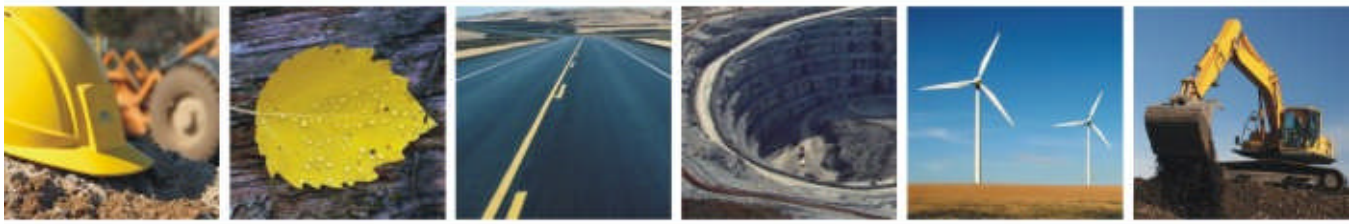
COMOX VALLEY REGIONAL DISTRICT

CAMPBELL RIVER WASTE MANAGEMENT CENTRE 2012 WATER QUALITY MONITORING REPORT



REPORT

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EXECUTIVE SUMMARY

EBA Engineering Consultants Ltd. operating as EBA, A Tetra Tech Company (EBA) was retained by the Comox Valley Regional District (CVRD) to conduct the 2012 annual water quality monitoring and sampling program and to prepare the 2012 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 one surface water sampling location were monitored and sampled during the sampling events completed in February, May, August and December 2012. A second surface water location was attempted to be monitored and sampled but was found to be dry during the May, August and December events.

Based on the 2012 monitoring data, the following conclusions are drawn:

- Groundwater flowed towards the east/northeast across most of the CRWMC. The horizontal hydraulic gradient estimated for the CRWMC was 0.02 m/m for all 2012 monitoring events;
- Groundwater analytical data obtained in 2012 indicates that groundwater sampled beneath the CRWMC in 2012 contains pH, temperature, total dissolved solids (TDS) and dissolved metal parameters concentrations (i.e. copper, zinc, iron, manganese, cadmium and chromium) exceeding the British Columbia Approved Water Quality Guidelines (BCAWQG) and/or Canadian Drinking Water Quality Guidelines (CDWQG) and copper and zinc concentrations exceeding the Contaminated Sites Regulation (CSR) freshwater aquatic life water use (AW) standards. Analytical results obtained for groundwater samples collected from monitoring wells located down and cross gradient of the CRWMC indicate dissolved metal concentrations (i.e. chromium and vanadium) exceeding the BCAWQG for the protection of freshwater aquatic life and TDS and dissolved manganese concentrations exceeding the CDWQG;
- Surface water analytical data obtained in 2012 indicates total cadmium concentration exceedances during two monitoring events in 2012;
- 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 of background concentrations at the furthest downgradient monitoring well (AG99-06) and at the surface water sampling station (SW1);
- The concentrations of conductivity, chloride, dissolved iron and dissolved manganese are observed to be increasing in the monitoring wells located at the eastern boundary of the CRWMC (HBT94-1 and/or HBT94-3). The concentrations of conductivity, alkalinity and hardness are observed to be increasing in the monitoring well located immediately downgradient of the CRWMC property boundaries (EBA04-7);
- pH, temperature, iron, manganese, zinc and copper concentrations identified in groundwater as exceeding the applicable BCAWQG in 2012 were limited to monitoring wells located within the CRWMC property boundaries;

- Identified cadmium and vanadium concentrations in groundwater and/or surface water at concentrations exceeding the BCAWQG for the protection of freshwater aquatic life does not appear to be directly related to the CRWMC operations and therefore are not considered a non-compliance issue with the operational certificate; and,
- Dissolved chromium concentrations exceeding the BCAWQG for the protection of freshwater aquatic life was identified in groundwater samples collected from three monitoring wells located immediately downgradient of the CRWMC and one monitoring well located further downgradient of the CRWMC. The identified dissolved chromium concentrations exceeding the currently applicable BCAWQG for the protection of freshwater aquatic life at the downgradient monitoring wells are non-compliant with the operational certificate for the CRWMC. None of the dissolved chromium concentrations measured at the downgradient monitoring wells in 2012, however, exceeds the CSR AW standards. Continued monitoring is required to further assess dissolved chromium exceedances in groundwater identified downgradient of the CRWMC.

Based on the conclusions presented above, EBA recommends:

- The water quality monitoring program continues on a quarterly annual basis in 2013.

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1.0 INTRODUCTION

EBA Engineering Consultants Ltd. operating as EBA, A Tetra Tech Company (EBA), was retained by the Comox Valley Regional District (CVRD) to conduct the 2012 annual water quality monitoring and sampling program and to prepare the 2012 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 2012. 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 2013 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.* 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 1970s (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 monitoring wells and one surface water location;
- Collected samples 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 criteria; 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 2013 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. Twenty-eight groundwater monitoring wells and three domestic water supply wells are 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 or longer and AM00-01, EBA04-5 and GLL93-3 have been damaged or blocked and are no longer accessible.
- 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 has been damaged and is therefore no longer accessible.
- 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. 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 (SW1) 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. EBA attempted to collect surface water samples from another Cold Creek tributary shown on the BC Water Resource Atlas in May, August and December 2012. The approximate location (SW) 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. However, this location was found to be dry during the May, August and December 2012 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 any 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 20th and 22nd, 2012, May 23rd and 25th, 2012, August 15th and 17th, 2012 and December 4th and 6th, 2012. 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 2012 required that the completed field and reporting program:

- Adhered to standard 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 2012 monitoring and sampling results are presented in the below Sections 4.1 to 4.5.

4.1 Groundwater Flow Regime

Monitoring wells GLL93-1, GLL93-2, GLL93-4 and HBT94-5 were dry during all monitoring events in 2012. Monitoring wells HBT94-3 and AM02-1 were dry during the February, May and August monitoring events in 2012. In an attempt to ensure a groundwater sample was collected from the upgradient monitoring well AM02-01, representative of background water quality, EBA also mobilized to the site on April 24, 2012 and June 22, 2012 to try to collect a sample from monitoring well AM02-01. Monitoring well AM02-01 was dry on both April 24, 2012 and June 22, 2012.

The measured water levels and geodetic groundwater elevations from 1993 to 2012 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 December 2012 monitoring events are presented on Figures 3 and 4, respectively. 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 2012 monitoring event was east at the CRWMC and east-northeast downgradient of the CRWMC. As shown on Figure 4, the horizontal groundwater flow direction for the December 2012 monitoring event was to the northeast. The horizontal gradient was 0.02 m/m for all four of the 2012 monitoring. 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 2012 were consistently downwards in EBA04-6/EBA04-7 at 0.017 m/m to 0.018 m/m, and in HBT94-1/HBT94-2 at 0.001 to 0.286 m/m.

4.2 Water Quality Assessment Criteria

In accordance with the identified potential sensitive receptors described in Section 2.4, the groundwater quality sampling results were compared with the currently applicable criteria outlined in the *British Columbia Approved Water Quality Guidelines* (1998, Updated September 2011) and the *Compendium of Working Water Quality Guidelines for British Columbia* (1998, Updated 2006) for the protection of freshwater aquatic life and drinking water. These guidelines have been referenced on the groundwater quality tables presented in Appendix F as the BCAWQG. The groundwater quality results have also been compared to the drinking water criteria outlined in the *Canadian Drinking Water Quality Guidelines* (CDWQG) (updated December 2010). The surface water quality sampling results were compared with the criteria outlined in the *British Columbia Approved Water Quality Guidelines* and the *Compendium of Working Water Quality Guidelines for British Columbia* for the protection of freshwater aquatic life. These guidelines have been referenced on the surface water quality tables presented in Appendix F as the BCAWQG.

Discussions with MOE have indicated that the applicable standards or assessment criteria for a municipal solid waste landfill are evolving. For future reporting the BC *Contaminated Sites Regulation* (CSR) would be considered the applicable standards for groundwater at a permitted municipal disposal facility. For this reason, the results of the 2012 groundwater sampling program were also compared to the BC CSR (BC Reg. 375/96 includes amendments up to BC Reg. 6/2013, January 24, 2013) Freshwater Aquatic Life (AW) water use and Drinking Water (DW) use standards.

4.3 Groundwater Quality Comparison to Assessment Criteria

The following sections document the groundwater quality testing results obtained during the annual groundwater monitoring program at the CRWMC. Groundwater quality data for the period of 1994 to 2012 is presented in Appendix F. The 2012 analytical laboratory certificates for the CRWMC are attached in Appendix D. Table 2 summarizes parameters that did not meet the applicable assessment criteria at one or more locations during the 2012 monitoring program. These parameters are discussed in Sections 4.3.2 and 4.3.3. A summary of groundwater metal analytical results for 2012 is also shown on Figure 5. An overall water quality discussion for the CRWMC is in Section 5.

4.3.1 Background Water Quality

The groundwater analytical results for the samples collected from the background monitoring well, AM02-01, during the December 2012 monitoring events, met the applicable criteria for the majority of the parameters tested. The toluene concentration in the groundwater sample collected from AM02-01 during the December 2012 sampling event, however, was greater than the BCAWQG for freshwater aquatic life protection but less than the CSR AW standard. Monitoring well AM02-01 was dry during the February, May, and August 2012 monitoring events and on April 24, 2012 and June 22, 2012.

4.3.2 Water Quality Beneath CRWMC

- **pH** –The field pH measurements from groundwater collected from HBT94-3 and EBA04-1 during the December 2012 monitoring event was greater than the maximum threshold criteria for drinking water protection defined by the BCAWQG and CDWQG. There is currently no CSR AW or DW standard for pH.
- **Temperature** – The temperature measured in groundwater in HBT94-1 during the May 2012 monitoring event, EBA04-1 during the August and December 2012 monitoring events and EBA04-4 during the February and December 2012 monitoring events exceeded the maximum temperature criteria defined by the BCAWQG and CDWQG for drinking water protection. There is currently no CSR AW or DW standard for temperature.
- **Dissolved Oxygen** - Dissolved oxygen concentrations in groundwater were compared to the BCAWQG for freshwater aquatic life protection for reference only because this criteria is set to protect freshwater aquatic life in a surface water receiving environment, not groundwater where dissolved oxygen concentrations are naturally expected to be low (i.e., < 0.1 mg/L). The dissolved oxygen concentrations measured in groundwater in HBT94-1 and HBT94-2 during the August 2012 monitoring event, HBT94-3 during the December 2012 monitoring event and HBT94-4 during the February and May 2012 monitoring events did not meet the minimum threshold criteria defined by the BCAWQG for freshwater aquatic life protection. There is currently no CSR AW or DW standard for dissolved oxygen.
- **Total Dissolved Solids** (TDS) - The total dissolved solids measured in groundwater in HBT94-3 during the December 2012 monitoring event exceeded the TDS criteria defined by the CDWQG for drinking water protection. There is currently no CSR AW or DW standard for dissolved oxygen.

- **Dissolved Metals**
  - **Cadmium** – Dissolved cadmium concentrations exceeded the hardness based BCAWQG for the protection of freshwater aquatic life in groundwater sampled from HBT94-1 during all 2012 monitoring events, EBA04-1 during the May monitoring event, and EBA04-4 during the December 2012 monitoring events. Dissolved cadmium concentrations for all landfill monitoring wells sampled during all four monitoring events were less than the CSR AW and DW standards.
  - **Chromium -** Dissolved chromium concentration exceeded the BCAWQG for the protection of freshwater aquatic life in groundwater sampled from EBA04-1 during the May monitoring event. Dissolved chromium concentrations for all landfill monitoring wells sampled during all four monitoring events were less than the CSR AW and DW standards.
  - **Copper -** Dissolved copper concentration exceeded the hardness based BCAWQG for the protection of freshwater aquatic life and the hardness based CSR AW standard in groundwater sampled from EBA04-1 during the February monitoring event. The concentrations recorded were less than the BCAWQG for the protection of drinking water, the CDWQG and the CRW DW standards.
  - **Iron** – Dissolved iron concentrations measured in groundwater sampled from HBT94-1 during the February 2012 monitoring event exceeded the CDWQG for the protection of drinking water and HBT94-3 during the December 2012 monitoring event exceeded the applicable BCAWQG for the protection of aquatic life and the CDWQG for the protection of drinking water. HBT94-3 was dry during the February, May and August 2012 monitoring events. There is currently no CSR AW or DW standard for iron for a municipal disposal facility.
  - **Manganese** – Dissolved manganese concentrations measured in groundwater sampled from HBT94-1 and, HBT94-2 during all of the 2012 monitoring events exceeded the applicable CDWQG for the protection of drinking water quality. Dissolved manganese concentration at HBT94-3 during the December 2012 monitoring event exceeded the BCAWQG for the protection of aquatic life and the CDWQG. HBT94-3 was dry during the February, May and August 2012 monitoring events. There is currently no CSR AW or DW standard for manganese for a municipal disposal facility.
  - **Zinc** – Dissolved zinc concentrations, exceeding the hardness based BCAWQG for the protection of freshwater aquatic life, were reported in groundwater samples from EBA04-1 during the February May, and August 2012 monitoring events. The dissolved zinc concentration at EBA04-1 during the May 2012 monitoring event also exceeded the CSR AW standard. The concentrations recorded were less than the BCAWQG for the protection of drinking water, the CDWQG and the CRW 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.

4.3.3 Downgradient Water Quality

- **Dissolved Oxygen** - Dissolved oxygen concentrations in groundwater were compared to the BCAWQG for freshwater aquatic life protection for reference only because this criteria is set to protect freshwater aquatic life in a surface water receiving environment, not groundwater where concentrations are commonly low. The dissolved oxygen concentration measured in groundwater

from EBA04-6 during the August 2012 monitoring event and EBA04-7 during all monitoring events did not meet the minimum threshold criteria defined by the BCAWQG for freshwater aquatic life protection. There is currently no CSR AW or DW standard for dissolved oxygen.

- **Total Dissolved Solids (TDS)** - The total dissolved solids measured in groundwater in EBA04-7 during the February, May and December 2012 monitoring event exceeded the TDS criteria defined by the CDWQG for drinking water protection. There are currently no BCAWQG, CSR AW and DW standards for TDS.
- **Dissolved Metals**
  - **Chromium** – Dissolved chromium concentrations exceeded the BCAWQG for hexavalent chromium for the protection of freshwater aquatic life in groundwater sampled from EBA04-6 during the February, May and December 2012 monitoring events, EBA11-1, and EBA11-2 during all 2012 monitoring events and EBA11-4 during the February, May, and August 2012 monitoring events. The concentrations recorded were one order of magnitude less than the CDWQG. Dissolved chromium concentrations for all downgradient monitoring wells sampled during all four monitoring events were less than the CSR AW and DW standards.
  - **Manganese** – Dissolved manganese concentrations measured in groundwater samples from EBA04-7 during all monitoring events exceeded the applicable CDWQG. There is currently no CSR AW or DW standard for manganese for a municipal disposal facility.
  - **Vanadium** – Dissolved vanadium concentrations exceeding the BCAWQG for the protection of freshwater aquatic life were recorded for groundwater samples from AG99-01 during the February, August and December 2012 monitoring events. Also AG99-02 and EBA11-4 had concentrations exceeding the BCAWQG for the protection of freshwater aquatic life during all 2012 monitoring events. There is currently no CSR AW or DW standard for vanadium.

No other exceedances were noted for analyzed groundwater samples from either of the 2012 groundwater sampling events from monitoring wells located downgradient of the CRWMC.

4.4 Surface Water Quality

The surface water sampling station (SW1) is shown on Figure 2. The 2012 laboratory certificates for the surface water samples collected at the CRWMC are presented in Appendix D.

The surface water quality data collected in 2012 is summarized in Appendix F. Table 3 summarizes parameters that did not meet the applicable assessment criteria during the 2012 monitoring program. A discussion of the observed water quality within the context of both the surface water and groundwater data is provided in Section 5.

In 2012, the majority of the parameters tested from the surface water samples collected from SW1 during the sampling events met the applicable criterion. The sample collected from SW1 during the February and August monitoring events contained a total cadmium concentration exceeding the BCAWQG for freshwater aquatic life protection.

4.5 Quality Control/Quality Assurance

As part of EBA's QA/QC program, blind laboratory duplicates and extra sample duplicates were submitted for analysis to ascertain the laboratory and field test accuracy. The results from the duplicate samples collected from HBT94-2, EBA04-03, EBA04-7, EBA11-3, and EBA11-4 are listed in Table 4. The results have been analysed using the relative percent difference between each measured parameter value.

When comparing laboratory duplicates with laboratory samples, the results are typically considered to be acceptable within 30% relative percent difference. Results that are within five times the method detection limit are also considered to meet QA/QC objectives.

As shown in Table 4, one or more analytical result(s) for several analytes were less than the method detection limit and the associated RPD values could not be calculated. As well, RPD values were not calculated when the concentration of the original sample and/or the duplicate sample was less than five times the detection limit since large RPD values are typical when the concentrations are within five times the detection limit. The majority of the RPD values calculated met the data quality objective of 30%. Only six RPD values: the RPD values for ammonia and nitrate in samples collected from EBA11-4 in May 2012; ammonia in samples collected from EBA04-7 in December 2012; and, three metals parameters each from three different sampling events exceeded the data quality objective of 30%. The RPDs exceeding 30% for ammonia, nitrate and the three metals parameters (i.e., aluminum, zinc and copper) 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 2012 monitoring program, 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. Figure 8 shows a summary of dissolved metal analytical results in groundwater for 2012. Figures 6 through 8 present contour maps to show spatial variability for electrical conductivity, chloride and ammonia, respectively. The 2012 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.

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 and August 2012 monitoring events and on April 24, 2012 and June 22, 2012.

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

- Low hardness (35 to 71 mg/L - indication of low mineralization) and alkalinity (37.1 to 61 mg/L – indication of low acid neutralizing capacity);
- Variable pH (typically 6.49 to 8.13, one outlier pH measurement of 4.72 in the summer of 2009);
- Electrical conductivity values less than 200 µs/cm (59 to 163.8 µs/cm);
- Chloride concentrations ranging from 0.69 to 18.4 mg/L;
- Sulphate concentrations ranging from 1.46 to 4 mg/L;
- Non-detectable to low ammonia (0.036 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 (0.0002 to 0.017 mg/L);
- Variable dissolved oxygen concentrations;
- Low concentrations of dissolved cadmium (non-detectable to 0.00011 mg/L), but which still historically exceeded the BCAWQG for the protection of freshwater aquatic life on five occasions in groundwater samples collected from AM02-01; and,
- The other metals measured in AM02-01 have been less than the applicable criteria. Detectable concentrations of aluminium, barium, boron, chromium, copper, lithium, manganese, nickel, selenium, vanadium, and zinc have been measured in groundwater from AM02-01 in the past, though these concentrations were less than the applicable criteria.

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 2012, the highest hardness and alkalinity results in groundwater from the HBT series wells (i.e., landfill wells) were 512 and 561 mg/L, respectively. The highest hardness and alkalinity results in groundwater from EBA04-3, EBA04-6, EBA04-7, EBA11-1 and EBA11-2 (i.e. boundary monitoring wells), located immediately downgradient of the CRWMC property boundaries, were 536 mg/L and 478 mg/L, respectively. In 2012, the highest hardness and alkalinity results in groundwater from the AG99-01 to AG99-06, EBA11-3, and EBA11-4 (i.e. downgradient monitoring wells), located further downgradient and cross gradient to the CRWMC were 152 and 164 mg/L, respectively. The graphs of the hardness and alkalinity concentrations measured for the monitoring wells at the CRWMC are included 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. Hardness and alkalinity concentrations in the landfill and boundary wells are ten times the ambient water quality represented by monitoring well AM02-01 and in the downgradient monitoring wells

similar to slightly elevated as compared to ambient water quality. There are currently no BCAWQG, CDWQG or 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 station in 2012, SW-1, 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 2012, the pH values ranged from 6.43 (HBT94-3) to 8.55 (EBA04-1) in groundwater beneath the CRWMC. Immediately downgradient, in 2012, the pH values in groundwater ranged from 6.6 (EBA04-7) to 7.9 (EBA04-3). Further downgradient, in 2012, the pH values in groundwater ranged from 7.3 (EBA11-3) to 8.8 (AG99-05).The pH measurements at the surface water sampling station SW1 in 2012 ranged from 7.8 to 8.0. No obvious trends are noted based on the historic and 2012 data as shown in Appendix G. The field pH measurements from two monitoring wells located within the CRWMC boundaries (HBT94-3 and EBA04-1) was greater than the maximum threshold criteria defined by the BCAWQG and CDWQG for drinking water protection. All other monitoring wells sampled in 2012 contained a pH that meets the BCAWQG and CDWQG for drinking water protection. 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 bi-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 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 the electrical conductivity in the ambient water quality represented by monitoring well AM02-01. In 2012, electrical conductivity values ranged from 113 (EBA04-4) to 1387 µs/cm (HBT4-3) in the landfill monitoring wells, 238 (EBA11-2) to 1044 µs/cm (EBA04-7) in the boundary wells and 99 (AG99-06) to 278 µs/cm (EBA11-3) in the downgradient monitoring wells. 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 an increasing trend. No other trends are noted based on the historic and 2012 electrical conductivity data as shown in Appendix G. There are currently no BCAWQG, CDWQG or CSR standards for the protection of aquatic life or drinking water for electrical conductivity.

  Figure 6 and Figure 7 show distribution maps for electrical conductivity in groundwater from May 2012 and December 2012, 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 electrical conductivity values measured at the surface water sampling station in 2012, SW-1, were comparable to background levels represented by well AM02-01.

- **Chloride** - Based on the 2012 and historic data, chloride concentrations have fluctuated at all monitoring well locations but since 2002 have remained less than 75 mg/L which is less than one third of the lowest BCAWQG criteria for this parameter. 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, EB11-1 and EB11-2 historically are elevated relative to the typical background levels. Chloride concentrations measured at AG99-06 and EBA11-3 are also shown to be elevated relative to background levels. The chloride concentrations measured at HBT94-3, located at the eastern boundary of the CRWMC, show an increasing trend. No other trends are noted based on the historic and 2012 chloride data as shown in Appendix G.

  The chloride data from December 2012 is spatially represented on the chloride distribution map shown on Figure 8. 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 in 2012 ranged from 2.0 to 3.5 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 and 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 currently applicable BCAWQG for the protection of both drinking water and freshwater aquatic life and the CDWQG. 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 in 2012 ranged from 1.9 to 3.2 mg/L and are comparable to typical background levels represented by monitoring well AM02-01.

- **Ammonia** – The ammonia distribution in groundwater from December 2012 is shown on Figure 9. Groundwater in most of the monitoring wells sampled had no detectable to low ammonia concentrations. The HBT-series wells (closest to the landfilled wastes) had the highest ammonia concentrations, which in 2012 were up to 11 mg/L and recorded historic levels have been as high as 29.4 mg/L. Ammonia typically represents a high percentage of the nitrogen species in a young leachate while it is still in the acid generating phase. None of the monitoring wells or surface water surface water location sampled in 2012 contained ammonia concentrations exceeding the currently applicable BCAWQG for the protection of drinking water and freshwater aquatic life, the CDWQG and CSR AW and DW standards.

  The highest nitrate concentration in 2012 was measured in the groundwater sample collected from EBA04-7 (3 mg/L) which is significantly less than the currently applicable BCAWQG for the protection of drinking water and freshwater aquatic life, the CDWQG and CSR AW and DW standards.

- **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. No obvious trends for the other monitoring wells are apparent at this time. In 2012, dissolved manganese and/or iron concentrations measured at HBT94-1, HBT94-2, HBT94-3, located within the CRWMC property boundaries, and EBA04-7, located immediately downgradient of the CRWMC, exceeded the currently applicable BCAWQG and/or CDWQG. All other monitoring wells sampled in 2012 contained dissolved iron and manganese concentrations less than the applicable guidelines. There are currently no iron and manganese CSR and DW standards for a municipal disposal facility. A summary of the metal analytical results obtained for groundwater in 2012 is shown on the attached Figure 5.

- **Heavy Metals** - Dissolved aluminium, arsenic, barium, chromium, copper, iron, manganese, selenium, silver, vanadium and zinc concentrations in groundwater at levels exceeding the BCAWQG have been recorded at the wells located at the CRWMC, or downgradient monitoring wells during one or more occasions since water quality monitoring started at the CRWMC. As indicated in Section 5.2.1, many of these metals have also been detected in the background water quality, but typically at lesser concentrations.

  In 2012, vanadium, zinc, chromium, copper and cadmium were detected in the groundwater at concentrations exceeding the applicable criterion. A summary of dissolved metal analytical results in groundwater for 2012 is shown on the attached Figure 5. 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 exceedances identified in groundwater in 2012 are discussed further in Section 5.2.3.

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 either the BCAWQG, or natural background concentrations where these concentrations exceed the BCAWQG. According to MOE, the applicable standards at a municipal disposal facility are evolving and the CSR AW and DW standards would be the applicable groundwater standards for future monitoring and sampling at the CRWMC therefore the exceedances are also discussed below in regards to the CSR groundwater standards.

The groundwater sampled beneath the CRWMC in 2012 contains pH, temperature, dissolved oxygen and certain dissolved metal parameters concentrations (i.e., copper, zinc, iron, manganese, cadmium and chromium) exceeding the BCAWQG and copper and zinc concentrations that exceed the CSR AW standards. Analytical results obtained for groundwater samples collected from monitoring wells located down and cross gradient of the CRWMC indicate dissolved oxygen and certain dissolved metals parameters concentrations (i.e., chromium and vanadium) exceeding the BCAWQG. The exceedances identified in

groundwater during the 2012 annual water quality monitoring program in regards to compliance to the Operational Certificate MR-2401 are discussed as follows:

- pH and temperature measured in groundwater at levels not within the criterion was limited to monitoring wells located within the CRWMC property boundaries. There is currently no CSR DW or AW standard for pH or temperature;
- Dissolved oxygen concentrations in groundwater not within the referenced minimum acceptable concentration threshold of 5 mg/L under the BCAWQG for freshwater aquatic life protection in 2012 was identified at monitoring wells located within and immediately downgradient of the CRWMC property boundaries. It should be noted that the dissolved oxygen BCAWQG for freshwater aquatic life protection is set to protect freshwater aquatic life in a surface water receiving environment not groundwater where concentrations are commonly low and therefore is not considered a non-compliance issue with the operational certificate. There is currently no CSR AW or DW standard for dissolved oxygen;
- Copper and zinc concentrations exceeding the BCAWQG for the protection of freshwater aquatic life and the CSR AW standards were measured in the groundwater samples 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 and copper zinc concentrations in the groundwater samples may be a result of piping etc. associated with the water supply well and not a true indication of zinc and copper concentrations in the groundwater;
- Dissolved manganese and iron concentrations exceeding the applicable BCAWQG in 2012 were limited to monitoring wells located within the CRWMC property boundaries. There is no iron or manganese CSR AW or DW standard for a municipal disposal facility;
- Historically, cadmium concentrations exceeding the BCAWQG for the protection of freshwater aquatic life have been observed from upgradient well, AM02-01, through to downgradient well, AG99-06, and the surface water sampling station, SW1. In 2012, cadmium exceedances were identified at monitoring wells HBT94-1, EBA04-1, and EBA04-4, located within the CRWMC property boundaries, and surface water sampling location SW1. Based on the 2012 and historic cadmium concentration levels and the spatial distribution, the elevated cadmium concentrations are not considered to be directly related to the CRWMC operations. In addition, the cadmium concentrations measured at these locations are less than the CSR AW and DW standards;
- Dissolved vanadium concentrations exceeding the BCAWQG for the protection of freshwater aquatic life were only identified in one or three monitoring wells and not in monitoring wells located within or immediately downgradient of the CRWMC property boundaries. Based on the 2012 and historic vanadium concentration levels and the spatial distribution, the elevated vanadium concentrations are not considered to be directly related to the CRWMC operations and therefore are not considered a non-compliance issue with the operational certificate. In addition, the vanadium concentrations measured at these locations are less than the CSR AW and DW standards; and,

- Dissolved chromium concentrations exceeding the BCAWQG for the protection of freshwater aquatic life was identified in groundwater samples collected from three monitoring wells located immediately downgradient of the CRWMC (EBA11-1, EBA11-2 and EBA04-7) and one monitoring well located further downgradient of the CRWMC (EBA11-4). The identified dissolved chromium concentrations exceeding the currently applicable BCAWQG for the protection of freshwater aquatic life at the downgradient monitoring wells are non-compliant with the operational certificate for the CRWMC. None of the dissolved chromium concentrations measured at the downgradient monitoring wells in 2012, however, exceeds the CSR AW and DW standards. Continued monitoring is required to further assess dissolved chromium exceedances in groundwater identified downgradient of the CRWMC.

The downgradient surface water receptor (SW1) met the applicable BCAWQG for all parameters tested in 2012 with the exception of cadmium during the February and May 2012 monitoring events which exceeded the BCAWQG for freshwater aquatic life protection. The cadmium concentrations for the surface water sample collected from SW1 during the February and May 2012 monitoring events were within typical background dissolved cadmium concentrations as represented by monitoring well AM02-01.

Toluene was identified at a concentration exceeding the BCAWQG for the protection of freshwater aquatic life at monitoring well AM02-01, located upgradient of the CRWMC property boundaries during the December 2012 monitoring event. Since AM02-01 is an upgradient well, the toluene exceedance is not considered a result of activities at the CRWMC.

5.2 Water Quality Monitoring Network and Current Analytical Program

EBA considers that monitoring wells located on and downgradient to the CRWMC provide appropriate spatial coverage. Most of the water quality exceedances measured in 2012 related to freshwater aquatic life related criteria. The surface water sampling location SW1 is well placed to monitor the one tributary, but a second tributary is located closer to Argonaut Road. EBA attempted to sample this tributary during the 2012 monitoring events but was unsuccessful. EBA recommends this tributary continue to be monitored and sampled, if possible.

6.0 CONCLUSIONS

Based on the 2012 monitoring data, the following conclusions are drawn:

- Groundwater flowed towards the east/northeast across most of the CRWMC. The horizontal hydraulic gradient estimated for the CRWMC in 2012 was 0.02 m/m for all 2012 monitoring events;
- Groundwater analytical data obtained in 2012 indicates that groundwater sampled beneath the CRWMC in 2012 contains pH, temperature, TDS and certain dissolved metal parameters concentrations (i.e., copper, zinc, iron, manganese, cadmium and chromium) exceeding the BCAWQG and/or CDWQG and copper and zinc concentrations exceeding the CSR AW standards. Analytical results obtained for groundwater samples collected from monitoring wells located down and cross gradient of the CRWMC indicate certain dissolved metals parameters concentrations (i.e., chromium and vanadium) that exceed the BCAWQG and TDS and dissolved manganese concentrations exceeding the CDWQG;

- Surface water analytical data obtained in 2012 indicates total cadmium concentration exceedances during two monitoring events in 2012;
- 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 of background concentrations at the furthest downgradient monitoring well (AG99-06) and at the surface water sampling station (SW1).
- 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);
- pH, temperature, iron, manganese, zinc and copper concentrations identified in groundwater as exceeding the applicable BCAWQG in 2012 were limited to monitoring wells located within the CRWMC property boundaries;
- Identified cadmium and vanadium concentrations in groundwater and/or surface water at concentrations exceeding the BCAWQG for the protection of freshwater aquatic life does not appear to be directly related to the CRWMC operations and therefore are not considered a non-compliance issue with the operational certificate; and,
- Dissolved chromium concentrations exceeding the BCAWQG for the protection of freshwater aquatic life was identified in groundwater samples collected from three monitoring wells located immediately downgradient of the CRWMC and one monitoring well located further downgradient of the CRWMC. The identified dissolved chromium concentrations exceeding the currently applicable BCAWQG for the protection of freshwater aquatic life at the downgradient monitoring wells are non-compliant with the operational certificate for the CRWMC. None of the dissolved chromium concentrations measured at the downgradient monitoring wells in 2012, however, exceeds the CSR AW standards. Continued monitoring is required to further assess dissolved chromium exceedances in groundwater identified downgradient of the CRWMC.

7.0 RECOMMENDATIONS

Based on the conclusions presented above, EBA recommends:

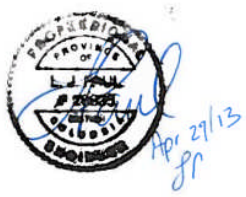
- The water quality monitoring program, continue on a quarterly annual basis in 2013.

8.0 CLOSURE

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

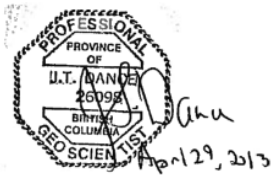
Sincerely,
EBA Engineering Consultants Ltd.

Prepared by:



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Reviewed by:



Tom Dance, M.Sc., P.Geo.
Principal Hydrogeologist,

TABLES

Table 1 Historical Vertical Gradients
Table 2 2012 Summary of Groundwater Exceedances
Table 3 2012 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	21-Feb-12	24-May-12	16-Aug-12	4-Dec-12
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	112.08	110.92	110.94	113.31
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	111.94	110.79	110.81	113.18
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	0.018	0.017	0.017	0.017
Gradient		down	down	up	up	up	up	down	down	down	down	down	down	down	down	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
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
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
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
Gradient		down	down	down	up	up	down	down	down	down	down	down	down

TABLE 2: 2012 SUMMARY OF GROUNDWATER EXCEEDANCES

							Beneath CRWMC												
Parameter	**Units**	**BC.AWQG.AL**	**BC.AWQG.DW**	**CDWG**	**CSR AW**	**CSR DW**	**HBT94-1**	**HBT94-1**	**HBT94-1**	**HBT94-1**	**HBT94-2**	**Duplicate HBT94-2**	**HBT94-2**	**Duplicate HBT94-2**	**HBT94-2**	**Duplicate HBT94-2**	**HBT94-2**	**Duplicate HBT94-2**	**HBT94-3**
Physical Tests							**22-Feb-12**	**25-May-12**	**16-Aug-12**	**3-Dec-12**	**22-Feb-12**	**22-Feb-12**	**24-May-12**	**25-May-12**	**16-Aug-12**	**16-Aug-12**	**3-Dec-12**	**3-Dec-12**	**3-Dec-12**
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	no standard	no standard	7.0	7.1	7.15	7.57	7.4	-	7.5	-	7.22	-	7.35	-	**6.43 abc**
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	no standard	no standard	7.61	7.88	8.21	8.09	7.93	8	8.09	8.08	8.27	8.26	8.08	8.19	7.42
Temperature (Field)	deg C	19	15	15	no standard	no standard	10.5	**15.1 bc**	12.57	9.98	11.6	-	12.1	-	12.23	-	11.35	-	12.5
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	no standard	no standard	10.0	16.3	**4.08 a**	8.98	6.5	-	5.6	-	**3.85 a**	-	5.8	-	**3.66 a**
Total Dissolved Solids (Field)	mg/L	no guidleine	no guideline	500	no standard	no standard	300	320	314	322	200	-	300	-	275	-	328		**901c**
Dissolved Metals																			
Cadmium (Cd)	mg/L	*	no guideline	0.005	0.0001 @ H < 30 0.0003 @ H = 30 - < 90 0.0005 @ H = 90 - < 150 0.0006 @ H = 150 - < 210	0.005	**0.00039 a**	**0.000419 a**	**0.000231 a**	**0.00021 a**	0.000012	0.000017	0.0000366	0.0000508	0.000041	0.000024	0.000065	0.000021	0.000056
Chromium (Cr)	mg/L	0.001	no guideline	0.05	0.01	0.05	0.0001	<0.0001	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.00025
Hex. Chromium (Cr 6+)	mg/L	0.001	no guideline	0.05	0.01	no standard	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	mg/L	*	0.5	1	0.020 @ H < 50 0.030 @ H = 50 - < 75 0.040 @ H = 75 - < 100 0.050 @ H = 100 - < 125 0.060 @ H = 125 - < 150 0.070 @ H = 150 - < 175 0.080 @ H = 175 - < 200 0.090 @ H > 200	1	0.00424	0.00385	0.00367	0.00281	0.00025	0.00013	0.000221	0.000212	0.000208	0.000168	0.000307	0.000242	0.00285
Iron (Fe)	mg/L	0.35	no guideline	0.3	no standard	no standard	**0.337 c**	0.0036	0.0153	0.0238	0.174	0.182	0.206	0.207	0.189	0.195	0.223	0.237	**4.58 ac**
Manganese (Mn)	mg/L	*	no guideline	0.05	no standard	no standard	**0.294 c**	**0.483 c**	**0.528 c**	**0.0781 c**	**0.606 c**	**0.622 c**	**0.851 c**	**0.859 c**	**0.857 c**	**0.85 c**	**1.12 c**	**1.09 c**	**6.38 ac**
Vanadium (V)	mg/L	0.006	no guideline	no guideline	no standard	no standard	0.0006	0.0044	0.00305	0.00099	0.0005	0.0005	0.00046	0.00046	0.00057	0.00062	0.00072	0.00069	0.0025
Zinc (Zn)	mg/L	*	5	5	0.075 @ H < 90 0.15 @ H = 90 - < 100 0.9@ H = 100 - < 200 1.65 @ H = 200 - < 300 2.4@ H = 300 - < 400	5	0.0026	0.0023	0.00154	0.00136	0.0005	0.0008	0.00024	0.00035	0.00034	0.00019	0.00056	0.00102	0.00116
Non-Halogenated Volatiles																			
Toluene	mg/L	0.0005	no guideline	0.024	0.39	0.024	-	-	-	-	<0.0005	-	<0.0005	-	<0.0005	-	<0.0005	-	-

							Beneath CRWMC												Upgradient
Parameter	**Units**	**BC.AWQG.AL**	**BC.AWQG.DW**	**CDWG**	**CSR AW**	**CSR DW**	**HBT94-4**	**HBT94-4**	**HBT94-4**	**HBT94-4**	**EBA04-1**	**EBA04-1**	**EBA04-1**	**EBA04-1**	**EBA04-4**	**EBA04-4**	**EBA04-4**	**EBA04-4**	**AM02-1**
Physical Tests							**22-Feb-12**	**24-May-12**	**16-Aug-12**	**3-Dec-12**	**20-Feb-12**	**23-May-12**	**16-Aug-12**	**3-Dec-12**	**20-Feb-12**	**23-May-12**	**16-Aug-12**	**3-Dec-12**	**3-Dec-12**
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	no standard	no standard	7.8	7.9	8.03	8.05	7.72	8.5	8.28	**8.55 bc**	8.1	7.8	8.01	8.15	6.77
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	no standard	no standard	7.98	7.98	7.97	8.18	7.96	7.81	7.81	7.93	8.08	7.88	7.77	7.95	7.70
Temperature (Field)	deg C	19	15	15	no standard	no standard	11.5	11.9	10.66	9.94	5.7	14.1	**18.75 bc**	**15.63 bc**	**15.5 bc**	13.8	13.67	**15.31 bc**	10.0
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	no standard	no standard	**3.0 a**	**4.8 a**	5.13	5.1	10.5	5.1	5.54	7.47	7.0	8.2	7.31	5.3	9.2
Total Dissolved Solids (Field)	mg/L	no guidleine	no guideline	500	no standard	no standard	100	100	82	142	100	50	53	55	100	80	64	88	72
Dissolved Metals																			
Cadmium (Cd)	mg/L	*	no guideline	0.005	0.0001 @ H < 30 0.0003 @ H = 30 - < 90 0.0005 @ H = 90 - < 150 0.0006 @ H = 150 - < 210	0.005	<0.000005	<0.0000050	<0.0000050	<0.0000050	0.000009	**0.0000605 a**	0.00001	0.000007	0.000014	<0.0000050	0.000008	**0.000292 a**	<0.0000050
Chromium (Cr)	mg/L	0.001	no guideline	0.05	0.01	0.05	<0.0001	0.00016	0.00022	<0.00010	0.0004	**0.00124 a**	0.00045	0.00033	0.0004	0.00021	0.00018	0.00024	0.00019
Hex. Chromium (Cr 6+)	mg/L	0.001	no guideline	0.05	0.01	no standard	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	mg/L	*	0.5	1	0.020 @ H < 50 0.030 @ H = 50 - < 75 0.040 @ H = 75 - < 100 0.050 @ H = 100 - < 125 0.060 @ H = 125 - < 150 0.070 @ H = 150 - < 175 0.080 @ H = 175 - < 200 0.090 @ H > 200	1	0.00019	0.000382	0.000248	0.000456	**0.0238 ad**	0.00358	0.00469	0.00388	0.0003	0.000356	0.000283	0.000313	0.000638
Iron (Fe)	mg/L	0.35	no guideline	0.3	no standard	no standard	0.004	<0.0010	0.0016	0.0023	0.001	0.132	0.0129	0.0069	0.002	<0.0010	0.0013	<0.0010	0.0016
Manganese (Mn)	mg/L	*	no guideline	0.05	no standard	no standard	0.0296	0.00716	0.000256	0.00124	0.00017	0.0076	0.000845	0.000188	0.00009	0.000078	0.00142	<0.000050	0.000088
Vanadium (V)	mg/L	0.006	no guideline	no guideline	no standard	no standard	0.0034	0.00372	0.00507	0.00483	0.004	0.00428	0.00228	0.00366	0.0026	0.00167	0.0021	0.00269	0.00119
Zinc (Zn)	mg/L	*	5	5	0.075 @ H < 90 0.15 @ H = 90 - < 100 0.9@ H = 100 - < 200 1.65 @ H = 200 - < 300 2.4@ H = 300 - < 400	5	0.0002	0.00082	0.00031	0.00065	**0.0705 a**	**1.1 ad**	**0.0521 a**	0.0168	0.0031	0.0006	0.0009	0.00066	0.00023
Non-Halogenated Volatiles																			-
Toluene	mg/L	0.0005	no guideline	0.024	0.39	0.024	-	-	-	-	-	-	-	-	-	-	-	**0.0007 a**	

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life (updated September 2011).
BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water (updated September 2011).
CDWG - Canadian Drinking Water Quality Guidelines (updated December 2010).
CSR AW (Freshwater) - BC Contaminated Sites Regulation (CSR) (BC Reg. 375/96 includes amendments up to BC Reg. 6/2013, January 24, 2013). Schedule 6 Generic Numerical Water Standards for Aquatic Life (AW) in Freshwater.
CSR DW - BC Contaminated Sites Regulation (CSR) (BC Reg. 375/96 includes amendments up to BC Reg. 6/2013, January 24, 2013). Schedule 6 and 10 Generic Numerical Water Standards for Drinking Water (DW).
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
d - Parameter exceeds the CSR AW (Freshwater)
e - Parameter exceeds the CSR DW
BOLD - Parameter exceeds BCAWQG and/or CDWQG
Shaded - Parameter exceeds CSR standards

* **Calculated Guidelines from the BC Approved and Working Water Quality Guidelines, updated September 2011 (where H = Hardness)**

* **Calculated Guidelines from the BC Approved and Working Water Quality Guidelines, updated August 2006 (where H = Hardness)**
Cadmium - Criteria is based on equation Cd = 10^(0.86(Log(H))-3.2) (in ug/L).
Copper - Criteria is based on equation Cu = (0.094(hardness)+2) ug/L(hardness as mg/L CaCO3
Manganese - Criteria is based on equation: Mn = 0.01102 x H + 0.54 (in mg/L).
Zinc - Criteria is based on equation: Zn = 33 + 0.75 x (hardness -90)

TABLE 2: 2012 SUMMARY OF GROUNDWATER EXCEEDANCES

							Downgradient																
Parameter	**Units**	**BC.AWQG.AL**	**BC.AWQG.DW**	**CDWG**	**CSR AW**	**CSR DW**	**AG99-01**	**AG99-01**	**AG99-01**	**AG99-01**	**AG99-02**	**AG99-02**	**AG99-02**	**AG99-02**	**EBA04-6**	**EBA04-6**	**EBA04-6**	**EBA04-6**	**EBA04-7**	**EBA04-7**	**Duplicate EBA04-7**	**EBA04-7**	**Duplicate EBA04-7**	**EBA04-7**	**Duplicate EBA04-7**
Physical Tests							**21-Feb-12**	**24-May-12**	**16-Aug-12**	**3-Dec-12**	**21-Feb-12**	**24-May-12**	**16-Aug-12**	**3-Dec-12**	**21-Feb-12**	**24-May-12**	**16-Aug-12**	**3-Dec-12**	**20-Feb-12**	**25-May-12**	**25-May-12**	**16-Aug-12**	**16-Aug-12**	**3-Dec-12**	**3-Dec-12**
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	no standard	no standard	7.7	7.8	7.71	8.23	8.0	7.9	8.01	8.17	7.3	7.3	7.08	7.36	6.8	6.6	-	6.77	-	6.92	-
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	no standard	no standard	7.97	8.08	8.17	8.08	8.17	7.98	8.06	8.17	8.2	8.03	8.18	8.19	7.92	7.77	7.89	7.96	8.02	7.76	7.84
Temperature (Field)	deg C	19	15	15	no standard	no standard	10.6	11.0	11.33	10.93	9.9	10.7	11.7	10.35	10.0	10.3	10.79	10.07	9.7	10.1	-	10.41	-	9.66	-
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	no standard	no standard	9.8	6.9	8.41	9.08	6.9	6.8	9.01	6.6	9.1	9.5	**3.84 a**	5.53	**2.6 a**	**1.7 a**	-	**2.5 a**	-	**0.6 a**	-
Total Dissolved Solids (Field)	mg/L	no guidleine	no guideline	500	no standard	no standard	100	140	121	115	200	130	108	139	300	300	452	376	**600c**	**540c**	-	490	-	**660c**	-
Dissolved Metals																									
Cadmium (Cd)	mg/L	*	no guideline	0.005	0.0001 @ H < 30 0.0003 @ H = 30 - < 90 0.0005 @ H = 90 - < 150 0.0006 @ H = 150 - < 210	0.005	<0.000005	<0.0000050	<0.0000050	<0.0000050	0.000007	0.0000068	<0.0000050	<0.0000050	0.000021	0.0000106	0.000011	0.000006	0.00006	0.0000474	0.0000418	0.000028	0.000033	0.00009	0.000033
Chromium (Cr)	mg/L	0.001	no guideline	0.05	0.01	0.05	0.0005	0.00052	0.00055	0.00045	0.0006	0.00049	0.00044	0.0006	**0.0011 a**	0.001	0.00066	**0.00114 a**	0.0001	<0.0001	<0.0001	<0.00010	0.00017	<0.00010	<0.00010
Hex. Chromium (Cr 6+)		0.001	no guideline	0.05	0.01	no standard	-	-	-	-	-	-	-	-	-	**0.0026 a**	-	**0.0026 a**	-	-	-	-	-	-	-
Copper (Cu)		*	0.5	1	0.020 @ H < 50 0.030 @ H = 50 - < 75 0.040 @ H = 75 - < 100 0.050 @ H = 100 - < 125 0.060 @ H = 125 - < 150 0.070 @ H = 150 - < 175 0.080 @ H = 175 - < 200 0.090 @ H > 200	1	0.0004	0.000136	0.00012	0.000181	0.00006	0.000247	0.000124	0.000175	0.00025	0.000112	0.000544	0.000142	0.00286	0.00272	0.00285	0.00252	0.00247	0.00404	0.00366
Iron (Fe)	mg/L	0.35	no guideline	0.3	no standard	no standard	0.001	0.0013	0.0016	0.003	0.001	0.0014	0.0012	<0.0010	0.002	0.0022	0.0029	0.0018	0.006	0.0053	0.0051	0.0115	0.0206	0.0066	0.0038
Manganese (Mn)	mg/L	*	no guideline	0.05	no standard	no standard	0.0001	<0.000050	0.000097	0.00014	0.00007	0.000345	0.000143	<0.000050	0.00011	0.000268	0.00033	0.000074	**0.13 c**	**0.1 c**	**0.101 c**	**0.0999 c**	**0.0999 c**	**0.133 c**	**0.129 c**
Vanadium (V)	mg/L	0.006	no guideline	no guideline	no standard	no standard	**0.0065 a**	0.00571	**0.00609 a**	**0.0063 a**	**0.0172 a**	**0.0181 a**	**0.0192 a**	**0.0199 a**	0.0013	0.00122	0.00137	0.00142	0.0019	0.00158	0.00154	0.00166	0.00151	0.00178	0.00187
Zinc (Zn)	mg/L	*	5	5	0.075 @ H < 90 0.15 @ H = 90 - < 100 0.9@ H = 100 - < 200 1.65 @ H = 200 - < 300 2.4@ H = 300 - < 400	5	0.0003	0.00018	0.00052	0.00028	0.0004	0.00088	0.00042	0.00056	0.002	0.00063	0.0002	0.00029	0.0006	0.00058	0.00053	0.0005	0.00048	0.00059	0.00039
Non-Halogenated Volatiles																									
Toluene	mg/L	0.0005	no guideline	0.024	0.39	0.024	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	-	<0.0005	-	<0.0006	-

							Downgradient														
Parameter	**Units**	**BC.AWQG.AL**	**BC.AWQG.DW**	**CDWG**	**CSR AW**	**CSR DW**	**EBA11-1**	**EBA11-1**	**EBA11-1**	**EBA11-1**	**EBA11-2**	**EBA11-2**	**EBA11-2**	**EBA11-2**	**EBA11-4**	**EBA11-4**	**Duplicate EBA11-4**	**EBA11-4**	**Duplicate EBA11-4**	**EBA11-4**	**Duplicate EBA11-4**
Physical Tests							**21-Feb-12**	**23-May-12**	**16-Aug-12**	**5-Dec-12**	**20-Feb-12**	**24-May-12**	**16-Aug-12**	**4-Dec-12**	**21-Feb-12**	**25-May-12**	**25-May-12**	**16-Aug-12**	**16-Aug-12**	**5-Dec-12**	**5-Dec-12**
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	no standard	no standard	7.5	7.3	7.49	7.74	7.7	7.4	7.46	7.86	7.8	7.7	-	7.73	-	8.09	-
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	no standard	no standard	7.94	8.2	8.25	8.09	8.24	8.2	8.21	8.16	7.72	7.73	7.76	7.87	7.86	7.87	7.86
Temperature (Field)	deg C	19	15	15	no standard	no standard	9.1	9.4	9.95	9.25	9.7	7.6	10.65	10.33	9.8	10.1	-	10.43	-	9.93	-
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	no standard	no standard	7.7	7.2	6.12	7.15	7.8	7.6	6.92	7.14	8.5	8.9	-	8.64	-	10.49	-
Total Dissolved Solids (Field)	mg/L	no guidleine	no guideline	500	no standard	no standard	300	310	304	269	200	190	168	260	100	90	-	80	-	64	-
Dissolved Metals																					
Cadmium (Cd)	mg/L	*	no guideline	0.005	0.0001 @ H < 30 0.0003 @ H = 30 - < 90 0.0005 @ H = 90 - < 150 0.0006 @ H = 150 - < 210	0.005	0.000009	0.0000062	<0.0000050	<0.0000050	<0.000005	<0.0000050	0.000007	<0.0000050	<0.000005	<0.000005	<0.000005	0.000006	<0.0000050	0.000012	<0.0000050
Chromium (Cr)	mg/L	0.001	no guideline	0.05	0.01	0.05	**0.0014 a**	**0.00136 a**	**0.0016 a**	**0.00119 a**	**0.0029 a**	**0.00222 a**	**0.00191 a**	**0.00118 a**	**0.0017 a**	**0.00148 a**	**0.00143 a**	**0.00138 a**	**0.00145 a**	0.00066	0.00062
Hex. Chromium (Cr 6+)				0.05	0.01	no standard	-	**0.0032 a**	**0.0022 a**	**0.0022 a**	-	**0.0032 a**	**0.0032 a**	**0.0019 a**	-	**0.0028 a**	-	**0.0015 a**	-	-	-
Copper (Cu)				1	0.020 @ H < 50 0.030 @ H = 50 - < 75 0.040 @ H = 75 - < 100 0.050 @ H = 100 - < 125 0.060 @ H = 125 - < 150 0.070 @ H = 150 - < 175 0.080 @ H = 175 - < 200 0.090 @ H > 200	1	0.00072	0.000274	0.000236	0.000343	0.00012	0.00018	0.000189	0.000155	0.0001	0.000062	0.000078	0.000179	0.000159	0.000521	0.000204
Iron (Fe)	mg/L	0.35	no guideline	0.3	no standard	no standard	0.002	0.0014	0.002	0.0034	0.004	0.0022	0.0266	0.0021	0.005	0.0031	0.003	0.0115	0.0104	0.0081	0.0068
Manganese (Mn)	mg/L	*	no guideline	0.05	no standard	no standard	0.00338	0.000665	0.000218	0.000282	0.00237	0.000293	0.000265	<0.000050	0.00329	0.000486	0.00046	0.000227	0.000136	0.000131	0.000079
Vanadium (V)	mg/L	0.006	no guideline	no guideline	no standard	no standard	0.0032	0.00363	0.00402	0.00506	0.0033	0.00291	0.0027	0.00236	**0.0115 a**	**0.013 a**	**0.0131 a**	**0.0142 a**	**0.0142 a**	**0.0149 a**	**0.0146 a**
Zinc (Zn)	mg/L	*	5	5	0.075 @ H < 90 0.15 @ H = 90 - < 100 0.9@ H = 100 - < 200 1.65 @ H = 200 - < 300 2.4@ H = 300 - < 400	5	0.0003	0.00043	0.0002	0.00053	0.0001	0.00086	<0.00010	0.0004	0.0002	0.0008	0.00031	0.00041	<0.00010	0.00078	0.00022
Non-Halogenated Volatiles																					
Toluene	mg/L	0.0005	no guideline	0.024	0.39	0.024	<0.0005	<0.0005	<0.0005	<0.0005	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life (updated September 2011).

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water (updated September 2011).

CDWG - Canadian Drinking Water Quality Guidelines (updated December 2010).

CSR AW (Freshwater) - BC Contaminated Sites Regulation (CSR) (BC Reg. 375/96 includes amendments up to BC Reg. 6/2013, January 24, 2013). Schedule 6 Generic Numerical Water Standards for Aquatic Life (AW) in Freshwater.

CSR DW - BC Contaminated Sites Regulation (CSR) (BC Reg. 375/96 includes amendments up to BC Reg, 6/2013, January 24, 2013). Schedule 6 and 10 Generic Numerical Water Standards for Drinking Water (DW).

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

d - Parameter exceeds the CSR AW (Freshwater)

e - Parameter exceeds the CSR DW

BOLD - Parameter exceeds BC.AWQG and/or CDWQG

Shaded - Parameter exceeds CSR standards

* **Calculated Guidelines from the BC Approved and Working Water Quality Guidelines, updated September 2011 (where H = Hardness)**

* **Calculated Guidelines from the BC Approved and Working Water Quality Guidelines, updated August 2006 (where H = Hardness)**

Cadmium - Criteria is based on equation Cd = 10^(0.86[Log(H)]-3.2) (in µg/L).

Copper - Criteria is based on equation Cu = (0.094(hardness)+2) µg/L(hardness as mg/L CaCO3

Manganese - Criteria is based on equation: Mn = 0.01102 x H + 0.54 (in mg/L).

Zinc - Criteria is based on equation: Zn = 33 + 0.75 x (hardness -90)

TABLE 3: 2012 SUMMARY OF SURFACE WATER EXCEEDANCES

Parameter	Units	BC.AWQG.AL	SW-1	SW-1	SW-1	SW-1
			21-Feb-12	24-May-12	15-Aug-12	4-Dec-12
Total Metals						
Cadmium (Cd)	mg/L	*	**0.000055 a**	0.0000138	**0.000034 a**	0.000008

Notes:
BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life (updated September 2011).
Cadmium - Criteria is based on equation Cd = 10^(0.86[Log(H)]-3.2) (in µg/L).
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
* indicates that guideline is calculated based on sample specific data

TABLE 4: 2012 QUALITY ASSURANCE / QUALITY CONTROL

Parameter	Units	MDL	HBT94-2	Dup HBT94-2	RPD	HBT94-2	Dup HBT94-2	RPD	HBT94-2	Dup HBT94-2	RPD	HBT94-2	Dup HBT94-2	RPD
			22-Feb-12	22-Feb-12	%	25-May-12	25-May-12	%	16-Aug-12	16-Aug-12	%	3-Dec-12	3-Dec-12	%
Physical Tests														
pH (Lab)	pH Unit	-	7.93	8	1%	8.09	8.08	0%	8.27	8.26	0%	8.08	8.19	1%
Specific Conductance (Lab)	µS/cm	1	336	336	0%	451	452	0%	433	430	1%	488	492	1%
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	0.2	152	156	3%	205	204	0%	190	197	4%	230	236	3%
Anions and Nutrients														
Ammonia (as N)	mg/L	0.005	0.29	0.29	0%	0.23	0.25	8%	0.33	0.34	3%	0.32	0.31	3%
Nitrogen: Nitrite (as N) (Lab)	mg/L	0.002	0.007	0.007	-	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.0050	<0.0050	-
Nitrogen: Nitrate (as N) (Lab)	mg/L	0.01	<0.020	0.182	-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-
Chloride (Lab)	mg/L	0.2	5.8	5.4	7%	13	13	0%	13	13	0%	18	18	0%
Fluoride: Dissolved	mg/L	0.01	0.025	0.024	-	0.019	0.018	-	0.018	0.017	-	0.019	0.018	-
Sulphate (Lab)	mg/L	0.5	3.52	3.47	1%	3.29	3.37	2%	3.09	2.5	-	3.41	3.42	0%
Alkalinity (Lab)	mg/L	0.5	168	168	0%	218	219	0%	213	213	0%	231	233	1%
Dissolved Metals														
Aluminum: Dissolved	mg/L	0.00100	0.0078	0.0129	**49%**	0.00704	0.00699	1%	0.00763	0.00725	5%	0.00734	0.0074	1%
Antimony: Dissolved	mg/L	0.0002	<0.00002	<0.00002	-	<0.00002	<0.00002	-	<0.000020	<0.000020	-	<0.000020	<0.000020	-
Arsenic: Dissolved	mg/L	0.0002	0.00247	0.00246	0%	0.00258	0.0026	1%	0.00241	0.00229	5%	0.00254	0.00244	4%
Barium: Dissolved	mg/L	0.0002	0.00584	0.00602	3%	0.00851	0.00848	0%	0.00889	0.00845	5%	0.00923	0.00996	8%
Beryllium: Dissolved	mg/L	0.0002	<0.00001	<0.00001	-	<0.00001	<0.00001	-	<0.000010	<0.000010	-	<0.000010	<0.000010	-
Bismuth: Dissolved	mg/L	0.0002	<0.000005	<0.000005	-	<0.000005	<0.000005	-	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	-
Boron: Dissolved	mg/L	0.01	0.1	0.11	10%	0.086	0.08	7%	0.183	0.173	6%	0.132	0.151	13%
Cadmium: Dissolved	mg/L	0.00001	0.000012	0.000017	-	0.0000366	0.0000508	-	0.000041	0.000024	-	0.000065	0.000021	-
Calcium: Dissolved	mg/L	0.01	51.1	52.4	3%	68.9	68.6	0%	64.4	67.1	4%	78	80.9	4%
Chromium: Dissolved	mg/L	0.0002	<0.0001	<0.0001	-	<0.0001	<0.0001	-	<0.00010	<0.00010	-	<0.00010	<0.00010	-
Cobalt: Dissolved	mg/L	0.0002	0.000067	0.000075	-	0.000121	0.000103	-	0.000096	0.00011	-	0.000154	0.000133	-
Copper: Dissolved	mg/L	0.0001	0.00025	0.00013	-	0.000221	0.000212	-	0.000208	0.000168	-	0.000307	0.000242	-
Iron: Dissolved (Lab)	mg/L	0.001	0.174	0.182	4%	0.206	0.207	0%	0.189	0.195	3%	0.223	0.237	6%
Lead: Dissolved	mg/L	0.000005	0.000009	0.000015	-	<0.000005	<0.000005	-	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	-
Lithium: Dissolved	mg/L	0.0002	<0.0005	<0.0005	-	<0.0005	<0.0005	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
Magnesium: Dissolved	mg/L	0.005	5.95	6.15	3%	8.03	7.87	2%	7.15	7.15	0%	8.47	8.31	2%
Manganese: Dissolved	mg/L	0.0001	0.606	0.622	3%	0.851	0.859	1%	0.857	0.85	1%	1.12	1.09	3%
Mercury: Dissolved	mg/L	0.00002	< 0.00001	< 0.00001	-	<0.000010	<0.000010	-	<0.000010	<0.000010	-	<0.000010	<0.000010	-
Molybdenum: Dissolved	mg/L	0.0001	0.00026	0.00027	-	0.000264	0.000231	-	0.000241	0.000246	-	0.00025	0.000259	-
Nickel: Dissolved	mg/L	0.0005	0.00043	0.00043	-	0.000685	0.000731	-	0.000688	0.000649	-	0.000984	0.000955	-
Potassium: Dissolved	mg/L	0.0100	0.0583	0.0106	-	1.79	1.74	3%	1.75	1.76	1%	1.89	1.89	0%
Selenium: Dissolved	mg/L	0.0002	<0.00004	<0.00004	-	<0.00004	<0.00004	-	<0.000040	<0.000040	-	<0.000040	0.00005	-
Silicon: Dissolved	mg/L	0.05	7.5	7.5	0%	7.82	7.91	1%	7.82	8.02	3%	7.7	8.23	7%
Silver: Dissolved	mg/L	0.00005	<0.000005	<0.000005	-	<0.000005	<0.000005	-	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	-
Sodium: Dissolved	mg/L	0.005	10.1	10.5	4%	13	12.7	2%	16.1	16.2	1%	18.3	18	2%
Strontium: Dissolved	mg/L	0.0001	0.0786	0.0808	3%	0.12	0.121	1%	0.123	0.121	2%	0.145	0.154	6%
Sulphur: Dissolved	mg/L	0.5	<10	<10	-	<15	<15	-	<10	<10	-	<3.0	<3.0	-
Thallium: Dissolved	mg/L	0.000002	<0.000002	<0.000002	-	0.0000034	0.0000033	-	0.000004	0.000002	-	0.000003	0.000003	-
Tin: Dissolved	mg/L	0.0002	<0.0002	<0.0002	-	<0.0002	<0.0002	-	<0.00020	<0.00020	-	<0.00020	0.0003	-
Titanium: Dissolved	mg/L	0.0002	<0.0005	<0.0005	-	<0.0005	<0.0005	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
Uranium: Dissolved	mg/L	0.00005	0.000083	0.000089	-	0.000112	0.000115	-	0.000116	0.000114	-	0.000134	0.000152	-
Vanadium: Dissolved	mg/L	0.0001	0.0005	0.0005	-	0.00046	0.00046	-	0.00057	0.00062	8%	0.00072	0.00069	4%
Zinc: Dissolved	mg/L	0.0001	0.0005	0.0008	-	0.00024	0.00035	-	0.00034	0.00019	-	0.00056	0.00102	**58%**
Zirconium: Dissolved	mg/L	0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	-	<0.00010	<0.00010	-	<0.00010	<0.00010	-

Notes:

- Relative percent difference (RPD) in concentrations calculated as RPD = {[C2-C1] / [(C1+C2)/2]} x100% 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: 2012 QUALITY ASSURANCE / QUALITY CONTROL

Parameter	Units	MDL	EBA04-3	Dup EBA04-3	RPD	EBA04-7	Dup EBA04-7	RPD	EBA04-7	Dup EBA04-7	RPD	EBA04-7	Dup EBA04-7	RPD
			20-Feb-12	20-Feb-12	%	25-May-12	25-May-12	%	15-Aug-12	15-Aug-12	%	4-Dec-12	4-Dec-12	%
Physical Tests														
pH (Lab)	pH Unit	-	8.15	8.19	0%	7.77	7.89	2%	7.96	8.02	1%	7.76	7.84	1%
Specific Conductance (Lab)	µS/cm	1	476	479	1%	827	818	1%	697	722	4%	994	990	0%
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	0.2	259	260	0%	401	392	2%	388	365	6%	536	520	3%
Anions and Nutrients														-
Ammonia (as N)	mg/L	0.005	0.0088	0.0084	-	0.017	0.014	-	0.012	0.0078	-	0.071	0.044	**47%**
Nitrogen: Nitrite (as N) (Lab)	mg/L	0.002	0.009	0.008	-	0.0345	0.0347	1%	0.028	0.028	0%	0.0585	0.059	1%
Nitrogen: Nitrate (as N) (Lab)	mg/L	0.01	0.989	0.973	2%	1.82	1.79	2%	1.66	1.67	1%	0.507	0.508	0%
Chloride (Lab)	mg/L	0.2	11	11	0%	27	27	0%	27	27	0%	35	31	12%
Fluoride: Dissolved	mg/L	0.01	<0.010	<0.010	-	0.012	0.012	-	0.011	0.01	-	0.014	0.015	-
Sulphate (Lab)	mg/L	0.5	4.4	4.26	-	19.8	19.9	1%	17.2	16.7	3%	25.9	25.9	0%
Alkalinity (Lab)	mg/L	0.5	222	224	1%	388	383	1%	316	332	5%	478	476	0%
Dissolved Metals														
Aluminum: Dissolved	mg/L	0.001	0.0031	0.0027	-	0.00221	0.0021	-	0.00152	0.00168	-	0.00155	0.00143	-
Antimony: Dissolved	mg/L	0.0002	0.00002	<0.00002	-	0.000041	0.00004	-	0.00003	0.000033	-	0.000041	0.000042	-
Arsenic: Dissolved	mg/L	0.0002	0.00006	0.00007	-	0.000114	0.000141	-	0.000139	0.000154	-	0.000189	0.00018	-
Barium: Dissolved	mg/L	0.0002	0.0084	0.00799	5%	0.0157	0.0157	0%	0.0152	0.015	1%	0.0193	0.019	2%
Beryllium: Dissolved	mg/L	0.0002	<0.00001	<0.00001	-	0.000022	0.000022	-	<0.000010	<0.000010	-	<0.000010	<0.000010	-
Bismuth: Dissolved	mg/L	0.0002	<0.000005	<0.000005	-	<0.000005	<0.000005	-	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	-
Boron: Dissolved	mg/L	0.01	<0.05	<0.05	-	0.299	0.293	2%	0.284	0.296	4%	0.296	0.288	3%
Cadmium: Dissolved	mg/L	0.00001	<0.000005	<0.000005	-	0.0000474	0.0000418	-	0.000028	0.000033	-	0.00009	0.000033	-
Calcium: Dissolved	mg/L	0.000005	82.9	81.7	1%	115	111	4%	113	104	8%	161	157	3%
Chromium: Dissolved	mg/L	0.0002	0.0007	0.0007	-	<0.0001	<0.0001	-	<0.00010	0.00017	-	<0.00010	<0.00010	-
Cobalt: Dissolved	mg/L	0.0002	0.000008	0.000006	-	0.000547	0.000528	-	0.000428	0.000436	-	0.000527	0.000452	-
Copper: Dissolved	mg/L	0.0001	0.00014	0.00015	-	0.00272	0.00285	5%	0.00252	0.00247	2%	0.00404	0.00366	10%
Iron: Dissolved (Lab)	mg/L	0.01	0.003	0.002	-	0.0053	0.0051	-	0.0115	0.0206	-	0.0066	0.0038	-
Lead: Dissolved	mg/L	0.0002	<0.000005	<0.000005	-	0.0000206	0.0000051	-	0.000009	0.000006	-	<0.0000050	0.000015	-
Lithium: Dissolved	mg/L	0.000005	0.0008	0.0008	0%	0.00108	0.00107	1%	0.00095	0.00093	2%	0.00112	0.00106	6%
Magnesium: Dissolved	mg/L	0.005	12.6	13.5	7%	27.4	27.9	2%	25.5	25.5	0%	32.7	31.2	5%
Manganese: Dissolved	mg/L	0.0001	<0.00005	<0.00005	-	0.1	0.101	1%	0.0999	0.0999	0%	0.133	0.129	3%
Mercury: Dissolved	mg/L	0.00002	< 0.00001	< 0.00001	-	<0.00001	<0.00001	-	<0.000010	<0.000010	-	<0.000010	<0.000010	-
Molybdenum: Dissolved	mg/L	0.0001	<0.00005	<0.00005	-	0.000071	0.000093	-	0.000085	0.000092	-	0.000129	0.00012	-
Nickel: Dissolved	mg/L	0.0005	0.00002	0.00006	-	0.00171	0.00172	-	0.00159	0.00162	-	0.00239	0.00217	-
Potassium: Dissolved	mg/L	0.01	0.98	0.93	5%	2.24	2.23	0%	2.21	2.19	1%	2.38	2.35	1%
Selenium: Dissolved	mg/L	0.00005	0.00021	0.0002	-	0.000099	0.000088	-	0.000068	0.000076	-	0.00007	0.000112	-
Silicon: Dissolved	mg/L	0.05	7.3	7.1	3%	12	12.2	2%	13.1	12.2	7%	14.3	13.9	3%
Silver: Dissolved	mg/L	0.00005	<0.000005	<0.000005	-	<0.000005	<0.000005	-	<0.0000050	<0.0000050	-	0.000005	0.000005	-
Sodium: Dissolved	mg/L	0.005	2.68	2.98	11%	22.2	22.7	2%	22.1	22	0%	25.8	24.3	6%
Strontium: Dissolved	mg/L	0.0001	0.162	0.16	1%	0.293	0.294	0%	0.288	0.294	2%	0.367	0.364	1%
Sulphur: Dissolved	mg/L	0.5	<10	<10	-	<15	<15	-	<10	<10	-	10.7	10.5	2%
Thallium: Dissolved	mg/L	0.00002	<0.000002	<0.000002	-	0.0000067	0.0000059	-	0.000005	0.000004	-	0.000005	0.000006	-
Tin: Dissolved	mg/L	0.0002	<0.0002	<0.0002	-	<0.0002	<0.0002	-	<0.00020	<0.00020	-	0.00028	<0.00020	-
Titanium: Dissolved	mg/L	0.0002	<0.0005	<0.0005	-	<0.0005	<0.0005	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
Uranium: Dissolved	mg/L	0.00005	0.000144	0.000182	-	0.000935	0.000951	2%	0.000851	0.000854	0%	0.000944	0.000964	2%
Vanadium: Dissolved	mg/L	0.0001	0.0007	0.0008	13%	0.00158	0.00154	3%	0.00166	0.00151	9%	0.00178	0.00187	5%
Zinc: Dissolved	mg/L	0.0001	0.0003	0.0002	-	0.00058	0.00053	9%	0.0005	0.00048	-	0.00059	0.00039	-
Zirconium: Dissolved	mg/L	0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	-	<0.00010	<0.00010	-	<0.00010	<0.00010	-

Notes:

- Relative percent difference (RPD) in concentrations calculated as RPD = {[C2-C1] / [(C1+C2)/2]} x100% 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: 2012 QUALITY ASSURANCE / QUALITY CONTROL

Parameter	Units	MDL	EBA11-3	Dup EBA11-3	RPD	EBA11-4	Dup EBA11-4	RPD	EBA11-4	Dup EBA11-4	RPD	EBA11-4	Dup EBA11-4	RPD
			21-Feb-12	21-Feb-12	%	25-May-12	25-May-12	%	16-Aug-12	16-Aug-12	%	5-Dec-12	5-Dec-12	%
Physical Tests														
pH (Lab)	pH Unit	-	7.79	7.78	0%	7.73	7.76	0%	7.87	7.86	0%	7.87	7.86	0%
Specific Conductance (Lab)	µS/cm	1	183	183	0%	135	134	1%	128	128	0%	100	100	0%
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	0.2	82.5	84.1	2%	58.3	58.5	0%	54.4	54.9	1%	44.2	44.3	0%
Anions and Nutrients														
Ammonia (as N)	mg/L	0.005	0.0073	0.0066	-	0.026	0.067	**88%**	0.017	0.021	-	<0.0050	<0.0050	-
Nitrogen: Nitrite (as N) (Lab)	mg/L	0.002	0.026	0.025	4%	0.0261	0.0153	**52%**	<0.0050	<0.0050	-	<0.0050	<0.0050	-
Nitrogen: Nitrate (as N) (Lab)	mg/L	0.01	0.113	0.115	2%	0.164	0.166	1%	0.137	0.137	-	0.021	<0.020	-
Chloride (Lab)	mg/L	0.2	19	19	0%	12	11	9%	10	10	0%	3.9	3.8	3%
Fluoride: Dissolved	mg/L	0.01	0.019	0.021	-	0.026	0.024	-	0.027	0.027	-	0.023	0.023	-
Sulphate (Lab)	mg/L	0.5	4.32	4.15	4%	3.18	2.76	14%	1.4	1.48	-	0.84	0.91	-
Alkalinity (Lab)	mg/L	0.5	59.8	57.6	4%	46.6	47	1%	47.4	46.9	1%	44.6	43.8	2%
Dissolved Metals														
Aluminum: Dissolved	mg/L	0.001	0.0028	0.0028	-	0.00861	0.00877	2%	0.0169	0.0129	27%	0.013	0.0123	6%
Antimony: Dissolved	mg/L	0.0002	0.00003	0.00003	-	0.000022	0.000022	-	0.000026	0.000021	-	0.000027	0.000025	-
Arsenic: Dissolved	mg/L	0.0002	0.00017	0.00015	-	0.00145	0.00158	9%	0.00153	0.00162	6%	0.00137	0.00141	3%
Barium: Dissolved	mg/L	0.0002	0.00188	0.00167	12%	0.00225	0.00222	1%	0.00198	0.00179	10%	0.0018	0.00165	9%
Beryllium: Dissolved	mg/L	0.0002	<0.00001	<0.00001	-	<0.00001	<0.00001	-	<0.000010	<0.000010	-	<0.000010	<0.000010	-
Bismuth: Dissolved	mg/L	0.0002	<0.000005	<0.000005	-	<0.000005	<0.000005	-	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	-
Boron: Dissolved	mg/L	0.01	<0.05	<0.05	-	<0.05	<0.05	-	<0.050	<0.050	-	<0.050	<0.050	-
Cadmium: Dissolved	mg/L	0.00001	<0.000005	0.000005	-	<0.000005	<0.000005	-	0.000006	<0.0000050	-	0.000012	<0.0000050	-
Calcium: Dissolved	mg/L	0.01	25.8	26.4	2%	17.9	18.2	2%	16.9	17.1	1%	13.3	13.5	1%
Chromium: Dissolved	mg/L	0.0002	0.0005	0.0005	-	0.00148	0.00143	3%	0.00138	0.00145	5%	0.00066	0.00062	-
Cobalt: Dissolved	mg/L	0.0002	0.000018	0.000018	-	0.0000051	0.0000069	-	0.000007	<0.0000050	-	0.000006	<0.0000050	-
Copper: Dissolved	mg/L	0.000005	<0.00005	<0.00005	-	0.000062	0.000078	23%	0.000179	0.000159	12%	0.000521	0.000204	**87%**
Iron: Dissolved (Lab)	mg/L	0.00005	<0.001	0.001	-	0.0031	0.003	3%	0.0115	0.0104	10%	0.0081	0.0068	17%
Lead: Dissolved	mg/L	0.0002	<0.000005	0.000009	-	<0.000005	<0.000005	-	0.000015	<0.0000050	-	0.00001	0.000008	-
Lithium: Dissolved	mg/L	0.0002	<0.0005	<0.0005	-	<0.0005	<0.0005	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
Magnesium: Dissolved	mg/L	0.005	4.43	4.43	0%	3.29	3.13	5%	2.96	2.98	1%	2.67	2.56	4%
Manganese: Dissolved	mg/L	0.0001	0.00252	0.00248	2%	0.000486	0.00046	-	0.000227	0.000136	-	0.000131	0.000079	-
Mercury: Dissolved	mg/L	0.00002	< 0.00001	< 0.00001	-	<0.00001	<0.00001	-	<0.000010	0.000015	-	<0.000010	<0.000010	-
Molybdenum: Dissolved	mg/L	0.0001	0.00008	0.00007	-	0.000095	0.000121	-	0.000128	0.000123	-	0.00011	0.000086	-
Nickel: Dissolved	mg/L	0.0005	0.00006	0.0001	-	0.000057	0.000539	-	0.000071	0.000042	-	0.000241	0.000054	-
Potassium: Dissolved	mg/L	0.01	0.0606	0.0486	-	0.8	0.79	1%	0.742	0.736	1%	0.977	0.954	2%
Selenium: Dissolved	mg/L	0.0002	0.00018	0.00018	-	0.000235	0.000218	-	0.000187	0.000231	-	0.000131	0.000277	-
Silicon: Dissolved	mg/L	0.05	4.4	4.5	2%	5.99	5.96	1%	5.97	6.02	1%	4.97	5.13	3%
Silver: Dissolved	mg/L	0.00005	<0.000005	<0.000005	-	<0.000005	<0.000005	-	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	-
Sodium: Dissolved	mg/L	0.005	1.61	1.61	0%	2.67	2.57	4%	2.42	2.4	1%	2.24	2.1	6%
Strontium: Dissolved	mg/L	0.0001	0.0475	0.0474	0%	0.033	0.033	0%	0.0318	0.0315	1%	0.0247	0.0243	2%
Sulphur: Dissolved	mg/L	0.5	<10	<10	-	<15	<15	-	<10	<10	-	<3.0	<3.0	-
Thallium: Dissolved	mg/L	0.00002	<0.000002	<0.000002	-	0.0000026	0.000003	-	0.000002	0.000002	-	0.000002	0.000002	-
Tin: Dissolved	mg/L	0.0002	<0.0002	<0.0002	-	<0.0002	<0.0002	-	<0.00020	<0.00020	-	0.00029	<0.00020	-
Titanium: Dissolved	mg/L	0.0002	<0.0005	<0.0005	-	<0.0005	<0.0005	-	<0.00050	<0.00050	-	<0.00050	0.0005	-
Uranium: Dissolved	mg/L	0.00005	0.000059	0.000054	-	0.000195	0.00019	-	0.000203	0.000207	-	0.000128	0.000131	-
Vanadium: Dissolved	mg/L	0.0001	0.003	0.0029	3%	0.013	0.0131	1%	0.0142	0.0142	0%	0.0149	0.0146	2%
Zinc: Dissolved	mg/L	0.0001	0.0002	0.0003	-	0.0008	0.00031	-	0.00041	<0.00010	-	0.00078	0.00022	-
Zirconium: Dissolved	mg/L	0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	-	<0.00010	<0.00010	-	<0.00010	<0.00010	-

Notes:

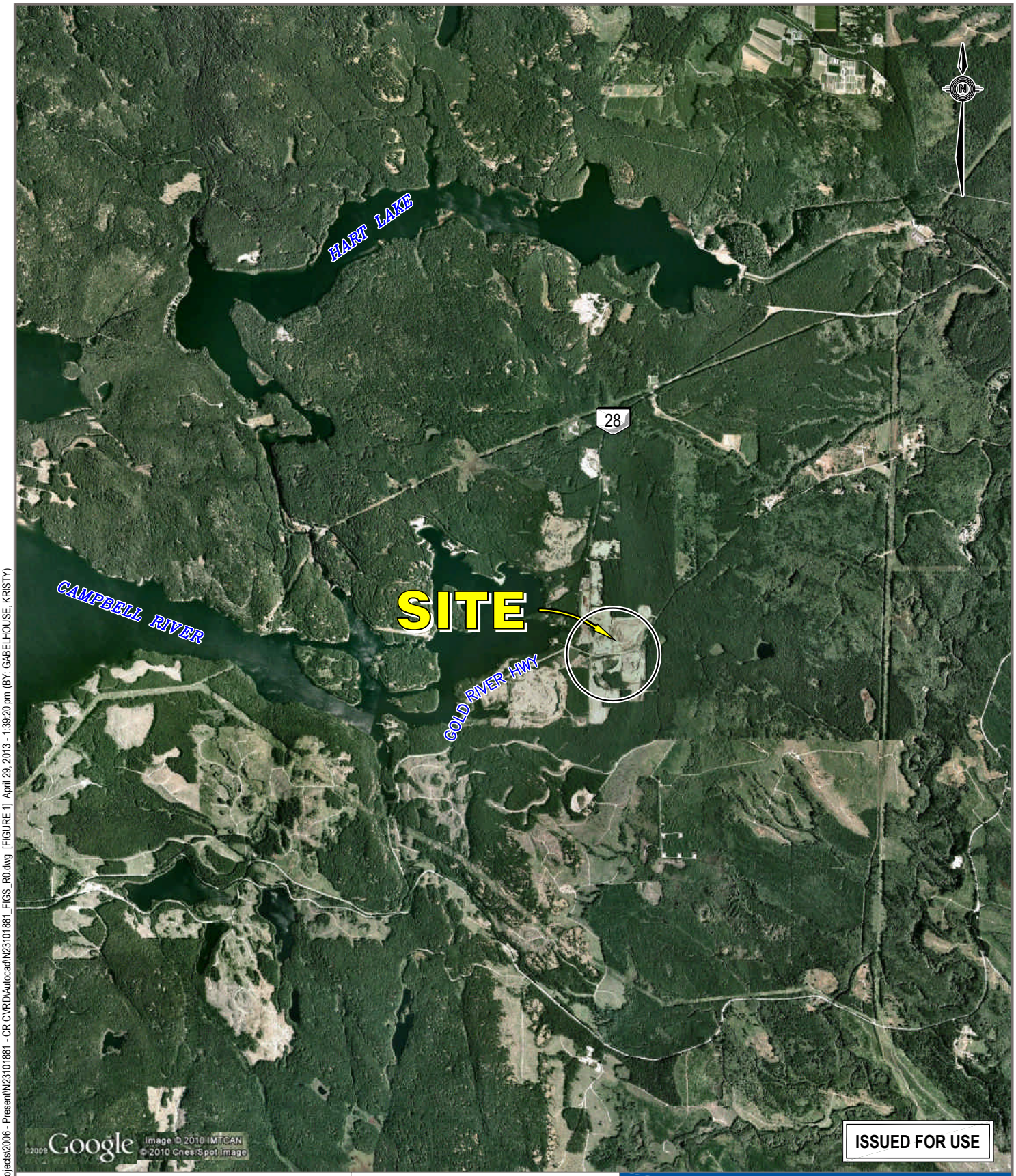
- Relative percent difference (RPD) in concentrations calculated as RPD = {[C2-C1] / [(C1+C2)/2]} x100% where C1, C2 = concentrations of parameters in 1st and 2nd sample respectively.
- RPD cannot be calculated when the concentration of either parameters is less than the method detection limit (MDL) 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 Locations
Figure 3	Groundwater Elevation Contour Map, May 2012
Figure 4	Groundwater Elevation Contour Map, December 2012
Figure 5	2012 Groundwater Metal Analytical Results
Figure 6	Electrical Conductivity Distribution in Groundwater, May 2012
Figure 7	Electrical Conductivity Distribution in Groundwater, December 2012
Figure 8	Chloride Distribution in Groundwater, December 2012
Figure 9	Ammonia Distribution in Groundwater, December 2012



SCALE 1:50,000

0.5 0 0.5 1.0 2.0km

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Comox Valley Regional District

2012 GROUNDWATER MONITORING
CAMPBELL RIVER WASTE MANAGEMENT CENTRE, BC

SITE LOCATION PLAN

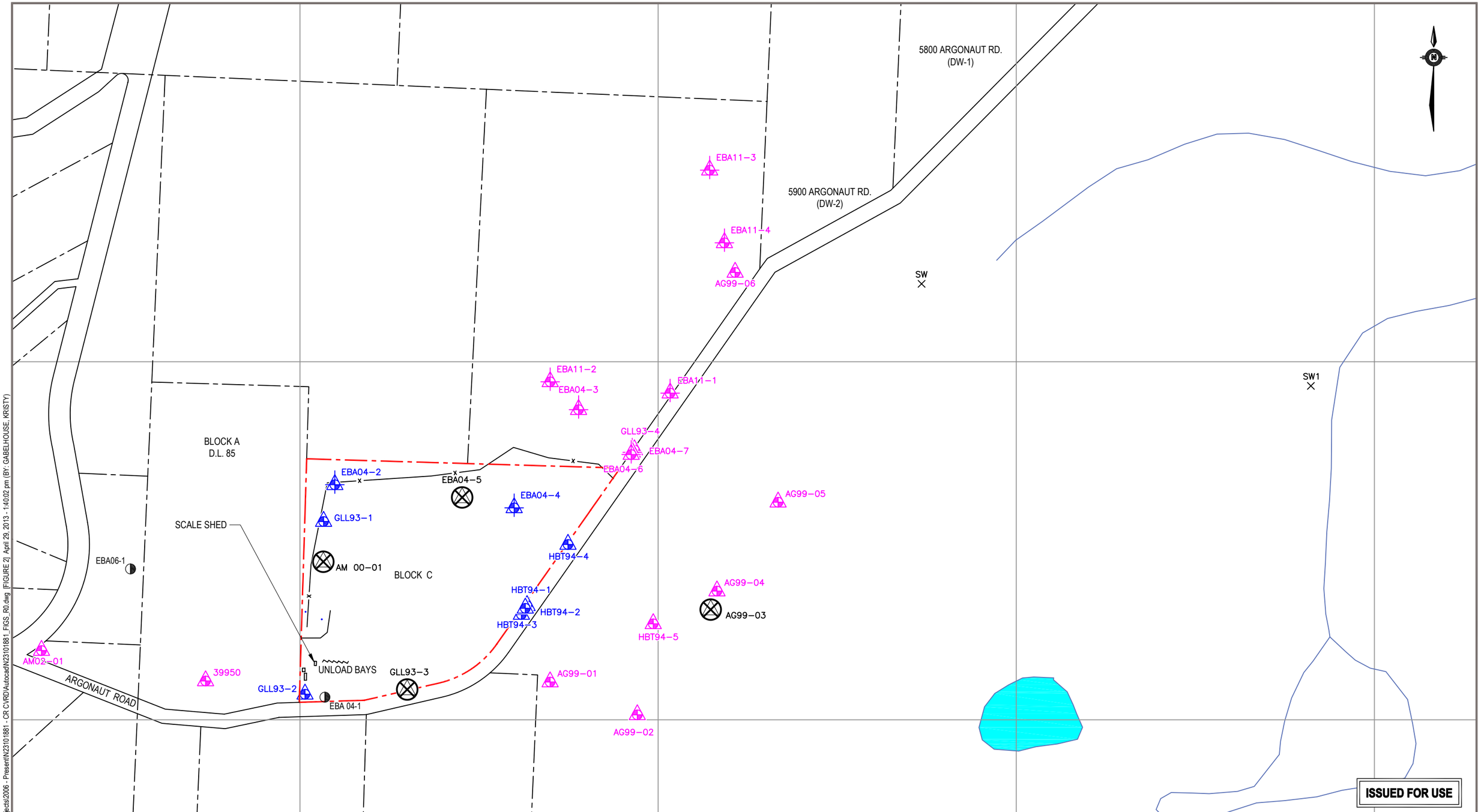
eba
A TETRA TECH COMPANY

PROJECT NO.	DWN	CKD	REV
N23101881	LM	KG	0

OFFICE	DATE
NANAIMO	March 27, 2013

Figure 1

\\eba.local\corp\Nanaimo\Environmental\N2311\Projects\2006 - Present\N23101881 - CR CVRD\Autocad\N23101881_FIGS_R0.dwg [FIGURE 1] April 29, 2013 - 1:39:20 pm (BY: GABELHOUSE, KRISTY)



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

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Comox Valley Regional District

2012 GROUNDWATER MONITORING
CAMPBELL RIVER WASTE MANAGEMENT CENTRE, BC

MONITORING WELL LOCATIONS

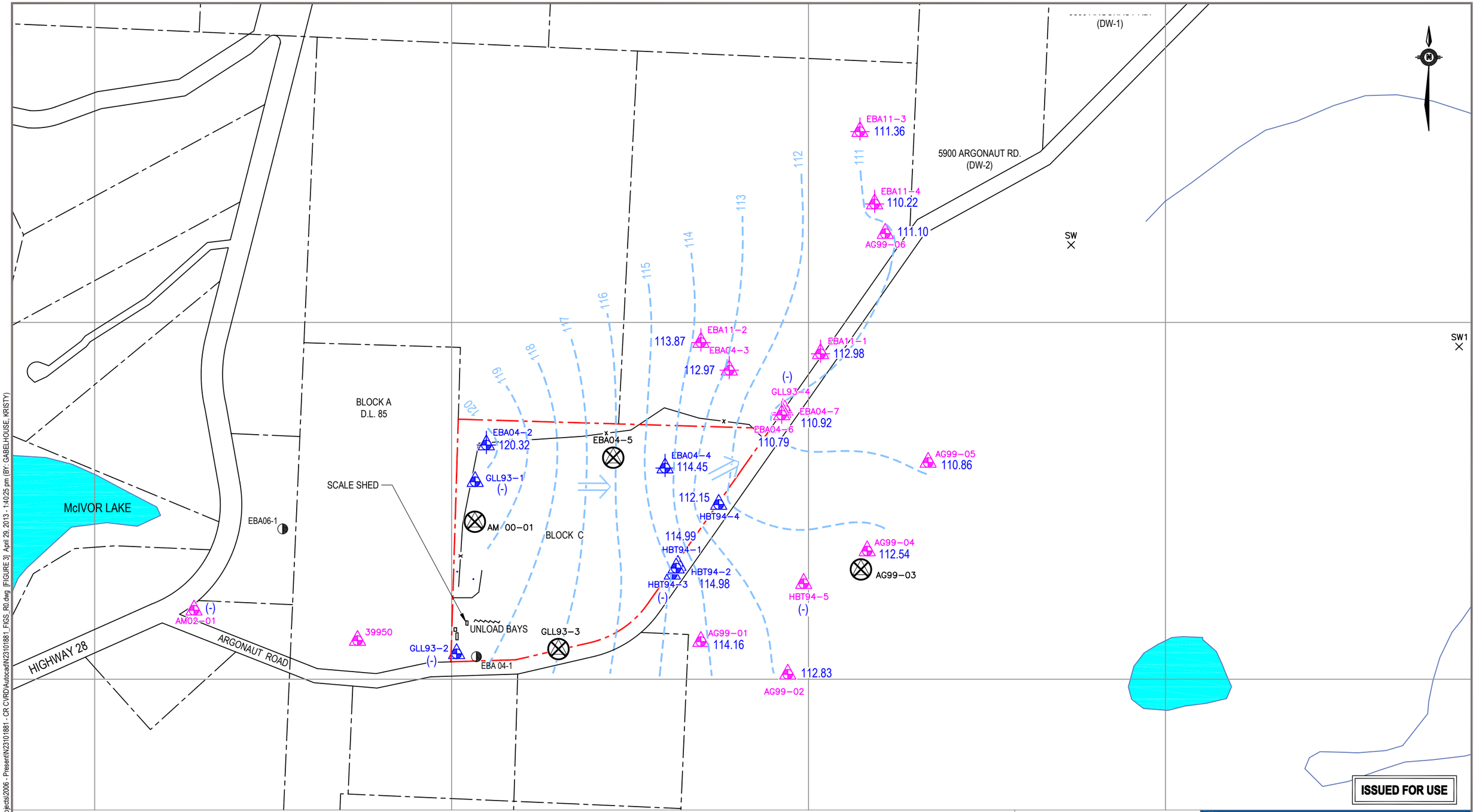
eba A TETRA TECH COMPANY

PROJECT NO.	DWN	CKD	REV
N23101881	LM	KG	0

OFFICE	DATE
NANAIMO	March 27, 2013

Figure 2

\\eba.local\corp\Nanaimo\Environmental\N2310\Projects\2006 - Present\N23101881 - CR CVRD\Autocad\N23101881_FIGS_R0.dwg [FIGURE 2] April 29, 2013 - 1:40:02 pm (BY: GABELHOUSE, KRISTY)



ISSUED FOR USE

\\eba.local\corp\Nanaimo\Environmental\N2319\Projects\2006 - Present\N23101881 - CR CVRD\Autocad\N23101881_FIGS_R0.dwg, [FIGURE 3], April 29, 2013 - 1:40:25 pm (BY: GABELHOUSE, KRISTY)

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
- 112.83 Groundwater elevation, measured May 2012 (meters above sea level)
- (-) Well was dry
- Inferred groundwater contour (meters above sea level)
- Inferred groundwater flow direction

CLIENT

Comox Valley Regional District

2012 GROUNDWATER MONITORING
CAMPBELL RIVER WASTE MANAGEMENT CENTRE, BC

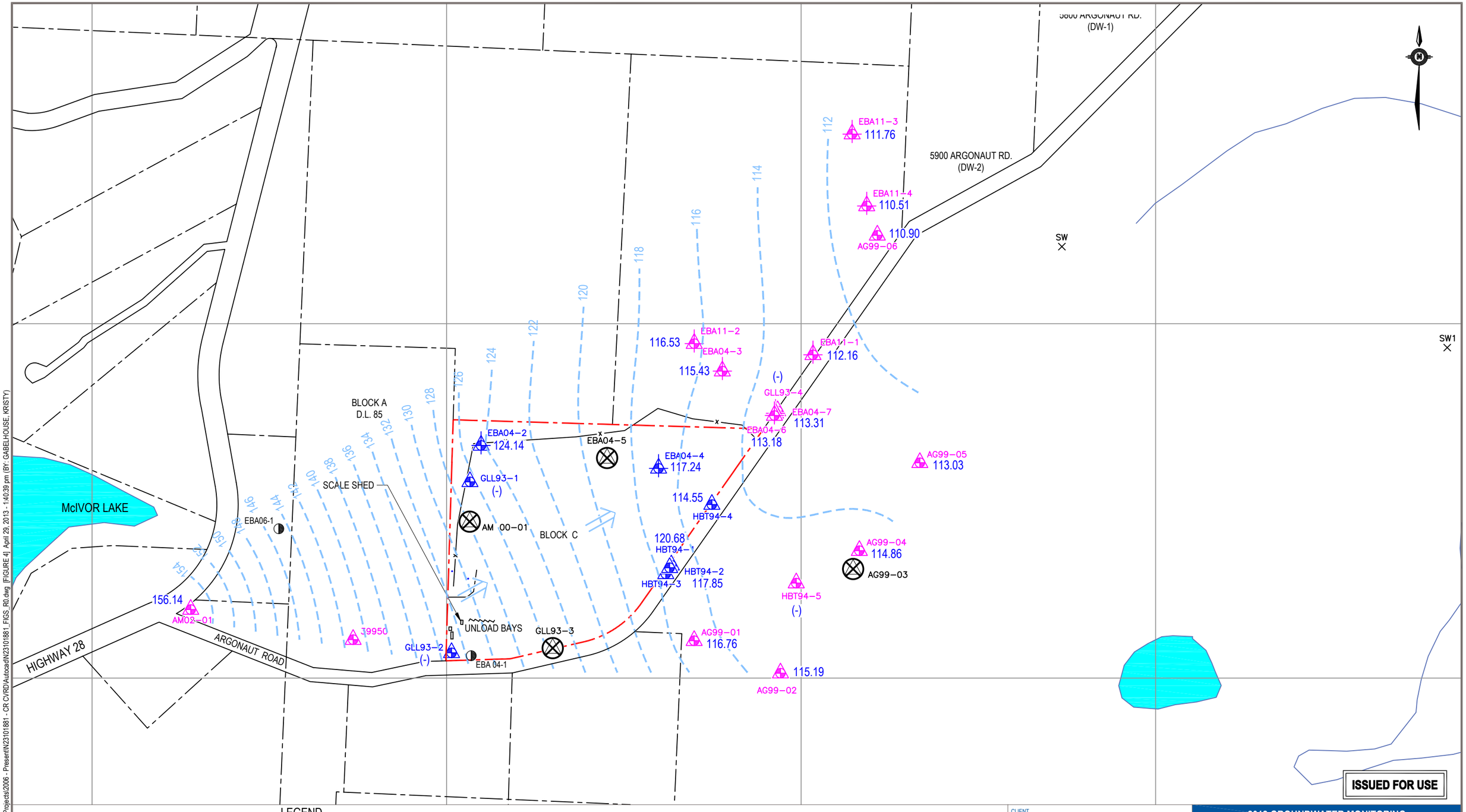
GROUNDWATER ELEVATION CONTOUR MAP - MAY 2012

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PROJECT NO.	DWN	CKD	REV
N23101881	LM	KG	0

OFFICE	DATE
NANAIMO	March 27, 2013

Figure 3



\\eba.local\comp\Nanaimo\Environmental\N231\Projects\2006 - Present\N23101881 - CR CVRD\Autocad\N23101881_FIGS_R0.dwg [FIGURE 4] April 29, 2013 - 1:40:39 pm (BY: GABELHOUSE, KRISTY)

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
- 115.19 Groundwater elevation, measured December 2012 (meters above sea level)
- (-) Well was dry
- Inferred groundwater contour (meters above sea level)
- Inferred groundwater flow direction

CLIENT

Comox Valley Regional District

2012 GROUNDWATER MONITORING
CAMPBELL RIVER WASTE MANAGEMENT CENTRE, BC

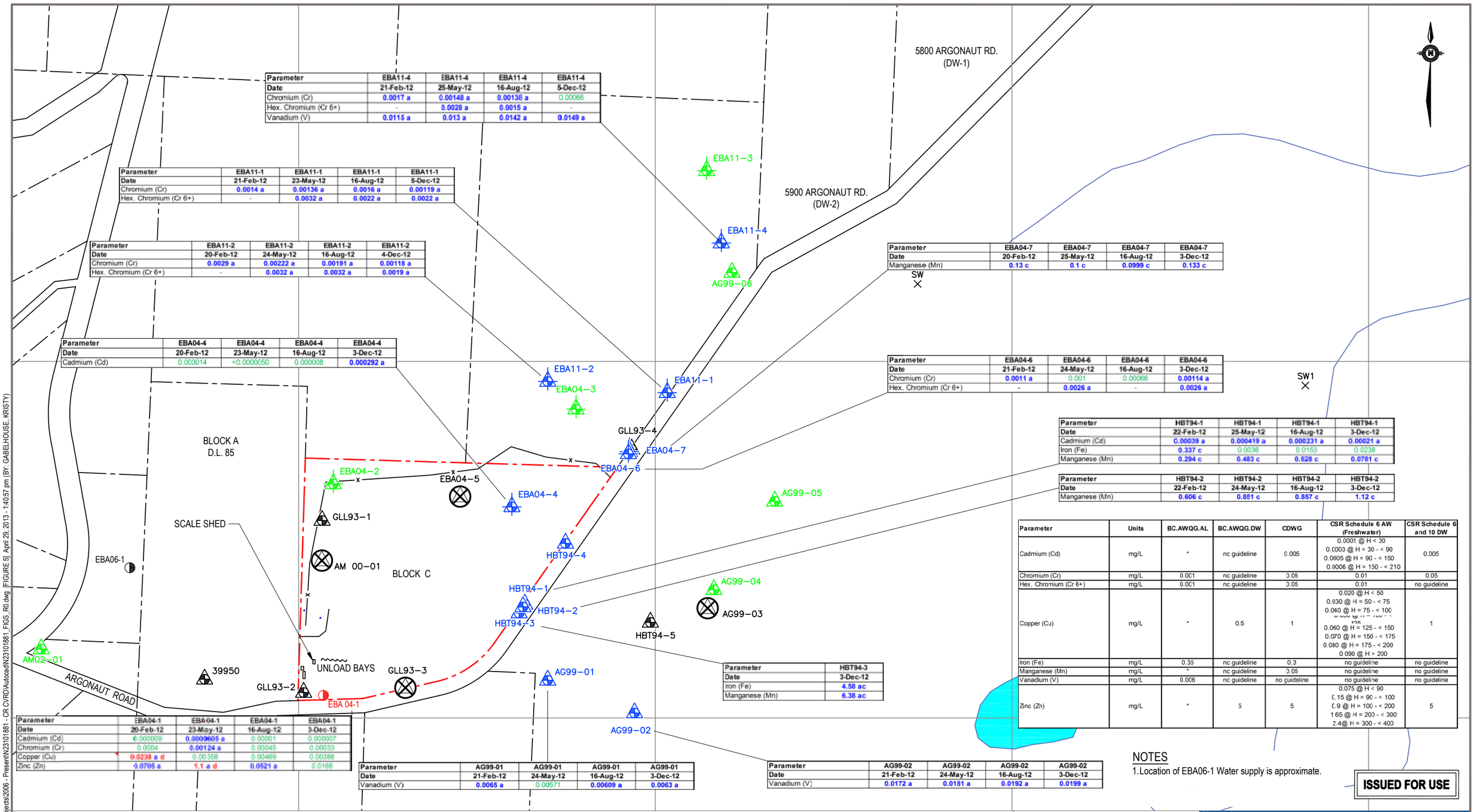
GROUNDWATER ELEVATION CONTOUR MAP - DECEMBER 2012

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PROJECT NO.	DWN	CKD	REV
N23101881	LM	KG	0

OFFICE: NANAIMO
DATE: March 27, 2013

Figure 4



Parameter	EBA11-4	EBA11-4	EBA11-4	EBA11-4
Date	21-Feb-12	25-May-12	16-Aug-12	5-Dec-12
Chromium (Cr)	0.0017 a	0.00148 a	0.00138 a	0.00066
Hex. Chromium (Cr 6+)	-	0.0028 a	0.0015 a	-
Vanadium (V)	0.0115 a	0.013 a	0.0142 a	0.0149 a

Parameter	EBA11-1	EBA11-1	EBA11-1	EBA11-1
Date	21-Feb-12	23-May-12	16-Aug-12	5-Dec-12
Chromium (Cr)	0.0014 a	0.00136 a	0.0016 a	0.00119 a
Hex. Chromium (Cr 6+)	-	0.0032 a	0.0022 a	0.0022 a

Parameter	EBA11-2	EBA11-2	EBA11-2	EBA11-2
Date	20-Feb-12	24-May-12	16-Aug-12	4-Dec-12
Chromium (Cr)	0.0029 a	0.00222 a	0.00191 a	0.00118 a
Hex. Chromium (Cr 6+)	-	0.0032 a	0.0032 a	0.0019 a

Parameter	EBA04-4	EBA04-4	EBA04-4	EBA04-4
Date	20-Feb-12	23-May-12	16-Aug-12	3-Dec-12
Cadmium (Cd)	0.000014	<0.0000050	0.000008	0.000292 a

Parameter	EBA04-7	EBA04-7	EBA04-7	EBA04-7
Date	20-Feb-12	25-May-12	16-Aug-12	3-Dec-12
Manganese (Mn)	0.13 c	0.1 c	0.0999 c	0.133 c

Parameter	EBA04-6	EBA04-6	EBA04-6	EBA04-6
Date	21-Feb-12	24-May-12	16-Aug-12	3-Dec-12
Chromium (Cr)	0.0011 a	0.001	0.00066	0.00114 a
Hex. Chromium (Cr 6+)	-	0.0026 a	-	0.0026 a

Parameter	HBT94-1	HBT94-1	HBT94-1	HBT94-1
Date	22-Feb-12	25-May-12	16-Aug-12	3-Dec-12
Cadmium (Cd)	0.00039 a	0.000419 a	0.000231 a	0.00021 a
Iron (Fe)	0.337 c	0.0036	0.0153	0.0238
Manganese (Mn)	0.294 c	0.483 c	0.528 c	0.0781 c

Parameter	HBT94-2	HBT94-2	HBT94-2	HBT94-2
Date	22-Feb-12	24-May-12	16-Aug-12	3-Dec-12
Manganese (Mn)	0.606 c	0.851 c	0.857 c	1.12 c

Parameter	HBT94-3
Date	3-Dec-12
Iron (Fe)	4.58 ac
Manganese (Mn)	6.38 ac

Parameter	EBA04-1	EBA04-1	EBA04-1	EBA04-1
Date	20-Feb-12	23-May-12	16-Aug-12	3-Dec-12
Cadmium (Cd)	0.000009	0.0000605 a	0.00001	0.000007
Chromium (Cr)	0.0004	0.00124 a	0.00045	0.00033
Copper (Cu)	0.0238 a d	0.00358	0.00469	0.00388
Zinc (Zn)	0.0705 a	1.1 a d	0.0521 a	0.0168

Parameter	AG99-01	AG99-01	AG99-01	AG99-01
Date	21-Feb-12	24-May-12	16-Aug-12	3-Dec-12
Vanadium (V)	0.0065 a	0.00571	0.00609 a	0.0063 a

Parameter	AG99-02	AG99-02	AG99-02	AG99-02
Date	21-Feb-12	24-May-12	16-Aug-12	3-Dec-12
Vanadium (V)	0.0172 a	0.0181 a	0.0192 a	0.0199 a

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	CSR Schedule 6 AW (Freshwater)	CSR Schedule 6 and 10 DW
Cadmium (Cd)	mg/L	*	nc guideline	0.005	0.0001 @ H < 30 0.0003 @ H = 30 - < 90 0.0005 @ H = 90 - < 150 0.0006 @ H = 150 - < 210	0.005
Chromium (Cr)	mg/L	0.001	nc guideline	0.05	0.01	0.05
Hex. Chromium (Cr 6+)	mg/L	0.001	nc guideline	0.05	0.01	no guideline
Copper (Cu)	mg/L	*	0.5	1	0.020 @ H < 50 0.030 @ H = 50 - < 75 0.040 @ H = 75 - < 100 0.050 @ H = 100 - < 125 0.060 @ H = 125 - < 150 0.070 @ H = 150 - < 175 0.080 @ H = 175 - < 200 0.090 @ H > 200	1
Iron (Fe)	mg/L	0.35	nc guideline	0.3	no guideline	no guideline
Manganese (Mn)	mg/L	*	nc guideline	0.05	no guideline	no guideline
Vanadium (V)	mg/L	0.006	nc guideline	no guideline	no guideline	no guideline
Zinc (Zn)	mg/L	*	5	5	0.075 @ H < 90 0.15 @ H = 90 - < 100 0.9 @ H = 100 - < 200 1.65 @ H = 200 - < 300 2.4 @ H = 300 - < 400	5

NOTES
1. Location of EBA06-1 Water supply is approximate.

ISSUED FOR USE

LEGEND
- Subject Property
- Water supply
- Monitoring Well
- Wells destroyed / blocked
- Surface water sample location

SCALE 1:5000
50 0 50 100 200m

Indicates concentrations of analysed parameters in groundwater sample collected at this location were less than the BC Approved & Working Water Quality Guidelines (BCAWQG)for protection of aquatic life (AL) and drinking water (DW) (updated September 2011), the Canadian Drinking Water Quality Guidelines (CDWG) (updated December 2010), and the BC Contaminated Sites Regulation (CSR) Aquatic Life (AW) in Freshwater and Drinking Water (DW) use standards (BC Reg. 375/96 includes amendments up to BC Reg. 6/2013, January 24, 2013).

Indicates concentrations of analysed parameters in groundwater sample collected at this location were greater than the BCAWQG for protection of AL and DW and the CDWG, but less than the CSR AW in Freshwater and DW use standards.

Indicates concentrations of analysed parameters in groundwater sample collected at this location were greater than the CSR AW in Freshwater and DW use standards.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the BCAWQG.AL.
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the BCAWQG.DW.
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the CDWQG.
d - Parameter exceeds the CSR AW standard.
e - Parameter exceeds the CSR DW standard.

* - Calculated Guidelines from the BC Approved and Working Water Quality Guidelines, updated September 2011 (where H = Hardness)

NOTES
1. Location of EBA06-1 Water supply is approximate.

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Comox Valley Regional District

2012 GROUNDWATER MONITORING CAMPBELL RIVER WASTE MANAGEMENT CENTRE, BC

2012 GROUNDWATER METAL ANALYTICAL RESULTS

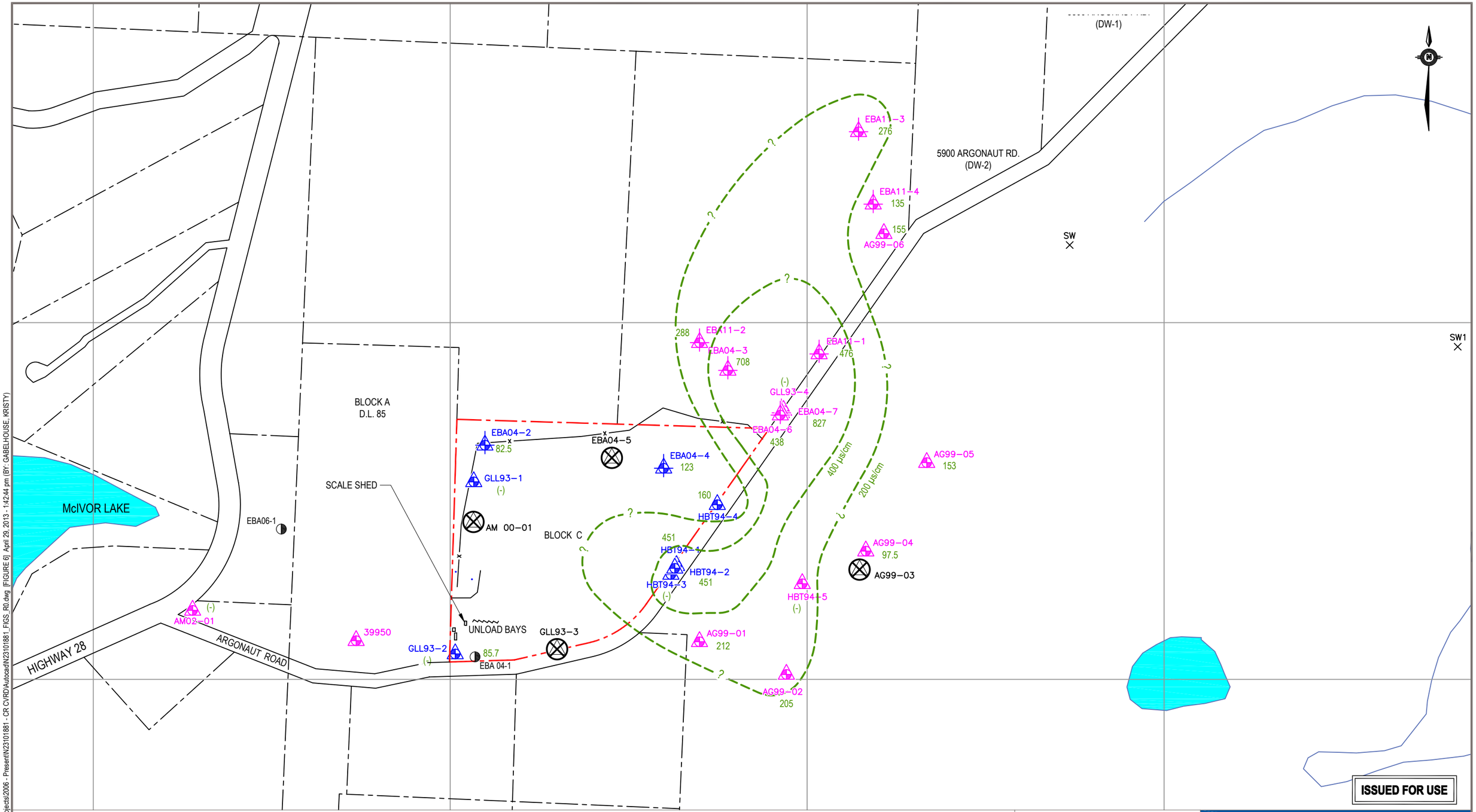
A TETRA TECH COMPANY

PROJECT NO.	DWN	CKD	REV
N23101881	LM	KG	0

OFFICE: NANAIMO
DATE: March 27, 2013

Figure 5

\\eba.local\corp\Nanaimo\Environmental\N231\Projects\2006 - Present\N23101881 - CR CVRD\Autocad\N23101881_FIGS_R0.dwg [FIGURE 5] April 29, 2013 - 1:40:57 pm (BY: GABELHOUSE, KRISTY)



ISSUED FOR USE

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
- 205 Electrical Conductivity (µs/cm) values measured May 2012
- (-) Well was dry
- Interpreted electrical conductivity contours
- inferred electrical conductivity contours

CLIENT

Comox Valley Regional District

2012 GROUNDWATER MONITORING
CAMPBELL RIVER WASTE MANAGEMENT CENTRE, BC

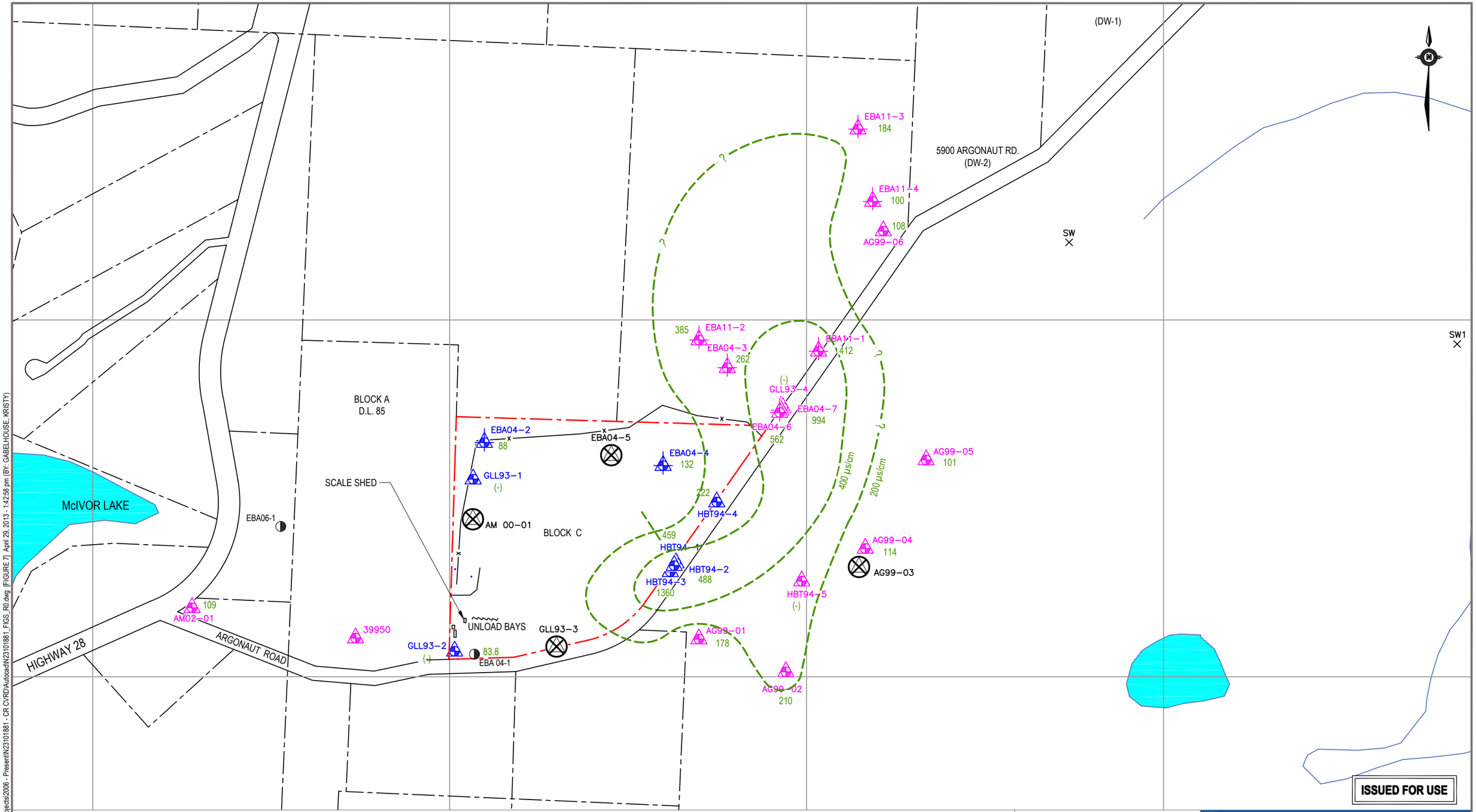
ELECTRICAL CONDUCTIVITY DISTRIBUTION IN GROUNDWATER - MAY 2012

eba A TETRA TECH COMPANY

PROJECT NO.	DWN	CKD	REV
N23101881	LM	KG	0
OFFICE: NANAIMO	DATE: March 27, 2013		

Figure 6

\\eba.local\corp\Nanaimo\Environmental\N2319\Projects\2006 - Present\N23101881 - CR CVRD\Autocad\N23101881_FIGS_R0.dwg, [FIGURE 6], April 29, 2013 - 1:42:44 pm (BY: GABELHOUSE, KRISTY)



ISSUED FOR USE

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
- 210 Electrical Conductivity (µs/cm) values measured December 2012
- (-) Well was dry
- Interpreted electrical conductivity contours
- Inferred electrical conductivity contours

CLIENT

Comox Valley Regional District

2012 GROUNDWATER MONITORING
CAMPBELL RIVER WASTE MANAGEMENT CENTRE, BC

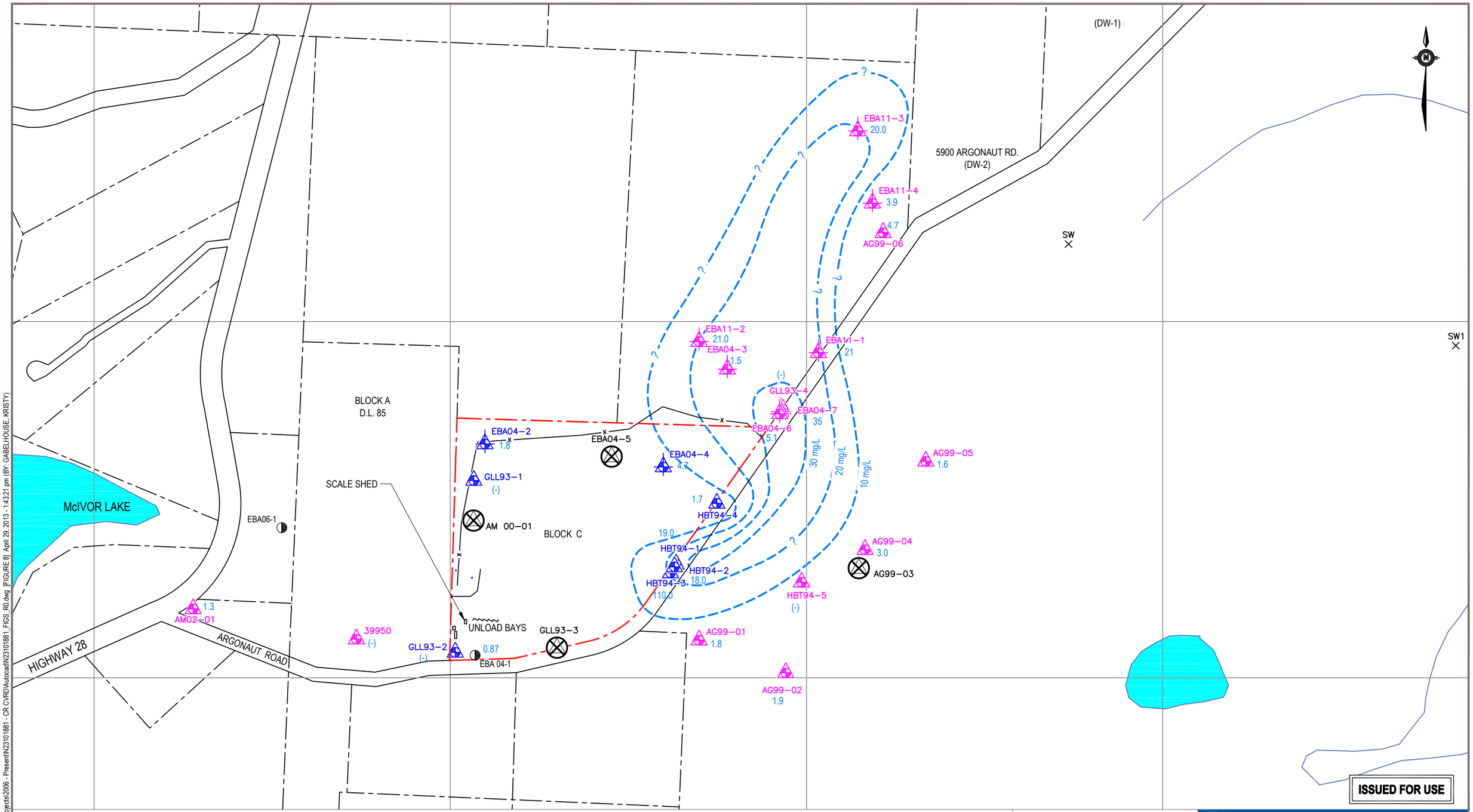
ELECTRICAL CONDUCTIVITY DISTRIBUTION IN GROUNDWATER - DECEMBER 2012

eba A TETRA TECH COMPANY

PROJECT NO.	DWN	CKD	REV
N23101881	LM	KG	0
OFFICE: NANAIMO	DATE: March 27, 2013		

Figure 7

\\eba.local\corp\Nanaimo\Environmental\N23\Projects\2006 - Present\N23101881 - CR CVRD\Autocad\N23101881_FIGS_R0.dwg, [FIGURE 7], April 29, 2013 - 1:42:58 pm (BY: GABELHOUSE, KRISTY)



ISSUED FOR USE

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
- 1.9 Chloride concentration (mg/L) measured December 2012
- (-) Well was dry
- Interpreted contour showing chloride concentrations
- Inferred contour showing chloride concentrations

CLIENT

Comox Valley Regional District

2012 GROUNDWATER MONITORING
CAMPBELL RIVER WASTE MANAGEMENT CENTRE, BC

CHLORIDE DISTRIBUTION IN GROUNDWATER - DECEMBER 2012

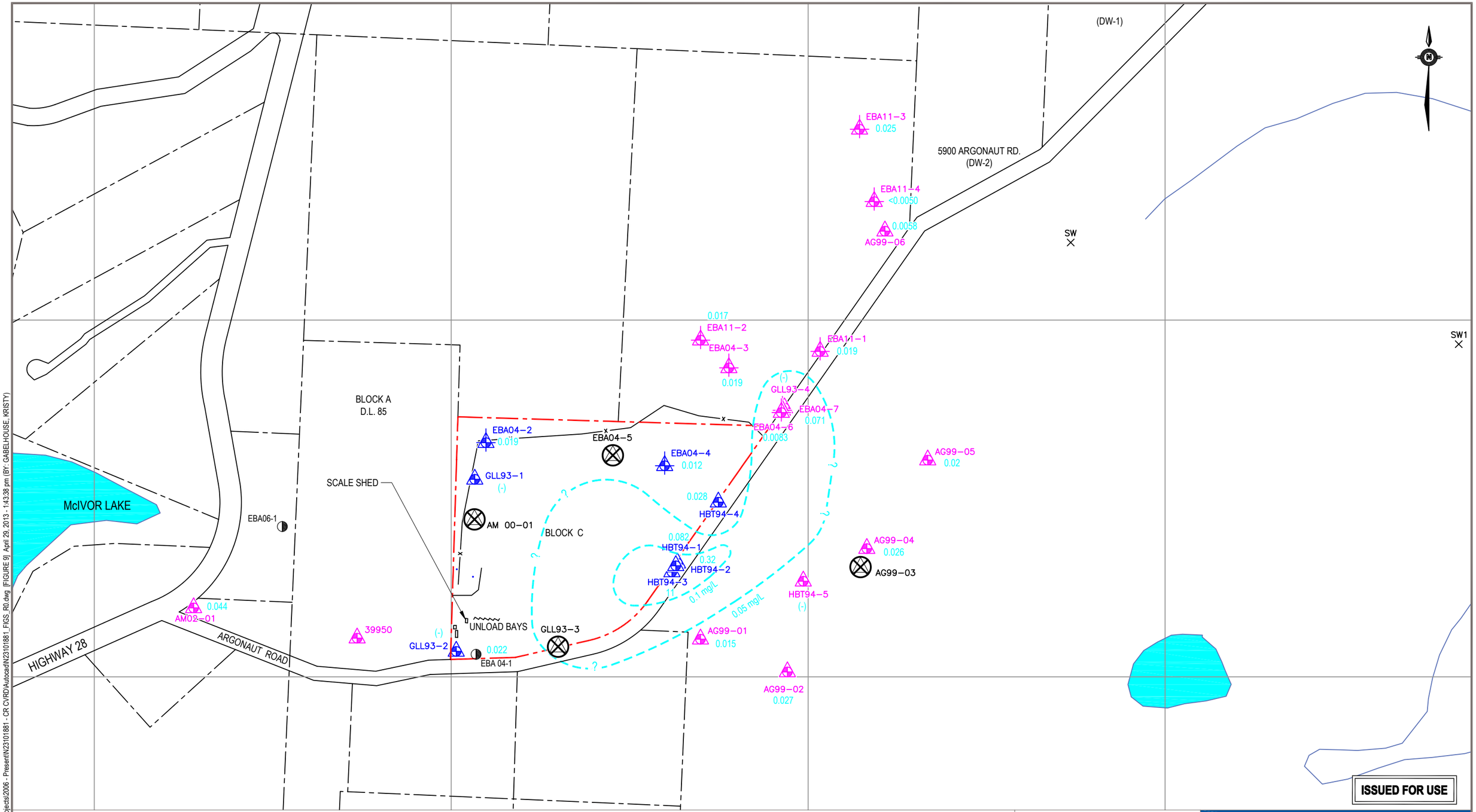
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PROJECT NO.	DWN	CKD	REV
N23101881	LM	KG	0

OFFICE	DATE
NANAIMO	March 27, 2013

Figure 8

\\eba.local\corp\Nanaimo\Environmental\N2301\Projects\2006 - Present\N23101881 - CR CVRD\Autocad\N23101881_FIGS_R0.dwg [FIGURE 8] April 29, 2013 - 1:43:21 pm [BY: GABELHOUSE, KRISTY]



\\eba.local\corp\Nanaimo\Environmental\N23\Projects\2006 - Present\N23101881 - CR CVRD\Autocad\N23101881_FIGS_R0.dwg, [FIGURE 9], April 29, 2013 - 14:38 pm (BY: GABELHOUSE, KRISTY)

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
- 0.027 Ammonia concentration (mg/L) measured December 2012
- (-) Well was dry
- Interpreted contour showing ammonia concentrations
- Inferred contour showing ammonia concentrations

CLIENT

Comox Valley Regional District

2012 GROUNDWATER MONITORING
CAMPBELL RIVER WASTE MANAGEMENT CENTRE, BC

AMMONIA DISTRIBUTION IN GROUNDWATER - DECEMBER 2012

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PROJECT NO.	DWN	CKD	REV
N23101881	LM	KG	0

OFFICE	DATE
NANAIMO	March 27, 2013

Figure 9

APPENDIX A

MOE OPERATIONAL CERTIFICATE MR-02401

CONSULTING ENGINEERS & SCIENTISTS - www.eba.ca

A TETRA TECH COMPANY

BRITISH COLUMBIA

MINISTRY OF WATER, LAND AND AIR PROTECTION

Vancouver Island Region
Environmental Protection
2080-A Labieux 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

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Date Amended:
(most recent)

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Assistant Regional Waste Manager

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.

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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.

Date Issued: DEC 0 2 2003
Date Amended:
(most recent)

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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.

Date Issued: DEC 0 2 2003
Date Amended:
(most recent)

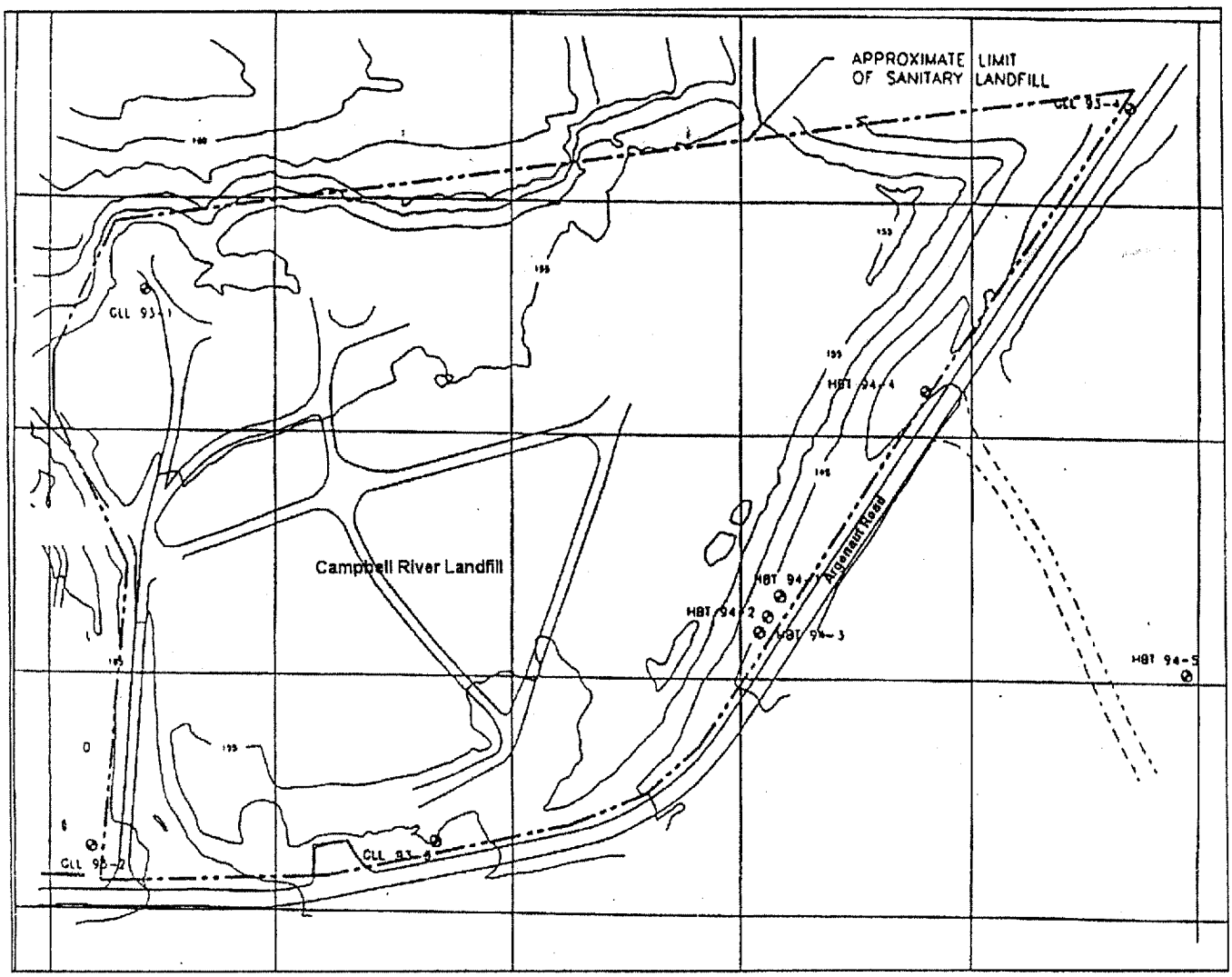
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Assistant Regional Waste Manager

PROVINCE OF
BRITISH COLUMBIA

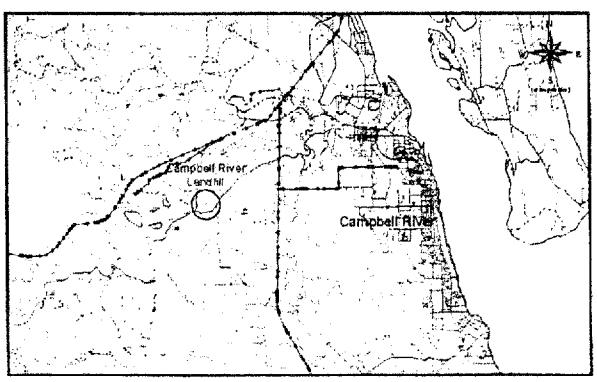
Environmental Protection

SITE PLAN A

N



Location Map



Scale: Not to Scale

Operational Certificate: MR-02401

Date: DEC 0 2 2003

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

APPENDIX B
MONITORING WELL INFORMATION

CONSULTING ENGINEERS & SCIENTISTS - www.eba.ca

A TETRA TECH COMPANY

APPENDIX B1 - SUMMARY OF BOREHOLE AND MONITORING WELL DATA

Well	Year of	Depth	Elevation of	Elevation of	Depth of	Location		Soil Description
No.	Installation	of Borehole	Top of Piezometer (1)	Top of Screen	Screened	Easting	Northing	in Screened Interval
		(m-btop)	(m-asl)	(m-asl)	Interval (m-btop)			
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 DAMAGED
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 DAMAGED
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 DAMAGED
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 DAMAGED
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 Denision 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 Plasic 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

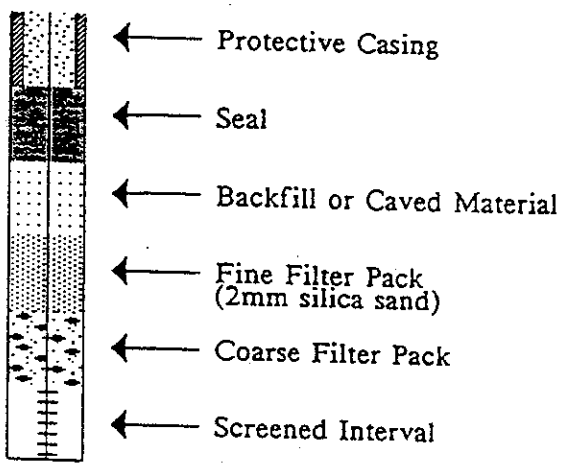
Cohesionless Soils

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

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
1		**SAND** Medium brown fine to medium sand, trace silt, moist, loose.				GS						
2												
3												
4												
5												
6.1 6		**SAND AND GRAVEL** Medium brown fine to medium sand, trace silt, trace fine to medium subrounded gravel, moist, loose.				GS						
7												
8						GS						
9												
10												
11						GS						
12												
13.1 13		**SAND** Medium brown fine to medium sand, trace silt, trace fine to medium subrounded gravel, moist, compact.				GS						
14												
14.6 15		**SAND AND GRAVEL** Medium brown fine to medium sand, some fine to medium subrounded gravel, moist, compact.				GS						
16												
17		- Medium brown fine to medium sand and fine to coarse gravel with cobbles from 16.5 m to 17.1 m.				GS						
18						GS						
19												

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

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
21												
22												
23												
24												
24.8		Saturated at 24.80 m.										
25		SAND Medium brown fine to medium sand and fine to medium subrounded gravel, moist, compact.				GS						
26												
27												
28.0		Borehole sands cave from 28.00 m to 27.17 m.										
28		Borehole terminated at 28.00 m.										

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 NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
1		**SAND AND GRAVEL** Medium brown fine to medium sand, trace silt and fine subrounded gravel, moist, loose.				GS						
5						GS						
12						GS						
15.2 15		**SAND** Medium brown fine to medium sand, trace silt, a few fine pieces of gravel, moist, loose.				GS						
18		- Gravel layer at 18.30 m to 18.50 m.										

Gartner Lee Limited

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

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
21												
22												
23												
24												
25												
26												
27												
28		- Gravel layer at 27.40 m to 28.00 m.										
29												
30.3 30												
31		SAND AND SILT Medium brown fine sand and silt, saturated, dense.				GS						
32												
33												
34		Saturated at 33.75 m.										
35.3 35												
		Borehole terminated at 35.33 m below ground.										

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

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION
1.5		**SAND AND GRAVEL FILL** Grey fine to medium silty sand fill with some fine subrounded gravel, moist, loose.
		SAND AND GRAVEL Grey to dark brown fine to medium silty sand with refuse to 4.6 m, moist, loose.
6.1		**SAND** Dark brown fine to medium sand, some fine to medium gravel, trace silt, moist.
9.1		**SAND AND GRAVEL** Dark brown fine to medium sand and fine to coarse gravel, moist, dense.
12.2		
12.5		**SAND** Dark brown fine to medium sand, moist.
		SAND AND GRAVEL Alternating layers of medium brown, fine to medium sand and fine to coarse gravel and cobbles, moist, dense.

MONITOR DETAILS & NUMBER

SAMPLE: NUMBER | INTERVAL | TYPE | N VALUE | % WATER | % REC | % RQD

N VALUE: 15 30 45 60

WATER CONTENT (%): 10 20 30 40

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

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION
21		
22		
23		
24		
25		
26		
27.0		Saturated below 26.40 m.
27		SAND Dark brown to grey fine to medium sand, trace silt, saturated, compact.
28		
29		
30		
31		
31.8		Borehole terminated at 31.80 m in sand. Stratigraphy logged from auger cuttings.

MONITOR DETAILS & NUMBER

SAMPLE: NUMBER | INTERVAL | TYPE | N VALUE | % WATER | % REC | % RQD

N VALUE: 15 30 45 60

WATER CONTENT (%): 10 20 30 40

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

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
0		**SAND**				GS						
1		Medium brown fine to medium sand, trace silt, moist, loose to compact.										
2												
3												
4												
5												
6												
7												
8												
9						GS						
10												
11												
12												
13						GS						
14												
15												
16												
17		Saturated at 17.1 m.										
18		Changes to grey in colour below 17.5 m.				GS						
19.4		Borehole terminated at 19.4 m in sand.										

