B&L Woodwaste Site
Pierce County, Washington

2013 Annual Operations & Maintenance Report

Prepared for

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LIMITATIONS

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

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List of Abbreviations/Acronyms

Acronym/ Abbreviation	Definition
12SETZ	12th Street East Treatment Zone
Annual Report	2013 Annual O&M Report
CAP	2008 Cleanup Action Plan
CMP	Compliance Monitoring Plan
CMR	Compliance Monitoring Report
Consent Decree	Consent Decree No. 08-2-10610-7
CUL	Cleanup level
DMR	Discharge monitoring report
Ecology	Washington State Department of Ecology
Fe^{+3}	Ferric iron
GPD	Gallons per day
GPM	Gallons per minute
GWTP	Groundwater treatment plant
H_2SO_4	Sulfuric acid
ITTZ	Interurban Trail Treatment Zone
$KMnO_4$	Potassium permanganate
Landfill	B&L Woodwaste Landfill
µg/L	Micrograms per liter
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
OMMP	Operations, Monitoring, and Maintenance Plan
ORP	Oxidation-reduction potential
P&ID	Process and instrumentation diagram
Permit	Permit No. WA0040321
PLC	Programmable logic controller
PM	Preventative maintenance
PRB	Permeable reactive barrier
Site	B&L Woodwaste Site
SOP	Standard operating procedure
Trust	B&L Woodwaste Custodial Trust
TSETZ	12th Street East Treatment Zone

Acronym/ Abbreviation	Definition
TSS	Total suspended solids
WSDOT	Washington State Department of Transpiration

1.0 Introduction

1.1 SITE BACKGROUND

The B&L Woodwaste Site (Site) is located within unincorporated Pierce County (Drawing G-01). The street address for the property on which the B&L Woodwaste Landfill (Landfill) is located s 1522 Fife Way East, Milton, Washington. The Site is being remediated under the terms of Consent Decree No. 08-2-10610-7 (Consent Decree) and the 2008 Cleanup Action Plan (CAP) approved by the Washington State Department of Ecology (Ecology). Site remediation is being managed by the B&L Woodwaste Custodial Trust (Trust). The Trust is responsible for implementation of the overall remediation program at the Site, which includes maintenance of the barrier wall and interceptor trench, recovery and treatment of contaminated groundwater within the groundwater treatment plant (GWTP), management of in situ treatment of arsenic-impacted groundwater, and monitoring of groundwater and surface water quality.

1.2 REPORT PURPOSE

This 2013 Annual Operations & Maintenance Report (Annual Report) has been prepared to summarize operations, maintenance, and performance associated with the barrier wall/interceptor trench system, the groundwater recovery system, the GWTP, and the in situ groundwater remediation program that are being conducted at the Site. The barrier wall provides physical containment for contaminated groundwater beneath the Landfill. Contaminated groundwater must be recovered from beneath the Landfill and in hotspots outside the Landfill to achieve remediation objectives described in the CAP. Recovered groundwater is treated in the GWTP for discharge to surface water, as authorized by National Pollutant Discharge Elimination System (NPDES) Permit No. WA0040321 (Permit). In situ treatment is being implemented along the leading edge of the contaminated groundwater plume to prevent further migration. This Annual Report has been prepared to document activities associated with these elements of the site remedy, as described in the Operations, Monitoring, and Maintenance Plan (OMMP, Floyd|Snider/AMEC 2013a).

1.3 SITE REMEDY OVERVIEW

The site remedy specified in the CAP is currently being implemented. This remedy establishes containment of contaminated groundwater beneath the Landfill, reduces the mass of arsenic in contaminated groundwater outside the Landfill, and limits further downgradient migration of the contaminated groundwater plume. The key elements of the site remedy are described below.

1.3.1 Landfill Containment System

The Landfill containment system provides primary confinement for wastes located within the Landfill and for the most highly contaminated groundwater impacted by releases from the landfilled waste. The containment system includes physical barriers to reduce generation of leachate by limiting infiltration of stormwater into the waste and limiting movement of contaminated groundwater beneath the Landfill. The containment system includes engineered components designed to establish physical containment and minimize potentially adverse impacts on surrounding properties. The containment system includes the following:

- A multi-layer, low-permeability cap over the Landfill that promotes runoff and limits stormwater infiltration. The cap was constructed following waste consolidation in 1993. The cap surface consists of native grasses that control erosion. The cap includes a synthetic geomembrane over the entire 11-acre Landfill.
- A subsurface barrier wall surrounding the Landfill that provides a physical barrier for flow of contaminated groundwater immediately beneath the Landfill. The barrier wall encloses the area beneath the Landfill cap and is keyed into a shallow aquitard, where the aquitard is present.
- A groundwater interceptor trench that is located outside of and along the eastern and southern portions of the barrier wall. The interceptor trench facilitates groundwater flow around the barrier wall, discharging to the West and North Ponds. Under normal conditions, the trench functions as a passive drain. The trench includes two lift stations that actively pump groundwater under high water table conditions. The interceptor trench is presently shut down due to the presence of contaminated groundwater within the trench.
- A perimeter ditch/drainage system that collects runoff and drainage from the cap and directs clean stormwater runoff from the cap to the North Pond.
- The North Pond is an unlined pond that collects stormwater runoff from the cap overflow from the West Pond, and the treated discharge from the groundwater treatment plant. The North Pond overflows to the agricultural ditch north of the North Pond. It also receives discharge from the east interceptor trench when the trench is operating.
- The West Pond receives discharges from the south interceptor trench. This unlined pond provides some infiltration and stores groundwater directed around the barrier wall in the south section of the interceptor trench when the trench is operating.

1.3.2 Groundwater Recovery Well Network

The groundwater recovery well network is located within the Landfill and extends to the east, north, and west of the Landfill (Drawing C-04). Contaminated groundwater requiring treatment for removal of arsenic is recovered from a network of recovery wells located beneath the Landfill and in the groundwater plume located outside the Landfill to the north, east, and west of the Landfill. Groundwater recovered by the wells is collected in three collection manifolds, as shown on Drawing C-04. Each line discharges to the Head Tank, located inside the GWTP Building. Groundwater is pumped from the wells using electrically-operated pumps under automatic control. The automatic control system for the groundwater recovery wells is also used to control the GWTP, so that the wells can be controlled to maintain remediation objectives and can be stopped if necessary during GWTP upsets. The pumps that collect groundwater from inside the Landfill are each controlled by transducers located in piezometers located at the Landfill perimeter (Drawing C-04). The recovery well pumps use the water levels as measured by the transducers to control the pump flow rate based upon the measured water level gradient across the Landfill wall.

1.3.3 Groundwater Treatment Plant Overview

The groundwater treatment system has been designed with the primary goal of removing arsenic from the contaminated groundwater recovered from the Site to achieve effluent

concentrations that meet the discharge criteria of 5 micrograms per liter (µg/L). The treatment system consists of chemical oxidation, pH adjustment, co-precipitation, clarification, filtration, and adsorption. A process flow diagram is presented in Drawing PFD-01. The treated groundwater is then pumped to the North Pond via a buried pipeline (Drawing C-04). The North Pond overflows to an adjacent drainage ditch that flows parallel to the Interurban Trail and eventually combines with the Surprise Lake Drain, flows beneath Interstate Highway 5, joins Hylebos Creek, and ultimately discharges to the Hylebos Waterway and into Commencement Bay.

1.3.3.1 Unit Operations

The treatment process includes seven primary unit operations, including the Head Tank, Oxidation Unit, Co-Precipitation Unit, Clarifier Unit, pH Adjustment Unit, Filtration Unit, and Adsorption Unit (PFD-01). Ancillary units for the treatment process include the sludge management unit (filter press for sludge dewatering), an air compressor providing compressed air for process equipment and for maintenance, and chemical storage and feed units. A centralized programmable logic controller (PLC) is used for data acquisition and automatic control of the entire GWTP and groundwater recovery system. Treated effluent is sampled and discharged to the North Pond as required by the Permit. The unit operations and ancillary units are described in more detail below.

1.3.3.2 Head Tank

The Head Tank receives pumped water from the three recovery lines discussed above. The head tank is an unmixed flow equalization tank that provides elevation for groundwater to flow through the rest of the unit operations upstream of the pH adjust tank. Groundwater is discharged from the Head Tank by gravity flow to a flow meter and the downstream process units. The Head Tank outlet includes a sample tap for influent groundwater. The Head Tank is equipped with a level switch to initiate emergency shutdown and alarms if a high level is detected.

1.3.3.3 Oxidation Tank

The Oxidation Tank provides mixing for addition of potassium permanganate ($KMnO_4$) feed solution and provides reaction time to oxidize iron, manganese, arsenic, and oxidizable organic carbon. Chemical oxidation results in precipitation of ferric hydroxide and removal of arsenic. The higher oxidation states of arsenic and iron precipitate more readily and the arsenic is more amenable to adsorption onto the iron hydroxide floc. Water flows from the Oxidation Tank to the Co-Precipitation Tank under gravity flow.

The $KMnO_4$ feed solution is added to the Oxidation Tank via a chemical dosing skid that feeds the solution from a $KMnO_4$ make down tank into the process. The $KMnO_4$ feed system has been designed to provide a range of dosages that can be set by the operator as appropriate to accommodate changes in the influent groundwater quality and to treat the full range of influent groundwater flows. The actual dosage is adjusted as needed by the operator, based on testing the influent for arsenic, iron, and manganese to avoid over- or under-dosing. An oxidation-reduction potential (ORP) sensor and transmitter is installed in the Oxidation Tank to monitor ORP and ensure appropriate oxidation conditions are maintained. The ORP sensor transmits a signal to the PLC for automatic monitoring. A warning alarm is initiated if the ORP is outside of

the expected range to alert the operator that there is a potential problem with the $KMnO_4$ dosing system so that corrective action can be taken.

1.3.3.4 Co-Precipitation Tank

After sufficient contact time in the Oxidation Tank, the groundwater flows by gravity into the Co-Precipitation Tank where lime slurry is added and mixed into the tank under automatic control to raise the pH of the groundwater. The ferric iron (Fe^{+3}) formed in the Oxidation Tank will form hydroxides at the elevated pH and precipitate. Arsenic will then adsorb to the floc and be entrapped by the precipitated iron hydroxides. The addition of the lime slurry in the Co-Precipitation Tank raises the pH and causes additional precipitation of ferric hydroxide. The Co-Precipitation Tank also receives sludge recycle from the Clarifier Unit to provide extra seed for floc formation. In addition to lime slurry and sludge recycle; coagulant is also added to the Co-Precipitation Tank to facilitate formation of a well settling floc. The Co-Precipitation Tank is equipped with a pH sensor and transmitter that is tied to the PLC; the sensor is used to control lime additions and monitor process conditions.

The lime slurry is fed to the Co-Precipitation Tank under PLC control by a small peristaltic dosing pump drawing from the lime recirculation line. The lime slurry feed rate is automatically controlled by the PLC to achieve the target pH in the Co-Precipitation Tank. The hydrated lime slurry is fed to the process from a large lime mix tank that consists of a large peristaltic recirculation pump to prevent the lime colloids from settling out. The coagulant feed is dosed in the Co-Precipitation Tank via a chemical dosing skid that pumps from a 55-gallon drum of ferric sulfate-based coagulant and has been designed to provide a range of dosages that can be set by the operator to support the required flexibility to accommodate changes in the groundwater quality and to service the full range of influent groundwater flows. Sludge recycle is fed to the Co-Precipitation Tank from the underflow of the Clarifier Unit by a pneumatic double-diaphragm pump under PLC control.

1.3.3.5 Clarifier Unit

Groundwater flows by gravity from the Co-Precipitation Tank to an inclined plate Clarifier Unit to separate the floc from the treated water. The Clarifier Unit includes integral rapid-mix and flocculation tanks, each equipped with a variable speed mixer. A polymer flocculant feed solution is dosed to the flash mix tank under automatic control by the PLC at a rate proportional to the influent groundwater flow rate. Batches of feed polymer are made automatically by the polymer feed skid under PLC control. The make down tank feed rate to the rapid-mix tank is adjusted by the operator to account for varying influent water quality and flow conditions.

The rapid-mix tank provides complete mixing of the groundwater with the dilute polymer solution and a short residence time. The polymer-groundwater slurry from the rapid-mix tank then flows by gravity to the flocculation tank to provide a period of slow mixing to allow for floc growth. The flocculated groundwater then flows into the inclined plate settler, allowing the solids to settle to the sludge hopper and the clarified groundwater to overflow the effluent weir. As noted above, a portion of the sludge from the Clarifier Unit is pumped to the Co-Precipitation Tank. Excess sludge is pumped to the sludge management unit, which is described below.

1.3.3.6 pH Adjust Tank

The Clarifier Unit overflow flows by gravity to the pH Adjust Tank where the water is mixed with sulfuric acid (H_2SO_4) to adjust the pH to a level needed to achieve effective adsorption of the remaining arsenic in the downstream adsorption columns. The pH Adjust Tank is equipped with a pH sensor and transmitter that relays the pH level to the PLC. The pH in the pH Adjust Tank is reduced by the addition of sulfuric acid from an acid tote using a chemical dosing skid under automatic pH control. The rate of acid addition is controlled by the PLC, using the continuous pH sensor in the pH Adjust Tank to achieve the pH setpoint entered by the operator.

Water from the pH Adjust Tank is pumped through the Filter and Adsorption Units under level control. Level is controlled by a continuous level sensor tied to the PLC. The continuous level sensor is used as the control signal for the PLC to automatically regulate pump flow rate from the discharge pumps. Pump speed is controlled by the PLC to maintain a constant level in the pH Adjust Tank. The pumps also provide pressure needed to push the water through the filters and adsorbers. The level sensor in the pH Adjust Tank will issue an alarm or a plant shutdown in the event the high or high-high level set points (respectively) are detected.

1.3.3.7 Filter Unit

The Filter Unit includes two bag filters followed by two cartridge filters. Water is pumped from the pH Adjust Tank directly to a duplex-bag filter unit and then through a duplex cartridge-filter unit to remove the remaining suspended solids that were not removed in the Clarifier Unit and to prevent plugging of the Adsorption Unit. Pressure loss across each of the Filter Units is monitored continuously by the PLC; an alarm is issued if high pressure loss (indicating plugging of the filters) is detected. Filters are changed manually.

1.3.3.8 Adsorber Unit

The final unit operation needed to achieve the low-level arsenic treatment target of 5 µg/L is adsorption onto activated alumina media in two adsorption columns operated in series (as lead and lag units). Breakthrough of arsenic is monitored for both columns and media are replaced as needed to prevent any non-compliant discharges. Each adsorber is equipped with a continuous differential pressure sensor so that pressure drop can be monitored by the PLC. An alarm is issued if high pressure drop is detected, indicating that the affected adsorber has become plugged and requires operator attention.

Effluent from the second adsorber column is the final, treated effluent. The pH of the discharge from the second adsorber is monitored continuously to ensure that the pH is within the permitted range and will issue an alarm/plant shutdown in any case where the pH gets close to the discharge lower or upper limits. The final treated water, once through the pH meter, flows through an effluent flow meter were total flow rate is recorded for reporting the daily discharge volume and is directed to the North Pond for discharge via permitted Outfall #001. The quality of the final treated effluent is monitored by collecting a composite sample from a sample tap located adjacent to the flow meter, inside the GWTP building. The final effluent line includes a sample tap where grab samples are collected to monitor the effluent pH, in accordance with the Permit.

1.3.3.9 Sludge Storage and Dewatering Unit

Excess sludge generated from treatment of groundwater is collected and dewatered for disposal in a permitted, off-site landfill. A user-defined fraction of underflow from the Clarifier Unit is pumped to the sludge storage tank and another fraction is pumped back into the process in the co-precipitation tank with a pneumatic diaphragm pump operated on a timer control system. The sludge is accumulated in the storage tank for batch-wise dewatering by a filter press that is run manually by an on-site operator. The sludge storage tank is equipped with a continuous level sensor and a high-level switch that are monitored by the PLC. Alarms are initiated when high inventory or high levels are detected in the sludge storage tank. Polymer flocculant can be added to the sludge storage tank by the operator to improve sludge dewatering performance.

When a sludge dewatering batch is initiated, sludge is pumped from the sludge storage tank to the filter press by a pneumatic diaphragm pump. The filtrate flows from the filter press by gravity to a collection sump, where it is pumped to the Oxidation Tank for treatment with the influent untreated groundwater. The filter press produces filter cakes that are dumped into a roll-off container located immediately below the filter press for waste disposal.

1.3.3.10 Instrumentation and Controls

Instrumentation for the GWTP is depicted in the process and instrumentation diagrams (P&IDs; Drawings PID-00 through PID-05). The system has been designed to be automated to the extent practical. The GWTP includes significant instrumentation for control and monitoring purposes. The treatment equipment and instrumentation is automated with a single, centralized PLC. The system operations are monitored via a human machine interface (HMI) located in the treatment building or off-site by logging into the on-site computer. The control system includes call out alarms, data logging, and tracking of most process instruments, as shown on the P&IDs.

1.3.4 In Situ Groundwater Remediation System

In situ groundwater remediation is being conducted using a permeable reactive barrier (PRB) configuration in two areas along the leading edge of the groundwater plume emanating to the north and west of the Landfill. Additionally, a pilot program is underway to assess area-wide treatment of low to moderate levels of arsenic contamination in the main portion of the plume north of the Landfill. Remediation is accomplished by injecting a commercially-available remediation product, EHC-M, into the subsurface to promote biological and chemical conditions to remove arsenic from the plume and sequester it in aquifer solids. In situ remediation is a key component of the remedy specified in the 2008 CAP. This program is monitored and maintained to achieve cleanup levels (CULs) in groundwater downgradient of the treatment areas. In situ treatment will be used in the future to achieve the arsenic CUL over most of the plume outside the Landfill. Areas of contamination outside the Landfill barrier, shown on Figure 1.1 and collectively referred to as the Outside Area, include the Wetlands Plume, Agricultural Field Plume, Eastern Boundary Mini-Plume, and Fife Way Mini-Plume.

1.3.5 Groundwater Monitoring System

A key component of the remediation program is the network of groundwater monitoring wells that are sampled to assess movement of the groundwater plume and changes in groundwater quality (shown on Figure 1.1). The monitoring well network is used for compliance monitoring,

as required in the Model Toxics Control Act (MTCA) regulations. The wells included in the monitoring well network are located on the following properties:

- The B&L Property
- The Washington State Department of Transportation (WSDOT) properties located west and northwest of the B&L Property
- The City of Milton Interurban Trail
- The M-F Associates wetlands property
- The 12th Street Easement belonging to Pierce County
- The WSDOT property north of the 12th Street Easement

The network of groundwater monitoring wells are sampled on a semiannual basis, as described in the OMMP. Monitoring results are also reported to Ecology semiannually.

2.0 Groundwater Recovery System

The groundwater recovery system is operated to establish and maintain an inward and upward groundwater gradient beneath the Landfill and to reduce the mass of arsenic within groundwater hotspots outside the Landfill. Overall performance of the groundwater recovery system during 2013 is summarized below.

2.1 CROSS-WALL AND VERTICAL GRADIENT CONTROL PERFORMANCE

To evaluate the effectiveness of the groundwater recovery system in maintaining an inward-directed cross-wall groundwater gradient[1] and an upward gradient from the Lower Sand Aquifer to the Upper Sand Aquifer beneath the Landfill, a total of 19 piezometers in 8 clusters are distributed around the Landfill and are used to measure water levels. Most piezometers are paired (e.g., PZ-2a/b). Three piezometer clusters located in the vicinity of known gaps in the lower silt aquitard include a third piezometer (e.g., PZ-4a/b/c) to monitor cross-wall and vertical gradients. Locations of all piezometers are shown on Figure 1.1 and Drawing C-4. Piezometers numbered with an "a" represent water levels in the Upper Sand Aquifer outside the barrier wall, piezometers numbered with a "b" represent water levels in the Upper Sand Aquifer inside the barrier wall, and piezometers numbered with a "c" represent water levels in the Lower Sand Aquifer. Thus an "a/b" pair is used to calculate the cross-wall gradient from the water level in the "a" piezometer minus the water level in the "b" piezometer. Vertical gradients are calculated from the water level in the "c" piezometer minus the water level in the "b" piezometer. Inward and upward gradients would be positive (greater than 0) in these calculations; negative gradients would be either outward or downward, depending on whether the paired piezometers are a/b or b/c pairs, respectively. The performance standard established in the CAP for hydraulic containment inside the Landfill is a cross-wall gradient greater than or equal to 0.5 feet and an upward gradient greater than 0 feet. Table 2.1 summarizes the percent of time for each month that a piezometer pair achieved an inward and upward gradient. As noted on the table, the transducers initially installed in the system proved to be inaccurate and unreliable and were replaced in September 2013.

As shown in Table 2.1, piezometer pairs located along the southwestern side of the Landfill (i.e., PZ-4a/b and PZ-5a/b) show that the groundwater recovery system failed to establish and maintain the specified performance standard (cross wall gradients greater than 0.5 feet) the majority of the time as a result of the discontinuity in the aquitard. In addition, the specified upward gradient in the south west corner was not reliably achieved in piezometer pair PZ-4b/c. The cross-wall piezometer pairs on the southeast, east, north, and northwest portions of the Landfill reliably achieved the performance standard. The vertical gradient standard was also achieved reliably in the vertical piezometer pair on the east side of the Landfill (PZ-8b/c). In general, the effectiveness of the groundwater recovery system in establishing and achieving the performance standard for piezometers other than PZ-4a/b/c and PZ-5a/b/c is related to the operating time of the GWTP. Additional groundwater recovery capacity is needed to achieve the performance standard for PZ-4a/b/c and PZ-5a/b/c.

[1] The term "gradient" is used here to describe the calculated difference in head in two piezometers, without accounting for the distance between them.

2.2 TOTAL VOLUME OF GROUNDWATER RECOVERED

The total amount of groundwater recovered from the groundwater recovery well network was 6,704,813 gallons in 2013. The most groundwater recovered during a month occurred in July and was 856,235 gallons. The daily average groundwater flow during 2013 was 18,344 gallons per day (GPD). Table 2.2 summarizes the monthly average GPD and total gallons recovered from the Site. Figure 2.1 shows the total groundwater recovered per month and the average daily flow recovered at the Site during 2013. From the beginning of 2013, an increasing groundwater recovery trend can be observed in Figure 2.1 as system reliability was improved.

2.3 ANALYTICAL DATA FROM RECOVERY WELLS

Samples were taken from the recovery wells inside the Landfill barrier wall (Recovery Wells R-1 through R-11) and outside the Landfill (Recovery Wells R-12 through R-21) in August and September of 2013. Sample results are summarized in Table 2.3; laboratory results and Chain of Custody forms are in Appendix A. Drawing C-04 shows the locations of all of the recovery wells. Two wells inside the Landfill (R-03 and R-06) were not sampled. These recovery wells have never been operated because they do not produce water at adequate rates. Two recovery wells outside the Landfill were not producing water due to faulty equipment and were repaired after the sampling event had concluded. Table 2.3 also includes initial landfill data taken from April 2010 sampling prior to the construction of the GWTP.

2.4 CAPTURE ZONE AND MASS RECOVERY ASSESSMENT

Performance of the Outside Area recovery system was monitored in accordance with the OMMP to assess attainment of the cleanup objective for the Outside Area groundwater recovery system: removal of contaminant mass and lowering of groundwater concentrations. Performance was evaluated through capture zone assessment and mass recovery assessment. Monitoring of monitoring wells adjacent to the recovery wells was performed as part of the compliance monitoring program; refer to the Annual Compliance Monitoring Report (CMR; Floyd|Snider/AMEC 2014a).

A capture zone assessment was completed in general accordance with the OMMP and applicable guidance (USEPA 2008). Based on the conceptual site model and cleanup objectives for the Site, the site-specific target capture zone is defined as the zone of groundwater within the estimated 500 µg/L arsenic contour. Groundwater recovery in the initial year has shrunk the area with the 500 µg/L arsenic contour so that it is now smaller than the area relied upon in recovery system design, and this area is expected to continue to change with remediation progress. Because the remedial objective for the Outside Area recovery system is mass recovery, not hydraulic containment, complete capture of groundwater within this changing zone is not necessary, but instead serves as a tool for assessing the effectiveness of the Outside Area recovery system in attaining its goal of reducing arsenic mass in the areas of the Outside Area plume with the highest arsenic concentrations. Uncaptured portions of the plume will be addressed through other remedial components.

Water level elevation contours based on measurements from Upper Sand Aquifer wells and piezometers collected during the October compliance monitoring event in October 2013 are shown on Figure 2.2. Water level measurements from recovery well sounding tubes collected as part of the October 2013 event are shown uncorrected for potential well inefficiency and losses. The horizontal capture zones, within which all flow lines reach a recovery well, are shown

interpreted based on flow lines perpendicular to groundwater elevation contours. Vertical groundwater flow patterns are not necessary to be analyzed, based on the presence of a low-permeability confining layer beneath the Upper Sand Aquifer.

As shown in Figure 2.2, the interpreted actual capture zones are substantially larger than the target capture zones. With the exception of the downgradient edge of the arsenic plume in the wetlands, all of the target capture zone areas are within interpreted actual capture zones. Under these conditions, which are considered representative of recovery well network operations in 2013, groundwater in the Upper Sand Aquifer within the interpreted actual capture zones will flow to a recovery well. Elevated arsenic in groundwater beyond the wetlands capture zone will be remediated by the in situ treatment PRB at 12th Street East, and/or other future groundwater remediation components.

Contaminant trends as measured at monitoring wells in the vicinity of the recovery wells are presented in Appendix A of the CMP. In the Wetlands Plume area, monitoring Wells MW-13 and MW-15 are indicative of concentrations in the target capture zone. In the Eastern Boundary Mini-Plume area, RW-12 is representative of concentrations in the target capture zone; MW-35 is representative of concentrations downgradient of the target capture zone. In the Agricultural Field Plume, R-14 is representative of concentrations in the target capture zone; MW-33 is representative of concentrations downgradient of the target capture zone. Concentration trends for the wells within the target capture zone indicate a clear pattern of steeply reducing concentrations. In the two events representing the onset of groundwater recovery, the arsenic concentration at MW-13 has decreased by 610 µg/L (approximately 26 percent) to less than 2,000 µg/L for the first time. The arsenic concentration at MW-15 has decreased by 360 µg/L (approximately 23 percent) to less than 1,300 µg/L for the first time. Concentration trend data at MW-33 and MW-35 indicate that the arsenic concentration is stable in the areas downgradient of the capture zones measured by these wells. No trend data are yet available at R-12 or R-14 (refer to Table 2.3).

Based on the results of the comparison of target to interpreted capture zone, and the concentration trend results, the performance objective of the recovery system in the three groundwater recovery areas is being met.

The recovery mass assessment for the Site is based on arsenic concentrations measured from the influent water to the GWTP with an on-site test kit. The weekly arsenic measurements were then averaged over each calendar month and multiplied by that month's total flow to determine an approximate mass recovered for that month. The sum of all monthly recovered masses yields an annual mass recovery estimate of approximately 15.4 pounds of arsenic. Table 2.4 summarizes the monthly and annual mass recovery estimates.

2.5 SUMMARY OF INSPECTIONS, OPERATIONS CHECKS, AND MAINTENANCE

2.5.1 Specific Capacity Testing

Specific capacity measurements were taken in December of 2013 by pumping from four wells at a time for at least 8 hours and measuring the drawdown and flow rate from each pumping well. The four wells that were run at a time were located far enough apart to have negligible effects on the other pumps being run at the same time. Table 2.5 has the measured drawdown, flow, and calculated specific capacity results. The field forms used in measuring the specific capacity testing parameters is in Appendix B. During measurement of the flow rates taken during the

specific capacity testing, several flow meters were observed to be broken. In addition, some flow measurements were higher than anticipated in the specific wells measured. As such, some of the specific capacity measurements are marked as being erroneous on Table 2.5.

2.5.2 Well Vault, Collection Manifold, and Piezometer and Kiosk Inspections

The recovery wells and pumps were inspected as required during 2013. Recovery well inspections consisted of verifying the flow meters for the recovery pumps were in operation, the check valves were in good operating condition, and that no leaks in the recovery well piping were detected. Kiosks are inspected on an as needed basis and consist of verifying the recovery pumps' CU-300s (communication devices) are in operation without any faults and that no other visual damage or issues are observed in the kiosk. Piezometers are inspected during water level checks to verify transducer calibration. Appendix C includes copies of inspections and maintenance information for each of the recovery wells and pumps.

2.5.3 Transducer Checks and Maintenance

Transducer calibration, calibration checks, and maintenance are summarized for the transducer located in each piezometer located around the Landfill in Appendix D. The original transducers installed in the piezometers experienced several failures and replacements that resulted in a lack of confidence in their capability to provide accurate and reliable water level measurements. As a result, all of the transducers were changed out in the middle of September to go to a new more consistent transducer.

3.0 Groundwater Treatment Plant Operations Summary

3.1 OPERATING FACTOR

The operating factor for the GWTP represents the percent of time that the treatment system is in operation as indicated by flow measured in the GWTP's effluent flow meter. The annual operating factor for the GWTP was 62 percent for 2013 with the highest monthly operating factor occurring in December of 2013 with an operating factor of 88 percent. Table 3.1 shows the monthly and annual operating factors for 2013. Figure 3.1 shows the monthly operating factor throughout 2013 along with the overall annual operating factor. Low operating factors occurred in the months of January and February, prior to retaining an operator for the facility, and as a result of several operations problems being encountered. Subsequent to February, monthly operating factors were at or above 60 percent except for September, when significant downtime occurred due to failure of the polymer feed unit.

3.2 VOLUME OF GROUNDWATER TREATED

The total volume recovered and run through the GWTP in 2013 was 6,705,000 gallons with an average daily flow through the GWTP of 18,000 GPD. The greatest monthly volume recovered occurred in July, with a recovered volume of 856,000 gallons and a daily average of 28,500 GPD. Table 3.2 summarizes the average daily flows per month and annually in addition to the total volumes recovered. Figure 3.2 is a plot comparing the monthly volume and monthly average daily flows for 2013.

3.3 CHEMICAL USAGE

Several chemicals are used in the GWTP process to remove the arsenic from the contaminated groundwater. Potassium permanganate is used to oxidize the groundwater in the Oxidation Tank before lime is added to the Co-Precipitation Tank to raise the pH for further precipitation and coagulant is added to facilitate floc growth. After the Co-Precipitation Tank, polymer is added just upstream of the Clarifier Unit to assist in settling of solids. Sulfuric acid is added to the process after the Clarifier Unit to reduce the pH and improve the adsorption effectiveness through the adsorbers. The two adsorbers are each filled with 40 cubic feet of activated alumina. Other chemicals used at the GWTP include sodium hypochlorite and sodium sulfite, which were used for periodic chlorine shock treatments to remove biological growth. Very small quantities of lab standards and testing chemicals are also used to monitor the treatment process. Table 3.3 summarizes the major chemicals used at the GWTP in 2013.

3.4 WASTES GENERATED

All waste generated in 2013 was disposed of through Waste Management. Wastes consisted of spent media, dewatered sludge filter cake, spent filters from the treatment process, and other miscellaneous consumables used at the plant. All wastes were characterized and were found not to be Dangerous Waste. Wastes are placed in a 48-cubic yard roll off container and picked up by Waste Management upon request from the process engineer. In 2013, a total of 37 tons of waste were generated and disposed of through Waste Management.

3.5 SUMMARY OF OPERATIONS ISSUES AND MAINTENANCE REQUIRED

Table 3.4 summarizes several of the operations and maintenance (O&M) issues and resolutions for problems encountered for 2013. Several of the O&M problems were corrected in 2013 within a month or two of discovering the problem. Some of the larger issues with operations discovered in late 2013 have been addressed in early 2014 or are in progress to being addressed. Examples of some of the problems and fixes from 2013 include several issues encountered in August and September of 2013 related to filter life and increased cost and time for maintenance of filter and clarification equipment. These problems were addressed by re-evaluating process chemical doses, by evaluating particle sizes coming into the filter units and ultimately adding new bag filter housings to the process, and by developing a routine preventive maintenance (PM) schedule. Other notable problems that occurred in 2013 were related to the lime recirculation and feed system, which experience multiple clogs, line failures for both the process feed pump and the recirculation pump, and lime dosing control problems due to the thickness of the lime slurry. These problems were addressed by not only developing a PM schedule for the lime equipment but also by developing procedures for tracking the lime thickness and modifying the lime's density as required.

Several other O&M issues were identified and addressed in 2013 related to areas of the GWTP from the Head Tanks' discharge pipe clogging and restricting flow, to process tank level sensors malfunctioning, to power and light problems at the plant. All of these issues are covered in Table 3.4, along with the resolution and the date the issues were resolved. 2013 represented the first full year of operation and a period of developing the treatment process and equipment needed to adequately treat the process water. A more rigorous PM schedule along with more efficient maintenance procedures have been in development since the end of 2013 and will continue to be developed in the beginning of 2014 to transition from a reactive O&M schedule to a more proactive PM schedule, which will result in fewer maintenance issues and resulting failures.

3.6 RECOMMENDATIONS FOR PROCESS IMPROVEMENTS

Several future process improvements are planned for 2014 to improve the GWTP process. Adjustments to the target pH in the Co-Precipitation Tank to improve iron precipitation and thus improve arsenic removal through co-precipitation with the iron are currently being evaluated and will continue to be evaluated throughout the first quarter of 2014. An alternate coagulant to the current proprietary coagulant blend will also be evaluated to not only save cost, but to potentially improve the treatment process and reduce plant downtime due to filtration problems. In addition to the chemical dosing evaluations, several types of media will be evaluated to select a longer life media to save costs and potentially to improve adsorption of arsenic from the process water. To extend the life of the filter cartridges and the filter bags, various bag filter types are currently being evaluated to increase the amount of time in between bag filter change outs and to extend the life of the cartridge filters downstream.

3.7 SUMMARY OF REVISIONS TO O&M MANUAL

Revisions to the O&M manual for the GWTP included minor updates to standard operating procedures (SOPs) and the addition of equipment maintenance for bag filters that were recently installed. In addition to the updating of SOPs; maintenance schedules were created and added to the O&M manual to reduce risk of plant shutdowns from equipment failure and to get on a more proactive maintenance schedule. Updates to the O&M manual can be seen in the most recent version, submitted to Ecology November 2013 (Floyd|Snider/AMEC 2013a).

Future updates to the O&M manual are planned for 2014 to evaluate and improve SOPs and to continue to improve upon the PM schedule currently in effect. The 2014 revisions to the O&M manual will be submitted by the November due date.

4.0 In Situ Treatment Operations

This section addresses the operation/maintenance and monitoring of the in situ groundwater remediation system, and in situ treatment being monitored as part of the Phase 2 Pilot Study.

4.1 IN SITU TREATMENT IMPLEMENTATION STATUS

The in situ groundwater remediation system consists of two injected PRBs, specifically the 12th Street East Treatment Zone (12SETZ) in the Wetlands Plume and the Interurban Trail Treatment Zone (ITTZ) in the Agricultural Field Plume (Floyd|Snider/AMEC 2010a; refer to Figure 1.1). These reductive precipitation permeable reactive barriers (PRBs) were successfully implemented to intercept contaminated groundwater at the leading edges of the arsenic plume at the Site following a Phase 1 Pilot Study demonstration (Floyd|Snider/AMEC 2011a, Floyd|Snider AMEC 2011b, Floyd|Snider/AMEC 2010, Floyd|Snider/AMEC 2009). Additional information on the system design is presented in the OMMP (Floyd|Snider/AMEC 2013a).

Following several years of groundwater recovery from areas with the highest arsenic concentrations; the in situ groundwater remediation system is expected to be expanded into the remaining portions of the Outside Area where arsenic concentrations in groundwater exceed the CUL, in accordance with the 2008 CAP. The goal of this hybrid approach is to first reduce the mass of arsenic in the groundwater plume by recovering groundwater from the highest concentration areas (i.e., areas with arsenic concentrations greater than approximately 500 µg/L) for treatment at the GWTP. Following reduction of the arsenic mass from these areas of the plume; an in situ treatment using reductive precipitation will be utilized to achieve site CULs in areas where arsenic contamination persists, based on the results of the ongoing Phase 2 Pilot Study. Additional information on the Phase 2 Pilot Study is presented in the Phase 2 Pilot Study Monitoring Reports (Floyd|Snider/AMEC 2013b; 2014b) and Phase 2 Pilot Study Work Plan (Floyd|Snider/AMEC 2011c).

4.2 PERMEABLE REACTIVE BARRIER TREATMENT EFFECTIVENESS AND ATTAINMENT OF CLEANUP STANDARD

Monitoring of effectiveness of the two PRBs in Phase 3 consists of semiannual monitoring of representative monitoring wells as part of normal compliance monitoring. In 2013, Ecology determined that the arsenic plume has stabilized sufficiently so that no further monitoring of in situ treatment constituents is needed from the PRB areas. The monitoring results described here address the two existing PRBs (i.e., 12SETZ and ITTZ). The long-term monitoring program for expanded in situ treatment of Outside Area groundwater has not yet been defined.

