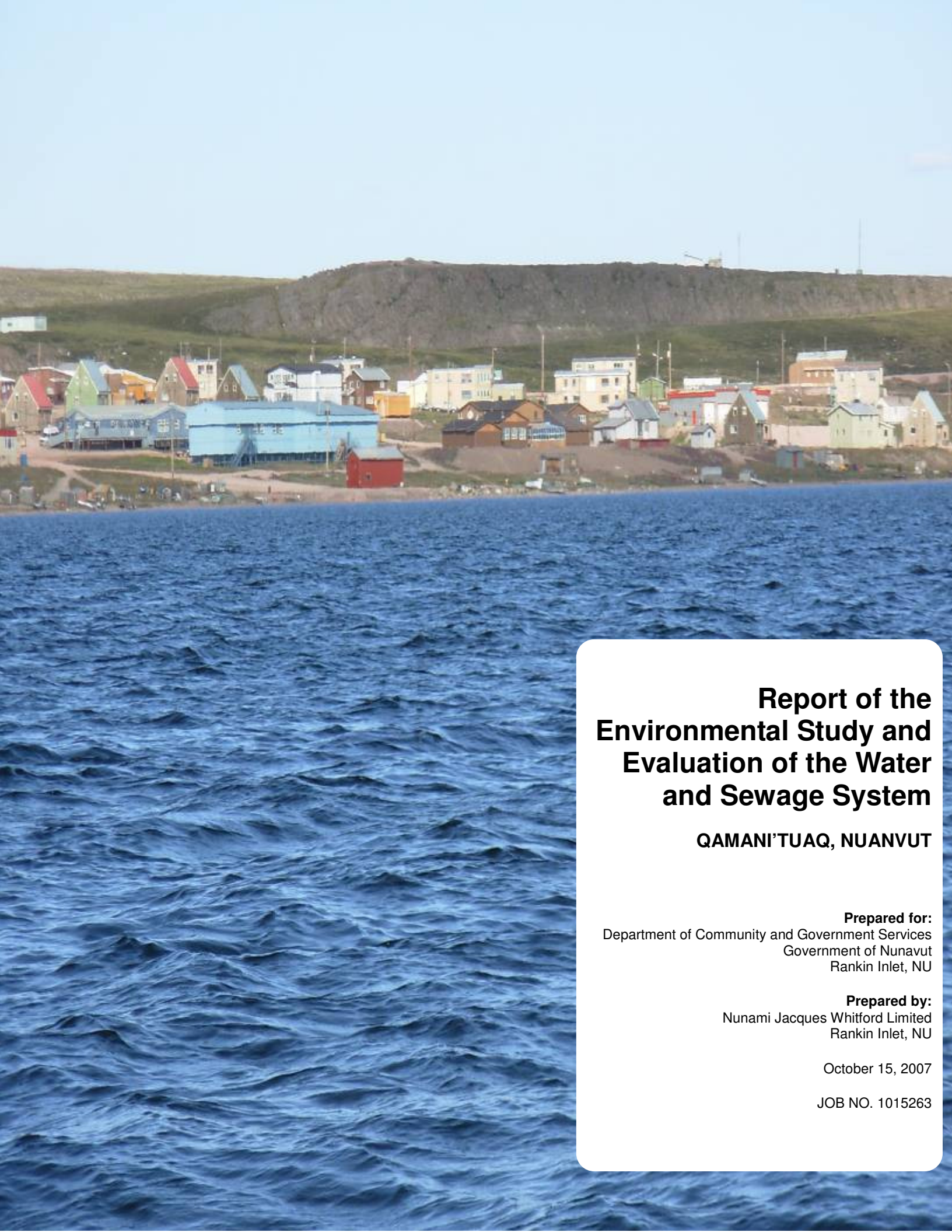




Report of the Environmental Study and Evaluation of the Water and Sewage System

QAMANI'TUAQ, NUANVUT

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Executive Summary

The Hamlet of Qamani'tuaq (the Hamlet) draws its drinking water from Baker Lake and trucks it to users throughout the community. Sewage generated in the community is treated in a natural wetland system (the Tundra Wetland) before eventually flowing into Baker Lake through Garbage Creek. The Tundra Wetland consists of a sewage holding cell, and a natural wetland providing sewage treatment, with two small lakes, and the channels between them. Leachate from the Hamlet's solid waste facilities also enters the wetland system. Residents and regulators are concerned about the effectiveness of the wetland treatment system and potential impacts from the wetland to their drinking water. As such, the Government of Nunavut's (GN's) Department of Community and Government Services (CGS) retained Nunami Jacques Whitford Limited (NJWL) to investigate wastewater treatment effectiveness in the Tundra Wetland and to assess the water quality of Baker Lake. The overall objectives of the study included:

- Reviewing the performance of the sewage treatment system to determine if it is meeting current Nunavut Water Board (NWB) license requirements and what, if any, modifications may be needed to meet current and future requirements;
- Determining water quality in the area of drinking water intake, identifying actual or potential impacts to drinking water quality and recommending measures to address such impacts; and
- Improving local capacity to understand the operation of the water and sewage disposal systems; and to undertake monitoring of same.

NJWL visited the community of Qamani'tuaq on two occasions in the summer of 2006. A third visit took place in early October to complete a second round of sampling prior to freeze up, and a fourth visit occurred in June 2007 to complete the third and final round of sampling during spring melt. Samples were obtained from Baker Lake and the Tundra Wetland during all sampling events and sent to ALS Laboratories in Winnipeg, MB for analysis.

Results from samples collected in the Tundra Wetland indicate that the wetland is able to effectively treat the majority of parameters in compliance with Nunavut Water Board licence requirements. Two exceptions were noted at STN-6 where pH exceeded licence requirements in August 2006 and biological oxygen demand exceeded in June 2007. Leachate from the current solid waste facility does appear to be impacting water quality within the Tundra Wetland. Levels of iron, aluminum, cadmium, copper and phenols were above the recommended CCME guideline at the compliance point during one or more sampling events. Concentrations of phenols and these metals were below guidelines by the time effluent reached Baker Lake. It was recommended that enhancements to the current system (e.g. enlarged holding cell, flow attenuation berms) are completed to improve current treatment and to meet future sewage volumes. Additionally, while not a treatment issue, the installation of fencing to prevent caribou access to the head of the wetland is recommended.

The water quality of Baker Lake was found to be suitable for drinking water purposes during all sampling events. Health Canada's Guidelines for Canadian Drinking Water Quality were not exceeded during summer or fall 2006. In June 2007, the open water shoreline of Baker Lake was sampled; aluminum and turbidity exceeded the recommended drinking water values. These exceedances are not thought to be significant from a human health or aesthetic perspective as onshore water of Baker Lake is not used for drinking water purposes and the value for aluminum is not aesthetically or health-based.

Elevated levels of cadmium and silver were present in water samples collected in August and October of 2006. These metals exceeded the CCME guidelines for the protection of freshwater aquatic life, though they did not exceed drinking water guidelines. Cadmium and silver were not elevated in samples collected from Baker Lake in June 2007, however several metals, including cadmium, were detected in streams draining the community. Other parameters were also notably higher in drainage streams,

suggesting that streams flowing through the community pick up materials and contaminants, and transport them into Baker Lake. NJWL developed a preliminary Water Source Protection Plan for the GN's and Hamlet's consideration to address existing and potential impacts to the Hamlet's drinking water source. It was also recommended the shoreline be cleaned and maintained, signs erected identifying Baker Lake as a drinking water source, and further assessment be completed into the source of contaminants within community drainage.

Following completion of NJWL investigation over three seasons, there does not appear to be a strong influence of Garbage Creek water at the drinking water intake, 2 km to the west. The presence of a large sandbar at the mouth of the Thelon River can direct large volumes of water from the river northeast, along the lakeshore in front of the community; implying greater influence of the Thelon River at the intake, and that Garbage Creek would flow eastward, away from the drinking water intake. Additionally, examination of water quality in through the three sampling events shows elevated levels of certain parameters at the intake which are not present in Garbage Creek water. As well, in June when ice is present on Baker Lake and the shoreline is open, there was no consistent decrease (or dilution) between the outflow of the Tundra Wetland and the nearest station, 1000 m to the west, implying little, or no, influence of Garbage Creek at that station.

This final report serves to inform CGS and Qamani'tuaq on the findings of NJWL's investigation, and provides recommendations for future improvements to the Tundra Wetland and water quality of Baker Lake.

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1 Introduction

1.1 Project Overview

Nunami Jacques Whitford Limited (NJWL) was retained by the Department of Community & Government Services (CGS), Government of Nunavut (GN) to investigate the effectiveness of the natural wetland sewage treatment facility (the Tundra Wetland) and the quality of the drinking water source in Qamani'tuaq (Baker Lake, the Hamlet), Nunavut. The specific project objectives included:

1. Assessing the Tundra Wetland Area, including:
 - reviewing background information about the wetland treatment system;
 - estimating the volume of sewage produced by the community over a 20 year period;
 - obtaining effluent samples at stations identified in the Water Licence's "Surveillance Network Program" and any other locations required to evaluate wetland treatment performance;
 - outlining and mapping the physical limits of the existing Tundra Wetland area;
 - conducting a fish habitat and wildlife study on Lagoon Lake, Finger Lake and Airplane Lake and interconnecting creeks to determine what environmental impacts the sewage effluent may be having on the fish and wildlife in the wetlands area;
 - determining the capacity of the Tundra Wetland to meet Nunavut Water Board Licence requirements over the 20 year period and identifying any improvements that are necessary to meet such requirements; and
 - consulting with the Hamlet and CGS about findings and preparing a capital investment plan and cost estimates for recommended improvements to the Tundra Wetland sewage treatment system.
2. Assessing and Evaluating the Existing Water Supply Source, including:
 - evaluating the water currents in Baker Lake in the vicinity of the drinking water source and the final sewage effluent discharge from Garbage Creek;
 - conducting a water sampling program in Baker Lake to cover a distance of approximately 2000 m on each side of the drinking water intake;
 - conducting a visual survey of the community to identify potential hazards to the drinking water source and developing a water source protection plan;
 - consulting with Transport Canada and Nunavut Power to attempt to determine if contamination from their sites is leaching into Baker Lake;
 - consulting with Inuit Elders to collect traditional knowledge pertaining to the study; and
 - consulting with the Department of Health and Social Services to obtain records of bacteriological analysis of untreated water from Baker Lake water pump house and identifying any historical drinking water quality issues.

The Project commenced with a meeting with Hamlet Council and staff in June 2006 to discuss the purpose and intent of the Project and to identify preliminary concerns for investigation. Three sampling events were undertaken; the first two were between July 31 and August 4, and October 3 and 6, 2006 with the third event occurring between June 18 and 21, 2007. This final report is based on the activities conducted and results obtained in 2006 and 2007.

1.2 Report Organization

The study findings are presented in ten sections. Section 1 outlines the objectives of the study and provides background information on treatment wetlands. Section 2 provides an overview of the local environment and the water and waste facilities. A summary of available information from previous reports is provided in Section 3. Section 4 presents a description and evaluation of the wetland treatment system. The assessment of water quality in Baker Lake is presented in Section 5.

The results of consultations undertaken to date are documented in Section 6. Final conclusions and recommendations are presented in Sections 7 and 8, respectively. Report closure is provided in Section 9, with references available in Section 10. Appendices include drawings, analytical summary figures, photographs, laboratory certificates, report and recommendations for the Tundra Wetland, the water source protection plan, and the results of the elder consultation.

1.3 Wetlands

Wetlands are defined as lands that are seasonally or permanently inundated by shallow water. In them, the presence of abundant water has caused the formation of hydric soils (saturated with water and anaerobic in nature) and has favored the dominance of either aquatic (hydrophytic) or water-tolerant vegetation. In Canada, 127.2 MM hectares (14% of the surface) are wetlands, most of them peatlands.

Wetlands are dynamic ecosystems that undergo seasonal and annual changes in composition of plant, microbial and animal species. Hydrologic changes have the largest effect. Some wetlands are dry for part of the year, depending on seasonal flooding to maintain their wetland characteristics. Many wetlands are more productive than fertile farm fields, as they receive, hold and recycle nutrients continually washed into them from higher, drier ground.

The ecological functions of wetlands include controlling and storing surface water (and/or the discharge of groundwater); aiding in flood control and conveyance; providing corridors for wildlife movement; protecting shorelines from erosion; supporting complex food chains; providing habitat; trapping sediments; and interacting with dissolved and suspended materials in the water in manners that maintain and improve water quality.

It is these latter attributes which interest engineers. Wetlands can be used to remove a variety of contaminants in water including nutrients, undesirable micro-organisms, suspended and dissolved solids, heavy metals, oil and grease, and other organic compounds. Wetland plants absorb and assimilate nutrients from water and release oxygen as a by-product of photosynthesis. This increases dissolved oxygen content in the water and the soil in the vicinity of plant roots, thereby allowing aerobic microbial reactions to supplement the anaerobic ones typical of hydric soils. Accordingly, wetlands can treat many kinds of waterborne contaminants. They can remove or convert large quantities of pollutants that enter as leachates, municipal and industrial wastewater or surface runoff from non-point pollution sources (e.g., agricultural areas, urban streets). The impacts of these discharges on wetlands have been highly variable, but in general wetlands have functioned well as pollution removal mechanisms.

1.3.1 Wetland Categorization

There are three basic kinds of wetlands: natural wetlands, created wetlands and constructed wetlands. Created and constructed wetlands are artificial systems, designed and built for specific purposes. Created wetlands are built for purposes other than wastewater treatment (e.g., recreation, habitat creation, mitigation). For example, Ducks Unlimited builds many created wetlands for habitat purposes.

Constructed wetlands consist of two main categories: those for water quantity control (stormwater wetlands) and those for water quality control - wastewater contaminants removals/mitigations. The latter, to which the term constructed wetlands (CWs) is more generally associated, can be used to treat

municipal (e.g., raw or partially pre-treated sewage), agricultural (e.g., manure pile leachates) or industrial wastewaters (e.g., discharged process water and acid drainages from mining operations).

Both natural and constructed wetlands can be used for wastewater treatment (WWT) and both are referred to as treatment wetlands. The undersurface of wetland water contains a microbial biofilm, a complex community of many kinds of bacteria, fungi and other microbes. Organisms in the biofilm are primarily responsible for removing contaminants that enter the wetland, although some wastewater treatment also occurs by settling/filtration, direct plant uptake, and planktonic microorganisms in open water areas. The release of oxygen from algae and aquatic plants also results in an increase in dissolved oxygen levels in water and in sediment around the plant roots, creating an environment suitable for aerobic organisms. Accordingly, wetlands can be used to treat pollutants from sewage discharges, leachates, and/or surface runoff from non-point pollution sources by involving both aerobic and anaerobic removal mechanisms. Treatment wetlands can be considered natural, largely solar-powered WWT facilities.

1.3.2 Advantages and Disadvantages of Treatment Wetlands

There are several advantages to using wetlands for treating or polishing wastewaters, Wetlands:

- provide effective and reliable wastewater treatment;
- are relatively inexpensive to adapt or construct;
- are relatively economical to operate and have low labour and energy requirements;
- are able to accept varying quantities and concentrations of pollutants;
- are tolerant of fluctuating hydrologic and contaminant concentration conditions;
- provide indirect aesthetic benefits (e.g., habitat, green space, recreation); and
- can be readily linked with other kinds of natural WWT facilities (e.g., lagoons, detention cells, sedimentation ponds, biofilters) to provide enhanced WWT.

However, using treatment wetlands for wastewater treatment is not a panacea. There are disadvantages to the use of these wetlands for WWT. Wetlands:

- require large land areas;
- are ecologically and hydrologically complex;
- can lead to pest problems (e.g., mosquitoes);
- may not prove practical in situations where local conditions (topography, drainage, soils, etc.) are not suitable;
- if constructed, may require some time before optimum efficiency is achieved;
- may be unfamiliar to regulatory authorities who may not have precedents;
- be subject to erroneous negative perceptions, related to poor design of many early treatment wetlands; and
- operate at lower efficiencies during winter.

1.3.3 Natural Wetlands

Natural wetlands support, at least periodically, hydrophytes (water-loving plants) and contain predominantly un-drained hydric (i.e., saturated anoxic) soils, or non-soil substrates saturated or covered by shallow water at some time during the growing season each year. They contain little or no flood-intolerant vegetation.

Natural wetlands occur in surface depressions, and along streams, lakes and the sea; they often provide the interface between fully aquatic and terrestrial ecosystems. Waters in natural wetlands are generally less than two metres deep (and often very much shallower), and may stand/flow both on the surface and sub-surface in and through soils and substrates. Regular to erratic drying cycles may occur and water level fluctuations are normal. Wetland morphology can be complex, with many flow channels, backwaters and other heterogeneous areas.

The Canadian Wetland Classification System (NWWG 1997) defines natural wetlands in three hierarchical levels: classes, forms and types. There are five wetland classes: bogs, fens, marshes, swamps and shallow water wetlands. Bogs and fens are types of peatlands, as are some other sub-classes. Saturated areas dominated by water-resistant woody plants and trees are called swamps and areas dominated by soft-stemmed plants are called marshes.

There are 70 wetland forms, defined by source water, basin topography, morphology, etc: 18 types of bogs (e.g., collapse scar bogs, string bogs); 17 forms of fens (e.g., channel fens, basin fens); 15 forms of marshes (e.g., floodplain marshes, tidal freshwater marshes); 7 forms of swamps (e.g., peat margin swamps, stream swamps); and 13 forms of shallow water wetlands (e.g., delta water wetlands).

There are eight natural wetland types, defined by vegetation type: treed, shrub, forb, graminoid, moss, lichen, aquatic and non-vegetated wetlands.

1.3.4 Natural Wetlands for Wastewater Treatment

Natural wetlands are generally used for wastewater treatment mainly in northern and remote communities, although there are exceptions such as the Town of Houghton Lake in Michigan, which has used a natural wetland for WWT since the 1970s. In addition natural wetlands are often used as receiving waters for wastewaters that have been treated by some other WWT process. In such cases, they provide a complementary polishing role.

Because of the heterogeneous physical structure of a typical natural wetland, very large areas are required to ensure adequate wastewater treatment. In the past, a commonly accepted hydraulic loading rate (wastewater flow rate over wetland area) for natural wetlands treating domestic sewage was 27.6 ha of wetland surface area per 1000 m³/d of sewage flow introduced, but more recent studies have indicated that as little as 1.4 ha/1000 m³/d can be appropriate if conditions are right, some pre-treatment has occurred, and/or the wetland has been “engineered” to ensure better contact between wastewater and the vegetation/microbial biofilm in the wetland. A more conservative recommendation for areas outside the Arctic is for 50 ha/1000 m³/d (0.2 cm/d) for municipal wastewaters, especially where cold weather conditions are encountered and there is untreated ammonia nitrogen in the wastewater being treated (Kadlec and Knight, 1996).

The addition of wastewater to a natural wetland will substantially alter its physical and chemical characteristics (temperature, pH, flow regime), ecology and biology (plant species and growth). Nutrient-deficient, standing-water wetlands such as bogs may be converted into flowing systems with new plant species adapted to the changed conditions.

1.3.5 Constructed Wetlands

Constructed wetlands (CWs) for WWT represent a well-developed environmental/biological technology. There are many tens of thousands of these natural systems treating wastewaters of all sorts worldwide. CWs are artificial facilities where wastewater treatment is managed in an engineered manner, and regulators typically considered them as natural wastewater treatment plants. In contrast to natural wetlands, water flow and level in a CW is controlled, water is almost always present and the plant community is often a monoculture of herbaceous emergents such as cattails or reeds.

Modern CWs often consist of individual basins (cells) connected in series, and surrounded by berms of earth, clay, rock, or concrete. Although CW cells may be any shape, they are usually rectilinear as these are the most efficient hydraulically (ensuring maximum contact between wastewater and the plant roots/microbial biofilm matrix). Wastewater often flows in either a single flow path (train), or in two or more parallel trains of one or more treatment cells. These passive treatment systems also can include ancillary features such as pumps, ditching, cascades or land treatment fields. Surge ponds and lagoon cells may be present upstream or downstream of the vegetated CW cells and are regarded as cells of the CW system.

Three types of vegetated cells are used in CW systems: pond cells, free water surface (FWS) cells, and sub-surface flow (SSF) cells.

Pond CWs are simple shallow pools or small shallow lakes, usually vegetated with emergent wetland vegetation (e.g., cattails) around the periphery (10 - 30% of area), and having an open water area with submergent and/or floating vegetation. Pond CWs are most commonly used in conjunction with other types of cells (e.g., as re-aeration basins between cells in the common marsh-pond-marsh CW system). Pond CWs provide quiescent areas where sediments and some suspended solids can settle, so they are good for dealing with suspended solids, BOD, oil, grease, pesticides, herbicides, fertilizers, other organic matter and heavy metals contained in many wastewaters. In contrast to most WWT lagoons, pond CWs almost always contain vegetation, are usually shallower (up to one to two metres), and tend to be more oxygenated (due to easier surface re-aeration).

Free water surface (FWS) CWs are artificial marsh ecosystems in which water flows on the surface through largely emergent herbaceous wetland vegetation (e.g., cattails). In FWS CWs, the submerged portions of the plants, soil/sediment and detritus act as substrates for microbial biofilms. These biofilms and physical filtration are responsible for much of the removals of contaminants from the wastewater. FWS CWs are the most common type of CW in North America.

With sub-surface flow (SSF) CWs, the wastewater being treated flows just under the surface of porous materials (substrates) consisting of beds of gravel, sand or rock. SSF wetland cells may be horizontally fed (HSSF cells), or the wastewater may move vertically in the substrates (VSSF cells). With SSF CWs, wetland vegetation grows out of the substrate (usually gravel) of the wetland cells and it is possible to walk on their normally dry surfaces if one can get in among the normally dense stands of emergent vegetation. Most of the pollutant removal activity is conducted by aerobic and anaerobic microbial reactions in the highly porous biofilm/root system matrix in the interstices of the gravel substrate rather than by the wetland plants.

SSF CWs are smaller and more efficient than FWS ones, but often are more costly to build because of higher design and substrates costs. There are operational, full scale SSF wetlands treating relatively high volumes of influent stormwater (>15 L/s) and SSF CWs to treat even larger volumes of water are being designed and built by Jacques Whitford.

The ultimate in constructed wetlands is the engineered wetland. Engineered wetlands (EWs) are advanced forms of CWs that involve more active manipulation of process conditions than is usual for ordinary CWs, which are largely passive systems. For example, EW systems may involve aspects such as cell aeration, the addition of chemicals and/or energy, active phytoremediation, and/or use of specialty substrates that chemically interact with certain wastewater pollutants. Engineered wetland cells can be of the pond, FWS or SSF varieties, but are more commonly SSF ones. Jacques Whitford specializes in SSF EWs.

As mentioned above, the removal of many pollutants such as ammonia in a treatment wetland is dependant on microbially-mediated aerobic transformations. Wetland plants can provide some oxygen to microbes in their root zones, but there is a limit to amount of oxygen that can be provided in this way. This limitation can be overcome by using submerged perforated or diffuser piping through which air is

introduced into the water or under the substrates in SSF engineered wetland (EW) cells. By improving aeration, ammonia nitrification rates can be increased to over 99%, and size of the treatment cells (?) can be reduced by at least one order of magnitude. Jacques Whitford is involved with three very large VSSF EW projects: one for treating municipal sewage (5,500 m³/d), one for treating gold mine tailings pond recycle water (17,000 m³/d), and one for treating de-icing glycol-contaminated airport runoff (4,800 m³/d).

1.3.6 Tundra Wetlands in the Arctic

Over 45% of all natural wetlands in the world lie above 45° North Latitude, and these are largely tundra, muskeg, taiga and coastal marsh wetlands. Prior to division of Nunavut from the Northwest Territories, the Northwest Territories had the second highest total of natural wetland area in Canada, second only to Ontario. Peatlands of various sorts (bogs, fens) are the most common type of natural wetland in northern areas. The tundra wetland, a peatland/pond mixed wetland, is an important kind of arctic natural treatment wetland, and may be viewed as the natural analogue of marsh-pond-marsh constructed wetlands, as it consists of boggy areas, channels and small ponds/small lakes.

Tundra wetlands are spongy accumulations of living and dead *Sphagnum* moss, lichens, grasses, small willow shrubs and other vegetation, as well as dead plants, usually only partly decomposed. Water flow through these wetland areas is partly sub-surface and partly over the surface and/or via channels. Tundra wetlands contain numerous shallow ponds/lakes that have no drainage to groundwater in the short summers, due to underlying permafrost. Frost heaving during winter creates ridges and depressions with unique polygon configurations. During summer in the north, long days lead to the proliferation of algae in tundra wetland ponds and small lakes, and photosynthesis leads to highly oxic conditions. Tundra wetlands exhibit pollutant removal rates equal to or better than that expected from an annual storage lagoon. Tundra wetlands are often “engineered” to some extent to improve water flows through them.

As outlined in Section 1.3.4, recommended size for natural wetlands treating municipal wastewaters range from 1.4 – 50 ha/1000 m³/d. While the more conservative value (50 ha/1000m³/d) may be suitable for natural treatment wetlands in southern regions, it is probably too high for Arctic wetlands where the bulk of sewage treatment occurs over a very short period (two to three months) under high light conditions. Actual measurements of sewage contaminant concentrations in tundra wetlands at Coral Harbour, Baker Lake and Chesterfield Inlet indicate very much higher treatment rates, indicating that values closer to the lower end of the range (1.4 ha/1000 m³/d) are more realistic for tundra wetlands, especially if they have been engineered to improve water flows. Given that most tundra wetlands treat some landfill leachate as well as sewage, a value of 5 ha/1000m³/d is recommended for tundra wetlands.

2 Facility Overview

The **Hamlet of Qamani'tuaq** is located north of the mouth of the Thelon River on the northwest shore of Baker Lake in the Kivalliq region of Nunavut. The geographic co-ordinates of the community are 64° 18' N, 96° 03' W. The location of the community is illustrated on Drawing 1 in **Appendix A**. Baker Lake itself is the fifth largest lake in Nunavut, totalling 1887 km² and measuring approximately 91 km from the mouth of the Thelon River in the west to the Bowell Islands and Narrows in the east (Natural Resources Canada 2004).

The Hamlet is located in the Wager Bay Plateau Ecoregion of the Northern Arctic Ecozone. The region is characterized by broad sloping uplands, plains and valleys. Soils are primarily silty sand and silty clays overlying boulder till, beach deposits and reworked till. Local topography slopes upward from the lake to a ridge approximately 2 km to the north. Historically, the community has been subject to extreme snow drifting. A large snow fence has been installed to the north of the community and more snow drift protection is planned (see Drawing 2 in **Appendix A** for a site overview). Permafrost is present, with the active layer established at up to 1.5 m depth. Vegetation in the area is typical tundra vegetation consisting of mosses, lichens, grasses and dwarf shrubs.

The average annual precipitation in Qamani'tuaq consists of 156 mm of rainfall and 1,307 mm of snowfall. The July mean high and low temperatures are 16°C and 6°C, respectively. The January mean high and low temperatures are -29.5°C and -36.4°C, respectively. Winds are commonly from the north at an average speed of 23 km/h.

The population of the community was estimated at 1,655 in 2006, and is expected to rise to 2,399 by 2026 (Nunavut Bureau of Statistics, 2000). Economic activities include public services, mineral exploration and arts and crafts. The level of mineral exploration activity around Qamani'tuaq has increased significantly over the last two years. In September 2006, Cumberland Resources announced their intention to construct the Meadowbank Gold Mine, 110 km northwest of the Hamlet.

Electrical services are provided by the Qulliq Energy Corporation, while the Hamlet provides trucked water, sewage and waste disposal services. The community has regularly scheduled air service; however, most supplies arrive annually by barge during the open water period.

Sewage is collected from the Hamlet's houses and other buildings by truck and discharged into a holding cell located approximately 1.2 km north of the community. Sewage exits the holding cell by exfiltration and/or by overtopping the berms. Sewage flows approximately 200 m down a slope before entering Lagoon Lake. From Lagoon Lake it flows east approximately 300 m to Finger Lake and then another 1000 m from Finger Lake to the entry of Airplane Lake. Compliance with water license effluent criteria is to be achieved at SNP Station BAK-2 at the inflow to Airplane Lake. Airplane Lake drains through Garbage Creek, entering Baker Lake, approximately 1300 m to the south. This wastewater treatment area is illustrated in Drawing 3 (**Appendix A**).

Qamani'tuaq presently draws its drinking water from Baker Lake, approximately 120 m from the shore at a depth of 5 to 6 m below surface. The water intake is located approximately 2 km west of the discharge of Garbage Creek into Baker Lake. Water is currently pumped from the intake directly into distribution trucks; it is chlorinated using calcium hypochlorite in the truckfill line. Originally the system was designed for chlorination to take place before entering storage tanks, and after leaving the tanks before entering the trucks. The storage tanks in the pumphouse were originally meant to be used to fill the distribution trucks and to supply water to the Health Centre, Nurse's Residence, Senior's facility and group home via a small piped distribution system. This piped system was taken off-line after Dillon Consulting Ltd. (2006) observed only batch chlorination occurring for water to the piped system and free residual chlorine was

below the regulated level. Residents and regulators have expressed concern about the potential effects of Garbage Creek outflows on the community's drinking water source

The solid waste facility (landfill) is located on the south shore of Finger Lake (part of the wetland). It was originally constructed in 1991 and expanded and modified to meet territorial environmental guidelines in 1998. The solid waste facility accepts household refuse, batteries, appliances, fuel and water tanks, discarded fuel drums, abandoned vehicles, etc. Household refuse is burned on site, as weather permits. Runoff from the solid waste site flows into Finger Lake.

3 Review of Background Information

Several documents were made available to NJWL as background to the current study. Key findings from these materials are reported below.

Type “B” Water License for N6L3-1191 (Renewal), Northwest Territories Water Board - September 1993

Licence N6L3-1191, a renewal Type “B” Water Licence, was issued to the Hamlet of Baker Lake, for the period of September 1, 1993 to August 31, 1999. A number of general conditions are included in the Licence, as well as specific conditions pertaining to Water Use, Waste Disposal, Abandonment and Restoration, and Operation and Maintenance. The license establishes sewage effluent quality standards to be met at SNP Station 1191-2, identified in the license as “run-off below the Waste Disposal Facilities (exact location to be determined following a study required in the license).” The location of this station was subsequently recommended to be located where water from the wetland enters Airplane Lake. Two Surveillance Network Program (SNP) stations were identified, with one at the pump house (1191-1) and one at the run-off below the waste disposal facility (1191-2). Parameters required to be analyzed on a monthly and annual basis were also specified.

Sewage Treatment Using Tundra Wetlands, Dillon Consulting Limited, 1999

Dillon Consulting Limited (Dillon) undertook a review of three existing wetland sewage treatment systems in Nunavut, including Qamani'tuaq, to develop a better understanding of the sewage treatment capabilities of natural wetlands in northern Canada. The study involved a review of pertinent literature, characterization of the three wetlands and collection and analysis of effluent samples. Key findings for Qamani'tuaq include:

- During the sampling period (spring and summer 1996) the Tundra Wetland achieved removal rates for analyzed parameters equal to or better than expected from an annual storage lagoon;
- When temperatures are below freezing (October to May), a sewage ice pack forms on the slope of the valley walls up-gradient of Lagoon Lake. Observations indicate that the ice pack melts over a period of approximately four weeks;
- The mass of fecal coliforms coming from the melting ice pack was minimal, likely due to die off through freeze/thaw action. Data also suggested a slight reduction of BOD5 from the melting ice pack;
- The addition of a primary treatment lagoon would hold the melting ice pack and reduce loading to the system during the spring melt period, allowing for a controlled discharge over time;
- Analytical data suggested that nutrient removal increases with treatment distance, time and increased hydraulic retention; and
- There was a perception, identified in the Traditional Environmental Knowledge study, that the wetland treatment system will not protect the aquatic environment in the future and, therefore, may impact the flora and fauna of the area.

Baker Lake Sewage and Solid Waste Disposal Operation and Maintenance Manual, Dillon Consulting, 1999

This manual was prepared as a requirement of the Hamlet's Water Licence and is intended to assist the Hamlet to operate its waste disposal facilities in compliance with its licence. The manual provides a general overview of the sewage and solid waste disposal systems in the community, including sketches of the general layout of both facilities. The manual provides general instructions for operation and

maintenance of each facility, including record keeping and effluent sampling according to licence requirements. A spill contingency plan for spills occurring at the landfill is appended.

Water Licence for NWB3BAK9904 (Renewal of NWT Licence N6L3 – 1191), Nunavut Water Board June 1999

The Nunavut Water Board issued Water Licence NWB3BAK9904 to the Hamlet of Baker Lake, for a five year period, effective October 1, 1999. This licence is a renewal of Water Licence N6L3-1191, issued by the NWT Water Board prior to territorial division. Licence requirements include the submission of Annual Reports, an Operation and Maintenance (O & M) Manual, a Spill Contingency Plan and an Abandonment and Restoration (A & R) Plan; operation of a Surveillance Network Program; posting of signs indicating the location of facilities and sampling locations; and maintenance of all licenced facilities.

Four Surveillance Network Program (SNP) stations were identified - BAK-1 (formerly 1191-1), BAK-2 (formerly 1191-2), BAK-3 (formerly 1191-3) located at the outlet of Airplane Lake, and BAK-4, located at the runoff from the solid waste disposal facility at Finger Lake. Specified sewage effluent quality criteria are to be met at Station BAK-2.

Water Licence Inspection Report, Indian and Northern Affairs Canada - November 2001

The Water Resources Division of Indian and Northern Affairs Canada (INAC) conducted a water licence inspection in August of 2001. The inspection reported on five topics: potable water, sewage lagoon, landfill, waste oil and non-compliance. In addition, a number of water and effluent samples were taken at the Surveillance Network Program (SNP) stations. The water licence inspection report highlighted the following:

- Evidence of erosion of the sewage holding cell berms was observed: preventative maintenance was recommended;
- The solid waste site was reported to be efficiently managed with proper waste segregation being practiced;
- There was a lack of evidence that the former waste oil pit had been properly contained, resulting in the potential for hydrocarbon contamination of water. Hydrocarbon contamination was noted at the current waste oil storage site;
- Analysis of an effluent sample from Station BAK2 indicated compliance with all licence and Canadian Council of Ministers of Environment (CCME) Protection of Freshwater Life parameters, except iron and a Microtox analysis did not attribute toxicity to runoff from the solid waste facility;
- Analysis of a raw water sample from the vicinity of the drinking water supply (Station BAK-1) indicated compliance with all parameters of the guidelines for Canadian Drinking Water Quality. Due to transportation delays, bacteriological analysis of sample was not undertaken;
- Required signs had not been posted; and
- The licensee had not submitted the required Annual Reports, Operations and Maintenance Plan, Spill Contingency Plan and Abandonment and Restoration Plan.

Water Licence Inspection Report, Indian and Northern Affairs Canada (INAC) - November 2002

The Water Resources Division of INAC conducted a water licence inspection again in July 2002. The inspection addressed the items reviewed in 2001. The water licence inspection report highlighted the following:

- Analysis of a raw water sample from the vicinity of the drinking water supply (Station BAK-1) indicated compliance with all parameters of the CCME guidelines for Canadian Drinking Water Quality with the exception of slight exceedances for colour and turbidity;

- The sewage holding cell appeared to be ineffective in reducing total suspended solids from reaching the wetland; however effluent was reported to have undergone considerable treatment prior to reaching Airplane Lake;
- Samples of seepage from the landfill (Station BAK-4), indicated total ammonia, turbidity, total suspended solids and BOD exceeded Municipal Wastewater Effluent Quality Guidelines;
- Waste oil drums were observed in the ditch and associated leaking of oil had occurred, stained soil was observed;
- Secondary containment for waste batteries was recommended;
- Wastes were poorly segregated in the bulk metal waste area;
- Required signs had not been posted; and
- The licensee has not submitted the required Annual Reports or the Operations and Maintenance Plan.

Water Licence Inspection Report, Indian and Northern Affairs Canada (INAC) - November 2003

The Water Resources Division of INAC conducted a third water licence inspection in August of 2003. The inspection addressed the items reviewed in 2001 and 2002. The water licence inspection report highlighted the following:

- The drinking water source is not identified with signs: there is a significant amount of traffic on the lake which presents potential for contamination;
- Station BAK-1, the drinking water intake, was sampled and all results were within Licenced Guidelines and the CCME Drinking Water Quality guidelines;
- There was evidence that the berms on the sewage holding cell had been breached and the holding cell was observed to be discharging continuously, despite the repairs to the berm;
- Stations BAK-2, BAK-3 and BAK-4 were sampled; BAK-2 exceeded guidelines for total iron and phenol, BAK-3 samples were within guidelines (iron levels were only slightly less than the guideline), and the BAK-4 sample greatly exceeded the CCME guidelines for iron, suggesting that leachate from the old landfill may be affecting the water quality at this station;
- There is a lack of containment for hazardous materials at the solid waste landfill and runoff into Finger Lake is a concern; and
- Numerous non-compliance issues related to reporting and submission of plans were identified.

Site Investigation Report for the Sewage Disposal System in the Hamlet of Baker Lake, NU – September 2005

Community and Government Services (CGS) completed a site investigation of the sewage wetland system to evaluate its effectiveness and compliance with water licence requirements and federal water quality guidelines. Three sampling events were undertaken in 2005, with sample locations including Lagoon Lake (P1), Finger Lake (P2), Airplane Lake (P3) and the mouth of Garbage Creek at Baker Lake (Pfd). Observations and conclusions of the investigation are summarized below:

- Effluent was observed to seep out of the holding cell, traveling downslope to Lagoon Lake;
- Water in Lagoon Lake and Finger Lake appeared green, likely due to an algal bloom resulting from nutrients in the effluent;
- The wetland area contained thick and abundant vegetation as well as various bird species and small fish in the third lake (Airplane Lake);

- The proximity of the landfill to the wetland raises the potential for leachate from the landfill to enter the wetland and negatively affect effluent quality;
- Analytical results for samples from all three events indicated compliance with water licence effluent quality criteria and most federal criteria by the time effluent reached Finger Lake (P2). The exceptions were elevated copper, iron and zinc, possibly an influence from landfill leachate; and
- Discarded metal drums at the current and previous landfill sites and the lack of signage throughout the wetland were noted as an issue of concern.

Site Investigation Report for the Water Supply System in the Hamlet of Baker Lake, NU – September 2005

CGS completed a site investigation to evaluate the effectiveness of the water treatment system, and to determine its compliance with federal and territorial water quality guidelines at the water intake and treatment points. Sample locations and analyses were chosen based on requirements for NWB water licences and applicable CCME guidelines. This Site Investigation identified the following:

- Water samples were collected between June and September of 2005 from Baker Lake at the shore of the pump house for analysis of drinking water quality: two additional sample locations were added on the second visit: 100 m west of the final wetland discharge point (mouth of Garbage Creek) on Baker Lake and from a water tap within the community;
- Potable water obtained from Baker Lake is treated with hypochlorite immediately prior to supply to water trucks; chlorine levels are tested every day;
- Since the final wetland discharge point is approximately 2000 m east of the water intake and the prevailing wind is from the north, it is thought that the final discharged sewage effluent has little effect on drinking water quality;
- Results confirmed that water in Baker Lake met CCME guidelines for Canadian Drinking Water Quality: turbidity appeared to be higher during spring (June) and summer (end of August) run-off; and
- The lack of vegetation around the pump house berm was noted as an issue of concern, as this may contribute to increased turbidity during spring and summer run-off; the lack of signage in the water intake and treatment areas was also noted.

4 Tundra Wetland Treatment System

The following section outlines work completed on Part A – “Sewage Treatment” of the study. It includes a summary of future sewage volume generation estimates, a detailed description of the wetland system, results of the effluent sampling program and analysis and conclusions about the effectiveness of the wetland in treating sewage to meet licence requirements.

4.1 Volume Predictions

An understanding of future sewage generation volumes is necessary to determine if the current sewage treatment system can meet the demands of the increasing population of Qamani'tuaq and achieve compliance with current and future regulatory requirements. The Nunavut Bureau of Statistics (www.stats.gov.nu.ca) provides population projections from 2000 to 2020 for communities throughout Nunavut. Table 1 extrapolates these population projections for the Hamlet of Qamani'tuaq to 2026, based on an annual increase of approximately 2.0%, as projected by the Bureau of Statistics.

Table 1 Population projections - Qamani'tuaq, Nunavut

Year	Population
2006	1,655
2011	1,808
2016	1,996
2021	2,188
2026	2,399

Projected annual sewage generation rates for the period between 2006 and 2026 are presented in Table 2. Sewage volumes are anticipated to be equal to water consumption volume, which is 104 litres per capita per day (L/c/d.). Table 2 also describes the sewage volume for a ten-month storage period each year (typical lagoon system).

Table 2 Sewage generation projections – Qamani'tuaq, Nunavut

Year	Population	Water Consumption (m ³ per year)	Sewage Volume (m ³ per year)	10-month Sewage Volume (m ³ per year)
2006	1,655	62,824	62,824	52,353
2007	1,683	63,887	63,887	53,239
2008	1,712	64,988	64,988	54,156
2009	1,745	66,240	66,240	55,200
2010	1,777	67,455	67,455	56,212
2011	1,808	68,632	68,632	57,193
2012	1,843	69,960	69,960	58,300
2013	1,882	71,441	71,441	59,534
2014	1,918	72,807	72,807	60,673
2015	1,957	74,288	74,288	61,906
2016	1,996	75,768	75,768	63,140

Table 2 Sewage generation projections – Qamani'tuaq, Nunavut (cont'd)

Year	Population	Water Consumption (m ³ per year)	Sewage Volume (m ³ per year)	10-month Sewage Volume (m ³ per year)
2017	2,036	77,287	77,287	64,405
2018	2,072	78,653	78,653	65,544
2019	2,108	80,020	80,020	66,683
2020	2,148	81,538	81,538	67,948
2021	2,188	83,057	83,057	69,214
2022	2,229	84,603	84,603	70,503
2023	2,270	86,179	86,179	71,816
2024	2,313	87,784	87,784	73,153
2025	2,356	89,419	89,419	74,516
2026	2,399	91,084	91,084	75,904

Following a typical northern lagoon storage and release regime of ten months storage and two month release in the fall, the sewage holding cell or lagoon at Baker Lake would be required to have a capacity of 75,904 m³ to address the 20 year planning horizon ending in 2026.

The dimensions of the current holding cell are approximately 31 m by 6.5 to 9 m, at the cell's widest, with an approximate depth of 1.5 m. Allowing for reduced capacity due to the interior side slopes on the berms, the estimated capacity of the detention cell is approximately 300 m³. The size of a lagoon required for 10 months of storage to meet the 20 year demand (approximately 76,000 m³) would be approximately 175 m by 175 m, with a 2.5 m depth. Such a large lagoon might be prohibitively expensive for CGS and Qamani'tuaq.

4.2 The Existing Wetland System

NJWL site visits in 2006 and 2007 confirmed previous observations about the Tundra Wetland. The Tundra Wetland treatment system consists of the holding cell and a natural wetland located in a valley bounded to the north and south by rocky hills (Drawing 2, **Appendix A**). Lagoon Lake, the channel between Lagoon Lake and Finger Lake, Finger Lake and the channel from Finger Lake to the monitoring station at its outlet to Airplane Lake make up the remainder of the Tundra Wetland treatment system. The Tundra Wetland treats both wastewater from the Hamlet and leachate from the landfill. See **Appendix E** for photographs of the Tundra Wetland.

Sewage is discharged into the holding cell on a slope of the valley located approximately 1.2 km north of the community. Sewage was observed to be flowing continuously through a breach in the top of the berm of the holding cell during the August 2006 site visit. After the reconstruction of the holding cell in September 2006, the effluent was observed to exfiltrate through the larger fill at the bottom of the cell berm. Sewage exiting the holding cell flows overland in a northerly direction, down gradient to the midpoint of Lagoon Lake, a distance of 180 to 200 m. Although the main flow area between the holding cell and Lagoon Lake is devoid of vegetation, this area and Lagoon Lake are bordered by thick vegetation, comprised mainly of grasses and sedges with some shrubs (e.g. willow). Water in Lagoon Lake was observed to be green due to an algal bloom and a strong sewage odour was present. The area of Lagoon Lake is approximately 2.4 ha with a reported depth of 1.2 m (Dillon 1999).

During the June 2007 site visit, the holding cell was discharging through the bottom of the berm, downslope towards Lagoon Lake. The majority of the area between the holding cell and Lagoon Lake

was snow covered. The snowpack began approximately 30 m downhill from the holding cell, where it was approximately 1 m deep, and extended to the shore of Lagoon Lake, subsequently decreasing in depth. Numerous channels through the snowpack were observed, several of them exposing vegetation and flowing water at ground level. The surface of Lagoon Lake was ice free, though the Lake was still frozen from the bottom up, leaving approximately 0.2 m of free water. The water in Lagoon Lake was green colored and had a strong sewage odour.

Water in Lagoon Lake flows east into Finger Lake, a distance of approximately 300 m. During the 2006 site visits, flow was visible through a defined channel. During the spring 2007 visit, flows were observed to spread wider, beyond the channel. Water flow between Lagoon Lake and Finger Lake encompassed the majority of valley bottom, extending to the base of the landfill in one area. At the main outlet of these flows into Finger Lake, water was moving relatively quickly and was fairly deep, compared to the defined channel observed during the 2006 site visits; a sewage odour was also present.

Finger Lake covers an area of approximately 7.2 ha with an average depth of approximately 1.4 m. During the summer and fall of 2006, water in Finger Lake was observed to be green in colour and a sewage odour was detected. Both the channel and the lake were bordered by thick vegetation, mainly grasses and sedges with some shrubs. In spring 2007, water in Finger Lake had a slight color and a slight sewage odour. Ice was present on the surface in the centre of the lake, while the shoreline was largely ice-free (approximately 15 m or more between the shore and the surface ice).

The solid waste facility is located near the southwest shore of Finger Lake, 10 to 15 m away from the shore at its closest point. Drainage from the solid waste facility enters Finger Lake through three culverts installed through the northern berm of the facility. Pools of water were observed inside the berm beneath the level of the culverts during the summer and fall 2006 site visits. In addition, debris and a large pool of water with a thick layer of algae had accumulated in the area of a fourth culvert, installed along the southern berm of the landfill extension. The outlet of this fourth culvert was not identified in 2006 and appears to have been buried. In the spring of 2007, water was flowing through at least two of the north berm culverts and overland through the landfill, towards Finger Lake.

A channel approximately 1000 m long, running in a southeast direction, connects Finger Lake with the northwest corner of Airplane Lake. About two-thirds of the way along the channel towards Airplane Lake, the water in the creek was observed to be clear with no apparent odour in summer 2006. The channel has a rocky substrate covered with a thick layer of algae; thick vegetation borders the channel banks. During the 2006 site visits, the channel flowed through a culvert before emerging and entering Airplane Lake; algal growth in this area was dense. A second culvert had been installed approximately 45 m south of original culvert, between the fall 2006 and spring 2007 site visits. In 2007, presumably due to spring melt, the channel spread wide as it flowed towards the road and through both culverts into Airplane Lake. SNP Station BAK-2, the point at which effluent must comply with the effluent quality criteria specified in the water licence, is located just upstream of the channel flow into Airplane Lake, following the original culvert.

Although the sewage treatment facility is considered to end at the outflow into Airplane Lake, water flows from Airplane Lake through Garbage Creek another 1300 m into Baker Lake. Garbage Creek has a rocky substrate, with some algal growth noted throughout in summer and fall 2006. The water observed in Airplane Lake and Garbage Creek was clear and had no detectable odour. The banks of Garbage Creek were bordered by thick vegetation, primarily sedges in the upstream area with increasing density of shrubs downstream toward Baker Lake. In spring 2007, ice was present on the surface of Airplane Lake, with 5 to 10 m of open water between the shore and ice. In addition, flow volume through Garbage Creek was much greater than observed in 2006. At the head of Garbage Creek, the low-lying banks had flooded up to 20 m on either side of the original channel. Downstream, Garbage Creek had a fast, wide and turbulent flow prior to entering Baker Lake.

4.2.1 Solid Waste Disposal Facility

There are two solid waste disposal areas, or landfills, within the wetland watershed.

The active landfill is located southeast of the sewage holding cell on the same north-facing slope immediately south of Finger Lake (Drawing No. 2, **Appendix A**). The landfill was constructed in 1991 and expanded in 1998 to extend its life and achieve compliance with guidelines for municipal waste disposal. Domestic solid waste is collected from the community and deposited in the landfill on a daily basis. Separate areas are provided for bulky metal wastes, hazardous wastes and waste oil. The landfill drains through culverts into the southwest end of Finger Lake. Previous Water Licence inspection reports noted concerns with the impact of landfill leachate on Finger Lake and the downstream aquatic system.

In addition to the active landfill, there are several other landfills or waste disposal sites in the area around Airplane Lake. A former landfill is located between the south shore of Airplane Lake and the upslope plateau to the south. Over one hundred oil drums (presumably empty) are stacked just south of the shore, along with numerous scrap metal items. Various types of debris are reported to be buried in the plateau area. The underlying surface and partially buried waste is visible through the cover of grasses, sedges and moss. Waste in this area includes scrap metal, snowmobiles, household garbage, mattresses and animal carcasses. A saturated area located in the middle of the plateau contains rust-colored water, approximately 30 cm deep, with the bottom covered by plastic and metal debris. It could not be determined if the saturated area drains north into Airplane Lake or south into Baker Lake. Previous water sampling from Airplane Lake has shown that drainage from these sites may be entering Airplane Lake, though it should be noted that the area immediately downslope in Baker Lake has not been analyzed for the presence of landfill leachate.

Immediately west of the former landfill lies the Transport Canada (TC) laydown site. This laydown area includes heavy equipment storage, abandoned vehicles and a large contaminated soil disposal area. The remedial status of this contaminated soil is currently unknown. During NJWL's October 2006 site visit, it appeared as though a fence was being erected at this laydown area. A second laydown immediately adjacent to the TC laydown was also being constructed in 2006. This new laydown area is lined and fenced, and housed totes of ammonium nitrate for Cumberland Resources Ltd in 2007. Overland runoff was noted from the west side of the laydown, flowing with topography into the neighbouring unoccupied area.

4.3 Effluent Sampling Program

Effluent samples were collected at six (6) locations throughout the Tundra Wetland to characterize the effluent as it traveled through the wetland from the holding cell to Airplane Lake and eventually to Baker Lake. Samples were collected in August and October 2006, and June 2007. A seventh station (STN-7) was added in October to replace STN-3. The location of STN-7 is the same location as NWB station 1191-2/BAK-2, considered by the NWB as the end of the sewage treatment facility, where effluent must meet effluent quality guidelines. Wetland sample locations are illustrated in Table 3 and in Drawing No. 3 (**Appendix A**).

Table 3 Tundra Wetland sample stations

Station Name	Station Location
STN-1	Discharge of Garbage Creek into Baker Lake
STN-2	Outflow of Garbage Creek from Airplane Lake (equivalent to NWB Station 1191-3/BAK-3)
STN-3	Channel between Airplane Lake and Finger Lake, three-quarters of the way down from Finger Lake
STN-4	Mid-south shore of Finger Lake
STN-5	Channel between Finger Lake and Lagoon Lake
STN-6	South shore of Lagoon Lake, between holding cell flow and channel exit
STN-7	Prior to stream inlet into Airplane Lake (equivalent to NWB Station 1191-2/BAK-2)

All sampling was carried out during a single day in August and again in October 2006 and June 2007. Samples were collected by immersing the bottles in water at the station, upstream from the sampler. Samples were collected in triple rinsed bottles, except fecal coliforms, which were collected with pre-sterilized bottles containing preservative from the laboratory. Samples were preserved as appropriate.

NJWL collected effluent samples on August 1, 2006 with the assistance of Mr. Gabriel Joedee of Qamani'tuaq. Samples were shipped to **ALS Laboratories** in Winnipeg, MB on August 2, 2006 and were received on August 3rd. Lab analyses included routine parameters (TSS, pH, conductivity, etc), biological oxygen demand (BOD), nutrients, phenols, fecal coliforms, total metals, and oil and grease. In total, 42 samples were collected from the sewage treatment wetland, including duplicate samples from one station. Field measurements were not taken during the August sampling event as the Hydrolab Quanta field meter did not arrive to the site on time.

Fall sampling occurred on October 4, 2006, with the assistance of Mr. Nathaniel Kunantnat of Qamani'tuaq. Samples were shipped to ALS Laboratories on October 5, 2006 and were received on the same day. Lab analyses were similar to those in August, with the addition of total, dissolved and ortho-phosphorus, and Kjeldahl nitrogen. Field measurements for pH, temperature, conductivity, salinity, oxidation-reduction potential (ORP) and dissolved oxygen (D.O.) were made using the Hydrolab.

Spring sampling took place on June 19, 2007. A local assistant could not be found to assist NJWL with their 2007 field program. Samples were shipped to ALS Laboratories on June 20, 2007 and were received on June 21st. Similar lab analyses were carried out in 2007, with the addition of chemical oxygen demand (COD). Field measurements were taken using a Hydrolab Quanta, recording the same parameters as in October 2006 (e.g. pH, conductivity, D.O., etc). All Tundra Wetland *in situ* data for October 2006 and June 2007 is available in Tables 2 and 4 in **Appendix C**.

4.3.1 QA/QC

A number of QA/QC procedures were in place to ensure the collection of high quality effluent data. NJWL collected duplicate samples for one of every ten samples and carried a travel blank during summer sampling in 2006. Duplicate samples were collected to check accuracy of sampling procedures and precision of laboratory methods; duplicate samples can also help describe natural environmental variability. Travel blanks are used to test for contamination from the bottles, or during handling, storage and transport.

During sampling of the Tundra Wetland in the summer, one blind duplicate sample was taken at STN-4. Results of the duplicate samples were comparable, confirming that sample procedures and analyses

were consistent. Analysis of the travel blank demonstrated there was no contamination from the bottles or due to handling, transport or storage. All results were consistent with those of deionized water

A duplicate sample taken at STN-5 during fall 2006 showed similar results between the replicates. There was one exception, for aluminum data (421 µg/L and 290 µg/L), perhaps attributable to the slight differences in calculated dissolved solids (74.37 mg/L and 68.23 mg/L).

Duplicate samples were collected at STN-7 during spring 2007. Results were comparable, though exceptions were noted for silver (<0.1 µg/L and 0.9 µg/L) and fecal coliforms (20 CFU/100 mL and 10 CFU/100 mL). The fecal coliform levels were low, and the between-sample difference was not significant. Discrepancies for silver may be due to laboratory error, as any field contamination would show up in the other parameters.

Field pH was not measured during summer sampling, so a comparison between laboratory and field pH was not made. When both measurements were made, laboratory values were generally higher than field values in fall, while laboratory and field values were more similar in the spring. The difficulty obtaining accurate pH measurements in the field is recognized, and the added time between sampling and analysis allows for changes in the chemical characteristics of the water, which can alter pH as some ions move in and out of solution. Therefore, the differences between pH are not considered to be significant. There was little difference between field and laboratory measurements of conductivity in fall 2006, although field measurements were lower than laboratory values in spring 2007, possibly resulting from field meter error.

Data quality objectives (DQOs) provided by the laboratory showed results were reliable. All parameters were within their acceptable limits of calibration and all laboratory duplicates were below their recommended maximum relative percent differences. DQOs were acceptable for both summer, fall and spring sampling events.

4.3.2 Analytical Results

Laboratory results from the summer, fall and spring effluent sampling events are presented in the following three sections. Laboratory Analytical Certificates are included in **Appendix B**. Stations are numbered upstream from Baker Lake (STN-1) to Lagoon Lake (STN-6), where sanitary effluent enters the wetland.

4.3.2.1 Summer (August 2006)

Table 4 presents analytical results for August sampling of the Tundra Wetland, including applicable NWB Water Licence criteria.