AGRA
Earth & Environmental

LOG OF BOREHOLE NO. HBT 94-1

DISTRICT OF CAMPBELL RIVER LANDFILL. ARGONAUT ROAD
1994 HYDROGEOLOGIC INVESTIGATIONS

LOGGED/DWN.

DATE OF INVEST. JUNE 1994

DRILL TYPE BECKER HAMMER

JOB NO. NX30016

BECKER OPEN END BLOW COUNTS

PERCENTAGE (%) SILT .....

PERCENTAGE (%) GRAVEL — — —

DATUM GROUND SURFACE EL. 142.02m

——— ABRUPT CONTACT
GRADATIONAL CONTACT
– – – INTERPRETED CONTACT

DEPTH (ft)	PARTICULAR	GENERAL	U.S.C.	OTHER TESTS (Samples)	SOIL SYMBOL	DEPTH (m)
0	GARBAGE & GRAVEL MIXTURE GRAVEL, compact, sandy, brown, maximum 50 mm.	GRAVEL AND GARBAGE DEBRIS	GAR	BAG		0 m
10	SAND, some silt, fine grained, compact, brown. GRAVEL, sandy, some silt, compact, brown.	GLACIOFLUVIAL DEPOSIT: Interbedded SAND and GRAVEL with horizontal bedded uniform sand, frequently cross bedded with well sorted sandy gravel layers.	SM	BAG		5
20	SAND, well graded, clean, compact, grey, damp.	GLACIOFLUVIAL SAND 1: Interbedded SAND and GRAVEL with horizontal bedded uniform sand, frequently cross bedded with well sorted sandy gravel layers.	GP	BAG		
30	GRAVEL, very sandy, clean, grey, damp, compact, maximum diameter 50 mm.	GLACIOFLUVIAL GRAVEL 1: Coarse sandy gravel, trace to some silt, well graded sandy lens/inclusions up to 7 feet thick encountered becoming cleaner with depth.	SW	BAG		10
40	GRAVEL, very coarse, dry, greyish.		GP	BAG		
50				BAG		15
60	very moist, wet three water zone at 63'		SP	BAG		
70	SAND, silty, compact, grey.	GLACIOFLUVIAL SAND 1: Grey sand with trace to some silt, becoming becoming cleaner with depth, occasional compact.		BAG		20
80	SAND, trace silt, fine grained, grey.		SM	BAG		
90	GRAVEL, silty, dense, very sandy, grey. (trace of coal in return material) - more coarse at 88'. GRAVEL, trace silt, coarse, grey, no odour.	GLACIOFLUVIAL GRAVEL 2: Dense, coarse grained gravel, trace to some silt, sandy lens/inclusions of sand, increasing percentage of sand with depth.	GP	BAG		25
100	- sandy at 100'.			BAG		
110	SAND, trace silt, well grained, compact, grey. - no odour. - gravel lenses, dense. - sand coming up on the outside of inner liner. - standpipe installed in sand zone.	GLACIAL LAKE/MARINE DEPOSITS: SAND with trace Silty Sand seams, trace to some gravel, well graded.	SP	BAG		30
120		Standpipe piezometer (2" dia) Measured Hydraulic Conductivity -Approximately 2.6E-7 cm/s		BAG		35
130				BAG		

Piezometric Surface Sept 94
Piezometric Surface July 94

PIEZOMETER INSTALLATION
PEA GRAVEL
CEMENT GROUT
BENTONITE

AGRA
Earth & Environmental

LOG OF BOREHOLE NO HBT 94-2

DISTRICT OF CAMPBELL RIVER LANDFILL, ARGONAUT ROAD
1994 HYDROGEOLOGIC INVESTIGATIONS

LOGGED/DWN.

DATE OF INVEST. JUNE 1994

JOB NO. NX30015

DRILL TYPE BECKER HAMMER

BECKER OPEN END BLOW COUNTS

PERCENTAGE (%) SILT

PERCENTAGE (%) GRAVEL

DEPTH (ft)

SOIL DESCRIPTION

DATUM GROUND SURFACE EL. 145.5m

ABRUPT CONTACT
GRADATIONAL CONTACT
INTERPRETED CONTACT

PARTICULAR	GENERAL	U.S.C.	OTHER TESTS (Samples)	SOIL SYMBOL
GRAVEL & GARBAGE DEBRIS - strong odour - leaf fill - shoes - rubber debris	GRAVEL AND GARBAGE DEBRIS		BAG BAG BAG	
SAND, wel grained, trace silt, brown, moist.	GLACIOFLUVIAL DEPOSIT: Interbedded SAND and GRAVEL, with horizontal bedded uniform sand, frequently cross bedded with well sorted sandy gravel layers.	SM	BAG	
	GLACIOFLUVIAL SAND 1 Fine grained, dense to compact sand, trace to some silt, interbedded with seams / layers of gravel / silt.	SM	BAG	
- more coarse at 38'.				
GRAVEL, some silt, moist, very sandy, brown.	GLACIOFLUVIAL GRAVEL 1: Coarse sandy gravel trace to some silt, well grained sandy lens/inclusions up to 7 feet thick encountered.	GP	BAG BAG	
- grey at 40' - very coarse gravel sand. - more moist.			BAG	
SAND, some silt, coarse grained, moist, compact, grey - water table at 62'	GLACIOFLUVIAL SAND 1 trace to some silt, becoming cleaner with depth, occasional lens of gravel/pebbles, compact to dense.	SP	BAG	
SAND, wel grained, grey, compact, moist, occasional pebble upto 20 cm dia.			BAG BAG	
GRAVEL, poorly graded, some silt, dense, brownish, max. 50 mm in dia.	GLACIOFLUVIAL GRAVEL 2: Interbedded/layers of dense coarse gravel/silt with trace to some sand, increasing percentage of sand with depth.	GP	BAG BAG	
- dense gravel			BAG	
SAND, some silt, compact to dense, fine grained, greyish, some #4.	GLACIAL LAKE/MARINE DEPOSITS: SAND with trace Silty Sand seams, becoming more fine grained with depth.	SP	BAG BAG BAG BAG BAG	
- saturated			BAG BAG BAG	
End of Hole 145'				

Piezometric surface Sept 94

Piezometric Surface Aug 94

Standpipe piezometer (2" dia)
Measured Hydraulic Conductivity
Approximately 2.5E-6 cm/s

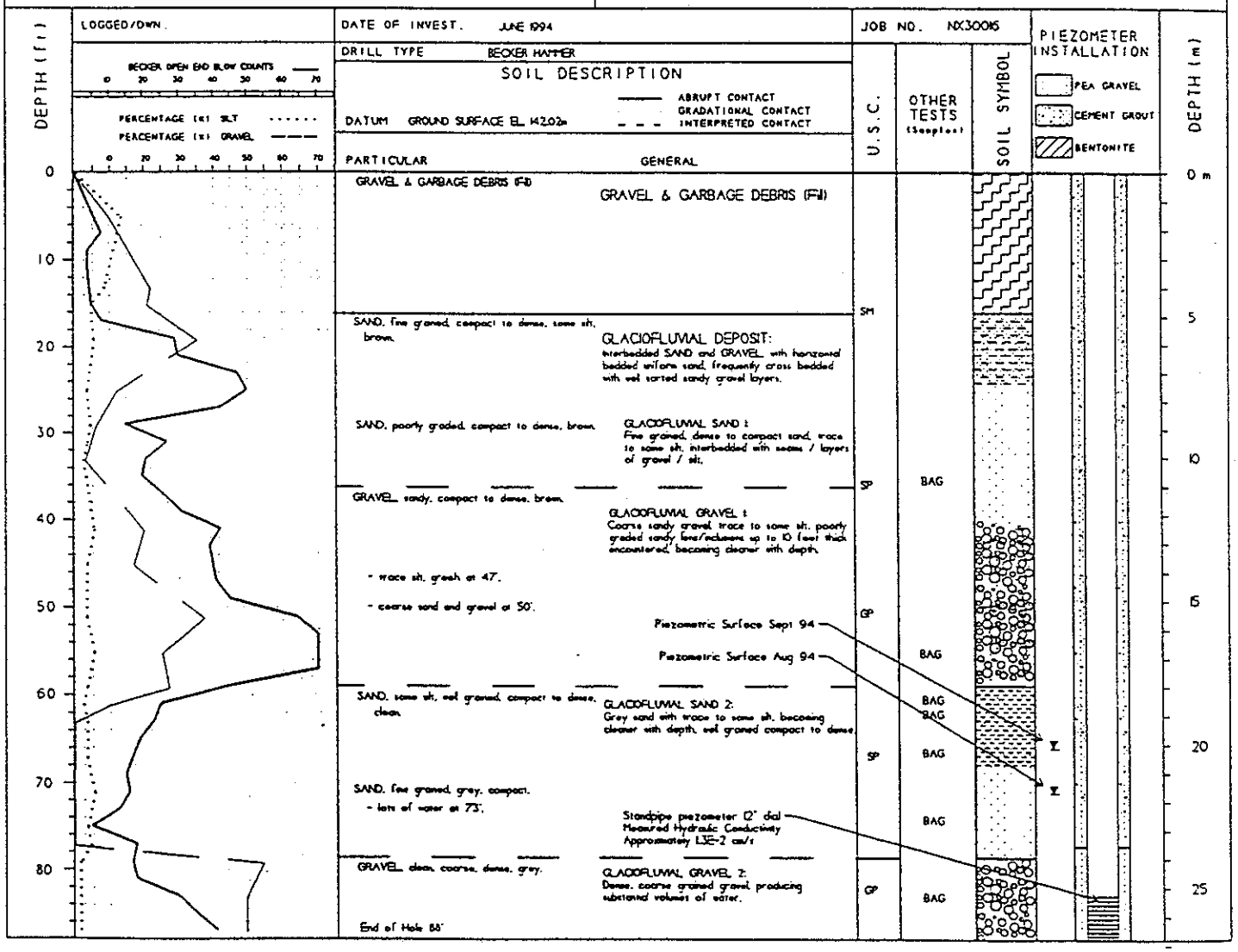
PIEZOMETER INSTALLATION
- PEA GRAVEL
- CEMENT GROUT
- BENTONITE

DEPTH (m)

AGRA
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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

LOGGED/DWN.

DATE OF INVEST. JUNE 1994

JOB NO. NX30016

DRILL TYPE BECKER HAMMER

DATUM GROUND SURFACE EL. 139.9m

BECKER OPEN END BLOW COUNTS

PERCENTAGE (%) SLT

PERCENTAGE (%) GRAVEL

SOIL DESCRIPTION

ABRUPT CONTACT
GRADATIONAL CONTACT
INTERPRETED CONTACT

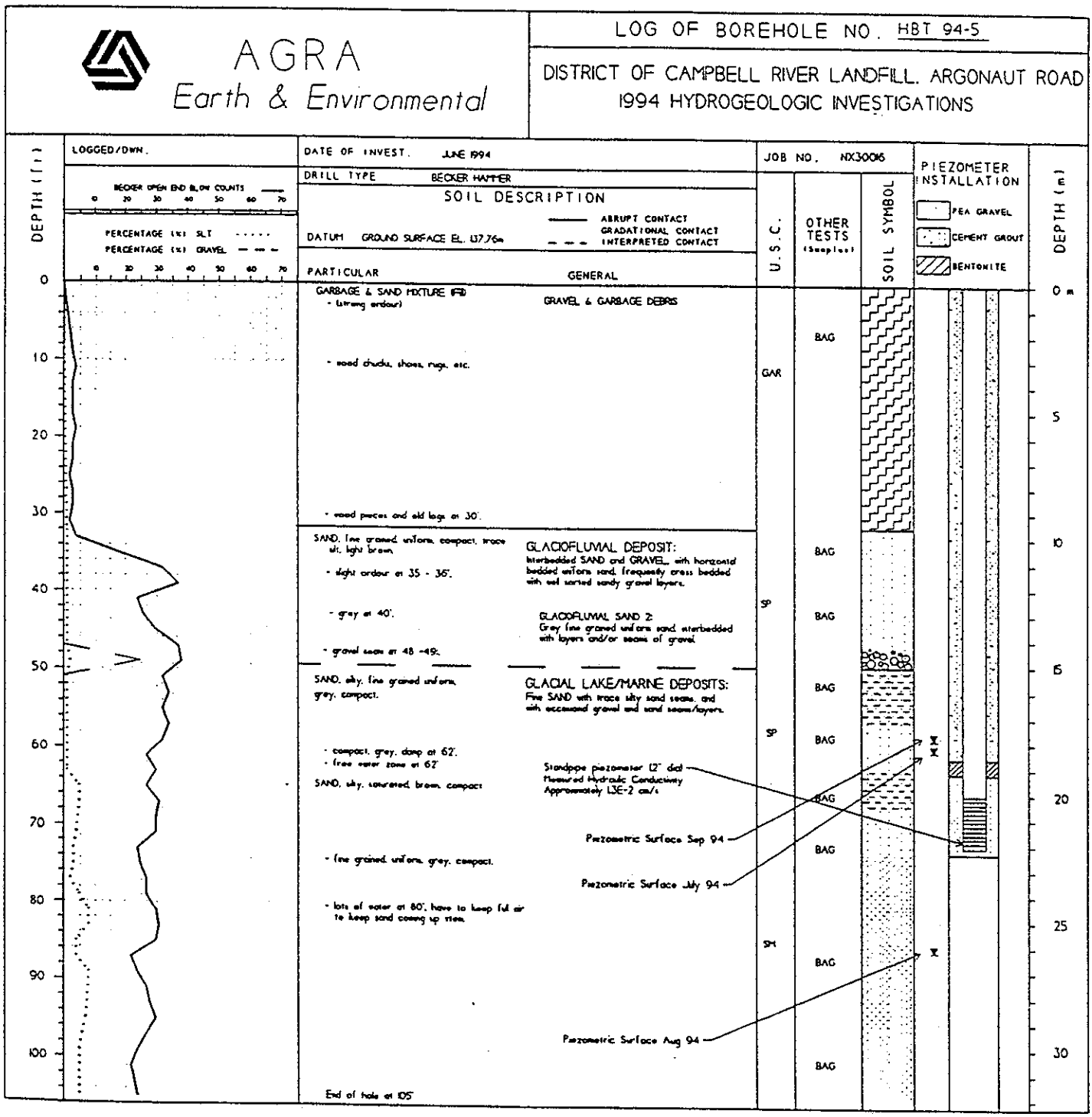
DEPTH (ft)	PARTICULAR	GENERAL	U.S.C.	OTHER TESTS (Samples)	SOIL SYMBOL
0	GRAVEL & GARBAGE (FILL) - (strong odour)	GRAVEL & GARBAGE DEBRIS			
	SAND, well grained, compact, rusty brown. - auger refusal at 6'			BAG	
10	GRAVEL, very sandy, clean, greyish, compact to dense.		SM	BAG	
			GP		
20	SAND, poorly graded, compact, grey.	GLACIOFLUVIAL DEPOSIT: Interbedded SAND and GRAVEL with horizontal bedded and/or cross bedded. Frequently cross bedded with well sorted sandy gravel layers.		BAG	
	- dense layer at 25'			BAG	
30		GLACIOFLUVIAL SAND 1: Grey fine grained sand, interbedded with layers and/or inclusions of silt, dense to compact.			
	- clean, fine grained, light grey at 35'.			BAG	
40			SP	BAG	
50					
	Piezometric Surface Aug 94			BAG	
	- silt layer at 54 - 56.5', light brown.		SM	BAG	
60	SAND, very silty, moist, greyish.			BAG	
	Piezometric Surface July 94				
	- water table at 62'				
70	GRAVEL, clean, some silt, some sand, dense, grey.	GLACIOFLUVIAL GRAVEL 2: Dense, coarse grained gravel, trace to some silt and sand, becoming cleaner and sandier with depth.		BAG	
	- silty gravel at 77'			BAG	
80				BAG	
90			GP		
				BAG	
100				BAG	
	Standpipe piezometer (2" dia) Measured Hydraulic Conductivity Approximately $1.3E-2$ cm/s				
110	- sandier at 109'.			BAG	
120	End of Hole 120'			BAG	

PIEZOMETER INSTALLATION

- PEA GRAVEL
- CEMENT GROUT
- BENTONITE

DEPTH (m)

0 m, 5, 10, 15, 20, 25, 30, 35


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Earth & Environmental
LOG OF BOREHOLE NO. HBT 94-5
DISTRICT OF CAMPBELL RIVER LANDFILL. ARGONAUT ROAD
1994 HYDROGEOLOGIC INVESTIGATIONS
LOGGED/DWN.
DATE OF INVEST. JUNE 1994
DRILL TYPE BECKER HAMMER
DATUM GROUND SURFACE EL. 137.76m
JOB NO. NX30006
SOIL DESCRIPTION
ABRUPT CONTACT
GRADATIONAL CONTACT
INTERPRETED CONTACT
BECKER OPEN END BLOW COUNTS
PERCENTAGE (%) SLT
PERCENTAGE (%) GRAVEL
PARTICULAR
GENERAL
U.S.C.
OTHER TESTS (Sample)
SOIL SYMBOL
PIEZOMETER INSTALLATION
PEA GRAVEL
CEMENT GROUT
BENTONITE
DEPTH (ft)
DEPTH (m)
GARBAGE & SAND MIXTURE (FILL)
- strong ordour
GRAVEL & GARBAGE DEBRIS
- wood chucks, shoes, rugs, etc.
- wood pieces and old logs at 30'.
SAND, fine grained, uniform, compact, trace silt, light brown.
- slight ordour at 35 - 36'.
- grey at 40'.
- gravel seam at 48 -49'.
GLACIOFLUVIAL DEPOSIT:
Interbedded SAND and GRAVEL, with horizontal bedded uniform sand, frequently cross bedded with well sorted sandy gravel layers.
GLACIOFLUVIAL SAND 2:
Grey fine grained uniform sand, interbedded with layers and/or seams of gravel.
SAND, silty, fine grained uniform, grey, compact.
- compact, grey, damp at 62'.
- free water zone at 62'
SAND, silty, saturated, brown, compact
GLACIAL LAKE/MARINE DEPOSITS:
Fine SAND with trace silty sand seams, and with occasional gravel and sand seams/layers.
- fine grained, uniform, grey, compact.
- lots of water at 80', have to keep full air to keep sand coming up stem.
Standpipe piezometer 12" dia.
Measured Hydraulic Conductivity
Approximately 1.3E-2 cm/s
Piezometric Surface Sep 94
Piezometric Surface July 94
Piezometric Surface Aug 94
GAR
SP
SP
SM
BAG
BAG
BAG
BAG
BAG
BAG
BAG
End of hole at 105'
DEPTH (ft)
0
10
20
30
40
50
60
70
80
90
100
DEPTH (m)
0 m
5
10
15
20
25
30

REGIONAL DISTRICT OF COMOX-STRATHCONA	Drilling Contractor: BECK Drilling	BOREHOLE NO: AG99-01
ADDITIONAL MONITORING WELL INSTALLATIC	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 Description	SAMPLE TYPE	RUN NO	Additional Comments
0.0	OL	SAND – medium grained, poorly sorted, moderately oxidized, trace gravel/cobbles up to 100 mm diameter.			
3.0	SP/GP	SAND AND GRAVEL – trace silt, poorly graded, damp.		01	
6.0	SP	SAND – some gravel, trace silt, poorly graded, damp.		02	
9.0	SP/GP	GRAVEL AND SAND – trace silt, poorly graded, damp.		03	
12.0	SP	SAND – trace silt, fine grained, damp.		04	
18.0	ML	SILT – some clay, some fine sand, laminated.		05	
21.0	SP	SAND – trace silt, fine grained, wet.		06	
24.0	SP			07	Cuttings are wet below 23.2 m.
27.0	SP	SAND – some gravel, trace silt.		08	
30.0					

% Fines: 20 40 60 80

% Sand: 20 40 60 80

% Gravel: 20 40 60 80

SLOTTED PIEZOMETER

Depth(ft): 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 55.0 60.0 65. 70. 75. 80. 85 90 95

AGRA Earth & Environmental
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LOGGED BY: JW	COMPLETION DEPTH: 48.5 m
REVIEWED BY: JR	COMPLETE: 17/06/99

00/03/23 04:01Pm (BOREHOLE)

REGIONAL DISTRICT OF COMOX-STRATHCONA	Drilling Contractor: BECK Drilling	BOREHOLE NO: AG99-01
ADDITIONAL MONITORING WELL INSTALLATIO	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 Description	SAMPLE TYPE	RUN NO	Additional Comments
30.0	SP				
31.0		SAND AND SILT – low plastic, wet.		09	
32.0	SM/ML				
33.0					
34.0		SAND – some silt, fine grained, wet.		11	
35.0	SM				
36.0					
37.0		SAND – trace silt, fine grained, wet.		12	
38.0					
39.0					
40.0				13	
41.0	SP				
42.0					
43.0					
44.0					
45.0					
46.0		GRAVEL – little sand, clean, wet, occasional cobbles/cobble fragments up to 120 mm diameter.		14	
47.0	GP				
48.0					
49.0		End of Hole at 48.5 m.			
50.0					
51.0					
52.0					
53.0					
54.0					
55.0					
56.0					
57.0					
58.0					
59.0					
60.0					

■ % Fines ■ 20 40 60 80

◆ % Sand ◆ 20 40 60 80

● % Gravel ● 20 40 60 80

SLOTTED PIEZOMETER

Depth(ft): 100. 105. 110. 115. 120. 125. 130. 135. 140. 145. 150. 155. 160. 165. 170. 175. 180. 185. 190. 195.

AGRA Earth & Environmental
Nanaimo, B.C.

LOGGED BY: JW
REVIEWED BY: JR

COMPLETION DEPTH: 48.5 m
COMPLETE: 17/06/99

00/03/23 04:01Pm (BOREHOLE)

REGIONAL DISTRICT OF COMOX-STRATHCONA	Drilling Contractor: BECK Drilling	BOREHOLE NO: AG99-02
ADDITIONAL MONITORING WELL INSTALLATIO	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
0.0			SAND – silty, cobbles, oxidized, sand is fine grained.			
3.0	SP		SAND – trace silt, fine grained, occasional gravel, damp, poorly graded.		01	
7.0			SAND – some gravel, trace silt, max 100 mm diameter, damp, poorly graded.		02	
10.0			SAND – fine grained, trace silt, damp, poorly graded.		03	
13.0	SP/ML		– silt lenses from 13.7 to 14.9 m.			
15.0			SAND – some gravel, trace silt, damp, poorly graded.		04	
18.0	SP				05	
20.0			SAND – fine to medium grained, trace silt, wet.		06	
23.0	ML		SILT – some fine sand, low plastic, moist, oxidized.		07	
24.0			SAND AND SILT – low plastic, moist.		08	
27.0	ML/SP					Water encountered at 27.7 m depth.
30.0						

■ % Fines ■ 20 40 60 80

◆ % Sand ◆ 20 40 60 80

● % Gravel ● 20 40 60 80

SLOTTED PIEZOMETER

Depth(ft): 0.0, 5.0, 10.0, 15.0, 20.0, 25.0, 30.0, 35.0, 40.0, 45.0, 50.0, 55.0, 60.0, 65.0, 70.0, 75.0, 80.0, 85.0, 90.0, 95.0

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LOGGED BY: JW
REVIEWED BY: JR

COMPLETION DEPTH: 51.51 m
COMPLETE: 18/06/99

00/03/23 04:01PM (BOREHOLE)

REGIONAL DISTRICT OF COMOX-STRATHCONA	Drilling Contractor: BECK Drilling	BOREHOLE NO: AG99-02
ADDITIONAL MONITORING WELL INSTALLATIO.	Method: Becker Hammer	PROJECT NO: NX201360
		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 (20 40 60 80)	SLOTTED PIEZOMETER	Depth(ft)
30.0	SW		SAND – little silt, poorly graded, wet.		09				100.
31.0									
32.0									105.
33.0			SAND – trace silt, fine grained, wet.		10				110.
34.0									
35.0									115.
36.0									
37.0					11	Rapid drill penetration.			120.
38.0									
39.0									125.
40.0									
41.0	SP								130.
42.0									
43.0					12				135.
44.0									
45.0									140.
46.0					13				
47.0									145.
48.0									
49.0					14				150.
50.0	GW		GRAVEL – some sand, some cobbles, clean.						
51.0									155.
52.0			End of Hole at 51.5 m. Well installed.						160.
53.0									
54.0									165.
55.0									
56.0									170.
57.0									
58.0									175.
59.0									
60.0									180.
									185.
									190.
									195.

AGRA Earth & Environmental
Nanaimo, B.C.

LOGGED BY: JW | COMPLETION DEPTH: 51.51 m
REVIEWED BY: JR | COMPLETE: 18/06/99

00/03/23 04:01PM (BOREHOLE)

REGIONAL DISTRICT OF COMOX-STRATHCONA	Drilling Contractor: BECK Drilling	BOREHOLE NO: AG99-03
ADDITIONAL MONITORING WELL INSTALLATIC	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 Description	SAMPLE TYPE	RUN NO	Additional Comments	% Fines / % Sand / % Gravel (20 40 60 80)	SLOTTED PIEZOMETER	Depth(ft)
0.0		SAND – some silt, fine to medium grained sand, oxidized.						0.0
2.0	SM	SAND – some silt, fine grained, damp, grey.		01				5.0
4.0								10.0
5.0	SM/ML	SAND – some silt, fine grained sand, interbedded silt layers up to 40 mm thick, damp, grey.						15.0
6.0		SAND AND SILT – brow-grey, damp.						20.0
8.0	SM			02				25.0
10.0								30.0
11.0		GRAVEL – some sand, trace silt, damp, subrounded to subangular, max diameter 150 mm, poorly graded.						35.0
12.0	GP			03				40.0
14.0		GRAVEL AND SAND – trace silt, cobbles up to 120 mm diameter recovered, poorly graded.		04	Fast penetration with drill.			45.0
15.0								50.0
16.0		SAND AND GRAVEL – trace silt, well rounded, well graded, damp. Coarsening at depth.		05	Wet at 16.8 m bgs.			55.0
18.0	GW							60.0
20.0		GRAVEL – some coarse sand, wet, well graded.		06				65.0
21.0		GRAVEL AND SAND – poorly graded, cobbles up to 150 mm diameter recovered.			Drill penetration rate slower.			70.0
22.0				07				75.0
24.0								80.0
25.0	GP	– poor sample recovery. Recovered material is cobble sized.						85.0
26.0								90.0
27.0		GRAVEL AND SAND – coarse grained sand, cobbles up to 100 mm diameter recovered, poorly graded.		08				95.0
29.0								
30.0								

AGRA Earth & Environmental
Nanaimo, B.C.

LOGGED BY: JR	COMPLETION DEPTH: 53.2 m
REVIEWED BY: JW	COMPLETE: 18/06/99

00/03/23 04:01PM (BOREHOLE)

REGIONAL DISTRICT OF COMOX-STRATHCONA	Drilling Contractor: BECK Drilling	BOREHOLE NO: AG99-03
ADDITIONAL MONITORING WELL INSTALLATIO	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 (20 40 60 80)	SLOTTED PIEZOMETER	Depth(ft)
30.0	GP		– well graded.		09				100.0
31.0									
32.0									105.0
33.0									
34.0									110.0
35.0	GW								
36.0					10				115.0
37.0									
38.0									120.0
39.0									
40.0			– poorly graded.		12				125.0
41.0									
42.0									130.0
43.0			GRAVEL – some cobbles, little sand, poorly graded.		13				
44.0	GP								135.0
45.0									
46.0			– increasing sand content.		14				140.0
47.0									
48.0									145.0
49.0			GRAVEL – some sand, well graded.		15				
50.0									150.0
51.0	GW								
52.0									155.0
53.0									
54.0			End of Hole at 53.2 m.			Drill penetration rate very slow. Drill bit blocked, withdraw to 50.6 m.			160.0
55.0									
56.0									165.0
57.0									
58.0									170.0
59.0									
60.0									175.0
									180.0
									185.0
									190.0
									195.0

AGRA Earth & Environmental
Nanaimo, B.C.

LOGGED BY: JR
REVIEWED BY: JW

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

00/03/23 04:01PM (BOREHOLE)

REGIONAL DISTRICT OF COMOX-STRATHCONA	Drilling Contractor: BECK Drilling	BOREHOLE NO: AG99-04
ADDITIONAL MONITORING WELL INSTALLATIO.	Method: Becker Hammer	PROJECT NO: NX2013694
		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 (20 40 60 80)	SLOTTED PIEZOMETER	Depth(ft)
0.0	SM		SAND – silty, fine grained, oxidized, trace gravel, damp.						0.0
3.0	SW		SAND – little gravel, trace silt, well graded, damp.						10.0
6.0	SP		SAND – some gravel, trace silt, poorly graded, damp.		01				20.0
9.0	SP/GP		SAND AND GRAVEL – trace silt, poorly graded, damp.		03				30.0
12.0	GW		GRAVEL – some sand, trace silt, well graded, damp.		04				40.0
18.0	SP		SAND – little gravel, wet, poorly graded.		06	Water encountered at 19.2 m.			60.0
21.0	GP		GRAVEL AND SAND – medium to coarse sand, poorly graded, wet.		07				70.0
24.0	SP		SAND AND GRAVEL – poorly graded, wet.		08				80.0
27.0	GP		GRAVEL – some sand, poorly graded, wet.		09				90.0
30.0									95.0

AGRA Earth & Environmental
Nanaimo, B.C.

LOGGED BY: JW
REVIEWED BY: JR

COMPLETION DEPTH: 45.42 m
COMPLETE: 17/06/99

00/03/23 04:01PM (BOREHOLE)

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 (20 40 60 80)	SLOTTED PIEZOMETER	Depth(ft)
30.0									100.0
31.0									
32.0					10				105.0
33.0	GP								
34.0					11				110.0
35.0									
36.0									115.0
37.0			GRAVEL – little sand, well graded, wet.						
38.0	GW				12				120.0
39.0									125.0
40.0			GRAVEL – some sand, poorly graded, wet.						130.0
41.0					13				
42.0	GP								135.0
43.0			GRAVEL – some cobbles, trace sand, poorly graded.						140.0
44.0					14				
45.0									145.0
46.0			End of Hole at 45.4 m. Slow drilling. Well installed.						150.0
47.0									
48.0									155.0
49.0									
50.0									160.0
51.0									
52.0									165.0
53.0									
54.0									170.0
55.0									
56.0									175.0
57.0									
58.0									180.0
59.0									
60.0									185.0
									190.0
									195.0

AGRA Earth & Environmental
Nanaimo, B.C.

LOGGED BY: JW
REVIEWED BY: JR

COMPLETION DEPTH: 45.42 m
COMPLETE: 17/06/99

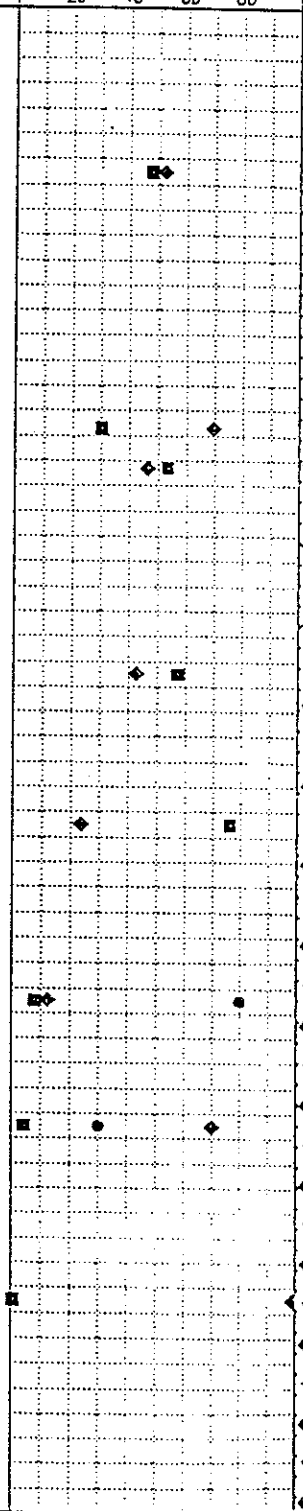
00/03/23 04:01PM (BOREHOLE)

REGIONAL DISTRICT OF COMOX-STRATHCONA	Drilling Contractor: BECK Drilling	BOREHOLE NO: AG99-05
ADDITIONAL MONITORING WELL INSTALLATIO...	Method: Becker Hammer	PROJECT NO: NX201.3604
		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
0.0						
1.0	OL		Oxidized loam.			
2.0			SAND AND SILT – fine grained, low plastic.			
3.0					01	
4.0						
5.0	ML					
6.0						
7.0						
8.0	SM		SAND – some silt, fine sand, moderately oxidized, damp.		02	
9.0			SILT AND SAND – fine sand, silt layers approx. 10 to 20 mm thick.		03	
10.0						
11.0						
12.0			SILT AND SAND – fine sand, little clay, low plastic, wet, fragments show bedding and laminations.			
13.0					04	
14.0	ML					
15.0			SILT – some clay, some fine sand, low plastic, moist to wet.			
16.0					05	
17.0						
18.0						
19.0						
20.0	GP		GRAVEL – little sand, trace silt, wet, poorly graded.		06	
21.0			SAND – some gravel, trace silt, poorly graded, wet.			
22.0						
23.0					07	
24.0						
25.0						
26.0	SP		SAND – trace silt, medium to fine grained, poorly graded, wet.		08	
27.0						
28.0						
29.0						
30.0						



SLOTTED PIEZOMETER

Depth(ft): 0.0, 5.0, 10.0, 15.0, 20.0, 25.0, 30.0, 35.0, 40.0, 45.0, 50.0, 55.0, 60.0, 65.0, 70.0, 75.0, 80.0, 85.0, 90.0, 95.0

AGRA Earth & Environmental
Nanaimo, B.C.

LOGGED BY: JW	COMPLETION DEPTH: 50.9 m
REVIEWED BY: JR	COMPLETE: 18/06/99

00/03/23 04:02PM (BOREHOLE)

REGIONAL DISTRICT OF COMOX-STRATHCONA	Drilling Contractor: BECK Drilling	BOREHOLE NO: AG99-05
ADDITIONAL MONITORING WELL INSTALLATIO	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 (20 40 60 80)	SLOTTED PIEZOMETER	Depth(ft)
30.0									100.0
31.0	SP								
32.0									105.0
33.0			SAND AND GRAVEL – poorly graded, cobbles up to 120 mm diameter.		09	Fast drill penetration.			
34.0	GP/SP				10	Low recovery, slow penetration rate.			110.0
35.0									115.0
36.0									
37.0			GRAVEL – some sand, poorly graded, occasional cobbles up to 120 mm diameter.						120.0
38.0	GP								
39.0									125.0
40.0									130.0
41.0			SAND – some gravel, poorly graded, wet.		11				
42.0									135.0
43.0									140.0
44.0									
45.0									145.0
46.0	SP		SAND – little gravel, trace silt, medium to fine grained.		12				150.0
47.0									
48.0									155.0
49.0									160.0
50.0									
51.0			End of Hole at 50.9 m.						165.0
52.0									170.0
53.0									
54.0									175.0
55.0									180.0
56.0									
57.0									185.0
58.0									190.0
59.0									
60.0									195.0

AGRA Earth & Environmental
Nanaimo, B.C.

LOGGED BY: JW | COMPLETION DEPTH: 50.9 m
REVIEWED BY: JR | COMPLETE: 18/06/99

00/03/23 04:02Pm (BOREHOLE)

REGIONAL DISTRICT OF COMOX-STRATHCONA

ADDITIONAL MONITORING WELL INSTALLATION

Drilling Contractor: BECK Drilling

Method: Becker Hammer

BOREHOLE NO: AG99-06

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
0.0			SAND – medium grained.			
13.0			– grades to fine sand.			
17.0			SAND – some gravel, little silt, moist, medium grained sand.			
18.0			SAND – little silt, fine grained sand.		01	
25.0			SILT – sandy, fine grained, wet.		02	
30.0					03	

■ % Fines ■ 20 40 60 80

◆ % Sand ◆ 20 40 60 80

● % Gravel ● 20 40 60 80

SLOTTED PIEZOMETER

Depth(ft): 0.0, 5.0, 10.0, 15.0, 20.0, 25.0, 30.0, 35.0, 40.0, 45.0, 50.0, 55.0, 60.0, 65.0, 70.0, 75.0, 80.0, 85.0, 90.0, 95.0

AGRA Earth & Environmental

Nanaimo, B.C.

LOGGED BY: JW

REVIEWED BY: JR

COMPLETION DEPTH: 45.11 m

COMPLETE: 18/06/99

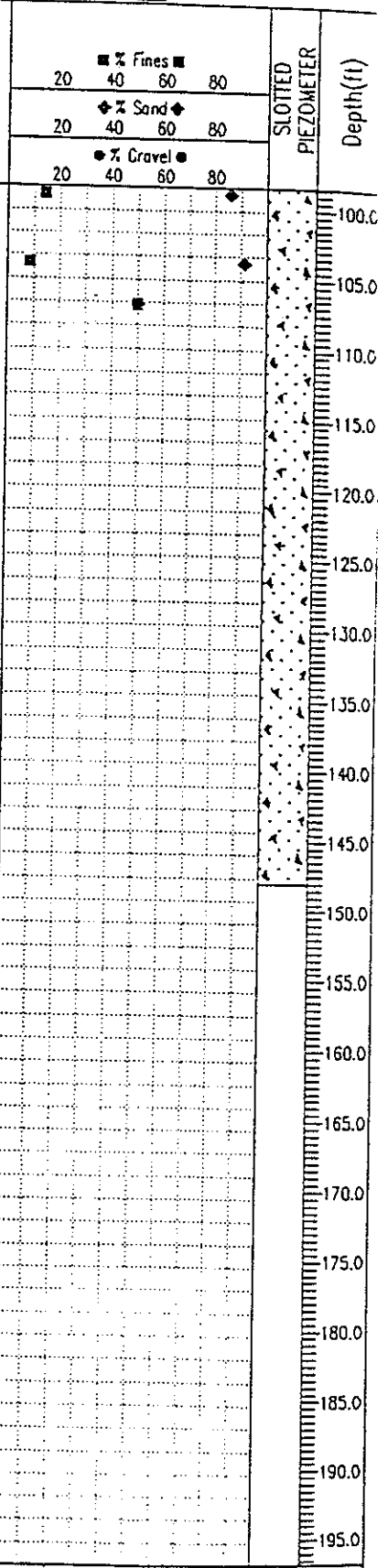
00/00/23 04:00PM (BOREHOLE)

REGIONAL DISTRICT OF COMOX-STRATHCONA	Drilling Contractor: BECK Drilling	BOREHOLE NO: AG99-06
ADDITIONAL MONITORING WELL INSTALLATIO..	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
30.0			– interbedded fine SAND and SILT layers, very wet.		03	
31.0						
32.0			SILT – some sand, some clay, low plastic, soft.		04	
33.0			SILT – some fine sand, some clay, wet.		05	
34.0						
35.0						
36.0						
37.0						
38.0						
39.0			SILT AND SAND – fine sand, wet, occasional silt lense approx. 0.3 m thick slows drill penetration rate.			
40.0						
41.0						
42.0			– low recovery, silty fine SANDS.			
43.0						
44.0						
45.0			End of Hole at 45.1 m. Hole sloughed in to 39.3 m, attempt to redrill, rods blocked. Grout from 39.3 m to 25 m. Install well.			
46.0						
47.0						
48.0						
49.0						
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: 45.11 m
REVIEWED BY: JR	COMPLETE: 18/06/99

00/03/23 04:00PM (BOREHOLE)

REGIONAL DISTRICT OF COMOX-STRATHCONA	Contractor: BECK Drilling	BOREHOLE NO: AM00-01
ADDITIONAL MONITORING WELL INSTALLATIC	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)	SLOTTED PIEZOMETER	Depth(ft)
0.0		GARBAGE – plastic, wood, rags, etc.						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		Black sludge with sewage odour noted from 9.5 m to 10.7 m bgs.						50.0
11.0								55.0
12.0								
13.0								
14.0								
15.0								
16.0								
17.0								
18.0								

AMEC Earth & Environmental Limited
Nanaimo, B.C.

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

00/09/27 11:12AM (NX2025S)

REGIONAL DISTRICT OF COMOX-STRATHCONA	Contractor: BECK Drilling	BOREHOLE NO: AM00-01
ADDITIONAL MONITORING WELL INSTALLATIO	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)	SLOTTED PIEZOMETER	Depth(ft)
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

00/09/27 11:12AM (NX2025S5)

REGIONAL DISTRICT OF COMOX-STRATHCONA
ADDITIONAL MONITORING WELL INSTALLATIO

Contractor: BECK Drilling
Method: Becker Hammer, Hollow Stem

BOREHOLE NO: AM00-01
PROJECT NO: NX2025SS-500
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)	SLOTTED PIEZOMETER	Depth(ft)
36.0		SAND – clean, very dense, uniform, grey.						120.0
37.0		GRAVEL – some sand, very dense, grey.			Boulder encountered at 36.9 m bgs.			125.0
38.0				G4				
39.0		–becoming wet at 39.3 m.						130.0
40.0								
41.0								135.0
42.0								
43.0								140.0
44.0				G5				
45.0								145.0
46.0								150.0
47.0								
48.0								155.0
49.0		End of Hole at 48.5 m. Monitoring well installed. Screen from 33.2 m to 48.5 m bgs. Sand from 0 to 30.8 m bgs. Bentonite plug from 30.8 m to 32.3 m bgs. Sand from 32.3 m to 48.5 m bgs.						160.0
50.0								
51.0								165.0
52.0		Borehole located 20 m NW of 1st attempt. 2nd attempt located 10 m S of 1st attempt.						170.0
53.0								
54.0								175.0

AMEC Earth & Environmental Limited
Nanaimo, B.C.

LOGGED BY: BH
REVIEWED BY: CM

COMPLETION DEPTH: 48.463 m
COMPLETE: 21/09/00

Annual Groundwater Monitoring	BECK Drilling and Environmental Services	BOREHOLE NO: AMOC-1
Regional District of Comox-Strathcona	Acker Tractor Air Rotary Drill	PROJECT NO:
		ELEVATION:

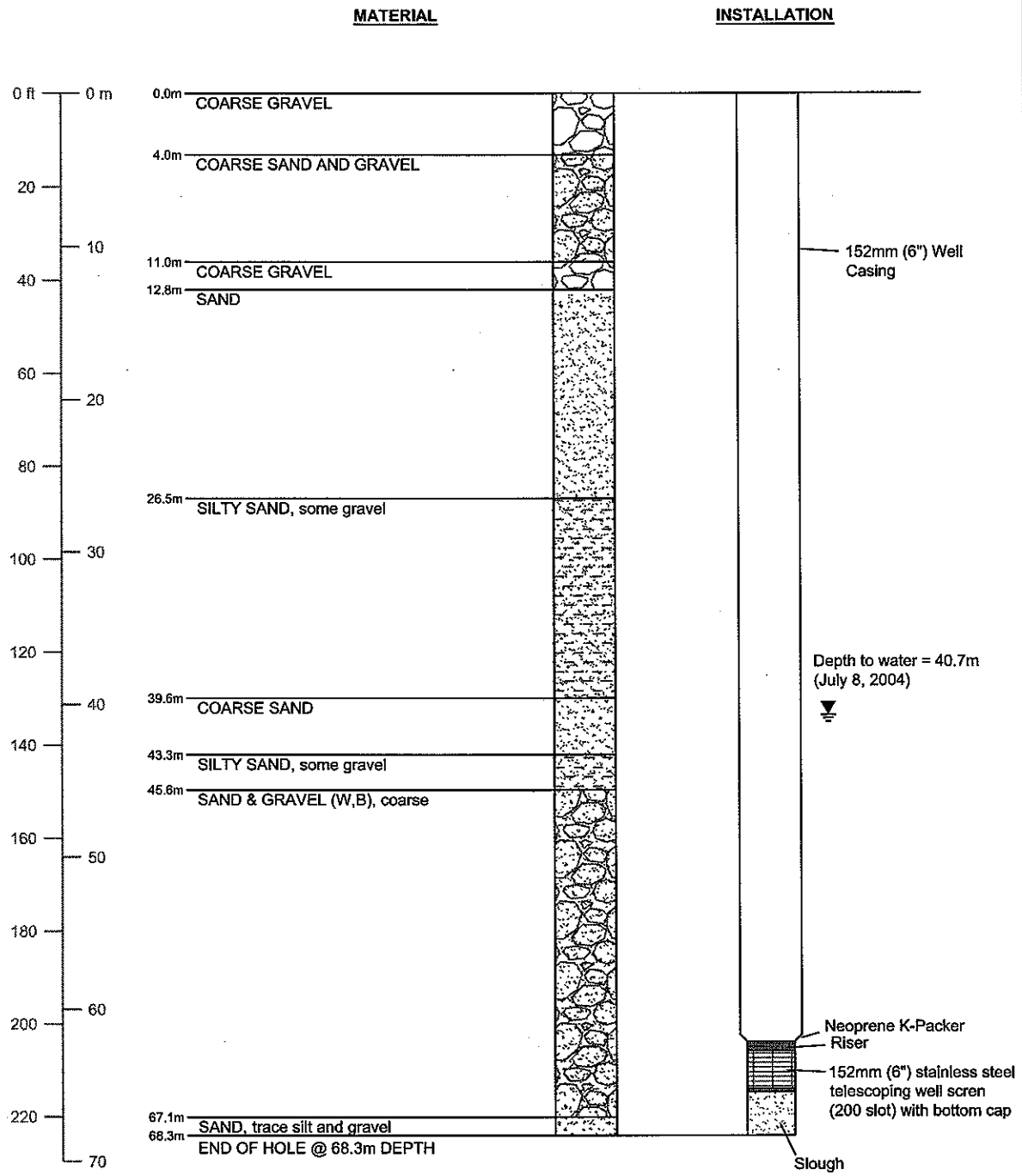
BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | OTHER

Depth(m)	SOIL SYMBOL	Soil Description	SLOTTED PIEZOMETER	Depth(ft)
0.0		SAND and GRAVEL – brown, dry, cobbles to 0,15 m diametre		0.0
		SAND – fine grained, grey, dry		
		SAND and GRAVEL – grey, dry		10.0
5.0		SAND – medium grained, grey, damp		
		SAND – some gravel, medium grained, grey, damp		20.0
10.0				30.0
				40.0
15.0		SAND – trace silt, medium grained, brown, moist		50.0
		SAND – some gravel, medium grained, brown, damp		60.0
20.0				70.0
25.0		SAND and GRAVEL – medium grained, brown, damp		80.0
		SAND – coarse grained, brown, wet – Groundwater encountered at 25.9 m.		90.0
30.0				100.0
		End of Hole at 33.2 m. Monitoring well installed to 32 m. Screened from 19.8 to 32 m.		110.0
35.0				120.0
40.0				

AMEC Earth & Environmental Limited

LOGGED BY: ARM
REVIEWED BY: CT
COMPLETION DEPTH: 33.2 m
COMPLETED: 10/16/...

02/10/04 12:09PM (2025506)



VERTICAL SCALE 1:400

4 0 4 10 16m

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

Depth(m)	SOIL SYMBOL	Soil Description	Field Notes	SLOTTED PIEZOMETER	Depth(ft)
0.0		GRAVEL CAP			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	CASING LEFT IN GROUND TO DEPTH OF 33.5m.		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

04/12/16 02:57PM (SHELLY)

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					
40.0					
41					135
42.0					140.0
43.0		SAND & GRAVEL			145.0
44.0					
45.0					150.0
46.0					
47.0					155.0
48.0					
49.0					160.0
50.0					
51.0					165.0
52.0					
53.0					170.0
54.0					
55.0					175.0
56.0					
57.0					180.0
58.0					
59.0					185.0
60.0					
61.0					190.0
62.0					
63.0					195.0
64.0					
65.0					200.0
66.0		END OF HOLE @ 65.5m BELOW SURFACE			205.0
67.0		NOTE: SOILS LOGGED BY DRILLWELL STAFF.			210.0
68.0					215.0
69.0					220.0
70.0					225.0

EBA Engineering Consultants Ltd.

LOGGED BY: MK	COMPLETION DEPTH: 65.5 m
REVIEWED BY: SB	COMPLETE: 07/07/04

04/12/16 02:57PM (SHELLY)

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)
0.0		SAND	CASING LEFT IN GROUND TO DEPTH OF 11.2m.		0.0
5.0		SAND, some gravel			15.0
8.0		SAND AND GRAVEL			25.0
13.0		SILTY SAND			40.0
14.0		FINE SAND			45.0
17.0		COARSE SAND			55.0
18.0		FINE SAND, some silt			60.0
33.0		SAND AND GRAVEL			110.0
35.0					

EBA Engineering Consultants Ltd.

LOGGED BY: MC	COMPLETION DEPTH: 41.2 m
REVIEWED BY: SB	COMPLETE: 07/07/04

04/12/16 12:10PM (SHELLY)

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 to 41.0					115.0 to 135.0
41.0		END OF HOLE @ 41.2 m BELOW SURFACE NOTE: SOILS LOGGED BY DRILLWELL STAFF.			
42.0 to 70.0					140.0 to 225.0

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

04/12/16 12:10PM (SHELLY)

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
21.0		SAND, fine to medium grained, well sorted, loose, damp			
25.0		SILT, occasional gravel, trace silt, compact, moist			
26.0		SAND, fine to medium grained, well sorted			
27.0		SILT & CLAY with trace sand			
28.0		SAND and SAND & GRAVEL interlayers			
35.0					

EBA Engineering Consultants Ltd.

LOGGED BY: MC
REVIEWED BY: SB

COMPLETION DEPTH: 53.4 m
COMPLETE: 15/07/04

04/12/16 02:51PM (SHELLY)

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 to 53.0					115.0 to 175.0
53.0		END OF HOLE @ 53.3 m BELOW SURFACE NOTE: SOILS LOGGED BY EBA STAFF.			
54.0 to 70.0					180.0 to 225.0

EBA Engineering Consultants Ltd.

LOGGED BY: MC | COMPLETION DEPTH: 53.4 m
REVIEWED BY: SB | COMPLETE: 15/07/04

04/12/16 02:51PM (SHELLY)

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			0.0
19.0		SAND & GRAVEL, medium to coarse grained, sub-angular, compact moist			65.0
28.0		SILT & GRAVEL, moist			90.0
29.0		SAND & GRAVEL, poorly graded, compact, moist			95.0
35.0					110.0

WELLSCREEN FULL OF BENTONITE, WELL TO BE REDRILLED.

EBA Engineering Consultants Ltd.

LOGGED BY: MC	COMPLETION DEPTH: 67.1 m
REVIEWED BY: SB	COMPLETE: 07/07/04

04/12/16 02:51PM (SHELLY)

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		– some cobbles @ 53.3m – little recovery between 53.3 to 67.1m			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		END OF HOLE @ 67.1 m BELOW SURFACE NOTE: SOILS LOGGED BY EBA STAFF.			
68.0					
69.0					
70.0					

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

04/12/16 02:51PM (SHELLY)

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
5.0		SAND, some gravel			15.0
6.0		COARSE GRAVEL			20.0
10.0		SAND & FINER GRAVEL			35.0
15.0		SILTY SAND			50.0
16.0		SAND			55.0
23.0		SAND & GRAVEL, slightly silty			75.0
25.0		SILTY SAND, brown			85.0
29.0		SAND & GRAVEL			95.0
35.0					110.0

EBA Engineering Consultants Ltd.

LOGGED BY: MC	COMPLETION DEPTH: 39.6 m
REVIEWED BY: SB	COMPLETE: 13/07/04

04/12/16 12:10PM (SHELLY)

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		END OF HOLE @ 39.6 m BELOW SURFACE			140.0
41.0		NOTE: SOILS LOGGED BY DRILLWELL STAFF.			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	COMPLETION DEPTH: 39.6 m
REVIEWED BY: SB	COMPLETE: 13/07/04

04/12/16 12:10PM (SHELLY)

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	SLOTTED PIEZOMETER	Depth(ft)
0.0		SAND	CASING LEFT IN GROUND TO DEPTH OF 11.2m		0.0
5.0		SAND, some gravel			15.0
6.0		COARSE GRAVEL			20.0
7.0		SAND & GRAVEL			25.0
15.0		SILTY SAND			50.0
16.0		SAND			55.0
23.0		SAND & GRAVEL, some silt			75.0
25.0		SILTY SAND, brown			80.0
29.0		SAND & GRAVEL			95.0
32.0		END OF HOLE @ 32.0 m BELOW SURFACE NOTE: SOILS LOGGED BY DRILLWELL STAFF.			105.0
35.0					110.0

EBA Engineering Consultants Ltd.

LOGGED BY: MC	COMPLETION DEPTH: 32 m
REVIEWED BY: SB	COMPLETE: 17/07/04

04/12/16 12:10PM (SHELLY)

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	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
	- Trace silt at 11.3 m - No silt at 11.7 m					40
						45
	- Coarse sand at 14.3 m		SW			50
	SAND, fine grained, homogenous moist, brown - Trace small gravel at 15.2 m					55
						60
	SAND, trace to some silt, very fine grained, moist, grey					65
20	- Silty at 19.8 m					70
	- Moist to wet at 20.7 m					75
						80
	- Saturated at 23.2 m					85
						90
						95
	End of hole at 29.0 m					100
30						105
						110
35						115

November 17, 2011

EBA11-01

LOGGED BY: MG	COMPLETION DEPTH: 28.96 m
REVIEWED BY:	COMPLETE: 11/15/2011
DRAWING NO: 1	Page 1 of 1

eba A TETRA TECH COMPANY

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 | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	USC	SOIL SYMBOL	NOTES & COMMENTS	EBA11-02	Depth (ft)
0	SAND (FILL), some gravel, fine to coarse grained, loose, brown		FILL				0
	SAND, trace to some gravel, fine to medium grained, loose, damp, grey and brown		SW				5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75
20	SAND, fine to medium grained, loose, moist, brown						
November 17, 2011	SAND, silty, very fine grained, saturated, grey - Saturated at 26.5 m		SM				80, 85, 90, 95
30	SILT, sandy, fine grained, soft, grey		ML				100, 105, 110, 115, 120, 125
	SAND, gravelly, trace silt, medium to coarse grained, loose, saturated, grey		SW				
40	End of hole at 35.0 m						130

November 16, 2011

eba 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 | SHELBY TUBE | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	USC	SOIL SYMBOL	NOTES & COMMENTS	EBA11-03	Depth (ft)
0	ORGANICS (FOREST FLOOR), silt, trace sand, soft, moist, dark brown		TOPSOIL				0
	SILT, trace sand, trace organics, fine to coarse grained, soft, moist, reddish brown		SM				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
			SW				55
							60
	SAND, fine to coarse grained, moist, grey						65
20							70
November 17, 2011							November 17, 2011 75
	- Saturated at 22.6 m, trace gravel						80
							85
							90
							95
	SILT, sandy, trace gravel, very fine grained, soft, saturated, grey		SM				100
30							105
	End of hole at 30.1 m						110
35							115

eba 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		ML				0
	SAND, fine grained, loose, homogenous, moist, tan coloured						5
	- Grey at 3.1 m						10
							15
							20
							25
10							30
			SW				35
							40
							45
							50
							55
							60
	SAND, trace gravel, fine to medium grained, compact						65
20							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
35							115

November 17, 2011

eba 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 GROUNDWATER MONITORING

The following methodology was conducted at each monitoring well location (Figure 2) for the February, May, August and December 2012 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, HBT94-3, HBT94-5, and AM02-1 were dry and therefore could not be sampled during the February, May and August monitoring events. Monitoring wells GLL93-1, GLL93-2, GLL93-4, and HBT94-5 were dry and therefore could not be sampled during the December monitoring event.

2.0 GROUNDWATER SAMPLING

The following methodology was conducted at each monitoring well with sufficient water for sampling for the February, May, August and December 2012 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 5 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.

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Nanaimo, BC V9T 6A7 CANADA
p. 250.756.2256 f. 250.756.2686

  - 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.

3.0 SURFACE WATER SAMPLING

The following methodology was conducted for one surface water location (SW-1) as shown on Figure 2 for the February, May, August and December 2012 monitoring 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 - 2012 GROUNDWATER QUALITY TESTING

Sample Information		Monitoring		Field Screening					Lab Analysis									
Well #	Status	Water Level	Depth to Bottom	Temperature	Dissolved Oxygen	Redox Potential	pH	ElectricalConductivity	pH	ElectricalConductivity	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.

- HBT94-3 and AM02-01 was dry during the Febuary, May, August 2012 monitoring events
- EBA04-1 is a drinking water well and therefore water level cannot be measured.

APPENDIX D

2012 LABORATORY CERTIFICATES

CONSULTING ENGINEERS & SCIENTISTS - www.eba.ca

A TETRA TECH COMPANY

Success Through Science®

Your Project #: CRWMC-CVRD N23101881
Your C.O.C. #: 25616901, 25616902

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

Report Date: 2012/03/27
This report supersedes all previous reports with the same Maxxam job number

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B215204
Received: 2012/02/23, 07:30

Sample Matrix: Water
Samples Received: 14

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	14	2012/02/25	2012/02/27	BBY6SOP-00026, BBY0SOP-00002	SM2320B
Chloride by Automated Colourimetry	1	N/A	2012/02/24	BBY6SOP-00011	SM-4500-Cl-
Chloride by Automated Colourimetry	13	N/A	2012/02/27	BBY6SOP-00011	SM-4500-Cl-
Conductance - water	14	N/A	2012/02/27	BBY6SOP-00026	SM-2510B
Fluoride	6	N/A	2012/02/29	BBY6SOP-00038	SM - 4500 F C
Fluoride	8	N/A	2012/03/01	BBY6SOP-00038	SM - 4500 F C
Hardness Total (calculated as CaCO3)	1	N/A	2012/02/29		
Hardness (calculated as CaCO3)	13	N/A	2012/02/29	BBY7SOP-00002	Calculated Parameter
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	13	N/A	2012/02/29	BBY7SOP-00002	EPA 6020A
Elements by ICPMS Low Level (dissolved)	13	N/A	2012/02/29	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (total)	1	N/A	2012/02/29	BBY7SOP-00002	EPA 6020A
Elements by ICPMS Low Level (total)	1	N/A	2012/02/29	BBY7SOP-00002	EPA 6020A
Ammonia-N	14	N/A	2012/02/24	BBY6SOP-00009	SM-4500NH3G
Nitrate + Nitrite (N)	1	N/A	2012/02/24	BBY6SOP-00010	USEPA 353.2
Nitrate + Nitrite (N)	12	N/A	2012/02/25	BBY6SOP-00010	USEPA 353.2
Nitrate + Nitrite (N)	1	N/A	2012/02/26	BBY6SOP-00010	USEPA 353.2
Nitrite (N) by CFA	1	N/A	2012/02/24	BBY6SOP-00010	EPA 353.2
Nitrite (N) by CFA	13	N/A	2012/02/25	BBY6SOP-00010	EPA 353.2
Nitrogen - Nitrate (as N)	1	N/A	2012/02/24	BBY6SOP-00010	Based on EPA 353.2
Nitrogen - Nitrate (as N)	12	N/A	2012/02/27	BBY6SOP-00010	Based on EPA 353.2
Nitrogen - Nitrate (as N)	1	N/A	2012/02/29	BBY6SOP-00010	Based on EPA 353.2
Filter and HNO3 Preserve for Metals	13	N/A	2012/02/23	BBY6WI-00001	EPA 200.2
pH Water	14	N/A	2012/02/27	BBY6SOP-00026	SM-4500H+B
CSR VH C6-C10 in Water by HS GC/MS	2	N/A	2012/02/29	BBY8SOP-00011	EPA 8260B
Sulphate by Automated Colourimetry	1	N/A	2012/02/24	BBY6SOP-00017	SM4500-SO42
Sulphate by Automated Colourimetry	13	N/A	2012/02/27	BBY6SOP-00017	SM4500-SO42
Phosphorus-P (Total, dissolved)	2	2012/02/27	2012/02/28	BBY6SOP-00013	SM-4500PE
Phosphorus-P (Total, dissolved)	11	2012/02/29	2012/02/29	BBY6SOP-00013	SM-4500PE
Total Phosphorus	1	N/A	2012/02/28	BBY6SOP-00013	SM 4500 PE
VOCs in Water by HS GC/MS	2	2012/02/28	2012/02/29	BBY8-SOP-0009	EPA 8260C
Volatile HC-BTEX	2	N/A	2012/03/01		

* Results relate only to the items tested.

../2

Maxxam Job #: B215204
Report Date: 2012/03/27

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-CVRD N23101881

Encryption Key

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

NAMITA SAHNI, Burnaby Project Manager
Email: NSahni@maxxam.ca
Phone# (604) 639-2614

==========

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 #: B215204
Report Date: 2012/03/27

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-CVRD N23101881

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		CU1985		CU1986		CU1987		CU1988	CU1989	CU1990		
Sampling Date		2012/02/21		2012/02/21		2012/02/21		2012/02/21	2012/02/21	2012/02/21		
COC#		25616901		25616901		25616901		25616901	25616901	25616901		
	Units	**SW1**	**QC Batch**	**AG99-01**	**QC Batch**	**AG99-05**	**QC Batch**	**AG99-06**	**EBA11-1**	**EBA11-3**	**RDL**	**QC Batch**
ANIONS												
Nitrite (N)	mg/L	<0.005	5625175	<0.005(1)	5625893	<0.005(1)	5625893	<0.005(1)	0.013(1)	0.026(1)	0.005	5625893
Calculated Parameters												
Filter and HNO3 Preservation	N/A			FIELD	ONSITE	FIELD	ONSITE	FIELD	FIELD	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.095	5619141	0.146	5619141	0.075	5619141	<0.020	0.716	0.113	0.020	5619141
Misc. Inorganics												
Fluoride (F)	mg/L	0.021	5636285	0.022	5636285	0.020	5636285	0.038	0.027	0.019	0.010	5636285
Alkalinity (Total as CaCO3)	mg/L	66.0	5625915	98.8	5625915	53.3	5625915	55.1	164	59.8	0.50	5625915
Alkalinity (PP as CaCO3)	mg/L	<0.50	5625915	<0.50	5625915	<0.50	5625915	<0.50	<0.50	<0.50	0.50	5625915
Bicarbonate (HCO3)	mg/L	80.6	5625915	121	5625915	65.1	5625915	67.3	200	72.9	0.50	5625915
Carbonate (CO3)	mg/L	<0.50	5625915	<0.50	5625915	<0.50	5625915	<0.50	<0.50	<0.50	0.50	5625915
Hydroxide (OH)	mg/L	<0.50	5625915	<0.50	5625915	<0.50	5625915	<0.50	<0.50	<0.50	0.50	5625915
Anions												
Dissolved Sulphate (SO4)	mg/L	3.18	5625677	3.59	5630093	3.24	5630093	1.48	68.0	4.32	0.50	5630093
Dissolved Chloride (Cl)	mg/L	2.4	5625675	2.0	5630060	0.6	5630060	3.9	10	19	0.5	5630060
Nutrients												
Ammonia (N)	mg/L	0.0080	5624967	0.0066	5624967	<0.0050	5624967	<0.0050	0.0072	0.0073	0.0050	5624967
Dissolved Phosphorus (P)	mg/L			0.0231	5637926	0.0084	5631294	0.0290	0.0534	0.0606	0.0050	5637926
Nitrate plus Nitrite (N)	mg/L	0.095	5625174	0.146(1)	5625892	0.075(1)	5625892	<0.020(1)	0.729(1)	0.139	0.020	5625892
Total Phosphorus (P)	mg/L	0.0108	5631295								0.0050	
Physical Properties												
Conductivity	uS/cm	146	5625914	200	5625914	113	5625914	118	479	183	1.0	5625914
pH	pH Units	7.84	5625912	7.97	5625912	7.93	5625912	7.78	7.94	7.79		5625912

N/A = Not Applicable
RDL = Reportable Detection Limit
(1) - Sample analysed past recommended hold time

Maxxam Job #: B215204
Report Date: 2012/03/27

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-CVRD N23101881

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		CU1991	CU1992	CU1993	CU1994	CU2004	CU2005	CU2006		CU2007		
Sampling Date		2012/02/21	2012/02/21	2012/02/22	2012/02/22	2012/02/22	2012/02/22	2012/02/22		2012/02/22		
COC#		25616901	25616901	25616901	25616901	25616902	25616902	25616902		25616902		
	Units	**EBA11-4**	**EBA11-5**	**AG99-02**	**AG99-04**	**HBT94-1**	**HBT94-2**	**HBT94-4**	**QC Batch**	**HBT94-6**	**RDL**	**QC Batch**
ANIONS												
Nitrite (N)	mg/L	<0.005(1)	0.025(1)	<0.005	<0.005	0.022	0.007	<0.005	5625893	0.007	0.005	5625893
Calculated Parameters												
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	ONSITE	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.193	0.115	0.197	0.104	0.290	<0.020	0.117	5619141	0.182	0.020	5619141
Misc. Inorganics												
Fluoride (F)	mg/L	0.026	0.021	0.017	0.022	0.031	0.025	0.025	5640443	0.024	0.010	5640443
Alkalinity (Total as CaCO3)	mg/L	43.6	57.6	154	47.6	233	168	87.6	5625915	168	0.50	5625915
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5625915	<0.50	0.50	5625915
Bicarbonate (HCO3)	mg/L	53.2	70.2	188	58.1	284	205	107	5625915	205	0.50	5625915
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5625915	<0.50	0.50	5625915
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5625915	<0.50	0.50	5625915
Anions												
Dissolved Sulphate (SO4)	mg/L	3.08	4.15	3.72	3.05	4.43	3.52	3.55	5630093	3.47	0.50	5630093
Dissolved Chloride (Cl)	mg/L	12	19	1.8	1.9	20	5.8	2.4	5630060	5.4	0.5	5630060
Nutrients												
Ammonia (N)	mg/L	0.012	0.0066	<0.0050	0.0071	0.31	0.29	0.0094	5624967	0.29	0.0050	5624967
Dissolved Phosphorus (P)	mg/L	0.402	0.0486	0.0328	0.0057	0.173	0.0583	0.0090	5637926	0.0106	0.0050	5631294
Nitrate plus Nitrite (N)	mg/L	0.193(1)	0.140(1)	0.197	0.104	0.312	<0.020	0.117	5625892	0.189(1)	0.020	5626317
Physical Properties												
Conductivity	uS/cm	128	183	295	102	511	336	183	5625914	336	1.0	5625914
pH	pH Units	7.72	7.78	8.17	7.89	7.61	7.93	7.98	5625912	8.00		5625912

N/A = Not Applicable
RDL = Reportable Detection Limit
(1) - Sample analysed past recommended hold time

Maxxam Job #: B215204
Report Date: 2012/03/27

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-CVRD N23101881

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		CU1986	CU1987	CU1988	CU1989	CU1990	CU1991	CU1992		
Sampling Date		2012/02/21	2012/02/21	2012/02/21	2012/02/21	2012/02/21	2012/02/21	2012/02/21		
COC#		25616901	25616901	25616901	25616901	25616901	25616901	25616901		
	Units	**AG99-01**	**AG99-05**	**AG99-06**	**EBA11-1**	**EBA11-3**	**EBA11-4**	**EBA11-5**	**RDL**	**QC Batch**
Misc. Inorganics										
Dissolved Hardness (CaCO3)	mg/L	101	54.6	58.6	241	82.5	55.3	84.1	0.5	5619138

RDL = Reportable Detection Limit

Maxxam Job #: B215204
Report Date: 2012/03/27

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-CVRD N23101881

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		CU1986	CU1987	CU1988	CU1989	CU1990	CU1991	CU1992		
Sampling Date		2012/02/21	2012/02/21	2012/02/21	2012/02/21	2012/02/21	2012/02/21	2012/02/21		
COC#		25616901	25616901	25616901	25616901	25616901	25616901	25616901		
	Units	**AG99-01**	**AG99-05**	**AG99-06**	**EBA11-1**	**EBA11-3**	**EBA11-4**	**EBA11-5**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS										
Dissolved Aluminum (Al)	mg/L	0.0040	0.0074	0.0019	0.0051	0.0028	0.0121	0.0028	0.0002	5631533
Dissolved Antimony (Sb)	mg/L	0.00003	0.00003	<0.00002	0.00002	0.00003	0.00003	0.00003	0.00002	5631533
Dissolved Arsenic (As)	mg/L	0.00089	0.00078	0.00010	0.00025	0.00017	0.00119	0.00015	0.00002	5631533
Dissolved Barium (Ba)	mg/L	0.00193	0.00104	0.00045	0.00819	0.00188	0.00270	0.00167	0.00002	5631533
Dissolved Beryllium (Be)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00001	5631533
Dissolved Bismuth (Bi)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.000005	5631533
Dissolved Boron (B)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	5631533
Dissolved Cadmium (Cd)	mg/L	<0.000005	0.000006	<0.000005	0.000009	<0.000005	<0.000005	0.000005	0.000005	5631533
Dissolved Chromium (Cr)	mg/L	0.0005	0.0002	0.0007	0.0014	0.0005	0.0017	0.0005	0.0001	5631533
Dissolved Cobalt (Co)	mg/L	<0.000005	0.000019	0.000006	0.000064	0.000018	0.000029(1)	0.000018	0.000005	5631533
Dissolved Copper (Cu)	mg/L	0.00040	0.00037	<0.00005	0.00072	<0.00005	0.00010	<0.00005	0.00005	5631533
Dissolved Iron (Fe)	mg/L	0.001	0.002	<0.001	0.002	<0.001	0.005	0.001	0.001	5631533
Dissolved Lead (Pb)	mg/L	0.000022	0.000013	0.000005	0.000021	<0.000005	<0.000005	0.000009	0.000005	5631533
Dissolved Lithium (Li)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	5631533
Dissolved Manganese (Mn)	mg/L	0.00010	0.00011	<0.00005	0.00338	0.00252	0.00329	0.00248	0.00005	5631533
Dissolved Mercury (Hg)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00001	5631533
Dissolved Molybdenum (Mo)	mg/L	0.00012	0.00011	0.00008	0.00006	0.00008	0.00010	0.00007	0.00005	5631533
Dissolved Nickel (Ni)	mg/L	0.00003	0.00009	0.00002	0.00050	0.00006	0.00009	0.00010	0.00002	5631533
Dissolved Selenium (Se)	mg/L	0.00010	0.00009	0.00008	0.00004	0.00018	0.00025	0.00018	0.00004	5631533
Dissolved Silicon (Si)	mg/L	5.7	3.6	4.3	5.6	4.4	5.4	4.5	0.1	5631533
Dissolved Silver (Ag)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.000005	5631533
Dissolved Strontium (Sr)	mg/L	0.0463	0.0269	0.0396	0.141	0.0475	0.0307	0.0474	0.00005	5631533
Dissolved Thallium (Tl)	mg/L	<0.000002	<0.000002	<0.000002	0.000007	<0.000002	0.000003	<0.000002	0.000002	5631533
Dissolved Tin (Sn)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	5631533
Dissolved Titanium (Ti)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	5631533
Dissolved Uranium (U)	mg/L	0.000106	0.000055	0.000038	0.000968	0.000059	0.000153	0.000054	0.000002	5631533
Dissolved Vanadium (V)	mg/L	0.0065	0.0043	0.0026	0.0032	0.0030	0.0115	0.0029	0.0002	5631533
Dissolved Zinc (Zn)	mg/L	0.0003	0.0027	0.0006	0.0003	0.0002	0.0002	0.0003	0.0001	5631533
Dissolved Zirconium (Zr)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	5631533
Dissolved Calcium (Ca)	mg/L	32.6	18.2	18.0	71.7	25.8	16.7	26.4	0.05	5622479
Dissolved Magnesium (Mg)	mg/L	4.86	2.20	3.31	15.0	4.43	3.27	4.43	0.05	5622479
Dissolved Potassium (K)	mg/L	0.79	0.43	0.29	0.81	0.36	1.19	0.37	0.05	5622479
Dissolved Sodium (Na)	mg/L	1.71	1.40	1.93	4.84	1.61	2.47	1.61	0.05	5622479
Dissolved Sulphur (S)	mg/L	<10	<10	<10	26	<10	<10	<10	10	5622479

RDL = Reportable Detection Limit
(1) - Duplicate RPD above control limit - (10% of analytes failure allowed).

Maxxam Job #: B215204
Report Date: 2012/03/27

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-CVRD N23101881

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		CU1993	CU1994	CU2004	CU2005	CU2006	CU2007		
Sampling Date		2012/02/22	2012/02/22	2012/02/22	2012/02/22	2012/02/22	2012/02/22		
COC#		25616901	25616901	25616902	25616902	25616902	25616902		
	Units	**AG99-02**	**AG99-04**	**HBT94-1**	**HBT94-2**	**HBT94-4**	**HBT94-6**	**RDL**	**QC Batch**
Misc. Inorganics									
Dissolved Hardness (CaCO3)	mg/L	152	49.4	179	152	90.1	156	0.5	5619138

RDL = Reportable Detection Limit

Maxxam Job #: B215204
Report Date: 2012/03/27

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-CVRD N23101881

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		CU1993	CU1994	CU2004	CU2005	CU2006	CU2007		
Sampling Date		2012/02/22	2012/02/22	2012/02/22	2012/02/22	2012/02/22	2012/02/22		
COC#		25616901	25616901	25616902	25616902	25616902	25616902		
	Units	**AG99-02**	**AG99-04**	**HBT94-1**	**HBT94-2**	**HBT94-4**	**HBT94-6**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS									
Dissolved Aluminum (Al)	mg/L	0.0049	0.0064	0.0047	0.0078	0.0030	0.0129	0.0002	5631533
Dissolved Antimony (Sb)	mg/L	0.00003	0.00003	0.00009	<0.00002	0.00009	<0.00002	0.00002	5631533
Dissolved Arsenic (As)	mg/L	0.00188	0.00043	0.00021	0.00247	0.00025	0.00246	0.00002	5631533
Dissolved Barium (Ba)	mg/L	0.00757	0.00068	0.0113	0.00584	0.00133	0.00602	0.00002	5631533
Dissolved Beryllium (Be)	mg/L	<0.00001	<0.00001	0.00002	<0.00001	<0.00001	<0.00001	0.00001	5631533
Dissolved Bismuth (Bi)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.000005	5631533
Dissolved Boron (B)	mg/L	<0.05	<0.05	0.48	0.10	<0.05	0.11	0.05	5631533
Dissolved Cadmium (Cd)	mg/L	0.000007	<0.000005	0.000390	0.000012	<0.000005	0.000017	0.000005	5631533
Dissolved Chromium (Cr)	mg/L	0.0006	0.0002	0.0001	<0.0001	<0.0001	<0.0001	0.0001	5631533
Dissolved Cobalt (Co)	mg/L	<0.000005	0.000007	0.000275	0.000067	0.000009	0.000075	0.000005	5631533
Dissolved Copper (Cu)	mg/L	0.00006	0.00020	0.00424	0.00025	0.00019	0.00013	0.00005	5631533
Dissolved Iron (Fe)	mg/L	0.001	0.015	0.337	0.174	0.004	0.182	0.001	5631533
Dissolved Lead (Pb)	mg/L	<0.000005	0.000006	0.000035	0.000009	<0.000005	0.000015	0.000005	5631533
Dissolved Lithium (Li)	mg/L	<0.0005	<0.0005	0.0009	<0.0005	<0.0005	<0.0005	0.0005	5631533
Dissolved Manganese (Mn)	mg/L	0.00007	0.00007	0.294	0.606	0.0296	0.622	0.00005	5631533
Dissolved Mercury (Hg)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00001	5631533
Dissolved Molybdenum (Mo)	mg/L	<0.00005	0.00010	0.00062	0.00026	0.00007	0.00027	0.00005	5631533
Dissolved Nickel (Ni)	mg/L	<0.00002	0.00006	0.00181	0.00043	0.00002	0.00043	0.00002	5631533
Dissolved Selenium (Se)	mg/L	0.00013	0.00010	0.00006	<0.00004	0.00102	<0.00004	0.00004	5631533
Dissolved Silicon (Si)	mg/L	4.9	3.6	6.4	7.5	4.0	7.5	0.1	5631533
Dissolved Silver (Ag)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.000005	5631533
Dissolved Strontium (Sr)	mg/L	0.0628	0.0258	0.205	0.0786	0.0544	0.0808	0.00005	5631533
Dissolved Thallium (Tl)	mg/L	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002	0.000002	5631533
Dissolved Tin (Sn)	mg/L	<0.0002	<0.0002	0.0005	<0.0002	<0.0002	<0.0002	0.0002	5631533
Dissolved Titanium (Ti)	mg/L	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	0.0005	5631533
Dissolved Uranium (U)	mg/L	0.000996	0.000036	0.000081	0.000083	0.000058	0.000089	0.000002	5631533
Dissolved Vanadium (V)	mg/L	0.0172	0.0030	0.0006	0.0005	0.0034	0.0005	0.0002	5631533
Dissolved Zinc (Zn)	mg/L	0.0004	0.0004	0.0026	0.0005	0.0002	0.0008	0.0001	5631533
Dissolved Zirconium (Zr)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	5631533
Dissolved Calcium (Ca)	mg/L	49.8	16.7	60.6	51.1	32.3	52.4	0.05	5622479
Dissolved Magnesium (Mg)	mg/L	6.70	1.91	6.63	5.95	2.32	6.15	0.05	5622479
Dissolved Potassium (K)	mg/L	1.66	0.31	7.19	1.54	0.63	1.62	0.05	5622479
Dissolved Sodium (Na)	mg/L	2.01	1.44	28.6	10.1	1.92	10.5	0.05	5622479
Dissolved Sulphur (S)	mg/L	<10	<10	<10	<10	<10	<10	10	5622479

RDL = Reportable Detection Limit

Maxxam Job #: B215204
Report Date: 2012/03/27

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-CVRD N23101881

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		CU1985		
Sampling Date		2012/02/21		
COC#		25616901		
	Units	**SW1**	**RDL**	**QC Batch**
Calculated Parameters				
Total Hardness (CaCO3)	mg/L	72.6	0.50	5619137

RDL = Reportable Detection Limit

Maxxam Job #: B215204
Report Date: 2012/03/27

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-CVRD N23101881

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		CU1985		
Sampling Date		2012/02/21		
COC#		25616901		
	Units	**SW1**	**RDL**	**QC Batch**
Total Metals by ICPMS				
Total Aluminum (Al)	mg/L	0.0462	0.0002	5631009
Total Antimony (Sb)	mg/L	0.00004	0.00002	5631009
Total Arsenic (As)	mg/L	0.00047	0.00002	5631009
Total Barium (Ba)	mg/L	0.00194	0.00002	5631009
Total Beryllium (Be)	mg/L	<0.00001	0.00001	5631009
Total Bismuth (Bi)	mg/L	<0.000005	0.000005	5631009
Total Boron (B)	mg/L	<0.05	0.05	5631009
Total Cadmium (Cd)	mg/L	0.000055	0.000005	5631009
Total Chromium (Cr)	mg/L	0.0003	0.0001	5631009
Total Cobalt (Co)	mg/L	0.000083	0.000005	5631009
Total Copper (Cu)	mg/L	0.00068	0.00005	5631009
Total Iron (Fe)	mg/L	0.067	0.001	5631009
Total Lead (Pb)	mg/L	0.000030	0.000005	5631009
Total Lithium (Li)	mg/L	<0.0005	0.0005	5631009
Total Manganese (Mn)	mg/L	0.00294	0.00005	5631009
Total Mercury (Hg)	mg/L	<0.00001	0.00001	5631009
Total Molybdenum (Mo)	mg/L	0.00010	0.00005	5631009
Total Nickel (Ni)	mg/L	0.00023	0.00002	5631009
Total Selenium (Se)	mg/L	0.00011	0.00004	5631009
Total Silicon (Si)	mg/L	4.7	0.1	5631009
Total Silver (Ag)	mg/L	<0.000005	0.000005	5631009
Total Strontium (Sr)	mg/L	0.0355	0.00005	5631009
Total Thallium (Tl)	mg/L	<0.000002	0.000002	5631009
Total Tin (Sn)	mg/L	<0.0002	0.0002	5631009
Total Titanium (Ti)	mg/L	0.0035	0.0005	5631009
Total Uranium (U)	mg/L	0.000124	0.000002	5631009
Total Vanadium (V)	mg/L	0.0042	0.0002	5631009
Total Zinc (Zn)	mg/L	0.0013	0.0001	5631009
Total Zirconium (Zr)	mg/L	<0.0001	0.0001	5631009
Total Calcium (Ca)	mg/L	22.7	0.05	5622480
Total Magnesium (Mg)	mg/L	3.87	0.05	5622480
Total Potassium (K)	mg/L	0.41	0.05	5622480
Total Sodium (Na)	mg/L	2.23	0.05	5622480
Total Sulphur (S)	mg/L	<10	10	5622480

RDL = Reportable Detection Limit

Maxxam Job #: B215204
Report Date: 2012/03/27

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-CVRD N23101881

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		CU1988	CU2005		
Sampling Date		2012/02/21	2012/02/22		
COC#		25616901	25616902		
	Units	**AG99-06**	**HBT94-2**	**RDL**	**QC Batch**
Volatiles					
VPH (VH6 to 10 - BTEX)	ug/L	<300	<300	300	5620728
Volatile Hydrocarbons					
VH C6-C10	ug/L	<300	<300	300	5633653
Volatiles					
Chloromethane	mg/L	<0.0010	<0.0010	0.0010	5632715
Vinyl chloride	mg/L	<0.00050	<0.00050	0.00050	5632715
Chloroethane	mg/L	<0.0010	<0.0010	0.0010	5632715
Trichlorofluoromethane	mg/L	<0.0040	<0.0040	0.0040	5632715
1,1-dichloroethene	mg/L	<0.00050	<0.00050	0.00050	5632715
Dichloromethane	mg/L	<0.0020	<0.0020	0.0020	5632715
trans-1,2-dichloroethene	mg/L	<0.0010	<0.0010	0.0010	5632715
1,1-dichloroethane	mg/L	<0.00050	<0.00050	0.00050	5632715
cis-1,2-dichloroethene	mg/L	<0.0010	<0.0010	0.0010	5632715
Chloroform	mg/L	<0.0010	<0.0010	0.0010	5632715
1,1,1-trichloroethane	mg/L	<0.00050	<0.00050	0.00050	5632715
1,2-dichloroethane	mg/L	<0.00050	<0.00050	0.00050	5632715
Carbon tetrachloride	mg/L	<0.00050	<0.00050	0.00050	5632715
Benzene	mg/L	<0.00050	<0.00050	0.00050	5632715
Methyl-tert-butylether (MTBE)	mg/L	<0.0040	<0.0040	0.0040	5632715
1,2-dichloropropane	mg/L	<0.00050	<0.00050	0.00050	5632715
cis-1,3-dichloropropene	mg/L	<0.0010	<0.0010	0.0010	5632715
trans-1,3-dichloropropene	mg/L	<0.0010	<0.0010	0.0010	5632715
Bromomethane	mg/L	<0.0010	<0.0010	0.0010	5632715
1,1,2-trichloroethane	mg/L	<0.00050	<0.00050	0.00050	5632715
Trichloroethene	mg/L	<0.00050	<0.00050	0.00050	5632715
Chlorodibromomethane	mg/L	<0.0010	<0.0010	0.0010	5632715
Tetrachloroethene	mg/L	<0.00050	<0.00050	0.00050	5632715
Bromodichloromethane	mg/L	<0.0010	<0.0010	0.0010	5632715
Toluene	mg/L	<0.00050	<0.00050	0.00050	5632715
Ethylbenzene	mg/L	<0.00050	<0.00050	0.00050	5632715
m & p-Xylene	mg/L	<0.0010	<0.0010	0.0010	5632715
Bromoform	mg/L	<0.0010	<0.0010	0.0010	5632715
Styrene	mg/L	<0.00050	<0.00050	0.00050	5632715
o-Xylene	mg/L	<0.00050	<0.00050	0.00050	5632715
Xylenes (Total)	mg/L	<0.0010	<0.0010	0.0010	5632715

RDL = Reportable Detection Limit

Maxxam Job #: B215204
Report Date: 2012/03/27

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-CVRD N23101881

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		CU1988	CU2005		
Sampling Date		2012/02/21	2012/02/22		
COC#		25616901	25616902		
	Units	**AG99-06**	**HBT94-2**	**RDL**	**QC Batch**
1,1,1,2-tetrachloroethane	mg/L	<0.00050	<0.00050	0.00050	5632715
1,1,2,2-tetrachloroethane	mg/L	<0.00050	<0.00050	0.00050	5632715
1,2-dichlorobenzene	mg/L	<0.00050	<0.00050	0.00050	5632715
1,3-dichlorobenzene	mg/L	<0.00050	<0.00050	0.00050	5632715
1,4-dichlorobenzene	mg/L	<0.00050	<0.00050	0.00050	5632715
Chlorobenzene	mg/L	<0.00050	<0.00050	0.00050	5632715
Dibromomethane	mg/L	<0.00090	<0.00090	0.00090	5632715
Surrogate Recovery (%)					
4-BROMOFLUOROBENZENE (sur.)	%	86	82		5632715
D4-1,2-DICHLOROETHANE (sur.)	%	98	99		5632715

RDL = Reportable Detection Limit

Maxxam Job #: B215204
Report Date: 2012/03/27

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-CVRD N23101881

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
5624967	Ammonia (N)	2012/02/24	91	80 - 120	101	80 - 120	0.0069, RDL=0.0050	mg/L	NC	20		
5625174	Nitrate plus Nitrite (N)	2012/02/24	NC	80 - 120	105	80 - 120	<0.020	mg/L	NC	25		
5625175	Nitrite (N)	2012/02/24	98	80 - 120	100	80 - 120	<0.005	mg/L	NC	20		
5625675	Dissolved Chloride (Cl)	2012/02/24	112	80 - 120	103	80 - 120	<0.5	mg/L	NC	20		
5625677	Dissolved Sulphate (SO4)	2012/02/24	NC	80 - 120	96	80 - 120	<0.50	mg/L	3.6	20		
5625892	Nitrate plus Nitrite (N)	2012/02/25	NC	80 - 120	105	80 - 120	<0.020	mg/L	0.6	25		
5625893	Nitrite (N)	2012/02/25	110	80 - 120	99	80 - 120	<0.005	mg/L	2.4	20		
5625914	Conductivity	2012/02/27			98	80 - 120	<1.0	uS/cm	0.05	20		
5625915	Alkalinity (Total as CaCO3)	2012/02/27	95	80 - 120	94	80 - 120	<0.50	mg/L	NC	20		
5625915	Alkalinity (PP as CaCO3)	2012/02/27					<0.50	mg/L	NC	20		
5625915	Bicarbonate (HCO3)	2012/02/27					<0.50	mg/L	NC	20		
5625915	Carbonate (CO3)	2012/02/27					<0.50	mg/L	NC	20		
5625915	Hydroxide (OH)	2012/02/27					<0.50	mg/L	NC	20		
5626317	Nitrate plus Nitrite (N)	2012/02/26	NC	80 - 120	104	80 - 120	<0.020	mg/L	1.9	25		
5630060	Dissolved Chloride (Cl)	2012/02/27	NC	80 - 120	105	80 - 120	<0.5	mg/L	0.1	20		
5630093	Dissolved Sulphate (SO4)	2012/02/27	109	80 - 120	98	80 - 120	<0.50	mg/L	2.8	20		
5631009	Total Aluminum (Al)	2012/02/29	100	80 - 120	104	80 - 120	0.0003, RDL=0.0002	mg/L	16.9	20		
5631009	Total Antimony (Sb)	2012/02/29	107	80 - 120	104	80 - 120	<0.00002	mg/L	NC	20		
5631009	Total Arsenic (As)	2012/02/29	101	80 - 120	102	80 - 120	<0.00002	mg/L	3.8	20		
5631009	Total Barium (Ba)	2012/02/29	NC	80 - 120	103	80 - 120	<0.00002	mg/L	0.8	20		
5631009	Total Beryllium (Be)	2012/02/29	99	80 - 120	102	80 - 120	<0.00001	mg/L	NC	20		
5631009	Total Bismuth (Bi)	2012/02/29	99	80 - 120	101	80 - 120	<0.000005	mg/L	NC	20		
5631009	Total Cadmium (Cd)	2012/02/29	102	80 - 120	100	80 - 120	<0.000005	mg/L	NC	20		
5631009	Total Chromium (Cr)	2012/02/29	98	80 - 120	103	80 - 120	<0.0001	mg/L	NC	20		
5631009	Total Cobalt (Co)	2012/02/29	97	80 - 120	102	80 - 120	<0.000005	mg/L	5.6	20		
5631009	Total Copper (Cu)	2012/02/29	94	80 - 120	102	80 - 120	<0.00005	mg/L	NC	20		
5631009	Total Iron (Fe)	2012/02/29	101	80 - 120	106	80 - 120	<0.001	mg/L	3.4	20		
5631009	Total Lead (Pb)	2012/02/29	97	80 - 120	101	80 - 120	<0.000005	mg/L	4.3	20		
5631009	Total Lithium (Li)	2012/02/29	NC	80 - 120	100	80 - 120	<0.0005	mg/L	1.3	20		
5631009	Total Manganese (Mn)	2012/02/29	95	80 - 120	103	80 - 120	<0.00005	mg/L	1.3	20		
5631009	Total Mercury (Hg)	2012/02/29	101	80 - 120	95	80 - 120	0.00002, RDL=0.00001	mg/L				
5631009	Total Molybdenum (Mo)	2012/02/29	NC	80 - 120	98	80 - 120	<0.00005	mg/L	2.0	20		
5631009	Total Nickel (Ni)	2012/02/29	96	80 - 120	104	80 - 120	0.00002, RDL=0.00002	mg/L	15.6	20		
5631009	Total Selenium (Se)	2012/02/29	NC	80 - 120	104	80 - 120	<0.00004	mg/L	0.5	20		
5631009	Total Silver (Ag)	2012/02/29	104	80 - 120	106	80 - 120	<0.000005	mg/L	NC	20		
5631009	Total Strontium (Sr)	2012/02/29	NC	80 - 120	101	80 - 120	<0.00005	mg/L	0.7	20		
5631009	Total Thallium (Tl)	2012/02/29	97	80 - 120	103	80 - 120	<0.000002	mg/L	NC	20		
5631009	Total Tin (Sn)	2012/02/29	108	80 - 120	101	80 - 120	<0.0002	mg/L	NC	20		
5631009	Total Titanium (Ti)	2012/02/29	99	80 - 120	95	80 - 120	<0.0005	mg/L	NC	20		
5631009	Total Uranium (U)	2012/02/29	102	80 - 120	102	80 - 120	<0.000002	mg/L	0.09	20		

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EBA Engineering Consultants Ltd.
Client Project #: CRWMC-CVRD N23101881

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
5631009	Total Vanadium (V)	2012/02/29	100	80 - 120	101	80 - 120	<0.0002	mg/L	NC	20		
5631009	Total Zinc (Zn)	2012/02/29	95	80 - 120	104	80 - 120	<0.0001	mg/L	8.8	20		
5631009	Total Boron (B)	2012/02/29					<0.05	mg/L	NC	20		
5631009	Total Silicon (Si)	2012/02/29					<0.1	mg/L	2.7	20		
5631009	Total Zirconium (Zr)	2012/02/29					<0.0001	mg/L	NC	20		
5631294	Dissolved Phosphorus (P)	2012/02/28	100	80 - 120	92	80 - 120	<0.0050	mg/L	NC	20		
5631295	Total Phosphorus (P)	2012/02/28	98	80 - 120	94	80 - 120	<0.0050	mg/L	NC	20		
5631533	Dissolved Aluminum (Al)	2012/02/29	105	80 - 120	104	80 - 120	<0.0002	mg/L	16.6	20		
5631533	Dissolved Antimony (Sb)	2012/02/29	109	80 - 120	108	80 - 120	<0.00002	mg/L	NC	20		
5631533	Dissolved Arsenic (As)	2012/02/29	104	80 - 120	102	80 - 120	<0.00002	mg/L	1.3	20		
5631533	Dissolved Barium (Ba)	2012/02/29	102	80 - 120	103	80 - 120	<0.00002	mg/L	0.6	20		
5631533	Dissolved Beryllium (Be)	2012/02/29	110	80 - 120	107	80 - 120	<0.00001	mg/L	NC	20		
5631533	Dissolved Bismuth (Bi)	2012/02/29	107	80 - 120	104	80 - 120	<0.000005	mg/L	NC	20		
5631533	Dissolved Cadmium (Cd)	2012/02/29	105	80 - 120	102	80 - 120	<0.000005	mg/L	NC	20		
5631533	Dissolved Chromium (Cr)	2012/02/29	101	80 - 120	101	80 - 120	<0.0001	mg/L	0.06	20		
5631533	Dissolved Cobalt (Co)	2012/02/29	100	80 - 120	100	80 - 120	<0.000005	mg/L	NC	20		
5631533	Dissolved Copper (Cu)	2012/02/29	99	80 - 120	100	80 - 120	<0.00005	mg/L	NC	20		
5631533	Dissolved Iron (Fe)	2012/02/29	110	80 - 120	110	80 - 120	<0.001	mg/L	NC	20		
5631533	Dissolved Lead (Pb)	2012/02/29	105	80 - 120	104	80 - 120	<0.000005	mg/L	NC	20		
5631533	Dissolved Lithium (Li)	2012/02/29	102	80 - 120	106	80 - 120	<0.0005	mg/L	NC	20		
5631533	Dissolved Manganese (Mn)	2012/02/29	103	80 - 120	104	80 - 120	<0.00005	mg/L	2.8	20		
5631533	Dissolved Mercury (Hg)	2012/02/29	102	80 - 120	95	80 - 120	<0.00001	mg/L	NC	20		
5631533	Dissolved Molybdenum (Mo)	2012/02/29	97	80 - 120	98	80 - 120	<0.00005	mg/L	NC	20		
5631533	Dissolved Nickel (Ni)	2012/02/29	101	80 - 120	101	80 - 120	<0.00002	mg/L	NC	20		
5631533	Dissolved Selenium (Se)	2012/02/29	112	80 - 120	105	80 - 120	<0.00004	mg/L	7.0	20		
5631533	Dissolved Silver (Ag)	2012/02/29	109	80 - 120	106	80 - 120	<0.000005	mg/L	NC	20		
5631533	Dissolved Strontium (Sr)	2012/02/29	NC	80 - 120	103	80 - 120	<0.00005	mg/L	0.4	20		
5631533	Dissolved Thallium (Tl)	2012/02/29	97	80 - 120	110	80 - 120	<0.000002	mg/L	NC	20		
5631533	Dissolved Tin (Sn)	2012/02/29	110	80 - 120	100	80 - 120	<0.0002	mg/L	NC	20		
5631533	Dissolved Titanium (Ti)	2012/02/29	101	80 - 120	98	80 - 120	<0.0005	mg/L	NC	20		
5631533	Dissolved Uranium (U)	2012/02/29	110	80 - 120	106	80 - 120	<0.000002	mg/L	3.7	20		
5631533	Dissolved Vanadium (V)	2012/02/29	NC	80 - 120	100	80 - 120	<0.0002	mg/L	3.8	20		
5631533	Dissolved Zinc (Zn)	2012/02/29	103	80 - 120	104	80 - 120	<0.0001	mg/L	NC	20		
5631533	Dissolved Boron (B)	2012/02/29					<0.05	mg/L	NC	20		
5631533	Dissolved Silicon (Si)	2012/02/29					<0.1	mg/L	0.2	20		
5631533	Dissolved Zirconium (Zr)	2012/02/29					<0.0001	mg/L	NC	20		
5632715	4-BROMOFLUOROBENZENE (sur.)	2012/02/29	94	70 - 130	98	70 - 130	85	%				
5632715	D4-1,2-DICHLOROETHANE (sur.)	2012/02/29	101	70 - 130	95	70 - 130	91	%				
5632715	Chloromethane	2012/02/29	122	60 - 140	92	60 - 140	<0.0010	mg/L	NC	30		
5632715	Vinyl chloride	2012/02/29	134	60 - 140	125	60 - 140	<0.00050	mg/L	NC	30		

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QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
5632715	Chloroethane	2012/02/29	132	60 - 140	100	60 - 140	<0.0010	mg/L	NC	30		
5632715	Trichlorofluoromethane	2012/02/29	90	60 - 140	116	60 - 140	<0.0040	mg/L	NC	30		
5632715	1,1-dichloroethene	2012/02/29	119	70 - 130	98	70 - 130	<0.00050	mg/L	NC	30		
5632715	Dichloromethane	2012/02/29	108	70 - 130	101	70 - 130	<0.0020	mg/L	NC	30		
5632715	trans-1,2-dichloroethene	2012/02/29	118	70 - 130	94	70 - 130	<0.0010	mg/L	NC	30		
5632715	1,1-dichloroethane	2012/02/29	119	70 - 130	96	70 - 130	<0.00050	mg/L	NC	30		
5632715	cis-1,2-dichloroethene	2012/02/29	115	70 - 130	95	70 - 130	<0.0010	mg/L	NC	30		
5632715	Chloroform	2012/02/29	114	70 - 130	92	70 - 130	<0.0010	mg/L	NC	30		
5632715	1,1,1-trichloroethane	2012/02/29	112	70 - 130	92	70 - 130	<0.00050	mg/L	NC	30		
5632715	1,2-dichloroethane	2012/02/29	115	70 - 130	92	70 - 130	<0.00050	mg/L	NC	30		
5632715	Carbon tetrachloride	2012/02/29	113	70 - 130	94	70 - 130	<0.00050	mg/L	NC	30		
5632715	Benzene	2012/02/29	107	70 - 130	106	70 - 130	<0.00050	mg/L	NC	30		
5632715	Methyl-tert-butylether(MTBE)	2012/02/29	110	70 - 130	92	70 - 130	<0.0040	mg/L	NC	30		
5632715	1,2-dichloropropane	2012/02/29	114	70 - 130	94	70 - 130	<0.00050	mg/L	NC	30		
5632715	cis-1,3-dichloropropene	2012/02/29	92	70 - 130	73	70 - 130	<0.0010	mg/L	NC	30		
5632715	trans-1,3-dichloropropene	2012/02/29	94	70 - 130	74	70 - 130	<0.0010	mg/L	NC	30		
5632715	Bromomethane	2012/02/29	134	60 - 140	102	60 - 140	<0.0010	mg/L	NC	30		
5632715	1,1,2-trichloroethane	2012/02/29	103	70 - 130	110	70 - 130	<0.00050	mg/L	NC	30		
5632715	Trichloroethene	2012/02/29	97	70 - 130	106	70 - 130	<0.00050	mg/L	NC	30		
5632715	Chlorodibromomethane	2012/02/29	108	70 - 130	93	70 - 130	<0.0010	mg/L	NC	30		
5632715	Tetrachloroethene	2012/02/29	109	70 - 130	94	70 - 130	<0.00050	mg/L	NC	30		
5632715	Bromodichloromethane	2012/02/29	114	70 - 130	93	70 - 130	<0.0010	mg/L	NC	30		
5632715	Toluene	2012/02/29	104	70 - 130	88	70 - 130	<0.00050	mg/L	NC	30		
5632715	Ethylbenzene	2012/02/29	98	70 - 130	83	70 - 130	<0.00050	mg/L	NC	30		
5632715	m & p-Xylene	2012/02/29	105	70 - 130	88	70 - 130	<0.0010	mg/L	NC	30		
5632715	Bromoform	2012/02/29	106	70 - 130	94	70 - 130	<0.0010	mg/L	NC	30		
5632715	Styrene	2012/02/29	92	70 - 130	77	70 - 130	<0.00050	mg/L	NC	30		
5632715	o-Xylene	2012/02/29	97	70 - 130	81	70 - 130	<0.00050	mg/L	NC	30		
5632715	1,1,1,2-tetrachloroethane	2012/02/29	109	70 - 130	92	70 - 130	<0.00050	mg/L	NC	30		
5632715	1,1,2,2-tetrachloroethane	2012/02/29	114	70 - 130	116	70 - 130	<0.00050	mg/L	NC	30		
5632715	1,2-dichlorobenzene	2012/02/29	116	70 - 130	100	70 - 130	<0.00050	mg/L	NC	30		
5632715	1,3-dichlorobenzene	2012/02/29	116	70 - 130	100	70 - 130	<0.00050	mg/L	NC	30		
5632715	1,4-dichlorobenzene	2012/02/29	113	70 - 130	97	70 - 130	<0.00050	mg/L	NC	30		
5632715	Chlorobenzene	2012/02/29	111	70 - 130	90	70 - 130	<0.00050	mg/L	NC	30		
5632715	Dibromomethane	2012/02/29	114	70 - 130	93	70 - 130	<0.00090	mg/L	NC	30		
5632715	Xylenes (Total)	2012/02/29					<0.0010	mg/L	NC	30		
5633653	VH C6-C10	2012/02/29					<300	ug/L	NC	40	89	70 - 130
5636285	Fluoride (F)	2012/02/29	NC	80 - 120	104	80 - 120	<0.010	mg/L	1.1	20		

Maxxam Job #: B215204
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EBA Engineering Consultants Ltd.
Client Project #: CRWMC-CVRD N23101881

QUALITY ASSURANCE REPORT

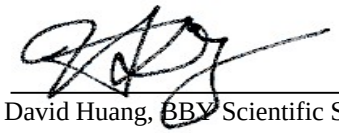
			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
5637926	Dissolved Phosphorus (P)	2012/02/29	NC	80 - 120	100	80 - 120	<0.0050	mg/L	0.7	20		
5640443	Fluoride (F)	2012/03/01	110	80 - 120	104	80 - 120	<0.010	mg/L	6.9	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.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
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 #: B215204

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



David Huang, BBY Scientific Specialist



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.

Maxxam

Maxxam Analytics International Corporation o/a Maxxam Analytics
4606 Canada Way, Burnaby, British Columbia Canada V5G 1K5 Tel:(604) 734 7276 Toll-free:(604) 734 7276 Fax:(604) 731 2386 www.maxxam.ca

CHAIN OF CUSTODY RECORD

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#5908 EBA Engineering Consultants Ltd.	Company Name:		Quotation #:	B10655	MAXXAM JOB #: B215204	BOTTLE ORDER #: 256103
Contact Name:	Kristy Gabelhouse	Contact Name:		P.O. #:			
Address:	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Address:		Project #:	CWMC-CVRD NZ301881	CHAIN OF CUSTODY #: C#256169-01-01	PROJECT MANAGER: NAMITA SAHNI
Phone:	(250)756-2256 x233 Fax: (250)756-2686	Phone:	Fax:	Project Name:			
Email:	kgabelhouse@eba.ca dromano@eba.ca	Email:		Site #:			
				Sampled By:	K.Gabelhouse		

REGULATORY CRITERIA
- ☐ CSR
- ☐ CCME
- ☒ BC Water Quality ALL DW
- ☒ Other CDW QG

SPECIAL INSTRUCTIONS

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

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 most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans 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 lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered * (Y / N)	Alkalinity ,pH , Conductivity	Ammonia (N)	ANION (CL, F, NO2, NO3, SO4)	Low Level Dissolved Metals	Dissolved Phosphorous	Ammonia-N	ANIONS (CL, F, NO2, NO3, SO4)	Low Level Total Metals	pH,Conductivity,Alkalinity	Total Phosphorous	# of Bottles	Comments
1	CV 1985	SW1	Feb21/12		SW							X	X	X	X	X	4	
2	986	AG99-01	↓		GW	X	X	X	X	X	X						4	
3	987	AG99-05				X	X	X	X	X	X						4	
4	988	AG99-06				X	X	X	X	X	X						7	VOC analysis too
5	989	EBA11-1				X	X	X	X	X	X						4	
6	990	EBA11-3				X	X	X	X	X	X						4	
7	991	EBA11-4				X	X	X	X	X	X						4	
8	992	EBA11-5	↓			X	X	X	X	X	X						4	
9	993	AG99-02	Feb22/12			X	X	X	X	X	X						4	B215204
10	994	AG99-04	↓		↓	X	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: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
K Gabelhouse	12/02/22	5:00pm	A Patel AVANI PATEL	2012/02/23	07:30		☐	1 5 2	NA ☐ 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.

White: Maxxam Yellow: Client

Maxxam

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4606 Canada Way, Burnaby, British Columbia Canada V5G 1K5 Tel (604) 734 7276 Toll-free (604) 734 7276 Fax (604) 731 2386 www.maxxam.ca

CHAIN OF CUSTODY RECORD

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#5908 EBA Engineering Consultants Ltd.	Company Name:		Quotation #:	B10655	MAXXAM JOB #:	BOTTLE ORDER #:
Contact Name:	Kristy Gabelhouse	Contact Name:		P.O. #:			256185
Address:	#1 - 4376 Boban Drive	Address:		Project #:	CWMC-CVRD 1231018881	CHAIN OF CUSTODY #:	PROJECT MANAGER:
	Nanaimo BC V9T 6A7			Project Name:		D#256186-03-01	NAMITA SAHNI
Phone:	(250)756-2256 x233 Fax: (250)756-2686	Phone:	Fax:	Site #:			
Email:	kgabelhouse@eba.ca dsomani@eba.ca	Email:		Sampled By:	K. Gabelhouse		

REGULATORY CRITERIA:
- ☐ CSR
- ☐ CCME
- ☒ BC Water Quality DW/AL
- ☒ Other CDWQG

SPECIAL INSTRUCTIONS

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

ANALYSIS REQUESTED (Please be specific):

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 most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans 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 lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered ? (Y / N)	Alkalinity ,pH , Conductivity	Ammonia (N)	ANION (CL, F, NO2, NO3, SO4)	Low Level Dissolved Metals	Dissolved Phosphorous	VOC	ANIONS (CL, F, NO2, NO3, SO4)	Low Level Total Metals	pH,Conductivity,Alkalinity	Total Phosphorus	# of Bottles	Comments
1	CW2004	HBT94-1	Feb22/12		GW	X	X	X	X	X	X						4	
2	005	HBT94-2	↓		↓	X	X	X	X	X	X	X					7	
3	006	HBT94-4				X	X	X	X	X	X						4	
4	007	HBT94-6				X	X	X	X	X	X						4	
5																		
6																		
7																		
8																		
9																		
10																		

B215204

*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: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
K Gabelhouse	12/02/22	4:00pm	A Patel AVANI PATEL	2012/02/23	09:30		☐	1 5 2	NA ☐ 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.

White: Maxxam Yellow: Client

Success Through Science®

Your Project #: CRWMC-CVRD N23101881
Your C.O.C. #: 25635301

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

Report Date: 2012/03/27
This report supersedes all previous reports with the same Maxxam job number

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B214692
Received: 2012/02/22, 09:30

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	8	2012/02/22	2012/02/23	BBY6SOP-00026, BBY0SOP-00002	SM2320B
Chloride by Automated Colourimetry	8	N/A	2012/02/23	BBY6SOP-00011	SM-4500-Cl-
Conductance - water	8	N/A	2012/02/23	BBY6SOP-00026	SM-2510B
Fluoride	8	N/A	2012/02/28	BBY6SOP-00038	SM - 4500 F C
Hardness (calculated as CaCO3)	8	N/A	2012/02/28	BBY7SOP-00002	Calculated Parameter
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	8	N/A	2012/02/28	BBY7SOP-00002	EPA 6020A
Elements by ICPMS Low Level (dissolved)	8	N/A	2012/02/27	BBY7SOP-00002	EPA 6020A
Ammonia-N	8	N/A	2012/02/23	BBY6SOP-00009	SM-4500NH3G
Nitrate + Nitrite (N)	8	N/A	2012/02/22	BBY6SOP-00010	USEPA 353.2
Nitrite (N) by CFA	8	N/A	2012/02/22	BBY6SOP-00010	EPA 353.2
Nitrogen - Nitrate (as N)	8	N/A	2012/02/23	BBY6SOP-00010	Based on EPA 353.2
Filter and HNO3 Preserve for Metals	8	N/A	2012/02/22	BBY6WI-00001	EPA 200.2
pH Water	8	N/A	2012/02/23	BBY6SOP-00026	SM-4500H+B
CSR VH C6-C10 in Water by HS GC/MS	1	N/A	2012/02/22	BBY8SOP-00011	EPA 8260B
Sulphate by Automated Colourimetry	8	N/A	2012/02/23	BBY6SOP-00017	SM4500-SO42
Phosphorus-P (Total, dissolved)	8	2012/02/23	2012/02/24	BBY6SOP-00013	SM-4500PE
VOCs in Water by HS GC/MS	1	2012/02/22	2012/02/22	BBY8-SOP-0009	EPA 8260C
Volatile HC-BTEX	1	N/A	2012/02/23		

* Results relate only to the items tested.

Encryption Key

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

NAMITA SAHNI, Burnaby Project Manager
Email: NSahni@maxxam.ca
Phone# (604) 639-2614

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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 #: B214692
Report Date: 2012/03/27

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-CVRD N23101881

Sampler Initials: KG

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		CT9184	CT9185	CT9186	CT9187	CT9188		CT9189		CT9190	CT9191		
Sampling Date		2012/02/20	2012/02/20	2012/02/20	2012/02/20	2012/02/20		2012/02/20		2012/02/20	2012/02/20		
COC#		25635301	25635301	25635301	25635301	25635301		25635301		25635301	25635301		
	Units	**EBA04-1**	**EBA04-2**	**EBA04-3**	**EBA04-4**	**EBA04-6**	**RDL**	**EBA04-7**	**RDL**	**EBA04-8**	**EBA11-2**	**RDL**	**QC Batch**
ANIONS													
Nitrite (N)	mg/L	<0.005	<0.005	0.009	<0.005	<0.005	0.005	0.051	0.005	0.008	<0.005	0.005	5617313
Calculated Parameters													
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD	FIELD	N/A	FIELD	N/A	FIELD	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.193	0.062	0.989	0.123	1.03	0.020	3.00	0.10	0.973	0.235	0.020	5616310
Misc. Inorganics													
Fluoride (F)	mg/L	0.017	0.018	<0.010	0.019	0.013	0.010	0.014	0.010	<0.010	0.027	0.010	5634227
Alkalinity (Total as CaCO3)	mg/L	50.8	46.0	222	53.3	215	0.50	443	0.50	224	111	0.50	5616908
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	0.50	5616908
Bicarbonate (HCO3)	mg/L	62.0	56.1	271	65.1	263	0.50	540	0.50	274	136	0.50	5616908
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	5616908
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	5616908
Anions													
Dissolved Sulphate (SO4)	mg/L	3.42	3.38	4.40	2.95	1.67	0.50	42.0	0.50	4.26	8.08	0.50	5622468
Dissolved Chloride (Cl)	mg/L	2.0	3.4	11	3.4	1.7	0.5	29	0.5	11	5.0	0.5	5622458
Nutrients													
Ammonia (N)	mg/L	0.011	0.013	0.0088	0.010	0.021	0.0050	0.0091	0.0050	0.0084	0.010	0.0050	5620705
Dissolved Phosphorus (P)	mg/L	0.0154	<0.0050	<0.0050	0.0053	<0.0050	0.0050	0.0085	0.0050	<0.0050	0.0092	0.0050	5625697
Nitrate plus Nitrite (N)	mg/L	0.193	0.062	0.997	0.123	1.03	0.020	3.05	0.10	0.981	0.235	0.020	5617312
Physical Properties													
Conductivity	uS/cm	114	112	476	119	431	1.0	993	1.0	479	249	1.0	5616907
pH	pH Units	7.96	8.05	8.15	8.08	8.20		7.92		8.19	8.24		5616896

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: B214692
Report Date: 2012/03/27

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-CVRD N23101881

Sampler Initials: KG

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		CT9184	CT9185	CT9186	CT9187	CT9188	CT9189	CT9190	CT9191		
Sampling Date		2012/02/20	2012/02/20	2012/02/20	2012/02/20	2012/02/20	2012/02/20	2012/02/20	2012/02/20		
COC#		25635301	25635301	25635301	25635301	25635301	25635301	25635301	25635301		
	Units	**EBA04-1**	**EBA04-2**	**EBA04-3**	**EBA04-4**	**EBA04-6**	**EBA04-7**	**EBA04-8**	**EBA11-2**	**RDL**	**QC Batch**
Misc. Inorganics											
Dissolved Hardness (CaCO3)	mg/L	53.9	53.8	259	57.9	225	534	260	125	0.5	5615399

RDL = Reportable Detection Limit

Maxxam Job #: B214692
Report Date: 2012/03/27

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-CVRD N23101881

Sampler Initials: KG

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		CT9184	CT9185	CT9186	CT9187	CT9188	CT9189	CT9190	CT9191		
Sampling Date		2012/02/20	2012/02/20	2012/02/20	2012/02/20	2012/02/20	2012/02/20	2012/02/20	2012/02/20		
COC#		25635301	25635301	25635301	25635301	25635301	25635301	25635301	25635301		
	Units	**EBA04-1**	**EBA04-2**	**EBA04-3**	**EBA04-4**	**EBA04-6**	**EBA04-7**	**EBA04-8**	**EBA11-2**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS											
Dissolved Aluminum (Al)	mg/L	0.0031(1)	0.0066	0.0031	0.0078	0.0027	0.0021	0.0027	0.0099	0.0002	5624669
Dissolved Antimony (Sb)	mg/L	0.00004	0.00003	0.00002	0.00003	0.00003	0.00005	<0.00002	0.00002	0.00002	5624669
Dissolved Arsenic (As)	mg/L	0.00033	0.00031	0.00006	0.00029	0.00011	0.00022	0.00007	0.00019	0.00002	5624669
Dissolved Barium (Ba)	mg/L	0.00128	0.00071	0.00840	0.00090	0.00496	0.0229	0.00799	0.00750	0.00002	5624669
Dissolved Beryllium (Be)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00001	<0.00001	<0.00001	0.00001	5624669
Dissolved Bismuth (Bi)	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.000005	5624669
Dissolved Boron (B)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	0.26	<0.05	<0.05	0.05	5624669
Dissolved Cadmium (Cd)	mg/L	0.000009	<0.000005	<0.000005	0.000014	0.000021	0.000060	<0.000005	<0.000005	0.000005	5624669
Dissolved Chromium (Cr)	mg/L	0.0004	0.0003	0.0007	0.0004	0.0011	0.0001	0.0007	0.0029	0.0001	5624669
Dissolved Cobalt (Co)	mg/L	0.000009	0.000009	0.000008	0.000015	0.000009	0.000576	0.000006	0.000026	0.000005	5624669
Dissolved Copper (Cu)	mg/L	0.0238	0.00020	0.00014	0.00030	0.00025	0.00286	0.00015	0.00012	0.00005	5624669
Dissolved Iron (Fe)	mg/L	0.001	<0.001	0.003	0.002	0.002	0.006	0.002	0.004	0.001	5624669
Dissolved Lead (Pb)	mg/L	0.000142	<0.000005	<0.000005	0.000018	0.000008	0.000007	<0.000005	0.000007	0.000005	5624669
Dissolved Lithium (Li)	mg/L	<0.0005	<0.0005	0.0008	<0.0005	0.0008	0.0012	0.0008	0.0005	0.0005	5624669
Dissolved Manganese (Mn)	mg/L	0.00017	0.00009	<0.00005	0.00009	0.00011	0.130	<0.00005	0.00237	0.00005	5624669
Dissolved Mercury (Hg)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00001	5624669
Dissolved Molybdenum (Mo)	mg/L	0.00007	0.00011	<0.00005	0.00012	<0.00005	0.00012	<0.00005	0.00016	0.00005	5624669
Dissolved Nickel (Ni)	mg/L	0.00012(1)	<0.00002	0.00002	0.00005	0.00010	0.00168	0.00006	0.00017	0.00002	5624669
Dissolved Selenium (Se)	mg/L	0.00014	0.00012	0.00021	0.00011	0.00005	0.00006	0.00020	0.00015	0.00004	5624669
Dissolved Silicon (Si)	mg/L	4.7	3.6	7.3	4.1	9.1	13.1	7.1	8.0	0.1	5624669
Dissolved Silver (Ag)	mg/L	0.000006	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.000005	5624669
Dissolved Strontium (Sr)	mg/L	0.0274	0.0292	0.162	0.0324	0.134	0.375	0.160	0.0596	0.00005	5624669
Dissolved Thallium (Tl)	mg/L	<0.000002	<0.000002	<0.000002	0.000002	<0.000002	0.000005	<0.000002	0.000006	0.000002	5624669
Dissolved Tin (Sn)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	5624669
Dissolved Titanium (Ti)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	5624669
Dissolved Uranium (U)	mg/L	0.000035	0.000018	0.000144	0.000018	0.000234	0.00100	0.000182	0.000190	0.000002	5624669
Dissolved Vanadium (V)	mg/L	0.0040	0.0021	0.0007	0.0026	0.0013	0.0019	0.0008	0.0033	0.0002	5624669
Dissolved Zinc (Zn)	mg/L	0.0705	0.0005	0.0003	0.0031	0.0020	0.0006	0.0002	0.0001	0.0001	5624669
Dissolved Zirconium (Zr)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	5624669
Dissolved Calcium (Ca)	mg/L	17.2	18.2	82.9	20.1	65.7	159	81.7	32.8	0.05	5615854
Dissolved Magnesium (Mg)	mg/L	2.66	2.00	12.6	1.86	14.7	33.2	13.5	10.4	0.05	5615854
Dissolved Potassium (K)	mg/L	0.39	0.24	0.98	0.37	1.40	2.83	0.93	0.47	0.05	5615854
Dissolved Sodium (Na)	mg/L	1.57	1.12	2.68	1.45	5.65	21.6	2.98	4.81	0.05	5615854
Dissolved Sulphur (S)	mg/L	<10	<10	<10	<10	<10	19	<10	<10	10	5615854

RDL = Reportable Detection Limit
(1) - Duplicate RPD above control limit - (10% of analytes failure allowed).

Maxxam Job #: B214692
Report Date: 2012/03/27

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-CVRD N23101881

Sampler Initials: KG

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		CT9189		
Sampling Date		2012/02/20		
COC#		25635301		
	Units	**EBA04-7**	**RDL**	**QC Batch**
Volatiles				
VPH (VH6 to 10 - BTEX)	ug/L	<300	300	5615402
Volatile Hydrocarbons				
VH C6-C10	ug/L	<300	300	5617452
Volatiles				
Chloromethane	mg/L	<0.0010	0.0010	5615941
Vinyl chloride	mg/L	<0.00050	0.00050	5615941
Chloroethane	mg/L	<0.0010	0.0010	5615941
Trichlorofluoromethane	mg/L	<0.0040	0.0040	5615941
1,1-dichloroethene	mg/L	<0.00050	0.00050	5615941
Dichloromethane	mg/L	<0.0020	0.0020	5615941
trans-1,2-dichloroethene	mg/L	<0.0010	0.0010	5615941
1,1-dichloroethane	mg/L	<0.00050	0.00050	5615941
cis-1,2-dichloroethene	mg/L	<0.0010	0.0010	5615941
Chloroform	mg/L	<0.0010	0.0010	5615941
1,1,1-trichloroethane	mg/L	<0.00050	0.00050	5615941
1,2-dichloroethane	mg/L	<0.00050	0.00050	5615941
Carbon tetrachloride	mg/L	<0.00050	0.00050	5615941
Benzene	mg/L	<0.00050	0.00050	5615941
Methyl-tert-butylether (MTBE)	mg/L	<0.0040	0.0040	5615941
1,2-dichloropropane	mg/L	<0.00050	0.00050	5615941
cis-1,3-dichloropropene	mg/L	<0.0010	0.0010	5615941
trans-1,3-dichloropropene	mg/L	<0.0010	0.0010	5615941
Bromomethane	mg/L	<0.0010	0.0010	5615941
1,1,2-trichloroethane	mg/L	<0.00050	0.00050	5615941
Trichloroethene	mg/L	<0.00050	0.00050	5615941
Chlorodibromomethane	mg/L	<0.0010	0.0010	5615941
Tetrachloroethene	mg/L	<0.00050	0.00050	5615941
Bromodichloromethane	mg/L	<0.0010	0.0010	5615941
Toluene	mg/L	<0.00050	0.00050	5615941
Ethylbenzene	mg/L	<0.00050	0.00050	5615941
m & p-Xylene	mg/L	<0.0010	0.0010	5615941
Bromoform	mg/L	<0.0010	0.0010	5615941
Styrene	mg/L	<0.00050	0.00050	5615941
o-Xylene	mg/L	<0.00050	0.00050	5615941
Xylenes (Total)	mg/L	<0.0010	0.0010	5615941

RDL = Reportable Detection Limit

Maxxam Job #: B214692
Report Date: 2012/03/27

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-CVRD N23101881

Sampler Initials: KG

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		CT9189		
Sampling Date		2012/02/20		
COC#		25635301		
	Units	**EBA04-7**	**RDL**	**QC Batch**
1,1,1,2-tetrachloroethane	mg/L	<0.00050	0.00050	5615941
1,1,2,2-tetrachloroethane	mg/L	<0.00050	0.00050	5615941
1,2-dichlorobenzene	mg/L	<0.00050	0.00050	5615941
1,3-dichlorobenzene	mg/L	<0.00050	0.00050	5615941
1,4-dichlorobenzene	mg/L	<0.00050	0.00050	5615941
Chlorobenzene	mg/L	<0.00050	0.00050	5615941
Dibromomethane	mg/L	<0.00090	0.00090	5615941
Surrogate Recovery (%)				
4-BROMOFLUOROBENZENE (sur.)	%	82		5615941
D4-1,2-DICHLOROETHANE (sur.)	%	90		5615941
D8-TOLUENE (sur.)	%	97		5615941

RDL = Reportable Detection Limit

Maxxam Job #: B214692
Report Date: 2012/03/27

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-CVRD N23101881

Sampler Initials: KG

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
5615941	4-BROMOFLUOROBENZENE (sur.)	2012/02/22	81	70 - 130	114	70 - 130	84	%				
5615941	D4-1,2-DICHLOROETHANE (sur.)	2012/02/22	85	70 - 130	107	70 - 130	94	%				
5615941	D8-TOLUENE (sur.)	2012/02/22	97	70 - 130	119	70 - 130	97	%				
5615941	Chloromethane	2012/02/22	77	60 - 140	89	60 - 140	<0.0010	mg/L				
5615941	Vinyl chloride	2012/02/22	111	60 - 140	113	60 - 140	<0.00050	mg/L				
5615941	Chloroethane	2012/02/22	113	60 - 140	123	60 - 140	<0.0010	mg/L				
5615941	Trichlorofluoromethane	2012/02/22	108	60 - 140	120	60 - 140	<0.0040	mg/L				
5615941	1,1-dichloroethene	2012/02/22	86	70 - 130	105	70 - 130	<0.00050	mg/L				
5615941	Dichloromethane	2012/02/22	94	70 - 130	109	70 - 130	<0.0020	mg/L				
5615941	trans-1,2-dichloroethene	2012/02/22	83	70 - 130	102	70 - 130	<0.0010	mg/L				
5615941	1,1-dichloroethane	2012/02/22	91	70 - 130	101	70 - 130	<0.00050	mg/L				
5615941	cis-1,2-dichloroethene	2012/02/22	85	70 - 130	102	70 - 130	<0.0010	mg/L				
5615941	Chloroform	2012/02/22	90	70 - 130	99	70 - 130	<0.0010	mg/L				
5615941	1,1,1-trichloroethane	2012/02/22	82	70 - 130	100	70 - 130	<0.00050	mg/L				
5615941	1,2-dichloroethane	2012/02/22	87	70 - 130	95	70 - 130	<0.00050	mg/L				
5615941	Carbon tetrachloride	2012/02/22	81	70 - 130	102	70 - 130	<0.00050	mg/L				
5615941	Benzene	2012/02/22	101	70 - 130	111	70 - 130	<0.00050	mg/L				
5615941	Methyl-tert-butylether(MTBE)	2012/02/22	84	70 - 130	96	70 - 130	<0.0040	mg/L				
5615941	1,2-dichloropropane	2012/02/22	89	70 - 130	98	70 - 130	<0.00050	mg/L				
5615941	cis-1,3-dichloropropene	2012/02/22	86	70 - 130	85	70 - 130	<0.0010	mg/L				
5615941	trans-1,3-dichloropropene	2012/02/22	81	70 - 130	91	70 - 130	<0.0010	mg/L				
5615941	Bromomethane	2012/02/22	81	60 - 140	103	60 - 140	<0.0010	mg/L				
5615941	1,1,2-trichloroethane	2012/02/22	98	70 - 130	93	70 - 130	<0.00050	mg/L				
5615941	Trichloroethene	2012/02/22	80	70 - 130	106	70 - 130	<0.00050	mg/L				
5615941	Chlorodibromomethane	2012/02/22	78	70 - 130	98	70 - 130	<0.0010	mg/L				
5615941	Tetrachloroethene	2012/02/22	77	70 - 130	103	70 - 130	<0.00050	mg/L				
5615941	Bromodichloromethane	2012/02/22	92	70 - 130	98	70 - 130	<0.0010	mg/L				
5615941	Toluene	2012/02/22	89	70 - 130	98	70 - 130	<0.00050	mg/L				
5615941	Ethylbenzene	2012/02/22	83	70 - 130	92	70 - 130	<0.00050	mg/L				
5615941	m & p-Xylene	2012/02/22	85	70 - 130	95	70 - 130	<0.0010	mg/L				
5615941	Bromoform	2012/02/22	72	70 - 130	98	70 - 130	<0.0010	mg/L				
5615941	Styrene	2012/02/22	66(1)	70 - 130	77	70 - 130	<0.00050	mg/L				
5615941	o-Xylene	2012/02/22	84	70 - 130	94	70 - 130	<0.00050	mg/L				
5615941	1,1,1,2-tetrachloroethane	2012/02/22	77	70 - 130	101	70 - 130	<0.00050	mg/L				
5615941	1,1,2,2-tetrachloroethane	2012/02/22	114	70 - 130	101	70 - 130	<0.00050	mg/L				
5615941	1,2-dichlorobenzene	2012/02/22	88	70 - 130	94	70 - 130	<0.00050	mg/L				
5615941	1,3-dichlorobenzene	2012/02/22	86	70 - 130	95	70 - 130	<0.00050	mg/L				
5615941	1,4-dichlorobenzene	2012/02/22	86	70 - 130	93	70 - 130	<0.00050	mg/L				
5615941	Chlorobenzene	2012/02/22	90	70 - 130	99	70 - 130	<0.00050	mg/L				
5615941	Dibromomethane	2012/02/22	105	70 - 130	96	70 - 130	<0.00090	mg/L				

Maxxam Job #: B214692
Report Date: 2012/03/27

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-CVRD N23101881

Sampler Initials: KG

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
5615941	Xylenes (Total)	2012/02/22					<0.0010	mg/L				
5616907	Conductivity	2012/02/23			100	80 - 120	<1.0	uS/cm	1.8	20		
5616908	Alkalinity (Total as CaCO3)	2012/02/23			92	80 - 120	<0.50	mg/L	2.3	20		
5616908	Alkalinity (PP as CaCO3)	2012/02/23					<0.50	mg/L	NC	20		
5616908	Bicarbonate (HCO3)	2012/02/23					<0.50	mg/L	2.3	20		
5616908	Carbonate (CO3)	2012/02/23					<0.50	mg/L	NC	20		
5616908	Hydroxide (OH)	2012/02/23					<0.50	mg/L	NC	20		
5617312	Nitrate plus Nitrite (N)	2012/02/22	107	80 - 120	112	80 - 120	<0.020	mg/L	2.2	25		
5617313	Nitrite (N)	2012/02/22	99	80 - 120	96	80 - 120	<0.005	mg/L	NC	20		
5617452	VH C6-C10	2012/02/22					<300	ug/L	NC	40	93	70 - 130
5620705	Ammonia (N)	2012/02/23	NC	80 - 120	104	80 - 120	<0.0050	mg/L	2.5	20		
5622458	Dissolved Chloride (Cl)	2012/02/23	NC	80 - 120	105	80 - 120	<0.5	mg/L	11.3	20		
5622468	Dissolved Sulphate (SO4)	2012/02/23	NC	80 - 120	106	80 - 120	<0.50	mg/L	0.7	20		
5624669	Dissolved Aluminum (Al)	2012/02/27	94	80 - 120	103	80 - 120	<0.0002	mg/L	26.3(1)	20		
5624669	Dissolved Antimony (Sb)	2012/02/27	114	80 - 120	114	80 - 120	<0.00002	mg/L	NC	20		
5624669	Dissolved Arsenic (As)	2012/02/27	104	80 - 120	103	80 - 120	<0.00002	mg/L	5.3	20		
5624669	Dissolved Barium (Ba)	2012/02/27	97	80 - 120	100	80 - 120	<0.00002	mg/L	2.8	20		
5624669	Dissolved Beryllium (Be)	2012/02/27	113	80 - 120	109	80 - 120	<0.00001	mg/L	NC	20		
5624669	Dissolved Bismuth (Bi)	2012/02/27	101	80 - 120	105	80 - 120	<0.000005	mg/L	NC	20		
5624669	Dissolved Cadmium (Cd)	2012/02/27	106	80 - 120	107	80 - 120	<0.000005	mg/L	NC	20		
5624669	Dissolved Chromium (Cr)	2012/02/27	93	80 - 120	97	80 - 120	0.0001, RDL=0.0001	mg/L	NC	20		
5624669	Dissolved Cobalt (Co)	2012/02/27	92	80 - 120	96	80 - 120	<0.000005	mg/L	NC	20		
5624669	Dissolved Copper (Cu)	2012/02/27	NC	80 - 120	92	80 - 120	<0.00005	mg/L	2.8	20		
5624669	Dissolved Iron (Fe)	2012/02/27	100	80 - 120	106	80 - 120	<0.001	mg/L	NC	20		
5624669	Dissolved Lead (Pb)	2012/02/27	102	80 - 120	107	80 - 120	<0.000005	mg/L	1.7	20		
5624669	Dissolved Lithium (Li)	2012/02/27	100	80 - 120	105	80 - 120	<0.0005	mg/L	NC	20		
5624669	Dissolved Manganese (Mn)	2012/02/27	103	80 - 120	105	80 - 120	<0.00005	mg/L	NC	20		
5624669	Dissolved Mercury (Hg)	2012/02/27	104	80 - 120	102	80 - 120	<0.00001	mg/L				
5624669	Dissolved Molybdenum (Mo)	2012/02/27	101	80 - 120	105	80 - 120	<0.00005	mg/L	NC	20		
5624669	Dissolved Nickel (Ni)	2012/02/27	91	80 - 120	93	80 - 120	<0.00002	mg/L	23.4(1)	20		
5624669	Dissolved Selenium (Se)	2012/02/27	102	80 - 120	106	80 - 120	<0.00004	mg/L	NC	20		
5624669	Dissolved Silver (Ag)	2012/02/27	108	80 - 120	113	80 - 120	0.000005, RDL=0.000005	mg/L	NC	20		
5624669	Dissolved Strontium (Sr)	2012/02/27	NC	80 - 120	109	80 - 120	<0.00005	mg/L	0.7	20		
5624669	Dissolved Thallium (Tl)	2012/02/27	85	80 - 120	107	80 - 120	<0.000002	mg/L	NC	20		
5624669	Dissolved Tin (Sn)	2012/02/27	135(1, 2)	80 - 120	123(1, 3)	80 - 120	<0.0002	mg/L	NC	20		
5624669	Dissolved Titanium (Ti)	2012/02/27	107	80 - 120	97	80 - 120	<0.0005	mg/L	NC	20		
5624669	Dissolved Uranium (U)	2012/02/27	91	80 - 120	91	80 - 120	<0.000002	mg/L	3.4	20		
5624669	Dissolved Vanadium (V)	2012/02/27	92	80 - 120	99	80 - 120	0.0003, RDL=0.0002	mg/L	0.02	20		
5624669	Dissolved Zinc (Zn)	2012/02/27	NC	80 - 120	102	80 - 120	<0.0001	mg/L	1.6	20		
5624669	Dissolved Boron (B)	2012/02/27					<0.05	mg/L	NC	20		

Maxxam Job #: B214692
Report Date: 2012/03/27

EBA Engineering Consultants Ltd.
Client Project #: CRWMC-CVRD N23101881

Sampler Initials: KG

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
5624669	Dissolved Silicon (Si)	2012/02/27					<0.1	mg/L	0.8	20		
5624669	Dissolved Zirconium (Zr)	2012/02/27					<0.0001	mg/L	NC	20		
5625697	Dissolved Phosphorus (P)	2012/02/24			102	80 - 120	<0.0050	mg/L	0.9	20		
5634227	Fluoride (F)	2012/02/28	96	80 - 120	108	80 - 120	<0.010	mg/L	3.2	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.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
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) - Matrix Spike outside acceptance criteria (10% of analytes failure allowed).
(3) - Blank Spike outside acceptance criteria (10% of analytes failure allowed).

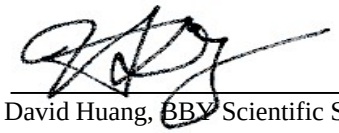
Validation Signature Page

Maxxam Job #: B214692

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



ANDY LU, Data Validation Coordinator



David Huang, BBY Scientific Specialist

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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.

Maxxam

Maxxam Analytics International Corporation o/a Maxxam Analytics
#606 Daneda Way, Burnaby, British Columbia Canada V5G 1K5 Tel:(604) 734 7276 Toll-free:(604) 734 7276 Fax:(604) 731 2386 www.maxxam.ca

CHAIN OF CUSTODY RECORD

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#5908 EBA Engineering Consultants Ltd.	Company Name:		Quotation #:	B10655	MAXXAM JOB #: B214692	BOTTLE ORDER #: 256353
Contact Name:	Kristy Gabelhouse	Contact Name:		P.O. #:			
Address:	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Address:		Project #:	CrWMC-CVRD N23101801	CHAIN OF CUSTODY #: C#256353-01-01	PROJECT MANAGER: NAMITA SAHNI
Phone:	(250)756-2256 x233 Fax: (250)756-2686	Phone:	Fax:	Project Name:			
Email:	kgabelhouse@eba.ca dromano@eba.ca	Email:		Site #:			
				Sampled By:	K.Gabelhouse		

REGULATORY CRITERIA
- ☐ CSR
- ☐ CCME
- ☒ BC Water Quality AL/DW
- ☒ Other CDWQG

SPECIAL INSTRUCTIONS

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

ANALYSIS REQUESTED (Please be specific):

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 most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans 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 lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered (Y / N)	Alkalinity, pH, Conductivity	Ammonia (N)	ANION (Cl, F, NO2, NO3, SO4)	Dissolved Phosphorous	Low Level Dissolved Metals	VOC	# of Bottles	Comments
1		~~AG99-03~~	Feb20/12		GW	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		~~4~~	Not sampled
2	CT9184	EBA04-1				X	X	X	X	X	X		4	
3	185	EBA04-2				X	X	X	X	X	X		4	
4	186	EBA04-3				X	X	X	X	X	X		4	
5	187	EBA04-4				X	X	X	X	X	X		4	
6	188	EBA04-6				X	X	X	X	X	X		4	
7	189	EBA04-7				X	X	X	X	X	X	X	7	B214692
8	190	EBA04-8	↓		↓	X	X	X	X	X	X		4	
9	191	EBA11-2				X	X	X	X	X	X		4	
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: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
K. Gabelhouse	12/02/20	5:00 pm	Veronica de Guzman VD	12/02/22	09:30		☐	2 | 1	☐ Yes ☐ No

VD Feb 22/12

* 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.

