	**Vicinity Map**	Figure 1



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Notes

1. Most recent monitoring wells installed in December 2012. Figure last updated in February 2013.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Shallow Monitoring Well (2 to 30 ft BGS)
- (I) Intermediate Monitoring Well (40 to 60 ft BGS)
- (D) Deep Monitoring Well (80 to 100 ft BGS)
- (M) Multilevel Monitoring Well
- Waterways
- Wetland Areas
- Water Bodies
- Boeing Property
- City Limits

N

0 1,000 2,000

Scale in Feet

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

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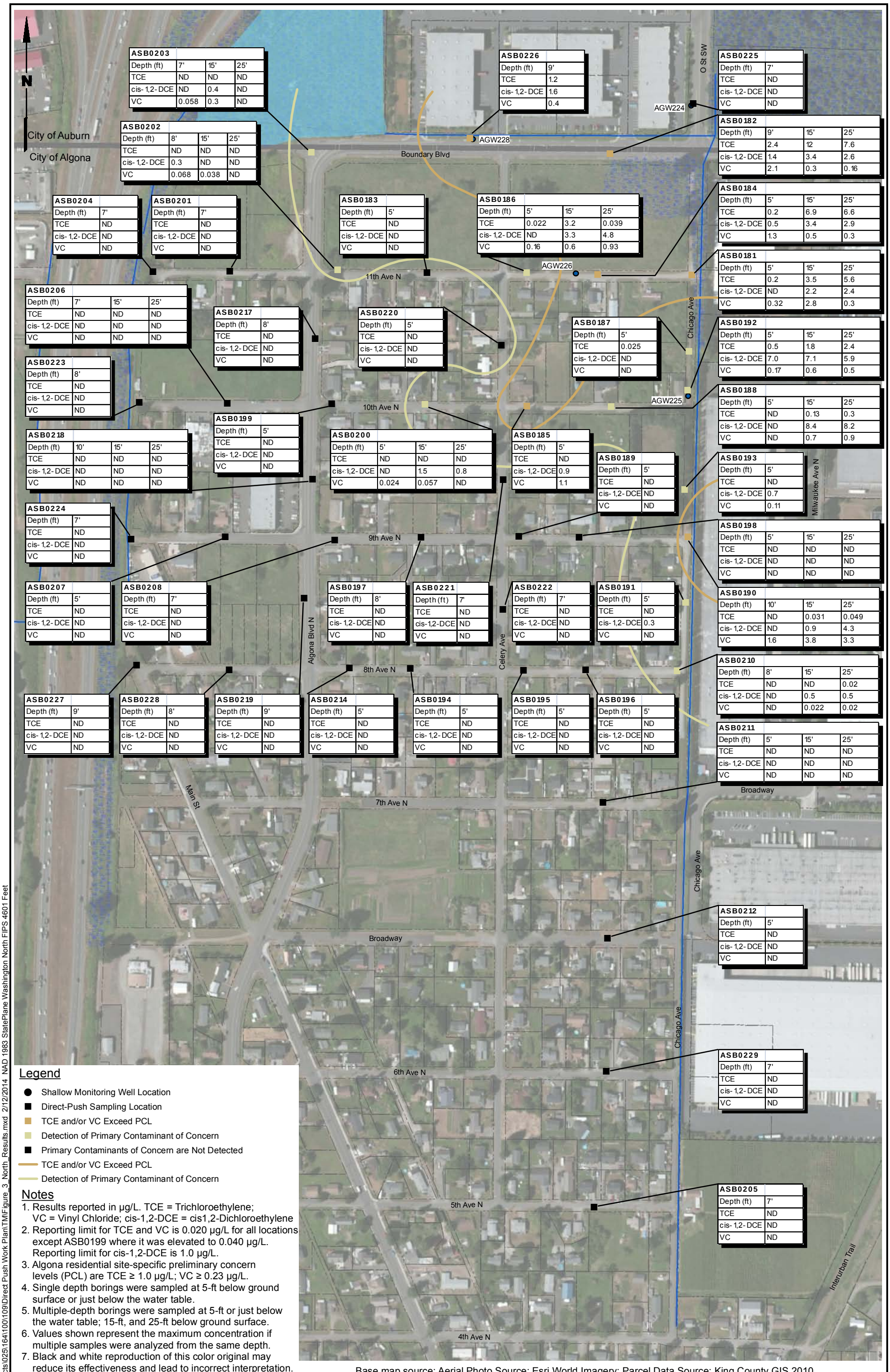
Boeing Auburn Auburn, Washington	**Current Monitoring Well Network**	Figure 2



Legend

- Shallow Monitoring Well Location
- Direct-Push Sampling Location
- TCE and/or VC Exceed PCL
- Detection of Primary Contaminant of Concern
- Primary Contaminants of Concern are Not Detected
- TCE and/or VC Exceed PCL
- Detection of Primary Contaminant of Concern

Notes

1. Results reported in µg/L. TCE = Trichloroethylene; VC = Vinyl Chloride; cis-1,2-DCE = cis1,2-Dichloroethylene
2. Reporting limit for TCE and VC is 0.020 µg/L for all locations except ASB0199 where it was elevated to 0.040 µg/L. Reporting limit for cis-1,2-DCE is 1.0 µg/L.
3. Algona residential site-specific preliminary concern levels (PCL) are TCE ≥ 1.0 µg/L; VC ≥ 0.23 µg/L.
4. Single depth borings were sampled at 5-ft below ground surface or just below the water table.
5. Multiple-depth borings were sampled at 5-ft or just below the water table; 15-ft, and 25-ft below ground surface.
6. Values shown represent the maximum concentration if multiple samples were analyzed from the same depth.
7. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Base map source: Aerial Photo Source: Esri World Imagery; Parcel Data Source: King County GIS 2010

0 300 600

Scale in Feet

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Boeing Auburn
Auburn, Washington

Direct-Push Drilling Results
Algona North

Figure
3

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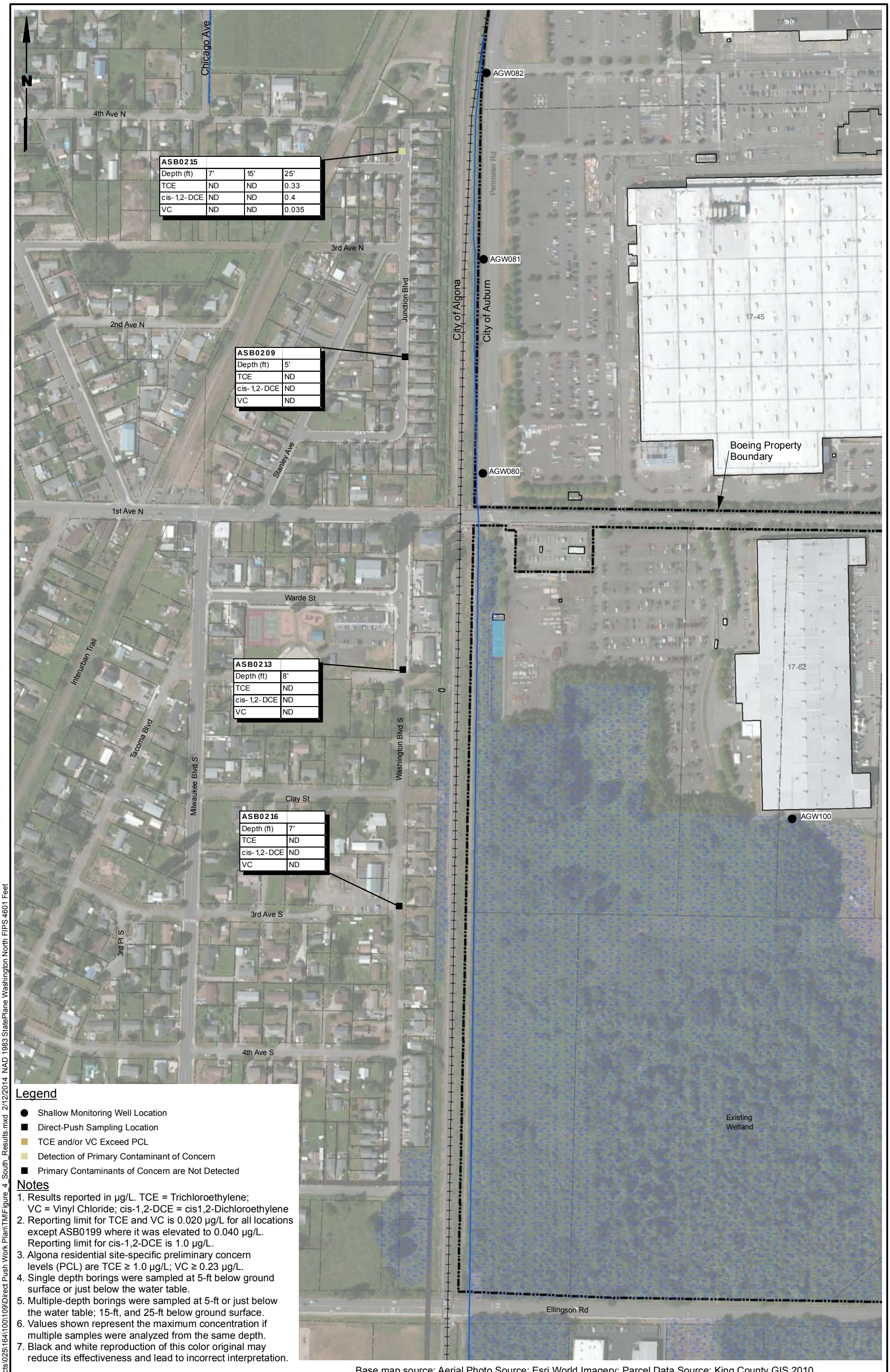

Legend

- Shallow Monitoring Well Location
- Direct-Push Sampling Location
- TCE and/or VC Exceed PCL
- Detection of Primary Contaminant of Concern
- Primary Contaminants of Concern are Not Detected

Notes

1. Results reported in µg/L. TCE = Trichloroethylene; VC = Vinyl Chloride; cis-1,2-DCE = cis1,2-Dichloroethylene
2. Reporting limit for TCE and VC is 0.020 µg/L for all locations except ASB0199 where it was elevated to 0.040 µg/L. Reporting limit for cis-1,2-DCE is 1.0 µg/L.
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5. Multiple-depth borings were sampled at 5-ft or just below the water table; 15-ft, and 25-ft below ground surface.
6. Values shown represent the maximum concentration if multiple samples were analyzed from the same depth.
7. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Base map source: Aerial Photo Source: Esri World Imagery; Parcel Data Source: King County GIS 2010

0 300 600

Scale in Feet

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Boeing Auburn
Auburn, Washington

Direct-Push Drilling Results
Algona South

Figure
4

G:\Projects\025\164\100109\Direct Push Work Plan\TM\Figure_4_South_Results.mxd 2/12/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

Legend

- Direct-Push Sampling Location
- Shallow Monitoring Well Location

ASB203 Boring ID Number

(3.8) At Time of Drilling Depth to Water (feet BGS)

Notes

1. At multiple-depth boring locations depth to water values presented were measured during groundwater sample collection at the shallow depth, approximately 5-ft.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Aerial Photo Source: Esri World Imagery; Parcel Data Source: King County GIS 2010

0 250 500

Scale in Feet

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Boeing Auburn
Auburn, Washington

Depth to Water Measurements

Figure
5

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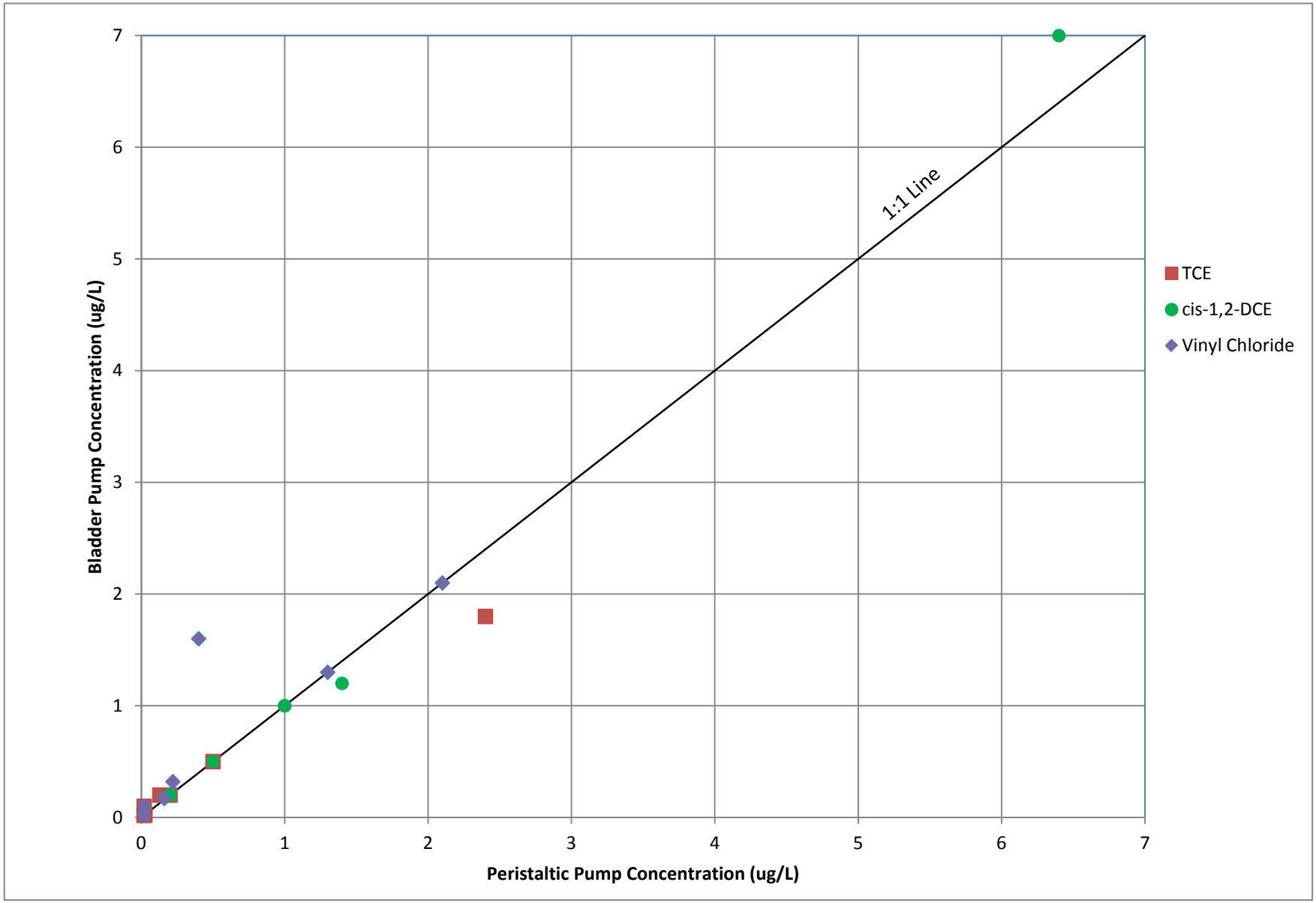

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Boeing Auburn Auburn, Washington	**Comparison of VOC Concentrations by Sampling Method**	Figure 6

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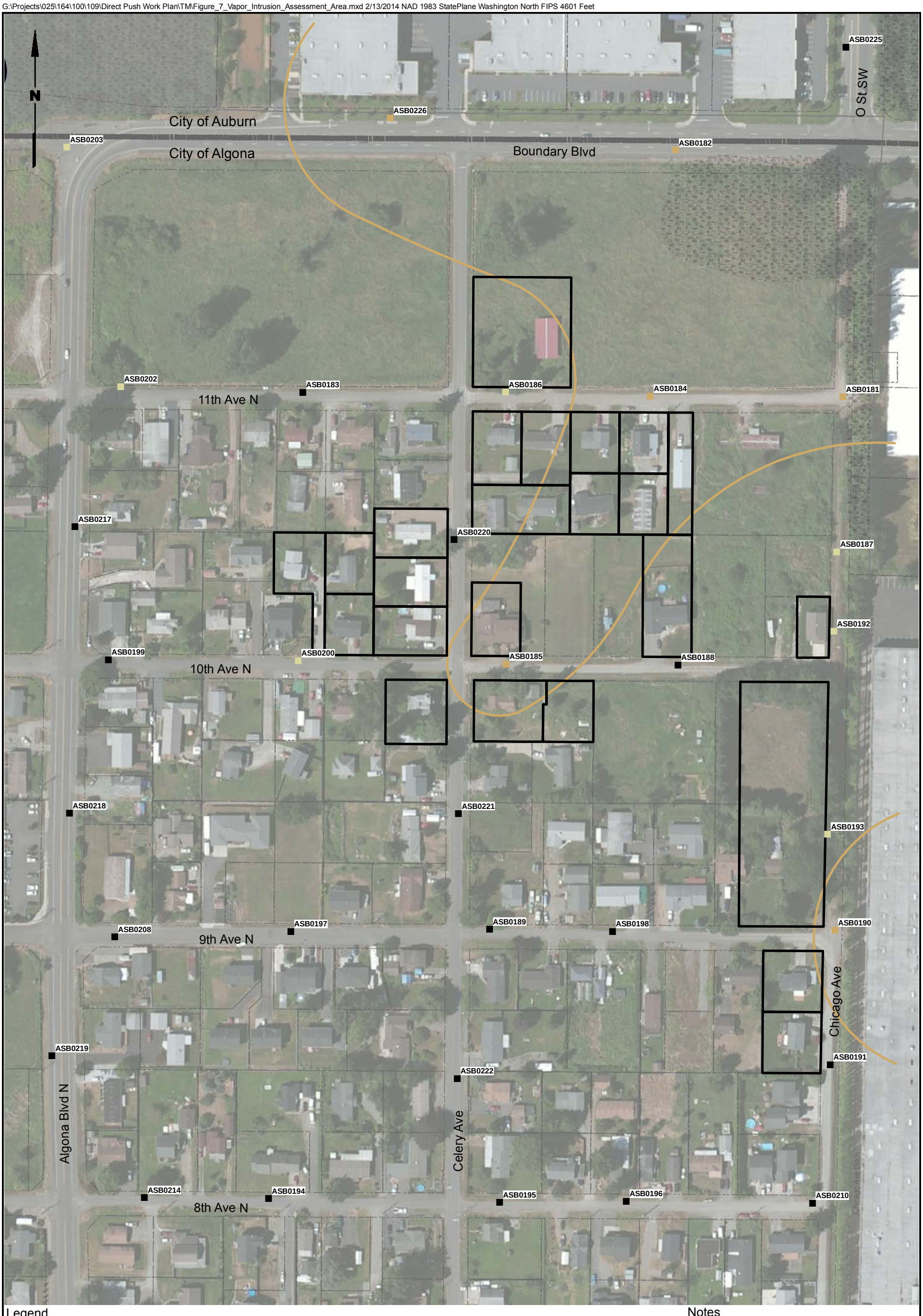

Legend

VOC Concentrations in Shallow Ground Water

- TCE and/or vinyl chloride exceed PCL
- TCE and/or vinyl chloride are detected (neither exceed PCL)
- TCE and vinyl chloride are not detected

TCE and/or VC Exceed PCL

Initial Residences Selected for Sampling

Notes

1. Groundwater Preliminary Concern Levels (PCL):
   trichloroethylene (TCE) ≥ 1 ppb
   vinyl chloride (VC) ≥ 0.23 ppb
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Data Source: Esri World Imagery, King County GIS 2010