The compliance monitoring program is described in the CMP as presented in the OMMP (Appendix B). In accordance with the CMP, Monitoring Well MW-31A in the TSETZ and Monitoring Well W-1 in the ITTZ are monitored for total arsenic. Results from these wells are presented in the annual Compliance Monitoring Report (CMR; Floyd|Snider/AMEC 2014a). These results, summarized below, provide indications of treatment effectiveness.

Total arsenic was measured at MW-31A in October 2013, at a concentration of 5.3 µg/L. In the previous monitoring event, April 2013, total arsenic was measured at this location at a concentration of 6.6 µg/L. These results are consistent with previous results indicating the effectiveness of the in situ treatment PRB in reducing total arsenic concentrations to

concentrations approaching the CUL of 5 µg/L (Floyd|Snider/AMEC 2011c). Time-series trends (refer to Appendix A to the CMR) suggest that the CUL is expected to be attained with no further maintenance treatment of the PRB.

- In the ITTZ, total arsenic was measured at 12 µg/L at Monitoring Well W-1 during the most recent monitoring event in October 2013. In the previous monitoring event, April 2013, total arsenic was measured at this location at a concentration of 10.9 µg/L. Maintenance injections of in situ treatment reagent, EHC-M, were performed in the ITTZ in November 2011, to supplement the original PRB and decrease total arsenic concentrations, which were observed as high as 19 µg/L in 2010 (Floyd|Snider/AMEC 2013b, Phase 2 In Situ Pilot Study Monitoring Report). Maintenance injections temporarily depressed arsenic concentrations to less than the CUL in the ITTZ for a monitoring event in January 2012. Total arsenic concentrations have subsequently remained around 12 µg/L.

The recent results indicate the effectiveness of the ITTZ in situ treatment PRB in reducing total arsenic concentrations to a limited extent, from the observed arsenic concentration range of 15-20 µg/L to approximately 12 µg/L (Floyd|Snider/AMEC 2013b). The effectiveness of the PRB is further demonstrated by the results at W-1 when they are compared to the monitoring well located immediately upgradient of the PRB (refer to Figure 1.1). Total arsenic concentrations at MW-33 were measured at 404 µg/L in October 2013, indicating the effectiveness of the PRB in intercepting arsenic transported by groundwater. Concentrations measured at W-1 approach the cleanup level of 5 µg/L, and are expected to attain the CUL in conjunction with source control and groundwater recovery in the upgradient plume beneath the agricultural field with no further maintenance treatment of the PRB.

4.3 SUMMARY OF PILOT STUDY STATUS AND RECOMMENDATIONS

The Phase 2 Pilot Study was intended to test the selected treatments under field conditions to identify the optimal dosage, evaluate the delivery systems, and improve the understanding of the effectiveness, stability, and necessary monitoring to support the design of the full-scale remedy. Pilot Study treatment cells are illustrated on Figure 1.1. Two treatment amendments were tested at two concentrations in a field arrangement intended to determine the effectiveness of each while simultaneously beginning remediation of a portion of the plume. Phase 2 Pilot Study results from 2013 monitoring are presented in the Phase 2 Pilot Study Monitoring Report (Floyd|Snider/AMEC 2014b).

Conclusions from the draft report are summarized below:

- Indications that remediation has been successful in the monitoring wells representative of Treatment Cells A and B suggest that the EHC-M treatment can be successful in attaining CULs when used as an area treatment.
- Based on available data, EHC-M would be proposed as the selected amendment. The results for EHC-M demonstrate arsenic removal from groundwater to concentrations that approach the CUL through apparent precipitation of iron sulfides. Substantially greater effectiveness in decreasing arsenic concentrations has been observed in the EHC-M Treatment Cells than in the custom reagent Treatment Cells. The arsenic concentrations in the two EHC-M treatment cells were last measured at 9.6 and 12.4 µg/L (compared to pre-treatment concentrations of 88.2 and 21.7 µg/L,

respectively), concentrations that approach the CUL level of 5 µg/L and suggest that the treatment can achieve cleanup objectives.

- The custom reagent, as applied and under site conditions, has been successful only in a temporary depression of arsenic in one treatment cell, followed by rebound close to starting concentrations within 1 year.
- The Pilot Study data provide indications of the range of dosages of EHC-M that may be effective in achieving CULs but do not yet provide conclusive data in this regard.
- Solid-phase speciation results provide direct evidence that arsenic is sequestered in iron sulfide phases, which are more stable over the long-term, especially under iron-reducing conditions, and which may form the precursor to incorporation in crystalline iron sulfide phases. Based on this finding, it is believed that in situ treatment using reductive precipitation under site conditions will result in a permanent, long-term remedy for this Site.

Based on the second year of results of the Phase 2 Pilot Study, collection of 1 year of additional data would be useful to better assess the technology's capacity to achieve CULs, the proper dosage(s), the permanence of the treatment, and the maintenance needs of treatment to prepare for an effective design and implementation of the full-scale in situ remedy for area treatment.

5.0 General Facility Compliance

5.1 NATIONAL POLLUTANT DISCHARGE ELLIMINATION SYSTEM COMPLIANCE SUMMARY

Per the NPDES Waste Discharge Permit No. WA0040321 (last modified May 31, 2013; the Permit), several permit parameters are measured on a monthly basis in addition to the reporting requirements for 2013. Permit parameters measured include the GWTP effluent flow, pH, arsenic, zinc, lead, copper, total suspended solids (TSS), and turbidity. Flow is measured by the effluent flow meter and recorded by the PLC. The pH is measured through a weekly grab sample form the effluent sample port on a bench top pH meter. All of the metals, TSS, and turbidity are sampled once a month through the collection of a 24-hour composite sample from the GWTP effluent sample port and analyzed by an Ecology-certified Washington State laboratory. All of the parameters are reported on a monthly discharge monitoring report (DMR) that is submitted electronically to Ecology. All 2013 DMRs that were submitted are included as Appendix F.

During 2013 no NPDES non-compliances occurred. The monthly discharge monitoring report for the month of August was submitted on the September 16, 2013, one day later than the due date, which occurred on a Sunday. Ecology is aware of the late submittal and does not consider the late submittal a non-compliance event. Table 5.1 summarizes non-compliance events throughout the 2013 year.

Several submittals were required per the Permit for 2013. The submittal and a brief description are summarized below:

- DMRs submitted by the 15th of each month; included all monitoring parameters as required by the Permit.
- O&M manual updates submitted by November 1, 2013; included updated O&M SOPs, new maintenance schedules, and updated drawings.
- Engineering Documents submitted by January 2, 2013; included final As-Builts and construction documents.
- Outfall Evaluation submitted by November 1, 2013; included a detailed evaluation of the GWTP's outfall to the north ditch.
- Acute Toxicity Compliance Monitoring Reports submitted by November 15, 2013; included data and summary report from acute toxicity testing. No acute toxicity was observed.
- Chronic Toxicity Compliance Monitoring Reports submitted by November 15, 2013; included data and summary report from chronic toxicity testing. No chronic toxicity was observed.

5.2 LANDFILL INSPECTIONS

Results of inspections of the Landfill cap, stormwater collection ditch, and culverts are summarized below. Major site features discussed are illustrated on Figure 1.1.

5.2.1 Cap and Stormwater System

The Landfill cap and stormwater system were inspected in accordance with the OMMP. Inspection results are recorded on the Landfill cap and stormwater system inspection sheet (refer to Appendix E), and are summarized below.

The perimeter road was found to be in good condition, with no signs of settlement along the alignment of the interceptor or utility trenches. The perimeter stormwater ditch was found to be draining effectively, with minor amounts of sedimentation accumulating in the riprap in a few locations on the east side of the Landfill that do not affect drainage. Debris identified along the perimeter for removal included several pieces of plywood and an empty 55-gallon container.

Both stormwater ponds (the North Pond and West Pond) were observed to be in good condition, with no substantial sedimentation or diminished storage. All banks and pond berms remain fully covered with protective gravel. All culverts, both catwalks, both overflow structures, and the groundwater treatment plant outfall were observed to be in good working condition; with no obstructions. Vegetation in the form of scotch broom is growing along the fence line on the northern edge of the North Pond, around the North Pond catwalk, and in scattered locations near the West Pond. Wetland vegetation was observed in the southern end of the West Pond. Problem scotch broom growth will be targeted for cutting with annual landscape maintenance.

The landfill cap was mowed as part of regular maintenance prior to the annual inspection. The landfill cap was inspected for signs of erosion, the condition of the vegetative cover, signs of inadequate drainage, settlement, and slope failure. The landfill cover and access road were observed to be in good condition, with full vegetative cover and no signs of erosion or exposed liner. Some minor rutting from construction vehicle traffic was observed on the landfill cap near the entranceway, though the tire grooves have been re-vegetated and do not present an erosion concern. A small apparent depression in the cap soil cover was noted on the east side of the Landfill near Gas Vent #4. Based on the results of the landfill settlement survey, this feature is not interpreted to indicate landfill settlement.

Landfill gas vents and the leachate collection monitoring sump were inspected and found to be in good working order. Two gas vents (#2 and #5) lean downslope slightly, which may indicate slow movement of cap cover soil. The condition of these vents will be monitored in future inspections for further movement. The sump was observed to be in acceptable working condition.

5.2.2 Settlement Monitoring

Landfill settlement evaluation is conducted to provide a basis for documenting site stability based on settlement of the ground surface on the engineered cap. The Washington Minimum Functional Standards for Solid Waste Handling provide that landfill site stability may be demonstrated if, among other requirements, post-closure monitoring has established that little or no settlement is occurring (Washington Administrative Code [WAC] 173-304-407(8)(c)). In addition, periodic surveys provide the opportunity for evaluation of differential settlement of the landfill cap system and to identify any areas of potential concern.

Topographic surveys were conducted at the Landfill in 1994 as part of closure activities and in 2008 and 2009 as part of cap maintenance during remedy construction. Twelve permanent settlement monitoring markers (approximately 1 per acre) were installed on the landfill cap and surveyed by Barghausen Surveyors in December 2008.

In 2013, settlement monitoring activities consisted of monitoring the permanent settlement monuments and comparing the elevations to prior measurements, and a detailed topographic survey of the landfill mound surface with comparison to a previous topographic survey.

5.2.2.1 Settlement Monument Survey

In November 2013, Lanktree Land Surveying conducted monitoring of the settlement marker monument network. Of the 12 permanent monuments that were installed in December 2008, 5 were found to be disturbed by construction activities since the time of their installation. Disturbed markers were reinstalled in the same approximate location prior to the settlement survey of all 12 monuments. The monuments, which consist of 1-foot sections of steel rebar, were installed in accordance with industry practice for long-term topographic evaluation, and driven into the landfill cap cover soil without penetrating the cap liner.

The results of the settlement monument survey are presented in Table 5.2. Landfill settlement monument locations are shown on Figure 1.1. Of the seven locations that have been in place since 2008 (LS-1, LS-2, LS-4, LS-5, LS-7, LS-8, and LS-9), small elevation changes were measured at LS-1 (0.09 feet) and LS-9 (0.03 feet). No elevation change was observed at the other five undisturbed locations.

5.2.2.2 Topographic Survey and Elevation Comparison

Landfill settlement was also evaluated through a comparison between a 2009 detailed topographic survey, which was completed prior to restoration of the landfill cap following slurry wall construction, and a recent survey. Lanktree Land Surveying performed a detailed topographic survey of the landfill cap in November 2013, and prepared a drawing illustrating the change in elevation between the two surveys. The elevation comparison drawing is provided as Appendix F.

Areas in which the elevation is higher than in the previous survey are shown in green, and areas in which the elevation is lower than in the previous survey are shown in red. Changes in elevation illustrated in this drawing generally fall into three categories: (1) increased elevation from filling and new cap placement in the barrier wall mixing pad area; (2) elevation decreases and increases associated with disturbance from stockpiling of cap soil and re-grading of the area upslope of the mixing pad; and (3) decreases in elevation from other disturbance of the cap top soils from small vehicle traffic between the entrance gate and the top of the Landfill and from soil stockpiling and re-grading along the landfill access road.

Decreases in elevation measured in this survey are relatively minor and are generally on the order of 0.01 foot or less. Based on these survey results, no areas are identified as areas of ongoing settlement. Future survey results collected at 5-year intervals will be compared to these results to continue to assess landfill grade for areas of settlement.

5.2.3 Barrier Wall

The ground surface along the barrier wall alignment was inspected in accordance with the OMMP. The inspection for the condition of the cap surface and stormwater ditch above the barrier wall alignment revealed no indications of barrier wall settlement. Refer to the inspection form included in the Appendix E.

5.2.4 Interceptor Trench

The interceptor trench system was designed to control groundwater mounding on the upgradient or southeast side of the barrier wall and direct flow to the downgradient, or north and west sides of the Landfill to maintain natural groundwater flow patterns. The system allows for groundwater along the southern boundary of the Landfill to be managed separately from groundwater along the eastern side of the Landfill.

Based on observed groundwater levels, the interceptor trench system is not needed to control mounding or maintain groundwater flow patterns. In addition, because of arsenic groundwater contamination identified on the east side of the Landfill after the interceptor trench was constructed, the interceptor trench has the potential to transport elevated arsenic concentrations to the North Pond, which overflows to the agricultural ditch system and drains off-site. Additionally, the North Pond does not allow for infiltration at rates suitable for the flow rate from the active interceptor trench lift stations, especially because the North Pond is the discharge point for the GWTP. Because of these conditions, the interceptor trench system operation has been discontinued indefinitely since 2011. Lift stations were submerged with water, and no inspection was conducted.

5.2.5 Security System

Site security features were inspected in accordance with the OMMP. Perimeter gates and fencing were found to be secure and in good condition. Results of the inspection of the perimeter fence and gates are presented on the inspection form in Appendix E.

The condition of the site entrance gate and security fencing for the GWTP building were found to be secure and in good working condition. The monitored security system for the GWTP building and control panels for the groundwater recovery system were found to be operating normally.

5.3 HEALTH AND SAFETY

5.3.1 Incidents and Responses

Several false alarms were experienced in 2013 that resulted in responses by the Pierce County Fire Department to the Site. The false alarms were associated with malfunctioning smoke alarms that were being tripped due to their locations adjacent to the GWTP process tanks. The fire marshal granted permission to remove the smoke alarms to prevent future false alarms.

5.3.2 Overview of Health and Safety Performance

Health and safety performance is measured in terms of events that result in either an injury to personnel at the Site or a near miss with regards to an injury. No significant health and safety issues occurred at the Site in 2013. Two minor events occurred, however. In March a small quantity of solid potassium permanganate was discovered on the floor of the GWTP that was spilled by Clearcreek Contractors during repair work and was not reported to the site operator. The spilled material was cleaned up by the operator. No known exposure resulted from this incident.

In December, during specific capacity testing, an engineer was carrying a 5-gallon bucket nearly full of purge water from a recovery well across the Landfill and re-aggravated a pre-existing injury. He was not carrying more than 50 pounds and the result of the injury was ultimately deemed to be due to a pre-existing condition and not related to work performed at the Site.

5.3.3 Routine Health and Safety Inspections and Testing

Routine health and safety inspections conducted at the Site include regular routine checks for the eye wash and annual checks of the flow rate for the safety shower and the eye wash; both located right outside of the laboratory in the GWTP (Drawing M-01). Routine checks of the eye wash consist of actuating the lever to check that the eye wash is in working order and that the rinse water is of appropriate water temperature and quality. The safety shower and the eye wash are inspected once a year to ensure that they can deliver an adequate amount of rinse water in case of employee exposure to corrosives or irritants. The safety shower flow rate is verified to be at least 20 gallons per minute (GPM) and distributed such that the flow will cover the operator's body in case of exposure. The eye wash flow rate is verified to be at least 3 GPM. In addition to the flow rates being checked; the plumbing and any valves are also checked at this time. The safety shower and eye wash were last checked in March of 2013.

5.3.4 Fire Alarm and Fire Protection Inspections

The fire protection system consists of the fire extinguishers, sprinkler system, and the fire alarms/smoke detectors located throughout the GWTP. The fire alarm system, including the smoke alarms, audible sound devices, and the alarm panel, were inspected on September 22, 2013 (inspection form included in Appendix H). The sprinkler system was inspected on October 2, 2013; this inspection included the line pressure, sprinkler valves, and sprinkler system signage. The sprinkler inspection form is included in Appendix H. The fire extinguishers were sent into an inspection company in October to verify they are still in good working order. The inspection details are posted on the fire extinguishers tags.

6.0 References

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Tables

Table 2.1
Contained Area Groundwater Gradient[1] Summary

Month	North of Landfill		West of Landfill			South of Landfill			East of Landfill		
				Aquitard Gap		Aquitard Gap				Aquitard Gap	
	1a/b	2a/b	3a/b	4a/b	4b/c	5a/b	5b/c	6a/b	7a/b	8a/b	8b/c
January 2013	Faulty transducers were in place through mid-September. No valid comparison is available until new transducers were installed on September 20, 2013.										
February 2013											
March 2013											
April 2013											
May 2013											
June 2013											
July 2013											
August 2013											
September[2] 2013	27.7%	40.6%	27.7%	0.0%	12.4%	1.7%	65.9%	20.4%	100.0%	11.5%	0.2%
October 2013	74.6%	85.1%	77.1%	0.0%	54.6%	0.0%	98.8%	100.0%	100.0%	70.4%	45.0%
November 2013	61.7%	71.3%	71.6%	0.0%	1.6%	0.0%	95.6%	94.6%	100.0%	49.7%	91.5%
December[3] 2013	90.8%	90.0%	91.3%	0.0%	0.0%	0.0%	99.9%	90.1%	100.0%	84.9%	100.0%

Notes:

1 The term "gradient" is used here to describe the calculated difference in head in two piezometers, without accounting for the distance between them. Values are a percent of the logged readings with an inward gradient (a/b pair) > 0.5' and an upward gradient (b/c or a/c pairs) > 0.

2 September data used are primarily from the end of the month when the transducers were changed out (9/20 and on).

3 December values do not include week well pumps were mosty shut down for annual specific capacity testing (12/15–12/20).

Table 2.2
Groundwater Recovery Summary

Month	Discharge Volume	
	Average (gal/day)	Total (gal)
January 2013	2,000	59,985
February 2013	9,709	262,136
March 2013	14,770	443,092
April 2013	16,734	485,284
May 2013	19,906	597,183
June 2013	20,347	590,076
July 2013	28,541	856,235
August 2013	28,161	844,824
September 2013	13,827	400,991
October 2013	24,818	769,351
November 2013	21,854	655,634
December 2013	23,872	740,022
Total Flows	18,344	6,704,813

Abbreviation:
gal Gallons

Table 2.3
Recovery Well Samples

Well[1, 2, 3]	pH (SU)	Alkalinity				Total Metals			
		Total (mg/L $CaCO_3$)	Bicarbonate (mg/L $CaCO_3$)	Carbonate (mg/L $CaCO_3$)	Hydroxide (mg/L $CaCO_3$)	Arsenic (µg/L)	Copper (µg/L)	Lead (µg/L)	Zinc (µg/L)
Landfill Water Qualoty Basis[4]									
Minimum	5.7	129	129	1.0 U	1.0 U	1.2	ND	ND	ND
Average	6.3	514	514	--	--	1121	6.3	5.8	33
Maximum	7.28	923	923	1.0 U	1.0 U	4,540	47	12	80
Landfill Wells									
R01	6.50	654	654	1.0 U	1.0 U	711	27.6	11.2	37
R02	7.18	140	140	1.0 U	1.0 U	50.6	13.4	3.0	10
R03	Well never in operation								
R04	6.42	512	512	1.0 U	1.0 U	1,810	3.7	2.9	11
R05	6.31	685	685	1.0 U	1.0 U	3,240	8.4	3.5	8
R06	Well never in operation								
R07	6.63	123	123	1.0 U	1.0 U	50.0	1.7	0.9	4
R08	6.36	327	327	1.0 U	1.0 U	250	3.1	1.0	17
R09	6.57	166	166	1.0 U	1.0 U	552	12.6	3.2	11
R10	6.34	672	672	1.0 U	1.0 U	692	4.4	3.5	21
R11	6.47	924	924	1.0 U	1.0 U	4,370	76.7	27.2	143
Outside Area Wells									
R12	7.08	135	135	1.0 U	1.0 U	746	4,130	20.4	143
R13	6.96	154	154	1.0 U	1.0 U	52.2	82.3	14.1	50
R14	Well could not be sampled								
R15	6.62	219	219	1.0 U	1.0 U	285	176	5.8	35
R16	6.59	132	132	1.0 U	1.0 U	75.2	77.1	0.8	7
R17	Well could not be sampled								
R18	6.59	127	127	1.0 U	1.0 U	206	287	21.0	47
R19	6.51	573	573	1.0 U	1.0 U	663	169	113	184
R20	6.59	529	529	1.0 U	1.0 U	951	9.2	10.2	12
R21	6.53	726	726	1.0 U	1.0 U	1,060	6.6	8.2	7

Notes:

-- Not applicable or available.

1 Samples for Wells R12 - R21 collected on August 28, 2013.

2 Samples for Wells R01, R02, and R07 - R11 collected on September 17, 2013.

3 Samples for Wells R04 and R05 collected September 19, 2013.

4 Landfill water quality basis based on Landfill samples collected in April 2010.

Abbreviations:

$CaCO_3$ Calcium carbonate

µg/L Micrograms per liter

mg/L Milligrams per liter

ND Non-detect

SU Standard Unit

Qualifiers:

U Analyte was not detected at the given reporting limit.

Table 2.4
Arsenic Recovery Summary

Date Sampled	Arsenic Influent Concentration µg/L	Arsenic Monthly Average µg/L	Groundwater Volume Recovered Gallons	Arsenic Mass Recovered lbs
1/1/2013	--	400	59,985	0.2
2/11/2013	300	400	262,136	0.9
2/19/2013	500			
3/25/2013	400	400	443,092	1.5
4/5/2013	400	350	485,284	1.4
4/10/2013	400			
4/20/2013	300			
4/27/2013	300			
5/17/2013	400	350	597,183	1.7
5/25/2013	300			
6/1/2013	300	300	590,076	1.5
6/19/2013	300			
7/13/2013	300	300	856,235	2.1
7/19/2013	300			
7/27/2013	300			
8/2/2013	300	300	844,824	2.1
8/10/2013	300			
8/17/2013	300			
8/23/2013	300			
8/28/2013	300			
9/13/2013	300	300	400,991	1.0
9/20/2013	300			
10/5/2013	300	225	769,351	1.4
10/17/2013	150			
11/12/2013	60	92.5	655,634	0.5
11/19/2013	125			
12/6/2013	200	160	740,022	1.0
12/11/2013	120			
Annual Totals			**6,704,813**	**15.4**

Note:

-- Not applicable or available.

Abbreviations:

lbs Pounds

µg/L Micrograms per liter

Table 2.5
Specific Capacity Testing Results[1,2]

Recovery Wells	Initial DTW	Final DTW	Pump Flow	Specific Capacity
	ft	ft	GPM	GPM/ft
R1	10.79	17.28	4.02	0.62
R2	9.55	21.98	5.76	0.46
R4	34.24	39.83	3.11	0.56
R5	38.27	50.43	2.02	0.17
R7	9.61	10.05	6.18	14.05
R8[3]	16.63	18.82	2.44	1.11
R9[4]	18.51	18.02	6.16	--
R10	13.08	26.06	2.80	0.22
R11[3]	15.24	23.32	0.24	0.03
R12	2.23	6.96	1.74	0.37
R13	1.39	1.44	0.30	6.00
R14[5]	2.37	8.11	2.02	0.35
R15[5]	2.23	8.87	1.54	0.23
R16	3.36	4.07	0.69	0.97
R17	3.19	3.36	0.31	1.82
R18[3]	2.51	2.55	0.40	10.00
R19[4]	2.02	2.26	0.00	--
R20[4]	2.26	2.44	0.00	--
R21[4]	1.92	1.90	0.23	--

Notes:

-- Specific capacity not calculated for this well.

1 DTW is the measurement from the top of the sounding tube for the recovery well to the water surface in the well.

2 Unless otherwise noted; flow rates were measured from a turbine flow meter in the well during final DTW measurements.

3 Flow rate calculated from measurements of other three wells run at the same time and the PLC influent flow level.

4 Error in depth to water measurement.

5 Flow meter value assumed to be erroneous.

Abbreviations:

DTW Depth to water
ft Feet
GPM Gallons per minute
PLC Programmable logic controller

Table 3.1
Groundwater Treatment Plant Operating Factor

Month	Operating Factor
01/2013	10%
02/2013	41%
03/2013	60%
04/2013	83%
05/2013	86%
06/2013	60%
07/2013	59%
08/2013	69%
09/2013	45%
10/2013	75%
11/2013	65%
12/1/2013[1]	88%
Annual:	62%

Note:

1 Operating factor does not include 5 days of specific capacity testing from 12/15/2013 to 12/20/2013.

Table 3.2
Groundwater Treatment Plant Annual Flow Data

Month	Average Daily Flow GPD	Total Flow Gallons
01/2013	1,935	59,987
02/2013	9,709	262,136
03/2013	14,770	443,092
04/2013	16,734	485,284
05/2013	19,906	597,183
06/2013	20,347	590,076
07/2013	28,541	856,235
08/2013	28,161	844,824
09/2013	13,827	400,991
10/2013	24,818	769,351
11/2013	21,854	655,634
12/2013	23,872	740,022
Annual:	18,369	6,704,814

Abbreviation:
GPD Gallons per day

Table 3.3
Groundwater Treatment Plant Chemical Usage 2013

Chemical	Units	Quantity
Activated Alumina[1]	Cubic Feet	240
Coagulant	Gallons	180
Lime[2]	Pounds	21,890
Polymer	Gallons	85
Potassium Permanganate	Pounds	1,376
Sodium Hypochlorite	Gallons	4
Sodium Sulfite	Pounds	50
Sulfuric Acid	Gallons	265

Notes:

1 Each adsrober changed out is 40 cubic feet.

2 Pounds of hydrated lime.

Table 3.4
B&L Woodwaste Site Operations and Maintenance Issue Log

Issue Date	Issue	Resolution	Resolution Date
1/1/2013	Difficulty in obtaining differentials for southwest corner of landfill.	This problem is being addressed by adding new recovery well pumps in Wells R-7 and R-9 to increase flow from this region.	March 2014
7/1/2013	Permanganate auger broken.	Designing and constructing safe and practical permanganate dumping system.	In Progress
8/1/2013	Lime recirculation pump hose failing.	Clean out lime tank to remove foreign materials.	10/10/2013
8/1/2013	Lime recirculation pump hose failing.	Create PM schedule and new O&M procedure to prevent future failure.	10/15/2013
9/1/2013	PLC having trouble controlling pH level in co-precipitation tank.	Had Systems Interface tune PID loop. Control lime specific gravity better.	10/1/2013
9/1/2013	Lime dose pump hose keeps failing.	Monitoring lime specific gravity on a regular basis and developed procedures.	10/1/2013
9/1/2013	Polymer/coagulant were creating sticky floc in the past resulting in extra filter changeouts and clarifier problems.	Evaluated polymer dose and coagulant doses and re-optimized dose to improve treatment process.	9/19/2013
9/23/2013	Polymer blend skid electrical failure.	Sub-contractor to the Site to fix the blend skid panel.	9/27/2013
9/28/2013	High arsenic and iron concentrations coming into adsorbers.	Evaluated permanganate dose to ensure complete oxidation of process water.	11/1/2013
10/2/2013	Filter cartridges not lasting as long as anticipated.	Evaluated particle size distribution and installed filter bags upstream of cartridges.	10/27/2013
10/28/2013	Polymer ultrasonic level sensor acting up during cold weather. Caused polymer dosing pumps to run dry and burn out.	Monitoring level in PLC and installing secondary level sensor with alarm to prevent dry running in the future.	March 2014
11/24/2013	Activated alumina changeouts and cost is expensive and media is not lasting as long as anticipated.	Will run multiple side-by-side column tests to evaluate alternate media. Also looking into changing media delivery/installation method.	In Progress
12/1/2013	Exterior lights not turing on.	Betschart has given quote to do this work. Just waiting on budget to do the rest of the electrical work at the same time.	March 2014
12/19/2013	Polymer low level not creating a plant shutdown or at least a polymer dosing pump shutdown.	This problem is being addressed with the installation of a transducer and low low level shutoff as addressed in the memo to System Interface dated 10/31/2013.	March 2014
12/30/2013	Head tank high float keeps getting actuated to shut down influent pumps.	Break apart head tank piping and add unions to make pipe servicing easier.	February 2014
12/30/2013	Pipe in-between oxidation tank and co-precipitation tank restricting flow.	Will add flange valves to each tank and unions.	In Progress

Abbrevations:

O&M	Operatins and Maintenance
PID	Photoionization detector
PLC	Programmable logic controller
PM	Preventative maintenance
Site	B&L Woodsate Site

Table 5.1
Groundwater Treatment Plant Non-Compliance Events

Month	Number of Non-Compliances	Comments
January 2013	0	
February 2013	0	
March 2013	0	
April 2013	0	
May 2013	0	
June 2013	0	
July 2013	0	
August 2013	0	
September 2013	0	DMR submitted online 1 day late.[1]
October 2013	0	
November 2013	0	
December 2013	0	

Note:

1 DMR submitted next business day (9/16).

Table 5.2
Landfill Settlement Monument Survey Results

Settlement Monument	Northing (feet NAD 83/98)	Change in Northing (feet)	Easting (feet NAD 83/98)	Change in Easting (feet)	Elevation (NAVD 88)	Elevation Change (feet)	Survey Date	Comments
LS-1	702081.01		1185854.15		29.43		12/1/2008 [1]	
	702081.18	-0.17	1185853.99	0.16	29.34	-0.09	11/14/2013 [2]	
LS-2	702228.80		1186102.04		28.68		12/1/2008	
	702228.80	0.00	1186102.06	-0.02	28.68	0.00	11/14/2013	
LS-3	702282.18		1186303.36		27.15		12/1/2008	
	702289.11	-6.93	1186285.67	17.69	27.48	0.34 [3]	11/14/2013	Monument was re-installed prior to November 2013 survey.
LS-4	701975.35		1186013.39		48.53		12/1/2008	
	701975.40	-0.05	1186013.45	-0.06	48.53	0.00	11/14/2013	
LS-5	702073.92		1186184.19		50.43		12/1/2008	
	702073.91	0.01	1186184.27	-0.08	50.43	0.00	11/14/2013	
LS-6	702104.39		1186421.77		29.09		12/1/2008	
	702103.35	1.03	1186425.86	-4.09	28.40	-0.69 [3]	11/14/2013	Monument was re-installed prior to November 2013 survey.
LS-7	701833.41		1186070.32		48.12		12/1/2008	
	701833.42	-0.01	1186070.25	0.06	48.12	0.00	11/14/2013	
LS-8	701897.64		1186297.76		51.17		12/1/2008	
	701897.61	0.03	1186297.76	0.00	51.17	0.00	11/14/2013	
LS-9	701958.64		1186495.13		29.75		12/1/2008	
	701958.56	0.08	1186495.17	-0.04	29.72	-0.03	11/15/2013	
LS-10	701685.35		1186181.76		28.25		12/1/2008	
	701685.60	-0.25	1186181.73	0.03	28.20	-0.05 [3]	11/15/2013	Monument was re-installed prior to November 2013 survey.
LS-11	701684.80		1186349.95		27.17		12/1/2008	
	701684.59	0.21	1186349.16	0.79	27.19	0.02 [3]	11/14/2013	Monument was re-installed prior to November 2013 survey.
LS-12	701820.54		1186500.85		28.02		12/1/2008	
	701820.29	0.25	1186500.97	-0.12	28.02	0.00 [3]	11/15/2013	Monument was re-installed prior to November 2013 survey.

Notes:

1 December 2008 survey by Barghausen Consulting Engineers.

2 November 2013 survey by Lanktree Land Surveying.

3 Landfill settlement cannot be assessed based on changes in elevation and location of settlement monument.

Abbreviations:

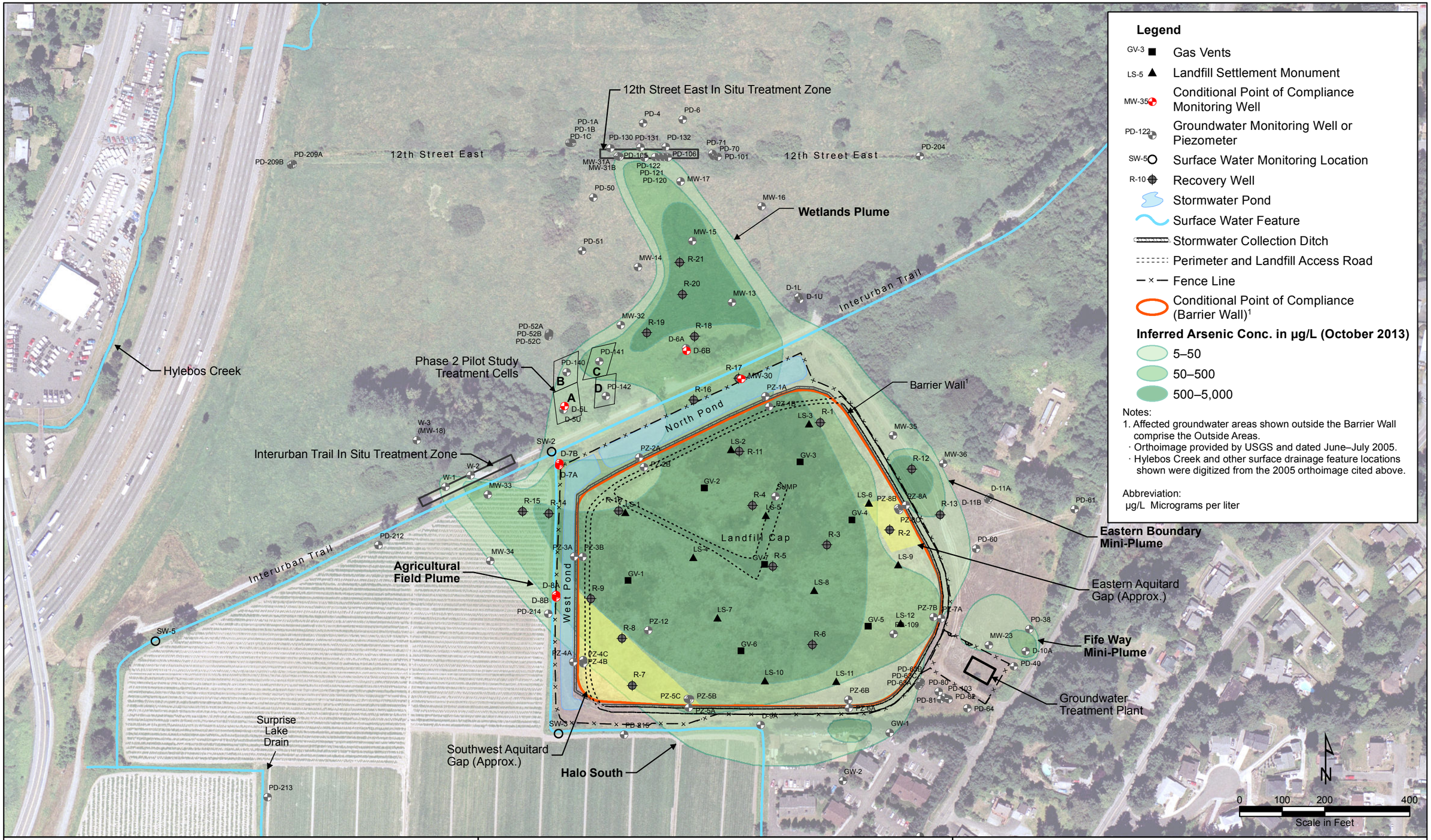
NAD 83/89 North American Datum of 1983/1989

NAVD 88 Noth American Vertical Datum of 1988

B&L Woodwaste Site

2013 Annual Operations & Maintenance Report

Figures



Legend

- GV-3 ■ Gas Vents
- LS-5 ▲ Landfill Settlement Monument
- MW-35 Conditional Point of Compliance Monitoring Well
- PD-122 Groundwater Monitoring Well or Piezometer
- SW-5 Surface Water Monitoring Location
- R-10 Recovery Well
- Stormwater Pond
- Surface Water Feature
- Stormwater Collection Ditch
- Perimeter and Landfill Access Road
- Fence Line
- Conditional Point of Compliance (Barrier Wall)[1]

Inferred Arsenic Conc. in µg/L (October 2013)

- 5–50
- 50–500
- 500–5,000

Notes:
1. Affected groundwater areas shown outside the Barrier Wall comprise the Outside Areas.
   · Orthoimage provided by USGS and dated June–July 2005.
   · Hylebos Creek and other surface drainage feature locations shown were digitized from the 2005 orthoimage cited above.