White: Maxxam Yellow: Client

N/A

Success Through Science®

Your Project #: CRWMC - N23101881
Your C.O.C. #: 27964901, 27964914

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

Report Date: 2012/06/19
This report supersedes all previous reports with the same Maxxam job number

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B243312
Received: 2012/05/25, 08:30

Sample Matrix: Water
Samples Received: 11

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	11	2012/05/28	2012/05/28	BBY6SOP-00026	SM2320B
Chloride by Automated Colourimetry	11	N/A	2012/05/29	BBY6SOP-00011	SM-4500-Cl-
Chromium III Dissolved (Calc'd)	2	N/A	2012/06/18		
Chromium, Hexavalent, Dissolved	2	N/A	2012/05/29	BBY6SOP-00015	SM-3500Cr B
Conductance - water	11	N/A	2012/05/28	BBY6SOP-00026	SM-2510B
Fluoride	11	N/A	2012/05/31	BBY6SOP-00038	SM - 4500 F C
Hardness (calculated as CaCO3)	10	N/A	2012/05/29	BBY WI-00033	Calculated Parameter
Hardness (calculated as CaCO3)	1	N/A	2012/06/01	BBY WI-00033	Calculated Parameter
Mercury (Dissolved) by CVAF	3	N/A	2012/06/19	65-A-002-10	EPA 1631B
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	2	N/A	2012/06/14	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	9	N/A	2012/06/15	BBY7SOP-00002	EPA 6020A
Elements by ICPMS Low Level (dissolved)	11	N/A	2012/06/17	BBY7SOP-00002	EPA 6020A
Ammonia-N	2	N/A	2012/05/28	BBY6SOP-00009	SM-4500NH3G
Ammonia-N	9	N/A	2012/05/29	BBY6SOP-00009	SM-4500NH3G
Nitrate + Nitrite (N)	11	N/A	2012/05/26	BBY6SOP-00010	USEPA 353.2
Nitrite (N) by CFA	11	N/A	2012/05/26	BBY6SOP-00010	EPA 353.2
Nitrogen - Nitrate (as N)	11	N/A	2012/05/28	BBY6SOP-00010	Based on EPA 353.2
Filter and HNO3 Preserve for Metals	11	N/A	2012/05/26	BBY6WI-00001	EPA 200.2
pH Water	11	N/A	2012/05/28	BBY6SOP-00026	SM-4500H+B
CSR VH C6-C10 in Water by HS GC/MS	4	N/A	2012/05/28	BBY8SOP-00011	EPA 8260B
Sulphate by Automated Colourimetry	11	N/A	2012/05/29	BBY6SOP-00017	SM4500-SO42
Phosphorus-P (Total, dissolved)	11	2012/05/29	2012/05/30	BBY6SOP-00013	SM-4500PE
VOCs in Water by HS GC/MS	4	2012/05/27	2012/05/28	BBY8-SOP-0009	EPA 8260C
Volatile HC-BTEX	4	N/A	2012/05/29	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.

NAMITA SAHNI, Burnaby Project Manager
Email: NSahni@maxxam.ca
Phone# (604) 639-2614

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Maxxam Job #: B243312
Report Date: 2012/06/19

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23101881

Sampler Initials: DT

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 #: B243312
Report Date: 2012/06/19

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23101881

Sampler Initials: DT

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		DM8133		DM8134	DM8135	DM8136	DM8137	DM8138		
Sampling Date		2012/05/23		2012/05/23	2012/05/23	2012/05/23	2012/05/23	2012/05/23		
COC#		27964901		27964901	27964901	27964901	27964901	27964901		
	UNITS	**EBA04-2**	**QC Batch**	**EBA04-4**	**EBA04-1**	**AG99-02**	**AG99-04**	**AG99-05**	**RDL**	**QC Batch**
ANIONS										
Nitrite (N)	mg/L	<0.0050	5870176	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	5870176
Calculated Parameters										
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD	FIELD	FIELD	FIELD	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.056	5869970	0.177	0.052	0.152	0.099	0.057	0.020	5869970
Misc. Inorganics										
Fluoride (F)	mg/L	0.021	5885017	0.017	0.021	0.016	0.018	0.016	0.010	5885017
Alkalinity (Total as CaCO3)	mg/L	38.2	5874134	54.4	40.8	99.7	42.8	69.8	0.50	5874134
Alkalinity (PP as CaCO3)	mg/L	<0.50	5874134	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5874134
Bicarbonate (HCO3)	mg/L	46.6	5874134	66.3	49.8	122	52.2	85.2	0.50	5874134
Carbonate (CO3)	mg/L	<0.50	5874134	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5874134
Hydroxide (OH)	mg/L	<0.50	5874134	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5874134
Anions										
Dissolved Sulphate (SO4)	mg/L	2.94	5876383	3.05	2.64	3.47	2.99	3.39	0.50	5876383
Dissolved Chloride (Cl)	mg/L	1.7	5876309	2.8	1.3	1.7	1.9	4.6	0.50	5876309
Nutrients										
Ammonia (N)	mg/L	<0.0050	5873990	0.017	0.020	0.026	0.011	0.028	0.0050	5878253
Dissolved Phosphorus (P)	mg/L	<0.0050(1)	5878779	<0.0050(1)	0.0065(1)	0.0304(1)	0.0066(1)	0.0084(1)	0.0050	5878779
Nitrate plus Nitrite (N)	mg/L	0.056	5870167	0.177	0.052	0.152	0.099	0.057	0.020	5870167
Physical Properties										
Conductivity	uS/cm	82.5	5874151	123	85.7	205	97.5	153	1.0	5874151
pH	pH Units	7.78	5874166	7.88	7.81	7.98	7.88	7.98		5874166

N/A = Not Applicable
RDL = Reportable Detection Limit
(1) - Sample analysed past recommended hold time

Maxxam Job #: B243312
Report Date: 2012/06/19

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23101881

Sampler Initials: DT

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		DM8139		DM8140		DM8141	DM8142	DM8144		
Sampling Date		2012/05/23		2012/05/24		2012/05/24	2012/05/24	2012/05/24		
COC#		27964901		27964901		27964901	27964901	27964914		
	UNITS	**EBA11-01**	**QC Batch**	**HBT94-4**	**QC Batch**	**EBA11-02**	**AG99-1**	**EBA04-3**	**RDL**	**QC Batch**
ANIONS										
Nitrite (N)	mg/L	0.0051	5870176	<0.0050	5870176	0.0479	<0.0050	<0.0050	0.0050	5870176
Calculated Parameters										
Dissolved Chromium III	mg/L	<0.0010	5923382			<0.0010			0.0010	5923382
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD	ONSITE	FIELD	FIELD	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.500	5869970	0.178	5869970	0.620	0.163	0.550	0.020	5869970
Misc. Inorganics										
Fluoride (F)	mg/L	0.022	5885017	0.024	5885017	0.039	0.020	<0.010	0.010	5885017
Alkalinity (Total as CaCO3)	mg/L	175	5874134	73.0	5874134	136	103	335	0.50	5874134
Alkalinity (PP as CaCO3)	mg/L	<0.50	5874134	<0.50	5874134	<0.50	<0.50	<0.50	0.50	5874134
Bicarbonate (HCO3)	mg/L	214	5874134	89.0	5874134	166	126	409	0.50	5874134
Carbonate (CO3)	mg/L	<0.50	5874134	<0.50	5874134	<0.50	<0.50	<0.50	0.50	5874134
Hydroxide (OH)	mg/L	<0.50	5874134	<0.50	5874134	<0.50	<0.50	<0.50	0.50	5874134
Anions										
Dissolved Sulphate (SO4)	mg/L	61.4	5876383	3.67	5876383	8.48	3.59	6.95	0.50	5876383
Dissolved Chloride (Cl)	mg/L	13	5876309	3.5	5876309	4.4	3.0	29	0.50	5876309
Metals										
Dissolved Hex. Chromium (Cr 6+)	mg/L	0.0032	5876287			0.0032			0.0010	5876287
Nutrients										
Ammonia (N)	mg/L	0.014	5878253	0.012	5873990	0.016	0.013	0.018	0.0050	5878253
Dissolved Phosphorus (P)	mg/L	0.0187(1)	5878779	0.0054(1)	5878779	0.0068(1)	0.0122(1)	<0.0050(1)	0.0050	5878779
Nitrate plus Nitrite (N)	mg/L	0.505	5870167	0.178	5870167	0.668	0.163	0.550	0.020	5870167
Physical Properties										
Conductivity	uS/cm	476	5874151	160	5874151	288	212	708	1.0	5874151
pH	pH Units	8.20	5874166	7.98	5874166	8.20	8.08	7.99		5874166

N/A = Not Applicable
RDL = Reportable Detection Limit
(1) - Sample analysed past recommended hold time

Maxxam Job #: B243312
Report Date: 2012/06/19

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23101881

Sampler Initials: DT

MERCURY BY COLD VAPOR (WATER)

Maxxam ID		DM8133	DM8136	DM8137		
Sampling Date		2012/05/23	2012/05/23	2012/05/23		
COC#		27964901	27964901	27964901		
	UNITS	**EBA04-2**	**AG99-02**	**AG99-04**	**RDL**	**QC Batch**
Elements						
Dissolved Mercury (Hg)	ug/L	<0.010	<0.010	<0.010	0.010	5933798

CSR DISSOLVED METALS IN WATER (WATER)

Maxxam ID		DM8133	DM8134	DM8135	DM8136	DM8137		
Sampling Date		2012/05/23	2012/05/23	2012/05/23	2012/05/23	2012/05/23		
COC#		27964901	27964901	27964901	27964901	27964901		
	UNITS	**EBA04-2**	**EBA04-4**	**EBA04-1**	**AG99-02**	**AG99-04**	**RDL**	**QC Batch**
Misc. Inorganics								
Dissolved Hardness (CaCO3)	mg/L	38.6	58.8	38.4	99.8	46.1	0.50	5869965

Maxxam ID		DM8138	DM8139	DM8140	DM8141	DM8142	DM8144		
Sampling Date		2012/05/23	2012/05/23	2012/05/24	2012/05/24	2012/05/24	2012/05/24		
COC#		27964901	27964901	27964901	27964901	27964901	27964914		
	UNITS	**AG99-05**	**EBA11-01**	**HBT94-4**	**EBA11-02**	**AG99-1**	**EBA04-3**	**RDL**	**QC Batch**
Misc. Inorganics									
Dissolved Hardness (CaCO3)	mg/L	75.6	239	78.3	143	108	431	0.50	5869965

RDL = Reportable Detection Limit

Maxxam Job #: B243312
Report Date: 2012/06/19

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23101881

Sampler Initials: DT

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		DM8133	DM8134	DM8135	DM8136	DM8137		
Sampling Date		2012/05/23	2012/05/23	2012/05/23	2012/05/23	2012/05/23		
COC#		27964901	27964901	27964901	27964901	27964901		
	UNITS	**EBA04-2**	**EBA04-4**	**EBA04-1**	**AG99-02**	**AG99-04**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.00790	0.00489	0.00457	0.00634	0.00620	0.00020	5928378
Dissolved Antimony (Sb)	mg/L	0.000031	0.000028	0.000026	0.000036	0.000022	0.000020	5928378
Dissolved Arsenic (As)	mg/L	0.000180	0.000172	0.000578	0.00216	0.000474	0.000020	5928378
Dissolved Barium (Ba)	mg/L	0.000557	0.000775	0.000704	0.00483	0.000612	0.000020	5928378
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000012	<0.000010	<0.000010	0.000010	5928378
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	5928378
Dissolved Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5928378
Dissolved Cadmium (Cd)	mg/L	<0.0000050	<0.0000050	0.0000605	0.0000068	<0.0000050	0.0000050	5928378
Dissolved Chromium (Cr)	mg/L	0.00017	0.00021	0.00124	0.00049	0.00020	0.00010	5928378
Dissolved Cobalt (Co)	mg/L	0.0000095	0.0000261	0.0000181	0.0000086	0.0000077	0.0000050	5928378
Dissolved Copper (Cu)	mg/L	0.000225	0.000356	0.00358	0.000247	0.000172	0.000050	5928378
Dissolved Iron (Fe)	mg/L	0.0018	<0.0010	0.132	0.0014	<0.0010	0.0010	5928378
Dissolved Lead (Pb)	mg/L	0.0000094	<0.0000050	0.000262	0.0000066	<0.0000050	0.0000050	5928378
Dissolved Lithium (Li)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5928378
Dissolved Manganese (Mn)	mg/L	0.000138	0.000078	0.00760	0.000345	<0.000050	0.000050	5928378
Dissolved Mercury (Hg)	mg/L		0.000010	<0.000010			0.000010	5928378
Dissolved Molybdenum (Mo)	mg/L	0.000135	0.000117	0.000130	0.000113	0.000120	0.000050	5928378
Dissolved Nickel (Ni)	mg/L	0.000141 (1)	0.000066	0.000253	0.000059	0.000051	0.000020	5928378
Dissolved Selenium (Se)	mg/L	0.000099	0.000104	0.000126	0.000217	0.000094	0.000040	5928378
Dissolved Silicon (Si)	mg/L	3.47	3.69	4.67	5.21	3.60	0.10	5928378
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	5928378
Dissolved Strontium (Sr)	mg/L	0.0202	0.0317	0.0184	0.0412	0.0228	0.000050	5928378
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	5928378
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	5928378
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5928378
Dissolved Uranium (U)	mg/L	0.0000106	0.0000230	0.0000228	0.000480	0.0000262	0.0000020	5928378
Dissolved Vanadium (V)	mg/L	0.00182	0.00167	0.00428	0.0181	0.00286	0.00020	5928378
Dissolved Zinc (Zn)	mg/L	0.00095	0.00060	1.10	0.00088	0.00049	0.00010	5928378
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	5928378
Dissolved Calcium (Ca)	mg/L	13.3	20.5	12.4	33.0	15.8	0.25	5917728
Dissolved Magnesium (Mg)	mg/L	1.34	1.85	1.79	4.20	1.62	0.25	5917728
Dissolved Potassium (K)	mg/L	<0.25	0.32	0.28	1.35	0.28	0.25	5917728
Dissolved Sodium (Na)	mg/L	0.94	1.70	1.30	1.53	1.18	0.25	5917728
Dissolved Sulphur (S)	mg/L	<15	<15	<15	<15	<15	15	5917728

RDL = Reportable Detection Limit
(1) - Duplicate RPD above control limit - (10% of analytes failure allowed).

Maxxam Job #: B243312
Report Date: 2012/06/19

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23101881

Sampler Initials: DT

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		DM8138	DM8139	DM8140	DM8141	DM8142	DM8144		
Sampling Date		2012/05/23	2012/05/23	2012/05/24	2012/05/24	2012/05/24	2012/05/24		
COC#		27964901	27964901	27964901	27964901	27964901	27964914		
	UNITS	**AG99-05**	**EBA11-01**	**HBT94-4**	**EBA11-02**	**AG99-1**	**EBA04-3**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS									
Dissolved Aluminum (Al)	mg/L	0.00535	0.00521	0.00434	0.00622	0.00360	0.00224	0.00020	5928378
Dissolved Antimony (Sb)	mg/L	0.000022	<0.000020	0.000128	<0.000020	0.000037	<0.000020	0.000020	5928378
Dissolved Arsenic (As)	mg/L	0.000632	0.000189	0.000241	0.000088	0.000814	0.000060	0.000020	5928378
Dissolved Barium (Ba)	mg/L	0.000946	0.00657	0.00106	0.00668	0.00182	0.0128	0.000020	5928378
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	5928378
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	5928378
Dissolved Boron (B)	mg/L	<0.050	<0.050	<0.050	0.058	<0.050	<0.050	0.050	5928378
Dissolved Cadmium (Cd)	mg/L	<0.0000050	0.0000062	<0.0000050	<0.0000050	<0.0000050	0.0000107	0.0000050	5928378
Dissolved Chromium (Cr)	mg/L	0.00020	0.00136	0.00016	0.00222	0.00052	0.00070	0.00010	5928378
Dissolved Cobalt (Co)	mg/L	0.0000069	0.0000290	0.0000133	0.0000111	<0.0000050	0.0000105	0.0000050	5928378
Dissolved Copper (Cu)	mg/L	0.000252	0.000274	0.000382	0.000180	0.000136	0.000237	0.000050	5928378
Dissolved Iron (Fe)	mg/L	<0.0010	0.0014	<0.0010	0.0022	0.0013	0.0022	0.0010	5928378
Dissolved Lead (Pb)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000068	0.0000077	0.0000050	5928378
Dissolved Lithium (Li)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00096	0.00050	5928378
Dissolved Manganese (Mn)	mg/L	0.000056	0.000665	0.00716	0.000293	<0.000050	0.000156	0.000050	5928378
Dissolved Mercury (Hg)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	5928378
Dissolved Molybdenum (Mo)	mg/L	0.000120	0.000065	0.000133	0.000085	0.000106	<0.000050	0.000050	5928378
Dissolved Nickel (Ni)	mg/L	0.000086	0.000268	0.000058	0.000113	0.000033	0.000101	0.000020	5928378
Dissolved Selenium (Se)	mg/L	0.000085	0.000082	0.00224	0.000096	0.000158	0.000169	0.000040	5928378
Dissolved Silicon (Si)	mg/L	3.80	5.89	3.68	7.86	5.95	7.72	0.10	5928378
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	5928378
Dissolved Strontium (Sr)	mg/L	0.0345	0.143	0.0461	0.0700	0.0483	0.258	0.000050	5928378
Dissolved Thallium (Tl)	mg/L	<0.0000020	0.0000064	0.0000024	0.0000034	<0.0000020	0.0000022	0.0000020	5928378
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	5928378
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5928378
Dissolved Uranium (U)	mg/L	0.0000744	0.000841	0.0000475	0.000198	0.0000937	0.000279	0.0000020	5928378
Dissolved Vanadium (V)	mg/L	0.00363	0.00363	0.00372	0.00291	0.00571	0.00083	0.00020	5928378
Dissolved Zinc (Zn)	mg/L	0.00038	0.00043	0.00082	0.00086	0.00018	0.00108	0.00010	5928378
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	5928378
Dissolved Calcium (Ca)	mg/L	25.5	71.3	28.3	38.5	35.3	137	0.25	5917728
Dissolved Magnesium (Mg)	mg/L	2.91	14.8	1.85	11.3	4.90	21.5	0.25	5917728
Dissolved Potassium (K)	mg/L	0.44	0.76	0.57	0.45	0.77	1.18	0.25	5917728
Dissolved Sodium (Na)	mg/L	1.44	4.58	1.47	4.46	1.65	4.18	0.25	5917728
Dissolved Sulphur (S)	mg/L	<15	21	<15	<15	<15	<15	15	5917728

RDL = Reportable Detection Limit

Maxxam Job #: B243312
Report Date: 2012/06/19

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23101881

Sampler Initials: DT

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		DM8137	DM8138	DM8139	DM8144		
Sampling Date		2012/05/23	2012/05/23	2012/05/23	2012/05/24		
COC#		27964901	27964901	27964901	27964914		
	UNITS	**AG99-04**	**AG99-05**	**EBA11-01**	**EBA04-3**	**RDL**	**QC Batch**
Volatiles							
VPH (VH6 to 10 - BTEX)	ug/L	<300	<300	<300	<300	300	5869973
Volatile Hydrocarbons							
VH C6-C10	ug/L	<300	<300	<300	<300	300	5870700
Volatiles							
Chloromethane	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	5870698
Vinyl chloride	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5870698
Chloroethane	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	5870698
Trichlorofluoromethane	mg/L	<0.0040	<0.0040	<0.0040	<0.0040	0.0040	5870698
1,1,2Trichloro-1,2,2Trifluoroethane	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	5870698
Dichlorodifluoromethane	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	5870698
1,1-dichloroethene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5870698
Dichloromethane	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	5870698
trans-1,2-dichloroethene	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	5870698
1,1-dichloroethane	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5870698
cis-1,2-dichloroethene	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	5870698
Chloroform	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	5870698
1,1,1-trichloroethane	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5870698
1,2-dichloroethane	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5870698
Carbon tetrachloride	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5870698
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5870698
Methyl-tert-butylether (MTBE)	mg/L	<0.0040	<0.0040	<0.0040	<0.0040	0.0040	5870698
1,2-dichloropropane	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5870698
cis-1,3-dichloropropene	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	5870698
trans-1,3-dichloropropene	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	5870698
Bromomethane	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	5870698
1,1,2-trichloroethane	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5870698
Trichloroethene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5870698
Chlorodibromomethane	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	5870698
1,3-Butadiene	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	5870698
Tetrachloroethene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5870698
Bromodichloromethane	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	5870698
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5870698
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5870698
m & p-Xylene	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	5870698
Bromoform	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	5870698

RDL = Reportable Detection Limit

Maxxam Job #: B243312
Report Date: 2012/06/19

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23101881

Sampler Initials: DT

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		DM8137	DM8138	DM8139	DM8144		
Sampling Date		2012/05/23	2012/05/23	2012/05/23	2012/05/24		
COC#		27964901	27964901	27964901	27964914		
	UNITS	**AG99-04**	**AG99-05**	**EBA11-01**	**EBA04-3**	**RDL**	**QC Batch**
Styrene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5870698
o-Xylene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5870698
Xylenes (Total)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	5870698
1,1,1,2-tetrachloroethane	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5870698
1,1,2,2-tetrachloroethane	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5870698
1,2-dichlorobenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5870698
1,3-dichlorobenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5870698
1,4-dichlorobenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5870698
Chlorobenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	5870698
Dibromomethane	mg/L	<0.00090	<0.00090	<0.00090	<0.00090	0.00090	5870698
Bromobenzene	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	5870698
Surrogate Recovery (%)							
1,4-Difluorobenzene (sur.)	%	99	99	100	102		5870698
4-BROMOFLUOROBENZENE (sur.)	%	87	89	86	90		5870698
D4-1,2-DICHLOROETHANE (sur.)	%	81	84	81	83		5870698

RDL = Reportable Detection Limit

Maxxam Job #: B243312
Report Date: 2012/06/19

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23101881

Sampler Initials: DT

General Comments

Sample DM8133-01: 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 DM8134-01: 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 DM8135-01: 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 DM8136-01: 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 DM8137-01: 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 DM8138-01: 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 DM8139-01: 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 DM8140-01: 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 DM8141-01: 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 DM8142-01: 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 DM8144-01: 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 #: B243312
Report Date: 2012/06/19

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23101881

Sampler Initials: DT

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5870167	Nitrate plus Nitrite (N)	2012/05/26	98	80 - 120	107	80 - 120	<0.020	mg/L	0.7(1)	25		
5870176	Nitrite (N)	2012/05/26	81	80 - 120	102	80 - 120	<0.0050	mg/L	NC(1)	20		
5870698	1,4-Difluorobenzene (sur.)	2012/05/28	101	70 - 130	100	70 - 130	98	%				
5870698	4-BROMOFLUOROBENZENE (sur.)	2012/05/28	93	70 - 130	88	70 - 130	84	%				
5870698	D4-1,2-DICHLOROETHANE (sur.)	2012/05/28	91	70 - 130	79	70 - 130	80	%				
5870698	Chloromethane	2012/05/28	92	60 - 140	83	60 - 140	<0.0010	mg/L	NC	30		
5870698	Vinyl chloride	2012/05/28	108	60 - 140	64	60 - 140	<0.00050	mg/L	NC	30		
5870698	Chloroethane	2012/05/28	87	60 - 140	82	60 - 140	<0.0010	mg/L	NC	30		
5870698	Trichlorofluoromethane	2012/05/28	119	60 - 140	112	60 - 140	<0.0040	mg/L	NC	30		
5870698	Dichlorodifluoromethane	2012/05/28	106	60 - 140	83	60 - 140	<0.0020	mg/L				
5870698	1,1-dichloroethene	2012/05/28	91	70 - 130	80	70 - 130	<0.00050	mg/L	NC	30		
5870698	Dichloromethane	2012/05/28	102	70 - 130	80	70 - 130	<0.0020	mg/L	NC	30		
5870698	trans-1,2-dichloroethene	2012/05/28	88	70 - 130	79	70 - 130	<0.0010	mg/L	NC	30		
5870698	1,1-dichloroethane	2012/05/28	95	70 - 130	80	70 - 130	<0.00050	mg/L	NC	30		
5870698	cis-1,2-dichloroethene	2012/05/28	91	70 - 130	81	70 - 130	<0.0010	mg/L	NC	30		
5870698	Chloroform	2012/05/28	77	70 - 130	72	70 - 130	<0.0010	mg/L	1	30		
5870698	1,1,1-trichloroethane	2012/05/28	94	70 - 130	80	70 - 130	<0.00050	mg/L	NC	30		
5870698	1,2-dichloroethane	2012/05/28	97	70 - 130	77	70 - 130	<0.00050	mg/L	NC	30		
5870698	Carbon tetrachloride	2012/05/28	98	70 - 130	86	70 - 130	<0.00050	mg/L	NC	30		
5870698	Benzene	2012/05/28	93	70 - 130	80	70 - 130	<0.00050	mg/L	NC	30		
5870698	Methyl-tert-butylether(MTBE)	2012/05/28	80	70 - 130	77	70 - 130	<0.0040	mg/L	NC	30		
5870698	1,2-dichloropropane	2012/05/28	88	70 - 130	82	70 - 130	<0.00050	mg/L	NC	30		
5870698	cis-1,3-dichloropropene	2012/05/28	85	70 - 130	53(2, 3)	70 - 130	<0.0010	mg/L	NC	30		
5870698	trans-1,3-dichloropropene	2012/05/28	83	70 - 130	49(2, 3)	70 - 130	<0.0010	mg/L	NC	30		
5870698	Bromomethane	2012/05/28	93	60 - 140	56(2, 3)	60 - 140	<0.0010	mg/L	NC	30		
5870698	1,1,2-trichloroethane	2012/05/28	101	70 - 130	77	70 - 130	<0.00050	mg/L	NC	30		
5870698	Trichloroethene	2012/05/28	95	70 - 130	78	70 - 130	<0.00050	mg/L	NC	30		
5870698	Chlorodibromomethane	2012/05/28	88	70 - 130	80	70 - 130	<0.0010	mg/L	NC	30		
5870698	Tetrachloroethene	2012/05/28	93	70 - 130	79	70 - 130	<0.00050	mg/L	NC	30		
5870698	Bromodichloromethane	2012/05/28	92	70 - 130	77	70 - 130	<0.0010	mg/L	5.3	30		
5870698	Toluene	2012/05/28	91	70 - 130	78	70 - 130	<0.00050	mg/L	NC	30		
5870698	Ethylbenzene	2012/05/28	85	70 - 130	72	70 - 130	<0.00050	mg/L	NC	30		
5870698	m & p-Xylene	2012/05/28	86	70 - 130	75	70 - 130	<0.0010	mg/L	NC	30		
5870698	Bromoform	2012/05/28	105	70 - 130	79	70 - 130	<0.0010	mg/L	NC	30		
5870698	Styrene	2012/05/28	96	70 - 130	68(2, 3)	70 - 130	<0.00050	mg/L	NC	30		
5870698	o-Xylene	2012/05/28	77	70 - 130	67(2, 3)	70 - 130	<0.00050	mg/L	NC	30		
5870698	1,1,1,2-tetrachloroethane	2012/05/28	100	70 - 130	78	70 - 130	<0.00050	mg/L	NC	30		
5870698	1,1,2,2-tetrachloroethane	2012/05/28	100	70 - 130	87	70 - 130	<0.00050	mg/L	NC	30		
5870698	1,2-dichlorobenzene	2012/05/28	93	70 - 130	82	70 - 130	<0.00050	mg/L	NC	30		
5870698	1,3-dichlorobenzene	2012/05/28	86	70 - 130	75	70 - 130	<0.00050	mg/L	NC	30		

Maxxam Job #: B243312
Report Date: 2012/06/19

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23101881

Sampler Initials: DT

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5870698	1,4-dichlorobenzene	2012/05/28	95	70 - 130	81	70 - 130	<0.00050	mg/L	NC	30		
5870698	Chlorobenzene	2012/05/28	83	70 - 130	71	70 - 130	<0.00050	mg/L	NC	30		
5870698	Dibromomethane	2012/05/28	102	70 - 130			<0.00090	mg/L				
5870698	Bromobenzene	2012/05/28	96	70 - 130	82	70 - 130	<0.0020	mg/L				
5870698	1,1,2Trichloro-1,2,2Trifluoroethane	2012/05/28					<0.0020	mg/L				
5870698	1,3-Butadiene	2012/05/28					<0.0050	mg/L				
5870698	Xylenes (Total)	2012/05/28					<0.0010	mg/L	NC	30		
5870700	VH C6-C10	2012/05/28					<300	ug/L	NC	40	113	70 - 130
5873990	Ammonia (N)	2012/05/28	NC	80 - 120	102	80 - 120	<0.0050	mg/L	NC	20		
5874134	Alkalinity (Total as CaCO3)	2012/05/28	NC	80 - 120	98	80 - 120	<0.50	mg/L	0.4	20		
5874134	Alkalinity (PP as CaCO3)	2012/05/28					<0.50	mg/L	NC	20		
5874134	Bicarbonate (HCO3)	2012/05/28					<0.50	mg/L	0.4	20		
5874134	Carbonate (CO3)	2012/05/28					<0.50	mg/L	NC	20		
5874134	Hydroxide (OH)	2012/05/28					<0.50	mg/L	NC	20		
5874151	Conductivity	2012/05/28			100	80 - 120	<1.0	uS/cm	0.2	20		
5876287	Dissolved Hex. Chromium (Cr 6+)	2012/05/29	101	80 - 120	94	80 - 120	<0.0010	mg/L	NC	20		
5876309	Dissolved Chloride (Cl)	2012/05/29	98	80 - 120	101	80 - 120	<0.50	mg/L	2.0	20		
5876383	Dissolved Sulphate (SO4)	2012/05/29	97	80 - 120	99	80 - 120	<0.50	mg/L	0.6	20		
5878253	Ammonia (N)	2012/05/29	93	80 - 120	100	80 - 120	<0.0050	mg/L	NC	20		
5878779	Dissolved Phosphorus (P)	2012/05/30	99	80 - 120	89	80 - 120	<0.0050	mg/L	NC	20		
5885017	Fluoride (F)	2012/05/31	101	80 - 120	100	80 - 120	<0.010	mg/L	4.0	20		
5928378	Dissolved Aluminum (Al)	2012/06/17	96	80 - 120	108	80 - 120	<0.00020	mg/L	5.4	20		
5928378	Dissolved Antimony (Sb)	2012/06/17	101	80 - 120	105	80 - 120	<0.000020	mg/L	NC	20		
5928378	Dissolved Arsenic (As)	2012/06/17	100	80 - 120	94	80 - 120	0.000032, RDL=0.000020	mg/L	13.4	20		
5928378	Dissolved Barium (Ba)	2012/06/17	92	80 - 120	99	80 - 120	<0.000020	mg/L	5.5	20		
5928378	Dissolved Beryllium (Be)	2012/06/17	104	80 - 120	103	80 - 120	<0.000010	mg/L	NC	20		
5928378	Dissolved Bismuth (Bi)	2012/06/17	97	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20		
5928378	Dissolved Cadmium (Cd)	2012/06/17	102	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20		
5928378	Dissolved Chromium (Cr)	2012/06/17	94	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20		
5928378	Dissolved Cobalt (Co)	2012/06/17	93	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20		
5928378	Dissolved Copper (Cu)	2012/06/17	93	80 - 120	97	80 - 120	<0.000050	mg/L	NC	20		
5928378	Dissolved Iron (Fe)	2012/06/17	98	80 - 120	104	80 - 120	<0.0010	mg/L	NC	20		
5928378	Dissolved Lead (Pb)	2012/06/17	95	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20		
5928378	Dissolved Lithium (Li)	2012/06/17	97	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20		
5928378	Dissolved Manganese (Mn)	2012/06/17	96	80 - 120	98	80 - 120	<0.000050	mg/L	NC	20		
5928378	Dissolved Mercury (Hg)	2012/06/17	95	80 - 120	98	80 - 120	<0.000010	mg/L				
5928378	Dissolved Molybdenum (Mo)	2012/06/17	104	80 - 120	104	80 - 120	<0.000050	mg/L	NC	20		
5928378	Dissolved Nickel (Ni)	2012/06/17	92	80 - 120	99	80 - 120	<0.000020	mg/L	29.7(2)	20		
5928378	Dissolved Selenium (Se)	2012/06/17	110	80 - 120	101	80 - 120	<0.000040	mg/L	NC	20		
5928378	Dissolved Silver (Ag)	2012/06/17	98	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20		

Maxxam Job #: B243312
Report Date: 2012/06/19

EBA Engineering Consultants Ltd.
Client Project #: CRWMC - N23101881

Sampler Initials: DT

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5928378	Dissolved Strontium (Sr)	2012/06/17	NC	80 - 120	99	80 - 120	<0.000050	mg/L	5.4	20		
5928378	Dissolved Thallium (Tl)	2012/06/17	83	80 - 120	93	80 - 120	<0.0000020	mg/L	NC	20		
5928378	Dissolved Tin (Sn)	2012/06/17	99	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20		
5928378	Dissolved Titanium (Ti)	2012/06/17	92	80 - 120	90	80 - 120	<0.00050	mg/L	NC	20		
5928378	Dissolved Uranium (U)	2012/06/17	95	80 - 120	97	80 - 120	<0.0000020	mg/L	NC	20		
5928378	Dissolved Vanadium (V)	2012/06/17	94	80 - 120	97	80 - 120	<0.00020	mg/L	3.4	20		
5928378	Dissolved Zinc (Zn)	2012/06/17	104	80 - 120	100	80 - 120	<0.00010	mg/L	7.8	20		
5928378	Dissolved Boron (B)	2012/06/17					<0.050	mg/L	NC	20		
5928378	Dissolved Silicon (Si)	2012/06/17					<0.10	mg/L	0.5	20		
5928378	Dissolved Zirconium (Zr)	2012/06/17					<0.00010	mg/L	NC	20		
5933798	Dissolved Mercury (Hg)	2012/06/19	90	80 - 120	97	80 - 120	<0.010	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.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
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) - Sample analysed past recommended hold time
(2) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.
(3) - LCS outside acceptance criteria (10% of analytes failure allowed)

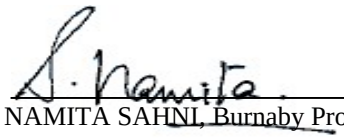
Validation Signature Page

Maxxam Job #: B243312

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



ROB REINERT, Data Validation Coordinator



NAMITA SAHNI, Burnaby Project Manager

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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.

maxxam

Maxxam Analytics International Corporation o/a Maxxam Analytics
4606 Canada Way, Burnaby, British Columbia Canada V5G 1K5 Tel (604) 734 7276 Toll-free (604) 734 7276 Fax (604) 731 2386 www.maxxam.ca

CHAIN OF CUSTODY RECORD

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#5908 EBA Engineering Consultants Ltd.	Company Name:		Quotation #:	B10655	MAXXAM JOB #: B243312	BOTTLE ORDER #: 279648
Contact Name:	Kristy Gabelhouse	Contact Name:		P.O. #:			
Address:	#1 - 4376 Boban Drive	Address:		Project #:	CRWMC - N23101881		
	Nanaimo BC V9T 6A7			Project Name:		CHAIN OF CUSTODY #: C#279649-01-01	PROJECT MANAGER: NAMITA SAHNI
Phone:	(250)756-2256 x233 Fax: (250)756-2686	Phone:	Fax:	Site #:			
Email:	kgabelhouse@eba.ca / dromano@eba.ca	Email:	lpaul@eba.ca	Sampled By:	D. THOMAS / K. GABELHOUSE		

REGULATORY CRITERIA

- ☐ CCME
- ☒ BC Water Quality DW; AL
- ☒ Other CDWQG

SPECIAL INSTRUCTIONS

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

ANALYSIS REQUESTED (Please be specific):

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 most tests
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans 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 lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered ? (Y / N)	Ammonia-N	ANION (CL, F, NO2, NO3, SO4)	Dissolved Metals incl Sulphur and Hg	pH/CONDUCTIVITY/ALK	Total Metals incl Sulphur and hardness	Total Phosphorus	Dissolved Phosphous	VOC + VPH	Dissolved Cr VI Field Filtered		# of Bottles	Comments
1	DM8133	EBA04-2	May 23		Ground water	Y	X	X	X	X		X	X					
2	DM8134	EBA04-4	"			Y	X	X	X	X		X	X					
3	DM8135	EBA04-1	"			Y	X	X	X	X		X	X					
4	DM8136	AG[illegible]99-02	"			Y	X	X	X	X		X	X					
5	DM8137	AG[illegible]99-04	"			Y	X	X	X	X		X	X	X				
6	DM8138	AG99-05	"			Y	X	X	X	X		X	X	X				
7	DM8139	EBA11-01	"			Y	X	X	X	X		X	X	X	X			
8	DM8140	HBT94-4	May 24			Y	X	X	X	X		X	X					
9	DM8141	EBA11-02	"			Y	X	X	X	X		X	X		X			
10	DM8142	AG99-1	"		↓	Y	X	X	X	X		X	X					

B243312

*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: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
DARREN THOMAS / [signature]	12/05/24	12:00pm	[signature] LOUISE LAU	2024/05/25	08:30		☐	3.3, 6.	☐ 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.

Maxxam Analytics International Corporation o/a Maxxam Analytics
White: Maxxam Yellow: Client

N/A

Maxxam Analytics International Corporation o/a Maxxam Analytics
4606 Canada Way, Burnaby, British Columbia Canada V5G 1K5 Tel (604) 734 7276 Toll-free (604) 734 7276 Fax (604) 731 2386 www.maxxam.ca

CHAIN OF CUSTODY RECORD

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#5908 EBA Engineering Consultants Ltd.	Company Name:		Quotation #:	B10655	MAXXAM JOB #:	BOTTLE ORDER #:
Contact Name:	Kristy Gabelhouse	Contact Name:		P.O. #:		B243312	229648
Address:	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Address:		Project #:	CRWMC - N23101881	CHAIN OF CUSTODY #:	PROJECT MANAGER:
Phone:	(250)756-2256 x233 Fax: (250)756-2686	Phone:	Fax:	Project Name:		C#270649-14-01	NAMITA GAHNI
Email:	kgabelhouse@eba.ca / dromano@eba.ca	Email:	lpaul@eba.ca	Site #:			
				Sampled By:	EG/DT		

REGULATORY CRITERIA:
- ☐ CSR
- ☐ CCME
- ☒ BC Water Quality DW/AL
- ☒ Other CDWQG

SPECIAL INSTRUCTIONS

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(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 Dioxins/Furans 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 lab for #)

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

ANALYSIS REQUESTED (Please be specific):

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered ? (Y / N)	Ammonia-N	ANION (CL, F, NO2, NO3, SO4)	Dissolved Metals incl Sulphur and Hg	pH/CONDUCTIVITY/ALK	Total Metals incl Sulphur and hardness	Total Phosphorus	Dissolved Phosphorus	VOC + VPH			# of Bottles	Comments
1	DM8144	EBA04-3	May 24/12		GW	Y	X	X	X	X		[redacted]	X	X			7	
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

B243312

*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: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
DARREN THOMAS	12/05/24	12:00pm	LOUISE CAU	2012/05/25	09:30		☐	3;3;6	☐ 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.

White: Maxxam Yellow: Client

Success Through Science®

Your Project #: CRWMC - N23101881
Your C.O.C. #: 27964902, 27964904

Attention: Kristy Gabelhouse
EBA ENGINEERING CONSULTANTS LTD.
NANAIMO_
#1 - 4376 BOBAN DRIVE
NANAIMO, BC
Canada V9T 6A7

Report Date: 2012/06/19
This report supersedes all previous reports with the same Maxxam job number

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B243426
Received: 2012/05/26, 09:30

Sample Matrix: Water
Samples Received: 11

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	11	2012/05/28	2012/05/28	BBY6SOP-00026	SM2320B
Chloride by Automated Colourimetry	11	N/A	2012/05/29	BBY6SOP-00011	SM-4500-Cl-
Chromium III Dissolved (Calc'd)	2	N/A	2012/05/30		
Chromium, Hexavalent, Dissolved	2	N/A	2012/05/29	BBY6SOP-00015	SM-3500Cr B
Conductance - water	11	N/A	2012/05/28	BBY6SOP-00026	SM-2510B
Fluoride	11	N/A	2012/06/01	BBY6SOP-00038	SM - 4500 F C
Hardness Total (calculated as CaCO3)	1	N/A	2012/05/31	BBY WI-00033	Calculated Parameter
Hardness (calculated as CaCO3)	10	N/A	2012/05/30	BBY WI-00033	Calculated Parameter
Mercury (Dissolved) by CVAF	2	N/A	2012/06/19	65-A-002-10	EPA 1631B
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	10	N/A	2012/06/18	BBY7SOP-00002	EPA 6020A
Elements by ICPMS Low Level (dissolved)	10	N/A	2012/06/17	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (total)	1	N/A	2012/06/18	BBY7SOP-00002	EPA 6020A
Elements by ICPMS Low Level (total)	1	N/A	2012/06/18	BBY7SOP-00002	EPA 6020A
Ammonia-N	11	N/A	2012/05/28	BBY6SOP-00009	SM-4500NH3G
Nitrate + Nitrite (N)	11	N/A	2012/05/29	BBY6SOP-00010	USEPA 353.2
Nitrite (N) by CFA	11	N/A	2012/05/29	BBY6SOP-00010	EPA 353.2
Nitrogen - Nitrate (as N)	11	N/A	2012/05/30	BBY6SOP-00010	Based on EPA 353.2
Filter and HNO3 Preserve for Metals	10	N/A	2012/05/26	BBY6WI-00001	EPA 200.2
pH Water	11	N/A	2012/05/28	BBY6SOP-00026	SM-4500H+B
CSR VH C6-C10 in Water by HS GC/MS	2	N/A	2012/05/29	BBY8SOP-00011	EPA 8260B
CSR VH C6-C10 in Water by HS GC/MS	1	N/A	2012/05/31	BBY8SOP-00011	EPA 8260B
Sulphate by Automated Colourimetry	11	N/A	2012/05/29	BBY6SOP-00017	SM4500-SO42
Phosphorus-P (Total, dissolved)	10	2012/05/29	2012/05/30	BBY6SOP-00013	SM-4500PE
Total Phosphorus	1	N/A	2012/05/30	BBY6SOP-00013	SM 4500 PE
VOCs in Water by HS GC/MS	2	2012/05/29	2012/05/29	BBY8-SOP-0009	EPA 8260C
VOCs in Water by HS GC/MS	1	2012/05/29	2012/05/31	BBY8-SOP-0009	EPA 8260C
Volatile HC-BTEX	2	N/A	2012/05/30	BBY WI-00033	BC MOE Lab Method
Volatile HC-BTEX	1	N/A	2012/05/31	BBY WI-00033	BC MOE Lab Method

* Results relate only to the items tested.

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EBA ENGINEERING CONSULTANTS LTD.
Client Project #: CRWMC - N23101881

Maxxam Job #: B243426
Report Date: 2012/06/19

Encryption Key

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

NAMITA SAHNI, Burnaby Project Manager
Email: NSahni@maxxam.ca
Phone# (604) 639-2614

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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.

Maxxam Job #: B243426
Report Date: 2012/06/19

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: CRWMC - N23101881

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		DM8856	DM8857	DM8858	DM8859	DM8860		
Sampling Date		2012/05/25	2012/05/24	2012/05/24	2012/05/25	2012/05/25		
	UNITS	**HBT94-1**	**HBT94-2**	**SW1**	**EBA04-7**	**EBA04-6**	**RDL**	**QC Batch**
ANIONS								
Nitrite (N)	mg/L	0.0210(1)	<0.0050(1)	<0.0050(1)	0.0345(1)	<0.0050	0.0050	5878376
Calculated Parameters								
Dissolved Chromium III	mg/L					<0.0010	0.0010	5871244
Filter and HNO3 Preservation	N/A	FIELD	FIELD		FIELD	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.068	<0.020	0.109	1.82	0.499	0.020	5869970
Misc. Inorganics								
Fluoride (F)	mg/L	0.021	0.019	0.018	0.012	0.011	0.010	5890946
Alkalinity (Total as CaCO3)	mg/L	209	218	64.6	388	240	0.50	5874172
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5874172
Bicarbonate (HCO3)	mg/L	255	266	78.8	474	293	0.50	5874172
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5874172
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5874172
Anions								
Dissolved Sulphate (SO4)	mg/L	6.00	3.29	3.13	19.8	2.24	0.50	5876383
Dissolved Chloride (Cl)	mg/L	17	13	2.0	27	3.9	0.50	5876309
Metals								
Dissolved Hex. Chromium (Cr 6+)	mg/L					0.0026	0.0010	5876287
Nutrients								
Ammonia (N)	mg/L	0.19	0.23	<0.0050	0.017	<0.0050	0.0050	5873990
Dissolved Phosphorus (P)	mg/L	<0.0050(1)	0.0125(1)		0.0064(1)	0.0052(1)	0.0050	5878779
Nitrate plus Nitrite (N)	mg/L	0.089(1)	<0.020(1)	0.109(1)	1.85(1)	0.499	0.020	5878373
Total Phosphorus (P)	mg/L			0.0086(1)			0.0050	5878780
Physical Properties								
Conductivity	uS/cm	451	451	137	827	438	1.0	5874227
pH	pH Units	7.88	8.09	7.84	7.77	8.03		5874235

N/A = Not Applicable
RDL = Reportable Detection Limit
(1) - Sample analysed past recommended hold time

Maxxam Job #: B243426
Report Date: 2012/06/19

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: CRWMC - N23101881

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		DM8861	DM8862	DM8863	DM8864	DM8865	DM8866		
Sampling Date		2012/05/25	2012/05/25	2012/05/25	2012/05/24	2012/05/25	2012/05/25		
	UNITS	**EBA11-03**	**EBA11-04**	**AG99-06**	**HBT94-6**	**EBA04-8**	**EBA11-5**	**RDL**	**QC Batch**
ANIONS									
Nitrite (N)	mg/L	<0.0050(1)	0.0261(1)	<0.0050(1)	<0.0050(1)	0.0347(1)	0.0153(1)	0.0050	5878376
Calculated Parameters									
Dissolved Chromium III	mg/L		<0.0010					0.0010	5871244
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.255	0.164	0.095	<0.020	1.79	0.166	0.020	5869970
Misc. Inorganics									
Fluoride (F)	mg/L	0.014	0.026	0.029	0.018	0.012	0.024	0.010	5890946
Alkalinity (Total as CaCO3)	mg/L	42.7	46.6	65.2	219	383	47.0	0.50	5874172
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5874172
Bicarbonate (HCO3)	mg/L	52.1	56.8	79.6	268	468	57.3	0.50	5874172
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5874172
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5874172
Anions									
Dissolved Sulphate (SO4)	mg/L	5.68	3.18	1.66	3.37	19.9	2.76	0.50	5876383
Dissolved Chloride (Cl)	mg/L	49	12	7.6	13	27	11	0.50	5876309
Metals									
Dissolved Hex. Chromium (Cr 6+)	mg/L		0.0028					0.0010	5876287
Nutrients									
Ammonia (N)	mg/L	0.013	0.026	0.0073	0.25	0.014	0.067	0.0050	5873990
Dissolved Phosphorus (P)	mg/L	0.0135(1)	0.0387(1)	0.0176(1)	0.0130(1)	0.0051(1)	0.0379(1)	0.0050	5878779
Nitrate plus Nitrite (N)	mg/L	0.255(1)	0.190(1)	0.095(1)	<0.020(1)	1.83(1)	0.181(1)	0.020	5878373
Physical Properties									
Conductivity	uS/cm	276	135	155	452	818	134	1.0	5874227
pH	pH Units	7.69	7.73	7.88	8.08	7.89	7.76		5874235

N/A = Not Applicable
RDL = Reportable Detection Limit
(1) - Sample analysed past recommended hold time

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: CRWMC - N23101881

Maxxam Job #: B243426
Report Date: 2012/06/19

MERCURY BY COLD VAPOR (WATER)

Maxxam ID		DM8860	DM8866		
Sampling Date		2012/05/25	2012/05/25		
	UNITS	**EBA04-6**	**EBA11-5**	**RDL**	**QC Batch**
Elements					
Dissolved Mercury (Hg)	ug/L	<0.010	<0.010	0.010	5933798

CSR DISSOLVED METALS IN WATER (WATER)

Maxxam ID		DM8856	DM8857	DM8859	DM8860	DM8861	DM8862	DM8863	DM8864	DM8865		
Sampling Date		2012/05/25	2012/05/24	2012/05/25	2012/05/25	2012/05/25	2012/05/25	2012/05/25	2012/05/24	2012/05/25		
	UNITS	**HBT94-1**	**HBT94-2**	**EBA04-7**	**EBA04-6**	**EBA11-03**	**EBA11-04**	**AG99-06**	**HBT94-6**	**EBA04-8**	**RDL**	**QC Batch**
Misc. Inorganics												
Dissolved Hardness (CaCO3)	mg/L	167	205	401	227	116	58.3	73.3	204	392	0.50	5869965

Maxxam ID		DM8866		
Sampling Date		2012/05/25		
	UNITS	**EBA11-5**	**RDL**	**QC Batch**
Misc. Inorganics				
Dissolved Hardness (CaCO3)	mg/L	58.5	0.50	5869965

CSR TOTAL METALS IN WATER (WATER)

Maxxam ID		DM8858		
Sampling Date		2012/05/24		
	UNITS	**SW1**	**RDL**	**QC Batch**
Calculated Parameters				
Total Hardness (CaCO3)	mg/L	66.3	0.50	5869964

RDL = Reportable Detection Limit

Maxxam Job #: B243426
Report Date: 2012/06/19

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: CRWMC - N23101881

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		DM8856	DM8857	DM8859	DM8860	DM8861		
Sampling Date		2012/05/25	2012/05/24	2012/05/25	2012/05/25	2012/05/25		
	UNITS	**HBT94-1**	**HBT94-2**	**EBA04-7**	**EBA04-6**	**EBA11-03**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	ug/L	4.72	7.04	2.21	2.25	2.54	0.20	5928378
Dissolved Antimony (Sb)	ug/L	0.172	<0.020	0.041	0.022	<0.020	0.020	5928378
Dissolved Arsenic (As)	ug/L	0.404	2.58	0.114	0.061	0.093	0.020	5928378
Dissolved Barium (Ba)	ug/L	5.09	8.51	15.7	5.62	2.42	0.020	5928378
Dissolved Beryllium (Be)	ug/L	0.020	<0.010	0.022	<0.010	<0.010	0.010	5928378
Dissolved Bismuth (Bi)	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	5928378
Dissolved Boron (B)	ug/L	291	86	299	<50	<50	50	5928378
Dissolved Cadmium (Cd)	ug/L	0.419	0.0366	0.0474	0.0106	0.0051	0.0050	5928378
Dissolved Chromium (Cr)	ug/L	<0.10	<0.10	<0.10	1.00	0.58	0.10	5928378
Dissolved Cobalt (Co)	ug/L	0.165	0.121	0.547	0.0094	0.0125	0.0050	5928378
Dissolved Copper (Cu)	ug/L	3.85	0.221	2.72	0.112	0.084	0.050	5928378
Dissolved Iron (Fe)	ug/L	3.6	206	5.3	2.2	2.1	1.0	5928378
Dissolved Lead (Pb)	ug/L	0.0105	<0.0050	0.0206	<0.0050	<0.0050	0.0050	5928378
Dissolved Lithium (Li)	ug/L	1.14	<0.50	1.08	0.66	<0.50	0.50	5928378
Dissolved Manganese (Mn)	ug/L	483	851	100	0.268	0.860	0.050	5928378
Dissolved Mercury (Hg)	ug/L	<0.010	<0.010	<0.010		<0.010	0.010	5928378
Dissolved Molybdenum (Mo)	ug/L	0.707	0.264	0.071	<0.050	0.115	0.050	5928378
Dissolved Nickel (Ni)	ug/L	1.32	0.685	1.71	0.103	0.115	0.020	5928378
Dissolved Selenium (Se)	ug/L	0.074	<0.040	0.099	0.055	0.200	0.040	5928378
Dissolved Silicon (Si)	ug/L	7680	7820	12000	9080	4540	100	5928378
Dissolved Silver (Ag)	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	5928378
Dissolved Strontium (Sr)	ug/L	162	120	293	145	63.3	0.050	5928378
Dissolved Thallium (Tl)	ug/L	<0.0020	0.0034	0.0067	<0.0020	0.0029	0.0020	5928378
Dissolved Tin (Sn)	ug/L	0.22	<0.20	<0.20	<0.20	<0.20	0.20	5928378
Dissolved Titanium (Ti)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5928378
Dissolved Uranium (U)	ug/L	0.0784	0.112	0.935	0.233	0.0309	0.0020	5928378
Dissolved Vanadium (V)	ug/L	4.40	0.46	1.58	1.22	2.33	0.20	5928378
Dissolved Zinc (Zn)	ug/L	2.30	0.24	0.58	0.63	0.48	0.10	5928378
Dissolved Zirconium (Zr)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	5928378
Dissolved Calcium (Ca)	mg/L	56.8	68.9	115	67.3	35.8	0.25	5917728
Dissolved Magnesium (Mg)	mg/L	6.01	8.03	27.4	14.3	6.33	0.25	5917728
Dissolved Potassium (K)	mg/L	3.37	1.79	2.24	1.35	0.42	0.25	5917728
Dissolved Sodium (Na)	mg/L	28.8	13.0	22.2	5.23	1.93	0.25	5917728
Dissolved Sulphur (S)	mg/L	<15	<15	<15	<15	<15	15	5917728

RDL = Reportable Detection Limit

Maxxam Job #: B243426
Report Date: 2012/06/19

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: CRWMC - N23101881

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		DM8862	DM8863	DM8864	DM8865		DM8866		
Sampling Date		2012/05/25	2012/05/25	2012/05/24	2012/05/25		2012/05/25		
	UNITS	**EBA11-04**	**AG99-06**	**HBT94-6**	**EBA04-8**	**QC Batch**	**EBA11-5**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS									
Dissolved Aluminum (Al)	ug/L	8.61	2.34	6.99	2.10	5928378	8.77	0.20	5928381
Dissolved Antimony (Sb)	ug/L	0.022	<0.020	<0.020	0.040	5928378	0.022	0.020	5928381
Dissolved Arsenic (As)	ug/L	1.45	0.043	2.60	0.141	5928378	1.58	0.020	5928381
Dissolved Barium (Ba)	ug/L	2.25	0.483	8.48	15.7	5928378	2.22	0.020	5928381
Dissolved Beryllium (Be)	ug/L	<0.010	<0.010	<0.010	0.022	5928378	<0.010	0.010	5928381
Dissolved Bismuth (Bi)	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	5928378	<0.0050	0.0050	5928381
Dissolved Boron (B)	ug/L	<50	<50	80	293	5928378	<50	50	5928381
Dissolved Cadmium (Cd)	ug/L	<0.0050	<0.0050	0.0508	0.0418	5928378	<0.0050	0.0050	5928381
Dissolved Chromium (Cr)	ug/L	1.48	0.89	<0.10	<0.10	5928378	1.43	0.10	5928381
Dissolved Cobalt (Co)	ug/L	0.0051	<0.0050	0.103	0.528	5928378	0.0069	0.0050	5928381
Dissolved Copper (Cu)	ug/L	0.062	0.185	0.212	2.85	5928378	0.078	0.050	5928381
Dissolved Iron (Fe)	ug/L	3.1	<1.0	207	5.1	5928378	3.0	1.0	5928381
Dissolved Lead (Pb)	ug/L	<0.0050	0.0133	<0.0050	0.0051	5928378	<0.0050	0.0050	5928381
Dissolved Lithium (Li)	ug/L	<0.50	<0.50	<0.50	1.07	5928378	<0.50	0.50	5928381
Dissolved Manganese (Mn)	ug/L	0.486	0.098	859	101	5928378	0.460	0.050	5928381
Dissolved Mercury (Hg)	ug/L	<0.010	<0.010	<0.010	<0.010	5928378		0.010	
Dissolved Molybdenum (Mo)	ug/L	0.095	0.099	0.231	0.093	5928378	0.121	0.050	5928381
Dissolved Nickel (Ni)	ug/L	0.057	<0.020	0.731	1.72	5928378	0.539	0.020	5928381
Dissolved Selenium (Se)	ug/L	0.235	0.145	<0.040	0.088	5928378	0.218	0.040	5928381
Dissolved Silicon (Si)	ug/L	5990	4440	7910	12200	5928378	5960	100	5928381
Dissolved Silver (Ag)	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	5928378	<0.0050	0.0050	5928381
Dissolved Strontium (Sr)	ug/L	33.0	50.2	121	294	5928378	33.0	0.050	5928381
Dissolved Thallium (Tl)	ug/L	0.0026	<0.0020	0.0033	0.0059	5928378	0.0030	0.0020	5928381
Dissolved Tin (Sn)	ug/L	<0.20	<0.20	<0.20	<0.20	5928378	<0.20	0.20	5928381
Dissolved Titanium (Ti)	ug/L	<0.50	<0.50	<0.50	<0.50	5928378	<0.50	0.50	5928381
Dissolved Uranium (U)	ug/L	0.195	0.0445	0.115	0.951	5928378	0.190	0.0020	5928381
Dissolved Vanadium (V)	ug/L	13.0	2.25	0.46	1.54	5928378	13.1	0.20	5928381
Dissolved Zinc (Zn)	ug/L	0.80	1.53	0.35	0.53	5928378	0.31	0.10	5928381
Dissolved Zirconium (Zr)	ug/L	<0.10	<0.10	<0.10	<0.10	5928378	<0.10	0.10	5928381
Dissolved Calcium (Ca)	mg/L	17.9	22.7	68.6	111	5917728	18.2	0.25	5917728
Dissolved Magnesium (Mg)	mg/L	3.29	4.01	7.87	27.9	5917728	3.13	0.25	5917728
Dissolved Potassium (K)	mg/L	0.80	0.31	1.74	2.23	5917728	0.79	0.25	5917728
Dissolved Sodium (Na)	mg/L	2.67	2.25	12.7	22.7	5917728	2.57	0.25	5917728
Dissolved Sulphur (S)	mg/L	<15	<15	<15	<15	5917728	<15	15	5917728

RDL = Reportable Detection Limit

Maxxam Job #: B243426
Report Date: 2012/06/19

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: CRWMC - N23101881

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		DM8858		
Sampling Date		2012/05/24		
	UNITS	**SW1**	**RDL**	**QC Batch**
Total Metals by ICPMS				
Total Aluminum (Al)	ug/L	21.3	0.20	5929561
Total Antimony (Sb)	ug/L	0.027	0.020	5929561
Total Arsenic (As)	ug/L	0.526	0.020	5929561
Total Barium (Ba)	ug/L	1.53	0.020	5929561
Total Beryllium (Be)	ug/L	<0.010	0.010	5929561
Total Bismuth (Bi)	ug/L	<0.0050	0.0050	5929561
Total Boron (B)	ug/L	<50	50	5929561
Total Cadmium (Cd)	ug/L	0.0138	0.0050	5929561
Total Chromium (Cr)	ug/L	0.27	0.10	5929561
Total Cobalt (Co)	ug/L	0.0299	0.0050	5929561
Total Copper (Cu)	ug/L	0.406	0.050	5929561
Total Iron (Fe)	ug/L	25.4	1.0	5929561
Total Lead (Pb)	ug/L	0.0111	0.0050	5929561
Total Lithium (Li)	ug/L	<0.50	0.50	5929561
Total Manganese (Mn)	ug/L	0.792	0.050	5929561
Total Mercury (Hg)	ug/L	<0.010	0.010	5929561
Total Molybdenum (Mo)	ug/L	0.120	0.050	5929561
Total Nickel (Ni)	ug/L	0.113	0.020	5929561
Total Selenium (Se)	ug/L	0.152	0.040	5929561
Total Silicon (Si)	ug/L	4780	100	5929561
Total Silver (Ag)	ug/L	<0.0050	0.0050	5929561
Total Strontium (Sr)	ug/L	31.7	0.050	5929561
Total Thallium (Tl)	ug/L	<0.0020	0.0020	5929561
Total Tin (Sn)	ug/L	<0.20	0.20	5929561
Total Titanium (Ti)	ug/L	1.35	0.50	5929561
Total Uranium (U)	ug/L	0.0883	0.0020	5929561
Total Vanadium (V)	ug/L	4.54	0.20	5929561
Total Zinc (Zn)	ug/L	0.43	0.10	5929561
Total Zirconium (Zr)	ug/L	<0.10	0.10	5929561
Total Calcium (Ca)	mg/L	20.8	0.25	5917729
Total Magnesium (Mg)	mg/L	3.49	0.25	5917729
Total Potassium (K)	mg/L	0.39	0.25	5917729
Total Sodium (Na)	mg/L	1.87	0.25	5917729
Total Sulphur (S)	mg/L	<15	15	5917729

RDL = Reportable Detection Limit

Maxxam Job #: B243426
Report Date: 2012/06/19

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: CRWMC - N23101881

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		DM8857	DM8859		DM8863		
Sampling Date		2012/05/24	2012/05/25		2012/05/25		
	UNITS	**HBT94-2**	**EBA04-7**	**QC Batch**	**AG99-06**	**RDL**	**QC Batch**
Volatiles							
VPH (VHW6 to 10 - BTEX)	ug/L	<300	<300	5869973	<300	300	5869973
Volatile Hydrocarbons							
VH C6-C10	ug/L	<300	<300	5878364	<300	300	5881760
Volatiles							
Chloromethane	ug/L	<1.0	<1.0	5876098	<1.0	1.0	5880910
Vinyl chloride	ug/L	<0.50	<0.50	5876098	<0.50	0.50	5880910
Chloroethane	ug/L	<1.0	<1.0	5876098	<1.0	1.0	5880910
Trichlorofluoromethane	ug/L	<4.0	<4.0	5876098	<4.0	4.0	5880910
1,1,2Trichloro-1,2,2Trifluoroethane	ug/L	<2.0	<2.0	5876098	<2.0	2.0	5880910
Dichlorodifluoromethane	ug/L	<2.0	<2.0	5876098	<2.0	2.0	5880910
1,1-dichloroethene	ug/L	<0.50	<0.50	5876098	<0.50	0.50	5880910
Dichloromethane	ug/L	<2.0	<2.0	5876098	<2.0	2.0	5880910
trans-1,2-dichloroethene	ug/L	<1.0	<1.0	5876098	<1.0	1.0	5880910
1,1-dichloroethane	ug/L	<0.50	<0.50	5876098	<0.50	0.50	5880910
cis-1,2-dichloroethene	ug/L	<1.0	<1.0	5876098	<1.0	1.0	5880910
Chloroform	ug/L	<1.0	<1.0	5876098	<1.0	1.0	5880910
1,1,1-trichloroethane	ug/L	<0.50	<0.50	5876098	<0.50	0.50	5880910
1,2-dichloroethane	ug/L	<0.50	<0.50	5876098	<0.50	0.50	5880910
Carbon tetrachloride	ug/L	<0.50	<0.50	5876098	<0.50	0.50	5880910
Benzene	ug/L	<0.50	<0.50	5876098	<0.50	0.50	5880910
Methyl-tert-butylether (MTBE)	ug/L	<4.0	<4.0	5876098	<4.0	4.0	5880910
1,2-dichloropropane	ug/L	<0.50	<0.50	5876098	<0.50	0.50	5880910
cis-1,3-dichloropropene	ug/L	<1.0	<1.0	5876098	<1.0	1.0	5880910
trans-1,3-dichloropropene	ug/L	<1.0	<1.0	5876098	<1.0	1.0	5880910
Bromomethane	ug/L	<1.0	<1.0	5876098	<1.0	1.0	5880910
1,1,2-trichloroethane	ug/L	<0.50	<0.50	5876098	<0.50	0.50	5880910
Trichloroethene	ug/L	<0.50	<0.50	5876098	<0.50	0.50	5880910
Chlorodibromomethane	ug/L	<1.0	<1.0	5876098	<1.0	1.0	5880910
1,3-Butadiene	ug/L	<5.0	<5.0	5876098	<5.0	5.0	5880910
Tetrachloroethene	ug/L	<0.50	<0.50	5876098	<0.50	0.50	5880910
Bromodichloromethane	ug/L	<1.0	<1.0	5876098	<1.0	1.0	5880910
Toluene	ug/L	<0.50	<0.50	5876098	<0.50	0.50	5880910
Ethylbenzene	ug/L	<0.50	<0.50	5876098	<0.50	0.50	5880910
m & p-Xylene	ug/L	<1.0	<1.0	5876098	<1.0	1.0	5880910
Bromoform	ug/L	<1.0	<1.0	5876098	<1.0	1.0	5880910
Styrene	ug/L	<0.50	<0.50	5876098	<0.50	0.50	5880910

RDL = Reportable Detection Limit

Maxxam Job #: B243426
Report Date: 2012/06/19

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: CRWMC - N23101881

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		DM8857	DM8859		DM8863		
Sampling Date		2012/05/24	2012/05/25		2012/05/25		
	UNITS	**HBT94-2**	**EBA04-7**	**QC Batch**	**AG99-06**	**RDL**	**QC Batch**
o-Xylene	ug/L	<0.50	<0.50	5876098	<0.50	0.50	5880910
Xylenes (Total)	ug/L	<1.0	<1.0	5876098	<1.0	1.0	5880910
1,1,1,2-tetrachloroethane	ug/L	<0.50	<0.50	5876098	<0.50	0.50	5880910
1,1,2,2-tetrachloroethane	ug/L	<0.50	<0.50	5876098	<0.50	0.50	5880910
1,2-dichlorobenzene	ug/L	<0.50	<0.50	5876098	<0.50	0.50	5880910
1,3-dichlorobenzene	ug/L	<0.50	<0.50	5876098	<0.50	0.50	5880910
1,4-dichlorobenzene	ug/L	<0.50	<0.50	5876098	<0.50	0.50	5880910
Chlorobenzene	ug/L	<0.50	<0.50	5876098	<0.50	0.50	5880910
Dibromomethane	ug/L	<0.90	<0.90	5876098	<0.90	0.90	5880910
Bromobenzene	ug/L	<2.0	<2.0	5876098	<2.0	2.0	5880910
Surrogate Recovery (%)							
1,4-Difluorobenzene (sur.)	%	102	105	5876098	104		5880910
4-BROMOFLUOROBENZENE (sur.)	%	91	91	5876098	84		5880910
D4-1,2-DICHLOROETHANE (sur.)	%	84	88	5876098	85		5880910

RDL = Reportable Detection Limit

Maxxam Job #: B243426
Report Date: 2012/06/19

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: CRWMC - N23101881

Package 1	3.7°C

Each temperature is the average of up to three cooler temperatures taken at receipt

General Comments

Sample DM8856-01: 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 DM8857-01: 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 DM8858-01: 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 DM8859-01: 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 DM8860-01: 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 DM8861-01: 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 DM8862-01: 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 DM8863-01: 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 DM8864-01: 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 DM8865-01: 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 DM8866-01: 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 #: B243426
Report Date: 2012/06/19

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: CRWMC - N23101881

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5873990	Ammonia (N)	2012/05/28	NC	80 - 120	102	80 - 120	<0.0050	mg/L	5.3	20		
5874172	Alkalinity (Total as CaCO3)	2012/05/28	NC	80 - 120	96	80 - 120	<0.50	mg/L	0.3	20		
5874172	Alkalinity (PP as CaCO3)	2012/05/28					<0.50	mg/L	NC	20		
5874172	Bicarbonate (HCO3)	2012/05/28					<0.50	mg/L	0.3	20		
5874172	Carbonate (CO3)	2012/05/28					<0.50	mg/L	NC	20		
5874172	Hydroxide (OH)	2012/05/28					<0.50	mg/L	NC	20		
5874227	Conductivity	2012/05/28			99	80 - 120	<1.0	uS/cm	0.2	20		
5876098	1,4-Difluorobenzene (sur.)	2012/05/29	86	70 - 130	105	70 - 130	101	%				
5876098	4-BROMOFLUOROBENZENE (sur.)	2012/05/29	102	70 - 130	104	70 - 130	88	%				
5876098	D4-1,2-DICHLOROETHANE (sur.)	2012/05/29	86	70 - 130	85	70 - 130	84	%				
5876098	Chloromethane	2012/05/29	92	60 - 140	78	60 - 140	<1.0	ug/L	NC	30		
5876098	Vinyl chloride	2012/05/29	84	60 - 140	93	60 - 140	<0.50	ug/L	NC	30		
5876098	Chloroethane	2012/05/29	92	60 - 140	84	60 - 140	<1.0	ug/L	NC	30		
5876098	Trichlorofluoromethane	2012/05/29	78	60 - 140	125	60 - 140	<4.0	ug/L	NC	30		
5876098	Dichlorodifluoromethane	2012/05/29	102	60 - 140	102	60 - 140	<2.0	ug/L				
5876098	1,1-dichloroethene	2012/05/29	78	70 - 130	83	70 - 130	<0.50	ug/L	NC	30		
5876098	Dichloromethane	2012/05/29	79	70 - 130	92	70 - 130	<2.0	ug/L	NC	30		
5876098	trans-1,2-dichloroethene	2012/05/29	89	70 - 130	94	70 - 130	<1.0	ug/L	NC	30		
5876098	1,1-dichloroethane	2012/05/29	78	70 - 130	85	70 - 130	<0.50	ug/L	NC	30		
5876098	cis-1,2-dichloroethene	2012/05/29	85	70 - 130	87	70 - 130	<1.0	ug/L	NC	30		
5876098	Chloroform	2012/05/29	81	70 - 130	84	70 - 130	<1.0	ug/L	NC	30		
5876098	1,1,1-trichloroethane	2012/05/29	79	70 - 130	96	70 - 130	<0.50	ug/L	NC	30		
5876098	1,2-dichloroethane	2012/05/29	78	70 - 130	88	70 - 130	<0.50	ug/L	NC	30		
5876098	Carbon tetrachloride	2012/05/29	89	70 - 130	100	70 - 130	<0.50	ug/L	NC	30		
5876098	Benzene	2012/05/29	96	70 - 130	79	70 - 130	<0.50	ug/L	NC	30		
5876098	Methyl-tert-butylether(MTBE)	2012/05/29	86	70 - 130	75	70 - 130	<4.0	ug/L	NC	30		
5876098	1,2-dichloropropane	2012/05/29	83	70 - 130	78	70 - 130	<0.50	ug/L	NC	30		
5876098	cis-1,3-dichloropropene	2012/05/29	87	70 - 130	89	70 - 130	<1.0	ug/L	NC	30		
5876098	trans-1,3-dichloropropene	2012/05/29	77	70 - 130	90	70 - 130	<1.0	ug/L	NC	30		
5876098	Bromomethane	2012/05/29	82	60 - 140	102	60 - 140	<1.0	ug/L	NC	30		
5876098	1,1,2-trichloroethane	2012/05/29	78	70 - 130	62 (1, 2)	70 - 130	<0.50	ug/L	NC	30		
5876098	Trichloroethene	2012/05/29	86	70 - 130	90	70 - 130	<0.50	ug/L	NC	30		
5876098	Chlorodibromomethane	2012/05/29	75	70 - 130	94	70 - 130	<1.0	ug/L	NC	30		
5876098	Tetrachloroethene	2012/05/29	85	70 - 130	94	70 - 130	<0.50	ug/L	NC	30		
5876098	Bromodichloromethane	2012/05/29	71	70 - 130	91	70 - 130	<1.0	ug/L	NC	30		
5876098	Toluene	2012/05/29	84	70 - 130	79	70 - 130	<0.50	ug/L	NC	30		
5876098	Ethylbenzene	2012/05/29	75	70 - 130	81	70 - 130	<0.50	ug/L	NC	30		
5876098	m & p-Xylene	2012/05/29	74	70 - 130	79	70 - 130	<1.0	ug/L	NC	30		
5876098	Bromoform	2012/05/29	72	70 - 130	99	70 - 130	<1.0	ug/L	NC	30		
5876098	Styrene	2012/05/29	72	70 - 130	75	70 - 130	<0.50	ug/L	NC	30		

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: CRWMC - N23101881

Maxxam Job #: B243426
Report Date: 2012/06/19

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5876098	o-Xylene	2012/05/29	66(1)	70 - 130	71	70 - 130	<0.50	ug/L	NC	30		
5876098	1,1,1,2-tetrachloroethane	2012/05/29	82	70 - 130	90	70 - 130	<0.50	ug/L	NC	30		
5876098	1,1,2,2-tetrachloroethane	2012/05/29	93	70 - 130	90	70 - 130	<0.50	ug/L	NC	30		
5876098	1,2-dichlorobenzene	2012/05/29	83	70 - 130	85	70 - 130	<0.50	ug/L	NC	30		
5876098	1,3-dichlorobenzene	2012/05/29	83	70 - 130	80	70 - 130	<0.50	ug/L	NC	30		
5876098	1,4-dichlorobenzene	2012/05/29	77	70 - 130	90	70 - 130	<0.50	ug/L	NC	30		
5876098	Chlorobenzene	2012/05/29	82	70 - 130	82	70 - 130	<0.50	ug/L	NC	30		
5876098	Dibromomethane	2012/05/29	75	70 - 130	74	70 - 130	<0.90	ug/L	NC	30		
5876098	Bromobenzene	2012/05/29	81	70 - 130			<2.0	ug/L				
5876098	1,1,2Trichloro-1,2,2Trifluoroethane	2012/05/29					<2.0	ug/L				
5876098	1,3-Butadiene	2012/05/29					<5.0	ug/L				
5876098	Xylenes (Total)	2012/05/29					<1.0	ug/L	NC	30		
5876287	Dissolved Hex. Chromium (Cr 6+)	2012/05/29	101	80 - 120	94	80 - 120	<0.0010	mg/L	NC	20		
5876309	Dissolved Chloride (Cl)	2012/05/29	98	80 - 120	101	80 - 120	<0.50	mg/L	0.4	20		
5876383	Dissolved Sulphate (SO4)	2012/05/29	97	80 - 120	99	80 - 120	<0.50	mg/L	0.3	20		
5878364	VH C6-C10	2012/05/29					<300	ug/L	NC	40	82(3)	70 - 130
5878373	Nitrate plus Nitrite (N)	2012/05/29	NC	80 - 120	108	80 - 120	<0.020	mg/L	9.9(4)	25		
5878376	Nitrite (N)	2012/05/29	96	80 - 120	104	80 - 120	<0.0050	mg/L	NC(4)	20		
5878779	Dissolved Phosphorus (P)	2012/05/30	99	80 - 120	89	80 - 120	<0.0050	mg/L	NC	20		
5878780	Total Phosphorus (P)	2012/05/30	NC	80 - 120	94	80 - 120	<0.0050	mg/L	0.6	20		
5880910	1,4-Difluorobenzene (sur.)	2012/05/31	100	70 - 130	100	70 - 130	101	%				
5880910	4-BROMOFLUOROBENZENE (sur.)	2012/05/31	97	70 - 130	94	70 - 130	86	%				
5880910	D4-1,2-DICHLOROETHANE (sur.)	2012/05/31	81	70 - 130	84	70 - 130	82	%				
5880910	Chloromethane	2012/05/31	106	60 - 140	98	60 - 140	<1.0	ug/L	NC	30		
5880910	Vinyl chloride	2012/05/31	114	60 - 140	97	60 - 140	<0.50	ug/L	NC	30		
5880910	Chloroethane	2012/05/31	91	60 - 140	82	60 - 140	<1.0	ug/L	NC	30		
5880910	Trichlorofluoromethane	2012/05/31	128	60 - 140	116	60 - 140	<4.0	ug/L	NC	30		
5880910	Dichlorodifluoromethane	2012/05/31	118	60 - 140	104	60 - 140	<2.0	ug/L	NC	30		
5880910	1,1-dichloroethene	2012/05/31	98	70 - 130	91	70 - 130	<0.50	ug/L	NC	30		
5880910	Dichloromethane	2012/05/31	104	70 - 130	94	70 - 130	<2.0	ug/L	NC	30		
5880910	trans-1,2-dichloroethene	2012/05/31	94	70 - 130	83	70 - 130	<1.0	ug/L	NC	30		
5880910	1,1-dichloroethane	2012/05/31	99	70 - 130	91	70 - 130	<0.50	ug/L	NC	30		
5880910	cis-1,2-dichloroethene	2012/05/31	94	70 - 130	81	70 - 130	<1.0	ug/L	NC	30		
5880910	Chloroform	2012/05/31	85	70 - 130	75	70 - 130	<1.0	ug/L	NC	30		
5880910	1,1,1-trichloroethane	2012/05/31	101	70 - 130	90	70 - 130	<0.50	ug/L	NC	30		
5880910	1,2-dichloroethane	2012/05/31	99	70 - 130	93	70 - 130	<0.50	ug/L	NC	30		
5880910	Carbon tetrachloride	2012/05/31	107	70 - 130	95	70 - 130	<0.50	ug/L	NC	30		
5880910	Benzene	2012/05/31	95	70 - 130	91	70 - 130	<0.50	ug/L	NC	30		
5880910	Methyl-tert-butylether(MTBE)	2012/05/31	84	70 - 130	79	70 - 130	<4.0	ug/L	NC	30		
5880910	1,2-dichloropropane	2012/05/31	94	70 - 130	86	70 - 130	<0.50	ug/L	NC	30		

Maxxam Job #: B243426
Report Date: 2012/06/19

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: CRWMC - N23101881

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5880910	cis-1,3-dichloropropene	2012/05/31	107	70 - 130	82	70 - 130	<1.0	ug/L	NC	30		
5880910	trans-1,3-dichloropropene	2012/05/31	102	70 - 130	73	70 - 130	<1.0	ug/L	NC	30		
5880910	Bromomethane	2012/05/31	101	60 - 140	81	60 - 140	<1.0	ug/L	NC	30		
5880910	1,1,2-trichloroethane	2012/05/31	101	70 - 130	91	70 - 130	<0.50	ug/L	NC	30		
5880910	Trichloroethene	2012/05/31	100	70 - 130	89	70 - 130	<0.50	ug/L	NC	30		
5880910	Chlorodibromomethane	2012/05/31	99	70 - 130	83	70 - 130	<1.0	ug/L	NC	30		
5880910	Tetrachloroethene	2012/05/31	99	70 - 130	90	70 - 130	<0.50	ug/L	NC	30		
5880910	Bromodichloromethane	2012/05/31	94	70 - 130	88	70 - 130	<1.0	ug/L	NC	30		
5880910	Toluene	2012/05/31	95	70 - 130	89	70 - 130	<0.50	ug/L	NC	30		
5880910	Ethylbenzene	2012/05/31	94	70 - 130	85	70 - 130	<0.50	ug/L	NC	30		
5880910	m & p-Xylene	2012/05/31	95	70 - 130	86	70 - 130	<1.0	ug/L	NC	30		
5880910	Bromoform	2012/05/31	109	70 - 130	95	70 - 130	<1.0	ug/L	NC	30		
5880910	Styrene	2012/05/31	108	70 - 130	98	70 - 130	<0.50	ug/L	NC	30		
5880910	o-Xylene	2012/05/31	86	70 - 130	75	70 - 130	<0.50	ug/L	NC	30		
5880910	1,1,1,2-tetrachloroethane	2012/05/31	105	70 - 130	98	70 - 130	<0.50	ug/L	NC	30		
5880910	1,1,2,2-tetrachloroethane	2012/05/31	99	70 - 130	95	70 - 130	<0.50	ug/L	NC	30		
5880910	1,2-dichlorobenzene	2012/05/31	97	70 - 130	90	70 - 130	<0.50	ug/L	NC	30		
5880910	1,3-dichlorobenzene	2012/05/31	93	70 - 130	84	70 - 130	<0.50	ug/L	NC	30		
5880910	1,4-dichlorobenzene	2012/05/31	99	70 - 130	93	70 - 130	<0.50	ug/L	NC	30		
5880910	Chlorobenzene	2012/05/31	88	70 - 130	79	70 - 130	<0.50	ug/L	NC	30		
5880910	Dibromomethane	2012/05/31	105	70 - 130	103	70 - 130	<0.90	ug/L	NC	30		
5880910	Bromobenzene	2012/05/31	100	70 - 130	92	70 - 130	<2.0	ug/L	NC	30		
5880910	1,1,2Trichloro-1,2,2Trifluoroethane	2012/05/31					<2.0	ug/L	NC	30		
5880910	1,3-Butadiene	2012/05/31					<5.0	ug/L	NC	30		
5880910	Xylenes (Total)	2012/05/31					<1.0	ug/L	NC	30		
5881760	VH C6-C10	2012/05/31					<300	ug/L	NC	40	89	70 - 130
5890946	Fluoride (F)	2012/06/01	92	80 - 120	100	80 - 120	<0.010	mg/L	NC	20		
5928378	Dissolved Aluminum (Al)	2012/06/17	96	80 - 120	108	80 - 120	<0.20	ug/L	5.4	20		
5928378	Dissolved Antimony (Sb)	2012/06/17	101	80 - 120	105	80 - 120	<0.020	ug/L	NC	20		
5928378	Dissolved Arsenic (As)	2012/06/17	100	80 - 120	94	80 - 120	0.032, RDL=0.020	ug/L	13.4	20		
5928378	Dissolved Barium (Ba)	2012/06/17	92	80 - 120	99	80 - 120	<0.020	ug/L	5.5	20		
5928378	Dissolved Beryllium (Be)	2012/06/17	104	80 - 120	103	80 - 120	<0.010	ug/L	NC	20		
5928378	Dissolved Bismuth (Bi)	2012/06/17	97	80 - 120	102	80 - 120	<0.0050	ug/L	NC	20		
5928378	Dissolved Cadmium (Cd)	2012/06/17	102	80 - 120	101	80 - 120	<0.0050	ug/L	NC	20		
5928378	Dissolved Chromium (Cr)	2012/06/17	94	80 - 120	98	80 - 120	<0.10	ug/L	NC	20		
5928378	Dissolved Cobalt (Co)	2012/06/17	93	80 - 120	98	80 - 120	<0.0050	ug/L	NC	20		
5928378	Dissolved Copper (Cu)	2012/06/17	93	80 - 120	97	80 - 120	<0.050	ug/L	NC	20		
5928378	Dissolved Iron (Fe)	2012/06/17	98	80 - 120	104	80 - 120	<1.0	ug/L	NC	20		
5928378	Dissolved Lead (Pb)	2012/06/17	95	80 - 120	101	80 - 120	<0.0050	ug/L	NC	20		
5928378	Dissolved Lithium (Li)	2012/06/17	97	80 - 120	100	80 - 120	<0.50	ug/L	NC	20		

Maxxam Job #: B243426
Report Date: 2012/06/19

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: CRWMC - N23101881

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5928378	Dissolved Manganese (Mn)	2012/06/17	96	80 - 120	98	80 - 120	<0.050	ug/L	NC	20		
5928378	Dissolved Mercury (Hg)	2012/06/17	95	80 - 120	98	80 - 120	<0.010	ug/L				
5928378	Dissolved Molybdenum (Mo)	2012/06/17	104	80 - 120	104	80 - 120	<0.050	ug/L	NC	20		
5928378	Dissolved Nickel (Ni)	2012/06/17	92	80 - 120	99	80 - 120	<0.020	ug/L	29.7 (1)	20		
5928378	Dissolved Selenium (Se)	2012/06/17	110	80 - 120	101	80 - 120	<0.040	ug/L	NC	20		
5928378	Dissolved Silver (Ag)	2012/06/17	98	80 - 120	101	80 - 120	<0.0050	ug/L	NC	20		
5928378	Dissolved Strontium (Sr)	2012/06/17	NC	80 - 120	99	80 - 120	<0.050	ug/L	5.4	20		
5928378	Dissolved Thallium (Tl)	2012/06/17	83	80 - 120	93	80 - 120	<0.0020	ug/L	NC	20		
5928378	Dissolved Tin (Sn)	2012/06/17	99	80 - 120	97	80 - 120	<0.20	ug/L	NC	20		
5928378	Dissolved Titanium (Ti)	2012/06/17	92	80 - 120	90	80 - 120	<0.50	ug/L	NC	20		
5928378	Dissolved Uranium (U)	2012/06/17	95	80 - 120	97	80 - 120	<0.0020	ug/L	NC	20		
5928378	Dissolved Vanadium (V)	2012/06/17	94	80 - 120	97	80 - 120	<0.20	ug/L	3.4	20		
5928378	Dissolved Zinc (Zn)	2012/06/17	104	80 - 120	100	80 - 120	<0.10	ug/L	7.8	20		
5928378	Dissolved Boron (B)	2012/06/17					<50	ug/L	NC	20		
5928378	Dissolved Silicon (Si)	2012/06/17					<100	ug/L	0.5	20		
5928378	Dissolved Zirconium (Zr)	2012/06/17					<0.10	ug/L	NC	20		
5928381	Dissolved Aluminum (Al)	2012/06/17	99	80 - 120	104	80 - 120	<0.20	ug/L	0.4	20		
5928381	Dissolved Antimony (Sb)	2012/06/17	103	80 - 120	104	80 - 120	<0.020	ug/L	NC	20		
5928381	Dissolved Arsenic (As)	2012/06/17	95	80 - 120	97	80 - 120	0.036, RDL=0.020	ug/L	7.1	20		
5928381	Dissolved Barium (Ba)	2012/06/17	94	80 - 120	99	80 - 120	<0.020	ug/L	0.6	20		
5928381	Dissolved Beryllium (Be)	2012/06/17	102	80 - 120	102	80 - 120	<0.010	ug/L	NC	20		
5928381	Dissolved Bismuth (Bi)	2012/06/17	101	80 - 120	100	80 - 120	<0.0050	ug/L	NC	20		
5928381	Dissolved Cadmium (Cd)	2012/06/17	102	80 - 120	101	80 - 120	<0.0050	ug/L	NC	20		
5928381	Dissolved Chromium (Cr)	2012/06/17	92	80 - 120	99	80 - 120	<0.10	ug/L	2.5	20		
5928381	Dissolved Cobalt (Co)	2012/06/17	92	80 - 120	100	80 - 120	<0.0050	ug/L	NC	20		
5928381	Dissolved Copper (Cu)	2012/06/17	91	80 - 120	100	80 - 120	<0.050	ug/L	NC	20		
5928381	Dissolved Iron (Fe)	2012/06/17	98	80 - 120	102	80 - 120	<1.0	ug/L	NC	20		
5928381	Dissolved Lead (Pb)	2012/06/17	97	80 - 120	101	80 - 120	<0.0050	ug/L	NC	20		
5928381	Dissolved Lithium (Li)	2012/06/17	96	80 - 120	100	80 - 120	<0.50	ug/L	NC	20		
5928381	Dissolved Manganese (Mn)	2012/06/17	95	80 - 120	102	80 - 120	<0.050	ug/L	6.9	20		
5928381	Dissolved Molybdenum (Mo)	2012/06/17	102	80 - 120	101	80 - 120	<0.050	ug/L	NC	20		
5928381	Dissolved Nickel (Ni)	2012/06/17	91	80 - 120	101	80 - 120	<0.020	ug/L	17.6	20		
5928381	Dissolved Selenium (Se)	2012/06/17	108	80 - 120	99	80 - 120	<0.040	ug/L	0.6	20		
5928381	Dissolved Silver (Ag)	2012/06/17	95	80 - 120	103	80 - 120	<0.0050	ug/L	NC	20		
5928381	Dissolved Strontium (Sr)	2012/06/17	NC	80 - 120	98	80 - 120	<0.050	ug/L	0.7	20		
5928381	Dissolved Thallium (Tl)	2012/06/17	86	80 - 120	95	80 - 120	<0.0020	ug/L	NC	20		
5928381	Dissolved Tin (Sn)	2012/06/17	107	80 - 120	97	80 - 120	<0.20	ug/L	NC	20		
5928381	Dissolved Titanium (Ti)	2012/06/17	94	80 - 120	119	80 - 120	<0.50	ug/L	NC	20		
5928381	Dissolved Uranium (U)	2012/06/17	98	80 - 120	97	80 - 120	<0.0020	ug/L	5.6	20		
5928381	Dissolved Vanadium (V)	2012/06/17	NC	80 - 120	97	80 - 120	<0.20	ug/L	2.0	20		

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: CRWMC - N23101881

Maxxam Job #: B243426
Report Date: 2012/06/19

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5928381	Dissolved Zinc (Zn)	2012/06/17	95	80 - 120	100	80 - 120	<0.10	ug/L	NC	20		
5928381	Dissolved Boron (B)	2012/06/17					<50	ug/L	NC	20		
5928381	Dissolved Silicon (Si)	2012/06/17					<100	ug/L	0.8	20		
5928381	Dissolved Zirconium (Zr)	2012/06/17					<0.10	ug/L	NC	20		
5929561	Total Aluminum (Al)	2012/06/18	102	80 - 120	101	80 - 120	<0.20	ug/L	NC	20		
5929561	Total Antimony (Sb)	2012/06/18	105	80 - 120	105	80 - 120	<0.020	ug/L	NC	20		
5929561	Total Arsenic (As)	2012/06/18	102	80 - 120	100	80 - 120	<0.020	ug/L	NC	20		
5929561	Total Barium (Ba)	2012/06/18	102	80 - 120	96	80 - 120	<0.020	ug/L	NC	20		
5929561	Total Beryllium (Be)	2012/06/18	103	80 - 120	96	80 - 120	<0.010	ug/L	NC	20		
5929561	Total Bismuth (Bi)	2012/06/18	100	80 - 120	97	80 - 120	<0.0050	ug/L	NC	20		
5929561	Total Cadmium (Cd)	2012/06/18	107	80 - 120	99	80 - 120	<0.0050	ug/L	NC	20		
5929561	Total Chromium (Cr)	2012/06/18	95	80 - 120	100	80 - 120	<0.10	ug/L	NC	20		
5929561	Total Cobalt (Co)	2012/06/18	94	80 - 120	98	80 - 120	<0.0050	ug/L	NC	20		
5929561	Total Copper (Cu)	2012/06/18	93	80 - 120	99	80 - 120	<0.050	ug/L	NC	20		
5929561	Total Iron (Fe)	2012/06/18	108	80 - 120	108	80 - 120	<1.0	ug/L	NC	20		
5929561	Total Lead (Pb)	2012/06/18	105	80 - 120	101	80 - 120	<0.0050	ug/L	NC	20		
5929561	Total Lithium (Li)	2012/06/18	103	80 - 120	101	80 - 120	<0.50	ug/L	NC	20		
5929561	Total Manganese (Mn)	2012/06/18	101	80 - 120	101	80 - 120	<0.050	ug/L	NC	20		
5929561	Total Mercury (Hg)	2012/06/18	101	80 - 120	96	80 - 120	<0.010	ug/L				
5929561	Total Molybdenum (Mo)	2012/06/18	99	80 - 120	94	80 - 120	<0.050	ug/L	NC	20		
5929561	Total Nickel (Ni)	2012/06/18	93	80 - 120	100	80 - 120	<0.020	ug/L	NC	20		
5929561	Total Selenium (Se)	2012/06/18	114	80 - 120	104	80 - 120	<0.040	ug/L	NC	20		
5929561	Total Silver (Ag)	2012/06/18	105	80 - 120	98	80 - 120	<0.0050	ug/L	NC	20		
5929561	Total Strontium (Sr)	2012/06/18	99	80 - 120	96	80 - 120	<0.050	ug/L	NC	20		
5929561	Total Thallium (Tl)	2012/06/18	105	80 - 120	103	80 - 120	<0.0020	ug/L	NC	20		
5929561	Total Tin (Sn)	2012/06/18	101	80 - 120	98	80 - 120	<0.20	ug/L	NC	20		
5929561	Total Titanium (Ti)	2012/06/18	91	80 - 120	101	80 - 120	<0.50	ug/L	NC	20		
5929561	Total Uranium (U)	2012/06/18	88	80 - 120	94	80 - 120	<0.0020	ug/L	NC	20		
5929561	Total Vanadium (V)	2012/06/18	100	80 - 120	103	80 - 120	<0.20	ug/L	NC	20		
5929561	Total Zinc (Zn)	2012/06/18	103	80 - 120	103	80 - 120	<0.10	ug/L	NC	20		
5929561	Total Boron (B)	2012/06/18					<50	ug/L	NC	20		
5929561	Total Silicon (Si)	2012/06/18					<100	ug/L	NC	20		

Maxxam Job #: B243426
Report Date: 2012/06/19

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: CRWMC - N23101881

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5929561	Total Zirconium (Zr)	2012/06/18					<0.10	ug/L	NC	20		
5933798	Dissolved Mercury (Hg)	2012/06/19	90	80 - 120	97	80 - 120	<0.010	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.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
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 outside acceptance criteria (10% of analytes failure allowed)
(3) - SQC trend rule failure for CSR VH C6-C10 Batch 5878364
. 4 of 5 consecutive points greater than 1SD below the mean.
(4) - Sample analysed past recommended hold time

Maxxam

Maxxam Analytics International Corporation o/a Maxxam Analytics
4606 Canada Way, Burnaby, British Columbia Canada V5G 1K5 Tel (604) 734 7276 Toll-free (604) 734 7276 Fax (604) 731 2386 www.maxxam.ca

CHAIN OF CUSTODY RECORD

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#5908 EBA Engineering Consultants Ltd.	Company Name:		Quotation #:	B10655	MAXXAM JOB #: B243426	BOTTLE ORDER #: 279649
Contact Name:	Kristy Gabelhouse	Contact Name:		P.O. #:			
Address:	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Address:		Project #:	CRWMC - N23101881	CHAIN OF CUSTODY #: C#276649-02-01	PROJECT MANAGER: NAMITA SAHNI
Phone:	(250)756-2256 x233 Fax: (250)756-2686	Phone:	Fax:	Project Name:			
Email:	kgabelhouse@eba.ca dromani@eba.ca	Email:	lpaul@eba.ca	Site #:			
				Sampled By:			

REGULATORY CRITERIA:
- ☐ CSR
- ☐ CCME
- ☒ BC Water Quality DW/AL
- ☒ Other CDWQG

SPECIAL INSTRUCTIONS:

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

ANALYSIS REQUESTED (Please be specific):

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 most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans 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 lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered ? (Y / N)	Ammonia-N	ANION (CL, F, NO2, NO3, SO4)	Dissolved Metals incl Sulphur and Hg	pH/CONDUCTIVITY/ALK	Total Metals incl Sulphur and hardness	Total Phosphorus	Dissolved Phosphorus	VOC + VPH	Speciated Cr Dissolved CrVI Field Filtered		# of Bottles	Comments
1	DM8856	HBT94-1	May25/12		GW	Y	X	X	X	X			X				4	
2	DM8857	HBT94-2	May24/12			Y	X	X	X	X			X	X			7	
3	—	AG99-01	May24/12		↓	Y	X	X	X	X			X				4	
4	DM8858	SW1	May24/12		SW	N	X	X		X	X	X					4	
5	DM8859	EBA04-7	May25/12		GW	Y	X	X	X	X			X	X			7	
6	DM8860	EBA04-6	"		"	Y	X	X	X	X			X		X		5	
7	DM8861	EBA11-03	"		"	Y	X	X	X	X			X				4	
8	DM8862	EBA11-04	"		"	Y	X	X	X	X			X		X		5	
9	DM8863	AG99-06	"		"	Y	X	X	X	X			X	X			7	B243426
10	DM8864	HBT94-6	May24/12		"	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: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
K. Galulin	12/05/25	4:00pm	Andre ANDY LEWIS	2012/05/26	09:30		☐	2,5,4	☐ 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.

White: Maxxam Yellow: Client

CS; NA

Maxxam

Maxxam Analytics International Corporation o/a Maxxam Analytics
4606 Canada Way, Burnaby, British Columbia Canada V5G 1K5 Tel (604) 734 7276 Toll-free (604) 734 7276 Fax (604) 731 2386 www.maxxam.ca

CHAIN OF CUSTODY RECORD

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#5908 EBA Engineering Consultants Ltd.	Company Name:		Quotation #:	B10655	MAXXAM JOB #: B243426	BOTTLE ORDER #: 279649
Contact Name:	Kristy Gabelhouse	Contact Name:		P.O. #:			
Address:	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Address:		Project #:	CRWMC - N23101881	CHAIN OF CUSTODY #: C#279649-04-01	PROJECT MANAGER: NAMITA SAHNI
Phone:	(250)756-2256 x233 Fax: (250)756-2686	Phone:	Fax:	Project Name:			
Email:	kgabelhouse@eba.ca dromans@eba.ca	Email:	lpaul@eba.ca	Site #:			
				Sampled By:			

REGULATORY CRITERIA:
- ☐ CSR
- ☐ CCME
- ☒ BC Water Quality DW/AL
- ☒ Other CDWQG

SPECIAL INSTRUCTIONS

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

ANALYSIS REQUESTED (Please be specific):

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 most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans 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 lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered ? (Y / N)	Ammonia-N	ANION (CL, F, NO2, NO3, SO4)	Dissolved Metals incl Sulphur and Hg	pH/CONDUCTIVITY/ALK	Total Metals incl Sulphur and hardness	Total Phosphorus	Dissolved Phosphorus	VOC + VPH			# of Bottles	Comments
1	DM8865	EBA04-8	May25/12		GW	Y	X	X	X	X	X		X				4	
2	DM8866	EBA11-5	May25/12		GW	Y	X	X	X	X	X		X				4	
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

B243426

*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: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
	12/05/25	4:00pm	Andy2 Andy Lewis	2012/05/26	09:30		☐	2, 5, 4	☐ 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.

White: Maxxam Yellow: Client

CS: NA

Success Through Science®

Your Project #: CVRD-N23101881
Site#: CRWMC-N23101881
Your C.O.C. #: 32356909

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

Report Date: 2012/09/18
This report supersedes all previous reports with the same Maxxam job number

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B273331
Received: 2012/08/18, 09:50

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	6	2012/08/20	2012/08/20	BBY6SOP-00026	SM2320B
Chloride by Automated Colourimetry	6	N/A	2012/08/20	BBY6SOP-00011	SM-4500-Cl-
Chromium III Dissolved (Calc'd)	1	N/A	2012/09/18		
Chromium, Hexavalent, Dissolved	1	N/A	2012/09/18	BBY6SOP-00015	SM-3500Cr B
Conductance - water	6	N/A	2012/08/20	BBY6SOP-00026	SM-2510B
Fluoride	6	N/A	2012/08/20	BBY6SOP-00038	SM - 4500 F C
Hardness (calculated as CaCO3)	6	N/A	2012/08/27	BBY WI-00033	Calculated Parameter
Mercury (Dissolved) by CVAF	2	N/A	2012/08/27	65-A-002-10	EPA 1631B
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	6	N/A	2012/08/27	BBY7SOP-00002	EPA 6020A
Elements by ICPMS Low Level (dissolved)	6	N/A	2012/08/24	BBY7SOP-00002	EPA 6020A
Ammonia-N	6	N/A	2012/08/20	BBY6SOP-00009	SM-4500NH3G
Nitrate + Nitrite (N)	6	N/A	2012/08/18	BBY6SOP-00010	USEPA 353.2
Nitrite (N) by CFA	6	N/A	2012/08/18	BBY6SOP-00010	EPA 353.2
Nitrogen - Nitrate (as N)	6	N/A	2012/08/20	BBY6SOP-00010	Based on EPA 353.2
Filter and HNO3 Preserve for Metals	6	N/A	2012/08/24	BBY6WI-00001	EPA 200.2
pH Water	6	N/A	2012/08/20	BBY6SOP-00026	SM-4500H+B
CSR VH C6-C10 in Water by HS GC/MS	2	N/A	2012/08/22	BBY8SOP-00011	EPA 8260B
Sulphate by Automated Colourimetry	6	N/A	2012/08/20	BBY6SOP-00017	SM4500-SO42
Total Phosphorus	6	N/A	2012/08/21	BBY6SOP-00013	SM 4500 PE
VOCs in Water by HS GC/MS	2	2012/08/21	2012/08/22	BBY8-SOP-0009	EPA 8260C
Volatile HC-BTEX	2	N/A	2012/08/24	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.

Namita Sahni, Burnaby Project Manager
Email: NSahni@maxxam.ca
Phone# (604) 639-2614

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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 #: B273331
Report Date: 2012/09/18

EBA Engineering Consultants Ltd.
Client Project #: CVRD-N23101881

Sampler Initials: KG

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		EF7147	EF7148	EF7149		EF7150	EF7151	EF7152		
Sampling Date		2012/08/16	2012/08/16	2012/08/16		2012/08/17	2012/08/16	2012/08/17		
COC#		32356909	32356909	32356909		32356909	32356909	32356909		
	UNITS	**EBA11-3**	**EBA11-4**	**EBA11-5**	**RDL**	**A999-4**	**A999-6**	**HBT94-4**	**RDL**	**QC Batch**
ANIONS										
Nitrite (N)	mg/L	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	0.0050	6094939
Calculated Parameters										
Dissolved Chromium III	mg/L		<0.0010		0.0010					6166714
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	N/A	FIELD	FIELD	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.163	0.137	0.137	0.020	0.147	0.114	0.150	0.020	6094655
Misc. Inorganics										
Fluoride (F)	mg/L	0.015	0.027	0.027	0.010	0.017	0.029	0.024	0.010	6099209
Alkalinity (Total as CaCO3)	mg/L	47.7	47.4	46.9	0.50	46.5	63.2	62.3	0.50	6099736
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	0.50	<0.50	<0.50	<0.50	0.50	6099736
Bicarbonate (HCO3)	mg/L	58.2	57.8	57.2	0.50	56.8	77.1	76.0	0.50	6099736
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	0.50	<0.50	<0.50	<0.50	0.50	6099736
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	0.50	<0.50	<0.50	<0.50	0.50	6099736
Anions										
Dissolved Sulphate (SO4)	mg/L	3.68	1.40	1.48	0.50	2.34	0.77	2.03	0.50	6099215
Dissolved Chloride (Cl)	mg/L	24	10	10	0.50	1.5	8.2	1.8	0.50	6099202
Metals										
Dissolved Hex. Chromium (Cr 6+)	mg/L		0.0015		0.0010					6177929
Nutrients										
Ammonia (N)	mg/L	0.026	0.017	0.021	0.0050	0.012	0.010	0.010	0.0050	6095772
Nitrate plus Nitrite (N)	mg/L	0.163	0.137	0.137	0.020	0.147	0.114	0.150	0.020	6094921
Total Phosphorus (P)	mg/L	0.607	1.33	1.44	0.050	0.0063	0.0588	0.0134	0.0050	6101305
Physical Properties										
Conductivity	uS/cm	190	128	128	1.0	96.6	149	132	1.0	6099738
pH	pH Units	7.85	7.87	7.86		7.86	7.84	7.97		6099739

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: B273331
Report Date: 2012/09/18

EBA Engineering Consultants Ltd.
Client Project #: CVRD-N23101881

Sampler Initials: KG

MERCURY BY COLD VAPOR (WATER)

Maxxam ID		EF7149	EF7152		
Sampling Date		2012/08/16	2012/08/17		
COC#		32356909	32356909		
	UNITS	**EBA11-5**	**HBT94-4**	**RDL**	**QC Batch**
Elements					
Dissolved Mercury (Hg)	ug/L	0.015	0.013	0.010	6117801

RDL = Reportable Detection Limit

Maxxam Job #: B273331
Report Date: 2012/09/18

EBA Engineering Consultants Ltd.
Client Project #: CVRD-N23101881

Sampler Initials: KG

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		EF7147	EF7148	EF7149	EF7150	EF7151	EF7152		
Sampling Date		2012/08/16	2012/08/16	2012/08/16	2012/08/17	2012/08/16	2012/08/17		
COC#		32356909	32356909	32356909	32356909	32356909	32356909		
	UNITS	**EBA11-3**	**EBA11-4**	**EBA11-5**	**A999-4**	**A999-6**	**HBT94-4**	**RDL**	**QC Batch**
Misc. Inorganics									
Dissolved Hardness (CaCO3)	mg/L	81.1	54.4	54.9	44.3	69.8	62.4	0.50	6094649

RDL = Reportable Detection Limit

Maxxam Job #: B273331
Report Date: 2012/09/18

EBA Engineering Consultants Ltd.
Client Project #: CVRD-N23101881

Sampler Initials: KG

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		EF7147	EF7148	EF7149	EF7150	EF7151	EF7152		
Sampling Date		2012/08/16	2012/08/16	2012/08/16	2012/08/17	2012/08/16	2012/08/17		
COC#		32356909	32356909	32356909	32356909	32356909	32356909		
	UNITS	**EBA11-3**	**EBA11-4**	**EBA11-5**	**A999-4**	**A999-6**	**HBT94-4**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS									
Dissolved Aluminum (Al)	mg/L	0.00757	0.0169	0.0129(1)	0.0108	0.00654	0.00505	0.00020	6105353
Dissolved Antimony (Sb)	mg/L	<0.000020	0.000026	0.000021	0.000024	<0.000020	0.000114	0.000020	6105353
Dissolved Arsenic (As)	mg/L	0.000144	0.00153	0.00162	0.000434	0.000081	0.000349	0.000020	6105353
Dissolved Barium (Ba)	mg/L	0.00132	0.00198	0.00179	0.000766	0.000414	0.000890	0.000020	6105353
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	6105353
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	6105353
Dissolved Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6105353
Dissolved Cadmium (Cd)	mg/L	<0.0000050	0.0000060	<0.0000050	0.0000110	<0.0000050	<0.0000050	0.0000050	6105353
Dissolved Chromium (Cr)	mg/L	0.00078	0.00138	0.00145	0.00025	0.00085	0.00022	0.00010	6105353
Dissolved Cobalt (Co)	mg/L	0.0000060	0.0000070	<0.0000050	0.0000080	<0.0000050	0.0000100	0.0000050	6105353
Dissolved Copper (Cu)	mg/L	0.000154	0.000179	0.000159	0.000428	0.000098	0.000248	0.000050	6105353
Dissolved Iron (Fe)	mg/L	0.0030	0.0115	0.0104	0.0025	0.0068	0.0016	0.0010	6105353
Dissolved Lead (Pb)	mg/L	<0.0000050	0.0000150	<0.0000050	0.0000120	0.0000060	<0.0000050	0.0000050	6105353
Dissolved Lithium (Li)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6105353
Dissolved Manganese (Mn)	mg/L	0.000151	0.000227	0.000136	0.000073	<0.000050	0.000256	0.000050	6105353
Dissolved Mercury (Hg)	mg/L	<0.000010	<0.000010		<0.000010	<0.000010		0.000010	6105353
Dissolved Molybdenum (Mo)	mg/L	0.000094	0.000128	0.000123	0.000123	0.000121	0.000162	0.000050	6105353
Dissolved Nickel (Ni)	mg/L	0.000087	0.000071	0.000042	0.000060	<0.000020	<0.000020	0.000020	6105353
Dissolved Selenium (Se)	mg/L	0.000296	0.000187	0.000231	0.000136	0.000116	0.00170	0.000040	6105353
Dissolved Silicon (Si)	mg/L	4.62	5.97	6.02	3.44	4.25	3.20	0.10	6105353
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	6105353
Dissolved Strontium (Sr)	mg/L	0.0433	0.0318	0.0315	0.0224	0.0460	0.0353	0.000050	6105353
Dissolved Thallium (Tl)	mg/L	<0.0000020	0.0000020	0.0000020	<0.0000020	<0.0000020	0.0000020	0.0000020	6105353
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	6105353
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6105353
Dissolved Uranium (U)	mg/L	0.0000260	0.000203	0.000207	0.0000240	0.0000390	0.0000450	0.0000020	6105353
Dissolved Vanadium (V)	mg/L	0.00274	0.0142	0.0142	0.00323	0.00248	0.00507	0.00020	6105353
Dissolved Zinc (Zn)	mg/L	0.00022	0.00041	<0.00010	0.00451	0.00080	0.00031	0.00010	6105353
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	6105353
Dissolved Calcium (Ca)	mg/L	25.2	16.9	17.1	14.9	21.7	22.3	0.050	6094748
Dissolved Magnesium (Mg)	mg/L	4.40	2.96	2.98	1.73	3.80	1.60	0.050	6094748
Dissolved Potassium (K)	mg/L	0.345	0.742	0.736	0.283	0.290	0.479	0.050	6094748
Dissolved Sodium (Na)	mg/L	1.60	2.42	2.40	1.31	2.04	1.26	0.050	6094748
Dissolved Sulphur (S)	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6105353

RDL = Reportable Detection Limit
(1) - Duplicate RPD above control limit - (10% of analytes failure allowed).

Maxxam Job #: B273331
Report Date: 2012/09/18

EBA Engineering Consultants Ltd.
Client Project #: CVRD-N23101881

Sampler Initials: KG

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		EF7150	EF7151		
Sampling Date		2012/08/17	2012/08/16		
COC#		32356909	32356909		
	UNITS	**A999-4**	**A999-6**	**RDL**	**QC Batch**
Volatiles					
VPH (VH6 to 10 - BTEX)	ug/L	<300	<300	300	6094671
Volatile Hydrocarbons					
VH C6-C10	ug/L	<300	<300	300	6102886
Volatiles					
Chloromethane	mg/L	<0.0010	<0.0010	0.0010	6102742
Vinyl chloride	mg/L	<0.00050	<0.00050	0.00050	6102742
Chloroethane	mg/L	<0.0010	<0.0010	0.0010	6102742
Trichlorofluoromethane	mg/L	<0.0040	<0.0040	0.0040	6102742
1,1-dichloroethene	mg/L	<0.00050	<0.00050	0.00050	6102742
Dichloromethane	mg/L	<0.0020	<0.0020	0.0020	6102742
trans-1,2-dichloroethene	mg/L	<0.0010	<0.0010	0.0010	6102742
1,1-dichloroethane	mg/L	<0.00050	<0.00050	0.00050	6102742
cis-1,2-dichloroethene	mg/L	<0.0010	<0.0010	0.0010	6102742
Chloroform	mg/L	<0.0010	<0.0010	0.0010	6102742
1,1,1-trichloroethane	mg/L	<0.00050	<0.00050	0.00050	6102742
1,2-dichloroethane	mg/L	<0.00050	<0.00050	0.00050	6102742
Carbon tetrachloride	mg/L	<0.00050	<0.00050	0.00050	6102742
Benzene	mg/L	<0.00040	<0.00040	0.00040	6102742
Methyl-tert-butylether (MTBE)	mg/L	<0.0040	<0.0040	0.0040	6102742
1,2-dichloropropane	mg/L	<0.00050	<0.00050	0.00050	6102742
cis-1,3-dichloropropene	mg/L	<0.0010	<0.0010	0.0010	6102742
trans-1,3-dichloropropene	mg/L	<0.0010	<0.0010	0.0010	6102742
Bromomethane	mg/L	<0.0010	<0.0010	0.0010	6102742
1,1,2-trichloroethane	mg/L	<0.00050	<0.00050	0.00050	6102742
Trichloroethene	mg/L	<0.00050	<0.00050	0.00050	6102742
Chlorodibromomethane	mg/L	<0.0010	<0.0010	0.0010	6102742
Tetrachloroethene	mg/L	<0.00050	<0.00050	0.00050	6102742
Bromodichloromethane	mg/L	<0.0010	<0.0010	0.0010	6102742
Toluene	mg/L	<0.00040	<0.00040	0.00040	6102742
Ethylbenzene	mg/L	<0.00040	<0.00040	0.00040	6102742
m & p-Xylene	mg/L	<0.00040	<0.00040	0.00040	6102742
Bromoform	mg/L	<0.0010	<0.0010	0.0010	6102742
Styrene	mg/L	<0.00050	<0.00050	0.00050	6102742
o-Xylene	mg/L	<0.00040	<0.00040	0.00040	6102742
Xylenes (Total)	mg/L	<0.00040	<0.00040	0.00040	6102742

RDL = Reportable Detection Limit

Maxxam Job #: B273331
Report Date: 2012/09/18

EBA Engineering Consultants Ltd.
Client Project #: CVRD-N23101881

Sampler Initials: KG

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		EF7150	EF7151		
Sampling Date		2012/08/17	2012/08/16		
COC#		32356909	32356909		
	UNITS	**A999-4**	**A999-6**	**RDL**	**QC Batch**
1,1,1,2-tetrachloroethane	mg/L	<0.00050	<0.00050	0.00050	6102742
1,1,2,2-tetrachloroethane	mg/L	<0.00050	<0.00050	0.00050	6102742
1,2-dichlorobenzene	mg/L	<0.00050	<0.00050	0.00050	6102742
1,3-dichlorobenzene	mg/L	<0.00050	<0.00050	0.00050	6102742
1,4-dichlorobenzene	mg/L	<0.00050	<0.00050	0.00050	6102742
Chlorobenzene	mg/L	<0.00050	<0.00050	0.00050	6102742
Dibromomethane	mg/L	<0.00090	<0.00090	0.00090	6102742
Surrogate Recovery (%)					
1,4-Difluorobenzene (sur.)	%	102	101		6102742
4-BROMOFLUOROBENZENE (sur.)	%	99	98		6102742
D4-1,2-DICHLOROETHANE (sur.)	%	90	87		6102742

RDL = Reportable Detection Limit

Maxxam Job #: B273331
Report Date: 2012/09/18

EBA Engineering Consultants Ltd.
Client Project #: CVRD-N23101881

Sampler Initials: KG

General Comments

Sample EF7147-01: 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 EF7148-01: 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 EF7149-01: 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 EF7150-01: 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 EF7151-01: 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 EF7152-01: 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 #: B273331
Report Date: 2012/09/18

EBA Engineering Consultants Ltd.
Client Project #: CVRD-N23101881

Sampler Initials: KG

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
6094921	Nitrate plus Nitrite (N)	2012/08/18	112	80 - 120	107	80 - 120	<0.020	mg/L	NC	25		
6094939	Nitrite (N)	2012/08/18	104	80 - 120	102	80 - 120	<0.0050	mg/L	NC	20		
6095772	Ammonia (N)	2012/08/20	NC	80 - 120	98	80 - 120	<0.0050	mg/L	1.1	20		
6099202	Dissolved Chloride (Cl)	2012/08/20	NC	80 - 120	104	80 - 120	<0.50	mg/L	0.1	20		
6099209	Fluoride (F)	2012/08/20	NC	80 - 120	96	80 - 120	<0.010	mg/L	0	20		
6099215	Dissolved Sulphate (SO4)	2012/08/20	NC	80 - 120	97	80 - 120	<0.50	mg/L	0.8	20		
6099736	Alkalinity (Total as CaCO3)	2012/08/20	NC	80 - 120	98	80 - 120	<0.50	mg/L	1.0	20		
6099736	Alkalinity (PP as CaCO3)	2012/08/20					<0.50	mg/L	NC	20		
6099736	Bicarbonate (HCO3)	2012/08/20					<0.50	mg/L	1.0	20		
6099736	Carbonate (CO3)	2012/08/20					<0.50	mg/L	NC	20		
6099736	Hydroxide (OH)	2012/08/20					<0.50	mg/L	NC	20		
6099738	Conductivity	2012/08/20			99	80 - 120	<1.0	uS/cm	0.5	20		
6101305	Total Phosphorus (P)	2012/08/21	NC	80 - 120	100	80 - 120	<0.0050	mg/L	4.7	20		
6102742	1,4-Difluorobenzene (sur.)	2012/08/22	101	70 - 130	101	70 - 130	101	%				
6102742	4-BROMOFLUOROBENZENE (sur.)	2012/08/22	102	70 - 130	105	70 - 130	102	%				
6102742	D4-1,2-DICHLOROETHANE (sur.)	2012/08/22	91	70 - 130	102	70 - 130	93	%				
6102742	Chloromethane	2012/08/22	92	60 - 140	90	60 - 140	<0.0010	mg/L				
6102742	Vinyl chloride	2012/08/22	112	60 - 140	112	60 - 140	<0.00050	mg/L				
6102742	Chloroethane	2012/08/22	89	60 - 140	91	60 - 140	<0.0010	mg/L				
6102742	Trichlorofluoromethane	2012/08/22	124	60 - 140	126	60 - 140	<0.0040	mg/L				
6102742	1,1-dichloroethene	2012/08/22	90	70 - 130	92	70 - 130	<0.00050	mg/L				
6102742	Dichloromethane	2012/08/22	90	70 - 130	102	70 - 130	<0.0020	mg/L				
6102742	trans-1,2-dichloroethene	2012/08/22	91	70 - 130	94	70 - 130	<0.0010	mg/L				
6102742	1,1-dichloroethane	2012/08/22	93	70 - 130	98	70 - 130	<0.00050	mg/L				
6102742	cis-1,2-dichloroethene	2012/08/22	91	70 - 130	99	70 - 130	<0.0010	mg/L				
6102742	Chloroform	2012/08/22	91	70 - 130	98	70 - 130	<0.0010	mg/L				
6102742	1,1,1-trichloroethane	2012/08/22	89	70 - 130	92	70 - 130	<0.00050	mg/L				
6102742	1,2-dichloroethane	2012/08/22	88	70 - 130	101	70 - 130	<0.00050	mg/L				
6102742	Carbon tetrachloride	2012/08/22	88	70 - 130	90	70 - 130	<0.00050	mg/L				
6102742	Benzene	2012/08/22	87	70 - 130	92	70 - 130	<0.00040	mg/L				
6102742	Methyl-tert-butylether(MTBE)	2012/08/22	78	70 - 130	88	70 - 130	<0.0040	mg/L				
6102742	1,2-dichloropropane	2012/08/22	92	70 - 130	102	70 - 130	<0.00050	mg/L				
6102742	cis-1,3-dichloropropene	2012/08/22	71	70 - 130	92	70 - 130	<0.0010	mg/L				
6102742	Bromomethane	2012/08/22	80	60 - 140	94	60 - 140	<0.0010	mg/L				
6102742	1,1,2-trichloroethane	2012/08/22	73	70 - 130	99	70 - 130	<0.00050	mg/L				
6102742	Trichloroethene	2012/08/22	90	70 - 130	94	70 - 130	<0.00050	mg/L	NC	30		
6102742	Chlorodibromomethane	2012/08/22	89	70 - 130	100	70 - 130	<0.0010	mg/L				
6102742	Tetrachloroethene	2012/08/22	91	70 - 130	92	70 - 130	<0.00050	mg/L	0.5	30		
6102742	Bromodichloromethane	2012/08/22	89	70 - 130	99	70 - 130	<0.0010	mg/L				
6102742	Toluene	2012/08/22	86	70 - 130	91	70 - 130	<0.00040	mg/L				

Maxxam Job #: B273331
Report Date: 2012/09/18

EBA Engineering Consultants Ltd.
Client Project #: CVRD-N23101881

Sampler Initials: KG

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
6102742	Ethylbenzene	2012/08/22	86	70 - 130	93	70 - 130	<0.00040	mg/L				
6102742	m & p-Xylene	2012/08/22	83	70 - 130	90	70 - 130	<0.00040	mg/L				
6102742	Bromoform	2012/08/22	91	70 - 130	105	70 - 130	<0.0010	mg/L				
6102742	Styrene	2012/08/22	88	70 - 130	97	70 - 130	<0.00050	mg/L				
6102742	o-Xylene	2012/08/22	77	70 - 130	84	70 - 130	<0.00040	mg/L				
6102742	1,1,1,2-tetrachloroethane	2012/08/22	89	70 - 130	94	70 - 130	<0.00050	mg/L				
6102742	1,1,2,2-tetrachloroethane	2012/08/22	94	70 - 130	108	70 - 130	<0.00050	mg/L				
6102742	1,2-dichlorobenzene	2012/08/22	84	70 - 130	91	70 - 130	<0.00050	mg/L				
6102742	1,3-dichlorobenzene	2012/08/22	83	70 - 130	86	70 - 130	<0.00050	mg/L				
6102742	1,4-dichlorobenzene	2012/08/22	88	70 - 130	93	70 - 130	<0.00050	mg/L				
6102742	Chlorobenzene	2012/08/22	80	70 - 130	87	70 - 130	<0.00050	mg/L				
6102742	Dibromomethane	2012/08/22	91	70 - 130	105	70 - 130	<0.00090	mg/L				
6102742	trans-1,3-dichloropropene	2012/08/22			98	70 - 130	<0.0010	mg/L				
6102742	Xylenes (Total)	2012/08/22					<0.00040	mg/L				
6102886	VH C6-C10	2012/08/22					<300	ug/L			91	70 - 130
6105353	Dissolved Aluminum (Al)	2012/08/24	94	80 - 120	100	80 - 120	0.00038, RDL=0.00020	mg/L	25.7(1)	20		
6105353	Dissolved Antimony (Sb)	2012/08/24	100	80 - 120	97	80 - 120	<0.000020	mg/L	NC	20		
6105353	Dissolved Arsenic (As)	2012/08/24	97	80 - 120	97	80 - 120	<0.000020	mg/L	0.7	20		
6105353	Dissolved Barium (Ba)	2012/08/24	92	80 - 120	93	80 - 120	<0.000020	mg/L	0.8	20		
6105353	Dissolved Beryllium (Be)	2012/08/24	95	80 - 120	92	80 - 120	<0.000010	mg/L	NC	20		
6105353	Dissolved Bismuth (Bi)	2012/08/24	93	80 - 120	92	80 - 120	<0.0000050	mg/L	NC	20		
6105353	Dissolved Cadmium (Cd)	2012/08/24	95	80 - 120	95	80 - 120	<0.0000050	mg/L	NC	20		
6105353	Dissolved Chromium (Cr)	2012/08/24	93	80 - 120	97	80 - 120	<0.00010	mg/L	1.9	20		
6105353	Dissolved Cobalt (Co)	2012/08/24	92	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20		
6105353	Dissolved Copper (Cu)	2012/08/24	90	80 - 120	95	80 - 120	<0.000050	mg/L	NC	20		
6105353	Dissolved Iron (Fe)	2012/08/24	95	80 - 120	99	80 - 120	<0.0010	mg/L	3.2	20		
6105353	Dissolved Lead (Pb)	2012/08/24	92	80 - 120	95	80 - 120	<0.0000050	mg/L	NC	20		
6105353	Dissolved Lithium (Li)	2012/08/24	93	80 - 120	94	80 - 120	<0.00050	mg/L	NC	20		
6105353	Dissolved Manganese (Mn)	2012/08/24	93	80 - 120	97	80 - 120	<0.000050	mg/L	NC	20		
6105353	Dissolved Mercury (Hg)	2012/08/24	94	80 - 120	93	80 - 120	<0.000010	mg/L				
6105353	Dissolved Molybdenum (Mo)	2012/08/24	92	80 - 120	94	80 - 120	<0.000050	mg/L	NC	20		
6105353	Dissolved Nickel (Ni)	2012/08/24	92	80 - 120	99	80 - 120	<0.000020	mg/L	NC	20		
6105353	Dissolved Selenium (Se)	2012/08/24	102	80 - 120	99	80 - 120	<0.000040	mg/L	NC	20		
6105353	Dissolved Silver (Ag)	2012/08/24	94	80 - 120	95	80 - 120	<0.0000050	mg/L	NC	20		
6105353	Dissolved Strontium (Sr)	2012/08/24	NC	80 - 120	94	80 - 120	<0.000050	mg/L	0.2	20		
6105353	Dissolved Thallium (Tl)	2012/08/24	91	80 - 120	95	80 - 120	<0.0000020	mg/L	NC	20		
6105353	Dissolved Tin (Sn)	2012/08/24	99	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20		
6105353	Dissolved Titanium (Ti)	2012/08/24	101	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20		
6105353	Dissolved Uranium (U)	2012/08/24	92	80 - 120	92	80 - 120	<0.0000020	mg/L	0.5	20		
6105353	Dissolved Vanadium (V)	2012/08/24	NC	80 - 120	96	80 - 120	<0.00020	mg/L	0.5	20		

Maxxam Job #: B273331
Report Date: 2012/09/18

EBA Engineering Consultants Ltd.
Client Project #: CVRD-N23101881

Sampler Initials: KG

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
6105353	Dissolved Zinc (Zn)	2012/08/24	102	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20		
6105353	Dissolved Boron (B)	2012/08/24					<0.050	mg/L	NC	20		
6105353	Dissolved Silicon (Si)	2012/08/24					<0.10	mg/L	0.1	20		
6105353	Dissolved Zirconium (Zr)	2012/08/24					<0.00010	mg/L	NC	20		
6105353	Dissolved Sulphur (S)	2012/08/24					<2.0	mg/L	NC	20		
6117801	Dissolved Mercury (Hg)	2012/08/27	100	80 - 120	93	80 - 120	<0.010	ug/L	NC	20		
6177929	Dissolved Hex. Chromium (Cr 6+)	2012/09/18	105	80 - 120	102	80 - 120	<0.0010	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.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
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.

EBA Engineering Consultants Ltd.
Client Project #: CVRD-N23101881

Maxxam Job #: B273331
Report Date: 2012/09/18

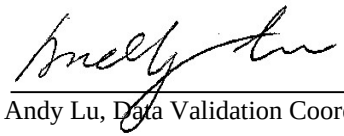
Sampler Initials: KG

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 #: B273331

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.

Maxxam Analytics International Corporation o/a Maxxam Analytics
4606 Canada Way, Burnaby, British Columbia Canada V5G 1K5 Tel (604) 734 7276 Toll-free (604) 734 7276 Fax (604) 731 2386 www.maxxam.ca

CHAIN OF CUSTODY RECORD

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#5908 EBA Engineering Consultants Ltd.	Company Name:		Quotation #:	B10655	MAXXAM JOB #: B273331	BOTTLE ORDER #: 323569
Contact Name:	Kristy Gabelhouse	Contact Name:	Lora Paul	P.O. #:			
Address:	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Address:		Project #:	CVRD-N23101881	CHAIN OF CUSTODY #: C#323569-09-01	PROJECT MANAGER: Namita Sahni
Phone:	(250)756-2256 x233 Fax: (250)756-2685	Phone:	Fax:	Project Name:			
Email:	kgabelhouse@eba.ca dromano@eba.ca	Email:	lpaul@eba.ca Kgabelhouse@eba.ca lc Gabelhouse	Site #:	CRWMC - N23101881		

REGULATORY CRITERIA:
- ☐ CSR
- ☐ CCME
- ☒ BC Water Quality AL/DW
- ☒ Other CDWQG

SPECIAL INSTRUCTIONS:
- Inc. Mercury/Sulphur
- Low level metals
- call Lora Paul if confusion at all

ANALYSIS REQUESTED (Please be specific):

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 most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans 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 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)	Ammonia (N)	ANION (CL, F, NO2, NO3, SO4)	pH, EC, ALK	Total Phosphorus	Phosphorus-P (Total dissolved) ?	Low L Total Metals incl Hg-P, S + Hard	VOC + VPH	Low L Dissolved Metals incl Hg, S+hard	DISSOLVED SPECIATED CHROMIUM III	Chromium VI	# of Bottles	Comments
1	EF7147	EBA11-3	Aug 16/12		GW	Y	X	X	X	X				X			4	
2	48	EBA11-4	↓		↓	Y	X	X	X	X				X	00 X Hold	Hold	6	Hold Chromium III and chromium VI
3	49	EBA11-5				Y	X	X	X	X				X			4	
4	50	AG99-4	Aug 17/12			Y	X	X	X	X			X	X			7	
5	51	AG99-6	Aug 16/12			Y	X	X	X	X			X	X			7	
6	52	MBT94-4	Aug 17/12		↓	Y	X	X	X	X				X			4	
7																		
8																		
9																		
10																		

B273331

*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: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
K. Gabelhouse	12/08/17	4:00pm	Andy C. Andy LEUNG	2012.08.18	09:50		☐	10.9.12	☐ 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.

White: Maxxam Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics

NA

Maxxam

Success Through Science®

Your Project #: N23101881 - CVRD
Site#: CVWMC
Your C.O.C. #: 33974004

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

Report Date: 2012/12/20
This report supersedes all previous reports with the same Maxxam job number

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B2B0855
Received: 2012/12/06, 08:00

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	6	2012/12/08	2012/12/10	BBY6SOP-00026	SM2320B
Chloride by Automated Colourimetry	6	N/A	2012/12/07	BBY6SOP-00011	SM-4500-Cl-
Chromium III Dissolved (Calc'd)	1	N/A	2012/12/18		
Chromium, Hexavalent, Dissolved	1	N/A	2012/12/18	BBY6SOP-00015	SM-3500Cr B
Conductance - water	6	N/A	2012/12/09	BBY6SOP-00026	SM-2510B
Fluoride	6	N/A	2012/12/07	BBY6SOP-00038	SM - 4500 F C
Hardness (calculated as CaCO3)	6	N/A	2012/12/12	BBY WI-00033	Calculated Parameter
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	6	N/A	2012/12/12	BBY7SOP-00002	EPA 6020A
Elements by ICPMS Low Level (dissolved)	6	N/A	2012/12/12	BBY7SOP-00002	EPA 6020A
Ammonia-N (Preserved)	6	N/A	2012/12/07	BBY6SOP-00009	SM-4500NH3G
Nitrate + Nitrite (N)	6	N/A	2012/12/07	BBY6SOP-00010	USEPA 353.2
Nitrite (N) by CFA	6	N/A	2012/12/07	BBY6SOP-00010	EPA 353.2
Nitrogen - Nitrate (as N)	6	N/A	2012/12/08	BBY6SOP-00010	Based on EPA 353.2
Filter and HNO3 Preserve for Metals	6	N/A	2012/12/06	BBY6WI-00001	EPA 200.2
pH Water	6	N/A	2012/12/10	BBY6SOP-00026	SM-4500H+B
CSR VH C6-C10 in Water by HS GC/MS	2	N/A	2012/12/10	BBY8SOP-00011	EPA 8260B
Sulphate by Automated Colourimetry	6	N/A	2012/12/07	BBY6SOP-00017	SM4500-SO42- E
Total Phosphorus	6	N/A	2012/12/10	BBY6SOP-00013	SM 4500 PE
VOCs in Water by HS GC/MS	2	2012/12/10	2012/12/10	BBY8-SOP-0009	EPA 8260C
Volatile HC-BTEX	2	N/A	2012/12/11	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 #: B2B0855
Report Date: 2012/12/20

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD

Sampler Initials: KG

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		FE4641		FE4642	FE4643		FE4644		FE4645		FE4646		
Sampling Date		2012/12/05		2012/12/05	2012/12/05		2012/12/05		2012/12/05		2012/12/05		
COC#		33974004		33974004	33974004		33974004		33974004		33974004		
	UNITS	**EBA11-01**	**RDL**	**HBT94-4**	**EBA11-03**	**RDL**	**EBA11-04**	**RDL**	**AG99-6**	**RDL**	**EBA11-05**	**RDL**	**QC Batch**
ANIONS													
Nitrite (N)	mg/L	<0.0050	0.0050	0.0102	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	6408535
Calculated Parameters													
Dissolved Chromium III	mg/L	<0.0010	0.0010										6425589
Filter and HNO3 Preservation	N/A	FIELD	N/A	FIELD	FIELD	N/A	FIELD	N/A	FIELD	N/A	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.352	0.020	<0.020	0.907	0.020	0.021	0.020	<0.020	0.020	<0.020	0.020	6402538
Misc. Inorganics													
Fluoride (F)	mg/L	0.019	0.010	0.017	0.017	0.010	0.023	0.010	0.037	0.010	0.023	0.010	6409515
Alkalinity (Total as CaCO3)	mg/L	126	0.50	110	50.3	0.50	44.6	0.50	46.9	0.50	43.8	0.50	6410003
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	0.50	6410003
Bicarbonate (HCO3)	mg/L	154	0.50	134	61.4	0.50	54.4	0.50	57.2	0.50	53.5	0.50	6410003
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	6410003
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	6410003
Anions													
Dissolved Sulphate (SO4)	mg/L	46.8	0.50	2.43	2.75	0.50	0.84	0.50	1.06	0.50	0.91	0.50	6408826
Dissolved Chloride (Cl)	mg/L	21	0.50	1.7	20	0.50	3.9	0.50	4.7	0.50	3.8	0.50	6407916
Metals													
Dissolved Hex. Chromium (Cr 6+)	mg/L	0.0022	0.0010										6434878
Nutrients													
Ammonia (N)	mg/L	0.019	0.0050	0.028	0.025	0.0050	<0.0050	0.0050	0.0058	0.0050	<0.0050	0.0050	6406117
Nitrate plus Nitrite (N)	mg/L	0.352	0.020	0.023	0.907	0.020	0.021	0.020	<0.020	0.020	<0.020	0.020	6408530
Total Phosphorus (P)	mg/L	0.935	0.050	0.0089	0.144	0.0050	1.71	0.050	0.236	0.0050	1.76	0.050	6409450
Physical Properties													
Conductivity	uS/cm	412	1.0	222	184	1.0	100	1.0	108	1.0	100	1.0	6410017
pH	pH Units	8.09		8.18	7.91		7.87		7.79		7.86		6410018

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: B2B0855
Report Date: 2012/12/20

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD

Sampler Initials: KG

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		FE4641	FE4642	FE4643	FE4644	FE4645	FE4646		
Sampling Date		2012/12/05	2012/12/05	2012/12/05	2012/12/05	2012/12/05	2012/12/05		
COC#		33974004	33974004	33974004	33974004	33974004	33974004		
	UNITS	**EBA11-01**	**HBT94-4**	**EBA11-03**	**EBA11-04**	**AG99-6**	**EBA11-05**	**RDL**	**QC Batch**
Misc. Inorganics									
Dissolved Hardness (CaCO3)	mg/L	211	110	80.5	44.2	48.4	44.3	0.50	6402597

RDL = Reportable Detection Limit

Maxxam Job #: B2B0855
Report Date: 2012/12/20

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD

Sampler Initials: KG

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		FE4641	FE4642	FE4643	FE4644	FE4645	FE4646		
Sampling Date		2012/12/05	2012/12/05	2012/12/05	2012/12/05	2012/12/05	2012/12/05		
COC#		33974004	33974004	33974004	33974004	33974004	33974004		
	UNITS	**EBA11-01**	**HBT94-4**	**EBA11-03**	**EBA11-04**	**AG99-6**	**EBA11-05**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS									
Dissolved Aluminum (Al)	mg/L	0.00544	0.00327	0.00343	0.0130	0.00217	0.0123	0.00020	6414325
Dissolved Antimony (Sb)	mg/L	0.000025	0.000073	0.000027	0.000027	0.000020	0.000025	0.000020	6414325
Dissolved Arsenic (As)	mg/L	0.000285	0.000327	0.000181	0.00137	0.000099	0.00141	0.000020	6414325
Dissolved Barium (Ba)	mg/L	0.00555	0.00157	0.00121	0.00180	0.000321	0.00165	0.000020	6414325
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	6414325
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	6414325
Dissolved Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6414325
Dissolved Cadmium (Cd)	mg/L	<0.0000050	<0.0000050	0.0000080	0.0000120	0.0000060	<0.0000050	0.0000050	6414325
Dissolved Chromium (Cr)	mg/L	0.00119	<0.00010	0.00051	0.00066	0.00025	0.00062	0.00010	6414325
Dissolved Cobalt (Co)	mg/L	0.0000160	0.0000100	<0.0000050	0.0000060	0.0000060	<0.0000050	0.0000050	6414325
Dissolved Copper (Cu)	mg/L	0.000343	0.000456	0.000109	0.000521	0.000073	0.000204	0.000050	6414325
Dissolved Iron (Fe)	mg/L	0.0034	0.0023	0.0016	0.0081	0.0043	0.0068	0.0010	6414325
Dissolved Lead (Pb)	mg/L	0.0000110	0.0000150	0.0000100	0.0000100	<0.0000050	0.0000080	0.0000050	6414325
Dissolved Lithium (Li)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6414325
Dissolved Manganese (Mn)	mg/L	0.000282	0.00124	0.000123	0.000131	0.000057	0.000079	0.000050	6414325
Dissolved Mercury (Hg)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	6414325
Dissolved Molybdenum (Mo)	mg/L	0.000116	0.000132	0.000128	0.000110	0.000095	0.000086	0.000050	6414325
Dissolved Nickel (Ni)	mg/L	0.000295	0.000102	0.000041	0.000241	0.000157	0.000054	0.000020	6414325
Dissolved Selenium (Se)	mg/L	0.000146	0.000206	0.000184	0.000131	0.000051	0.000277 (1)	0.000040	6414325
Dissolved Silicon (Si)	mg/L	5.94	3.73	4.56	4.97	4.41	5.13	0.10	6414325
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	6414325
Dissolved Strontium (Sr)	mg/L	0.112	0.0641	0.0443	0.0247	0.0297	0.0243	0.000050	6414325
Dissolved Thallium (Tl)	mg/L	0.0000040	0.0000040	<0.0000020	0.0000020	<0.0000020	0.0000020	0.0000020	6414325
Dissolved Tin (Sn)	mg/L	0.00032	0.00024	<0.00020	0.00029	<0.00020	<0.00020	0.00020	6414325
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	0.00050	6414325
Dissolved Uranium (U)	mg/L	0.000481	0.0000600	0.0000300	0.000128	0.0000180	0.000131	0.0000020	6414325
Dissolved Vanadium (V)	mg/L	0.00506	0.00483	0.00277	0.0149	0.00232	0.0146	0.00020	6414325
Dissolved Zinc (Zn)	mg/L	0.00053	0.00065	0.00087	0.00078	0.00034	0.00022 (2)	0.00010	6414325
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	6414325
Dissolved Calcium (Ca)	mg/L	65.0	39.2	25.2	13.3	14.7	13.5	0.050	6403057
Dissolved Magnesium (Mg)	mg/L	11.9	3.03	4.27	2.67	2.81	2.56	0.050	6403057
Dissolved Potassium (K)	mg/L	0.862	0.597	0.340	0.977	0.221	0.954	0.050	6403057
Dissolved Sodium (Na)	mg/L	4.85	1.90	1.57	2.24	2.14	2.10	0.050	6403057

RDL = Reportable Detection Limit
(1) - Duplicate RPD above control limit - (10% of analytes failure allowed).
(2) - Matrix Spike outside acceptance criteria (10% of analytes failure allowed).