Table 4 Analytical results from the Tundra Wetland at Qamani'tuaq, NU, August 2006 (bolded result indicates guideline exceedance)

Station	BOD (mg/L)	Fecal Coliforms (CFU/100mL)	Oil & Grease (mg/L)	Total Suspended Solids (mg/L)	Nitrate + Nitrite-N (mg/L)	Ammonia-N (mg/L)	pH
STN-1	54	1	< 1	< 5	0.019	0.04	7.29
STN-2	6	10	< 1	< 5	0.448	0.024	7.55
STN-3	8	10	< 1	6	0.416	0.049	7.25
STN-4	8	10	< 1	< 5	1.71	0.999	8.07
STN-5	17	640	< 1	93	0.851	2.78	7.59
STN-6	59	2000	1	72	0.417	4.84	9.38
Water Licence Effluent Criteria	80	1X10 ⁴ (10 000)	No visible sheen	100	-	-	Between 6 and 9

Levels of BOD, fecal coliforms, total suspended solids, nitrate + nitrite and ammonia decreased through the wetland system from the Lagoon Lake (STN-6) to the outlet into Baker Lake (STN-1) in the August 2006 samples. The only parameter to exceed NWB Water Licence Criteria was pH at STN-6 (Lagoon Lake). Overall results indicated effective effluent treatment in the wetland system.

CCME guidelines for the Protection of Freshwater Aquatic Life (PFAL) have a limit for molecular ammonia in wastewater of 19 parts per billion (ppb), well below the generally accepted toxicity limit for molecular ammonia of 200 ppb (0.2 mg/L). Table 4 indicates an ammonia-N level of 4.84 mg/L at station STN-6 in August, in water of pH 9.38. This is equivalent to a molecular ammonia concentration of 1385 ppb, far above the toxicity limit, assuming that water temperature in the lake at this time was about 5 C. The ammonia-N concentration decreased to 2.78 mg/L at a pH of 7.59 by STN-5 (inlet of Finger Lake), equivalent to a non-toxic level of about 24 ppb of molecular ammonia, just above the CCME PFAL wastewater guideline. By the time the water reached STN-3, just above the Compliance Point at the entrance to Airplane Lake, the ammonia nitrogen level had dropped to 0.049 mg/L.

Results for Tundra Wetland metals are shown in Table 5. Several metals exceeded CCME PFAL guidelines at STN-6: aluminum, copper, iron and cadmium (see Figures 1 to 3, **Appendix C**). There appears to be an influence of landfill leachate on effluent quality, as concentrations of aluminum, cadmium, iron, lead, silver and other metals increased downstream of STN-6, exceeding CCME guidelines. Aluminum, iron and copper continued to exceed CCME guidelines at STN-3 (Figures 1 to 3), just above the Tundra Wetland Compliance Point. Copper, which decreased in concentration downstream of the Lagoon Lake, is likely to originate in the sanitary waste (related to copper piping in domestic systems) rather than landfill leachate. No metals were in exceedance at STN-2, the outlet of Airplane Lake or entering Baker Lake at STN-1.

There was previous concern regarding iron and phenols at the Compliance Point. Phenols are aromatic compounds that mainly come from industrial effluents or domestic sewage (CCME 1999). Phenols exceeded applicable guidelines at two stations but were well within compliance by the required point (Table 5). Additionally, the previous concern of iron exceedances at STN-3, just above the Compliance Point, appears to be confirmed.

Table 5 Analytical results (µg/L) for metals and phenols in the Tundra Wetland at Qamani'tuaq, August 2006 (bolded result indicates guideline exceedance)

Total Metals (ug/L)	Station						CCME Guidelines (ug/L)*
	STN-1	STN-2	STN-3	STN-4	STN-5	STN-6	
Aluminum**	67	11	200	94	337	297	100 ^a
Cadmium**	<0.02	<0.02	<0.02	<0.02	0.56	0.03	0.017 ^b
Iron**	160	90	1170	1220	1020	840	300
Mercury**	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.1
Arsenic	0.7	0.7	1.3	1.3	1.4	0.9	5
Boron	<30	<30	<30	<30	50	50	
Barium	34.1	35	30.4	22.2	22.2	17.2	
Beryllium	<1	<1	<1	<1	<1	<1	
Bismuth	<0.2	<0.2	<0.2	<0.2	0.8	<0.2	
Calcium	4500	3900	7800	7200	7400	7500	
Cobalt	<0.2	<0.2	0.4	0.3	1.2	0.6	110 ^g
Chromium	<1	<1	<1	<1	<1	<1	8.9 ^c
Cesium	<0.1	<0.1	<0.1	<0.1	0.6	<0.1	
Copper	2	2	4	4	14	16	2 ^d
Potassium	900	800	2200	2400	4600	5200	
Magnesium	930	820	1460	1640	1620	1710	
Manganese	25.3	7	68.9	72.3	51.9	57.5	
Molybdenum	<0.2	<0.2	<0.2	<0.2	0.8	0.3	73
Sodium	2780	2610	8340	9990	19400	21500	
Nickel	<2	<2	<2	<2	2	<2	25 ^e
Phosphorus	<50	<50	600	760	1860	2080	
Lead	<0.5	<0.5	0.7	<0.5	1.2	0.6	1 ^f
Rubidium	0.8	0.6	2.2	2.4	6.2	6.2	
Antimony	<1	<1	<1	<1	1	<1	
Selenium	1	1	2	1	<1	<1	1
Tin	<0.6	<0.6	<0.6	<0.6	1	<0.6	
Strontium	17.4	15.5	30.6	29.9	25.5	24.9	
Tellurium	<1	<1	<1	<1	1	<1	
Titanium	2.6	<0.9	5.4	2.4	6.8	3.6	
Thallium	<0.1	<0.1	<0.1	<0.1	0.6	<0.1	0.8
Uranium	<0.1	<0.1	0.1	<0.1	0.7	0.1	
Vanadium	<1	<1	<1	<1	1	<1	
Tungsten	<0.2	<0.2	<0.2	<0.2	0.5	<0.2	
Zirconium	<0.4	<0.4	0.7	0.5	1.4	0.9	
Silver	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	0.1
Zinc	<10	<10	10	<10	10	10	30
Phenols	1	1	2	3	6	10	4

* CCME guidelines for the Protection of (Freshwater) Aquatic Life (unless otherwise noted)

** Metal scan with ultra low detection limits

^a Aluminum = 100 ug/L when pH ≥ 6.5, [Ca²⁺] ≥ 4 mg/L, DOC ≥ 2 mg/L

^b Cadmium = 0.017 ug/L when Hardness [CaCO₃] is 1-60 mg/L

^c Guideline for trivalent chromium (Cr³⁺)

^d Copper = 2 ug/L when Hardness [CaCO₃] is < 120 mg/L

^e Nickel = 25 ug/L when Hardness [CaCO₃] is < 60 mg/L

^f Lead = 1 ug/L when Hardness [CaCO₃] is < 60 mg/L

^g British Columbia Ministry of Environment Guidelines (for comparison)

4.3.2.2 Fall (October 2006)

Tables 6 and 7 present results from the October sampling of the Tundra Wetland and include the applicable NWB Water Licence criteria. As previously mentioned, STN-7 was added during this round of sampling to replace STN-3 and serve as the Tundra Wetland Compliance Point. Values at STN-3 and STN-7 were similar in the October samples.

Table 6 Analytical results from the Tundra Wetland at Qamani'tuaq, NU, October 2006

Station	BOD (mg/L)	Fecal Coliforms (CFU/100mL)	Oil & Grease (mg/L)	Total Suspended Solids (mg/L)	pH	Dissolved Oxygen (mg/L)
STN-1	6	< 10	< 1	6	7.36	14.76
STN-2	< 6	< 10	< 1	< 5	7.56	14.32
STN-7	< 6	< 10	< 1	< 5	7.56	14.85
STN-3	< 6	< 10	< 1	< 5	7.64	15.22
STN-4	< 6	< 10	< 1	< 5	7.45	12.86
STN-5	< 6	460	1	< 5	7.47	5.87
STN-6	8	2330	2	7	7.51	4.61
Water Licence Effluent Criteria	80	1X10 ⁴ (10 000)	No visible sheen	100	Between 6 and 9	-

Table 7 Analytical results from the Tundra Wetland at Qamani'tuaq, NU, October 2006

Station	Ammonia-N (mg/L)	Nitrate + Nitrite-N (mg/L)	Nitrate (NO ₃) (mg/L)	Nitrite-N (NO ₂) (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Total Phosphorus (mg/L)	Total Diss. Phosphorus (mg/L)	Ortho-Phosphorus (mg/L)	Total Phosphate (mg/L)
STN-1	0.003	0.044	0.040	< 0.01	0.400	0.023	0.008	0.003	0.071
STN-2	< 0.003	0.074	0.070	< 0.01	0.400	0.019	0.008	0.002	0.058
STN-7	0.065	2.120	2.100	0.020	0.900	0.249	0.210	0.101	0.763
STN-3	0.066	2.110	2.100	0.010	1.100	0.253	0.236	0.119	0.776
STN-4	1.630	1.960	1.890	0.060	3.000	0.484	0.461	0.305	1.484
STN-5	20.400	0.310	0.260	0.050	20.200	2.250	2.110	2.060	6.899
STN-6	22.400	0.079	0.040	0.040	24.500	2.710	2.470	2.410	8.309

* Total Phosphate is estimated by multiplying Total Phosphorus by a factor of 3.066 (ALS Laboratories 2006)

There were no exceedances of the NWB Water Licence criteria in October at any station. At STN-6, BOD (8 mg/L) and suspended solids (7 mg/L) were less than in August, and fecal coliforms (2330 CFU/100 mL) were greater; however, all were compliant with NWB Criteria.

The ammonia concentration was 22.4 mg/L in Lagoon Lake (STN-6), equivalent to a molecular ammonia concentration of 85 ppb (Table 7). This level was well above the CCME PFAL guideline for water of pH 7.51, but below toxicity levels, as the water temperature in Lagoon Lake was approximately 2°C (see **Appendix C**). Phosphorus results (all > 2 mg/L) were also high in Lagoon Lake in October, compared to other sites. Both ammonia and phosphorus levels decreased through the Tundra Wetland system and indicated that the Tundra Wetland, as configured, provides effective treatment of the Hamlet's sewage effluent for these parameters during the fall.

October results for the Tundra Wetland metals and phenols are shown in Table 8. Iron, copper and aluminum levels, whether from sewage effluent or landfill leachate, exceeded CCME PFAL guidelines at several sites in both August and October (see Figures 1 to 3 in **Appendix C**). Copper and iron exceeded these guidelines at STN-7, the Compliance Point, in October, but met the guidelines further downstream at STN-2. At STN-1, only aluminum exceeded the guidelines (possibly related to road construction upstream of STN-1).

Phenols did not exceed CCME PFAL guidelines at any station in October and were well within compliance at STN-7.

Table 8 Analytical results (µg/L) for metals and phenols from the Tundra Wetland at Qamani'tuaq, October 2006 (bolded result indicates guideline exceedance)

Total Metals (ug/L)	Station							CCME Guidelines (ug/L)*
	STN-1	STN-2	STN-7	STN-3	STN-4	STN-5	STN-6	
Aluminum**	285	48	74	83	144	421	601	100 ^a
Cadmium**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.017 ^b
Iron**	240	120	640	650	980	1660	1910	300
Mercury**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Arsenic	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.8	5
Boron	<30	<30	40	30	50	60	70	
Barium	47	<0.3	41.7	40.7	40.7	28.8	33.3	
Beryllium	<1	<1	<1	<1	<1	<1	<1	
Bismuth	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	
Calcium	6800	<100	12700	12400	11600	11300	11900	
Cobalt	<0.2	<0.2	0.3	0.3	0.4	0.7	0.8	110 ^g
Chromium	<1	<1	<1	<1	<1	2	3	8.9 ^c
Cesium	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Copper	<2	<1	3	3	4	8	10	2 ^d
Potassium	1000	<100	3600	3900	4000	7800	8400	
Magnesium	1390	<10	2420	2320	2740	2860	3160	
Manganese	8.4	<1.1	52.5	36	51.7	125	141	800 ^g
Molybdenum	<0.2	<0.2	<0.2	<0.2	0.2	<0.2	<0.2	73
Sodium	3870	<30	16400	15600	19400	34200	36600	
Nickel	<2	<2	<2	<2	<2	3	3	25 ^e
Phosphorus	60	110	260	250	530	2220	2670	
Lead	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.8	1 ^f
Rubidium	1	<0.2	2.6	3	3.7	9.4	10	
Antimony	<1	<1	<1	<1	<1	<1	<1	
Selenium	1	<1	<1	2	<1	<1	<1	1
Tin	<0.6	<0.6	<0.6	<0.6	<0.6	0.7	<0.6	
Strontium	24.7	<0.1	46.4	44.8	46.1	39.2	40.4	
Tellurium	<1	<1	<1	<1	<1	<1	<1	
Titanium	4.7	1.1	<0.9	1.6	2.3	9.2	17.9	
Thallium	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	0.8
Uranium	0.1	<0.1	0.2	0.2	0.1	<0.1	0.1	
Vanadium	<1	<1	1	<1	1	1	2	
Tungsten	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	
Zirconium	<0.4	<0.4	<0.4	<0.4	0.5	1.3	1.8	
Silver	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1
Zinc	<10	<10	<10	<10	<10	20	20	30
Phenols	<1	<1	<1	<1	1	3	2	4

* CCME guidelines for the Protection of (Freshwater) Aquatic Life

** Metal scan with ultra low detection limits

^a Aluminum = 100 ug/L when pH ≥ 6.5, [Ca²⁺] ≥ 4 mg/L, DOC ≥ 2 mg/L

^b Cadmium = 0.017 ug/L when Hardness [CaCO₃] is 1-60 mg/L

^c Guideline is for trivalent chromium (Cr³⁺)

^d Copper = 2 ug/L when Hardness [CaCO₃] is < 120 mg/L

^e Nickel = 25 ug/L when Hardness [CaCO₃] is < 60 mg/L

^f Lead = 1 ug/L when Hardness [CaCO₃] is < 60 mg/L

^g British Columbia Ministry of Environment Guidelines for the Protection of Freshwater Aquatic Life (for comparison)

4.3.2.3 Spring (June 2007)

Results from sampling of the Tundra Wetland in June of 2007 are presented in Tables 9 and 10, along with applicable NWB License criteria.

Table 9 Analytical results from the Tundra Wetland at Qamani'tuaq, NU, June 2007 (bolded result indicates guideline exceedance)

Station	BOD (mg/L)	Fecal Coliforms (CFU/100mL)	Oil & Grease (mg/L)	Total Suspended Solids (mg/L)	pH	Dissolved Oxygen (mg/L)
STN-1	< 6	110	< 1	< 5	7.24	19.20
STN-2	< 6	40	-	< 5	6.93	14.53
STN-7	< 6	20	< 1	< 5	6.90	13.35
STN-4	< 6	550	< 1	5	6.83	13.12
STN-5	11	> 2000	2	8	6.89	12.20
STN-6	160	> 2000	48	77	7.28	12.41
Water Licence Effluent Criteria	80	1X10 ⁴ (10 000)	No visible sheen	100	Between 6 and 9	-

Table 10 Analytical results from the Tundra Wetland at Qamani'tuaq, NU, June 2007

Station	COD (mg/L)	Ammonia-N (mg/L)	Nitrate + Nitrite-N (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Total Phosphorus (mg/L)	Total Phosphate* (mg/L)
STN-1	20	0.780	0.147	1.1	0.101	0.310
STN-2	22	0.911	0.097	1.3	0.131	0.402
STN-7	22	0.753	0.084	1.1	0.132	0.405
STN-4	30	2.14	0.517	2.9	0.262	0.803
STN-5	51	5.37	0.038	6.6	0.813	2.493
STN-6	470	45.00	0.044	65.7	7.01	21.493

* Total Phosphate is estimated by multiplying Total Phosphorous by a factor of 3.066 (ALS Laboratories 2006)

BOD (160 mg/L) within Lagoon Lake was the only parameter to exceed NWB Water Licence Criteria within the Tundra Wetland during spring sampling. Oil and grease levels were highest within Lagoon Lake, and the highest among the three dates sampled. Although there was no visible sheen observed on Lagoon Lake at STN-6, the removal rate of oils and grease between the holding cell and Lagoon Lake could be reduced due to the presence of snow/ice and lack of this year's vegetation growth. Fecal coliforms and TSS were also relatively high within Lagoon Lake; however levels did not exceed NWB Licence Criteria and decreased rapidly. Fecal coliforms did increase by STN-1, indicating recent fecal contamination; this is perhaps related to several dogs that were tied up near the shore of Garbage Creek. However, by the licence compliance point at STN-7, and at STN-1, all NWB Licence Criteria were met.

At STN-6 (Lagoon Lake), the ammonia-N concentration during the June 2007 sampling date was 45.0 mg/L in water (Table 10) with a field pH of 8.96 and a temperature of 0.23 °C (**Appendix C**). This is equivalent to a molecular ammonia concentration of 3631 ppb, far above the toxicity limit of 200 ppb. By STN-5 (inlet of Finger Lake), the ammonia-N concentration decreased to 5.37 mg/L at a field pH of 7.58 and a temperature of 2.48°C, equivalent to a level of about 13 ppb of molecular ammonia, just below the 19 ppb CCME PFAL guideline for ammonia in wastewater. At STN-4, half way along Finger Lake, the molecular ammonia concentration had dropped to 6 ppb (NH₃-N of 2.14 mg/L at 1.98 °C and a measured

field pH of 7.36). Values for other contaminants also were very low at STN-4, meeting both Water Licence criteria and CCME PFAL guidelines. By STN-7, the Compliance Point at the entrance to Airplane Lake, the ammonia-N level had dropped to 0.753 mg/L (equivalent to 1 ppb of molecular ammonia) and remained low (1 - 2 ppb molecular ammonia) at sites downstream to Baker Lake. These ammonia-N values indicate effective effluent treatment in the wetland system in June.

At STN-6, BOD exceeded the NWB Water Licence limit of 80 mg/L; the suspended solids (77 mg TSS/L) and fecal coliforms (>2000 CFU/100 mL) levels, although elevated, did not exceed Water Licence criteria.

Total metal and phenol results from spring sampling are shown in Table 11. Several metals exceeded CCME PFAL guidelines at one or more stations within the Tundra Wetland during June 2007:

- lead, silver and zinc exceeded CCME PFAL guidelines within Lagoon Lake during spring sampling;
- aluminum and copper exceeded CCME guidelines at the compliance point (Figures 4 and 5, **Appendix C**), and
- iron levels exceeded CCME guidelines at Lagoon Lake in June 2007 (Figure 6, **Appendix C**).

During June, it appears that the Tundra Wetland does not effectively treat aluminum, copper or iron from landfill leachate and/or domestic wastewater to meet CCME PFAL guidelines at the NWB compliance point.

Phenol levels exceeded CCME guidelines at all stations within the Tundra Wetland in June 2007, ranging from 36 times (at STN-6) to 1.5 times (at STN-1) the guideline limit (Table 11).

Table 11 Analytical results (µg/L) for metals and phenols from the Tundra Wetland at Qamani'tuaq, June 2007 (bolded result indicates guideline exceedance)

Total Metals (ug/L)	Station						CCME Guidelines (ug/L)*
	STN-1	STN-2	STN-7	STN-4	STN-5	STN-6	
Aluminum**	128	121	125	151	179	3000	100 ^a
Cadmium**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.017 ^b
Iron**	110	120	120	170	160	1250	300
Mercury**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Arsenic	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	5
Boron	<30	<30	<30	<30	<30	140	
Barium	20.2	15	11.4	15.1	10.7	28.9	
Beryllium	<1	<1	<1	<1	<1	<1	
Bismuth	<0.2	<0.2	<0.2	<0.2	<0.2	2	
Calcium	3400	3400	3800	4400	3600	8300	
Cobalt	<0.2	<0.2	0.2	0.2	0.2	2	110 ^g
Chromium	<1	<1	<1	<1	<1	<1	8.9 ^c
Cesium	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	
Copper	2	2	3	4	10	124	2 ^d
Potassium	1000	1000	900	1600	2000	13900	
Magnesium	760	690	720	910	750	2820	
Manganese	20.7	29.7	42.2	47.5	30.5	69.4	700 ^g
Molybdenum	<0.2	<0.2	<0.2	<0.2	<0.2	1.8	73
Sodium	2270	2180	1950	3950	5040	46400	
Nickel	<2	<2	<2	<2	<2	6	25 ^e
Phosphorus	150	120	150	300	680	7880	
Lead	<0.5	<0.5	<0.5	<0.5	<0.5	3.6	1 ^f
Rubidium	1	1	1	1.7	2.4	18.4	
Antimony	<1	<1	<1	<1	<1	1	
Selenium	<1	<1	<1	<1	<1	<1	1
Tin	<0.6	<0.6	<0.6	1.3	0.7	18.8	
Strontium	12.6	12.3	13.4	17.3	12.9	20.4	
Tellurium	<1	<1	<1	<1	<1	<1	
Titanium	2	1.9	2.4	5	5.3	75.7	100 ^g
Thallium	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.8
Uranium	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	300 ^g
Vanadium	<1	<1	<1	1	<1	<1	
Tungsten	<0.2	<0.2	<0.2	<0.2	<0.2	0.3	
Zirconium	<0.4	<0.4	<0.4	<0.4	0.7	10	
Silver	<0.1	<0.1	<0.1	<0.1	<0.1	1.3	0.1
Zinc	<10	20	30	10	20	470	30
Phenols	6	7	7	11	10	147	4

* CCME Guidelines for the Protection of (Freshwater) Aquatic Life (except where noted)

** Metal scan with ultra low detection limits

^a Aluminum = 100 ug/L when pH ≥ 6.5, [Ca²⁺] ≥ 4 mg/L, DOC ≥ 2 mg/L

^b Cadmium = 0.017 ug/L when Hardness [CaCO₃] is 1-60 mg/L

^c Guideline is for trivalent chromium (Cr³⁺)

^d Copper = 2 ug/L when Hardness [CaCO₃] is < 120 mg/L

^e Nickel = 25 ug/L when Hardness [CaCO₃] is < 60 mg/L

^f Lead = 1 ug/L when Hardness [CaCO₃] is < 60 mg/L

^g British Columbia Ministry of Environment Guidelines for the Protection of Freshwater Aquatic Life (for comparison)

4.3.2.4 Summer (July 2007)

A Project Engineer from Jacques Whitford NAWÉ (North American Wetland Engineering) Ltd. visited the Hamlet during July 2007 to further delineate wastewater and landfill leachate flows, and collect additional information for the design of structures to enhance the wetland for wastewater treatment. Locations of proposed flow attenuation dikes were identified and recorded by GPS. The full field report is available in **Appendix D**.

During the visit, NJWL observed wastewater flows through the Tundra Wetland to the east and south. Solids were present outside of the holding cell and there was evidence of significant erosion to the fill material placed for the north berm. From the holding cell to Airplane Lake, there was indication of higher and expanding flows during the spring melt. Algal growth was present through the wetland throughout the Tundra Wetland, though decreased closer to Airplane Lake.

An examination of the area between the current solid waste facility and Finger Lake revealed pools of water located above the high flow elevation of the channel between Lagoon Lake and Finger Lake. These pools had significant algal growth and evidence of hydrocarbons on the pool surfaces; it was apparent that contamination and nutrients were entering the Tundra Wetland from the solid waste facility.

4.3.2.5 Summary

Levels of BOD, ammonia, nitrate + nitrite, total suspended solids and fecal coliforms decreased with passage through the Tundra Wetland area on the three dates sampled, indicating effective operation of the wetland treatment system for removal of these parameters. BOD, oil and grease and ammonia levels were highest at the entrance to the system (STN-6) in June, reflecting the accumulation of sanitary wastewater over the winter.

Effluent and water quality met applicable NWB Water Licence criteria (BOD, fecal coliforms, total suspended solids, pH) at the compliance point (STN-3 or STN-7) and also at the other stations, with two exceptions at STN-6 (pH in August 2006 and BOD in June 2007).

Levels of ammonia and other nutrients decreased with distance through the Tundra Wetland. Ammonia levels, calculated as molecular ammonia, exceeded the CCME PFAL guideline of 19 ppb on all three dates and the reported toxicity level of 200 ppb in August and June at the entrance to the wetland system (STN-6), although levels had decreased to the PFAL level by the next downstream station (STN-5).

Oil and grease levels were highest in June 2007, with maximum levels reported for STN-6 (Lagoon Lake), although there was no visible sheen observed at that time. In June, elevated levels of oil and grease reflect the accumulation of wastewater over the winter storage period, and a decreased removal rate between the holding cell and Lagoon Lake due to the presence of snow and ice and lack of vegetation at that time of year.

Metals levels tended to be highest in June, related to storage of wastewater over the winter, though generally decreased with passage through the wetland. Levels of most metals were below CCME PFAL guidelines at wetland stations, with the following exceptions:

- aluminum levels were above CCME guidelines at the upper end of the system (STN-6 to STN-4 or STN-3) on all dates, and throughout the system in June; levels increased downstream of STN-6, associated with landfill leachate; elevated aluminum levels were also reported at STN-1 in October, possibly related to road construction upstream of STN-1;
- iron levels followed a similar pattern to aluminum, and were above CCME guidelines at the upper end of the system (STN-6 to STN-3 or STN-7 in August and October, and STN-6 in June);
- copper levels were above CCME guidelines at the upper end of the system (STN-6 to STN-3 or STN-7) and were greatest at the inflow to the wetland (STN-6); the source of copper is likely to be leaching from copper piping in household and community water supply systems;

- cadmium levels exceeded guidelines at STN-6 and STN-5 in August, the maximum at STN-5 suggesting inputs from landfill leachate; and,
- zinc, silver and lead levels exceeded CCME guidelines at the inflow to the wetland (STN-6) in June, likely related to the volume of wastewater stored over the winter.

Although notable in the elevated levels of some metals, their effect on the receiving environment of Baker Lake is likely to be minimal, given that CCME guidelines for PFAL are met well before the wetland drains into the lake (STN-2 and STN-1).

In August, increases in metals downstream of STN-6 were attributed to inputs from landfill leachate; this increase was not noted in October, perhaps attributable to reduced runoff during freezing conditions, or June, likely related to the amount of wastewater stored over the winter.

The source of elevated levels of aluminum in the wetland system has not been identified, although it is likely that the landfill leachate is a significant source, along with domestic wastewater and natural processes. Aluminum is the most abundant metal in the Earth's crust and a normal component of soil, plant and animal tissue and surface water (Health Canada 1998). Iron is also an abundant element within the Earth's crust and is typically present as insoluble salts, which settle out or are adsorbed onto surfaces (Health Canada 1987). Similar to aluminum, iron within the Tundra Wetland can be a result of natural processes, though due to the observed trends, landfill leachate and domestic wastewater appear to be a source of additional iron within the Tundra Wetland.

Phenols were cited as a contaminant of concern within the Tundra Wetland (INAC 2003). Phenols exceeded the CCME PFAL guideline of 4 µg/L at STN-6 and STN-5 during August 2006 (maximum 10 µg/L), and were below the guidelines in October 2006. In June 2007, phenols exceeded CCME guidelines at all stations (6 to 147 µg/L, maximum at STN-6), reflecting the accumulation of phenols over the ten month effluent storage period. Phenols enter the environment through industrial and domestic wastewater, and are commonly used in antibacterial products, antiseptics, household liquid cleaners, lubricating oils, automotive chemicals and paint and varnish removers (Government of Australia 2005). Given that microbial degradation is one of the major biological processes for removing phenols from water (CCME 1999); there is not sufficient time at a suitable water temperature for this process to occur over the winter, resulting in the elevated levels of phenols in the spring. As a result, the Tundra Wetland may not be able to effectively treat phenols during spring, but is effective during summer and fall, once biological processes are operating and removal efficiencies are greatest.

4.4 Impact of Effluent on Waterbodies

A large volume of effluent (60 L) was collected from STN-1 (mouth of Garbage Creek at Baker Lake) in August 2006 and submitted for a bioassay to assess acute toxicity to rainbow trout (*Onchorhynchus mykiss*). The number of stressed and/or dead rainbow trout in a 96-hour period was measured using methods described in Environment Canada (2000). STN-1 was selected as the sampling station because of previous concern about levels of iron entering Baker Lake from the Airplane Lake drainage. Baker Lake is the drinking water source for the community and a source of fish for domestic consumption. Iron was not above CCME guidelines at the time of sampling and there were no stressed or dead fish recorded during the 96-hour test period. Therefore, the effluent sample from Garbage Creek can be considered non-toxic to fish at the time sampled.

There have been reports of the presence of fish in Airplane Lake. An elder, Ms. Lucy Iyago, confirmed to NJWL that residents used to fish in Airplane Lake for lake trout and grayling; however, fishing stopped once sewage started being deposited in the wetland. The presence of fish in Airplane Lake was confirmed by NJWL during the October site visit, when several small unidentified fish were observed.

Zooplankton were observed at several sample locations within the Tundra Wetland during the October site visit. *Daphnia* species (water fleas) and ehippia (egg cases evident of sexual reproduction) were found at STN-4, STN-5 and STN-6. At STN-6, daphnids were observed swimming on the surface of the water. Copepods were also observed at STN-4.

Wildlife observed in the Tundra Wetland during the sampling events included ducks and gulls primarily on Finger Lake, where numerous birds were observed. Unidentified duck species were also observed on Lagoon Lake and the holding cell during June 2007. Two sandhill cranes were observed between the holding cell and Lagoon Lake in August 2006. The presence of gulls within the Tundra Wetland may in part be due to the proximity of the landfill, as many gulls were also observed at the landfill. Ms. Iyago commented on the noticeable increase of animals, including grizzly bears, near town since the development of the sewage treatment wetland and landfill. Discussions with Hamlet officials confirmed that caribou are often found in the wetland area during fall and winter and that people have observed the animals drinking from ponds in the wetland. Hunting of animals seen in the Tundra Wetland has ceased as people fear they are contaminated as a result of eating within the wetland.

Flora throughout the Tundra Wetland appeared dense, especially around the edges of ponds and streams. This is expected as these are wetter areas with added nutrients. To NJWL's knowledge, plant species composition was not documented before the establishment of the sewage treatment wetland system, making it difficult to determine any change in composition or density since then. However, it is well-known that additions of sewage effluent to a natural wetland can be expected to alter its ecology and biology, including plant growth and species composition. Plants in the Tundra Wetland will proliferate in the new positively stressed conditions, due to the addition of nutrients (nitrogen and phosphorus). Some plant species observed throughout the Tundra Wetland in June 2007 include dwarf birch (*Betula glandulosa*), Labrador tea (*Ledum decumbens*) and Scheuchzer's cottongrass (*Eriophorum scheuchzeri*), as well as various willows (*Salix* spp.), sedges (*Carex* spp.), grasses, club-moss (*Lycopodium* spp.) and moss.

4.5 Conclusions and Recommended Improvements to the Tundra Wetland System

Table 12 presents the approximate sizing of the Tundra Wetland at present. These calculations are conservative as they assume that water from the holding cell is restricted to a one metre wide flow channel and that the same holds true for the channels between the lakes. During snowmelt, water in the wetland that overflows the channels is being treated in the wider natural wetland area. The total current effective Tundra Wetland area is estimated conservatively at approximately 10 ha, but more realistically at 15 ha.

Table 12 Current area of Qamani'tuaq's Tundra Wetland System

Component	Dimension	Approximate Area (ha)
Holding Cell	31 m by 6 m to 9.5 m	0.02
Flow Area below Holding Cell	180 m by a 1 m channel	0.02
Lagoon Lake	-	2.4
Channel, Lagoon Lake to Finger Lake	300 m by 1 m channel	0.03
Finger Lake	-	7.2
Channel, Finger Lake to Airport Lake	1300 m by 2 m	0.3
Total	-	9.7

The current (2006) estimated 10-month sewage volume is 52,353 m³ (Table 2) Assuming all is stored as ice during winter and released evenly during the 4 week freshet period, the flow rate passing through the Tundra Wetland is 1745 m³/d. This is approximately 5.7 ha/1000 m³/d, which is the recommended 5.7 ha/1000 m³/d minimum size (Section 1.9).

By year 2025, the 10-month sewage volume for Baker Lake is forecast to rise to 74,516 m³ (Table 2), equivalent to 2484 m³/d during snowmelt, a 42% increase from 2006. The Tundra Wetland loading would be equivalent to approximately 4 ha/1000 m³/d, below that recommended in Section 1.9.

There are number of relatively easy ways to increase the effective area of the Tundra Wetland. Recommendations are provided in **Appendix D** in the report from the Jacques Whitford NAWÉ Project Engineer. In summary however, the holding cell could be increased in size, and a re-design of the berms of the holding cell could re-align the path of water flowing to Lagoon Lake from its current narrow flow channel (assumed to be one metre wide) to a wider path. Judicious design could create a flow pattern up to 100 m wide. Similar design changes downstream (e.g. adding berms perpendicular to flow) could increase the flow pattern from Lagoon Lake to Finger Lake to a similar width, and that from Finger Lake to Airplane Lake to twice as much. In addition, a second holding cell could be constructed downslope from the existing landfill to impound and treat leachate before it overflows into Finger Lake.

Table 13 shows the potential effect these suggestions could have on the size of the Tundra Wetland. Any or all of these solutions could be implemented on an as-needed basis to increase the treatment area and would be more economical than constructing a new lagoon large enough to meet 20 year needs. In addition such improvements would assure better treatment and provide for future sewage flows.

Table 13 Potential area of Qamani'tuaq' Tundra Wetland following upgrades

Component	Dimensions	Approximate Area (ha)
Enlarged Holding Cell	50 m by 50 m	0.3
Expanded Flow Area below Holding Cell	180 by 100 m channel	1.8
Lagoon Lake	-	2.4
Channel, Lagoon Lake to Finger Lake	300 m by 100 m channel	3.0
Finger Lake	-	7.2
Channel, Finger Lake to Airport Lake	1300 m by 200 m	26.0
Landfill Holding Cell	100 m by 50 m	0.5
Total Possible	-	41.2

Lagoon Lake, Finger Lake, Airplane Lake and the streams connecting them and leading into Baker Lake are all part of the Tundra Wetland System. Indeed in many jurisdictions (e.g. Ontario), the whole system (including the holding cell and STN-6 to STN-1) would be classified as a sewage treatment plant. Hence contaminants levels within the system exceeding Water Licence or CCME PFAL criteria are not germane and only the contaminant concentrations at the system's exit (STN-1 at Baker Lake) are relevant. As the June 2007 sampling results indicate water quality entering Baker Lake meets most criteria, even when levels entering the system are at a maximum following the winter storage period.

Overall, the results indicate that the Tundra Wetland, as it is currently configured, provides effective treatment of both the Hamlet's sewage and any landfill leachate for most of the year. However due to the exceedances of phenols and some metals in spring at STN-1, it is recommended that solutions provided to enhance treatment within the Tundra Wetland are implemented to provide effective treatment of these parameters, following the winter storage period.

While not directly related to treatment effectiveness, community residents believe that caribou frequenting the wetland are being contaminated and are, therefore unfit for consumption. Installation of a fence surrounding the holding cell and Lagoon Lake would prevent caribou from coming into contact with the sewage effluent until further downstream, by which time it has received considerable treatment.

5 Assessment of Existing Water Supply Source

The following section outlines work completed on Part B “Water Quality” of the study. It includes the identification of hydrological influences on Baker Lake, a discussion of results from the water quality sampling program, an account of potential impacts to the water source, a summary of NJWL’s consultation with Environmental Health Officers and an initial water source protection plan.

5.1 Hydrological Influences on Baker Lake

There are several Water Survey of Canada (WSC) hydrologic stations in and around Baker Lake. The WSC has monitored discharge from Thelon River, Kazan River, Prince River, Qinguq Creek and Akkutuak Creek, which flow into Baker Lake. Of these, only the Kazan River station is still monitored. Archived data from these stations is available online (www.wsc.ec.gc.ca) and was reviewed to estimate the contributions of different water sources to Baker Lake.

The Thelon and the Kazan Rivers have the largest discharges of all watercourses for which data is available. The Prince River, Qinguq Creek and Akkutuak Creek are ephemeral systems (frozen, with no flow for part of the year). As such, their hydrological influence on Baker Lake is expected to be negligible in comparison to that of the Thelon or Kazan Rivers. The approximate mean monthly and annual discharges of these water courses are presented in Table 14.

Table 14 Mean monthly and annual discharge (m³/s) of Akkutuak Creek, Qinguq Creek, Prince River, Kazan River and Thelon River

Station*	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Akkutuak	0	0	0	0	0.037	0.814	0.226	0.129	0.179	0.031	0	0	0.127
Qinguq	0	0	0	0	0.688	16.9	5.61	2.49	3.56	0.571	0.011	0	2.63
Prince	0	0	0	0	0.259	49.5	53.1	25.2	23	7.44	1.3	0.135	11.9
Kazan	134	106	97.5	110	176	864	1,240	914	674	466	302	201	447
Thelon	316	259	233	236	349	1,950	1,980	1,100	859	699	541	407	757

Akkutuak (64° 18' 57" N by 95° 58' 23" W) from 1978 – 1990

Qinguq (64° 15' 42" N by 96° 18' 53" W) from 1969 – 1994

Prince (64° 18' 8" N by 95° 43' 31" W) from 1979 – 1990

Kazan (63° 39' 9" N by 95° 51' 8" W) from 1965 - present

Thelon (64° 24' 25" N by 96° 24' 37" W) from 1973 – 1982

Given the discharge and geographical location of these watercourses (see Figure 7 in **Appendix C**); the Thelon River is believed to have the greatest influence on water quality near Qamani'tuaq. The Thelon contributes 62% of total discharge of these five rivers. In October 2006, NJWL discussed with a long-time resident of the community the direction Thelon River water flows take once it enters Baker Lake. NJWL was informed that the water sweeps north-northeast around Hornet Point, then east through Baker Lake, towards the Chesterfield Inlet. In Figure 7, a large underwater sand deposit is outlined at the inflow of the Thelon River to Baker Lake. Built up over time, this sand deposit affects transport and mixing of the inflow waters (Murthy 1996). Given the current build up of sand, this deposition can direct Thelon waters further towards the community, increasing the potential to influence water quality in front of the community, and moving inflowing stream water (e.g. Garbage Creek) eastward, away from the Hamlet.

5.2 Water Quality Sampling Program

Water quality sampling was carried out on Baker Lake from a small boat on August 2 and 3 (summer) and October 5 (fall) in 2006, and from shore on June 20 (spring) in 2007. Mr. Joe Uqayuittuq of Qamani'tuaq assisted NJWL with sample collection in August 2006, while Mr. Nathaniel Kunantnat assisted NJWL in October 2006. Stations on Baker Lake were established in a gradient to the east and west of the drinking water intake (BL-6, equivalent to NWB station 1191-1/BAK-1). Sampling locations on Baker Lake are described in Table 15 and illustrated in Drawing No. 4, **Appendix A**. In August, 25 sampling stations were located at 200 m intervals up to 2 km east and 2 km west of the drinking water intake (BL-6). Two additional stations, BL-11 (1 km west of BL-6, closer to shore) and Thelon (4.5 km south of BL-6 at Hornet Point, where some residents draw drinking water) were added for the October sampling. The easternmost station was at Garbage Creek (STN-1).

The location of BL-6 was estimated in August 2006 by measuring distance from the shore. Subsequently, coordinates for the end of the water intake pipe were supplied by Arctic Divers (NWT) Ltd. Hence the location differed by approximately 33 m for the October samples taken from BL-6.

In June 2007, Baker Lake was ice covered except for approximately 10 - 15 m of open shoreline in front of the community. Due to logistical constraints during June, the original stations on Baker Lake could not be sampled. Three on-shore stations immediately across from the original stations were sampled and two additional on-shore stations were added to determine if soil-based hydrocarbon plumes from the past and present activities at the former Nunavut Power Corporation Plant site may have affected the water quality of Baker Lake. Additionally, based on results of the previous sampling events, five (5) streams flowing through/near the community and entering Baker Lake were sampled to ascertain water quality. Streams were sampled at least one metre upstream from their outlet into Baker Lake. All station locations throughout the sampling program were recorded as Universal Transverse Mercator (UTM) points, using a hand-held Garmin GPS 76 unit.

Grab samples were collected at 0.5 m depth using a Van Dorn sampler (beta bottle) for analysis of total metals, coliforms, nutrients and general water quality parameters. In August 2006, samples were collected at 11 stations (BL-1 through BL-10 and STN-1) and *in situ* water quality was measured at all 25 stations. In addition, grab samples were collected at BL-6 using the Van Dorn sampler at 3 m and 5 m depth. In October, grab and *in situ* samples were collected at three stations (BL-4, BL-6 at 0.5 m, 3 m and 6 m, and BL-9) and at BL-11 and Thelon, to expand on and validate August results (see Section 5.2.2). In June, grab samples were collected by immersing the sample bottles in water near the shore of Baker Lake and in streams, typically at a depth of 0.10 m or as allowed, below the surface. All samples were placed in a cooler, maintained at 4°C and shipped to ALS Laboratories in Winnipeg, MB.

In situ profiles of temperature, conductivity, pH and dissolved oxygen were measured at 2 m depth intervals using a Hydrolab Quanta meter in August and October. During spring, *in situ* measurements were taken at the surface (upper 0.20 m) of streams and onshore Baker Lake stations (See Table 15 for a breakdown of station sampling).

Table 15: Water quality sample locations In Baker Lake, NU

Station	Station Location	August		October		June	
		Grab	In situ	Grab	In situ	Grab	In situ
BL-1	2000 m southwest of the water intake	0.5 m	X				
Insitu-1	1800 m southwest of the water intake		X				
Insitu-2	1600 m southwest of the water intake		X				
BL-2	1500 m southwest of the water intake	0.5 m	X				
Insitu-3	1400 m southwest of the water intake		X				
Insitu-4	1200 m southwest of the water intake		X				
BL-3	1000 m southwest of the water intake	0.5 m	X				
Insitu-5	800 m southwest of the water intake		X				
Insitu-6	600 m southwest of the water intake		X				
BL-4	500 m southwest of the water intake	0.5 m	X	0.5 m	X		
Insitu-7	400 m southwest of the water intake		X				
BL-5	200 m west of the water intake	0.5 m	X				
BL-6	Drinking water intake	0.5 m 3 m 5 m	X	0.5 m 3 m 6 m	X		
BL-7	200 m east of the water intake	0.5 m	X				
Insitu-8	400 m east of the water intake		X				
BL-8	500 m east of the water intake	0.5 m	X				
Insitu-9	600 m east of the water intake		X				
Insitu-10	800 m east of the water intake		X				
BL-9	1000 m east of the water intake	0.5 m	X	0.5 m	X		
Insitu-11	1200 m east of the water intake		X				
Insitu-12	1400 m east of the water intake		X				
BL-10	1500 m east of the water intake	0.5 m	X				
Insitu-13	1600 m east of the water intake		X				
Insitu-14	1800 m east of the water intake		X				
STN-1	2000 m east of the water intake	0.5 m	X				
BL-11	Approximately 1 km west of BL-6			0.5 m	X		
Thelon	Approximately 4.5 km south of BL-6			0.5 m	X		
BL-12	550 m east of the water intake, on shore					0.20 m	X
BL-13	670 m east of the water intake, on shore					0.20 m	X
BL-14	500 m west of water intake (BL-4), on shore					0.15 m	X
BL-15	Drinking water intake (BL-6), on shore					0.10 m	X
BL-16	1000 m east of water intake (BL-9), on shore					0.10 m	X
STRM-1	250 m east of water intake, on shore					0.15 m	X
STRM-2	380 m west of water intake, on shore					0.10 m	X
STRM-3	910 m west of water intake, on shore					0.10 m	X
STRM-4	1290 m west of water intake, on shore					0.15 m	X
STRM-5	1320 m west of water intake, on shore					0.10 m	X

There was a three-day delay in shipping samples to the laboratory in August, resulting in exceedance of specified hold times for some parameters. Results of certain analyses may have been compromised (i.e.,

false negative or lower levels than expected for fecal coliforms and nitrate). October samples were received on time at the laboratory and coliform results were similar to those obtained in August; suggesting that results from August are consistent. In June 2007, samples were received at ALS Laboratories one day late, affecting hold time for coliform samples.

Analytical results for the grab samples are provided in Tables 16 through 27, with laboratory certificates included in **Appendix B**. *In situ* measurements taken in August, October and June are provided in Tables 17, 21 and 25, with all data available in Tables 1, 3 and 5 in **Appendix C**.

5.2.1 QA/QC

During summer sampling of Baker Lake, one duplicate sample was taken at BL-8. Differences between the duplicates were small, suggesting low short-term variability in water quality and consistent sampling procedures and laboratory methods. No duplicate sample was taken during fall or spring due to the reduced sampling schedule.

The same travel blank was used for sewage wetland and Baker Lake sampling in August. The results obtained from the travel blank showed no contamination from the bottles or due to transport, storage or handling; all results were consistent with deionized water.

In summer, fall and spring sampling, there were some discrepancies between field and laboratory pH. Laboratory values for pH were consistently higher than field values for both August and October, while the opposite was observed in June (see Figures 8 to 10 in **Appendix C**). These differences are not thought to be significant as some disagreement between lab and field pH is expected. Reasons for this discrepancy include the inherent difficulty of obtaining accurate pH measurements in the field, and the increased time between sampling and laboratory analysis. Conductivity (August and October) and dissolved oxygen (D.O.) values (August) were fairly similar between laboratory and field measurements. Field measurements of conductivity were consistently lower than laboratory measurements during June, perhaps due to field meter error as noted for the Tundra Wetland samples.

Data quality objectives (DQOs) provided by the laboratory were met, showing results were reliable. All parameters were within their acceptable limits of calibration and all laboratory duplicates were within applicable relative percent differences. DQOs were acceptable for all sampling events, in summer, fall and spring.

5.2.2 Analytical Results

Laboratory results from the summer, fall and spring water quality sampling events are presented in the following three sections. Laboratory Analytical Certificates are included in **Appendix B**.

5.2.2.1 Summer (August 2006)

Results for August (Table 16) showed Baker Lake to be a clear (maximum turbidity 1.3 NTU), relatively soft water (up to 20 mg/L hardness), thermally stratified lake. Temperature was fairly constant across the surface of Baker Lake, with the exception of a decrease measured between BL-3 and BL-6. Temperature decreased with depth in the water column (Figure 11 in **Appendix C**), with the thermocline occurring between 4 and 6 m. Table 17 provides the *in situ* results for temperature, pH, D.O. and conductivity at 0.5 m depth; all *in situ* results are reported in Table 1 in **Appendix C**.

Table 16 General water chemistry of Baker Lake (BL), August 2006 (0.5 m depth at all stations, plus 3 m and 5 m at BL-6)

Station	Sodium (mg/L)	Chloride (mg/L)	Cond. (uS/cm)	TDS (mg/L)	Turbidity (NTU)	Hardness (mg/L)	pH	Nitrate+ Nitrite-N (mg/L)	D.O. (mg/L)
BL-1	0.79	<9	25.6	10	0.60	9.5	7.22	0.005	11.0
BL-2	0.64	<9	24.4	6	0.55	9.5	7.19	< 0.005	11.5
BL-3	1.89	<9	32.3	10	0.50	10.3	7.18	0.005	11.5
BL-4	6.91	13	67.9	32	0.45	13.2	7.14	0.011	11.9
BL-5	15.6	29	136	66	0.40	20.0	7.29	0.023	12.1
BL-6 (0.5 m)	16.1	32	144	84	0.35	17.4	7.20	0.030	13.2
BL-6 (3.0 m)	18	32	144	68	0.35	18.1	7.20	0.029	13.2
BL-6 (5.0 m)	17.8	32	144	72	0.40	18.3	7.19	0.028	13.0
BL-7	1.66	<9	32.8	18	0.45	8.9	7.30	0.007	11.8
BL-8	1.44	<9	30.7	14	0.40	8.7	7.25	0.007	11.9
BL-9	0.92	<9	26.8	14	0.40	8.5	7.27	0.010	11.5
BL-10	1.92	<9	34.1	16	0.40	9.3	7.26	0.007	11.8
STN-1	2.78	<9	52.8	24	1.30	15.3	7.29	0.019	8.8

Table 17 *In situ* temperature, pH, dissolved oxygen (D.O.) and conductivity in Baker Lake, August 2006 (0.5 m depth)

Station	Temp (C)	pH	D.O. (mg/L)	Cond. (uS/cm)
BL - 1	11.01	6.10	13.99	25
BL - 2	10.41	6.14	12.76	25
BL - 3	9.95	6.23	12.17	32
BL - 4	8.64	6.61	12.21	71
BL - 5	5.55	6.58	13.03	141
BL - 6 (0.5 m)	5.19	6.16	13.80	150
BL - 6 (4 m)	5.00	6.03	13.52	149
BL - 6 (6 m)	5.02	6.08	13.48	149
BL - 7	10.60	7.03	12.43	32
BL - 8	10.51	8.14	11.91	29
BL - 9	10.61	8.15	11.95	26
BL - 10	10.26	7.65	12.31	34
STN - 1	18.02	*	10.62	63

* Hydrolab error - pH value could not be obtained

In situ pH values did not vary greatly through the water column at a given station but did change across Baker Lake, ranging from 6.1 to 8.1. In contrast, laboratory pH values were fairly constant across Baker Lake (7.1 to 7.3, see also Figure 8, **Appendix C**). Both pH and D.O. values were within the CCME PFAL (Protection of Freshwater Aquatic Life) guidelines.

Conductivity varied markedly in surface water, with a maximum of approximately 150 µS/cm at BL-5 and BL-6 and decreasing to 25 to 34 µS/cm to the east and the west of these two sites. Similar results were reported for field and laboratory analyses (Tables 16 and 17). Conductivity increased again to 63 µS/cm at STN-1. The increase in conductivity at Garbage Creek was expected due to elevated dissolved solids in the creek (Dodds 2002), but the spatial trend for the lake was not anticipated.

The spatial trend for maximum conductivity at sites near the water intake (BL-4, BL-5 and BL-6) and near Garbage Creek (STN-1) is reflected in those for sodium, chloride, total dissolved solids (TDS) and nitrate/nitrite (Table 16). This relationship is displayed graphically in Figure 12 (**Appendix C**). Sulphate and total suspended solids (TSS) were less than their detection limits (<9 mg/L and <5 mg/L, respectively) at all stations. At no station did any of these parameters exceed CCME PFAL guidelines or Health Canada's Guidelines for Canadian Drinking Water Quality (GCDWQ).

The spatial trend for a number of metals was similar to that for conductivity, TDS, sodium, chloride and nitrate/nitrite (Table 18). Between BL-4 and BL-6, cadmium, silver, chromium, lead, selenium and thallium all exceeded CCME PFAL guidelines at one or more stations. Concentrations of thallium, selenium and lead were relatively close to the corresponding guideline, whereas those for cadmium, silver and chromium were 2 to 46 times higher than their corresponding CCME PFAL guideline (Figures 13 to 15, Appendix C). For cadmium, it was assumed that values lower than the laboratory detection limits were compliant with the CCME PFAL guideline even though the detection limit (0.02 µg/L) was slightly higher than the guideline (0.017 µg/L).

The reason for the increase in several metals and other water quality characteristics between BL-4 and BL-6 is not clear. The increases cannot be attributed to the outflow from Garbage Creek as the parameters increase from west to east, in front of the community, up to the location of the water intake at BL-6, then decrease further east (Drawing No. 5, **Appendix A**). Potential sources of these substances include run-off from the community, inputs from other streams in the surrounding area, the outflow of the Thelon River or groundwater flows. At this time, the increases in sodium, TDS, conductivity, hardness and metals do not exceed the GCDWQ, although levels of some metals are higher than their CCME PFAL guidelines.

Table 18 Analytical results for metals (µg/L) in Baker Lake, August 2006 (0.5 m depth at all stations, plus 3 m and 5 m at BL-6)

Total Metals (ug/L)	Station												STN-1	Applicable Guidelines	
	BL-1	BL-2	BL-3	BL-4	BL-5	BL-6 (0.5 m)	BL-6 (3 m)	BL-6 (5 m)	BL-7	BL-8	BL-9	BL-10		CCME ^a (ug/L)	GCDWQ ^b (ug/L)
Aluminum ^c	25	28	29	15	17	32	29	26	28	43	31	28	67	100 ^d	100
Cadmium ^c	<0.02	<0.02	<0.02	0.79	0.69	0.79	0.74	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.017 ^e	5
Iron ^c	70	60	80	100	90	100	130	40	50	40	50	40	160	300	300
Mercury ^c	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	1
Arsenic	<0.5	<0.5	<0.5	1	0.8	1.1	1	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	5	5
Boron	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30		5000
Barium	17.7	17.2	16.8	16.4	16.7	17.6	17.4	16.6	17.1	16.8	16.8	17.6	34.1		1000
Beryllium	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Bismuth	<0.2	<0.2	<0.2	1.2	0.9	0.9	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		
Calcium	2200	2300	2300	2300	2900	2900	3200	3300	2300	2200	2200	2300	4500		
Cobalt	<0.2	<0.2	<0.2	1.1	1	1.1	1.1	<0.2	0.3	0.2	0.2	0.2	<0.2		
Chromium	<1	<1	<1	2	3	<1	10	<1	<1	<1	<1	<1	<1	8.9 ^f	50
Cesium	<0.1	<0.1	<0.1	1	0.9	0.9	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Copper	<1	<1	2	2	2	2	1	2	2	<1	<1	1	2	2 ^g	1000
Potassium	400	300	400	800	1200	1000	1100	1000	500	400	400	500	900		
Magnesium	950	930	1080	1750	2810	2810	3160	3020	1050	1010	950	1090	930		
Manganese	3.6	3.3	5.6	9.4	11.5	11.5	14.4	12.2	5	4.7	4.8	5.2	25.3		
Molybdenum	<0.2	<0.2	<0.2	1.2	1	1	1.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	73	
Sodium	790	640	1890	6910	15600	16100	18000	17800	1660	1440	920	1920	2780		200 000
Nickel	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	25 ^h	
Phosphorus	60	<50	60	70	70	<50	<50	<50	<50	<50	50	<50	<50		
Lead	<0.5	<0.5	<0.5	1.4	1	1	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1 ⁱ	10
Rubidium	0.8	0.8	0.8	1.8	1.9	2	1.8	<1	0.8	0.8	0.8	0.8	0.8		
Antimony	<1	<1	<1	2	1	2	1	<1	<1	<1	<1	<1	<1		6
Selenium	<1	<1	<1	1	2	1	1	<1	<1	<1	<1	<1	1	1	10
Tin	<0.6	<0.6	<0.6	1	0.8	1.1	2.8	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6		
Strontium	15.6	15.2	16.2	19.7	26.4	26.9	28.5	26.3	16.1	16.4	14.9	16.4	17.4		
Tellurium	<1	<1	<1	1	<1	<1	1	<1	<1	<1	<1	<1	<1		
Titanium	<0.9	0.9	1.2	<0.9	1.6	1.3	1.2	<0.9	<0.9	<0.9	<0.9	<0.9	2.6		
Thallium	<0.1	<0.1	<0.1	1	0.8	1.1	0.9	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.8	
Uranium	<0.1	<0.1	<0.1	1.1	0.9	0.9	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		20
Vanadium	<1	<1	<1	1	2	<1	<1	<1	<1	<1	<1	<1	<1		
Tungsten	<0.2	<0.2	<0.2	1.2	1.1	0.9	1.1	0.2	<0.2	<0.2	<0.2	<0.2	<0.2		
Zirconium	<0.4	<0.4	<0.4	1.2	1.2	1	1	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4		
Silver	<0.1	<0.1	<0.1	0.4	0.5	0.8	0.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	
Zinc	<10	<10	<10	<10	<10	<10	10	30	<10	<10	<10	<10	<10	30	5000

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Bolded results indicate guideline exceedances

^a CCME Guidelines for the Protection of (Freshwater) Aquatic Life

^b Health Canada Guidelines for Canadian Drinking Water Quality

^c Metal scan with ultra low detection limits

^d Aluminum = 100 ug/L when pH $\geq$ 6.5, $[Ca^{2+}] \geq$ 4 mg/L, DOC $\geq$ 2 mg/L

^e Cadmium = 0.0017 ug/L when Hardness $[CaCO_3]$ is < 60 mg/L

^f Guideline for trivalent chromium (Cr^{3+})

^g Copper = 2 ug/L when Hardness $[CaCO_3]$ is < 120 mg/L

^h Nickel = 25 ug/L when Hardness $[CaCO_3]$ is < 60 mg/L

ⁱ Lead = 2 ug/L when Hardness $[CaCO_3]$ is < 60 mg/L

As the drinking water intake is located at 5 to 6 m depth at BL-6, it is important to consider chemical characteristics throughout the water column. Water temperature at BL-6 was constant with depth, with no evidence of thermal stratification (Table 17). At present, it is not clear why stratification breaks down here or further east between BL-4 and BL-6. Although suction from the water intake may possibly contribute to localized break down of thermal stratification, it is unlikely to be responsible for the reduced stratification observed at BL-4 and BL-5, 500 m and 200 m away, respectively. Levels of chloride, conductivity, pH, nitrate/nitrite and D.O were also relatively constant with depth at BL-6, corresponding with the temperature profile. Sodium and hardness increased slightly with depth, and TDS decreased slightly with depth (Table 16) at BL-6. Metal concentrations generally were greater at 0.5 m and 3 m than at 5 m. This was notable for cadmium, mercury, selenium, thallium and silver, which exceed CCME PFAL guidelines at 0.5 m and 3 m, and for chromium, which exceeded the guideline at 3 m. None of the metals or other parameters at any depth exceeded GCDWQ, indicating the drinking water quality through the water column at BL-6 is acceptable during summer.