0 150 300

Scale in Feet

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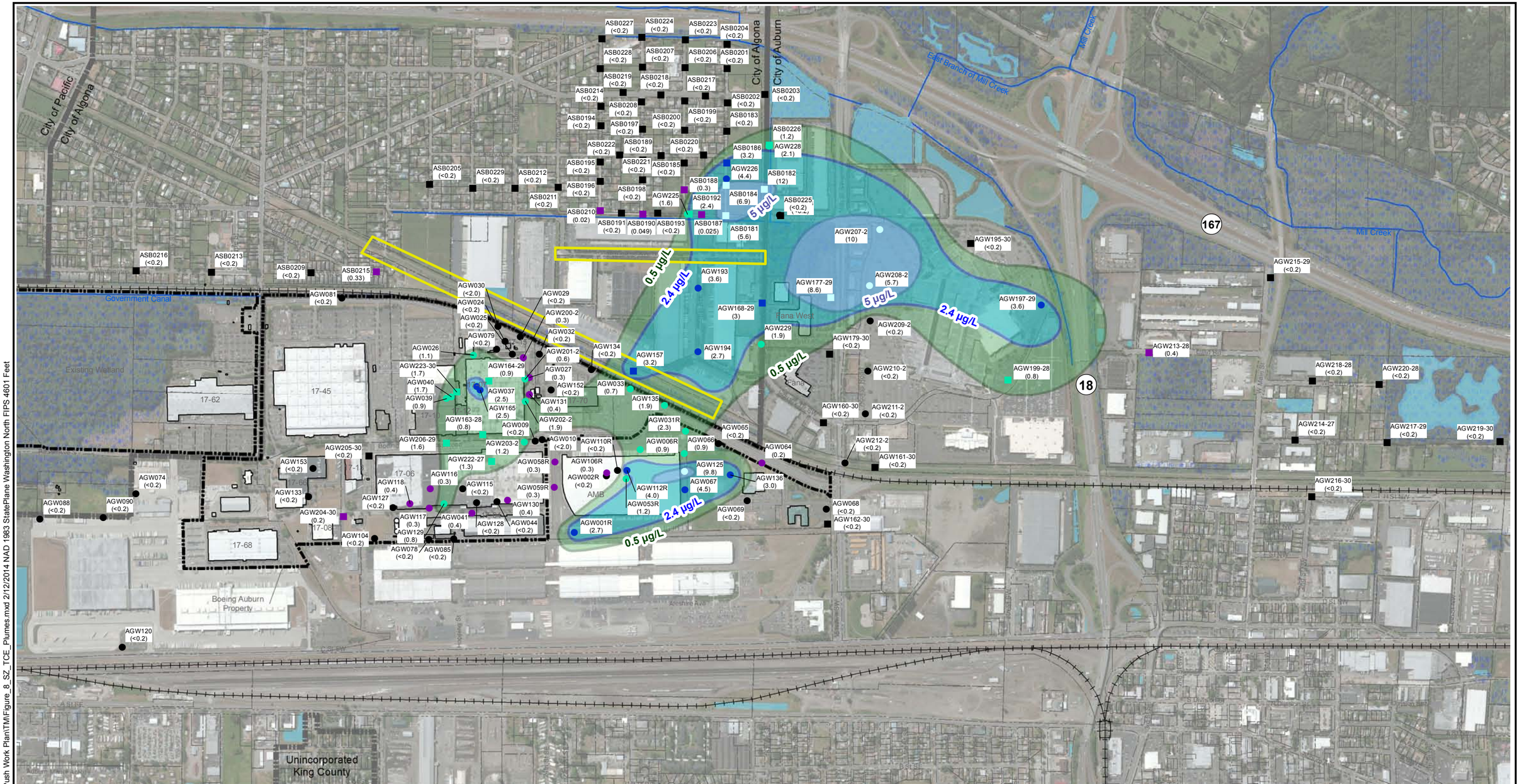
Boeing Auburn
Auburn, Washington

Vapor Intrusion Assessment Area

Figure 7



Notes

1. All concentrations shown in µg/L. The screening level for TCE is 0.49 µg/L.
2. <0.02 = Compound not detected at indicated reporting limits.
3. Monitoring well results are the most recent as of December 2012. Direct-Push borehole sample results are from April 2013. Borehole grab samples from monitoring wells were collected at time of drilling.
4. Multilevel wells have seven well channels. Channel designations are included in the well ID (ex: AGW208-1). Channels 1 and 2 are in the shallow aquifer zone.
5. Direct-Push data collected at multiple depths. Only the hightest concentrations is represented.
6. Groundwater monitoring wells are identified by the AGW prefix. Soil borings from the April 2013 Direct-Push investigation are identified by the ASB prefix.
6. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Monitoring Well Location
- Borehole Grab Sample Location
- Last TCE Detection = > 5 µg/L
- Last TCE Detection = > 2.4-5 µg/L
- Last TCE Detection = 0.5-2.4 µg/L
- Last TCE Detection = < 0.5 µg/L
- Non-Detect
- Recommended Areas for Additional Direct-Push Drilling in Algona Industrial Area
- TCE Contour = ≥ 5.0 µg/L
- TCE Contour = > 2.4 µg/L
- TCE Contour = > 0.5 µg/L
- Boeing Property
- City Limits

N

0 1,000 2,000

Scale in Feet

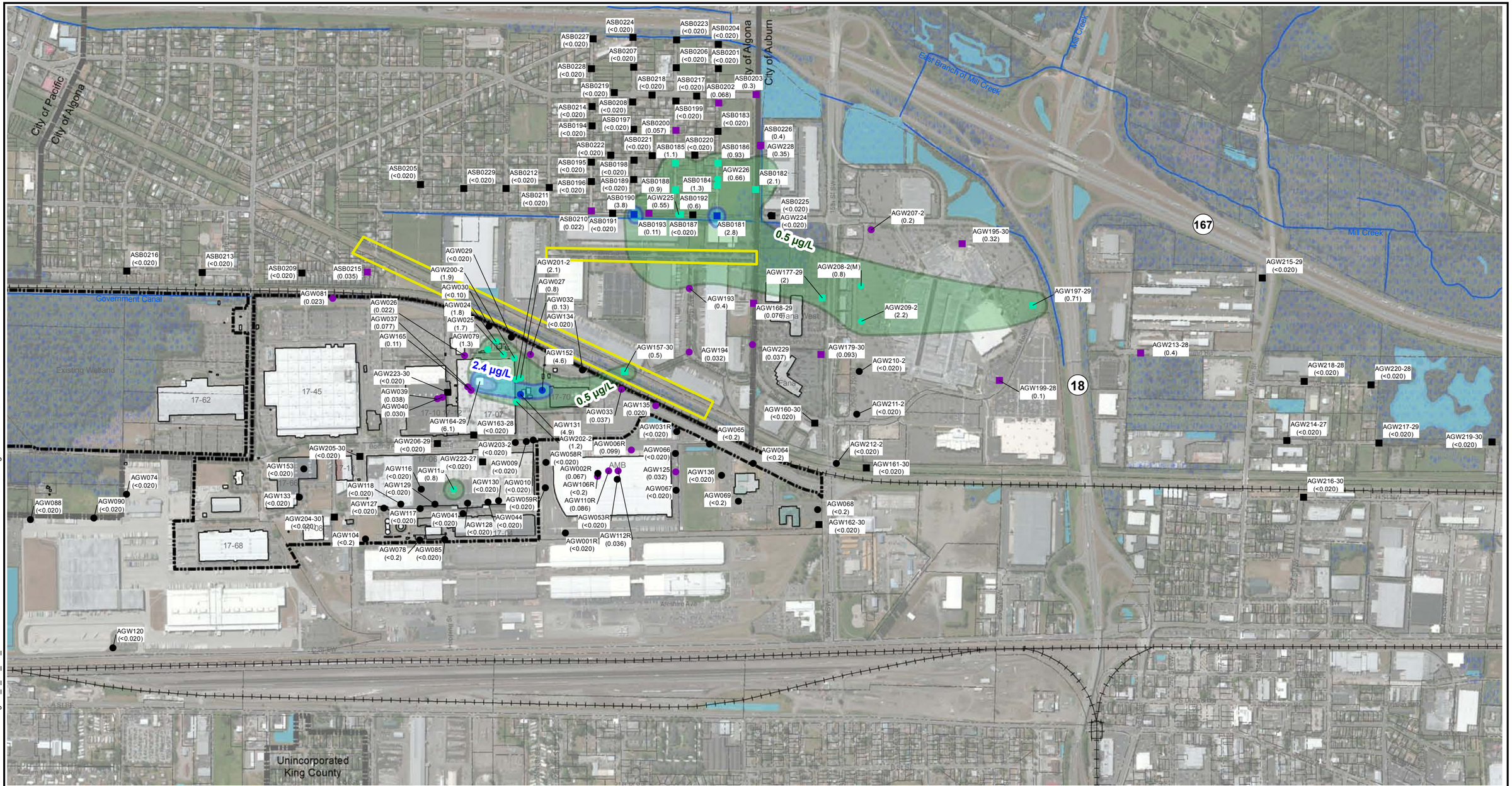
Base map source: Geometrix 2003; Aerial Photo Source: Esri World Imagery; Parcel Data Source: King County GIS 2010

LANDAU ASSOCIATES

Boeing Auburn Auburn, Washington	**Shallow Zone TCE Plumes**	Figure 8

G:\Projects\025\164\100\109\Direct Push Work Plan\TM\Figure_8_SZ_TCE_Plumes.mxd 2/12/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

G:\Projects\025\164\100\109\Direct Push Work Plan\TM\Figure_9_SZ_VC_Plumes.mxd 2/12/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet



Notes

1. All concentrations shown in µg/L.
   The screening level for VC is 0.029 µg/L.
2. <0.020 = Compound not detected at indicated reporting limits.
3. Monitoring well results are the most recent as of December 2012. Direct-Push borehole sample results are from April 2013. Borehole grab samples from monitoring wells were collected at time of drilling.
4. Multilevel wells have seven well channels. Channel designations are included in the well ID (ex: AGW208-1). Channels 1 and 2 are in the shallow aquifer zone.
5. Direct-Push data collected at multiple depths. Only the hightest concentrations is represented.
6. Groundwater monitoring wells are identified by the AGW prefix. Soil borings from the April 2013 Direct-Push investigation are identified by the ASB prefix.
6. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Monitoring Well Location
- Borehole Grab Sample Location
- Last VC Detection = > 5 µg/L
- Last VC Detection = > 2.4-5 µg/L
- Last VC Detection = 0.5-2.4 µg/L
- Last VC Detection = < 0.5 µg/L
- Non-Detect
- Recommended Areas for Additional Direct-Push Drilling in Algona Industrial Area
- VC Contour = ≥ 5.0 µg/L
- VC Contour = > 2.4 µg/L
- VC Contour = > 0.5 µg/L
- Boeing Property
- City Limits

N

0 1,000 2,000

Scale in Feet

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

LANDAU ASSOCIATES

Boeing Auburn Auburn, Washington	**Shallow Zone Vinyl Chloride Plumes**	Figure 9

TABLE 1
BOREHOLE GROUNDWATER ANALYTICAL RESULTS
ALGONA DIRECT-PUSH INVESTIGATION - APRIL 2013
BOEING AUBURN

Location:	ASB0181-5	ASB0181-5b	ASB0181-15	ASB0181-25	ASB0182-9	ASB0182-9b
SDG:	1380303	1380303	1380303	1380303	1380643	1380643
Lab ID:	7009562	7009563	7009564	7009565	7011090	7011091
	4/3/2013	4/3/2013	4/3/2013	4/3/2013	4/4/2013	4/4/2013
VOLATILES (µg/L)						
Method SW8260C						
Acetone	25 U	25 U	5.0 U	5.0 U	5.0 UJ	5.0 UJ
Benzene	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromodichloromethane	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	25 U	25 U	5.0 U	5.0 U	5.0 UJ	5.0 UJ
Carbon Disulfide	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U
Chlorobenzene	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloromethane	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethene	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	1.0 U	1.0 U	**2.2**	**2.4**	**1.4**	**1.2**
trans-1,2-Dichloroethene	1.0 U	1.0 U	**0.3**	**0.2**	0.2 U	0.2 U
1,2-Dichloropropane	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,3-Dichloropropene	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Hexanone	25 U	25 U	5.0 U	5.0 U	5.0 UJ	5.0 UJ
4-Methyl-2-Pentanone (MIBK)	25 U	25 U	5.0 U	5.0 U	5.0 UJ	5.0 UJ
Methylene Chloride	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U
Tetrachloroethene	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-Trichloro-1,2,2-trifluoroethane	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichloroethene	1.0 U	1.0 U	**3.5**	**5.6**	**2.4**	**1.8**
Trichlorofluoromethane	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Acetate	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	1.0 U	1.0 U	**2.8**	**0.3**	**2.1**	**2.1**
m,p-Xylene	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-Xylene	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U
VOLATILES (µg/L)						
Method 8260C SIM						
Trichloroethene	**0.13**	**0.20**	**2.7**	**4.3**	**1.3**	**1.4**
Vinyl Chloride	**0.22**	**0.32**	**2.4**	**0.22**	**1.8**	**1.7**
VOLATILES (µg/L)						
Method 8260C SIM						
with anti-foaming agent						
Trichloroethene						
Vinyl Chloride						

TABLE 1
BOREHOLE GROUNDWATER ANALYTICAL RESULTS
ALGONA DIRECT-PUSH INVESTIGATION - APRIL 2013
BOEING AUBURN

Location:	ASB0182-15	ASB0182-25	ASB0183-5	ASB0184-5	ASB0184-5b	ASB0184-15
SDG:	1380643	1380643	1380643/1382956	1380919	1380919	1380919
Lab ID:	7011092	7011094	7011095/7022707	7012530	7012531	7012533
	4/4/2013	4/4/2013	4/4/2013	4/5/2013	4/5/2013	4/5/2013
VOLATILES (µg/L)						
Method SW8260C						
Acetone	5.0 UJ	5.0 UJ	25 UJ	5.0 UJ	5.0 UJ	5.0 UJ
Benzene	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U	0.2 U
Bromodichloromethane	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	5.0 UJ	5.0 UJ	25 UJ	5.0 UJ	5.0 UJ	5.0 UJ
Carbon Disulfide	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U	0.2 U
Chlorobenzene	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Chloroform	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U	0.2 U
Chloromethane	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethene	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	**3.4**	**2.6**	1.0 U	**0.5**	**0.5**	**3.4**
trans-1,2-Dichloroethene	**0.4**	**0.2**	1.0 U	0.2 U	0.2 U	**0.4**
1,2-Dichloropropane	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U	0.2 U
trans-1,3-Dichloropropene	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
2-Hexanone	5.0 UJ	5.0 UJ	25 UJ	5.0 UJ	5.0 UJ	5.0 UJ
4-Methyl-2-Pentanone (MIBK)	5.0 UJ	5.0 UJ	25 UJ	5.0 UJ	5.0 UJ	5.0 UJ
Methylene Chloride	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Styrene	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U	0.2 U
Tetrachloroethene	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U	0.2 U
Toluene	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U	0.2 U
1,1,2-Trichloro-1,2,2-trifluoroethane	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U	0.2 U
Trichloroethene	**12**	**7.6**	1.0 U	**0.2**	**0.2**	**6.9**
Trichlorofluoromethane	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Vinyl Acetate	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	**0.3**	0.2 U	1.0 U	**1.3**	**1.3**	**0.5**
m,p-Xylene	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
o-Xylene	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
VOLATILES (µg/L)						
Method 8260C SIM						
Trichloroethene	**9.0**	**6.2**	0.10 U	**0.15**	**0.18**	**5.6**
Vinyl Chloride	**0.27**	**0.16**	0.10 U	**1.1**	**1.3**	**0.42**
VOLATILES (µg/L)						
Method 8260C SIM						
with anti-foaming agent						
Trichloroethene			0.020 U			
Vinyl Chloride			0.020 U			

TABLE 1
BOREHOLE GROUNDWATER ANALYTICAL RESULTS
ALGONA DIRECT-PUSH INVESTIGATION - APRIL 2013
BOEING AUBURN

Location:	ASB0184-25	ASB0185-5	ASB0186-5	ASB0186-15	ASB0186-25	ASB0187-5
SDG:	1380919	1380919	1381416/1382956	1381416	1381416	1381416
Lab ID:	7012534	7012535	7014884/7022706	7014886	7014887	7014889
	4/5/2013	4/5/2013	4/8/2013	4/8/2013	4/8/2013	04/08/2013
VOLATILES (µg/L)						
Method SW8260C						
Acetone	5.0 UJ	5.0 UJ	25 U	5.0 U	5.0 U	5.0 U
Benzene	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U	0.2 U
Bromodichloromethane	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	5.0 UJ	5.0 UJ	25 U	5.0 U	5.0 U	5.0 U
Carbon Disulfide	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U	0.2 U
Chlorobenzene	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Chloroform	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U	0.2 U
Chloromethane	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.2 U	0.2 U	1.0 U	0.2 U	**0.4**	0.2 U
1,1-Dichloroethene	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	**2.9**	**0.9**	1.0 U	**3.3**	**4.8**	0.2 U
trans-1,2-Dichloroethene	**0.3**	0.2 U	1.0 U	**0.4**	**0.5**	0.2 U
1,2-Dichloropropane	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U	0.2 U
trans-1,3-Dichloropropene	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
2-Hexanone	5.0 UJ	5.0 UJ	25 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-Pentanone (MIBK)	5.0 UJ	5.0 UJ	25 U	5.0 U	5.0 U	5.0 U
Methylene Chloride	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Styrene	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U	0.2 U
Tetrachloroethene	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U	0.2 U
Toluene	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U	0.2 U
1,1,2-Trichloro-1,2,2-trifluoroethane	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U	0.2 U
Trichloroethene	**6.6**	0.2 U	1.0 U	**3.2**	0.2 U	0.2 U
Trichlorofluoromethane	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Vinyl Acetate	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	**0.3**	**1.1**	1.0 U	**0.6**	**0.9**	0.2 U
m,p-Xylene	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
o-Xylene	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
VOLATILES (µg/L)						
Method 8260C SIM						
Trichloroethene	**5.6**	0.020 U	0.10 U	**2.5**	**0.039**	**0.025**
Vinyl Chloride	**0.27**	**0.98**	**0.12**	**0.53**	**0.93**	0.020 U
VOLATILES (µg/L)						
Method 8260C SIM						
with anti-foaming agent						
Trichloroethene			**0.022**			
Vinyl Chloride			**0.16**			