Maxxam Job #: B2B0855
Report Date: 2012/12/20

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD

Sampler Initials: KG

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		FE4641	FE4642	FE4643	FE4644	FE4645	FE4646		
Sampling Date		2012/12/05	2012/12/05	2012/12/05	2012/12/05	2012/12/05	2012/12/05		
COC#		33974004	33974004	33974004	33974004	33974004	33974004		
	UNITS	**EBA11-01**	**HBT94-4**	**EBA11-03**	**EBA11-04**	**AG99-6**	**EBA11-05**	**RDL**	**QC Batch**
Dissolved Sulphur (S)	mg/L	16.5	0.76	0.86	<0.60	1.11	<0.60	0.60	6414325

RDL = Reportable Detection Limit

Maxxam Job #: B2B0855
Report Date: 2012/12/20

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD

Sampler Initials: KG

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		FE4641		FE4645		
Sampling Date		2012/12/05		2012/12/05		
COC#		33974004		33974004		
	UNITS	**EBA11-01**	**RDL**	**AG99-6**	**RDL**	**QC Batch**
Volatiles						
VPH (VH6 to 10 - BTEX)	ug/L	<300	300	<300	300	6402600
Volatile Hydrocarbons						
VH C6-C10	ug/L	<300	300	<300	300	6413780
Volatiles						
Chloromethane	mg/L	<0.0010	0.0010	<0.0010	0.0010	6413721
Vinyl chloride	mg/L	<0.00050	0.00050	<0.00050	0.00050	6413721
Chloroethane	mg/L	<0.0010	0.0010	<0.0010	0.0010	6413721
Trichlorofluoromethane	mg/L	<0.0040	0.0040	<0.0040	0.0040	6413721
1,1-dichloroethene	mg/L	<0.00050	0.00050	<0.00050	0.00050	6413721
Dichloromethane	mg/L	<0.0020	0.0020	<0.0020	0.0020	6413721
trans-1,2-dichloroethene	mg/L	<0.0010	0.0010	<0.0010	0.0010	6413721
1,1-dichloroethane	mg/L	<0.00050	0.00050	<0.00050	0.00050	6413721
cis-1,2-dichloroethene	mg/L	<0.0010	0.0010	<0.0010	0.0010	6413721
Chloroform	mg/L	<0.0010	0.0010	<0.0010	0.0010	6413721
1,1,1-trichloroethane	mg/L	<0.00050	0.00050	<0.00050	0.00050	6413721
1,2-dichloroethane	mg/L	<0.00050	0.00050	<0.00050	0.00050	6413721
Carbon tetrachloride	mg/L	<0.00050	0.00050	<0.00050	0.00050	6413721
Benzene	mg/L	<0.00040	0.00040	<0.00040	0.00040	6413721
Methyl-tert-butylether (MTBE)	mg/L	<0.0040	0.0040	<0.0040	0.0040	6413721
1,2-dichloropropane	mg/L	<0.00050	0.00050	<0.00050	0.00050	6413721
cis-1,3-dichloropropene	mg/L	<0.0010	0.0010	<0.0010	0.0010	6413721
trans-1,3-dichloropropene	mg/L	<0.0010	0.0010	<0.0010	0.0010	6413721
Bromomethane	mg/L	<0.0010	0.0010	<0.0018 (1)	0.0018	6413721
1,1,2-trichloroethane	mg/L	<0.00050	0.00050	<0.00050	0.00050	6413721
Trichloroethene	mg/L	<0.00050	0.00050	<0.00050	0.00050	6413721
Chlorodibromomethane	mg/L	<0.0010	0.0010	<0.0010	0.0010	6413721
Tetrachloroethene	mg/L	<0.00050	0.00050	<0.00050	0.00050	6413721
Bromodichloromethane	mg/L	<0.0010	0.0010	<0.0010	0.0010	6413721
Toluene	mg/L	<0.00040	0.00040	<0.00040	0.00040	6413721
Ethylbenzene	mg/L	<0.00040	0.00040	<0.00040	0.00040	6413721
m & p-Xylene	mg/L	<0.00040	0.00040	<0.00040	0.00040	6413721
Bromoform	mg/L	<0.0010	0.0010	<0.0010	0.0010	6413721
Styrene	mg/L	<0.00050	0.00050	<0.00050	0.00050	6413721
o-Xylene	mg/L	<0.00040	0.00040	<0.00040	0.00040	6413721

RDL = Reportable Detection Limit
(1) - RDL raised due to sample matrix interference.

Maxxam Job #: B2B0855
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EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD

Sampler Initials: KG

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		FE4641		FE4645		
Sampling Date		2012/12/05		2012/12/05		
COC#		33974004		33974004		
	UNITS	**EBA11-01**	**RDL**	**AG99-6**	**RDL**	**QC Batch**
Xylenes (Total)	mg/L	<0.00040	0.00040	<0.00040	0.00040	6413721
1,1,1,2-tetrachloroethane	mg/L	<0.00050	0.00050	<0.00050	0.00050	6413721
1,1,2,2-tetrachloroethane	mg/L	<0.00050	0.00050	<0.00050	0.00050	6413721
1,2-dichlorobenzene	mg/L	<0.00050	0.00050	<0.00050	0.00050	6413721
1,3-dichlorobenzene	mg/L	<0.00050	0.00050	<0.00050	0.00050	6413721
1,4-dichlorobenzene	mg/L	<0.00050	0.00050	<0.00050	0.00050	6413721
Chlorobenzene	mg/L	<0.00050	0.00050	<0.00050	0.00050	6413721
Dibromomethane	mg/L	<0.00090	0.00090	<0.00090	0.00090	6413721
Surrogate Recovery (%)						
1,4-Difluorobenzene (sur.)	%	101		101		6413721
4-BROMOFLUOROBENZENE (sur.)	%	93		92		6413721
D4-1,2-DICHLOROETHANE (sur.)	%	99		100		6413721

RDL = Reportable Detection Limit

Maxxam Job #: B2B0855
Report Date: 2012/12/20

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD

Sampler Initials: KG

General Comments

REVISED REPORT - additional analysis has been performed on sample FE4641. KD4 - Dec. 20/12

Sample FE4641-01: 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 FE4642-01: 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 FE4643-01: 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 FE4644-01: 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 FE4645-01: 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 FE4646-01: 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.

CSR VOC + VPH IN WATER (WATER) Comments

VOCs in Water by HS GC/MS: RDL raised due to sample matrix interference.

Maxxam Job #: B2B0855
Report Date: 2012/12/20

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD

Sampler Initials: KG

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6406117	Ammonia (N)	2012/12/07	98	80 - 120	99	80 - 120	<0.0050	mg/L	14.2	20
6407916	Dissolved Chloride (Cl)	2012/12/07	99	80 - 120	104	80 - 120	<0.50	mg/L	3.9	20
6408530	Nitrate plus Nitrite (N)	2012/12/07	104	80 - 120	108	80 - 120	<0.020	mg/L	NC	25
6408535	Nitrite (N)	2012/12/07	107	80 - 120	99	80 - 120	<0.0050	mg/L	NC	20
6408826	Dissolved Sulphate (SO4)	2012/12/07	NC	80 - 120	103	80 - 120	<0.50	mg/L	NC	20
6409450	Total Phosphorus (P)	2012/12/10	NC	80 - 120	99	80 - 120	<0.0050	mg/L	0.3	20
6409515	Fluoride (F)	2012/12/07	106	80 - 120	98	80 - 120	0.013, RDL=0.010	mg/L	0	20
6410003	Alkalinity (Total as CaCO3)	2012/12/10	NC	80 - 120	93	80 - 120	<0.50	mg/L	0.4	20
6410003	Alkalinity (PP as CaCO3)	2012/12/10					<0.50	mg/L	NC	20
6410003	Bicarbonate (HCO3)	2012/12/10					<0.50	mg/L	0.4	20
6410003	Carbonate (CO3)	2012/12/10					<0.50	mg/L	NC	20
6410003	Hydroxide (OH)	2012/12/10					<0.50	mg/L	NC	20
6410017	Conductivity	2012/12/09			101	80 - 120	<1.0	uS/cm	0.6	20
6413721	1,4-Difluorobenzene (sur.)	2012/12/10	100	70 - 130	102	70 - 130	99	%		
6413721	4-BROMOFLUOROBENZENE (sur.)	2012/12/10	101	70 - 130	104	70 - 130	86	%		
6413721	D4-1,2-DICHLOROETHANE (sur.)	2012/12/10	102	70 - 130	100	70 - 130	89	%		
6413721	Chloromethane	2012/12/10	80	60 - 140	97	60 - 140	<0.0010	mg/L		
6413721	Vinyl chloride	2012/12/10	105	60 - 140	93	60 - 140	<0.00050	mg/L	NC	30
6413721	Chloroethane	2012/12/10	91	60 - 140	87	60 - 140	<0.0010	mg/L		
6413721	Trichlorofluoromethane	2012/12/10	104	60 - 140	106	60 - 140	<0.0040	mg/L		
6413721	1,1-dichloroethene	2012/12/10	81	70 - 130	83	70 - 130	<0.00050	mg/L		
6413721	Dichloromethane	2012/12/10	88	70 - 130	89	70 - 130	<0.0020	mg/L		
6413721	trans-1,2-dichloroethene	2012/12/10	86	70 - 130	90	70 - 130	<0.0010	mg/L		
6413721	1,1-dichloroethane	2012/12/10	89	70 - 130	85	70 - 130	<0.00050	mg/L		
6413721	cis-1,2-dichloroethene	2012/12/10	87	70 - 130	88	70 - 130	<0.0010	mg/L		
6413721	Chloroform	2012/12/10	86	70 - 130	87	70 - 130	<0.0010	mg/L		
6413721	1,1,1-trichloroethane	2012/12/10	85	70 - 130	86	70 - 130	<0.00050	mg/L		
6413721	1,2-dichloroethane	2012/12/10	85	70 - 130	83	70 - 130	<0.00050	mg/L		
6413721	Carbon tetrachloride	2012/12/10	88	70 - 130	89	70 - 130	<0.00050	mg/L		
6413721	Benzene	2012/12/10	87	70 - 130	86	70 - 130	<0.00040	mg/L	4.4	30
6413721	Methyl-tert-butylether(MTBE)	2012/12/10	91	70 - 130	89	70 - 130	<0.0040	mg/L		
6413721	1,2-dichloropropane	2012/12/10	90	70 - 130	89	70 - 130	<0.00050	mg/L		
6413721	cis-1,3-dichloropropene	2012/12/10	83	70 - 130	80	70 - 130	<0.0010	mg/L		
6413721	trans-1,3-dichloropropene	2012/12/10	76	70 - 130	75	70 - 130	<0.0010	mg/L		
6413721	Bromomethane	2012/12/10	82	60 - 140	84	60 - 140	<0.0010	mg/L		
6413721	1,1,2-trichloroethane	2012/12/10	90	70 - 130	91	70 - 130	<0.00050	mg/L		
6413721	Trichloroethene	2012/12/10	84	70 - 130	86	70 - 130	<0.00050	mg/L	NC	30
6413721	Chlorodibromomethane	2012/12/10	83	70 - 130	84	70 - 130	<0.0010	mg/L		
6413721	Tetrachloroethene	2012/12/10	83	70 - 130	86	70 - 130	<0.00050	mg/L	NC	30
6413721	Bromodichloromethane	2012/12/10	88	70 - 130	89	70 - 130	<0.0010	mg/L		

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QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6413721	Toluene	2012/12/10	83	70 - 130	84	70 - 130	<0.00040	mg/L	2.2	30
6413721	Ethylbenzene	2012/12/10	88	70 - 130	87	70 - 130	<0.00040	mg/L	NC	30
6413721	m & p-Xylene	2012/12/10	91	70 - 130	93	70 - 130	<0.00040	mg/L	3.3	30
6413721	Bromoform	2012/12/10	90	70 - 130	93	70 - 130	<0.0010	mg/L		
6413721	Styrene	2012/12/10	77	70 - 130	78	70 - 130	<0.00050	mg/L	NC	30
6413721	o-Xylene	2012/12/10	84	70 - 130	84	70 - 130	<0.00040	mg/L	5.0	30
6413721	1,1,1,2-tetrachloroethane	2012/12/10	86	70 - 130	88	70 - 130	<0.00050	mg/L		
6413721	1,1,2,2-tetrachloroethane	2012/12/10	97	70 - 130	95	70 - 130	<0.00050	mg/L		
6413721	1,2-dichlorobenzene	2012/12/10	87	70 - 130	89	70 - 130	<0.00050	mg/L		
6413721	1,3-dichlorobenzene	2012/12/10	82	70 - 130	83	70 - 130	<0.00050	mg/L		
6413721	1,4-dichlorobenzene	2012/12/10	87	70 - 130	89	70 - 130	<0.00050	mg/L		
6413721	Chlorobenzene	2012/12/10	77	70 - 130	77	70 - 130	<0.00050	mg/L		
6413721	Dibromomethane	2012/12/10	90	70 - 130	91	70 - 130	<0.00090	mg/L		
6413721	Xylenes (Total)	2012/12/10					<0.00040	mg/L	4.1	30
6413780	VH C6-C10	2012/12/10			94	70 - 130	<300	ug/L	NC	40
6414325	Dissolved Aluminum (Al)	2012/12/12	107	80 - 120	101	80 - 120	<0.00020	mg/L	0.6	20
6414325	Dissolved Antimony (Sb)	2012/12/12	109	80 - 120	98	80 - 120	<0.000020	mg/L	NC	20
6414325	Dissolved Arsenic (As)	2012/12/12	106	80 - 120	106	80 - 120	<0.000020	mg/L	4.0	20
6414325	Dissolved Barium (Ba)	2012/12/12	104	80 - 120	96	80 - 120	<0.000020	mg/L	0	20
6414325	Dissolved Beryllium (Be)	2012/12/12	108	80 - 120	95	80 - 120	<0.000010	mg/L	NC	20
6414325	Dissolved Bismuth (Bi)	2012/12/12	110	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
6414325	Dissolved Cadmium (Cd)	2012/12/12	106	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
6414325	Dissolved Chromium (Cr)	2012/12/12	104	80 - 120	107	80 - 120	<0.00010	mg/L	9.9	20
6414325	Dissolved Cobalt (Co)	2012/12/12	105	80 - 120	108	80 - 120	<0.0000050	mg/L	NC	20
6414325	Dissolved Copper (Cu)	2012/12/12	106	80 - 120	110	80 - 120	<0.000050	mg/L	NC	20
6414325	Dissolved Iron (Fe)	2012/12/12	117	80 - 120	119	80 - 120	<0.0010	mg/L	8.3	20
6414325	Dissolved Lead (Pb)	2012/12/12	107	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
6414325	Dissolved Lithium (Li)	2012/12/12	106	80 - 120	99	80 - 120	<0.00050	mg/L	NC	20
6414325	Dissolved Manganese (Mn)	2012/12/12	103	80 - 120	107	80 - 120	<0.000050	mg/L	NC	20
6414325	Dissolved Mercury (Hg)	2012/12/12	104	80 - 120	90	80 - 120	<0.000010	mg/L	NC	20
6414325	Dissolved Molybdenum (Mo)	2012/12/12	109	80 - 120	99	80 - 120	<0.000050	mg/L	NC	20
6414325	Dissolved Nickel (Ni)	2012/12/12	109	80 - 120	110	80 - 120	<0.000020	mg/L	NC	20
6414325	Dissolved Selenium (Se)	2012/12/12	111	80 - 120	106	80 - 120	<0.000040	mg/L	23.4 (1)	20
6414325	Dissolved Silver (Ag)	2012/12/12	113	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
6414325	Dissolved Strontium (Sr)	2012/12/12	NC	80 - 120	99	80 - 120	<0.000050	mg/L	0.6	20
6414325	Dissolved Thallium (Tl)	2012/12/12	106	80 - 120	97	80 - 120	<0.0000020	mg/L	NC	20
6414325	Dissolved Tin (Sn)	2012/12/12	118	80 - 120	104	80 - 120	<0.00020	mg/L	NC	20
6414325	Dissolved Titanium (Ti)	2012/12/12	100	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20
6414325	Dissolved Uranium (U)	2012/12/12	111	80 - 120	99	80 - 120	<0.0000020	mg/L	1.5	20
6414325	Dissolved Vanadium (V)	2012/12/12	NC	80 - 120	102	80 - 120	<0.00020	mg/L	3.2	20

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Sampler Initials: KG

QUALITY ASSURANCE REPORT

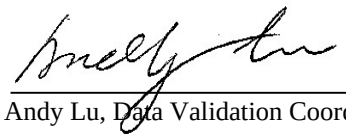
			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6414325	Dissolved Zinc (Zn)	2012/12/12	128(1)	80 - 120	117	80 - 120	<0.00010	mg/L	NC	20
6414325	Dissolved Boron (B)	2012/12/12					<0.050	mg/L	NC	20
6414325	Dissolved Silicon (Si)	2012/12/12					<0.10	mg/L	4.9	20
6414325	Dissolved Zirconium (Zr)	2012/12/12					<0.00010	mg/L	NC	20
6414325	Dissolved Sulphur (S)	2012/12/12					<0.60	mg/L	NC	20
6434878	Dissolved Hex. Chromium (Cr 6+)	2012/12/18	104	80 - 120	106	80 - 120	<0.0010	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 #: B2B0855

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 Analytics International Corporation o/a Maxxam Analytics
4606 Canada Way, Burnaby, British Columbia Canada V5G 1K5 Tel (604) 734 7276 Toll-free (800) 665 5566 Fax (604) 630 0110 www.maxxam.ca

CHAIN OF CUSTODY RECORD

Page 1 of 1

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 #: B2B0855	BOTTLE ORDER #: 339740
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 #:	N23101881 - CVRD	CHAIN OF CUSTODY #: C#339740-04-01	PROJECT MANAGER: Kim Domini
Phone:	(250)756-2256 Fax: (250)756-2686	Phone:	(250)756-2256 Fax:	Project Name:			
Email:	dromano@eba.ca, lpaul@eba.ca	Email:	kgabelhouse@eba.ca	Site #:	CVWMC		
				Sampled By:	K. Gabelhouse		

REGULATORY CRITERIA:
- ☐ CSR
- ☐ CCME
- ☒ BC Water Quality DW/AL
- ☒ Other CDWQG

SPECIAL INSTRUCTIONS

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

ANALYSIS REQUESTED (Please be specific):

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 most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans 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 lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered ? (Y / N)	(CL, F, NO2, NO3, SO4) ANIONS	AMMONIA-N	CSR VOC + VPH	Low Level Dissolved Metals + Hardness + Mercury	pH / Conductivity / Alkalinity	Total Phosphorus	Dissolved Speciated Chromium	Sulphur			# of Bottles	Comments
1	FE4641	EBA11-01	Dec 5/12		GW	Y	X	X	X	X	X	X		X			8	Speciated Chrominm on hold
2	FE4642	HBT94-4	↓		↓	Y	X	X		X	X	X		X			4	
3	FE4643	EBA11-03				Y	X	X		X	X	X		X			4	
4	FE4644	EBA11-04				Y	X	X		X	X	X		X			4	~~chrom~~ speciated chrominm on hold
5	FE4645	AG99-6				Y	X	X	X	X	X	X		X			7	
6	FE4646	EBA11-05				Y	X	X		X	X	X		X			4	
7																		
8																		
9																		
10																		

B2B0855

*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: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
K. Gabelhouse	12/11/05	4:00pm	Maxxam Laurel Bathgate	10/12/06	08:00		☐	5,5,3	NA ☐ 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.

White: Maxxam Yellow: Client

Your Project #: N23101881 - CVRD
Site Location: CVWMC
Your C.O.C. #: 33952005, 33974005

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

Report Date: 2012/12/21
This report supersedes all previous reports with the same Maxxam job number

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B2B0204
Received: 2012/12/05, 08:00

Sample Matrix: Water
Samples Received: 18

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	18	2012/12/06	2012/12/07	BBY6SOP-00026	SM2320B
Chloride by Automated Colourimetry	18	N/A	2012/12/06	BBY6SOP-00011	SM-4500-Cl-
Chromium III Dissolved (Calc'd)	1	N/A	2012/12/17		
Chromium III Dissolved (Calc'd)	1	N/A	2012/12/18		
Chromium, Hexavalent, Dissolved	1	N/A	2012/12/17	BBY6SOP-00015	SM-3500Cr B
Chromium, Hexavalent, Dissolved	1	N/A	2012/12/18	BBY6SOP-00015	SM-3500Cr B
Conductance - water	18	N/A	2012/12/07	BBY6SOP-00026	SM-2510B
Fluoride	18	N/A	2012/12/06	BBY6SOP-00038	SM - 4500 F C
Hardness Total (calculated as CaCO3)	1	N/A	2012/12/10	BBY WI-00033	Calculated Parameter
Hardness (calculated as CaCO3)	17	N/A	2012/12/11	BBY WI-00033	Calculated Parameter
Mercury (Dissolved) by CVAF	1	N/A	2012/12/11	BBY7SOP-00015	EPA 245.7
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	17	N/A	2012/12/11	BBY7SOP-00002	EPA 6020A
Elements by ICPMS Low Level (dissolved)	11	N/A	2012/12/10	BBY7SOP-00002	EPA 6020A
Elements by ICPMS Low Level (dissolved)	6	N/A	2012/12/11	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (total)	1	N/A	2012/12/10	BBY7SOP-00002	EPA 6020A
Elements by ICPMS Low Level (total)	1	N/A	2012/12/08	BBY7SOP-00002	EPA 6020A
Ammonia-N (Preserved)	18	N/A	2012/12/06	BBY6SOP-00009	SM-4500NH3G
Nitrate + Nitrite (N)	18	N/A	2012/12/06	BBY6SOP-00010	USEPA 353.2
Nitrite (N) by CFA	18	N/A	2012/12/06	BBY6SOP-00010	EPA 353.2
Nitrogen - Nitrate (as N)	18	N/A	2012/12/07	BBY6SOP-00010	Based on EPA 353.2
Filter and HNO3 Preserve for Metals	17	N/A	2012/12/05	BBY6WI-00001	EPA 200.2
pH Water	18	N/A	2012/12/06	BBY6SOP-00026	SM-4500H+B
CSR VH C6-C10 in Water by HS GC/MS	6	N/A	2012/12/09	BBY8SOP-00011	EPA 8260B
Sulphate by Automated Colourimetry	18	N/A	2012/12/06	BBY6SOP-00017	SM4500-SO42- E
Total Phosphorus	18	N/A	2012/12/07	BBY6SOP-00013	SM 4500 PE
VOCs in Water by HS GC/MS	6	2012/12/09	2012/12/09	BBY8-SOP-0009	EPA 8260C
Volatile HC-BTEX	6	N/A	2012/12/11	BBY WI-00033	BC MOE Lab Method

* Results relate only to the items tested.

../2

Maxxam Job #: B2B0204
Report Date: 2012/12/21

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD
Site Location: CVWMC
Sampler Initials: KG

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: 2

Maxxam Job #: B2B0204
Report Date: 2012/12/21

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD
Site Location: CVWMC
Sampler Initials: KG

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		FE1127	FE1128	FE1129	FE1130	FE1132	FE1133	FE1134	FE1135		
Sampling Date		2012/12/03	2012/12/03	2012/12/03	2012/12/03	2012/12/03	2012/12/03	2012/12/03	2012/12/03		
COC#		33952005	33952005	33952005	33952005	33952005	33952005	33952005	33952005		
	UNITS	**AM02-1**	**EBA04-2**	**EBA04-4**	**EBA04-1**	**AG99-2**	**AG99-4**	**HBT94-1**	**HBT94-2**	**RDL**	**QC Batch**
ANIONS											
Nitrite (N)	mg/L	0.0095	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0060	<0.0050	0.0050	6404934
Calculated Parameters											
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	0.360	0.068	0.150	0.025	0.175	0.140	0.282	<0.020	0.020	6398958
Misc. Inorganics											
Fluoride (F)	mg/L	0.023	0.019	0.018	0.020	0.016	0.018	0.022	0.019	0.010	6402736
Alkalinity (Total as CaCO3)	mg/L	49.2	38.3	60.9	41.1	104	50.5	201	231	0.50	6404991
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6404991
Bicarbonate (HCO3)	mg/L	60.1	46.8	74.3	50.1	127	61.7	246	282	0.50	6404991
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6404991
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6404991
Anions											
Dissolved Sulphate (SO4)	mg/L	3.89	2.78	3.49	2.63	3.41	3.12	7.35	3.41	0.50	6404990
Dissolved Chloride (Cl)	mg/L	1.3	1.8	4.7	0.87	1.9	3.0	19	18	0.50	6404979
Nutrients											
Ammonia (N)	mg/L	0.044	0.019	0.012	0.022	0.027	0.026	0.082	0.32	0.0050	6402079
Nitrate plus Nitrite (N)	mg/L	0.369	0.068	0.150	0.025	0.175	0.140	0.288	<0.020	0.020	6404931
Total Phosphorus (P)	mg/L	0.237	0.0103	0.0071	0.0096	0.0563	0.0074	0.0872	0.0382	0.0050	6401590
Physical Properties											
Conductivity	uS/cm	109	88.0	132	83.8	210	114	459	488	1.0	6405048
pH	pH Units	7.70	7.75	7.95	7.93	8.17	7.86	8.09	8.08		6405051

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: B2B0204
Report Date: 2012/12/21

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD
Site Location: CVWMC
Sampler Initials: KG

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		FE1136		FE1137	FE1201	FE1202	FE1203		
Sampling Date		2012/12/03		2012/12/03	2012/12/04	2012/12/04	2012/12/04		
COC#		33952005		33952005	33974005	33974005	33974005		
	UNITS	**HBT94-3**	**RDL**	**HBT94-6**	**EBA04-7**	**EBA04-8**	**EBA04-6**	**RDL**	**QC Batch**
ANIONS									
Nitrite (N)	mg/L	0.0151	0.0050	<0.0050	0.0585	0.0590	<0.0050	0.0050	6404934
Calculated Parameters									
Dissolved Chromium III	mg/L						<0.0010	0.0010	6425589
Filter and HNO3 Preservation	N/A	FIELD	N/A	FIELD	FIELD	FIELD	FIELD	N/A	ONSITE
Nitrate (N)	mg/L	<0.020	0.020	<0.020	0.507	0.508	0.818	0.020	6398958
Misc. Inorganics									
Fluoride (F)	mg/L	0.031	0.010	0.018	0.014	0.015	0.012	0.010	6402736
Alkalinity (Total as CaCO3)	mg/L	561	0.50	233	478	476	300	0.50	6404991
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	0.50	6404991
Bicarbonate (HCO3)	mg/L	684	0.50	285	583	580	365	0.50	6404991
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	0.50	6404991
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	0.50	6404991
Anions									
Dissolved Sulphate (SO4)	mg/L	1.56	0.50	3.42	25.9	25.9	5.12	0.50	6404990
Dissolved Chloride (Cl)	mg/L	110	0.50	18	35	31	5.1	0.50	6404979
Metals									
Dissolved Hex. Chromium (Cr 6+)	mg/L						0.0026	0.0010	6431738
Nutrients									
Ammonia (N)	mg/L	11	0.10	0.31	0.071	0.044	0.0083	0.0050	6402079
Nitrate plus Nitrite (N)	mg/L	<0.020	0.020	<0.020	0.566	0.567	0.818	0.020	6404931
Total Phosphorus (P)	mg/L	0.117	0.0050	0.0573	0.0491	0.0417	<0.0050	0.0050	6401590
Physical Properties									
Conductivity	uS/cm	1360	1.0	492	994	990	562	1.0	6405048
pH	pH Units	7.42		8.19	7.76	7.84	8.19		6405051

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: B2B0204
Report Date: 2012/12/21

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD
Site Location: CVWMC
Sampler Initials: KG

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		FE1204		FE1205	FE1206	FE1207	FE1208		
Sampling Date		2012/12/04		2012/12/04	2012/12/04	2012/12/04	2012/12/04		
COC#		33974005		33974005	33974005	33974005	33974005		
	UNITS	**EBA11-2**	**RDL**	**EBA04-3**	**AG99-01**	**AG99-05**	**SW1**	**RDL**	**QC Batch**
ANIONS									
Nitrite (N)	mg/L	0.0068	0.0050	0.0059	<0.0050	<0.0050	<0.0050	0.0050	6404934
Calculated Parameters									
Dissolved Chromium III	mg/L	<0.0010	0.0010						6425589
Filter and HNO3 Preservation	N/A	FIELD	N/A	FIELD	FIELD	FIELD		N/A	ONSITE
Nitrate (N)	mg/L	0.382	0.020	0.051	0.125	0.071	0.108	0.020	6398958
Misc. Inorganics									
Fluoride (F)	mg/L	0.016	0.010	0.012	0.022	0.019	0.021	0.010	6402736
Alkalinity (Total as CaCO3)	mg/L	164	0.50	136	88.2	48.1	57.4	0.50	6404991
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	0.50	6404991
Bicarbonate (HCO3)	mg/L	200	0.50	166	108	58.6	70.1	0.50	6404991
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	0.50	6404991
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	0.50	6404991
Anions									
Dissolved Sulphate (SO4)	mg/L	3.95	0.50	3.08	3.13	2.79	2.87	0.50	6404990
Dissolved Chloride (Cl)	mg/L	21	0.50	1.5	1.8	1.6	3.5	0.50	6404979
Metals									
Dissolved Hex. Chromium (Cr 6+)	mg/L	0.0019	0.0010						6434878
Nutrients									
Ammonia (N)	mg/L	0.017	0.0050	0.019	0.015	0.020	0.022	0.0050	6402079
Nitrate plus Nitrite (N)	mg/L	0.389	0.020	0.057	0.125	0.071	0.108	0.020	6404931
Total Phosphorus (P)	mg/L	1.09	0.050	0.257	0.0411	0.0236	0.0130	0.0050	6401590
Physical Properties									
Conductivity	uS/cm	385	1.0	262	178	101	125	1.0	6405048
pH	pH Units	8.16		8.12	8.08	7.95	7.94		6405051

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: B2B0204
Report Date: 2012/12/21

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD
Site Location: CVWMC
Sampler Initials: KG

MERCURY BY COLD VAPOR (WATER)

Maxxam ID		FE1202		
Sampling Date		2012/12/04		
COC#		33974005		
	UNITS	**EBA04-8**	**RDL**	**QC Batch**
Elements				
Dissolved Mercury (Hg)	ug/L	<0.010	0.010	6414507

RDL = Reportable Detection Limit

Maxxam Job #: B2B0204
Report Date: 2012/12/21

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD
Site Location: CVWMC
Sampler Initials: KG

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		FE1127	FE1128	FE1129	FE1130	FE1132	FE1133	FE1134	FE1135		
Sampling Date		2012/12/03	2012/12/03	2012/12/03	2012/12/03	2012/12/03	2012/12/03	2012/12/03	2012/12/03		
COC#		33952005	33952005	33952005	33952005	33952005	33952005	33952005	33952005		
	UNITS	**AM02-1**	**EBA04-2**	**EBA04-4**	**EBA04-1**	**AG99-2**	**AG99-4**	**HBT94-1**	**HBT94-2**	**RDL**	**QC Batch**
Misc. Inorganics											
Dissolved Hardness (CaCO3)	mg/L	55.2	41.9	67.9	41.1	109	59.7	195	230	0.50	6399843

RDL = Reportable Detection Limit

Maxxam Job #: B2B0204
Report Date: 2012/12/21

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD
Site Location: CVWMC
Sampler Initials: KG

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		FE1127	FE1128	FE1129	FE1130	FE1132	FE1133	FE1134	FE1135		
Sampling Date		2012/12/03	2012/12/03	2012/12/03	2012/12/03	2012/12/03	2012/12/03	2012/12/03	2012/12/03		
COC#		33952005	33952005	33952005	33952005	33952005	33952005	33952005	33952005		
	UNITS	**AM02-1**	**EBA04-2**	**EBA04-4**	**EBA04-1**	**AG99-2**	**AG99-4**	**HBT94-1**	**HBT94-2**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS											
Dissolved Aluminum (Al)	mg/L	0.00577	0.00702	0.00710	0.00898	0.00593	0.00548	0.00231	0.00734	0.00020	6407016
Dissolved Antimony (Sb)	mg/L	0.000043	0.000027	0.000022	0.000027	0.000036	0.000023	0.000138	<0.000020	0.000020	6407016
Dissolved Arsenic (As)	mg/L	0.000076	0.000211	0.000304	0.000445	0.00209	0.000422	0.000150	0.00254	0.000020	6407016
Dissolved Barium (Ba)	mg/L	0.000819	0.000583	0.000850	0.000806	0.00497	0.000733	0.00472	0.00923	0.000020	6407016
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	6407016
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	6407016
Dissolved Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.313	0.132	0.050	6407016
Dissolved Cadmium (Cd)	mg/L	<0.0000050	<0.0000050	0.000292	0.0000070	<0.0000050	<0.0000050	0.000210	0.0000650	0.0000050	6407016
Dissolved Chromium (Cr)	mg/L	0.00019	0.00024	0.00024	0.00033	0.00060	0.00020	<0.00010	<0.00010	0.00010	6407016
Dissolved Cobalt (Co)	mg/L	<0.0000050	<0.0000050	0.0000100	<0.0000050	0.0000050	0.0000070	0.000172	0.000154	0.0000050	6407016
Dissolved Copper (Cu)	mg/L	0.000638	0.000200	0.000313	0.00388	0.000175	0.000354	0.00281	0.000307	0.000050	6407016
Dissolved Iron (Fe)	mg/L	0.0016	0.0031	<0.0010	0.0069	<0.0010	0.0017	0.0238	0.223	0.0010	6407016
Dissolved Lead (Pb)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000850	<0.0000050	0.0000140	0.0000140	<0.0000050	0.0000050	6407016
Dissolved Lithium (Li)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00104	<0.00050	0.00050	6407016
Dissolved Manganese (Mn)	mg/L	0.000088	0.000070	<0.000050	0.000188	<0.000050	<0.000050	0.0781	1.12	0.000050	6407016
Dissolved Mercury (Hg)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	6407016
Dissolved Molybdenum (Mo)	mg/L	0.000433	0.000209	0.000169	0.000183	0.000147	0.000166	0.000738	0.000250	0.000050	6407016
Dissolved Nickel (Ni)	mg/L	0.000034	<0.000020	0.000038	0.000035	0.000023	0.000025	0.00137	0.000984	0.000020	6407016
Dissolved Selenium (Se)	mg/L	0.000396	0.000115	0.000126	0.000161	0.000163	0.000086	0.000068	<0.000040	0.000040	6407016
Dissolved Silicon (Si)	mg/L	5.75	3.71	4.05	4.21	5.03	4.03	6.77	7.70	0.10	6407016
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	6407016
Dissolved Strontium (Sr)	mg/L	0.0291	0.0230	0.0346	0.0212	0.0438	0.0275	0.184	0.145	0.000050	6407016
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	0.0000030	0.0000020	6407016
Dissolved Tin (Sn)	mg/L	0.00080	0.00023	<0.00020	<0.00020	<0.00020	0.00030	0.00070	<0.00020	0.00020	6407016
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	6407016
Dissolved Uranium (U)	mg/L	0.0000270	0.0000140	0.0000310	0.0000150	0.000463	0.0000370	0.0000980	0.000134	0.0000020	6407016
Dissolved Vanadium (V)	mg/L	0.00119	0.00196	0.00269	0.00366	0.0199	0.00316	0.00099	0.00072	0.00020	6407016
Dissolved Zinc (Zn)	mg/L	0.00023	0.00040	0.00066	0.0168	0.00056	0.00071	0.00136	0.00056	0.00010	6407016
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	6407016
Dissolved Calcium (Ca)	mg/L	18.0	14.3	23.5	13.9	35.9	20.5	66.8	78.0	0.050	6398685
Dissolved Magnesium (Mg)	mg/L	2.45	1.54	2.24	1.54	4.70	2.10	6.77	8.47	0.050	6398685
Dissolved Potassium (K)	mg/L	0.211	0.206	0.325	0.239	1.36	0.315	4.15	1.89	0.050	6398685
Dissolved Sodium (Na)	mg/L	2.47	1.17	1.64	1.17	1.77	1.49	26.1	18.3	0.050	6398685
Dissolved Sulphur (S)	mg/L	1.22	0.65	1.09	0.97	1.24	1.27	2.83	1.76	0.60	6407016

RDL = Reportable Detection Limit

Maxxam Job #: B2B0204
Report Date: 2012/12/21

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD
Site Location: CVWMC
Sampler Initials: KG

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		FE1136			FE1137	FE1201		FE1202	FE1203	FE1204		
Sampling Date		2012/12/03			2012/12/03	2012/12/04		2012/12/04	2012/12/04	2012/12/04		
COC#		33952005			33952005	33974005		33974005	33974005	33974005		
	UNITS	**HBT94-3**	**RDL**	**QC Batch**	**HBT94-6**	**EBA04-7**	**QC Batch**	**EBA04-8**	**EBA04-6**	**EBA11-2**	**RDL**	**QC Batch**
Misc. Inorganics												
Dissolved Hardness (CaCO3)	mg/L	512	0.50	6399843	236	536	6399843	520	311	198	0.50	6399843

RDL = Reportable Detection Limit

Maxxam Job #: B2B0204
Report Date: 2012/12/21

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD
Site Location: CVWMC
Sampler Initials: KG

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		FE1136			FE1137	FE1201		FE1202	FE1203	FE1204		
Sampling Date		2012/12/03			2012/12/03	2012/12/04		2012/12/04	2012/12/04	2012/12/04		
COC#		33952005			33952005	33974005		33974005	33974005	33974005		
	UNITS	**HBT94-3**	**RDL**	**QC Batch**	**HBT94-6**	**EBA04-7**	**QC Batch**	**EBA04-8**	**EBA04-6**	**EBA11-2**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS												
Dissolved Aluminum (Al)	mg/L	0.00262	0.00020	6407016	0.00740	0.00155	6407016	0.00143	0.00165	0.00589	0.00020	6407910
Dissolved Antimony (Sb)	mg/L	0.000086	0.000020	6407016	<0.000020	0.000041	6407016	0.000042	0.000038	<0.000020	0.000020	6407910
Dissolved Arsenic (As)	mg/L	0.00289	0.000020	6407016	0.00244	0.000189	6407016	0.000180	0.000120	0.000123	0.000020	6407910
Dissolved Barium (Ba)	mg/L	0.0583	0.000020	6407016	0.00996	0.0193	6407016	0.0190	0.0118	0.00844	0.000020	6407910
Dissolved Beryllium (Be)	mg/L	<0.000010	0.000010	6407016	<0.000010	<0.000010	6407016	<0.000010	<0.000010	<0.000010	0.000010	6407910
Dissolved Bismuth (Bi)	mg/L	<0.0000050	0.0000050	6407016	<0.0000050	<0.0000050	6407016	<0.0000050	<0.0000050	<0.0000050	0.0000050	6407910
Dissolved Boron (B)	mg/L	0.893	0.050	6407016	0.151	0.296	6407016	0.288	<0.050	<0.050	0.050	6407910
Dissolved Cadmium (Cd)	mg/L	0.0000560	0.0000050	6407016	0.0000210	0.0000900	6407016	0.0000330	0.0000060	<0.0000050	0.0000050	6407910
Dissolved Chromium (Cr)	mg/L	0.00025	0.00010	6407016	<0.00010	<0.00010	6407016	<0.00010	0.00114	0.00118	0.00010	6407910
Dissolved Cobalt (Co)	mg/L	0.00452	0.0000050	6407016	0.000133	0.000527	6407016	0.000452	<0.0000050	<0.0000050	0.0000050	6407910
Dissolved Copper (Cu)	mg/L	0.00285	0.000050	6407016	0.000242	0.00404	6407016	0.00366	0.000142	0.000155	0.000050	6407910
Dissolved Iron (Fe)	mg/L	4.58	0.0010	6407016	0.237	0.0066	6407016	0.0038	0.0018	0.0021	0.0010	6407910
Dissolved Lead (Pb)	mg/L	0.0000370	0.0000050	6407016	<0.0000050	<0.0000050	6407016	0.0000150	<0.0000050	<0.0000050	0.0000050	6407910
Dissolved Lithium (Li)	mg/L	0.00060	0.00050	6407016	<0.00050	0.00112	6407016	0.00106	0.00074	0.00065	0.00050	6407910
Dissolved Manganese (Mn)	mg/L	6.38	0.000050	6407016	1.09	0.133	6407016	0.129	0.000074	<0.000050	0.000050	6407910
Dissolved Mercury (Hg)	mg/L	<0.000010	0.000010	6407016	<0.000010	<0.000010	6407016		<0.000010	<0.000010	0.000010	6407910
Dissolved Molybdenum (Mo)	mg/L	0.000216	0.000050	6407016	0.000259	0.000129	6407016	0.000120	0.000082	0.000069	0.000050	6407910
Dissolved Nickel (Ni)	mg/L	0.00505	0.000020	6407016	0.000955	0.00239	6407016	0.00217	0.000199	0.000105	0.000020	6407910
Dissolved Selenium (Se)	mg/L	0.000072	0.000040	6407016	0.000050	0.000070	6407016	0.000112	0.000067	0.000150	0.000040	6407910
Dissolved Silicon (Si)	mg/L	15.0	0.10	6407016	8.23	14.3	6407016	13.9	10.5	9.35	0.10	6407910
Dissolved Silver (Ag)	mg/L	<0.0000050	0.0000050	6407016	<0.0000050	0.0000050	6407016	0.0000050	<0.0000050	<0.0000050	0.0000050	6407910
Dissolved Strontium (Sr)	mg/L	0.546	0.000050	6407016	0.154	0.367	6407016	0.364	0.185	0.116	0.000050	6407910
Dissolved Thallium (Tl)	mg/L	0.0000050	0.0000020	6407016	0.0000030	0.0000050	6407016	0.0000060	0.0000030	0.0000040	0.0000020	6407910
Dissolved Tin (Sn)	mg/L	0.00032	0.00020	6407016	0.00030	0.00028	6407016	<0.00020	<0.00020	<0.00020	0.00020	6407910
Dissolved Titanium (Ti)	mg/L	<0.00050	0.00050	6407016	<0.00050	<0.00050	6407016	<0.00050	<0.00050	<0.00050	0.00050	6407910
Dissolved Uranium (U)	mg/L	0.000963	0.0000020	6407016	0.000152	0.000944	6407016	0.000964	0.000326	0.000245	0.0000020	6407910
Dissolved Vanadium (V)	mg/L	0.00250	0.00020	6407016	0.00069	0.00178	6407016	0.00187	0.00142	0.00236	0.00020	6407910
Dissolved Zinc (Zn)	mg/L	0.00116	0.00010	6407016	0.00102	0.00059	6407016	0.00039	0.00029	0.00040	0.00010	6407910
Dissolved Zirconium (Zr)	mg/L	0.00019	0.00010	6407016	<0.00010	<0.00010	6407016	<0.00010	<0.00010	<0.00010	0.00010	6407910
Dissolved Calcium (Ca)	mg/L	155	0.050	6398685	80.9	161	6398685	157	95.1	58.9	0.050	6398685
Dissolved Magnesium (Mg)	mg/L	30.4	0.050	6398685	8.31	32.7	6398685	31.2	18.0	12.4	0.050	6398685
Dissolved Potassium (K)	mg/L	13.6	0.050	6398685	1.89	2.38	6398685	2.35	1.54	1.06	0.050	6398685
Dissolved Sodium (Na)	mg/L	79.1	0.050	6398685	18.0	25.8	6398685	24.3	6.31	3.40	0.050	6398685
Dissolved Sulphur (S)	mg/L	<3.0	3.0	6398685	1.89	10.7	6407016	10.5	2.31	2.11	0.60	6407910

RDL = Reportable Detection Limit

Maxxam Job #: B2B0204
Report Date: 2012/12/21

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD
Site Location: CVWMC
Sampler Initials: KG

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		FE1205			FE1206			FE1207		
Sampling Date		2012/12/04			2012/12/04			2012/12/04		
COC#		33974005			33974005			33974005		
	UNITS	**EBA04-3**	**RDL**	**QC Batch**	**AG99-01**	**RDL**	**QC Batch**	**AG99-05**	**RDL**	**QC Batch**
Misc. Inorganics										
Dissolved Hardness (CaCO3)	mg/L	137	0.50	6399843	93.6	0.50	6399843	50.4	0.50	6399843

RDL = Reportable Detection Limit

Maxxam Job #: B2B0204
Report Date: 2012/12/21

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD
Site Location: CVWMC
Sampler Initials: KG

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		FE1205			FE1206			FE1207		
Sampling Date		2012/12/04			2012/12/04			2012/12/04		
COC#		33974005			33974005			33974005		
	UNITS	**EBA04-3**	**RDL**	**QC Batch**	**AG99-01**	**RDL**	**QC Batch**	**AG99-05**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS										
Dissolved Aluminum (Al)	mg/L	0.00780	0.00020	6407910	0.00492	0.00020	6407910	0.00614	0.00020	6407910
Dissolved Antimony (Sb)	mg/L	0.000021	0.000020	6407910	0.000029	0.000020	6407910	0.000028	0.000020	6407910
Dissolved Arsenic (As)	mg/L	0.000055	0.000020	6407910	0.000931	0.000020	6407910	0.000773	0.000020	6407910
Dissolved Barium (Ba)	mg/L	0.00430	0.000020	6407910	0.00159	0.000020	6407910	0.000612	0.000020	6407910
Dissolved Beryllium (Be)	mg/L	<0.000010	0.000010	6407910	<0.000010	0.000010	6407910	<0.000010	0.000010	6407910
Dissolved Bismuth (Bi)	mg/L	<0.0000050	0.0000050	6407910	<0.0000050	0.0000050	6407910	<0.0000050	0.0000050	6407910
Dissolved Boron (B)	mg/L	<0.050	0.050	6407910	<0.050	0.050	6407910	<0.050	0.050	6407910
Dissolved Cadmium (Cd)	mg/L	<0.0000050	0.0000050	6407910	<0.0000050	0.0000050	6407910	<0.0000050	0.0000050	6407910
Dissolved Chromium (Cr)	mg/L	0.00031	0.00010	6407910	0.00045	0.00010	6407910	0.00014	0.00010	6407910
Dissolved Cobalt (Co)	mg/L	0.0000140	0.0000050	6407910	0.0000060	0.0000050	6407910	<0.0000050	0.0000050	6407910
Dissolved Copper (Cu)	mg/L	0.000166	0.000050	6407910	0.000181	0.000050	6407910	0.000182	0.000050	6407910
Dissolved Iron (Fe)	mg/L	0.0138	0.0010	6407910	0.0030	0.0010	6407910	<0.0010	0.0010	6407910
Dissolved Lead (Pb)	mg/L	<0.0000050	0.0000050	6407910	<0.0000050	0.0000050	6407910	<0.0000050	0.0000050	6407910
Dissolved Lithium (Li)	mg/L	0.00052	0.00050	6407910	<0.00050	0.00050	6407910	<0.00050	0.00050	6407910
Dissolved Manganese (Mn)	mg/L	0.000499	0.000050	6407910	0.000140	0.000050	6407910	<0.000050	0.000050	6407910
Dissolved Mercury (Hg)	mg/L	<0.000010	0.000010	6407910	<0.000010	0.000010	6407910	<0.000010	0.000010	6407910
Dissolved Molybdenum (Mo)	mg/L	0.000064	0.000050	6407910	0.000130	0.000050	6407910	0.000136	0.000050	6407910
Dissolved Nickel (Ni)	mg/L	0.000062	0.000020	6407910	0.000040	0.000020	6407910	0.000025	0.000020	6407910
Dissolved Selenium (Se)	mg/L	0.000168	0.000040	6407910	0.000089	0.000040	6407910	0.000131	0.000040	6407910
Dissolved Silicon (Si)	mg/L	6.45	0.10	6407910	6.48	0.10	6407910	4.17	0.10	6407910
Dissolved Silver (Ag)	mg/L	<0.0000050	0.0000050	6407910	<0.0000050	0.0000050	6407910	<0.0000050	0.0000050	6407910
Dissolved Strontium (Sr)	mg/L	0.0845	0.000050	6407910	0.0425	0.000050	6407910	0.0215	0.000050	6407910
Dissolved Thallium (Tl)	mg/L	<0.0000020	0.0000020	6407910	<0.0000020	0.0000020	6407910	<0.0000020	0.0000020	6407910
Dissolved Tin (Sn)	mg/L	0.00021	0.00020	6407910	0.00021	0.00020	6407910	<0.00020	0.00020	6407910
Dissolved Titanium (Ti)	mg/L	<0.00050	0.00050	6407910	<0.00050	0.00050	6407910	<0.00050	0.00050	6407910
Dissolved Uranium (U)	mg/L	0.000116	0.0000020	6407910	0.0000900	0.0000020	6407910	0.0000370	0.0000020	6407910
Dissolved Vanadium (V)	mg/L	0.00094	0.00020	6407910	0.00630	0.00020	6407910	0.00459	0.00020	6407910
Dissolved Zinc (Zn)	mg/L	0.00081	0.00010	6407910	0.00028	0.00010	6407910	0.00045	0.00010	6407910
Dissolved Zirconium (Zr)	mg/L	<0.00010	0.00010	6407910	<0.00010	0.00010	6407910	<0.00010	0.00010	6407910
Dissolved Calcium (Ca)	mg/L	45.1	0.050	6398685	30.8	0.050	6398685	17.2	0.050	6398685
Dissolved Magnesium (Mg)	mg/L	5.96	0.050	6398685	4.07	0.050	6398685	1.83	0.050	6398685
Dissolved Potassium (K)	mg/L	0.692	0.050	6398685	0.689	0.050	6398685	0.339	0.050	6398685
Dissolved Sodium (Na)	mg/L	2.71	0.050	6398685	1.54	0.050	6398685	1.12	0.050	6398685
Dissolved Sulphur (S)	mg/L	0.86	0.60	6407910	<3.0	3.0	6398685	0.74	0.60	6407910

RDL = Reportable Detection Limit

Maxxam Job #: B2B0204
Report Date: 2012/12/21

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD
Site Location: CVWMC
Sampler Initials: KG

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		FE1208		
Sampling Date		2012/12/04		
COC#		33974005		
	UNITS	**SW1**	**RDL**	**QC Batch**
Calculated Parameters				
Total Hardness (CaCO3)	mg/L	60.2	0.50	6402536

RDL = Reportable Detection Limit

Maxxam Job #: B2B0204
Report Date: 2012/12/21

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD
Site Location: CVWMC
Sampler Initials: KG

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		FE1208		
Sampling Date		2012/12/04		
COC#		33974005		
	UNITS	**SW1**	**RDL**	**QC Batch**
Total Metals by ICPMS				
Total Aluminum (Al)	mg/L	0.0736	0.00020	6405634
Total Antimony (Sb)	mg/L	0.000032	0.000020	6405634
Total Arsenic (As)	mg/L	0.000465	0.000020	6405634
Total Barium (Ba)	mg/L	0.00335	0.000020	6405634
Total Beryllium (Be)	mg/L	<0.000010	0.000010	6405634
Total Bismuth (Bi)	mg/L	<0.0000050	0.0000050	6405634
Total Boron (B)	mg/L	<0.050	0.050	6405634
Total Cadmium (Cd)	mg/L	0.0000080	0.0000050	6405634
Total Chromium (Cr)	mg/L	0.00031	0.00010	6405634
Total Cobalt (Co)	mg/L	0.0000900	0.0000050	6405634
Total Copper (Cu)	mg/L	0.000786	0.000050	6405634
Total Iron (Fe)	mg/L	0.105	0.0010	6405634
Total Lead (Pb)	mg/L	0.0000410	0.0000050	6405634
Total Lithium (Li)	mg/L	<0.00050	0.00050	6405634
Total Manganese (Mn)	mg/L	0.00353	0.000050	6405634
Total Mercury (Hg)	mg/L	<0.000010	0.000010	6405634
Total Molybdenum (Mo)	mg/L	0.000190	0.000050	6405634
Total Nickel (Ni)	mg/L	0.000236	0.000020	6405634
Total Selenium (Se)	mg/L	0.000085	0.000040	6405634
Total Silicon (Si)	mg/L	4.30	0.10	6405634
Total Silver (Ag)	mg/L	<0.0000050	0.0000050	6405634
Total Strontium (Sr)	mg/L	0.0350	0.000050	6405634
Total Thallium (Tl)	mg/L	<0.0000020	0.0000020	6405634
Total Tin (Sn)	mg/L	<0.00020	0.00020	6405634
Total Titanium (Ti)	mg/L	0.00538	0.00050	6405634
Total Uranium (U)	mg/L	0.0000870	0.0000020	6405634
Total Vanadium (V)	mg/L	0.00410	0.00020	6405634
Total Zinc (Zn)	mg/L	0.00119	0.00010	6405634
Total Zirconium (Zr)	mg/L	<0.00010	0.00010	6405634
Total Calcium (Ca)	mg/L	18.3	0.050	6402566
Total Magnesium (Mg)	mg/L	3.53	0.050	6402566
Total Potassium (K)	mg/L	0.370	0.050	6402566
Total Sodium (Na)	mg/L	2.32	0.050	6402566
Total Sulphur (S)	mg/L	0.68	0.60	6405634

RDL = Reportable Detection Limit

Maxxam Job #: B2B0204
Report Date: 2012/12/21

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD
Site Location: CVWMC
Sampler Initials: KG

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		FE1127		FE1133		FE1135	FE1201		FE1205		FE1207		
Sampling Date		2012/12/03		2012/12/03		2012/12/03	2012/12/04		2012/12/04		2012/12/04		
COC#		33952005		33952005		33952005	33974005		33974005		33974005		
	UNITS	**AM02-1**	**RDL**	**AG99-4**	**RDL**	**HBT94-2**	**EBA04-7**	**RDL**	**EBA04-3**	**RDL**	**AG99-05**	**RDL**	**QC Batch**
Volatiles													
VPH (VH6 to 10 - BTEX)	ug/L	<300	300	<300	300	<300	<300	300	<300	300	<300	300	6398734
Volatile Hydrocarbons													
VH C6-C10	ug/L	<300	300	<300	300	<300	<300	300	<300	300	<300	300	6410409
Volatiles													
Chloromethane	mg/L	<0.0010	0.0010	<0.0010	0.0010	<0.0010	<0.0010	0.0010	<0.0010	0.0010	<0.0010	0.0010	6410407
Vinyl chloride	mg/L	<0.00050	0.00050	<0.00050	0.00050	<0.00050	<0.00050	0.00050	<0.00050	0.00050	<0.00050	0.00050	6410407
Chloroethane	mg/L	<0.0010	0.0010	<0.0010	0.0010	<0.0010	<0.0010	0.0010	<0.0010	0.0010	<0.0010	0.0010	6410407
Trichlorofluoromethane	mg/L	<0.0040	0.0040	<0.0040	0.0040	<0.0040	<0.0040	0.0040	<0.0040	0.0040	<0.0040	0.0040	6410407
1,1-dichloroethene	mg/L	<0.00050	0.00050	<0.00050	0.00050	<0.00050	<0.00050	0.00050	<0.00050	0.00050	<0.00050	0.00050	6410407
Dichloromethane	mg/L	<0.0020	0.0020	<0.0020	0.0020	<0.0020	<0.0020	0.0020	<0.0020	0.0020	<0.0020	0.0020	6410407
trans-1,2-dichloroethene	mg/L	<0.0010	0.0010	<0.0010	0.0010	<0.0010	<0.0010	0.0010	<0.0010	0.0010	<0.0010	0.0010	6410407
1,1-dichloroethane	mg/L	<0.00050	0.00050	<0.00050	0.00050	<0.00050	<0.00050	0.00050	<0.00050	0.00050	<0.00050	0.00050	6410407
cis-1,2-dichloroethene	mg/L	<0.0010	0.0010	<0.0010	0.0010	<0.0010	<0.0010	0.0010	<0.0010	0.0010	<0.0010	0.0010	6410407
Chloroform	mg/L	<0.0010	0.0010	<0.0010	0.0010	<0.0010	<0.0010	0.0010	<0.0010	0.0010	<0.0010	0.0010	6410407
1,1,1-trichloroethane	mg/L	<0.00050	0.00050	<0.00050	0.00050	<0.00050	<0.00050	0.00050	<0.00050	0.00050	<0.00050	0.00050	6410407
1,2-dichloroethane	mg/L	<0.00050	0.00050	<0.00050	0.00050	<0.00050	<0.00050	0.00050	<0.00050	0.00050	<0.00050	0.00050	6410407
Carbon tetrachloride	mg/L	<0.00050	0.00050	<0.00050	0.00050	<0.00050	<0.00050	0.00050	<0.00050	0.00050	<0.00050	0.00050	6410407
Benzene	mg/L	<0.00040	0.00040	<0.00040	0.00040	<0.00040	<0.00040	0.00040	<0.00040	0.00040	<0.00040	0.00040	6410407
Methyl-tert-butylether (MTBE)	mg/L	<0.0040	0.0040	<0.0040	0.0040	<0.0040	<0.0040	0.0040	<0.0040	0.0040	<0.0040	0.0040	6410407
1,2-dichloropropane	mg/L	<0.00050	0.00050	<0.00050	0.00050	<0.00050	<0.00050	0.00050	<0.00050	0.00050	<0.00050	0.00050	6410407
cis-1,3-dichloropropene	mg/L	<0.0010	0.0010	<0.0010	0.0010	<0.0010	<0.0010	0.0010	<0.0010	0.0010	<0.0010	0.0010	6410407
trans-1,3-dichloropropene	mg/L	<0.0010	0.0010	<0.0010	0.0010	<0.0010	<0.0010	0.0010	<0.0010	0.0010	<0.0010	0.0010	6410407
Bromomethane	mg/L	<0.0017(1)	0.0017	<0.0010	0.0010	<0.0019(1)	<0.0019(1)	0.0019	<0.0015(1)	0.0015	<0.0019(1)	0.0019	6410407
1,1,2-trichloroethane	mg/L	<0.00050	0.00050	<0.00050	0.00050	<0.00050	<0.00050	0.00050	<0.00050	0.00050	<0.00050	0.00050	6410407
Trichloroethene	mg/L	<0.00050	0.00050	<0.00050	0.00050	<0.00050	<0.00050	0.00050	<0.00050	0.00050	<0.00050	0.00050	6410407
Chlorodibromomethane	mg/L	<0.0010	0.0010	<0.0010	0.0010	<0.0010	<0.0010	0.0010	<0.0010	0.0010	<0.0010	0.0010	6410407
Tetrachloroethene	mg/L	<0.00050	0.00050	<0.00050	0.00050	<0.00050	<0.00050	0.00050	<0.00050	0.00050	<0.00050	0.00050	6410407
Bromodichloromethane	mg/L	<0.0010	0.0010	<0.0010	0.0010	<0.0010	<0.0010	0.0010	<0.0010	0.0010	<0.0010	0.0010	6410407
Toluene	mg/L	0.00070	0.00040	<0.00040	0.00040	<0.00040	<0.00040	0.00040	<0.00040	0.00040	<0.00040	0.00040	6410407
Ethylbenzene	mg/L	<0.00040	0.00040	<0.00040	0.00040	<0.00040	<0.00040	0.00040	<0.00040	0.00040	<0.00040	0.00040	6410407
m & p-Xylene	mg/L	<0.00040	0.00040	<0.00040	0.00040	<0.00040	<0.00040	0.00040	<0.00040	0.00040	<0.00040	0.00040	6410407
Bromoform	mg/L	<0.0010	0.0010	<0.0010	0.0010	<0.0010	<0.0010	0.0010	<0.0010	0.0010	<0.0010	0.0010	6410407
Styrene	mg/L	<0.00050	0.00050	<0.00050	0.00050	<0.00050	<0.00050	0.00050	<0.00050	0.00050	<0.00050	0.00050	6410407
o-Xylene	mg/L	<0.00040	0.00040	<0.00040	0.00040	<0.00040	<0.00040	0.00040	<0.00040	0.00040	<0.00040	0.00040	6410407

RDL = Reportable Detection Limit
(1) - RDL raised due to sample matrix interference.

Maxxam Job #: B2B0204
Report Date: 2012/12/21

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD
Site Location: CVWMC
Sampler Initials: KG

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		FE1127		FE1133		FE1135	FE1201		FE1205		FE1207		
Sampling Date		2012/12/03		2012/12/03		2012/12/03	2012/12/04		2012/12/04		2012/12/04		
COC#		33952005		33952005		33952005	33974005		33974005		33974005		
	UNITS	**AM02-1**	**RDL**	**AG99-4**	**RDL**	**HBT94-2**	**EBA04-7**	**RDL**	**EBA04-3**	**RDL**	**AG99-05**	**RDL**	**QC Batch**
Xylenes (Total)	mg/L	<0.00040	0.00040	<0.00040	0.00040	<0.00040	<0.00040	0.00040	<0.00040	0.00040	<0.00040	0.00040	6410407
1,1,1,2-tetrachloroethane	mg/L	<0.00050	0.00050	<0.00050	0.00050	<0.00050	<0.00050	0.00050	<0.00050	0.00050	<0.00050	0.00050	6410407
1,1,2,2-tetrachloroethane	mg/L	<0.00050	0.00050	<0.00050	0.00050	<0.00050	<0.00050	0.00050	<0.00050	0.00050	<0.00050	0.00050	6410407
1,2-dichlorobenzene	mg/L	<0.00050	0.00050	<0.00050	0.00050	<0.00050	<0.00050	0.00050	<0.00050	0.00050	<0.00050	0.00050	6410407
1,3-dichlorobenzene	mg/L	<0.00050	0.00050	<0.00050	0.00050	<0.00050	<0.00050	0.00050	<0.00050	0.00050	<0.00050	0.00050	6410407
1,4-dichlorobenzene	mg/L	<0.00050	0.00050	<0.00050	0.00050	<0.00050	<0.00050	0.00050	<0.00050	0.00050	<0.00050	0.00050	6410407
Chlorobenzene	mg/L	<0.00050	0.00050	<0.00050	0.00050	<0.00050	<0.00050	0.00050	<0.00050	0.00050	<0.00050	0.00050	6410407
Dibromomethane	mg/L	<0.00090	0.00090	<0.00090	0.00090	<0.00090	<0.00090	0.00090	<0.00090	0.00090	<0.00090	0.00090	6410407
Surrogate Recovery (%)													
1,4-Difluorobenzene (sur.)	%	103		102		102	103		104		104		6410407
4-BROMOFLUOROBENZENE (sur.)	%	96		92		93	92		95		93		6410407
D4-1,2-DICHLOROETHANE (sur.)	%	94		94		96	96		94		94		6410407

RDL = Reportable Detection Limit

Maxxam Job #: B2B0204
Report Date: 2012/12/21

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD
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General Comments

REVISED REPORT - Speciated Chromium analysis has been added to samples FE1203 and FE1204. KD4 - Dec. 20/12

Sample FE1127-01: 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 FE1128-01: 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 FE1129-01: 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 FE1130-01: 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 FE1132-01: 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 FE1133-01: 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 FE1134-01: 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 FE1135-01: 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 FE1136-01: 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 FE1137-01: 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 FE1201-01: 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 FE1202-01: 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 FE1203-01: 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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Sample FE1204-01: 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 FE1205-01: 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 FE1206-01: 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 FE1207-01: 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 FE1208-01: 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 #: B2B0204
Report Date: 2012/12/21

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD
Site Location: CVWMC
Sampler Initials: KG

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	%Recovery	QC Limits	%Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6401590	Total Phosphorus (P)	2012/12/07	NC	80 - 120	98	80 - 120	<0.0050	mg/L	1.5	20
6402079	Ammonia (N)	2012/12/06	92	80 - 120	99	80 - 120	0.0057, RDL=0.0050	mg/L	NC	20
6402736	Fluoride (F)	2012/12/06	98	80 - 120	102	80 - 120	<0.010	mg/L	NC	20
6404931	Nitrate plus Nitrite (N)	2012/12/06	91	80 - 120	111	80 - 120	<0.020	mg/L	3.0	25
6404934	Nitrite (N)	2012/12/06	99	80 - 120	102	80 - 120	<0.0050	mg/L	NC	20
6404979	Dissolved Chloride (Cl)	2012/12/06	98	80 - 120	103	80 - 120	<0.50	mg/L	0.2	20
6404990	Dissolved Sulphate (SO4)	2012/12/06	NC	80 - 120	97	80 - 120	<0.50	mg/L	12.9	20
6404991	Alkalinity (Total as CaCO3)	2012/12/07	NC	80 - 120	99	80 - 120	<0.50	mg/L	0.6	20
6404991	Alkalinity (PP as CaCO3)	2012/12/07					<0.50	mg/L	NC	20
6404991	Bicarbonate (HCO3)	2012/12/07					<0.50	mg/L	0.6	20
6404991	Carbonate (CO3)	2012/12/07					<0.50	mg/L	NC	20
6404991	Hydroxide (OH)	2012/12/07					<0.50	mg/L	NC	20
6405048	Conductivity	2012/12/07			99	80 - 120	<1.0	uS/cm	0.4	20
6405634	Total Aluminum (Al)	2012/12/08	98	80 - 120	105	80 - 120	<0.00020	mg/L	0.8	20
6405634	Total Antimony (Sb)	2012/12/08	90	80 - 120	96	80 - 120	<0.000020	mg/L	NC	20
6405634	Total Arsenic (As)	2012/12/08	95	80 - 120	91	80 - 120	<0.000020	mg/L	NC	20
6405634	Total Barium (Ba)	2012/12/08	NC	80 - 120	95	80 - 120	<0.000020	mg/L	1	20
6405634	Total Beryllium (Be)	2012/12/08	91	80 - 120	92	80 - 120	<0.000010	mg/L	NC	20
6405634	Total Bismuth (Bi)	2012/12/08	89	80 - 120	92	80 - 120	<0.0000050	mg/L	NC	20
6405634	Total Cadmium (Cd)	2012/12/08	92	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
6405634	Total Chromium (Cr)	2012/12/08	95	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
6405634	Total Cobalt (Co)	2012/12/08	92	80 - 120	99	80 - 120	<0.0000050	mg/L	9.2	20
6405634	Total Copper (Cu)	2012/12/08	92	80 - 120	97	80 - 120	<0.000050	mg/L	2.6	20
6405634	Total Iron (Fe)	2012/12/08	NC	80 - 120	114	80 - 120	<0.0010	mg/L	0.05	20
6405634	Total Lead (Pb)	2012/12/08	91	80 - 120	98	80 - 120	<0.0000050	mg/L	7.6	20
6405634	Total Lithium (Li)	2012/12/08	NC	80 - 120	95	80 - 120	<0.00050	mg/L	0.2	20
6405634	Total Manganese (Mn)	2012/12/08	90	80 - 120	98	80 - 120	<0.000050	mg/L	2.2	20
6405634	Total Mercury (Hg)	2012/12/08	88	80 - 120	93	80 - 120	<0.000010	mg/L		
6405634	Total Molybdenum (Mo)	2012/12/08	NC	80 - 120	96	80 - 120	<0.000050	mg/L	1.0	20
6405634	Total Nickel (Ni)	2012/12/08	94	80 - 120	103	80 - 120	<0.000020	mg/L	8.1	20
6405634	Total Selenium (Se)	2012/12/08	96	80 - 120	103	80 - 120	<0.000040	mg/L	9.3	20
6405634	Total Silver (Ag)	2012/12/08	94	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
6405634	Total Strontium (Sr)	2012/12/08	NC	80 - 120	98	80 - 120	<0.000050	mg/L	1.1	20
6405634	Total Thallium (Tl)	2012/12/08	88	80 - 120	97	80 - 120	<0.0000020	mg/L	NC	20
6405634	Total Tin (Sn)	2012/12/08	104	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
6405634	Total Titanium (Ti)	2012/12/08	100	80 - 120	98	80 - 120	<0.00050	mg/L		
6405634	Total Uranium (U)	2012/12/08	94	80 - 120	98	80 - 120	<0.0000020	mg/L	1.8	20
6405634	Total Vanadium (V)	2012/12/08	98	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
6405634	Total Zinc (Zn)	2012/12/08	105	80 - 120	106	80 - 120	<0.00010	mg/L	23.0(1)	20
6405634	Total Boron (B)	2012/12/08					<0.050	mg/L	NC	20

Maxxam Job #: B2B0204
Report Date: 2012/12/21

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD
Site Location: CVWMC
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QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	%Recovery	QC Limits	%Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6405634	Total Silicon (Si)	2012/12/08					<0.10	mg/L		
6405634	Total Zirconium (Zr)	2012/12/08					<0.00010	mg/L		
6405634	Total Sulphur (S)	2012/12/08					<0.60	mg/L		
6407016	Dissolved Aluminum (Al)	2012/12/10	109	80 - 120	107	80 - 120	<0.00020	mg/L	0.4	20
6407016	Dissolved Antimony (Sb)	2012/12/10	104	80 - 120	100	80 - 120	<0.000020	mg/L	NC	20
6407016	Dissolved Arsenic (As)	2012/12/10	104	80 - 120	96	80 - 120	<0.000020	mg/L	10.6	20
6407016	Dissolved Barium (Ba)	2012/12/10	101	80 - 120	97	80 - 120	<0.000020	mg/L	2.3	20
6407016	Dissolved Beryllium (Be)	2012/12/10	111	80 - 120	102	80 - 120	<0.000010	mg/L	NC	20
6407016	Dissolved Bismuth (Bi)	2012/12/10	107	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
6407016	Dissolved Cadmium (Cd)	2012/12/10	106	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
6407016	Dissolved Chromium (Cr)	2012/12/10	108	80 - 120	105	80 - 120	<0.00010	mg/L	NC	20
6407016	Dissolved Cobalt (Co)	2012/12/10	107	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
6407016	Dissolved Copper (Cu)	2012/12/10	110	80 - 120	106	80 - 120	<0.000050	mg/L	8.2	20
6407016	Dissolved Iron (Fe)	2012/12/10	113	80 - 120	109	80 - 120	<0.0010	mg/L	NC	20
6407016	Dissolved Lead (Pb)	2012/12/10	105	80 - 120	100	80 - 120	<0.0000050	mg/L	8.0	20
6407016	Dissolved Lithium (Li)	2012/12/10	104	80 - 120	99	80 - 120	<0.00050	mg/L	NC	20
6407016	Dissolved Manganese (Mn)	2012/12/10	108	80 - 120	102	80 - 120	<0.000050	mg/L	7.9	20
6407016	Dissolved Mercury (Hg)	2012/12/10	102	80 - 120	94	80 - 120	<0.000010	mg/L		
6407016	Dissolved Molybdenum (Mo)	2012/12/10	109	80 - 120	102	80 - 120	<0.000050	mg/L	6.7	20
6407016	Dissolved Nickel (Ni)	2012/12/10	108	80 - 120	105	80 - 120	<0.000020	mg/L	NC	20
6407016	Dissolved Selenium (Se)	2012/12/10	112	80 - 120	103	80 - 120	<0.000040	mg/L	NC	20
6407016	Dissolved Silver (Ag)	2012/12/10	112	80 - 120	108	80 - 120	<0.0000050	mg/L	NC	20
6407016	Dissolved Strontium (Sr)	2012/12/10	NC	80 - 120	101	80 - 120	<0.000050	mg/L	3.1	20
6407016	Dissolved Thallium (Tl)	2012/12/10	106	80 - 120	98	80 - 120	<0.0000020	mg/L	0	20
6407016	Dissolved Tin (Sn)	2012/12/10	105	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
6407016	Dissolved Titanium (Ti)	2012/12/10	110	80 - 120	110	80 - 120	<0.00050	mg/L	NC	20
6407016	Dissolved Uranium (U)	2012/12/10	107	80 - 120	102	80 - 120	<0.0000020	mg/L	24.0(1)	20
6407016	Dissolved Vanadium (V)	2012/12/10	104	80 - 120	104	80 - 120	<0.00020	mg/L	3.2	20
6407016	Dissolved Zinc (Zn)	2012/12/10	115	80 - 120	118	80 - 120	<0.00010	mg/L	39.1(1)	20
6407016	Dissolved Boron (B)	2012/12/10					<0.050	mg/L	NC	20
6407016	Dissolved Silicon (Si)	2012/12/10					<0.10	mg/L	0.3	20
6407016	Dissolved Zirconium (Zr)	2012/12/10					<0.00010	mg/L	NC	20
6407016	Dissolved Sulphur (S)	2012/12/10					<0.60	mg/L		
6407910	Dissolved Aluminum (Al)	2012/12/10	109	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20
6407910	Dissolved Antimony (Sb)	2012/12/10	98	80 - 120	96	80 - 120	<0.000020	mg/L	NC	20
6407910	Dissolved Arsenic (As)	2012/12/10	103	80 - 120	97	80 - 120	<0.000020	mg/L	NC	20
6407910	Dissolved Barium (Ba)	2012/12/10	98	80 - 120	95	80 - 120	<0.000020	mg/L	NC	20
6407910	Dissolved Beryllium (Be)	2012/12/10	100	80 - 120	93	80 - 120	<0.000010	mg/L	NC	20
6407910	Dissolved Bismuth (Bi)	2012/12/10	91	80 - 120	94	80 - 120	<0.0000050	mg/L	NC	20
6407910	Dissolved Cadmium (Cd)	2012/12/10	99	80 - 120	95	80 - 120	<0.0000050	mg/L	NC	20

Maxxam Job #: B2B0204
Report Date: 2012/12/21

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD
Site Location: CVWMC
Sampler Initials: KG

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6407910	Dissolved Chromium (Cr)	2012/12/10	100	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
6407910	Dissolved Cobalt (Co)	2012/12/10	99	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
6407910	Dissolved Copper (Cu)	2012/12/10	99	80 - 120	97	80 - 120	<0.000050	mg/L	NC	20
6407910	Dissolved Iron (Fe)	2012/12/10	114	80 - 120	111	80 - 120	<0.0010	mg/L	NC	20
6407910	Dissolved Lead (Pb)	2012/12/10	100	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
6407910	Dissolved Lithium (Li)	2012/12/10	98	80 - 120	93	80 - 120	<0.00050	mg/L	NC	20
6407910	Dissolved Manganese (Mn)	2012/12/10	102	80 - 120	103	80 - 120	<0.000050	mg/L	NC	20
6407910	Dissolved Mercury (Hg)	2012/12/10	92	80 - 120	90	80 - 120	<0.000010	mg/L		
6407910	Dissolved Molybdenum (Mo)	2012/12/10	105	80 - 120	96	80 - 120	<0.000050	mg/L	NC	20
6407910	Dissolved Nickel (Ni)	2012/12/10	100	80 - 120	99	80 - 120	<0.000020	mg/L	NC	20
6407910	Dissolved Selenium (Se)	2012/12/10	112	80 - 120	104	80 - 120	<0.000040	mg/L	NC	20
6407910	Dissolved Silver (Ag)	2012/12/10	103	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
6407910	Dissolved Strontium (Sr)	2012/12/10	102	80 - 120	96	80 - 120	<0.000050	mg/L	NC	20
6407910	Dissolved Thallium (Tl)	2012/12/10	91	80 - 120	94	80 - 120	<0.0000020	mg/L	NC	20
6407910	Dissolved Tin (Sn)	2012/12/10	100	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
6407910	Dissolved Titanium (Ti)	2012/12/10	92	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20
6407910	Dissolved Uranium (U)	2012/12/10	98	80 - 120	96	80 - 120	<0.0000020	mg/L	NC	20
6407910	Dissolved Vanadium (V)	2012/12/10	103	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20
6407910	Dissolved Zinc (Zn)	2012/12/10	112	80 - 120	105	80 - 120	<0.00010	mg/L	NC	20
6407910	Dissolved Boron (B)	2012/12/10					<0.050	mg/L	NC	20
6407910	Dissolved Silicon (Si)	2012/12/10					<0.10	mg/L	NC	20
6407910	Dissolved Zirconium (Zr)	2012/12/10					<0.00010	mg/L	NC	20
6407910	Dissolved Sulphur (S)	2012/12/10					<0.60	mg/L		
6410407	1,4-Difluorobenzene (sur.)	2012/12/12	102	70 - 130	100	70 - 130	100	%		
6410407	4-BROMOFLUOROBENZENE (sur.)	2012/12/12	101	70 - 130	99	70 - 130	90	%		
6410407	D4-1,2-DICHLOROETHANE (sur.)	2012/12/12	94	70 - 130	95	70 - 130	96	%		
6410407	Chloromethane	2012/12/09	89	60 - 140	100	60 - 140	<0.0010	mg/L	NC	30
6410407	Vinyl chloride	2012/12/09	120	60 - 140	104	60 - 140	<0.00050	mg/L	NC	30
6410407	Chloroethane	2012/12/09	105	60 - 140	101	60 - 140	<0.0010	mg/L	NC	30
6410407	Trichlorofluoromethane	2012/12/09	116	60 - 140	107	60 - 140	<0.0040	mg/L	NC	30
6410407	1,1-dichloroethene	2012/12/09	89	70 - 130	83	70 - 130	<0.00050	mg/L	NC	30
6410407	Dichloromethane	2012/12/09	96	70 - 130	93	70 - 130	<0.0020	mg/L	NC	30
6410407	trans-1,2-dichloroethene	2012/12/09	93	70 - 130	86	70 - 130	<0.0010	mg/L	NC	30
6410407	1,1-dichloroethane	2012/12/09	93	70 - 130	88	70 - 130	<0.00050	mg/L	NC	30
6410407	cis-1,2-dichloroethene	2012/12/09	94	70 - 130	89	70 - 130	<0.0010	mg/L	NC	30
6410407	Chloroform	2012/12/09	92	70 - 130	87	70 - 130	<0.0010	mg/L	NC	30
6410407	1,1,1-trichloroethane	2012/12/09	92	70 - 130	86	70 - 130	<0.00050	mg/L	NC	30
6410407	1,2-dichloroethane	2012/12/09	88	70 - 130	84	70 - 130	<0.00050	mg/L	NC	30
6410407	Carbon tetrachloride	2012/12/09	92	70 - 130	86	70 - 130	<0.00050	mg/L	NC	30
6410407	Benzene	2012/12/09	91	70 - 130	87	70 - 130	<0.00040	mg/L	NC	30

Maxxam Job #: B2B0204
Report Date: 2012/12/21

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD
Site Location: CVWMC
Sampler Initials: KG

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	%Recovery	QC Limits	%Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6410407	Methyl-tert-butylether(MTBE)	2012/12/09	81	70 - 130	85	70 - 130	<0.0040	mg/L	NC	30
6410407	1,2-dichloropropane	2012/12/09	92	70 - 130	88	70 - 130	<0.00050	mg/L	NC	30
6410407	cis-1,3-dichloropropene	2012/12/09	92	70 - 130	90	70 - 130	<0.0010	mg/L	NC	30
6410407	trans-1,3-dichloropropene	2012/12/09	87	70 - 130	90	70 - 130	<0.0010	mg/L	NC	30
6410407	Bromomethane	2012/12/09	84	60 - 140	75	60 - 140	<0.0010	mg/L	NC	30
6410407	1,1,2-trichloroethane	2012/12/09	91	70 - 130	86	70 - 130	<0.00050	mg/L	NC	30
6410407	Trichloroethene	2012/12/09	92	70 - 130	86	70 - 130	<0.00050	mg/L	NC	30
6410407	Chlorodibromomethane	2012/12/09	89	70 - 130	84	70 - 130	<0.0010	mg/L	NC	30
6410407	Tetrachloroethene	2012/12/09	94	70 - 130	87	70 - 130	<0.00050	mg/L	NC	30
6410407	Bromodichloromethane	2012/12/09	92	70 - 130	86	70 - 130	<0.0010	mg/L	NC	30
6410407	Toluene	2012/12/09	90	70 - 130	86	70 - 130	<0.00040	mg/L	NC	30
6410407	Ethylbenzene	2012/12/09	97	70 - 130	92	70 - 130	<0.00040	mg/L	NC	30
6410407	m & p-Xylene	2012/12/09	99	70 - 130	95	70 - 130	<0.00040	mg/L	NC	30
6410407	Bromoform	2012/12/09	87	70 - 130	80	70 - 130	<0.0010	mg/L	NC	30
6410407	Styrene	2012/12/09	75	70 - 130	69(1)	70 - 130	<0.00050	mg/L	NC	30
6410407	o-Xylene	2012/12/09	88	70 - 130	84	70 - 130	<0.00040	mg/L	NC	30
6410407	1,1,1,2-tetrachloroethane	2012/12/09	93	70 - 130	87	70 - 130	<0.00050	mg/L	NC	30
6410407	1,1,2,2-tetrachloroethane	2012/12/09	100	70 - 130	91	70 - 130	<0.00050	mg/L	NC	30
6410407	1,2-dichlorobenzene	2012/12/09	95	70 - 130	90	70 - 130	<0.00050	mg/L	NC	30
6410407	1,3-dichlorobenzene	2012/12/09	94	70 - 130	87	70 - 130	<0.00050	mg/L	NC	30
6410407	1,4-dichlorobenzene	2012/12/09	98	70 - 130	91	70 - 130	<0.00050	mg/L	NC	30
6410407	Chlorobenzene	2012/12/09	80	70 - 130	77	70 - 130	<0.00050	mg/L	NC	30
6410407	Dibromomethane	2012/12/09	92	70 - 130	86	70 - 130	<0.00090	mg/L	NC	30
6410407	Xylenes (Total)	2012/12/09					<0.00040	mg/L	NC	30
6410409	VH C6-C10	2012/12/09			104	70 - 130	<300	ug/L	NC	40
6414507	Dissolved Mercury (Hg)	2012/12/11	107	80 - 120	104	80 - 120	<0.010	ug/L	NC	20
6431738	Dissolved Hex. Chromium (Cr 6+)	2012/12/17	100	80 - 120	107	80 - 120	<0.0010	mg/L	NC	20
6434878	Dissolved Hex. Chromium (Cr 6+)	2012/12/18	104	80 - 120	106	80 - 120	<0.0010	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.

Maxxam Job #: B2B0204
Report Date: 2012/12/21

EBA Engineering Consultants Ltd.
Client Project #: N23101881 - CVRD
Site Location: CVWMC
Sampler Initials: KG

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 #: B2B0204

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.

Maxxam Analytics International Corporation o/a Maxxam Analytics
4606 Canada Way, Burnaby, British Columbia Canada V5G 1K5 Tel (604) 734 7276 Toll-free (800) 665-8566 Fax (604) 030 0110 www.maxxam.ca

CHAIN OF CUSTODY RECORD

Page 1 of 2

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 #: B2B8204	BOTTLE ORDER #: 339520
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 #:	N23101881 - CVRD	CHAIN OF CUSTODY #: C#339520-05-01	PROJECT MANAGER: Kim Domino
Phone:	(250)756-2256 Fax: (250)756-2686	Phone:	(250)756-2256 Fax:	Project Name:			
Email:	dromano@eba.ca, lpaul@eba.ca	Email:	kgabelhouse@eba.ca	Site #:	CVWMC		
				Sampled By:	K Gabelhouse		

REGULATORY CRITERIA:
- ☐ CSR
- ☐ CCME
- ☒ BC Water Quality DW/AL
- ☒ Other CDWQG

SPECIAL INSTRUCTIONS:

B2B8204

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

ANALYSIS REQUESTED (Please be specific):

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 most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans 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 lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered ? (Y / N)	(CL, F, NO2, NO3, SO4) ANIONS	AMMONIA-N	[illegible]	Low Level Dissolved Metals + Hardness (Me-U)	pH / Conductivity / Alkalinity	Total Phosphorus	VOC + VPH	Sulphur			# of Bottles	Comments
1	FE1127	AM02-1	Dec 3/12		GW	Y	X	X		X	X	X	X	X			7	
2	FE1128	EBA04-2	↓		↓	Y	X	X		X	X	X		X			4	
3	FE1129	EBA04-4				Y	X	X		X	X	X		X			4	
4	FE1130	EBA04-1				Y	X	X		X	X	X		X			4	
5	FE1131	AG99-2				Y	X	X		X	X	X		X			4	
6	FE1132	AG99-4				Y	X	X		X	X	X	X	X			7	
7	FE1133	HBT94-1				Y	X	X		X	X	X		X			4	
8	FE1134	HBT94-2				Y	X	X		X	X	X	X	X			7	
9	FE1135	HBT94-3				Y	X	X		X	X	X		X			4	
10	FE1136	HBT94-6	↓		↓	Y	X	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: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
K Gabelhouse	12/Dec/04	5:30pm	[illegible]	12/12/05	08:00		☐	5.2, 6.6, 2	N/A ☐ 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.

White: Maxxam Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics
4606 Canada Way, Burnaby, British Columbia Canada V5G 1K5 Tel (604) 734 7276 Toll-free (800) 665 8566 Fax (604) 630 0110 www.maxxam.ca

CHAIN OF CUSTODY RECORD

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. #:		B230204	339740
Address:	#1 - 4376 Boban Drive Nanaimo BC V9T 6A7	Address:	#1 - 4376 Boban Drive Nanaimo BC V9T6A7	Project #:	N23101881 - CVRD	CHAIN OF CUSTODY #:	PROJECT MANAGER:
Phone:	(250)756-2256 Fax: (250)756-2686	Phone:	(250)756-2256 Fax:	Project Name:		C#339740-05-01	Kim Domino
Email:	dromano@eba.ca, lpaul@eba.ca	Email:	kgabelhouse@eba.ca	Site #:	CVWMC		
				Sampled By:	K Gabelhouse		

REGULATORY CRITERIA:
- ☐ CDR
- ☐ CCME
- ☒ BC Water Quality AL/AW
- ☒ Other CDWQG

B230204

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

ANALYSIS REQUESTED (Please be specific):

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 most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans 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 lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered ? (Y / N)	(CL, F, NO2, NO3, SO4) ANIONS	AMMONIA-N	CSR [illegible]	Low Level Dissolved Metals + Hardness + Hg-comp	pH / Conductivity / Alkalinity	Total Phosphorus	Dissolved Speciated Chromium	VOC + VPH	Low Level Speciated Total Hardness (Mercury)	Sulphur	# of Bottles	Comments
1	FE1201	EBA04-7	Dec 4/12		GW	Y	X	X		X	X	X		X		X	7	
2	FE1202	EBA04-8				Y	X	X		X	X	X				X		
3	FE1203	EBA04-6				Y	X	X		X	X	X	[redacted]			X	5	chromium on hold
4	FE1204	EBA11-2				Y	X	X		X	X	X				X	5	chromium on hold
5	FE1205	EBA04-3				Y	X	X		X	X	X		X		X	7	
6	FE1206	AG99-01				Y	X	X		X	X	X				X		
7	FE1207	AG99-05			↓	Y	X	X		X	X	X		X		X	7	
8	FE1208	SW1	↓		SW	N	X	X			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: Time Sensitive	Temperature (°C) on Receipt	Custody seal intact on cooler?
K Gabelhouse	12/11/04	5:30 pm	Matth. Laurel Berthiaume	2012/12/05	08:00		☐	5.2, 4.6, 6.2	N/A ☐ 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.

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APPENDIX E

GROUNDWATER MONITORING INFORMATION

APPENDIX E1 - CAMPBELL RIVER LANDFILL, GROUNDWATER ELEVATIONS 1993 - 2012

N23101881
April 2013

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	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
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	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	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	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	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	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	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	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	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	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
AG99-02																															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
AG99-04																															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
AG99-06																															133.03	133.03	133.03	133.03	133.03	133.03
AM00-01																																			164.6	164.6
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 (m-top)	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	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
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	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	35.9	36.2		35.93	34.87				35.38	35.34	35.1	35.8	35.85	35.91	35.48	DRY	35	36.12	DRY	DRY	DRY	DRY	DRY
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	31.8	31.91	31.62	DRY	31.45	33.083	DRY	DRY	DRY	DRY	33.94
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	18.7	DRY	17.45	DRY	DRY	DRY	19.35?	DRY	DRY	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	19.997	20.2	19.63	21.11	19.38	20.78	21.6	23.18	22.16	21.91	20.5
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	20.07	20.1	19.46	21.1	19.54	20.96	21.78	22.89	22.19	21.45	21.89
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	20.1	20.3	19.76	21	19.82	21.28	22.09	22.99	22.75	21.75	22.205
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	21.37	21.33	21.15	22.28	21.32	22.47	23.18	24.085	23.47	22.86	23.29
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	17.41	17.3	16.93	18.43	DRY	18.53	19.19	DRY	20.18	DRY	19.59
AG99-01																															24.41	25.07	25.92	25.42	24.595	25.175
AG99-02																															21.365	22.04	23.12	22.52	21.915	22.385
AG99-03																															19.45	20.13	21.04	20.455	19.843	20.245
AG99-04																															18.5	19.19	20.11	19.52	18.905	19.315
AG99-05																															16.7	16.71	17.63	17.095	16.51	16.85
AG99-06																															17.702	18.08	19.26	19.495	19.335	19.185
AM00-01																																			37.556	38.835
AM02-01																																				
EBA04-1																																				
EBA04-2																																				
EBA04-3																																				
EBA04-4																																				
EBA04-6																																				
EBA04-7																																				
EBA11-1																																				
EBA11-2																																				
EBA11-3																																				
EBA11-4																																				
Groundwater Elevation (m-asl)	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	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
GLL93-1	137.73	138.06	138.59	137.33			139.11																													
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			130.83	130.53		130.8	131.86				131.35	131.39	131.63	130.93	130.88	130.82	131.25		131.73						
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		127.37	137.40	127.97	127.45		130.22	126.82	127.13	126.64	126.57	126.46	126.75		126.92						124.43
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		118.69									
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	122.333	122.13	122.7	121.22	122.95	121.55	120.73	119.15	120.17	120.42	121.83
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	122.37	122.34	122.98	121.34	122.9	121.48	120.66	119.55	120.25	120.99	120.55
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	122.62	122.42	122.96	121.72	122.9	121.44	120.63	119.73	119.97	120.97	120.515
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	118.74	118.78	118.96	117.83	118.79	117.64	116.93	116.025	116.64	117.25	116.82
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	121.67	120.54	120.5	120.42	120.74	120.85	120.88	120.99	121.36	119.86		119.76	119.1		118.11		118.7
AG99-01																															119.78	119.12	118.27	118.77	119.595	119.015
AG99-02																															118.485	117.81	116.73	117.33	117.935	117.465
AG99-03																															117.34	116.66	115.75	116.335	116.947	116.545
AG99-04																															117.94	117.25	116.33	116.92	117.535	117.125
AG99-05																															115.39	115.38	114.46	114.995	115.58	115.24
AG99-06																															115.328	114.95	113.77	113.535	113.695	113.845
AM00-01																																			127.044	125.765
AM02-01																																				
EBA04-1																																				
EBA04-2																																				
EBA04-3																																				
EBA04-4																																				
EBA04-6																																				
EBA04-7																																				
EBA11-1																																				
EBA11-2																																				
EBA11-3																																				
EBA11-4																																				

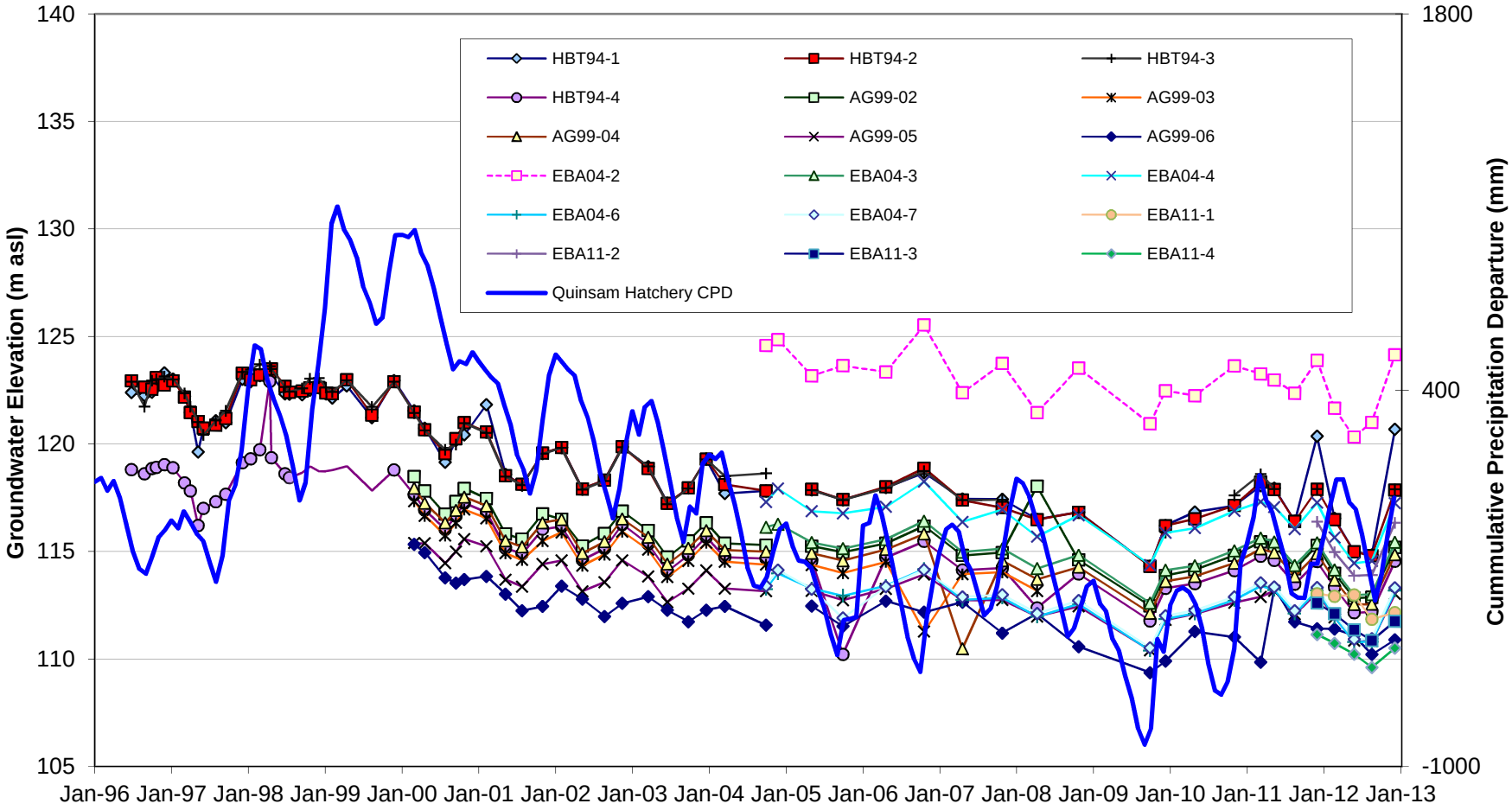
Note: 1) Geodetic elevation are in metres above sea level (m-asl) and are derived from the 2005 well survey completed by Quarmby Land Surveying.

APPENDIX E1 - CAMPBELL RIVER LANDFILL, GROUNDWATER ELEVATIONS 1993 - 2012

N23101881
April 2013

Top of Casing Elevation	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	20-Apr-06	19-Oct-06	19-Apr-07	25-Oct-07	8-Apr-08	22-Oct-08	27-Sep-09	9-Dec-09	28-Apr-10	2-Nov-10	7-Mar-11	11-May-11	16-Aug-11	30-Nov-11	21-Feb-12	24-May-12	16-Aug-12	4-Dec-12
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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	186.59	186.59	186.59	186.59	186.59	186.59	186.59	186.59	186.59	186.59	186.59	186.59	186.59	186.59	186.59	186.59	186.59	186.59
EBA04-1													164.74	164.74	164.74	164.74	164.74	164.74	164.74	164.74	164.74	164.74	164.74	164.74	164.74	164.74	164.74	164.74	164.74	164.74	164.74	164.74	164.74	164.74
EBA04-2													162.92	162.92	162.92	162.92	162.92	162.92	162.92	162.92	162.92	162.92	162.92	162.92	162.92	162.92	162.92	162.92	162.92	162.92	162.92	162.92	162.92	162.92
EBA04-3													142.2	142.2	142.2	142.2	142.2	142.2	142.2	142.2	142.2	142.2	142.2	142.2	142.2	142.2	142.2	142.2	142.2	142.2	142.2	142.2	142.2	142.2
EBA04-4													163.37	163.37	163.37	163.37	163.37	163.37	163.37	163.37	163.37	163.37	163.37	163.272	163.37	163.272	163.272	163.272	163.272	163.272	163.174	163.272	163.174	163.174
EBA04-6													136.34	136.34	136.34	136.34	136.34	136.34	136.34	136.34	136.34	136.34	136.34	136.34	136.34	136.34	136.34	136.34	136.34	136.34	136.34	136.34	136.34	136.34
EBA04-7													136.4	136.4	136.4	136.4	136.4	136.4	136.4	136.4	136.4	136.4	136.4	136.4	136.4	136.4	136.4	136.4	136.4	136.4	136.4	136.4	136.4	136.4
EBA11-1																														134.77	134.77	134.77	134.77	134.77
EBA11-2																														141.55	141.55	141.55	141.55	141.55
EBA11-3																														134.19	134.19	134.19	134.19	134.19
EBA11-4																														133.13	133.13	133.13	133.13	133.13
Depth to Groundwater (m-top)	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	20-Apr-06	19-Oct-06	19-Apr-07	25-Oct-07	8-Apr-08	22-Oct-08	27-Sep-09	9-Dec-09	28-Apr-10	2-Nov-10	7-Mar-11	11-May-11	16-Aug-11	30-Nov-11	21-Feb-12	24-May-12	16-Aug-12	4-Dec-12
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	DRY	DRY	DRY	DRY	DRY	DRY
GLL93-2	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	DRY	DRY	DRY	DRY	DRY	DRY
GLL93-3	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	DRY	DRY	DRY	DRY	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked
GLL93-4	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	DRY	DRY	DRY	DRY	DRY	DRY
HBT94-1	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	24.353	23.67	24.889	24.899	25.839	25.5	28.01	26.12	25.49	25.2	24.275	24.39	25.92	21.97	25.79	27.34	27.49	21.65
HBT94-2	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	24.432	23.565	25.05	25.402	25.96	25.612	28.14	26.24	25.92	25.295	24.22	24.56	26.04	24.55	25.96	27.46	27.63	24.59
HBT94-3	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	24.77	23.985	25.331	25.312	DRY	25.925	DRY	26.84	DRY	25.11	24.12	24.82	DRY	24.82	DRY	DRY	DRY	24.83
HBT94-4	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	25.391	24.64	25.979	25.879	27.735	26.15	28.34	26.82	26.6	26	25.327	25.52	26.63	25.58	26.78	27.96	27.92	25.56
HBT94-5	DRY	DRY	DRY	20.11	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	DRY	DRY
AG99-01	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	-	27.335	26.423	27.992	27.712	28.768	28.04	30.33	28.82	28.63	27.88	27.33	27.48	28.56	27.39	28.82	30.03	29.9	27.43
AG99-02	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	24.473	23.665	25.037	24.902	21.815	25.24	27.385	25.96	25.7	25.03	24.399	24.58	25.65	24.565	25.87	27.02	26.98	24.66
AG99-03	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	22.274	25.51	22.844	22.755	23.63	Damaged	Damaged	Damaged	Damaged	Damaged	Damaged	Damaged	Damaged	Damaged	Damaged	Damaged	Damaged	Damaged
AG99-04	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	21.344	20.624	25.962	21.869	22.734	22.165	24.31	22.83	22.6	21.98	21.317	21.5	22.6	21.53	22.77	23.9	23.89	21.58
AG99-05	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	18.823	18.154	19.358	19.342	20.114	19.645	21.69	20.27	19.99	19.47	19.2	18.915	20	19.02	20.16	21.23	21.26	19.06
AG99-06	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	20.333	20.852	20.385	21.821	20.925	22.455	23.66	23.13	21.75	22.01	23.18	19.72	21.3	21.62	21.63	21.93	22.82	22.13
AM00-01	40.88	40.495	38.94	39.54	33.96	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	-	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	Blocked	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	30.32	27.235	DRY	31.321	32.719	28.573	31.62	32.01	31.41	30.14	DRY	DRY	31.825	31.24	DRY	DRY	DRY	30.45
EBA04-1													-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBA04-2													38.341	38.066	39.752	39.28	39.572	37.392	40.544	39.181	41.463	39.39	41.98	40.445	40.68	39.29	39.66	39.945	40.56	39.03	41.26	42.6	41.91	38.78
EBA04-3													26.068	25.927	26.784	27.065	26.632	25.784	27.224	27.073	27.989	27.368	29.6	28.07	27.86	27.16	26.569	26.75	27.84	26.79	28.05	29.23	29.19	26.77
EBA04-4													46.074	45.445	46.5	46.594	46.293	45.122	46.991	46.419	47.678	46.684	49	47.4	47.285	46.39	45.96	46.2	47.23	46	47.52	48.82	48.62	45.93
EBA04-6													23.088	22.356	23.062	23.405	22.933	22.161	23.588	23.491	24.369	23.775	25.95	24.475	24.22	23.59	22.94	23.128	24.23	23.14	24.4	25.55	25.53	23.16
EBA04-7													22.993	22.268	23.147	24.495	23.03	22.255	23.506	23.412	24.283	23.685	25.88	24.39	24.14	23.51	22.86	23.05	24.15	23.07	24.32	25.48	25.46	23.09
EBA11-1																														21.735	21.85	21.79	22.92	22.61
EBA11-2																														25.16	26.58	27.68	27.64	25.21
EBA11-3																														21.59	22.09	22.83	23.33	22.43
EBA11-4																														21.99	22.4	22.91	23.52	22.62
Groundwater Elevation (m-asl)	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	20-Apr-06	19-Oct-06	19-Apr-07	25-Oct-07	8-Apr-08	22-Oct-08	27-Sep-09	9-Dec-09	28-Apr-10	2-Nov-10	7-Mar-11	11-May-11	16-Aug-11	30-Nov-11	21-Feb-12	24-May-12	16-Aug-12	4-Dec-12
GLL93-1																																		
GLL93-2																																		
GLL93-3																																		
GLL93-4																																		
HBT94-1	118.58	118.085	119.555	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	114.32	116.21	116.84	117.13	118.055	117.94	116.41	120.36	116.54	114.99	114.84	120.68
HBT94-2	118.52	118.125	119.575	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	114.3	116.2	116.52	117.145	118.22	117.88	116.4	117.89	116.48	114.98	114.81	117.85
HBT94-3	118.48	118.09	119.55	119.82	117.875	118.28	119.845	118.96	117.203	117.926	119.286	118.502	118.635		117.851	117.395	117.95	118.735	117.389	117.408		116.795		115.88		117.61	118.6	117.9			117.9				117.89
HBT94-4	115.148	114.895	116.035	116.16	114.605	115.136	116.26	115.35	114.084	114.842	115.668	114.74	114.668		114.565	110.215	114.719	115.47	114.131	114.231	112.375	113.96	111.77	113.29	113.51	114.11	114.783	114.59	113.48	114.53	113.33	112.15	112.19	114.55
HBT94-5				118.18																														
AG99-01	117.26	117.11	119.26	118.29	116.69	117.405	118.495	116.898	115.63	117.057	117.319	116.827	116.743	116.574	116.683		116.855	117.767	116.198	116.478	115.422	116.15	113.86	115.37	115.56	116.31	116.86	116.71	115.63	116.8	115.37	114.16	114.29	116.76
AG99-02	115.82	115.57	116.75	116.5	115.258	115.838	116.87	115.977	114.735	115.492	116.338	115.381	115.294		115.242	114.965	115.377	116.185	114.813	114.948	118.035	114.61	112.465	113.89	114.15	114.82	115.451	115.27	114.2	115.285	113.98	112.83	112.87	115.19
AG99-03	114.915	114.61	115.49	115.89	114.345	114.857	115.925	115.087	113.819	114.566	115.405	114.525	114.392		114.37	113.997	114.516	111.28	113.946	114.035	113.16														
AG99-04	115.498	115.21	116.34	116.49	114.92	115.457	116.515	115.669	114.415	115.155	115.972	115.064	114.994		114.917	114.574	115.096	115.816	110.478	114.571	113.706	114.275	112.13	113.61	113.84	114.46	115.123	114.94	113.84	114.91	113.67	112.54	112.55	114.86
AG99-05	113.688	113.365	114.415	114.58	113.148	113.57	114.588	113.838	112.65	113.276	114.12	113.278	113.156		113.17	112.736	113.267	113.936	112.732	112.748	111.976	112.445	110.4	111.82	112.1	112.62	112.89	113.175	112.09	113.07	111.93	110.86	110.83	113.03
AG99-06	113.022	112.25	112.445	113.385	112.787	111.975	112.59	112.898	112.265	111.736	112.272	112.456	111.57		112.461	111.52	112.697	112.178	112.645	111.209	112.105	110.575	109.37	109.9	111.28	111.02	109.85	113.31	111.73	111.41	111.4	111.1	110.21	110.9
AM00-01	123.72	124.105	125.66	125.06	130.64	DRY	DRY	DRY	DRY	DRY	DRY																							
AM02-01						160.041	156.76	DRY	154.399	159.965	155.481		158.086	156.574	154.125	154.945	156.27	159.355		155.269	153.871	158.017	154.97	154.58	155.18	156.45			154.765	155.35					156.14
EBA04-1																															-	-	-	-
EBA04-2													124.579	124.854	123.168	123.64	123.348	125.528	122.376	123.739	121.457	123.53	120.94	122.475	122.24	123.63	123.26	122.975	122.36	123.89	121.66	120.32	121.01	124.14
EBA04-3													116.132	116.273	115.416	115.135	115.568	116.416	114.976	115.127	114.211	114.832	112.6	114.13	114.34	115.04	115.631	115.45	114.36	115.41	114.15	112.97	113.01	115.43
EBA04-4													117.296	117.925	116.87	116.776	117.077	118.248	116.379	116.951	115.692	116.686	114.37	115.872	116.085	116.882	117.312	117.072	116.042	117.272	115.654	114.452	114.554	117.244
EBA04-6													113.252	113.984	113.278	112.935	113.407	114.179	112.752	112.849	111.971	112.565	110.39	111.865	112.12	112.75	113.4	113.212	112.11	113.2	111.94	110.79	110.81	113.18
EBA04-7													113.407	114.132	113.253	111.905	113.37	114.145	112.894	112.988	112.117	112.565	110.39	111.865	112.12	112.75	113.54	113.35	112.25	113.33	112.08	110.92	110.94	113.31
EBA11-1																														113.035	112.92	112.98	111.85	112.16
EBA11-2																														116.39	114.97	113.87	113.91	116.34
EBA11-3																														112.6	112.1	111.36	110.86	111.76
EBA11-4																														111.14	110.73	110.22	109.61	110.51

Appendix E2 - Groundwater Elevations and Cumulative Annual Precipitation



APPENDIX F
WATER QUALITY INFORMATION

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Results of Water Quality Testing - Explanatory Notes for Criteria

* Calculated Guidelines from the BC Approved and Working Water Quality Guidelines, updated 2006 and including amendments up to September 2011 (1)

Aluminum - Criteria is based on equation: Al = e^(1.209 -2.426 pH + 0.286 pH^2) (in mg/L) if pH<6.5 and 0.1 mg/L if pH>6.5.
Ammonia - Criteria is derived from a pH and temperature based matrix.
Cadmium - Criteria is based on equation Cd = 10^(0.86[Log(H)]-3.2) (in µg/L).
Copper - Criteria is based on equation Cu = (0.094(H)+2) (in µg/L).
Fluoride - Criteria is0.4 mg/L at H = 10 mg/L or (-51.73 + 92.57 log H) X 0.01 mg/L
Lead - Criteria is based on equation Pb = e^(1.273 ln[H] - 1.460) (in µg/L).
Manganese - Criteria is based on equation: Mn = 0.01102 x H + 0.54 (in mg/L).
Nickel - Criteria is 25 µg/L when H = 0 to 60; 65 µg/L when H = 60 to 120; 110 µg/L H = 120 to 180; and 150 µg/L when H > 180
Silver - Criteria is 0.1 µg/L where H < 100 and 3 µg/L where H > 100.
Zinc - Criteria is based on the equation: Zn = 33 + 0.75 x (H - 90) (in µg/L).
where H = hardness (mg/L $CaCO_3$)

Notes:

(1) Changes to the BC Approved and Working Water Quality Guidelines (BCAWQG) (September 2011) and Canadian Drinking Water Quality Guidelines (CDWQG) (December 2010) are outlined below:

Iron	-Changed BC Working Guideline (0.3 mg/L) to BC Approved Guideline for the protection of aquatic life (0.35 mg/L) in 2008
Nitrate	-Became a BC Approved Guideline for the protection of aquatic life (32.8 mg/L) in 2009
Fluoride	-Change to the equation in BC Approved Guideline for the protection of aquatic life in 2011
Toluene	-Changed BC Working Guideline (0.039 mg/L) to BC Approved Guideline for the protection of aquatic life (0.0005 mg/L) in 2007.
Xylenes	-Changed from no guideline to BC Approved Guideline for the protection of aquatic life (0.03 mg/L) in 2007.
Methyl-Tert-Butylether	-Changed from no guideline to BC Approved Guideline for the protection of aquatic life (3400 mg/L) in 2007.
Methyl-Tert-Butylether	-Changed from BC Approved Guideline for the protection of drinking water (15 mg/L) to BC Approved Guideline for the protection of drinking water (20 mg/L) in 2007.

(2) Following guidelines were removed from the BCAWQG according to Ministry of Environment in circa 2010 due to misinterpretation of summary guideline table

Specific Conductance	-Removed from the BCAWQG DW
Hardness	-Removed from the BCAWQG DW
Total Dissolved Solids	-Removed from the BCAWQG DW
Antimony, Barium, Cadmium, Chromium, Iron, Magnesium, Manganese, Sodium, and Uranium	-Removed from the BCAWQG DW

(3) Pre-2011 data were compared to the applicable guidelines at the time of sampling and therefore exceedences highlighted may not exceed the current applicable guidelines.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-1 19-Jul-94	HBT94-1 26-Oct-94	HBT94-1 2-Mar-95	HBT94-1 22-Jun-95	HBT94-1 20-Jul-95	HBT94-1 16-Jan-96	HBT94-1 23-Apr-96	HBT94-1 25-Jun-96	HBT94-1 5-Nov-96	HBT94-1 9-Jan-97	HBT94-1 10-Feb-97	HBT94-1 6-Mar-97	HBT94-1 7-May-97	HBT94-1 5-Jun-97	HBT94-1 31-Jul-97	HBT94-1 2-Oct-97	HBT94-1 8-Dec-97	HBT94-1 12-Jan-98	HBT94-1 3-Feb-98	HBT94-1 5-Mar-98	HBT94-1 13-Apr-98	HBT94-1 20-May-98
Physical Tests																										
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	**12.1 abc**	**12.8 abc**	**13.2 abc**	**12.3 abc**	**12.54 abc**	**12.1 abc**	**11.8 abc**	**11.6 abc**	**11.9 abc**	**11.88 abc**	**12.1 abc**	**11.82 abc**	**11.6 abc**	**11.4 abc**	**11.85 abc**	**11.8 abc**	**11.6 abc**	**11.2 abc**	**10.9 abc**	**11.4 abc**	**11.3 abc**	**11.7 abc**
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	**1980 b**	**9570 b**	**6750 b**	**6880 b**	**5700 b**	**4260 b**	**3670 b**	**3160 b**	**1800 b**	**1390 b**	**2190 b**	**1770 b**	**1665 b**	**1860 b**	**1970 b**	**1550 b**	**1290 b**	**1210 b**	635	**1350 b**	**1660 b**	**1650 b**
Temperature (Field)	deg C	19	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	81.4	**680 b**	412	-	-	290	204	-	-	-	160	-	-	-	-	-	-	-	84	-	-	-
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	481	**2350 bc**	**1390 bc**	**1870 bc**	**2850 bc**	**1130 bc**	**852 bc**	**722 bc**	437	**695 bc**	**711 bc**	**883 bc**	**834 bc**	480	**981 bc**	**522 bc**	397	375	298	411	**1030 bc**	485
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																										
Ammonia (as N)	mg/L	*	no guideline	no guideline	0.017	**1.19 a**	**0.979 a**	-	-	**0.82 a**	**0.9 a**	-	-	-	**1.03 a**	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.039	-	-	-
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	-	-
Chloride (Lab)	mg/L	600	250	250	6	5	39.5	4.7	-	14.7	17.8	24.3	28.5	-	31.6	-	-	32.3	-	35.7	-	-	28.8	-	32.3	-
Fluoride: Dissolved	mg/L	*	1.5	1.5	-	-	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Lab)	mg/L	100	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	373	2400	603	1680	-	922	831	669	362	-	535	-	-	470	-	410	-	-	164	-	342	-
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	<1.0	-	-	<1.0	<1.0	-	-	-	<1	-	-	-	-	-	-	-	<0.5	-	-	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																										
Aluminum: Dissolved	mg/L	*	0.2	0.1	**0.22 abc**	**1.18 abc**	**1.72 abc**	-	-	**6.7 abc**	**7.3 abc**	-	-	-	**8.26 abc**	-	-	-	-	-	-	-	**6.5 abc**	-	-	-
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	<0.20	<0.20	<0.20	-	-	<0.20	<0.20	-	-	-	-	-	-	-	-	-	-	-	<0.001	-	-	-
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	0.0001	0.0001	0.0001	-	-	0.0001	0.0001	-	-	-	0.0002	-	-	-	-	-	-	-	<0.001	-	-	-
Barium: Dissolved	mg/L	5	no guideline	1	0.483	**4.77 bc**	**3.27 bc**	-	-	**1.02 bc**	0.59	-	-	-	0.19	-	-	-	-	-	-	-	0.043	-	-	-
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	<0.005	<0.005	<0.005	-	-	<0.005	<0.005	-	-	-	<0.005	-	-	-	-	-	-	-	<0.001	-	-	-
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.10	<0.10	<0.10	-	-	<0.10	<0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Dissolved	mg/L	1.2	5	5	<0.10	<0.10	0.16	-	-	0.16	0.2	-	-	-	0.4	-	-	-	-	-	-	-	0.45	-	-	-
Cadmium: Dissolved	mg/L	*	no guideline	0.005	<0.0002	<0.0002	<0.0002	-	-	<0.0002	<0.0002	-	-	-	<0.0002	-	-	-	-	-	-	-	<0.0002	-	-	-
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	92.6	272	165	211	-	116	81.6	81.2	75.7	-	64.2	-	-	-	-	-	-	-	34.8	-	-	-
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	<0.015	<0.015	<0.015	-	-	<0.015	<0.01	-	-	-	<0.001	-	-	-	-	-	-	-	<0.001	-	-	-
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	<0.015	<0.015	<0.015	-	-	<0.015	<0.01	-	-	-	<0.02	-	-	-	-	-	-	-	<0.001	-	-	-
Copper: Dissolved	mg/L	*	0.5	1	**0.014 a**	<0.010	**0.068 a**	-	-	0.016	0.02	-	-	-	0.011	-	-	-	-	-	-	-	0.006	-	-	-
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	<0.030	<0.030	0.036	-	-	0.033	0.05	-	-	-	0.04	-	-	-	-	-	-	-	<0.05	-	-	-
Lead: Dissolved	mg/L	*	0.05	0.01	<0.001	0.004	0.005	-	-	0.002	0.002	-	-	-	<0.001	-	-	-	-	-	-	-	<0.001	-	-	-
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	0.049	0.413	0.424	-	-	0.295	0.23	-	-	-	0.15	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.010	0.017	<0.050	<0.050	-	<0.050	<0.050	<0.050	0.37	-	<0.05	-	-	-	-	-	-	-	<0.05	-	-	-
Manganese: Dissolved	mg/L	*	no guideline	0.05	<0.005	<0.005	<0.005	-	-	<0.005	<0.005	-	-	-	<0.005	-	-	-	-	-	-	-	<0.001	-	-	-
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	<0.00005	-	-	-	-	-	-	-	<0.00005	-	-	-	-	-	-	-	<0.00005	-	-	-
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	<0.030	<0.030	<0.030	-	-	0.032	0.06	-	-	-	0.2	-	-	-	-	-	-	-	0.23	-	-	-
Nickel: Dissolved	mg/L	*	no guideline	no guideline	<0.020	<0.020	<0.020	-	-	<0.020	<0.020	-	-	-	<0.02	-	-	-	-	-	-	-	<0.001	-	-	-
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	0.65	<0.30	1.76	-	-	<0.30	<0.30	-	-	-	-	-	-	-	-	-	-	-	0.02	-	-	-
Potassium: Dissolved	mg/L	373	no guideline	no guideline	22.9	61	62.7	46	-	29.3	25	22	18	-	-	-	-	-	-	-	-	-	10.7	-	-	-
Selenium: Dissolved	mg/L	0.002	0.01	0.01	<0.0005	<0.0005	<0.0005	-	-	0.0005	0.0012	-	-	-	**0.0037 a**	-	-	-	-	-	-	-	**0.006 a**	-	-	-
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	4.87	0.639	1.1	-	-	1.19	1.53	-	-	-	-	-	-	-	-	-	-	-	5.53	-	-	-
Silver: Dissolved	mg/L	-	no guideline	no guideline	<0.015	<0.015	<0.015	-	-	<0.015	<0.01	-	-	-	<0.0001	-	-	-	-	-	-	-	<0.0001	-	-	-
Sodium: Dissolved	mg/L	no guideline	no guideline	200	163	**557 bc**	**500 bc**	**426 bc**	-	**300 bc**	**247 bc**	**224 bc**	158	-	153	-	-	-	-	-	-	-	85	-	-	-
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	3.82	30.6	22.9	-	-	11.2	8	-	-	-	-	-	-	-	-	-	-	-	2.24	-	-	-
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	<0.10	<0.10	<0.10	-	-	<0.10	<0.10	-	-	-	-	-	-	-	-	-	-	-	<0.0001	-	-	-
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.30	<0.30	<0.30	-	-	<0.30	<0.03	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-
Titanium: Dissolved	mg/L	2	no guideline	no guideline	<0.010	<0.010	<0.010	-	-	<0.010	<0.010	-	-	-	-	-	-	-	-	-	-	-	<0.001	-	-	-
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	-	-	-
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	<0.030	<0.030	<0.030	-	-	<0.030	<0.030	-	-	-	<0.03	-	-	-	-	-	-	-	**0.01 a**	-	-	-
Zinc: Dissolved	mg/L	*	5	5	<0.005	0.14	0.086	-	-	0.078	0.022	-	-	-	<0.005	-	-	-	-	-	-	-	<0.005	-	-	-
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-1 19-Jul-94	HBT94-1 26-Oct-94	HBT94-1 2-Mar-95	HBT94-1 22-Jun-95	HBT94-1 20-Jul-95	HBT94-1 16-Jan-96	HBT94-1 23-Apr-96	HBT94-1 25-Jun-96	HBT94-1 5-Nov-96	HBT94-1 9-Jan-97	HBT94-1 10-Feb-97	HBT94-1 6-Mar-97	HBT94-1 7-May-97	HBT94-1 5-Jun-97	HBT94-1 31-Jul-97	HBT94-1 2-Oct-97	HBT94-1 8-Dec-97	HBT94-1 12-Jan-98	HBT94-1 3-Feb-98	HBT94-1 5-Mar-98	HBT94-1 13-Apr-98	HBT94-1 20-May-98
Total Metals																										
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	59.5	-	65.1	-	-	-	-	83.1	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	0.06	-	0.006	-	-	-	-	0.43	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	18.8	-	13.4	-	-	-	-	11.6	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-	-	-	-	-	-	-	134	-	109	-	-	-	-	96.9	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																										
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	132	94	99	-	-	60	50	-	-	-	45	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	24.8	7.43	20	-	-	5.5	6.4	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	30.8	7.5	23.8	-	-	5.6	9.4	-	-	-	4.2	-	-	-	-	-	-	-	-	-	-	-
Bacteria																										
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	0	0	<1	<2	-	<1	<2	<2	<1	-	<2	-	-	<2	-	<2	-	-	<1	-	<2	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	0	0	<1	<2	-	<1	<2	<2	<1	-	<2	-	-	<2	-	<2	-	-	<1	-	<2	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																										
Hardness: Total (as $CaCO_3$) (Fie	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	-	2.1	1.1	-	2.1	3.3	4.7	11	-	9	-	-	13	-	18.3	-	-	17.2	-	22.2	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

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BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

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a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

* - See notes at beginning of Appendix F.

