



TETRA TECH EBA

CAMPBELL RIVER WASTE MANAGEMENT CENTRE 2013 ANNUAL WATER QUALITY MONITORING REPORT



PRESENTED TO

Comox Valley Regional District

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EXECUTIVE SUMMARY

Tetra Tech EBA Inc. (Tetra Tech EBA), formerly EBA, A Tetra Tech Company, was retained by the Comox Valley Regional District (CVRD) to conduct the 2013 annual water quality monitoring and sampling program and to prepare the 2013 annual water quality monitoring report for the Campbell River Waste Management Centre (CRWMC). The CRWMC is located on the north side of Argonaut Road near Campbell River, BC.

Twenty wells and two surface water sampling locations were monitored and sampled during the sampling events completed in February, May, August and November 2013.

Based on the 2013 monitoring data, the following conclusions are drawn:

- Groundwater flowed towards the east/northeast across most of the CRWMC. The horizontal gradient was 0.02 m/m for the spring (May 2013) monitoring event and 0.03 m/m for the autumn (November 2013) monitoring event;
- Groundwater analytical data obtained in 2013 indicates that groundwater sampled beneath the CRWMC in 2013 contains ammonia and chromium concentrations exceeding the applicable Contaminated Sites Regulation (CSR) Aquatic Life Water use (AW) standards. None of the groundwater samples collected in 2013 from monitoring wells located down and cross gradient of the CRWMC contained concentrations of parameters tested exceeding the CSR AW standards. None of the groundwater samples collected in 2013 contained concentrations of parameters tested exceeding the CSR Drinking Water Use (DW) standards;
- Surface water analytical data obtained in 2013 indicates a field pH and total cadmium concentration exceedance during one monitoring event in 2013 (February 2013) for SW-2. No exceedences were found for all four 2013 monitoring events for samples collected from surface water sampling location SW-1;
- The concentrations of several typical landfill leachate indicator parameters in groundwater are greater than the background concentrations at monitoring wells located along the eastern boundary of the CRWMC and immediately downgradient of the CRWMC. The indicator concentrations decrease away from the CRWMC and are at concentrations generally typical or slightly elevated of background concentrations at the furthest downgradient monitoring well (AG99-06) and at the surface water sampling stations (SW-1 and SW-2);
- Electrical conductivity, chloride, dissolved iron and dissolved manganese concentrations are observed to be an increasing trend in the monitoring wells located at the eastern boundary of the CRWMC (HBT94-1 and/or HBT94-3). Electrical conductivity, alkalinity and hardness concentrations are observed to be an increasing trend in the monitoring wells located immediately downgradient of the CRWMC property boundaries (EBA04-7);
- An ammonia concentration identified in groundwater as exceeding the applicable CSR AW standard in 2013 was limited to one monitoring well during one monitoring event (February 2013). However, this exceedance indicates the possibility of ammonia at concentrations exceeding the CSR AW standard extending offsite to the east and thus resulting in a non-compliance issue. Monitoring wells located further down and cross gradient of HBT94-3 contained significantly lower concentrations of ammonia and met the CSR AW standard. In addition, samples collected from surface water sampling locations SW-1 and SW-2 contained ammonia concentrations comparable to background levels represented by well AM02-01;

- An identified cadmium concentration in surface water at a concentration exceeding the applicable BC Approved Water Quality Guidelines (BCAWQG) for the protection of freshwater aquatic life does not appear to be directly related to the CRWMC operations and therefore is not considered a non-compliance issue with the operational certificate; and
- A dissolved total chromium concentration marginally exceeding the CSR AW standard for hexavalent chromium was identified in a groundwater sample collected from EBA04-1, the water supply well located at the southern boundary of the CRWMC, during the May 2013 monitoring event. None of the dissolved chromium concentrations measured at the downgradient and crossgradient monitoring wells in 2013, however, exceeds the CSR AW standards. Continued monitoring is required to further assess dissolved chromium exceedances in groundwater identified beneath the CRWMC.

Based on the conclusions presented above, Tetra Tech EBA recommends:

- The water quality monitoring program, continue on a quarterly annual basis in 2014;
- Re-survey groundwater monitoring wells that have not been surveyed in the last five years to confirm top of pipe elevation;
- Closely monitor ammonia concentrations in the downgradient wells and at the surface water sampling locations to ensure ammonia at concentrations exceeding the CSR AW standards is not posing a risk to the downgradient surface water bodies; and
- Conduct speciated chromium analysis of select groundwater samples to further assess the chromium exceedance identified in 2013 at the water supply well located at the CRWMC.

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LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Comox Valley Regional District and their agents. Tetra Tech EBA Inc. (Tetra Tech EBA) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Comox Valley Regional District, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in Tetra Tech EBA's Services Agreement. Tetra Tech EBA's General Conditions are provided in Appendix H of this report.

1.0 INTRODUCTION

Tetra Tech EBA Inc. (Tetra Tech EBA); formerly EBA, A Tetra Tech Company, was retained by the Comox Valley Regional District (CVRD) to conduct the 2013 annual water quality monitoring and sampling program and to prepare the 2013 annual water quality monitoring report for the Campbell River Waste Management Centre (CRWMC). The CRWMC is located on the north side of Argonaut Road near Campbell River, BC. A CRWMC location map and site plan showing the water quality monitoring locations are presented on Figure 1 and Figure 2, respectively.

Authorization to carry out the water quality monitoring program was provided by the CVRD in February 2013. The program's objectives are to fulfill the requirements specified by the BC Ministry of Environment (MOE) Operational Certificate MR-02401 and to identify potential adverse water quality impacts related to operations at the CRWMC.

This report summarizes field activities and chemical analytical results, discusses long-term trends and possible migration of leachate from the CRWMC and presents recommendations for the 2014 annual water quality monitoring program.

1.1 Background

The BC MOE administers Operational Certificate No. MR-02401 and specifies the CRWMC's operational requirements. The Operational Certificate replaced the original permit for the facility in 2003 and included obligations to conduct a monitoring program that at minimum, meets the requirements of Subsections 4.1, 4.2 and 7.15 of the *Landfill Criteria for Municipal Solid Waste* and the *Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills*. It should be noted that the Landfill Criteria for Municipal Solid Waste is currently evolving with the Draft Interim Second Edition published in November 2013. A copy of the 2003 Operational Certificate No. MR-02401 is provided in Appendix A. The CRWMC property boundary (the compliance point as defined in the operational certificate) is shown as a red dashed line on Figure 2.

According to staff at the District of Campbell River, the CRWMC began as an unofficial dump prior to the 1970's (the exact date is uncertain). During the early years of its operation, it was common practice to burn the materials dumped at the CRWMC. In addition, liquid waste was regularly disposed of at the CRWMC. At the time, waste materials entering the CRWMC were neither monitored nor restricted.

In the mid-1970s, burning was discontinued and the District of Campbell River retained an operator to start covering the uncompacted waste materials. A scale was installed at the CRWMC in 1995 and some restrictions were set in place to control the waste materials entering the CRWMC. The CVRD took over operations from the District of Campbell River in 1999.

A groundwater monitoring program was implemented at the CRWMC in 1994. Until 2002, the CVRD provided funding to the Quinsam Hatchery to conduct surface water monitoring and the Quinsam Hatchery would then share the data with the CVRD. The surface water monitoring program was added to the water quality monitoring program in October 2006.

The CRWMC is currently operational, but will likely be closed within the next five years.

1.2 Scope of Services – Water Quality Sampling Program

To meet the water quality monitoring program's objectives, the following activities were undertaken:

- Measured the groundwater depths in each existing monitoring well, except EBA04-1, which is a water supply well;

- Monitored field parameters at twenty-four monitoring wells and two surface water locations;
- Samples collected from selected groundwater monitoring wells and surface water stations for submission to Maxxam Analytics Inc. (Maxxam) of Burnaby, BC for laboratory analysis of landfill leachate and natural attenuation process indicators (selected metals, anions, nutrients, organic compounds and physical tests);
- Submitted laboratory blind duplicate samples as part of the quality assurance and quality control (QA/QC) program;
- Entered all water quality data into ESdat, an environmental database program, and utilized ESdat to tabulate the data and to identify water quality parameters exceeding the applicable water quality assessment groundwater standards and surface water guidelines; and
- Prepared a report that summarized field activities and chemical analytical results, discussed long-term trends and possible leachate migration from the landfill and presented recommendations for the 2014 monitoring program.

This monitoring report has been prepared in general accordance with Operational Certificate MR-02401 issued to the CVRD by the BC MOE, Environmental Protection Division under provisions outlined in the BC Environmental Management Act.

2.0 PHYSIOGRAPHIC SETTING

2.1 CRWMC Site Description

The CRWMC is an irregularly shaped property covering approximately 10.8 hectares. The CRWMC is located 365 m east of the intersection of Highway 28 and Argonaut Road in the District of Campbell River. The approximate position of the CRWMC is latitude 50° 00' 29.4" N and longitude 125° 21' 0.3" W.

A topographic map for the region shows McIvor Lake located approximately 400 m to the west of the CRWMC. Elevations across the CRWMC property range between approximately 170 m in the west to 140 m along the eastern property boundary. The ground level drops from McIvor Lake with a moderate slope to the east/northeast across the landfill's property. The slope then flattens out as it enters the coastal lowland area towards the Cold Creek Valley.

The property located directly west of the CRWMC is occupied by Island Ready Mix Ltd., a concrete manufacturing facility. The lands to the north and east of the CRWMC are primarily forested. Al & Sons occupy a gravel pit to the south of the CRWMC. Three residential properties are located further to the northeast along Argonaut Road (at distances greater than 400 m from the CRWMC).

Monitoring well information is summarized in Appendix B. Figure 2 shows the CRWMC layout, including the existing monitoring well locations. Historically twenty-eight groundwater monitoring wells and three domestic water supply wells were located either on or near the CRWMC. Of the wells, only twenty-four remain undamaged and accessible as described below:

- AM02-01 is the only upgradient well currently sampled. This well is occasionally dry. EBA06-1, a water supply well located to the west of the CRWMC, was sampled in 2006 and 2007, but given the lack of reliable information about the domestic well (depth, stratigraphy, completion, etc.) to support the data interpretation, sampling was discontinued in 2008.

- Wells GLL93-1 through GLL93-3, HBT94-1 through HBT94-4, AM00-01, EBA04-1, EBA04-2, EBA04-4 and EBA04-5 are located within the CRWMC property boundaries. Of these wells, GLL93-1 and GLL93-2 have been dry since 2000 and AM00-01, EBA04-5 and GLL93-3 have been decommissioned or are no longer accessible. EBA04-2 above ground casing was extended in July 2013 and was not accessible for the August and November 2013 monitoring events.
- The remaining wells constitute downgradient 'compliance' wells. These include GLL93-4, HBT94-5, AG99-01 through AG99-06, EBA04-3, EBA04-6, EBA04-7, and EBA11-1 through EBA11-4. Of these wells, GLL93-4 and HBT94-5 have been dry for most of their monitoring history and AG99-03 was damaged and therefore decommissioned.
- The closest downgradient domestic water wells, DW-1 and DW-2, are located east of AG99-06 at 5800 Argonaut Road and 5900 Argonaut Road, respectively. Prior to 2008, the property owner of 5800 Argonaut Road would not permit CVRD staff or representatives to access and sample the well. In 2008, the property owner of 5800 Argonaut Road, Mr. Kolonsky, allowed the well to be sampled at the CVRD's request. Water well DW-1 was not sampled in 2009 and 2010. Tetra Tech EBA requested permission from Mr. Kolonsky, owner of 5800 Argonaut Road, and Mr. Martinelli, owner of 5900 Argonaut Road, to sample their domestic water wells in 2011 but Mr. Kolonsky and Mr. Martinelli would not permit CVRD staff or representatives to access and sample their wells. The well records were not made available for review.

A surface water sampling station (SW-1) on a Cold Creek tributary was added to the field program in 2006. The approximate location is also shown on Figure 2 and is considered to be downgradient of the CRWMC property with respect to the historically interpreted groundwater flow direction. The Cold Creek tributary drains into the Quinsam River. A second surface water sampling station (SW-2) from another Cold Creek tributary was added to the field program in 2013. The approximate location of SW-2 is also shown on Figure 2 and is considered to be downgradient of the CRWMC property with respect to the historically interpreted groundwater flow direction. This location was found to be dry during the May, August and November 2013 monitoring events.

2.2 Local Geology

According to the Soils of South Vancouver Island, Soil Survey Report No. 44 (Sheet 7) (J. Jungen, 1978) the overburden deposits near the CRWMC consist of Hawarth Soils, which include deep, glaciofluvial sands and gravels. Slightly east of the CRWMC, the soils grade into Dashwood Soils, which may combine both glaciofluvial and glaciomarine type deposits consisting of sands and gravels with some silt layers.

The available well records for the CRWMC and surrounding area confirm the stratigraphy described by Jungen (1978). Near the CRWMC, deep, interlayered deposits of sand and gravel are present. A low permeability sand and silt layer underlies the interlayered sand and gravel deposits. Many of the wells drilled in the area encountered the sand and silt layer at depth.

Based on the Geology of Vancouver Island (East Half) 1:250,000 scale map, prepared by J.E. Muller in 1977, bedrock on the west side of the study area is primarily Triassic age Karmutsen Formation, which consists of basalt flows, minor limestone, shale, pillow lava and breccia. The east side of the CRWMC is covered by a thick layer of Quaternary sediments, underlain by sedimentary rocks of the Cretaceous Nanaimo Group. None of the well records reviewed for the wells located near the CRWMC encountered bedrock.

2.3 Hydrology

The nearest surface water bodies to the CRWMC are located approximately 400 m to the west (McIvor Lake) and approximately 600 m to the northeast (tributary of Cold Creek and an unnamed pond believed to be connected to the Cold Creek hydrologic system). Cold Creek drains towards the northeast into the Quinsam River. No watercourses are present on the CRWMC.

2.4 Hydrogeological Setting

The CRWMC overlies an unconfined sand and gravel aquifer. Based on available drill logs, the geological materials comprising the aquifer are heterogeneous with discontinuous, fine sand and or sandy silt interlayers within layers of coarse sands and gravels. A less permeable glaciomarine silt and sand deposit has been identified at the base of the surficial sand and gravel deposits.

Groundwater is inferred to follow the topographic gradient towards the Cold Creek Valley and onwards towards the Quinsam River.

2.5 Potential Sensitive Receptors

Based on the interpreted groundwater flow direction, the CRWMC represents a potential risk to the drinking water wells, with the nearest drinking water well located approximately 450 m northeast of the CRWMC along Argonaut Road and to the unnamed tributary to Cold Creek, located approximately 600 m to the northeast of the CRWMC.

The area does not appear to be farmed; therefore, it is unlikely that groundwater water would be used for other purposes (irrigation or livestock watering).

3.0 MONITORING AND SAMPLING METHODOLOGY

3.1 Groundwater and Surface Water Monitoring and Water Sampling

Water quality monitoring and sampling was conducted between February 20 and 22, 2013, May 28 and 30, 2013, August 20 and 21, 2013, and November 26 and 28, 2013. Monitoring wells GLL93-1, GLL93-2, GLL93-4, HBT94-5 and AM02-01 were dry during the February, May, August and November monitoring and sampling events in 2013. Monitoring well HBT94-3 was dry during the May, August and November monitoring events in 2013. In an attempt to ensure a groundwater sample was collected from the upgradient monitoring well AM02-01, representative of background water quality, Tetra Tech EBA also mobilized to the site on October 29, 2013 to monitor monitoring well AM02-01 only and if sufficient water to collect a groundwater sample. Groundwater was observed in monitoring well AM02-01 on October 29, 2013. Figure 2 presents the sampling locations. The field monitoring and sampling methodology and deviations from the previously described scope of services is described in Appendix C.

3.2 Analytical Testing of Water Quality Samples

All laboratory analyses were completed by Maxxam Analytical Services (Maxxam) using methods approved by MOE. Maxxam is accredited by the Canadian Association for Laboratory Accreditation (CALA). The analytical testing program details are provided in Appendix C. The analytical program is based on past water quality data, identified receptors and the need to characterize the groundwater chemistry in response to potential impacts from the CRWMC.

3.3 Quality Assurance/Quality Control

The QA/QC protocols applied in 2013 required that the completed field and reporting program:

- Adhered to standard Tetra Tech EBA quality management system (QMS) field and record keeping procedures;
- Used new disposable nitrile gloves when collecting each sample;
- Placed samples in appropriate new and labelled laboratory-supplied containers;
- Provided minimal head-space in the sample containers, where required;
- Properly preserved samples and transported the samples on ice to the analytical laboratory;
- Completed detailed field notes and accurately recorded sample locations;
- Collected in the field and submitted blind-labelled duplicate samples for laboratory analyses and, where appropriate and practical, from duplicate samples using splitting methods;
- Completed chain-of-custody forms for all samples submitted for laboratory analyses;
- Analyzed the samples within the recommended holding time following their collection;
- Ensured one person who did not compile the tables provided in this report reviewed the tables and compared the tabulated analytical results with the original information appearing on the laboratory certificates and information on the chain-of-custody forms to verify the accuracy in the tables; and
- Provided a senior professional review of this report to verify that it meets investigation and reporting standards.

4.0 RESULTS

The 2013 monitoring and sampling results are presented in the below Sections 4.1 to 4.5.

4.1 Groundwater Flow Regime

The measured water levels and geodetic groundwater elevations from 1993 to 2013 are included in Appendix E. Hydrographs for each well are also included in Appendix E. Based on Appendix E, water levels in the monitoring wells have shown a decreasing trend since 2000 but have seem to stabilized since 2007 similar to the cumulative average precipitation trend.

Two groundwater elevation contour maps showing data for the May and November 2013 monitoring events are presented on Figures 3 and 4, respectively. The groundwater monitoring wells EBA04-6, EBA04-7 and HBT94-4 were not included in the assessment of groundwater flow direction as Tetra Tech EBA believes these wells have settled since the last survey and should be resurveyed to confirm elevation of top of pipe. The groundwater elevations show groundwater flow is predominantly towards the east-northeast. As shown on Figure 3, the horizontal groundwater flow direction for the May 2013 monitoring event was east at the CRWMC and east-northeast downgradient of the CRWMC. As shown on Figure 4, groundwater information was limited to the eastern portion of the landfill and down and cross gradient due to monitoring well EBA04-2 being extended and therefore not feasible to monitor during the November, 2013 monitoring event. Figure 4 shows the horizontal groundwater flow direction for the November 2013 to the northeast. The horizontal gradient was 0.02 m/m for the

spring (May 2013) monitoring event and 0.03 m/m for the autumn (November 2013) monitoring event. These results are consistent with historical horizontal flow directions and gradients measured at the CRWMC.

Vertical hydraulic gradients were evaluated between well pairs, HBT94-1/HBT94-2 and EBA04-6/EBA04-7 using the measured groundwater elevations and the difference between the top of screen elevation for each monitoring well. Table 1 presents a historical summary of the vertical gradients for these two well pairs.

The calculated vertical hydraulic gradients in 2013 were consistently downwards in EBA04-6/EBA04-7 at 0.016 m/m to 0.023 m/m. The calculated vertical hydraulic gradients in 2013 were mostly downwards in HBT94-1/HBT94-2 at 0.001 to 0.003 m/m. The August 2013 calculated vertical hydraulic gradient was upwards in HBT94-1/HBT94-2 at -0.008m/m.

4.2 Groundwater Quality

Groundwater quality data for the period of 2009 to 2013 is presented in Appendix F. Groundwater quality data obtained for the CRWMC prior to 2009 is included in Appendix F of the Campbell River Waste Management Centre 2012 Water Quality Monitoring Report, dated April 2013. The 2013 analytical laboratory certificates for the CRWMC are attached in Appendix D. The groundwater analytical results obtained during the 2013 monitoring events are discussed in the following sections.

4.2.1 Comparison to Assessment Standards

Based on evolving criteria for municipal solid waste landfills and discussion with Ministry of Environment, the analytical results from the 2013 groundwater sampling program were compared to the British Columbia Contaminated Sites Regulation (CSR) (BC Reg. 375/96 including amendments up to BC Reg. 4/2014, January 31, 2014) Freshwater Aquatic Life (AW) water use and Drinking Water (DW) use standards.

Table 2 summarizes parameters that did not meet the applicable assessment standards at one or more locations during the 2013 monitoring program. These parameters are summarized below. A discussion of the Table 2 exceedances and implications to the water quality with respect to the historical data set and temporal trends at the CRWMC will follow in Section 5.1.

Background Water Quality

Monitoring well AM02-01 was dry during the February, May, August, and November 2013 monitoring events, but a sample was able to be collected in October 2013. The groundwater analytical results for the samples collected from the background monitoring well, AM02-01 in October 2013 met the applicable CSR AW and DW standards for the parameters tested.

Water Quality Beneath CRWMC

An ammonia concentration of 27 mg/L in the groundwater sample collected from HBT94-3, located at the eastern boundary of the CRWMC, during the February monitoring event exceeded the pH based CSR AW standard of 1.31 to 18.4 mg/L. Ammonia concentrations for all other landfill monitoring wells sampled during all four monitoring events were less than the CSR AW standards. There is currently no CSR DW standard for ammonia.

A dissolved chromium (III+VI) concentration of 10.2 ug/L in the groundwater sampled from EBA04-1, the water supply well located at the southern boundary of the CRWMC, during the May monitoring event exceeded the hexavalent chromium CSR AW standard of 10 ug/L but met the CSR DW standard of 50 ug/L. Dissolved chromium concentrations for all other landfill monitoring wells sampled during all four monitoring events were less than the CSR AW and DW standards.

No other exceedances were recorded for groundwater samples collected from the monitoring wells completed within the CRWMC during any of the monitoring events.

Downgradient Water Quality

No exceedances were noted for analyzed groundwater samples from any of the four 2013 groundwater sampling events from monitoring wells located downgradient of the CRWMC.

4.2.2 Summary of Common Landfill Leachate Indicators Results for 2013

A summary of the 2013 results for common landfill leachate indicators at the monitoring wells located within the property boundaries and downgradient of the property is provided in the below table. A discussion of the implications of the below results with respect to the historical data set and temporal trends at the CRWMC follows in Section 5.1.

The monitoring wells monitored and sampled during the 2013 annual water quality program and selected for comparison were divided into four categories depending on their location as follows:

- Monitoring well located upgradient of the CRWMC and considered representative of background conditions: AM02-01 (herein referred to as “upgradient well”);
- Monitoring wells located within the landfill footprint or at the toe of the landfill and representative of water quality beneath the CRWMC: EBA04-2, EBA04-4, HBT94-1, HBT94-2, HBT94-3 and HBT94-4 (herein referred to as “landfill wells”);
- Monitoring wells located immediately downgradient of the CRWMC and within CVRD owned lands: EBA04-3, EBA04-6, EBA04-7, EBA11-1, and EBA11-2 (herein referred to as “boundary wells”); and,
- Monitoring wells located further down/cross gradient of the CRWMC: AG99-01, AG99-02, AG99-04, AG99-05, EBA11-3 and EBA11-4 (herein referred to as “downgradient wells”).

Summary of 2013 Groundwater Results - Common Landfill Leachate Indicators

Parameter	Upgradient Well	Landfill Wells	Boundary Wells	Downgradient Wells	CSR AW	CSR DW
Field pH (pH unit)	6.19	6.07 – 8.37	5.69 – 7.69	6.62 – 8.6	No Standard	No Standard
Hardness (mg/L)	45.2	41.2 - 428	130 - 435	43.4 - 130	No Standard	No Standard
Alkalinity (mg/L)	52.5	39.7 - 621	102 - 419	42.9 - 126	No Standard	No Standard
Chloride (mg/L)	2	0.96 - 92	3.9 - 26	1.3 - 50	1500	250
Field Electric Conductivity (uS/cm)	114	90 - 1470	222 - 878	91 - 288	No Standard	No Standard
Sulphate (mg/L)	2.91	2.71 – 9.57	2.69 - 72	1.44 – 3.98	1000	500
Nitrate (mg/L)	0.101	<0.02 – 0.375	0.093 – 1.95	0.036 – 0.434	400	10
Ammonia (mg/L)	0.0055	<0.005-27	<0.005-0.052	<0.005-0.034	1.31 - 18.4*	NS
Iron (mg/L)	<0.005	0.001 – 5.15	<0.001 – 0.0312	<0.001 – 0.024	No Standard	No Standard
Manganese (mg/L)	<0.001	<0.00005 – 4.24	<0.00005 – 0.13	<0.00005 - <0.001	No Standard	No Standard

Notes:

BC CSR (BC Reg. 375/96 includes amendments up to BC Reg. 4/2014, January 31, 2014) Freshwater Aquatic Life (AW) water use and Drinking Water (DW).

4.3 Surface Water Quality

The surface water sampling stations, SW-1 and SW-2, are shown on Figure 2. The 2013 laboratory certificates for the surface water samples collected at the CRWMC are presented in Appendix D. The surface water quality data collected in 2013 is summarized in Appendix F. The surface water analytical results obtained during the 2013 monitoring events are discussed in the following sections.

4.3.1 Comparison to Assessment Standards

The surface water analytical results obtained in 2013 were compared to the currently applicable BC Approved Water Quality Guidelines (1998, Updated April 2013) and the Compendium of Working Water Quality Guidelines for BC (1998, Updated August 2006) for the protection of freshwater aquatic life. These guidelines have been referenced together in the quality data tables as the BCAWQG.

Table 3 summarizes parameters that did not meet the applicable assessment criteria during the 2013 monitoring program. The observed water quality within the context of both the surface water and groundwater data is discussed in Section 5.1.

In 2013, the majority of the parameters tested from the surface water samples collected from SW-1 and SW-2 during the sampling events met the applicable criterion. The sample collected from SW-2 during the February 2013 monitoring event contained a field pH measurement and total cadmium concentration (the duplicate of SW-2 also exceeded for total cadmium) exceeding the BCAWQG for freshwater aquatic life protection.

4.3.2 Summary of Common Landfill Leachate Indicators Results for 2013

A summary of the 2013 results for common landfill leachate indicators at the two surface water sampling locations is provided in this table. The observed surface water quality is discussed in Section 5.1 within the context of both the surface water and groundwater results and trend analysis.

Summary of 2013 Surface Water Results - Common Landfill Leachate Indicators

Parameter	SW1	SW2	BCAWQG Aquatic Life
Field pH (pH unit)	6.9 – 8.2	5.69	6.5-9
Hardness (mg/L)	61.1 – 74.7	23.6	No Guideline
Alkalinity (mg/L)	59 – 70.2	23.8	No Guideline
Chloride (mg/L)	2.1 – 3.1	3.8	600
Field Electric Conductivity (uS/cm)	133 – 163.1	79	No Guideline
Sulphate (mg/L)	2.45 – 4.06	1.59	100
Nitrate (mg/L)	0.121 – 0.249	<0.02	32.8
Ammonia (mg/L)	<0.005-0.015	0.0055	*
Iron (mg/L)	0.0049 – 0.0541	0.0476	0.35
Manganese (mg/L)	<0.00005 – 0.00334	0.00157	*

Note: BCAWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life (updated 2006 and including amendments up to September 2011).

* indicates that guideline is calculated based on sample specific data

4.4 Quality Control/Quality Assurance

As part of Tetra Tech EBA's QA/QC program, blind laboratory duplicates and extra sample duplicates were submitted for analysis to confirm the accuracy of the laboratory and field test accuracy. The results from the duplicate samples collected from HBT94-2, EBA04-7, EBA11-4, and SW-2 are listed in Table 4. The results have been analysed using the relative percent difference between each measured parameter value.

The QA/QC results are presented for comparison purposes to assess laboratory analytical data quality (Table 4). The results have been analyzed using the relative percent difference (RPD) method. The RPD is the absolute difference between the analytical results from two samples divided by the average analytical result, expressed as a per cent (%). RPD values were not calculated when analytical results were below or within five times the analytical detection limit.

According to the MOE British Columbia Laboratory Sampling Manual¹, an acceptable data quality objective for laboratory-split duplicates (which provide a measure of laboratory precision) is RPD values below 20%. The data quality objective for field duplicates will be slightly higher, with RPD values over 20% indicating a possible problem and RPD values over 50% indicating a definite problem (likely either contamination or lack of sample representativeness). Therefore, Tetra Tech EBA considers that a data quality objective of RPD values less than 30% is acceptable for field duplicates. Any RPD values exceeding the data quality objectives should be identified and their significance should be discussed.

As shown in Table 4, the majority of the RPD values calculated met the data quality objective of 30%. Only six RPD values, the RPD value for iron in samples collected from HBT94-2 in February 2013; the RPD value for molybdenum and nickel in samples collected from HBT94-2 in May 2013, the RPD value for nickel in samples collected from EBA04-7 in May 2013 and the RPD value for iron in samples collected from EBA04-7 and EBA11-4 in August 2013, exceeded the data quality objective of 30%. The RPDs exceeding 30% for the three metals parameters (i.e., iron, molybdenum and nickel) were considered acceptable since the concentrations for both the original and duplicate samples were low therefore any variability in the concentrations would result in a higher RPD.

For the 2013 monitoring program, Tetra Tech EBA considers the quality of the laboratory results to be acceptable for all parameters.

5.0 WATER QUALITY DISCUSSION

The following sections discuss the monitoring program findings.

5.1 Surface and Groundwater Analytical Results Discussion

Graphs showing selected landfill leachate indicators temporal variation are attached as Appendix G. Figures 5 through 8 present contour maps to show spatial variability for electrical conductivity for the May and November 2013 monitoring events, chloride for the November 2013 monitoring event and ammonia for the February and November 2013 monitoring events, respectively. The 2013 monitoring and sampling data has been analyzed within the context of exceedances, temporal trends and spatial relationships to assess compliance with the permit requirements and potential for adverse impacts from the CRWMC.

¹ British Columbia Environmental Laboratory Sampling Manual: 2009 — Sampling, Methods and Quality Assurance, Last Updated: October 2011. URL: <http://www.env.gov.bc.ca/epd/wamr/labsys/lab-man-09/index.htm>

5.1.1 Background Water Quality

Monitoring well, AM02-01, is hydraulically upgradient of the CRWMC and thus represents background groundwater quality. Monitoring well AM02-01 has been dry on occasion during sampling events; and was dry during the February, May, August and November 2013 monitoring events. A sample was collected in October 2013.

Historically, the water quality characteristics for this well have included:

- Low hardness (35 to 71 mg/L - indication of low mineralization) and alkalinity (37 to 61 mg/L – indication of low acid neutralizing capacity);
- Variable pH (typically 6.19 to 8.13, one outlier pH measurement of 4.72 in the summer of 2009);
- Electrical conductivity values less than 200 $\mu\text{S}/\text{cm}$ (59 to 164 $\mu\text{S}/\text{cm}$);
- Chloride concentrations ranging from 0.5 to 18.4 mg/L;
- Sulphate concentrations ranging from 1.5 to 4 mg/L;
- Non-detectable to low ammonia (0.005 to 0.051 mg/L), non-detectable to low nitrite concentrations (0.0011 to 0.01 mg/L) and low nitrate concentrations (0.0814 to 0.392 mg/L);
- Non-detectable to low dissolved iron (less than 0.05 mg/L) and dissolved manganese (non-detectable to 0.017 mg/L);
- Variable dissolved oxygen concentrations;
- Low concentrations of dissolved cadmium (non-detectable to 0.00011 mg/L); and
- Detectable concentrations of aluminium, barium, boron, chromium, copper, lithium, magnesium, nickel, selenium, vanadium, and zinc have been measured in groundwater from AM02-01 in the past, though these concentrations were less than the applicable standards.

5.1.2 Landfill Leachate Indicators Beneath CRWMC and Downgradient

This section discusses the landfill leachate indicator characteristics in relation to potential leachate impacts beneath the CRWMC and downgradient.

- **Hardness and Alkalinity** – Elevated hardness and alkalinity values are commonly associated with municipal solid waste degradation. In 2013, hardness and alkalinity concentrations in the landfill and boundary wells were up to ten times the ambient water quality represented by monitoring well AM02-01 and in the downgradient monitoring wells up to three times the ambient water quality.

As shown in the graphs in Appendix G, the hardness and alkalinity concentrations measured at EBA04-7, located immediately downgradient of the CRWMC property boundaries, show a slight increasing trend until 2011. Since 2011 the concentrations have stabilized. No other obvious trends are noted based on the historic and 2013 data as shown in Appendix G. There are currently no CSR standards for the protection of aquatic life or drinking water for hardness and alkalinity.

The hardness and alkalinity concentrations measured at the surface water sampling stations (SW1 and SW2) in 2013 were comparable to background levels represented by well AM02-01.

- **pH** – Historically, the groundwater pH has fluctuated from acidic to basic depending on the location and sampling event. In 2013, the pH values ranged from 6.07 (HBT94-1) to 8.37 (EBA04-2) in groundwater beneath the CRWMC. Immediately downgradient, in 2013, the pH values in groundwater ranged from 5.69 (EBA04-7) to 7.69 (EBA11-2). Further downgradient, in 2013, the pH values in groundwater ranged from 6.62 (AG99-05) to 8.6 (AG99-05). The pH measurements at the surface water sampling station SW-1 in 2013 ranged from 6.9 to 8.2. The pH measurements at the surface water sampling station SW-2 in 2013 was 5.69. No obvious trends are noted based on the historic and 2013 data as shown in Appendix G. There is currently no CSR AW or DW standard for pH.
- **Specific Conductance** – Elevated dissolved solids concentrations in groundwater result from the mixing of waste degradation by-products with groundwater. As expected and as shown in Appendix G, the monitoring wells located closest to the downgradient property line, HBT94-1, HBT94-2, HBT94-3, EBA04-3, EBA04-6, EBA04-7, EBA11-1 and EBA11-2 have had historical electrical conductivity values that are greater than up to ten times the electrical conductivity in the ambient water quality (represented by monitoring well AM02-01). Historical electrical conductivity values for the furthest downgradient monitoring wells are similar to slightly elevated than the electrical conductivity in the ambient water quality represented by monitoring well AM02-01. The electrical conductivity values measured at HBT94-1 and HBT94-3, located at the eastern boundary line of the CRWMC and EBA04-7, located immediately downgradient of the CRWMC property boundaries, show a slight increasing trend. No other trends are noted based on the historic and 2013 electrical conductivity data as shown in Appendix G. There are currently no CSR standards for the protection of aquatic life or drinking water for electrical conductivity.

Figure 5 and Figure 6 show distribution maps for electrical conductivity in groundwater from May 2013 and November 2013, respectively. As shown, electrical conductivity values are highest in groundwater along the eastern boundary and immediately downgradient of the CRWMC property at EBA04-7 and decrease to the northeast towards AG99-06 and to the east towards AG99-04 and AG99-05.

The 2013 electrical conductivity values measured at the surface water sampling stations (SW1 and SW2) in 2013 were comparable to background levels represented by well AM02-01.

- **Chloride** – Based on the 2013 and historic data, chloride concentrations have fluctuated at all monitoring well locations but since 2002 have remained less than 110 mg/L. The CSR AW standard of 1500 mg/L and the CSR DW standard of 250 mg/L. Chloride levels in the monitoring wells located closest to the downgradient property line, EBA04-3, EBA04-6, EBA04-7, HBT94-1, HBT94-2, HBT94-3, EBA11-1 and EBA11-2 historically are elevated relative to the typical background levels. Chloride concentrations measured at AG99-06 and EBA11-3, located further downgradient of the CRWMC, are also shown to be elevated relative to background levels. The chloride concentrations measured at HBT94-1 and HBT94-3, located at the eastern boundary of the CRWMC, show an increasing trend. No other trends are noted based on the historic and 2013 chloride data as shown in Appendix G.

The chloride data from February 2013 and November 2013 is spatially represented on the chloride distribution map shown on Figure 7. As shown, chloride concentrations are highest in groundwater along the eastern boundary and immediately downgradient of the CRWMC property at EBA04-7 and decrease to the northeast towards AG99-06 and to the east towards AG99-04 and AG99-05.

Chloride concentrations in surface water at SW-1 and SW-2 in 2013 ranged from 2.1 to 3.9 mg/L and are therefore comparable to typical background levels represented by monitoring well AM02-01.

- **Sulphate** – Based on Appendix G, sulphate concentrations in groundwater from most of the monitoring wells have been less than 15 mg/L since 2003 and are generally comparable with background sulphate concentrations. Monitoring wells EBA04-3, EBA04-6, EBA04-7, EBA11-1, located immediately downgradient of the CRWMC property boundaries generally contain sulphate concentrations that are greater than the typical background levels represented by well AM02-01 but at concentrations less than the CSR AW and DW standards. Sulphate concentrations are shown to fluctuate in monitoring wells EBA04-3, EBA04-6, EBA04-7 and EBA11-1 but no discernable trends are observed for these monitoring wells.

Sulphate concentrations in surface water collected from SW-1 and SW-2 in 2013 ranged from 1.47 mg/L to 4.06 mg/L and are comparable to typical background levels represented by monitoring well AM02-01.

- **Ammonia** – The ammonia distribution in groundwater from February 2013 and November 2013 are shown on Figure 8 and 9. Ammonia typically represents a high percentage of the nitrogen species in a young leachate while it is still in the acid generating phase. Groundwater in most of the monitoring wells sampled had below detectable to low ammonia concentrations (i.e., less than 0.1 mg/L). The HBT-series wells (closest to the landfilled wastes) had the highest ammonia concentrations, which in 2013 were up to 27 mg/L and recorded historic levels have been as high as 29.4 mg/L. HBT94-3 contained concentrations of ammonia during the February 2013 sampling event that exceeded the CSR AW standard for ammonia. None of the other monitoring wells sampled in 2013 contained ammonia concentrations exceeding the CSR AW standard. There is currently no CSR DW standard for ammonia. The ammonia concentrations measured at the surface water sampling stations (SW1 and SW2) in 2013 were comparable to background levels represented by well AM02-01.

The highest nitrate concentration in 2013 was measured in the groundwater sample collected from EBA04-7 (1.94 mg/L) which is less than the CSR AW standard of 400 mg/L and DW standard of 10 mg/L. Nitrate concentrations in the landfill wells and downgradient wells were elevated as compared to typical background levels represented by well AM02-01 by up to 4 times and in the boundary wells by up to 20 times.

- **Manganese and Iron** – Manganese and iron concentrations in groundwater, as shown in Appendix G, have been generally low to non-detectable in all monitoring wells with the exception of the monitoring wells located closest to the downgradient property boundary (HBT94-1, HBT94-2, and HBT94-3). These wells have had manganese and iron concentrations greater than the background concentrations. Dissolved manganese and iron concentrations measured in the groundwater at HBT94-3, located within the CRWMC property boundaries, show an increasing trend. There are currently no iron and manganese CSR and DW standards for a municipal disposal facility.
- **Heavy Metals** – In 2013, dissolved chromium concentrations in groundwater was found at levels exceeding the CSR AW standard for hexavalent chromium at the water supply well located at the CRWMC (EBA04-1). Many other heavy metals have been detected in the groundwater beneath the CRWMC and downgradient but at concentrations less than the applicable CSR AW and DW standards. As indicated in Section 5.1.1, many heavy metals have also been detected in the background water quality, but typically at lesser concentrations.

In 2013, a total cadmium concentration in the surface water sample collected from surface water sampling location SW-2 in February 2013 exceeded the BCAWQG but was similar to typical background levels represented by well AM02-01.

Several factors may contribute to elevated heavy metal concentrations in groundwater (natural background levels, reducing conditions, or biological attenuation of organic contaminants in the leachate/groundwater mixing zone). Some may become immobilized as reducing conditions shift to oxidizing conditions

downgradient of the mixing zone beneath the landfill. The heavy metal concentrations and the exceedences in chromium identified in groundwater in 2013 and cadmium identified in surface water are discussed further in Section 5.1.3.

5.1.3 Water Quality Compliance Assessment

The Operational Certificate MR-2401 requires that leachate impacted groundwater leaving the CRWMC at the property boundary meet the applicable groundwater standards as per the current landfill criteria for municipal solid waste or natural background concentrations where these concentrations exceed the applicable groundwater standards. Based on conversations with MOE and the new draft interim second edition of the Landfill Criteria for Municipal Solid Waste, the applicable standards at a municipal disposal facility are evolving and the CSR AW and DW groundwater standards are now considered the applicable groundwater standards at the CRWMC.

The groundwater sampled beneath the CRWMC in 2013 resulted in ammonia and chromium concentrations that exceed the CSR AW standards. Surface water analytical results obtained in 2013 indicated a field pH and total cadmium exceedence for the surface water sample collected from SW-2 in February 2013. There were no exceedences in the 2013 analytical results of the CSR DW standards. The exceedences identified in groundwater and surface water during the 2013 annual water quality monitoring program in regards to compliance to the Operational Certificate MR-2401 are discussed as follows:

- An ammonia concentration exceeding the CSR AW standard was measured in the groundwater sample collected from well HBT94-3, located at the eastern boundary of CRWMC, during the February 2013 monitoring event. This monitoring well is the most shallow of the HBT94 series and is often dry. As shown on Figure 9, ammonia at concentrations exceeding the CSR AW standard is limited to the vicinity of HBT94-3. Monitoring wells located further down and cross gradient of HBT94-3 contained significantly lower concentrations of ammonia;
- A chromium concentration of 10.2 ug/L marginally exceeding the CSR AW standard of 10 ug/L for hexavalent chromium was measured in the groundwater sample collected from well EBA04-1, located within the CRWMC property boundaries. It should be noted that the samples collected from EBA04-1 are collected from a tap since this water well is a water supply well and therefore the elevated concentrations in the groundwater samples may be a result of piping etc. associated with the water supply well and not a true indication of concentrations in the groundwater; and
- Historically, cadmium concentrations exceeding the BCAWQG for the protection of freshwater aquatic life have been observed from the surface water sampling station, SW-1. In 2013, there was no exceedences found for cadmium in SW-1, however, cadmium exceedences were identified at the newly added surface water sampling location SW-2. The cadmium concentrations for the surface water samples collected from SW-1 and SW-2 during the 2013 monitoring events were within typical background dissolved cadmium concentrations as represented by monitoring well AM02-01 and therefore the exceedance identified at SW-2 in February 2012 is not considered a non-compliance issue.

5.2 Water Quality Monitoring Network and Current Analytical Program

Tetra Tech EBA considers that monitoring wells located on and downgradient to the CRWMC provide appropriate spatial coverage. The surface water sampling locations SW-1 and SW-2 are also considered to be well placed. Based on 2013 and historical analytical results, no changes to the current analytical program is recommended.

6.0 CONCLUSIONS

Based on the 2013 monitoring data, the following conclusions are drawn:

- Groundwater flowed towards the east/northeast across most of the CRWMC. The horizontal gradient was 0.02 m/m for the spring (May 2013) monitoring event and 0.03 m/m for the autumn (November 2013) monitoring event;
- Groundwater analytical data obtained in 2013 indicates that groundwater sampled beneath the CRWMC in 2013 contains ammonia and chromium concentrations exceeding the CSR AW standards. None of the groundwater samples collected in 2013 from monitoring wells located down and cross gradient of the CRWMC contained concentrations of parameters tested exceeding the CSR AW standards. None of the groundwater samples collected in 2013 contained groundwater concentrations exceeding the CSR DW standards;
- Surface water analytical data obtained in 2013 indicates a field pH and total cadmium concentration exceedance during the one monitoring event in 2013 (February 2013) for SW-2. No exceedences were found for all four 2013 monitoring events for SW-1;
- The concentrations of several typical landfill leachate indicator parameters in groundwater are greater than the background concentrations at monitoring wells located along the eastern boundary of the CRWMC and immediately downgradient of the CRWMC. The indicator concentrations decrease away from the CRWMC and are at concentrations generally typical or slightly elevated of background concentrations at the furthest downgradient monitoring well (AG99-06) and at the surface water sampling stations (SW-1 and SW-2);
- Conductivity, chloride, dissolved iron and dissolved manganese are observed to be on an increasing trend in the monitoring wells located at the eastern boundary of the CRWMC (HBT94-1 and/or HBT94-3). Conductivity, alkalinity and hardness are observed to be on an increasing trend in the monitoring wells located immediately downgradient of the CRWMC property boundaries (EBA04-7);
- An ammonia concentration identified in groundwater as exceeding the applicable CSR AW standard in 2013 was limited to one monitoring well during one monitoring event (February 2013). However, this exceedance indicates the possibility of ammonia at concentrations exceeding the CSR AW standard extending offsite to the east and thus resulting in a non-compliance issue. Monitoring wells located further down and cross gradient of HBT94-3 contained significantly lower concentrations of ammonia and met the CSR AW standard. In addition, samples collected from surface water sampling locations SW-1 and SW-2 contained ammonia concentrations comparable to background levels represented by well AM02-01;
- An identified cadmium concentration in surface water at a concentration exceeding the applicable BCAWQG for the protection of freshwater aquatic life does not appear to be directly related to the CRWMC operations and therefore is not considered a non-compliance issue with the operational certificate; and
- A dissolved total chromium concentration marginally exceeding the CSR AW standard for hexavalent chromium was identified in a groundwater sample collected from EBA04-1, the water supply well located at the southern boundary of the CRWMC, during the May 2013 monitoring event. None of the dissolved chromium concentrations measured at the downgradient and crossgradient monitoring wells in 2013, however, exceeds the CSR AW standards. Continued monitoring is required to further assess dissolved chromium exceedances in groundwater identified beneath the CRWMC.

7.0 RECOMMENDATIONS

Based on the conclusions presented above, Tetra Tech EBA recommends:

- The water quality monitoring program, continue on a quarterly annual basis in 2014;
- Re-survey groundwater monitoring wells that have not been surveyed in the last five years to confirm top of pipe elevation;
- Closely monitor ammonia concentrations in the downgradient wells and at the surface water sampling locations to ensure ammonia at concentrations exceeding the CSR AW standards is not posing a risk to the downgradient surface water bodies; and
- Conduct speciated chromium analysis of select groundwater samples to further assess the chromium exceedance identified in 2013 at the water supply well located at the CRWMC.

8.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned

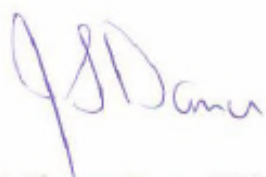
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TABLES

Table 1	Historical Vertical Gradients
Table 2	2013 Summary of Groundwater Exceedances
Table 3	2013 Summary of Surface Water Exceedances
Table 4	Quality Assurance / Quality Control

TABLE 1: HISTORICAL VERTICAL GRADIENTS

Well Pair	Top of Screen Elevation (m)	27-Sep-04	23-Nov-04	3-May-05	28-Sep-05	20-Apr-06	19-Oct-06	19-Apr-07	25-Oct-07	8-Apr-08	22-Oct-08	27-Aug-09	9-Dec-09	29-Apr-10	2-Nov-10	10-Mar-11	11-May-11	16-Aug-11	30-Nov-11
EBA04-7	105.9	113.407	114.132	113.253	111.905	113.37	114.145	112.894	112.988	112.117	112.715	110.52	112.01	112.26	112.89	113.54	113.35	112.25	113.33
EBA04-6	98.24	113.252	113.984	113.278	112.935	113.407	114.179	112.752	112.849	111.971	112.565	110.39	111.87	112.12	112.75	113.40	113.21	112.11	113.20
Differences	7.66	0.020	0.019	-0.003	-0.134	-0.005	-0.004	0.019	0.018	0.019	0.020	0.017	0.019	0.018	0.018	0.018	0.018	0.018	0.017
Gradient		down	down	up	up	up	up	down	down	down	down	down	down	down	down	down	down	down	down
Well Pair	Top of Screen Elevation (m)	21-Feb-12	24-May-12	16-Aug-12	4-Dec-12	20-Feb-13	29-May-13	20-Aug-13	27-Nov-13										
EBA04-7	105.9	112.08	110.92	110.94	113.31	112.95	111.56	111.33	112.30										
EBA04-6	98.24	111.94	110.79	110.81	113.18	112.77	111.44	111.18	112.15										
Differences	7.66	0.018	0.017	0.017	0.017	0.023	0.016	0.020	0.020										
Gradient		down	down	down	down	down	down	down	down										
Well Pair	Top of Screen Elevation (m)	24-Jun-96	26-Aug-96	30-Sep-96	21-Oct-96	28-Nov-96	8-Jan-97	4-Mar-97	1-Apr-97	7-May-97	2-Jun-97	31-Jul-97	16-Sep-97	4-Dec-97	12-Jan-98	25-Feb-98	13-Apr-98	21-Apr-98	25-Jun-98
HBT94-1	111.33	122.395	122.25	122.41	122.68	123.31	123.03	122.21	121.47	119.63	120.73	121.08	120.99	123.01	122.89	123.18	123.13	123.2	122.33
HBT94-2	101.44	122.935	122.64	122.55	123.09	122.74	122.94	122.18	121.45	121.04	120.74	120.87	121.19	123.3	122.98	123.21	123.19	123.49	122.68
Differences	9.89	-0.055	-0.039	-0.014	-0.041	0.058	0.009	0.003	0.002	-0.143	-0.001	0.021	-0.020	-0.029	-0.009	-0.003	-0.006	-0.029	-0.035
Gradient		up	up	up	up	down	down	down	down	up	up	down	up	up	up	up	up	up	up
Well Pair	Top of Screen Elevation (m)	16-Jul-98	14-Sep-98	21-Oct-98	2-Dec-98	5-Jan-99	5-Feb-99	14-Apr-99	12-Aug-99	25-Nov-99	28-Feb-00	19-Apr-00	25-Jul-00	14-Sep-00	24-Oct-00	6-Feb-01	8-May-01	26-Jul-01	31-Oct-01
HBT94-1	111.33	122.32	122.29	122.5	122.61	122.333	122.13	122.7	121.22	122.95	121.55	120.73	119.15	120.17	120.42	121.83	118.58	118.085	119.555
HBT94-2	101.44	122.41	122.46	122.61	122.63	122.37	122.34	122.98	121.34	122.9	121.48	120.66	119.55	120.25	120.99	120.55	118.52	118.125	119.575
Differences	9.89	-0.009	-0.017	-0.011	-0.002	-0.004	-0.021	-0.028	-0.012	0.005	0.007	0.007	-0.040	-0.008	-0.058	0.129	0.006	-0.004	-0.002
Gradient		up	up	up	up	up	up	up	up	down	down	down	up	up	up	down	down	up	up
Well Pair	Top of Screen Elevation (m)	29-Jan-02	8-May-02	22-Aug-02	14-Nov-02	17-Mar-03	16-Jun-03	24-Sep-03	18-Dec-03	15-Mar-04	27-Sep-04	3-May-05	28-Sep-05	20-Apr-06	19-Oct-06	19-Apr-07	25-Oct-07	8-Apr-08	23-Oct-08
HBT94-1	111.33	119.83	117.91	118.313	119.865	118.945	117.245	117.951	119.302	117.694	117.817	117.86	117.404	117.977	118.66	117.441	117.431	116.491	116.83
HBT94-2	101.44	119.84	117.91	118.318	119.868	118.86	117.237	117.959	119.299	118.114	117.819	117.886	117.41	118.008	118.875	117.39	117.038	116.48	116.828
Differences	9.89	-0.001	0.000	-0.001	0.000	0.009	0.001	-0.001	0.000	-0.042	0.000	-0.003	-0.001	-0.003	-0.022	0.005	0.040	0.001	0.000
Gradient		up	neither	up	neither	down	down	up	neither	up	neither	up	up	up	up	down	down	down	neither
Well Pair	Top of Screen Elevation (m)	27-Aug-09	9-Dec-09	29-Apr-10	2-Nov-10	10-Mar-11	11-May-11	16-Aug-11	30-Nov-11	21-Feb-12	24-May-12	16-Aug-12	4-Dec-12	21-Feb-13	29-May-13	26-Aug-13	27-Nov-13		
HBT94-1	111.33	114.32	116.21	116.84	117.13	118.06	117.94	116.41	120.36	116.54	114.99	114.84	120.68	117.57	115.67	115.14	116.48		
HBT94-2	101.44	114.3	116.2	116.52	117.15	118.22	117.88	116.40	117.89	116.48	114.98	114.81	117.85	117.54	115.64	115.22	116.47		
Differences	9.89	0.002	0.001	0.032	-0.002	-0.017	0.006	0.001	0.250	0.006	0.001	0.003	0.286	0.003	0.003	-0.008	0.001		
Gradient		down	down	down	up	up	down	down	down	down	down	down	down	down	down	up	down		

NOTE:
2013 data shaded.

TABLE 2: 2013 SUMMARY OF GROUNDWATER EXCEEDANCES

Parameter	Units	BC CSR		HBT94-3	EBA04-01
		Aquatic Life	Drinking Water	21-Feb-13	28-May-13
Physical Tests					
Ammonia (as N)	mg/L	1.31 - 18.4*	NS	27	0.011
Chromium: Dissolved	mg/L	0.01, 0.09	0.05	0.00021	0.0102

Notes:

BC CSR - BC Contaminated Sites Regulation (CSR) (BC Reg. 375/96, including amendments up to BC Reg. 4/2014, January 31, 2014), Schedule 6 and 10 Generic Numerical Water Standards for the Protection of Freshwater Aquatic Life (AW) and Drinking Water (DW)

* Indicates that the guideline is dependent on chloride, hardness or pH

Parameter exceeds CSR AW standard

Italics

Parameter exceeds CSR DW standard

BOLD

TABLE 3: 2013 SUMMARY OF SURFACE WATER EXCEEDANCES

Parameter	Units	BC.AWQG.AL	SW-2	SW-2-DUP
			21-Feb-13	
Physical Tests				
pH (Field)	pH Units	6.5 - 9	5.69	-
Total Metals				
Cadmium: Total	mg/L	0.00001 - 0.00006 *	0.000016	0.000016

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life (updated April 2013).

* indicates that guideline is calculated based on sample specific data (sample hardness values)

Parameter exceeds BC.AWQG.AL standard

BOLD

TABLE 4: 2013 QUALITY ASSURANCE / QUALITY CONTROL

Parameter	Units	MDL	HBT94-2	HBT94-2-DUP	RPD (%)	HBT94-2	HBT94-2-DUP	RPD (%)	HBT94-2	HBT94-2-DUP	RPD (%)	HBT94-2	HBT94-2-DUP	RPD (%)
			21-Feb-13	21-Feb-13		29-May-13	29-May-13		21-Aug-13	21-Aug-13		27-Nov-13	27-Nov-13	
Physical Tests														
pH (Lab)	pH_Units		8.18	8.18	0.0%	8.38	8.36	0.2%	8.15	8.13	0.2%	8.32	8.28	0.5%
Specific Conductance (Lab)	uS/cm	1	552	548	0.7%	377	377	0.0%	510	510	0.0%	411	410	0.2%
Hardness: Total (as CaCO ₃) (Lab)	mg/l	0.5	265	259	2.3%	-	-	-	258	246	4.8%	189	190	0.5%
Anions and Nutrients														
Ammonia (as N)	mg/l	0.005	0.36	0.36	0.0%	0.31	0.32	3.2%	0.4	0.4	0.0%	0.3	0.3	0.0%
Nitrogen: Nitrite (as N) (Lab)	mg/l	0.005	<0.005	<0.005	-	<0.005	<0.005	-	<0.005	<0.005	-	<0.005	<0.005	-
Nitrogen: Nitrate (as N) (Lab)	mg/l	0.02	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-
Chloride (Lab)	mg/l	0.5	17	18	5.7%	8.5	8.6	1.2%	20	20	0.0%	14	14	0.0%
Fluoride: Dissolved	mg/l	0.01	0.013	0.013	-	0.017	0.017	-	0.016	0.018	-	0.025	0.028	-
Sulphate (Lab)	mg/l	0.5	3.63	3.4	6.5%	3.41	3.53	3.5%	3.9	3.78	3.1%	3.38	3.85	13.0%
Alkalinity (Lab)	mg/l	0.5	273	270	1.1%	185	188	1.6%	269	243	10.2%	200	201	0.5%
Bicarbonate	mg/l	0.5	333	330	0.9%	218	223	2.3%	328	297	9.9%	239	245	2.5%
Carbonate	mg/l	0.5	<0.5	<0.5	-	3.8	3.19	17.5%	<0.5	<0.5	-	2.36	<0.5	-
Hydroxide	mg/l	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Dissolved Metals														
Aluminium: Dissolved	mg/l	0.003	0.00401	0.00522	-	0.0071	0.0069	-	0.0059	0.0061	-	0.00615	0.0166	-
Antimony: Dissolved	mg/l	0.00002	<0.00002	<0.00002	-	<0.0005	<0.0005	-	<0.0005	<0.0005	-	<0.00002	<0.00002	-
Arsenic: Dissolved	mg/l	0.00002	0.00233	0.00233	0.0%	0.00219	0.00219	0.0%	0.00241	0.00244	1.2%	0.00228	0.00224	1.8%
Barium: Dissolved	mg/l	0.00002	0.0103	0.01	3.0%	0.0072	0.0071	1.4%	0.0104	0.0104	0.0%	0.0079	0.00805	1.9%
Beryllium: Dissolved	mg/l	0.00001	<0.00001	<0.00001	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-	<0.00001	<0.00001	-
Bismuth: Dissolved	mg/l	0.000005	<0.000005	<0.000005	-	<0.001	<0.001	-	<0.001	<0.001	-	<0.000005	<0.000005	-
Boron: Dissolved	mg/l	0.05	0.147	0.148	-	0.117	0.118	-	0.154	0.15	-	0.147	0.15	-
Cadmium: Dissolved	mg/l	0.000005	0.000031	0.000031	0.0%	0.000035	0.000021	-	0.000036	0.000037	2.7%	0.000025	0.000027	-
Calcium: Dissolved	mg/l	0.01	90.4	88.2	2.5%	57.7	58.3	1.0%	87.9	83	5.7%	64	65	1.6%
Chromium: Dissolved	mg/l	0.0001	<0.0001	<0.0001	-	0.006	<0.001	-	<0.001	<0.001	-	<0.0001	<0.0001	-
Cobalt: Dissolved	mg/l	0.000005	0.000127	0.000134	5.4%	<0.0005	<0.0005	-	<0.0005	<0.0005	-	0.000108	0.000115	6.3%
Copper: Dissolved	mg/l	0.00005	0.000138	0.000153	-	0.00026	<0.0002	-	0.00022	0.00027	-	0.000215	0.000245	-
Iron: Dissolved	mg/l	0.001	0.133	0.251	61.5%	0.159	0.159	0.0%	0.241	0.225	6.9%	0.183	0.179	2.2%
Lead: Dissolved	mg/l	0.000005	0.000035	<0.000005	-	<0.0002	<0.0002	-	<0.0002	<0.0002	-	0.000006	0.000018	-
Lithium: Dissolved	mg/l	0.0005	<0.0005	<0.0005	-	<0.005	<0.005	-	<0.005	<0.005	-	<0.0005	<0.0005	-
Magnesium: Dissolved	mg/l	0.01	9.63	9.32	3.3%	6.2	6.24	0.6%	9.36	9.29	0.8%	7.08	6.63	6.6%
Manganese: Dissolved	mg/l	0.00005	1.38	1.34	2.9%	0.867	0.862	0.6%	1.24	1.2	3.3%	0.973	0.962	1.1%
Mercury: Dissolved	mg/l	0.00005	<0.00001	<0.00001	-	<0.00005	<0.00005	-	<0.00005	<0.00005	-	<0.000002	<0.000002	-
Molybdenum: Dissolved	mg/l	0.00005	0.000185	0.000197	-	0.0103	0.0011	161.4%	<0.001	<0.001	-	0.000202	0.000234	-
Nickel: Dissolved	mg/l	0.00002	0.000939	0.000933	0.6%	0.0404	0.0046	159.1%	<0.001	<0.001	-	0.000784	0.000798	1.8%
Potassium: Dissolved	mg/l	0.01	1.88	1.82	3.2%	1.6	1.6	0.0%	2.02	2.04	1.0%	1.8	1.77	1.7%
Selenium: Dissolved	mg/l	0.00004	<0.00004	<0.00004	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-	<0.00004	<0.00004	-
Silicon: Dissolved	mg/l	0.1	7.63	7.61	0.3%	7.02	7.11	1.3%	8.05	7.83	2.8%	7.52	7.65	1.7%
Silver: Dissolved	mg/l	0.000005	<0.000005	<0.000005	-	<0.00002	<0.00002	-	<0.00002	<0.00002	-	<0.000005	<0.000005	-
Sodium: Dissolved	mg/l	0.01	13.3	12.9	3.1%	12.1	12.1	0.0%	14.8	15	1.3%	13.4	12.6	6.2%
Strontium: Dissolved	mg/l	0.00005	0.177	0.171	3.4%	0.124	0.124	0.0%	0.184	0.183	0.5%	0.142	0.138	2.9%
Sulphur as S: Dissolved	mg/l	0.6	0.82	0.96	-	<3	<3	-	<3	<3	-	0.8	0.95	-
Thallium: Dissolved	mg/l	0.000002	0.000004	0.000002	-	<0.00005	<0.00005	-	<0.00005	<0.00005	-	0.000003	0.000002	-
Tin: Dissolved	mg/l	0.0002	<0.0002	<0.0002	-	<0.005	<0.005	-	<0.005	<0.005	-	<0.0002	<0.0002	-
Titanium: Dissolved	mg/l	0.0005	<0.0005	<0.0005	-	<0.005	<0.005	-	<0.005	<0.005	-	<0.0005	<0.0005	-
Uranium: Dissolved	mg/l	0.000002	0.000167	0.000164	1.8%	0.00011	0.0001	9.5%	0.00016	0.00016	0.0%	0.000105	0.000105	0.0%
Vanadium: Dissolved	mg/l	0.0002	0.00053	0.0006	-	<0.005	<0.005	-	<0.005	<0.005	-	0.00052	0.0005	-
Zinc: Dissolved	mg/l	0.0001	<0.0001	0.00014	-	<0.005	<0.005	-	<0.005	<0.005	-	0.00041	0.00105	-
Zirconium: Dissolved	mg/l	0.0001	<0.0001	<0.0001	-	<0.0005	<0.0005	-	<0.0005	<0.0005	-	<0.0001	<0.0001	-

- Notes:**
- Relative percent difference (RPD) in concentrations calculated as $RPD = \{[C2-C1] / [(C1+C2)/2]\} \times 100\%$ where C1, C2 = concentrations of parameters in 1st and 2nd sample respectively.
 - RPD cannot be calculated when the concentration of either parameters is less than the method detection limit (MDL) or within five times the MDL and is indicated by "-".
 - MDL = method detection limit
 - The grey shaded values indicate RPD's that exceed the 30% accuracy range.

TABLE 4: 2013 QUALITY ASSURANCE / QUALITY CONTROL

Parameter	Units	MDL	EBA04-7	EBA04-7-DUP	RPD (%)	EBA04-7	EBA04-7-DUP	RPD (%)	EBA04-7	EBA04-7-DUP	RPD (%)	EBA04-7	EBA04-7-DUP	RPD (%)
			20-Feb-13	20-Feb-13		28-May-13	28-May-13		20-Aug-13	20-Aug-13		27-Nov-13	27-Nov-13	
Physical Tests														
pH (Lab)	pH_Units		7.98	7.98	0.0%	7.91	7.73	2.3%	7.95	7.9	0.6%	7.96	7.95	0.1%
Specific Conductance (Lab)	uS/cm	1	755	725	4.1%	844	871	3.1%	702	761	8.1%	847	833	1.7%
Hardness: Total (as CaCO ₃) (Lab)	mg/l	0.5	396	398	0.5%	-	-	-	420	428	1.9%	435	428	1.6%
Anions and Nutrients														
Ammonia (as N)	mg/l	0.005	0.0085	0.0062	-	0.013	0.01	-	0.019	0.052	-	0.0062	0.0074	-
Nitrogen: Nitrite (as N) (Lab)	mg/l	0.005	0.0249	0.0271	-	0.037	0.0321	14.2%	0.0281	0.0273	2.9%	0.0249	0.0256	-
Nitrogen: Nitrate (as N) (Lab)	mg/l	0.02	1.43	1.42	0.7%	1.55	1.24	22.2%	1.95	1.94	0.5%	0.398	0.396	0.5%
Chloride (Lab)	mg/l	0.5	15	15	0.0%	26	26	0.0%	23	22	4.4%	21	21	0.0%
Fluoride: Dissolved	mg/l	0.01	0.012	0.012	-	0.017	0.013	-	0.011	0.014	-	0.012	0.012	-
Sulphate (Lab)	mg/l	0.5	28.5	28.6	0.4%	25.6	24.6	4.0%	19.2	19.3	0.5%	22.3	21	6.0%
Alkalinity (Lab)	mg/l	0.5	366	350	4.5%	404	419	3.6%	328	363	10.1%	416	407	2.2%
Bicarbonate	mg/l	0.5	446	427	4.4%	493	511	3.6%	400	443	10.2%	508	496	2.4%
Carbonate	mg/l	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Hydroxide	mg/l	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Dissolved Metals														
Aluminium: Dissolved	mg/l	0.003	0.00088	0.00096	-	<0.003	<0.003	-	0.0047	<0.003	-	0.0121	0.0115	-
Antimony: Dissolved	mg/l	0.00002	0.000029	0.000031	-	<0.0005	<0.0005	-	<0.0005	<0.0005	-	0.000029	0.00003	-
Arsenic: Dissolved	mg/l	0.00002	0.000147	0.000191	26.0%	0.00014	0.00012	15.4%	0.0002	0.00017	16.2%	0.000158	0.000155	1.9%
Barium: Dissolved	mg/l	0.00002	0.0155	0.0155	0.0%	0.0176	0.0177	0.6%	0.0153	0.0164	6.9%	0.0157	0.016	1.9%
Beryllium: Dissolved	mg/l	0.00001	<0.00001	<0.00001	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-	<0.00001	<0.00001	-
Bismuth: Dissolved	mg/l	0.000005	<0.000005	<0.000005	-	<0.001	<0.001	-	<0.001	<0.001	-	<0.000005	<0.000005	-
Boron: Dissolved	mg/l	0.05	0.298	0.304	2.0%	0.33	0.331	0.3%	0.35	0.355	1.4%	0.213	0.219	-
Cadmium: Dissolved	mg/l	0.000005	0.000035	0.00003	15.4%	0.000062	0.000032	63.8%	0.000068	0.000059	14.2%	0.000045	0.000044	2.2%
Calcium: Dissolved	mg/l	0.01	116	117	0.9%	124	122	1.6%	121	123	1.6%	128	125	2.4%
Chromium: Dissolved	mg/l	0.0001	<0.0001	<0.0001	-	<0.001	<0.001	-	<0.001	<0.001	-	<0.0001	<0.0001	-
Cobalt: Dissolved	mg/l	0.000005	0.000403	0.000434	7.4%	0.00059	0.00059	0.0%	0.0005	<0.0005	-	0.000412	0.000391	5.2%
Copper: Dissolved	mg/l	0.00005	0.00235	0.00239	1.7%	0.00314	0.00305	2.9%	0.00293	0.00284	3.1%	0.0026	0.00272	4.5%
Iron: Dissolved	mg/l	0.001	0.0026	0.0027	-	<0.005	<0.005	-	0.0095	0.0059	46.8%	0.0041	0.0041	-
Lead: Dissolved	mg/l	0.000005	0.000005	<0.000005	-	<0.0002	<0.0002	-	<0.0002	<0.0002	-	0.000013	0.000015	-
Lithium: Dissolved	mg/l	0.0005	0.00083	0.00086	-	<0.005	<0.005	-	<0.005	<0.005	-	0.00086	0.00087	-
Magnesium: Dissolved	mg/l	0.01	26	25.9	0.4%	29.1	28.5	2.1%	28.9	29.1	0.7%	27.8	28.5	2.5%
Manganese: Dissolved	mg/l	0.00005	0.117	0.118	0.9%	0.116	0.114	1.7%	0.106	0.102	3.8%	0.13	0.13	0.0%
Mercury: Dissolved	mg/l	0.00005	<0.00001	<0.00001	-	<0.00005	<0.00005	-	<0.00005	<0.00005	-	0.0000022	0.0000025	-
Molybdenum: Dissolved	mg/l	0.00005	0.000089	0.000079	-	<0.001	0.001	-	<0.001	<0.001	-	0.000084	0.000087	-
Nickel: Dissolved	mg/l	0.00002	0.00108	0.00113	4.5%	0.0019	0.0055	97.3%	0.0019	0.0017	11.1%	0.00166	0.00191	14.0%
Potassium: Dissolved	mg/l	0.01	1.92	1.94	1.0%	2.22	2.19	1.4%	2.15	2.18	1.4%	2.17	2.18	0.5%
Selenium: Dissolved	mg/l	0.00004	0.000063	0.000052	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-	0.000047	<0.00004	-
Silicon: Dissolved	mg/l	0.1	11.8	11.8	0.0%	11.8	11.6	1.7%	12.4	12.5	0.8%	12.8	12.6	1.6%
Silver: Dissolved	mg/l	0.000005	<0.000005	<0.000005	-	<0.00002	<0.00002	-	<0.00002	<0.00002	-	<0.000005	<0.000005	-
Sodium: Dissolved	mg/l	0.01	16.9	17.1	1.2%	23	22.5	2.2%	24	24.2	0.8%	23.9	24.4	2.1%
Strontium: Dissolved	mg/l	0.00005	0.294	0.294	0.0%	0.337	0.334	0.9%	0.31	0.315	1.6%	0.296	0.294	0.7%
Sulphur as S: Dissolved	mg/l	0.6	9.43	9.35	0.9%	8.6	8.8	2.3%	7.3	6.5	11.6%	8	7.7	3.8%
Thallium: Dissolved	mg/l	0.000002	0.000006	0.000005	-	<0.00005	<0.00005	-	<0.00005	<0.00005	-	0.000005	0.000005	-
Tin: Dissolved	mg/l	0.0002	<0.0002	<0.0002	-	<0.005	<0.005	-	<0.005	<0.005	-	<0.0002	<0.0002	-
Titanium: Dissolved	mg/l	0.0005	<0.0005	<0.0005	-	<0.005	<0.005	-	<0.005	<0.005	-	<0.0005	<0.0005	-
Uranium: Dissolved	mg/l	0.000002	0.000999	0.001	0.1%	0.00095	0.00095	0.0%	0.00098	0.00099	1.0%	0.000838	0.000834	0.5%
Vanadium: Dissolved	mg/l	0.0002	0.00155	0.00159	2.5%	<0.005	<0.005	-	<0.005	<0.005	-	0.0017	0.00172	1.2%
Zinc: Dissolved	mg/l	0.0001	0.00019	0.00027	-	<0.005	<0.005	-	<0.005	<0.005	-	0.00086	0.00088	2.3%
Zirconium: Dissolved	mg/l	0.0001	<0.0001	<0.0001	-	<0.0005	<0.0005	-	<0.0005	<0.0005	-	<0.0001	<0.0001	-

- Notes:**
- Relative percent difference (RPD) in concentrations calculated as $RPD = \{[C2-C1] / [(C1+C2)/2]\} \times 100\%$ where C1, C2 = concentrations of parameters in 1st and 2nd sample respectively.
 - RPD cannot be calculated when the concentration of either parameters is less than the method detection limit (MDL) or within five times the MDL and is indicated by "-".
 - MDL = method detection limit
 - The grey shaded values indicate RPD's that exceed the 30% accuracy range.

TABLE 4: 2013 QUALITY ASSURANCE / QUALITY CONTROL

Parameter	Units	MDL	EBA11-4	EBA11-4-DUP	RPD (%)	EBA11-4	EBA11-4-DUP	RPD (%)	EBA11-4	EBA11-4-DUP	RPD (%)
			30-May-13	30-May-13		21-Aug-13	21-Aug-13		28-Nov-13	28-Nov-13	
Physical Tests											
pH (Lab)	pH_Units		7.9	7.91	0.1%	7.8	7.79	0.1%	7.85	7.93	1.0%
Specific Conductance (Lab)	uS/cm	1	133	134	0.7%	112	113	0.9%	106	107	0.9%
Hardness: Total (as CaCO ₃) (Lab)	mg/l	0.5	-	-	-	49.8	48.7	2.2%	47.2	48.9	3.5%
Anions and Nutrients											
Ammonia (as N)	mg/l	0.005	0.0069	0.0077	-	0.013	0.021	-	0.022	0.023	-
Nitrogen: Nitrite (as N) (Lab)	mg/l	0.005	<0.005	0.0628	-	<0.005	<0.005	-	0.0505	0.0487	3.6%
Nitrogen: Nitrate (as N) (Lab)	mg/l	0.02	0.161	0.138	15.4%	0.087	0.089	-	0.082	0.085	-
Chloride (Lab)	mg/l	0.5	10	10	0.0%	6.4	6.5	1.6%	4	4.5	11.8%
Fluoride: Dissolved	mg/l	0.01	0.027	0.025	-	0.018	0.019	-	0.035	0.038	-
Sulphate (Lab)	mg/l	0.5	2.35	2.09	-	1.44	1.55	-	1.59	1.57	-
Alkalinity (Lab)	mg/l	0.5	49.3	49.1	0.4%	45.2	44.5	1.6%	45.5	45.5	0.0%
Bicarbonate	mg/l	0.5	60.2	59.9	0.5%	55.1	54.3	1.5%	55.6	55.5	0.2%
Carbonate	mg/l	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Hydroxide	mg/l	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Dissolved Metals											
Aluminium: Dissolved	mg/l	0.003	0.0062	0.0064	-	0.0184	0.0141	-	0.021	0.0249	17.0%
Antimony: Dissolved	mg/l	0.00002	<0.0005	<0.0005	-	<0.0005	<0.0005	-	0.000026	0.000028	-
Arsenic: Dissolved	mg/l	0.00002	0.00167	0.0016	4.3%	0.00174	0.0017	2.3%	0.00142	0.00138	2.9%
Barium: Dissolved	mg/l	0.00002	0.0019	0.0019	0.0%	0.0018	0.0016	11.8%	0.00165	0.00157	5.0%
Beryllium: Dissolved	mg/l	0.00001	<0.0001	<0.0001	-	<0.0001	<0.0001	-	<0.00001	<0.00001	-
Bismuth: Dissolved	mg/l	0.000005	<0.001	<0.001	-	<0.001	<0.001	-	<0.000005	<0.000005	-
Boron: Dissolved	mg/l	0.05	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-
Cadmium: Dissolved	mg/l	0.000005	0.000012	0.000022	-	0.000019	<0.00001	-	<0.000005	<0.000005	-
Calcium: Dissolved	mg/l	0.01	18	17.5	2.8%	15.5	15.3	1.3%	14.7	14.9	1.4%
Chromium: Dissolved	mg/l	0.0001	0.0083	0.0095	13.5%	0.001	0.0011	9.5%	0.00074	0.0007	5.6%
Cobalt: Dissolved	mg/l	0.000005	<0.0005	<0.0005	-	<0.0005	<0.0005	-	0.000008	<0.000005	-
Copper: Dissolved	mg/l	0.00005	<0.0002	0.00033	-	0.00026	0.00022	-	0.000113	0.000089	-
Iron: Dissolved	mg/l	0.001	<0.005	<0.005	-	0.024	0.0153	44.3%	0.0038	0.0035	-
Lead: Dissolved	mg/l	0.000005	<0.0002	<0.0002	-	<0.0002	<0.0002	-	0.000014	0.000014	-
Lithium: Dissolved	mg/l	0.0005	<0.005	<0.005	-	<0.005	<0.005	-	<0.0005	<0.0005	-
Magnesium: Dissolved	mg/l	0.01	2.96	2.97	0.3%	2.67	2.54	5.0%	2.54	2.83	10.8%
Manganese: Dissolved	mg/l	0.00005	<0.001	<0.001	-	<0.001	<0.001	-	0.000053	0.000074	-
Mercury: Dissolved	mg/l	0.00005	<0.00005	<0.00005	-	<0.00005	<0.00005	-	<0.000002	<0.000002	-
Molybdenum: Dissolved	mg/l	0.00005	0.0125	0.0143	13.4%	<0.001	<0.001	-	0.000196	0.000104	-
Nickel: Dissolved	mg/l	0.00002	0.0471	0.055	15.5%	<0.001	<0.001	-	0.000036	0.000038	-
Potassium: Dissolved	mg/l	0.01	0.773	0.782	1.2%	0.746	0.714	4.4%	0.988	1.01	2.2%
Selenium: Dissolved	mg/l	0.00004	0.00029	0.00026	10.9%	0.00019	0.00017	-	0.000165	0.000154	-
Silicon: Dissolved	mg/l	0.1	6.26	6.14	1.9%	6.12	6.14	0.3%	5.44	5.37	1.3%
Silver: Dissolved	mg/l	0.000005	<0.00002	<0.00002	-	<0.00002	<0.00002	-	<0.000005	<0.000005	-
Sodium: Dissolved	mg/l	0.01	2.46	2.47	0.4%	2.19	2.12	3.2%	2.21	2.35	6.1%
Strontium: Dissolved	mg/l	0.00005	0.0337	0.0337	0.0%	0.0288	0.0284	1.4%	0.0261	0.027	3.4%
Sulphur as S: Dissolved	mg/l	0.6	<3	<3	-	<3	<3	-	<0.6	<0.6	-
Thallium: Dissolved	mg/l	0.000002	<0.00005	<0.00005	-	<0.00005	<0.00005	-	<0.000002	<0.000002	-
Tin: Dissolved	mg/l	0.0002	<0.005	<0.005	-	<0.005	<0.005	-	<0.0002	<0.0002	-
Titanium: Dissolved	mg/l	0.0005	<0.005	<0.005	-	<0.005	<0.005	-	<0.0005	<0.0005	-
Uranium: Dissolved	mg/l	0.000002	0.0002	0.0002	0.0%	0.00018	0.00017	5.7%	0.00016	0.000151	5.8%
Vanadium: Dissolved	mg/l	0.0002	0.0142	0.0142	0.0%	0.0152	0.0148	2.7%	0.0139	0.0139	0.0%
Zinc: Dissolved	mg/l	0.0001	<0.005	<0.005	-	<0.005	<0.005	-	0.00088	0.00097	9.7%
Zirconium: Dissolved	mg/l	0.0001	<0.0005	<0.0005	-	<0.0005	<0.0005	-	<0.0001	<0.0001	-

Notes:

- Relative percent difference (RPD) in concentrations calculated as $RPD = \frac{[C2-C1]}{[(C1+C2)/2]} \times 100\%$ where C1, C2 = concentrations of parameters in 1st and 2nd sample respectively.
- RPD cannot be calculated when the concentration of either parameters is less than the method detection limit (MDL) or within five times the MDL and is indicated by "-".
- MDL = method detection limit
- The grey shaded values indicate RPD's that exceed the 30% accuracy range.

TABLE 4: 2013 QUALITY ASSURANCE / QUALITY CONTROL

Parameter	Units	MDL	SW-2	SW-2 (Duplicate)	RPD (%)
			21-Feb-13	21-Feb-13	
Physical Tests					
pH (Lab)	pH Units		7.53	7.46	0.9%
Specific Conductance (Lab)	uS/cm	1	61.1	60.8	0.5%
Hardness: Total (as CaCO ₃) (Lab)	mg/l	0.5	23.6	24.6	4.1%
Anions and Nutrients					
Ammonia (as N)	mg/l	0.005	0.0055	0.015	-
Nitrogen: Nitrite (as N) (Lab)	mg/l	0.005	<0.005	<0.005	-
Nitrogen: Nitrate (as N) (Lab)	mg/l	0.02	<0.02	<0.02	-
Chloride (Lab)	mg/l	0.5	3.8	3.9	2.6%
Fluoride: Dissolved	mg/l	0.01	0.024	0.023	-
Sulphate (Lab)	mg/l	0.5	1.59	1.47	-
Alkalinity (Lab)	mg/l	0.5	23.8	23.6	0.8%
Bicarbonate	mg/l	0.5	29	28.8	0.7%
Carbonate	mg/l	0.5	<0.5	<0.5	-
Hydroxide	mg/l	0.5	<0.5	<0.5	-
Total Metals					
Aluminium: Total	mg/l	0.0002	0.0243	0.0237	2.5%
Antimony: Total	mg/l	0.00002	<0.00002	<0.00002	-
Arsenic: Total	mg/l	0.00002	0.000025	0.000023	-
Barium: Total	mg/l	0.00002	0.000522	0.000567	8.3%
Beryllium: Total	mg/l	0.00001	<0.00001	<0.00001	-
Bismuth: Total	mg/l	0.000005	<0.000005	<0.000005	-
Boron: Total	mg/l	0.05	<0.05	<0.05	-
Cadmium: Total	mg/l	0.000005	0.000016	0.000016	-
Calcium: Total	mg/l	0.01	5.01	5.27	5.1%
Chromium: Total	mg/l	0.0001	0.00021	0.00024	-
Cobalt: Total	mg/l	0.000005	0.000057	0.000065	13.1%
Copper: Total	mg/l	0.00005	0.000415	0.000335	21.3%
Iron: Total	mg/l	0.001	0.0476	0.0635	28.6%
Lead: Total	mg/l	0.000005	0.000019	0.000028	-
Lithium: Total	mg/l	0.0005	<0.0005	<0.0005	-
Magnesium: Total	mg/l	0.01	2.69	2.78	3.3%
Manganese: Total	mg/l	0.00005	0.00157	0.00192	20.1%
Mercury: Total	mg/l	0.00001	<0.00001	<0.00001	-
Molybdenum: Total	mg/l	0.00005	0.000051	<0.00005	-
Nickel: Total	mg/l	0.00002	0.000062	0.000066	-
Potassium: Total	mg/l	0.01	0.198	0.221	11.0%
Selenium: Total	mg/l	0.00004	0.000045	0.000076	-
Silicon: Total	mg/l	0.1	6.57	6.52	0.8%
Silver: Total	mg/l	0.000005	<0.000005	<0.000005	-
Sodium: Total	mg/l	0.01	3.38	3.28	3.0%
Strontium: Total	mg/l	0.00005	0.0162	0.0172	6.0%
Sulphur: Total	mg/l	2	<3	<3	-
Thallium: Total	mg/l	0.000002	0.000002	<0.000002	-
Tin: Total	mg/l	0.0002	0.00117	<0.0002	-
Titanium: Total	mg/l	0.0005	0.00143	0.00196	-
Uranium: Total	mg/l	0.000002	0.000005	0.000002	-
Vanadium: Total	mg/l	0.0002	0.00188	0.00185	1.6%
Zinc: Total	mg/l	0.0001	0.00051	0.00049	-
Zirconium: Total	mg/l	0.0001	<0.0001	<0.0001	-

Notes:

- Relative percent difference (RPD) in concentrations calculated as $RPD = \frac{|C2 - C1|}{[(C1 + C2)/2]} \times 100\%$ where C1, C2 = concentrations of parameters in 1st and 2nd sample respectively.

- RPD cannot be calculated when the concentration of either parameters is less than the method detection limit (MDL) or within five times the MDL and is indicated by "-".

MDL = method detection limit

- The grey shaded values indicate RPD's that exceed the 30% accuracy range.

FIGURES

Figure 1	Site Location Plan
Figure 2	Monitoring Well and Surface Water Locations
Figure 3	Groundwater Elevation Contour Map, May 2013
Figure 4	Groundwater Elevation Contour Map, November 2013
Figure 5	Electrical Conductivity Distribution in Groundwater, May 2013
Figure 6	Electrical Conductivity Distribution in Groundwater, November 2013
Figure 7	Chloride Distribution in Groundwater, November 2013
Figure 8	Ammonia Distribution in Groundwater, February 2013
Figure 9	Ammonia Distribution in Groundwater, November 2013



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**2013 GROUNDWATER MONITORING
CAMPBELL RIVER WASTE MANAGEMENT CENTRE, BC**

SITE LOCATION PLAN

PROJECT NO.
N23103074-01

DWN
MMK

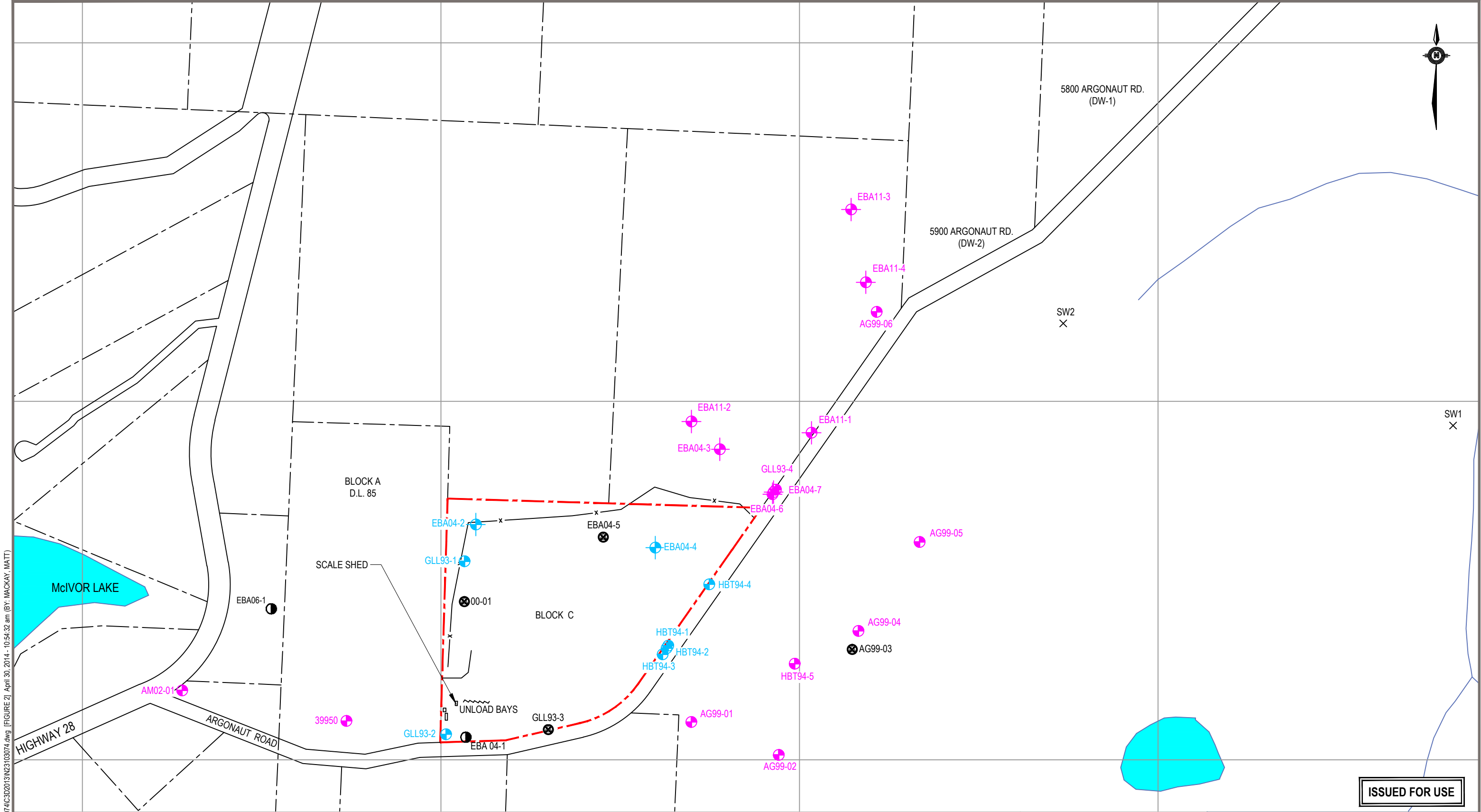
CKD
KG

REV
0

OFFICE
EBA-RIV

DATE
April 2014

Figure 1



Q:\Riverbend\Drafting\Other\Offices\N23103074\N23103074.dwg [FIGURE 2] April 30, 2014 - 10:54:32 am (BY: MACKAY, MATT)

NOTES

- Location of EBA06-1 Water supply is approximate.
- EBA04-5 and AG99-03 Wells are destroyed.
- AM00-01 and GLL93-3 Wells are blocked.

SCALE 1:5000



LEGEND

- Subject Property
- Monitoring Well - on site
- Monitoring Well - off site
- Water supply
- Wells destroyed / blocked
- Surface water sample location

- EBA Installed Monitoring Well - on site
- EBA Installed Monitoring Well - off site

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**Comox Strathcona
Waste Management**

TETRA TECH EBA

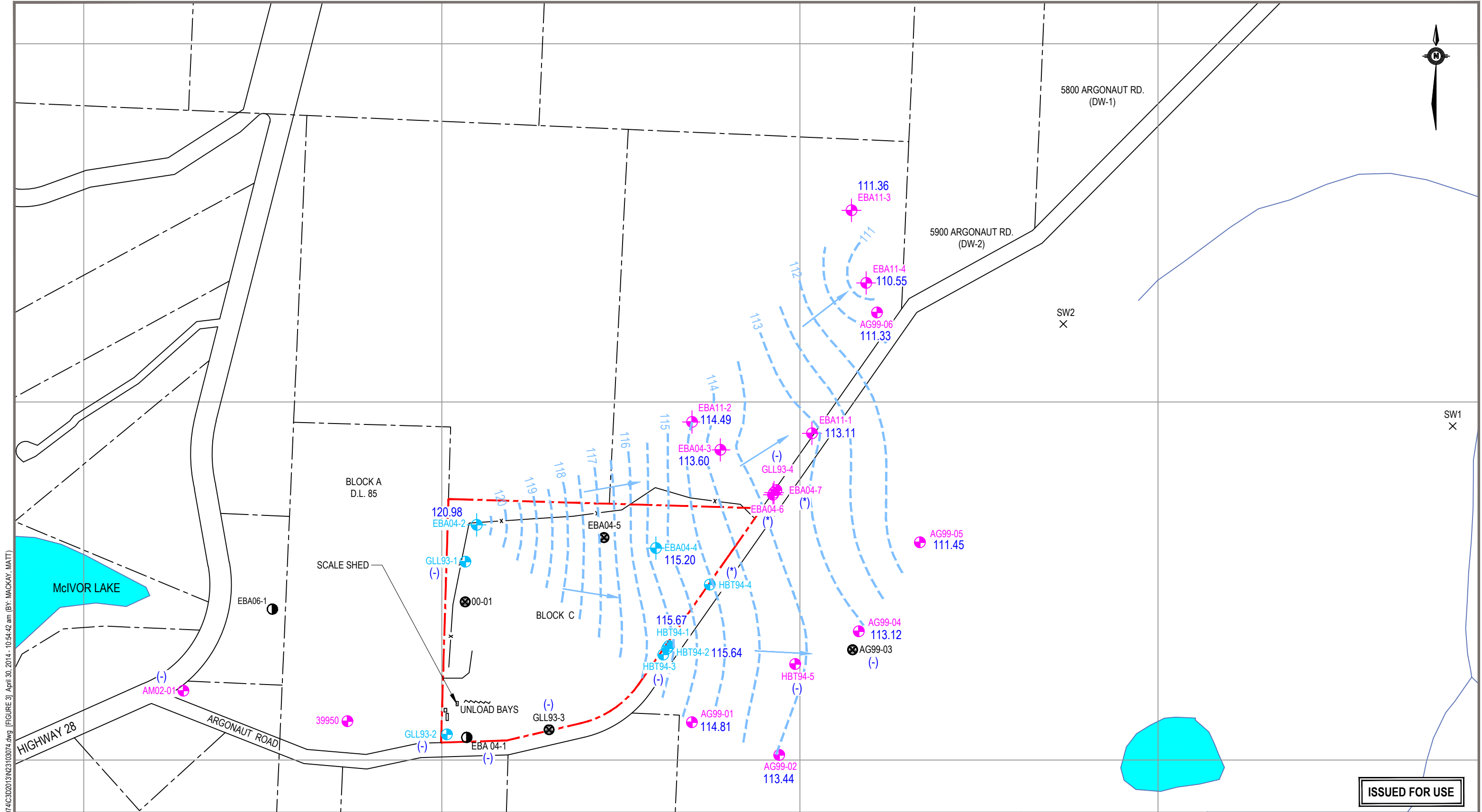
**2013 GROUNDWATER MONITORING
CAMPBELL RIVER WASTE MANAGEMENT CENTRE, BC**

MONITORING WELL AND SURFACE WATER LOCATIONS

PROJECT NO. N23103074-01	DWN MMK	CKD KG	REV 0
OFFICE EBA-RIV	DATE April 2014		

Figure 2

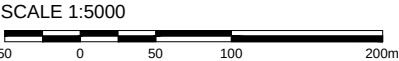
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NOTES

1. Location of EBA06-1 Water supply is approximate.
2. EBA04-5 and AG99-03 Wells are destroyed.
3. AM00-01 and GLL93-3 Wells are blocked.



LEGEND

- Subject Property
- Monitoring Well - on site
- Monitoring Well - off site
- Water supply
- Wells destroyed / blocked
- Surface water sample location

- EBA Installed Monitoring Well - on site
- EBA Installed Monitoring Well - off site
- Groundwater elevation, measured May 2013 (meters above sea level)
- (-) Well was dry or unable to measure groundwater
- (*) Groundwater well not included in groundwater elevation calculations. Survey should be conducted to confirm top of pipe elevations.

- Inferred groundwater contour (meters above sea level)
- Inferred groundwater flow direction

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Waste Management



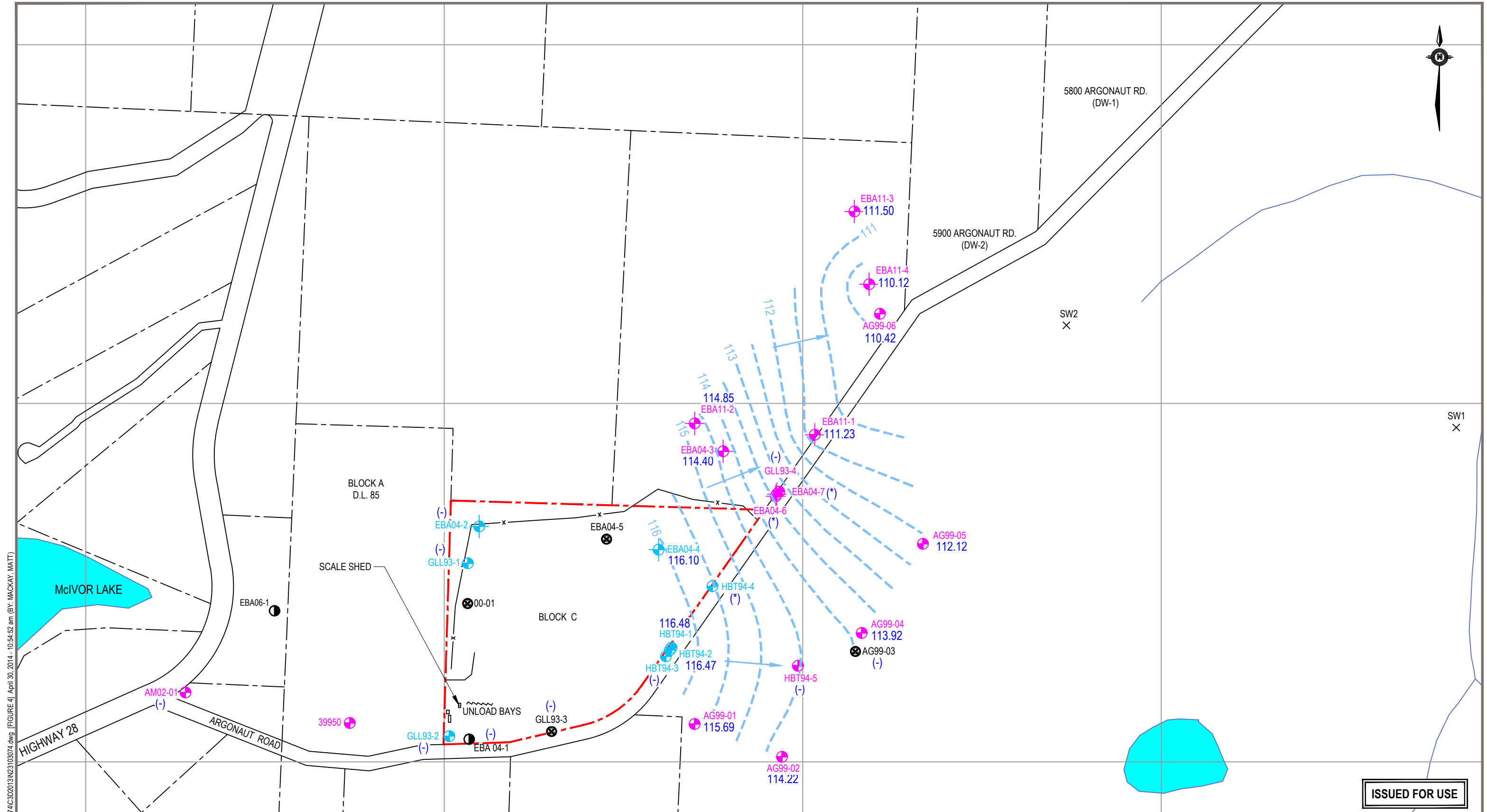
2013 GROUNDWATER MONITORING
CAMPBELL RIVER WASTE MANAGEMENT CENTRE, BC

GROUNDWATER ELEVATION CONTOUR MAP -
MAY 2013

PROJECT NO. N23103074-01	DWN MMK	CKD KG	REV 0
OFFICE EBA-RIV	DATE April 2014		

Figure 3

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Q:\Riverbend\Drafting\Other\Office\N231\N23103074\4C3D2013\N23103074.dwg [FIGURE 4] April 30, 2014 - 10:54:52 am (BY: MACKAY, MATT)

NOTES
1. Location of EBA06-1 Water supply is approximate.
2. EBA04-5 and AG99-03 Wells are destroyed.
3. AM00-01 and GLL93-3 Wells are blocked.

SCALE 1:5000

50 0 50 100 200m

LEGEND

--- Subject Property

Monitoring Well - on site

Monitoring Well - off site

Water supply

Wells destroyed / blocked

Surface water sample location

EBA Installed Monitoring Well - on site

EBA Installed Monitoring Well - off site

Groundwater elevation, measured November 2013 (meters above sea level)

(-) Well was dry or unable to measure groundwater

(*) Groundwater well not included in groundwater elevation calculations. Survey should be conducted to confirm top of pipe elevations.

--- Inferred groundwater contour (meters above sea level)

→ Inferred groundwater flow direction

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Comox Strathcona Waste Management

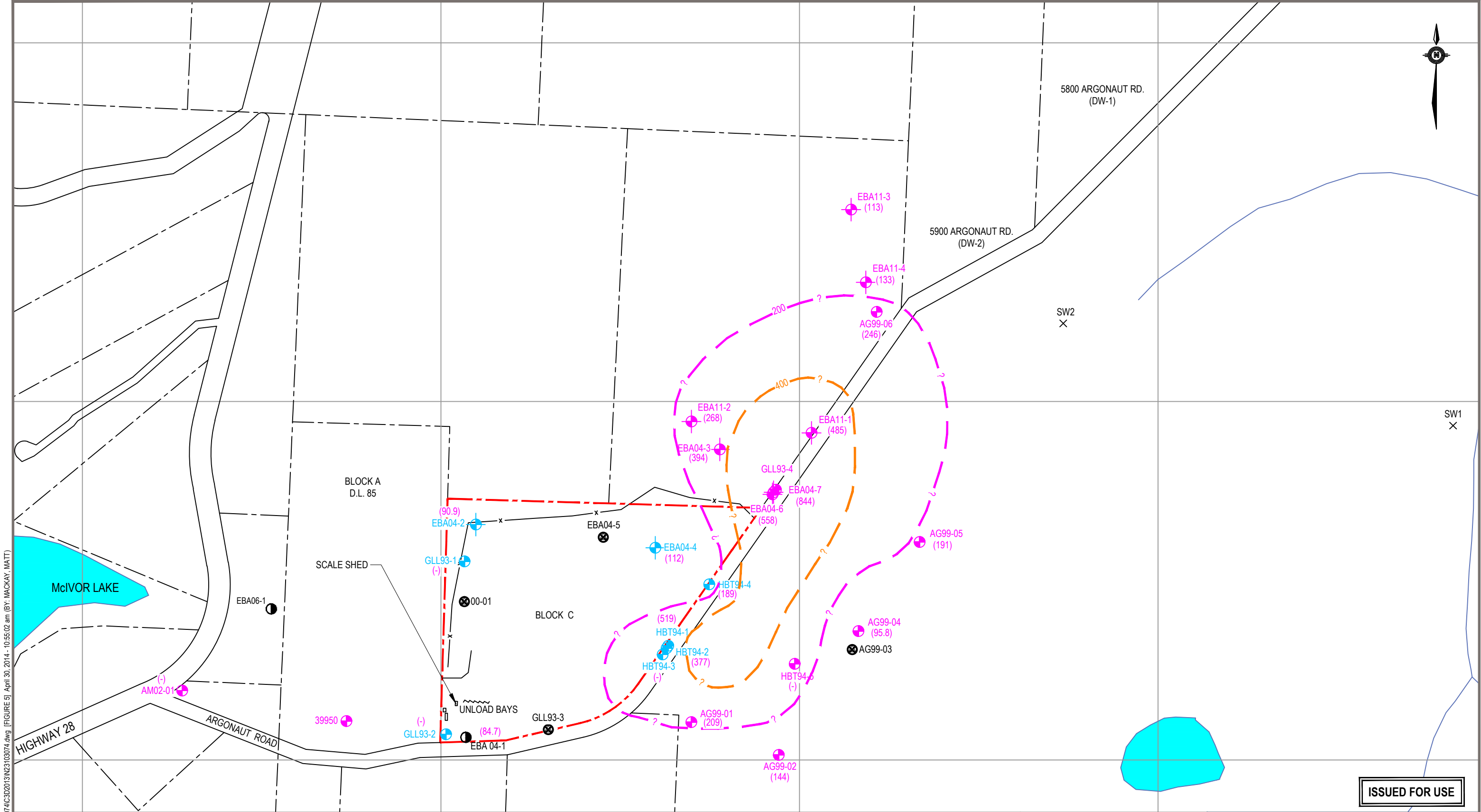
TETRA TECH EBA

2013 GROUNDWATER MONITORING CAMPBELL RIVER WASTE MANAGEMENT CENTRE, BC

GROUNDWATER ELEVATION CONTOUR MAP - NOVEMBER 2013

PROJECT NO. N23103074-01	DWN MMK	CKD KG	REV 0
OFFICE EBA-RIV	DATE April 2014		

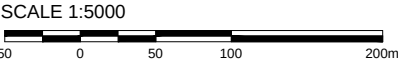
Figure 4



Q:\Riverbend\Drafting\Other\Office\N231\N2310307\4\C3D2013\N23103074.dwg [FIGURE 5] April 30, 2014 - 10:55:02 am (BY: MACKAY, MATT)

NOTES

- 1. Location of EBA06-1 Water supply is approximate.
- 2. EBA04-5 and AG99-03 Wells are destroyed.
- 3. AM00-01 and GLL93-3 Wells are blocked.



LEGEND

- Subject Property
- Monitoring Well - on site
- Monitoring Well - off site
- Water supply
- Wells destroyed / blocked
- Surface water sample location

- EBA Installed Monitoring Well - on site
- EBA Installed Monitoring Well - off site
- Electrical conductivity ($\mu\text{S}/\text{cm}$) values measured May 2013
- Interpreted contour showing electrical conductivity values (200 $\mu\text{S}/\text{cm}$)
- Interpreted contour showing electrical conductivity values (400 $\mu\text{S}/\text{cm}$)
- Well was dry or unable to sample

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**Comox Strathcona
Waste Management**



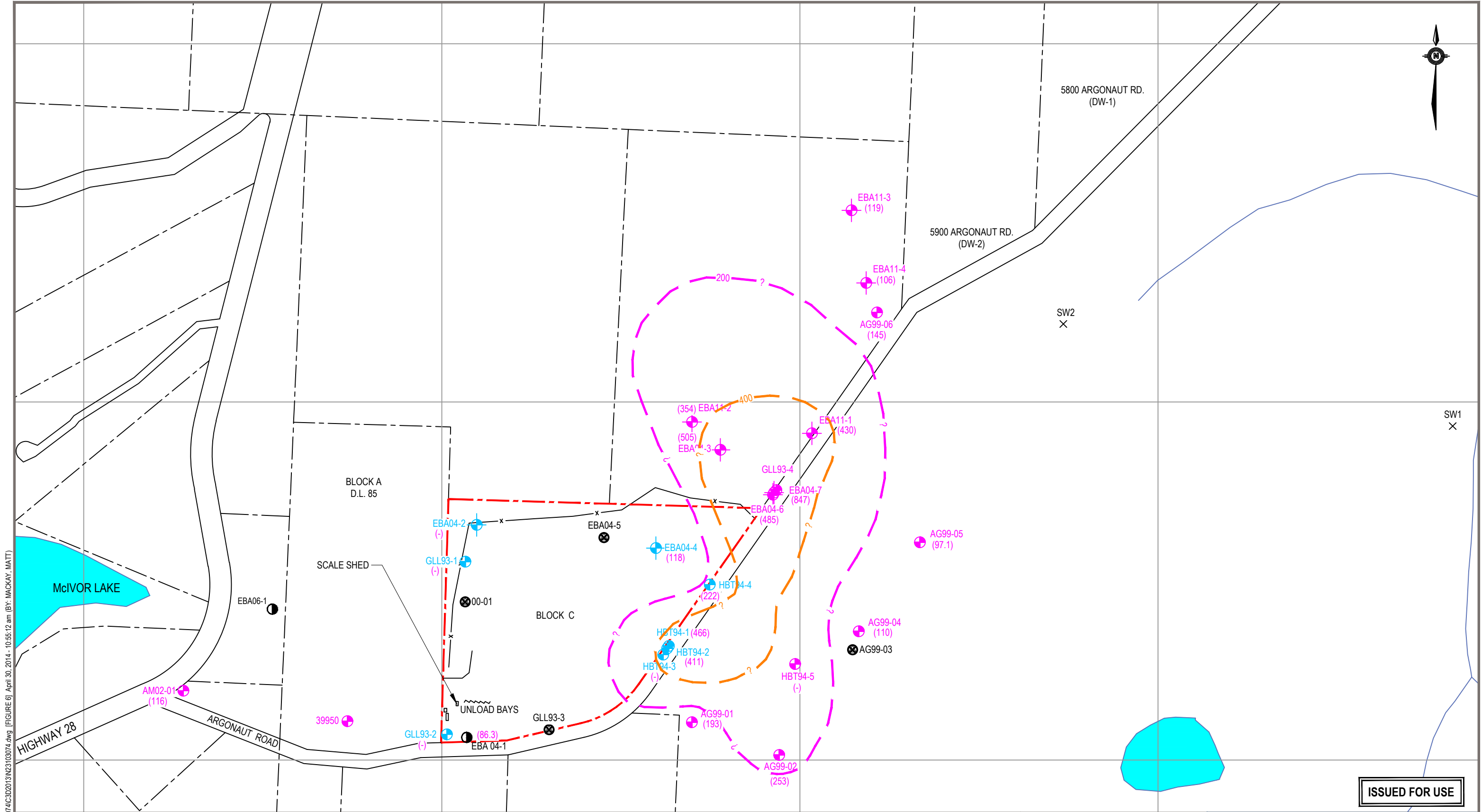
2013 GROUNDWATER MONITORING
CAMPBELL RIVER WASTE MANAGEMENT CENTRE, BC

ELECTRICAL CONDUCTIVITY DISTRIBUTION IN
GROUNDWATER - MAY 2013

PROJECT NO. N23103074-01	DWN MMK	CKD KG	REV 0
OFFICE EBA-RIV	DATE April 2014		

Figure 5

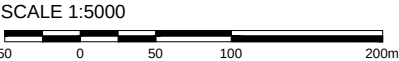
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Q:\Riverbend\Drafting\Other\Office\N231\N23103074\4C3D2013\N23103074.dwg [FIGURE 6] April 30, 2014 - 10:55:12 am (BY: MACKAY, MATT)

NOTES

- 1.Location of EBA06-1 Water supply is approximate.
- 2.EBA04-5 and AG99-03 Wells are destroyed.
- 3.AM00-01 and GLL93-3 Wells are blocked.



LEGEND

- Subject Property
- Monitoring Well - on site
- Monitoring Well - off site
- Water supply
- Wells destroyed / blocked
- Surface water sample location

- EBA Installed Monitoring Well - on site
- EBA Installed Monitoring Well - off site
- Electrical conductivity (µS/cm) values measured November 2013
- Interpreted contour showing electrical conductivity values (200 µS/cm)
- Interpreted contour showing electrical conductivity values (400 µS/cm)
- Well was dry or unable to sample

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**Comox Strathcona
Waste Management**



2013 GROUNDWATER MONITORING
CAMPBELL RIVER WASTE MANAGEMENT CENTRE, BC

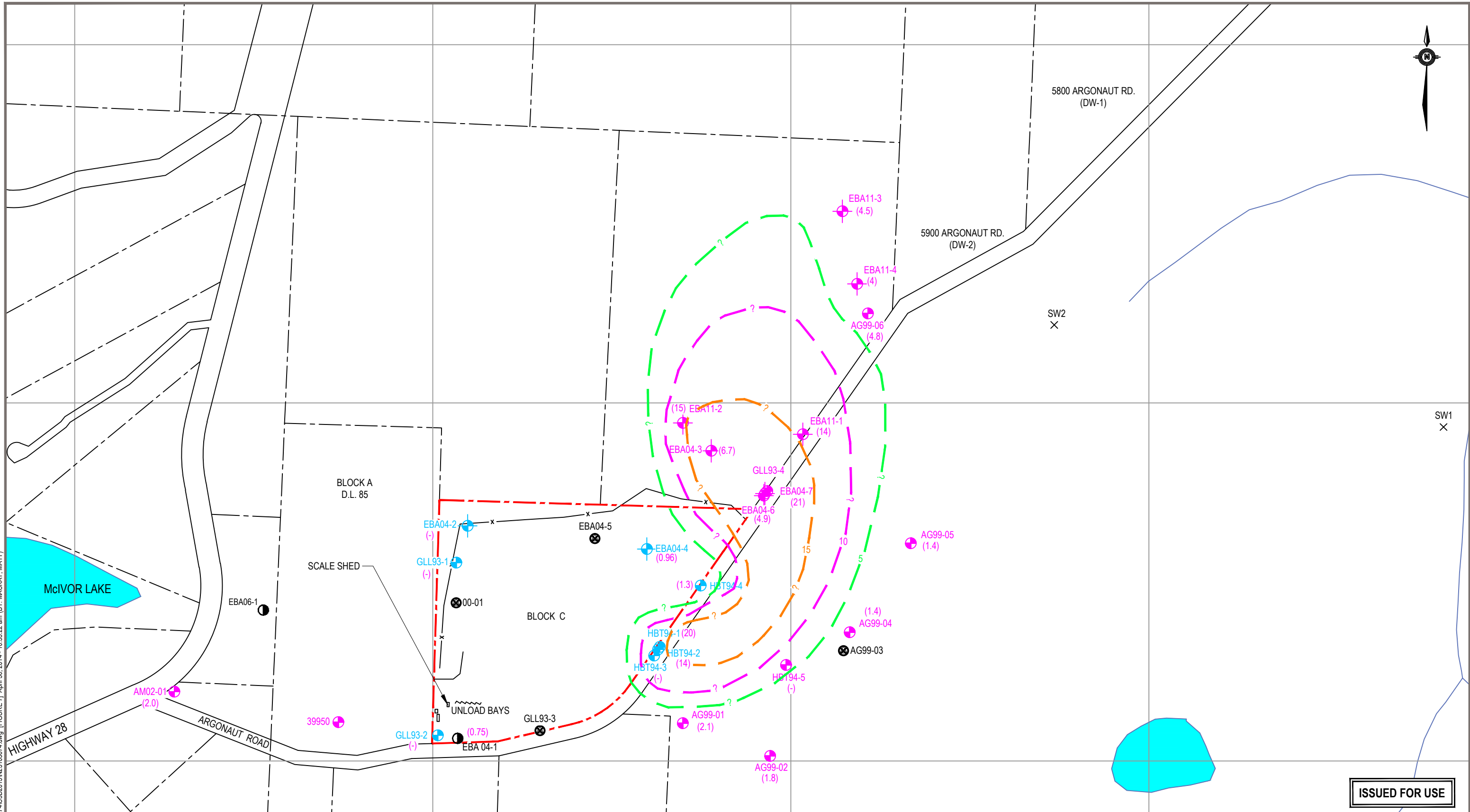
ELECTRICAL CONDUCTIVITY DISTRIBUTION IN
GROUNDWATER - NOVEMBER 2013

PROJECT NO. N23103074-01	DWN MMK	CKD KG	REV 0
OFFICE EBA-RIV	DATE April 2014		

Figure 6

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NOTES

1. Location of EBA06-1 Water supply is approximate.
2. EBA04-5 and AG99-03 Wells are destroyed.
3. AM00-01 and GLL93-3 Wells are blocked.