TABLE 1
BOREHOLE GROUNDWATER ANALYTICAL RESULTS
ALGONA DIRECT-PUSH INVESTIGATION - APRIL 2013
BOEING AUBURN

Location:	ASB0187-5b	ASB0188-5	ASB0188-5b	ASB0188-15	ASB9188-15	ASB0188-25
SDG:	1381416	1381711/1382956	1381711	1381711	1381711	1381711
Lab ID:	7014890	7016095/7022708	7016096	7016097	7016098	7016099
	04/08/2013	4/9/2013	4/9/2013	4/9/2013	4/9/2013	4/9/2013
VOLATILES (µg/L)						
Method SW8260C						
Acetone	5.0 U	25 U	25 U	5.0 U	5.0 U	5.0 U
Benzene	0.2 U	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U
Bromodichloromethane	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	5.0 U	25 U	25 U	5.0 U	5.0 U	5.0 U
Carbon Disulfide	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.2 U	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U
Chlorobenzene	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Chloroform	0.2 U	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U
Chloromethane	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.2 U	1.0 U	1.0 U	**0.2**	**0.2**	**0.2**
1,1-Dichloroethene	0.2 U	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	0.2 U	1.0 U	1.0 U	**8.4**	**8.0**	**8.2**
trans-1,2-Dichloroethene	0.2 U	1.0 U	1.0 U	**1.1**	**1.0**	**1.1**
1,2-Dichloropropane	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	0.2 U	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U
trans-1,3-Dichloropropene	0.2 U	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U
2-Hexanone	5.0 U	25 U	25 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-Pentanone (MIBK)	5.0 U	25 U	25 U	5.0 U	5.0 U	5.0 U
Methylene Chloride	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Styrene	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.2 U	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U
Tetrachloroethene	0.2 U	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U
Toluene	0.2 U	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U
1,1,2-Trichloro-1,2,2-trifluoroethane	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	0.2 U	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U
Trichloroethene	0.2 U	1.0 U	1.0 U	0.2 U	0.2 U	**0.3**
Trichlorofluoromethane	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Vinyl Acetate	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	0.2 U	1.0 U	1.0 U	**0.7**	**0.7**	**0.9**
m,p-Xylene	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U
o-Xylene	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U
VOLATILES (µg/L)						
Method 8260C SIM						
Trichloroethene	**0.024**	0.20 U	0.10 U	**0.13**	**0.13**	**0.26**
Vinyl Chloride	0.020 U	0.20 U	0.10 U	**0.66**	**0.61**	**0.82**
VOLATILES (µg/L)						
Method 8260C SIM						
with anti-foaming agent						
Trichloroethene		0.020 U				
Vinyl Chloride		0.020 U				

TABLE 1
BOREHOLE GROUNDWATER ANALYTICAL RESULTS
ALGONA DIRECT-PUSH INVESTIGATION - APRIL 2013
BOEING AUBURN

Location:	ASB0189-5	ASB0190-10	ASB0190-10b	ASB0190-15	ASB0190-25	ASB0191-5
SDG:	1381711/1382956	1382121	1382121	1382121	1382121	1382121
Lab ID:	7016100/7022709	7018224	7018225	7018226	7018227	7018228
	4/9/2013	4/10/2013	4/10/2013	4/10/2013	4/10/2013	4/10/2013
VOLATILES (µg/L)						
Method SW8260C						
Acetone	25 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Benzene	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromodichloromethane	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	25 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon Disulfide	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chlorobenzene	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloromethane	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethene	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	1.0 U	0.2 U	0.2 U	**0.9**	**4.3**	**0.3**
trans-1,2-Dichloroethene	1.0 U	**0.2**	**0.3**	**0.5**	**0.9**	0.2 U
1,2-Dichloropropane	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,3-Dichloropropene	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Hexanone	25 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-Pentanone (MIBK)	25 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methylene Chloride	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Tetrachloroethene	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-Trichloro-1,2,2-trifluoroethane	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichloroethene	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichlorofluoromethane	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Acetate	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	1.0 U	**0.4**	**1.6**	**3.8**	**3.3**	0.2 U
m,p-Xylene	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-Xylene	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
VOLATILES (µg/L)						
Method 8260C SIM						
Trichloroethene	0.10 U	0.020 U	0.020 U	**0.031**	**0.049**	0.020 U
Vinyl Chloride	0.10 U	**0.36**	**1.3**	**3.4**	**2.6**	0.020 U
VOLATILES (µg/L)						
Method 8260C SIM						
with anti-foaming agent						
Trichloroethene	0.020 U					
Vinyl Chloride	0.020 U					

TABLE 1
BOREHOLE GROUNDWATER ANALYTICAL RESULTS
ALGONA DIRECT-PUSH INVESTIGATION - APRIL 2013
BOEING AUBURN

Location:	ASB0192-5	ASB0192-5b	ASB0192-15	ASB0192-25	ASB0193-5	ASB9193-5
SDG:	1382468	1382468	1382468	1382468	1382468	1382468
Lab ID:	7020169	7020168	7020171	7020172	7020173	7020174
	4/11/2013	4/11/2013	4/11/2013	4/11/2013	4/11/2013	4/11/2013
VOLATILES (µg/L)						
Method SW8260C						
Acetone	5.0 U	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
Bromodichloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	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
Carbon Disulfide	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
Chlorobenzene	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
Chloroform	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
Dibromochloromethane	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
1,2-Dichloroethane	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
cis-1,2-Dichloroethene	**6.4**	**7.0**	**7.1**	**5.9**	**0.7**	**0.7**
trans-1,2-Dichloroethene	**0.4**	**0.4**	**0.7**	**0.6**	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
cis-1,3-Dichloropropene	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
Ethylbenzene	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
4-Methyl-2-Pentanone (MIBK)	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
Styrene	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
Tetrachloroethene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
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
1,1,1-Trichloroethane	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
Trichloroethene	**0.5**	**0.5**	**1.8**	**2.4**	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
Vinyl Acetate	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	0.2 U	0.2 U	**0.6**	**0.5**	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
o-Xylene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
VOLATILES (µg/L)						
Method 8260C SIM						
Trichloroethene	**0.38**	**0.39**	**1.5**	**1.9**	0.020 U	0.020 U
Vinyl Chloride	**0.16**	**0.17**	**0.48**	**0.43**	**0.11**	**0.11**
VOLATILES (µg/L)						
Method 8260C SIM						
with anti-foaming agent						
Trichloroethene						
Vinyl Chloride						

TABLE 1
BOREHOLE GROUNDWATER ANALYTICAL RESULTS
ALGONA DIRECT-PUSH INVESTIGATION - APRIL 2013
BOEING AUBURN

Location:	ASB0194-5	ASB0195-5	ASB0196-5	ASB0196-5b	ASB0197-8	ASB0198-5
SDG:	1382705	1382705	1382705	1382705	1383074	1383074
Lab ID:	7021479	7021481	7021482	7021483	7023175	7023176
	4/12/2013	4/12/2013	4/13/2013	4/12/2013	4/15/2013	4/15/2013
VOLATILES (µg/L)						
Method SW8260C						
Acetone	5.0 U	5.0 U	5.0 U	5.0 U	10 U	10 U
Benzene	0.2 U	0.2 U	0.2 U	0.2 U	0.4 U	0.4 U
Bromodichloromethane	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U	1.0 U
Bromoform	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U	1.0 U
Bromomethane	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U	1.0 U
2-Butanone	5.0 U	5.0 U	5.0 U	5.0 U	10 U	10 U
Carbon Disulfide	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U	1.0 U
Carbon Tetrachloride	0.2 U	0.2 U	0.2 U	0.2 U	0.4 U	0.4 U
Chlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U	1.0 U
Chloroethane	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U	1.0 U
Chloroform	0.2 U	0.2 U	0.2 U	0.2 U	0.4 U	0.4 U
Chloromethane	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U	1.0 U
Dibromochloromethane	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U	1.0 U
1,1-Dichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U	1.0 U
1,2-Dichloroethane	0.2 U	0.2 U	0.2 U	0.2 U	0.4 U	0.4 U
1,1-Dichloroethene	0.2 U	0.2 U	0.2 U	0.2 U	0.4 U	0.4 U
cis-1,2-Dichloroethene	0.2 U	0.2 U	0.2 U	0.2 U	0.4 U	0.4 U
trans-1,2-Dichloroethene	0.2 U	0.2 U	0.2 U	0.2 U	0.4 U	0.4 U
1,2-Dichloropropane	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U	1.0 U
cis-1,3-Dichloropropene	0.2 U	0.2 U	0.2 U	0.2 U	0.4 U	0.4 U
trans-1,3-Dichloropropene	0.2 U	0.2 U	0.2 U	0.2 U	0.4 U	0.4 U
Ethylbenzene	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U	1.0 U
2-Hexanone	5.0 U	5.0 U	5.0 U	5.0 U	10 U	10 U
4-Methyl-2-Pentanone (MIBK)	5.0 U	5.0 U	5.0 U	5.0 U	10 U	10 U
Methylene Chloride	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U	1.0 U
Styrene	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	0.2 U	0.2 U	0.2 U	0.2 U	0.4 U	0.4 U
Tetrachloroethene	0.2 U	0.2 U	0.2 U	0.2 U	0.4 U	0.4 U
Toluene	0.2 U	0.2 U	0.2 U	0.2 U	0.4 U	0.4 U
1,1,2-Trichloro-1,2,2-trifluoroethane	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U	1.0 U
1,1,1-Trichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U	1.0 U
1,1,2-Trichloroethane	0.2 U	0.2 U	0.2 U	0.2 U	0.4 U	0.4 U
Trichloroethene	0.2 U	0.2 U	0.2 U	0.2 U	0.4 U	0.4 U
Trichlorofluoromethane	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U	1.0 U
Vinyl Acetate	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U	1.0 U
Vinyl Chloride	0.2 U	0.2 U	0.2 U	0.2 U	0.4 U	0.4 U
m,p-Xylene	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U	1.0 U
o-Xylene	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U	1.0 U
VOLATILES (µg/L)						
Method 8260C SIM						
Trichloroethene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
VOLATILES (µg/L)						
Method 8260C SIM						
with anti-foaming agent						
Trichloroethene						
Vinyl Chloride						

TABLE 1
BOREHOLE GROUNDWATER ANALYTICAL RESULTS
ALGONA DIRECT-PUSH INVESTIGATION - APRIL 2013
BOEING AUBURN

Location:	ASB0198-15	ASB0198-25	ASB0199-5	ASB0200-5	ASB0200-15	ASB0200-25
SDG:	1383074	1383074	1383441	1383441	1383441	1383441
Lab ID:	7023177	7023178	7024827	7024829	7024830	7024831
	4/15/2013	4/15/2013	4/16/2013	4/16/2013	4/16/2013	4/16/2013
VOLATILES (µg/L)						
Method SW8260C						
Acetone	5.0 U	5.0 U	25 U	10 U	5.0 U	5.0 U
Benzene	0.2 U	0.2 U	1.0 U	0.4 U	0.2 U	0.2 U
Bromodichloromethane	0.5 U	0.5 U	2.5 U	1.0 U	0.5 U	0.5 U
Bromoform	0.5 U	0.5 U	2.5 U	1.0 U	0.5 U	0.5 U
Bromomethane	0.5 U	0.5 U	2.5 U	1.0 U	0.5 U	0.5 U
2-Butanone	5.0 U	5.0 U	25 U	10 U	5.0 U	5.0 U
Carbon Disulfide	0.5 U	0.5 U	2.5 U	1.0 U	0.5 U	0.5 U
Carbon Tetrachloride	0.2 U	0.2 U	1.0 U	0.4 U	0.2 U	0.2 U
Chlorobenzene	0.5 U	0.5 U	2.5 U	1.0 U	0.5 U	0.5 U
Chloroethane	0.5 U	0.5 U	2.5 U	1.0 U	0.5 U	0.5 U
Chloroform	0.2 U	0.2 U	1.0 U	0.4 U	0.2 U	0.2 U
Chloromethane	0.5 U	0.5 U	2.5 U	1.0 U	0.5 U	0.5 U
Dibromochloromethane	0.5 U	0.5 U	2.5 U	1.0 U	0.5 U	0.5 U
1,1-Dichloroethane	0.5 U	0.5 U	2.5 U	1.0 U	0.5 U	0.5 U
1,2-Dichloroethane	0.2 U	0.2 U	1.0 U	0.4 U	0.2 U	0.2 U
1,1-Dichloroethene	0.2 U	0.2 U	1.0 U	0.4 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	0.2 U	0.2 U	1.0 U	0.4 U	**1.5**	**0.8**
trans-1,2-Dichloroethene	0.2 U	0.2 U	1.0 U	0.4 U	0.2 U	0.2 U
1,2-Dichloropropane	0.5 U	0.5 U	2.5 U	1.0 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	0.2 U	0.2 U	1.0 U	0.4 U	0.2 U	0.2 U
trans-1,3-Dichloropropene	0.2 U	0.2 U	1.0 U	0.4 U	0.2 U	0.2 U
Ethylbenzene	0.5 U	0.5 U	2.5 U	1.0 U	0.5 U	0.5 U
2-Hexanone	5.0 U	5.0 U	25 U	10 U	5.0 U	5.0 U
4-Methyl-2-Pentanone (MIBK)	5.0 U	5.0 U	25 U	10 U	5.0 U	5.0 U
Methylene Chloride	0.5 U	0.5 U	2.5 U	1.0 U	0.5 U	0.5 U
Styrene	0.5 U	0.5 U	2.5 U	1.0 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.2 U	0.2 U	1.0 U	0.4 U	0.2 U	0.2 U
Tetrachloroethene	0.2 U	0.2 U	1.0 U	0.4 U	0.2 U	0.2 U
Toluene	0.2 U	0.2 U	1.0 U	0.4 U	0.2 U	0.2 U
1,1,2-Trichloro-1,2,2-trifluoroethane	0.5 U	0.5 U	2.5 U	1.0 U	0.5 U	0.5 U
1,1,1-Trichloroethane	0.5 U	0.5 U	2.5 U	1.0 U	0.5 U	0.5 U
1,1,2-Trichloroethane	0.2 U	0.2 U	1.0 U	0.4 U	0.2 U	0.2 U
Trichloroethene	0.2 U	0.2 U	1.0 U	0.4 U	0.2 U	0.2 U
Trichlorofluoromethane	0.5 U	0.5 U	2.5 U	1.0 U	0.5 U	0.5 U
Vinyl Acetate	0.5 U	0.5 U	2.5 U	1.0 U	0.5 U	0.5 U
Vinyl Chloride	0.2 U	0.2 U	1.0 U	0.4 U	0.2 U	0.2 U
m,p-Xylene	0.5 U	0.5 U	2.5 U	1.0 U	0.5 U	0.5 U
o-Xylene	0.5 U	0.5 U	2.5 U	1.0 U	0.5 U	0.5 U
VOLATILES (µg/L)						
Method 8260C SIM						
Trichloroethene	0.020 U	0.020 U	0.040 U	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.020 U	0.020 U	0.040 U	**0.024**	**0.057**	0.020 U
VOLATILES (µg/L)						
Method 8260C SIM						
with anti-foaming agent						
Trichloroethene						
Vinyl Chloride						

TABLE 1
BOREHOLE GROUNDWATER ANALYTICAL RESULTS
ALGONA DIRECT-PUSH INVESTIGATION - APRIL 2013
BOEING AUBURN

Location:	ASB0201-7	ASB0202-8	ASB9202-8	ASB0202-15	ASB0202-25	ASB0203-7
SDG:	1383773	1383773	1383773	1383773	1383773	1384192
Lab ID:	7026450	7026451	7026452	7026453	7026454	7028205
	04/17/2013	04/17/2013	04/17/2013	04/17/2013	04/17/2013	4/18/2013
VOLATILES (µg/L)						
Method SW8260C						
Acetone	5.0 U	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
Bromodichloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	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
Carbon Disulfide	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
Chlorobenzene	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
Chloroform	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
Dibromochloromethane	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
1,2-Dichloroethane	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
cis-1,2-Dichloroethene	0.2 U	**0.3**	**0.3**	0.2 U	0.2 U	0.2 U
trans-1,2-Dichloroethene	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
cis-1,3-Dichloropropene	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
Ethylbenzene	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
4-Methyl-2-Pentanone (MIBK)	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
Styrene	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
Tetrachloroethene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
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
1,1,1-Trichloroethane	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
Trichloroethene	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
Vinyl Acetate	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	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
o-Xylene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
VOLATILES (µg/L)						
Method 8260C SIM						
Trichloroethene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.020 U	**0.068**	**0.070**	**0.038**	0.020 U	**0.058**
VOLATILES (µg/L)						
Method 8260C SIM						
with anti-foaming agent						
Trichloroethene						
Vinyl Chloride						

TABLE 1
BOREHOLE GROUNDWATER ANALYTICAL RESULTS
ALGONA DIRECT-PUSH INVESTIGATION - APRIL 2013
BOEING AUBURN

Location:	ASB0203-15	ASB0203-25	ASB0204-7	ASB0205-7	ASB9205-7	ASB0206-7
SDG:	1384192	1384192	1384192	1384192	1384192	1384423
Lab ID:	7028207	7028208	7028209	7028210	7028211	7029519
	4/18/2013	4/18/2013	4/18/2013	4/18/2013	4/18/2013	4/19/2013
VOLATILES (µg/L)						
Method SW8260C						
Acetone	5.0 U	5.0 U	**6.5**	5.0 U	5.0 U	**13**
Benzene	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
Bromoform	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	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
Carbon Disulfide	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
Chlorobenzene	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
Chloroform	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
Dibromochloromethane	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
1,2-Dichloroethane	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
cis-1,2-Dichloroethene	**0.4**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,2-Dichloroethene	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
cis-1,3-Dichloropropene	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
Ethylbenzene	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
4-Methyl-2-Pentanone (MIBK)	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
Styrene	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
Tetrachloroethene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
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
1,1,1-Trichloroethane	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
Trichloroethene	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
Vinyl Acetate	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	**0.3**	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
o-Xylene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
VOLATILES (µg/L)						
Method 8260C SIM						
Trichloroethene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Vinyl Chloride	**0.22**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
VOLATILES (µg/L)						
Method 8260C SIM						
with anti-foaming agent						
Trichloroethene						
Vinyl Chloride						

TABLE 1
BOREHOLE GROUNDWATER ANALYTICAL RESULTS
ALGONA DIRECT-PUSH INVESTIGATION - APRIL 2013
BOEING AUBURN

Location:	ASB0206-15	ASB0206-25	ASB0207-5	ASB0208-7	ASB0209-5	ASB0210-8
SDG:	1384423	1384423	1384423	1384767	1384767	1384767
Lab ID:	7029521	7029522	7029523	7031273	7031274	7031276
	4/19/2013	4/19/2013	4/19/2013	4/22/2013	4/22/2013	4/22/2013
VOLATILES (µg/L)						
Method SW8260C						
Acetone	5.0 U	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
Bromodichloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	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
Carbon Disulfide	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
Chlorobenzene	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
Chloroform	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
Dibromochloromethane	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
1,2-Dichloroethane	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
cis-1,2-Dichloroethene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,2-Dichloroethene	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
cis-1,3-Dichloropropene	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
Ethylbenzene	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
4-Methyl-2-Pentanone (MIBK)	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
Styrene	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
Tetrachloroethene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
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
1,1,1-Trichloroethane	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
Trichloroethene	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
Vinyl Acetate	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	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
o-Xylene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
VOLATILES (µg/L)						
Method 8260C SIM						
Trichloroethene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
VOLATILES (µg/L)						
Method 8260C SIM						
with anti-foaming agent						
Trichloroethene						
Vinyl Chloride						