Review of the microbiological quality of Baker Lake indicates *Escherichia coli* (*E. coli*) and total coliforms were low at all stations (Table 19). *E. coli*, a fecal coliform indicating fecal contamination, was always reported as one (1) or less than one (<1) colony forming units per 100 millilitres (CFU/100mL). Total coliforms include *E. coli* and many, mostly harmless bacteria, naturally occurring in soil, water, plants and the guts of animals. Total coliforms ranged from <1 to 2 CFU/100 mL. Although coliforms increased between BL-6 and the outlet of Garbage Creek, the difference was small and results were confounded due to the fact that these samples were analyzed past their holding times (72 hours vs. 24 hour holding time). The actual results for BL-6 through to BL-10 could be over or underestimated.

Table 19 Microbiological results for Baker Lake, August 2006 (0.5 m depth for all stations, plus 3 m and 5 m at BL-6)

S t a t i o n	<i>E . c o l i</i> C F U / 1 0 0 m L	T o t a l C o l i f o r m s C F U / 1 0 0 m L
B L - 1	< 1	< 1
B L - 2	< 1	< 1
B L - 3	< 1	1
B L - 4	< 1	< 1
B L - 5	< 1	< 1
B L - 6 (0 . 5 m)	1	1
B L - 6 (3 . 0 m)	< 1	< 1
B L - 6 (5 . 0 m)	< 1	< 1
B L - 7	< 1	2
B L - 8	< 1	2
B L - 9	< 1	2
B L - 1 0	< 1	2
S T N - 1	< 1	1 6

The GCDWQ for *E. coli* and total coliforms are zero (0) CFU per 100 mL in water leaving a treatment plant. It is assumed that the addition of hypochlorite to the water is sufficient to eliminate these organisms from the drinking water supply (Health Canada 2005). However chlorine itself should not be relied upon to remove protozoan cysts from drinking water supplies (Health Canada 2005). NJWL sampled for protozoans at BL-6 (0.5 m) in August, and no protozoan cysts or oocysts were detected in Baker Lake at the water intake.

5.2.2.2 Fall (October 2006) Results

October results confirmed Baker Lake to be a soft water lake, with lower hardness than in summer, and that it is at least monomictic, as temperature through the water column and across the surface was stable and no thermocline was present. The average surface temperature was 4.41 °C, while the average temperature at depth was 4.32 °C, signifying the lake was in turnover at that time. Figure 11 (**Appendix C**) depicts the temperature-depth relationship through Baker Lake in October. Table 20 contains the analytical results from Baker Lake stations at 0.5 m depths, while Table 3 (in **Appendix C**) contains the *in situ* results for temperature, pH, D.O. and conductivity.

Table 20 General water chemistry of Baker Lake (BL), October 2006 (0.5 m depth at all stations, plus 3 m and 6 m at BL-6)

Station	Sodium (mg/L)	Chloride (mg/L)	Cond. (uS/cm)	TDS (mg/L)	Turbidity (NTU)	Hardness (mg/L)	pH	Nitrate+ Nitrite-N	D.O. (mg/L)
Thelon	0.42	<9	22.8	10	0.26	9.0	7.14	0.011	12.16
BL-11	0.46	<9	22.9	12	0.31	8.9	7.17	0.010	12.13
BL-4	0.46	<9	22.8	18	0.33	9.1	7.12	0.011	12.65
BL-6 (0.5 m)	0.53	<9	23.3	14	0.32	9.3	7.14	0.013	12.37
BL-6 (3.0 m)	0.55	<9	23.7	10	0.3	9.2	7.13	0.008	-
BL-6 (6.0 m)	0.58	<9	23.9	16	0.31	8.9	7.14	0.010	12.14
BL-9	2.17	<9	37.6	20	0.31	9.9	7.14	0.011	12.18
STN-1	3.87	<9	66.6	42	4.2	20.6	7.45	0.038	14.76

Table 21 *In situ* pH, dissolved hoxygen (D.O.) and conductivity in Baker Lake in October 2006 (0.5 m depth, plus 4 m and 6 m for BL-6)

Station	Temp (C)	pH	D . O . (m g / L)	Cond . (u S / c m)
Thelon	4.58	6.81	12.16	22
BL-11	4.38	6.85	12.13	22
BL - 4	4.54	6.35	12.65	22
BL - 6 (0.5 m)	4.07	6.75	12.37	23
BL - 6 (4 m)	4.05	6.73	12.16	23
BL - 6 (6 m)	4.01	6.72	12.14	24
BL - 9	4.47	6.80	12.18	37
SNP - 1	0.86	5.89	14.76	66

A comparison of laboratory and field pH measurements is provided in Figure 15, **Appendix C**. In the fall, field pH ranged from 5.90 to 6.85, and did not vary as much across the lake as during the summer, although the smaller number of stations sampled in fall can reduce the variability. Laboratory pH was again higher (7.12 to 7.45) than field pH (Figure 9, **Appendix C**). At BL-4, a slight decrease in pH was noted in both field and laboratory pH in autumn sampling, whereas in summer, a slight increase was noted. The high conductivity reported at BL-4 and BL-6 in August was not observed in fall. Instead, conductivity was constant, aside from a slight increase at BL-9 and a larger increase at STN-1. Overall, the conductivity trend is relatively constant for fall, indicating fewer inputs into the lake. D.O and pH values were within CCME recommended ranges.

In fall, consistent with conductivity values, there was less variability in levels of nutrients and metals compared to summer. Again, sulphate and TSS were below detection limits, with the exception of STN-1 (TSS 6 mg/L). The substantial increase in sodium, nitrate/nitrite, chloride and TDS levels noted for stations BL-4 through BL-6 in August were not reported in October, although small increases in TDS at BL-4, and sodium and nitrate/nitrite at BL-6 were observed (see Figures 16 and 17 in **Appendix C**). Concentrations of all parameters were relatively constant with depth at BL-6 and water quality at BL-6 met applicable drinking water standards.

At BL-9, sodium, TDS and hardness levels were greater than at the other Baker Lake sites sampled in October, and higher than BL-9 results in the summer; these variations are displayed in Figures 16 and 17, **Appendix C**. This may be the result of localized runoff in the area; at no time did any of these parameters exceed CCME PFAL guidelines or GCDWQ.

In contrast to the summer, when increases in levels of several metals accompanied the increased TDS, conductivity, sodium, and nitrate/nitrite levels at BL-4 through BL-6, there were no spatial trends for metals consistent with the smaller increases in TDS, etc. in the fall. No metals exceeded GCDWQ. Most metals were at or below their detection levels across Baker Lake, although silver, aluminum and cadmium were present at levels higher than CCME PFAL guidelines (Table 22) at one or more stations:

- cadmium levels were higher than the CCME PFAL guideline (0.017 µg/L) at all stations except STN-1, ranging from <0.02 (at STN-1) to 0.12 µg/L in surface water (at BL-6). In addition, the sample from 6 m at BL-6 had a cadmium concentration of 0.98 µg/L (Figure 13, **Appendix C**);
- silver was below detection (< 0.1 µg/L) at all sites, with the exception of BL-6 (6.0 m), with 0.9 µg/L (Figure 14, **Appendix C**); silver primarily enters aquatic systems through run-off, although the source of silver within the community is not known; and,
- aluminum exceeded the CCME guideline (100 µg/L) at STN-1 (outlet of Garbage Creek) by a factor of 2.85.

The elevated aluminum levels at STN-1 were discussed in Section 4.3.2.2 related to wetland operations and may be related to road construction. The aluminum Heath Canada Standard (200 µg/L) provided in Table 22 is an

operational guidance value for water treatment systems using alternative treatments (e.g. not aluminum-based coagulants). There is no health-based or aesthetic objective for aluminum in the GCDWQ as there is no convincing evidence that aluminum causes adverse health effects or affects the acceptance (e.g. taste, colour - aesthetics) of drinking water by consumers (Health Canada 1998). Elevated aluminum levels were not reported at other stations in Baker Lake and levels of aluminum at Baker Lake stations were lower in the fall than the summer. Therefore, aluminum from Garbage Creek does not appear to have a negative effect on the water quality of Baker Lake, west of the creek. Dilution and the predicted southerly movement of creek flow are the likely reasons for this.

Differences in distribution of cadmium with depth at BL-6 between August ($< 0.02 \mu\text{g/L}$) and October ($0.98 \mu\text{g/L}$) suggest a re-suspension of sediment during fall turnover. Despite this, cadmium levels through the water column at BL-6 in October did not exceed the GCDWQ. The origin of elevated cadmium levels is not clear. Cadmium has a high affinity for negatively charged particles so tends to settle out bound to the sediment (CCME 1999), and can be remobilized during spring and fall turnovers, thereby increasing concentrations within surface waters (CCME 1996). The elevated cadmium levels across Baker Lake in October may be related to lake turnover, which was occurring at the time of sampling. However there may be additional sources of cadmium to the lake, given that the guideline was also exceeded at several sites in summer during thermal stratification, and that maximum levels were reported at the same sites in both summer and fall. Furthermore, other sediment-bound metals (i.e. lead, iron), nitrate/nitrites and phosphorous did not notably increase during overturn, as they tend to during lake turnover. This implies that there is either a large store of cadmium in the sediments, in comparison to other sediment-bound materials, indicating a history of cadmium inputs to the lake, or an increase in cadmium inputs to the lake since the August sampling event.

Major pathways for cadmium to enter aquatic systems are from atmospheric deposition and industrial and municipal waste discharge, e.g., from smelting effluents (Health Canada 1986, CCME 1999). Atmospheric deposition would most likely result in constant levels across the study area, rather than the spatial trend noted for Baker Lake. There are no smelters or operating mines in the general area, and levels are lowest near Garbage Creek (STN-1), so do not appear to be influenced by effluent from the Tundra Wetland. Other sources of cadmium are nickel cadmium batteries, pigments and coatings, alloys, television picture tubes, motor oils and automobile radiators (CCME 1999); it may also be found unintentionally in galvanized products (Health Canada 1986), any of which could be potential sources for some of the cadmium entering Baker Lake, either directly or from contaminated runoff from the community. See Figure 19, **Appendix C** for a graphical display of the change in cadmium concentrations across Baker Lake in the fall and Figure 20, **Appendix C** for a comparison of summer and fall levels of cadmium.

Table 22 Analytical results for metals in Baker Lake, October 2006 (0.5 m depth for all stations, plus 3.0 and 6.0 m for BL-6)

Total Metals (ug/L)	Station								Applicable Guidelines	
	Thelon	BL-11	BL-4	BL-6 (0.5 m)	BL-6 (3 m)	BL-6 (6 m)	BL-9	STN-1	CCME ^a (ug/L)	GCDWQ ^b (ug/L)
Aluminum ^c	22	20	15	19	27	32	15	285	100 ^d	100
Cadmium ^c	0.04	0.04	0.09	0.12	0.12	0.98	0.04	<0.02	0.017 ^e	5
Iron ^c	20	40	30	20	40	100	30	240	300	300
Mercury ^c	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	0.1	1
Arsenic	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	5	5
Boron	<30	<30	<30	<30	<30	<30	<30	<30		5000
Barium	14.7	15	14.7	14.7	14.6	15.8	15	47		1000
Beryllium	<1	<1	<1	<1	<1	<1	<1	<1		
Bismuth	<0.2	<0.2	<0.2	<0.2	<0.2	0.9	<0.2	<0.2		
Calcium	1800	1900	1900	2100	2000	1900	2200	6800		
Cobalt	<0.2	<0.2	<0.2	<0.2	<0.2	1	<0.2	<0.2		
Chromium	<1	<1	<1	<1	<1	1	<1	<1	8.9 ^f	50
Cesium	<0.1	<0.1	<0.1	<0.1	<0.1	0.9	<0.1	<0.1		
Copper	<1	<1	<1	<1	<1	1	<1	<2	2 ^g	1000
Potassium	<100	200	100	200	200	100	200	1000		
Magnesium	780	820	830	870	860	870	1050	1390		
Manganese	2.1	1.9	2	5	1.7	2.5	2.2	8.4		
Molybdenum	<0.2	<0.2	<0.2	<0.2	<0.2	0.9	<0.2	<0.2	73	
Sodium	420	460	460	530	550	580	2170	3870		200 000
Nickel	<2	<2	<2	<2	<2	<2	<2	<2	25 ^h	
Phosphorus	<50	<50	<50	<50	<50	<50	<50	60		
Lead	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	1 ^j	10
Rubidium	0.4	0.5	<0.2	<0.2	<0.2	1.3	0.5	1		
Antimony	<1	<1	<1	<1	<1	1	<1	<1		6
Selenium	<1	<1	<1	<1	<1	<1	<1	1	1	10
Tin	<0.6	<0.6	<0.6	<1	<0.6	0.9	<0.6	<0.6		
Strontium	12.3	12.7	12.4	13.2	13.1	13.3	14.7	24.7		
Tellurium	<1	<1	<1	<1	<1	<1	<1	<1		
Titanium	<0.9	<0.9	<0.9	<0.9	<0.9	1.3	<0.9	4.7		
Thallium	<0.1	<0.1	<0.1	<0.1	<0.1	0.8	<0.1	<0.1	0.8	
Uranium	<0.1	<0.1	<0.1	<0.1	<0.1	0.9	<0.1	0.1		20
Vanadium	<1	<1	<1	<1	<1	<1	<1	<1		
Tungsten	<0.2	<0.2	<0.2	<0.2	<0.2	0.8	<0.2	<0.2		
Zirconium	<0.4	<0.4	<0.4	<0.4	<0.4	1.1	<0.4	<0.4		
Silver	<0.1	<0.1	<0.1	<0.1	<0.1	0.9	<0.1	<0.1	0.1	
Zinc	<10	<10	<10	<10	<10	<10	<10	<10	30	5000

Bolded results indicate guideline exceedances

^a CCME Guidelines for the Protection of (Freshwater) Aquatic Life

^b Health Canada Guidelines for Canadian Drinking Water Quality

^c Metal scan with ultra low detection limits

^d Aluminum = 100 ug/L when pH ≥ 6.5, [Ca²⁺] ≥ 4 mg/L, DOC ≥ 2 mg/L

^e Cadmium = 0.017 ug/L when Hardness [CaCO₃] is < 60 mg/L

^f Guideline is for trivalent chromium (Cr³⁺)

^g Copper = 2 ug/L when Hardness [CaCO₃] is < 120 mg/L

^h Nickel = 25 ug/L when Hardness [CaCO₃] is < 60 mg/L

^j Lead = 2 ug/L when Hardness [CaCO₃] is < 60 mg/L

Generally, the microbiological quality of Baker Lake was good and changed little from August to October. *E. coli* was reported as < 1 CFU/100 mL at all stations and total coliforms were generally < 1 CFU/100 mL, with only BL-6 (0.5 m) reporting 1 CFU/100 mL total coliforms (see Table 20). Protozoans were not assessed during October.

Table 23 **Microbiological results for Baker Lake stations in October 2006 (0.5 m depth for all stations, plus 3 m and 6 m at BL-6).**

Station	<i>E. coli</i> CFU/100 mL	Total Coliforms CFU/100 mL
Thelon	< 1	< 1
BL-11	< 1	< 1
BL-4	< 1	< 1
BL-6 (0.5 m)	< 1	1
BL-6 (3.0 m)	< 1	< 1
BL-6 (6.0 m)	< 1	< 1
BL-9	< 1	< 1
STN-1	< 1	< 1

5.2.2.3 Spring (June 2007)

Residents are most concerned about water quality during spring, when ice is still present on Baker Lake and there are open water leads along the shoreline. The Tundra Wetland is flowing at this time and the high water flows in the wetland might be perceived to result in effluent not receiving full treatment. There is a concern that water from Garbage Creek could enter the lake and flow eastward along the ice-free shoreline toward the drinking water intake, where it could have a negative impact on drinking water quality.

Water samples were collected from locations along the ice-free shoreline of Baker Lake, from several streams that flow through the Hamlet, and from streams flowing near the community (to provide reference stations) to assess water quality during the spring. Results for both lake and stream sampling are presented together to illustrate spatial trends and potential influences on lake water quality. In addition to the streams sampled, several ephemeral streams were noted but not sampled (e.g. in the vicinity of stations BL-12 and BL-13). Drawing 5 in **Appendix A** shows locations of the lake and stream sampling locations.

Analytical results from onshore Baker Lake and stream stations are shown in Table 24. Within the lake, general water quality characteristics in June were distinct compared to those reported in August and October for offshore stations. Levels of sodium, conductivity, TDS and hardness were slightly higher and levels of turbidity and nitrate/nitrite were notably higher in June compared to August and October (see Figures 18 and 19 in **Appendix C** for June results). However this is expected during the spring melt, when the rate of surface runoff into the lake is at a maximum for the year (Cumberland 2005). Among onshore stations, levels of these parameters were generally highest at BL-16, at the eastern end of the community. Nitrate/nitrate levels ranged from 0.073 to 0.458 mg/L in June (maximum at BL-12 and BL-13), compared to <0.005 to 0.030 mg/L in August and October. *In situ* values are reported in Table 25 and Table 5 in **Appendix C**. Temperature profiles were not taken in June, as sampling occurred in shallower waters onshore.

Turbidity levels were compared with drinking water standards, although it is noted that onshore water is not used for drinking water. Turbidity levels (1.4 to 3.7 NTU) exceeded the < 1.0 NTU GCDWQ, at all sites (Figure 20, **Appendix C**), consistent with values reported by CGS for June 2005, but onshore stations did meet the Nunavut *Consolidation of Public Water Supply Regulations* (maximum allowable value for turbidity of 5 NTU for a surface water source).

Table 24 Analytical results from onshore Baker Lake (BL) and stream (STRM) stations in June 2007 (listed from west to east)

Station	Sodium (mg/L)	Chloride (mg/L)	Cond. (uS/cm)	TDS (mg/L)	Turbidity (NTU)	Hardness (mg/L)	pH	Nitrate+Nitrite-N (mg/L)	Ammonia-N (mg/L)	D.O. (mg/L)
STRM-5	0.75	< 9	30.9	23	1.1	12.9	7.14	0.013	0.005	11.83
STRM-4	0.78	< 9	30.5	22	0.3	11.9	7.03	0.020	0.006	11.79
STRM-3	1.54	< 9	75.6	50	10	31.6	7.47	0.288	0.056	12.84
BL-14	0.97	< 9	31.4	12	1.4	11.2	7.12	0.083	-	14.80
STRM-2	1.97	< 9	108	63	24	45.4	7.76	0.529	0.146	14.35
BL-15	0.98	< 9	32.9	28	2.2	12.9	7.17	0.073	-	15.01
STRM-1	1.34	< 9	49.8	23	3.8	22.1	7.42	0.017	0.007	13.81
BL-12	1.23	< 9	47	19	2.1	17.6	7.22	0.458	0.213	14.78
BL-13	1.29	< 9	43.3	17	1.5	17.6	7.12	0.192	0.084	14.90
BL-16	1.51	< 9	67.2	36	3.7	27.9	7.57	0.073	-	13.76
STN-1	2.27	-	46	-	-	11.7	7.24	0.147	0.780	19.20

Table 25 *In situ* temperature, pH, dissolved oxygen (D.O.) and conductivity at onshore Baker Lake (BL) and stream (STRM) stations in June 2007 (listed from west to east)

Station	Temp (°C)	pH	D.O. (mg/L)	Cond. (uS/cm)
STRM-5	8.74	7.13	11.83	17
STRM-4	8.74	7.03	11.79	17
STRM-3	6.64	7.53	12.84	49
BL-14	2.20	7.33	14.80	18
STRM-2	4.82	7.91	14.35	73
BL-15	3.81	7.40	15.01	18
STRM-1	5.59	7.86	13.81	29
BL-12	1.16	7.27	14.78	25
BL-13	1.89	7.31	14.90	23
BL-16	5.88	7.69	13.76	41
STN-1	1.38	7.33	19.20	10

Surface flows to Baker Lake were high at the time of sampling (Table 11). STRM-1, STRM-2 and STRM-3 flow through drainage ditches within the community. STRM-4 and STRM-5 are located to the west of the community (reference areas) and are culverted at Baker Lake. STRM-1 flows through the community, but originates in lakes situated between the community and the Tundra Wetland. Ephemeral streams in the vicinity of BL-12 and BL-13 did not have as large a flow as other streams and were not sampled.

Water quality of STRM-2 and STRM-3, which flow through the community, had notably higher levels of sodium, turbidity, hardness, TDS, ammonia and nitrate/nitrite levels than the reference streams and STRM-1 (Figure 18 and 19, **Appendix C**). These data suggest that streams flowing through the community pick up materials and potential pollutants and transport the materials into Baker Lake. For example, ammonia levels were 30 times greater and nitrate/nitrite levels 40 times greater at STRM-3 than at reference streams and similarly elevated for STRM-2, indicating substantial sources of nitrogen on Hamlet land.

Table 26 presents total metal results for stream and onshore Baker Lake stations. Levels of most metals were within their respective CCME PFAL and Health Canada guidelines. The following exceptions were noted:

- aluminum levels across the study area exceeded CCME PFAL guidelines and, at BL-12, exceeded the GCDWQ operational guidance value (the latter is not thought significant from a human health or aesthetic perspective), see Figure 21 in **Appendix C**;
- iron levels in two streams (STRM-2 and STRM-3) exceeded the CCME PFAL guideline and the GCDWQ aesthetic objective; however, elevated iron levels were not noted at onshore lake stations (Figure 22 in **Appendix C**);
- copper levels at STRM-2 and STRM-3 exceeded CCME guidelines (Figure 23 in **Appendix C**);
- cadmium levels at STRM-3 exceeded CCME guidelines; and
- zinc levels exceeded CCME guidelines at STRM-2.

Aluminum levels at onshore lake stations sampled in June (102 to 225 µg/L) were notably higher than at offshore stations monitored in August and October (15 to 43 µg/L). The inflowing streams had levels of 77 to 1750 µg/L in the June samples, indicating considerable aluminum flowing into the lake, even from the reference streams (77 to 117 µg/L). Elevated levels of aluminum during spring melt and runoff may be partly a natural occurrence as aluminum can be released from soil and/or bedrock, and, with iron, in suspended sediment particles (silt, clay, sand). A comparison of turbidity, nitrate and ammonia values (Table 24) and aluminum and iron levels (Table 26) show parallel trends, with highest levels of all five parameters at STRM-2 and STRM-3, all of which are likely related to runoff from the Hamlet. There may be additional sources of aluminum, which is commonly used in building and construction materials, cans, packaging and vehicle parts (Health Canada 1998), any of which may contribute to levels in the drainage streams. Similarly, the elevated zinc levels reported at STRM-2 may indicate runoff from community sources such as galvanized metals used in building construction.

Metals commonly elevated within the Tundra Wetland (i.e. aluminum, copper and iron) were elevated in STRM-2 and STRM-3, and may share a similar source for contamination within the community and the current solid waste facility. Also of note is the exceedance of cadmium and elevation of chromium in the two streams, as these metals were also found to be elevated within Baker Lake during August and October.

The environmental significance of elevated aluminum and iron levels, and perhaps of the other metals, may be limited, in that they are most likely present in the particulate form, as indicated by high turbidity levels, rather than the more biologically toxic dissolved form. It would be useful to confirm this in a subsequent round of water sampling, including dissolved as well as total metals analyses.

Table 26 Total metals levels across onshore Baker Lake and stream stations in June 2007 (listed from west to east)

Total Metals (ug/L)	Station											Applicable Guidelines	
	STRM-5	STRM-4	STRM-3	BL-14	STRM-2	BL-15	STRM-1	BL-12	BL-13	BL-16	STN-1	CCME ^a (ug/L)	GCDWQ ^b (ug/L)
Aluminum ^c	117	77	665	108	1750	124	394	225	108	167	128	100 ^d	200
Cadmium ^c	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.017 ^e	5
Iron ^c	100	40	380	70	730	70	150	120	70	80	110	300	300
Mercury ^c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	1
Arsenic	<0.5	<0.5	0.6	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	5	5
Boron	<30	<30	<30	<30	<30	<30	<30	40	<30	<30	<30		5000
Barium	37.3	30.8	74.2	19.4	103	23.7	42.3	34.3	28.3	42.8	20.2		1000
Beryllium	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Bismuth	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		
Calcium	4500	4000	11100	2800	16000	3500	7000	5000	4900	8800	3400		
Cobalt	<0.2	<0.2	0.3	<0.2	0.5	<0.2	0.2	0.3	0.2	<0.2	<0.2		
Chromium	<1	<1	<1	<1	2	<1	<1	<1	<1	<1	<1	8.9 ^f	50
Cesium	<0.1	<0.1	0.1	<0.1	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Copper	1	2	3	<1	4	<1	2	1	1	<1	2	2 ^g	1000
Potassium	600	600	1900	500	2800	500	900	800	700	900	1000		
Magnesium	750	630	1620	1070	2160	1140	1120	1260	1290	1530	760		
Manganese	4	0.5	13.4	5.8	27.7	6	3.5	16.8	11.1	5.1	20.7		
Molybdenum	<0.2	<0.2	0.3	<0.2	0.5	<0.2	<0.2	<0.2	0.2	0.2	<0.2	73	
Sodium	750	780	1540	970	1970	980	1340	1230	1290	1510	2270		200 000
Nickel	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	25 ^h	
Phosphorus	<50	70	250	<50	160	<50	80	<50	80	<50	150		
Lead	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1 ⁱ	10
Rubidium	0.7	0.6	1.8	<0.9	4.5	0.9	1	1.3	1.1	0.9	1		
Antimony	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		6
Selenium	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	10
Tin	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6		
Strontium	15.9	14.2	34.7	16.7	49	17.9	22.7	22.5	23.3	29.9	12.6		
Tellurium	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Titanium	3	2.9	9.5	2.7	32.1	1.4	2.9	2.4	1.1	2.4	2		
Thallium	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.8	
Uranium	<0.1	<0.1	0.1	<0.1	0.2	<0.1	<0.1	<0.1	0.1	<0.1	<0.1		20
Vanadium	<1	<1	<1	<1	2	<1	<1	<1	<1	<1	<1		
Tungsten	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		
Zirconium	<0.4	<0.4	0.7	<0.4	1.5	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4		
Silver	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	
Zinc	<10	<10	30	<10	40	<10	10	<10	40	10	<10	30	5000

Bolded results indicate guideline exceedance

^a CCME Guidelines for the Protection of (Freshwater) Aquatic Life

^b Health Canada Guidelines for Canadian Drinking Water Quality

^c Metal scan with ultra low detection limits

^d Aluminum = 100 ug/L when pH $\geq$ 6.5, $[Ca^{2+}] \geq$ 4 mg/L, DOC $\geq$ 2 mg/L

^e Cadmium = 0.0017 ug/L when Hardness $[CaCO_3]$ is < 60 mg/L

^f Guideline for trivalent chromium (Cr^{3+})

^g Copper = 2 ug/L when Hardness $[CaCO_3]$ is < 120 mg/L

^h Nickel = 25 ug/L when Hardness $[CaCO_3]$ is < 60 mg/L

^j Lead = 2 ug/L when Hardness $[CaCO_3]$ is < 60 mg/L

The microbiological quality of Baker Lake water in June was, in general, similar to that reported in August and October, with total coliform and *E. coli* levels ranging from <1 to 6 CFU/100 mL (Table 27). *E. coli* was reported at < 1 CFU/100 mL at onshore lake stations, except at BL-15 (2 CFU/100 mL), located in front of the pumphouse across from the water intake station (BL-6). However, a measurable *E. coli* level at the shore is unlikely to be associated with conditions at the water intake, 120 m offshore under the ice at 5 to 6 m depth. Debris in the vicinity of BL-15 (approximately 5 m offshore included wood pallets, a caribou hide) could contribute to coliform results at this station. Local CGS sampling of raw water at the pumphouse demonstrated zero *E. coli* and total coliforms per 100 mL in May through July 2007.

Table 23 Microbiological Results for onshore Baker Lake and stream stations in June 2007 (listed from west to east)

Station	<i>E. coli</i> CFU/100 mL	Total Coliforms CFU/100 mL
STRM-5	< 1	< 1
STRM-4	< 1	< 1
STRM-3	12	73
BL-14	< 1	< 1
STRM-2	10	32
BL-15	2	2
STRM-1	< 1	3
BL-12	< 1	1
BL-13	< 1	< 1
BL-16	< 1	6
STN-1	7	178

As noted for the Tundra Wetland (Section 4.3.2.3), coliform levels observed at STN-1 indicate recent fecal contamination, perhaps related to several dogs that were tied up near the shore of Garbage Creek. Results from coliform analysis of other stream stations also indicate fecal contamination from within the community: levels were low or below detection at STRM-1 and reference stations STRM-4 and STRM-5 and elevated (10 and 12 CFU/100 mL *E. coli*, 32 and 73 CFU/100 mL total coliforms) at STRM-2 and STRM-3, a similar trend to that noted for nitrate, ammonia, turbidity, iron and aluminum. Dogs are present throughout the community, and their fecal waste would run off into the streams and drainage ditches, then into Baker Lake, particularly during the high snowmelt period, and is likely a main source of fecal coliforms in the streams. Other potential coliform sources would be discarded animal parts (e.g. lower intestines of caribou that contain fecal material).

The *E. coli* levels reported in Table 27 are elevated for the two streams that drain the community and do indicate fecal contamination. However these levels do not exceed CCME guidelines for recreational use. The CCME and Health Canada guidelines for coliforms in drinking water (0 per 100 mL *E. coli* and 0 per

100 mL total coliforms) is considerably lower than for other uses. For example, the CCME guideline for recreational use (including primary contact such as swimming and wading), is calculated as a geometric mean of at least five samples in a 30 day period, with a limit for *E. coli* of 2000 per litre (200 per 100 mL). Further, there is no guideline for the protection of aquatic life for *E. coli*.

Although elevated *E. coli* and total coliforms were observed in the two streams, it is presumed that the bacteria would not survive long in Baker Lake. The higher numbers of *E. coli* and total coliforms were not transferred to Baker Lake stations and the microbial quality of Baker Lake was not impacted.

5.2.3 Summary of Baker Lake Water Quality

NJWL sampled the water of Baker Lake to assess its quality as a source of potable water for the community of Qamani'tuaq. In the summer, samples were collected from ten (10) locations on the lake, offshore from the community. All results from summer sampling showed the water of Baker Lake to be of good quality for drinking water purposes and none of the samples collected exceeded the GCDWQ, including STN-1 at the mouth of Garbage Creek.

Sampling in the fall was conducted at five (5) stations, two of which had not been sampled during the summer. All results from the fall sampling demonstrated that Baker Lake is an acceptable source of drinking water; none of the samples exceeded GCDWQ.

Spring sampling was conducted at five (5) stations along the shore of Baker Lake because the presence of ice offshore presented logistical problems; stations were situated across from original offshore stations. Although results from spring sampling showed an overall decrease in water quality compared to summer and fall results, the water of Baker Lake remains an acceptable potable water source for the community of Qamani'tuaq. All results from Baker Lake met applicable GCDWQ.

During sampling events in summer and fall, cadmium and silver levels were found to be elevated in the vicinity of the water intake; chromium was also slightly elevated in the summer. This trend was not detected at any Baker Lake station in spring, though cadmium was elevated in one stream (STRM-3) and chromium slightly elevated in another (STRM-2). These metals did not exceed the GCDWQ; however, cadmium was higher than CCME guidelines for the protection of freshwater aquatic life (PFAL). The elevated levels of several metals in Baker Lake through August and October, and their presence in community drainage streams in June, warrants further investigation into the source of these metals within the community.

Elevated aluminum levels were reported within Garbage Creek (STN-1) in October and at all Baker Lake and stream stations in June, exceeding the CCME PFAL guideline. The higher level within Garbage Creek in October was probably a result of road construction that was occurring upstream at the time, although data from June also indicate high levels of aluminum occur during spring run-off and may in part be natural (e.g. from soil). The large increases observed in the two community drainage streams suggest additional sources that may benefit from further investigation, although there did not appear to be an impact on onshore Baker Lake stations. During June, onshore stations generally had aluminum values within the GCDWQ operational guidance value, though any exceedance of this is not a concern from a human health or drinking water aesthetic perspective (Health Canada 1998) because this onshore water is not used for drinking purposes.

There is potential for inflowing streams to affect water quality at onshore stations during spring runoff (Tables 24, 26, 27), although direct relationships have not been established because onshore lake stations were not situated adjacent to stream inflows. The two streams, STRM-2 and STRM-3 that traverse the community had elevated levels of turbidity, nitrate/nitrite, ammonia, aluminum, iron and coliforms, all indicative of runoff from land sources. Two onshore lake stations, BL-12 and BL-13 also had elevated nitrate/nitrite and ammonia levels; although these two lake sites are not located near STRM-2 and STRM-3, they are in the vicinity of small ephemeral streams that drain the community. These

ephemeral streams, although not sampled in June, may also carry contaminants into the lake. In any event, the June sampling results indicate potential links between the land, streams and Baker Lake. Common community sources of ammonia and nitrate/nitrite in water are manure and other fertilizers, animal waste and domestic sewage in runoff. For the Hamlet, fertilizers and domestic sewage are not likely sources, as sewage is transported to the Tundra Wetland and large scale fertilization of gardens is unlikely to be significant. However, animal waste, perhaps from dogs, wildlife and birds, may contribute nitrogen, as large amounts could accumulate during the winter and be washed into the streams and lake during the spring thaw. The results for fecal coliforms are consistent with those for ammonia and nitrate/nitrite, linking fecal material as a significant source of nitrogen.

There is a concern that water from Garbage Creek (STN-1, the effluent from the wetland treatment facility) could flow westward along the ice-free area of Baker Lake during spring thaw, having a negative effect on drinking water quality at the intake (BL-6). The perception is that wetland treatment capacity could be overwhelmed with melting snow and sewage at that time and contribute contaminants to the lake. Garbage Creek flows were higher in June than in August or October, carrying meltwater and effluent from the Tundra Wetland. Several lines of evidence were examined, in the absence of definitive information (e.g. studies of plume delineation or currents in the lake) and the following points were considered to conclude no, or at best, limited influence of Garbage Creek water on the Baker Lake drinking water intake, 2 km to the east. Rather, further investigation of runoff sources from the community may be warranted to assess whether these provide localized water quality problems in Baker Lake during the spring.

1. A comparison of characteristics at STN-1 and the closest onshore Baker Lake station in June (BL-16, parallel to BL-9), 1000 m away, does not suggest a strong influence of Garbage Creek water at BL-16, given that there was no consistent decrease (or dilution) between STN-1 and BL-16. Sodium and nitrate levels were higher at Garbage Creek than BL16, and conductivity and hardness levels were lower. Also STN-1 would not be a source of nitrate/nitrite for other stations in Baker Lake, given that levels at STN-1 (0.147 mg/L) were lower than at BL-12 and BL-13 (0.192 and 0.148 mg/L, respectively).
2. The presence of a large sandbar at the mouth of the Thelon River, the largest river flowing into Baker Lake in that area, probably directs the large volumes of water from the river northeast along the lakeshore, in front of the community. This implies water from Garbage Creek would flow eastward rather than west.
3. Samples collected in June from streams indicate runoff from the community contains high levels of turbidity and particulate matter, including aluminum, iron, nitrogen (ammonia, nitrate and nitrite) and fecal coliform bacteria. Some onshore lake stations also showed elevated levels of these parameters and streams away from the community showing reduced levels. One common source may be fecal waste from animals such as dogs, which would have accumulated over the long winter.
4. Samples collected in August indicate elevated levels of several parameters in an area around the drinking water intake (BL-3 to BL-6), compared to sites further east and west, including the Garbage Creek outflow at STN-1. Levels of total dissolved solids, conductivity, sodium, chloride, hardness, nitrate/nitrite and several metals (cadmium, silver, chromium, lead, selenium and thallium above CCME guidelines) were highest at BL-5 and BL-6, suggesting an influence from the shoreline (likely the Hamlet). The metals present at elevated levels in the lake were not present in the Garbage Creek sample, suggesting a lack of influence of Garbage Creek at that time of year.
5. There are two pathways for inflowing stream water to mix with lake water in an ice-covered lake (Ellis 1991) that are useful to consider for Baker Lake. Mixing and flow patterns depend on differences in temperature and density of the inflowing and lake water: streams with denser and colder (less than 2°C) water flowing into an ice covered lake under winter stratification tend to flow along the bottom of the lake, while streams with lighter and warmer (greater than 3°C) water flow under the ice. Given that Garbage Creek water temperature was 1.38°C in June and was flowing into an ice covered lake

with higher temperatures, 1.16°C (BL-12) to 5.88°C (BL-16), it is likely the inflowing water from Garbage Creek sinks to the lake bottom in spring and does not travel along the open shoreline.

6. In June, the presence of the large abutment (the barge dock) 1.6 km west of Garbage Creek and 0.4 km east of the water intake would limit any westward movement of water along the open shoreline since at that time, the ice was closest to shore at the dock. If water from Garbage Creek does move west along the open shoreline, it would reach the dock and presumably be deflected under the ice. The 1.6 km distance from Garbage creek would provide sufficient time for dilution. In addition, water quality between BL-16 and BL-15 (the water intake) meets the GCDWQ in June.
7. Data from BL-9 (August and October) and BL-16 (June) suggest the influence of local runoff, but do not rule out westward flow from Garbage Creek. With sodium and other parameters having higher levels at STN-1 than BL-9 or BL-16, and no samples collected east of STN-1 to suggest direction of water flow, some dilution (i.e. water movement) between STN-1 to BL16 cannot be ruled out.

Overall, results from the three seasonal sampling events provide evidence that water from Garbage Creek, the ultimate drainage of the Tundra Wetland, does not appear to affect drinking water quality at the community water intake. Additionally, the water quality of Baker Lake meets the GCDWQ and is an acceptable source for potable water. However several metals consistently exceeded CCME PFAL guidelines, most likely due to contamination from within the community. If these sources are not addressed, levels may continue to increase in this part of Baker Lake, to a point where aquatic species or humans could be affected. In contrast, runoff issues in the small streams traversing the community are implicated in localized areas of the lake.

The following sections outline the potential impacts to the drinking water source, those that may partly be responsible for contamination, and describe the Water Source Protection Plan (**Appendix F**), which aims to minimize these impacts by adopting a multi-barrier approach to protecting the drinking water source.

5.2.4 Potential Impacts to the Drinking Water Source

The drinking water intake for the community is located approximately 120 m offshore in Baker Lake, directly in front of the built-up area of the community. NJWL staff walked along the lakeshore from Garbage Creek west to the southward turn of the shore towards the airport, during all three sampling events. A number of potential impacts to the water quality of Baker Lake were observed on the beach on all occasions, including scattered garbage, small fuel spills, abandoned batteries and vehicles.

Debris observed on the shoreline, or sometimes in the water, included drink bottles, plastic bags, large and small pieces of Styrofoam insulation, discarded oil and camp fuel containers, discarded fuel drums, pieces of metal siding, cardboard boxes and animal carcasses. A number of areas of stained soil were noted on the lakeshore, likely from spills of fuel or oil during re-fueling of engines. Two larger stained areas were observed; both appeared to have resulted from spilled containers of camp fuel. Also observed were a large number of engine batteries, fuel cans, boat motors, snowmobiles and vehicles (abandoned and in working condition).

Many of these objects contain hazardous materials that could negatively affect water quality. Among those, engine batteries are known to contain cadmium and lead, oil bottles and fuel cans contain hydrocarbons and other compounds and vehicles can contain any number of compounds from oils, fuels, solvents and antifreezes, to metals, which can leach from the structure of the vehicles. Additionally, many of these items were noted on the ice in June. Many items, including an abandoned snowmobile, a fuel drum, fire extinguisher, several wood pallets and other plastic and metal debris, were observed on the edge of the ice sheet, either in the water already or appearing as if they would soon be in the water as the ice melted. These observations raise the question of what other items may have been left on the ice and have sunk in the lake in previous years. All the materials observed and noted above can contribute contaminants to Baker Lake. The majority of these observed impacts would require minimal clean-up

efforts, but a continual effort to keep the shoreline and ice surface clean and free of potential contaminants.

The solid waste landfill provides a facility for the disposal of many of the materials discarded along the shore of Baker Lake. There are areas for waste oil and fuel, disposal of household garbage and animal carcasses, disposal/storage of old vehicles and snowmobiles, and disposal/storage of batteries. All of these items along the shore should be removed and disposed of at the solid waste site.

In addition to the materials noted above, a number of dogs were observed to be tied up within 15 m of the shoreline of Baker Lake. Dog waste is a source of fecal coliforms including *E. coli*, and protozoans, and also of nutrients (nitrate, nitrite, ammonia), all of which are easily transported to the lake through runoff. This could result in degraded drinking water quality and localized eutrophication. Garbage Creek and two community drainage streams had elevated fecal coliform, ammonia, nitrate and nitrite levels in June, which most likely resulted from run-off containing dog waste. The community shoreline of Baker Lake was also covered with relatively dense algal growth in August and October, which appeared to be heavier in areas downgradient from where dogs were present.

Due to local topography, all surface drainage from the community flows directly to Baker Lake. Waste or contaminants from locations throughout the community can be carried by surface drainage to Baker Lake, further affecting water quality. Evidence of this was seen in two community drainage streams in June, where elevated levels of nutrients and several metals (higher than CCME PFAL guidelines) were reported; in contrast, levels of these parameters were considerably lower in two nearby reference streams.

The lack of signage on the shore, indicating Baker Lake as a source of drinking water for the community has been noted in several reports. The lake shore, including the area around the drinking water intake, can be heavily used by boats in the summer and by snowmobiles in the winter and spring. Signs should be erected near the water intake and traffic in this area should be minimized to reduce the potential for pollution of the drinking water source.

EBA Engineering Consultants Ltd. (EBA) completed a Phase III Environmental Site Assessment in January 2007 at the former Nunavut Power Generating Station, located 100 m north of the Baker Lake shore, within the community (see Drawing 5 and 6 in **Appendix A**). The investigation delineated five plumes of hydrocarbon-contaminated soil, related to releases from the Nunavut Power site and former associated facilities. The hydrocarbon fuel contaminants were light non-aqueous phase liquids, hence would travel along the groundwater surface, downslope towards Baker Lake. These plumes have undergone some degree of bioremediation from local bacterial populations since previous sampling in 1998, however, the plumes have also migrated towards the lake during this period. Results from groundwater monitoring wells sampled by EBA indicated that dissolved hydrocarbon constituents (BTEX [benzene, toluene, ethylbenzene and xylene] and F1 fractions) are still detectable and could impact Baker Lake before adequate bioremediation occurs. Surface water samples collected by NJWL at the onshore stations BL-12 and BL-13 (see Drawing 5 in **Appendix A**) indicated BTEX and total hydrocarbon F1 to F4 levels below detection, suggesting either the plumes have not yet reached Baker Lake, or enough *in situ* bioremediation occurs to remediate the plumes prior to reaching the lake. It is likely the plumes have not yet reached the lake as EBA undertook sampling in September 2006.

5.2.5 Consultation with Environmental Health Officer

Prior to the visit to Qamani'tuaq in August, NJWL attempted unsuccessfully to contact Mr. Bob Hanley, the Kivalliq Region Environmental Health Officer. Mr. Fred O'Brien, Environmental Health Specialist in Iqaluit, was later contacted and asked about any previous sampling results and concerns regarding drinking water quality in Baker Lake. Mr. O'Brien reported that all samples taken at the water intake

between 2003 and 2005 were satisfactory. Coliforms were not detected at the raw water supply and results for Garbage Creek were satisfactory.

Mr. Hanley was contacted again in September 2006, once NJWL became aware of a public health concern about pathogens in the community. Mr. Hanley verified there was a gastrointestinal illness reported in Qamani'tuaq and commented that it appeared to be spread through person-to-person contact and that the analyses did not confirm a pathogen nor whether it could be food or water-borne. Mr. Hanley further confirmed that bacteriological quality of the drinking water in the community has been satisfactory.

5.2.6 Water Source Protection Plan

A Water Source Protection Plan (WSPP) was developed by NJWL for use within Qamani'tuaq. The WSPP was developed to be used as a preliminary guide for the GN and the Hamlet, providing information and recommendations for handling current known and potential impacts to Baker Lake, Qamani'tuaq's drinking water source. The WSPP is included in **Appendix F** as a separate document.

6 Consultations

6.1 Consultation with Elders

During the visit to Qamani'tuaq in August, NJWL met with an Elder selected by the Hamlet to discuss past and current conditions in the wetland treatment area, traditional use of the wetland area, and any changes they have seen and concerns they may have. NJWL met with Ms. Lucy Iyago, who has been in the area of Baker Lake for many years and is a member of the Hamlet Council. Mr. Michael Haqpi was present and provided interpretive services. The series of questions asked and responses are included in **Appendix G**.

In general, Ms. Iyago expressed concern regarding the sewage treatment wetland and the effect it may be having on the water of Baker Lake and on the animals that feed there. Ms. Iyago reported that people used to fish in Airplane Lake for lake trout and grayling; however, fishing has stopped due to concern about the effects of sewage effluent. She also commented that animals (including grizzly bears) come closer to town since the establishment of the sewage wetland and solid waste facility, and that people are worried about hunting animals that feed in the sewage wetland area for fear they are contaminated from sewage. Ms. Iyago was also concerned with how the Tundra Wetland will be cleaned up and restored to its natural state.

Ms. Iyago reported that algae have always been present along the shore of Baker Lake; however, it is different now, which she believes is a result of the sewage effluent. In the area around the community, Ms. Iyago mentioned she has noticed less water flowing through the wetland and that Baker Lake is reduced in size. She also stated she has observed a difference in the atmosphere, weather and melting today from what it was years ago, specifically more melting and thawing of snow and ice.

6.2 Consultation with Officials

A number of officials have been consulted for this project. During visits in 2006, NJWL met with some key Hamlet officials to discuss their concerns and to collect and verify information. Mr. David Aksawnee, Mayor of Qamani'tuaq; Mr. Gary Perkinson, Hamlet Foreman; and Mr. Sam Ittilik, Economic Development Officer, Mr. Hugh Ikoe, Settlement Maintainer and Mr. Willie Tapatai, Public Works Foreman of CGS were consulted. Public Health Officers with the Government of Nunavut, Mr. Bob Hanley and Mr. Fred O'Brien, were contacted to identify any past or current concerns with drinking water quality in the community.

7 Conclusion

7.1 Sewage Treatment

The Tundra Wetland was determined to be effective at treating the majority of contaminants in wastewater by the Licence compliance point. All NWB Water Licence Criteria were met at the compliance point at STN-7. Concerns were raised over the levels of aluminum, iron and copper that exceeded CCME protection of freshwater aquatic life guidelines through the Tundra Wetland and at STN-3 and STN-7. Concern is also raised over phenols, which exceeded CCME guidelines at the Compliance Point in June 2007.

In August and October 2006, no parameters exceeded NWB or CCME guidelines at the head of Garbage Creek (STN-2), nor entering Baker Lake (STN-1). Aluminum at the outlet of Garbage Creek was an exception in October, though this was considered periodic in nature due to upstream road construction. In June 2007, aluminum and phenols exceeded CCME guidelines at the head of Garbage Creek and entering Baker Lake, reflecting the accumulation of wastewater over the winter storage period, spring runoff from surrounding area, and the minimal removal processes occurring at this time of the year.

Landfill leachate also appears to be impacting effluent quality within the Tundra Wetland; it was noted that several metals and nutrients increased downstream of Lagoon Lake in August 2006 and flow between the landfill and Finger Lake was observed during all site visits.

Given the current size of the Tundra Wetland, the increasing discharge rate within the next 20 years would cause the loading rate of the Tundra Wetland to increase above the recommended loading rate for tundra wetlands. Several options were identified that could increase the effective size of the Tundra Wetland to address current and future loading rates. These included construction of a larger holding cell, widening the flow area through the wetland, and the addition of a landfill holding cell. Proposed locations of flow attenuation berms were recorded using GPS. Additionally, while not related to treatment efficiency, community members are concerned about the potential effects to caribou from their feeding and drinking within the wetland. To alleviate this concern, fencing could be installed to prevent caribou access within the head of the wetland, where effluent has only received partial treatment.

7.2 Water Quality

The water quality of Baker Lake was found to be acceptable for drinking water purposes and the discharge from Garbage Creek does not appear to affect drinking water quality at the intake during the three seasons sampled. During summer and fall, none of the offshore stations sampled exceeded Health Canada's Guidelines for Canadian Drinking Water Quality. In spring, aluminum did exceed the GCDWQ at one onshore station, though is not a concern from a human health or drinking water aesthetic perspective (Health Canada 1998); the remainder of results were within the GCDWQ.

Several metals were found to exceed CCME Protection of Freshwater Aquatic Life guidelines, namely cadmium and silver in the vicinity of the water intake during summer and fall sampling events, as well as aluminum in spring at onshore stations. The ongoing reporting of elevated levels of cadmium and silver warrants further investigation into the cause and the source of these metals. Stream samples collected in June indicated runoff from the community contains high levels of turbidity and particulate matter, including elevated aluminum, iron, nitrogen (ammonia, nitrate and nitrite), and coliform bacteria, in comparison to reference streams. Elevated levels of copper, zinc, cadmium and chromium were also observed in drainage streams. These data suggest that streams flowing through the community pick up materials and contaminants and transport them into Baker Lake.

The shoreline of Baker Lake contained many potential impacts that could reduce the water quality of Baker Lake, in the vicinity of the community. These potential impacts ranged from scattered garbage and debris, to fecal material from dogs and wildlife, animal carcasses, small oil/fuel spills and abandoned vehicles. It is recommended that the shoreline be cleaned to reduce the potential for contamination of run-off or leaching of contaminants into Baker Lake. A Water Source Protection Plan was developed for the Hamlet and CGS to serve as a preliminary plan provide information and recommendations for handling current known and potential impacts to Baker Lake, the Hamlet's drinking water source.

8 Recommendations

Recommendations provided in this Final Report include:

- Tundra Wetland:
 - Expansion of the holding cell (to approximately 50 m by 50 m) to meet current and future demands; the holding cell should be lined prevent leaking of water through the berms and provide for controlled discharge.
 - Installation of flow attenuation berms to increase contact and flow patterns; potentially in the areas between the holding cell and Lagoon Lake, and between Lagoon Lake and Finger Lake.
 - Construction of a second holding cell to impound and treat landfill leachate prior to discharge to Finger Lake, or the addition of a long permeable berm to provide treatment and flow attenuation.
 - Installation of fencing in the area of the holding cell and Lagoon Lake to prevent caribou from contacting effluent prior to it receiving full treatment.
- Baker Lake Water Quality:
 - Implementation of the preliminary Water Source Protection Plan and its further development (e.g., treatment and distribution system upgrades, establishment of monitoring program and emergency response plans).
 - Cleaning the shoreline of the Hamlet, to reduce the potential for pollution of the drinking water source.
 - Erecting signs in the area of the water intake, identifying Baker Lake as a drinking water source for the Hamlet.
 - Continued monitoring of the progression of the former Nunavut Power Generating Station hydrocarbon plumes downslope (groundwater and surface water).
 - Assessing sources of contaminants in spring runoff into streams draining the Hamlet and their potential for affecting water quality on the shore of Baker Lake.

9 Closure

This Report has been prepared for the sole benefit of the Department of Community and Government Services (CGS) of the Government of Nunavut and the Hamlet of Qamani'tuaq. The report may not be used by any other person or entity without the express written consent of Nunami Jacques Whitford Limited and CGS.

Any use which a third party makes of this report, or any reliance on decisions made based on it, is the responsibility of such third parties. Jacques Whitford accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

This report was prepared by Nick Lawson, B.Sc., and senior review was completed by Karen Munro, M.Sc., R.P.Bio. and Jim Higgins, Ph.D., P.Eng. We trust that this information meets your requirements at this time. If you have any questions or concerns, please do not hesitate to contact the undersigned.

Yours truly,

NUNAMI JACQUES WHITFORD LIMITED

Original signed by Nick Lawson

Nick Lawson, B.Sc.
Senior Environmental Scientist
Operations Manager

NL/cc

R:\Other Offices - Projects\Manitoba & West\Yellowknife\1015263\R01_fnl_Oct-15-07_Baker Lake Water and Sewage_cc.doc

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Appendix A Drawings



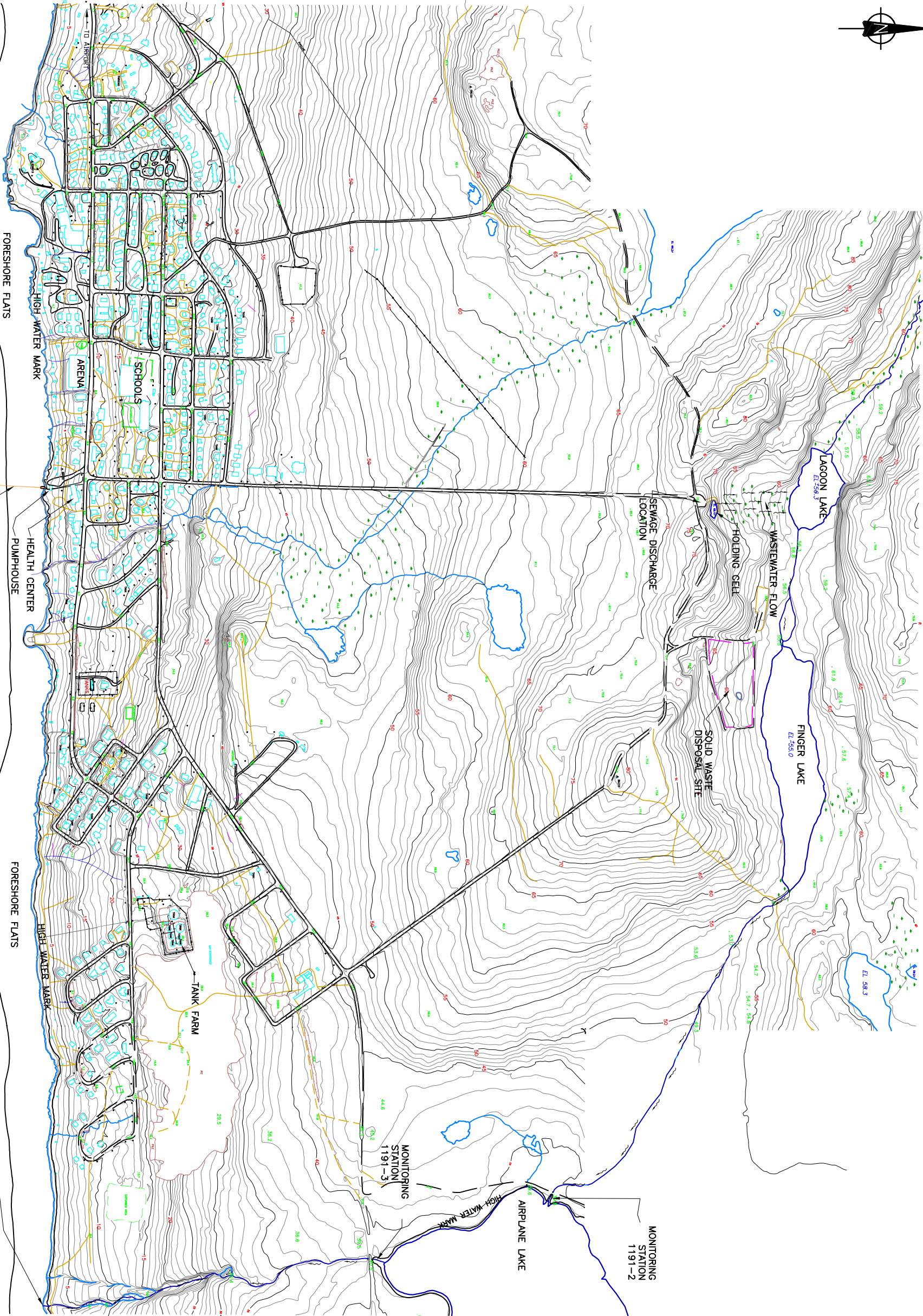
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 APPROVED BY:

CLIENT :
 TITLE :

COMMUNITY AND GOVERNMENT SERVICES
 GOVERNMENT OF NUNAVUT
SITE LOCATION PLAN
 QAMANI'TUAQ, NU

DRAWING NO.