Abbreviation:
µg/L Micrograms per liter

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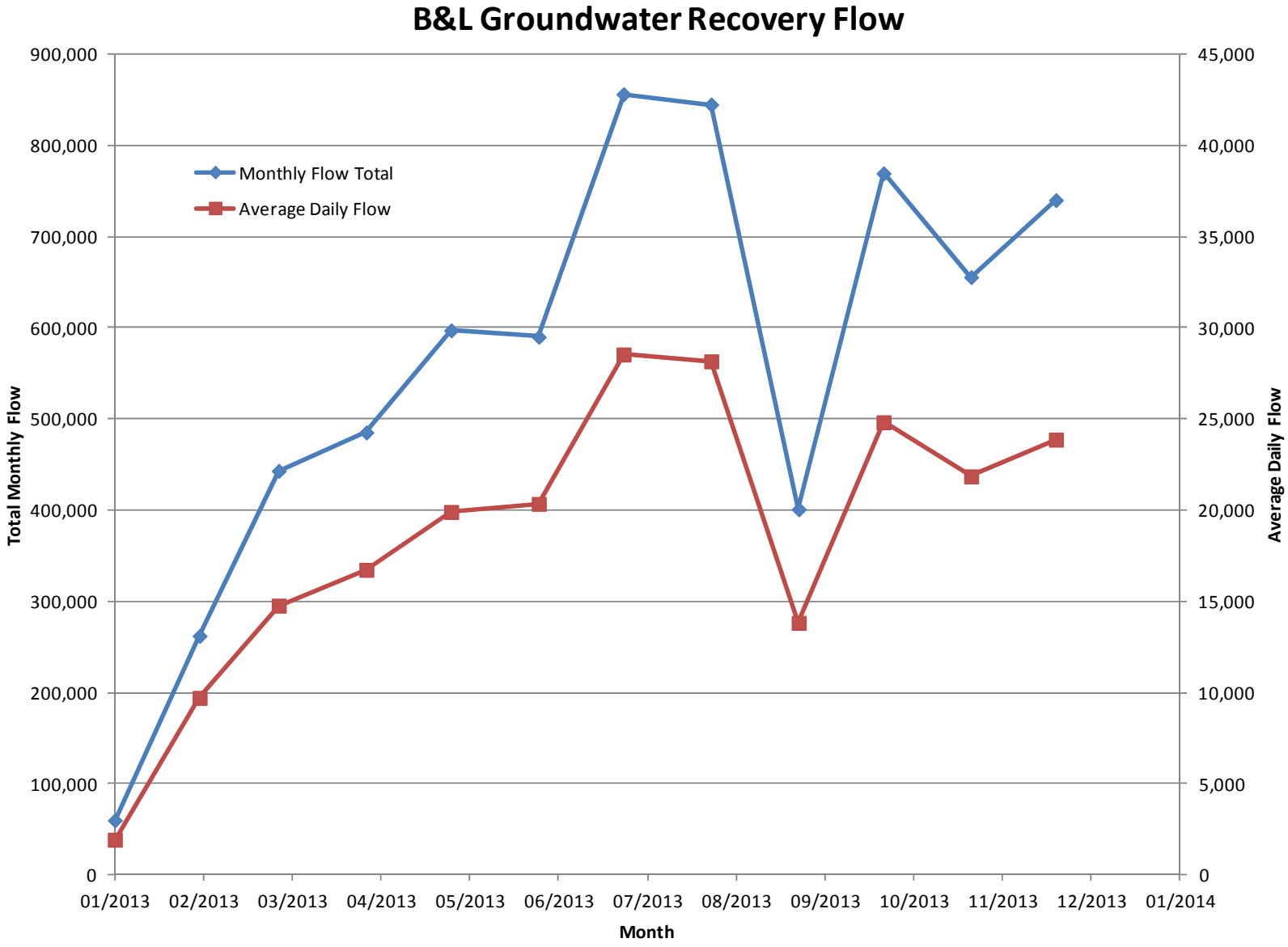
Annual Operations Report
B&L Woodwaste Site
Pierce County, Washington

Figure 1.1
Site Map

I:\GIS\Projects\B&L-O&M\MXD\2014 Operations\Figure 1.1 (Site Map).mxd
4/4/2014



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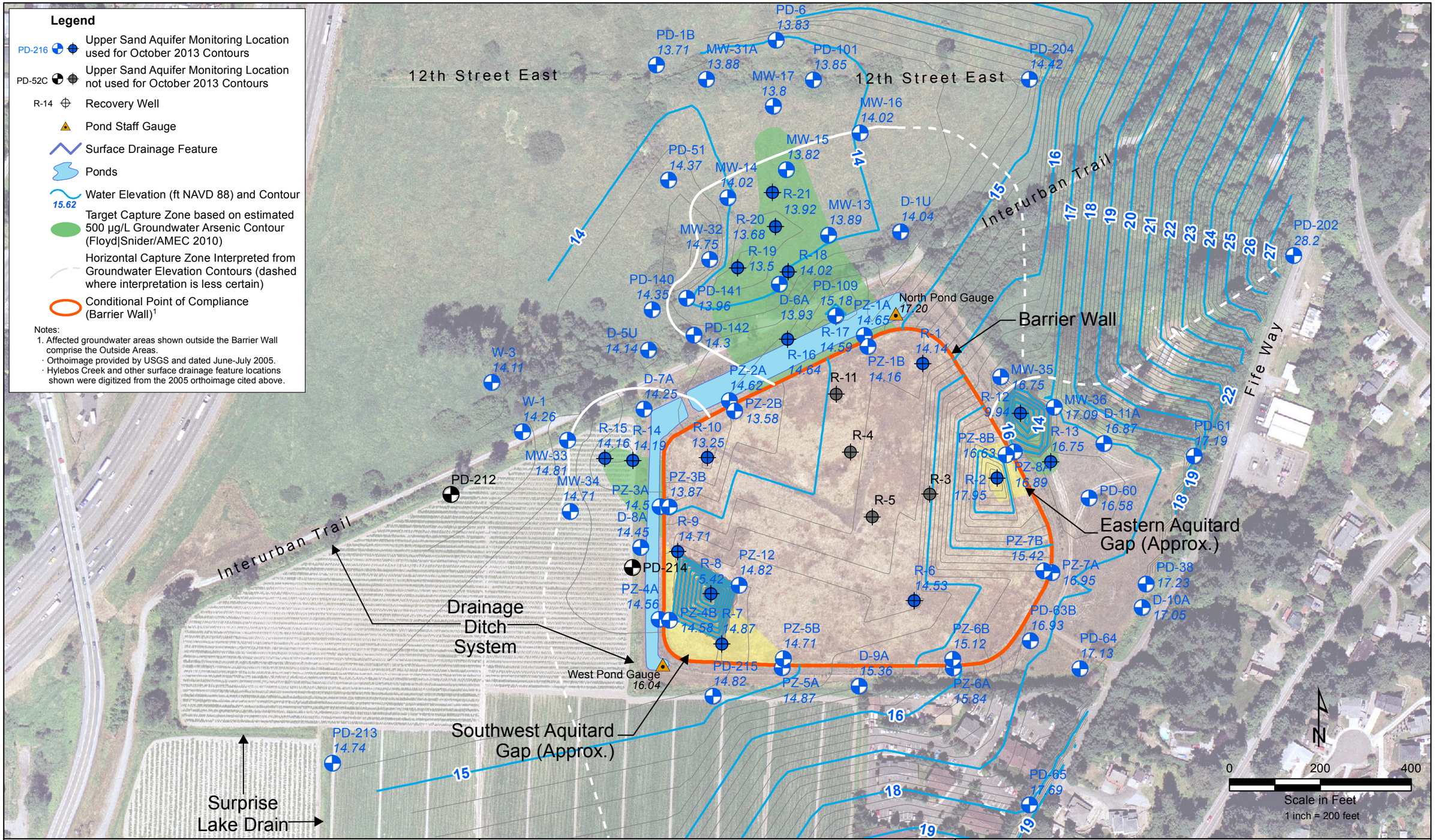
B&L Woodwaste Site
Pierce County, Washington

Figure 2.1
B&L Groundwater Recovery Flow



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B&L Woodwaste Site
Pierce County, Washington

Figure 2.2
Capture Zone Assessment, October 2013

I:\GIS\Projects\B&L-O&M\MXD\2014 Operations\Figure 2.2 (Capture Zone Assessment - Oct 2013).mxd 4/4/2014

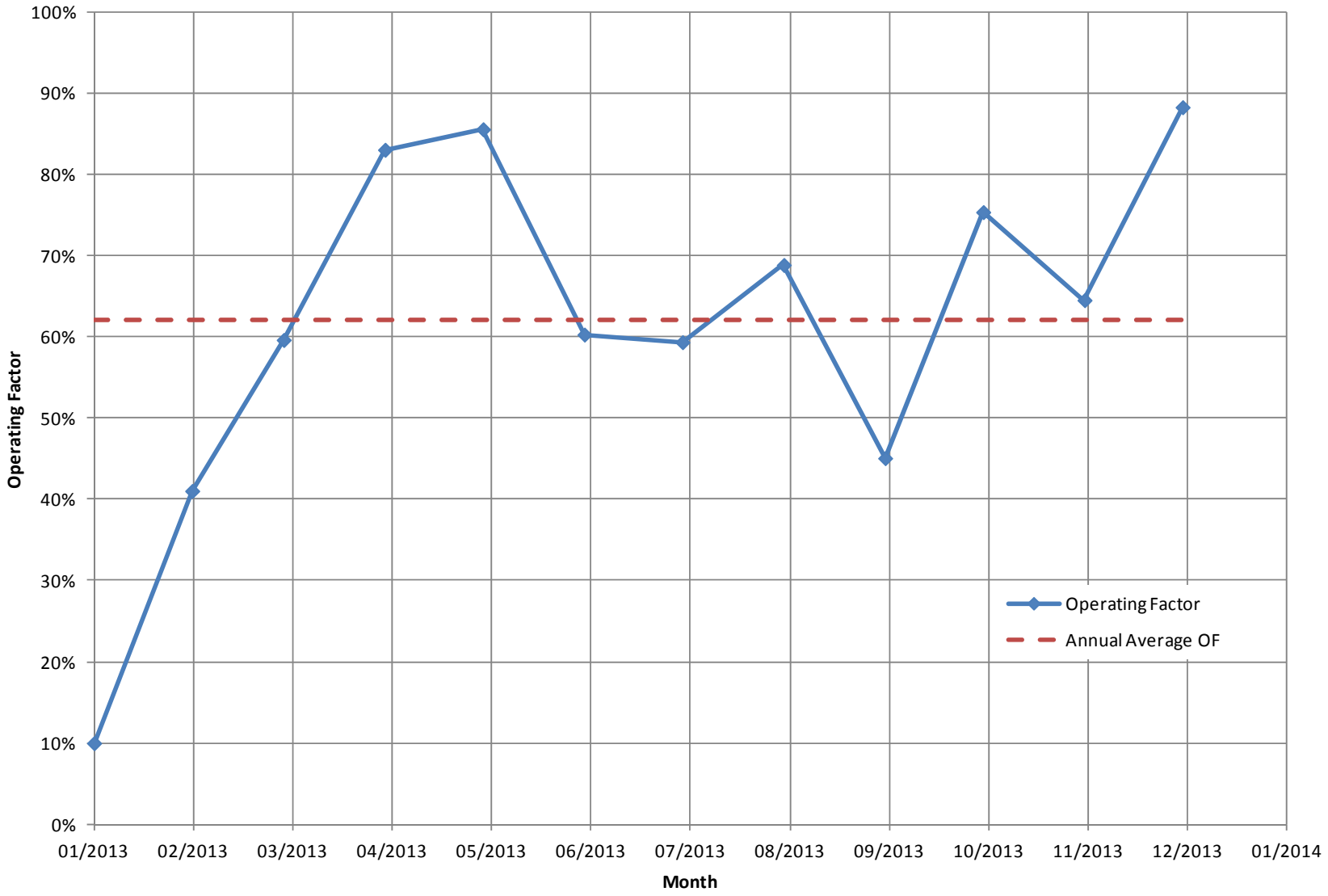

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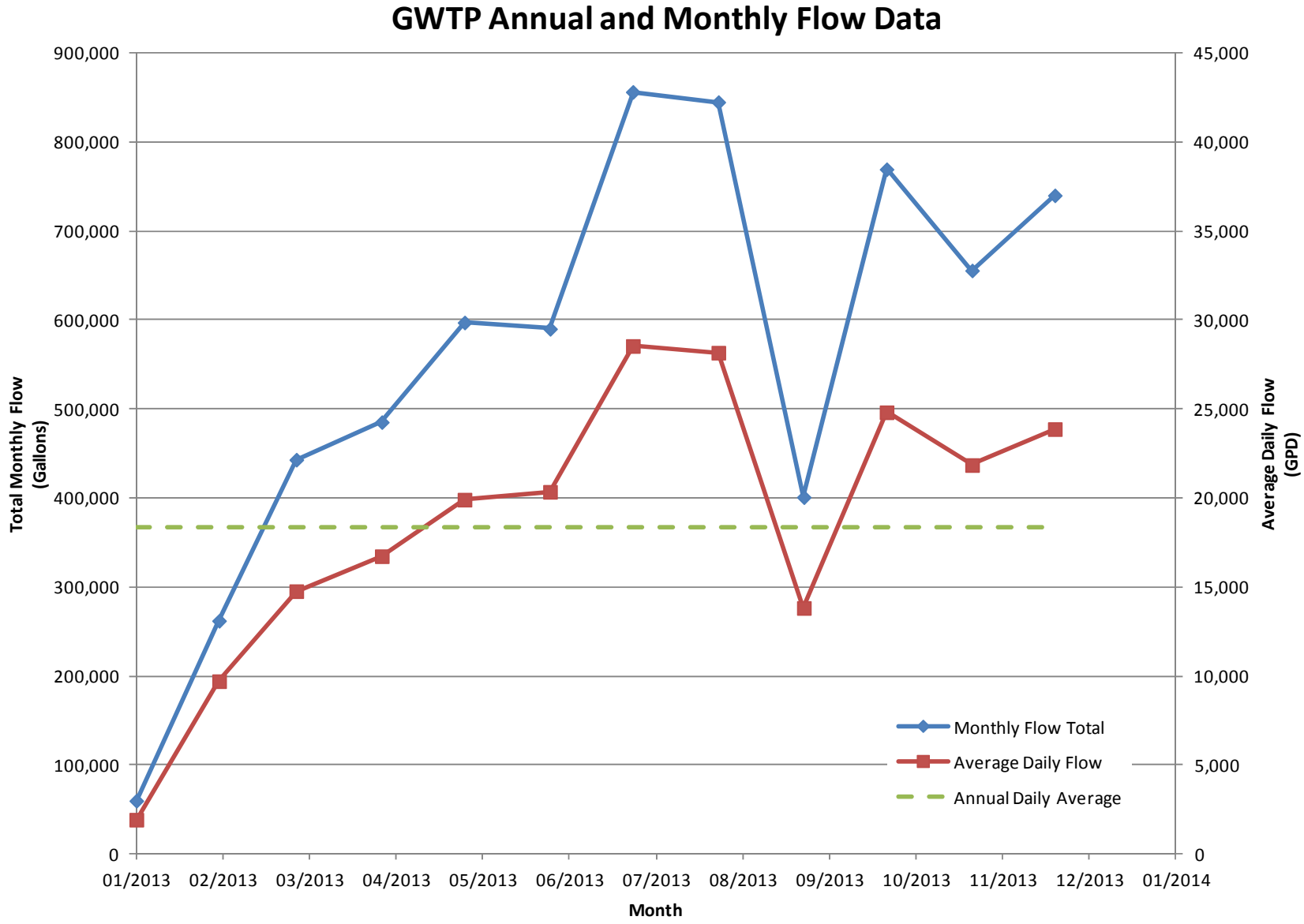
Figure 3.1
B&L Groundwater Treatment
System 2013 Operating Factor



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B&L Woodwaste Site
Pierce County, Washington

Figure 3.2
Groundwater Treatment Plant
Annual and Monthly Flow Data

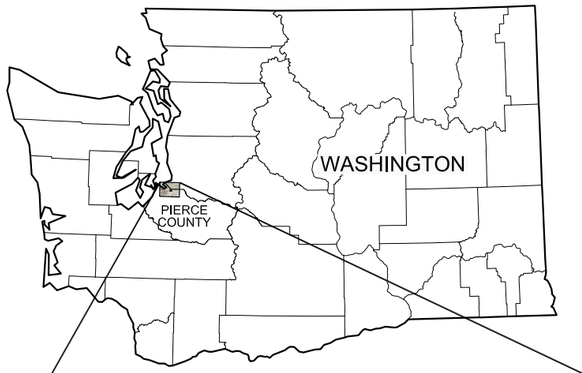
B&L Woodwaste Site

2013 Annual Operations & Maintenance Report

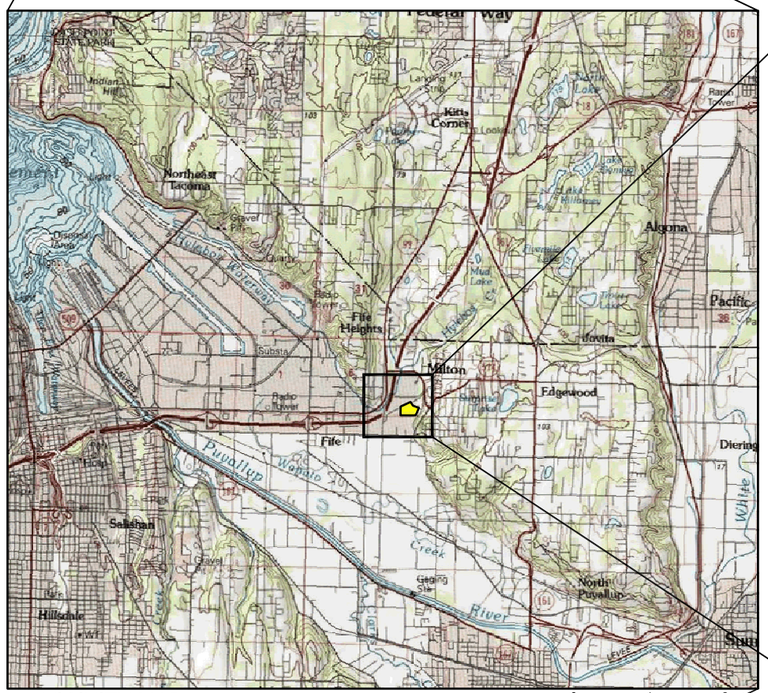
Drawings

GROUNDWATER RECOVERY AND TREATMENT SYSTEM
OPERATION & MAINTENANCE MANUAL

B&L WOODWASTE SITE
PIERCE COUNTY, WASHINGTON



LOCATION MAP



VICINITY MAP

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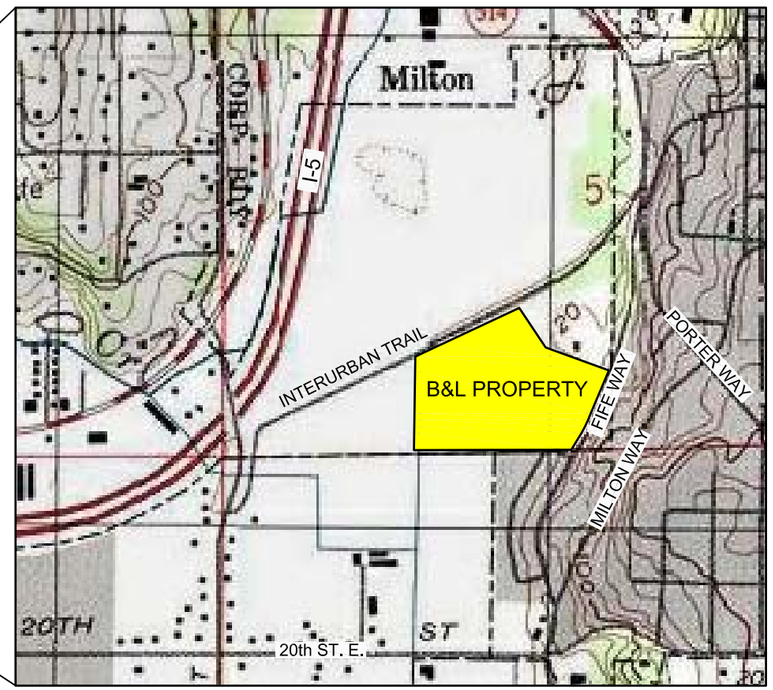
APPROXIMATE SCALE IN MILES



PROJECT SITE MAP

0 500 1000
APPROXIMATE SCALE IN FEET

DRAWING LIST

G-1	COVER SHEET
C-03	GROUNDWATER TREATMENT PLANT PARTIAL SITE PLAN
C-04	GROUNDWATER RECOVERY AND TREATMENT PLANT PIPING LAYOUT
M-01	GROUNDWATER TREATMENT PLANT MECHANICAL LAYOUT FLOOR PLAN
M-02	GROUNDWATER TREATMENT PLANT MECHANICAL LAYOUT MEZZANINE PLAN
P&ID-00	PROCESS FLOW AND INSTRUMENTATION LEGEND
PFD-01	PROCESS FLOW DIAGRAM
P&ID-01	PROCESS FLOW AND INSTRUMENTATION OXIDATION / PRECIPITATION
P&ID-02	PROCESS FLOW AND INSTRUMENTATION SLUDGE HANDLING
P&ID-03	PROCESS FLOW AND INSTRUMENTATION ADDITIVES
P&ID-04	PROCESS FLOW AND INSTRUMENTATION EFFLUENT POLISHING
P&ID-05	PROCESS FLOW AND INSTRUMENTATION EXTRACTION AND MONITORING WELLS

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REFERENCES:
PLANS

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VERTICAL: NAVD88 FEET

NO.	REVISION	DATE	APRVD

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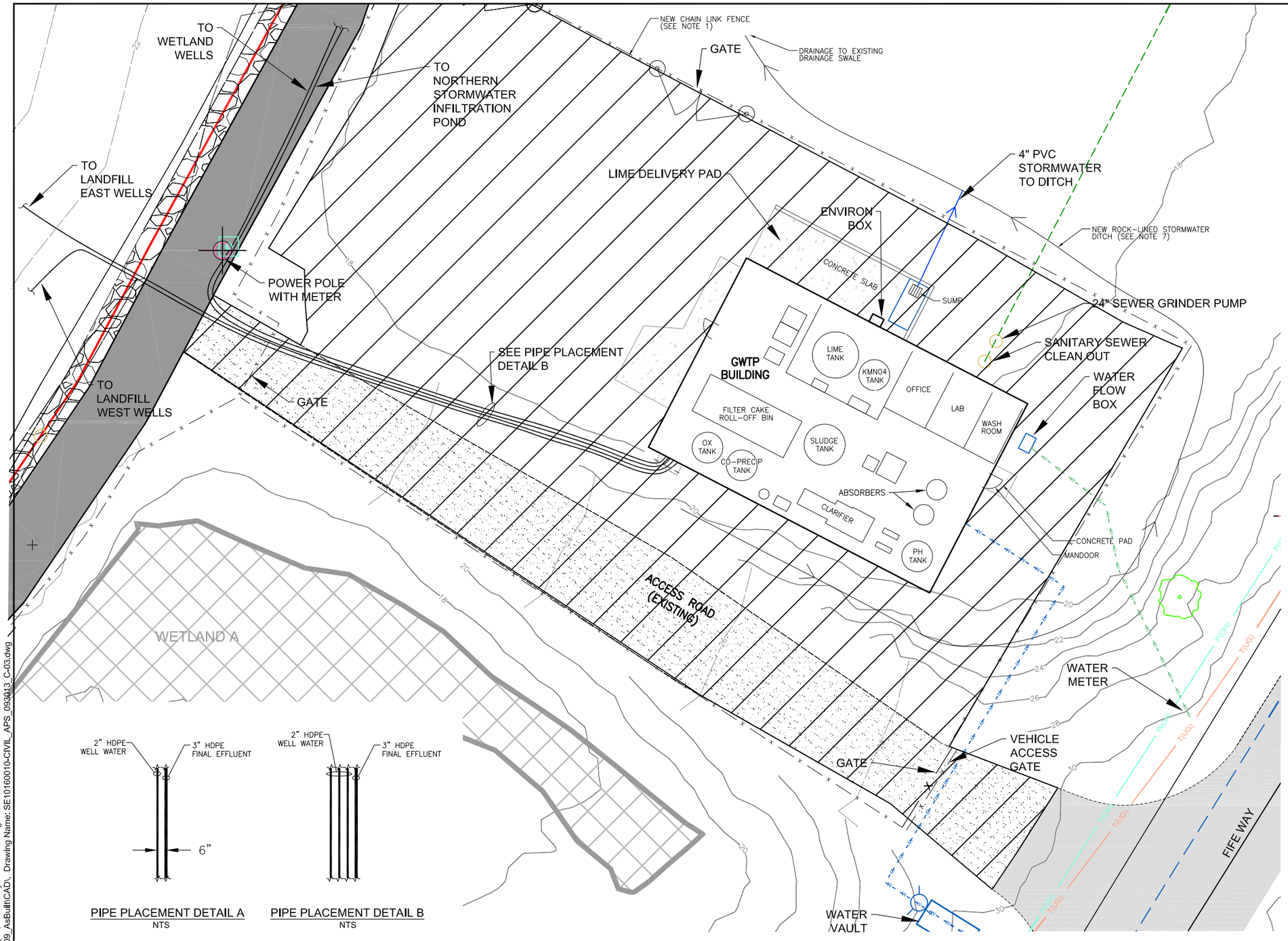
COVER SHEET
OPERATION & MAINTENANCE MANUAL

B&L WOODWASTE SITE
PIERCE COUNTY, WASHINGTON

DATE: 09/30/13
PROJECT NO.: SE10160010

DRAWING
G–01



PIPE PLACEMENT DETAIL A
NTS

PIPE PLACEMENT DETAIL B
NTS

LEGEND:

- TAX PARCEL LINE
- EXISTING FENCE LINE
- WETLAND
- STORMWATER COLLECTION DITCH (EXISTING)
- 2" POTABLE WATER LINE
- 6" FIRE WATER LINE
- PERIMETER ROAD (EXISTING)
- HDPE PIPE
- SANITARY SEWER LINE
- DRAIN PIPE

NOTES:

1. NEW FENCE TO MATCH EXISTING.
2. SWINGING CHAIN LINK GATE, FULL WIDTH OF ACCESS ROAD, C/W LOCKING HARDWARE. HEIGHT TO MATCH EXISTING FENCE.
3. HATCHED AREA WILL BE USED AS ACCESS ROAD AND PARKING AREA AROUND BUILDING. SUPPLY AND PLACE 6-INCH THICK, UNIFORM LAYER OF CRUSHED SURFACING MATERIAL MEETING WSDOT 9-03.9(3) "CRUSHED SURFACING - TOP COURSE" WITHIN THE AREA INDICATED. SHAPE CRUSHED SURFACING TO REQUIRED CROWN ELEVATIONS AND CROSS-SLOPE GRADES TO PROMOTE POSITIVE DRAINAGE AWAY FROM BUILDING AREA (GENERALLY TO THE NORTH).
4. PIPING, CONDUIT, TRENCH, AND BACKFILL UNDER EXISING PERIMETER ROAD, ACCESS ROAD AND GRAVEL AREA AROUND BUILDING SHALL BE SUITABLE FOR HEAVY TRUCK TRAFFIC.
5. PIPING AND CONDUIT IS SHOWN TO ILLUSTRATE CONCEPT ONLY. FINAL SPACING AND LOCATION SHALL BE DETERMINED BY CONTRACTOR.
6. RAMMED AGGREGATE PIER FOUNDATIONS WILL BE CONSTRUCTED BY OTHERS TO STABILIZE SOIL BENEATH BUILDING. FINAL BUILDING SIZE, LOCATION, LAYOUT MUST BE SUITABLE FOR LOCATION OF THOSE EXISTING PIERS.
7. EXCAVATE DRAINAGE DITCH AT THE APPROXIMATE LOCATION INDICATED. SLOPE DITCH INVERT SUCH THAT POSITIVE DRAINAGE IS MAINTAINED IN THE DIRECTION SHOWN WITH DISCHARGE POINT LOCATED AS SHOWN. LINE DITCH WITH 2- TO 4-INCH DIAMETER QUARRY SPALLS TO ARMOR DITCH SIDEWALLS.
8. CONTRACTOR TO PROVIDE ADDITIONAL FILL TO COMPENSATE FOR MAXIMUM 6 INCHES OF SETTLEMENT IN HATCHED AREA OUTSIDE OF BUILDING, BEFORE PLACING CRUSHED ROCK SURFACING. UTILIZE RECOVERED FILL FROM EXCAVATION ACTIVITIES FOR BUILDING FOUNDATION ETC WHERE POSSIBLE. PROVIDE IMPORTED MATERIAL TO MATCH EXISTING FILL (WSDOT 9-03.14(2) "SELECT BORROW") WHERE NECESSARY.
9. WHERE NATIVE SOIL IS LESS THAN 2 FT BELOW ANY SUMPS, FOOTINGS, OR OTHER NEW STRUCTURES, OVER EXCAVATE BY A MINIMUM OF 2 FEET AND PLACE AND COMPACT FILL IN SUITABLE LIFTS. FILL MATERIAL SHALL MEET WSDOT 9-03.14(2) "SELECT BORROW". UTILIZE RECOVERED FILL FROM EXCAVATION WHERE POSSIBLE.
10. PROVIDE SUITABLE YARD LIGHTING ABOVE EACH BUILDING DOOR AND FOR PARKING AREA WEST OF BUILDING.
11. TIE BUILDING ROOF GUTTERS AND DOWNSPOUTS INTO NEW STORMWATER DRAINAGE DITCH.

PIPING LOCATIONS BASED ON SURVEY AND CONTRACTOR MARKUPS.

SCALE BAR (1" = 20'-0")

0 20'-0" 40'-0" 60'-0"

RECORD DRAWING

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REFERENCES:
PLANS

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VERTICAL: NAVD88 FEET

NO.	REVISION	DATE	APRVD
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2			
3			
4			

DRAWN
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CHECKED
REVIEWED

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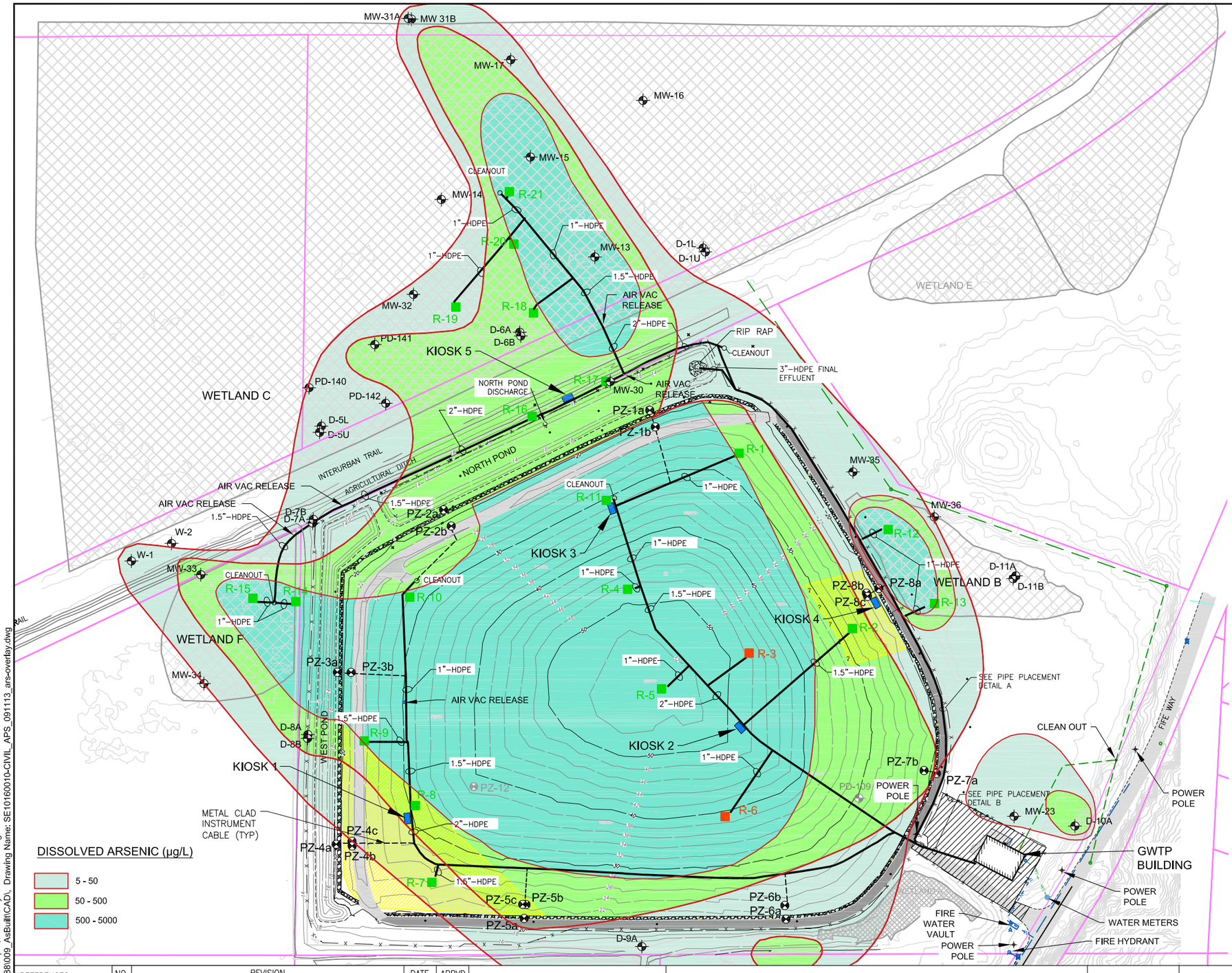
GROUNDWATER TREATMENT PLANT
PARTIAL SITE PLAN

B&L WOODWASTE SITE
PIERCE COUNTY, WASHINGTON

DATE: 09/30/13
PROJECT NO.: SE10160010

DRAWING
C-03



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REFERENCES:
PLANS

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VERTICAL: NAVD88 FEET

NO.	REVISION	DATE	APRVD
1			
2			
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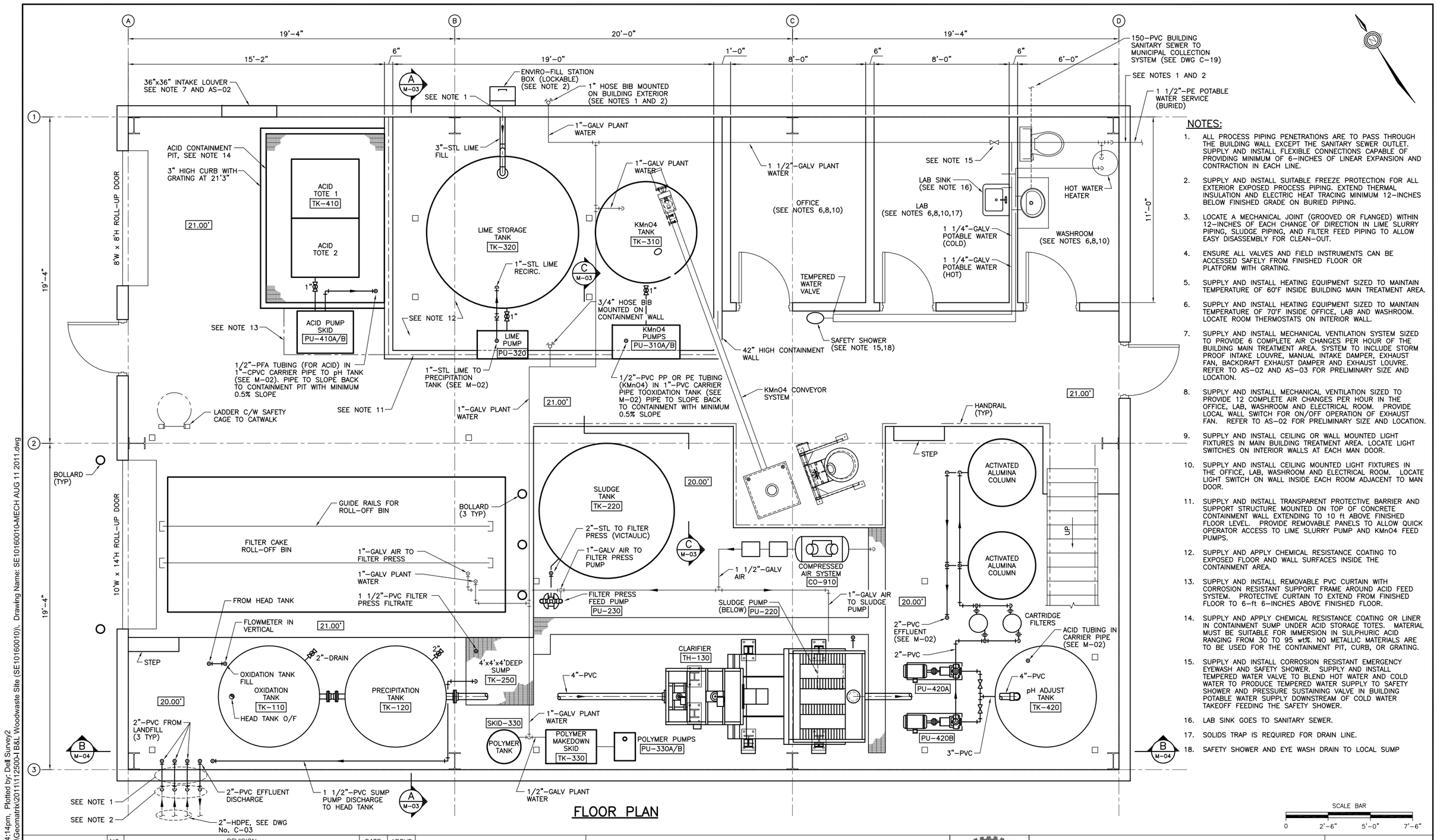
GROUNDWATER RECOVERY AND TREATMENT PLANT PIPING LAYOUT