TABLE 1
BOREHOLE GROUNDWATER ANALYTICAL RESULTS
ALGONA DIRECT-PUSH INVESTIGATION - APRIL 2013
BOEING AUBURN

Location:	ASB0210-15	ASB0210-25	ASB0211-5	ASB0211-15	ASB0211-25	ASB0212-5
SDG:	1384767	1384767	1385084	1385084	1385084	1385084
Lab ID:	7031277	7031280	7032620	7032621	7032622	7032623
	4/22/2013	4/22/2013	04/23/2013	04/23/2013	04/23/2013	04/23/2013
VOLATILES (µg/L)						
Method SW8260C						
Acetone	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Benzene	0.2 UJ	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
Bromoform	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	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
Carbon Disulfide	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
Chlorobenzene	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
Chloroform	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 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Dibromochloromethane	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
1,2-Dichloroethane	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
cis-1,2-Dichloroethene	**0.5**	**0.5**	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,2-Dichloroethene	0.2 UJ	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
cis-1,3-Dichloropropene	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
Ethylbenzene	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
4-Methyl-2-Pentanone (MIBK)	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
Styrene	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
Tetrachloroethene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
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
1,1,1-Trichloroethane	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
Trichloroethene	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
Vinyl Acetate	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	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
o-Xylene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
VOLATILES (µg/L)						
Method 8260C SIM						
Trichloroethene	0.020 U	**0.020**	0.020 U	0.020 U	0.020 U	0.020 U
Vinyl Chloride	**0.022**	**0.020**	0.020 U	0.020 U	0.020 U	0.020 U
VOLATILES (µg/L)						
Method 8260C SIM						
with anti-foaming agent						
Trichloroethene						
Vinyl Chloride						

TABLE 1
BOREHOLE GROUNDWATER ANALYTICAL RESULTS
ALGONA DIRECT-PUSH INVESTIGATION - APRIL 2013
BOEING AUBURN

Location:	ASB0213-8	ASB0214-5	ASB9214-5	ASB0215-7	ASB0215-15	ASB0215-25
SDG:	1385084	1385432	1385432	1385432	1385432	1385432
Lab ID:	7032624	7034083	7034084	7034085	7034086	7034087
	04/23/2013	04/24/2013	04/24/2013	04/24/2013	04/24/2013	04/24/2013
VOLATILES (µg/L)						
Method SW8260C						
Acetone	5.0 U	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
Bromodichloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	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
Carbon Disulfide	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
Chlorobenzene	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
Chloroform	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloromethane	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Dibromochloromethane	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
1,2-Dichloroethane	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
cis-1,2-Dichloroethene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**0.4**
trans-1,2-Dichloroethene	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
cis-1,3-Dichloropropene	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
Ethylbenzene	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
4-Methyl-2-Pentanone (MIBK)	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
Styrene	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
Tetrachloroethene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
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
1,1,1-Trichloroethane	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
Trichloroethene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**0.4**
Trichlorofluoromethane	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
Vinyl Chloride	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
o-Xylene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
VOLATILES (µg/L)						
Method 8260C SIM						
Trichloroethene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	**0.33**
Vinyl Chloride	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	**0.035**
VOLATILES (µg/L)						
Method 8260C SIM						
with anti-foaming agent						
Trichloroethene						
Vinyl Chloride						

TABLE 1
BOREHOLE GROUNDWATER ANALYTICAL RESULTS
ALGONA DIRECT-PUSH INVESTIGATION - APRIL 2013
BOEING AUBURN

Location:	ASB0216-7	ASB0217-8	ASB0218-10	ASB0218-15	ASB0218-25	ASB0219-9
SDG:	1385432	1385793	1385793	1385793	1385793	1385793
Lab ID:	7034088	7036402	7036404	7036405	7036406	7036407
	04/24/2013	4/25/2013	4/25/2013	4/25/2013	4/25/2013	4/25/2013
VOLATILES (µg/L)						
Method SW8260C						
Acetone	5.0 U	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
Bromodichloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	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
Carbon Disulfide	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
Chlorobenzene	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
Chloroform	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloromethane	0.5 UJ	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
1,1-Dichloroethane	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
1,1-Dichloroethene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,2-Dichloroethene	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
cis-1,3-Dichloropropene	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
Ethylbenzene	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
4-Methyl-2-Pentanone (MIBK)	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
Styrene	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
Tetrachloroethene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
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
1,1,1-Trichloroethane	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
Trichloroethene	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
Vinyl Acetate	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	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
o-Xylene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
VOLATILES (µg/L)						
Method 8260C SIM						
Trichloroethene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
VOLATILES (µg/L)						
Method 8260C SIM						
with anti-foaming agent						
Trichloroethene						
Vinyl Chloride						

TABLE 1
BOREHOLE GROUNDWATER ANALYTICAL RESULTS
ALGONA DIRECT-PUSH INVESTIGATION - APRIL 2013
BOEING AUBURN

Location:	ASB0220-5	ASB0221-7	ASB0222-7	ASB0223-8	ASB0224-7	ASB0225-7
SDG:	1386002	1386002	1386002	1386333	1386333	1386333
Lab ID:	7037611	7037612	7037613	7039097	7039098	7039099
	4/26/2013	4/26/2013	4/26/2013	04/29/2013	04/29/2013	04/29/2013
VOLATILES (µg/L)						
Method SW8260C						
Acetone	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	**6.2**
Benzene	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
Bromoform	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	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
Carbon Disulfide	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
Chlorobenzene	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
Chloroform	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
Dibromochloromethane	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
1,2-Dichloroethane	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
cis-1,2-Dichloroethene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,2-Dichloroethene	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
cis-1,3-Dichloropropene	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
Ethylbenzene	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
4-Methyl-2-Pentanone (MIBK)	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
Styrene	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
Tetrachloroethene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
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
1,1,1-Trichloroethane	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
Trichloroethene	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
Vinyl Acetate	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	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
o-Xylene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
VOLATILES (µg/L)						
Method 8260C SIM						
Trichloroethene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
VOLATILES (µg/L)						
Method 8260C SIM						
with anti-foaming agent						
Trichloroethene						
Vinyl Chloride						

TABLE 1
BOREHOLE GROUNDWATER ANALYTICAL RESULTS
ALGONA DIRECT-PUSH INVESTIGATION - APRIL 2013
BOEING AUBURN

Location:	ASB0226-9	ASB0227-9	ASB0228-8	ASB0229-7
SDG:	1386333	1386673	1386673	1386673
Lab ID:	7039100	7040693	7040694	7040695
	04/29/2013	04/30/2013	04/30/2013	04/30/2013
VOLATILES (µg/L)				
Method SW8260C				
Acetone	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
Bromodichloromethane	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	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
Carbon Disulfide	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
Chlorobenzene	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
Chloroform	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
Dibromochloromethane	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
1,2-Dichloroethane	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
cis-1,2-Dichloroethene	**1.6**	0.2 U	0.2 U	0.2 U
trans-1,2-Dichloroethene	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
cis-1,3-Dichloropropene	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
Ethylbenzene	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
4-Methyl-2-Pentanone (MIBK)	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
Styrene	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
Tetrachloroethene	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-Trichloro-1,2,2-trifluoroethane	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
1,1,2-Trichloroethane	0.2 U	0.2 U	0.2 U	0.2 U
Trichloroethene	**1.2**	0.2 U	0.2 U	0.2 U
Trichlorofluoromethane	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
Vinyl Chloride	**0.4**	0.2 U	0.2 U	0.2 U
m,p-Xylene	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
VOLATILES (µg/L)				
Method 8260C SIM				
Trichloroethene	**0.92**	0.020 U	0.020 U	0.020 U
Vinyl Chloride	**0.35**	0.020 U	0.020 U	0.020 U
VOLATILES (µg/L)				
Method 8260C SIM				
with anti-foaming agent				
Trichloroethene				
Vinyl Chloride				

U = Indicates the compound was undetected at the reported concentration.
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.
Bold = Detected compound.

TABLE 2
COMPARISON OF VOC CONCENTRATIONS BY SAMPLING METHOD
ALGONA DIRECT-PUSH INVESTIGATION - APRIL 2013
BOEING AUBURN

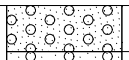
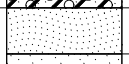
	Trichloroethene		Vinyl Chloride		cis-1,2-Dichloroethene	
	Peristaltic Pump	Bladder Pump	Peristaltic Pump	Bladder Pump	Peristaltic Pump	Bladder Pump
ASB0181-5	0.13	0.2	0.22	0.32	1 U	1 U
ASB0182-9	2.4	1.8	2.1	2.1	1.4	1.2
ASB0184-5	0.2	0.2	1.3	1.3	0.5	0.5
ASB0187-5	0.025	0.024	0.02 U	0.02 U	0.2 U	0.2 U
ASB0188-5	0.02 U	0.1 U	0.02 U	0.1 U	1 U	1 U
ASB0190-10	0.02 U	0.02 U	0.4	1.6	0.2 U	0.2 U
ASB0192-5	0.5	0.5	0.16	0.17	6.4	7
ASB0196-5	0.02 U	0.02 U	0.02 U	0.02 U	0.2 U	0.2 U

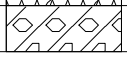
U = Not Detected

ATTACHMENT A

Boring Logs

Soil Classification System

MAJOR DIVISIONS			GRAPHIC SYMBOL	USCS LETTER SYMBOL[1]	TYPICAL DESCRIPTIONS [2][3]
COARSE-GRAINED SOIL (More than 50% of material is larger than No. 200 sieve size)	GRAVEL AND GRAVELLY SOIL (More than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (Little or no fines)		**GW**	Well-graded gravel; gravel/sand mixture(s); little or no fines
				**GP**	Poorly graded gravel; gravel/sand mixture(s); little or no fines
		GRAVEL WITH FINES (Appreciable amount of fines)		**GM**	Silty gravel; gravel/sand/silt mixture(s)
				**GC**	Clayey gravel; gravel/sand/clay mixture(s)
	SAND AND SANDY SOIL (More than 50% of coarse fraction passed through No. 4 sieve)	CLEAN SAND (Little or no fines)		**SW**	Well-graded sand; gravelly sand; little or no fines
				**SP**	Poorly graded sand; gravelly sand; little or no fines
		SAND WITH FINES (Appreciable amount of fines)		**SM**	Silty sand; sand/silt mixture(s)
				**SC**	Clayey sand; sand/clay mixture(s)
FINE-GRAINED SOIL (More than 50% of material is smaller than No. 200 sieve size)	SILT AND CLAY (Liquid limit less than 50)			**ML**	Inorganic silt and very fine sand; rock flour; silty or clayey fine sand or clayey silt with slight plasticity
				**CL**	Inorganic clay of low to medium plasticity; gravelly clay; sandy clay; silty clay; lean clay
				**OL**	Organic silt; organic, silty clay of low plasticity
	SILT AND CLAY (Liquid limit greater than 50)			**MH**	Inorganic silt; micaceous or diatomaceous fine sand
				**CH**	Inorganic clay of high plasticity; fat clay
				**OH**	Organic clay of medium to high plasticity; organic silt
	HIGHLY ORGANIC SOIL			**PT**	Peat; humus; swamp soil with high organic content

OTHER MATERIALS	GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
PAVEMENT		**AC** or **PC**	Asphalt concrete pavement or Portland cement pavement
ROCK		**RK**	Rock (See Rock Classification)
WOOD		**WD**	Wood, lumber, wood chips
DEBRIS		**DB**	Construction debris, garbage

NOTES:

1. USCS letter symbols correspond to symbols used by the Unified Soil Classification System and ASTM classification methods. Dual letter symbols (e.g., SP-SM for sand or gravel) indicate soil with an estimated 5-15% fines. Multiple letter symbols (e.g., ML/CL) indicate borderline or multiple soil classifications.
2. Soil descriptions are based on the general approach presented in the *Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)*, outlined in ASTM D 2488. Where laboratory index testing has been conducted, soil classifications are based on the *Standard Test Method for Classification of Soils for Engineering Purposes*, as outlined in ASTM D 2487.
3. Soil description terminology is based on visual estimates (in the absence of laboratory test data) of the percentages of each soil type and is defined as follows:

Primary Constituent:	> 50%	- "GRAVEL," "SAND," "SILT," "CLAY," etc.
Secondary Constituents:	> 30% and ≤ 50%	- "very gravelly," "very sandy," "very silty," etc.
	> 15% and ≤ 30%	- "gravelly," "sandy," "silty," etc.
Additional Constituents:	> 5% and ≤ 15%	- "with gravel," "with sand," "with silt," etc.
	≤ 5%	- "trace gravel," "trace sand," "trace silt," etc., or not noted.

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Soil Classification System and Key

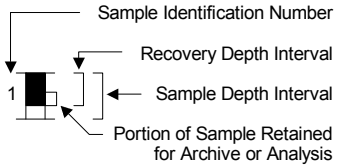
Figure
A-1
(1 of 2)

Drilling and Sampling Key

SAMPLER TYPE

Code	Description
a	3.25-inch O.D., 2.42-inch I.D. Split Spoon
b	2.00-inch O.D., 1.50-inch I.D. Split Spoon
c	Shelby Tube
d	Grab Sample
e	Single-Tube Core Barrel
f	Double-Tube Core Barrel
g	Other - See text if applicable
1	300-lb Hammer, 30-inch Drop
2	140-lb Hammer, 30-inch Drop
3	Pushed
4	Rotosonic
5	Air Rotary (Rock)
6	Wash Rotary (Rock)
7	Other - See text if applicable

SAMPLE NUMBER & INTERVAL



Field and Lab Test Data

Code	Description
PP = 1.0	Pocket Penetrometer, tsf
TV = 0.5	Torvane, tsf
PID = 100	Photoionization Detector VOC screening, ppm
W = 10	Moisture Content, %
D = 120	Dry Density, pcf
-200 = 60	Material smaller than No. 200 sieve, %
GS	Grain Size - See separate figure for data
AL	Atterberg Limits - See separate figure for data
VST	Vane Shear Test
GT	Other Geotechnical Testing
CA	Chemical Analysis

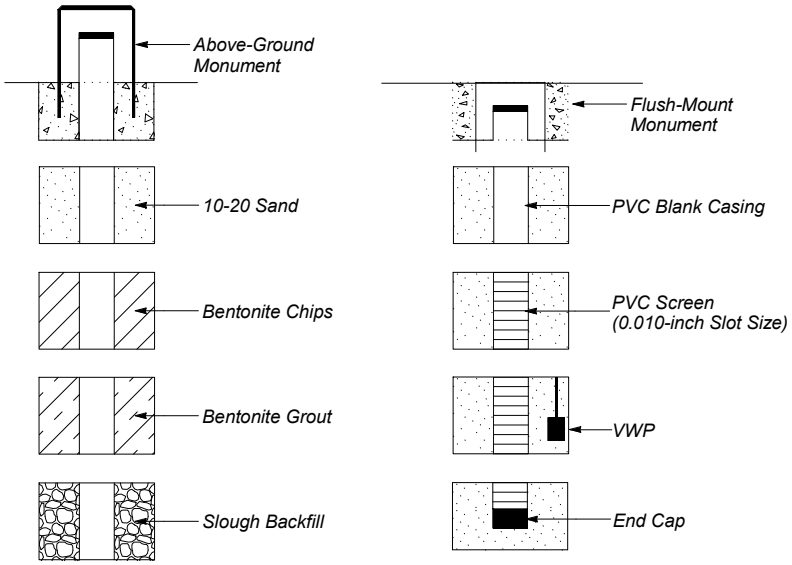
Groundwater

▽ Approximate water elevation at time of drilling (ATD).

▼ Approximate water elevation at other time(s). When multiple water levels are obtained other than ATD, only a representative range is shown. See text for additional information.

Note: Groundwater levels can fluctuate due to precipitation, seasonal conditions, and other factors.

Well Log Graphics



LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Soil Classification System and Key

Figure A-1 (2 of 2)

ASB0181

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Drilling Method: Geoprobe™ Ground Elevation (ft): Not Measured Drilled By: Cascade Drilling Inc.	Water Level
0						GP	Gray, sandy gravel (loose, moist)	
	S-1	d		0.0		SP	**(FILL)**	ATD
		e4					Dark brown, gravelly, fine to coarse SAND (loose, wet)	
							(ALLUVIUM)	
						GP	Dark brown, sandy GRAVEL with organics (medium dense, wet)	
5	S-2	d		0.0			**Groundwater sample ASB0181-5-20130403**	
							Groundwater sample ASB0181-5b-20130403	
	S-3	e4 d		0.0		ML	Dark brown, gravelly SILT (medium stiff, wet)	
						SP	Dark gray, fine to medium SAND (loose, wet)	
10	S-4	d		0.0				
		e4						
15							**Groundwater sample ASB0181-15-20150403**	
		e4						
						WD	WOOD with gravel	
	S-5	d		0.0		GP	Dark gray, very sandy GRAVEL (medium dense, wet)	
20						SP		
				0.0		GP	Dark gray, fine to coarse SAND (dense, wet)	
				0.0			Dark gray, GRAVEL with sand (dense, wet)	
		e4		0.0				
							Groundwater sample ASB0181-25-20130403	
25								
30								
35								

Boring Completed 04/03/13
Total Depth of Boring = 25.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-11.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Boring ASB0181

Figure
A-2

ASB0182

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	SOIL PROFILE	Water Level
0						AC	Asphalt concrete pavement	
						GP		
	S-1	d				SP	Brown, sandy GRAVEL (dense, dry) **(FILL)**	
		e4						
	S-2	d				PT	Brownish-black, gravelly, fine to coarse SAND (dense, dry) **(ALLUVIUM)**	
	S-3	d		0.0		SP-SM		
5							- grades gray	ATD
	S-4	d				SM	Dark brown PEAT (soft, wet)	
		e4					Brownish-gray, fine to medium SAND with silt and organics (medium dense, moist)	
	S-5	d		0.0		ML	Brownish-gray, silty fine SAND (medium dense, wet)	
10	S-6	d		0.0			Brownish-gray, sandy SILT (medium stiff, wet)	
							Groundwater sample ASB0182-9-20130403	
	S-7	d				SM		
		e4					**Groundwater sample ASB0182-9b-20130403**	
							Brownish-gray, very silty, fine SAND (medium dense, wet)	
15						SP	Dark gray fine to medium SAND (medium dense, wet)	
	S-8	d		0.0				
		e4					**Groundwater sample ASB0182-15-20130403**	
		d				GP		
	S-9						Dark gray, sandy GRAVEL (medium dense, wet)	
20	S-10	d		0.0		SP	Dark gray, fine to medium SAND (medium dense, wet)	
	S-11	d						
	S-12	e4				GP	Dark gray, sandy GRAVEL (medium dense, wet)	
		d						
25							**Groundwater sample ASB0182-25-20130403**	
30								
35								

Boring Completed 04/04/13
Total Depth of Boring = 25.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-3.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0182

Figure
A-3

ASB0183

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level
0						AC	
						GP	
	S-1	d		0.0		PT	ATD
	S-2	e4 d				SM	
5							
10							
15							
20							
25							
30							
35							

Drilling Method: Geoprobe™

Ground Elevation (ft): Not Measured

Drilled By: Cascade Drilling Inc.

Asphalt concrete pavement

Brown, sandy GRAVEL (medium dense, damp)

(FILL)

Brown PEAT (soft, wet)

(ALLUVIUM)

Grayish-brown silty, fine SAND with organic laminations (medium dense, wet)

Groundwater sample ASB0183-5-20130405

Boring Completed 04/04/13
Total Depth of Boring = 5.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-8.