1



LEGEND :

- PREVIOUS SEWAGE LAGOON
- FUEL RE-SUPPLY PIPELINE
- DRAINAGE
- WATER INTAKE
- SOLID WASTE FACILITY

*THIS DRAWING WAS ORIGINALLY CREATED IN COLOUR.

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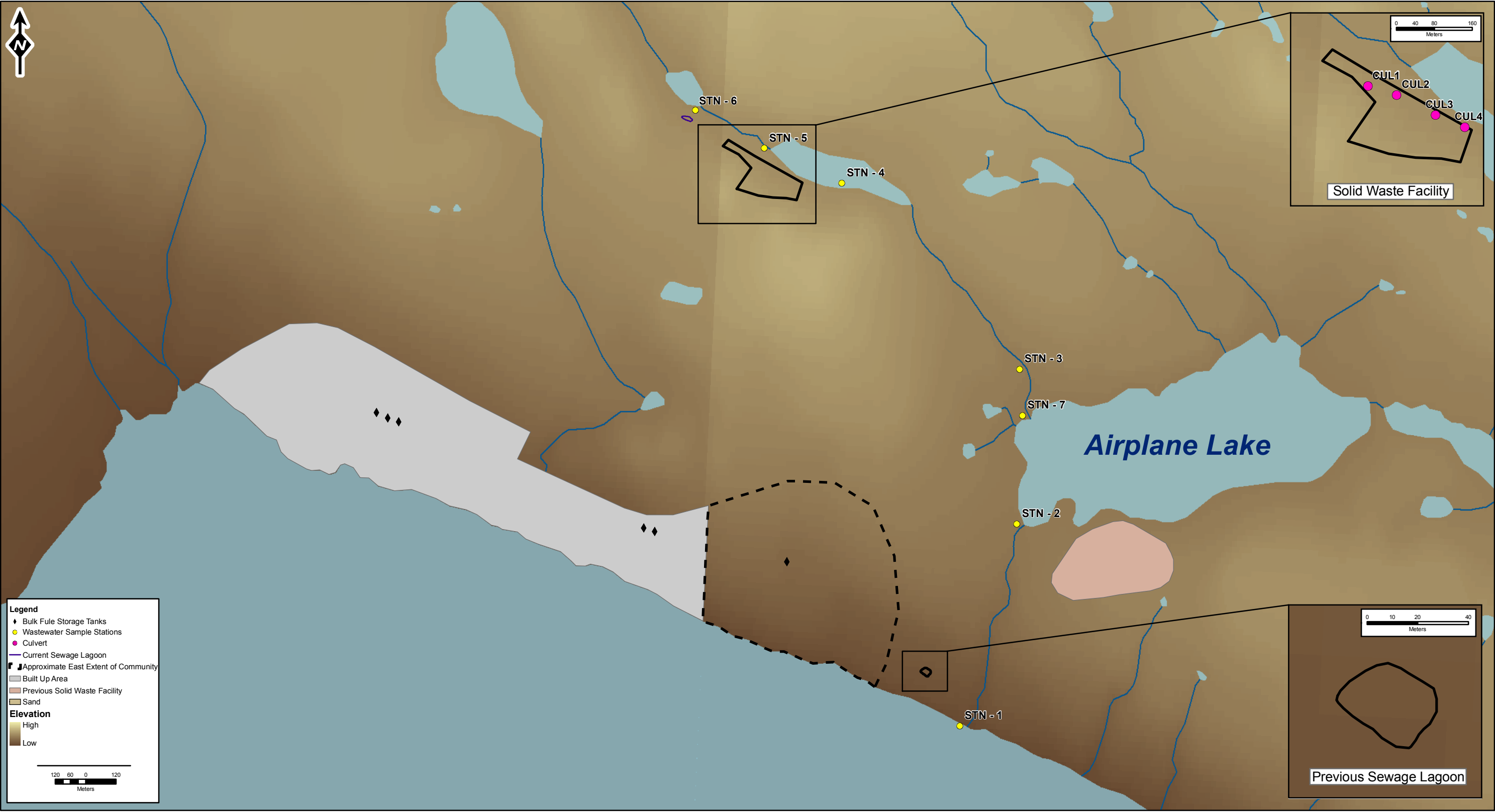
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COMMUNITY AND GOVERNMENT SERVICES
GOVERNMENT OF NUNAVUT

TITLE:
SITE OVERVIEW
QAMANITTUAQ, NU

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DATE :	14/11/06	
DRAWN BY :	SEA	
APPROVED :		



Prepared By:



Prepared For:

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1 : 15 000

Date:

19/10/06

Drawn by:

SEA

Approved by:

Client:

Community and Government Services
Government of Nunavut

Title:

Significant Features and Sample Locations throughout the Sewage Treatment Wetland
Qamani'tuaq, NU

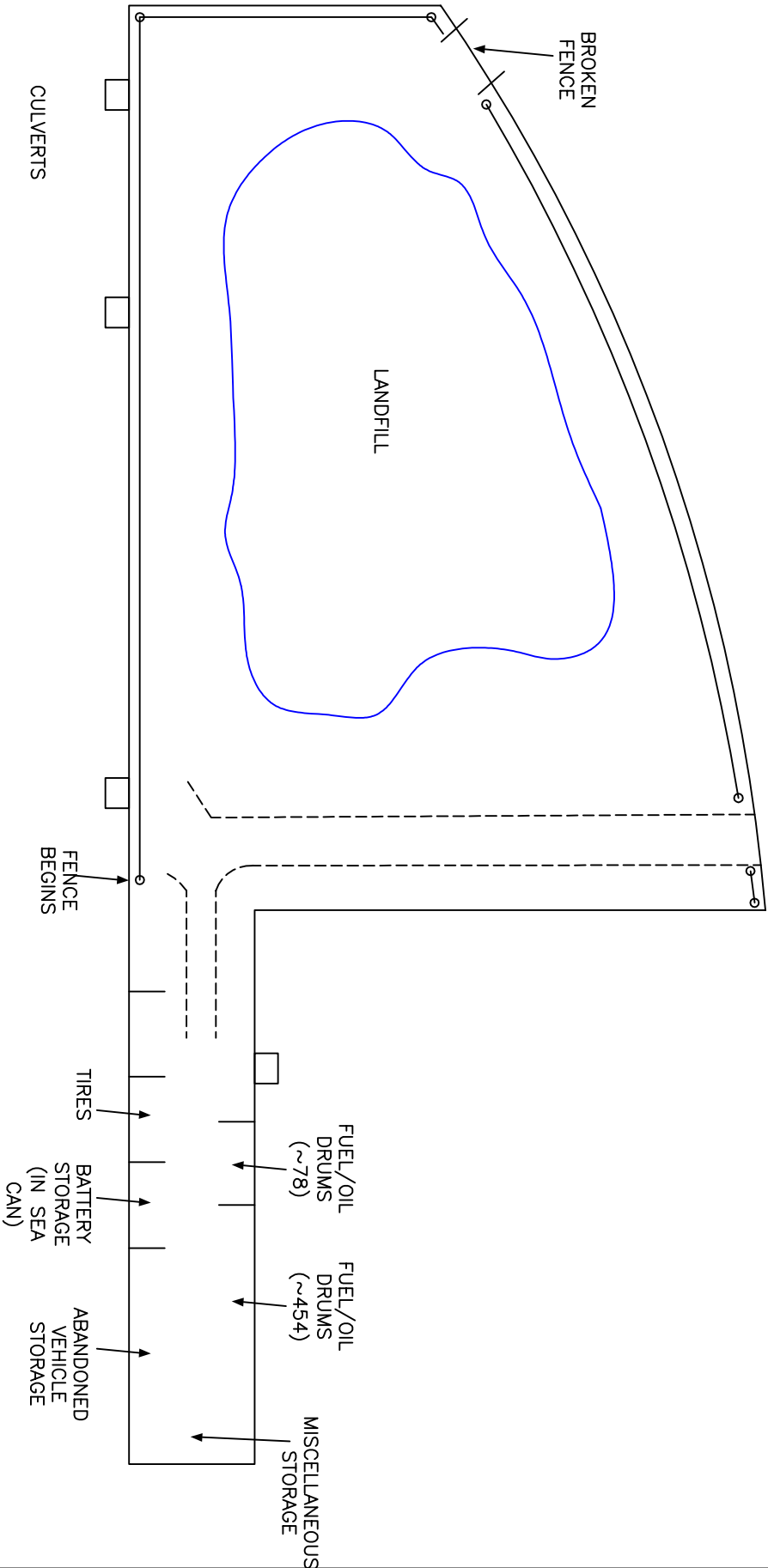
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UTM Zone 15
NAD83

References:

Figure No.:

3



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SCALE: 1: 1500

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DRAWN BY: SEA

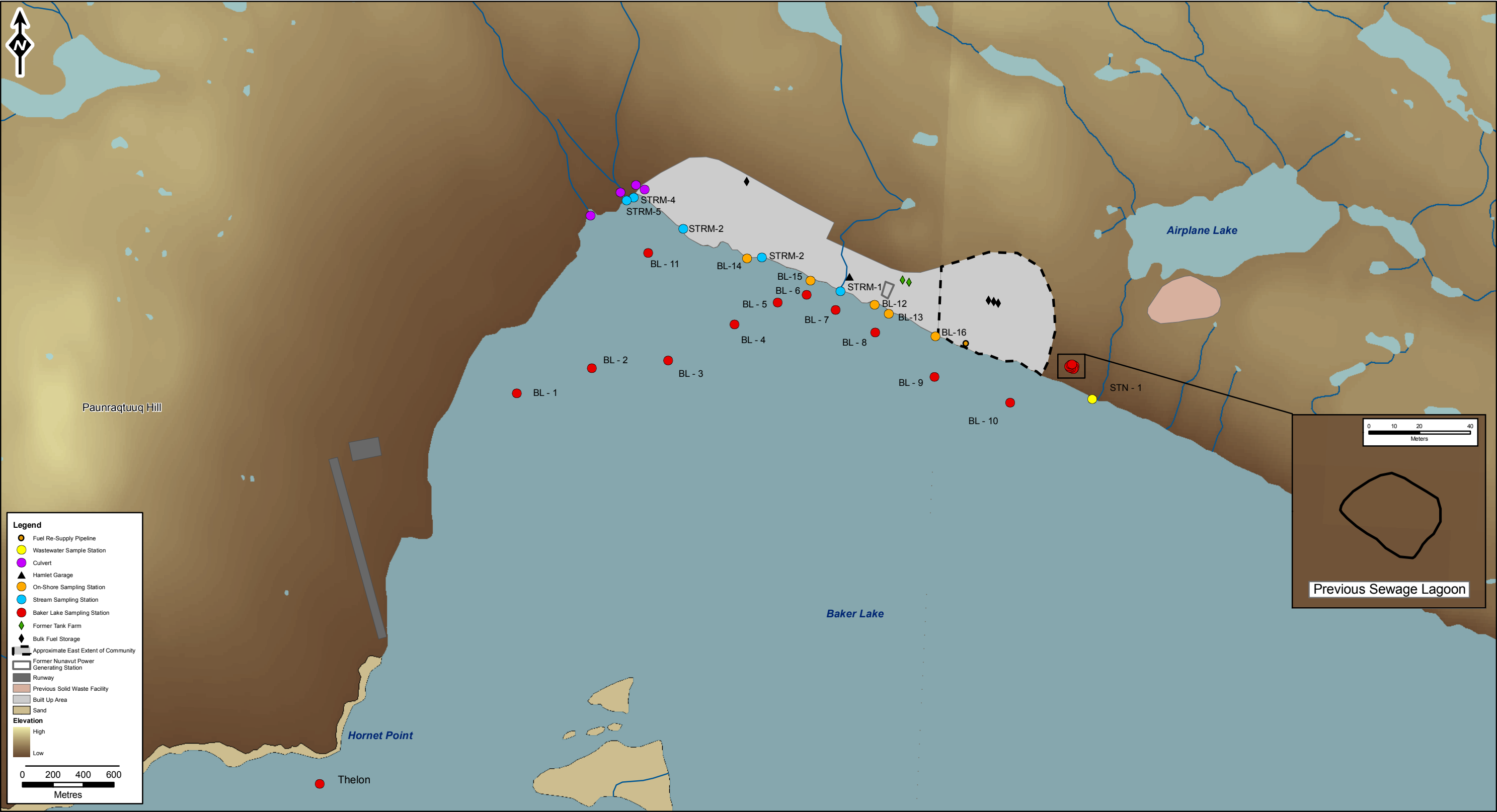
APPROVED BY:

CLIENT :
TITLE :

COMMUNITY AND GOVERNMENT SERVICES
GOVERNMENT OF NUNAVUT
SOLID WASTE FACILITY DETAIL
QAMANI'TUAQ, NU

DRAWING:

4



Prepared By:



Prepared For:

Scale: 1 : 25 000

Date: 19/10/06

Drawn by: SEA

Approved by:

Client:

Title:

Community and Government Services
Government of Nunavut

Significant Features and Sample Locations for Water Quality Analysis on Baker Lake
NU

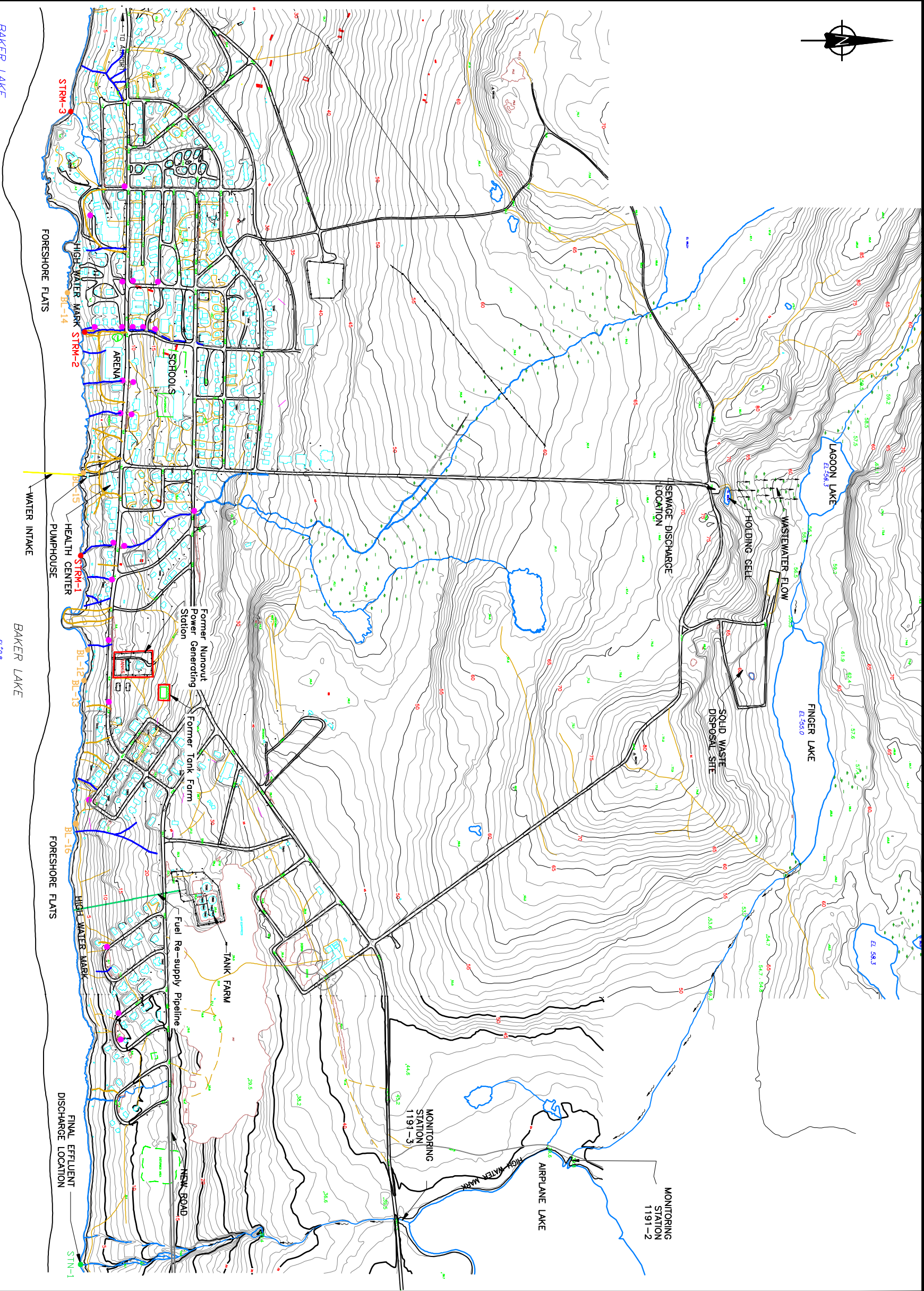
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UTM Zone 15
NAD83

References:

Figure No.:

5



LEGEND :

- Culvert
- Wastewater Sampling Station
- Stream Sampling Station
- On-shore Baker Lake Sampling Station
- PREVIOUS SEWAGE LAGOON
- FUEL RE-SUPPLY PIPELINE
- ROADS/TRAILS
- MAIN ROAD
- NEW ROAD
- DRAINAGE

*THIS DRAWING WAS ORIGINALLY CREATED IN COLOUR.

REFERENCE:

DRAWING REFERENCE: GOVERNMENT OF NUNAVUT



CLIENT:

COMMUNITY AND GOVERNMENT SERVICES
GOVERNMENT OF NUNAVUT

TITLE:

POTENTIAL IMPACTS TO WATER SOURCE
QAMANTTUQA, NU

SCALE : 1 : 10000

DRAWING NO.:

DATE : 14/11/06 // 18/09/07

DRAWN BY : SEA // NJA

APPROVED :

Appendix B Laboratory Certificate of Analysis

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



Environmental Division

PRELIMINARY RESULTS

JACQUES WHITFORD

ATTN: CAREY SIBBALD

Reported On: 21-AUG-06 03:07 PM

201, 5103 - 51ST AVE

YELLOWKNIFE NT X1A 2P3

Lab Work Order #: **L418507**

Date Received: **03-AUG-06**

Project P.O. #:

Job Reference: 1015263

Legal Site Desc:

CofC Numbers:

Other Information:

Comments:

APPROVED BY: _____

GAIL HILL

Project Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

Manitoba Technology Centre Ltd.

Part of the **ALS Laboratory Group**

1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4

Phone: +1 204 255 9720 Fax: +1 204 255 9721 www.alsglobal.com

A Campbell Brothers Limited Company



Now part of the ALS Laboratory Group

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L418507-1 SNP-1								
Sampled By: CS / GJ on 01-AUG-06 @ 16:00								
Matrix: WATER								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.067	RAMB	0.005	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Cadmium (Cd)-Total	<0.00002		0.00002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Iron (Fe)-Total	0.16		0.02	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Metal scan								
Arsenic (As)-Total	0.0007		0.0005	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Boron (B)-Total	<0.03		0.03	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Barium (Ba)-Total	0.0341		0.0003	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Beryllium (Be)-Total	<0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Calcium (Ca)-Total	4.5		0.1	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Cobalt (Co)-Total	<0.0002		0.0002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Chromium (Cr)-Total	<0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Copper (Cu)-Total	0.002		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Potassium (K)-Total	0.9		0.1	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Magnesium (Mg)-Total	0.93		0.01	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Manganese (Mn)-Total	0.0253		0.0003	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Sodium (Na)-Total	2.78		0.03	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Nickel (Ni)-Total	<0.002		0.002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Phosphorus (P)-Total	<0.05	RAMB	0.05	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Lead (Pb)-Total	<0.0005		0.0005	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Rubidium (Rb)-Total	0.0008		0.0002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Antimony (Sb)-Total	<0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Selenium (Se)-Total	0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Tin (Sn)-Total	<0.0006		0.0006	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Strontium (Sr)-Total	0.0174		0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Tellurium (Te)-Total	<0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Titanium (Ti)-Total	0.0026		0.0009	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Uranium (U)-Total	<0.0001		0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Vanadium (V)-Total	<0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Tungsten (W)-Total	<0.0002		0.0002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Zinc (Zn)-Total	<0.01		0.01	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Zirconium (Zr)-Total	<0.0004		0.0004	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Silver (Ag)-Total	<0.0001	RAMB	0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Zinc (Zn)-Total	<0.01		0.01	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Ammonia (NH3) - Soluble	0.040	RAMB	0.003	mg/L		17-AUG-06	ALW	R431815
Biochemical Oxygen Demand	54		1	mg/L	04-AUG-06	09-AUG-06	DXN	R428361
Oxygen, Dissolved	8.8		0.1	mg/L		03-AUG-06	SXG	R428754
Fecal Coliform	1		1	CFU/100 mL	03-AUG-06	04-AUG-06	AOB	R427448
Phenols (4AAP)	0.001		0.001	mg/L		08-AUG-06	NAP	R428301
Total Dissolved Solids	24		5	mg/L		08-AUG-06	CXZ	R428779
Total Oil and Grease	<1		1	mg/L	10-AUG-06	11-AUG-06	IML	R428391
Total Suspended Solids	<5		5	mg/L		08-AUG-06	CXZ	R428779
ROU4W Extractable								
Alkalinity								
Alkalinity, Total (as CaCO3)	16		1	mg/L		08-AUG-06	SXB	R428269

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L418507-1 SNP-1								
Sampled By: CS / GJ on 01-AUG-06 @ 16:00								
Matrix: WATER								
RQU4W Extractable								
Alkalinity								
Bicarbonate (HCO ₃)	19		2	mg/L		08-AUG-06	SXB	R428269
Carbonate (CO ₃)	<0.6		0.6	mg/L		08-AUG-06	SXB	R428269
Hydroxide (OH)	<0.4		0.4	mg/L		08-AUG-06	SXB	R428269
Chloride Soluble								
Chloride (Cl) - Soluble	<9		9	mg/L		09-AUG-06	LDE	R428543
Conductivity								
Conductivity	52.8		0.4	umhos/cm		04-AUG-06	SXB	R427845
Fluoride Soluble								
Fluoride (F) - Soluble	0.2		0.1	mg/L		09-AUG-06	LDE	R428543
Hardness (as CaCO ₃)	15.3		0.2	mg/L		10-AUG-06		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	0.019	RAMB	0.005	mg/L		04-AUG-06	LDE	R427877
Routine Metals								
Calcium (Ca)-Extractable	4.69		0.05	mg/L		09-AUG-06	DAG	R428922
Potassium (K)-Extractable	0.61		0.05	mg/L		09-AUG-06	DAG	R428922
Magnesium (Mg)-Extractable	0.88		0.01	mg/L		09-AUG-06	DAG	R428922
Sodium (Na)-Extractable	2.97		0.02	mg/L		09-AUG-06	DAG	R428922
Iron (Fe)-Extractable	0.19		0.01	mg/L		09-AUG-06	DAG	R428922
Manganese (Mn)-Extractable	0.0251		0.0002	mg/L		09-AUG-06	DAG	R428922
Sulphate Soluble								
Sulphate (SO ₄) - Soluble	<9		9	mg/L		09-AUG-06	LDE	R428543
TDS (Calculated)	19		5	mg/L		10-AUG-06		
Turbidity								
Turbidity	1.3		0.05	NTU		04-AUG-06	SXG	R427977
pH								
PH	7.29		0.01	pH units		04-AUG-06	SXB	R427845
Total Coliform and E. Coli by MColi Blue								
Escherichia Coli mcoli blue MF								
E. Coli	<1		1	CFU/100mL	03-AUG-06	04-AUG-06	AOB	R427448
Total Coliform mcoli blue MF								
Total Coliforms	16		1	CFU/100mL	03-AUG-06	04-AUG-06	AOB	R427448

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L418508-1	SNP-2								
Sampled By: CS / GJ on 01-AUG-06 @ 19:00									
Matrix: WATER									
Metal scan, total with ultras									
Aluminum (Al)-Total		0.011	RAMB	0.005	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Cadmium (Cd)-Total		<0.00002		0.00002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Iron (Fe)-Total		0.09		0.02	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Mercury (Hg)-Total		<0.0001		0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Metal scan									
Arsenic (As)-Total		0.0007		0.0005	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Boron (B)-Total		<0.03		0.03	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Barium (Ba)-Total		0.0350		0.0003	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Beryllium (Be)-Total		<0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Bismuth (Bi)-Total		<0.0002		0.0002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Calcium (Ca)-Total		3.9		0.1	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Cobalt (Co)-Total		<0.0002		0.0002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Chromium (Cr)-Total		<0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Cesium (Cs)-Total		<0.0001		0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Copper (Cu)-Total		0.002		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Potassium (K)-Total		0.8		0.1	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Magnesium (Mg)-Total		0.82		0.01	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Manganese (Mn)-Total		0.0070		0.0003	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Molybdenum (Mo)-Total		<0.0002		0.0002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Sodium (Na)-Total		2.61		0.03	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Nickel (Ni)-Total		<0.002		0.002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Phosphorus (P)-Total		<0.05	RAMB	0.05	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Lead (Pb)-Total		<0.0005		0.0005	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Rubidium (Rb)-Total		0.0006		0.0002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Antimony (Sb)-Total		<0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Selenium (Se)-Total		0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Tin (Sn)-Total		<0.0006		0.0006	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Strontium (Sr)-Total		0.0155		0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Tellurium (Te)-Total		<0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Titanium (Ti)-Total		<0.0009		0.0009	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Thallium (Tl)-Total		<0.0001		0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Uranium (U)-Total		<0.0001		0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Vanadium (V)-Total		<0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Tungsten (W)-Total		<0.0002		0.0002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Zinc (Zn)-Total		<0.01		0.01	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Zirconium (Zr)-Total		<0.0004		0.0004	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Silver (Ag)-Total		<0.0001	RAMB	0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Zinc (Zn)-Total		<0.01		0.01	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Ammonia (NH3) - Soluble		0.024	RAMB	0.003	mg/L		17-AUG-06	ALW	R431815
Biochemical Oxygen Demand		6		1	mg/L	04-AUG-06	09-AUG-06	DXN	R428361
Conductivity		48.5		0.4	umhos/cm		04-AUG-06	SXB	R427845
Fecal Coliform		<10		10	CFU/100mL	03-AUG-06	04-AUG-06	AOB	R427451
Nitrate+Nitrite-N - Soluble		0.448	RAMB	0.005	mg/L		04-AUG-06	LDE	R427877
Phenols (4AAP)		0.001		0.001	mg/L		08-AUG-06	NAP	R428301
Sulphate (SO4) - Soluble		<9		9	mg/L		09-AUG-06	LDE	R428543
Total Oil and Grease		<1		1	mg/L	10-AUG-06	11-AUG-06	IML	R429391
Total Suspended Solids		<5		5	mg/L		08-AUG-06	CXZ	R428779
PH		7.55		0.01	pH units		04-AUG-06	SXB	R427845

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L418508-2	SNP-3								
Sampled By: CS / GJ on 01-AUG-06 @ 19:00									
Matrix: WATER									
Metal scan, total with ultras									
Aluminum (Al)-Total		0.200	RAMB	0.005	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Cadmium (Cd)-Total		<0.00002		0.00002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Iron (Fe)-Total		1.17		0.02	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Mercury (Hg)-Total		<0.0001		0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Metal scan									
Arsenic (As)-Total		0.0013		0.0005	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Boron (B)-Total		<0.03		0.03	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Barium (Ba)-Total		0.0304		0.0003	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Beryllium (Be)-Total		<0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Bismuth (Bi)-Total		<0.0002		0.0002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Calcium (Ca)-Total		7.8		0.1	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Cobalt (Co)-Total		0.0004		0.0002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Chromium (Cr)-Total		<0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Cesium (Cs)-Total		<0.0001		0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Copper (Cu)-Total		0.004		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Potassium (K)-Total		2.2		0.1	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Magnesium (Mg)-Total		1.48		0.01	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Manganese (Mn)-Total		0.0689		0.0003	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Molybdenum (Mo)-Total		<0.0002		0.0002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Sodium (Na)-Total		8.34		0.03	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Nickel (Ni)-Total		<0.002		0.002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Phosphorus (P)-Total		0.60	RAMB	0.05	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Lead (Pb)-Total		0.0007		0.0005	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Rubidium (Rb)-Total		0.0022		0.0002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Antimony (Sb)-Total		<0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Selenium (Se)-Total		0.002		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Tin (Sn)-Total		<0.0006		0.0006	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Strontium (Sr)-Total		0.0306		0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Tellurium (Te)-Total		<0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Titanium (Ti)-Total		0.0054		0.0009	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Thallium (Tl)-Total		<0.0001		0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Uranium (U)-Total		0.0001		0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Vanadium (V)-Total		<0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Tungsten (W)-Total		<0.0002		0.0002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Zinc (Zn)-Total		0.01		0.01	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Zirconium (Zr)-Total		0.0007		0.0004	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Silver (Ag)-Total		<0.0001	RAMB	0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Zinc (Zn)-Total		0.01		0.01	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Ammonia (NH3) - Soluble		0.049	RAMB	0.003	mg/L		17-AUG-06	ALW	R431815
Biochemical Oxygen Demand		8		1	mg/L	04-AUG-06	09-AUG-06	DXN	R428361
Conductivity		106		0.4	umhos/cm		04-AUG-06	SXB	R427845
Fecal Coliform		<10		10	CFU/100mL	03-AUG-06	04-AUG-06	AOB	R427451
Nitrate+Nitrite-N - Soluble		0.416	RAMB	0.005	mg/L		04-AUG-06	LDE	R427877
Phenols (4AAP)		0.002		0.001	mg/L		08-AUG-06	NAP	R428301
Sulphate (SO4) - Soluble		<9		9	mg/L		09-AUG-06	LDE	R428543
Total Oil and Grease		<1		1	mg/L	10-AUG-06	11-AUG-06	IML	R429391
Total Suspended Solids		6		5	mg/L		08-AUG-06	CXZ	R428779
PH		7.25		0.01	pH units		04-AUG-06	SXB	R427845

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D/L	Units	Extracted	Analyzed	By	Batch
L418508-3 SNP-4								
Sampled By: CS / GJ on 01-AUG-06 @ 19:00								
Matrix: WATER								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.094	RAMB	0.005	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Cadmium (Cd)-Total	<0.00002		0.00002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Iron (Fe)-Total	1.22		0.02	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Metal scan								
Arsenic (As)-Total	0.0013		0.0005	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Boron (B)-Total	<0.03		0.03	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Barium (Ba)-Total	0.0222		0.0003	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Beryllium (Be)-Total	<0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Calcium (Ca)-Total	7.2		0.1	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Cobalt (Co)-Total	0.0003		0.0002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Chromium (Cr)-Total	<0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Copper (Cu)-Total	0.004		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Potassium (K)-Total	2.4		0.1	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Magnesium (Mg)-Total	1.64		0.01	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Manganese (Mn)-Total	0.0723		0.0003	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Sodium (Na)-Total	9.99		0.03	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Nickel (Ni)-Total	<0.002		0.002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Phosphorus (P)-Total	0.76	RAMB	0.05	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Lead (Pb)-Total	<0.0005		0.0005	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Rubidium (Rb)-Total	0.0024		0.0002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Antimony (Sb)-Total	<0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Selenium (Se)-Total	0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Tin (Sn)-Total	<0.0006		0.0006	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Strontium (Sr)-Total	0.0299		0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Tellurium (Te)-Total	<0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Titanium (Ti)-Total	0.0024		0.0009	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Uranium (U)-Total	<0.0001		0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Vanadium (V)-Total	<0.001		0.001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Tungsten (W)-Total	<0.0002		0.0002	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Zinc (Zn)-Total	<0.01		0.01	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Zirconium (Zr)-Total	0.0005		0.0004	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Silver (Ag)-Total	<0.0001	RAMB	0.0001	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Zinc (Zn)-Total	<0.01		0.01	mg/L	16-AUG-06	19-AUG-06	DAG	R432531
Ammonia (NH3) - Soluble	0.999		0.003	mg/L		04-AUG-06	LDE	R427877
Biochemical Oxygen Demand	8		1	mg/L	04-AUG-06	09-AUG-06	DXN	R428361
Conductivity	114		0.4	umhos/cm		04-AUG-06	SXB	R427845
Fecal Coliform	<10		10	CFU/100mL	03-AUG-06	04-AUG-06	AOR	R427451
Nitrate+Nitrite-N - Soluble	1.71	RAMB	0.005	mg/L		04-AUG-06	LDE	R427877
Phenols (4AAP)	0.003		0.001	mg/L		04-AUG-06	NAP	R428301
Sulphate (SO4) - Soluble	<9		9	mg/L		09-AUG-06	LDE	R428543
Total Suspended Solids	<5		5	mg/L		08-AUG-06	CXZ	R428779
PH	8.07		0.01	pH units		04-AUG-06	SXB	R427845

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L418508-4	SNP-5								
Sampled By:	CS / GJ on 01-AUG-06 @ 19:00								
Matrix:	WATER								
Metal scan, total with ultras									
Aluminum (Al)-Total		0.337	RAMB	0.005	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Cadmium (Cd)-Total		0.00056		0.00002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Iron (Fe)-Total		1.02		0.02	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Mercury (Hg)-Total		0.0001		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Metal scan									
Arsenic (As)-Total		0.0014		0.0005	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Boron (B)-Total		0.05		0.03	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Barium (Ba)-Total		0.0222		0.0003	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Beryllium (Be)-Total		<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Bismuth (Bi)-Total		0.0008		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Calcium (Ca)-Total		7.4		0.1	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Cobalt (Co)-Total		0.0012		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Chromium (Cr)-Total		<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Cesium (Cs)-Total		0.0006		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Copper (Cu)-Total		0.014		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Potassium (K)-Total		4.6		0.1	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Magnesium (Mg)-Total		1.62		0.01	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Manganese (Mn)-Total		0.0519	RAMB	0.0003	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Molybdenum (Mo)-Total		0.0008		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Sodium (Na)-Total		19.4		0.03	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Nickel (Ni)-Total		0.002		0.002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Phosphorus (P)-Total		1.86	RAMB	0.05	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Lead (Pb)-Total		0.0012		0.0005	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Rubidium (Rb)-Total		0.0062		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Antimony (Sb)-Total		0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Selenium (Se)-Total		<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Tin (Sn)-Total		0.0010		0.0006	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Strontium (Sr)-Total		0.0255	RAMB	0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Tellurium (Te)-Total		<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Titanium (Ti)-Total		0.0068		0.0009	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Thallium (Tl)-Total		0.0008		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Uranium (U)-Total		0.0007		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Vanadium (V)-Total		0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Tungsten (W)-Total		0.0005		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Zinc (Zn)-Total		0.01		0.01	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Zirconium (Zr)-Total		0.0014		0.0004	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Silver (Ag)-Total		0.0002	RAMB	0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Zinc (Zn)-Total		0.01		0.01	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Ammonia (NH3) - Soluble		2.78		0.003	mg/L		04-AUG-06	LDE	R427877
Biochemical Oxygen Demand		17		1	mg/L	04-AUG-06	09-AUG-06	DXN	R428361
Conductivity		160		0.4	umhos/cm		04-AUG-06	SXB	R427845
Fecal Coliform		640		10	CFU/100mL	03-AUG-06	04-AUG-06	AOB	R427451
Nitrate+Nitrite-N - Soluble		0.851	RAMB	0.005	mg/L		04-AUG-06	LDE	R427877
Phenols (4AAP)		0.006		0.001	mg/L		08-AUG-06	NAP	R428301
Sulphate (SO4) - Soluble		18		9	mg/L		09-AUG-06	LDE	R428543
Total Oil and Grease		<1		1	mg/L	10-AUG-06	11-AUG-06	IML	R429391
Total Suspended Solids		93		5	mg/L		08-AUG-06	CXZ	R428779
PH		7.59		0.01	pH units		04-AUG-06	SXB	R427845

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L418508-5	SNP-6							
Sampled By: CS / GJ on 01-AUG-06 @ 19:00								
Matrix: WATER								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.297	RAMB	0.005	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Cadmium (Cd)-Total	0.00003		0.00002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Iron (Fe)-Total	0.84		0.02	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Metal scan								
Arsenic (As)-Total	0.0009		0.0005	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Boron (B)-Total	0.05		0.03	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Barium (Ba)-Total	0.0172		0.0003	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Beryllium (Be)-Total	<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Calcium (Ca)-Total	7.5		0.1	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Cobalt (Co)-Total	0.0006		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Chromium (Cr)-Total	<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Copper (Cu)-Total	0.016		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Potassium (K)-Total	5.2		0.1	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Magnesium (Mg)-Total	1.71		0.01	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Manganese (Mn)-Total	0.0575	RAMB	0.0003	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Molybdenum (Mo)-Total	0.0003		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Sodium (Na)-Total	21.5		0.03	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Nickel (Ni)-Total	<0.002		0.002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Phosphorus (P)-Total	2.08	RAMB	0.05	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Lead (Pb)-Total	0.0006		0.0005	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Rubidium (Rb)-Total	0.0062		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Antimony (Sb)-Total	<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Selenium (Se)-Total	<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Tin (Sn)-Total	<0.0006		0.0006	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Strontium (Sr)-Total	0.0249	RAMB	0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Tellurium (Te)-Total	<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Titanium (Ti)-Total	0.0036		0.0009	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Uranium (U)-Total	0.0001		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Vanadium (V)-Total	<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Tungsten (W)-Total	<0.0002		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Zinc (Zn)-Total	0.01		0.01	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Zirconium (Zr)-Total	0.0009		0.0004	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Silver (Ag)-Total	<0.0001	RAMB	0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Zinc (Zn)-Total	0.01		0.01	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Ammonia (NH3) - Soluble	4.84		0.003	mg/L		16-AUG-06	ALW	R431239
Biochemical Oxygen Demand	59		1	mg/L	04-AUG-06	09-AUG-06	DXN	R428361
Conductivity	178		0.4	umhos/cm		04-AUG-06	SXB	R427845
Nitrate+Nitrite-N - Soluble	0.417	RAMB	0.005	mg/L		04-AUG-06	LDE	R427877
Phenols (4AAP)	0.010		0.001	mg/L		08-AUG-06	NAP	R428301
Sulphate (SO4) - Soluble	25		9	mg/L		09-AUG-06	LDE	R428543
Total Oil and Grease	1		1	mg/L	10-AUG-06	11-AUG-06	IML	R429391
Total Suspended Solids	72		5	mg/L		08-AUG-06	CXZ	R428779
PH	9.38		0.01	pH units		04-AUG-06	SXB	R427845

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L418508-6 FINGER 1									
Sampled By: CS / GJ on 01-AUG-06 @ 19:00									
Matrix: WATER									
Metal scan, total with ultras									
Aluminum (Al)-Total		0.140	RAMB	0.005	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Cadmium (Cd)-Total		<0.00002		0.00002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Iron (Fe)-Total		1.50		0.02	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Mercury (Hg)-Total		<0.0001		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Metal scan									
Arsenic (As)-Total		0.0011		0.0005	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Boron (B)-Total		0.04		0.03	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Barium (Ba)-Total		0.0262		0.0003	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Beryllium (Be)-Total		<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Bismuth (Bi)-Total		<0.0002		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Calcium (Ca)-Total		8.0		0.1	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Cobalt (Co)-Total		0.0005		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Chromium (Cr)-Total		<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Cesium (Cs)-Total		<0.0001		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Copper (Cu)-Total		0.004		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Potassium (K)-Total		2.6		0.1	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Magnesium (Mg)-Total		1.73		0.01	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Manganese (Mn)-Total		0.0957	RAMB	0.0003	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Molybdenum (Mo)-Total		<0.0002		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Sodium (Na)-Total		10.5		0.03	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Nickel (Ni)-Total		<0.002		0.002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Phosphorus (P)-Total		0.88	RAMB	0.05	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Lead (Pb)-Total		<0.0005		0.0005	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Rubidium (Rb)-Total		0.0026		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Antimony (Sb)-Total		<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Selenium (Se)-Total		<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Tin (Sn)-Total		<0.0006		0.0006	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Strontium (Sr)-Total		0.0315	RAMB	0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Tellurium (Te)-Total		<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Titanium (Ti)-Total		0.0029		0.0009	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Thallium (Tl)-Total		<0.0001		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Uranium (U)-Total		0.0001		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Vanadium (V)-Total		<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Tungsten (W)-Total		<0.0002		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Zinc (Zn)-Total		<0.01		0.01	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Zirconium (Zr)-Total		0.0004		0.0004	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Silver (Ag)-Total		<0.0001	RAMB	0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Zinc (Zn)-Total		<0.01		0.01	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Ammonia (NH3) - Soluble		0.258		0.003	mg/L		08-AUG-06	LDE	R428305
Biochemical Oxygen Demand		8		1	mg/L	04-AUG-06	09-AUG-06	DXN	R428361
Conductivity		114		0.4	umhos/cm		04-AUG-06	SXB	R427845
Fecal Coliform		<10		10	CFU/100mL	03-AUG-06	04-AUG-06	AOB	R427451
Nitrate+Nitrite-N - Soluble		0.428		0.005	mg/L		08-AUG-06	LDE	R428305
Phenols (4AAP)		0.002		0.001	mg/L		08-AUG-06	NAP	R428301
Sulphate (SO4) - Soluble		9		9	mg/L		09-AUG-06	LDE	R428543
Total Oil and Grease		<1		1	mg/L	10-AUG-06	11-AUG-06	IML	R429391
Total Suspended Solids		6		5	mg/L		08-AUG-06	CXZ	R428779
PH		8.27		0.01	pH units		04-AUG-06	SXB	R427845

[illegible]

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L418414-1	SNP-1							
Sampled By:	CS/GJ on 01-AUG-06 @ 16:30							
Matrix:	GRAB WATER							
Trout Bioassay LC50	see attached				04-AUG-06	11-AUG-06	DKO	R429271
* Refer to Referenced Information for Qualifiers (if any) and Methodology.								

Rainbow Trout Bioassay Test Report – LC50

Sample Number: L418414-1

Summary Results

96-hour LC50 v/v (%):	>100
95% Lower Confidence Interval v/v (%):	N/A
95% Upper Confidence Interval v/v (%):	N/A
Method of Calculation:	N/A
Confirmed by Graph:	N/A

Sample Information

Sample Origin:	Jacques Whitford
Sample Description:	SNP-1
Sampling Date and Time:	1-Aug-06 16:30
Sampling Method:	Grab
Sampled By:	CS/GJ
Container(s) Description:	3 x 20 L polyethylene pails w/liner
Sample Volume (L):	60
Date and Time Received:	3-Aug-06 10:00
Transit Irregularities:	None
Storage Temperature (°C):	4

Test Information

Test Organism:	Oncorhynchus mykiss
Test Description:	Acute, 96-hour, Static, LC50
Reference Method:	EPS1/RM/13, 2 nd Ed. Dec. 2000, Environment Canada
Performed By:	DKO
Starting Date & Time:	4-Aug-06
Deviations from Reference Method:	None

Condition of Sample Upon Arrival

Observations:

Colour:	clear
Odour:	none
Turbidity:	none
Solids:	none
Hardness (mg/L):	1.2 mL titration solution/ 1 mL sample x 1000 = 120
Alkalinity (mg/L):	0.3 mL titration solution/ 10 mL sample x 1000 = 30
Temperature (°C):	9.7
Dissolved Oxygen (mg/L):	9.98
Conductivity at 25 °C (umhos/cm):	63.8
pH:	7.34
pH adjustment:	Not Adjusted
pH adjustment procedure:	N/A

Pre-Aeration

Aeration Rate (5.5 - 7.5 mL/min/L):	6.4 ± 0.6	
Aeration time (min):	30	
Sample Test Concentration (v/v):	100%	0%
Before Pre-Aeration Dissolved Oxygen (%)	99.8	99.7
After Pre-Aeration Dissolved Oxygen (%):	97.6	99.8

Test Organism Data

Lot Number:	2-June-06-T2
Weekly Mortality Preceding Test (%):	0
Sample size:	10

Conditions Common to all Concentrations During Test

Source of Holding/Dilution Water:	Dechlorinated UV treated city of Winnipeg tap water
Container Description:	Polyethylene pail w/liner
Test Solution Volume (L):	20
Test Solution Depth (cm):	34
Number of Test Organisms/Container:	10
Loading Density (g/L):	0.34

Conditions During Test

Concentration (% v/v)	Temperature (°C)					Dissolved Oxygen (mg/L)					pH				
	0h	24h	48h	72h	96h	0h	24h	48h	72h	96h	0h	24h	48h	72h	96h
0	14.7	15	N/A	N/A	15	9.77	9.34	N/A	N/A	8.95	7.54	7.56	N/A	N/A	7.59
6.25	14.7	15	N/A	N/A	15.1	9.32	9.46	N/A	N/A	8.90	7.37	7.49	N/A	N/A	7.50
12.5	14.6	15	N/A	N/A	15.1	9.70	9.44	N/A	N/A	9.16	7.43	7.46	N/A	N/A	7.46
25	14.2	15	N/A	N/A	15.2	9.90	8.61	N/A	N/A	7.50	7.49	7.28	N/A	N/A	7.22
50	14.4	15	N/A	N/A	15.3	9.98	9.12	N/A	N/A	8.41	7.46	7.32	N/A	N/A	7.20
100	14.6	15	N/A	N/A	15.4	9.87	9.35	N/A	N/A	9.02	7.47	7.35	N/A	N/A	7.32

Concentration (% v/v)	Conductivity (umhos/cm)	Number of fish Dead				Number of fish Stressed			
		0h	24h	48h	72h	96h	24h	48h	72h
0	164.6	0	N/A	N/A	0	0	N/A	N/A	0
6.25	158.8	0	N/A	N/A	0	0	N/A	N/A	0
12.5	151.8	0	N/A	N/A	0	0	N/A	N/A	0
25	135.9	0	N/A	N/A	0	0	N/A	N/A	0
50	108.4	0	N/A	N/A	0	0	N/A	N/A	0
100	64.8	0	N/A	N/A	0	0	N/A	N/A	0

Control Fish Information at End of Test

Mean Fork Length (mm):	42
Lower Range Fork Length (mm):	39
Upper Range Fork Length (mm):	45
Mean Wet Weight (g):	0.69

Mortality and Stressed Behaviour Information

Concentration (% v/v)	Mean Number of fish at end of Test		Mean Rate of fish at end of Test (%)	
	Dead	Stressed	Dead	Stressed
0	0	0	0	0
6.25	0	0	0	0
12.5	0	0	0	0
25	0	0	0	0
50	0	0	0	0
100	0	0	0	0

Median Lethal Concentration Results for Multi-Concentration Tests

LC₅₀: Non Lethal
 LC₅₀ Lower 95% Confidence Limit: N/A
 LC₅₀ Upper 95% Confidence Limit: N/A
 Statistical Method: N/A

Note:
 >100% = 1 mortality
 Non Lethal = 0 mortality

Reference Toxicant

Test Starting Date:	Toxicant:	Zinc Sulphate
		4-July-06
96-hour LC50 (mg/L Zinc):		0.24
95% Lower Confidence Interval (mg/L Zinc):		0.14
95% Upper Confidence Interval (mg/L Zinc):		0.33
Historic Geometric Mean LC50 (mg/L Zinc):		0.70
95% Lower Confidence Interval (mg/L Zinc):		0.03
95% Upper Confidence Interval (mg/L Zinc):		1.37
Method of Calculation:		Stephan LC50 Program, Probit
Confirmed by Graph:		Yes

Sublethal Biological Effects

No sublethal biological effects.

Observations/Comments

No toxicity observed.
No parameters taken at 48 and 72 hours.

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
RAMB	Result Adjusted For Method Blank

Methods Listed (If applicable):

ALS Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
AG-TOT-ULTRA-WP	Water	Silver (Ag)-Total		EPA 200.8 Rev 5.4 May 1994
AL-TOT-ULTRA-WP	Water	Aluminum (Al)-Total		EPA 200.8 Rev 5.4 May 1994
BOD-WP	Water	Biochemical Oxygen Demand (BOD)		APHA 5210 B

The sample is incubated for 5 days at 20 degrees Celsius. Comparison of dissolved oxygen content at the beginning and end of incubation provides a measure of biochemical oxygen demand. If carbonaceous BOD is requested, TCMP is added to the sample to chemically inhibit nitrogenous oxygen demand. If dissolved BOD is requested, the sample is filtered prior to analysis. Surface waters have a DL of 1 mg/L. Effluents are diluted according to their history and will have a sample DL of 6 mg/L or greater, depending on the dilutions used.

CD-TOT-ULTRA-WP	Water	Cadmium (Cd)-Total		EPA 200.8 Rev 5.4 May 1994
EC-WP	Water	Conductivity		APHA 2510B

Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.

EC-WP	Water	Conductivity		APHA 4500B, 2510B, 2320B, 1998
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Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.

FC-MF-HIGH-WP	Water	Fecal Coliforms high in water		APHA 9222D
FC-MF-HIGH-WP	Water	Fecal Coliforms high in water		APHA 9222D, 1998
FE-TOT-ULTRA-WP	Water	Iron (Fe)-Total		EPA 200.8 Rev 5.4 May 1994
HG-TOT-ULTRA-WP	Water	Mercury (Hg)-Total		EPA 200.8 Rev 5.4 May 1994
MET-SCNOU-TOT-LOW-WP	Water	Metal scan		EPA 200.8 Rev 5.4 May 1994
N2N3-SOL-WP	Water	Nitrate + Nitrite Soluble		APHA4500;1998/LACHAT;MAR 1997
N2N3-SOL-WP	Water	Nitrate + Nitrite Soluble		APHA4500;2005/LACHAT;1997,1999
NH3-SOL-WP	Water	Ammonia Soluble		APHA4500;1998/LACHAT;MAR 1997

Ammonia - Colourimetric using Salicylate-nitroprusside and hypochlorite, in an alkaline phosphate buffer.

NH3-SOL-WP	Water	Ammonia Soluble		LACHAT;2003
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Ammonia - Colourimetric using Salicylate-nitroprusside and hypochlorite, in an alkaline phosphate buffer.

OGG-IR-WP	Water	Total Oil and Grease		APHA METHOD 5520C
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PH-WP	Water	pH		APHA 4500B, 2510B, 2320B, 1998
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pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.

PH-WP	Water	pH		APHA 4500H
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pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.

PHENOLS-4AAP-TB	Water	Phenols (4AAP)		APHA 5530 B,D Colourimetry
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PHENOLS-4AAP-TB	Water	Phenols (4AAP)		APHA 5530 B,D-Colourimetry
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PHENOLS-4AAP-TB	Water	Phenols (4AAP)		APHA 5530 D-Colourimetry
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SO4-SOL-WP	Water	Sulphate Soluble		APHA4500/LACHAT
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Sulphate - Turbidimetric

SO4-SOL-WP	Water	Sulphate Soluble		APHA4500;1998/LACHAT;MAR 1997
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Sulphate - Turbidimetric

SOLIDS-TOTSUS-WP	Water	Total Suspended Solids		APHA 2540
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Reference Information

The residue retained by a prepared 1.5 um Whatman 934-AH glass microfibre filter dried at 105 degrees C.

ZN-TOT-LOW-WP Water Zinc (Zn)-Total EPA 200.8 Rev 5.4 May 1994

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

Chain of Custody numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
TB	ALS LABORATORY GROUP - THUNDER BAY, ONTARIO, CANADA	WP	ALS LABORATORY GROUP - WINNIPEG, MANITOBA, CANADA

GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency. The Laboratory control limits are determined under column heading D.L.

mg/kg (units) - unit of concentration based on mass, parts per million.

mg/L (units) - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

UNLESS OTHERWISE STATED, SAMPLES ARE NOT CORRECTED FOR CLIENT FIELD BLANKS.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
TROUT-LC50-WP	Water	Trout Bioassay LC50		EPS/1/RM/9+13

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

Chain of Custody numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WP	ALS LABORATORY GROUP - WINNIPEG, MANITOBA, CANADA		

GLOSSARY OF REPORT TERMS

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ENVIRONMENTAL MTC

Manitoba Technology Centre Ltd.

745 Logan Avenue, Winnipeg, Manitoba R2E 3L5
 583-57th Avenue, Edmonton, Alberta T6E 0T5
 Edmonton Toll Free Line
 1815 - 44 Avenue N.E., Calgary, Alberta T2E 6L5
 General Purpose Bldg., 124 Victoria Road, Saskatoon, Sask. S7N 6C3
 1081 Barton Street, Thunder Bay, Ontario P7B 5N3

CHAIN OF CUSTODY ANALYTICAL REQUEST FORM

Telephone: (204) 945-3705
 Telephone: (780) 413-0227
 Telephone: (506) 468-9878
 Telephone: (403) 281-9937
 Telephone: (306) 993-6370
 Telephone: (807) 822-4463
 Fax: (204) 945-0763
 Fax: (780) 413-2311
 Fax: (506) 468-7219
 Fax: (403) 281-0298
 Fax: (306) 993-6363
 Fax: (807) 822-5798

DATE SUBMITTED: Aug 22 1996 DATE REQUIRED: ASAP

SERVICE REQUESTED: As per quote # Q13013
 PRICING (CHECK ONE):
 AS PER QUOTE # Q13013
 AS PER LIST PRICE: ☐

SAMPLE ID	SAMPLED BY	DATE / TIME SAMPLED	SAMPLE TYPE	PRESERVED	REFUSED
SNP-1	CS/KGJ	Aug 11 1996	GAB		
NO CRISTO + GARDIA					

NOTES & CONDITIONS:

1. Quote number must be provided to ensure proper pricing.
 2. All hazardous samples submitted must be labeled to comply with WHMIS regulations. This must include the nature of the hazard, as well as a contact name and phone number.
 3. ETL's liability limited to cost of analysis.

NOTE: Failure to properly complete all portions of this form may delay analysis.

RELINQUISHED BY: CS DATE: Aug 11 1996 TIME: 20:00
 RECEIVED BY: GH DATE: Aug 30 1996 TIME: 10:00
 RELINQUISHED BY: CS DATE: Aug 11 1996 TIME: 20:00
 RECEIVED BY: GH DATE: Aug 30 1996 TIME: 10:00

SAMPLE CONDITION UPON RECEIPT: ☒ ACCEPTABLE ☐ NON ACCEPTABLE

FROZEN ☐ GOLD ☐ AMBIENT

OTHER (BREAKAGE, LEAKAGE, ETC.): See label

E-MAIL: YES ☐ NO ☒

E-MAIL ADDRESS: cs@mtc.ca

P.O. NO.

JOB NO. 1015263

WHITE - File Copy
 GREEN - Final Report
 PINK - Invoicing
 BLUE - Client Support
 YELLOW - Customer

REV. JUNE / 99

ANALYSIS REQUESTED:

Reception: (814) 342-3715 Fax: (204) 642-0735
 Telephones: (700) 413-3822 Fax: (700) 457-2411
 Telephones: (800) 669-4870 Fax: (400) 229-7819
 Telephones: (408) 291-9397 Fax: (408) 291-0396
 Telephones: (805) 668-6370 Fax: (805) 668-6363
 Telephones: (807) 623-6463 Fax: (807) 623-7566

ATX

AS PER QUOTE # Q120123 ☐
 AS PER LIST PRICE: ☐

SAMPLE TYPE

62-10470

LAB SAMPLE NO.