SCALE 1:5000



LEGEND

- Subject Property
- Monitoring Well - on site
- Monitoring Well - off site
- Water supply
- Wells destroyed / blocked
- Surface water sample location

- EBA Installed Monitoring Well - on site
- EBA Installed Monitoring Well - off site
- Chloride concentration (mg/L) measured November 2013
- Interpreted contour showing chloride concentrations (5 mg/L)
- Interpreted contour showing chloride concentrations (10 mg/L)
- Interpreted contour showing chloride concentrations (15 mg/L)
- Well was dry or unable to sample

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**Comox Strathcona
Waste Management**

TETRA TECH EBA

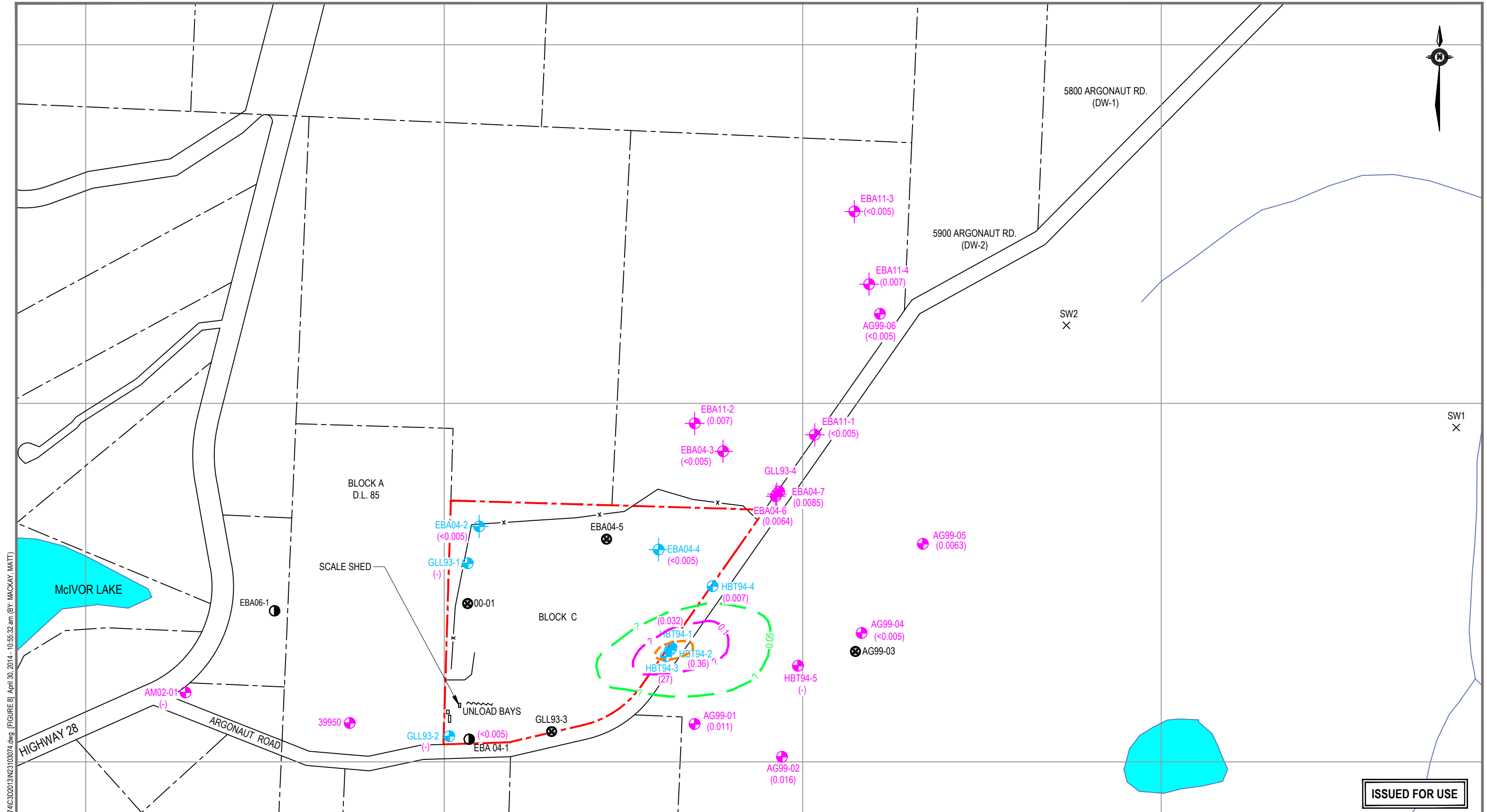
**2013 GROUNDWATER MONITORING
CAMPBELL RIVER WASTE MANAGEMENT CENTRE, BC**

**CHLORIDE DISTRIBUTION IN GROUNDWATER -
NOVEMBER 2013**

PROJECT NO. N23103074-01	DWN MMK	CKD KG	REV 0
OFFICE EBA-RIV	DATE April 2014		

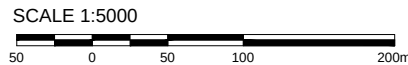
Figure 7

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Q:\Riverbend\Drafting\Other\Office\N231\N23103074\4C3D2013\N23103074.dwg [FIGURE 8] April 30, 2014 - 10:55:32 am (BY: MACKAY, MATT)

NOTES
1. Location of EBA06-1 Water supply is approximate.
2. EBA04-5 and AG99-03 Wells are destroyed.
3. AM00-01 and GLL93-3 Wells are blocked.



- LEGEND**
- Subject Property
 - Monitoring Well - on site
 - Monitoring Well - off site
 - Water supply
 - Wells destroyed / blocked
 - Surface water sample location
 - EBA Installed Monitoring Well - on site
 - EBA Installed Monitoring Well - off site
 - Ammonia concentration (mg/L) measured February 2013
 - Interpreted contour showing ammonia concentrations (0.05 mg/L)
 - Interpreted contour showing ammonia concentrations (0.1 mg/L)
 - Interpreted contour showing ammonia concentrations (0.5 mg/L)
 - (-) Well was dry or unable to sample

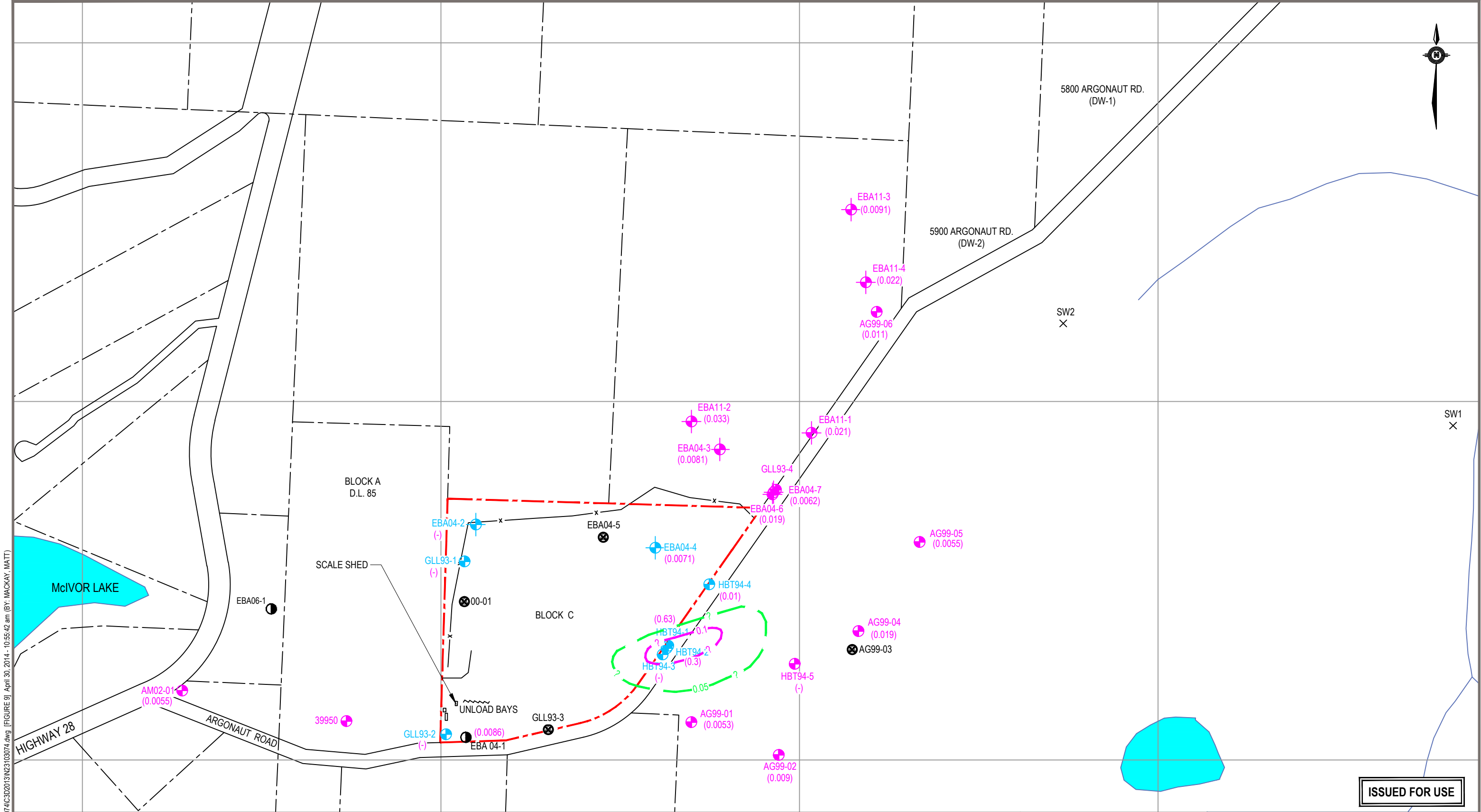
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Comox Strathcona Waste Management

**2013 GROUNDWATER MONITORING
CAMPBELL RIVER WASTE MANAGEMENT CENTRE, BC**

**AMMONIA DISTRIBUTION IN GROUNDWATER -
FEBRUARY 2013**

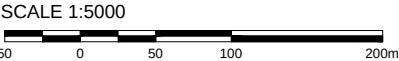
PROJECT NO. N23103074-01	DWN MMK	CKD KG	REV 0	Figure 8
OFFICE EBA-RIV	DATE April 2014			



Q:\Riverbend\Drafting\Other\Office\N231\N23103074\4C3D2013\N23103074.dwg [FIGURE 9] April 30, 2014 - 10:55:42 am (BY: MACKAY, MATT)

NOTES

- 1. Location of EBA06-1 Water supply is approximate.
- 2. EBA04-5 and AG99-03 Wells are destroyed.
- 3. AM00-01 and GLL93-3 Wells are blocked.



LEGEND

- Subject Property
- Monitoring Well - on site
- Monitoring Well - off site
- Water supply
- Wells destroyed / blocked
- Surface water sample location

- EBA Installed Monitoring Well - on site
- EBA Installed Monitoring Well - off site
- Ammonia concentration (mg/L) measured November 2013
- Interpreted contour showing ammonia concentrations (0.05 mg/L)
- Interpreted contour showing ammonia concentrations (0.1 mg/L)
- Well was dry or unable to sample

CLIENT

**Comox Strathcona
Waste Management**



2013 GROUNDWATER MONITORING
CAMPBELL RIVER WASTE MANAGEMENT CENTRE, BC

AMMONIA DISTRIBUTION IN GROUNDWATER -
NOVEMBER 2013

PROJECT NO. N23103074-01	DWN MMK	CKD KG	REV 0
OFFICE EBA-RIV	DATE April 2014		

Figure 9

ISSUED FOR USE

APPENDIX A

MOE OPERATIONAL CERTIFICATE MR-02401



MINISTRY OF WATER, LAND
AND AIR PROTECTION

Vancouver Island Region
Environmental Protection
2080-A Lableux Road
Nanaimo, British Columbia
V9T 6J9
Telephone: (250) 751-3100
Fax: (250) 751-3103

OPERATIONAL CERTIFICATE
MR-02401

Under the Provisions of the Waste Management Act

Regional District of Comox-Strathcona

600 Comox Road

Courtenay, British Columbia

V9N 3P6

is authorised to manage waste and recyclable material from the Regional District of Comox-Strathcona and environs at the Campbell River landfill located on Argonaut Road, Campbell River, British Columbia, subject to the conditions listed below. Contravention of any of these conditions is a violation of the *Waste Management Act* and may result in prosecution.

1. MANAGEMENT OF WASTE AND RECYCLABLE MATERIAL

1.1. Sanitary Landfill

- 1.1.1. This subsection applies to the discharge of waste to a sanitary landfill.
- 1.1.2. Waste may be discharged to the sanitary landfill shown on attached Site Plan A.
- 1.1.3. The characteristics of the discharge must be municipal solid waste as defined under the *Waste Management Act* and other wastes as approved in writing by the Regional Waste Manager.
- 1.1.4. The authorised works are a sanitary landfill, and related appurtenances approximately located as shown on attached Site Plan A.
- 1.1.5. The authorised works must be complete and in operation on and from the date of this operational certificate.

1.2. Leachate

- 1.2.1. This subsection applies to leachate from the landfill.
- 1.2.2. The characteristics of the leachate must not exceed concentrations set in the *British Columbia Approved Water Quality Guidelines (Criteria)* and *A Compendium of Working Water Quality Guidelines for British Columbia* at the property boundary. Where natural background water quality concentrations

Date Issued: DEC 02 2003
Date Amended:
(most recent)
Page: 1 of 4


B. W. Medlar
Assistant Regional Waste Manager

OPERATIONAL CERTIFICATE: MR-02401

exceed the aforementioned guidelines, characteristics of the leachate must not exceed background concentrations.

1.3. Entrance facilities

- 1.3.1. The authorised facilities are signs, weigh scales, recyclable material and waste drop-off and storage facilities and related appurtenances.
- 1.3.2. The authorised facilities must be complete and in operation on and from the date of this operational certificate.

1.4. Location of Authorised Facilities

The location of the facilities for the management of waste and recyclable material to which this operational certificate is applicable is Block C of District Lot 85, Sayward Land District, approximately located as shown on attached Site Plan A.

2. GENERAL REQUIREMENTS

2.1. Qualified Professionals

All facilities and information, including works, plans, assessments, investigations, surveys, programs and reports, must be certified by qualified professionals.

2.2. Plans

- 2.2.1. Site development, operating, leachate management, closure and post closure plans must be submitted to the Regional Waste Manager by December 31, 2003.
- 2.2.2. The plans referenced in subsection 2.2.1 must address, but not be limited to, each of the subsections in the *Landfill Criteria for Municipal Solid Waste* including performance, siting, design, operational and closure and post-closure criteria.
- 2.2.3. The facilities must be developed, operated and closed in accordance with the plans referenced in subsection 2.2.1.

2.3. Bear-Proof Facilities

- 2.3.1. Bears must not access putrescible waste at the landfill facility. All putrescible waste that arrives at the landfill facility must be immediately contained within a bear-proof bin or an area enclosed by a bear-proof electric fence. Grass, leaves, weeds, branches and woodwaste are exempt from bear-proofing requirements.
- 2.3.2. A bear-proof electric fence must be installed around the landfill facilities.



B. W. Medlar
Assistant Regional Waste Manager

- 2.3.3. The bear-proof fence must be designed, constructed, operated and maintained to prevent bears from penetrating the fence.
- 2.3.4. The bear-proof electric fence and bear-proof bins must be installed and in operation by March 30, 2004.

2.4. Landfill Gas

- 2.4.1. When 100,000 tonnes of waste have been discharged at the landfill, an assessment of the potential for landfill gas generation must be submitted to the Regional Waste Manager.
- 2.4.2. The landfill gas assessment must address, but is not limited to, subsections 4.2 and 6.4 of the *Landfill Criteria for Municipal Solid Waste* and section 6 of the *Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills*.
- 2.4.3. The potential for landfill gas generation is to be re-assessed at least once every 5 years after the initial assessment.

2.5. Seismic and Fault Activity

A report that assesses the risk from seismic and fault activity must be submitted to the Regional Waste Manager by December 31, 2003.

2.6. Additional Facilities or Works

The Regional Waste Manager may require investigations, surveys, and the construction of additional facilities or works including, but not limited to, additional leachate and landfill gas management facilities. The Regional Waste Manager may also amend the requirements of any of the information required by this operational certificate including plans, programs, assessments and reports.

3. MONITORING AND REPORTING

3.1. Monitoring Program

- 3.1.1. A monitoring program must be developed to identify any impacts to the environment and public health from the landfill.
- 3.1.2. The monitoring program must address, but not be limited to, subsections 4.1, 4.2 and 7.15 of the *Landfill Criteria for Municipal Solid Waste* and the *Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills*.
- 3.1.3. Monitoring must be conducted in accordance with the monitoring program.



B. W. Medlar
Assistant Regional Waste Manager

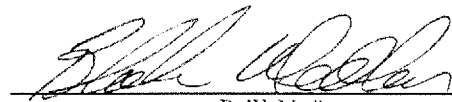
3.2. Annual Operating and Monitoring Report

- 3.2.1. An annual operating and monitoring report for the preceding 12 month period from January 1 to December 31 must be submitted to the Regional Waste Manager by April 30 of each year.
- 3.2.2. The report must include:
- An executive summary;
 - Tonnage of each type of waste discharged to the landfill for the year;
 - Remaining site life and capacity;
 - Review of the preceding year of operation, plans for the next year and any new information or proposed changes relating to the facilities and plans;
 - Comparison of the monitoring data with the performance criteria in section 4 of the *Landfill Criteria for Municipal Solid Waste* and the *Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills*, interpretation of the monitoring data, identification and interpretation of irregularities and trends, recommendations, and any proposed changes to the monitoring program.

4. SITE CLOSURE

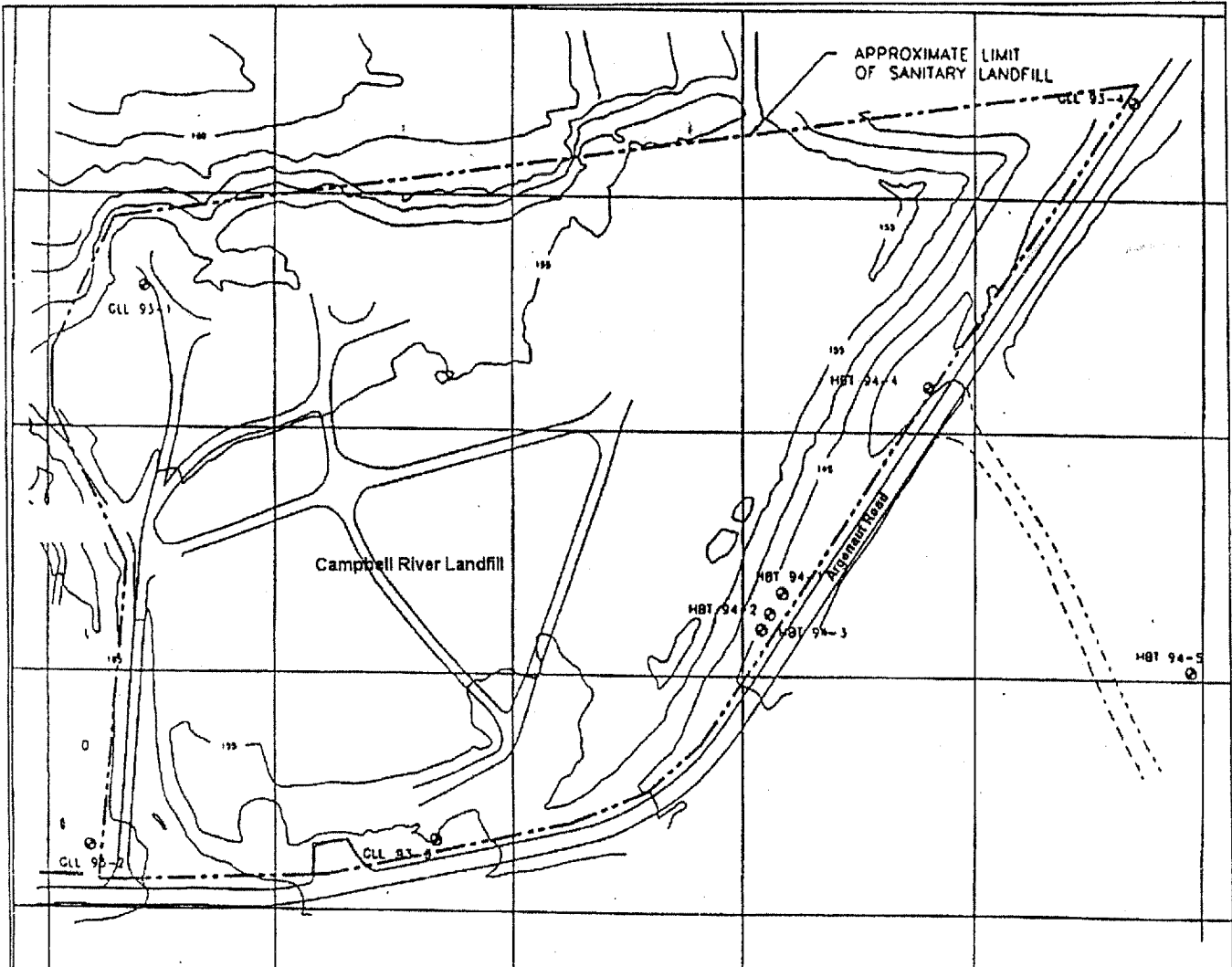
4.1. Closure and Post-Closure Fund

A closure and post-closure financial security trust fund must be built up over time. The closure and post-closure fund must ultimately meet or exceed the estimated closure and post-closure costs plus a reasonable contingency for any remediation that may be required.

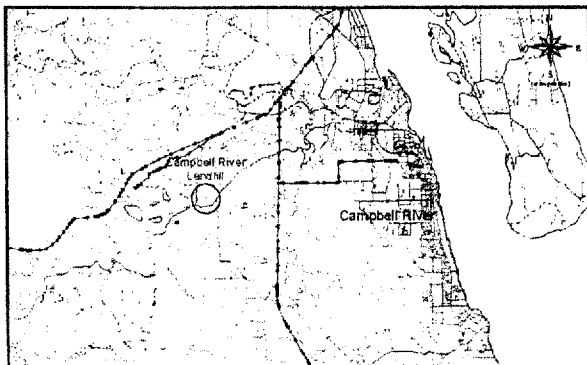


B. W. Medlar
Assistant Regional Waste Manager

SITE PLAN A



Location Map



Scale: Not to Scale

Operational Certificate: MR-02401

Date: DEC 02 2003

B. W. Medlar
Assistant Regional Waste Manager
Vancouver Island Region

APPENDIX B

MONITORING WELL INFORMATION

APPENDIX B1 - SUMMARY OF BOREHOLE AND MONITORING WELL DATA

Well No.	Year of Installation	Depth of Borehole (m-btop)	Elevation of Top of Piezometer ⁽¹⁾ (m-asl)	Elevation of Top of Screen (m-asl)	Depth of Screened Interval (m-btop)	Location		Soil Description in Screened Interval
						Easting	Northing	
GLL93-1	1993	28.00	163.31	138.81	24.5-27	351363.0674	5542374.024	SAND, some fine to medium gravel
GLL93-2	1993	35.33	166.73	134.23	32.5-35.3	351337.1166	5542132.819	SAND AND SILT
GLL93-3	1993	31.80	158.37	133.87	24.5-30.5	351479.7962	5542139.41	WELL DECOMMISSIONED
GLL93-4	1993	19.40	137.39	120.89	16.5-19.4	351796.994	5542473.929	SAND
HBT94-1	1994	40.00	142.33	111.33	31-34	351647.1133	5542256.417	SAND, trace of silt and gravel
HBT94-2	1994	43.00	142.44	101.44	41-43	351644.672	5542252.834	SAND, some silt
HBT94-3	1994	27.00	142.72	117.72	25-27	351639.264	5542244.214	GRAVEL
HBT94-4	1994	36.50	140.11	106.61	33.5-35	351704.2763	5542341.953	GRAVEL, some silt and sand
HBT94-5	1994	32.00	138.29	118.29	20-22	351823.2907	5542231.173	SAND, silty
AG99-01	1999	48.50	144.19	97.69	46.5-48.5	351679.2892	5542149.915	GRAVEL
AG99-02	1999	51.50	139.85	90.85	49-51	351801.0404	5542104.061	GRAVEL, some sand and cobbles
AG99-03	1999	53.20	136.79	99.79	37-45	351903.5151	5542251.002	WELL DECOMMISSIONED
AG99-04	1999	45.40	136.44	98.44	38-45	351912.2829	5542276.902	GRAVEL, some sand and cobbles
AG99-05	1999	50.90	132.09	88.09	44-50	351997.6062	5542400.95	SAND, trace silt
AG99-06	1999	45.11	133.03	111.03	22-25	351937.6388	5542721.804	SAND, little silt
AM00-01	2000	48.46	164.60	131.60	33-48	351362.6912	5542317.81	WELL DECOMMISSIONED
AM02-01	2002	33.20	186.59	167.59	19-34	350969.2493	5542193.84	SAND
EBA04-1	2004	68.30	164.74	101.84	62.9-65.5	Tap from Building		SAND and GRAVEL
EBA04-2	2004	65.50	162.92	119.02	43.9-47	351378.7509	5542425.337	SAND and GRAVEL
EBA04-3	2004	41.20	142.20	104.10	38.1-41.2	351719.0497	5542530.197	SAND and GRAVEL
EBA04-4	2004	53.30	163.272	113.07	50.2-53.3	351629.1238	5542393.032	Sand and Sand & Gravel Interlayers
EBA04-5	2004	ABANDONED	164.66	-	-	351556.518	5542407.609	WELL DECOMMISSIONED
EBA04-6	2004	39.60	136.34	98.24	38.1-39.6	351792.5091	5542467.539	SAND and GRAVEL
EBA04-7	2004	32.00	136.40	105.90	30.5-32	351794.0216	5542470.669	SAND and GRAVEL
EBA06-1	Unknown - this well is a domestic well and was sampled in 2006 and 2007. No well details are known for this well.							
EBA11-1	2011	28.96	134.77	107.77	25.6 - 28.7	332019.4216	5542455.181	SAND, trace to some silt
EBA11-2	2011	35.00	141.55	109.55	32 - 35	331842.4388	5542479.855	SAND, gravelly and trace silt
EBA11-3	2011	30.18	134.19	107.19	27.1 - 30.18	332061.9186	5542787.4	SAND, trace gravel
EBA11-4	2011	29.57	133.13	107.13	25.9 - 29	332085.3845	5542684.875	SAND, trace gravel, trace to some silt

Notes:

m-btop indicates metres below top of casing.

m-asl indicates meters above sea level

⁽¹⁾ Most recent survey information used.

GRAPHICS, SYMBOLS AND ABBREVIATIONS ON LOGS

SAMPLE TYPES and TESTS

SS	Split Spoon Sample	
SN	Non-Standard Split Spoon Sample	
ST	Shelby Tube Sample : (unconfined compression or unconsolidated undrained test)	- ◆
DS	Denison Type Sample	
PS	Piston Type Sample	
CS	Continuous Sample	
GS	Grab Sample	
WS	Wash Sample	
BQ	BQ Core Sample	
HQ	HQ Core Sample	
NQ	NQ Core Sample	
DT	Dynamic Penetration Test	
VT	Field Vane Test (undisturbed)	- +
VT	Field Vane Test (remoulded)	- ⊕

PENETRATION RESISTANCES

Standard Penetration Resistance(N Value)

The number of blows by a 63.6 kg (140 lb) hammer dropped 760 mm (30 in.) required to drive a 50 mm (2 in.) split spoon sampler for a distance of 300 mm (12 in.).

ABBREVIATIONS

DTPL: Drier Than Plastic Limit
 APL: About Plastic Limit
 WTPL: Wetter Than Plastic Limit
 K: Hydraulic Conductivity (m/s)
 C_u : Undrained Shear Strength (kPa)
 % REC : Percentage of Sample Recovered
 % RQD : Indirect Measure of the Number of Fractures and Soundness of Rock Mass
 ≈ Approximate Water Table

GRAIN SIZE CLASSIFICATION %

trace, "eg. trace sand"	1 - 10
some, "eg. some sand"	10 - 20
adjective, "eg. sandy"	20 - 35
and, "eg. and sand"	35 - 50
noun, "eg. sand"	>50

Note: Classification Divisions Based on Modified M.I.T. Grain Size Scale

SOIL DESCRIPTIONS

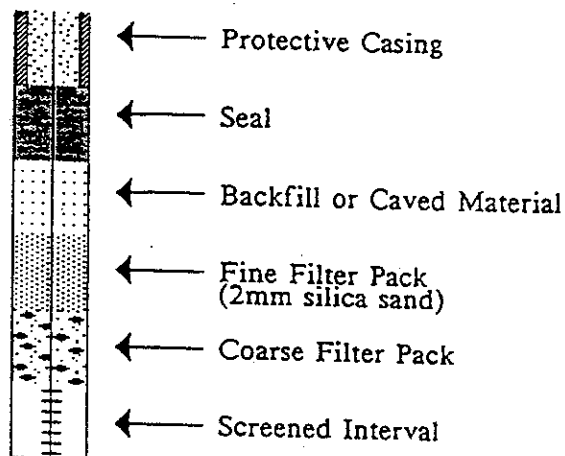
Cohesionless Soils

Relative Density	N Value
Very loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	over 50

Cohesive Soils

Consistency	C_u (kPa)	N Value
Very soft	0 to 12	0 to 2
Soft	12 to 25	2 to 4
Firm	25 to 50	4 to 8
Stiff	50 to 100	8 to 15
Very Stiff	100 to 200	15 to 30
Hard	over 200	over 30

MONITOR DETAILS



BOREHOLE LOG

PROJECT: 92-746

BOREHOLE: 1 1 of 2

CAMPBELL RIVER SANITARY LANDFILL
CAMPBELL RIVER, BRITISH COLUMBIA
FOR: DISTRICT OF CAMPBELL RIVER

DATE: 11 January 1993

GEOLOGIST SRB

ELEVATION 154.0 m ASL

SOUNDING LOG																			
DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE					N VALUE				WATER CONTENT (%)						
				NUMBER	INTERVAL TYPE	N VALUE	% WATER	% REC	% RQD										
										15	30	45	60	10	20	30	40		
1		SAND Medium brown fine to medium sand, trace silt, moist, loose.			GS														
2																			
3																			
4																			
5																			
6.1		SAND AND GRAVEL Medium brown fine to medium sand, trace silt, trace fine to medium subrounded gravel, moist, loose.			GS														
7																			
8																			
9																			
10																			
11		SAND Medium brown fine to medium sand, trace silt, trace fine to medium subrounded gravel, moist, compact.			GS														
12																			
13.1																			
13																			
14																			
14.6		SAND AND GRAVEL Medium brown fine to medium sand, some fine to medium subrounded gravel, moist, compact.			GS														
15																			
16																			
17																			
18																			
19																			
		- Medium brown fine to medium sand and fine to coarse gravel with cobbles from 16.5 m to 17.1 m.			GS														

BOREHOLE LOG

PROJECT: 92-746

BOREHOLE: 1 2 of 2

CAMPBELL RIVER SANITARY LANDFILL
CAMPBELL RIVER, BRITISH COLUMBIA
FOR: DISTRICT OF CAMPBELL RIVER

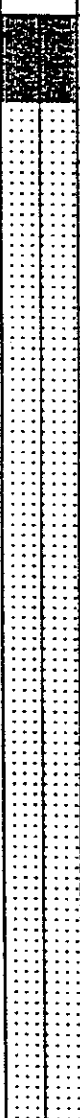
DATE: 11 January 1993

GEOLOGIST SRB

ELEVATION 154.0 m ASL

[illegible]

BOREHOLE LOG	PROJECT: 92-746	BOREHOLE: 2	1 of 2
CAMPBELL RIVER SANITARY LANDFILL CAMPBELL RIVER, BRITISH COLUMBIA FOR: DISTRICT OF CAMPBELL RIVER		DATE: 12 January 1993 GEOLOGIST SRB ELEVATION 165.9 m ASL	

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE					N VALUE				WATER CONTENT (%)						
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD	N VALUE				WATER CONTENT (%)				
											15	30	45	60	10	20	30	40	
1		SAND AND GRAVEL Medium brown fine to medium sand, trace silt and fine subrounded gravel, moist, loose.				GS													
2																			
3																			
4																			
5								GS											
6																			
7																			
8																			
9																			
10																			
11																			
12								GS											
13																			
14																			
15.2																			
16		SAND Medium brown fine to medium sand, trace silt, a few fine pieces of gravel, moist, loose.				GS													
17																			
18																			
19																			
		- Gravel layer at 18.30 m to 18.50 m.																	

BOREHOLE LOG

PROJECT: 92-746

BOREHOLE: 2 2 of 2

CAMPBELL RIVER SANITARY LANDFILL
CAMPBELL RIVER, BRITISH COLUMBIA
FOR: DISTRICT OF CAMPBELL RIVER

DATE: 12 January 1993

GEOLOGIST SRB

ELEVATION 165.9 m ASL

[illegible]

BOREHOLE LOG

PROJECT: 92-746

BOREHOLE: 3

1 of 2

CAMPBELL RIVER SANITARY LANDFILL
CAMPBELL RIVER, BRITISH COLUMBIA
FOR: DISTRICT OF CAMPBELL RIVER

DATE: 14 January 1993

GEOLOGIST SRB

ELEVATION 153.6 m ASL

[illegible]

BOREHOLE LOG

PROJECT: 92-746

BOREHOLE: 3 2 of 2

CAMPBELL RIVER SANITARY LANDFILL
CAMPBELL RIVER, BRITISH COLUMBIA
FOR: DISTRICT OF CAMPBELL RIVER

DATE: 14 January 1993

GEOLOGIST SRB

ELEVATION 153.6 m ASL

[illegible]

BOREHOLE LOG

PROJECT: 92-746

BOREHOLE: 4 1 of 1

CAMPBELL RIVER SANITARY LANDFILL
CAMPBELL RIVER, BRITISH COLUMBIA
FOR: DISTRICT OF CAMPBELL RIVER

DATE: 14 January 1993

GEOLOGIST SRB

ELEVATION 146.4 m ASL

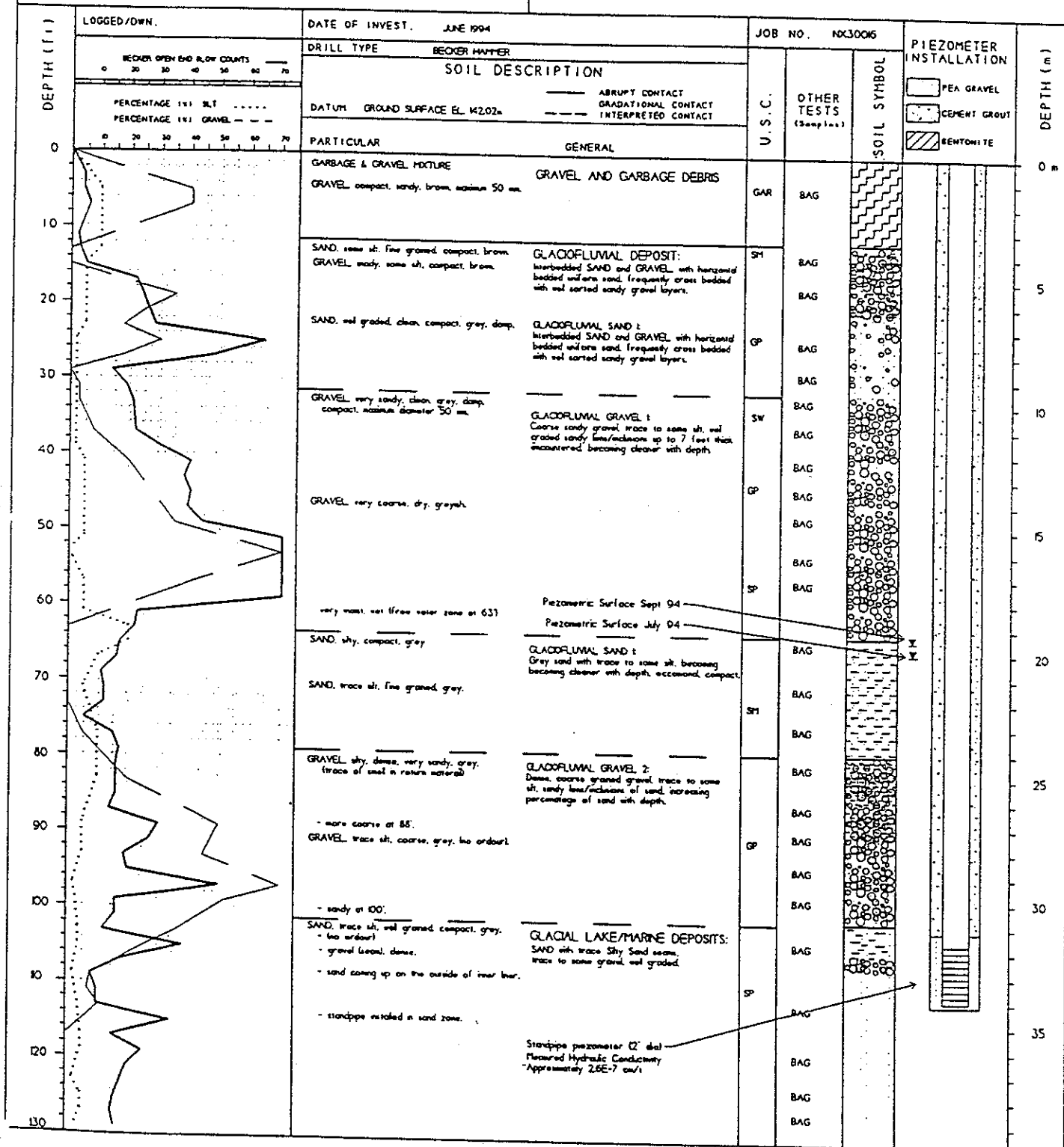
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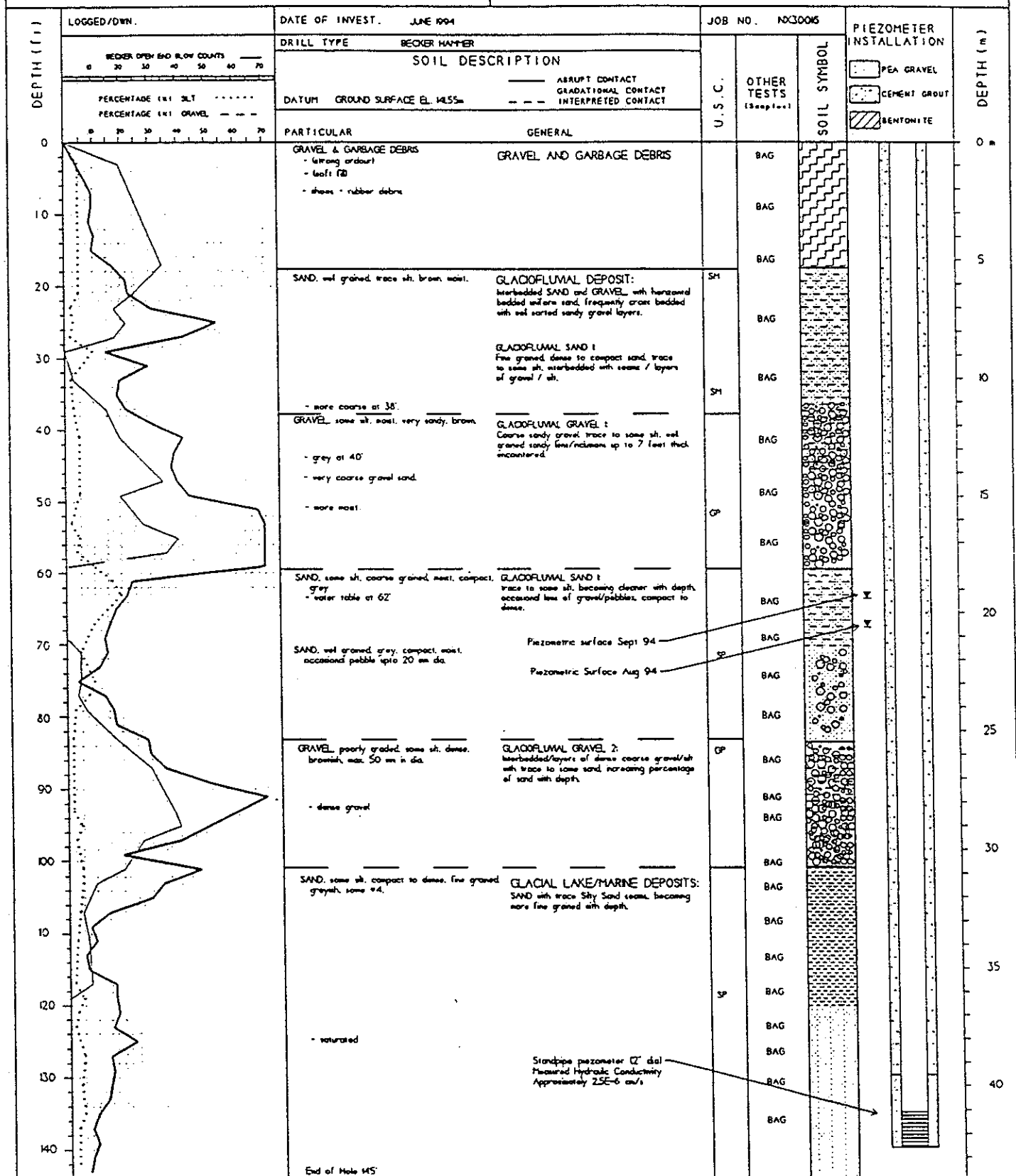


AGRA
Earth & Environmental

LOG OF BOREHOLE NO. HBT 94-1

DISTRICT OF CAMPBELL RIVER LANDFILL, ARGONAUT ROAD
1994 HYDROGEOLOGIC INVESTIGATIONS



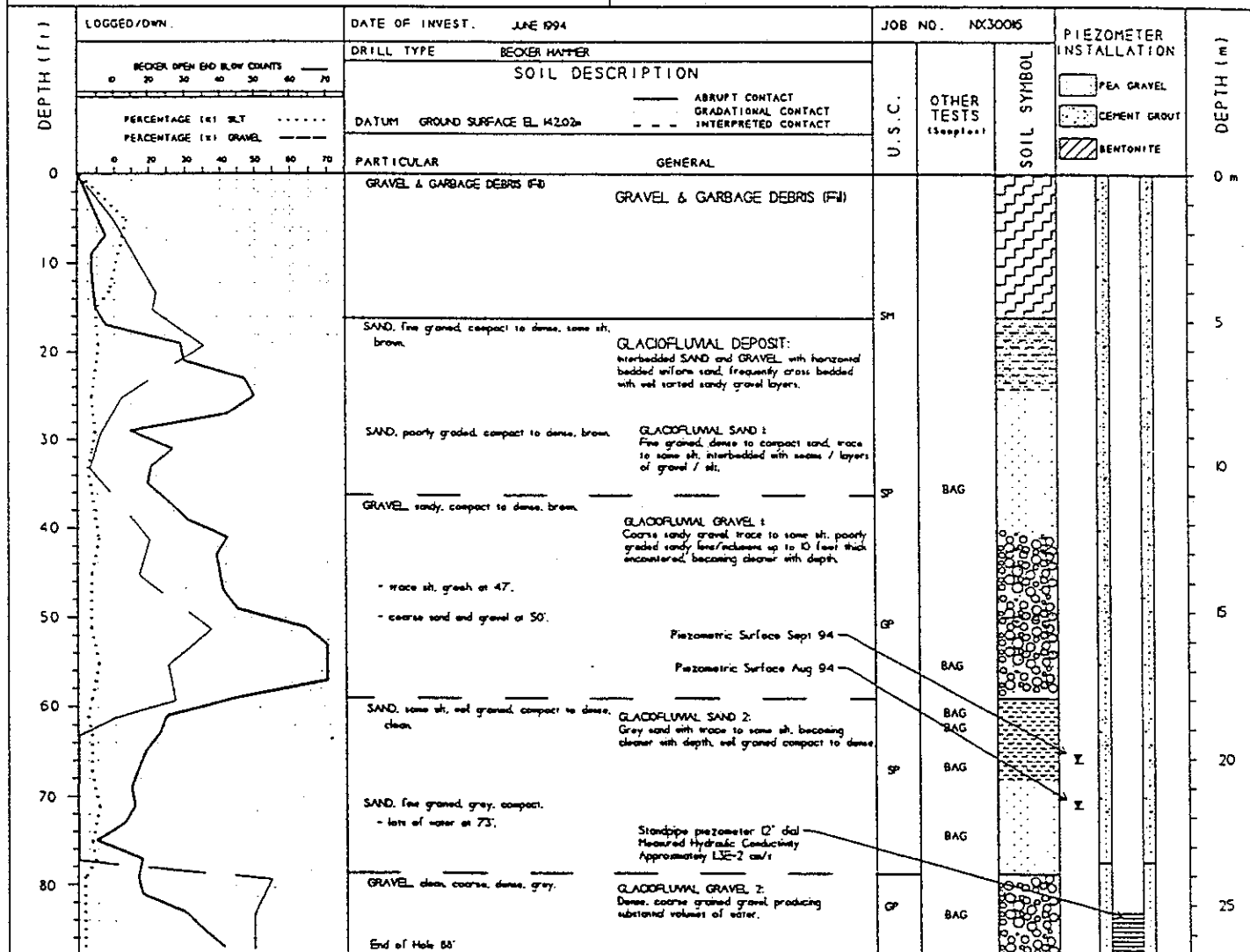
DISTRICT OF CAMPBELL RIVER LANDFILL, ARGONAUT ROAD
1994 HYDROGEOLOGIC INVESTIGATIONS



AGRA
Earth & Environmental

LOG OF BOREHOLE NO. HBT 94-3

DISTRICT OF CAMPBELL RIVER LANDFILL, ARGONAUT ROAD
1994 HYDROGEOLOGIC INVESTIGATIONS

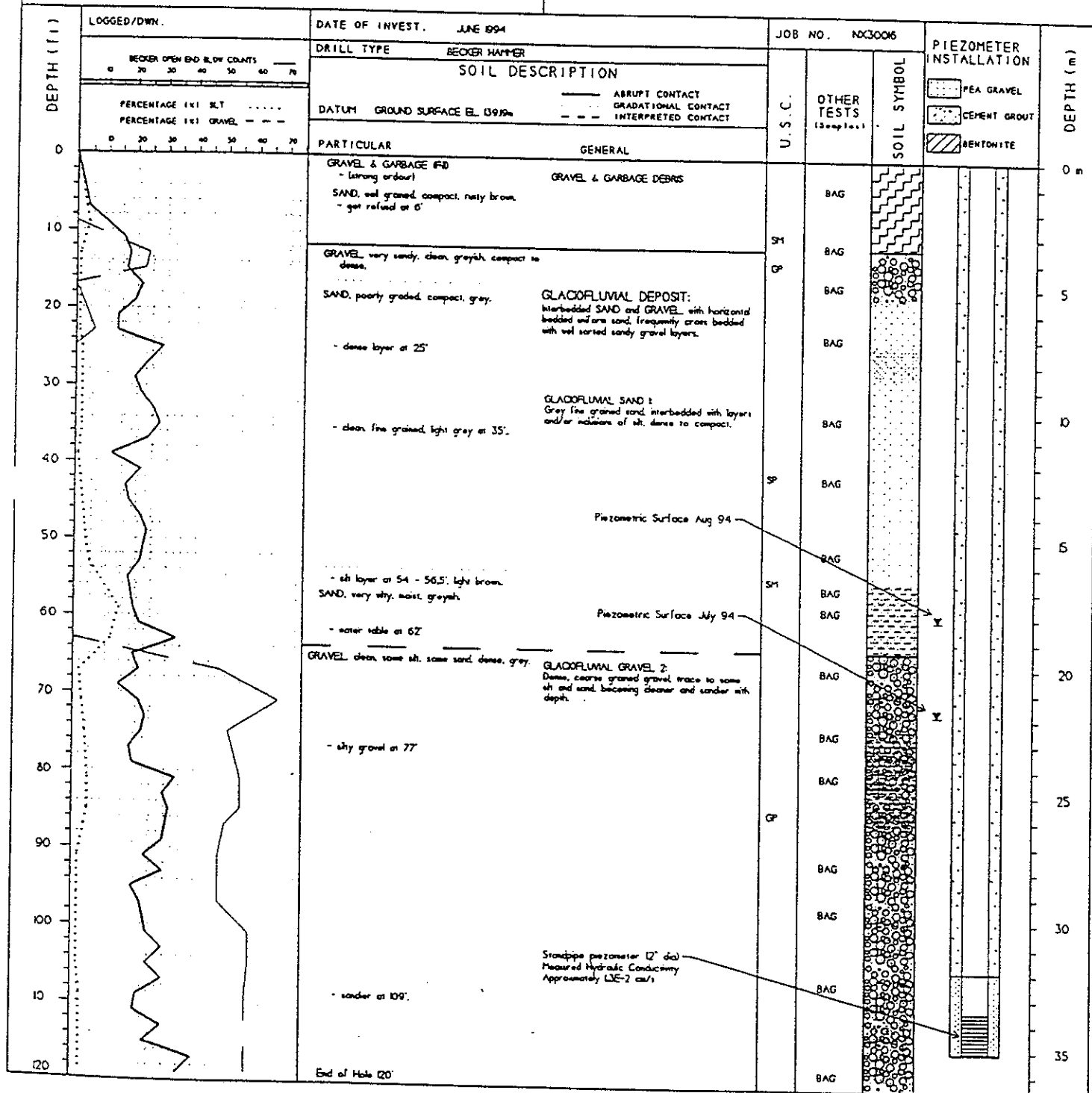




AGRA
Earth & Environmental

LOG OF BOREHOLE NO. HBT 94-4

DISTRICT OF CAMPBELL RIVER LANDFILL ARGONAUT ROAD
1994 HYDROGEOLOGIC INVESTIGATIONS

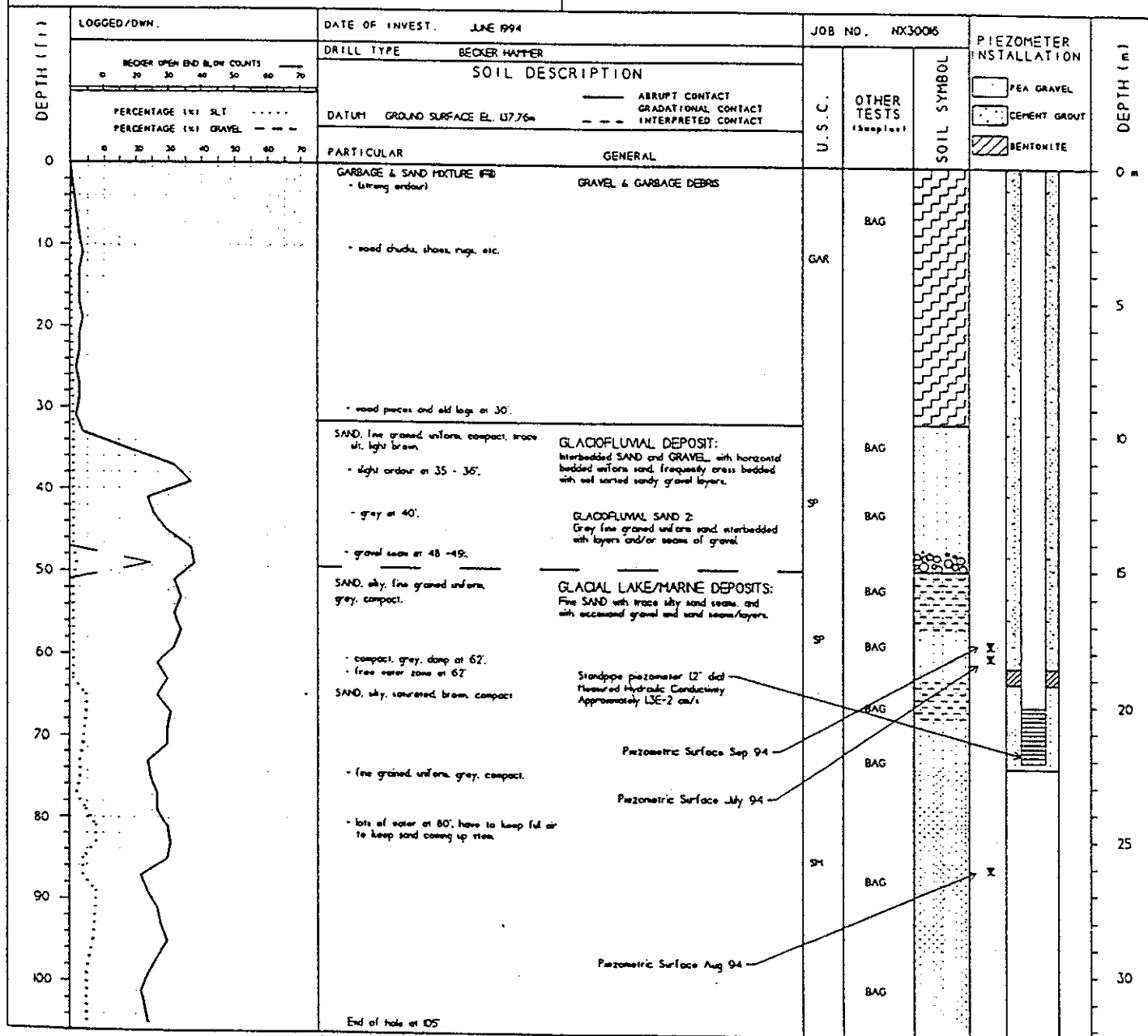


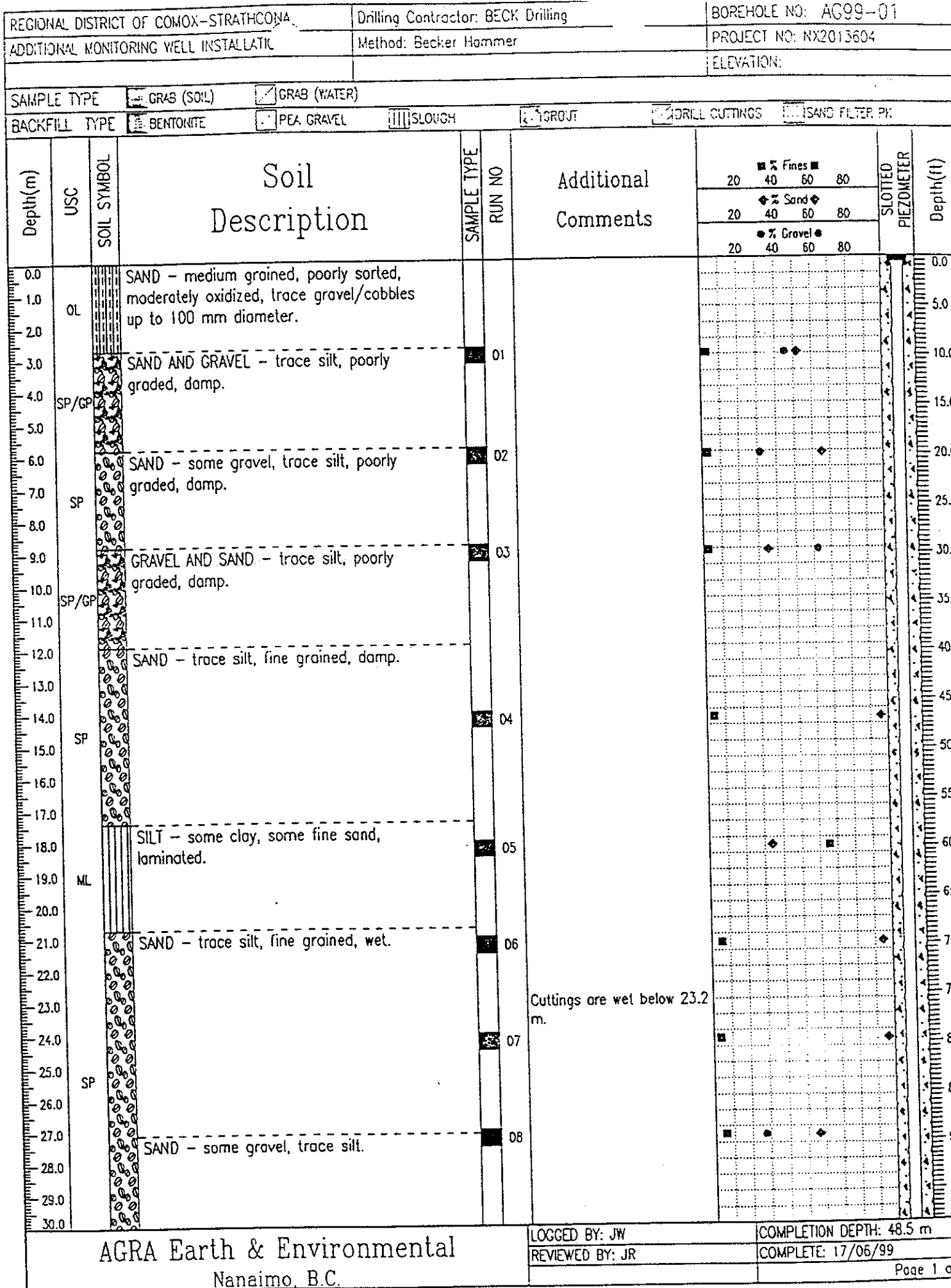


AGRA
Earth & Environmental

LOG OF BOREHOLE NO. HBT 94-5

DISTRICT OF CAMPBELL RIVER LANDFILL, ARGONAUT ROAD
1994 HYDROGEOLOGIC INVESTIGATIONS





REGIONAL DISTRICT OF COMOX-STRATHCONA		Drilling Contractor: BECK Drilling		BOREHOLE NO: AG99-01	
ADDITIONAL MONITORING WELL INSTALLATION		Method: Becker Hammer		PROJECT NO: NX2013604	
				ELEVATION:	

SAMPLE TYPE		☒ GRAB (SOIL)	☐ GRAB (WATER)
BACKFILL TYPE		☒ BENTONITE	☐ PEA GRAVEL
		☐ SLOUGH	☐ GROUT
		☐ DRILL CUTTINGS	☐ SAND FILTER PK

Depth(m)	USC	SOIL SYMBOL	Soil Description	SAMPLE TYPE	RUN NO	Additional Comments	% Fines				SLOTTED PIEZOMETER	Depth(ft)
							20	40	60	80		
							% Sand					
							20	40	60	80		
30.0	SP											100.0
31.0			SAND AND SILT - low plastic, wet.		09							105.0
32.0	SM/ML											110.0
33.0			SAND - some silt, fine grained, wet.		11							115.0
34.0												120.0
35.0	SM											125.0
36.0			SAND - trace silt, fine grained, wet.		12							130.0
37.0												135.0
38.0												140.0
39.0												145.0
40.0					13							150.0
41.0	SP											155.0
42.0												160.0
43.0												165.0
44.0												170.0
45.0												175.0
46.0			GRAVEL - little sand, clean, wet, occasional cobbles/cobble fragments up to 120 mm diameter.		14							180.0
47.0	GP											185.0
48.0												190.0
49.0			End of Hole at 48.5 m.									195.0
50.0												
51.0												
52.0												
53.0												
54.0												
55.0												
56.0												
57.0												
58.0												
59.0												
60.0												

AGRA Earth & Environmental Nanaimo, B.C.		LOGGED BY: JW	COMPLETION DEPTH: 48.5 m
		REVIEWED BY: JR	COMPLETE: 17/05/99

REGIONAL DISTRICT OF COMOX-STRAATHCONA		Drilling Contractor: BECK Drilling		BOREHOLE NO: AG99-02	
ADDITIONAL MONITORING WELL INSTALLATION		Method: Becker Hammer		PROJECT NO: NX2013504	
				ELEVATION:	
SAMPLE TYPE		☒ GRAB (SOIL) ☐ GRAB (WATER)			
BACKFILL TYPE		☒ BENTONITE ☐ PEA GRAVEL ☐ SLOUGH ☐ GROUT ☒ DRILL CUTTINGS ☐ SAND FILTER PK			

Depth(m)	USC	SOIL SYMBOL	Soil Description	SAMPLE TYPE	RUN NO	Additional Comments	☒ Fines ☒ Sand ☒ Gravel			SLOTTED PIEZOMETER	Depth(ft)
							20	40	60		
							20	40	60		
							20	40	60		
0.0			SAND - silty, cobbles, oxidized, sand is fine grained.							0.0	
1.0										5.0	
2.0										10.0	
3.0			SAND - trace silt, fine grained, occasional gravel, damp, poorly graded.		01						15.0
4.0										20.0	
5.0										25.0	
6.0	SP									30.0	
7.0										35.0	
8.0			SAND - some gravel, trace silt, max 100 mm diameter, damp, poorly graded.		02						40.0
9.0										45.0	
10.0										50.0	
11.0			SAND - fine grained, trace silt, damp, poorly graded.		03						55.0
12.0										60.0	
13.0										65.0	
14.0	SP/ML		- silt lenses from 13.7 to 14.9 m.								70.0
15.0										75.0	
16.0			SAND - some gravel, trace silt, damp, poorly graded.		04						80.0
17.0										85.0	
18.0										90.0	
19.0	SP				05						95.0
20.0											
21.0			SAND - fine to medium grained, trace silt, wet.		06						
22.0											
23.0											
24.0	ML		SILT - some fine sand, low plastic, moist, oxidized.		07						
25.0			SAND AND SILT - low plastic, moist.		08						
26.0											
27.0	ML/SP										
28.0						Water encountered at 27.7 m depth.					
29.0											
30.0											

AGRA Earth & Environmental		LOGGED BY: JW	COMPLETION DEPTH: 51.51 m
Nanaimo, B.C.		REVIEWED BY: JR	COMPLETE: 18/06/99

REGIONAL DISTRICT OF COMOX-STRAATHCONA		Drilling Contractor: BECK Drilling		BOREHOLE NO: AC99-02	
ADDITIONAL MONITORING WELL INSTALLATION		Method: Becker Hammer		PROJECT NO: NX2013604	
		ELEVATION:			
SAMPLE TYPE		☒ GRAB (SOIL) ☐ GRAB (WATER)			
BACKFILL TYPE		☒ BENTONITE ☐ PEA GRAVEL ☐ SLOUGH ☐ GROUT ☒ DRILL CUTTINGS ☐ SAND FILTER PK			

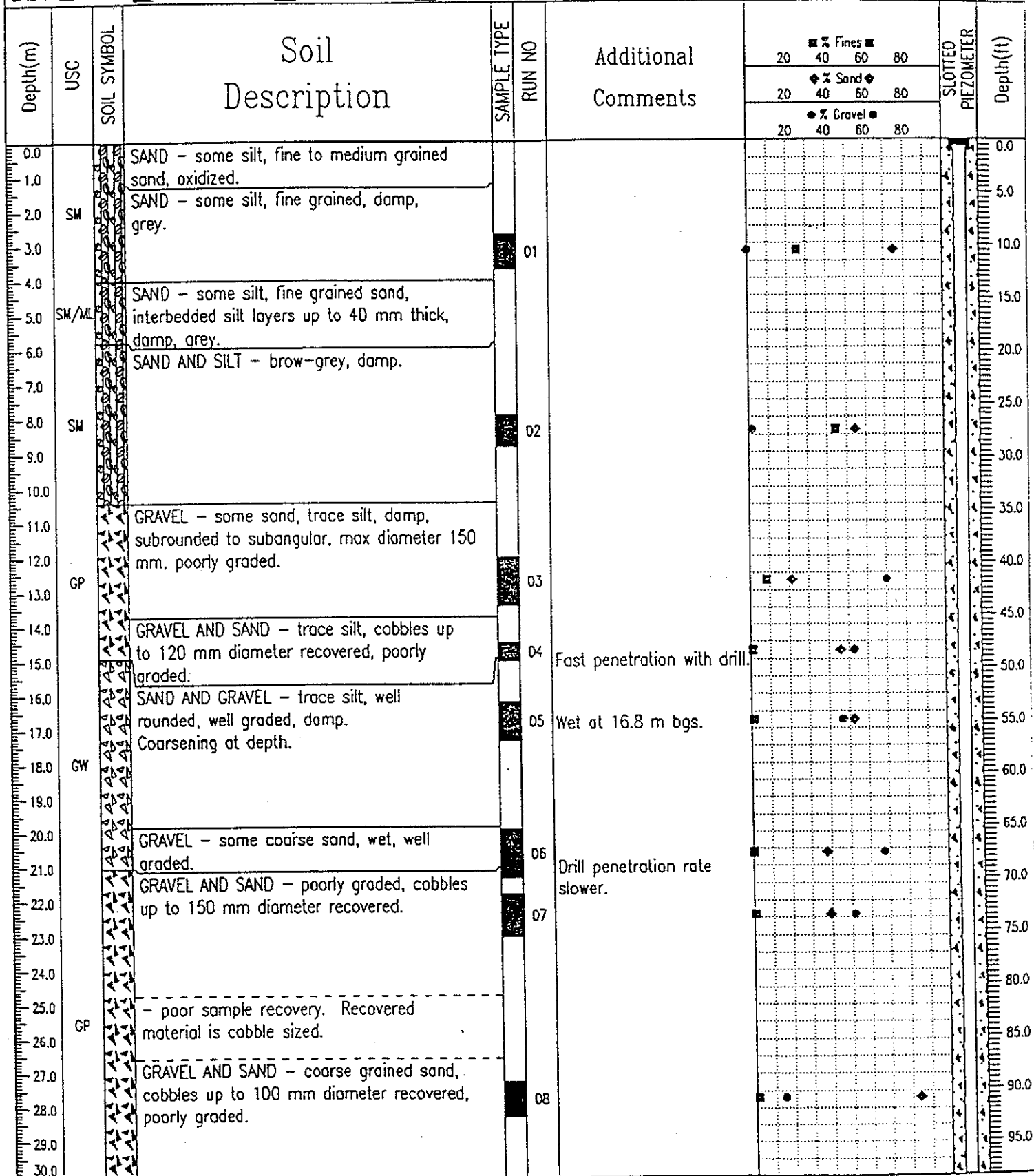
Depth(m)	USC	SOIL SYMBOL	Soil Description	SAMPLE TYPE	RUN NO	Additional Comments	Grain Size Analysis (%)				SLOTTED PIEZOMETER	Depth(ft)
							20	40	60	80		
30.0	SM		SAND - little silt, poorly graded, wet.		09							100.0
31.0											105.0	
32.0											110.0	
33.0											115.0	
34.0	SP		SAND - trace silt, fine grained, wet.		10	Rapid drill penetration.						120.0
35.0											125.0	
36.0											130.0	
37.0											135.0	
38.0											140.0	
39.0											145.0	
40.0											150.0	
41.0											155.0	
42.0											160.0	
43.0											165.0	
44.0	GW		GRAVEL - some sand, some cobbles, clean.		12							170.0
45.0											175.0	
46.0											180.0	
47.0											185.0	
48.0											190.0	
49.0											195.0	
50.0												
51.0												
52.0			End of Hole at 51.5 m. Well installed.									
53.0												
54.0												
55.0												
56.0												
57.0												
58.0												
59.0												
60.0												

AGRA Earth & Environmental Nanaimo, B.C.		LOGGED BY: JW	COMPLETION DEPTH: 51.51 m
		REVIEWED BY: JR	COMPLETE: 18/06/99

Page 2 of 2

REGIONAL DISTRICT OF COMOX-STRAATHCONA	Drilling Contractor: BECK Drilling	BOREHOLE NO: AG99-03
ADDITIONAL MONITORING WELL INSTALLATION	Method: Becker Hammer	PROJECT NO: NX2013604
		ELEVATION:

SAMPLE TYPE	☒ GRAB (SOIL)	☒ GRAB (WATER)				
BACKFILL TYPE	☒ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☒ DRILL CUTTINGS	☐ SAND FILTER PK



AGRA Earth & Environmental
Nanaimo, B.C.

LOGGED BY: JR
REVIEWED BY: JW

COMPLETION DEPTH: 53.2 m
COMPLETE: 18/06/99

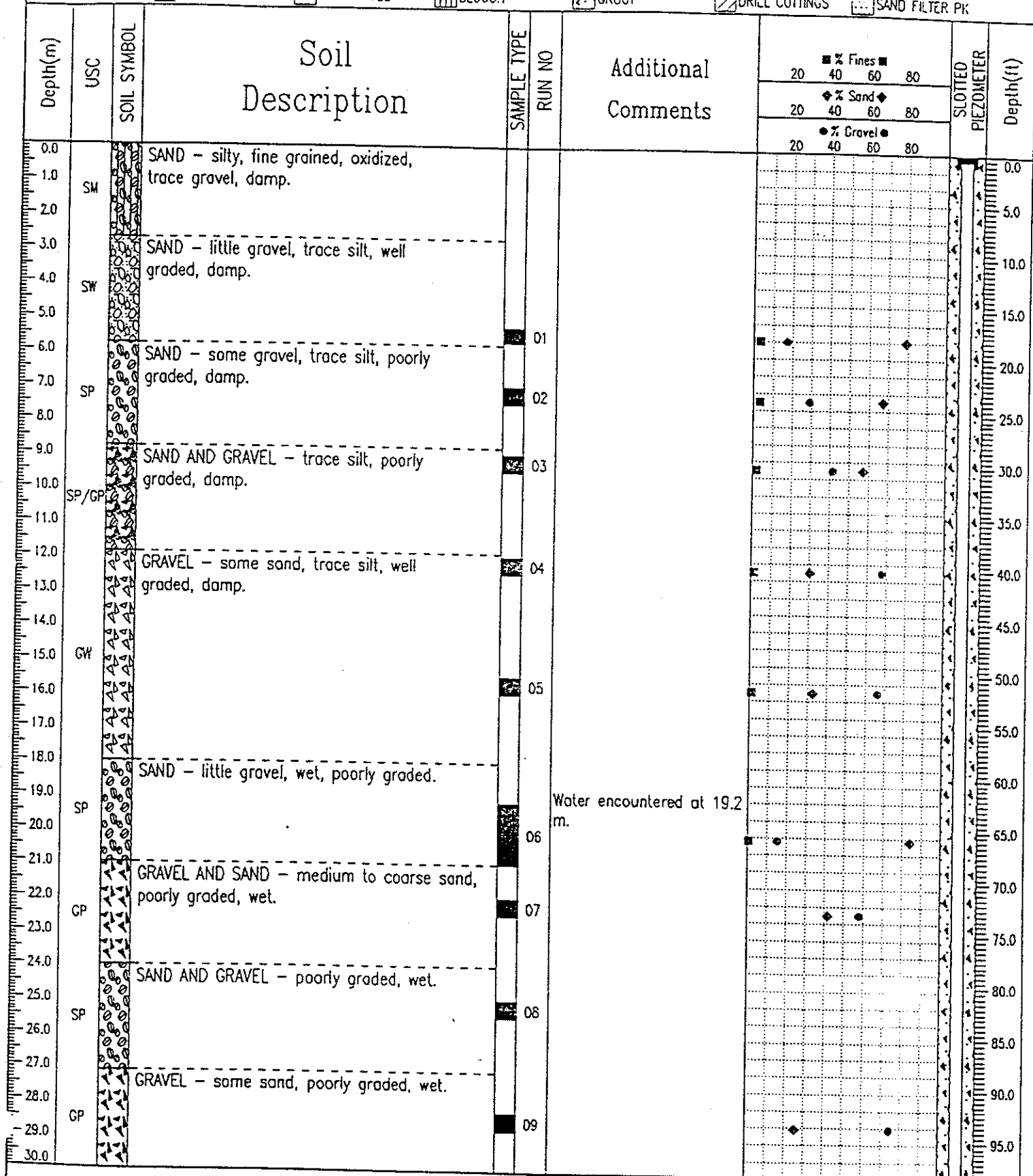
REGIONAL DISTRICT OF COMOX-STRAATHCONA		Drilling Contractor: BECK Drilling		BOREHOLE NO: AG99-03	
ADDITIONAL MONITORING WELL INSTALLATION		Method: Becker Hammer		PROJECT NO: NX2013504	
				ELEVATION:	
SAMPLE TYPE ☒ GRAB (SOIL) ☐ GRAB (WATER)					
BACKFILL TYPE ☒ BENTONITE ☐ PEA GRAVEL ☐ SLOUGH ☐ GROUT ☐ DRILL CUTTINGS ☐ SAND FILTER PK					

Depth(m)	USC	SOIL SYMBOL	Soil Description	SAMPLE TYPE	RUN NO	Additional Comments	Grain Size Analysis (%)				SLOTTED PIEZOMETER	Depth(ft)
							Fines	Sand	Gravel			
							20	40	60	80		
							20	40	60	80		
30.0	GP	AG	- well graded.		09							100.0
31.0		AG										105.0
32.0		AG										110.0
33.0		AG										115.0
34.0		AG										120.0
35.0	GW	AG										125.0
36.0		AG			10							130.0
37.0		AG										135.0
38.0		AG										140.0
39.0		AG										145.0
40.0		AG	- poorly graded.		12							150.0
41.0		AG										155.0
42.0		AG										160.0
43.0		AG	GRAVEL - some cobbles, little sand, poorly graded.		13							165.0
44.0	GP	AG										170.0
45.0		AG										175.0
46.0		AG	- increasing sand content.		14							180.0
47.0		AG										185.0
48.0		AG										190.0
49.0		AG	GRAVEL - some sand, well graded.		15							195.0
50.0		AG										
51.0	GW	AG										
52.0		AG										
53.0		AG										
54.0			End of Hole at 53.2 m.			Drill penetration rate very slow. Drill bit blocked, withdraw to 50.6 m.						
55.0												
56.0												
57.0												
58.0												
59.0												
60.0												

AGRA Earth & Environmental Nanaimo, B.C.		LOGGED BY: JR	COMPLETION DEPTH: 53.2 m
		REVIEWED BY: JW	COMPLETE: 18/06/99
		Page 2 of 2	

REGIONAL DISTRICT OF COMOX-STRAATHCONA	Drilling Contractor: BECK Drilling	BOREHOLE NO: AG99-04
ADDITIONAL MONITORING WELL INSTALLATION	Method: Becker Hammer	PROJECT NO: NX2013504
		ELEVATION:

SAMPLE TYPE	☒ GRAB (SOIL)	☐ GRAB (WATER)
BACKFILL TYPE	☒ BENTONITE	☐ PEA GRAVEL
	☐ SLOUGH	☐ GROUT
	☐ DRILL CUTTINGS	☐ SAND FILTER PK



AGRA Earth & Environmental
Nanaimo, B.C.

LOGGED BY: JW

REVIEWED BY: JR

COMPLETION DEPTH: 45.42 m

COMPLETE: 17/06/99

REGIONAL DISTRICT OF COMOX-STRATHCONA		Drilling Contractor: BECK Drilling		BOREHOLE NO: AG99-04	
ADDITIONAL MONITORING WELL INSTALLATION		Method: Becker Hammer		PROJECT NO: NX2013604	
ELEVATION:					
SAMPLE TYPE ☒ GRAB (SOIL) ☐ GRAB (WATER)					
BACKFILL TYPE ☒ BENTONITE ☐ PEA GRAVEL ☐ SLOUGH ☐ GROUT ☒ DRILL CUTTINGS ☐ SAND FILTER PK					

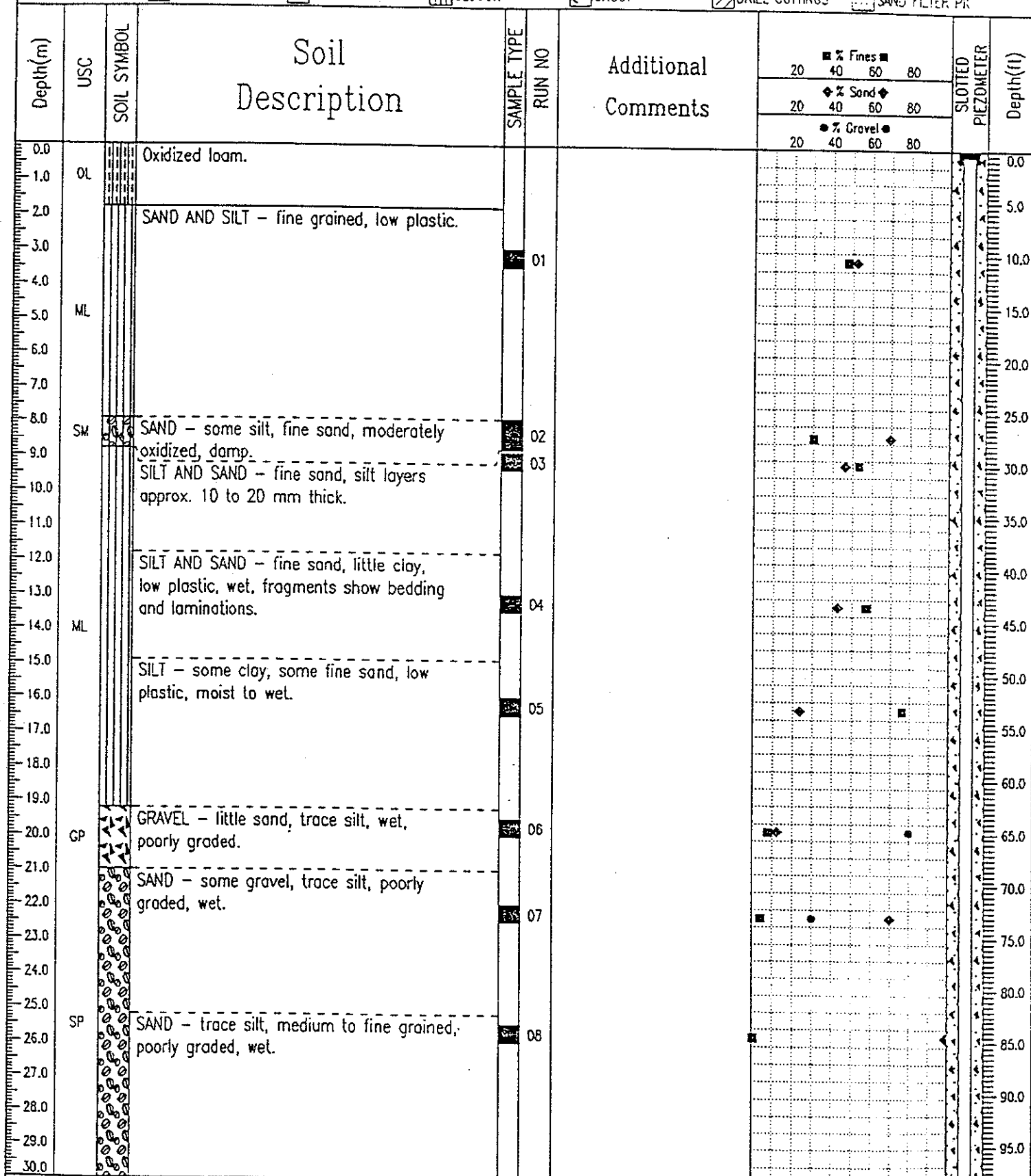
Depth(m)	USC	SOIL SYMBOL	Soil Description	SAMPLE TYPE	RUN NO	Additional Comments	% Fines				% Sand				% Gravel				SLOTTED PIEZOMETER	Depth(ft)
							20	40	60	80	20	40	60	80	20	40	60	80		
							20	40	60	80	20	40	60	80	20	40	60	80		
30.0																		100.0		
31.0																		105.0		
32.0																		110.0		
33.0	GP																	115.0		
34.0																		120.0		
35.0																		125.0		
36.0																		130.0		
37.0				GRAVEL - little sand, well graded, wet.														135.0		
38.0	GW																	140.0		
39.0																		145.0		
40.0				GRAVEL - some sand, poorly graded, wet.														150.0		
41.0																		155.0		
42.0	GP																	160.0		
43.0				GRAVEL - some cobbles, trace sand, poorly graded.														165.0		
44.0																		170.0		
45.0																		175.0		
46.0				End of Hole at 45.4 m.														180.0		
47.0				Slow drilling.														185.0		
48.0				Well installed.														190.0		
49.0																		195.0		
50.0																				
51.0																				
52.0																				
53.0																				
54.0																				
55.0																				
56.0																				
57.0																				
58.0																				
59.0																				
60.0																				

AGRA Earth & Environmental Nanaimo, B.C.		LOGGED BY: JW	COMPLETION DEPTH: 45.42 m
		REVIEWED BY: JR	COMPLETE: 17/06/99

07/03/23 04:31PM (BCKHOLE)
Page 2 of 2

REGIONAL DISTRICT OF COMOX-STRAATHCONA	Drilling Contractor: BECK Drilling	BOREHOLE NO: AC99-05
ADDITIONAL MONITORING WELL INSTALLATION	Method: Becker Hammer	PROJECT NO: NX2013504
		ELEVATION:

SAMPLE TYPE	☒ GRAB (SOIL)	☐ GRAB (WATER)
BACKFILL TYPE	☒ BENTONITE	☐ PEA GRAVEL
	☐ SLOUGH	☐ GROUT
	☒ DRILL CUTTINGS	☐ SAND FILTER PK



AGRA Earth & Environmental
Nanaimo, B.C.

LOGGED BY: JW
REVIEWED BY: JR

COMPLETION DEPTH: 50.9 m
COMPLETE: 18/06/99

REGIONAL DISTRICT OF COMOX-STRAATHCONA		Drilling Contractor: BECK Drilling		BOREHOLE NO: AC99-05	
ADDITIONAL MONITORING WELL INSTALLATION		Method: Becker Hammer		PROJECT NO: KX2013604	
				ELEVATION:	
SAMPLE TYPE		☒ GRAB (SOIL) ☐ GRAB (WATER)			
BACKFILL TYPE		☒ BENTONITE ☐ PEA GRAVEL ☐ SLOUGH ☐ GROUT ☐ DRILL CUTTINGS ☐ SAND FILTER PK			

Depth(m)	USC	SOIL SYMBOL	Soil Description	SAMPLE TYPE	RUN NO	Additional Comments	Grain Size Analysis (%)			SLOTTED PIEZOMETER	Depth(ft)	
							Fines	Sand	Gravel			
							20	40	60			
							80	20	40			60
30.0											100.0	
31.0	SP										105.0	
32.0											110.0	
33.0			SAND AND GRAVEL - poorly graded, cobbles up to 120 mm diameter.		09	Fast drill penetration.						115.0
34.0	GP/SP				10	Low recovery, slow penetration rate.						120.0
35.0											125.0	
36.0											130.0	
37.0			GRAVEL - some sand, poorly graded, occasional cobbles up to 120 mm diameter.								135.0	
38.0	GP										140.0	
39.0											145.0	
40.0											150.0	
41.0			SAND - some gravel, poorly graded, wel.		11						155.0	
42.0											160.0	
43.0											165.0	
44.0											170.0	
45.0											175.0	
46.0	SP		SAND - little gravel, trace silt, medium to fine grained.		12						180.0	
47.0											185.0	
48.0											190.0	
49.0											195.0	
50.0												
51.0			End of Hole at 50.9 m.									
52.0												
53.0												
54.0												
55.0												
56.0												
57.0												
58.0												
59.0												
60.0												

AGRA Earth & Environmental Nanaimo, B.C.		LOGGED BY: JW	COMPLETION DEPTH: 50.9 m
		REVIEWED BY: JR	COMPLETE: 18/06/99
		Page 2 of 2	

REGIONAL DISTRICT OF COMOX-STRAATHCONA		Drilling Contractor: BECK Drilling		BOREHOLE NO: AC99-06	
ADDITIONAL MONITORING WELL INSTALLATION		Method: Becker Hammer		PROJECT NO: NX2013604	
				ELEVATION:	
SAMPLE TYPE ☒ GRAB (SOIL) ☐ GRAB (WATER)					
BACKFILL TYPE ☒ BENTONITE ☐ PEA GRAVEL ☐ SLOUGH ☐ GROUT ☐ DRILL CUTTINGS ☐ SAND FILTER PK					

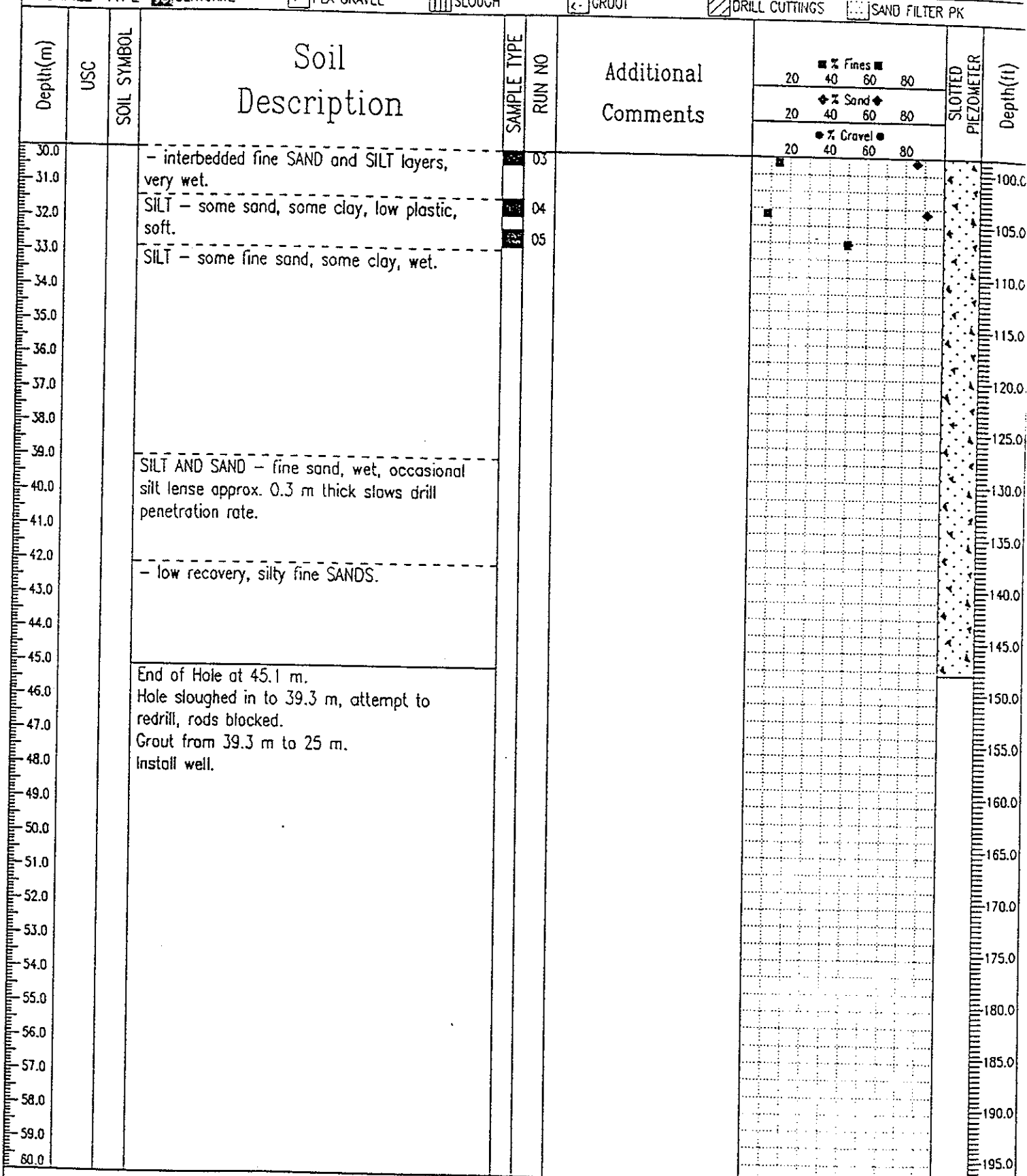
Depth(m)	USC	SOIL SYMBOL	Soil Description	SAMPLE TYPE	RUN NO	Additional Comments	☒ Fines 20 40 60 80 ☒ Sand 20 40 60 80 ☒ Gravel 20 40 60 80			SLOTTED PIEZOMETER	Depth(ft)
0.0			SAND - medium grained.							0.0	
1.0										5.0	
2.0										10.0	
3.0										15.0	
4.0										20.0	
5.0										25.0	
6.0										30.0	
7.0										35.0	
8.0										40.0	
9.0										45.0	
10.0										50.0	
11.0										55.0	
12.0										60.0	
13.0										65.0	
14.0			- grades to fine sand.							70.0	
15.0										75.0	
16.0										80.0	
17.0										85.0	
18.0			SAND - some gravel, little silt, moist, medium grained sand.							90.0	
19.0			SAND - little silt, fine grained sand.		01					95.0	
20.0											
21.0											
22.0											
23.0											
24.0											
25.0											
26.0			SILT - sandy, fine grained, wet.		02						
27.0											
28.0											
29.0											
30.0											

AGRA Earth & Environmental Nanaimo, B.C.		LOGGED BY: JW	COMPLETION DEPTH: 45.11 m
		REVIEWED BY: JR	COMPLETE: 18/06/99

03/03/23 04:00 PM (BOREHOLE)
Page 1 of 2

REGIONAL DISTRICT OF COMOX-STRAATHCONA	Drilling Contractor: BECK Drilling	BOREHOLE NO: AG99-06
ADDITIONAL MONITORING WELL INSTALLATION	Method: Becker Hammer	PROJECT NO: NX2013604
		ELEVATION:

SAMPLE TYPE	☒ GRAB (SOIL)	☐ GRAB (WATER)
BACKFILL TYPE	☒ BENTONITE	☐ PEA GRAVEL
	☐ SLOUGH	☐ GROUT
	☐ DRILL CUTTINGS	☐ SAND FILTER PK



AGRA Earth & Environmental
Nanaimo, B.C.

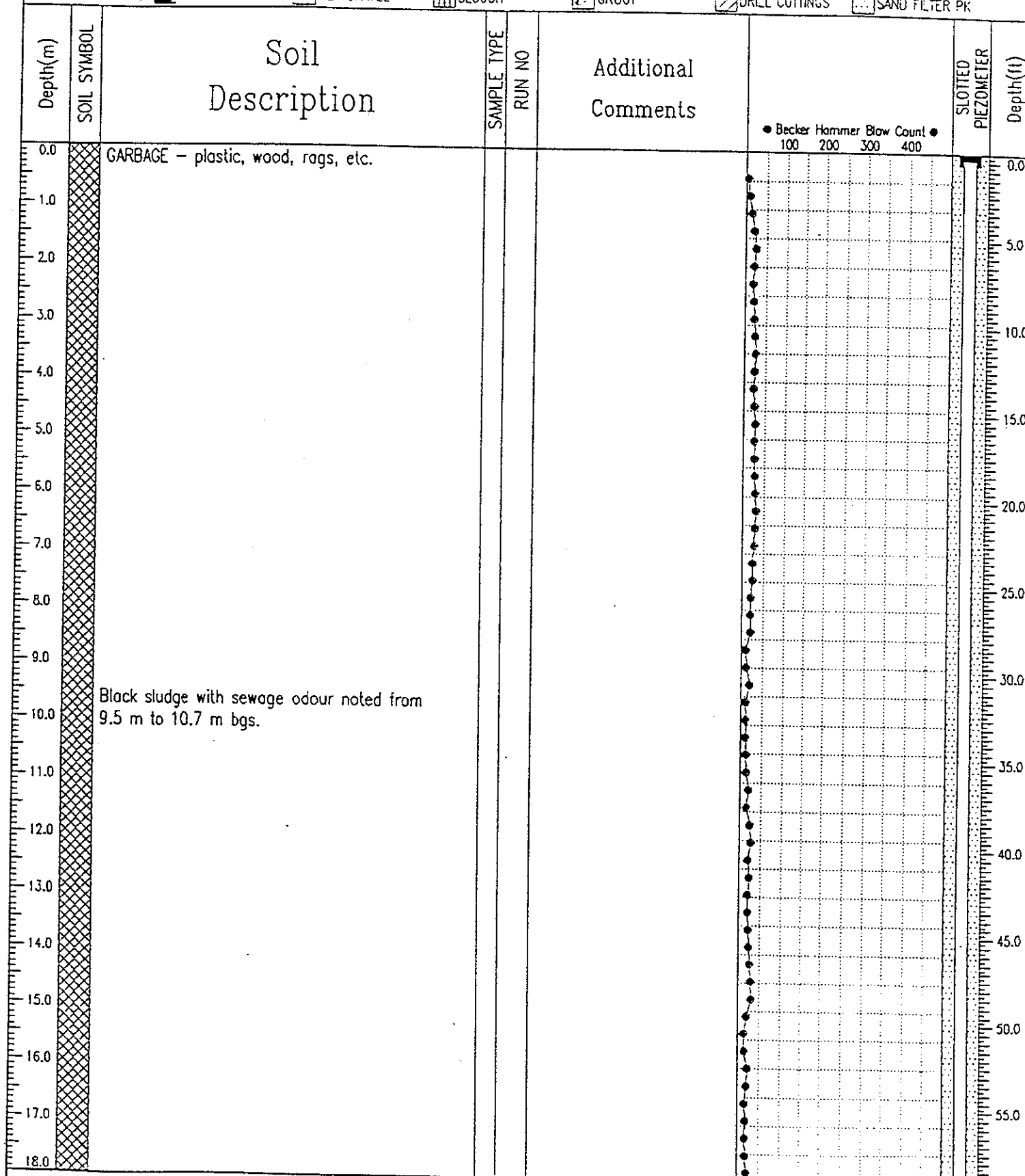
LOGGED BY: JW

REVIEWED BY: JR

COMPLETION DEPTH: 45.11 m

COMPLETE: 18/06/99

REGIONAL DISTRICT OF COMOX-STRAATHCONA		Contractor: BECK Drilling	BOREHOLE NO: AM00-01
ADDITIONAL MONITORING WELL INSTALLATION		Method: Becker Hammer, Hollow Stem	PROJECT NO: HX2025502-500
		ELEVATION:	
SAMPLE TYPE	☒ GRAB (SOIL) ☒ GRAB (WATER) ☒ SPT		
BACKFILL TYPE	☒ BENTONITE ☐ PEA GRAVEL ☐ SLOUGH ☐ GROUT ☒ DRILL CUTTINGS ☐ SAND FILTER PK		



AMEC Earth & Environmental Limited
Nanaimo, B.C.

LOGGED BY: BH

REVIEWED BY: CM

COMPLETION DEPTH: 48.463 m

COMPLETE: 21/09/00

REGIONAL DISTRICT OF COMOX-STRAATHCOMA		Contractor: BECK Drilling		BOREHOLE NO: AM00-01		
ADDITIONAL MONITORING WELL INSTALLATION		Method: Becker Hammer, Hollow Stem		PROJECT NO: NX2025502-600		
				ELEVATION:		
SAMPLE TYPE ☒ GRAB (SOIL) ☒ GRAB (WATER) ☒ SPT						
BACKFILL TYPE ☒ BENTONITE ☐ PEA GRAVEL ☐ SLOUGH ☐ GROUT ☒ DRILL CUTTINGS ☐ SAND FILTER PK						
Depth(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	RUN NO	Additional Comments	● Becker Hammer Blow Count ● 100 200 300 400
18.0						60.0
19.0						65.0
20.0						70.0
21.0						75.0
22.0						80.0
23.0						85.0
24.0						90.0
25.0						95.0
26.0		Wood debris.			Dust appearing in cyclone.	100.0
27.0		GRAVEL - some sand, very dense, greyish.				105.0
28.0						110.0
29.0		-becoming damp at 29.3 m.		G1		115.0
30.0						
31.0						
32.0				G2		
33.0						
34.0		SAND - clean, very dense, moist, grey.		G3		
35.0		GRAVEL - sandy, clean, very dense, moist.				
36.0						

AMEC Earth & Environmental Limited
Nanaimo, B.C.

LOGGED BY: BH	COMPLETION DEPTH: 48.463 m
REVIEWED BY: CM	COMPLETE: 21/09/00

REGIONAL DISTRICT OF COMOX-STRAATHCOM

Contractor: BECK Drilling

BOREHOLE NO: AM00-01

ADDITIONAL MONITORING WELL INSTALLATION

Method: Becker Hammer, Hollow Stem

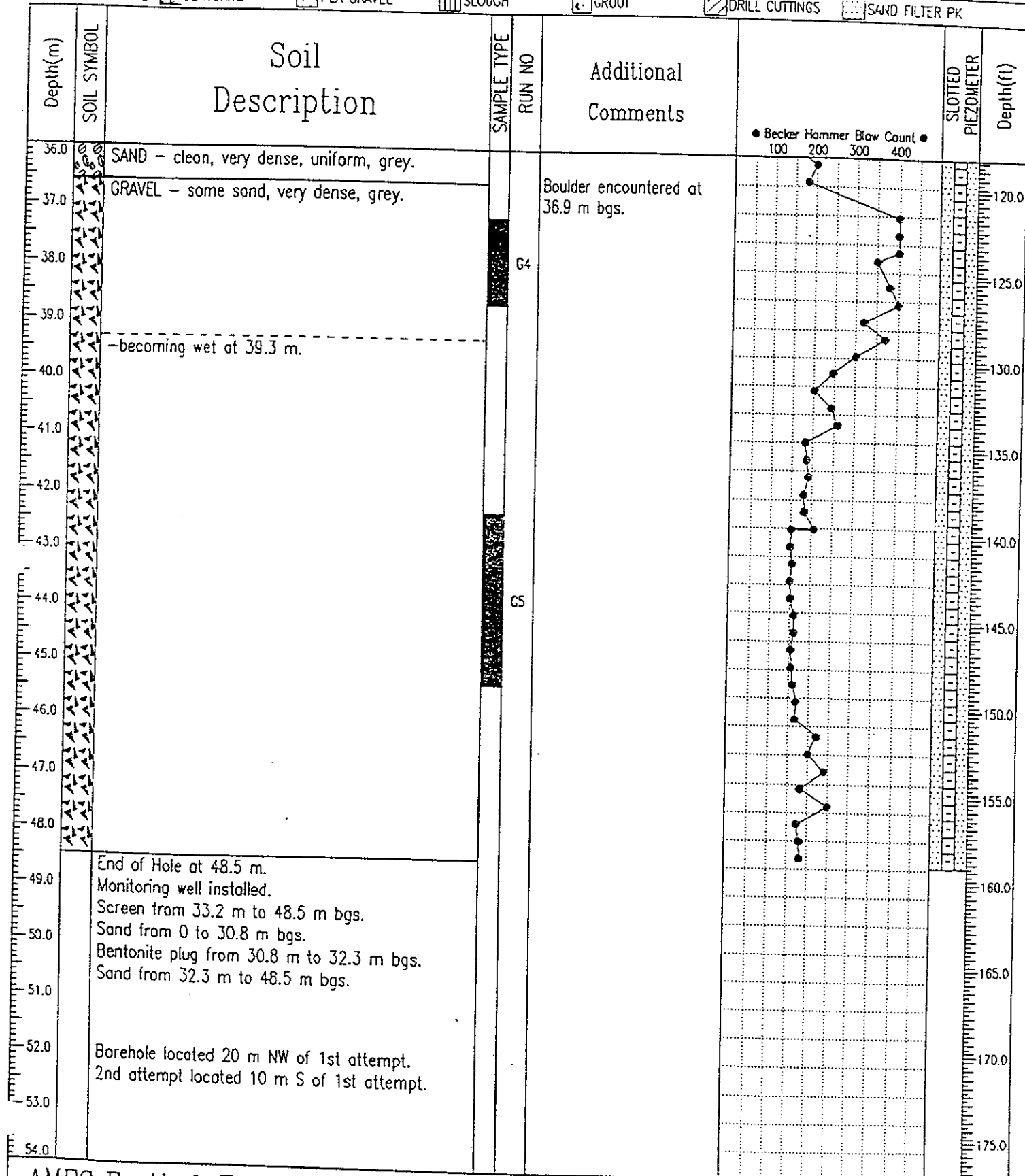
PROJECT NO: WX2025502-600

SAMPLE TYPE

☐ GRAB (SOIL)☐ GRAB (WATER)☒ ISPT

ELEVATION:

BACKFILL TYPE

☒ BENTONITE☐ PEA GRAVEL☐ SLOUGH☐ GROUT☒ DRILL CUTTINGS☐ SAND FILTER PK

AMEC Earth & Environmental Limited
Nanaimo, B.C.

LOGGED BY: BH

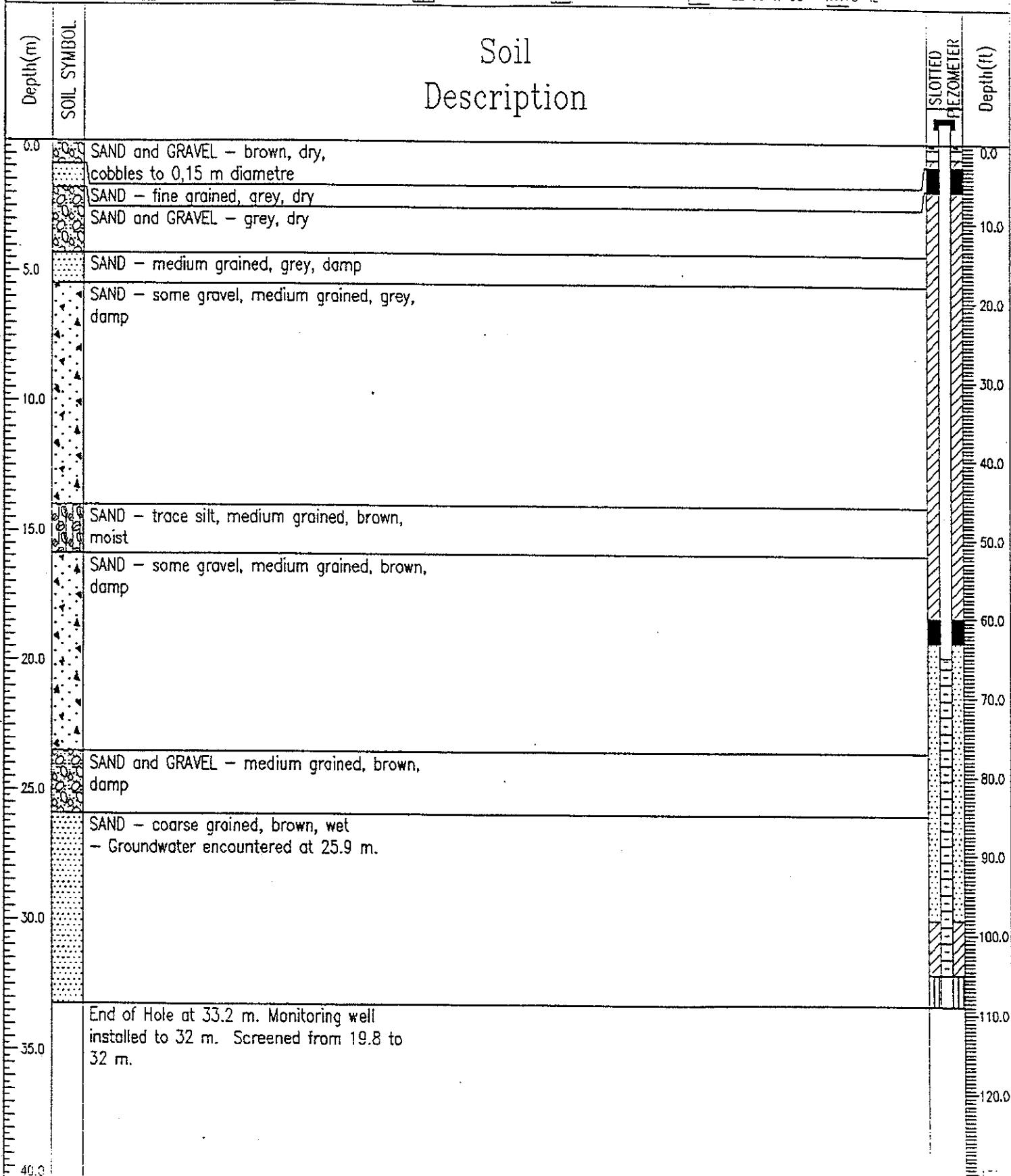
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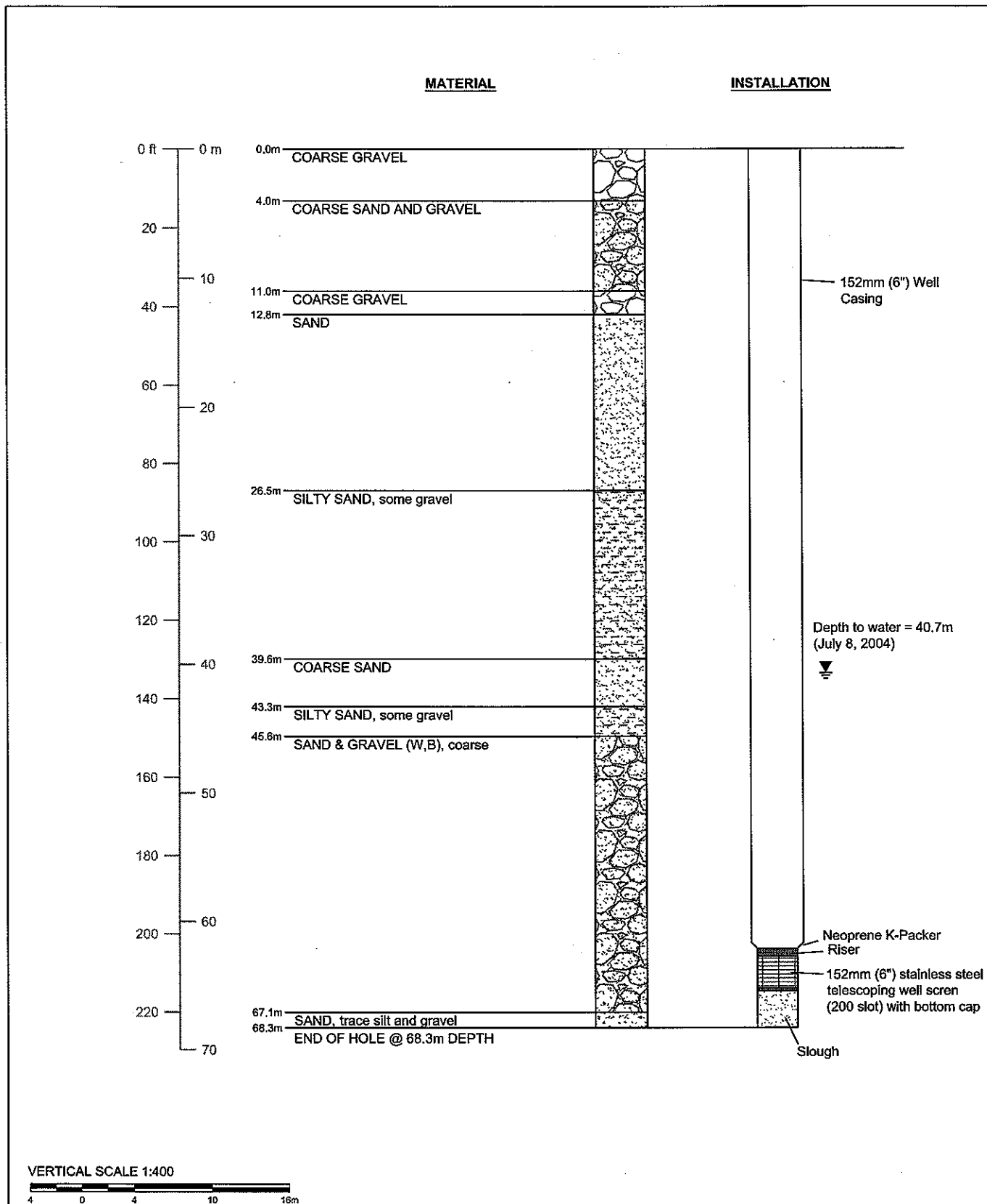
COMPLETION DEPTH: 48.463 m

COMPLETE: 21/09/00

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Annual Groundwater Monitoring	BECK Drilling and Environmental Services	BOREHOLE NO: AMOC-1
Regional District of Comox-Straithcreek	Acker Tractor Air Rotary Drill	PROJECT NO: NX2025506
		ELEVATION:
BACKFILL TYPE	☐ BENTONITE ☐ PEA GRAVEL ☒ SLOUGH ☐ GROUT ☐ DRILL CUTTINGS ☐ SAND	





EBA Engineering Consultants Ltd.



PROJECT INSTALLATION OF PROD. WELL AND ADDITIONAL MONITORING WELLS, CAMPBELL RIVER LANDFILL

CLIENT

REGIONAL DISTRICT OF COMOX-STRATHCONA

TITLE

EBA04-1 WELL SCHEMATIC

DATE 2004/08/17

DWN.

YL

CHKD.

SB

FILE NO.