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0183

Figure
A-4

ASB0184

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Drilling Method: Geoprobe™ Ground Elevation (ft): Not Measured Drilled By: Cascade Drilling Inc.	Water Level
0						AC	Asphalt concrete pavement	
	S-1	d		0.0		GP SM	Brown, sandy GRAVEL (medium dense, moist)	ATD
	S-2	e4 d				SM	**(FILL)** Dark brown, silty, fine to medium SAND (loose, wet)	
5	S-3	d				SP- SM	**(ALLUVIUM)** Brownish-gray, very silty, fine SAND (medium dense, wet)	
	S-4	d				ML		
	S-5	d				SP	Dark gray, fine to medium SAND with silt (medium dense, wet)	
		e4						
	S-6	d		0.0		ML	**Groundwater sample ASB0184-5-20130405**	
10	S-7	d		0.0		SP- SM	**Groundwater sample ASB0184-5b-20130405**	
	S-8	d				SP	Grayish-brown, SILT with sand (medium stiff, wet)	
		e4					Dark gray, fine to medium SAND (medium dense, wet)	
	S-9	d				GP	Grayish-brown, SILT with sand (stiff, wet)	
15	S-10	d		0.0		SP- SM	Dark gray, fine to medium SAND with silt (medium dense, wet)	
	S-11	d				GP		
	S-12	d				SP	Dark gray, fine to medium SAND (medium dense, wet)	
		e4					Dark gray, sandy GRAVEL (medium dense, wet)	
20	S-13	d					Dark gray, fine to coarse SAND with silt (medium dense, wet)	
		e4					**Groundwater sample ASB0184-15-20130405**	
	S-14	d				GP	Dark gray, GRAVEL with sand (medium dense, wet)	
	S-15	d		0.0		SP	Dark gray, gravelly, fine to coarse SAND (medium dense, wet)	
25							- grades fine to medium sand and trace gravel @ 20 ft. (medium dense, wet)	
							Dark gray, GRAVEL with sand (medium dense, wet)	
							Dark gray, gravelly, fine to coarse SAND (medium dense, wet)	
30							**Groundwater sample ASB0184-25-20130405**	
35								

Boring Completed 04/05/13
Total Depth of Boring = 25.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-10.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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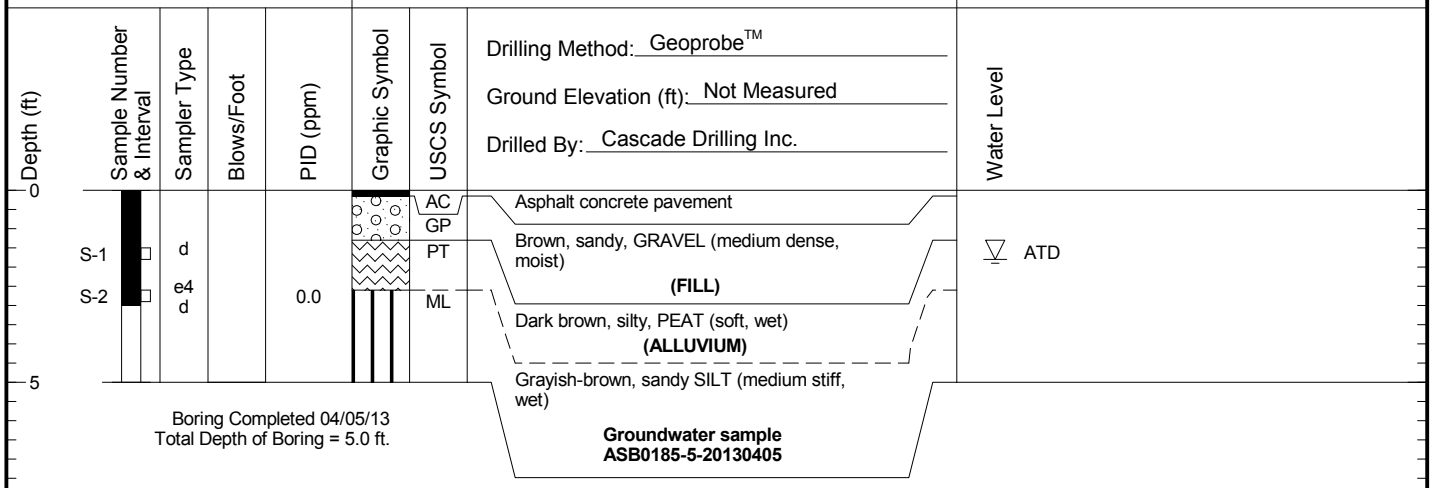
Boeing Auburn
Auburn, Washington

Log of Boring ASB0184

Figure
A-5

ASB0185



Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-19.

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Auburn, Washington

Log of Boring ASB0185

Figure
A-6

ASB0186

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Soil Profile	Water Level
0						AC	Asphalt concrete pavement	
	S-1	d				GP		
						SM	Brown, sandy GRAVEL (medium dense, dry) **(FILL)**	
	S-2	d		0.0		SM		
		e4					Dark brown, silty, fine to coarse SAND with gravel (medium dense, damp) **(ALLUVIUM)**	▽ ATD
5							- grades with trace organics	
	S-3	d		0.5		SP-SM	Gray, silty, fine SAND with organics (medium dense, wet)	
	S-4	e4				SP	Grayish-brown, fine to medium SAND with silt (loose, wet)	
		d				SP-SM	**Groundwater sample: ASB0186-5-20130408**	
10						SP	- grades with wood pieces	
							Dark gray, fine to medium SAND (medium dense, wet)	
	S-5	d		0.2		ML		
	S-6	e4					Grayish-brown, fine to medium SAND with silt (medium dense, wet)	
	S-7	d						
		d						
	S-8	d		0.0			Dark gray, fine to medium SAND (medium dense, wet)	
15	S-9	d				SP-SM	Brownish-gray, sandy SILT (medium stiff, wet)	
	S-10	d				SM	- Driller reported experiencing heave	
		e4						
	S-11	d				SP-SM	Dark gray, fine to medium SAND with silt (medium dense, wet)	
							Groundwater sample: ASB0186-15-20130408	
20	S-12	d		0.0			Dark gray, very silty, fine to medium SAND (medium dense, wet)	
		e4					Dark gray. fine SAND with silt (medium dense, wet)	
	S-13	d				GP	Dark gray, sandy GRAVEL (medium dense, wet)	
25							**Groundwater sample: ASB0186-25-20130408**	

Boring Completed 04/08/13
Total Depth of Boring = 25.0 ft.

30

35

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-9.

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Auburn, Washington

Log of Boring ASB0186

Figure
A-7

ASB0187

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Hand Auger
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Soil Description	Water Level
0	S-1	d				SM	Dark brown, silty fine to coarse SAND with organics (medium dense, dry) **(TOPSOIL)**	
	S-2	d				GP		
	S-3	d				SP		
	S-4	d e4		0.0		SM	Brown, sandy GRAVEL (medium dense, moist) **(FILL)**	ATD
5							Brown, fine to medium SAND (medium dense, moist) **(ALLUVIUM)**	
							Brown, silty, fine to medium SAND with gravel (medium dense, wet)	
							- grades to trace gravel and with trace organics	
10							**Groundwater sample: ASB0187-5-20130408**	
							Groundwater sample: ASB0187-5b-20130408	
15								
20								
25								
30								
35								

Boring Completed 04/08/13
Total Depth of Boring = 5.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-14.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Log of Boring ASB0187

Figure
A-8

ASB0188

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample Number & Interval	Sampler Type	PID (ppm)	USCS Symbol	Soil Profile
0				AC	Asphalt concrete pavement
	S-1	d		GP SM	Brown, sandy GRAVEL (medium dense, moist) **(FILL)**
	S-2	e4 d	0.5	SP- SM	Brown, silty, fine to coarse SAND with gravel (medium dense, wet) **(ALLUVIUM)**
5	S-3	d		SP	Brown, fine to medium SAND with silt (medium dense, wet)
	S-4	d	0.7	SM	Brown, fine to medium SAND (medium dense, wet)
	S-5	d		SP-	
	S-6	e4		SM	**Groundwater sample: ASB0188-5-20130409**
	S-7	d		SM	
	S-8	d d		SP- SM	**Groundwater sample: ASB0188-5b-20130409**
10	S-9	d		ML SM	
	S-10	d e4	0.8	SP	Grayish-brown, very silty, fine to medium SAND (medium dense, wet)
					Dark gray, fine to medium SAND with silt (medium dense, wet)
15	S-11	d	0.6		Grayish-brown, silty, fine to medium SAND (medium dense, wet)
					Dark gray, fine SAND with silt (medium dense, wet)
		e4			Grayish-brown SILT with organics (medium stiff, wet)
					Grayish-brown, very silty, fine SAND (medium dense, wet)
20	S-12	d		GP	Dark gray, fine to medium SAND (medium dense, wet)
	S-13	d	0.0	ML SP	**Groundwater sample: ASB0188-15-20130409**
		e4			Dark gray, sandy GRAVEL (medium dense, wet)
25					Grayish-brown, sandy SILT (soft, wet)
					Dark gray, fine to medium SAND (medium dense, wet)
					Groundwater sample: ASB0188-25-20130409
30					
35					

Water Level: ▽ ATD

Boring Completed 04/09/13
Total Depth of Boring = 25.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-20.

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0188

Figure
A-9

ASB0189

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level
0	S-1	d		0.0		AC	
						GP	
						PT	ATD
	S-2	e4 d				SM	
5							

Drilling Method: Geoprobe™

Ground Elevation (ft): Not Measured

Drilled By: Cascade Drilling Inc.

Asphalt concrete pavement

Brown, sandy GRAVEL (dense, damp)
(FILL)

Dark brown, silty PEAT (soft, wet)
(ALLUVIUM)

Brown, very silty, fine SAND (medium dense, wet)

Boring Completed 04/09/13
Total Depth of Boring = 5.0 ft.

Groundwater sample: ASB0189-5-20130409

10 15 20 25 30 35

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-29.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0189

Figure
A-10

ASB0190

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample	Sampler Type	PID (ppm)	USCS	Description
0	S-1	d	0.0	GP	Brown, sandy GRAVEL (medium dense, moist) **(FILL)**
		e4			
5	S-2	d		GP-GM	Brown, sandy GRAVEL with silt (medium dense, wet)
	S-3	d	0.0	SM	
	S-4	d ee		SP	Brown, very silty, fine SAND (medium dense, wet) **(ALLUVIUM)**
					Dark gray, fine to medium SAND (medium dense, wet)
10					**Groundwater sample: ASB0190-10-20130410**
	S-5 S-6	d d e4	0.0	GP	**Groundwater sample: ASB0190-10b-10230410**
					Dark gray, sandy GRAVEL (medium dense, wet)
15	S-7	d	0.0	SP	Dark gray, fine to medium SAND (medium dense, wet)
					Groundwater sample: ASB0190-15-20130410
	S-8	e4 d		GP	Dark gray, sandy GRAVEL (medium dense, wet)
20				SP	Dark gray, fine to medium SAND (medium dense, wet)
		e4			
	S-9	d	0.0	GP	Dark gray GRAVEL with sand (medium dense, wet)
25					**Groundwater sample: ASB0190-25-20130410**

Water Level: ▽ ATD

Boring Completed 04/10/13
Total Depth of Boring = 25.0 ft.

30

35

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-31.

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0190

Figure
A-11

ASB0191

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level
0						AC	
						GP	
						SM	
	S-1	e4 d		0.0			
5							

Drilling Method: Geoprobe™

Ground Elevation (ft): Not Measured

Drilled By: Cascade Drilling Inc.

Asphalt concrete pavement

Brown, sandy GRAVEL (medium dense, damp)

(FILL)

Brown, very silty, fine SAND (medium dense, wet)

(ALLUVIUM)

- grades with iron oxide mottling at 2.5 ft

Groundwater sample: ASB0191-5-20130410

▽ ATD

Boring Completed 04/10/13
Total Depth of Boring = 5.0 ft.

10
15
20
25
30
35

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-34.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0191

Figure
A-12

ASB0192

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample Number & Interval	Sampler Type	PID (ppm)	USCS Symbol	Soil Description
0	S-1	d		SM	Brown, silty, fine to medium SAND (loose, moist)
				SP-SM	**(ALLUVIUM)**
		e4			Brownish-gray, fine to medium SAND with silt (loose, moist)
					▽ ATD
5	S-2	d	0.8		- grades brown, medium dense and wet
					Groundwater sample: ASB0192-5-20130411
	S-3	d		SM	
		e4			**Groundwater sample: ASB0192-5b-20130411**
				SP-SM	Brownish-gray, very silty, fine SAND (medium dense, wet)
	S-4	d		SM	
10				SP	Brownish-gray, fine SAND with silt (medium dense, wet)
	S-5	d	0.0		Brownish-gray, silty, fine SAND (medium dense, wet)
		e4			Dark gray, fine to medium SAND (medium dense, wet)
15					**Groundwater sample: ASB0192-15-20130411**
		e4		GP	Dark gray, sandy GRAVEL (medium dense, wet)
	S-6	d	0.9		
20	S-7	d	1.4	SP	Dark gray, fine to coarse SAND (medium dense, wet)
	S-8	e4		GP	Dark gray, sandy GRAVEL (medium dense, wet)
		d			
25					**Groundwater sample: ASB0192-25-20130411**

Boring Completed 04/11/13
Total Depth of Boring = 25.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-21.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0192

Figure
A-13

ASB0193

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level
0	S-1	d				SM	
	S-2	d		1.1		ML	ATD
	S-3	d				SM	
		e4					
	S-4	d				SP-SM	
5	S-5	d				SP	

Drilling Method: Hand Auger

Ground Elevation (ft): Not Measured

Drilled By: Cascade Drilling Inc.

Brown, silty, fine to medium SAND with gravel (medium dense, moist)
(FILL)

Grayish-brown mottled SILT (soft, wet)
(ALLUVIUM)

Grayish-brown, very silty, fine SAND (medium dense, wet)

Dark brown, fine to medium SAND with silt (medium dense, wet)

Dark brown, fine to medium SAND (medium dense, wet)

Groundwater sample: ASB0193-5-20130411

Boring Completed 04/11/13
Total Depth of Boring = 5.0 ft.

10
15
20
25
30
35

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-24.

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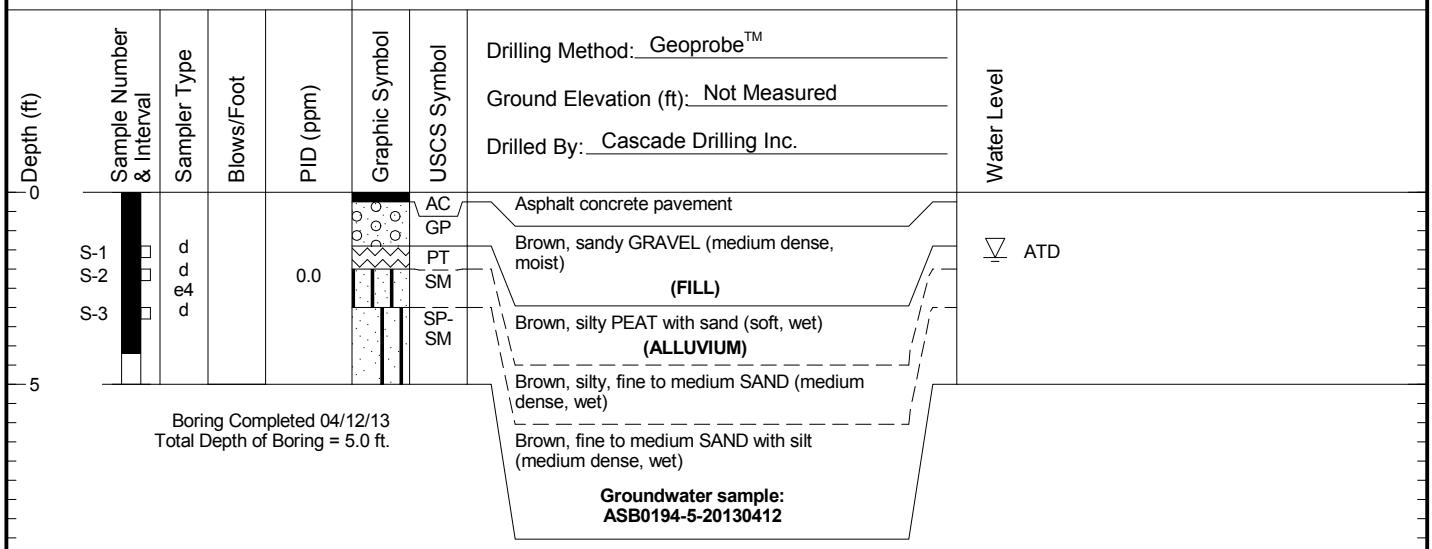
Boeing Auburn
Auburn, Washington

Log of Boring ASB0193

Figure
A-14

ASB0194



Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-38.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Boring ASB0194

Figure
A-15

ASB0195

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level
0	S-1	d				AC	
	S-2	d		1.4		GP	
		e4				SM	ATD
						SP	
5							

Drilling Method: Geoprobe™

Ground Elevation (ft): Not Measured

Drilled By: Cascade Drilling Inc.

Asphalt concrete pavement

Brown, sandy GRAVEL (medium dense, moist)

(FILL)

Brown iron oxide mottled, silty, fine SAND (medium dense, moist)

(ALLUVIUM)

Brown, fine SAND (medium dense, wet)

Groundwater sample: ASB0195-5-20130412

Boring Completed 04/13/13
Total Depth of Boring = 5.0 ft.