74
SAMPLE RECEIVED (Y OR N)
SAMPLE BROKEN (Y OR N)

RECEIVED (Y OR N)
SAMPLE BROKEN (Y OR N)
64

418914

NOTES & CONDITIONS

2. All hazardous samples, containing must be subjected to comply with WHMIS regulations. This must include the nature of the hazard, as well as a contact name and phone number that the lab can contact for further information.

3. EIL's liability limited to cost of analysis.

NOTE: Failure to properly complete all portions of this form may delay analysis.

NO SAMPLES SUBMITTED.

NO BOTTLE SAMPLERS



1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

1. *Journal of the American Medical Association*, 2000; 284: 1039-1044.

1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 26

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EMAIL: YES ☒ NO

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E-MAIL ADDRESS: TSX

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P.O. NO. 1

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JOB NO. 101

1. *Chlorophyll a* (Chl *a*)

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REV. JUNE / 99

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



Environmental Division

PRELIMINARY RESULTS

JACQUES WHITFORD

ATTN: CAREY SIBBALD

201, 5103 - 51ST AVE

YELLOWKNIFE NT X1A 2P3

Reported On: 23-AUG-06 08:33 AM

Lab Work Order #: **L418704**

Date Received: **04-AUG-06**

Project P.O. #:

Job Reference: 1015263

Legal Site Desc:

CofC Numbers:

Other Information:

Comments:

APPROVED BY: _____

GAIL HILL

Project Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

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ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L418704-1 BL-1								
Sampled By: CS/JQ on 02-AUG-06 @ 15:00								
Matrix: GRAB WATER								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.025	RAMB	0.005	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Cadmium (Cd)-Total	<0.00002		0.00002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Iron (Fe)-Total	0.07		0.02	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Metal scan								
Arsenic (As)-Total	<0.0005		0.0005	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Boron (B)-Total	<0.03		0.03	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Barium (Ba)-Total	0.0177		0.0003	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Beryllium (Be)-Total	<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Calcium (Ca)-Total	2.2		0.1	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Cobalt (Co)-Total	<0.0002		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Chromium (Cr)-Total	<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Copper (Cu)-Total	<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Potassium (K)-Total	0.4		0.1	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Magnesium (Mg)-Total	0.95		0.01	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Manganese (Mn)-Total	0.0036	RAMB	0.0003	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Sodium (Na)-Total	0.79		0.03	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Nickel (Ni)-Total	<0.002		0.002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Phosphorus (P)-Total	0.06	RAMB	0.05	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Lead (Pb)-Total	<0.0005		0.0005	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Rubidium (Rb)-Total	0.0008		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Antimony (Sb)-Total	<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Selenium (Se)-Total	<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Tin (Sn)-Total	<0.0006		0.0006	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Strontium (Sr)-Total	0.0156	RAMB	0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Tellurium (Te)-Total	<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Titanium (Ti)-Total	<0.0009		0.0009	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Uranium (U)-Total	<0.0001		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Vanadium (V)-Total	<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Tungsten (W)-Total	<0.0002		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Zinc (Zn)-Total	<0.01		0.01	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Zirconium (Zr)-Total	<0.0004		0.0004	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Silver (Ag)-Total	<0.0001	RAMB	0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Zinc (Zn)-Total	<0.01		0.01	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Oxygen, Dissolved	11.0		0.1	mg/L		04-AUG-06	LJH	R427390
Total Dissolved Solids	10		5	mg/L		08-AUG-06	CXZ	R428779
Total Suspended Solids	<5		5	mg/L		08-AUG-06	CXZ	R428779
ROU4W Extractable								
Alkalinity								
Alkalinity, Total (as CaCO3)	9		1	mg/L		08-AUG-06	SXB	R428269
Bicarbonate (HCO3)	12		2	mg/L		08-AUG-06	SXB	R428269
Carbonate (CO3)	<0.6		0.6	mg/L		08-AUG-06	SXB	R428269
Hydroxide (OH)	<0.4		0.4	mg/L		08-AUG-06	SXB	R428269
Chloride Soluble								
Chloride (Cl) - Soluble	<9		9	mg/L		09-AUG-06	LDE	R428543
Conductivity								

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L418704-1 BL-1									
Sampled By: CS/JQ on 02-AUG-06 @ 15:00									
Matrix: GRAB WATER									
ROU4W Extractable									
Conductivity									
Conductivity		25.6		0.4	umhos/cm		04-AUG-06	SXB	R427845
Fluoride Soluble									
Fluoride (F) - Soluble		0.2		0.1	mg/L		09-AUG-06	LDE	R428543
Hardness (as CaCO3)		9.5		0.2	mg/L		10-AUG-06		
Nitrate + Nitrite Soluble									
Nitrate+Nitrite-N - Soluble		0.005	RAMB	0.005	mg/L		04-AUG-06	LDE	R427877
Routine Metals									
Calcium (Ca)-Extractable		2.22		0.05	mg/L		09-AUG-06	DAG	R428922
Potassium (K)-Extractable		0.37		0.05	mg/L		09-AUG-06	DAG	R428922
Magnesium (Mg)-Extractable		0.96		0.01	mg/L		09-AUG-06	DAG	R428922
Sodium (Na)-Extractable		0.83		0.02	mg/L		09-AUG-06	DAG	R428922
Iron (Fe)-Extractable		0.09		0.01	mg/L		09-AUG-06	DAG	R428922
Manganese (Mn)-Extractable		0.0044		0.0002	mg/L		09-AUG-06	DAG	R428922
Sulphate Soluble									
Sulphate (SO4) - Soluble		<9		9	mg/L		09-AUG-06	LDE	R428543
TDS (Calculated)		10		5	mg/L		10-AUG-06		
Turbidity									
Turbidity		0.60		0.05	NTU		04-AUG-06	SXG	R427977
pH									
PH		7.22		0.01	pH units		04-AUG-06	SXB	R427845
Total Coliform and E. Coli by MColi Blue									
Escherichia Coli mcoli blue MF									
E. Coli		<1		1	CFU/100mL	04-AUG-06	05-AUG-06	AOB	R427589
Total Coliform mcoli blue MF									
Total Coliforms		<1		1	CFU/100mL	04-AUG-06	05-AUG-06	AOB	R427589
L418704-2 BL-2									
Sampled By: CS/JQ on 02-AUG-06 @ 15:00									
Matrix: GRAB WATER									
Metal scan, total with ultras									
Aluminum (Al)-Total		0.028	RAMB	0.005	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Cadmium (Cd)-Total		<0.00002		0.00002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Iron (Fe)-Total		0.06		0.02	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Mercury (Hg)-Total		<0.0001		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Metal scan									
Arsenic (As)-Total		<0.0005		0.0005	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Boron (B)-Total		<0.03		0.03	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Barium (Ba)-Total		0.0172		0.0003	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Beryllium (Be)-Total		<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Bismuth (Bi)-Total		<0.0002		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Calcium (Ca)-Total		2.3		0.1	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Cobalt (Co)-Total		<0.0002		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Chromium (Cr)-Total		<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Cesium (Cs)-Total		<0.0001		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Copper (Cu)-Total		<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Potassium (K)-Total		0.3		0.1	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Magnesium (Mg)-Total		0.93		0.01	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Manganese (Mn)-Total		0.0033	RAMB	0.0003	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Molybdenum (Mo)-Total		<0.0002		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Sodium (Na)-Total		0.64		0.03	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Nickel (Ni)-Total		<0.002		0.002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L418704-2 BL-2								
Sampled By: CS/JQ on 02-AUG-06 @ 15:00								
Matrix: GRAB WATER								
Metal scan, total with ultras								
Metal scan								
Phosphorus (P)-Total	<0.05	RAMB	0.05	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Lead (Pb)-Total	<0.0005		0.0005	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Rubidium (Rb)-Total	0.0008		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Antimony (Sb)-Total	<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Selenium (Se)-Total	<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Tin (Sn)-Total	<0.0006		0.0006	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Strontium (Sr)-Total	0.0152	RAMB	0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Tellurium (Te)-Total	<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Titanium (Ti)-Total	0.0009		0.0009	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Uranium (U)-Total	<0.0001		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Vanadium (V)-Total	<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Tungsten (W)-Total	<0.0002		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Zinc (Zn)-Total	<0.01		0.01	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Zirconium (Zr)-Total	<0.0004		0.0004	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Silver (Ag)-Total	<0.0001	RAMB	0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Zinc (Zn)-Total	<0.01		0.01	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Oxygen, Dissolved	11.5		0.1	mg/L		04-AUG-06	LJH	R427390
Total Dissolved Solids	6		5	mg/L		08-AUG-06	CXZ	R428779
Total Suspended Solids	<5		5	mg/L		08-AUG-06	CXZ	R428779
ROU4W Extractable								
Alkalinity								
Alkalinity, Total (as CaCO3)	9		1	mg/L		08-AUG-06	SXB	R428269
Bicarbonate (HCO3)	12		2	mg/L		08-AUG-06	SXB	R428269
Carbonate (CO3)	<0.6		0.6	mg/L		08-AUG-06	SXB	R428269
Hydroxide (OH)	<0.4		0.4	mg/L		08-AUG-06	SXB	R428269
Chloride Soluble								
Chloride (Cl) - Soluble	<9		9	mg/L		09-AUG-06	LDE	R428543
Conductivity								
Conductivity	24.4		0.4	umhos/cm		04-AUG-06	SXB	R427845
Fluoride Soluble								
Fluoride (F) - Soluble	0.2		0.1	mg/L		09-AUG-06	LDE	R428543
Hardness (as CaCO3)	9.5		0.2	mg/L		10-AUG-06		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	<0.005	RAMB	0.005	mg/L		04-AUG-06	LDE	R427877
Routine Metals								
Calcium (Ca)-Extractable	2.23		0.05	mg/L		09-AUG-06	DAG	R428922
Potassium (K)-Extractable	0.39		0.05	mg/L		09-AUG-06	DAG	R428922
Magnesium (Mg)-Extractable	0.96		0.01	mg/L		09-AUG-06	DAG	R428922
Sodium (Na)-Extractable	0.69		0.02	mg/L		09-AUG-06	DAG	R428922
Iron (Fe)-Extractable	0.09		0.01	mg/L		09-AUG-06	DAG	R428922
Manganese (Mn)-Extractable	0.0041		0.0002	mg/L		09-AUG-06	DAG	R428922
Sulphate Soluble								
Sulphate (SO4) - Soluble	<9		9	mg/L		09-AUG-06	LDE	R428543
TDS (Calculated)	10		5	mg/L		10-AUG-06		
Turbidity								
Turbidity	0.55		0.05	NTU		04-AUG-06	SXB	R427877
pH								
PH	7.19		0.01	pH units		04-AUG-06	SXB	R427845
Total Coliform and E. Coli by MColi Blue								

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L418704-2 BL-2									
Sampled By: CS/JQ on 02-AUG-06 @ 15:00									
Matrix: GRAB WATER									
Total Coliform and E. Coli by MColi Blue									
Escherichia Coli mcoli blue MF									
E. Coli		<1		1	CFU/100mL	04-AUG-06	05-AUG-06	AOB	R427589
Total Coliform mcoli blue MF									
Total Coliforms		<1		1	CFU/100mL	04-AUG-06	05-AUG-06	AOB	R427589
L418704-3 BL-3									
Sampled By: CS/JQ on 02-AUG-06 @ 15:00									
Matrix: GRAB WATER									
Metal scan, total with ultras									
Aluminum (Al)-Total		0.029	RAMB	0.005	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Cadmium (Cd)-Total		<0.00002		0.00002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Iron (Fe)-Total		0.08		0.02	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Mercury (Hg)-Total		<0.0001		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Metal scan									
Arsenic (As)-Total		<0.0005		0.0005	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Boron (B)-Total		<0.03		0.03	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Barium (Ba)-Total		0.0168		0.0003	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Beryllium (Be)-Total		<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Bismuth (Bi)-Total		<0.0002		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Calcium (Ca)-Total		2.3		0.1	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Cobalt (Co)-Total		<0.0002		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Chromium (Cr)-Total		<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Cesium (Cs)-Total		<0.0001		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Copper (Cu)-Total		0.002		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Potassium (K)-Total		0.4		0.1	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Magnesium (Mg)-Total		1.08		0.01	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Manganese (Mn)-Total		0.0056	RAMB	0.0003	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Molybdenum (Mo)-Total		<0.0002		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Sodium (Na)-Total		1.89		0.03	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Nickel (Ni)-Total		<0.002		0.002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Phosphorus (P)-Total		0.06	RAMB	0.05	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Lead (Pb)-Total		<0.0005		0.0005	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Rubidium (Rb)-Total		0.0008		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Antimony (Sb)-Total		<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Selenium (Se)-Total		<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Tin (Sn)-Total		<0.0006		0.0006	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Strontium (Sr)-Total		0.0162	RAMB	0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Tellurium (Te)-Total		<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Titanium (Ti)-Total		0.0012		0.0009	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Thallium (Tl)-Total		<0.0001		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Uranium (U)-Total		<0.0001		0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Vanadium (V)-Total		<0.001		0.001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Tungsten (W)-Total		<0.0002		0.0002	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Zinc (Zn)-Total		<0.01		0.01	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Zirconium (Zr)-Total		<0.0004		0.0004	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Silver (Ag)-Total		<0.0001	RAMB	0.0001	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Zinc (Zn)-Total		<0.01		0.01	mg/L	18-AUG-06	20-AUG-06	DAG	R432647
Oxygen, Dissolved		11.5		0.1	mg/L		04-AUG-06	LJH	R427390
Total Dissolved Solids		10		5	mg/L		08-AUG-06	CXZ	R428779
Total Suspended Solids		<5		5	mg/L		08-AUG-06	CXZ	R428779
ROU4W Extractable									

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Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L418704-3 BL-3								
Sampled By: CS/JQ on 02-AUG-06 @ 15:00								
Matrix: GRAB WATER								
ROU4W Extractable								
Alkalinity								
Alkalinity, Total (as CaCO ₃)	9		1	mg/L		08-AUG-06	SXB	R428269
Bicarbonate (HCO ₃)	12		2	mg/L		08-AUG-06	SXB	R428269
Carbonate (CO ₃)	<0.6		0.6	mg/L		08-AUG-06	SXB	R428269
Hydroxide (OH)	<0.4		0.4	mg/L		08-AUG-06	SXB	R428269
Chloride Soluble								
Chloride (Cl) - Soluble	<9		9	mg/L		09-AUG-06	LDE	R428543
Conductivity								
Conductivity	32.3		0.4	umhos/cm		04-AUG-06	SXB	R427845
Fluoride Soluble								
Fluoride (F) - Soluble	0.1		0.1	mg/L		09-AUG-06	LDE	R428543
Hardness (as CaCO ₃)	10.3		0.2	mg/L		10-AUG-06		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	0.005	RAMB	0.005	mg/L		04-AUG-06	LDE	R427877
Routine Metals								
Calcium (Ca)-Extractable	2.28		0.05	mg/L		10-AUG-06	DAG	R428922
Potassium (K)-Extractable	0.46		0.05	mg/L		10-AUG-06	DAG	R428922
Magnesium (Mg)-Extractable	1.11		0.01	mg/L		10-AUG-06	DAG	R428922
Sodium (Na)-Extractable	1.83		0.02	mg/L		10-AUG-06	DAG	R428922
Iron (Fe)-Extractable	0.10		0.01	mg/L		10-AUG-06	DAG	R428922
Manganese (Mn)-Extractable	0.0063		0.0002	mg/L		10-AUG-06	DAG	R428922
Sulphate Soluble								
Sulphate (SO ₄) - Soluble	<9		9	mg/L		09-AUG-06	LDE	R428543
TDS (Calculated)	11		5	mg/L		10-AUG-06		
Turbidity								
Turbidity	0.50		0.05	NTU		04-AUG-06	SXG	R427977
pH								
PH	7.18		0.01	pH units		04-AUG-06	SXB	R427845
Total Coliform and E. Coli by MColi Blue								
Escherichia Coli mcoli blue MF								
E. Coli	<1		1	CFU/100mL	04-AUG-06	05-AUG-06	AOB	R427589
Total Coliform mcoli blue MF								
Total Coliforms	1		1	CFU/100mL	04-AUG-06	05-AUG-06	AOB	R427589
L418704-4 BL-4								
Sampled By: CS/JQ on 02-AUG-06 @ 15:00								
Matrix: GRAB WATER								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.015	RAMB	0.005	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Cadmium (Cd)-Total	0.00079		0.00002	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Iron (Fe)-Total	0.10		0.02	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Metal scan								
Arsenic (As)-Total	0.0010		0.0005	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Boron (B)-Total	<0.03		0.03	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Barium (Ba)-Total	0.0164		0.0003	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Beryllium (Be)-Total	0.001		0.001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Bismuth (Bi)-Total	0.0012		0.0002	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Calcium (Ca)-Total	2.3		0.1	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Cobalt (Co)-Total	0.0011		0.0002	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Chromium (Cr)-Total	0.002		0.001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Cesium (Cs)-Total	0.0010		0.0001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L418704-4 BL-4								
Sampled By: CS/JQ on 02-AUG-06 @ 15:00								
Matrix: GRAB WATER								
Metal scan, total with ultras								
Metal scan								
Copper (Cu)-Total	0.002		0.001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Potassium (K)-Total	0.8		0.1	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Magnesium (Mg)-Total	1.75		0.01	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Manganese (Mn)-Total	0.0094		0.0003	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Molybdenum (Mo)-Total	0.0012		0.0002	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Sodium (Na)-Total	6.91		0.03	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Nickel (Ni)-Total	<0.002		0.002	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Phosphorus (P)-Total	0.07	RAMB	0.05	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Lead (Pb)-Total	0.0014		0.0005	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Rubidium (Rb)-Total	0.0018		0.0002	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Antimony (Sb)-Total	0.002		0.001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Selenium (Se)-Total	0.001		0.001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Tin (Sn)-Total	0.0010		0.0006	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Strontium (Sr)-Total	0.0197		0.0001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Tellurium (Te)-Total	0.001		0.001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Titanium (Ti)-Total	<0.0009		0.0009	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Thallium (Tl)-Total	0.0010		0.0001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Uranium (U)-Total	0.0011		0.0001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Vanadium (V)-Total	0.001		0.001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Tungsten (W)-Total	0.0012	RAMB	0.0002	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Zinc (Zn)-Total	<0.01		0.01	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Zirconium (Zr)-Total	0.0012		0.0004	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Silver (Ag)-Total	0.0004	RAMB	0.0001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Zinc (Zn)-Total	<0.01		0.01	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Oxygen, Dissolved	11.9		0.1	mg/L		04-AUG-06	LJH	R427390
Total Dissolved Solids	32		5	mg/L		08-AUG-06	CXZ	R428779
Total Suspended Solids	<5		5	mg/L		08-AUG-06	CXZ	R428779
ROU4W Extractable								
Alkalinity								
Alkalinity, Total (as CaCO3)	10		1	mg/L		08-AUG-06	SXB	R428269
Bicarbonate (HCO3)	12		2	mg/L		08-AUG-06	SXB	R428269
Carbonate (CO3)	<0.6		0.6	mg/L		08-AUG-06	SXB	R428269
Hydroxide (OH)	<0.4		0.4	mg/L		08-AUG-06	SXB	R428269
Chloride Soluble								
Chloride (Cl) - Soluble	13		9	mg/L		09-AUG-06	LDE	R428543
Conductivity								
Conductivity	67.8		0.4	umhos/cm		04-AUG-06	SXB	R427845
Fluoride Soluble								
Fluoride (F) - Soluble	0.2		0.1	mg/L		09-AUG-06	LDE	R428543
Hardness (as CaCO3)	13.2		0.2	mg/L		10-AUG-06		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	0.011	RAMB	0.005	mg/L		04-AUG-06	LDE	R427877
Routine Metals								
Calcium (Ca)-Extractable	2.47		0.05	mg/L		10-AUG-06	DAG	R428922
Potassium (K)-Extractable	0.66		0.05	mg/L		10-AUG-06	DAG	R428922
Magnesium (Mg)-Extractable	1.71		0.01	mg/L		10-AUG-06	DAG	R428922
Sodium (Na)-Extractable	7.36		0.02	mg/L		10-AUG-06	DAG	R428922
Iron (Fe)-Extractable	0.08		0.01	mg/L		10-AUG-06	DAG	R428922
Manganese (Mn)-Extractable	0.0085		0.0002	mg/L		10-AUG-06	DAG	R428922
Sulphate Soluble								

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L418704-4	BL-4								
Sampled By: CS/JQ on 02-AUG-06 @ 15:00									
Matrix: GRAB WATER									
ROU4W Extractable									
Sulphate Soluble									
Sulphate (SO4) - Soluble		<9		9	mg/L		09-AUG-06	LDE	R428543
TDS (Calculated)		31		5	mg/L		10-AUG-06		
Turbidity									
Turbidity		0.45		0.05	NTU		04-AUG-06	SXG	R427977
pH									
PH		7.14		0.01	pH units		04-AUG-06	SXB	R427845
Total Coliform and E. Coli by MColi Blue									
Escherichia Coli mcoli blue MF									
E. Coli		<1		1	CFU/100mL	04-AUG-06	05-AUG-06	AOB	R427589
Total Coliform mcoli blue MF									
Total Coliforms		<1		1	CFU/100mL	04-AUG-06	05-AUG-06	AOB	R427589
L418704-5	BL-5								
Sampled By: CS/JQ on 02-AUG-06 @ 19:30									
Matrix: GRAB WATER									
Metal scan, total with ultras									
Aluminum (Al)-Total		0.017	RAMB	0.005	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Cadmium (Cd)-Total		0.00069		0.00002	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Iron (Fe)-Total		0.09		0.02	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Mercury (Hg)-Total		<0.0001		0.0001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Metal scan									
Arsenic (As)-Total		0.0008		0.0005	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Boron (B)-Total		<0.03		0.03	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Barium (Ba)-Total		0.0167		0.0003	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Beryllium (Be)-Total		<0.001		0.001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Bismuth (Bi)-Total		0.0009		0.0002	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Calcium (Ca)-Total		2.9		0.1	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Cobalt (Co)-Total		0.0010		0.0002	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Chromium (Cr)-Total		0.003		0.001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Cesium (Cs)-Total		0.0009		0.0001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Copper (Cu)-Total		0.002		0.001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Potassium (K)-Total		1.2		0.1	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Magnesium (Mg)-Total		2.81		0.01	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Manganese (Mn)-Total		0.0115		0.0003	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Molybdenum (Mo)-Total		0.0010		0.0002	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Sodium (Na)-Total		15.6		0.03	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Nickel (Ni)-Total		<0.002		0.002	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Phosphorus (P)-Total		0.07	RAMB	0.05	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Lead (Pb)-Total		0.0010		0.0005	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Rubidium (Rb)-Total		0.0019		0.0002	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Antimony (Sb)-Total		0.001		0.001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Selenium (Se)-Total		0.002		0.001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Tin (Sn)-Total		0.0008		0.0006	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Strontium (Sr)-Total		0.0264		0.0001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Tellurium (Te)-Total		<0.001		0.001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Titanium (Ti)-Total		0.0016		0.0009	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Thallium (Tl)-Total		0.0008		0.0001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Uranium (U)-Total		0.0009		0.0001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Vanadium (V)-Total		0.002		0.001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Tungsten (W)-Total		0.0011		0.0002	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Zinc (Zn)-Total		<0.01		0.01	mg/L	18-AUG-06	19-AUG-06	DAG	R432531

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L418704-5 BL-5									
Sampled By: CS/JQ on 02-AUG-06 @ 19:30									
Matrix: GRAB WATER									
Metal scan, total with ultras									
Metal scan									
Zirconium (Zr)-Total		0.0012		0.0004	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Silver (Ag)-Total		0.0005	RAMB	0.0001	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Zinc (Zn)-Total		<0.01		0.01	mg/L	18-AUG-06	19-AUG-06	DAG	R432531
Oxygen, Dissolved		12.1		0.1	mg/L		04-AUG-06	LJH	R427390
Total Dissolved Solids		66		5	mg/L		08-AUG-06	CXZ	R428779
Total Suspended Solids		<5		5	mg/L		08-AUG-06	CXZ	R428779
ROU4W Extractable									
Alkalinity									
Alkalinity, Total (as CaCO3)		10		1	mg/L		08-AUG-06	SXB	R428269
Bicarbonate (HCO3)		12		2	mg/L		08-AUG-06	SXB	R428269
Carbonate (CO3)		<0.6		0.6	mg/L		08-AUG-06	SXB	R428269
Hydroxide (OH)		<0.4		0.4	mg/L		08-AUG-06	SXB	R428269
Chloride Soluble									
Chloride (Cl) - Soluble		29		9	mg/L		09-AUG-06	LDE	R428543
Conductivity									
Conductivity		136		0.4	umhos/cm		04-AUG-06	SXB	R427845
Fluoride Soluble									
Fluoride (F) - Soluble		0.2		0.1	mg/L		09-AUG-06	LDE	R428543
Hardness (as CaCO3)		20.0		0.2	mg/L		10-AUG-06		
Nitrate + Nitrite Soluble									
Nitrate+Nitrite-N - Soluble		0.023	RAMB	0.005	mg/L		04-AUG-06	LDE	R427877
Routine Metals									
Calcium (Ca)-Extractable		3.04		0.05	mg/L		10-AUG-06	DAG	R428922
Potassium (K)-Extractable		1.12		0.05	mg/L		10-AUG-06	DAG	R428922
Magnesium (Mg)-Extractable		3.02		0.01	mg/L		10-AUG-06	DAG	R428922
Sodium (Na)-Extractable		17.6		0.02	mg/L		10-AUG-06	DAG	R428922
Iron (Fe)-Extractable		0.10		0.01	mg/L		10-AUG-06	DAG	R428922
Manganese (Mn)-Extractable		0.0121		0.0002	mg/L		10-AUG-06	DAG	R428922
Sulphate Soluble									
Sulphate (SO4) - Soluble		<9		9	mg/L		09-AUG-06	LDE	R428543
TDS (Calculated)		60		5	mg/L		10-AUG-06		
Turbidity									
Turbidity		0.40		0.05	NTU		04-AUG-06	SXG	R427977
pH									
PH		7.29		0.01	pH units		04-AUG-06	SXB	R427845
Total Coliform and E. Coli by MColi Blue									
Escherichia Coli mcoli blue MF									
E. Coli		<1		1	CFU/100mL	04-AUG-06	05-AUG-06	AOB	R427589
Total Coliform mcoli blue MF									
Total Coliforms		<1		1	CFU/100mL	04-AUG-06	05-AUG-06	AOB	R427589

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L418722-1	BL-5								
Sampled By:	CS/JQ on 02-AUG-06 @ 19:30								
Matrix:	GRAB WATER								
Total Oil and Grease		<1		1	mg/l.	10-AUG-06	11-AUG-06	IML	R429391
* Refer to Referenced Information for Qualifiers (if any) and Methodology.									

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L419171-1 BL-6-0.5M								
Sampled By: CS/JU on 03-AUG-06 @ 09:40								
Matrix: GRAB WATER								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.032		0.005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cadmium (Cd)-Total	0.00079		0.00002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Iron (Fe)-Total	0.10		0.02	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Mercury (Hg)-Total	0.0002		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Metal scan								
Arsenic (As)-Total	0.0011		0.0005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Boron (B)-Total	<0.03		0.03	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Barium (Ba)-Total	0.0176		0.0003	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Beryllium (Be)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Bismuth (Bi)-Total	0.0009		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Calcium (Ca)-Total	2.9		0.1	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cobalt (Co)-Total	0.0011		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Chromium (Cr)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cesium (Cs)-Total	0.0009		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Copper (Cu)-Total	0.002		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Potassium (K)-Total	1.0		0.1	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Magnesium (Mg)-Total	2.81		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Manganese (Mn)-Total	0.0115		0.0003	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Molybdenum (Mo)-Total	0.0010		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Sodium (Na)-Total	16.1		0.03	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Nickel (Ni)-Total	<0.002		0.002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Phosphorus (P)-Total	<0.05	RAMB	0.05	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Lead (Pb)-Total	0.0010		0.0005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Rubidium (Rb)-Total	0.0020		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Antimony (Sb)-Total	0.002		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Selenium (Se)-Total	0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tin (Sn)-Total	0.0011		0.0006	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Strontium (Sr)-Total	0.0269		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tellurium (Te)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Titanium (Ti)-Total	0.0013		0.0009	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Thallium (Tl)-Total	0.0011		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Uranium (U)-Total	0.0009		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Vanadium (V)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tungsten (W)-Total	0.0009		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zinc (Zn)-Total	<0.01		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zirconium (Zr)-Total	0.0010		0.0004	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Silver (Ag)-Total	0.0008		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zinc (Zn)-Total	<0.01		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Oxygen, Dissolved	13.2		0.1	mg/L		10-AUG-06	LJH	R428757
Total Dissolved Solids	84		5	mg/L		10-AUG-06	CXZ	R429027
Total Suspended Solids	<5		5	mg/L		10-AUG-06	CXZ	R429027
ROU4W Extractable								
Alkalinity								
Alkalinity, Total (as CaCO3)	10		1	mg/L		09-AUG-06	SXB	R428766
Bicarbonate (HCO3)	12		2	mg/L		09-AUG-06	SXB	R428766
Carbonate (CO3)	<0.6		0.6	mg/L		09-AUG-06	SXB	R428766
Hydroxide (OH)	<0.4		0.4	mg/L		09-AUG-06	SXB	R428766
Chloride Soluble								
Chloride (Cl) - Soluble	32		9	mg/L		10-AUG-06	LDE	R429030
Conductivity								

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L419171-1 BL-6-0.5M								
Sampled By: CS/JU on 03-AUG-06 @ 09:40								
Matrix: GRAB WATER								
ROU4W Extractable								
Conductivity								
Conductivity	144		0.4	umhos/cm		08-AUG-06	SXB	R428269
Fluoride Soluble								
Fluoride (F) - Soluble	0.1		0.1	mg/L		10-AUG-06	LDE	R429030
Hardness (as CaCO3)	17.4		0.2	mg/L		10-AUG-06		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	0.030		0.005	mg/L		08-AUG-06	LDE	R428305
Routine Metals								
Calcium (Ca)-Extractable	2.73		0.05	mg/L		10-AUG-06	DAG	R428922
Potassium (K)-Extractable	0.92		0.05	mg/L		10-AUG-06	DAG	R428922
Magnesium (Mg)-Extractable	2.58		0.01	mg/L		10-AUG-06	DAG	R428922
Sodium (Na)-Extractable	15.3		0.02	mg/L		10-AUG-06	DAG	R428922
Iron (Fe)-Extractable	<0.01		0.01	mg/L		10-AUG-06	DAG	R428922
Manganese (Mn)-Extractable	0.0102		0.0002	mg/L		10-AUG-06	DAG	R428922
Sulphate Soluble								
Sulphate (SO4) - Soluble	<9		9	mg/L		10-AUG-06	LDE	R429030
TDS (Calculated)	60		5	mg/L		10-AUG-06		
Turbidity								
Turbidity	0.35		0.05	NTU		08-AUG-06	SXB	R428272
pH								
PH	7.20		0.01	pH units		08-AUG-06	SXB	R428269
Total Coliform and E. Coli by MColi Blue								
Escherichia Coli mcoli blue MF								
E. Coli	1		1	CFU/100mL	08-AUG-06	09-AUG-06	RCV	R428579
Total Coliform mcoli blue MF								
Total Coliforms	1		1	CFU/100mL	08-AUG-06	09-AUG-06	RCV	R428579
I 419171-2 BL-7								
Sampled By: CS/JU on 03-AUG-06 @ 11:15								
Matrix: GRAB WATER								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.028		0.005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cadmium (Cd)-Total	<0.00002		0.00002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Iron (Fe)-Total	0.05		0.02	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Metal scan								
Arsenic (As)-Total	<0.0005		0.0005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Boron (B)-Total	<0.03		0.03	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Barium (Ba)-Total	0.0171		0.0003	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Beryllium (Be)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Calcium (Ca)-Total	2.3		0.1	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cobalt (Co)-Total	0.0003		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Chromium (Cr)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Copper (Cu)-Total	0.002		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Potassium (K)-Total	0.5		0.1	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Magnesium (Mg)-Total	1.05		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Manganese (Mn)-Total	0.0050		0.0003	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Sodium (Na)-Total	1.66		0.03	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Nickel (Ni)-Total	<0.002		0.002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L419171-2 BL-7								
Sampled By: CS/JU on 03-AUG-06 @ 11:15								
Matrix: GRAB WATER								
Metal scan, total with ultras								
Metal scan								
Phosphorus (P)-Total	<0.05	RAMB	0.05	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Lead (Pb)-Total	<0.0005		0.0005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Rubidium (Rb)-Total	0.0008		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Antimony (Sb)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Selenium (Se)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tin (Sn)-Total	<0.0006		0.0006	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Strontium (Sr)-Total	0.0161		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tellurium (Te)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Titanium (Ti)-Total	<0.0009		0.0009	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Thallium (Tl)-Total	0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Uranium (U)-Total	<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Vanadium (V)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tungsten (W)-Total	<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zinc (Zn)-Total	<0.01		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zirconium (Zr)-Total	<0.0004		0.0004	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Silver (Ag)-Total	<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zinc (Zn)-Total	<0.01		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Oxygen, Dissolved	11.8		0.1	mg/L		10-AUG-06	LJH	R428757
Total Dissolved Solids	18		5	mg/L		10-AUG-06	CXZ	R429027
Total Suspended Solids	<5		5	mg/L		10-AUG-06	CXZ	R429027
ROU4W Extractable								
Alkalinity								
Alkalinity, Total (as CaCO3)	9		1	mg/L		09-AUG-06	SXB	R428766
Bicarbonate (HCO3)	12		2	mg/L		09-AUG-06	SXB	R428766
Carbonate (CO3)	<0.6		0.6	mg/L		09-AUG-06	SXB	R428766
Hydroxide (OH)	<0.4		0.4	mg/L		09-AUG-06	SXB	R428766
Chloride Soluble								
Chloride (Cl) - Soluble	<9		9	mg/L		10-AUG-06	LDE	R429030
Conductivity								
Conductivity	32.8		0.4	umhos/cm		08-AUG-06	SXB	R428269
Fluoride Soluble								
Fluoride (F) - Soluble	0.2		0.1	mg/L		10-AUG-06	LDE	R429030
Hardness (as CaCO3)	8.9		0.2	mg/L		10-AUG-06		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	0.007		0.005	mg/L		08-AUG-06	LDE	R428305
Routine Metals								
Calcium (Ca)-Extractable	2.03		0.05	mg/L		10-AUG-06	DAG	R428922
Potassium (K)-Extractable	0.32		0.05	mg/L		10-AUG-06	DAG	R428922
Magnesium (Mg)-Extractable	0.93		0.01	mg/L		10-AUG-06	DAG	R428922
Sodium (Na)-Extractable	1.51		0.02	mg/L		10-AUG-06	DAG	R428922
Iron (Fe)-Extractable	<0.01		0.01	mg/L		10-AUG-06	DAG	R428922
Manganese (Mn)-Extractable	0.0043		0.0002	mg/L		10-AUG-06	DAG	R428922
Sulphate Soluble								
Sulphate (SO4) - Soluble	<9		9	mg/L		10-AUG-06	LDE	R429030
TDS (Calculated)	10		5	mg/L		10-AUG-06		
Turbidity								
Turbidity	0.45		0.05	NTU		08-AUG-06	SXB	R428272
pH								
PH	7.30		0.01	pH units		08-AUG-06	SXB	R428269
Total Coliform and E. Coli by MColi Blue								

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L419171-2	BL-7								
Sampled By: CS/JU on 03-AUG-06 @ 11:15									
Matrix: GRAB WATER									
Total Coliform and E. Coli by MColi Blue									
Escherichia Coli mcoli blue MF									
E. Coli		<1		1	CFU/100mL	08-AUG-06	09-AUG-06	RCV	R428579
Total Coliform mcoli blue MF									
Total Coliforms		2		1	CFU/100mL	08-AUG-06	09-AUG-06	RCV	R428579
L419171-3	BL-8								
Sampled By: CS/JU on 03-AUG-06 @ 11:30									
Matrix: GRAB WATER									
Metal scan, total with ultras									
Aluminum (Al)-Total		0.043		0.005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cadmium (Cd)-Total		<0.00002		0.00002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Iron (Fe)-Total		0.04		0.02	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Mercury (Hg)-Total		<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Metal scan									
Arsenic (As)-Total		<0.0005		0.0005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Boron (B)-Total		<0.03		0.03	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Barium (Ba)-Total		0.0168		0.0003	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Beryllium (Be)-Total		<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Bismuth (Bi)-Total		<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Calcium (Ca)-Total		2.2		0.1	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cobalt (Co)-Total		0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Chromium (Cr)-Total		<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cesium (Cs)-Total		<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Copper (Cu)-Total		<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Potassium (K)-Total		0.4		0.1	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Magnesium (Mg)-Total		1.01		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Manganese (Mn)-Total		0.0047		0.0003	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Molybdenum (Mo)-Total		<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Sodium (Na)-Total		1.44		0.03	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Nickel (Ni)-Total		<0.002		0.002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Phosphorus (P)-Total		<0.05	RAMB	0.05	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Lead (Pb)-Total		<0.0005		0.0005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Rubidium (Rb)-Total		0.0008		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Antimony (Sb)-Total		<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Selenium (Se)-Total		<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tin (Sn)-Total		<0.0006		0.0006	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Strontium (Sr)-Total		0.0164		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tellurium (Te)-Total		<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Titanium (Ti)-Total		<0.0009		0.0009	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Thallium (Tl)-Total		<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Uranium (U)-Total		<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Vanadium (V)-Total		<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tungsten (W)-Total		<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zinc (Zn)-Total		<0.01		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zirconium (Zr)-Total		<0.0004		0.0004	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Silver (Ag)-Total		<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zinc (Zn)-Total		<0.01		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Oxygen, Dissolved		11.9		0.1	mg/L		10-AUG-06	LJH	R428757
Total Dissolved Solids		14		5	mg/L		10-AUG-06	CXZ	R429027
Total Suspended Solids		<5		5	mg/L		10-AUG-06	CXZ	R429027
ROU4W Extractable									

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Sample Details/Parameters		Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L419171-3 BL-8									
Sampled By: CS/JU on 03-AUG-06 @ 11:30									
Matrix: GRAB WATER									
ROU4W Extractable									
Alkalinity									
Alkalinity, Total (as CaCO ₃)		9		1	mg/L		09-AUG-06	SXB	R428766
Bicarbonate (HCO ₃)		11		2	mg/L		09-AUG-06	SXB	R428766
Carbonate (CO ₃)		<0.6		0.6	mg/L		09-AUG-06	SXB	R428766
Hydroxide (OH)		<0.4		0.4	mg/L		09-AUG-06	SXB	R428766
Chloride Soluble									
Chloride (Cl) - Soluble		<9		9	mg/L		10-AUG-06	LDE	R429030
Conductivity									
Conductivity		30.7		0.4	umhos/cm		08-AUG-06	SXB	R428269
Fluoride Soluble									
Fluoride (F) - Soluble		0.2		0.1	mg/L		10-AUG-06	LDE	R429030
Hardness (as CaCO ₃)		8.7		0.2	mg/L		10-AUG-06		
Nitrate + Nitrite Soluble									
Nitrate+Nitrite-N - Soluble		0.007		0.005	mg/L		08-AUG-06	LDE	R428305
Routine Metals									
Calcium (Ca)-Extractable		1.98		0.05	mg/L		10-AUG-06	DAG	R428922
Potassium (K)-Extractable		0.32		0.05	mg/L		10-AUG-06	DAG	R428922
Magnesium (Mg)-Extractable		0.91		0.01	mg/L		10-AUG-06	DAG	R428922
Sodium (Na)-Extractable		1.30		0.02	mg/L		10-AUG-06	DAG	R428922
Iron (Fe)-Extractable		<0.01		0.01	mg/L		10-AUG-06	DAG	R428922
Manganese (Mn)-Extractable		0.0044		0.0002	mg/L		10-AUG-06	DAG	R428922
Sulphate Soluble									
Sulphate (SO ₄) - Soluble		<9		9	mg/L		10-AUG-06	LDE	R429030
TDS (Calculated)		10		5	mg/L		10-AUG-06		
Turbidity									
Turbidity		0.40		0.05	NTU		08-AUG-06	SXB	R428272
pH									
PH		7.25		0.01	pH units		08-AUG-06	SXB	R428269
Total Coliform and E. Coli by MColi Blue									
Escherichia Coli mcoli blue MF									
E. Coli		<1		1	CFU/100mL	08-AUG-06	09-AUG-06	RCV	R428579
Total Coliform mcoli blue MF									
Total Coliforms		2		1	CFU/100mL	08-AUG-06	09-AUG-06	RCV	R428579
L419171-4 BL-9									
Sampled By: CS/JU on 03-AUG-06 @ 14:40									
Matrix: GRAB WATER									
Metal scan, total with ultras									
Aluminum (Al)-Total		0.031		0.005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cadmium (Cd)-Total		<0.00002		0.00002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Iron (Fe)-Total		0.05		0.02	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Mercury (Hg)-Total		<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Metal scan									
Arsenic (As)-Total		<0.0005		0.0005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Boron (B)-Total		<0.03		0.03	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Barium (Ba)-Total		0.0168		0.0003	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Beryllium (Be)-Total		<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Bismuth (Bi)-Total		<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Calcium (Ca)-Total		2.2		0.1	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cobalt (Co)-Total		0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Chromium (Cr)-Total		<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cesium (Cs)-Total		<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414

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Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L419171-4 BL-9								
Sampled By: CS/JU on 03-AUG-06 @ 14:40								
Matrix: GRAB WATER								
Metal scan, total with ultras								
Metal scan								
Copper (Cu)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Potassium (K)-Total	0.4		0.1	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Magnesium (Mg)-Total	0.95		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Manganese (Mn)-Total	0.0048		0.0003	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Sodium (Na)-Total	0.92		0.03	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Nickel (Ni)-Total	<0.002		0.002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Phosphorus (P)-Total	0.05	RAMB	0.05	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Lead (Pb)-Total	<0.0005		0.0005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Rubidium (Rb)-Total	0.0008		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Antimony (Sb)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Selenium (Se)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tin (Sn)-Total	<0.0006		0.0006	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Strontium (Sr)-Total	0.0149		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tellurium (Te)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Titanium (Ti)-Total	<0.0009		0.0009	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Uranium (U)-Total	<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Vanadium (V)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tungsten (W)-Total	<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zinc (Zn)-Total	<0.01		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zirconium (Zr)-Total	<0.0004		0.0004	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Silver (Ag)-Total	<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zinc (Zn)-Total	<0.01		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Oxygen, Dissolved	11.5		0.1	mg/L		10-AUG-06	LJH	R428757
Total Dissolved Solids	14		5	mg/L		10-AUG-06	CXZ	R429027
Total Suspended Solids	<5		5	mg/L		10-AUG-06	CXZ	R429027
ROU4W Extractable								
Alkalinity								
Alkalinity, Total (as CaCO3)	9		1	mg/L		09-AUG-06	SXB	R428766
Bicarbonate (HCO3)	11		2	mg/L		09-AUG-06	SXB	R428766
Carbonate (CO3)	<0.6		0.6	mg/L		09-AUG-06	SXB	R428766
Hydroxide (OH)	<0.4		0.4	mg/L		09-AUG-06	SXB	R428766
Chloride Soluble								
Chloride (Cl) - Soluble	<9		9	mg/L		10-AUG-06	LDE	R429030
Conductivity								
Conductivity	26.8		0.4	umhos/cm		08-AUG-06	SXB	R428269
Fluoride Soluble								
Fluoride (F) - Soluble	0.2		0.1	mg/L		10-AUG-06	LDE	R429030
Hardness (as CaCO3)	8.5		0.2	mg/L		10-AUG-06		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	0.010		0.005	mg/L		08-AUG-06	LDE	R428305
Routine Metals								
Calcium (Ca)-Extractable	2.00		0.05	mg/L		10-AUG-06	DAG	R428922
Potassium (K)-Extractable	0.32		0.05	mg/L		10-AUG-06	DAG	R428922
Magnesium (Mg)-Extractable	0.86		0.01	mg/L		10-AUG-06	DAG	R428922
Sodium (Na)-Extractable	0.85		0.02	mg/L		10-AUG-06	DAG	R428922
Iron (Fe)-Extractable	<0.01		0.01	mg/L		10-AUG-06	DAG	R428922
Manganese (Mn)-Extractable	0.0038		0.0002	mg/L		10-AUG-06	DAG	R428922
Sulphate Soluble								

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L419171-4 BL-9								
Sampled By: CS/JU on 03-AUG-06 @ 14:40								
Matrix: GRAB WATER								
ROU4W Extractable								
Sulphate Soluble								
Sulphate (SO4) - Soluble	<9		9	mg/L		10-AUG-06	LDE	R429030
TDS (Calculated)	10		5	mg/L		10-AUG-06		
Turbidity								
Turbidity	0.40		0.05	NTU		08-AUG-06	SXB	R428272
pH								
PH	7.27		0.01	pH units		08-AUG-06	SXB	R428269
Total Coliform and E. Coli by MColi Blue								
Escherichia Coli mcoli blue MF								
E. Coli	<1		1	CFU/100mL	08-AUG-06	09-AUG-06	RCV	R428579
Total Coliform mcoli blue MF								
Total Coliforms	2		1	CFU/100mL	08-AUG-06	09-AUG-06	RCV	R428579
L419171-5 BL-10								
Sampled By: CS/JU on 03-AUG-06 @ 15:45								
Matrix: GRAB WATER								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.028		0.005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cadmium (Cd)-Total	<0.00002		0.00002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Iron (Fe)-Total	0.04		0.02	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Metal scan								
Arsenic (As)-Total	<0.0005		0.0005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Boron (B)-Total	<0.03		0.03	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Barium (Ba)-Total	0.0176		0.0003	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Beryllium (Be)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Calcium (Ca)-Total	2.3		0.1	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cobalt (Co)-Total	0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Chromium (Cr)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Copper (Cu)-Total	0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Potassium (K)-Total	0.5		0.1	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Magnesium (Mg)-Total	1.09		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Manganese (Mn)-Total	0.0052		0.0003	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Sodium (Na)-Total	1.92		0.03	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Nickel (Ni)-Total	<0.002		0.002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Phosphorus (P)-Total	<0.05	RAMB	0.05	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Lead (Pb)-Total	<0.0005		0.0005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Rubidium (Rb)-Total	0.0008		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Antimony (Sb)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Selenium (Se)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tin (Sn)-Total	<0.0006		0.0006	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Strontium (Sr)-Total	0.0164		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tellurium (Te)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Titanium (Ti)-Total	<0.0009		0.0009	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Uranium (U)-Total	<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Vanadium (V)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tungsten (W)-Total	<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zinc (Zn)-Total	<0.01		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414

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Sample Details/Parameters		Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L419171-5 BL-10									
Sampled By: CS/JU on 03-AUG-06 @ 15:45									
Matrix: GRAB WATER									
Metal scan, total with ultras									
Metal scan									
Zirconium (Zr)-Total		<0.0004		0.0004	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Silver (Ag)-Total		<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zinc (Zn)-Total		<0.01		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Oxygen, Dissolved		11.8		0.1	mg/L		10-AUG-06	LJH	R428757
Total Dissolved Solids		16		5	mg/L		10-AUG-06	CXZ	R429027
Total Suspended Solids		<5		5	mg/L		10-AUG-06	CXZ	R429027
ROU4W Extractable									
Alkalinity									
Alkalinity, Total (as CaCO3)		9		1	mg/L		09-AUG-06	SXB	R428766
Bicarbonate (HCO3)		11		2	mg/L		09-AUG-06	SXB	R428766
Carbonate (CO3)		<0.6		0.6	mg/L		09-AUG-06	SXB	R428766
Hydroxide (OH)		<0.4		0.4	mg/L		09-AUG-06	SXB	R428766
Chloride Soluble									
Chloride (Cl) - Soluble		<9		9	mg/L		10-AUG-06	LDE	R429030
Conductivity									
Conductivity		34.1		0.4	umhos/cm		08-AUG-06	SXB	R428269
Fluoride Soluble									
Fluoride (F) - Soluble		0.2		0.1	mg/L		10-AUG-06	LDE	R429030
Hardness (as CaCO3)		9.3		0.2	mg/L		10-AUG-06		
Nitrate + Nitrite Soluble									
Nitrate+Nitrite-N - Soluble		0.007		0.005	mg/L		08-AUG-06	LDE	R428305
Routine Metals									
Calcium (Ca)-Extractable		2.11		0.05	mg/L		10-AUG-06	DAG	R428922
Potassium (K)-Extractable		0.37		0.05	mg/L		10-AUG-06	DAG	R428922
Magnesium (Mg)-Extractable		0.99		0.01	mg/L		10-AUG-06	DAG	R428922
Sodium (Na)-Extractable		1.76		0.02	mg/L		10-AUG-06	DAG	R428922
Iron (Fe)-Extractable		<0.01		0.01	mg/L		10-AUG-06	DAG	R428922
Manganese (Mn)-Extractable		0.0046		0.0002	mg/L		10-AUG-06	DAG	R428922
Sulphate Soluble									
Sulphate (SO4) - Soluble		<9		9	mg/L		10-AUG-06	LDE	R429030
TDS (Calculated)		11		5	mg/L		10-AUG-06		
Turbidity									
Turbidity		0.40		0.05	NTU		08-AUG-06	SXB	R428272
pH									
PH		7.26		0.01	pH units		08-AUG-06	SXB	R428269
Total Coliform and E. Coli by MColi Blue									
Escherichia Coli mcoli blue MF									
E. Coli		<1		1	CFU/100mL	08-AUG-06	09-AUG-06	RCV	R428579
Total Coliform mcoli blue MF									
Total Coliforms		2		1	CFU/100mL	08-AUG-06	09-AUG-06	RCV	R428579
L419171-6 BL-11									
Sampled By: CS/JU on 03-AUG-06 @ 11:50									
Matrix: GRAB WATER									
Metal scan, total with ultras									
Aluminum (Al)-Total		0.031		0.005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cadmium (Cd)-Total		<0.00002		0.00002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Iron (Fe)-Total		0.04		0.02	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Mercury (Hg)-Total		<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Metal scan									

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Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L419171-6 BL-11									
Sampled By: CS/JU on 03-AUG-06 @ 11:50									
Matrix: GRAB WATER									
Metal scan, total with ultras									
Metal scan									
Arsenic (As)-Total		<0.0005		0.0005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Boron (B)-Total		<0.03		0.03	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Barium (Ba)-Total		0.0171		0.0003	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Beryllium (Be)-Total		<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Bismuth (Bi)-Total		<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Calcium (Ca)-Total		2.2		0.1	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cobalt (Co)-Total		0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Chromium (Cr)-Total		<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cesium (Cs)-Total		<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Copper (Cu)-Total		<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Potassium (K)-Total		0.4		0.1	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Magnesium (Mg)-Total		1.00		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Manganese (Mn)-Total		0.0047		0.0003	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Molybdenum (Mo)-Total		<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Sodium (Na)-Total		1.45		0.03	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Nickel (Ni)-Total		<0.002		0.002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Phosphorus (P)-Total		<0.05	RAMB	0.05	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Lead (Pb)-Total		<0.0005		0.0005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Rubidium (Rb)-Total		0.0008		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Antimony (Sb)-Total		<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Selenium (Se)-Total		<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tin (Sn)-Total		<0.0006		0.0006	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Strontium (Sr)-Total		0.0157		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tellurium (Te)-Total		<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Titanium (Ti)-Total		<0.0009		0.0009	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Thallium (Tl)-Total		<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Uranium (U)-Total		<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Vanadium (V)-Total		<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tungsten (W)-Total		<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zinc (Zn)-Total		<0.01		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zirconium (Zr)-Total		<0.0004		0.0004	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Silver (Ag)-Total		<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zinc (Zn)-Total		<0.01		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Oxygen, Dissolved		11.9		0.1	mg/L		10-AUG-06	LJH	R428757
Total Dissolved Solids		14		5	mg/L		10-AUG-06	CXZ	R429027
Total Suspended Solids		<5		5	mg/L		10-AUG-06	CXZ	R429027
ROU4W Extractable									
Alkalinity									
Alkalinity, Total (as CaCO3)		9		1	mg/L		09-AUG-06	SXB	R428766
Bicarbonate (HCO3)		12		2	mg/L		09-AUG-06	SXB	R428766
Carbonate (CO3)		<0.6		0.6	mg/L		09-AUG-06	SXB	R428766
Hydroxide (OH)		<0.4		0.4	mg/L		09-AUG-06	SXB	R428766
Chloride Soluble									
Chloride (Cl) - Soluble		<9		9	mg/L		10-AUG-06	LDE	R429030
Conductivity									
Conductivity		30.8		0.4	umhos/cm		08-AUG-06	SXB	R428269
Fluoride Soluble									
Fluoride (F) - Soluble		0.2		0.1	mg/L		10-AUG-06	LDE	R429030
Hardness (as CaCO3)		9.1		0.2	mg/L		10-AUG-06		

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Sample Details/Parameters		Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L419171-6	BL-11								
Sampled By: CS/JU on 03-AUG-06 @ 11:50									
Matrix: GRAB WATER									
ROU4W Extractable									
Nitrate + Nitrite Soluble									
Nitrate+Nitrite-N - Soluble		0.006		0.005	mg/L		08-AUG-06	LDE	R428305
Routine Metals									
Calcium (Ca)-Extractable		2.08		0.05	mg/L		10-AUG-06	DAG	R428922
Potassium (K)-Extractable		0.36		0.05	mg/L		10-AUG-06	DAG	R428922
Magnesium (Mg)-Extractable		0.95		0.01	mg/L		10-AUG-06	DAG	R428922
Sodium (Na)-Extractable		1.37		0.02	mg/L		10-AUG-06	DAG	R428922
Iron (Fe)-Extractable		<0.01		0.01	mg/L		10-AUG-06	DAG	R428922
Manganese (Mn)-Extractable		0.0045		0.0002	mg/L		10-AUG-06	DAG	R428922
Sulphate Soluble									
Sulphate (SO4) - Soluble		<9		9	mg/L		10-AUG-06	LDE	R429030
TDS (Calculated)		10		5	mg/L		10-AUG-06		
Turbidity									
Turbidity		0.40		0.05	NTU		08-AUG-06	SXB	R428272
pH									
PH		7.26		0.01	pH units		08-AUG-06	SXB	R428269
Total Coliform and E. Coli by MColi Blue									
Escherichia Coli mcoli blue MF									
E. Coli		<1		1	CFU/100mL	08-AUG-06	09-AUG-06	RCV	R428579
Total Coliform mcoli blue MF									
Total Coliforms		4		1	CFU/100mL	08-AUG-06	09-AUG-06	RCV	R428579
L419171-7	BL-6-3M								
Sampled By: CS/JU on 03-AUG-06 @ 10:00									
Matrix: GRAB WATER									
Metal scan, total with ultras									
Aluminum (Al)-Total		0.029		0.005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cadmium (Cd)-Total		0.00074		0.00002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Iron (Fe)-Total		0.13		0.02	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Mercury (Hg)-Total		0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Metal scan									
Arsenic (As)-Total		0.0010		0.0005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Boron (B)-Total		<0.03		0.03	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Barium (Ba)-Total		0.0174		0.0003	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Beryllium (Be)-Total		<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Bismuth (Bi)-Total		0.0010		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Calcium (Ca)-Total		3.2		0.1	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cobalt (Co)-Total		0.0011		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Chromium (Cr)-Total		0.010		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cesium (Cs)-Total		0.0008		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Copper (Cu)-Total		0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Potassium (K)-Total		1.1		0.1	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Magnesium (Mg)-Total		3.16		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Manganese (Mn)-Total		0.0144		0.0003	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Molybdenum (Mo)-Total		0.0011		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Sodium (Na)-Total		18.0		0.03	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Nickel (Ni)-Total		<0.002		0.002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Phosphorus (P)-Total		<0.05		0.05	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Lead (Pb)-Total		0.0009	RAMB	0.0005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Rubidium (Rb)-Total		0.0018		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Antimony (Sb)-Total		0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Selenium (Se)-Total		0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L419171-7	BL-6-3M								
Sampled By: CS/JU on 03-AUG-06 @ 10:00									
Matrix: GRAB WATER									
Metal scan, total with ultras									
Metal scan									
Tin (Sn)-Total		0.0028		0.0006	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Strontium (Sr)-Total		0.0285		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tellurium (Te)-Total		0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Titanium (Ti)-Total		0.0012		0.0009	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Thallium (Tl)-Total		0.0009		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Uranium (U)-Total		0.0008		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Vanadium (V)-Total		<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tungsten (W)-Total		0.0011		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zinc (Zn)-Total		0.01		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zirconium (Zr)-Total		0.0010		0.0004	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Silver (Ag)-Total		0.0007		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zinc (Zn)-Total		0.01		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Oxygen, Dissolved		13.2		0.1	mg/L		10-AUG-06	LJH	R428757
Total Dissolved Solids		68		5	mg/L		10-AUG-06	CXZ	R429027
Total Suspended Solids		<5		5	mg/L		10-AUG-06	CXZ	R429027
ROU4W Extractable									
Alkalinity									
Alkalinity, Total (as CaCO3)		10		1	mg/L		09-AUG-06	SXB	R428766
Bicarbonate (HCO3)		12		2	mg/L		09-AUG-06	SXB	R428766
Carbonate (CO3)		<0.6		0.6	mg/L		09-AUG-06	SXB	R428766
Hydroxide (OH)		<0.4		0.4	mg/L		09-AUG-06	SXB	R428766
Chloride Soluble									
Chloride (Cl) - Soluble		32		9	mg/L		10-AUG-06	LDE	R429030
Conductivity									
Conductivity		144		0.4	umhos/cm		08-AUG-06	SXB	R428269
Fluoride Soluble									
Fluoride (F) - Soluble		0.2		0.1	mg/L		10-AUG-06	LDE	R429030
Hardness (as CaCO3)		18.1		0.2	mg/L		10-AUG-06		
Nitrate + Nitrite Soluble									
Nitrate+Nitrite-N - Soluble		0.029		0.005	mg/L		08-AUG-06	LDE	R428305
Routine Metals									
Calcium (Ca)-Extractable		2.75		0.05	mg/L		10-AUG-06	DAG	R428922
Potassium (K)-Extractable		1.02		0.05	mg/L		10-AUG-06	DAG	R428922
Magnesium (Mg)-Extractable		2.74		0.01	mg/L		10-AUG-06	DAG	R428922
Sodium (Na)-Extractable		16.0		0.02	mg/L		10-AUG-06	DAG	R428922
Iron (Fe)-Extractable		<0.01		0.01	mg/L		10-AUG-06	DAG	R428922
Manganese (Mn)-Extractable		0.0125		0.0002	mg/L		10-AUG-06	DAG	R428922
Sulphate Soluble									
Sulphate (SO4) - Soluble		<9		9	mg/L		10-AUG-06	LDE	R429030
TDS (Calculated)		60		5	mg/L		10-AUG-06		
Turbidity									
Turbidity		0.35		0.05	NTU		08-AUG-06	SXB	R428272
pH									
PH		7.20		0.01	pH units		08-AUG-06	SXB	R428269
Total Coliform and E. Coli by MColi Blue									
Escherichia Coli mcoli blue MF									
E. Coli		<1		1	CFU/100mL	08-AUG-06	09-AUG-06	RCV	R428579
Total Coliform mcoli blue MF									
Total Coliforms		<1		1	CFU/100mL	08-AUG-06	09-AUG-06	RCV	R428579