0807-2840017.010

Monitoring Wells Campbell River Landfill		Drillwell Enterprises Ltd.	BOREHOLE NO: EBA04-2
Regional District of Comox-Strathcona		Drilling Method: Air Rotary	PROJECT NO: 2840017.010
		ELEVATION:	

BACKFILL TYPE	☒ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☐ DRILL CUTTINGS	☐ SAND
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Depth (m)	SOIL SYMBOL	Soil Description	Field Notes	SLOTTED PIEZOMETER	Depth (ft)
0.0		GRAVEL CAP	CASING LEFT IN GROUND TO DEPTH OF 33.5m.		0.0
1.0		WOOD FIBRE		5.0	
2.0		GARBAGE		10.0	
3.0		WOOD FIBRE		15.0	
4.0		GARBAGE		20.0	
5.0		SAND & GRAVEL		25.0	
6.0				30.0	
7.0				35.0	
8.0		COARSE GRAVEL		40.0	
9.0				45.0	
10.0			50.0		
11.0			55.0		
12.0			60.0		
13.0			65.0		
14.0			70.0		
15.0			75.0		
16.0			80.0		
17.0			85.0		
18.0			90.0		
19.0			95.0		
20.0			100.0		
21.0			105.0		
22.0			110.0		
23.0					
24.0					
25.0					
26.0					
27.0					
28.0					
29.0					
30.0					
31.0					
32.0					
33.0					
34.0					
35.0					

EBA Engineering Consultants Ltd.	LOGGED BY: MK	COMPLETION DEPTH: 65.5 m
	REVIEWED BY: SB	COMPLETE: 07/07/04
		Page 1 of 2

Monitoring Wells Campbell River Landfill		Drillwell Enterprises Ltd.	BOREHOLE NO: EBA04-2		
Regional District of Comox-Strathcona		Drilling Method: Air Rotary	PROJECT NO: 2840017.010		
			ELEVATION:		
BACKFILL TYPE ☒ BENTONITE ☐ PEA GRAVEL ☐ SLOUGH ☐ GROUT ☐ DRILL CUTTINGS ☐ SAND					
Depth(m)	SOIL SYMBOL	Soil Description	Field Notes	SLOTTED PIEZOMETER	Depth(ft)
35.0					115.0
36.0					120.0
37.0					125.0
38.0					130.0
39.0					135.0
40.0					140.0
41.0					145.0
42.0					150.0
43.0					155.0
44.0					160.0
45.0					165.0
46.0					170.0
47.0					175.0
48.0					180.0
49.0					185.0
50.0					190.0
51.0					SAND & GRAVEL
52.0	200.0				
53.0	205.0				
54.0	210.0				
55.0	215.0				
56.0	220.0				
57.0	225.0				
58.0					
59.0					
60.0					
61.0	END OF HOLE @ 65.5m BELOW SURFACE NOTE: SOILS LOGGED BY DRILLWELL STAFF.				215.0
62.0					220.0
63.0					225.0
64.0					
65.0					
66.0					
67.0					
68.0					
69.0					
70.0					
EBA Engineering Consultants Ltd.			LOGGED BY: MK	COMPLETION DEPTH: 65.5 m	
			REVIEWED BY: SB	COMPLETE: 07/07/04	
				Page 2 of 2	

Monitoring Wells Campbell River Landfill		Drillwell Enterprises Ltd.	BOREHOLE NO: EBA04-3
Regional District of Comox-Strathcona		Drilling Method: Air Rotary	PROJECT NO: 2840017.010
		ELEVATION:	

BACKFILL TYPE	☒ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☐ DRILL CUTTINGS	☐ SAND
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Depth(m)	SOIL SYMBOL	Soil Description	Field Notes	SLOTTED PIEZOMETER	Depth(ft)
0.0		SAND	CASING LEFT IN GROUND TO DEPTH OF 11.2m.		0.0
1.0					
2.0					
3.0					
4.0		SAND, some gravel			5.0
5.0					
6.0					
7.0					
8.0		SAND AND GRAVEL			10.0
9.0					
10.0					
11.0					
12.0		SILTY SAND	15.0		
13.0					
14.0					
15.0					
16.0		FINE SAND	20.0		
17.0					
18.0					
19.0					
20.0		COARSE SAND	25.0		
21.0					
22.0					
23.0					
24.0		FINE SAND, some silt	30.0		
25.0					
26.0					
27.0					
28.0					
29.0					
30.0					
31.0					
32.0					
33.0					
34.0					
35.0		SAND AND GRAVEL	35.0		

EBA Engineering Consultants Ltd.	LOGGED BY: MC	COMPLETION DEPTH: 41.2 m
	REVIEWED BY: SB	COMPLETE: 07/07/04
Page 1 of 2		

Monitoring Wells Campbell River Landfill		Drillwell Enterprises Ltd.		BOREHOLE NO: EBA04-3	
Regional District of Comox-Strathcona		Drilling Method: Air Rotary		PROJECT NO: 2840017.010	
				ELEVATION:	
BACKFILL TYPE ☒ BENTONITE ☐ PEA GRAVEL ☐ SLOUGH ☐ GROUT ☐ DRILL CUTTINGS ☐ SAND					
Depth(m)	SOIL SYMBOL	Soil Description	Field Notes	SLOTTED PIEZOMETER	Depth(ft)
35.0		END OF HOLE @ 41.2 m BELOW SURFACE NOTE: SOILS LOGGED BY DRILLWELL STAFF.			115.0
36.0					120.0
37.0					125.0
38.0					130.0
39.0					135.0
40.0					140.0
41.0					145.0
42.0					150.0
43.0					155.0
44.0					160.0
45.0					165.0
46.0					170.0
47.0					175.0
48.0					180.0
49.0					185.0
50.0					190.0
51.0					195.0
52.0	200.0				
53.0	205.0				
54.0	210.0				
55.0	215.0				
56.0	220.0				
57.0	225.0				
58.0					
59.0					
60.0					
61.0					
62.0					
63.0					
64.0					
65.0					
66.0					
67.0					
68.0					
69.0					
70.0					
EBA Engineering Consultants Ltd.		LOGGED BY: MC REVIEWED BY: SB		COMPLETION DEPTH: 41.2 m COMPLETE: 07/07/04	

Monitoring Wells Campbell River Landfill		Sonic Drilling Ltd.		BOREHOLE NO: EBA04-4	
Regional District of Comox-Strathcona		Drilling Method: Sonic		PROJECT NO: 2840017.010	
				ELEVATION:	
BACKFILL TYPE ☒ BENTONITE ☐ PEA GRAVEL ☐ SLOUGH ☐ GROUT ☐ DRILL CUTTINGS ☐ SAND					
Depth(m)	SOIL SYMBOL	Soil Description	Field Notes	SLOTTED PIEZOMETER	Depth(ft)
0.0		GARBAGE			0.0
1.0					5.0
2.0					10.0
3.0					15.0
4.0					20.0
5.0					25.0
6.0					30.0
7.0					35.0
8.0					40.0
9.0					45.0
10.0					50.0
11.0					55.0
12.0					60.0
13.0					65.0
14.0					70.0
15.0					75.0
16.0					80.0
17.0					85.0
18.0					90.0
19.0					95.0
20.0					100.0
21.0	105.0				
22.0	110.0				
22.0		SAND, fine to medium grained, well sorted, loose, damp			70.0
23.0					75.0
24.0					80.0
25.0					85.0
26.0		SILT, occasional gravel, trace silt, compact, moist			90.0
27.0		SAND, fine to medium grained, well sorted			95.0
28.0		SILT & CLAY with trace sand			100.0
29.0		SAND and SAND & GRAVEL interlayers			105.0
30.0					110.0
31.0					
32.0					
33.0					
34.0					
35.0					
EBA Engineering Consultants Ltd.			LOGGED BY: MC	COMPLETION DEPTH: 53.4 m	
			REVIEWED BY: SB	COMPLETE: 15/07/04	
			Page 1 of 2		

Monitoring Wells Campbell River Landfill		Sonic Drilling Ltd.		BOREHOLE NO: EBA04-4	
Regional District of Comox-Strathcona		Drilling Method: Sonic		PROJECT NO: 2840017.010	
				ELEVATION:	
BACKFILL TYPE ☒ BENTONITE ☐ PEA GRAVEL ☐ SLOUGH ☐ GROUT ☐ DRILL CUTTINGS ☐ SAND					
Depth(m)	SOIL SYMBOL	Soil Description	Field Notes	SLOTTED PIEZOMETER	Depth(ft)
35.0					115.0
36.0					120.0
37.0					125.0
38.0					130.0
39.0					135.0
40.0					140.0
41.0					145.0
42.0					150.0
43.0					155.0
44.0					160.0
45.0					165.0
46.0					170.0
47.0					175.0
48.0					180.0
49.0					185.0
50.0					190.0
51.0					END OF HOLE @ 53.3 m BELOW SURFACE NOTE: SOILS LOGGED BY EBA STAFF.
52.0	200.0				
53.0	205.0				
54.0	210.0				
55.0	215.0				
56.0	220.0				
57.0	225.0				
58.0					
59.0					
60.0					
61.0					
62.0					
63.0					
64.0					
65.0					
66.0					
67.0					
68.0					
69.0					
70.0					
EBA Engineering Consultants Ltd.			LOGGED BY: MC	COMPLETION DEPTH: 53.4 m	
			REVIEWED BY: SB	COMPLETE: 15/07/04	
				Page 2 of 2	

Monitoring Wells Campbell River Landfill		Sonic Drilling Ltd.		BOREHOLE NO: EBA04-5	
Regional District of Comox-Strathcona		Drilling Method: Sonic		PROJECT NO: 2840017.010	
				ELEVATION:	
BACKFILL TYPE ☒ BENTONITE ☐ PEA GRAVEL ☐ SLOUGH ☐ GROUT ☐ DRILL CUTTINGS ☐ SAND					
Depth(m)	SOIL SYMBOL	Soil Description	Field Notes	SLOTTED PIEZOMETER	Depth(ft)
0.0	GARBAGE		WELLSCREEN FULL OF BENTONITE, WELL TO BE REDRILLED.	SLOTTED PIEZOMETER	0.0
1.0					5.0
2.0					10.0
3.0					15.0
4.0					20.0
5.0					25.0
6.0					30.0
7.0					35.0
8.0					40.0
9.0					45.0
10.0					50.0
11.0					55.0
12.0					60.0
13.0					65.0
14.0					70.0
15.0					75.0
16.0					80.0
17.0					85.0
18.0					90.0
19.0					95.0
20.0	SAND & GRAVEL, medium to coarse grained, sub-angular, compact moist			SLOTTED PIEZOMETER	100.0
21.0					105.0
22.0					110.0
23.0					
24.0					
25.0					
26.0					
27.0					
28.0					
29.0					
30.0					
31.0	SILT & GRAVEL, moist			SLOTTED PIEZOMETER	
32.0					
33.0					
34.0					
35.0					
36.0	SAND & GRAVEL, poorly graded, compact, moist			SLOTTED PIEZOMETER	
37.0					
38.0					
39.0					
40.0					

EBA Engineering Consultants Ltd.		LOGGED BY: MC	COMPLETION DEPTH: 67.1 m
		REVIEWED BY: SB	COMPLETE: 07/07/04
		Page 1 of 2	

Monitoring Wells Campbell River Landfill		Sonic Drilling Ltd.		BOREHOLE NO: EBA04-5	
Regional District of Comox-Strathcona		Drilling Method: Sonic		PROJECT NO: 2840017.010	
				ELEVATION:	
BACKFILL TYPE ☒ BENTONITE ☐ PEA GRAVEL ☐ SLOUGH ☐ GROUT ☐ DRILL CUTTINGS ☐ SAND					
Depth(m)	SOIL SYMBOL	Soil Description	Field Notes	SLOTTED PIEZOMETER	Depth (ft)
35.0					115.0
36.0					120.0
37.0					125.0
38.0					130.0
39.0					135.0
40.0					140.0
41.0					145.0
42.0					150.0
43.0					155.0
44.0					160.0
45.0					165.0
46.0					170.0
47.0					175.0
48.0					180.0
49.0					185.0
50.0					190.0
51.0					195.0
52.0					200.0
53.0					205.0
54.0					
55.0					215.0
56.0					220.0
57.0					225.0
58.0					
59.0					
60.0					
61.0					
62.0					
63.0					
64.0					
65.0					
66.0					
67.0					
68.0		END OF HOLE @ 67.1 m BELOW SURFACE NOTE: SOILS LOGGED BY EBA STAFF.			
69.0					
70.0					
EBA Engineering Consultants Ltd.			LOGGED BY: MC REVIEWED BY: SB	COMPLETION DEPTH: 67.1 m COMPLETE: 07/07/04	

Monitoring Wells Campbell River Landfill		Drillwell Enterprises Ltd.	BOREHOLE NO: EBA04-6
Regional District of Comox-Strathcona		Drilling Method: Air Rotary	PROJECT NO: 2840017.010
		ELEVATION:	

BACKFILL TYPE	☒ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☒ DRILL CUTTINGS	☐ SAND
---------------	---	-------------------------------------	---------------------------------	--------------------------------	--	-------------------------------

Depth(m)	SOIL SYMBOL	Soil Description	Field Notes	SLOTTED PIEZOMETER	Depth(ft)
0.0		SAND	CASING LEFT IN GROUND TO DEPTH OF 26.2m.		0.0
1.0					
2.0					
3.0					
4.0		SAND, some gravel			5.0
5.0					
6.0					
7.0		COARSE GRAVEL			10.0
8.0					
9.0					
10.0		SAND & FINER GRAVEL			15.0
11.0					
12.0					
13.0					
14.0					
15.0					
16.0		SILTY SAND	20.0		
17.0		SAND	25.0		
18.0					
19.0					
20.0					
21.0					
22.0		SAND & GRAVEL, slightly silty	30.0		
23.0					
24.0					
25.0		SILTY SAND, brown	35.0		
26.0					
27.0					
28.0		SAND & GRAVEL	40.0		
29.0					
30.0					
31.0					
32.0					
33.0					
34.0					
35.0					

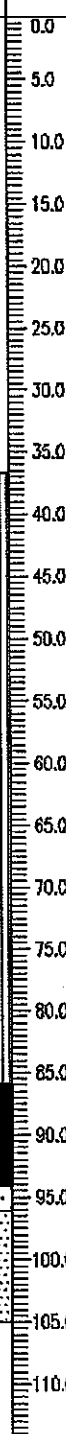
EBA Engineering Consultants Ltd.	LOGGED BY: MC	COMPLETION DEPTH: 39.6 m
	REVIEWED BY: SB	COMPLETE: 13/07/04
		Page 1 of 2

Monitoring Wells Campbell River Landfill		Drillwell Enterprises Ltd.	BOREHOLE NO: EBA04-6		
Regional District of Comox-Strathcona		Drilling Method: Air Rotary	PROJECT NO: 2840017.010		
			ELEVATION:		
BACKFILL TYPE ☒ BENTONITE ☐ PEA GRAVEL ☐ SLOUGH ☐ GROUT ☐ DRILL CUTTINGS ☐ SAND					
Depth(m)	SOIL SYMBOL	Soil Description	Field Notes	SLOTTED PIEZOMETER	Depth(ft)
35.0					115.0
36.0					120.0
37.0					125.0
38.0					130.0
39.0					135.0
40.0					140.0
41.0					145.0
42.0					150.0
43.0					155.0
44.0					160.0
45.0	165.0				
46.0	170.0				
47.0	175.0				
48.0	180.0				
49.0	185.0				
50.0	190.0				
51.0	195.0				
52.0	200.0				
53.0	205.0				
54.0	210.0				
55.0	215.0				
56.0	220.0				
57.0	225.0				
58.0					
59.0					
60.0					
61.0					
62.0					
63.0					
64.0					
65.0					
66.0					
67.0					
68.0					
69.0					
70.0					
		END OF HOLE @ 39.6 m BELOW SURFACE NOTE: SOILS LOGGED BY DRILLWELL STAFF.			
EBA Engineering Consultants Ltd.		LOGGED BY: MC	COMPLETION DEPTH: 39.6 m		
		REVIEWED BY: SB	COMPLETE: 13/07/04		
			Page 2 of 2		

Monitoring Wells Campbell River Landfill		Drillwell Enterprises Ltd.	BOREHOLE NO: EBA04-7
Regional District of Comox-Strathcona		Drilling Method: Air Rotary	PROJECT NO: 2840017.010
		ELEVATION:	
BACKFILL TYPE ☒ BENTONITE ☒ PEA GRAVEL ☐ SLOUGH ☐ GROUT ☒ DRILL CUTTINGS ☒ SAND			
Depth(m)	SOIL SYMBOL	Soil Description	Field Notes
0.0		SAND	CASING LEFT IN GROUND TO DEPTH OF 11.2m
1.0			
2.0			
3.0			
4.0			
5.0			
6.0			
7.0			
8.0			
9.0			
10.0		SAND, some gravel	
11.0			
12.0			
13.0			
14.0			
15.0			
16.0			
17.0			
18.0			
19.0			
20.0		COARSE GRAVEL	
21.0			
22.0			
23.0			
24.0			
25.0			
26.0			
27.0			
28.0			
29.0			
30.0		SAND & GRAVEL	
31.0			
32.0			
33.0			
34.0			
35.0			
36.0			
37.0			
38.0			
39.0			
40.0		SILTY SAND	
41.0			
42.0			
43.0			
44.0			
45.0			
46.0			
47.0			
48.0			
49.0			
50.0		SAND	
51.0			
52.0			
53.0			
54.0			
55.0			
56.0			
57.0			
58.0			
59.0			
60.0		SAND & GRAVEL, some silt	
61.0			
62.0			
63.0			
64.0			
65.0			
66.0			
67.0			
68.0			
69.0			
70.0		SILTY SAND, brown	
71.0			
72.0			
73.0			
74.0			
75.0			
76.0			
77.0			
78.0			
79.0			
80.0		SAND & GRAVEL	
81.0			
82.0			
83.0			
84.0			
85.0			
86.0			
87.0			
88.0			
89.0			
90.0		END OF HOLE @ 32.0 m BELOW SURFACE NOTE: SOILS LOGGED BY DRILLWELL STAFF.	
91.0			
92.0			
93.0			
94.0			
95.0			
96.0			
97.0			
98.0			
99.0			

SLOTTED
PIEZOMETER

Depth(ft)



EBA Engineering Consultants Ltd.

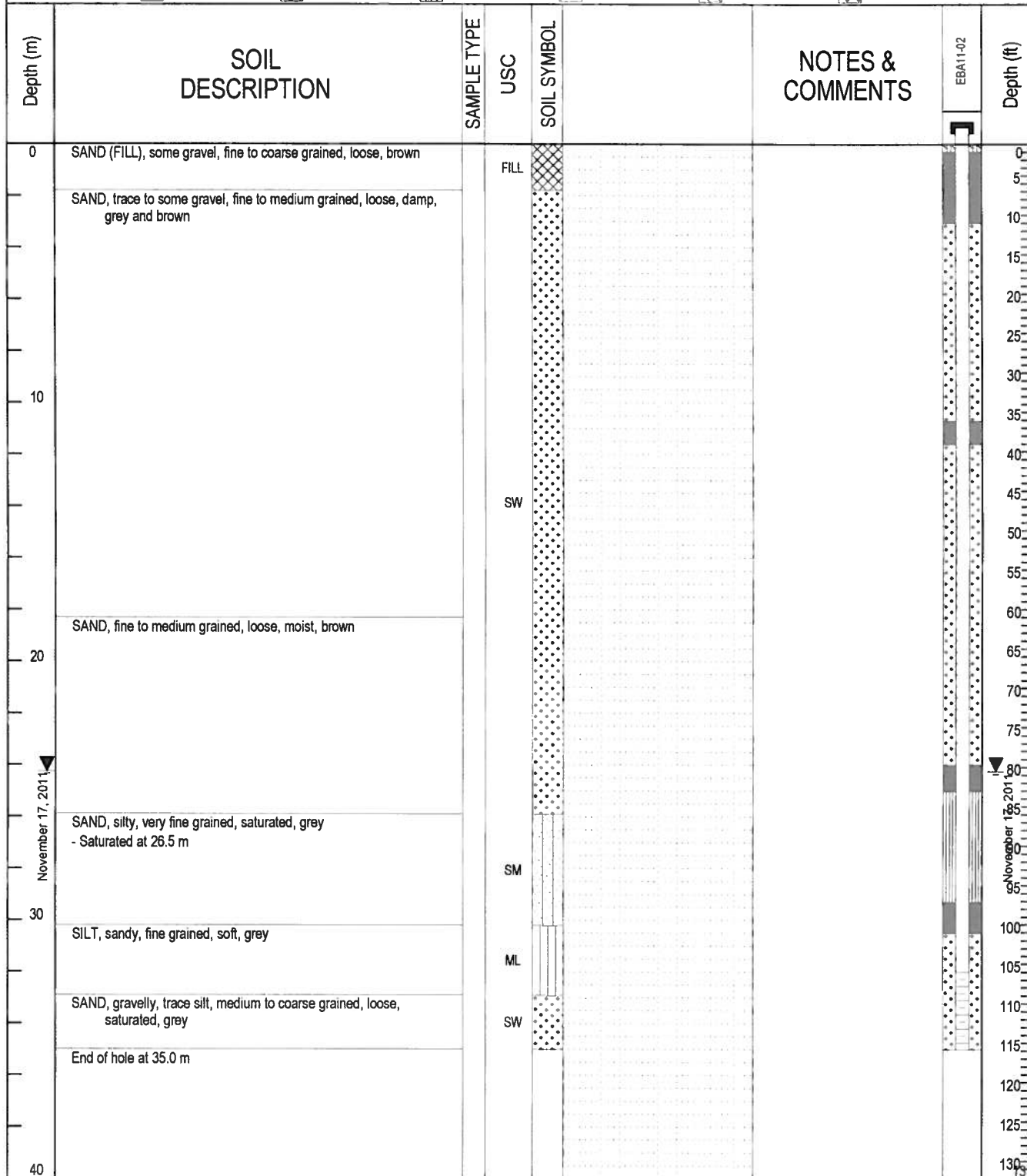
LOGGED BY: MC
REVIEWED BY: SB

COMPLETION DEPTH: 32 m
COMPLETE: 17/07/04

Project: Stage 2 PSI		Client: Comox Valley Regional District		PROJECT NO. - BOREHOLE NO.	
Location: Block J, CRWMC		Drilling Contractor: Drillwell Enterprises		N23101802 - EBA11-01	
Client: Campbell River, BC		Drilling Method: Air Rotary			
SAMPLE TYPE DISTURBED NO RECOVERY SPT A-CASING SHELBY TUBE CORE					
BACKFILL TYPE BENTONITE PEA GRAVEL SLOUGH GROUT DRILL CUTTINGS SAND					

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	USC	SOIL SYMBOL	NOTES & COMMENTS	EBA11-01	Depth (ft)
0	SAND, fine grained, loose, homogeneous, damp, orange and white						0
	SAND, fine to medium grained, loose, moist, grey						5
							10
							15
	- Trace silt at 6.1 m						20
							25
	- Compact at 8.5 m						30
10	SAND, fine grained, trace gravel, small, grey						35
							40
	- Trace silt at 11.3 m						45
	- No silt at 11.7 m						50
							55
	- Coarse sand at 14.3 m		SW				60
	SAND, fine grained, homogenous moist, brown						65
	- Trace small gravel at 15.2 m						70
							75
20	SAND, trace to some silt, very fine grained, moist, grey						80
	- Silty at 19.8 m						85
	- Moist to wet at 20.7 m						90
							95
	- Saturated at 23.2 m						100
							105
							110
							115
							120
							125
							130
							135
							140
							145
							150
							155
							160
							165
							170
							175
							180
							185
							190
							195
							200
							205
							210
							215
							220
							225
							230
							235
							240
							245
							250
							255
							260
							265
							270
							275
							280
							285
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							805
							810
							815
							820
							825
							830
							835
							840
							845
							850
							855
							860
							865
							870
							875
							880
							885
							890
							895
							900
							905
							910
							915
							920
							925
							930
							935
							940
							945
							950
							955
							960
							965
							970
							975
							980
							985
							990
							995
							1000
							1005
							1010
							1015
							1020
							1025
							1030
							1035
							1040
							1045
							1050
							1055
							1060
							1065
							1070
							1075
							1080
							1085
							1090
							1095
							1100
							1105
							1110
							1115
							1120
							1125
							1130
							1135
							1140

Project: Subsurface Investigation		Client: Comox Valley Regional District		PROJECT NO. - BOREHOLE NO.	
Location: Block J, CRWMC		Drilling Contractor: Drillwell Enterprises		N23101803 - EBA11-02	
City: Campbell River, BC		Drilling Method: Air Rotary			
SAMPLE TYPE	☒ DISTURBED	☐ NO RECOVERY	☒ SPT	☐ A-CASING	☐ SHELBY TUBE
BACKFILL TYPE	☒ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☐ DRILL CUTTINGS
					☐ SAND



 A TETRA TECH COMPANY	LOGGED BY: MG	COMPLETION DEPTH: 35 m
	REVIEWED BY:	COMPLETE: 11/16/2011
	DRAWING NO: 6	Page 1 of 1

Project: Stage 2 PSI		Client: Comox Valley Regional District		PROJECT NO. - BOREHOLE NO.	
Location: Block J, CRWMC		Drilling Contractor: Drillwell Enterprises		N23101802 - EBA11-03	
Client: Campbell River, BC		Drilling Method: Air Rotary			
SAMPLE TYPE		☒ DISTURBED	☐ NO RECOVERY	☒ SPT	☐ A-CASING
BACKFILL TYPE		☒ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT
		☐ SHELBY TUBE	☐ CORE	☐ DRILL CUTTINGS	☐ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	USC	SOIL SYMBOL	NOTES & COMMENTS	Depth (ft)
0	ORGANICS (FOREST FLOOR), silt, trace sand, soft, moist, dark brown	TOPSOIL	SM			0
	SILT, trace sand, trace organics, fine to coarse grained, soft, moist, reddish brown					5
	SILT, trace clay, stiff, moist, light brown		SC			10
	SAND, fine to medium grained, loose, damp, tan coloured					15
	- Brown at 6.1 m					20
	- Compact at 7.9 m					25
	- Loose at 8.8 m					30
10						35
						40
						45
						50
						55
			SW			60
						65
20						70
	SAND, fine to coarse grained, moist, grey					75
	- Saturated at 22.6 m, trace gravel					80
						85
						90
						95
30			SM			100
	SILT, sandy, trace gravel, very fine grained, soft, saturated, grey					105
	End of hole at 30.1 m					110
						115
35						120

 A TETRA TECH COMPANY	LOGGED BY: MG	COMPLETION DEPTH: 30.175 m
	REVIEWED BY:	COMPLETE: 11/17/2011
	DRAWING NO: 2	Page 1 of 1

Project: Stage 2 PSI		Client: Comox Valley Regional District		PROJECT NO. - BOREHOLE NO.	
Location: Block J, CRWMC		Drilling Contractor: Drillwell Enterprises		N23101802 - EBA11-04	
Client: Campbell River, BC		Drilling Method: Air Rotary			
SAMPLE TYPE DISTURBED NO RECOVERY SPT A-CASING SHELBY TUBE CORE					
BACKFILL TYPE BENTONITE PEA GRAVEL SLOUGH GROUT DRILL CUTTINGS SAND					

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	USC	SOIL SYMBOL	NOTES & COMMENTS	EBA11-04	Depth (ft)
0	SILT, sandy, trace organics, soft, moist, reddish brown SAND, fine grained, loose, homogenous, moist, tan coloured		ML				0
	- Grey at 3.1 m						5
			SW				10
							15
							20
							25
							30
							35
							40
							45
							50
							55
							60
							65
20	SAND, trace gravel, fine to medium grained, compact						70
	SILT, sandy, fine grained, trace gravel, moist to wet, grey		ML				75
							80
	SAND, trace gravel, trace silt, saturated, tan coloured		SW				85
	SILT, sandy, soft, saturated, grey		ML				90
	SAND, very fine grained, some silt, saturated, grey		SM				95
30	End of hole at 29.6 m						100
							105
							110
							115
35							120

 A TETRA TECH COMPANY	LOGGED BY: MG	COMPLETION DEPTH: 29.57 m
	REVIEWED BY:	COMPLETE: 11/17/2011
	DRAWING NO: 3	Page 1 of 1

APPENDIX C

FIELD METHODOLOGY

1.0 APPENDIX C - FIELD METHODOLOGY

1.1 Groundwater Monitoring

The following methodology was conducted at each monitoring well location (Figure 2) for the February, May, August and November 2013 monitoring events:

- Confirmed the piezometer identity.
- Assessed well condition.
- Measured the depth to water at the end of the piezometer using a water level meter with the exception of the water supply well. The water level is not measured in the water supply well due to the risk of damage to the probe or pumping equipment and lines.

Monitoring wells GLL93-1, GLL93-2, GLL93-4, HBT94-5, and AM02-1 were dry and therefore could not be sampled during the February monitoring event. Monitoring wells GLL93-1, GLL93-2, GLL93-4, HBT94-3, HBT94-5, and AM02-1 were dry and therefore could not be sampled during the May, August and November monitoring events. Since upgradient monitoring well AM02-01 was dry during the February, May and August 2013 monitoring events, Tetra Tech EBA returned to the site on October 29, 2013 to monitor AM02-01 and if sufficient water to collect a sample. The above methodology was conducted during the October monitoring event for AM02-01 only.

1.2 Groundwater Sampling

The following methodology was conducted at each monitoring well with sufficient water for sampling for the February, May, August and November 2013 monitoring events:

- Purged each well using a Hydrolift II pump with dedicated Waterra tubing and foot valves. For the water supply well, the tap was opened for approximately 15 minutes to flush out any standing water in the pump and associated piping.
- Field screened pH, temperature, electrical conductivity, dissolved oxygen and redox potential using a calibrated hand held meter and a flow cell until pH, temperature and electrical conductivity readings stabilized.
- Collected water samples for laboratory analysis of selected parameters, as outlined in the attached Table C-2, in clean, laboratory-supplied containers as follows:
 - Samples for pH, electrical conductivity, alkalinity and anions were unpreserved and placed in 250 mL plastic bottles.
 - Samples for dissolved metals and dissolved sulphur analyses were field-filtered (using 45 micron in-line filters), placed in 120 mL plastic bottles marked “VCB” (verified clean bottle) and then preserved with nitric acid.
 - Samples for ammonia were placed in 120 mL plastic bottles and preserved with sulphuric acid.
 - Samples for volatile organic carbons were placed in three 40 mL glass vials with preservative and no headspace.
- All samples were stored on ice in a cooler until they were shipped to Maxxam Analytics (Maxxam).
- A chain of custody form was completed and all samples were submitted to Maxxam for analysis.

- Duplicate samples were blind-labelled and submitted to Maxxam for analysis of parameters described in the analytical table for Campbell River.

The above methodology was also conducted for the collection of groundwater sample from AM02-01 on October 29, 2013.

1.3 Surface Water Sampling

The following methodology was conducted for two surface water locations (SW-1 and SW-2) as shown on Figure 2 for the February, May, August and November 2013 monitoring events (SW-2 was found to be dry in May, August and November sampling events):

- Conducted field screening for the surface water sample (pH, temperature, electrical conductivity and dissolved oxygen).
- Collected the water sample for laboratory analysis of selected parameters, as outlined in the attached Table C-2, in clean, laboratory-supplied containers as follows:
 - The sample for pH, electrical conductivity, alkalinity and anions were unpreserved and placed in a 250 mL plastic bottle.
 - The sample for total metals and total sulphur analyses were placed in a 120 mL plastic bottle marked “VCB” and preserved with nitric acid (not field filtered).
 - The samples for ammonia were placed in 120 mL plastic bottles and preserved with sulphuric acid.
- The samples were kept on ice in a cooler until shipped to Maxxam for analysis under chain of custody.

TABLE C2 - 2013 GROUNDWATER QUALITY TESTING

Sample Information		Monitoring		Field Screening					Lab Analysis									
Well #	Status	Water Level	Depth to Bottom	Temperature	Dissolved Oxygen	Redox Potential	pH	Electrical Conductivity	pH	Electrical Conductivity	Alkalinity	Full Anion Scan (Cl, SO4, NO2, NO3, F)	Ammonia, N	Dissolved Sulphur	Full Dissolved Metals Scan (includes Hardness)	Total Sulphur	Full Total Metals Scan (includes Hardness)	Volatile Organic Carbon
GLL93-1	Dry	√	√															
GLL93-2	Dry	√	√															
GLL93-3	Damaged																	
GLL93-4	Dry	√	√															
HBT94-1	Useable	√	√	4	4	4	4	4	4	4	4	4	4	4	4			
HBT94-2	Useable	√	√	4	4	4	4	4	4	4	4	4	4	4	4			4
HBT94-3	Useable	√	√	1	1	1	1	1	1	1	1	1	1	1	1			
HBT94-4	Useable	√	√	4	4	4	4	4	4	4	4	4	4	4	4			
HBT94-5	Dry	√	√															
AG99-01	Useable	√	√	4	4	4	4	4	4	4	4	4	4	4	4			
AG99-02	Useable	√	√	4	4	4	4	4	4	4	4	4	4	4	4			
AG99-03	Damaged																	
AG99-04	Useable	√	√	4	4	4	4	4	4	4	4	4	4	4	4			
AG99-05	Useable	√	√	4	4	4	4	4	4	4	4	4	4	4	4			
AG99-06	Useable	√	√	4	4	4	4	4	4	4	4	4	4	4	4			4
AM00-01	Blocked																	
AM02-01	Useable	√	√	1	1	1	1	1	1	1	1	1	1	1	1			1
EBA04-1	Useable			4	4	4	4	4	4	4	4	4	4	4	4			
EBA04-2	Useable	√	√	4	4	4	4	4	4	4	4	4	4	4	4			
EBA04-3	Useable	√	√	4	4	4	4	4	4	4	4	4	4	4	4			
EBA04-4	Useable	√	√	4	4	4	4	4	4	4	4	4	4	4	4			
EBA04-5	Damaged																	
EBA04-6	Useable	√	√	4	4	4	4	4	4	4	4	4	4	4	4			
EBA04-7	Useable	√	√	4	4	4	4	4	4	4	4	4	4	4	4			4
EBA11-1	Useable	√	√	4	4	4	4	4	4	4	4	4	4	4	4			4
EBA11-2	Useable	√	√	4	4	4	4	4	4	4	4	4	4	4	4			
EBA11-3	Useable	√	√	4	4	4	4	4	4	4	4	4	4	4	4			4
EBA11-4	Useable	√	√	4	4	4	4	4	4	4	4	4	4	4	4			4
SW-1	Useable	√	√	4	4	4	4	4	4	4	4	4	4			4	4	
Blind Laboratory Duplicate #1									4	4	4	4	4	4	4			
Blind Laboratory Duplicate #2									4	4	4	4	4	4	4			
Blind Laboratory Duplicate #3									4	4	4	4	4	4	4			

Notes:

√	Monitoring was completed during the sampling event.
1	Well was sampled during one of the sampling events.
2	Well was sampled during this many sampling events.

- AM02-01 was dry during the February, May, August, and November 2013 monitoring events. Was sampled in October.
- HBT94-3 was dry during the May, August and November 2013 monitoring events
- EBA04-1 is a drinking water well and therefore water level cannot be measured.

APPENDIX D

2013 LABORATORY CERTIFICATES

Your Project #: N23103074-01
 Site Location: CVRD - CRWMC
 Your C.O.C. #: 35289705

Attention: Kristy Gabelhouse

EBA Engineering Consultants Ltd.
 NANAIMO
 #1 - 4376 Boban Drive
 Nanaimo, BC
 CANADA V9T 6A7

Report Date: 2013/03/04

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B314389
Received: 2013/02/23, 10:15

Sample Matrix: Water
 # Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	8	2013/02/25	2013/02/25	BBY6SOP-00026	SM2320B
Chloride by Automated Colourimetry	8	N/A	2013/02/25	BBY6SOP-00011	SM-4500-CI-
Conductance - water	8	N/A	2013/02/25	BBY6SOP-00026	SM-2510B
Fluoride	8	N/A	2013/02/25	BBY6SOP-00038	SM - 4500 F C
Hardness Total (calculated as CaCO ₃)	3	N/A	2013/02/27	BBY WI-00033	Calculated Parameter
Hardness (calculated as CaCO ₃)	5	N/A	2013/02/28	BBY WI-00033	Calculated Parameter
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	5	N/A	2013/02/28	BBY7SOP-00002	EPA 6020A
Elements by ICPMS Low Level (dissolved)	5	N/A	2013/02/28	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (total)	3	N/A	2013/02/27	BBY7SOP-00002	EPA 6020A
Elements by ICPMS Low Level (total)	3	N/A	2013/02/27	BBY7SOP-00002	EPA 6020A
Ammonia-N (Preserved)	8	N/A	2013/02/25	BBY6SOP-00009	SM-4500NH3G
Nitrate + Nitrite (N)	8	N/A	2013/02/23	BBY6SOP-00010	USEPA 353.2
Nitrite (N) by CFA	8	N/A	2013/02/23	BBY6SOP-00010	EPA 353.2
Nitrogen - Nitrate (as N)	8	N/A	2013/02/25	BBY6SOP-00010	Based on EPA 353.2
Filter and HNO ₃ Preserve for Metals	5	N/A	2013/02/23	BBY6WI-00001	EPA 200.2
pH Water	8	N/A	2013/02/25	BBY6SOP-00026	SM-4500H+B
CSR VH C6-C10 in Water by HS GC/MS	1	N/A	2013/03/01	BBY8SOP-00011	EPA 8260B
CSR VH C6-C10 in Water by HS GC/MS	1	N/A	2013/03/02	BBY8SOP-00011	EPA 8260B
Sulphate by Automated Colourimetry	8	N/A	2013/02/25	BBY6SOP-00017	SM4500-SO42- E
VOCs in Water by HS GC/MS	1	2013/02/28	2013/03/01	BBY8-SOP-0009	EPA 8260C
VOCs in Water by HS GC/MS	1	2013/02/28	2013/03/02	BBY8-SOP-0009	EPA 8260C
Volatile HC-BTEX	2	N/A	2013/03/04	BBY WI-00033	BC MOE Lab Method

* Results relate only to the items tested.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Kim Domino, Burnaby Senior Project Manager
 Email: KDomino@maxxam.ca
 Phone# (604) 638-5018

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 1

Maxxam Job #: B314389
Report Date: 2013/03/04

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01
Site Location: CVRD - CRWMC
Sampler Initials: KG

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		FS0942	FS0943	FS0944	FS0945	FS0946	FS0947	FS0948	FS0949		
Sampling Date		2013/02/21	2013/02/21	2013/02/21	2013/02/21	2013/02/21	2013/02/22	2013/02/22	2013/02/22		
COC#		35289705	35289705	35289705	35289705	35289705	35289705	35289705	35289705		
	UNITS	MBT94-4	AG99-5	SW2	SW3	SW1	AG 99-6	EBA11-3	EBA11-4	RDL	QC Batch
ANIONS											
Nitrite (N)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0083	<0.0050	<0.0050	0.0050	6594050
Calculated Parameters											
Filter and HNO3 Preservation	N/A	FIELD	FIELD				FIELD	FIELD	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.359	0.090	<0.020	<0.020	0.249	<0.020	0.434	0.228	0.020	6593740
Misc. Inorganics											
Fluoride (F)	mg/L	0.015	0.019	0.024	0.023	0.014	0.022	0.012	0.018	0.010	6597908
Alkalinity (Total as CaCO3)	mg/L	106	61.7	23.8	23.6	59.0	44.4	43.2	43.7	0.50	6597858
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6597858
Bicarbonate (HCO3)	mg/L	129	75.3	29.0	28.8	71.9	54.2	52.8	53.3	0.50	6597858
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6597858
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6597858
Anions											
Dissolved Sulphate (SO4)	mg/L	3.22	2.92	1.59	1.47	2.45	0.96	2.31	2.68	0.50	6597943
Dissolved Chloride (Cl)	mg/L	3.6	2.7	3.8	3.9	2.1	3.7	50	13	0.50	6597938
Nutrients											
Ammonia (N)	mg/L	0.0070	0.0063	0.0055	0.015	<0.0050	<0.0050	<0.0050	0.0070	0.0050	6597852
Nitrate plus Nitrite (N)	mg/L	0.359	0.090	<0.020	<0.020	0.249	0.024	0.434	0.228	0.020	6594042
Physical Properties											
Conductivity	uS/cm	219	135	61.1	60.8	128	97.8	276	139	1.0	6597863
pH	pH Units	8.07	7.92	7.53	7.46	7.88	7.78	7.73	7.78		6597864

N/A = Not Applicable

RDL = Reportable Detection Limit

Maxxam Job #: B314389
Report Date: 2013/03/04

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01
Site Location: CVRD - CRWMC
Sampler Initials: KG

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		FS0942	FS0943	FS0947	FS0948	FS0949		
Sampling Date		2013/02/21	2013/02/21	2013/02/22	2013/02/22	2013/02/22		
COC#		35289705	35289705	35289705	35289705	35289705		
	UNITS	MBT94-4	AG99-5	AG 99-6	EBA11-3	EBA11-4	RDL	QC Batch
Misc. Inorganics								
Dissolved Hardness (CaCO ₃)	mg/L	109	64.3	44.0	117	58.7	0.50	6593735

RDL = Reportable Detection Limit

Maxxam Job #: B314389
Report Date: 2013/03/04

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01
Site Location: CVRD - CRWMC
Sampler Initials: KG

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		FS0942	FS0943	FS0947	FS0948	FS0949		
Sampling Date		2013/02/21	2013/02/21	2013/02/22	2013/02/22	2013/02/22		
COC#		35289705	35289705	35289705	35289705	35289705		
	UNITS	MBT94-4	AG99-5	AG 99-6	EBA11-3	EBA11-4	RDL	QC Batch
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.00304	0.00578	0.00208	0.00238	0.00772	0.00020	6606156
Dissolved Antimony (Sb)	mg/L	0.000104	0.000022	<0.000020	<0.000020	0.000023	0.000020	6606156
Dissolved Arsenic (As)	mg/L	0.000231	0.000647	0.000091	0.000126	0.00139	0.000020	6606156
Dissolved Barium (Ba)	mg/L	0.00181	0.000812	0.000359	0.00161	0.00210	0.000020	6606156
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	6606156
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	6606156
Dissolved Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6606156
Dissolved Cadmium (Cd)	mg/L	0.0000180	<0.0000050	0.0000290	0.0000080	<0.0000050	0.0000050	6606156
Dissolved Chromium (Cr)	mg/L	<0.00010	0.00024	0.00056	0.00027	0.00164	0.00010	6606156
Dissolved Cobalt (Co)	mg/L	0.0000210	0.0000080	<0.0000050	0.0000050	<0.0000050	0.0000050	6606156
Dissolved Copper (Cu)	mg/L	0.000931	0.000186	0.000072	0.000100	0.000188	0.000050	6606156
Dissolved Iron (Fe)	mg/L	0.0012	<0.0010	0.0013	0.0012	0.0016	0.0010	6606156
Dissolved Lead (Pb)	mg/L	0.0000080	0.0000070	<0.0000050	<0.0000050	<0.0000050	0.0000050	6606156
Dissolved Lithium (Li)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6606156
Dissolved Manganese (Mn)	mg/L	0.0181	<0.000050	<0.000050	0.000061	<0.000050	0.000050	6606156
Dissolved Mercury (Hg)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	6606156
Dissolved Molybdenum (Mo)	mg/L	0.000130	0.000154	0.000092	0.000098	0.000097	0.000050	6606156
Dissolved Nickel (Ni)	mg/L	0.000192	0.000056	<0.000020	0.000048	0.000047	0.000020	6606156
Dissolved Selenium (Se)	mg/L	0.000503	0.000072	0.000194	0.000141	0.000293	0.000040	6606156
Dissolved Silicon (Si)	mg/L	5.16	3.89	5.33	4.78	5.85	0.10	6606156
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	6606156
Dissolved Strontium (Sr)	mg/L	0.0705	0.0311	0.0350	0.0647	0.0332	0.000050	6606156
Dissolved Thallium (Tl)	mg/L	0.0000070	<0.0000020	<0.0000020	<0.0000020	0.0000020	0.0000020	6606156
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	6606156
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6606156
Dissolved Uranium (U)	mg/L	0.0000640	0.0000600	0.0000200	0.0000240	0.000170	0.0000020	6606156
Dissolved Vanadium (V)	mg/L	0.00474	0.00403	0.00279	0.00266	0.0136	0.00020	6606156
Dissolved Zinc (Zn)	mg/L	0.00034	0.00011	0.00023	0.00020	<0.00010	0.00010	6606156
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	6606156
Dissolved Calcium (Ca)	mg/L	39.0	21.4	13.6	37.2	18.1	0.050	6593747
Dissolved Magnesium (Mg)	mg/L	2.79	2.61	2.43	5.85	3.27	0.050	6593747
Dissolved Potassium (K)	mg/L	0.692	0.418	0.252	0.440	1.11	0.050	6593747
Dissolved Sodium (Na)	mg/L	2.12	1.37	2.03	1.87	2.63	0.050	6593747
Dissolved Sulphur (S)	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	3.0	6593747

RDL = Reportable Detection Limit

Maxxam Job #: B314389
Report Date: 2013/03/04

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01
Site Location: CVRD - CRWMC
Sampler Initials: KG

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		FS0944	FS0945	FS0946		
Sampling Date		2013/02/21	2013/02/21	2013/02/21		
COC#		35289705	35289705	35289705		
	UNITS	SW2	SW3	SW1	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	23.6	24.6	61.1	0.50	6593746

Maxxam Job #: B314389
Report Date: 2013/03/04

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01
Site Location: CVRD - CRWMC
Sampler Initials: KG

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		FS0944	FS0945	FS0946		
Sampling Date		2013/02/21	2013/02/21	2013/02/21		
COC#		35289705	35289705	35289705		
	UNITS	SW2	SW3	SW1	RDL	QC Batch
Total Metals by ICPMS						
Total Aluminum (Al)	mg/L	0.0243	0.0237	0.00531	0.00020	6603355
Total Antimony (Sb)	mg/L	<0.000020	<0.000020	0.000029	0.000020	6603355
Total Arsenic (As)	mg/L	0.000025	0.000023	0.000589	0.000020	6603355
Total Barium (Ba)	mg/L	0.000522	0.000567	0.00112	0.000020	6603355
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	6603355
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	6603355
Total Boron (B)	mg/L	<0.050	<0.050	<0.050	0.050	6603355
Total Cadmium (Cd)	mg/L	0.0000160	0.0000160	<0.0000050	0.0000050	6603355
Total Chromium (Cr)	mg/L	0.00021	0.00024	0.00022	0.00010	6603355
Total Cobalt (Co)	mg/L	0.0000570	0.0000650	0.0000120	0.0000050	6603355
Total Copper (Cu)	mg/L	0.000415	0.000335	0.000280	0.000050	6603355
Total Iron (Fe)	mg/L	0.0476	0.0635	0.0049	0.0010	6603355
Total Lead (Pb)	mg/L	0.0000190	0.0000280	<0.0000050	0.0000050	6603355
Total Lithium (Li)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	6603355
Total Manganese (Mn)	mg/L	0.00157	0.00192	<0.000050	0.000050	6603355
Total Mercury (Hg)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	6603355
Total Molybdenum (Mo)	mg/L	0.000051	<0.000050	0.000153	0.000050	6603355
Total Nickel (Ni)	mg/L	0.000062	0.000066	0.000220	0.000020	6603355
Total Selenium (Se)	mg/L	0.000045	0.000076	0.000109	0.000040	6603355
Total Silicon (Si)	mg/L	6.57	6.52	4.33	0.10	6603355
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	6603355
Total Strontium (Sr)	mg/L	0.0162	0.0172	0.0296	0.000050	6603355
Total Thallium (Tl)	mg/L	0.0000020	<0.0000020	<0.0000020	0.0000020	6603355
Total Tin (Sn)	mg/L	0.00117	<0.00020	<0.00020	0.00020	6603355
Total Titanium (Ti)	mg/L	0.00143	0.00196	<0.00050	0.00050	6603355
Total Uranium (U)	mg/L	0.0000050	0.0000020	0.0000880	0.0000020	6603355
Total Vanadium (V)	mg/L	0.00188	0.00185	0.00441	0.00020	6603355
Total Zinc (Zn)	mg/L	0.00051	0.00049	<0.00010	0.00010	6603355
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	6603355
Total Calcium (Ca)	mg/L	5.01	5.27	19.7	0.050	6593748
Total Magnesium (Mg)	mg/L	2.69	2.78	2.89	0.050	6593748
Total Potassium (K)	mg/L	0.198	0.221	0.379	0.050	6593748
Total Sodium (Na)	mg/L	3.38	3.28	1.71	0.050	6593748
Total Sulphur (S)	mg/L	<3.0	<3.0	<3.0	3.0	6593748

RDL = Reportable Detection Limit

Maxxam Job #: B314389
Report Date: 2013/03/04

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01
Site Location: CVRD - CRWMC
Sampler Initials: KG

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		FS0943	FS0947		
Sampling Date		2013/02/21	2013/02/22		
COC#		35289705	35289705		
	UNITS	AG99-5	AG 99-6	RDL	QC Batch
Volatiles					
VPH (VH6 to 10 - BTEX)	ug/L	<300	<300	300	6593793
Volatile Hydrocarbons					
VH C6-C10	ug/L	<300	<300	300	6609712
Volatiles					
Chloromethane	mg/L	<0.0010	<0.0010	0.0010	6608510
Vinyl chloride	mg/L	<0.00050	<0.00050	0.00050	6608510
Chloroethane	mg/L	<0.0010	<0.0010	0.0010	6608510
Trichlorofluoromethane	mg/L	<0.0040	<0.0040	0.0040	6608510
1,1-dichloroethene	mg/L	<0.00050	<0.00050	0.00050	6608510
Dichloromethane	mg/L	<0.0020	<0.0020	0.0020	6608510
trans-1,2-dichloroethene	mg/L	<0.0010	<0.0010	0.0010	6608510
1,1-dichloroethane	mg/L	<0.00050	<0.00050	0.00050	6608510
cis-1,2-dichloroethene	mg/L	<0.0010	<0.0010	0.0010	6608510
Chloroform	mg/L	<0.0010	<0.0010	0.0010	6608510
1,1,1-trichloroethane	mg/L	<0.00050	<0.00050	0.00050	6608510
1,2-dichloroethane	mg/L	<0.00050	<0.00050	0.00050	6608510
Carbon tetrachloride	mg/L	<0.00050	<0.00050	0.00050	6608510
Benzene	mg/L	<0.00040	<0.00040	0.00040	6608510
Methyl-tert-butylether (MTBE)	mg/L	<0.0040	<0.0040	0.0040	6608510
1,2-dichloropropane	mg/L	<0.00050	<0.00050	0.00050	6608510
cis-1,3-dichloropropene	mg/L	<0.0010	<0.0010	0.0010	6608510
trans-1,3-dichloropropene	mg/L	<0.0010	<0.0010	0.0010	6608510
Bromomethane	mg/L	<0.0010	<0.0010	0.0010	6608510
1,1,2-trichloroethane	mg/L	<0.00050	<0.00050	0.00050	6608510
Trichloroethene	mg/L	<0.00050	<0.00050	0.00050	6608510
Chlorodibromomethane	mg/L	<0.0010	<0.0010	0.0010	6608510
Tetrachloroethene	mg/L	<0.00050	<0.00050	0.00050	6608510
Bromodichloromethane	mg/L	<0.0010	<0.0010	0.0010	6608510
Toluene	mg/L	<0.00040	<0.00040	0.00040	6608510
Ethylbenzene	mg/L	<0.00040	<0.00040	0.00040	6608510
m & p-Xylene	mg/L	<0.00040	<0.00040	0.00040	6608510
Bromoform	mg/L	<0.0010	<0.0010	0.0010	6608510
Styrene	mg/L	<0.00050	<0.00050	0.00050	6608510
o-Xylene	mg/L	<0.00040	<0.00040	0.00040	6608510
Xylenes (Total)	mg/L	<0.00040	<0.00040	0.00040	6608510

RDL = Reportable Detection Limit

Maxxam Job #: B314389
Report Date: 2013/03/04

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01
Site Location: CVRD - CRWMC
Sampler Initials: KG

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		FS0943	FS0947		
Sampling Date		2013/02/21	2013/02/22		
COC#		35289705	35289705		
	UNITS	AG99-5	AG 99-6	RDL	QC Batch
1,1,1,2-tetrachloroethane	mg/L	<0.00050	<0.00050	0.00050	6608510
1,1,2,2-tetrachloroethane	mg/L	<0.00050	<0.00050	0.00050	6608510
1,2-dichlorobenzene	mg/L	<0.00050	<0.00050	0.00050	6608510
1,3-dichlorobenzene	mg/L	<0.00050	<0.00050	0.00050	6608510
1,4-dichlorobenzene	mg/L	<0.00050	<0.00050	0.00050	6608510
Chlorobenzene	mg/L	<0.00050	<0.00050	0.00050	6608510
Dibromomethane	mg/L	<0.00090	<0.00090	0.00090	6608510
Surrogate Recovery (%)					
1,4-Difluorobenzene (sur.)	%	100	98		6608510
4-BROMOFLUOROBENZENE (sur.)	%	89	88		6608510
D4-1,2-DICHLOROETHANE (sur.)	%	104	110		6608510

RDL = Reportable Detection Limit

Maxxam Job #: B314389
Report Date: 2013/03/04

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01
Site Location: CVRD - CRWMC
Sampler Initials: KG

General Comments

Sample FS0942-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample FS0943-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample FS0944-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample FS0945-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample FS0946-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample FS0947-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample FS0948-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample FS0949-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

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EBA Engineering Consultants Ltd.
Client Project #: N23103074-01
Site Location: CVRD - CRWMC
Sampler Initials: KG

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6594042	Nitrate plus Nitrite (N)	2013/02/23	108	80 - 120	106	80 - 120	<0.020	mg/L	0.8	25
6594050	Nitrite (N)	2013/02/23	99	80 - 120	101	80 - 120	<0.0050	mg/L	NC	20
6597852	Ammonia (N)	2013/02/25	100	80 - 120	98	80 - 120	<0.0050	mg/L	NC	20
6597858	Alkalinity (Total as CaCO ₃)	2013/02/25	NC	80 - 120	97	80 - 120	<0.50	mg/L	1.2	20
6597858	Alkalinity (PP as CaCO ₃)	2013/02/25					<0.50	mg/L	NC	20
6597858	Bicarbonate (HCO ₃)	2013/02/25					<0.50	mg/L	1.3	20
6597858	Carbonate (CO ₃)	2013/02/25					<0.50	mg/L	NC	20
6597858	Hydroxide (OH)	2013/02/25					<0.50	mg/L	NC	20
6597863	Conductivity	2013/02/25			99	80 - 120	<1.0	uS/cm	2.2	20
6597908	Fluoride (F)	2013/02/25	88	80 - 120	100	80 - 120	<0.010	mg/L	NC	20
6597938	Dissolved Chloride (Cl)	2013/02/25	94	80 - 120	103	80 - 120	<0.50	mg/L	0.8	20
6597943	Dissolved Sulphate (SO ₄)	2013/02/25	90	80 - 120	99	80 - 120	<0.50	mg/L	NC	20
6603355	Total Aluminum (Al)	2013/02/27	103	80 - 120	106	80 - 120	<0.00020	mg/L	4.6	20
6603355	Total Antimony (Sb)	2013/02/27	103	80 - 120	105	80 - 120	<0.000020	mg/L	NC	20
6603355	Total Arsenic (As)	2013/02/27	106	80 - 120	106	80 - 120	<0.000020	mg/L	0.9	20
6603355	Total Barium (Ba)	2013/02/27	NC	80 - 120	106	80 - 120	<0.000020	mg/L	5.4	20
6603355	Total Beryllium (Be)	2013/02/27	101	80 - 120	100	80 - 120	<0.000010	mg/L	NC	20
6603355	Total Bismuth (Bi)	2013/02/27	100	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
6603355	Total Cadmium (Cd)	2013/02/27	105	80 - 120	106	80 - 120	<0.0000050	mg/L	NC	20
6603355	Total Chromium (Cr)	2013/02/27	99	80 - 120	104	80 - 120	<0.00010	mg/L	NC	20
6603355	Total Cobalt (Co)	2013/02/27	98	80 - 120	105	80 - 120	<0.0000050	mg/L	NC	20
6603355	Total Copper (Cu)	2013/02/27	98	80 - 120	105	80 - 120	<0.000050	mg/L	7.8	20
6603355	Total Iron (Fe)	2013/02/27	107	80 - 120	111	80 - 120	<0.0010	mg/L	NC	20
6603355	Total Lead (Pb)	2013/02/27	100	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
6603355	Total Lithium (Li)	2013/02/27	101	80 - 120	105	80 - 120	<0.00050	mg/L	NC	20
6603355	Total Manganese (Mn)	2013/02/27	101	80 - 120	106	80 - 120	<0.000050	mg/L	NC	20
6603355	Total Mercury (Hg)	2013/02/27	102	80 - 120	102	80 - 120	<0.000010	mg/L	NC	20
6603355	Total Molybdenum (Mo)	2013/02/27	NC	80 - 120	108	80 - 120	<0.000050	mg/L	1.9	20
6603355	Total Nickel (Ni)	2013/02/27	101	80 - 120	107	80 - 120	<0.000020	mg/L	0	20
6603355	Total Selenium (Se)	2013/02/27	108	80 - 120	110	80 - 120	<0.000040	mg/L	5.4	20
6603355	Total Silver (Ag)	2013/02/27	102	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
6603355	Total Strontium (Sr)	2013/02/27	NC	80 - 120	103	80 - 120	<0.000050	mg/L	4.9	20
6603355	Total Thallium (Tl)	2013/02/27	96	80 - 120	104	80 - 120	<0.0000020	mg/L	NC	20
6603355	Total Tin (Sn)	2013/02/27	106	80 - 120	110	80 - 120	<0.00020	mg/L	NC	20
6603355	Total Titanium (Ti)	2013/02/27	110	80 - 120	106	80 - 120	<0.00050	mg/L	NC	20
6603355	Total Uranium (U)	2013/02/27	101	80 - 120	103	80 - 120	<0.0000020	mg/L	4.3	20
6603355	Total Vanadium (V)	2013/02/27	103	80 - 120	105	80 - 120	<0.00020	mg/L	NC	20
6603355	Total Zinc (Zn)	2013/02/27	110	80 - 120	109	80 - 120	<0.00010	mg/L	NC	20
6603355	Total Boron (B)	2013/02/27					<0.050	mg/L	NC	20
6603355	Total Silicon (Si)	2013/02/27					<0.10	mg/L	2.8	20

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EBA Engineering Consultants Ltd.
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Sampler Initials: KG

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6603355	Total Zirconium (Zr)	2013/02/27					<0.00010	mg/L	NC	20
6606156	Dissolved Aluminum (Al)	2013/02/28	NC	80 - 120	107	80 - 120	<0.00020	mg/L	1.3	20
6606156	Dissolved Antimony (Sb)	2013/02/28	NC	80 - 120	104	80 - 120	<0.000020	mg/L	0.5	20
6606156	Dissolved Arsenic (As)	2013/02/28	NC	80 - 120	98	80 - 120	<0.000020	mg/L	2.8	20
6606156	Dissolved Barium (Ba)	2013/02/28	99	80 - 120	101	80 - 120	<0.000020	mg/L	2.1	20
6606156	Dissolved Beryllium (Be)	2013/02/28	104	80 - 120	97	80 - 120	<0.000010	mg/L	NC	20
6606156	Dissolved Bismuth (Bi)	2013/02/28	105	80 - 120	105	80 - 120	<0.0000050	mg/L	NC	20
6606156	Dissolved Cadmium (Cd)	2013/02/28	103	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
6606156	Dissolved Chromium (Cr)	2013/02/28	101	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
6606156	Dissolved Cobalt (Co)	2013/02/28	102	80 - 120	101	80 - 120	<0.0000050	mg/L	4.1	20
6606156	Dissolved Copper (Cu)	2013/02/28	101	80 - 120	102	80 - 120	<0.000050	mg/L	2.3	20
6606156	Dissolved Iron (Fe)	2013/02/28	137 ⁽¹⁾	80 - 120	107	80 - 120	<0.0010	mg/L	NC	20
6606156	Dissolved Lead (Pb)	2013/02/28	101	80 - 120	103	80 - 120	0.0000080, RDL=0.0000050	mg/L	5.0	20
6606156	Dissolved Lithium (Li)	2013/02/28	101	80 - 120	97	80 - 120	<0.00050	mg/L	NC	20
6606156	Dissolved Manganese (Mn)	2013/02/28	NC	80 - 120	104	80 - 120	<0.000050	mg/L	0.8	20
6606156	Dissolved Mercury (Hg)	2013/02/28	111	80 - 120	96	80 - 120	<0.000010	mg/L	NC	20
6606156	Dissolved Molybdenum (Mo)	2013/02/28	NC	80 - 120	100	80 - 120	<0.000050	mg/L	1.5	20
6606156	Dissolved Nickel (Ni)	2013/02/28	102	80 - 120	102	80 - 120	<0.000020	mg/L	0.7	20
6606156	Dissolved Selenium (Se)	2013/02/28	118	80 - 120	107	80 - 120	<0.000040	mg/L	2.4	20
6606156	Dissolved Silver (Ag)	2013/02/28	103	80 - 120	106	80 - 120	<0.0000050	mg/L	NC	20
6606156	Dissolved Strontium (Sr)	2013/02/28	NC	80 - 120	103	80 - 120	<0.000050	mg/L	0.2	20
6606156	Dissolved Thallium (Tl)	2013/02/28	107	80 - 120	107	80 - 120	<0.0000020	mg/L	NC	20
6606156	Dissolved Tin (Sn)	2013/02/28	NC	80 - 120	106	80 - 120	<0.00020	mg/L	1	20
6606156	Dissolved Titanium (Ti)	2013/02/28	95	80 - 120	99	80 - 120	<0.00050	mg/L	NC	20
6606156	Dissolved Uranium (U)	2013/02/28	NC	80 - 120	106	80 - 120	<0.0000020	mg/L	2.1	20
6606156	Dissolved Vanadium (V)	2013/02/28	104	80 - 120	104	80 - 120	<0.00020	mg/L	NC	20
6606156	Dissolved Zinc (Zn)	2013/02/28	119	80 - 120	117	80 - 120	<0.00010	mg/L	NC	20
6606156	Dissolved Boron (B)	2013/02/28					<0.050	mg/L	NC	20
6606156	Dissolved Silicon (Si)	2013/02/28					<0.10	mg/L	0.001	20
6606156	Dissolved Zirconium (Zr)	2013/02/28					<0.00010	mg/L	NC	20
6608510	1,4-Difluorobenzene (sur.)	2013/03/01	99	70 - 130	98	70 - 130	99	%		
6608510	4-BROMOFLUOROBENZENE (sur.)	2013/03/01	98	70 - 130	101	70 - 130	106	%		
6608510	D4-1,2-DICHLOROETHANE (sur.)	2013/03/01	116	70 - 130	108	70 - 130	116	%		
6608510	Chloromethane	2013/03/01	156 ⁽¹⁾	60 - 140	152 ^(1, 2)	60 - 140	<0.0010	mg/L	15.0	30
6608510	Vinyl chloride	2013/03/01	157 ⁽¹⁾	60 - 140	131	60 - 140	<0.00050	mg/L	NC	30
6608510	Chloroethane	2013/03/01	141 ⁽¹⁾	60 - 140	101	60 - 140	<0.0010	mg/L	NC	30
6608510	Trichlorofluoromethane	2013/03/01	171 ⁽¹⁾	60 - 140	146 ^(1, 2)	60 - 140	<0.0040	mg/L	2.1	30
6608510	1,1-dichloroethene	2013/03/01	NC	70 - 130	97	70 - 130	<0.00050	mg/L	4.1	30
6608510	Dichloromethane	2013/03/01	NC	70 - 130	103	70 - 130	<0.0020	mg/L	3.0	30
6608510	trans-1,2-dichloroethene	2013/03/01	112	70 - 130	98	70 - 130	<0.0010	mg/L	NC	30

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QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6608510	1,1-dichloroethane	2013/03/01	NC	70 - 130	106	70 - 130	<0.00050	mg/L	1.8	30
6608510	cis-1,2-dichloroethene	2013/03/01	NC	70 - 130	101	70 - 130	<0.0010	mg/L	2.2	30
6608510	Chloroform	2013/03/01	108	70 - 130	98	70 - 130	<0.0010	mg/L	NC	30
6608510	1,1,1-trichloroethane	2013/03/01	107	70 - 130	97	70 - 130	<0.00050	mg/L	NC	30
6608510	1,2-dichloroethane	2013/03/01	NC	70 - 130	107	70 - 130	<0.00050	mg/L	3.2	30
6608510	Carbon tetrachloride	2013/03/01	NC	70 - 130	88	70 - 130	<0.00050	mg/L	6.1	30
6608510	Benzene	2013/03/01	122	70 - 130	102	70 - 130	<0.00040	mg/L	NC	30
6608510	Methyl-tert-butylether(MTBE)	2013/03/01	NC	70 - 130	97	70 - 130	<0.0040	mg/L	2.2	30
6608510	1,2-dichloropropane	2013/03/01	120	70 - 130	110	70 - 130	<0.00050	mg/L	NC	30
6608510	cis-1,3-dichloropropene	2013/03/01	NC	70 - 130	96	70 - 130	<0.0010	mg/L	4.2	30
6608510	trans-1,3-dichloropropene	2013/03/01	92	70 - 130	78	70 - 130	<0.0010	mg/L	6.4	30
6608510	Bromomethane	2013/03/01	103	60 - 140	92	60 - 140	<0.0010	mg/L	NC	30
6608510	1,1,2-trichloroethane	2013/03/01	NC	70 - 130	96	70 - 130	<0.00050	mg/L	2.1	30
6608510	Trichloroethene	2013/03/01	NC	70 - 130	95	70 - 130	<0.00050	mg/L	3.5	30
6608510	Chlorodibromomethane	2013/03/01	NC	70 - 130	83	70 - 130	<0.0010	mg/L	9.6	30
6608510	Tetrachloroethene	2013/03/01	100	70 - 130	96	70 - 130	<0.00050	mg/L	NC	30
6608510	Bromodichloromethane	2013/03/01	95	70 - 130	90	70 - 130	<0.0010	mg/L	NC	30
6608510	Toluene	2013/03/01	NC	70 - 130	97	70 - 130	<0.00040	mg/L	4.5	30
6608510	Ethylbenzene	2013/03/01	NC	70 - 130	99	70 - 130	<0.00040	mg/L	0.5	30
6608510	m & p-Xylene	2013/03/01	NC	70 - 130	106	70 - 130	<0.00040	mg/L	3.2	30
6608510	Bromoform	2013/03/01	NC	70 - 130	72	70 - 130	<0.0010	mg/L	5.5	30
6608510	Styrene	2013/03/01	NC	70 - 130	98	70 - 130	<0.00050	mg/L	2.2	30
6608510	o-Xylene	2013/03/01	NC	70 - 130	103	70 - 130	<0.00040	mg/L	1.8	30
6608510	1,1,1,2-tetrachloroethane	2013/03/01	NC	70 - 130	86	70 - 130	<0.00050	mg/L	3.9	30
6608510	1,1,2,2-tetrachloroethane	2013/03/01	98	70 - 130	97	70 - 130	<0.00050	mg/L	NC	30
6608510	1,2-dichlorobenzene	2013/03/01	NC	70 - 130	102	70 - 130	<0.00050	mg/L	2.0	30
6608510	1,3-dichlorobenzene	2013/03/01	NC	70 - 130	99	70 - 130	<0.00050	mg/L	0.5	30
6608510	1,4-dichlorobenzene	2013/03/01	99	70 - 130	93	70 - 130	<0.00050	mg/L	NC	30
6608510	Chlorobenzene	2013/03/01	NC	70 - 130	108	70 - 130	<0.00050	mg/L	2.1	30
6608510	Dibromomethane	2013/03/01	109	70 - 130	104	70 - 130	<0.00090	mg/L	NC	30

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Sampler Initials: KG

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6608510	Xylenes (Total)	2013/03/01					<0.00040	mg/L	2.4	30
6609712	VH C6-C10	2013/03/01			92	70 - 130	<300	ug/L	NC	40

N/A = Not Applicable

RDL = Reportable Detection Limit

RPD = Relative Percent Difference

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.

NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

(1) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) - LCS recovery above control limit

Validation Signature Page

Maxxam Job #: B314389

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Andy Lu, Data Validation Coordinator

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#5908 EBA Engineering Consultants Ltd.	Company Name:	#18501 EBA Engineering Consultants Ltd.	Quotation #:	B10655	MAXXAM JOB #:	BOTTLE ORDER #:
Contact Name:	Accounts Payable	Contact Name:	Kristy Gabelhouse	P.O. #:			
Address:	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Address:	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Project #:	N23103074-01 - CVRD	CHAIN OF CUSTODY #:	PROJECT MANAGER:
Phone:	(250)756-2256 Fax: (250)756-2686	Phone:	(250)756-2256 Fax:	Project Name:	CRWMC		
Email:	dromano@eba.ca, lpaul@eba.ca	Email:	kgabelhouse@eba.ca	Site #:			
				Sampled By:	K. Gabelhouse		

REGULATORY CRITERIA:		SPECIAL INSTRUCTIONS:		ANALYSIS REQUESTED (Please be specific):		TURNAROUND TIME (TAT) REQUIRED:	
☐ CSR							
☐ CCME							
☒ WC Water Quality	DW/AL						
☒ Other	CDWQG						
Bottles have -02 instead of -01 per # (01 is correct)		Please inc. Mercury Sulphur and Hardness		Low Level Dissolved Metals inc. Mercury, Sulphur and Hardness		Regular (Standard) TAT: (will be applied if Rush TAT is not specified):	
						Standard TAT = 5 working days for most tests	
						Please note: Standard TAT for certain tests such as BOD and Dissolved Metals are > 5 days - contact your Project Manager for details	
						Job Specific Rush TAT (if applies to entire submission)	
						1 Day ☐ 2 Day ☐ 3 Day ☐ Date Required: _____	
						Rush Confirmation Number: _____ (Call us for #)	

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM									
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered (Y/N)	(CL, F, NO2, NO3, SO4) ANIONS	AMMONIA-N	Low Level Dissolved Metals inc. Mercury, Sulphur and Hardness	pH / Conductivity / Alkalinity
1 F50942	MBT94-4	Feb 24/13		GW	Y	X	X	X	X
2 F50943	AG99-5	"		"	Y	X	X	X	X
3 F50944	SW2	"		SW	N	X	X	X	X
4 F50945	SW3	"		"	N	X	X	X	X
5 F50946	SW1	"		"	N	X	X	X	X
6 F50947	AG99-6	Feb 22/13		GW	Y	X	X	X	X
7 F50948	EBA11-3	"		"	Y	X	X	X	X
8 F50949	EBA11-4	"		"	Y	X	X	X	X
9									
10									

RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)	Time:	RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)	Time:	# Jars Used and Not Submitted	Laboratory Use Only	
K. Gabelhouse		13/02/22	4:00pm	Norel Pines		13/02/23	10:15		Time Sampled	Temperature (°C) on Receipt
										3, 1, 1
										Custody Seal Intact on Receipt
										☐ Yes ☐ No

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

Your Project #: N23103074-01 - CVRD
 Site Location: CRWMC
 Your C.O.C. #: 35289704, 35289703

Attention: Kristy Gabelhouse

EBA Engineering Consultants Ltd.
 NANAIMO
 #1 - 4376 Boban Drive
 Nanaimo, BC
 CANADA V9T 6A7

Report Date: 2013/03/01

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B314293
Received: 2013/02/22, 09:45

Sample Matrix: Water
 # Samples Received: 16

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	16	2013/02/25	2013/02/25	BBY6SOP-00026	SM2320B
Chloride by Automated Colourimetry	16	N/A	2013/02/25	BBY6SOP-00011	SM-4500-CI-
Conductance - water	16	N/A	2013/02/25	BBY6SOP-00026	SM-2510B
Fluoride	16	N/A	2013/02/25	BBY6SOP-00038	SM - 4500 F C
Hardness (calculated as CaCO3)	16	N/A	2013/02/27	BBY WI-00033	Calculated Parameter
Mercury (Dissolved) by CVAf	1	N/A	2013/02/27	BBY7SOP-00015	EPA 245.7
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	16	N/A	2013/02/27	BBY7SOP-00002	EPA 6020A
Elements by ICPMS Low Level (dissolved)	16	N/A	2013/02/27	BBY7SOP-00002	EPA 6020A
Ammonia-N (Preserved)	16	N/A	2013/02/25	BBY6SOP-00009	SM-4500NH3G
Nitrate + Nitrite (N)	16	N/A	2013/02/23	BBY6SOP-00010	USEPA 353.2
Nitrite (N) by CFA	16	N/A	2013/02/23	BBY6SOP-00010	EPA 353.2
Nitrogen - Nitrate (as N)	16	N/A	2013/02/25	BBY6SOP-00010	Based on EPA 353.2
Filter and HNO3 Preserve for Metals	16	N/A	2013/02/23	BBY6WI-00001	EPA 200.2
pH Water	16	N/A	2013/02/25	BBY6SOP-00026	SM-4500H+B
CSR VH C6-C10 in Water by HS GC/MS	2	N/A	2013/02/28	BBY8SOP-00011	EPA 8260B
CSR VH C6-C10 in Water by HS GC/MS	3	N/A	2013/03/01	BBY8SOP-00011	EPA 8260B
Sulphate by Automated Colourimetry	16	N/A	2013/02/25	BBY6SOP-00017	SM4500-SO42- E
VOCs in Water by HS GC/MS	2	2013/02/27	2013/02/28	BBY8-SOP-0009	EPA 8260C
VOCs in Water by HS GC/MS	3	2013/02/27	2013/03/01	BBY8-SOP-0009	EPA 8260C
Volatile HC-BTEX	5	N/A	2013/03/01	BBY WI-00033	BC MOE Lab Method

* Results relate only to the items tested.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Kim Domino, Burnaby Senior Project Manager
 Email: KDomino@maxxam.ca
 Phone# (604) 638-5018

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 1

Maxxam Job #: B314293
Report Date: 2013/03/01

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01 - CVRD
Site Location: CRWMC
Sampler Initials: KG

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		FS0200	FS0201	FS0202	FS0203	FS0204	FS0205	FS0206	FS0207	FS0208		
Sampling Date		2013/02/20	2013/02/20	2013/02/20	2013/02/20	2013/02/20	2013/02/20	2013/02/20	2013/02/20	2013/02/20		
COC#		35289704	35289704	35289704	35289704	35289704	35289704	35289704	35289704	35289704		
	UNITS	EBA04-2	EBA04-1	EBA04-4	EBA11-2	EBA04-3	AG99-2	AG99-4	EBA04-7	EBA04-8	RDL	QC Batch
ANIONS												
Nitrite (N)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	0.0055	<0.0050	<0.0050	0.0249	0.0271	0.0050	6594050
Calculated Parameters												
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.065	0.141	0.101	0.321	0.093	0.136	0.110	1.43	1.42	0.020	6593740
Misc. Inorganics												
Fluoride (F)	mg/L	0.013	0.019	0.013	0.015	<0.010	0.015	0.014	0.012	0.012	0.010	6597908
Alkalinity (Total as CaCO3)	mg/L	42.5	46.5	61.3	126	102	82.4	50.5	366	350	0.50	6597858
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6597858
Bicarbonate (HCO3)	mg/L	51.8	56.7	74.8	153	124	101	61.6	446	427	0.50	6597858
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6597858
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6597858
Anions												
Dissolved Sulphate (SO4)	mg/L	3.14	2.88	3.46	3.66	2.76	3.21	2.84	28.5	28.6	0.50	6597943
Dissolved Chloride (Cl)	mg/L	1.4	1.3	2.7	8.9	4.4	1.7	2.0	15	15	0.50	6597938
Nutrients												
Ammonia (N)	mg/L	<0.0050	<0.0050	<0.0050	0.0070	<0.0050	0.016	<0.0050	0.0085	0.0062	0.0050	6597852
Nitrate plus Nitrite (N)	mg/L	0.065	0.141	0.101	0.321	0.098	0.136	0.110	1.46	1.44	0.020	6594042
Physical Properties												
Conductivity	uS/cm	96.2	103	134	273	213	170	112	755	725	1.0	6597863
pH	pH Units	7.82	7.83	7.84	8.15	8.07	7.99	7.80	7.98	7.98		6597864

N/A = Not Applicable

RDL = Reportable Detection Limit

Maxxam Job #: B314293
Report Date: 2013/03/01

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01 - CVRD
Site Location: CRWMC
Sampler Initials: KG

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		FS0209	FS0210	FS0211	FS0212	FS0213		FS0214		FS0215		
Sampling Date		2013/02/20	2013/02/21	2013/02/21	2013/02/21	2013/02/21		2013/02/21		2013/02/21		
COC#		35289704	35289703	35289703	35289703	35289703		35289703		35289703		
	UNITS	EBA04-6	EBA11-1	AG99-1	HBT94-1	HBT94-2	RDL	HBT94-3	RDL	HBT94-6	RDL	QC Batch
ANIONS												
Nitrite (N)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	6594050
Calculated Parameters												
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD	FIELD	N/A	FIELD	N/A	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	1.09	0.405	0.110	0.375	<0.020	0.020	0.021	0.020	<0.020	0.020	6593740
Misc. Inorganics												
Fluoride (F)	mg/L	0.011	0.016	0.016	0.014	0.013	0.010	0.024	0.010	0.013	0.010	6597908
Alkalinity (Total as CaCO3)	mg/L	309	160	87.5	238	273	0.50	621	0.50	270	0.50	6597858
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	6597858
Bicarbonate (HCO3)	mg/L	377	195	107	290	333	0.50	758	0.50	330	0.50	6597858
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	6597858
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	6597858
Anions												
Dissolved Sulphate (SO4)	mg/L	7.18	72.0	2.91	5.39	3.63	0.50	2.21	0.50	3.40	0.50	6597943
Dissolved Chloride (Cl)	mg/L	3.9	20	1.6	28	17	0.50	92	0.50	18	0.50	6597938
Nutrients												
Ammonia (N)	mg/L	0.0064	<0.0050	0.011	0.032	0.36	0.0050	27	0.050	0.36	0.0050	6597852
Nitrate plus Nitrite (N)	mg/L	1.09	0.405	0.110	0.375	<0.020	0.020	0.021	0.020	<0.020	0.020	6594042
Physical Properties												
Conductivity	uS/cm	577	502	179	541	552	1.0	1410	1.0	548	1.0	6597863
pH	pH Units	8.21	8.23	8.05	8.08	8.18		7.64		8.18		6597864

MERCURY BY COLD VAPOR (WATER)

Maxxam ID		FS0214		
Sampling Date		2013/02/21		
COC#		35289703		
	UNITS	HBT94-3	RDL	QC Batch
Elements				
Dissolved Mercury (Hg)	ug/L	<0.010	0.010	6603323

N/A = Not Applicable
RDL = Reportable Detection Limit



Maxxam Job #: B314293
Report Date: 2013/03/01

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01 - CVRD
Site Location: CRWMC
Sampler Initials: KG

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		FS0200	FS0201	FS0202	FS0203	FS0204	FS0205	FS0206	FS0207	FS0208		
Sampling Date		2013/02/20	2013/02/20	2013/02/20	2013/02/20	2013/02/20	2013/02/20	2013/02/20	2013/02/20	2013/02/20		
COC#		35289704	35289704	35289704	35289704	35289704	35289704	35289704	35289704	35289704		
	UNITS	EBA04-2	EBA04-1	EBA04-4	EBA11-2	EBA04-3	AG99-2	AG99-4	EBA04-7	EBA04-8	RDL	QC Batch
Misc. Inorganics												
Dissolved Hardness (CaCO ₃)	mg/L	44.4	47.1	59.5	131	103	81.4	50.7	396	398	0.50	6593735

RDL = Reportable Detection Limit

Maxxam Job #: B314293
Report Date: 2013/03/01

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01 - CVRD
Site Location: CRWMC
Sampler Initials: KG

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		FS0200	FS0201	FS0202	FS0203	FS0204	FS0205	FS0206	FS0207	FS0208		
Sampling Date		2013/02/20	2013/02/20	2013/02/20	2013/02/20	2013/02/20	2013/02/20	2013/02/20	2013/02/20	2013/02/20		
COC#		35289704	35289704	35289704	35289704	35289704	35289704	35289704	35289704	35289704		
	UNITS	EBA04-2	EBA04-1	EBA04-4	EBA11-2	EBA04-3	AG99-2	AG99-4	EBA04-7	EBA04-8	RDL	QC Batch
Dissolved Metals by ICPMS												
Dissolved Aluminum (Al)	mg/L	0.00592	0.00364	0.00511	0.0293	0.00348	0.00569	0.00521	0.00088	0.00096	0.00020	6602181
Dissolved Antimony (Sb)	mg/L	0.000028	0.000022	0.000026	<0.000020	<0.000020	0.000032	0.000026	0.000029	0.000031	0.000020	6602181
Dissolved Arsenic (As)	mg/L	0.000219	0.000532	0.000254	0.000161	0.000102	0.00223	0.000394	0.000147	0.000191	0.000020	6602181
Dissolved Barium (Ba)	mg/L	0.000627	0.000872	0.000881	0.00573	0.00313	0.00385	0.000683	0.0155	0.0155	0.000020	6602181
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	6602181
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	6602181
Dissolved Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.298	0.304	0.050	6602181
Dissolved Cadmium (Cd)	mg/L	0.0000050	0.0000060	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000350	0.0000300	0.0000050	6602181
Dissolved Chromium (Cr)	mg/L	<0.00010	0.00025	<0.00010	0.00188	<0.00010	0.00030	<0.00010	<0.00010	<0.00010	0.00010	6602181
Dissolved Cobalt (Co)	mg/L	0.0000050	0.0000060	0.0000120	0.0000250	0.0000060	0.0000050	0.0000110	0.000403	0.000434	0.0000050	6602181
Dissolved Copper (Cu)	mg/L	0.000246	0.00652	0.000269	0.000254	0.000105	0.000171	0.000252	0.00235	0.00239	0.000050	6602181
Dissolved Iron (Fe)	mg/L	0.0019	0.0012	0.0010	0.0312	0.0052	0.0025	<0.0010	0.0026	0.0027	0.0010	6602181
Dissolved Lead (Pb)	mg/L	0.0000070	0.0000780	<0.0000050	0.0000070	<0.0000050	0.0000060	<0.0000050	0.0000050	<0.0000050	0.0000050	6602181
Dissolved Lithium (Li)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00083	0.00086	0.00050	6602181
Dissolved Manganese (Mn)	mg/L	<0.000050	0.000073	<0.000050	0.000870	0.000484	<0.000050	<0.000050	0.117	0.118	0.000050	6602181
Dissolved Mercury (Hg)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	6602181
Dissolved Molybdenum (Mo)	mg/L	0.000135	0.000101	0.000129	0.000062	0.000119	0.000156	0.000129	0.000089	0.000079	0.000050	6602181
Dissolved Nickel (Ni)	mg/L	<0.000020	<0.000020	<0.000020	0.000083	<0.000020	<0.000020	<0.000020	0.00108	0.00113	0.000020	6602181
Dissolved Selenium (Se)	mg/L	0.000108	0.000119	0.000168	0.000095	0.000088	0.000179	0.000128	0.000063	0.000052	0.000040	6602181
Dissolved Silicon (Si)	mg/L	3.71	5.15	4.06	8.30	5.46	4.84	3.78	11.8	11.8	0.10	6602181
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	6602181
Dissolved Strontium (Sr)	mg/L	0.0227	0.0227	0.0336	0.0801	0.0666	0.0340	0.0254	0.294	0.294	0.000050	6602181
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000030	<0.0000020	<0.0000020	<0.0000020	0.0000060	0.0000050	0.0000020	6602181
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	6602181
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00133	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6602181
Dissolved Uranium (U)	mg/L	0.0000110	0.0000250	0.0000270	0.000184	0.0000870	0.000276	0.0000270	0.000999	0.00100	0.0000020	6602181
Dissolved Vanadium (V)	mg/L	0.00189	0.00439	0.00236	0.00257	0.00094	0.0198	0.00286	0.00155	0.00159	0.00020	6602181
Dissolved Zinc (Zn)	mg/L	0.00063	0.0259	0.00028	0.00027	0.00019	0.00035	0.00012	0.00019	0.00027	0.00010	6602181
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	6602181
Dissolved Calcium (Ca)	mg/L	15.1	15.3	20.6	37.7	33.7	26.7	17.3	116	117	0.050	6593747
Dissolved Magnesium (Mg)	mg/L	1.61	2.13	1.93	8.97	4.53	3.57	1.83	26.0	25.9	0.050	6593747
Dissolved Potassium (K)	mg/L	0.200	0.292	0.325	0.742	0.578	1.13	0.288	1.92	1.94	0.050	6593747
Dissolved Sodium (Na)	mg/L	1.14	1.48	1.82	3.58	2.28	1.49	1.40	16.9	17.1	0.050	6593747
Dissolved Sulphur (S)	mg/L	0.81	<0.60	0.77	0.77	0.61	0.88	<0.60	9.43	9.35	0.60	6602181

RDL = Reportable Detection Limit

Maxxam Job #: B314293
Report Date: 2013/03/01

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01 - CVRD
Site Location: CRWMC
Sampler Initials: KG

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		FS0209	FS0210	FS0211	FS0212	FS0213	FS0214	FS0215		
Sampling Date		2013/02/20	2013/02/21	2013/02/21	2013/02/21	2013/02/21	2013/02/21	2013/02/21		
COC#		35289704	35289703	35289703	35289703	35289703	35289703	35289703		
	UNITS	EBA04-6	EBA11-1	AG99-1	HBT94-1	HBT94-2	HBT94-3	HBT94-6	RDL	QC Batch
Misc. Inorganics										
Dissolved Hardness (CaCO3)	mg/L	301	242	86.4	214	265	428	259	0.50	6593735

RDL = Reportable Detection Limit

Maxxam Job #: B314293
Report Date: 2013/03/01

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01 - CVRD
Site Location: CRWMC
Sampler Initials: KG

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		FS0209	FS0210	FS0211	FS0212	FS0213	FS0214	FS0215		
Sampling Date		2013/02/20	2013/02/21	2013/02/21	2013/02/21	2013/02/21	2013/02/21	2013/02/21		
COC#		35289704	35289703	35289703	35289703	35289703	35289703	35289703		
	UNITS	EBA04-6	EBA11-1	AG99-1	HBT94-1	HBT94-2	HBT94-3	HBT94-6	RDL	QC Batch
Dissolved Metals by ICPMS										
Dissolved Aluminum (Al)	mg/L	0.00187	0.00312	0.00271	0.00127	0.00401	0.00286	0.00522	0.00020	6602181
Dissolved Antimony (Sb)	mg/L	0.000020	<0.000020	0.000030	0.000109	<0.000020	0.000051	<0.000020	0.000020	6602181
Dissolved Arsenic (As)	mg/L	0.000091	0.000233	0.00102	0.000175	0.00233	0.00194	0.00233	0.000020	6602181
Dissolved Barium (Ba)	mg/L	0.00725	0.00650	0.00148	0.00499	0.0103	0.0671	0.0100	0.000020	6602181
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	6602181
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	6602181
Dissolved Boron (B)	mg/L	<0.050	0.065	<0.050	0.290	0.147	0.992	0.148	0.050	6602181
Dissolved Cadmium (Cd)	mg/L	0.0000190	<0.0000050	<0.0000050	0.000130	0.0000310	0.000108	0.0000310	0.0000050	6602181
Dissolved Chromium (Cr)	mg/L	0.00055	0.00103	0.00023	<0.00010	<0.00010	0.00021	<0.00010	0.00010	6602181
Dissolved Cobalt (Co)	mg/L	0.000090	0.0000160	<0.0000050	0.000163	0.000127	0.00352	0.000134	0.0000050	6602181
Dissolved Copper (Cu)	mg/L	0.000301	0.000263	0.000192	0.00252	0.000138	0.000751	0.000153	0.000050	6602181
Dissolved Iron (Fe)	mg/L	<0.0010	<0.0010	<0.0010	0.0060	0.133	5.15	0.251	0.0010	6602181
Dissolved Lead (Pb)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000070	0.0000350	0.0000120	<0.0000050	0.0000050	6602181
Dissolved Lithium (Li)	mg/L	0.00056	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6602181
Dissolved Manganese (Mn)	mg/L	<0.000050	0.000052	<0.000050	0.0572	1.38	4.24	1.34	0.000050	6602181
Dissolved Mercury (Hg)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010		<0.000010	0.000010	6602181
Dissolved Molybdenum (Mo)	mg/L	<0.000050	<0.000050	0.000125	0.000505	0.000185	0.000225	0.000197	0.000050	6602181
Dissolved Nickel (Ni)	mg/L	0.000099	0.000112	<0.000020	0.00143	0.000939	0.00527	0.000933	0.000020	6602181
Dissolved Selenium (Se)	mg/L	<0.000040	0.000162	0.000117	0.000045	<0.000040	0.000123	<0.000040	0.000040	6602181
Dissolved Silicon (Si)	mg/L	9.77	5.89	5.75	5.32	7.63	14.3	7.61	0.10	6602181
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	6602181
Dissolved Strontium (Sr)	mg/L	0.194	0.144	0.0414	0.211	0.177	0.565	0.171	0.000050	6602181
Dissolved Thallium (Tl)	mg/L	0.0000020	0.0000020	<0.0000020	0.0000020	0.0000040	<0.0000020	0.0000020	0.0000020	6602181
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00026	<0.00020	0.00020	6602181
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00069	<0.00050	0.00050	6602181
Dissolved Uranium (U)	mg/L	0.000361	0.000652	0.0000850	0.0000880	0.000167	0.000262	0.000164	0.0000020	6602181
Dissolved Vanadium (V)	mg/L	0.00134	0.00445	0.00637	0.00077	0.00053	0.00352	0.00060	0.00020	6602181
Dissolved Zinc (Zn)	mg/L	0.00018	0.00024	0.00013	0.00114	<0.00010	0.00141	0.00014	0.00010	6602181
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00031	<0.00010	0.00010	6602181
Dissolved Calcium (Ca)	mg/L	90.6	74.0	27.9	72.4	90.4	131	88.2	0.050	6593747
Dissolved Magnesium (Mg)	mg/L	18.1	13.9	4.10	8.16	9.63	24.8	9.32	0.050	6593747
Dissolved Potassium (K)	mg/L	1.42	0.793	0.644	6.58	1.88	16.5	1.82	0.050	6593747
Dissolved Sodium (Na)	mg/L	6.10	4.76	1.57	25.4	13.3	83.4	12.9	0.050	6593747
Dissolved Sulphur (S)	mg/L	1.90	23.0	0.84	1.51	0.82	1.89	0.96	0.60	6602181

RDL = Reportable Detection Limit

Maxxam Job #: B314293
Report Date: 2013/03/01

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01 - CVRD
Site Location: CRWMC
Sampler Initials: KG

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		FS0204	FS0206	FS0207	FS0210	FS0213		
Sampling Date		2013/02/20	2013/02/20	2013/02/20	2013/02/21	2013/02/21		
COC#		35289704	35289704	35289704	35289703	35289703		
	UNITS	EBA04-3	AG99-4	EBA04-7	EBA11-1	HBT94-2	RDL	QC Batch
Volatiles								
VPH (VH6 to 10 - BTEX)	ug/L	<300	<300	<300	<300	<300	300	6593793
Volatile Hydrocarbons								
VH C6-C10	ug/L	<300	<300	<300	<300	<300	300	6606150
Volatiles								
Chloromethane	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	6603481
Vinyl chloride	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6603481
Chloroethane	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	6603481
Trichlorofluoromethane	mg/L	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	0.0040	6603481
1,1-dichloroethene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6603481
Dichloromethane	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	6603481
trans-1,2-dichloroethene	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	6603481
1,1-dichloroethane	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6603481
cis-1,2-dichloroethene	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	6603481
Chloroform	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	6603481
1,1,1-trichloroethane	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6603481
1,2-dichloroethane	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6603481
Carbon tetrachloride	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6603481
Benzene	mg/L	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.00040	6603481
Methyl-tert-butylether (MTBE)	mg/L	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	0.0040	6603481
1,2-dichloropropane	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6603481
cis-1,3-dichloropropene	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	6603481
trans-1,3-dichloropropene	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	6603481
Bromomethane	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	6603481
1,1,2-trichloroethane	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6603481
Trichloroethene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6603481
Chlorodibromomethane	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	6603481
Tetrachloroethene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6603481
Bromodichloromethane	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	6603481
Toluene	mg/L	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.00040	6603481
Ethylbenzene	mg/L	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.00040	6603481
m & p-Xylene	mg/L	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.00040	6603481
Bromoform	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	6603481
Styrene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6603481
o-Xylene	mg/L	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.00040	6603481
Xylenes (Total)	mg/L	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.00040	6603481

RDL = Reportable Detection Limit

Maxxam Job #: B314293
Report Date: 2013/03/01

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01 - CVRD
Site Location: CRWMC
Sampler Initials: KG

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		FS0204	FS0206	FS0207	FS0210	FS0213		
Sampling Date		2013/02/20	2013/02/20	2013/02/20	2013/02/21	2013/02/21		
COC#		35289704	35289704	35289704	35289703	35289703		
	UNITS	EBA04-3	AG99-4	EBA04-7	EBA11-1	HBT94-2	RDL	QC Batch
1,1,1,2-tetrachloroethane	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6603481
1,1,2,2-tetrachloroethane	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6603481
1,2-dichlorobenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6603481
1,3-dichlorobenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6603481
1,4-dichlorobenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6603481
Chlorobenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6603481
Dibromomethane	mg/L	<0.00090	<0.00090	<0.00090	<0.00090	<0.00090	0.00090	6603481
Surrogate Recovery (%)								
1,4-Difluorobenzene (sur.)	%	99	100	100	96	99		6603481
4-BROMOFLUOROBENZENE (sur.)	%	104	100	103	91	94		6603481
D4-1,2-DICHLOROETHANE (sur.)	%	120	117	124	129	125		6603481

RDL = Reportable Detection Limit

Maxxam Job #: B314293
Report Date: 2013/03/01

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01 - CVRD
Site Location: CRWMC
Sampler Initials: KG

General Comments

Sample FS0200-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample FS0201-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample FS0202-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample FS0203-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample FS0204-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample FS0205-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample FS0206-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample FS0207-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample FS0208-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample FS0209-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample FS0210-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample FS0211-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample FS0212-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample FS0213-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Maxxam Job #: B314293
Report Date: 2013/03/01

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01 - CVRD
Site Location: CRWMC
Sampler Initials: KG

pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample FS0214-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample FS0215-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Maxxam Job #: B314293
Report Date: 2013/03/01

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01 - CVRD
Site Location: CRWMC
Sampler Initials: KG

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6594042	Nitrate plus Nitrite (N)	2013/02/23	108	80 - 120	106	80 - 120	<0.020	mg/L	0.4	25
6594050	Nitrite (N)	2013/02/23	99	80 - 120	101	80 - 120	<0.0050	mg/L	NC	20
6597852	Ammonia (N)	2013/02/25	100	80 - 120	98	80 - 120	<0.0050	mg/L	0.2	20
6597858	Alkalinity (Total as CaCO ₃)	2013/02/25	NC	80 - 120	97	80 - 120	<0.50	mg/L	0.1	20
6597858	Alkalinity (PP as CaCO ₃)	2013/02/25					<0.50	mg/L	NC	20
6597858	Bicarbonate (HCO ₃)	2013/02/25					<0.50	mg/L	0.2	20
6597858	Carbonate (CO ₃)	2013/02/25					<0.50	mg/L	NC	20
6597858	Hydroxide (OH)	2013/02/25					<0.50	mg/L	NC	20
6597863	Conductivity	2013/02/25			99	80 - 120	<1.0	uS/cm	0	20
6597908	Fluoride (F)	2013/02/25	88	80 - 120	100	80 - 120	<0.010	mg/L	NC	20
6597938	Dissolved Chloride (Cl)	2013/02/25	94	80 - 120	103	80 - 120	<0.50	mg/L	5.0	20
6597943	Dissolved Sulphate (SO ₄)	2013/02/25	90	80 - 120	99	80 - 120	<0.50	mg/L	3.2	20
6602181	Dissolved Aluminum (Al)	2013/02/27	101	80 - 120	105	80 - 120	<0.00020	mg/L	NC	20
6602181	Dissolved Antimony (Sb)	2013/02/27	100	80 - 120	98	80 - 120	<0.000020	mg/L	NC	20
6602181	Dissolved Arsenic (As)	2013/02/27	100	80 - 120	98	80 - 120	<0.000020	mg/L	NC	20
6602181	Dissolved Barium (Ba)	2013/02/27	98	80 - 120	101	80 - 120	<0.000020	mg/L	NC	20
6602181	Dissolved Beryllium (Be)	2013/02/27	96	80 - 120	98	80 - 120	<0.000010	mg/L	NC	20
6602181	Dissolved Bismuth (Bi)	2013/02/27	94	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
6602181	Dissolved Cadmium (Cd)	2013/02/27	102	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
6602181	Dissolved Chromium (Cr)	2013/02/27	98	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
6602181	Dissolved Cobalt (Co)	2013/02/27	98	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
6602181	Dissolved Copper (Cu)	2013/02/27	98	80 - 120	102	80 - 120	<0.000050	mg/L	NC	20
6602181	Dissolved Iron (Fe)	2013/02/27	103	80 - 120	107	80 - 120	<0.0010	mg/L	NC	20
6602181	Dissolved Lead (Pb)	2013/02/27	95	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
6602181	Dissolved Lithium (Li)	2013/02/27	93	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
6602181	Dissolved Manganese (Mn)	2013/02/27	96	80 - 120	101	80 - 120	<0.000050	mg/L	NC	20
6602181	Dissolved Mercury (Hg)	2013/02/27	95	80 - 120	94	80 - 120	<0.000010	mg/L	NC	20
6602181	Dissolved Molybdenum (Mo)	2013/02/27	93	80 - 120	103	80 - 120	<0.000050	mg/L	NC	20
6602181	Dissolved Nickel (Ni)	2013/02/27	99	80 - 120	103	80 - 120	<0.000020	mg/L	NC	20
6602181	Dissolved Selenium (Se)	2013/02/27	106	80 - 120	107	80 - 120	<0.000040	mg/L	NC	20
6602181	Dissolved Silver (Ag)	2013/02/27	98	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
6602181	Dissolved Strontium (Sr)	2013/02/27	95	80 - 120	100	80 - 120	<0.000050	mg/L	NC	20
6602181	Dissolved Thallium (Tl)	2013/02/27	92	80 - 120	101	80 - 120	<0.0000020	mg/L	NC	20
6602181	Dissolved Tin (Sn)	2013/02/27	102	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
6602181	Dissolved Titanium (Ti)	2013/02/27	104	80 - 120	107	80 - 120	<0.00050	mg/L	NC	20
6602181	Dissolved Uranium (U)	2013/02/27	92	80 - 120	97	80 - 120	<0.0000020	mg/L	NC	20
6602181	Dissolved Vanadium (V)	2013/02/27	99	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
6602181	Dissolved Zinc (Zn)	2013/02/27	109	80 - 120	106	80 - 120	<0.00010	mg/L	NC	20
6602181	Dissolved Boron (B)	2013/02/27					<0.050	mg/L	NC	20
6602181	Dissolved Silicon (Si)	2013/02/27					<0.10	mg/L	NC	20

Maxxam Job #: B314293
Report Date: 2013/03/01

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01 - CVRD
Site Location: CRWMC
Sampler Initials: KG

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6602181	Dissolved Zirconium (Zr)	2013/02/27					<0.00010	mg/L	NC	20
6602181	Dissolved Sulphur (S)	2013/02/27					<0.60	mg/L		
6603323	Dissolved Mercury (Hg)	2013/02/27	102	80 - 120	87	80 - 120	<0.010	ug/L	NC	20
6603481	1,4-Difluorobenzene (sur.)	2013/02/28	97	70 - 130	99	70 - 130	94	%		
6603481	4-BROMOFLUOROBENZENE (sur.)	2013/02/28	101	70 - 130	107	70 - 130	90	%		
6603481	D4-1,2-DICHLOROETHANE (sur.)	2013/02/28	115	70 - 130	109	70 - 130	128	%		
6603481	Chloromethane	2013/02/28	107	60 - 140	128	60 - 140	<0.0010	mg/L	NC	30
6603481	Vinyl chloride	2013/02/28	135	60 - 140	129	60 - 140	<0.00050	mg/L	6.0	30
6603481	Chloroethane	2013/02/28	125	60 - 140	99	60 - 140	<0.0010	mg/L	NC	30
6603481	Trichlorofluoromethane	2013/02/28	163 ₍₁₎	60 - 140	153 _(1, 2)	60 - 140	<0.0040	mg/L	NC	30
6603481	1,1-dichloroethene	2013/02/28	111	70 - 130	107	70 - 130	<0.00050	mg/L	NC	30
6603481	Dichloromethane	2013/02/28	116	70 - 130	113	70 - 130	<0.0020	mg/L	NC	30
6603481	trans-1,2-dichloroethene	2013/02/28	114	70 - 130	107	70 - 130	<0.0010	mg/L	NC	30
6603481	1,1-dichloroethane	2013/02/28	113	70 - 130	109	70 - 130	<0.00050	mg/L	NC	30
6603481	cis-1,2-dichloroethene	2013/02/28	111	70 - 130	108	70 - 130	<0.0010	mg/L	1	30
6603481	Chloroform	2013/02/28	105	70 - 130	102	70 - 130	<0.0010	mg/L	NC	30
6603481	1,1,1-trichloroethane	2013/02/28	112	70 - 130	109	70 - 130	<0.00050	mg/L	NC	30
6603481	1,2-dichloroethane	2013/02/28	108	70 - 130	103	70 - 130	<0.00050	mg/L	NC	30
6603481	Carbon tetrachloride	2013/02/28	112	70 - 130	111	70 - 130	<0.00050	mg/L	NC	30
6603481	Benzene	2013/02/28	115	70 - 130	111	70 - 130	<0.00040	mg/L	NC	30
6603481	Methyl-tert-butylether(MTBE)	2013/02/28	104	70 - 130	102	70 - 130	<0.0040	mg/L	NC	30
6603481	1,2-dichloropropane	2013/02/28	116	70 - 130	113	70 - 130	<0.00050	mg/L	NC	30
6603481	cis-1,3-dichloropropene	2013/02/28	91	70 - 130	98	70 - 130	<0.0010	mg/L	NC	30
6603481	trans-1,3-dichloropropene	2013/02/28	66 ₍₁₎	70 - 130	73	70 - 130	<0.0010	mg/L	NC	30
6603481	Bromomethane	2013/02/28	92	60 - 140	93	60 - 140	<0.0010	mg/L	NC	30
6603481	1,1,2-trichloroethane	2013/02/28	103	70 - 130	104	70 - 130	<0.00050	mg/L	NC	30
6603481	Trichloroethene	2013/02/28	106	70 - 130	105	70 - 130	<0.00050	mg/L	3.3	30
6603481	Chlorodibromomethane	2013/02/28	106	70 - 130	105	70 - 130	<0.0010	mg/L	NC	30
6603481	Tetrachloroethene	2013/02/28	NC	70 - 130	109	70 - 130	<0.00050	mg/L	3.8	30
6603481	Bromodichloromethane	2013/02/28	109	70 - 130	106	70 - 130	<0.0010	mg/L	NC	30
6603481	Toluene	2013/02/28	104	70 - 130	107	70 - 130	<0.00040	mg/L	NC	30
6603481	Ethylbenzene	2013/02/28	108	70 - 130	109	70 - 130	<0.00040	mg/L	NC	30
6603481	m & p-Xylene	2013/02/28	104	70 - 130	105	70 - 130	<0.00040	mg/L	NC	30
6603481	Bromoform	2013/02/28	103	70 - 130	107	70 - 130	<0.0010	mg/L	NC	30
6603481	Styrene	2013/02/28	93	70 - 130	95	70 - 130	<0.00050	mg/L	NC	30
6603481	o-Xylene	2013/02/28	119	70 - 130	120	70 - 130	<0.00040	mg/L	NC	30
6603481	1,1,1,2-tetrachloroethane	2013/02/28	106	70 - 130	104	70 - 130	<0.00050	mg/L	NC	30
6603481	1,1,2,2-tetrachloroethane	2013/02/28	114	70 - 130	110	70 - 130	<0.00050	mg/L	NC	30
6603481	1,2-dichlorobenzene	2013/02/28	126	70 - 130	122	70 - 130	<0.00050	mg/L	NC	30
6603481	1,3-dichlorobenzene	2013/02/28	123	70 - 130	119	70 - 130	<0.00050	mg/L	NC	30

Maxxam Job #: B314293
Report Date: 2013/03/01

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01 - CVRD
Site Location: CRWMC
Sampler Initials: KG

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6603481	1,4-dichlorobenzene	2013/02/28	115	70 - 130	113	70 - 130	<0.00050	mg/L	NC	30
6603481	Chlorobenzene	2013/02/28	113	70 - 130	112	70 - 130	<0.00050	mg/L	NC	30
6603481	Dibromomethane	2013/02/28	103	70 - 130	105	70 - 130	<0.00090	mg/L	NC	30
6603481	Xylenes (Total)	2013/02/28					<0.00040	mg/L	NC	30
6606150	VH C6-C10	2013/02/28			99	70 - 130	<300	ug/L		

N/A = Not Applicable

RPD = Relative Percent Difference

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.

NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

(1) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) - LCS recovery above control limit

Validation Signature Page

Maxxam Job #: B314293

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Andy Lu, Data Validation Coordinator

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#5908 EBA Engineering Consultants Ltd.	Company Name:	#18501 EBA Engineering Consultants Ltd.	Question #:	B10655	MAXXAM JOB #:	B314293
Contact Name:	Accounts Payable	Contact Name:	Kristy Gabelhouse	P.O. #:			
Address:	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Address:	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Project #:	N23103074 - CVRD	CHAIN OF CUSTODY #:	
Phone:	(250)756-2256 Fax: (250)756-2686	Phone:	(250)756-2256 Fax:	Project Name:	N23103074.01		
Email:	dromano@eba.ca lpaul@eba.ca	Email:	kgabelhouse@eba.ca	Site #:	CRWMC	PROJECT MANAGER:	Ken Domino
				Sampled By:	K. Gabelhouse		

REGULATORY CRITERIA:	SPECIAL INSTRUCTIONS:	ANALYSIS REQUESTED (Please be specific):	TURNAROUND TIME (TAT) REQUIRED:
☐ CSR ☐ CCME ☒ Water Quality DW/AL ☒ Other CDWQG	Please include Mercury, Sulphur and Hardness	ANALYSIS REQUESTED (Please be specific): Metals Field Filtered? (Y/N) _____ (CL, F, NO2, NO3, SO4) ANIONS _____ AMMONIA-N _____ Low Level Dissolved Metals inc. Mercury, Sulphur and Hardness _____ pH / Conductivity / Alkalinity _____ Low Level Total Metals inc. Mercury, Sulphur and Hardness _____ CSR VOC + VPH _____	TURNAROUND TIME (TAT) REQUIRED: PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS: Regular (Standard) TAT: (will be applied if Rush TAT is not specified). (Standard TAT = 5 working days for metals tests). Please note: Standard TAT for certain tests such as BOD and Dissolved Metals are > 5 days - contact your Project Manager for details. Job Specific Rush TAT (if applies to entire submission) _____ 1 Day ☐ 2 Day ☐ 3 Day ☐ Date Required: _____

SAMPLES MUST BE KEPT COOL (+ 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM						Rush Confirmation Number: _____ (call lab for #)						
Sample Barcode Label	Sample Location/Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered? (CL, F, NO ₂ , NO ₃ , SO ₄) ANIONS	AMMONIA-N	Low Level Dissolved Metals inc. Mercury, Sulphur and Hardness	pH / Conductivity / Alkalinity	Low Level Total Metals inc. Mercury, Sulphur and Hardness	CSR VOC + VPH	# of Batches	Comments
FS0200	EBA04-2	Feb 20/13	- GW		Y	X	X	X	X		4	
FS0201	EBA04-1	"	"		Y	X	X	X	X		4	
FS0202	EBA04-4	"	"		Y	X	X	X	X		4	
FS0203	EBA11-2	"	"		Y	X	X	X	X		4	
FS0204	EBA04-3	"	"		Y	X	X	X	X	X	7	
FS0205	AG99-2	"	"		Y	X	X	X	X		4	
FS0206	AG99-4	"	"		Y	X	X	X	X	X	7	
FS0207	EBA04-7	"	"		Y	X	X	X	X	X	7	
FS0208	EBA04-8	"	"		Y	X	X	X	X		4	
FS0209	EBA04-6	"	"		Y	X	X	X	X		4	


B314293

RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time:	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time:	# Jars Used and Not Submitted:	Laboratory Use Only
K. Gabelhouse	13/02/21	2:00pm	Laurel Bernier	13/02/21	09:45		Time Sensitive: ☐ Temperature OK on Receipt: ☐ Seal intact on Receipt? ☐ Yes ☐ No 32.3

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#5908 EBA Engineering Consultants Ltd.	Company Name:	#18501 EBA Engineering Consultants Ltd.	Quotation #:	B10655	MAXXAM JOB #:	B314293
Contact Name:	Accounts Payable	Contact Name:	Kristy Gabelhouse	P.O. #:		BOTTLE ORDER #:	352807
Address:	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Address:	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Project #:	N23103074-01 - CVRD	CHAIN OF CUSTODY #:	
Phone:	(250)756-2256 Fax: (250)756-2686	Phone:	(250)756-2256 Fax:	Project Name:	CRWMC	PROJECT MANAGER:	Kim Domingo
Email:	dromano@eba.ca lpaul@eba.ca	Email:	kgabelhouse@eba.ca	Site #:			
				Sampled By:	K. Gabelhouse		CR352807-03-01

REGULATORY CRITERIA:	SPECIAL INSTRUCTIONS:	ANALYSIS REQUESTED (Please be specific):	TURNAROUND TIME (TAT) REQUIRED:
☐ CSR ☐ OCME ☒ BC Water Quality ☒ Other CDWQA	Please inc. Mercury, Sulphur and Hardness	Metals Field Filtered 7 (Y/N) (CL, F, NO2, NO3, SO4) ANIONS AMMONIA-N Low Level Dissolved Metals plus Mercury, Sulphur and Hardness pH / Conductivity / Alkalinity Low Level Total Metals CSR VOC + VPH	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS Regular (Standard) TAT: (will be applied if Rush TAT is not specified) Standard TAT = 8 working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dissolved Fluores are + 5 days - contact your Project Manager for details. Job Specific Rush TAT (if applies to entire submission) 1 Day ☐ 2 Day ☐ 3 Day ☐ Date Required: ☐ Rush Confirmation Number: ☐ (Call 604 for #)

SAMPLES MUST BE KEPT COOL (+ 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM													
Sample Barcode Label	Sample Location Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered 7 (Y/N)	(CL, F, NO ₂ , NO ₃ , SO ₄) ANIONS	AMMONIA-N	Low Level Dissolved Metals plus Mercury, Sulphur and Hardness	pH / Conductivity / Alkalinity	Low Level Total Metals	CSR VOC + VPH	# of Bottles	Comments
1 FS0210	EBA11-1	Feb 21/13	GW	Y	X	X	X	X	X		X	7	
2 FS0211	AG99-1	"	"	Y	X	X	X	X				4	
3 FS0212	HBT94-1	"	"	Y	X	X	X	X				4	
4 FS0213	HBT94-2	"	"	Y	X	X	X	X		X		7	
5 FS0214	HBT94-3	"	"	Y	X	X	X	X				4	
6 FS0215	HBT94-6	"	"	Y	X	Y	X	X				4	
7													
8													
9													
10													



B314293

RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time:	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time:	# Jars Used and Not Submitted	Laboratory Use Only
K. Gabelhouse	13/02/21	2:00pm	K. Gabelhouse	13/02/22	09:45		Time Sensitive ☐ Temperature (°C) on Receipt: 3, 2, 3 Chain of Custody Test on: NA ☐ Yes ☐ No

Your Project #: CRWMC - N23103074-01

Site#: CRWMC

Your C.O.C. #: 37657305, 37657306

Attention: KRISTY GABELHOUSE

EBA Engineering Consultants Ltd.