B&L WOODWASTE SITE
PIERCE COUNTY, WASHINGTON

DATE: 09/30/13
PROJECT NO.: SE10160010
DRAWING C–04



FLOOR PLAN

NOTES:

1. ALL PROCESS PIPING PENETRATIONS ARE TO PASS THROUGH THE BUILDING WALL EXCEPT THE SANITARY SEWER OUTLET. SUPPLY AND INSTALL FLEXIBLE CONNECTIONS CAPABLE OF PROVIDING MINIMUM OF 6-INCHES OF LINEAR EXPANSION AND CONTRACTION IN EACH LINE.
2. SUPPLY AND INSTALL SUITABLE FREEZE PROTECTION FOR ALL EXTERIOR EXPOSED PROCESS PIPING. EXTEND THERMAL INSULATION AND ELECTRIC HEAT TRACING MINIMUM 12-INCHES BELOW FINISHED GRADE ON BURIED PIPING.
3. LOCATE A MECHANICAL JOINT (GROOVED OR FLANGED) WITHIN 12-INCHES OF EACH CHANGE OF DIRECTION IN LIME SLURRY PIPING, SLUDGE PIPING, AND FILTER FEED PIPING TO ALLOW EASY DISASSEMBLY FOR CLEAN-OUT.
4. ENSURE ALL VALVES AND FIELD INSTRUMENTS CAN BE ACCESSED SAFELY FROM FINISHED FLOOR OR PLATFORM WITH GRATING.
5. SUPPLY AND INSTALL HEATING EQUIPMENT SIZED TO MAINTAIN TEMPERATURE OF 60°F INSIDE BUILDING MAIN TREATMENT AREA.
6. SUPPLY AND INSTALL HEATING EQUIPMENT SIZED TO MAINTAIN TEMPERATURE OF 70°F INSIDE OFFICE, LAB AND WASHROOM. LOCATE ROOM THERMOSTATS ON INTERIOR WALL.
7. SUPPLY AND INSTALL MECHANICAL VENTILATION SYSTEM SIZED TO PROVIDE 6 COMPLETE AIR CHANGES PER HOUR OF THE BUILDING MAIN TREATMENT AREA. SYSTEM TO INCLUDE STORM PROOF INTAKE LOUVRE, MANUAL INTAKE DAMPER, EXHAUST FAN, BACKDRAFT EXHAUST DAMPER AND EXHAUST LOUVRE. REFER TO AS-02 AND AS-03 FOR PRELIMINARY SIZE AND LOCATION.
8. SUPPLY AND INSTALL MECHANICAL VENTILATION SIZED TO PROVIDE 12 COMPLETE AIR CHANGES PER HOUR IN THE OFFICE, LAB, WASHROOM AND ELECTRICAL ROOM. PROVIDE LOCAL WALL SWITCH FOR ON/OFF OPERATION OF EXHAUST FAN. REFER TO AS-02 FOR PRELIMINARY SIZE AND LOCATION.
9. SUPPLY AND INSTALL CEILING OR WALL MOUNTED LIGHT FIXTURES IN MAIN BUILDING TREATMENT AREA. LOCATE LIGHT SWITCHES ON INTERIOR WALLS AT EACH MAN DOOR.
10. SUPPLY AND INSTALL CEILING MOUNTED LIGHT FIXTURES IN THE OFFICE, LAB, WASHROOM AND ELECTRICAL ROOM. LOCATE LIGHT SWITCH ON WALL INSIDE EACH ROOM ADJACENT TO MAN DOOR.
11. SUPPLY AND INSTALL TRANSPARENT PROTECTIVE BARRIER AND SUPPORT STRUCTURE MOUNTED ON TOP OF CONCRETE CONTAINMENT WALL EXTENDING TO 10 ft ABOVE FINISHED FLOOR LEVEL. PROVIDE REMOVABLE PANELS TO ALLOW QUICK OPERATOR ACCESS TO LIME SLURRY PUMP AND KMnO4 FEED PUMPS.
12. SUPPLY AND APPLY CHEMICAL RESISTANCE COATING TO EXPOSED FLOOR AND WALL SURFACES INSIDE THE CONTAINMENT AREA.
13. SUPPLY AND INSTALL REMOVABLE PVC CURTAIN WITH CORROSION RESISTANT SUPPORT FRAME AROUND ACID FEED SYSTEM. PROTECTIVE CURTAIN TO EXTEND FROM FINISHED FLOOR TO 6-ft 6-INCHES ABOVE FINISHED FLOOR.
14. SUPPLY AND APPLY CHEMICAL RESISTANCE COATING OR LINER IN CONTAINMENT SUMP UNDER ACID STORAGE TOTES. MATERIAL MUST BE SUITABLE FOR IMMERSION IN SULPHURIC ACID RANGING FROM 30 TO 95 wt%. NO METALLIC MATERIALS ARE TO BE USED FOR THE CONTAINMENT PIT, CURB, OR GRATING.
15. SUPPLY AND INSTALL CORROSION RESISTANT EMERGENCY EYEWASH AND SAFETY SHOWER. SUPPLY AND INSTALL TEMPERED WATER VALVE TO BLEND HOT WATER AND COLD WATER TO PRODUCE TEMPERED WATER SUPPLY TO SAFETY SHOWER AND PRESSURE SUSTAINING VALVE IN BUILDING POTABLE WATER SUPPLY DOWNSTREAM OF COLD WATER TAKEOFF FEEDING THE SAFETY SHOWER.
16. LAB SINK GOES TO SANITARY SEWER.
17. SOLIDS TRAP IS REQUIRED FOR DRAIN LINE.
18. SAFETY SHOWER AND EYE WASH DRAIN TO LOCAL SUMP

SCALE BAR
0 2'-6" 5'-0" 7'-6"

REFERENCES:
PLANS

DATUM
HORIZONTAL: WASP-NAD83-S FEET
VERTICAL: NAVD88 FEET

NO.	REVISION	DATE	APRVD
2	ISSUED FOR TENDER	05/20/11	WJM
3	TRANSMITTED TO CONTRACTOR	JLY 13	–
4	CONTAINMENT MODIFICATIONS	SEPT 01	LMM
5	ISSUED FOR CONSTRUCTION	JLY 26	LDV
6	PLUMBING CHANGES	SEPT 21	LMM

DRAWN PRV
DESIGNED BE
CHECKED GP
REVIEWED WJM/LMM

AMEC Geomatrix

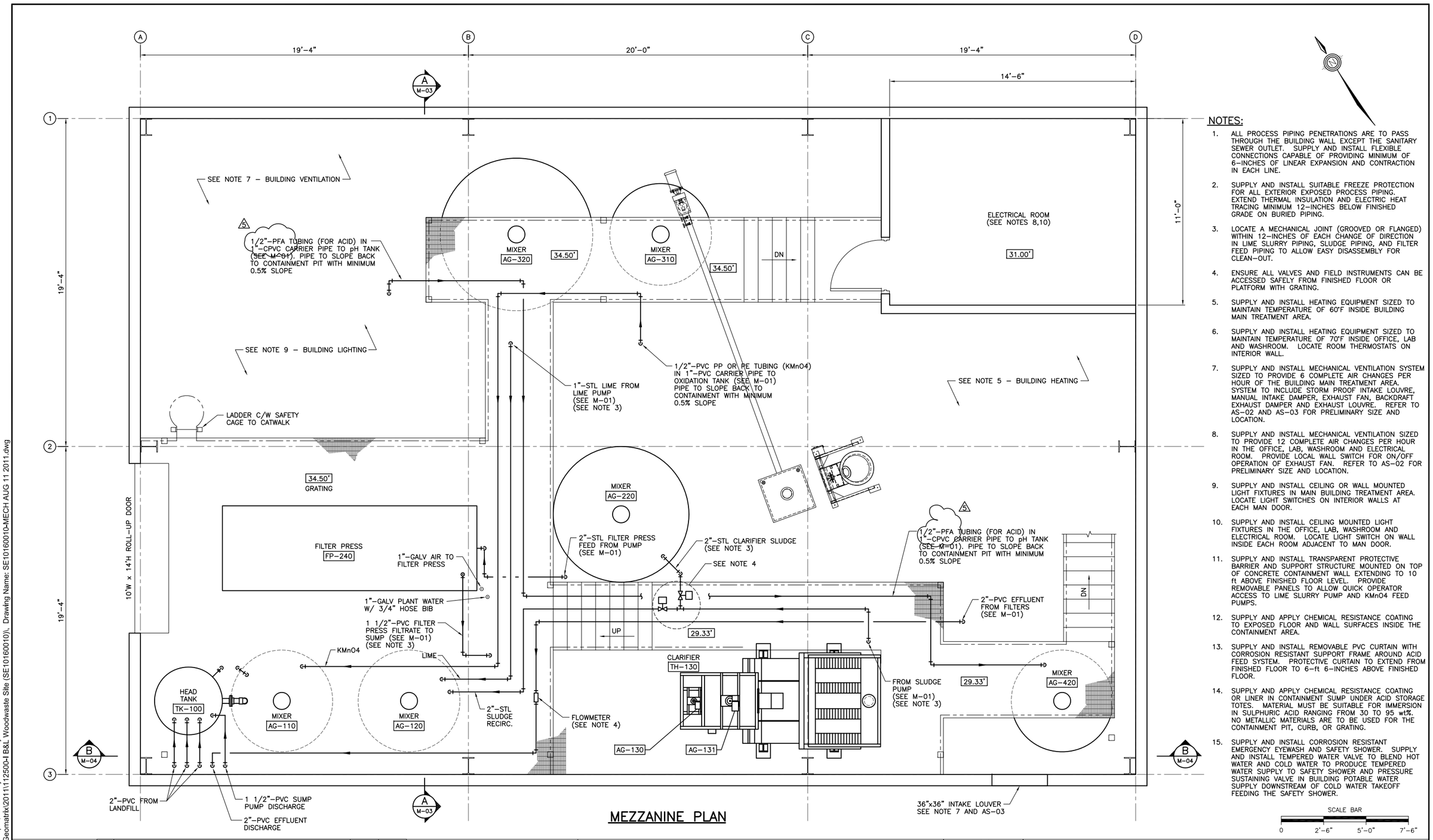
LARRY H. McCAUGHEY STATE OF WASHINGTON 19963 REGISTERED PROFESSIONAL ENGINEER

GROUNDWATER TREATMENT PLANT
MECHANICAL LAYOUT - FLOOR PLAN

B&L WOODWASTE SITE
PIERCE COUNTY, WASHINGTON

DATE: 09/21/11
PROJECT NO.: SE10160010
DRAWING M-01

Plot Date: 09/21/11 - 4:14pm, Plotted by: Dell Survey2
Drawing Path: T:\Pete\Geomatrix\2011\112500-I B&L Woodwaste Site (SE10160010)\, Drawing Name: SE10160010-MECH AUG 11 2011.dwg



MEZZANINE PLAN

NOTES:

1. ALL PROCESS PIPING PENETRATIONS ARE TO PASS THROUGH THE BUILDING WALL EXCEPT THE SANITARY SEWER OUTLET. SUPPLY AND INSTALL FLEXIBLE CONNECTIONS CAPABLE OF PROVIDING MINIMUM OF 6-INCHES OF LINEAR EXPANSION AND CONTRACTION IN EACH LINE.
2. SUPPLY AND INSTALL SUITABLE FREEZE PROTECTION FOR ALL EXTERIOR EXPOSED PROCESS PIPING. EXTEND THERMAL INSULATION AND ELECTRIC HEAT TRACING MINIMUM 12-INCHES BELOW FINISHED GRADE ON BURIED PIPING.
3. LOCATE A MECHANICAL JOINT (GROOVED OR FLANGED) WITHIN 12-INCHES OF EACH CHANGE OF DIRECTION IN LIME SLURRY PIPING, SLUDGE PIPING, AND FILTER FEED PIPING TO ALLOW EASY DISASSEMBLY FOR CLEAN-OUT.
4. ENSURE ALL VALVES AND FIELD INSTRUMENTS CAN BE ACCESSED SAFELY FROM FINISHED FLOOR OR PLATFORM WITH GRATING.
5. SUPPLY AND INSTALL HEATING EQUIPMENT SIZED TO MAINTAIN TEMPERATURE OF 60°F INSIDE BUILDING MAIN TREATMENT AREA.
6. SUPPLY AND INSTALL HEATING EQUIPMENT SIZED TO MAINTAIN TEMPERATURE OF 70°F INSIDE OFFICE, LAB AND WASHROOM. LOCATE ROOM THERMOSTATS ON INTERIOR WALL.
7. SUPPLY AND INSTALL MECHANICAL VENTILATION SYSTEM SIZED TO PROVIDE 6 COMPLETE AIR CHANGES PER HOUR OF THE BUILDING MAIN TREATMENT AREA. SYSTEM TO INCLUDE STORM PROOF INTAKE LOUVRE, MANUAL INTAKE DAMPER, EXHAUST FAN, BACKDRAFT EXHAUST DAMPER AND EXHAUST LOUVRE. REFER TO AS-02 AND AS-03 FOR PRELIMINARY SIZE AND LOCATION.
8. SUPPLY AND INSTALL MECHANICAL VENTILATION SIZED TO PROVIDE 12 COMPLETE AIR CHANGES PER HOUR IN THE OFFICE, LAB, WASHROOM AND ELECTRICAL ROOM. PROVIDE LOCAL WALL SWITCH FOR ON/OFF OPERATION OF EXHAUST FAN. REFER TO AS-02 FOR PRELIMINARY SIZE AND LOCATION.
9. SUPPLY AND INSTALL CEILING OR WALL MOUNTED LIGHT FIXTURES IN MAIN BUILDING TREATMENT AREA. LOCATE LIGHT SWITCHES ON INTERIOR WALLS AT EACH MAN DOOR.
10. SUPPLY AND INSTALL CEILING MOUNTED LIGHT FIXTURES IN THE OFFICE, LAB, WASHROOM AND ELECTRICAL ROOM. LOCATE LIGHT SWITCH ON WALL INSIDE EACH ROOM ADJACENT TO MAN DOOR.
11. SUPPLY AND INSTALL TRANSPARENT PROTECTIVE BARRIER AND SUPPORT STRUCTURE MOUNTED ON TOP OF CONCRETE CONTAINMENT WALL EXTENDING TO 10 ft ABOVE FINISHED FLOOR LEVEL. PROVIDE REMOVABLE PANELS TO ALLOW QUICK OPERATOR ACCESS TO LIME SLURRY PUMP AND KMnO4 FEED PUMPS.
12. SUPPLY AND APPLY CHEMICAL RESISTANCE COATING TO EXPOSED FLOOR AND WALL SURFACES INSIDE THE CONTAINMENT AREA.
13. SUPPLY AND INSTALL REMOVABLE PVC CURTAIN WITH CORROSION RESISTANT SUPPORT FRAME AROUND ACID FEED SYSTEM. PROTECTIVE CURTAIN TO EXTEND FROM FINISHED FLOOR TO 6-ft 6-INCHES ABOVE FINISHED FLOOR.
14. SUPPLY AND APPLY CHEMICAL RESISTANCE COATING OR LINER IN CONTAINMENT SUMP UNDER ACID STORAGE TOTES. MATERIAL MUST BE SUITABLE FOR IMMERSION IN SULPHURIC ACID RANGING FROM 30 TO 95 wt%. NO METALLIC MATERIALS ARE TO BE USED FOR THE CONTAINMENT PIT, CURB, OR GRATING.
15. SUPPLY AND INSTALL CORROSION RESISTANT EMERGENCY EYEWASH AND SAFETY SHOWER. SUPPLY AND INSTALL TEMPERED WATER VALVE TO BLEND HOT WATER AND COLD WATER TO PRODUCE TEMPERED WATER SUPPLY TO SAFETY SHOWER AND PRESSURE SUSTAINING VALVE IN BUILDING POTABLE WATER SUPPLY DOWNSTREAM OF COLD WATER TAKEOFF FEEDING THE SAFETY SHOWER.

SCALE BAR
0 2'-6" 5'-0" 7'-6"

REFERENCES:
PLANS

DATUM
HORIZONTAL:
WASP-NAD83-S FEET
VERTICAL: NAVD88 FEET

NO.	REVISION	DATE	APRVD
1	ISSUED FOR PLANS & SPECIFICATIONS	04/20/11	–
2	ISSUED FOR TENDER	05/20/11	WJM
3	TRANSMITTED TO CONTRACTOR	JLY 13	–
4	ISSUED FOR CONSTRUCTION	JLY 26	LDV
5	MATERIALS CHANGE	SEPT 8	LMM

DRAWN PRV
DESIGNED BE
CHECKED GP
REVIEWED WJM/LMM

AMEC Geomatrix

LARRY M. McCAUGHEY STATE OF WASHINGTON 10923 REGISTERED PROFESSIONAL ENGINEER

GROUNDWATER TREATMENT PLANT MECHANICAL LAYOUT - MEZZANINE PLAN

B&L WOODWASTE SITE
PIERCE COUNTY, WASHINGTON

DATE: 09/09/11
PROJECT NO.: SE10160010
DRAWING M-02

Plot Date: 09/09/11 - 5:13pm, Plotted by: Dell Survey2
Drawing Path: T:\Pete\Geomatrix\2011\112500-I B&L Woodwaste Site (SE10160010)\, Drawing Name: SE10160010-MECH AUG 11 2011.dwg

INSTRUMENT IDENTIFICATION

GENERAL INSTRUMENT OR FUNCTION SYMBOLS

	FIELD MOUNTED	PRIMARY LOCATION NORMALLY ACCESSIBLE TO OPERATOR	AUXILIARY LOCATION NORMALLY ACCESSIBLE TO OPERATOR
DISCRETE INSTRUMENTS	X / X–X–X	X / X–X–X	X / X–X–X
SHARED DISPLAY, SHARED CONTROL	X / X–X–X	X / X–X–X	X / X–X–X
COMPUTER FUNCTION	X / X–X–X	X / X–X–X	X / X–X–X
PROGRAMABLE LOGIC CONTROL	X / X–X–X	X / X–X–X	X / X–X–X

NORMALLY INACCESSIBLE OR BEHIND–THE–PANEL DEVICES OR FUNCTIONS ARE DEPICTED BY THE SAME SYMBOLS BUT WITH DASHED HORIZONTAL BARS, i.e.

X / X–X–X X / X–X–X X / X–X–X

ISA INSTRUMENTATION IDENTIFICATION LETTERS

LETTER	FIRST LETTER (S)		SUCCEEDING LETTERS		
	PROCESS OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER FLAME		USERS CHOICE	USERS CHOICE	USERS CHOICE
C	CONDUCTIVITY			CONTROL	
D	DENSITY (S.G)	DIFFERENTIAL			
E	VOLTAGE		PRIMARY ELEMENT		
F	FLOW RATE	RATIO			
G	GAUGE		GLASS	GATE	
H	HAND (MANUAL)				HIGH
I	CURRENT		INDICATE		
J	POWER	SCAN			
K	TIME OR SCHEDULE			CONTROL STATION	
L	LEVEL		LIGHT (PILOT)		LOW
M	MOTION/MOISTURE				MIDDLE
N	TURBIDITY		MIDDLE/INTERMEDIATE		
O	USERS CHOICE		ORIFICE		
P	PRESSURE (OR VACUUM)		POINT (TEST CONNECTION)		
Q	QUANTITY OR EVENT	INTEGRATE	INTEGRATE		
R			RECORD OR PRINT		
S	SPEED OR FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMITTER	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VISCOSITY			VALVE OR DAMPER	
W	WEIGHT OR FORCE		WELL		
X	AS DEFINED				
Y	STATUS			RELAY OR COMPUTE	
Z	POSITION			DRIVE, ACTUATE OR UNCLASSIFIED FINAL CONTROL ELEMENT	

LINE LEGEND

- PROCESS (CLOSED CONDUIT, DASHED LINE INDICATES ALTERNATE FLOW STREAM)
- PROCESS (OPEN CHANNEL)
- ----A---- ANALOG SIGNAL (4 TO 20 mAdc, ETC.)
- DISCRETE SIGNAL (ON/OFF, ETC.)
- COMPRESSED AIR
- PNEUMATIC SIGNAL
- FILLED SYSTEM SIGNAL
- HYDRAULIC SYSTEM SIGNAL
- SONIC SIGNAL
- PACKAGED BUILDING OR FACILITY BOUNDARY
- CONNECTING LINES
- NON–CONNECTING LINES
- HEAT TRACE

ABBREVIATIONS & LETTER SYMBOLS

AC	ALTERNATING CURRENT
CCS	CENTRAL CONTROL SYSTEM
CSC	CAR SEAL CLOSED
CSO	CAR SEAL OPEN
CP–X	CONTROL PANEL NO. X
CS	CARBON STEEL
DC	DIRECT CURRENT
DISC	DISCONNECT
ES	EMERGENCY STOP
FOS	FAST–OFF–SLOW
FOSA	FAST–OFF–SLOW–AUTO
FOSR	FAST–OFF–SLOW–REMOTE
FR	FORWARD–REVERSE
GALV	GALVANIZED STEEL
HOA	HAND–OFF–AUTO
HOR	HAND–OFF–REMOTE
LEL	LOWER EXPLOSIVE LIMIT
LCP	LOCAL CONTROL PANEL
LOS	LOCKOUT STOP
LR	LOCAL–REMOTE
MA	MANUAL–AUTO
MC	MODULATE–CLOSE
MCC	MOTOR CONTROL CENTRE
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OC	OPEN–CLOSE (D)
OCR	OPEN–CLOSE–REMOTE
OCA	OPEN–CLOSE–AUTO
OO	ON–OFF
OOA	ON–OFF–AUTO
OOR	ON–OFF–REMOTE
OSC	OPEN–STOP–CLOSE
REM	REMOTE
RPU	REMOTE PROCESSING UNIT
SF	SLOWER–FASTER
SS	START–STOP
SSC	SUPERVISORY SET POINT CONTROL
VIB	VIBRATION

PUMP AND COMPRESSOR SYMBOLS

- CENTRIFUGAL PUMP
- CHEMICAL FEED PUMP
- DIAPHRAGM PUMP
- GEAR PUMP OR BLOWER (POSITIVE DISPLACEMENT)
- PISTON PUMP
- PROGRESSIVE CAVITY PUMP
- SUBMERSIBLE SUMP PUMP
- COMPRESSOR (CENTRIFUGAL) BLOWER OR TURBINE
- COMPRESSOR (PISTON)
- PERISTALTIC PUMP

MISCELLANEOUS SYMBOLS

- SIGHT GLASS
- DIAPHRAGM SEAL
- BLIND FLANGE
- AIR GAP
- VENT TO ATMOSPHERE
- RUPTURE DISK
- M ELECTRIC MOTOR
- PRESSURE GAUGE
- AIR FILTER
- CALIBRATION COLUMN
- CAM–LOCK
- REDUCER
- Y–STRAINER

PRIMARY ELEMENT SYMBOLS

- ORIFICE PLATE
- FLOW TUBE
- VORTEX METER
- ELECTROMAGNETIC FLOWMETER
- PROPELLER OR TURBINE METER
- LEVEL (ULTRASONIC)
- LEVEL (FLOAT)

ACTUATOR SYMBOLS

- P Z PNEUMATIC W/POSITIONER
- P S PNEUMATIC W/SOLENOID
- E ELECTRIC/MOTOR
- E Z ELECTRIC/MOTOR W/POSITIONER
- EH ELECTROHYDRAULIC
- H HYDRAULIC
- P B PNEUMATIC WITH VOLUME BOOSTER
- S SOLENOID
- MANUAL

VALVE SYMBOLS

- GATE
- K KNIFE GATE
- BUTTERFLY
- GLOBE
- BALL
- V VEE–BALL
- SEAT PORT ECCENTRIC PLUG
- PLUG OR COCK
- NEEDLE
- DIAPHRAGM
- PINCH
- SWING CHECK
- BALL CHECK
- SPRING CHECK
- HOSE VALVE OR BIBB
- PRESSURE RELIEF
- PRESSURE/VACUUM RELIEF VALVE
- AIR AND/OR VACUUM RELEASE
- ACTUATOR MOTORIZED VALVE
- ACTUATOR SOLENOID VALVE
- ACTUATOR TO TEMPERATURE SENSOR TEMPERATURE SENSING VALVE
- REGULATED SIDE PRESSURE CONTROL

REFERENCES:
PLANS

DATUM
HORIZONTAL:
WASP–NAD83–S FEET
VERTICAL: NAVD88 FEET

NO.	REVISION	DATE	APRVD
3	ISSUED FOR TENDER	MAY 26	LDV
4	ISSUED FOR CONSTRUCTION	JLY 26	LDV
5	CONTROL CHANGES	DEC 20	
6	CONTROL CHANGES (2)	JAN 10	BE
7	AS–BUILT	DEC 7	BE

DRAWN JR
DESIGNED LDV
CHECKED GP
REVIEWED WJM/LMM

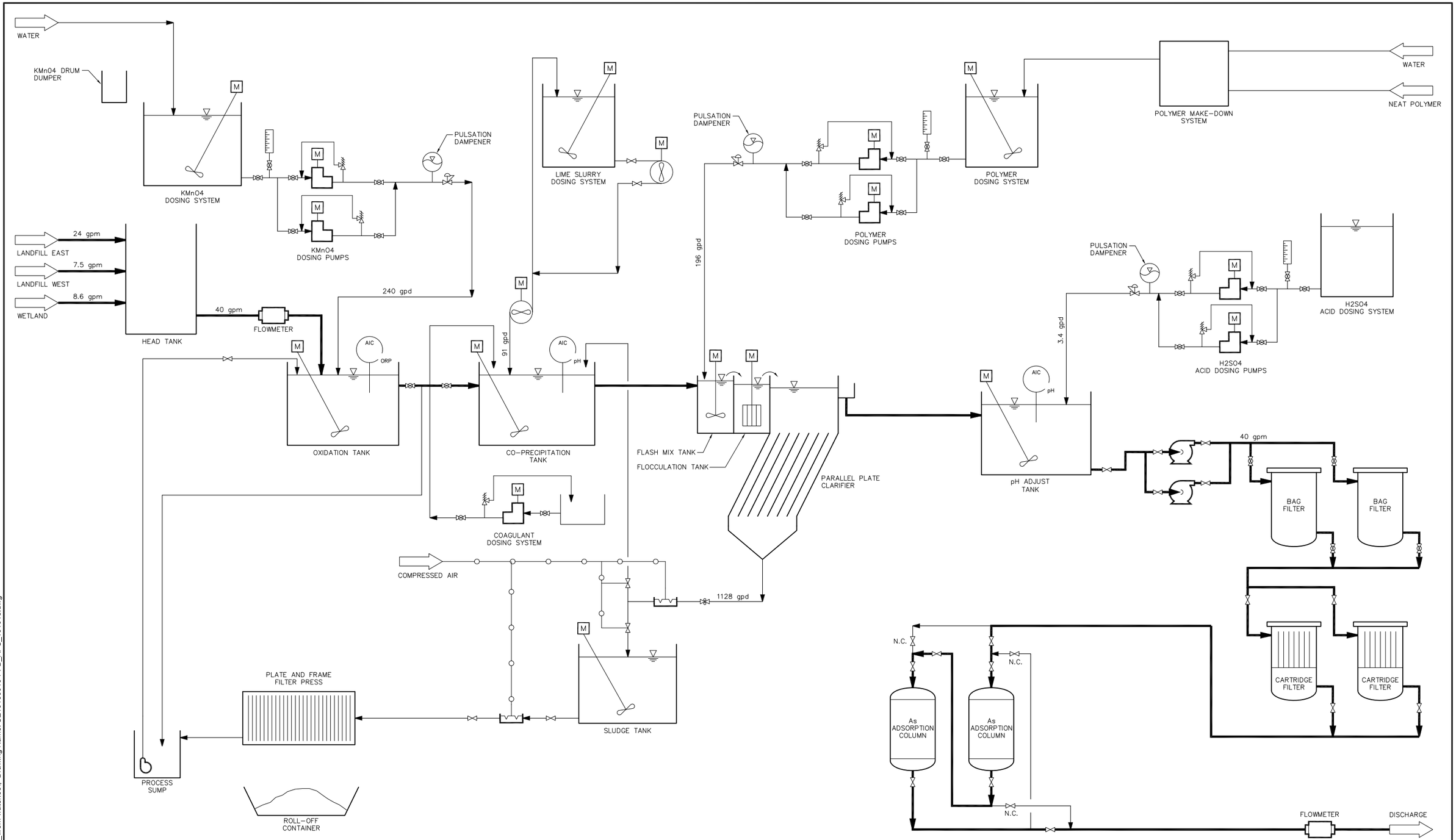
AMEC
Environment & Infrastructure, Inc.
600 University Street
Suite 600
Seattle, Washington 98101

PROCESS FLOW AND INSTRUMENTATION LEGEND

B&L WOODWASTE SITE
PIERCE COUNTY, WASHINGTON

DATE: 10/10/13
PROJECT NO.: SE10160010
DRAWING P&ID–00

Plot Date: 10/10/13 - 7:01pm, Plotted by: adam.stenberg
Drawing Path: S:\13488\008_\from waterfool\, Drawing Name: SE10160010-PIDs_APS_101013.dwg



REFERENCES:	NO.	REVISION	DATE	APRVD
PLANS	1	ISSUED FOR REVIEW	MAR 04	GP
	2	ISSUED FOR SPECIFICATION PACKAGE REVIEW	APR 21	LDV
DATUM HORIZONTAL: WASP-NAD83-S FEET VERTICAL: NAVD88 FEET	3	ISSUED FOR TENDER	MAY 26	LDV
	4	ISSUED FOR CONSTRUCTION	JLY 26	LDV
	5	AS-BUILT	DEC 7	BE

DRAWN PRV
DESIGNED CH
CHECKED GP
REVIEWED WJM/LMM

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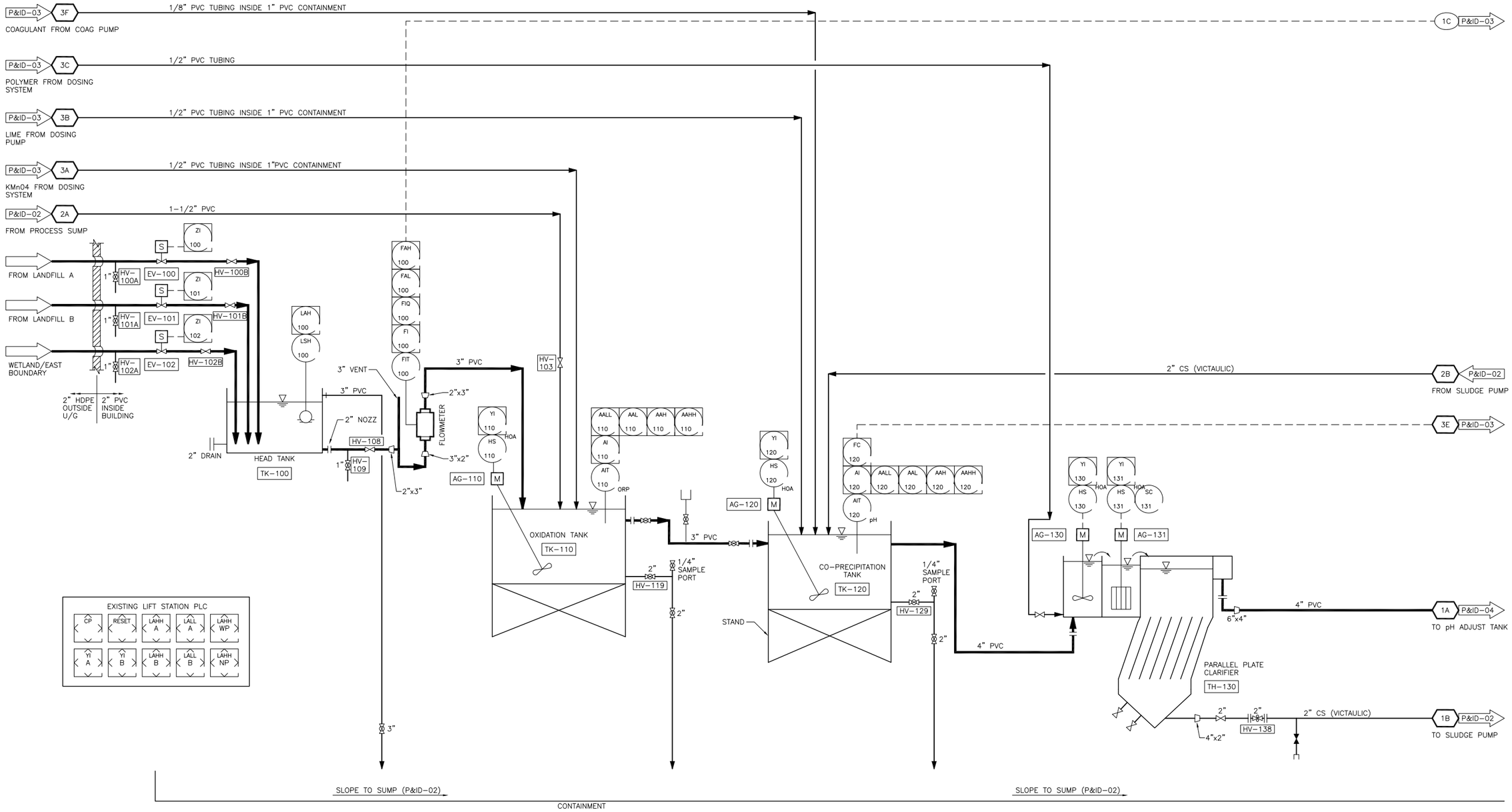
Environment & Infrastructure, Inc.
600 University Street
Suite 600
Seattle, Washington 98101

PROCESS FLOW DIAGRAM

B&L WOODWASTE SITE
PIERCE COUNTY, WASHINGTON

DATE: 10/14/13
PROJECT NO.: SE10160010
DRAWING PFD-01

Plot Date: 10/14/13 - 12:15pm, Plotted by: adam.stenberg
Drawing Path: S:\13488\008_\from waterfool\, Drawing Name: SE10160010-PFD_APS_101013.dwg



REFERENCES:	NO.	REVISION	DATE	APRVD
PLANS	4	ISSUED FOR TENDER	MAY 26	LDV
	5	ISSUED FOR CONSTRUCTION	JLY 26	LDV
DATUM	6	CONTROL CHANGES	DEC 20	
HORIZONTAL: WASP–NAD83–S FEET	7	CONTROL CHANGES (2)	JAN 10	BE
VERTICAL: NAVD88 FEET	8	AS–BUILT	DEC 7	BE

DRAWN JR
DESIGNED LDV
CHECKED GP
REVIEWED WJM/LMM

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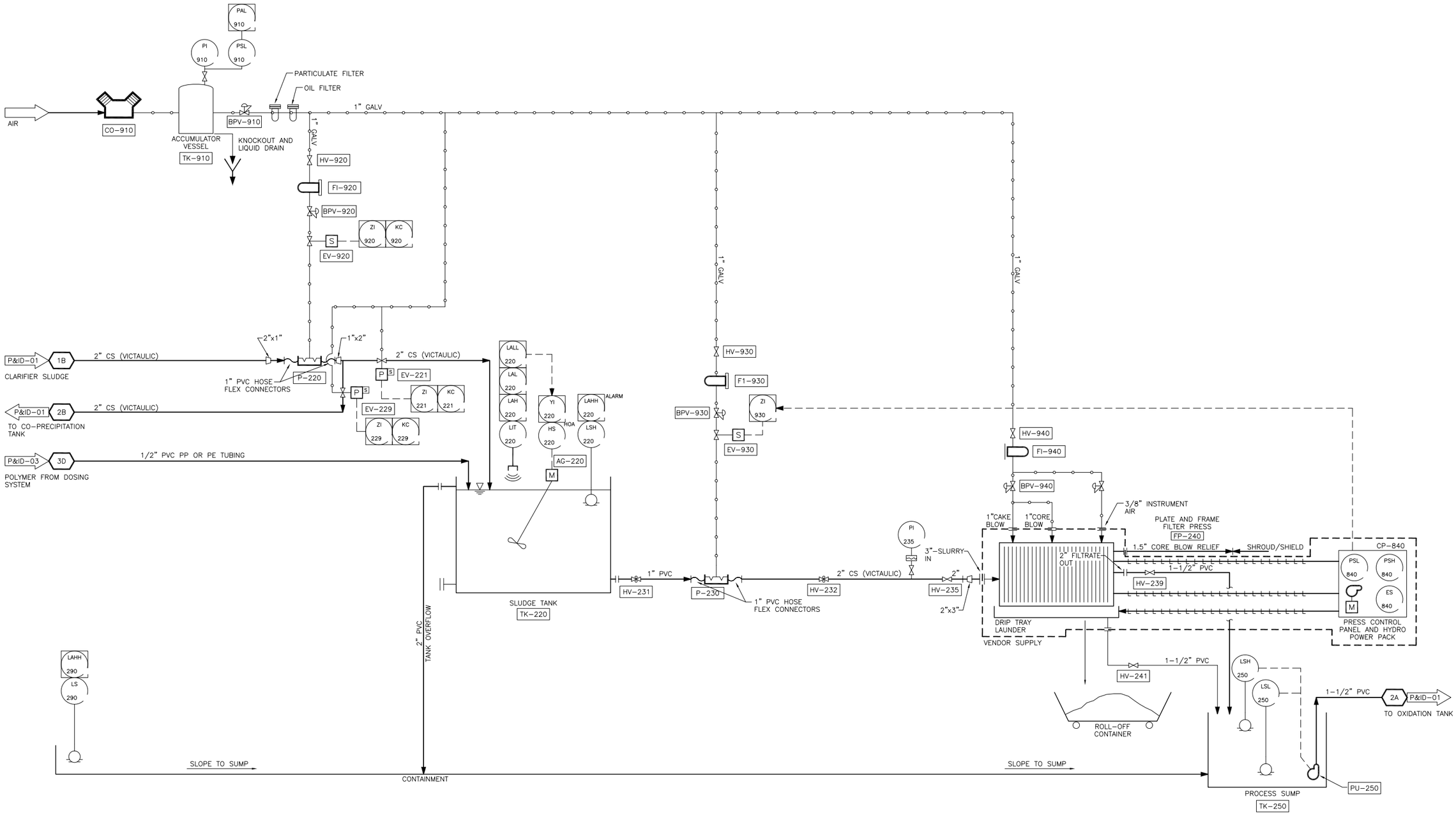
600 University Street
Suite 600
Seattle, Washington 98101