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L419171-8 BL-6-5 M								
Sampled By: CS/JU on 03-AUG-06 @ 10:15								
Matrix: GRAB WATER								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.026		0.005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cadmium (Cd)-Total	<0.00002		0.00002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Iron (Fe)-Total	0.04		0.02	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Metal scan								
Arsenic (As)-Total	<0.0005		0.0005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Boron (B)-Total	<0.03		0.03	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Barium (Ba)-Total	0.0166		0.0003	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Beryllium (Be)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Calcium (Ca)-Total	3.3		0.1	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cobalt (Co)-Total	<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Chromium (Cr)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Copper (Cu)-Total	0.002		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Potassium (K)-Total	1.0		0.1	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Magnesium (Mg)-Total	3.02		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Manganese (Mn)-Total	0.0122		0.0003	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Sodium (Na)-Total	17.8		0.03	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Nickel (Ni)-Total	<0.002		0.002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Phosphorus (P)-Total	<0.05	RAMB	0.05	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Lead (Pb)-Total	<0.0005		0.0005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Rubidium (Rb)-Total	0.0010		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Antimony (Sb)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Selenium (Se)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tin (Sn)-Total	<0.0006		0.0006	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Strontium (Sr)-Total	0.0263		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tellurium (Te)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Titanium (Ti)-Total	<0.0009		0.0009	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Uranium (U)-Total	<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Vanadium (V)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tungsten (W)-Total	0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zinc (Zn)-Total	0.03		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zirconium (Zr)-Total	<0.0004		0.0004	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Silver (Ag)-Total	<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zinc (Zn)-Total	0.03		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Oxygen, Dissolved	13.0		0.1	mg/L		10-AUG-06	LJH	R428757
Total Dissolved Solids	72		5	mg/L		10-AUG-06	CXZ	R429027
Total Suspended Solids	<5		5	mg/L		10-AUG-06	CXZ	R429027
ROU4W Extractable								
Alkalinity								
Alkalinity, Total (as CaCO3)	10		1	mg/L		09-AUG-06	SXB	R428766
Bicarbonate (HCO3)	12		2	mg/L		09-AUG-06	SXB	R428766
Carbonate (CO3)	<0.6		0.6	mg/L		09-AUG-06	SXB	R428766
Hydroxide (OH)	<0.4		0.4	mg/L		09-AUG-06	SXB	R428766
Chloride Soluble								
Chloride (Cl) - Soluble	32		9	mg/L		10-AUG-06	LDE	R429030
Conductivity								

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L419171-8	BL-6-5 M								
Sampled By:	CS/JU on 03-AUG-06 @ 10:15								
Matrix:	GRAB WATER								
ROU4W Extractable									
Conductivity									
Conductivity		144		0.4	umhos/cm		08-AUG-06	SXB	R428268
Fluoride Soluble									
Fluoride (F) - Soluble		0.2		0.1	mg/L		10-AUG-06	LDE	R429030
Hardness (as CaCO3)		18.3		0.2	mg/L		10-AUG-06		
Nitrate + Nitrite Soluble									
Nitrate+Nitrite-N - Soluble		0.028		0.005	mg/L		08-AUG-06	LDE	R428305
Routine Metals									
Calcium (Ca)-Extractable		2.84		0.05	mg/L		10-AUG-06	DAG	R428922
Potassium (K)-Extractable		1.03		0.05	mg/L		10-AUG-06	DAG	R428922
Magnesium (Mg)-Extractable		2.72		0.01	mg/L		10-AUG-06	DAG	R428922
Sodium (Na)-Extractable		15.9		0.02	mg/L		10-AUG-06	DAG	R428922
Iron (Fe)-Extractable		<0.01		0.01	mg/L		10-AUG-06	DAG	R428922
Manganese (Mn)-Extractable		0.0109		0.0002	mg/L		10-AUG-06	DAG	R428922
Sulphate Soluble									
Sulphate (SO4) - Soluble		<9		9	mg/L		10-AUG-06	LDE	R429030
TDS (Calculated)		60		5	mg/L		10-AUG-06		
Turbidity									
Turbidity		0.40		0.05	NTU		08-AUG-06	SXB	R428272
pH									
PH		7.19		0.01	pH units		08-AUG-06	SXB	R428269
Total Coliform and E. Coli by MColi Blue									
Escherichia Coli mcoli blue MF									
E. Coli		<1		1	CFU/100mL	08-AUG-06	09-AUG-06	RCV	R428579
Total Coliform mcoli blue MF									
Total Coliforms		<1		1	CFU/100mL	08-AUG-06	09-AUG-06	RCV	R428579
L419171-9	BL-6-P								
Sampled By:	CS/JU on 03-AUG-06 @ 10:15								
Matrix:	GRAB WATER								
Crypto and Giardia									
Cryptosporidium									
Cryptosporidium		0		0	oocyst/10L		14-AUG-06	ODY	R430178
Cryptosporidium Volume Filtered		10		0	L		08-AUG-06	ODY	R430118
Viable oocysts		0					14-AUG-06	ODY	R430178
Nonviable Crypto		0					14-AUG-06	ODY	R430178
Amorphous Crypto		0					14-AUG-06	ODY	R430178
Pellet Volume Crypto		0.5 mL					14-AUG-06	ODY	R430178
Giardia									
Giardia		0		0	cysts/10 L		14-AUG-06	ODY	R430178
Giardia Volume Filtered		10		0	L		08-AUG-06	ODY	R430118
Viable cysts		0.0					14-AUG-06	ODY	R430178
Nonviable Giardia		0.0					14-AUG-06	ODY	R430178
Amorphous Giardia		0.0					14-AUG-06	ODY	R430178
Pellet Volume Giardia		0.5 mL					14-AUG-06	ODY	R430178
L419171-10	TRAVEL BLANK								
Sampled By:	CS/JU on 03-AUG-06 @ 10:15								
Matrix:	GRAB WATER								
Metal scan, total with ultras									
Aluminum (Al)-Total		0.008		0.005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cadmium (Cd)-Total		<0.00002		0.00002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L419171-10 TRAVEL BLANK								
Sampled By: CS/JU on 03-AUG-06 @ 10:15								
Matrix: GRAB WATER								
Metal scan, total with ultras								
Iron (Fe)-Total	<0.02		0.02	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Metal scan								
Arsenic (As)-Total	<0.0005		0.0005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Boron (B)-Total	<0.03		0.03	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Barium (Ba)-Total	<0.0003		0.0003	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Beryllium (Be)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Calcium (Ca)-Total	<0.1		0.1	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cobalt (Co)-Total	<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Chromium (Cr)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Copper (Cu)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Potassium (K)-Total	<0.1		0.1	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Magnesium (Mg)-Total	<0.01		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Manganese (Mn)-Total	<0.0003		0.0003	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Sodium (Na)-Total	<0.03		0.03	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Nickel (Ni)-Total	<0.002		0.002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Phosphorus (P)-Total	<0.05	RAMB	0.05	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Lead (Pb)-Total	<0.0005		0.0005	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Rubidium (Rb)-Total	<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Antimony (Sb)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Selenium (Se)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tin (Sn)-Total	<0.0006		0.0006	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Strontium (Sr)-Total	<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tellurium (Te)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Titanium (Ti)-Total	<0.0009		0.0009	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Uranium (U)-Total	<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Vanadium (V)-Total	<0.001		0.001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Tungsten (W)-Total	<0.0002		0.0002	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zinc (Zn)-Total	<0.01		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zirconium (Zr)-Total	<0.0004		0.0004	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Silver (Ag)-Total	<0.0001		0.0001	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Zinc (Zn)-Total	<0.01		0.01	mg/L	21-AUG-06	22-AUG-06	DAG	R433414
Phenols (4AAP)	<0.001		0.001	mg/L		10-AUG-06	MRR	R429053
Total Dissolved Solids	<5		5	mg/L		10-AUG-06	CXZ	R429027
Total Suspended Solids	<5		5	mg/L		10-AUG-06	CXZ	R429027
ROU4W Extractable								
Alkalinity								
Alkalinity, Total (as CaCO3)	2		1	mg/L		09-AUG-06	SXB	R428766
Bicarbonate (HCO3)	2		2	mg/L		09-AUG-06	SXB	R428766
Carbonate (CO3)	<0.6		0.6	mg/L		09-AUG-06	SXB	R428766
Hydroxide (OH)	<0.4		0.4	mg/L		09-AUG-06	SXB	R428766
Chloride Soluble								
Chloride (Cl) - Soluble	<9		9	mg/L		10-AUG-06	LDE	R429030
Conductivity								
Conductivity	<0.4		0.4	umhos/cm		09-AUG-06	SXB	R428768
Fluoride Soluble								

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L419171-10 TRAVEL BLANK									
Sampled By: CS/JU on 03-AUG-06 @ 10:15									
Matrix: GRAB WATER									
ROU4W Extractable									
Fluoride Soluble									
Fluoride (F) - Soluble		<0.1		0.1	mg/L		10-AUG-06	LDE	R429030
Hardness (as CaCO3)		<0.2		0.2	mg/L		10-AUG-06		
Nitrate + Nitrite Soluble									
Nitrate+Nitrite-N - Soluble		<0.005		0.005	mg/L		08-AUG-06	LDE	R428305
Routine Metals									
Calcium (Ca)-Extractable		<0.05		0.05	mg/L		10-AUG-06	DAG	R428922
Potassium (K)-Extractable		<0.05		0.05	mg/L		10-AUG-06	DAG	R428922
Magnesium (Mg)-Extractable		<0.01		0.01	mg/L		10-AUG-06	DAG	R428922
Sodium (Na)-Extractable		<0.02		0.02	mg/L		10-AUG-06	DAG	R428922
Iron (Fe)-Extractable		<0.01		0.01	mg/L		10-AUG-06	DAG	R428922
Manganese (Mn)-Extractable		<0.0002		0.0002	mg/L		10-AUG-06	DAG	R428922
Sulphate Soluble									
Sulphate (SO4) - Soluble		<9		9	mg/L		10-AUG-06	LDE	R429030
TDS (Calculated)		<5		5	mg/L		10-AUG-06		
Turbidity									
Turbidity		0.050		0.05	NTU		08-AUG-06	SXB	R428272
pH									
PH		5.71		0.01	pH units		08-AUG-06	SXB	R428269
Total Coliform and E. Coli by MColi Blue									
Escherichia Coli mcoli blue MF									
E. Coli		<1		1	CFU/100mL	08-AUG-06	09-AUG-06	RCV	R428579
Total Coliform mcoli blue MF									
Total Coliforms		<1		1	CFU/100mL	08-AUG-06	09-AUG-06	RCV	R428579

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
RAMB	Result Adjusted For Method Blank

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
AG-TOT-ULTRA-WP	Water	Silver (Ag)-Total		EPA 200.8 Rev 5.4 May 1994
AL-TOT-ULTRA-WP	Water	Aluminum (Al)-Total		EPA 200.8 Rev 5.4 May 1994
ALK-TOT-WP	Water	Alkalinity		APHA 2320B

Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. It is determined by titration with a standard solution of strong mineral acid to the successive HCO₃⁻ and H₂CO₃ endpoints indicated electrometrically.

ALK-TOT-WP	Water	Alkalinity		APHA 4500B, 2510B, 2320B, 1998
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Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. It is determined by titration with a standard solution of strong mineral acid to the successive HCO₃⁻ and H₂CO₃ endpoints indicated electrometrically.

CD-TOT-ULTRA-WP	Water	Cadmium (Cd)-Total		EPA 200.8 Rev 5.4 May 1994
CL-SOL-WP	Water	Chloride Soluble		APHA4500/LACHAT

Chloride - Colourimetric using Mercuric Thiocyanate

CL-SOL-WP	Water	Chloride Soluble		APHA4500;1998/LACHAT;MAR 1997
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Chloride - Colourimetric using Mercuric Thiocyanate

CRYPTO-WP	Water	Cryptosporidium		EPA-821-R-01-025 Method 1623
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EC-MCOLIMF-WP	Water	Escherichia Coli mcoli blue MF		APHA 9222B and HACH #10029
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This procedure is applicable to E. coli analysis for water samples. It is also used for Total Coliform analysis when only one 100 mL samples is submitted for both Total Coliforms and E. coli. If two sample bottles are submitted for these analyses, E. coli analysis is performed by this procedure, and Total Coliform analysis can be performed by A151.

A suitable sample volume is poured through a membrane filter and placed in a petri dish prepared with m-Coli Blue 24 broth. The inverted plates are incubated at 35C +/- 0.5C for 24hrs. Coliforms that are not E. coli turn red because they reduce TTC (2,3,5 triphenyltetrazolium chloride) in the medium. E. coli turn blue due to the reaction between the enzyme beta glucuronidase and BCIG (5-bromo-4 chloro-3 indolyl-beta-D-glucuronide) in the medium.

EC-MCOLIMF-WP	Water	Escherichia Coli mcoli blue MF		APHA 9222B and HACH 10029
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This procedure is applicable to E. coli analysis for water samples. It is also used for Total Coliform analysis when only one 100 mL samples is submitted for both Total Coliforms and E. coli. If two sample bottles are submitted for these analyses, E. coli analysis is performed by this procedure, and Total Coliform analysis can be performed by A151.

A suitable sample volume is poured through a membrane filter and placed in a petri dish prepared with m-Coli Blue 24 broth. The inverted plates are incubated at 35C +/- 0.5C for 24hrs. Coliforms that are not E. coli turn red because they reduce TTC (2,3,5 triphenyltetrazolium chloride) in the medium. E. coli turn blue due to the reaction between the enzyme beta glucuronidase and BCIG (5-bromo-4 chloro-3 indolyl-beta-D-glucuronide) in the medium.

EC-WP	Water	Conductivity		APHA 2510B
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Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.

EC-WP	Water	Conductivity		APHA 4500B, 2510B, 2320B, 1998
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Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.

ETL-HARDNESS-EXT-WP	Water	Hardness Calculated		Calculated
F-SOL-WP	Water	Fluoride Soluble		APHA4500/LACHAT

Fluoride - Ion selective electrode

F-SOL-WP	Water	Fluoride Soluble		APHA4500;1998/LACHAT;MAR 1997
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Fluoride - Ion selective electrode

FE-TOT-ULTRA-WP	Water	Iron (Fe)-Total		EPA 200.8 Rev 5.4 May 1994
GIARDIA-WP	Water	Giardia		EPA-821-R-01-025 Method 1623

Reference Information

HG-TOT-ULTRA-WP	Water	Mercury (Hg)-Total	EPA 200.8 Rev 5.4 May 1994
IONBALANCE-OP05-WP	Water		APHA 1030E
MET-SCNOU-TOT-LOW-WP	Water	Metal scan	EPA 200.8 Rev 5.4 May 1994
MET2-EXT-LOW-WP	Water	Routine Metals	EPA 200.8 Rev 5.4 May 1994
N2N3-SOL-WP	Water	Nitrate + Nitrite Soluble	APHA4500;1998/LACHAT;MAR 1997
N2N3-SOL-WP	Water	Nitrate + Nitrite Soluble	APHA4500;2005/LACHAT;1997,1999
O2-DIS-WP	Water	Dissolved Oxygen	APHA 4500-O-C

Manganous sulphate reacts with potassium or sodium hydroxide to give a white precipitate of manganous hydroxide. In the presence of oxygen, brown manganic hydroxide is formed. Addition of sulfuric acid dissolves the manganic hydroxide, yielding manganic sulfate which reacts with iodide, releasing iodide in an amount equivalent to the original DO content. The iodide is then titrated with a standard solution of thiosulphate.

O2-DIS-WP	Water	Dissolved Oxygen	APHA 4500-O-C, 1998
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Manganous sulphate reacts with potassium or sodium hydroxide to give a white precipitate of manganous hydroxide. In the presence of oxygen, brown manganic hydroxide is formed. Addition of sulfuric acid dissolves the manganic hydroxide, yielding manganic sulfate which reacts with iodide, releasing iodide in an amount equivalent to the original DO content. The iodide is then titrated with a standard solution of thiosulphate.

PH-WP	Water	pH	APHA 4500B, 2510B, 2320B, 1998
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pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.

PH-WP	Water	pH	APHA 4500H
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pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.

PHENOLS-4AAP-TB	Water	Phenols (4AAP)	APHA 5530 B,D Colourimetry
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PHENOLS-4AAP-TB	Water	Phenols (4AAP)	APHA 5530 B,D-Colourimetry
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PHENOLS-4AAP-TB	Water	Phenols (4AAP)	APHA 5530 D-Colourimetry
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SO4-SOL-WP	Water	Sulphate Soluble	APHA4500/LACHAT
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Sulphate - Turbidimetric

SO4-SOL-WP	Water	Sulphate Soluble	APHA4500;1998/LACHAT;MAR 1997
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Sulphate - Turbidimetric

SOLIDS-TDS-WP	Water	Total Dissolved Solids	APHA 2540
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The residue remaining in a prepared casserole after passing the sample through a 1.2 um Whatman GF/C glass microfibre filter and drying at 180 degrees C. Samples may be dried at 105 degrees C if the client specifically requests this drying temperature.

SOLIDS-TOTSUS-WP	Water	Total Suspended Solids	APHA 2540
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The residue retained by a prepared 1.5 um Whatman 934-AH glass microfibre filter dried at 105 degrees C.

TC-MCOLIMF-WP	Water	Total Coliform mcoli blue MF	APHA 9222B and HACH 10029
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This procedure is applicable to E. coli analysis for water samples. It is also used for Total Coliform analysis when only one 100 mL samples is submitted for both Total Coliforms and E. coli. If two sample bottles are submitted for these analyses, E. coli analysis is performed by this procedure, and Total Coliform analysis is performed by A151.

A suitable sample volume is poured through a membrane filter and placed in a petri dish prepared with m-Coli Blue 24 broth. The inverted plates are incubated at 35C +/- 0.5C for 24hrs. Coliforms that are not E. coli turn red because they reduce TTC (2,3,5 triphenyltetrazolium chloride) in the medium. E. coli turn blue due to the reaction between the enzyme beta glucuronidase and BCIG (5-bromo-4-chloro-3-indolyl-beta-D-glucuronide) in the medium.

TC-MCOLIMF-WP	Water	Total Coliform mcoli blue MF	HACH METHOD #10029,REV 2
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This procedure is applicable to E. coli analysis for water samples. It is also used for Total Coliform analysis when only one 100 mL samples is submitted for both Total Coliforms and E. coli. If two sample bottles are submitted for these analyses, E. coli analysis is performed by this procedure, and Total Coliform analysis is performed by A151.

A suitable sample volume is poured through a membrane filter and placed in a petri dish prepared with m-Coli Blue 24 broth. The inverted plates are

Enviro-Test MFC

Maritima Technology Centre Ltd.

1st Logan Avenue, Woodbridge, Ontario, Canada
 905-866-6700
 1st Floor, 1st Floor, 1st Floor
 1st Floor, 1st Floor, 1st Floor
 1st Floor, 1st Floor, 1st Floor

DATE SUBMITTED: Aug 21/06 ENTERED: ASAO

CHAIN OF CUSTODY ANALYTICAL REQUEST FORM

Telephone: (905) 866-6700 Fax: (905) 866-6700
 E-mail: info@envirotestmfc.com Web: www.envirotestmfc.com
 1st Floor, 1st Floor, 1st Floor
 1st Floor, 1st Floor, 1st Floor

PREPARED BY: ASAO
 DATE: Aug 21/06
 TIME: 10:30

SAMPLE	ANALYST	DATE	TIME	TYPE	STATUS	REMARKS
BU-S	CS/SA	Aug 21/06	10:30	Grab	PRESENT	INITIAL
(oil + grease)						

NOTES & CONDITIONS:

1. Sample number must be provided to ensure proper pricing.

2. All hazardous samples submitted must be labeled to comply with WHMIS regulations. The materials must be labeled with the name of the material, as well as a contact name and phone number. The label must remain on the container until the material is properly disposed.

3. ETL's liability is limited to cost of analysis.

NOTE: Failure to properly complete all portions of this form may delay analysis.

RECEIVED BY: AS DATE: Aug 21/06 TIME: 10:30

RECEIVED BY: AS DATE: Aug 21/06 TIME: 10:30

RECEIVED BY: AS DATE: Aug 21/06 TIME: 10:30

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RECEIVED BY: AS DATE: Aug 21/06 TIME: 10:30

RECEIVED BY: AS DATE: Aug 21/06 TIME: 10:30

ANALYSIS REQUESTED: LAB USE ONLY

SAMPLE RECEIVED (Y OR N): Y

SAMPLE BROKEN (Y OR N): Y

LAB SAMPLE NO. 418722

DATE: Aug 21/06 TIME: 10:30

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DATE: Aug 21/06 TIME: 10:30

ANALYTICAL REQUEST FORM

Manitoba Technology Centre Ltd.

745 Logan Avenue, Winnipeg, Manitoba R3E 3L5
 205-5586 • 67th Avenue, Edmonton, Alberta T5E 0P5
 Edmonton Toll Free Line
 1313 • 44 Avenue N.E., Calgary, Alberta T2K 6L5
 18881 Repulse Bldg., 124 Victoria Road, Saskatoon, Sask. S7N 5E3
 1241 Burch Street, Thunder Bay, Ontario R6P 2H3

Telephones	(204) 545-3706	Fax	(204) 945-0500
Telecopier	(781) 412-5227	Fax	(781) 437-2000
Telephone	1-800-898-9878	Fax	1-800-286-7500
Telephones	(408) 291-9907	Fax	(408) 281-4000
Telephones	(306) 625-5375	Fax	(306) 598-4300
Telephone	(817) 625-5675	Fax	(817) 625-5600

DATE SUBMITTED: 4-25-06 DATE REQUIRED:

22

PRICING (CHECK ONE)
AS PER QUOTE ☒ \$120.13 ☐
AS PER LIST PRICE ☐

SAMPLE ID	SAMPLED BY	DATE/TIME SAMPLED	SAMPLE TYPE
BL-6-0.5m	CSTJV	Aug 3/80	DWP
BL-7	"	"	1115
BL-8	"	"	1130
BL-9	"	"	1140
BL-10	"	"	1145
BL-11	"	"	1150
BL-6-2.5m	"	"	1000
BL-6-5m	"	"	1015
BL-6-p	"	"	1030
TRAVEL Band	"	"	"

NOTES & CONDITIONS:

I. Quote number must be provided to ensure proper pricing.

All trademarks or services submitted must be labeled to comply with WI-FI's regulations. This must include the names of the hazard, as well as a contact name and phone number. Use the link to contact for further information.

OFFICIALS OF THE U.S. DEPARTMENT OF JUSTICE

NOTE: Failure to properly complete all portions of this form may delay analysis.

NO SAMPLES SUBMITTED

NO. BOTTLES/SAMPLES

E-MAIL: YES TO THE

E-MAIL ADDRESS: 61624140 yac9

PO. NO.

JOB NO.

1015263

FROZEN ☒ COLD ☒ AMBIENT ☐

OTHER (BREAKAGE, LEAKAGE, ETC.):

SAMPLE CONDITION UPON RECEIPT ☒ ACCEPTABLE ☐ NON-ACCEPTABLE

100

[illegible]

1. *Chlorophyll a* (Chl *a*)
 2. *Chlorophyll b* (Chl *b*)
 3. *Chlorophyll c* (Chl *c*)
 4. *Chlorophyll d* (Chl *d*)
 5. *Chlorophyll e* (Chl *e*)
 6. *Chlorophyll f* (Chl *f*)
 7. *Chlorophyll g* (Chl *g*)
 8. *Chlorophyll h* (Chl *h*)
 9. *Chlorophyll i* (Chl *i*)
 10. *Chlorophyll j* (Chl *j*)
 11. *Chlorophyll k* (Chl *k*)
 12. *Chlorophyll l* (Chl *l*)
 13. *Chlorophyll m* (Chl *m*)
 14. *Chlorophyll n* (Chl *n*)
 15. *Chlorophyll o* (Chl *o*)
 16. *Chlorophyll p* (Chl *p*)
 17. *Chlorophyll q* (Chl *q*)
 18. *Chlorophyll r* (Chl *r*)
 19. *Chlorophyll s* (Chl *s*)
 20. *Chlorophyll t* (Chl *t*)
 21. *Chlorophyll u* (Chl *u*)
 22. *Chlorophyll v* (Chl *v*)
 23. *Chlorophyll w* (Chl *w*)
 24. *Chlorophyll x* (Chl *x*)
 25. *Chlorophyll y* (Chl *y*)
 26. *Chlorophyll z* (Chl *z*)
 27. *Chlorophyll aa* (Chl *aa*)
 28. *Chlorophyll ab* (Chl *ab*)
 29. *Chlorophyll ac* (Chl *ac*)
 30. *Chlorophyll ad* (Chl *ad*)
 31. *Chlorophyll ae* (Chl *ae*)
 32. *Chlorophyll af* (Chl *af*)
 33. *Chlorophyll ag* (Chl *ag*)
 34. *Chlorophyll ah* (Chl *ah*)
 35. *Chlorophyll ai* (Chl *ai*)
 36. *Chlorophyll aj* (Chl *aj*)
 37. *Chlorophyll ak* (Chl *ak*)
 38. *Chlorophyll al* (Chl *al*)
 39. *Chlorophyll am* (Chl *am*)
 40. *Chlorophyll an* (Chl *an*)
 41. *Chlorophyll ao* (Chl *ao*)
 42. *Chlorophyll ap* (Chl *ap*)
 43. *Chlorophyll aq* (Chl *aq*)
 44. *Chlorophyll ar* (Chl *ar*)
 45. *Chlorophyll as* (Chl *as*)
 46. *Chlorophyll at* (Chl *at*)
 47. *Chlorophyll au* (Chl *au*)
 48. *Chlorophyll av* (Chl *av*)
 49. *Chlorophyll aw* (Chl *aw*)
 50. *Chlorophyll ax* (Chl *ax*)
 51. *Chlorophyll ay* (Chl *ay*)
 52. *Chlorophyll az* (Chl *az*)
 53. *Chlorophyll aza* (Chl *aza*)
 54. *Chlorophyll abz* (Chl *abz*)
 55. *Chlorophyll acz* (Chl *acz*)
 56. *Chlorophyll adz* (Chl *adz*)
 57. *Chlorophyll aez* (Chl *aez*)
 58. *Chlorophyll afz* (Chl *afz*)
 59. *Chlorophyll agz* (Chl *agz*)
 60. *Chlorophyll ahz* (Chl *ahz*)
 61. *Chlorophyll aiz* (Chl *aiz*)
 62. *Chlorophyll ajz* (Chl *ajz*)
 63. *Chlorophyll akz* (Chl *akz*)
 64. *Chlorophyll alz* (Chl *alz*)
 65. *Chlorophyll amz* (Chl *amz*)
 66. *Chlorophyll anz* (Chl *anz*)
 67. *Chlorophyll aoz* (Chl *aoz*)
 68. *Chlorophyll apz* (Chl *apz*)
 69. *Chlorophyll aqz* (Chl *aqz*)
 70. *Chlorophyll arz* (Chl *arz*)
 71. *Chlorophyll asz* (Chl *asz*)
 72. *Chlorophyll atz* (Chl *atz*)
 73. *Chlorophyll auz* (Chl *auz*)
 74. *Chlorophyll avz* (Chl *avz*)
 75. *Chlorophyll awz* (Chl *awz*)
 76. *Chlorophyll axz* (Chl *axz*)
 77. *Chlorophyll ayz* (Chl *ayz*)
 78. *Chlorophyll azz* (Chl *azz*)
 79. *Chlorophyll azaa* (Chl *aza*)
 80. *Chlorophyll abz* (Chl *abz*)
 81. *Chlorophyll acz* (Chl *acz*)
 82. *Chlorophyll adz* (Chl *adz*)
 83. *Chlorophyll aez* (Chl *aez*)
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 93. *Chlorophyll aoz* (Chl *aoz*)
 94. *Chlorophyll apz* (Chl *apz*)
 95. *Chlorophyll aqz* (Chl *aqz*)
 96. *Chlorophyll arz* (Chl *arz*)
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 98. *Chlorophyll atz* (Chl *atz*)
 99. *Chlorophyll auz* (Chl *auz*)
 100. *Chlorophyll avz* (Chl *avz*)
 101. *Chlorophyll awz* (Chl *awz*)
 102. *Chlorophyll axz* (Chl *axz*)
 103. *Chlorophyll ayz* (Chl *ayz*)
 104. *Chlorophyll azz* (Chl *azz*)
 105. *Chlorophyll azaa* (Chl *aza*)
 106. *Chlorophyll abz* (Chl *abz*)
 107. *Chlorophyll acz* (Chl *acz*)
 108. *Chlorophyll adz* (Chl *adz*)
 109. *Chlorophyll aez* (Chl *aez*)
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 115. *Chlorophyll akz* (Chl *akz*)
 116. *Chlorophyll alz* (Chl *alz*)
 117. *Chlorophyll amz* (Chl *amz*)
 118. *Chlorophyll anz* (Chl *anz*)
 119. *Chlorophyll aoz* (Chl *aoz*)
 120. *Chlorophyll apz* (Chl *apz*)
 121. *Chlorophyll aqz* (Chl *aqz*)
 122. *Chlorophyll arz* (Chl *arz*)
 123. *Chlorophyll asz* (Chl *asz*)
 124. *Chlorophyll atz* (Chl *atz*)
 125. *Chlorophyll auz* (Chl *auz*)
 126. *Chlorophyll avz* (Chl *avz*)
 127. *Chlorophyll awz* (Chl *awz*)
 128. *Chlorophyll axz* (Chl *axz*)
 129. *Chlorophyll ayz* (Chl *ayz*)
 130. *Chlorophyll azz* (Chl *azz*)
 131. *Chlorophyll azaa* (Chl *aza*)
 132. *Chlorophyll abz* (Chl *abz*)
 133.

REV. JULY 1990

Reference Information

incubated at 35C +/- 0.5C for 24hrs. Coliforms that are not E. coli turn red because they reduce TTC (2,3,5 triphenyltetrazolium chloride) in the medium. E. coli turn blue due to the reaction between the enzyme beta glucuronidase and BCIG (5-bromo-4-chloro-3-indolyl-beta-D-glucuronide) in the medium.

TURBIDITY-WP Water Turbidity

APHA, 1998, 2130B

A strong light beam is sent through a transparent tube containing the sample. Light that is reflected at 90 degrees to the axis by suspended particles is detected by the photocell. The electrical response is proportional to the sample turbidity.

ZN-TOT-LOW-WP Water Zinc (Zn)-Total

EPA 200.8 Rev 5.4 May 1994

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

Chain of Custody numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
TB	ALS LABORATORY GROUP - THUNDER BAY, ONTARIO, CANADA	WP	ALS LABORATORY GROUP - WINNIPEG, MANITOBA, CANADA

GLOSSARY OF REPORT TERMS

Surrogate - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency. The Laboratory control limits are determined under column heading D.L.

mg/kg (units) - unit of concentration based on mass, parts per million.

mg/L (units) - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

UNLESS OTHERWISE STATED, SAMPLES ARE NOT CORRECTED FOR CLIENT FIELD BLANKS.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
OGG-IR-WP	Water	Total Oil and Grease		APHA METHOD 5520C

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

Chain of Custody numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WP	ALS LABORATORY GROUP - WINNIPEG, MANITOBA, CANADA		

GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency. The Laboratory control limits are determined under column heading D.L.

mg/kg (units) - unit of concentration based on mass, parts per million.

mg/L (units) - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

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ETL EnviroTest MFC

Manitoba Technology Centre Ltd

745 Logan Avenue, Winnipeg, Manitoba R5E 8L5
 204-581-8770
 Edmonton Toll Free Line
 1-813-44-AVAIL
 Calgary, Alberta T2E 8L5
 General Purpose Bldg., 124 Varsity Road, Saskatoon, Sask. S7N 5S3
 1001 Bessie Street, Thunder Bay, Ontario P7B 5K6

CHAIN OF CUSTODY ANALYTICAL REQUEST FORM

Telephone: (204) 581-3705 Fax: (204) 545-0703
 Telephone: (781) 473-5227 Fax: (781) 473-5211
 Telephone: 1-800-468-9078 Fax: 1-800-468-9319
 Telephone: (403) 261-3533 Fax: (403) 261-3206
 Telephone: (505) 466-8075 Fax: (505) 466-3363
 Telephone: (807) 822-4465 Fax: (807) 823-7566

DATE SUBMITTED Aug 14/04 DATE REQUIRED ASAP

PRECISING/ANALYSIS CODE
 AS PER QUOTE # 033012
 AS PER LIST REQUEST

SAMPLE ID	SAMPLED BY	DATE/TIME SAMPLED	SAMPLE TYPE	PRESERVED	RETURNED
SNR-5	CS/TV	Aug 3/04 1800	Grab		
SNR-6	"	" 1800	"		
BL-7	"	" 1815	"		

Handwritten note: Sample not sent
 pending analysis results
 returned 8/14/04

NOTES & CONDITIONS:

1. Client must provide all necessary information for proper analysis.

2. All hazardous samples submitted must be labeled to comply with WHMIS regulations. This must include the nature of the hazard, as well as a contact name and phone number. (This info. can be obtained by ETL's information.)

3. ETL's liability limited to cost of analysis.

NOTE: Failure to properly complete all portions of this form may delay analysis.

NO. SAMPLES SUBMITTED 3
 NO. BOTTLES/SAMPLES 3

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	DATE/TIME
CS	Aug 3/04 20:00	ETL LAB	
		RECEIVED BY:	DATE/TIME
		ETL LAB	Aug 3/04 21:30

SAMPLE CONDITION UPON RECEIPT: IF ACCEPTABLE, IF NON-ACCEPTABLE

WHITE - File Copy
 GREEN - Final Report
 BLUE - Client Support
 YELLOW - Customer

PROCESSED BY: Handwritten signature
 OTHER (PREMISE, LEAKAGE, ETC.):

E-MAIL: YES ☒ NO ☐

P.O. NO.:

JOB NO. 1015263

REV. JUNE / 99

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



Environmental Division

PRELIMINARY RESULTS

JACQUES WHITFORD

ATTN: CAREY SIBBALD

Reported On: 18-OCT-06 10:19 PM

201, 5103 - 51ST AVE

YELLOWKNIFE NT X1A 2P3

Lab Work Order #: **L440946**

Date Received: **05-OCT-06**

Project P.O. #:

Job Reference: 1015263

Legal Site Desc:

CofC Numbers:

Other Information:

Comments:

APPROVED BY: _____

PAUL NICOLAS

Project Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

Manitoba Technology Centre Ltd.

Part of the **ALS Laboratory Group**

1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4

Phone: +1 204 255 9720 Fax: +1 204 255 9721 www.alsglobal.com

A Campbell Brothers Limited Company

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
I 440946-1 SNP-1								
Sampled By: CS / NK on 04-OCT-06 @ 11:30								
Matrix: WATER (GRAB)								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.285		0.005	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Cadmium (Cd)-Total	<0.00002		0.00002	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Iron (Fe)-Total	0.24		0.02	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Metal scan								
Arsenic (As)-Total	<0.0005		0.0005	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Boron (B)-Total	<0.03		0.03	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Barium (Ba)-Total	0.0470		0.0003	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Beryllium (Be)-Total	<0.001		0.001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Calcium (Ca)-Total	6.8		0.1	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Cobalt (Co)-Total	<0.0002		0.0002	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Chromium (Cr)-Total	<0.001		0.001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Copper (Cu)-Total	0.002		0.001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Potassium (K)-Total	1.0		0.1	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Magnesium (Mg)-Total	1.39		0.01	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Manganese (Mn)-Total	0.0084		0.0003	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Sodium (Na)-Total	3.87		0.03	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Nickel (Ni)-Total	<0.002		0.002	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Phosphorus (P)-Total	0.06	RAMB	0.05	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Lead (Pb)-Total	<0.0005		0.0005	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Rubidium (Rb)-Total	0.0010		0.0002	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Antimony (Sb)-Total	<0.001		0.001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Selenium (Se)-Total	0.001		0.001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Tin (Sn)-Total	<0.0006		0.0006	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Strontium (Sr)-Total	0.0247		0.0001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Tellurium (Te)-Total	<0.001		0.001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Titanium (Ti)-Total	0.0047		0.0009	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Uranium (U)-Total	0.0001		0.0001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Vanadium (V)-Total	<0.001		0.001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Tungsten (W)-Total	<0.0002		0.0002	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Zirconium (Zr)-Total	<0.0004		0.0004	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Silver (Ag)-Total	<0.0001		0.0001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Zinc (Zn)-Total	<0.01		0.01	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Ammonia (NH3) - Soluble	0.003	RAMB	0.003	mg/L		06-OCT-06	LDE	R450708
Biochemical Oxygen Demand	6		1	mg/L	06-OCT-06	11-OCT-06	SXG	R451805
Conductivity	65.9		0.4	umhos/cm		06-OCT-06	SXB	R451386
Fecal Coliform	<10		10	CFU/100mL	05-OCT-06	06-OCT-06	ABG	R450802
Hardness (as CaCO3)	22.7		0.3	mg/L		06-OCT-06		
Ortho Phosphorous Soluble As P	0.003		0.001	mg/L	17-OCT-06	17-OCT-06	DXN	R454535
Phenols (4AAP)	<0.001		0.001	mg/L		10-OCT-06	MRR	R451983
Total Phosphorous	0.023		0.001	mg/L		11-OCT-06	LJH	R452222
Total Dissolved Phosphorous	0.008		0.001	mg/L		11-OCT-06	LJH	R452222
Sulphate (SO4) - Soluble	<9		9	mg/L		11-OCT-06	ALW	R452305
Total Kjeldahl Nitrogen	0.4		0.2	mg/L	06-OCT-06	17-OCT-06	LDE	R454142
Total Oil and Grease	<1		1	mg/L	12-OCT-06	13-OCT-06	IML	R453044

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L440946-1	SNP-1								
Sampled By:	CS / NK on 04-OCT-06 @ 11:30								
Matrix:	WATER (GRAB)								
Total Suspended Solids		6		5	mg/L		10-OCT-06	CXZ	R452074
PH		7.36		0.01	pH units		06-OCT-06	SXB	R451386
Nitrate (NO3) - Soluble		0.04		0.01	mg/L		11-OCT-06		
Nitrate + Nitrite Soluble									
Nitrate+Nitrite-N - Soluble		0.044		0.005	mg/L		06-OCT-06	LDE	R450708
Nitrite									
Nitrite-N Soluble		<0.01		0.01	mg/L		06-OCT-06	ALW	R451784
L440946-2	SNP-2								
Sampled By:	CS / NK on 04-OCT-06 @ 11:30								
Matrix:	WATER (GRAB)								
Metal scan, total with ultras									
Aluminum (Al)-Total		0.048		0.005	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Cadmium (Cd)-Total		<0.00002		0.00002	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Iron (Fe)-Total		0.12		0.02	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Mercury (Hg)-Total		<0.0001		0.0001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Metal scan									
Arsenic (As)-Total		<0.0005		0.0005	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Boron (B)-Total		<0.03		0.03	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Barium (Ba)-Total		<0.0003		0.0003	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Beryllium (Be)-Total		<0.001		0.001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Bismuth (Bi)-Total		<0.0002		0.0002	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Calcium (Ca)-Total		<0.1		0.1	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Cobalt (Co)-Total		<0.0002		0.0002	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Chromium (Cr)-Total		<0.001		0.001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Cesium (Cs)-Total		<0.0001		0.0001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Copper (Cu)-Total		<0.001		0.001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Potassium (K)-Total		<0.1		0.1	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Magnesium (Mg)-Total		<0.01		0.01	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Manganese (Mn)-Total		0.0011		0.0003	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Molybdenum (Mo)-Total		<0.0002		0.0002	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Sodium (Na)-Total		<0.03		0.03	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Nickel (Ni)-Total		<0.002		0.002	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Phosphorus (P)-Total		0.11	RAMB	0.05	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Lead (Pb)-Total		<0.0005		0.0005	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Rubidium (Rb)-Total		<0.0002		0.0002	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Antimony (Sb)-Total		<0.001		0.001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Selenium (Se)-Total		<0.001		0.001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Tin (Sn)-Total		<0.0006		0.0006	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Strontium (Sr)-Total		<0.0001		0.0001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Tellurium (Te)-Total		<0.001		0.001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Titanium (Ti)-Total		0.0011		0.0009	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Thallium (Tl)-Total		<0.0001		0.0001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Uranium (U)-Total		<0.0001		0.0001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Vanadium (V)-Total		<0.001		0.001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Tungsten (W)-Total		<0.0002		0.0002	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Zirconium (Zr)-Total		<0.0004		0.0004	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Silver (Ag)-Total		<0.0001		0.0001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Zinc (Zn)-Total		<0.01		0.01	mg/L	10-OCT-06	10-OCT-06	DAG	R451783

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L440946-2 SNP-2								
Sampled By: CS / NK on 04-OCT-06 @ 11:30								
Matrix: WATER (GRAB)								
Ammonia (NH3) - Soluble	<0.003	RAMB	0.003	mg/L		06-OCT-06	LDE	R450708
Biochemical Oxygen Demand	<6		1	mg/L	06-OCT-06	11-OCT-06	SXG	R451805
Conductivity	55.6		0.4	umhos/cm		06-OCT-06	SXB	R451386
Fecal Coliform	<10		10	CFU/100mL	05-OCT-06	06-OCT-06	ABG	R450802
Hardness (as CaCO3)	<0.3		0.3	mg/L		06-OCT-06		
Ortho Phosphorous Soluble As P	0.002		0.001	mg/L	17-OCT-06	17-OCT-06	DXN	R454535
Phenols (4AAP)	<0.001		0.001	mg/L		10-OCT-06	MRR	R451983
Total Phosphorous	0.019		0.001	mg/L		11-OCT-06	LJH	R452222
Total Dissolved Phosphorous	0.008		0.001	mg/L		11-OCT-06	LJH	R452222
Sulphate (SO4) - Soluble	<9		9	mg/L		11-OCT-06	ALW	R452305
Total Kjeldahl Nitrogen	0.4		0.2	mg/L	06-OCT-06	17-OCT-06	LDE	R454142
Total Oil and Grease	<1		1	mg/L	12-OCT-06	13-OCT-06	IML	R453044
Total Suspended Solids	<5		5	mg/L		10-OCT-06	CXZ	R452074
PH	7.56		0.01	pH units		06-OCT-06	SXB	R451386
Nitrate (NO3) - Soluble	0.07		0.01	mg/L		11-OCT-06		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	0.074		0.005	mg/L		06-OCT-06	LDE	R450708
Nitrite								
Nitrite-N Soluble	<0.01		0.01	mg/L		06-OCT-06	ALW	R451784
L440946-3 SNP-3								
Sampled By: CS / NK on 04-OCT-06 @ 11:30								
Matrix: WATER (GRAB)								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.083		0.005	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Cadmium (Cd)-Total	<0.00002		0.00002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Iron (Fe)-Total	0.65		0.02	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Metal scan								
Arsenic (As)-Total	0.0006		0.0005	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Boron (B)-Total	0.03		0.03	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Barium (Ba)-Total	0.0407		0.0003	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Beryllium (Be)-Total	<0.001		0.001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Calcium (Ca)-Total	12.4		0.1	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Cobalt (Co)-Total	0.0003		0.0002	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Chromium (Cr)-Total	<0.001		0.001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Copper (Cu)-Total	0.003		0.001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Potassium (K)-Total	3.9		0.1	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Magnesium (Mg)-Total	2.32		0.01	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Manganese (Mn)-Total	0.0360		0.0003	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Sodium (Na)-Total	15.6		0.03	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Nickel (Ni)-Total	<0.002		0.002	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Phosphorus (P)-Total	0.25	RAMB	0.05	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Lead (Pb)-Total	<0.0005		0.0005	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Rubidium (Rb)-Total	0.0030		0.0002	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Antimony (Sb)-Total	<0.001		0.001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Selenium (Se)-Total	0.002		0.001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L440946-3	SNP-3								
Sampled By:	CS / NK on 04-OCT-06 @ 11:30								
Matrix:	WATER (GRAB)								
Metal scan, total with ultras									
Metal scan									
Tin (Sn)-Total		<0.0006		0.0006	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Strontium (Sr)-Total		0.0448		0.0001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Tellurium (Te)-Total		<0.001		0.001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Titanium (Ti)-Total		0.0016		0.0009	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Thallium (Tl)-Total		0.0002		0.0001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Uranium (U)-Total		0.0002		0.0001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Vanadium (V)-Total		<0.001		0.001	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Tungsten (W)-Total		<0.0002		0.0002	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Zirconium (Zr)-Total		<0.0004		0.0004	mg/L	10-OCT-06	10-OCT-06	DAG	R451783
Silver (Ag)-Total		<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Zinc (Zn)-Total		<0.01		0.01	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Ammonia (NH3) - Soluble		0.066	RAMB	0.003	mg/L		06-OCT-06	LDE	R450708
Biochemical Oxygen Demand		<6		1	mg/L	06-OCT-06	11-OCT-06	SXB	R451805
Conductivity		181		0.4	umhos/cm		06-OCT-06	SXB	R451386
Fecal Coliform		<10		10	CFU/100mL	05-OCT-06	06-OCT-06	ABG	R450802
Hardness (as CaCO3)		40.4		0.3	mg/L		06-OCT-06		
Ortho Phosphorous Soluble As P		0.119		0.001	mg/L		11-OCT-06	LJH	R451987
Phenols (4AAP)		<0.001		0.001	mg/L		10-OCT-06	MRR	R451983
Total Phosphorous		0.253		0.001	mg/L		11-OCT-06	LJH	R452222
Total Dissolved Phosphorous		0.236		0.001	mg/L		11-OCT-06	LJH	R452222
Sulphate (SO4) - Soluble		19		9	mg/L		11-OCT-06	ALW	R452305
Total Kjeldahl Nitrogen		1.1		0.2	mg/L	06-OCT-06	17-OCT-06	LDE	R454142
Total Oil and Grease		<1		1	mg/L	12-OCT-06	13-OCT-06	IML	R453044
Total Suspended Solids		<5		5	mg/L		10-OCT-06	CXZ	R452074
PH		7.64		0.01	pH units		06-OCT-06	SXB	R451386
Nitrate (NO3) - Soluble		2.10		0.01	mg/L		11-OCT-06		
Nitrate + Nitrite Soluble									
Nitrate+Nitrite-N - Soluble		2.11		0.005	mg/L		06-OCT-06	LDE	R450708
Nitrite									
Nitrite-N Soluble		0.01		0.01	mg/L		06-OCT-06	ALW	R451784
L440946-4	SNP-4								
Sampled By:	CS / NK on 04-OCT-06 @ 11:30								
Matrix:	WATER (GRAB)								
Metal scan, total with ultras									
Aluminum (Al)-Total		0.144		0.005	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Cadmium (Cd)-Total		<0.00002		0.00002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Iron (Fe)-Total		0.98		0.02	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Mercury (Hg)-Total		<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Metal scan									
Arsenic (As)-Total		<0.0005		0.0005	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Boron (B)-Total		0.05		0.03	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Barium (Ba)-Total		0.0407		0.0003	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Beryllium (Be)-Total		<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Bismuth (Bi)-Total		<0.0002		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Calcium (Ca)-Total		11.6		0.1	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Cobalt (Co)-Total		0.0004		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Chromium (Cr)-Total		<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
I.440946-4 SNP-4								
Sampled By: CS / NK on 04-OCT-06 @ 11:30								
Matrix: WATER (GRAB)								
Metal scan, total with ultras								
Metal scan								
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Copper (Cu)-Total	0.004		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Potassium (K)-Total	4.0		0.1	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Magnesium (Mg)-Total	2.74		0.01	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Manganese (Mn)-Total	0.0517		0.0003	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Molybdenum (Mo)-Total	0.0002		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Sodium (Na)-Total	19.4		0.03	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Nickel (Ni)-Total	<0.002		0.002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Phosphorus (P)-Total	0.53	RAMB	0.05	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Lead (Pb)-Total	<0.0005		0.0005	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Rubidium (Rb)-Total	0.0037		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Antimony (Sb)-Total	<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Selenium (Se)-Total	<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Tin (Sn)-Total	<0.0006		0.0006	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Strontium (Sr)-Total	0.0461		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Tellurium (Te)-Total	<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Titanium (Ti)-Total	0.0023		0.0009	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Uranium (U)-Total	0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Vanadium (V)-Total	0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Tungsten (W)-Total	<0.0002		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Zirconium (Zr)-Total	0.0005		0.0004	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Silver (Ag)-Total	<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Zinc (Zn)-Total	<0.01		0.01	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Ammonia (NH3) - Soluble	1.63		0.003	mg/L		06-OCT-06	LDE	R450708
Biochemical Oxygen Demand	<6		1	mg/L	06-OCT-06	11-OCT-06	SXG	R451805
Conductivity	205		0.4	umhos/cm		06-OCT-06	SXB	R451386
Fecal Coliform	<10		10	CFU/100mL	05-OCT-06	06-OCT-06	ABG	R450802
Hardness (as CaCO3)	40.3		0.3	mg/L		06-OCT-06		
Ortho Phosphorous Soluble As P	0.305		0.001	mg/L		11-OCT-06	LJH	R451987
Phenols (4AAP)	0.001		0.001	mg/L		10-OCT-06	MRR	R451983
Total Phosphorous	0.484		0.001	mg/L		11-OCT-06	LJH	R452222
Total Dissolved Phosphorous	0.461		0.001	mg/L		11-OCT-06	LJH	R452222
Sulphate (SO4) - Soluble	21		9	mg/L		11-OCT-06	ALW	R452305
Total Kjeldahl Nitrogen	3.0		0.2	mg/L	06-OCT-06	17-OCT-06	LDE	R454142
Total Oil and Grease	<1		1	mg/L	12-OCT-06	13-OCT-06	IML	R453044
Total Suspended Solids	<5		5	mg/L		10-OCT-06	CXZ	R452074
PH	7.45		0.01	pH units		06-OCT-06	SXB	R451386
Nitrate (NO3) - Soluble	1.89		0.01	mg/L		11-OCT-06		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	1.96		0.005	mg/L		06-OCT-06	LDE	R450708
Nitrite								
Nitrite-N Soluble	0.06		0.01	mg/L		06-OCT-06	ALW	R451784
I.440946-5 SNP-5								
Sampled By: CS / NK on 04-OCT-06 @ 11:30								
Matrix: WATER (GRAB)								
Metal scan, total with ultras								

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L440946-5	SNP-5								
Sampled By:	CS / NK on 04-OCT-06 @ 11:30								
Matrix:	WATER (GRAB)								
Metal scan, total with ultras									
Aluminum (Al)-Total		0.421		0.005	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Cadmium (Cd)-Total		<0.00002		0.00002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Iron (Fe)-Total		1.66		0.02	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Mercury (Hg)-Total		<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Metal scan									
Arsenic (As)-Total		<0.0005		0.0005	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Boron (B)-Total		0.06		0.03	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Barium (Ba)-Total		0.0288		0.0003	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Beryllium (Be)-Total		<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Bismuth (Bi)-Total		<0.0002		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Calcium (Ca)-Total		11.3		0.1	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Cobalt (Co)-Total		0.0007		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Chromium (Cr)-Total		0.002		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Cesium (Cs)-Total		<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Copper (Cu)-Total		0.008		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Potassium (K)-Total		7.8		0.1	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Magnesium (Mg)-Total		2.86		0.01	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Manganese (Mn)-Total		0.125		0.0003	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Molybdenum (Mo)-Total		<0.0002		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Sodium (Na)-Total		34.2		0.03	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Nickel (Ni)-Total		0.003		0.002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Phosphorus (P)-Total		2.22	RAMB	0.05	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Lead (Pb)-Total		0.0006		0.0005	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Rubidium (Rb)-Total		0.0094		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Antimony (Sb)-Total		<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Selenium (Se)-Total		<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Tin (Sn)-Total		0.0007		0.0006	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Strontium (Sr)-Total		0.0392		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Tellurium (Te)-Total		<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Titanium (Ti)-Total		0.0092		0.0009	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Thallium (Tl)-Total		<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Uranium (U)-Total		<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Vanadium (V)-Total		0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Tungsten (W)-Total		<0.0002		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Zirconium (Zr)-Total		0.0013		0.0004	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Silver (Ag)-Total		<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Zinc (Zn)-Total		0.02		0.01	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Ammonia (NH3) - Soluble		20.4		0.003	mg/L		06-OCT-06	LDE	R450708
Biochemical Oxygen Demand		<6		1	mg/L	06-OCT-06	11-OCT-06	SXG	R451805
Conductivity		419		0.4	umhos/cm		06-OCT-06	SXB	R451386
Fecal Coliform		460		10	CFU/100mL	05-OCT-06	06-OCT-06	ABG	R450802
Hardness (as CaCO3)		39.9		0.3	mg/L		06-OCT-06		
Ortho Phosphorous Soluble As P		2.06		0.001	mg/L		11-OCT-06	LJH	R451987
Phenols (4AAP)		0.003		0.001	mg/L		10-OCT-06	MRR	R451983
Total Phosphorous		2.25		0.001	mg/L		11-OCT-06	LJH	R452222
Total Dissolved Phosphorous		2.11		0.001	mg/L		11-OCT-06	LJH	R452222
Sulphate (SO4) - Soluble		16		9	mg/L		11-OCT-06	ALW	R452305
Total Kjeldahl Nitrogen		20.2		0.2	mg/L	06-OCT-06	17-OCT-06	LDE	R454142
Total Oil and Grease		1		1	mg/L	12-OCT-06	13-OCT-06	IML	R453044