10 15 20 25 30 35

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-39.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

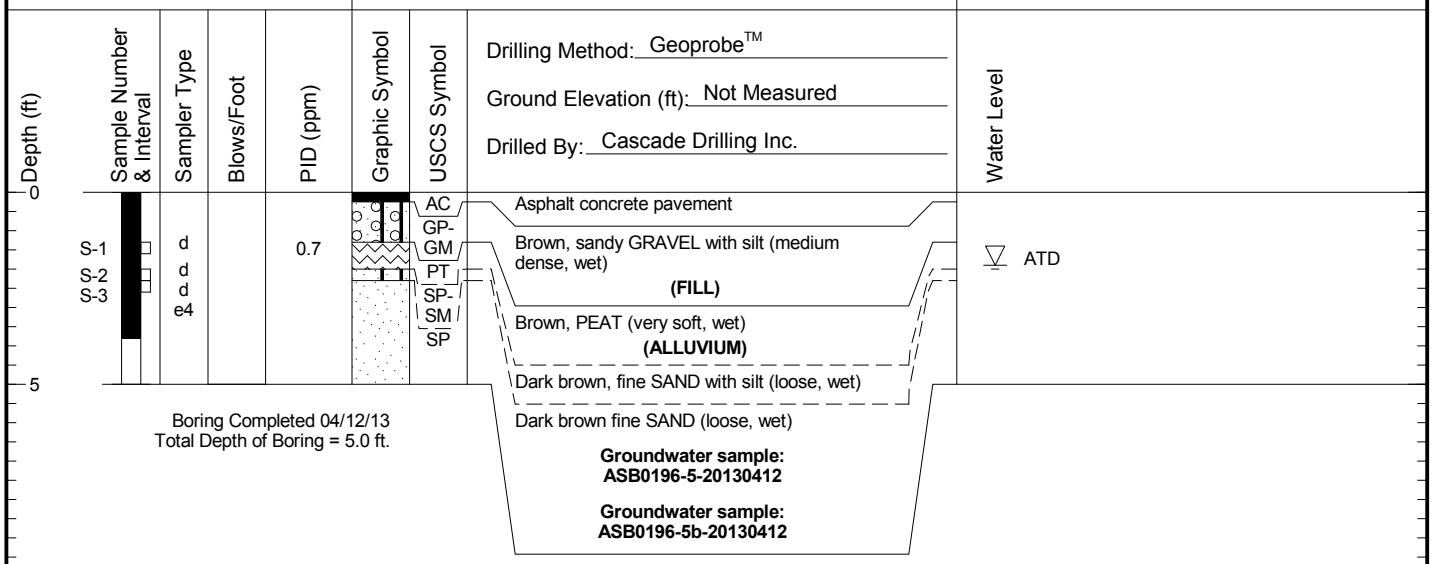
LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Boring ASB0195

Figure
A-16

ASB0196



Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-40.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Boring ASB0196

Figure
A-17

ASB0197

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample	Sampler Type	PID (ppm)	USCS Symbol	Description
0				AC	Asphalt concrete pavement
	S-1	d	0.0	SP-SM	Gray, gravelly, fine to coarse SAND with silt (dense, damp)
		e4			**(FILL)**
	S-2	d		SM	Grayish-brown, silty, fine SAND (dense, wet)
					(ALLUVIUM)
5	S-3	d	0.0	SM	- grades abundant organics
	S-4	d		SM	Gray, silty, fine to coarse SAND (dense, wet)
		e4		SP-SM	Grayish-brown, very silty, fine SAND (medium dense, wet)
	S-5	d		ML	
	S-6	d		SM	Dark gray, fine to medium SAND with silt (medium dense, wet)
10					Grayish-brown SILT (soft, wet)
					Groundwater sample: ASB0197-8-20130415
					- grades with sand
					Grayish-brown, very silty, fine SAND (dense, wet)
15					
20					
25					
30					
35					

Water Level: ATD

Boring Completed 04/15/13
Total Depth of Boring = 10.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-28.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

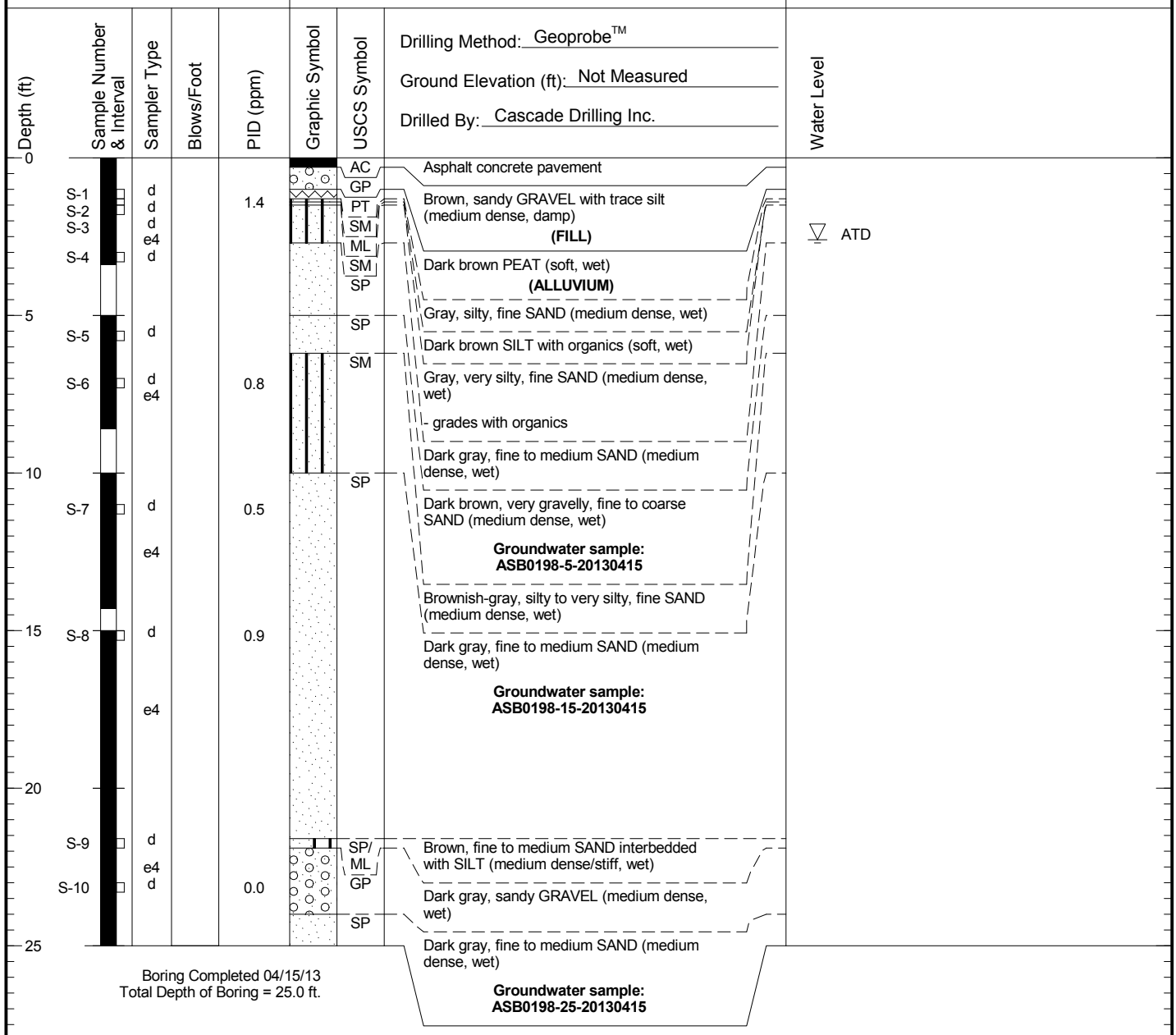
LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Boring ASB0197

Figure
A-18

ASB0198



Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-30.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0198

Figure
A-19

ASB0199

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Soil Profile	Water Level
0						AC	Asphalt concrete pavement	
	S-1 S-2	d d		0.0		GP-GM PT	Brown, sandy GRAVEL with silt (dense, damp) **(FILL)**	
	S-3 S-4	e4 d d				SP-SM ML SP	Dark brown, gravelly PEAT (very soft, wet) **(ALLUVIUM)**	ATD
5							Gray iron oxide mottled, fine to medium SAND with silt (medium dense, wet)	
							Brown SILT with organics (soft, wet)	
							Dark gray, fine to medium SAND (medium dense, wet)	
10							**Groundwater sample: ASB0199-5-20130416**	
15								
20								
25								
30								
35								

Boring Completed 04/16/13
Total Depth of Boring = 5.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-17.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Boring ASB0199

Figure
A-20

ASB0200

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample	Sampler Type	PID (ppm)	USCS	Description
0				AC	Asphalt concrete pavement
				GP	
	S-1	d		PT	Brown, sandy GRAVEL (dense, damp) **(FILL)**
		e4			
	S-2	d	0.3	SP	Dark brown, silty PEAT (soft, wet) **(ALLUVIUM)**
					- 2 inches of brown SILT with organics
5	S-3	d	0.7	SP	Gray, fine to medium SAND (medium dense, wet)
	S-4	d			Dark gray, fine to medium SAND (medium dense, wet)
		e4		ML	
				SP	**Groundwater sample: ASB0200-5-20130416**
10					Brownish-gray, sandy SILT (medium stiff, wet)
					Dark gray, fine to medium SAND (medium dense, wet)
	S-5	d	0.5		
		e4			
15					**Groundwater sample: ASB0200-15-20130416**
				GP	
	S-6	d	1.1		Dark gray, sandy GRAVEL (medium dense, wet)
		e4			
20				SP	Dark gray, fine to medium SAND (medium dense, wet)
		e4			
				GP	Dark gray, very sandy GRAVEL (medium dense, wet)
	S-7	d	1.3		- piece of wood
25					**Groundwater sample: ASB0200-25-20130416**

Water Level: ATD

Boring Completed 04/16/13
Total Depth of Boring = 25.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-18.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0200

Figure
A-21

ASB0201

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level
0	S-1	d		0.2		AC	
						GP-GM	
		e4				ML	
5	S-2	d		0.2			
		e4					
10							

Drilling Method: Geoprobe™

Ground Elevation (ft): Not Measured

Drilled By: Cascade Drilling Inc.

Asphalt concrete pavement

Brown, sandy GRAVEL with silt (dense, damp)

(FILL)

Dark brown SILT with abundant organics (very soft, wet)

(ALLUVIUM)

Groundwater sample: ASB0201-7-20130417

▽ ATD

Boring Completed 04/17/13
Total Depth of Boring = 10.0 ft.

15
20
25
30
35

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-6.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0201

Figure
A-22

ASB0202

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample Number & Interval	Sampler Type	PID (ppm)	USCS Symbol	Soil Profile
0	S-8	d		GP-GM	Brown, sandy GRAVEL with silt (medium dense, damp)
	S-1	d	0.3	SM	**(FILL)**
	S-2	e4		ML	Grayish-brown, silty, fine to medium SAND with gravel and trace organics (medium dense, moist)
		d		SM	**(ALLUVIUM)**
5	S-3	d		SP	Brown, sandy SILT with organics (soft, wet)
	S-4	d	1.7	SM	Gray, very silty, fine to medium SAND (medium dense, wet)
	S-5	d		SP-SM	
		e4			Grayish-brown, fine to medium SAND with trace gravel (medium dense, wet)
	S-6	d		ML	
	S-7	d		SP-SM	Gray, very silty, fine SAND (medium dense, wet)
10				SP	Gray, fine to medium SAND with silt (medium dense, wet)
	S-9	d	7.0		Gray, sandy SILT (medium stiff, wet)
		e4			**Groundwater sample: ASB0202-8-20130417**
15					Gray, fine to medium SAND with silt (medium dense, wet)
					Dark gray, fine to medium SAND (medium dense, wet)
	S-10	d	4.9	ML	- grades fine sand
		e4		SP-SM	**Groundwater sample: ASB0202-15-20130417**
	S-11	d			
20				ML	Dark gray SILT (medium stiff, wet)
	S-12	d			Dark gray, fine SAND with silt (medium dense, wet)
		e4			Brownish-gray SILT (soft, wet)
	S-13	d	3.5	SP-SM	- grades with organics for 4 inches
25					Dark gray, fine to medium SAND with silt (medium dense, wet)
					Groundwater sample: ASB0202-25-20130417

Water Level: ▽ ATD

Boring Completed 04/17/13
Total Depth of Boring = 25.0 ft.

30

35

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-7.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0202

Figure
A-23

ASB0203

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Soil Profile	Water Level
0	S-1	d		3.0		AC	Asphalt concrete pavement	
		e4				GP-GM	Brown, sandy GRAVEL with silt (dense, damp) **(FILL)**	
						PT	- grades gray Dark brown PEAT (soft, wet) **(ALLUVIUM)**	ATD
5	S-2	d						
	S-3	d				SM	Brownish-gray, silty, fine to coarse SAND with gravel (medium dense, wet)	
	S-4	d				SP		
	S-5	e4		0.8		ML	Dark gray, fine to medium SAND (medium dense, wet)	
	S-6	d				SM		
	S-7	d				ML	**Groundwater sample: ASB0203-7-20130418**	
10						SP		
	S-8	d		0.2			Brownish-gray SILT (soft, wet)	
		e4					Brownish-gray, silty, fine SAND (medium dense, wet)	
							Brown SILT (medium stiff, wet)	
15							Dark gray, fine to medium SAND (medium dense, wet)	
							Groundwater sample: ASB0203-15-20130418	
		e4						
20								
	S-9	d		62.3				
		e4						
25							**Groundwater sample: ASB0203-25-20130418**	

Boring Completed 04/18/13
Total Depth of Boring = 25.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-1.

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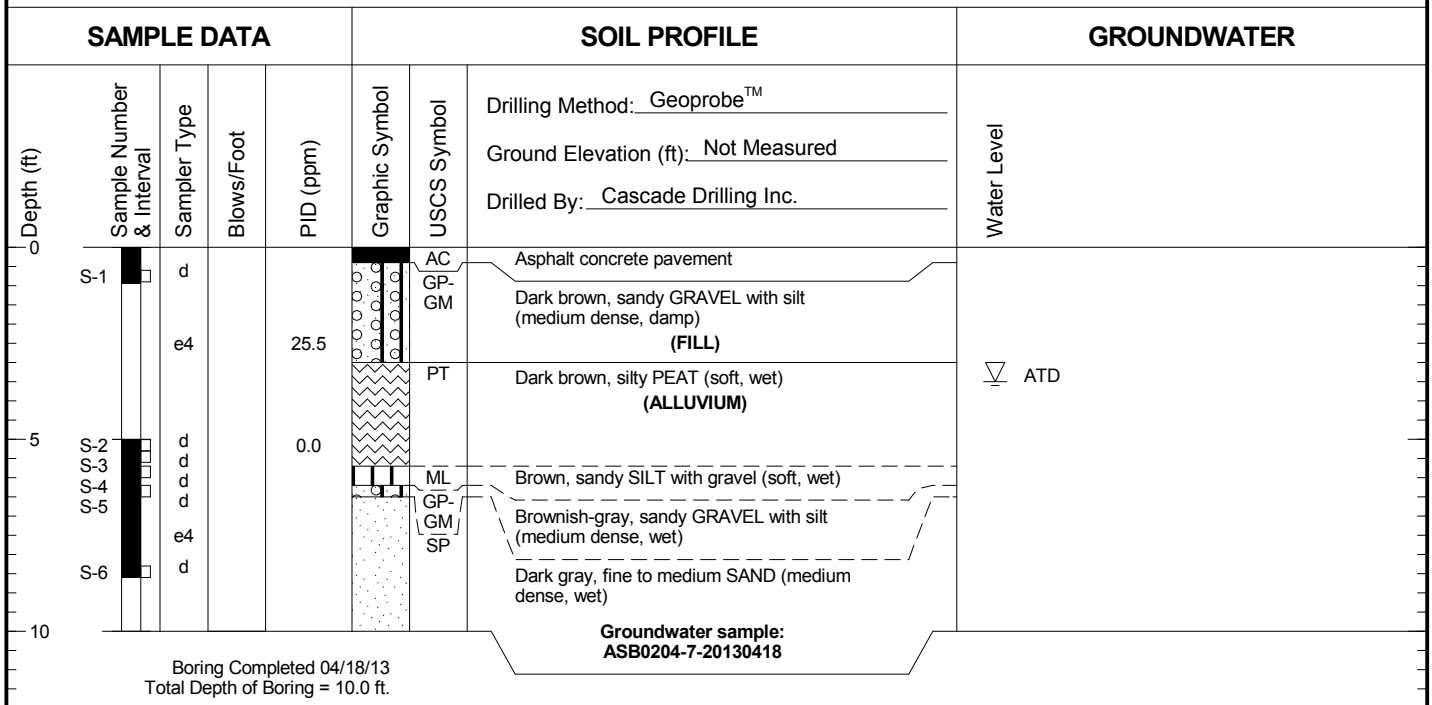
LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Boring ASB0203

Figure
A-24

ASB0204



Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-5.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Boring ASB0204

Figure
A-25

ASB0205

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Soil Profile	Water Level
0	S-1	d				AC	Asphalt concrete pavement	
	S-2	d				GP-GM	Brown, sandy GRAVEL with silt (dense, moist)	
						ML	**(FILL)**	
	S-3	e4		0.0		SP-SM	Brown SILT (medium stiff, moist)	ATD
		d					**(ALLUVIUM)**	
5	S-4	d		4.4		SP-SM	Brown iron oxide mottled, fine SAND with silt (medium dense, wet)	
							- 4 inches wood	
		e4					- grades gray	
	S-5	d				ML	Dark gray, fine to medium SAND with silt (medium dense, wet)	
	S-6	d				SP-SM	**Groundwater sample: ASB0205-7-20130418**	
10						ML SM	Brown, sandy SILT (medium stiff, wet)	
							Dark gray, fine to medium SAND with silt (medium dense, wet)	
							Brown SILT (medium stiff, wet)	
15							Brown, silty, fine SAND (medium dense, wet)	
20								
25								
30								
35								

Boring Completed 04/18/13
Total Depth of Boring = 10.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-45.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

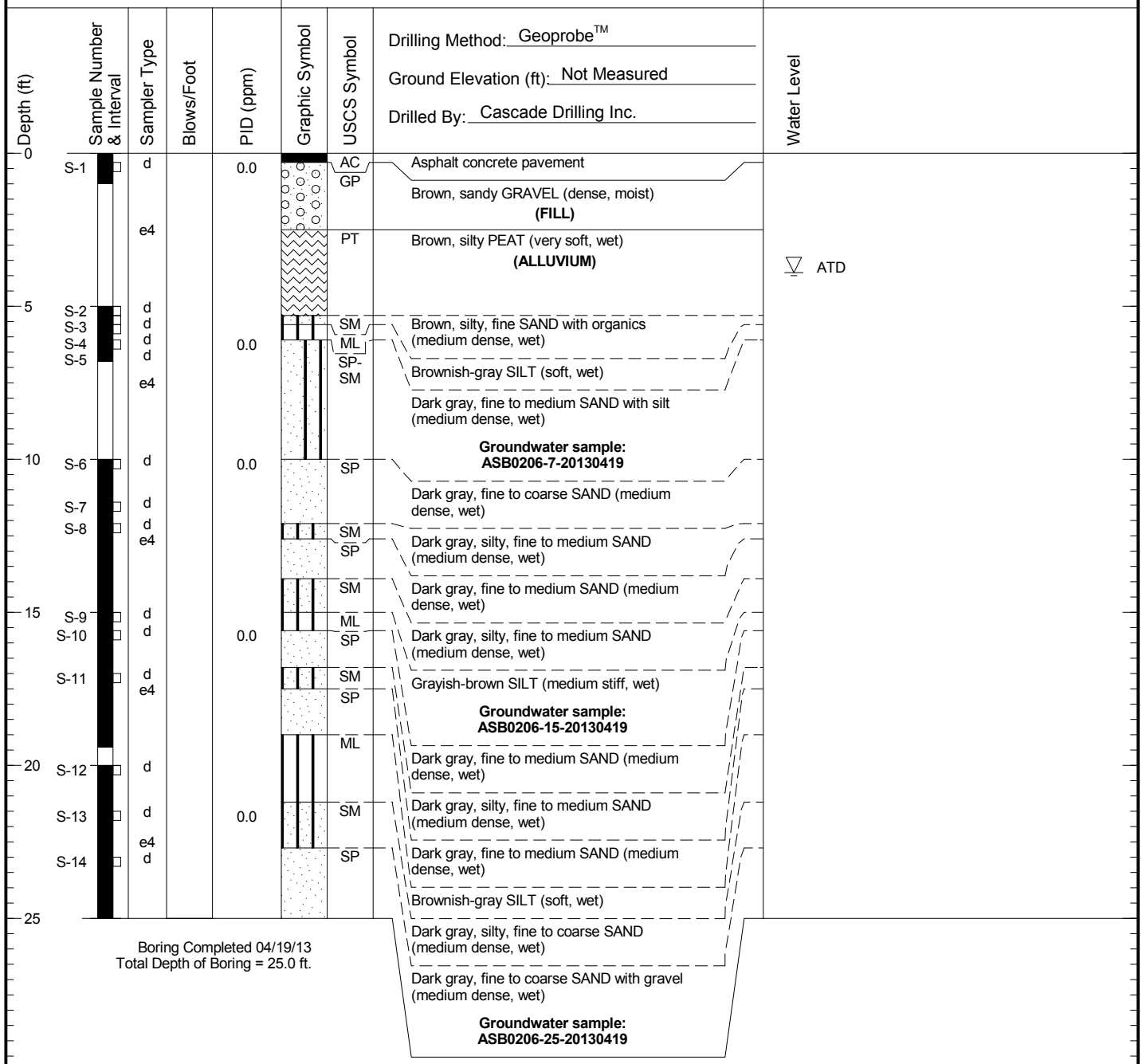
LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Boring ASB0205

Figure
A-26

ASB0206



Boring Completed 04/19/13
Total Depth of Boring = 25.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-16.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Auburn, Washington

Log of Boring ASB0206

Figure
A-27

ASB0207

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level
0	S-1	d				GP-GM	
	S-2	d				ML	
	S-3	d				SM	
	S-4	e4 d		6.3		ML	ATD
5							
10							
15							
20							
25							
30							
35							

Drilling Method: Geoprobe™

Ground Elevation (ft): Not Measured

Drilled By: Cascade Drilling Inc.