NANAIMO

#1 - 4376 Boban Drive

Nanaimo, BC

CANADA V9T 6A7

Report Date: 2013/06/05

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B343413
Received: 2013/05/30, 08:40

Sample Matrix: Water

Samples Received: 13

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	5	2013/05/31	2013/05/31	BBY6SOP-00026	SM2320B
Alkalinity - Water	8	2013/06/03	2013/06/03	BBY6SOP-00026	SM2320B
Chloride by Automated Colourimetry	2	N/A	2013/05/30	BBY6SOP-00011	SM-4500-Cl-
Chloride by Automated Colourimetry	11	N/A	2013/05/31	BBY6SOP-00011	SM-4500-Cl-
Conductance - water	5	N/A	2013/05/31	BBY6SOP-00026	SM-2510B
Conductance - water	8	N/A	2013/06/03	BBY6SOP-00026	SM-2510B
Fluoride	13	N/A	2013/05/31	BBY6SOP-00012	SM - 4500 F C
Hardness (calculated as CaCO3)	13	N/A	2013/06/04	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	13	N/A	2013/06/04	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (dissolved)	13	N/A	2013/06/03	BBY7SOP-00002	EPA 6020A
Ammonia-N (Preserved)	13	N/A	2013/05/31	BBY6SOP-00009	SM-4500NH3G
Nitrate + Nitrite (N)	2	N/A	2013/05/30	BBY6SOP-00010	SM 4500NO3-I
Nitrate + Nitrite (N)	11	N/A	2013/05/31	BBY6SOP-00010	SM 4500NO3-I
Nitrite (N) by CFA	2	N/A	2013/05/30	BBY6SOP-00010	EPA 353.2
Nitrite (N) by CFA	11	N/A	2013/05/31	BBY6SOP-00010	EPA 353.2
Nitrogen - Nitrate (as N)	2	N/A	2013/05/31	BBY6SOP-00010	SM 4500NO3-I
Nitrogen - Nitrate (as N)	11	N/A	2013/06/03	BBY6SOP-00010	SM 4500NO3-I
Filter and HNO3 Preserve for Metals	13	N/A	2013/05/30	BBY6WI-00001	EPA 200.2
pH Water	5	N/A	2013/05/31	BBY6SOP-00026	SM-4500H+B
pH Water	8	N/A	2013/06/03	BBY6SOP-00026	SM-4500H+B
CSR VH C6-C10 in Water by HS GC/MS	4	N/A	2013/05/31	BBY8SOP-00011	EPA 8260B
Sulphate by Automated Colourimetry	2	N/A	2013/05/30	BBY6SOP-00017	SM4500-SO42- E
Sulphate by Automated Colourimetry	11	N/A	2013/05/31	BBY6SOP-00017	SM4500-SO42- E
VOCs in Water by HS GC/MS	4	2013/05/30	2013/05/31	BBY8-SOP-0009	EPA 8260C
Volatile HC-BTEX	2	N/A	2013/05/31	BBY WI-00033	BC MOE Lab Method
Volatile HC-BTEX	2	N/A	2013/06/03	BBY WI-00033	BC MOE Lab Method

* Results relate only to the items tested.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Crystal Ireland, B.Sc., Account Specialist

Email: C.Ireland@maxxam.ca

Phone# (604) 538-5016

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Maxxam Job #: B343413
Report Date: 2013/06/05

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01

Sampler Initials: DT

-2-

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 2

Maxxam Job #: B343413
Report Date: 2013/06/05

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01

Sampler Initials: DT

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		GM9786	GM9787	GM9788	GM9789	GM9790	GM9791	GM9792		GM9793		
Sampling Date		2013/05/28	2013/05/28	2013/05/28	2013/05/28	2013/05/28	2013/05/28	2013/05/29		2013/05/29		
COC#		37657305	37657305	37657305	37657305	37657305	37657305	37657305		37657305		
	UNITS	AG99-01	EBA04-1	EBA04-2	EBA04-3	EBA04-4	EBA11-2	HBT94-2	QC Batch	HBT94-4	RDL	QC Batch
ANIONS												
Nitrite (N)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	6863898	<0.0050	0.0050	6863898
Calculated Parameters												
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	ONSITE	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.171	0.055	0.055	0.363	0.144	0.485	<0.020	6856734	0.157	0.020	6856734
Misc. Inorganics												
Fluoride (F)	mg/L	0.017	0.019	0.016	<0.010	0.016	0.021	0.017	6861468	0.019	0.010	6861468
Alkalinity (Total as CaCO3)	mg/L	100	39.0	39.7	200	50.7	128	185	6865224	93.0	0.50	6863861
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.17	6865224	<0.50	0.50	6863861
Bicarbonate (HCO3)	mg/L	123	47.5	48.5	244	61.9	156	218	6865224	114	0.50	6863861
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.80	6865224	<0.50	0.50	6863861
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	6865224	<0.50	0.50	6863861
Anions												
Dissolved Sulphate (SO4)	mg/L	3.26	2.65	2.91	4.96	2.71	5.00	3.41	6865513	3.74	0.50	6865513
Dissolved Chloride (Cl)	mg/L	2.9	1.1	1.8	4.8	2.2	5.6	8.5	6865494	1.9	0.50	6865494
Nutrients												
Ammonia (N)	mg/L	0.033	0.011	0.020	0.0080	0.013	0.017	0.31	6860942	0.012	0.0050	6860942
Nitrate plus Nitrite (N)	mg/L	0.171	0.055	0.055	0.363	0.144	0.485	<0.020	6863895	0.157	0.020	6863895
Physical Properties												
Conductivity	uS/cm	209	84.7	90.9	394	112	268	377	6865233	189	1.0	6863867
pH	pH Units	8.21	7.80	7.76	8.20	7.88	8.28	8.38	6865234	8.14		6863865

N/A = Not Applicable

RDL = Reportable Detection Limit

Maxxam Job #: B343413
Report Date: 2013/06/05

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01

Sampler Initials: DT

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		GM9794		GM9795	GM9807		GM9808	GM9809		
Sampling Date		2013/05/29		2013/05/29	2013/05/29		2013/05/29	2013/05/29		
COC#		37657305		37657305	37657306		37657306	37657306		
	UNITS	HBT94-6	QC Batch	EBA04-6	EBA04-7	QC Batch	EBA04-8	EBA11-1	RDL	QC Batch
ANIONS										
Nitrite (N)	mg/L	<0.0050	6863898	<0.0050	0.0370	6863898	0.0321	<0.0050	0.0050	6859583
Calculated Parameters										
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD	FIELD	ONSITE	FIELD	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	<0.020	6856734	1.13	1.55	6856734	1.24	0.483	0.020	6856734
Misc. Inorganics										
Fluoride (F)	mg/L	0.017	6861468	0.011	0.017	6861468	0.013	0.029	0.010	6861468
Alkalinity (Total as CaCO3)	mg/L	188	6865224	301	404	6863861	419	176	0.50	6863861
Alkalinity (PP as CaCO3)	mg/L	2.66	6865224	<0.50	<0.50	6863861	<0.50	<0.50	0.50	6863861
Bicarbonate (HCO3)	mg/L	223	6865224	367	493	6863861	511	215	0.50	6863861
Carbonate (CO3)	mg/L	3.19	6865224	<0.50	<0.50	6863861	<0.50	<0.50	0.50	6863861
Hydroxide (OH)	mg/L	<0.50	6865224	<0.50	<0.50	6863861	<0.50	<0.50	0.50	6863861
Anions										
Dissolved Sulphate (SO4)	mg/L	3.53	6865513	3.29	25.6	6865513	24.6	58.6	0.50	6860731
Dissolved Chloride (Cl)	mg/L	8.6	6865494	5.8	26	6865494	26	16	0.50	6860695
Nutrients										
Ammonia (N)	mg/L	0.32	6860942	0.020	0.013	6860942	0.010	0.0096	0.0050	6860942
Nitrate plus Nitrite (N)	mg/L	<0.020	6863895	1.13	1.59	6863895	1.27	0.483	0.020	6859493
Physical Properties										
Conductivity	uS/cm	377	6865233	558	844	6863867	871	485	1.0	6863867
pH	pH Units	8.36	6865234	8.28	7.91	6863865	7.73	8.16		6863865

N/A = Not Applicable

RDL = Reportable Detection Limit

Maxxam Job #: B343413
Report Date: 2013/06/05

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01

Sampler Initials: DT

CSR DISSOLVED METALS IN WATER (WATER)

Maxxam ID		GM9786	GM9787	GM9788	GM9789	GM9790	GM9791	GM9792		
Sampling Date		2013/05/28	2013/05/28	2013/05/28	2013/05/28	2013/05/28	2013/05/28	2013/05/29		
COC#		37657305	37657305	37657305	37657305	37657305	37657305	37657305		
	UNITS	AG99-01	EBA04-1	EBA04-2	EBA04-3	EBA04-4	EBA11-2	HBT94-2	RDL	QC Batch
Misc. Inorganics										
Dissolved Hardness (CaCO3)	mg/L	103	38.4	41.2	220	51.8	130	170	0.50	6856702

RDL = Reportable Detection Limit

Maxxam Job #: B343413
Report Date: 2013/06/05

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01

Sampler Initials: DT

CSR DISSOLVED METALS IN WATER (WATER)

Maxxam ID		GM9786	GM9787	GM9788	GM9789	GM9790	GM9791	GM9792		
Sampling Date		2013/05/28	2013/05/28	2013/05/28	2013/05/28	2013/05/28	2013/05/28	2013/05/29		
COC#		37657305	37657305	37657305	37657305	37657305	37657305	37657305		
	UNITS	AG99-01	EBA04-1	EBA04-2	EBA04-3	EBA04-4	EBA11-2	HBT94-2	RDL	QC Batch
Dissolved Metals by ICPMS										
Dissolved Aluminum (Al)	mg/L	0.0064	0.0054	0.0064	<0.0030	0.0049	0.0075	0.0071	0.0030	6865644
Dissolved Antimony (Sb)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6865644
Dissolved Arsenic (As)	mg/L	0.00084	0.00075	0.00025	<0.00010	0.00024	0.00010	0.00219	0.00010	6865644
Dissolved Barium (Ba)	mg/L	0.0020	<0.0010	<0.0010	0.0068	<0.0010	0.0058	0.0072	0.0010	6865644
Dissolved Beryllium (Be)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	6865644
Dissolved Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	6865644
Dissolved Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.057	0.117	0.050	6865644
Dissolved Cadmium (Cd)	mg/L	<0.000010	0.000026	<0.000010	0.000015	<0.000010	<0.000010	0.000035	0.000010	6865644
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0102	<0.0010	0.0082	<0.0010	0.0022	0.0060	0.0010	6865644
Dissolved Cobalt (Co)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6865644
Dissolved Copper (Cu)	mg/L	0.00079	0.00517	<0.00020	<0.00020	0.00021	0.00021	0.00026	0.00020	6865644
Dissolved Iron (Fe)	mg/L	0.0078	0.0073	<0.0050	<0.0050	<0.0050	<0.0050	0.159	0.0050	6865644
Dissolved Lead (Pb)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	6865644
Dissolved Lithium (Li)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6865644
Dissolved Manganese (Mn)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.867	0.0010	6865644
Dissolved Mercury (Hg)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000050	6865644
Dissolved Molybdenum (Mo)	mg/L	<0.0010	0.0156	<0.0010	0.0135	<0.0010	<0.0010	0.0103	0.0010	6865644
Dissolved Nickel (Ni)	mg/L	<0.0010	0.0648	<0.0010	0.0505	<0.0010	<0.0010	0.0404	0.0010	6865644
Dissolved Selenium (Se)	mg/L	0.00012	0.00013	<0.00010	0.00015	0.00010	<0.00010	<0.00010	0.00010	6865644
Dissolved Silicon (Si)	mg/L	5.74	4.98	3.47	5.79	3.62	8.11	7.02	0.10	6865644
Dissolved Silver (Ag)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000020	6865644
Dissolved Strontium (Sr)	mg/L	0.0514	0.0194	0.0221	0.147	0.0294	0.0712	0.124	0.0010	6865644
Dissolved Thallium (Tl)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000050	6865644
Dissolved Tin (Sn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6865644
Dissolved Titanium (Ti)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6865644
Dissolved Uranium (U)	mg/L	<0.00010	<0.00010	<0.00010	0.00018	<0.00010	0.00016	0.00011	0.00010	6865644
Dissolved Vanadium (V)	mg/L	0.0058	0.0055	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6865644
Dissolved Zinc (Zn)	mg/L	0.0066	0.0262	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6865644
Dissolved Zirconium (Zr)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6865644
Dissolved Calcium (Ca)	mg/L	33.5	12.6	14.2	73.3	18.0	35.5	57.7	0.050	6856703
Dissolved Magnesium (Mg)	mg/L	4.72	1.69	1.40	8.91	1.64	10.0	6.20	0.050	6856703
Dissolved Potassium (K)	mg/L	0.686	0.254	0.188	0.832	0.281	0.439	1.60	0.050	6856703
Dissolved Sodium (Na)	mg/L	1.72	1.28	1.14	3.22	1.53	4.20	12.1	0.050	6856703
Dissolved Sulphur (S)	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.0	6865644

RDL = Reportable Detection Limit

Maxxam Job #: B343413
Report Date: 2013/06/05

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01

Sampler Initials: DT

CSR DISSOLVED METALS IN WATER (WATER)

Maxxam ID		GM9793		GM9794	GM9795	GM9807	GM9808	GM9809		
Sampling Date		2013/05/29		2013/05/29	2013/05/29	2013/05/29	2013/05/29	2013/05/29		
COC#		37657305		37657305	37657305	37657306	37657306	37657306		
	UNITS	HBT94-4	QC Batch	HBT94-6	EBA04-6	EBA04-7	EBA04-8	EBA11-1	RDL	QC Batch
Misc. Inorganics										
Dissolved Hardness (CaCO3)	mg/L	91.5	6856702	171	294	429	423	239	0.50	6856702

RDL = Reportable Detection Limit

Maxxam Job #: B343413
Report Date: 2013/06/05

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01

Sampler Initials: DT

CSR DISSOLVED METALS IN WATER (WATER)

Maxxam ID		GM9793		GM9794	GM9795	GM9807	GM9808	GM9809		
Sampling Date		2013/05/29		2013/05/29	2013/05/29	2013/05/29	2013/05/29	2013/05/29		
COC#		37657305		37657305	37657305	37657306	37657306	37657306		
	UNITS	HB794-4	QC Batch	HB794-6	EBA04-6	EBA04-7	EBA04-8	EBA11-1	RDL	QC Batch
Dissolved Metals by ICPMS										
Dissolved Aluminum (Al)	mg/L	<0.0030	6865644	0.0069	<0.0030	<0.0030	<0.0030	0.0033	0.0030	6865644
Dissolved Antimony (Sb)	mg/L	<0.00050	6865644	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6865644
Dissolved Arsenic (As)	mg/L	0.00023	6865644	0.00219	<0.00010	0.00014	0.00012	0.00020	0.00010	6865644
Dissolved Barium (Ba)	mg/L	0.0016	6865644	0.0071	0.0074	0.0176	0.0177	0.0059	0.0010	6865644
Dissolved Beryllium (Be)	mg/L	<0.00010	6865644	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	6865644
Dissolved Bismuth (Bi)	mg/L	<0.0010	6865644	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	6865644
Dissolved Boron (B)	mg/L	<0.050	6865644	0.118	<0.050	0.330	0.331	0.054	0.050	6865644
Dissolved Cadmium (Cd)	mg/L	0.000011	6865644	0.000021	<0.000010	0.000062	0.000032	0.000012	0.000010	6865644
Dissolved Chromium (Cr)	mg/L	<0.0010	6865644	<0.0010	0.0011	<0.0010	<0.0010	0.0016	0.0010	6865644
Dissolved Cobalt (Co)	mg/L	<0.00050	6865644	<0.00050	<0.00050	0.00059	0.00059	<0.00050	0.00050	6865644
Dissolved Copper (Cu)	mg/L	0.00036	6865644	<0.00020	<0.00020	0.00314	0.00305	0.00023	0.00020	6865644
Dissolved Iron (Fe)	mg/L	<0.0050	6865644	0.159	0.0102	<0.0050	<0.0050	<0.0050	0.0050	6865644
Dissolved Lead (Pb)	mg/L	<0.00020	6865644	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	6865644
Dissolved Lithium (Li)	mg/L	<0.0050	6865644	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6865644
Dissolved Manganese (Mn)	mg/L	0.0085	6865644	0.862	<0.0010	0.116	0.114	<0.0010	0.0010	6865644
Dissolved Mercury (Hg)	mg/L	<0.000050	6865644	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000050	6865644
Dissolved Molybdenum (Mo)	mg/L	<0.0010	6865644	0.0011	<0.0010	<0.0010	0.0010	<0.0010	0.0010	6865644
Dissolved Nickel (Ni)	mg/L	<0.0010	6865644	0.0046	<0.0010	0.0019	0.0055	<0.0010	0.0010	6865644
Dissolved Selenium (Se)	mg/L	0.00090	6865644	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	6865644
Dissolved Silicon (Si)	mg/L	4.38	6865644	7.11	9.50	11.8	11.6	5.84	0.10	6865644
Dissolved Silver (Ag)	mg/L	<0.000020	6865644	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000020	6865644
Dissolved Strontium (Sr)	mg/L	0.0619	6865644	0.124	0.194	0.337	0.334	0.153	0.0010	6865644
Dissolved Thallium (Tl)	mg/L	<0.000050	6865644	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000050	6865644
Dissolved Tin (Sn)	mg/L	<0.0050	6865644	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6865644
Dissolved Titanium (Ti)	mg/L	<0.0050	6865644	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6865644
Dissolved Uranium (U)	mg/L	<0.00010	6865644	0.00010	0.00030	0.00095	0.00095	0.00070	0.00010	6865644
Dissolved Vanadium (V)	mg/L	<0.0050	6865644	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6865644
Dissolved Zinc (Zn)	mg/L	<0.0050	6865644	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6865644
Dissolved Zirconium (Zr)	mg/L	<0.00050	6865644	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6865644
Dissolved Calcium (Ca)	mg/L	32.9	6856703	58.3	88.7	124	122	71.6	0.050	6856703
Dissolved Magnesium (Mg)	mg/L	2.27	6856703	6.24	17.5	29.1	28.5	14.6	0.050	6856703
Dissolved Potassium (K)	mg/L	0.578	6856703	1.60	1.42	2.22	2.19	0.762	0.050	6856703
Dissolved Sodium (Na)	mg/L	2.17	6856703	12.1	5.79	23.0	22.5	4.86	0.050	6856703
Dissolved Sulphur (S)	mg/L	<3.0	6856703	<3.0	<3.0	8.6	8.8	19.3	3.0	6865644

RDL = Reportable Detection Limit

Maxxam Job #: B343413
Report Date: 2013/06/05

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01

Sampler Initials: DT

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		GM9789	GM9792	GM9807	GM9809		
Sampling Date		2013/05/28	2013/05/29	2013/05/29	2013/05/29		
COC#		37657305	37657305	37657306	37657306		
	UNITS	EBA04-3	HBT94-2	EBA04-7	EBA11-1	RDL	QC Batch
Volatiles							
VPH (VH6 to 10 - BTEX)	mg/L	<0.30	<0.30	<0.30	<0.30	0.30	6858197
Volatile Hydrocarbons							
VH C6-C10	mg/L	<0.30	<0.30	<0.30	<0.30	0.30	6859442
Volatiles							
Chloromethane	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	6858274
Vinyl chloride	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6858274
Chloroethane	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	6858274
Trichlorofluoromethane	ug/L	<4.0	<4.0	<4.0	<4.0	4.0	6858274
1,1-dichloroethene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6858274
Dichloromethane	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	6858274
trans-1,2-dichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	6858274
1,1-dichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6858274
cis-1,2-dichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	6858274
Chloroform	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	6858274
1,1,1-trichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6858274
1,2-dichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6858274
Carbon tetrachloride	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6858274
Benzene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	6858274
Methyl-tert-butylether (MTBE)	ug/L	<4.0	<4.0	<4.0	<4.0	4.0	6858274
1,2-dichloropropane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6858274
cis-1,3-dichloropropene	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	6858274
trans-1,3-dichloropropene	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	6858274
Bromomethane	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	6858274
1,1,2-trichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6858274
Trichloroethene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6858274
Chlorodibromomethane	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	6858274
Tetrachloroethene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6858274
Bromodichloromethane	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	6858274
Toluene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	6858274
Ethylbenzene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	6858274
m & p-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	6858274
Bromoform	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	6858274
Styrene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6858274
o-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	6858274
Xylenes (Total)	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	6858274

RDL = Reportable Detection Limit

Maxxam Job #: B343413
Report Date: 2013/06/05

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01

Sampler Initials: DT

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		GM9789	GM9792	GM9807	GM9809		
Sampling Date		2013/05/28	2013/05/29	2013/05/29	2013/05/29		
COC#		37657305	37657305	37657306	37657306		
	UNITS	EBA04-3	HBT94-2	EBA04-7	EBA11-1	RDL	QC Batch
1,1,1,2-tetrachloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6858274
1,1,2,2-tetrachloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6858274
1,2-dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6858274
1,3-dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6858274
1,4-dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6858274
Chlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	6858274
Dibromomethane	ug/L	<0.90	<0.90	<0.90	<0.90	0.90	6858274
Surrogate Recovery (%)							
1,4-Difluorobenzene (sur.)	%	97	101	97	99		6858274
4-BROMOFLUOROBENZENE (sur.)	%	84	89	81	92		6858274
D4-1,2-DICHLOROETHANE (sur.)	%	83	92	90	89		6858274

RDL = Reportable Detection Limit

Maxxam Job #: B343413
Report Date: 2013/06/05

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01

Sampler Initials: DT

General Comments

Sample GM9786-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GM9787-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GM9788-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GM9789-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GM9790-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GM9791-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GM9792-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GM9793-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GM9794-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GM9795-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GM9807-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GM9808-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GM9809-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Maxxam Job #: B343413
Report Date: 2013/06/05

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01

Sampler Initials: DT

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6858274	1,4-Difluorobenzene (sur.)	2013/05/30	112	70 - 130	109	70 - 130	98	%		
6858274	4-BROMOFLUOROBENZENE (sur.)	2013/05/30	121	70 - 130	102	70 - 130	83	%		
6858274	D4-1,2-DICHLOROETHANE (sur.)	2013/05/30	104	70 - 130	117	70 - 130	88	%		
6858274	Chloromethane	2013/05/31	86	60 - 140	97	60 - 140	<1.0	ug/L	NC	30
6858274	Vinyl chloride	2013/05/31	89	60 - 140	96	60 - 140	<0.50	ug/L	NC	30
6858274	Chloroethane	2013/05/31	71	60 - 140	91	60 - 140	<1.0	ug/L	NC	30
6858274	Trichlorofluoromethane	2013/05/31	114	60 - 140	121	60 - 140	<4.0	ug/L	NC	30
6858274	1,1-dichloroethene	2013/05/31	83	70 - 130	88	70 - 130	<0.50	ug/L	NC	30
6858274	Dichloromethane	2013/05/31	87	70 - 130	90	70 - 130	<2.0	ug/L	NC	30
6858274	trans-1,2-dichloroethene	2013/05/31	84	70 - 130	88	70 - 130	<1.0	ug/L	NC	30
6858274	1,1-dichloroethane	2013/05/31	75	70 - 130	82	70 - 130	<0.50	ug/L	NC	30
6858274	cis-1,2-dichloroethene	2013/05/31	88	70 - 130	90	70 - 130	<1.0	ug/L	NC	30
6858274	Chloroform	2013/05/31	82	70 - 130	87	70 - 130	<1.0	ug/L	NC	30
6858274	1,1,1-trichloroethane	2013/05/31	84	70 - 130	89	70 - 130	<0.50	ug/L	NC	30
6858274	1,2-dichloroethane	2013/05/31	83	70 - 130	99	70 - 130	<0.50	ug/L	NC	30
6858274	Carbon tetrachloride	2013/05/31	83	70 - 130	86	70 - 130	<0.50	ug/L	NC	30
6858274	Benzene	2013/05/31	83	70 - 130	104	70 - 130	<0.40	ug/L	NC	30
6858274	Methyl-tert-butylether(MTBE)	2013/05/31	77	70 - 130	84	70 - 130	<4.0	ug/L	NC	30
6858274	1,2-dichloropropane	2013/05/31	85	70 - 130	92	70 - 130	<0.50	ug/L	NC	30
6858274	cis-1,3-dichloropropene	2013/05/31	74	70 - 130	83	70 - 130	<1.0	ug/L	NC	30
6858274	trans-1,3-dichloropropene	2013/05/31	73	70 - 130	77	70 - 130	<1.0	ug/L	NC	30
6858274	Bromomethane	2013/05/31	71	60 - 140	85	60 - 140	<1.0	ug/L	NC	30
6858274	1,1,2-trichloroethane	2013/05/31	83	70 - 130	86	70 - 130	<0.50	ug/L	NC	30
6858274	Trichloroethene	2013/05/31	84	70 - 130	85	70 - 130	<0.50	ug/L	NC	30
6858274	Chlorodibromomethane	2013/05/31	87	70 - 130	86	70 - 130	<1.0	ug/L	NC	30
6858274	Tetrachloroethene	2013/05/31	88	70 - 130	84	70 - 130	<0.50	ug/L	NC	30
6858274	Bromodichloromethane	2013/05/31	82	70 - 130	86	70 - 130	<1.0	ug/L	NC	30
6858274	Toluene	2013/05/31	78	70 - 130	87	70 - 130	<0.40	ug/L	NC	30
6858274	Ethylbenzene	2013/05/31	79	70 - 130	89	70 - 130	<0.40	ug/L	NC	30
6858274	m & p-Xylene	2013/05/31	86	70 - 130	92	70 - 130	<0.40	ug/L	NC	30
6858274	Bromoform	2013/05/31	89	70 - 130	85	70 - 130	<1.0	ug/L	NC	30
6858274	Styrene	2013/05/31	89	70 - 130	94	70 - 130	<0.50	ug/L	NC	30
6858274	o-Xylene	2013/05/31	79	70 - 130	87	70 - 130	<0.40	ug/L	NC	30
6858274	1,1,1,2-tetrachloroethane	2013/05/31	86	70 - 130	86	70 - 130	<0.50	ug/L	NC	30
6858274	1,1,2,2-tetrachloroethane	2013/05/31	86	70 - 130	91	70 - 130	<0.50	ug/L	NC	30
6858274	1,2-dichlorobenzene	2013/05/31	84	70 - 130	87	70 - 130	<0.50	ug/L	NC	30
6858274	1,3-dichlorobenzene	2013/05/31	80	70 - 130	84	70 - 130	<0.50	ug/L	NC	30
6858274	1,4-dichlorobenzene	2013/05/31	87	70 - 130	90	70 - 130	<0.50	ug/L	NC	30
6858274	Chlorobenzene	2013/05/31	77	70 - 130	85	70 - 130	<0.50	ug/L	NC	30
6858274	Dibromomethane	2013/05/31	84	70 - 130	81	70 - 130	<0.90	ug/L	NC	30

Maxxam Job #: B343413
Report Date: 2013/06/05

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01

Sampler Initials: DT

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6858274	Xylenes (Total)	2013/05/31					<0.40	ug/L	NC	30
6859442	VH C6-C10	2013/05/31			99	70 - 130	<0.30	mg/L	NC	40
6859493	Nitrate plus Nitrite (N)	2013/05/30	103	80 - 120	107	80 - 120	<0.020	mg/L	NC	25
6859583	Nitrite (N)	2013/05/30	96	80 - 120	94	80 - 120	<0.0050	mg/L	NC	20
6860695	Dissolved Chloride (Cl)	2013/05/30	100	80 - 120	101	80 - 120	<0.50	mg/L	1.0	20
6860731	Dissolved Sulphate (SO4)	2013/05/30	NC	80 - 120	96	80 - 120	0.77, RDL=0.50	mg/L	6.0	20
6860942	Ammonia (N)	2013/05/31	110	80 - 120	93	80 - 120	<0.0050	mg/L	NC	20
6861468	Fluoride (F)	2013/05/31	91	80 - 120	102	80 - 120	<0.010	mg/L	NC	20
6863861	Alkalinity (Total as CaCO3)	2013/05/31	NC	80 - 120	101	80 - 120	<0.50	mg/L	3.8	20
6863861	Alkalinity (PP as CaCO3)	2013/05/31					<0.50	mg/L		
6863861	Bicarbonate (HCO3)	2013/05/31					<0.50	mg/L		
6863861	Carbonate (CO3)	2013/05/31					<0.50	mg/L		
6863861	Hydroxide (OH)	2013/05/31					<0.50	mg/L		
6863867	Conductivity	2013/05/31			99	80 - 120	<1.0	uS/cm	0.6	20
6863895	Nitrate plus Nitrite (N)	2013/05/31	104	80 - 120	109	80 - 120	<0.020	mg/L	2.8	25
6863898	Nitrite (N)	2013/05/31	100	80 - 120	99	80 - 120	<0.0050	mg/L	2.1	20
6865224	Alkalinity (Total as CaCO3)	2013/06/04	NC	80 - 120	96	80 - 120	<0.50	mg/L	0.3	20
6865224	Alkalinity (PP as CaCO3)	2013/06/04					<0.50	mg/L	4.5	20
6865224	Bicarbonate (HCO3)	2013/06/04					<0.50	mg/L	0.1	20
6865224	Carbonate (CO3)	2013/06/04					<0.50	mg/L	4.5	20
6865224	Hydroxide (OH)	2013/06/04					<0.50	mg/L	NC	20
6865233	Conductivity	2013/06/04			102	80 - 120	<1.0	uS/cm	0.3	20
6865494	Dissolved Chloride (Cl)	2013/05/31	100	80 - 120	101	80 - 120	0.50, RDL=0.50	mg/L	0.2	20
6865513	Dissolved Sulphate (SO4)	2013/05/31	NC	80 - 120	95	80 - 120	<0.50	mg/L	0.6	20
6865644	Dissolved Aluminum (Al)	2013/06/03	101	80 - 120	102	80 - 120	<0.0030	mg/L	NC	20
6865644	Dissolved Antimony (Sb)	2013/06/03	106	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20
6865644	Dissolved Arsenic (As)	2013/06/03	103	80 - 120	98	80 - 120	<0.00010	mg/L	3.5	20
6865644	Dissolved Barium (Ba)	2013/06/03	100	80 - 120	103	80 - 120	<0.0010	mg/L	NC	20
6865644	Dissolved Beryllium (Be)	2013/06/03	102	80 - 120	96	80 - 120	<0.00010	mg/L	NC	20
6865644	Dissolved Bismuth (Bi)	2013/06/03	98	80 - 120	97	80 - 120	<0.0010	mg/L	NC	20
6865644	Dissolved Cadmium (Cd)	2013/06/03	106	80 - 120	103	80 - 120	<0.000010	mg/L	NC	20
6865644	Dissolved Chromium (Cr)	2013/06/03	NC	80 - 120	101	80 - 120	<0.0010	mg/L	1.4	20
6865644	Dissolved Cobalt (Co)	2013/06/03	98	80 - 120	97	80 - 120	<0.00050	mg/L	NC	20
6865644	Dissolved Copper (Cu)	2013/06/03	NC	80 - 120	95	80 - 120	<0.00020	mg/L	1.8	20
6865644	Dissolved Iron (Fe)	2013/06/03	108	80 - 120	111	80 - 120	<0.0050	mg/L	NC	20
6865644	Dissolved Lead (Pb)	2013/06/03	100	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
6865644	Dissolved Lithium (Li)	2013/06/03	97	80 - 120	96	80 - 120	<0.0050	mg/L	NC	20
6865644	Dissolved Manganese (Mn)	2013/06/03	101	80 - 120	100	80 - 120	<0.0010	mg/L	NC	20
6865644	Dissolved Mercury (Hg)	2013/06/03	103	80 - 120	100	80 - 120	<0.000050	mg/L	NC	20
6865644	Dissolved Molybdenum (Mo)	2013/06/03	NC	80 - 120	100	80 - 120	<0.0010	mg/L	0.6	20

Maxxam Job #: B343413
Report Date: 2013/06/05

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01

Sampler Initials: DT

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6865644	Dissolved Nickel (Ni)	2013/06/03	NC	80 - 120	98	80 - 120	<0.0010	mg/L	2.1	20
6865644	Dissolved Selenium (Se)	2013/06/03	108	80 - 120	106	80 - 120	<0.00010	mg/L	NC	20
6865644	Dissolved Silver (Ag)	2013/06/03	102	80 - 120	101	80 - 120	<0.000020	mg/L	NC	20
6865644	Dissolved Strontium (Sr)	2013/06/03	NC	80 - 120	104	80 - 120	<0.0010	mg/L	0.05	20
6865644	Dissolved Thallium (Tl)	2013/06/03	84	80 - 120	101	80 - 120	<0.000050	mg/L	NC	20
6865644	Dissolved Tin (Sn)	2013/06/03	101	80 - 120	102	80 - 120	<0.0050	mg/L	NC	20
6865644	Dissolved Titanium (Ti)	2013/06/03	102	80 - 120	106	80 - 120	<0.0050	mg/L	NC	20
6865644	Dissolved Uranium (U)	2013/06/03	100	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
6865644	Dissolved Vanadium (V)	2013/06/03	NC	80 - 120	100	80 - 120	<0.0050	mg/L	NC	20
6865644	Dissolved Zinc (Zn)	2013/06/03	NC	80 - 120	112	80 - 120	<0.0050	mg/L	3.9	20
6865644	Dissolved Boron (B)	2013/06/03					<0.050	mg/L	NC	20
6865644	Dissolved Silicon (Si)	2013/06/03					<0.10	mg/L	0.9	20
6865644	Dissolved Zirconium (Zr)	2013/06/03					<0.00050	mg/L	NC	20
6865644	Dissolved Sulphur (S)	2013/06/03					<3.0	mg/L	NC	20

N/A = Not Applicable

RDL = Reportable Detection Limit

RPD = Relative Percent Difference

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

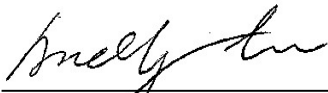
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.

NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Validation Signature Page

Maxxam Job #: B343413

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Andy Lu, Data Validation Coordinator

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#5908 EBA Engineering Consultants Ltd.	Company Name:	#18501 EBA Engineering Consultants Ltd.	Quotation #:	B10655	MAXXAM JOB #:	BOTTLE ORDER #:
Contact Name:	Accounts Payable	Contact Name:	Kristy Gabelhouse	P.O. #:			
Address:	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Address:	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Project #:	2WMC - N23103074-01	CHAIN OF CUSTODY #:	PROJECT MANAGER:
Phone:	(250)756-2256 Fax: (250)756-2680	Phone:	(250)756-2256 Fax:	Site #:	2WMC		
Email:	dromano@eba.ca, paul@eba.ca	Email:	kgabelhouse@eba.ca, sakbar@maxxam.ca	Sampled By:	DT + JS		

REGULATORY CRITERIA:	SPECIAL INSTRUCTIONS:	ANALYSIS REQUESTED (Please be specific):	TURNAROUND TIME (TAT) REQUIRED:
☒ CSR ☐ CCME ☒ BC Water Quality ☒ Other <u>BCA 1066</u>		AMMONIUM-N ANION (CL, F, NO2, NO3, SO4) CSR Dissolved Metals with HG + Hardness pH / Conductivity / Alkalinity Low Level Total Metals +rig + Hardness CSR VOC + VPH Diss. Sulphur Total Sulphur	Regular (Standard) TAT: (will be applied if Rush TAT is not specified) Standard TAT = 5 working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dissolved Metals are > 5 days - contact your Project Manager for details. Job Specific Rush TAT (if applies to entire submission) 1 Day ☐ 2 Day ☐ 3 Day ☐ Data Required ☐

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

Sample Barcode Label	Sample Location Identification	Date Sampled	Time Sampled	Metals Field Filtered? (Y/N)	AMMONIUM-N	ANION (CL, F, NO2, NO3, SO4)	CSR Dissolved Metals with HG + Hardness	pH / Conductivity / Alkalinity	Low Level Total Metals +rig + Hardness	CSR VOC + VPH	Diss. Sulphur	Total Sulphur	# of Bottles	Comments
GM9786	AG99-01	May 28	6w	Y	X	X	X	X			X		4	
GM9787	EBA04-1			Y	X	X	X	X			X		4	
GM9788	EBA04-2			Y	X	X	X	X			X		4	
GM9789	EBA04-3			Y	X	X	X	X	X	X	X		7	
GM9790	EBA04-4			Y	X	X	X	X			X		4	
GM9791	EBA11-2			Y	X	X	X	X			X		4	
GM9792	HBT94-2	May 29		Y	X	X	X	X	X	X	X		7	
GM9793	HBT94-4			Y	X	X	X	X			X		4	
GM9794	HBT94-6			Y	X	X	X	X			X		4	
GM9795	EBA04-6			Y	X	X	X	X			X		4	

RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time:	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time:	# Jars Used and Not Submitted	Laboratory Use Only
<i>[Signature]</i> / Dana Thomas	13/05/24	13:00	<i>[Signature]</i> / Kristy Gabelhouse	2013/05/30	08:40		Time Sampled: ☐ Temperature (°C) on Receipt: <u>24.2</u> Comments: <u>NA</u> ☐ Yes ☐ No

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#5908 EBA Engineering Consultants Ltd.	Company Name:	#18501 EBA Engineering Consultants Ltd.	Quotation #:	B10655	MAXXAM JOB #:	B343413
Contact Name:	Accounts Payable	Contact Name:	Kristy Gabelhouse	P.O. #:			
Address:	#1 - 4375 Boban Drive Nanaimo BC V9T 6A7	Address:	#1 - 4375 Boban Drive Nanaimo BC V9T 6A7	Project #:	CRWMC - N23103074-01		
Phone:	(250)756-2256 Fax: (250)756-2686	Phone:	(250)756-2256 Fax:	Project Name:	CRWMC	CHAIN OF CUSTODY #:	
Email:	dromano@eba.ca, lpaul@eba.ca	Email:	kgabelhouse@eba.ca, sakbar@maxxam.ca	Site #:			
				Sampled By:	Dr + K6		

REGULATORY CRITERIA:	SPECIAL INSTRUCTIONS:	ANALYSIS REQUESTED (Please be specific)		TURNAROUND TIME (TAT) REQUIRED:
☒ CSR ☐ CCME ☒ BC Water Quality ☒ Other <u>BLARGL</u>		ANION (CL, F, NO2, NO3, SO4)	AMMONIUM, N	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS Regular (Standard) TAT: (will be applied if Rush TAT is not specified) Standard TAT = 5 working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dissolved Phosphorus are > 5 days - contact your Project Manager for details. Job Specific Rush TAT (if applies to entire submission) 1 Day ☐ 2 Day ☐ 3 Day ☐ Date Required: _____

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM															
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered ? (Y/N)	AMMONIA-N	ANION (Cl, SO4)	CSR Dissolved Metals with HG + Hardness	pH / Conductivity / Alkalinity	Low Level Total Metals + HG + Hardness	CSR VOC + VPH	Diss. Sulphur	Total Sulphur	# of Bottles	Comments
GM9807	EBA04-7	Magara	6:45	GW	Y	X	X	X	X		X	X	~~7~~	7	
GM9808	EBA04-8				Y	X	X	X	X			X	~~4~~	4	
GM9809	EBA11-1				Y	X	X	X	X		X	X	~~7~~	7	
															</

RELINQUISHED BY (Signature/Print)	Date (YY/MM/DD)	Time	RECEIVED BY (Signature/Print)	Date (YY/MM/DD)	Time	# Jars Used and Not Submitted	Laboratory Use Only		
Dr + K6	13/05/29	13:00	Dr + K6	10/13/05/30	08:40		Time Sampled	Temperature (°C) on Receipt	Cashless Start on
							☐	24.2	☒ Yes ☐ No

Your Project #: CRWMC-N23103074-01
Your C.O.C. #: 37657309

Attention: KRISTY GABELHOUSE

EBA Engineering Consultants Ltd.
NANAIMO
#1 - 4376 Boban Drive
Nanaimo, BC
CANADA V9T 6A7

Report Date: 2013/06/07

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B343805

Received: 2013/05/31, 07:40

Sample Matrix: Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	9	2013/06/01	2013/06/01	BBY6SOP-00026	SM2320B
Chloride by Automated Colourimetry	9	N/A	2013/05/31	BBY6SOP-00011	SM-4500-CI-
Conductance - water	9	N/A	2013/06/01	BBY6SOP-00026	SM-2510B
Fluoride	9	N/A	2013/06/03	BBY6SOP-00012	SM - 4500 F C
Hardness Total (calculated as CaCO ₃)	1	N/A	2013/06/06	BBY7SOP-00002	EPA 6020A
Hardness (calculated as CaCO ₃)	8	N/A	2013/06/05	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	8	N/A	2013/06/05	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (dissolved)	8	N/A	2013/06/04	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (total)	1	N/A	2013/06/06	BBY7SOP-00002	EPA 6020A
Elements by ICPMS Low Level (total)	1	N/A	2013/06/06	BBY7SOP-00002	EPA 6020A
Ammonia-N (Preserved)	8	N/A	2013/05/31	BBY6SOP-00009	SM-4500NH3G
Ammonia-N (Preserved)	1	N/A	2013/06/03	BBY6SOP-00009	SM-4500NH3G
Nitrate + Nitrite (N)	9	N/A	2013/05/31	BBY6SOP-00010	SM 4500NO3-I
Nitrite (N) by CFA	9	N/A	2013/05/31	BBY6SOP-00010	EPA 353.2
Nitrogen - Nitrate (as N)	9	N/A	2013/06/03	BBY6SOP-00010	SM 4500NO3-I
Filter and HNO ₃ Preserve for Metals	8	N/A	2013/05/31	BBY6WI-00001	EPA 200.2
pH Water	9	N/A	2013/06/01	BBY6SOP-00026	SM-4500H+B
CSR VH C6-C10 in Water by HS GC/MS	3	N/A	2013/06/04	BBY8SOP-00011	EPA 8260B
Sulphate by Automated Colourimetry	8	N/A	2013/05/31	BBY6SOP-00017	SM4500-SO42- E
Sulphate by Automated Colourimetry	1	N/A	2013/06/04	BBY6SOP-00017	SM4500-SO42- E
VOCs in Water by HS GC/MS	3	2013/06/03	2013/06/04	BBY8-SOP-0009	EPA 8260C
Volatile HC-BTEX	3	N/A	2013/06/04	BBY WI-00033	BC MOE Lab Method

* Results relate only to the items tested.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Crystal Ireland, B.Sc., Account Specialist
Email: Cireland@maxxam.ca
Phone# (604) 538-5016

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 1

Maxxam Job #: B343805
Report Date: 2013/06/07

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-N23103074-01

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		GN2519		GN2520		GN2521	GN2522		
Sampling Date		2013/05/30		2013/05/30		2013/05/30	2013/05/30		
COC#		37657309		37657309		37657309	37657309		
	UNITS	HBT94-1	QC Batch	AG99-06	QC Batch	EBA11-03	EBA11-04	RDL	QC Batch
ANIONS									
Nitrite (N)	mg/L	0.0092	6863898	<0.0050	6863898	0.0387	<0.0050	0.0050	6863898
Calculated Parameters									
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD	ONSITE	FIELD	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.281	6860000	0.760	6860000	0.066	0.161	0.020	6860000
Misc. Inorganics									
Fluoride (F)	mg/L	0.026	6867333	0.024	6867333	0.018	0.027	0.010	6867333
Alkalinity (Total as CaCO3)	mg/L	220	6865655	72.1	6865655	54.0	49.3	0.50	6865655
Alkalinity (PP as CaCO3)	mg/L	<0.50	6865655	<0.50	6865655	<0.50	<0.50	0.50	6865655
Bicarbonate (HCO3)	mg/L	269	6865655	87.9	6865655	65.9	60.2	0.50	6865655
Carbonate (CO3)	mg/L	<0.50	6865655	<0.50	6865655	<0.50	<0.50	0.50	6865655
Hydroxide (OH)	mg/L	<0.50	6865655	<0.50	6865655	<0.50	<0.50	0.50	6865655
Anions									
Dissolved Sulphate (SO4)	mg/L	5.78	6865513	2.47	6869998	3.65	2.35	0.50	6865513
Dissolved Chloride (Cl)	mg/L	29	6865494	28	6865494	1.3	10	0.50	6865494
Nutrients									
Ammonia (N)	mg/L	1.6	6860942	0.0059	6860942	0.0094	0.0069	0.0050	6860942
Nitrate plus Nitrite (N)	mg/L	0.290	6863895	0.760	6863895	0.105	0.161	0.020	6863895
Physical Properties									
Conductivity	uS/cm	519	6865683	246	6865683	113	133	1.0	6865683
pH	pH Units	8.18	6865684	7.98	6865684	7.93	7.90		6865684

N/A = Not Applicable

RDL = Reportable Detection Limit

Maxxam Job #: B343805
Report Date: 2013/06/07

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-N23103074-01

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		GN2523		GN2524		GN2525	GN2526	GN2527		
Sampling Date		2013/05/30		2013/05/29		2013/05/29	2013/05/29	2013/05/29		
COC#		37657309		37657309		37657309	37657309	37657309		
	UNITS	EBA11-05	QC Batch	AG99-02	QC Batch	AG99-04	AG99-05	SW 1	RDL	QC Batch
ANIONS										
Nitrite (N)	mg/L	0.0628	6863898	<0.0050	6863898	<0.0050	<0.0050	<0.0050	0.0050	6863898
Calculated Parameters										
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD	ONSITE	FIELD	FIELD		N/A	ONSITE
Nitrate (N)	mg/L	0.138	6860000	0.126	6860000	0.102	0.076	0.121	0.020	6860000
Misc. Inorganics										
Fluoride (F)	mg/L	0.025	6867333	0.017	6867333	0.018	0.015	0.018	0.010	6867333
Alkalinity (Total as CaCO3)	mg/L	49.1	6865655	68.7	6865655	42.9	90.8	65.7	0.50	6865655
Alkalinity (PP as CaCO3)	mg/L	<0.50	6865655	<0.50	6865655	<0.50	<0.50	<0.50	0.50	6865655
Bicarbonate (HCO3)	mg/L	59.9	6865655	83.8	6865655	52.3	111	80.1	0.50	6865655
Carbonate (CO3)	mg/L	<0.50	6865655	<0.50	6865655	<0.50	<0.50	<0.50	0.50	6865655
Hydroxide (OH)	mg/L	<0.50	6865655	<0.50	6865655	<0.50	<0.50	<0.50	0.50	6865655
Anions										
Dissolved Sulphate (SO4)	mg/L	2.09	6865513	3.70	6865513	3.01	3.92	3.20	0.50	6865513
Dissolved Chloride (Cl)	mg/L	10	6865494	1.5	6865494	1.5	3.2	2.5	0.50	6865494
Nutrients										
Ammonia (N)	mg/L	0.0077	6860942	0.034	6865643	0.0099	0.0081	<0.0050	0.0050	6860942
Nitrate plus Nitrite (N)	mg/L	0.200	6863895	0.126	6863895	0.102	0.076	0.121	0.020	6863895
Physical Properties										
Conductivity	uS/cm	134	6865683	144	6865683	95.8	191	141	1.0	6865683
pH	pH Units	7.91	6865684	8.07	6865684	7.88	8.16	8.02		6865684

N/A = Not Applicable

RDL = Reportable Detection Limit

Maxxam Job #: B343805
Report Date: 2013/06/07

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-N23103074-01

CSR DISSOLVED METALS IN WATER (WATER)

Maxxam ID		GN2519	GN2520	GN2521	GN2522	GN2523	GN2524	GN2525	GN2526		
Sampling Date		2013/05/30	2013/05/30	2013/05/30	2013/05/30	2013/05/30	2013/05/29	2013/05/29	2013/05/29		
COC#		37657309	37657309	37657309	37657309	37657309	37657309	37657309	37657309		
	UNITS	HBT94-1	AG99-06	EBA11-03	EBA11-04	EBA11-05	AG99-02	AG99-04	AG99-05	RDL	QC Batch
Misc. Inorganics											
Dissolved Hardness (CaCO3)	mg/L	198	108	53.5	57.1	56.0	68.3	43.4	93.1	0.50	6859997

RDL = Reportable Detection Limit

Maxxam Job #: B343805
Report Date: 2013/06/07

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-N23103074-01

CSR DISSOLVED METALS IN WATER (WATER)

Maxxam ID		GN2519	GN2520	GN2521	GN2522	GN2523	GN2524	GN2525	GN2526		
Sampling Date		2013/05/30	2013/05/30	2013/05/30	2013/05/30	2013/05/30	2013/05/29	2013/05/29	2013/05/29		
COC#		37657309	37657309	37657309	37657309	37657309	37657309	37657309	37657309		
	UNITS	HBT94-1	AG99-06	EBA11-03	EBA11-04	EBA11-05	AG99-02	AG99-04	AG99-05	RDL	QC Batch
Dissolved Metals by ICPMS											
Dissolved Aluminum (Al)	mg/L	0.0033	<0.0030	0.0071	0.0062	0.0064	0.0069	0.0057	0.0051	0.0030	6868606
Dissolved Antimony (Sb)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6868606
Dissolved Arsenic (As)	mg/L	0.00024	<0.00010	0.00024	0.00167	0.00160	0.00249	0.00047	0.00059	0.00010	6868606
Dissolved Barium (Ba)	mg/L	0.0079	<0.0010	<0.0010	0.0019	0.0019	0.0033	<0.0010	0.0012	0.0010	6868606
Dissolved Beryllium (Be)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	6868606
Dissolved Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	6868606
Dissolved Boron (B)	mg/L	0.252	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6868606
Dissolved Cadmium (Cd)	mg/L	0.000356	0.000026	<0.000010	0.000012	0.000022	0.000020	<0.000010	0.000015	0.000010	6868606
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0049	0.0019	0.0083	0.0095	0.0037	0.0038	<0.0010	0.0010	6868606
Dissolved Cobalt (Co)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6868606
Dissolved Copper (Cu)	mg/L	0.00372	<0.00020	<0.00020	<0.00020	0.00033	0.00022	<0.00020	0.00069	0.00020	6868606
Dissolved Iron (Fe)	mg/L	0.0297	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6868606
Dissolved Lead (Pb)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	6868606
Dissolved Lithium (Li)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6868606
Dissolved Manganese (Mn)	mg/L	0.683	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	6868606
Dissolved Mercury (Hg)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000050	6868606
Dissolved Molybdenum (Mo)	mg/L	0.0015	0.0076	0.0029	0.0125	0.0143	0.0059	0.0064	<0.0010	0.0010	6868606
Dissolved Nickel (Ni)	mg/L	0.0050	0.0295	0.0110	0.0471	0.0550	0.0223	0.0254	<0.0010	0.0010	6868606
Dissolved Selenium (Se)	mg/L	<0.00010	0.00016	0.00013	0.00029	0.00026	0.00023	0.00011	0.00012	0.00010	6868606
Dissolved Silicon (Si)	mg/L	6.38	4.64	4.65	6.26	6.14	5.02	3.79	4.01	0.10	6868606
Dissolved Silver (Ag)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000020	6868606
Dissolved Strontium (Sr)	mg/L	0.177	0.0809	0.0300	0.0337	0.0337	0.0289	0.0220	0.0456	0.0010	6868606
Dissolved Thallium (Tl)	mg/L	<0.000050	<0.000050	<0.000050(1)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000050	6868606
Dissolved Tin (Sn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6868606
Dissolved Titanium (Ti)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6868606
Dissolved Uranium (U)	mg/L	<0.00010	<0.00010	<0.00010	0.00020	0.00020	0.00017	<0.00010	0.00011	0.00010	6868606
Dissolved Vanadium (V)	mg/L	<0.0050	<0.0050	<0.0050	0.0142	0.0142	0.0204	<0.0050	<0.0050	0.0050	6868606
Dissolved Zinc (Zn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6868606
Dissolved Zirconium (Zr)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6868606
Dissolved Calcium (Ca)	mg/L	67.4	33.9	16.8	18.0	17.5	22.6	14.9	31.3	0.050	6859998
Dissolved Magnesium (Mg)	mg/L	7.18	5.70	2.79	2.96	2.97	2.86	1.50	3.65	0.050	6859998
Dissolved Potassium (K)	mg/L	5.95	0.342	0.270	0.773	0.782	1.03	0.277	0.465	0.050	6859998
Dissolved Sodium (Na)	mg/L	26.0	2.45	1.28	2.46	2.47	1.31	1.28	1.61	0.050	6859998
Dissolved Sulphur (S)	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.0	6859998

RDL = Reportable Detection Limit

(1) - Matrix Spike outside acceptance criteria (10% of analytes failure allowed)

Maxxam Job #: B343805
Report Date: 2013/06/07

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-N23103074-01

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		GN2527		
Sampling Date		2013/05/29		
COC#		37657309		
	UNITS	SW 1	RDL	QC Batch
Calculated Parameters				
Total Hardness (CaCO ₃)	mg/L	64.5	0.50	6859996

RDL = Reportable Detection Limit

Maxxam Job #: B343805
Report Date: 2013/06/07

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-N23103074-01

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		GN2527		
Sampling Date		2013/05/29		
COC#		37657309		
	UNITS	SW 1	RDL	QC Batch
Total Metals by ICPMS				
Total Aluminum (Al)	mg/L	0.0125	0.00050	6865923
Total Antimony (Sb)	mg/L	0.000029	0.000020	6865923
Total Arsenic (As)	mg/L	0.000603	0.000020	6865923
Total Barium (Ba)	mg/L	0.00147	0.000020	6865923
Total Beryllium (Be)	mg/L	<0.000010	0.000010	6865923
Total Bismuth (Bi)	mg/L	<0.0000050	0.0000050	6865923
Total Boron (B)	mg/L	<0.050	0.050	6865923
Total Cadmium (Cd)	mg/L	<0.0000050	0.0000050	6865923
Total Chromium (Cr)	mg/L	0.00033	0.00010	6865923
Total Cobalt (Co)	mg/L	0.0000230	0.0000050	6865923
Total Copper (Cu)	mg/L	0.000769	0.000050	6865923
Total Iron (Fe)	mg/L	0.0193	0.0010	6865923
Total Lead (Pb)	mg/L	0.000144	0.0000050	6865923
Total Lithium (Li)	mg/L	<0.00050	0.00050	6865923
Total Manganese (Mn)	mg/L	0.000670	0.000050	6865923
Total Mercury (Hg)	mg/L	<0.000010	0.000010	6865923
Total Molybdenum (Mo)	mg/L	0.000122	0.000050	6865923
Total Nickel (Ni)	mg/L	0.000175	0.000020	6865923
Total Selenium (Se)	mg/L	0.000205	0.000040	6865923
Total Silicon (Si)	mg/L	4.45	0.10	6865923
Total Silver (Ag)	mg/L	0.0000260	0.0000050	6865923
Total Strontium (Sr)	mg/L	0.0323	0.000050	6865923
Total Thallium (Tl)	mg/L	<0.0000020	0.0000020	6865923
Total Tin (Sn)	mg/L	<0.00020	0.00020	6865923
Total Titanium (Ti)	mg/L	0.00266	0.00050	6865923
Total Uranium (U)	mg/L	0.0000970	0.0000020	6865923
Total Vanadium (V)	mg/L	0.00223	0.00020	6865923
Total Zinc (Zn)	mg/L	0.00030	0.00010	6865923
Total Zirconium (Zr)	mg/L	<0.00010	0.00010	6865923
Total Calcium (Ca)	mg/L	20.8	0.050	6861098
Total Magnesium (Mg)	mg/L	3.65	0.050	6861098
Total Potassium (K)	mg/L	0.389	0.050	6861098
Total Sodium (Na)	mg/L	1.91	0.050	6861098
Total Sulphur (S)	mg/L	<0.60	0.60	6865923

RDL = Reportable Detection Limit

Maxxam Job #: B343805
Report Date: 2013/06/07

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-N23103074-01

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		GN2520	GN2525	GN2526		
Sampling Date		2013/05/30	2013/05/29	2013/05/29		
COC#		37657309	37657309	37657309		
	UNITS	AG99-06	AG99-04	AG99-05	RDL	QC Batch
Volatiles						
VPH (VH6 to 10 - BTEX)	mg/L	<0.30	<0.30	<0.30	0.30	6860050
Volatile Hydrocarbons						
VH C6-C10	mg/L	<0.30	<0.30	<0.30	0.30	6867361
Volatiles						
Chloromethane	ug/L	<1.0	<1.0	<1.0	1.0	6865731
Vinyl chloride	ug/L	<0.50	<0.50	<0.50	0.50	6865731
Chloroethane	ug/L	<1.0	<1.0	<1.0	1.0	6865731
Trichlorofluoromethane	ug/L	<4.0	<4.0	<4.0	4.0	6865731
1,1,2Trichloro-1,2,2Trifluoroethane	ug/L	<2.0	<2.0	<2.0	2.0	6865731
Dichlorodifluoromethane	ug/L	<2.0	<2.0	<2.0	2.0	6865731
1,1-dichloroethene	ug/L	<0.50	<0.50	<0.50	0.50	6865731
Dichloromethane	ug/L	<2.0	<2.0	<2.0	2.0	6865731
trans-1,2-dichloroethene	ug/L	<1.0	<1.0	<1.0	1.0	6865731
1,1-dichloroethane	ug/L	<0.50	<0.50	<0.50	0.50	6865731
cis-1,2-dichloroethene	ug/L	<1.0	<1.0	<1.0	1.0	6865731
Chloroform	ug/L	<1.0	<1.0	<1.0	1.0	6865731
1,1,1-trichloroethane	ug/L	<0.50	<0.50	<0.50	0.50	6865731
1,2-dichloroethane	ug/L	<0.50	<0.50	<0.50	0.50	6865731
Carbon tetrachloride	ug/L	<0.50	<0.50	<0.50	0.50	6865731
Benzene	ug/L	<0.40	<0.40	<0.40	0.40	6865731
Methyl-tert-butylether (MTBE)	ug/L	<4.0	<4.0	<4.0	4.0	6865731
1,2-dichloropropane	ug/L	<0.50	<0.50	<0.50	0.50	6865731
cis-1,3-dichloropropene	ug/L	<1.0	<1.0	<1.0	1.0	6865731
trans-1,3-dichloropropene	ug/L	<1.0	<1.0	<1.0	1.0	6865731
Bromomethane	ug/L	<1.0	<1.0	<1.0	1.0	6865731
1,1,2-trichloroethane	ug/L	<0.50	<0.50	<0.50	0.50	6865731
Trichloroethene	ug/L	<0.50	<0.50	<0.50	0.50	6865731
Chlorodibromomethane	ug/L	<1.0	<1.0	<1.0	1.0	6865731
1,3-Butadiene	ug/L	<5.0	<5.0	<5.0	5.0	6865731
Tetrachloroethene	ug/L	<0.50	<0.50	<0.50	0.50	6865731
Bromodichloromethane	ug/L	<1.0	<1.0	<1.0	1.0	6865731
Toluene	ug/L	<0.40	<0.40	<0.40	0.40	6865731
Ethylbenzene	ug/L	<0.40	<0.40	<0.40	0.40	6865731
m & p-Xylene	ug/L	<0.40	<0.40	<0.40	0.40	6865731
Bromoform	ug/L	<1.0	<1.0	<1.0	1.0	6865731

RDL = Reportable Detection Limit

Maxxam Job #: B343805
Report Date: 2013/06/07

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-N23103074-01

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		GN2520	GN2525	GN2526		
Sampling Date		2013/05/30	2013/05/29	2013/05/29		
COC#		37657309	37657309	37657309		
	UNITS	AG99-06	AG99-04	AG99-05	RDL	QC Batch
Styrene	ug/L	<0.50	<0.50	<0.50	0.50	6865731
o-Xylene	ug/L	<0.40	<0.40	<0.40	0.40	6865731
Xylenes (Total)	ug/L	<0.40	<0.40	<0.40	0.40	6865731
1,1,1,2-tetrachloroethane	ug/L	<0.50	<0.50	<0.50	0.50	6865731
1,1,2,2-tetrachloroethane	ug/L	<0.50	<0.50	<0.50	0.50	6865731
1,2-dichlorobenzene	ug/L	<0.50	<0.50	<0.50	0.50	6865731
1,3-dichlorobenzene	ug/L	<0.50	<0.50	<0.50	0.50	6865731
1,4-dichlorobenzene	ug/L	<0.50	<0.50	<0.50	0.50	6865731
Chlorobenzene	ug/L	<0.50	<0.50	<0.50	0.50	6865731
Dibromomethane	ug/L	<0.90	<0.90	<0.90	0.90	6865731
Bromobenzene	ug/L	<2.0	<2.0	<2.0	2.0	6865731
Surrogate Recovery (%)						
1,4-Difluorobenzene (sur.)	%	101	103	102		6865731
4-BROMOFLUOROBENZENE (sur.)	%	87	86	86		6865731
D4-1,2-DICHLOROETHANE (sur.)	%	100	102	106		6865731

RDL = Reportable Detection Limit

General Comments

Sample GN2519-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GN2520-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GN2521-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GN2522-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GN2523-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GN2524-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GN2525-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GN2526-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GN2527-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Maxxam Job #: B343805
Report Date: 2013/06/07

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-N23103074-01

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6860942	Ammonia (N)	2013/05/31	110	80 - 120	93	80 - 120	<0.0050	mg/L	3.8	20
6863895	Nitrate plus Nitrite (N)	2013/05/31	104	80 - 120	109	80 - 120	<0.020	mg/L	NC	25
6863898	Nitrite (N)	2013/05/31	100	80 - 120	99	80 - 120	<0.0050	mg/L	NC	20
6865494	Dissolved Chloride (Cl)	2013/05/31	100	80 - 120	101	80 - 120	0.50, RDL=0.50	mg/L	0.2	20
6865513	Dissolved Sulphate (SO4)	2013/05/31	NC	80 - 120	95	80 - 120	<0.50	mg/L	3.3	20
6865643	Ammonia (N)	2013/06/03	105	80 - 120	100	80 - 120	<0.0050	mg/L	NC	20
6865655	Alkalinity (Total as CaCO3)	2013/06/01	96	80 - 120	101	80 - 120	<0.50	mg/L	2.6	20
6865655	Alkalinity (PP as CaCO3)	2013/06/01					<0.50	mg/L	NC	20
6865655	Bicarbonate (HCO3)	2013/06/01					<0.50	mg/L	2.5	20
6865655	Carbonate (CO3)	2013/06/01					<0.50	mg/L	NC	20
6865655	Hydroxide (OH)	2013/06/01					<0.50	mg/L	NC	20
6865683	Conductivity	2013/06/01			98	80 - 120	<1.0	uS/cm	0.9	20
6865731	1,4-Difluorobenzene (sur.)	2013/06/03	112	70 - 130	100	70 - 130	101	%		
6865731	4-BROMOFLUOROBENZENE (sur.)	2013/06/03	119	70 - 130	103	70 - 130	88	%		
6865731	D4-1,2-DICHLOROETHANE (sur.)	2013/06/03	118	70 - 130	97	70 - 130	95	%		
6865731	Chloromethane	2013/06/04	105	60 - 140	94	60 - 140	<1.0	ug/L	NC	30
6865731	Vinyl chloride	2013/06/04	95	60 - 140	97	60 - 140	<0.50	ug/L	NC	30
6865731	Chloroethane	2013/06/04	97	60 - 140	106	60 - 140	<1.0	ug/L	NC	30
6865731	Trichlorofluoromethane	2013/06/04	123	60 - 140	133	60 - 140	<4.0	ug/L	NC	30
6865731	Dichlorodifluoromethane	2013/06/03	98	60 - 140	132	60 - 140	<2.0	ug/L		
6865731	1,1-dichloroethene	2013/06/04	85	70 - 130	94	70 - 130	<0.50	ug/L	NC	30
6865731	Dichloromethane	2013/06/04	101	70 - 130	99	70 - 130	<2.0	ug/L	NC	30
6865731	trans-1,2-dichloroethene	2013/06/04	94	70 - 130	103	70 - 130	<1.0	ug/L	NC	30
6865731	1,1-dichloroethane	2013/06/04	90	70 - 130	96	70 - 130	<0.50	ug/L	NC	30
6865731	cis-1,2-dichloroethene	2013/06/04	105	70 - 130	109	70 - 130	<1.0	ug/L	NC	30
6865731	Chloroform	2013/06/04	97	70 - 130	99	70 - 130	<1.0	ug/L	NC	30
6865731	1,1,1-trichloroethane	2013/06/04	93	70 - 130	101	70 - 130	<0.50	ug/L	NC	30
6865731	1,2-dichloroethane	2013/06/04	105	70 - 130	100	70 - 130	<0.50	ug/L	NC	30
6865731	Carbon tetrachloride	2013/06/04	90	70 - 130	101	70 - 130	<0.50	ug/L	NC	30
6865731	Benzene	2013/06/04	95	70 - 130	101	70 - 130	<0.40	ug/L	NC	30
6865731	Methyl-tert-butylether(MTBE)	2013/06/03	99	70 - 130	91	70 - 130	<4.0	ug/L		
6865731	1,2-dichloropropane	2013/06/04	102	70 - 130	100	70 - 130	<0.50	ug/L	NC	30
6865731	cis-1,3-dichloropropene	2013/06/04	96	70 - 130	90	70 - 130	<1.0	ug/L	NC	30
6865731	trans-1,3-dichloropropene	2013/06/04	88	70 - 130	86	70 - 130	<1.0	ug/L	NC	30
6865731	Bromomethane	2013/06/04	85	60 - 140	74	60 - 140	<1.0	ug/L	NC	30
6865731	1,1,2-trichloroethane	2013/06/04	105	70 - 130	100	70 - 130	<0.50	ug/L	NC	30
6865731	Trichloroethene	2013/06/04	91	70 - 130	98	70 - 130	<0.50	ug/L	NC	30
6865731	Chlorodibromomethane	2013/06/04	102	70 - 130	97	70 - 130	<1.0	ug/L	NC	30
6865731	Tetrachloroethene	2013/06/04	86	70 - 130	96	70 - 130	<0.50	ug/L	NC	30
6865731	Bromodichloromethane	2013/06/04	100	70 - 130	98	70 - 130	<1.0	ug/L	NC	30

Maxxam Job #: B343805
Report Date: 2013/06/07

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-N23103074-01

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6865731	Toluene	2013/06/04	87	70 - 130	91	70 - 130	<0.40	ug/L	NC	30
6865731	Ethylbenzene	2013/06/04	83	70 - 130	94	70 - 130	<0.40	ug/L	NC	30
6865731	m & p-Xylene	2013/06/04	85	70 - 130	95	70 - 130	<0.40	ug/L	NC	30
6865731	Bromoform	2013/06/04	108	70 - 130	100	70 - 130	<1.0	ug/L	NC	30
6865731	Styrene	2013/06/04	90	70 - 130	102	70 - 130	<0.50	ug/L	NC	30
6865731	o-Xylene	2013/06/04	81	70 - 130	87	70 - 130	<0.40	ug/L	NC	30
6865731	1,1,1,2-tetrachloroethane	2013/06/04	95	70 - 130	97	70 - 130	<0.50	ug/L	NC	30
6865731	1,1,2,2-tetrachloroethane	2013/06/04	109	70 - 130	103	70 - 130	<0.50	ug/L	NC	30
6865731	1,2-dichlorobenzene	2013/06/04	98	70 - 130	104	70 - 130	<0.50	ug/L	NC	30
6865731	1,3-dichlorobenzene	2013/06/04	88	70 - 130	98	70 - 130	<0.50	ug/L	NC	30
6865731	1,4-dichlorobenzene	2013/06/04	95	70 - 130	102	70 - 130	<0.50	ug/L	NC	30
6865731	Chlorobenzene	2013/06/04	86	70 - 130	88	70 - 130	<0.50	ug/L	NC	30
6865731	Dibromomethane	2013/06/04	101	70 - 130	91	70 - 130	<0.90	ug/L	NC	30
6865731	Bromobenzene	2013/06/03	94	70 - 130	101	70 - 130	<2.0	ug/L		
6865731	1,1,2Trichloro-1,2,2Trifluoroethane	2013/06/03					<2.0	ug/L		
6865731	1,3-Butadiene	2013/06/03					<5.0	ug/L		
6865731	Xylenes (Total)	2013/06/04					<0.40	ug/L	NC	30
6865923	Total Aluminum (Al)	2013/06/06	97	80 - 120	102	80 - 120	<0.00050	mg/L	3.8	20
6865923	Total Antimony (Sb)	2013/06/06	102	80 - 120	106	80 - 120	<0.000020	mg/L	NC	20
6865923	Total Arsenic (As)	2013/06/06	103	80 - 120	97	80 - 120	<0.000020	mg/L	14.4	20
6865923	Total Barium (Ba)	2013/06/06	NC	80 - 120	100	80 - 120	<0.000020	mg/L	0.8	20
6865923	Total Beryllium (Be)	2013/06/06	98	80 - 120	95	80 - 120	<0.000010	mg/L	NC	20
6865923	Total Bismuth (Bi)	2013/06/06	92	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
6865923	Total Cadmium (Cd)	2013/06/06	102	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
6865923	Total Chromium (Cr)	2013/06/06	101	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
6865923	Total Cobalt (Co)	2013/06/06	98	80 - 120	98	80 - 120	<0.0000050	mg/L	1.1	20
6865923	Total Copper (Cu)	2013/06/06	99	80 - 120	99	80 - 120	<0.000050	mg/L	6.2	20
6865923	Total Iron (Fe)	2013/06/06	NC	80 - 120	101	80 - 120	<0.0010	mg/L	2.9	20
6865923	Total Lead (Pb)	2013/06/06	96	80 - 120	98	80 - 120	<0.0000050	mg/L	1.2	20
6865923	Total Lithium (Li)	2013/06/06	NC	80 - 120	98	80 - 120	<0.00050	mg/L	1.1	20
6865923	Total Manganese (Mn)	2013/06/06	104	80 - 120	100	80 - 120	<0.000050	mg/L	1.5	20
6865923	Total Mercury (Hg)	2013/06/06	105	80 - 120	100	80 - 120	<0.000010	mg/L		
6865923	Total Molybdenum (Mo)	2013/06/06	94	80 - 120	100	80 - 120	<0.000050	mg/L	1	20
6865923	Total Nickel (Ni)	2013/06/06	97	80 - 120	100	80 - 120	<0.000020	mg/L	3.4	20
6865923	Total Selenium (Se)	2013/06/06	NC	80 - 120	100	80 - 120	<0.000040	mg/L	0.1	20
6865923	Total Silver (Ag)	2013/06/06	99	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
6865923	Total Strontium (Sr)	2013/06/06	NC	80 - 120	100	80 - 120	<0.000050	mg/L	2.1	20
6865923	Total Thallium (Tl)	2013/06/06	99	80 - 120	102	80 - 120	<0.0000020	mg/L	NC	20
6865923	Total Tin (Sn)	2013/06/06	93	80 - 120	96	80 - 120	<0.00020	mg/L	NC	20
6865923	Total Titanium (Ti)	2013/06/06	97	80 - 120	97	80 - 120	<0.00050	mg/L		

Maxxam Job #: B343805
Report Date: 2013/06/07

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-N23103074-01

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6865923	Total Uranium (U)	2013/06/06	98	80 - 120	98	80 - 120	<0.0000020	mg/L	3.0	20
6865923	Total Vanadium (V)	2013/06/06	102	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
6865923	Total Zinc (Zn)	2013/06/06	93	80 - 120	117	80 - 120	<0.00010	mg/L	18.2	20
6865923	Total Boron (B)	2013/06/06					<0.050	mg/L	NC	20
6865923	Total Silicon (Si)	2013/06/06					<0.10	mg/L		
6865923	Total Zirconium (Zr)	2013/06/06					<0.00010	mg/L		
6865923	Total Sulphur (S)	2013/06/06					<0.60	mg/L		
6867333	Fluoride (F)	2013/06/03	NC	80 - 120	100	80 - 120	<0.010	mg/L	NC	20
6867361	VH C6-C10	2013/06/04			80	70 - 130	<0.30	mg/L	NC	40
6868606	Dissolved Aluminum (Al)	2013/06/04	100	80 - 120	106	80 - 120	<0.0030	mg/L	NC	20
6868606	Dissolved Antimony (Sb)	2013/06/04	106	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
6868606	Dissolved Arsenic (As)	2013/06/04	103	80 - 120	103	80 - 120	<0.00010	mg/L	NC	20
6868606	Dissolved Barium (Ba)	2013/06/04	101	80 - 120	101	80 - 120	<0.0010	mg/L	NC	20
6868606	Dissolved Beryllium (Be)	2013/06/04	103	80 - 120	97	80 - 120	<0.00010	mg/L	NC	20
6868606	Dissolved Bismuth (Bi)	2013/06/04	96	80 - 120	98	80 - 120	<0.0010	mg/L	NC	20
6868606	Dissolved Cadmium (Cd)	2013/06/04	105	80 - 120	101	80 - 120	<0.000010	mg/L	NC	20
6868606	Dissolved Chromium (Cr)	2013/06/04	98	80 - 120	102	80 - 120	<0.0010	mg/L	NC	20
6868606	Dissolved Cobalt (Co)	2013/06/04	98	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
6868606	Dissolved Copper (Cu)	2013/06/04	98	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
6868606	Dissolved Iron (Fe)	2013/06/04	105	80 - 120	106	80 - 120	<0.0050	mg/L	NC	20
6868606	Dissolved Lead (Pb)	2013/06/04	94	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
6868606	Dissolved Lithium (Li)	2013/06/04	94	80 - 120	95	80 - 120	<0.0050	mg/L	NC	20
6868606	Dissolved Manganese (Mn)	2013/06/04	101	80 - 120	105	80 - 120	<0.0010	mg/L	NC	20
6868606	Dissolved Mercury (Hg)	2013/06/04	101	80 - 120	100	80 - 120	<0.000050	mg/L	NC	20
6868606	Dissolved Molybdenum (Mo)	2013/06/04	NC	80 - 120	100	80 - 120	<0.0010	mg/L	NC	20
6868606	Dissolved Nickel (Ni)	2013/06/04	NC	80 - 120	103	80 - 120	<0.0010	mg/L	2.5	20
6868606	Dissolved Selenium (Se)	2013/06/04	107	80 - 120	103	80 - 120	<0.00010	mg/L	NC	20
6868606	Dissolved Silver (Ag)	2013/06/04	102	80 - 120	100	80 - 120	<0.000020	mg/L	NC	20
6868606	Dissolved Strontium (Sr)	2013/06/04	NC	80 - 120	100	80 - 120	<0.0010	mg/L	0.9	20
6868606	Dissolved Thallium (Tl)	2013/06/04	79 ₍₁₎	80 - 120	101	80 - 120	<0.000050	mg/L	NC	20
6868606	Dissolved Tin (Sn)	2013/06/04	102	80 - 120	100	80 - 120	<0.0050	mg/L	NC	20
6868606	Dissolved Titanium (Ti)	2013/06/04	102	80 - 120	109	80 - 120	<0.0050	mg/L	NC	20
6868606	Dissolved Uranium (U)	2013/06/04	94	80 - 120	96	80 - 120	<0.00010	mg/L	NC	20
6868606	Dissolved Vanadium (V)	2013/06/04	98	80 - 120	102	80 - 120	<0.0050	mg/L	NC	20
6868606	Dissolved Zinc (Zn)	2013/06/04	113	80 - 120	108	80 - 120	<0.0050	mg/L	NC	20
6868606	Dissolved Boron (B)	2013/06/04					<0.050	mg/L	NC	20
6868606	Dissolved Silicon (Si)	2013/06/04					<0.10	mg/L	0.7	20

Maxxam Job #: B343805
Report Date: 2013/06/07

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-N23103074-01

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6868606	Dissolved Zirconium (Zr)	2013/06/04					<0.00050	mg/L	NC	20
6869998	Dissolved Sulphate (SO4)	2013/06/04	99	80 - 120	100	80 - 120	<0.50	mg/L	NC	20

N/A = Not Applicable

RDL = Reportable Detection Limit

RPD = Relative Percent Difference

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.

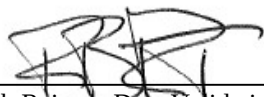
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

(1) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Validation Signature Page

Maxxam Job #: B343805

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Rob Reinert, Data Validation Coordinator

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#5908 EBA Engineering Consultants Ltd.	Company Name:	#18501 EBA Engineering Consultants Ltd.	Quotation #:	B10655	MAXXAM JOB #:	B343805
Contact Name:	Accounts Payable	Contact Name:	Kristy Gabelhouse	P.O. #:		BOTTLE ORDER #:	326573
Address:	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Address:	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Project #:	CRWMC - N23103074-01	CHAIN OF CUSTODY #:	
Phone:	(250)756-2256 Fax: (250)756-2686	Phone:	(250)756-2256 Fax:	Project Name:	CRWMC	PROJECT MANAGER:	Crystal Ireland
Email:	dromano@eba.ca, lpaul@eba.ca	Email:	kgabelhouse@eba.ca, sakbar@maxxam.ca	Site #:	CRWMC		
				Sampled By:	DT + JS		

REGULATORY CRITERIA	SPECIAL INSTRUCTIONS	ANALYSIS REQUESTED (Please be specific)	TURNAROUND TIME (TAT) REQUIRED:
☒ CSR ☐ CCME ☒ BC Water Quality ☒ New BAWQL - AL, DV		AMMONIA-N ANION (CL, F, NO3, SO4) CSR Dissolved Metals with HG + Hardness pH / Conductivity / Alkalinity Low Level Total Metals + Tg + Hardness CSR VOC + VPH Diss. Sulphur Total Sulphur	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS Regular (Standard) TAT: (will be applied if Rush TAT is not specified) Standard TAT = 5 working days for most tests Please note: Standard TAT for certain tests such as BOD and Dissolved Oxygen are > 3 days - contact your Project Manager for details Job Specific Rush TAT (if applies to entire submission) 1 Day ☐ 2 Day ☐ 3 Day ☐ Date Required: Rush Confirmation Number: (not fill for all)

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM					Metals Field	AMMONIA-N	ANION (C, SO4)	CSR Dissolved HG + Hg	pH / Conduct	Low Level T + Tg + CSR VOC	Diss.	Total	1 Day ☐ 2 Day ☐ 3 Day ☐ Date Required _____	Run Confirmation Number _____	Call lab for RI _____
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix									# of Bottles	Comments	
1 GN2519	HBT9A -1	May 30		GW	✓	X	X	X	X			X	4		
2 GN2520	AG99-06	↓		↓	✓	X	X	X	X		X	X	7		
3 GN2521	EBA11-03		✓		X	X	X	X		X	4				
4 GN2522	EBA11-04		✓		X	X	X	X		X	4				
5 GN2523	EBA11-05		✓		X	X	X	X		X	4				
6 GN2524	AG99-02	May 29		↓	✓	X	X	X	X		X		4		
7 GN2525	AG99-04	↓			✓	X	X	X	X		X	X	7		
8 GN2526	AG99-05		✓		X	X	X	X		X	X	7			
9 GN2527	SW 1		↓		SW	✓	X	X		X	X		X	4	

RELINQUISHED BY (Signature/Print)	Date (YYMMDD)	Time	RECEIVED BY (Signature/Print)	Date (YYMMDD)	Time	# Jars Used and Not Submitted	Laboratory Use Only
W. Owen Thomas	13/05/30	16:00	Richard Rocheleau	MAY 31, 2013	07:40		Thin Samples ☐ Temperature (°C) on Receipt: 11/10/9 Contain Seal Intact on Receipt? ☐ Yes ☐ No Write Maxxam Yellow Blank

Your Project #: CRWMC - N23103074-01
 Site#: CRWMC
 Site Location: CRWMC
 Your C.O.C. #: 40589604

Attention: Kristy Gabelhouse

EBA Engineering Consultants Ltd.
 #1 - 4376 Boban Drive
 Nanaimo, BC
 CANADA V9T6A7

Report Date: 2013/08/28

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B374680
Received: 2013/08/22, 08:00

Sample Matrix: Water
 # Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	6	2013/08/23	2013/08/23	BBY6SOP-00026	SM2320B
Chloride by Automated Colourimetry	5	N/A	2013/08/23	BBY6SOP-00011	SM-4500-Cl-
Chloride by Automated Colourimetry	1	N/A	2013/08/26	BBY6SOP-00011	SM-4500-Cl-
Conductance - water	6	N/A	2013/08/23	BBY6SOP-00026	SM-2510B
Fluoride	6	N/A	2013/08/23	BBY6SOP-00012	SM - 4500 F C
Hardness Total (calculated as CaCO3)	1	N/A	2013/08/28	BBY7SOP-00002	EPA 6020A
Hardness (calculated as CaCO3)	5	N/A	2013/08/27	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	5	N/A	2013/08/27	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (dissolved)	5	N/A	2013/08/26	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (total)	1	N/A	2013/08/28	BBY7SOP-00002	EPA 6020A
Elements by ICPMS Low Level (total)	1	N/A	2013/08/28	BBY7SOP-00002	EPA 6020A
Ammonia-N (Preserved)	6	N/A	2013/08/26	BBY6SOP-00009	SM-4500NH3G
Nitrate + Nitrite (N)	6	N/A	2013/08/23	BBY6SOP-00010	SM 4500NO3-I
Nitrite (N) by CFA	6	N/A	2013/08/23	BBY6SOP-00010	EPA 353.2
Nitrogen - Nitrate (as N)	6	N/A	2013/08/24	BBY6SOP-00010	SM 4500NO3-I
Filter and HNO3 Preserve for Metals	5	N/A	2013/08/22	BBY6WI-00001	EPA 200.2
pH Water	6	N/A	2013/08/23	BBY6SOP-00026	SM-4500H+B
CSR VH C6-C10 in Water by HS GC/MS	2	N/A	2013/08/24	BBY8SOP-00011	EPA 8260B
Sulphate by Automated Colourimetry	5	N/A	2013/08/23	BBY6SOP-00017	SM4500-SO42- E
Sulphate by Automated Colourimetry	1	N/A	2013/08/26	BBY6SOP-00017	SM4500-SO42- E
VOCs in Water by HS GC/MS	2	2013/08/23	2013/08/24	BBY8-SOP-0009	EPA 8260C
Volatile HC-BTEX	2	N/A	2013/08/26	BBY WI-00033	BC MOE Lab Method

* Results relate only to the items tested.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Crystal Ireland, B.Sc., Account Specialist
 Email: Cireland@maxxam.ca
 Phone# (604) 638-5016

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 1

Maxxam Job #: B374680
Report Date: 2013/08/28

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01
Site Location: CRWMC
Sampler Initials: KA

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		HH0864		HH0865	HH0866	HH0867	HH0868	HH0869		
Sampling Date		2013/08/21		2013/08/21	2013/08/21	2013/08/21	2013/08/21	2013/08/21		
COC#		40589604		40589604	40589604	40589604	40589604	40589604		
	UNITS	AG99-05	QC Batch	AG99-06	EBA11-3	EBA11-4	EBA11-5	SW-1	RDL	QC Batch
ANIONS										
Nitrite (N)	mg/L	<0.0050	7112433	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7112433
Calculated Parameters										
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD	FIELD	FIELD	FIELD		N/A	ONSITE
Nitrate (N)	mg/L	0.068	7102811	0.409	0.046	0.087	0.089	0.131	0.020	7102811
Misc. Inorganics										
Fluoride (F)	mg/L	0.018	7109547	0.021	0.015	0.018	0.019	0.018	0.010	7109547
Alkalinity (Total as CaCO3)	mg/L	50.1	7108709	105	53.9	45.2	44.5	64.5	0.50	7108709
Alkalinity (PP as CaCO3)	mg/L	<0.50	7108709	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7108709
Bicarbonate (HCO3)	mg/L	61.1	7108709	128	65.8	55.1	54.3	78.7	0.50	7108709
Carbonate (CO3)	mg/L	<0.50	7108709	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7108709
Hydroxide (OH)	mg/L	<0.50	7108709	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7108709
Anions										
Dissolved Sulphate (SO4)	mg/L	3.08	7117684	3.83	2.97	1.44	1.55	4.06	0.50	7111863
Dissolved Chloride (Cl)	mg/L	1.4	7117667	14	3.3	6.4	6.5	3.1	0.50	7111813
Nutrients										
Ammonia (N)	mg/L	0.020	7117277	0.0091	0.022	0.013	0.021	0.015	0.0050	7117277
Nitrate plus Nitrite (N)	mg/L	0.068	7112424	0.409	0.046	0.087	0.089	0.131	0.020	7112424
Physical Properties										
Conductivity	uS/cm	112	7108717	251	122	112	113	141	1.0	7108717
pH	pH Units	7.83	7108718	7.98	7.86	7.80	7.79	7.86		7108718

N/A = Not Applicable

RDL = Reportable Detection Limit

Maxxam Job #: B374680
Report Date: 2013/08/28

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01
Site Location: CRWMC
Sampler Initials: KA

CSR DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HH0864	HH0865	HH0866	HH0867	HH0868		
Sampling Date		2013/08/21	2013/08/21	2013/08/21	2013/08/21	2013/08/21		
COC#		40589604	40589604	40589604	40589604	40589604		
	UNITS	AG99-05	AG99-06	EBA11-3	EBA11-4	EBA11-5	RDL	QC Batch
Misc. Inorganics								
Dissolved Hardness (CaCO ₃)	mg/L	51.5	120	58.4	49.8	48.7	0.50	7107248

RDL = Reportable Detection Limit

Maxxam Job #: B374680
Report Date: 2013/08/28

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01
Site Location: CRWMC
Sampler Initials: KA

CSR DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HH0864	HH0865	HH0866	HH0867	HH0868		
Sampling Date		2013/08/21	2013/08/21	2013/08/21	2013/08/21	2013/08/21		
COC#		40589604	40589604	40589604	40589604	40589604		
	UNITS	AG99-05	AG99-06	EBA11-3	EBA11-4	EBA11-5	RDL	QC Batch
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.0063	<0.0030	0.0034	0.0184	0.0141	0.0030	7116977
Dissolved Antimony (Sb)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7116977
Dissolved Arsenic (As)	mg/L	0.00071	<0.00010	0.00019	0.00174	0.00170	0.00010	7116977
Dissolved Barium (Ba)	mg/L	<0.0010	<0.0010	<0.0010	0.0018	0.0016	0.0010	7116977
Dissolved Beryllium (Be)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	7116977
Dissolved Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7116977
Dissolved Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7116977
Dissolved Cadmium (Cd)	mg/L	0.000011	<0.000010	<0.000010	0.000019	<0.000010	0.000010	7116977
Dissolved Chromium (Cr)	mg/L	<0.0010	<0.0010	<0.0010	0.0010	0.0011	0.0010	7116977
Dissolved Cobalt (Co)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7116977
Dissolved Copper (Cu)	mg/L	0.00035	<0.00020	<0.00020	0.00026	0.00022	0.00020	7116977
Dissolved Iron (Fe)	mg/L	<0.0050	<0.0050	<0.0050	0.0240	0.0153	0.0050	7116977
Dissolved Lead (Pb)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	7116977
Dissolved Lithium (Li)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7116977
Dissolved Manganese (Mn)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7116977
Dissolved Mercury (Hg)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000050	7116977
Dissolved Molybdenum (Mo)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7116977
Dissolved Nickel (Ni)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7116977
Dissolved Selenium (Se)	mg/L	<0.00010	0.00016	0.00015	0.00019	0.00017	0.00010	7116977
Dissolved Silicon (Si)	mg/L	3.95	4.73	4.73	6.12	6.14	0.10	7116977
Dissolved Silver (Ag)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000020	7116977
Dissolved Strontium (Sr)	mg/L	0.0239	0.0882	0.0314	0.0288	0.0284	0.0010	7116977
Dissolved Thallium (Tl)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000050	7116977
Dissolved Tin (Sn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7116977
Dissolved Titanium (Ti)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7116977
Dissolved Uranium (U)	mg/L	<0.00010	0.00011	<0.00010	0.00018	0.00017	0.00010	7116977
Dissolved Vanadium (V)	mg/L	<0.0050	<0.0050	<0.0050	0.0152	0.0148	0.0050	7116977
Dissolved Zinc (Zn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7116977
Dissolved Zirconium (Zr)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7116977
Dissolved Calcium (Ca)	mg/L	17.3	37.5	18.4	15.5	15.3	0.050	7104169
Dissolved Magnesium (Mg)	mg/L	2.00	6.49	3.03	2.67	2.54	0.050	7104169
Dissolved Potassium (K)	mg/L	0.364	0.370	0.277	0.746	0.714	0.050	7104169
Dissolved Sodium (Na)	mg/L	1.15	2.66	1.33	2.19	2.12	0.050	7104169
Dissolved Sulphur (S)	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	3.0	7116977

RDL = Reportable Detection Limit

Maxxam Job #: B374680
Report Date: 2013/08/28

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01
Site Location: CRWMC
Sampler Initials: KA

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		HH0869		
Sampling Date		2013/08/21		
COC#		40589604		
	UNITS	SW-1	RDL	QC Batch
Calculated Parameters				
Total Hardness (CaCO ₃)	mg/L	72.8	0.50	7107247

RDL = Reportable Detection Limit

Maxxam Job #: B374680
Report Date: 2013/08/28

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01
Site Location: CRWMC
Sampler Initials: KA

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		HH0869		
Sampling Date		2013/08/21		
COC#		40589604		
	UNITS	SW-1	RDL	QC Batch
Total Metals by ICPMS				
Total Aluminum (Al)	mg/L	0.0543	0.00050	7120492
Total Antimony (Sb)	mg/L	0.000031	0.000020	7120492
Total Arsenic (As)	mg/L	0.000549	0.000020	7120492
Total Barium (Ba)	mg/L	0.00174	0.000020	7120492
Total Beryllium (Be)	mg/L	<0.000010	0.000010	7120492
Total Bismuth (Bi)	mg/L	<0.0000050	0.0000050	7120492
Total Boron (B)	mg/L	<0.050	0.050	7120492
Total Cadmium (Cd)	mg/L	0.0000210	0.0000050	7120492
Total Chromium (Cr)	mg/L	0.00035	0.00010	7120492
Total Cobalt (Co)	mg/L	0.0000430	0.0000050	7120492
Total Copper (Cu)	mg/L	0.00104	0.000050	7120492
Total Iron (Fe)	mg/L	0.0541	0.0010	7120492
Total Lead (Pb)	mg/L	0.0000740	0.0000050	7120492
Total Lithium (Li)	mg/L	<0.00050	0.00050	7120492
Total Manganese (Mn)	mg/L	0.00334	0.000050	7120492
Total Mercury (Hg)	mg/L	<0.000010	0.000010	7120492
Total Molybdenum (Mo)	mg/L	0.000091	0.000050	7120492
Total Nickel (Ni)	mg/L	0.000163	0.000020	7120492
Total Selenium (Se)	mg/L	0.000151	0.000040	7120492
Total Silicon (Si)	mg/L	4.78	0.10	7120492
Total Silver (Ag)	mg/L	<0.0000050	0.0000050	7120492
Total Strontium (Sr)	mg/L	0.0332	0.000050	7120492
Total Thallium (Tl)	mg/L	<0.0000020	0.0000020	7120492
Total Tin (Sn)	mg/L	0.00027	0.00020	7120492
Total Titanium (Ti)	mg/L	0.00293	0.00050	7120492
Total Uranium (U)	mg/L	0.000110	0.0000020	7120492
Total Vanadium (V)	mg/L	0.00482	0.00020	7120492
Total Zinc (Zn)	mg/L	0.00096	0.00010	7120492
Total Zirconium (Zr)	mg/L	<0.00010	0.00010	7120492
Total Calcium (Ca)	mg/L	23.4	0.050	7103711
Total Magnesium (Mg)	mg/L	3.52	0.050	7103711
Total Potassium (K)	mg/L	0.375	0.050	7103711
Total Sodium (Na)	mg/L	1.81	0.050	7103711
Total Sulphur (S)	mg/L	0.69	0.60	7120492

RDL = Reportable Detection Limit

Maxxam Job #: B374680
Report Date: 2013/08/28

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01
Site Location: CRWMC
Sampler Initials: KA

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		HH0864	HH0865		
Sampling Date		2013/08/21	2013/08/21		
COC#		40589604	40589604		
	UNITS	AG99-05	AG99-06	RDL	QC Batch
Volatiles					
VPH (VH6 to 10 - BTEX)	mg/L	<0.30	<0.30	0.30	7103150
Volatile Hydrocarbons					
VH C6-C10	mg/L	<0.30	<0.30	0.30	7111896
Volatiles					
Chloromethane	ug/L	<1.0	<1.0	1.0	7109746
Vinyl chloride	ug/L	<0.50	<0.50	0.50	7109746
Chloroethane	ug/L	<1.0	<1.0	1.0	7109746
Trichlorofluoromethane	ug/L	<4.0	<4.0	4.0	7109746
1,1-dichloroethene	ug/L	<0.50	<0.50	0.50	7109746
Dichloromethane	ug/L	<2.0	<2.0	2.0	7109746
trans-1,2-dichloroethene	ug/L	<1.0	<1.0	1.0	7109746
1,1-dichloroethane	ug/L	<0.50	<0.50	0.50	7109746
cis-1,2-dichloroethene	ug/L	<1.0	<1.0	1.0	7109746
Chloroform	ug/L	<1.0	<1.0	1.0	7109746
1,1,1-trichloroethane	ug/L	<0.50	<0.50	0.50	7109746
1,2-dichloroethane	ug/L	<0.50	<0.50	0.50	7109746
Carbon tetrachloride	ug/L	<0.50	<0.50	0.50	7109746
Benzene	ug/L	<0.40	<0.40	0.40	7109746
Methyl-tert-butylether (MTBE)	ug/L	<4.0	<4.0	4.0	7109746
1,2-dichloropropane	ug/L	<0.50	<0.50	0.50	7109746
cis-1,3-dichloropropene	ug/L	<1.0	<1.0	1.0	7109746
trans-1,3-dichloropropene	ug/L	<1.0	<1.0	1.0	7109746
Bromomethane	ug/L	<1.0	<1.0	1.0	7109746
1,1,2-trichloroethane	ug/L	<0.50	<0.50	0.50	7109746
Trichloroethene	ug/L	<0.50	<0.50	0.50	7109746
Chlorodibromomethane	ug/L	<1.0	<1.0	1.0	7109746
Tetrachloroethene	ug/L	<0.50	<0.50	0.50	7109746
Bromodichloromethane	ug/L	<1.0	<1.0	1.0	7109746
Toluene	ug/L	<0.40	<0.40	0.40	7109746
Ethylbenzene	ug/L	<0.40	<0.40	0.40	7109746
m & p-Xylene	ug/L	<0.40	<0.40	0.40	7109746
Bromoform	ug/L	<1.0	<1.0	1.0	7109746
Styrene	ug/L	<0.50	<0.50	0.50	7109746
o-Xylene	ug/L	<0.40	<0.40	0.40	7109746
Xylenes (Total)	ug/L	<0.40	<0.40	0.40	7109746

RDL = Reportable Detection Limit

Maxxam Job #: B374680
Report Date: 2013/08/28

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01
Site Location: CRWMC
Sampler Initials: KA

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		HH0864	HH0865		
Sampling Date		2013/08/21	2013/08/21		
COC#		40589604	40589604		
	UNITS	AG99-05	AG99-06	RDL	QC Batch
1,1,1,2-tetrachloroethane	ug/L	<0.50	<0.50	0.50	7109746
1,1,2,2-tetrachloroethane	ug/L	<0.50	<0.50	0.50	7109746
1,2-dichlorobenzene	ug/L	<0.50	<0.50	0.50	7109746
1,3-dichlorobenzene	ug/L	<0.50	<0.50	0.50	7109746
1,4-dichlorobenzene	ug/L	<0.50	<0.50	0.50	7109746
Chlorobenzene	ug/L	<0.50	<0.50	0.50	7109746
Dibromomethane	ug/L	<0.90	<0.90	0.90	7109746
Surrogate Recovery (%)					
1,4-Difluorobenzene (sur.)	%	106	105		7109746
4-BROMOFLUOROBENZENE (sur.)	%	87	95		7109746
D4-1,2-DICHLOROETHANE (sur.)	%	111	111		7109746

RDL = Reportable Detection Limit

Maxxam Job #: B374680
Report Date: 2013/08/28

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01
Site Location: CRWMC
Sampler Initials: KA

General Comments

Sample HH0864-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HH0865-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HH0866-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HH0867-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HH0868-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HH0869-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Maxxam Job #: B374680
Report Date: 2013/08/28

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01
Site Location: CRWMC
Sampler Initials: KA

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7108709	Alkalinity (Total as CaCO ₃)	2013/08/23	NC	80 - 120	96	80 - 120	<0.50	mg/L	1.5	20
7108709	Alkalinity (PP as CaCO ₃)	2013/08/23					<0.50	mg/L	NC	20
7108709	Bicarbonate (HCO ₃)	2013/08/23					<0.50	mg/L	1.5	20
7108709	Carbonate (CO ₃)	2013/08/23					<0.50	mg/L	NC	20
7108709	Hydroxide (OH)	2013/08/23					<0.50	mg/L	NC	20
7108717	Conductivity	2013/08/24			100	80 - 120	1.2, RDL=1.0	uS/cm	0.3	20
7109547	Fluoride (F)	2013/08/23	98	80 - 120	98	80 - 120	<0.010	mg/L	NC	20
7109746	1,4-Difluorobenzene (sur.)	2013/08/24	102	70 - 130	88	70 - 130	105	%		
7109746	4-BROMOFLUOROBENZENE (sur.)	2013/08/24	104	70 - 130	89	70 - 130	85	%		
7109746	D4-1,2-DICHLOROETHANE (sur.)	2013/08/24	106	70 - 130	91	70 - 130	109	%		
7109746	Chloromethane	2013/08/24	102	60 - 140	96	60 - 140	<1.0	ug/L	NC	30
7109746	Vinyl chloride	2013/08/24	117	60 - 140	105	60 - 140	<0.50	ug/L	NC	30
7109746	Chloroethane	2013/08/24	104	60 - 140	95	60 - 140	<1.0	ug/L	NC	30
7109746	Trichlorofluoromethane	2013/08/24	126	60 - 140	108	60 - 140	<4.0	ug/L	NC	30
7109746	1,1-dichloroethene	2013/08/24	103	70 - 130	88	70 - 130	<0.50	ug/L	NC	30
7109746	Dichloromethane	2013/08/24	109	70 - 130	93	70 - 130	<2.0	ug/L	NC	30
7109746	trans-1,2-dichloroethene	2013/08/24	107	70 - 130	91	70 - 130	<1.0	ug/L	NC	30
7109746	1,1-dichloroethane	2013/08/24	97	70 - 130	83	70 - 130	<0.50	ug/L	NC	30
7109746	cis-1,2-dichloroethene	2013/08/24	108	70 - 130	94	70 - 130	<1.0	ug/L	NC	30
7109746	Chloroform	2013/08/24	104	70 - 130	88	70 - 130	<1.0	ug/L	NC	30
7109746	1,1,1-trichloroethane	2013/08/24	98	70 - 130	84	70 - 130	<0.50	ug/L	NC	30
7109746	1,2-dichloroethane	2013/08/24	120	70 - 130	100	70 - 130	<0.50	ug/L	NC	30
7109746	Carbon tetrachloride	2013/08/24	99	70 - 130	86	70 - 130	<0.50	ug/L	NC	30
7109746	Benzene	2013/08/24	104	70 - 130	92	70 - 130	<0.40	ug/L	NC	30
7109746	Methyl-tert-butylether (MTBE)	2013/08/24	110	70 - 130	90	70 - 130	<4.0	ug/L	NC	30
7109746	1,2-dichloropropane	2013/08/24	115	70 - 130	96	70 - 130	<0.50	ug/L	NC	30
7109746	cis-1,3-dichloropropene	2013/08/24	115	70 - 130	87	70 - 130	<1.0	ug/L	NC	30
7109746	trans-1,3-dichloropropene	2013/08/24	97	70 - 130	72	70 - 130	<1.0	ug/L	NC	30
7109746	Bromomethane	2013/08/24	93	60 - 140	93	60 - 140	<1.0	ug/L	NC	30
7109746	1,1,2-trichloroethane	2013/08/24	119	70 - 130	100	70 - 130	<0.50	ug/L	NC	30
7109746	Trichloroethene	2013/08/24	111	70 - 130	96	70 - 130	<0.50	ug/L	NC	30
7109746	Chlorodibromomethane	2013/08/24	115	70 - 130	97	70 - 130	<1.0	ug/L	NC	30
7109746	Tetrachloroethene	2013/08/24	101	70 - 130	88	70 - 130	<0.50	ug/L	NC	30
7109746	Bromodichloromethane	2013/08/24	113	70 - 130	94	70 - 130	<1.0	ug/L	NC	30
7109746	Toluene	2013/08/24	109	70 - 130	91	70 - 130	<0.40	ug/L	NC	30
7109746	Ethylbenzene	2013/08/24	111	70 - 130	96	70 - 130	<0.40	ug/L	NC	30
7109746	m & p-Xylene	2013/08/24	121	70 - 130	104	70 - 130	<0.40	ug/L	NC	30
7109746	Bromoform	2013/08/24	108	70 - 130	90	70 - 130	<1.0	ug/L	NC	30
7109746	Styrene	2013/08/24	90	70 - 130	77	70 - 130	<0.50	ug/L	NC	30
7109746	o-Xylene	2013/08/24	120	70 - 130	99	70 - 130	<0.40	ug/L	NC	30

Maxxam Job #: B374680
Report Date: 2013/08/28

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01
Site Location: CRWMC
Sampler Initials: KA

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7109746	1,1,1,2-tetrachloroethane	2013/08/24	112	70 - 130	94	70 - 130	<0.50	ug/L	NC	30
7109746	1,1,2,2-tetrachloroethane	2013/08/24	119	70 - 130	116	70 - 130	<0.50	ug/L	NC	30
7109746	1,2-dichlorobenzene	2013/08/24	119	70 - 130	119	70 - 130	<0.50	ug/L	NC	30
7109746	1,3-dichlorobenzene	2013/08/24	115	70 - 130	116	70 - 130	<0.50	ug/L	NC	30
7109746	1,4-dichlorobenzene	2013/08/24	106	70 - 130	110	70 - 130	<0.50	ug/L	NC	30
7109746	Chlorobenzene	2013/08/24	110	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
7109746	Dibromomethane	2013/08/24	109	70 - 130	89	70 - 130	<0.90	ug/L	NC	30
7109746	Xylenes (Total)	2013/08/24					<0.40	ug/L	NC	30
7111813	Dissolved Chloride (Cl)	2013/08/23	NC	80 - 120	99	80 - 120	<0.50	mg/L	7.4	20
7111863	Dissolved Sulphate (SO4)	2013/08/23	NC	80 - 120	97	80 - 120	0.88, RDL=0.50	mg/L	19.8	20
7111896	VH C6-C10	2013/08/24			107	70 - 130	<0.30	mg/L	NC	40
7112424	Nitrate plus Nitrite (N)	2013/08/23	92	80 - 120	103	80 - 120	<0.020	mg/L	NC	25
7112433	Nitrite (N)	2013/08/23	94	80 - 120	100	80 - 120	<0.0050	mg/L	NC	20
7116977	Dissolved Aluminum (Al)	2013/08/26	108	80 - 120	107	80 - 120	<0.0030	mg/L	NC	20
7116977	Dissolved Antimony (Sb)	2013/08/26	102	80 - 120	104	80 - 120	<0.00050	mg/L	NC	20
7116977	Dissolved Arsenic (As)	2013/08/26	101	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
7116977	Dissolved Barium (Ba)	2013/08/26	98	80 - 120	102	80 - 120	<0.0010	mg/L	NC	20
7116977	Dissolved Beryllium (Be)	2013/08/26	96	80 - 120	95	80 - 120	<0.00010	mg/L	NC	20
7116977	Dissolved Bismuth (Bi)	2013/08/26	99	80 - 120	98	80 - 120	<0.0010	mg/L	NC	20
7116977	Dissolved Cadmium (Cd)	2013/08/26	101	80 - 120	101	80 - 120	<0.000010	mg/L	NC	20
7116977	Dissolved Chromium (Cr)	2013/08/26	95	80 - 120	97	80 - 120	<0.0010	mg/L	NC	20
7116977	Dissolved Cobalt (Co)	2013/08/26	95	80 - 120	96	80 - 120	<0.00050	mg/L	NC	20
7116977	Dissolved Copper (Cu)	2013/08/26	93	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
7116977	Dissolved Iron (Fe)	2013/08/26	105	80 - 120	119	80 - 120	<0.0050	mg/L	NC	20
7116977	Dissolved Lead (Pb)	2013/08/26	96	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
7116977	Dissolved Lithium (Li)	2013/08/26	96	80 - 120	94	80 - 120	<0.0050	mg/L		
7116977	Dissolved Manganese (Mn)	2013/08/26	97	80 - 120	98	80 - 120	<0.0010	mg/L	NC	20
7116977	Dissolved Mercury (Hg)	2013/08/26	97	80 - 120	97	80 - 120	<0.000050	mg/L	NC	20
7116977	Dissolved Molybdenum (Mo)	2013/08/26	99	80 - 120	103	80 - 120	<0.0010	mg/L	NC	20
7116977	Dissolved Nickel (Ni)	2013/08/26	95	80 - 120	96	80 - 120	<0.0010	mg/L	NC	20
7116977	Dissolved Selenium (Se)	2013/08/26	104	80 - 120	107	80 - 120	<0.00010	mg/L	NC	20
7116977	Dissolved Silver (Ag)	2013/08/26	79 _(L)	80 - 120	86	80 - 120	0.000028, RDL=0.000020	mg/L	NC	20
7116977	Dissolved Strontium (Sr)	2013/08/26	99	80 - 120	101	80 - 120	<0.0010	mg/L	NC	20
7116977	Dissolved Thallium (Tl)	2013/08/26	97	80 - 120	101	80 - 120	<0.000050	mg/L	NC	20
7116977	Dissolved Tin (Sn)	2013/08/26	97	80 - 120	100	80 - 120	<0.0050	mg/L	NC	20
7116977	Dissolved Titanium (Ti)	2013/08/26	98	80 - 120	104	80 - 120	<0.0050	mg/L	NC	20
7116977	Dissolved Uranium (U)	2013/08/26	95	80 - 120	97	80 - 120	<0.00010	mg/L	NC	20
7116977	Dissolved Vanadium (V)	2013/08/26	95	80 - 120	96	80 - 120	<0.0050	mg/L	NC	20
7116977	Dissolved Zinc (Zn)	2013/08/26	102	80 - 120	97	80 - 120	<0.0050	mg/L	NC	20
7116977	Dissolved Boron (B)	2013/08/26					<0.050	mg/L	NC	20

Maxxam Job #: B374680
Report Date: 2013/08/28

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01
Site Location: CRWMC
Sampler Initials: KA

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7116977	Dissolved Silicon (Si)	2013/08/26					<0.10	mg/L	NC	20
7116977	Dissolved Zirconium (Zr)	2013/08/26					<0.00050	mg/L	NC	20
7116977	Dissolved Sulphur (S)	2013/08/26					<3.0	mg/L		
7117277	Ammonia (N)	2013/08/26	98	80 - 120	104	80 - 120	0.0058, RDL=0.0050	mg/L	NC	20
7117667	Dissolved Chloride (Cl)	2013/08/26	NC	80 - 120	98	80 - 120	0.71, RDL=0.50	mg/L	4.0	20
7117684	Dissolved Sulphate (SO ₄)	2013/08/26	NC	80 - 120	97	80 - 120	<0.50	mg/L	3.1	20
7120492	Total Aluminum (Al)	2013/08/28	NC	80 - 120	108	80 - 120	<0.00050	mg/L	5.4	20
7120492	Total Antimony (Sb)	2013/08/28	103	80 - 120	97	80 - 120	<0.000020	mg/L	NC	20
7120492	Total Arsenic (As)	2013/08/28	105	80 - 120	101	80 - 120	<0.000020	mg/L	3.2	20
7120492	Total Barium (Ba)	2013/08/28	NC	80 - 120	99	80 - 120	<0.000020	mg/L	0.05	20
7120492	Total Beryllium (Be)	2013/08/28	97	80 - 120	101	80 - 120	<0.000010	mg/L	NC	20
7120492	Total Bismuth (Bi)	2013/08/28	91	80 - 120	92	80 - 120	<0.0000050	mg/L	NC	20
7120492	Total Cadmium (Cd)	2013/08/28	98	80 - 120	94	80 - 120	<0.0000050	mg/L	13.8	20
7120492	Total Chromium (Cr)	2013/08/28	102	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
7120492	Total Cobalt (Co)	2013/08/28	100	80 - 120	99	80 - 120	<0.0000050	mg/L	14.4	20
7120492	Total Copper (Cu)	2013/08/28	107	80 - 120	95	80 - 120	<0.000050	mg/L	26.4 ₍₁₎	20
7120492	Total Iron (Fe)	2013/08/28	NC	80 - 120	107	80 - 120	<0.0010	mg/L	6.9	20
7120492	Total Lead (Pb)	2013/08/28	91	80 - 120	94	80 - 120	<0.0000050	mg/L	0	20
7120492	Total Lithium (Li)	2013/08/28	92	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
7120492	Total Manganese (Mn)	2013/08/28	NC	80 - 120	97	80 - 120	<0.000050	mg/L	4.2	20
7120492	Total Mercury (Hg)	2013/08/28	98	80 - 120	94	80 - 120	<0.000010	mg/L	NC	20
7120492	Total Molybdenum (Mo)	2013/08/28	NC	80 - 120	95	80 - 120	<0.000050	mg/L	1.3	20
7120492	Total Nickel (Ni)	2013/08/28	98	80 - 120	98	80 - 120	<0.000020	mg/L	10.5	20
7120492	Total Selenium (Se)	2013/08/28	106	80 - 120	100	80 - 120	<0.000040	mg/L	7.3	20
7120492	Total Silver (Ag)	2013/08/28	105	80 - 120	85	80 - 120	<0.0000050	mg/L	NC	20
7120492	Total Strontium (Sr)	2013/08/28	NC	80 - 120	89	80 - 120	<0.000050	mg/L	0.7	20
7120492	Total Thallium (Tl)	2013/08/28	92	80 - 120	99	80 - 120	<0.0000020	mg/L	NC	20
7120492	Total Tin (Sn)	2013/08/28	97	80 - 120	94	80 - 120	<0.00020	mg/L	NC	20
7120492	Total Titanium (Ti)	2013/08/28	103	80 - 120	93	80 - 120	<0.00050	mg/L	NC	20
7120492	Total Uranium (U)	2013/08/28	92	80 - 120	93	80 - 120	<0.0000020	mg/L	2.6	20
7120492	Total Vanadium (V)	2013/08/28	104	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
7120492	Total Zinc (Zn)	2013/08/28	106	80 - 120	102	80 - 120	<0.00010	mg/L	11.3	20
7120492	Total Boron (B)	2013/08/28					<0.050	mg/L	NC	20
7120492	Total Silicon (Si)	2013/08/28					<0.10	mg/L	11.2	20

Maxxam Job #: B374680
Report Date: 2013/08/28

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01
Site Location: CRWMC
Sampler Initials: KA

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7120492	Total Zirconium (Zr)	2013/08/28					<0.00010	mg/L	NC	20
7120492	Total Sulphur (S)	2013/08/28					<0.60	mg/L		

N/A = Not Applicable

RDL = Reportable Detection Limit

RPD = Relative Percent Difference

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.