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-1 25-Jun-98	HBT94-1 21-Jul-98	HBT94-1 14-Sep-98	HBT94-1 26-Oct-98	HBT94-1 2-Dec-98	HBT94-1 5-Jan-99	HBT94-1 5-Feb-99	HBT94-1 14-Apr-99	HBT94-1 29-Jul-99	HBT94-1 25-Nov-99	HBT94-1 1-Mar-00	HBT94-1 19-Apr-00	HBT94-1 1-Aug-00	HBT94-1 25-Oct-00	HBT94-1 6-Feb-01	HBT94-1 10-May-01	HBT94-1 26-Jul-01	HBT94-1 31-Oct-01	HBT94-1 29-Jan-02	HBT94-1 8-May-02	HBT94-1 22-Aug-02	HBT94-1 14-Nov-02
Physical Tests																	Dry	Dry		Dry	Dry					
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	-	**10.63 abc**	**11.64 abc**	**11.86 abc**	6.69	7.23	7.35	**10.2 abc**	-	-	**9.5 abc**	-	-	7.1	-	-	**11.56 abc**	7.85	7.03	6.63	7.95
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	**11.5 abc**	**11.4 abc**	-	**11.2 abc**	-	-	**10 abc**	**11.3 abc**	**11.2 abc**	**11.1 abc**	**9.98 abc**	**11.3 abc**	-	-	**10.9 abc**	-	-	-	7.8	7.74	7.77	7.68
Specific Conductance (Field)	uS/cm	no guideline	no guideline	no guideline	-	-	670	**814 b**	**1740 b**	248	460	**860.1 b**	661	-	-	397	-	-	**780 b**	-	-	**993 b**	303	279	275	278
Specific Conductance (Lab)	uS/cm	no guideline	no guideline	no guideline	**1330 b**	**1010 b**	-	**783 b**	-	-	359	**869 b**	625	661	318	**713 b**	-	-	615	-	-	-	275	387	296	269
Temperature (Field)	deg C	19	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.29	-	-	9.2	7.4	12.1	**15.8 bc**	11.2
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	132	-	-	-	24	-	-	-	-	-	-	-	98	-	-	-
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	437	360	-	347	-	-	210	344	262	305	206	337	-	-	321	-	-	-	149	218	173	149
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																										
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	0.9	-	-	-	**1.6 a**	-	-	-	3.7	-	-	-	5.6	-	-	-
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Lab)	mg/L	600	250	250	-	33.1	-	34.7	-	-	26	33.8	35	34.8	31.1	38.6	-	-	26.7	-	-	-	6.8	16.4	10.4	7.6
Fluoride: Dissolved	mg/L	*	1.5	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Lab)	mg/L	100	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	214	-	188	-	-	102	184	175	150	64.9	165	-	-	98.4	-	-	-	133	192	141	128
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	12.5	-	-	-	10.8	-	-	-	<0.5	-	-	-	163	-	-	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	<0.5	-	-	-
Dissolved Metals																										
Aluminum: Dissolved	mg/L	*	0.2	0.1	-	-	-	-	-	-	**5.81 abc**	-	-	-	**2.45 abc**	-	-	-	**3.31 abc**	-	-	-	-	-	-	-
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-	-	-	<0.001	-	-	-	-	-	-	-
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-	-	-	<0.001	-	-	-	-	-	-	-
Barium: Dissolved	mg/L	5	no guideline	1	-	-	-	-	-	-	0.035	-	-	-	0.009	-	-	-	0.01	-	-	-	-	-	-	-
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-	-	-	<0.001	-	-	-	-	-	-	-
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Dissolved	mg/L	1.2	5	5	-	-	-	-	-	-	0.6	-	-	-	0.48	-	-	-	0.61	-	-	-	-	-	-	-
Cadmium: Dissolved	mg/L	*	no guideline	0.005	-	-	-	-	-	-	<0.0002	-	-	-	**0.004 a**	-	-	-	**0.0003 a**	-	-	-	-	-	-	-
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	54.5	41.1	32	-	6.23	1.4	-	-	25.7	-	-	-	-	-	-	-
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-	-	-	<0.001	-	-	-	-	-	-	-
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-	-	-	<0.001	-	-	-	-	-	-	-
Copper: Dissolved	mg/L	*	0.5	1	-	-	-	-	-	-	0.003	-	-	-	0.003	-	-	-	0.001	-	-	-	-	-	-	-
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-	<0.05	-	-	-	-	-	-	-	-
Lead: Dissolved	mg/L	*	0.05	0.01	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-	-	-	<0.001	-	-	-	-	-	-	-
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<0.05	0.31	0.14	-	0.85	0.2	-	-	0.1	-	-	-	-	-	-	-
Manganese: Dissolved	mg/L	*	no guideline	0.05	-	-	-	-	-	-	<0.001	-	-	-	0.002	-	-	0.004	-	-	-	-	-	-	-	-
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	<0.05	-	-	-	<0.02	-	-	-	<0.02	-	-	-	-	-	-	<0.00002
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	-	-	-	-	-	-	0.25	-	-	-	0.14	-	-	-	0.11	-	-	-	-	-	-	-
Nickel: Dissolved	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	0.001	-	-	-	0.001	-	-	-	0.001	-	-	-	-	-	-	-
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<0.01	-	-	-	0.01	-	-	-	0.03	-	-	-	-	-	-	-
Potassium: Dissolved	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	8	9.1	9.02	-	5.83	6.3	-	-	5.9	-	-	-	-	-	-	-
Selenium: Dissolved	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	<0.002	-	-	-	<0.002	-	-	-	<0.002	-	-	-	-	-	-	-
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	4.76	-	-	-	3.08	-	-	-	5.65	-	-	-	-	-	-	-
Silver: Dissolved	mg/L		no guideline	no guideline	-	-	-	-	-	-	<0.0001	-	-	-	<0.0001	-	-	-	<0.0001	-	-	-	-	-	-	-
Sodium: Dissolved	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	62.2	67	74.5	-	53.7	61.6	-	-	59.9	-	-	-	-	-	-	-
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	2.18	-	-	-	0.64	-	-	-	0.82	-	-	-	-	-	-	-
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-	-	-	<0.001	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	<0.0001	-	-	-	<0.0001	-	-	-	<0.0001	-	-	-	-	-	-	-
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<0.0005	-	-	-	<0.0005	-	-	-	<0.0005	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-	-	-	<0.001	-	-	-	-	-	-	-
Titanium: Dissolved	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-	-	-	<0.001	-	-	-	-	-	-	-
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	<0.0005	-	-	-	<0.0005	-	-	-	<0.0005	-	-	-	-	-	-	-
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	**0.015 a**	-	-	-	**0.011 a**	-	-	-	**0.033 a**	-	-	-	-	-	-	-
Zinc: Dissolved	mg/L	*	5	-	-	-	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	-	-	-
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<0.001	-	-	-	<0.01	-	-	-	<0.01	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-1	HBT94-1	HBT94-1	HBT94-1	HBT94-1	HBT94-1	HBT94-1	HBT94-1	HBT94-1	HBT94-1	HBT94-1	HBT94-1	HBT94-1	HBT94-1	HBT94-1	HBT94-1	HBT94-1	HBT94-1	HBT94-1	HBT94-1	HBT94-1
					25-Jun-98	21-Jul-98	14-Sep-98	26-Oct-98	2-Dec-98	5-Jan-99	5-Feb-99	14-Apr-99	29-Jul-99	25-Nov-99	1-Mar-00	19-Apr-00	1-Aug-00	25-Oct-00	6-Feb-01	10-May-01	26-Jul-01	31-Oct-01	29-Jan-02	8-May-02	22-Aug-02	14-Nov-02
Total Metals																	Dry	Dry		Dry	Dry					
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	57.3	-	26	-	-	-	-	-	2.03	-	14.1	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	0.21	-	-	-	-	-	0.35	-	0.72	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	0.58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	**11 b**	-	-	-	-	-	**8.94 b**	-	**72.2 b**	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	10.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L		no guideline	no guideline	-	-	-	**86.6 a**	-	-	-	-	-	**69.6 a**	-	**66.3 a**	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	89.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																										
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	3.8	-	-	-	6	-	-	-	4.5	-	-	-	<1	2.1	-	1.3
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	3.9	-	-	-	5.2	-	-	-	5.1	-	-	3.1	-	2.7	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria																										
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	-	-	-	-	-	-	<2	<2	<2	<2	<2	<2	-	-	<2	-	-	<1	<1	<1	-	<1
Coliforms: Total	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	<2	<2	<2	<2	**2 bc**	<2	-	-	<2	-	-	<1	<1	<1	-	**24 bc**
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	-	<1
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																										
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L		1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	31.2	-	33.2	-	-	23.8	29.5	32.2	54.5	50.3	55.4	-	-	**104 a**	-	-	-	6.7	8.1	8	6.9
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.
BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.
CDWG - Canadian Drinking Water Quality Guidelines.
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-1 17-Mar-03	HBT94-1 16-Jun-03	HBT94-1 24-Sep-03	HBT94-1 18-Dec-03	HBT94-1 15-Mar-04	HBT94-1 28-Sep-04	DupHBT94-1 28-Sep-04	HBT94-1 4-May-05	HBT94-1 29-Sep-05	HBT94-1 20-Apr-06	HBT94-1 19-Oct-06	HBT94-1 19-Apr-07	HBT94-1 26-Oct-07	HBT94-1 8-Apr-08	HBT94-1 23-Oct-08	HBT94-1 27-Aug-09	HBT94-1 9-Dec-09	HBT94-1 29-Apr-10	HBT94-1 2-Nov-10	HBT94-1 10-Mar-11	HBT94-1 11-May-11	HBT94-1 16-Aug-11	HBT94-1 29-Nov-11
Physical Tests																											
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.9	7.55	6.96	**6.33 abc**	7.9	7.3	7.5	7.54	6.955	7.462	7.6	6.58	7.48	6.95	7.09	7.65	**6.09 abc**	7.25	7.77	7.09	6.99	6.93	6.75
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	-	-	-	-	-	-	-	-	7.7	7.6	8.21	7.87	8.11	8.18	7.98	8.07	8.2	8.11	7.64	7.68	7.62	7.38
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	340	267	280	300	295	414	420	369	315	354	258	296	365	369	381	392	253	319	614	520	553	810	511
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	346	332	342	486	451	485	460	501	440	576	592	413	813	546
Temperature (Field)	deg C	19	15	15	8	**18.9 bc**	12.1	10.2	11.2	11.9	-	11.6	11.9	11.1	11.89	11.41	10.82	10.57	11.71	12.33	10.99	11.83	12.9	11.49	11.78	12.22	10.77
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	7.1	10.53	6.39	8.27	**2.89 a**	9.6	8	**1.04 a**	-	**0.0 a**	**0.2 a**	**0.86 a**	**2.79 a**	6.53	29.99	7.18	5.69	15.08	**0.96 a**	7.99	7.83	5.36	9.48
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	160	160	183	244	210	253	219	236	190	202	278	145	254	191
Dissolved Soliids: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	965	119	-80.5	-28.9	129.4	185.7	-27.7	-364.5	75.4	151.3	198.1
Anions and Nutrients																											
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	0.17	<0.05	0.192	0.198	0.213	0.19	0.10	0.12	0.43	0.23	0.23	0.48	0.24	0.24
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	-	-	-	-	-	0.06	-	-	<0.01	<0.01	0.0016	<0.0010	0.0011	<0.0010	<0.002	0.002	0.057	0.006	0.011	0.013	0.092	0.010
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	-	-	-	-	-	0.2	-	-	0.24	0.11	0.0971	0.0061	0.0053	<0.0050	0.02	<0.01	0.03	<0.02	0.05	0.42	**21 bc**	0.105
Chloride (Lab)	mg/L	600	250	250	-	-	-	-	-	-	15.9	-	-	11	10.1	10.5	18.5	13.8	19	20.6	20.1	19	21	17	14	37	19
Fluoride: Dissolved	mg/L	-	1.5	1.5	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.020	<0.020	<0.020	<0.020	<0.05	<0.05	0.02	0.02	0.01	0.02	0.02	0.037
Sulphate (Lab)	mg/L	100	500	500	-	-	-	-	-	-	4.7	-	-	4.9	4.8	4.65	3.75	3.78	4.1	4.99	6.09	4.3	5.8	3.4	4.4	15	4.29
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	200	-	-	-	-	179	240	228	247	220	253	200	270	290	200	220	255
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																											
Aluminum: Dissolved	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	0.057	0.011	0.0404	0.0403	0.0334	0.0302	0.012	0.006	0.005	0.007	0.009	0.007	0.003	0.0047
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002	<0.00010	<0.00050	<0.00050	<0.00050	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	0.0006	0.0005	0.00045	0.00058	0.00065	0.00067	0.0006	0.0007	0.0003	0.0006	0.0007	0.0003	0.0003	0.0003
Barium: Dissolved	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	0.006	0.007	0.0053	<0.020	<0.020	<0.020	0.0078	0.0064	0.009	0.009	0.01	0.01	0.016	0.0168
Berrylium: Dissolved	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.00050	<0.0010	<0.0010	<0.0010	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.00050	-	<0.20	-	<0.0002	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010
Boron: Dissolved	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	0.116	0.11	0.095	<0.10	0.22	0.19	0.22	0.15	0.15	0.41	0.52	0.26	0.35	0.495
Cadmium: Dissolved	mg/L	-	no guideline	0.005	-	-	-	-	-	-	-	-	-	**0.00013 a**	**0.00021 a**	**0.000095 a**	0.000066	**0.000081 a**	0.000071	**0.00011 a**	**0.00019 a**	**0.00011 a**	**0.0001 a**	**0.00017 a**	**0.00045 a**	**0.00018 a**	**0.000203 a**
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	52.2	52.9	-	82.6	70.4	85.2	74.2	81.8	65.5	66.2	94.1	49.8	85.2	64
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	0.0008	<0.0005	<0.00050	<0.0010	<0.0010	<0.0010	0.0002	<0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	0.0001	<0.0001	<0.00010	<0.00030	<0.00030	<0.00030	0.0002	0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050
Copper: Dissolved	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	<0.001	<0.001	0.00105	0.0026	0.0021	0.0026	0.0034	0.0031	0.0021	0.0043	0.0044	0.0043	0.0053	0.00583
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	<0.01	-	-	<0.01	0.01	-	<0.030	<0.030	0.043	<0.01	<0.01	0.015	0.196	0.05	0.038	0.019	0.0687
Lead: Dissolved	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	0.0001	0.0001	<0.000050	<0.00050	<0.00050	<0.00050	<0.0002	<0.00005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	0.002	0.001	<0.0050	<0.0050	<0.0050	<0.0050	0.0009	0.0007	<0.005	<0.005	-	-	<0.005	<0.0050
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	6.1	6.2	-	9.22	8.36	9.91	8.15	7.73	6.57	8.95	10.6	5.15	10.1	7.5
Manganese: Dissolved	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	**0.587 bc**	**0.751 bc**	**0.623 bc**	**0.166 bc**	**0.588 bc**	**1.01 bc**	**0.859 bc**	**1.30 bc**	**0.816 bc**	**1.51 bc**	**0.98 bc**	**1.96 bc**	**1.94 c**	**0.857 c**	**0.313 c**	**0.409 c**
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	<0.000020	<0.000020	<0.000020	<0.000020	<0.00002	<0.02	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.000050
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	0.002	<0.001	0.000703	<0.0010	<0.0010	<0.0010	0.0007	0.0007	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010
Nickel: Dissolved	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.00050	<0.0010	<0.0010	0.001	0.0012	<0.0002	<0.001	0.002	0.002	0.001	0.002	0.0029
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	<0.30	0.0176	<0.30	-	<0.03	<0.015	-	-	0.01	<0.01	-	-
Potassium: Dissolved	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-	-	1.9	1.9	-	<2.0	2.2	2	2.21	1.56	4.95	2.07	3.21	3.27	10.3	12.3
Selenium: Dissolved	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	0.0002	<0.0002	<0.0010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.00010
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	6.43	6.22	6.23	-	6.84	-	7.72	5.99	7.9	6.4	8.9	6.9	7	6.2
Silver: Dissolved	mg/L	-	no guideline	no guideline	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.000010	<0.000020	<0.000020	<0.000020	<0.00005	<0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020
Sodium: Dissolved	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-	-	-	11	10.6	-	12.3	15.3	17.3	16.9	18	15	16.8	38.7	27.9	47.5	33.7
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	0.119	0.136	0.109	-	0.147	-	0.161	0.179	0.143	0.17	0.188	0.123	0.289	0.274
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	1.4	1.5	1.53	1.65	1.54	1.54	<2	2	<3	<3	<3	<3	5	<3.0
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	<0.00005	<0.00005	<0.00010	<0.00020	<0.00020	<0.00020	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.00005	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.00010	<0.00050	<0.00050	<0.00050	0.0003	<0.0001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050
Titanium: Dissolved	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	-	<0.010	<0.010	<0.010	0.0004	<0.0002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	0.000114	<0.00020	<0.00020	<0.00020	0.0001	0.00011	<0.0001	0.0001	0.0001	<0.0001	< 0.0001	<0.00010
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	**0.0081 a**	0.0034	0.0059	0.0049	0.0054	0.005	0.0041	0.0032	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050
Zinc: Dissolved	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	0.002	0.002	<0.0010	<0.0050	<0.0050	<0.0050	<0.001	0.001	<0.005	<0.005	<0.005	0.006	<0.005	<0.0050
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.5	<0.00050

Notes:

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BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-1 17-Mar-03	HBT94-1 16-Jun-03	HBT94-1 24-Sep-03	HBT94-1 18-Dec-03	HBT94-1 15-Mar-04	HBT94-1 28-Sep-04	DupHBT94-1 28-Sep-04	HBT94-1 4-May-05	HBT94-1 29-Sep-05	HBT94-1 20-Apr-06	HBT94-1 19-Oct-06	HBT94-1 19-Apr-07	HBT94-1 26-Oct-07	HBT94-1 8-Apr-08	HBT94-1 10/23/2008	HBT94-1 27-Aug-09	HBT94-1 9-Dec-09	HBT94-1 29-Apr-10	HBT94-1 2-Nov-10	HBT94-1 10-Mar-11	HBT94-1 11-May-11	HBT94-1 16-Aug-11	HBT94-1 29-Nov-11
Total Metals																											
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	**0.8 abc**	**0.6 abc**	**0.8 abc**	**0.7 abc**	-	-	**1.13 abc**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																											
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria																											
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																											
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	135	170	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	125	-	125	150	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	<0.05	0.05	<0.05	<0.05	<0.05	<0.08	-	<0.08	<0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	<0.1	0.1	0.1	<0.1	<0.1	<0.2	-	0.52	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	<29	40	12	<30	28	11.62	-	13.94	17.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	-	-	-	-	10.14	-	<8	<8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	<10	-	-	11.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	<0.1	0.3	<0.1	<0.1	<0.1	0.2	-	<0.2	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	<0.1	**1.38 bac**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	**0.3 bc**	**2.87 abc**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-1 22-Feb-12	HBT94-1 25-May-12	HBT94-1 16-Aug-12	HBT94-1 3-Dec-12
Physical Tests								
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.0	7.1	7.15	7.57
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.61	7.88	8.21	8.09
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	431	499	483	498
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	511	451	457	459
Temperature (Field)	deg C	19	15	15	10.5	**15.1 bc**	12.57	9.98
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	10.0	16.3	**4.08 a**	8.98
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	179	167	178	195
Dissolved Solids: Total	mg/L	no guideline	no guideline	500	300	320	314	322
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	99.0	147	118.8	37.5
Anions and Nutrients								
Ammonia (as N)	mg/L	*	no guideline	no guideline	0.31	0.19	0.22	0.082
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	0.022	0.0210	0.0159	0.006
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	0.29	0.068	0.353	0.282
Chloride (Lab)	mg/L	600	250	250	20	17	22	19
Fluoride: Dissolved	mg/L	-	1.5	1.5	0.031	0.021	0.018	0.022
Sulphate (Lab)	mg/L	100	500	500	4.43	6.00	8.22	7.35
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	233	209	200	201
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	284	255	244	246
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	<0.50	<0.50	<0.50	<0.50
Hydroxide	mg/L	no guideline	no guideline	no guideline	<0.50	<0.50	<0.50	<0.50
Dissolved Metals								
Aluminum: Dissolved	mg/L	*	0.2	0.1	0.0047	0.00472	0.00466	0.00231
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	0.00009	0.000172	0.000121	0.000138
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	0.00021	0.000404	0.000378	0.00015
Barium: Dissolved	mg/L	5	no guideline	1	0.0113	0.00509	0.00656	0.00472
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	0.00002	0.00002	<0.000010	<0.000010
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.000005	<0.000005	<0.0000050	<0.0000050
Boron: Dissolved	mg/L	1.2	5	5	0.48	0.291	0.295	0.313
Cadmium: Dissolved	mg/L	*	no guideline	0.005	**0.00039 a**	**0.000419 a**	**0.000231 a**	**0.00021 a**
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	60.6	56.8	61	66.8
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	0.0001	<0.0001	<0.00010	<0.00010
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	0.000275	0.000165	0.000219	0.000172
Copper: Dissolved	mg/L	*	0.5	1	0.00424	0.00385	0.00367	0.00281
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	**0.337 c**	0.0036	0.0153	0.0238
Lead: Dissolved	mg/L	*	0.05	0.01	0.000035	0.0000105	0.000006	0.000014
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	0.0009	0.00114	0.00074	0.00104
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	6.63	6.01	6.36	6.77
Manganese: Dissolved	mg/L	*	no guideline	0.05	**0.294 c**	**0.483 c**	**0.528 c**	**0.0781 c**
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	< 0.00001	<0.000010	<0.000010	<0.000010
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	0.00062	0.000707	0.00106	0.000738
Nickel: Dissolved	mg/L	*	no guideline	no guideline	0.00181	0.00132	0.00137	0.00137
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	7.19	<0.0050	0.0439	0.0872
Potassium: Dissolved	mg/L	373	no guideline	no guideline	0.173	3.37	4.23	4.15
Selenium: Dissolved	mg/L	0.002	0.01	0.01	0.00006	0.000074	0.000057	0.000068
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	6.4	7.68	7.15	6.77
Silver: Dissolved	mg/L	-	no guideline	no guideline	<0.000005	<0.000005	<0.0000050	<0.0000050
Sodium: Dissolved	mg/L	no guideline	no guideline	200	28.6	28.8	28	26.1
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	0.205	0.162	0.171	0.184
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	<10	<15	<10	<3.0
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	<0.000002	<0.000002	0.000002	0.000002
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	0.0005	0.00022	<0.00020	0.0007
Titanium: Dissolved	mg/L	2	no guideline	no guideline	0.0006	<0.0005	<0.00050	<0.00050
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	0.000081	0.0000784	0.000081	0.000098
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	0.0006	0.0044	0.00305	0.00099
Zinc: Dissolved	mg/L	*	5	5	0.0026	0.0023	0.00154	0.00136
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.0001	<0.0001	<0.00010	<0.00010

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

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c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

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APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-1 22-Feb-12	HBT94-1 25-May-12	HBT94-1 16-Aug-12	HBT94-1 3-Dec-12
Total Metals								
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Organic Parameters								
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Bacteria								
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)								
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-
Chloride (Field)	mg/L	600	250	250	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-

Notes:

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APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-2 19-Jul-94	HBT94-2 26-Oct-94	HBT94-2 2-Mar-95	HBT94-2 22-Jun-95	HBT94-2 20-Jul-95	HBT94-2 16-Jan-96	HBT94-2 23-Apr-96	HBT94-2 5-Nov-96	HBT94-2 9-Jan-97	HBT94-2 10-Feb-97	HBT94-2 6-Mar-97	HBT94-2 7-May-97	HBT94-2 5-Jun-97	HBT94-2 31-Jul-97	HBT94-2 2-Oct-97	HBT94-2 8-Dec-97	HBT94-2 12-Jan-98	HBT94-2 3-Feb-98	HBT94-2 5-Mar-98	HBT94-2 13-Apr-98	HBT94-2 20-May-98	HBT94-2 25-Jun-98	HBT94-2 21-Jul-98	HBT94-2 14-Sep-98	HBT94-2 26-Oct-98	HBT94-2 2-Dec-98
Physical Tests																														
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.54	6.88	6.6
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.89	**11.3 abc**	**8.98 bc**	**11.44 abc**	**11.36 abc**	**11 abc**	**10 abc**	**9.41 abc**	**8.57 bc**	8.42	8.1	7.57	7.6	7.55	7.75	7.32	7.2	7.32	7.14	7.46	7.23	7.24	7.38	-	7.36	-
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**790 b**	**823 b**	**829 b**
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	147	674	372	111	448	520	342	346	331	370	379	403	550	530	532	530	535	536	530	587	**778 b**	**758 b**	**763 b**	-	**796 b**	-
Temperature (Field)	deg C	19	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	59.9	81.6	12.2	-	-	54.3	26	-	-	26.3	-	-	-	-	-	-	-	172	-	-	-	-	-	-	-	-
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	76	299	263	317	244	324	189	178	165	221	190	203	269	266	430	301	280	440	295	460	423	418	450	-	485	-
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																														
Ammonia (as N)	mg/L	*	no guideline	no guideline	0.282	**11.1 a**	**8.13 a**	-	-	**10 a**	**9.94 a**	-	-	**7.22 a**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.062	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	-	-	-	-	-	-	-	-
Chloride (Lab)	mg/L	600	250	250	2.4	37.9	4	-	-	39.6	35.9	33.9	-	33.7	-	-	24.5	-	25.3	-	-	25.8	-	26.6	-	-	46.7	-	43.9	-
Fluoride: Dissolved	mg/L	*	1.5	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Lab)	mg/L	100	500	500	-	-	24.3	-	-	28.3	33.9	36.6	-	34	-	-	19	-	17.2	-	-	16.9	-	16.9	-	-	5.3	-	4.9	-
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	61.3	173	104	-	-	144	94.4	87.4	-	72	-	-	220	-	234	-	-	228	-	221	-	-	370	-	362	-
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	29.7	-	-	<1.0	<1.0	-	-	70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																														
Aluminum: Dissolved	mg/L	*	0.2	0.1	<0.20	**3.35 abc**	**2 abc**	-	-	**2.97 abc**	**2.1 abc**	-	-	**0.194 a**	-	-	-	-	-	-	-	0.009	-	-	-	-	-	-	-	-
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	<0.20	<0.20	<0.20	-	-	<0.20	<0.20	-	-	-	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	0.0004	0.0005	0.0004	-	-	0.0006	0.0017	-	-	0.0014	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-
Barium: Dissolved	mg/L	5	no guideline	1	<0.010	0.15	0.059	-	-	0.099	0.05	-	-	0.01	-	-	-	-	-	-	-	0.049	-	-	-	-	-	-	-	-
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	<0.005	<0.005	<0.005	-	-	<0.005	<0.005	-	-	<0.005	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.10	<0.10	<0.10	-	-	<0.10	<0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Dissolved	mg/L	1.2	5	5	<0.10	0.65	0.72	-	-	0.85	1.1	-	-	1.1	-	-	-	-	-	-	-	0.87	-	-	-	-	-	-	-	-
Cadmium: Dissolved	mg/L	*	no guideline	0.005	<0.0002	<0.0002	<0.0002	-	-	**0.0004 a**	**0.0004 a**	-	-	**0.0051 bac**	-	-	-	-	-	-	-	**0.0037 a**	-	-	-	-	-	-	-	-
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	20.1	32.5	4.89	-	-	21.7	10	8.2	-	9.2	-	-	-	-	-	-	-	52.1	-	-	-	-	-	-	-	-
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	<0.015	**0.026 a**	<0.015	-	-	<0.015	<0.01	-	-	<0.001	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	<0.015	<0.015	<0.015	-	-	<0.015	<0.01	-	-	<0.02	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-
Copper: Dissolved	mg/L	*	1	1	<0.010	<0.010	<0.010	-	-	<0.010	<0.01	-	-	**0.008 a**	-	-	-	-	-	-	-	0.002	-	-	-	-	-	-	-	-
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	<0.030	<0.030	<0.030	-	-	<0.030	0.04	-	-	<0.03	-	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-
Lead: Dissolved	mg/L	*	0.05	0.01	<0.001	0.002	<0.001	-	-	<0.001	<0.001	-	-	<0.001	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	<0.015	0.019	0.018	-	-	0.017	0.01	-	-	<0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	2.34	0.073	<0.050	-	-	<0.050	0.23	0.81	-	0.81	-	-	-	-	-	-	-	8.56	-	-	-	-	-	-	-	-
Manganese: Dissolved	mg/L	*	no guideline	0.05	**0.245 bc**	<0.005	<0.005	-	-	<0.005	<0.005	-	-	<0.005	-	-	-	-	-	-	-	**1.2 bc**	-	-	-	-	-	-	-	-
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	<0.00005	-	-	-	-	-	-	-	<0.00005	-	-	-	-	-	-	-	-
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	<0.030	0.059	0.058	-	-	0.072	0.06	-	-	0.05	-	-	-	-	-	-	-	0.005	-	-	-	-	-	-	-	-
Nickel: Dissolved	mg/L	*	no guideline	no guideline	<0.020	<0.020	<0.020	-	-	<0.020	<0.020	-	-	<0.02	-	-	-	-	-	-	-	0.002	-	-	-	-	-	-	-	-
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	0.34	0.89	0.73	-	-	<0.30	<0.30	-	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-
Potassium: Dissolved	mg/L	373	no guideline	no guideline	2.36	11.2	12.8	-	-	12.3	11	11	-	-	-	-	-	-	-	-	-	9.87	-	-	-	-	-	-	-	-
Selenium: Dissolved	mg/L	0.002	0.01	0.01	<0.0005	<0.0005	<0.0005	-	-	<0.0005	0.0015	-	-	0.0011	-	-	-	-	-	-	-	<0.002	-	-	-	-	-	-	-	-
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	5.47	3.79	2.87	-	-	3.9	3.74	-	-	-	-	-	-	-	-	-	-	18.4	-	-	-	-	-	-	-	-
Silver: Dissolved	mg/L	*	no guideline	no guideline	<0.015	<0.015	<0.015	-	-	<0.015	<0.01	-	-	<0.0001	-	-	-	-	-	-	-	<0.0001	-	-	-	-	-	-	-	-
Sodium: Dissolved	mg/L	no guideline	no guideline	200	3.45	51.4	52.1	-	-	55.2	49	46	-	43	-	-	-	-	-	-	-	24.2	-	-	-	-	-	-	-	-
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	0.064	1.49	0.9	-	-	1.09	0.729	-	-	-	-	-	-	-	-	-	-	0.48	-	-	-	-	-	-	-	-
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	<0.10	<0.10	<0.10	-	-	<0.10	<0.10	-	-	-	-	-	-	-	-	-	-	<0.0001	-	-	-	-	-	-	-	-
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	-	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.30	<0.30	<0.30	-	-	<0.30	<0.03	-	-	-	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-
Titanium: Dissolved	mg/L	2	no guideline	no guideline	<0.010	<0.010	<0.010	-	-	<0.010	<0.010	-	-	-	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0007	-	-	-	-	-	-	-	-
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	<0.030	**0.031 a**	**0.031 a**	-	-	**0.048 a**	**0.05 a**	-	-	**0.05 a**	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-
Zinc: Dissolved	mg/L	*	5	5	0.006	0.024	0.009	-	-	0.014	0.009	-	-	<0.005	-	-	-	-	-	-	-	0.013	-	-	-	-	-	-	-	-
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

*- See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-2 19-Jul-94	HBT94-2 26-Oct-94	HBT94-2 2-Mar-95	HBT94-2 22-Jun-95	HBT94-2 20-Jul-95	HBT94-2 16-Jan-96	HBT94-2 23-Apr-96	HBT94-2 5-Nov-96	HBT94-2 9-Jan-97	HBT94-2 10-Feb-97	HBT94-2 6-Mar-97	HBT94-2 7-May-97	HBT94-2 5-Jun-97	HBT94-2 31-Jul-97	HBT94-2 2-Oct-97	HBT94-2 8-Dec-97	HBT94-2 12-Jan-98	HBT94-2 3-Feb-98	HBT94-2 5-Mar-98	HBT94-2 13-Apr-98	HBT94-2 20-May-98	HBT94-2 25-Jun-98	HBT94-2 21-Jul-98	HBT94-2 14-Sep-98	HBT94-2 26-Oct-98	HBT94-2 2-Dec-98
Total Metals																														
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	49.3	-	50	-	-	-	-	57.1	-	-	90.1	-	86.5	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	0.5	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	0.05	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	8.61	-	8.07	-	-	-	-	9.05	-	-	17	-	16.7	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	10.4	-	10.1	-	-	-	-	10.4	-	-	11.8	-	13.1	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-	-	-	-	-	-	27.4	-	25.9	-	-	-	-	26.2	-	-	29.6	-	29.6	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																														
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	96	149	43	-	-	59	46	-	-	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	8.35	17	8.3	-	-	6.7	6.9	-	-	6.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	8.3	17	8.4	-	-	7.6	7.3	-	-	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria																														
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	<1	<1	<1	-	-	<1	<2	<1	-	<2	-	-	<2	-	**350 b**	-	-	**13 b**	-	<2	-	-	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	**2 bc**	<1	<1	-	-	<1	<2	**18 bc**	-	**2200 bc**	-	-	**110 bc**	-	**84000 bc**	-	-	**540 bc**	-	**79 bc**	-	-	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																														
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-2 19-Jul-94	HBT94-2 26-Oct-94	HBT94-2 2-Mar-95	HBT94-2 22-Jun-95	HBT94-2 20-Jul-95	HBT94-2 16-Jan-96	HBT94-2 23-Apr-96	HBT94-2 5-Nov-96	HBT94-2 9-Jan-97	HBT94-2 10-Feb-97	HBT94-2 6-Mar-97	HBT94-2 7-May-97	HBT94-2 5-Jun-97	HBT94-2 31-Jul-97	HBT94-2 2-Oct-97	HBT94-2 8-Dec-97	HBT94-2 12-Jan-98	HBT94-2 3-Feb-98	HBT94-2 5-Mar-98	HBT94-2 13-Apr-98	HBT94-2 20-May-98	HBT94-2 25-Jun-98	HBT94-2 21-Jul-98	HBT94-2 14-Sep-98	HBT94-2 26-Oct-98	HBT94-2 2-Dec-98
Hydrocarbons																														
VHw6-10	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EHw10-19	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EHw19-32	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																														
Acenapthene	ug/L	6	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acridine	ug/L	0.05	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Pyrene	ug/L	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	ug/L	0.2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	ug/L	12	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Napthalene	ug/L	1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	ug/L	0.3	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	ug/L	0.02	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Halogenated Volatiles																														
Benzene	mg/L	0.4	0.005	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/L	0.2	0.0024	0.0024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/L	0.0005	0.024	0.024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes: Total	mg/L	0.03	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/L	0.072	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds																														
Bromodichloromethane	ug/L	no guideline	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	ug/L	13.3	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	ug/L	1.3	80	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	ug/L	1.8	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cis-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cis-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromoethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl-Tert-Butylether	ug/L	3400	20	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	ug/L	98.1	50	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrabromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	ug/L	111	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trans-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trans-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	ug/L	21	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	ug/L	no guideline	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	ug/L	no guideline	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	ug/L	0.7	200	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	ug/L	100	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	ug/L	150	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	ug/L	26	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	ug/L	11100	200	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-2 5-Jan-99	HBT94-2 5-Feb-99	HBT94-2 14-Apr-99	HBT94-2 29-Jul-99	HBT94-2 25-Nov-99	HBT94-2 1-Mar-00	HBT94-2 19-Apr-00	HBT94-2 2-Aug-00	HBT94-2 19-Sep-00	HBT94-2 25-Oct-00	HBT94-2 6-Feb-01	HBT94-2 10-May-01	HBT94-2 26-Jul-01	HBT94-2 31-Oct-01	HBT94-2 29-Jan-02	HBT94-2 8-May-02	HBT94-2 22-Aug-02	HBT94-2 14-Nov-02	HBT94-2 17-Mar-03	HBT94-2 16-Jun-03	HBT94-2 24-Sep-03	HBT94-2 18-Dec-03
Physical Tests																										
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	6.69	7.26	7.34	-	-	-	7	**6.4 abc**	-	**6.35 abc**	6.82	7.19	6.7	8.17	7.4	6.79	6.63	6.92	7.6	6.97	6.72	6.78
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	7.09	7.19	7.16	7.2	7.12	7.27	6.98	7.22	7.1	7.19	7.12	-	-	7.04	7.22	6.96	7.68	7.1	6.89	7.22	6.9
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	**821 b**	**767 b**	**711 b**	-	-	-	688	**807 b**	-	512	566	5.74	5.17	576	620	492	**750 b**	618	580	512	240	465
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	-	**768 b**	**713 b**	651	650	614	630	**781 b**	**800 b**	484	537	554	-	-	543	519	**856 b**	267	580	556	275	442
Temperature (Field)	deg C	19	15	-	-	-	-	-	-	-	-	-	-	-	7.1	14.8	**17.4 bc**	9.2	6.2	12.5	**15.8 bc**	12	7.6	**19.9 abc**	13.9	11.4
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.68	8.3	9.47	9.69
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	256	-	-	-	217	-	-	-	-	-	-	-	-	157	-	271	140	221	191	76	159
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	-	403	384	361	347	363	361	409	412	258	261	280	-	-	322	267	472	326	327	260	113	253
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																										
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	13.6	-	-	-	12.9	-	-	-	-	15.7	-	-	-	**18.7 a**	-	-	-	9.02	-	-	-
Nitrogen: Nitrite (as N) (Lab)	mg/L	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Lab)	mg/L	600	250	250	-	39.4	36.3	32.3	32.7	33.7	32.8	42.5	41	13.9	20.4	21.2	-	-	0.4	21.6	40	22.7	9.39	17.6	5.9	17.5
Fluoride: Dissolved	mg/L	*	1.5	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Lab)	mg/L	100	500	500	-	5.1	5.5	5.3	5.6	5	5.1	4.3	3.8	4.5	4.3	4.9	-	-	5.5	5.4	7	4.9	4.31	6.8	4.5	4.2
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	352	313	316	303	322	328	360	369	258	261	279	-	-	257	262	440	129	-	-	-	-
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	430	-	-	-	393	-	-	-	-	318	-	-	-	313	-	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-
Dissolved Metals																										
Aluminum: Dissolved	mg/L	*	0.2	0.1	-	0.011	-	-	-	0.006	-	-	-	-	0.053	<0.2	**1.69 abc**	**0.93 abc**	<0.05	<0.05	0.006	0.012	<0.005	<0.005	0.006	**1.88 abc**
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	-	<0.001	-	-	-	<0.001	-	-	-	-	<0.001	<0.2	<0.2	<0.2	<0.2	<0.2	<0.001	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	-	<0.001	-	-	-	0.001	-	-	-	-	0.003	<0.3	<0.03	<.003	<0.03	<0.03	0.002	0.001	0.0045	0.0039	0.0037	0.0046
Barium: Dissolved	mg/L	5	no guideline	1	-	0.061	-	-	-	0.06	-	-	-	-	0.026	0.037	0.06	0.056	0.044	0.039	0.058	0.036	0.04	0.031	0.012	0.039
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	-	<0.001	-	-	-	<0.001	-	-	-	-	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005
Boron: Dissolved	mg/L	1.2	5	5	-	0.53	-	-	-	0.54	-	-	-	-	0.22	0.18	0.22	0.23	0.14	0.19	0.8	0.24	0.335	0.306	0.168	0.116
Cadmium: Dissolved	mg/L	*	no guideline	0.005	-	**0.0007 a**	-	-	-	**0.0006 a**	-	-	-	-	<0.0002	<0.025	<0.025	<0.025	<0.025	<0.025	<0.0002	<0.0002	0.00006	**0.00007 a**	**0.00004 a**	**0.00009 a**
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	78.2	75	72.2	-	63.4	63.9	-	-	-	41.8	52.5	51	51.6	44.4	57	79.4	42.3	64.8	55.3	22.7	47.1
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	-	<0.001	-	-	-	<0.001	-	-	-	-	<0.001	<0.03	<0.03	<0.03	<0.03	**0.03 a**	<0.001	<0.001	**0.0026 a**	**0.0014 a**	<0.0005	**0.0015 a**
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	-	<0.001	-	-	-	<0.001	-	-	-	-	<0.001	<0.02	0.09	<0.02	<0.02	<0.02	0.001	<0.001	0.0006	0.0006	0.0002	0.001
Copper: Dissolved	mg/L	*	0.5	1	-	0.001	-	-	-	0.001	-	-	-	-	<0.001	<0.02	<0.02	<0.02	<0.02	<0.02	0.003	0.005	0.002	0.002	0.002	0.008
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	-	0.09	-	-	-	0.1	-	-	-	-	0.08	<0.02	**2.31 bac**	**1.87 bac**	<0.01	**0.55 bac**	<0.05	0.16	<0.01	0.01	0.02	**2.3 bac**
Lead: Dissolved	mg/L	*	0.05	0.01	-	<0.001	-	-	-	<0.001	-	-	-	-	<0.001	<0.08	<0.03	<0.03	<0.03	<0.03	<0.001	<0.001	<0.0001	<0.0001	<0.0001	0.0005
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	<0.001	<0.001	<0.001	<0.001	0.001
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	12.8	14.5	13.7	-	12.6	11.8	-	-	-	9.56	9.57	9.17	10.6	11.1	11.7	17.5	8.41	14.5	12.8	4.6	10
Manganese: Dissolved	mg/L	*	no guideline	0.05	-	**2.8 bc**	-	-	-	**5.04 abc**	-	-	-	-	**2.02 abc**	**2.12 abc**	**1.95 abc**	**2.42 abc**	**1.93 bc**	**2.56 abc**	**4.09 abc**	**1.62 bc**	**2.87 bc**	**2.07 bc**	**0.745 bc**	**1.68 bc**
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	<0.05	-	-	-	<0.02	-	-	-	-	<0.02	-	-	-	-	-	<0.00002	<0.00002	-	-	-	-
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	-	0.004	-	-	-	0.001	-	-	-	-	0.002	<0.04	<0.04	<0.04	<0.04	<0.04	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
Nickel: Dissolved	mg/L	*	no guideline	no guideline	-	0.003	-	-	-	0.003	-	-	-	-	0.001	<0.03	<0.03	<0.03	<0.03	<0.03	0.003	0.002	<0.0005	<0.0005	<0.0005	0.0018
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	0.01	-	-	-	0.01	-	-	-	-	0.04	<0.4	<0.4	<0.4	<0.4	<0.4	0.08	0.04	-	-	-	-
Potassium: Dissolved	mg/L	373	no guideline	no guideline	-	10.9	11.8	12.4	-	10.4	9.4	-	-	-	9.81	8.27	10.1	11.1	10.1	10.3	12.7	9.18	12	11.5	6.8	8.9
Selenium: Dissolved	mg/L	0.002	0.01	0.01	-	<0.002	-	-	-	<0.002	-	-	-	-	<0.002	-	-	-	-	-	<0.001	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	21.6	-	-	-	25.6	-	-	-	-	26.7	26.4	34.1	34.9	24.2	30.7	28.1	23.9	-	-	-	13.5
Silver: Dissolved	mg/L	*	no guideline	no guideline	-	<0.0001	-	-	-	<0.0001	-	-	-	-	<0.0001	<0.03	<0.03	<0.03	<0.03	**0.04 a**	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium: Dissolved	mg/L	no guideline	no guideline	200	-	23.1	29.6	30	-	30.5	27.8	-	-	-	22.7	22.5	22.4	21.3	15.8	20.7	25.8	27.7	25	26.5	15.5	19.2
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	0.49	-	-	-	0.41	-	-	-	-	0.2	0.24	0.24	0.29	0.47	0.31	0.41	0.22	0.279	0.228	0.102	0.22
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.97	2.28	1.3	1.24
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.001	-	-	-	<0.001	-	-	-	-	<0.001	-	0.22	-	-	-	<0.001	<0.001	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	<0.001	-	-	-	<0.0001	-	-	-	-	<0.0001	-	<0.01	-	-	-	<0.0001	<0.0001	<0.00005	<0.00005	<0.00005	<0.00005
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.0005	-	-	-	<0.0005	-	-	-	-	<0.0005	-	<0.005	-	-	-	<0.0005	<0.0005	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.001	-	-	-	<0.001	-	-	-	-	<0.001	<0.03	<0.03	<0.03	<0.03	<0.03	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium: Dissolved	mg/L	2	no guideline	no guideline	-	<0.001	-	-	-	<0.001	-	-	-	-	<0.001	<0.006	0.22	0.14	<0.006	<0.006	0.001	0.001	<0.0005	<0.0005	<0.0005	0.202
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	<0.0005	-	-	-	<0.0005	-	-	-	-	<0.0005	-	-	-	-	-	<0.0005	<0.0005	-	-	-	-
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	-	0.001	-	-	-	0.001	-	-	-	-	<0.001	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	**0.007 a**	0.0004	0.0007	0.0016	**0.0082 a**
Zinc: Dissolved	mg/L	*	5	5	-	0.006	-	-	-	0.007	-	-	-	-	<0.005	<0.02	<0.005	0.011	<0.005	0.017	0.01	<0.005	0.002	0.001	<0.001	0.005
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.001	-	-	-	<0.01	-	-	-	-	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

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c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-2	HBT94-2	HBT94-2	HBT94-2	HBT94-2	HBT94-2	HBT94-2	HBT94-2	HBT94-2	HBT94-2	HBT94-2	HBT94-2	HBT94-2	HBT94-2	HBT94-2	HBT94-2	HBT94-2	HBT94-2	HBT94-2	HBT94-2	HBT94-2
					5-Jan-99	5-Feb-99	14-Apr-99	29-Jul-99	25-Nov-99	1-Mar-00	19-Apr-00	2-Aug-00	19-Sep-00	25-Oct-00	6-Feb-01	10-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
Total Metals																									
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	66.8	-	66	86.5	82.6	43.6	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	12.8	-	12.4	17.9	18.4	9.91	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-	12	-	1.06	13.2	15.1	10.4	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-	28.7	-	28.3	32.5	31.8	19.3	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																									
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	<25	-	-	-	<25	-	-	-	-	<25	-	-	-	-	-	-	-	16	8	<5	<5
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	7.6	-	-	-	11	-	-	-	-	4.2	1.8	13	-	3.6	3.5	-	5.5	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	7.8	-	-	-	5.6	-	-	-	-	4.2	-	-	5.1	-	4.4	-	-	6.1	-	-	-
Bacteria																									
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	-	**2 b**	<2	<2	**2 b**	<2	<2	<2	<2	<2	<2	<1	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
Coliforms: Total	MPN/100 ml	no guideline	0	0	-	**130 bc**	**14 bc**	**64 bc**	**1600 bc**	**14 bc**	<2	**92000 bc**	**160 bc**	**13 bc**	**8 bc**	<1	<1	<1	<1	**2 bc**	-	<1	<10	<1	<1	**>3000 bc**
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																									
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	0.05	<0.05	<0.05
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	0.1	0.1	<0.1
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<29	42	8	<30
Sulphate (Field)	mg/L	100	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1 bac**	**1,5 bac**	0.2	**1.5 bac**
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**2 bac**	**2 bac**	**0.7 bac**	**1.5 bac**
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**>2 bc**	**1.7 bc**	**0.5 bc**	**1.2 bc**

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* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-2 5-Jan-99	HBT94-2 5-Feb-99	HBT94-2 14-Apr-99	HBT94-2 29-Jul-99	HBT94-2 25-Nov-99	HBT94-2 1-Mar-00	HBT94-2 19-Apr-00	HBT94-2 2-Aug-00	HBT94-2 19-Sep-00	HBT94-2 25-Oct-00	HBT94-2 6-Feb-01	HBT94-2 10-May-01	HBT94-2 26-Jul-01	HBT94-2 31-Oct-01	HBT94-2 29-Jan-02	HBT94-2 8-May-02	HBT94-2 22-Aug-02	HBT94-2 14-Nov-02	HBT94-2 17-Mar-03	HBT94-2 16-Jun-03	HBT94-2 24-Sep-03	HBT94-2 18-Dec-03
Hydrocarbons																										
VHw6-10	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EHw10-19	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EHw19-32	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																										
Acenapthene	ug/L	6	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acridine	ug/L	0.05	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Pyrene	ug/L	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	ug/L	0.2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	ug/L	12	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Napthalene	ug/L	1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	ug/L	0.3	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	ug/L	0.02	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Halogenated Volatiles																										
Benzene	mg/L	0.4	0.005	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/L	0.2	0.0024	0.0024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/L	0.0005	0.024	0.024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes: Total	mg/L	0.03	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/L	0.072	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds																										
Bromodichloromethane	ug/L	no guideline	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	ug/L	13.3	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	ug/L	1.3	80	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	ug/L	1.8	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cis-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cis-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromoethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl-Tert-Butylether	ug/L	3400	20	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	ug/L	98.1	50	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrabromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	ug/L	111	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trans-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trans-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	ug/L	21	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	ug/L	no guideline	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	ug/L	no guideline	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	ug/L	0.7	200	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	ug/L	100	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	ug/L	150	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	ug/L	26	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	ug/L	11100	200	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-2 15-Mar-04	DupHBT94-2 15-Mar-04	HBT94-2 28-Sep-04	HBT94-2 3-May-05	DupHBT94-2 3-May-05	HBT94-2 29-Sep-05	DupHBT94-2 29-Sep-05	HBT94-2 20-Apr-06	DupHBT94-2 20-Apr-06	HBT94-2 19-Oct-06	HBT94-2 27-Aug-09	HBT94-2 9-Dec-09	DUPHBT94-2 9-Dec-09	HBT94-2 29-Apr-10	DUPHBT94-2 29-Apr-10	HBT94-2 2-Nov-10	DupHBT94-2 2-Nov-10	HBT94-2 10-Mar-11	DupHBT94-2 10-Mar-11	HBT94-2 11-May-11	DupHBT94-2 11-May-11	HBT94-2 16-Aug-11	T94-6 DUP HBT9 16-Aug-11	HBT94-2 29-Nov-11	DupHBT94-2 29-Nov-11
Physical Tests																													
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	6.99	-	7.06	6.81	-	6.958	-	7.014	-	6.87	7.66	**6.17 abc**	-	7.9	-	7.38	-	7.28	-	7.26	-	7.45	-	7.3	-
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	6.9	6.9	7.1	6.9	7.1	7.5	7.5	7.3	7.2	6.9	8.06	8.15	8.18	8.2	8.1	8.15	8.19	7.72	7.69	7.76	7.82	7.75	7.78	7.73	7.74
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	563	-	303	615	-	340	-	303	-	663	502	239	-	329	-	433	-	383	-	322	-	428	-	374	-
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	623	625	310	607	608	341	346	288	290	**880 b**	548	475	475	440	448	420	422	430	430	331	331	445	444	424	416
Temperature (Field)	deg C	19	15	15	11.9	-	12.1	12.1	-	12.2	-	12	-	12.8	13.04	11.45	-	12.14	-	12.28	-	12.16	-	12.05	-	12.42	-	11.55	-
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	6.43	-	7.91	**0.53 a**	-	**0 a**	-	**0 a**	-	**0.06 a**	**0.45 a**	5.7	-	15.08	-	5.6	-	6.71	-	**3.24 a**	-	5.8	-	6.73	-
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	243.5	244.5	84	230	230	100	98	100	99	360	258	237	248	203	204	146	144	220	222	144	134	203	200	185	180
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	360	333	170	320	327	207	180	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-54.2	75.9	-	100.3	-	-70.5	-	-374.6	-	9.1	-	-37.9	-	-5.1	-
Anions and Nutrients																													
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	-	6.06	9.4	8.9	6.1	6.9	7.1	-	6.2	0.85	0.54	0.5	0.45	0.47	0.4	0.39	0.34	0.37	0.32	0.29	0.39	0.41	0.34	0.33
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	-	<0.03	<0.1	<0.1	<0.1	<0.1	<0.01	<0.01	<0.01	<0.002	0.004	0.004	0.026	0.018	0.017	0.014	<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	10	10	-	-	<0.01	<0.1	<0.1	<0.1	<0.1	<0.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.020	<0.020
Chloride (Lab)	mg/L	600	250	250	22.9	23.3	11.1	18.1	<2	8.5	7.9	7	6.9	25.8	23.1	17.8	17.8	12	12	10	9.9	11	12	6	7.1	13	13	12	12
Fluoride: Dissolved	mg/L	*	1.5	1.5	-	-	-	<1	<1	-	-	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.01	0.01	0.13	0.024	0.024
Sulphate (Lab)	mg/L	100	500	500	3.6	3.7	4.1	4.6	4.2	4.1	4.1	4.4	4.4	5.7	3.66	3.75	3.78	3.6	5.5	3.8	4	2.8	2.7	3.6	3.8	3.3	3.4	3.30	3.38
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	-	302	300	170	160	-	-	-	266	242	243	220	230	200	210	210	210	170	170	210	210	198	198
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																													
Aluminum: Dissolved	mg/L	*	0.2	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.008	<0.005	0.007	0.009	0.007	0.007	0.012	0.013	0.011	0.011	0.01	0.009	0.009	0.009	0.007	0.006	0.0061	0.0055
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<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	<0.00050	<0.00050
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	0.0036	0.0038	0.0034	0.0026	0.0026	0.0028	0.0029	0.0035	0.0035	**0.0054 a**	0.0034	0.0037	0.0038	0.0031	0.0031	0.0028	0.0027	0.0028	0.003	0.0025	0.0024	0.003	0.0028	0.00264	0.00257
Barium: Dissolved	mg/L	5	no guideline	1	0.034	0.034	0.013	0.034	0.034	0.016	0.015	0.012	0.012	0.047	0.016	0.012	0.012	0.01	0.01	0.009	0.009	0.009	0.009	0.0092	0.008	0.008	0.008	0.0074	0.0072
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<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	<0.00010	<0.00010
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010
Boron: Dissolved	mg/L	1.2	5	5	0.213	0.239	0.103	0.287	0.259	0.194	0.193	0.053	0.054	0.558	0.18	0.14	0.15	0.14	0.14	0.17	0.18	0.12	0.12	0.1	0.1	0.12	0.11	0.109	0.106
Cadmium: Dissolved	mg/L	-	no guideline	0.005	0.00004	0.00003	**0.00004 a**	**0.0001 a**	**0.00008 a**	**0.00006 a**	**0.00005 a**	**0.0002 a**	**0.00017 a**	0.00006	**0.0001 a**	0.00001	<0.00001	**0.0001 a**	0.00003	0.00002	0.00002	0.00002	0.00002	0.00001	**0.00005 a**	**0.00011 a**	0.00003	0.00002	0.000019	0.000017
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	71.4	71.7	25.9	66.5	67.1	31.9	30.5	30.4	29.8	105	86.9	81.1	85.1	68.8	69	65.5	65.6	72.9	73	47.8	44.7	67.7	67	62.3	60.3
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	**0.0012 a**	**0.0014 a**	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	0.0006	**0.0015 a**	0.0003	<0.0002	<0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	0.0006	0.0006	0.0006	0.0006	0.0006	0.0003	0.0003	0.0002	0.0002	0.0011	<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	<0.00050	<0.00050
Copper: Dissolved	mg/L	*	0.5	1	0.001	0.001	0.004	0.004	0.003	0.006	0.004	<0.001	<0.001	0.001	0.0026	0.0002	0.0002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0072	0.0031	<0.002	<0.002	<0.002	0.0021	<0.0020
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	0.01	0.02	<0.01	<0.01	<0.01	0.01	<0.01	**0.46 bac**	**0.46 bac**	**3.23 bac**	0.14	0.21	0.21	0.213	0.208	0.227	0.223	0.241	0.247	0.165	0.151	0.229	0.23	0.223	0.221
Lead: Dissolved	mg/L	*	0.05	0.01	<0.0001	<0.0001	<0.0001	-	-	0.0002	<0.0001	0.0002	<0.0001	0.0001	<0.0002	<0.00005	<0.00005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	<0.00020
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0004	0.0003	0.0003	<0.005	<0.005	<0.005	<0.005	-	-	-	-	<0.005	<0.005	<0.0050	<0.0050
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	15.9	15.9	4.7	14.3	14.5	5.4	5.3	5	5	22.6	8.97	8.38	8.46	7.64	7.69	7.6	7.49	9.23	9.69	5.88	5.51	8.2	8.08	7.18	7.22
Manganese: Dissolved	mg/L	*	no guideline	0.05	**2.64 bc**	**2.66 bc**	**0.772 bc**	**2.21 bc**	**2.22 bc**	**0.959 bc**	**0.927 bc**	**0.836 bc**	**0.822 bc**	**3.06 bc**	**0.477 bc**	**0.479 bc**	**0.49 bc**	**0.441 bc**	**0.445 bc**	**0.515 bc**	**0.509 bc**	**0.554 c**	**0.576 c**	**0.484 c**	**0.377 c**	**0.652 c**	**0.649 c**	**0.696 c**	**0.653 c**
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	<0.00002	<0.02	<0.02	<0.00002	<0.00002	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	<0.000050
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	0.0002	0.0002	0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010
Nickel: Dissolved	mg/L	*	no guideline	no guideline	<0.0005	<0.0005	<0.0005	0.0007	0.0008	0.0008	0.0005	<0.0005	<0.0005	0.0017	0.0013	<0.0002	<0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	0.03	0.02	0.02	-	-	-	-	0.03	0.03	0.03	0.02	-	-	-	-
Potassium: Dissolved	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	3.84	2.85	3	2.45	2.43	1.92	1.88	2.08	2.13	1.5	1.4	1.75	1.74	1.66	1.6
Selenium: Dissolved	mg/L	0.002	0.01	0.01	<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	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	13.3	12.8	13.1	13	15.5	9.03	7.01	7.09	9.8	9.9	7.2	7.2	9.7	9.7	7.9	7.4	8.7	8.5	7.91	7.88
Silver: Dissolved	mg/L	*	no guideline	no guideline	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00005	<0.00004	<0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020	<0.000020
Sodium: Dissolved	mg/L	no guideline	no guideline	200	23.6	23.7	15.4	21	22	19.1	18.2	6.5	6.5	30.2	19.7	15.9	16.3	14.9	14.3	11.8	11.5	14.9	15.5	10.9	9.86	12.9	12.7	10.3	10.4
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	0.267	0.266	0.111	0.279	0.272	0.13	0.121	0.105	0.106	0.368	0.164	0.157	0.16	0.109	0.109	0.097	0.096	0.095	0.096	0.072	0.067	0.105	0.105	0.101	0.099
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	1.58	1.6	1.26	2	2	1.4	1.3	1.4	1.4	2.2	<2	<1	<1	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3.0	<3.0
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00002	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	<0.000050
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.00005	<0.00005	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0002	<0.0001	<0.0001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050
Titanium: Dissolved	mg/L	2	no guideline	no guideline	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0015	0.001	0.0005	0.0006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	0.0002	0.00017	0.00018	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	<0.0001	<0.0001	0.0001	0.0001	0.0001	0.0001
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	0.0002	0.0002	0.003	0.0012	0.0011	0.001	0.0011	0.0018	0.0018	0.0043	0.0044	0.001	0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050
Zinc: Dissolved	mg/L	*	5	5	0.005	0.002	0.003	0.005	0.002	0.003	0.002	0.002	0.001	0.007	0.01	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	<0.002	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.5	<0.5	<0.00050	<0.00050

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-2	DupHBT94-2	HBT94-2	HBT94-2	DupHBT94-2	HBT94-2	DupHBT94-2	HBT94-2	DupHBT94-2	HBT94-2	HBT94-2	HBT94-2	DUPHBT94-2	HBT94-2	DUPHBT94-2	HBT94-2	DUPHBT94-2	HBT94-2	DupHBT94-2	HBT94-2	DupHBT94-2	HBT94-2	DupHBT94-2	HBT94-2	DupHBT94-2
					15-Mar-04	15-Mar-04	28-Sep-04	3-May-05	3-May-05	29-Sep-05	29-Sep-05	20-Apr-06	20-Apr-06	19-Oct-06	27-Aug-09	9-Dec-09	9-Dec-09	29-Apr-10	29-Apr-10	2-Nov-10	2-Nov-10	10-Mar-11	10-Mar-11	11-May-11	11-May-11	16-Aug-11	16-Aug-11	29-Nov-11	29-Nov-11
Total Metals																													
Aluminum: Total	mg/L	-	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	-	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																													
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	1	4	4	1.6	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria																													
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	<1	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0		<1	**1 bc**	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	<1	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																													
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	160	-	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	80	200	-	140	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	1	1	3.2	<0.08	-	<0.08	<0.08	-	<0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	<0.2	-	<0.2	<0.2	-	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	24	-	14.45	22.76	-	10.41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	-	5.54	<8	-	8.33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	13	-	-	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	**3 bac**	-	**0.4 bac**	-	-	**0.38 bac**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	**3 bac**	-	**0.84 bac**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	**2 bc**	-	**1.18 bc**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.
BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.
CDWG - Canadian Drinking Water Quality Guidelines.
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-2	DupHBT94-2	HBT94-2	HBT94-2	DupHBT94-2	HBT94-2	DupHBT94-2	HBT94-2	DupHBT94-2	HBT94-2	HBT94-2	HBT94-2	DUPHBT94-2	HBT94-2	DUPHBT94-2	HBT94-2	DUPHBT94-2	HBT94-2	DupHBT94-2	HBT94-2	DupHBT94-2	HBT94-2	DupHBT94-2	HBT94-2	DupHBT94-2
					15-Mar-04	15-Mar-04	28-Sep-04	3-May-05	3-May-05	29-Sep-05	29-Sep-05	20-Apr-06	20-Apr-06	19-Oct-06	27-Aug-09	9-Dec-09	9-Dec-09	29-Apr-10	29-Apr-10	2-Nov-10	2-Nov-10	10-Mar-11	10-Mar-11	11-May-11	11-May-11	16-Aug-11	16-Aug-11	29-Nov-11	29-Nov-11
Hydrocarbons																													
VHw6-10	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-	<0.3	-	-	-	<0.3	-	<0.3	-	<0.3	-
VPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-	<0.3	-	-	-	-	-	<0.3	-	<0.3	-
EHw10-19	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EHw19-32	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																													
Acenapthene	ug/L	6	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acridine	ug/L	0.05	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Pyrene	ug/L	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	ug/L	0.2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	ug/L	12	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Napthalene	ug/L	1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	ug/L	0.3	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	ug/L	0.02	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Halogenated Volatiles																													
Benzene	mg/L	0.4	0.005	0.005	-	-	-	-	-	<0.0005	-	-	-	0.0002	-	<0.0001	-	<0.0005	-	<0.0005	-	<0.0005	-	<0.0005	-	<0.0005	-	<0.0005	-
Ethylbenzene	mg/L	0.2	0.0024	0.0024	-	-	-	-	-	<0.0005	-	-	-	<0.0001	-	<0.0001	-	<0.0005	-	<0.0005	-	<0.0005	-	<0.0005	-	<0.0005	-	<0.0005	-
Toluene	mg/L	0.0005	0.024	0.024	-	-	-	-	-	<0.0005	-	-	-	0.0003	-	0.0005	-	<0.0005	-	<0.0005	-	<0.0005	-	**0.0009 a**	-	**0.0006 a**	-	<0.0005	-
Xylenes: Total	mg/L	0.03	no guideline	0.3	-	-	-	-	-	<0.001	-	-	-	<0.0001	-	<0.0001	-	<0.001	-	<0.001	-	<0.001	-	<0.001	-	<0.001	-	<0.001	-
Styrene	mg/L	0.072	no guideline	no guideline	-	-	-	-	-	<0.0005	-	-	-	<0.0001	-	<0.0001	-	<0.0005	-	<0.0005	-	<0.0005	-	<0.0005	-	<0.0005	-	<0.0005	-
Volatile Organic Compounds																													
Bromodichloromethane	ug/L	no guideline	16	16	-	-	-	-	-	<1	-	-	-	<0.1	-	<0.1	-	<1	-	<1	-	<1	-	<1	-	<1	-	<1	-
Bromoform	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	<1	-	-	-	<0.2	-	<0.2	-	<1	-	<1	-	<1	-	<1	-	<1	-	<1	-
Bromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	<1	-	-	-	<0.8	-	-	-	<1	-	<1	-	<1	-	<1	-	<1	-	<1	-
Carbon Tetrachloride	ug/L	13.3	5	5	-	-	-	-	-	<3	-	-	-	<0.1	-	<0.1	-	<1	-	<1	-	<1	-	<0.5	-	<0.5	-	<0.5	-
Chlorobenzene	ug/L	1.3	80	80	-	-	-	-	-	<0.5	-	-	-	**1.9 a**	-	<0.1	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-
Chloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	<1	-	-	-	<0.4	-	<0.4	-	<1	-	<1	-	<1	-	<1	-	<1	-	<1	-
Chloroform	ug/L	1.8	no guideline	no guideline	-	-	-	-	-	<1	-	-	-	<0.3	-	<0.3	-	<1	-	<1	-	<1	-	<1	-	<1	-	<1	-
Chloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	<1	-	-	-	<0.4	-	<0.4	-	<1	-	<1	-	<1	-	<1	-	<1	-	<1	-
Cis-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	<1	-	-	-	<0.1	-	<0.1	-	<1	-	<1	-	<1	-	<1	-	<1	-	<1	-
Cis-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	<0.1	-	-	-	<0.1	-	<0.1	-	<1	-	<1	-	<1	-	<1	-	<1	-	<1	-
Dibromochloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	<1	-	-	-	<0.1	-	<0.1	-	<1	-	<1	-	<1	-	<1	-	<1	-	<1	-
Dibromoethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	<0.5	-	-	-	<0.1	-	-	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.9	-	<0.9	-
Dibromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	<0.9	-	-	-	<0.2	-	-	-	-	-	-	-	-	-	-	-	<0.9	-	<0.9	-
Dichlorodifluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-	<2	-	-	-	-	-
Methyl-Tert-Butylether	ug/L	3400	20	200	-	-	-	-	-	<4	-	-	-	-	-	-	-	<4	-	<4	-	<4	-	<4	-	<4	-	<4	-
Methylene Chloride	ug/L	98.1	50	50	-	-	-	-	-	<2	-	-	-	<6	-	<6	-	<2	-	<2	-	<2	-	<0.2	-	<2	-	<2	-
Tetrabromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	ug/L	111	30	30	-	-	-	-	-	<0.5	-	-	-	<0.1	-	<0.1	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-
Trans-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	<1	-	-	-	<0.1	-	<0.1	-	<1	-	<1	-	<1	-	<1	-	<1	-	<1	-
Trans-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	<0.1	-	-	-	<0.1	-	<0.1	-	<1	-	<1	-	<1	-	<1	-	<1	-	<1	-
Trichloroethene	ug/L	21	5	5	-	-	-	-	-	<0.5	-	-	-	<0.1	-	<0.1	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-
Trichlorofluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	<4	-	-	-	<0.2	-	<0.2	-	<4	-	<4	-	<4	-	<4	-	<4	-	<4	-
Vinyl Chloride	ug/L	no guideline	2	2	-	-	-	-	-	<0.5	-	-	-	<0.2	-	<0.2	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-
1,1-Dichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	<0.5	-	-	-	<0.1	-	<0.1	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-
1,1-Dichloroethene	ug/L	no guideline	14	14	-	-	-	-	-	<0.5	-	-	-	<0.1	-	<0.1	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-
1,2-Dichlorobenzene	ug/L	0.7	200	200	-	-	-	-	-	<0.5	-	-	-	<0.1	-	<0.1	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-
1,2-Dichloroethane	ug/L	100	5	5	-	-	-	-	-	<0.5	-	-	-	<0.4	-	<0.4	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-
1,2-Dichloropropane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	<0.5	-	-	-	<0.1	-	<0.1	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-
1,3-Dichlorobenzene	ug/L	150	no guideline	no guideline	-	-	-	-	-	<0.5	-	-	-	<0.1	-	<0.1	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-
1,4-Dichlorobenzene	ug/L	26	5	5	-	-	-	-	-	<0.5	-	-	-	0.3	-	<0.1	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-
1,1,1-Trichloroethane	ug/L	11100	200	no guideline	-	-	-	-	-	<0.5	-	-	-	<0.1	-	<0.1	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-
1,1,2-Trichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	<0.5	-	-	-	<0.1	-	<0.1	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-
1,1,1,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	<0.5	-	-	-	-	-	-	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-
1,1,2,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	*	*	*	<0.5	*	<0.2	*	*	*	*	*	<0.2	*	<0.5	*	<0.5	*	<0.5	*	<0.5	*	<0.5	*	<0.5	*

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

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APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-2 22-Feb-12	DupHBT94-2 22-Feb-12	HBT94-2 24-May-12	DupHBT94-2 24-May-12	HBT94-2 16-Aug-12	DupHBT94-2 16-Aug-12	HBT94-2 3-Dec-12
Physical Tests											
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.4	-	7.5	-	7.22	-	7.35
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.93	8	8.09	8.08	8.27	8.26	8.08
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	286	-	456	-	420	-	306
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	336	336	451	452	433	430	488
Temperature (Field)	deg C	19	15	15	11.6	-	12.1	-	12.23	-	11.35
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	6.5	-	5.6	-	**3.95 a**	-	5.8
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	152	156	205	204	190	197	220
Dissolved Solids: Total	mg/L	no guideline	no guideline	500	200	-	300	-	275	-	328
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-20.7	-	1.4	-	-16.6	-	45.2
Anions and Nutrients											
Ammonia (as N)	mg/L	*	no guideline	no guideline	0.29	0.29	0.23	0.25	0.33	0.34	0.32
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	0.007	0.007	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	<0.020	0.182	<0.020	<0.020	<0.020	<0.020	<0.020
Chloride (Lab)	mg/L	600	250	250	5.8	5.4	13	13	13	13	18
Fluoride: Dissolved	mg/L	*	1.5	1.5	0.026	0.024	0.019	0.018	0.018	0.017	0.019
Sulphate (Lab)	mg/L	100	500	500	3.52	3.47	3.29	3.37	3.09	2.5	3.41
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	168	168	218	219	213	213	231
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	205	205	266	268	260	260	282
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Hydroxide	mg/L	no guideline	no guideline	no guideline	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Metals											
Aluminum: Dissolved	mg/L	*	0.2	0.1	0.0078	0.0128	0.00704	0.00899	0.00783	0.00725	0.00734
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020	<0.000020	<0.000020
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	0.00247	0.00246	0.00258	0.0026	0.00241	0.00229	0.00254
Barium: Dissolved	mg/L	5	no guideline	1	0.00984	0.00992	0.00851	0.00948	0.00889	0.00845	0.00923
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	<0.00001	<0.00001	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.000005	<0.000005	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050
Boron: Dissolved	mg/L	1.2	5	5	0.1	0.11	0.086	0.08	0.183	0.173	0.132
Cadmium: Dissolved	mg/L	-	no guideline	0.005	0.000012	0.000017	0.0000368	0.0000508	0.000041	0.000024	0.000065
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	51.1	52.4	68.9	68.6	64.4	67.1	78
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	0.000087	0.000075	0.000121	0.000103	0.000096	0.00011	0.000154
Copper: Dissolved	mg/L	*	0.5	1	0.00025	0.00013	0.000221	0.000212	0.00026	0.000168	0.000307
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	0.174	0.182	0.206	0.207	0.189	0.195	0.223
Lead: Dissolved	mg/L	*	0.05	0.01	0.000039	0.000015	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	5.95	6.15	8.03	7.87	7.15	7.15	8.47
Manganese: Dissolved	mg/L	*	no guideline	0.05	**0.606 c**	**0.622 c**	**0.851 c**	**0.889 c**	**0.857 c**	**0.85 c**	**1.12 c**
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	< 0.00001	< 0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	0.00026	0.00027	0.000264	0.000231	0.000241	0.000246	0.00025
Nickel: Dissolved	mg/L	*	no guideline	no guideline	0.00043	0.00043	0.000685	0.000731	0.000688	0.000649	0.000984
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	1.54	1.62	0.0125	0.013	0.0839	0.0885	0.0382
Potassium: Dissolved	mg/L	373	no guideline	no guideline	0.0583	0.0106	1.79	1.74	1.75	1.76	1.89
Selenium: Dissolved	mg/L	0.002	0.01	0.01	<0.00004	<0.00004	<0.00004	<0.00004	<0.000040	<0.000040	<0.000040
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	7.5	7.5	7.82	7.91	7.82	8.02	7.7
Silver: Dissolved	mg/L	*	no guideline	no guideline	<0.000005	<0.000005	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050
Sodium: Dissolved	mg/L	no guideline	no guideline	200	10.1	10.5	13	12.7	16.1	16.2	16.3
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	0.0786	0.0808	0.12	0.121	0.123	0.121	0.145
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	<10	<10	<15	<15	<10	<10	<3.0
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	<0.000002	<0.000002	0.0000034	0.0000033	0.000004	0.000002	0.000003
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	<0.00020	<0.00020
Titanium: Dissolved	mg/L	2	no guideline	no guideline	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	0.000083	0.000089	0.000112	0.000115	0.000116	0.000114	0.000134
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	0.0005	0.0005	0.00046	0.00046	0.00057	0.00062	0.00072
Zinc: Dissolved	mg/L	*	5	5	0.0005	0.0008	0.00024	0.00035	0.00034	0.00019	0.00056
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC AWQG AL	BC AWQG DW	CDWG	HBT94-2 22-Feb-12	DupHBT94-2 22-Feb-12	HBT94-2 24-May-12	DupHBT94-1 24-May-12	HBT94-2 16-Aug-12	DupHBT94-2 16-Aug-12	HBT94-2 3-Dec-12
Total Metals											
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Organic Parameters											
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Bacteria											
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	-	-	-	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2006 only (Discontinued due to data quality issues)											
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-

Notes:

BC AWQG AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC AWQG DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC AWQG AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC AWQG DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

*- See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-2	DupHBT94-2	HBT94-2	DupHBT94-2	HBT94-2	DupHBT94-2	HBT94-2
					22-Feb-12	22-Feb-12	24-May-12	24-May-12	16-Aug-12	16-Aug-12	3-Dec-12
Hydrocarbons											
VHw6-10	mg/L	no guideline	no guideline	no guideline	< 0.3	-	<0.3	-	<0.3	-	<0.3
VPHw	mg/L	no guideline	no guideline	no guideline	< 0.3	-	<0.3	-	<0.3	-	<0.3
EHw10-19	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
LEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
EHw19-32	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
HEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons											-
Acenapthene	ug/L	6	no guideline	no guideline	-	-	-	-	-	-	-
Acridine	ug/L	0.05	no guideline	no guideline	-	-	-	-	-	-	-
Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-
Benzo(A)Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-
Benzo(A)Pyrene	ug/L	0.01	0.01	0.01	-	-	-	-	-	-	-
Fluoranthene	ug/L	0.2	no guideline	no guideline	-	-	-	-	-	-	-
Fluorene	ug/L	12	no guideline	no guideline	-	-	-	-	-	-	-
Napthalene	ug/L	1	no guideline	no guideline	-	-	-	-	-	-	-
Phenanthrene	ug/L	0.3	no guideline	no guideline	-	-	-	-	-	-	-
Pyrene	ug/L	0.02	no guideline	no guideline	-	-	-	-	-	-	-
Non-Halogenated Volatiles											
Benzene	mg/L	0.4	0.005	0.005	<0.00050	-	<0.0005	-	<0.0005	-	<0.00040
Ethylbenzene	mg/L	0.2	0.0024	0.0024	<0.00050	-	<0.0005	-	<0.0005	-	<0.00040
Toluene	mg/L	0.0005	0.024	0.024	<0.00050	-	<0.0005	-	<0.0005	-	<0.00040
Xylenes: Total	mg/L	0.03	no guideline	0.3	<0.0010	-	<0.001	-	<0.001	-	<0.00040
Styrene	mg/L	0.072	no guideline	no guideline	<0.00050	-	<0.0005	-	<0.0005	-	<0.00050
Volatile Organic Compounds											
Bromodichloromethane	ug/L	no guideline	16	16	<1	-	<1	-	<1	-	<1
Bromoform	ug/L	no guideline	no guideline	no guideline	<1	-	<1	-	<1	-	<1
Bromomethane	ug/L	no guideline	no guideline	no guideline	<1	-	<1	-	<1	-	<1
Carbon Tetrachloride	ug/L	13.3	5	5	<0.5	-	<0.5	-	<0.5	-	<0.5
Chlorobenzene	ug/L	1.3	80	80	<0.5	-	<0.5	-	<0.5	-	<0.5
Chloroethane	ug/L	no guideline	no guideline	no guideline	<1	-	<1	-	<1	-	<1
Chloroform	ug/L	1.8	no guideline	no guideline	<1	-	<1	-	<1	-	<1
Chloromethane	ug/L	no guideline	no guideline	no guideline	<1	-	<1	-	<1	-	<1
Cis-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	<1	-	<1	-	<1	-	<1
Cis-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	<1	-	<1	-	<1	-	<1
Dibromochloromethane	ug/L	no guideline	no guideline	no guideline	<1	-	<1	-	<1	-	<1
Dibromoethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Dibromomethane	ug/L	no guideline	no guideline	no guideline	<0.9	-	<0.9	-	<0.9	-	<0.9
Dichlorodifluoromethane	ug/L	no guideline	no guideline	no guideline	<2	-	<2	-	<2	-	<2
Methyl-Tert-Butylether	ug/L	3400	20	200	<4	-	<4	-	<4	-	<4
Methylene Chloride	ug/L	98.1	50	50	<2	-	<2	-	<2	-	<2
Tetrabromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Tetrachloroethene	ug/L	111	30	30	<0.5	-	<0.5	-	<0.5	-	<0.5
Trans-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	<1	-	<1	-	<1	-	<1
Trans-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	<1	-	<1	-	<1	-	<1
Trichloroethene	ug/L	21	5	5	<0.5	-	<0.5	-	<0.5	-	<0.5
Trichlorofluoromethane	ug/L	no guideline	no guideline	no guideline	<4	-	<4	-	<4	-	<4
Vinyl Chloride	ug/L	no guideline	2	2	<0.5	-	<0.5	-	<0.5	-	<0.5
1,1-Dichloroethane	ug/L	no guideline	no guideline	no guideline	<0.5	-	<0.5	-	<0.5	-	<0.5
1,1-Dichloroethene	ug/L	no guideline	14	14	<0.5	-	<0.5	-	<0.5	-	<0.5
1,2-Dichlorobenzene	ug/L	0.7	200	200	<0.5	-	<0.5	-	<0.5	-	<0.5
1,2-Dichloroethane	ug/L	100	5	5	<0.5	-	<0.5	-	<0.5	-	<0.5
1,2-Dichloropropane	ug/L	no guideline	no guideline	no guideline	<0.5	-	<0.5	-	<0.5	-	<0.5
1,3-Dichlorobenzene	ug/L	150	no guideline	no guideline	<0.5	-	<0.5	-	<0.5	-	<0.5
1,4-Dichlorobenzene	ug/L	26	5	5	<0.5	-	<0.5	-	<0.5	-	<0.5
1,1,1-Trichloroethane	ug/L	11100	200	no guideline	<0.5	-	<0.5	-	<0.5	-	<0.5
1,1,2-Trichloroethane	ug/L	no guideline	no guideline	no guideline	<0.5	-	<0.5	-	<0.5	-	<0.5
1,1,1,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	<0.5	-	<0.5	-	<0.5	-	<0.5
1,1,2,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	<0.5	*	<0.5	*	<0.5	*	<0.5

Notes:

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APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3
					19-Jul-94	25-Oct-94	2-Mar-95	22-Jun-95	20-Jul-95	16-Jan-96	23-Apr-96	5-Nov-96	9-Jan-97	10-Feb-97	6-Mar-97	7-May-97	5-Jun-97	31-Jul-97	2-Oct-97	8-Dec-97	12-Jan-98	3-Feb-98	5-Mar-98	13-Apr-98	20-May-98	25-Jun-98	21-Jul-98	14-Sep-98	26-Oct-98	2-Dec-98
Physical Tests																															
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**6.4 abc**	6.69	6.56
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	6.85	6.72	6.93	7	7.23	7.24	6.77	7.05	7.36	7.1	7.13	6.98	6.87	6.76	7.29	7.05	6.75	7	6.77	7.06	7.04	7.06	7.14	-	7.23	-
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	318	238	251
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	284	224	233	254	238	193	347	199	176	185	197	283	491	377	333	297	306	310	313	364	443	364	341	-	233	-
Temperature (Field)	deg C	19	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	123	93.9	-	-	-	75.9	139	-	-	73.8	-	-	-	-	-	-	-	133	-	-	-	-	-	-	-	-
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	185	132	144	128	119	131	178	107	88	120	99	142	274	189	270	172	175	265	187	268	266	202	201	-	138	-
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																															
Ammonia (as N)	mg/L	*	no guideline	no guideline	0.55	0.768	-	-	-	0.61	2.79	-	-	1.28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.004	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-
Chloride (Lab)	mg/L	600	250	250	9.8	6.7	<0.5	-	-	6	12.1	4.4	-	4.8	-	-	21.8	-	10.6	-	-	10.8	-	14.5	-	-	12.8	-	6.2	-
Fluoride: Dissolved	mg/L	*	1.5	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Lab)	mg/L	100	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	128	97.6	102	-	-	86.6	159	89.7	-	86	-	-	227	-	161	-	-	148	-	155	-	-	169	-	112	-
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	102	-	-	86.6	159	-	-	86	-	-	-	-	-	-	-	181	-	-	-	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																															
Aluminum: Dissolved	mg/L	*	0.2	0.1	<0.20	<0.20	-	-	-	<0.20	<0.20	-	-	0.006	-	-	-	-	-	-	-	0.006	-	-	-	-	-	-	-	-	-
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	<0.20	<0.20	-	-	-	<0.20	<0.20	-	-	-	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	0.0009	0.0007	-	-	-	0.0002	0.0006	-	-	0.0004	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-
Barium: Dissolved	mg/L	5	no guideline	1	<0.010	<0.010	-	-	-	<0.010	<0.010	-	-	<0.01	-	-	-	-	-	-	-	0.006	-	-	-	-	-	-	-	-	-
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	<0.005	<0.005	-	-	-	<0.005	<0.005	-	-	<0.005	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.10	<0.10	-	-	-	<0.10	<0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Dissolved	mg/L	1.2	5	5	<0.10	<0.10	-	-	-	<0.10	<0.10	-	-	<0.1	-	-	-	-	-	-	-	0.12	-	5	-	-	-	-	-	-	-
Cadmium: Dissolved	mg/L	*	no guideline	0.005	<0.0005	<0.0002	-	-	-	**0.0009 a**	**0.0005 a**	-	-	**0.0036 a**	-	-	-	-	-	-	-	**0.0005 a**	-	-	-	-	-	-	-	-	-
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	39.8	29.9	34	-	-	24.6	45.2	25.4	-	24	-	-	-	-	-	-	-	39.8	-	-	-	-	-	-	-	-	-
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	<0.015	<0.015	-	-	-	<0.015	<0.01	-	-	<0.001	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	<0.015	<0.015	-	-	-	<0.015	<0.01	-	-	<0.02	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-
Copper: Dissolved	mg/L	*	0.5	1	<0.010	<0.010	-	-	-	<0.010	<0.010	-	-	0.003	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	0.06	0.191	-	-	-	<0.030	0.04	-	-	<0.03	-	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-
Lead: Dissolved	mg/L	*	0.05	0.01	<0.001	<0.001	-	-	-	<0.001	<0.001	-	-	<0.001	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	<0.015	<0.015	-	-	-	<0.015	<0.01	-	-	<0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	5.7	4.67	4.72	-	-	3.54	6.43	3.64	-	3.37	-	-	-	-	-	-	-	5.42	-	-	-	-	-	-	-	-	-
Manganese: Dissolved	mg/L	*	no guideline	0.05	**1.59 bc**	**1.32 bc**	-	-	-	**0.848 bc**	**1.83 bc**	-	-	**0.626 bc**	-	-	-	-	-	-	-	**1.09 bc**	-	-	-	-	-	-	-	-	-
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	<0.00005	-	-	-	-	-	-	-	<0.00005	-	-	-	-	-	-	-	-	-
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	<0.030	<0.030	-	-	-	<0.030	<0.030	-	-	<0.03	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-
Nickel: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.020	<0.020	-	-	-	<0.020	<0.020	-	-	<0.02	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	0.48	<0.30	-	-	-	<0.30	<0.30	-	-	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-	-	-	-	-
Potassium: Dissolved	mg/L	373	no guideline	no guideline	2.92	<2.0	2.7	-	-	2.2	3	<2	-	-	-	-	-	-	-	-	-	1.65	-	-	-	-	-	-	-	-	-
Selenium: Dissolved	mg/L	0.002	0.01	0.01	<0.0005	<0.0005	-	-	-	<0.0005	<0.0005	-	-	<0.0005	-	-	-	-	-	-	-	<0.002	-	-	-	-	-	-	-	-	-
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	6.69	6.62	-	-	-	5.58	6.12	-	-	-	-	-	-	-	-	-	-	12.4	-	-	-	-	-	-	-	-	-
Silver: Dissolved	mg/L	*	no guideline	no guideline	<0.015	<0.015	-	-	-	<0.015	<0.01	-	-	<0.0001	-	-	-	-	-	-	-	<0.0001	-	-	-	-	-	-	-	-	-
Sodium: Dissolved	mg/L	no guideline	no guideline	200	5.44	7.4	7.4	-	-	7	11	6	-	6	-	-	-	-	-	-	-	9.18	-	-	-	-	-	-	-	-	-
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	0.092	0.07	-	-	-	0.067	0.119	-	-	-	-	-	-	-	-	-	-	0.093	-	-	-	-	-	-	-	-	-
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	<0.10	<0.10	-	-	-	<0.10	<0.10	-	-	-	-	-	-	-	-	-	-	<0.0001	-	-	-	-	-	-	-	-	-
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	-	-	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.30	<0.30	-	-	-	<0.30	<0.30	-	-	-	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-
Titanium: Dissolved	mg/L	2	no guideline	no guideline	<0.010	<0.010	-	-	-	<0.010	<0.010	-	-	-	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	-	-	-	-	-	-	-	-	-
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	<0.030	<0.030	-	-	-	<0.030	<0.030	-	-	<0.03	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-
Zinc: Dissolved	mg/L	*	5	5	0.022	0.011	-	-	-	**0.095 a**	0.011	-	-	0.012	-	-	-	-	-	-	-	0.008	-	-	-	-	-	-	-	-	-
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3
					19-Jul-94	25-Oct-94	2-Mar-95	22-Jun-95	20-Jul-95	16-Jan-96	23-Apr-96	5-Nov-96	9-Jan-97	10-Feb-97	6-Mar-97	7-May-97	5-Jun-97	31-Jul-97	2-Oct-97	8-Dec-97	12-Jan-98	3-Feb-98	5-Mar-98	13-Apr-98	20-May-98	25-Jun-98	21-Jul-98	14-Sep-98	26-Oct-98	2-Dec-98
Total Metals																													
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	70.4	-	41.2	-	-	-	-	49.4	-	-	45.5	-	28.8	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	11.4	-	5.83	-	-	-	-	6.94	-	-	6.48	-	3.88	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	2.82	-	1.83	-	-	-	-	1.92	-	-	2.27	-	2.11	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-	-	-	-	-	-	6.97	-	9.5	-	-	-	-	15.2	-	-	13.9	-	10	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																														
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	148	<20	-	-	-	20	<20	-	-	<20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	8.25	0.78	-	-	-	1.4	1	-	-	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	42	1.2	-	-	-	1.5	1	-	-	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria																														
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	<1	<1	<1	-	-	<1	<2	<1	-	**2 b**	-	-	<2	-	<2	-	-	<2	-	<2	-	-	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	**17 bc**	<1	**1 bc**	-	-	**12 bc**	**4 bc**	**21 bc**	-	**90000 bc**	-	-	**240 bc**	-	**5 bc**	-	-	**240 bc**	-	<2	-	-	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																														
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	-	3.7	-	-	8.7	5.2	5.5	-	-	-	-	2	-	4.7	-	-	4.9	-	5.1	-	-	3.9	-	4.2	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.
BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.
CDWG - Canadian Drinking Water Quality Guidelines
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3
					5-Jan-99	5-Feb-99	14-Apr-99	29-Jul-99	25-Nov-99	1-Mar-00	19-Apr-00	2-Aug-00	13-Sep-00	25-Oct-00	6-Feb-01	10-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
Physical Tests															Dry	Dry								damaged	damaged	
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	6.7	6.92	7.03	**6.1 abc**	-	-	7.07	**6.36 abc**	-	**6.13 abc**	-	-	6.53	7.71	7.39	6.88	6.59	6.82	6.6	-	-	**6.14 abc**
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	6.89	7.02	6.93	6.94	6.89	6.91	7.01	7.25	7.05	-	-	-	-	6.99	7.15	7.15	7.14	-	-	-	-
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	597	232	266.1	282	-	-	233	349	-	341	-	-	383	425	494	444	431	501	350	-	-	481
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	-	211	250	252	229	197	232	344	385	308	-	-	-	-	449	428	494	602	-	-	-	-
Temperature (Field)	deg C	19	15	15	-	-	-	-	-	-	-	-	-	-	-	-	**17.7 bc**	9.5	7.4	12.3	14.8	12.1	9.8	-	-	11.3
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-		-			-	8.3	-	-	**2.74 a**
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	500	no guideline	-	84	-	-	-	86	-	-	-	-	-	-	-	-	142	-	-	-	-	-	-	-
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	-	116	138	155	148	120	154	197	222	199	-	-	-	-	219	250	301	301	-	-	-	-
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																										
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	1.3	-	-	-	1.7	-	-	-	-	-	-	-	-	8.5	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Lab)	mg/L	600	250	250	-	5	8	10	7	5.6	9.4	13.7	15	12.5	-	-	-	-	-	-	22.6	22.2	-	-	-	-
Fluoride: Dissolved	mg/L	*	1.5	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Lab)	mg/L	100	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	95.7	111	128	118	107	134	160	183	172	-	-	-	-	209	223	239	311	-	-	-	-
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	117	-	-	-	130	-	-	-	-	-	-	-	-	254	-	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-
Dissolved Metals																										
Aluminum: Dissolved	mg/L	*	0.2	0.1	-	0.016	-	-	-	0.007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	-	<0.001	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	-	<0.001	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Dissolved	mg/L	5	no guideline	1	-	0.004	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	-	<0.001	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Dissolved	mg/L	1.2	5	5	-	0.07	-	-	-	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Dissolved	mg/L	*	no guideline	0.005	-	**0.0013 a**	-	-	-	**0.0013 a**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	26.4	31.6	41	-	24.9	30.1	46.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	-	<0.001	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	-	<0.001	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Dissolved	mg/L	*	0.5	1	-	0.003	-	-	-	0.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	-	<0.05	-	-	-	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Dissolved	mg/L	*	0.05	0.01	-	<0.001	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	3.48	4.74	6.29	-	3.95	4.47	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Dissolved	mg/L	*	no guideline	0.05	-	0.041	-	-	-	**0.69 bc**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	<0.05	-	-	-	<0.02	-	-	-	-	-	-	-	-	-	-	-	<0.00002	-	-	-	-
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	-	0.001	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Dissolved	mg/L	*	no guideline	no guideline	-	0.003	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	0.02	-	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Dissolved	mg/L	373	no guideline	no guideline	-	1.85	2.54	2.43	-	1.79	2.06	3.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Dissolved	mg/L	0.002	0.01	0.01	-	<0.002	-	-	-	<0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	10.9	-	-	-	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Dissolved	mg/L	*	no guideline	no guideline	-	<0.001	-	-	-	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Dissolved	mg/L	no guideline	no guideline	200	-	6.44	8.6	10.8	-	8.58	8.8	8.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	0.074	-	-	-	0.065	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.001	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	<0.0001	-	-	-	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.0005	-	-	-	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.001	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Dissolved	mg/L	2	no guideline	no guideline	-	0.001	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	<0.0005	-	-	-	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	-	<0.001	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Dissolved	mg/L	*	5	5	-	**0.12 a**	-	-	-	0.007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.001	-	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3
					5-Jan-99	5-Feb-99	14-Apr-99	29-Jul-99	25-Nov-99	1-Mar-00	19-Apr-00	2-Aug-00	13-Sep-00	25-Oct-00	6-Feb-01	10-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
Total Metals																									
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	26.6	-	60.4	-	63.7	41.1	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	3.66	-	4.77	-	7.83	6.45	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-	2.02	-	2.14	-	2.81	2.47	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-	9.6	-	8.9	-	8.7	8.6	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																									
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	<25	-	-	-	<25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	2.6	-	-	-	4.1	-	-	-	-	-	-	5.5	-	-	2.7	-	5.2	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	2.7	-	-	-	4.3	-	-	-	-	-	-	-	3.1	-	3.5	-	-	-	-	-
Bacteria																									
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	-	**11 b**	<2	**2 b**	<2	<2	<2	<2	<2	**2 b**	-	-	**1 b**	<1	<1	<1	-	<1	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	-	**240 bc**	**70 bc**	**220000 bc**	**170 bc**	**44 bc**	**2 bc**	**1600 bc**	**49000 bc**	**920 bc**	-	-	<1	<1	<1	<1	-	**2 bc**	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	-	<1	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																									
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	-	<0.05
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	<0.1
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<29	-	-	<30
Sulphate (Field)	mg/L	100	500	500	-	3.9	4.7	5	4.2	4.2	4.3	5	6.9	5.8	-	-	-	-	5.1	5.7	6.1	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.4 bac**	-	-	**1 bac**
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.6 bac**	-	-	**1.2 bac**
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1.25 abc**	-	-	**1.6 abc**

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3
					15-Mar-04	27-Sep-04	4-May-05	20-Apr-06	19-Oct-06	19-Apr-07	26-Oct-07	8-Apr-08	23-Oct-08	27-Aug-09	9-Dec-09	29-Apr-10	2-Nov-10	10-Mar-11	11-May-11	16-Aug-11	29-Nov-11	3-Dec-12
Physical Tests																					
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.15	**6.25 abc**	6.864	6.688	6.94	**5.80 abc**	6.63	-	**6.43 abc**	-	-	-	**6.46 abc**	6.65	6.69	-	6.59	**6.43 abc**
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	-	-	6.9	7	7.89	7.09	-	7.44	-	-	-	7.73	7.33	7.36	-	7.41	7.42
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	377	538	579	654	535	632	651	-	544	-	-	-	920	945	849	-	763	1387
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	-	-	-	631	678	**730 b**	**840 b**	-	678	-	-	-	911	1080	889	-	836	1360
Temperature (Field)	deg C	19	15	15	12.1	12.1	14	12.7	12.8	13	12.8	-	12.64	-	-	-	13.05	12.85	13.01	-	12.41	12.5
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	**2.82 a**	**3.04 a**	**3.78 a**	**0.0 a**	**0.1 a**	**0.27 a**	**4.64 a**	-	11.46	-	-	-	8.8	6.85	7.8	-	6.92	**3.66 a**
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	-	260	260	345	360	-	291	-	-	-	270	357	278	-	272	512
Dissolved Solids: Total	mg/L	no guideline	no guideline	500	-	-	-	-	-	-	-	-	-	-	-	-	-			-	-	**901c**
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	18.7	806.8	-	-55.4	-	-	-	9.1	-381.3	23.7	-	9.9	20.4
Anions and Nutrients																						
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	-	-	2.3	2.42	<0.020	3.4	-	4.29	-	-	-	3	16	16	-	9	11
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	-	-	<0.01	<0.01	<0.0010	<0.0010	-	<0.0010	-	-	-	0.021	0.01	0.006	-	0.006	0.0151
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	-	-	0.02	0.11	<0.0050	<0.0050	-	0.0626	-	-	-	0.02	<0.02	0.07	-	<0.020	<0.020
Chloride (Lab)	mg/L	600	250	250	-	-	-	40	32.1	58.6	56.5	-	32	-	-	-	42	63	49	-	48	110
Fluoride: Dissolved	mg/L	*	1.5	1.5	-	-	-	<0.1	<0.1	0.065	0.106	-	0.124	-	-	-	0.03	0.02	0.02	-	0.024	0.031
Sulphate (Lab)	mg/L	100	500	500	-	-	-	4.5	5.7	4.16	4.87	-	7.36	-	-	-	7.2	2	1.5	-	<0.50	1.56
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	310	374	-	328	-	-	-	420	470	390	-	363	561
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	684
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	<0.50
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	<0.50
Dissolved Metals																						
Aluminum: Dissolved	mg/L	*	0.2	0.1	-	-	-	<0.005	<0.005	<0.0010	<0.010	-	<0.0050	-	-	-	<0.003	<0.003	0.004	-	<0.0030	0.00262
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	-	-	-	<0.0002	<0.0002	<0.00010	<0.0010	-	<0.00050	-	-	-	<0.0005	<0.0005	<0.0005	-	<0.00050	0.000086
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	-	-	-	0.0017	0.0018	0.00165	0.0019	-	0.00218	-	-	-	0.0013	0.0013	0.0015	-	0.00173	0.00289
Barium: Dissolved	mg/L	5	no guideline	1	-	-	-	0.015	0.014	0.0181	<0.020	-	0.021	-	-	-	0.025	0.046	0.033	-	0.0263	0.0583
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	-	-	-	<0.0001	<0.0001	<0.00050	<0.0020	-	<0.0010	-	-	-	<0.0001	<0.0001	<0.0001	-	<0.00010	<0.000010
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	<0.0005	<0.0005	<0.00050	-	-	-	-	-	-	<0.001	<0.001	<0.001	-	<0.0010	<0.0000050
Boron: Dissolved	mg/L	1.2	5	5	-	-	-	0.14	0.333	0.202	0.43	-	0.3	-	-	-	0.91	0.92	0.51	-	0.554	0.893
Cadmium: Dissolved	mg/L	*	no guideline	0.005	-	-	-	0.00003	**0.0001 a**	0.00003	0.000046	-	**0.000370 a**	-	-	-	**0.00026 a**	0.00001	**0.00023 a**	-	0.000014	0.000056
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	82.6	84.5	-	116	-	94.3	-	-	-	80.3	107	85	-	85	155
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	-	-	-	**0.0011 a**	<0.0005	<0.00050	**0.002 a**	-	<0.0020	-	-	-	<0.001	<0.001	<0.001	-	<0.0010	0.00025
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	-	-	-	0.0012	0.0017	0.00127	0.00213	-	0.00179	-	-	-	0.004	0.0025	0.0021	-	0.00223	0.00452
Copper: Dissolved	mg/L	*	0.5	1	-	-	-	<0.001	<0.001	0.00049	<0.0020	-	<0.0010	-	-	-	0.0063	0.0003	0.0007	-	0.00039	0.00285
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	**0.83 bac**	**1.13 bac**	-	**2.09 bac**	-	**1.61 bac**	-	-	-	**1.1 abc**	**2.48 ac**	**1.95 ac**	-	**2.69 ac**	**4.58 ac**
Lead: Dissolved	mg/L	*	0.05	0.01	-	-	-	<0.0001	0.0001	<0.000050	<0.0010	-	<0.00050	-	-	-	<0.0002	<0.0002	<0.0002	-	<0.00020	0.000037
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	-	-	-	<0.001	<0.001	<0.0050	<0.010	-	<0.0050	-	-	-	<0.005	-	-	-	<0.0050	0.0006
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	12.3	12.6	-	16.8	-	13.4	-	-	-	16.9	21.8	15.9	-	14.4	30.4
Manganese: Dissolved	mg/L	*	no guideline	0.05	-	-	**2.1 bc**	**2.46 bc**	**2.58 bc**	**2.78 bc**	**3.49 bc**	-	**2.95 bc**	-	-	-	**4.7 ac**	**3.53 c**	**2.66 c**	-	**3 c**	**6.38 ac**
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	-	-	-	<0.000020	<0.000020	-	<0.000020	-	-	-	<0.00002	<0.00005	<0.00005	-	<0.000050	<0.000010
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	-	-	-	<0.001	<0.001	0.000161	<0.0020	-	<0.0010	-	-	-	<0.001	<0.001	<0.001	-	<0.0010	0.000216
Nickel: Dissolved	mg/L	*	no guideline	no guideline	-	-	-	0.0006	0.0017	0.00175	0.0031	-	0.0025	-	-	-	0.005	0.004	0.003	-	0.0033	0.00505
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	<0.30	0.0042	-	-	-	-	-	-	0.01	0.02	-	-	0.117
Potassium: Dissolved	mg/L	373	no guideline	no guideline	-	-	-	3.8	3.1	-	4.6	-	5.2	-	-	-	5.26	15.9	9.6	-	7.09	13.6
Selenium: Dissolved	mg/L	0.002	0.01	0.01	-	-	-	<0.0002	<0.0002	<0.0010	<0.0020	-	<0.0010	-	-	-	0.0001	<0.0001	<0.0001	-	<0.00010	0.000072
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	9.19	8.5	9.59	-	-	-	-	-	-	9.6	13.9	12.6	-	12.5	15
Silver: Dissolved	mg/L	*	no guideline	no guideline	-	-	-	<0.0001	<0.0001	<0.000010	<0.000040	-	<0.000020	-	-	-	<0.00002	<0.00002	<0.00002	-	<0.000020	<0.0000050
Sodium: Dissolved	mg/L	no guideline	no guideline	200	-	-	-	25.4	39.7	-	37.7	-	38.4	-	-	-	49.1	70	49.6	-	39.2	79.1
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	0.214	0.2	0.258	-	-	-	-	-	-	0.31	0.363	0.306	-	0.304	0.546
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	1.7	1.9	1.66	2.36	-	2.61	-	-	-	<3	<3	<3	-	<3.0	<3.0
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	-	-	<0.00005	<0.00005	<0.00010	<0.00040	-	<0.00020	-	-	-	<0.00005	<0.00005	<0.00005	-	<0.000050	0.000005
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	<0.001	<0.001	<0.00010	<0.0010	-	<0.00050	-	-	-	<0.005	<0.005	<0.005	-	<0.0050	0.00032
Titanium: Dissolved	mg/L	2	no guideline	no guideline	-	-	-	<0.0005	<0.0005	-	<0.010	-	<0.010	-	-	-	<0.005	<0.005	<0.005	-	<0.0050	<0.00050
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	-	-	0.000184	<0.00040	-	<0.00020	-	-	-	0.0001	0.0001	0.0001	-	0.00011	0.000963
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	-	-	-	0.0034	0.001	<0.0010	<0.0020	-	<0.0010	-	-	-	<0.005	<0.005	<0.005	-	<0.0050	0.0025
Zinc: Dissolved	mg/L	*	5	5	-	-	-	<0.001	0.003	<0.0010	<0.010	-	<0.0050	-	-	-	<0.005	<0.005	<0.005	-	<0.0050	0.00116
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.0005	-	<0.00050	0.00019

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3	HBT94-3
					15-Mar-04	27-Sep-04	4-May-05	20-Apr-06	19-Oct-06	19-Apr-07	26-Oct-07	8-Apr-08	23-Oct-08	27-Aug-09	9-Dec-09	29-Apr-10	2-Nov-10	10-Mar-11	11-May-11	16-Aug-11	29-Nov-11	3-Dec-12
Total Metals																						
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																						
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria																						
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																						
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline		125	150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L		1	3.2	<0.05	<0.08	<0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	<0.1	<0.2	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	30	20.51	28.98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	5.87	5.66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	**1 bac**	**0.8 bac**	**1.14 bac**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	**1 bac**	**0.82 bac**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	**1.5 abc**	**2.48 abc**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-4 ######	HBT94-4 25-Oct-94	HBT94-4 ######	HBT94-4 22-Jun-95	HBT94-4 ######	HBT94-4 16-Jan-96	HBT94-4 23-Apr-96	HBT94-4 25-Jun-96	HBT94-4 5-Nov-96	HBT94-4 9-Jan-97	HBT94-4 10-Feb-97	HBT94-4 6-Mar-97	HBT94-4 7-May-97	HBT94-4 5-Jun-97	HBT94-4 ######	HBT94-4 2-Oct-97	HBT94-4 5-Dec-97	HBT94-4 12-Jan-98	HBT94-4 ######	HBT94-4 5-Mar-98
Physical Tests																								
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	6.9	6.55	7.1	6.78	6.77	7.16	6.94	6.76	6.81	6.97	6.85	6.74	6.67	7.53	6.7	7.16	6.81	6.94	6.89	6.86
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	**1040 b**	**1120 b**	**988 b**	**996 b**	**926 b**	595	603	**1320 b**	**1060 b**	**936 b**	**976 b**	**967 b**	**1458 b**	**1110 b**	**1035 b**	**1040 b**	**1040 b**	**1040 b**	**1060 b**	**1090 b**
Temperature (Field)	deg C	19	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	298	298	274	-	-	166	168	-	-	-	259	-	-	-	-	-	-	-	469	-
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	**662 bc**	**704 bc**	**653 bc**	**631 bc**	463	395	300	**717 bc**	500	468	**650 bc**	484	**731 bc**	**606 bc**	**520 bc**	**920 bc**	**638 bc**	**640 bc**	**996 bc**	**864 bc**
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																								
Ammonia (as N)	mg/L	-	no guideline	no guideline	16.1	21.1	**16.5 a**	-	-	10.7	12.7	-	-	-	**21 a**	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.024	-
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.24	-
Chloride (Lab)	mg/L	600	250	250	81.8	72.8	59.5	62.5	-	29.6	28.9	110	70	-	65.5	-	-	54.3	-	54.1	-	-	80.2	-
Fluoride: Dissolved	mg/L	*	1.5	1.5	-	-	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Lab)	mg/L	100	500	500	-	-	10.4	10.9	-	12.3	10.9	1.3	11.2	-	15	-	-	<1	-	0.7	-	-	<1	-
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	400	475	413	-	-	261	258	548	443	-	430	-	-	542	-	542	-	-	558	-
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	413	-	-	261	258	-	-	-	430	-	-	-	-	-	-	-	681	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																								
Aluminum: Dissolved	mg/L	*	0.2	0.1	<0.20	<0.20	<0.20	-	-	<0.20	<0.20	-	-	-	<0.005	-	-	-	-	-	-	-	0.006	-
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	<0.20	<0.20	<0.20	-	-	<0.20	<0.20	-	-	-	-	-	-	-	-	-	-	-	<0.001	-
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	0.0002	0.0019	0.0002	-	-	0.0006	0.0005	-	-	-	0.0009	-	-	-	-	-	-	-	<0.001	-
Barium: Dissolved	mg/L	5	no guideline	1	0.043	0.051	0.05	-	-	0.028	0.03	-	-	-	0.04	-	-	-	-	-	-	-	0.033	-
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	<0.005	<0.005	<0.005	-	-	<0.005	<0.005	-	-	-	<0.005	-	-	-	-	-	-	-	<0.001	-
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.10	<0.10	<0.10	-	-	<0.10	<0.10	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Dissolved	mg/L	1.2	5	5	0.2	0.37	0.37	-	-	0.25	0.2	-	-	-	0.4	-	-	-	-	-	-	-	0.36	-
Cadmium: Dissolved	mg/L	*	no guideline	0.005	<0.0002	<0.0002	<0.0002	-	-	<0.0002	**0.0003 a**	-	-	-	**0.0021 a**	-	-	-	-	-	-	-	**0.0008 a**	-
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	84	84.6	79.4	78.1	-	48	49.5	119	82.3	-	74	-	-	-	-	-	-	-	144	-
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	<0.015	<0.015	<0.015	-	-	<0.015	<0.01	-	-	-	<0.001	-	-	-	-	-	-	-	<0.001	-
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	<0.015	<0.015	<0.015	-	-	<0.015	<0.01	-	-	-	<0.02	-	-	-	-	-	-	-	0.001	-
Copper: Dissolved	mg/L	*	0.5	1	<0.010	<0.010	<0.010	-	-	<0.010	<0.010	-	-	-	0.005	-	-	-	-	-	-	-	0.001	-
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	**2.8 bac**	**1.17 bac**	0.031	-	-	<0.030	0.05	-	-	-	0.07	-	-	-	-	-	-	-	0.1	-
Lead: Dissolved	mg/L	*	0.05	0.01	<0.001	<0.001	<0.001	-	-	<0.001	<0.001	-	-	-	<0.001	-	-	-	-	-	-	-	<0.001	-
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	<0.015	<0.015	<0.015	-	-	<0.015	<0.01	-	-	-	<0.02	-	-	-	-	-	-	-	-	-
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	21.6	21	18.5	18.8	-	11.3	10.9	28.8	21	-	18	-	-	-	-	-	-	-	22.9	-
Manganese: Dissolved	mg/L	*	no guideline	0.05	**7.3 abc**	**6.33 abc**	**6.97 abc**	-	-	**3.03 abc**	**3.01 abc**	-	-	-	**6.31 abc**	-	-	-	-	-	-	-	**6.43 abc**	-
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	<0.00005	-	-	-	-	-	-	-	<0.00005	-	-	-	-	-	-	-	<0.00005	-
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	<0.030	<0.030	<0.030	-	-	<0.030	<0.030	-	-	-	<0.03	-	-	-	-	-	-	-	<0.001	-
Nickel: Dissolved	mg/L	*	no guideline	no guideline	<0.020	<0.020	<0.020	-	-	<0.020	<0.020	-	-	-	<0.02	-	-	-	-	-	-	-	0.004	-
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	0.55	<0.30	0.38	-	-	<0.30	<0.30	-	-	-	-	-	-	-	-	-	-	-	<0.01	-
Potassium: Dissolved	mg/L	373	no guideline	no guideline	20.5	17	17.2	17.6	-	12.5	12	19	19	-	-	-	-	-	-	-	-	-	14.8	-
Selenium: Dissolved	mg/L	0.002	0.01	0.01	<0.0005	<0.0005	<0.0005	-	-	<0.0005	<0.0005	-	-	-	<0.0005	-	-	-	-	-	-	-	<0.002	-
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	8.94	13.2	12.9	-	-	11.2	10.8	-	-	-	-	-	-	-	-	-	-	-	32.8	-
Silver: Dissolved	mg/L	*	no guideline	no guideline	<0.010	<0.010	<0.010	-	-	<0.010	<0.01	-	-	-	<0.0001	-	-	-	-	-	-	-	<0.0001	-
Sodium: Dissolved	mg/L	no guideline	no guideline	200	39.1	71.8	81.3	85.3	-	37	35	94	67	-	65	-	-	-	-	-	-	-	89	-
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	0.393	0.412	0.393	-	-	0.225	0.224	-	-	-	-	-	-	-	-	-	-	-	0.57	-
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	<0.10	<0.10	<0.10	-	-	<0.10	<0.10	-	-	-	-	-	-	-	-	-	-	-	<0.0001	-
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.30	<0.30	<0.30	-	-	<0.30	<0.03	-	-	-	-	-	-	-	-	-	-	-	<0.001	-
Titanium: Dissolved	mg/L	2	no guideline	no guideline	<0.010	<0.010	<0.010	-	-	<0.010	<0.010	-	-	-	-	-	-	-	-	-	-	-	<0.001	-
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	-
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	<0.030	<0.030	<0.030	-	-	<0.030	<0.030	-	-	-	<0.03	-	-	-	-	-	-	-	<0.001	-
Zinc: Dissolved	mg/L	*	5	5	<0.005	0.016	0.106	-	-	**0.175 a**	0.031	-	-	-	0.026	-	-	-	-	-	-	-	0.015	-
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	-

Notes:

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BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC AWQG AL	BC AWQG DW	CDWG	HBT94-4 #######	HBT94-4 25-Oct-94	HBT94-4 #######	HBT94-4 22-Jun-95	HBT94-4 #######	HBT94-4 16-Jan-96	HBT94-4 23-Apr-96	HBT94-4 25-Jun-96	HBT94-4 5-Nov-96	HBT94-4 9-Jan-97	HBT94-4 10-Feb-97	HBT94-4 6-Mar-97	HBT94-4 7-May-97	HBT94-4 5-Jun-97	HBT94-4 #######	HBT94-4 2-Oct-97	HBT94-4 8-Dec-97	HBT94-4 12-Jan-98	HBT94-4 #######	HBT94-4 5-Mar-98
Total Metals																								
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	-	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	132	-	130	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	24.5	-	23	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	17.7	-	17	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	-	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-	-	-	-	-	-	-	35.4	-	35.4	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																								
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	232	55	99	-	-	31	29	-	-	-	55	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	32.1	14.6	14.8	-	-	4.2	6.1	-	-	-	13	-	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	33.7	17	14.8	-	-	4.9	7.1	-	-	-	13	-	-	-	-	-	-	-	-	-
Bacteria																								
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	<1	<1	<1	**68 b**	-	<1	<2	<2	<1	-	<2	<2	-	<2	-	<2	-	-	<1	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	**50 bc**	<1	**23 bc**	**56 bc**	-	**10 bc**	**30 bc**	**23 bc**	<1	-	**1600 bc**	-	-	**7 bc**	-	**49 bc**	-	-	<1	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																								
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC AWQG AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.
BC AWQG DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.
CDWG - Canadian Drinking Water Quality Guidelines.
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC AWQG AL).
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC AWQG DW).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-4 ######	HBT94-4 ######	HBT94-4 ######	HBT94-4 ######	HBT94-4 ######	HBT94-4 ######	HBT94-4 ######	HBT94-4 ######	HBT94-4 ######	HBT94-4 ######	HBT94-4 ######	HBT94-4 25-Nov-99	HBT94-4 1-Mar-00	HBT94-4 19-Apr-00	HBT94-4 2-Aug-00	HBT94-4 13-Sep-00	HBT94-4 24-Oct-00	HBT94-4 6-Feb-01	HBT94-4 10-May-01	HBT94-4 ######
Physical Tests																								
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	-	-	-	**6.48 abc**	6.69	6.54	6.7	7.45	7.42	**6.27 abc**	-	**6.07 abc**	6.83	6.59	**6.19 abc**	**6.12 abc**	**5.98 abc**	7.6	7.71
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	6.88	7.11	6.93	7.04	-	7.09	-	-	6.99	7.08	7.07	7.1	7.26	7.21	7.25	6.92	6.82	6.85	6.98	-
Specific Conductance (Field)	uS/cm	no guideline	no guideline	no guideline	-	-	-	-	**893 b**	81	**783 b**	**764 b**	648	590.7	580	-	803	575	660	**988 b**	**1443 b**	**2090 b**	321	137.5
Specific Conductance (Lab)	uS/cm	no guideline	no guideline	no guideline	**1340 b**	**1220 b**	**1230 b**	**1050 b**	-	**765 b**	-	-	592	596	566	560	542	459	682	**973 b**	**1440 b**	**1540 b**	280	-
Temperature (Field)	deg C	-	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.8	13.3	**19.2 abc**
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	145	-	-	-	138	-	-	-	-	-	-	-
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	**1100 bc**	**737 bc**	**728 bc**	**608 bc**	-	420	-	-	295	293	286	282	267	267	321	488	**838 bc**	**834 bc**	156	-
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																								
Ammonia (as N)	mg/L	-	no guideline	no guideline	-	-	-	-	-	-	-	-	**17.5 a**	-	-	-	19.4	-	-	-	-	**29.4 a**	-	-
Nitrogen: Nitrite (as N) (Lab)	mg/L	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Lab)	mg/L	600	250	250	87.7	-	-	77.5	-	34.4	-	-	21.1	20.8	20.1	21.2	19.3	18.8	24.5	49.1	86.1	97.4	4.1	-
Fluoride: Dissolved	mg/L	*	1.5	1.5	-	-	-	-	-	-	-	-	-	**7.9 abc**	-	-	-	-	-	-	-	-	**6.6 abc**	-
Sulphate (Lab)	mg/L	100	500	500	3.9	-	-	11.8	-	9.1	-	-	7.7	-	8	8.1	7.6	7.7	7.3	4	<2.5	4	-	-
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	581	-	-	484	-	354	-	-	271	270	272	261	272	269	306	446	742	748	158	-
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	331	-	-	-	332	-	-	-	-	912	-	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																								
Aluminum: Dissolved	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	0.01	<0.2	<0.05
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-	-	-	-	<0.001	<0.2	<0.2
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	0.001	-	-	-	0.001	-	-	-	-	0.002	<0.3	<0.03
Barium: Dissolved	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	0.018	-	-	-	0.016	-	-	-	-	0.046	0.097	0.003
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-	-	-	-	<0.001	<0.003	<0.003
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Dissolved	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	0.27	-	-	-	0.33	-	-	-	-	0.5	0.06	0.03
Cadmium: Dissolved	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	**0.0013 a**	-	-	-	<0.0002	-	-	-	-	**0.0003 a**	<0.025	<0.025
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	39.7	45.1	44.8	-	36.4	37.8	-	-	165	153	33.4	18.2
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-	-	-	-	0.001	<0.03	<0.03
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-	-	-	-	0.003	<0.02	<0.02
Copper: Dissolved	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	0.002	-	-	-	<0.001	-	-	-	-	<0.001	<0.02	<0.02
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	<0.05	-	-	-	0.06	-	-	-	-	**0.63 bac**	<0.03	0.09
Lead: Dissolved	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-	-	-	-	<0.001	<0.08	<0.03
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	7.33	9.71	9.78	-	9.52	8.6	-	-	25.4	30.4	4.75	6.24
Manganese: Dissolved	mg/L	no guideline	no guideline	0.05	-	-	-	-	-	-	-	-	**1.42 bc**	-	-	-	**1.59 bc**	-	-	-	-	**5.23 abc**	**0.8 bc**	**0.24 bc**
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	<0.05	-	-	-	<0.02	-	-	-	-	<0.02	-	-
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	0.002	-	-	-	<0.001	-	-	-	-	0.001	<0.04	<0.04
Nickel: Dissolved	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	0.003	-	-	-	0.002	-	-	-	-	0.005	<0.03	<0.03
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	<0.01	-	-	-	<0.01	-	-	-	-	0.06	<0.4	<0.4
Potassium: Dissolved	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-	10.9	13.7	13.8	-	12.7	11.1	-	-	21.7	17.1	3.42	3.43
Selenium: Dissolved	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	<0.002	-	-	-	<0.002	-	-	-	-	<0.002	-	-
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	18.7	-	-	-	28	-	-	-	-	33.1	19.4	13.6
Silver: Dissolved	mg/L	-	no guideline	no guideline	-	-	-	-	-	-	-	-	<0.0001	-	-	-	<0.0001	-	-	-	-	<0.0001	<0.03	<0.03
Sodium: Dissolved	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-	-	24.8	33.6	33.3	-	33.3	32.3	-	-	99.9	76.4	9.9	3.3
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	0.2	-	-	-	0.19	-	-	-	-	0.66	0.11	0.047
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-	-	-	-	<0.001	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	<0.0001	-	-	-	<0.0001	-	-	-	-	0.0001	-	-
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	<0.0005	-	-	-	<0.0005	-	-	-	-	<0.0005	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-	-	-	-	<0.001	<0.03	<0.03
Titanium: Dissolved	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-	-	-	-	<0.001	<0.006	<0.006
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	<0.0005	-	-	-	<0.0005	-	-	-	-	<0.0005	-	-
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-	-	-	-	0.002	<0.01	<0.01
Zinc: Dissolved	mg/L	*	5	5	-	-	-	-	-	-	-	-	0.013	-	-	-	*	-	-	-	-	0.005	<0.02	<0.005
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	<0.001	-	-	-	<0.01	-	-	-	-	<0.01	<0.02	<0.02

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC AWQG AL	BC AWQG DW	CDWG	HBT94-4 #######	HBT94-4 #######	HBT94-4 #######	HBT94-4 #######	HBT94-4 #######	HBT94-4 #######	HBT94-4 #######	HBT94-4 #######	HBT94-4 #######	HBT94-4 #######	HBT94-4 25-Nov-99	HBT94-4 1-Mar-00	HBT94-4 19-Apr-00	HBT94-4 2-Aug-00	HBT94-4 13-Sep-00	HBT94-4 24-Oct-00	HBT94-4 6-Feb-01	HBT94-4 10-May-01	HBT94-4 #######
Total Metals																							
Aluminum: Total	mg/L	-	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	-	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	139	-	-	78.9	-	59.6	-	-	-	-	43.5	-	35.6	48.4	123	186	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	-	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	-	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	25.3	-	-	19.8	-	14.5	-	-	-	-	9.58	-	8.06	12.5	22.2	29.1	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	-	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	15.4	-	-	23.2	-	16.1	-	-	-	-	14.4	-	13	14.9	18.7	22.8	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	-	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	68.3	-	-	72.1	-	44.4	-	-	-	-	33.4	-	29.5	38.2	26.2	64.1	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	-	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																							
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	28	-	-	<25	-	-	-	32	-	-	-
Organic Carbon, Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	4.5	-	-	8.4	-	-	-	18	6.9	2.7	-
Organic Carbon, Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	4.6	-	-	7.4	-	-	-	16	-	-	-
Bacteria																							
Coliforms, Fecal	MPN/100 ml	no guideline	0	no guideline	<2	-	-	-	-	-	-	-	<2	<2	2 b	<2	2 b	<2	<2	<2	31 b	<2	<1	<1
Coliforms, Total	MPN/100 ml	no guideline	0	0	**3500 bc**	-	-	-	-	-	-	-	**79 bc**	**4 bc**	**54000 bc**	**9200 bc**	**460 bc**	**15 bc**	**540 bc**	**3000 bc**	**95 bc**	<2	<1	<1
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																							
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	-	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC AWQG AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.
BC AWQG DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.
CDWG - Canadian Drinking Water Quality Guidelines.
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC AWQG AL).
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC AWQG DW).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-4 31-Oct-01	HBT94-4 29-Jan-02	HBT94-4 8-May-02	HBT94-4 22-Aug-02	HBT94-4 14-Nov-02	HBT94-4 17-Mar-03	HBT94-4 16-Jun-03	HBT94-4 24-Sep-03	HBT94-4 18-Dec-03	HBT94-4 15-Mar-04	HBT94-4 28-Sep-04	HBT94-4 4-May-05	HBT94-4 29-Sep-05	HBT94-4 20-Apr-06	HBT94-4 19-Oct-06	HBT94-4 19-Apr-07	HBT94-4 25-Oct-07	HBT94-4 8-Apr-08	HBT94-4 23-Oct-08	HBT94-4 27-Aug-09	HBT94-4 9-Dec-09	HBT94-4 29-Apr-10	HBT94-4 2-Nov-10
Physical Tests																											
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	8.08	6.83	**6.32 abc**	6.65	7.62	8.3	7.58	7.01	7.01	7.46	7.79	7.47	6.956	7.564	8.1	6.61	7.68	6.87	7.51	8.2	7.4	7.82	7.74
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	7.34	7.62	7.73	7.07	7.4	7.57	7.66	7.5	7.5	7.9	7.6	8	7.8	7.8	8.17	7.82	8.1	8.16	7.92	8.11	8.2	8.06
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	259	348	217	138.3	350	190	165	160	202	190	201	220	177.6	197.8	115	157	126	134	170	103	89	139	194
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	-	283	201	159	539	270	188	182	214	211	207	211	187.9	188.6	157	184	174	161	233	127	109	189	190
Temperature (Field)	deg C	19	15	15	8.6	7.2	10.2	14.7	10.9	7.1	**18.9 bc**	12.1	10.2	12.7	10.6	13.4	10.6	12.3	10.66	12.16	10.11	11.45	10.16	10.53	10.33	12.88	10.3
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	-	-	-	-	**3.2 a**	6.97	**1.19 a**	9.85	6.9	7.52	**0.47 a**	**0 a**	**0.9 a**	**0.9 a**	**1.58 a**	**2.90 a**	9.79	24.11	8.84	7.91	12.17	17
Hardness, Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	112	-	61	126	148.1	89	89	97	103.6	100	100	93	92	78	102	91.8	79.2	135	69.1	101	96	72.6
Dissolved Solids, Total	mg/L	no guideline	no guideline	no guideline	-	172	111	98	211	173	53	127	107	133	120	87	80	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	664.5	12.1	-86.1	106.3	227.2	172	10.7
Anions and Nutrients																											
Ammonia (as N)	mg/L	-	no guideline	no guideline	-	2.5	-	-	-	0.69	-	-	-	-	0.3	0.35	<0.20	0.23	0.23	0.262	0.293	0.236	0.179	<0.01	<0.01	<0.01	<0.01	<0.005
Nitrogen, Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	<0.03	<0.1	<0.1	<0.01	<0.01	<0.01	0.0018	<0.0010	0.0013	<0.002	<0.002	0.008	<0.006
Nitrogen, Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	<0.01	<0.1	<0.1	<0.01	0.01	0.0063	0.0095	<0.0050	0.0388	0.12	0.07	0.16	0.11
Chloride (Lab)	mg/L	600	250	250	-	7.1	6.4	1.8	12.4	7.64	2.9	3.2	3.1	4.4	1.7	3.5	2	2.2	1.3	2.24	1.81	1.81	1.5	1.50	1.2	1.4	1.5
Fluoride, Dissolved	mg/L	1.5	1.5	1.5	-	-	-	-	-	-	-	-	-	-	<1	-	<0.1	<0.1	<0.1	<0.020	<0.020	<0.020	<0.020	<0.05	<0.05	0.02	0.02
Sulphate (Lab)	mg/L	100	500	500	-	7	4.4	4.1	5.9	6	5.2	3.8	4.8	3.9	3.5	4.3	3.7	4.5	4.5	3.59	2.97	3.74	2.79	3.60	3.07	3.7	2.5
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	137	106	80.1	264	-	-	-	-	-	-	-	94	-	-	94.5	86.7	77.3	128	60.8	107	95	94
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	167	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																											
Aluminum, Dissolved	mg/L	*	0.2	0.1	<0.05	<0.05	<0.05	0.015	0.006	<0.005	<0.005	<0.005	0.057	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0025	<0.0050	0.0063	<0.0050	0.004	0.003	0.004	0.006
Antimony, Dissolved	mg/L	0.02	no guideline	0.006	<0.2	<0.2	<0.2	<0.001	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00010	<0.00050	<0.00050	<0.00050	0.0002	0.0001	<0.0005	<0.0005
Arsenic, Dissolved	mg/L	0.005	0.025	0.01	<0.03	<0.03	<0.03	0.001	<0.001	0.0028	0.0019	0.0017	0.0017	0.002	0.0014	0.002	0.0014	0.0017	0.0011	0.00156	0.00099	0.00122	0.00067	0.0007	0.0005	0.0004	0.0003
Barium, Dissolved	mg/L	5	no guideline	1	0.01	0.011	0.004	0.003	0.004	0.005	0.002	0.006	0.002	0.004	0.002	0.003	0.003	0.002	0.001	0.0017	<0.020	<0.020	<0.020	0.001	0.0018	0.002	0.001
Beryllium, Dissolved	mg/L	0.0053	0.004	no guideline	<0.003	<0.003	<0.003	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0001	<0.0001
Bismuth, Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	<0.001	<0.001	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.00050	<0.26	-	<0.0002	<0.0002	<0.0001	<0.001
Boron, Dissolved	mg/L	1.2	5	5	0.02	0.02	0.01	<0.05	<0.05	0.032	0.026	0.014	0.036	0.033	0.011	0.036	0.012	0.013	0.013	0.024	<0.10	<0.10	<0.10	<0.01	0.011	<0.05	<0.05
Cadmium, Dissolved	mg/L	*	no guideline	0.005	<0.025	<0.025	<0.025	<0.0002	<0.0002	<0.00001	<0.00001	<0.00001	0.00002	<0.00001	<0.00001	0.00002	<0.00001	<0.00001	**0.00093 a**	**0.000069 a**	**0.000131 a**	**0.000048 a**	**0.000281 a**	<0.00004	0.00001	**0.00027 a**	<0.00001
Calcium, Dissolved	mg/L	no guideline	no guideline	no guideline	32.6	36.8	34.2	21	44.2	52.4	31.2	31.3	34.3	36.7	35.4	35.4	33.3	32.5	27	33.1	28.4	48.7	21.4	26.8	34	25.2	
Chromium, Dissolved	mg/L	0.001	no guideline	0.05	<0.03	<0.03	<0.03	<0.001	<0.001	0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.0010	<0.0010	<0.0010	0.0002	<0.0002	<0.001	<0.001
Cobalt, Dissolved	mg/L	0.11	no guideline	no guideline	<0.02	<0.02	<0.02	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00030	<0.00030	<0.00030	<0.0002	<0.0001	<0.0005	<0.0005
Copper, Dissolved	mg/L	*	0.5	1	<0.02	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00017	<0.0010	<0.0010	<0.0010	0.0008	0.0004	0.0004	0.0003
Iron, Dissolved (Lab)	mg/L	0.35	no guideline	0.3	0.07	<0.01	0.24	<0.05	0.15	<0.01	<0.01	<0.01	0.2	<0.01	0.01	<0.01	<0.01	0.07	0.03	-	0.032	0.038	0.052	<0.01	<0.01	<0.005	<0.005
Lead, Dissolved	mg/L	*	0.05	0.01	<0.03	<0.03	<0.03	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0000050	<0.00050	<0.00050	<0.00050	<0.0002	<0.00005	<0.0002	<0.0002
Lithium, Dissolved	mg/L	0.87	no guideline	no guideline	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0050	<0.0050	<0.0050	<0.0050	<0.0002	<0.0001	<0.005	<0.005
Magnesium, Dissolved	mg/L	no guideline	no guideline	no guideline	3.82	4.97	3.49	2.06	3.72	4.2	2.6	2.6	2.7	2.8	2.7	2.8	2.4	2.8	2.1	-	2.24	3	3.11	1.36	2.25	2.7	2.36
Manganese, Dissolved	mg/L	no guideline	no guideline	0.05	**0.39 bc**	**0.92 bc**	**0.64 bc**	**0.37 bc**	**0.74 bc**	**0.953 bc**	**0.529 bc**	**0.485 bc**	**0.581 bc**	**0.76 bc**	**0.617 bc**	**0.872 bc**	**0.605 bc**	**0.571 bc**	**0.367 bc**	**0.563 bc**	**0.324 bc**	**0.321 bc**	**0.420 bc**	0.044	**0.063 bc**	0.05	0.025	
Mercury, Dissolved	mg/L	no guideline	0.001	0.001	-	-	-	<0.00002	<0.00002	-	-	-	-	-	-	-	-	-	-	<0.000020	<0.000020	<0.000020	<0.000020	<0.00002	<0.02	<0.00002	<0.00002
Molybdenum, Dissolved	mg/L	2	0.25	no guideline	<0.04	<0.04	<0.04	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000241	<0.0010	<0.0010	<0.0010	0.0002	0.0001	<0.001	<0.001
Nickel, Dissolved	mg/L	*	no guideline	no guideline	<0.03	<0.03	<0.03	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	<0.001	<0.001
Phosphorus, Dissolved	mg/L	no guideline	no guideline	no guideline	<0.4	<0.4	<0.4	0.13	0.02	-	-	-	-	-	-	-	-	-	-	<0.30	0.016	<0.30	-	<0.03	<0.015	-	-
Potassium, Dissolved	mg/L	373	no guideline	no guideline	4.4	3.4	2.4	1.93	2.02	2.2	1.7	1.4	1.3	1.4	0.8	0.9	0.7	0.8	0.5	-	<2.0	<2.0	<2.0	<2.0	0.59	0.68	0.71	0.54
Selenium, Dissolved	mg/L	0.002	0.01	0.01	-	-	-	<0.001	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0010	<0.0010	<0.0010	<0.0010	**0.0046 a**	0.0001	0.0015	0.0008
Silicon, Dissolved	mg/L	no guideline	no guideline	no guideline	12.8	12.8	14	10.6	8.74	-	-	-	3.83	-	-	-	3.64	4.67	3.36	4.6	-	3.69	-	3.31	2.87	4.7	3.3
Silver, Dissolved	mg/L	*	no guideline	no guideline	<0.03	<0.03	<0.03	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0000010	<0.000020	<0.000020	<0.000020	<0.000005	<0.0000004	<0.00002	<0.00002
Sodium, Dissolved	mg/L	no guideline	no guideline	200	2.9	2.3	4.3	1.95	1.71	3.1	2.6	1.8	1.8	1.5	1.7	1.5	4.1	1.8	2	1.3	<2.0	<2.5	<2.0	1.17	1.23	1.31	1.18
Strontium, Dissolved	mg/L	no guideline	no guideline	no guideline	0.077	0.21	0.1	0.051	0.12	0.119	0.064	0.07	0.076	0.073	0.066	0.075	0.074	0.058	0.045	0.0576	-	0.0488	-	0.037	0.064	0.054	0.054
Sulphur, Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	2.03	1.63	1.21	1.15	1.52	1.08	1	1.2	1.4	1.4	1.23	-	1.22	1.42	1.02	<2	<3	<3	<3
Tellurium, Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002	-	-
Thallium, Dissolved	mg/L	0.0003	0.002	no guideline	-	-	-	<0.0001	<0.0001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00010	<0.00020	<0.00020	<0.00020	<0.00002	<0.00002	<0.00005	<0.00005
Thorium, Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	<0.0005	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.00005	-	-
Tin, Dissolved	mg/L	no guideline	no guideline	no guideline	<0.03	<0.03	<0.03	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00010	<0.00050	<0.00050	<0.00050	<0.0002	<0.0001	<0.005	<0.005
Titanium, Dissolved	mg/L	2	no guideline	no guideline	<0.006	<0.006	<0.006	<0.001	<0.001	<0.0005	<0.0005	<0.0005	0.0045	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.010	<0.010	<0.010	<0.0002	<0.0002	<0.005	<0.005
Tungsten, Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	-	-
Uranium, Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	<0.0005	<0.0005	-	-	-	-	-	-	-	-	-	-	0.000032	<0.00020	<0.00020	0.00028	0.0001	0.00021	0.0001	<0.0001
Vanadium, Dissolved	mg/L	0.006	no guideline	no guideline	<0.01	<0.01	<0.01	<0.001	<0.001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0008	0.0001	0.0002	0.0008	<0.0001	<0.00010	<0.0010	<0.0010	<0.0010	**0.008 a**	0.006	<0.005	<0.005
Zinc, Dissolved	mg/L	*	5	5	<0.005	<0.005	0.006	0.008	0.006	<0.001	0.002	0.001	<0.001	0.001	0.002	<0.001	0.001	0.003	0.006	0.0021	<0.0050	<0.0050	<0.0050	<0.001	<0.001	<0.005	<0.005
Zirconium, Dissolved	mg/L	no guideline	no guideline	no guideline	<0.02	<0.02	<0.02	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.002	<0.0001	<0.0005	<0.0005

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-4	HBT94-4	HBT94-4	HBT94-4	HBT94-4	HBT94-4	HBT94-4	HBT94-4	HBT94-4	HBT94-4	HBT94-4	HBT94-4	HBT94-4	HBT94-4	HBT94-4	HBT94-4	HBT94-4	HBT94-4	HBT94-4	HBT94-4	HBT94-4	HBT94-4	HBT94-4
					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	28-Sep-04	4-May-05	29-Sep-05	20-Apr-06	19-Oct-06	19-Apr-07	25-Oct-07	8-Apr-08	23-Oct-08	27-Aug-09	9-Dec-09	29-Apr-10	2-Nov-10
Total Metals																											
Aluminum: Total	mg/L	-	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	-	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	-	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	-	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																											
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	<5	<5	<5	<5	<5	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	1.1	<1	-	2	-	-	-	-	-	<1	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	1.3	-	1.1	-	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria																											
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	<1	<1	<1	-	<1	<10	**32 bc**	**280 bc**	<10	<1	**158 bc**	-	-	-	-	-	-	-	-	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																											
Hardness, Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	<50	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	<29	22	4	<30	7	<2.5	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	-	-	-	-	-	-	-	-	-	2.58	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	<10	-	<10	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	<0.1	<0.1	0.1	0.2	0.2	<0.01	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	**0.4 bac**	<0.1	0.2	0.3	0.2	0.13	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	**1.5 bc**	**0.8 bc**	**0.3 bc**	**0.3 bc**	**0.5 bc**	<1	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

~~Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).~~

~~parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).~~

~~Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).~~

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-4 9-Mar-11	HBT94-4 11-May-11	HBT94-4 16-Aug-11	HBT94-4 29-Nov-11	HBT94-4 22-Feb-12	HBT94-4 24-May-12	HBT94-4 17-Aug-12	HBT94-4 5-Dec-12
Physical Tests												
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.56	7.53	7.88	8.14	7.8	7.9	8.03	8.05
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.65	7.87	7.81	8.08	7.98	7.98	7.97	8.18
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	194	202	153	154	156	159	127	217
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	214	198	168	171	183	180	132	222
Temperature (Field)	deg C	19	15	15	12.95	12.83	11.1	9.69	11.5	11.9	10.68	9.94
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	**3.05 a**	6.29	7.88	9.03	**3.9 a**	**4.8 a**	5.13	5.1
Hardness, Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	116	98.7	76.9	83.9	90.1	78.3	62.4	110
Dissolved Solids, Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	100	100	82	142
Oxidation Reduction Potential	mV	no guideline	no guideline	500	-384.9	228.1	114.4	106.8	56.4	161	98.4	29
Anions and Nutrients												
Ammonia (as N)	mg/L		no guideline	no guideline	0.048	0.034	0.053	0.051	0.0094	0.012	0.01	0.028
Nitrogen, Nitrite (as N) (Lab)	mg/L	*	1	3.2	<0.005	0.013	<0.005	<0.005	<0.005	<0.0050	<0.0050	0.0102
Nitrogen, Nitrate (as N) (Lab)	mg/L	32.8	10	10	0.23	0.42	0.19	0.168	0.117	0.179	0.15	<0.020
Chloride (Lab)	mg/L	600	250	250	3.8	3.9	2.2	1.2	2.4	3.5	1.8	1.7
Fluoride, Dissolved	mg/L	*	1.5	1.5	0.01	0.02	0.01	0.018	0.025	0.024	0.024	0.017
Sulphate (Lab)	mg/L	100	500	500	3.4	4.7	2.8	3.45	3.55	3.67	2.03	2.43
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	100	95	71	83.2	87.6	73	62.3	110
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	107	89	76	134
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	<0.50	<0.50	<0.50	<0.50
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	<0.50	<0.50	<0.50	<0.50
Dissolved Metals												
Aluminum, Dissolved	mg/L	*	0.2	0.1	0.004	0.005	0.003	<0.0030	0.003	0.00434	0.00505	0.00327
Antimony, Dissolved	mg/L	0.02	no guideline	0.006	<0.0005	<0.0005	<0.0005	<0.00050	0.00009	0.000128	0.000114	0.000073
Arsenic, Dissolved	mg/L	0.005	0.025	0.01	0.0004	0.0004	0.0004	0.00027	0.00025	0.000241	0.000149	0.000327
Barium, Dissolved	mg/L	5	no guideline	1	0.002	0.002	0.001	0.0012	0.00133	0.00106	0.00089	0.00157
Beryllium, Dissolved	mg/L	0.0053	0.004	no guideline	<0.0001	<0.0001	<0.0001	<0.00010	<0.00001	<0.000013	<0.000010	<0.000010
Bismuth, Dissolved	mg/L	no guideline	no guideline	no guideline	<0.001	<0.001	<0.001	<0.0010	<0.000005	<0.0000050	<0.0000050	<0.0000050
Boron, Dissolved	mg/L	1.2	5	5	<0.05	<0.05	<0.05	<0.050	<0.05	<0.0500	<0.050	<0.050
Cadmium, Dissolved	mg/L	*	no guideline	0.005	0.00003	**0.00007 a**	<0.00001	<0.000010	<0.000005	<0.0000050	<0.0000050	<0.0000050
Calcium, Dissolved	mg/L	no guideline	no guideline	no guideline	41	34.7	27.9	30.2	32.3	28.3	22.5	39.2
Chromium, Dissolved	mg/L	0.001	no guideline	0.05	<0.001	<0.001	<0.001	<0.0010	<0.0001	0.00016	0.00022	<0.00010
Cobalt, Dissolved	mg/L	0.11	no guideline	no guideline	<0.0005	<0.0005	<0.0005	<0.00050	0.000009	0.0000133	0.00001	0.000001
Copper, Dissolved	mg/L	*	0.5	1	0.0007	0.0008	0.0004	0.00028	0.00019	0.000382	0.000248	0.000436
Iron, Dissolved (Lab)	mg/L	0.35	no guideline	0.3	0.01	0.008	<0.005	<0.0050	0.004	<0.0010	0.0018	0.0023
Lead, Dissolved	mg/L	*	0.05	0.01	<0.0002	<0.0002	<0.0002	<0.00020	<0.000005	<0.0000050	<0.0000050	0.000015
Lithium, Dissolved	mg/L	0.87	no guideline	no guideline	-	-	<0.005	<0.0050	<0.0005	<0.00050	<0.00050	<0.00050
Magnesium, Dissolved	mg/L	no guideline	no guideline	no guideline	3.23	2.47	1.75	2.03	2.32	1.85	1.6	3.93
Manganese, Dissolved	mg/L	*	no guideline	0.05	**0.121 c**	**0.104 c**	0.03	0.0243	0.0296	0.00716	0.000256	0.00124
Mercury, Dissolved	mg/L	no guideline	0.001	0.001	<0.00005	<0.00005	<0.00005	<0.000050	< 0.00001	<0.000010	0.000013	<0.000010
Molybdenum, Dissolved	mg/L	2	0.25	no guideline	<0.001	<0.001	<0.001	<0.0010	0.00007	0.000133	0.000162	0.000132
Nickel, Dissolved	mg/L	*	no guideline	no guideline	<0.001	<0.001	<0.001	<0.0010	0.00002	0.000258	<0.000020	0.000102
Phosphorus, Dissolved	mg/L	no guideline	no guideline	no guideline	<0.01	<0.01	-	-	0.63	0.0054	0.0134	0.0089
Potassium, Dissolved	mg/L	373	no guideline	no guideline	0.86	0.72	0.53	0.549	0.009	0.57	0.479	0.597
Selenium, Dissolved	mg/L	0.002	0.01	0.01	0.0003	0.0008	0.001	0.00072	0.00102	0.00224	0.0017	0.0002
Silicon, Dissolved	mg/L	no guideline	no guideline	no guideline	5.5	4.6	3.7	3.33	4	3.88	3.2	3.73
Silver, Dissolved	mg/L	*	no guideline	no guideline	<0.00002	<0.00002	<0.00002	<0.000020	<0.000005	<0.0000050	<0.0000050	<0.0000050
Sodium, Dissolved	mg/L	no guideline	no guideline	200	2.73	2.71	1.73	1.55	1.92	1.47	1.28	1.9
Strontium, Dissolved	mg/L	no guideline	no guideline	no guideline	0.091	0.081	0.047	0.0619	0.0544	0.0461	0.0353	0.0641
Sulphur, Dissolved	mg/L	no guideline	no guideline	no guideline	<3	<3	<3	<3.0	<10	<15	<10	<3.0
Tellurium, Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-
Thallium, Dissolved	mg/L	0.0003	0.002	no guideline	<0.00005	<0.00005	<0.00005	<0.000050	<0.000002	0.0000024	0.000002	0.000004
Thorium, Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-
Tin, Dissolved	mg/L	no guideline	no guideline	no guideline	<0.005	<0.005	<0.005	<0.0050	<0.0002	<0.00020	<0.00020	0.00024
Titanium, Dissolved	mg/L	2	no guideline	no guideline	<0.005	<0.005	<0.005	<0.0050	<0.0005	<0.00050	<0.00050	<0.00050
Tungsten, Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-
Uranium, Dissolved	mg/L	0.3	no guideline	0.02	<0.0001	<0.0001	< 0.0001	<0.00010	0.000058	0.0000475	0.000045	0.00006
Vanadium, Dissolved	mg/L	0.006	no guideline	no guideline	<0.005	<0.005	<0.005	<0.0050	0.0034	0.00372	0.00507	0.00483
Zinc, Dissolved	mg/L	*	5	5	<0.005	<0.005	<0.005	<0.0050	0.0002	0.00382	0.00031	0.00065
Zirconium, Dissolved	mg/L	no guideline	no guideline	no guideline	<0.0005	<0.0005	<0.0005	<0.00050	<0.0001	<0.00010	<0.00010	<0.00010

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-4 9-Mar-11	HBT94-4 11-May-11	HBT94-4 16-Aug-11	HBT94-4 28-Nov-11	HBT94-4 22-Feb-12	HBT94-4 24-May-12	HBT94-4 17-Aug-12	HBT94-4 5-Dec-12
Total Metals												
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-
Iron, Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-
Phosphorous: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-
Organic Parameters												
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-
Bacteria												
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	-	-	-	-	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)												
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water

CDWG - Canadian Drinking Water Quality Guidelines

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-5 19-Jul-94	HBT94-5 26-Oct-94	HBT94-5 2-Mar-95	HBT94-5 22-Jun-95	HBT94-5 20-Jul-95	HBT94-5 16-Jan-96	HBT94-5 28-Feb-96	HBT94-5 23-Apr-96	HBT94-5 5-Nov-96	HBT94-5 9-Jan-97	HBT94-5 10-Feb-97	HBT94-5 6-Mar-97	HBT94-5 7-May-97	HBT94-5 5-Jun-97	HBT94-5 31-Jul-97	HBT94-5 2-Oct-97	HBT94-5 8-Dec-97	HBT94-5 12-Jan-98	HBT94-5 3-Feb-98
Physical Tests																							
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.27	6.58	6.93	6.71	6.78	6.78	6.75	7.21	6.51	6.65	6.71	7	**6.34 abc**	**6.42 abc**	**6.47 abc**	6.95	6.84	**6.47 abc**	6.76
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	438	484	270	373	451	225	254	340	230	236	156	203	326	400	271	206	293	175	193
Temperature (Field)	deg C	19	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	66.1	185	-	-	-	80.4	-	114	-	-	53.2	-	-	-	-	-	-	-	74
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	249	282	167	188	226	156	127	218	194	118	105	102	180	259	147	160	188	114	183
Anions and Nutrients		no guideline	no guideline	no guideline																			
Ammonia (as N)	mg/L				0.032	0.014	-	-	-	<0.005	-	<0.005	-	-	<0.005	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Lab)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Lab)	mg/L	32.8	10	10	17.3	22.6	7	-	-	8.2	-	6.5	10.7	-	5.5	-	-	5.4	-	7.8	-	-	4.3
Fluoride: Dissolved	mg/L	600	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Lab)	mg/L	*	1.5	1.5	-	-	21	-	-	12.9	-	21.3	9.5	-	4	-	-	67	-	9.5	-	-	3.7
Alkalinity (as $CaCO_3$) (Lab)	mg/L	100	500	500	189	189	109	-	-	93.2	-	145	133	-	69	-	-	132	-	77.3	-	-	94.8
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals		no guideline	no guideline	no guideline																			
Aluminum: Dissolved	mg/L				<0.20	<0.20	-	-	-	<0.20	-	<0.20	-	-	<0.005	-	-	-	-	-	-	-	0.012
Antimony: Dissolved	mg/L	*	0.2	0.1	<0.20	<0.20	-	-	-	<0.20	-	<0.20	-	-	-	-	-	-	-	-	-	-	<0.001
Arsenic: Dissolved	mg/L	0.02	no guideline	0.006	0.0009	0.0001	-	-	-	<0.0001	-	<0.0001	-	-	0.0001	-	-	-	-	-	-	-	<0.001
Barium: Dissolved	mg/L	0.005	0.025	0.01	0.013	0.019	-	-	-	0.011	-	<0.01	-	-	<0.01	-	-	-	-	-	-	-	0.004
Beryllium: Dissolved	mg/L	5	no guideline	1	<0.005	<0.005	-	-	-	<0.005	-	<0.005	-	-	<0.005	-	-	-	-	-	-	-	<0.001
Bismuth: Dissolved	mg/L	0.0053	0.004	no guideline	<0.10	<0.10	-	-	-	<0.10	-	<0.10	-	-	-	-	-	-	-	-	-	-	-
Boron: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.10	0.11	-	-	-	<0.10	-	<0.10	-	-	<0.1	-	-	-	-	-	-	-	<0.05
Cadmium: Dissolved	mg/L	1.2	5	5	<0.0002	<0.0002	-	-	-	**0.0024 a**	-	**0.0017 a**	-	-	**0.0015 a**	-	-	-	-	-	-	-	**0.0024 a**
Calcium: Dissolved	mg/L	*	no guideline	0.005	21.8	56.2	27.9	-	-	25.5	-	37.2	37.1	-	16.1	-	-	-	-	-	-	-	22.5
Chromium: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.015	<0.015	-	-	-	<0.015	-	<0.01	-	-	<0.001	-	-	-	-	-	-	-	<0.001
Cobalt: Dissolved	mg/L	0.001	no guideline	0.05	<0.015	<0.015	-	-	-	<0.015	-	<0.01	-	-	<0.02	-	-	-	-	-	-	-	<0.001
Copper: Dissolved	mg/L	0.11	no guideline	no guideline	<0.010	<0.010	-	-	-	<0.010	-	<0.01	-	-	0.003	-	-	-	-	-	-	-	0.002
Iron: Dissolved (Lab)	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Dissolved	mg/L	0.35	no guideline	0.3	<0.001	<0.001	-	-	-	<0.001	-	<0.001	-	-	<0.001	-	-	-	-	-	-	-	<0.001
Lithium: Dissolved	mg/L	*	0.05	0.01	<0.015	<0.015	-	-	-	<0.015	-	<0.01	-	-	<0.02	-	-	-	-	-	-	-	-
Magnesium: Dissolved	mg/L	0.87	no guideline	no guideline	2.85	10.9	4.75	-	-	4.09	-	5	6.24	-	3.18	-	-	-	-	-	-	-	3.62
Manganese: Dissolved	mg/L	no guideline	no guideline	no guideline	**0.121 bc**	**0.189 bc**	-	-	-	**0.4 bc**	-	0.009	-	-	**0.215 bc**	-	-	-	-	-	-	-	0.001
Mercury: Dissolved	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	<0.00005	-	-	-	-	-	-	-	<0.00005
Molybdenum: Dissolved	mg/L	no guideline	0.001	0.001	<0.030	<0.030	-	-	-	<0.030	-	<0.030	-	-	<0.03	-	-	-	-	-	-	-	<0.001
Nickel: Dissolved	mg/L	2	0.25	no guideline	<0.020	0.114	-	-	-	<0.020	-	<0.020	-	-	<0.02	-	-	-	-	-	-	-	<0.001
Phosphorus: Dissolved	mg/L	*	no guideline	no guideline	<0.30	<0.30	-	-	-	<0.30	-	<0.30	-	-	-	-	-	-	-	-	-	-	0.04
Potassium: Dissolved	mg/L	no guideline	no guideline	no guideline	1.86	<2.0	2.6	-	-	<2.0	-	2	<2	-	-	-	-	-	-	-	-	-	0.82
Selenium: Dissolved	mg/L	373	no guideline	no guideline	<0.0005	<0.0005	-	-	-	<0.0005	-	<0.0005	-	-	<0.0005	-	-	-	-	-	-	-	<0.002
Silicon: Dissolved	mg/L	0.002	0.01	0.01	7.33	11	-	-	-	11.1	-	9.3	-	-	-	-	-	-	-	-	-	-	20.9
Silver: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.015	<0.015	-	-	-	<0.015	-	<0.01	-	-	<0.0001	-	-	-	-	-	-	-	<0.0001
Sodium: Dissolved	mg/L	*	no guideline	no guideline	66.4	26.4	23.5	-	-	17.8	-	20	17	-	12	-	-	-	-	-	-	-	11.3
Strontium: Dissolved	mg/L	no guideline	no guideline	200	0.137	0.203	-	-	-	0.082	-	0.165	-	-	-	-	-	-	-	-	-	-	0.073
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001
Thallium: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.10	<0.10	-	-	-	<0.10	-	<0.10	-	-	-	-	-	-	-	-	-	-	<0.0001
Thorium: Dissolved	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.30	<0.30	-	-	-	<0.30	-	<0.03	-	-	-	-	-	-	-	-	-	-	<0.001
Titanium: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.010	<0.010	-	-	-	<0.010	-	<0.010	-	-	-	-	-	-	-	-	-	-	<0.001
Tungsten: Dissolved	mg/L	2	no guideline	no guideline	<0.10	<0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005
Vanadium: Dissolved	mg/L	0.3	no guideline	0.02	<0.030	<0.030	-	-	-	<0.030	-	<0.030	-	-	<0.03	-	-	-	-	-	-	-	<0.001
Zinc: Dissolved	mg/L	0.006	no guideline	no guideline	<0.005	**0.133 a**	-	-	-	**0.299 a**	-	0.027	-	-	0.005	-	-	-	-	-	-	-	0.012
Zirconium: Dissolved	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001

Notes:

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Total Metals																							
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	54.3	-	26.8	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	10.4	-	3.64	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	1.11	-	1.53	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-	-	-	-	-	-	-	7.54	-	11.1	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																							
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	188	31	-	-	-	20	-	41	-	-	24	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	7.8	1.89	-	-	-	1.4	-	4.6	-	-	1.9	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	16.5	2.2	-	-	-	1.5	-	4.6	-	-	2.2	-	-	-	-	-	-	-	-
Bacteria																							
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	**3000 b**	0	<1.1	-	-	<1	-	**8 b**	**1 b**	-	<2	-	-	<2	-	**21 b**	-	-	<2
Coliforms: Total	MPN/100 ml	no guideline	0	0	**8000 bc**	0	**>23 bc**	-	-	**20 bc**	-	**23 bc**	**112 bc**	-	**1600 bc**	-	-	**1600 bc**	-	**32 bc**	-	-	**350 bc**
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																							
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L		1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.
BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.
CDWG - Canadian Drinking Water Quality Guidelines.
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-5 5-Mar-98	HBT94-5 13-Apr-98	HBT94-5 20-May-98	HBT94-5 25-Jun-98	HBT94-5 21-Jul-98	HBT94-5 14-Sep-98	HBT94-5 26-Oct-98	HBT94-5 2-Dec-98	HBT94-5 5-Jan-99	HBT94-5 5-Feb-99	HBT94-5 14-Apr-99	HBT94-5 29-Jul-99	HBT94-5 25-Nov-99	HBT94-5 1-Mar-00	HBT94-5 19-Apr-00
Physical Tests																			
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	-	-	-	-	**5.89 abc**	**6.43 abc**	**6.16 abc**	**6.13 abc**	7.02	6.77	-	-	**5.78 abc**	**6.05 abc**
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	6.68	6.84	**6.49 abc**	6.69	6.77	-	6.97	-	-	6.67	6.74	6.55	6.66	6.76	6.62
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	-	-	-	-	-	223	256	280	208	198	621.5	-	-	188.1	353
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	256	373	276	179	203	-	253	-	-	153	261	186	198	181	326
Temperature (Field)	deg C	19	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	65	-	-	-	71	-
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	162	292	195	130	125	-	153	-	-	90	165	119	136	119	274
Anions and Nutrients		no guideline	no guideline	no guideline															
Ammonia (as N)	mg/L				-	-	-	-	-	-	-	-	-	0.04	-	-	-	0.04	-
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Lab)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Lab)	mg/L	32.8	10	10	-	6.7	-	-	7.5	-	7.4	-	-	3.3	2.9	5.5	5.7	3.5	4
Fluoride: Dissolved	mg/L	600	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Lab)	mg/L	*	1.5	1.5	-	19.2	-	-	13.3	-	7.4	-	-	3.3	31.1	10.3	7.7	4.2	61.8
Alkalinity (as $CaCO_3$) (Lab)	mg/L	100	500	500	-	152	-	-	67.9	-	107	-	-	72.4	98.4	80.1	90.3	91	162
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals		no guideline	no guideline	no guideline															
Aluminum: Dissolved	mg/L				-	-	-	-	-	-	-	-	-	0.006	-	-	-	0.01	-
Antimony: Dissolved	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-
Arsenic: Dissolved	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-
Barium: Dissolved	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	0.003	-	-	-	0.003	-
Beryllium: Dissolved	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-
Bismuth: Dissolved	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	<0.05	-	-	-	0.05	-
Cadmium: Dissolved	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	**0.0007 a**	-	-	-	**0.0009 a**	-
Calcium: Dissolved	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	19.6	42	28.9	-	23.5	37.9
Chromium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-
Cobalt: Dissolved	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-
Copper: Dissolved	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	0.001	-	-	-	<0.001	-
Iron: Dissolved (Lab)	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Dissolved	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-
Lithium: Dissolved	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Dissolved	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	2.11	5.24	4.89	-	3.43	4.34
Manganese: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	0.002	-	-	-	0.005	-
Mercury: Dissolved	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	<0.05	-	-	-	<0.02	-
Molybdenum: Dissolved	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-
Nickel: Dissolved	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	0.002	-	-	-	<0.001	-
Phosphorus: Dissolved	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	0.07	-	-	-	0.1	-
Potassium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	0.58	1.1	0.83	-	0.31	0.88
Selenium: Dissolved	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-	-	<0.002	-	-	-	<0.002	-
Silicon: Dissolved	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	13	-	-	-	20.1	-
Silver: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	<0.0001	-	-	-	<0.0001	-
Sodium: Dissolved	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	4.24	8.2	7.4	-	6.99	7.6
Strontium: Dissolved	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-	-	-	0.055	-	-	-	0.06	-
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-
Thallium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	<0.0001	-	-	-	<0.0001	-
Thorium: Dissolved	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	<0.0005	-	-	-	<0.0005	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-
Titanium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	<0.001	-	-	-	<0.001	-
Tungsten: Dissolved	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	<0.0005	-	-	-	<0.0005	-
Vanadium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	<0.001	-	-	-	0.001	-
Zinc: Dissolved	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	0.027	-	-	-	0.009	-
Zirconium: Dissolved	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	<0.001	-	-	-	<0.01	-

Notes:

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BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	HBT94-5 5-Mar-98	HBT94-5 13-Apr-98	HBT94-5 20-May-98	HBT94-5 25-Jun-98	HBT94-5 21-Jul-98	HBT94-5 14-Sep-98	HBT94-5 26-Oct-98	HBT94-5 2-Dec-98	HBT94-5 5-Jan-99	HBT94-5 5-Feb-99	HBT94-5 14-Apr-99	HBT94-5 29-Jul-99	HBT94-5 25-Nov-99	HBT94-5 1-Mar-00	HBT94-5 19-Apr-00
Total Metals																			
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	44.8	-	-	26.3	-	30	-	-	-	-	-	21.5	-	39.1
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	8.22	-	-	4.49	-	4.62	-	-	-	-	-	3.42	-	4.52
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	1.34	-	-	0.91	-	1.25	-	-	-	-	-	0.78	-	1.11
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	13.8	-	-	7	-	15	-	-	-	-	-	12	-	7.8
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																			
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	<25	-	-	-	<25	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	3.4	-	-	-	2.3	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	4.5	-	-	-	1.6	-
Bacteria																			
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	-	<2	-	-	-	-	-	-	-	**6 b**	<2	**4 b**	**5 b**	**2 b**	<2
Coliforms: Total	MPN/100 ml	no guideline	0	0	-	**170 bc**	-	-	-	-	-	-	-	**540 bc**	**920 bc**	**14000 bc**	**3500 bc**	**3500 bc**	**5 bc**
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																			
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	65	-	-	-	71	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L		1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01
					11-Aug-99	25-Nov-99	19-Apr-00	26-Jul-00	13-Sep-00	25-Oct-00	6-Feb-01	8-May-01	28-Jul-01	31-Oct-01	6-Feb-02	8-May-02	22-Aug-02	14-Nov-02	19-Mar-03	17-Jun-03	24-Sep-03
Physical Tests																					
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	-	**10.83 abc**	7.45	7.29	7.51	6.87	7.72	8.03	7.99	-	7.02	6.63	7.68	7.5	7.43	**5.92 abc**
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	**10.9 abc**	**8.58 bc**	8	8.12	8.16	8.03	7.7	6.92	-	-	7.68	7.68	7.83	7.91	7.75	7.75	7.92
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	-	-	285	148.8	140.9	145	144.5	135.7	128.7	142.2	-	187.1	156.4	214	170	170	160
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	236	98	117	156	154	135	145	142	-	-	172	175	178	167	157	196	179
Temperature (Field)	deg C	19	15	15	-	-	-	-	-	-	7.1	13.2	**19.3 abc**	8.8	-	10.5	13.3	10.8	7.3	**15.6 bc**	11.8
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**3.7 a**	7.31	6.32
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	81	-	74	65	93	98	92
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	107	61	79	99	94	88	93	90	-	-	81	111	126	100	127	87	127
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																					
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	<0.02	-	-	-	<0.01	-	-	-	<0.01	-	-
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Lab)	mg/L	600	250	250	5.2	2.9	2.7	1.9	1.8	1.5	1.5	1.4	-	-	1.6	1.7	2.5	1.9	2.3	3.3	3.4
Fluoride: Dissolved	mg/L	*	1.5	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Lab)	mg/L	100	500	500	17.1	6.8	5.4	3.1	3.4	3	3	3	-	-	3.4	3.1	3.3	4.1	3.37	5.1	3.8
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	69.8	40.8	59.1	80.6	77.1	75.1	78.5	81.8	-	-	91.6	93.7	96.9	90.3	-	-	-
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	95.8	-	-	-	112	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-
Dissolved Metals																					
Aluminum: Dissolved	mg/L	*	0.2	0.1	-	-	-	-	-	-	0.014	<0.2	<0.05	-	<0.05	<0.05	0.008	0.006	<0.005	<0.005	**0.053 a**
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	<0.001	<0.2	<0.2	-	<0.2	<0.2	<0.001	<0.001	<0.0002	<0.0002	<0.0002
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	0.001	<0.3	<0.03	-	<0.03	<0.03	<0.001	<0.001	0.0015	0.0012	0.0014
Barium: Dissolved	mg/L	5	no guideline	1	-	-	-	-	-	-	0.003	0.001	0.002	-	0.01	0.003	0.002	0.001	0.003	0.003	0.003
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	<0.001	<0.003	<0.003	-	<0.003	<0.003	<0.001	<0.001	<0.0001	<0.0001	<0.0001
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.0005	<0.0005	<0.0005
Boron: Dissolved	mg/L	1.2	5	5	-	-	-	-	-	-	<0.05	0.01	0.03	-	<0.01	<0.01	<0.05	<0.05	0.006	0.008	0.008
Cadmium: Dissolved	mg/L	*	no guideline	0.005	-	-	-	-	-	-	**0.0009 a**	<0.025	<0.025	-	<0.025	<0.025	<0.0002	<0.0002	<0.00001	<0.00001	<0.00001
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	21.8	-	17.5	-	-	-	21.4	22.7	23.3	-	25.4	28.8	23	20.2	29	30.5	28.7
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	<0.001	<0.03	<0.03	-	<0.03	<0.03	<0.001	<0.001	0.001	0.0007	0.0009
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	<0.001	<0.02	<0.02	-	<0.02	<0.02	<0.001	<0.001	<0.0001	<0.0001	<0.0001
Copper: Dissolved	mg/L	*	0.5	1	-	-	-	-	-	-	<0.001	<0.02	<0.02	-	<0.02	<0.02	<0.001	<0.001	0.002	<0.001	<0.001
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	<0.05	<0.03	<0.01	-	<0.01	<0.01	<0.05	0.06	0.01	<0.01	0.05
Lead: Dissolved	mg/L	*	0.05	0.01	-	-	-	-	-	-	<0.001	<0.08	<0.03	-	<0.03	<0.03	<0.001	<0.001	<0.0001	<0.0001	<0.0001
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	2.23	-	0.2	-	-	-	3.8	3.9	3.8	-	4.2	4.99	4.07	3.62	5	5.2	5
Manganese: Dissolved	mg/L	*	no guideline	0.05	-	-	-	-	-	-	<0.001	<0.003	<0.003	-	<0.003	<0.003	<0.001	<0.001	<0.005	<0.005	<0.005
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	<0.00002	-	-	-	-	-	<0.00002	<0.00002	-	-	-
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	-	-	-	-	-	-	<0.001	<0.04	<0.04	-	<0.04	<0.04	<0.0005	<0.0005	<0.001	<0.001	<0.001
Nickel: Dissolved	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	<0.001	<0.03	<0.03	-	<0.03	<0.03	<0.001	<0.001	<0.0005	<0.0005	<0.0005
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	0.07	<0.4	<0.4	-	<0.4	<0.4	0.09	0.07	-	-	-
Potassium: Dissolved	mg/L	373	no guideline	no guideline	6.55	-	3.31	-	-	-	0.52	<0.01	0.56	-	<0.25	0.8	0.69	0.32	0.7	0.8	0.7
Selenium: Dissolved	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	<0.002	-	-	-	-	-	<0.001	<0.001	<0.0002	<0.0002	<0.0002
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	10.7	10.8	10.6	-	10.6	12.2	9.9	9.91	-	-	-
Silver: Dissolved	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	<0.001	<0.03	<0.03	-	<0.03	<0.03	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium: Dissolved	mg/L	no guideline	no guideline	200	8.3	-	6.1	-	-	-	1.33	1.1	1.2	-	1.3	5.3	1.22	1.2	1.7	1.8	1.6
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	0.031	0.029	0.028	-	0.19	0.057	0.031	0.031	0.039	0.041	0.043
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.24	1.18	1.59
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<0.001	-	-	-	-	-	<0.001	<0.001	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	<0.0001	-	-	-	-	-	<0.0001	<0.0001	<0.00005	<0.00005	<0.00005
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<0.0005	-	-	-	-	-	<0.0005	<0.0005	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<0.001	<0.03	<0.03	-	<0.03	<0.03	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium: Dissolved	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	<0.001	<0.006	<0.006	-	<0.006	<0.006	<0.001	<0.001	<0.0005	<0.0005	0.0045
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	<0.0005	-	-	-	-	-	<0.0005	<0.0005	-	-	-
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	**0.008 a**	<0.01	<0.01	-	<0.01	<0.01	0.006	0.006	**0.0076 a**	**0.0077 a**	**0.0087 a**
Zinc: Dissolved	mg/L	*	5	5	-	-	-	-	-	-	0.007	<0.02	<0.005	-	<0.005	0.01	0.006	0.007	<0.001	0.001	<0.001
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<0.01	<0.02	0.03	-	<0.02	<0.02	<0.01	<0.01	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01
					11-Aug-99	25-Nov-99	19-Apr-00	26-Jul-00	13-Sep-00	25-Oct-00	6-Feb-01	8-May-01	26-Jul-01	31-Oct-01	6-Feb-02	8-May-02	22-Aug-02	14-Nov-02	19-Mar-03	17-Jun-03	24-Sep-03
Total Metals																					
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	9.57	22.8	22.4	23.2	20.2	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	1.34	0.43	3.49	3.88	3.44	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	6.54	4.11	0.63	0.57	0.51	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	5.9	6.5	1	1.6	1.6	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																					
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<25	-	-	-	-	-	-	-	<5	<5	<5
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	1.1	1.2	1.3	-	<1	<1	<1	<1	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	1.2	-	-	<1	1.2	<1	-	-	<0.05	-	-
Bacteria																					
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	<2	<2	<2	**2 b**	<2	<2	<2	<1	<1	<1	<1	<1	-	<1	<1	<1	<1
Coliforms: Total	MPN/100 ml	no guideline	0	0	**18 bc**	**13 bc**	**5 bc**	**9 bc**	**2 bc**	**5 bc**	<2	<1	<1	<1	**1 bc**	<1	-	<1	<1	<1	<1
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	<1	<1	<1	<1	<1	-	<1	<1	<1	<1
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																					
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	0.05	<0.05
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2	0.5
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.58	12	20
Sulphate (Field)	mg/L	100	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	0.1
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	0.2
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	<0.3	<0.3

Notes:
BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.
BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.
CDWG - Canadian Drinking Water Quality Guidelines.
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-01	DupAG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01
					18-Dec-03	18-Dec-03	16-Mar-04	23-Nov-04	4-May-05	20-Apr-06	19-Oct-06	19-Apr-07	25-Oct-07	8-Apr-08	23-Oct-08	27-Aug-09	9-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	5-Dec-12
Physical Tests																										
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	**6.38 abc**	-	8.33	**8.58 bc**	7.97	7.811	8.15	7.1	7.96	6.55	7.6	7.72	6.64	8.29	7.66	7.36	7.52	7.8	7.65	7.7	7.8	7.71	8.23
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.9	7.9	7.9	8	-	8	8	8.24	7.91	8.17	8.07	8.08	7.92	8.2	7.92	7.67	7.97	7.91	7.88	7.97	8.08	8.17	8.08
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	180	-	163	197.7	197	201	150	185	143	165	141	169	76	141	191	203	234	221	201	173	215	186	178
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	174	176	180	175	-	191.2	202	214	189	200	183	191	167	200	200	225	242	235	215	200	212	196	178
Temperature (Field)	deg C	19	15	15	10.4	-	10.9	10.4	10.8	10.9	11.42	10.99	11.06	10.64	11.14	11.84	10.66	11.05	11.28	10.83	10.77	11.4	10.42	10.6	11.0	11.33	10.93
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	7.57	-	**4.01 a**	9.8	6.47	**1.1 a**	6.08	**4.44 a**	7.59	9.47	18.93	8.05	10.9	13.06	13	**2.90 a**	5.82	11.21	6.33	9.8	6.9	8.41	9.08
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	91	92	99.2	87	-	98	88	122	104	105	106	94.1	83.9	99.7	98	129	123	118	103	101	108	93.7	93.6
Dissolved Solids: Total	mg/L	no guideline	no guideline	500	100	113	113	110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	140	121	115
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	107.9	1.2	339.2	-69.7	199	80.6	164.3	40.5	-377.5	119.7	189.9	41.2	88.5	245	48.7	44.4
Anions and Nutrients																											
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	-	-	-	-	<0.02	<0.05	0.023	0.06	<0.020	<0.020	<0.01	<0.01	<0.01	0.039	0.014	0.02	0.032	0.02	0.0066	0.013	0.0069	0.015
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	-	-	<0.01	-	<0.01	<0.01	<0.0010	<0.0010	<0.0010	<0.0010	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	<0.005	<0.0050	<0.0050	<0.0050
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	-	-	0.2	-	0.23	0.16	0.221	0.252	0.205	0.19	0.15	0.14	0.17	0.19	0.16	0.22	0.33	0.171	0.146	0.163	0.166	0.125
Chloride (Lab)	mg/L	600	250	250	2.7	2.9	2.2	2.4	-	2.1	2.3	3.09	2.6	2.27	2.27	3.12	1.72	1.4	1.8	1.9	2.9	4.4	2.5	2.0	3.0	2.6	1.8
Fluoride: Dissolved	mg/L	*	1.5	1.5	-	-	-	-	-	<0.1	<0.1	<0.020	<0.020	<0.020	<0.020	<0.05	<0.05	0.02	0.01	0.02	0.02	0.01	0.024	0.022	0.02	0.019	0.022
Sulphate (Lab)	mg/L	100	500	500	3.4	3.8	3.3	3.3	-	4	4.6	3.74	3.33	3.3	3.38	3.51	3.04	3.1	7	2.7	4.2	3.5	3.74	3.59	3.59	2.26	3.13
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	109	90.5	97.9	95	96.6	87.2	100	100	110	130	110	104	98.8	103	97.1	88.2
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	121	126	119	108
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50
Dissolved Metals																											
Aluminum: Dissolved	mg/L	*	0.2	0.1	**0.649 abc**	**0.541 abc**	0.01	0.009	-	<0.005	**0.178 a**	0.0028	<0.0050	0.0052	<0.0050	0.003	0.003	0.011	0.003	0.006	0.01	0.004	<0.0030	0.004	0.0036	0.00321	0.00492
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	<0.0002	<0.0002	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.00010	<0.00050	<0.00050	<0.00050	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.00003	0.000037	0.000026	0.000029
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	0.0014	0.0013	0.0013	0.0013	-	0.0012	0.0013	0.001	0.00107	0.00111	0.00105	0.001	0.0012	0.001	0.0009	0.0009	0.0009	0.0008	0.00089	0.00089	0.000814	0.000867	0.000931
Barium: Dissolved	mg/L	5	no guideline	1	0.004	0.004	0.003	0.002	-	0.002	0.003	0.002	<0.020	<0.020	<0.020	0.0017	0.0013	0.002	0.002	0.002	0.003	0.002	0.0019	0.00193	0.00182	0.00171	0.00159
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.00050	<0.0010	<0.0010	<0.0010	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00001	<0.000010	<0.000010	<0.000010
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.0005	<0.0005	<0.000050	-	<0.20	-	<0.0002	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.000005	<0.0000050	<0.0000050	<0.0000050
Boron: Dissolved	mg/L	1.2	5	5	0.008	0.008	0.007	0.007	-	0.007	0.01	<0.010	<0.10	<0.10	<0.10	<0.01	0.006	<0.05	<0.05	<0.05	<0.05	<0.05	<0.050	<0.05	<0.050	<0.050	<0.050
Cadmium: Dissolved	mg/L	*	no guideline	0.005	0.00003	0.00003	<0.00001	<0.00001	-	0.00003	0.00002	<0.000017	<0.000017	0.000018	<0.000017	<0.00004	**0.00008 a**	**0.00016 a**	0.00001	<0.00001	**0.00036 a**	0.00002	<0.000010	<0.000005	<0.0000050	<0.0000050	<0.0000050
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	28.7	28.9	31.3	27.7	-	31.1	26.7	-	33.7	33.9	34.9	30.3	27.6	32.3	31.4	41.1	39.6	38.2	33.2	32.6	35.3	30	30.8
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	0.0008	0.0008	0.0005	0.0006	-	0.0009	**0.0016 a**	<0.00050	**0.0011 a**	<0.0010	<0.0010	0.0006	0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.0005	0.00052	0.00055	0.00045
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	0.0004	0.0004	<0.0001	<0.0001	-	<0.0001	0.0002	<0.00010	<0.00030	<0.00030	<0.00030	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.000005	<0.0000050	<0.0000050	0.000006
Copper: Dissolved	mg/L	*	0.5	1	0.003	0.002	<0.001	<0.001	-	<0.001	<0.001	0.00016	<0.0010	<0.0010	<0.0010	0.0006	0.0004	0.0002	<0.0002	0.0002	0.0009	0.0003	<0.00020	0.0004	0.000136	0.00012	0.000181
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	**0.7 bac**	**0.6 bac**	<0.01	0.01	-	<0.01	**0.68 bac**	-	<0.030	<0.030	<0.030	<0.01	<0.01	0.009	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.001	0.0013	0.0016	0.003
Lead: Dissolved	mg/L	*	0.05	0.01	0.0003	0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.000050	<0.00050	<0.00050	<0.00050	<0.0002	<0.00005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	0.000022	0.0000068	<0.0000050	<0.0000050
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.0050	<0.0050	<0.0050	<0.0050	<0.0002	0.0002	<0.005	<0.005	-	-	<0.005	<0.0050	<0.0005	<0.00050	<0.00050	<0.00050
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	4.8	4.7	5	4.4	-	5	5.2	-	4.7	4.85	4.61	4.45	3.6	4.62	4.77	6.41	5.79	5.46	4.91	4.86	4.9	4.57	4.07
Manganese: Dissolved	mg/L	*	no guideline	0.05	0.029	0.029	<0.005	<0.005	<0.005	<0.005	0.017	0.000263	<0.00040	0.00064	<0.00030	<0.0002	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.0001	<0.000050	0.000097	0.00014
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	<0.000020	<0.000020	<0.000020	<0.000020	<0.00002	<0.02	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.000050	< 0.00001	<0.000010	<0.000010	<0.000010
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	0.000123	<0.0010	<0.0010	<0.0010	<0.0001	0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00012	0.000106	0.000105	0.00013
Nickel: Dissolved	mg/L	*	no guideline	no guideline	<0.0005	<0.0005	<0.0005	0.0012	-	<0.0005	<0.0005	<0.00050	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00003	0.000033	0.000034	0.00004
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	<0.30	0.0148	<0.30	-	<0.03	<0.015	-	-	0.02	0.01	-	-	0.79	0.0122	0.0305	0.0411
Potassium: Dissolved	mg/L	373	no guideline	no guideline	0.7	0.7	0.8	0.8	-	0.7	0.7	-	<2.0	<2.0	<2.0	0.69	0.6	0.74	0.71	0.96	0.84	0.73	0.772	0.0231	0.77	0.723	0.689
Selenium: Dissolved	mg/L	0.002	0.01	0.01	<0.0002	<0.0002	<0.0002	<0.0002	-	0.0002	<0.0002	<0.0010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.00015	0.0001	0.000158	0.000127	0.000089
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	5.36	5.38	-	-	-	6.21	7.49	5.88	-	6.02	-	6.35	4.65	6.5	5.7	7.1	6.2	6.2	5.68	5.7	5.95	5.64	6.48
Silver: Dissolved	mg/L	*	no guideline	no guideline	<0.0001	<0.0001	<0.0001	0.0001	-	<0.0001	<0.0001	<0.000010	<0.000020	<0.000020	<0.000020	<0.00005	<0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020	<0.000005	<0.0000050	<0.0000050
Sodium: Dissolved	mg/L	no guideline	no guideline	200	1.5	1.5	1.6	1.4	-	1.6	1.8	-	<2.0	<2.0	<2.0	1.6	1.29	1.55	1.64	1.99	1.74	1.82	1.74	1.71	1.65	1.64	1.54
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	0.048	0.048	0.039	0.037	-	0.041	0.044	0.0483	-	0.0463	-	0.043	0.039	0.043	0.046	0.053	0.057	0.054	0.0503	0.0463	0.0483	0.0467	0.0425
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	0.93	0.94	1.21	1.19	-	1.3	1.8	1.26	1.35	1.29	1.23	<2	<1	<3	<3	<3	<3	<3	<3.0	<10	<15	<10	<3.0
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	<0.00005	<0.00005	<0.00005	<0.00005	-	<0.00005	<0.00005	<0.00010	<0.00020	<0.00020	<0.00020	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	<0.000002	<0.0000020	<0.0000020
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.00005	-	-	-	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.001	<0.001	<0.001	0.003	-	<0.001	<0.001	<0.00010	<0.00050	<0.00050	<0.00050	<0.0002	<0.0001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0002	<0.00020	<0.00020	0.00021
Titanium: Dissolved	mg/L	2	no guideline	no guideline	0.0723	0.0454	0.0008	<0.0005	-	<0.0005	0.0124	-	<0.010	<0.010	<0.010	0.0003	<0.0002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0005	<0.00050	<0.00050	<0.00050
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	0.00011	<0.00020	<0.00020	<0.00020	<0.0001	0.00008	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.000106	0.0000937	0.000082	0.00009
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	**0.0112 a**	**0.0106 a**	**0.0083 a**	**0.0083 a**	-	**0.0085 a**	**0.0094 a**	**0.0068 a**	**0.0068 a**	**0.0066 a**	**0.0065 a**	**0.0066 a**	**0.0063 a**	0.006	0.006	**0.007 a**	0.006	0.006	0.006	**0.0065 a**	0.00571	**0.00609 a**	**0.0063 a**
Zinc: Dissolved	mg/L	*	5	5	0.002	0.002	<0.001	<0.001	-	<0.001	<0.001	<0.0010	<0.0050	<0.0050	<0.0050	0.002	0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.0003	0.00018	0.00052	0.00028
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	<0.002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.0001	<0.00010	<0.00010	<0.00010

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-01	DupAG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01	AG99-01
					18-Dec-03	18-Dec-03	16-Mar-04	23-Nov-04	4-May-05	20-Apr-06	19-Oct-06	19-Apr-07	25-Oct-07	8-Apr-08	23-Oct-08	27-Aug-09	9-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	5-Dec-12
Total Metals																										
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																										
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	<5	<5	<5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria																										
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	<1	<1	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	<10	<10	<1	**5 bc**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	<1	<1	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																										
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	58	65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	<0.05	-	<0.05	<0.08	<0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	0.8	-	0.4	<0.2	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	<30	-	12	<2.5	<2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	-	-	3.6	<8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	<0.1	-	<0.1	0.08	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	<0.1	-	<0.1	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	<0.3	-	<0.3	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

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APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02
					11-Aug-99	25-Nov-99	1-Mar-00	19-Apr-00	26-Jul-00	13-Sep-00	25-Oct-00	6-Feb-01	8-May-01	26-Jul-01	6-Nov-01	29-Jan-02	8-May-02	22-Aug-02	14-Nov-02	19-Mar-03	19-Jun-03	25-Sep-03	19-Dec-03
Physical Tests																							
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	-	-	6.91	7.09	7.35	7.34	6.54	7.65	7.43	7.74	8.12	6.61	6.65	**9.61 abc**	8.1	8.23	-	7.05
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	**8.69 bc**	7.4	7.48	7.35	7.79	8.01	7.67	7.61	6.77	-	-	7.85	7.73	7.85	**9 bc**	7.95	7.8	7.92	8
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	-	-	-	135.3	114.6	118.1	131.7	122.1	96.6	113.4	118.7	129.7	115.6	106.5	136	160	123	140	150
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	107	131	128	136	119	124	115	124	107	-	-	120	107	124	90	132	160	174	154
Temperature (Field)	deg C	19	15	15	-	-	-	-	-	-	-	6.2	13.2	12.7	-	6.4	9.1	13.7	11	8.5	11.8	13.7	10.2
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**3.84 a**	7	7.67	5.26
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	66	-	-	-	-	-	48	-	-	57	-	48	38	73.6	72.4	83	76
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	75	83	83	88	74	79	71	64	62	-	-	76	56	85	62	80	107	93	87
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																							
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	-	<0.02	-	-	-	-	0.03	0.75	-	-	0.06	-	-	-	<0.01	-	-	-
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01	-	-
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.28	-	-
Chloride (Lab)	mg/L	600	250	250	2.2	4.8	1.3	1.2	1.4	1.9	1.5	1.2	1.1	-	-	1.2	1.3	2	2.2	3.82	3.18	4.7	3.3
Fluoride: Dissolved	mg/L	*	1.5	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Lab)	mg/L	100	500	500	3.9	3.3	3	3	2.8	3.1	2.8	2.9	2.9	-	-	2.9	2.9	2.9	3.8	3.15	3.11	3.8	3.7
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	52.6	59.7	71.1	79	57.3	59	61.5	63.2	54.3	-	-	60.8	55.5	61.1	43.3	-	-	-	-
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	86.8	-	-	-	-	77.1	66.3	-	-	74.2	-	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-
Dissolved Metals																							
Aluminum: Dissolved	mg/L	*	0.2	0.1	-	-	0.024	-	-	-	-	0.013	0.014	-	-	<0.05	<0.05	0.009	0.014	<0.005	<0.005	0.009	0.071
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	-	-	<0.001	-	-	-	-	<0.001	<0.001	-	-	<0.2	<0.2	<0.001	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	-	-	0.001	-	-	-	-	0.002	0.002	-	-	<0.03	<0.03	0.001	0.001	<0.0020	0.0022	0.0017	0.0018
Barium: Dissolved	mg/L	5	no guideline	1	-	-	0.006	-	-	-	-	0.003	0.003	-	-	0.007	0.004	0.003	0.02	0.005	0.004	0.004	0.005
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	-	-	<0.001	-	-	-	-	<0.001	<0.001	-	-	<0.003	<0.003	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005
Boron: Dissolved	mg/L	1.2	5	5	-	-	<0.05	-	-	-	-	<0.05	<0.05	-	-	<0.01	<0.01	<0.05	<0.05	0.004	0.007	0.007	0.009
Cadmium: Dissolved	mg/L	*	no guideline	0.005	-	-	<0.0002	-	-	-	-	<0.0002	<0.0002	-	-	<0.025	<0.025	<0.0002	<0.0002	**0.00003 a**	<0.00001	<0.00001	**0.00005 a**
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	19	-	20.9	20.8	-	-	-	18	14.5	-	-	17.6	15.3	15.5	11.8	23.7	23.4	26.6	24.9
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	-	-	<0.001	-	-	-	-	<0.001	<0.001	-	-	<0.03	<0.03	<0.001	0.001	0.0009	**0.002 a**	0.0005	0.0007
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	-	-	<0.001	-	-	-	-	<0.001	<0.001	-	-	<0.02	<0.02	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001
Copper: Dissolved	mg/L	*	0.5	1	-	-	<0.001	-	-	-	-	<0.001	0.002	-	-	<0.02	<0.02	0.001	<0.001	0.001	<0.001	<0.001	<0.001
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	-	-	<0.05	-	-	-	-	<0.05	<0.05	-	-	<0.01	<0.01	<0.05	<0.05	<0.01	<0.01	0.04	<0.1
Lead: Dissolved	mg/L	*	0.05	0.01	-	-	<0.001	-	-	-	-	<0.001	<0.001	-	-	<0.03	<0.03	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	3.59	-	3.08	3.02	-	-	-	3.08	2.62	-	-	3.15	2.41	2.37	2.04	3.5	3.4	4	3.4
Manganese: Dissolved	mg/L	*	no guideline	0.05	-	-	0.003	-	-	-	-	<0.001	<0.001	-	-	<0.003	<0.003	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	<0.00002	-	-	-	-	<0.00002	<0.00002	-	-	-	-	<0.00002	<0.00002	-	-	-	-
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	-	-	<0.001	-	-	-	-	<0.001	0.002	-	-	<0.04	<0.04	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
Nickel: Dissolved	mg/L	-	no guideline	no guideline	-	-	<0.001	-	-	-	-	<0.001	<0.001	-	-	<0.03	<0.03	<0.001	0.003	<0.0005	<0.0005	<0.0005	<0.0005
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	0.09	-	-	-	-	0.12	0.17	-	-	<0.4	<0.4	0.14	0.05	-	-	-	-
Potassium: Dissolved	mg/L	373	no guideline	no guideline	1.73	-	1.01	0.84	-	-	-	0.96	0.94	-	-	1.1	0.8	0.98	0.75	1.2	1.4	1.2	1.2
Selenium: Dissolved	mg/L	0.002	0.01	0.01	-	-	<0.002	-	-	-	-	<0.002	<0.002	-	-	-	-	<0.001	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	10.5	-	-	-	-	9.22	9.36	-	-	8.5	10.1	8.25	7.29	-	-	-	4.22
Silver: Dissolved	mg/L	*	no guideline	no guideline	-	-	<0.0001	-	-	-	-	<0.0001	<0.0001	-	-	<0.03	<0.03	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium: Dissolved	mg/L	no guideline	no guideline	200	3.5	-	1.38	1.5	-	-	-	1.49	1.09	-	-	1	1.1	0.98	1.52	1.4	2.3	1.6	1.2
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	0.039	-	-	-	-	0.027	0.021	-	-	0.048	0.04	0.023	0.1	0.036	0.036	0.038	0.038
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	1.35	1.13	0.93
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.001	-	-	-	-	<0.001	0.002	-	-	-	-	<0.001	<0.001	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	-	<0.0001	-	-	-	-	<0.0001	<0.0001	-	-	-	-	<0.0001	<0.0001	<0.00005	<0.00005	<0.00005	<0.00005
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.0005	-	-	-	-	<0.0005	<0.0005	-	-	-	-	<0.0005	<0.0005	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.001	-	-	-	-	<0.001	<0.001	-	-	<0.03	<0.03	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium: Dissolved	mg/L	2	no guideline	no guideline	-	-	<0.001	-	-	-	-	<0.001	<0.001	-	-	<0.006	<0.006	<0.001	<0.001	<0.0005	<0.0005	<0.0005	0.0057
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	<0.0005	-	-	-	-	<0.0005	<0.0005	-	-	-	-	<0.0005	<0.0005	-	-	-	-
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	-	-	**0.012 a**	-	-	-	-	**0.015 a**	**0.015 a**	-	-	<0.01	**0.01 a**	**0.013 a**	**0.011 a**	**0.0151 a**	**0.0163 a**	**0.015 a**	**0.0176 a**
Zinc: Dissolved	mg/L	*	5	5	-	-	0.012	-	-	-	-	<0.005	<0.005	-	-	<0.005	0.01	<0.005	0.006	<0.001	<0.001	<0.001	0.002
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.01	-	-	-	-	<0.01	<0.01	-	-	<0.02	<0.02	<0.01	<0.01	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-02 11-Aug-99	AG99-02 25-Nov-99	AG99-02 1-Mar-00	AG99-02 19-Apr-00	AG99-02 26-Jul-00	AG99-02 13-Sep-00	AG99-02 25-Oct-00	AG99-02 6-Feb-01	AG99-02 8-May-01	AG99-02 26-Jul-01	AG99-02 6-Nov-01	AG99-02 29-Jan-02	AG99-02 8-May-02	AG99-02 22-Aug-02	AG99-02 14-Nov-02	AG99-02 19-Mar-03	AG99-02 19-Jun-03	AG99-02 25-Sep-03	AG99-02 19-Dec-03
Total Metals																							
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	11.9	-	20.2	16.5	19.7	16.8	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	<0.05	-	-	-	-	<0.05	<0.05	-	-	<0.01	<0.01	<0.05	<0.05	<0.01	<0.01	0.04	<0.1
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	2.97	-	2.92	2.49	2.97	2.67	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	0.003	-	-	-	-	<0.001	<0.001	-	-	<0.003	<0.003	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	2.11	-	1.01	1.04	1.07	1.02	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	2.6	-	1.8	0.9	1.7	1.6	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																							
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	<25	-	-	-	-	<25	<25	-	-	-	-	-	-	<5	<5	<5	<5
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	1.6	-	-	-	-	1.1	<1	2	-	<1	<1	-	<1	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	1.9	-	-	-	-	1.5	<1	-	-	-	<1	-	-	<0.5	-	-	-
Bacteria																							
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	<2	<2	<2	<2	**2 b**	<2	<2	<2	<1	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
Coliforms: Total	MPN/100 ml	no guideline	0	0	<2	**110 bc**	**4 bc**	<2	**350 bc**	<2	<2	<2	<1	<1	<1	<1	<1	-	**3 bc**	<1	<1	**2 bc**	**25 bc**
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																							
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.3	0.4	0.9
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<29	18	12	<30
Sulphate (Field)	mg/L	100	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	<0.3	<0.3	<0.3

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02	AG99-02
					16-Mar-04	28-Sep-04	4-May-05	29-Sep-05	20-Apr-06	19-Oct-06	20-Apr-07	25-Oct-07	9-Apr-08	22-Oct-08	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
Physical Tests																									
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	8.32	7.97	8.13	6.952	8.076	8.15	7.48	7.49	7.97	7.73	8.16	6.95	8.2	8.07	8.17	7.97	8.03	7.95	8.0	7.9	8.01	8.17
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	8	8.2	8	8.2	8.2	8	8.22	7.99	8.21	8	8.12	8.07	8.1	8.09	7.79	8.03	8.01	7.87	8.17	7.98	8.06	8.17
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	174.2	162	163.9	133.4	165.3	122	136	124	129	125	144	95	104	184	213	224	217	210	256	204	165	216
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	152	153.6	161	140.3	157	155.5	161	163	165	164	165	213	153	184	234	230	226	226	295	205	170	210
Temperature (Field)	deg C	19	15	15	11.1	11.5	11	11.3	11	10.88	10.32	10.86	9.36	10.87	11.46	10.17	10.93	10.84	9.84	10.63	11.2	10.1	9.9	10.7	11.7	10.35
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	**4.38 a**	8.75	6.41	7.29	**1.1 a**	**0.33 a**	**3.84 a**	10.6	8.71	20.51	**4.92 a**	9.7	20.84	11.9	7.07	8.89	11.7	6.69	6.9	6.8	9.01	6.6
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	78.2	73	82	66	79	82	90.8	82.2	80.3	92.6	81.7	101	74.3	66.3	130	116	115	112	152	99.8	86.7	109
Dissolved Solids: Total	mg/L	no guideline	no guideline	500	87	87	67	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200	130	108	139
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	117.5	718.9	141	-49	192	51.9	181.6	41.3	-355	88.2	86.9	122.6	96.0	43.2	-17.9	286
Anions and Nutrients																										
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	<0.02	<0.02	<0.20	<0.02	<0.05	0.021	0.216	<0.020	<0.020	<0.01	<0.01	<0.01	<0.005	0.016	0.024	0.017	0.021	<0.0050	0.026	0.011	0.027
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	<0.03	<0.1	<0.1	<0.01	<0.01	<0.0010	<0.0010	<0.0010	<0.0010	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	0.38	0.2	0.3	0.18	0.15	0.173	0.206	0.146	0.203	0.15	0.17	0.15	0.15	0.17	0.16	0.19	0.223	0.197	0.152	0.15	0.175
Chloride (Lab)	mg/L	600	250	250	1.6	3.5	2.2	2.8	1.5	1.9	1.65	2.06	1.5	1.98	2.40	2.1	1.1	1	1.4	1.6	2.1	2.4	1.8	1.7	2	1.9
Fluoride: Dissolved	mg/L	*	1.5	1.5	-	-	<1	-	<0.1	<0.1	<0.020	<0.020	<0.020	<0.020	<0.05	<0.05	0.02	0.02	0.01	0.01	0.01	0.019	0.017	0.016	0.014	0.016
Sulphate (Lab)	mg/L	100	500	500	3	3.5	3.4	2.9	3.5	3.5	2.99	3.01	3.91	3.03	2.96	3.02	3.5	1.4	2.9	3.8	3	3.21	3.72	3.47	2.24	3.41
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	86	67	-	-	83.8	80.1	77.9	87.5	83.8	113	76	91	120	120	110	110	154	99.7	84.6	104
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-		-	-	-		-	-	188	122	103	127
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-		-	-	-		-	-	<0.50	<0.50	<0.50	<0.50
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	<0.50	<0.50	<0.50	<0.50
Dissolved Metals																										
Aluminum: Dissolved	mg/L	*	0.2	0.1	0.008	0.007	0.006	0.006	<0.005	0.009	0.0064	0.0055	0.0067	0.0055	0.006	0.004	0.01	0.006	0.007	0.007	0.006	0.0047	0.0049	0.00634	0.00681	0.00593
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00010	<0.00050	<0.00050	<0.00050	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.00003	0.000036	0.000032	0.000036
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	0.0019	0.002	0.002	0.002	0.0022	0.002	0.00217	0.00222	0.00226	0.00218	0.0022	0.0021	0.0023	0.0021	0.002	0.002	0.002	0.00193	0.00188	0.00216	0.00234	0.00209
Barium: Dissolved	mg/L	5	no guideline	1	0.005	0.004	0.005	0.004	0.004	0.004	0.00414	<0.020	<0.020	<0.020	0.0041	0.005	0.004	0.004	0.006	0.006	0.006	0.0054	0.00757	0.00483	0.00413	0.00497
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00050	<0.0010	<0.0010	<0.0010	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00001	<0.000010	<0.000010	<0.000010
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	-	<0.20	-	<0.0002	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.000005	<0.0000050	<0.0000050	<0.0000050
Boron: Dissolved	mg/L	1.2	5	5	0.005	0.005	0.004	0.005	0.005	0.005	<0.010	<0.10	<0.10	<0.10	<0.01	<0.005	<0.05	<0.05	0.05	<0.05	<0.05	<0.050	<0.05	<0.050	<0.050	<0.050
Cadmium: Dissolved	mg/L	*	no guideline	0.005	<0.00001	<0.00001	<0.00001	<0.00001	0.00002	**0.00003 a**	<0.000017	<0.000017	0.000023	**0.000068 a**	<0.00004	0.00003	**0.00047 a**	<0.00001	<0.00001	**0.00006 a**	<0.00001	<0.000010	0.000007	0.0000068	<0.0000050	<0.0000050
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	25.7	23.9	26.6	21.8	25.5	26.7	-	27	26.3	31	26.9	33.3	24.6	20.8	42.6	38.5	38.1	36.9	49.8	33	28.6	35.9
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	0.0005	0.0009	<0.0005	<0.0005	0.0008	0.0006	<0.00050	0.001	<0.0010	<0.0010	0.0006	0.0006	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.0006	0.00049	0.00044	0.0006
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	<0.0001	0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00030	<0.00030	<0.00030	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.000005	0.0000086	<0.0000050	0.000005
Copper: Dissolved	mg/L	*	0.5	1	0.002	<0.001	0.001	0.001	<0.001	<0.001	0.00016	<0.0010	<0.0010	<0.0010	0.0006	0.0001	0.0003	<0.0002	<0.0002	0.0002	<0.0002	<0.00020	0.00006	0.000247	0.000124	0.000175
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.030	<0.030	<0.030	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.001	0.0014	0.0012	<0.0010
Lead: Dissolved	mg/L	*	0.05	0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.000050	<0.00050	<0.00050	<0.00050	<0.0002	<0.00005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	<0.000005	0.0000066	<0.0000050	<0.0000050
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0050	<0.0050	<0.0050	<0.0050	0.0002	<0.0001	<0.005	<0.005	-	-	<0.005	<0.0050	<0.0005	<0.00050	<0.00050	<0.00050
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	3.5	3.2	3.9	2.8	3.7	3.8	-	3.59	3.55	3.72	3.53	4.26	3.12	3.52	5.81	4.94	4.82	4.8	6.7	4.2	3.7	4.70
Manganese: Dissolved	mg/L	*	no guideline	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.000143	<0.00030	0.00041	<0.00030	<0.0002	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00007	0.000345	0.000143	<0.000050
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	<0.000020	<0.000020	<0.000020	<0.000020	<0.00002	<0.02	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.000050	< 0.00001	<0.00001	<0.000010	<0.000010
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000115	<0.0010	<0.0010	<0.0010	<0.0001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.00005	0.000113	0.000108	0.000147
Nickel: Dissolved	mg/L	*	no guideline	no guideline	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.00002	0.000059	0.000022	0.000023
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<0.30	0.0339	<0.30	-	0.04	0.03	-	-	0.04	0.04	-	-	1.66	0.0304	0.0467	0.0563
Potassium: Dissolved	mg/L	373	no guideline	no guideline	1.3	1	1	1.1	1.2	1.1	-	<2.0	<2.0	<2.0	1.17	1.26	1.13	1.15	1.54	1.33	1.33	1.39	0.0328	1.35	1.21	1.36
Selenium: Dissolved	mg/L	0.002	0.01	0.01	<0.0002	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.0010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	0.0002	0.0001	0.0002	0.0002	0.0002	0.00014	0.00013	0.000217	0.000114	0.000163
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	4.66	5.02	4.88	4.82	-	4.93	-	5.35	4.2	5.3	4.2	5.8	5.1	5.1	4.83	4.9	5.21	5.09	5.03
Silver: Dissolved	mg/L	*	no guideline	no guideline	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.000010	<0.000020	<0.000020	<0.000020	<0.00005	<0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020	<0.000005	<0.0000050	<0.0000050	<0.0000050
Sodium: Dissolved	mg/L	no guideline	no guideline	200	1.4	1.2	1	1.4	1.4	1.4	-	<2.0	<2.0	<2.0	1.41	1.34	1.24	1.31	1.78	1.56	1.61	1.67	2.01	1.53	1.48	1.77
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	0.033	0.032	0.036	0.029	0.033	0.034	0.0341	-	0.0353	-	0.035	0.047	0.03	0.036	0.048	0.048	0.049	0.0482	0.0628	0.0412	0.0348	0.0438
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	1.11	1.09	1	1.1	1	1.2	0.92	1.2	1.47	1.09	<2	<1	<3	<3	<3	<3	<3	<3.0	<10	<15	<10	<3.0
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00010	<0.00020	<0.00020	<0.00020	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	<0.000002	<0.0000020	<0.0000020	<0.0000020
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.00005	-	-	-	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00010	<0.00050	<0.00050	<0.00050	<0.0002	<0.0001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0002	<0.00020	<0.00020	<0.00020
Titanium: Dissolved	mg/L	2	no guideline	no guideline	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.010	<0.010	0.0003	<0.0002	<0.0002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0005	<0.00050	<0.00050	<0.00050
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	<0.0001	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	0.000518	0.00049	0.00048	0.00052	0.0004	0.00069	0.0003	0.0004	0.0007	0.0007	0.0007	0.00058	0.000996	0.00048	0.000306	0.000463
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	**0.0173 a**	**0.0174 a**	**0.0192 a**	**0.0185 a**	**0.02 a**	**0.0184 a**	**0.0180 a**	**0.0177 a**	**0.0175 a**	**0.0178 a**	**0.019 a**	**0.016 a**	**0.018 a**	**0.019 a**	**0.019 a**	**0.018 a**	**0.018 a**	**0.0178 a**	**0.0172 a**	**0.0181 a**	**0.0192 a**	**0.0199 a**
Zinc: Dissolved	mg/L	*	5	5	0.003	0.001	<0.001	0.003	<0.001	0.001	<0.0010	<0.0050	<0.0050	<0.0050	0.002	0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.0004	0.00088	0.00042	0.00056
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	<0.002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.0001	<0.00010	<0.00010	<0.00010

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-02 16-Mar-04	AG99-02 28-Sep-04	AG99-02 4-May-05	AG99-02 29-Sep-05	AG99-02 20-Apr-06	AG99-02 19-Oct-06	AG99-02 20-Apr-07	AG99-02 25-Oct-07	AG99-02 9-Apr-08	AG99-02 22-Oct-08	AG99-02 27-Aug-09	AG99-02 9-Dec-09	AG99-02 29-Apr-10	AG99-02 2-Nov-10	AG99-02 10-Mar-11	AG99-02 11-May-11	AG99-02 15-Aug-11	AG99-02 29-Nov-11	AG99-02 22-Feb-12	AG99-02 23-May-12	AG99-02 15-Aug-12	AG99-02 3-Dec-12
Total Metals																										
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																										
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	<5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria																										
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	**1 bc**	**90 bc**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																										
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline		50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L		1	3.2	<0.05	<0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	0.2	0.48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	12	<2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	3.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	<10	-	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	<0.1	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	<0.1	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	<0.1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.
BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.
CDWG - Canadian Drinking Water Quality Guidelines.
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	DupAG99-03
					11-Aug-99	25-Nov-99	1-Mar-00	19-Apr-00	25-Jul-00	13-Sep-00	24-Oct-00	6-Feb-01	8-May-01	26-Jul-01	6-Nov-01	29-Jan-02	8-May-02	22-Aug-02	14-Nov-02	18-Mar-03	19-Jun-03	25-Sep-03	25-Sep-03
Physical Tests																						
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	-	7.19	7.3	7.07	6.91	7.24	-	7.76	7.33	7.76	7.81	**6.24 abc**	6.65	7.87	8.3	7.95	**5.74 abc**	-
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	8.1	7.77	7.75	7.44	7.82	7.77	7.08	7.43	6.67	-	-	7.7	7.55	7.67	7.69	7.69	7.39	7.69	7.7
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	-	-	122	103.4	102.4	105.1	118.5	113.3	94.9	108	106	140.4	118.7	105.5	130	130	100	100	-
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	100	107	110	100	107	111	109	112	103	-	-	126	111	123	125	116	132	129	129
Temperature (Field)	deg C	19	15	15	-	-	-	-	-	-	-	8.3	12.6	12.4	-	7.6	10.5	13	10	9.2	12.8	11	-
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**3.8 a**	7	9.9	-
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	53	-	-	-	-	-	46	-	-	56	-	48	46	67.3	59	60	63
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	52	73	77	72	59	59	67	85	56	-	-	81	62	82	64	87	93	73	67
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																							
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	-	<0.02	-	-	-	-	0.02	<0.02	-	-	0.1	-	-	-	<0.01	-	-	-
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.13	0.15	0.15
Chloride (Lab)	mg/L	600	250	250	2.1	2.5	1.7	1.4	1.4	1.6	1.3	1.1	1.1	-	-	1.6	2.1	2.1	1.5	2.23	2.14	1.9	1.9
Fluoride: Dissolved	mg/L	*	1.5	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Lab)	mg/L	100	500	500	5	5.7	3.7	2.8	2.7	3.1	2.9	2.9	2.9	-	-	3.2	3	3.2	4.1	3.17	2.89	2.9	3
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	49.3	45.8	58.5	57.8	50.6	51.8	55.2	55.8	51.2	-	-	61.2	57.4	59.1	66.5	-	-	-	-
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	71.3	-	-	-	-	68.1	62.5	-	-	74.6	-	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-
Dissolved Metals																							
Aluminum: Dissolved	mg/L	*	0.2	0.1	-	-	0.033	-	-	-	-	0.006	-	<0.05	-	<0.05	<0.05	0.015	0.005	<0.005	<0.005	0.005	0.006
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	-	-	<0.001	-	-	-	-	<0.001	-	<0.2	-	<0.2	<0.2	<0.001	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	-	-	<0.001	-	-	-	-	<0.001	-	<0.03	-	<0.03	<0.03	<0.001	<0.001	0.0004	0.0005	0.0003	0.0003
Barium: Dissolved	mg/L	5	no guideline	1	-	-	0.005	-	-	-	-	0.001	-	0.001	-	0.004	0.001	<0.001	0.001	0.002	0.003	0.001	0.001
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	-	-	<0.001	-	-	-	-	<0.001	-	<0.003	-	<0.003	<0.003	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005
Boron: Dissolved	mg/L	1.2	*	5	-	-	<0.05	-	-	-	-	<0.05	-	<0.01	-	<0.01	<0.01	<0.05	<0.05	0.01	0.011	0.009	0.012
Cadmium: Dissolved	mg/L	*	no guideline	0.005	-	-	**0.0033 a**	-	-	-	-	<0.0002	-	<0.025	-	<0.025	<0.025	<0.0002	<0.0002	<0.00001	<0.00001	<0.00001	0.00001
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	14.8	-	17.1	17.7	-	-	16.5	17.1	-	18.2	-	18.8	20.2	16.2	15.6	23	20.3	20.5	21.7
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	-	-	<0.001	-	-	-	-	<0.001	-	<0.03	-	<0.03	<0.03	<0.001	<0.001	0.0006	**0.0013 a**	<0.0005	<0.0005
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	-	-	<0.001	-	-	-	-	<0.001	-	<0.02	-	<0.02	<0.02	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001
Copper: Dissolved	mg/L	*	0.5	1	-	-	<0.001	-	-	-	-	<0.001	-	<0.02	-	<0.02	<0.02	<0.001	<0.001	0.002	<0.001	<0.001	<0.001
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	-	-	<0.05	-	-	-	-	<0.05	-	<0.01	-	<0.01	<0.01	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01
Lead: Dissolved	mg/L	*	0.05	0.01	-	-	<0.001	-	-	-	-	<0.001	-	<0.03	-	<0.03	<0.03	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	2.09	-	1.07	1.63	-	-	1.78	1.99	-	1.81	-	2.12	2.11	1.82	1.77	2.4	2	2.1	2.2
Manganese: Dissolved	mg/L	*	no guideline	0.05	-	-	0.009	-	-	-	-	<0.001	-	<0.003	-	<0.003	<0.003	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	<0.00002	-	-	-	-	<0.00002	-	-	-	-	-	<0.00002	<0.00002	-	-	-	-
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	-	-	<0.001	-	-	-	-	<0.001	-	<0.04	-	<0.04	<0.04	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
Nickel: Dissolved	mg/L	*	no guideline	no guideline	-	-	<0.001	-	-	-	-	<0.001	-	<0.03	-	<0.03	<0.03	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.01	-	-	-	-	0.05	-	<0.4	-	<0.4	<0.4	0.09	0.03	-	-	-	-
Potassium: Dissolved	mg/L	373	no guideline	no guideline	2.46	-	0.62	0.3	-	-	0.28	0.44	-	0.36	-	<0.25	0.5	0.43	0.14	0.7	0.5	<0.4	0.4
Selenium: Dissolved	mg/L	0.002	0.01	0.01	-	-	<0.002	-	-	-	-	<0.002	-	-	-	-	-	<0.001	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	7.02	-	-	-	-	7.07	-	6.7	-	6.7	7.9	6.42	5.58	-	-	-	-
Silver: Dissolved	mg/L	*	no guideline	no guideline	-	-	<0.0001	-	-	-	-	<0.0001	-	<0.03	-	<0.03	<0.03	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium: Dissolved	mg/L	no guideline	no guideline	200	3.8	-	1.06	1.5	-	-	1.2	1.4	-	1.2	-	1	2.9	1.18	1.14	1.9	2.1	1.4	1.8
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	0.058	-	-	-	-	0.029	-	0.024	-	0.074	0.047	0.024	0.027	0.037	0.035	0.032	0.033
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.22	1.23	1.12	1.07
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.001	-	-	-	-	<0.001	-	-	-	-	-	<0.001	<0.001	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	-	<0.0001	-	-	-	-	<0.0001	-	-	-	-	-	<0.0001	<0.0001	<0.00005	<0.00005	<0.00005	<0.00005
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.0005	-	-	-	-	<0.0005	-	-	-	-	-	<0.0005	<0.0005	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.001	-	-	-	-	<0.001	-	<0.03	-	<0.03	<0.03	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium: Dissolved	mg/L	2	no guideline	no guideline	-	-	<0.001	-	-	-	-	<0.001	-	<0.006	-	<0.006	<0.006	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	<0.0005	-	-	-	-	<0.0005	-	-	-	-	-	<0.0005	<0.0005	-	-	-	-
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	-	-	0.001	-	-	-	-	0.002	-	<0.01	-	<0.01	<0.01	0.002	0.002	0.0026	0.0027	0.0021	0.0022
Zinc: Dissolved	mg/L	*	5	5	-	-	0.006	-	-	-	-	<0.005	-	<0.005	-	<0.005	<0.005	0.007	0.014	0.001	<0.001	<0.001	<0.001
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.01	-	-	-	-	<0.01	-	<0.02	-	<0.02	<0.02	<0.01	<0.01	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.
BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.
CDWG - Canadian Drinking Water Quality Guidelines.
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	AG99-03	DupAG99-03
					11-Aug-99	25-Nov-99	1-Mar-00	19-Apr-00	25-Jul-00	13-Sep-00	24-Oct-00	6-Feb-01	8-May-01	26-Jul-01	6-Nov-01	29-Jan-02	8-May-02	22-Aug-02	14-Nov-02	18-Mar-03	19-Jun-03	25-Sep-03	25-Sep-03
Total Metals																							
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	14.7	-	18.6	17	19	18.4	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	<0.05	-	-	-	-	<0.05	-	<0.01	-	<0.01	<0.01	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	1.37	-	1.73	1.67	1.86	2	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	0.009	-	-	-	-	<0.001	-	<0.003	-	<0.003	<0.003	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	2.08	-	0.41	0.32	0.17	0.32	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	1.8	-	1.5	1.2	1.8	1.2	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																							
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	<25	-	-	-	-	<25	<25	-	-	-	-	-	-	<5	<5	<5	<5
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	1.8	-	-	-	-	1.1	<1	2.2	-	<1	<1	-	<1	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	<1	-	-	-	-	1.2	<1	-	-	-	<1	-	-	<0.5	-	-	-
Bacteria																							
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	<2	<2	<2	<2	<2	<2	<2	<2	<1	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
Coliforms: Total	MPN/100 ml	no guideline	0	0	**11 bc**	**20 bc**	**7 bc**	**6 bc**	<2	<2	<2	<2	<1	**6 bc**	**2 bc**	<1	<1	-	<1	<1	<1	<1	<1
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																							
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2	0.3	-
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<29	2	12	12
Sulphate (Field)	mg/L	100	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	<0.3	<0.3	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-03	AG99-03	AG99-03	DupAG99-03	AG99-03	AG99-03	AG99-03	DupAG99-03	AG99-03	AG99-03	DupAG99-03	AG99-03	AG99-03
					19-Dec-03	16-Mar-04	28-Sep-04	28-Sep-04	3-May-05	29-Sep-05	20-Apr-06	20-Apr-06	19-Oct-06	20-Apr-07	20-Apr-07	25-Oct-07	9-Apr-08
Physical Tests																	
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.09	8.18	7.85	-	7.7	6.955	7.598	-	8.15	6.84	-	7.6	7.33
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.9	7.7	8	7.6	7.6	8	7.8	7.8	7.9	8.12	8.12	7.81	7.43
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	131	151.8	136	-	134.6	119.4	153.3	-	90	122	-	94	130
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	136	132	127.2	123.2	127	128.3	144.6	146.6	113.7	144	143	127	155
Temperature (Field)	deg C	19	15	15	10.6	12.9	10.2	-	12.9	10.5	12.5	-	10.22	12.08	-	10.16	10.89
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	7.68	**4.93 a**	**4.01 a**	-	9.81	**4.11 a**	**1.6 a**	-	**0.21 a**	**3.30 a**	-	6.01	6.77
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	63	67.5	61	59	63	61	70	70	61	73.2	72.3	62	74.9
Dissolved Solids: Total	mg/L	no guideline	no guideline	500	110	100	80	53	33	93	-	-	-	-	-	-	-
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	131.9	507.5	145.4
Anions and Nutrients																	
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	-	<0.02	<0.02	<0.02	<0.20	<0.02	<0.02	<0.05	<0.020	<0.020	0.04	<0.020
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	<0.01	<0.03	<0.03	<0.1	<0.1	<0.01	<0.01	<0.01	<0.0010	<0.0010	<0.0010	<0.0010
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	0.15	0.16	0.16	0.2	0.2	0.18	0.17	0.12	0.194	0.194	0.209	0.272
Chloride (Lab)	mg/L	600	250	250	2.3	2.1	1.8	1.8	2.1	5	2.8	2.8	1.4	2.96	2.95	1.6	2.85
Fluoride: Dissolved	mg/L	*	1.5	1.5	-	-	-	-	<1	-	<0.1	<0.1	<0.1	<0.020	<0.020	<0.020	<0.020
Sulphate (Lab)	mg/L	100	500	500	3.4	2.9	3.5	3.1	2.6	3.4	3.8	3.8	3.5	3.12	3.13	2.69	2.94
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-		-	63	60	-	-	-	70.9	76.7	62.7	77.9
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																	
Aluminum: Dissolved	mg/L	*	0.2	0.1	0.078	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0034	0.0028	<0.0050	<0.0050
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00010	<0.00010	<0.00050	<0.00050
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	0.0004	0.0003	0.0003	0.0003	0.0004	0.0004	0.0003	0.0004	0.0003	0.00026	0.00027	<0.00050	<0.00050
Barium: Dissolved	mg/L	5	no guideline	1	0.001	0.002	0.001	0.001	0.002	0.002	0.002	0.002	0.001	0.00137	0.00135	<0.020	<0.020
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00050	<0.00050	<0.0010	<0.0010
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.00050	-	<0.20
Boron: Dissolved	mg/L	1.2	5	5	0.014	0.011	0.01	0.009	0.01	0.012	0.019	0.019	0.012	0.023	0.023	<0.10	<0.10
Cadmium: Dissolved	mg/L	*	no guideline	0.005	<0.00001	<0.00001	<0.00001	<0.00001	**0.00003 a**	<0.00001	<0.00001	<0.00001	<0.00001	**0.000035 a**	0.00002	<0.000017	<0.000017
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	21.8	23.4	20.9	20.5	21.3	21.2	24	23.9	20.7	-	-	21.2	25.8
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.00050	<0.0010	<0.0010
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00030	<0.00030
Copper: Dissolved	mg/L	*	0.5	1	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.00052	0.00048	<0.0010	<0.0010
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.030	<0.030
Lead: Dissolved	mg/L	*	0.05	0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0003	<0.000050	<0.000050	<0.00050	<0.00050
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	2.2	2.2	2.1	2	2.3	2	2.5	2.5	2.2	-	-	2.18	2.58
Manganese: Dissolved	mg/L	*	no guideline	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.000122	<0.000050	<0.00030	<0.00030
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	<0.000020	<0.000020	<0.000020	<0.000020
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000131	0.000122	<0.0010	<0.0010
Nickel: Dissolved	mg/L	*	no guideline	no guideline	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.00050	<0.0010	<0.0010
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	<0.30	<0.30	0.0059	<0.30
Potassium: Dissolved	mg/L	373	no guideline	no guideline	0.5	0.5	<0.4	<0.4	<0.4	<0.4	0.5	0.4	<0.4	-	-	<2.0	<2.0
Selenium: Dissolved	mg/L	0.002	0.01	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	0.0002	<0.0002	<0.0010	<0.0010	<0.0010	<0.0010
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	3.34	-	-	-	-	3.39	4.03	4.04	3.32	3.92	3.88	-	4.14
Silver: Dissolved	mg/L	*	no guideline	no guideline	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.000010	<0.000010	<0.000020	<0.000020
Sodium: Dissolved	mg/L	no guideline	no guideline	200	1.4	1.7	1.4	1.4	2	1.8	1.9	1.8	1.6	-	-	<2.0	2.3
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	0.037	0.035	0.03	0.03	0.034	0.032	0.037	0.037	0.03	0.0368	0.0368	-	0.0431
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	0.87	1.09	0.98	<0.05	1	1.1	1.2	1.1	1.1	1.01	1.08	1.09	1.16
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00010	<0.00010	<0.00020	<0.00020
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00010	<0.00010	<0.00050	<0.00050
Titanium: Dissolved	mg/L	2	no guideline	no guideline	0.0064	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-	-	<0.010	<0.010
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	0.000044	0.000045	<0.00020	<0.00020
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	0.0032	0.0029	0.0026	0.0025	0.003	0.0023	0.0032	0.003	0.0022	0.0024	0.0023	0.002	0.0021
Zinc: Dissolved	mg/L		5	5	0.001	0.005	0.003	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010	<0.0050	<0.0050
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-03	AG99-03	AG99-03	DupAG99-03	AG99-03	AG99-03	AG99-03	DupAG99-03	AG99-03	AG99-03	DupAG99-03	AG99-03	AG99-03
					19-Dec-03	16-Mar-04	28-Sep-04	28-Sep-04	3-May-05	29-Sep-05	20-Apr-06	20-Apr-06	19-Oct-06	20-Apr-07	20-Apr-07	25-Oct-07	9-Apr-08
Total Metals																	
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	<0.1	<0.01	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	<0.005	<0.005	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																	
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	<5	<5	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria																	
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	<1	<1	<1	<1	-	-	-	-	-	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	<1	<1	<1	<1	-	-	-	-	-	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	<1	<1	<1	<1	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																	
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	<50	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	<0.05	<0.05	<0.08	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	0.3	0.3	<0.2	0.3	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	<30	4	<2.5	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	-	4.42	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	<10	-	-	<10	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	<0.1	<0.1	<0.01	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	<0.1	<0.1	<0.01	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	<0.3	<0.3	<1	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-04 11-Aug-99	AG99-04 25-Nov-99	AG99-04 1-Mar-00	AG99-04 19-Apr-00	AG99-04 25-Jul-00	AG99-04 13-Sep-00	AG99-04 24-Oct-00	AG99-04 6-Feb-01	AG99-04 8-May-01	AG99-04 26-Jul-01	AG99-04 6-Nov-01	AG99-04 29-Jan-02	AG99-04 8-May-02	AG99-04 22-Aug-02	AG99-04 14-Nov-02	AG99-04 18-Mar-03	AG99-04 19-Jun-03	AG99-04 25-Sep-03	AG99-04 18-Dec-03
Physical Tests																							
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	-	7.3	7.78	7.4	7.41	7.52	**6.36 abc**	8.15	7.67	7.87	8.12	**6.46 abc**	6.64	**8.52 bc**	8.3	8.12	-	7.02
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	8.47	7.85	7.75	7.59	7.91	8.03	7.29	7.49	6.87	-	-	7.93	7.71	7.73	7.87	-	-	-	-
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	-	-	100.7	82.9	79.6	82.1	92.8	89	78.8	75.4	104.8	100.6	91.7	74.3	104	110	77	80	103
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	86	93	91	77	81	84	88	88	80	-	-	94	80	84	100	-	-	-	-
Temperature (Field)	deg C	19	15	15	-	-	-	-	-	-	-	7.1	10.9	11.9	-	7.2	10	14.8	10.3	9	14	11.3	10.5
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**4.19 a**	6	5.81	5.55	-
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	44	-	-	-	-	-	-	-	-	41	-	-	-	-	-	-	-
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	54	60	73	51	50	48	48	56	47	-	-	63	53	47	69	-	-	-	-
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																							
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	-	<0.02	-	-	-	-	0.03	0.02	-	-	0.05	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Lab)	mg/L	600	250	250	1.6	1.2	0.9	0.8	1	1	0.8	0.8	0.8	-	-	1.1	1.1	1.3	1	-	-	-	-
Fluoride: Dissolved	mg/L	*	1.5	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Lab)	mg/L	100	500	500	5.1	3.3	2.9	2.8	2.6	3	2.7	2.8	2.8	-	-	3.1	3	3.2	4	-	-	-	-
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	41.1	46.6	49.5	43.5	38.2	39.6	42.9	47.9	39.7	-	-	44.3	40.7	43.2	51.6	-	-	-	-
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	60.4	-	-	-	-	58.4	48.5	-	-	54	-	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-
Dissolved Metals																							
Aluminum: Dissolved	mg/L	*	0.2	0.1	-	-	0.053	-	-	-	-	0.007	-	-	-	-	-	-	-	-	-	-	-
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	-	-	<0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	-	-	<0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Barium: Dissolved	mg/L	5	no guideline	1	-	-	0.004	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	-	-	<0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Dissolved	mg/L	1.2	5	5	-	-	<0.05	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Dissolved	mg/L	*	no guideline	0.005	-	-	**0.0017 a**	-	-	-	-	<0.0002	-	-	-	-	-	-	-	-	-	-	-
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	16.2	-	14.1	14	-	-	13.1	13.1	-	-	-	-	-	-	-	-	-	-	-
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	-	-	<0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	-	-	<0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Copper: Dissolved	mg/L	*	0.5	1	-	-	**0.009 a**	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	-	-	<0.05	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	-
Lead: Dissolved	mg/L	*	0.05	0.01	-	-	0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	1.51	-	0.9	1.29	-	-	1.46	1.58	-	-	-	-	-	-	-	-	-	-	-
Manganese: Dissolved	mg/L	*	no guideline	0.05	-	-	0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	<0.00002	-	-	-	-	<0.00002	-	-	-	-	-	-	<0.00002	-	-	-	-
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	-	-	<0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Nickel: Dissolved	mg/L	*	no guideline	no guideline	-	-	0.014	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	0.03	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-
Potassium: Dissolved	mg/L	373	no guideline	no guideline	0.85	-	0.18	0.17	-	-	0.16	0.29	-	-	-	-	-	-	-	-	-	-	-
Selenium: Dissolved	mg/L	0.002	0.01	0.01	-	-	<0.002	-	-	-	-	<0.002	-	-	-	-	-	-	-	-	-	-	-
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	6.78	-	-	-	-	6.76	-	-	-	-	-	-	-	-	-	-	-
Silver: Dissolved	mg/L	*	no guideline	no guideline	-	-	<0.0001	-	-	-	-	<0.0001	-	-	-	-	-	-	-	-	-	-	-
Sodium: Dissolved	mg/L	no guideline	no guideline	200	1.9	-	0.69	1.2	-	-	0.7	1.1	-	-	-	-	-	-	-	-	-	-	-
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	0.024	-	-	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	-	<0.0001	-	-	-	-	<0.0001	-	-	-	-	-	-	-	-	-	-	-
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.0005	-	-	-	-	<0.0005	-	-	-	-	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Titanium: Dissolved	mg/L	2	no guideline	no guideline	-	-	0.002	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	*	0.02	-	-	<0.0005	-	-	-	-	<0.0005	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	-	-	0.003	-	-	-	-	0.003	-	-	-	-	-	-	-	-	-	-	-
Zinc: Dissolved	mg/L	*	5	*	-	-	0.009	-	-	-	-	<0.005	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.01	-	-	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-

Notes:
BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.
BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.
CDWG - Canadian Drinking Water Quality Guidelines.
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-04 11-Aug-99	AG99-04 26-Nov-99	AG99-04 1-Mar-00	AG99-04 19-Apr-00	AG99-04 25-Jul-00	AG99-04 13-Sep-00	AG99-04 24-Oct-00	AG99-04 6-Feb-01	AG99-04 8-May-01	AG99-04 26-Jul-01	AG99-04 6-Nov-01	AG99-04 29-Jan-02	AG99-04 8-May-02	AG99-04 22-Aug-02	AG99-04 14-Nov-02	AG99-04 18-Mar-03	AG99-04 19-Jun-03	AG99-04 25-Sep-03	AG99-04 18-Dec-03
Total Metals																							
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	16	-	14.6	12.8	13.6	14.3	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	1.5	-	1.38	1.35	1.45	1.6	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	0.33	-	0.26	0.2	0.19	0.21	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	0.4	-	1.1	0.8	1.3	0.9	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																							
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	<25	-	-	-	-	<25	<25	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	1.7	-	-	-	-	<1	<1	<1	-	<1	<1	<1	1	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	2.2	-	-	-	-	3.2	<1	-	-	-	<1	-	-	-	-	-	-
Bacteria																							
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	<2	**2 b**	<2	<2	<2	<2	<2	<2	<1	<1	<1	<1	<1	-	<1	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	<2	**920 bc**	**7 bc**	**540 bc**	<2	<2	<2	<2	<1	<1	<1	<1	<1	-	<1	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	-	<1	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																							
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.2	0.2
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<29	2	8	<30
Sulphate (Field)	mg/L	100	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	<0.3	<0.3	<0.3

Notes:

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BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.
CDWG - Canadian Drinking Water Quality Guidelines.
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-04 11-Aug-99	AG99-04 25-Nov-99	AG99-04 1-Mar-00	AG99-04 19-Apr-00	AG99-04 25-Jul-00	AG99-04 13-Sep-00	AG99-04 24-Oct-00	AG99-04 6-Feb-01	AG99-04 8-May-01	AG99-04 26-Jul-01	AG99-04 6-Nov-01	AG99-04 29-Jan-02	AG99-04 8-May-02	AG99-04 22-Aug-02	AG99-04 14-Nov-02	AG99-04 18-Mar-03	AG99-04 19-Jun-03	AG99-04 25-Sep-03	AG99-04 18-Dec-03
Hydrocarbons																							
VHw6-10	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EHw10-19	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EHw19-32	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																							
Acenapthene	ug/L	6	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acridine	ug/L	0.05	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Pyrene	ug/L	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	ug/L	0.2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	ug/L	12	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Napthalene	ug/L	1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	ug/L	0.3	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	ug/L	0.02	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Halogenated Volatiles																							
Benzene	mg/L	0.4	0.005	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/L	0.2	0.0024	0.0024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/L	0.0005	0.024	0.024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes: Total	mg/L	0.03	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/L	0.072	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds																							
Bromodichloromethane	ug/L	no guideline	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	ug/L	13.3	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	ug/L	1.3	80	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	ug/L	1.8	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cis-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cis-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromoethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl-Tert-Butylether	ug/L	3400	20	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	ug/L	98.1	50	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrabromoethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	ug/L	111	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trans-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trans-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	ug/L	21	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	ug/L	no guideline	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	ug/L	no guideline	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	ug/L	0.7	200	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	ug/L	100	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	ug/L	150	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	ug/L	26	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	ug/L	11100	200	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-04	AG99-04	DupAG99-04	AG99-04	AG99-04	AG99-04	AG99-04	DupAG99-04	AG99-04	AG99-04	DupAG99-04	AG99-04	AG99-04	AG99-04	AG99-04	AG99-04	AG99-04	AG99-04	AG99-04	AG99-04	AG99-04	AG99-04
					16-Mar-04	28-Sep-04	28-Sep-04	3-May-05	29-Sep-05	20-Apr-06	19-Oct-06	19-Oct-06	20-Apr-07	25-Oct-07	25-Oct-07	9-Apr-08	22-Oct-08	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
Physical Tests																												
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	**8.63 bc**	8.38	-	8.41	6.953	8.35	**8.71 bc**	-	8.29	7.88	-	7.93	7.75	8.05	6.93	8.25	8.12	8.09	7.78	8.13	8.02	8.1	7.8	8.07	8.22
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	-	8.1	-	-	8.4	8.1	8.1	7.91	7.83	7.86	8	7.87	7.86	7.58	7.9	7.91	7.43	7.81	7.78	7.86	7.89	7.88	7.86	7.86
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	110.1	106	-	-	89.3	101.7	73	-	78	72	-	80	72	78	45	66	103	96	93	95	94	90	97	91	113
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	-	97.5	-	-	-	97.2	99.7	100	92.3	97.2	98.9	98.1	95.2	94	105	92	103	106	96	99	106	102	97.5	96.6	114
Temperature (Field)	deg C	-	15	15	12	10.6	-	12.4	10.7	11.9	10.83	-	11.93	10.24	-	10.59	10.34	10.9	10.48	12.09	9.96	11.39	11.76	10.6	9.65	10.6	11.3	10.47	10.01
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	**3.75 a**	**3.92 a**	11	11.41	5.2	**3 a**	**0.09 a**	-	**4.14 a**	7.94	-	8.43	13.93	9.75	9.78	21	15.9	6.45	10.84	12.9	9.75	6.6	9.7	8.61	8.97
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	46	49	50	47.8	48.1	48.5	46.3	48.4	44.2	48.6	43.1	35.2	55.7	44.6	50.3	50.4	49.4	46.1	44.3	59.7
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	60	60	74
Oxidation Reduction Potential	mV	no guideline	no guideline	500	-	-	-	-	-	-	-	-	-	127.3	699.8	138.2	-54.9	181.9	59.2	161.7	29.2	-351.8	98.9	87	116.3	73.8	82.2	82.6	330
Anions and Nutrients																													
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	-	-	-	-	<0.02	<0.05	<0.05	<0.020	0.022	<0.020	<0.020	<0.020	<0.01	<0.01	<0.01	0.009	0.015	<0.005	0.032	0.013	0.0071	0.011	0.012	0.026
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	3.2	3.2	-	-	<0.03	-	-	<0.01	<0.01	<0.01	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	-	0.1	-	-	0.08	0.06	0.09	0.0722	0.108	0.105	0.0914	0.128	0.1	0.1	0.08	0.11	0.1	0.1	0.18	0.128	0.104	0.099	0.147	0.14
Chloride (Lab)	mg/L	600	250	250	-	-	1.1	-	-	1.3	0.9	1	1.33	0.99	0.98	1.15	0.94	1.23	1.06	0.9	<0.5	1.3	1.3	1.9	1.1	1.9	1.9	1.5	3
Fluoride: Dissolved	mg/L	-	1.5	1.5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.020	<0.020	<0.020	<0.020	<0.020	<0.05	<0.05	0.03	0.02	0.02	0.02	0.01	0.022	0.022	0.018	0.017	0.018
Sulphate (Lab)	mg/L	100	500	500	-	-	3.2	-	-	3.7	3.3	3.4	3.24	2.64	2.65	3.14	2.66	2.78	2.71	3.5	1.9	2.4	3.3	2.2	2.87	3.05	2.99	2.34	3.12
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	50	-	-	-	-	-	43.7	45.6	46	45.2	47.3	45.2	52.4	45	49	50	48	45	49.4	47.6	42.8	46.5	50.5
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	58.1	52.2	56.8	61.7
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50
Dissolved Metals																													
Aluminum: Dissolved	mg/L	*	0.2	0.1	-	-	-	-	-	0.03	0.006	0.007	0.0058	<0.0050	0.0056	<0.0050	0.024	0.005	0.004	0.01	0.006	0.008	0.008	0.005	0.0042	0.0064	0.0062	0.0108	0.00548
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	-	-	-	-	-	<0.0002	<0.0002	<0.0002	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.00003	0.000022	0.000024	0.000023
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	-	-	-	-	-	0.0005	0.0005	0.0004	0.00046	<0.00050	<0.00050	<0.00050	<0.00050	0.0005	0.0005	0.0005	0.0004	0.0004	0.0005	0.0004	0.00038	0.00043	0.000474	0.000434	0.000422
Barium: Dissolved	mg/L	5	no guideline	1	-	-	-	-	-	0.001	<0.001	<0.001	0.000646	<0.020	<0.020	<0.020	<0.020	0.0006	0.0006	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00068	0.000612	0.000766	0.000733
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.00050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00001	<0.000010	<0.000010	<0.000010
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	<0.0005	<0.0005	<0.0005	<0.00050	-	-	<0.20	-	<0.0002	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.00005	<0.000050	<0.000050	<0.0000050
Boron: Dissolved	mg/L	1.2	5	5	-	-	-	-	-	0.007	0.006	0.007	<0.010	<0.10	<0.10	<0.10	<0.10	<0.01	0.006	<0.05	<0.05	<0.05	<0.05	<0.05	<0.050	<0.05	<0.050	<0.050	<0.050
Cadmium: Dissolved	mg/L	*	no guideline	0.005	-	-	-	-	-	0.00001	**0.00002 a**	**0.00003 a**	<0.000017	<0.000017	<0.000017	<0.000017	**0.000112 a**	<0.00004	<0.00001	**0.00034 a**	<0.00001	**0.00004 a**	**0.00018 a**	<0.00001	<0.000010	<0.000005	<0.000050	0.000011	<0.000050
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	15.5	16.4	16.8	-	16.3	16.4	15.7	16.4	14.9	16.8	14.7	11.5	16.8	15.1	17.4	17.2	16.7	15.8	14.9	20.9
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	-	-	-	-	-	0.0005	<0.0005	<0.0005	<0.00050	<0.0010	<0.0010	<0.0010	<0.0010	0.0003	<0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.0002	0.0002	0.00525	0.0002
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.00010	<0.00030	<0.00030	<0.00030	<0.00030	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.000007	0.0000077	0.000008	0.000007
Copper: Dissolved	mg/L	*	0.5	1	-	-	-	-	-	<0.001	<0.001	<0.001	0.00021	<0.0010	<0.0010	<0.0010	<0.0010	0.0003	0.0002	0.0003	<0.0002	0.0007	0.0003	0.0003	<0.00020	0.0002	0.000172	0.000428	0.000354
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	-	-	<0.01	-	-	0.01	<0.01	<0.01	-	<0.030	<0.030	<0.030	<0.030	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.015	<0.0010	0.0025	0.0017
Lead: Dissolved	mg/L	*	0.05	0.01	-	-	-	-	-	<0.0001	0.0001	0.0001	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0002	<0.00005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	0.000006	<0.000050	0.000012	0.000014
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	<0.001	<0.001	<0.001	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0002	<0.0001	<0.005	<0.005	-	-	<0.005	<0.0050	<0.0005	<0.00050	<0.00050	<0.00050
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	1.7	1.9	1.9	-	1.8	1.81	1.7	1.81	1.66	1.63	1.54	1.59	2.14	1.66	1.68	1.79	1.91	1.62	1.73	2.1
Manganese: Dissolved	mg/L	*	no guideline	0.05	-	-	-	<0.005	<0.005	0.006	<0.005	<0.005	0.000063	<0.00030	<0.00030	<0.00030	0.00117	<0.0002	<0.0001	<0.001	0.001	<0.001	<0.001	<0.001	<0.0010	0.00007	<0.000050	0.000073	<0.000050
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.00002	<0.02	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.000050	< 0.00001	<0.00001	<0.000010	<0.000010
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	-	-	-	-	-	<0.001	<0.001	<0.001	0.00015	<0.0010	<0.0010	<0.0010	<0.0010	<0.0001	0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.0001	0.00012	0.000123	0.000166
Nickel: Dissolved	mg/L	*	no guideline	no guideline	-	-	-	-	-	<0.0005	<0.0005	<0.0005	<0.00050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00006	0.000051	0.00006	0.000025
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.30	-	-	-	-	-	-	<0.30	0.0075	0.0074	<0.30	-	<0.03	<0.015	-	-	<0.01	<0.01	-	-	0.31	0.0066	0.0063	0.0074
Potassium: Dissolved	mg/L	373	no guideline	no guideline	-	-	-	-	-	<0.4	<0.4	<0.4	-	<2.0	<2.0	<2.0	<2.0	0.25	0.32	0.29	0.24	0.34	0.27	0.28	0.277	0.0057	0.28	0.283	0.315
Selenium: Dissolved	mg/L	0.002	0.01	0.01	-	-	-	-	-	<0.0002	<0.0002	<0.0002	<0.00010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.00013	0.0001	0.000094	0.000136	0.000086
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	3.75	3.29	3.29	3.54	-	-	3.67	-	3.72	2.99	4	3	4.4	3.7	3.9	3.34	3.6	3.6	3.44	4.03
Silver: Dissolved	mg/L	*	no guideline	no guideline	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.000010	<0.000020	<0.000020	<0.000020	<0.000020	<0.00005	<0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020	<0.000005	<0.000050	<0.000050	<0.000050
Sodium: Dissolved	mg/L	no guideline	no guideline	200	-	-	-	-	-	1.1	1.1	1.1	-	<2.0	<2.0	<2.0	<2.0	1.13	1.06	1.08	1.07	1.58	1.24	1.39	1.28	1.44	1.18	1.31	1.49
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	0.021	0.021	0.021	0.022	-	-	0.0239	-	0.022	0.024	0.021	0.023	0.024	0.023	0.023	0.0257	0.0258	0.0228	0.0224	0.0275
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	1.1	0.9	1	1.06	1.07	1.05	1.21	0.98	<2	<1	<3	<3	<3	<3	<3	<3.0	<10	<15	<10	<3.0
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	<0.00005	<0.00005	<0.00005	<0.00010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	<0.000002	<0.0000020	<0.0000020	<0.0000020
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.00005	-	-	-	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	<0.001	<0.001	<0.001	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.0002	<0.0001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0002	<0.00020	<0.00020	0.0003
Titanium: Dissolved	mg/L	2	no guideline	no guideline	-	-	-	-	-	<0.0005	<0.0005	<0.0005	-	<0.010	<0.010	<0.010	<0.010	<0.0002	<0.0002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0005	<0.00050	<0.00050	<0.00050
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	0.000027	<0.000020	<0.000020	<0.000020	<0.000020	<0.0001	<0.00005	-	-	-	<0.0001	<0.0001	< 0.0001	<0.00010	0.000036	0.0000262	0.000024	0.000037
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	0.0042	0.0032	0.0031	0.0033	0.0028	0.0028	0.0028	0.0029	0.003	0.0028	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.003	0.00286	0.00323	0.00316
Zinc: Dissolved	mg/L	*	5	5	-	-	-	-	-	<0.001	0.002	0.002	<0.00010	<0.0050	<0.0050	<0.0050	<0.0050	<0.001	0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.0004	0.00049	0.00451	0.00071
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.0001	<0.00010	<0.00010	<0.00010

Notes:
BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.
BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.
CDWG - Canadian Drinking Water Quality Guidelines.
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
* - See notes at beginning of Appendix F

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-04 16-Mar-04	AG99-04 28-Sep-04	DupAG99-04 28-Sep-04	AG99-04 3-May-05	AG99-04 29-Sep-05	AG99-04 20-Apr-06	AG99-04 19-Oct-06	DupAG99-04 19-Oct-06	AG99-04 20-Apr-07	AG99-04 25-Oct-07	DupAG99-04 25-Oct-07	AG99-04 9-Apr-08	AG99-04 22-Oct-08	AG99-04 27-Aug-09	AG99-04 9-Dec-09	AG99-04 29-Apr-10	AG99-04 2-Nov-10	AG99-04 10-Mar-11	AG99-04 11-May-11	AG99-04 15-Aug-11	AG99-04 29-Nov-11	AG99-04 22-Feb-12	AG99-04 23-May-12	AG99-04 15-Aug-12	AG99-04 3-Dec-12
Total Metals																														
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																														
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria																														
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																														
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	40	45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	<50	-	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L		1	3.2	<0.05	<0.08	-	<0.08	<0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	0.2	<0.2	-	<0.2	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	8	<2.5	-	<2.5	<2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	3.03	-	<8	<8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	<0.1	<0.01	-	<0.2	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	<0.3	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.
BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.
CDWG - Canadian Drinking Water Quality Guidelines.
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-04 16-Mar-04	AG99-04 28-Sep-04	DupAG99-04 28-Sep-04	AG99-04 3-May-05	AG99-04 29-Sep-05	AG99-04 20-Apr-06	AG99-04 19-Oct-06	DupAG99-04 19-Oct-06	AG99-04 20-Apr-07	AG99-04 25-Oct-07	DupAG99-04 25-Oct-07	AG99-04 9-Apr-08	AG99-04 22-Oct-08	AG99-04 27-Aug-09	AG99-04 9-Dec-09	AG99-04 29-Apr-10	AG99-04 2-Nov-10	AG99-04 10-Mar-11	AG99-04 11-May-11	AG99-04 15-Aug-11	AG99-04 29-Nov-11	AG99-04 22-Feb-12	AG99-04 23-May-12	AG99-04 15-Aug-12	AG99-04 3-Dec-12
Hydrocarbons																													
VHw6-10	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	<0.3	<0.3
VPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	<0.3	<0.3
EHw10-19	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EHw19-32	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																													
Acenapthene	ug/L	6	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acridine	ug/L	0.05	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Pyrene	ug/L	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	ug/L	0.2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	ug/L	12	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Napthalene	ug/L	1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	ug/L	0.3	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	ug/L	0.02	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Halogenated Volatiles																													
Benzene	mg/L	0.4	0.005	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.00040
Ethylbenzene	mg/L	0.2	0.0024	0.0024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.00040
Toluene	mg/L	0.0005	0.024	0.024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.00040
Xylenes: Total	mg/L	0.03	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.00040
Styrene	mg/L	0.072	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.00050
Volatile Organic Compounds																													
Bromodichloromethane	ug/L	no guideline	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Bromoform	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Bromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Carbon Tetrachloride	ug/L	13.3	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
Chlorobenzene	ug/L	1.3	80	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
Chloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Chloroform	ug/L	1.8	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Chloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Cis-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Cis-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Dibromochloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Dibromoethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Dibromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.9	<0.9	<0.9
Dichlorodifluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2	<2	<2
Methyl-Tert-Butylether	ug/L	3400	20	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<4	<4	<4
Methylene Chloride	ug/L	98.1	50	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2	<2	<2
Tetrabromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	ug/L	111	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
Trans-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Trans-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Trichloroethene	ug/L	21	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
Trichlorofluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<4	<4	<4
Vinyl Chloride	ug/L	no guideline	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
1,1-Dichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
1,1-Dichloroethene	ug/L	no guideline	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	ug/L	0.7	200	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
1,2-Dichloroethane	ug/L	100	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	ug/L	150	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ug/L	26	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	11100	200	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-05 11-Aug-99	AG99-05 25-Nov-99	AG99-05 1-Mar-00	AG99-05 19-Apr-00	AG99-05 25-Jul-00	AG99-05 13-Sep-00	AG99-05 24-Oct-00	AG99-05 6-Feb-01	AG99-05 8-May-01	AG99-05 25-Jul-01	AG99-05 31-Oct-01	AG99-05 29-Jan-02	AG99-05 8-May-02	AG99-05 22-Aug-02	AG99-05 26-Nov-02	AG99-05 18-Mar-03	AG99-05 19-Jun-03	AG99-05 25-Sep-03	AG99-05 18-Dec-03
Physical Tests																							
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	-		**8.74 bc**	7.53	7.52	7.7	6.5	**8.57 bc**	7.38	8.12	7.91	**5.96 abc**	6.71	6.84	8.5	8.32	-	7.2
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	**10.8 abc**	**10.5 abc**	**8.84 bc**	**8.93 bc**	8.06	8.23	7.4	7.59	6.76	7.39	-	6.78	7.85	7.86	7.94	-	-	-	-
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	-	-	-	93.3	78.5	75.3	80.1	85.7	110.8	77.4	85.9	116.6	107.7	78.4	231	110	84	80	101
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	148	132	77	84	84	78	75	88	91	77	-	119	98	76	90	-	-	-	-
Temperature (Field)	deg C	19	15	15	-	-	-	-	-	-	-	7.6	10.5	**16.2 bc**	8.3	4.8	9.5	11.6	8.9	9.4	12.6	12.4	10.6
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**4.45 a**	8	8.08	9.31
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	34	-	-	-	-	-	42	44.4	-	48	-	-	-	-	-	-	-
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	57	61	51	58	50	45	56	63	39	51	-	90	61	60	57	-	-	-	-
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																							
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	-	0.02	-	-	-	-	0.06	<0.02	-	-	0.05	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Lab)	mg/L	600	250	250	0.8	1	2.5	2.9	0.8	0.9	0.8	0.8	0.7	0.8	-	1.5	1.5	1	1.1	-	-	-	-
Fluoride: Dissolved	mg/L	*	1.5	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Lab)	mg/L	100	500	500	2.9	3	4.7	4.7	2.7	3	2.6	2.8	2.8	2.8	-	22.5	3	3	3.4	-	-	-	-
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	47.8	48.4	38.7	39.7	38.2	37.1	37.1	44.3	46.6	-	-	34.4	50	40.8	52.5	-	-	-	-
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	34	-	-	-	-	54.1	56.9	-	-	41.9	-	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-
Dissolved Metals																							
Aluminum: Dissolved	mg/L	-	0.2	0.1	-	-	0.031	-	-	-	-	0.009	-	-	-	-	-	-	-	-	-	-	-
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	-	-	<0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	-	-	<0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Barium: Dissolved	mg/L	5	no guideline	1	-	-	0.012	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	-	-	<0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Dissolved	mg/L	1.2	5	5	-	-	<0.05	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Dissolved	mg/L	*	no guideline	0.005	-	-	**0.0003 a**	-	-	-	-	<0.0002	-	-	-	-	-	-	-	-	-	-	-
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	44.9	-	9.27	10.7	-	-	11.1	12.7	-	-	-	-	-	-	-	-	-	-	-
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	-	-	**0.004 a**	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	-	-	<0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Copper: Dissolved	mg/L	*	0.5	1	-	-	<0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	-	-	<0.05	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	-
Lead: Dissolved	mg/L	*	0.05	0.01	-	-	<0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	4.98	-	1.29	2.71	-	-	1.33	1.69	-	-	-	-	-	-	-	-	-	-	-
Manganese: Dissolved	mg/L	-	no guideline	0.05	-	-	0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	<0.00002	-	-	-	-	<0.00002	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	-	-	<0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Nickel: Dissolved	mg/L	*	no guideline	no guideline	-	-	<0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.01	-	-	-	-	0.08	-	-	-	-	-	-	-	-	-	-	-
Potassium: Dissolved	mg/L	373	no guideline	no guideline	0.86	-	0.78	0.65	-	-	0.21	0.27	-	-	-	-	-	-	-	-	-	-	-
Selenium: Dissolved	mg/L	0.002	0.01	0.01	-	-	<0.002	-	-	-	-	<0.002	-	-	-	-	-	-	-	-	-	-	-
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	7.64	-	-	-	-	6.55	-	-	-	-	-	-	-	-	-	-	-
Silver: Dissolved	mg/L	*	no guideline	no guideline	-	-	<0.0001	-	-	-	-	<0.0001	-	-	-	-	-	-	-	-	-	-	-
Sodium: Dissolved	mg/L	no guideline	no guideline	200	1.5	-	4.04	4.1	-	-	0.6	0.9	-	-	-	-	-	-	-	-	-	-	-
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	0.12	-	-	-	-	0.017	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	-	<0.0001	-	-	-	-	<0.0001	-	-	-	-	-	-	-	-	-	-	-
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.0005	-	-	-	-	<0.0005	-	-	-	-	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Titanium: Dissolved	mg/L	2	no guideline	no guideline	-	-	0.002	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	<0.0005	-	-	-	-	<0.0005	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	-	-	0.002	-	-	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-
Zinc: Dissolved	mg/L	*	5	5	-	-	<0.005	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.01	-	-	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.
BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.
CDWG - Canadian Drinking Water Quality Guidelines.
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-05 11-Aug-99	AG99-05 25-Nov-99	AG99-05 1-Mar-00	AG99-05 19-Apr-00	AG99-05 25-Jul-00	AG99-05 13-Sep-00	AG99-05 24-Oct-00	AG99-05 6-Feb-01	AG99-05 8-May-01	AG99-05 25-Jul-01	AG99-05 31-Oct-01	AG99-05 29-Jan-02	AG99-05 8-May-02	AG99-05 22-Aug-02	AG99-05 26-Nov-02	AG99-05 18-Mar-03	AG99-05 19-Jun-03	AG99-05 25-Sep-03	AG99-05 18-Dec-03
Total Metals																							
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	17	-	10.1	14.7	13.4	12.4	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	0.32	-	2.4	1.52	1.45	1.47	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	0.96	-	0.75	0.3	0.25	0.25	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	<0.1	-	4.1	0.8	1.4	0.8	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																							
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	<25	-	-	-	-	<25	<25	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	5.3	-	-	-	-	<1	<1	1.9	-	<1	<1	-	<1	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	1.7	-	-	-	-	1.2	<1	-	<1	-	<1	-	-	-	-	-	-
Bacteria																							
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	<2	<2	<2	<2	<2	<2	<2	<2	<1	<1	<1	<1	<1	-	<1	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	<2	<2	<2	**23 bc**	<2	<2	<2	<2	<1	<1	<1	**2 bc**	<1	-	<1	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	-	<1	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																							
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	0.15	0.2	0.25
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<29	12	16	<30
Sulphate (Field)	mg/L	100	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	<0.3	<0.3	<0.3

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APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-05 11-Aug-99	AG99-05 25-Nov-99	AG99-05 1-Mar-00	AG99-05 19-Apr-00	AG99-05 25-Jul-00	AG99-05 13-Sep-00	AG99-05 24-Oct-00	AG99-05 6-Feb-01	AG99-05 8-May-01	AG99-05 25-Jul-01	AG99-05 31-Oct-01	AG99-05 29-Jan-02	AG99-05 8-May-02	AG99-05 22-Aug-02	AG99-05 26-Nov-02	AG99-05 18-Mar-03	AG99-05 19-Jun-03	AG99-05 25-Sep-03	AG99-05 18-Dec-03
Hydrocarbons																							
VHw6-10	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EHw10-19	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EHw19-32	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																							
Acenaphthene	ug/L	6	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acridine	ug/L	0.05	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Pyrene	ug/L	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	ug/L	0.2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	ug/L	12	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Napthalene	ug/L	1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	ug/L	0.3	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	ug/L	0.02	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Halogenated Volatiles																							
Benzene	mg/L	0.4	0.005	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/L	0.2	0.0024	0.0024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/L	0.0005	0.024	0.024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes: Total	mg/L	0.03	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/L	0.072	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds																							
Bromodichloromethane	ug/L	no guideline	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	ug/L	13.3	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	ug/L	1.3	80	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	ug/L	1.8	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cis-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cis-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromoethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl-Tert-Butylether	ug/L	3400	20	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	ug/L	98.1	50	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrabromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	ug/L	111	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trans-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trans-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	ug/L	21	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	ug/L	no guideline	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	ug/L	no guideline	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	ug/L	0.7	200	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	ug/L	100	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	ug/L	150	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	ug/L	26	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	ug/L	11100	200	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-05 15-Mar-04	AG99-05 28-Sep-04	DupAG99-05 28-Sep-04	AG99-05 3-May-05	AG99-05 29-Sep-05	AG99-05 20-Apr-06	AG99-05 20-Oct-06	AG99-05 20-Apr-07	AG99-05 26-Oct-07	AG99-05 9-Apr-08	DupAG99-05 9-Apr-08	AG99-05 22-Oct-08	DupAG99-05 22-Oct-08	AG99-05 27-Aug-09	DupAG99-05 27-Aug-09	AG99-05 9-Dec-09	AG99-05 30-Apr-10	AG99-05 2-Nov-10	AG99-05 10-Mar-11	AG99-05 11-May-11	AG99-05 16-Aug-11	AG99-05 29-Nov-11	AG99-05 21-Feb-12	AG99-05 23-May-12	AG99-06 15-Aug-12	AG99-05 4-Dec-12
Physical Tests																														
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	**8.6 bc**	8.49	8	**8.53 bc**	6.953	8.303	**8.75 bc**	8.16	**8.56 bc**	8.16	-	8.05	-	8.21	-	7.43	7.89	8.36	8.23	8.09	8.53	8.37	8.3	8.13	8.17	8.79
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	-	-	8	8.3	8.4	8.3	8.15	7.84	8.26	8.28	7.74	7.81	7.84	7.95	7.51	8.1	7.85	7.62	8.03	7.87	7.83	7.93	7.98	8.03	7.95
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	126.3	94	85.5	119	82.7	168	69	113	65	155	-	66	-	78	-	45	-	104	128	197	101	90	97	154	125	102
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	-	-	-	120.9	86.7	160.1	94	135	86.4	189	190	86.3	87.8	89	94	95	153	94	141	198	106	96.6	113	153	130	101
Temperature (Field)	deg C	19	15	15	11.5	11.8	-	11.8	12.1	11.2	11.47	11.23	11.7	10.68	15	10.77	-	11.69	-	10.33	11.37	11.01	10.72	11.28	11.74	10.49	8.6	10.8	11.47	10.21
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	5.93	9.21	9.9	5.9	6.96	**1 a**	7.28	**3.03 a**	8.01	5.12	-	9.67	-	9.97	-	7.5	10.76	21	8.88	8.94	9.43	7.59	6.6	5.3	8.89	7.23
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	-	62	40	80	45	71	42.4	99	99.2	44.9	45.5	42.4	43.1	39.6	74.2	44.8	75.1	98.2	53	42.7	54.6	75.6	64.3	50.4
Dissolved Solids: Total	mg/L	no guideline	no guideline	500	-	-	-	27	53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	100	81	67
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	115.5	789.2	-	-	-64.6	-	211.4	-	248.4	185.9	24.4	-378.1	226.2	83.1	75	113.1	69.5	-17.5	-5.8
Anions and Nutrients																														
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	-		<0.02	<0.20	<0.02	<0.05	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	0.015	0.01	0.015	0.022	<0.0050	0.028	0.012	0.02
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	-	<0.03	<0.1	<0.1	<0.01	<0.01	<0.0010	<0.0010	<0.0010	1	<0.0010	<0.0010	<0.0010	<0.002	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	-	0.07	<0.1	<0.1	0.07	0.02	0.0492	0.072	0.0611	0.0541	0.0788	0.0792	0.06	0.05	0.08	0.08	0.07	0.09	0.09	0.08	0.07	0.075	0.057	0.058	0.071
Chloride (Lab)	mg/L	600	250	250	-	-	0.9	<2	<2	2.6	0.9	2.37	0.87	3.85	4.04	0.91	0.91	1.05	1.09	0.95	1.4	<0.5	1.6	3.9	1.9	0.9	0.6	4.8	2.6	1.6
Fluoride: Dissolved	mg/L	*	1.5	1.5	-	-	-	<1	-	<0.1	<0.1	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.05	<0.05	<0.05	0.02	0.01	0.02	0.01	0.01	0.023	0.02	0.016	0.016	0.019
Sulphate (Lab)	mg/L	100	500	500	-	-	3.2	3.6	3.3	3.8	3.5	3.71	2.64	3.37	3.59	2.8	2.79	2.90	2.87	2.77	3.6	3.2	2.2	4.6	2.6	2.63	3.24	3.39	1.92	2.79
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	39	65	41	-	-	67.7	40.3	91.3	94.6	43	42.6	43.8	45.3	46.7	78	46	68	100	50	42.5	53.3	69.8	62.3	48.1
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	65.1	85.2	76	58.6
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50
Dissolved Metals																														
Aluminum: Dissolved	mg/L		0.2	0.1	-	-	-	<0.005	0.006	<0.005	0.008	0.0056	0.0061	<0.0050	<0.0050	0.006	0.0051	0.006	0.007	0.006	0.006	0.006	0.007	0.005	0.007	0.0052	0.0074	0.00535	0.00664	0.00614
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	-	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0002	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.00003	0.000022	0.000023	0.000028
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	-	-	-	0.0007	0.001	0.0007	0.0008	0.0007	0.00089	0.00066	0.00066	0.00091	0.00091	0.001	0.0009	0.001	0.0007	0.0009	0.0007	0.0006	0.0008	0.00081	0.00078	0.000832	0.00066	0.000773
Barium: Dissolved	mg/L	5	no guideline	1	-	-	-	0.002	0.001	0.001	<0.001	0.000949	<0.020	<0.020	<0.020	<0.020	<0.020	0.0006	0.0008	0.0006	0.001	<0.001	<0.001	0.001	<0.001	<0.0010	0.00104	0.000946	0.000787	0.000612
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00001	<0.000010	<0.000010	<0.000010
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050		<0.20	<0.20			<0.0002	<0.0002	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.000005	<0.0000550	<0.0000550	<0.0000050
Boron: Dissolved	mg/L	1.2	5	5	-	-	-	0.005	0.006	0.005	0.006	<0.010	<0.10	<0.10	5	<0.10	<0.10	0.01	0.01	0.007	<0.05	<0.05	<0.05	<0.05	<0.05	<0.050	<0.05	<0.050	<0.050	<0.050
Cadmium: Dissolved	mg/L		no guideline	0.005	-	-	-	<0.00001	<0.00001	0.00001	0.00001	<0.000017	<0.000017	0.000023	<0.000017	<0.000017	<0.000017	<0.00004	**0.00005 a**	<0.00001	**0.00006 a**	<0.00001	<0.00001	**0.00004 a**	<0.00001	<0.000010	0.000006	<0.0000050	<0.0000050	<0.0000050
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	20.4	13.4	26.6	14.9		14.1	33.3	33.3	15.1	15.4	14.2	14.4	13.3	25.1	15	25.1	33	18.1	14.4	18.2	25.5	21.5	17.2
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	-	-	-	<0.0005	<0.0005	0.0005	<0.0005	<0.00050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0003	0.0003	<0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.0002	0.0002	0.00021	0.00014
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.0002	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.000019	0.0000069	0.000015	<0.0000050
Copper: Dissolved	mg/L	*	0.5	1	-	-	-	<0.001	0.003	<0.001	<0.001	0.00035	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	0.0005	0.0002	0.0004	<0.0002	0.0003	0.0009	<0.0002	<0.00020	0.00037	0.000252	0.000326	0.000182
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	-	-	0.02	<0.01	0.01	<0.01	<0.01		<0.030	<0.030	<0.030	<0.030	<0.030	<0.01	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.002	<0.0010	0.0013	<0.0010
Lead: Dissolved	mg/L	-	0.05	0.01	-	-	-	<0.0001	0.0001	<0.0001	0.0001	<0.000050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0002	<0.0002	<0.00005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	0.000013	<0.0000050	0.00001	<0.0000050
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0002	<0.0002	<0.0001	<0.005	<0.005	<0.005	-	-	<0.005	<0.0050	<0.0005	<0.00050	<0.00050
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	2.6	1.5	3.4	1.9	-	1.71	3.84	3.87	1.76	1.74	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
Manganese: Dissolved	mg/L	-	no guideline	0.05	-	-	-	<0.005	<0.005	<0.005	<0.005	0.000068	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	0.0002	0.0002	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00011	0.000096	<0.000050	<0.000050
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.00002	<0.00002	<0.00002	<0.02	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.000050	< 0.00001	<0.000010	<0.000010
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	-	-	-	<0.001	<0.001	<0.001	<0.001	0.000117	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0001	<0.0001	0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00011	0.00012	0.000141	0.0001136
Nickel: Dissolved	mg/L	*	no guideline	no guideline	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	<0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00009	0.000086	0.000076	0.000025
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	<0.30	0.0113	<0.30	<0.30	-	-	<0.03	<0.03	<0.015	-	-	0.01	<0.01	-	-	0.43	0.0084	0.0106	0.0238
Potassium: Dissolved	mg/L	373	no guideline	no guideline	-	-	-	0.4	0.5	0.4	<0.4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	0.33	0.34	0.31	0.42	0.33	0.45	0.47	0.35	0.327	0.0084	0.44	0.412	0.339
Selenium: Dissolved	mg/L	0.002	0.01	0.01	-	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	<0.0002	<0.0001	0.0001	0.0001	0.0001	<0.0001	0.0001	<0.00010	0.00009	0.000085	0.0000089	0.000131
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	3.52	3.82	3.51	3.59	-	3.79	3.84	-	-	3.97	4.13	2.83	4.2	3.6	4.2	3.9	4	3.82	3.6	3.8	3.93	4.17
Silver: Dissolved	mg/L	*	no guideline	no guideline	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.000010	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.00005	<0.00005	<0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020	<0.000005	<0.0000050	<0.0000050	<0.0000050
Sodium: Dissolved	mg/L	no guideline	no guideline	200	-	-	-	1	1.2	1.3	1	-	<2.0	<2.0	<2.0	<2.0	<2.0	1.04	1.06	0.84	1.26	1.02	1.4	1.47	1.07	1.17	1.4	1.44	1.33	1.12
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	0.027	0.018	0.035	0.018	0.0296	-	0.0437	0.044	-	-	0.019	0.019	0.021	0.033	0.021	0.031	0.046	0.023	0.0219	0.0269	0.0345	0.0295	0.0215
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	1	1.1	1.1	1.1	1.17	1.05	1.32	1.33	1	1.01	<2	<2	<2	<1	<3	<3	<3	<3	<3.0	<10	<15	<10	<3.0
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00002	0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	<0.000002	<0.0000020	<0.0000020	<0.0000020
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.00005	-	-	-	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0002	<0.0002	<0.0001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0002	<0.00020	<0.00020	<0.00020
Titanium: Dissolved	mg/L	2	2	no guideline	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.010	<0.010	<0.010	<0.010	<0.010	0.0002	0.0002	<0.0002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0005	<0.00050	<0.00050	<0.00050
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	0.000092	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.0001	<0.0001	<0.00005	0.0001	<0.0001	<0.0001	0.0001	< 0.0001	<0.00010	0.000055	0.0000744	0.000066	0.000037
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	-	-	-	0.005	0.0053	0.0047	0.0051	0.0039	0.0048	0.0034	0.0036	0.0048	0.0048	0.0051	0.0052	0.0045	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.0043	0.00363	0.00424	0.00459
Zinc: Dissolved	mg/L	*	5	5	-	-	-	<0.001	0.002	<0.001	0.01	<0.0010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.001	0.002	0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.0027	0.00038	0.00153	0.00045
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.002	<0.002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.0001	<0.00010	<0.00010	<0.00010

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.
BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.
CDWG - Canadian Drinking Water Quality Guidelines.
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-05 15-Mar-04	AG99-05 28-Sep-04	DupAG99-05 28-Sep-04	AG99-05 3-May-05	AG99-05 29-Sep-05	AG99-05 20-Apr-06	AG99-05 20-Oct-06	AG99-05 20-Apr-07	AG99-05 26-Oct-07	AG99-05 9-Apr-08	DupAG99-05 9-Apr-08	AG99-05 22-Oct-08	DupAG99-05 22-Oct-08	AG99-05 27-Aug-09	DupAG99-05 27-Aug-09	AG99-05 9-Dec-09	AG99-05 30-Apr-10	AG99-05 2-Nov-10	AG99-05 10-Mar-11	AG99-05 11-May-11	AG99-05 16-Aug-11	AG99-05 29-Nov-11	AG99-05 21-Feb-12	AG99-05 23-May-12	AG99-05 15-Aug-12	AG99-05 4-Dec-12
Total Metals																														
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																														
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria																														
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																														
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	1	3.2	<0.05	<0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	0.2	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	4	<2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	<10	-	-	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	<0.1	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	<0.1	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	<0.3	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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					15-Mar-04	28-Sep-04	28-Sep-04	3-May-05	29-Sep-05	20-Apr-06	20-Oct-06	20-Apr-07	26-Oct-07	9-Apr-08	9-Apr-08	22-Oct-08	22-Oct-08	27-Aug-09	27-Aug-09	9-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
Hydrocarbons																													
VHw6-10	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	<0.3	<0.3
VPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	<0.3	<0.3
EHw10-19	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EHw19-32	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																													
Acenapthene	ug/L	6	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acridine	ug/L	0.05	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Pyrene	ug/L	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	ug/L	0.2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	ug/L	12	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Napthalene	ug/L	1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	ug/L	0.3	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	ug/L	0.02	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Halogenated Volatiles																													
Benzene	mg/L	0.4	0.005	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.00040
Ethylberxene	mg/L	0.2	0.0024	0.0024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.00040
Toluene	mg/L	0.0005	0.024	0.024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.00040
Xylenes: Total	mg/L	0.03	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.00040
Styrene	mg/L	0.072	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.00050
Volatile Organic Compounds																													
Bromodichloromethane	ug/L	no guideline	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Bromoform	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Bromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Carbon Tetrachloride	ug/L	13.3	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
Chlorobenzene	ug/L	1.3	80	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
Chloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Chloroform	ug/L	1.8	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Chloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Cis-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Cis-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Dibromochloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Dibromoethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.9	<0.9	<0.9
Dichlorodifluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2	<2	<2
Methyl-Tert-Butylether	ug/L	3400	20	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<4	<4	<4
Methylene Chloride	ug/L	98.1	50	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2	<2	<2
Tetrabromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	ug/L	111	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
Trans-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Trans-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
Trichloroethene	ug/L	21	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
Trichlorofluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<4	<4	<4
Vinyl Chloride	ug/L	no guideline	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
1,1-Dichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
1,1-Dichloroethene	ug/L	no guideline	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	ug/L	0.7	200	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
1,2-Dichloroethane	ug/L	100	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	ug/L	150	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ug/L	26	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	11100	200	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	DupAG99-06	AG99-06	DupAG99-06	AG99-06	AG99-06
					11-Aug-99	25-Nov-99	1-Mar-00	19-Apr-00	25-Jul-00	13-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	26-Nov-02	18-Mar-03	18-Mar-03	16-Jun-03	16-Jun-03	25-Sep-03	16-Dec-03
Physical Tests																								
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	-	-	6.71	6.7	6.75	7.03	**6.24 abc**	7.42	7.33	**8.99 bc**	7.66	**6.34 abc**	6.68	6.92	**8.6 bc**	-	7.52	-	-	7.01
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.57	7.6	7.36	7.26	7.55	7.55	7.04	7.32	6.82	-	-	7.53	7.43	7.5	7.8	7.7	7.54	7.43	7.51	7.51	7.5
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	-	-	-	149.8	151	176.5	191.1	147.5	127	95.8	123.4	133.9	110.7	103.2	235	150	-	115	-	102	140
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	134	167	128	133	159	191	184	150	132	-	-	123	109	106	116	119	119	132	131	158	144
Temperature (Field)	deg C	19	15	15	-	-	-	-	-	-	-	6.2	11.4	**20.6 abc**	9.2	5.8	9	11.9	7.8	9.7	-	12.3	-	11.6	5.3
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.56	-	10.87	-	7.36	9.82
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	64	-	-	-	-	-	-	-	-	51	-	43	53	65	65.1	63	64	72	72
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	82	101	80	103	123	132	138	93	85	-	-	75	60	74	74	113	73	53	27	113	87
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																									
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	-	0.02	-	-	-	-	0.15	-	-	-	0.03	-	-	-	<0.01	-	-	-	-	-
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01	-	-	-
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.12	-	-	-
Chloride (Lab)	mg/L	600	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoride: Dissolved	mg/L	-	1.5	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Lab)	mg/L	100	500	500	1.7	2.1	1.9	2.3	2	2.8	2.9	2.7	3.2	-	-	3.5	3	2.9	2.8	2.22	2.34	2.66	2.6	2.7	3.1
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	57.6	55.8	59.7	60.3	60.7	54.1	51.9	61	66.2	-	-	55	52.3	56.7	66.5	-	-	-	-	-	-
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	72.9	-	-	-	-	74.5	-	-	-	67.1	-	-	-	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-	-	-
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-	-	-
Dissolved Metals																									
Aluminum: Dissolved	mg/L	*	0.2	0.1	-	-	0.033	-	-	-	-	0.015	<0.2	**14.8 abc**	**3.51 abc**	<0.05	<0.05	0.01	0.041	<0.005	0.01	<0.005	<0.005	0.006	**1.35 abc**
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	-	-	<0.001	-	-	-	-	<0.001	<0.2	<0.2	<0.2	<0.2	<0.2	<0.001	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	-	-	<0.001	-	-	-	-	<0.001	<0.3	<0.03	<0.03	<0.03	<0.03	<0.001	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002
Barium: Dissolved	mg/L	5	no guideline	1	-	-	0.003	-	-	-	-	0.001	<0.001	0.078	0.019	0.006	<0.001	<0.001	0.001	0.002	0.002	0.002	<0.001	0.007	0.006
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	-	-	<0.001	-	-	-	-	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Boron: Dissolved	mg/L	1.2	5	5	-	-	0.07	-	-	-	-	<0.05	<0.01	0.06	0.018	<0.01	<0.01	<0.05	<0.05	0.005	0.004	0.007	0.008	0.006	0.007
Cadmium: Dissolved	mg/L	*	no guideline	0.005	-	-	**0.0014 a**	-	-	-	-	<0.0002	<0.025	<0.025	<0.025	<0.025	<0.025	<0.0002	<0.0002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	21.2	-	18.3	21.1	-	-	22.9	18.9	18.1	21.3	16.7	15.2	15.8	13.1	16.4	19.8	20	19.1	19.4	21.8	21.7
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	-	-	0.001	-	-	-	-	<0.001	<0.03	<0.03	<0.03	<0.03	<0.03	<0.001	<0.001	0.0009	0.0009	0.0009	0.001	0.001	**0.0014 a**
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	-	-	<0.001	-	-	-	-	<0.001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0007
Copper: Dissolved	mg/L	*	0.5	1	-	-	<0.001	-	-	-	-	<0.001	<0.02	**0.08 a**	<0.02	<0.02	<0.02	0.002	<0.001	0.004	<0.001	<0.001	<0.001	<0.001	0.003
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	-	-	<0.05	-	-	-	-	<0.05	<0.03	**19.4 bac**	**4.07 bac**	<0.01	<0.01	<0.05	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	**1.1 bac**
Lead: Dissolved	mg/L	*	0.05	0.01	-	-	<0.001	-	-	-	-	<0.001	<0.08	<0.03	<0.03	<0.03	<0.03	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	3.85	-	3.36	3.68	-	-	4.65	4.04	3.68	7.05	4.48	3.12	3.21	2.63	2.94	3.8	3.7	3.6	3.7	4.3	4.3
Manganese: Dissolved	mg/L	*	no guideline	0.05	-	-	0.002	-	-	-	-	<0.001	<0.003	**0.65 bc**	**0.15 bc**	<0.003	<0.003	<0.001	0.002	<0.005	<0.005	0.005	0.011	<0.005	0.024
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	<0.00002	-	-	-	-	<0.00002	-	-	-	-	-	<0.00002	<0.00002	-	-	-	-	-	-
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	-	-	<0.001	-	-	-	-	<0.001	<0.04	<0.04	<0.04	<0.04	<0.04	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel: Dissolved	mg/L	*	no guideline	no guideline	-	-	<0.001	-	-	-	-	<0.001	<0.03	<0.03	<0.03	<0.03	<0.03	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	0.06	-	-	-	-	0.08	<0.4	<0.4	<0.4	<0.4	<0.4	0.1	0.01	-	-	-	-	-	-
Potassium: Dissolved	mg/L	373	no guideline	no guideline	0.49	-	0.25	0.33	-	-	0.31	0.32	<0.01	10.2	0.59	<0.25	0.4	0.38	0.13	0.6	0.5	<0.4	<0.4	<0.4	0.5
Selenium: Dissolved	mg/L	0.002	0.01	0.01	-	-	<0.002	-	-	-	-	<0.002	-	-	-	-	-	<0.001	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	10.7	-	-	-	-	9.57	9.2	46.6	21.2	8.5	10.1	8.47	9.51	-	-	-	-	-	5.3
Silver: Dissolved	mg/L	*	no guideline	no guideline	-	-	<0.0001	-	-	-	-	<0.0001	<0.03	<0.03	<0.03	<0.03	<0.03	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium: Dissolved	mg/L	no guideline	no guideline	200	2.1	-	2.12	2	-	-	1.6	1.59	1.3	1.8	1.8	1.2	4.3	1.33	1.54	2.2	2	2	2.1	1.9	2
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	0.041	-	-	-	-	0.036	0.031	0.063	0.046	0.089	0.042	0.024	0.031	0.042	0.042	0.033	0.033	0.043	0.045
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.88	0.86	1.05	1.11	0.83	0.71
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.001	-	-	-	-	<0.001	-	-	-	-	-	<0.001	<0.001	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	-	<0.0001	-	-	-	-	<0.0001	-	-	-	-	-	<0.0001	<0.0001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.0005	-	-	-	-	<0.0005	-	-	-	-	-	<0.0005	<0.0005	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.001	-	-	-	-	<0.001	<0.03	<0.03	<0.03	<0.03	<0.03	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium: Dissolved	mg/L	2	no guideline	no guideline	-	-	0.002	-	-	-	-	<0.001	<0.006	1.07	0.23	<0.006	<0.006	<0.001	0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.124
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	<0.0005	-	-	-	-	<0.0005	-	-	-	-	-	<0.0005	<0.0005	-	-	-	-	-	-
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	-	-	0.002	-	-	-	-	0.002	<0.01	**0.05 a**	**0.013 a**	<0.01	<0.01	0.002	0.003	0.0027	0.0027	0.0029	0.0029	0.0031	**0.0072 a**
Zinc: Dissolved	mg/L	*	5	5	-	-	0.01	-	-	-	-	<0.005	<0.02	**0.038 a**	0.01	<0.005	0.015	<0.005	<0.005	0.003	0.001	0.001	<0.001	<0.001	0.002
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.01	-	-	-	-	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	-	-	-	-	-	-

Notes:
BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.
BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.
CDWG - Canadian Drinking Water Quality Guidelines.
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	DupAG99-06	AG99-06	DupAG99-06	AG99-06	AG99-06
					11-Aug-99	25-Nov-99	1-Mar-00	19-Apr-00	25-Jul-00	13-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	26-Nov-02	18-Mar-03	18-Mar-03	16-Jun-03	16-Jun-03	25-Sep-03	16-Dec-03
Total Metals																								
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	21.8	-	20.3	26.3	29.3	25.5	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	4.2	-	3.55	7.93	7.93	5.64	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	0.39	-	0.42	1.15	1.14	0.44	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	1.5	-	2.7	2.1	2.8	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																								
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	<25	-	-	-	-	<25	-	-	-	-	-	-	-	<5	<5	<5	<5	<5	<5
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	1.4	-	-	-	-	1.6	<1	2.1	-	<1	<1	-	<1	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	1.4	-	-	-	-	2.3	-	-	<1	-	<1	-	-	<0.5	1.7	-	-	-	-
Bacteria																								
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	<2	<2	**13 b**	<2	<2	<2	<2	<2	<1	<1	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1
Coliforms: Total	MPN/100 ml	no guideline	0	0	**2 bc**	**79 bc**	**2400 bc**	<2	<2	**1610 bc**	<2	<2	<1	<1	<1	**25 bc**	<1	-	<1	**140 bc**	**150 bc**	<1	<1	<1	<10
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																								
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	<0.05	-	<0.05	<0.05
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	0.2	-	0.4	0.4
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<29	-	12	-	8	<30
Sulphate (Field)	mg/L	100	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	<0.1	-	<0.1	<0.1
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	<0.1	-	<0.1	<0.1
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	-	<0.3	-	<0.3	<0.3

Notes:

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BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

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a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

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* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	DupAG99-06	AG99-06	DupAG99-06	AG99-06	AG99-06
					11-Aug-99	25-Nov-99	1-Mar-00	19-Apr-00	25-Jul-00	13-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	26-Nov-02	18-Mar-03	18-Mar-03	16-Jun-03	16-Jun-03	25-Sep-03	16-Dec-03
Hydrocarbons																									
VHw6-10	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	<100	-	-	-	<100	-	-	-	-	-	-	-	-
VPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	<100	-	-	-	<100	-	-	-	-	-	-	-	-
EHw10-19	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	<250	-	-	-	<250	-	-	-	-	-	-	-	-
LEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	<250	-	-	-	<250	-	-	-	-	-	-	-	-
EHw19-32	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																									
Acenapthene	ug/L	6	no guideline	no guideline	-	-	-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	-	-	-	-
Acridine	ug/L	0.05	no guideline	no guideline	-	-	-	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	-	-	-	-
Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	-	-	-	-
Benzo(A)Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	<0.01	-	-	-	<0.01	-	-	-	-	-	-	-	-
Benzo(A)Pyrene	ug/L	0.01	0.01	0.01	-	-	-	-	-	-	-	-	<0.01	-	-	-	<0.01	-	-	-	-	-	-	-	-
Fluoranthene	ug/L	0.2	no guideline	no guideline	-	-	-	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	-	-	-	-
Fluorene	ug/L	12	no guideline	no guideline	-	-	-	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	-	-	-	-
Napthalene	ug/L	1	no guideline	no guideline	-	-	-	-	-	-	-	-	<0.3	-	-	-	<0.3	-	-	<5	<5	-	-	-	-
Phenanthrene	ug/L	0.3	no guideline	no guideline	-	-	-	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	-	-	-	-
Pyrene	ug/L	0.02	no guideline	no guideline	-	-	-	-	-	-	-	-	<0.02	-	-	-	<0.02	-	-	-	-	-	-	-	-
Non-Halogenated Volatiles																									
Benzene	mg/L	0.4	0.005	0.005	-	-	-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	<1	<1	-	-	-	-
Ethylbenzene	mg/L	0.2	0.0024	0.0024	-	-	-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	<1	<1	-	-	-	-
Toluene	mg/L	0.0005	0.024	0.024	-	-	-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	<1	<1	-	-	-	-
Xylenes: Total	mg/L	0.03	no guideline	0.3	-	-	-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	<1	<1	-	-	-	-
Styrene	mg/L	0.072	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds																									
Bromodichloromethane	ug/L	no guideline	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	ug/L	13.3	5	5	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	<1	<1	-	-	-	-
Chlorobenzene	ug/L	1.3	80	80	-	-	-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	<1	<1	-	-	-	-
Chloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	ug/L	1.8	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cis-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cis-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromoethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl-Tert-Butylether	ug/L	3400	15	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	ug/L	98.1	50	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrabromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	ug/L	111	30	30	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	<1	<1	-	-	-	-
Trans-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trans-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	ug/L	21	5	5	-	-	-	-	-	-	-	-	-	-	-	-	0.48	-	-	<1	<1	-	-	-	-
Trichlorofluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	ug/L	no guideline	2	2	-	-	-	-	-	-	-	-	<0.2	-	-	-	<0.2	-	-	<10	<10	-	-	-	-
1,1-Dichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	ug/L	no guideline	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	ug/L	0.7	200	200	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	<1	<1	-	-	-	-
1,2-Dichloroethane	ug/L	100	5	5	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	-	<1	<1	-	-	-	-
1,2-Dichloropropane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	ug/L	150	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	ug/L	26	5	5	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	<1	<1	-	-	-	-
1,1,1-Trichloroethane	ug/L	11100	200	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-06 15-Mar-04	AG99-06 27-Sep-04	AG99-06 4-May-05	AG99-06 30-Sep-05	AG99-06 20-Apr-06	AG99-06 19-Oct-06	AG99-06 20-Apr-07	AG99-06 26-Oct-07	AG99-06 8-Apr-08	AG99-06 22-Oct-08	AG99-06 27-Aug-09	DUPAG99-06 27-Aug-09	AG99-06 9-Dec-09	AG99-06 30-Apr-10	AG99-06 2-Nov-10	AG99-06 10-Mar-11	AG99-06 11-May-11	AG99-06 16-Aug-11	AG99-06 28-Nov-11	AG99-06 21-Feb-12	AG99-06 25-May-12	AG99-06 16-Aug-12	AG99-06 5-Dec-12
Physical Tests																											
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.55	8.08	7.451	6.975	7.326	7.63	6.9	7.5	7.17	7.24	7.3	-	6.9	6.69	7.44	7.15	6.89	7.51	7.61	7.6	7.3	7.45	7.72
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.5	7.6	7.4	7.8	7.8	7.8	8.13	7.77	8.02	8.03	8.05	8.00	7.8	7.8	7.88	7.4	7.55	7.66	7.81	7.78	7.88	7.84	7.79
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	212	199	220	227	208	236	152	215	170	134	257	-	65	-	194	146	207	215	149	99	152	145	107
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	180	184.8	216	227	200	328	184	291	214	183	320	322	148	261	183	164	210	225	160	118	155	149	108
Temperature (Field)	deg C	19	15	15	10.4	13.9	10.3	10.1	10.4	9.97	9.29	10.12	9.55	10.01	11.11	-	9.42	9.32	9.97	8.57	9.42	9.86	9.72	8.2	9.2	9.73	7.07
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	5.06	5.84	10.35	8.64	**2 a**	**0.11 a**	6.32	7.49	19.06	28.8	11.86	-	12.4	14.15	17	132.3	13.95	11.86	12.22	11.4	11.1	9.14	10.17
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	74.9	91	100	110	97	160	101	153	109	101	145	142	70.6	113	83.5	84.9	97	113	78.9	58.6	73.3	69.8	48.4
Dissolved Solids: Total	mg/L	no guideline	no guideline	500	93	100	110	147	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	100	95	69
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	128.7	654	212.8	-21.2	109.6	-	276.7	251.8	62	-363.2	232.3	157.2	146.3	85.4	151	10.9	102.8
Anions and Nutrients																											
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	<0.05	<0.02	<0.20	<0.02	<0.05	<0.020	<0.020	<0.020	<0.020	<0.01	<0.01	<0.01	<0.01	<0.005	0.019	0.018	0.013	0.034	<0.0050	0.0073	0.01	0.0058
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	-	<0.1	<0.1	<0.01	<0.01	<0.0010	<0.0010	<0.0010	<0.0010	<0.002	<0.002	<0.002	<0.005	0.008	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	-	<0.1	0.2	0.14	0.22	0.0987	0.34	0.148	0.0647	0.38	0.36	0.04	0.31	0.08	0.1	0.13	0.14	0.053	<0.020	0.095	0.114	<0.020
Chloride (Lab)	mg/L	600	250	250	3.9	-	23	11.8	9.9	12.1	9.78	11.2	15.3	8.03	40.3	40.4	6.43	34	8.1	11	14	11	7.3	3.9	7.6	8.2	4.7
Fluoride: Dissolved	mg/L	-	1.5	1.5	-	-	<1		<0.1	<0.1	0.021	<0.020	<0.020	0.022	<0.05	<0.05	<0.05	0.02	0.02	0.02	0.02	0.02	0.032	0.038	0.029	0.029	0.037
Sulphate (Lab)	mg/L	100	500	500	2.1	2.6	2	2.8	2.5	2.9	1.62	2.09	1.42	1.4	1.99	2.01	1.39	2.2	2.4	0.8	2.2	1.6	4.88	1.48	1.66	0.77	1.06
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	71	94	-	-	89.9	134	84.8	85.1	102	102	70.2	72	83	68	88	95	70.2	55.1	65.2	63.2	46.9
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	67.3	79.6	77.1	57.2
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50
Dissolved Metals																											
Aluminum: Dissolved	mg/L	*	0.2	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0019	<0.0050	<0.0050	<0.0050	0.002	0.003	0.009	<0.003	0.004	0.049	<0.003	<0.003	<0.0030	0.0019	0.00234	0.00654	0.00217
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00010	<0.00050	<0.00050	<0.00050	<0.0002	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.00002	<0.00002	<0.000020	0.00002
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00010	<0.00050	<0.00050	<0.00050	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	0.0001	0.000043	0.000081	0.000099
Barium: Dissolved	mg/L	5	no guideline	1	0.002	0.001	0.002	0.003	0.001	0.001	0.0006	<0.020	<0.020	<0.020	0.0009	0.0009	0.0004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00045	0.000483	0.000414	0.000321
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00050	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00001	<0.00001	<0.000010	<0.000010
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	-	<0.20	-	<0.0002	<0.0002	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.000005	<0.000005	<0.000005	<0.0000050
Boron: Dissolved	mg/L	1.2	5	5	0.005	0.005	0.004	0.007	0.006	0.006	<0.010	<0.10	<0.10	<0.10	<0.01	<0.01	0.007	<0.05	<0.05	<0.05	<0.05	<0.05	<0.050	<0.05	<0.05	<0.050	<0.050
Cadmium: Dissolved	mg/L	*	no guideline	0.005	<0.00001	<0.00001	<0.00001	0.00001	**0.00015 a**	0.00002	**0.000039 a**	<0.000017	**0.000068 a**	**0.000367 a**	<0.00004	<0.00004	<0.00001	**0.00026 a**	**0.00003 a**	**0.0001 a**	**0.00008 a**	0.00002	<0.000010	<0.000005	<0.000005	<0.000050	0.000006
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	23.2	27.9	31.2	34.1	29.7	50.1	-	47.8	34.3	32.1	44.9	44.3	22.7	35.7	25.8	26.3	30.2	35	24.9	18	22.7	21.7	14.7
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	0.0008	0.0009	0.0006	0.0008	**0.0012 a**	0.001	0.00078	**0.0018 a**	0.001	0.001	0.0009	0.0009	0.0006	<0.001	<0.001	<0.001	<0.001	0.001	<0.0010	0.0007	0.00089	0.00085	0.00025
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00030	<0.00030	<0.00030	<0.0002	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.000006	<0.000005	<0.0000050	0.000006
Copper: Dissolved	mg/L	*	0.5	1	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.00016	<0.0010	<0.0010	<0.0010	0.0003	0.0004	0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	<0.00005	0.000185	0.000098	0.000073
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.030	<0.030	<0.030	<0.01	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.001	<0.001	0.0068	0.0043
Lead: Dissolved	mg/L	*	0.05	0.01	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	0.0001	<0.000050	<0.00050	<0.00050	<0.00050	<0.0002	<0.0002	<0.00005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	0.000005	0.0000133	0.000006	<0.0000050
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0050	<0.0050	<0.0050	<0.0050	<0.0002	<0.0002	<0.0001	<0.005	<0.005	-	-	<0.005	<0.0050	<0.0005	<0.0005	<0.00050	<0.00050
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	4.2	5.2	6	6	5.6	9.4	-	8.14	5.81	4.99	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
Manganese: Dissolved	mg/L	*	no guideline	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.000088	<0.00030	<0.00030	<0.00030	0.0003	0.0004	0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.00005	0.000098	<0.000050	0.000057
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	<0.000020	<0.000020	<0.000020	<0.000020	<0.00002	<0.00002	<0.02	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.000050	< 0.00001	<0.00001	<0.000010	<0.000010
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000096	<0.0010	<0.0010	<0.0010	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00008	0.000099	0.000121	0.000095
Nickel: Dissolved	mg/L	*	no guideline	no guideline	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	<0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00002	<0.00002	<0.000020	0.000157
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<0.30	0.0168	<0.30	-	<0.03	0.04	0.02	-	-	0.02	0.01	-	-	0.29	0.0176	0.0588	0.236
Potassium: Dissolved	mg/L	373	no guideline	no guideline	<0.4	<0.4	<0.4	0.4	<0.4	0.5	-	<2.0	<2.0	<2.0	0.45	0.44	0.3	0.34	0.32	0.35	0.34	0.39	0.318	0.029	0.31	0.29	0.221
Selenium: Dissolved	mg/L	0.002	0.01	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	<0.0002	<0.0002	0.0001	0.0001	0.0002	0.0002	0.00015	0.00008	0.000145	0.000116	0.000051
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	4.88	4.98	5.04	4.52	-	4.71	-	5.11	4.94	3.73	5.8	4.4	6.7	4.7	4.8	4.18	4.3	4.44	4.25	4.41
Silver: Dissolved	mg/L		no guideline	no guideline	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.000010	<0.000020	<0.000020	<0.000020	<0.00005	<0.00005	<0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020	<0.000005	<0.000005	<0.0000050	<0.0000050
Sodium: Dissolved	mg/L	no guideline	no guideline	200	2.2	2.3	2	3	2.5	2.9	-	2.6	2.3	2.3	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
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	0.039	0.045	0.056	0.064	0.059	0.08	0.0484	-	0.0613	-	0.106	0.107	0.047	0.068	0.058	0.054	0.065	0.072	0.0537	0.0396	0.0502	0.046	0.0297
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	0.81	0.82	0.5	0.8	0.8	0.9	0.54	0.91	0.62	0.54	<2	<2	<1	-	<3	<3	<3	<3	<3.0	<10	<15	<10	<3.0
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00010	<0.00020	<0.00020	<0.00020	<0.00002	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.000002	<0.000002	<0.0000020
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.00005	-	-	-	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00010	<0.00050	<0.00050	<0.00050	<0.0002	<0.0002	<0.0001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0002	<0.0002	<0.00020	<0.00020
Titanium: Dissolved	mg/L	2	no guideline	no guideline	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.010	<0.010	<0.010	0.0003	0.0003	0.0005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0005	<0.0005	<0.0050	<0.00050
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	0.000047	<0.00020	<0.00020	<0.00020	<0.0001	<0.0001	<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	< 0.0001	<0.00010	0.000038	0.0000445	0.000039	0.000018
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	0.0032	0.0031	0.0032	0.0028	0.0036	0.0027	0.0025	0.0026	0.0023	0.0026	0.0025	0.0025	0.0026	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.0026	0.00225	0.00248	0.00232
Zinc: Dissolved	mg/L	*	5	5	0.003	<0.001	<0.001	<0.001	<0.001	0.002	0.001	0.0014	<0.0050	<0.0050	<0.001	0.003	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.0006	0.00153	0.0006	0.00034
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	<0.002	<0.002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00010	<0.00010