PROCESS FLOW AND INSTRUMENTATION OXIDATION / PRECIPITATION

B&L WOODWASTE SITE
PIERCE COUNTY, WASHINGTON

DATE: 10/10/13
PROJECT NO.: SE10160010
DRAWING P&ID–01

Plot Date: 10/10/13 - 7:14pm. Plotted by: adam.stenberg
Drawing Path: S:\13488\008_\from waterloo_Drawing Name: SE10160010-PIDs_APS_101013.dwg



Plot Date: 10/14/13 - 11:09am, Plotted by: adam.stenberg
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REFERENCES:
PLANS

DATUM
HORIZONTAL: WASP-NAD83-S FEET
VERTICAL: NAVD88 FEET

NO.	REVISION	DATE	APRVD
4	ISSUED FOR TENDER	MAY 26	LDV
5	ISSUED FOR CONSTRUCTION	JLY 26	LDV
6	CONTROL CHANGES	DEC 20	
7	CONTROL CHANGES (2)	JAN 10	BE
8	AS-BUILT	DEC 7	BE

DRAWN JR
DESIGNED LDV
CHECKED GP
REVIEWED WJM/LMM

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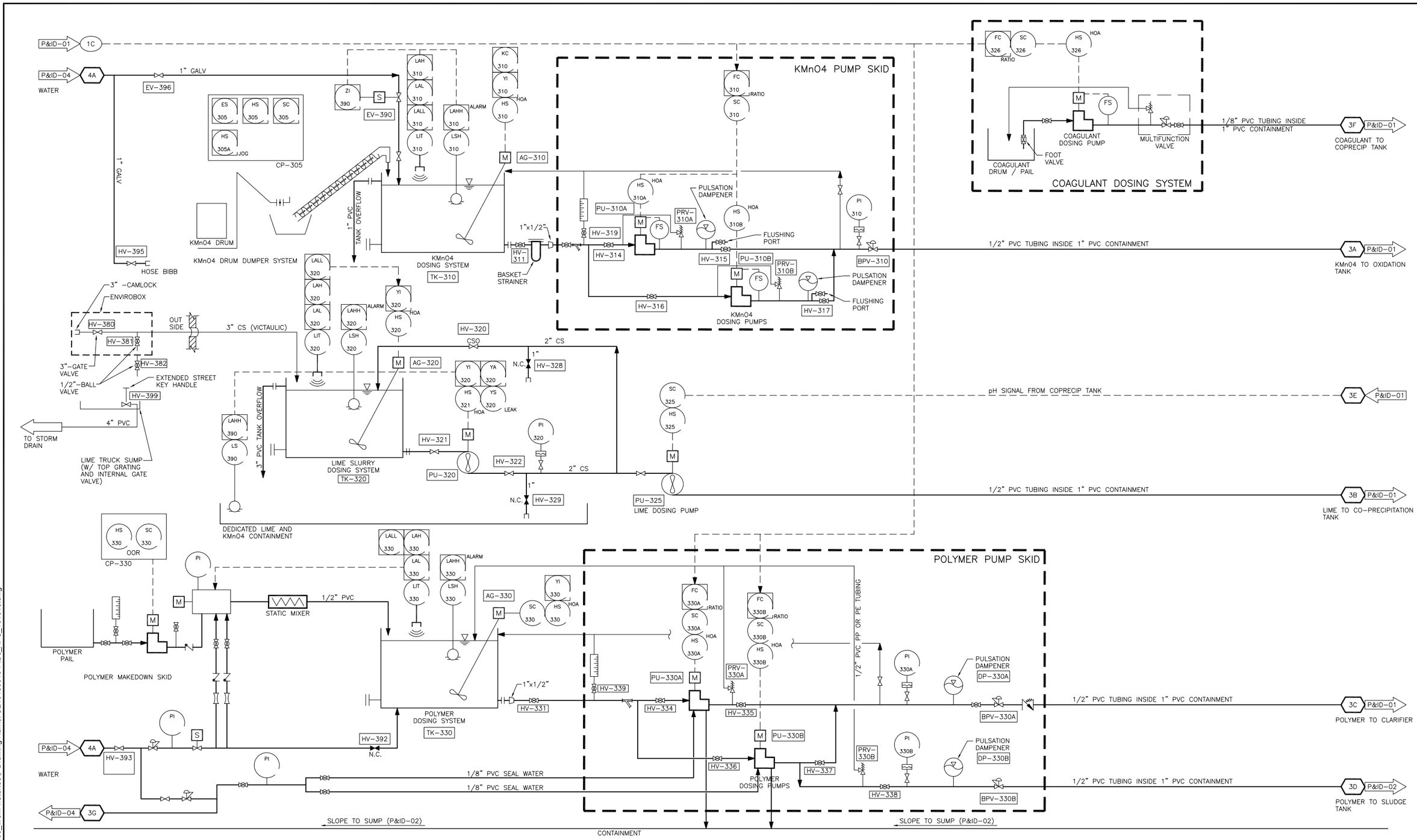
Environment & Infrastructure, Inc.
600 University Street
Suite 600
Seattle, Washington 98101

PROCESS FLOW AND INSTRUMENTATION SLUDGE HANDLING

B&L WOODWASTE SITE
PIERCE COUNTY, WASHINGTON

DATE: 10/14/13
PROJECT NO.: SE10160010

DRAWING P&ID-02



REFERENCES:	NO.	REVISION	DATE	APRVD
PLANS	4	ISSUED FOR TENDER	MAY 26	LDV
	5	ISSUED FOR CONSTRUCTION	JLY 26	LDV
DATUM	6	CONTROL CHANGES	DEC 20	
HORIZONTAL: WASP-NAD83-S FEET	7	CONTROL CHANGES (2)	JAN 10	BE
VERTICAL: NAVD88 FEET	8	AS-BUILT	DEC 7	BE

DRAWN JR
DESIGNED LDV
CHECKED GP
REVIEWED WJM/LMM

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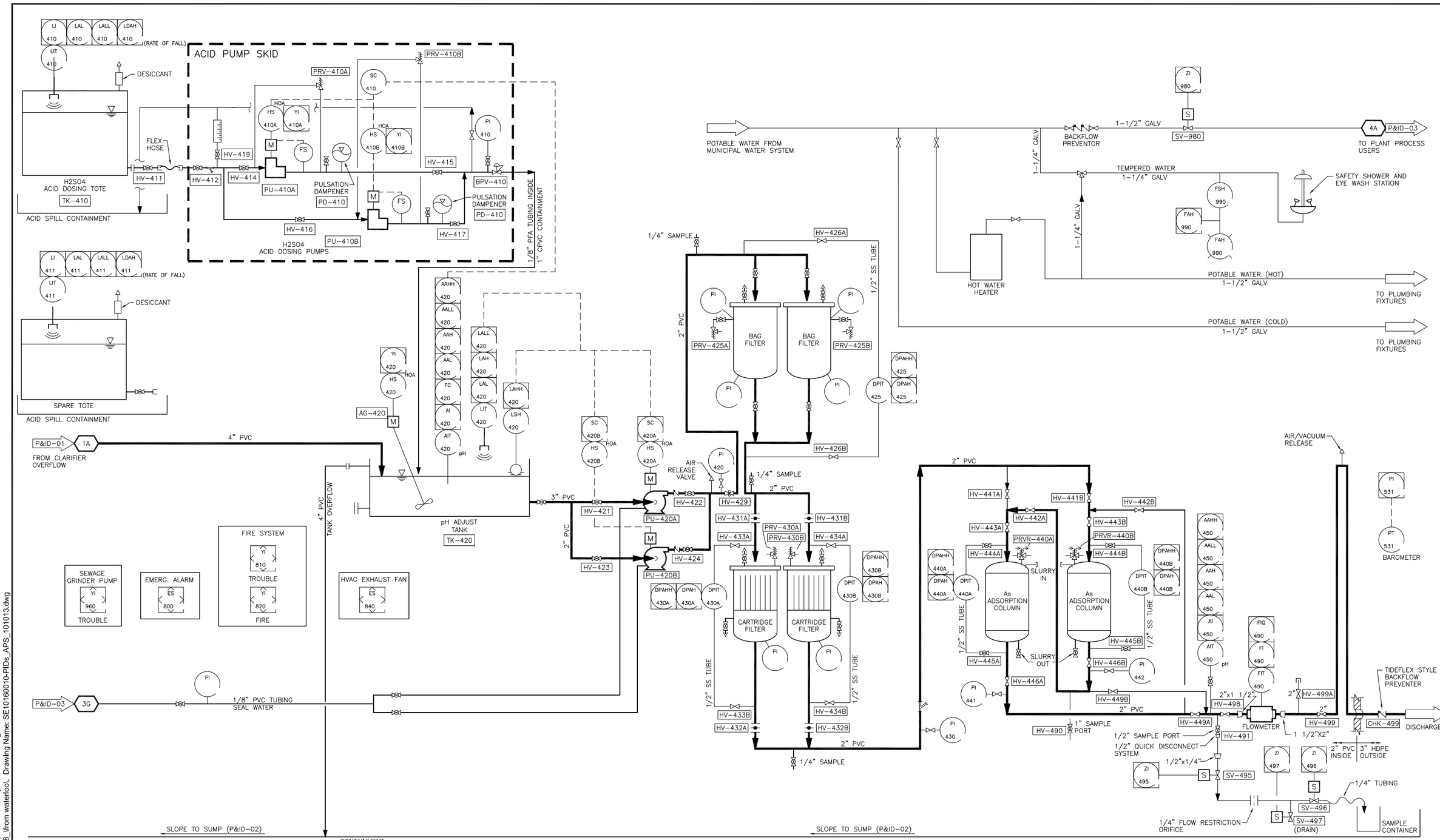
Environment & Infrastructure, Inc.
600 University Street
Suite 600
Seattle, Washington 98101

PROCESS FLOW AND INSTRUMENTATION ADDITIVES

B&L WOODWASTE SITE
PIERCE COUNTY, WASHINGTON

DATE: 10/10/13
PROJECT NO.: SE10160010
DRAWING P&ID-03

Plot Date: 10/10/13 - 7:02pm, Plotted by: adam.stenberg
Drawing Path: S:\134880008_\from waterfoo\, Drawing Name: SE10160010-PIDs_APS_101013.dwg



Plot Date: 10/14/13 - 12:15pm, Plotted by: adam.stenberg
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REFERENCES:
PLANS

DATUM
HORIZONTAL:
WASP-NAD83-S FEET
VERTICAL: NAVD88 FEET

NO.	REVISION	DATE	APRVD
5	ISSUED FOR CONSTRUCTION	JLY 26	LDV
6	MATERIAL CHANGE	SEPT 8	LMM
7	CONTROL CHANGES	DEC 20	
8	CONTROL CHANGES (2)	JAN 10	BE
9	AS-BUILT	DEC 7	BE

DRAWN JR
DESIGNED LDV
CHECKED GP
REVIEWED WJM/LMM

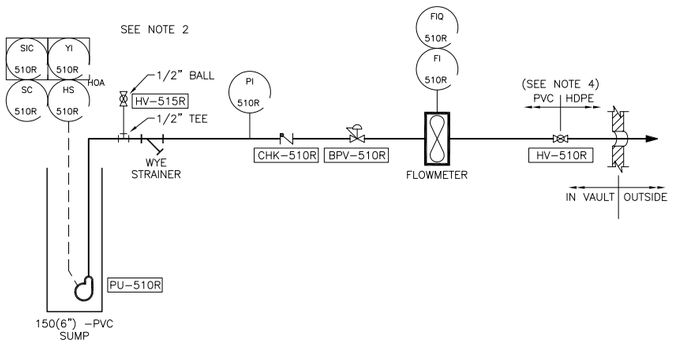
AMEC
Environment & Infrastructure, Inc.
600 University Street
Suite 600
Seattle, Washington 98101

PROCESS FLOW AND INSTRUMENTATION EFFLUENT POLISHING

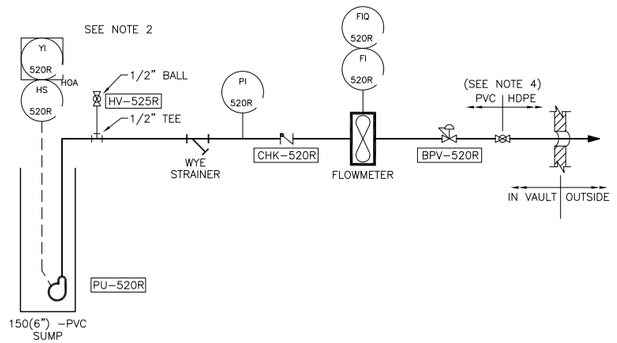
B&L WOODWASTE SITE
PIERCE COUNTY, WASHINGTON

DATE: 10/14/13
PROJECT NO.: SE10160010

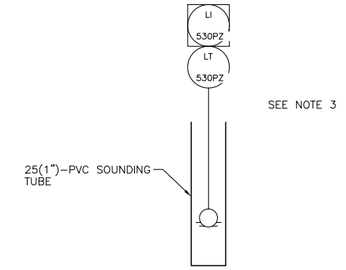
DRAWING
P&ID-04



LANDFILL WELLS DETAIL (TYP OF 11)



AG. FIELD AND WETLAND WELLS DETAIL (TYP OF 10)



PIEZOMETER DETAIL (TYP OF 16)

STATION	COORDS	TERMINATION
R-01	1186310.409 702291.5027 inside	KIOSK 3
R-02	1186467.023 702042.2185 inside	KIOSK 2
R-03	1186327.49 702003.56 inside	KIOSK 2
R-04	1186152.52 702096.41 inside	KIOSK 3
R-05	1186200.63 701953.59 inside	KIOSK 2
R-06	1186293.15 701769.26 inside	KIOSK 2
R-07	1185852.906 701693.703 inside	KIOSK 1
R-08	1185907.93 701803.16 inside	KIOSK 1
R-09	1185776.662 701873.0772 inside	KIOSK 1
R-10	1185842.089 702081.232 inside	KIOSK 1
R-11	1186121.23 702223.96 inside	KIOSK 3

TABLE OF LANDFILL WELLS

STATION	COORDS	TERMINATION
R-12	1186517.737 702182.2116 outside-east	KIOSK 4
R-13	1186579.559 702070.3399 outside-east	KIOSK 4
R-14	1185679.036 702073.3376 outside-west	KIOSK 5
R-15	1185617.392 702077.515 outside-west	KIOSK 5
R-16	1186011.284 702345.452 outside-north	KIOSK 5
R-17	1186126.763 702394.4934 outside-north	KIOSK 5
R-18	1186032.526 702468.6627 outside-north	KIOSK 5
R-19	1185911.289 702509.2755 outside-north	KIOSK 5
R-20	1185980.764 702595.2624 outside-north	KIOSK 5
R-21	1185984.041 702673.8679 outside-north	KIOSK 5

TABLE OF AG. FIELD AND WETLAND WELLS

STATION	COORDS	TERMINATION
PZ-1a	1186183.28 702353.14 perimeter	KIOSK 3
PZ-1b	1186191.53 702329.08 perimeter	KIOSK 3
PZ-2a	1185886.44 702209.88 perimeter	KIOSK 1
PZ-2b	1185897.84 702186.89 perimeter	KIOSK 1
PZ-3a	1185733.73 701976.73 perimeter	KIOSK 1
PZ-3b	1185753.71 701976.05 perimeter	KIOSK 1
PZ-4a	1185731.96 701728.73 perimeter	KIOSK 1
PZ-4b	1185755.21 701726.18 perimeter	KIOSK 1
PZ-4c	1185754.96 701732.98 perimeter	KIOSK 1
PZ-5a	1186002.81 701621.79 perimeter	KIOSK 1
PZ-5b	1186005.46 701641.88 perimeter	KIOSK 1
PZ-5c	1186000.96 701642.36 perimeter	KIOSK 1
PZ-6a	1186379.5 701620.95 perimeter	DIRECT
PZ-6b	1186377.84 701640.57 perimeter	DIRECT
PZ-7a	1186595.69 701831.05 perimeter	DIRECT
PZ-7b	1186578.05 701835.09 perimeter	DIRECT
PZ-8a	1186513.106 702097.0787 perimeter	KIOSK 4
PZ-8b	1186495.24 702090.37 perimeter	KIOSK 4
PZ-8c	1186496.75 702085.74 perimeter	KIOSK 4

TABLE OF PIEZOMETERS

NOTES:

1. WELL COORDINATES EXPRESSED IN WASHINGTON STATE PLANE COORDINATE SYSTEM. DATUM CITATION IN LOWER LEFT.
2. "R" = STATION NUMBER FOR EACH WELL
3. "PZ" = STATION NUMBER FOR EACH PIEZOMETER
4. INSIDE VAULT USE SCH 80 PVC, OUTSIDE VAULT USE SDR11 HDPE R2, R7, R9 ARE 1.5", ALL OTHERS ARE 1"

REFERENCES:
PLANS

DATUM
HORIZONTAL:
WASP-NAD83-S FEET
VERTICAL: NAVD88 FEET

NO.	REVISION	DATE	APRVD
4	ISSUED FOR TENDER	MAY 26	LDV
5	ISSUED FOR CONSTRUCTION	JLY 26	LDV
6	CONTROL CHANGES	DEC 20	
7	CONTROL CHANGES (2)	JAN 10	BE
8	AS-BUILT	DEC 7	BE

DRAWN JR
DESIGNED LDV
CHECKED GP
REVIEWED WJM/LMM

AMEC
Environment & Infrastructure, Inc.
600 University Street
Suite 600
Seattle, Washington 98101

PROCESS FLOW AND INSTRUMENTATION
EXTRACTION AND MONITORING WELLS

B&L WOODWASTE SITE
PIERCE COUNTY, WASHINGTON

DATE: 10/10/13
PROJECT NO.: SE10160010

DRAWING
P&ID-05

Plot Date: 10/10/13 - 7:24pm, Plotted by: adam.stenberg
Drawing Path: S:\13488\008_\from waterloo\, Drawing Name: SE10160010-PIDs_APS_101013.dwg

B&L Woodwaste Site

2013 Annual Operations & Maintenance Report

Appendix A
Analytical Data

Analytical Resources, Incorporated
Analytical Chemists and Consultants

September 6, 2013

Larry McGaughey
AMEC Environment and Infrastructure, Inc
One Union Square
600 University Street, Suite 600
Seattle, WA 98101

Client Project: B&L Woodwaste, 13488
ARI Job No.: XC64

Dear Mr. McGaughey:

Please find enclosed the original Chain-of-Custody record (COC), sample receipt documentation, and the final results for sample from the project referenced above. Six water samples were received in good condition on August 28, 2013.

The samples were analyzed for Alkalinity, pH and Total metals as requested on the COC.

There were no problems with the analyses.

An electronic copy of this report and all associated raw data will remain on file with ARI. If you have any questions or require additional information, please contact me at your convenience.

Respectfully,

ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
206.695.6211
kellyb@arilabs.com
www.arilabs.com

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number:	Turn-around Requested: Standard	Page: 1 of 1	
ARI Client Company: AMEC	Phone: 206-342-1760	Date: 8/28/13	Ice Present?
Client Contact: Larry McGaughey		No. of Coolers: 1	Cooler Temps: 0.8
Client Project Name: B+L Woodwaste			
Client Project #: 13498	Samplers: Eric Olson		

Sample ID	Date	Time	Matrix	No Containers	Total Metals	pH	Alkalinity						Notes/Comments
B+L-R12-082813	8/28/13	0958	W	3	X	X	X						
B+L-R13-082813	↓	1013	↓	↓	X	X	X						
B+L-R16-082813	↓	1110	↓	↓	X	X	X						
B+L-R15-082813	↓	1213	↓	↓	X	X	X						
B+L-R18-082813	↓	1416	↓	↓	X	X	X						
B+L-R19-082813	↓	1437	↓	↓	X	X	X						
B+L-R20-082813	↓	1455	↓	↓	X	X	X						
B+L-R21-082813	↓	1516	↓	↓	X	X	X						

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by	Received by:
Run pH+Alkalinity Simultaneously	(Signature)	(Signature)	(Signature)	(Signature)
	Printed Name: Eric Olson	Printed Name: Jennifer Millsap	Printed Name	Printed Name.
	Company: AMEC	Company: ARI	Company.	Company:
	Date & Time: 8/28/13 1720	Date & Time: 8/28/13 1720	Date & Time	Date & Time:

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

XC64 : 00002

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: XC64
Client: AMEC Earth & Environmental, Inc
Project Event: 13488
Project Name: B+L Woodwaste

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	B+L-R12-082813	XC64A	13-17945	Water	08/28/13 09:58	08/28/13 17:20
2.	B+L-R13-082813	XC64B	13-17946	Water	08/28/13 10:13	08/28/13 17:20
3.	B+L-R16-082813	XC64C	13-17947	Water	08/28/13 11:10	08/28/13 17:20
4.	B+L-R15-082813	XC64D	13-17948	Water	08/28/13 12:13	08/28/13 17:20
5.	B+L-R18-082813	XC64E	13-17949	Water	08/28/13 14:16	08/28/13 17:20
6.	B+L-R19-082813	XC64F	13-17950	Water	08/28/13 14:37	08/28/13 17:20
7.	B+L-R20-082813	XC64G	13-17951	Water	08/28/13 14:55	08/28/13 17:20
8.	B+L-R21-082813	XC64H	13-17952	Water	08/28/13 16:16	08/28/13 17:20

XC64:00003

PRESERVATION VERIFICATION 08/29/13
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **XC64**

Inquiry Number: NONE
Analysis Requested: 08/29/13
Contact: McGaughey, Larry
Client: AMEC Earth & Environmental, Inc
Logged by: TS
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

PC: Kelly
VTSR: 08/28/13

Project #: 13488
Project: B+L Woodwaste
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	Fe2+ <2	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
13-17945 **XC64A**	B+L-R12-082813						TOT P															
13-17946 **XC64B**	B+L-R13-082813						TOT P															
13-17947 **XC64C**	B+L-R16-082813						TOT P															
13-17948 **XC64D**	B+L-R15-082813						TOT P															
13-17949 **XC64E**	B+L-R18-082813						TOT P															
13-17950 **XC64F**	B+L-R19-082813						TOT P															
13-17951 **XC64G**	B+L-R20-082813						TOT P															
13-17952 **XC64H**	B+L-R21-082813						TOT P															

P = Pass

Checked By TS Date 8-29-13

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: AMEC Project Name: B+L Woodwaste

COC No(s): _____ (NA) Delivered by: Fed-Ex UPS Courier Hand Delivered Other _____

Assigned ARI Job No: XCF4 Tracking No _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)	0.8	

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 12241222

Cooler Accepted by: JM Date: 8/28/13 Time: 1720

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used?	Bubble Wrap (Wet Ice) Gel Packs Baggies Foam Block Paper Other:		
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)	NA	(YES)	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	(NA)		

Was Sample Split by ARI: (NA) YES Date/Time _____ Equipment: _____ Split by: _____

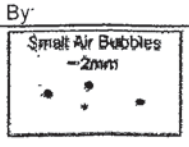
Samples Logged by: TS Date: 8/29/13 Time: 758

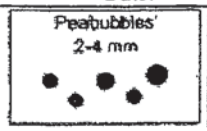
***** Notify Project Manager of discrepancies or concerns *****

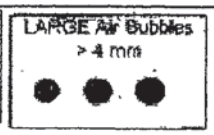
Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:







Small → "sm"
Peabubbles → "pb"
Large → "lg"
Headspace → "hs"

ADH : 08805

SAMPLE RESULTS-CONVENTIONALS
XC64-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/29/13

Project: B+L Woodwaste
Event: 13488
Date Sampled: 08/28/13
Date Received: 08/28/13

Client ID: B+L-R12-082813
ARI ID: 13-17945 XC64A

Analyte	Date Batch	Method	Units	RL	Sample
pH	08/28/13 082813#1	EPA 150.1	std units	0.01	7.08
Alkalinity	08/28/13 082813#1	SM 2320	mg/L CaCO3	1.0	135
Carbonate	08/28/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	08/28/13	SM 2320	mg/L CaCO3	1.0	135
Hydroxide	08/28/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U

RL Analytical reporting limit
U Undetected at reported detection limit

XC64 : 08806

SAMPLE RESULTS-CONVENTIONALS
XC64-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/29/13

Project: B+L Woodwaste
Event: 13488
Date Sampled: 08/28/13
Date Received: 08/28/13

Client ID: B+L-R13-082813
ARI ID: 13-17946 XC64B

Analyte	Date Batch	Method	Units	RL	Sample
pH	08/28/13 082813#1	EPA 150.1	std units	0.01	6.96
Alkalinity	08/28/13 082813#1	SM 2320	mg/L CaCO3	1.0	154
Carbonate	08/28/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	08/28/13	SM 2320	mg/L CaCO3	1.0	154
Hydroxide	08/28/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U

RL Analytical reporting limit
U Undetected at reported detection limit

XC64 : 00007

SAMPLE RESULTS-CONVENTIONALS
XC64-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/29/13

Project: B+L Woodwaste
Event: 13488
Date Sampled: 08/28/13
Date Received: 08/28/13

Client ID: B+L-R16-082813
ARI ID: 13-17947 XC64C

Analyte	Date Batch	Method	Units	RL	Sample
pH	08/28/13 082813#1	EPA 150.1	std units	0.01	6.59
Alkalinity	08/28/13 082813#1	SM 2320	mg/L CaCO3	1.0	132
Carbonate	08/28/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	08/28/13	SM 2320	mg/L CaCO3	1.0	132
Hydroxide	08/28/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U

RL Analytical reporting limit
U Undetected at reported detection limit

XC64 : 00000

SAMPLE RESULTS-CONVENTIONALS
XC64-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/29/13

Project: B+L Woodwaste
Event: 13488
Date Sampled: 08/28/13
Date Received: 08/28/13

Client ID: B+L-R15-082813
ARI ID: 13-17948 XC64D

Analyte	Date Batch	Method	Units	RL	Sample
pH	08/28/13 082813#1	EPA 150.1	std units	0.01	6.62
Alkalinity	08/28/13 082813#1	SM 2320	mg/L CaCO3	1.0	219
Carbonate	08/28/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	08/28/13	SM 2320	mg/L CaCO3	1.0	219
Hydroxide	08/28/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U

RL Analytical reporting limit
U Undetected at reported detection limit

XC64 : 66063

SAMPLE RESULTS-CONVENTIONALS
XC64-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/29/13

Project: B+L Woodwaste
Event: 13488
Date Sampled: 08/28/13
Date Received: 08/28/13

Client ID: B+L-R18-082813
ARI ID: 13-17949 XC64E

Analyte	Date Batch	Method	Units	RL	Sample
pH	08/28/13 082813#1	EPA 150.1	std units	0.01	6.59
Alkalinity	08/28/13 082813#1	SM 2320	mg/L CaCO3	1.0	127
Carbonate	08/28/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	08/28/13	SM 2320	mg/L CaCO3	1.0	127
Hydroxide	08/28/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U

RL Analytical reporting limit
U Undetected at reported detection limit

XC64 : 09618

SAMPLE RESULTS-CONVENTIONALS
XC64-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/29/13

Project: B+L Woodwaste
Event: 13488
Date Sampled: 08/28/13
Date Received: 08/28/13

Client ID: B+L-R19-082813
ARI ID: 13-17950 XC64F

Analyte	Date Batch	Method	Units	RL	Sample
pH	08/28/13 082813#1	EPA 150.1	std units	0.01	6.51
Alkalinity	08/28/13 082813#1	SM 2320	mg/L CaCO3	1.0	573
Carbonate	08/28/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	08/28/13	SM 2320	mg/L CaCO3	1.0	573
Hydroxide	08/28/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U

RL Analytical reporting limit
U Undetected at reported detection limit

XC64:0001

SAMPLE RESULTS-CONVENTIONALS
XC64-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/29/13

Project: B+L Woodwaste
Event: 13488
Date Sampled: 08/28/13
Date Received: 08/28/13

Client ID: B+L-R20-082813
ARI ID: 13-17951 XC64G

Analyte	Date Batch	Method	Units	RL	Sample
pH	08/28/13 082813#1	EPA 150.1	std units	0.01	6.59
Alkalinity	08/28/13 082813#1	SM 2320	mg/L CaCO3	1.0	529
Carbonate	08/28/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	08/28/13	SM 2320	mg/L CaCO3	1.0	529
Hydroxide	08/28/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U

RL Analytical reporting limit
U Undetected at reported detection limit

XC64 : 080612

SAMPLE RESULTS-CONVENTIONALS
XC64-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/29/13

Project: B+L Woodwaste
Event: 13488
Date Sampled: 08/28/13
Date Received: 08/28/13

Client ID: B+L-R21-082813
ARI ID: 13-17952 XC64H

Analyte	Date Batch	Method	Units	RL	Sample
pH	08/28/13 082813#1	EPA 150.1	std units	0.01	6.53
Alkalinity	08/28/13 082813#1	SM 2320	mg/L CaCO3	1.0	726
Carbonate	08/28/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	08/28/13	SM 2320	mg/L CaCO3	1.0	726
Hydroxide	08/28/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U

RL Analytical reporting limit
U Undetected at reported detection limit

XC64 : 08813

LAB CONTROL RESULTS-CONVENTIONALS
XC64-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/29/13

Project: B+L Woodwaste
Event: 13488
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
pH EPA 150.1	ICVL	08/28/13	std units	6.99	7.00	0.01

pH is evaluated as the Absolute Difference between the values rather than Percent Recovery.

XC64:09014

STANDARD REFERENCE RESULTS-CONVENTIONALS
XC64-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/29/13

Project: B+L Woodwaste
Event: 13488
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Method	Date	Units	SRM	True Value	Recovery
Alkalinity ERA #P114506	SM 2320	08/28/13	mg/L CaCO3	32.8	32.1	102.2%

XC64:66815

REPLICATE RESULTS-CONVENTIONALS
XC64-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/29/13

Project: B+L Woodwaste
Event: 13488
Date Sampled: 08/28/13
Date Received: 08/28/13

Analyte	Method	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: XC64A Client ID: B+L-R12-082813						
pH	EPA 150.1	08/28/13	std units	7.08	7.10	0.02
Alkalinity	SM 2320	08/28/13	mg/L CaCO3	135	134	0.7%
Carbonate	SM 2320	08/28/13	mg/L CaCO3	< 1.0	< 1.0	NA
Bicarbonate	SM 2320	08/28/13	mg/L CaCO3	135	134	0.7%
Hydroxide	SM 2320	08/28/13	mg/L CaCO3	< 1.0	< 1.0	NA

pH is evaluated as the Absolute Difference between the values rather than Relative Percent Difference

XC64:66616

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: B+L-R12-082813
SAMPLE

Lab Sample ID: XC64A
LIMS ID: 13-17945
Matrix: Water
Data Release Authorized:
Reported: 09/05/13

QC Report No: XC64-AMEC Earth & Environmental, Inc
Project: B+L Woodwaste
13488
Date Sampled: 08/28/13
Date Received: 08/28/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	09/03/13	200.8	09/04/13	**7440-38-2**	**Arsenic**	5	**746**	
200.8	09/03/13	200.8	09/04/13	**7440-50-8**	**Copper**	10	**4,130**	
200.8	09/03/13	200.8	09/04/13	**7439-92-1**	**Lead**	0.1	**20.4**	
200.8	09/03/13	200.8	09/04/13	**7440-66-6**	**Zinc**	4	**143**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: B+L-R13-082813
SAMPLE

Lab Sample ID: XC64B
LIMS ID: 13-17946
Matrix: Water
Data Release Authorized:
Reported: 09/05/13

QC Report No: XC64-AMEC Earth & Environmental, Inc
Project: B+L Woodwaste
13488
Date Sampled: 08/28/13
Date Received: 08/28/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	09/03/13	200.8	09/04/13	**7440-38-2**	**Arsenic**	0.2	**52.2**	
200.8	09/03/13	200.8	09/04/13	**7440-50-8**	**Copper**	0.5	**82.3**	
200.8	09/03/13	200.8	09/04/13	**7439-92-1**	**Lead**	0.1	**14.1**	
200.8	09/03/13	200.8	09/04/13	**7440-66-6**	**Zinc**	4	**50**	

U-Analyte undetected at given RL
RL-Reporting Limit

XC64:00616

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: B+L-R16-082813
SAMPLE

Lab Sample ID: XC64C
LIMS ID: 13-17947
Matrix: Water
Data Release Authorized:
Reported: 09/05/13

QC Report No: XC64-AMEC Earth & Environmental, Inc
Project: B+L Woodwaste
13488
Date Sampled: 08/28/13
Date Received: 08/28/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	09/03/13	200.8	09/04/13	**7440-38-2**	**Arsenic**	0.2	**75.2**	
200.8	09/03/13	200.8	09/04/13	**7440-50-8**	**Copper**	0.5	**77.1**	
200.8	09/03/13	200.8	09/04/13	**7439-92-1**	**Lead**	0.1	**0.8**	
200.8	09/03/13	200.8	09/04/13	**7440-66-6**	**Zinc**	4	**7**	

U-Analyte undetected at given RL
RL-Reporting Limit

XC64:60815

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: B+L-R15-082813
SAMPLE

Lab Sample ID: XC64D
LIMS ID: 13-17948
Matrix: Water
Data Release Authorized:
Reported: 09/05/13

QC Report No: XC64-AMEC Earth & Environmental, Inc
Project: B+L Woodwaste
13488
Date Sampled: 08/28/13
Date Received: 08/28/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	ug/L	Q
200.8	09/03/13	200.8	09/04/13	**7440-38-2**	Arsenic	0.2	285	
200.8	09/03/13	200.8	09/04/13	**7440-50-8**	Copper	0.5	176	
200.8	09/03/13	200.8	09/04/13	**7439-92-1**	Lead	0.1	5.8	
200.8	09/03/13	200.8	09/04/13	**7440-66-6**	Zinc	4	35	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: B+L-R18-082813
SAMPLE

Lab Sample ID: XC64E
LIMS ID: 13-17949
Matrix: Water
Data Release Authorized:
Reported: 09/05/13

QC Report No: XC64-AMEC Earth & Environmental, Inc
Project: B+L Woodwaste
13488
Date Sampled: 08/28/13
Date Received: 08/28/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	09/03/13	200.8	09/04/13	**7440-38-2**	**Arsenic**	0.2	**206**	
200.8	09/03/13	200.8	09/04/13	**7440-50-8**	**Copper**	0.5	**287**	
200.8	09/03/13	200.8	09/04/13	**7439-92-1**	**Lead**	0.1	**21.0**	
200.8	09/03/13	200.8	09/04/13	**7440-66-6**	**Zinc**	4	**47**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: B+L-R19-082813
SAMPLE

Lab Sample ID: XC64F
LIMS ID: 13-17950
Matrix: Water
Data Release Authorized:
Reported: 09/05/13

QC Report No: XC64-AMEC Earth & Environmental, Inc
Project: B+L Woodwaste
13488
Date Sampled: 08/28/13
Date Received: 08/28/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	09/03/13	200.8	09/04/13	**7440-38-2**	**Arsenic**	2	**663**	
200.8	09/03/13	200.8	09/04/13	**7440-50-8**	**Copper**	0.5	**169**	
200.8	09/03/13	200.8	09/04/13	**7439-92-1**	**Lead**	0.1	**113**	
200.8	09/03/13	200.8	09/04/13	**7440-66-6**	**Zinc**	4	**184**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: B+L-R20-082813
SAMPLE

Lab Sample ID: XC64G
LIMS ID: 13-17951
Matrix: Water
Data Release Authorized:
Reported: 09/05/13

QC Report No: XC64-AMEC Earth & Environmental, Inc
Project: B+L Woodwaste
13488
Date Sampled: 08/28/13
Date Received: 08/28/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	09/03/13	200.8	09/04/13	**7440-38-2**	**Arsenic**	2	**951**	
200.8	09/03/13	200.8	09/04/13	**7440-50-8**	**Copper**	0.5	**9.2**	
200.8	09/03/13	200.8	09/04/13	**7439-92-1**	**Lead**	0.1	**10.2**	
200.8	09/03/13	200.8	09/04/13	**7440-66-6**	**Zinc**	4	**12**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: B+L-R21-082813
SAMPLE

Lab Sample ID: XC64H
LIMS ID: 13-17952
Matrix: Water
Data Release Authorized:
Reported: 09/05/13

QC Report No: XC64-AMEC Earth & Environmental, Inc
Project: B+L Woodwaste
13488
Date Sampled: 08/28/13
Date Received: 08/28/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	09/03/13	200.8	09/04/13	**7440-38-2**	**Arsenic**	2	**1,060**	
200.8	09/03/13	200.8	09/04/13	**7440-50-8**	**Copper**	0.5	**6.6**	
200.8	09/03/13	200.8	09/04/13	**7439-92-1**	**Lead**	0.1	**8.2**	
200.8	09/03/13	200.8	09/04/13	**7440-66-6**	**Zinc**	4	**7**	

U-Analyte undetected at given RL
RL-Reporting Limit

XC64 : 88824

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: METHOD BLANK

Lab Sample ID: XC64MB
LIMS ID: 13-17952
Matrix: Water
Data Release Authorized:
Reported: 09/05/13

QC Report No: XC64-AMEC Earth & Environmental, Inc
Project: B+L Woodwaste
13488
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	09/03/13	200.8	09/04/13	7440-38-2	Arsenic	0.2	0.2	U
200.8	09/03/13	200.8	09/04/13	7440-50-8	Copper	0.5	0.5	U
200.8	09/03/13	200.8	09/04/13	7439-92-1	Lead	0.1	0.1	U
200.8	09/03/13	200.8	09/04/13	7440-66-6	Zinc	4	4	U

U-Analyte undetected at given RL
RL-Reporting Limit

XC64 : 68825

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: LAB CONTROL**

Lab Sample ID: XC64LCS
LIMS ID: 13-17952
Matrix: Water
Data Release Authorized:
Reported: 09/05/13

QC Report No: XC64-AMEC Earth & Environmental, Inc
Project: B+L Woodwaste
13488
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	200.8	24.1	25.0	96.4%	
Copper	200.8	27.6	25.0	110%	
Lead	200.8	26.4	25.0	106%	
Zinc	200.8	87	80	109%	

Reported in µg/L

N-Control limit not met
Control Limits: 80-120%

XC64 : 66825

Analytical Resources, Incorporated
Analytical Chemists and Consultants

September 25, 2013

Larry McGaughey
AMEC Environment and Infrastructure, Inc
One Union Square
600 University Street, Suite 600
Seattle, WA 98101

Client Project: B&L Woodwaste, 13488
ARI Job No.: XF47

Dear Mr. McGaughey:

Please find enclosed the original Chain-of-Custody record (COC), sample receipt documentation, and the final results for sample from the project referenced above. Seven water samples were received in good condition on September 17, 2013.