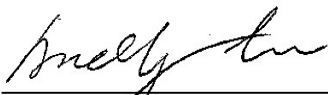
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

(1) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Validation Signature Page

Maxxam Job #: B374680

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Andy Lu, Data Validation Coordinator

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INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice)		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name: #5908 EBA Engineering Consultants Ltd.	Company Name: #18501 EBA Engineering Consultants Ltd.	Quotation #: B10655	MAXXAM JOB #: B374680		BOTTLE ORDER #:		
Contact Name: Accounts Payable	Contact Name: Kristy Gabelhouse	P.O. #:	CHAIN OF CUSTODY #:		PROJECT MANAGER:		
Address: #1 - 4375 Boban Drive Nanaimo BC V9T 6A7	Address: #1 - 4375 Boban Drive Nanaimo BC V9T 6A7	Project #: WMC - N23103074-01	CRYSTAL ISLAND				
Phone: (250) 756-2256 Fax: (250) 756-2686	Phone: (250) 756-2256 Fax:	Site #: WMC	CRYSTAL ISLAND				
Email: dromano@eba.ca, paul@eba.ca	Email: kgabelhouse@eba.ca, sakbar@maxxam.ca	Sampled By: K. Gabelhouse	CRYSTAL ISLAND				
REGULATORY CRITERIA:		SPECIAL INSTRUCTIONS:		ANALYSIS REQUESTED (Please be specific)		TURNAROUND TIME (TAT) REQUIRED:	
☒ GOR ☐ CCME ☒ BC Water Quality ☐ Other:		SW - low level total metals		AMMONIA-N ANION (CL, F, NO2, NO3, SO4) CSR Dissolved Metals with HG + Hardness pH / Conductivity / Alkalinity Low Level Total Metals CSR VOC + VPH Dissolved Sulphur Total Sulphur		Regular (Standard) TAT: (not applicable if Rush TAT is not specified) Standard TAT = 5 working days for most tests. Please note: Standard TAT for certain tests such as GOR and Dissolved Metals is > 5 days - contact your Project Manager for details. Job Specific Rush TAT (if applies to entire submission): 1 Day ☐ 2 Day ☐ 3 Day ☐ Date Required: ☐ Rush Confirmation Number:	
SAMPLES MUST BE KEPT COOL (+ 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM							
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Minerals Field Filtered ? (Y/N)	# of Bottles	Comments
1 HH0864	AG99-05	Aug 21/13		GW	Y	7	
2 HH0865	AG99-06	"		"	Y	7	
3 HH0866	EBA11-3	"		"	Y	4	
4 HH0867	EBA11-4	"		"	Y	4	
5 HH0868	EBA11-5	"		"	Y	4	
6 HH0869	SWH	"		SW	N	4	
7							
8							
9							
10							

RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)	Time:	RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)	Time:	# Jars Used and Not Submitted	Laboratory Use Only	
[Signature]		13/08/21	5:30pm	[Signature]		13/08/22	08:00		Test Results: ☐ Temperature (°C) on Receipt: 7.7.10 Quality Seal Intact on Receipt: ☒ Yes ☐ No	

Your Project #: CRWMC - N23103074-01
 Site#: CRWMC
 Site Location: CRWMC
 Your C.O.C. #: 40589605, 40589609

Attention: KRISTY GABELHOUSE

EBA Engineering Consultants Ltd.
 NANAIMO
 #1 - 4376 Boban Drive
 Nanaimo, BC
 CANADA V9T 6A7

Report Date: 2013/08/28

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B374525
Received: 2013/08/22, 09:30

Sample Matrix: Water

Samples Received: 15

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	15	2013/08/23	2013/08/24	BBY6SOP-00026	SM2320B
Chloride by Automated Colourimetry	15	N/A	2013/08/23	BBY6SOP-00011	SM-4500-CI-
Conductance - water	15	N/A	2013/08/24	BBY6SOP-00026	SM-2510B
Fluoride	15	N/A	2013/08/23	BBY6SOP-00012	SM - 4500 F C
Hardness (calculated as CaCO ₃)	13	N/A	2013/08/27	BBY7SOP-00002	EPA 6020A
Hardness (calculated as CaCO ₃)	2	N/A	2013/08/28	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	13	N/A	2013/08/27	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	2	N/A	2013/08/28	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (dissolved)	13	N/A	2013/08/26	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (dissolved)	2	N/A	2013/08/28	BBY7SOP-00002	EPA 6020A
Ammonia-N (Preserved)	4	N/A	2013/08/23	BBY6SOP-00009	SM-4500NH3G
Ammonia-N (Preserved)	11	N/A	2013/08/26	BBY6SOP-00009	SM-4500NH3G
Nitrate + Nitrite (N)	15	N/A	2013/08/23	BBY6SOP-00010	SM 4500NO3-I
Nitrite (N) by CFA	15	N/A	2013/08/23	BBY6SOP-00010	EPA 353.2
Nitrogen - Nitrate (as N)	15	N/A	2013/08/24	BBY6SOP-00010	SM 4500NO3-I
Filter and HNO ₃ Preserve for Metals	15	N/A	2013/08/22	BBY6WI-00001	EPA 200.2
pH Water	15	N/A	2013/08/24	BBY6SOP-00026	SM-4500H+B
CSR VH C6-C10 in Water by HS GC/MS	5	N/A	2013/08/24	BBY8SOP-00011	EPA 8260B
Sulphate by Automated Colourimetry	15	N/A	2013/08/23	BBY6SOP-00017	SM4500-SO42- E
VOCs in Water by HS GC/MS	5	2013/08/23	2013/08/24	BBY8-SOP-0009	EPA 8260C
Volatile HC-BTEX	5	N/A	2013/08/26	BBY WI-00033	BC MOE Lab Method

* Results relate only to the items tested.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Crystal Ireland, B.Sc., Account Specialist

Email: C Ireland@maxxam.ca

Phone# (604) 638-5016

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 1

Maxxam Job #: B374525
Report Date: 2013/08/28

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01
Site Location: CRWMC

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		HG9903	HG9904	HG9905	HG9906	HG9907	HG9908		
Sampling Date		2013/08/21	2013/08/21	2013/08/21	2013/08/21	2013/08/20	2013/08/20		
COC#		40589605	40589605	40589605	40589605	40589605	40589605		
	UNITS	HBT94-1	HBT94-2	HBT94-4	HBT94-6	EBA04-1	EBA04-3	RDL	QC Batch
ANIONS									
Nitrite (N)	mg/L	0.0113	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7112433
Calculated Parameters									
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.291	<0.020	0.161	<0.020	0.067	0.639	0.020	7102811
Misc. Inorganics									
Fluoride (F)	mg/L	0.020	0.016	0.016	0.018	0.014	<0.010	0.010	7109547
Alkalinity (Total as CaCO3)	mg/L	237	269	63.2	243	40.5	282	0.50	7108709
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7108709
Bicarbonate (HCO3)	mg/L	289	328	77.1	297	49.4	344	0.50	7108709
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7108709
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7108709
Anions									
Dissolved Sulphate (SO4)	mg/L	9.57	3.90	3.02	3.78	2.64	9.43	0.50	7111863
Dissolved Chloride (Cl)	mg/L	27	20	1.6	20	1.0	5.2	0.50	7111813
Nutrients									
Ammonia (N)	mg/L	1.0	0.40	0.016	0.40	0.013	0.016	0.0050	7117277
Nitrate plus Nitrite (N)	mg/L	0.302	<0.020	0.161	<0.020	0.067	0.639	0.020	7112424
Physical Properties									
Conductivity	uS/cm	538	510	132	510	85.5	540	1.0	7108717
pH	pH Units	8.24	8.15	7.99	8.13	7.69	8.04		7108718

N/A = Not Applicable

RDL = Reportable Detection Limit

Maxxam Job #: B374525
Report Date: 2013/08/28

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01
Site Location: CRWMC

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		HG9909		HG9910		HG9911		HG9912		
Sampling Date		2013/08/20		2013/08/20		2013/08/20		2013/08/20		
COC#		40589605		40589605		40589605		40589605		
	UNITS	EBA04-4	QC Batch	EBA04-6	QC Batch	EBA04-7	QC Batch	EBA04-8	RDL	QC Batch
ANIONS										
Nitrite (N)	mg/L	<0.0050	7112433	<0.0050	7112433	0.0281	7112433	0.0273	0.0050	7112433
Calculated Parameters										
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD	ONSITE	FIELD	ONSITE	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.126	7102811	1.22	7102811	1.95	7102811	1.94	0.020	7102811
Misc. Inorganics										
Fluoride (F)	mg/L	0.015	7109547	<0.010	7109547	0.011	7109547	0.014	0.010	7109547
Alkalinity (Total as CaCO3)	mg/L	48.8	7108709	342	7108709	328	7108709	363	0.50	7108709
Alkalinity (PP as CaCO3)	mg/L	<0.50	7108709	<0.50	7108709	<0.50	7108709	<0.50	0.50	7108709
Bicarbonate (HCO3)	mg/L	59.5	7108709	417	7108709	400	7108709	443	0.50	7108709
Carbonate (CO3)	mg/L	<0.50	7108709	<0.50	7108709	<0.50	7108709	<0.50	0.50	7108709
Hydroxide (OH)	mg/L	<0.50	7108709	<0.50	7108709	<0.50	7108709	<0.50	0.50	7108709
Anions										
Dissolved Sulphate (SO4)	mg/L	2.85	7111863	15.4	7111863	19.2	7111863	19.3	0.50	7111863
Dissolved Chloride (Cl)	mg/L	1.7	7111813	7.4	7111813	23	7111813	22	0.50	7111813
Nutrients										
Ammonia (N)	mg/L	0.015	7108781	0.018	7117277	0.019	7108781	0.052	0.0050	7117277
Nitrate plus Nitrite (N)	mg/L	0.126	7112424	1.22	7112424	1.98	7112424	1.96	0.020	7112424
Physical Properties										
Conductivity	uS/cm	103	7108717	649	7108717	702	7108717	761	1.0	7108717
pH	pH Units	7.91	7108718	8.29	7108718	7.95	7108718	7.90		7108718

N/A = Not Applicable

RDL = Reportable Detection Limit

Maxxam Job #: B374525
Report Date: 2013/08/28

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01
Site Location: CRWMC

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		HG9955	HG9956	HG9957		HG9958	HG9959		
Sampling Date		2013/08/21	2013/08/20	2013/08/20		2013/08/20	2013/08/20		
COC#		40589609	40589609	40589609		40589609	40589609		
	UNITS	EBA11-1	EBA11-2	AG99-01	QC Batch	AG99-02	AG99-04	RDL	QC Batch
ANIONS									
Nitrite (N)	mg/L	<0.0050	<0.0050	<0.0050	7112433	<0.0050	<0.0050	0.0050	7112433
Calculated Parameters									
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	ONSITE	FIELD	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.420	0.295	0.186	7102811	0.134	0.161	0.020	7102811
Misc. Inorganics									
Fluoride (F)	mg/L	0.021	0.027	0.017	7109547	0.014	0.016	0.010	7109547
Alkalinity (Total as CaCO3)	mg/L	155	125	109	7108709	82.0	44.3	0.50	7108709
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	7108709	<0.50	<0.50	0.50	7108709
Bicarbonate (HCO3)	mg/L	189	153	133	7108709	100	54.0	0.50	7108709
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	7108709	<0.50	<0.50	0.50	7108709
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	7108709	<0.50	<0.50	0.50	7108709
Anions									
Dissolved Sulphate (SO4)	mg/L	49.0	2.69	3.45	7111863	3.15	2.77	0.50	7111863
Dissolved Chloride (Cl)	mg/L	15	7.3	2.9	7111813	1.6	1.6	0.50	7111813
Nutrients									
Ammonia (N)	mg/L	0.045	0.018	0.013	7117277	0.0096	0.020	0.0050	7108781
Nitrate plus Nitrite (N)	mg/L	0.420	0.295	0.186	7112424	0.134	0.161	0.020	7112424
Physical Properties									
Conductivity	uS/cm	428	264	218	7108717	166	99.6	1.0	7108717
pH	pH Units	8.26	8.17	8.17	7108718	8.14	7.81		7108718

N/A = Not Applicable

RDL = Reportable Detection Limit

Maxxam Job #: B374525
Report Date: 2013/08/28

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01
Site Location: CRWMC

CSR DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HG9903	HG9904	HG9905	HG9906	HG9907	HG9908	HG9909	HG9910		
Sampling Date		2013/08/21	2013/08/21	2013/08/21	2013/08/21	2013/08/20	2013/08/20	2013/08/20	2013/08/20		
COC#		40589605	40589605	40589605	40589605	40589605	40589605	40589605	40589605		
	UNITS	HBT94-1	HBT94-2	HBT94-4	HBT94-6	EBA04-1	EBA04-3	EBA04-4	EBA04-6	RDL	QC Batch
Misc. Inorganics											
Dissolved Hardness (CaCO3)	mg/L	224	258	63.4	246	40.8	334	47.4	354	0.50	7102756

RDL = Reportable Detection Limit

Maxxam Job #: B374525
Report Date: 2013/08/28

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01
Site Location: CRWMC

CSR DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HG9903	HG9904	HG9905	HG9906	HG9907	HG9908	HG9909	HG9910		
Sampling Date		2013/08/21	2013/08/21	2013/08/21	2013/08/21	2013/08/20	2013/08/20	2013/08/20	2013/08/20		
COC#		40589605	40589605	40589605	40589605	40589605	40589605	40589605	40589605		
	UNITS	HBT94-1	HBT94-2	HBT94-4	HBT94-6	EBA04-1	EBA04-3	EBA04-4	EBA04-6	RDL	QC Batch
Dissolved Metals by ICPMS											
Dissolved Aluminum (Al)	mg/L	0.0056	0.0059	0.0042	0.0061	0.0054	<0.0030	0.0103	<0.0030	0.0030	7115945
Dissolved Antimony (Sb)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7115945
Dissolved Arsenic (As)	mg/L	0.00049	0.00241	0.00035	0.00244	0.00033	<0.00010	0.00026	<0.00010	0.00010	7115945
Dissolved Barium (Ba)	mg/L	0.0103	0.0104	<0.0010	0.0104	0.0011	0.0103	<0.0010	0.0085	0.0010	7115945
Dissolved Beryllium (Be)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	7115945
Dissolved Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7115945
Dissolved Boron (B)	mg/L	0.321	0.154	<0.050	0.150	<0.050	<0.050	<0.050	0.055	0.050	7115945
Dissolved Cadmium (Cd)	mg/L	0.000176	0.000036	<0.000010	0.000037	<0.000010	<0.000010	<0.000010	0.000021	0.000010	7115945
Dissolved Chromium (Cr)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7115945
Dissolved Cobalt (Co)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7115945
Dissolved Copper (Cu)	mg/L	0.00431	0.00022	0.00032	0.00027	0.0160	<0.00020	0.00027	0.00041	0.00020	7115945
Dissolved Iron (Fe)	mg/L	0.0251	0.241	<0.0050	0.225	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7115945
Dissolved Lead (Pb)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00045	<0.00020	<0.00020	<0.00020	0.00020	7115945
Dissolved Lithium (Li)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7115945
Dissolved Manganese (Mn)	mg/L	1.69	1.24	<0.0010	1.20	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7115945
Dissolved Mercury (Hg)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000050	7115945
Dissolved Molybdenum (Mo)	mg/L	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7115945
Dissolved Nickel (Ni)	mg/L	0.0017	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7115945
Dissolved Selenium (Se)	mg/L	<0.00010	<0.00010	0.00087	<0.00010	0.00013	<0.00010	0.00013	<0.00010	0.00010	7115945
Dissolved Silicon (Si)	mg/L	7.09	8.05	3.72	7.83	3.48	7.55	3.52	10.2	0.10	7115945
Dissolved Silver (Ag)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020 ⁽¹⁾	0.000020	7115945
Dissolved Strontium (Sr)	mg/L	0.182	0.184	0.0383	0.183	0.0199	0.214	0.0252	0.223	0.0010	7115945
Dissolved Thallium (Tl)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000050	7115945
Dissolved Tin (Sn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7115945
Dissolved Titanium (Ti)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7115945
Dissolved Uranium (U)	mg/L	0.00011	0.00016	<0.00010	0.00016	<0.00010	0.00027	<0.00010	0.00046	0.00010	7115945
Dissolved Vanadium (V)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7115945
Dissolved Zinc (Zn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	0.0285	<0.0050	<0.0050	<0.0050	0.0050	7115945
Dissolved Zirconium (Zr)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7115945
Dissolved Calcium (Ca)	mg/L	76.4	87.9	22.9	83.0	13.5	110	16.4	106	0.050	7104169
Dissolved Magnesium (Mg)	mg/L	8.11	9.36	1.47	9.29	1.71	14.7	1.56	22.0	0.050	7104169
Dissolved Potassium (K)	mg/L	4.69	2.02	0.442	2.04	0.230	1.03	0.267	1.56	0.050	7104169
Dissolved Sodium (Na)	mg/L	26.2	14.8	1.46	15.0	1.06	4.11	1.31	6.38	0.050	7104169
Dissolved Sulphur (S)	mg/L	3.0	<3.0	<3.0	<3.0	<3.0	3.5	<3.0	5.1	3.0	7104169

RDL = Reportable Detection Limit

(1) - Matrix Spike outside acceptance criteria (10% of analytes failure allowed).

Maxxam Job #: B374525
Report Date: 2013/08/28

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01
Site Location: CRWMC

CSR DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HG9911	HG9912		HG9955	HG9956	HG9957	HG9958	HG9959		
Sampling Date		2013/08/20	2013/08/20		2013/08/21	2013/08/20	2013/08/20	2013/08/20	2013/08/20		
COC#		40589605	40589605		40589609	40589609	40589609	40589609	40589609		
	UNITS	EBA04-7	EBA04-8	QC Batch	EBA11-1	EBA11-2	AG99-01	AG99-02	AG99-04	RDL	QC Batch
Misc. Inorganics											
Dissolved Hardness (CaCO3)	mg/L	420	428	7102756	219	129	114	79.5	46.5	0.50	7102756

RDL = Reportable Detection Limit

Maxxam Job #: B374525
Report Date: 2013/08/28

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01
Site Location: CRWMC

CSR DISSOLVED METALS IN WATER (WATER)

Maxxam ID		HG9911	HG9912		HG9955	HG9956	HG9957	HG9958	HG9959		
Sampling Date		2013/08/20	2013/08/20		2013/08/21	2013/08/20	2013/08/20	2013/08/20	2013/08/20		
COC#		40589605	40589605		40589609	40589609	40589609	40589609	40589609		
	UNITS	EBA04-7	EBA04-8	QC Batch	EBA11-1	EBA11-2	AG99-01	AG99-02	AG99-04	RDL	QC Batch
Dissolved Metals by ICPMS											
Dissolved Aluminum (Al)	mg/L	0.0047	<0.0030	7117182	0.0063	0.0096	0.0042	0.0066	0.0059	0.0030	7115945
Dissolved Antimony (Sb)	mg/L	<0.00050	<0.00050	7117182	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7115945
Dissolved Arsenic (As)	mg/L	0.00020	0.00017	7117182	0.00019	0.00014	0.00081	0.00235	0.00041	0.00010	7115945
Dissolved Barium (Ba)	mg/L	0.0153	0.0164	7117182	0.0046	0.0061	0.0020	0.0039	<0.0010	0.0010	7115945
Dissolved Beryllium (Be)	mg/L	<0.00010	<0.00010	7117182	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	7115945
Dissolved Bismuth (Bi)	mg/L	<0.0010	<0.0010	7117182	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7115945
Dissolved Boron (B)	mg/L	0.350	0.355	7117182	0.052	<0.050	<0.050	<0.050	<0.050	0.050	7115945
Dissolved Cadmium (Cd)	mg/L	0.000068	0.000059	7117182	0.000034	<0.000010	<0.000010	0.000010	<0.000010	0.000010	7115945
Dissolved Chromium (Cr)	mg/L	<0.0010	<0.0010	7117182	0.0015	0.0017	<0.0010	<0.0010	<0.0010	0.0010	7115945
Dissolved Cobalt (Co)	mg/L	0.00050	<0.00050	7117182	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7115945
Dissolved Copper (Cu)	mg/L	0.00293	0.00284	7117182	0.00032	<0.00020	0.00023	0.00024	0.00037	0.00020	7115945
Dissolved Iron (Fe)	mg/L	0.0095	0.0059	7117182	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7115945
Dissolved Lead (Pb)	mg/L	<0.00020	<0.00020	7117182	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	7115945
Dissolved Lithium (Li)	mg/L	<0.0050	<0.0050	7117182	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7115945
Dissolved Manganese (Mn)	mg/L	0.106	0.102	7117182	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7115945
Dissolved Mercury (Hg)	mg/L	<0.000050	<0.000050	7117182	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000050	7115945
Dissolved Molybdenum (Mo)	mg/L	<0.0010	<0.0010	7117182	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7115945
Dissolved Nickel (Ni)	mg/L	0.0019	0.0017	7117182	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7115945
Dissolved Selenium (Se)	mg/L	<0.00010	<0.00010	7117182	<0.00010	0.00013	0.00012	0.00016	0.00010	0.00010	7115945
Dissolved Silicon (Si)	mg/L	12.4	12.5	7117182	6.46	8.69	6.43	5.14	3.83	0.10	7115945
Dissolved Silver (Ag)	mg/L	<0.000020	<0.000020	7117182	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000020	7115945
Dissolved Strontium (Sr)	mg/L	0.310	0.315	7117182	0.132	0.0694	0.0544	0.0345	0.0231	0.0010	7115945
Dissolved Thallium (Tl)	mg/L	<0.000050	<0.000050	7117182	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000050	7115945
Dissolved Tin (Sn)	mg/L	<0.0050	<0.0050	7117182	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7115945
Dissolved Titanium (Ti)	mg/L	<0.0050	<0.0050	7117182	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7115945
Dissolved Uranium (U)	mg/L	0.00098	0.00099	7117182	0.00069	0.00019	<0.00010	0.00025	<0.00010	0.00010	7115945
Dissolved Vanadium (V)	mg/L	<0.0050	<0.0050	7117182	<0.0050	<0.0050	0.0054	0.0193	<0.0050	0.0050	7115945
Dissolved Zinc (Zn)	mg/L	<0.0050	<0.0050	7117182	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7115945
Dissolved Zirconium (Zr)	mg/L	<0.00050	<0.00050	7117182	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7115945
Dissolved Calcium (Ca)	mg/L	121	123	7104169	65.3	34.9	36.7	26.1	15.8	0.050	7104169
Dissolved Magnesium (Mg)	mg/L	28.9	29.1	7104169	13.5	10.1	5.36	3.48	1.69	0.050	7104169
Dissolved Potassium (K)	mg/L	2.15	2.18	7104169	0.688	0.521	0.748	1.14	0.285	0.050	7104169
Dissolved Sodium (Na)	mg/L	24.0	24.2	7104169	4.47	3.55	1.88	1.49	1.43	0.050	7104169
Dissolved Sulphur (S)	mg/L	7.3	6.5	7104169	15.3	<3.0	<3.0	<3.0	<3.0	3.0	7104169

RDL = Reportable Detection Limit

Maxxam Job #: B374525
Report Date: 2013/08/28

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23103074-01
Site Location: CRWMC

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		HG9904	HG9908	HG9911	HG9955	HG9959		
Sampling Date		2013/08/21	2013/08/20	2013/08/20	2013/08/21	2013/08/20		
COC#		40589605	40589605	40589605	40589609	40589609		
	UNITS	HBT94-2	EBA04-3	EBA04-7	EBA11-1	AG99-04	RDL	QC Batch
Volatiles								
VPH (VH6 to 10 - BTEX)	mg/L	<0.30	<0.30	<0.30	<0.30	<0.30	0.30	7103150
Volatile Hydrocarbons								
VH C6-C10	mg/L	<0.30	<0.30	<0.30	<0.30	<0.30	0.30	7111896
Volatiles								
Chloromethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7109746
Vinyl chloride	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7109746
Chloroethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7109746
Trichlorofluoromethane	ug/L	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	7109746
1,1-dichloroethene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7109746
Dichloromethane	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7109746
trans-1,2-dichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7109746
1,1-dichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7109746
cis-1,2-dichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7109746
Chloroform	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7109746
1,1,1-trichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7109746
1,2-dichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7109746
Carbon tetrachloride	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7109746
Benzene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	7109746
Methyl-tert-butylether (MTBE)	ug/L	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	7109746
1,2-dichloropropane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7109746
cis-1,3-dichloropropene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7109746
trans-1,3-dichloropropene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7109746
Bromomethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7109746
1,1,2-trichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7109746
Trichloroethene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7109746
Chlorodibromomethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7109746
Tetrachloroethene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7109746
Bromodichloromethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7109746
Toluene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	7109746
Ethylbenzene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	7109746
m & p-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	7109746
Bromoform	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7109746
Styrene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7109746
o-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	7109746
Xylenes (Total)	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	7109746

RDL = Reportable Detection Limit

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CSR VOC + VPH IN WATER (WATER)

Maxxam ID		HG9904	HG9908	HG9911	HG9955	HG9959		
Sampling Date		2013/08/21	2013/08/20	2013/08/20	2013/08/21	2013/08/20		
COC#		40589605	40589605	40589605	40589609	40589609		
	UNITS	HBT94-2	EBA04-3	EBA04-7	EBA11-1	AG99-04	RDL	QC Batch
1,1,1,2-tetrachloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7109746
1,1,2,2-tetrachloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7109746
1,2-dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7109746
1,3-dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7109746
1,4-dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7109746
Chlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7109746
Dibromomethane	ug/L	<0.90	<0.90	<0.90	<0.90	<0.90	0.90	7109746
Surrogate Recovery (%)								
1,4-Difluorobenzene (sur.)	%	105	104	107	106	105		7109746
4-BROMOFLUOROBENZENE (sur.)	%	87	91	99	89	85		7109746
D4-1,2-DICHLOROETHANE (sur.)	%	116	114	112	110	117		7109746

RDL = Reportable Detection Limit

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General Comments

Sample HG9903-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HG9904-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HG9905-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HG9906-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HG9907-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HG9908-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HG9909-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HG9910-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HG9911-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HG9912-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HG9955-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HG9956-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HG9957-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HG9958-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

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pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample HG9959-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

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QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7108709	Alkalinity (Total as CaCO ₃)	2013/08/23	NC	80 - 120	96	80 - 120	<0.50	mg/L	1.5	20
7108709	Alkalinity (PP as CaCO ₃)	2013/08/23					<0.50	mg/L	NC	20
7108709	Bicarbonate (HCO ₃)	2013/08/23					<0.50	mg/L	1.5	20
7108709	Carbonate (CO ₃)	2013/08/23					<0.50	mg/L	NC	20
7108709	Hydroxide (OH)	2013/08/23					<0.50	mg/L	NC	20
7108717	Conductivity	2013/08/24			100	80 - 120	1.2, RDL=1.0	uS/cm	0.3	20
7108781	Ammonia (N)	2013/08/23	NC	80 - 120	102	80 - 120	<0.0050	mg/L	1.0	20
7109547	Fluoride (F)	2013/08/23	98	80 - 120	98	80 - 120	<0.010	mg/L	NC	20
7109746	1,4-Difluorobenzene (sur.)	2013/08/24	102	70 - 130	88	70 - 130	105	%		
7109746	4-BROMOFLUOROBENZENE (sur.)	2013/08/24	104	70 - 130	89	70 - 130	85	%		
7109746	D4-1,2-DICHLOROETHANE (sur.)	2013/08/24	106	70 - 130	91	70 - 130	109	%		
7109746	Chloromethane	2013/08/24	102	60 - 140	96	60 - 140	<1.0	ug/L	NC	30
7109746	Vinyl chloride	2013/08/24	117	60 - 140	105	60 - 140	<0.50	ug/L	NC	30
7109746	Chloroethane	2013/08/24	104	60 - 140	95	60 - 140	<1.0	ug/L	NC	30
7109746	Trichlorofluoromethane	2013/08/24	126	60 - 140	108	60 - 140	<4.0	ug/L	NC	30
7109746	1,1-dichloroethene	2013/08/24	103	70 - 130	88	70 - 130	<0.50	ug/L	NC	30
7109746	Dichloromethane	2013/08/24	109	70 - 130	93	70 - 130	<2.0	ug/L	NC	30
7109746	trans-1,2-dichloroethene	2013/08/24	107	70 - 130	91	70 - 130	<1.0	ug/L	NC	30
7109746	1,1-dichloroethane	2013/08/24	97	70 - 130	83	70 - 130	<0.50	ug/L	NC	30
7109746	cis-1,2-dichloroethene	2013/08/24	108	70 - 130	94	70 - 130	<1.0	ug/L	NC	30
7109746	Chloroform	2013/08/24	104	70 - 130	88	70 - 130	<1.0	ug/L	NC	30
7109746	1,1,1-trichloroethane	2013/08/24	98	70 - 130	84	70 - 130	<0.50	ug/L	NC	30
7109746	1,2-dichloroethane	2013/08/24	120	70 - 130	100	70 - 130	<0.50	ug/L	NC	30
7109746	Carbon tetrachloride	2013/08/24	99	70 - 130	86	70 - 130	<0.50	ug/L	NC	30
7109746	Benzene	2013/08/24	104	70 - 130	92	70 - 130	<0.40	ug/L	NC	30
7109746	Methyl-tert-butylether (MTBE)	2013/08/24	110	70 - 130	90	70 - 130	<4.0	ug/L	NC	30
7109746	1,2-dichloropropane	2013/08/24	115	70 - 130	96	70 - 130	<0.50	ug/L	NC	30
7109746	cis-1,3-dichloropropene	2013/08/24	115	70 - 130	87	70 - 130	<1.0	ug/L	NC	30
7109746	trans-1,3-dichloropropene	2013/08/24	97	70 - 130	72	70 - 130	<1.0	ug/L	NC	30
7109746	Bromomethane	2013/08/24	93	60 - 140	93	60 - 140	<1.0	ug/L	NC	30
7109746	1,1,2-trichloroethane	2013/08/24	119	70 - 130	100	70 - 130	<0.50	ug/L	NC	30
7109746	Trichloroethene	2013/08/24	111	70 - 130	96	70 - 130	<0.50	ug/L	NC	30
7109746	Chlorodibromomethane	2013/08/24	115	70 - 130	97	70 - 130	<1.0	ug/L	NC	30
7109746	Tetrachloroethene	2013/08/24	101	70 - 130	88	70 - 130	<0.50	ug/L	NC	30
7109746	Bromodichloromethane	2013/08/24	113	70 - 130	94	70 - 130	<1.0	ug/L	NC	30
7109746	Toluene	2013/08/24	109	70 - 130	91	70 - 130	<0.40	ug/L	NC	30
7109746	Ethylbenzene	2013/08/24	111	70 - 130	96	70 - 130	<0.40	ug/L	NC	30
7109746	m & p-Xylene	2013/08/24	121	70 - 130	104	70 - 130	<0.40	ug/L	NC	30
7109746	Bromoform	2013/08/24	108	70 - 130	90	70 - 130	<1.0	ug/L	NC	30
7109746	Styrene	2013/08/24	90	70 - 130	77	70 - 130	<0.50	ug/L	NC	30

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QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7109746	o-Xylene	2013/08/24	120	70 - 130	99	70 - 130	<0.40	ug/L	NC	30
7109746	1,1,1,2-tetrachloroethane	2013/08/24	112	70 - 130	94	70 - 130	<0.50	ug/L	NC	30
7109746	1,1,2,2-tetrachloroethane	2013/08/24	119	70 - 130	116	70 - 130	<0.50	ug/L	NC	30
7109746	1,2-dichlorobenzene	2013/08/24	119	70 - 130	119	70 - 130	<0.50	ug/L	NC	30
7109746	1,3-dichlorobenzene	2013/08/24	115	70 - 130	116	70 - 130	<0.50	ug/L	NC	30
7109746	1,4-dichlorobenzene	2013/08/24	106	70 - 130	110	70 - 130	<0.50	ug/L	NC	30
7109746	Chlorobenzene	2013/08/24	110	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
7109746	Dibromomethane	2013/08/24	109	70 - 130	89	70 - 130	<0.90	ug/L	NC	30
7109746	Xylenes (Total)	2013/08/24					<0.40	ug/L	NC	30
7111813	Dissolved Chloride (Cl)	2013/08/23	NC	80 - 120	99	80 - 120	<0.50	mg/L	1.2	20
7111863	Dissolved Sulphate (SO4)	2013/08/23	NC	80 - 120	97	80 - 120	0.88, RDL=0.50	mg/L	1.4	20
7111896	VH C6-C10	2013/08/24			107	70 - 130	<0.30	mg/L	NC	40
7112424	Nitrate plus Nitrite (N)	2013/08/23	92	80 - 120	103	80 - 120	<0.020	mg/L	0.3	25
7112433	Nitrite (N)	2013/08/23	94	80 - 120	100	80 - 120	<0.0050	mg/L	0	20
7115945	Dissolved Aluminum (Al)	2013/08/26	103	80 - 120	107	80 - 120	<0.0030	mg/L	NC	20
7115945	Dissolved Antimony (Sb)	2013/08/26	102	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20
7115945	Dissolved Arsenic (As)	2013/08/26	106	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
7115945	Dissolved Barium (Ba)	2013/08/26	NC	80 - 120	102	80 - 120	<0.0010	mg/L	0.9	20
7115945	Dissolved Beryllium (Be)	2013/08/26	98	80 - 120	93	80 - 120	<0.00010	mg/L	NC	20
7115945	Dissolved Bismuth (Bi)	2013/08/26	95	80 - 120	101	80 - 120	<0.0010	mg/L	NC	20
7115945	Dissolved Cadmium (Cd)	2013/08/26	100	80 - 120	101	80 - 120	<0.000010	mg/L	NC	20
7115945	Dissolved Chromium (Cr)	2013/08/26	97	80 - 120	100	80 - 120	<0.0010	mg/L	NC	20
7115945	Dissolved Cobalt (Co)	2013/08/26	94	80 - 120	98	80 - 120	<0.00050	mg/L	NC	20
7115945	Dissolved Copper (Cu)	2013/08/26	90	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
7115945	Dissolved Iron (Fe)	2013/08/26	107	80 - 120	107	80 - 120	<0.0050	mg/L	NC	20
7115945	Dissolved Lead (Pb)	2013/08/26	96	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
7115945	Dissolved Lithium (Li)	2013/08/26	97	80 - 120	92	80 - 120	<0.0050	mg/L	NC	20
7115945	Dissolved Manganese (Mn)	2013/08/26	96	80 - 120	100	80 - 120	<0.0010	mg/L	NC	20
7115945	Dissolved Mercury (Hg)	2013/08/26	96	80 - 120	95	80 - 120	<0.000050	mg/L	NC	20
7115945	Dissolved Molybdenum (Mo)	2013/08/26	112	80 - 120	97	80 - 120	<0.0010	mg/L	NC	20
7115945	Dissolved Nickel (Ni)	2013/08/26	92	80 - 120	99	80 - 120	<0.0010	mg/L	NC	20
7115945	Dissolved Selenium (Se)	2013/08/26	109	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
7115945	Dissolved Silver (Ag)	2013/08/26	73 ₍₁₎	80 - 120	96	80 - 120	<0.000020	mg/L	NC	20
7115945	Dissolved Strontium (Sr)	2013/08/26	NC	80 - 120	101	80 - 120	<0.0010	mg/L	1.1	20
7115945	Dissolved Thallium (Tl)	2013/08/26	97	80 - 120	105	80 - 120	<0.000050	mg/L	NC	20
7115945	Dissolved Tin (Sn)	2013/08/26	98	80 - 120	97	80 - 120	<0.0050	mg/L	NC	20
7115945	Dissolved Titanium (Ti)	2013/08/26	100	80 - 120	95	80 - 120	<0.0050	mg/L	NC	20
7115945	Dissolved Uranium (U)	2013/08/26	101	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
7115945	Dissolved Vanadium (V)	2013/08/26	100	80 - 120	98	80 - 120	<0.0050	mg/L	NC	20
7115945	Dissolved Zinc (Zn)	2013/08/26	94	80 - 120	101	80 - 120	<0.0050	mg/L	NC	20

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QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7115945	Dissolved Boron (B)	2013/08/26					<0.050	mg/L	NC	20
7115945	Dissolved Silicon (Si)	2013/08/26					<0.10	mg/L	2.7	20
7115945	Dissolved Zirconium (Zr)	2013/08/26					<0.00050	mg/L	NC	20
7117182	Dissolved Aluminum (Al)	2013/08/27	102	80 - 120	104	80 - 120	<0.0030	mg/L	NC	20
7117182	Dissolved Antimony (Sb)	2013/08/27	102	80 - 120	104	80 - 120	<0.00050	mg/L		
7117182	Dissolved Arsenic (As)	2013/08/27	101	80 - 120	100	80 - 120	<0.00010	mg/L		
7117182	Dissolved Barium (Ba)	2013/08/27	NC	80 - 120	102	80 - 120	<0.0010	mg/L		
7117182	Dissolved Beryllium (Be)	2013/08/27	102	80 - 120	97	80 - 120	<0.00010	mg/L		
7117182	Dissolved Bismuth (Bi)	2013/08/27	90	80 - 120	88	80 - 120	<0.0010	mg/L		
7117182	Dissolved Cadmium (Cd)	2013/08/27	107	80 - 120	105	80 - 120	<0.000010	mg/L	NC	20
7117182	Dissolved Chromium (Cr)	2013/08/27	100	80 - 120	99	80 - 120	<0.0010	mg/L		
7117182	Dissolved Cobalt (Co)	2013/08/27	98	80 - 120	98	80 - 120	<0.00050	mg/L		
7117182	Dissolved Copper (Cu)	2013/08/27	97	80 - 120	97	80 - 120	<0.00020	mg/L	10.8	20
7117182	Dissolved Iron (Fe)	2013/08/27	108	80 - 120	113	80 - 120	<0.0050	mg/L	3.4	20
7117182	Dissolved Lead (Pb)	2013/08/27	101	80 - 120	102	80 - 120	<0.00020	mg/L		
7117182	Dissolved Lithium (Li)	2013/08/27	98	80 - 120	98	80 - 120	<0.0050	mg/L		
7117182	Dissolved Manganese (Mn)	2013/08/27	96	80 - 120	101	80 - 120	<0.0010	mg/L	NC	20
7117182	Dissolved Mercury (Hg)	2013/08/27	103	80 - 120	101	80 - 120	<0.000050	mg/L		
7117182	Dissolved Molybdenum (Mo)	2013/08/27	94	80 - 120	97	80 - 120	<0.0010	mg/L		
7117182	Dissolved Nickel (Ni)	2013/08/27	99	80 - 120	99	80 - 120	<0.0010	mg/L		
7117182	Dissolved Selenium (Se)	2013/08/27	117	80 - 120	109	80 - 120	<0.00010	mg/L	NC	20
7117182	Dissolved Silver (Ag)	2013/08/27	98	80 - 120	92	80 - 120	<0.000020	mg/L		
7117182	Dissolved Strontium (Sr)	2013/08/27	NC	80 - 120	99	80 - 120	<0.0010	mg/L		
7117182	Dissolved Thallium (Tl)	2013/08/27	99	80 - 120	106	80 - 120	<0.000050	mg/L		
7117182	Dissolved Tin (Sn)	2013/08/27	100	80 - 120	99	80 - 120	<0.0050	mg/L		
7117182	Dissolved Titanium (Ti)	2013/08/27	103	80 - 120	90	80 - 120	<0.0050	mg/L		
7117182	Dissolved Uranium (U)	2013/08/27	110	80 - 120	111	80 - 120	<0.00010	mg/L		
7117182	Dissolved Vanadium (V)	2013/08/27	98	80 - 120	98	80 - 120	<0.0050	mg/L		
7117182	Dissolved Zinc (Zn)	2013/08/27	104	80 - 120	113	80 - 120	<0.0050	mg/L	NC	20
7117182	Dissolved Boron (B)	2013/08/27					<0.050	mg/L		
7117182	Dissolved Silicon (Si)	2013/08/27					<0.10	mg/L		

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QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7117182	Dissolved Zirconium (Zr)	2013/08/27					<0.00050	mg/L		
7117277	Ammonia (N)	2013/08/26	98	80 - 120	104	80 - 120	0.0058, RDL=0.0050	mg/L	4.0	20

N/A = Not Applicable

RDL = Reportable Detection Limit

RPD = Relative Percent Difference

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.

NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

(1) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Validation Signature Page

Maxxam Job #: B374525

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Andy Lu, Data Validation Coordinator

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

INVOICE INFORMATION:		REPORT INFORMATION (If differs from invoice):		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name	#5908 EBA Engineering Consultants Ltd.	Company Name	#18501 EBA Engineering Consultants Ltd.	Question #	B10655	MAXXAM JOB #	BOTTLE ORDER #
Contact Name	Accounts Payable	Contact Name	Kristy Gabelhouse	P.O. #		B374525	
Address	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Address	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Project #	RAMC - N23103074-01	CHAIN OF CUSTODY #	PROJECT MANAGER
Phone	(250)756-2256 Fax: (250)756-2088	Phone	(250)756-2256 Fax: (250)756-2088	Project Name	RAMC		Crystal Island
Email	dromano@eba.ca ipaul@eba.ca	Email	kgabelhouse@eba.ca sakbar@maxxam.ca	Site #	K Gabelhouse	ON00096-05-01	

REGULATORY CRITERIA		SPECIAL INSTRUCTIONS		ANALYSIS REQUESTED (Please be specific)										TURNAROUND TIME (TAT) REQUIRED:	
☒ CSR ☐ COME ☐ BC Water Quality ☐ Other _____				ANALYSIS REQUESTED (Please be specific) AMMONIA-N ANION (CL, F, NO2, NO3, SO4) CSR Dissolved Metals with HB + Hardness pH / Conductivity / Alkalinity ~~Leachate Total Metals~~ CSR VOC + VPH Dissolved Sulphate										PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS Regular (Standard) TAT: (We will apply 2 Rush TAT if not specified) Standard TAT = 5 working days for most tests. Please note: Standard TAT for certain tests such as BOD and Coliforms are > 5 days - contact your Project Manager for details. Job Specific Rush TAT if applies to entire submission: 1 Day ☐ 2 Day ☐ 3 Day ☐ Date Required: _____ Rush Confirmation Number: _____ (MAXXAM USE ONLY)	

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM											
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Mark	AMMONIA-N	ANION (CL, F, NO2, NO3, SO4)	CSR Dissolved Metals with HB + Hardness	pH / Conductivity / Alkalinity	~~Leachate Total Metals~~	CSR VOC + VPH	Dissolved Sulphate
1 HG9903	HBT94-1	Aug 21/13		GW	X	X	X	X			X
2 HG9904	HBT94-2	"		"	X	X	X	X		X	X
3 HG9905	HBT94-4	"		"	X	X	X	X			X
4 HG9906	HBT94-6	"		"	X	X	X	X			X
5 HG9907	EBA04-1	Aug 20/13		"	X	X	X	X			X
6 HG9908	EBA04-3	"		"	X	X	X	X		X	X
7 HG9909	EBA04-4	"		"	X	X	X	X			X
8 HG9910	EBA04-6	"		"	X	X	X	X			X
9 HG9911	EBA04-7	"		"	X	X	X	X		X	X
10 HG9912	EBA04-8	"		"	X	X	X	X			X

RELINQUISHED BY (Signature/Print)		Date: (YY/MM/DD)	Time:	RECEIVED BY (Signature/Print)		Date: (YY/MM/DD)	Time:	# Jars Used and Not Submitted	Laboratory Use Only	
K Gabelhouse		13/08/21	1:00pm	CHRIS WONG		13/08/22	09:30		Time Inactive	Temperature (°C) at Receipt
									☐	3.3.4

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name	#5908 EBA Engineering Consultants Ltd.	Company Name	#18501 EBA Engineering Consultants Ltd.	Quotation #	B10655	MAXXAM JOB #	BOTTLE ORDER #
Contact Name	Accounts Payable	Contact Name	Kristy Gabelhouse	P.O. #		8374525	
Address	#1 - 4375 Boban Drive Nanaimo BC V9T 8A7	Address	#1 - 4375 Boban Drive Nanaimo BC V9T 8A7	Project #	QWMC - N23103074-01	CHAIN OF CUSTODY #	PROJECT MANAGER
Phone	(250) 756-2256 Fax: (250) 756-2886	Phone	(250) 756-2256 Fax:	Project Name	QWMC		Crystal Island
Email	dromano@eba.ca, lpau@eba.ca	Email	kgabelhouse@eba.ca, sakbar@maxxam.ca	Site #		0401896-09-01	
				Sampled By	K. Gabelhouse		

REGULATORY CRITERIA		SPECIAL INSTRUCTIONS		ANALYSIS REQUESTED (Please be specific):		TURNAROUND TIME (TAT) REQUIRED:	
☒ CSR ☐ CCME ☐ BC Water Quality ☐ Other _____				AMMONIA-N ANION (CL, F, NO2, NO3, SO4) CSR Dissolved Metals with HG + Hardness pH / Conductivity / Alkalinity ~~Labile Lead Toxicity~~ CSR VOC + VPH Dissolved Sulfide		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS Regular (Standard) TAT: (will be advised if Rush TAT is not specified) Standard TAT = 8 working days for most tests Please note: Standard TAT for certain tests such as BOD and Dissolved Metals are 10 days - contact your Project Manager for details. Job Specific Rush TAT (if applies to entire submission) 1 Day ☐ 2 Day ☐ 3 Day ☐ Date Required: _____	

SAMPLES MUST BE KEPT COOL (+ 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM										Rush Confirmation Number: _____ (only for Rush #)	
Sample Barcode Label	Sample Location Identification	Date Sampled	Time Sampled	Matrix	AMMONIA-N	ANION (CL, F, NO2, NO3, SO4)	CSR Dissolved Metals with HG + Hardness	pH / Conductivity / Alkalinity	~~Labile Lead Toxicity~~	CSR VOC + VPH	Dissolved Sulfide
1 H69955	EBA11-1	Aug 21/13		GW	X	X	X	X		X	X
2 H69956	EBA11-2	Aug 20/13		"	X	X	X	X			X
3 H69957	AG99-01	"		"	X	X	X	X			X
4 H69958	AG99-02	"		"	X	X	X	X			X
5 H69959	AG99-04	"		"	X	X	X	X		X	X
6											
7											
8											
9											
10											

RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)		Time:		RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)		Time:		# Jars Used and Not Submitted		Laboratory Use Only	
K. Gabelhouse		13/08/21		1:00pm		K. Gabelhouse		13/08/22		09:30				Time Sampled: ☐ Temperature (°C) in Recept: 33.4 Cavity Used (Start at 1): ☒ Yes ☐ No	

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

Your Project #: CVWMC - N23103074-01
 Site#: CVWMC
 Your C.O.C. #: 42162201, 42162202

Attention: Kristy Gabelhouse

EBA Engineering Consultants Ltd.
 #1 - 4376 Boban Drive
 Nanaimo, BC
 CANADA V9T6A7

Report Date: 2013/12/04

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B3B0324
Received: 2013/11/28, 08:40

Sample Matrix: Water

Samples Received: 13

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	13	2013/11/29	2013/11/30	BBY6SOP-00026	SM2320B
Chloride by Automated Colourimetry	12	N/A	2013/11/29	BBY6SOP-00011	SM-4500-Cl-
Chloride by Automated Colourimetry	1	N/A	2013/11/30	BBY6SOP-00011	SM-4500-Cl-
Conductance - water	13	N/A	2013/11/30	BBY6SOP-00026	SM-2510B
Fluoride	13	N/A	2013/11/29	BBY6SOP-00012	SM - 4500 F C
Hardness Total (calculated as CaCO ₃)	1	N/A	2013/11/30	BBY7SOP-00002	EPA 6020A
Hardness (calculated as CaCO ₃)	12	N/A	2013/12/02	BBY7SOP-00002	EPA 6020A
Mercury (Dissolved-LowLevel) by CVAF	12	N/A	2013/12/04	BBY7SOP-00015	EPA 245.7
Mercury (Total-LowLevel) by CVAF	1	2013/12/03	2013/12/03	BBY7SOP-00015	EPA 245.7
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	12	N/A	2013/12/02	BBY7SOP-00002	EPA 6020A
Elements by ICPMS Low Level (dissolved)	12	N/A	2013/12/01	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (total)	1	N/A	2013/11/30	BBY7SOP-00002	EPA 6020A
Elements by ICPMS Low Level (total)	1	N/A	2013/11/30	BBY7SOP-00002	EPA 6020A
Ammonia-N (Preserved)	13	N/A	2013/11/29	BBY6SOP-00009	SM-4500NH3G
Nitrate + Nitrite (N)	13	N/A	2013/11/28	BBY6SOP-00010	SM 4500NO3-I
Nitrite (N) by CFA	13	N/A	2013/11/28	BBY6SOP-00010	EPA 353.2
Nitrogen - Nitrate (as N)	13	N/A	2013/11/28	BBY6SOP-00010	SM 4500NO3-I
Filter and HNO ₃ Preserve for Metals	12	N/A	2013/11/28	BBY6WI-00001	EPA 200.2
pH Water (l)	13	N/A	2013/11/30	BBY6SOP-00026	SM-4500H+B
CSR VH C6-C10 in Water by HS GC/MS	5	N/A	2013/12/02	BBY8SOP-00011	EPA 8260B
Sulphate by Automated Colourimetry	12	N/A	2013/11/29	BBY6SOP-00017	SM4500-SO42- E
Sulphate by Automated Colourimetry	1	N/A	2013/11/30	BBY6SOP-00017	SM4500-SO42- E
VOCs in Water by HS GC/MS	5	2013/12/02	2013/12/02	BBY8-SOP-0009	EPA 8260C
Volatile HC-BTEX	5	N/A	2013/12/03	BBY WI-00033	BC MOE Lab Method

* Results relate only to the items tested.

(1) The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.



Maxxam Job #: B3B0324
Report Date: 2013/12/04

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

-2-

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Crystal Ireland, B.Sc., Account Specialist
Email: Cireland@maxxam.ca
Phone# (604) 638-5016

=====
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 2

Maxxam Job #: B3B0324
Report Date: 2013/12/04

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		IE8559	IE8560		IE8561		IE8562	IE8563	IE8564	IE8565		
Sampling Date		2013/11/26	2013/11/26		2013/11/26		2013/11/27	2013/11/27	2013/11/27	2013/11/26		
COC#		42162201	42162201		42162201		42162201	42162201	42162201	42162201		
	UNITS	EBA04-1	EBA04-3	QC Batch	EBA04-4	QC Batch	EBA04-6	EBA04-7	AG99-1	AG99-2	RDL	QC Batch
ANIONS												
Nitrite (N)	mg/L	<0.0050	<0.0050	7301587	<0.0050	7301587	<0.0050	0.0249	<0.0050	<0.0050	0.0050	7301587
Calculated Parameters												
Filter and HNO3 Preservation	N/A	FIELD	FIELD	ONSITE	FIELD	ONSITE	FIELD	FIELD	FIELD	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.046	0.225	7300878	0.130	7300878	0.953	0.398	0.132	0.205	0.020	7300878
Misc. Inorganics												
Fluoride (F)	mg/L	0.016	<0.010	7302808	0.017	7302808	0.011	0.012	0.018	0.013	0.010	7302808
Alkalinity (Total as CaCO3)	mg/L	41.0	254	7303039	55.0	7303039	251	416	93.1	126	0.50	7303039
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	7303039	<0.50	7303039	<0.50	<0.50	<0.50	0.79	0.50	7303039
Bicarbonate (HCO3)	mg/L	50.0	309	7303039	67.1	7303039	306	508	114	151	0.50	7303039
Carbonate (CO3)	mg/L	<0.50	<0.50	7303039	<0.50	7303039	<0.50	<0.50	<0.50	0.95	0.50	7303039
Hydroxide (OH)	mg/L	<0.50	<0.50	7303039	<0.50	7303039	<0.50	<0.50	<0.50	<0.50	0.50	7303039
Anions												
Dissolved Sulphate (SO4)	mg/L	3.04	9.47	7303712	3.39	7304313	3.06	22.3	3.79	3.98	0.50	7303712
Dissolved Chloride (Cl)	mg/L	0.75	6.7	7303709	0.96	7304312	4.9	21	2.1	1.8	0.50	7303709
Nutrients												
Ammonia (N)	mg/L	0.0086	0.0081	7301502	0.0071	7301502	0.019	0.0062	0.0053	0.0090	0.0050	7301502
Nitrate plus Nitrite (N)	mg/L	0.046	0.225	7301556	0.130	7301556	0.953	0.423	0.132	0.205	0.020	7301556
Physical Properties												
Conductivity	uS/cm	86.3	505	7303041	118	7303041	485	847	193	253	1.0	7303041
pH	pH Units	7.84	8.08	7303040	7.93	7303040	8.13	7.96	8.15	8.30		7303040

N/A = Not Applicable

RDL = Reportable Detection Limit

Maxxam Job #: B3B0324
Report Date: 2013/12/04

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		IE8566	IE8567	IE8568	IE8588	IE8589	IE8590		
Sampling Date		2013/11/26	2013/11/26	2013/11/27	2013/11/26	2013/11/26	2013/11/27		
COC#		42162201	42162201	42162201	42162202	42162202	42162202		
	UNITS	AG99-4	AG99-5	EBA04-8	EBA11-1	EBA11-2	SW1	RDL	QC Batch
ANIONS									
Nitrite (N)	mg/L	<0.0050	<0.0050	0.0256	0.0097	0.0196	<0.0050	0.0050	7301587
Calculated Parameters									
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD	FIELD		N/A	ONSITE
Nitrate (N)	mg/L	0.139	0.080	0.396	0.368	0.386	0.128	0.020	7300878
Misc. Inorganics									
Fluoride (F)	mg/L	0.017	0.018	0.012	0.018	0.015	0.021	0.010	7302808
Alkalinity (Total as CaCO3)	mg/L	52.0	46.1	407	170	156	70.2	0.50	7303039
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7303039
Bicarbonate (HCO3)	mg/L	63.4	56.2	496	207	190	85.7	0.50	7303039
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7303039
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7303039
Anions									
Dissolved Sulphate (SO4)	mg/L	2.90	2.95	21.0	34.7	4.59	3.73	0.50	7303712
Dissolved Chloride (Cl)	mg/L	1.4	1.4	21	14	15	2.9	0.50	7303709
Nutrients									
Ammonia (N)	mg/L	0.019	0.0055	0.0074	0.021	0.033	0.0059	0.0050	7301502
Nitrate plus Nitrite (N)	mg/L	0.139	0.080	0.421	0.378	0.405	0.128	0.020	7301556
Physical Properties									
Conductivity	uS/cm	110	97.1	833	430	354	152	1.0	7303041
pH	pH Units	7.97	7.79	7.95	8.27	8.24	8.08		7303040

N/A = Not Applicable

RDL = Reportable Detection Limit

Maxxam Job #: B3B0324
Report Date: 2013/12/04

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

LOW LEVEL DISSOLVED METALS WITH CV HG (WATER)

Maxxam ID		IE8559	IE8560	IE8561	IE8562	IE8563	IE8564	IE8565		
Sampling Date		2013/11/26	2013/11/26	2013/11/26	2013/11/27	2013/11/27	2013/11/27	2013/11/26		
COC#		42162201	42162201	42162201	42162201	42162201	42162201	42162201		
	UNITS	EBA04-1	EBA04-3	EBA04-4	EBA04-6	EBA04-7	AG99-1	AG99-2	RDL	QC Batch
Misc. Inorganics										
Dissolved Hardness (CaCO3)	mg/L	41.6	297	57.5	258	435	95.5	130	0.50	7300525
Elements										
Dissolved Mercury (Hg)	ug/L	<0.0020	<0.0020	<0.0020	<0.0020	0.0022	<0.0020	<0.0020	0.0020	7308008

RDL = Reportable Detection Limit

Maxxam Job #: B3B0324
Report Date: 2013/12/04

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

LOW LEVEL DISSOLVED METALS WITH CV HG (WATER)

Maxxam ID		IE8559	IE8560	IE8561	IE8562	IE8563	IE8564	IE8565		
Sampling Date		2013/11/26	2013/11/26	2013/11/26	2013/11/27	2013/11/27	2013/11/27	2013/11/26		
COC#		42162201	42162201	42162201	42162201	42162201	42162201	42162201		
	UNITS	EBA04-1	EBA04-3	EBA04-4	EBA04-6	EBA04-7	AG99-1	AG99-2	RDL	QC Batch
Dissolved Metals by ICPMS										
Dissolved Aluminum (Al)	mg/L	0.0176	0.00194	0.0168	0.0117	0.0121	0.0217	0.0155	0.00050	7303282
Dissolved Antimony (Sb)	mg/L	0.000032	<0.000020	0.000022	<0.000020	0.000029	0.000026	0.000029	0.000020	7303282
Dissolved Arsenic (As)	mg/L	0.000382	0.000142	0.000275	0.000095	0.000158	0.000877	0.00215	0.000020	7303282
Dissolved Barium (Ba)	mg/L	0.00103	0.00844	0.000673	0.00563	0.0157	0.00171	0.00576	0.000020	7303282
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	7303282
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	7303282
Dissolved Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	0.213	<0.050	<0.050	0.050	7303282
Dissolved Cadmium (Cd)	mg/L	0.0000180	0.0000070	<0.0000050	0.0000080	0.0000450	0.0000060	<0.0000050	0.0000050	7303282
Dissolved Chromium (Cr)	mg/L	0.00029	0.00054	0.00020	0.00107	<0.00010	0.00046	0.00044	0.00010	7303282
Dissolved Cobalt (Co)	mg/L	0.0000050	0.0000110	0.0000080	0.0000110	0.000412	0.0000070	0.0000070	0.0000050	7303282
Dissolved Copper (Cu)	mg/L	0.00398	0.000157	0.000191	0.000121	0.00260	0.000259	0.000186	0.000050	7303282
Dissolved Iron (Fe)	mg/L	0.0343	0.0024	0.0012	0.0017	0.0041	0.0059	0.0012	0.0010	7303282
Dissolved Lead (Pb)	mg/L	0.000216	0.0000060	0.0000130	0.0000110	0.0000130	0.0000180	0.0000150	0.0000050	7303282
Dissolved Lithium (Li)	mg/L	<0.00050	0.00058	<0.00050	0.00057	0.00086	<0.00050	<0.00050	0.00050	7303282
Dissolved Manganese (Mn)	mg/L	0.000633	<0.000050	<0.000050	0.000089	0.130	0.000151	0.000068	0.000050	7303282
Dissolved Molybdenum (Mo)	mg/L	0.000142	<0.000050	0.000107	<0.000050	0.000084	0.000078	0.000053	0.000050	7303282
Dissolved Nickel (Ni)	mg/L	0.000244	0.000207	0.000042	0.000264	0.00166	0.000549	0.000055	0.000020	7303282
Dissolved Selenium (Se)	mg/L	0.000110	0.000187	0.000141	<0.000040	0.000047	0.000138	0.000157	0.000040	7303282
Dissolved Silicon (Si)	mg/L	4.03	7.20	3.99	9.82	12.8	6.02	5.23	0.10	7303282
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	7303282
Dissolved Strontium (Sr)	mg/L	0.0201	0.178	0.0275	0.157	0.296	0.0417	0.0495	0.000050	7303282
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000050	<0.0000020	<0.0000020	0.0000020	7303282
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	7303282
Dissolved Titanium (Ti)	mg/L	<0.00050	0.00103	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7303282
Dissolved Uranium (U)	mg/L	0.0000130	0.000200	0.0000250	0.000236	0.000838	0.0000840	0.000513	0.0000020	7303282
Dissolved Vanadium (V)	mg/L	0.00279	0.00114	0.00253	0.00139	0.00170	0.00595	0.0181	0.00020	7303282
Dissolved Zinc (Zn)	mg/L	0.0336	0.00051	0.00098	0.00106	0.00086	0.00106	0.00142	0.00010	7303282
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	7303282
Dissolved Calcium (Ca)	mg/L	14.0	99.0	20.0	76.9	128	31.1	43.1	0.050	7300877
Dissolved Magnesium (Mg)	mg/L	1.60	12.2	1.84	16.0	27.8	4.35	5.41	0.050	7300877
Dissolved Potassium (K)	mg/L	0.235	0.953	0.302	1.38	2.17	0.706	1.45	0.050	7300877
Dissolved Sodium (Na)	mg/L	1.21	3.87	1.50	5.77	23.9	1.66	1.82	0.050	7300877
Dissolved Sulphur (S)	mg/L	<3.0	3.6	<3.0	<3.0	8.0	<3.0	<3.0	3.0	7300877

RDL = Reportable Detection Limit

Maxxam Job #: B3B0324
Report Date: 2013/12/04

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

LOW LEVEL DISSOLVED METALS WITH CV HG (WATER)

Maxxam ID		IE8566	IE8567	IE8568	IE8588	IE8589		
Sampling Date		2013/11/26	2013/11/26	2013/11/27	2013/11/26	2013/11/26		
COC#		42162201	42162201	42162201	42162202	42162202		
	UNITS	AG99-4	AG99-5	EBA04-8	EBA11-1	EBA11-2	RDL	QC Batch
Misc. Inorganics								
Dissolved Hardness (CaCO ₃)	mg/L	54.4	45.4	428	222	180	0.50	7300525
Elements								
Dissolved Mercury (Hg)	ug/L	<0.0020	<0.0020	0.0025	<0.0020	<0.0020	0.0020	7308008

RDL = Reportable Detection Limit

Maxxam Job #: B3B0324
Report Date: 2013/12/04

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

LOW LEVEL DISSOLVED METALS WITH CV HG (WATER)

Maxxam ID		IE8566	IE8567	IE8568	IE8588	IE8589		
Sampling Date		2013/11/26	2013/11/26	2013/11/27	2013/11/26	2013/11/26		
COC#		42162201	42162201	42162201	42162202	42162202		
	UNITS	AG99-4	AG99-5	EBA04-8	EBA11-1	EBA11-2	RDL	QC Batch
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.00734	0.0237	0.0115	0.00326	0.00638	0.00050	7303282
Dissolved Antimony (Sb)	mg/L	0.000026	0.000027	0.000030	<0.000020	<0.000020	0.000020	7303282
Dissolved Arsenic (As)	mg/L	0.000404	0.000759	0.000155	0.000266	0.000185	0.000020	7303282
Dissolved Barium (Ba)	mg/L	0.000714	0.000591	0.0160	0.00484	0.00745	0.000020	7303282
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	7303282
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	7303282
Dissolved Boron (B)	mg/L	<0.050	<0.050	0.219	0.066	<0.050	0.050	7303282
Dissolved Cadmium (Cd)	mg/L	<0.0000050	<0.0000050	0.0000440	0.0000120	<0.0000050	0.0000050	7303282
Dissolved Chromium (Cr)	mg/L	0.00015	0.00022	<0.00010	0.00127	0.00130	0.00010	7303282
Dissolved Cobalt (Co)	mg/L	0.0000060	0.0000050	0.000391	0.0000290	0.0000050	0.0000050	7303282
Dissolved Copper (Cu)	mg/L	0.000200	0.000181	0.00272	0.000288	0.000082	0.000050	7303282
Dissolved Iron (Fe)	mg/L	<0.0010	0.0015	0.0041	0.0019	0.0020	0.0010	7303282
Dissolved Lead (Pb)	mg/L	0.0000060	0.0000200	0.0000150	0.0000050	0.0000050	0.0000050	7303282
Dissolved Lithium (Li)	mg/L	<0.00050	<0.00050	0.00087	<0.00050	<0.00050	0.00050	7303282
Dissolved Manganese (Mn)	mg/L	<0.000050	0.000070	0.130	0.000054	<0.000050	0.000050	7303282
Dissolved Molybdenum (Mo)	mg/L	0.000125	0.000115	0.000087	<0.000050	<0.000050	0.000050	7303282
Dissolved Nickel (Ni)	mg/L	0.000078	0.000072	0.00191	0.000189	0.000102	0.000020	7303282
Dissolved Selenium (Se)	mg/L	0.000135	0.000115	<0.000040	0.000079	0.000152	0.000040	7303282
Dissolved Silicon (Si)	mg/L	4.10	3.82	12.6	6.52	8.79	0.10	7303282
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	7303282
Dissolved Strontium (Sr)	mg/L	0.0272	0.0212	0.294	0.119	0.0952	0.000050	7303282
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000050	<0.0000020	0.0000020	0.0000020	7303282
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	7303282
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7303282
Dissolved Uranium (U)	mg/L	0.0000300	0.0000320	0.000834	0.000553	0.000213	0.0000020	7303282
Dissolved Vanadium (V)	mg/L	0.00280	0.00467	0.00172	0.00522	0.00237	0.00020	7303282
Dissolved Zinc (Zn)	mg/L	0.00070	0.00121	0.00088	0.00121	0.00029	0.00010	7303282
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	7303282
Dissolved Calcium (Ca)	mg/L	18.8	15.1	125	67.7	52.6	0.050	7300877
Dissolved Magnesium (Mg)	mg/L	1.80	1.87	28.5	12.8	11.9	0.050	7300877
Dissolved Potassium (K)	mg/L	0.280	0.356	2.18	0.819	0.982	0.050	7300877
Dissolved Sodium (Na)	mg/L	1.37	1.24	24.4	4.88	3.44	0.050	7300877
Dissolved Sulphur (S)	mg/L	<3.0	<3.0	7.7	11.9	<3.0	3.0	7300877

RDL = Reportable Detection Limit

Maxxam Job #: B3B0324
Report Date: 2013/12/04

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

LOW LEVEL TOTAL METALS WITH CV HG (WATER)

Maxxam ID		IE8590		
Sampling Date		2013/11/27		
COC#		42162202		
	UNITS	SW1	RDL	QC Batch
Calculated Parameters				
Total Hardness (CaCO ₃)	mg/L	74.7	0.50	7300345
Elements				
Total Mercury (Hg)	ug/L	<0.0020	0.0020	7307132

Maxxam Job #: B3B0324
Report Date: 2013/12/04

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

LOW LEVEL TOTAL METALS WITH CV HG (WATER)

Maxxam ID		IE8590		
Sampling Date		2013/11/27		
COC#		42162202		
	UNITS	SW1	RDL	QC Batch
Total Metals by ICPMS				
Total Aluminum (Al)	mg/L	0.0243	0.00050	7302579
Total Antimony (Sb)	mg/L	0.000027	0.000020	7302579
Total Arsenic (As)	mg/L	0.000513	0.000020	7302579
Total Barium (Ba)	mg/L	0.00171	0.000020	7302579
Total Beryllium (Be)	mg/L	<0.000010	0.000010	7302579
Total Bismuth (Bi)	mg/L	<0.0000050	0.0000050	7302579
Total Boron (B)	mg/L	<0.050	0.050	7302579
Total Cadmium (Cd)	mg/L	<0.0000050	0.0000050	7302579
Total Chromium (Cr)	mg/L	0.00029	0.00010	7302579
Total Cobalt (Co)	mg/L	0.0000410	0.0000050	7302579
Total Copper (Cu)	mg/L	0.000725	0.000050	7302579
Total Iron (Fe)	mg/L	0.0350	0.0010	7302579
Total Lead (Pb)	mg/L	0.0000340	0.0000050	7302579
Total Lithium (Li)	mg/L	<0.00050	0.00050	7302579
Total Manganese (Mn)	mg/L	0.00181	0.000050	7302579
Total Molybdenum (Mo)	mg/L	0.000130	0.000050	7302579
Total Nickel (Ni)	mg/L	0.000170	0.000020	7302579
Total Selenium (Se)	mg/L	0.000126	0.000040	7302579
Total Silicon (Si)	mg/L	4.60	0.10	7302579
Total Silver (Ag)	mg/L	<0.0000050	0.0000050	7302579
Total Strontium (Sr)	mg/L	0.0370	0.000050	7302579
Total Thallium (Tl)	mg/L	<0.0000020	0.0000020	7302579
Total Tin (Sn)	mg/L	<0.00020	0.00020	7302579
Total Titanium (Ti)	mg/L	0.00185	0.00050	7302579
Total Uranium (U)	mg/L	0.000114	0.0000020	7302579
Total Vanadium (V)	mg/L	0.00421	0.00020	7302579
Total Zinc (Zn)	mg/L	0.00019	0.00010	7302579
Total Zirconium (Zr)	mg/L	<0.00010	0.00010	7302579
Total Calcium (Ca)	mg/L	23.7	0.050	7300527
Total Magnesium (Mg)	mg/L	3.79	0.050	7300527
Total Potassium (K)	mg/L	0.401	0.050	7300527
Total Sodium (Na)	mg/L	1.97	0.050	7300527
Total Sulphur (S)	mg/L	<3.0	3.0	7300527

RDL = Reportable Detection Limit

Maxxam Job #: B3B0324
Report Date: 2013/12/04

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		IE8560	IE8563	IE8566	IE8567	IE8588		
Sampling Date		2013/11/26	2013/11/27	2013/11/26	2013/11/26	2013/11/26		
COC#		42162201	42162201	42162201	42162201	42162202		
	UNITS	EBA04-3	EBA04-7	AG99-4	AG99-5	EBA11-1	RDL	QC Batch
Volatiles								
VPH (VH6 to 10 - BTEX)	mg/L	<0.30	<0.30	<0.30	<0.30	<0.30	0.30	7300880
Volatile Hydrocarbons								
VH C6-C10	mg/L	<0.30	<0.30	<0.30	<0.30	<0.30	0.30	7305835
Volatiles								
Chloromethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7305434
Vinyl chloride	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7305434
Chloroethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7305434
Trichlorofluoromethane	ug/L	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	7305434
1,1-dichloroethene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7305434
Dichloromethane	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7305434
trans-1,2-dichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7305434
1,1-dichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7305434
cis-1,2-dichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7305434
Chloroform	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7305434
1,1,1-trichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7305434
1,2-dichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7305434
Carbon tetrachloride	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7305434
Benzene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	7305434
Methyl-tert-butylether (MTBE)	ug/L	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	7305434
1,2-dichloropropane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7305434
cis-1,3-dichloropropene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7305434
trans-1,3-dichloropropene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7305434
Bromomethane	ug/L	<10 ⁽¹⁾	<10 ⁽¹⁾	<10 ⁽¹⁾	<10 ⁽¹⁾	<10 ⁽¹⁾	10	7305434
1,1,2-trichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7305434
Trichloroethene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7305434
Chlorodibromomethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7305434
Tetrachloroethene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7305434
Bromodichloromethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7305434
Toluene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	7305434
Ethylbenzene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	7305434
m & p-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	7305434
Bromoform	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7305434
Styrene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7305434
o-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	7305434

RDL = Reportable Detection Limit

(1) - RDL raised due to background artifacts detected in analysis

Maxxam Job #: B3B0324
Report Date: 2013/12/04

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		IE8560	IE8563	IE8566	IE8567	IE8588		
Sampling Date		2013/11/26	2013/11/27	2013/11/26	2013/11/26	2013/11/26		
COC#		42162201	42162201	42162201	42162201	42162202		
	UNITS	EBA04-3	EBA04-7	AG99-4	AG99-5	EBA11-1	RDL	QC Batch
Xylenes (Total)	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	7305434
1,1,1,2-tetrachloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7305434
1,1,2,2-tetrachloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7305434
1,2-dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7305434
1,3-dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7305434
1,4-dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7305434
Chlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7305434
Dibromomethane	ug/L	<0.90	<0.90	<0.90	<0.90	<0.90	0.90	7305434
Surrogate Recovery (%)								
1,4-Difluorobenzene (sur.)	%	98	100	102	100	99		7305434
4-BROMOFLUOROBENZENE (sur.)	%	79	86	85	82	76		7305434
D4-1,2-DICHLOROETHANE (sur.)	%	93	93	99	93	92		7305434

RDL = Reportable Detection Limit

Maxxam Job #: B3B0324
Report Date: 2013/12/04

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7301502	Ammonia (N)	2013/11/29	101	80 - 120	98	80 - 120	<0.0050	mg/L	NC	20
7301556	Nitrate plus Nitrite (N)	2013/11/28	103	80 - 120	106	80 - 120	<0.020	mg/L	NC	25
7301587	Nitrite (N)	2013/11/28	98	80 - 120	102	80 - 120	<0.0050	mg/L	NC	20
7302579	Total Aluminum (Al)	2013/11/30	101	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20
7302579	Total Antimony (Sb)	2013/11/30	97	80 - 120	96	80 - 120	<0.000020	mg/L	NC	20
7302579	Total Arsenic (As)	2013/11/30	104	80 - 120	102	80 - 120	0.000028, RDL=0.000020	mg/L	NC	20
7302579	Total Barium (Ba)	2013/11/30	96	80 - 120	98	80 - 120	<0.000020	mg/L	NC	20
7302579	Total Beryllium (Be)	2013/11/30	100	80 - 120	103	80 - 120	<0.000010	mg/L	NC	20
7302579	Total Bismuth (Bi)	2013/11/30	99	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
7302579	Total Cadmium (Cd)	2013/11/30	99	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
7302579	Total Chromium (Cr)	2013/11/30	101	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
7302579	Total Cobalt (Co)	2013/11/30	102	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
7302579	Total Copper (Cu)	2013/11/30	101	80 - 120	102	80 - 120	<0.000050	mg/L	NC	20
7302579	Total Iron (Fe)	2013/11/30	108	80 - 120	106	80 - 120	<0.0010	mg/L	NC	20
7302579	Total Lead (Pb)	2013/11/30	98	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
7302579	Total Lithium (Li)	2013/11/30	95	80 - 120	98	80 - 120	<0.00050	mg/L	NC	20
7302579	Total Manganese (Mn)	2013/11/30	103	80 - 120	100	80 - 120	<0.000050	mg/L	NC	20
7302579	Total Molybdenum (Mo)	2013/11/30	95	80 - 120	98	80 - 120	<0.000050	mg/L	NC	20
7302579	Total Nickel (Ni)	2013/11/30	106	80 - 120	105	80 - 120	<0.000020	mg/L	NC	20
7302579	Total Selenium (Se)	2013/11/30	99	80 - 120	101	80 - 120	<0.000040	mg/L	NC	20
7302579	Total Silver (Ag)	2013/11/30	98	80 - 120	92	80 - 120	0.0000060, RDL=0.0000050	mg/L	NC	20
7302579	Total Strontium (Sr)	2013/11/30	96	80 - 120	98	80 - 120	<0.000050	mg/L	NC	20
7302579	Total Thallium (Tl)	2013/11/30	99	80 - 120	101	80 - 120	0.0000030, RDL=0.0000020	mg/L	NC	20
7302579	Total Tin (Sn)	2013/11/30	96	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
7302579	Total Titanium (Ti)	2013/11/30	95	80 - 120	106	80 - 120	<0.00050	mg/L	NC	20
7302579	Total Uranium (U)	2013/11/30	99	80 - 120	98	80 - 120	<0.0000020	mg/L	NC	20
7302579	Total Vanadium (V)	2013/11/30	102	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
7302579	Total Zinc (Zn)	2013/11/30	107	80 - 120	103	80 - 120	<0.00010	mg/L	NC	20
7302579	Total Boron (B)	2013/11/30					<0.050	mg/L	NC	20
7302579	Total Silicon (Si)	2013/11/30					<0.10	mg/L	NC	20
7302579	Total Zirconium (Zr)	2013/11/30					<0.00010	mg/L	NC	20
7302808	Fluoride (F)	2013/11/29	101	80 - 120	92	80 - 120	<0.010	mg/L	NC	20
7303039	Alkalinity (Total as CaCO3)	2013/11/30	NC	80 - 120	97	80 - 120	<0.50	mg/L	4.8	20
7303039	Alkalinity (PP as CaCO3)	2013/11/30					<0.50	mg/L	NC	20
7303039	Bicarbonate (HCO3)	2013/11/30					<0.50	mg/L	4.8	20
7303039	Carbonate (CO3)	2013/11/30					<0.50	mg/L	NC	20
7303039	Hydroxide (OH)	2013/11/30					<0.50	mg/L	NC	20
7303041	Conductivity	2013/11/30			101	80 - 120	1.3, RDL=1.0	uS/cm	1.2	20
7303282	Dissolved Aluminum (Al)	2013/12/01	107	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
7303282	Dissolved Antimony (Sb)	2013/12/01	98	80 - 120	97	80 - 120	<0.000020	mg/L	NC	20

Maxxam Job #: B3B0324
Report Date: 2013/12/04

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7303282	Dissolved Arsenic (As)	2013/12/01	105	80 - 120	102	80 - 120	<0.000020	mg/L	NC	20
7303282	Dissolved Barium (Ba)	2013/12/01	94	80 - 120	89	80 - 120	<0.000020	mg/L	NC	20
7303282	Dissolved Beryllium (Be)	2013/12/01	99	80 - 120	96	80 - 120	<0.000010	mg/L	NC	20
7303282	Dissolved Bismuth (Bi)	2013/12/01	97	80 - 120	92	80 - 120	<0.0000050	mg/L	NC	20
7303282	Dissolved Cadmium (Cd)	2013/12/01	92	80 - 120	93	80 - 120	<0.0000050	mg/L	NC	20
7303282	Dissolved Chromium (Cr)	2013/12/01	102	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
7303282	Dissolved Cobalt (Co)	2013/12/01	99	80 - 120	95	80 - 120	<0.0000050	mg/L	NC	20
7303282	Dissolved Copper (Cu)	2013/12/01	102	80 - 120	100	80 - 120	<0.000050	mg/L	NC	20
7303282	Dissolved Iron (Fe)	2013/12/01	103	80 - 120	100	80 - 120	<0.0010	mg/L	NC	20
7303282	Dissolved Lead (Pb)	2013/12/01	95	80 - 120	92	80 - 120	<0.0000050	mg/L	NC	20
7303282	Dissolved Lithium (Li)	2013/12/01	93	80 - 120	91	80 - 120	<0.00050	mg/L	NC	20
7303282	Dissolved Manganese (Mn)	2013/12/01	104	80 - 120	101	80 - 120	<0.000050	mg/L	NC	20
7303282	Dissolved Molybdenum (Mo)	2013/12/01	91	80 - 120	91	80 - 120	<0.000050	mg/L	NC	20
7303282	Dissolved Nickel (Ni)	2013/12/01	103	80 - 120	101	80 - 120	0.000020, RDL=0.000020	mg/L	NC	20
7303282	Dissolved Selenium (Se)	2013/12/01	104	80 - 120	100	80 - 120	<0.000040	mg/L	NC	20
7303282	Dissolved Silver (Ag)	2013/12/01	94	80 - 120	94	80 - 120	<0.0000050	mg/L	NC	20
7303282	Dissolved Strontium (Sr)	2013/12/01	93	80 - 120	92	80 - 120	<0.000050	mg/L	NC	20
7303282	Dissolved Thallium (Tl)	2013/12/01	98	80 - 120	95	80 - 120	<0.0000020	mg/L	NC	20
7303282	Dissolved Tin (Sn)	2013/12/01	95	80 - 120	92	80 - 120	<0.00020	mg/L	NC	20
7303282	Dissolved Titanium (Ti)	2013/12/01	107	80 - 120	105	80 - 120	<0.00050	mg/L	NC	20
7303282	Dissolved Uranium (U)	2013/12/01	93	80 - 120	90	80 - 120	<0.0000020	mg/L	NC	20
7303282	Dissolved Vanadium (V)	2013/12/01	102	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
7303282	Dissolved Zinc (Zn)	2013/12/01	102	80 - 120	103	80 - 120	<0.00010	mg/L	NC	20
7303282	Dissolved Boron (B)	2013/12/01					<0.050	mg/L	NC	20
7303282	Dissolved Silicon (Si)	2013/12/01					<0.10	mg/L	NC	20
7303282	Dissolved Zirconium (Zr)	2013/12/01					<0.00010	mg/L	NC	20
7303709	Dissolved Chloride (Cl)	2013/11/29	NC	80 - 120	106	80 - 120	<0.50	mg/L	0.06	20
7303712	Dissolved Sulphate (SO4)	2013/11/29	NC	80 - 120	103	80 - 120	<0.50	mg/L	4.1	20
7304312	Dissolved Chloride (Cl)	2013/11/30	NC	80 - 120	107	80 - 120	<0.50	mg/L	2.5	20
7304313	Dissolved Sulphate (SO4)	2013/11/30	NC	80 - 120	107	80 - 120	0.55, RDL=0.50	mg/L	7.0	20
7305434	1,4-Difluorobenzene (sur.)	2013/12/02	97	70 - 130	98	70 - 130	97	%		
7305434	4-BROMOFLUOROBENZENE (sur.)	2013/12/02	90	70 - 130	97	70 - 130	73	%		
7305434	D4-1,2-DICHLOROETHANE (sur.)	2013/12/02	91	70 - 130	92	70 - 130	88	%		
7305434	Chloromethane	2013/12/02	120	60 - 140	104	60 - 140	<1.0	ug/L	NC	30
7305434	Vinyl chloride	2013/12/02	106	60 - 140	102	60 - 140	<0.50	ug/L	NC	30
7305434	Chloroethane	2013/12/02	98	60 - 140	97	60 - 140	<1.0	ug/L	NC	30
7305434	Trichlorofluoromethane	2013/12/02	121	60 - 140	122	60 - 140	<4.0	ug/L	NC	30
7305434	1,1-dichloroethene	2013/12/02	115	70 - 130	116	70 - 130	<0.50	ug/L	NC	30
7305434	Dichloromethane	2013/12/02	108	70 - 130	109	70 - 130	<2.0	ug/L	NC	30
7305434	trans-1,2-dichloroethene	2013/12/02	107	70 - 130	108	70 - 130	<1.0	ug/L	NC	30

Maxxam Job #: B3B0324
Report Date: 2013/12/04

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7305434	1,1-dichloroethane	2013/12/02	102	70 - 130	100	70 - 130	<0.50	ug/L	NC	30
7305434	cis-1,2-dichloroethene	2013/12/02	107	70 - 130	110	70 - 130	<1.0	ug/L	NC	30
7305434	Chloroform	2013/12/02	103	70 - 130	105	70 - 130	<1.0	ug/L	5.3	30
7305434	1,1,1-trichloroethane	2013/12/02	106	70 - 130	106	70 - 130	<0.50	ug/L	NC	30
7305434	1,2-dichloroethane	2013/12/02	102	70 - 130	103	70 - 130	<0.50	ug/L	NC	30
7305434	Carbon tetrachloride	2013/12/02	105	70 - 130	108	70 - 130	<0.50	ug/L	NC	30
7305434	Benzene	2013/12/02	105	70 - 130	107	70 - 130	<0.40	ug/L	NC	30
7305434	Methyl-tert-butylether(MTBE)	2013/12/02	101	70 - 130	102	70 - 130	<4.0	ug/L	NC	30
7305434	1,2-dichloropropane	2013/12/02	110	70 - 130	111	70 - 130	<0.50	ug/L	NC	30
7305434	cis-1,3-dichloropropene	2013/12/02	104	70 - 130	114	70 - 130	<1.0	ug/L	NC	30
7305434	trans-1,3-dichloropropene	2013/12/02	115	70 - 130	125	70 - 130	<1.0	ug/L	NC	30
7305434	Bromomethane	2013/12/02	160 ⁽¹⁾	60 - 140	119	60 - 140	<10 ⁽²⁾	ug/L	NC ⁽²⁾	30
7305434	1,1,2-trichloroethane	2013/12/02	98	70 - 130	106	70 - 130	<0.50	ug/L	NC	30
7305434	Trichloroethene	2013/12/02	102	70 - 130	105	70 - 130	<0.50	ug/L	NC	30
7305434	Chlorodibromomethane	2013/12/02	88	70 - 130	95	70 - 130	<1.0	ug/L	NC	30
7305434	Tetrachloroethene	2013/12/02	100	70 - 130	104	70 - 130	<0.50	ug/L	NC	30
7305434	Bromodichloromethane	2013/12/02	102	70 - 130	105	70 - 130	<1.0	ug/L	NC	30
7305434	Toluene	2013/12/02	93	70 - 130	97	70 - 130	<0.40	ug/L	NC	30
7305434	Ethylbenzene	2013/12/02	95	70 - 130	97	70 - 130	<0.40	ug/L	4.7	30
7305434	m & p-Xylene	2013/12/02	109	70 - 130	105	70 - 130	<0.40	ug/L	4.5	30
7305434	Bromoform	2013/12/02	87	70 - 130	102	70 - 130	<1.0	ug/L	NC	30
7305434	Styrene	2013/12/02	97	70 - 130	110	70 - 130	<0.50	ug/L	NC	30
7305434	o-Xylene	2013/12/02	102	70 - 130	104	70 - 130	<0.40	ug/L	4.8	30
7305434	1,1,1,2-tetrachloroethane	2013/12/02	99	70 - 130	105	70 - 130	<0.50	ug/L	NC	30
7305434	1,1,2,2-tetrachloroethane	2013/12/02	96	70 - 130	110	70 - 130	<0.50	ug/L	NC	30
7305434	1,2-dichlorobenzene	2013/12/02	104	70 - 130	119	70 - 130	<0.50	ug/L	NC	30
7305434	1,3-dichlorobenzene	2013/12/02	110	70 - 130	120	70 - 130	<0.50	ug/L	NC	30
7305434	1,4-dichlorobenzene	2013/12/02	100	70 - 130	109	70 - 130	<0.50	ug/L	NC	30
7305434	Chlorobenzene	2013/12/02	95	70 - 130	99	70 - 130	<0.50	ug/L	NC	30
7305434	Dibromomethane	2013/12/02	98	70 - 130	99	70 - 130	<0.90	ug/L	NC	30
7305434	Xylenes (Total)	2013/12/02					<0.40	ug/L	4.6	30
7305835	VH C6-C10	2013/12/02			94	70 - 130	<0.30	mg/L	NC	40

Maxxam Job #: B3B0324
Report Date: 2013/12/04

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7307132	Total Mercury (Hg)	2013/12/03	92	80 - 120	98	80 - 120	<0.0020	ug/L	NC	20
7308008	Dissolved Mercury (Hg)	2013/12/04	93	80 - 120	93	80 - 120	<0.0020	ug/L	NC	20

N/A = Not Applicable

RDL = Reportable Detection Limit

RPD = Relative Percent Difference

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.

NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

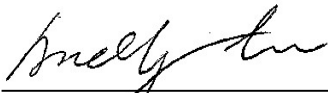
(1) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) - RDL raised due to background artifacts detected in analysis

Validation Signature Page

Maxxam Job #: B3B0324

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Andy Lu, Data Validation Coordinator

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

INVOICE INFORMATION:		Report Information		Project Information		Laboratory Use Only	
Company Name	#5908 EBA Engineering Consultants Ltd.	Company Name	#18501 EBA Engineering Consultants Ltd.	Quotation #	B10655	Maxxam Job #	Bottle Order #:
Contact Name	Accounts Payable	Contact Name	Kristy Gabelhouse	P.O. #		B3B0324	
Address	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Address	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Project #	CWVWC - N23103074-01		
Phone	(250) 756-2256 Fax: (250) 756-2686	Phone	(250) 756-2256 Fax:	Project Name	CWVWC		Crystal Island
Email	drmiano@eba.ca, paul@eba.ca	Email	kgabelhouse@eba.ca, sakbar@maxxam.ca	Site #			
Regulatory Criteria:		Special Instructions:		ANALYSIS REQUESTED (Please be specific):		Turnaround Time (TAT) Required:	
☒ CBR ☐ CCME ☒ BC Water Quality ☐ Other:				Metals Field Filtered ? (Y/N) AMMONIA-N ANION (CL, F, NO2, NO3, SO4) pH / Conductivity / Alkalinity CSR Dissolved Metals in Water with CV Hg + 5/1 pH CSR Total Metals in Water with CV Hg CSR VOC + VPH		Please provide advance notice for rush projects Regular (Standard) TAT: (Will be applied if Rush TAT is not specified) Standard TAT = 8 Working days for most tests Please note: Standard TAT for certain tests such as SOD and Dissolved Metals are + 5 days - contact your Project Manager for details. Job Specific Rush TAT (if applies to entire submission) 1 Day ☐ 2 Day ☐ 3 Day ☐ Date Required: Rush Confirmation Number: (see lab for #)	
SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM							
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered ? (Y/N)	# of Bottles	Comments
1 IE8559	EBA04-1	Nov 26		Ground water	Y	5	
2 IE8560	EBA04-3	Nov 26			Y	8	
3 IE8561	EBA04-4	Nov 26			Y	5	
4 IE8562	EBA04-6	Nov 27			Y	5	
5 IE8563	EBA04-7	Nov 27			Y	8	
6 IE8564	AG99-1	Nov 27			Y	5	
7 IE8565	AG99-2	Nov 26			Y	5	
8 IE8566	AG99-4	Nov 26			Y	8	
9 IE8567	AG99-5	Nov 27			Y	8	
10 IE8568	EBA04-8	Nov 27			Y	5	
* RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)	Time
[Signature] / Darren Thomas		13/11/27	15:30	[Signature]		13/11/28	08:40
						# jars used and not submitted	Lab Use Only
						Time Sensitive ☐	Temperature (°C) on Receipt: 44.4/45.4
							Custody - See Lab on Cooler? ☐ Yes ☐ No

INVOICE INFORMATION:			Report Information			Project Information			Laboratory Use Only	
Company Name	#5908 EBA Engineering Consultants Ltd.		Company Name	#18501 EBA Engineering Consultants Ltd.		Quotation #	B10855		Maxxam Job #	Bottle Order #
Contact Name	Accounts Payable		Contact Name	Kristy Gabelhouse		P.O. #				
Address	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7		Address	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7		Project #	CWVMC - N23103074-01			
Phone	(250) 756-2256 Fax: (250) 756-2686		Phone	(250) 756-2256 Fax:		Project Name	CWVMC		Chain Of Custody Record	Project Manager
Email	dromano@eba.ca, lpaul@eba.ca		Email	kgabelhouse@eba.ca, sakbar@maxxam.ca		Site #				
						Sampled By	D. Thomas			
Regulatory Criteria:		Special Instructions		ANALYSIS REQUESTED (Please be specific)				Turnaround Time (TAT) Required:		
☒ CSR ☐ CCME ☒ BC Water Quality ☐ Other _____				Metaph: Filtered 7 (Y / N) AMMONIA - N ANION (CL, F, NO2, NO3, SO4) pH / Conductivity / Alkalinity CSR Dissolved Metals in Water with CV Hg + Sealer CSR Total Metals in Water with CV Hg + Sealer CSR VOC + VPH				Please provide advance notice for rush projects. Regular (Standard) TAT: (will be applied if Rush TAT is not specified) Standard TAT = 5 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dissolved Phosphorus are > 5 days - contact your Project Manager for details. Job Specific Rush TAT (if applies to entire submission): 1 DAY ☐ 2 Day ☐ 3 Day ☐ Date Required: _____ Rush Confirmation Number: _____ (Your Job No.)		
SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM										
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix						
1	~~EBA04-1~~									
2	~~EBA04-2~~									
3	~~EBA04-3~~									
4	~~EBA04-4~~									
5	~~EBA04-5~~									
6	~~EBA04-6~~									
7	~~EBA04-7~~									
8	IE8588	Nov 26	15:30	Grav water	X	X	X	X	X	8
9	IE8589	Nov 26		↓	X	X	X	X		5
10	IE8590	Nov 27		Surface water	X	X	X		X	5
RELINQUISHED BY: (Signature/Print)		Date: (YYMMDD)	Time	RECEIVED BY: (Signature/Print)		Date: (YYMMDD)	Time	# (are used and not submitted)	Lab Use Only	
D. Thomas		12/3/0/27	15:30	M. Thomas		12/3/1/28	08:40		Time Sampled	Temperature (°C) on Receipt
										4.44/4.54
									Customize Contact on Cooler?	Yes ☐ No ☐

Your Project #: CVWMC - N23103074-01
 Site#: CVWMC
 Your C.O.C. #: 42162203

Attention: Kristy Gabelhouse

EBA Engineering Consultants Ltd.
 #1 - 4376 Boban Drive
 Nanaimo, BC
 CANADA V9T6A7

Report Date: 2014/01/07

This report supersedes all previous reports with the same Maxxam job number

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B3B0961
Received: 2013/11/29, 07:50

Sample Matrix: Water
 # Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	7	2013/11/30	2013/11/30	BBY6SOP-00026	SM2320B
Alkalinity - Water	1	2013/12/02	2013/12/03	BBY6SOP-00026	SM2320B
Chloride by Automated Colourimetry	7	N/A	2013/11/29	BBY6SOP-00011	SM-4500-Cl-
Chloride by Automated Colourimetry	1	N/A	2013/11/30	BBY6SOP-00011	SM-4500-Cl-
Conductance - water	7	N/A	2013/11/30	BBY6SOP-00026	SM-2510B
Conductance - water	1	N/A	2013/12/03	BBY6SOP-00026	SM-2510B
Fluoride	8	N/A	2013/12/02	BBY6SOP-00012	SM - 4500 F C
Hardness (calculated as CaCO ₃)	1	N/A	2013/12/04	BBY7SOP-00002	EPA 6020A
Hardness (calculated as CaCO ₃)	7	N/A	2013/12/05	BBY7SOP-00002	EPA 6020A
Mercury (Dissolved) by CVAf	1	N/A	2013/12/05	BBY7SOP-00015	EPA 245.7
Mercury (Dissolved) by CVAf	7	N/A	2014/01/07	BBY7SOP-00015	EPA 245.7
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	1	N/A	2013/12/04	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	7	N/A	2014/01/07	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (dissolved)	8	N/A	2013/12/04	BBY7SOP-00002	EPA 6020A
Ammonia-N (Preserved)	8	N/A	2013/12/02	BBY6SOP-00009	SM-4500NH ₃ G
Nitrate + Nitrite (N)	8	N/A	2013/11/30	BBY6SOP-00010	SM 4500NO ₃ -I
Nitrite (N) by CFA	8	N/A	2013/11/30	BBY6SOP-00010	EPA 353.2
Nitrogen - Nitrate (as N)	8	N/A	2013/11/30	BBY6SOP-00010	SM 4500NO ₃ -I
Filter and HNO ₃ Preserve for Metals	7	N/A	2013/11/29	BBY6WI-00001	EPA 200.2
Filter and HNO ₃ Preserve for Metals	1	N/A	2013/12/05	BBY6WI-00001	EPA 200.2
pH Water (1)	7	N/A	2013/11/30	BBY6SOP-00026	SM-4500H+B
pH Water (1)	1	N/A	2013/12/03	BBY6SOP-00026	SM-4500H+B
CSR VH C6-C10 in Water by HS GC/MS	2	N/A	2013/12/02	BBY8SOP-00011	EPA 8260B
Sulphate by Automated Colourimetry	7	N/A	2013/11/29	BBY6SOP-00017	SM4500-SO42- E
Sulphate by Automated Colourimetry	1	N/A	2013/11/30	BBY6SOP-00017	SM4500-SO42- E
VOCs in Water by HS GC/MS	2	2013/12/01	2013/12/02	BBY8-SOP-0009	EPA 8260C
Volatile HC-BTEX	2	N/A	2013/12/03	BBY WI-00033	BC MOE Lab Method

* Results relate only to the items tested.

(1) The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.



Maxxam Job #: B3B0961
Report Date: 2014/01/07

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

-2-

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Crystal Ireland, B.Sc., Account Specialist
Email: Cireland@maxxam.ca
Phone# (604) 638-5016

=====
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 2

Maxxam Job #: B3B0961
Report Date: 2014/01/07

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		IF2762	IF2763	IF2764	IF2765	IF2766	IF2767	IF2768		IF2769		
Sampling Date		2013/11/28	2013/11/28	2013/11/27	2013/11/27	2013/11/27	2013/11/28	2013/11/28		2013/11/28		
COC#		42162203	42162203	42162203	42162203	42162203	42162203	42162203		42162203		
	UNITS	EBA11-4	EBA11-5	HBT94-2	HBT94-6	HBT94-4	AG99-06	HBT94-1	QC Batch	EBA11-3	RDL	QC Batch
ANIONS												
Nitrite (N)	mg/L	0.0505	0.0487	<0.0050	<0.0050	<0.0050	<0.0050	0.0064	7304360	0.0050	0.0050	7304360
Calculated Parameters												
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	ONSITE	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.082	0.085	<0.020	<0.020	0.051	0.053	0.085	7301810	0.036	0.020	7301810
Misc. Inorganics												
Fluoride (F)	mg/L	0.035	0.038	0.025	0.028	0.022	0.041	0.025	7305979	0.028	0.010	7305979
Dissolved Hardness (CaCO3)	mg/L	47.2	48.9	189	190	112	69.8	198	7301807		0.50	
Alkalinity (Total as CaCO3)	mg/L	45.5	45.5	200	201	111	65.1	215	7304142	49.8	0.50	7306041
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	1.97	<0.50	<0.50	<0.50	<0.50	7304142	<0.50	0.50	7306041
Bicarbonate (HCO3)	mg/L	55.6	55.5	239	245	136	79.4	262	7304142	60.8	0.50	7306041
Carbonate (CO3)	mg/L	<0.50	<0.50	2.36	<0.50	<0.50	<0.50	<0.50	7304142	<0.50	0.50	7306041
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	7304142	<0.50	0.50	7306041
Anions												
Dissolved Sulphate (SO4)	mg/L	1.59	1.57	3.38	3.85	3.30	1.88	6.05	7303712	3.86	0.50	7304313
Dissolved Chloride (Cl)	mg/L	4.0	4.5	14	14	1.3	4.8	20	7303709	4.5	0.50	7304312
Nutrients												
Ammonia (N)	mg/L	0.022	0.023	0.30	0.30	0.010	0.011	0.63	7305003	0.0091	0.0050	7305003
Nitrate plus Nitrite (N)	mg/L	0.133	0.134	<0.020	<0.020	0.051	0.053	0.091	7304359	0.041	0.020	7304359
Physical Properties												
Conductivity	uS/cm	106	107	411	410	222	145	466	7304151	119	1.0	7306043
pH	pH	7.85	7.93	8.32	8.28	8.17	7.83	8.23	7304152	7.92		7306042

N/A = Not Applicable

RDL = Reportable Detection Limit

Maxxam Job #: B3B0961
Report Date: 2014/01/07

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)

Maxxam ID		IF2762	IF2763	IF2764	IF2765	IF2766	IF2767	IF2768		IF2769		
Sampling Date		2013/11/28	2013/11/28	2013/11/27	2013/11/27	2013/11/27	2013/11/28	2013/11/28		2013/11/28		
COC#		42162203	42162203	42162203	42162203	42162203	42162203	42162203		42162203		
	UNITS	EBA11-4	EBA11-5	HBT94-2	HBT94-6	HBT94-4	AG99-06	HBT94-1	QC Batch	EBA11-3	RDL	QC Batch
Misc. Inorganics												
Dissolved Hardness (CaCO3)	mg/L									54.3	0.50	7301807
Elements												
Dissolved Mercury (Hg)	ug/L	<0.010 ₍₁₎	<0.010 ₍₁₎	<0.010 ₍₁₎	<0.010 ₍₁₎	<0.010 ₍₁₎	<0.010 ₍₁₎	<0.010 ₍₁₎	7343153	<0.010	0.010	7308740

RDL = Reportable Detection Limit

(1) - Sample analyzed past recommended hold time.

Maxxam Job #: B3B0961
Report Date: 2014/01/07

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)

Maxxam ID		IF2762	IF2763	IF2764	IF2765	IF2766	IF2767	IF2768		IF2769		
Sampling Date		2013/11/28	2013/11/28	2013/11/27	2013/11/27	2013/11/27	2013/11/28	2013/11/28		2013/11/28		
COC#		42162203	42162203	42162203	42162203	42162203	42162203	42162203		42162203		
	UNITS	EBA11-4	EBA11-5	HBT94-2	HBT94-6	HBT94-4	AG99-06	HBT94-1	QC Batch	EBA11-3	RDL	QC Batch
Dissolved Metals by ICPMS												
Dissolved Aluminum (Al)	mg/L	0.0210	0.0249	0.0062	0.0166	0.0130	0.0121	0.0127	7343458	0.0176	0.0030	7307686
Dissolved Antimony (Sb)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	7343458	<0.00050	0.00050	7307686
Dissolved Arsenic (As)	mg/L	0.00142	0.00138	0.00228	0.00224	0.00027	<0.00010	0.00025	7343458	0.00019	0.00010	7307686
Dissolved Barium (Ba)	mg/L	0.0017	0.0016	0.0079	0.0081	0.0016	<0.0010	0.0056	7343458	<0.0010	0.0010	7307686
Dissolved Beryllium (Be)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	7343458	<0.00010	0.00010	7307686
Dissolved Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	7343458	<0.0010	0.0010	7307686
Dissolved Boron (B)	mg/L	<0.050	<0.050	0.147	0.150	<0.050	<0.050	0.232	7343458	<0.050	0.050	7307686
Dissolved Cadmium (Cd)	mg/L	<0.000010	<0.000010	0.000025	0.000027	<0.000010	<0.000010	0.000154	7343458	<0.000010	0.000010	7307686
Dissolved Chromium (Cr)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	7343458	<0.0010	0.0010	7307686
Dissolved Cobalt (Co)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	7343458	<0.00050	0.00050	7307686
Dissolved Copper (Cu)	mg/L	<0.00020	<0.00020	0.00022	0.00025	0.00039	<0.00020	0.00306	7343458	0.00020	0.00020	7307686
Dissolved Iron (Fe)	mg/L	<0.0050	<0.0050	0.183	0.179	<0.0050	<0.0050	0.0068	7343458	<0.0050	0.0050	7307686
Dissolved Lead (Pb)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	7343458	<0.00020	0.00020	7307686
Dissolved Lithium (Li)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	7343458	<0.0050	0.0050	7307686
Dissolved Manganese (Mn)	mg/L	<0.0010	<0.0010	0.973	0.962	0.0018	<0.0010	0.567	7343458	<0.0010	0.0010	7307686
Dissolved Molybdenum (Mo)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	7343458	<0.0010	0.0010	7307686
Dissolved Nickel (Ni)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7343458	<0.0010	0.0010	7307686
Dissolved Selenium (Se)	mg/L	0.00017	0.00015	<0.00010	<0.00010	0.00016	0.00013	<0.00010	7343458	0.00018	0.00010	7307686
Dissolved Silicon (Si)	mg/L	5.44	5.37	7.52	7.65	4.20	4.43	6.63	7343458	4.57	0.10	7307686
Dissolved Silver (Ag)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	7343458	<0.000020	0.000020	7307686
Dissolved Strontium (Sr)	mg/L	0.0261	0.0270	0.142	0.138	0.0686	0.0515	0.162	7343458	0.0299	0.0010	7307686
Dissolved Thallium (Tl)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	7343458	<0.000050	0.000050	7307686
Dissolved Tin (Sn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	7343458	<0.0050	0.0050	7307686
Dissolved Titanium (Ti)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	7343458	<0.0050	0.0050	7307686
Dissolved Uranium (U)	mg/L	0.00016	0.00015	0.00011	0.00011	<0.00010	<0.00010	<0.00010	7343458	<0.00010	0.00010	7307686
Dissolved Vanadium (V)	mg/L	0.0139	0.0139	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	7343458	<0.0050	0.0050	7307686
Dissolved Zinc (Zn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	7343458	<0.0050	0.0050	7307686
Dissolved Zirconium (Zr)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	7343458	<0.00050	0.00050	7307686
Dissolved Calcium (Ca)	mg/L	14.7	14.9	64.0	65.0	40.3	22.0	67.3	7342662	17.2	0.050	7301809
Dissolved Magnesium (Mg)	mg/L	2.54	2.83	7.08	6.63	2.81	3.61	7.18	7342662	2.74	0.050	7301809
Dissolved Potassium (K)	mg/L	0.988	1.01	1.80	1.77	0.565	0.281	3.28	7342662	0.270	0.050	7301809
Dissolved Sodium (Na)	mg/L	2.21	2.35	13.4	12.6	1.97	1.98	21.8	7342662	1.29	0.050	7301809
Dissolved Sulphur (S)	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	7342662	<3.0	3.0	7301809

RDL = Reportable Detection Limit

Maxxam Job #: B3B0961
Report Date: 2014/01/07

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		IF2764	IF2767		
Sampling Date		2013/11/27	2013/11/28		
COC#		42162203	42162203		
	UNITS	HBT94-2	AG99-06	RDL	QC Batch
Volatiles					
VPH (VH6 to 10 - BTEX)	mg/L	<0.30	<0.30	0.30	7301894
Volatile Hydrocarbons					
VH C6-C10	mg/L	<0.30	<0.30	0.30	7304683
Volatiles					
Chloromethane	ug/L	<1.0	<1.0	1.0	7304652
Vinyl chloride	ug/L	<0.50	<0.50	0.50	7304652
Chloroethane	ug/L	<1.0	<1.0	1.0	7304652
Trichlorofluoromethane	ug/L	<4.0	<4.0	4.0	7304652
1,1-dichloroethene	ug/L	<0.50	<0.50	0.50	7304652
Dichloromethane	ug/L	<2.0	<2.0	2.0	7304652
trans-1,2-dichloroethene	ug/L	<1.0	<1.0	1.0	7304652
1,1-dichloroethane	ug/L	<0.50	<0.50	0.50	7304652
cis-1,2-dichloroethene	ug/L	<1.0	<1.0	1.0	7304652
Chloroform	ug/L	<1.0	<1.0	1.0	7304652
1,1,1-trichloroethane	ug/L	<0.50	<0.50	0.50	7304652
1,2-dichloroethane	ug/L	<0.50	<0.50	0.50	7304652
Carbon tetrachloride	ug/L	<0.50	<0.50	0.50	7304652
Benzene	ug/L	<0.40	<0.40	0.40	7304652
Methyl-tert-butylether (MTBE)	ug/L	<4.0	<4.0	4.0	7304652
1,2-dichloropropane	ug/L	<0.50	<0.50	0.50	7304652
cis-1,3-dichloropropene	ug/L	<1.0	<1.0	1.0	7304652
trans-1,3-dichloropropene	ug/L	<1.0	<1.0	1.0	7304652
Bromomethane	ug/L	<1.0	<1.0	1.0	7304652
1,1,2-trichloroethane	ug/L	<0.50	<0.50	0.50	7304652
Trichloroethene	ug/L	<0.50	<0.50	0.50	7304652
Chlorodibromomethane	ug/L	<1.0	<1.0	1.0	7304652
Tetrachloroethene	ug/L	<0.50	<0.50	0.50	7304652
Bromodichloromethane	ug/L	<1.0	<1.0	1.0	7304652
Toluene	ug/L	<0.40	<0.40	0.40	7304652
Ethylbenzene	ug/L	<0.40	<0.40	0.40	7304652
m & p-Xylene	ug/L	<0.40	<0.40	0.40	7304652
Bromoform	ug/L	<1.0	<1.0	1.0	7304652
Styrene	ug/L	<0.50	<0.50	0.50	7304652
o-Xylene	ug/L	<0.40	<0.40	0.40	7304652
Xylenes (Total)	ug/L	<0.40	<0.40	0.40	7304652

RDL = Reportable Detection Limit

Maxxam Job #: B3B0961
Report Date: 2014/01/07

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		IF2764	IF2767		
Sampling Date		2013/11/27	2013/11/28		
COC#		42162203	42162203		
	UNITS	HBT94-2	AG99-06	RDL	QC Batch
1,1,1,2-tetrachloroethane	ug/L	<0.50	<0.50	0.50	7304652
1,1,2,2-tetrachloroethane	ug/L	<0.50	<0.50	0.50	7304652
1,2-dichlorobenzene	ug/L	<0.50	<0.50	0.50	7304652
1,3-dichlorobenzene	ug/L	<0.50	<0.50	0.50	7304652
1,4-dichlorobenzene	ug/L	<0.50	<0.50	0.50	7304652
Chlorobenzene	ug/L	<0.50	<0.50	0.50	7304652
Dibromomethane	ug/L	<0.90	<0.90	0.90	7304652
Surrogate Recovery (%)					
1,4-Difluorobenzene (sur.)	%	102	101		7304652
4-BROMOFLUOROBENZENE (sur.)	%	89	88		7304652
D4-1,2-DICHLOROETHANE (sur.)	%	98	103		7304652

RDL = Reportable Detection Limit

Maxxam Job #: B3B0961
Report Date: 2014/01/07

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7303709	Dissolved Chloride (Cl)	2013/11/29	NC	80 - 120	106	80 - 120	<0.50	mg/L	0.6	20
7303712	Dissolved Sulphate (SO ₄)	2013/11/29	NC	80 - 120	103	80 - 120	<0.50	mg/L		
7304142	Alkalinity (Total as CaCO ₃)	2013/11/30	NC	80 - 120	101	80 - 120	<0.50	mg/L	9.4	20
7304142	Alkalinity (PP as CaCO ₃)	2013/11/30					<0.50	mg/L	NC	20
7304142	Bicarbonate (HCO ₃)	2013/11/30					<0.50	mg/L	9.4	20
7304142	Carbonate (CO ₃)	2013/11/30					<0.50	mg/L	NC	20
7304142	Hydroxide (OH)	2013/11/30					<0.50	mg/L	NC	20
7304151	Conductivity	2013/11/30			100	80 - 120	<1.0	uS/cm	9.1	20
7304312	Dissolved Chloride (Cl)	2013/11/30	NC	80 - 120	107	80 - 120	<0.50	mg/L	2.5	20
7304313	Dissolved Sulphate (SO ₄)	2013/11/30	NC	80 - 120	107	80 - 120	0.55, RDL=0.50	mg/L	7.0	20
7304359	Nitrate plus Nitrite (N)	2013/11/30	108	80 - 120	105	80 - 120	<0.020	mg/L	NC	25
7304360	Nitrite (N)	2013/11/30	104	80 - 120	99	80 - 120	<0.0050	mg/L	NC	20
7304652	1,4-Difluorobenzene (sur.)	2013/12/02	100	70 - 130	101	70 - 130	102	%		
7304652	4-BROMOFLUOROBENZENE (sur.)	2013/12/02	96	70 - 130	98	70 - 130	83	%		
7304652	D4-1,2-DICHLOROETHANE (sur.)	2013/12/02	97	70 - 130	97	70 - 130	93	%		
7304652	Chloromethane	2013/12/02	137	60 - 140	132	60 - 140	<1.0	ug/L	NC	30
7304652	Vinyl chloride	2013/12/02	113	60 - 140	110	60 - 140	<0.50	ug/L	NC	30
7304652	Chloroethane	2013/12/02	82	60 - 140	78	60 - 140	<1.0	ug/L	NC	30
7304652	Trichlorofluoromethane	2013/12/02	131	60 - 140	126	60 - 140	<4.0	ug/L	NC	30
7304652	1,1-dichloroethene	2013/12/02	108	70 - 130	106	70 - 130	<0.50	ug/L	NC	30
7304652	Dichloromethane	2013/12/02	95	70 - 130	92	70 - 130	<2.0	ug/L	NC	30
7304652	trans-1,2-dichloroethene	2013/12/02	100	70 - 130	98	70 - 130	<1.0	ug/L	NC	30
7304652	1,1-dichloroethane	2013/12/02	92	70 - 130	89	70 - 130	<0.50	ug/L	NC	30
7304652	cis-1,2-dichloroethene	2013/12/02	98	70 - 130	96	70 - 130	<1.0	ug/L	NC	30
7304652	Chloroform	2013/12/02	96	70 - 130	94	70 - 130	<1.0	ug/L	NC	30
7304652	1,1,1-trichloroethane	2013/12/02	97	70 - 130	96	70 - 130	<0.50	ug/L	NC	30
7304652	1,2-dichloroethane	2013/12/02	97	70 - 130	94	70 - 130	<0.50	ug/L	NC	30
7304652	Carbon tetrachloride	2013/12/02	99	70 - 130	96	70 - 130	<0.50	ug/L	NC	30
7304652	Benzene	2013/12/02	95	70 - 130	96	70 - 130	<0.40	ug/L	NC	30
7304652	Methyl-tert-butylether(MTBE)	2013/12/02	92	70 - 130	90	70 - 130	<4.0	ug/L	NC	30
7304652	1,2-dichloropropane	2013/12/02	99	70 - 130	96	70 - 130	<0.50	ug/L	NC	30
7304652	cis-1,3-dichloropropene	2013/12/02	87	70 - 130	85	70 - 130	<1.0	ug/L	NC	30
7304652	trans-1,3-dichloropropene	2013/12/02	90	70 - 130	88	70 - 130	<1.0	ug/L	NC	30
7304652	Bromomethane	2013/12/02	15 ⁽¹⁾	60 - 140	83	60 - 140	<1.0	ug/L	NC	30
7304652	1,1,2-trichloroethane	2013/12/02	100	70 - 130	97	70 - 130	<0.50	ug/L	NC	30
7304652	Trichloroethene	2013/12/02	97	70 - 130	96	70 - 130	<0.50	ug/L	NC	30
7304652	Chlorodibromomethane	2013/12/02	92	70 - 130	91	70 - 130	<1.0	ug/L	NC	30
7304652	Tetrachloroethene	2013/12/02	95	70 - 130	95	70 - 130	<0.50	ug/L	NC	30
7304652	Bromodichloromethane	2013/12/02	95	70 - 130	93	70 - 130	<1.0	ug/L	NC	30
7304652	Toluene	2013/12/02	85	70 - 130	86	70 - 130	<0.40	ug/L	NC	30

Maxxam Job #: B3B0961
Report Date: 2014/01/07

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7304652	Ethylbenzene	2013/12/02	79	70 - 130	80	70 - 130	<0.40	ug/L	NC	30
7304652	m & p-Xylene	2013/12/02	89	70 - 130	89	70 - 130	<0.40	ug/L	NC	30
7304652	Bromoform	2013/12/02	95	70 - 130	93	70 - 130	<1.0	ug/L	NC	30
7304652	Styrene	2013/12/02	76	70 - 130	77	70 - 130	<0.50	ug/L	NC	30
7304652	o-Xylene	2013/12/02	75	70 - 130	76	70 - 130	<0.40	ug/L	NC	30
7304652	1,1,1,2-tetrachloroethane	2013/12/02	97	70 - 130	95	70 - 130	<0.50	ug/L	NC	30
7304652	1,1,2,2-tetrachloroethane	2013/12/02	102	70 - 130	96	70 - 130	<0.50	ug/L	NC	30
7304652	1,2-dichlorobenzene	2013/12/02	104	70 - 130	103	70 - 130	<0.50	ug/L	NC	30
7304652	1,3-dichlorobenzene	2013/12/02	105	70 - 130	105	70 - 130	<0.50	ug/L	NC	30
7304652	1,4-dichlorobenzene	2013/12/02	99	70 - 130	97	70 - 130	<0.50	ug/L	NC	30
7304652	Chlorobenzene	2013/12/02	90	70 - 130	90	70 - 130	<0.50	ug/L	NC	30
7304652	Dibromomethane	2013/12/02	96	70 - 130	92	70 - 130	<0.90	ug/L		
7304652	Xylenes (Total)	2013/12/02					<0.40	ug/L	NC	30
7304683	VH C6-C10	2013/12/02			93	70 - 130	<0.30	mg/L	NC	40
7305003	Ammonia (N)	2013/12/02	NC	80 - 120	99	80 - 120	<0.0050	mg/L	5.2	20
7305979	Fluoride (F)	2013/12/02	92	80 - 120	92	80 - 120	0.019, RDL=0.010	mg/L	NC	20
7306041	Alkalinity (Total as CaCO3)	2013/12/02	NC	80 - 120	98	80 - 120	<0.50	mg/L	0.07	20
7306041	Alkalinity (PP as CaCO3)	2013/12/02					<0.50	mg/L	NC	20
7306041	Bicarbonate (HCO3)	2013/12/02					<0.50	mg/L	0.08	20
7306041	Carbonate (CO3)	2013/12/02					<0.50	mg/L	NC	20
7306041	Hydroxide (OH)	2013/12/02					<0.50	mg/L	NC	20
7306043	Conductivity	2013/12/02			101	80 - 120	1.0, RDL=1.0	uS/cm	0.5	20
7307686	Dissolved Aluminum (Al)	2013/12/04	100	80 - 120	101	80 - 120	<0.0030	mg/L		
7307686	Dissolved Antimony (Sb)	2013/12/04	99	80 - 120	105	80 - 120	<0.00050	mg/L		
7307686	Dissolved Arsenic (As)	2013/12/04	101	80 - 120	99	80 - 120	<0.00010	mg/L		
7307686	Dissolved Barium (Ba)	2013/12/04	95	80 - 120	94	80 - 120	<0.0010	mg/L		
7307686	Dissolved Beryllium (Be)	2013/12/04	98	80 - 120	99	80 - 120	<0.00010	mg/L		
7307686	Dissolved Bismuth (Bi)	2013/12/04	99	80 - 120	101	80 - 120	<0.0010	mg/L		
7307686	Dissolved Cadmium (Cd)	2013/12/04	103	80 - 120	103	80 - 120	<0.000010	mg/L		
7307686	Dissolved Chromium (Cr)	2013/12/04	102	80 - 120	98	80 - 120	<0.0010	mg/L		
7307686	Dissolved Cobalt (Co)	2013/12/04	100	80 - 120	98	80 - 120	<0.00050	mg/L		
7307686	Dissolved Copper (Cu)	2013/12/04	100	80 - 120	99	80 - 120	<0.00020	mg/L		
7307686	Dissolved Iron (Fe)	2013/12/04	106	80 - 120	108	80 - 120	<0.0050	mg/L		
7307686	Dissolved Lead (Pb)	2013/12/04	98	80 - 120	100	80 - 120	<0.00020	mg/L		
7307686	Dissolved Lithium (Li)	2013/12/04	93	80 - 120	97	80 - 120	<0.0050	mg/L		
7307686	Dissolved Manganese (Mn)	2013/12/04	101	80 - 120	97	80 - 120	<0.0010	mg/L		
7307686	Dissolved Molybdenum (Mo)	2013/12/04	100	80 - 120	103	80 - 120	<0.0010	mg/L		
7307686	Dissolved Nickel (Ni)	2013/12/04	100	80 - 120	99	80 - 120	<0.0010	mg/L		
7307686	Dissolved Selenium (Se)	2013/12/04	101	80 - 120	102	80 - 120	<0.00010	mg/L		
7307686	Dissolved Silver (Ag)	2013/12/04	103	80 - 120	97	80 - 120	<0.000020	mg/L		

Maxxam Job #: B3B0961
Report Date: 2014/01/07

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7307686	Dissolved Strontium (Sr)	2013/12/04	96	80 - 120	97	80 - 120	<0.0010	mg/L		
7307686	Dissolved Thallium (Tl)	2013/12/04	98	80 - 120	103	80 - 120	<0.000050	mg/L		
7307686	Dissolved Tin (Sn)	2013/12/04	99	80 - 120	101	80 - 120	<0.0050	mg/L		
7307686	Dissolved Titanium (Ti)	2013/12/04	95	80 - 120	97	80 - 120	<0.0050	mg/L		
7307686	Dissolved Uranium (U)	2013/12/04	96	80 - 120	98	80 - 120	<0.00010	mg/L		
7307686	Dissolved Vanadium (V)	2013/12/04	100	80 - 120	96	80 - 120	<0.0050	mg/L		
7307686	Dissolved Zinc (Zn)	2013/12/04	107	80 - 120	101	80 - 120	<0.0050	mg/L		
7307686	Dissolved Boron (B)	2013/12/04					<0.050	mg/L		
7307686	Dissolved Silicon (Si)	2013/12/04					<0.10	mg/L		
7307686	Dissolved Zirconium (Zr)	2013/12/04					<0.00050	mg/L		
7308740	Dissolved Mercury (Hg)	2013/12/05	91	80 - 120	97	80 - 120	<0.010	ug/L	NC	20
7343153	Dissolved Mercury (Hg)	2014/01/07	101	80 - 120	101	80 - 120	<0.010	ug/L	NC	20
7343458	Dissolved Aluminum (Al)	2013/12/04			105	80 - 120	<0.0030	mg/L		
7343458	Dissolved Antimony (Sb)	2013/12/04			99	80 - 120	<0.00050	mg/L		
7343458	Dissolved Arsenic (As)	2013/12/04			97	80 - 120	<0.00010	mg/L		
7343458	Dissolved Barium (Ba)	2013/12/04			97	80 - 120	<0.0010	mg/L		
7343458	Dissolved Beryllium (Be)	2013/12/04			94	80 - 120	<0.00010	mg/L		
7343458	Dissolved Bismuth (Bi)	2013/12/04			101	80 - 120	<0.0010	mg/L		
7343458	Dissolved Cadmium (Cd)	2013/12/04			98	80 - 120	<0.000010	mg/L		
7343458	Dissolved Chromium (Cr)	2013/12/04			99	80 - 120	<0.0010	mg/L		
7343458	Dissolved Cobalt (Co)	2013/12/04			99	80 - 120	<0.00050	mg/L		
7343458	Dissolved Copper (Cu)	2013/12/04			98	80 - 120	<0.00020	mg/L		
7343458	Dissolved Iron (Fe)	2013/12/04			116	80 - 120	<0.0050	mg/L		
7343458	Dissolved Lead (Pb)	2013/12/04			100	80 - 120	<0.00020	mg/L		
7343458	Dissolved Lithium (Li)	2013/12/04			99	80 - 120	<0.0050	mg/L		
7343458	Dissolved Manganese (Mn)	2013/12/04			102	80 - 120	<0.0010	mg/L		
7343458	Dissolved Molybdenum (Mo)	2013/12/04			104	80 - 120	<0.0010	mg/L		
7343458	Dissolved Nickel (Ni)	2013/12/04			100	80 - 120	<0.0010	mg/L		
7343458	Dissolved Selenium (Se)	2013/12/04			98	80 - 120	<0.00010	mg/L		
7343458	Dissolved Silver (Ag)	2013/12/04			102	80 - 120	<0.000020	mg/L		
7343458	Dissolved Strontium (Sr)	2013/12/04			104	80 - 120	<0.0010	mg/L		
7343458	Dissolved Thallium (Tl)	2013/12/04			102	80 - 120	<0.000050	mg/L		
7343458	Dissolved Tin (Sn)	2013/12/04			94	80 - 120	<0.0050	mg/L		
7343458	Dissolved Titanium (Ti)	2013/12/04			100	80 - 120	<0.0050	mg/L		
7343458	Dissolved Uranium (U)	2013/12/04			96	80 - 120	<0.00010	mg/L		
7343458	Dissolved Vanadium (V)	2013/12/04			97	80 - 120	<0.0050	mg/L		
7343458	Dissolved Zinc (Zn)	2013/12/04			100	80 - 120	<0.0050	mg/L		
7343458	Dissolved Boron (B)	2013/12/04					<0.050	mg/L		

Maxxam Job #: B3B0961
Report Date: 2014/01/07

EBA Engineering Consultants Ltd.
Client Project #: CVWMC - N23103074-01

Sampler Initials: DT

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7343458	Dissolved Silicon (Si)	2013/12/04					<0.10	mg/L		
7343458	Dissolved Zirconium (Zr)	2013/12/04					<0.00050	mg/L		

N/A = Not Applicable

RDL = Reportable Detection Limit

RPD = Relative Percent Difference

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.