Brown, sandy GRAVEL with silt (medium dense, wet)

(FILL)

Dark brown SILT with sand and trace gravel (soft, wet)

(ALLUVIUM)

Gray, very silty, fine SAND with organics (medium dense, wet)

Grayish-brown SILT with sand and organics (soft, wet)

Groundwater sample: ASB0207-5-20130419

Boring Completed 04/19/13
Total Depth of Boring = 5.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-26.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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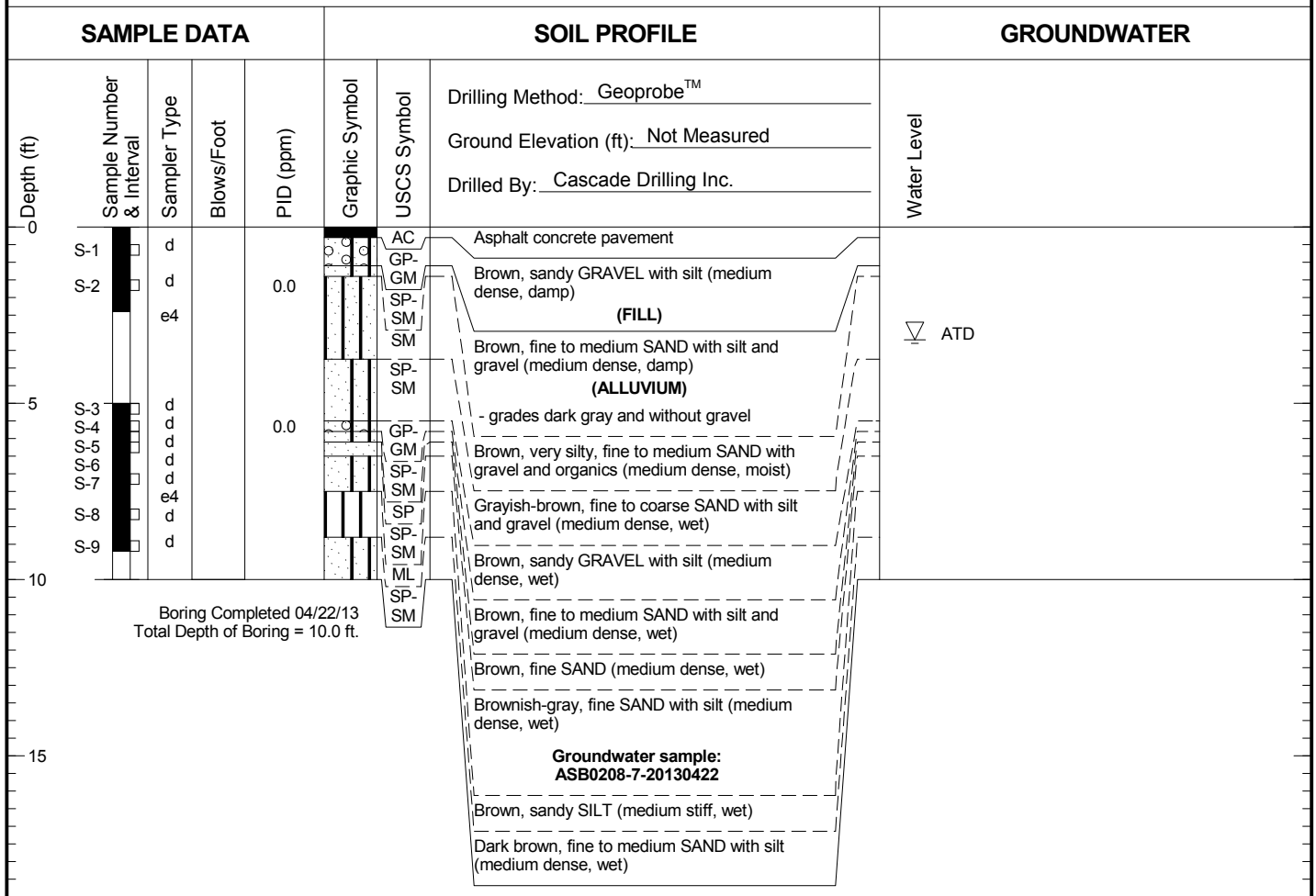
Boeing Auburn
Auburn, Washington

Log of Boring ASB0207

Figure
A-28

ASB0208



Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-27.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Boring ASB0208

Figure
A-29

ASB0209

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level
0	S-1	d				AC	
	S-2	d		6.6		GP-GM	
	S-3	e4				SP	
	S-4	d				SP-SM	
		d				SP-SM	
5						SP	

Drilling Method: Hand Auger

Ground Elevation (ft): Not Measured

Drilled By: Cascade Drilling Inc.

Asphalt concrete pavement

Gray, sandy GRAVEL with silt (medium dense, moist)

(FILL)

Gray, fine to coarse SAND with gravel (medium dense, moist)

Gray, fine to coarse SAND with gravel and silt (medium dense, wet)

Brown, fine to medium SAND with silt and organics (dense, wet)

(ALLUVIUM)

Dark gray, fine to medium SAND (medium dense, wet)

Groundwater sample: ASB0209-5-20130422

ATD

Boring Completed 04/22/13
Total Depth of Boring = 5.0 ft.

10
15
20
25
30
35

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-47.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Boring ASB0209

Figure
A-30

ASB0210

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample	Sampler Type	PID (ppm)	USCS Symbol	Description
0	S-1	d		AC	Asphalt concrete pavement
				GP-GM	Brown, sandy GRAVEL with silt (dense, moist)
	S-2	d		ML	**(FILL)**
	S-3	e4	22.7	SM	Dark gray SILT with sand (medium stiff, wet)
		d			**(ALLUVIUM)**
				SP	Dark gray, silty, fine SAND (medium dense, wet)
5	S-4	d	6.5		
	S-5	d		SP-SM	Brown, fine to coarse SAND with gravel (medium dense, wet)
	S-6	d		SP	Dark gray, fine to medium SAND with silt (medium dense, wet)
		e4			
	S-7	d		ML	
	S-8	d		SP-SM	Dark gray, fine to medium SAND (medium dense, wet)
10				SM	**Groundwater sample: ASB0210-8-20130422**
	S-9	d			
	S-10	d	1.3	SP	Grayish-brown SILT with sand (soft, wet)
		e4			Dark gray, fine to medium SAND with silt (medium dense, wet)
15					Dark gray, silty, fine to medium SAND (medium dense, wet)
	S-11	d	1.0		Dark gray, fine SAND with organics (medium dense, wet)
		e4			- grades without organics
					Groundwater sample: ASB0210-15-20130422
20	S-12	d	0.0		
		e4			
	S-13	d		GP	Dark gray GRAVEL with sand (medium dense, wet)
25					**Groundwater sample: ASB0210-25-20130422**
30					
35					

ATD

Boring Completed 04/22/13
Total Depth of Boring = 25.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-41.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Boring ASB0210

Figure
A-31

ASB0211

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample	Sampler Type	PID (ppm)	USCS	Description
0	S-1	d		AC	Asphalt concrete pavement
	S-2	d		GM	
	S-3	d	0.0	ML	Brown, silty, sandy GRAVEL (medium dense, moist)
	S-4	d, e4		SM, ML	**(FILL)**
	S-5	d		SP-SM	Brown SILT with organics (medium stiff, wet)
	S-6	d		SM	**(ALLUVIUM)**
5	S-7	d		SM, SP-SM	Gray, silty, fine SAND (medium dense, moist)
	S-8	d	1.2	SP, SM	Brown SILT (medium stiff, wet)
	S-9	e4, d		SP/ML	Brown, fine SAND with silt (medium dense, wet)
	S-10	d		SP	Brownish-gray, silty, fine SAND (medium dense, wet)
10					Brown, fine SAND with silt (medium dense, wet)
	S-11	d, e4	3.1	SM	Dark gray, fine to coarse SAND (medium dense, wet)
					Groundwater sample: ASB0211-5-20130423
15	S-12	d		SP-SM	Dark grayish-brown, silty, fine SAND (medium dense, wet)
	S-13	d			- grades very silty
	S-14	e4, d	0.2	SP	Dark gray, fine to medium SAND and grayish-brown SILT (medium dense/very stiff, wet)
	S-15	d		SP-SM	
20	S-16	d	0.0	SM, SP	Dark gray, fine SAND (medium dense, wet)
					Grayish-brown, silty, fine SAND (medium dense, wet)
	S-17	d, e4		GP	Dark grayish-brown, fine SAND with silt (medium dense, wet)
					Groundwater sample: ASB0211-15-20130423
25					Dark gray, fine to medium SAND (medium dense, wet)
					Dark gray, fine to medium SAND with silt (medium dense, wet)
					Dark gray, fine to medium SAND (medium dense, wet)
30					Dark gray GRAVEL with sand (medium dense, wet)
					Groundwater sample: ASB0211-25-20130423
35					

Water Level: ▽ ATD

Boring Completed 04/23/13
Total Depth of Boring = 25.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-42.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0211

Figure
A-32

ASB0212

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level
0	S-1	d				AC	
						GP-GM	ATD
	S-2	d		0.0		SM	
	S-3	e4				SP-SM	
	S-4	d				ML	
5	S-5	d				SM	

Drilling Method: Geoprobe™

Ground Elevation (ft): Not Measured

Drilled By: Cascade Drilling Inc.

Asphalt concrete pavement

Gray, sandy GRAVEL with silt (medium dense, damp)

(FILL)

Gray, very silty, fine SAND with gravel (medium dense, wet)

(ALLUVIUM)

Dark gray, fine to medium SAND with silt (medium dense, wet)

Grayish-brown SILT with sand (medium stiff, wet)

- grades with PEAT interbeds

Dark gray, silty, fine SAND (medium dense, wet)

Groundwater sample: ASB0212-5-20130423

Boring Completed 04/23/13
Total Depth of Boring = 5.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-43.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Boring ASB0212

Figure
A-33

ASB0213

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Soil Profile	Water Level
0	S-1	d				AC	Asphalt concrete pavement	
	S-2	d		0.9		GP-GM	Gray, sandy GRAVEL with silt (dense, damp)	
	S-3	e4 d				PT	**(FILL)**	
						SM ML	Brown PEAT (soft, wet) **(ALLUVIUM)**	ATD
5	S-4	d		0.4			Brownish-gray, very silty, fine SAND (medium dense, wet)	
							Dark brown and grayish-brown SILT interbedded with PEAT (soft, wet)	
	S-5	e4 d				SP-SM	Dark gray, fine SAND with silt (medium dense, wet)	
	S-6	d				SP	**Groundwater sample: ASB0213-8-20130423**	
10							Dark gray, fine to medium SAND (medium dense, wet)	

Boring Completed 04/23/13
Total Depth of Boring = 10.0 ft.

15
20
25
30
35

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-48.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0213

Figure
A-34

ASB0214

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level
0	S-1	d				AC	
	S-2	d		0.0		GP-GM	
	S-3	d e4				ML SP-SM	ATD
5							
10							
15							
20							
25							
30							
35							

Drilling Method: Geoprobe™

Ground Elevation (ft): Not Measured

Drilled By: Cascade Drilling Inc.

Asphalt concrete pavement

Brown, very sandy GRAVEL with silt (medium dense, damp)
(FILL)

Dark brown SILT (medium stiff, wet)
(ALLUVIUM)

Grayish-brown, fine SAND with silt (medium dense, wet)

Boring Completed 04/24/13
Total Depth of Boring = 5.0 ft.

Groundwater sample: ASB0214-5-20130424

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-37.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0214

Figure
A-35

ASB0215

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	SOIL PROFILE	Water Level
0	S-1	d				AC	Asphalt concrete pavement	
	S-2	d				GP-GM	Grayish-brown, sandy GRAVEL with silt (medium dense, damp)	
	S-3	e4 d		3.9		SP-SM	**(FILL)**	
							Grayish-brown, fine to medium SAND with silt (medium dense, damp) **(ALLUVIUM)**	ATD
5	S-4	d						
	S-5	d e4				ML	Dark gray iron oxide mottled SILT (medium stiff, wet)	
						SP	**Groundwater sample: ASB0215-7-20130424**	
	S-6	d		2.8				
10	S-7	d				SM	Dark gray, fine to medium SAND (medium dense, wet)	
	S-8	d		0.3		SP	Dark gray, very silty, fine SAND (medium dense, wet)	
		e4					- Driller reports heave while drilling	
							Dark gray, fine to medium SAND (medium dense, wet)	
15	S-9	d					**Groundwater sample: ASB0215-15-20130424**	
	S-10	d e4		0.1		GP	Dark gray GRAVEL with sand (medium dense, wet)	
20	S-11	d		0.1		SP	Dark gray, fine to medium SAND (medium dense, wet)	
						GP	Dark gray GRAVEL with sand (medium dense, wet)	
	S-12	e4 d						
25							**Groundwater sample: ASB0215-25-20130424**	
30								
35								

Boring Completed 04/24/13
Total Depth of Boring = 25.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-46.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0215

Figure
A-36

ASB0216

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Soil Profile	Water Level
0	S-1	d				AC	Asphalt concrete pavement	
	S-2	d		0.3		GP-GM PT	Gray, very sandy GRAVEL with silt (dense, damp) **(FILL)**	ATD
	S-3	e4 d				SM PT	Brown PEAT (soft, wet) **(ALLUVIUM)**	
5	S-4	d		0.1		ML	Brownish-gray, silty, fine SAND with organics (loose, wet)	
	S-5	d e4				SM	Brown PEAT (soft, wet)	
10							Dark brown, sandy SILT with abundant organics (soft, wet)	
							Gray, very silty, fine SAND (medium dense, wet)	

Groundwater sample: ASB0216-7-20130424

Boring Completed 04/24/13
Total Depth of Boring = 10.0 ft.

15
20
25
30
35

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-49.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Boring ASB0216

Figure
A-37

ASB0217

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Soil Profile	Water Level
0	S-1	d				AC	Asphalt concrete pavement	
						GP-GM	Brown, sandy GRAVEL with silt (dense, damp)	
	S-2	d		0.5		PT	**(FILL)**	
	S-3	e4 d				SP-SM	Brown, silty PEAT (soft, wet) **(ALLUVIUM)**	ATD
5	S-4	d				SP-SM	Gray, fine to medium SAND with silt (medium dense, wet)	
	S-5	d		0.2		SP		
	S-6	d				ML	Brown, fine to coarse SAND with gravel and silt (medium dense, wet)	
		e4				SM		
						ML SM	Dark gray, fine to medium SAND (medium dense, wet)	
10							Gray SILT (medium stiff, wet)	
							Gray, very silty, fine SAND (medium dense, wet)	
							Groundwater sample: ASB0217-8-20130425	
15							Gray SILT (medium stiff, wet)	
							Gray, very silty, fine SAND (medium dense, wet)	
20								
25								
30								
35								

Boring Completed 04/25/13
Total Depth of Boring = 10.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-12.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0217

Figure
A-38

ASB0218

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Soil Profile	Water Level
0	S-1	d		0.2		AC	Asphalt concrete pavement	
						GP-GM	Brown, sandy GRAVEL with silt (dense, damp)	
	S-2	d				PT	**(FILL)**	
		e4						
	S-3	d				ML	Brown PEAT (very soft, wet)	
							(ALLUVIUM)	
5	S-4	d				PT	Brownish-gray, sandy SILT with organics (medium stiff, wet)	ATD
	S-5	d				SP-SM		
						ML	Dark brown PEAT (soft, wet)	
	S-6	d		1.5			Brownish-gray, fine to coarse SAND with silt (medium dense, wet)	
		e4						
	S-7	d					Gray SILT with organics (soft, wet)	
	S-8	d				SM		
10	S-9	d				SM	- grades with sand and abundant organics	
	S-10	d				ML	Gray, very silty, fine SAND (medium dense, wet)	
	S-11	d		0.2		SP-SM		
	S-12	e4				SM	Brownish-gray, very silty, fine to medium SAND with gravel (medium dense, wet)	
		d					**Groundwater sample: ASB0218-10-20130425**	
15						SP	Brownish-gray SILT (soft, wet)	
	S-13	d		0.0			Brownish-gray, fine SAND with silt (medium dense, wet)	
		e4					Brownish-gray, silty, fine SAND (medium dense, wet)	
20	S-14	d					Dark gray, fine to medium SAND with trace wood fragments (medium dense, wet)	
	S-15	d		0.3		ML	**Groundwater sample: ASB0218-15-20130425**	
	S-16	d				SM		
		e4					Brownish-gray SILT (medium stiff, wet)	
						ML	Brownish-gray, silty, fine SAND (medium dense, wet)	
	S-17	d				SP-SM		
25						SP	Brownish-gray SILT (medium stiff, wet)	
							Brownish-gray, fine to medium SAND with silt (medium dense, wet)	
							Dark gray, fine to medium SAND (medium dense, wet)	
							Groundwater sample: ASB0218-25-20130425	
30								
35								

Boring Completed 04/25/13
Total Depth of Boring = 25.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-22.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0218

Figure
A-39

ASB0219

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level
0						AC	Asphalt concrete pavement
	S-1	d		0.3		GP-GM	Brown, sandy GRAVEL with silt (medium dense, damp)
		e4					**(FILL)**
						SP	Brown, fine to coarse SAND with gravel (dense, moist)
5	S-2	d					ATD
	S-3	d				ML	Brown, sandy SILT (stiff, wet)
							(ALLUVIUM)
							- grades gray
	S-4	e4 d		0.3		SM	Brownish-gray, silty, fine SAND (medium dense, wet)
10							**Groundwater sample: ASB0219-9-20130425**

Drilling Method: Geoprobe™

Ground Elevation (ft): Not Measured

Drilled By: Cascade Drilling Inc.

Boring Completed 04/25/13
Total Depth of Boring = 10.0 ft.