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L	Units	Extracted	Analyzed	By	Batch
L440946-5 SNP-5								
Sampled By: CS / NK on 04-OCT-06 @ 11:30								
Matrix: WATER (GRAB)								
Total Suspended Solids	<5		5	mg/L		10-OCT-06	CXZ	R452074
PH	7.47		0.01	pH units		06-OCT-06	SXB	R451386
Nitrate (NO3) - Soluble	0.26		0.01	mg/L		11-OCT-06		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	0.310		0.005	mg/L		06-OCT-06	LDE	R450708
Nitrite								
Nitrite-N Soluble	0.05		0.01	mg/L		06-OCT-06	ALW	R451784
L440946-6 SNP-6								
Sampled By: CS / NK on 04-OCT-06 @ 17:15								
Matrix: WATER (GRAB)								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.601		0.005	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Cadmium (Cd)-Total	<0.00002		0.00002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Iron (Fe)-Total	1.91		0.02	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Metal scan								
Arsenic (As)-Total	<0.0005		0.0005	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Boron (B)-Total	0.07		0.03	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Barium (Ba)-Total	0.0333		0.0003	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Beryllium (Be)-Total	<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Calcium (Ca)-Total	11.9		0.1	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Cobalt (Co)-Total	0.0008		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Chromium (Cr)-Total	0.003		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Copper (Cu)-Total	0.010		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Potassium (K)-Total	8.4		0.1	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Magnesium (Mg)-Total	3.16		0.01	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Manganese (Mn)-Total	0.141		0.0003	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Sodium (Na)-Total	36.6		0.03	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Nickel (Ni)-Total	0.003		0.002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Phosphorus (P)-Total	2.67	RAMB	0.05	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Lead (Pb)-Total	0.0008		0.0005	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Rubidium (Rb)-Total	0.0100		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Antimony (Sb)-Total	<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Selenium (Se)-Total	<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Tin (Sn)-Total	<0.0006		0.0006	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Strontium (Sr)-Total	0.0404		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Tellurium (Te)-Total	<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Titanium (Ti)-Total	0.0179		0.0009	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Uranium (U)-Total	0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Vanadium (V)-Total	0.002		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Tungsten (W)-Total	<0.0002		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Zirconium (Zr)-Total	0.0018		0.0004	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Silver (Ag)-Total	0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Zinc (Zn)-Total	0.02		0.01	mg/L	10-OCT-06	11-OCT-06	DAG	R451783

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L440946-6	SNP-6								
Sampled By:	CS / NK on 04-OCT-06 @ 17:15								
Matrix:	WATER (GRAB)								
Ammonia (NH3) - Soluble		22.4		0.003	mg/L		06-OCT-06	LDE	R450708
Biochemical Oxygen Demand		8		1	mg/L	06-OCT-06	11-OCT-06	SXG	R451805
Conductivity		446		0.4	umhos/cm		06-OCT-06	SXB	R451386
Fecal Coliform		2330		10	CFU/100mL	05-OCT-06	06-OCT-06	ABG	R450802
Hardness (as CaCO3)		42.8		0.3	mg/L		06-OCT-06		
Ortho Phosphorous Soluble As P		2.41		0.001	mg/L		11-OCT-06	LJH	R451987
Phenols (4AAP)		0.002		0.001	mg/L		10-OCT-06	MRR	R451983
Total Phosphorous		2.71		0.001	mg/L		11-OCT-06	LJH	R452222
Total Dissolved Phosphorous		2.47		0.001	mg/L		11-OCT-06	LJH	R452222
Sulphate (SO4) - Soluble		15		9	mg/L		11-OCT-06	ALW	R452305
Total Kjeldahl Nitrogen		24.5		0.2	mg/L	06-OCT-06	17-OCT-06	LDE	R454142
Total Oil and Grease		2		1	mg/L	12-OCT-06	13-OCT-06	IML	R453044
Total Suspended Solids		7		5	mg/L		10-OCT-06	CXZ	R452074
PH		7.51		0.01	pH units		06-OCT-06	SXB	R451386
Nitrate (NO3) - Soluble		0.04		0.01	mg/L		11-OCT-06		
Nitrate + Nitrite Soluble									
Nitrate+Nitrite-N - Soluble		0.079		0.005	mg/L		06-OCT-06	LDE	R450708
Nitrite									
Nitrite-N Soluble		0.04		0.01	mg/L		06-OCT-06	ALW	R451784
L440946-7	SNP-7								
Sampled By:	CS / NK on 04-OCT-06 @ 17:15								
Matrix:	WATER (GRAB)								
Metal scan, total with ultras									
Aluminum (Al)-Total		0.074		0.005	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Cadmium (Cd)-Total		<0.00002		0.00002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Iron (Fe)-Total		0.64		0.02	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Mercury (Hg)-Total		<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Metal scan									
Arsenic (As)-Total		<0.0005		0.0005	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Boron (B)-Total		0.04		0.03	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Barium (Ba)-Total		0.0417		0.0003	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Beryllium (Be)-Total		<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Bismuth (Bi)-Total		<0.0002		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Calcium (Ca)-Total		12.7		0.1	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Cobalt (Co)-Total		0.0003		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Chromium (Cr)-Total		<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Cesium (Cs)-Total		<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Copper (Cu)-Total		0.003		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Potassium (K)-Total		3.6		0.1	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Magnesium (Mg)-Total		2.42		0.01	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Manganese (Mn)-Total		0.0525		0.0003	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Molybdenum (Mo)-Total		<0.0002		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Sodium (Na)-Total		16.4		0.03	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Nickel (Ni)-Total		<0.002		0.002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Phosphorus (P)-Total		0.26		0.05	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Lead (Pb)-Total		<0.0005	RAMB	0.0005	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Rubidium (Rb)-Total		0.0026		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Antimony (Sb)-Total		<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Selenium (Se)-Total		<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783

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Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L440946-7 SNP-7								
Sampled By: CS / NK on 04-OCT-06 @ 17:15								
Matrix: WATER (GRAB)								
Metal scan, total with ultras								
Metal scan								
Tin (Sn)-Total	<0.0006		0.0006	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Strontium (Sr)-Total	0.0464		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Tellurium (Te)-Total	<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Titanium (Ti)-Total	<0.0009		0.0009	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Uranium (U)-Total	0.0002		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Vanadium (V)-Total	0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Tungsten (W)-Total	<0.0002		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Zirconium (Zr)-Total	<0.0004		0.0004	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Silver (Ag)-Total	<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Zinc (Zn)-Total	<0.01		0.01	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Ammonia (NH3) - Soluble	0.065	RAMB	0.003	mg/L		06-OCT-06	LDE	R450708
Biochemical Oxygen Demand	<6		1	mg/L	06-OCT-06	11-OCT-06	SXB	R451805
Conductivity	181		0.4	umhos/cm		06-OCT-06	SXB	R451386
Fecal Coliform	<10		10	CFU/100mL	05-OCT-06	06-OCT-06	ABG	R450802
Hardness (as CaCO3)	41.8		0.3	mg/L		06-OCT-06		
Ortho Phosphorous Soluble As P	0.101		0.001	mg/L		11-OCT-06	LJH	R451987
Phenols (4AAP)	<0.001		0.001	mg/L		10-OCT-06	MRR	R451983
Total Phosphorous	0.249		0.001	mg/L		11-OCT-06	LJH	R452222
Total Dissolved Phosphorous	0.210		0.001	mg/L		11-OCT-06	LJH	R452222
Sulphate (SO4) - Soluble	19		9	mg/L		11-OCT-06	ALW	R452305
Total Kjeldahl Nitrogen	0.9		0.2	mg/L	06-OCT-06	17-OCT-06	LDE	R454142
Total Oil and Grease	<1		1	mg/L	12-OCT-06	13-OCT-06	IML	R453044
Total Suspended Solids	<5		5	mg/L		10-OCT-06	CXZ	R452074
PH	7.56		0.01	pH units		06-OCT-06	SXB	R451386
Nitrate (NO3) - Soluble	2.10		0.01	mg/L		11-OCT-06		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	2.12		0.005	mg/L		06-OCT-06	LDE	R450708
Nitrite								
Nitrite-N Soluble	0.02		0.01	mg/L		06-OCT-06	ALW	R451784
L440946-8 SNP-8								
Sampled By: CS / NK on 04-OCT-06 @ 16:15								
Matrix: WATER (GRAB)								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.290		0.005	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Cadmium (Cd)-Total	<0.00002		0.00002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Iron (Fe)-Total	1.56		0.02	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Metal scan								
Arsenic (As)-Total	<0.0005		0.0005	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Boron (B)-Total	0.06		0.03	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Barium (Ba)-Total	0.0241		0.0003	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Beryllium (Be)-Total	<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Calcium (Ca)-Total	10.6		0.1	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Cobalt (Co)-Total	0.0007		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Chromium (Cr)-Total	<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L440946-8	SNP-8								
Sampled By:	CS / NK on 04-OCT-06 @ 16:15								
Matrix:	WATER (GRAB)								
Metal scan, total with ultras									
Metal scan									
Cesium (Cs)-Total		<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Copper (Cu)-Total		0.007		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Potassium (K)-Total		7.2		0.1	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Magnesium (Mg)-Total		2.67		0.01	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Manganese (Mn)-Total		0.112		0.0003	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Molybdenum (Mo)-Total		<0.0002		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Sodium (Na)-Total		31.8		0.03	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Nickel (Ni)-Total		0.002		0.002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Phosphorus (P)-Total		2.05	RAMB	0.05	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Lead (Pb)-Total		0.0006		0.0005	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Rubidium (Rb)-Total		0.0083		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Antimony (Sb)-Total		<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Selenium (Se)-Total		<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Tin (Sn)-Total		<0.0006		0.0006	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Strontium (Sr)-Total		0.0348		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Tellurium (Te)-Total		<0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Titanium (Ti)-Total		0.0092		0.0009	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Thallium (Tl)-Total		<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Uranium (U)-Total		<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Vanadium (V)-Total		0.001		0.001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Tungsten (W)-Total		<0.0002		0.0002	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Zirconium (Zr)-Total		0.0012		0.0004	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Silver (Ag)-Total		<0.0001		0.0001	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Zinc (Zn)-Total		<0.01		0.01	mg/L	10-OCT-06	11-OCT-06	DAG	R451783
Ammonia (NH3) - Soluble		20.3		0.003	mg/L		06-OCT-06	LDE	R450708
Conductivity		417		0.4	umhos/cm		06-OCT-06	SXB	R451386
Hardness (as CaCO3)		37.5		0.3	mg/L		06-OCT-06		
Ortho Phosphorous Soluble As P		2.02		0.001	mg/L		11-OCT-06	LJH	R451987
Phenols (4AAP)		0.003		0.001	mg/L		10-OCT-06	MRR	R451983
Total Phosphorous		2.25		0.001	mg/L		11-OCT-06	LJH	R452222
Total Dissolved Phosphorous		2.13		0.001	mg/L		11-OCT-06	LJH	R452222
Sulphate (SO4) - Soluble		14		9	mg/L		11-OCT-06	ALW	R452305
Total Kjeldahl Nitrogen		22.0		0.2	mg/L	06-OCT-06	17-OCT-06	LDE	R454142
Total Oil and Grease		<1		1	mg/L	12-OCT-06	13-OCT-06	IML	R453044
Total Suspended Solids		<5		5	mg/L		10-OCT-06	CXZ	R452074
PH		7.45		0.01	pH units		06-OCT-06	SXB	R451386
Nitrate (NO3) - Soluble		0.24		0.01	mg/L		11-OCT-06		
Nitrate + Nitrite Soluble									
Nitrate+Nitrite-N - Soluble		0.296		0.005	mg/L		06-OCT-06	LDE	R450708
Nitrite									
Nitrite-N Soluble		0.06		0.01	mg/L		06-OCT-06	ALW	R451784

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L440945-1	SNP-1								
Sampled By:	CS / NK on 04-OCT-06 @ 11:30								
Matrix:	WATER								
Total Dissolved Solids		42		5	mg/L		06-OCT-06	CXZ	R451416
Total Suspended Solids		6		5	mg/L		06-OCT-06	CXZ	R451416
ROU4W Extractable									
Alkalinity									
Alkalinity, Total (as CaCO ₃)		23		1	mg/L		11-OCT-06	SXB	R452133
Bicarbonate (HCO ₃)		28		2	mg/L		11-OCT-06	SXB	R452133
Carbonate (CO ₃)		<0.6		0.6	mg/L		11-OCT-06	SXB	R452133
Hydroxide (OH)		<0.4		0.4	mg/L		11-OCT-06	SXB	R452133
Chloride Soluble									
Chloride (Cl) - Soluble		<9		9	mg/L		11-OCT-06	ALW	R452305
Conductivity									
Conductivity		66.6		0.4	umhos/cm		06-OCT-06	SXB	R451386
Fluoride Soluble									
Fluoride (F) - Soluble		0.2		0.1	mg/L		12-OCT-06	ALW	R452766
Hardness (as CaCO ₃)		20.6		0.2	mg/L		17-OCT-06		
Nitrate + Nitrite Soluble									
Nitrate+Nitrite-N - Soluble		0.038		0.005	mg/L		06-OCT-06	LDE	R450708
Routine Metals									
Calcium (Ca)-Extractable		6.33		0.05	mg/L		16-OCT-06	DAG	R454124
Potassium (K)-Extractable		0.97		0.05	mg/L		16-OCT-06	DAG	R454124
Magnesium (Mg)-Extractable		1.17		0.01	mg/L		16-OCT-06	DAG	R454124
Sodium (Na)-Extractable		3.53		0.02	mg/L		16-OCT-06	DAG	R454124
Iron (Fe)-Extractable		0.10		0.01	mg/L		16-OCT-06	DAG	R454124
Manganese (Mn)-Extractable		0.0061		0.0002	mg/L		16-OCT-06	DAG	R454124
Sulphate Soluble									
Sulphate (SO ₄) - Soluble		<9		9	mg/L		11-OCT-06	ALW	R452305
TDS (Calculated)		26		5	mg/L		17-OCT-06		
Turbidity									
Turbidity		4.2		0.05	NTU		06-OCT-06	SXG	R451319
pH									
PH		7.45		0.01	pH units		06-OCT-06	SXB	R451386
Total Coliform and E. Coll by MColi Blue									
Escherichia Coli mcoli blue MF									
E. Coli		2		1	CFU/100mL	05-OCT-06	06-OCT-06	MJS	R450824
Total Coliform mcoli blue MF									
Total Coliforms		38		1	CFU/100mL	05-OCT-06	06-OCT-06	MJS	R450824

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
ALK-TOT-WP	Water	Alkalinity		APHA 2320B
Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. It is determined by titration with a standard solution of strong mineral acid to the successive HCO ₃ ⁻ and H ₂ CO ₃ endpoints indicated electrometrically.				
ALK-TOT-WP	Water	Alkalinity		APHA 4500B, 2510B, 2320B, 1998
Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. It is determined by titration with a standard solution of strong mineral acid to the successive HCO ₃ ⁻ and H ₂ CO ₃ endpoints indicated electrometrically.				
CL-SOL-WP	Water	Chloride Soluble		APHA4500/LACHAT
Chloride - Colourimetric using Mercuric Thiocyanate				
CL-SOL-WP	Water	Chloride Soluble		APHA4500;1998/LACHAT;MAR 1997
Chloride - Colourimetric using Mercuric Thiocyanate				
EC-MCOLIMF-WP	Water	Escherichia Coli mcoli blue MF		APHA 9222B and HACH #10029
This procedure is applicable to E. coli analysis for water samples. It is also used for Total Coliform analysis when only one 100 mL samples is submitted for both Total Coliforms and E. coli. If two sample bottles are submitted for these analyses, E. coli analysis is performed by this procedure, and Total Coliform analysis can be performed by A151.				
A suitable sample volume is poured through a membrane filter and placed in a petri dish prepared with m-Coli Blue 24 broth. The inverted plates are incubated at 35C +/- 0.5C for 24hrs. Coliforms that are not E. coli turn red because they reduce TTC (2,3,5 triphenyltetrazolium chloride) in the medium. E. coli turn blue due to the reaction between the enzyme beta glucuronidase and BCIG (5-bromo-4 chloro-3 indolyl-beta-D-glucuronide) in the medium.				
EC-MCOLIMF-WP	Water	Escherichia Coli mcoli blue MF		APHA 9222B and HACH 10029
This procedure is applicable to E. coli analysis for water samples. It is also used for Total Coliform analysis when only one 100 mL samples is submitted for both Total Coliforms and E. coli. If two sample bottles are submitted for these analyses, E. coli analysis is performed by this procedure, and Total Coliform analysis can be performed by A151.				
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EC-WP	Water	Conductivity		APHA 2510B
Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.				
EC-WP	Water	Conductivity		APHA 4500B, 2510B, 2320B, 1998
Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.				
ETL-HARDNESS-EXT-WP	Water	Hardness Calculated		Calculated
F-SOL-WP	Water	Fluoride Soluble		APHA4500/LACHAT
Fluoride - Ion selective electrode				
F-SOL-WP	Water	Fluoride Soluble		APHA4500;1998/LACHAT;MAR 1997
Fluoride - Ion selective electrode				
IONBALANCE-OP05-WP	Water			APHA 1030E
MET2-EXT-LOW-WP	Water	Routine Metals		EPA 200.8 Rev 5.4 May 1994
N2N3-SOL-WP	Water	Nitrate + Nitrite Soluble		APHA4500;1998/LACHAT;MAR 1997
N2N3-SOL-WP	Water	Nitrate + Nitrite Soluble		APHA4500;2005/LACHAT;1997,1999
PH-WP	Water	pH		APHA 4500B, 2510B, 2320B, 1998
pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.				
PH-WP	Water	pH		APHA 4500H
pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.				

Reference Information

SO4-SOL-WP	Water	Sulphate Soluble	APHA4500/LACHAT
Sulphate - Turbidimetric			
SO4-SOL-WP	Water	Sulphate Soluble	APHA4500;1998/LACHAT;MAR 1997
Sulphate - Turbidimetric			
SOLIDS-TDS-WP	Water	Total Dissolved Solids	APHA 2540
The residue remaining in a prepared casserole after passing the sample through a 1.2 um Whatman GF/C glass microfibre filter and drying at 180 degrees C. Samples may be dried at 105 degrees C if the client specifically requests this drying temperature.			
SOLIDS-TOTSUS-WP	Water	Total Suspended Solids	APHA 2540
The residue retained by a prepared 1.5 um Whatman 934-AH glass microfibre filter dried at 105 degrees C.			
TC-MCOLIMF-WP	Water	Total Coliform mcoli blue MF	APHA 9222B and HACH 10029
This procedure is applicable to E. coli analysis for water samples. It is also used for Total Coliform analysis when only one 100 mL samples is submitted for both Total Coliforms and E. coli. If two sample bottles are submitted for these analyses, E. coli analysis is performed by this procedure, and Total Coliform analysis is performed by A151.			
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TC-MCOLIMF-WP	Water	Total Coliform mcoli blue MF	HACH METHOD #10029,REV 2
This procedure is applicable to E. coli analysis for water samples. It is also used for Total Coliform analysis when only one 100 mL samples is submitted for both Total Coliforms and E. coli. If two sample bottles are submitted for these analyses, E. coli analysis is performed by this procedure, and Total Coliform analysis is performed by A151.			
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TURBIDITY-WP	Water	Turbidity	APHA, 1998, 2130B
A strong light beam is sent through a transparent tube containing the sample. Light that is reflected at 90 degrees to the axis by suspended particles is detected by the photocell. The electrical response is proportional to the sample turbidity.			

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

Chain of Custody numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WP	ALS LABORATORY GROUP - WINNIPEG, MANITOBA, CANADA		

Reference Information

GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency. The Laboratory control limits are determined under column heading D.L.

mg/kg (units) - unit of concentration based on mass, parts per million.

mg/L (units) - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

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Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
ALK-TOT-WP	Water	Alkalinity		APHA 2320B
Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. It is determined by titration with a standard solution of strong mineral acid to the successive HCO ₃ ⁻ and H ₂ CO ₃ endpoints indicated electrometrically.				
ALK-TOT-WP	Water	Alkalinity		APHA 4500B, 2510B, 2320B, 1998
Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. It is determined by titration with a standard solution of strong mineral acid to the successive HCO ₃ ⁻ and H ₂ CO ₃ endpoints indicated electrometrically.				
CL-SOL-WP	Water	Chloride Soluble		APHA4500/LACHAT
Chloride - Colourimetric using Mercuric Thiocyanate				
CL-SOL-WP	Water	Chloride Soluble		APHA4500;1998/LACHAT;MAR 1997
Chloride - Colourimetric using Mercuric Thiocyanate				
EC-MCOLIMF-WP	Water	Escherichia Coli mcoli blue MF		APHA 9222B and HACH #10029
This procedure is applicable to E. coli analysis for water samples. It is also used for Total Coliform analysis when only one 100 mL samples is submitted for both Total Coliforms and E. coli. If two sample bottles are submitted for these analyses, E. coli analysis is performed by this procedure, and Total Coliform analysis can be performed by A151.				
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EC-WP	Water	Conductivity		APHA 2510B
Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.				
EC-WP	Water	Conductivity		APHA 4500B, 2510B, 2320B, 1998
Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.				
ETL-HARDNESS-EXT-WP	Water	Hardness Calculated		Calculated
F-SOL-WP	Water	Fluoride Soluble		APHA4500/LACHAT
Fluoride - Ion selective electrode				
F-SOL-WP	Water	Fluoride Soluble		APHA4500;1998/LACHAT;MAR 1997
Fluoride - Ion selective electrode				
IONBALANCE-OP05-WP	Water			APHA 1030E
MET2-EXT-LOW-WP	Water	Routine Metals		EPA 200.8 Rev 5.4 May 1994
N2N3-SOL-WP	Water	Nitrate + Nitrite Soluble		APHA4500;1998/LACHAT;MAR 1997
N2N3-SOL-WP	Water	Nitrate + Nitrite Soluble		APHA4500;2005/LACHAT;1997,1999
PH-WP	Water	pH		APHA 4500B, 2510B, 2320B, 1998
pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.				
PH-WP	Water	pH		APHA 4500H
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Reference Information

SO4-SOL-WP	Water	Sulphate Soluble	APHA4500/LACHAT
Sulphate - Turbidimetric			
SO4-SOL-WP	Water	Sulphate Soluble	APHA4500;1998/LACHAT;MAR 1997
Sulphate - Turbidimetric			
SOLIDS-TDS-WP	Water	Total Dissolved Solids	APHA 2540

The residue remaining in a prepared casserole after passing the sample through a 1.2 um Whatman GF/C glass microfibre filter and drying at 180 degrees C. Samples may be dried at 105 degrees C if the client specifically requests this drying temperature.

SOLIDS-TOTSUS-WP	Water	Total Suspended Solids	APHA 2540
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The residue retained by a prepared 1.5 um Whatman 934-AH glass microfibre filter dried at 105 degrees C.

TC-MCOLIMF-WP	Water	Total Coliform mcoli blue MF	APHA 9222B and HACH 10029
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TC-MCOLIMF-WP	Water	Total Coliform mcoli blue MF	HACH METHOD #10029,REV 2
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This procedure is applicable to E. coli analysis for water samples. It is also used for Total Coliform analysis when only one 100 mL samples is submitted for both Total Coliforms and E. coli. If two sample bottles are submitted for these analyses, E. coli analysis is performed by this procedure, and Total Coliform analysis is performed by A151.

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TURBIDITY-WP	Water	Turbidity	APHA, 1998, 2130B
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A strong light beam is sent through a transparent tube containing the sample. Light that is reflected at 90 degrees to the axis by suspended particles is detected by the photocell. The electrical response is proportional to the sample turbidity.

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The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

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Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds. The reported surrogate recovery value provides a measure of method efficiency. The Laboratory control limits are determined under column heading D.L.

mg/kg (units) - unit of concentration based on mass, parts per million.

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D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

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ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



Environmental Division

PRELIMINARY RESULTS

JACQUES WHITFORD

ATTN: CAREY SIBBALD

201, 5103 - 51ST AVE

YELLOWKNIFE NT X1A 2P3

Reported On: 19-OCT-06 03:18 PM

Lab Work Order #: **L441336**

Date Received: **06-OCT-06**

Project P.O. #:

Job Reference: 1015263

Legal Site Desc:

CofC Numbers:

Other Information:

Comments:

APPROVED BY: _____

PAUL NICOLAS

Project Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

Manitoba Technology Centre Ltd.

Part of the **ALS Laboratory Group**

1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4

Phone: +1 204 255 9720 Fax: +1 204 255 9721 www.alsglobal.com

A Campbell Brothers Limited Company

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L441336-1	BL-4								
Sampled By: CS / NK on 05-OCT-06 @ 09:30									
Matrix: WATER									
Metal scan, total with ultras									
Aluminum (Al)-Total		0.015		0.005	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Cadmium (Cd)-Total		0.00009		0.00002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Iron (Fe)-Total		0.03		0.02	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Mercury (Hg)-Total		<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Metal scan									
Arsenic (As)-Total		<0.0005		0.0005	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Boron (B)-Total		<0.03		0.03	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Barium (Ba)-Total		0.0147		0.0003	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Beryllium (Be)-Total		<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Bismuth (Bi)-Total		<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Calcium (Ca)-Total		1.9		0.1	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Cobalt (Co)-Total		<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Chromium (Cr)-Total		<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Cesium (Cs)-Total		<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Copper (Cu)-Total		<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Potassium (K)-Total		0.1		0.1	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Magnesium (Mg)-Total		0.83		0.01	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Manganese (Mn)-Total		0.0020		0.0003	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Molybdenum (Mo)-Total		<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Sodium (Na)-Total		0.46		0.03	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Nickel (Ni)-Total		<0.002		0.002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Phosphorus (P)-Total		<0.05	RAMB	0.05	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Lead (Pb)-Total		<0.0005		0.0005	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Rubidium (Rb)-Total		<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Antimony (Sb)-Total		<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Selenium (Se)-Total		<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Tin (Sn)-Total		<0.0006		0.0006	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Strontium (Sr)-Total		0.0124		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Tellurium (Te)-Total		<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Titanium (Ti)-Total		<0.0009		0.0009	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Thallium (Tl)-Total		<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Uranium (U)-Total		<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Vanadium (V)-Total		<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Tungsten (W)-Total		<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Zirconium (Zr)-Total		<0.0004		0.0004	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Silver (Ag)-Total		<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Zinc (Zn)-Total		<0.01		0.01	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Total Dissolved Solids		18		5	mg/L		12-OCT-06	CXZ	R452850
Total Suspended Solids		<5		5	mg/L		12-OCT-06	CXZ	R452850
ROU4W Extractable									
Alkalinity									
Alkalinity, Total (as CaCO3)		9		1	mg/L		11-OCT-06	SXB	R452133
Bicarbonate (HCO3)		11		2	mg/L		11-OCT-06	SXB	R452133
Carbonate (CO3)		<0.6		0.6	mg/L		11-OCT-06	SXB	R452133
Hydroxide (OH)		<0.4		0.4	mg/L		11-OCT-06	SXB	R452133
Chloride Soluble									
Chloride (Cl) - Soluble		<9		9	mg/L		18-OCT-06	ALW	R454143
Conductivity									
Conductivity		22.8		0.4	umhos/cm		06-OCT-06	SXB	R451386
Fluoride Soluble									

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L441336-1 BL-4								
Sampled By: CS / NK on 05-OCT-06 @ 09:30								
Matrix: WATER								
ROU4W Extractable								
Fluoride Soluble								
Fluoride (F) - Soluble	0.1		0.1	mg/L		12-OCT-06	ALW	R452766
Hardness (as CaCO3)	9.1		0.2	mg/L		18-OCT-06		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	0.011		0.005	mg/L		10-OCT-06	CLM	R451757
Routine Metals								
Calcium (Ca)-Extractable	2.13		0.05	mg/L		17-OCT-06	MEB	R454804
Potassium (K)-Extractable	0.34		0.05	mg/L		17-OCT-06	MEB	R454804
Magnesium (Mg)-Extractable	0.92		0.01	mg/L		17-OCT-06	MEB	R454804
Sodium (Na)-Extractable	0.51		0.02	mg/L		17-OCT-06	MEB	R454804
Iron (Fe)-Extractable	0.06		0.01	mg/L		17-OCT-06	MEB	R454804
Manganese (Mn)-Extractable	0.0041		0.0002	mg/L		17-OCT-06	MEB	R454804
Sulphate Soluble								
Sulphate (SO4) - Soluble	<9		9	mg/L		12-OCT-06	ALW	R452759
TDS (Calculated)	9		5	mg/L		18-OCT-06		
Turbidity								
Turbidity	0.33		0.05	NTU		06-OCT-06	SXG	R451319
pH								
PH	7.12		0.01	pH units		06-OCT-06	SXB	R451386
Total Coliform and E. Coli by MColi Blue								
Escherichia Coli mcoli blue MF								
E. Coli	<1		1	CFU/100mL	06-OCT-06	07-OCT-06	ARC	R451080
Total Coliform mcoli blue MF								
Total Coliforms	<1		1	CFU/100mL	06-OCT-06	07-OCT-06	ARC	R451080
L441336-2 BL-6-0.5 M								
Sampled By: CS / NK on 05-OCT-06 @ 09:30								
Matrix: WATER								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.019		0.005	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Cadmium (Cd)-Total	0.00012		0.00002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Iron (Fe)-Total	0.02		0.02	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Metal scan								
Arsenic (As)-Total	<0.0005		0.0005	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Boron (B)-Total	<0.03		0.03	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Barium (Ba)-Total	0.0147		0.0003	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Beryllium (Be)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Calcium (Ca)-Total	2.1		0.1	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Cobalt (Co)-Total	<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Chromium (Cr)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Copper (Cu)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Potassium (K)-Total	0.2		0.1	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Magnesium (Mg)-Total	0.87		0.01	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Manganese (Mn)-Total	0.0050		0.0003	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Sodium (Na)-Total	0.53		0.03	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Nickel (Ni)-Total	<0.002		0.002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Phosphorus (P)-Total	<0.05		0.05	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Lead (Pb)-Total	<0.0005	RAMB	0.0005	mg/L	12-OCT-06	13-OCT-06	DAG	R452883

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L441336-2 BL-6-0.5 M								
Sampled By: CS / NK on 05-OCT-06 @ 09:30								
Matrix: WATER								
Metal scan, total with ultras								
Metal scan								
Rubidium (Rb)-Total	<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Antimony (Sb)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Selenium (Se)-Total	0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Tin (Sn)-Total	0.0010		0.0006	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Strontium (Sr)-Total	0.0132		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Tellurium (Te)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Titanium (Ti)-Total	<0.0009		0.0009	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Uranium (U)-Total	<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Vanadium (V)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Tungsten (W)-Total	<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Zirconium (Zr)-Total	<0.0004		0.0004	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Silver (Ag)-Total	<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Zinc (Zn)-Total	<0.01		0.01	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Total Dissolved Solids	14		5	mg/L		12-OCT-06	CXZ	R452850
Total Suspended Solids	<5		5	mg/L		12-OCT-06	CXZ	R452850
ROU4W Extractable								
Alkalinity								
Alkalinity, Total (as CaCO3)	9		1	mg/L		11-OCT-06	SXB	R452133
Bicarbonate (HCO3)	11		2	mg/L		11-OCT-06	SXB	R452133
Carbonate (CO3)	<0.6		0.6	mg/L		11-OCT-06	SXB	R452133
Hydroxide (OH)	<0.4		0.4	mg/L		11-OCT-06	SXB	R452133
Chloride Soluble								
Chloride (Cl) - Soluble	<9		9	mg/L		12-OCT-06	ALW	R452766
Conductivity								
Conductivity	23.3		0.4	umhos/cm		06-OCT-06	SXB	R451386
Fluoride Soluble								
Fluoride (F) - Soluble	0.1		0.1	mg/L		12-OCT-06	ALW	R452766
Hardness (as CaCO3)	9.3		0.2	mg/L		18-OCT-06		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	0.013		0.005	mg/L		10-OCT-06	CLM	R451757
Routine Metals								
Calcium (Ca)-Extractable	2.18		0.05	mg/L		17-OCT-06	MEB	R454804
Potassium (K)-Extractable	0.42		0.05	mg/L		17-OCT-06	MEB	R454804
Magnesium (Mg)-Extractable	0.93		0.01	mg/L		17-OCT-06	MEB	R454804
Sodium (Na)-Extractable	0.60		0.02	mg/L		17-OCT-06	MEB	R454804
Iron (Fe)-Extractable	0.02		0.01	mg/L		17-OCT-06	MEB	R454804
Manganese (Mn)-Extractable	0.0018		0.0002	mg/L		17-OCT-06	MEB	R454804
Sulphate Soluble								
Sulphate (SO4) - Soluble	<9		9	mg/L		12-OCT-06	ALW	R452766
TDS (Calculated)	10		5	mg/L		18-OCT-06		
Turbidity								
Turbidity	0.32		0.05	NTU		06-OCT-06	SXG	R451319
pH								
PH	7.14		0.01	pH units		06-OCT-06	SXB	R451386
Total Coliform and E. Coli by MColi Blue								
Escherichia Coli mcoli blue MF								
E. Coli	<1		1	CFU/100mL	06-OCT-06	07-OCT-06	ARC	R451080
Total Coliform mcoli blue MF								
Total Coliforms	1		1	CFU/100mL	06-OCT-06	07-OCT-06	ARC	R451080

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L	Units	Extracted	Analyzed	By	Batch
L441336-2	BL-6-0.5 M								
Sampled By: CS / NK on 05-OCT-06 @ 09:30									
Matrix: WATER									
Total Coliform and E. Coli by MColi Blue									
L441336-3	BL-6-3 M								
Sampled By: CS / NK on 05-OCT-06 @ 09:30									
Matrix: WATER									
Metal scan, total with ultras									
Aluminum (Al)-Total		0.027		0.005	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Cadmium (Cd)-Total		0.00012		0.00002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Iron (Fe)-Total		0.04		0.02	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Mercury (Hg)-Total		<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Metal scan									
Arsenic (As)-Total		<0.0005		0.0005	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Boron (B)-Total		<0.03		0.03	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Barium (Ba)-Total		0.0146		0.0003	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Beryllium (Be)-Total		<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Bismuth (Bi)-Total		<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Calcium (Ca)-Total		2.0		0.1	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Cobalt (Co)-Total		<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Chromium (Cr)-Total		<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Cesium (Cs)-Total		<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Copper (Cu)-Total		<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Potassium (K)-Total		0.2		0.1	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Magnesium (Mg)-Total		0.86		0.01	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Manganese (Mn)-Total		0.0017		0.0003	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Molybdenum (Mo)-Total		<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Sodium (Na)-Total		0.55		0.03	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Nickel (Ni)-Total		<0.002		0.002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Phosphorus (P)-Total		<0.05	RAMB	0.05	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Lead (Pb)-Total		<0.0005		0.0005	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Rubidium (Rb)-Total		<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Antimony (Sb)-Total		<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Selenium (Se)-Total		<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Tin (Sn)-Total		<0.0006		0.0006	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Strontium (Sr)-Total		0.0131		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Tellurium (Te)-Total		<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Titanium (Ti)-Total		<0.0009		0.0009	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Thallium (Tl)-Total		<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Uranium (U)-Total		<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Vanadium (V)-Total		<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Tungsten (W)-Total		<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Zirconium (Zr)-Total		<0.0004		0.0004	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Silver (Ag)-Total		<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Zinc (Zn)-Total		<0.01		0.01	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Total Dissolved Solids		10		5	mg/L		12-OCT-06	CXZ	R452850
Total Suspended Solids		<5		5	mg/L		12-OCT-06	CXZ	R452850
ROU4W Extractable									
Alkalinity									
Alkalinity, Total (as CaCO3)		9		1	mg/L		11-OCT-06	SXB	R452133
Bicarbonate (HCO3)		11		2	mg/L		11-OCT-06	SXB	R452133
Carbonate (CO3)		<0.6		0.6	mg/L		11-OCT-06	SXB	R452133
Hydroxide (OH)		<0.4		0.4	mg/L		11-OCT-06	SXB	R452133
Chloride Soluble									

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L441336-3 BL-6-3 M								
Sampled By: CS / NK on 05-OCT-06 @ 09:30								
Matrix: WATER								
ROU4W Extractable								
Chloride Soluble								
Chloride (Cl) - Soluble	<9		9	mg/L		12-OCT-06	ALW	R452766
Conductivity								
Conductivity	23.7		0.4	umhos/cm		06-OCT-06	SXB	R451386
Fluoride Soluble								
Fluoride (F) - Soluble	0.1		0.1	mg/L		12-OCT-06	ALW	R452766
Hardness (as CaCO3)	9.2		0.2	mg/L		18-OCT-06		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	0.008		0.005	mg/L		10-OCT-06	CLM	R451757
Routine Metals								
Calcium (Ca)-Extractable	2.20		0.05	mg/L		17-OCT-06	MEB	R454804
Potassium (K)-Extractable	0.34		0.05	mg/L		17-OCT-06	MEB	R454804
Magnesium (Mg)-Extractable	0.91		0.01	mg/L		17-OCT-06	MEB	R454804
Sodium (Na)-Extractable	0.59		0.02	mg/L		17-OCT-06	MEB	R454804
Iron (Fe)-Extractable	0.02		0.01	mg/L		17-OCT-06	MEB	R454804
Manganese (Mn)-Extractable	0.0023		0.0002	mg/L		17-OCT-06	MEB	R454804
Sulphate Soluble								
Sulphate (SO4) - Soluble	<9		9	mg/L		12-OCT-06	ALW	R452766
TDS (Calculated)	10		5	mg/L		18-OCT-06		
Turbidity								
Turbidity	0.30		0.05	NTU		06-OCT-06	SXG	R451319
pH								
PH	7.13		0.01	pH units		06-OCT-06	SXB	R451386
Total Coliform and E. Coli by MColi Blue								
Escherichia Coli mcol blue MF								
E. Coli	<1		1	CFU/100mL	06-OCT-06	07-OCT-06	ARC	R451080
Total Coliform mcol blue MF								
Total Coliforms	<1		1	CFU/100mL	06-OCT-06	07-OCT-06	ARC	R451080
L441336-4 BL-6-6 M								
Sampled By: CS / NK on 05-OCT-06 @ 09:30								
Matrix: WATER								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.032		0.005	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Cadmium (Cd)-Total	0.00098		0.00002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Iron (Fe)-Total	0.10		0.02	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Mercury (Hg)-Total	0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Metal scan								
Arsenic (As)-Total	0.0008		0.0005	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Boron (B)-Total	<0.03		0.03	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Barium (Ba)-Total	0.0158		0.0003	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Beryllium (Be)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Bismuth (Bi)-Total	0.0009		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Calcium (Ca)-Total	1.9		0.1	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Cobalt (Co)-Total	0.0010		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Chromium (Cr)-Total	0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Cesium (Cs)-Total	0.0009		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Copper (Cu)-Total	0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Potassium (K)-Total	0.1		0.1	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Magnesium (Mg)-Total	0.87		0.01	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Manganese (Mn)-Total	0.0025		0.0003	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Molybdenum (Mo)-Total	0.0009		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L441336-4 BL-6-6 M									
Sampled By: CS / NK on 05-OCT-06 @ 09:30									
Matrix: WATER									
Metal scan, total with ultras									
Metal scan									
Sodium (Na)-Total		0.58		0.03	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Nickel (Ni)-Total		<0.002		0.002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Phosphorus (P)-Total		<0.05	RAMB	0.05	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Lead (Pb)-Total		0.0008		0.0005	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Rubidium (Rb)-Total		0.0013		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Antimony (Sb)-Total		0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Selenium (Se)-Total		<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Tin (Sn)-Total		0.0009		0.0006	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Strontium (Sr)-Total		0.0133		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Tellurium (Te)-Total		<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Titanium (Ti)-Total		0.0013		0.0009	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Thallium (Tl)-Total		0.0008		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Uranium (U)-Total		0.0009		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Vanadium (V)-Total		<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Tungsten (W)-Total		0.0008		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Zirconium (Zr)-Total		0.0011		0.0004	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Silver (Ag)-Total		0.0009		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Zinc (Zn)-Total		<0.01		0.01	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Total Dissolved Solids		16		5	mg/L		12-OCT-06	CXZ	R452850
Total Suspended Solids		<5		5	mg/L		12-OCT-06	CXZ	R452850
ROU4W Extractable									
Alkalinity									
Alkalinity, Total (as CaCO3)		9		1	mg/L		11-OCT-06	SXB	R452133
Bicarbonate (HCO3)		11		2	mg/L		11-OCT-06	SXB	R452133
Carbonate (CO3)		<0.6		0.6	mg/L		11-OCT-06	SXB	R452133
Hydroxide (OH)		<0.4		0.4	mg/L		11-OCT-06	SXB	R452133
Chloride Soluble									
Chloride (Cl) - Soluble		<9		9	mg/L		12-OCT-06	ALW	R452766
Conductivity									
Conductivity		23.9		0.4	umhos/cm		06-OCT-06	SXB	R451386
Fluoride Soluble									
Fluoride (F) - Soluble		0.1		0.1	mg/L		12-OCT-06	ALW	R452766
Hardness (as CaCO3)		8.9		0.2	mg/L		18-OCT-06		
Nitrate + Nitrite Soluble									
Nitrate+Nitrite-N - Soluble		0.010		0.005	mg/L		10-OCT-06	CLM	R451757
Routine Metals									
Calcium (Ca)-Extractable		2.05		0.05	mg/L		17-OCT-06	MEB	R454804
Potassium (K)-Extractable		0.34		0.05	mg/L		17-OCT-06	MEB	R454804
Magnesium (Mg)-Extractable		0.92		0.01	mg/L		17-OCT-06	MEB	R454804
Sodium (Na)-Extractable		0.62		0.02	mg/L		17-OCT-06	MEB	R454804
Iron (Fe)-Extractable		0.03		0.01	mg/L		17-OCT-06	MEB	R454804
Manganese (Mn)-Extractable		0.0018		0.0002	mg/L		17-OCT-06	MEB	R454804
Sulphate Soluble									
Sulphate (SO4) - Soluble		<9		9	mg/L		12-OCT-06	ALW	R452766
TDS (Calculated)		9		5	mg/L		18-OCT-06		
Turbidity									
Turbidity		0.31		0.05	NTU		06-OCT-06	SXG	R451319
pH									
PH		7.14		0.01	pH units		06-OCT-06	SXB	R451386
Total Coliform and E. Coli by MColi Blue									

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L441336-4 BL-6-6 M								
Sampled By: CS / NK on 05-OCT-06 @ 09:30								
Matrix: WATER								
Total Coliform and E. Coli by MColl Blue								
Escherichia Coli mcoli blue MF								
E. Coli	<1		1	CFU/100mL	06-OCT-06	07-OCT-06	ARC	R451080
Total Coliform mcoli blue MF								
Total Coliforms	<1		1	CFU/100mL	06-OCT-06	07-OCT-06	ARC	R451080
L441336-5 BL-9								
Sampled By: CS / NK on 05-OCT-06 @ 09:30								
Matrix: WATER								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.015		0.005	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Cadmium (Cd)-Total	0.00004		0.00002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Iron (Fe)-Total	0.03		0.02	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Metal scan								
Arsenic (As)-Total	<0.0005		0.0005	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Boron (B)-Total	<0.03		0.03	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Barium (Ba)-Total	0.0150		0.0003	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Beryllium (Be)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Calcium (Ca)-Total	2.2		0.1	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Cobalt (Co)-Total	<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Chromium (Cr)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Copper (Cu)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Potassium (K)-Total	0.2		0.1	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Magnesium (Mg)-Total	1.05		0.01	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Manganese (Mn)-Total	0.0022		0.0003	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Sodium (Na)-Total	2.17		0.03	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Nickel (Ni)-Total	<0.002		0.002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Phosphorus (P)-Total	<0.05	RAMB	0.05	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Lead (Pb)-Total	<0.0005		0.0005	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Rubidium (Rb)-Total	0.0005		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Antimony (Sb)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Selenium (Se)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Tin (Sn)-Total	<0.0006		0.0006	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Strontium (Sr)-Total	0.0147		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Tellurium (Te)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Titanium (Ti)-Total	<0.0009		0.0009	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Uranium (U)-Total	<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Vanadium (V)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Tungsten (W)-Total	<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Zirconium (Zr)-Total	<0.0004		0.0004	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Silver (Ag)-Total	<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Zinc (Zn)-Total	<0.01		0.01	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Total Dissolved Solids	20		5	mg/L		12-OCT-06	CXZ	R452850
Total Suspended Solids	<5		5	mg/L		12-OCT-06	CXZ	R452850
ROU4W Extractable								
Alkalinity								
Alkalinity, Total (as CaCO3)	9		1	mg/L		11-OCT-06	SXB	R452133

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier	D.L	Units	Extracted	Analyzed	By	Batch
L441336-5	BL-9								
Sampled By: CS / NK on 05-OCT-06 @ 09:30									
Matrix: WATER									
ROU4W Extractable									
Alkalinity									
Bicarbonate (HCO ₃)		11		2	mg/L		11-OCT-06	SXB	R452133
Carbonate (CO ₃)		<0.6		0.6	mg/L		11-OCT-06	SXB	R452133
Hydroxide (OH)		<0.4		0.4	mg/L		11-OCT-06	SXB	R452133
Chloride Soluble									
Chloride (Cl) - Soluble		<9		9	mg/L		12-OCT-06	ALW	R452766
Conductivity									
Conductivity		37.6		0.4	umhos/cm		06-OCT-06	SXB	R451386
Fluoride Soluble									
Fluoride (F) - Soluble		<0.1		0.1	mg/L		12-OCT-06	ALW	R452766
Hardness (as CaCO ₃)		9.9		0.2	mg/L		18-OCT-06		
Nitrate + Nitrite Soluble									
Nitrate+Nitrite-N - Soluble		0.011		0.005	mg/L		10-OCT-06	CLM	R451757
Routine Metals									
Calcium (Ca)-Extractable		2.11		0.05	mg/L		17-OCT-06	MEB	R454804
Potassium (K)-Extractable		0.40		0.05	mg/L		17-OCT-06	MEB	R454804
Magnesium (Mg)-Extractable		1.13		0.01	mg/L		17-OCT-06	MEB	R454804
Sodium (Na)-Extractable		2.46		0.02	mg/L		17-OCT-06	MEB	R454804
Iron (Fe)-Extractable		0.02		0.01	mg/L		17-OCT-06	MEB	R454804
Manganese (Mn)-Extractable		0.0022		0.0002	mg/L		17-OCT-06	MEB	R454804
Sulphate Soluble									
Sulphate (SO ₄) - Soluble		<9		9	mg/L		12-OCT-06	ALW	R452766
TDS (Calculated)		12		5	mg/L		18-OCT-06		
Turbidity									
Turbidity		0.31		0.05	NTU		06-OCT-06	SXG	R451319
pH									
PH		7.14		0.01	pH units		06-OCT-06	SXB	R451386
Total Coliform and E. Coli by MColi Blue									
Escherichia Coli mcoli blue MF									
E. Coli		<1		1	CFU/100mL	06-OCT-06	07-OCT-06	ARC	R451080
Total Coliform mcoli blue MF									
Total Coliforms		<1		1	CFU/100mL	06-OCT-06	07-OCT-06	ARC	R451080
L441336-6	BL-11								
Sampled By: CS / NK on 05-OCT-06 @ 09:30									
Matrix: WATER									
Metal scan, total with ultras									
Aluminum (Al)-Total		0.020		0.005	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Cadmium (Cd)-Total		0.00004		0.00002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Iron (Fe)-Total		0.04		0.02	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Mercury (Hg)-Total		<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Metal scan									
Arsenic (As)-Total		<0.0005		0.0005	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Boron (B)-Total		<0.03		0.03	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Barium (Ba)-Total		0.0150		0.0003	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Beryllium (Be)-Total		<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Bismuth (Bi)-Total		<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Calcium (Ca)-Total		1.9		0.1	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Cobalt (Co)-Total		<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Chromium (Cr)-Total		<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Cesium (Cs)-Total		<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Copper (Cu)-Total		<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L441336-6 BL-11								
Sampled By: CS / NK on 05-OCT-06 @ 09:30								
Matrix: WATER								
Metal scan, total with ultras								
Metal scan								
Potassium (K)-Total	0.2		0.1	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Magnesium (Mg)-Total	0.82		0.01	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Manganese (Mn)-Total	0.0019		0.0003	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Sodium (Na)-Total	0.46		0.03	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Nickel (Ni)-Total	<0.002		0.002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Phosphorus (P)-Total	<0.05	RAMB	0.05	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Lead (Pb)-Total	<0.0005		0.0005	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Rubidium (Rb)-Total	0.0005		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Antimony (Sb)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Selenium (Se)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Tin (Sn)-Total	<0.0006		0.0006	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Strontium (Sr)-Total	0.0127		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Tellurium (Te)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Titanium (Ti)-Total	<0.0009		0.0009	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Uranium (U)-Total	<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Vanadium (V)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Tungsten (W)-Total	<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Zirconium (Zr)-Total	<0.0004		0.0004	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Silver (Ag)-Total	<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Zinc (Zn)-Total	<0.01		0.01	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Total Dissolved Solids	12		5	mg/L		12-OCT-06	CXZ	R452850
Total Suspended Solids	<5		5	mg/L		12-OCT-06	CXZ	R452850
ROU4W Extractable								
Alkalinity								
Alkalinity, Total (as CaCO3)	9		1	mg/L		11-OCT-06	SXB	R452133
Bicarbonate (HCO3)	11		2	mg/L		11-OCT-06	SXB	R452133
Carbonate (CO3)	<0.6		0.6	mg/L		11-OCT-06	SXB	R452133
Hydroxide (OH)	<0.4		0.4	mg/L		11-OCT-06	SXB	R452133
Chloride Soluble								
Chloride (Cl) - Soluble	<9		9	mg/L		12-OCT-06	ALW	R452766
Conductivity								
Conductivity	22.9		0.4	umhos/cm		06-OCT-06	SXB	R451386
Fluoride Soluble								
Fluoride (F) - Soluble	0.2		0.1	mg/L		12-OCT-06	ALW	R452766
Hardness (as CaCO3)	8.9		0.2	mg/L		18-OCT-06		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	0.010		0.005	mg/L		10-OCT-06	CLM	R451757
Routine Metals								
Calcium (Ca)-Extractable	2.06		0.05	mg/L		17-OCT-06	MEB	R454804
Potassium (K)-Extractable	0.36		0.05	mg/L		17-OCT-06	MEB	R454804
Magnesium (Mg)-Extractable	0.92		0.01	mg/L		17-OCT-06	MEB	R454804
Sodium (Na)-Extractable	0.52		0.02	mg/L		17-OCT-06	MEB	R454804
Iron (Fe)-Extractable	0.03		0.01	mg/L		17-OCT-06	MEB	R454804
Manganese (Mn)-Extractable	0.0019		0.0002	mg/L		17-OCT-06	MEB	R454804
Sulphate Soluble								
Sulphate (SO4) - Soluble	<9		9	mg/L		12-OCT-06	ALW	R452766
TDS (Calculated)	9		5	mg/L		18-OCT-06		
Turbidity								

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L441336-6	BL-11								
Sampled By:	CS / NK on 05-OCT-06 @ 09:30								
Matrix:	WATER								
ROU4W Extractable									
Turbidity									
	Turbidity	0.31		0.05	NTU		06-OCT-06	SXG	R451319
pH									
	PH	7.17		0.01	pH units		08-OCT-06	SXB	R451386
Total Coliform and E. Coli by MColi Blue									
Escherichia Coli mcoli blue MF									
	E. Coli	<1		1	CFU/100mL	06-OCT-06	07-OCT-06	ARC	R451080
Total Coliform mcoli blue MF									
	Total Coliforms	<1		1	CFU/100mL	06-OCT-06	07-OCT-06	ARC	R451080
L441336-7	THELAN								
Sampled By:	CS / NK on 05-OCT-06 @ 12:15								
Matrix:	WATER								
Metal scan, total with ultras									
	Aluminum (Al)-Total	0.022		0.005	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Cadmium (Cd)-Total	0.00004		0.00002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Iron (Fe)-Total	0.02		0.02	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Mercury (Hg)-Total	<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
Metal scan									
	Arsenic (As)-Total	<0.0005		0.0005	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Boron (B)-Total	<0.03		0.03	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Barium (Ba)-Total	0.0147		0.0003	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Beryllium (Be)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Calcium (Ca)-Total	1.8		0.1	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Cobalt (Co)-Total	<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Chromium (Cr)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Cesium (Cs)-Total	<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Copper (Cu)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Potassium (K)-Total	<0.1		0.1	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Magnesium (Mg)-Total	0.78		0.01	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Manganese (Mn)-Total	0.0021		0.0003	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Sodium (Na)-Total	0.42		0.03	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Nickel (Ni)-Total	<0.002		0.002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Phosphorus (P)-Total	<0.05	RAMB	0.05	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Lead (Pb)-Total	<0.0005		0.0005	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Rubidium (Rb)-Total	0.0004		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Antimony (Sb)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Selenium (Se)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Tin (Sn)-Total	<0.0006		0.0006	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Strontium (Sr)-Total	0.0123		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Tellurium (Te)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Titanium (Ti)-Total	<0.0009		0.0009	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Thallium (Tl)-Total	<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Uranium (U)-Total	<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Vanadium (V)-Total	<0.001		0.001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Tungsten (W)-Total	<0.0002		0.0002	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Zirconium (Zr)-Total	<0.0004		0.0004	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Silver (Ag)-Total	<0.0001		0.0001	mg/L	12-OCT-06	13-OCT-06	DAG	R452883
	Zinc (Zn)-Total	<0.01		0.01	mg/L	12-OCT-06	13-OCT-06	DAG	R452883

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L441336-7 THELAN									
Sampled By: CS / NK on 05-OCT-06 @ 12:15									
Matrix: WATER									
Total Dissolved Solids		10		5	mg/L		12-OCT-06	CXZ	R452850
Total Suspended Solids		<5		5	mg/L		12-OCT-06	CXZ	R452850
ROU4W Extractable									
Alkalinity									
Alkalinity, Total (as CaCO ₃)		9		1	mg/L		11-OCT-06	SXB	R452133
Bicarbonate (HCO ₃)		11		2	mg/L		11-OCT-06	SXB	R452133
Carbonate (CO ₃)		<0.6		0.6	mg/L		11-OCT-06	SXB	R452133
Hydroxide (OH)		<0.4		0.4	mg/L		11-OCT-06	SXB	R452133
Chloride Soluble									
Chloride (Cl) - Soluble		<9		9	mg/L		12-OCT-06	ALW	R452766
Conductivity									
Conductivity		22.8		0.4	umhos/cm		06-OCT-06	SXB	R451386
Fluoride Soluble									
Fluoride (F) - Soluble		0.1		0.1	mg/L		12-OCT-06	ALW	R452766
Hardness (as CaCO ₃)		9.0		0.2	mg/L		18-OCT-06		
Nitrate + Nitrite Soluble									
Nitrate+Nitrite-N - Soluble		0.011		0.005	mg/L		10-OCT-06	CLM	R451757
Routine Metals									
Calcium (Ca)-Extractable		2.08		0.05	mg/L		17-OCT-06	MEB	R454804
Potassium (K)-Extractable		0.36		0.05	mg/L		17-OCT-06	MEB	R454804
Magnesium (Mg)-Extractable		0.92		0.01	mg/L		17-OCT-06	MEB	R454804
Sodium (Na)-Extractable		0.52		0.02	mg/L		17-OCT-06	MEB	R454804
Iron (Fe)-Extractable		0.02		0.01	mg/L		17-OCT-06	MEB	R454804
Manganese (Mn)-Extractable		0.0019		0.0002	mg/L		17-OCT-06	MEB	R454804
Sulphate Soluble									
Sulphate (SO ₄) - Soluble		<9		9	mg/L		12-OCT-06	ALW	R452766
TDS (Calculated)		9		5	mg/L		18-OCT-06		
Turbidity									
Turbidity		0.26		0.05	NTU		06-OCT-06	SXG	R451319
pH									
PH		7.14		0.01	pH units		06-OCT-06	SXB	R451386
Total Coliform and E. Coli by MColi Blue									
Escherichia Coli mcoli blue MF									
E. Coli		<1		1	CFU/100mL	06-OCT-06	07-OCT-06	ARC	R451080
Total Coliform mcoli blue MF									
Total Coliforms		<1		1	CFU/100mL	06-OCT-06	07-OCT-06	ARC	R451080

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
RAMB	Result Adjusted For Method Blank

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
AG-TOT-ULTRA-WP	Water	Silver (Ag)-Total		EPA 200.8 Rev 5.4 May 1994
AL-TOT-ULTRA-WP	Water	Aluminum (Al)-Total		EPA 200.8 Rev 5.4 May 1994
ALK-TOT-WP	Water	Alkalinity		APHA 2320B

Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. It is determined by titration with a standard solution of strong mineral acid to the successive HCO₃⁻ and H₂CO₃ endpoints indicated electrometrically.