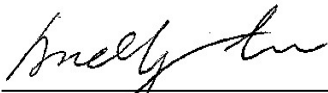
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

(1) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Validation Signature Page

Maxxam Job #: B3B0961

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Andy Lu, Data Validation Coordinator

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

INVOICE INFORMATION:		Report Information		Project Information		Laboratory Use Only						
Company Name: #5908 EBA Engineering Consultants Ltd.	Company Name: #18501 EBA Engineering Consultants Ltd.	Quotation #: B10555	Maximum Job #: B3B 0961	Bottle Order #: 421622								
Contact Name: Accounts Payable	Contact Name: Kristy Gabelhouse	P.O. #: CVWMC - N23103074-01	Chain Of Custody Record		Project Manager							
Address: #1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Address: #1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Project Name: CVWMC	Crystal Island									
Phone: (250) 756-2255 Fax: (250) 756-2688	Phone: (250) 756-2255 Fax: (250) 756-2688	Site #: D. Thomas	CMA 1622-03-01									
Email: dromano@eba.ca, lpaul@eba.ca	Email: kgabelhouse@eba.ca, sakbar@maxxam.ca	Sampled By:										
Regulatory Criteria:	Special Instructions:	ANALYSIS REQUESTED (Please be specific):				Turnaround Time (TAT) Required:						
☒ CSR ☐ CCME ☐ BC Water Quality ☐ Other:		AMMONIA-N ANION (CL, F, NO2, NO3, SO4) pH / Conductivity / Alkalinity CSR Dissolved Metals in Water with CV Hg + Selenium CSR Total Metals in Water with CV Hg CSR VOC + VPH				Please provide advance notice for rush projects Regular (Standard) TAT: (Not applicable if Rush TAT is not assigned) Standard TAT = 5 Working days for most tests Please note: Standard TAT for certain tests such as BOD and Dissolved Metals are + 5 days - contact your Project Manager for details. Job Specific Rush TAT (if applies to entire submission): 1 DAY: ☐ 2 Day: ☐ 3 Day: ☐ Rush Required: ☐ Rush Confirmation Number:						
SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM												
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Filtered 7 (Y/N)	ANION (CL, F, NO2, NO3, SO4)	pH / Conductivity / Alkalinity	CSR Dissolved Metals in Water with CV Hg + Selenium	CSR Total Metals in Water with CV Hg	CSR VOC + VPH	# of Bottles	Comments
1 IF2762	EBA11-4	Nov 28		Gravel bed	Y	X	X	X	X		5	
2 IF2763	EBA11-5	Nov 28			Y	X	X	X	X		5	
3 IF2764	HBT94-2	Nov 27			Y	X	X	X	X	X	8	
4 IF2765	HBT94-6	Nov 27			Y	X	X	X	X		5	
5 IF2766	HBT94-4	Nov 27			Y	X	X	X	X		5	
6 IF2767	AG99-05	Nov 28			Y	X	X	X	X	X	8	
7 IF2768	HBT94-1	Nov 28			Y	X	X	X	X		5	
8	EBA11-2	Nov 28			Y	X	X	X	X		5	
9												
10												
* RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	# Jars used and not submitted	Lab Use Only			
Dawn Thomas		13/11/28	16:30	Michelle Berthier		2013/11/28	07:50		Time Sensitive	Temperature (°C) on Receipt	Customs Contact on Order?	
									☐	24.4	☒ Yes ☐ No	



Maxxam Analytica International Corporation c/o Maxxam Analytica
4606 Canada Way, Burnaby, British Columbia Canada V5G 1K5 Tel (804) 734 7276 Toll-Free 800-563-8266 Fax (504) 731 2386 www.maxxam.ca

B3B0961

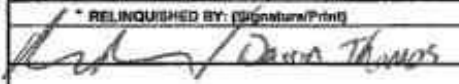
Chain Of Custody Record

INVOICE INFORMATION:		Report Information		Project Information		Laboratory	
Company Name	#5908 EBA Engineering Consultants Ltd.	Company Name	#18501 EBA Engineering Consultants Ltd.	Quotation #	B10655	Maxxam Job #	
Contact Name	Accounts Payable	Contact Name	Kristy Gabelhouse	P.O. #			
Address	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Address	#1 - 4376 Boban Drive Nanaimo BC V9T6A7	Project #	CVWMC - N23103074-01		
Phone	(250) 756-2256 Fax (250) 756-2686	Phone	(250) 756-2256 Fax	Project Name	CVWMC	Chain Of Custody Record	
Email	dromano@eba.ca, lpaul@eba.ca	Email	kgabelhouse@eba.ca, sakbar@maxxam.ca	Site #			
				Sampled By	J. Thomas	C#421622-03-01	

Regulatory Criteria		Special Instructions		ANALYSIS REQUESTED (Please be specific):										Turnaround Time		
☒ CSR ☐ CCME ☐ BC Water Quality ☐ Other														Please provide advance		
SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered (Y/N)	AMMONIA-N	ANION (CL, F, NO2, NO3, SO4)	pH / Conductivity / Alkalinity	CSR Dissolved Metals in Water with CV Hg + Sulphur	CSR Total Metals in Water with CV Hg	CSR VOC + VPH					# of Bottles
1	EBA11-4	Nov 28		Gravel water	Y	X	X	X	X							5
2	EBA11-5	Nov 28			Y	X	X	X	X							5
3	HBT94-2 SW1	Nov 27			Y	X	X	X	X		X					8
4	HBT94-6 SW2	Nov 27			Y	X	X	X	X							5
5	HBT94-4 SW3	Nov 27			Y	X	X	X	X							5
6	AG99-06	Nov 28			Y	X	X	X	X		X					8
7	HBT94-1	Nov 28			Y	X	X	X	X							
8	EBA11-3	Nov 28			Y	X	X	X	X							
9																
10	SWater															



B3B0961

* RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	# jars used and not submitted	Time Sensitive	Lab Use C
		13/11/28	16:30						☐	Temperature (°C) on Rec

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

Your Project #: N23103074-01 CAMPBELL RIVER CV
Your C.O.C. #: G072520

Attention: KRISTY GABELHOUSE

EBA Engineering Consultants Ltd.
NANAIMO
#1 - 4376 Boban Drive
Nanaimo, BC
CANADA V9T 6A7

Report Date: 2013/11/06

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B3A1284

Received: 2013/11/01, 08:00

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	1	2013/11/01	2013/11/02	BBY6SOP-00026	SM2320B
Chloride by Automated Colourimetry	1	N/A	2013/11/01	BBY6SOP-00011	SM-4500-CI-
Conductance - water	1	N/A	2013/11/02	BBY6SOP-00026	SM-2510B
Fluoride	1	N/A	2013/11/04	BBY6SOP-00012	SM - 4500 F C
Hardness (calculated as CaCO ₃)	1	N/A	2013/11/05	BBY7SOP-00002	EPA 6020A
Mercury (Dissolved) by CVA	1	N/A	2013/11/06	BBY7SOP-00015	EPA 245.7
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	1	N/A	2013/11/05	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (dissolved)	1	N/A	2013/11/04	BBY7SOP-00002	EPA 6020A
Ammonia-N (Preserved)	1	N/A	2013/11/04	BBY6SOP-00009	SM-4500NH3G
Nitrate + Nitrite (N)	1	N/A	2013/11/01	BBY6SOP-00010	SM 4500NO3-I
Nitrite (N) by CFA	1	N/A	2013/11/01	BBY6SOP-00010	EPA 353.2
Nitrogen - Nitrate (as N)	1	N/A	2013/11/01	BBY6SOP-00010	SM 4500NO3-I
Filter and HNO ₃ Preserve for Metals	1	N/A	2013/11/01	BBY6WI-00001	EPA 200.2
pH Water (l)	1	N/A	2013/11/02	BBY6SOP-00026	SM-4500H+B
CSR VH C6-C10 in Water by HS GC/MS	1	N/A	2013/11/05	BBY8SOP-00011	EPA 8260B
Sulphate by Automated Colourimetry	1	N/A	2013/11/01	BBY6SOP-00017	SM4500-SO42- E
VOCs in Water by HS GC/MS	1	2013/11/04	2013/11/05	BBY8-SOP-0009	EPA 8260C
Volatile HC-BTEX	1	N/A	2013/11/05	BBY WI-00033	BC MOE Lab Method

* Results relate only to the items tested.

(1) The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Crystal Ireland, B.Sc., Account Specialist
Email: C Ireland@maxxam.ca
Phone# (604) 638-5016

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 1

Maxxam Job #: B3A1284
Report Date: 2013/11/06

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01 CAMPBELL RIVER CV

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		HZ4938		
Sampling Date		2013/10/29		
COC#		G072520		
	UNITS	AM02-01	RDL	QC Batch
ANIONS				
Nitrite (N)	mg/L	<0.0050	0.0050	7259423
Calculated Parameters				
Filter and HNO3 Preservation	N/A	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.101	0.020	7258903
Misc. Inorganics				
Fluoride (F)	mg/L	0.019	0.010	7262056
Alkalinity (Total as CaCO3)	mg/L	52.5	0.50	7259869
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	7259869
Bicarbonate (HCO3)	mg/L	64.1	0.50	7259869
Carbonate (CO3)	mg/L	<0.50	0.50	7259869
Hydroxide (OH)	mg/L	<0.50	0.50	7259869
Anions				
Dissolved Sulphate (SO4)	mg/L	2.91	0.50	7259792
Dissolved Chloride (Cl)	mg/L	2.0	0.50	7259787
Nutrients				
Ammonia (N)	mg/L	0.0055	0.0050	7262449
Nitrate plus Nitrite (N)	mg/L	0.101	0.020	7259038
Physical Properties				
Conductivity	uS/cm	116	1.0	7259878
pH	pH Units	7.82		7259877

N/A = Not Applicable

RDL = Reportable Detection Limit

Maxxam Job #: B3A1284
Report Date: 2013/11/06

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01 CAMPBELL RIVER CV

CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)

Maxxam ID		HZ4938		
Sampling Date		2013/10/29		
COC#		G072520		
	UNITS	AM02-01	RDL	QC Batch
Misc. Inorganics				
Dissolved Hardness (CaCO ₃)	mg/L	45.2	0.50	7258558
Elements				
Dissolved Mercury (Hg)	ug/L	<0.010	0.010	7263644

RDL = Reportable Detection Limit

Maxxam Job #: B3A1284
Report Date: 2013/11/06

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01 CAMPBELL RIVER CV

CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)

Maxxam ID		HZ4938		
Sampling Date		2013/10/29		
COC#		G072520		
	UNITS	AM02-01	RDL	QC Batch
Dissolved Metals by ICPMS				
Dissolved Aluminum (Al)	mg/L	<0.0030	0.0030	7261986
Dissolved Antimony (Sb)	mg/L	<0.00050	0.00050	7261986
Dissolved Arsenic (As)	mg/L	<0.00010	0.00010	7261986
Dissolved Barium (Ba)	mg/L	<0.0010	0.0010	7261986
Dissolved Beryllium (Be)	mg/L	<0.00010	0.00010	7261986
Dissolved Bismuth (Bi)	mg/L	<0.0010	0.0010	7261986
Dissolved Boron (B)	mg/L	<0.050	0.050	7261986
Dissolved Cadmium (Cd)	mg/L	<0.000010	0.000010	7261986
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0010	7261986
Dissolved Cobalt (Co)	mg/L	<0.00050	0.00050	7261986
Dissolved Copper (Cu)	mg/L	0.00062	0.00020	7261986
Dissolved Iron (Fe)	mg/L	<0.0050	0.0050	7261986
Dissolved Lead (Pb)	mg/L	<0.00020	0.00020	7261986
Dissolved Lithium (Li)	mg/L	<0.0050	0.0050	7261986
Dissolved Manganese (Mn)	mg/L	<0.0010	0.0010	7261986
Dissolved Molybdenum (Mo)	mg/L	<0.0010	0.0010	7261986
Dissolved Nickel (Ni)	mg/L	<0.0010	0.0010	7261986
Dissolved Selenium (Se)	mg/L	0.00028	0.00010	7261986
Dissolved Silicon (Si)	mg/L	6.12	0.10	7261986
Dissolved Silver (Ag)	mg/L	<0.000020	0.000020	7261986
Dissolved Strontium (Sr)	mg/L	0.0287	0.0010	7261986
Dissolved Thallium (Tl)	mg/L	<0.000050	0.000050	7261986
Dissolved Tin (Sn)	mg/L	<0.0050	0.0050	7261986
Dissolved Titanium (Ti)	mg/L	<0.0050	0.0050	7261986
Dissolved Uranium (U)	mg/L	<0.00010	0.00010	7261986
Dissolved Vanadium (V)	mg/L	<0.0050	0.0050	7261986
Dissolved Zinc (Zn)	mg/L	<0.0050	0.0050	7261986
Dissolved Zirconium (Zr)	mg/L	<0.00050	0.00050	7261986
Dissolved Calcium (Ca)	mg/L	14.9	0.050	7258559
Dissolved Magnesium (Mg)	mg/L	1.93	0.050	7258559
Dissolved Potassium (K)	mg/L	0.251	0.050	7258559
Dissolved Sodium (Na)	mg/L	6.37	0.050	7258559
Dissolved Sulphur (S)	mg/L	<3.0	3.0	7258559

RDL = Reportable Detection Limit

Maxxam Job #: B3A1284
Report Date: 2013/11/06

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01 CAMPBELL RIVER CV

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		HZ4938		
Sampling Date		2013/10/29		
COC#		G072520		
	UNITS	AM02-01	RDL	QC Batch
Volatiles				
VPH (VH6 to 10 - BTEX)	mg/L	<0.30	0.30	7259049
Volatile Hydrocarbons				
VH C6-C10	mg/L	<0.30	0.30	7261795
Volatiles				
Chloromethane	ug/L	<1.0	1.0	7261536
Vinyl chloride	ug/L	<0.50	0.50	7261536
Chloroethane	ug/L	<1.0	1.0	7261536
Trichlorofluoromethane	ug/L	<4.0	4.0	7261536
1,1-dichloroethene	ug/L	<0.50	0.50	7261536
Dichloromethane	ug/L	<2.0	2.0	7261536
trans-1,2-dichloroethene	ug/L	<1.0	1.0	7261536
1,1-dichloroethane	ug/L	<0.50	0.50	7261536
cis-1,2-dichloroethene	ug/L	<1.0	1.0	7261536
Chloroform	ug/L	<1.0	1.0	7261536
1,1,1-trichloroethane	ug/L	<0.50	0.50	7261536
1,2-dichloroethane	ug/L	<0.50	0.50	7261536
Carbon tetrachloride	ug/L	<0.50	0.50	7261536
Benzene	ug/L	<0.40	0.40	7261536
Methyl-tert-butylether (MTBE)	ug/L	<4.0	4.0	7261536
1,2-dichloropropane	ug/L	<0.50	0.50	7261536
cis-1,3-dichloropropene	ug/L	<1.0	1.0	7261536
trans-1,3-dichloropropene	ug/L	<1.0	1.0	7261536
Bromomethane	ug/L	<1.0	1.0	7261536
1,1,2-trichloroethane	ug/L	<0.50	0.50	7261536
Trichloroethene	ug/L	<0.50	0.50	7261536
Chlorodibromomethane	ug/L	<1.0	1.0	7261536
Tetrachloroethene	ug/L	<0.50	0.50	7261536
Bromodichloromethane	ug/L	<1.0	1.0	7261536
Toluene	ug/L	<0.40	0.40	7261536
Ethylbenzene	ug/L	<0.40	0.40	7261536
m & p-Xylene	ug/L	<0.40	0.40	7261536
Bromoform	ug/L	<1.0	1.0	7261536
Styrene	ug/L	<0.50	0.50	7261536
o-Xylene	ug/L	<0.40	0.40	7261536
Xylenes (Total)	ug/L	<0.40	0.40	7261536

RDL = Reportable Detection Limit

Maxxam Job #: B3A1284
Report Date: 2013/11/06

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01 CAMPBELL RIVER CV

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		HZ4938		
Sampling Date		2013/10/29		
COC#		G072520		
	UNITS	AM02-01	RDL	QC Batch
1,1,1,2-tetrachloroethane	ug/L	<0.50	0.50	7261536
1,1,2,2-tetrachloroethane	ug/L	<0.50	0.50	7261536
1,2-dichlorobenzene	ug/L	<0.50	0.50	7261536
1,3-dichlorobenzene	ug/L	<0.50	0.50	7261536
1,4-dichlorobenzene	ug/L	<0.50	0.50	7261536
Chlorobenzene	ug/L	<0.50	0.50	7261536
Dibromomethane	ug/L	<0.90	0.90	7261536
Surrogate Recovery (%)				
1,4-Difluorobenzene (sur.)	%	103		7261536
4-BROMOFLUOROBENZENE (sur.)	%	103		7261536
D4-1,2-DICHLOROETHANE (sur.)	%	99		7261536

RDL = Reportable Detection Limit

Maxxam Job #: B3A1284
Report Date: 2013/11/06

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01 CAMPBELL RIVER CV

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7259038	Nitrate plus Nitrite (N)	2013/11/01	NC	80 - 120	102	80 - 120	<0.020	mg/L	0.2	25
7259423	Nitrite (N)	2013/11/01	103	80 - 120	99	80 - 120	<0.0050	mg/L	0.9	20
7259787	Dissolved Chloride (Cl)	2013/11/01	103	80 - 120	100	80 - 120	<0.50	mg/L	3.6	20
7259792	Dissolved Sulphate (SO4)	2013/11/01	NC	80 - 120	97	80 - 120	<0.50	mg/L	NC	20
7259869	Alkalinity (Total as CaCO3)	2013/11/02	NC	80 - 120	97	80 - 120	<0.50	mg/L	11.6	20
7259869	Alkalinity (PP as CaCO3)	2013/11/02					<0.50	mg/L	NC	20
7259869	Bicarbonate (HCO3)	2013/11/02					<0.50	mg/L	11.6	20
7259869	Carbonate (CO3)	2013/11/02					<0.50	mg/L	NC	20
7259869	Hydroxide (OH)	2013/11/02					<0.50	mg/L	NC	20
7259878	Conductivity	2013/11/02			99	80 - 120	<1.0	uS/cm	0.3	20
7261536	1,4-Difluorobenzene(sur.)	2013/11/05	99	70 - 130	101	70 - 130	101	%		
7261536	4-BROMOFLUOROBENZENE (sur.)	2013/11/05	98	70 - 130	99	70 - 130	95	%		
7261536	D4-1,2-DICHLOROETHANE (sur.)	2013/11/05	92	70 - 130	95	70 - 130	91	%		
7261536	Chloromethane	2013/11/05	130	60 - 140	106	60 - 140	<1.0	ug/L	NC	30
7261536	Vinyl chloride	2013/11/05	110	60 - 140	108	60 - 140	<0.50	ug/L	NC	30
7261536	Chloroethane	2013/11/05	107	60 - 140	107	60 - 140	<1.0	ug/L	NC	30
7261536	Trichlorofluoromethane	2013/11/05	123	60 - 140	118	60 - 140	<4.0	ug/L	NC	30
7261536	1,1-dichloroethene	2013/11/05	103	70 - 130	100	70 - 130	<0.50	ug/L	NC	30
7261536	Dichloromethane	2013/11/05	92	70 - 130	95	70 - 130	<2.0	ug/L	NC	30
7261536	trans-1,2-dichloroethene	2013/11/05	96	70 - 130	93	70 - 130	<1.0	ug/L	NC	30
7261536	1,1-dichloroethane	2013/11/05	93	70 - 130	92	70 - 130	<0.50	ug/L	NC	30
7261536	cis-1,2-dichloroethene	2013/11/05	92	70 - 130	96	70 - 130	<1.0	ug/L	NC	30
7261536	Chloroform	2013/11/05	NC	70 - 130	94	70 - 130	<1.0	ug/L	1.9	30
7261536	1,1,1-trichloroethane	2013/11/05	94	70 - 130	92	70 - 130	<0.50	ug/L	NC	30
7261536	1,2-dichloroethane	2013/11/05	95	70 - 130	98	70 - 130	<0.50	ug/L	NC	30
7261536	Carbon tetrachloride	2013/11/05	96	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
7261536	Benzene	2013/11/05	92	70 - 130	92	70 - 130	<0.40	ug/L	NC	30
7261536	Methyl-tert-butylether(MTBE)	2013/11/05	96	70 - 130	98	70 - 130	<4.0	ug/L	NC	30
7261536	1,2-dichloropropane	2013/11/05	96	70 - 130	95	70 - 130	<0.50	ug/L	NC	30
7261536	cis-1,3-dichloropropene	2013/11/05	78	70 - 130	82	70 - 130	<1.0	ug/L	NC	30
7261536	trans-1,3-dichloropropene	2013/11/05	74	70 - 130	81	70 - 130	<1.0	ug/L	NC	30
7261536	Bromomethane	2013/11/05	106	60 - 140	110	60 - 140	<1.0	ug/L	NC	30
7261536	1,1,2-trichloroethane	2013/11/05	92	70 - 130	94	70 - 130	<0.50	ug/L	NC	30
7261536	Trichloroethene	2013/11/05	95	70 - 130	94	70 - 130	<0.50	ug/L	NC	30
7261536	Chlorodibromomethane	2013/11/05	94	70 - 130	96	70 - 130	<1.0	ug/L	NC	30
7261536	Tetrachloroethene	2013/11/05	96	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
7261536	Bromodichloromethane	2013/11/05	95	70 - 130	96	70 - 130	<1.0	ug/L	NC	30
7261536	Toluene	2013/11/05	93	70 - 130	92	70 - 130	<0.40	ug/L	NC	30
7261536	Ethylbenzene	2013/11/05	94	70 - 130	92	70 - 130	<0.40	ug/L	NC	30
7261536	m & p-Xylene	2013/11/05	98	70 - 130	98	70 - 130	<0.40	ug/L	NC	30

Maxxam Job #: B3A1284
Report Date: 2013/11/06

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01 CAMPBELL RIVER CV

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7261536	Bromoform	2013/11/05	94	70 - 130	96	70 - 130	<1.0	ug/L	NC	30
7261536	o-Xylene	2013/11/05	97	70 - 130	97	70 - 130	<0.40	ug/L	NC	30
7261536	1,1,1,2-tetrachloroethane	2013/11/05	93	70 - 130	94	70 - 130	<0.50	ug/L	NC	30
7261536	1,1,2,2-tetrachloroethane	2013/11/05	96	70 - 130	100	70 - 130	<0.50	ug/L	NC	30
7261536	1,2-dichlorobenzene	2013/11/05	105	70 - 130	106	70 - 130	<0.50	ug/L	NC	30
7261536	1,3-dichlorobenzene	2013/11/05	103	70 - 130	101	70 - 130	<0.50	ug/L	NC	30
7261536	1,4-dichlorobenzene	2013/11/05	96	70 - 130	96	70 - 130	<0.50	ug/L	NC	30
7261536	Chlorobenzene	2013/11/05	95	70 - 130	95	70 - 130	<0.50	ug/L	NC	30
7261536	Dibromomethane	2013/11/05	96	70 - 130	100	70 - 130	<0.90	ug/L	NC	30
7261536	Styrene	2013/11/05			77	70 - 130	<0.50	ug/L	NC	30
7261536	Xylenes (Total)	2013/11/05					<0.40	ug/L	NC	30
7261795	VH C6-C10	2013/11/05			85	70 - 130	<0.30	mg/L	NC	40
7261986	Dissolved Aluminum (Al)	2013/11/04	103	80 - 120	102	80 - 120	<0.0030	mg/L	NC	20
7261986	Dissolved Antimony (Sb)	2013/11/04	105	80 - 120	104	80 - 120	<0.00050	mg/L	NC	20
7261986	Dissolved Arsenic (As)	2013/11/04	102	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
7261986	Dissolved Barium (Ba)	2013/11/04	101	80 - 120	102	80 - 120	<0.0010	mg/L	NC	20
7261986	Dissolved Beryllium (Be)	2013/11/04	102	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
7261986	Dissolved Bismuth (Bi)	2013/11/04	101	80 - 120	102	80 - 120	<0.0010	mg/L	NC	20
7261986	Dissolved Cadmium (Cd)	2013/11/04	103	80 - 120	103	80 - 120	<0.000010	mg/L	NC	20
7261986	Dissolved Chromium (Cr)	2013/11/04	104	80 - 120	104	80 - 120	<0.0010	mg/L	NC	20
7261986	Dissolved Cobalt (Co)	2013/11/04	106	80 - 120	105	80 - 120	<0.00050	mg/L	NC	20
7261986	Dissolved Copper (Cu)	2013/11/04	105	80 - 120	109	80 - 120	<0.00020	mg/L	NC	20
7261986	Dissolved Iron (Fe)	2013/11/04	109	80 - 120	105	80 - 120	<0.0050	mg/L	NC	20
7261986	Dissolved Lead (Pb)	2013/11/04	100	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
7261986	Dissolved Lithium (Li)	2013/11/04	104	80 - 120	108	80 - 120	<0.0050	mg/L		
7261986	Dissolved Manganese (Mn)	2013/11/04	102	80 - 120	105	80 - 120	<0.0010	mg/L	NC	20
7261986	Dissolved Molybdenum (Mo)	2013/11/04	100	80 - 120	104	80 - 120	<0.0010	mg/L	NC	20
7261986	Dissolved Nickel (Ni)	2013/11/04	105	80 - 120	105	80 - 120	<0.0010	mg/L	NC	20
7261986	Dissolved Selenium (Se)	2013/11/04	107	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
7261986	Dissolved Silver (Ag)	2013/11/04	101	80 - 120	94	80 - 120	<0.000020	mg/L	NC	20
7261986	Dissolved Strontium (Sr)	2013/11/04	98	80 - 120	100	80 - 120	<0.0010	mg/L	NC	20
7261986	Dissolved Thallium (Tl)	2013/11/04	99	80 - 120	104	80 - 120	<0.000050	mg/L	NC	20
7261986	Dissolved Tin (Sn)	2013/11/04	101	80 - 120	103	80 - 120	<0.0050	mg/L	NC	20
7261986	Dissolved Titanium (Ti)	2013/11/04	104	80 - 120	95	80 - 120	<0.0050	mg/L	NC	20
7261986	Dissolved Uranium (U)	2013/11/04	101	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
7261986	Dissolved Vanadium (V)	2013/11/04	103	80 - 120	107	80 - 120	<0.0050	mg/L	NC	20
7261986	Dissolved Zinc (Zn)	2013/11/04	113	80 - 120	109	80 - 120	<0.0050	mg/L	NC	20
7261986	Dissolved Boron (B)	2013/11/04					<0.050	mg/L	NC	20
7261986	Dissolved Silicon (Si)	2013/11/04					<0.10	mg/L	NC	20
7261986	Dissolved Zirconium (Zr)	2013/11/04					<0.00050	mg/L	NC	20

Maxxam Job #: B3A1284
Report Date: 2013/11/06

EBA Engineering Consultants Ltd.
Client Project #: N23103074-01 CAMPBELL RIVER CV

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7262056	Fluoride (F)	2013/11/04	105	80 - 120	98	80 - 120	<0.010	mg/L	NC	20
7262449	Ammonia (N)	2013/11/04	NC	80 - 120	101	80 - 120	<0.0050	mg/L	3.5	20
7263644	Dissolved Mercury (Hg)	2013/11/06	96	80 - 120	92	80 - 120	<0.010	ug/L	NC	20

N/A = Not Applicable

RPD = Relative Percent Difference

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

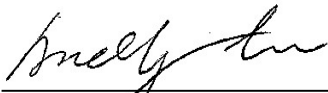
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.

NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Validation Signature Page

Maxxam Job #: B3A1284

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Andy Lu, Data Validation Coordinator

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job#:

B3A1284

CHAIN OF CUSTODY RECORD

Page: 1 of 1

G 072520

Invoice To: Require Report? Yes ☒ No ☐

Company Name: EISA #5908

Contact Name: Account, Possible

Address: #1-4376 Ryden Drive

November 21 PC: V4T 6A7

Phone / Fax#: Ph: 252-751-2224 Fax: 252-751-2110

E-mail: denise@che.lu

Company Name: EBA

Contact Name: Krista Lundhase

Address: _____

PC:

PH 50-714-3043 FAX:

E-mail: karol.nasr@univ-lorraine.fr

kgbdata@ebc.ca

PO #:

Quotation #:

Project # : N23103074-01

Proj. Name: Campbell River CURD

Location: _____

Sampled By: D. Thomas & J. Sklar

REGULATORY REQUIREMENTS SERVICE REQUESTED:

☒ CSR
☐ CCME
☐ BC Water Quality
☐ Other _____
DRINKING WATER

☒ Regular Turn Around Time (TAT)
 (5 days for most tests)
☐ RUSH (Please contact the lab)
☐ 1 Day ☐ 2 Day ☐ 3 Day
 Date Required: _____

Special Instructions:

Return Cooler ☐	Ship Sample Bottles (please specify) ☐
CGR Diss Models with Cu, Hg, hardness + Salinity	

ANALYSIS REQUESTED

[illegible]

Samples are from a Drinking Water Source?
Does source supply multiple households?

Laboratory Use Only

*Relinquished by:	Date (YY/MM/DD):	Time:	Received by:	Date (YY/MM/DD):	Time:	Time Sensitive ☐	Temperature on Receipt (°C) 3, 4, 5	Custody Seal Intact on Cooler?	
Darren Thoms	13/10/31	16:00	Philanthrop Helen Zehn	2013/11/01	08:00			Yes	No

IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL LATENCIES.

White: Maximum Yellow: Clear

APPENDIX E

GROUNDWATER MONITORING INFORMATION

Top of Casing Elevation	14-Jan-93	21-Sep-93	5-Jan-94	4-Mar-94	24-Jun-96	26-Aug-96	30-Sep-96	21-Oct-96	28-Nov-96	8-Jan-97	4-Mar-97	1-Apr-97	7-May-97	2-Jun-97	31-Jul-97	16-Sep-97	4-Dec-97	12-Jan-98	25-Feb-98	13-Apr-98	21-Apr-98	25-Jun-98	16-Jul-98	14-Sep-98	21-Oct-98	2-Dec-98	
GLL93-1	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	
GLL93-2	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	
GLL93-3	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	
GLL93-4	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	
HBT94-1	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	
HBT94-2	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	
HBT94-3	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	
HBT94-4	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	
HBT94-5	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	
AG99-01																											
AG99-02																											
AG99-03																											
AG99-04																											
AG99-05																											
AG99-06																											
AM00-01																											
AM02-01																											
EBA04-1																											
EBA04-2																											
EBA04-3																											
EBA04-4																											
EBA04-6																											
EBA04-7																											
EBA11-1																											
EBA11-2																											
EBA11-3																											
EBA11-4																											
Depth to Groundwater	14-Jan-93	21-Sep-93	5-Jan-94	4-Mar-94	24-Jun-96	26-Aug-96	30-Sep-96	21-Oct-96	28-Nov-96	8-Jan-97	4-Mar-97	1-Apr-97	7-May-97	2-Jun-97	31-Jul-97	16-Sep-97	4-Dec-97	12-Jan-98	25-Feb-98	13-Apr-98	21-Apr-98	25-Jun-98	16-Jul-98	14-Sep-98	21-Oct-98	2-Dec-98	
GLL93-1	25.58	25.25	24.72	25.98	DRY	DRY	24.2	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	
GLL93-2	34.87	34.58	34.1	35.03	31.85	35.1	35.15	35.04	34.94	35.42	35.98	35.98	DRY	DRY	DRY	36.2		35.93	34.87				35.38	35.34	35.1	35.8	
GLL93-3	26.75	27.05	26.12	27.22	27.46	27.55	27.26	27.22	27.18	27.54	28.48	28.92	29.6	29.6	35.4			31	20.98	30.4	30.92		28.15	31.55	31.24	31.73	
GLL93-4	17.78	18.65	17.9	18.03	18.25	DRY	18.65	18.63	18.6	18.49	18.5	18.78	DRY	DRY	DRY	DRY	18.54	18.1	17.5	14.0	17.41	18.82	18.6	DRY	18.75	DRY	
HBT94-1					19.935	20.08	19.92	19.65	19.02	19.3	20.12	20.86	22.7	21.6	21.25	21.34	19.32	19.44	19.15	19.2	19.13	20	20.01	20.04	19.83	19.72	
HBT94-2					19.505	19.8	19.89	19.35	19.7	19.5	20.26	20.99	21.4	21.7	21.57	21.25	19.14	19.46	19.23	19.25	18.95	19.76	20.03	19.98	19.83	19.81	
HBT94-3					19.82	20.98	19.77	19.71	19.58	19.72	20.37	20.98	21.7	22.3	21.63	21.17	19.38	19.26	19.01	19.1	19.23	20.07	20.29	20.13	19.68	19.66	
HBT94-4					21.31	21.5	21.26	21.2	21.07	21.22	21.92	22.29	23.9	23.1	22.8	22.45	20.98	20.8	20.38	17.2	20.75	21.5	21.68	21.45	21.16	21.39	
HBT94-5					17.3	17.75	17.54	17.44	17.3	17.2	17.7	18.15	19	19.33	19.23	19.3	17.03	16.74	16.67	16.4	16.62	17.75	17.79	17.87	17.55	17.44	
AG99-01																											
AG99-02																											
AG99-03																											
AG99-04																											
AG99-05																											
AG99-06																											
AM00-01																											
AM02-01																											
EBA04-1																											
EBA04-2																											
EBA04-3																											
EBA04-4																											
EBA04-6																											
EBA04-7																											
EBA11-1																											
EBA11-2																											
EBA11-3																											
EBA11-4																											
Groundwater Elevation	14-Jan-93	21-Sep-93	5-Jan-94	4-Mar-94	24-Jun-96	26-Aug-96	30-Sep-96	21-Oct-96	28-Nov-96	8-Jan-97	4-Mar-97	1-Apr-97	7-May-97	2-Jun-97	31-Jul-97	16-Sep-97	4-Dec-97	12-Jan-98	25-Feb-98	13-Apr-98	21-Apr-98	25-Jun-98	16-Jul-98	14-Sep-98	21-Oct-98	2-Dec-98	
GLL93-1	137.73	138.06	138.59	137.33			139.11								130.83	130.53			130.8	131.86				131.35	131.39	131.63	130.93
GLL93-2	131.86	132.15	132.63	131.7	134.88	131.63	131.58	131.69	131.79	131.31	130.75	130.75							127.37	137.40				130.22	127.13	126.64	
GLL93-3	131.62	131.32	132.25	131.15	130.91	130.82	131.11	131.15	131.19	130.83	129.89	129.45	128.77	128.77		122.97			119.29	119.89	123.39	127.45					
GLL93-4	119.61	118.74	119.49	119.36	119.14		118.74	118.76	118.79	118.9	118.89	118.61					118.85		119.29	119.89	123.39	119.98	118.57	118.79	118.64		
HBT94-1					122.395	122.25	122.41	122.68	123.31	123.03	122.21	121.47	119.63	120.73	121.08	120.99	123.01	122.89	123.18	123.13	123.2	122.33	122.32	122.29	122.5	122.61	
HBT94-2					122.935	122.64	122.55	123.09	122.74	122.94	122.18	121.45	121.04	120.74	120.87	121.19	123.3	122.98	123.21	123.19	123.49	122.68	122.41	122.46	122.61	122.63	
HBT94-3					122.9	121.74	122.95	123.01	123.14	123	122.35	121.74	121.02	120.42	121.09	121.55	123.34	123.46	123.71	123.62	123.49	122.65	122.43	122.59	123.04	123.06	
HBT94-4					118.8	118.61	118.85	118.91	119.04	118.89	118.19	117.82	116.21	117.01	117.31	117.66	119.13	119.31	119.73	122.91	119.36	118.61	118.43	118.66	118.95	118.72	
HBT94-5					120.99	120.54	120.75	120.85	120.99	121.09	120.59	120.14	119.29	118.96	119.06	118.99	121.26	121.55	121.62	121.89	121						

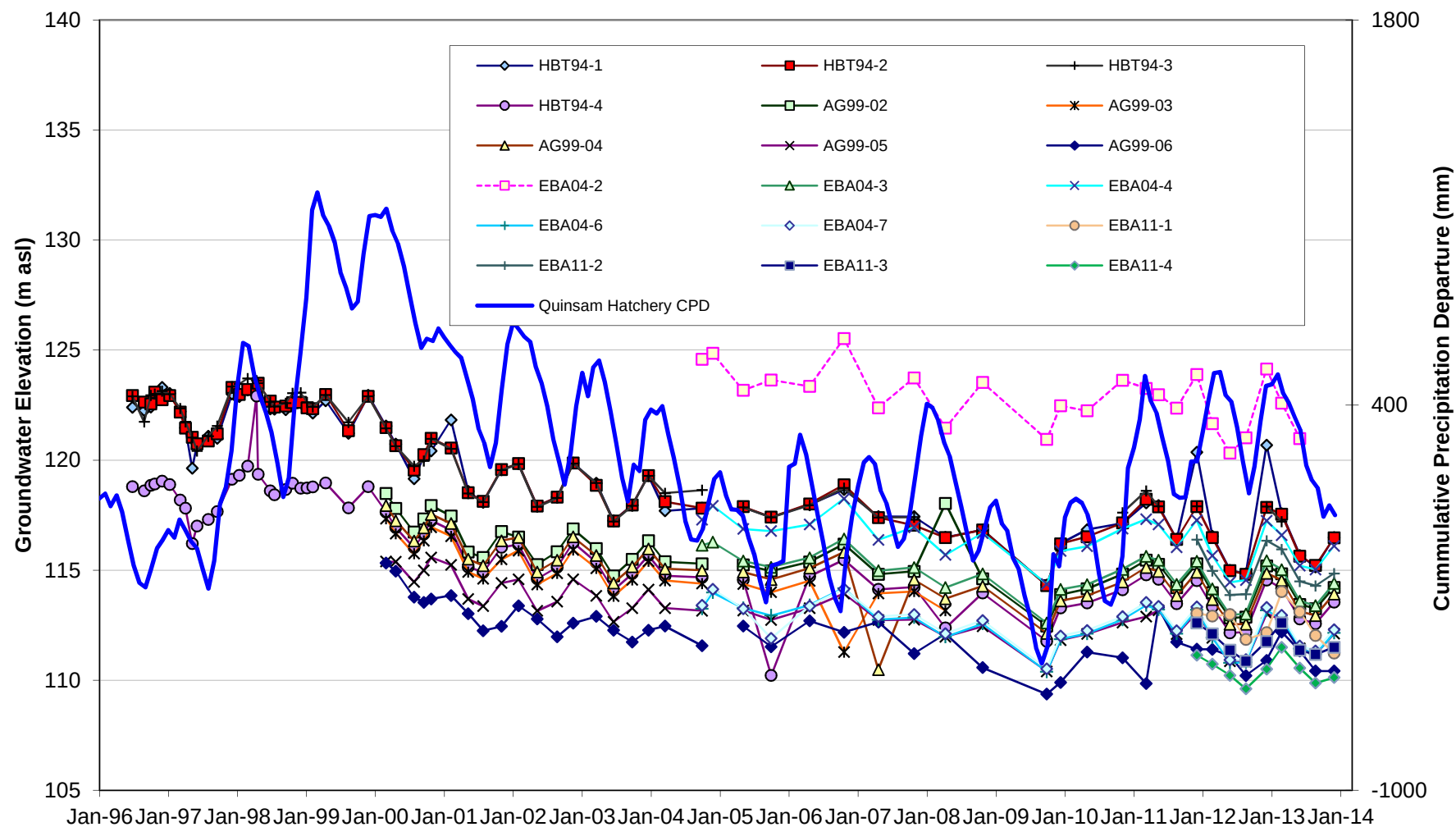
Appendix E1 - Groundwater Elevations

Top of Casing Elevation	5-Jan-99	5-Feb-99	14-Apr-99	12-Aug-99	25-Nov-99	28-Feb-00	19-Apr-00	25-Jul-00	14-Sep-00	24-Oct-00	6-Feb-01	8-May-01	26-Jul-01	31-Oct-01	29-Jan-02	8-May-02	22-Aug-02	14-Nov-02	17-Mar-03	16-Jun-03	24-Sep-03	18-Dec-03	15-Mar-04	27-Sep-04	23-Nov-04	3-May-05	28-Sep-05
GLL93-1	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31	163.31
GLL93-2	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73	166.73
GLL93-3	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37	158.37
GLL93-4	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39	137.39
HBT94-1	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33	142.33
HBT94-2	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44	142.44
HBT94-3	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72	142.72
HBT94-4	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11
HBT94-5	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29	138.29
AG99-01						144.19	144.19	144.19	144.19	144.19	144.19	144.19	144.19	144.19	144.19	144.19	144.19	144.19	144.19	144.19	144.19	144.19	144.19	144.19	144.19	144.19	144.19
AG99-02						139.85	139.85	139.85	139.85	139.85	139.85	139.85	139.85	139.85	139.85	139.85	139.85	139.85	139.85	139.85	139.85	139.85	139.85	139.85	139.85	139.85	139.85
AG99-03						136.79	136.79	136.79	136.79	136.79	136.79	136.79	136.79	136.79	136.79	136.79	136.79	136.79	136.79	136.79	136.79	136.79	136.79	136.79	136.79	136.79	136.79
AG99-04						136.44	136.44	136.44	136.44	136.44	136.44	136.44	136.44	136.44	136.44	136.44	136.44	136.44	136.44	136.44	136.44	136.44	136.44	136.44	136.44	136.44	136.44
AG99-05						132.09	132.09	132.09	132.09	132.09	132.09	132.09	132.09	132.09	132.09	132.09	132.09	132.09	132.09	132.09	132.09	132.09	132.09	132.09	132.09	132.09	132.09
AG99-06						133.03	133.03	133.03	133.03	133.03	133.03	133.03	133.03	133.03	133.03	133.03	133.03	133.03	133.03	133.03	133.03	133.03	133.03	133.03	133.03	133.03	133.03
AM00-01										164.6	164.6	164.6	164.6	164.6	164.6	164.6	164.6	164.6	164.6	164.6	164.6	164.6	164.6	164.6	164.6	164.6	164.6
AM02-01																	186.59	186.59	186.59	186.59	186.59	186.59	186.59	186.59	186.59	186.59	186.59
EBA04-1																											
EBA04-2																											
EBA04-3																											
EBA04-4																											
EBA04-6																											
EBA04-7																											
EBA11-1																											
EBA11-2																											
EBA11-3																											
EBA11-4																											
Depth to Groundwater	5-Jan-99	5-Feb-99	14-Apr-99	12-Aug-99	25-Nov-99	28-Feb-00	19-Apr-00	25-Jul-00	14-Sep-00	24-Oct-00	6-Feb-01	8-May-01	26-Jul-01	31-Oct-01	29-Jan-02	8-May-02	22-Aug-02	14-Nov-02	17-Mar-03	16-Jun-03	24-Sep-03	18-Dec-03	15-Mar-04	27-Sep-04	23-Nov-04	3-May-05	28-Sep-05
GLL93-1	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
GLL93-2	35.85	35.91	35.48	DRY	35	36.12	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
GLL93-3	31.8	31.91	31.62	DRY	31.45	33.083	DRY	DRY	DRY	DRY	33.94	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
GLL93-4	18.7	DRY	17.45	DRY	DRY	DRY	DRY	19.35?	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
HBT94-1	19.997	20.2	19.63	21.11	19.38	20.78	21.6	23.18	22.16	21.91	20.5	23.75	24.245	22.775	22.5	24.42	24.017	22.465	23.385	25.085	24.379	23.028	24.636	24.513	24.47	24.926	
HBT94-2	20.07	20.1	19.46	21.1	19.54	20.96	21.78	22.89	22.19	21.45	21.89	23.92	24.315	22.865	22.6	24.53	24.122	22.572	23.58	25.203	24.481	23.141	24.326	24.621	24.554	25.03	
HBT94-3	20.1	20.3	19.76	21	19.82	21.28	22.09	22.99	22.75	22.205	24.24	24.63	23.17	22.9	24.845	24.44	22.875	23.76	25.517	24.794	23.434	24.218	24.085	24.869	25.325	25.325	
HBT94-4	21.37	21.33	21.15	22.28	21.32	22.47	23.18	24.085	23.47	22.86	23.29	24.962	25.215	24.075	23.95	25.505	24.974	23.85	24.76	26.026	25.268	24.442	25.37	25.442	25.545	29.895	
HBT94-5	17.41	17.3	16.93	18.43	DRY	18.53	19.19	DRY	20.18	DRY	19.59	DRY	DRY	DRY	20.11	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
AG99-01						24.41	25.07	25.92	25.42	24.595	25.175	26.93	27.08	24.93	25.9	27.5	26.785	25.695	27.292	28.56	27.133	26.871	27.363	27.447	27.616	27.507	-
AG99-02						21.365	22.04	23.12	22.52	21.915	22.385	24.03	24.28	23.1	23.35	24.592	24.012	22.98	23.873	25.115	24.358	23.512	24.469	24.556	24.608	24.885	
AG99-03						19.45	20.13	21.04	20.455	19.843	20.245	21.875	22.18	21.3	20.9	22.445	21.933	20.865	21.703	22.971	22.224	21.385	22.265	22.398	22.42	22.793	
AG99-04						18.5	19.19	20.11	19.52	18.905	19.315	20.942	21.23	20.1	19.95	21.52	20.983	19.925	20.771	22.025	21.285	20.468	21.376	21.446	21.523	21.866	
AG99-05						16.7	16.71	17.63	17.095	16.51	16.85	18.402	18.725	17.675	17.51	18.942	18.52	17.502	18.252	19.44	18.814	17.97	18.812	18.934	18.92	19.354	
AG99-06						17.702	18.08	19.26	19.495	19.335	19.185	20.008	20.78	20.585	19.645	20.243	21.055	20.44	20.132	20.765	21.294	20.758	20.574	21.46	20.569	21.51	
AM00-01										37.556	38.835	40.88	40.495	38.94	39.54	33.96	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked
AM02-01																	26.549	29.83	DRY	32.191	26.625	31.109	DRY	28.504	30.016	32.465	31.645
EBA04-1																											
EBA04-2																											
EBA04-3																											
EBA04-4																											
EBA04-6																											
EBA04-7																											
EBA11-1																											
EBA11-2																											
EBA11-3																											
EBA11-4																											
Groundwater Elevation	5-Jan-99	5-Feb-99	14-Apr-99	12-Aug-99	25-Nov-99	28-Feb-00	19-Apr-00	25-Jul-00	14-Sep-00	24-Oct-00	6-Feb-01	8-May-01	26-Jul-01	31-Oct-01	29-Jan-												

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Appendix E2 - Groundwater Elevations and Cumulative Annual Precipitation



APPENDIX F

WATER QUALITY INFORMATION

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Unit	BC CSR		HBT94-1															
		Aquatic Life	Drinking Water	27-Aug-09	10-Dec-09	29-Apr-10	2-Nov-10	10-Mar-11	11-May-11	16-Aug-11	29-Nov-11	22-Feb-12	25-May-12	16-Aug-12	3-Dec-12	21-Feb-13	30-May-13	21-Aug-13	28-Nov-13
Physical Tests																			
pH (Field)	pH_Units	NS	NS	7.65	6.09	7.25	7.77	7.09	6.99	6.93	6.75	7	7.1	7.15	7.57	6.07	-	7.11	7.51
pH (Lab)	pH_Units	NS	NS	7.98	8.07	8.22	8.11	7.64	7.68	7.62	7.38	7.61	7.88	8.21	8.09	8.08	8.18	8.24	8.23
Specific Conductance (Field)	uS/cm	NS	NS	392	253	319	614	520	553	810	511	431	499	483	498	590	591	563	471
Specific Conductance (Lab)	uS/cm	NS	NS	460	501	440	576	592	413	813	546	511	451	457	459	541	519	538	466
Temperature (Field)	°C	NS	NS	12.33	10.99	11.83	12.9	11.49	11.78	12.22	10.77	10.5	15.1	12.57	9.98	7.48	11.99	13.05	10.4
Dissolved Oxygen (Field)	mg/L	NS	NS	7.18	5.69	15.08	0.96	7.99	7.83	5.36	9.48	10	16.3	4.08	8.98	8.43	12.31	4.37	-
Hardness: Total (as CaCO3) (Lab)	mg/L	NS	NS	219	236	190	202	278	145	254	191	179	167	178	195	214	-	224	198
Dissolved Solids: Total	mg/L	NS	NS	-	-	-	-	-	-	-	-	300	320	314	322	383	385	366	236
Oxidation Reduction Potential (Field)	mV	NS	NS	-28.9	129.4	185.7	-27.7	-364.5	75.4	151.3	198.1	99	147	118.8	37.5	9.3	274.7	102.1	-
Anions and Nutrients																			
Ammonia (as N)	mg/L	1.31 - 18.4*	NS	0.1	0.12	0.43	0.23	0.23	0.48	0.24	0.24	0.31	0.19	0.22	0.082	0.032	1.6	1	0.63
Nitrogen: Nitrite (as N) (Lab)	mg/L	0.2 - 2*	3.2	<0.002	0.002	0.057	0.0064	0.011	0.013	0.092	0.0101	0.022	0.021	0.0159	0.006	<0.005	0.0092	0.0113	0.0064
Nitrogen: Nitrate (as N) (Lab)	mg/L	400	10	0.02	< 0.01	0.029	<0.02	0.05	0.42	21	0.105	0.29	0.068	0.353	0.282	0.375	0.281	0.291	0.085
Chloride (Lab)	mg/L	1,500	250	20.6	20.1	19	21	17	14	37	19	20	17	22	19	28	29	27	20
Fluoride: Dissolved	mg/L	2 - 3*	1.5	<0.05	< 0.05	0.021	0.022	0.01	0.02	0.02	0.037	0.031	0.021	0.018	0.022	0.014	0.026	0.02	0.025
Sulphate (Lab)	mg/L	1,000	500	4.99	6.09	4.32	5.8	3.4	4.4	15	4.29	4.43	6	8.22	7.35	5.39	5.78	9.57	6.05
Alkalinity (as CaCO3) (Lab)	mg/L	NS	NS	220	253	202	267	290	200	220	255	233	209	200	201	238	220	237	215
Bicarbonate (as CaCO3)	mg/L	NS	NS	269	-	247	326	360	240	270	311	284	255	244	246	290	269	289	262
Carbonate (as CaCO3)	mg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hydroxide	mg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Metals																			
Aluminum: Dissolved	mg/L	NS	9.5	<0.012	0.006	0.0046	0.0074	0.009	0.007	0.003	0.0047	0.0047	0.00472	0.00466	0.00231	0.00127	0.0033	0.0056	0.0127
Antimony: Dissolved	mg/L	0.2	0.006	0.0002	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00009	0.000172	0.000121	0.000138	0.000109	<0.0005	<0.0005	0.000047
Arsenic: Dissolved	mg/L	0.05	0.01	0.0006	0.0007	0.00032	0.0006	0.0007	0.0003	0.0003	0.0003	0.00021	0.000404	0.000378	0.00015	0.000175	0.00024	0.00049	0.000254
Barium: Dissolved	mg/L	10	1	0.0078	0.0064	0.0093	0.0091	0.01	0.01	0.016	0.0168	0.0113	0.00509	0.00656	0.00472	0.00499	0.0079	0.0103	0.00556
Beryllium: Dissolved	mg/L	0.053	NS	<0.0002	< 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00002	0.00002	<0.00001	<0.00001	<0.00001	<0.0001	<0.0001	<0.00001
Bismuth: Dissolved	mg/L	NS	NS	<0.0002	< 0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.001	<0.001	<0.000005
Boron: Dissolved	mg/L	50	5	0.22	0.15	0.147	0.415	0.52	0.26	0.35	0.495	0.48	0.291	0.295	0.313	0.29	0.252	0.321	0.232
Cadmium: Dissolved	mg/L	0.0001-0.0013*	0.005	0.00011	0.00019	0.000107	0.000104	0.00017	0.00045	0.00018	0.000203	0.00039	0.000419	0.000231	0.00021	0.00013	0.000356	0.000176	0.000154
Calcium: Dissolved	mg/L	NS	NS	74.2	81.8	65.5	66.2	94.1	49.8	85.2	64	60.6	56.8	61	66.8	72.4	67.4	76.4	67.3
Chromium: Dissolved	mg/L	0.01, 0.09	0.05	0.0002	< 0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.0001
Cobalt: Dissolved	mg/L	0.04	NS	0.0002	0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000275	0.000165	0.000219	0.000172	0.000163	<0.0005	<0.0005	0.000184
Copper: Dissolved	mg/L	0.02 - 0.090*	1	0.0034	0.0031	0.00209	0.00429	0.0044	0.0043	0.0053	0.00583	0.00424	0.00385	0.00367	0.00281	0.00252	0.00372	0.00431	0.00306
Iron: Dissolved (Lab)	mg/L	NS	NS**	<0.01	< 0.01	0.0147	0.196	0.05	0.038	0.019	0.0687	0.337	0.0036	0.0153	0.0238	0.006	0.0297	0.0251	0.0068
Lead: Dissolved	mg/L	0.040 - 0.160*	0.01	<0.0002	< 0.00005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.000035	0.0000105	0.000006	0.000014	0.000007	<0.0002	<0.0002	0.000027
Lithium: Dissolved	mg/L	NS	0.73	0.0009	0.0007	<0.005	<0.005	-	-	<0.005	<0.005	0.0009	0.00114	0.00074	0.00104	<0.0005	<0.005	<0.005	0.00074
Magnesium: Dissolved	mg/L	NS	100	8.15	7.73	6.57	8.95	10.6	5.15	10.1	7.5	6.63	6.01	6.36	6.77	8.16	7.18	8.11	7.18
Manganese: Dissolved	mg/L	NS	NS**	0.816	1.51	0.98	1.96	1.94	0.857	0.313	0.409	0.294	0.483	0.528	0.0781	0.0572	0.683	1.69	0.567
Mercury: Dissolved	mg/L	0.001	0.001	<0.00002	< 0.02	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00005	<0.00005	0.0000021
Molybdenum: Dissolved	mg/L	10	0.25	0.0007	0.0007	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00062	0.000707	0.00106	0.000738	0.000505	0.0015	0.0011	0.000587
Nickel: Dissolved	mg/L	0.250 - 1.5*	NS	0.0012	< 0.0002	<0.001	0.002	0.002	0.001	0.002	0.0029	0.00181	0.00132	0.00137	0.00137	0.00143	0.005	0.0017	0.00101
Phosphorus: Dissolved	mg/L	NS	NS	<0.03	< 0.015	-	-	0.01	<0.01	-	-	0.173	<0.005	0.0439	0.0872	-	-	-	-
Potassium: Dissolved	mg/L	NS	NS	2.21	1.56	4.95	2.07	3.21	3.27	10.3	12.3	7.19	3.37	4.23	4.15	6.58	5.95	4.69	3.28
Selenium: Dissolved	mg/L	0.01	0.01	<0.0002	< 0.0002	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.00006	0.000074	0.000057	0.000068	0.000045	<0.0001	<0.0001	0.000047
Silicon: Dissolved	mg/L	NS	NS	7.72	5.99	7.94	6.43	8.9	6.9	7	6.2	6.4	7.68	7.15	6.77	5.32	6.38	7.09	6.63
Silver: Dissolved	mg/L	0.0005-0.015*	NS	<0.00005	< 0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.00002	<0.00002	<0.000005
Sodium: Dissolved	mg/L	NS	200	16.9	18	15	16.8	38.7	27.9										

[illegible]

Notes:

BC CSR - BC Contaminated Sites Regulation (CSR) (BC Reg. 375/96, including amendments up to BC Reg. 4/2014, January 31, 2014), Schedule 6 and 10 Generic Numerical Water Standards for the Protection of Freshwater Aquatic Life (AW) and Drinking Water (DW)

* Indicates that the guideline is dependent on chloride, hardness or pH

-- Stage 9 Amendment of the CSR applies

NS - No standard

Parameter exceeds CSR AW standard

Parameter exceeds CSR DW standard

Italics

BOLD

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Unit	BC CSR		HBT94-3					
		Aquatic Life	Drinking Water	2-Nov-10	10-Mar-11	11-May-11	29-Nov-11	3-Dec-12	21-Feb-13
Physical Tests									
pH (Field)	pH_Units	NS	NS	6.46	6.65	6.69	6.59	6.43	6.63
pH (Lab)	pH_Units	NS	NS	7.73	7.33	7.36	7.41	7.42	7.64
Specific Conductance (Field)	uS/cm	NS	NS	920	945	849	763	1,387	1,470
Specific Conductance (Lab)	uS/cm	NS	NS	911	1,080	889	836	1,360	1,410
Temperature (Field)	°C	NS	NS	13.05	12.85	13.01	12.41	12.5	11.37
Dissolved Oxygen (Field)	mg/L	NS	NS	8.8	6.65	7.8	6.92	3.66	3.9
Hardness: Total (as CaCO3) (Lab)	mg/L	NS	NS	270	357	278	272	512	428
Dissolved Solids: Total	mg/L	NS	NS	-	-	-	-	901	956
Oxidation Reduction Potential (Field)	mV	NS	NS	9.1	-381.3	23.7	9.9	20.4	-53.7
Anions and Nutrients									
Ammonia (as N)	mg/L	1.31 - 18.4*	NS	3	16	16	9	11	27
Nitrogen: Nitrite (as N) (Lab)	mg/L	0.2 - 2*	3.2	0.0206	0.01	0.006	0.0055	0.0151	<0.005
Nitrogen: Nitrate (as N) (Lab)	mg/L	400	10	0.024	<0.02	0.07	<0.02	<0.02	0.021
Chloride (Lab)	mg/L	1,500	250	42	63	49	48	110	92
Fluoride: Dissolved	mg/L	2 - 3*	1.5	0.03	0.02	0.02	0.024	0.031	0.024
Sulphate (Lab)	mg/L	1,000	500	7.18	2	1.5	<0.5	1.56	2.21
Alkalinity (as CaCO ₃) (Lab)	mg/L	NS	NS	415	470	390	363	561	621
Bicarbonate (as CaCO ₃)	mg/L	NS	NS	506	570	480	443	684	758
Carbonate (as CaCO ₃)	mg/L	NS	NS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hydroxide	mg/L	NS	NS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Metals									
Aluminum: Dissolved	mg/L	NS	9.5	<0.003	<0.003	0.004	<0.003	0.00262	0.00286
Antimony: Dissolved	mg/L	0.2	0.006	<0.0005	<0.0005	<0.0005	<0.0005	0.000086	0.000051
Arsenic: Dissolved	mg/L	0.05	0.01	0.0013	0.0013	0.0015	0.00173	0.00289	0.00194
Barium: Dissolved	mg/L	10	1	0.0251	0.046	0.033	0.0263	0.0583	0.0671
Beryllium: Dissolved	mg/L	0.053	NS	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	<0.00001
Bismuth: Dissolved	mg/L	NS	NS	<0.001	<0.001	<0.001	<0.001	<0.000005	<0.000005
Boron: Dissolved	mg/L	50	5	0.913	0.92	0.51	0.554	0.893	0.992
Cadmium: Dissolved	mg/L	0.0001-0.0013*	0.005	0.000258	0.00001	0.00023	0.000014	0.000056	0.000108
Calcium: Dissolved	mg/L	NS	NS	80.3	107	85	85	155	131
Chromium: Dissolved	mg/L	0.01, 0.09	0.05	<0.001	<0.001	<0.001	<0.001	0.00025	0.00021
Cobalt: Dissolved	mg/L	0.04	NS	0.00403	0.0025	0.0021	0.00223	0.00452	0.00352
Copper: Dissolved	mg/L	0.02 - 0.090*	1	0.00629	0.0003	0.0007	0.00039	0.00285	0.000751
Iron: Dissolved (Lab)	mg/L	NS	NS**	1.1	2.48	1.95	2.69	4.58	5.15
Lead: Dissolved	mg/L	0.040 - 0.160*	0.01	<0.0002	<0.0002	<0.0002	<0.0002	0.000037	0.000012
Lithium: Dissolved	mg/L	NS	0.73	<0.005	-	-	<0.005	0.0006	<0.0005
Magnesium: Dissolved	mg/L	NS	100	16.9	21.8	15.9	14.4	30.4	24.8
Manganese: Dissolved	mg/L	NS	NS**	4.7	3.53	2.66	3	6.38	4.24
Mercury: Dissolved	mg/L	0.001	0.001	<0.00002	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001
Molybdenum: Dissolved	mg/L	10	0.25	<0.001	<0.001	<0.001	<0.001	0.000216	0.000225
Nickel: Dissolved	mg/L	0.250 - 1.5*	NS	0.0046	0.004	0.003	0.0033	0.00505	0.00527
Phosphorus: Dissolved	mg/L	NS	NS	-	0.01	0.02	-	0.117	-
Potassium: Dissolved	mg/L	NS	NS	5.26	15.9	9.6	7.09	13.6	16.5
Selenium: Dissolved	mg/L	0.01	0.01	0.00013	<0.0001	<0.0001	<0.0001	0.000072	0.000123
Silicon: Dissolved	mg/L	NS	NS	9.61	13.9	12.6	12.5	15	14.3
Silver: Dissolved	mg/L	0.0005-0.015*	NS	<0.00002	<0.00002	<0.00002	<0.00002	<0.000005	<0.000005
Sodium: Dissolved	mg/L	NS	200	49.1	70	49.6	39.2	79.1	83.4
Strontium: Dissolved	mg/L	NS	22	0.31	0.363	0.306	0.304	0.546	0.565
Sulphur: Dissolved	mg/L	NS	NS	<3	<3	<3	<3	<3 - 1.76	<3 - 1.89
Tellurium: Dissolved	mg/L	NS	NS	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.003	NS	<0.00005	<0.00005	<0.00005	<0.00005	0.000005	<0.000002
Thorium: Dissolved	mg/L	NS	NS	-	-	-	-	-	-
Tin: Dissolved	mg/L	NS	22	<0.005	<0.005	<0.005	<0.005	0.00032	0.00026
Titanium: Dissolved	mg/L	1	NS	<0.005	<0.005	<0.005	<0.005	<0.0005	0.00069
Tungsten: Dissolved	mg/L	NS	NS	-	-	-	-	-	-
Uranium: Dissolved	mg/L	3	0.02	0.00014	0.0001	0.0001	0.00011	0.000963	0.000262
Vanadium: Dissolved	mg/L	NS	NS	<0.005	<0.005	<0.005	<0.005	0.0025	0.00352
Zinc: Dissolved	mg/L	0.075 - 2.4*	5	<0.005	<0.005	<0.005	<0.005	0.00116	0.00141
Zirconium: Dissolved	mg/L	NS	NS	<0.0005	<0.0005	<0.0005	<0.0005	0.00019	0.00031

Notes:

BC CSR - BC Contaminated Sites Regulation (CSR) (BC Reg. 375/96, including amendments up to BC Reg. 4/2014, January 31, 2014), Schedule 6 and 10 Generic Numerical Water Standards for the Protection of Freshwater Aquatic Life (AW) and Drinking Water (DW)

* Indicates that the guideline is dependent on chloride, hardness or pH

** Stage 8 Amendment of the CSR applies

NS - No standard

Parameter exceeds CSR AW standard

Parameter exceeds CSR DW standard

Italics

BOLD

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Unit	BC CSR		HBT94-4															
		Aquatic Life	Drinking Water	28-Aug-09	11-Dec-09	29-Apr-10	2-Nov-10	9-Mar-11	11-May-11	16-Aug-11	28-Nov-11	22-Feb-12	24-May-12	17-Aug-12	5-Dec-12	21-Feb-13	29-May-13	21-Aug-13	27-Nov-13
Physical Tests																			
pH (Field)	pH_Units	NS	NS	8.2	7.4	7.82	7.74	7.56	7.53	7.88	8.14	7.8	7.9	8.03	8.05	6.53	7.5	8.02	8.23
pH (Lab)	pH_Units	NS	NS	7.92	8.11	8.15	8.06	7.65	7.87	7.81	8.08	7.98	7.98	7.97	8.18	8.07	8.14	7.99	8.17
Specific Conductance (Field)	uS/cm	NS	NS	103	89	139	194	194	202	153	154	155	159	127	217	233	189	128	228
Specific Conductance (Lab)	uS/cm	NS	NS	127	199	189	190	214	198	158	171	183	160	132	222	219	189	132	222
Temperature (Field)	°C	NS	NS	10.53	10.33	12.88	10.3	12.95	12.93	11.1	9.69	11.5	11.9	10.66	9.94	11.66	12.35	11.09	10.2
Dissolved Oxygen (Field)	mg/L	NS	NS	8.84	7.91	12.17	17	3.05	6.29	7.88	9.03	3	4.8	5.13	5.1	6.29	11.63	9.41	-
Hardness: Total (as CaCO3) (Lab)	mg/L	NS	NS	59.1	101	96	72.6	116	96.7	76.9	83.9	90.1	78.3	62.4	110	109	-	63.4	112
Dissolved Solids: Total	mg/L	NS	NS	-	-	-	-	-	-	-	-	100	100	82	142	152	124	83	114
Oxidation Reduction Potential (Field)	mV	NS	NS	106.3	227.2	172	10.7	-384.9	228.1	114.4	106.8	56.4	161	98.4	29	109	252.9	81.8	-
Anions and Nutrients																			
Ammonia (as N)	mg/L	1.31 - 18.4*	NS	<0.01	< 0.01	<0.01	<0.005	0.048	0.034	0.053	0.051	0.0094	0.012	0.01	0.028	0.007	0.012	0.016	0.01
Nitrogen: Nitrite (as N) (Lab)	mg/L	0.2 - 2*	3.2	<0.002	< 0.002	0.008	<0.005	<0.005	0.013	<0.005	<0.005	<0.005	<0.005	<0.005	0.0102	<0.005	<0.005	<0.005	<0.005
Nitrogen: Nitrate (as N) (Lab)	mg/L	400	10	0.12	0.07	0.159	0.107	0.23	0.42	0.19	0.168	0.117	0.178	0.15	<0.02	0.359	0.157	0.161	0.051
Chloride (Lab)	mg/L	1,500	250	1.5	1.2	1.4	1.5	3.8	3.9	2.2	1.2	2.4	3.5	1.8	1.7	3.6	1.9	1.6	1.3
Fluoride: Dissolved	mg/L	2 - 3*	1.5	<0.05	< 0.05	0.016	0.019	0.01	0.02	0.01	0.018	0.025	0.024	0.024	0.017	0.015	0.019	0.016	0.022
Sulphate (Lab)	mg/L	1,000	500	3.6	3.07	3.74	2.51	3.4	4.7	2.8	3.45	3.55	3.67	2.03	2.43	3.22	3.74	3.02	3.3
Alkalinity (as CaCO3) (Lab)	mg/L	NS	NS	60.8	107	95.4	93.6	100	95	71	83.2	87.6	73	62.3	110	106	93	63.2	111
Bicarbonate (as CaCO3)	mg/L	NS	NS	74.1	-	116	114	120	120	87	102	107	89	76	134	129	114	77.1	136
Carbonate (as CaCO3)	mg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hydroxide	mg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Metals																			
Aluminum: Dissolved	mg/L	NS	9.5	0.004	0.003	0.0039	0.006	0.004	0.005	0.003	<0.003	0.003	0.00434	0.00505	0.00327	0.00304	<0.003	0.0042	0.013
Antimony: Dissolved	mg/L	0.2	0.006	0.0002	0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00009	0.000128	0.000114	0.000073	0.000104	<0.0005	<0.0005	0.00007
Arsenic: Dissolved	mg/L	0.05	0.01	0.0007	0.0005	0.0004	0.00028	0.0004	0.0004	0.0004	0.00027	0.00025	0.000241	0.000349	0.000327	0.000231	0.00023	0.00035	0.00027
Barium: Dissolved	mg/L	10	1	0.001	0.0016	0.0016	0.0014	0.002	0.002	0.001	0.0012	0.00133	0.00106	0.00089	0.00157	0.00181	0.0016	<0.001	0.00159
Beryllium: Dissolved	mg/L	0.053	NS	<0.0002	< 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.0001	<0.0001	<0.00001
Bismuth: Dissolved	mg/L	NS	NS	<0.0002	< 0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00005	<0.000005	<0.000005	<0.000005	<0.000005	<0.001	<0.001	<0.000005
Boron: Dissolved	mg/L	50	5	<0.01	0.011	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium: Dissolved	mg/L	0.0001-0.0013*	0.005	<0.00004	0.00001	0.000271	<0.00001	0.00003	0.00007	<0.00001	<0.00001	<0.000005	<0.000005	<0.000005	<0.000005	0.000018	0.000011	<0.00001	0.000006
Calcium: Dissolved	mg/L	NS	NS	21.4	36.8	34	25.2	41	34.7	27.9	30.2	32.3	28.3	22.3	39.2	39	32.9	22.9	40.3
Chromium: Dissolved	mg/L	0.01, 0.09	0.05	0.0002	< 0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	0.00016	0.00022	<0.0001	<0.0001	<0.001	<0.001	<0.0001
Cobalt: Dissolved	mg/L	0.04	NS	<0.0002	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000009	0.0000133	0.00001	0.00001	0.000021	<0.0005	<0.0005	0.000013
Copper: Dissolved	mg/L	0.02 - 0.090*	1	0.0006	0.0004	0.00038	0.00029	0.0007	0.0006	0.0004	0.00028	0.00019	0.000382	0.000248	0.000456	0.000931	0.00036	0.00032	0.000391
Iron: Dissolved (Lab)	mg/L	NS	NS**	<0.01	< 0.01	<0.005	<0.005	0.01	0.008	<0.005	<0.005	0.004	<0.001	0.0016	0.0023	0.0012	<0.005	<0.005	0.0013
Lead: Dissolved	mg/L	0.040 - 0.160*	0.01	<0.0002	< 0.00005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.000005	<0.000005	<0.000005	0.000015	0.000008	<0.0002	<0.0002	0.000016
Lithium: Dissolved	mg/L	NS	0.73	<0.0002	< 0.0001	<0.005	<0.005	-	-	<0.005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.005	<0.0005
Magnesium: Dissolved	mg/L	NS	100	1.36	2.25	2.7	2.36	3.23	2.47	1.75	2.03	2.25	1.6	3.3	3.03	2.79	2.27	1.47	2.81
Manganese: Dissolved	mg/L	NS	NS**	0.044	0.063	0.05	0.0247	0.121	0.104	0.03	0.0243	0.0296	0.00716	0.000256	0.00124	0.0181	0.0085	<0.001	0.00178
Mercury: Dissolved	mg/L	0.001	0.001	<0.00002	< 0.02	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	-	<0.00001	0.000013	<0.00001	<0.00001	<0.00005	<0.00005	<0.000002
Molybdenum: Dissolved	mg/L	10	0.25	0.0002	0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00007	0.000133	0.000162	0.000132	0.00013	<0.001	<0.001	0.000071
Nickel: Dissolved	mg/L	0.250 - 1.5*	NS	<0.0002	< 0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00002	0.000058	<0.00002	0.000102	0.000192	<0.001	<0.001	0.000073
Phosphorus: Dissolved	mg/L	NS	NS	<0.03	< 0.015	-	-	<0.01	<0.01	-	-	0.009	0.0054	0.0134	0.0089	-	-	-	-
Potassium: Dissolved	mg/L	NS	NS	0.59	0.68	0.709	0.54	0.86	0.72	0.53	0.549	0.63	0.57	0.479	0.597	0.692	0.578	0.442	0.565
Selenium: Dissolved	mg/L	0.01	0.01	0.0045	0.0011	0.0015	0.00082	0.0003	0.0006	0.001	0.00072	0.00102	0.00224	0.0017	0.000206	0.000503	0.0009	0.00087	0.000162
Silicon: Dissolved	mg/L	NS	NS	3.31	2.87	4.71	3.29	5.5	4.6	3.7	3.33	4	3.68	3.2	4.73	5.16	4.38	3.72	4.2
Silver: Dissolved	mg/L	0.0005-0.015*	NS	<0.00005	< 0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.00002	<0.00002	<0.000005
Sodium: Dissolved	mg/L	NS	200	1.17	1.23	1.31	1.18	2.73	2.71	1.73	1.55	1.92	1.47	1.26	1.9	2.12	2.17	1.46	1.97
Strontium: Dissolved	mg/L	NS	22	0.037	0.064	0.0545	0.0541	0.061	0.061	0.047	0.0519	0.0353	0.0461	0.0353	0.0641	0.0705	0.0619	0.0383	0.0686
Sulphur: Dissolved	mg/L	NS	NS	<2	< 1	<3	<3	<3	<3	<3	<3	<10	<15	<2	<3 - 0.76	<3	<3	<3	<3 - 0.88
Tellurium: Dissolved	mg/L	NS	NS	<0.0002	< 0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.003	NS	<0.00002	< 0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.000002	0.0000024	0.000002	0.000004	0.000007	<0.00005	<0.00005	0.000003
Thorium: Dissolved	mg/L	NS	NS	<0.0001	< 0.00005	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	NS	22	<0.0002	< 0.0001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0002	<0.0002	<0.0002	0.00024	<0.0002	<0.005	<0.005	<0.0002
Titanium: Dissolved	mg/L	1	NS	<0.0002	< 0.0002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.005	<0.0005
Tungsten: Dissolved	mg/L	NS	NS	-	< 0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	3	0.02	<0.0001	0.00021	0.00013	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.000058	0.0000475	0.000045	0.00006	0.000064	<0.0001	<0.0001	0.000056
Vanadium: Dissolved	mg/L	NS	NS	0.008	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0034	0.00372	0.00507	0.00483	0.00474	<0.005	<0.005	0.00423
Zinc: Dissolved	mg/L	0.075 - 2.4*	5	<0.001	< 0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0002	0.00082	0.00031	0.00065	0.00034	<0.005	<0.005	0.00081
Zirconium: Dissolved	mg/L	NS	NS	<0.002	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0001

Notes:

BC CSR - BC Contaminated Sites Regulation (CSR) (BC Reg. 375/96, including amendments up to BC Reg. 4/2014, January 31, 2014), Schedule 6 and 10 Generic Numerical Water Standards for the Protection of Freshwater Aquatic Life (AW) and Drinking Water (DW)

* Indicates that the guideline is dependent on chloride, hardness or pH

** Stage 8 Amendment of the CSR applies

NS - No standard

Parameter exceeds CSR AW standard

Parameter exceeds CSR DW standard

Italics

BOLD

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Unit	BC CSR		AG99-01															
		Aquatic Life	Drinking Water	28-Aug-09	10-Dec-09	29-Apr-10	1-Nov-10	9-Mar-11	11-May-11	16-Aug-11	29-Nov-11	21-Feb-12	24-May-12	16-Aug-12	4-Dec-12	21-Feb-13	28-May-13	20-Aug-13	27-Nov-13
Physical Tests																			
pH (Field)	pH_Units	NS	NS	7.72	6.64	8.29	7.66	7.36	7.52	7.8	7.65	7.7	7.8	7.71	8.23	7.09	7.39	7.83	8.03
pH (Lab)	pH_Units	NS	NS	8.08	7.92	8.16	7.92	7.67	7.97	7.91	7.88	7.97	8.08	8.17	8.08	8.05	8.21	8.17	8.15
Specific Conductance (Field)	uS/cm	NS	NS	169	76	141	191	203	234	221	201	173	215	186	178	192	208	211	199
Specific Conductance (Lab)	uS/cm	NS	NS	191	167	200	200	225	242	235	215	200	212	196	178	179	209	218	193
Temperature (Field)	°C	NS	NS	11.84	10.66	11.05	11.28	10.83	10.77	11.4	10.42	10.6	11	11.33	10.93	10.15	11.04	11.34	10.7
Dissolved Oxygen (Field)	mg/L	NS	NS	8.05	10.9	13.06	13	2.9	5.82	11.21	6.33	9.8	6.9	8.41	9.08	7.11	10.36	13.34	-
Hardness: Total (as CaCO3) (Lab)	mg/L	NS	NS	94.1	83.9	99.7	98	129	123	118	103	101	108	93.7	93.6	86.4	-	114	95.5
Dissolved Solids: Total	mg/L	NS	NS	-	-	-	-	-	-	-	-	100	140	121	115	125	136	138	99
Oxidation Reduction Potential (Field)	mV	NS	NS	199	80.6	164.3	40.5	-377.5	119.7	189.9	41.2	88.5	245	48.7	44.4	206.7	198.1	-16.2	-
Anions and Nutrients																			
Ammonia (as N)	mg/L	1.31 - 18.4*	NS	<0.01	< 0.01	<0.01	0.039	0.014	0.02	0.032	0.02	0.0066	0.013	0.0069	0.015	0.011	0.033	0.013	0.0053
Nitrogen: Nitrite (as N) (Lab)	mg/L	0.2 - 2*	3.2	<0.002	< 0.002	<0.005	<0.005	<0.005	<0.005	<0.005	0.0065	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nitrogen: Nitrate (as N) (Lab)	mg/L	400	10	0.15	0.14	0.167	0.194	0.16	0.22	0.33	0.171	0.146	0.163	0.166	0.125	0.11	0.171	0.186	0.132
Chloride (Lab)	mg/L	1,500	250	3.12	1.72	1.4	1.8	1.9	2.9	4.4	2.5	2	3	2.6	1.8	1.6	2.9	2.9	2.1
Fluoride: Dissolved	mg/L	2 - 3*	1.5	<0.05	< 0.05	0.018	0.013	0.02	0.02	0.01	0.024	0.022	0.02	0.019	0.022	0.016	0.017	0.017	0.018
Sulphate (Lab)	mg/L	1,000	500	3.51	3.04	3.1	7.03	2.7	4.2	3.5	3.74	3.59	3.59	2.26	3.13	2.91	3.26	3.45	3.79
Alkalinity (as CaCO3) (Lab)	mg/L	NS	NS	96.6	87.2	103	102	110	130	110	104	98.8	103	97.1	88.2	87.5	100	109	93.1
Bicarbonate (as CaCO3)	mg/L	NS	NS	118	-	126	124	140	150	130	127	121	126	119	108	107	123	133	114
Carbonate (as CaCO3)	mg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hydroxide	mg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Metals																			
Aluminum: Dissolved	mg/L	NS	9.5	0.003	0.003	0.0112	0.0032	0.006	0.01	0.004	<0.003	0.004	0.0036	0.00321	0.00492	0.00271	0.0064	0.0042	0.0217
Antimony: Dissolved	mg/L	0.2	0.006	<0.0002	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00003	0.000037	0.000026	0.000029	0.00003	<0.0005	<0.0005	0.000026
Arsenic: Dissolved	mg/L	0.05	0.01	0.001	0.0012	0.00101	0.00095	0.0009	0.0009	0.0008	0.00089	0.00089	0.000814	0.000867	0.000931	0.00102	0.00084	0.00081	0.000877
Barium: Dissolved	mg/L	10	1	0.0017	0.0013	0.002	0.0018	0.002	0.003	0.002	0.0019	0.00193	0.00182	0.00171	0.00159	0.00148	0.002	0.002	0.00171
Beryllium: Dissolved	mg/L	0.053	NS	<0.0002	< 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.0001	<0.0001	<0.00001
Bismuth: Dissolved	mg/L	NS	NS	<0.0002	< 0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.001	<0.001	<0.000005
Boron: Dissolved	mg/L	50	5	<0.01	0.006	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium: Dissolved	mg/L	0.0001-0.0013*	0.005	<0.00004	0.00008	0.000163	0.00001	<0.00001	0.00036	0.00002	<0.00001	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.00001	<0.00001	0.000006
Calcium: Dissolved	mg/L	NS	NS	30.3	27.6	32.3	31.4	41.1	39.6	38.2	33.2	32.6	35.3	30	30.8	27.9	33.5	36.7	31.1
Chromium: Dissolved	mg/L	0.01, 0.09	0.05	0.0006	0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0005	0.00052	0.00055	0.00045	0.00023	<0.001	<0.001	0.00046
Cobalt: Dissolved	mg/L	0.04	NS	<0.0002	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.000005	<0.000005	<0.000005	0.000006	<0.000005	<0.0005	<0.0005	0.000007
Copper: Dissolved	mg/L	0.02 - 0.090*	1	0.0006	0.0004	0.00025	<0.0002	0.0002	0.0009	0.0003	<0.0002	0.0004	0.000136	0.00012	0.000181	0.000192	0.00079	0.00023	0.000259
Iron: Dissolved (Lab)	mg/L	NS	NS**	<0.01	< 0.01	0.0091	<0.005	<0.005	<0.005	<0.005	<0.005	0.001	0.0013	0.0016	0.003	<0.001	0.0078	<0.005	0.0059
Lead: Dissolved	mg/L	0.040 - 0.160*	0.01	<0.0002	< 0.00005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.000022	0.0000068	<0.000005	<0.000005	<0.000005	<0.0002	<0.0002	0.000018
Lithium: Dissolved	mg/L	NS	0.73	<0.0002	0.0002	<0.005	<0.005	-	-	<0.005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.005	<0.0005
Magnesium: Dissolved	mg/L	NS	100	4.45	3.6	4.62	4.77	6.41	5.79	5.46	4.91	4.86	4.9	4.57	4.07	4.1	4.72	5.36	4.35
Manganese: Dissolved	mg/L	NS	NS**	<0.0002	< 0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0001	<0.00005	0.000097	0.00014	<0.00005	<0.001	<0.001	0.000151
Mercury: Dissolved	mg/L	0.001	0.001	<0.00002	< 0.02	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00005	<0.00005	<0.000002
Molybdenum: Dissolved	mg/L	10	0.25	<0.0001	0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00012	0.000106	0.000105	0.00013	0.000125	<0.001	<0.001	0.000078
Nickel: Dissolved	mg/L	0.250 - 1.5*	NS	<0.0002	< 0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00003	0.000033	0.000034	0.00004	<0.00002	<0.001	<0.001	0.000549
Phosphorus: Dissolved	mg/L	NS	NS	<0.03	< 0.015	-	-	0.02	0.01	-	0.0231	0.0123	0.0305	0.0305	0.0411	-	-	-	-
Potassium: Dissolved	mg/L	NS	NS	0.69	0.6	0.742	0.709	0.96	0.84	0.73	0.772	0.79	0.77	0.723	0.689	0.644	0.686	0.748	0.706
Selenium: Dissolved	mg/L	0.01	0.01	<0.0002	< 0.0002	0.00011	0.00011	0.0001	0.0001	0.0001	0.00015	0.0001	0.000158	0.000127	0.000089	0.000117	0.00012	0.00012	0.000138
Silicon: Dissolved	mg/L	NS	NS	6.35	4.65	6.54	5.66	7.1	6.2	6.2	5.68	5.7	5.95	5.64	6.48	5.75	5.74	6.43	6.02
Silver: Dissolved	mg/L	0.0005-0.015*	NS	<0.00005	< 0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.00002	<0.00002	<0.000005
Sodium: Dissolved	mg/L	NS	200	1.6	1.29	1.55	1.64	1.99	1.74	1.82	1.74	1.71	1.65	1.64	1.54	1.57	1.72	1.88	1.66
Strontium: Dissolved	mg/L	NS	22	0.043	0.039	0.0432	0.0464	0.053	0.057	0.054	0.0503	0.0463	0.0483	0.0467	0.0425	0.0414	0.0514	0.0544	0.0417
Sulphur: Dissolved	mg/L	NS	NS	<2	< 1	<3	<3	<3	<3	<3	<3	<10	<15	<2	<3 - 1.23	<3 - 0.84	<3	<3	<3
Tellurium: Dissolved	mg/L	NS	NS	<0.0002	< 0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.003	NS	<0.00002	< 0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002	<0.00005	<0.00005	<0.000002
Thorium: Dissolved	mg/L	NS	NS	<0.0001	< 0.00005	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	NS	22	<0.0002	< 0.0001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0002	<0.0002	<0.0002	0.00021	<0.0002	<0.005	<0.005	<0.0002
Titanium: Dissolved	mg/L	1	NS	0.0003	< 0.0002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.005	<0.0005
Tungsten: Dissolved	mg/L	NS	NS	-	< 0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	3	0.02	<0.0001	0.00008	0.00011	0.00011	0.0001	0.0001	0.0001	0.0001	0.000106	0.0000937	0.000082	0.00009	0.000085	<0.0001	<0.0001	0.000084
Vanadium: Dissolved	mg/L	NS	NS	0.0066	0.0063	0.0063	0.0062	0.007	0.006	0.006	0.006	0.006	0.0065	0.00571	0.00609	0.0063	0.00637	0.0058	0.00595
Zinc: Dissolved	mg/L	0.075 - 2.4*	5	0.002	0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0003	0.00018	0.00052	0.00028	0.00013	0.0066	<0.005	0.00106
Zirconium: Dissolved	mg/L	NS	NS	<0.002	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0001

Notes:

BC CSR - BC Contaminated Sites Regulation (CSR) (BC Reg. 375/96, including amendments up to BC Reg. 4/2014, January 31, 2014), Schedule 6 and 10 Generic Numerical Water Standards for the Protection of Freshwater Aquatic Life (AW) and Drinking Water (DW)

* Indicates that the guideline is dependent on chloride, hardness or pH

** Stage 8 Amendment of the CSR applies

NS - No standard

Parameter exceeds CSR AW standard

Parameter exceeds CSR DW standard

Italics

BOLD

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Unit	BC CSR		AG99-02																
		Aquatic Life	Drinking Water	27-Aug-09	9-Dec-09	29-Apr-10	2-Nov-10	10-Mar-11	11-May-11	15-Aug-11	29-Nov-11	22-Feb-12	23-May-12	15-Aug-12	3-Dec-12	20-Feb-13	29-May-13	20-Aug-13	26-Nov-13	
Physical Tests																				
pH (Field)	pH_Units	NS	NS	8.16	6.95	8.2	8.07	8.17	7.97	8.03	7.95	8	7.9	8.01	8.17	8.25	7.69	8.24	8.2	
pH (Lab)	pH_Units	NS	NS	8.12	8.07	8.07	8.09	7.79	8.03	8.01	7.87	8.17	7.98	8.06	8.17	7.99	8.07	8.14	8.3	
Specific Conductance (Field)	uS/cm	NS	NS	144	95	104	184	213	224	217	210	256	204	165	216	176	141	164	255	
Specific Conductance (Lab)	uS/cm	NS	NS	165	213	153	184	234	230	226	226	295	205	170	210	170	144	166	253	
Temperature (Field)	°C	NS	NS	11.46	10.17	10.93	10.84	9.84	10.63	11.2	10.1	9.9	10.7	11.7	10.35	9.82	10.68	11.24	9.45	
Dissolved Oxygen (Field)	mg/L	NS	NS	4.92	9.7	20.84	11.9	7.07	8.89	11.7	6.69	6.9	6.8	9.01	6.6	8.51	22	8.4	0.81	
Hardness: Total (as CaCO3) (Lab)	mg/L	NS	NS	81.7	101	74.3	66.3	130	116	115	112	152	99.8	86.7	109	81.4	-	79.5	130	
Dissolved Solids: Total	mg/L	NS	NS	-	-	-	-	-	-	-	-	200	130	108	139	115	92	106	165	
Oxidation Reduction Potential (Field)	mV	NS	NS	192	51.9	181.6	41.3	-355	88.2	86.9	122.6	96	43.2	-17.9	286	115.2	301	-79.1	140.7	
Anions and Nutrients																				
Ammonia (as N)	mg/L	1.31 - 18.4*	NS	<0.01	< 0.01	<0.01	<0.005	0.016	0.024	0.017	0.021	<0.005	0.026	0.011	0.027	0.016	0.034	0.0096	0.009	
Nitrogen: Nitrite (as N) (Lab)	mg/L	0.2 - 2*	3.2	<0.002	< 0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Nitrogen: Nitrate (as N) (Lab)	mg/L	400	10	0.15	0.16	0.151	0.153	0.197	0.152	0.19	0.17	0.152	0.197	0.152	0.175	0.136	0.126	0.134	0.205	
Chloride (Lab)	mg/L	1,500	250	2.4	2.1	1.1	1	1.4	1.6	2.1	2.4	1.8	1.7	2	1.9	1.7	1.5	1.6	1.8	
Fluoride: Dissolved	mg/L	2 - 3*	1.5	<0.05	< 0.05	0.016	0.022	0.01	0.01	0.01	0.019	0.017	0.016	0.014	0.016	0.015	0.017	0.014	0.013	
Sulphate (Lab)	mg/L	1,000	500	2.96	3.02	3.54	1.44	2.9	3.8	3	3.21	3.72	3.47	2.24	3.41	3.21	3.7	3.15	3.98	
Alkalinity (as CaCO ₃) (Lab)	mg/L	NS	NS	83.8	113	76.3	90.8	120	120	110	110	154	99.7	84.6	104	82.4	68.7	82	126	
Bicarbonate (as CaCO ₃)	mg/L	NS	NS	102	-	93.1	111	140	150	140	134	188	122	103	127	101	83.8	100	151	
Carbonate (as CaCO ₃)	mg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.95	
Hydroxide	mg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Dissolved Metals																				
Aluminum: Dissolved	mg/L	NS	9.5	0.006	0.004	0.0098	0.0057	0.007	0.007	0.006	0.0047	0.0049	0.00634	0.00681	0.00593	0.00569	0.0069	0.0066	0.0155	
Antimony: Dissolved	mg/L	0.2	0.006	<0.0002	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00003	0.000036	0.000032	0.000036	0.000032	<0.0005	<0.0005	0.000029	
Arsenic: Dissolved	mg/L	0.05	0.01	0.0022	0.0021	0.00226	0.00209	0.002	0.002	0.002	0.00193	0.00188	0.00216	0.00234	0.00209	0.00223	0.00249	0.00235	0.00215	
Barium: Dissolved	mg/L	10	1	0.0041	0.005	0.0039	0.0044	0.006	0.0054	0.00757	0.00483	0.00413	0.00497	0.00385	0.0033	0.0039	0.00376	0.00576		
Beryllium: Dissolved	mg/L	0.053	NS	<0.0002	< 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Bismuth: Dissolved	mg/L	NS	NS	<0.0002	< 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.0001	<0.0001	<0.000005	
Boron: Dissolved	mg/L	50	5	<0.01	< 0.005	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Cadmium: Dissolved	mg/L	0.0001-0.0013*	0.005	<0.00004	0.00003	0.000469	<0.00001	<0.00001	0.00006	<0.00001	0.000007	0.0000068	<0.000005	<0.000005	<0.000005	0.00002	0.00001	<0.000005		
Calcium: Dissolved	mg/L	NS	NS	26.9	33.3	24.6	28.8	36.9	38.1	36.9	32.9	36.9	33	28.6	35.9	22.6	26.1	43.1		
Chromium: Dissolved	mg/L	0.01, 0.09	0.05	0.0006	0.0006	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0006	0.00049	0.00044	0.0006	0.0003	0.0037	<0.001	0.00044	
Cobalt: Dissolved	mg/L	0.04	NS	<0.0002	< 0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.000005	0.0000086	<0.000005	0.000005	0.000005	<0.0005	<0.0005	0.000007	
Copper: Dissolved	mg/L	0.02 - 0.090*	1	0.0006	0.0001	0.00028	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	0.00006	0.000247	0.000124	0.000175	0.000171	0.00022	0.00024	0.000186	
Iron: Dissolved (Lab)	mg/L	NS	NS**	<0.01	< 0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.001	0.0014	0.0012	<0.001	0.0025	<0.05	<0.05	0.0012	
Lead: Dissolved	mg/L	0.040 - 0.160*	0.01	<0.0002	< 0.00005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.000005	0.0000066	<0.000005	<0.000005	0.000006	<0.0002	<0.0002	0.000015	
Lithium: Dissolved	mg/L	NS	0.73	0.0002	< 0.0001	<0.05	<0.05	-	-	<0.005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.005	<0.0005	
Magnesium: Dissolved	mg/L	NS	100	3.53	4.26	3.12	3.52	5.81	4.94	4.82	4.8	6.7	4.2	3.7	4.7	3.57	2.86	3.48	5.41	
Manganese: Dissolved	mg/L	NS	NS**	<0.0002	< 0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00007	0.000345	0.000143	<0.00005	<0.00005	<0.001	<0.001	0.000068	
Mercury: Dissolved	mg/L	0.001	0.001	<0.0002	< 0.0002	<0.0002	<0.0002	<0.00005	<0.00005	<0.00005	<0.00005	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00005	<0.00002	<0.000002	
Molybdenum: Dissolved	mg/L	10	0.25	<0.0001	< 0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	0.000113	0.000108	0.000147	0.000156	0.0059	<0.001	0.000053	
Nickel: Dissolved	mg/L	0.250 - 1.5*	NS	<0.0002	< 0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00002	0.000059	0.000022	0.000023	<0.00002	0.0223	<0.001	0.000055	
Phosphorus: Dissolved	mg/L	NS	NS	0.04	0.03	-	-	0.04	0.04	-	-	0.0328	0.0304	0.0467	0.0563	-	-	-	-	
Potassium: Dissolved	mg/L	NS	NS	1.17	1.26	1.13	1.15	1.54	1.33	1.33	1.39	1.66	1.35	1.21	1.36	1.13	1.03	1.14	1.45	
Selenium: Dissolved	mg/L	0.01	0.01	<0.0002	< 0.0002	0.00019	0.00013	0.0002	0.0002	0.00014	0.00013	0.000217	0.000114	0.000163	0.000179	0.00023	0.00016	0.000157		
Silicon: Dissolved	mg/L	NS	NS	5.35	4.2	5.32	4.22	5.8	5.1	5.1	4.83	4.9	5.21	5.09	5.03	4.84	5.02	5.14	5.23	
Silver: Dissolved	mg/L	0.0005-0.015*	NS	<0.00005	< 0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.00002	<0.00002	<0.000005	
Sodium: Dissolved	mg/L	NS	200	1.41	1.31	1.24	1.31	1.78	1.61	1.54	1.67	2.01	1.78	1.77	1.49	1.31	1.49	1.82		
Strontium: Dissolved	mg/L	NS	22	0.035	0.047	0.0299	0.036	0.048	0.048	0.049	0.0482	0.0628	0.0412	0.0348	0.0438	0.034	0.0289	0.0345	0.0495	
Sulphur: Dissolved	mg/L	NS	NS	<2	< 1	<3	<3	<3	<3	<3	<3	<10	<15	<2	<3 - 1.24	<3 - 0.88	<3	<3	<3	
Tellurium: Dissolved	mg/L	NS	NS	<0.0002	< 0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Thallium: Dissolved	mg/L	0.003	NS	<0.0002	< 0.0002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002	<0.00005	<0.00005	<0.000002	
Thorium: Dissolved	mg/L	NS	NS	<0.0001	< 0.00005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Tin: Dissolved	mg/L	NS	22	<0.0002	< 0.0001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.005	<0.005	<0.0002	
Titanium: Dissolved	mg/L	1	NS	0.0003	< 0.0002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.005	<0.0005	
Tungsten: Dissolved	mg/L	NS	NS	-	< 0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Uranium: Dissolved	mg/L	3	0.02	0.0004	0.00069	0.00033	0.00042	0.0007	0.0007	0.0007	0.00058	0.000996	0.00048	0.000306	0.000463	0.000276	0.00017	0.00025	0.000513	
Vanadium: Dissolved	mg/L	NS	NS	0.019	0.016	0.0183	0.0186	0.019	0.018	0.018	0.0178	0.0172	0.0181	0.0192	0.0198	0.0204	0.0193	0.0181		
Zinc: Dissolved	mg/L	0.075 - 2.4*	5	0.002	0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0004	0.00088	0.00042	0.00056	0.00035	<0.005	<0.005	0.00142	
Zirconium: Dissolved	mg/L	NS	NS	<0.002	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0001	

Notes:

BC CSR - BC Contaminated Sites Regulation (CSR) (BC Reg. 375/96, including amendments up to BC Reg. 4/2014, January 31, 2014), Schedule 6 and 10 Generic Numerical Water Standards for the Protection of Freshwater Aquatic Life (AW) and Drinking Water (DW)

* Indicates that the guideline is dependent on chloride, hardness or pH

** Stage 8 Amendment of the CSR applies

NS - No standard

Parameter exceeds CSR AW standard	<i>Italics</i>
Parameter exceeds CSR DW standard	BOLD

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Unit	BC CSR				AG99-04														
		Aquatic Life	Drinking Water	28-Aug-09	10-Dec-09	29-Apr-10	2-Nov-10	10-Mar-11	11-May-11	15-Aug-11	29-Nov-11	22-Feb-12	23-May-12	17-Aug-12	3-Dec-12	20-Feb-13	29-May-13	20-Aug-13	26-Nov-13	
Physical Tests																				
pH (Field)	pH_Units	NS	NS	8.05	6.93	8.25	8.12	8.09	7.78	8.13	8.02	8.1	7.8	8.07	8.22	6.82	7.7	8.36	8.25	
pH (Lab)	pH_Units	NS	NS	7.86	7.58	7.91	7.91	7.43	7.81	7.78	7.86	7.89	7.88	7.86	7.86	7.8	7.88	7.81	7.97	
Specific Conductance (Field)	uS/cm	NS	NS	78	45	66	103	96	93	95	94	90	97	91	113	119	93	91	108	
Specific Conductance (Lab)	uS/cm	NS	NS	94	105	92.1	103	106	96	99	106	102	97.5	96.6	114	112	95.8	99.6	110	
Temperature (Field)	°C	NS	NS	10.9	10.48	12.09	9.96	11.39	11.76	10.6	9.65	10.6	11.3	10.47	10.01	10.46	11.46	10.72	9.8	
Dissolved Oxygen (Field)	mg/L	NS	NS	9.75	9.78	21	15.9	6.45	10.84	12.9	9.75	6.6	9.7	8.61	8.97	10.51	26.89	14.01	9.77	
Hardness: Total (as CaCO3) (Lab)	mg/L	NS	NS	44.2	48.6	43.1	35.2	55.7	44.6	50.3	50.4	49.4	46.1	44.3	59.7	50.7	-	46.5	54.4	
Dissolved Solids: Total	mg/L	NS	NS	-	-	-	-	-	-	-	-	100	60	60	74	79	60	60	71	
Oxidation Reduction Potential (Field)	mV	NS	NS	181.9	59.2	161.7	29.2	-351.8	98.9	87	116.3	73.8	82.2	82.6	330	103.6	295.2	-32.3	132.7	
Anions and Nutrients																				
Ammonia (as N)	mg/L	1.31 - 18.4*	NS	<0.01	< 0.01	<0.01	0.0087	0.015	<0.005	0.032	0.013	0.0071	0.011	0.012	0.026	<0.005	0.0099	0.02	0.019	
Nitrogen: Nitrite (as N) (Lab)	mg/L	0.2 - 2*	3.2	<0.002	< 0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Nitrogen: Nitrate (as N) (Lab)	mg/L	400	10	0.1	0.1	0.084	0.111	0.1	0.1	0.18	0.128	0.104	0.099	0.147	0.14	0.11	0.102	0.161	0.139	
Chloride (Lab)	mg/L	1,500	250	1.23	1.06	0.92	<0.5	1.3	1.3	1.9	1.1	1.9	1.9	1.5	3	2	1.5	1.6	1.4	
Fluoride: Dissolved	mg/L	2 - 3*	1.5	<0.05	< 0.05	0.025	0.024	0.02	0.02	0.01	0.022	0.022	0.018	0.017	0.018	0.014	0.018	0.016	0.015	
Sulphate (Lab)	mg/L	1,000	500	2.78	2.71	3.47	1.56	2.4	3.3	2.2	2.87	3.05	2.99	2.34	3.12	2.84	3.01	2.77	2.9	
Alkalinity (as CaCO3) (Lab)	mg/L	NS	NS	45.2	52.4	44.8	49.3	50	48	45	49.4	47.6	42.8	46.5	50.5	50.5	42.9	44.3	52	
Bicarbonate (as CaCO3)	mg/L	NS	NS	55.1	-	54.6	60.1	61	59	55	60.2	58.1	52.2	56.8	61.7	61.6	52.3	54	63.4	
Carbonate (as CaCO3)	mg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Hydroxide	mg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Dissolved Metals																				
Aluminum: Dissolved	mg/L	NS	9.5	0.005	0.004	0.0099	0.0058	0.008	0.008	0.005	0.0042	0.0064	0.0062	0.0108	0.00548	0.00521	0.0057	0.0059	0.00734	
Antimony: Dissolved	mg/L	0.2	0.006	<0.0002	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00003	0.000022	0.000024	0.000023	0.000026	<0.0005	<0.0005	0.000026	
Arsenic: Dissolved	mg/L	0.05	0.01	0.0005	0.0005	0.00051	0.00041	0.0004	0.0004	0.00039	0.00043	0.000474	0.000434	0.000422	0.000394	0.00047	0.00041	0.000404	0.000404	
Barium: Dissolved	mg/L	10	1	0.0006	0.0006	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00068	0.000612	0.000766	0.000733	0.000683	<0.001	<0.001	0.000714	
Beryllium: Dissolved	mg/L	0.053	NS	<0.0002	< 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.0001	<0.0001	<0.00001	
Bismuth: Dissolved	mg/L	NS	NS	<0.0002	< 0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.001	<0.001	<0.000005	
Boron: Dissolved	mg/L	50	5	<0.01	0.006	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Cadmium: Dissolved	mg/L	0.0001-0.0013*	0.005	< 0.00004	< 0.00001	0.000342	<0.00001	0.00004	0.00018	<0.00001	<0.00001	<0.000005	<0.000005	0.000011	<0.000005	<0.000005	<0.00001	<0.00001	<0.000005	
Calcium: Dissolved	mg/L	NS	NS	14.9	16.8	14.7	11.5	18.8	15.1	17.4	17.2	16.7	15.8	14.9	20.5	17.3	14.9	15.8	18.8	
Chromium: Dissolved	mg/L	0.01, 0.09	0.05	0.0003	< 0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0002	0.0002	0.00025	0.0002	<0.0001	0.0038	<0.001	0.00015	
Cobalt: Dissolved	mg/L	0.04	NS	<0.0002	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0000077	0.000008	0.000007	0.000011	<0.0005	<0.0005	0.000006	0.000006	
Copper: Dissolved	mg/L	0.02 - 0.090*	0.0003	0.0003	0.0002	0.00028	<0.0002	0.0007	0.0003	0.0002	0.000172	0.000172	0.000428	0.000254	0.000252	<0.0002	0.00037	0.0002	0.0002	
Iron: Dissolved (Lab)	mg/L	NS	NS**	<0.01	< 0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.015	<0.001	0.0025	0.0017	<0.001	<0.005	<0.005	<0.001	
Lead: Dissolved	mg/L	0.040 - 0.160*	0.01	<0.0002	< 0.00005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.000006	<0.000005	0.000012	0.000014	<0.000005	<0.0002	<0.0002	0.000006	
Lithium: Dissolved	mg/L	NS	0.73	<0.0002	< 0.0001	<0.005	<0.005	-	-	<0.005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.005	<0.0005	
Magnesium: Dissolved	mg/L	NS	100	1.66	1.63	1.54	1.59	2.14	1.66	1.68	1.79	1.91	1.62	1.73	2.1	1.83	1.5	1.69	1.8	
Manganese: Dissolved	mg/L	NS	NS**	<0.0002	< 0.0001	<0.001	0.0014	<0.001	<0.001	<0.001	<0.001	0.00007	<0.00005	0.000073	<0.00005	<0.00005	<0.001	<0.001	<0.00005	
Mercury: Dissolved	mg/L	0.001	0.001	0.00002	< 0.02	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	-	<0.00001	<0.00001	<0.00001	<0.00005	<0.00005	<0.000002	<0.000002	
Molybdenum: Dissolved	mg/L	10	0.25	<0.0001	0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0001	0.00012	0.000123	0.000166	0.000129	0.0064	<0.001	0.000125	
Nickel: Dissolved	mg/L	0.250 - 1.5*	NS	<0.0002	< 0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00006	0.000051	0.00006	0.000025	<0.00002	0.0254	<0.001	0.000078	
Phosphorus: Dissolved	mg/L	NS	NS	<0.03	< 0.015	0.289	0.245	0.34	0.067	0.01	0.064	0.064	0.064	0.074	0.289	0.288	0.277	0.285	0.28	
Potassium: Dissolved	mg/L	NS	NS	0.25	0.32	0.289	0.245	0.34	0.067	0.01	0.064	0.064	0.064	0.074	0.289	0.288	0.277	0.285	0.28	
Selenium: Dissolved	mg/L	0.01	0.01	<0.0002	< 0.00011	0.00012	0.00012	0.0001	<0.0001	0.0001	0.00013	0.0001	0.000094	0.000136	0.000086	0.000128	0.00011	0.0001	0.000135	
Silicon: Dissolved	mg/L	NS	NS	3.72	2.99	4.04	3.04	4.4	3.7	3.9	3.34	3.6	3.6	3.44	4.03	3.78	3.79	3.83	4.1	
Silver: Dissolved	mg/L	0.0005-0.015*	NS	<0.00005	< 0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.00002	<0.00002	<0.000005	
Sodium: Dissolved	mg/L	NS	200	1.13	1.06	1.08	1.07	1.58	1.24	1.39	1.28	1.44	1.18	1.31	1.49	1.4	1.28	1.43	1.37	
Strontium: Dissolved	mg/L	NS	22	0.022	0.024	0.0209	0.0228	0.024	0.023	0.023	0.0257	0.0258	0.0228	0.0224	0.0275	0.0254	0.022	0.0231	0.0272	
Sulphur: Dissolved	mg/L	NS	NS	<2	< 1	<3	<3	<3	<3	<3	<3	<10	<15	<2	<3 - 1.27	<0.6	<3	<3	<3	
Tellurium: Dissolved	mg/L	NS	NS	<0.0002	< 0.0002	-	-	-</												