15
20
25
30
35

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-32.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0219

Figure
A-40

ASB0220

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Soil Profile	Water Level
0	S-1	d				AC	Asphalt concrete pavement	
	S-2	d				GP-GM	Brown, sandy GRAVEL with silt (dense, moist)	
	S-3	e4		0.4		PT	**(FILL)**	ATD
	S-4	d				SM		
		d				ML	- grades gray	
5							Brown PEAT (soft, wet) **(ALLUVIUM)**	
							Gray, silty, fine SAND (medium dense, wet)	
							Grayish-brown SILT with organics (soft, wet)	
10							**Groundwater sample: ASB0220-5-20130426**	
15								
20								
25								
30								
35								

Boring Completed 04/26/13
Total Depth of Boring = 5.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-13.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0220

Figure
A-41

ASB0221

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level
0	S-1	d				AC	
						GP	
	S-2	d				PT	
	S-3	e4		1.5		SM	ATD
		d					
						SM	
5	S-4	d					
	S-5	d		0.5		SM	
	S-6	d				SM	
	S-7	d				SP-SM	
		e4					
	S-8	d				SM	
	S-9	d				SP	
10							
15							
20							
25							
30							
35							

Asphalt concrete pavement

Brown, sandy GRAVEL (medium dense, damp)

(FILL)

Dark brown PEAT with silt (very soft, wet)

(ALLUVIUM)

Gray, silty, fine to medium SAND (medium dense, wet)

Dark brown, very silty, fine SAND with abundant organics (medium dense, wet)

Grayish-brown, silty, fine to medium SAND (medium dense, wet)

- grades with gravel and organics

Grayish-brown, very silty, fine to medium SAND (medium dense, wet)

Dark gray, fine to medium SAND with silt (medium dense, wet)

Groundwater sample: ASB0221-7-20130426

Grayish-brown, very silty, fine SAND (medium dense, wet)

Dark gray, fine to medium SAND (medium dense, wet)

Boring Completed 04/26/13
Total Depth of Boring = 10.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-23.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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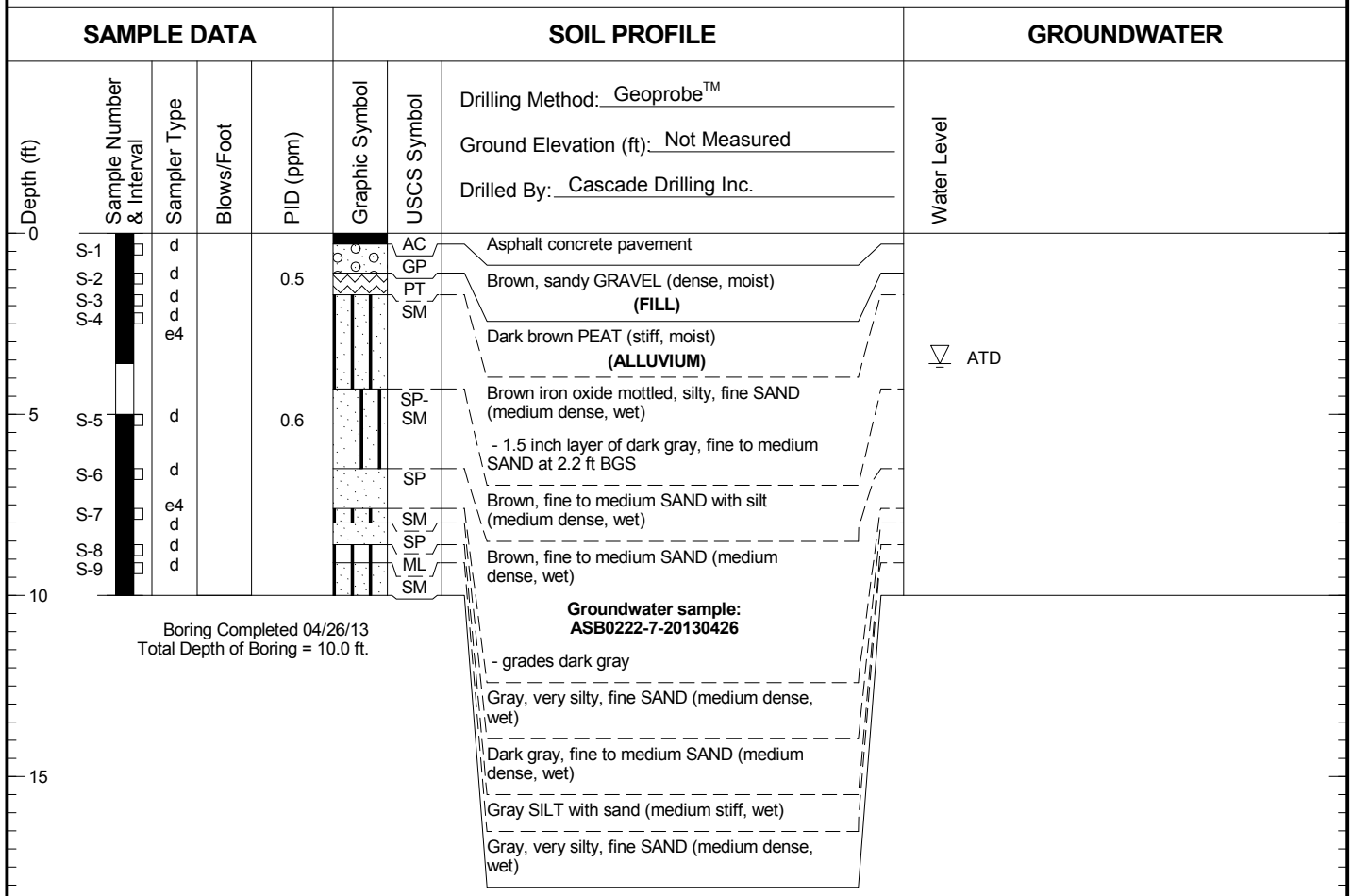
Boeing Auburn
Auburn, Washington

Log of Boring ASB0221

Figure
A-42

ASB0222



Boring Completed 04/26/13
Total Depth of Boring = 10.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-33.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0222

Figure
A-43

ASB0223

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Soil Profile	Water Level
0	S-1	d				AC	Asphalt concrete pavement	
	S-2	d		0.0		GP-GM	Brown, sandy GRAVEL with silt (medium dense, damp)	
	S-3	d				PT		
	S-4	e4 d				SM	**(FILL)**	
						ML	Dark brown PEAT (very soft, wet)	▽ ATD
						PT	**(ALLUVIUM)**	
5	S-5	d					Gray, very silty, fine SAND (medium dense, wet)	
	S-6	d				ML	Gray SILT (medium stiff, wet)	
	S-7	e4 d		0.0		SP	Dark brown, silty PEAT (soft, wet)	
							Gray SILT (medium stiff, wet)	
10							Dark gray, fine to medium SAND (medium dense, wet)	

Boring Completed 04/29/13
Total Depth of Boring = 10.0 ft.

Groundwater sample: ASB0223-8-20130429

15
20
25
30
35

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-15.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0223

Figure
A-44

ASB0224

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Soil Profile	Water Level
0	S-1	d				AC	Asphalt concrete pavement	
						GP		
	S-2	d		0.0		ML	Grayish-brown, very sandy GRAVEL (medium dense, damp) **(FILL)**	
		e4						ATD
						SP	Dark brown SILT with abundant organics (medium stiff, wet)	
						ML	**(ALLUVIUM)**	
5	S-3	d				SP-SM	Dark gray, fine to medium SAND (medium dense, wet)	
	S-4	d		0.0				
	S-5	d				GP-GM	Dark brown SILT with abundant organics (very soft, wet)	
		e4				SM		
	S-6	d				ML	Grayish-brown, fine to medium SAND with silt (medium dense, wet)	
						SP		
10							Grayish-brown, sandy GRAVEL with silt (dense, wet)	
							Dark gray, silty, fine to medium SAND with organics (medium dense, wet)	
							Brown SILT with organics (medium dense, wet)	
							Groundwater sample: ASB0224-7-20130429	
15							Dark gray, fine to medium SAND (medium dense, wet)	
20								
25								
30								
35								

Boring Completed 04/29/13
Total Depth of Boring = 10.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-25.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Boeing Auburn
Auburn, Washington

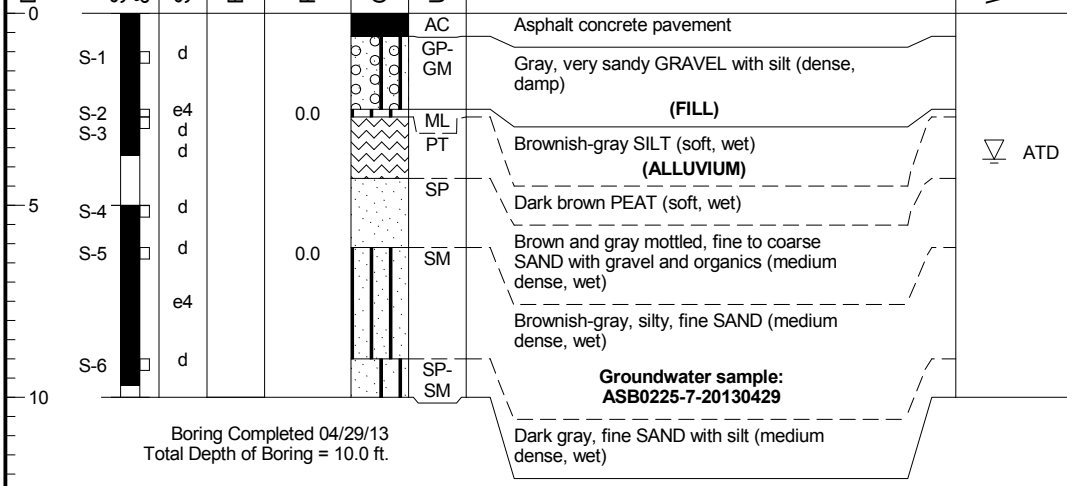
Log of Boring ASB0224

Figure
A-45

ASB0225

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.



Asphalt concrete pavement

Gray, very sandy GRAVEL with silt (dense, damp)

(FILL)

Brownish-gray SILT (soft, wet)

(ALLUVIUM)

Dark brown PEAT (soft, wet)

Brown and gray mottled, fine to coarse SAND with gravel and organics (medium dense, wet)

Brownish-gray, silty, fine SAND (medium dense, wet)

Groundwater sample: ASB0225-7-20130429

Dark gray, fine SAND with silt (medium dense, wet)

Boring Completed 04/29/13
Total Depth of Boring = 10.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-4.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0225

Figure
A-46

ASB0226

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Water Level
0	S-1	d		0.1		SP-SM	
		e4					
5							ATD
		e4					
10							

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Brownish-gray, very gravelly, fine to coarse SAND with silt (medium dense, moist)

See log for AGW227 for lithology due to poor recovery

Groundwater sample: ASB0226-9-20130429

Boring Completed 04/29/13
Total Depth of Boring = 10.0 ft.

15
20
25
30
35

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-2.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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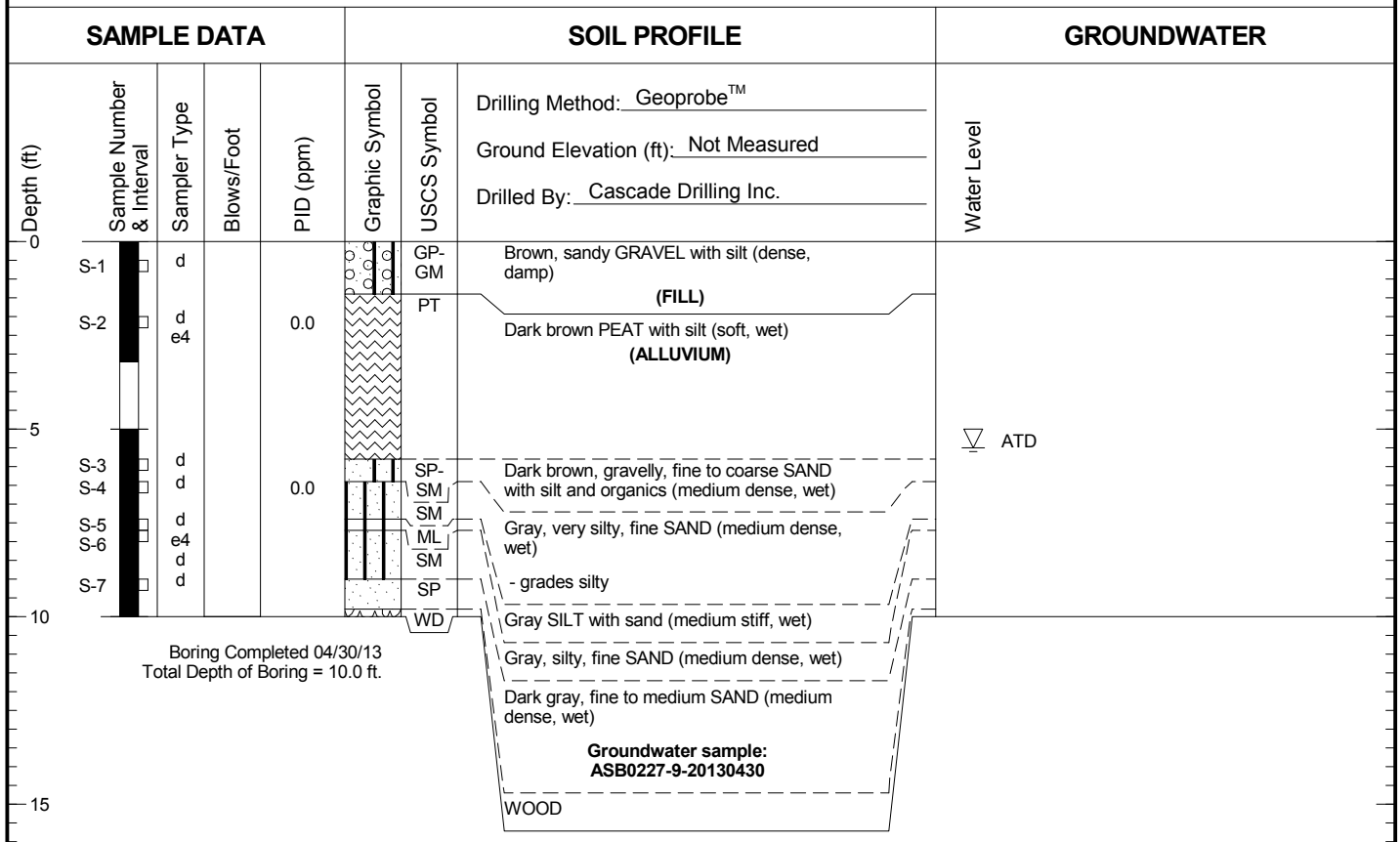
Auburn, Washington

Log of Boring ASB0226

Figure
A-47

ASB0227



Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-35.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Auburn, Washington

Log of Boring ASB0227

Figure
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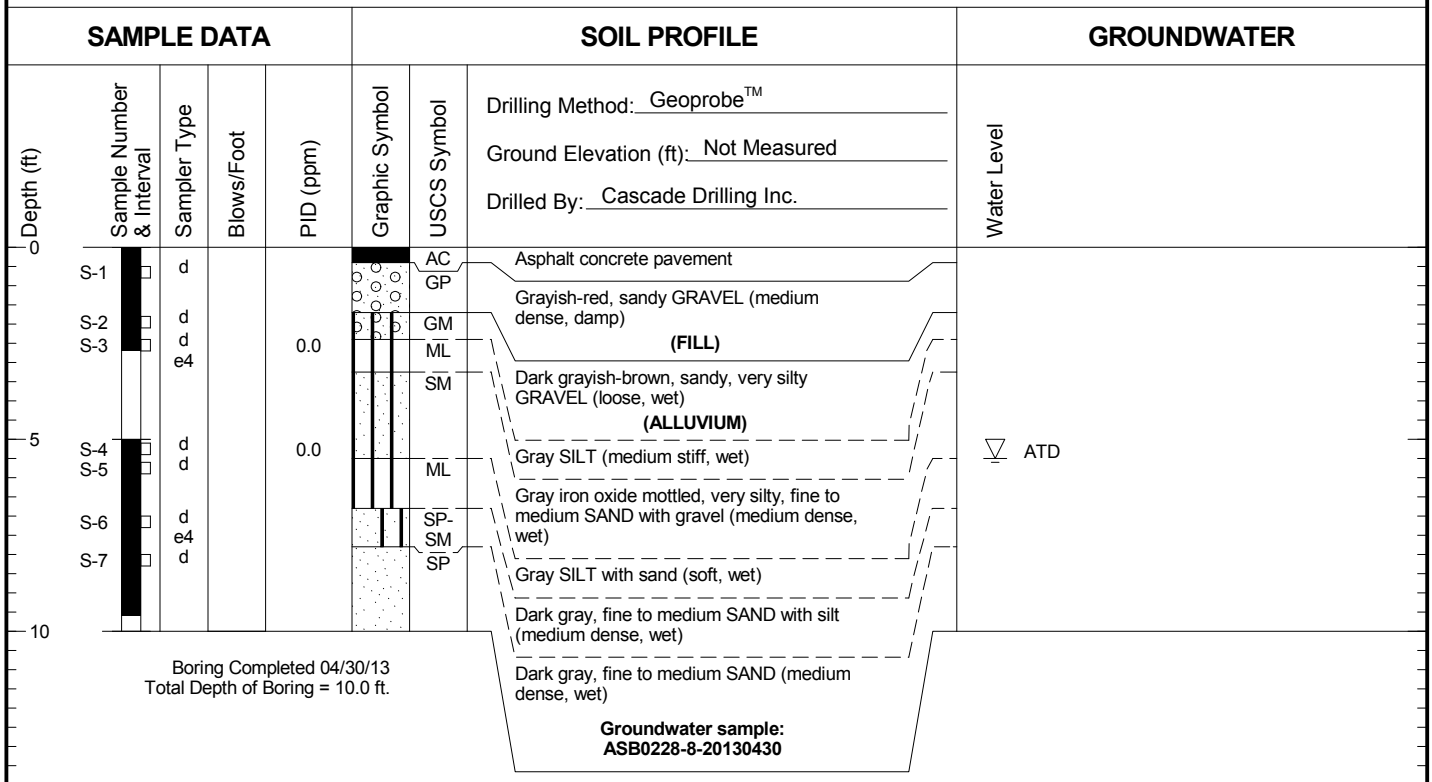
ASB0228



Boring Completed 04/30/13
Total Depth of Boring = 10.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-36.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Boeing Auburn
Auburn, Washington

Log of Boring ASB0228

Figure
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ASB0229

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Geoprobe™
Ground Elevation (ft): Not Measured
Drilled By: Cascade Drilling Inc.

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Soil Description	Water Level
0	S-1	d				GP-GM	Brown, sandy GRAVEL with silt (medium dense, damp)	
	S-2	d				GM		
	S-3	d		0.0		GM	**(FILL)**	
	S-4	d				ML		
	S-5	d				SM	Brown, silty, sandy GRAVEL (medium dense, damp)	ATD
		e4				SP	Gray and brown mottled, sandy SILT with organics (very soft, wet)	
5	S-6	d				SP-SM	**(ALLUVIUM)**	
	S-7	d		0.0		SM	Gray, silty, fine SAND (medium dense, wet)	
		e4					Gray, fine to medium SAND (medium dense, wet)	
	S-8	d				ML		
	S-9	d				PT	Gray, fine to medium SAND with silt (medium dense, wet)	
10						ML	Brown, very silty, fine SAND (medium dense, wet)	
							Groundwater sample: ASB0229-7-20130430	
							Brownish-gray SILT with organics (stiff, wet)	
15							Dark brown PEAT (soft, wet)	
							Grayish-brown SILT with sand and organics (soft, wet)	
20								
25								
30								
35								

Boring Completed 04/30/13
Total Depth of Boring = 10.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. Work plan designation P-44.

025164. 6/14/13 N:\PROJECTS\025164 - MASTER FILE.GPJ SOIL BORING LOG

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Auburn, Washington

Log of Boring ASB0229

Figure
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