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality GuideInes.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	DUPAG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06
					15-Mar-04	27-Sep-04	4-May-05	30-Sep-05	20-Apr-06	19-Oct-06	20-Apr-07	26-Oct-07	8-Apr-08	22-Oct-08	27-Aug-09	27-Aug-09	9-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
Total Metals																										
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																										
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	<5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria																										
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	<1	<1	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	<1	<1	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	<1	<1	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																										
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	<0.05	<0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	0.15	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	16	5.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	4.98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	10	-	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	<0.1	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	<0.1	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	<0.3	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	DUPAG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06	AG99-06
					15-Mar-04	27-Sep-04	4-May-05	30-Sep-05	20-Apr-06	19-Oct-06	20-Apr-07	26-Oct-07	8-Apr-08	22-Oct-08	27-Aug-09	27-Aug-09	9-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
Hydrocarbons																										
VHw6-10	mg/L	no guideline	no guideline	no guideline	-	-	-	<0.1	-	-	-	<0.10	-	-	-	-	-	-	<0.3	-	-	<0.3	<0.3	< 0.3	<0.3	<0.3	<0.3
VPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	<0.1	-	-	-	<0.10	-	-	-	-	-	-	<0.3	-	-	<0.3	<0.3	< 0.3	<0.3	<0.3	<0.3
EHw10-19	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EHw19-32	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																											
Acenapthene	ug/L	6	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acridine	ug/L	0.05	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Pyrene	ug/L	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	ug/L	0.2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	ug/L	12	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Napthalene	ug/L	1	no guideline	no guideline	-	<5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	ug/L	0.3	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	ug/L	0.02	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Halogenated Volatiles																											
Benzene	mg/L	0.4	0.005	0.005	-	<1	-	<0.0005	-	<0.0001	-	<0.00050	-	<0.00050	-	-	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.0005	<0.0005	<0.00040
Ethylbenzene	mg/L	0.2	0.0024	0.0024	-	<1	-	<0.0005	-	<0.0001	-	<0.00050	-	<0.00050	-	-	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.0005	<0.0005	<0.00040
Toluene	mg/L	0.0005	0.024	0.024	-	<1	-	<0.0005	-	0.0006	-	<0.0010	-	<0.0010	-	-	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.0005	<0.0005	<0.00040
Xylenes: Total	mg/L	0.03	no guideline	0.3	-	<1	-	<0.001	-	<0.0001	-	<0.0010	-	<0.0010	-	-	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.001	<0.001	<0.00040
Styrene	mg/L	0.072	no guideline	no guideline	-	-	-	<0.0005	-	<0.0001	-	<0.00050	-	<0.00050	-	-	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.0005	<0.0005	<0.00050
Volatile Organic Compounds																											
Bromodichloromethane	ug/L	no guideline	16	16	-	-	-	<1	-	<0.1	-	<1.0	-	<1	-	-	<0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromoform	ug/L	no guideline	no guideline	no guideline	-	-	-	<1	-	<0.2	-	<1.0	-	<1	-	-	<0.2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	<1	-	<0.8	-	-	-	-	-	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbon Tetrachloride	ug/L	13.3	5	5	-	<1	-	<3	-	<0.1	-	<1.0	-	<1	-	-	<0.1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	ug/L	1.3	80	80	-	<1	-	<0.5	-	<0.1	-	<1.0	-	<1	-	-	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	<1	-	<0.4	-	<1.0	-	<1	-	-	<0.4	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	1.8	no guideline	no guideline	-	-	-	<1	-	<0.3	-	<1.0	-	<1	-	-	<0.3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	<1	-	<0.4	-	<1.0	-	<5	-	-	<0.4	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cis-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	<1	-	<0.1	-	<1.0	-	<1	-	-	<0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cis-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	<0.1	-	<0.1	-	<1.0	-	<1	-	-	<0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dibromochloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	<1	-	<0.1	-	<1.0	-	<1	-	-	<0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dibromoethane	ug/L	no guideline	no guideline	no guideline	-	-	-	<0.5	-	<0.1	-	-	-	-	-	-	-	<0.2	<0.2	<0.2	<0.2	<0.9	<0.9	-	-	-	-
Dibromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	<0.9	-	<0.2	-	-	-	-	-	-	-	-	-	-	-	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
Dichlorodifluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2	<2	<2
Methyl-Tert-Butylether	ug/L	3400	15	200	-	-	-	<4	-	-	-	<1.0	-	<1	-	-	-	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Methylene Chloride	ug/L	98.1	50	50	-	-	-	<2	-	<6	-	<5.0	-	<5	-	-	<6	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Tetrabromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	ug/L	111	30	30	-	<1	-	<0.5	-	<0.1	-	<1.0	-	<1	-	-	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trans-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	<1	-	<0.1	-	<1.0	-	<1	-	-	<0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trans-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	<0.1	-	<0.1	-	<1.0	-	<1	-	-	<0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	21	5	5	-	<1	-	<0.5	-	<0.1	-	<1.0	-	<1	-	-	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	<4	-	<0.2	-	<1.0	-	<1	-	-	<0.2	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Vinyl Chloride	ug/L	no guideline	2	2	-	<10	-	<0.5	-	<0.2	-	<1.0	-	<1	-	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	<0.5	-	<0.1	-	<1.0	-	<1	-	-	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethene	ug/L	no guideline	14	14	-	-	-	<0.5	-	<0.1	-	<1.0	-	<1	-	-	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	ug/L	0.7	200	200	-	<1	-	<0.5	-	<0.1	-	<1.0	-	<1	-	-	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	ug/L	100	5	5	-	<1	-	<0.5	-	<0.4	-	<1.0	-	<1	-	-	<0.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	no guideline	no guideline	no guideline	-	-	-	<0.5	-	<0.1	-	<1.0	-	<1	-	-	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	ug/L	150	no guideline	no guideline	-	-	-	<0.5	-	<0.1	-	<1.0	-	<1	-	-	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ug/L	26	5	5	-	<1	-	<0.5	-	<0.1	-	<1.0	-	<1	-	-	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	1100	200	no guideline	-	-	-	<0.5	-	<0.1	-	<1.0	-	<1	-	-	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	<0.5	-	<0.1	-	<1.0	-	<1	-	-	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	<0.5	-	-	-	<1.0	-	<1	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	<0.5	-	<0.2	-	-	-	<1.0	-	<1	-	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AM00-01 25-Oct-00	AM00-01 6-Feb-01	AM00-01 8-May-01	AM00-01 25-Jul-01	AM00-01 31-Oct-01	AM00-01 29-Jan-02	AM00-01 8-May-02
Physical Tests											
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.27	7.2	7.44	7.4	8.06	7.45	7.03
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.9	7.54	6.73	7.33	-	7.29	7.47
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	143.1	113.4	95.1	97.7	143.8	432	474
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	127	115	102	110	-	365	316
Temperature (Field)	deg C	19	15	15	-	10	14.4	**17.2 bc**	9.8	7.7	**16.6 bc**
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	-	-	-	-	-	-	-
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	84	81	53	73	-	207	143
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline							
Anions and Nutrients					-	<0.02	<0.02	-	-	0.05	-
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	1.3	1.1	1.1	1.5	-	23	13.9
Chloride (Lab)	mg/L	600	250	250	-	-	-	-	-	-	-
Fluoride: Dissolved	mg/L	*	1.5	1.5	2.9	2.9	2.8	2.9	-	4.1	3
Sulphate (Lab)	mg/L	100	500	500	71.5	59.3	53.2	-	-	158	158
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	72.3	64.9	-	-	193	-
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	<0.5	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	<0.5	-
Hydroxide	mg/L	no guideline	no guideline	no guideline							
Dissolved Metals					-	0.013	-	-	-	-	-
Aluminum: Dissolved	mg/L	*	0.2	0.1	-	<0.001	-	-	-	-	-
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	-	<0.001	-	-	-	-	-
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	-	0.002	-	-	-	-	-
Barium: Dissolved	mg/L	5	no guideline	1	-	<0.001	-	-	-	-	-
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.05	-	-	-	-	-
Boron: Dissolved	mg/L	1.2	5	5	-	<0.0002	-	-	-	-	-
Cadmium: Dissolved	mg/L	*	no guideline	0.005	-	18.5	-	-	-	-	-
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.001	-	-	-	-	-
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	-	<0.001	-	-	-	-	-
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	-	<0.001	-	-	-	-	-
Copper: Dissolved	mg/L	*	0.5	1	-	<0.05	-	-	-	-	-
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	-	<0.001	-	-	-	-	-
Lead: Dissolved	mg/L	*	0.05	0.01	-	-	-	-	-	-	-
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	-	1.71	-	-	-	-	-
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	0.005	-	-	-	-	-
Manganese: Dissolved	mg/L	*	no guideline	0.05	-	<0.00002	<0.00002	-	-	-	-
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	<0.00002	-	-	-	-	-
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	-	<0.001	-	-	-	-	-
Nickel: Dissolved	mg/L	*	no guideline	no guideline	-	0.06	-	-	-	-	-
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	0.25	-	-	-	-	-
Potassium: Dissolved	mg/L	373	no guideline	no guideline	-	<0.002	-	-	-	-	-
Selenium: Dissolved	mg/L	0.002	0.01	0.01	-	7.78	-	-	-	-	-
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.0001	-	-	-	-	-
Silver: Dissolved	mg/L	*	no guideline	no guideline	-	1.17	-	-	-	-	-
Sodium: Dissolved	mg/L	no guideline	no guideline	200	-	0.03	-	-	-	-	-
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.001	-	-	-	-	-
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.0001	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	<0.0005	-	-	-	-	-
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.001	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.001	-	-	-	-	-
Titanium: Dissolved	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.0005	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	0.003	-	-	-	-	-
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	-	<0.005	-	-	-	-	-
Zinc: Dissolved	mg/L	*	5	5	-	<0.01	-	-	-	-	-
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AM00-01 25-Oct-00	AM00-01 6-Feb-01	AM00-01 8-May-01	AM00-01 25-Jul-01	AM00-01 31-Oct-01	AM00-01 29-Jan-02	AM00-01 8-May-02
Total Metals											
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	22.3	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	2.09	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	0.16	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	1.5	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Organic Parameters											
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	<25	<25	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<1	<1	2.2	-	5.3	4.4
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	<1	<1	-	<1	-	9.6
Bacteria											
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	<2	<2	<1	<1	<1	<1	<1
Coliforms: Total	MPN/100 ml	no guideline	0	0	<2	**7 bc**	<1	**1 bc**	<1	<1	**2200 bc**
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	<1	<1	<1	<1
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)											
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-

Notes:

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BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

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a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

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c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01
					22-Aug-02	14-Nov-02	18-Mar-03	16-Jun-03	24-Sep-03	18-Dec-03	15-Mar-04	27-Sep-04	23-Nov-04	May-05	Sep-05	21-Apr-06	20-Oct-06
Physical Tests											Dry			Dry	Dry		
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	6.65	6.78	-	-	-	6.97	-	7.87	8.13	-	-	6.818	7.47
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.22	7.08	-	-	-	-	-	7.6	7.1	-	-	7.2	7.3
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	78.3	119	-	-	118	103	-	100.1	112.5	-	-	163.8	62
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	98	71	-	-	-	-	-	96.1	100	-	-	158.9	84.8
Temperature (Field)	deg C	19	15	15	**15.3 bc**	12.9	-	-	10.8	11.1	-	11.4	11.6	-	-	11.6	10.95
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	-	-	-	-	7.61	7.8	-	7.07	9.8	-	-	**1 a**	8.6
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	35	-	-	-	-	-	-	44	45	-	-	71	40
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	72	53	-	-	-	-	-	47	67	-	-	-	-
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																	
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	<0.05	-	-	-	<0.02	<0.05
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	<0.01	-	-	<0.01	<0.01
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	0.14	-	-	0.39	0.11
Chloride (Lab)	mg/L	600	250	250	2.3	0.7	-	-	-	-	-	10.1	1.1	-	-	8.9	0.8
Fluoride: Dissolved	mg/L	*	1.5	1.5	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1
Sulphate (Lab)	mg/L	100	500	500	3.2	4	-	-	-	-	-	3.1	3	-	-	3.1	3.4
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	47.3	37.1	-	-	-	-	-	-	-	-	-	-	-
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																	
Aluminum: Dissolved	mg/L	*	0.2	0.1	0.021	-	-	-	-	-	-	<0.005	<0.005	-	-	<0.005	<0.005
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	<0.001	-	-	-	-	-	-	<0.0002	<0.0002	-	-	<0.0002	<0.0002
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	<0.001	-	-	-	-	-	-	<0.0002	<0.0002	-	-	<0.0002	<0.0002
Barium: Dissolved	mg/L	5	no guideline	1	0.001	-	-	-	-	-	-	0.001	0.001	-	-	0.001	<0.001
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	<0.001	-	-	-	-	-	-	<0.0001	<0.0001	-	-	<0.0001	<0.0001
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.001	-	-	-	-	-	-	<0.0005	<0.0005	-	-	<0.0005	<0.0005
Boron: Dissolved	mg/L	1.2	5	5	<0.05	-	-	-	-	-	-	0.006	0.007	-	-	0.006	0.007
Cadmium: Dissolved	mg/L	*	no guideline	0.005	<0.0002	-	-	-	-	-	-	**0.00005 a**	**0.00003 a**	-	-	**0.00005 a**	<0.00001
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	11.2	-	-	-	-	-	-	14.7	15.2	-	-	23.2	12.9
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	<0.001	-	-	-	-	-	-	<0.0005	<0.0005	-	-	0.0005	<0.0005
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	<0.001	-	-	-	-	-	-	<0.0001	<0.0001	-	-	<0.0001	<0.0001
Copper: Dissolved	mg/L	*	0.5	1	<0.001	-	-	-	-	-	-	<0.001	<0.001	-	-	<0.001	<0.001
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	<0.05	-	-	-	-	-	-	<0.01	<0.01	-	-	<0.01	<0.01
Lead: Dissolved	mg/L	*	0.05	0.01	<0.001	-	-	-	-	-	-	<0.0001	<0.0001	-	-	<0.0001	<0.0001
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	<0.001	-	-	-	-	-	-	<0.001	<0.001	-	-	<0.001	<0.001
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	1.56	-	-	-	-	-	-	1.8	1.8	-	-	3.2	1.8
Manganese: Dissolved	mg/L	*	no guideline	0.05	0.017	-	-	-	-	-	-	<0.005	<0.005	-	-	<0.005	<0.005
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	<0.00002	<0.00002	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	<0.0005	-	-	-	-	-	-	<0.001	<0.001	-	-	<0.001	<0.001
Nickel: Dissolved	mg/L	*	no guideline	no guideline	<0.001	-	-	-	-	-	-	<0.0005	0.0007	-	-	<0.0005	<0.0005
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	0.06	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Dissolved	mg/L	373	no guideline	no guideline	0.32	-	-	-	-	-	-	<0.4	<0.4	-	-	<0.4	<0.4
Selenium: Dissolved	mg/L	0.002	0.01	0.01	<0.001	-	-	-	-	-	-	<0.0002	0.0003	-	-	0.0004	<0.0002
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	8.02	-	-	-	-	-	-	-	-	-	-	4.8	4.02
Silver: Dissolved	mg/L	*	no guideline	no guideline	<0.0001	-	-	-	-	-	-	<0.0001	0.0001	-	-	<0.0001	<0.0001
Sodium: Dissolved	mg/L	no guideline	no guideline	200	3.58	-	-	-	-	-	-	1.7	1.6	-	-	3.5	1.6
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	0.022	-	-	-	-	-	-	0.023	0.025	-	-	0.038	0.02
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	0.93	1.03	-	-	1	0.9
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.001	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	<0.0001	-	-	-	-	-	-	<0.00005	<0.00005	-	-	<0.00005	<0.00005
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.001	-	-	-	-	-	-	<0.001	<0.001	-	-	<0.001	<0.001
Titanium: Dissolved	mg/L	2	no guideline	no guideline	0.001	-	-	-	-	-	-	<0.0005	<0.0005	-	-	<0.0005	<0.0005
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	<0.001	-	-	-	-	-	-	0.0013	0.0016	-	-	0.0016	0.001
Zinc: Dissolved	mg/L	*	5	5	0.007	-	-	-	-	-	-	0.004	0.002	-	-	<0.001	0.001
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.01	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

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a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

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APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AM02-01 22-Aug-02	AM02-01 14-Nov-02	AM02-01 18-Mar-03	AM02-01 16-Jun-03	AM02-01 24-Sep-03	AM02-01 18-Dec-03	AM02-01 15-Mar-04	AM02-01 27-Sep-04	AM02-01 23-Nov-04	AM02-01 May-05	AM02-01 Sep-05	AM02-01 21-Apr-06	AM02-01 20-Oct-06
Total Metals											Dry			Dry	Dry		
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-			-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-			-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters														-	-		
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	1.2	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria														-	-		
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	-	<1	-	-	-	-	-	<1	**1 b**	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	-	**8 bc**	-	-	-	-	-	<1	<1	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	<1	-	-	-	-	-	<1	<1	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)														-	-		
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	<50	<50	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	-	-	-	-	<0.05	<0.05	-	<0.08	**0.35 a**	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	0.2	0.2	-	0.37	0.23	-	-	-	-
Chloride (Field)	mg/L	600	250	250	-	-	-	-	12	<30	-	<2.5	13.53	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	-	-	-	-	-	-	12.82	80.7	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	<10	<10	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	0.1	**0.6 bac**	-	<0.2	**4.66 bac**	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	**0.6 bac**	**0.6 bac**	-	<0.01	**6.34 bac**	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	<0.3	<0.3	-	**1.73 abc**	**21.99 abc**	-	-	-	-

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APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01
					22-Aug-02	14-Nov-02	18-Mar-03	16-Jun-03	24-Sep-03	18-Dec-03	15-Mar-04	27-Sep-04	23-Nov-04	May-05	Sep-05	21-Apr-06	20-Oct-06
Hydrocarbons																	
VHw6-10	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
VPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
EHw10-19	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
LEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
EHw19-32	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
HEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																	
Acenapthene	ug/L	6	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Acridine	ug/L	0.05	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Pyrene	ug/L	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	ug/L	0.2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	ug/L	12	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Napthalene	ug/L	1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	ug/L	0.3	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	ug/L	0.02	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Halogenated Volatiles																	
Benzene	mg/L	0.4	0.005	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/L	0.2	0.0024	0.0024	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/L	0.0005	0.024	0.024	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes: Total	mg/L	0.03	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/L	0.072	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds					-	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	ug/L	no guideline	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	ug/L	13.3	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	ug/L	1.3	80	80	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	ug/L	1.8	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Cis-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Cis-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromoethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl-Tert-Butylether	ug/L	3400	20	200	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	ug/L	98.1	50	50	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrabromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	ug/L	111	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-
Trans-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Trans-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	ug/L	21	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	ug/L	no guideline	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	ug/L	no guideline	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	ug/L	0.7	200	200	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	ug/L	100	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	ug/L	150	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	ug/L	26	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	ug/L	11100	200	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-1	AM02-1	AM02-1
					20-Apr-07	26-Oct-07	8-Apr-08	22-Oct-08	27-Aug-09	9-Dec-09	28-Apr-10	1-Nov-10	10-Mar-11	11-May-11	15-Aug-11	28-Nov-11	3-Dec-12
Physical Tests																	
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	7.08	-	6.9	**4.72 abc**	6.7	**6.49 abc**	6.71	**-**	-	6.9	6.78	6.77
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	-	7.37	-	7.64	7.64	7.37	7.9	7.39	-	-	7.42	7.62	7.70
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	-	78	-	59	106	75	110	96	-	-	132	110	111
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	-	107	-	79.6	126	164	153	98	-	-	133	118	109
Temperature (Field)	deg C	19	15	15	-	10.22	-	10.45	11.65	10.05	11.83	10.77	-	-	10.35	10.01	10.0
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	-	8.71	-	12.83	11.53	11.07	13.4	19	-	-	10.6	9.97	9.2
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	51.4	-	39.1	55	50.8	37.6	42.7	-	-	57.9	52.3	55.2
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-		-	-	-		-	-	72
Oxidation Reduction Potential	mV	no guideline	no guideline	500	-	832.6	-	-7.5	314.3	41.4	205.4	-3.5	-	-	155.4	139.3	293.2
Anions and Nutrients																	
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	<0.020	-	<0.020	<0.01	<0.01	<0.01	<0.005	-	-	0.036	0.051	0.044
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	-	0.0011	-	<0.0010	<0.002	<0.002	<0.005	0.01	-	-	0.005	<0.005	0.0095
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	-	0.392	-	0.0814	0.12	0.12	0.12	0.13	-	-	0.09	0.303	0.360
Chloride (Lab)	mg/L	600	250	250	-	1.08	-	0.69	2.16	18.4	12	0.5	-	-	3.7	1.2	1.3
Fluoride: Dissolved	mg/L	*	1.5	1.5	-	<0.020	-	<0.020	<0.05	<0.05	0.01	0.02	-	-	0.01	0.017	0.023
Sulphate (Lab)	mg/L	100	500	500	-	2.73	-	2.6	2.53	1.46	2.1	3.1	-	-	1.5	3.31	3.89
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	48.6	-	39.7	61	57	61	50	-	-	60	56	49.2
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-		-	-	-		-	-	60.1
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-		-	-	-		-	-	<0.50
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-		-	-	<0.50
Dissolved Metals																	
Aluminum: Dissolved	mg/L	*	0.2	0.1	-	<0.0050	-	<0.0050	0.003	0.016	0.003	0.006	-	-	0.003	<0.0030	0.00577
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	-	<0.00050	-	<0.00050	<0.0002	<0.0001	<0.0005	<0.0005	-	-	<0.0005	<0.00050	0.000043
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	-	<0.00050	-	<0.00050	<0.0002	<0.0002	<0.0001	<0.0001	-	-	<0.0001	<0.00010	0.000076
Barium: Dissolved	mg/L	5	no guideline	1	-	<0.020	-	<0.020	0.001	0.0012	0.001	<0.001	-	-	0.002	<0.0010	0.000819
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	-	<0.0010	-	<0.0010	<0.0002	<0.0001	<0.0001	<0.0001	-	-	<0.0001	<0.00010	<0.000010
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	<0.0002	<0.0001	<0.001	<0.001	-	-	<0.001	<0.0010	<0.0000050
Boron: Dissolved	mg/L	1.2	5	5	-	<0.10	-	<0.10	<0.01	0.005	<0.05	<0.05	-	-	<0.05	<0.050	<0.050
Cadmium: Dissolved	mg/L	*	no guideline	0.005	-	<0.000017	-	<0.000017	<0.00004	<0.00001	**0.00011 a**	<0.00001	**-**	-	**0.00005 a**	<0.000010	<0.0000050
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	16.8	-	12.9	18	16.8	12.3	14	-	-	18.9	17.2	18.0
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	-	<0.0010	-	<0.0010	0.0002	<0.0002	<0.001	<0.001	-	-	<0.001	<0.0010	0.00019
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	-	<0.00030	-	<0.00030	<0.0002	<0.0001	<0.0005	<0.0005	-	-	<0.0005	<0.00050	<0.0000050
Copper: Dissolved	mg/L	*	0.5	1	-	<0.0010	-	<0.0010	0.0005	0.0003	<0.0002	<0.0002	-	-	0.0009	<0.00020	0.000638
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	-	<0.030	-	<0.030	<0.01	<0.01	<0.005	0.005	-	-	<0.005	<0.0050	0.0016
Lead: Dissolved	mg/L	*	0.05	0.01	-	<0.00050	-	<0.00050	<0.0002	0.00011	<0.0002	<0.0002	-	-	<0.0002	<0.00020	<0.0000050
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	-	<0.0050	-	<0.0050	<0.0002	0.0003	<0.005	<0.005	-	-	<0.005	<0.0050	<0.00050
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	2.29	-	1.69	2.43	2.16	1.64	1.9	-	-	2.57	2.3	2.45
Manganese: Dissolved	mg/L	*	no guideline	0.05	-	<0.00030	-	<0.00030	0.0002	0.0003	<0.001	<0.001	-	-	<0.001	<0.0010	0.000088
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	<0.000020	-	<0.000020	<0.00002	<0.02	<0.00002	<0.00002	-	-	<0.00005	<0.000050	<0.000010
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	-	<0.0010	-	<0.0010	<0.0001	<0.0001	<0.001	<0.001	-	-	<0.001	<0.0010	0.000433
Nickel: Dissolved	mg/L	*	no guideline	no guideline	-	<0.0010	-	<0.0010	<0.0002	<0.0002	<0.001	<0.001	-	-	<0.001	<0.0010	0.000034
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	0.0026	-	-	<0.03	<0.015	-	-	-	-	-	-	0.237
Potassium: Dissolved	mg/L	373	no guideline	no guideline	-	<2.0	-	<2.0	0.23	0.28	0.3	0.18	-	-	0.27	0.203	0.211
Selenium: Dissolved	mg/L	0.002	0.01	0.01	-	<0.0010	-	<0.0010	<0.0002	0.0002	0.0002	0.0002	-	-	0.0003	0.00033	0.000396
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	5.07	4.64	6.3	4.3	-	-	4.7	4.46	5.75
Silver: Dissolved	mg/L	*	no guideline	no guideline	-	<0.000020	-	<0.000020	<0.00005	<0.00004	<0.00002	<0.00002	-	-	<0.00002	<0.000020	<0.0000050
Sodium: Dissolved	mg/L	no guideline	no guideline	200	-	<2.0	-	<2.0	1.96	9.34	15.5	1.94	-	-	3.19	2.28	2.47
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	0.031	0.038	0.027	0.024	-	-	0.034	0.0313	0.0291
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	1.1	-	0.93	<2	<1	<3	<3	-	-	<3	<3.0	<3.0
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	<0.0002	<0.0002	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	<0.00020	-	<0.00020	<0.00002	<0.00002	<0.00005	<0.00005	-	-	<0.00005	<0.000050	<0.0000020
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	<0.0001	<0.00005	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.00050	-	<0.00050	<0.0002	<0.0001	<0.005	<0.005	-	-	<0.005	<0.0050	0.0008
Titanium: Dissolved	mg/L	2	no guideline	no guideline	-	<0.010	-	<0.010	0.0003	<0.0002	<0.005	<0.005	-	-	<0.005	<0.0050	<0.00050
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	<0.0001	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	<0.00020	-	<0.00020	<0.0001	<0.00005	<0.0001	<0.0001	-	-	< 0.0001	<0.00010	0.000027
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	-	<0.0010	-	0.001	0.0012	0.0009	<0.005	<0.005	-	-	<0.005	<0.0050	0.00119
Zinc: Dissolved	mg/L	*	5	5	-	<0.0050	-	<0.0050	<0.001	0.001	<0.005	<0.005	-	-	0.007	<0.0050	0.00023
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	<0.002	<0.0001	<0.0005	<0.0005	-	-	<0.0005	<0.00050	<0.00010

Notes:

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BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

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APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AM02-01 20-Apr-07	AM02-01 26-Oct-07	AM02-01 8-Apr-08	AM02-01 22-Oct-08	AM02-01 27-Aug-09	AM02-01 9-Dec-09	AM02-01 28-Apr-10	AM02-01 1-Nov-10	AM02-01 10-Mar-11	AM02-01 11-May-11	AM02-01 15-Aug-11	AM02-01 28-Nov-11	AM02-01 3-Dec-12
Total Metals																	
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																	
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria																	
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																	
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

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BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

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a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

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c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

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APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-01	AM02-1	AM02-1	AM02-1
					20-Apr-07	26-Oct-07	8-Apr-08	22-Oct-08	27-Aug-09	9-Dec-09	28-Apr-10	1-Nov-10	10-Mar-11	11-May-11	15-Aug-11	28-Nov-11	3-Dec-12
Hydrocarbons																	
VHw6-10	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	<0.3	-	-	<0.3	<0.3	<0.3
VPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	<0.3	-	-	<0.3	<0.3	<0.3
EHw10-19	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
LEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
EHw19-32	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
HEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																	-
Acenapthene	ug/L	6	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Acridine	ug/L	0.05	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Pyrene	ug/L	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	ug/L	0.2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	ug/L	12	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Napthalene	ug/L	1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	ug/L	0.3	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	ug/L	0.02	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Halogenated Volatiles																	-
Benzene	mg/L	0.4	0.005	0.005	-	-	-	-	-	-	<0.0005	<0.0005	-	-	<0.0005	<0.0005	<0.00040
Ethylbenzene	mg/L	0.2	0.0024	0.0024	-	-	-	-	-	-	<0.0005	<0.0005	-	-	<0.0005	<0.0005	<0.00040
Toluene	mg/L	0.0005	0.024	0.024	-	-	-	-	-	-	<0.0005	<0.0005	-	-	<0.0005	<0.0005	**0.0007 a**
Xylenes: Total	mg/L	0.03	no guideline	0.3	-	-	-	-	-	-	<0.001	<0.001	-	-	<0.001	<0.001	<0.00040
Styrene	mg/L	0.072	no guideline	no guideline	-	-	-	-	-	-	<0.0005	<0.0005	-	-	<0.0005	<0.0005	<0.00050
Volatile Organic Compounds					-	-	-	-	-	-			-	-			
Bromodichloromethane	ug/L	no guideline	16	16	-	-	-	-	-	-	<1	<1	-	-	<1	<1	<1
Bromoform	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<1	<1	-	-	<1	<1	<1
Bromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<1	<1	-	-	<1	<1	<1
Carbon Tetrachloride	ug/L	13.3	5	5	-	-	-	-	-	-	<1	<1	-	-	<0.5	<0.5	<0.5
Chlorobenzene	ug/L	1.3	80	80	-	-	-	-	-	-	<0.5	<0.5	-	-	<0.5	<0.5	<0.5
Chloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<1	<1	-	-	<1	<1	<1
Chloroform	ug/L	1.8	no guideline	no guideline	-	-	-	-	-	-	<1	<1	-	-	<1	<1	<1
Chloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<1	<1	-	-	<1	<1	<1
Cis-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<1	<1	-	-	<1	<1	<1
Cis-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<1	<1	-	-	<1	<1	<1
Dibromochloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<1	<1	-	-	<1	<1	<1
Dibromoethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<0.2	<0.2	-	-	<0.9	<0.9	-
Dibromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	<0.9	<0.9	<0.9
Dichlorodifluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	<2
Methyl-Tert-Butylether	ug/L	3400	20	200	-	-	-	-	-	-	<4	<4	-	-	<4	<4	<4
Methylene Chloride	ug/L	98.1	50	50	-	-	-	-	-	-	<2	<2	-	-	<2	<2	<2
Tetrabromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	ug/L	111	30	30	-	-	-	-	-	-	<0.5	<0.5	-	-	<0.5	<0.5	<0.5
Trans-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<1	<1	-	-	<1	<1	<1
Trans-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<1	<1	-	-	<1	<1	<1
Trichloroethene	ug/L	21	5	5	-	-	-	-	-	-	<0.5	<0.5	-	-	<0.5	<0.5	<0.5
Trichlorofluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<4	<4	-	-	<4	<4	<4
Vinyl Chloride	ug/L	no guideline	2	2	-	-	-	-	-	-	<0.5	<0.5	-	-	<0.5	<0.5	<0.5
1,1-Dichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<0.5	<0.5	-	-	<0.5	<0.5	<0.5
1,1-Dichloroethene	ug/L	no guideline	14	14	-	-	-	-	-	-	<0.5	<0.5	-	-	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	ug/L	0.7	200	200	-	-	-	-	-	-	<0.5	<0.5	-	-	<0.5	<0.5	<0.5
1,2-Dichloroethane	ug/L	100	5	5	-	-	-	-	-	-	<0.5	<0.5	-	-	<0.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<0.5	<0.5	-	-	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	ug/L	150	no guideline	no guideline	-	-	-	-	-	-	<0.5	<0.5	-	-	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ug/L	26	5	5	-	-	-	-	-	-	<0.5	<0.5	-	-	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	11100	200	no guideline	-	-	-	-	-	-	<0.5	<0.5	-	-	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<0.5	<0.5	-	-	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<0.5	<0.5	-	-	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<0.5	<0.5	-	-	<0.5	<0.5	<0.5

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA04-1 11-Aug-04	EBA04-1 19-Oct-06	EBA04-1 19-Apr-07	EBA04-1 25-Oct-07	EBA04-1 8-Apr-08	EBA04-1 22-Oct-08	EBA04-1 27-Aug-09	EBA04-1 9-Dec-09	EBA04-1 28-Apr-10	EBA04-1 1-Nov-10	EBA04-1 9-Mar-11	EBA04-1 11-May-11	EBA04-1 15-Aug-11	EBA04-1 28-Nov-11	EBA04-1 20-Feb-12	EBA04-1 23-May-12	EBA04-1 16-Aug-12	EBA04-1 3-Dec-12
Physical Tests																						
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.01	**8.58 bc**	**4.20 abc**	8.41	8.47	7.85	6.7	7.43	**5.84 abc**	8.42	8.33	7.6	8.36	7.86	7.72	8.5	8.28	**8.55 bc**
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	8.33	8.1	7.97	7.69	8.19	7.79	7.80	7.28	7.8	7.8	7.38	7.88	7.82	7.67	7.96	7.81	7.81	7.93
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	96	74	68	65	63	62	82	36	70	88	79	85	83	95	108	82	81	85
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	86.6	87.4	81.3	83	83.9	79.3	82	84	78	78	84	84	85	100	114	85.7	82.9	83.8
Temperature (Field)	deg C	19	15	15	10.3	**15.76 bc**	8.68	12.13	8.24	11.89	**20.45 abc**	9.08	11.9	12.38	8.76	11.11	**15.3 bc**	8.32	5.7	14.1	**18.75 bc**	**15.63 bc**
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	-	6.21	5.3	7.6	6.5	7.73	6.51	11.2	9.8	5.3	5.31	6.82	9.23	18.86	10.5	5.1	8.54	7.47
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	42	41	41.9	40.8	39.3	39.1	38.8	40.9	36.7	37	43	40	39.5	47.7	53.9	38.4	38.8	41.1
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	47	-	-	-	-	-			-	-			-	-	100	50	53	55
Oxidation Reduction Potential	mV	no guideline	no guideline	500	-	-		31.1	239.1	-33.4	56.6	17.6	197	-6.5	-362.9	256	41.7	124.2	103.6	11.2	61.7	189.8
Anions and Nutrients																						
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	<0.05	<0.020	<0.020	<0.020	<0.020	<0.01	<0.01	<0.01	<0.005	0.024	<0.005	0.03	0.038	0.011	0.02	0.015	0.022
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	<0.05	<0.01	0.0013	0.0014	<0.0010	<0.0010	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	<0.1	<0.01	0.0293	0.0375	0.0543	0.0548	0.05	0.03	0.06	0.04	0.06	0.07	0.07	0.196	0.193	0.052	0.058	0.025
Chloride (Lab)	mg/L	600	250	250	0.9	0.8	0.97	0.63	0.94	0.67	0.89	0.81	<0.5	<0.5	0.9	0.8	1.1	0.9	2.0	1.3	0.82	0.87
Fluoride: Dissolved	mg/L	*	1.5	1.5	<0.05	<0.1	<0.020	<0.020	0.021	<0.020	<0.05	<0.05	0.02	0.01	0.02	0.02	0.01	0.015	0.017	0.021	0.015	0.02
Sulphate (Lab)	mg/L	100	500	500	2.8	3.4	2.9	2.38	2.9	2.51	2.62	2.27	2.8	8.1	1.9	3.1	2.5	2.71	3.42	2.64	1.44	2.63
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	39	-	38.3	39.7	38.7	40.3	40.6	40.8	38	39	45	42	38	43.9	50.8	40.8	40.9	41.1
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-		-	-	-		-	-	62	49.8	49.9	50.1
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-		-	-	-		-	-	<0.50	<0.50	<0.50	<0.50
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-			-	-	<0.50	<0.50	<0.50	<0.50
Dissolved Metals																						
Aluminum: Dissolved	mg/L	*	0.2	0.1	-	0.005	0.0071	<0.0050	<0.0050	<0.0050	0.004	0.006	0.007	0.004	0.008	0.009	0.006	<0.0030	0.0031	0.00457	0.00628	0.00898
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	-	<0.0002	<0.00010	<0.00050	<0.00050	<0.00050	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.00004	0.000026	<0.000020	0.000027
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	-	0.0002	0.00083	<0.00050	0.0008	<0.00050	0.0002	0.0005	0.0004	0.0003	0.0007	0.0008	0.0005	0.00034	0.00033	0.000578	0.000276	0.000445
Barium: Dissolved	mg/L	5	no guideline	1	-	0.002	0.000481	<0.020	<0.020	<0.020	0.0007	0.0008	<0.001	<0.001	0.001	0.001	<0.001	0.0028	0.00128	0.000704	0.000873	0.000806
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	-	<0.0001	<0.00050	<0.0010	<0.0010	<0.0010	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	0.000012	<0.000010	<0.000010
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.0005	<0.00050	-	<0.20	-	<0.0002	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.000005	<0.0000050	<0.0000050	<0.0000050
Boron: Dissolved	mg/L	1.2	5	5	-	0.005	<0.010	<0.10	<0.10	<0.10	<0.01	0.006	<0.05	<0.05	<0.05	<0.05	<0.05	<0.050	<0.05	<0.050	<0.050	<0.050
Cadmium: Dissolved	mg/L	*	no guideline	0.005	-	<0.00001	<0.000017	**0.000022 a**	<0.000017	<0.000017	<0.00004	<0.00001	**0.00003 a**	<0.00001	0.00001	**0.00006 a**	<0.00001	<0.000010	0.000009	**0.0000605 a**	0.00001	0.000007
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	13.6	-	13.7	12.8	13.2	12.9	14	12.3	12.4	14	13	13.1	15.5	17.2	12.4	12.7	13.9
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	-	<0.0005	<0.00050	<0.0010	<0.0010	<0.0010	0.0002	0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.0004	**0.00124 a**	0.00045	0.00033
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	-	<0.0001	<0.00010	<0.00030	<0.00030	<0.00030	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.000009	0.0000181	<0.0000050	<0.0000050
Copper: Dissolved	mg/L	*	0.5	1	-	**0.06 a**	**0.0299 a**	**0.0077 a**	0.0015	0.0023	**0.0057 a**	0.0044	0.0033	0.0031	0.0029	0.0031	0.0038	0.0123	**0.0238 a**	0.00358	0.00469	0.00388
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	-	<0.01	-	0.046	<0.030	<0.030	0.07	0.03	0.038	0.065	0.008	0.005	<0.005	<0.0050	0.001	0.132	0.0129	0.0069
Lead: Dissolved	mg/L	*	0.05	0.01	-	0.0003	0.00117	<0.00050	<0.00050	<0.00050	0.0003	0.00013	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	0.000142	0.000262	0.000109	0.000085
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	-	<0.001	<0.0050	<0.0050	<0.0050	<0.0050	<0.0002	<0.0001	<0.005	<0.005	-	-	<0.005	<0.0050	<0.0005	<0.00050	<0.00050	<0.00050
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	1.6	-	1.59	1.78	1.5	1.58	1.42	1.48	1.43	1.93	1.83	1.63	2.19	2.66	1.79	1.71	1.54
Manganese: Dissolved	mg/L	*	no guideline	0.05	-	0.008	0.00185	0.00681	0.00116	0.00059	0.0035	0.0028	0.002	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00017	0.0076	0.000845	0.000188
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	<0.000020	<0.000020	<0.000020	<0.000020	<0.00002	<0.02	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.000050	< 0.00001	<0.000010	<0.000010	<0.000010
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	-	<0.001	0.00013	<0.0010	<0.0010	<0.0010	<0.0001	0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00007	0.00013	0.000132	0.000183
Nickel: Dissolved	mg/L	*	no guideline	no guideline	-	<0.0005	0.00061	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00012	0.000253	0.000131	0.000035
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.30	0.0042	<0.30	-	<0.03	<0.015	-	-	0.02	0.02	-	-	0.0154	0.0065	0.0056	0.0096
Potassium: Dissolved	mg/L	373	no guideline	no guideline	-	<0.4	-	<2.0	<2.0	<2.0	0.22	0.26	0.23	0.21	0.28	0.27	0.23	0.38	0.39	0.28	0.243	0.239
Selenium: Dissolved	mg/L	0.002	0.01	0.01	-	<0.0002	<0.0010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.00012	0.00014	0.000126	0.000112	0.000161
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	3.37	4.96	-	5.47	-	3.43	3.67	3.8	3.3	5.5	5.5	3.3	4.52	4.7	4.67	3.29	4.21
Silver: Dissolved	mg/L		no guideline	no guideline	-	<0.0001	<0.000010	<0.000020	<0.000020	<0.000020	<0.00005	<0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020	0.000006	<0.0000050	<0.0000050	<0.0000050
Sodium: Dissolved	mg/L	no guideline	no guideline	200	-	1.1	-	<2.0	<2.0	<2.0	1	1.11	0.97	1.04	1.43	1.31	0.87	1.57	1.57	1.3	0.991	1.17
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	0.02	0.0189	-	0.0199	-	0.019	0.022	0.018	0.019	0.018	0.02	0.019	0.0253	0.0274	0.0184	0.0196	0.0212
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	1	0.84	0.96	1.03	0.89	<2	<1	<3	<3	<3	<3	<3	<3.0	<10	<15	<10	<3.0
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	<0.00005	<0.00010	<0.00020	<0.00020	<0.00020	0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00050	<0.000002	<0.0000020	<0.0000020	<0.0000020
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<0.0001	<0.00005	-	-	-	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.001	0.00028	<0.00050	<0.00050	<0.00050	<0.0002	<0.0001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0002	<0.00020	<0.00020	<0.00020
Titanium: Dissolved	mg/L	2	no guideline	no guideline	-	<0.0005	-	<0.010	<0.010	<0.010	<0.0002	<0.0002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0005	<0.00050	<0.00050	<0.00050
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	<0.0001	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	0.000016	<0.00020	<0.00020	<0.00020	<0.0001	<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	< 0.0001	<0.00010	0.000035	0.0000228	0.00001	0.000015
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	-	0.0019	0.0056	0.002	0.0055	0.0029	0.002	0.0033	<0.005	<0.005	0.005	0.006	<0.005	<0.0050	0.004	0.00428	0.00228	0.00386
Zinc: Dissolved	mg/L	*	5	5	-	**0.151 a**	**0.0992 a**	**0.0827 a**	0.0164	**0.0351 a**	**0.095 a**	**0.058 a**	**0.115 a**	**0.087 a**	**0.055 a**	0.014	0.019	**0.0381 a**	**0.0705 a**	**1.1 a**	**0.0521 a**	0.0168
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<0.002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.0001	<0.00010	<0.00010	<0.00010

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA04-1	EBA04-1	EBA04-1	EBA04-1	EBA04-1	EBA04-1	EBA04-1	EBA04-1	EBA04-1	EBA04-1	EBA04-1	EBA04-1	EBA04-1	EBA04-1	EBA04-1	EBA04-1	EBA04-1	EBA04-1
					11-Aug-04	19-Oct-06	19-Apr-07	25-Oct-07	8-Apr-08	22-Oct-08	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
Total Metals																						
Aluminum: Total	mg/L	*	0.2	0.1	0.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	0.008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	<0.00001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	14.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	**0.0011 a**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	**1.3 bac**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	0.0006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	<0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	0.027	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																						
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria																						
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																						
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

*- See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2
					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	23-Oct-08	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
Physical Tests																									
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	**8.68 bc**	**9.04 abc**	**8.74 bc**	6.951	8.136	**8.66 bc**	7.69	**8.55 bc**	8.13	7.81	8.27	6.72	**9.00 bc**	7.97	7.89	8.02	8.48	**8.58 bc**	8.0	7.5	8.39	8.19
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	8	8.3	7.9	8.2	8.1	8.2	7.97	7.74	8.04	7.82	7.83	7.46	7.9	7.77	7.36	7.8	7.8	7.75	8.05	7.78	7.82	7.75
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	92	100.3	77.1	79.6	95.5	69	68	66	74	62	68	44	67	80	81	80	80	76	107	83	79	88
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	85	89.8	80.4	83.5	90.5	89.2	80	83.5	84.5	78.9	82	96	90	81	87	81	81	83.7	112	82.5	80.5	88
Temperature (Field)	deg C	19	15	15	12.6	11.5	13.5	11.1	13.5	12.98	13.87	12.7	13.72	12.3	11.88	12.15	14.09	12.84	13.28	13.82	11.45	11.57	11.9	12.6	11.66	12.4
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	6.8	9.56	9.13	5.56	**2.5 a**	6.63	6.11	7.46	12.3	10.6	10.7	11.38	18.79	21.66	17.5	11.3	9.95	7.93	6.6	7.2	8.2	6.18
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	44	76	39	39	43	42	41.3	41.2	39.3	39.9	38.8	45.4	41.7	37.9	45.6	39.2	38.3	40.3	53.8	38.6	39.6	41.9
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	60	67	53	53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	50	50	57
Oxidation Reduction Potential	mV	no guideline	no guideline	500	-	-	-	-	-	-	86.6	398.2	248	-23.7	-28.5	65.8	131.7	11.7	-308.9	222	36.8	130.1	92.6	94.9	12.1	262.9
Anions and Nutrients																										
Ammonia (as N)	mg/L	*	no guideline	no guideline	<0.02	-	<0.02	<0.20	<0.02	<0.05	<0.020	<0.020	<0.020	<0.020	<0.01	<0.01	<0.01	<0.005	0.029	0.017	0.053	0.052	0.013	<0.0050	0.025	0.019
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	<0.3	<0.01	<0.1	<0.1	<0.01	<0.01	<0.0010	0.0012	<0.0010	<0.0010	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	<0.1	0.08	<0.1	0.2	0.06	0.04	0.0522	0.0709	0.0584	0.0699	0.07	0.06	0.06	0.06	0.06	0.05	0.06	0.066	0.062	0.056	0.066	0.068
Chloride (Lab)	mg/L	600	250	250	1.3	0.9	<2	<2	0.9	0.7	0.97	0.67	0.96	0.69	0.90	0.85	0.6	<0.5	0.9	1.9	1.3	<0.5	3.4	1.7	0.98	1.8
Fluoride: Dissolved	mg/L	*	1.5	1.5	<1.0	-	<1	-	<0.1	<0.1	<0.020	<0.020	<0.020	<0.020	<0.05	<0.05	0.02	0.02	0.02	0.02	0.01	0.017	0.018	0.021	0.016	0.019
Sulphate (Lab)	mg/L	100	500	500	3.2	2.8	3	4.1	3.4	3.5	2.96	2.56	2.82	2.54	2.75	2.81	3.3	2.2	2.1	3.2	2.3	2.95	3.38	2.94	1.37	2.78
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	39	40	39	36	-	-	37	39.7	38.8	39.7	39.8	47.3	43	40	41	37	38	39.6	46	38.2	38.4	38.3
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	56.1	46.6	46.8	46.8
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50
Dissolved Metals																										
Aluminum: Dissolved	mg/L	*	0.2	0.1	-	0.01	0.01	0.008	0.007	0.012	0.0103	0.0067	0.0076	0.0071	0.007	0.025	0.015	0.006	0.009	0.01	0.007	0.0061	0.0066	0.0079	0.00666	0.00702
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00010	<0.00050	<0.00050	<0.00050	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.00003	0.000031	<0.000220	0.000027
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	-	0.0004	0.0004	0.0003	0.0004	0.0002	0.00028	<0.00050	<0.00050	<0.00050	0.0002	0.0003	0.0003	0.0002	0.0002	0.0003	0.0002	0.00021	0.00031	0.00018	0.000229	0.000211
Barium: Dissolved	mg/L	5	no guideline	1	-	0.002	0.001	0.001	0.001	<0.001	0.0007	<0.020	<0.020	<0.020	0.0005	0.0007	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00071	0.000557	0.00043	0.000583
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00050	<0.0010	<0.0010	<0.0010	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00001	<0.000010	<0.000010	<0.0000010
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	-	<0.20	-	<0.0002	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.000005	<0.0000050	<0.0000050	<0.0000050
Boron: Dissolved	mg/L	1.2	5	5	-	0.005	0.005	0.005	0.005	0.006	<0.010	<0.10	<0.10	<0.10	<0.01	<0.005	<0.05	<0.05	<0.05	<0.05	<0.05	<0.050	<0.05	<0.050	<0.050	<0.050
Cadmium: Dissolved	mg/L	*	no guideline	0.005	-	<0.00001	<0.00001	**0.00002 a**	<0.00001	**0.00006 a**	**0.000019 a**	<0.000017	<0.000017	<0.000017	**0.00004 a**	<0.00001	**0.00064 a**	<0.00001	**0.00002 a**	**0.00005 a**	<0.00001	<0.000010	<0.000005	<0.0000050	<0.0000050	<0.0000050
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	14	13	13.1	14.5	14.3	-	14.1	13.3	13.6	13.2	15.7	14.2	12.9	15.3	13.3	13.1	13.8	18.2	13.3	13.5	14.3
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	-	<0.0005	<0.0005	**0.0011 a**	<0.0005	<0.0005	<0.00050	<0.0010	<0.0010	<0.0010	0.0002	<0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.0003	0.00017	0.00017	0.00024
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00030	<0.00030	<0.00030	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.000009	0.0000995	<0.0000050	<0.0000050
Copper: Dissolved	mg/L	*	0.5	1	-	<0.001	<0.001	**0.03 a**	<0.001	<0.001	0.00019	<0.0010	<0.0010	<0.0010	0.0009	0.0003	0.0004	<0.0002	<0.0002	0.0003	<0.0002	0.00029	0.0002	0.000225	0.000127	0.0002
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.030	<0.030	<0.030	<0.01	0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.001	0.0018	0.0013	0.0031
Lead: Dissolved	mg/L	*	0.05	0.01	-	<0.0001	<0.0001	0.0011	<0.0001	0.0001	<0.000050	<0.00050	<0.00050	<0.00050	<0.0002	<0.00005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	<0.000005	0.0000994	0.000009	<0.0000050
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0050	<0.0050	<0.0050	<0.0050	<0.0002	<0.0001	<0.005	<0.005	-	-	<0.005	<0.0050	<0.0005	<0.00050	<0.00050	<0.00050
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	1.5	1.5	1.4	1.6	1.6	-	1.48	1.46	1.44	1.41	1.49	1.53	1.39	1.79	1.43	1.36	1.39	2	1.34	1.44	1.54
Manganese: Dissolved	mg/L	*	no guideline	0.05	-	<0.005	<0.005	<0.005	<0.005	<0.005	0.000321	<0.00030	<0.00030	<0.00030	<0.0002	0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00009	0.000138	0.000165	0.00007
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	<0.000020	<0.000020	<0.000020	<0.000020	<0.00002	<0.02	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.000050	< 0.00001	<0.00001	<0.000010	<0.000010
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.000139	<0.0010	<0.0010	<0.0010	<0.0001	0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00011	0.000135	0.000117	0.0002029
Nickel: Dissolved	mg/L	*	no guideline	no guideline	-	0.0006	<0.0005	0.0018	<0.0005	<0.0005	<0.00050	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.00002	0.000141	0.000025	<0.0000020
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	<0.30	0.0034	<0.30	-	<0.03	<0.015	-	-	<0.01	<0.01	-	-	<0.0050	<0.0050	0.0168	0.0103
Potassium: Dissolved	mg/L	373	no guideline	no guideline	-	<0.4	<0.4	<0.4	<0.4	<0.4	-	<2.0	<2.0	<2.0	0.2	0.2	0.23	0.19	0.22	0.19	0.17	0.187	0.24	<0.25	0.181	0.206
Selenium: Dissolved	mg/L	0.002	0.01	0.01	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	<0.0001	0.0001	0.0001	<0.0001	0.0001	0.00012	0.00012	0.000099	0.000117	0.000115
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	3.17	3.81	3.41	3.45	-	3.61	-	3.73	2.92	4.1	3.5	4.1	3.7	3.3	3.27	3.6	3.47	3.44	3.71
Silver: Dissolved	mg/L	*	no guideline	no guideline	-	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.000010	<0.000020	<0.000020	<0.000020	<0.00005	<0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020	<0.000005	<0.0000050	<0.0000050	<0.0000050
Sodium: Dissolved	mg/L	no guideline	no guideline	200	-	1	1	1	1	1.1	-	<2.0	<2.0	<2.0	0.98	0.87	0.96	1.05	1.18	0.97	0.85	0.908	1.12	0.94	0.986	1.17
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	0.021	0.02	0.02	0.02	0.02	0.0195	-	0.0211	-	0.02	0.025	0.02	0.02	0.022	0.02	0.019	0.0212	0.0292	0.0202	0.0196	0.023
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	0.94	1	1	1.1	1	0.88	1.02	1	0.9	<2	<1	<3	<3	<3	<3	<3	<3.0	<10	<15	<10	<3.0
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00010	<0.00020	<0.00020	<0.00020	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	<0.000002	<0.0000020	<0.0000020	<0.0000020
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-										<0.0001	<0.00005										
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00010	<0.00050	<0.00050	<0.00050	<0.0002	<0.0001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0002	<0.00020	<0.00020	0.00023
Titanium: Dissolved	mg/L	2	no guideline	no guideline	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.010	<0.010	<0.010	0.0002	0.0019	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0005	<0.00050	<0.00050	<0.00050
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-					<0.0001										
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	<0.000010	<0.00020	<0.00020	<0.00020	<0.0001	<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	< 0.0001	<0.00010	0.000018	0.0000106	0.000008	0.000014
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	-	0.0026	0.0034	0.0023	0.0034	0.002	0.0025	0.0017	0.002	0.002	0.0019	0.0017	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.0021	0.00182	0.00176	0.00196
Zinc: Dissolved	mg/L	*	5	5	-	<0.001	0.001	0.016	0.001	0.005	<0.0010	<0.0050	<0.0050	<0.0050	0.003	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.0005	0.00095	0.00101	0.0004
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	<0.002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.0001	<0.00010	<0.00010	<0.00010

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2	EBA04-2
					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	23-Oct-08	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
Total Metals																									
Aluminum: Total	mg/L	*	0.2	0.1	**1.33 abc**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	0.0007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	0.007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	**0.00004 a**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	14.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	**0.0014 a**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	**0.008 a**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	**2 bac**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	**0.073 bc**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	<0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																									
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria																									
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																									
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	<0.08	<0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	<0.2	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	<2.5	<2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	7.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	<10	<10	-	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	<0.01	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	**0.57 bac**	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	**3.15 abc**	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
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BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.
CDWG - Canadian Drinking Water Quality Guidelines.
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA04-3	EBA04-3	EBA04-3	EBA04-3	EBA04-3	DupEBA04-3	EBA04-3	EBA04-3	DupEBA04-3	EBA04-3	EBA04-3	EBA04-3	EBA04-3	EBA04-3	DUPEBA04-3
					27-Sep-04	23-Nov-04	3-May-05	28-Sep-05	20-Apr-06	20-Apr-06	19-Oct-06	19-Apr-07	19-Apr-07	25-Oct-07	9-Apr-08	23-Oct-08	27-Aug-09	9-Dec-09	9-Dec-09
Physical Tests																			
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.78	**6.33 abc**	7.98	6.951	7.239	-	7.47	**6.39 abc**	-	7.4	7.27	6.95	7.42	7.01	-
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.5	7.6	7.6	7.7	7.5	7.5	7.5	8.15	8.15	7.58	7.72	8.06	8.07	8.17	8.17
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	509	216	197	421	591	-	342	**748 b**	-	359	384	370	525	101	-
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	410	248	424	424	573	574	462	**848 b**	**852 b**	470	480	484	647	221	221
Temperature (Field)	deg C	19	15	15	-	9.9	10.8	10.2	10.4	-	10.39	10.09	-	10.55	9.99	10.04	10.78	10.02	-
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	-	10.24	6.47	**1.1 a**	**0.8 a**	-	**3.99 a**	**0.64 a**	-	7.81	6.46	46.4	7.68	11.69	-
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	**750 b**	130	240	220	310	300	250	495	**507 b**	265	250	305	371	118	112
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	230	130	233	230	-	-	-	-	-	-	-	-	-	-	
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	48.5	634.8	112.4	-12.3	-28.9	270.5	-
Anions and Nutrients																			
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	-	<0.02	<0.20	<0.02	<0.02	<0.05	<0.020	<0.020	<0.020	<0.020	<0.020	<0.01	<0.01	<0.01
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	<0.30	<0.01	<0.1	<0.1	<0.01	<0.01	<0.01	0.001	0.0012	<0.0010	<0.0010	<0.0010	<0.002	<0.002	<0.002
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	<0.10	0.3	<0.1	<0.1	0.2	0.21	0.15	0.485	0.483	0.2	0.654	0.218	0.57	0.07	0.07
Chloride (Lab)	mg/L	600	250	250	2.6	1.4	2.3	3.5	14	15	3.1	29.5	29.3	6.97	31.8	7.07	12.9	0.95	0.96
Fluoride: Dissolved	mg/L	*	1.5	1.5	<1.0	-	<1	-	<0.1	<0.1	<0.1	<0.020	<0.020	<0.020	<0.020	<0.020	<0.05	<0.05	<0.05
Sulphate (Lab)	mg/L	100	500	500	5	3.3	4	5.1	5.9	6.1	5.1	11.5	11.4	4.99	6.06	6.04	11.3	2.93	2.95
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	220	-	235	220	-	-	-	448	435	252	219	276	342	123	122
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-		
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-		
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																			
Aluminum: Dissolved	mg/L	*	0.2	0.1	-	<0.005	<0.005	<0.005	<0.005	<0.005	0.008	<0.0020	<0.0020	<0.0050	<0.0050	<0.0050	0.003	0.001	0.001
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	<0.00020	<0.00050	<0.00050	<0.00050	<0.0002	<0.0001	<0.0001
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	<0.00020	<0.00050	<0.00050	<0.00050	<0.0002	<0.0002	<0.0002
Barium: Dissolved	mg/L	5	no guideline	1	-	0.006	0.01	0.01	0.012	0.012	0.009	0.0197	0.0194	<0.020	<0.020	<0.020	0.013	0.0036	0.0035
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0001	<0.0001
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0010	<0.0010	-	<0.20	-	<0.0002	<0.0001	<0.0001
Boron: Dissolved	mg/L	1.2	5	5	-	0.008	0.006	0.012	0.009	0.009	0.014	<0.020	<0.020	<0.10	<0.10	<0.10	0.01	0.009	0.008
Cadmium: Dissolved	mg/L	*	no guideline	0.005	-	0.00002	0.00002	0.00001	<0.00001	**0.00001 a**	0.00002	<0.000034	<0.000034	<0.000017	<0.000017	**0.000090 a**	**0.00019 a**	<0.00001	<0.00001
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	37.6	70.4	67.5	92	89.8	74.8	-	-	81.9	77.9	94.8	115	38.8	36.7
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	-	<0.0005	<0.0005	**0.0011 a**	0.001	**0.0011 a**	0.0006	<0.0010	<0.0010	<0.0010	<0.0010	**0.0011 a**	0.001	0.0003	0.0003
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.00020	<0.00020	<0.00030	<0.00030	<0.00030	<0.0002	<0.0001	<0.0001
Copper: Dissolved	mg/L	*	0.5	1	-	<0.001	0.003	0.015	<0.001	<0.001	<0.001	0.00034	0.00026	<0.0010	<0.0010	<0.0010	0.0007	0.0001	<0.0001
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	-	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	-	-	<0.030	<0.030	<0.030	<0.01	<0.01	<0.01
Lead: Dissolved	mg/L	*	0.05	0.01	-	<0.0001	0.0001	0.0007	<0.0001	<0.0001	0.0001	<0.00010	<0.00010	<0.00050	<0.00050	<0.00050	<0.0002	<0.00005	<0.00005
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.010	<0.010	<0.0050	<0.0050	<0.0050	0.0008	0.0003	0.0003
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	8.2	15.3	13.4	19.1	18.8	15.6	-	-	14.7	13.6	16.6	20.4	5.08	4.97
Manganese: Dissolved	mg/L	*	no guideline	0.05	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.00063	0.00266	0.00035	0.00048	0.0002	0.0002	0.0001	<0.0001
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.00002	<0.02	<0.02
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00010	<0.00010	<0.0010	<0.0010	<0.0010	<0.0001	<0.0001	<0.0001
Nickel: Dissolved	mg/L	*	no guideline	no guideline	-	0.0017	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	<0.0002
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	<0.30	<0.30	0.0028	<0.30	-	<0.03	<0.015	<0.015
Potassium: Dissolved	mg/L	373	no guideline	no guideline	-	0.8	0.7	0.8	0.9	0.9	0.8	-	-	<2.0	<2.0	<2.0	0.95	0.51	0.49
Selenium: Dissolved	mg/L	0.002	0.01	0.01	-	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0020	<0.0020	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	<0.0002
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	6.28	6.58	6.46	6.57	7.42	7.56	-	6.23	-	7.76	4.53	4.36
Silver: Dissolved	mg/L	*	no guideline	no guideline	-	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.00005	<0.00004	<0.00004
Sodium: Dissolved	mg/L	no guideline	no guideline	200	-	1.4	3	2.5	2.4	2.3	2.1	-	-	2.2	2.2	3	2.84	1.21	1.2
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	0.077	0.154	0.156	0.184	0.183	0.141	0.31	0.298	-	0.154	-	0.234	0.078	0.076
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	1.27	2	1.7	1.8	1.7	1.6	3.71	3.83	2.02	2.21	2.17	4	<1	<1
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002	<0.0002
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00002	<0.00002	<0.00002
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.00005	<0.00005
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00020	<0.00020	<0.00050	<0.00050	<0.00050	<0.0002	<0.0001	<0.0001
Titanium: Dissolved	mg/L	2	no guideline	no guideline	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005			<0.010	<0.010	<0.010	0.0004	<0.0002	<0.0002
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	0.000404	0.000392	<0.00020	<0.00020	0.00023	0.0003	0.00008	0.00009
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	-	0.0023	0.0014	0.0012	0.003	0.003	0.0011	<0.0020	<0.0020	<0.0010	<0.0010	<0.0010	0.0019	0.0009	0.0009
Zinc: Dissolved	mg/L	*	5	5	-	0.006	0.004	0.01	<0.001	<0.001	0.006	0.0038	0.0036	<0.0050	<0.0050	<0.0050	0.005	<0.001	<0.001
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	<0.002	<0.0001	<0.0001

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.
BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.
CDWG - Canadian Drinking Water Quality Guidelines.
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA04-3 27-Sep-04	EBA04-3 23-Nov-04	EBA04-3 3-May-05	EBA04-3 28-Sep-05	EBA04-3 20-Apr-06	DupEBA04-3 20-Apr-06	EBA04-3 19-Oct-06	EBA04-3 19-Apr-07	DupEBA04-3 19-Apr-07	EBA04-3 25-Oct-07	EBA04-3 9-Apr-08	EBA04-3 23-Oct-08	EBA04-3 27-Aug-09	EBA04-3 9-Dec-09	DUPEBA04-3 9-Dec-09
Total Metals																			
Aluminum: Total	mg/L	*	0.2	0.1	0.044	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	0.011	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	<0.00001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	62.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	0.0009	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	14.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																			
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria																			
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																			
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	80	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	140	85	65	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	<0.2	0.2	<0.2	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	2.97	<2.5	<2.5	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	4.53	2.05	<8	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	13	<10	-	23	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	<0.01	0.04	<0.2	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	<0.01	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA04-3	EBA04-3	EBA04-3	EBA04-3	EBA04-3	DupEBA04-3	EBA04-3	EBA04-3	DupEBA04-3	EBA04-3	EBA04-3	EBA04-3	EBA04-3	EBA04-3	DUPEBA04-3
					27-Sep-04	23-Nov-04	3-May-05	28-Sep-05	20-Apr-06	20-Apr-06	19-Oct-06	19-Apr-07	19-Apr-07	25-Oct-07	9-Apr-08	23-Oct-08	27-Aug-09	9-Dec-09	9-Dec-09
Hydrocarbons																			
VHw6-10	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EHw10-19	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EHw19-32	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																			
Acenapthene	ug/L	6	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acridine	ug/L	0.05	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Pyrene	ug/L	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	ug/L	0.2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	ug/L	12	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Napthalene	ug/L	1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	ug/L	0.3	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	ug/L	0.02	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Halogenated Volatiles																			
Benzene	mg/L	0.4	0.005	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/L	0.2	0.0024	0.0024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/L	0.0005	0.024	0.024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes: Total	mg/L	0.03	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/L	0.072	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds																			
Bromodichloromethane	ug/L	no guideline	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	ug/L	13.3	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	ug/L	1.3	80	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	ug/L	1.8	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cis-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cis-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromoethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl-Tert-Butylether	ug/L	3400	20	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	ug/L	98.1	50	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrabromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	ug/L	111	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trans-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trans-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	ug/L	21	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	ug/L	no guideline	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	ug/L	no guideline	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	ug/L	0.7	200	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	ug/L	100	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	ug/L	150	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	ug/L	26	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	ug/L	11100	200	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA04-3	DUPEBA04-3	EBA04-3	DupEBA04-3	EBA04-3	DupEBA04-3	EBA04-3	DupEBA04-3	EBA04-3	DUPEBA04-3	EBA04-3	DupEBA04-3	EBA04-3	DupEBA04-3	EBA04-3	EBA04-3	EBA04-3
					29-Apr-10	29-Apr-10	1-Nov-10	1-Nov-10	9-Mar-11	9-Mar-11	11-May-11	11-May-11	15-Aug-11	15-Aug-11	30-Nov-11	30-Nov-11	20-Feb-12	20-Feb-12	23-May-12	16-Aug-12	4-Dec-12
Physical Tests																					
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.57	-	7.41	-	7.09	-	6.91	-	7.12	-	6.95	-	7.2	-	7.2	7.04	7.91
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	8	8.1	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
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	257	-	398	-	700	-	715	-	595	-	741	-	465	-	770	536	267
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	374	365	439	437	787	787	709	716	607	607	823	816	476	479	708	510	262
Temperature (Field)	deg C	19	15	15	10.72	-	10.33	-	10.65	-	10.68	-	10.67	-	9.93	-	10.1		10.6	10.92	9.92
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	13.59	-	12.05	-	5.76	-	7.98	-	8.41	-	6.35	-	7.7	-	7.7	6.45	6.32
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	194	199	225	217	461	453	394	371	317	324	413	388	259	260	431	297	137
Dissolved Solids: Total	mg/L	no guideline	no guideline	500	-	-	-	-					-	-	-	-	300	-	500	349	174
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	152.5	-	18.1	-	-356.2	-	225.4	-	81.9	-	157.6	-	98.0	-	142	67.7	27.7
Anions and Nutrients																					
Ammonia (as N)	mg/L	*	no guideline	no guideline	<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
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	0.009	0.008	<0.0050	<0.0050	0.0059
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	0.3	0.3	0.39	0.4	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
Chloride (Lab)	mg/L	600	250	250	3.8	3.8	3.9	4	24	22	11	9.7	5.2	5	73	73	11	11	29	5.3	1.5
Fluoride: Dissolved	mg/L	*	1.5	1.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.012
Sulphate (Lab)	mg/L	100	500	500	5.8	5.7	18	14	19	19	11	11	6.8	6.2	12.2	12.4	4.40	4.26	6.95	5.56	3.08
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	190	190	220	220	370	370	370	370	310	310	311	310	222	224	335	269	136
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-			-	-	-	-	271	274	409	328	166
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-			-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-			-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Metals																					
Aluminum: Dissolved	mg/L	*	0.2	0.1	0.004	0.004	<0.003	0.008	<0.003	0.004	0.004	0.004	<0.003	<0.003	<0.0030	<0.0030	0.0031	0.0027	0.00224	0.00281	0.0078
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.00050	0.00002	<0.00002	<0.000020	<0.000020	0.000021
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	0.00006	0.00007	0.00006	0.000051	0.000055
Barium: Dissolved	mg/L	5	no guideline	1	0.006	0.007	0.008	0.008	0.015	0.015	0.013	0.013	0.01	0.01	0.0122	0.012	0.0084	0.00799	0.0128	0.00966	0.0043
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050
Boron: Dissolved	mg/L	1.2	5	5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.050	<0.050	<0.05	<0.05	<0.050	<0.050	<0.050
Cadmium: Dissolved	mg/L	*	no guideline	0.005	0.00003	0.00003	<0.00001	0.00002	0.00001	0.00002	0.00003	0.00004	0.00001	0.00001	<0.000010	<0.000010	<0.000005	<0.000005	0.0000107	0.000006	<0.0000050
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	64.3	-	72.9	69.3	148	146	128	120	101	102	128	119	82.9	81.7	137	95.5	45.1
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010	0.0007	0.0007	0.0007	0.0007	0.00031
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.00050	0.000008	0.000006	0.0000105	0.000008	0.000014
Copper: Dissolved	mg/L	*	0.5	1	<0.0002	<0.0002	<0.0002	<0.0002	0.0032	0.0029	0.0004	0.0003	<0.0002	<0.0002	0.00022	<0.00020	0.00014	0.00015	0.000237	0.00034	0.000166
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0092	<0.0050	0.003	0.002	0.0022	0.0023	0.0138
Lead: Dissolved	mg/L	*	0.05	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	<0.00020	<0.000005	<0.000005	0.0000077	0.000006	<0.0000050
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	<0.005	<0.005	<0.005	<0.005	-	-	-	-	<0.005	<0.005	<0.0050	<0.0050	0.0008	0.0008	0.00096	0.00074	0.00052
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	8.12	-	10.3	10.6	22	21.2	18.1	17.2	15.8	16.6	22.9	21.7	12.6	13.5	21.5	14.2	5.96
Manganese: Dissolved	mg/L	*	no guideline	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010	<0.00005	<0.00005	0.000156	0.000155	0.000499
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	<0.00002	<0.00002	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	<0.000050	< 0.00001	< 0.00001	<0.000010	<0.000010	<0.000010
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010	<0.00005	<0.00005	<0.000050	<0.000050	0.000064
Nickel: Dissolved	mg/L	*	no guideline	no guideline	<0.001	<0.001	<0.001	<0.001	0.002	0.002	*	<0.001	<0.001	<0.001	<0.0010	<0.0010	0.00002	0.00006	0.000101	0.000089	0.000062
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	<0.01	<0.01	<0.01	<0.01	-	-	-	-	<0.0050	<0.0050	<0.0050	0.121	0.257
Potassium: Dissolved	mg/L	373	no guideline	no guideline	0.68	-	0.71	0.71	1.14	1.14	1.02	0.96	0.91	0.95	1.11	1.09	0.98	0.93	1.18	1.06	0.692
Selenium: Dissolved	mg/L	0.002	0.01	0.01	<0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0001	0.0001	0.0001	<0.0001	0.00018	0.0002	0.00021	0.0002	0.000169	0.000086	0.000168
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	6.6	6.8	6	5.8	8.1	7.8	7.9	7.5	7.5	7.6	7.17	7.4	7.3	7.1	7.72	8.13	6.45
Silver: Dissolved	mg/L	*	no guideline	no guideline	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020	<0.000020	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050
Sodium: Dissolved	mg/L	no guideline	no guideline	200	1.79	-	1.98	2.04	3.28	3.24	4.2	2.75	2.8	2.91	3.01	3.16	2.68	2.98	4.18	4.11	2.71
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	0.114	0.119	0.145	0.148	0.268	0.267	0.245	0.24	0.212	0.213	0.272	0.27	0.162	0.16	0.258	0.196	0.0845
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	<3	-	4	4	7	7	4	4	<3	<3	<3.0	4.2	<10	<10	<15	<10	<3.0
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	<0.000050	<0.000002	<0.000002	0.0000022	<0.0000020	<0.0000020
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0002	<0.0002	<0.00020	<0.00020	0.00021
Titanium: Dissolved	mg/L	2	no guideline	no guideline	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003	0.0002	0.0002	0.00024	0.00025	0.000144	0.000182	0.000279	0.000199	0.000116
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	0.0007	0.0008	0.00083	0.00079	0.00094
Zinc: Dissolved	mg/L	*	5	5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	0.0003	0.0002	0.00108	0.0011	0.00081
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.00050	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.
BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.
CDWG - Canadian Drinking Water Quality Guidelines.
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA04-3 29-Apr-10	DUPEBA04-3 29-Apr-10	EBA04-3 1-Nov-10	DUPEBA04-3 1-Nov-10	EBA04-3 9-Mar-11	DupEBA04-3 9-Mar-11	EBA04-3 11-May-11	DupEBA04-3 11-May-11	EBA04-3 15-Aug-11	DupEBA04-3 15-Aug-11	EBA04-3 30-Nov-11	DupEBA04-3 30-Nov-11	EBA04-3 20-Feb-12	DupEBA04-3 20-Feb-12	EBA04-3 23-May-12	EBA04-3 16-Aug-12	EBA04-3 4-Dec-12
Total Metals																					
Aluminum: Total	mg/L	*	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																					
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria																					
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																					
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA04-3	DUPEBA04-3	EBA04-3	DupEBA04-3	EBA04-3	DupEBA04-3	EBA04-3	DupEBA04-3	EBA04-3	DUPEBA04-3	EBA04-3	DupEBA04-3	EBA04-3	DupEBA04-3	EBA04-3	EBA04-3	EBA04-3
					29-Apr-10	29-Apr-10	1-Nov-10	1-Nov-10	9-Mar-11	9-Mar-11	11-May-11	11-May-11	15-Aug-11	15-Aug-11	30-Nov-11	30-Nov-11	20-Feb-12	20-Feb-12	23-May-12	16-Aug-12	4-Dec-12
Hydrocarbons																					
VHw6-10	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	<0.3
VPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	<0.3
EHw10-19	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EHw19-32	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																				-	-
Acenapthene	ug/L	6	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acridine	ug/L	0.05	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Pyrene	ug/L	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	ug/L	0.2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	ug/L	12	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Napthalene	ug/L	1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	ug/L	0.3	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	ug/L	0.02	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Halogenated Volatiles																				-	-
Benzene	mg/L	0.4	0.005	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00040
Ethylbenzene	mg/L	0.2	0.0024	0.0024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00040
Toluene	mg/L	0.0005	0.024	0.024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00040
Xylenes: Total	mg/L	0.03	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.00040
Styrene	mg/L	0.072	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.00050
Volatile Organic Compounds																					
Bromodichloromethane	ug/L	no guideline	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1
Bromoform	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1
Bromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1
Carbon Tetrachloride	ug/L	13.3	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5
Chlorobenzene	ug/L	1.3	80	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5
Chloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1
Chloroform	ug/L	1.8	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1
Chloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1
Cis-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1
Cis-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1
Dibromochloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1
Dibromoethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.9	<0.9
Dichlorodifluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2	<2
Methyl-Tert-Butylether	ug/L	3400	20	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<4	<4
Methylene Chloride	ug/L	98.1	50	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2	<2
Tetrabromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	ug/L	111	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5
Trans-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1
Trans-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1
Trichloroethene	ug/L	21	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5
Trichlorofluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<4	<4
Vinyl Chloride	ug/L	no guideline	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5
1,1-Dichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5
1,1-Dichloroethene	ug/L	no guideline	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5
1,2-Dichlorobenzene	ug/L	0.7	200	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5
1,2-Dichloroethane	ug/L	100	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5
1,2-Dichloropropane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5
1,3-Dichlorobenzene	ug/L	150	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5
1,4-Dichlorobenzene	ug/L	26	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	11100	200	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5
1,1,2-Trichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5
1,1,1,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5
1,1,2,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA04-4 27-Sep-04	EBA04-4 23-Nov-04	DupEBA04-4 23-Nov-04	EBA04-4 4-May-05	EBA04-4 28-Sep-05	EBA04-4 21-Apr-06	EBA04-4 19-Oct-06	EBA04-4 19-Apr-07	EBA04-4 25-Oct-07	EBA04-4 8-Apr-08	DupEBA04-4 8-Apr-08	EBA04-4 23-Oct-08	DupEBA04-4 23-Oct-08	EBA04-4 27-Aug-09	EBA04-4 9-Dec-09	EBA04-4 29-Apr-10	EBA04-4 1-Nov-10	EBA04-4 9-Mar-11	EBA04-4 11-May-11	EBA04-4 15-Aug-11	EBA04-4 28-Nov-11	EBA04-4 20-Feb-12	EBA04-4 23-May-12	EBA04-4 15-Aug-12	EBA04-4 3-Dec-12
Physical Tests																													
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	8.39	**8.98 bc**	-	8.48	6.951	8.176	**8.73 bc**	7.66	7.39	7.88	-	8	-	8.02	6.87	7.9	8.08	7.76	7.78	8.13	**8.52 bc**	8.1	7.8	8.01	8.15
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	8	8.3	8.4	-	-	8.3	8.1	8.1	7.89	8.08	8.09	7.83	7.8	7.88	7.63	8	7.83	7.48	7.67	7.65	7.76	8.08	7.88	7.77	7.95
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	115.2	126.8	-	102.9	100.2	117.4	88	93	85	106	-	80	-	86	57	91	98	116	115	100	104	113	124	98	135
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	**1056 b**	112	111	-	-	112	112.5	110	108	115	114	101	102	104	117	113	105	123	117	99	113	119	123	105	132
Temperature (Field)	deg C	19	15	15	-	12.9	-	13.9	11.4	13.2	13.37	15	13.32	**15.91 bc**	-	13.25	-	12.66	14.47	**17.18 bc**	14.23	14	**15.65 bc**	**19.31 abc**	**18.3 bc**	**15.5 bc**	13.8	13.67	**15.31 bc**
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	6.86	10.63	-	6.86	5.51	**8.7 a**	5.24	5.8	7.95	9.69	-	11.91	-	9.65	11	12.85	7.2	**3.64 a**	9.85	8.61	8.68	7.0	8.2	7.31	6.3
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	50	54	53	-	-	54	54	56.5	53.2	54	54.3	52	50.8	46.8	50.3	52.1	49.7	64.1	57	46.9	55.4	57.9	58.8	50.2	67.9
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	53	80	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	80	64	88
Oxidation Reduction Potential	mV	no guideline	no guideline	800	-	-	-	-	-	-	-	115.7	-	220.11	-	-38.7	-	207	58.7	186.8	-10.7	-310.2	217	44	117.8	87.7	46.6	26.2	239.1
Anions and Nutrients																													
Ammonia (as N)	mg/L	*	no guideline	no guideline	-	-	-	-	-	<0.02	<0.05	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.01	<0.01	<0.01	<0.005	0.055	0.022	0.032	0.019	0.01	0.017	0.018	0.012
Nitrogen: Nitrite (as N) (Lab)	mg/L	-	1	3.2	<0.3	<0.01	<0.01	-	-	<0.01	<0.01	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	0.2	0.08	0.08	-	-	0.13	0.11	0.127	0.12	0.135	0.136	0.116	0.117	0.1	0.11	0.15	0.11	0.16	0.17	0.16	0.13	0.123	0.177	0.133	0.15
Chloride (Lab)	mg/L	600	250	250	2	1.1	1.3	-	-	1.9	1	1.91	1.05	1.84	1.84	0.95	0.95	1.38	1.27	1.4	<0.5	1.7	1.9	2.1	0.7	3.4	2.8	1.7	4.7
Fluoride: Dissolved	mg/L	1.5	1.5	1.5	<1.0	-	-	-	-	<0.1	<0.1	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.05	<0.05	0.02	0.01	0.02	0.02	0.01	0.016	0.019	0.017	0.016	0.018
Sulphate (Lab)	mg/L	100	500	500	3.4	2.8	2.9	-	-	3.5	3.5	2.93	2.67	2.9	2.89	2.65	2.64	2.83	3.22	3.3	2.6	2.8	3.6	2.3	2.77	2.95	3.05	1.82	3.49
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	51	-	-	-	-	-	-	59.9	52.6	52.5	56	54	50.6	49.1	57.7	54	51	58	55	46	51.9	53.3	54.4	47.7	60.9
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	65.1	66.3	58.2	74.3
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50
Dissolved Metals																													
Aluminum: Dissolved	mg/L	-	0.2	0.1	-	0.006	0.007	-	-	<0.005	0.009	0.0058	0.0053	0.0053	0.0064	0.0052	0.0055	0.005	0.005	0.017	0.005	0.007	0.006	0.006	0.0076	0.0078	0.00489	0.00552	0.0071
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	-	<0.0002	<0.0002	-	-	<0.0002	<0.0002	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.00003	0.000028	<0.000200	0.000022
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	-	0.0004	0.0004	-	-	0.0003	0.0004	0.00027	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0003	0.0003	0.0003	0.0003	0.0002	0.0002	0.0003	0.00028	0.00029	0.000172	0.000266	0.000304
Barium: Dissolved	mg/L	5	no guideline	1	-	0.002	0.001	-	-	<0.001	<0.001	0.000703	<0.020	<0.020	<0.020	<0.020	<0.020	0.0006	0.0006	<0.001	<0.001	<0.001	0.001	<0.001	<0.0010	0.0009	0.000775	0.000663	0.00085
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	-	<0.0001	<0.0001	-	-	<0.0001	<0.0001	<0.00050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00001	<0.00010	<0.000010	<0.000010
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.0005	<0.0005	-	-	<0.0005	<0.0005	<0.00050	-	<0.20	<0.20	-	-	<0.0002	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.000005	<0.0000050	<0.0000050	<0.0000050
Boron: Dissolved	mg/L	1.2	5	5	-	0.006	0.006	-	-	0.01	0.006	0.011	<0.10	<0.10	<0.10	<0.10	<0.10	<0.01	0.008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.050	<0.05	<0.050	<0.050	<0.050
Cadmium: Dissolved	mg/L	-	no guideline	0.005	-	<0.00001	<0.00001	-	-	<0.00001	**0.00007 a**	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.00004	**0.00004 a**	**0.00742 abc**	<0.00001	<0.00001	**0.00007 a**	<0.00001	**0.000025 a**	0.000014	<0.0000050	0.000008	**0.000292 a**
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	18.6	18.5	-	-	18.6	18.5	18.7	18.4	18.7	18.8	18	17.5	16.1	17.4	18.1	17.2	21.9	19.7	16.4	19.2	20.1	20.5	17.3	23.5
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	-	<0.0005	<0.0005	-	-	<0.0005	<0.0005	<0.00050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0002	0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.0004	0.00021	0.00018	0.00024
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	-	<0.0001	<0.0001	-	-	<0.0001	<0.0001	<0.00010	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.000015	0.0000261	0.000009	0.00001
Copper: Dissolved	mg/L	*	1	1	-	<0.001	<0.001	-	-	<0.001	0.001	0.00034	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0025	0.0003	0.0006	<0.0002	0.0004	0.0006	<0.0002	0.00024	0.0003	0.000356	0.000283	0.000313
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	-	<0.01	<0.01	-	-	<0.01	<0.01	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.01	<0.01	0.006	<0.005	<0.005	<0.005	<0.005	<0.0050	0.002	<0.0010	0.0013	<0.0010
Lead: Dissolved	mg/L	*	0.05	0.01	-	<0.0001	<0.0001	-	-	<0.0001	0.0002	<0.000050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0002	<0.00005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	0.000018	<0.0000050	0.000006	<0.0000050
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	-	<0.001	<0.001	-	-	<0.001	<0.001	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0002	<0.0001	<0.005	<0.005	-	-	<0.005	<0.0050	<0.0005	<0.00050	<0.00050	<0.00050
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	1.8	1.7	-	-	1.8	1.9	-	1.76	1.77	1.8	1.72	1.73	1.61	1.66	1.68	1.62	2.26	1.89	1.46	1.79	1.86	1.85	1.67	2.24
Manganese: Dissolved	mg/L	*	no guideline	0.05	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.000050	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.0002	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00009	0.000078	0.00142	<0.000050
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000002	<0.02	<0.00002	<0.000002	<0.00005	<0.00005	<0.00005	<0.000050	< 0.00001	0.00001	<0.000010	<0.000010
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	-	<0.001	<0.001	-	-	<0.001	<0.001	0.000131	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0001	0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00012	0.000117	0.000113	0.000169
Nickel: Dissolved	mg/L	-	no guideline	no guideline	-	0.0008	0.0009	-	-	<0.0005	<0.0005	<0.00050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00005	0.000066	0.00003	0.000038
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	<0.30	0.0065	<0.30	<0.30	-	-	<0.03	<0.015	-	-	<0.01	<0.01	-	-	0.0053	<0.0050	0.012	0.0071
Potassium: Dissolved	mg/L	373	no guideline	no guideline	-	<0.4	0.4	-	-	0.5	<0.4	-	<2.0	<2.0	<2.0	<2.0	<2.0	0.27	0.36	0.32	0.26	0.37	0.31	0.24	0.296	0.37	0.32	0.277	0.325
Selenium: Dissolved	mg/L	0.002	0.01	0.01	-	<0.0002	0.0002	-	-	0.0003	<0.0002	<0.00010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.00017	0.00011	0.000104	0.000087	0.000126
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	3.66	3.2	3.57	-	<0.0050	3.8	-	4.1	3.52	3.16	4.1	3.4	4.4	3.8	3.4	3.35	4.1	3.69	3.48	4.05
Silver: Dissolved	mg/L	*	no guideline	no guideline	-	0.0001	0.0001	-	-	<0.0001	<0.0001	<0.000010	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000005	<0.00004	<0.00002	<0.000002	<0.00002	<0.00002	<0.00002	<0.000020	<0.000005	<0.0000050	<0.0000050	<0.0000050
Sodium: Dissolved	mg/L	no guideline	no guideline	200	-	1.2	1.2	-	-	1.5	1.1	-	<2.0	<2.0	<2.0	<2.0	<2.0	1.19	1.17	1.3	1.14	1.79	1.55	1.15	1.27	1.45	1.7	1.35	1.64
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	0.027	0.028	-	-	0.027	0.024	0.0276	-	0.0292	0.0298	-	-	0.024	0.029	0.027	0.027	0.031	0.031	0.025	0.0299	0.0324	0.0317	0.0254	0.0346
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	1	1.01	-	-	1.1	1.1	0.97	1.08	1.04	1.06	0.95	0.95	<2	<1	<3	<3	<3	<3	<3	<3.0	<10	<15	<10	<3.0
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	<0.00005	<0.00005	-	-	<0.00005	<0.00005	<0.00010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00050	0.000002	<0.0000020	<0.0000020	<0.0000020
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.00005	-	-	-	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.001	<0.001	-	-	<0.001	<0.001	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0002	<0.0001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0002	<0.00020	<0.00020	<0.00020
Titanium: Dissolved	mg/L	2	no guideline	no guideline	-	<0.0005	<0.0005	-	-	<0.0005	<0.0005	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0002	<0.0002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0005	<0.00050	<0.00050	<0.00050
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	0.000024	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.0001	<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	< 0.0001	<0.00010	0.000018	0.000023	0.00002	0.000031
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	-	0.0032	0.0033	-	-	0.0031	0.0024	0.0025	0.0023	0.0024	0.0024	0.0025	0.0025	0.0022	0.0025	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.0026	0.00167	0.0021	0.00269
Zinc: Dissolved	mg/L	*	5	5	-	<0.001	<0.001	-	-	0.004	0.002	0.0011	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.004	0.002	0.007	<0.005	<0.005	<0.005	<0.005	<0.0050	0.0031	0.0006	0.0009	0.00066
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.0001	<0.00010	<0.00010	<0.00010

Notes:
BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.
BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.
CDWG - Canadian Drinking Water Quality Guidelines.
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA04-4 27-Sep-04	EBA04-4 23-Nov-04	DupEBA04-4 23-Nov-04	EBA04-4 4-May-05	EBA04-4 28-Sep-05	EBA04-4 21-Apr-06	EBA04-4 19-Oct-06	EBA04-4 19-Apr-07	EBA04-4 25-Oct-07	EBA04-4 8-Apr-08	DupEBA04-4 8-Apr-08	EBA04-4 23-Oct-08	DupEBA04-4 23-Oct-08	EBA04-4 27-Aug-09	EBA04-4 9-Dec-09	EBA04-4 29-Apr-10	EBA04-4 1-Nov-10	EBA04-4 9-Mar-11	EBA04-4 11-May-11	EBA04-4 15-Aug-11	EBA04-4 28-Nov-11	EBA04-4 20-Feb-12	EBA04-4 23-May-12	EBA04-4 15-Aug-12	EBA04-4 3-Dec-12
Total Metals																														
Aluminum: Total	mg/L	*	0.2	0.1	0.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	<0.00001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	17.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	<0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																														
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria																														
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	<1	<1	<1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	<1	**7 bc**	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																														
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	60	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	<50	<50	-	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	1	1	3.2	<0.08	<0.08	-	<0.08	<0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	<0.2	<0.2	-	<0.2	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	<2.5	<2.5	-	<2.5	<2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	3.59	1.99	-	<8	<8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	<10	<10	-	-	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	<0.01	0.01	-	<0.2	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	0.05	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA04-6 27-Sep-04	EBA04-6 23-Nov-04	EBA04-6 3-May-05	EBA04-6 29-Sep-05	EBA04-6 20-Apr-06	EBA04-6 19-Oct-06	DupEBA04-6 19-Oct-06	EBA04-6 19-Apr-07	EBA04-6 25-Oct-07	DupEBA04-6 25-Oct-07	EBA04-6 9-Apr-08	EBA04-6 22-Oct-08	EBA04-6 27-Aug-09	EBA04-6 9-Dec-09	EBA04-6 29-Apr-10	EBA04-6 1-Nov-10	EBA04-6 9-Mar-11	EBA04-6 11-May-11	EBA04-6 15-Aug-11	EBA04-6 29-Nov-11	EBA04-6 20-Feb-12	EBA04-6 25-May-12	EBA04-6 15-Aug-12	EBA04-6 4-Dec-12
Physical Tests																												
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.84	**6.23 abc**	7.27	6.955	6.861	7.19	-	**6.00 abc**	7.42	-	7.25	7.01	7.31	6.66	7.3	7.18	7.06	7.19	7.03	7.18	7.3	7.3	7.08	7.36
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.7	7.6	-	-	7.1	7.3	7.3	8.1	7.91	7.88	8.13	8.16	8.19	8.1	8.1	7.83	7.71	7.75	7.49	7.86	8.2	8.03	8.18	8.19
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	358	369	563	695	**917 b**	651	-	671	294	-	350	289	370	230	366	473	433	579	856	444	413	458	695	576
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	372	434	-	-	**883 b**	**898 b**	**899 b**	**786 b**	399	399	441	384	473	475	536	527	491	583	873	487	431	438	672	562
Temperature (Field)	deg C	19	15	15	12.8	10	10.1	10.4	9.9	10.3	-	10.36	10.47	-	9.74	10.43	10.64	10.18	10.31	10.43	10.19	10.27	10.64	9.09	10.0	10.3	10.79	10.07
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	5.06	9.86	**2.31 a**	**0 a**	**0.0 a**	**0.0 a**	-	**0.20 a**	**3.79 a**	-	6.32	40.72	11.76	11.67	10.25	20.8	9.26	9.64	7.49	8.48	9.1	9.5	**3.84 a**	5.53
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	200	130	-	-	480	490	490	449	218	218	239	231	263	269	295	265	296	317	447	255	225	227	387	311
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	190	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	300	300	452	376
Oxidation Reduction Potential	mV	no guideline	no guideline	500	-	-	-	-	-	-	-	128.7	561.7	-	49	-33.5	-1.6	71.2	233.1	38	-369.4	244.6	96.7	120.8	80.3	126	27.3	112.7
Anions and Nutrients																												
Ammonia (as N)	mg/L	*	no guideline	no guideline	<0.02	-	-	-	<0.02	<0.05	<0.05	<0.020	<0.020	0.021	<0.020	<0.020	<0.01	<0.01	<0.01	0.036	0.014	0.009	0.012	0.0059	0.021	<0.0050	0.029	0.0083
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	<0.3	<0.01	-	-	<0.01	<0.01	<0.01	0.0252	0.0011	<0.0010	0.005	<0.0010	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	<0.0050	<0.0050	<0.0050
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	<0.1	0.04	-	-	0.03	0.13	0.12	0.0769	0.0742	0.0713	0.0625	0.0573	0.34	0.45	0.4	0.46	1.13	0.59	1.28	0.071	1.03	0.499	1.65	0.818
Chloride (Lab)	mg/L	600	250	250	4.2	4	-	-	26	26.5	26.8	28	5	4.97	6.55	4.32	5.90	7	5.1	4.2	4.4	7.4	21	4.4	1.7	3.9	11	5.1
Fluoride: Dissolved	mg/L	*	1.5	1.5	<1.0	-	-	-	<0.1	<0.1	<0.1	<0.020	<0.020	<0.020	<0.020	<0.020	<0.05	<0.05	<0.01	<0.01	0.02	<0.01	0.01	0.012	0.013	0.011	<0.010	0.012
Sulphate (Lab)	mg/L	100	500	500	2.67	4.4	-	-	11.3	12.7	12.5	17.2	7.26	7.17	7.34	6.32	11.1	5.47	4.5	3.6	1.6	6.6	44	2.53	1.67	2.24	29.8	5.12
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	200	-	-	-	-	-	-	397	208	208	241	219	248	261	300	280	250	310	400	254	215	240	328	300
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	263	293	397	365
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50
Dissolved Metals																												
Aluminum: Dissolved	mg/L	*	0.2	0.1	-	<0.005	-	-	<0.005	<0.005	<0.005	<0.0020	<0.0050	<0.0050	<0.0050	<0.0050	0.002	<0.001	0.004	<0.003	<0.003	<0.003	<0.003	<0.0030	0.0027	0.00225	0.00137	0.00165
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	-	<0.0002	-	-	<0.0002	<0.0002	<0.0002	<0.00020	<0.00050	<0.00050	<0.00050	<0.00050	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.00003	0.000022	<0.000020	0.000038
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	-	<0.0002	-	-	0.0004	0.0004	0.0005	<0.00020	<0.00050	<0.00050	<0.00050	<0.00050	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.00010	0.00011	0.000061	0.0001	0.00012
Barium: Dissolved	mg/L	5	no guideline	1	-	0.009	-	-	0.016	0.016	0.016	0.0143	<0.020	<0.020	<0.020	<0.020	0.0061	0.0058	0.007	0.006	0.006	0.007	0.011	0.0064	0.00496	0.00562	0.00943	0.0118
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	-	<0.0001	-	-	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00010	<0.00001	<0.00001	<0.000010	<0.000010
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.0005	-	-	<0.0005	<0.0005	<0.0005	<0.0010	-	-	<0.20	-	<0.0002	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.000005	<0.000005	<0.0000050	<0.0000050
Boron: Dissolved	mg/L	1.2	5	5	-	0.011	-	-	0.112	0.15	0.155	0.128	<0.10	<0.10	<0.10	<0.10	0.01	0.02	<0.05	<0.05	<0.05	<0.05	0.09	0.051	<0.05	<0.05	0.051	<0.050
Cadmium: Dissolved	mg/L	*	no guideline	0.005	-	0.00002	-	-	0.00003	0.00003	<0.00001	<0.000034	<0.0000017	0.0000019	<0.0000017	<0.0000017	<0.00004	<0.00001	<0.00006	<0.00001	<0.00001	0.00002	0.00005	<0.0000010	0.000021	0.0000106	0.000011	0.000006
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	67.7	-	-	130	134	133	-	64.4	64.5	70.6	69.4	77	80.8	88.6	77.6	85.9	94.7	134	76.9	65.7	67.3	117	95.1
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	-	0.001	-	-	**0.0016 a**	<0.0005	<0.0005	<0.0010	<0.0020	<0.0020	<0.0015	**0.0014 a**	**0.0011 a**	0.0008	<0.001	0.001	0.001	<0.001	<0.001	<0.0010	**0.0011 a**	0.001	0.00066	**0.00114 a**
Chromium III	mg/L	0.0089	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0010	-	<0.001
Hex. Chromium (Cr 6+)	mg/L	0.001	no guideline	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.0026 a**	-	**0.0026 a**
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	-	0.0002	-	-	0.0005	0.0005	0.0005	0.00037	<0.00030	<0.00030	<0.00030	<0.00030	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.0000099	0.0000094	0.000038	<0.00000050
Copper: Dissolved	mg/L	*	0.5	1	-	<0.001	-	-	<0.001	0.002	0.002	0.0018	<0.0010	<0.0010	<0.0010	<0.0010	0.0008	<0.0001	<0.0002	<0.0002	<0.0002	0.0003	0.0019	<0.00020	0.00025	0.000112	0.000544	0.000142
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	-	<0.01	-	-	0.02	0.02	0.02	-	<0.030	<0.030	<0.030	<0.030	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.002	0.0022	0.0029	0.0018
Lead: Dissolved	mg/L	*	0.05	0.01	-	0.0005	-	-	<0.0001	0.0001	<0.0001	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.0002	<0.00005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	0.00008	<0.000005	<0.0000050	<0.0000050
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	-	<0.001	-	-	0.001	0.001	0.001	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	0.0007	0.0007	<0.005	<0.005	-	-	0.01	<0.0050	0.0008	0.00066	0.00082	0.00074
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	15.4	-	-	36.4	37.6	37.4	-	13.8	13.7	15.3	13.9	17.1	16.2	17.9	17.2	19.8	19.6	27.5	15.2	14.7	14.3	23.3	18
Manganese: Dissolved	mg/L	*	no guideline	0.05	-	0.008	0.04	0.027	0.04	**0.058 bc**	**0.059 bc**	**0.0544 bc**	0.00167	0.00179	0.00444	0.00122	0.0013	0.0002	<0.001	<0.001	<0.001	<0.001	0.002	<0.0010	0.00011	0.000268	0.00033	0.000074
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	-	-	-	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.00002	<0.02	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.000050	< 0.00001	<0.00001	<0.000010	<0.000010
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	-	<0.001	-	-	<0.001	<0.001	<0.001	0.000019	<0.0010	<0.0010	<0.0010	<0.0010	<0.0001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.00005	<0.00005	<0.000050	0.000082
Nickel: Dissolved	mg/L	2	no guideline	no guideline	-	0.0033	-	-	<0.0005	0.0012	0.0014	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	<0.001	<0.001	<0.001	<0.001	0.001	<0.0010	0.0001	0.000103	0.000321	0.000199
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	<0.30	0.0035	0.0034	<0.30	-	<0.03	<0.015	-	-	<0.01	<0.01	-	-	<0.0050	0.0052	0.0102	<0.0050
Potassium: Dissolved	mg/L	373	no guideline	no guideline	-	1.4	-	-	2.3	2.1	2.1	-	<2.0	<2.0	<2.0	<2.0	1.35	1.33	1.51	1.39	1.64	1.44	1.64	1.39	1.4	1.35	1.7	1.54
Selenium: Dissolved	mg/L	0.002	0.01	0.01	-	<0.0002	-	-	<0.0002	<0.0002	<0.0002	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	0.00005	0.000055	<0.000040	0.000067
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	11.5	11.4	11.3	10.9	-	-	7.98	-	8.85	8.98	9.4	8.8	10.7	9.6	10.2	9.21	9.1	9.08	10.5	10.5
Silver: Dissolved	mg/L	*	no guideline	no guideline	-	0.0001	-	-	<0.0001	<0.0001	<0.0001	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.00002	<0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000005	<0.000005	<0.0000050	<0.0000050
Sodium: Dissolved	mg/L	no guideline	no guideline	200	-	2.8	-	-	15.3	17.5	17.4	-	3.8	3.7	4.7	5.1	4.82	4.66	5.72	5.26	5.75	4.83	6.73	5.58	5.65	5.23	6.77	6.31
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	0.125	-	-	0.305	0.289	0.29	0.275	-	-	0.144	-	0.158	0.182	0.169	0.167	0.148	0.185	0.28	0.162	0.134	0.145	0.248	0.185
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	1.81	-	-	0.3	4.1	4.2	5.96	2.76	2.75	2.95	2.21	4	1	<3	<3	<3	16	<3.0	<10	<10	<15	12	<3.0
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	<0.00005	-	-	<0.00005	<0.00005	<0.00005	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00050	<0.000002	<0.000002	0.000002	0.000003
Thorium: Dissolved	mg/L	-	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.00005	-	-	-	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.001	-	-	<0.001	<0.001	<0.001	<0.00020	<0.00050	<0.00050	<0.00050	<0.00050	<0.0002	<0.0001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0002	<0.0002	<0.0002	<0.00020
Titanium: Dissolved	mg/L	2	no guideline	no guideline	-	<0.0005	-	-	<0.0005	0.0007	0.0006	-	<0.010	<0.010	<0.010	<0.010	0.0004	<0.0002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0005	<0.0005	<0.00050	<0.00050
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	0.0012	0.00025	0.00025	0.00029	0.00023	0.0004	0.00033	0.0004	0.0003	0.0002	0.0003	0.0006	0.00021	0.000234	0.000233	0.000546	0.000326
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	-	0.0036	-	-	**0.0062 a**	0.0026	0.0026	<0.0020	0.0012	0.0012	0.0011	0.0011	0.0015	0.0013	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.0013	0.00122	0.00137	0.00142
Zinc: Dissolved	mg/L	*	5	5	-	<0.001	-	-	0.002	0.003	0.001	<0.0020	<0.0050	<0.0050	<0.0050	<0.0050	0.002	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.002	0.00063	0.0002	0.00029
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	<0.002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.0001	<0.0001	<0.00010	<0.00010

Notes:
BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.
BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.
CDWG - Canadian Drinking Water Quality Guidelines.
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA04-6 27-Sep-04	EBA04-6 23-Nov-04	EBA04-6 3-May-05	EBA04-6 29-Sep-05	EBA04-6 20-Apr-06	EBA04-6 19-Oct-06	DupEBA04-6 19-Oct-06	EBA04-6 19-Apr-07	EBA04-6 25-Oct-07	DupEBA04-6 25-Oct-07	EBA04-6 9-Apr-08	EBA04-6 22-Oct-08	EBA04-6 27-Aug-09	EBA04-6 9-Dec-09	EBA04-6 29-Apr-10	EBA04-6 1-Nov-10	EBA04-6 9-Mar-11	EBA04-6 11-May-11	EBA04-6 15-Aug-11	EBA04-6 29-Nov-11	EBA04-6 20-Feb-12	EBA04-6 25-May-12	EBA04-6 15-Aug-12	EBA04-6 4-Dec-12
Total Metals																												
Aluminum: Total	mg/L	*	0.2	0.1	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	0.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	0.00001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	58.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	0.0008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	13.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	0.009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	8.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																												
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria																												
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	**240 bc**	**70 bc**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																												
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	270	425	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	125	150	150	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	<0.06	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	<0.2	0.3	<0.2	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	2.78	<2.5	6.73	22.29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	3.01	4.84	8	8.16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	<10	18	-	45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	<0.01	0.28	0.24	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	<0.1	**0.32 bac**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	0.009	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
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Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA04-7	DupEBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	DupEBA04-7	EBA04-7	DupEBA04-7	EBA04-7	DupEBA04-7
					27-Sep-04	27-Sep-04	23-Nov-04	3-May-05	29-Sep-05	20-Apr-06	19-Oct-06	19-Apr-07	25-Oct-07	9-Apr-08	22-Oct-08	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	25-May-12	15-Aug-12	15-Aug-12	4-Dec-12	4-Dec-12
Physical Tests																													
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.02	-	**6.02 abc**	7.56	6.954	7.543	7.81	6.84	7.17	6.75	6.62	7.18	**6.25 abc**	6.84	6.77	6.6	6.73	6.85	6.72	6.8	6.6	-	6.77	-	6.92	-
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.4	7.1	7.2	-	-	7.8	7.7	8.3	7.45	7.83	7.94	7.99	7.88	7.8	7.57	7.42	7.44	7.48	7.26	7.92	7.77	7.89	7.96	8.02	7.76	7.84
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	629	-	664	438	343	337	268	258	612	600	**704 b**	669	423	825	**951 b**	764	833	794	1044	952	830	-	760	-	1019	-
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	657	646	**786 b**	-	-	321	369	302	**838 b**	**774 b**	**946 b**	**844 b**	**818 b**	**936 b**	**1080 b**	877	864	820	1140	993	827	818	697	722	994	990
Temperature (Field)	deg C	19	15	15	11.6	-	9.8	10.3	10.7	10.2	10.43	10.16	10.06	9.56	10.19	10.44	9.9	10.04	10.2	9.99	10.11	10.28	9.89	9.7	10.1	-	10.41	-	9.66	-
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	**1.09 a**	-	7.18	**3.66 a**	5.37	**1 a**	**0.2 a**	5.17	**4.07 a**	**4.15 a**	74.5	6.68	7.9	9.51	8.5	5.43	6.92	7.75	**2.95 a**	**2.6 a**	**1.7 a**	-	**2.5 a**	-	**0.6 a**	-
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	350	360	440	-	-	170	200	176	443	405	**541 b**	447	477	**513 b**	**553 b**	470	420	387	566	534	401	392	388	365	536	520
Dissolved Solids: Total	mg/L	no guideline	no guideline	500	380	350	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**600c**	**540c**	-	490	-	**660c**	-
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	34.7	356.1	61.2	-33.5	-69.8	45.1	244.9	-70.1	-398.4	260.2	106.4	144.4	96.1	212	-	-3	-	146	-
Anions and Nutrients																														
Ammonia (as N)	mg/L	*	no guideline	no guideline	<0.02	<0.02	-	-	-	<0.02	<0.05	<0.020	0.03	<0.020	<0.020	<0.01	<0.01	<0.01	0.039	0.02	0.008	0.031	0.025	0.0091	0.017	0.014	0.012	0.0078	0.071	0.044
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	<0.30	<0.03	<0.01	-	-	<0.01	<0.01	<0.0010	0.0235	0.0359	0.0524	0.011	0.009	0.02	0.027	0.029	0.036	0.027	0.071	0.051	0.0345	0.0347	0.028	0.028	0.0585	0.059
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	<0.10	0.06	0.18	-	-	0.06	0.01	0.0313	1.96	0.316	0.81	<0.01	0.1	0.26	0.52	2.36	2.18	2.58	1.42	3	1.82	1.79	1.66	1.67	0.507	0.508
Chloride (Lab)	mg/L	600	250	250	12.1	11.7	14	-	-	5.5	5.2	4.61	23.6	26.6	37.1	31.8	33.3	32	40	19	27	26	41	29	27	27	27	27	35	31
Fluoride: Dissolved	mg/L	*	1.5	1.5	<1.0	<0.1	-	-	-	<0.1	<0.1	<0.020	<0.020	<0.020	<0.020	<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
Sulphate (Lab)	mg/L	100	500	500	4.18	3.92	3.5	-	-	2.7	2.2	1.19	16.5	17.6	29.6	21.5	23.8	27	42	37	23	20	36.4	42.0	19.8	19.9	17.2	16.7	25.9	25.9
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	340	350	-	-	-	-	-	166	415	369	495	420	422	460	520	400	410	380	534	443	388	383	316	332	478	476
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	540	474	468	386	405	583	580
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Hydroxide	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Metals																														
Aluminum: Dissolved	mg/L	*	0.2	0.1	-	-	<0.005	-	-	<0.005	0.01	0.0017	<0.010	<0.010	<0.010	<0.001	<0.001	0.004	<0.003	<0.003	0.003	0.005	<0.0030	0.0021	0.00221	0.0021	0.00152	0.00168	0.00155	0.00143
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	-	-	<0.0002	-	-	<0.0002	<0.0002	<0.00010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.00005	0.000041	0.00004	0.00003	0.000033	0.000041	0.000042
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	-	-	0.0004	-	-	<0.0002	<0.0002	<0.00010	<0.0010	<0.0010	<0.0010	0.0002	0.0003	0.0002	0.0002	0.0001	0.0002	0.0002	0.00016	0.00022	0.000114	0.000141	0.000139	0.000154	0.000189	0.00018
Barium: Dissolved	mg/L	5	no guideline	1	-	-	0.02	-	-	0.004	0.005	0.00414	<0.020	<0.020	<0.020	0.016	0.017	0.018	0.022	0.017	0.016	0.015	0.0228	0.0229	0.0157	0.0157	0.0152	0.015	0.0193	0.019
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	-	-	<0.0001	-	-	<0.0001	<0.0001	<0.00050	<0.0020	<0.0020	<0.0020	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	0.00001	0.000022	0.000022	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.0005	-	-	<0.0005	<0.0005	<0.00050	-	<0.20	-	<0.0002	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.000005	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron: Dissolved	mg/L	1.2	5	5	-	-	0.04	-	-	0.01	0.014	<0.010	0.2	0.24	0.25	0.27	0.15	0.23	0.28	0.26	0.31	0.31	0.278	0.26	0.299	0.293	0.284	0.296	0.296	0.288
Cadmium: Dissolved	mg/L		no guideline	0.005	-	-	0.00004	-	-	0.00001	0.00001	<0.000017	<0.000034	0.000037	**0.000223 a**	<0.00004	0.00003	0.00011	0.00006	0.00003	**0.00015 a**	**0.00012 a**	0.000052	0.00006	0.0000474	0.0000418	0.000028	0.000033	0.00009	0.000033
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	120	-	-	47.7	57.9	-	125	113	153	129	142	151	161	134	121	112	167	159	115	111	113	104	161	157
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	-	-	**0.0016 a**	-	-	**0.0014 a**	0.0006	0.00059	<0.0020	<0.0020	<0.0020	0.0004	<0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.0001	<0.0001	<0.0001	<0.00010	0.00017	<0.00010	<0.00010
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	-	-	0.0004	-	-	<0.0001	0.0003	<0.00010	<0.00060	<0.00060	<0.00060	0.0006	0.0003	0.0005	0.0006	<0.0005	0.0005	<0.0005	0.00076	0.000576	0.000547	0.000528	0.000428	0.000436	0.000527	0.000452
Copper: Dissolved	mg/L	*	0.5	1	-	-	<0.001	-	-	<0.001	<0.001	0.00015	<0.0020	0.0027	0.0037	0.0028	0.0017	0.0103	0.0033	0.0021	0.0031	0.0025	0.00453	0.00286	0.00272	0.00285	0.00252	0.00247	0.00404	0.00366
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	-	-	<0.01	-	-	<0.01	0.02	-	<0.030	<0.030	<0.030	<0.01	0.01	0.006	0.008	<0.005	0.007	<0.005	0.0076	0.006	0.0053	0.0051	0.0115	0.0206	0.0066	0.0038
Lead: Dissolved	mg/L	*	0.05	0.01	-	-	<0.0001	-	-	<0.0001	0.0001	<0.000050	<0.0010	<0.0010	<0.0010	<0.0002	<0.00005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	0.000007	0.0000206	0.0000051	0.000009	0.000006	<0.0000050	0.000015
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	-	-	0.001	-	-	<0.001	<0.001	<0.0050	<0.010	<0.010	<0.010	0.0012	0.001	<0.005	<0.005	<0.005	-	<0.005	<0.0050	0.0012	0.00108	0.00107	0.00095	0.00093	0.00112	0.00106
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	33.4	-	-	11.2	13.3	-	31.7	29.7	38.5	30	29.3	33	36.6	33	28.5	25.8	36.2	33.2	27.4	27.9	25.5	25.5	32.7	31.2
Manganese: Dissolved	mg/L	*	no guideline	0.05	-	-	0.02	<0.005	<0.005	<0.005	0.006	0.0032	**0.07 bc**	**0.0626 bc**	**0.0739 bc**	**0.062 bc**	**0.069 bc**	**0.07 bc**	**0.102 bc**	**0.1 c**	**0.081 c**	**0.083 c**	**0.129 c**	**0.13 c**	**0.1 c**	**0.101 c**	**0.0999 c**	**0.0999 c**	**0.133 c**	**0.129 c**
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	-	-	-	-	-	-	-	<0.000020	<0.000020	<0.000020	<0.000020	<0.00002	<0.02	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.000050	< 0.00001	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	-	-	<0.001	-	-	<0.001	<0.001	0.000064	<0.0020	<0.0020	<0.0020	<0.0001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00012	0.000071	0.000093	0.000085	0.000092	0.000129	0.00012
Nickel: Dissolved	mg/L	*	no guideline	no guideline	-	-	0.0071	-	-	<0.0005	<0.0005	<0.00050	<0.0020	<0.0020	0.002	0.0016	<0.0002	0.002	0.003	0.001	0.004	0.001	0.0025	0.00168	0.00171	0.00172	0.00159	0.00162	0.00239	0.00217
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	<0.30	0.0079	<0.30	-	<0.03	<0.015	-	-	<0.01	0.01	-	-	0.0085	0.0064	0.0051	0.0205	0.0191	0.0491	0.0417
Potassium: Dissolved	mg/L	373	no guideline	no guideline	-	-	2.4	-	-	1.1	1.2	-	2.2	2.1	2.6	2.09	1.91	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
Selenium: Dissolved	mg/L	0.002	0.01	0.01	-	-	<0.0002	-	-	<0.0002	<0.0002	<0.0010	<0.0020	<0.0020	<0.0020	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00012	0.00006	0.000099	0.000088	0.000068	0.000076	0.00007	0.000112
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	7.76	7.85	7.21	-	11.1	-	12.6	10	13.9	12.7	13	12.2	12.1	12.2	13.1	12	12.2	13.1	12.2	14.3	13.9
Silver: Dissolved	mg/L	*	*	no guideline	-	-	0.0001	-	-	<0.0001	<0.0001	<0.000010	<0.000040	<0.000040	<0.000040	<0.00005	<0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020	<0.000005	<0.000005	<0.000005	<0.0000050	<0.0000050	0.000005	0.000005
Sodium: Dissolved	mg/L	no guideline	no guideline	200	-	-	11.1	-	-	2.5	3.1	-	22.1	18.1	26.7	19.1	15.3	15	22.1	20.1	21.3	22.1	25.3	21.6	22.2	22.7	22.1	22	25.8	24.3
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	0.266	-	-	0.091	0.109	0.0927	-	0.282	-	0.316	0.38	0.344	0.39	0.309	0.298	0.293	0.438	0.375	0.293	0.294	0.288	0.294	0.367	0.364
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	1.79	-	-	0.8	0.7	<0.50	6.16	6.48	9.7	7	7	12	17	16	9	8	9.7	19	<15	<15	<10	<10	10.7	10.5
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	-	<0.00005	-	-	<0.00005	<0.00005	<0.00010	<0.00040	<0.00040	<0.00040	<0.00002	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	0.000005	0.0000067	0.0000059	0.000005	0.000004	0.000005	0.000006
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.00005	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.001	-	-	<0.001	<0.001	<0.00010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0002	<0.0002	<0.0002	<0.00020	<0.00020	0.00028	<0.00020
Titanium: Dissolved	mg/L	2	no guideline	no guideline	-	-	<0.0005	-	-	<0.0005	<0.0005	-	<0.010	<0.010	<0.010	0.0007	0.0005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0005	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	-	-	-	-	-	-	-	0.000184	0.00118	0.00124	0.00125	0.0009	0.00094	0.0011	0.0012	0.001	0.0009	0.0009	0.00112	0.001	0.000935	0.000951	0.000851	0.000854	0.000944	0.000964
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	-	-	0.0053	-	-	0.0026	0.0014	0.0012	<0.0020	<0.0020	<0.0020	0.0024	0.0016	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.0019	0.00158	0.00154	0.00166	0.00151	0.00178	0.00187
Zinc: Dissolved	mg/L	*	5	5	-	-	<0.001	-	-	<0.001	0.002	0.0014	<0.010	<0.0050	<0.0050	0.002	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.0008	0.00058	0.00053	0.0005	0.00048	0.00059	0.00039
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	<0.002	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA04-7	DupEBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	DupEBA04-7	EBA04-7	EBA04-7	EBA04-7	DupEBA04-7
					27-Sep-04	27-Sep-04	23-Nov-04	3-May-05	29-Sep-05	20-Apr-06	19-Oct-06	19-Apr-07	25-Oct-07	9-Apr-08	22-Oct-08	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	25-May-12	15-Aug-12	15-Aug-12	4-Dec-12	4-Dec-12
Total Metals																														
Aluminum: Total	mg/L	*	0.2	0.1	**1.14 abc**	**1.43 abc**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony: Total	mg/L	0.02	no guideline	0.006	<0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic: Total	mg/L	0.005	0.025	0.01	0.0006	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium: Total	mg/L	5	no guideline	1	0.033	0.034	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium: Total	mg/L	0.0053	0.004	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron: Total	mg/L	1.2	5	5	0.043	0.043	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium: Total	mg/L	*	no guideline	0.005	**0.0001 a**	0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium: Total	mg/L	no guideline	no guideline	no guideline	95.3	96.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium: Total	mg/L	0.001	no guideline	0.05	**0.0018 a**	**0.0018 a**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt: Total	mg/L	0.11	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper: Total	mg/L	*	0.5	1	0.006	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Lab)	mg/L	0.35	no guideline	0.3	**1.9 abc**	**1.9 abc**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead: Total	mg/L	*	0.05	0.01	0.0001	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium: Total	mg/L	0.87	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium: Total	mg/L	no guideline	no guideline	no guideline	27.9	28.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Lab)	mg/L	*	no guideline	0.05	**0.091 bc**	**0.093 bc**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury: Total	mg/L	no guideline	0.001	0.001	<0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum: Total	mg/L	2	0.25	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel: Total	mg/L	*	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium: Total	mg/L	373	no guideline	no guideline	2.1	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium: Total	mg/L	0.002	0.01	0.01	<0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver: Total	mg/L	-	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium: Total	mg/L	no guideline	no guideline	200	10	10.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	0.002	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium: Total	mg/L	2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	no guideline	0.02	0.0009	0.0009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium: Total	mg/L	0.006	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc: Total	mg/L	*	5	5	0.005	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Parameters																														
Chemical Oxygen Demand	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacteria																														
Coliforms: Fecal	MPN/100 ml	no guideline	0	no guideline	<1	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms: Total	MPN/100 ml	no guideline	0	0	**191 bc**	**300 bc**	**230 bc**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Escherichia Coli	MPN/100 ml	no guideline	0	0	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parameters Measured Using Field Test Kits - 2003 to 2005 only (Discontinued due to data quality issues)																														
Hardness: Total (as $CaCO_3$) (Field)	mg/L	no guideline	500	no guideline	-	-	-	300	220	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (as $CaCO_3$) (Field)	mg/L	no guideline	no guideline	no guideline	-	-	240	100	175	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrite (as N) (Field)	mg/L	*	1	3.2	<0.08	-	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen: Nitrate (as N) (Field)	mg/L	32.8	10	10	<0.2	-	<0.2	<0.2	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Field)	mg/L	600	250	250	16.75	-	2.56	<2.5	5.19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (Field)	mg/L	100	500	500	9.94	-	8.25	<8	<8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	mg/L	no guideline	no guideline	no guideline	27	-	22	-	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Dissolved (Field)	mg/L	0.35	no guideline	0.3	<0.1	-	0.28	<0.2	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron: Total (Field)	mg/L	1	no guideline	0.3	**0.49 abc**	-	**0.32 abc**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese: Total (Field)	mg/L	*	no guideline	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.
BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.
CDWG - Canadian Drinking Water Quality Guidelines.
a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).
b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).
c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).
* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA04-7	DupEBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	EBA04-7	DupEBA04-7	EBA04-7	EBA04-7	EBA04-7	DupEBA04-7
					27-Sep-04	27-Sep-04	23-Nov-04	3-May-05	29-Sep-05	20-Apr-06	19-Oct-06	19-Apr-07	25-Oct-07	9-Apr-08	22-Oct-08	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	25-May-12	15-Aug-12	15-Aug-12	4-Dec-12	4-Dec-12
Hydrocarbons																													
VHw6-10	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	-	-	-	-	< 0.3	<0.3	-	<0.3	-	<0.3	-
VPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	-	-	-	-	< 0.3	<0.3	-	<0.3	-	<0.3	-
EHw10-19	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EHw19-32	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEPHw	mg/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																											-		-	
Acenapthene	ug/L	6	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acridine	ug/L	0.05	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Anthracene	ug/L	0.1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(A)Pyrene	ug/L	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	ug/L	0.2	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	ug/L	12	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Napthalene	ug/L	1	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	ug/L	0.3	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	ug/L	0.02	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Halogenated Volatiles																											-		-	
Benzene	mg/L	0.4	0.005	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.0005	-	<0.0005	-	<0.00040	-
Ethylbenzene	mg/L	0.2	0.0024	0.0024	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.0005	-	<0.0005	-	<0.00040	-
Toluene	mg/L	0.0005	0.024	0.024	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	0.0006	<0.0005	**0.0009 a**	<0.0005	<0.0005	<0.00050	<0.0005	-	<0.0005	-	<0.00040	-
Xylenes: Total	mg/L	0.03	no guideline	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.001	-	<0.001	-	<0.00040	-
Styrene	mg/L	0.072	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.0005	-	<0.0005	-	<0.00050	-
Volatile Organic Compounds					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	ug/L	no guideline	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	<1	-
Bromoform	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	<1	-
Bromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	<1	-
Carbon Tetrachloride	ug/L	13.3	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	-
Chlorobenzene	ug/L	1.3	80	80	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	-
Chloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	<1	-
Chloroform	ug/L	1.8	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	<1	-
Chloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	<1	-
Cis-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	<1	-
Cis-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	<1	-
DibromochloromethaneDibromochloromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	<1	-
Dibromoethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.9	<0.9	-	-	-	-	-	-
Dibromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.9	<0.9	<0.9	<0.9	<0.9	-	<0.9	-
Dichlorodifluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2	-	-	<2	<2	-	<2	-	<2	-
Methyl-Tert-Butylether	ug/L	3400	20	200	-	-	-	-	-	-	-	-	-	-	-	-	-	<4	<4	<4	<4	<4	<4	<4	<4	-	<4	-	<4	-
Methylene Chloride	ug/L	98.1	50	50	-	-	-	-	-	-	-	-	-	-	-	-	-	<2	<2	<2	<0.2	<2	<2	<2	<2	-	<2	-	<2	-
Tetrabromomethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	ug/L	111	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	-
Trans-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	<1	-
Trans-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	<1	-
Trichloroethene	ug/L	21	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	-
Trichlorofluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<4	<4	<4	<4	<4	<4	<4	<4	-	<4	-	<4	-
Vinyl Chloride	ug/L	no guideline	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	-
1,1-Dichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	-
1,1-Dichloroethene	ug/L	no guideline	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	-
1,2-Dichlorobenzene	ug/L	0.7	200	200	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	-
1,2-Dichloroethane	ug/L	100	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	-
1,2-Dichloropropane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	-
1,3-Dichlorobenzene	ug/L	150	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	-
1,4-Dichlorobenzene	ug/L	26	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	-
1,1,1-Trichloroethane	ug/L	11100	200	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	-
1,1,2-Trichloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	-
1,1,1,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	-
1,1,2,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

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c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA06-1 21-Apr-06	EBA06-1 20-Oct-06	EBA06-1 20-Apr-07	EBA06-1 26-Oct-07
Physical Tests								
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	**8.595 bc**	7.8	7.01	**8.90 bc**
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	**8.7 bc**	8.3	8.06	8.08
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	81.1	59	68	67
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	79.3	95.3	81.4	97.4
Temperature (Field)	deg C	19	15	15	14.7	10.23	11.26	8.6
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	**0.5 a**	5.91	**4.75 a**	5.99
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	28	46	42.4	49
Dissolved Solids: Total	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline				
Anions and Nutrients					<0.02	<0.05	<0.020	<0.020
Ammonia (as N)	mg/L	*	no guideline	no guideline	<0.01	<0.01	<0.0010	0.0015
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	0.05	0.06	0.0432	0.0533
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	0.9	0.7	0.79	0.67
Chloride (Lab)	mg/L	600	250	250	<0.1	<0.1	<0.020	<0.020
Fluoride: Dissolved	mg/L	*	1.5	1.5	3.4	3.3	2.79	2.53
Sulphate (Lab)	mg/L	100	500	500	-	-	38.6	47
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Carbonate (as $CaCO_3$)	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Hydroxide	mg/L	no guideline	no guideline	no guideline				
Dissolved Metals					<0.005	0.007	0.0071	<0.0050
Aluminum: Dissolved	mg/L	*	0.2	0.1	<0.0002	<0.0002	<0.00010	<0.00050
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	0.0003	<0.0002	0.00028	<0.00050
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	<0.001	0.001	0.000788	<0.020
Barium: Dissolved	mg/L	5	no guideline	1	<0.0001	<0.0001	<0.00050	<0.0010
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	<0.0005	<0.0005	<0.00050	-
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	0.005	0.004	<0.010	<0.10
Boron: Dissolved	mg/L	1.2	5	5	<0.00001	<0.00001	<0.000017	<0.000017
Cadmium: Dissolved	mg/L	*	no guideline	0.005	9.2	15.6	-	16.6
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	0.0005	<0.0005	<0.00050	<0.0010
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	<0.0001	<0.0001	<0.00010	<0.00030
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	<0.001	<0.001	0.00171	<0.0010
Copper: Dissolved	mg/L	*	0.5	1	0.07	<0.01	-	<0.030
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	<0.0001	<0.0001	0.000115	<0.00050
Lead: Dissolved	mg/L	*	0.05	0.01	<0.001	<0.001	<0.0050	<0.0050
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	1.2	1.8	-	1.82
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.005	<0.005	0.000872	0.00039
Manganese: Dissolved	mg/L	*	no guideline	0.05	-	-	<0.000020	<0.000020
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	<0.001	<0.001	0.000182	<0.0010
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	<0.0005	<0.0005	<0.00050	<0.0010
Nickel: Dissolved	mg/L	*	no guideline	no guideline	-	-	<0.30	0.0037
Phosphorus: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.4	<0.4	-	<2.0
Potassium: Dissolved	mg/L	373	no guideline	no guideline	<0.0002	<0.0002	<0.0010	<0.0010
Selenium: Dissolved	mg/L	0.002	0.01	0.01	3.92	3.18	3.92	-
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.0001	<0.0001	<0.000010	<0.000020
Silver: Dissolved	mg/L	*	no guideline	no guideline	1	1	-	<2.0
Sodium: Dissolved	mg/L	no guideline	no guideline	200	0.016	0.018	0.0171	-
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	1	1	0.88	1.04
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	-	-
Tellurium: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.00005	<0.00005	<0.00010	<0.00020
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	-	-	-	-
Thorium: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.001	<0.001	<0.00010	<0.00050
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.0005	<0.0005	-	<0.010
Titanium: Dissolved	mg/L	2	no guideline	no guideline	-	-	-	-
Tungsten: Dissolved	mg/L	no guideline	no guideline	no guideline	-	-	<0.000010	<0.00020
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	0.0032	0.0016	0.0024	0.0013
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	<0.001	0.003	0.0029	<0.0050
Zinc: Dissolved	mg/L	*	5	5	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

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c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA11-1 30-Nov-11	EBA11-1 21-Feb-12	EBA11-1 23-May-12	EBA11-1 16-Aug-12	EBA11-1 5-Dec-12
Physical Tests									
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.46	7.5	7.3	7.49	7.74
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.94	7.94	8.2	8.25	8.09
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	473	408	477	468	414
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	514	479	476	480	412
Temperature (Field)	deg C	19	15	15	8.8	9.1	9.4	9.95	9.25
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	10.12	7.7	7.2	6.12	7.15
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	249	241	239	240	211
Dissolved Solids: Total	mg/L	no guideline	no guideline	500	-	300	310	304	269
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	138.3	87.3	106	19.1	-46.2
Anions and Nutrients									
Ammonia (as N)	mg/L	*	no guideline	no guideline	0.011	0.0072	0.014	0.023	0.019
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	0.011	0.013	0.0051	<0.0050	<0.0050
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	0.349	0.716	0.5	0.527	0.352
Chloride (Lab)	mg/L	600	250	250	21	10	13	20	21
Fluoride: Dissolved	mg/L	*	1.5	1.5	0.019	0.027	0.022	0.02	0.019
Sulphate (Lab)	mg/L	100	500	500	71.2	68.0	61.4	52	46.8
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	165	164	175	171	126
Bicarbonate (HCO3)	mg/L	no guideline	no guideline	no guideline	-	200	214	209	154
Carbonate (CO3)	mg/L	no guideline	no guideline	no guideline	-	<0.50	<0.50	<0.50	<0.50
Hydroxide (OH)	mg/L	no guideline	no guideline	no guideline	-	<0.50	<0.50	<0.50	<0.50
Dissolved Metals									
Aluminum: Dissolved	mg/L	*	0.2	0.1	0.0048	0.0051	0.00521	0.0042	0.00544
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	<0.00050	0.00002	<0.000020	<0.000020	0.000025
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	0.00036	0.00025	0.000189	0.000202	0.000285
Barium: Dissolved	mg/L	5	no guideline	1	0.0193	0.00819	0.00657	0.00658	0.00555
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	<0.00010	<0.00001	<0.000010	<0.000010	<0.000010
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.0010	<0.000005	<0.0000050	<0.0000050	<0.0000050
Boron: Dissolved	mg/L	1.2	5	5	<0.050	<0.05	<0.050	<0.050	<0.050
Cadmium: Dissolved	mg/L	*	no guideline	0.005	0.000017	0.000009	0.0000062	<0.0000050	<0.0000050
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	75.3	71.7	71.3	71.2	65
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	**0.0012 a**	**0.0014 a**	**0.00136 a**	**0.0016 a**	**0.00119 a**
Chromium III	mg/L	0.0089	no guideline	0.05	-	-	<0.0010	<0.0010	<0.001
Hex. Chromium (Cr 6+)	mg/L	0.001	no guideline	0.05	-	-	**0.0032 a**	**0.0022 a**	**0.0022 a**
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	<0.00050	0.000064	0.000029	0.000016	0.000016
Copper: Dissolved	mg/L	*	0.5	1	0.00028	0.00072	0.000274	0.000236	0.000343
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	<0.0050	0.002	0.0014	0.002	0.0034
Lead: Dissolved	mg/L	*	0.05	0.01	<0.00020	0.000021	<0.0000050	<0.0000050	0.000011
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	<0.0050	<0.0005	<0.00050	<0.00050	<0.00050
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	14.9	15	14.8	15	11.9
Manganese: Dissolved	mg/L	*	no guideline	0.05	0.0265	0.00338	0.000665	0.000218	0.000282
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	<0.000050	< 0.00001	<0.000010	<0.000010	<0.000010
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	<0.0010	0.00006	0.000065	0.000074	0.000116
Nickel: Dissolved	mg/L	*	no guideline	no guideline	<0.0010	0.0005	0.000268	0.000242	0.000295
Phosphorus (P)	mg/L	no guideline	no guideline	no guideline	-	0.81	0.0187	0.483	0.935
Potassium: Dissolved	mg/L	373	no guideline	no guideline	0.947	0.0534	0.76	0.786	0.862
Selenium: Dissolved	mg/L	0.002	0.01	0.01	0.00013	0.00004	0.000082	0.000121	0.000146
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	5.83	5.6	5.89	6.13	5.94
Silver: Dissolved	mg/L	*	no guideline	no guideline	<0.000020	<0.000005	<0.0000050	<0.0000050	<0.0000050
Sodium: Dissolved	mg/L	no guideline	no guideline	200	5.17	4.84	4.58	4.58	4.85
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	0.15	0.141	0.143	0.147	0.112
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	23.6	26	21	19	16.5
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	<0.000050	0.000007	0.0000064	0.000004	0.000004
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.0050	<0.0002	<0.00020	<0.00020	0.00032
Titanium: Dissolved	mg/L	2	no guideline	no guideline	<0.0050	<0.0005	<0.00050	<0.00050	<0.00050
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	0.00106	0.000968	0.000841	0.000855	0.000481
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	<0.0050	0.0032	0.00363	0.00402	0.00506
Zinc: Dissolved	mg/L	*	5	5	<0.0050	0.0003	0.00043	0.0002	0.00053
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.00050	<0.0001	<0.00010	<0.00010	<0.00010
Bacteria									
Coliforms: Fecal	MPN/100 ml	no guideline	none detectable per 100 mL	none detectable per 100 mL	<2	-	-	-	-

Notes:

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BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines (updated May 2008).

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APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA11-1	EBA11-1	EBA11-1	EBA11-1	EBA11-1
					29-Nov-11	21-Feb-12	23-May-12	16-Aug-12	5-Dec-12
Hydrocarbons									
VHw6-10	mg/L	no guideline	no guideline	no guideline	<0.3	-	<0.3	<0.3	<0.3
VPHw	mg/L	no guideline	no guideline	no guideline	<0.3	-	<0.3	<0.3	<0.3
EHw10-19	mg/L	no guideline	no guideline	no guideline	<0.2	-	-	-	-
LEPHw	mg/L	no guideline	no guideline	no guideline	<0.2	-	-	-	-
EHw19-32	mg/L	no guideline	no guideline	no guideline	<0.2	-	-	-	-
HEPHw	mg/L	no guideline	no guideline	no guideline	<0.2	-	-	-	-
Polycyclic Aromatic Hydrocarbons								-	-
Acenapthene	ug/L	6	no guideline	no guideline	<0.050	-	-	-	-
Acridine	ug/L	0.05	no guideline	no guideline	<0.050	-	-	-	-
Anthracene	ug/L	0.1	no guideline	no guideline	<0.010	-	-	-	-
Benzo(A)Anthracene	ug/L	0.1	no guideline	no guideline	<0.010	-	-	-	-
Benzo(A)Pyrene	ug/L	0.01	0.01	0.01	<0.0090	-	-	-	-
Fluoranthene	ug/L	0.2	no guideline	no guideline	<0.020	-	-	-	-
Fluorene	ug/L	12	no guideline	no guideline	<0.050	-	-	-	-
Napthalene	ug/L	1	no guideline	no guideline	<0.050	-	-	-	-
Phenanthrene	ug/L	0.3	no guideline	no guideline	<0.050	-	-	-	-
Pyrene	ug/L	0.02	no guideline	no guideline	<0.020	-	-	-	-
Non-Halogenated Volatiles								-	-
Benzene	mg/L	0.4	0.005	0.005	<0.0005	-	<0.0005	<0.0005	<0.00040
Ethylbenzene	mg/L	0.2	0.0024	0.0024	<0.0005	-	<0.0005	<0.0005	<0.00040
Toluene	mg/L	0.0005	0.024	0.024	<0.0005	-	<0.0005	<0.0005	<0.00040
Xylenes: Total	mg/L	0.03	no guideline	0.3	<0.001	-	<0.001	<0.001	<0.00040
Styrene	mg/L	0.072	no guideline	no guideline	<0.0005	-	<0.0005	<0.0005	<0.00050
Volatile Organic Compounds									
Bromodichloromethane	ug/L	no guideline	16	16	<1	-	<1	<1	<1
Bromoform	ug/L	no guideline	no guideline	no guideline	<1	-	<1	<1	<1
Bromomethane	ug/L	no guideline	no guideline	no guideline	<1	-	<1	<1	<1
Carbon Tetrachloride	ug/L	13.3	5	5	<0.5	-	<0.5	<0.5	<0.5
Chlorobenzene	ug/L	1.3	80	80	<0.5	-	<0.5	<0.5	<0.5
Chloroethane	ug/L	no guideline	no guideline	no guideline	<1	-	<1	<1	<1
Chloroform	ug/L	1.8	no guideline	no guideline	<1	-	<1	<1	<1
Chloromethane	ug/L	no guideline	no guideline	no guideline	<1	-	<1	<1	<1
Cis-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	<1	-	<1	<1	<1
Cis-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	<1	-	<1	<1	<1
Dibromochloromethane	ug/L	no guideline	no guideline	no guideline	<1	-	<1	<1	<1
Dibromoethane	ug/L	no guideline	no guideline	no guideline	<0.9	-	-	-	-
Dibromomethane	ug/L	no guideline	no guideline	no guideline	<0.9	-	<0.9	<0.9	<0.9
Dichlorodifluoromethane	ug/L	no guideline	no guideline	no guideline	-	-	<2	<2	<2
Methyl-Tert-Butylether	ug/L	3400	15	200	<4	-	<4	<4	<4
Methylene Chloride	ug/L	98.1	50	50	<2	-	<2	<2	<2
Tetrabromomethane	ug/L	no guideline	no guideline	no guideline	<0.5	-	-	-	-
Tetrachloroethene	ug/L	111	30	30	-	-	<0.5	<0.5	<0.5
Trans-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	<1	-	<1	<1	<1
Trans-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	<1	-	<1	<1	<1
Trichloroethene	ug/L	21	5	5	<0.5	-	<0.5	<0.5	<0.5
Trichlorofluoromethane	ug/L	no guideline	no guideline	no guideline	<4	-	<4	<4	<4
Vinyl Chloride	ug/L	no guideline	2	2	<0.5	-	<0.5	<0.5	<0.5
1,1-Dichloroethane	ug/L	no guideline	no guideline	no guideline	<0.5	-	<0.5	<0.5	<0.5
1,1-Dichloroethene	ug/L	no guideline	14	14	<0.5	-	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	ug/L	0.7	200	200	<0.5	-	<0.5	<0.5	<0.5
1,2-Dichloroethane	ug/L	100	5	5	<0.5	-	<0.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	no guideline	no guideline	no guideline	<0.5	-	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	ug/L	150	no guideline	no guideline	<0.5	-	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ug/L	26	5	5	<0.5	-	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	11100	200	no guideline	<0.5	-	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	ug/L	no guideline	no guideline	no guideline	<0.5	-	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	<0.5	-	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	<0.5	-	<0.5	<0.5	<0.5

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA11-2 30-Nov-11	EBA11-2 20-Feb-12	EBA11-2 24-May-12	EBA11-2 16-Aug-12	EBA11-2 4-Dec-12
Physical Tests									
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.45	7.7	7.4	7.46	7.86
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.89	8.24	8.2	8.21	8.16
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	340	238	285	258	395
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	387	249	288	267	385
Temperature (Field)	deg C	19	15	15	10.02	9.7	7.6	10.65	10.33
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	8.44	7.8	7.6	6.92	7.14
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	201	125	143	133	198
Dissolved Solids: Total	mg/L	no guideline	no guideline	500	-	200	190	168	260
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	147.6	91.2	144	41.7	87.9
Anions and Nutrients									
Ammonia (as N)	mg/L	*	no guideline	no guideline	0.028	0.01	0.016	0.012	0.017
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	<0.005	<0.005	0.0479	<0.0050	0.0068
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	0.61	0.235	0.62	0.549	0.382
Chloride (Lab)	mg/L	600	250	250	9.7	5.0	4.4	7.7	21
Fluoride: Dissolved	mg/L	*	1.5	1.5	0.013	0.027	0.039	0.023	0.016
Sulphate (Lab)	mg/L	100	500	500	5.64	8.08	8.48	4.65	3.95
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	187	111	136	127	164
Bicarbonate (HCO3)	mg/L	no guideline	no guideline	no guideline	-	136	166	155	200
Carbonate (CO3)	mg/L	no guideline	no guideline	no guideline	-	<0.50	<0.50	<0.50	<0.50
Hydroxide (OH)	mg/L	no guideline	no guideline	no guideline	-	<0.50	<0.50	<0.50	<0.50
Dissolved Metals									
Aluminum: Dissolved	mg/L	*	0.2	0.1	0.0072	0.0099	0.00622	0.00791	0.00589
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	<0.00050	0.00002	<0.000020	<0.000020	<0.000020
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	0.00023	0.00019	0.000088	0.000111	0.000123
Barium: Dissolved	mg/L	5	no guideline	1	0.0122	0.0075	0.00668	0.00655	0.00844
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	<0.00010	<0.00001	<0.000010	<0.000010	<0.000010
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.0010	<0.000005	<0.0000050	<0.0000050	<0.0000050
Boron: Dissolved	mg/L	1.2	5	5	<0.050	<0.05	0.058	<0.050	<0.050
Cadmium: Dissolved	mg/L	*	no guideline	0.005	0.000011	<0.000005	<0.0000050	0.000007	<0.0000050
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	58.9	32.8	38.5	36.6	58.9
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	**0.0014 a**	**0.0029 a**	**0.00222 a**	**0.00191 a**	**0.00118 a**
Chromium III	mg/L	0.0089	no guideline	0.05	-	-	<0.0010	<0.0010	<0.001
Hex. Chromium (Cr 6+)	mg/L	0.001	no guideline	0.05	-	-	**0.0032 a**	**0.0032 a**	**0.0019 a**
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	<0.00050	0.000026	0.0000111	0.000006	<0.0000050
Copper: Dissolved	mg/L	*	0.5	1	<0.00020	0.00012	0.00018	0.000189	0.000155
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	<0.0050	0.004	0.0022	0.0266	0.0021
Lead: Dissolved	mg/L	*	0.05	0.01	<0.00020	0.000007	<0.0000050	0.000007	<0.0000050
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	<0.0050	0.0005	<0.00050	<0.00050	0.00065
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	13.2	10.4	11.3	9.97	12.4
Manganese: Dissolved	mg/L	*	no guideline	0.05	0.0158	0.00237	0.000293	0.000265	<0.000050
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	<0.000050	< 0.00001	<0.000010	<0.000010	<0.000010
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	<0.0010	0.00016	0.000085	0.000105	0.000069
Nickel: Dissolved	mg/L	*	no guideline	no guideline	<0.0010	0.00017	0.000113	0.000106	0.000105
Phosphorus (P)	mg/L	no guideline	no guideline	no guideline	-	0.0092	0.0068	1.26	1.09
Potassium: Dissolved	mg/L	373	no guideline	no guideline	1.23	0.47	0.45	0.426	1.06
Selenium: Dissolved	mg/L	0.002	0.01	0.01	0.00018	0.00015	0.000096	0.000141	0.00015
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	8.63	8	7.86	9.02	9.35
Silver: Dissolved	mg/L	*	no guideline	no guideline	<0.000020	<0.000005	<0.0000050	<0.0000050	<0.0000050
Sodium: Dissolved	mg/L	no guideline	no guideline	200	3.5	4.81	4.46	3.75	3.4
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	0.122	0.0596	0.07	0.0668	0.116
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	<3.0	<10	<15	<10	<3.0
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	<0.000050	0.000006	0.0000034	0.000002	0.000004
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.0050	<0.0002	<0.00020	<0.00020	<0.00020
Titanium: Dissolved	mg/L	2	no guideline	no guideline	<0.0050	<0.0005	<0.00050	<0.00050	<0.00050
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	0.00033	0.00019	0.000198	0.000194	0.000245
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	<0.0050	0.0033	0.00291	0.0027	0.00236
Zinc: Dissolved	mg/L	*	5	5	<0.0050	0.0001	0.00086	<0.00010	0.0004
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.00050	<0.0001	<0.00010	<0.00010	<0.00010

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines (updated May 2008).