The samples were analyzed for Alkalinity, pH and Total metals as requested on the COC. It was noted that all alkalinity samples arrived with headspace.

There were no problems with the analyses.

An electronic copy of this report and all associated raw data will remain on file with ARI. If you have any questions or require additional information, please contact me at your convenience.

Respectfully,

ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
206.695.6211
kellyb@arilabs.com
www.arilabs.com

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number: XF47	Turn-around Requested: Standard	Page: 1 of 1	
ARI Client Company: AMEC	Phone: 201-342-1760	Date: 9/17/13	Ice Present? Y
Client Contact: Larry McGaghey		No. of Coolers: 1	Cooler Temps: 0.6
Client Project Name: BHL			
Client Project #: 13488	Samplers: Eric Olson		

Sample ID	Date	Time	Matrix	No Containers	pH	alkalinity	total metals						Notes/Comments
BHL-R7-091713	9/17/13	1011	W	3	X	X	X						
BHL-R9-091713	↓	1039	↓	3	X	X	X						
BHL-R10-091713	↓	1113	↓	3	X	X	X						
BHL-R11-091713	↓	1127	↓	3	X	X	X						
BHL-R1-091713	↓	1155	↓	3	X	X	X						
BHL-R2-091713	↓	1210	↓	3	X	X	X						
BHL-R8-091713	↓	1425	↓	3	X	X	X						

Comments/Special Instructions	Relinquished by	Received by	Relinquished by	Received by
run pH + alkalinity simultaneously	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Eric Olson	Printed Name: Jennifer Millsap	Printed Name	Printed Name
	Company: AMEC	Company: ARI	Company	Company
	Date & Time: 9/17/13 17:30	Date & Time: 9/17/13 1730	Date & Time	Date & Time

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: AMEC Project Name: B+C

COC No(s): _____ (NA) Delivered by: Fed-Ex UPS Courier (Hand Delivered) Other: _____

Assigned ARI Job No: XF47 Tracking No. _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)..... 0.6

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 90877952

Cooler Accepted by: JM Date: 9/17/13 Time: 1730

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ...	Bubble Wrap (Wet Ice) Gel Packs Baggies Foam Block Paper Other: _____		
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	(YES)	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	(NA)		

Was Sample Split by ARI : (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: JM Date: 9/18/13 Time: 656

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: _____ Date: _____

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
• • •	• • • •	● ● ●

Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to <4 mm)
Large → "lg" (4 to <6 mm)
Headspace → "hs" (>6 mm)

XF47 : 09005

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: XF47
Client: AMEC Earth & Environmental, Inc
Project Event: 13488
Project Name: B&L

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	B&L-R7-091713	XF47A	13-19681	Water	09/17/13 10:11	09/17/13 17:30
2.	B&L-R9-091713	XF47B	13-19682	Water	09/17/13 10:39	09/17/13 17:30
3.	B&L-R10-091713	XF47C	13-19683	Water	09/17/13 11:13	09/17/13 17:30
4.	B&L-R11-091713	XF47D	13-19684	Water	09/17/13 11:27	09/17/13 17:30
5.	B&L-R1-091713	XF47E	13-19685	Water	09/17/13 11:55	09/17/13 17:30
6.	B&L-R2-091713	XF47F	13-19686	Water	09/17/13 12:10	09/17/13 17:30
7.	B&L-R8-091713	XF47G	13-19687	Water	09/17/13 14:25	09/17/13 17:30

SAMPLE RESULTS-CONVENTIONALS
XF47-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 09/20/13

Project: B&L
Event: 13488
Date Sampled: 09/17/13
Date Received: 09/17/13

Client ID: B&L-R7-091713
ARI ID: 13-19681 XF47A

Analyte	Date Batch	Method	Units	RL	Sample
pH	09/18/13 091813#1	EPA 150.1	std units	0.01	6.63
Alkalinity	09/18/13 091813#1	SM 2320	mg/L CaCO3	1.0	123
Carbonate	09/18/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	09/18/13	SM 2320	mg/L CaCO3	1.0	123
Hydroxide	09/18/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
XF47-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 09/20/13

Project: B&L
Event: 13488
Date Sampled: 09/17/13
Date Received: 09/17/13

Client ID: B&L-R9-091713
ARI ID: 13-19682 XF47B

Analyte	Date Batch	Method	Units	RL	Sample
pH	09/18/13 091813#1	EPA 150.1	std units	0.01	6.57
Alkalinity	09/18/13 091813#1	SM 2320	mg/L CaCO3	1.0	166
Carbonate	09/18/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	09/18/13	SM 2320	mg/L CaCO3	1.0	166
Hydroxide	09/18/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
XF47-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 09/20/13

Project: B&L
Event: 13488
Date Sampled: 09/17/13
Date Received: 09/17/13

Client ID: B&L-R10-091713
ARI ID: 13-19683 XF47C

Analyte	Date Batch	Method	Units	RL	Sample
pH	09/18/13 091813#1	EPA 150.1	std units	0.01	6.34
Alkalinity	09/18/13 091813#1	SM 2320	mg/L CaCO3	1.0	672
Carbonate	09/18/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	09/18/13	SM 2320	mg/L CaCO3	1.0	672
Hydroxide	09/18/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
XF47-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 09/20/13

Project: B&L
Event: 13488
Date Sampled: 09/17/13
Date Received: 09/17/13

Client ID: B&L-R11-091713
ARI ID: 13-19684 XF47D

Analyte	Date Batch	Method	Units	RL	Sample
pH	09/18/13 091813#1	EPA 150.1	std units	0.01	6.47
Alkalinity	09/18/13 091813#1	SM 2320	mg/L CaCO3	1.0	924
Carbonate	09/18/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	09/18/13	SM 2320	mg/L CaCO3	1.0	924
Hydroxide	09/18/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
XF47-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 09/20/13

Project: B&L
Event: 13488
Date Sampled: 09/17/13
Date Received: 09/17/13

Client ID: B&L-R1-091713
ARI ID: 13-19685 XF47E

Analyte	Date Batch	Method	Units	RL	Sample
pH	09/18/13 091813#1	EPA 150.1	std units	0.01	6.50
Alkalinity	09/18/13 091813#1	SM 2320	mg/L CaCO3	1.0	654
Carbonate	09/18/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	09/18/13	SM 2320	mg/L CaCO3	1.0	654
Hydroxide	09/18/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
XF47-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 09/20/13

Project: B&L
Event: 13488
Date Sampled: 09/17/13
Date Received: 09/17/13

Client ID: B&L-R2-091713
ARI ID: 13-19686 XF47F

Analyte	Date Batch	Method	Units	RL	Sample
pH	09/18/13 091813#1	EPA 150.1	std units	0.01	7.18
Alkalinity	09/18/13 091813#1	SM 2320	mg/L CaCO3	1.0	140
Carbonate	09/18/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	09/18/13	SM 2320	mg/L CaCO3	1.0	140
Hydroxide	09/18/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U

RL Analytical reporting limit
U Undetected at reported detection limit

XF47 090913

SAMPLE RESULTS-CONVENTIONALS
XF47-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 09/20/13

Project: B&L
Event: 13488
Date Sampled: 09/17/13
Date Received: 09/17/13

Client ID: B&L-R8-091713
ARI ID: 13-19687 XF47G

Analyte	Date Batch	Method	Units	RL	Sample
pH	09/18/13 091813#1	EPA 150.1	std units	0.01	6.36
Alkalinity	09/18/13 091813#1	SM 2320	mg/L CaCO3	1.0	327
Carbonate	09/18/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	09/18/13	SM 2320	mg/L CaCO3	1.0	327
Hydroxide	09/18/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U

RL Analytical reporting limit
U Undetected at reported detection limit

LAB CONTROL RESULTS-CONVENTIONALS
XF47-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 09/20/13

Project: B&L
Event: 13488
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
pH EPA 150.1	ICVL	09/18/13	std units	7.02	7.00	0.02

pH is evaluated as the Absolute Difference between the values rather than Percent Recovery.

STANDARD REFERENCE RESULTS-CONVENTIONALS
XF47-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 09/20/13

Project: B&L
Event: 13488
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Method	Date	Units	SRM	True Value	Recovery
Alkalinity ERA #P114506	SM 2320	09/18/13	mg/L CaCO3	32.6	32.1	101.6%

REPLICATE RESULTS-CONVENTIONALS
XF47-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 09/20/13

Project: B&L
Event: 13488
Date Sampled: 09/17/13
Date Received: 09/17/13

Analyte	Method	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: XF47A Client ID: B&L-R7-091713						
pH	EPA 150.1	09/18/13	std units	6.63	6.64	0.01
Alkalinity	SM 2320	09/18/13	mg/L CaCO3	123	124	0.8%
Carbonate	SM 2320	09/18/13	mg/L CaCO3	< 1.0	< 1.0	NA
Bicarbonate	SM 2320	09/18/13	mg/L CaCO3	123	124	0.8%
Hydroxide	SM 2320	09/18/13	mg/L CaCO3	< 1.0	< 1.0	NA

pH is evaluated as the Absolute Difference between the values rather than Relative Percent Difference

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: B&L-R7-091713
SAMPLE

Lab Sample ID: XF47A
LIMS ID: 13-19681
Matrix: Water
Data Release Authorized:
Reported: 09/24/13

QC Report No: XF47-AMEC Earth & Environmental, Inc
Project: B&L
13488
Date Sampled: 09/17/13
Date Received: 09/17/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	09/20/13	200.8	09/23/13	**7440-38-2**	**Arsenic**	0.2	**50.0**	
200.8	09/20/13	200.8	09/23/13	**7440-50-8**	**Copper**	0.5	**1.7**	
200.8	09/20/13	200.8	09/23/13	**7439-92-1**	**Lead**	0.1	**0.9**	
200.8	09/20/13	200.8	09/23/13	**7440-66-6**	**Zinc**	4	**4**	

U-Analyte undetected at given RL
RL-Reporting Limit

XF47.00015

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: B&L-R7-091713
DUPLICATE

Lab Sample ID: XF47A
LIMS ID: 13-19681
Matrix: Water
Data Release Authorized:
Reported: 09/24/13

QC Report No: XF47-AMEC Earth & Environmental, Inc
Project: B&L
13488
Date Sampled: 09/17/13
Date Received: 09/17/13

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	200.8	50.0	50.4	0.8%	+/- 20%	
Copper	200.8	1.7	1.1	42.9%	+/- 0.5	L*
Lead	200.8	0.9	0.9	0.0%	+/- 20%	
Zinc	200.8	4	5	22.2%	+/- 4	L

Reported in µg/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: B&L-R7-091713
MATRIX SPIKE

Lab Sample ID: XF47A
LIMS ID: 13-19681
Matrix: Water
Data Release Authorized:
Reported: 09/24/13

QC Report No: XF47-AMEC Earth & Environmental, Inc
Project: B&L
13488
Date Sampled: 09/17/13
Date Received: 09/17/13

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	200.8	50.0	77.0	25.0	108%	
Copper	200.8	1.7	26.0	25.0	97.2%	
Lead	200.8	0.9	26.2	25.0	101%	
Zinc	200.8	4	69	80	81.2%	

Reported in µg/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked
NR-Not Recovered

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
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Sample ID: B&L-R9-091713
SAMPLE

Lab Sample ID: XF47B
LIMS ID: 13-19682
Matrix: Water
Data Release Authorized:
Reported: 09/24/13

QC Report No: XF47-AMEC Earth & Environmental, Inc
Project: B&L
13488
Date Sampled: 09/17/13
Date Received: 09/17/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	09/20/13	200.8	09/23/13	**7440-38-2**	**Arsenic**	2	**552**	
200.8	09/20/13	200.8	09/23/13	**7440-50-8**	**Copper**	0.5	**12.6**	
200.8	09/20/13	200.8	09/23/13	**7439-92-1**	**Lead**	0.1	**3.2**	
200.8	09/20/13	200.8	09/23/13	**7440-66-6**	**Zinc**	4	**11**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: B&L-R10-091713
SAMPLE

Lab Sample ID: XF47C
LIMS ID: 13-19683
Matrix: Water
Data Release Authorized:
Reported: 09/24/13

QC Report No: XF47-AMEC Earth & Environmental, Inc
Project: B&L
13488
Date Sampled: 09/17/13
Date Received: 09/17/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	09/20/13	200.8	09/23/13	**7440-38-2**	**Arsenic**	2	**692**	
200.8	09/20/13	200.8	09/23/13	**7440-50-8**	**Copper**	0.5	**4.4**	
200.8	09/20/13	200.8	09/23/13	**7439-92-1**	**Lead**	0.1	**3.5**	
200.8	09/20/13	200.8	09/23/13	**7440-66-6**	**Zinc**	4	**21**	

U-Analyte undetected at given RL
RL-Reporting Limit

XF47:0913

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: B&L-R11-091713
SAMPLE

Lab Sample ID: XF47D
LIMS ID: 13-19684
Matrix: Water
Data Release Authorized:
Reported: 09/24/13

QC Report No: XF47-AMEC Earth & Environmental, Inc
Project: B&L
13488
Date Sampled: 09/17/13
Date Received: 09/17/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	09/20/13	200.8	09/23/13	**7440-38-2**	**Arsenic**	10	**4,370**	
200.8	09/20/13	200.8	09/23/13	**7440-50-8**	**Copper**	0.5	**76.7**	
200.8	09/20/13	200.8	09/23/13	**7439-92-1**	**Lead**	0.1	**27.2**	
200.8	09/20/13	200.8	09/23/13	**7440-66-6**	**Zinc**	4	**143**	

U-Analyte undetected at given RL
RL-Reporting Limit

XF47 1 0606268

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: B&L-R1-091713
SAMPLE

Lab Sample ID: XF47E
LIMS ID: 13-19685
Matrix: Water
Data Release Authorized:
Reported: 09/24/13

QC Report No: XF47-AMEC Earth & Environmental, Inc
Project: B&L
13488
Date Sampled: 09/17/13
Date Received: 09/17/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	09/20/13	200.8	09/23/13	**7440-38-2**	**Arsenic**	2	**711**	
200.8	09/20/13	200.8	09/23/13	**7440-50-8**	**Copper**	0.5	**27.6**	
200.8	09/20/13	200.8	09/23/13	**7439-92-1**	**Lead**	0.1	**11.2**	
200.8	09/20/13	200.8	09/23/13	**7440-66-6**	**Zinc**	4	**37**	

U-Analyte undetected at given RL
RL-Reporting Limit

XF47I00002

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: B&L-R2-091713
SAMPLE

Lab Sample ID: XF47F
LIMS ID: 13-19686
Matrix: Water
Data Release Authorized:
Reported: 09/24/13

QC Report No: XF47-AMEC Earth & Environmental, Inc
Project: B&L
13488
Date Sampled: 09/17/13
Date Received: 09/17/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	09/20/13	200.8	09/23/13	**7440-38-2**	**Arsenic**	0.2	**50.6**	
200.8	09/20/13	200.8	09/23/13	**7440-50-8**	**Copper**	0.5	**13.4**	
200.8	09/20/13	200.8	09/23/13	**7439-92-1**	**Lead**	0.1	**3.0**	
200.8	09/20/13	200.8	09/23/13	**7440-66-6**	**Zinc**	4	**10**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: B&L-R8-091713
SAMPLE

Lab Sample ID: XF47G
LIMS ID: 13-19687
Matrix: Water
Data Release Authorized:
Reported: 09/24/13

QC Report No: XF47-AMEC Earth & Environmental, Inc
Project: B&L
13488
Date Sampled: 09/17/13
Date Received: 09/17/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	09/20/13	200.8	09/23/13	**7440-38-2**	**Arsenic**	0.2	**250**	
200.8	09/20/13	200.8	09/23/13	**7440-50-8**	**Copper**	0.5	**3.1**	
200.8	09/20/13	200.8	09/23/13	**7439-92-1**	**Lead**	0.1	**1.0**	
200.8	09/20/13	200.8	09/23/13	**7440-66-6**	**Zinc**	4	**17**	

U-Analyte undetected at given RL
RL-Reporting Limit

XF47:000023

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: XF47MB
LIMS ID: 13-19682
Matrix: Water
Data Release Authorized:
Reported: 09/24/13

QC Report No: XF47-AMEC Earth & Environmental, Inc
Project: B&L
13488
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	09/20/13	200.8	09/23/13	7440-38-2	Arsenic	0.2	0.2	U
200.8	09/20/13	200.8	09/23/13	7440-50-8	Copper	0.5	0.5	U
200.8	09/20/13	200.8	09/23/13	7439-92-1	Lead	0.1	0.1	U
200.8	09/20/13	200.8	09/23/13	7440-66-6	Zinc	4	4	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: XF47LCS
LIMS ID: 13-19682
Matrix: Water
Data Release Authorized:
Reported: 09/24/13

QC Report No: XF47-AMEC Earth & Environmental, Inc
Project: B&L
13488
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	200.8	26.7	25.0	107%	
Copper	200.8	25.1	25.0	100%	
Lead	200.8	26.7	25.0	107%	
Zinc	200.8	74	80	92.5%	

Reported in µg/L

N-Control limit not met
Control Limits: 80-120%

XF47:00023

Analytical Resources, Incorporated
Analytical Chemists and Consultants

September 26, 2013

Larry McGaughey
AMEC Environment and Infrastructure, Inc
One Union Square
600 University Street, Suite 600
Seattle, WA 98101

Client Project: B&L Woodwaste, 13488
ARI Job No.: XF91

Dear Mr. McGaughey:

Please find enclosed the original Chain-of-Custody record (COC), sample receipt documentation, and the final results for sample from the project referenced above. Two water samples were received in good condition on September 19, 2013.

The samples were analyzed for Alkalinity, pH and Total metals as requested on the COC. It was noted that all alkalinity samples arrived with headspace. The pH samples were analyzed outside of the method recommended holding time and analyzed as requested per the client to be analyzed simultaneously with alkalinity.

There were no problems with the analyses.

An electronic copy of this report and all associated raw data will remain on file with ARI. If you have any questions or require additional information, please contact me at your convenience.

Respectfully,

ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
206.695.6211
kellyb@arilabs.com
www.arilabs.com

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: XF91	Turn-around Requested: Standard	Page: 1 of 1	
ARI Client Company: AMEC	Phone: 206-342-1760	Date: 9/19/13	Ice Present? Y
Client Contact: Larry McGaughey		No. of Coolers: 1	Cooler Temps: 4.2
Client Project Name: B+L			
Client Project #: 13488	Samplers: Eric Olson		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: Total metals	pH	Alkalinity	Notes/Comments
B+L-R5-091913	9/19/13	1415	W	3	X	X	X	
B+L-R4-091913	9/19/13	1422	W	3	X	X	X	

Comments/Special Instructions: Run pH + Alkalinity Simultaneously

	Relinquished by	Received by	Relinquished by	Received by
(Signature)				
Printed Name	Eric Olson	A. Volgardsen		
Company	AMEC	ARI		
Date & Time	9/19/13 17:30	9/19/13 1730		

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: AMEC Project Name: B+L

COC No(s): _____ (NA) Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: XF91 Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)
Time: 1726 4.2

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 90877952

Cooler Accepted by: AV Date: 9/19/13 Time 1730

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? Bubble Wrap (Wet Ice) Gel Packs Baggies Foam Block Paper Other: _____			
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)	NA	(YES)	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI.	(NA)		_____

Was Sample Split by ARI (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

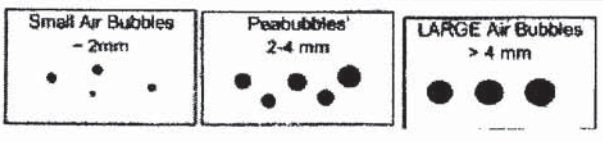
Samples Logged by: SM Date: 9/20/13 Time: 1005

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By _____ Date. _____



Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: XF91
Client: AMEC Earth & Environmental, Inc
Project Event: 13488
Project Name: B&L

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	B&L-R5-091913	XF91A	13-20115	Water	09/19/13 14:15	09/19/13 17:30
2.	B&L-R4-091913	XF91B	13-20116	Water	09/19/13 14:22	09/19/13 17:30

XF91 : 090904

SAMPLE RESULTS-CONVENTIONALS
XF91-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 09/25/13

Project: B&L
Event: 13488
Date Sampled: 09/19/13
Date Received: 09/19/13

Client ID: B&L-R5-091913
ARI ID: 13-20115 XF91A

Analyte	Date Batch	Method	Units	RL	Sample
pH	09/20/13 092013#1	EPA 150.1	std units	0.01	6.31
Alkalinity	09/20/13 092013#1	SM 2320	mg/L CaCO3	1.0	685
Carbonate	09/20/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	09/20/13	SM 2320	mg/L CaCO3	1.0	685
Hydroxide	09/20/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U

RL Analytical reporting limit
U Undetected at reported detection limit

XF91 : 000000

SAMPLE RESULTS-CONVENTIONALS
XF91-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 09/25/13

Project: B&L
Event: 13488
Date Sampled: 09/19/13
Date Received: 09/19/13

Client ID: B&L-R4-091913
ARI ID: 13-20116 XF91B

Analyte	Date Batch	Method	Units	RL	Sample
pH	09/20/13 092013#1	EPA 150.1	std units	0.01	6.42
Alkalinity	09/20/13 092013#1	SM 2320	mg/L CaCO3	1.0	512
Carbonate	09/20/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	09/20/13	SM 2320	mg/L CaCO3	1.0	512
Hydroxide	09/20/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U

RL Analytical reporting limit
U Undetected at reported detection limit

LAB CONTROL RESULTS-CONVENTIONALS
XF91-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 09/25/13

Project: B&L
Event: 13488
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
pH EPA 150.1	ICVL	09/20/13	std units	6.98	7.00	0.02

pH is evaluated as the Absolute Difference between the values rather than Percent Recovery.

STANDARD REFERENCE RESULTS-CONVENTIONALS
XF91-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 09/25/13

Project: B&L
Event: 13488
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Method	Date	Units	SRM	True Value	Recovery
Alkalinity ERA #P114506	SM 2320	09/20/13	mg/L CaCO3	32.8	32.1	102.2%

XF91 000005

REPLICATE RESULTS-CONVENTIONALS
XF91-AMEC Earth & Environmental, Inc

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 09/25/13

Project: B&L
Event: 13488
Date Sampled: 09/19/13
Date Received: 09/19/13

Analyte	Method	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: XF91A Client ID: B&L-R5-091913						
pH	EPA 150.1	09/20/13	std units	6.31	6.35	0.04
Alkalinity	SM 2320	09/20/13	mg/L CaCO3	685	680	0.7%
Carbonate	SM 2320	09/20/13	mg/L CaCO3	< 1.0	< 1.0	NA
Bicarbonate	SM 2320	09/20/13	mg/L CaCO3	685	680	0.7%
Hydroxide	SM 2320	09/20/13	mg/L CaCO3	< 1.0	< 1.0	NA

pH is evaluated as the Absolute Difference between the values rather than Relative Percent Difference

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
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Sample ID: B&L-R5-091913
SAMPLE

Lab Sample ID: XF91A
LIMS ID: 13-20115
Matrix: Water
Data Release Authorized:
Reported: 09/26/13

QC Report No: XF91-AMEC Earth & Environmental, Inc
Project: B&L
13488
Date Sampled: 09/19/13
Date Received: 09/19/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	09/23/13	200.8	09/25/13	**7440-38-2**	**Arsenic**	10	**3,240**	
200.8	09/23/13	200.8	09/24/13	**7440-50-8**	**Copper**	0.5	**8.4**	
200.8	09/23/13	200.8	09/24/13	**7439-92-1**	**Lead**	0.1	**3.5**	
200.8	09/23/13	200.8	09/24/13	**7440-66-6**	**Zinc**	4	**8**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: B&L-R4-091913
SAMPLE

Lab Sample ID: XF91B
LIMS ID: 13-20116
Matrix: Water
Data Release Authorized:
Reported: 09/26/13

QC Report No: XF91-AMEC Earth & Environmental, Inc
Project: B&L
13488
Date Sampled: 09/19/13
Date Received: 09/19/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	09/23/13	200.8	09/25/13	**7440-38-2**	**Arsenic**	10	**1,810**	
200.8	09/23/13	200.8	09/24/13	**7440-50-8**	**Copper**	0.5	**3.7**	
200.8	09/23/13	200.8	09/24/13	**7439-92-1**	**Lead**	0.1	**2.9**	
200.8	09/23/13	200.8	09/24/13	**7440-66-6**	**Zinc**	4	**11**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: METHOD BLANK

Lab Sample ID: XF91MB
LIMS ID: 13-20115
Matrix: Water
Data Release Authorized:
Reported: 09/26/13

QC Report No: XF91-AMEC Earth & Environmental, Inc
Project: B&L
13488
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	09/23/13	200.8	09/24/13	7440-38-2	Arsenic	0.2	0.2	U
200.8	09/23/13	200.8	09/24/13	7440-50-8	Copper	0.5	0.5	U
200.8	09/23/13	200.8	09/24/13	7439-92-1	Lead	0.1	0.1	U
200.8	09/23/13	200.8	09/24/13	7440-66-6	Zinc	4	4	U

U-Analyte undetected at given RL
RL-Reporting Limit

XF91:09MB12

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: LAB CONTROL

Lab Sample ID: XF91LCS
LIMS ID: 13-20115
Matrix: Water
Data Release Authorized:
Reported: 09/26/13

QC Report No: XF91-AMEC Earth & Environmental, Inc
Project: B&L
13488
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	200.8	22.8	25.0	91.2%	
Copper	200.8	25.3	25.0	101%	
Lead	200.8	25.1	25.0	100%	
Zinc	200.8	74	80	92.5%	

Reported in µg/L

N-Control limit not met
Control Limits: 80-120%

XF91:09613

B&L Woodwaste Site

2013 Annual Operations & Maintenance Report

Appendix B
Specific Capacity Testing

B&L Wood Waste Site
Milton, WA
Specific Capacity Testing Form

	Date	Well 1 Reading	Well 1 Flow Rate	Time	Well 2 Reading	Well 2 Flow Rate	Time	Well 3 Reading	Well 3 Flow Rate	Time	Well 4 Reading	Well 4 Flow Rate	Time
Day 1		**R12**			**R15**			**R17**			**R4**		
DTW 1	12/16/2013	2.23		8:51	2.23		10:32	3.19		8:58	34.24		11:11
DTW 2	12/16/2013	6.96	1.74	16:34	8.87	1.54	16:08	3.36	0.31	16:43	39.83	3.11	16:55
DTW 3	12/17/2013	2.28		8:18	2.23		9:10	3.16		8:26	34.12		7:55
Day 2		**R13**			**R14**			**R20**			**R5**		
DTW 1	12/17/2013	1.39		8:04	2.37		9:15	2.26		8:42	38.27		7:49
DTW 2	12/17/2013	1.44	0.30	16:55	8.11	2.02	16:12	2.44	0.00	16:38	50.43	2.02	17:18
DTW 3	12/18/2013	1.49		9:33	2.45		10:00	2.26		9:10	38.01		7:55
Day 3		**R19**			**R8**			**R2**			**R11**		
DTW 1	12/18/2013	2.02		9:03	16.63		8:35	9.55		7:45	15.24		8:20
DTW 2	12/18/2013	2.26	0.00	16:22	18.82	*2.44*	16:46	21.98	5.76	16:38	23.32	*0.24*	17:08
DTW 3	12/19/2013	2.05		9:10	17.04		8:12	9.60		7:49	15.23		8:32
Day 4		**R7**			**R1**			**R18**			**R10**		
DTW 1	12/19/2013	9.61		8:24	10.79		8:39	2.51		9:20	13.08		8:03
DTW 2	12/19/2013	10.05	6.18		17.28	4.02	16:39	2.55	*0.40*	16:09	26.06	*2.80*	16:45
DTW 3	12/20/2013	--		--	--		--	--		--	--		--
Day 5		**R9**			**R16**			**R21**					
DTW 1	12/20/2013	18.51		10:44	3.36		9:47	1.92		9:14			
DTW 2	12/20/2013	18.02	6.16	16:13	4.07	0.69	16:33	1.90	*0.23*	16:43			

Notes:

1. Prior to measuring the DTW for day 1, all pumps must be turned off for at least 12 hrs.
2. DTW 1 = Depth to water prior to any pumping (Taken at the start of the day).
3. DTW 2 = Depth to water after at least 8 hrs of continuous pumping of the well group.
4. DTW 3 = Depth to water prior to starting the wells the next day to check well recovery.

Italicized numbers were calculated from readings and flow data from PLC.

B&L Wood Waste Site
Milton, WA
Specific Capacity Testing Form

	Date	Well 1 Reading	Well 1 Flow Rate	Time	Well 2 Reading	Well 2 Flow Rate	Time	Well 3 Reading	Well 3 Flow Rate	Time	Well 4 Reading	Well 4 Flow Rate	Time	Comments
Day 1			R12			R15			R17			R4		
DTW 1	12/16/2013	2.23		0851	2.23		1032	3.19		0858	34.24		1111	Start Wells
DTW 2	12/16/2013	6.96	1.74	1634	8.87	1.54	1608	3.36	0.31	1643	39.83	3.11	1655	Shutoff Wells After Reading
DTW 3	12/17/2013	2.28		0818	2.23		0910	3.16		0826	34.12		0755	
Day 2			R13	0804		R14			R20			R5		
DTW 1	12/17/2013	1.39		~~0845~~	2.37		0915	2.26		0842	38.27		0749	Start Wells
DTW 2	12/17/2013	1.44	0.30	1655	8.11	2.02	1612	2.44	0.00	1638	50.43*	2.02	1718	Shutoff Wells After Reading
DTW 3	12/18/2013	1.49		0933	2.45		1000	2.26		0910	38.01		0755	
Day 3			R19			R8			R2			R11		
DTW 1	12/18/2013	2.02		0903	16.63		0835	9.55		0745	15.24		0820	Start Wells
DTW 2	12/18/2013	2.26	**	1622	18.82	**	1646	21.98	5.76	1638	22.32	**	1708	Shutoff Wells After Reading
DTW 3	12/19/2013	2.05		0910	17.04		0812	9.60		0749	15.23		0832	
Day 4			R7			R1			R18			R10		
DTW 1	12/19/2013	9.61		0824	10.79		0839	2.51		0920	1308		0803	Start Wells
DTW 2	12/19/2013	10.05	6.18		17.78	4.02	1639	2.55	**	1609	26.00	**	1645	Shutoff Wells After Reading
DTW 3	12/20/2013	~~4.44~~		~~0844~~	10.43		1027	9.99		0741				
Day 5			R9			R16			R21					
DTW 1	12/20/2013	15.51		1044	3.36		947	1.92		954				Start Wells
DTW 2	12/20/2013	18.02	6.16	413	4.07	0.69	432	1.90	0.00	442				Turn back on all wells.

Notes:
1. Prior to measuring the DTW for day 1, all pumps must be turned off for at least 12 hrs.
2. DTW 1 = Depth to water prior to any pumping (Taken at the start of the day).
3. DTW 2 = Depth to water after at least 8 hrs of continuous pumping of the well group.
4. DTW 3 = Depth to water prior to starting the wells the next day to check well recovery.

* R5 appears refusal at pump
** R11, R8, R9, R10, R18 flow meter does not work

B&L Woodwaste Site

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Appendix C
Recovery Well Inspection

MAINTENCE LOG WELL PUMP R-01

DATE	ACTIVITY
2/12/2013	Visually inspected well from outside, doesn't appear to be leaking

MAINTENCE LOG WELL PUMP R-02

DATE	ACTIVITY
2/12/2013	Visually inspected well from outside, doesn't appear to be leaking
10/24/2013	Pump unresponsive to PLC, cycled power to CU-300, issue resolved
12/18/2013	Vault inspected, 6.14GPM

MAINTENCE LOG WELL PUMP R-04

DATE	ACTIVITY
2/12/2013	Visually inspected well from outside, doesn't appear to be leaking
9/17/2013	Pump unresponsive to PLC, cycled power to CU-300, issue resolved

MAINTENCE LOG WELL PUMP R-05

DATE	ACTIVITY
2/12/2013	Visually inspected well from outside, doesn't appear to be leaking
3/4/2013	Power cycled CU-300, pump would not respond to PLC commands
9/17/2013	Pump unresponsive to PLC, cycled power to CU-300, issue resolved
10/24/2013	Pump unresponsive to PLC, cycled power to CU-300, issue resolved
12/17/2013	Vault inspected, adjusted backpressure, 2.00GPM

MAINTENCE LOG WELL PUMP R-07

DATE	ACTIVITY
2/12/2013	Visually inspected well from outside, doesn't appear to be leaking
6/21/2013	Pump unresponsive to PLC, cycled power to CU-300, issue resolved
7/17/2013	Inspected vault,5.78 gpm

MAINTENCE LOG WELL PUMP R-08

DATE	ACTIVITY
2/12/2013	Visually inspected well from outside, doesn't appear to be leaking
3/22/2013	PLC reported fault, CU-330 reports dryrunning. Turned down speed.
6/21/2013	Pump unresponsive to PLC, cycled power to CU-300, issue resolved
7/17/2013	Inspected vault, flow meter broken, frequently dryrunning faults
12/18/2013	Inspected vault, flow meter broken, 2GPM via main flowmeter

MAINTENCE LOG WELL PUMP R-09

DATE	ACTIVITY
2/12/2013	Visually inspected well from outside, doesn't appear to be leaking
6/21/2013	Pump unresponsive to PLC, cycled power to CU-300, issue resolved
7/17/2013	Inspected vault, 6.58gpm

MAINTENCE LOG WELL PUMP R-10

DATE	ACTIVITY
2/12/2013	Visually inspected well from outside, doesn't appear to be leaking
2/26/2013	Fault reported at PLC, reset itself.

MAINTENCE LOG WELL PUMP R-11

DATE	ACTIVITY
2/12/2013	Visually inspected well from outside, doesn't appear to be leaking
12/18/2013	Vault inspected,flowmeter doesn’t work.