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Unit	BC CSR		AG99-05	AG99-05-DUP	AG99-05																	
		Aquatic Life	Drinking Water			28-Aug-09		11-Dec-09	30-Apr-10	2-Nov-10	10-Mar-11	11-May-11	16-Aug-11	29-Nov-11	21-Feb-12	23-May-12	15-Aug-12	4-Dec-12	21-Feb-13	29-May-13	21-Aug-13	26-Nov-13	
Physical Tests																							
pH (Field)	pH_Units	NS	NS		8.21	-	7.43	7.89	8.36	8.23	8.09	8.53	8.37	8.3	8.13	8.17	7.99	6.62	7.88	8.43	8.6		
pH (Lab)	pH_Units	NS	NS		7.84	7.95	7.51	8.09	7.85	7.62	8.03	7.87	7.83	7.93	7.98	8.03	7.85	7.92	8.16	7.83	7.79		
Specific Conductance (Field)	uS/cm	NS	NS		78	-	45	-	104	128	197	101	90	97	154	125	102	145	189	107	106.5		
Specific Conductance (Lab)	uS/cm	NS	NS		89	94	95	153	93.6	141	198	106	96.6	113	153	130	101	135	191	112	97.1		
Temperature (Field)	°C	NS	NS		11.69	-	10.33	11.37	11.01	10.72	11.28	11.74	10.49	8.6	10.8	11.47	10.21	10.04	10.96	11.56	10.4		
Dissolved Oxygen (Field)	mg/L	NS	NS		9.97	-	7.5	8.84	21	8.88	9.43	7.59	6.5	5.3	8.88	7.23	7.16	8.88	8.96	8.36	8.96		
Hardness: Total (as CaCO3) (Lab)	mg/L	NS	NS		42.4	43.1	39.6	74.2	44.8	75.1	98.2	53	42.7	53	64.3	64.3	51.5	84.3	84.3	51.5	45.4		
Dissolved Solids: Total	mg/L	NS	NS		-	-	-	-	-	-	-	-	-	-	100	100	81	67	95	12.3	70	53.1	
Oxidation Reduction Potential (Field)	mV	NS	NS		214	-	248.4	185.9	24.4	-378.1	226.2	83.1	75	113.1	69.5	-17.5	-5.8	84.1	392.6	6.7	-		
Anions and Nutrients																							
Ammonia (as N)	mg/L	1.31 - 18.4*	NS		<0.01	<0.01	< 0.01	<0.01	<0.005	0.015	0.01	0.015	0.022	<0.005	0.028	0.012	0.02	0.0063	0.0081	0.02	0.0055		
Nitrogen: Nitrite (as N) (Lab)	mg/L	0.2 - 2*	3.2		<0.002	<0.002	< 0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		
Nitrogen: Nitrate (as N) (Lab)	mg/L	400	100		0.06	0.05	0.08	0.079	0.065	0.09	0.09	0.08	0.07	0.075	0.057	0.058	0.071	0.09	0.076	0.068	0.08		
Chloride (Lab)	mg/L	1,500	250		1.05	1.09	0.95	1.4	0.55	1.6	3.9	1.9	0.91	0.6	4.6	2.6	1.6	2.7	3.2	1.4	1.4		
Fluoride: Dissolved	mg/L	2 - 2*	1.5		<0.05	< 0.05	0.015	0.015	0.012	0.02	0.01	0.01	0.01	0.023	0.016	0.016	0.019	0.019	0.015	0.018	0.00759		
Sulphate (Lab)	mg/L	2,900	500		2.9	2.87	4.6	3.6	3.22	4.6	3.24	3.92	2.63	3.24	3.92	3.92	3.92	3.92	3.92	2.95	2.95		
Alkalinity (as CaCO3) (Lab)	mg/L	NS	NS		43.8	45.3	46.7	78.2	46.1	68	100	50	42.5	53.3	69.8	62.3	48.1	61.7	90.8	50.1	46.1		
Bicarbonate (as CaCO3)	mg/L	NS	NS		53.5	55.3	-	95.5	56.2	83	120	61	51.9	65.1	85.2	76	58.6	75.3	111	61.1	56.2		
Carbonate (as CaCO3)	mg/L	NS	NS		<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Hydroxide	mg/L	NS	NS		<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Dissolved Metals																							
Aluminum: Dissolved	mg/L	NS	9.5		0.006	0.007	0.005	0.0064	0.0059	0.007	0.005	0.007	0.0052	0.0074	0.00535	0.00664	0.00614	0.00578	0.0051	0.0063	0.0237		
Antimony: Dissolved	mg/L	0.2	0.006		<0.0002	<0.0002	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00003	0.000022	0.000023	0.000028	0.000022	<0.0005	<0.0005	0.000027		
Arsenic: Dissolved	mg/L	0.05	0.01		0.001	0.0009	0.001	0.00069	0.00085	0.0007	0.0006	0.0008	0.00081	0.00078	0.000662	0.00066	0.000773	0.000647	0.00059	0.00071	0.000759		
Boron: Dissolved	mg/L	10	1		0.0006	0.0006	0.001	0.001	0.0009	<0.001	<0.001	<0.001	<0.001	0.00104	0.000946	0.000812	0.000812	0.000812	0.0012	<0.001	0.000691		
Beryllium: Dissolved	mg/L	0.053	NS		<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.0001	<0.0001	<0.0001		
Bismuth: Dissolved	mg/L	NS	NS		<0.0002	<0.0002	< 0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.001	<0.001	<0.000005		
Boron: Dissolved	mg/L	50	5		0.01	0.01	0.007	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
Cadmium: Dissolved	mg/L	0.0001-0.0013*	0.005		<0.00004	0.00005	< 0.00001	0.000064	<0.00001	<0.00001	0.00004	<0.00001	<0.00001	<0.00006	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.000015	0.000011	<0.000005	
Calcium: Dissolved	mg/L	NS	NS		14.2	14.4	13.3	25.1	15	25.1	33	18.1	14.4	18.2	25.5	21.5	17.2	21.4	31.3	17.3	15.1		
Chromium: Dissolved	mg/L	0.01, 0.09	0.05		0.0003	0.0003	< 0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0002	0.0002	0.00021	0.00014	0.00024	<0.001	<0.001	0.00022		
Cobalt: Dissolved	mg/L	0.04	NS		<0.0002	<0.0002	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000019	0.0000069	0.000015	<0.000005	0.000008	<0.0005	<0.0005	0.000005		
Copper: Dissolved	mg/L	0.02 - 0.090*	1		0.0005	0.0005	0.0002	0.0004	<0.0002	0.0003	0.0009	<0.0002	<0.0002	0.00037	0.000252	0.000326	0.000182	0.000186	0.00069	0.00035	0.000181		
Cyanide: Dissolved (Lab)	mg/L	NS	NS*		<0.01	<0.01	< 0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.002	<0.001	0.0013	<0.001	<0.001	<0.005	<0.005	0.0015		
Lead: Dissolved	mg/L	0.040 - 0.160*	0.01		<0.0002	<0.0002	< 0.00005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.000013	<0.000005	0.00001	<0.000005	0.000007	<0.0002	<0.0002	0.00002		
Lithium: Dissolved	mg/L	NS	0.73		<0.0002	<0.0002	< 0.0001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.005	<0.005		
Magnesium: Dissolved	mg/L	NS	100		1.68	1.73	1.53	2.82	1.76	3.03	3.84	1.89	1.66	2.2	2.91	2.59	1.83	2.61	3.65	2	1.87		
Manganese: Dissolved	mg/L	NS	NS**		<0.0002	0.0002	< 0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00011	0.000056	<0.00005	<0.00005	<0.00005	<0.001	<0.001	0.00007	
Mercury: Dissolved	mg/L	0.001	0.001		<0.00002	<0.00002	< 0.02	<0.00002	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00005	<0.00005	<0.00002		
Molybdenum: Dissolved	mg/L	10	0.25		<0.0001	<0.0001	0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00011	0.00012	0.000141	0.000136	0.000154	<0.001	<0.001	0.000115		
Nickel: Dissolved	mg/L	0.250 - 1.5*	NS		<0.0002	<0.0002	< 0.0002	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00009	0.000086	0.000076	0.000025	0.000056	<0.0001	<0.001	0.000072		
Phosphorus: Dissolved	mg/L	NS	NS		<0.03	<0.03	< 0.015	0.03	<0.015	0.01	<0.01	<0.01	<0.01	-	0.0084	0.0084	0.0106	0.0236	0.048	0.364	0.368		
Potassium: Dissolved	mg/L	NS	NS		0.35	0.34	0.31	0.416	0.328	0.45	0.47	0.35	0.27	0.44	0.42	0.44	0.418	0.465	0.418	0.364	0.368		
Selenium: Dissolved	mg/L	0.01	0.01		<0.0002	<0.0002	< 0.0001	<0.0001	0.00011	0.0001	<0.0001	0.0001	0.00011	0.00009	0.000085	0.000085	0.000131	0.000072	0.00012	<0.0001	0.000115		
Silicon: Dissolved	mg/L	NS	NS		3.97	4.13	2.83	4.18	3.61	4.2	3.9	4	3.62	3.6	3.8	3.93	4.17	3.89	4.01	3.95	3.82		
Silver: Dissolved	mg/L	0.0005-0.015*	NS		<0.0005	0.00005	< 0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.00002	<0.00002	<0.000005		
Sodium: Dissolved	mg/L	NS	200		1.04	1.06	0.84	1.26	1.02	1.4	1.47	1.17	1.4	1.44	1.33	1.12	1.37	1.61	1.15	1.24	1.0005		
Strontium: Dissolved	mg/L	NS	22		0.019	0.019	0.021	0.0332	0.0209	0.031	0.046	0.023	0.0219	0.0269	0.0345	0.0295	0.0215	0.0311	0.0456	0.0239	0.0212		
Sulphur: Dissolved	mg/L	NS	NS		<2	<2	< 1	<3	<3	<3	<3	<3	<3	<10	<15	<2	<3 - 0.74	<3	<3	<3	<3		
Tellurium: Dissolved	mg/L	NS	NS		<0.0002	<0.0002	< 0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Thallium: Dissolved	mg/L	0.003	NS		<0.00002	0.00002	< 0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002	<0.00005	<0.00005	<0.000002		
Thorium: Dissolved	mg/L	NS	NS		<0.0001	<0.0001	< 0.00005	-	<0.00005	-	-	-	-	-	-	-	-	-	-	-	-		
Tin: Dissolved	mg/L	NS	22		<0.0002	<0.0002	< 0.0001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.005	<0.005	<0.0002		
Titanium: Dissolved	mg/L	1	NS		0.0002	-	< 0.0002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005		
Tungsten: Dissolved	mg/L	NS	NS		-	-	< 0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Uranium: Dissolved	mg/L	3	0.02		<0.0001	<0.00005	0.00011	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.000055	0.0000744	0.000066	0.000037	0.00006	0.00011	<0.0001	0.000		

Notes:
BC CSR - BC Contaminated Sites Regulation (CSR) (BC Reg. 375/96, including amendments up to BC Reg. 4/2014, January 31, 2014), Schedule 6 and 10 Generic Numerical Water Standards for the Protection of Freshwater Aquatic Life (AW) and Drinking Water (DW)

Parameter exceeds CSR AW standard

Parameter exceeds CSR DW standard **BOLD**

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Unit	BC CSR		AG99-06	AG99-06-DUP	AG99-06																
		Aquatic Life	Drinking Water	27-Aug-09		11-Dec-09	30-Apr-10	2-Nov-10	10-Mar-11	11-May-11	16-Aug-11	28-Nov-11	21-Feb-12	25-May-12	16-Aug-12	5-Dec-12	22-Feb-13	30-May-13	21-Aug-13	28-Nov-13		
Physical Tests																						
pH (Field)	pH Units	NS	NS	7.3	-	6.9	6.69	7.44	7.15	6.89	7.51	7.61	7.6	7.3	7.45	7.72	8.02	-	7.44	7.89		
pH (Lab)	pH Units	NS	NS	8.05	8	7.8	7.81	7.88	7.4	7.55	7.66	7.81	7.78	7.88	7.84	7.79	7.78	7.98	7.98	7.83		
Specific Conductance (Field)	uS/cm	NS	NS	257	-	65	-	194	146	207	215	149	99	152	145	107	108	244	248	157.9		
Specific Conductance (Lab)	uS/cm	NS	NS	320	322	148	261	183	164	210	225	160	118	155	149	108	97.8	246	251	145		
Temperature (Field)	°C	NS	NS	11.11	-	9.42	9.32	9.97	8.57	9.42	9.86	9.72	8.2	9.2	9.73	7.07	7.89	8.92	9.6	9.3		
Dissolved Oxygen (Field)	mg/L	NS	NS	14.15	-	12.4	14.15	17	13.24	13.95	11.86	12.22	11.4	11.1	9.14	10.17	11.63	22.81	12.40	-		
Hardness: Total (as CaCO3) (Lab)	mg/L	NS	NS	186	142	70.6	113	83.5	84.9	97	113	78.9	58.6	73.3	69.8	48.4	44	-	120	69.8		
Dissolved Solids: Total	mg/L	NS	NS	-	-	-	-	-	-	-	-	-	100	100	95	69	71	159	161	9.3		
Oxidation Reduction Potential (Field)	mV	NS	NS	109.6	-	276.7	251.8	62	-363.2	232.3	157.2	146.3	85.4	151	10.9	102.8	157.7	320.3	56.4	-		
Anions and Nutrients																						
Ammonia (as N)	mg/L	1.31 - 18.4*	NS	<0.01	<0.01	<0.01	<0.01	<0.005	0.019	0.018	0.013	0.034	<0.005	0.0073	0.01	0.0058	<0.005	0.0059	0.0091	0.011		
Nitrogen: Nitrite (as N) (Lab)	mg/L	0.2 - 2*	2.2	<0.002	<0.002	<0.002	<0.005	0.0078	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0032	<0.005	<0.005	<0.005	<0.005		
Nitrogen: Nitrate (as N) (Lab)	mg/L	400	10	0.38	0.36	0.04	0.313	0.078	0.1	0.13	0.14	0.053	<0.02	0.095	0.114	<0.02	<0.02	0.76	0.49	0.053		
Nitrate (Lab)	mg/L	1,500	250	40.3	40.4	6.43	34	8.1	11	14	11	7.3	3.9	7.6	8.2	4.7	3.7	28	14	4.8		
Fluoride: Dissolved	mg/L	2 - 3*	1.5	<0.05	<0.05	<0.05	0.022	0.019	0.02	0.02	0.02	0.032	0.038	0.029	0.029	0.037	0.022	0.024	0.021	0.041		
Sulphate (Lab)	mg/L	1,000	500	1.99	2.01	1.39	2.15	2.44	0.8	2.2	1.6	4.88	1.48	1.66	0.77	1.06	0.96	2.47	3.83	1.88		
Alkalinity (as CaCO ₃) (Lab)	mg/L	NS	NS	102	102	70.2	71.6	82.6	68	88	95	70.2	55.1	65.2	46.9	44.4	44.4	72.1	105	65.1		
Bicarbonate (as CaCO ₃) (Lab)	mg/L	NS	NS	124	124	-	87.4	101	83	110	120	85.6	67.3	54.2	67.1	57.2	54.2	87.9	128	79.4		
Carbonate (as CaCO ₃) (Lab)	mg/L	NS	NS	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Hydroxide	mg/L	NS	NS	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Dissolved Metals																						
Aluminum: Dissolved	mg/L	NS	NS	9.5	0.002	0.003	0.009	<0.003	0.0036	0.049	<0.003	<0.003	0.0019	0.00234	0.00654	0.00217	0.00208	<0.003	<0.003	0.0121		
Antimony: Dissolved	mg/L	0.2	0.006	<0.002	<0.002	<0.009	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.00002	<0.00002	<0.00002	0.00002	<0.00002	<0.0005	<0.0005	<0.0002		
Arsenic: Dissolved	mg/L	0.05	0.01	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.000043	0.000081	0.000099	<0.0001	<0.0001	0.000093		
Barium: Dissolved	mg/L	10	1	0.0009	0.0004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00045	0.000483	0.000414	0.000321	0.000359	<0.001	<0.001		
Beryllium: Dissolved	mg/L	0.053	NS	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.0001	<0.00001		
Bismuth: Dissolved	mg/L	NS	NS	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.0001	<0.00001		
Boron: Dissolved	mg/L	50	5	<0.01	0.001	0.007	<0.0001	0.0006	0.00029	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.00029	0.00026	<0.0001		
Cadmium: Dissolved	mg/L	0.0001 - 0.0013*	0.005	<0.0004	<0.0004	<0.00001	0.00026	0.000029	0.0001	0.00008	0.00002	<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	0.000029	0.00026	<0.00001	<0.000005		
Chromium: Dissolved	mg/L	NS	NS	44.3	NS	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7		
Chromium: Dissolved	mg/L	0.01, 0.09	0.05	0.0009	0.0009	0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0007	0.00089	0.00085	0.00025	0.00056	0.0049	<0.001	0.00076		
Cobalt: Dissolved	mg/L	0.04	NS	<0.0002	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000006	<0.00005	<0.00005	<0.00005	<0.00005	<0.0005	<0.0005	<0.00005		
Copper: Dissolved	mg/L	0.02 - 0.090*	1	0.0003	0.0004	0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00005	0.000185	0.000098	0.000073	0.000072	<0.0002	<0.0002	0.000063		
Iron: Dissolved (Lab)	mg/L	NS	NS**	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001	0.0068	0.0043	0.0013	<0.005	<0.005	0.00012		
Lead: Dissolved	mg/L	0.040 - 0.160*	0.01	<0.0002	<0.0002	<0.00005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.000005	0.0000133	0.000006	<0.00005	<0.00005	<0.0002	<0.0002	0.000014		
Lithium: Dissolved	mg/L	NS	0.73	<0.0002	<0.0002	<0.0001	<0.005	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005		
Magnesium: Dissolved	mg/L	NS	100	7.92	7.68	3.39	5.75	4.66	4.63	5.27	6.1	4.02	3.31	4.01	3.8	2.81	2.43	5.7	6.49	3.61		
Manganese: Dissolved	mg/L	NS	NS**	0.0003	0.0004	0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00005	0.000098	<0.00005	0.000057	<0.00005	<0.0001	<0.001	0.000257		
Mercury: Dissolved	mg/L	0.001	0.001	<0.00002	<0.00002	<0.02	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	-	<0.00001	<0.00001	<0.00001	<0.00005	<0.00005	<0.000002		
Molybdenum: Dissolved	mg/L	10	0.25	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00008	0.000099	0.000121	0.000095	0.000092	0.0076	<0.001	0.0000114		
Nickel: Dissolved	mg/L	0.250 - 1.5*	NS	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00002	<0.00002	<0.00002	0.000157	<0.00002	0.0295	<0.001	<0.00002		
Phosphorus: Dissolved	mg/L	NS	NS	<0.03	0.04	0.02	-	0.02	-	0.02	-	0.02	-	0.029	0.0588	0.0236	-	-	-	-		
Potassium: Dissolved	mg/L	NS	NS	0.45	0.44	0.3	0.343	0.32	0.35	0.34	0.39	0.318	0.29	0.31	0.29	0.221	0.252	0.342	0.37	0.281		
Selenium: Dissolved	mg/L	0.01	0.01	<0.0002	<0.0002	<0.0002	0.00013	0.00013	0.0001	0.0002	0.0002	0.00015	0.00008	0.000145	0.000116	0.000051	0.000194	0.00016	0.00016	0.000129		
Silicon: Dissolved	mg/L	NS	NS	5.11	4.94	3.73	4.77	4.38	6.7	4.7	4.8	4.18	4.3	4.44	4.25	4.41	5.33	4.64	4.73	4.43		
Silver: Dissolved	mg/L	0.0005 - 0.015*	NS	<0.00005	<0.00005	<0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00005	<0.000005	<0.000005	<0.00005	<0.00005	<0.00002	<0.00005		
Sodium: Dissolved	mg/L	NS	200	2.73	2.67	1.54	2.08	1.95	2.85	2.26	2.55	2.1	1.93	2.25	2.04	2.14	2.43	2.66	3.01	1.98		
Sulphur: Dissolved	mg/L	NS	22	0.106	0.107	0.047	0.0675	0.0582	0.054	0.065	0.052	0.0537	0.0396	0.0502	0.046	0.0297	0.035	0.0809	0.0882	0.0515		
Strontium: Dissolved	mg/L	NS	NS	<2	<2	<1	<3	<3	<3	<3	<3	<3	<3	<10	<15	<2	<3 - 1.11	<3	<3	<0.6		
Thallium: Dissolved	mg/L	NS	NS	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Thorium: Dissolved	mg/L	0.0003	NS	<0.0002	<0.0002	<0.0002	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00002	<0.00002	<0.00002	<0.00002	<0.00005	<0.00005	<0.00002		
Thorium: Dissolved	mg/L	NS	NS	<0.0001	<0.0001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005		
Tin: Dissolved	mg/L	NS	22	<0.0002	<0.0002	<0.0001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0002	<0.0002	<0.0002	<0.0002	<0.005	<0.005	<0.0002		
Titanium: Dissolved	mg/L	1	NS	0.0003	0.0003	0.0005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005		
Tungsten: Dissolved	mg/L	NS	NS	-	-	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Uranium: Dissolved	mg/L	3	0.02	<0.0001	<0.0001	<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.000038	0.0000445	0.000039	0.000018	0.00002	<0.0001	0.00011	0.000061		
Vanadium: Dissolved	mg/L	NS	NS	0.0025	0.0025	0.0026	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0026	0.00232	0.00279	<0.005	<0.005	<0.0005	0.00257		
Zinc: Dissolved																						

Notes:

BC CSR - BC Contaminated Sites Regulation (CSR) (BC Reg. 375/96, including amendments up to BC Reg. 4/2014, January 31, 2014), Schedule 6 and 10 Generic Numerical Water Standards for the Protection of Freshwater Aquatic Life (AW) and Drinking Water (DW)

* Indicates that the guideline is dependent on chloride, hardness or pH

** Stage 8 Amendment of the CSR applies

NS - No standard

Parameter exceeds CSR AW standard

Parameter exceeds CSR DW standard

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Unit	BC CSR		AM02-01							
		Aquatic Life	Drinking Water	28-Aug-09	9-Dec-09	28-Apr-10	1-Nov-10	15-Aug-11	28-Nov-11	3-Dec-12	29-Oct-13
Physical Tests											
pH (Field)	pH_Units	NS	NS	4.72	6.7	6.49	6.71	6.9	6.78	6.77	6.19
pH (Lab)	pH_Units	NS	NS	7.64	7.37	7.93	7.39	7.42	7.62	7.7	7.82
Specific Conductance (Field)	uS/cm	NS	NS	106	75	110	96	132	110	111	114
Specific Conductance (Lab)	uS/cm	NS	NS	126	164	153	98.1	133	118	109	116
Temperature (Field)	°C	NS	NS	11.65	10.05	11.83	10.77	10.35	10.01	10	10.26
Dissolved Oxygen (Field)	mg/L	NS	NS	11.53	11.07	13.4	19	10.6	9.97	9.2	12.96
Hardness: Total (as CaCO3) (Lab)	mg/L	NS	NS	55	50.8	37.6	42.7	57.9	52.3	55.2	45.2
Dissolved Solids: Total	mg/L	NS	NS	-	-	-	-	-	-	72	74
Oxidation Reduction Potential (Field)	mV	NS	NS	314.3	41.4	205.4	-3.5	155.4	139.3	293.2	118.9
Anions and Nutrients											
Ammonia (as N)	mg/L	1.31 - 18.4*	NS	<0.01	< 0.01	<0.01	<0.005	0.036	0.051	0.044	0.0055
Nitrogen: Nitrite (as N) (Lab)	mg/L	0.2 - 2*	3.2	<0.002	< 0.002	<0.005	0.0104	0.005	<0.005	0.0095	<0.005
Nitrogen: Nitrate (as N) (Lab)	mg/L	400	10	0.12	0.12	0.118	0.128	0.09	0.303	0.36	0.101
Chloride (Lab)	mg/L	1,500	250	2.16	18.4	12	0.53	3.7	1.2	1.3	2
Fluoride: Dissolved	mg/L	2 - 3*	1.5	<0.05	< 0.05	0.013	0.018	0.01	0.017	0.023	0.019
Sulphate (Lab)	mg/L	1,000	500	2.53	1.46	2.07	3.07	1.5	3.31	3.89	2.91
Alkalinity (as CaCO ₃) (Lab)	mg/L	NS	NS	61	57	61.3	50.4	60	56	49.2	52.5
Bicarbonate (as CaCO ₃)	mg/L	NS	NS	74.4	-	74.8	61.4	73	68.3	60.1	64.1
Carbonate (as CaCO ₃)	mg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hydroxide	mg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Metals											
Aluminum: Dissolved	mg/L	NS	9.5	0.0003	0.016	0.0032	0.006	0.003	<0.003	0.00577	<0.003
Antimony: Dissolved	mg/L	0.2	0.006	<0.0002	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	0.000043	<0.0005
Arsenic: Dissolved	mg/L	0.05	0.01	<0.0002	< 0.0002	<0.0001	<0.0001	<0.0001	<0.0001	0.000076	<0.0001
Barium: Dissolved	mg/L	10	1	0.001	0.0012	0.0011	<0.001	0.002	<0.001	0.000819	<0.001
Beryllium: Dissolved	mg/L	0.053	NS	<0.0002	< 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	<0.0001
Bismuth: Dissolved	mg/L	NS	NS	<0.0002	< 0.0001	<0.001	<0.001	<0.001	<0.001	<0.000005	<0.001
Boron: Dissolved	mg/L	50	5	<0.01	0.005	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium: Dissolved	mg/L	0.0001-0.0013*	0.005	<0.00004	< 0.00001	0.000109	<0.00001	0.00005	<0.00001	<0.000005	<0.00001
Calcium: Dissolved	mg/L	NS	NS	18	16.8	12.3	14	18.9	17.2	18	14.9
Chromium: Dissolved	mg/L	0.01, 0.09	0.05	0.0002	< 0.0002	<0.001	<0.001	<0.001	<0.001	0.00019	<0.001
Cobalt: Dissolved	mg/L	0.04	NS	<0.0002	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.000005	<0.0005
Copper: Dissolved	mg/L	0.02 - 0.090*	1	0.0005	0.0003	<0.0002	<0.0002	0.0009	<0.0002	0.000638	0.00062
Iron: Dissolved (Lab)	mg/L	NS	NS**	<0.01	< 0.01	<0.005	0.0051	<0.005	<0.005	0.0016	<0.005
Lead: Dissolved	mg/L	0.040 - 0.160*	0.01	<0.0002	0.00011	<0.0002	<0.0002	<0.0002	<0.0002	<0.000005	<0.0002
Lithium: Dissolved	mg/L	NS	0.73	<0.0002	0.0003	<0.005	<0.005	<0.005	<0.005	<0.0005	<0.005
Magnesium: Dissolved	mg/L	NS	100	2.43	2.16	1.64	1.9	2.57	2.3	2.45	1.93
Manganese: Dissolved	mg/L	NS	NS**	0.0002	0.0003	<0.001	<0.001	<0.001	<0.001	0.000088	<0.001
Mercury: Dissolved	mg/L	0.001	0.001	<0.00002	< 0.02	<0.00002	<0.00002	<0.00005	<0.00005	<0.00001	<0.00001
Molybdenum: Dissolved	mg/L	10	0.25	<0.0001	< 0.0001	<0.001	<0.001	<0.001	<0.001	0.000433	<0.001
Nickel: Dissolved	mg/L	0.250 - 1.5*	NS	<0.0002	< 0.0002	<0.001	<0.001	<0.001	<0.001	0.000034	<0.001
Phosphorus: Dissolved	mg/L	NS	NS	<0.03	< 0.015	-	-	-	-	0.237	-
Potassium: Dissolved	mg/L	NS	NS	0.23	0.28	0.299	0.178	0.27	0.203	0.211	0.251
Selenium: Dissolved	mg/L	0.01	0.01	<0.0002	0.0002	0.00022	0.00019	0.0003	0.00033	0.000396	0.00028
Silicon: Dissolved	mg/L	NS	NS	5.07	4.64	6.27	4.35	4.7	4.46	5.75	6.12
Silver: Dissolved	mg/L	0.0005-0.015*	NS	<0.00005	< 0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.000005	<0.00002
Sodium: Dissolved	mg/L	NS	200	1.96	9.34	15.5	1.94	3.19	2.28	2.47	6.37
Strontium: Dissolved	mg/L	NS	22	0.031	0.038	0.0266	0.024	0.034	0.0313	0.0291	0.0287
Sulphur: Dissolved	mg/L	NS	NS	<2	< 1	<3	<3	<3	<3	<3 - 1.22	<3
Tellurium: Dissolved	mg/L	NS	NS	<0.0002	< 0.0002	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.003	NS	<0.00002	< 0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.000002	<0.00005
Thorium: Dissolved	mg/L	NS	NS	<0.0001	< 0.00005	-	-	-	-	-	-
Tin: Dissolved	mg/L	NS	22	<0.0002	< 0.0001	<0.005	<0.005	<0.005	<0.005	0.0008	<0.005
Titanium: Dissolved	mg/L	1	NS	0.0003	< 0.0002	<0.005	<0.005	<0.005	<0.005	<0.0005	<0.005
Tungsten: Dissolved	mg/L	NS	NS	-	< 0.0001	-	-	-	-	-	-
Uranium: Dissolved	mg/L	3	0.02	<0.0001	< 0.00005	<0.0001	<0.0001	<0.0001	<0.0001	0.000027	<0.0001
Vanadium: Dissolved	mg/L	NS	NS	0.0012	0.0009	<0.005	<0.005	<0.005	<0.005	0.00119	<0.005
Zinc: Dissolved	mg/L	0.075 - 2.4*	5	<0.001	0.001	<0.005	<0.005	0.007	<0.005	0.00023	<0.005
Zirconium: Dissolved	mg/L	NS	NS	<0.002	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0001	<0.0005
Hydrocarbons											
VHw6-10	mg/L	15	15	-	-	-	<0.3	<0.3	<0.3	<0.3	<0.3
VPHw	mg/L	1.5	NS	-	-	-	<0.3	<0.3	<0.3	<0.3	-
Non-Halogenated Hydrocarbons											
Benzene	mg/L	4	0.005	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004
Ethylbenzene	mg/L	2	0.0024	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004
Toluene	mg/L	0.39	0.024	-	-	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	<0.0004
Xylene Total	mg/L	NS	0.3	-	-	<0.001	<0.001	<0.001	<0.001	<0.0004	<0.0004
Styrene	mg/L	0.72	NS	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Volatile Organic Compounds											
1,1,1,2- Tetrachloroethane	µg/L	NS	NS	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-trichloroethane	µg/L	NS	NS	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2,2-tetrachloroethane	µg/L	1,100	30	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-trichloroethane	µg/L	200	5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-dichloroethane	µg/L	NS	NS	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-dichloroethene	ug/L	NS	14	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-dibromoethane	µg/L	NS	NS	-	-	<0.2	<0.2	-	-	-	-
1,2-dichlorobenzene	ug/L	7	3	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-dichloroethane	ug/L	1000	5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-dichloropropane	µg/L	NS	NS	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-dichlorobenzene	µg/L	1500	NS	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-dichlorobenzene	ug/L	260	1	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromobenzene	µg/L	NS	NS	-	-	-	-	-	-	-	-
Bromodichloromethane	µg/L	NS	NS	-	-	<1	<1	<1	<1	<1	<1
Bromoform	µg/L	NS	100	-	-	<1	<1	<1	<1	<1	<1</

Notes:

BC CSR - BC Contaminated Sites Regulation (CSR) (BC Reg. 375/96, including amendments up to BC Reg. 4/2014, January 31, 2014), Schedule 6 and 10 Generic Numerical Water Standards for the Protection of Freshwater Aquatic Life (AW) and Drinking Water (DW)

* Indicates that the guideline is dependent on chloride, hardness or pH

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Unit	BC CSR		EBA04-01															
		Aquatic Life	Drinking Water	27-Aug-09	9-Dec-09	28-Apr-10	1-Nov-10	9-Mar-11	11-May-11	15-Aug-11	28-Nov-11	20-Feb-12	23-May-12	16-Aug-12	3-Dec-12	20-Feb-13	28-May-13	20-Aug-13	26-Nov-13
Physical Tests																			
pH (Field)	pH_Units	NS	NS	6.7	7.43	5.84	8.42	8.33	7.6	8.36	7.86	7.72	8.5	8.28	8.55	7.61	6.91	8.09	8.57
pH (Lab)	pH_Units	NS	NS	7.8	7.28	7.83	7.8	7.38	7.88	7.82	7.67	7.96	7.81	7.81	7.93	7.83	7.8	7.69	7.84
Specific Conductance (Field)	uS/cm	NS	NS	82	36	70	88	79	85	83	95	108	82	81	85	121	85	87	86
Specific Conductance (Lab)	uS/cm	NS	NS	82	84	78.4	78.1	84	84	85	100	114	85.7	82.9	83.8	103	84.7	85.5	86.3
Temperature (Field)	°C	NS	NS	20.45	9.08	11.9	12.38	8.76	11.11	15.3	8.32	5.7	14.1	18.75	15.63	9.31	16.2	20.22	9.58
Dissolved Oxygen (Field)	mg/L	NS	NS	6.51	11.2	9.8	5.3	5.31	6.82	9.23	18.86	10.5	5.1	5.54	7.47	10.2	6.44	6.54	5.75
Hardness: Total (as CaCO3) (Lab)	mg/L	NS	NS	38.8	40.9	36.7	37	43	40	39.5	47.7	53.9	38.4	38.8	41.1	47.1	-	40.8	41.6
Dissolved Solids: Total	mg/L	NS	NS	-	-	-	-	-	-	-	-	100	50	53	55	78	55	65	56
Oxidation Reduction Potential (Field)	mV	NS	NS	56.6	17.6	197	-6.5	-362.9	256	41.7	124.2	103.6	11.2	61.7	189.8	136.7	288.5	22.5	138.4
Anions and Nutrients																			
Ammonia (as N)	mg/L	1.31 - 18.4*	NS	<0.01	< 0.01	<0.01	<0.005	0.024	<0.005	0.03	0.038	0.011	0.02	0.015	0.022	<0.005	0.011	0.013	0.0086
Nitrogen: Nitrite (as N) (Lab)	mg/L	0.2 - 2*	3.2	<0.002	< 0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nitrogen: Nitrate (as N) (Lab)	mg/L	400	10	0.05	0.03	0.056	0.04	0.06	0.07	0.07	0.196	0.193	0.052	0.058	0.025	0.141	0.055	0.067	0.046
Chloride (Lab)	mg/L	1,500	250	0.89	0.81	<0.5	<0.5	0.9	0.8	1.1	0.88	2.0	1.3	0.82	0.87	1.3	1.1	1	0.75
Fluoride: Dissolved	mg/L	2 - 3*	1.5	<0.05	< 0.05	0.015	0.012	0.02	0.02	0.01	0.015	0.017	0.021	0.015	0.02	0.019	0.019	0.014	0.016
Sulphate (Lab)	mg/L	1,000	500	2.62	2.77	2.79	8.09	1.9	3.1	2.5	2.71	3.42	2.64	1.44	2.63	2.88	2.65	2.64	3.04
Alkalinity (as CaCO ₃) (Lab)	mg/L	NS	NS	40.6	40.8	38.3	38.9	45	42	38	43.9	50.8	40.8	40.9	41.1	46.5	39	40.5	41
Bicarbonate (as CaCO ₃)	mg/L	NS	NS	49.6	-	46.7	47.5	55	51	47	53.5	62	49.8	49.9	50.1	56.7	47.5	49.4	50
Carbonate (as CaCO ₃)	mg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hydroxide	mg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Metals																			
Aluminum: Dissolved	mg/L	NS	9.5	0.004	0.006	0.0065	0.0039	0.008	0.009	0.006	<0.003	0.0031	0.00457	0.00628	0.00898	0.00364	0.0054	0.0054	0.0176
Antimony: Dissolved	mg/L	0.2	0.006	<0.0002	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00004	0.000026	<0.00002	0.000027	0.000022	<0.0005	<0.0005	0.000032
Arsenic: Dissolved	mg/L	0.05	0.01	0.0002	0.0005	0.00037	0.00031	0.0007	0.0008	0.0005	0.00034	0.00033	0.000578	0.000276	0.000445	0.000532	0.00075	0.00033	0.000382
Barium: Dissolved	mg/L	10	1	0.0007	0.0008	<0.001	<0.001	0.001	0.001	<0.001	0.0028	0.00128	0.000704	0.000873	0.000806	0.000872	<0.001	0.0011	0.00103
Beryllium: Dissolved	mg/L	0.053	NS	<0.0002	< 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	0.000012	<0.00001	<0.00001	<0.00001	<0.0001	<0.0001	<0.00001
Bismuth: Dissolved	mg/L	NS	NS	<0.0002	< 0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.001	<0.001	<0.000005
Boron: Dissolved	mg/L	50	5	<0.01	0.006	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium: Dissolved	mg/L	0.0001-0.0013*	0.005	<0.00004	< 0.00001	0.00003	<0.00001	0.00001	0.00006	<0.00001	<0.00001	0.000009	0.0000605	0.00001	0.000007	0.000006	0.000026	<0.00001	0.000018
Calcium: Dissolved	mg/L	NS	NS	12.9	14	12.3	12.4	14	13	13.1	15.5	17.2	12.4	12.7	13.9	15.3	12.6	13.5	14
Chromium: Dissolved	mg/L	0.01, 0.09	0.05	0.0002	0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0004	0.00124	0.00045	0.00033	0.00025	0.0102	<0.001	0.00029
Cobalt: Dissolved	mg/L	0.04	NS	<0.0002	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000009	0.0000181	<0.000005	<0.000005	0.000006	<0.0005	<0.0005	0.000005
Copper: Dissolved	mg/L	0.02 - 0.090*	1	0.0057	0.0044	0.00331	0.00309	0.0029	0.0031	0.0038	0.0123	0.0238	0.00358	0.00469	0.00388	0.00652	0.00517	0.016	0.00398
Iron: Dissolved (Lab)	mg/L	NS	NS**	0.07	0.03	0.0379	0.0648	0.008	0.005	<0.005	<0.005	0.001	0.132	0.0129	0.0069	0.0012	0.0073	<0.005	0.0343
Lead: Dissolved	mg/L	0.040 - 0.160*	0.01	0.0003	0.00013	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.000142	0.000262	0.000109	0.000085	0.000078	<0.0002	0.00045	0.000216
Lithium: Dissolved	mg/L	NS	0.73	<0.0002	< 0.0001	<0.005	<0.005	-	-	<0.005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.005	<0.0005
Magnesium: Dissolved	mg/L	NS	100	1.58	1.42	1.48	1.43	1.93	1.83	1.63	2.19	2.66	1.79	1.71	1.54	2.13	1.69	1.71	1.6
Manganese: Dissolved	mg/L	NS	NS**	0.0035	0.0028	0.0024	<0.001	<0.001	<0.001	<0.001	<0.001	0.00017	0.0076	0.000845	0.000188	0.000073	<0.001	<0.001	0.000633
Mercury: Dissolved	mg/L	0.001	0.001	<0.00002	< 0.02	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	< 0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00005	<0.00005	<0.000002
Molybdenum: Dissolved	mg/L	10	0.25	<0.0001	0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00007	0.00013	0.000132	0.000183	0.000101	0.0156	<0.001	0.000142
Nickel: Dissolved	mg/L	0.250 - 1.5*	NS	<0.0002	< 0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00012	0.000253	0.000131	0.000035	<0.00002	0.0648	<0.001	0.000244
Phosphorus: Dissolved	mg/L	NS	NS	<0.03	< 0.015	-	-	0.02	0.02	-	-	0.0154	0.0065	0.0056	0.0096	-	-	-	-
Potassium: Dissolved	mg/L	NS	NS	0.22	0.26	0.231	0.213	0.28	0.27	0.23	0.38	0.39	0.28	0.243	0.239	0.292	0.254	0.23	0.235
Selenium: Dissolved	mg/L	0.01	0.01	<0.0002	< 0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.00012	0.00014	0.000126	0.000112	0.000161	0.000119	0.00013	0.00013	0.00011
Silicon: Dissolved	mg/L	NS	NS	3.43	3.67	3.75	3.27	5.5	5.5	3.3	4.52	4.7	4.67	3.29	4.21	5.15	4.98	3.48	4.03
Silver: Dissolved	mg/L	0.0005-0.015*	NS	<0.00005	< 0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.000006	<0.000005	<0.000005	<0.000005	<0.000005	<0.00002	<0.00002	<0.000005
Sodium: Dissolved	mg/L	NS	200	1	1.11	0.971	1.04	1.43	1.31	0.87	1.57	1.57	1.3	0.991	1.17	1.48	1.28	1.06	td

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Unit	BC CSR		EBA04-02													
		Aquatic Life	Drinking Water	27-Aug-09	10-Dec-09	29-Apr-10	1-Nov-10	9-Mar-11	11-May-11	15-Aug-11	28-Nov-11	20-Feb-12	23-May-12	15-Aug-12	3-Dec-12	20-Feb-13	28-May-13
Physical Tests																	
pH (Field)	pH_Units	NS	NS	8.27	6.72	9	7.97	7.89	8.02	8.48	8.58	8.0	7.5	8.39	8.19	8.37	6.81
pH (Lab)	pH_Units	NS	NS	7.83	7.46	7.91	7.77	7.36	7.8	7.8	7.75	8.05	7.78	7.82	7.75	7.82	7.76
Specific Conductance (Field)	uS/cm	NS	NS	66	44	67	80	81	80	80	76	107	83	79	88	107	90
Specific Conductance (Lab)	uS/cm	NS	NS	82	96	89.8	80.9	87	81	81	83.7	112	82.5	80.5	88	96.2	90.9
Temperature (Field)	°C	NS	NS	11.88	12.15	14.09	12.84	13.28	13.82	11.45	11.57	11.9	12.6	11.66	12.4	12.42	13.98
Dissolved Oxygen (Field)	mg/L	NS	NS	10.7	11.38	18.79	21.66	17.5	11.3	9.95	7.93	6.6	7.2	8.2	6.18	11.6	10.98
Hardness: Total (as CaCO3) (Lab)	mg/L	NS	NS	38.8	45.4	41.7	37.9	45.6	39.2	38.3	40.3	53.8	38.6	39.6	41.9	44.4	-
Dissolved Solids: Total	mg/L	NS	NS	-	-	-	-	-	-	-	-	100	50	50	57	70	58
Oxidation Reduction Potential (Field)	mV	NS	NS	-28.5	65.8	131.7	11.7	-308.9	222	36.8	130.1	92.6	94.9	12.1	262.9	71.2	253.3
Anions and Nutrients																	
Ammonia (as N)	mg/L	1.31 - 18.4*	NS	<0.01	< 0.01	<0.01	<0.005	0.029	0.017	0.053	0.052	0.013	<0.005	0.025	0.019	<0.005	0.02
Nitrogen: Nitrite (as N) (Lab)	mg/L	0.2 - 2*	3.2	<0.002	< 0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nitrogen: Nitrate (as N) (Lab)	mg/L	400	10	0.07	0.06	0.065	0.062	0.06	0.05	0.06	0.066	0.062	0.056	0.066	0.068	0.065	0.055
Chloride (Lab)	mg/L	1,500	250	0.9	0.85	0.63	<0.5	0.9	1.9	1.3	<0.5	3.4	1.7	0.98	1.8	1.4	1.8
Fluoride: Dissolved	mg/L	2 - 3*	1.5	<0.05	< 0.05	0.021	0.015	0.02	0.02	0.01	0.017	0.018	0.021	0.016	0.019	0.013	0.016
Sulphate (Lab)	mg/L	1,000	500	2.75	2.81	3.26	2.19	2.1	3.2	2.3	2.95	3.38	2.94	1.37	2.78	3.14	2.91
Alkalinity (as CaCO ₃) (Lab)	mg/L	NS	NS	39.8	47.3	43.2	39.8	41	37	38	39.6	46	38.2	38.4	38.3	42.5	39.7
Bicarbonate (as CaCO ₃)	mg/L	NS	NS	48.6	-	52.7	48.5	50	45	46	48.3	56.1	46.6	46.8	46.8	51.8	48.5
Carbonate (as CaCO ₃)	mg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hydroxide	mg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Metals																	
Aluminum: Dissolved	mg/L	NS	9.5	0.007	0.025	0.0146	0.0056	0.009	0.01	0.007	0.0061	0.0066	0.0079	0.00666	0.00702	0.00592	0.0064
Antimony: Dissolved	mg/L	0.2	0.006	<0.0002	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00003	0.000031	<0.00002	0.000027	0.000028	<0.0005
Arsenic: Dissolved	mg/L	0.05	0.01	0.0002	0.0003	0.00031	0.00017	0.0002	0.0003	0.0002	0.00021	0.00031	0.00018	0.000229	0.000211	0.000219	0.00025
Barium: Dissolved	mg/L	10	1	0.0005	0.0007	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00071	0.000557	0.00043	0.000583	0.000627	<0.001
Beryllium: Dissolved	mg/L	0.053	NS	<0.0002	< 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.0001
Bismuth: Dissolved	mg/L	NS	NS	<0.0002	< 0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.001
Boron: Dissolved	mg/L	50	5	<0.01	< 0.005	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium: Dissolved	mg/L	0.0001-0.0013*	0.005	0.00004	< 0.00001	0.000644	<0.00001	0.00002	0.00005	<0.00001	<0.00001	<0.000005	<0.000005	<0.000005	<0.000005	0.000005	<0.00001
Calcium: Dissolved	mg/L	NS	NS	13.2	15.7	14.2	12.9	15.3	13.3	13.1	13.8	18.2	13.3	13.5	14.3	15.1	14.2
Chromium: Dissolved	mg/L	0.01, 0.09	0.05	0.0002	< 0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0003	0.00017	0.00017	0.00024	<0.0001	<0.001
Cobalt: Dissolved	mg/L	0.04	NS	<0.0002	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000009	0.0000095	<0.000005	<0.000005	0.000005	<0.0005
Copper: Dissolved	mg/L	0.02 - 0.090*	1	0.0009	0.0003	0.0004	<0.0002	<0.0002	0.0003	<0.0002	0.00029	0.0002	0.000225	0.000127	0.0002	0.000246	<0.0002
Iron: Dissolved (Lab)	mg/L	NS	NS**	<0.01	0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	0.0018	0.0013	0.0031	0.0019	<0.005
Lead: Dissolved	mg/L	0.040 - 0.160*	0.01	<0.0002	< 0.00005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.000005	0.0000094	0.000009	<0.000005	0.000007	<0.0002
Lithium: Dissolved	mg/L	NS	0.73	<0.0002	< 0.0001	<0.005	<0.005	-	-	<0.005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005
Magnesium: Dissolved	mg/L	NS	100	1.41	1.49	1.53	1.39	1.79	1.43	1.36	1.39	2	1.34	1.44	1.54	1.61	1.4
Manganese: Dissolved	mg/L	NS	NS**	<0.0002	0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00009	0.000138	0.000165	0.00007	<0.00005	<0.001
Mercury: Dissolved	mg/L	0.001	0.001	<0.00002	< 0.02	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	< 0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00005
Molybdenum: Dissolved	mg/L	10	0.25	<0.0001	0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00011	0.000135	0.000117	0.000209	0.000135	<0.001
Nickel: Dissolved	mg/L	0.250 - 1.5*	NS	<0.0002	< 0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00002	0.000141	0.000025	<0.00002	<0.00002	<0.001
Phosphorus: Dissolved	mg/L	NS	NS	<0.03	< 0.015	-	-	<0.01	<0.01	-	-	<0.0050	<0.005	0.0168	0.0103	-	-
Potassium: Dissolved	mg/L	NS	NS	0.2	0.2	0.229	0.193	0.22	0.19	0.17	0.187	0.24	<0.25	0.181	0.206	0.2	0.188
Selenium: Dissolved	mg/L	0.01	0.01	<0.0002	< 0.0002	<0.0001	0.00012	0.0001	<0.0001	0.0001	0.00012	0.00012	0.000099	0.000117	0.000115	0.000108	<0.0001
Silicon: Dissolved	mg/L	NS	NS	3.73	2.92	4.05	3.55	4.1	3.7	3.3	3.27	3.6	3.47	3.44	3.71	3.71	3.47
Silver: Dissolved	mg/L	0.0005-0.015*	NS	<0.00005	< 0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.00002
Sodium: Dissolved	mg/L	NS	200	0.98	0.87	0.958	1.05	1.18	0.97	0.85	0.908	1.12	0.94	0.986	1.17	1.14	1.14
Strontium: Dissolved	mg/L	NS	22	0.02	0.025	0.0204	0.0204	0.022	0.02	0.019	0.0212	0.0292	0.0202	0.0196	0.023	0.0227	0.0221
Sulphur: Dissolved	mg/L	NS	NS	<2	< 1	<3	<3	<3	<3	<3	<3	<10	<15	<2	<3 - 0.65	<3 - 0.81	<3
Tellurium: Dissolved	mg/L	NS	NS	<0.0002	< 0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.003	NS	<0.00002	< 0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002	<0.00005
Thorium: Dissolved	mg/L	NS	NS	<0.0001	< 0.00005	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	NS	22	<0.0002	< 0.0001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0002	<0.0002	<0.0002	0.00023	<0.0002	<0.005
Titanium: Dissolved	mg/L	1	NS	0.0002	0.0019	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005
Tungsten: Dissolved	mg/L	NS	NS	-	< 0.0001	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	3	0.02	<0.0001	< 0.00005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.000018	0.0000106	0.000008	0.000014	0.000011	<0.0001
Vanadium: Dissolved	mg/L	NS	NS	0.0019	0.0017	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0021	0.00182	0.00176	0.00196	0.00189	<0.005
Zinc: Dissolved	mg/L	0.075 - 2.4*	5	0.003	< 0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0005	0.00095	0.00101	0.0004		

Notes:

BC CSR - BC Contaminated Sites Regulation (CSR) (BC Reg. 375/96, including amendments up to BC Reg. 4/2014, January 31, 2014), Schedule 6 and 10 Generic Numerical Water Standards for the Protection of Freshwater Aquatic Life (AW) and Drinking Water (DW)

* Indicates that the guideline is dependent on chloride, hardness or pH

** Stage 8 Ammendment of the CSR applies

NS - No standard

Parameter exceeds CSR AW standard

Parameter exceeds CSR DW standard

Italics

BOLD

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Unit	BC CSR		EBA04-03	EBA04-03	EBA04-03-DUP	EBA04-03	EBA04-03-DUP	EBA04-03	EBA04-03-DUP	EBA04-03	EBA04-03-DUP	EBA04-03	EBA04-03-DUP	EBA04-03	EBA04-03-DUP	EBA04-03	EBA04-03-DUP	EBA04-03	EBA04-03-DUP	EBA04-03	EBA04-03-DUP	EBA04-03	EBA04-03-DUP	EBA04-03	EBA04-03-DUP	EBA04-03	EBA04-03-DUP
		Aquatic Life	Drinking Water	27-Aug-09	9-Dec-09	29-Apr-10	1-Nov-10	9-Mar-11	11-May-11	15-Aug-11	30-Nov-11	20-Feb-12	24-May-12	16-Aug-12	4-Dec-12	20-Feb-13	28-May-13	20-Aug-13	26-Nov-13									
Physical Tests																												
pH (Field)	pH Units	NS	NS	7.42	7.01	-	7.57	-	7.41	-	7.09	-	6.91	-	7.12	-	6.95	-	7.2	-	7.2	7.04	7.91	7.05	7.21	7.27	7.19	
pH (Lab)	pH Units	NS	NS	8.07	8.17	8.17	7.98	8.07	7.92	7.86	7.69	7.63	7.68	7.64	7.59	7.63	7.55	7.55	8.15	8.19	7.99	8.09	8.12	8.07	8.2	8.04	8.08	
Specific Conductance (Field)	uS/cm	NS	NS	525	101	-	257	-	398	-	700	-	715	-	595	-	741	-	465	-	770	536	267	222	433	613	554	
Specific Conductance (Lab)	uS/cm	NS	NS	647	221	221	374	365	439	437	787	787	709	716	607	607	823	816	476	479	708	510	262	213	394	540	505	
Temperature (Field)	°C	NS	NS	10.78	10.02	-	10.72	-	10.33	-	10.65	-	10.68	-	10.67	-	9.93	-	10.1	-	10.6	10.92	9.92	9.7	10.54	10.73	9.36	
Dissolved Oxygen (Field)	mg/L	NS	NS	7.68	11.69	-	13.59	-	12.05	-	5.76	-	7.98	-	8.41	-	6.35	-	7.7	-	7.7	6.45	6.32	10.48	12.12	12.81	6.01	
Hardness: Total (as CaCO3) (Lab)	mg/L	NS	NS	371	118	112	194	199	225	217	461	453	394	413	317	324	413	388	269	269	431	297	197	103	334	297	360	
Dissolved Solids: Total	mg/L	NS	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	300	-	300	-	500	349	174	145	281	399	360	
Oxidation Reduction Potential (Field)	mV	NS	NS	-28.9	270.5	-	152.5	-	18.1	-	-356.2	-	225.4	-	81.9	-	157.6	-	98.0	-	142	67.7	27.7	140.5	179.8	-44.1	155.3	
Anions and Nutrients																												
Ammonia (as N)	mg/L	1.31 - 18.4*	NS	<0.01	< 0.01	< 0.01	<0.01	<0.01	0.034	0.037	0.021	0.021	0.012	0.017	0.031	0.022	0.0076	0.011	0.0088	0.0084	0.018	0.015	0.019	<0.005	0.008	0.016	0.0081	
Nitrogen: Nitrite (as N) (Lab)	mg/L	0.2 - 2*	3.2	<0.002	< 0.002	< 0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0053	0.009	0.008	<0.005	0.0059	0.0055	<0.005	<0.005	<0.005	<0.005	
Nitrogen: Nitrate (as N) (Lab)	mg/L	400	10	0.57	0.07	0.07	0.299	0.299	0.393	0.395	1.51	1.53	0.64	0.65	0.5	0.51	0.447	0.504	0.989	0.973	0.55	0.338	0.051	0.093	0.363	0.639	0.225	
Chloride (Lab)	mg/L	1,500	250	12.9	0.95	0.96	3.8	3.8	3.9	4	24	22	11	9.7	5.2	5	73	73	11	29	5.3	1.5	4.4	4.8	5.2	6.7		
Fluoride: Dissolved	mg/L	2 - 3*	1.5	<0.05	< 0.05	< 0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.010	<0.010	<0.01	0.012	<0.01	<0.01	<0.01	<0.01		
Sulphate (Lab)	mg/L	1,000	500	11.3	2.93	2.95	5.83	5.73	17.8	13.9	19	19	11	6.8	6.2	12.2	12.4	4.40	4.26	6.95	5.56	3.08	2.76	4.96	9.43	9.47		
Alkalinity (as CaCO3) (Lab)	mg/L	NS	NS	342	123	122	194	192	221	219	370	370	370	370	310	310	311	310	222	224	335	269	136	102	200	282	254	
Bicarbonate (as CaCO3)	mg/L	NS	NS	417	-	-	236	235	270	268	460	460	450	450	370	379	379	271	274	409	328	166	124	244	344	309		
Carbonate (as CaCO3)	mg/L	NS	NS	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.50	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Hydroxide	mg/L	NS	NS	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.50	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Dissolved Metals																												
Aluminum: Dissolved	mg/L	NS	9.5	0.003	0.001	0.001	0.0039	0.004	<0.003	0.0081	<0.003	0.004	0.004	<0.003	<0.003	<0.003	<0.003	<0.003	0.0031	0.0027	0.00224	0.00281	0.0078	0.00348	<0.003	<0.003	0.00194	
Antimony: Dissolved	mg/L	0.2	0.006	< 0.0002	< 0.0001	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00002	<0.00002	<0.00002	0.000021	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	
Arsenic: Dissolved	mg/L	0.05	0.01	<0.0002	< 0.0002	< 0.0002	0.00011	0.00011	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00006	0.00007	0.00006	0.000051	0.000055	0.000102	<0.0001	<0.0001	0.000142	
Barium: Dissolved	mg/L	10	1	0.13	0.0036	0.0036	0.0064	0.0066	0.0079	0.008	0.015	0.015	0.013	0.013	0.01	0.012	0.012	0.0094	0.00799	0.0128	0.00966	0.0043	0.00313	0.0098	0.0103	0.0084		
Beryllium: Dissolved	mg/L	0.053	NS	<0.0002	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	
Bismuth: Dissolved	mg/L	NS	NS	<0.0002	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	
Boron: Dissolved	mg/L	50	5	0.01	0.009	0.008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Cadmium: Dissolved	mg/L	0.0001-0.0013*	0.005	0.00019	< 0.00001	< 0.00001	0.00003	0.000026	<0.00001	0.000022	0.00001	0.00002	0.00003	0.00004	0.00001	0.00001	<0.00001	<0.00005	<0.00005	0.0000107	0.000006	<0.00005	<0.00005	0.000015	<0.00001	0.000007		
Calcium: Dissolved	mg/L	NS	NS	115	38.8	36.7	64.3	-	72.9	69.3	148	146	128	120	101	102	128	119	82.9	81.7	137	95.5	45.1	33.7	73.3	110	99	
Chromium: Dissolved	mg/L	0.01, 0.09	0.05	0.001	0.0003	0.0003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0007	0.0007	0.0007	0.0007	0.00031	<0.0001	0.0082	<0.001	0.0054		
Cobalt: Dissolved	mg/L	0.04	NS	<0.0002	< 0.0001	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00008	0.000006	0.0000105	0.000008	0.000014	0.0000166	0.000006	<0.0005	<0.0005	0.000011		
Copper: Dissolved	mg/L	0.02 - 0.090*	1	0.0007	0.0001	< 0.0001	<0.0002	<0.0002	<0.0002	<0.0002	0.00029	0.0004	0.0003	<0.0002	0.00022	0.00022	0.00014	0.00015	0.00034	0.000166	0.000105	<0.0002	<0.0002	<0.0002	<0.0002	0.000157		
Iron																												

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Unit	BC CSR		EBA04-04															
		Aquatic Life	Drinking Water	27-Aug-09	9-Dec-09	29-Apr-10	1-Nov-10	9-Mar-11	11-May-11	15-Aug-11	28-Nov-11	20-Feb-12	23-May-12	15-Aug-12	3-Dec-12	20-Feb-13	28-May-13	20-Aug-13	26-Nov-13
Physical Tests																			
pH (Field)	pH_Units	NS	NS	8.02	6.87	7.9	8.08	7.76	7.78	8.13	8.52	8.1	7.8	8.01	8.15	8.04	7.68	7.82	8.26
pH (Lab)	pH_Units	NS	NS	7.88	7.63	8.02	7.83	7.48	7.67	7.65	7.76	8.08	7.88	7.77	7.95	7.84	7.88	7.91	7.93
Specific Conductance (Field)	uS/cm	NS	NS	86	57	91	98	116	115	100	104	113	124	98	135	143	112	100	118
Specific Conductance (Lab)	uS/cm	NS	NS	104	117	113	105	123	117	99	113	119	123	105	132	134	112	103	118
Temperature (Field)	°C	NS	NS	12.66	14.47	17.18	14.23	14	15.65	19.31	18.3	15.5	13.8	13.67	15.31	11.22	18.86	12.06	12.93
Dissolved Oxygen (Field)	mg/L	NS	NS	9.65	11	12.85	7.2	3.64	9.85	8.61	8.68	7.0	8.2	7.31	5.3	8.5	13.86	8.24	9.1
Hardness: Total (as CaCO3) (Lab)	mg/L	NS	NS	46.8	50.3	52.1	49.7	64.1	57	46.9	55.4	57.9	58.8	50.2	67.9	59.5	-	47.4	57.5
Dissolved Solids: Total	mg/L	NS	NS	-	-	-	-	-	-	-	-	100	80	64	88	93	73	66	77
Oxidation Reduction Potential (Field)	mV	NS	NS	207	58.7	186.8	-10.7	-310.2	217	44	117.8	87.7	46.6	26.2	239.1	216.8	190.1	-43.3	149
Anions and Nutrients																			
Ammonia (as N)	mg/L	1.31 - 18.4*	NS	<0.01	< 0.01	<0.01	<0.005	0.055	0.022	0.032	0.019	0.01	0.017	0.018	0.012	<0.005	0.013	0.015	0.0071
Nitrogen: Nitrite (as N) (Lab)	mg/L	0.2 - 2*	3.2	<0.002	< 0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nitrogen: Nitrate (as N) (Lab)	mg/L	400	10	0.1	0.11	0.148	0.112	0.16	0.17	0.16	0.13	0.123	0.177	0.133	0.15	0.101	0.144	0.126	0.13
Chloride (Lab)	mg/L	1,500	250	1.38	1.27	1.4	<0.5	1.7	1.9	2.1	0.74	3.4	2.8	1.7	4.7	2.7	2.2	1.7	0.96
Fluoride: Dissolved	mg/L	2 - 3*	1.5	<0.05	< 0.05	0.016	0.012	0.02	0.02	0.01	0.016	0.019	0.017	0.016	0.018	0.013	0.016	0.015	0.017
Sulphate (Lab)	mg/L	1,000	500	2.83	3.22	3.3	2.65	2.8	3.6	2.3	2.77	2.95	3.05	1.82	3.49	3.46	2.71	2.85	3.39
Alkalinity (as CaCO ₃) (Lab)	mg/L	NS	NS	49.1	57.7	53.7	51.5	58	55	46	51.9	53.3	54.4	47.7	60.9	61.3	50.7	48.8	55
Bicarbonate (as CaCO ₃)	mg/L	NS	NS	59.9	-	65.5	62.8	71	67	56	63.3	65.1	66.3	58.2	74.3	74.8	61.9	59.5	67.1
Carbonate (as CaCO ₃)	mg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hydroxide	mg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Metals																			
Aluminum: Dissolved	mg/L	NS	9.5	0.005	0.005	0.0173	0.0052	0.007	0.006	0.006	0.0076	0.0078	0.00489	0.00552	0.0071	0.00511	0.0049	0.0103	0.0168
Antimony: Dissolved	mg/L	0.2	0.006	<0.0002	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00003	0.000028	<0.00002	0.000022	0.000026	<0.0005	<0.0005	0.000022
Arsenic: Dissolved	mg/L	0.05	0.01	0.0003	0.0003	0.00029	0.00029	0.0002	0.0002	0.0003	0.00028	0.00029	0.000172	0.000266	0.000304	0.000254	0.00024	0.00026	0.000275
Barium: Dissolved	mg/L	10	1	0.0006	0.0006	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	0.0009	0.000775	0.000663	0.00085	0.000881	<0.001	<0.001	0.000673
Beryllium: Dissolved	mg/L	0.053	NS	<0.0002	< 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.0001	<0.0001	<0.00001
Bismuth: Dissolved	mg/L	NS	NS	<0.0002	< 0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.001	<0.001	<0.000005
Boron: Dissolved	mg/L	50	5	<0.01	0.008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium: Dissolved	mg/L	0.0001-0.0013*	0.005	<0.00004	0.00004	0.00742	<0.00001	<0.00001	0.00007	<0.00001	0.000025	0.000014	<0.000005	0.000008	0.000292	<0.000005	<0.00001	<0.00001	<0.000005
Calcium: Dissolved	mg/L	NS	NS	16.1	17.4	18.1	17.2	21.9	19.7	16.4	19.2	20.1	20.5	17.3	23.5	20.6	18	16.4	20
Chromium: Dissolved	mg/L	0.01, 0.09	0.05	0.0002	0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0004	0.00021	0.000018	0.00024	<0.0001	<0.001	<0.001	0.0002
Cobalt: Dissolved	mg/L	0.04	NS	<0.0002	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000015	0.0000261	0.000009	0.00001	0.000012	<0.0005	<0.0005	0.000008
Copper: Dissolved	mg/L	0.02 - 0.090*	1	0.0025	0.0003	0.00064	<0.0002	0.0004	0.0006	<0.0002	0.00024	0.0003	0.000356	0.000283	0.000313	0.000269	0.00021	0.00027	0.000191
Iron: Dissolved (Lab)	mg/L	NS	NS**	<0.01	< 0.01	0.0063	<0.005	<0.005	<0.005	<0.005	<0.005	0.002	<0.001	0.0013	<0.001	0.001	<0.005	<0.005	0.0012
Lead: Dissolved	mg/L	0.040 - 0.160*	0.01	<0.0002	< 0.00005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.000018	<0.000005	0.000006	<0.000005	<0.000005	<0.0002	<0.0002	0.000013
Lithium: Dissolved	mg/L	NS	0.73	<0.0002	< 0.0001	<0.005	<0.005	-	-	<0.005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.005	<0.0005
Magnesium: Dissolved	mg/L	NS	100	1.61	1.66	1.68	1.62	2.26	1.89	1.46	1.79	1.86	1.85	1.67	2.24	1.93	1.64	1.56	1.84
Manganese: Dissolved	mg/L	NS	NS**	<0.0002	< 0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00009	0.000078	0.00142	<0.00005	<0.00005	<0.001	<0.001	<0.00005
Mercury: Dissolved	mg/L	0.001	0.001	<0.00002	< 0.02	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	< 0.00001	0.00001	<0.00001	<0.00001	<0.00001	<0.00005	<0.00005	<0.000002
Molybdenum: Dissolved	mg/L	10	0.25	<0.0001	0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00012	0.000117	0.000113	0.000169	0.000129	<0.001	<0.001	0.000107
Nickel: Dissolved	mg/L	0.250 - 1.5*	NS	<0.0002	< 0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00005	0.000066	0.00003	0.000038	<0.00002	<0.001	<0.001	0.000042
Phosphorus: Dissolved	mg/L	NS	NS	<0.03	< 0.015	-	-	<0.01	<0.01	-	-	0.0053	<0.005	0.012	0.0071	-	-	-	-
Potassium: Dissolved	mg/L	NS	NS	0.27	0.36	0.321	0.259	0.37	0.31	0.24	0.296	0.37	0.32	0.277	0.325	0.325	0.281	0.267	0.302
Selenium: Dissolved	mg/L	0.01	0.01	<0.0002	< 0.0002	0.0001	0.00014	0.0001	0.0001	0.0001	0.00017	0.00011	0.000104	0.000087	0.000126	0.000168	0.0001	0.00013	0.000141
Silicon: Dissolved	mg/L	NS	NS	3.52	3.16	4.05	3.39	4.4	3.8	3.4	3.35	4.1	3.69	3.48	4.05	4.06	3.62	3.52	3.99
Silver: Dissolved	mg/L	0.0005-0.015*	NS	<0.00005	< 0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.00002	<0.00002	<0.000005
Sodium: Dissolved	mg/L	NS	200	1.19	1.17	1.3	1.14	1.79	1.55	1									

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Unit	BC CSR		EBA04-06															
		Aquatic Life	Drinking Water	27-Aug-09	9-Dec-09	29-Apr-10	1-Nov-10	9-Mar-11	11-May-11	15-Aug-11	29-Nov-11	20-Feb-12	25-May-12	15-Aug-12	4-Dec-12	20-Feb-13	29-May-13	20-Aug-13	27-Nov-13
Physical Tests																			
pH (Field)	pH_Units	NS	NS	7.31	6.66	7.3	7.18	7.06	7.19	7.03	7.18	7.3	7.3	7.08	7.36	6.4	6.94	7.22	7.59
pH (Lab)	pH_Units	NS	NS	8.19	7.88	8.12	7.83	7.71	7.75	7.49	7.66	8.2	8.03	8.18	8.19	8.21	8.28	8.29	8.13
Specific Conductance (Field)	uS/cm	NS	NS	370	230	366	473	433	579	856	444	413	458	695	576	602	570	672	501
Specific Conductance (Lab)	uS/cm	NS	NS	473	818	536	527	491	583	873	487	431	438	672	562	577	558	649	485
Temperature (Field)	°C	NS	NS	10.64	10.18	10.31	10.43	10.19	10.27	10.64	9.09	10.0	10.3	10.79	10.07	9.43	10.16	10.89	10
Dissolved Oxygen (Field)	mg/L	NS	NS	11.76	11.67	10.25	20.8	9.26	9.64	7.49	8.48	9.1	9.5	3.84	5.53	7.72	14.56	3.41	-
Hardness: Total (as CaCO3) (Lab)	mg/L	NS	NS	263	477	295	265	296	317	447	255	225	227	387	311	301	-	354	258
Dissolved Solids: Total	mg/L	NS	NS	-	-	-	-	-	-	-	-	300	300	452	376	391	370	437	250
Oxidation Reduction Potential (Field)	mV	NS	NS	-1.6	71.2	233.1	38	-369.4	244.6	96.7	120.8	80.3	126	27.3	112.7	136.9	120.2	-34.8	-
Anions and Nutrients																			
Ammonia (as N)	mg/L	1.31 - 18.4*	NS	<0.01	< 0.01	<0.01	0.036	0.014	0.009	0.012	0.0059	0.021	<0.005	0.029	0.0083	0.0064	0.02	0.018	0.019
Nitrogen: Nitrite (as N) (Lab)	mg/L	0.2 - 2*	3.2	<0.002	0.009	<0.005	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nitrogen: Nitrate (as N) (Lab)	mg/L	400	10	0.34	0.1	0.401	0.464	1.13	0.59	1.26	0.071	1.03	0.499	1.65	0.818	1.09	1.13	1.22	0.953
Chloride (Lab)	mg/L	1,500	250	5.9	33.3	5.1	4.2	4.4	7.4	21	4.4	1.7	3.9	11	5.1	3.9	5.8	7.4	4.9
Fluoride: Dissolved	mg/L	2 - 3*	1.5	<0.05	< 0.05	<0.01	<0.01	0.02	<0.01	0.01	0.012	0.013	0.011	<0.01	0.012	0.011	0.011	<0.01	0.011
Sulphate (Lab)	mg/L	1,000	500	11.1	23.8	4.48	3.63	1.6	6.6	44	2.53	1.67	2.24	29.8	5.12	7.18	3.29	15.4	3.06
Alkalinity (as CaCO3) (Lab)	mg/L	NS	NS	248	422	297	283	250	310	400	254	215	240	326	300	309	301	342	251
Bicarbonate (as CaCO3)	mg/L	NS	NS	302	-	362	345	310	380	-	310	263	293	397	365	377	367	417	306
Carbonate (as CaCO3)	mg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hydroxide	mg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Metals																			
Aluminum: Dissolved	mg/L	NS	9.5	0.002	< 0.001	0.0044	<0.003	<0.003	<0.003	<0.003	<0.003	0.0027	0.00225	0.00137	0.00165	0.00187	<0.003	<0.003	0.0117
Antimony: Dissolved	mg/L	0.2	0.006	<0.0002	< 0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00003	0.000022	<0.00002	0.000038	0.00002	<0.0005	<0.0005	<0.00002
Arsenic: Dissolved	mg/L	0.05	0.01	<0.0002	0.0003	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	0.00011	0.000061	0.0001	0.00012	0.000091	<0.0001	<0.0001	0.000095
Barium: Dissolved	mg/L	10	1	0.0061	0.017	0.0069	0.0062	0.006	0.007	0.011	0.0064	0.00496	0.00562	0.00943	0.0118	0.00725	0.0074	0.0085	0.00563
Beryllium: Dissolved	mg/L	0.053	NS	<0.0002	< 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.0001	<0.0001	<0.00001
Bismuth: Dissolved	mg/L	NS	NS	<0.0002	< 0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.001	<0.001	<0.000005
Boron: Dissolved	mg/L	50	5	0.01	0.15	<0.05	<0.05	<0.05	<0.05	0.09	0.051	<0.05	<0.05	0.051	<0.05	<0.05	<0.05	0.055	<0.05
Cadmium: Dissolved	mg/L	0.0001-0.0013*	0.005	<0.00004	0.00003	0.000061	<0.00001	<0.00001	0.00002	0.00005	<0.00001	0.000021	0.0000106	0.000011	0.000006	0.000019	<0.00001	0.000021	0.000008
Calcium: Dissolved	mg/L	NS	NS	77	142	88.6	77.6	85.9	94.7	134	76.9	65.7	67.3	117	95.1	90.6	88.7	106	76.9
Chromium: Dissolved	mg/L	0.01, 0.09	0.05	0.0011	< 0.0002	<0.001	0.0012	0.001	<0.001	<0.001	<0.001	0.0011	0.001	0.00066	0.00114	0.00055	0.0011	<0.001	0.00107
Cobalt: Dissolved	mg/L	0.04	NS	<0.0002	0.0003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000009	0.0000094	0.000038	<0.00005	0.000009	<0.0005	<0.0005	0.000011
Copper: Dissolved	mg/L	0.02 - 0.090*	1	0.0008	0.0017	<0.0002	<0.0002	<0.0002	0.0003	0.0019	<0.0002	0.00025	0.000112	0.000544	0.000142	0.000301	<0.0002	0.00041	0.000121
Iron: Dissolved (Lab)	mg/L	NS	NS**	<0.01	0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.002	0.0022	0.0029	0.0018	<0.001	0.0102	<0.005	0.0017
Lead: Dissolved	mg/L	0.040 - 0.160*	0.01	<0.0002	< 0.00005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.000008	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.0002	0.000011
Lithium: Dissolved	mg/L	NS	0.73	0.0007	0.001	<0.005	<0.005	-	-	0.01	<0.005	0.0008	0.00066	0.00082	0.00074	0.00056	<0.005	<0.005	0.00057
Magnesium: Dissolved	mg/L	NS	100	17.1	29.3	17.9	17.2	19.8	19.6	27.5	15.2	14.7	14.3	23.3	18	18.1	17.5	22	16
Manganese: Dissolved	mg/L	NS	NS**	0.0013	0.069	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	0.00011	0.000268	0.00033	0.000074	<0.00005	<0.001	<0.001	0.000089
Mercury: Dissolved	mg/L	0.001	0.001	<0.00002	< 0.02	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	< 0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00005	<0.00005	<0.000002
Molybdenum: Dissolved	mg/L	10	0.25	<0.0001	< 0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00005	<0.00005	<0.00005	0.000082	<0.00005	<0.001	<0.001	<0.00005
Nickel: Dissolved	mg/L	0.250 - 1.5*	NS	<0.0002	< 0.0002	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.0001	0.000103	0.000321	0.000199	0.000099	<0.001	<0.001	0.000264
Phosphorus: Dissolved	mg/L	NS	NS	<0.03	< 0.015	-	-	<0.01	<0.01	-	-	<0.0050	0.0052	0.0102	<0.005	-	-	-	-
Potassium: Dissolved	mg/L	NS	NS	1.35	1.91	1.51	1.39	1.64	1.44	1.64	1.39	1.4	1.35	1.7	1.54	1.42	1.42	1.56	1.38
Selenium: Dissolved	mg/L	0.01	0.01	<0.0002	< 0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00005	0.000055	<0.00004	0.000067	<0.00004	<0.0001	<0.0001	<0.00004
Silicon: Dissolved	mg/L	NS	NS	8.85	10	9.42	8.85	10.7	9.6	10.2	9.21	9.1	9.08	10.5	10.5	9.77	9.5	10.2	9.82
Silver: Dissolved	mg/L	0.0005-0.015*	NS	<0.00005	< 0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.00002	<0.00002	<0.000005
Sodium: Dissolved	mg/L	NS	200	4.82	15.3	5.72	5.26	5.75	4.83	6.73	5.58	5.65	5.23	6.77	6.31	6.1	5.79	6.38	5

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Unit	BC CSR		EBA04-07		EBA04-07		EBA04-07		EBA04-07		EBA04-07 DUP		EBA04-07 DUP		EBA04-07 DUP		EBA04-07 DUP		EBA04-07 DUP		EBA04-07 DUP		EBA04-07 DUP		EBA04-07 DUP		EBA04-07 DUP		
		Aquatic Life	Drinking Water	27-Aug-09	9-Dec-09	29-Apr-10	1-Nov-10	9-Mar-11	11-May-11	15-Aug-11	29-Nov-11	20-Feb-12	25-May-12	15-Aug-12	4-Dec-12	20-Feb-13	29-May-13	20-Aug-13	27-Nov-13											
Physical Tests																														
pH (Field)	pH Units	NS	NS	7.18	6.25	6.84	6.77	6.6	6.73	6.85	6.72	6.8	6.6	6.77	-	6.92	-	6.54	-	6.87	-	7.12	-							
pH (Lab)	pH Units	NS	NS	7.99	8.1	7.76	7.99	7.42	7.76	7.44	7.76	7.92	7.48	7.89	7.76	8.02	7.77	7.96	7.73	7.95	7.9	7.96	7.95							
Specific Conductance (Field)	uS/cm	NS	NS	669	423	625	951	764	833	794	1,044	952	830	750	1,019	791	878	864	822	878	864	822								
Specific Conductance (Lab)	uS/cm	NS	NS	844	475	936	1,080	877	864	820	1,140	993	827	818	760	994	990	755	725	844	871	702	761	847	833					
Temperature (Field)	°C	NS	NS	10.44	9.9	10.04	10.2	9.99	10.11	10.28	9.99	9.7	10.1	-	10.41	-	9.66	-	9.33	-	9.97	-	10.38	-	9.7	-				
Dissolved Oxygen (Field)	mg/L	NS	NS	6.68	7.9	9.51	8.5	5.43	6.92	7.75	2.85	2.6	1.7	2.5	-	9.6	-	9.7	-	10.4	-	5.22	-	-	-					
Hardness: Total (as CaCO3) (Lab)	mg/L	NS	NS	447	269	513	553	470	420	387	566	534	401	392	388	365	536	520	396	398	-	420	-	435	428					
Dissolved Solids: Total	mg/L	NS	NS	-	-	-	-	-	-	-	600c	540	-	490	-	660	-	515	-	570	-	535	428	432	-	-				
Oxidation Reduction Potential (Field)	mV	NS	NS	-69.8	45.1	244.9	-70.1	-398.4	260.2	106.4	144.4	96.1	212	-	146	-	150.6	-	237.5	-	-23.9	-	-	-	-	-				
Anions and Nutrients																														
Ammonia (as N)	mg/L	1.31 - 18.4*	NS	<0.01	<0.01	<0.01	0.039	0.02	0.008	0.031	0.035	0.0091	0.017	0.014	0.012	0.0078	0.071	0.0085	0.0062	0.013	0.01	0.019	0.052	0.0062	0.0074					
Nitrogen: Nitrate (as N) (Lab)	mg/L	0.2 - 2*	3.2	0.011	<0.002	0.0196	0.0268	0.029	0.036	0.027	0.0713	0.051	0.0345	0.0347	0.028	0.028	0.0585	0.059	0.0249	0.037	0.0321	0.0281	0.0273	0.0249	0.0256					
Nitrogen: Nitrate (as N) (Lab)	mg/L	400	10	<0.01	0.45	0.262	0.515	2.36	2.18	2.58	1.42	3	1.82	1.79	1.66	1.67	0.507	0.508	1.43	1.42	1.55	1.24	1.94	1.94	0.398	0.396				
Chloride (Lab)	mg/L	1,500	250	31.8	7	32	40	19	27	26	41	29	27	27	27	27	35	31	15	15	26	22	22	21	21					
Fluoride: Dissolved	mg/L	2 - 3*	1.5	<0.05	<0.05	<0.01	<0.01	<0.01	0.01	0.01	0.015	0.014	0.012	0.012	0.011	0.01	0.014	0.015	0.012	0.012	0.013	0.011	0.014	0.012	0.01					
Sulphate (Lab)	mg/L	1,000	500	21.5	5.47	26.9	42.4	37	23	20	36.4	42.0	19.8	19.9	17.2	16.7	25.9	25.9	28.5	26.4	25.6	24.6	19.2	19.3	22.3	21				
Alkalinity (as CaCO3) (Lab)	mg/L	NS	NS	420	261	461	516	400	410	380	534	443	388	383	316	332	478	476	366	350	404	419	328	363	416	407				
Bicarbonate (as CaCO3)	mg/L	NS	NS	512	-	563	629	490	500	460	652	540	474	468	386	405	583	580	446	427	493	511	400	443	508	496				
Carbonate (as CaCO3)	mg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Hydrosulfide	mg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Dissolved Metals																														
Aluminum: Dissolved	mg/L	NS	NS	9.5	<0.001	0.0039	<0.003	<0.003	0.003	0.005	<0.003	0.0021	0.00221	0.0021	0.00152	0.00168	0.00155	0.00143	0.00088	0.00096	<0.003	<0.003	0.0047	<0.003	0.0121	0.0115				
Antimony: Dissolved	mg/L	0.2	0.006	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000041	0.00004	0.00003	0.000033	0.000041	0.000042	0.000029	0.000031	0.000031	<0.0005	<0.0005	<0.0005	0.000029	0.00003					
Arsenic: Dissolved	mg/L	0.05	0.01	<0.0002	<0.0002	0.00022	0.00014	0.0001	0.0002	0.0002	0.00016	0.00022	0.000141	0.000141	0.000139	0.000154	0.000189	0.00018	0.000147	0.000191	0.00014	0.00012	<0.00017	0.00017	0.000158	0.000155				
Barium: Dissolved	mg/L	10	1	0.016	0.0058	0.0178	0.0216	0.017	0.016	0.015	0.0228	0.0229	0.0157	0.0157	0.0152	0.015	0.0193	0.019	0.0155	0.0155	0.0176	0.0177	0.0153	0.0164	0.0157	0.016				
Beryllium: Dissolved	mg/L	0.053	NS	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00001	0.000022	0.000022	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	
Bismuth: Dissolved	mg/L	NS	NS	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.0001	<0.001	<0.001	<0.0005	<0.00005					
Boron: Dissolved	mg/L	50	0.001	0.02	0.031	0.1	0.263	0.26	0.278	0.26	0.29	0.293	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26				
Cadmium: Dissolved	mg/L	0.0001 - 0.0013*	0.005	<0.00001	0.000011	0.000011	0.00003	0.000015	0.000012	0.000032	0.00006	0.0000474	0.0000418	0.0000328	0.000033	0.000039	0.000035	0.000035	0.000032	0.000032	0.000032	0.000032	0.000032	0.000032	0.000032	0.000032	0.000032	0.000032	0.000032	0.000032
Calcium: Dissolved	mg/L	NS	NS	129	80.8	151	161	134	121	112	167	159	115	111	113	104	161	157	115	127	124	122	121	123	128	125				
Chromium: Dissolved	mg/L	0.001, 0.09	0.05	0.0004	0.0008	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt: Dissolved	mg/L	0.04	NS	0.0006	<0.0001	0.00054	0.00059	<0.0005	0.0005	<0.0005	0.00076	0.000576	0.000547	0.000528	0.000428	0.000436	0.000527	0.000452	0.000403	0.00059	0.00059	0.0005	<0.0005	0.000412	0.000391					
Copper: Dissolved	mg/L	0.02 - 0.090*	1	0.0028	<0.0001	0.0033	0.0021	0.0033	0.0025	0.00453	0.00286	0.00272	0.00285	0.00272	0.00247	0.00404	0.00366	0.00235	0.00239	0.00314	0.00305	0.00293	0.00284	0.0026	0.00272					
Iron: Dissolved (Lab)	mg/L	NS	NS**	<0.01	<0.01	0.006	0.0085	<0.005	0.007	<0.005	0.0076	0.006	0.0053	0.0051	0.0115	0.0206	0.0066	0.0038	0.0026	0.0027	<0.005	<0.005	0.0095	0.0059	0.0041	0.0041				
Lead: Dissolved	mg/L	0.040 - 0.160*	0.01	<0.0002	<0.00005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.000007	0.0000206	0.0000051	0.000009	0.000006	<0.000005	0.000015	0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
Lithium: Dissolved	mg/L	NS	0.73	0.0012	0.0007	<0.005	<0.005	<0.005	<0.005	<0.005	0.0012	0.00108	0.00107	0.00099	0.00093	0.00112	0.00106	0.00083	0.00086	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Magnesium: Dissolved	mg/L	NS	NS	100	32	33	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2				
Manganese: Dissolved	mg/L	NS	NS**	0.062	0.0002	0.0695	0.102	0.1	0.081	0.083	0.129	0.13	0.1	0.101	0.0999	0.0999	0.133	0.129	0.117	0.118	0.116	0.114	0.105	0.102	0.13	0.13				
Mercury: Dissolved	mg/L	0.001	0.001	<0.00002	<0.0002	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Molybdenum: Dissolved	mg/L	10	0.25	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.000071	0.000093	0.000085	0.000092	0.000129	0.00012	0.000089	0.000079	<0.001	0.001	<0.001	0.000084	0.000087					
Nickel: Dissolved	mg/L	0.250 - 1.5*	NS	0.0016	<0.0002	0.0018	0.0025	0.001	0.004	0.001	0.0025	0.00168	0.00171	0.00172	0.00159	0.00162	0.00239	0.00217	0.00108	0.00113	0.0019	0.0055	0.0019	0.0017	0.00166	0.00191				
Phosphorus: Dissolved	mg/L	NS	NS	<0.03	<0.015	-	-	<0.01	0.01	-	0.0085	0.0064	0.0051	0.0051	0.0205	0.0191	0.0491	0.0417	-	-	-	-	-	-	-	-				
Potassium: Dissolved	mg/L	NS	NS	2.09	1.33	2.26	2.22	2.37	2.18	2.1	2.46	2.83	2.24	2.23	2.21	2.19	2.38	2.35	1.92	1.94	2.22	2.19	2.15	2.18	2.17	2.18				
Selenium: Dissolved	mg/L	0.01	0.01	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00012	0.00006	0.000099	0.000088	0.000068	0.														

Notes:

BC CSR - BC Contaminated Sites Regulation (CSR) (BC Reg. 375/96, including amendments up to BC Reg. 4/2014, January 31, 2014), Schedule 6 and 10 Generic Numerical Water Standards for the Protection of Freshwater Aquatic Life (AW) and Drinking Water (DW)

* Indicates that the guideline is dependent on chloride, hardness or pH

** Stage 8 Amendment of the CSR applies

NS - No standard

Parameter exceeds CSR AW standard

Parameter exceeds CSR DW standard

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Unit	BC CSR		EBA11-1								
		Aquatic Life	Drinking Water	30-Nov-11	21-Feb-12	23-May-12	16-Aug-12	5-Dec-12	21-Feb-13	29-May-13	21-Aug-13	26-Nov-13
Physical Tests												
pH (Field)	pH_Units	NS	NS	7.46	7.5	7.3	7.49	7.74	7.53	7.09	7.42	7.68
pH (Lab)	pH_Units	NS	NS	7.94	7.94	8.2	8.25	8.09	8.23	8.16	8.26	8.27
Specific Conductance (Field)	uS/cm	NS	NS	473	408	477	468	414	519	488	426	442
Specific Conductance (Lab)	uS/cm	NS	NS	514	479	476	480	412	502	485	428	430
Temperature (Field)	°C	NS	NS	8.8	9.1	9.4	9.95	9.25	8.71	9.42	10.08	8.8
Dissolved Oxygen (Field)	mg/L	NS	NS	10.12	7.7	7.2	6.12	7.15	7.59	13.2	7.53	7.26
Hardness: Total (as CaCO3) (Lab)	mg/L	NS	NS	249	241	239	240	211	242	-	219	222
Dissolved Solids: Total	mg/L	NS	NS	-	300	310	304	269	337	317	277	287
Oxidation Reduction Potential (Field)	mV	NS	NS	138.3	87.3	106	19.1	-46.2	166.1	306.6	130.9	147.6
Anions and Nutrients												
Ammonia (as N)	mg/L	1.31 - 18.4*	NS	0.011	0.0072	0.014	0.023	0.019	<0.005	0.0096	0.045	0.021
Nitrogen: Nitrite (as N) (Lab)	mg/L	0.2 - 2*	3.2	0.011	0.013	0.0051	<0.005	<0.005	<0.005	<0.005	<0.005	0.0097
Nitrogen: Nitrate (as N) (Lab)	mg/L	400	10	0.349	0.716	0.5	0.527	0.352	0.405	0.483	0.42	0.368
Chloride (Lab)	mg/L	1,500	250	21	10	13	20	21	20	16	15	14
Fluoride: Dissolved	mg/L	2 - 3*	1.5	0.019	0.027	0.022	0.02	0.019	0.016	0.029	0.021	0.018
Sulphate (Lab)	mg/L	1,000	500	71.2	68	61.4	52	46.8	72	58.6	49	34.7
Alkalinity (as CaCO3) (Lab)	mg/L	NS	NS	165	164	175	171	126	160	176	155	170
Bicarbonate (as CaCO3)	mg/L	NS	NS	-	200	214	209	154	195	215	189	207
Carbonate (as CaCO3)	mg/L	NS	NS	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hydroxide	mg/L	NS	NS	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Metals												
Aluminum: Dissolved	mg/L	NS	9.5	0.0048	0.0051	0.00521	0.0042	0.00544	0.00312	0.0033	0.0063	0.00326
Antimony: Dissolved	mg/L	0.2	0.006	<0.00050	0.00002	<0.00002	<0.00002	0.000025	<0.00002	<0.0005	<0.0005	<0.00002
Arsenic: Dissolved	mg/L	0.05	0.01	0.00036	0.00025	0.000189	0.000202	0.000285	0.000233	0.0002	0.00019	0.000266
Barium: Dissolved	mg/L	10	1	0.0193	0.00819	0.00657	0.00658	0.00555	0.0065	0.0059	0.0046	0.00484
Beryllium: Dissolved	mg/L	0.053	NS	<0.00010	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.0001	<0.0001	<0.00001
Bismuth: Dissolved	mg/L	NS	NS	<0.0010	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.001	<0.001	<0.000005
Boron: Dissolved	mg/L	50	5	<0.050	<0.05	<0.05	<0.05	<0.05	0.065	0.054	0.052	0.066
Cadmium (Filtered)	mg/L	0.0001-0.0013*	0.005	0.000017	0.000009	0.0000062	<0.000005	<0.000005	<0.000005	0.000012	0.000034	0.000012
Calcium: Dissolved	mg/L	NS	NS	75.3	71.7	71.3	71.2	65	74	71.6	65.3	67.7
Chromium: Dissolved	mg/L	0.01, 0.09	0.05	0.0012	0.0014	0.00136	0.0016	0.00119	0.00103	0.0016	0.0015	0.00127
Cobalt: Dissolved	mg/L	0.04	NS	<0.00050	0.000064	0.000029	0.000016	0.000016	0.000016	<0.0005	<0.0005	0.000029
Copper: Dissolved	mg/L	0.02 - 0.090*	1	0.00028	0.00072	0.000274	0.000236	0.000343	0.000263	0.00023	0.00032	0.000288
Iron: Dissolved (Lab)	mg/L	NS	NS**	<0.0050	0.002	0.0014	0.002	0.0034	<0.001	<0.005	<0.005	0.0019
Lead: Dissolved	mg/L	0.040 - 0.160*	0.01	<0.00020	0.000021	<0.000005	<0.000005	0.000011	<0.000005	<0.0002	<0.0002	0.000005
Lithium: Dissolved	mg/L	NS	0.73	<0.0050	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.005	<0.0005
Magnesium: Dissolved	mg/L	NS	100	14.9	15	14.8	15	11.9	13.9	14.6	13.5	12.8
Manganese: Dissolved	mg/L	NS	NS**	0.0265	0.00338	0.000665	0.000218	0.000282	0.000052	<0.001	<0.001	0.000054
Mercury: Dissolved	mg/L	0.001	0.001	<0.000050	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00005	<0.00005	<0.00002
Molybdenum: Dissolved	mg/L	10	0.25	<0.0010	0.00006	0.000065	0.000074	0.000116	<0.00005	<0.001	<0.001	<0.00005
Nickel: Dissolved	mg/L	0.250 - 1.5*	NS	<0.0010	0.0005	0.000268	0.000242	0.000295	0.000112	<0.001	<0.001	0.000189
Phosphorus: Dissolved	mg/L	NS	NS	-	0.0534	0.0187	0.483	0.935	-	-	-	-
Potassium: Dissolved	mg/L	NS	NS	0.947	0.81	0.76	0.786	0.862	0.793	0.762	0.688	0.819
Selenium: Dissolved	mg/L	0.01	0.01	0.00013	0.00004	0.000082	0.000121	0.000146	0.000162	<0.0001	<0.0001	0.000079
Silicon: Dissolved	mg/L	NS	NS	5.83	5.6	5.89	6.13	5.94	5.89	5.84	6.46	6.52
Silver: Dissolved	mg/L	0.0005-0.015*	NS	<0.000020	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.00002	<0.00002	<0.000005
Sodium: Dissolved	mg/L	NS	200	5.17	4.84	4.58	4.58	4.85	4.76	4.86	4.47	4.88
Strontium: Dissolved	mg/L	NS	22	0.15	0.141	0.143	0.147	0.112	0.144	0.153	0.132	0.119
Sulphur: Dissolved	mg/L	NS	NS	23.6	26	21	19 - 19.2	16.5	23	19.3	15.3	11.9
Thallium: Dissolved	mg/L	0.003	NS	<0.000050	0.000007	0.0000064	0.000004	0.000004	0.000002	<0.00005	<0.00005	<0.000002
Tin: Dissolved	mg/L	NS	22	<0.0050	<0.0002	<0.0002	<0.0002	0.00032	<0.0002	<0.005	<0.005	<0.0002
Titanium: Dissolved	mg/L	1	NS	<0.0050	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.005	<0.0005
Uranium: Dissolved	mg/L	3	0.02	0.00106	0.000968	0.000841	0.000855	0.000481	0.000652	0.0007	0.00069	0.000553
Vanadium: Dissolved	mg/L	NS	NS	<0.0050	0.0032	0.00363	0.00402	0.00445	0.00445	<0.005	<0.005	0.00522
Zinc: Dissolved	mg/L	0.075 - 2.4*	5	<0.0050	0.0003	0.00043	0.0002	0.00053	0.00024	<0.005	<0.005	0.00121
Zirconium: Dissolved	mg/L	NS	NS	<0.00050	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0001
Hydrocarbons												
VHw6-10	mg/L	15	15	<0.3	-	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
VPW	mg/L	1.5	NS	<0.3	-	<0.3	<0.3	<0.3	<0.3	<0.3	-	-
Non-Halogenated Hydrocarbons												
Benzene	mg/L	4	0.005	<0.0005	-	<0.0005	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Ethylbenzene	mg/L	2	0.0024	<0.0005	-	<0.0005	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Toluene	mg/L	0.39	0.024	<0.0005	-	<0.0005	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Xylene Total	mg/L	NS	0.3	<0.001	-	<0.001	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Styrene	mg/L	0.72	NS	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Volatile Organic Compounds												
1,1,1,2- Tetrachloroethane	µg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-trichloroethane	µg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2,2-tetrachloroethane	µg/L	1,100	30	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-trichloroethane	µg/L	200	5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-dichloroethane	µg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-dichloroethene	ug/L	NS	14	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-dichlorobenzene	ug/L	7	3	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-dichloroethane	ug/L	1000	5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-dichloropropane	µg/L	NS	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-dichlorobenzene	µg/L	1500	NS	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-dichlorobenzene	ug/L	260	1	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromobenzene	µg/L	NS	NS	<2	-	<2	-	-	-	-	-	-
Bromodichloromethane	µg/L	NS	NS	<1	-	<1	<1	<1	<1	<1	<1	<1
Bromoform	µg/L	NS	100	<1	-	<1	<1	<1	<1	<1	<1	<1
Bromomethane	µg/L	NS	NS	<1	-	<1	<1	<1	<1	<1	<1	<10
Carbon tetrachloride	ug/L	130	5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	ug/L	13	30	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorodibromomethane	ug/L	NS	NS	<1	-	<1	<1	<1	<1	<1	<1	<1
Chloroethane	µg/L	NS	NS	<1	-	<1	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	20	100	<1	-	<1	<1	<1	<1	<1	<1	<1
Chloromethane	µg/L	NS	NS	<1	-	<1	<1	<1	<1	<1	<1	<1
cis-1,2-dichloroethene	µg/L	NS	NS	<1	-	<1	<1	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	µg/L	NS	NS	<1	-	<1	<1	<1	<1	<1	<1	<1
Dibromomethane	µg/L	NS	NS	<0.9	-	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
Dichlorodifluoromethane	µg/L	NS	NS	<2	-	<2	-	-	-	-	-	-
Dichloromethane	ug/L	980	50	<2	-	<2	<2	<2	<2	<2	<2	<2
Methyl Tertiary Butyl Ether	µg/L	NS	NS	<4	-	<4	<4	<4	<4	<4	<4	<4
Trichloroethene	ug/L	200	5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethene	ug/L	1100	30	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-dichloroethene	µg/L	NS	NS	<1	-	<1	<1	<1	<1	<1	<1	<1
trans-1,3-dichloropropene	µg/L	NS	NS	<1	-	<1	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	µg/L	NS	NS	<4	-	<4	<4	<4	<4	<4	<4	<4
Vinyl chloride	ug/L	NS	2	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Notes:

BC CSR - BC Contaminated Sites Regulation (CSR) (BC Reg. 375/96, including amendments up to BC Reg. 4/2014, January 31, 2014), Schedule 6 and 10 Generic Numerical Water Standards for the Protection of Freshwater Aquatic Life (AW) and Drinking Water (DW)

* Indicates that the guideline is dependent on chloride, hardness or pH

** Stage 8 Amendment of the CSR applies

NS - No standard

Parameter exceeds CSR AW standard

Parameter exceeds CSR DW standard

Italic.