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA11-3	EBA11-5 DUP EBA11-3	EBA11-3	EBA11-5 DUP EBA11-3	EBA11-3	EBA11-3	EBA11-3
					30-Nov-11	30-Nov-11	21-Feb-12	21-Feb-12	25-May-12	16-Aug-12	5-Dec-12
Physical Tests											
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.46	-	7.5	-	7.4	7.48	7.71
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.83	7.75	7.79	7.78	7.69	7.85	7.91
Specific Conductance (Field)	µS/cm	no guideline	no guideline	no guideline	129	-	156	-	278	183	182
Specific Conductance (Lab)	µS/cm	no guideline	no guideline	no guideline	143	142	183	183	276	190	184
Temperature (Field)	deg C	19	15	15	10.11	-	9.9	-	10.2	10.32	10.04
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	8.32	-	10.4	-	10.7	9.73	9.95
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	63.3	63.9	82.5	84.1	116	81.1	80.5
Dissolved Solids: Total	mg/L	no guideline	no guideline	500	-	-	100	-	180	119	119
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	145.2	-	83.9	-	144	7.4	135.9
Anions and Nutrients											
Ammonia (as N)	mg/L	*	no guideline	no guideline	0.025	0.02	0.0073	0.0066	0.013	0.026	0.025
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	0.045	0.007	0.026	0.025	<0.0050	<0.0050	<0.0050
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	0.17	0.186	0.113	0.115	0.255	0.163	0.907
Chloride (Lab)	mg/L	600	250	250	10	9.6	19	19	49	24	20
Fluoride: Dissolved	mg/L	*	1.5	1.5	0.016	0.016	0.019	0.021	0.014	0.015	0.017
Sulphate (Lab)	mg/L	100	500	500	5.06	5.75	4.32	4.15	5.68	3.68	2.75
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	54.3	51.6	59.8	57.6	42.7	47.7	50.3
Bicarbonate (HCO3)	mg/L	no guideline	no guideline	no guideline	-	-	72.9	70.2	52.1	58.2	61.4
Carbonate (CO3)	mg/L	no guideline	no guideline	no guideline	-	-	<0.50	<0.50	<0.50	<0.50	<0.50
Hydroxide (OH)	mg/L	no guideline	no guideline	no guideline	-	-	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Metals											
Aluminum: Dissolved	mg/L	*	0.2	0.1	0.0042	0.0036	0.0028	0.0028	0.00254	0.00757	0.00343
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	<0.00050	<0.00050	0.00003	0.00003	<0.00002	<0.000020	0.000027
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	0.00017	0.0002	0.00017	0.00015	0.000093	0.000144	0.000181
Barium: Dissolved	mg/L	5	no guideline	1	0.0021	0.0022	0.00188	0.00167	0.00242	0.00132	0.00121
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	<0.00010	<0.00010	<0.00001	<0.00001	<0.00001	<0.000010	<0.000010
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.0010	<0.0010	<0.000005	<0.000005	<0.000005	<0.0000050	<0.0000050
Boron: Dissolved	mg/L	1.2	5	5	<0.050	<0.050	<0.05	<0.05	<0.05	<0.050	<0.050
Cadmium: Dissolved	mg/L	*	no guideline	0.005	<0.000010	<0.000010	<0.000005	0.000005	0.0000051	<0.0000050	0.000008
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	19.7	20	25.8	26.4	35.8	25.2	25.2
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	<0.0010	<0.0010	0.0005	0.0005	0.00058	0.00078	0.00051
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	<0.00050	<0.00050	0.000018	0.000018	0.0000125	0.000006	<0.0000050
Copper: Dissolved	mg/L	*	0.5	1	<0.00020	<0.00020	<0.00005	<0.00005	0.000084	0.000154	0.000109
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	<0.0050	<0.0050	<0.001	0.001	0.0021	0.003	0.0016
Lead: Dissolved	mg/L	*	0.05	0.01	<0.00020	<0.00020	<0.000005	0.000009	<0.000005	<0.0000050	0.00001
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	<0.0050	<0.0050	<0.0005	<0.0005	<0.0005	<0.00050	<0.00050
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	3.42	3.42	4.43	4.43	6.33	4.4	4.27
Manganese: Dissolved	mg/L	*	no guideline	0.05	0.0161	0.016	0.00252	0.00248	0.00086	0.000151	0.000123
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	<0.000050	<0.000050	< 0.00001	< 0.00001	<0.00001	<0.000010	<0.000010
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	<0.0010	<0.0010	0.00008	0.00007	0.000115	0.000094	0.000128
Nickel: Dissolved	mg/L	*	no guideline	no guideline	<0.0010	<0.0010	0.00006	0.0001	0.000115	0.000087	0.000041
Phosphorus (P)	mg/L	no guideline	no guideline	no guideline	-	-	0.36	0.37	0.0135	0.607	0.144
Potassium: Dissolved	mg/L	373	no guideline	no guideline	0.348	0.345	0.0606	0.0486	0.42	0.345	0.34
Selenium: Dissolved	mg/L	0.002	0.01	0.01	0.00019	0.00023	0.00018	0.00018	0.0002	0.000296	0.000184
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	4.41	4.39	4.4	4.5	4.54	4.62	4.56
Silver: Dissolved	mg/L	*	no guideline	no guideline	<0.000020	<0.000020	<0.000005	<0.000005	<0.000005	<0.0000050	<0.0000050
Sodium: Dissolved	mg/L	no guideline	no guideline	200	1.43	1.42	1.61	1.61	1.93	1.6	1.57
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	0.0393	0.0381	0.0475	0.0474	0.0633	0.0433	0.0443
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	<3.0	<3.0	<10	<10	<15	<10	<3.0
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	<0.000050	<0.000050	<0.000002	<0.000002	0.0000029	<0.0000020	<0.0000020
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.0050	<0.0050	<0.0002	<0.0002	<0.0002	<0.00020	<0.00020
Titanium: Dissolved	mg/L	2	no guideline	no guideline	<0.0050	<0.0050	<0.0005	<0.0005	<0.0005	<0.00050	<0.00050
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	<0.0001	<0.0001	0.000059	0.000054	0.0000309	0.000026	0.00003
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	<0.0050	<0.0050	0.003	0.0029	0.00233	0.00274	0.00277
Zinc: Dissolved	mg/L	*	5	5	<0.0050	<0.0050	0.0002	0.0003	0.00048	0.00022	0.00087
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.00050	<0.00050	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010
Bacteria											
Coliforms: Fecal	MPN/100 ml	no guideline	none detectable per 100 mL	none detectable per 100 mL	<2	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines (updated May 2008).

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA11-3	EBA11-5 DUP EBA11-3	EBA11-3	EBA11-5 DUP EBA11-3	EBA11-3	EBA11-3	EBA11-3
					30-Nov-11	30-Nov-11	21-Feb-12	21-Feb-12	25-May-12	16-Aug-12	5-Dec-12
Hydrocarbons											
VHw6-10	mg/L	no guideline	no guideline	no guideline	<0.3	-	-	-	-	-	-
VPHw	mg/L	no guideline	no guideline	no guideline	<0.3	-	-	-	-	-	-
c - Parameter exceeds and/or is not with	mg/L	no guideline	no guideline	no guideline	<0.2	-	-	-	-	-	-
LEPHw	mg/L	no guideline	no guideline	no guideline	<0.2	-	-	-	-	-	-
EHw19-32	mg/L	no guideline	no guideline	no guideline	<0.2	-	-	-	-	-	-
HEPHw	mg/L	no guideline	no guideline	no guideline	<0.2	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons											
Acenapthene	ug/L	6	no guideline	no guideline	<0.050	-	-	-	-	-	-
Acridine	ug/L	0.05	no guideline	no guideline	<0.050	-	-	-	-	-	-
Anthracene	ug/L	0.1	no guideline	no guideline	<0.010	-	-	-	-	-	-
Benzo(A)Anthracene	ug/L	0.1	no guideline	no guideline	<0.010	-	-	-	-	-	-
Benzo(A)Pyrene	ug/L	0.01	0.01	0.01	<0.0090	-	-	-	-	-	-
Fluoranthene	ug/L	0.2	no guideline	no guideline	<0.020	-	-	-	-	-	-
Fluorene	ug/L	12	no guideline	no guideline	<0.050	-	-	-	-	-	-
Napthalene	ug/L	1	no guideline	no guideline	<0.050	-	-	-	-	-	-
Phenanthrene	ug/L	0.3	no guideline	no guideline	<0.050	-	-	-	-	-	-
Pyrene	ug/L	0.02	no guideline	no guideline	<0.020	-	-	-	-	-	-
Non-Halogenated Volatiles											
Benzene	mg/L	0.4	0.005	0.005	<0.0005	-	-	-	-	-	-
Ethylbenzene	mg/L	0.2	0.0024	0.0024	<0.0005	-	-	-	-	-	-
Toluene	mg/L	0.0005	0.024	0.024	<0.0005	-	-	-	-	-	-
Xylenes: Total	mg/L	0.03	no guideline	0.3	<0.001	-	-	-	-	-	-
Styrene	mg/L	0.072	no guideline	no guideline	<0.0005	-	-	-	-	-	-
Volatile Organic Compounds											
Bromodichloromethane	ug/L	no guideline	16	16	<1	-	-	-	-	-	-
Bromoform	ug/L	no guideline	no guideline	no guideline	<1	-	-	-	-	-	-
Bromomethane	ug/L	no guideline	no guideline	no guideline	<1	-	-	-	-	-	-
Carbon Tetrachloride	ug/L	13.3	5	5	<0.5	-	-	-	-	-	-
Chlorobenzene	ug/L	1.3	80	80	<0.5	-	-	-	-	-	-
Chloroethane	ug/L	no guideline	no guideline	no guideline	<1	-	-	-	-	-	-
Chloroform	ug/L	1.8	no guideline	no guideline	<1	-	-	-	-	-	-
Chloromethane	ug/L	no guideline	no guideline	no guideline	<1	-	-	-	-	-	-
Cis-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	<1	-	-	-	-	-	-
Cis-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	<1	-	-	-	-	-	-
Dibromochloromethane	ug/L	no guideline	no guideline	no guideline	<1	-	-	-	-	-	-
Dibromoethane	ug/L	no guideline	no guideline	no guideline	<0.9	-	-	-	-	-	-
Dibromomethane	ug/L	no guideline	no guideline	no guideline	<0.9	-	-	-	-	-	-
Methyl-Tert-Butylether	ug/L	3400	20	15	<4	-	-	-	-	-	-
Methylene Chloride	ug/L	98.1	50	50	<2	-	-	-	-	-	-
Tetrachloroethene	ug/L	111	30	30	<0.5	-	-	-	-	-	-
Trans-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	<1	-	-	-	-	-	-
Trans-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	<1	-	-	-	-	-	-
Trichloroethene	ug/L	21	5	5	<0.5	-	-	-	-	-	-
Trichlorofluoromethane	ug/L	no guideline	no guideline	no guideline	<4	-	-	-	-	-	-
Vinyl Chloride	ug/L	no guideline	2	2	<0.5	-	-	-	-	-	-
1,1-Dichloroethane	ug/L	no guideline	no guideline	no guideline	<0.5	-	-	-	-	-	-
1,1-Dichloroethene	ug/L	no guideline	14	14	<0.5	-	-	-	-	-	-
1,2-Dichlorobenzene	ug/L	0.7	200	200	<0.5	-	-	-	-	-	-
1,2-Dichloroethane	ug/L	100	5	5	<0.5	-	-	-	-	-	-
1,2-Dichloropropane	ug/L	no guideline	no guideline	no guideline	<0.5	-	-	-	-	-	-
1,3-Dichlorobenzene	ug/L	150	no guideline	no guideline	<0.5	-	-	-	-	-	-
1,4-Dichlorobenzene	ug/L	26	5	5	<0.5	-	-	-	-	-	-
1,1,1-Trichloroethane	ug/L	11100	200	no guideline	<0.5	-	-	-	-	-	-
1,1,2-Trichloroethane	ug/L	no guideline	no guideline	no guideline	<0.5	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	<0.5	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	<0.5	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines (updated May 2008).

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

b - Parameter exceeds and/or is not within the acceptable criteria ranges of the British Columbia drinking water guidelines (BC.AWQG.DW).

c - Parameter exceeds and/or is not within the acceptable criteria ranges of the Canadian drinking water guidelines (CDWG).

* - See notes at beginning of Appendix F.

APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA11-4 30-Nov-11	EBA11-4 21-Feb-12	EBA11-4 25-May-12	DupEBA11-4 25-May-12	EBA11-4 16-Aug-12	DupEBA11-4 16-Aug-12	EBA11-4 5-Dec-12	DupEBA11-4 5-Dec-12
Physical Tests												
pH (Field)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.7	7.8	7.7	-	7.73	-	8.09	-
pH (Lab)	pH Unit	6.5 - 9	6.5 - 8.5	6.5 - 8.5	7.8	7.72	7.73	7.76	7.87	7.86	7.87	7.86
Specific Conductance (Field)	uS/cm	no guideline	no guideline	no guideline	101	110	134	-	123	-	98	-
Specific Conductance (Lab)	uS/cm	no guideline	no guideline	no guideline	112	128	135	134	128	128	100	100
Temperature (Field)	deg C	19	15	15	9.86	9.8	10.1	-	10.43	-	9.93	-
Dissolved Oxygen (Field)	mg/L	5	no guideline	no guideline	10.89	8.5	8.9	-	8.64	-	10.49	-
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	48.7	55.3	58.3	58.5	54.4	54.9	44.2	44.3
Dissolved Solids: Total	mg/L	no guideline	no guideline	500	-	100	90	-	80	-	64	-
Oxidation Reduction Potential	mV	no guideline	no guideline	no guideline	165.7	73.8	138	-	-11.4	-	135.7	-
Anions and Nutrients												
Ammonia (as N)	mg/L	*	no guideline	no guideline	0.013	0.012	0.026	0.067	0.017	0.021	<0.0050	<0.0050
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	1	3.2	0.087	<0.005	0.0261	0.0153	<0.0050	<0.0050	<0.0050	<0.0050
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	10	10	< 0.02	0.193	0.164	0.166	0.137	0.137	0.021	<0.020
Chloride (Lab)	mg/L	600	250	250	6.1	12	12	11	10	10	3.9	3.8
Fluoride: Dissolved	mg/L	*	1.5	1.5	0.017	0.026	0.026	0.024	0.027	0.027	0.023	0.023
Sulphate (Lab)	mg/L	100	500	500	4.16	3.08	3.18	2.76	1.4	1.48	0.84	0.91
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	no guideline	no guideline	46.3	43.6	46.6	47	47.4	46.9	44.6	43.8
Bicarbonate (HCO3)	mg/L	no guideline	no guideline	no guideline	-	53.2	56.8	57.3	57.8	57.2	54.4	53.5
Carbonate (CO3)	mg/L	no guideline	no guideline	no guideline	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Hydroxide (OH)	mg/L	no guideline	no guideline	no guideline	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Metals												
Aluminum: Dissolved	mg/L	*	0.2	0.1	0.0121	0.0121	0.00861	0.00877	0.0169	0.0129	0.013	0.0123
Antimony: Dissolved	mg/L	0.02	no guideline	0.006	<0.00050	0.00003	0.000022	0.000022	0.000026	0.000021	0.000027	0.000025
Arsenic: Dissolved	mg/L	0.005	0.025	0.01	0.00106	0.00119	0.00145	0.00158	0.00153	0.00162	0.00137	0.00141
Barium: Dissolved	mg/L	5	no guideline	1	0.0034	0.0027	0.00225	0.00222	0.00198	0.00179	0.0018	0.00185
Beryllium: Dissolved	mg/L	0.0053	0.004	no guideline	<0.00010	<0.00001	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.0010	<0.000005	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron: Dissolved	mg/L	1.2	5	5	<0.050	<0.05	<0.05	<0.05	<0.050	<0.050	<0.050	<0.050
Cadmium: Dissolved	mg/L	*	no guideline	0.005	<0.000010	<0.000005	<0.000005	<0.000005	0.000006	<0.0000050	0.000012	<0.0000050
Calcium: Dissolved	mg/L	no guideline	no guideline	no guideline	14.7	16.7	17.9	18.2	16.9	17.1	13.3	13.5
Chromium: Dissolved	mg/L	0.001	no guideline	0.05	<0.0010	**0.0017 a**	**0.00148 a**	**0.00143 a**	**0.00138 a**	**0.00145 a**	0.00066	0.00062
Chromium III	mg/L	0.0089	no guideline	0.05	-	-	<0.0010	-	<0.0010	-	-	-
Hex. Chromium (Cr 6+)	mg/L	0.001	no guideline	0.05	-	-	**0.0028 a**	-	**0.0015 a**	-	-	-
Cobalt: Dissolved	mg/L	0.11	no guideline	no guideline	<0.00050	0.000029	0.0000051	0.0000069	0.000007	<0.0000050	0.000006	<0.0000050
Copper: Dissolved	mg/L	*	0.5	1	0.00023	0.0001	0.000062	0.000078	0.000179	0.000159	0.000521	0.000204
Iron: Dissolved (Lab)	mg/L	0.35	no guideline	0.3	<0.0050	0.005	0.0031	0.003	0.0115	0.0104	0.0081	0.0068
Lead: Dissolved	mg/L	*	0.05	0.01	<0.00020	<0.000005	<0.000005	<0.000005	0.000015	<0.0000050	0.00001	0.000008
Lithium: Dissolved	mg/L	0.87	no guideline	no guideline	<0.0050	<0.0005	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium: Dissolved	mg/L	no guideline	no guideline	no guideline	2.9	3.27	3.29	3.13	2.96	2.98	2.67	2.56
Manganese: Dissolved	mg/L		no guideline	0.05	0.0054	0.00329	0.000486	0.00046	0.000227	0.000136	0.000131	0.000079
Mercury: Dissolved	mg/L	no guideline	0.001	0.001	<0.000050	< 0.00001	<0.00001	<0.00001	<0.000010	0.000015	<0.000010	<0.000010
Molybdenum: Dissolved	mg/L	2	0.25	no guideline	<0.0010	0.0001	0.000095	0.000121	0.000128	0.000123	0.00011	0.000086
Nickel: Dissolved	mg/L	*	no guideline	no guideline	<0.0010	0.00009	0.000057	0.000539	0.000071	0.000042	0.000241	0.000054
Phosphorus (P)	mg/L	no guideline	no guideline	no guideline	-	1.19	0.0387	0.0379	1.33	1.44	1.71	1.76
Potassium: Dissolved	mg/L	373	no guideline	no guideline	1.08	0.402	0.8	0.79	0.742	0.736	0.977	0.954
Selenium: Dissolved	mg/L	0.002	0.01	0.01	0.00016	0.00025	0.000235	0.000218	0.000187	0.000231	0.000131	0.000277
Silicon: Dissolved	mg/L	no guideline	no guideline	no guideline	4.93	5.4	5.99	5.96	5.97	6.02	4.97	5.13
Silver: Dissolved	mg/L	*	no guideline	no guideline	<0.000020	<0.000005	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium: Dissolved	mg/L	no guideline	no guideline	200	1.87	2.47	2.67	2.57	2.42	2.4	2.24	2.1
Strontium: Dissolved	mg/L	no guideline	no guideline	no guideline	0.0269	0.0307	0.033	0.033	0.0318	0.0315	0.0247	0.0243
Sulphur: Dissolved	mg/L	no guideline	no guideline	no guideline	<3.0	<10	<15	<15	<10	<10	<3.0	<3.0
Thallium: Dissolved	mg/L	0.0003	0.002	no guideline	<0.000050	0.000003	0.0000026	0.000003	0.000002	0.000002	0.000002	0.000002
Tin: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.0050	<0.0002	<0.0002	<0.0002	<0.00020	<0.00020	0.00029	<0.00020
Titanium: Dissolved	mg/L	2	no guideline	no guideline	<0.0050	<0.0005	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	0.0005
Uranium: Dissolved	mg/L	0.3	no guideline	0.02	0.00014	0.000153	0.000195	0.00019	0.000203	0.000207	0.000128	0.000131
Vanadium: Dissolved	mg/L	0.006	no guideline	no guideline	**0.0116 a**	**0.0115 a**	**0.013 a**	**0.0131 a**	**0.0142 a**	**0.0142 a**	**0.0149 a**	**0.0146 a**
Zinc: Dissolved	mg/L	*	5	5	<0.0050	0.0002	0.0008	0.00031	0.00041	<0.00010	0.00078	0.00022
Zirconium: Dissolved	mg/L	no guideline	no guideline	no guideline	<0.00050	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Bacteria												
Coliforms: Fecal	MPN/100 ml	no guideline	none detectable per	none detectable	<2	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines (updated May 2008).

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

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APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	BC.AWQG.DW	CDWG	EBA11-4	EBA11-4	EBA11-4	EBA11-4	EBA11-4	EBA11-4	EBA11-4	EBA11-4
					30-Nov-11	21-Feb-12	25-May-12	25-May-12	16-Aug-12	16-Aug-12	5-Dec-12	5-Dec-12
Hydrocarbons												
VHw6-10	mg/L	no guideline	no guideline	no guideline	<0.3	-	-	-	-	-	-	-
VPHw	mg/L	no guideline	no guideline	no guideline	<0.3	-	-	-	-	-	-	-
c - Parameter exceeds and/or is not with	mg/L	no guideline	no guideline	no guideline	<0.2	-	-	-	-	-	-	-
LEPHw	mg/L	no guideline	no guideline	no guideline	<0.2	-	-	-	-	-	-	-
EHw19-32	mg/L	no guideline	no guideline	no guideline	<0.2	-	-	-	-	-	-	-
HEPHw	mg/L	no guideline	no guideline	no guideline	<0.2	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons												
Acenapthene	ug/L	6	no guideline	no guideline	<0.050	-	-	-	-	-	-	-
Acridine	ug/L	0.05	no guideline	no guideline	<0.050	-	-	-	-	-	-	-
Anthracene	ug/L	0.1	no guideline	no guideline	<0.010	-	-	-	-	-	-	-
Benzo(A)Anthracene	ug/L	0.1	no guideline	no guideline	<0.010	-	-	-	-	-	-	-
Benzo(A)Pyrene	ug/L	0.01	0.01	0.01	<0.0090	-	-	-	-	-	-	-
Fluoranthene	ug/L	0.2	no guideline	no guideline	<0.020	-	-	-	-	-	-	-
Fluorene	ug/L	12	no guideline	no guideline	<0.050	-	-	-	-	-	-	-
Napthalene	ug/L	1	no guideline	no guideline	<0.050	-	-	-	-	-	-	-
Phenanthrene	ug/L	0.3	no guideline	no guideline	<0.050	-	-	-	-	-	-	-
Pyrene	ug/L	0.02	no guideline	no guideline	<0.020	-	-	-	-	-	-	-
Non-Halogenated Volatiles												
Benzene	mg/L	0.4	0.005	0.005	<0.0005	-	-	-	-	-	-	-
Ethylbenzene	mg/L	0.2	0.0024	0.0024	<0.0005	-	-	-	-	-	-	-
Toluene	mg/L	0.0005	0.024	0.024	<0.0005	-	-	-	-	-	-	-
Xylenes: Total	mg/L	0.03	no guideline	0.3	<0.001	-	-	-	-	-	-	-
Styrene	mg/L	0.072	no guideline	no guideline	<0.0005	-	-	-	-	-	-	-
Volatile Organic Compounds												
Bromodichloromethane	ug/L	no guideline	16	16	<1	-	-	-	-	-	-	-
Bromoform	ug/L	no guideline	no guideline	no guideline	<1	-	-	-	-	-	-	-
Bromomethane	ug/L	no guideline	no guideline	no guideline	<1	-	-	-	-	-	-	-
Carbon Tetrachloride	ug/L	13.3	5	5	<0.5	-	-	-	-	-	-	-
Chlorobenzene	ug/L	1.3	80	80	<0.5	-	-	-	-	-	-	-
Chloroethane	ug/L	no guideline	no guideline	no guideline	<1	-	-	-	-	-	-	-
Chloroform	ug/L	1.8	no guideline	no guideline	<1	-	-	-	-	-	-	-
Chloromethane	ug/L	no guideline	no guideline	no guideline	<1	-	-	-	-	-	-	-
Cis-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	<1	-	-	-	-	-	-	-
Cis-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	<1	-	-	-	-	-	-	-
Dibromochloromethane	ug/L	no guideline	no guideline	no guideline	<1	-	-	-	-	-	-	-
Dibromoethane	ug/L	no guideline	no guideline	no guideline	<0.9	-	-	-	-	-	-	-
Dibromomethane	ug/L	no guideline	no guideline	no guideline	<0.9	-	-	-	-	-	-	-
Methyl-Tert-Butylether	ug/L	3400	20	15	<4	-	-	-	-	-	-	-
Methylene Chloride	ug/L	98.1	50	50	<2	-	-	-	-	-	-	-
Tetrachloroethene	ug/L	111	30	30	<0.5	-	-	-	-	-	-	-
Trans-1,2-Dichloroethene	ug/L	no guideline	no guideline	no guideline	<1	-	-	-	-	-	-	-
Trans-1,3-Dichloropropene	ug/L	no guideline	no guideline	no guideline	<1	-	-	-	-	-	-	-
Trichloroethene	ug/L	21	5	5	<0.5	-	-	-	-	-	-	-
Trichlorofluoromethane	ug/L	no guideline	no guideline	no guideline	<4	-	-	-	-	-	-	-
Vinyl Chloride	ug/L	no guideline	2	2	<0.5	-	-	-	-	-	-	-
1,1-Dichloroethane	ug/L	no guideline	no guideline	no guideline	<0.5	-	-	-	-	-	-	-
1,1-Dichloroethene	ug/L	no guideline	14	14	<0.5	-	-	-	-	-	-	-
1,2-Dichlorobenzene	ug/L	0.7	200	200	<0.5	-	-	-	-	-	-	-
1,2-Dichloroethane	ug/L	100	5	5	<0.5	-	-	-	-	-	-	-
1,2-Dichloropropane	ug/L	no guideline	no guideline	no guideline	<0.5	-	-	-	-	-	-	-
1,3-Dichlorobenzene	ug/L	150	no guideline	no guideline	<0.5	-	-	-	-	-	-	-
1,4-Dichlorobenzene	ug/L	26	5	5	<0.5	-	-	-	-	-	-	-
1,1,1-Trichloroethane	ug/L	11100	200	no guideline	<0.5	-	-	-	-	-	-	-
1,1,2-Trichloroethane	ug/L	no guideline	no guideline	no guideline	<0.5	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	<0.5	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	ug/L	no guideline	no guideline	no guideline	<0.5	-	-	-	-	-	-	-

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

BC.AWQG.DW - BC Approved & Working Water Quality Guidelines for protection of drinking water.

CDWG - Canadian Drinking Water Quality Guidelines (updated May 2008).

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

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APPENDIX F: HISTORICAL WATER QUALITY DATABASE, CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Parameter	Units	BC.AWQG.AL	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1
			20-Oct-06	20-Apr-07	26-Oct-07	9-Apr-08	22-Oct-08	27-Aug-09	11-Dec-09	30-Apr-10	2-Nov-10	9-Mar-11	11-May-11	16-Aug-11	28-Nov-11	21-Feb-12	24-May-12	16-Aug-12	4-Dec-12
Physical Tests																			
pH (Field)	pH Unit	6.5 - 9	8.11	7.8	**6.40 a**	8.18	7.43	**6.23 a**	7.29	7.39	8.14	-	7.74	8.14	7.72	7.9	7.9	7.78	8.0
pH (Lab)	pH Unit	6.5 - 9	8	8.11	7.94	8.1	7.81	7.91	7.66	8	7.76	-	7.84	7.8	7.77	7.84	7.84	8.03	7.94
Specific Conductance (Field)	µS/cm	no guideline	92	97	110	102	92	99	52	-	142	-	125	131	140	123	147	122	130
Specific Conductance (Lab)	µS/cm	no guideline	125.1	116	124	119	116	120	115	120	116	-	125	140	161	146	137	133	125
Temperature (Field)	deg C	19	11.14	11.24	11.06	10.52	10.75	11.02	11.22	11.33	10.99	-	11.15	11.12	9.9	9.6	11.3	11.07	9.69
Dissolved Oxygen (Field)	mg/L	5	9.02	**4.44 a**	8.35	8.77	8.72	9.34	10.62	11.09	24.2	-	9.4	18.16	15.05	9.3	12.0	7.05	11.2
Hardness: Total (as $CaCO_3$) (Lab)	mg/L	no guideline	56	60.8	60.5	57.1	63.9	51.6	49.4	56	60.3	-	58.8	63.9	73.6	72.6	66.3	73.5	60.2
Dissolved Solids: Total	mg/L	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	100	96	81	85
Oxidation Reduction Potential	mV	no guideline	-	93.4	224.5	154.4	-39.7	298.6	202.2	203.7	31	-	230.8	114.5	59.6	95.8	48.1	43.6	79.9
Anions and Nutrients																			
Ammonia (as N)	mg/L	*	<0.05	<0.020	<0.020	<0.020	<0.020	<0.01	<0.01	<0.01	0.029	-	0.019	<0.005	0.0085	0.008	<0.0050	0.013	0.022
Nitrogen: Nitrite (as N) (Lab)	mg/L	*	<0.01	<0.0010	<0.0010	<0.0010	<0.0010	<0.002	<0.002	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050
Nitrogen: Nitrate (as N) (Lab)	mg/L	32.8	0.09	0.117	0.167	0.145	0.17	0.12	0.15	0.17	0.17	-	0.16	0.03	0.115	0.095	0.109	0.105	0.108
Chloride (Lab)	mg/L	600	1.8	1.73	1.93	1.78	2.02	1.73	1.68	1.4	1.1	-	1.8	2.6	3.1	2.4	2.0	2	3.5
Fluoride: Dissolved	mg/L	*	<0.1	<0.020	<0.020	<0.020	<0.020	<0.05	-	0.03	0.01	-	0.02	0.01	0.022	0.021	0.018	0.017	0.021
Sulphate (Lab)	mg/L	100	3.6	3	2.74	3.02	2.88	2.92	<0.05	2.9	3.1	-	3.3	2.6	3.18	3.18	3.13	1.91	2.87
Alkalinity (as $CaCO_3$) (Lab)	mg/L	no guideline	-	58	61.1	63.4	59.4	56.6	2.78	59	59	-	61	65	73.1	66	64.6	64.2	57.4
Bicarbonate (as $CaCO_3$)	mg/L	no guideline	-	-	-	-	-	-	56.9	-	-	-	-	-	-	80.6	78.8	78.3	70.1
Carbonate (as $CaCO_3$)	mg/L	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50
Hydroxide	mg/L	no guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50
Total Metals																			
Aluminum: Total	mg/L	*	0.012	0.005	<0.0050	<0.0050	<0.0050	0.006	0.006	0.01	0.023	-	0.008	0.012	0.021	0.0462	0.0213	0.0556	0.0736
Antimony: Total	mg/L	0.02	<0.0002	<0.00010	<0.00050	<0.00050	<0.00050	<0.0002	<0.0001	<0.0005	<0.0005	-	<0.0005	<0.0005	<0.0005	0.00004	0.000027	0.000033	0.000032
Arsenic: Total	mg/L	0.005	0.0006	0.00063	0.00064	0.00067	0.00062	0.0006	0.0006	0.0006	0.0006	-	0.0006	0.0005	0.0005	0.00047	0.000526	0.000556	0.000465
Barium: Total	mg/L	5	0.001	0.0011	<0.020	<0.020	<0.020	0.001	0.0009	0.001	0.001	-	0.001	0.001	0.002	0.00194	0.00153	0.00167	0.00335
Beryllium: Total	mg/L	0.0053	<0.0001	<0.00050	<0.0010	<0.0010	<0.0010	<0.0002	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.00001	<0.00001	<0.000010	<0.000010
Bismuth: Total	mg/L	no guideline	<0.0005	<0.00050	-	<0.20	-	<0.0002	<0.0001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.000005	<0.000005	<0.0000050	<0.0000050
Boron: Total	mg/L	1.2	0.008	<0.010	<0.10	<0.10	<0.10	0.02	0.01	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.050	<0.050
Cadmium: Total	mg/L	*	<0.00001	<0.000017	**0.000052 a**	<0.000017	<0.000017	<0.00004	<0.00001	**0.00005 a**	<0.00001	-	**0.00004 a**	0.00001	<0.00001	**0.000055 a**	0.0000138	**0.000034 a**	0.000008
Calcium: Total	mg/L	no guideline	17.8	-	19.3	18.3	20.5	16.4	16	18	18.9	-	18.7	20.1	23	22.7	20.8	23.6	18.3
Chromium: Total	mg/L	0.001	<0.0005	<0.00050	<0.0010	<0.0010	<0.0010	0.0003	<0.0002	<0.001	<0.001	-	<0.001	<0.001	<0.001	0.0003	0.00027	0.00035	0.00031
Cobalt: Total	mg/L	0.11	<0.0001	<0.00010	<0.00030	<0.00030	<0.00030	<0.0002	<0.0001	<0.0005	<0.0005	-	<0.0005	<0.0005	<0.0005	0.000083	0.0000299	0.00005	0.00009
Copper: Total	mg/L	*	<0.001	0.00022	<0.0010	<0.0010	<0.0010	0.0004	0.0002	0.0003	0.0005	-	0.0003	0.0004	0.0008	0.00068	0.000406	0.00052	0.000786
Iron: Total (Lab)	mg/L	0.35	<0.1	-	<0.030	<0.030	<0.030	<0.01	<0.01	<0.005	0.005	-	<0.005	0.015	0.029	0.067	0.0254	0.0834	0.105
Lead: Total	mg/L	*	<0.0001	<0.000050	<0.00050	<0.00050	<0.00050	<0.0002	<0.00005	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	0.00003	0.0000111	0.000035	0.000041
Lithium: Total	mg/L	0.87	<0.001	<0.0050	<0.0050	<0.0050	<0.0050	<0.0002	<0.0001	<0.005	<0.005	-	-	<0.005	<0.005	<0.0005	<0.0005	<0.00050	<0.00050
Magnesium: Total	mg/L	no guideline	2.7	-	2.99	2.81	3.09	2.59	2.27	2.67	3.2	-	2.95	3.33	3.94	3.87	3.49	3.56	3.53
Manganese: Total	mg/L	*	<0.005	<0.000050	<0.00030	<0.00030	<0.00030	<0.0002	<0.0001	<0.001	<0.001	-	0.001	<0.001	0.001	0.00294	0.000792	0.00158	0.00353
Mercury: Total	mg/L	no guideline	-	<0.000020	<0.000020	<0.000020	<0.000020	<0.02	<0.02	<0.00002	<0.00002	-	<0.00005	<0.00005	<0.00005	< 0.00001	<0.00001	<0.000010	<0.000010
Molybdenum: Total	mg/L	2	<0.001	0.000131	<0.0010	<0.0010	<0.0010	<0.0001	0.0001	<0.001	<0.001	-	<0.001	<0.001	<0.001	0.0001	0.00012	0.000114	0.00019
Nickel: Total	mg/L	*	<0.0005	<0.00050	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	<0.001	<0.001	-	<0.001	<0.001	<0.001	0.00023	0.000113	0.000127	0.000236
Phosphorus: Total	mg/L	no guideline	-	<0.30	0.0157	<0.30	-	<0.03	<0.015	-	-	-	0.02	-	-	0.0108	0.0086	0.0192	0.013
Potassium: Total	mg/L	373	<0.4	-	<2.0	<2.0	<2.0	0.34	0.34	0.41	0.39	-	0.38	0.37	0.428	0.41	0.39	0.417	0.37
Selenium: Total	mg/L	0.002	<0.0002	<0.0010	<0.0010	<0.0010	<0.0010	<0.0002	<0.0002	0.0001	0.0001	-	0.0001	0.0001	0.0001	0.00011	0.000152	0.000167	0.000085
Silicon: Total	mg/L	no guideline	3.74	3.89	-	4.14	-	4.06	3.13	4	4	-	3.9	4.5	4	4.7	4.78	5.04	4.3
Silver: Total	mg/L	*	<0.0001	<0.000010	<0.000020	<0.000020	<0.000020	<0.00005	<0.00004	<0.00002	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.000005	<0.000005	<0.0000050	<0.0000050
Sodium: Total	mg/L	no guideline	1.4	-	<2.0	<2.0	<2.0	1.41	1.19	1.39	1.59	-	1.62	1.75	1.96	2.23	1.87	1.89	2.32
Strontium: Total	mg/L	no guideline	0.027	0.0271	-	0.0276	-	0.027	0.026	0.027	0.031	-	0.03	0.03	0.037	0.0355	0.0317	0.0322	0.035
Sulphur: Total	mg/L	no guideline	0.9	0.92	1.11	1.1	1.05	<2	<1	<3	<3	-	<3	<3	<3.0	<10	<15	<10	0.68
Tellurium: Total	mg/L	no guideline	-	-	-	-	-	<0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-
Thallium: Total	mg/L	0.0003	<0.00005	<0.00010	<0.00020	<0.00020	<0.00020	<0.00002	<0.00002	<0.00005	<0.00005	-	<0.00005	<0.00005	<0.00005	<0.000002	<0.000002	<0.0000020	<0.0000020
Thorium: Total	mg/L	no guideline	-	-	-	-	-	<0.0001	<0.00005	-	-	-	-	-	-	-	-	-	-
Tin: Total	mg/L	no guideline	<0.001	<0.00010	<0.00050	<0.00050	<0.00050	<0.0002	<0.0001	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.0002	<0.0002	<0.00020	<0.00020
Titanium: Total	mg/L	2	<0.0005	-	<0.010	<0.010	<0.010	0.0002	<0.0002	<0.005	<0.005	-	<0.005	<0.005	<0.005	0.0035	0.00135	0.00503	0.00538
Tungsten: Total	mg/L	no guideline	-	-	-	-	-	-	<0.0001	-	-	-	-	-	-	-	-	-	-
Uranium: Total	mg/L	0.3	-	0.00008	<0.00020	<0.00020	<0.00020	<0.0001	0.00008	<0.0001	<0.0001	-	<0.0001	<0.0001	0.0001	0.000124	0.0000883	0.000092	0.000087
Vanadium: Total	mg/L	0.006	0.0052	0.0048	0.0047	0.0048	0.0047	0.0044	0.0043	<0.005	<0.005	-	<0.005	<0.005	<0.005	0.0042	0.00454	0.00471	0.0041
Zinc: Total	mg/L	*	<0.001	<0.0010	<0.0050	<0.0050	<0.0050	<0.001	<0.001	<0.005	<0.005	-	<0.005	<0.005	<0.005	0.0013	0.00043	0.00096	0.00119
Zirconium: Total	mg/L	no guideline	-	-	-	-	-	<0.002	<0.0001	<0.0005	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.00010	<0.00010

Notes:

BC.AWQG.AL - BC Approved & Working Water Quality Guidelines for protection of aquatic life.

a - Parameter exceeds and/or is not within the acceptable criteria ranges of the aquatic life guidelines (BC.AWQG.AL).

* - See notes at beginning of Appendix F.

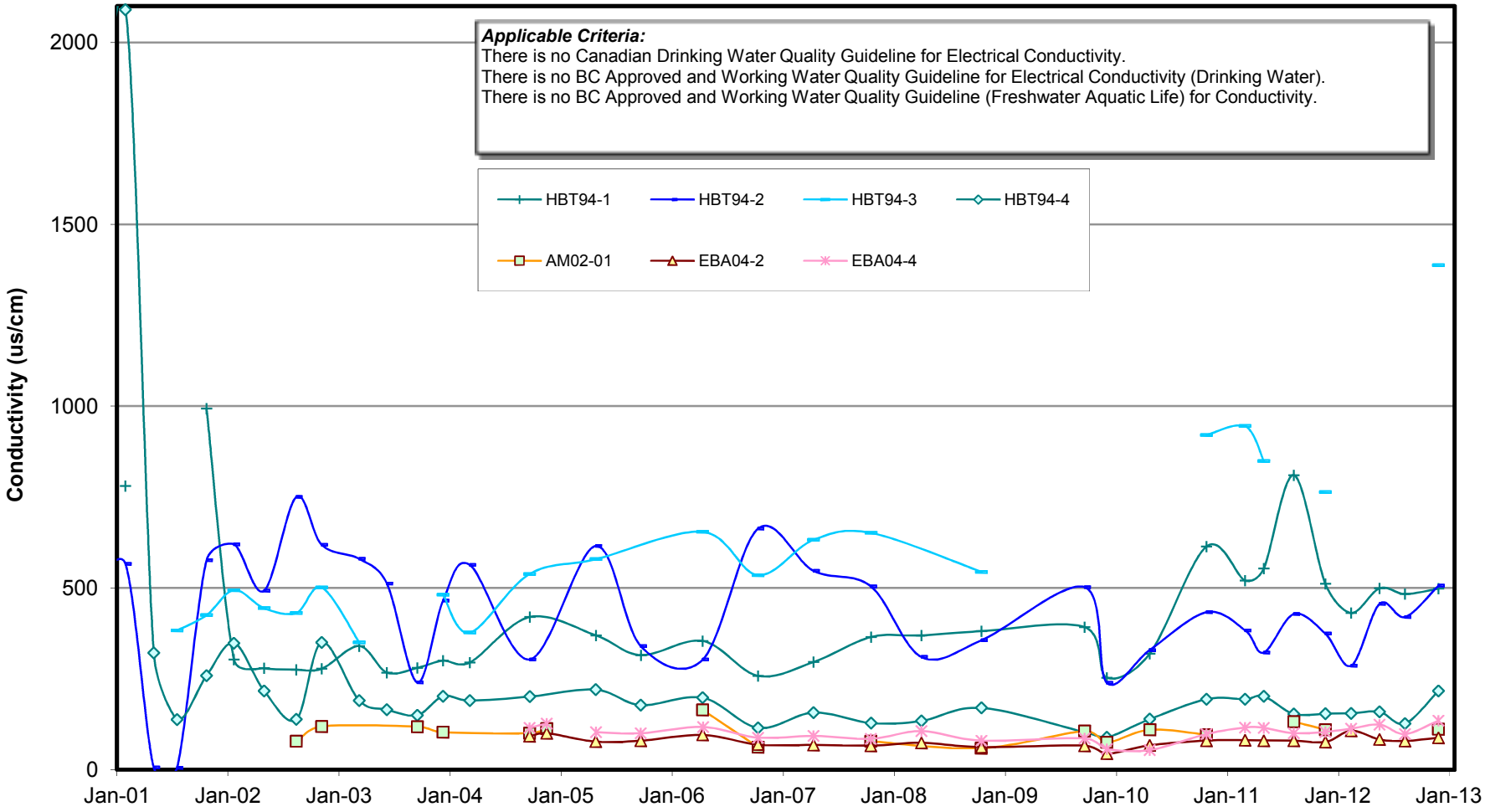
APPENDIX G

PARAMETER VS. TIME GRAPHS

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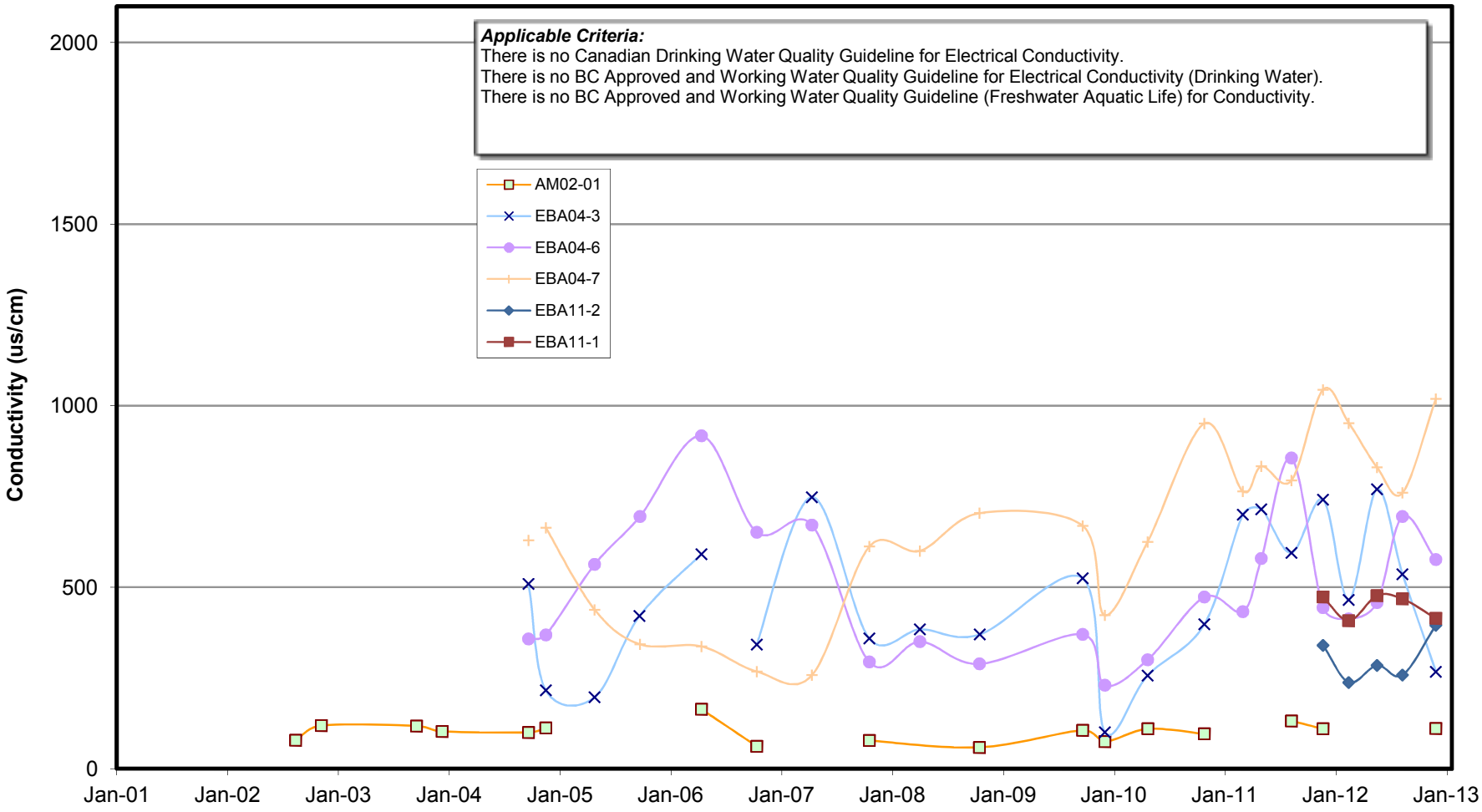
A TETRA TECH COMPANY

Figure G1 - Conductivity at Campbell River Waste Management Centre - Landfill Wells



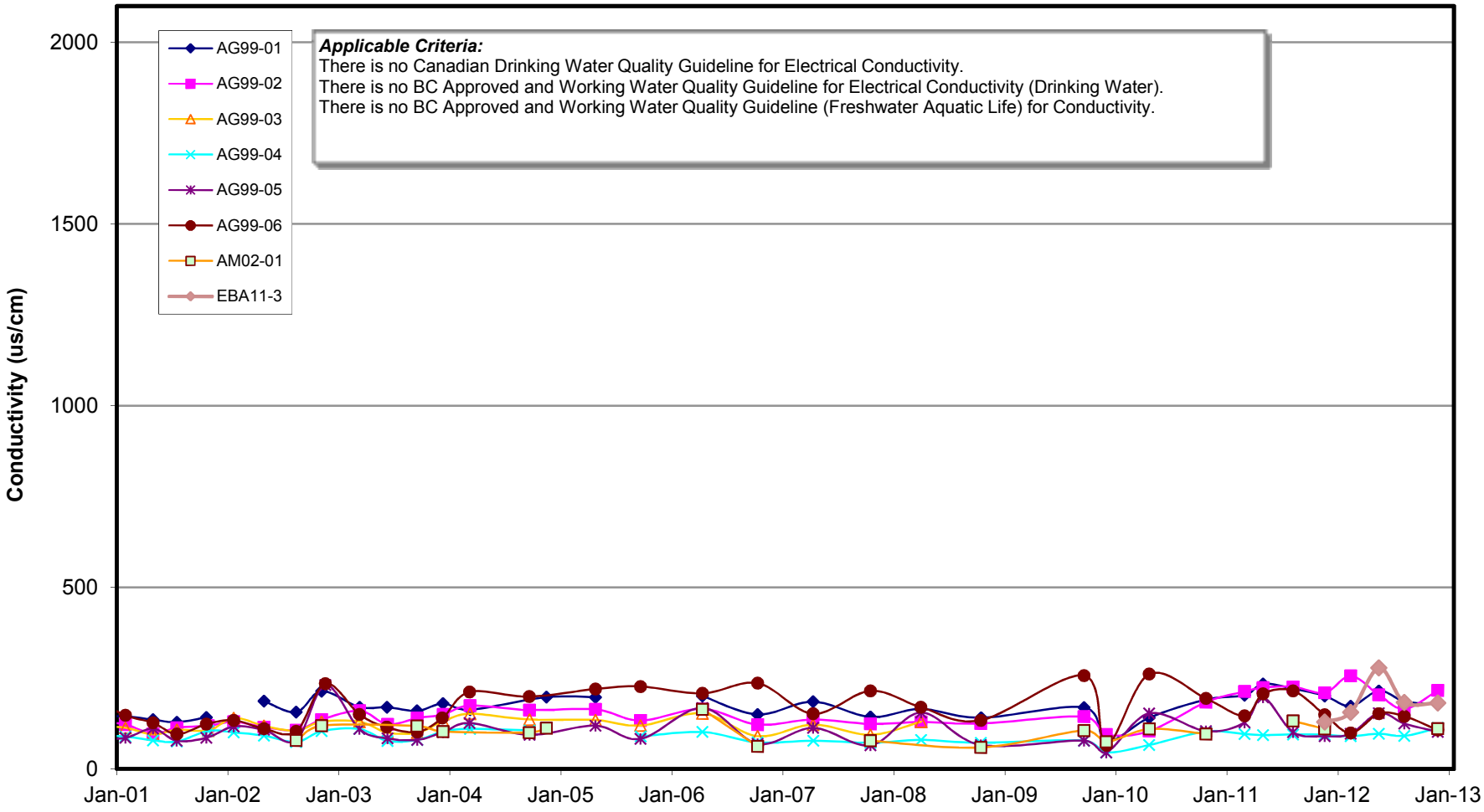
Note: Breaks in the lines indicate missing data.

Figure G1 - Conductivity at Campbell River Waste Management Centre - Boundary Wells



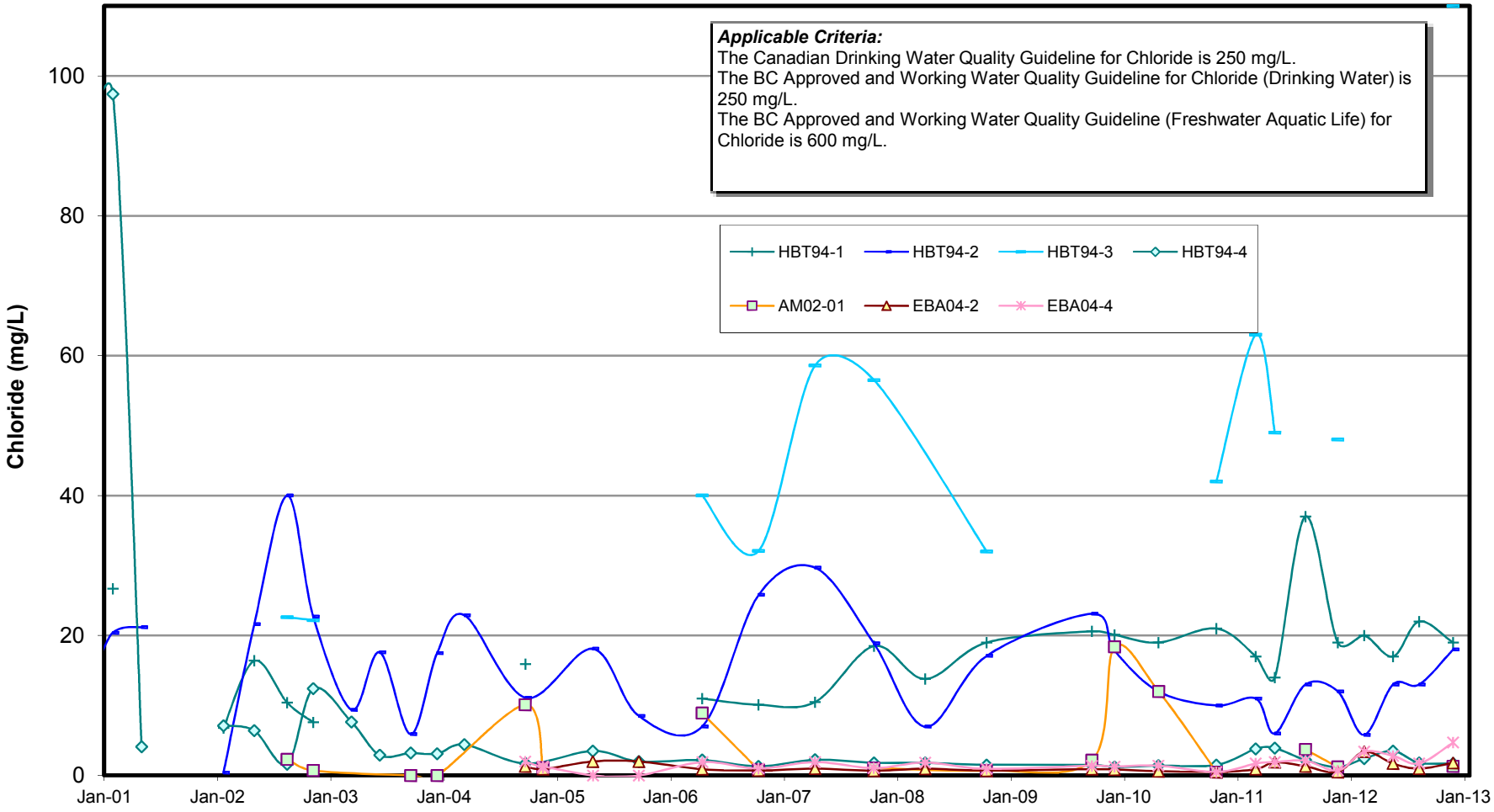
Note: Breaks in the lines indicate missing data.

Figure G1 - Conductivity at Campbell River Waste Management Centre - Downgradient Wells



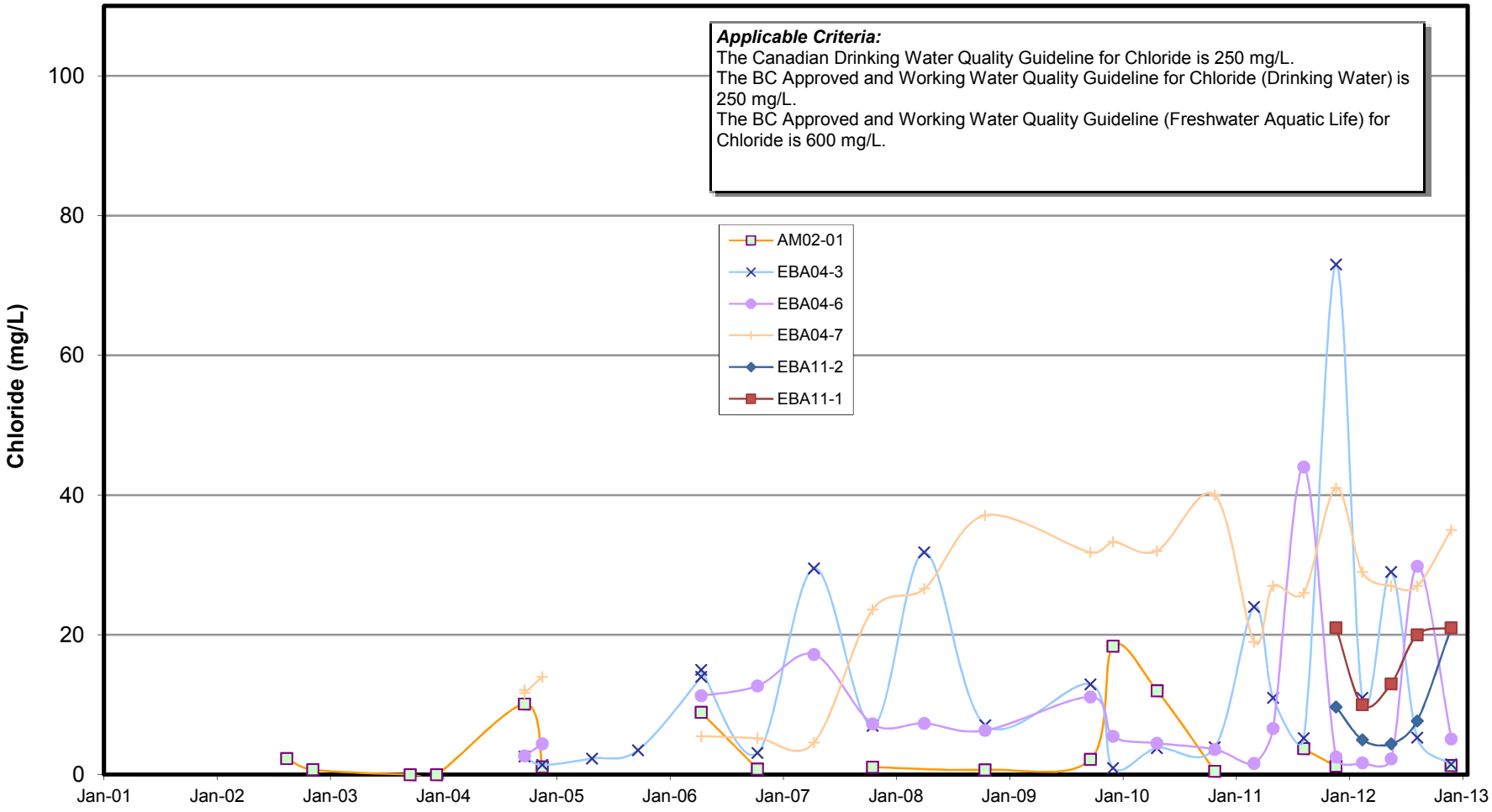
Note: Breaks in the lines indicate missing data.

Figure G2- Chloride at Campbell River Waste Management Centre - Landfill Wells



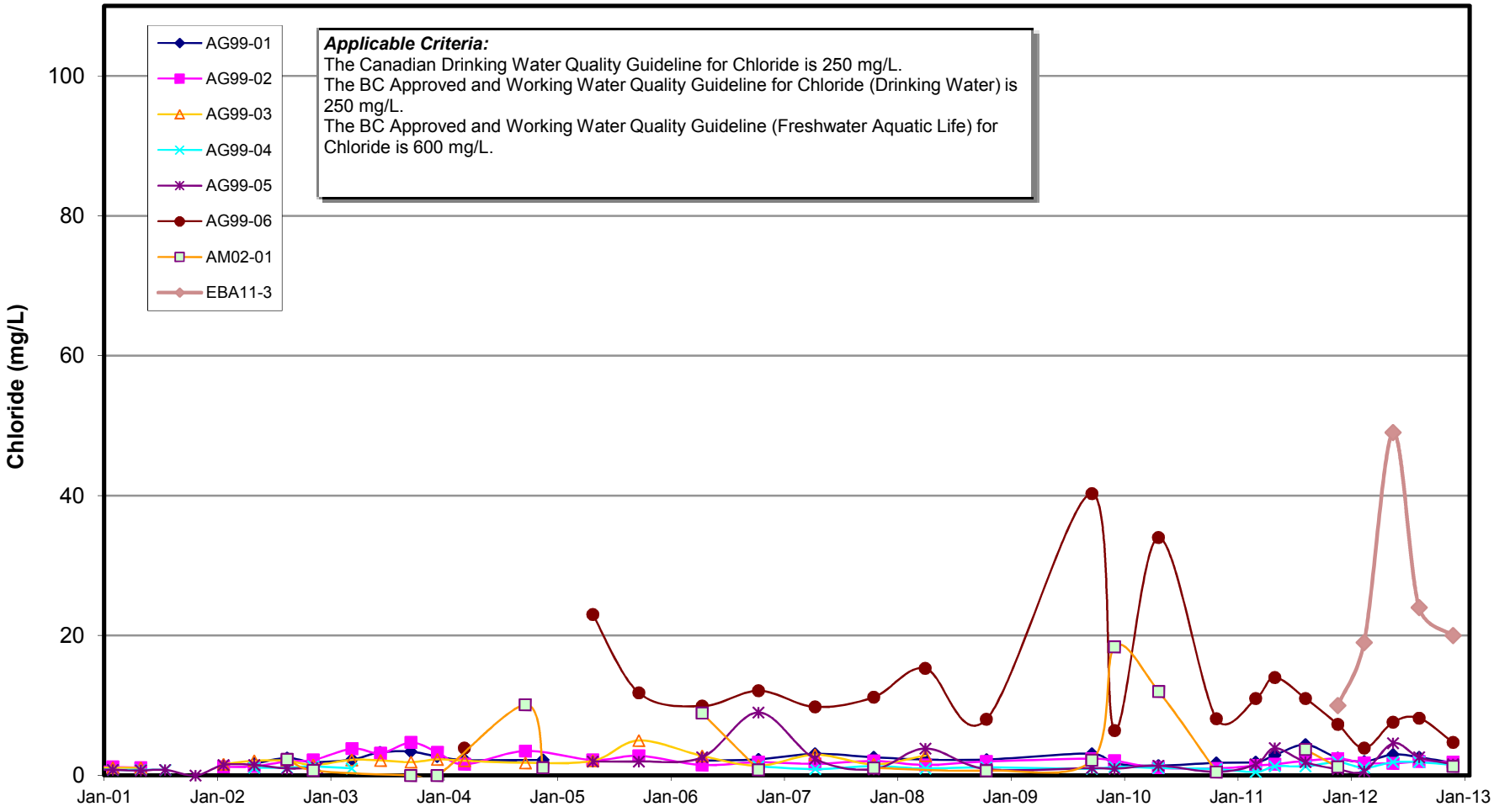
Note: Breaks in the lines indicate missing data.

Figure G2- Chloride at Campbell River Waste Management Centre - Boundary Wells



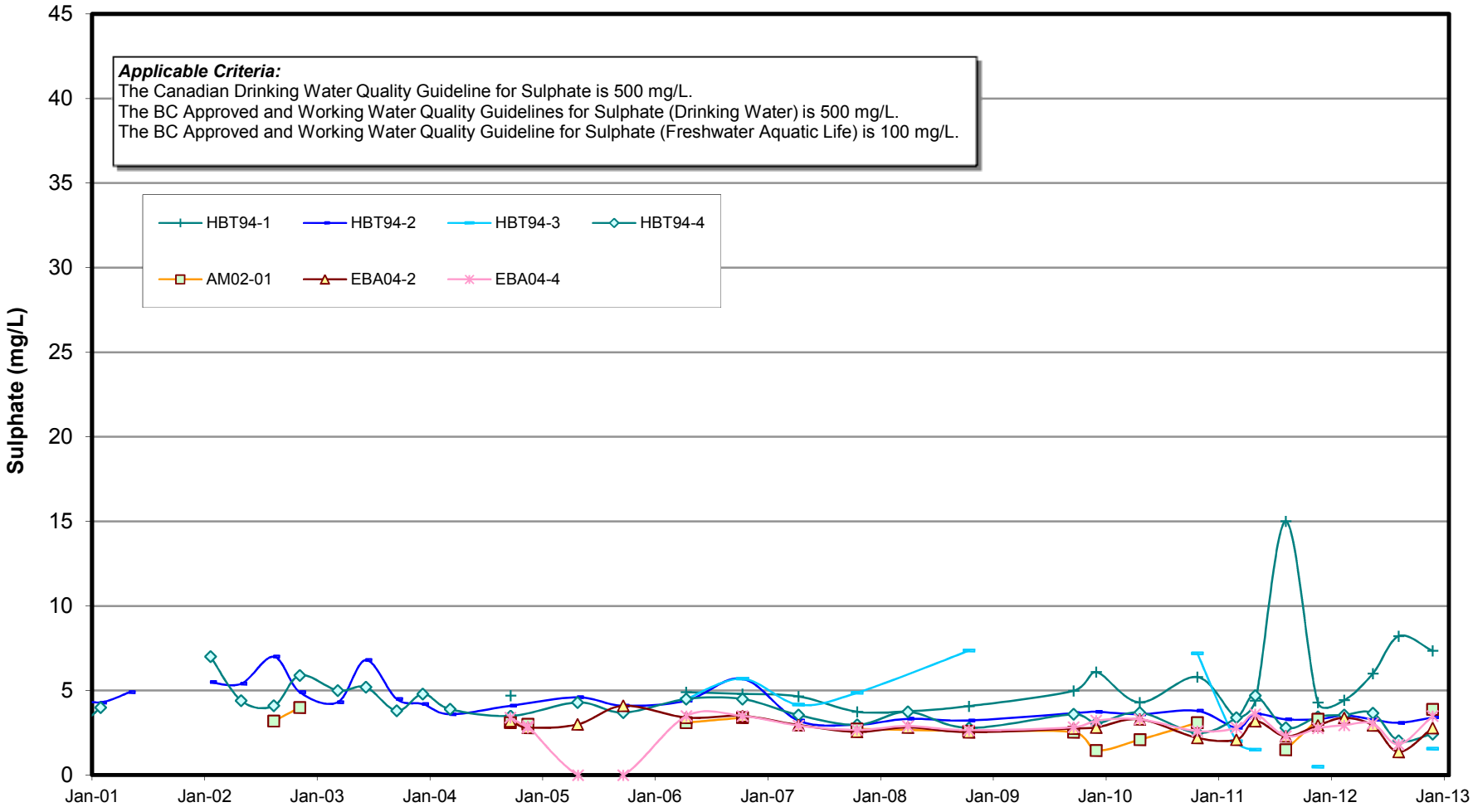
Note: Breaks in the lines indicate missing data.

Figure G2- Chloride at Campbell River Waste Management Centre - Downgradient Wells



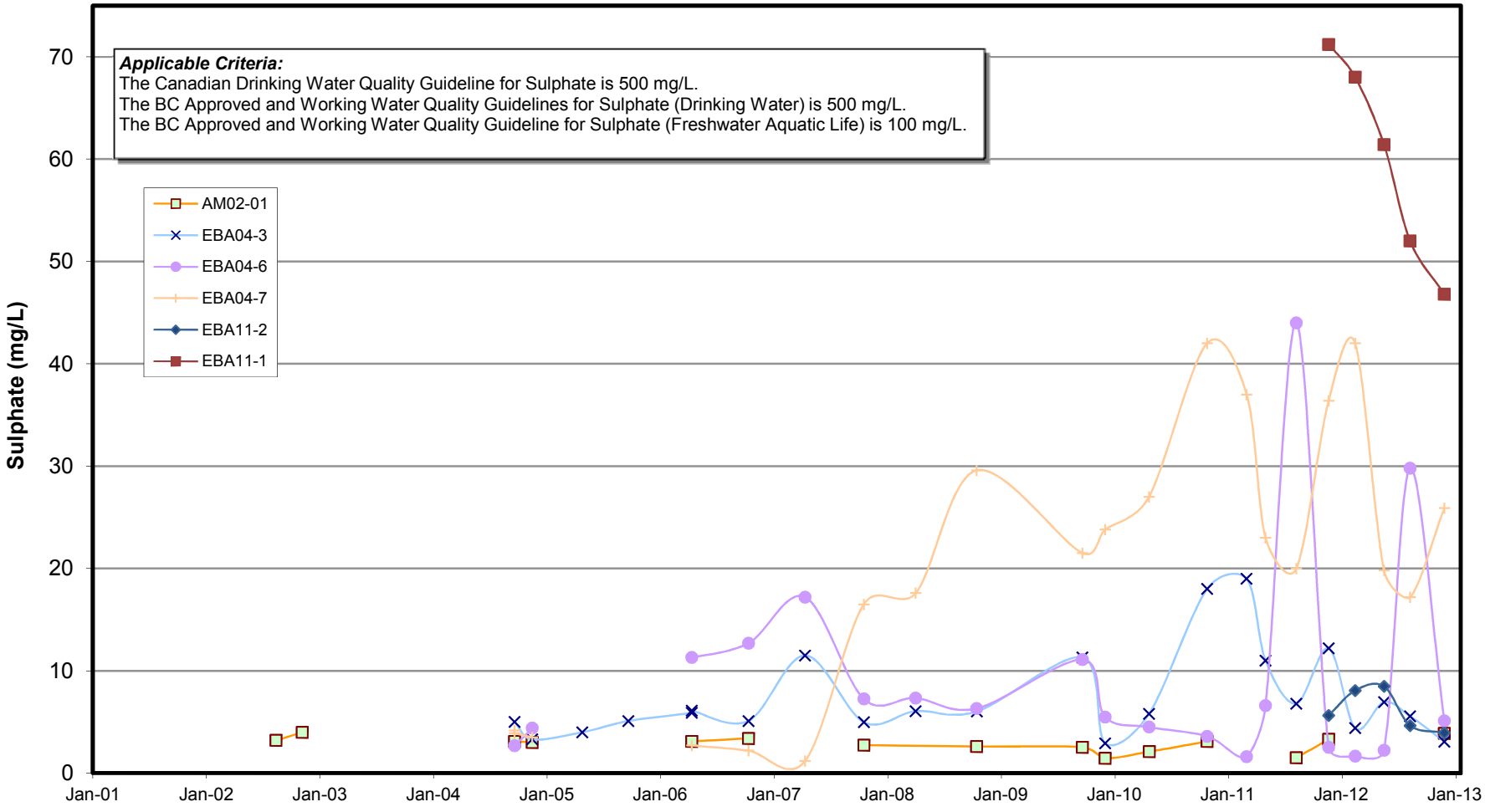
Note: Breaks in the lines indicate missing data.

Figure G3 - Sulphate at Campbell River Waste Management Centre - Landfill Wells



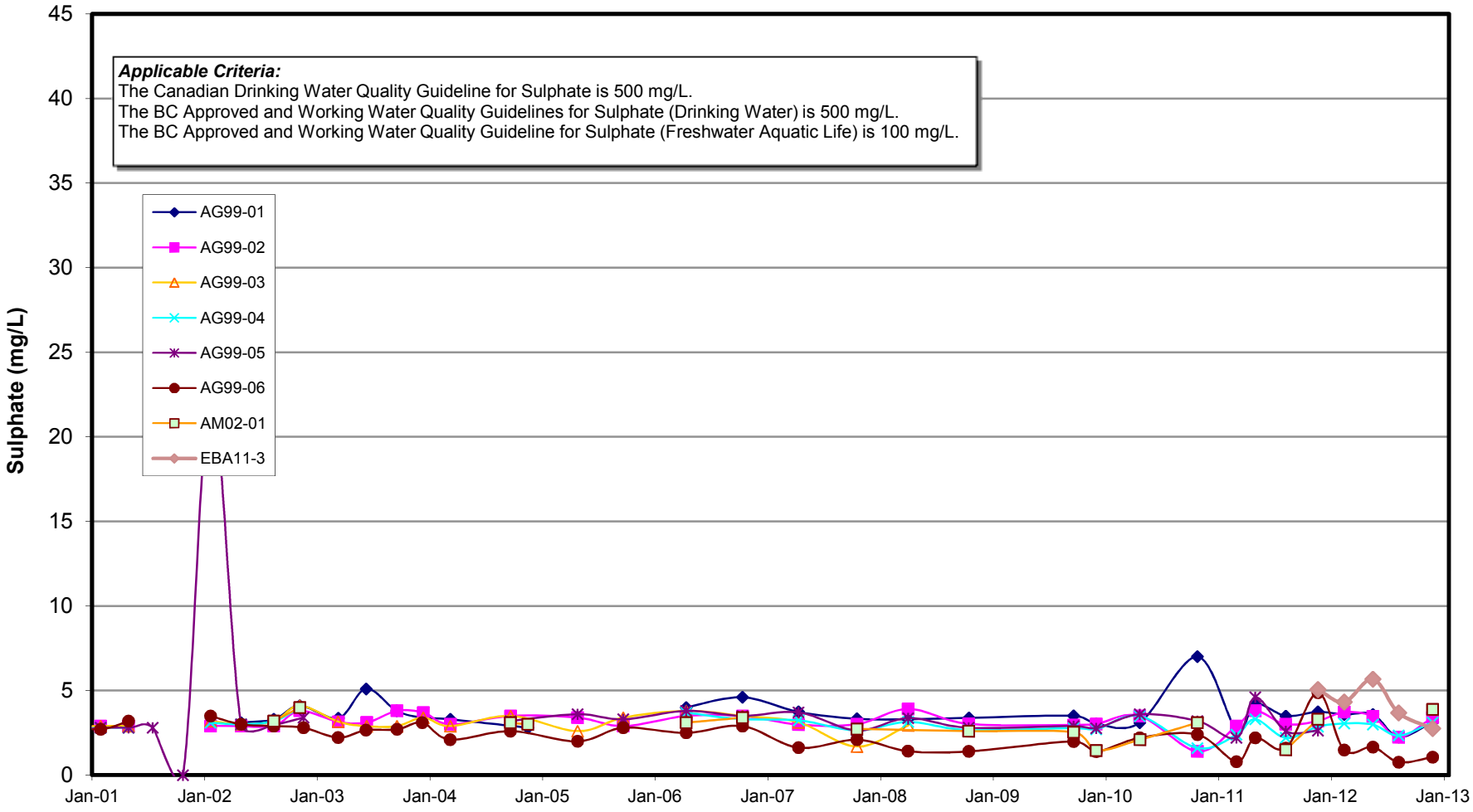
Note: Breaks in the lines indicate missing data.

Figure G3 - Sulphate at Campbell River Waste Management Centre - Boundary Wells



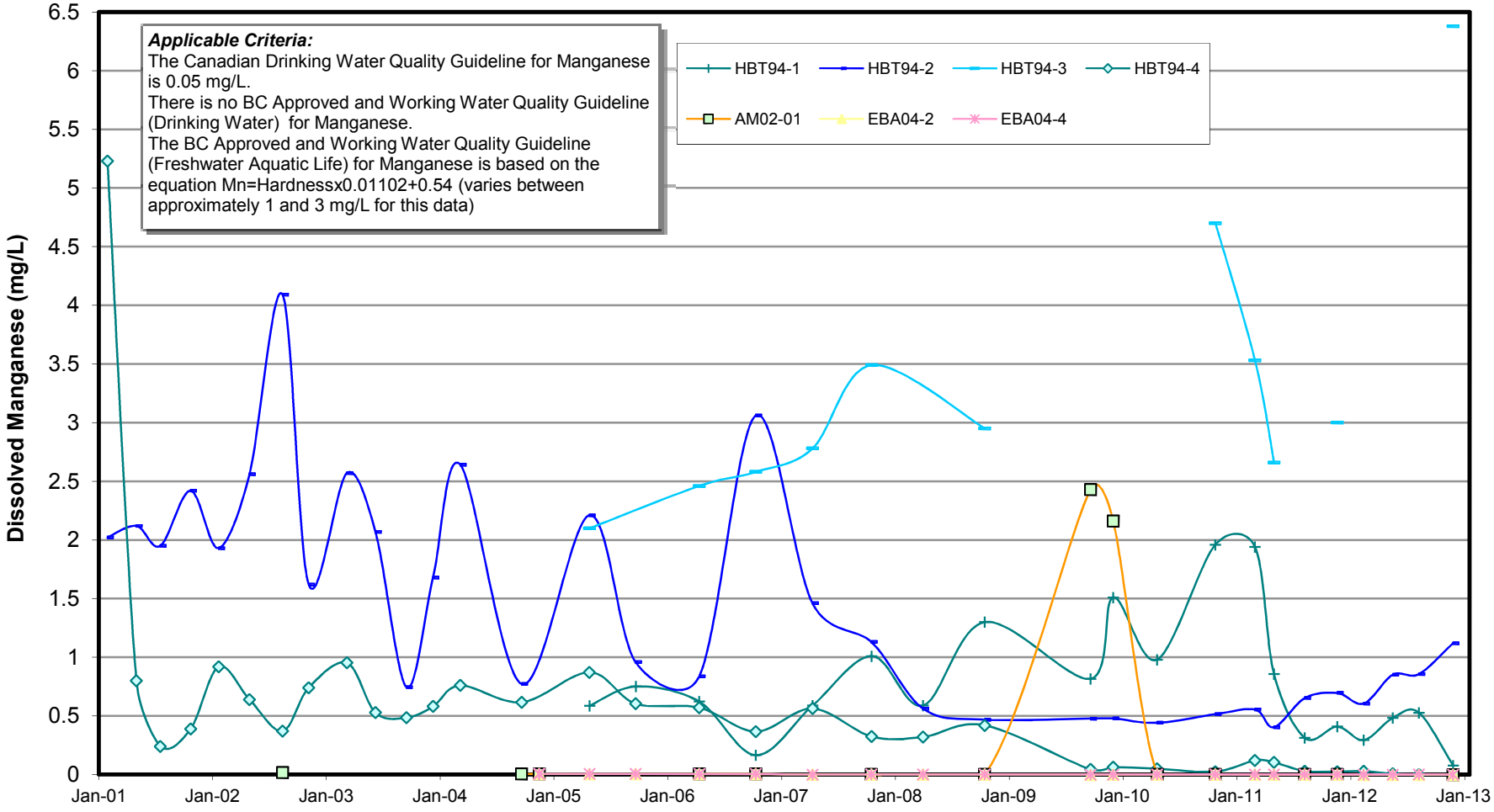
Note: Breaks in the lines indicate missing data.

Figure G3 - Sulphate at Campbell River Waste Management Centre - Downgradient Wells



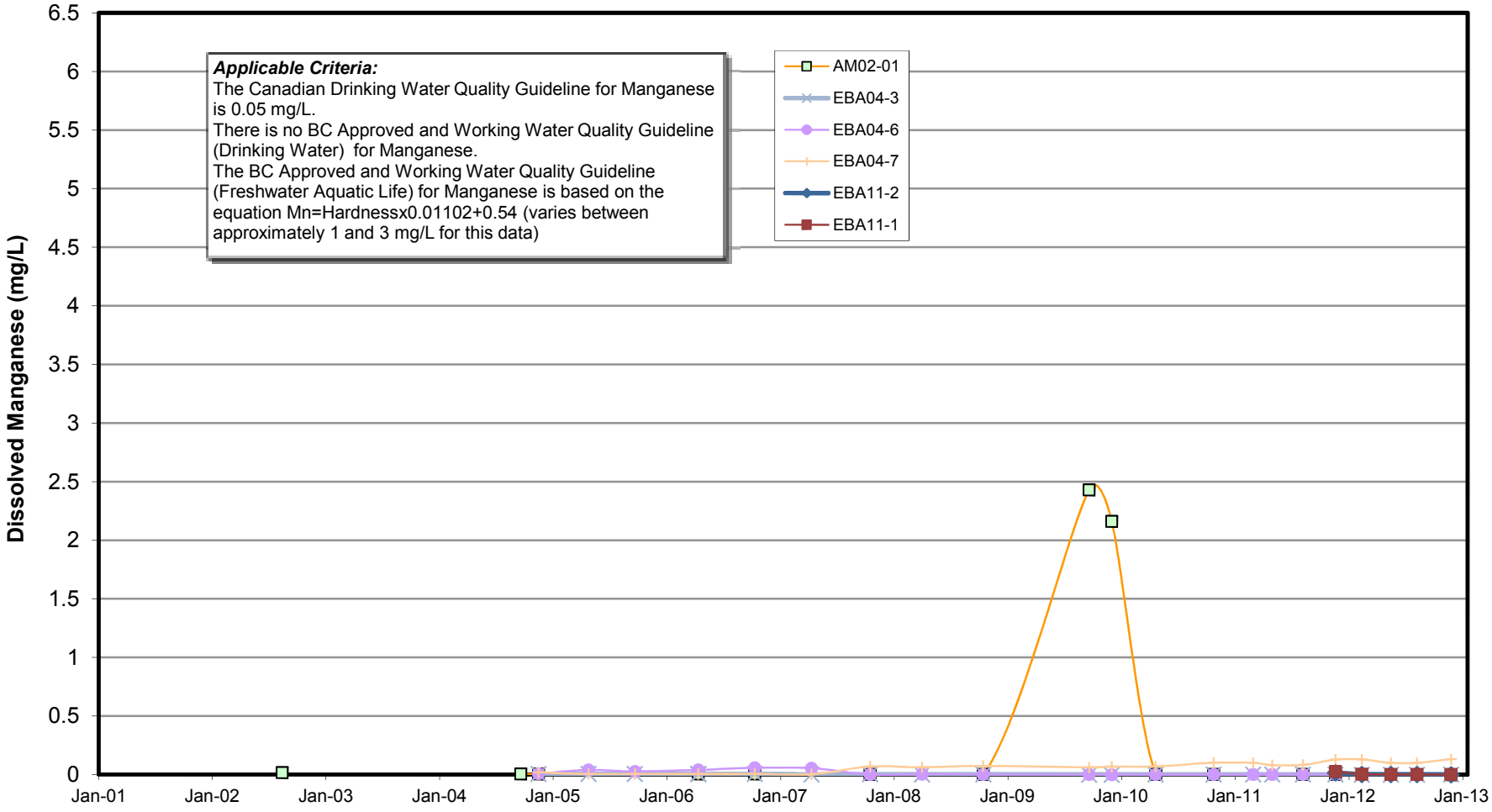
Note: Breaks in the lines indicate missing data.

Figure G4 - Dissolved Manganese Concentrations at Campbell River Waste Management Centre - Landfill Wells



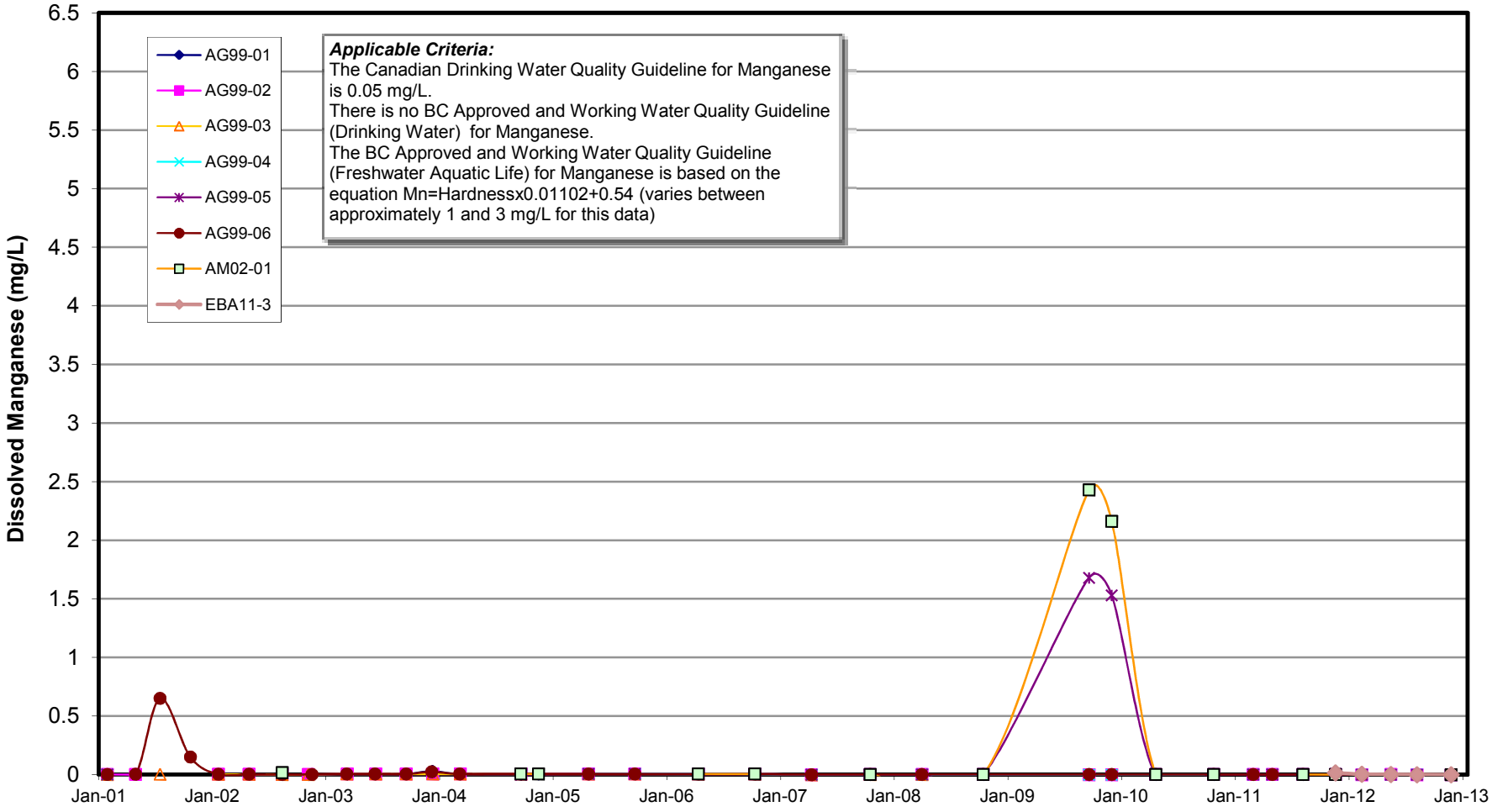
Note: Breaks in the lines indicate missing data.

Figure G4 - Dissolved Manganese Concentrations at Campbell River Waste Management Centre - Boundary Wells



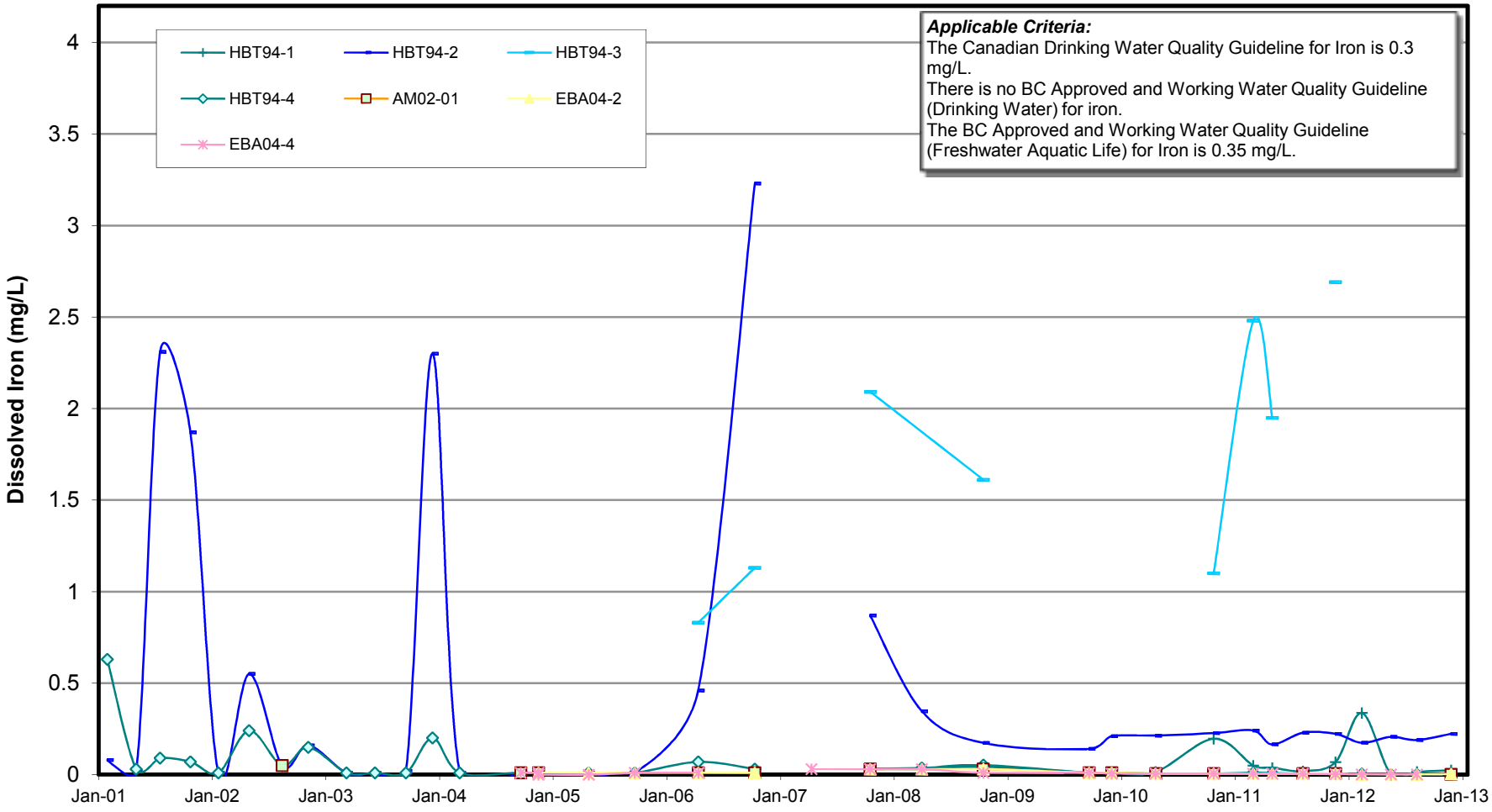
Note: Breaks in the lines indicate missing data.

Figure G4 - Dissolved Manganese Concentrations at Campbell River Waste Management Centre - Downgradient Wells



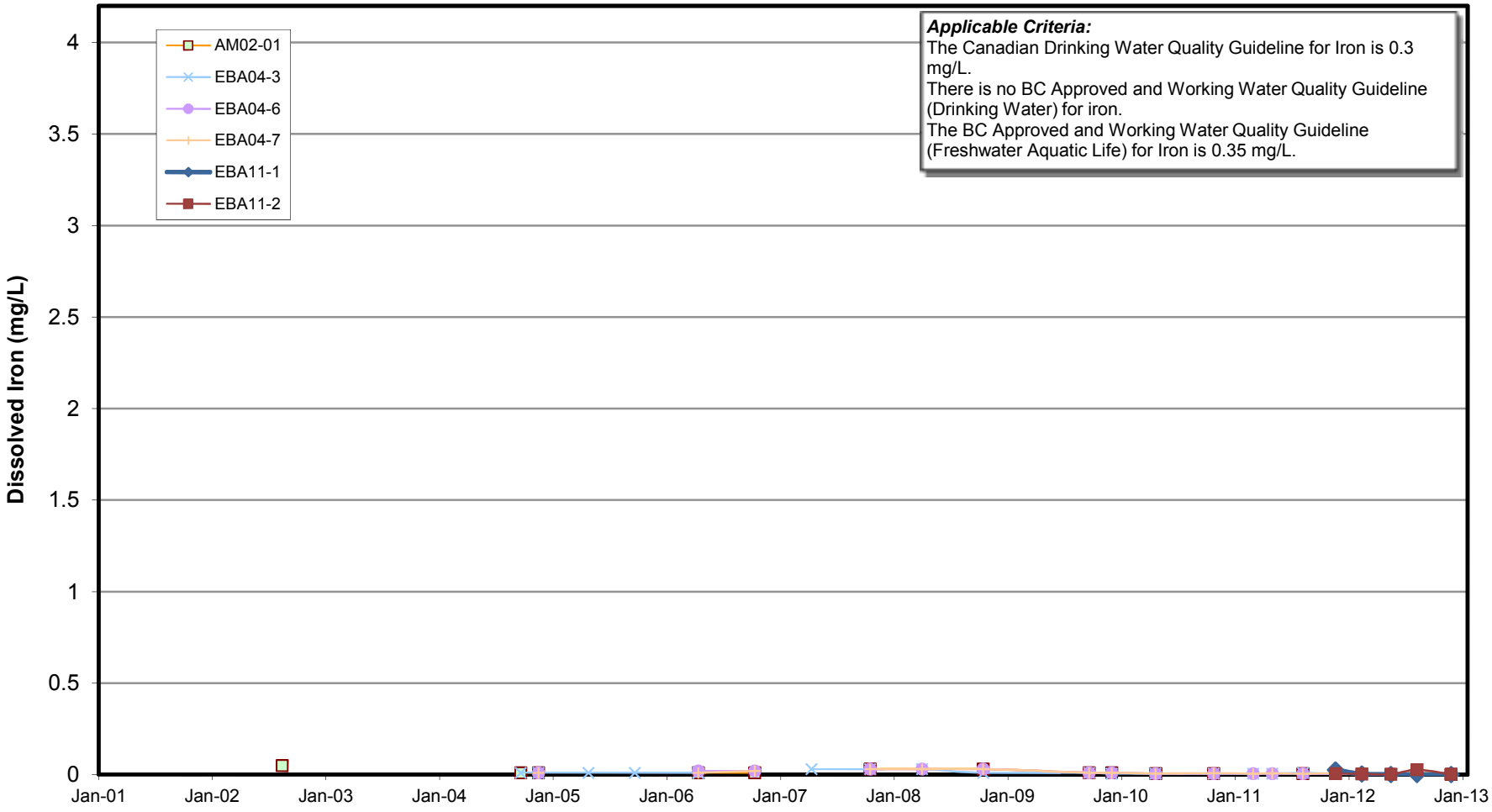
Note: Breaks in the lines indicate missing data.

Figure G5 - Dissolved Iron Concentrations at Campbell River Waste Management Centre - Landfill Wells



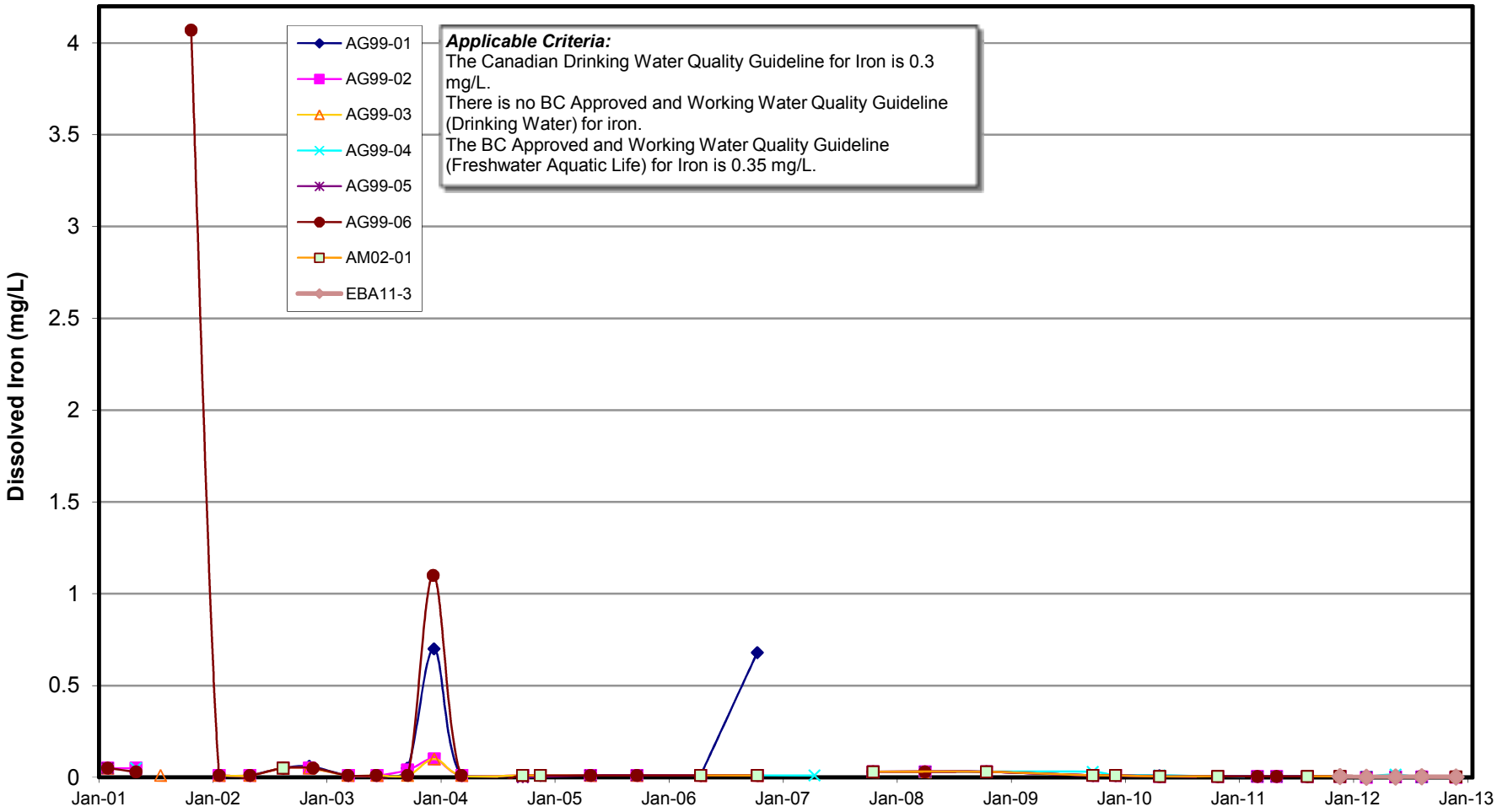
Note: Breaks in the lines indicate missing data.

Figure G5 - Dissolved Iron Concentrations at Campbell River Waste Management Centre - Boundary Wells



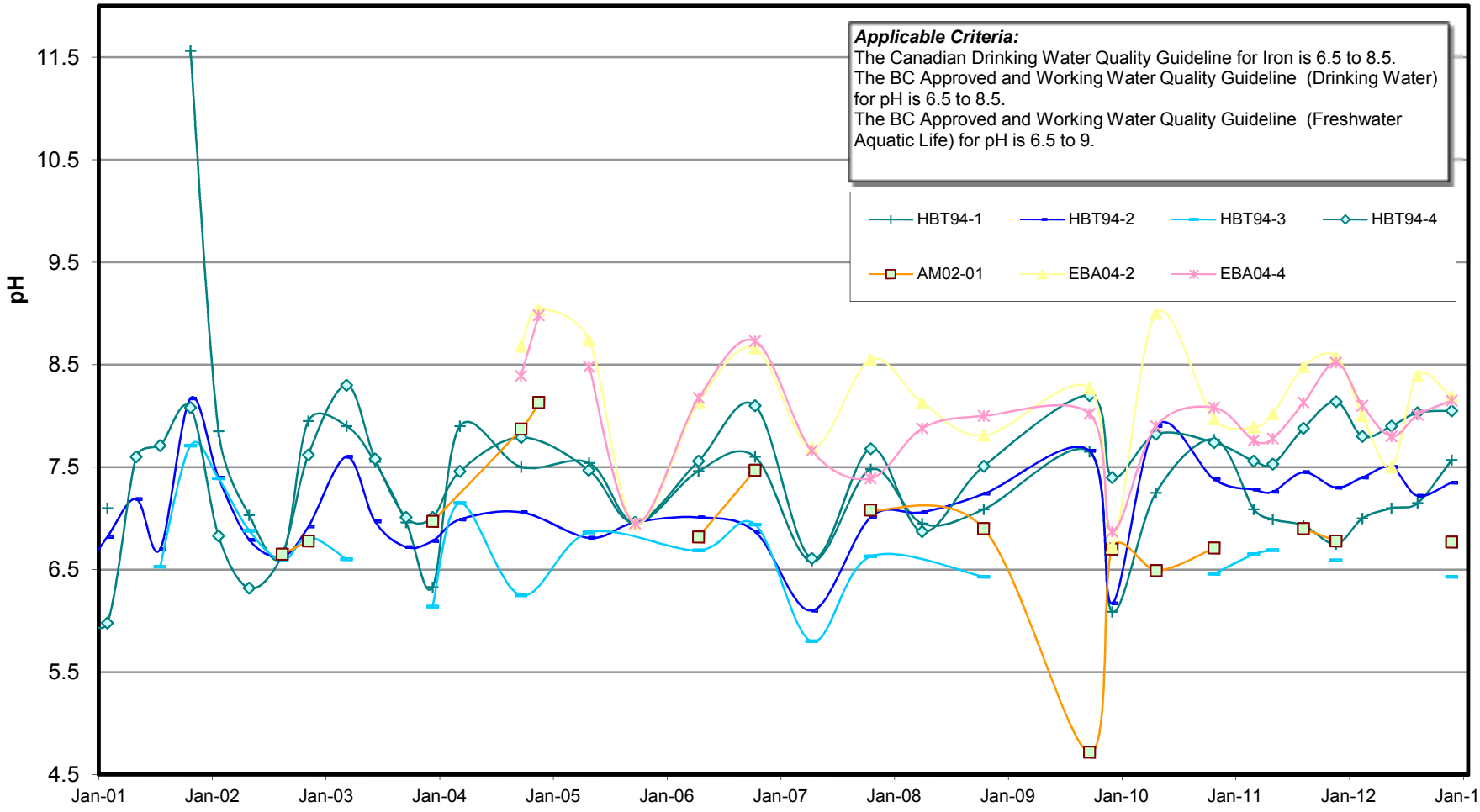
Note: Breaks in the lines indicate missing data.

Figure G5 - Dissolved Iron Concentrations at Campbell River Waste Management Centre - Downgradient Wells



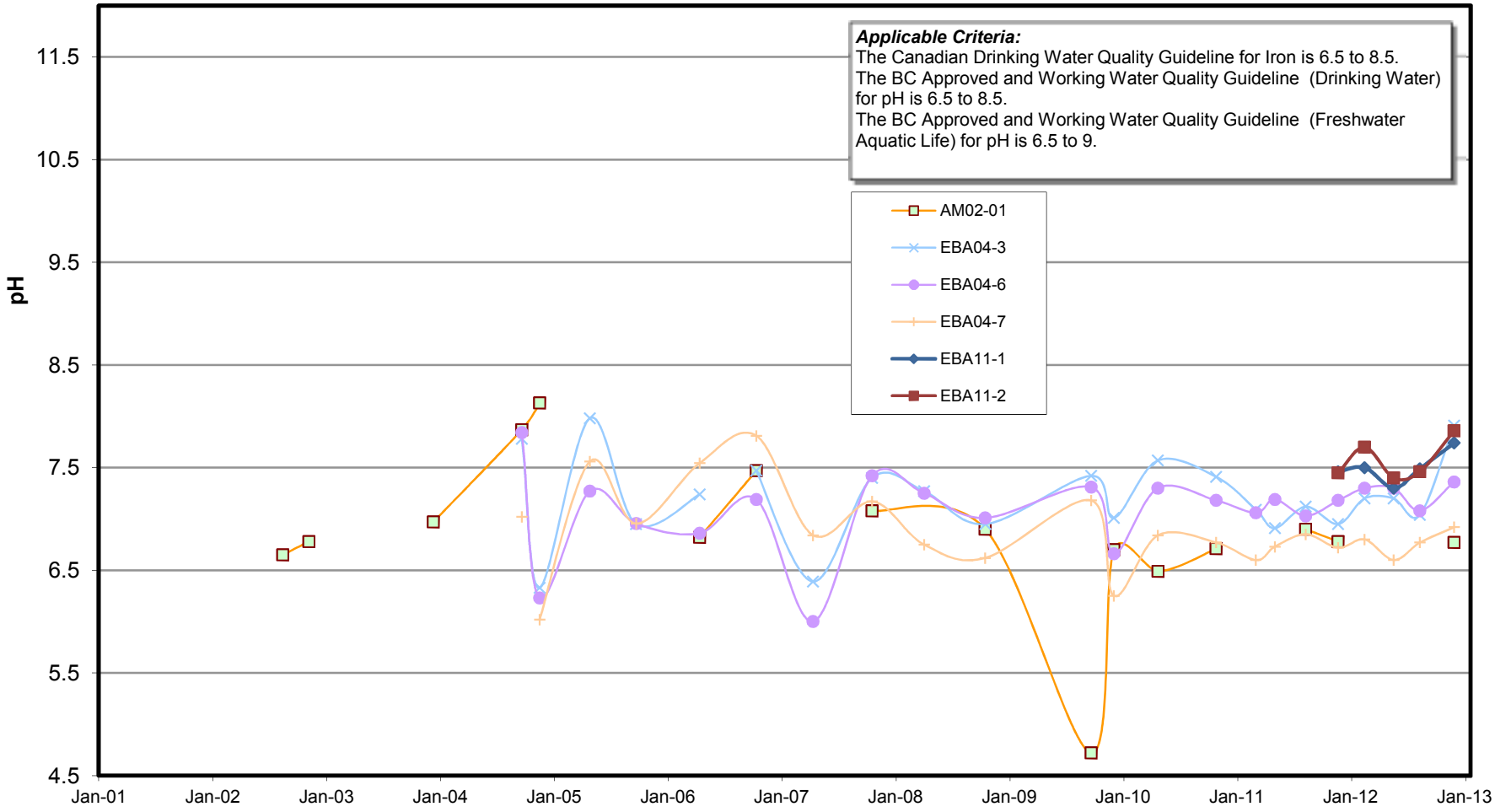
Note: Breaks in the lines indicate missing data.

Figure G6 - pH Concentrations at Campbell River Waste Management Centre - Landfill Wells



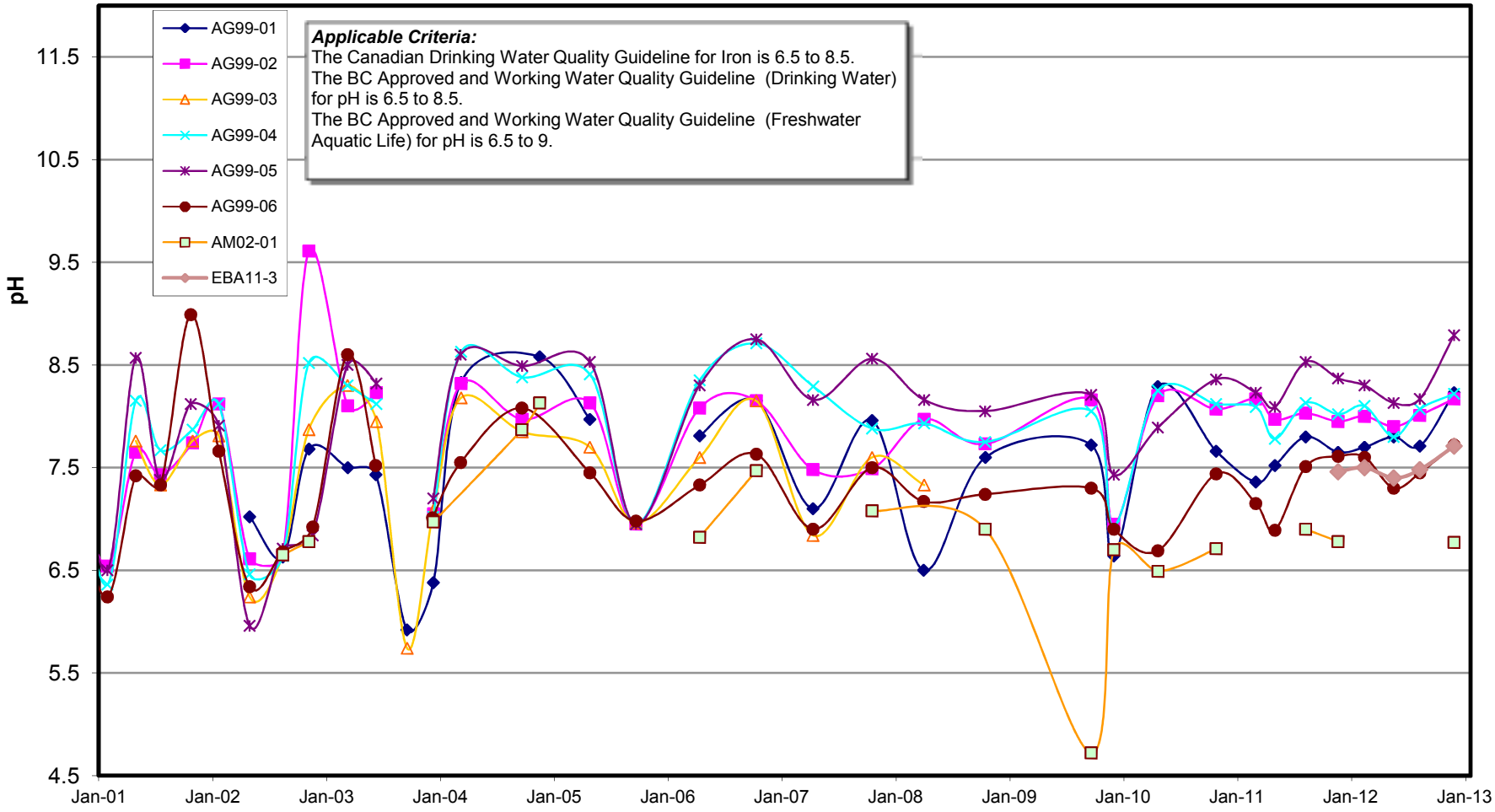
Note: Breaks in the lines indicate missing data.

Figure G6 - pH at Campbell River Waste Management Centre - Boundary Wells



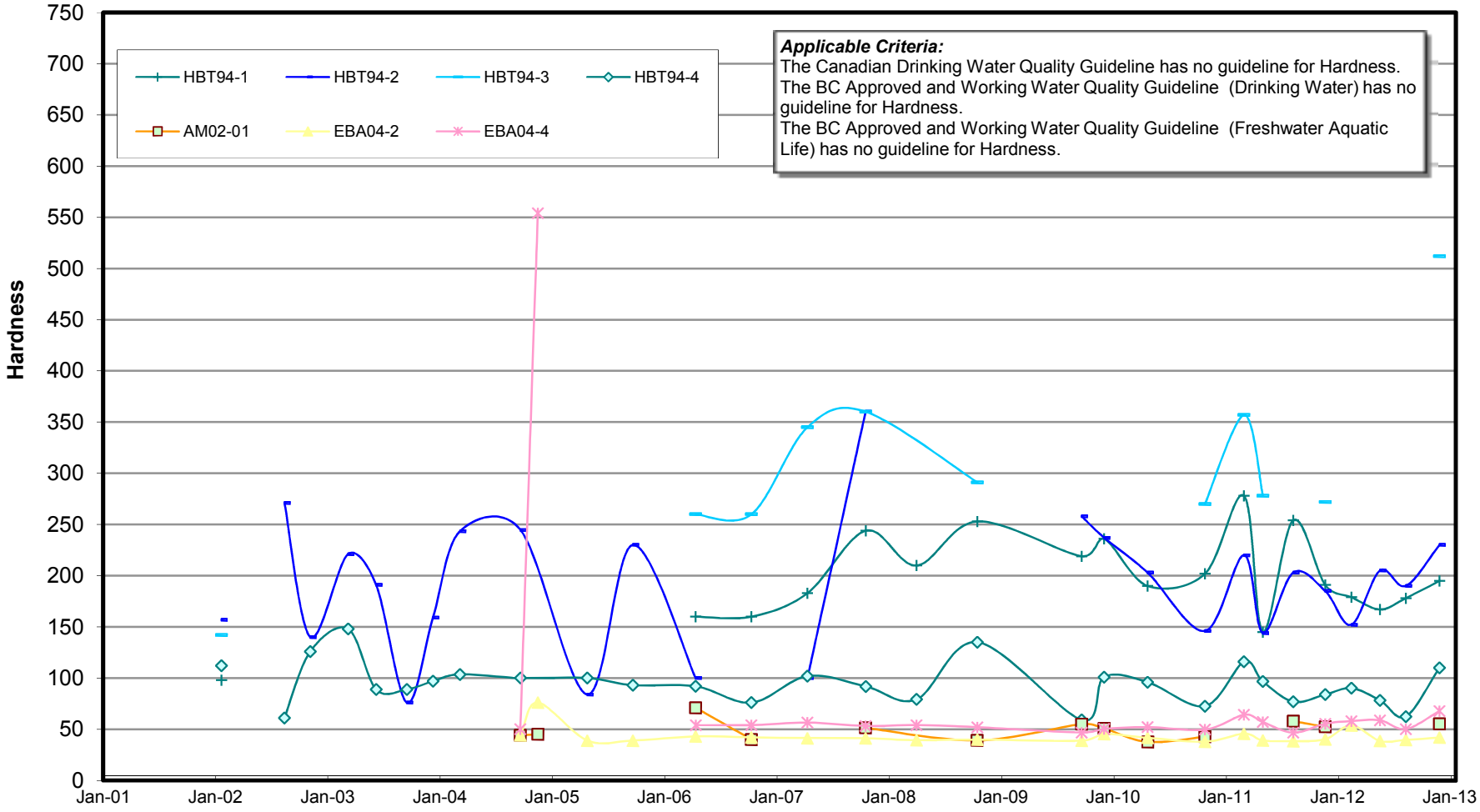
Note: Breaks in the lines indicate missing data.

Figure G6 - pH at Campbell River Waste Management Centre - Downgradient Wells



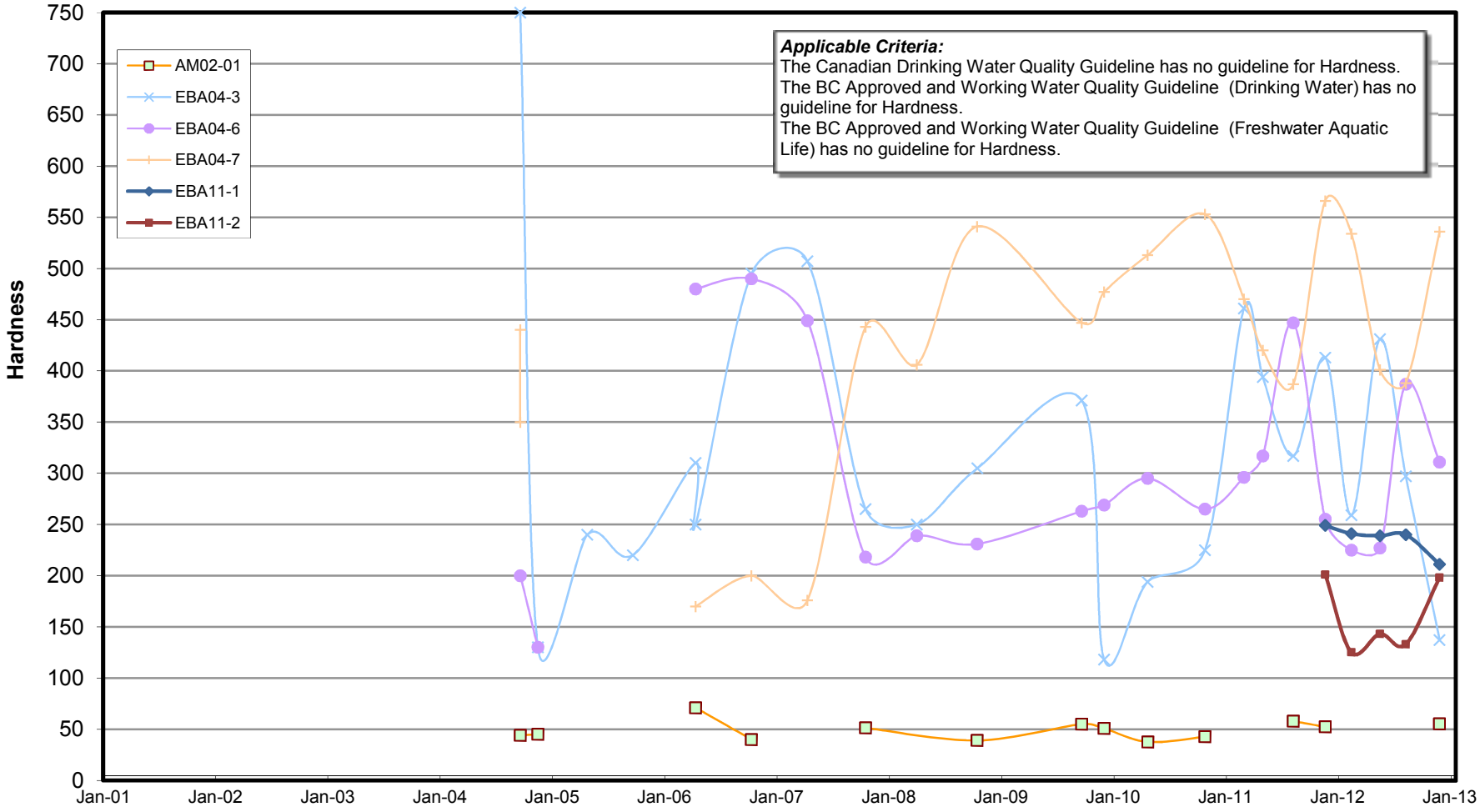
Note: Breaks in the lines indicate missing data.

Figure G7 - Hardness at Campbell River Waste Management Centre - Landfill Wells



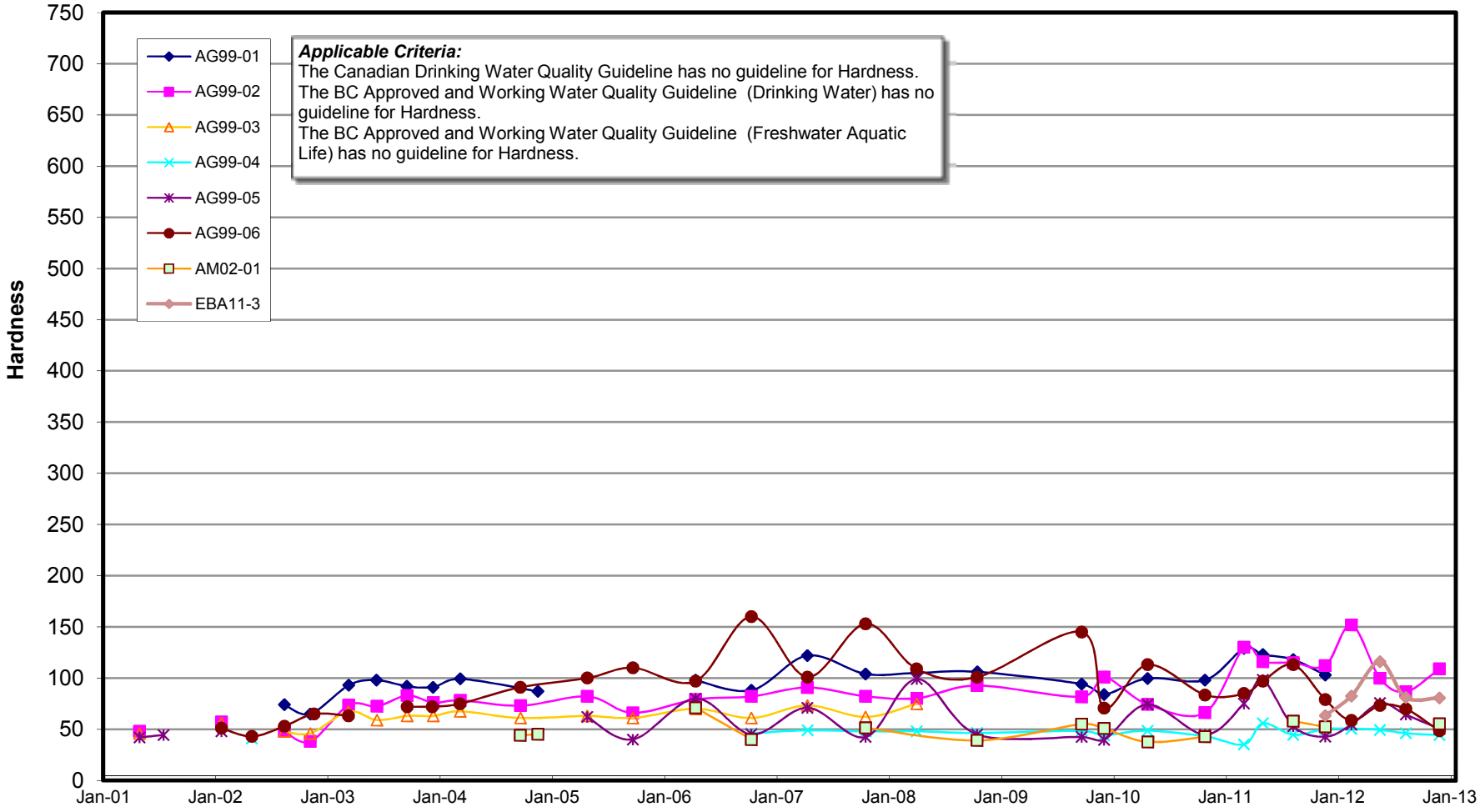
Note: Breaks in the lines indicate missing data.

Figure G7 - Hardness at Campbell River Waste Management Centre - Boundary Wells



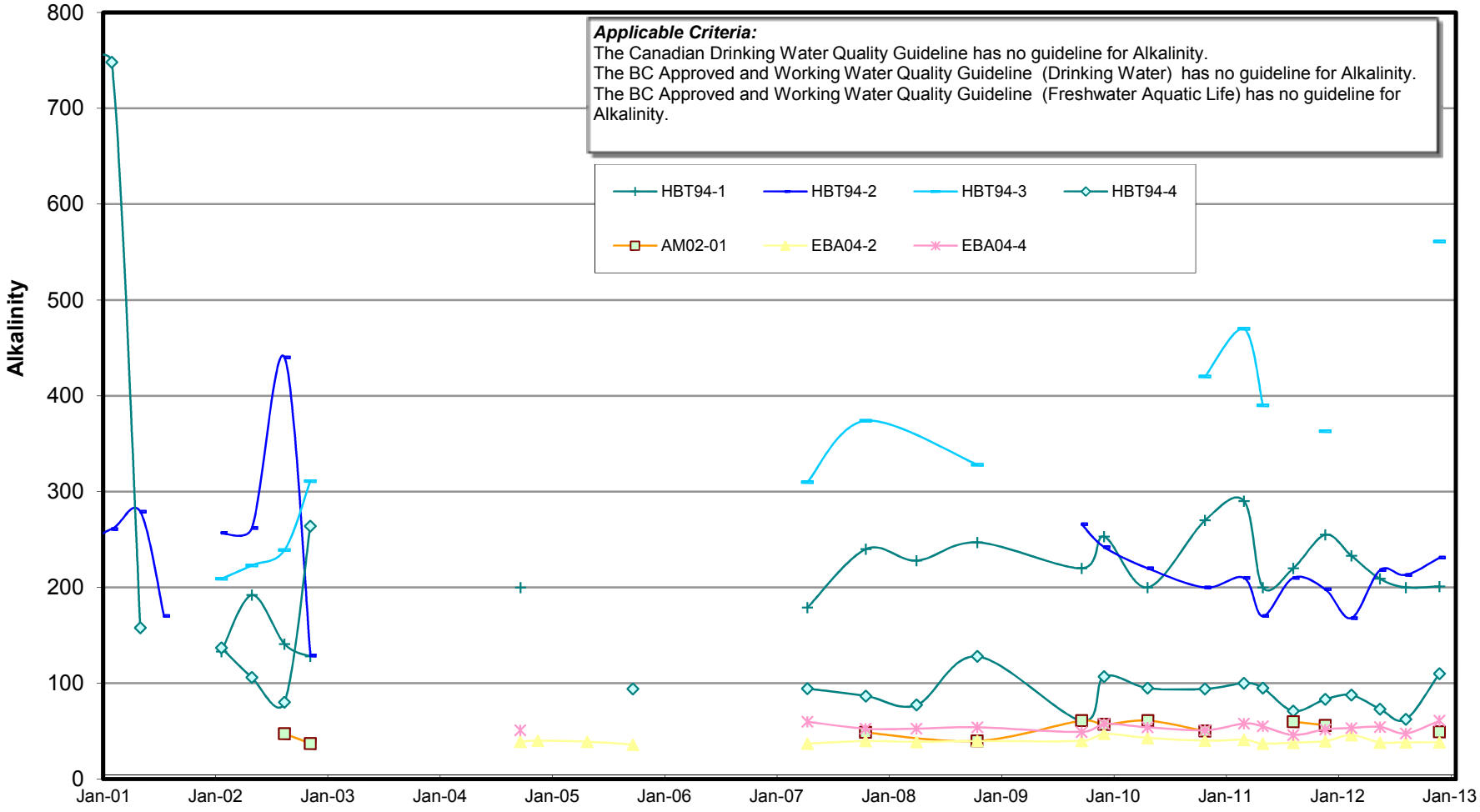
Note: Breaks in the lines indicate missing data.

Figure G7 - Hardness at Campbell River Waste Management Centre - Downgradient Wells



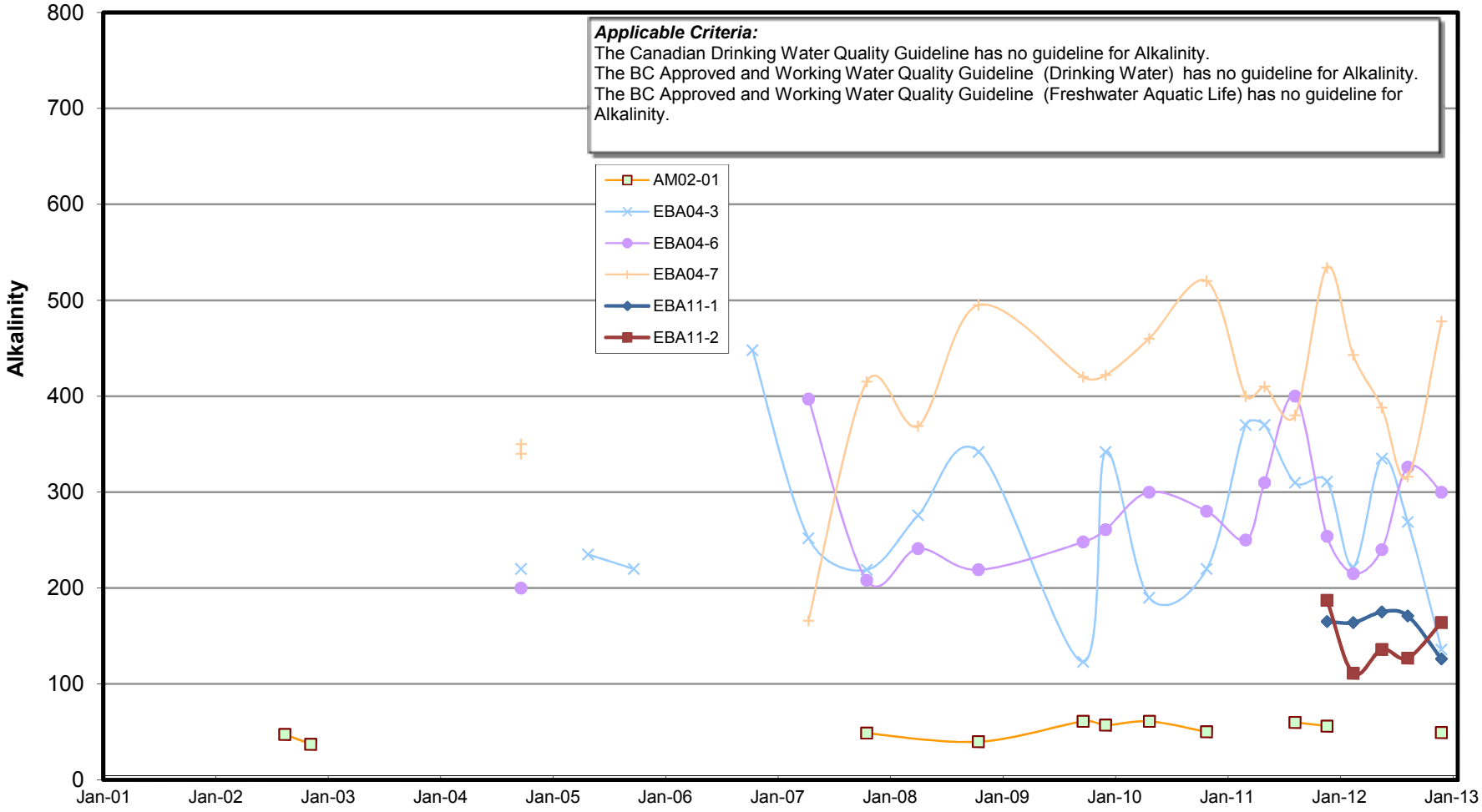
Note: Breaks in the lines indicate missing data.

Figure G8 - Alkalinity at Campbell River Waste Management Centre - Landfill Wells



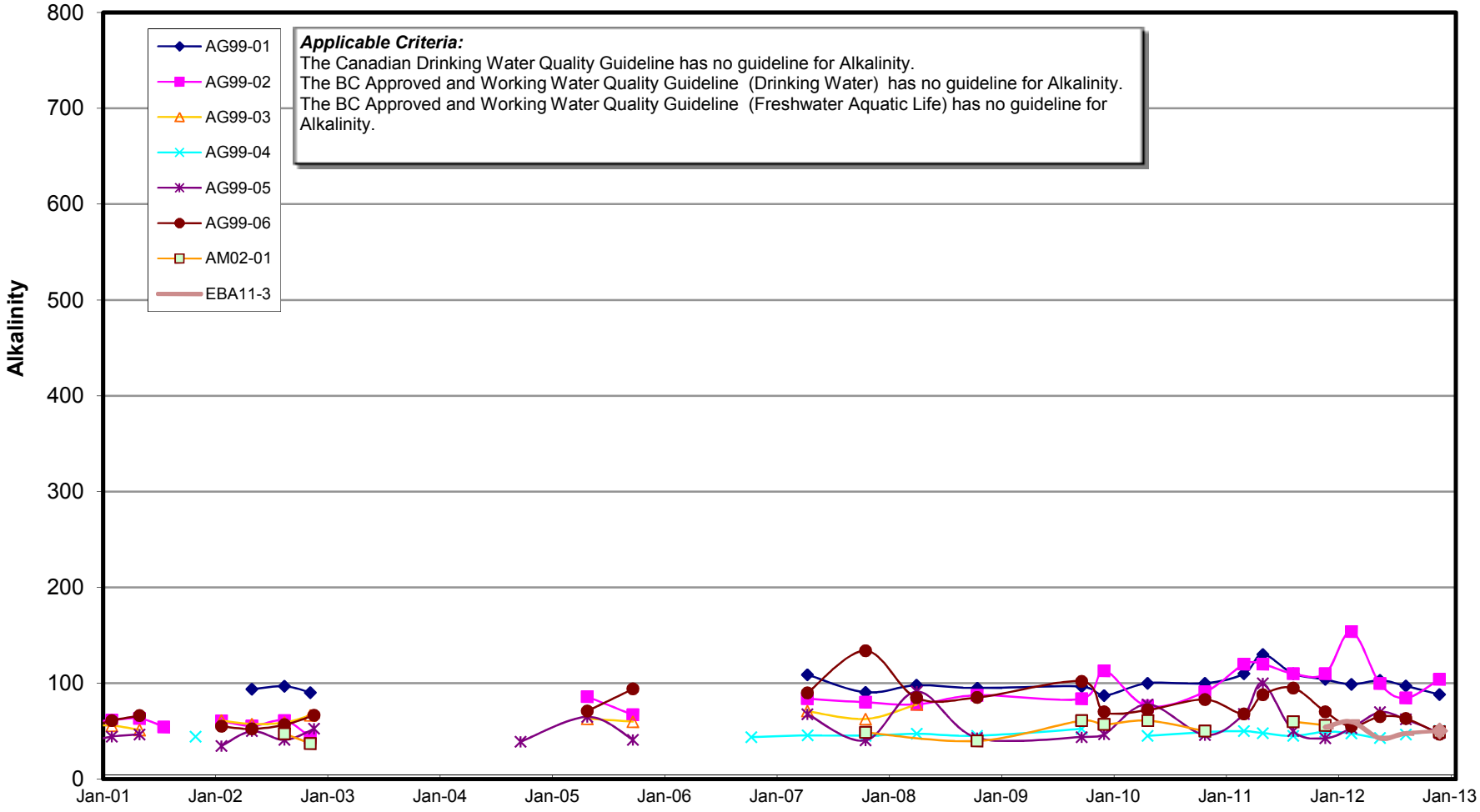
Note: Breaks in the lines indicate missing data.

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

ENVIRONMENTAL REPORT – GENERAL CONDITIONS

GENERAL CONDITIONS

GEO-ENVIRONMENTAL 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 EBA’s client. 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 EBA’s Client unless otherwise authorized in writing by EBA. Any unauthorized use of the report is at the sole risk of the user.

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2.0 ALTERNATE REPORT FORMAT

Where EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed 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 EBA shall be deemed to be the original for the Project.

Both electronic file and hard copy versions of EBA’s instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EBA. The Client warrants that EBA’s instruments of professional service will be used only and exactly as submitted by EBA.

Electronic files submitted by EBA have been prepared and submitted using specific software and hardware systems. 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 EBA in its reasonably exercised discretion.

4.0 INFORMATION PROVIDED TO EBA BY OTHERS

During the performance of the work and the preparation of the report, EBA may rely on information provided by persons other than the Client. While EBA endeavours to verify the accuracy of such information when instructed to do so by the Client, EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.