MAINTENCE LOG WELL PUMP R-12

DATE	ACTIVITY
2/5/2013	Pipping broke, spraying water. Vault flooded.
2/12/2013	Visually inspected well from outside, doesn't appear to be leaking
3/8/2013	Replaced check valve

MAINTENCE LOG WELL PUMP R-13

DATE	ACTIVITY
2/5/2013	Check valve broke, spraying water
2/12/2013	Visually inspected well from outside, doesn't appear to be leaking
3/8/2013	Replaced checkvalve
3/12/2013	Inspected vault, still small leak in repaired piping
10/30/2013	Pump faults at PLC, Cleaned y-strainer, not resolved

MAINTENCE LOG WELL PUMP R-14

DATE	ACTIVITY
2/12/2013	Visually inspected well from outside, doesn't appear to be leaking
11/8/2013	Spare pump installed

MAINTENCE LOG WELL PUMP R-15

DATE	ACTIVITY
2/12/2013	Visually inspected well from outside, doesn't appear to be leaking

MAINTENCE LOG WELL PUMP R-16

DATE	ACTIVITY

MAINTENCE LOG WELL PUMP R-17

DATE	ACTIVITY
11/7/2013	No flow, pvc hose became disconected, replaced with Stainless Steel fitting
11/8/2013	Vault inspected and tested, 1.28GPM

MAINTENCE LOG WELL PUMP R-18

DATE	ACTIVITY

MAINTENCE LOG WELL PUMP R-19

DATE	ACTIVITY

MAINTENCE LOG WELL PUMP R-20

DATE	ACTIVITY

MAINTENCE LOG WELL PUMP R-21

DATE	ACTIVITY

B&L Woodwaste Site

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Appendix D
Transducer Maintenance

Equipment		Transducer 1a
Date	**Operator**	**Maintenance Performed**
3/1/2013	Mark Mierjesk	Etran set at 7.327 based on DTW readings.
6/17/2013	Eric Olson	New transducer installed.
6/17/2013	Eric Olson	Etran set at 3.1 based on DTW readings.
7/19/2013	Eric Olson	Calibration check. Difference between Manual DTW and PLC reading is 0.11 ft.
9/13/2013	Charles Hand	New in-situ transducer installed.
9/14/2013	Charles Hand	Calibration performed for new transducers. Etran set at 2.904.
10/7/2013	Charles Hand	Calibration check. Difference between Manual DTW and PLC reading is 0.06 ft.

Equipment		Transducer 1b
Date	**Operator**	**Maintenance Performed**
3/1/2013	Mark Mierjesk	Etran set at 2.394 based on DTW readings.
9/13/2013	Charles Hand	New in-situ transducer installed.
9/14/2013	Charles Hand	Calibration performed for new transducers. Etran set at 3.198.
10/7/2013	Charles Hand	Calibration check. Difference between Manual DTW and PLC reading is 0.06 ft.

Equipment		Transducer 2a
Date	**Operator**	**Maintenance Performed**
3/1/2013	Mark Mierjesk	Etran set at 2.966 based on DTW readings.
6/17/2013	Eric Olson	New transducer installed.
6/17/2013	Eric Olson	Etran set at 2.66 based on DTW readings.
7/19/2013	Eric Olson	Calibration check. Difference between Manual DTW and PLC reading is 0.18 ft.
9/13/2013	Charles Hand	New in-situ transducer installed.
9/14/2013	Charles Hand	Calibration performed for new transducers. Etran set at 2.476.
10/7/2013	Charles Hand	Calibration check. Difference between Manual DTW and PLC reading is 0.04 ft.

Equipment		Transducer 2b
Date	**Operator**	**Maintenance Performed**
3/1/2013	Mark Mierjesk	Etran set at 2.966 based on DTW readings.
6/17/2013	Eric Olson	New transducer installed.
6/17/2013	Eric Olson	Etran set at 3.15 based on DTW readings.
7/19/2013	Eric Olson	Calibration check. Difference between Manual DTW and PLC reading is 0.32 ft.
7/19/2013	Eric Olson	Calibration check. Difference between Manual DTW and PLC reading is 0.46 ft.
7/24/2013	Eric Olson	Changed Etran value in PLC from 3.15 to 2.76 due to manual depth to water measurements
9/13/2013	Charles Hand	New in-situ transducer installed.
9/14/2013	Charles Hand	Calibration performed for new transducers. Etran set at 2.881.
10/7/2013	Charles Hand	Calibration check. Difference between Manual DTW and PLC reading is 0.07 ft.

Equipment		Transducer 3a
Date	**Operator**	**Maintenance Performed**
3/1/2013	Mark Mierjesk	Etran set at 6.071 based on DTW readings.
6/17/2013	Eric Olson	New transducer installed.
6/17/2013	Eric Olson	Etran set at 4.19 based on DTW readings.
7/19/2013	Eric Olson	Calibration check. Difference between Manual DTW and PLC reading is 0.09 ft.
9/13/2013	Charles Hand	New in-situ transducer installed.
9/14/2013	Charles Hand	Calibration performed for new transducers. Etran set at 3.889.
10/7/2013	Charles Hand	Calibration check. Difference between Manual DTW and PLC reading is 0.00 ft.

Equipment		Transducer 3b
Date	**Operator**	**Maintenance Performed**
3/1/2013	Mark Mierjesk	Etran set at 11.652 based on DTW readings.
6/19/2013	Eric Olson	New transducer installed.
6/19/2013	Eric Olson	Etran set at 3.95 based on DTW readings.
7/19/2013	Eric Olson	Calibration check. Difference between Manual DTW and PLC reading is 0.01 ft.
9/13/2013	Charles Hand	New in-situ transducer installed.
9/14/2013	Charles Hand	Calibration performed for new transducers. Etran set at 3.223.
10/7/2013	Charles Hand	Calibration check. Difference between Manual DTW and PLC reading is 0.10 ft.

Equipment		Transducer 4a
Date	**Operator**	**Maintenance Performed**
3/1/2013	Mark Mierjesk	Etran set at 2.515 based on DTW readings.
6/17/2013	Eric Olson	New transducer installed.
6/17/2013	Eric Olson	Etran set at 2.72 based on DTW readings.
7/19/2013	Eric Olson	Calibration check. Difference between Manual DTW and PLC reading is 0.08 ft.
9/13/2013	Charles Hand	New in-situ transducer installed.
9/14/2013	Charles Hand	Calibration performed for new transducers. Etran set at 3.368.
10/7/2013	Charles Hand	Calibration check. Difference between Manual DTW and PLC reading is 0.00 ft.

Equipment		Transducer 4b
Date	**Operator**	**Maintenance Performed**
3/1/2013	Mark Mierjesk	Etran set at 4.328 based on DTW readings.
6/17/2013	Eric Olson	New transducer installed.
6/17/2013	Eric Olson	Etran set at 3.5 based on DTW readings.
7/19/2013	Eric Olson	Calibration check. Difference between Manual DTW and PLC reading is 0.19 ft.
9/13/2013	Charles Hand	New in-situ transducer installed.
9/14/2013	Charles Hand	Calibration performed for new transducers. Etran set at 3.283.
10/7/2013	Charles Hand	Calibration check. Difference between Manual DTW and PLC reading is 0.03 ft.

Equipment		Transducer 4c
Date	**Operator**	**Maintenance Performed**
3/1/2013	Mark Mierjeski	Etran set at 4.152 based on DTW readings.
6/19/2013	Eric Olson	New transducer installed.
6/19/2013	Eric Olson	Etran set at 5.03 based on DTW readings.
7/19/2013	Eric Olson	Calibration check. Difference between Manual DTW and PLC reading is 0.29 ft.
7/19/2013	Eric Olson	Calibration check. Difference between Manual DTW and PLC reading is 0.15 ft.
7/24/2013	Eric Olson	Changed Etran value in PLC from 5.03 to 5.25 due to manual depth to water measurements
9/13/2013	Charles Hand	New in-situ transducer installed.
9/14/2013	Charles Hand	Calibration performed for new transducers. Etran set at 4.840.
10/7/2013	Charles Hand	Calibration check. Difference between Manual DTW and PLC reading is 0.21 ft.

Equipment **Transducer 5a**

Date	Operator	Maintenance Performed
3/1/2013	Mark Mierjesk	Etran set at 5.063 based on DTW readings.
6/14/2013	Eric Olson	New transducer installed.
6/14/2013	Eric Olson	Etran set at 5.28 based on DTW readings.
7/19/2013	Eric Olson	Calibration check. Difference between Manual DTW and PLC reading is 0.12 ft.
9/13/2013	Charles Hand	New in-situ transducer installed.
9/14/2013	Charles Hand	Calibration performed for new transducers. Etran set at 4.764.
10/7/2013	Charles Hand	Calibration check. Difference between Manual DTW and PLC reading is 0.06 ft.

Equipment		Transducer 5b
Date	**Operator**	**Maintenance Performed**
3/1/2013	Mark Mierjesk	Etran set at 5.768 based on DTW readings.
6/17/2013	Eric Olson	New transducer installed.
6/19/2013	Eric Olson	Etran set at 4.27 based on DTW readings.
7/19/2013	Eric Olson	Calibration check. Difference between Manual DTW and PLC reading is 1.02 ft.
7/23/2013	Eric Olson	Changed Etran value in PLC from 4.27 to 5.27 due to field error during original calibration.
9/13/2013	Charles Hand	New in-situ transducer installed.
9/14/2013	Charles Hand	Calibration performed for new transducers. Etran set at 6.624.
10/7/2013	Charles Hand	Calibration check. Difference between Manual DTW and PLC reading is 0.04 ft.

Equipment		Transducer 5c
Date	**Operator**	**Maintenance Performed**
3/1/2013	Mark Mierjesk	Etran set at 5.778 based on DTW readings.
6/19/2013	Eric Olson	New transducer installed.
6/19/2013	Eric Olson	Etran set at 4.51 based on DTW readings.
7/19/2013	Eric Olson	Calibration check. Difference between Manual DTW and PLC reading is 1.12 ft.
7/23/2013	Eric Olson	Changed Etran value in PLC from 4.51 to 5.51 due to field error during original calibration.
9/13/2013	Charles Hand	New in-situ transducer installed.
9/14/2013	Charles Hand	Calibration performed for new transducers. Etran set at 5.017.
10/7/2013	Charles Hand	Calibration check. Difference between Manual DTW and PLC reading is 0.04 ft.

Equipment		Transducer 6a
Date	**Operator**	**Maintenance Performed**
3/1/2013	Mark Mierjesk	Etran set at 9.985 based on DTW readings.
9/13/2013	Charles Hand	New in-situ transducer installed.
9/14/2013	Charles Hand	Calibration performed for new transducers. Etran set at 6.027.
10/7/2013	Charles Hand	Calibration check. Difference between Manual DTW and PLC reading is 0.05 ft.

Equipment		Transducer 6b
Date	**Operator**	**Maintenance Performed**
3/1/2013	Mark Mierjesk	Etran set at 21.261 based on DTW readings.
9/13/2013	Charles Hand	New in-situ transducer installed.
9/14/2013	Charles Hand	Calibration performed for new transducers. Etran set at 5.415.
10/7/2013	Charles Hand	Calibration check. Difference between Manual DTW and PLC reading is 0.07 ft.

Equipment		Transducer 7a
Date	**Operator**	**Maintenance Performed**
3/1/2013	Mark Mierjesk	Etran set at 4.305 based on DTW readings.
9/13/2013	Charles Hand	New in-situ transducer installed.
9/14/2013	Charles Hand	Calibration performed for new transducers. Etran set at 2.525.
10/7/2013	Charles Hand	Calibration check. Difference between Manual DTW and PLC reading is 0.03 ft.

Equipment		Transducer 7b
Date	**Operator**	**Maintenance Performed**
3/1/2013	Mark Mierjesk	Etran set at 5.252 based on DTW readings.
9/13/2013	Charles Hand	New in-situ transducer installed.
9/14/2013	Charles Hand	Calibration performed for new transducers. Etran set at 4.662.
10/7/2013	Charles Hand	Calibration check. Difference between Manual DTW and PLC reading is 0.01 ft.

Equipment		Transducer 8a
Date	**Operator**	**Maintenance Performed**
6/19/2013	Eric Olson	New transducer installed.
6/19/2013	Eric Olson	Etran set at 6.68 based on DTW readings.
7/19/2013	Eric Olson	Calibration check. Difference between Manual DTW and PLC reading is 0.22 ft.
7/23/2013	Eric Olson	Changed Etran value in PLC from 6.68 to 6.78 due to field error during original calibration.
9/13/2013	Charles Hand	New in-situ transducer installed.
9/14/2013	Charles Hand	Calibration performed for new transducers. Etran set at 5.532.
10/7/2013	Charles Hand	Calibration check. Difference between Manual DTW and PLC reading is 0.02 ft.

Equipment		Transducer 8b
Date	**Operator**	**Maintenance Performed**
3/1/2013	Mark Mierjesk	Etran set at 8.782 based on DTW readings.
6/17/2013	Eric Olson	New transducer installed.
6/17/2013	Eric Olson	Etran set at 8.87 based on DTW readings.
7/19/2013	Eric Olson	Calibration check. Difference between Manual DTW and PLC reading is 0.09 ft.
9/13/2013	Charles Hand	New in-situ transducer installed.
9/14/2013	Charles Hand	Calibration performed for new transducers. Etran set at 10.323.
10/7/2013	Charles Hand	Calibration check. Difference between Manual DTW and PLC reading is 0.01 ft.

Equipment		Transducer 8c
Date	**Operator**	**Maintenance Performed**
3/1/2013	Mark Mierjesk	Etran set at 5.760 based on DTW readings.
9/13/2013	Charles Hand	New in-situ transducer installed.
9/14/2013	Charles Hand	Calibration performed for new transducers. Etran set at 4.800.
10/7/2013	Charles Hand	Calibration check. Difference between Manual DTW and PLC reading is 0.02 ft.

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Appendix E
Landfill Inspections

Inspection and Maintenance Checklist
Landfill Cap, Stormwater System, Barrier Wall, and Physical Security

Inspected by: Brett Beaulieu Inspection date: 11/14/13

✓		Comment
Perimeter Area		
1. Perimeter Area Fence and Gates		
✓	Condition	All gates (main entrance, northwest, southwest) secure and locks in good working condition.
✓	Vegetation	Scotch broom growth between fence and North pond is up to 4' tall, will need some work.
✓	Other	Small animal burrow beneath fence at northwest corner, adjacent pond.
2. Perimeter Road		
✓	Condition	Road condition is good.
✓	Settlement	No indications of settlement along interceptor trench or utility trench alignment.
✓	Vegetation	Substantial brush cutting done in 2013; no vegetation issues adjacent road.
✓	Erosion	Possible minor erosion in places along east side, based on siltation in stormwater ditch.
	Other	
3. Perimeter Stormwater Drainage-Ditch		
✓	Debris	Drum, empty, and labelled "empty" present in NW corner adjacent ditch. Plywood in ditch in three locations – east and west of entrance gate and in southwest corner.
✓	Sediment	Some siltation of sandy material in rip-rap along east side of landfill. Does not interfere with water flow in slotted pipe. Also adjacent Landfill entrance gate.
✓	Drainage	Drainage is good based on inspection of cleanouts.
✓	Vegetation	Very little vegetation in perimeter stormwater drainage ditch.

4. Barrier Wall Alignment		
✓	Settlement	Cap surface adjacent barrier wall alignment shows no signs of settlement of slurry wall.
✓	Erosion	No signs of erosion present.
5. North Detention Pond		
✓	Berm condition/ side slopes (erosion)	Bank condition is good, with full gravel coverage. As noted above, scotch broom growing to 4' adjacent to Fence line.
✓	Storage area (sediment)	No indications of substantial sedimentation or loss of storage.
✓	Vegetation	Recently cleared with exception of fenceline north of pond and catwalk. Pond bottom not vegetated.
✓	Stormwater ~~/Intercepter~~ culverts	Outfall pipe is submerged but appears to be in good working condition and free of debris.
✓	Treatment plant oufall	Outfall appears to be operating normally. Rip-rap beneath discharge point is in good shape. Free of debris.
✓	Catwalk	Catwalk condition good. Excessive scotch broom vegetation.
✓	Overflow structure	Condition appears good.
6. West Detention Pond		
✓	Berm condition/ side slopes (erosion)	Gravel bank condition is good. No signs of esosion.
✓	Storage area (sediment)	Very minimal sedimentation on bottom of pond.
✓	Vegetation	Minimal vegetation adjacent pond. Scattered scotch broom up to 2-3' tall and wetland vegetation in pond.
✓	~~Stormwater~~ ~~/Intercepter~~ culverts	Stormwater Culvert is submerged but appears in good working condition, free of debris.
NA	Treatment plant outfall	—
✓	Catwalk	Catwalk and associated structures in good condition.
✓	Overflow structure	Condition appears good.

Inspected by: Brett Beaulieu Inspection date: 11/14/13

Mound Area		
1. Mound Area Surface		
✓		COMMENT
✓	Vegetation	Landfill cap vegetation cover is mowed and in good shape.
✓	Erosion	No major erosion. Small depression in cap noted on east side near gas vent #4. Small (3") rodent burrow on south slope, uphill of vent #6.
✓	Settlement	Other than possible settlement in depression on east side noted above, no settlement indicators observed.
✓	Slope failure (liner exposure)	No exposed liner observed.
2. Landfill Sump		
✓	Landfill sump	Sump condition is consistent with previous inspections. Aboveground pvc not continuous, but no functional or security problems; cover intact.
3. Gas Vents		
✓	Gas vents	Gas vents #2 and #5 lean downslope slightly, consistent with slope creep. Lichen observed on gas vents, but does not block function / does not require maintenance.
4. Mound Access Road		
✓	Condition	Condition is good. No evident erosion. Some unevenness in grade near sump due to earth-moving.
✓	Settlement	No signs of settlement observed.

Inspected by: Brett Beaulieu Inspection date: 11/14/13

INSPECTION SUMMARY
Inspection performed in accordance with work plan. Refer to notes above for details. 11/14/13

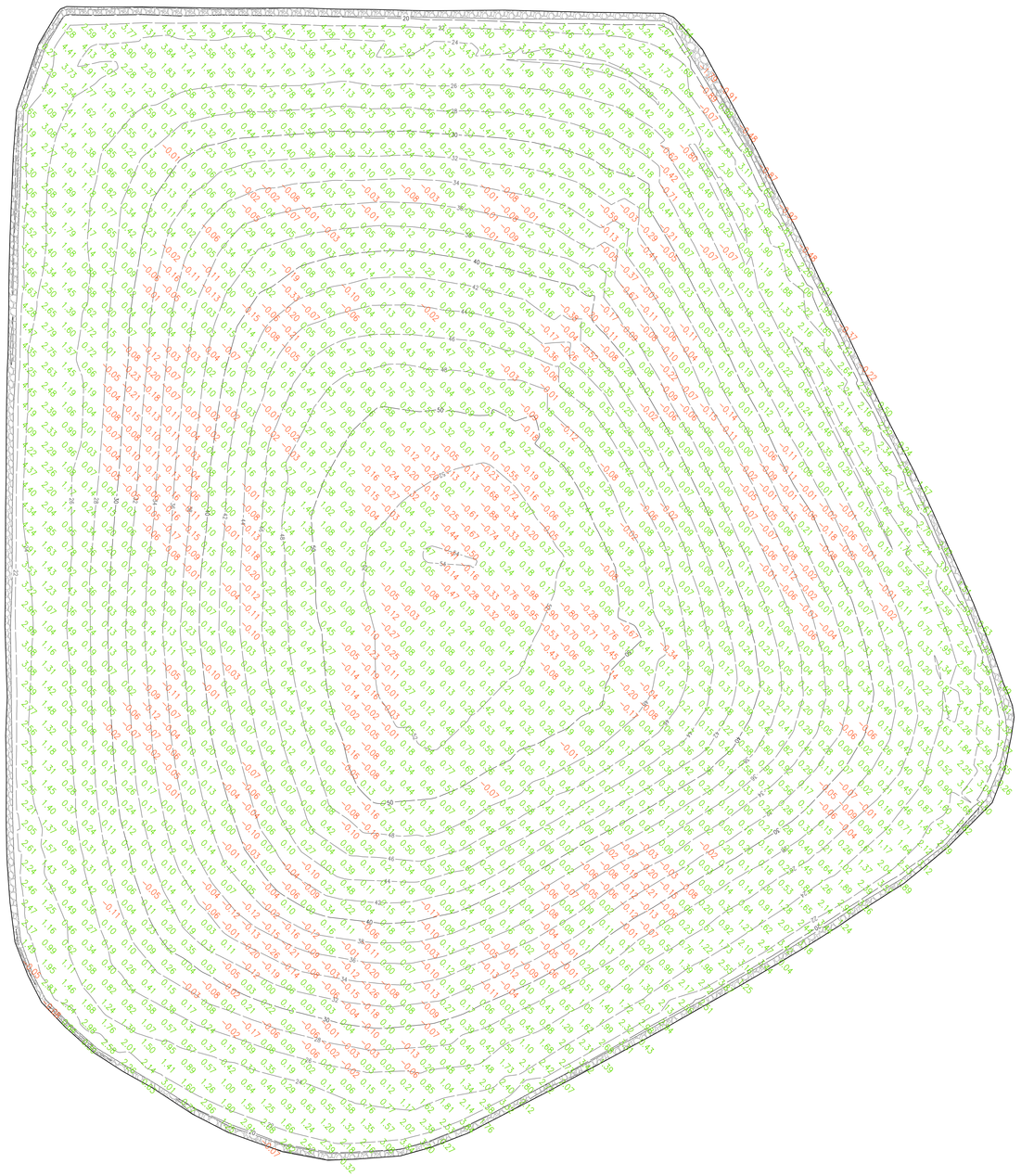
Inspected by: _____ Inspection date: _____

INSPECTION SUMMARY, CONTINUED

B&L Woodwaste Site

2013 Annual Operations & Maintenance Report

Appendix F
Landfill Settlement Drawing



TOPOGRAPHIC SURVEY

LEGEND

AREAS LOWER THAN 07/2009

AREAS HIGHER THAN 07/2009

NET OF 11,200 CU. YD. OF FILL

SCALE: 1"=20'

0 10 20 40

S W E N

No.	Date	By	Ckd.	Appr.	Revision

Job Number 1331

Sheet 1 of 1

LANKTREE
LAND SURVEYING, INC.
32320 111TH PLACE S.E., AUBURN, WA 98092
PHONE: (253) 653-6423
FAX: (253) 793-1616
WWW.LANKTREELANDSURVEYING.COM

Designed ____
Drawn STM
Checked TSL
Approved TSL
Date 11/19/13

Scale:
Horizontal 1"=20'
Vertical

For:
FLOYD SNIDER
C/O BRETT BEAULIEU
601 UNION STREET, SUITE 600
SEATTLE, WA 98101

Title: TOPOGRAPHIC SURVEY

PTN. OF THE SW1/4, SEC. 5, T20N-R4E, W.M.
PIERCE COUNTY, WASHINGTON

B&L Woodwaste Site

2013 Annual Operations & Maintenance Report

Appendix G
Discharge Monitoring Report

Washington State Department of Ecology **Discharge Monitoring Report (DMR)**

Permit Number: WA0040321 **Permittee:** B & L WOODWASTE LANDFILL

Facility County: Pierce **Receiving Waterbody:**

Monitoring Period: 01/01/2013 - 01/31/2013 **Outfall:** NP01 - Unnamed agricultural ditch which is a tributary of the Hylebos Creek. **Version:** 1

Week	Monitoring Point	Flow Gallons/Day (gpd) 1/Day Metered/Recorded	Arsenic Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Lead Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Zinc Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Copper Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Total Suspended Solids (TSS) Total suspended (TSS) Milligrams/L (mg/L) Monthly Composite Sample (24 HR Time Proportional comp)	Turbidity (NTU) Measured NTU Monthly Composite Sample (24 HR Time Proportional comp)	pH Daily Min Standard Units Continuous Metered/Recorded	pH Daily Max Standard Units Continuous Metered/Recorded
		NP01	NP01	NP01	NP01	NP01	NP01	NP01	NP01	NP01
1-T	**1/1/13**	C							C	C
1-W	**1/2/13**	C							C	C
1-Th	**1/3/13**	1200							6.99	7.16
1-F	**1/4/13**	C							C	C
1-Sa	**1/5/13**	C							C	C
2-Su	**1/6/13**	C							C	C
2-M	**1/7/13**	C							C	C
2-T	**1/8/13**	C							C	C
2-W	**1/9/13**	C							C	C
2-Th	**1/10/13**	4499							6.55	7.20
2-F	**1/11/13**	3499							6.54	7.31
2-Sa	**1/12/13**	C							C	C
3-Su	**1/13/13**	C							C	C
3-M	**1/14/13**	C							C	C
3-T	**1/15/13**	C							C	C
3-W	**1/16/13**	C							C	C
3-Th	**1/17/13**	C							C	C
3-F	**1/18/13**	C							C	C
3-Sa	**1/19/13**	C							C	C
4-Su	**1/20/13**	C							C	C
4-M	**1/21/13**	C							C	C
4-T	**1/22/13**	C							C	C
4-W	**1/23/13**	500							7.69	8.41
4-Th	**1/24/13**	C							C	C
4-F	**1/25/13**	C							C	C
4-Sa	**1/26/13**	C							C	C
5-Su	**1/27/13**	C							C	C
5-M	**1/28/13**	1700							6.75	8.37
5-T	**1/29/13**	14197	0.8	0.8	186	2.8	B|1	0.12	7.88	8.46
5-W	**1/30/13**	25394							6.61	8.47
5-Th	**1/31/13**	8998							6.80	8.47
Minimum									6.54	
									>= 6.5	
Maximum										8.47
										<= 8.5
Daily Maximum		25394	0.8	0.8	186	2.8	1	0.12		
		Report Only	<= 5	Report Only	Report Only	Report Only	Report Only	Report Only		

Reporting Codes Used: B - Below Detection Limit/No Detection, C - No Discharge

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Larry McGaughey	2/6/2013 10:57:17 AM
Signature	**Date**

Washington State Department of Ecology **Discharge Monitoring Report (DMR)**

Permit Number: WA0040321 **Permittee:** B & L WOODWASTE LANDFILL

Facility County: Pierce **Receiving Waterbody:**

Monitoring Period: 02/01/2013 - 02/28/2013 **Outfall:** NP01 - Unnamed agricultural ditch which is a tributary of the Hylebos Creek. **Version:** 1

Week	Monitoring Point	Flow Gallons/Day (gpd) 1/Day Metered/Recorded	Arsenic Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Lead Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Zinc Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Copper Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Total Suspended Solids (TSS) Total suspended (TSS) Milligrams/L (mg/L) Monthly Composite Sample (24 HR Time Proportional comp)	Turbidity (NTU) Measured NTU Monthly Composite Sample (24 HR Time Proportional comp)	pH Daily Min Standard Units Continuous Metered/Recorded	pH Daily Max Standard Units Continuous Metered/Recorded
		NP01	NP01	NP01	NP01	NP01	NP01	NP01	NP01	NP01
1-F	**2/1/13**	11597							6.55	7.78
1-Sa	**2/2/13**	C							C	C
2-Su	**2/3/13**	C							C	C
2-M	**2/4/13**	C							C	C
2-T	**2/5/13**	11997							6.71	7.79
2-W	**2/6/13**	7898							7.00	7.47
2-Th	**2/7/13**	5299							7.24	7.37
2-F	**2/8/13**	4399							6.99	7.07
2-Sa	**2/9/13**	C							C	C
3-Su	**2/10/13**	C							C	C
3-M	**2/11/13**	12197							6.96	7.05
3-T	**2/12/13**	22594							6.99	7.06
3-W	**2/13/13**	16296							6.98	7.04
3-Th	**2/14/13**	6998	1.4	0.5	65	3.7	B|<1.1	0.11	6.97	7.08
3-F	**2/15/13**	900							7.00	7.05
3-Sa	**2/16/13**	C							C	C
4-Su	**2/17/13**	C							C	C
4-M	**2/18/13**	11197							6.93	7.08
4-T	**2/19/13**	10897							7.05	7.12
4-W	**2/20/13**	C							C	C
4-Th	**2/21/13**	13397							6.99	7.09
4-F	**2/22/13**	16096							6.98	7.03
4-Sa	**2/23/13**	14996							6.98	7.00
5-Su	**2/24/13**	13397							6.97	6.99
5-M	**2/25/13**	22794							6.97	7.01
5-T	**2/26/13**	26294							6.98	7.42
5-W	**2/27/13**	31492							6.84	6.92
5-Th	**2/28/13**	1400							6.84	6.88
Minimum									6.55	
									>= 6.5	
Maximum										7.79
										<= 8.5
Daily Maximum		31492	1.4	0.5	65	3.7	B|1.1	0.11		
		Report Only	<= 5	Report Only	Report Only	Report Only	Report Only	Report Only		

Reporting Codes Used: B - Below Detection Limit/No Detection, C - No Discharge

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Larry McGaughey

Signature

3/15/2013 3:58:58 PM

Date

Washington State Department of Ecology

Discharge Monitoring Report (DMR)

Permit Number: WA0040321 **Permittee:** B & L WOODWASTE LANDFILL

Facility County: Pierce **Receiving Waterbody:**

Monitoring Period: 03/01/2013 - 03/31/2013 **Outfall:** NP01 - Unnamed agricultural ditch which is a tributary of the Hylebos Creek. **Version:** 1

Week	Monitoring Point	Flow Gallons/Day (gpd) 1/Day Metered/Recorded	Arsenic Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Lead Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Zinc Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Copper Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Total Suspended Solids (TSS) Total suspended (TSS) Milligrams/L (mg/L) Monthly Composite Sample (24 HR Time Proportional comp)	Turbidity (NTU) Measured NTU Monthly Composite Sample (24 HR Time Proportional comp)	pH Daily Min Standard Units Continuous Metered/Recorded	pH Daily Max Standard Units Continuous Metered/Recorded
		NP01	NP01	NP01	NP01	NP01	NP01	NP01	NP01	NP01
1-F	**3/1/13**	18096							6.74	6.81
1-Sa	**3/2/13**	14696							6.79	7.24
2-Su	**3/3/13**	C							C*	C
2-M	**3/4/13**	400							6.89	7.25
2-T	**3/5/13**	C							C	C
2-W	**3/6/13**	C							C	C
2-Th	**3/7/13**	11197							6.55	6.90
2-F	**3/8/13**	20495							6.80	6.81
2-Sa	**3/9/13**	5999							6.80	6.88
3-Su	**3/10/13**	8998							6.76	6.91
3-M	**3/11/13**	100							6.75	6.77
3-T	**3/12/13**	14197							6.75	6.80
3-W	**3/13/13**	21295	1.5	0.6	50	5.0	B|1.1	0.12	6.80	6.87
3-Th	**3/14/13**	9098							6.78	7.00
3-F	**3/15/13**	24694							6.79	7.00
3-Sa	**3/16/13**	24994							6.69	6.80
4-Su	**3/17/13**	18495							6.63	6.80
4-M	**3/18/13**	23594							6.80	6.84
4-T	**3/19/13**	8798							6.76	6.83
4-W	**3/20/13**	7098							6.80	6.80
4-Th	**3/21/13**	10897							6.75	6.82
4-F	**3/22/13**	16996							6.74	6.92
4-Sa	**3/23/13**	22395							6.74	6.80
5-Su	**3/24/13**	23994							6.78	6.80
5-M	**3/25/13**	21895							6.71	6.82
5-T	**3/26/13**	22694							6.80	6.80
5-W	**3/27/13**	23894							6.80	6.82
5-Th	**3/28/13**	21495							6.79	6.82
5-F	**3/29/13**	25194							6.79	6.80
5-Sa	**3/30/13**	21395							6.79	6.80
6-Su	**3/31/13**	C							C	C
Minimum									6.55	
									>= 6.5	
Maximum										7.25
										<= 8.5
Daily Maximum		25194	1.5	0.6	50	5	1.1	0.12		
		Report Only	<= 5	Report Only	Report Only	Report Only	Report Only	Report Only		

Reporting Codes Used: B - Below Detection Limit/No Detection, C - No Discharge

Outfall: NP01 - Unnamed agricultural ditch which is a tributary of the Hylebos Creek.

Monitoring Point	Parameter	Sample Date/ Statistical Base	Value	Notes/Comment
NP01	pH (Hydrogen Ion) Daily Min Not Applicable Standard Units	3/3/2013	C	c

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Larry McGaughey
Signature

4/15/2013 12:34:01 PM
Date

Washington State Department of Ecology **Discharge Monitoring Report (DMR)**

Permit Number: WA0040321 **Permittee:** B & L WOODWASTE LANDFILL

Facility County: Pierce **Receiving Waterbody:**

Monitoring Period: 04/01/2013 - 04/30/2013 **Outfall:** NP01 - Unnamed agricultural ditch which is a tributary of the Hylebos Creek. **Version:** 1

Week	Monitoring Point	Flow Gallons/Day (gpd) 1/Day Metered/Recorded	Arsenic Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Lead Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Zinc Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Copper Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Total Suspended Solids (TSS) Total suspended (TSS) Milligrams/L (mg/L) Monthly Composite Sample (24 HR Time Proportional comp)	Turbidity (NTU) Measured NTU Monthly Composite Sample (24 HR Time Proportional comp)	pH Daily Min Standard Units Continuous Metered/Recorded	pH Daily Max Standard Units Continuous Metered/Recorded
		NP01	NP01	NP01	NP01	NP01	NP01	NP01	NP01	NP01
1-M	**4/1/13**	C							C	C
1-T	**4/2/13**	6398							6.77	6.79
1-W	**4/3/13**	16796							6.78	6.82
1-Th	**4/4/13**	22395							6.79	6.80
1-F	**4/5/13**	21795							6.79	6.80
1-Sa	**4/6/13**	20095							6.79	6.80
2-Su	**4/7/13**	18196							6.77	6.80
2-M	**4/8/13**	18595							6.78	6.80
2-T	**4/9/13**	17496							6.78	6.79
2-W	**4/10/13**	16796							6.78	6.79
2-Th	**4/11/13**	16096							6.72	6.78
2-F	**4/12/13**	15996							6.75	6.77
2-Sa	**4/13/13**	15796							6.75	6.77
3-Su	**4/14/13**	8598							6.72	6.87
3-M	**4/15/13**	6298							6.75	6.81
3-T	**4/16/13**	4499							6.79	7.08
3-W	**4/17/13**	14200							6.79	6.86
3-Th	**4/18/13**	13313							6.78	6.80
3-F	**4/19/13**	14214	0.8	0.5	47	4.4	B|1.1	B|0.05	6.77	6.79
3-Sa	**4/20/13**	12212							6.76	6.78
4-Su	**4/21/13**	20920							6.78	6.80
4-M	**4/22/13**	22222							6.79	6.81
4-T	**4/23/13**	19819							6.78	6.80
4-W	**4/24/13**	10210							6.78	6.82
4-Th	**4/25/13**	6306							6.81	6.82
4-F	**4/26/13**	24824							6.68	6.81
4-Sa	**4/27/13**	25325							6.79	6.83
5-Su	**4/28/13**	27927							6.78	6.80
5-M	**4/29/13**	26726							6.79	6.80
5-T	**4/30/13**	21221							6.79	6.80
Minimum									6.68	
									>= 6.5	
Maximum										7.08
										<= 8.5
Daily Maximum		27927	0.8	0.5	47	4.4	1.1	0.05		
		Report Only	<= 5	Report Only	Report Only	Report Only	Report Only	Report Only		

Reporting Codes Used: B - Below Detection Limit/No Detection, C - No Discharge

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Larry McGaughey
Signature

5/14/2013 3:41:33 PM
Date

Washington State Department of Ecology

Discharge Monitoring Report (DMR)

Permit Number: WA0040321 **Permittee:** B & L WOODWASTE LANDFILL

Facility County: Pierce **Receiving Waterbody:**

Monitoring Period: 05/01/2013 - 05/31/2013 **Outfall:** NP01 - Unnamed agricultural ditch which is a tributary of the Hylebos Creek. **Version:** 1

Week	Monitoring Point	Flow Gallons/Day (gpd) 1/Day Metered/Recorded	Arsenic Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Lead Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Zinc Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Copper Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Total Suspended Solids (TSS) Total suspended (TSS) Milligrams/L (mg/L) Monthly Composite Sample (24 HR Time Proportional comp)	Turbidity (NTU) Measured NTU Monthly Composite Sample (24 HR Time Proportional comp)	pH Daily Min Standard Units Continuous Metered/Recorded	pH Daily Max Standard Units Continuous Metered/Recorded
		NP01	NP01	NP01	NP01	NP01	NP01	NP01	NP01	NP01
1-W	**5/1/13**	21221							6.78	6.80
1-Th	**5/2/13**	19019							6.78	6.80
1-F	**5/3/13**	21221							6.78	6.80
1-Sa	**5/4/13**	21821							6.76	6.80
2-Su	**5/5/13**	22222							6.76	6.80
2-M	**5/6/13**	24124							6.78	6.79
2-T	**5/7/13**	20620							6.76	6.78
2-W	**5/8/13**	18018							6.75	6.77
2-Th	**5/9/13**	15115							6.74	6.76
2-F	**5/10/13**	17817							6.75	6.78
2-Sa	**5/11/13**	15515							6.77	6.86
3-Su	**5/12/13**	C							C	C
3-M	**5/13/13**	6506							6.70	6.79
3-T	**5/14/13**	22622							6.77	6.78
3-W	**5/15/13**	25425							6.78	6.80
3-Th	**5/16/13**	25825							6.73	6.79
3-F	**5/17/13**	28728							6.74	6.80
3-Sa	**5/18/13**	26626							6.78	6.79
4-Su	**5/19/13**	24624							6.78	6.83
4-M	**5/20/13**	15815							6.80	6.86
4-T	**5/21/13**	20120							6.73	6.80
4-W	**5/22/13**	18818							6.70	6.75
4-Th	**5/23/13**	21621							6.71	6.77
4-F	**5/24/13**	25125							6.72	6.77
4-Sa	**5/25/13**	22222							6.71	6.74
5-Su	**5/26/13**	20620							6.72	6.74
5-M	**5/27/13**	19019							6.72	6.75
5-T	**5/28/13**	9810							6.72	6.75
5-W	**5/29/13**	C							C	C
5-Th	**5/30/13**	9910							6.71	6.80
5-F	**5/31/13**	37036	2.4	0.5	30	4.3	B|1.1	0.08	6.79	6.80
Minimum									6.7	
									>= 6.5	
Maximum										6.86
										<= 8.5
Daily Maximum		37036	2.4	0.5	30	4.3	1.1	0.08		
		Report Only	<= 5	Report Only	Report Only	Report Only	Report Only	Report Only		