BOLD

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Unit	BC CSR		EBA11-2								
		Aquatic Life	Drinking Water	30-Nov-11	20-Feb-12	24-May-12	16-Aug-12	4-Dec-12	20-Feb-13	28-May-13	20-Aug-13	26-Nov-13
Physical Tests												
pH (Field)	pH_Units	NS	NS	7.45	7.7	7.4	7.46	7.86	7.69	7.18	7.55	7.66
pH (Lab)	pH_Units	NS	NS	7.89	8.24	8.2	8.21	8.16	8.15	8.28	8.17	8.24
Specific Conductance (Field)	uS/cm	NS	NS	340	238	285	258	395	276	267	262	357
Specific Conductance (Lab)	uS/cm	NS	NS	387	249	288	267	385	273	268	264	354
Temperature (Field)	°C	NS	NS	10.02	9.7	7.6	10.65	10.33	9.57	10.25	10.8	9.66
Dissolved Oxygen (Field)	mg/L	NS	NS	8.44	7.8	7.6	6.92	7.14	11.1	17.27	12.02	6.51
Hardness: Total (as CaCO3) (Lab)	mg/L	NS	NS	201	125	143	133	198	131	-	129	180
Dissolved Solids: Total	mg/L	NS	NS	-	200	190	168	260	180	173	170	232
Oxidation Reduction Potential (Field)	mV	NS	NS	147.6	91.2	144	41.7	87.9	157.4	206	-43.4	144.9
Anions and Nutrients												
Ammonia (as N)	mg/L	1.31 - 18.4*	NS	0.028	0.01	0.016	0.012	0.017	0.007	0.017	0.018	0.033
Nitrogen: Nitrite (as N) (Lab)	mg/L	0.2 - 2*	3.2	<0.005	<0.005	0.0479	<0.005	0.0068	<0.005	<0.005	<0.005	0.0196
Nitrogen: Nitrate (as N) (Lab)	mg/L	400	10	0.61	0.235	0.62	0.549	0.382	0.321	0.485	0.295	0.386
Chloride (Lab)	mg/L	1,500	250	9.7	5.0	4.4	7.7	21	8.9	5.6	7.3	15
Fluoride: Dissolved	mg/L	2 - 3*	1.5	0.013	0.027	0.039	0.023	0.016	0.015	0.021	0.027	0.015
Sulphate (Lab)	mg/L	1,000	500	5.64	8.08	8.48	4.65	3.95	3.66	5	2.69	4.59
Alkalinity (as CaCO ₃) (Lab)	mg/L	NS	NS	187	111	136	127	164	126	128	125	156
Bicarbonate (as CaCO ₃)	mg/L	NS	NS	-	136	166	155	200	153	156	153	190
Carbonate (as CaCO ₃)	mg/L	NS	NS	-	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hydroxide	mg/L	NS	NS	-	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Metals												
Aluminum: Dissolved	mg/L	NS	9.5	0.0072	0.0099	0.00622	0.00791	0.00589	0.0293	0.0075	0.0096	0.00638
Antimony: Dissolved	mg/L	0.2	0.006	<0.00050	0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.0005	<0.0005	<0.00002
Arsenic: Dissolved	mg/L	0.05	0.01	0.00023	0.00019	0.000088	0.000111	0.000123	0.000161	0.0001	0.00014	0.000185
Barium: Dissolved	mg/L	10	1	0.0122	0.0075	0.00668	0.00655	0.00844	0.00573	0.0058	0.0061	0.00745
Beryllium: Dissolved	mg/L	0.053	NS	<0.00010	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.0001	<0.0001	<0.00001
Bismuth: Dissolved	mg/L	NS	NS	<0.0010	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.001	<0.001	<0.000005
Boron: Dissolved	mg/L	50	5	<0.050	<0.05	0.058	<0.05	<0.05	<0.05	0.057	<0.05	<0.05
Cadmium (Filtered)	mg/L	0.0001-0.0013*	0.005	0.000011	<0.000005	<0.000005	0.000007	<0.000005	<0.000005	<0.00001	<0.00001	<0.000005
Calcium: Dissolved	mg/L	NS	NS	58.9	32.8	38.5	36.6	58.9	37.7	35.5	34.9	52.6
Chromium: Dissolved	mg/L	0.01, 0.09	0.05	0.0014	0.0029	0.00222	0.00191	0.00118	0.00188	0.0022	0.0017	0.0013
Cobalt: Dissolved	mg/L	0.04	NS	<0.00050	0.000026	0.0000111	0.000006	<0.000005	0.000025	<0.0005	<0.0005	0.000005
Copper: Dissolved	mg/L	0.02 - 0.090*	1	<0.00020	0.00012	0.00018	0.000189	0.000155	0.000254	0.00021	<0.0002	0.000082
Iron: Dissolved (Lab)	mg/L	NS	NS**	<0.0050	0.004	0.0022	0.0266	0.0021	0.0312	<0.005	<0.005	0.002
Lead: Dissolved	mg/L	0.040 - 0.160*	0.01	<0.00020	0.000007	<0.000005	0.000007	<0.000005	0.000007	<0.0002	<0.0002	0.000005
Lithium: Dissolved	mg/L	NS	0.73	<0.0050	0.0005	<0.0005	<0.0005	0.00065	<0.0005	<0.005	<0.005	<0.0005
Magnesium: Dissolved	mg/L	NS	100	13.2	10.4	11.3	9.97	12.4	8.97	10	10.1	11.9
Manganese: Dissolved	mg/L	NS	NS**	0.0158	0.00237	0.000293	0.000265	<0.00005	0.00087	<0.001	<0.001	<0.00005
Mercury: Dissolved	mg/L	0.001	0.001	<0.000050	< 0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00005	<0.00005	<0.000002
Molybdenum: Dissolved	mg/L	10	0.25	<0.0010	0.00016	0.000085	0.000105	0.000069	0.000062	<0.001	<0.001	<0.00005
Nickel: Dissolved	mg/L	0.250 - 1.5*	NS	<0.0010	0.00017	0.000113	0.000106	0.000105	0.000083	<0.001	<0.001	0.000102
Phosphorus: Dissolved	mg/L	NS	NS	-	0.0092	0.0068	1.26	1.09	-	-	-	-
Potassium: Dissolved	mg/L	NS	NS	1.23	0.47	0.45	0.426	1.06	0.742	0.439	0.521	0.982
Selenium: Dissolved	mg/L	0.01	0.01	0.00018	0.00015	0.000096	0.000141	0.00015	0.000095	<0.0001	0.00013	0.000152
Silicon: Dissolved	mg/L	NS	NS	8.63	8	7.86	9.02	9.35	8.3	8.11	8.69	8.79
Silver: Dissolved	mg/L	0.0005-0.015*	NS	<0.000020	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.00002	<0.00002	<0.000005
Sodium: Dissolved	mg/L	NS	200	3.5	4.81	4.46	3.75	3.4	3.58	4.2	3.55	3.44
Strontium: Dissolved	mg/L	NS	22	0.122	0.0596	0.07	0.0668	0.116	0.0801	0.0712	0.0694	0.0952
Sulphur: Dissolved	mg/L	NS	NS	<3.0	<10	<15	<2	<3 - 2.11	<3 - 0.77	<3	<3	<3
Thallium: Dissolved	mg/L	0.003	NS	<0.000050	0.000006	0.0000034	0.000002	0.000004	0.000003	<0.00005	<0.00005	0.000002
Tin: Dissolved	mg/L	NS	22	<0.0050	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.005	<0.005	<0.0002
Titanium: Dissolved	mg/L	1	NS	<0.0050	<0.0005	<0.0005	<0.0005	<0.0005	0.00133	<0.005	<0.005	<0.0005
Uranium: Dissolved	mg/L	3	0.02	0.00033	0.00019	0.000198	0.000194	0.000245	0.000184	0.00016	0.00019	0.000213
Vanadium: Dissolved	mg/L	NS	NS	<0.0050	0.0033	0.00291	0.0027	0.00236	0.00257	<0.005	<0.005	0.00237
Zinc: Dissolved	mg/L	0.075 - 2.4*	5	<0.0050	0.0001	0.00086	<0.0001	0.0004	0.00027	<0.005	<0.005	0.00029
Zirconium: Dissolved	mg/L	NS	NS	<0.00050	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0001

Notes:

BC CSR - BC Contaminated Sites Regulation (CSR) (BC Reg. 375/96, including amendments up to BC Reg. 4/2014, January 31, 2014), Schedule 6 and 10 Generic Numerical Water Standards for the Protection of Freshwater Aquatic Life (AW) and Drinking Water (DW)

* Indicates that the guideline is dependent on chloride, hardness or pH

** Stage 8 Ammendment of the CSR applies

NS - No standard

Parameter exceeds CSR AW standard

Parameter exceeds CSR DW standard

Italics

BOLD

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Unit	BC CSR		EBA11-3	EBA11-3-DUP	EBA11-3	EBA11-3-DUP	EBA11-3	EBA11-3	EBA11-3	EBA11-3	EBA11-3	EBA11-3	EBA11-3
		Aquatic Life	Drinking Water	30-Nov-11		21-Feb-12		25-May-12	16-Aug-12	5-Dec-12	22-Feb-13	30-May-13	21-Aug-13	28-Nov-13
Physical Tests														
pH (Field)	pH_Units	NS	NS	7.46	-	7.5	-	7.4	7.48	7.71	7.62	-	7.65	7.69
pH (Lab)	pH_Units	NS	NS	7.83	7.75	7.79	7.78	7.69	7.85	7.91	7.73	7.93	7.86	7.92
Specific Conductance (Field)	uS/cm	NS	NS	129	-	156	-	278	183	182	288	112	121	129.5
Specific Conductance (Lab)	uS/cm	NS	NS	143	142	183	183	276	190	184	276	113	122	119
Temperature (Field)	°C	NS	NS	10.11	-	9.9	-	10.2	10.32	10.04	9.66	10.03	10.3	10.2
Dissolved Oxygen (Field)	mg/L	NS	NS	8.32	-	10.4	-	10.7	9.73	9.95	8.88	22.28	10.6	-
Hardness: Total (as CaCO3) (Lab)	mg/L	NS	NS	63.3	63.9	82.5	84.1	116	81.1	80.5	117	-	58.4	54.3
Dissolved Solids: Total	mg/L	NS	NS	-	-	100	-	180	119	119	187	73	79	64.7
Oxidation Reduction Potential (Field)	mV	NS	NS	145.2	-	83.9	-	144	7.4	135.9	207.2	296.2	77.1	-
Anions and Nutrients														
Ammonia (as N)	mg/L	1.31 - 18.4*	NS	0.025	0.02	0.0073	0.0066	0.013	0.026	0.025	<0.005	0.0094	0.022	0.0091
Nitrogen: Nitrite (as N) (Lab)	mg/L	0.2 - 2*	3.2	0.045	0.007	0.026	0.025	<0.005	<0.005	<0.005	<0.005	0.0387	<0.005	0.005
Nitrogen: Nitrate (as N) (Lab)	mg/L	400	10	0.17	0.186	0.113	0.115	0.255	0.163	0.907	0.434	0.066	0.046	0.036
Chloride (Lab)	mg/L	1,500	250	10	9.6	19	19	49	24	20	50	1.3	3.3	4.5
Fluoride: Dissolved	mg/L	2 - 3*	1.5	0.016	0.016	0.019	0.021	0.014	0.015	0.017	0.012	0.018	0.015	0.028
Sulphate (Lab)	mg/L	1,000	500	5.06	5.75	4.32	4.15	5.68	3.68	2.75	2.31	3.65	2.97	3.86
Alkalinity (as CaCO ₃) (Lab)	mg/L	NS	NS	54.3	51.6	59.8	57.6	42.7	47.7	50.3	43.2	54	53.9	49.8
Bicarbonate (as CaCO ₃)	mg/L	NS	NS	-	-	72.9	70.2	52.1	58.2	61.4	52.8	65.9	65.8	60.8
Carbonate (as CaCO ₃)	mg/L	NS	NS	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hydroxide	mg/L	NS	NS	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Metals														
Aluminum: Dissolved	mg/L	NS	9.5	0.0042	0.0036	0.0028	0.0028	0.00254	0.00757	0.00343	0.00238	0.0071	0.0034	0.0176
Antimony: Dissolved	mg/L	0.2	0.006	<0.00050	<0.00050	0.00003	0.00003	<0.00002	<0.00002	0.000027	<0.00002	<0.0005	<0.0005	<0.0005
Arsenic: Dissolved	mg/L	0.05	0.01	0.00017	0.0002	0.00017	0.00015	0.000093	0.000144	0.000181	0.000126	0.00024	0.00019	0.00019
Barium: Dissolved	mg/L	10	1	0.0021	0.0022	0.00188	0.00167	0.00242	0.00132	0.00121	0.00161	<0.001	<0.001	<0.001
Beryllium: Dissolved	mg/L	0.053	NS	<0.00010	<0.00010	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.0001	<0.0001	<0.0001
Bismuth: Dissolved	mg/L	NS	NS	<0.0010	<0.0010	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.001	<0.001	<0.001
Boron: Dissolved	mg/L	50	5	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium (Filtered)	mg/L	0.0001-0.0013*	0.005	<0.000010	<0.000010	<0.000005	0.000005	0.0000051	<0.000005	0.000008	0.000008	<0.00001	<0.00001	<0.00001
Calcium: Dissolved	mg/L	NS	NS	19.7	20	25.8	26.4	35.8	25.2	25.2	37.2	16.8	18.4	17.2
Chromium: Dissolved	mg/L	0.01, 0.09	0.05	<0.0010	<0.0010	0.0005	0.0005	0.00058	0.00078	0.00051	0.00027	0.0019	<0.001	<0.001
Cobalt: Dissolved	mg/L	0.04	NS	<0.00050	<0.00050	0.000018	0.000018	0.0000125	0.000006	<0.000005	0.000005	<0.0005	<0.0005	<0.0005
Copper: Dissolved	mg/L	0.02 - 0.090*	1	<0.00020	<0.00020	<0.00005	<0.00005	0.000084	0.000154	0.000109	0.0001	<0.0002	<0.0002	0.0002
Iron: Dissolved (Lab)	mg/L	NS	NS**	<0.0050	<0.0050	<0.001	0.001	0.0021	0.003	0.0016	0.0012	<0.005	<0.005	<0.005
Lead: Dissolved	mg/L	0.040 - 0.160*	0.01	<0.00020	<0.00020	<0.000005	0.000009	<0.000005	<0.000005	0.00001	<0.000005	<0.0002	<0.0002	<0.0002
Lithium: Dissolved	mg/L	NS	0.73	<0.0050	<0.0050	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.005	<0.005
Magnesium: Dissolved	mg/L	NS	100	3.42	3.42	4.43	4.43	6.33	4.4	4.27	5.85	2.79	3.03	2.74
Manganese: Dissolved	mg/L	NS	NS**	0.0161	0.016	0.00252	0.00248	0.00086	0.000151	0.000123	0.000061	<0.001	<0.001	<0.001
Mercury: Dissolved	mg/L	0.001	0.001	<0.000050	<0.000050	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00005	<0.00005	<0.00001
Molybdenum: Dissolved	mg/L	10	0.25	<0.0010	<0.0010	0.00008	0.00007	0.000115	0.000094	0.000128	0.000098	0.0029	<0.001	<0.001
Nickel: Dissolved	mg/L	0.250 - 1.5*	NS	<0.0010	<0.0010	0.00006	0.0001	0.000115	0.000087	0.000041	0.000048	0.011	<0.001	<0.001
Phosphorus: Dissolved	mg/L	NS	NS	-	-	0.0606	0.0486	0.0135	0.607	0.144	-	-	-	-
Potassium: Dissolved	mg/L	NS	NS	0.348	0.345	0.36	0.37	0.42	0.345	0.34	0.44	0.27	0.277	0.27
Selenium: Dissolved	mg/L	0.01	0.01	0.00019	0.00023	0.00018	0.00018	0.0002	0.000296	0.000184	0.000141	0.00013	0.00015	0.00018
Silicon: Dissolved	mg/L	NS	NS	4.41	4.39	4.4	4.5	4.54	4.62	4.56	4.78	4.65	4.73	4.57
Silver: Dissolved	mg/L	0.0005-0.015*	NS	<0.000020	<0.000020	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.00002	<0.00002	<0.00002
Sodium: Dissolved	mg/L	NS	200	1.43	1.42	1.61	1.61	1.93	1.6	1.57	1.87	1.28	1.33	1.29
Strontium: Dissolved	mg/L	NS	22	0.0393	0.0381	0.0475	0.0474	0.0633	0.0433	0.0443	0.0647	0.03	0.0314	0.0299
Sulphur: Dissolved	mg/L	NS	NS	<3.0	<3.0	<10	<10	<15	<2	<3 - 0.86	<3	<3	<3	<3
Thallium: Dissolved	mg/L	0.003	NS	<0.000050	<0.000050	<0.000002	<0.000002	0.0000029	<0.000002	<0.000002	<0.000002	<0.00005	<0.00005	<0.00005
Tin: Dissolved	mg/L	NS	22	<0.0050	<0.0050	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.005	<0.005	<0.005
Titanium: Dissolved	mg/L	1	NS	<0.0050	<0.0050	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.005	<0.005
Uranium: Dissolved	mg/L	3	0.02	<0.0001	<0.0001	0.000059	0.000054	0.0000309	0.000026	0.00003	0.000024	<0.0001	<0.0001	<0.0001
Vanadium: Dissolved	mg/L	NS	NS	<0.0050	<0.0050	0.003	0.0029	0.00233	0.00274	0.00277	0.00266	<0.005	<0.005	<0.005
Zinc: Dissolved	mg/L	0.075 - 2.4*	5	<0.0050	<0.0050	0.0002	0.0003	0.00048	0.00022	0.00087	0.0002	<0.005	<0.005	<0.005
Zirconium: Dissolved	mg/L	NS	NS	<0.00050	<0.00050	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005
Hydrocarbons														
VHw6-10	mg/L	15	15	<0.3		-		-	-	-	-	-	-	-
VPhW	mg/L	1.5	NS	<0.3		-		-	-	-	-	-	-	-
Non-Halogenated Hydrocarbons														
Benzene	mg/L	4	0.005	<0.0005		-		-	-	-	-	-	-	-
Ethylbenzene	mg/L	2	0.0024	<0.0005		-		-	-	-	-	-	-	-
Toluene	mg/L	0.39	0.024	<0.0005		-		-	-	-	-	-	-	-
Xylene Total	mg/L	NS	0.3	<0.001		-		-	-	-	-	-	-	-
Styrene	mg/L	0.72	NS	<0.0005		-		-	-	-	-	-	-	-
Volatile Organic Compounds														
1,1,1,2- Tetrachloroethane	µg/L	NS	NS	<0.5		-		-	-	-	-	-	-	-
1,1,1-trichloroethane	µg/L	NS	NS	<0.5		-		-	-	-	-	-	-	-
1,1,2,2-tetrachloro														

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Unit	BC CSR		EBA11-4	EBA11-4	EBA11-4	EBA11-4-DUP	EBA11-4	EBA11-4-DUP	EBA11-4	EBA11-4-DUP	EBA11-4	EBA11-4	EBA11-4-DUP	EBA11-4	EBA11-4-DUP	EBA11-4	EBA11-4-DUP
		Aquatic Life	Drinking Water	30-Nov-11	21-Feb-12	25-May-12			16-Aug-12			5-Dec-12		22-Feb-13	30-May-13		21-Aug-13	
Physical Tests																		
pH (Field)	pH_Units	NS	NS	7.7	7.8	7.7	-	7.73	-	8.09	-	8.17	-	-	7.88	-	8.07	-
pH (Lab)	pH_Units	NS	NS	7.8	7.72	7.73	7.76	7.87	7.86	7.87	7.86	7.78	7.9	7.91	7.8	7.79	7.85	7.93
Specific Conductance (Field)	uS/cm	NS	NS	101	110	134	-	123	-	98	-	149	131	-	112	-	116.5	-
Specific Conductance (Lab)	uS/cm	NS	NS	112	128	135	134	128	128	100	100	139	133	134	112	113	106	107
Temperature (Field)	°C	NS	NS	9.86	9.8	10.1	-	10.43	-	9.93	-	9.08	9.81	-	10.55	-	10	-
Dissolved Oxygen (Field)	mg/L	NS	NS	10.89	8.5	8.9	-	8.64	-	10.49	-	10.03	25.83	-	10.88	-	-	-
Hardness: Total (as CaCO3) (Lab)	mg/L	NS	NS	48.7	55.3	58.3	58.5	54.4	54.9	44.2	44.3	58.7	-	-	49.8	48.7	47.2	48.9
Dissolved Solids: Total	mg/L	NS	NS	-	100	90	-	80	-	64	-	97	85	-	73	-	58.2	-
Oxidation Reduction Potential (Field)	mV	NS	NS	165.7	73.8	138	-	-11.4	-	135.7	-	138	391	-	48	-	-	-
Anions and Nutrients																		
Ammonia (as N)	mg/L	1.31 - 18.4*	NS	0.013	0.012	0.026	0.067	0.017	0.021	<0.005	<0.005	0.007	0.0069	0.0077	0.013	0.021	0.022	0.023
Nitrogen: Nitrite (as N) (Lab)	mg/L	0.2 - 2*	3.2	0.087	<0.005	0.0261	0.0153	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0628	<0.005	<0.005	0.0505	0.0487
Nitrogen: Nitrate (as N) (Lab)	mg/L	400	10	< 0.02	0.193	0.164	0.166	0.137	0.137	0.021	<0.02	0.228	0.161	0.138	0.087	0.089	0.082	0.085
Chloride (Lab)	mg/L	1,500	250	6.1	12	12	11	10	10	3.9	3.8	13	10	10	6.4	6.5	4	4.5
Fluoride: Dissolved	mg/L	2 - 3*	1.5	0.017	0.026	0.026	0.024	0.027	0.027	0.023	0.023	0.018	0.027	0.025	0.018	0.019	0.035	0.038
Sulphate (Lab)	mg/L	1,000	500	4.16	3.08	3.18	2.76	1.4	1.48	0.84	0.91	2.68	2.35	2.09	1.44	1.55	1.59	1.57
Alkalinity (as CaCO ₃) (Lab)	mg/L	NS	NS	46.3	43.6	46.6	47	47.4	46.9	44.6	43.8	43.7	49.3	49.1	45.2	44.5	45.5	45.5
Bicarbonate (as CaCO ₃)	mg/L	NS	NS	-	53.2	56.8	57.3	57.8	57.2	54.4	53.5	53.3	60.2	59.9	55.1	54.3	55.6	55.5
Carbonate (as CaCO ₃)	mg/L	NS	NS	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hydroxide	mg/L	NS	NS	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Metals																		
Aluminum: Dissolved	mg/L	NS	9.5	0.0121	0.0121	0.00861	0.00877	0.0169	0.0129	0.013	0.0123	0.00772	0.0062	0.0064	0.0184	0.0141	0.021	0.0249
Antimony: Dissolved	mg/L	0.2	0.006	<0.00050	0.00003	0.000022	0.000022	0.000026	0.000021	0.000027	0.000025	0.000023	<0.0005	<0.0005	<0.0005	<0.0005	0.000026	0.000028
Arsenic: Dissolved	mg/L	0.05	0.01	0.00106	0.00119	0.00145	0.00158	0.00153	0.00162	0.00137	0.00141	0.00139	0.00167	0.0016	0.00174	0.0017	0.00142	0.00138
Barium: Dissolved	mg/L	10	1	0.0034	0.0027	0.00225	0.00222	0.00198	0.00179	0.0018	0.00165	0.0021	0.0019	0.0019	0.0018	0.0016	0.00165	0.00157
Beryllium: Dissolved	mg/L	0.053	NS	<0.00010	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	<0.00001
Bismuth: Dissolved	mg/L	NS	NS	<0.0010	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.001	<0.001	<0.001	<0.001	<0.000005	<0.000005
Boron: Dissolved	mg/L	50	5	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium (Filtered)	mg/L	0.0001-0.0013*	0.005	<0.000010	<0.000005	<0.000005	<0.000005	0.000006	<0.000005	0.000012	<0.000005	<0.000005	0.000012	0.000022	0.000019	<0.00001	<0.000005	<0.000005
Calcium: Dissolved	mg/L	NS	NS	14.7	16.7	17.9	18.2	16.9	17.1	13.3	13.5	18.1	18	17.5	15.5	15.3	14.7	14.9
Chromium: Dissolved	mg/L	0.01, 0.09	0.05	<0.0010	0.0017	0.00148	0.00143	0.00138	0.00145	0.00066	0.00062	0.00164	0.0083	0.0095	0.001	0.0011	0.00074	0.0007
Cobalt: Dissolved	mg/L	0.04	NS	<0.00050	0.000029	0.0000051	0.0000069	0.000007	<0.000005	0.000006	<0.000005	<0.000005	<0.0005	<0.0005	<0.0005	<0.0005	0.000008	<0.000005
Copper: Dissolved	mg/L	0.02 - 0.090*	1	0.00023	0.0001	0.000062	0.000078	0.000179	0.000159	0.000521	0.000204	0.000188	<0.0002	0.00033	0.00026	0.00022	0.000113	0.000089
Iron: Dissolved (Lab)	mg/L	NS	NS**	<0.0050	0.005	0.0031	0.003	0.0115	0.0104	0.0081	0.0068	0.0016	<0.005	<0.005	0.024	0.0153	0.0038	0.0035
Lead: Dissolved	mg/L	0.040 - 0.160*	0.01	<0.00020	<0.000005	<0.000005	<0.000005	0.000015	<0.000005	0.00001	0.000008	<0.000005	<0.0002	<0.0002	<0.0002	<0.0002	0.000014	0.000014
Lithium: Dissolved	mg/L	NS	0.73	<0.0050	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.005	<0.005	<0.005	<0.0005	<0.0005
Magnesium: Dissolved	mg/L	NS	100	2.9	3.27	3.29	3.13	2.96	2.98	2.67	2.56	3.27	2.96	2.97	2.67	2.54	2.54	2.83
Manganese: Dissolved	mg/L	NS	NS**	0.0054	0.00329	0.000486	0.00046	0.000227	0.000136	0.000131	0.000079	<0.00005	<0.001	<0.001	<0.001	<0.001	0.000053	0.000074
Mercury: Dissolved	mg/L	0.001	0.001	<0.000050	-	<0.00001	<0.00001	<0.00001	<0.000015	<0.00001	<0.00001	<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.000002	<0.000002
Molybdenum: Dissolved	mg/L	10	0.25	<0.0010	0.0001	0.000095	0.000121	0.000128	0.000123	0.00011	0.000086	0.000097	0.0125	0.0143	<0.001	<0.001	0.000196	0.000104
Nickel: Dissolved	mg/L	0.250 - 1.5*	NS	<0.0010	0.00009	0.000057	0.000539	0.000071	0.000042	0.000241	0.000054	0.000047	0.0471	0.055	<0.001	<0.001	0.000036	0.000038
Phosphorus: Dissolved	mg/L	NS	NS	-	0.402	0.0387	0.0379	1.33	1.44	1.71	1.76	-	-	-	-	-	-	-
Potassium: Dissolved	mg/L	NS	NS	1.08	1.19	0.8	0.79	0.742	0.736	0.977	0.954	1.11	0.773	0.782	0.746	0.714	0.988	1.01
Selenium: Dissolved	mg/L	0.01	0.01	0.00016	0.00025	0.000235	0.000218	0.000187	0.000231	0.000131	0.000277	0.000293	0.00029	0.00026	0.00019	0.00017	0.000165	0.000154
Silicon: Dissolved	mg/L	NS	NS	4.93	5.4	5.99	5.96	5.97	6.02	4.97	5.13	5.85	6.26	6.14	6.12	6.14	5.44	5.37
Silver: Dissolved	mg/L	0.0005-0.015*	NS	<0.000020	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.00002	<0.00002	<0.00002	<0.00002	<0.000005	<0.000005
Sodium: Dissolved	mg/L	NS	200	1.87	2.47	2.67	2.57	2.42	2.4	2.24	2.1	2.63	2.46	2.47	2.19	2.12	2.21	2.35
Strontium: Dissolved	mg/L	NS	22	0.0269	0.0307	0.033	0.033	0.0318	0.0315	0.0247	0.0243	0.0332	0.0337	0.0337	0.0288	0.0284	0.0261	0.027
Sulphur: Dissolved	mg/L	NS	NS	<3.0	<10	<15	<15	<2	<2	<0.6	<0.6	<3	<3	<3	<3	<3	<0.6	<0.6
Thallium: Dissolved	mg/L	0.003	NS	<0.000050	0.000003	0.0000026	0.000003	0.000002	0.000002	0.000002	0.000002	0.000002	<0.00005	<0.00005	<0.00005	<0.00005	<0.000002	<0.000002
Tin: Dissolved	mg/L	NS	22	<0.0050	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.00029	<0.0002	<0.0002	<0.005	<0.005	<0.005	<0.005	<0.0002	<0.0002
Titanium: Dissolved	mg/L	1	NS	<0.0050	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.005	<0.005	<0.005	<0.005	<0.0005	<0.0005
Uranium: Dissolved	mg/L	3	0.02	0.00014	0.000153	0.000195	0.00019	0.000203	0.000207	0.000128	0.000131	0.00017	0.0002	0.0002	0.00018	0.00017	0.00016	0.000151
Vanadium: Dissolved	mg/L	NS	NS															

Notes:

BC CSR - BC Contaminated Sites Regulation (CSR) (BC Reg. 375/96, including amendments up to BC Reg. 4/2014, January 31, 2014), Schedule 6 and 10 Generic Numerical Water Standards for the Protection of Freshwater Aquatic Life (AW) and Drinking Water (DW)

* Indicates that the guideline is dependent on chloride, hardness or pH

** Stage 8 Amendment of the CSR applies

NS - No standard

Parameter exceeds CSR AW standard

Parameter exceeds CSR DW standard

Italics

BOLD

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Unit	BC.AWQG.AL	SW-1														
			27-Aug-09	11-Dec-09	30-Apr-10	2-Nov-10	11-May-11	16-Aug-11	29-Nov-11	21-Feb-12	24-May-12	16-Aug-12	4-Dec-12	21-Feb-13	29-May-13	21-Aug-13	27-Nov-13
Physical Tests																	
pH (Field)	pH_Units	6.5-9	6.23	7.29	7.39	8.14	7.74	8.14	7.72	7.9	7.9	7.78	8	6.9	7.38	8.1	8.2
pH (Lab)	pH_Units	6.5-9	7.91	7.66	7.96	7.76	7.84	7.8	7.77	7.84	7.84	8.03	7.94	7.88	8.02	7.86	8.08
Specific Conductance (Field)	uS/cm	no guideline	99	52	-	142	125	131	140	123	147	122	130	140	133	144	163.1
Specific Conductance (Lab)	uS/cm	no guideline	120	115	120	116	125	140	161	146	137	133	125	128	141	141	152
Temperature (Field)	°C	19	11.02	11.22	11.33	10.99	11.15	11.12	9.9	9.6	11.3	11.07	9.69	10.21	10.64	11.81	9.7
Dissolved Oxygen (Field)	mg/L	5	9.34	10.62	11.09	24.2	9.4	18.16	15.05	9.3	12	7.05	11.2	9.36	11.97	9.49	-
Hardness: Total (as CaCO3) (Lab)	mg/L	no guideline	51.6	49.4	56	60.3	58.8	63.9	73.6	72.6	66.3	73.5	60.2	61.1	64.5	72.8	74.7
Dissolved Solids: Total	mg/L	no guideline	-	-	-	-	-	-	-	100	96	81	85	91	11.97	94	81
Oxidation Reduction Potential (Field)	mV	no guideline	298.6	202.2	203.7	31	230.8	114.5	59.6	95.8	48.1	43.6	79.9	98.1	-	17.4	-
Anions and Nutrients																	
Ammonia (as N)	mg/L	*	<0.01	< 0.01	<0.01	0.029	0.019	<0.005	0.0085	0.008	<0.005	0.013	0.022	<0.005	<0.005	0.015	0.0059
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	0.002	< 0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	<0.12	0.15	0.172	0.172	0.16	0.03	0.115	0.095	0.109	0.105	0.108	0.249	0.121	0.131	0.128
Chloride (Lab)	mg/L	600	1.73	1.68	1.4	1.1	1.8	2.6	3.1	2.4	2	2	3.5	2.1	2.5	3.1	2.9
Fluoride: Dissolved	mg/L	*	<0.05	< 0.05	0.026	0.012	0.02	0.01	0.022	0.021	0.018	0.017	0.021	0.014	0.018	0.018	0.021
Sulphate (Lab)	mg/L	100	2.92	2.78	2.91	3.13	3.3	2.6	3.18	3.18	3.13	1.91	2.87	2.45	3.2	4.06	3.73
Alkalinity (as CaCO ₃) (Lab)	mg/L	no guideline	56.6	56.9	59.1	58.9	61	65	73.1	66	64.6	64.2	57.4	59	65.7	64.5	70.2
Bicarbonate (as CaCO ₃)	mg/L	no guideline	69	-	72.1	71.8	74	79	89.1	80.6	78.8	78.3	70.1	71.9	80.1	78.7	85.7
Carbonate (as CaCO ₃)	mg/L	no guideline	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hydroxide	mg/L	no guideline	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Metals																	
Aluminum: Total	mg/L	*	0.006	-	0.0105	0.0226	0.008	0.012	0.0206	0.0462	0.0213	0.0556	0.0736	0.00531	0.0125	0.0543	0.0243
Antimony: Total	mg/L	0.02	<0.0002	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00004	0.000027	0.000033	0.000032	0.000029	0.000029	0.000031	0.000027
Arsenic: Total	mg/L	0.005	0.0006	-	0.00056	0.00064	0.0006	0.0005	0.00052	0.00047	0.000526	0.000556	0.000465	0.000589	0.000603	0.000549	0.000513
Barium: Total	mg/L	5	0.001	-	0.0011	0.0012	0.001	0.001	0.0015	0.00194	0.00153	0.00167	0.00335	0.00112	0.00147	0.00174	0.00171
Beryllium: Total	mg/L	0.0053	<0.0002	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Bismuth: Total	mg/L	no guideline	<0.0002	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
Boron: Total	mg/L	1.2	0.02	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium: Total	mg/L	*	<0.00004	-	0.000046	<0.00001	0.00004	0.00001	<0.00001	0.000055	0.0000138	0.000034	0.000008	<0.000005	<0.000005	0.000021	<0.000005
Calcium: Total	mg/L	no guideline	16.4	-	18	18.9	18.7	20.1	23	22.7	20.8	23.6	18.3	19.7	20.8	23.4	23.7
Chromium: Total	mg/L	0.001	0.0003	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.0003	0.00027	0.00035	0.00031	0.00022	0.00033	0.00035	0.00029
Cobalt: Total	mg/L	0.11	<0.0002	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000083	0.0000299	0.00005	0.00009	0.000012	0.000023	0.000043	0.000041
Copper: Total	mg/L	*	0.0004	-	0.00033	0.00048	0.0003	0.0004	0.00083	0.00068	0.000406	0.00052	0.000786	0.00028	0.000769	0.00104	0.000725
Iron: Total (Lab)	mg/L	0.3	<0.01	-	<0.005	0.0053	<0.005	0.015	0.0293	0.067	0.0254	0.0834	0.105	0.0049	0.0193	0.0541	0.035
Lead: Total	mg/L	*	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.00003	0.0000111	0.000035	0.000041	<0.000005	0.000144	0.000074	0.000034
Lithium: Total	mg/L	0.87	<0.0002	-	<0.005	<0.005	-	<0.005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Magnesium: Total	mg/L	no guideline	2.59	-	2.67	3.2	2.95	3.33	3.94	3.87	3.49	3.56	3.53	2.89	3.65	3.52	3.79
Manganese: Total	mg/L	*	<0.0002	-	<0.001	<0.001	0.001	<0.001	0.001	0.00294	0.000792	0.00158	0.00353	<0.00005	0.00067	0.00334	0.00181
Mercury: Total	mg/L	no guideline	<0.00002	-	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000002
Molybdenum: Total	mg/L	2	<0.0001	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.0001	0.00012	0.000114	0.00019	0.000153	0.000122	0.000091	0.00013
Nickel: Total	mg/L	*	<0.0002	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.00023	0.000113	0.000127	0.000236	0.00022	0.000175	0.000163	0.00017
Phosphorus: Total	mg/L	no guideline	<0.03	-	-	-	0.02	-	-	0.0108	0.0086	0.0192	0.013	-	-	-	-
Potassium: Total	mg/L	373	0.34	-	0.41	0.386	0.38	0.37	0.428	0.41	0.39	0.417	0.37	0.379	0.389	0.375	0.401
Selenium: Total	mg/L	0.002	<0.0002	-	0.00011	0.00013	0.0001	0.0001	0.00012	0.00011	0.000152	0.000167	0.000085	0.000109	0.000205	0.000151	0.000126
Silicon: Total	mg/L	no guideline	4.06	-	4	4.04	3.9	4.5	4.03	4.7	4.78	5.04	4.3	4.33	4.45	4.78	4.6
Silver: Total	mg/L	*	<0.00005	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.000026	<0.000005	<0.000005
Sodium: Total	mg/L	no guideline	1.41	-	1.39	1.59	1.62	1.75	1.96	2.23	1.87	1.89	2.32	1.71	1.91	1.81	1.97
Strontium: Total	mg/L	no guideline	0.027	-	0.0273	0.0309	0.03	0.03	0.0372	0.0355	0.0317	0.0322	0.035	0.0296	0.0323	0.0332	0.037
Sulphur: Total	mg/L	no guideline	<2	-	<3	<3	<3	<3	<3	<10	<15	<2	<3 - 0.68	<3	<0.6	<3 - 0.69	<3
Tellurium: Total	mg/L	no guideline	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	<0.00004	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002
Thorium: Total	mg/L	no guideline	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	<0.0002	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.00027	<0.0002
Titanium: Total	mg/L	2	0.0002	-	<0.005	<0.005	<0.005	<0.005	<0.005	0.0035	0.00135	0.00503	0.00538	<0.0005	0.00266	0.00293	0.00185
Uranium: Total	mg/L	0.3	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	0.00012	0.000124	0.0000883	0.000092	0.000087	0.000088	0.000097	0.00011	0.000114
Vanadium: Total	mg/L	0.006	0.0044	-	<0.005	<0.005	<0.005	<0.005	<0.005	0.0042	0.00454	0.00471	0.0041	0.00441	0.00223	0.00482	0.00421
Zinc: Total	mg/L	*	<0.001	-	<0.005	<0.005	<0.005	<0.005	<0.005	0.0013	0.00043	0.00096	0.00119	<0.0001	0.0003	0.00096	0.00019
Zirconium: Total	mg/L	no guideline	<0.002	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Notes:
BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life (updated April 2013).
* indicates that guideline is calculated based on sample specific data
Parameter exceeds BC.AWQG.AL standard

BOLD

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Unit	BC.AWQG.AL	SW-2	SW-2-DUP
			21-Feb-13	21-Feb-13
Physical Tests				
pH (Field)	pH_Units	6.5-9	5.69	-
pH (Lab)	pH_Units	6.5-9	7.53	7.46
Specific Conductance (Field)	uS/cm	no guideline	79	-
Specific Conductance (Lab)	uS/cm	no guideline	61.1	60.8
Temperature (Field)	°C	19	4.89	-
Dissolved Oxygen (Field)	mg/L	5	9.41	-
Hardness: Total (as CaCO3) (Lab)	mg/L	no guideline	23.6	24.6
Dissolved Solids: Total	mg/L	no guideline	53	-
Oxidation Reduction Potential (Field)	mV	no guideline	103.7	-
Anions and Nutrients				
Ammonia (as N)	mg/L	*	0.0055	0.015
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	<0.005	<0.005
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	<0.02	<0.02
Chloride (Lab)	mg/L	600	3.8	3.9
Fluoride: Dissolved	mg/L	*	0.024	0.023
Sulphate (Lab)	mg/L	100	1.59	1.47
Alkalinity (as CaCO3) (Lab)	mg/L	no guideline	23.8	23.6
Bicarbonate (as CaCO3)	mg/L	no guideline	29	28.8
Carbonate (as CaCO3)	mg/L	no guideline	<0.5	<0.5
Hydroxide	mg/L	no guideline	<0.5	<0.5
Total Metals				
Aluminum: Total	mg/L	*	0.0243	0.0237
Antimony: Total	mg/L	0.02	<0.00002	<0.00002
Arsenic: Total	mg/L	0.005	0.000025	0.000023
Barium: Total	mg/L	5	0.000522	0.000567
Beryllium: Total	mg/L	0.0053	<0.00001	<0.00001
Bismuth: Total	mg/L	no guideline	<0.000005	<0.000005
Boron: Total	mg/L	1.2	<0.05	<0.05
Cadmium: Total	mg/L	*	0.000016	0.000016
Calcium: Total	mg/L	no guideline	5.01	5.27
Chromium: Total	mg/L	0.001	0.00021	0.00024
Cobalt: Total	mg/L	0.11	0.000057	0.000065
Copper: Total	mg/L	*	0.000415	0.000335
Iron: Total (Lab)	mg/L	0.3	0.0476	0.0635
Lead: Total	mg/L	*	0.000019	0.000028
Lithium: Total	mg/L	0.87	<0.0005	<0.0005
Magnesium: Total	mg/L	no guideline	2.69	2.78
Manganese: Total	mg/L	*	0.00157	0.00192
Mercury: Total	mg/L	no guideline	<0.00001	<0.00001
Molybdenum: Total	mg/L	2	0.000051	<0.00005
Nickel: Total	mg/L	*	0.000062	0.000066
Potassium: Total	mg/L	373	0.198	0.221
Selenium: Total	mg/L	0.002	0.000045	0.000076
Silicon: Total	mg/L	no guideline	6.57	6.52
Silver: Total	mg/L	*	<0.000005	<0.000005
Sodium: Total	mg/L	no guideline	3.38	3.28
Strontium: Total	mg/L	no guideline	0.0162	0.0172
Sulphur: Total	mg/L	no guideline	<3	<3
Thallium: Total	mg/L	0.0003	0.000002	<0.000002
Tin: Total	mg/L	no guideline	0.00117	<0.0002
Titanium: Total	mg/L	2	0.00143	0.00196
Uranium: Total	mg/L	0.3	0.000005	0.000002
Vanadium: Total	mg/L	0.006	0.00188	0.00185
Zinc: Total	mg/L	*	0.00051	0.00049
Zirconium: Total	mg/L	no guideline	<0.0001	<0.0001

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life (updated April 2013).

* indicates that guideline is calculated based on sample specific data

Parameter exceeds BC.AWQG.AL standard

BOLD

APPENDIX G

PARAMETER VS TIME GRAPHS

Figure G1 - Conductivity at Campbell River Waste Management Centre - Landfill Wells

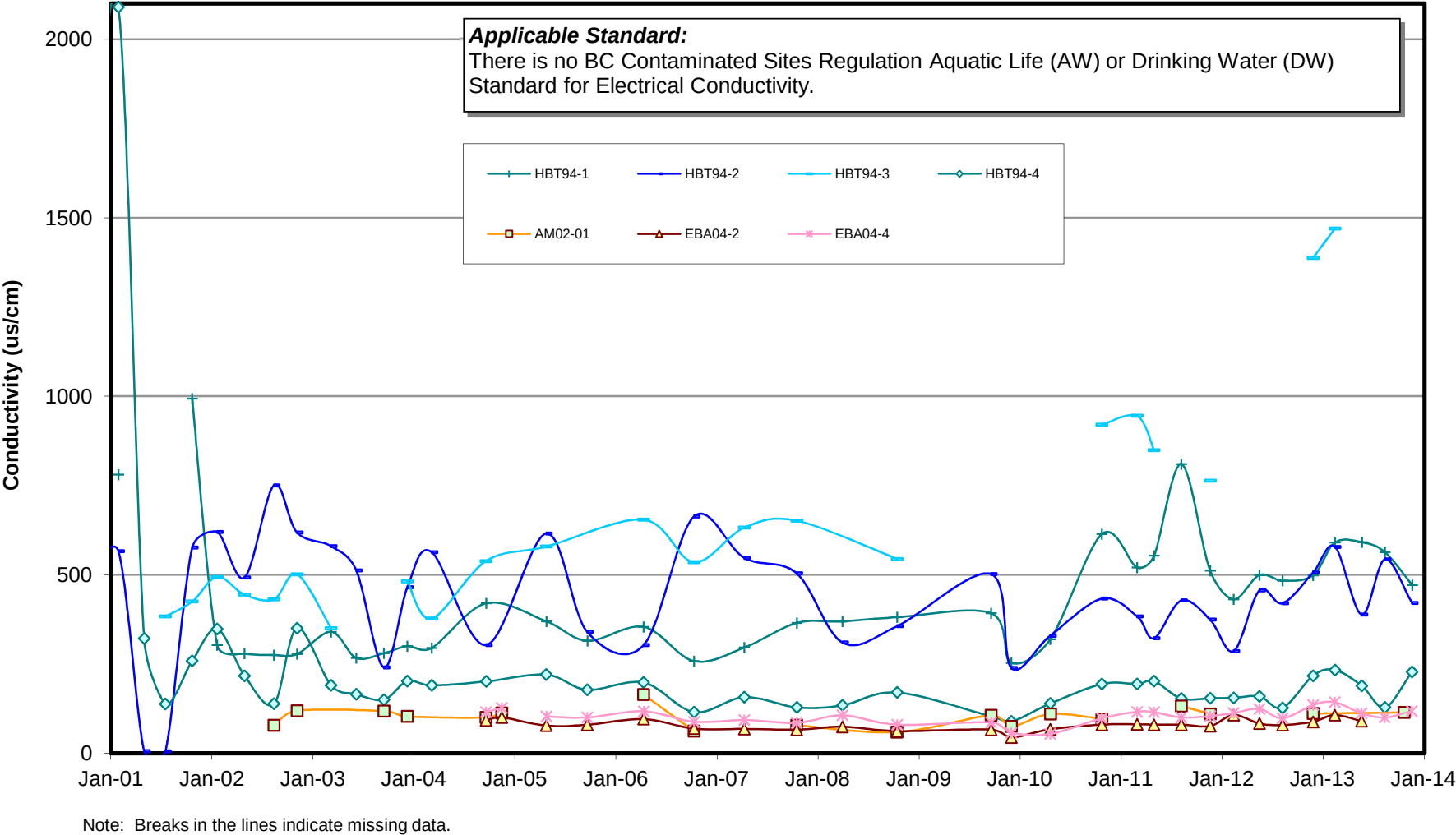
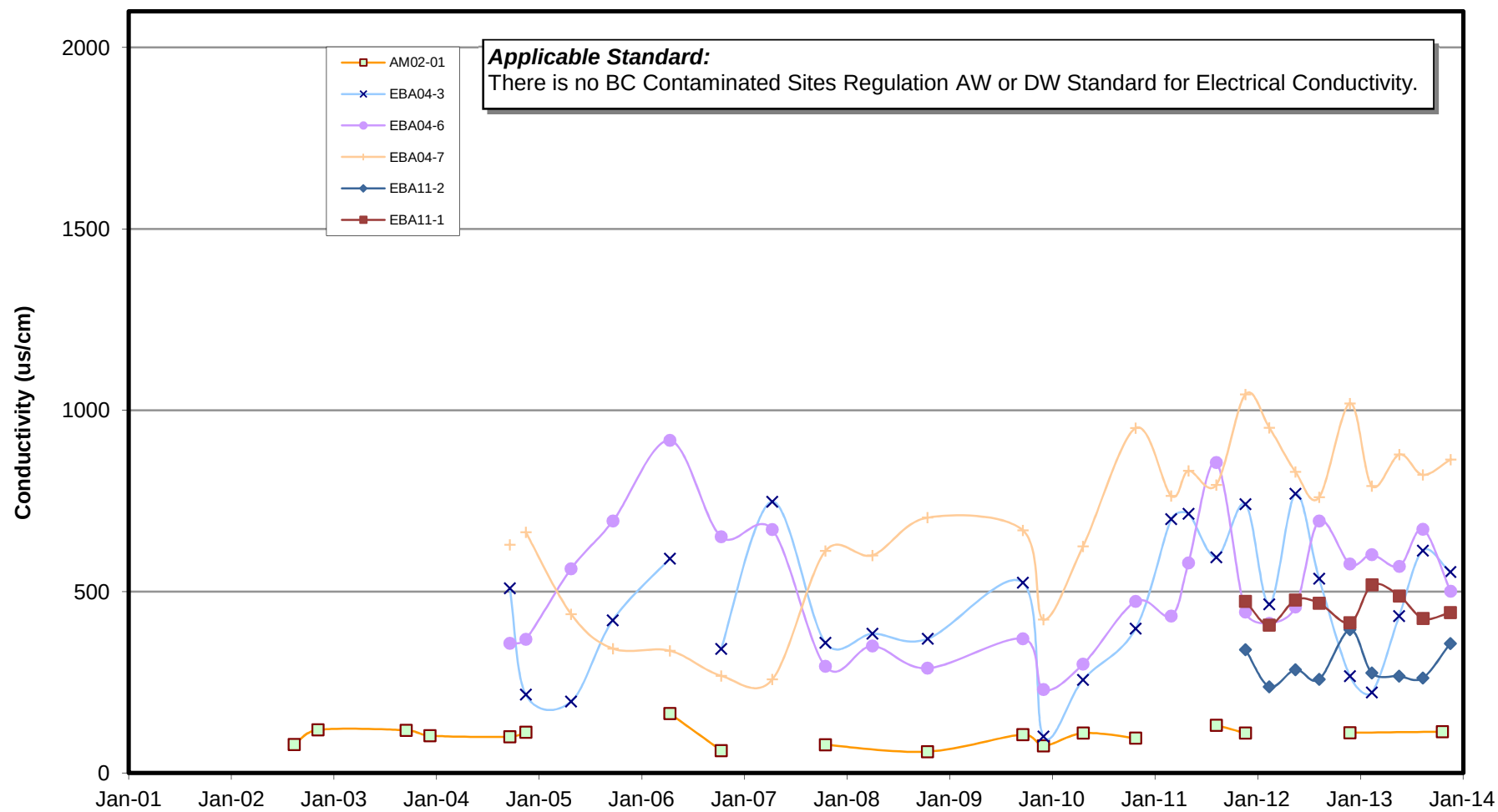


Figure G1 - Conductivity at Campbell River Waste Management Centre - Boundary Wells



Note: Breaks in the lines indicate missing data.

Figure G1 - Conductivity at Campbell River Waste Management Centre - Downgradient Wells

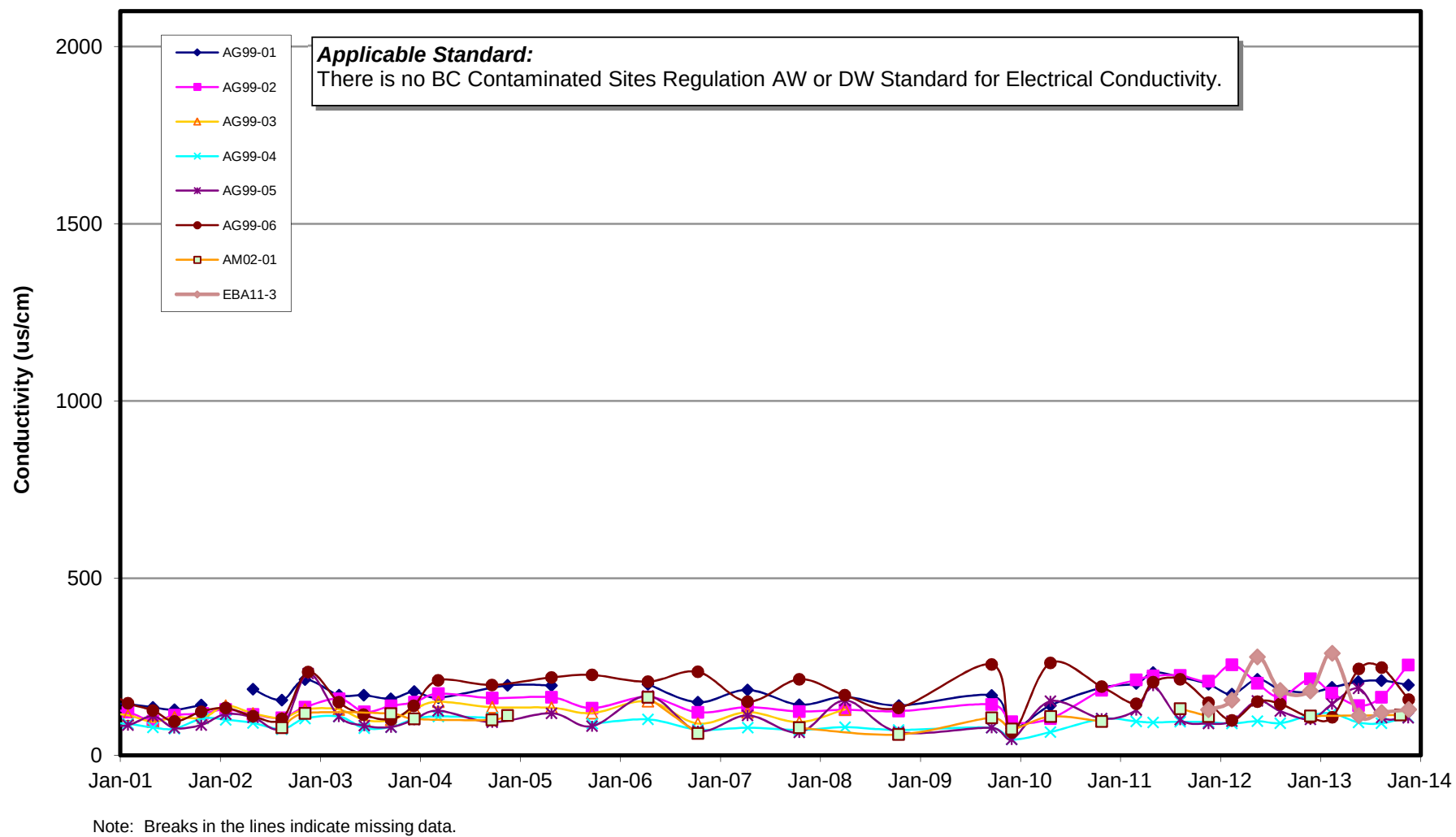


Figure G2- Chloride at Campbell River Waste Management Centre - Landfill Wells

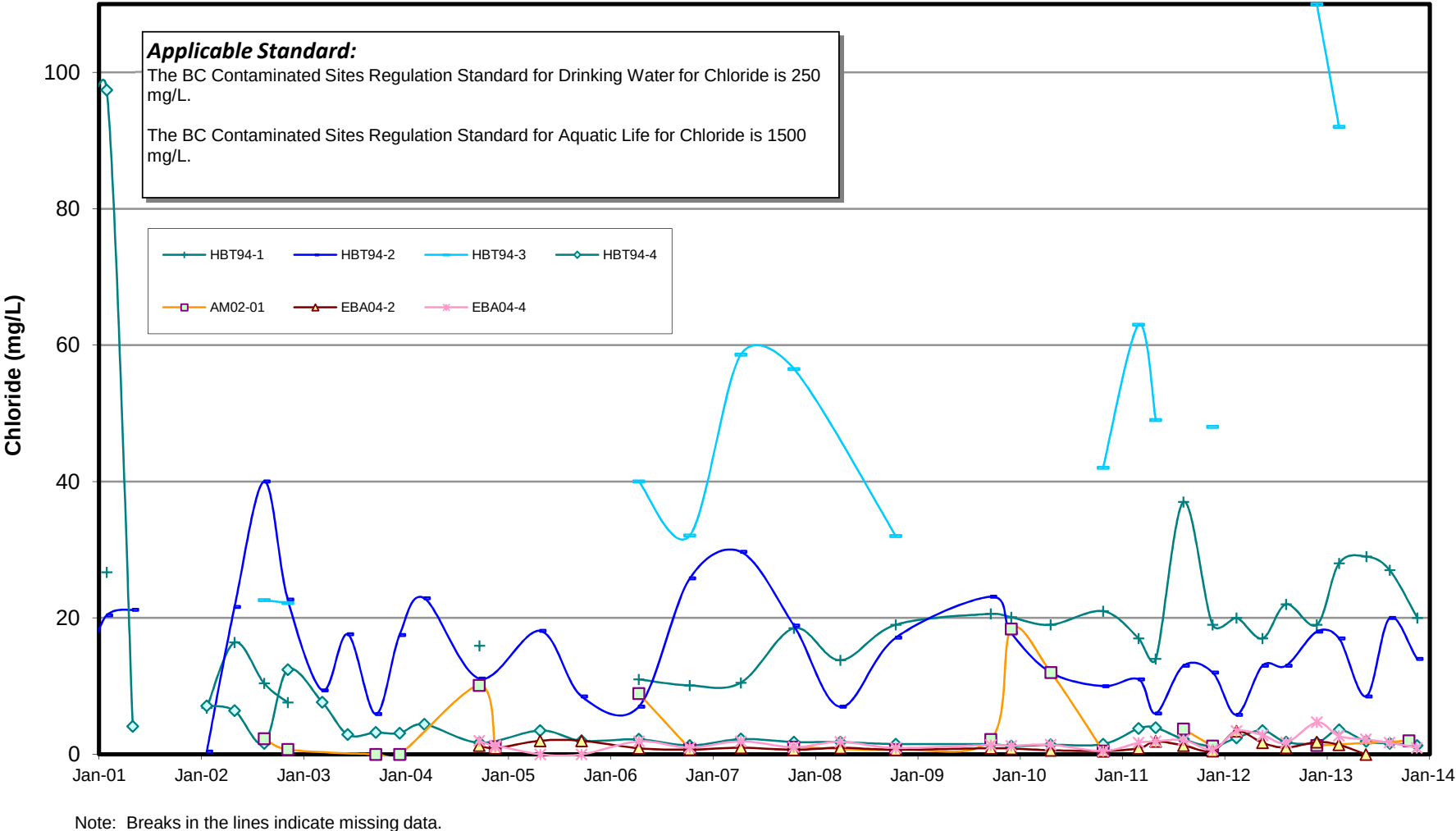
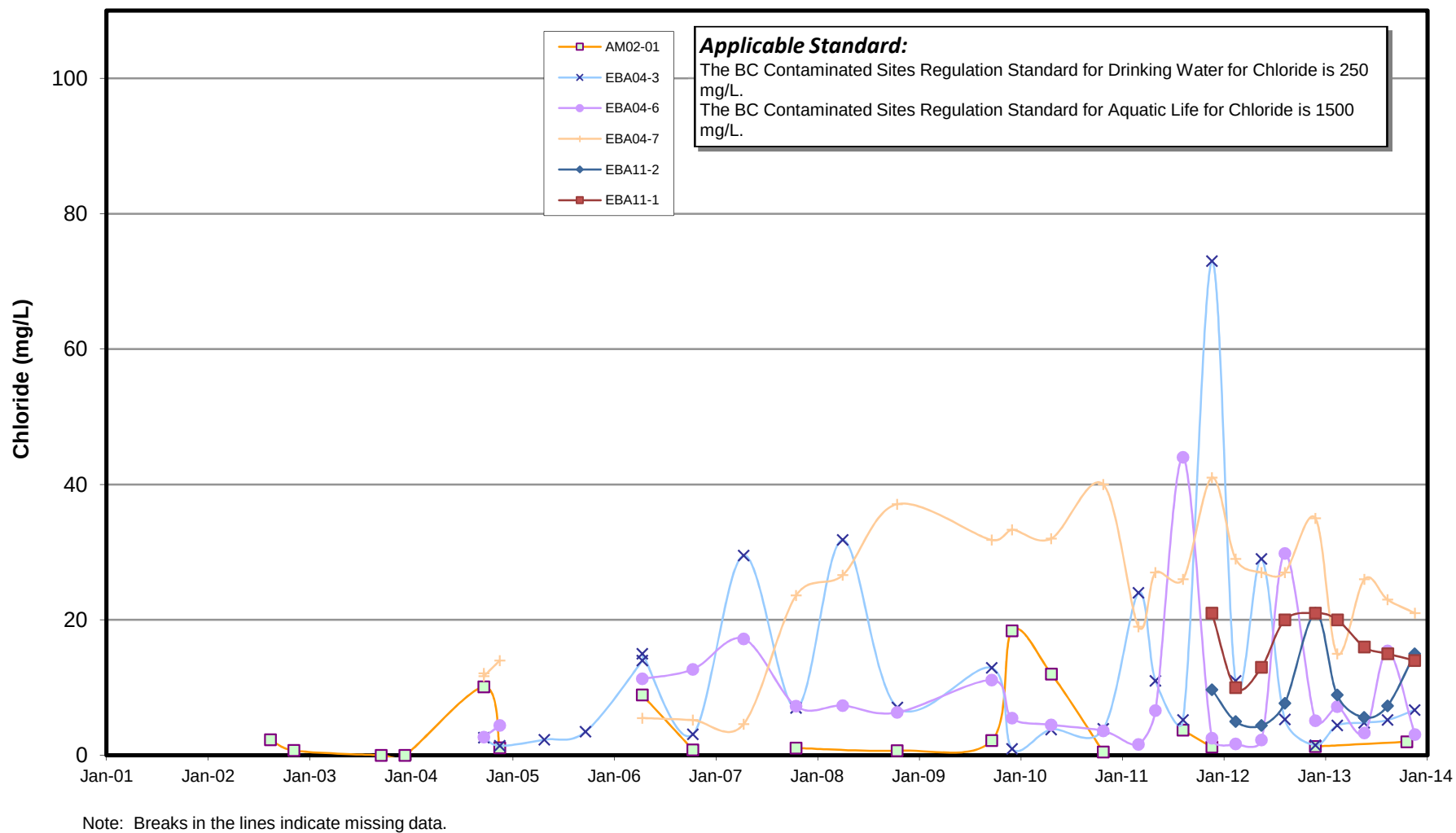


Figure G2- Chloride at Campbell River Waste Management Centre - Boundary Wells



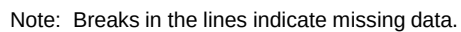


Figure G3 - Sulphate at Campbell River Waste Management Centre - Landfill Wells

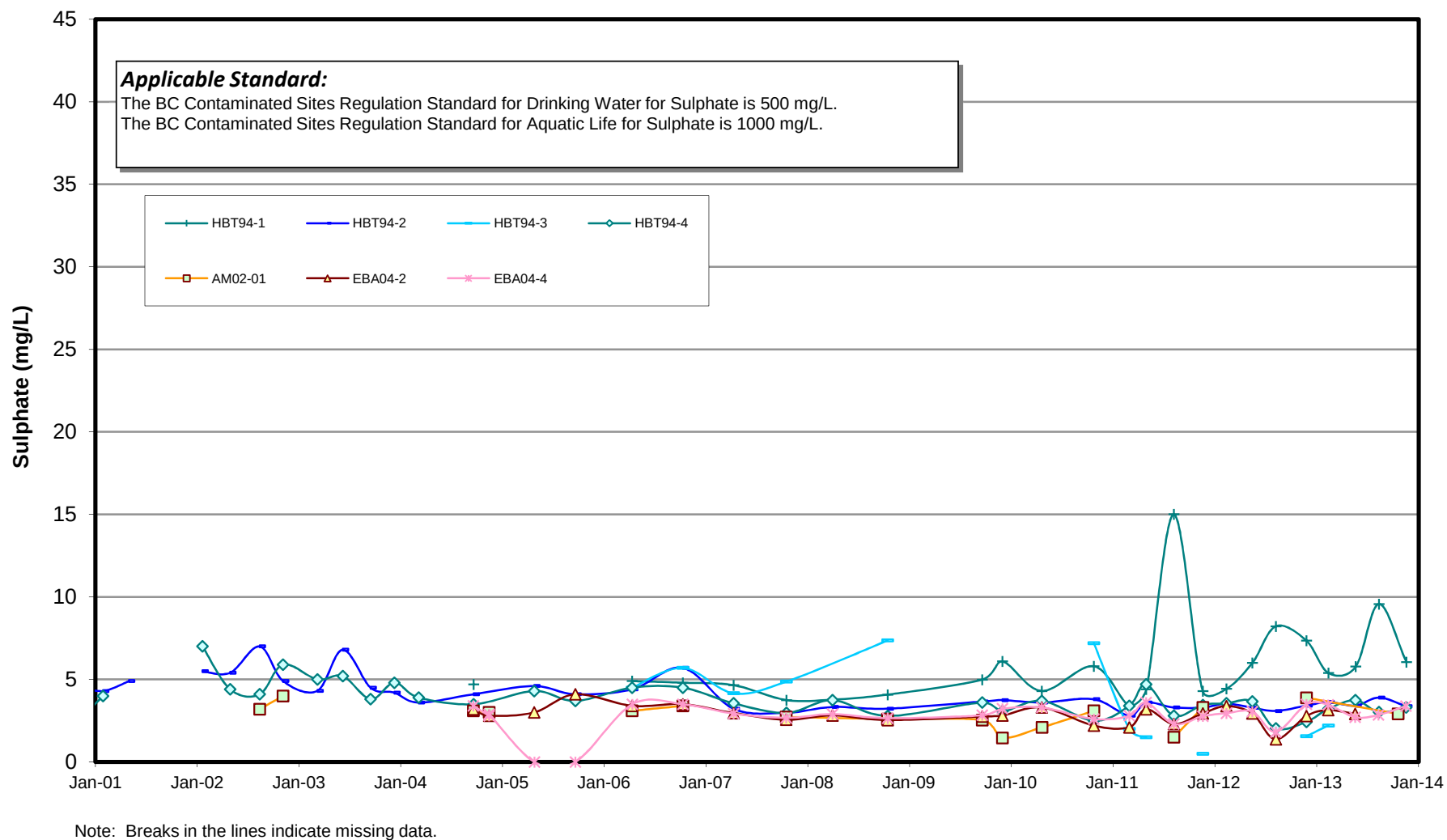
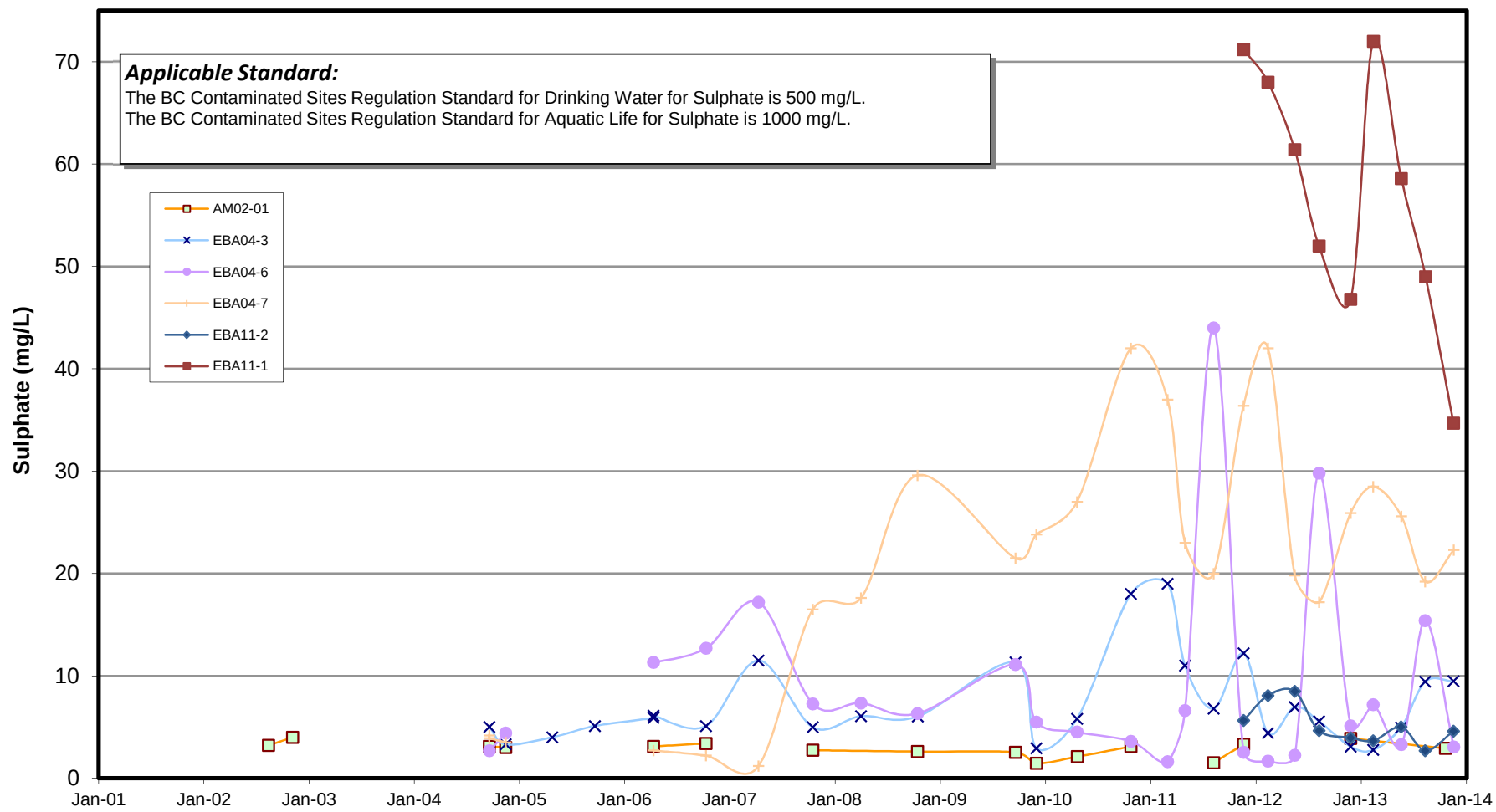
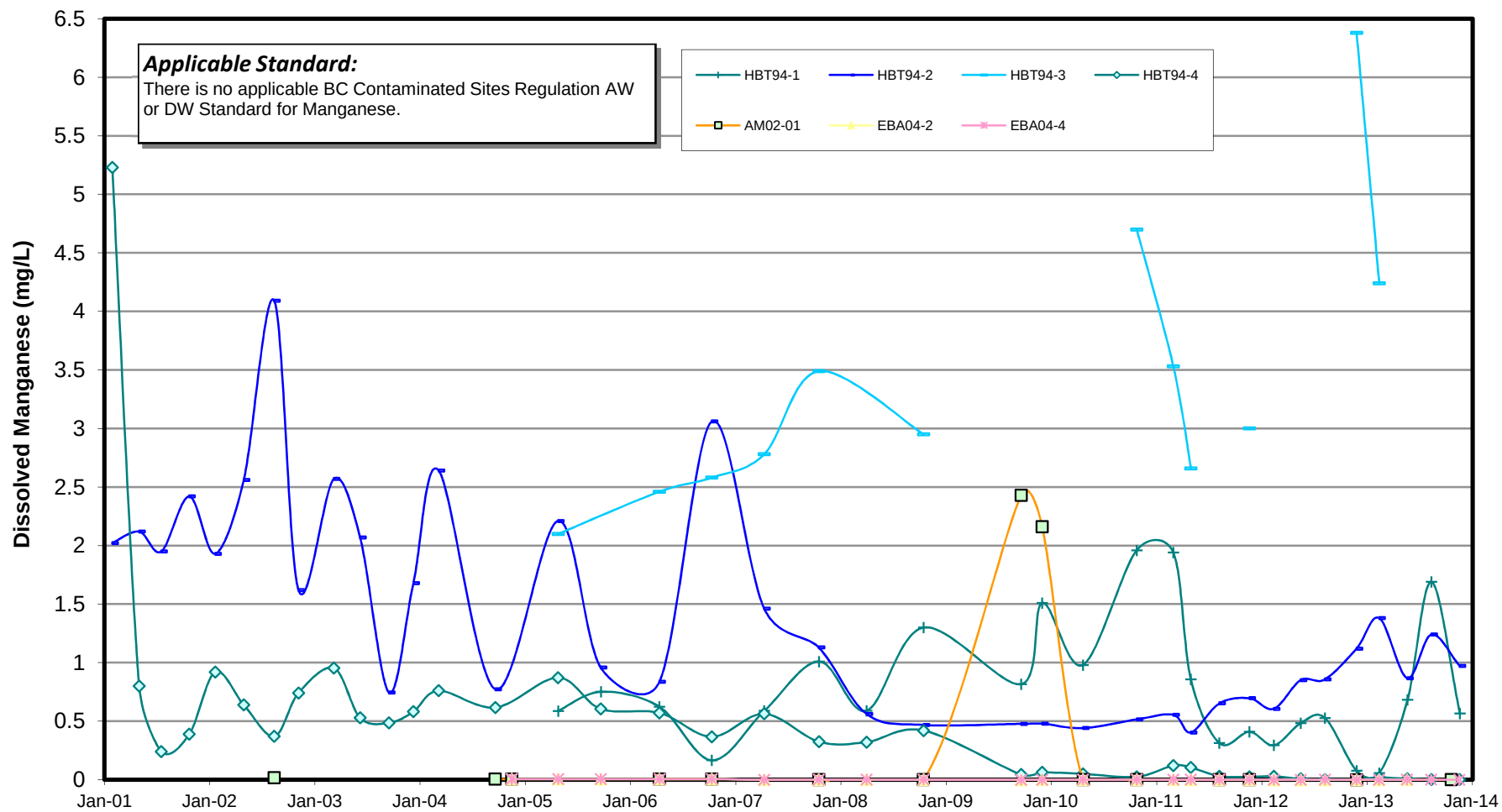


Figure G3 - Sulphate at Campbell River Waste Management Centre - Boundary Wells



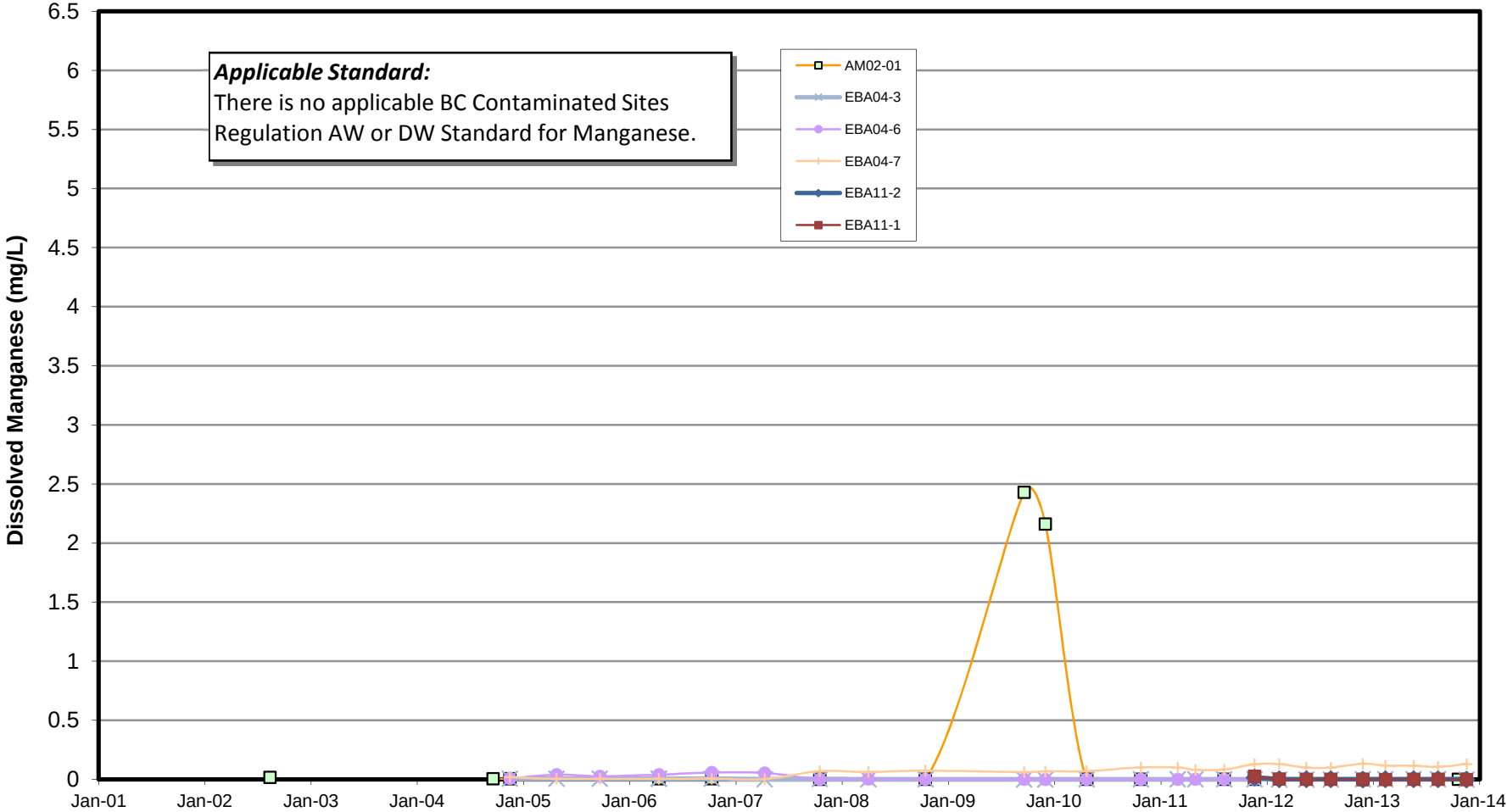
Note: Breaks in the lines indicate missing data.

**Figure G4 - Dissolved Manganese Concentrations at
Campbell River Waste Management Centre - Landfill Wells**



Note: Breaks in the lines indicate missing data.

**Figure G4 - Dissolved Manganese Concentrations at
Campbell River Waste Management Centre - Boundary Wells**



Note: Breaks in the lines indicate missing data.

**Figure G4 - Dissolved Manganese Concentrations at
Campbell River Waste Management Centre - Downgradient Wells**

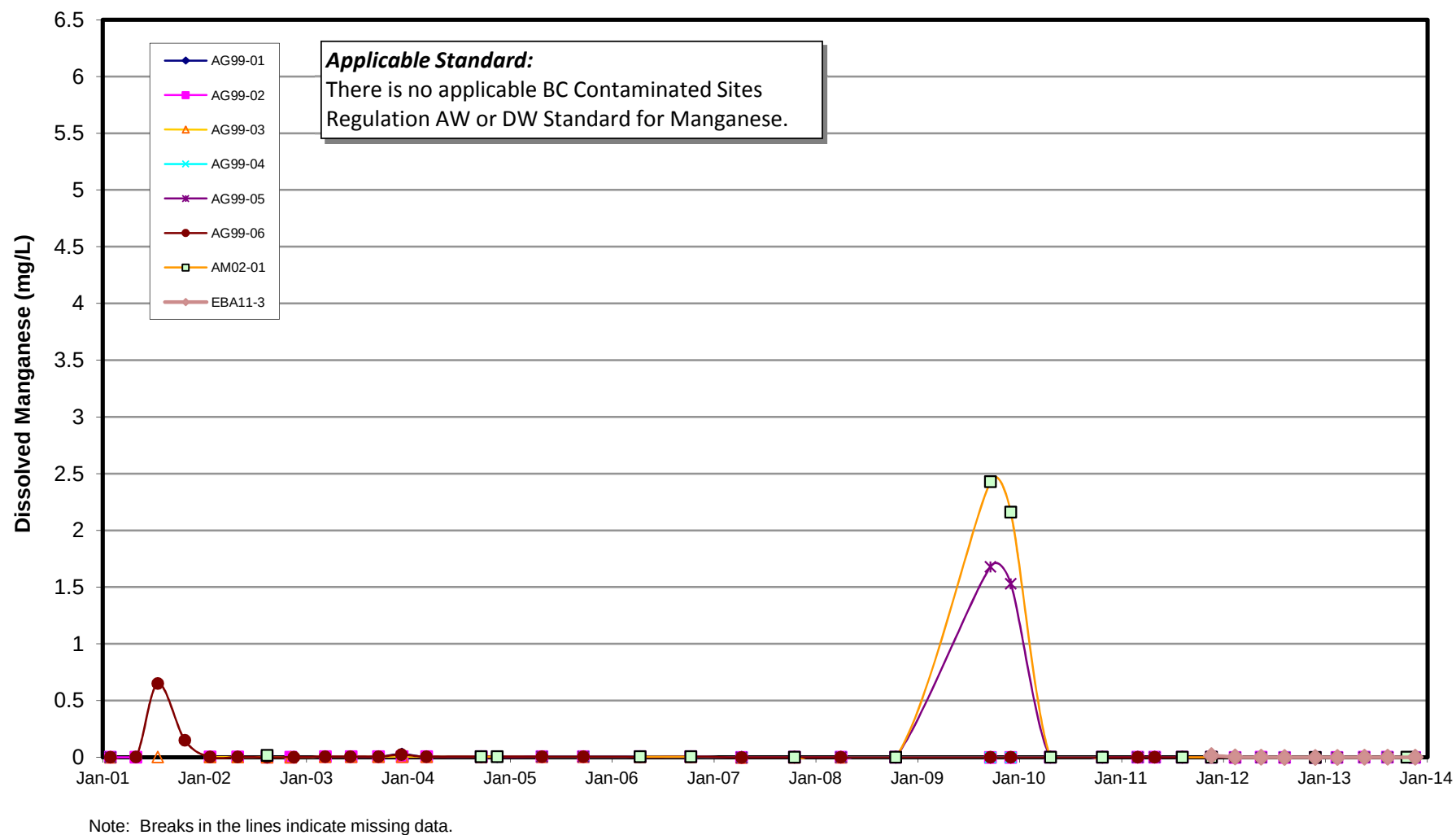
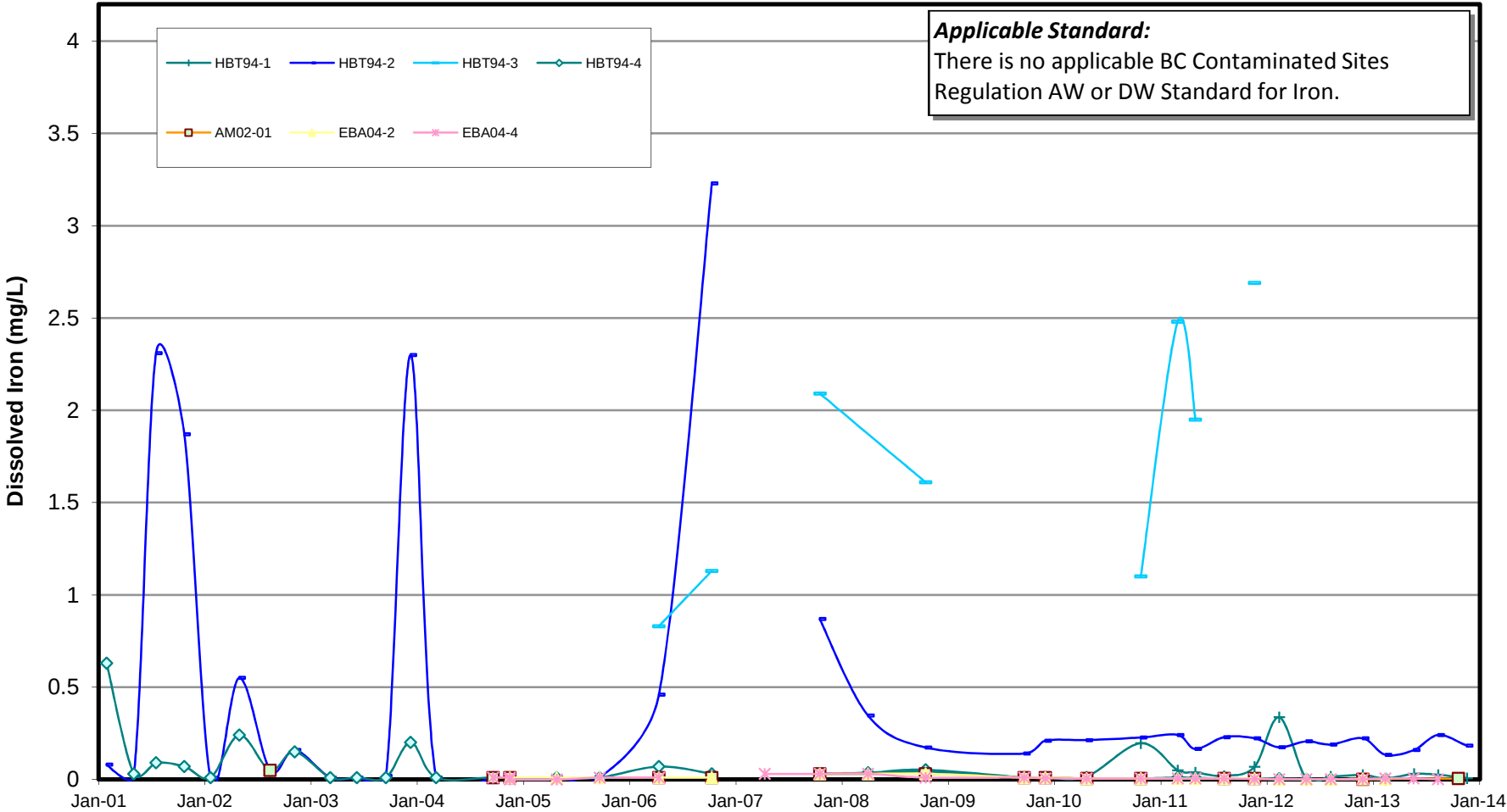


**Figure G5 - Dissolved Iron Concentrations at Campbell River Waste Management Centre -
Landfill Wells**



Note: Breaks in the lines indicate missing data.

Figure G5 - Dissolved Iron Concentrations at Campbell River Waste Management Centre - Boundary Wells

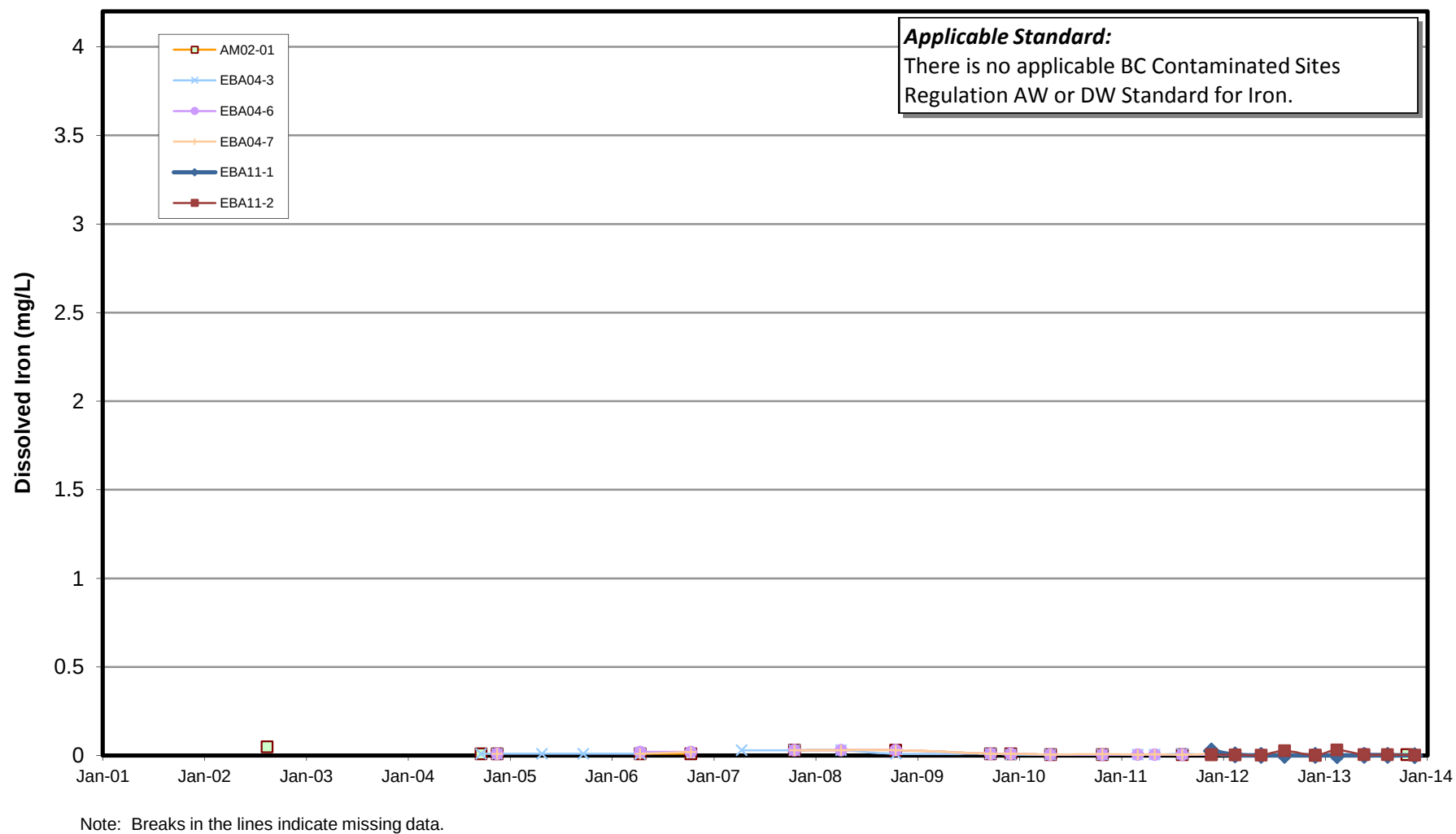
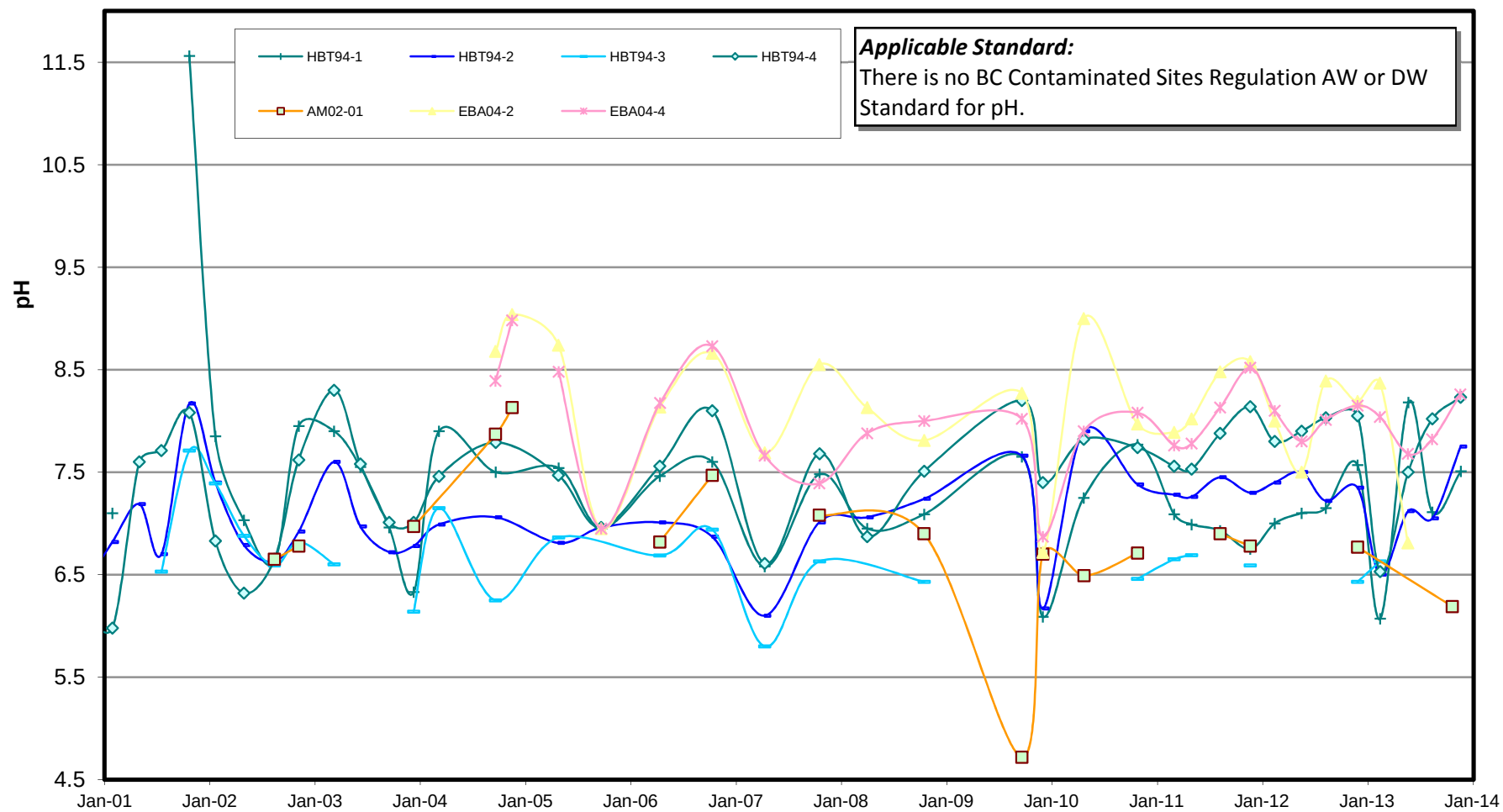


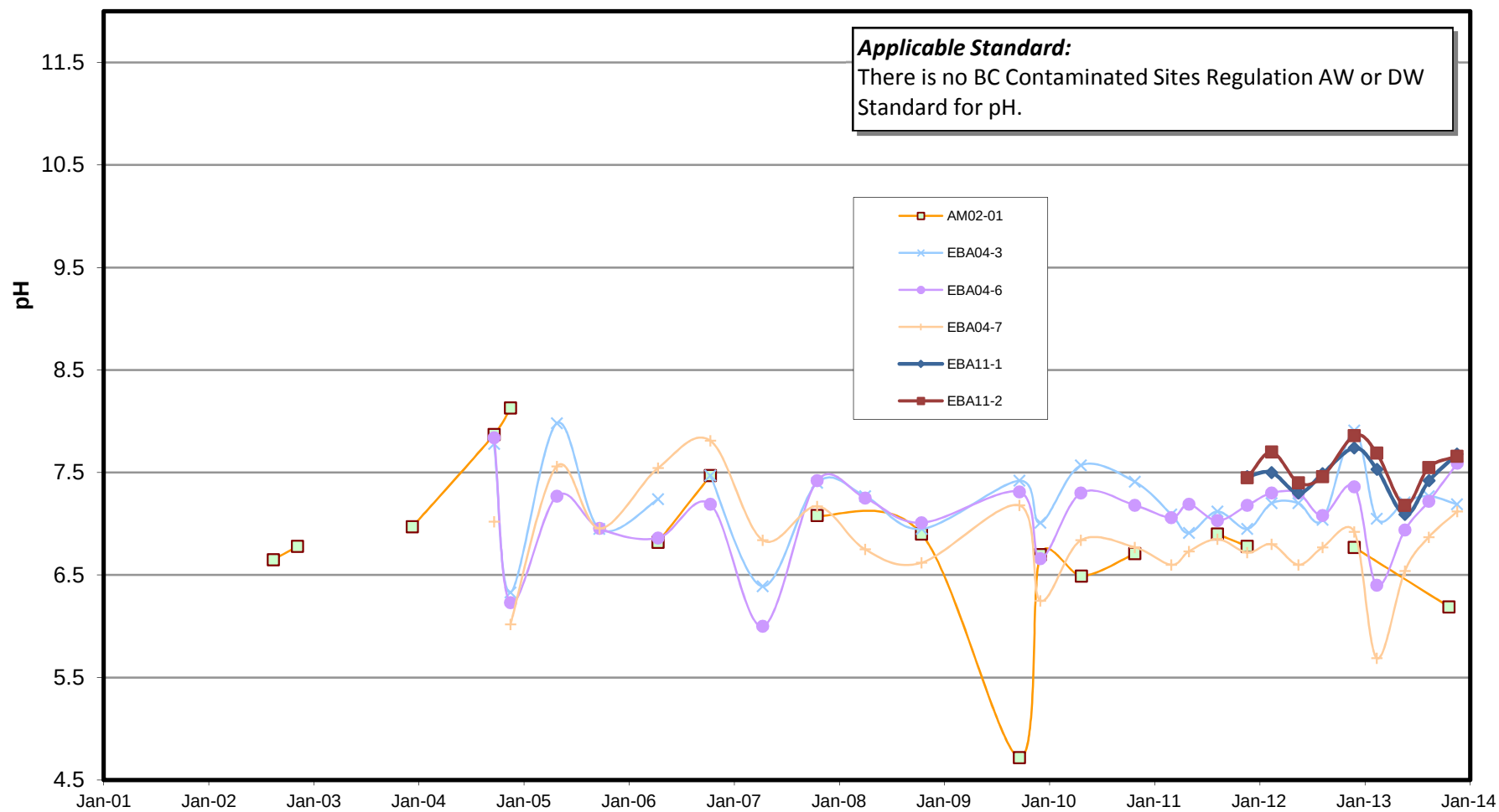


Figure G6 - pH Concentrations at Campbell River Waste Management Centre - Landfill Wells



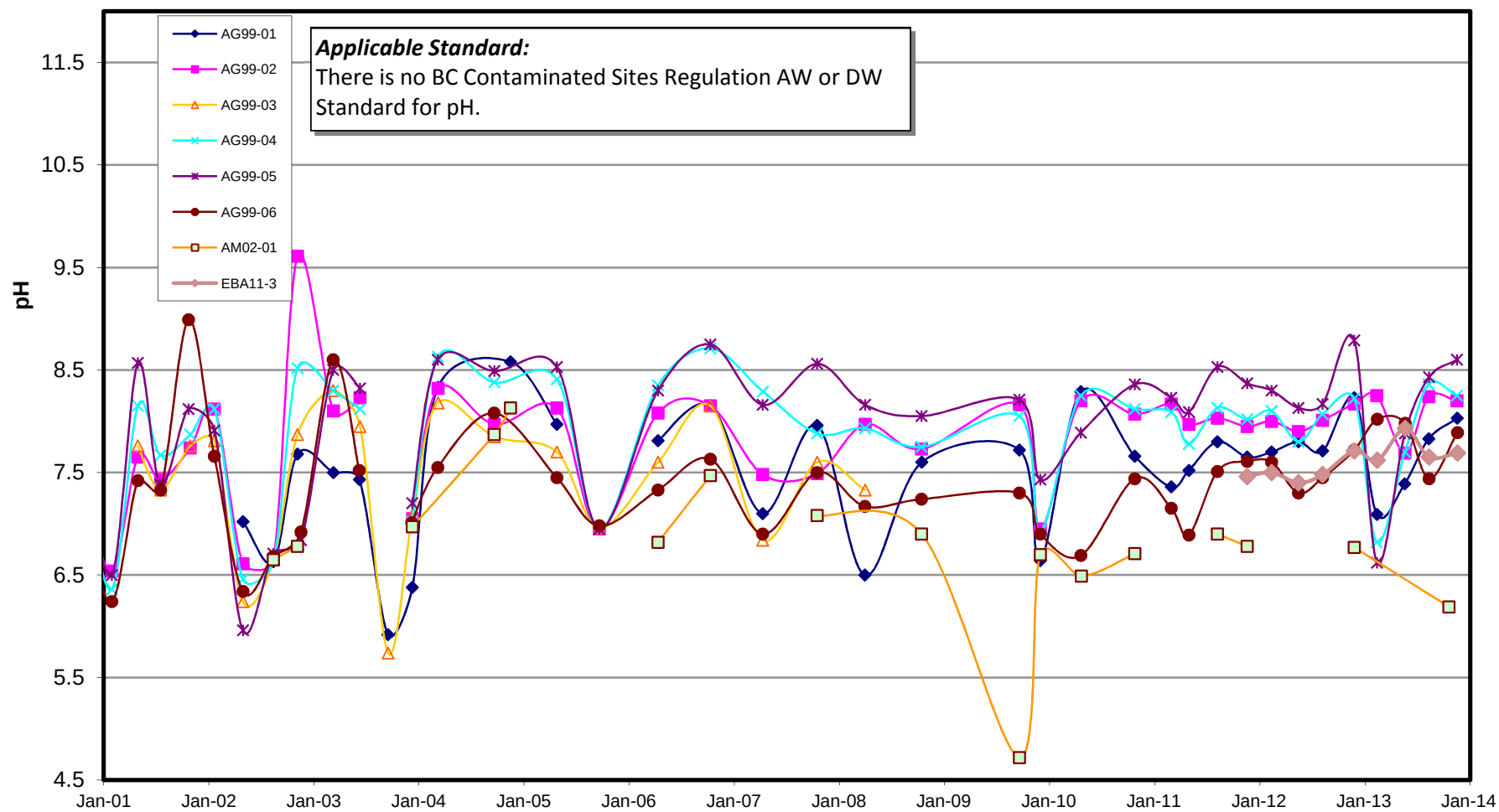
Note: Breaks in the lines indicate missing data.

Figure G6 - pH at Campbell River Waste Management Centre - Boundary Wells



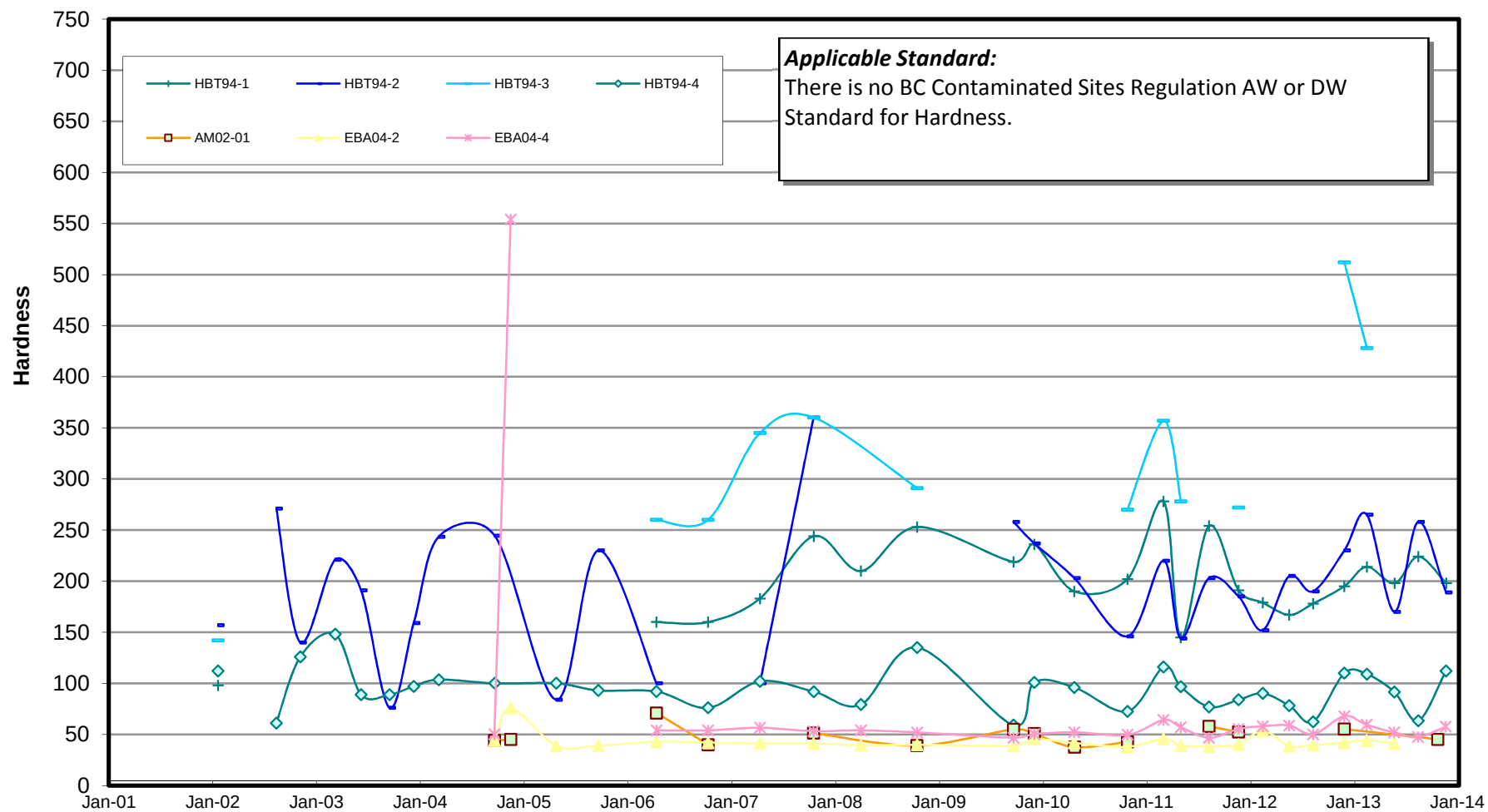
Note: Breaks in the lines indicate missing data.

Figure G6 - pH at Campbell River Waste Management Centre - Downgradient Wells



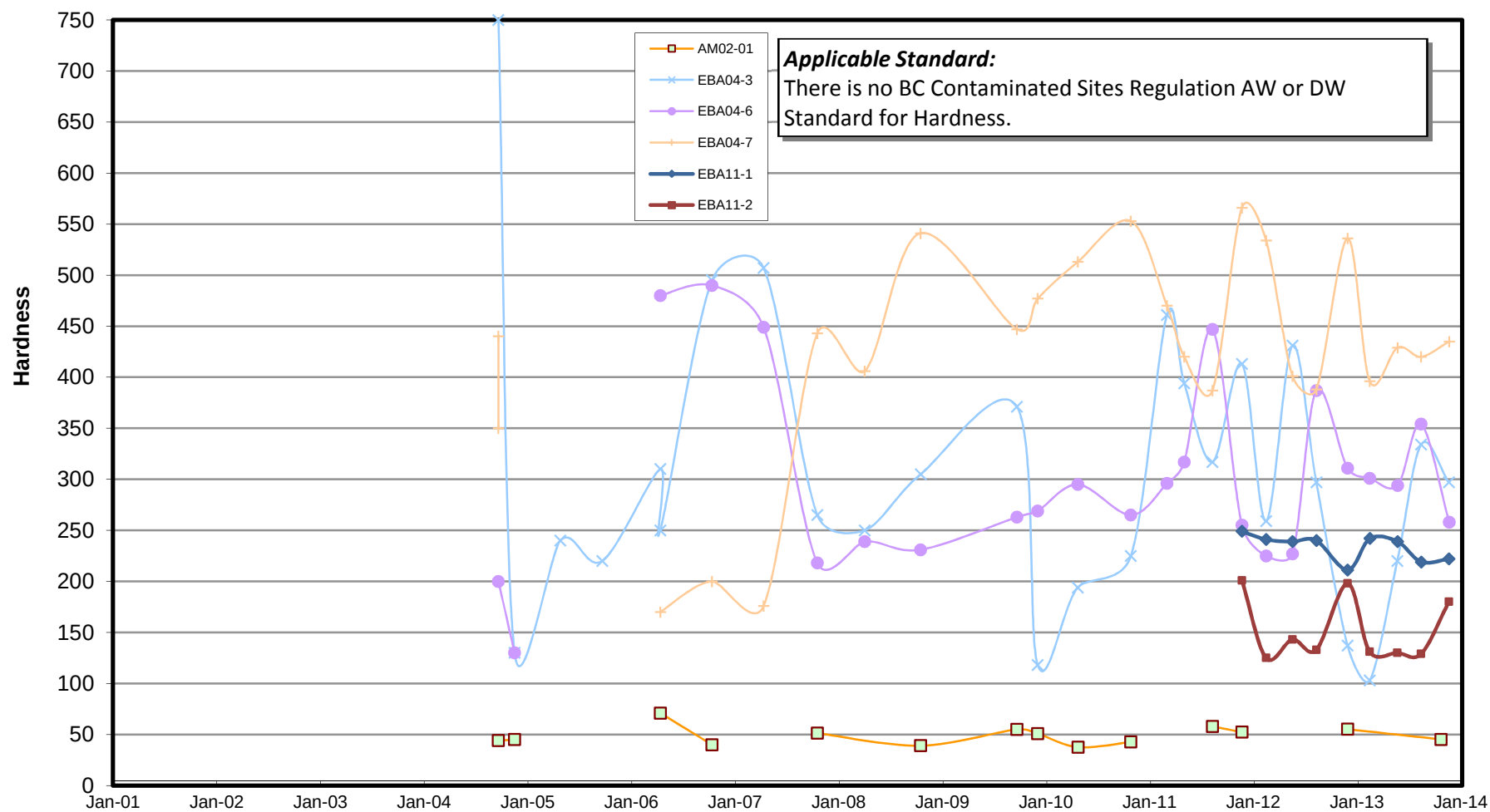
Note: Breaks in the lines indicate missing data.

Figure G7 - Hardness at Campbell River Waste Management Centre - Landfill Wells



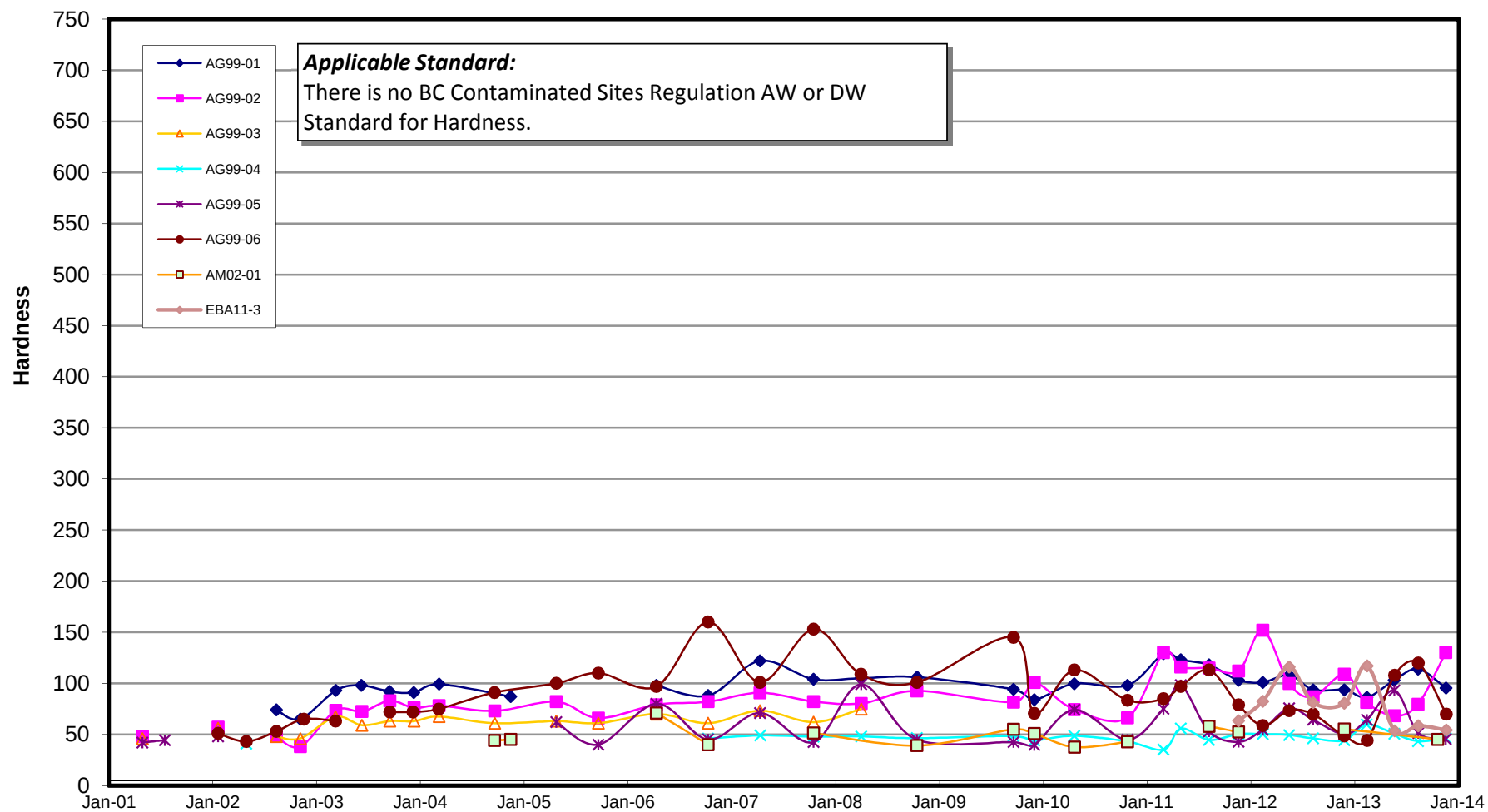
Note: Breaks in the lines indicate missing data.

Figure G7 - Hardness at Campbell River Waste Management Centre - Boundary Wells



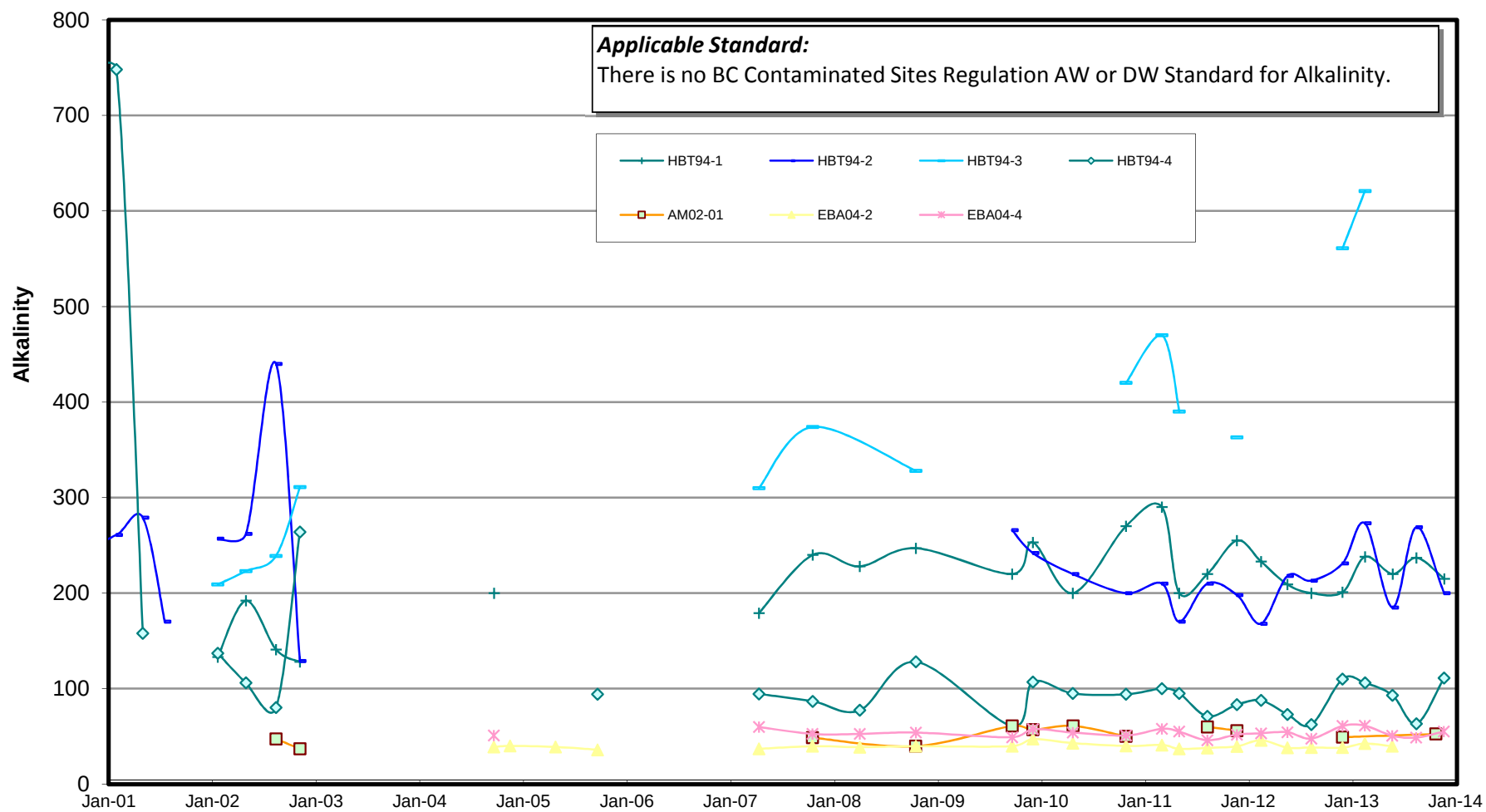
Note: Breaks in the lines indicate missing data.

Figure G7 - Hardness at Campbell River Waste Management Centre - Downgradient Wells



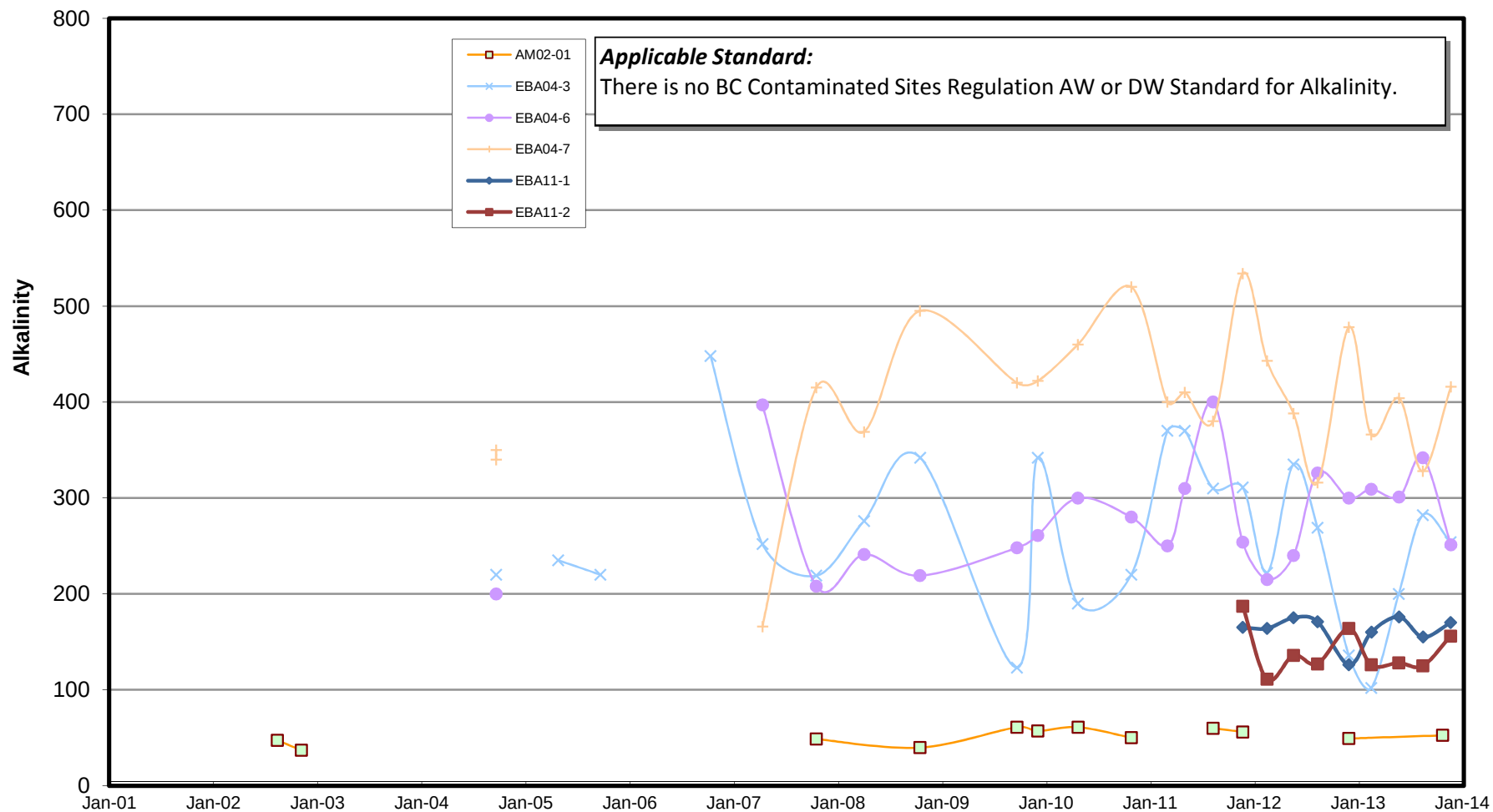
Note: Breaks in the lines indicate missing data.

Figure G8 - Alkalinity at Campbell River Waste Management Centre - Landfill Wells



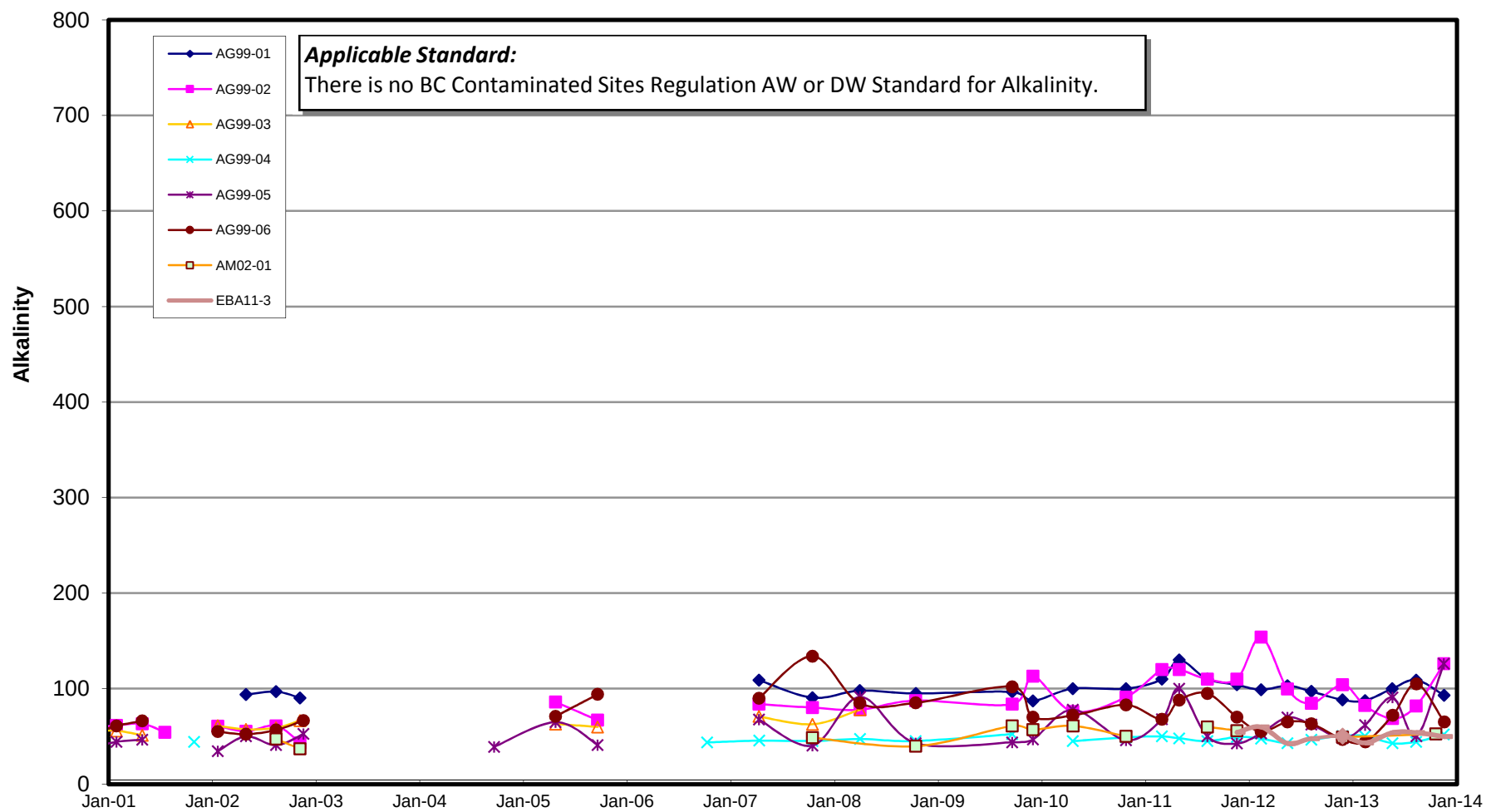
Note: Breaks in the lines indicate missing data.

Figure G8 - Alkalinity at Campbell River Waste Management Centre - Boundary Wells



Note: Breaks in the lines indicate missing data.

Figure G8 - Alkalinity at Campbell River Waste Management Centre - Downgradient Wells



Note: Breaks in the lines indicate missing data.

APPENDIX H

TETRA TECH EBA'S ENVIRONMENTAL REPORT – GENERAL CONDITIONS

GENERAL CONDITIONS

GEOENVIRONMENTAL REPORT

This report incorporates and is subject to these “General Conditions”.

1.0 USE OF REPORT AND OWNERSHIP

This report pertains to a specific site, a specific development, and a specific scope of work. It is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site or proposed development would necessitate a supplementary investigation and assessment.

This report and the assessments and recommendations contained in it are intended for the sole use of Tetra Tech EBA's client. Tetra Tech EBA does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than Tetra Tech EBA's Client unless otherwise authorized in writing by Tetra Tech EBA. Any unauthorized use of the report is at the sole risk of the user.

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Where Tetra Tech EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed Tetra Tech EBA's instruments of professional service), only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by Tetra Tech EBA shall be deemed to be the original for the Project.

Both electronic file and hard copy versions of Tetra Tech EBA's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except Tetra Tech EBA. The Client warrants that Tetra Tech EBA's instruments of professional service will be used only and exactly as submitted by Tetra Tech EBA.

Electronic files submitted by Tetra Tech EBA have been prepared and submitted using specific software and hardware systems. Tetra Tech EBA makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

3.0 NOTIFICATION OF AUTHORITIES

In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by Tetra Tech EBA in its reasonably exercised discretion.

4.0 INFORMATION PROVIDED TO TETRA TECH EBA BY OTHERS

During the performance of the work and the preparation of the report, Tetra Tech EBA may rely on information provided by persons other than the Client. While Tetra Tech EBA endeavours to verify the accuracy of such information when instructed to do so by the Client, Tetra Tech EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.