Reporting Codes Used: B - Below Detection Limit/No Detection, C - No Discharge

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Larry McGaughey	6/14/2013 1:43:26 PM
Signature	**Date**

Washington State Department of Ecology **Discharge Monitoring Report (DMR)**

Received Date: 7/15/2013

Permit Number: WA0040321 **Permittee:** B & L WOODWASTE LANDFILL

Facility County: Pierce **Receiving Waterbody:**

Monitoring Period: 06/01/2013 - 06/30/2013 **Outfall:** NP01 - Unnamed agricultural ditch which is a tributary of the Hylebos Creek. **Version:** 1

Week	Monitoring Point	Flow Gallons/Day (gpd) 1/Day Metered/Recorded	Arsenic Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Lead Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Zinc Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Copper Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Total Suspended Solids (TSS) Total suspended (TSS) Milligrams/L (mg/L) Monthly Composite Sample (24 HR Time Proportional comp)	Turbidity (NTU) Measured NTU Monthly Composite Sample (24 HR Time Proportional comp)	pH Standard Units Weekly Grab
		NP01	NP01	NP01	NP01	NP01	NP01	NP01	NP01
1-Sa	**6/1/13**	36936							7.62
2-Su	**6/2/13**	36836							
2-M	**6/3/13**	24023							
2-T	**6/4/13**	25725							
2-W	**6/5/13**	37036							6.85
2-Th	**6/6/13**	10310							
2-F	**6/7/13**	5405							
2-Sa	**6/8/13**	C							
3-Su	**6/9/13**	C							
3-M	**6/10/13**	C							
3-T	**6/11/13**	6907							
3-W	**6/12/13**	27927							
3-Th	**6/13/13**	28328							8.00
3-F	**6/14/13**	30330							
3-Sa	**6/15/13**	19819							
4-Su	**6/16/13**	C							
4-M	**6/17/13**	13313							
4-T	**6/18/13**	27727							
4-W	**6/19/13**	22322							
4-Th	**6/20/13**	23022							
4-F	**6/21/13**	36035							7.10
4-Sa	**6/22/13**	35134							
5-Su	**6/23/13**	37537							6.74
5-M	**6/24/13**	15815							
5-T	**6/25/13**	C							
5-W	**6/26/13**	10010							
5-Th	**6/27/13**	15615							
5-F	**6/28/13**	12412							
5-Sa	**6/29/13**	27527	2.7	0.9	51	7.5	B|1.1	0.12	
6-Su	**6/30/13**	24023							
Minimum									6.74
									>= 6.0
Maximum									8
									<= 9.0
Daily Maximum		37537	2.7	0.9	51	7.5	1.1	0.12	
		Report Only	<= 5	Report Only	Report Only	Report Only	Report Only	Report Only	

Reporting Codes Used: B - Below Detection Limit/No Detection, C - No Discharge

Printed Date: 7/16/2013 11:40:45 AM

Washington State Department of Ecology **Discharge Monitoring Report (DMR)**

Permit Number: WA0040321 **Permittee:** B & L WOODWASTE LANDFILL

Facility County: Pierce **Receiving Waterbody:**

Monitoring Period: 07/01/2013 - 07/31/2013 **Outfall:** NP01 - Unnamed agricultural ditch which is a tributary of the Hylebos Creek. **Version:** 1

Week	Monitoring Point	Flow Gallons/Day (gpd) 1/Day Metered/Recorded	Arsenic Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Lead Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Zinc Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Copper Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Total Suspended Solids (TSS) Total suspended (TSS) Milligrams/L (mg/L) Monthly Composite Sample (24 HR Time Proportional comp)	Turbidity (NTU) Measured NTU Monthly Composite Sample (24 HR Time Proportional comp)	pH Standard Units Weekly Grab
		NP01	NP01	NP01	NP01	NP01	NP01	NP01	NP01
1-M	**7/1/13**	21621							
1-T	**7/2/13**	42842							6.89
1-W	**7/3/13**	35334							
1-Th	**7/4/13**	45645							
1-F	**7/5/13**	8708							
1-Sa	**7/6/13**	C							
2-Su	**7/7/13**	C							
2-M	**7/8/13**	10911							
2-T	**7/9/13**	33733							
2-W	**7/10/13**	8608							
2-Th	**7/11/13**	27126							
2-F	**7/12/13**	25024							
2-Sa	**7/13/13**	36536							6.83
3-Su	**7/14/13**	9609							
3-M	**7/15/13**	19219							
3-T	**7/16/13**	12112							
3-W	**7/17/13**	50349							
3-Th	**7/18/13**	41541							
3-F	**7/19/13**	26526							7.04
3-Sa	**7/20/13**	3003							
4-Su	**7/21/13**	8909							
4-M	**7/22/13**	43142							
4-T	**7/23/13**	39338							
4-W	**7/24/13**	43843							
4-Th	**7/25/13**	48047							
4-F	**7/26/13**	21021							
4-Sa	**7/27/13**	28127							7.35
5-Su	**7/28/13**	35635							
5-M	**7/29/13**	45745	4.7	0.6	67	4.7	B|1.1	0.17	
5-T	**7/30/13**	42742							
5-W	**7/31/13**	41240							
Minimum									6.83
									>= 6.0
Maximum									7.35
									<= 9.0
Daily Maximum		50349	4.7	0.6	67	4.7	1.1	0.17	
		Report Only	<= 5	Report Only	Report Only	Report Only	Report Only	Report Only	

Reporting Codes Used: B - Below Detection Limit/No Detection, C - No Discharge

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Larry McGaughey	8/13/2013 1:52:41 PM
Signature	**Date**

Washington State Department of Ecology

Discharge Monitoring Report (DMR)

Permit Number: WA0040321 **Permittee:** B & L WOODWASTE LANDFILL

Facility County: Pierce **Receiving Waterbody:**

Monitoring Period: 08/01/2013 - 08/31/2013 **Outfall:** NP01 - Unnamed agricultural ditch which is a tributary of the Hylebos Creek. **Version:** 1

Week	Monitoring Point	Flow Gallons/Day (gpd) 1/Day Metered/Recorded	Arsenic Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Lead Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Zinc Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Copper Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Total Suspended Solids (TSS) Total suspended (TSS) Milligrams/L (mg/L) Monthly Composite Sample (24 HR Time Proportional comp)	Turbidity (NTU) Measured NTU Monthly Composite Sample (24 HR Time Proportional comp)	pH Standard Units Weekly Grab
		NP01	NP01	NP01	NP01	NP01	NP01	NP01	NP01
1-Th	**8/1/13**	47346							
1-F	**8/2/13**	38938							6.951
1-Sa	**8/3/13**	43643							
2-Su	**8/4/13**	34434							
2-M	**8/5/13**	44143							
2-T	**8/6/13**	37036							
2-W	**8/7/13**	36836							
2-Th	**8/8/13**	26826							
2-F	**8/9/13**	20620							7.010
2-Sa	**8/10/13**	17217							
3-Su	**8/11/13**	6907							
3-M	**8/12/13**	5906							
3-T	**8/13/13**	16216							
3-W	**8/14/13**	19219							
3-Th	**8/15/13**	10210							
3-F	**8/16/13**	43142							
3-Sa	**8/17/13**	28628							7.089
4-Su	**8/18/13**	38237							
4-M	**8/19/13**	34834							
4-T	**8/20/13**	14214							
4-W	**8/21/13**	6707							
4-Th	**8/22/13**	37036							
4-F	**8/23/13**	40039							7.203
4-Sa	**8/24/13**	27427	0.9	0.8	107.0	5.0	B|1.1	0.25	
5-Su	**8/25/13**	C							
5-M	**8/26/13**	18718							
5-T	**8/27/13**	37236							
5-W	**8/28/13**	36035							6.736
5-Th	**8/29/13**	27927							
5-F	**8/30/13**	14414							
5-Sa	**8/31/13**	34734							
Minimum									6.736
									>= 6.0
Maximum									7.203
									<= 9.0
Daily Maximum		47346	0.9	0.8	107	5	1.1	0.25	
		Report Only	<= 5	Report Only	Report Only	Report Only	Report Only	Report Only	

Reporting Codes Used: B - Below Detection Limit/No Detection, C - No Discharge

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Larry McGaughey	9/16/2013 9:17:47 AM
Signature	**Date**

Washington State Department of Ecology

Discharge Monitoring Report (DMR)

Permit Number: WA0040321 **Permittee:** B & L WOODWASTE LANDFILL

Facility County: Pierce **Receiving Waterbody:**

Monitoring Period: 09/01/2013 - 09/30/2013 **Outfall:** NP01 - Unnamed agricultural ditch which is a tributary of the Hylebos Creek. **Version:** 1

Week	Monitoring Point	Flow Gallons/Day (gpd) 1/Day Metered/Recorded	Arsenic Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Lead Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Zinc Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Copper Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Total Suspended Solids (TSS) Total suspended (TSS) Milligrams/L (mg/L) Monthly Composite Sample (24 HR Time Proportional comp)	Turbidity (NTU) Measured NTU Monthly Composite Sample (24 HR Time Proportional comp)	pH Standard Units Weekly Grab
		NP01	NP01	NP01	NP01	NP01	NP01	NP01	NP01
1-Su	**9/1/13**	13813							
1-M	**9/2/13**	801							
1-T	**9/3/13**	8708							
1-W	**9/4/13**	9209							
1-Th	**9/5/13**	20420							
1-F	**9/6/13**	9810							6.55
1-Sa	**9/7/13**	25725							
2-Su	**9/8/13**	32732							
2-M	**9/9/13**	23223							
2-T	**9/10/13**	5305							
2-W	**9/11/13**	11211							
2-Th	**9/12/13**	32632							
2-F	**9/13/13**	29729	1.3	0.9	95	5.5	1.9	0.82	6.54
2-Sa	**9/14/13**	11011							
3-Su	**9/15/13**	7507							
3-M	**9/16/13**	28928							
3-T	**9/17/13**	16216							
3-W	**9/18/13**	C							
3-Th	**9/19/13**	10811							
3-F	**9/20/13**	12112							6.43
3-Sa	**9/21/13**	6606							
4-Su	**9/22/13**	19519							
4-M	**9/23/13**	14714							
4-T	**9/24/13**	C							6.84
4-W	**9/25/13**	C							
4-Th	**9/26/13**	C							
4-F	**9/27/13**	11411							
4-Sa	**9/28/13**	6006							
5-Su	**9/29/13**	6807							
5-M	**9/30/13**	26025							
Minimum									6.43
									>= 6.0
Maximum									6.84
									<= 9.0
Daily Maximum		32732	1.3	0.9	95	5.5	1.9	0.82	
		Report Only	<= 5	Report Only	Report Only	Report Only	Report Only	Report Only	

Reporting Codes Used: C - No Discharge

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Larry McGaughey	10/14/2013 9:47:13 AM
Signature	**Date**

Washington State Department of Ecology **Discharge Monitoring Report (DMR)**

Permit Number: WA0040321 **Permittee:** B & L WOODWASTE LANDFILL

Facility County: Pierce **Receiving Waterbody:**

Monitoring Period: 10/01/2013 - 10/31/2013 **Outfall:** NP01 - Unnamed agricultural ditch which is a tributary of the Hylebos Creek. **Version:** 1

Week	Monitoring Point	Flow Gallons/Day (gpd) 1/Day Metered/Recorded	Arsenic Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Lead Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Zinc Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Copper Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Total Suspended Solids (TSS) Total suspended (TSS) Milligrams/L (mg/L) Monthly Composite Sample (24 HR Time Proportional comp)	Turbidity (NTU) Measured NTU Monthly Composite Sample (24 HR Time Proportional comp)	pH Standard Units Weekly Grab
		NP01	NP01	NP01	NP01	NP01	NP01	NP01	NP01
1-T	**10/1/13**	23223							
1-W	**10/2/13**	12312							
1-Th	**10/3/13**	31230							
1-F	**10/4/13**	35034							
1-Sa	**10/5/13**	35435							6.790
2-Su	**10/6/13**	34233							
2-M	**10/7/13**	29329							
2-T	**10/8/13**	18018							
2-W	**10/9/13**	C							
2-Th	**10/10/13**	C							
2-F	**10/11/13**	20020							7.926
2-Sa	**10/12/13**	29729							
3-Su	**10/13/13**	C							
3-M	**10/14/13**	19019							
3-T	**10/15/13**	23123							
3-W	**10/16/13**	34333							
3-Th	**10/17/13**	34734							6.599
3-F	**10/18/13**	33533							
3-Sa	**10/19/13**	32131							
4-Su	**10/20/13**	33633							
4-M	**10/21/13**	34934							
4-T	**10/22/13**	27727							
4-W	**10/23/13**	24724							
4-Th	**10/24/13**	33232							6.524
4-F	**10/25/13**	32832							
4-Sa	**10/26/13**	32231							
5-Su	**10/27/13**	16917							
5-M	**10/28/13**	16516							
5-T	**10/29/13**	7207							
5-W	**10/30/13**	31931							
5-Th	**10/31/13**	32031	4.8	0.6	123	8.1	J|1.0	0.16	6.607
Minimum									6.524
									>= 6.0
Maximum									7.926
									<= 9.0
Daily Maximum		35435	4.8	0.6	123	8.1	1	0.16	
		Report Only	<= 5	Report Only	Report Only	Report Only	Report Only	Report Only	

Reporting Codes Used: C - No Discharge, J - Estimated Value/Below Quantitation Limit

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Larry McGaughey	11/14/2013 11:08:52 AM
Signature	**Date**

Washington State Department of Ecology **Discharge Monitoring Report (DMR)**

Permit Number: WA0040321 **Permittee:** B & L WOODWASTE LANDFILL

Facility County: Pierce **Receiving Waterbody:**

Monitoring Period: 11/01/2013 - 11/30/2013 **Outfall:** NP01 - Unnamed agricultural ditch which is a tributary of the Hylebos Creek. **Version:** 1

Week	Monitoring Point	Flow Gallons/Day (gpd) 1/Day Metered/Recorded	Arsenic Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Lead Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Zinc Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Copper Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Total Suspended Solids (TSS) Total suspended (TSS) Milligrams/L (mg/L) Monthly Composite Sample (24 HR Time Proportional comp)	Turbidity (NTU) Measured NTU Monthly Composite Sample (24 HR Time Proportional comp)	pH Standard Units Weekly Grab
		NP01	NP01	NP01	NP01	NP01	NP01	NP01	NP01
1-F	**11/1/13**	31230							
1-Sa	**11/2/13**	13613							
2-Su	**11/3/13**	7006							
2-M	**11/4/13**	32031							
2-T	**11/5/13**	18418							
2-W	**11/6/13**	34834							
2-Th	**11/7/13**	10310							
2-F	**11/8/13**	20220							6.418
2-Sa	**11/9/13**	14914							
3-Su	**11/10/13**	8508							
3-M	**11/11/13**	21721							
3-T	**11/12/13**	35234							6.820
3-W	**11/13/13**	26025							
3-Th	**11/14/13**	31230							
3-F	**11/15/13**	34934							
3-Sa	**11/16/13**	22021							
4-Su	**11/17/13**	16516							
4-M	**11/18/13**	22521							
4-T	**11/19/13**	27927							7.209
4-W	**11/20/13**	34534							
4-Th	**11/21/13**	34434							
4-F	**11/22/13**	36536							
4-Sa	**11/23/13**	28928							
5-Su	**11/24/13**	17917							
5-M	**11/25/13**	24424							
5-T	**11/26/13**	C							
5-W	**11/27/13**	9109							
5-Th	**11/28/13**	100							
5-F	**11/29/13**	11011							
5-Sa	**11/30/13**	29428	1.2	0.6	21	1.8	B|4.3	0.76	7.701
Minimum									6.418
									>= 6.0
Maximum									7.701
									<= 9.0
Daily Maximum		36536	1.2	0.6	21	1.8	4.3	0.76	
		Report Only	<= 5	Report Only	Report Only	Report Only	Report Only	Report Only	

Reporting Codes Used: B - Below Detection Limit/No Detection, C - No Discharge

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Larry McGaughey	12/13/2013 9:52:11 AM
Signature	**Date**

Washington State Department of Ecology — Discharge Monitoring Report (DMR)

Permit Number: WA0040321 **Permittee:** B & L WOODWASTE LANDFILL

Facility County: Pierce **Receiving Waterbody:**

Monitoring Period: 12/01/2013 - 12/31/2013 **Outfall:** NP01 - Unnamed agricultural ditch which is a tributary of the Hylebos Creek. **Version:** 1

Week	Monitoring Point	Flow Gallons/Day (gpd) 1/Day Metered/Recorded	Arsenic Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Lead Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Zinc Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Copper Total Micrograms/L (ug/L) Monthly Composite Sample (24 HR Time Proportional comp)	Total Suspended Solids (TSS) Total suspended (TSS) Milligrams/L (mg/L) Monthly Composite Sample (24 HR Time Proportional comp)	Turbidity (NTU) Measured NTU Monthly Composite Sample (24 HR Time Proportional comp)	pH Standard Units Weekly Grab
		NP01	NP01	NP01	NP01	NP01	NP01	NP01	NP01
1-Su	**12/1/13**	17617							
1-M	**12/2/13**	8909							
1-T	**12/3/13**	10710							
1-W	**12/4/13**	32932							
1-Th	**12/5/13**	33032							
1-F	**12/6/13**	32131							6.32
1-Sa	**12/7/13**	32031							
2-Su	**12/8/13**	31130							
2-M	**12/9/13**	31230							
2-T	**12/10/13**	31431							
2-W	**12/11/13**	29229							6.77
2-Th	**12/12/13**	31731							
2-F	**12/13/13**	30730							
2-Sa	**12/14/13**	24224							
3-Su	**12/15/13**	25125							
3-M	**12/16/13**	5005							
3-T	**12/17/13**	1802							
3-W	**12/18/13**	3003							
3-Th	**12/19/13**	6506							
3-F	**12/20/13**	13613							6.58
3-Sa	**12/21/13**	32932							
4-Su	**12/22/13**	31230	1.1	0.7	121	6.6	B|1.0	0.11	
4-M	**12/23/13**	31431							
4-T	**12/24/13**	28528							
4-W	**12/25/13**	31731							
4-Th	**12/26/13**	23523							
4-F	**12/27/13**	26226							
4-Sa	**12/28/13**	9009							6.67
5-Su	**12/29/13**	31531							
5-M	**12/30/13**	32031							
5-T	**12/31/13**	29729							
Minimum									6.32
									>= 6.0
Maximum									6.77
									<= 9.0
Daily Maximum		33032	1.1	0.7	121	6.6	1	0.11	
		Report Only	<= 5	Report Only	Report Only	Report Only	Report Only	Report Only	

Reporting Codes Used: B - Below Detection Limit/No Detection

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Larry McGaughey	1/13/2014 3:39:48 PM
Signature	**Date**

B&L Woodwaste Site

2013 Annual Operations & Maintenance Report

Appendix H
Health and Safety Inspections

Alarm Communications, Inc.
Post Office Box 127
Lynnwood, WA 98046-0127
(425) 670-1119 OFFICE
(425) 774-4665 FAX

Seattle Fire Department

Confidence Test Report

206-386-1448 Confidence Testing Officer
206-615-1068 (fax)
206-233-7219 Red Tag Hotline

FIRE ALARM SYSTEM

(One System per Report)

Certification Given: RED ☐ YELLOW ☐ WHITE ☐

CONFIDENCE TEST ☑ REPAIRS ☑ Sprinkler Monitoring Panel? ☐

Occupancy Address:	1522 E Fife Way	Occupancy Name:	BL Woodinville
Responsible Person First & Last Name:	Frank Rome	Phone Number:	(360) 509 2787
Responsible Person Address, City, State, Zip:		Responsible Party E–Mail Address	
Date of Inspection:	9/22/13	Inspection Frequency/Type:	Quarterly ☐ (High-rise Only) Annual ☑
Testers Name (Please Print):	Ron Murphy	SFD Certification Number: SCP –	M-06496
Identification Number:	M-06496	System Location	Upstairs Electrical RM
Central station monitoring?	Yes ☑ No ☐	Monitoring Company Name:	NW Monitoring
Monitoring Required?	Yes ☑ No ☐		
System Make:	Silent Night	System Model:	5808

SEATTLE FIRE CODE VIOLATIONS FOUND: (If additional room is needed, please add a separate sheet)

None

CORRECTIONS MADE: Date Corrected: _____ Corrected By: _____

(If additional room is needed, please add a separate sheet) SFD Certification Number: SCP -

Replaced Smoke detector

This certifies that this fire and life safety system has been properly inspected for reliability to cover the Items listed in this report and is consistent with Seattle Fire Department Fire Code standards, and that discrepancies are noted and have been reported to the building Owner/Manager for corrective action.

Signature of Tester: R Murphy Phone # 206 369-5442

Building Representative (signature) Ron Murphy

The items on the checklists below shall be inspected and tested. This list does not constitute all of the required inspecting and testing of the fire and life safety system. Refer to the Seattle Fire Department Fire Code for inspecting and testing requirements.

Alarm System Functionality

1. Trouble signal with AC power off?		Yes ☑	No ☐
2. System operates properly on battery backup?		Yes ☑	No ☐
3. Battery voltage (no load)	27.05 volts		
4. Battery voltage (full load)	25.13 volts (signals operating)		
5. Charge circuit voltage	27.25 volts		
6. System operates properly on standby power?		Yes ☑	No ☐
7. All signals operate on AC power?		Yes ☑	No ☐
8. Number of initiating circuits			
9. Number of signal circuits	4		
10. Does alarm system meet audibility standards as accepted?		Yes ☑	No ☐
11. All circuits checked for electrical supervision?		Yes ☑	No ☐
12. All auxiliary equipment operates (Elevators, fans, dampers)?	N/A ☑	Yes ☐	No ☐
13. Ventilation controls operate?	N/A ☑	Yes ☐	No ☐
14. Key to panel available?	N/A ☐	Yes ☑	No ☐
15. Materials and equipment needed to restore pull stations are available at the main panel, e.g. glass rods, and plates; keys and allen wrenches, etc?	N/A ☐	Yes ☑	No ☐
16. Operating instructions at panel?		Yes ☑	No ☐
17. Trouble indicators function properly?		Yes ☑	No ☐
18. Remote Annunciator Panels function properly?	N/A ☐	Yes ☑	No ☐
19. Elevator Call Down functions properly?	N/A ☐	Yes ☐	No ☐
20. Test record posted at panel?		Yes ☑	No ☐
21. General alarm automatic time delay ____ (minutes)	N/A ☑		
22. Was a signal received at the Central Station monitoring company?	N/A ☐	Yes ☑	No ☐
23. Other Devices (Specify)		Yes ☐	No ☐

System Devices	Total Number of Units in Building	Total Number Units Tested	Test Results Acceptable		
24. Bells, Horns, Chimes	6	6	N/A ☐	Yes ☑	No ☐
25. Voice Speakers (Voice Clarity)			N/A ☑	Yes ☐	No ☐
26. Visual Alarm Devices	9	9	N/A ☐	Yes ☑	No ☐
27. Smoke Detectors	7	6	N/A ☐	Yes ☑	No ☐
28. Heat Detectors			N/A ☑	Yes ☐	No ☐
29. Duct Detectors			N/A ☑	Yes ☐	No ☐
30. Sprinkler Flow Switches	1	1	N/A ☐	Yes ☐	No ☐
31. Sprinkler Supervisory Switches	3	3	N/A ☐	Yes ☑	No ☐
32. Manual Pull Stations	FA3 3 HAZ	FA 3 3 HAZ	N/A ☐	Yes ☑	No ☐
33. Annunciator(s)	1	1	N/A ☐	Yes ☐	No ☐
34. Beam Detectors			N/A ☑	Yes ☐	No ☐
35. Automatic Door Unlocks			N/A ☑	Yes ☐	No ☐
36. Automatic Door Release			N/A ☑	Yes ☐	No ☐
37. Fire Dampers			N/A ☑	Yes ☐	No ☐

Communication Equipment	Total Number of Units in Building	Total Number Units Tested	Test Results Acceptable		
38. Phone Sets			N/A ☑	Yes ☐	No ☐
39. Phone Jacks			N/A ☑	Yes ☐	No ☐
40. Call-in Signal			N/A ☑	Yes ☐	No ☐

PATRIOT FIRE PROTECTION, INC.
2707 70th Avenue East
Tacoma, WA 98424
Phone 253.926.2290
Fax 253.922.6150

WET – AUTOMATIC SPRINKLERS (One System per Report)	CTF 8002	System Certification Given						
CONFIDENCE TEST ☒	REPAIRS ☐		RED ☐		YELLOW ☐		GREEN ☒	
Frequency	5 Year: ☐	Annual: ☒	Semi-Annual: ☐	Quarterly: ☐				
Date of Inspection: 10/2/2013								
Occupancy Information								
Occupancy Name: B&L Woodwaste		Occupancy Address: 1522 East Fife Way Milton,Wa						
Building Owner:	Phone Number:	Owner Address:						
Contact Person: Frank Rorie		Phone Number: 360-509-2787						
System Information (where applicable)								
Central Station Monitoring Yes ☒ No ☐		Monitoring Company Name: Central						
Control Panel Manufacturer: Silent Knight		Model Number: 5808						
Location of Riser: East wall under stairs	Max Height 30ft	# of Heads 30+	System # 1	TFD System #				
Testing Agency Information								
City of Tacoma Fire Protection License: 50000460	Washington State Contractor License: PATRIFP099CF Washington State Inspector's License: FSCC-12239	NICET NUMBER:						
Testing Agency Name: Patriot Fire Protection Inc.		Address: 2707 70th Avenue East, Tacoma WA 98424						
Phone: (253) 926-2290		E-mail:						

***Problems Found** (Explain any "no" responses and use additional paper if needed):*

Unable to unlock PIV. Did not actuate.

Inital annual inspection.

Corrections Made:

Date Corrected: _____ Corrected by: (Print) (Sign)

This report certifies this fire and life safety system has been properly inspected for reliability to cover the items listed in the report and is consistent with NFPA 25 Standard. All discrepancies are noted and have been reported to the building owner or responsible person for corrective action.

TECH NAME: (Print) Travis Arnott	(Sign)	Date: 10/2/2013
Building Representative: (Print)	(Sign)	Date:

The items on the checklists below shall be inspected and tested. This list does not constitute all of the required inspecting and testing of the fire and life safety system. Refer to the NFPA 25 Standard Inspection, Testing and Maintenance of Water Based Fire Protection Systems requirements.

SYSTEM FUNCTIONALITY			
Was a full walk through performed?		Yes X	No
Is building fully sprinkled? Notes:		Yes X	No
Is there a calculation plate?		Yes X	No
What is the design density? (gallons per sq ft.) 90/500			
Main drain flow test conducted?		Yes X	No
Static pressure: 143 psi / Residual Pressure: 120 psi / Test pipe size? 2"			
Flow switches, supervisory switches and alarm bells tested satisfactorily	N/A	Yes X	No
Water motor gong operates properly?	N/A X	Yes	No
System is free of any recalled heads?	UNK X	Yes	No
Pressure regulating valves tested satisfactorily?	N/A X	Yes	No
Valves are locked or supervised?		Yes X	No
Signs are provided on control valves?		Yes X	No
Sprinkler heads are less than:			
☐ 1. 50 years for Standard Response	N/A	Yes X	No
☐ 2. 20 years for Fast Response	N/A X	Yes	No
☐ 3. 10 years for Dry Type	N/A X	Yes	No
☐ 4. 5 years for solder type with extra high temperature rating	N/A X	Yes	No
Dry head sample successfully tested within last 10 years? UNK X	N/A	Yes	No
Sprinkler heads free of corrosion, paint, obstructions and/or physical damage?		Yes X	No
Proper number of spare sprinkler heads available?		Yes X	No
Sprinkler wrench available for each type of sprinkler?		Yes X	No
Minimum of 18" clearance between top of storage and sprinkler deflector?		Yes X	No
Did antifreeze systems test satisfactorily?	N/A X	Yes	No
Is building adequately heated?		Yes X	No
System left in service with an inspection tag posted main valve?		Yes X	No
System gauges replaced or calibrated every 5 years? Date: 2012		Yes X	No
Fire Department Connection in satisfactory condition, couplings free, caps in place, check valves tight?		Yes X	No
Was the Fire Department Connection (FDC) internal inspection completed? (every 5 years) Date: 2012		Yes X	No
Was debris found in the Fire Department Connection (FDC)?		Yes	No X
When was an internal pipe inspection performed? (req every 5 years) Date:	CPVC N/A	Yes	No X
Testing agency has informed owner of legal obligation to perform inspections, testing and maintenance in accordance with NFPA 25.		Yes X	No

Water Purveyor:	New ☐
	Existing ☒
	Replacement ☐

PATRIOT FIRE PROTECTION, INC.

BACKFLOW PREVENTION ASSEMBLY TEST REPORT

Name: B&L Wood Waste **REF #:** _____

Service Address: 1522 East Fife Way, Milton, Wa

Location: In hotbox on the eastside of the building

Cross Connection Control For: Domestic **Type Assembly:** RPBA

Manufacturer: Watts **Model:** 009M2QT **Size:** 1.5" **Serial #:** 157965

	Initial Test Results	Test After Repair or Cleaning
RPBA	Line Pressure: 140 Pressure Drop Across: No. 1 Check Valve (A) 7.8 psid Relief Valve Opened (B) 2.5 psid Buffer C = (A - B) _____ psid No. 1 Check: Closed Tight ☒ Leaked ☐ No. 2 Check: Closed Tight ☒ Leaked ☐ Minimum AG Separation: Yes ☒ No ☐ Passed Test: Yes ☒ No ☐	Line Pressure: _____ Pressure Drop Across: No. 1 Check Valve (A) _____ psid Relief Valve Opened (B) _____ psid Buffer C = (A - B) _____ psid No. 1 Check: Closed Tight ☐ Leaked ☐ No. 2 Check: Closed Tight ☐ Leaked ☐ Minimum AG Separation: Yes ☐ No ☐ Passed Test: Yes ☐ No ☐
DCVA	Line Pressure: _____ No. 1 Check Valve: Differential _____ psid No. 2 Check Valve: Differential _____ psid Passed Test: Yes ☐ No ☐	Line Pressure: _____ No. 1 Check Valve: Differential _____ psid No. 2 Check Valve: Differential _____ psid Passed Test: Yes ☐ No ☐
PVB	Line Pressure: _____ Air Inlet: Opened _____ psid Failed to Open ☐ Check Valve: _____ psid Leaked ☐ Passed Test: Yes ☐ No ☐	Line Pressure: _____ Air Inlet: Opened _____ psid Failed to Open ☐ Check Valve: _____ psid Leaked ☐ Passed Test: Yes ☐ No ☐
AG	Minimum Separation: Yes ☐ No ☐	Please Record Repair or Cleaning Information in Remarks Section Below

Is this a proper installation? YES: ☒ NO: ☐

Water service found: ON: ☒ OFF: ☐ **Water Service Left:** ON: ☒ OFF: ☐

WA State Approved Assy? YES: ☒ NO: ☐

Remarks: _____

I certify this report is accurate, and that I have used WAC 246-290-490 approved test methods.

Robert Stinson
Certified Tester's Typed or Printed Name:

(253) 926-2290
Phone Number

Initial Test By: Robert Stinson Signature **Certification #:** B-5306 **Date:** 10/22/13

Repaired By: _____ **Certification #:** _____ **Date:** _____

Repair Test By: _____ **Certification #:** _____ **Date:** _____

Test Equipment Make: Prime Model: 247C Serial #: 219877 Accuracy Verification Date: 10/01/13

Water Purveyor:	New ☐
	Existing ☒
	Replacement ☐

PATRIOT FIRE PROTECTION, INC.

BACKFLOW PREVENTION ASSEMBLY TEST REPORT

Name: B&L Wood Waste **REF #:** _____

Service Address: 1522 East Fife Way, Milton, Wa

Location: In vault on the eastside of the building

Cross Connection Control For: Fire Protection **Type Assembly:** DCDA

Manufacturer: Wilkins **Model:** 9350DA **Size:** 6" **Serial #:** V30257

	Initial Test Results	Test After Repair or Cleaning
RPBA	Line Pressure: _____ Pressure Drop Across: No. 1 Check Valve (A) _____psid Relief Valve Opened (B) _____psid Buffer C = (A - B) _____psid No. 1 Check: Closed Tight ☐ Leaked ☐ No. 2 Check: Closed Tight ☐ Leaked ☐ Minimum AG Separation: Yes ☐ No ☐ Passed Test: Yes ☐ No ☐	Line Pressure: _____ Pressure Drop Across: No. 1 Check Valve (A) _____psid Relief Valve Opened (B) _____psid Buffer C = (A - B) _____psid No. 1 Check: Closed Tight ☐ Leaked ☐ No. 2 Check: Closed Tight ☐ Leaked ☐ Minimum AG Separation: Yes ☐ No ☐ Passed Test: Yes ☐ No ☐
DCVA	Line Pressure: 135 No. 1 Check Valve: Differential 1.8 psid No. 2 Check Valve: Differential 1.3 psid Passed Test: Yes ☒ No ☐	Line Pressure: _____ No. 1 Check Valve: Differential _____psid No. 2 Check Valve: Differential _____psid Passed Test: Yes ☐ No ☐
PVB	Line Pressure: _____ Air Inlet: Opened _____psid Failed to Open ☐ Check Valve: _____psid Leaked ☐ Passed Test: Yes ☐ No ☐	Line Pressure: _____ Air Inlet: Opened _____psid Failed to Open ☐ Check Valve: _____psid Leaked ☐ Passed Test: Yes ☐ No ☐
AG	Minimum Separation: Yes ☐ No ☐	Please Record Repair or Cleaning Information in Remarks Section Below

Is this a proper installation? YES: ☒ NO: ☐

Water service found: ON: ☒ OFF: ☐ **Water Service Left:** ON: ☒ OFF: ☐

WA State Approved Assy? YES: ☒ NO: ☐

Remarks: _____

I certify this report is accurate, and that I have used WAC 246-290-490 approved test methods.

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(253) 926-2290
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Repaired By: _____ **Certification #:** _____ **Date:** _____

Repair Test By: _____ **Certification #:** _____ **Date:** _____

Test Equipment Make: Prime Model: 247C Serial #: 219877 Accuracy Verification Date: 10/01/13

Water Purveyor:	New ☐
	Existing ☒
	Replacement ☐

PATRIOT FIRE PROTECTION, INC.

BACKFLOW PREVENTION ASSEMBLY TEST REPORT

Name: B&L Wood Waste **REF #:** _____

Service Address: 1522 East Fife Way, Milton, Wa

Location: In vault on the eastside of the building

Cross Connection Control For: Fire Protection Bypass **Type Assembly:** DCVA

Manufacturer: Wilkins **Model:** 950XL **Size:** 3/4" **Serial #:** 3510126XLD

	Initial Test Results	Test After Repair or Cleaning
RPBA	Line Pressure: _____ Pressure Drop Across: No. 1 Check Valve (A) _____psid Relief Valve Opened (B) _____psid Buffer C = (A - B) _____psid No. 1 Check: Closed Tight ☐ Leaked ☐ No. 2 Check: Closed Tight ☐ Leaked ☐ Minimum AG Separation: Yes ☐ No ☐ Passed Test: Yes ☐ No ☐	Line Pressure: _____ Pressure Drop Across: No. 1 Check Valve (A) _____psid Relief Valve Opened (B) _____psid Buffer C = (A - B) _____psid No. 1 Check: Closed Tight ☐ Leaked ☐ No. 2 Check: Closed Tight ☐ Leaked ☐ Minimum AG Separation: Yes ☐ No ☐ Passed Test: Yes ☐ No ☐
DCVA	Line Pressure: 135 No. 1 Check Valve: Differential 2.2 psid No. 2 Check Valve: Differential 1.8 psid Passed Test: Yes ☒ No ☐	Line Pressure: _____ No. 1 Check Valve: Differential _____psid No. 2 Check Valve: Differential _____psid Passed Test: Yes ☐ No ☐
PVB	Line Pressure: _____ Air Inlet: Opened _____psid Failed to Open ☐ Check Valve: _____psid Leaked ☐ Passed Test: Yes ☐ No ☐	Line Pressure: _____ Air Inlet: Opened _____psid Failed to Open ☐ Check Valve: _____psid Leaked ☐ Passed Test: Yes ☐ No ☐
AG	Minimum Separation: Yes ☐ No ☐	Please Record Repair or Cleaning Information in Remarks Section Below

Is this a proper installation? YES: ☒ NO: ☐

Water service found: ON: ☒ OFF: ☐ **Water Service Left:** ON: ☒ OFF: ☐

WA State Approved Assy? YES: ☒ NO: ☐

Remarks: _____

I certify this report is accurate, and that I have used WAC 246-290-490 approved test methods.

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Signature

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