CD-TOT-ULTRA-WP	Water	Cadmium (Cd)-Total		EPA 200.8 Rev 5.4 May 1994
CL-SOL-WP	Water	Chloride Soluble		APHA4500/LACHAT

Chloride - Colourimetric using Mercuric Thiocyanate

EC-MCOLIMF-WP	Water	Escherichia Coli mcoli blue MF		APHA 9222B and HACH 10029
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This procedure is applicable to E. coli analysis for water samples. It is also used for Total Coliform analysis when only one 100 mL samples is submitted for both Total Coliforms and E. coli. If two sample bottles are submitted for these analyses, E. coli analysis is performed by this procedure, and Total Coliform analysis can be performed by A151.

A suitable sample volume is poured through a membrane filter and placed in a petri dish prepared with m-Coli Blue 24 broth. The inverted plates are incubated at 35C +/- 0.5C for 24hrs. Coliforms that are not E. coli turn red because they reduce TTC (2,3,5 triphenyltetrazolium chloride) in the medium. E. coli turn blue due to the reaction between the enzyme beta glucuronidase and BCIG (5-bromo-4 chloro-3 indolyl-beta-D-glucuronide) in the medium.

EC-WP	Water	Conductivity		APHA 2510B
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Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.

ETL-HARDNESS-EXT-WP	Water	Hardness Calculated		Calculated
F-SOL-WP	Water	Fluoride Soluble		APHA4500/LACHAT

Fluoride - Ion selective electrode

FE-TOT-ULTRA-WP	Water	Iron (Fe)-Total		EPA 200.8 Rev 5.4 May 1994
HG-TOT-ULTRA-WP	Water	Mercury (Hg)-Total		EPA 200.8 Rev 5.4 May 1994
IONBALANCE-OP05-WP	Water			APHA 1030E
MET-SCNOU-TOT-LOW-WP	Water	Metal scan		EPA 200.8 Rev 5.4 May 1994
MET2-EXT-LOW-WP	Water	Routine Metals		EPA 200.8 Rev 5.4 May 1994
N2N3-SOL-WP	Water	Nitrate + Nitrite Soluble		APHA4500;2005/LACHAT;1997,1999
PH-WP	Water	pH		APHA 4500H

pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.

SO4-SOL-WP	Water	Sulphate Soluble		APHA4500/LACHAT
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Sulphate - Turbidimetric

SOLIDS-TDS-WP	Water	Total Dissolved Solids		APHA 2540
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The residue remaining in a prepared casserole after passing the sample through a 1.2 um Whatman GF/C glass microfibre filter and drying at 180 degrees C. Samples may be dried at 105 degrees C if the client specifically requests this drying temperature.

SOLIDS-TOTSUS-WP	Water	Total Suspended Solids		APHA 2540
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The residue retained by a prepared 1.5 um Whatman 934-AH glass microfibre filter dried at 105 degrees C.

TC-MCOLIMF-WP	Water	Total Coliform mcoli blue MF		APHA 9222B and HACH 10029
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This procedure is applicable to E. coli analysis for water samples. It is also used for Total Coliform analysis when only one 100 mL samples is submitted for both Total Coliforms and E. coli. If two sample bottles are submitted for these analyses, E. coli analysis is performed by this procedure, and Total Coliform analysis is performed by A151.

A suitable sample volume is poured through a membrane filter and placed in a petri dish prepared with m-Coli Blue 24 broth. The inverted plates are incubated at 35C +/- 0.5C for 24hrs. Coliforms that are not E. coli turn red because they reduce TTC (2,3,5 triphenyltetrazolium chloride) in the medium. E. coli turn blue due to the reaction between the enzyme beta glucuronidase and BCIG (5-bromo-4 chloro-3 indolyl-beta-D-glucuronide) in the medium.

Reference Information

TURBIDITY-WP

Water

Turbidity

APHA, 1998, 2130B

A strong light beam is sent through a transparent tube containing the sample. Light that is reflected at 90 degrees to the axis by suspended particles is detected by the photocell. The electrical response is proportional to the sample turbidity.

ZN-TOT-ULTRA-WP

Water

Zinc (Zn)-Total

EPA 200.8 Rev 5.4 May 1994

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

Chain of Custody numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WP	ALS LABORATORY GROUP - WINNIPEG, MANITOBA, CANADA		

GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds. The reported surrogate recovery value provides a measure of method efficiency. The Laboratory control limits are determined under column heading D.L.

mg/kg (units) - unit of concentration based on mass, parts per million.

mg/L (units) - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

UNLESS OTHERWISE STATED, SAMPLES ARE NOT CORRECTED FOR CLIENT FIELD BLANKS.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



Environmental Division

ANALYTICAL REPORT

JACQUES WHITFORD LTD.

ATTN: CAREY SIBBALD

201, 5103 - 51ST AVE

YELLOWKNIFE NT X1A 2P3

Reported On: 09-JUL-07 11:19 AM

Lab Work Order #: **L520725**

Date Received: **21-JUN-07**

Project P.O. #:

Job Reference: 1015263

Legal Site Desc:

CofC Numbers:

Other Information:

Comments:

APPROVED BY:

Paul Nicolas

PAUL NICOLAS

Project Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

Manitoba Technology Centre Ltd.

Part of the **ALS Laboratory Group**
1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4

Phone: +1 204 255 9720 Fax: +1 204 255 9721 www.alsglobal.com

A Campbell Brothers Limited Company

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L520725-1	STN - 1								
Sampled By:	CS on 19-JUN-07 @ 11:35								
Matrix:	Grab								
Metal scan, total with ultras									
Aluminum (Al)-Total		0.128		0.005	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Cadmium (Cd)-Total		<0.00002		0.00002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Iron (Fe)-Total		0.11		0.02	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Mercury (Hg)-Total		<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Metal scan									
Arsenic (As)-Total		<0.0005		0.0005	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Boron (B)-Total		<0.03		0.03	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Barium (Ba)-Total		0.0202		0.0003	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Beryllium (Be)-Total		<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Bismuth (Bi)-Total		<0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Calcium (Ca)-Total		3.4		0.1	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Cobalt (Co)-Total		<0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Chromium (Cr)-Total		<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Cesium (Cs)-Total		<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Copper (Cu)-Total		0.002		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Potassium (K)-Total		1.0		0.1	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Magnesium (Mg)-Total		0.76		0.01	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Manganese (Mn)-Total		0.0207		0.0003	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Molybdenum (Mo)-Total		<0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Sodium (Na)-Total		2.27		0.03	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Nickel (Ni)-Total		<0.002		0.002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Phosphorus (P)-Total		0.15	RAMB	0.05	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Lead (Pb)-Total		<0.0005		0.0005	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Rubidium (Rb)-Total		0.0010		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Antimony (Sb)-Total		<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Selenium (Se)-Total		<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Tin (Sn)-Total		<0.0006		0.0006	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Strontium (Sr)-Total		0.0126		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Tellurium (Te)-Total		<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Titanium (Ti)-Total		0.0020		0.0009	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Thallium (Tl)-Total		<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Uranium (U)-Total		<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Vanadium (V)-Total		<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Tungsten (W)-Total		<0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Zirconium (Zr)-Total		<0.0004		0.0004	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Silver (Ag)-Total		<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Zinc (Zn)-Total		<0.01		0.01	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Ammonia (NH3) - Soluble		0.780		0.003	mg/L		21-JUN-07	CLM	R538843
Biochemical Oxygen Demand		<6		1	mg/L	21-JUN-07	26-JUN-07	IML	R540428
Chemical Oxygen Demand		20		8	mg/L		26-JUN-07	IML	R540568
Conductivity		46.0		0.4	umhos/cm		22-JUN-07	DVH	R540224
Fecal Coliform		110		10	CFU/100mL	21-JUN-07	22-JUN-07	GOB	R539185
Hardness (as CaCO3)		11.7		0.3	mg/L		21-JUN-07		
Nitrate+Nitrite-N - Soluble		0.147	RAMB	0.005	mg/L		21-JUN-07	CLM	R538843
Phenols (4AAP)		0.006		0.001	mg/L		22-JUN-07	NAP	R539114
Phosphorus, Total		0.101		0.001	mg/L		04-JUL-07	MEB	R543848
Sulphate (SO4) - Soluble		<9		9	mg/L		28-JUN-07	TJJ	R541653
Total Kjeldahl Nitrogen		1.1		0.2	mg/L	22-JUN-07	29-JUN-07	LDE	R542105
Total Oil and Grease		<1		1	mg/L	27-JUN-07	28-JUN-07	MDM	R540065

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L520725-1	STN - 1								
Sampled By:	CS on 19-JUN-07 @ 11:35								
Matrix:	Grab								
Total Suspended Solids		<5		5	mg/L		27-JUN-07	BJL	R541051
PH		7.24		0.01	pH units		22-JUN-07	DVH	R540224
L520725-2	STN - 2								
Sampled By:	CS on 19-JUN-07 @ 12:50								
Matrix:	Grab								
Metal scan, total with ultras									
Aluminum (Al)-Total		0.121		0.005	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Cadmium (Cd)-Total		<0.00002		0.00002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Iron (Fe)-Total		0.12		0.02	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Mercury (Hg)-Total		<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Metal scan									
Arsenic (As)-Total		<0.0005		0.0005	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Boron (B)-Total		<0.03		0.03	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Barium (Ba)-Total		0.0150		0.0003	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Beryllium (Be)-Total		<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Bismuth (Bi)-Total		<0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Calcium (Ca)-Total		3.4		0.1	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Cobalt (Co)-Total		<0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Chromium (Cr)-Total		<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Cesium (Cs)-Total		<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Copper (Cu)-Total		0.002		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Potassium (K)-Total		1.0		0.1	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Magnesium (Mg)-Total		0.69		0.01	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Manganese (Mn)-Total		0.0297		0.0003	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Molybdenum (Mo)-Total		<0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Sodium (Na)-Total		2.18		0.03	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Nickel (Ni)-Total		<0.002		0.002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Phosphorus (P)-Total		0.12	RAMB	0.05	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Lead (Pb)-Total		<0.0005		0.0005	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Rubidium (Rb)-Total		0.0010		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Antimony (Sb)-Total		<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Selenium (Se)-Total		<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Tin (Sn)-Total		<0.0006		0.0006	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Strontium (Sr)-Total		0.0123		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Tellurium (Te)-Total		<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Titanium (Ti)-Total		0.0019		0.0009	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Thallium (Tl)-Total		<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Uranium (U)-Total		<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Vanadium (V)-Total		<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Tungsten (W)-Total		<0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Zirconium (Zr)-Total		<0.0004		0.0004	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Silver (Ag)-Total		<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Zinc (Zn)-Total		0.02		0.01	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Ammonia (NH3) - Soluble		0.911		0.003	mg/L		21-JUN-07	CLM	R538843
Biochemical Oxygen Demand		<6		1	mg/L	21-JUN-07	26-JUN-07	IML	R540428
Chemical Oxygen Demand		22		8	mg/L		26-JUN-07	IML	R540568
Conductivity		45.7		0.4	umhos/cm		22-JUN-07	DVH	R540224
Fecal Coliform		40		10	CFU/100mL	21-JUN-07	22-JUN-07	GOB	R539185
Hardness (as CaCO3)		11.3		0.3	mg/L		21-JUN-07		

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L520725-2	STN - 2								
Sampled By:	CS on 19-JUN-07 @ 12:50								
Matrix:	Grab								
	Nitrate+Nitrite-N - Soluble	0.097	RAMB	0.005	mg/L		21-JUN-07	CLM	R538843
	Phenols (4AAP)	0.007		0.001	mg/L		22-JUN-07	NAP	R539114
	Phosphorus, Total	0.131		0.001	mg/L		04-JUL-07	MEB	R543848
	Sulphate (SO4) - Soluble	<9		9	mg/L		28-JUN-07	TJJ	R541853
	Total Kjeldahl Nitrogen	1.3		0.2	mg/L	22-JUN-07	29-JUN-07	LDE	R542105
	Total Suspended Solids	<5		5	mg/L		27-JUN-07	BJL	R541051
	PH	6.93		0.01	pH units		22-JUN-07	DVH	R540224
L520725-3	STN - 7								
Sampled By:	CS on 19-JUN-07 @ 14:15								
Matrix:	Grab								
	Metal scan, total with ultras								
	Aluminum (Al)-Total	0.125		0.005	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Cadmium (Cd)-Total	<0.00002		0.00002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Iron (Fe)-Total	0.12		0.02	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Mercury (Hg)-Total	<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Metal scan								
	Arsenic (As)-Total	<0.0005		0.0005	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Boron (B)-Total	<0.03		0.03	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Barium (Ba)-Total	0.0114		0.0003	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Beryllium (Be)-Total	<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Calcium (Ca)-Total	3.8		0.1	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Cobalt (Co)-Total	0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Chromium (Cr)-Total	<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Cesium (Cs)-Total	<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Copper (Cu)-Total	0.003		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Potassium (K)-Total	0.9		0.1	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Magnesium (Mg)-Total	0.72		0.01	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Manganese (Mn)-Total	0.0422		0.0003	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Sodium (Na)-Total	1.95		0.03	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Nickel (Ni)-Total	<0.002		0.002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Phosphorus (P)-Total	0.15	RAMB	0.05	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Lead (Pb)-Total	<0.0005		0.0005	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Rubidium (Rb)-Total	0.0010		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Antimony (Sb)-Total	<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Selenium (Se)-Total	<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Tin (Sn)-Total	<0.0006		0.0006	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Strontium (Sr)-Total	0.0134		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Tellurium (Te)-Total	<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Titanium (Ti)-Total	0.0024		0.0009	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Thallium (Tl)-Total	<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Uranium (U)-Total	<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Vanadium (V)-Total	<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Tungsten (W)-Total	<0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Zirconium (Zr)-Total	<0.0004		0.0004	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Silver (Ag)-Total	<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Zinc (Zn)-Total	0.03		0.01	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
	Ammonia (NH3) - Soluble	0.753		0.003	mg/L		21-JUN-07	CLM	R538843

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L520725-3	STN - 7								
Sampled By:	CS on 19-JUN-07 @ 14:15								
Matrix:	Grab								
Biochemical Oxygen Demand		<6		1	mg/L	21-JUN-07	26-JUN-07	IML	R540428
Chemical Oxygen Demand		22		8	mg/L		26-JUN-07	IML	R540568
Conductivity		43.4		0.4	umhos/cm		22-JUN-07	DVH	R540224
Fecal Coliform		20		10	CFU/100mL	21-JUN-07	22-JUN-07	GOB	R539185
Hardness (as CaCO3)		12.4		0.3	mg/L		21-JUN-07		
Nitrate+Nitrite-N - Soluble		0.084	RAMB	0.005	mg/L		21-JUN-07	CLM	R538843
Phenols (4AAP)		0.007		0.001	mg/L		22-JUN-07	NAP	R539114
Phosphorus, Total		0.132		0.001	mg/L		04-JUL-07	MEB	R543848
Sulphate (SO4) - Soluble		<8		9	mg/L		28-JUN-07	TJJ	R541653
Total Kjeldahl Nitrogen		1.1		0.2	mg/L	22-JUN-07	29-JUN-07	LDE	R542105
Total Oil and Grease		<1		1	mg/L	27-JUN-07	28-JUN-07	MDM	R540065
Total Suspended Solids		<5		5	mg/L		27-JUN-07	BJL	R541051
PH		6.90		0.01	pH units		22-JUN-07	DVH	R540224
L520725-4	STN - 4								
Sampled By:	CS on 19-JUN-07 @ 16:00								
Matrix:	Grab								
Metal scan, total with ultras									
Aluminum (Al)-Total		0.151		0.005	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Cadmium (Cd)-Total		<0.00002		0.00002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Iron (Fe)-Total		0.17		0.02	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Mercury (Hg)-Total		<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Metal scan									
Arsenic (As)-Total		<0.0005		0.0005	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Boron (B)-Total		<0.03		0.03	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Barium (Ba)-Total		0.0151		0.0003	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Beryllium (Be)-Total		<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Bismuth (Bi)-Total		<0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Calcium (Ca)-Total		4.4		0.1	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Cobalt (Co)-Total		0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Chromium (Cr)-Total		<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Cesium (Cs)-Total		<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Copper (Cu)-Total		0.004		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Potassium (K)-Total		1.6		0.1	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Magnesium (Mg)-Total		0.91		0.01	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Manganese (Mn)-Total		0.0475		0.0003	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Molybdenum (Mo)-Total		<0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Sodium (Na)-Total		3.95		0.03	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Nickel (Ni)-Total		<0.002		0.002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Phosphorus (P)-Total		0.30	RAMB	0.05	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Lead (Pb)-Total		<0.0005		0.0005	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Rubidium (Rb)-Total		0.0017		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Antimony (Sb)-Total		<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Selenium (Se)-Total		<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Tin (Sn)-Total		0.0013		0.0006	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Strontium (Sr)-Total		0.0173		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Tellurium (Te)-Total		<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Titanium (Ti)-Total		0.0050		0.0009	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Thallium (Tl)-Total		<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Uranium (U)-Total		<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Vanadium (V)-Total		0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L520725-4 STN - 4								
Sampled By: CS on 19-JUN-07 @ 16:00								
Matrix: Grab								
Metal scan, total with ultras								
Metal scan								
Tungsten (W)-Total	<0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Zirconium (Zr)-Total	<0.0004		0.0004	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Silver (Ag)-Total	<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Zinc (Zn)-Total	0.01		0.01	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Ammonia (NH3) - Soluble	2.14		0.003	mg/L		21-JUN-07	CLM	R538843
Biochemical Oxygen Demand	<6		1	mg/L	21-JUN-07	26-JUN-07	IML	R540428
Chemical Oxygen Demand	30		8	mg/L		26-JUN-07	IML	R540568
Conductivity	74.0		0.4	umhos/cm		22-JUN-07	DVH	R540224
Fecal Coliform	550		10	CFU/100mL	21-JUN-07	22-JUN-07	GOB	R539185
Hardness (as CaCO3)	14.8		0.3	mg/L		21-JUN-07		
Nitrate+Nitrite-N - Soluble	0.517	RAMB	0.005	mg/L		21-JUN-07	CLM	R538843
Phenols (4AAP)	0.011		0.001	mg/L		22-JUN-07	NAP	R539114
Phosphorus, Total	0.262		0.001	mg/L		04-JUL-07	MEB	R543848
Sulphate (SO4) - Soluble	9		9	mg/L		28-JUN-07	TJJ	R541653
Total Kjeldahl Nitrogen	2.9		0.2	mg/L	22-JUN-07	29-JUN-07	LDE	R542105
Total Oil and Grease	<1		1	mg/L	27-JUN-07	28-JUN-07	MDM	R540065
Total Suspended Solids	5		5	mg/L		27-JUN-07	BJL	R541051
PH	6.83		0.01	pH units		22-JUN-07	DVH	R540224
L520725-5 STN - 5								
Sampled By: CS on 19-JUN-07 @ 16:45								
Matrix: Grab								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.179		0.005	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Cadmium (Cd)-Total	<0.00002		0.00002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Iron (Fe)-Total	0.16		0.02	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Metal scan								
Arsenic (As)-Total	<0.0005		0.0005	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Boron (B)-Total	<0.03		0.03	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Barium (Ba)-Total	0.0107		0.0003	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Beryllium (Be)-Total	<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Calcium (Ca)-Total	3.6		0.1	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Cobalt (Co)-Total	0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Chromium (Cr)-Total	<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Copper (Cu)-Total	0.010		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Potassium (K)-Total	2.0		0.1	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Magnesium (Mg)-Total	0.75		0.01	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Manganese (Mn)-Total	0.0305		0.0003	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Sodium (Na)-Total	5.04		0.03	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Nickel (Ni)-Total	<0.002		0.002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Phosphorus (P)-Total	0.68	RAMB	0.05	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Lead (Pb)-Total	<0.0005		0.0005	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Rubidium (Rb)-Total	0.0024		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Antimony (Sb)-Total	<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L520725-5 STN - 5								
Sampled By: CS on 19-JUN-07 @ 16:45								
Matrix: Grab								
Metal scan, total with ultras								
Metal scan								
Selenium (Se)-Total	<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Tin (Sn)-Total	0.0007		0.0006	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Strontium (Sr)-Total	0.0129		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Tellurium (Te)-Total	<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Titanium (Ti)-Total	0.0053		0.0009	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Uranium (U)-Total	<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Vanadium (V)-Total	<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Tungsten (W)-Total	<0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Zirconium (Zr)-Total	0.0007		0.0004	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Silver (Ag)-Total	<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Zinc (Zn)-Total	0.02		0.01	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Ammonia (NH3) - Soluble	5.37		0.003	mg/L		21-JUN-07	CLM	R538843
Biochemical Oxygen Demand	11		1	mg/L	21-JUN-07	26-JUN-07	IML	R540428
Chemical Oxygen Demand	51		8	mg/L		26-JUN-07	IML	R540568
Conductivity	107		0.4	umhos/cm		22-JUN-07	DVH	R540224
Fecal Coliform	OVERGROWN		10	CFU/100mL	21-JUN-07	22-JUN-07	GOB	R539185
Hardness (as CaCO3)	12.0		0.3	mg/L		21-JUN-07		
Nitrate+Nitrite-N - Soluble	0.038	RAMB	0.005	mg/L		21-JUN-07	CLM	R538843
Phenols (4AAP)	0.010		0.001	mg/L	26-JUN-07	26-JUN-07	NAP	R540822
Phosphorus, Total	0.813		0.001	mg/L		04-JUL-07	MEB	R543848
Sulphate (SO4) - Soluble	10		9	mg/L		28-JUN-07	TJJ	R541653
Total Kjeldahl Nitrogen	6.6		0.2	mg/L	22-JUN-07	29-JUN-07	LDE	R542105
Total Oil and Grease	2		1	mg/L	27-JUN-07	28-JUN-07	MDM	R540065
Total Suspended Solids	8		5	mg/L		27-JUN-07	BJL	R541051
PH	6.89		0.01	pH units		22-JUN-07	DVH	R540224
L520725-6 STN - 6								
Sampled By: CS on 19-JUN-07 @ 17:45								
Matrix: Grab								
Metal scan, total with ultras								
Aluminum (Al)-Total	3.00		0.005	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Cadmium (Cd)-Total	<0.00002		0.00002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Iron (Fe)-Total	1.25		0.02	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Metal scan								
Arsenic (As)-Total	<0.0005		0.0005	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Boron (B)-Total	0.14		0.03	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Barium (Ba)-Total	0.0289		0.0003	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Beryllium (Be)-Total	<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Bismuth (Bi)-Total	0.0020		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Calcium (Ca)-Total	8.3		0.1	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Cobalt (Co)-Total	0.0020		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Chromium (Cr)-Total	<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Cesium (Cs)-Total	0.0002		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Copper (Cu)-Total	0.124		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Potassium (K)-Total	13.9		0.1	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Magnesium (Mg)-Total	2.82		0.01	mg/L	25-JUN-07	25-JUN-07	DAG	R540227

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L520725-6	STN - 6								
Sampled By:	CS on 19-JUN-07 @ 17:45								
Matrix:	Grab								
Metal scan, total with ultras									
Metal scan									
Manganese (Mn)-Total		0.0894		0.0003	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Molybdenum (Mo)-Total		0.0018		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Sodium (Na)-Total		46.4		0.03	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Nickel (Ni)-Total		0.006		0.002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Phosphorus (P)-Total		7.88	RAMB	0.05	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Lead (Pb)-Total		0.0036		0.0005	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Rubidium (Rb)-Total		0.0184		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Antimony (Sb)-Total		0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Selenium (Se)-Total		<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Tin (Sn)-Total		0.0188		0.0006	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Strontium (Sr)-Total		0.0204		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Tellurium (Te)-Total		<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Titanium (Ti)-Total		0.0757		0.0009	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Thallium (Tl)-Total		<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Uranium (U)-Total		<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Vanadium (V)-Total		<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Tungsten (W)-Total		0.0003		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Zirconium (Zr)-Total		0.0100		0.0004	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Silver (Ag)-Total		0.0013		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Zinc (Zn)-Total		0.47		0.01	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Ammonia (NH3) - Soluble		45.0		0.003	mg/L		26-JUN-07	CLM	R540745
Biochemical Oxygen Demand		160		1	mg/L	21-JUN-07	26-JUN-07	IML	R540428
Chemical Oxygen Demand		470		8	mg/L		26-JUN-07	IML	R540561
Conductivity		643		0.4	umhos/cm		22-JUN-07	DVH	R540224
Fecal Coliform		OVERGROWN		10	CFU/100mL	21-JUN-07	22-JUN-07	GOB	R539185
Hardness (as CaCO3)		32.3		0.3	mg/L		21-JUN-07		
Nitrate+Nitrite-N - Soluble		0.044	RAMB	0.005	mg/L		21-JUN-07	CLM	R538843
Phenols (4AAP)		0.147		0.001	mg/L		22-JUN-07	NAP	R539114
Phosphorus, Total		7.01		0.001	mg/L		04-JUL-07	MEB	R543848
Sulphate (SO4) - Soluble		45		9	mg/L		28-JUN-07	TJJ	R541653
Total Kjeldahl Nitrogen		65.7		0.2	mg/L	22-JUN-07	29-JUN-07	LDE	R542105
Total Oil and Grease		48		1	mg/L	27-JUN-07	28-JUN-07	MDM	R540065
Total Suspended Solids		77		5	mg/L		27-JUN-07	BJL	R541051
PH		7.28		0.01	pH units		22-JUN-07	DVH	R540224
L520725-7	STN - 7 DUP								
Sampled By:	CS on 19-JUN-07 @ 14:15								
Matrix:	Grab								
Metal scan, total with ultras									
Aluminum (Al)-Total		0.123		0.005	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Cadmium (Cd)-Total		<0.00002		0.00002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Iron (Fe)-Total		0.17		0.02	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Mercury (Hg)-Total		<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Metal scan									
Arsenic (As)-Total		<0.0005		0.0005	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Boron (B)-Total		<0.03		0.03	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Barium (Ba)-Total		0.0117		0.0003	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Beryllium (Be)-Total		<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L520725-7 STN - 7 DUP								
Sampled By: CS on 19-JUN-07 @ 14:15								
Matrix: Grab								
Metal scan, total with ultras								
Metal scan								
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Calcium (Ca)-Total	3.6		0.1	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Cobalt (Co)-Total	<0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Chromium (Cr)-Total	<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Copper (Cu)-Total	0.002		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Potassium (K)-Total	0.9		0.1	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Magnesium (Mg)-Total	0.69		0.01	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Manganese (Mn)-Total	0.0464		0.0003	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Sodium (Na)-Total	1.90		0.03	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Nickel (Ni)-Total	<0.002		0.002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Phosphorus (P)-Total	0.11	RAMB	0.05	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Lead (Pb)-Total	<0.0005		0.0005	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Rubidium (Rb)-Total	0.0010		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Antimony (Sb)-Total	<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Selenium (Se)-Total	<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Tin (Sn)-Total	<0.0006		0.0006	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Strontium (Sr)-Total	0.0136		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Tellurium (Te)-Total	<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Titanium (Ti)-Total	0.0024		0.0009	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Uranium (U)-Total	<0.0001		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Vanadium (V)-Total	<0.001		0.001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Tungsten (W)-Total	<0.0002		0.0002	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Zirconium (Zr)-Total	0.0005		0.0004	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Silver (Ag)-Total	0.0009		0.0001	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Zinc (Zn)-Total	<0.01		0.01	mg/L	25-JUN-07	25-JUN-07	DAG	R540227
Ammonia (NH3) - Soluble	0.702		0.003	mg/L		21-JUN-07	CLM	R538843
Biochemical Oxygen Demand	<6		1	mg/L	21-JUN-07	26-JUN-07	IML	R540428
Chemical Oxygen Demand	20		8	mg/L		26-JUN-07	IML	R540568
Conductivity	43.6		0.4	umhos/cm		22-JUN-07	DVH	R540224
Fecal Coliform	10		10	CFU/100mL	21-JUN-07	22-JUN-07	GOB	R539185
Hardness (as CaCO3)	11.8		0.3	mg/L		21-JUN-07		
Nitrate+Nitrite-N - Soluble	0.084	RAMB	0.005	mg/L		21-JUN-07	CLM	R538843
Phenols (4AAP)	0.006		0.001	mg/L		22-JUN-07	NAP	R539114
Phosphorus, Total	0.128		0.001	mg/L		04-JUL-07	MEB	R543848
Sulphate (SO4) - Soluble	<9		9	mg/L		28-JUN-07	TJJ	R541653
Total Kjeldahl Nitrogen	1.1		0.2	mg/L	22-JUN-07	29-JUN-07	LDE	R542105
Total Oil and Grease	<1		1	mg/L	27-JUN-07	28-JUN-07	MDM	R540065
Total Suspended Solids	<5		5	mg/L		27-JUN-07	BJL	R541051
PH	6.93		0.01	pH units		22-JUN-07	DVH	R540224

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
RAMB	Result Adjusted For Method Blank

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
AG-TOT-ULTRA-WP	Water	Silver (Ag)-Total		EPA 200.8 Rev 5.4 May 1994
AL-TOT-ULTRA-WP	Water	Aluminum (Al)-Total		EPA 200.8 Rev 5.4 May 1994
BOD-WP	Water	Biochemical Oxygen Demand (BOD)		APHA 5210 B
The sample is incubated for 5 days at 20 degrees Celcius. Comparison of dissolved oxygen content at the beginning and end of incubation provides a measure of biochemical oxygen demand. If carbonaceous BOD is requested, TCMP is added to the sample to chemically inhibit nitrogenous oxygen demand. If dissolved BOD is requested, the sample is filtered prior to analysis. Surface waters have a DL of 1 mg/L. Effluents are diluted according to their history and will have a sample DL of 6 mg/L or greater, depending on the dilutions used.				
CD-TOT-ULTRA-WP	Water	Cadmium (Cd)-Total		EPA 200.8 Rev 5.4 May 1994
COD-WP	Water	Chemical Oxygen Demand		APHA 5220 D

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to HACH brand COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion.

For the 10 - 150 mg/L range the remaining Cr6+ is measured colorimetrically and a decrease in absorbance at 420 nm is proportional to the COD. For the 100 - 1500 mg/L range the amount of Cr3+ produced is measured colorimetrically and an increase in absorbance at 620 nm is proportional to the COD. Samples with concentrations > 1500 mg/L can be diluted into either linear range.

EC-WP	Water	Conductivity		APHA 2510B
Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.				

ETL-HARDNESS-TOT-WP	Water	Hardness Calculated		Calculated
FC-MF-HIGH-WP	Water	Fecal Coliforms high in water		APHA 9222D
FE-TOT-ULTRA-WP	Water	Iron (Fe)-Total		EPA 200.8 Rev 5.4 May 1994
HG-TOT-ULTRA-WP	Water	Mercury (Hg)-Total		EPA 200.8 Rev 5.4 May 1994
MET-SCNOU-TOT-LOW-WP	Water	Metal scan		EPA 200.8 Rev 5.4 May 1994
N-TOTKJ-WP	Water	Total Kjeldahl Nitrogen		Quickchem method 10-107-06-2-E Lachat
Samples are digested with a sulphuric acid solution, cooled, diluted with water, and analyzed for ammonia. Total Kjeldahl nitrogen is the sum of free-ammonia and organic nitrogen compounds which are converted to ammonium sulphate through this digestion process. Analysis is performed by Flow Injection Analysis (FIA). The pH of the digested sample is raised to a known, basic pH by neutralization with a concentrated buffer solution. This neutralization converts the ammonium cation to ammonia. The ammonia produced is heated with salicylate and hypochlorite to produce blue colour which is proportional to the ammonia concentration.				

N2N3-SOL-WP	Water	Nitrate + Nitrite Soluble		APHA4500/2005/LACHAT;1997,1999
NH3-SOL-WP	Water	Ammonia Soluble		LACHAT;2003

Ammonia - Colourimetric using Salicylate-nitroprusside and hypochlorite, in an alkaline phosphate buffer.

OGG-IR-WP	Water	Total Oil and Grease		APHA METHOD 5520C
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P-TOTAL-WP	Water	Phosphorus, Total		APHA, 1998
Samples are digested using a sulphuric acid-persulphate mixture to convert organic phosphorous to orthophosphate. The samples are analyzed by either the Flow Injection Analysis (FIA) or the Segmented Flow Analysis (SFA) method. The absorbance measured by the instrument is proportional to the concentration of orthophosphate in the sample, and is reported as phosphorous. Samples are analyzed for total or total dissolved phosphorous depending on the sample pretreatment.				

PH-WP	Water	pH		APHA 4500H
pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.				

PHENOLS-4AAP-TB	Water	Phenols (4AAP)		APHA 5530 B,D Colourimetry
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SO4-SOL-WP	Water	Sulphate Soluble		APHA4500/LACHAT
Sulphate - Turbidimetric				

Reference Information

SOLIDS-TOTSUS-WP Water Total Suspended Solids

APHA 2540

The residue retained by a prepared 1.5 um Whatman 934-AH glass microfibre filter dried at 105 degrees C.

ZN-TOT-ULTRA-WP Water Zinc (Zn)-Total

EPA 200.8 Rev 5.4 May 1994

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

Chain of Custody numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
TB	ALS LABORATORY GROUP - THUNDER BAY, ONTARIO, CANADA	WP	ALS LABORATORY GROUP - WINNIPEG, MANITOBA, CANADA

GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds. The reported surrogate recovery value provides a measure of method efficiency. The Laboratory control limits are determined under column heading D.L.

mg/kg (units) - unit of concentration based on mass, parts per million.

mg/L (units) - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

UNLESS OTHERWISE STATED, SAMPLES ARE NOT CORRECTED FOR CLIENT FIELD BLANKS.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



Environmental Division

ANALYTICAL REPORT

JACQUES WHITFORD LTD.

ATTN: CAREY SIBBALD

201, 5103 - 51ST AVE

YELLOWKNIFE NT X1A 2P3

Reported On: 06-JUL-07 05:54 PM

Lab Work Order #: **L521223**

Date Received: **22-JUN-07**

Project P.O. #:

Job Reference: 1015263

Legal Site Desc:

CofC Numbers:

Other Information:

Comments:

APPROVED BY:

GAIL HILL

Project Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

Manitoba Technology Centre Ltd.

Part of the **ALS Laboratory Group**
1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4

Phone: +1 204 255 9720 Fax: +1 204 255 9721 www.alsglobal.com

A Campbell Brothers Limited Company

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L521223-1 BL-12								
Sampled By: CS on 20-JUN-07 @ 11:00								
Matrix: WATER								
BTEX, F1-F4 (O.Reg.153/04)								
BTEX (O.Reg.153/04)								
Benzene	<0.50		0.5	ug/L		26-JUN-07	TF	R540252
Ethyl Benzene	<0.50		0.5	ug/L		26-JUN-07	TF	R540252
m+p-Xylenes	<1.0		1	ug/L		26-JUN-07	TF	R540252
o-Xylene	<0.50		0.5	ug/L		26-JUN-07	TF	R540252
Toluene	<0.50		0.5	ug/L		26-JUN-07	TF	R540252
Xylene, (total)	<1.5		1.5	ug/L		26-JUN-07	TF	R540252
CCME Total Hydrocarbons								
F1 (C6-C10)	<100		100	ug/L		27-JUN-07		
F1-BTEX	<100		100	ug/L		27-JUN-07		
F2 (C10-C16)	<100		100	ug/L		27-JUN-07		
F3 (C16-C34)	<250		250	ug/L		27-JUN-07		
F4 (C34-C50)	<250		250	ug/L		27-JUN-07		
Total Hydrocarbons (C6-C50)	<250		250	ug/L		27-JUN-07		
Chromatogram to baseline at nC50	yes					27-JUN-07		
F1 (O.Reg.153/04)								
Analysis Date					25-JUN-07	25-JUN-07	TF	R540258
F2-F4 (O.Reg.153/04)								
Prep/Analysis Dates					27-JUN-07	27-JUN-07	LM	R541256
Surr: Octacosane	80		49-120	%	27-JUN-07	27-JUN-07	LM	R541256
Metal scan, total with ultras								
Aluminum (Al)-Total	0.225		0.005	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Cadmium (Cd)-Total	<0.00002		0.00002	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Iron (Fe)-Total	0.12		0.02	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Metal scan								
Arsenic (As)-Total	<0.0005		0.0005	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Boron (B)-Total	0.04		0.03	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Barium (Ba)-Total	0.0343		0.0003	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Beryllium (Be)-Total	<0.001		0.001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Calcium (Ca)-Total	5.0		0.1	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Cobalt (Co)-Total	0.0003		0.0002	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Chromium (Cr)-Total	<0.001		0.001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Copper (Cu)-Total	0.001		0.001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Potassium (K)-Total	0.8		0.1	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Magnesium (Mg)-Total	1.26		0.01	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Manganese (Mn)-Total	0.0168		0.0003	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Sodium (Na)-Total	1.23		0.03	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Nickel (Ni)-Total	<0.002		0.002	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Phosphorus (P)-Total	<0.05	RAMB	0.05	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Lead (Pb)-Total	<0.0005		0.0005	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Rubidium (Rb)-Total	0.0013		0.0002	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Antimony (Sb)-Total	<0.001		0.001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Selenium (Se)-Total	<0.001		0.001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Tin (Sn)-Total	<0.0006		0.0006	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Strontium (Sr)-Total	0.0225		0.0001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Tellurium (Te)-Total	<0.001		0.001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Titanium (Ti)-Total	0.0024		0.0009	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L521223-1 BL-12								
Sampled By: CS on 20-JUN-07 @ 11:00								
Matrix: WATER								
Metal scan, total with ultras								
Metal scan								
Uranium (U)-Total	<0.0001		0.0001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Vanadium (V)-Total	<0.001		0.001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Tungsten (W)-Total	<0.0002		0.0002	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Zirconium (Zr)-Total	<0.0004		0.0004	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Silver (Ag)-Total	<0.0001		0.0001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Zinc (Zn)-Total	<0.01		0.01	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Ammonia (NH3) - Soluble	0.213	RAMB	0.003	mg/L		22-JUN-07	CLM	R539885
ROU4W Extractable								
Alkalinity								
Alkalinity, Total (as CaCO3)	14		1	mg/L		25-JUN-07	DVH	R540290
Bicarbonate (HCO3)	17		2	mg/L		25-JUN-07	DVH	R540290
Carbonate (CO3)	<0.6		0.6	mg/L		25-JUN-07	DVH	R540290
Hydroxide (OH)	<0.4		0.4	mg/L		25-JUN-07	DVH	R540290
Chloride Soluble								
Chloride (Cl) - Soluble	<9		9	mg/L		28-JUN-07	TJJ	R541653
Conductivity								
Conductivity	47.0		0.4	umhos/cm		22-JUN-07	DVH	R540224
Fluoride Soluble								
Fluoride (F) - Soluble	0.1		0.1	mg/L		28-JUN-07	TJJ	R541653
Hardness (as CaCO3)	17.6		0.2	mg/L		27-JUN-07		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	0.458	RAMB	0.005	mg/L		22-JUN-07	CLM	R539885
Routine Metals								
Calcium (Ca)-Extractable	4.88		0.05	mg/L		26-JUN-07	DAG	R540797
Potassium (K)-Extractable	0.66		0.05	mg/L		26-JUN-07	DAG	R540797
Magnesium (Mg)-Extractable	1.21		0.01	mg/L		26-JUN-07	DAG	R540797
Sodium (Na)-Extractable	1.18		0.02	mg/L		26-JUN-07	DAG	R540797
Iron (Fe)-Extractable	0.06		0.01	mg/L		26-JUN-07	DAG	R540797
Manganese (Mn)-Extractable	0.0153		0.0002	mg/L		26-JUN-07	DAG	R540797
Sulphate Soluble								
Sulphate (SO4) - Soluble	<9		9	mg/L		28-JUN-07	TJJ	R541653
TDS (Calculated)	19		5	mg/L		29-JUN-07		
Turbidity								
Turbidity	2.1		0.05	NTU		22-JUN-07	BXD	R539684
pH								
PH	7.22		0.01	pH units		22-JUN-07	DVH	R540224
Total Coliform and E. Coli by MColi Blue								
Escherichia Coli mcoli blue MF								
E. Coli	<1		1	CFU/100mL	22-JUN-07	23-JUN-07	TMT	R539496
Total Coliform mcoli blue MF								
Total Coliforms	1		1	CFU/100mL	22-JUN-07	23-JUN-07	TMT	R539496
L521223-2 BL-13								
Sampled By: CS on 20-JUN-07 @ 11:30								
Matrix: WATER								
BTEX, F1-F4 (O.Reg.153/04)								
BTEX (O.Reg.153/04)								
Benzene	<0.50		0.5	ug/L		26-JUN-07	TF	R540252
Ethyl Benzene	<0.50		0.5	ug/L		26-JUN-07	TF	R540252
m+p-Xylenes	<1.0		1	ug/L		26-JUN-07	TF	R540252
o-Xylene	<0.50		0.5	ug/L		26-JUN-07	TF	R540252
Toluene	<0.50		0.5	ug/L		26-JUN-07	TF	R540252

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L521223-2 BL-13								
Sampled By: CS on 20-JUN-07 @ 11:30								
Matrix: WATER								
BTEX, F1-F4 (O.Reg.153/04)								
BTEX (O.Reg.153/04)								
Xylene, (total)	<1.5		1.5	ug/L		26-JUN-07	TF	R540252
CCME Total Hydrocarbons								
F1 (C6-C10)	<100		100	ug/L		27-JUN-07		
F1-BTEX	<100		100	ug/L		27-JUN-07		
F2 (C10-C16)	<100		100	ug/L		27-JUN-07		
F3 (C16-C34)	<250		250	ug/L		27-JUN-07		
F4 (C34-C50)	<250		250	ug/L		27-JUN-07		
Total Hydrocarbons (C6-C50)	<250		250	ug/L		27-JUN-07		
Chromatogram to baseline at nC50	yes					27-JUN-07		
F1 (O.Reg.153/04)								
Analysis Date					25-JUN-07	25-JUN-07	TF	R540258
F2-F4 (O.Reg.153/04)								
Prep/Analysis Dates					27-JUN-07	27-JUN-07	LM	R541256
Surr: Octacosane	79		49-120	%	27-JUN-07	27-JUN-07	LM	R541256
Metal scan, total with ultras								
Aluminum (Al)-Total	0.108		0.005	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Cadmium (Cd)-Total	<0.00002		0.00002	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Iron (Fe)-Total	0.07		0.02	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Metal scan								
Arsenic (As)-Total	<0.0005		0.0005	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Boron (B)-Total	<0.03		0.03	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Barium (Ba)-Total	0.0283		0.0003	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Beryllium (Be)-Total	<0.001		0.001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Calcium (Ca)-Total	4.9		0.1	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Cobalt (Co)-Total	0.0002		0.0002	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Chromium (Cr)-Total	<0.001		0.001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Copper (Cu)-Total	0.001		0.001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Potassium (K)-Total	0.7		0.1	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Magnesium (Mg)-Total	1.29		0.01	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Manganese (Mn)-Total	0.0111		0.0003	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Molybdenum (Mo)-Total	0.0002		0.0002	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Sodium (Na)-Total	1.29		0.03	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Nickel (Ni)-Total	<0.002		0.002	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Phosphorus (P)-Total	0.08		0.05	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Lead (Pb)-Total	<0.0005	RAMB	0.0005	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Rubidium (Rb)-Total	0.0011		0.0002	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Antimony (Sb)-Total	<0.001		0.001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Selenium (Se)-Total	<0.001		0.001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Tin (Sn)-Total	<0.0006		0.0006	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Strontium (Sr)-Total	0.0233		0.0001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Tellurium (Te)-Total	<0.001		0.001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Titanium (Ti)-Total	0.0011		0.0009	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Uranium (U)-Total	0.0001		0.0001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Vanadium (V)-Total	<0.001		0.001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Tungsten (W)-Total	<0.0002		0.0002	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Zirconium (Zr)-Total	<0.0004		0.0004	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Silver (Ag)-Total	<0.0001		0.0001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L521223-2 BL-13								
Sampled By: CS on 20-JUN-07 @ 11:30								
Matrix: WATER								
Metal scan, total with ultras								
Zinc (Zn)-Total	0.04		0.01	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Ammonia (NH3) - Soluble	0.084	RAMB	0.003	mg/L		22-JUN-07	CLM	R539885
ROU4W Extractable								
Alkalinity								
Alkalinity, Total (as CaCO3)	13		1	mg/L		25-JUN-07	DVH	R540290
Bicarbonate (HCO3)	16		2	mg/L		25-JUN-07	DVH	R540290
Carbonate (CO3)	<0.6		0.6	mg/L		25-JUN-07	DVH	R540290
Hydroxide (OH)	<0.4		0.4	mg/L		25-JUN-07	DVH	R540290
Chloride Soluble								
Chloride (Cl) - Soluble	<9		9	mg/L		28-JUN-07	TJJ	R541653
Conductivity								
Conductivity	43.3		0.4	umhos/cm		22-JUN-07	DVH	R540224
Fluoride Soluble								
Fluoride (F) - Soluble	0.1		0.1	mg/L		28-JUN-07	TJJ	R541653
Hardness (as CaCO3)	17.6		0.2	mg/L		27-JUN-07		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	0.192	RAMB	0.005	mg/L		22-JUN-07	CLM	R539885
Routine Metals								
Calcium (Ca)-Extractable	4.51		0.05	mg/L		26-JUN-07	DAG	R540797
Potassium (K)-Extractable	0.60		0.05	mg/L		26-JUN-07	DAG	R540797
Magnesium (Mg)-Extractable	1.20		0.01	mg/L		26-JUN-07	DAG	R540797
Sodium (Na)-Extractable	1.22		0.02	mg/L		26-JUN-07	DAG	R540797
Iron (Fe)-Extractable	0.03		0.01	mg/L		26-JUN-07	DAG	R540797
Manganese (Mn)-Extractable	0.0099		0.0002	mg/L		26-JUN-07	DAG	R540797
Sulphate Soluble								
Sulphate (SO4) - Soluble	<9		9	mg/L		28-JUN-07	TJJ	R541653
TDS (Calculated)	17		5	mg/L		29-JUN-07		
Turbidity								
Turbidity	1.5		0.05	NTU		22-JUN-07	BXD	R539684
pH								
PH	7.12		0.01	pH units		22-JUN-07	DVH	R540224
Total Coliform and E. Coli by MColi Blue								
Escherichia Coli mcoli blue MF								
E. Coli	<1		1	CFU/100mL	22-JUN-07	23-JUN-07	TMT	R539496
Total Coliform mcoli blue MF								
Total Coliforms	<1		1	CFU/100mL	22-JUN-07	23-JUN-07	TMT	R539496
L521223-3 STRM-1								
Sampled By: CS on 20-JUN-07 @ 12:00								
Matrix: WATER								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.394		0.005	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Cadmium (Cd)-Total	<0.00002		0.00002	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Iron (Fe)-Total	0.15		0.02	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Metal scan								
Arsenic (As)-Total	<0.0005		0.0005	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Boron (B)-Total	<0.03		0.03	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Barium (Ba)-Total	0.0423		0.0003	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Beryllium (Be)-Total	<0.001		0.001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Calcium (Ca)-Total	7.0		0.1	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Cobalt (Co)-Total	0.0002		0.0002	mg/L	25-JUN-07	26-JUN-07	DAG	R540797

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L	Units	Extracted	Analyzed	By	Batch
L521223-3 STRM-1								
Sampled By: CS on 20-JUN-07 @ 12:00								
Matrix: WATER								
Metal scan, total with ultras								
Metal scan								
Chromium (Cr)-Total	<0.001		0.001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Copper (Cu)-Total	0.002		0.001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Potassium (K)-Total	0.9		0.1	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Magnesium (Mg)-Total	1.12		0.01	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Manganese (Mn)-Total	0.0035		0.0003	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Sodium (Na)-Total	1.34		0.03	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Nickel (Ni)-Total	<0.002		0.002	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Phosphorus (P)-Total	0.08	RAMB	0.05	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Lead (Pb)-Total	<0.0005		0.0005	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Rubidium (Rb)-Total	0.0010		0.0002	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Antimony (Sb)-Total	<0.001		0.001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Selenium (Se)-Total	<0.001		0.001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Tin (Sn)-Total	<0.0006		0.0006	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Strontium (Sr)-Total	0.0227		0.0001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Tellurium (Te)-Total	<0.001		0.001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Titanium (Ti)-Total	0.0029		0.0009	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Uranium (U)-Total	<0.0001		0.0001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Vanadium (V)-Total	<0.001		0.001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Tungsten (W)-Total	<0.0002		0.0002	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Zirconium (Zr)-Total	<0.0004		0.0004	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Silver (Ag)-Total	<0.0001		0.0001	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Zinc (Zn)-Total	0.01		0.01	mg/L	25-JUN-07	26-JUN-07	DAG	R540797
Ammonia (NH3) - Soluble	0.007	RAMB	0.003	mg/L		22-JUN-07	CLM	R539885
ROU4W Extractable								
Alkalinity								
Alkalinity, Total (as CaCO3)	20		1	mg/L		25-JUN-07	DVH	R540290
Bicarbonate (HCO3)	25		2	mg/L		25-JUN-07	DVH	R540290
Carbonate (CO3)	<0.6		0.6	mg/L		25-JUN-07	DVH	R540290
Hydroxide (OH)	<0.4		0.4	mg/L		25-JUN-07	DVH	R540290
Chloride Soluble								
Chloride (Cl) - Soluble	<9		9	mg/L		28-JUN-07	TJJ	R541653
Conductivity								
Conductivity	49.8		0.4	umhos/cm		22-JUN-07	DVH	R540224
Fluoride Soluble								
Fluoride (F) - Soluble	<0.1		0.1	mg/L		28-JUN-07	TJJ	R541653
Hardness (as CaCO3)	22.1		0.2	mg/L		27-JUN-07		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	0.017	RAMB	0.005	mg/L		22-JUN-07	CLM	R539885
Routine Metals								
Calcium (Ca)-Extractable	6.37		0.05	mg/L		26-JUN-07	DAG	R540797
Potassium (K)-Extractable	0.75		0.05	mg/L		26-JUN-07	DAG	R540797
Magnesium (Mg)-Extractable	0.96		0.01	mg/L		26-JUN-07	DAG	R540797
Sodium (Na)-Extractable	1.22		0.02	mg/L		26-JUN-07	DAG	R540797
Iron (Fe)-Extractable	0.06		0.01	mg/L		26-JUN-07	DAG	R540797
Manganese (Mn)-Extractable	0.0030		0.0002	mg/L		26-JUN-07	DAG	R540797
Sulphate Soluble								
Sulphate (SO4) - Soluble	<9		9	mg/L		28-JUN-07	TJJ	R541653
TDS (Calculated)	23		5	mg/L		29-JUN-07		

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L521223-3 STRM-1								
Sampled By: CS on 20-JUN-07 @ 12:00								
Matrix: WATER								
ROU4W Extractable								
Turbidity								
Turbidity	3.8		0.05	NTU		22-JUN-07	BXD	R539684
pH								
PH	7.42		0.01	pH units		22-JUN-07	DVH	R540224
Total Coliform and E. Coli by MColi Blue								
Escherichia Coli mcoli blue MF								
E. Coli	<1		1	CFU/100mL	22-JUN-07	23-JUN-07	TMT	R539496
Total Coliform mcoli blue MF								
Total Coliforms	3		1	CFU/100mL	22-JUN-07	23-JUN-07	TMT	R539496
L521223-4 STRM-2								
Sampled By: CS on 20-JUN-07 @ 12:30								
Matrix: WATER								
Metal scan, total with ultras								
Aluminum (Al)-Total	1.75		0.005	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Cadmium (Cd)-Total	<0.00002		0.00002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Iron (Fe)-Total	0.73		0.02	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Metal scan								
Arsenic (As)-Total	0.0007		0.0005	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Boron (B)-Total	<0.03		0.03	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Barium (Ba)-Total	0.103		0.0003	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Beryllium (Be)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Calcium (Ca)-Total	16.0		0.1	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Cobalt (Co)-Total	0.0005		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Chromium (Cr)-Total	0.002		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Cesium (Cs)-Total	0.0004		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Copper (Cu)-Total	0.004		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Potassium (K)-Total	2.8		0.1	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Magnesium (Mg)-Total	2.16		0.01	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Manganese (Mn)-Total	0.0277		0.0003	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Molybdenum (Mo)-Total	0.0005		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Sodium (Na)-Total	1.97		0.03	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Nickel (Ni)-Total	<0.002		0.002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Phosphorus (P)-Total	0.16	RAMB	0.05	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Lead (Pb)-Total	0.0007		0.0005	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Rubidium (Rb)-Total	0.0045		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Antimony (Sb)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Selenium (Se)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Tin (Sn)-Total	<0.0006		0.0006	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Strontium (Sr)-Total	0.0480		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Tellurium (Te)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Titanium (Ti)-Total	0.0321		0.0009	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Uranium (U)-Total	0.0002		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Vanadium (V)-Total	0.002		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Tungsten (W)-Total	<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Zirconium (Zr)-Total	0.0015		0.0004	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Silver (Ag)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Zinc (Zn)-Total	0.04		0.01	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Ammonia (NH3) - Soluble	0.146	RAMB	0.003	mg/L		22-JUN-07	CLM	R539885

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L521223-4 STRM-2								
Sampled By: CS on 20-JUN-07 @ 12:30								
Matrix: WATER								
ROU4W Extractable								
Alkalinity								
Alkalinity, Total (as CaCO ₃)	45		1	mg/L		22-JUN-07	DVH	R540224
Bicarbonate (HCO ₃)	55		2	mg/L		22-JUN-07	DVH	R540224
Carbonate (CO ₃)	<0.6		0.6	mg/L		22-JUN-07	DVH	R540224
Hydroxide (OH)	<0.4		0.4	mg/L		22-JUN-07	DVH	R540224
Chloride Soluble								
Chloride (Cl) - Soluble	<9		9	mg/L		28-JUN-07	TJJ	R541653
Conductivity								
Conductivity	108		0.4	umhos/cm		22-JUN-07	DVH	R540224
Fluoride Soluble								
Fluoride (F) - Soluble	0.1		0.1	mg/L		28-JUN-07	TJJ	R541653
Hardness (as CaCO ₃)	45.4		0.2	mg/L		27-JUN-07		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	0.529	RAMB	0.005	mg/L		22-JUN-07	CLM	R539885
Routine Metals								
Calcium (Ca)-Extractable	15.4		0.05	mg/L		26-JUN-07	DAG	R540797
Potassium (K)-Extractable	2.23		0.05	mg/L		26-JUN-07	DAG	R540797
Magnesium (Mg)-Extractable	1.71		0.01	mg/L		26-JUN-07	DAG	R540797
Sodium (Na)-Extractable	1.89		0.02	mg/L		26-JUN-07	DAG	R540797
Iron (Fe)-Extractable	0.24		0.01	mg/L		26-JUN-07	DAG	R540797
Manganese (Mn)-Extractable	0.0233		0.0002	mg/L		26-JUN-07	DAG	R540797
Sulphate Soluble								
Sulphate (SO ₄) - Soluble	12		9	mg/L		28-JUN-07	TJJ	R541653
TDS (Calculated)	63		5	mg/L		29-JUN-07		
Turbidity								
Turbidity	24		0.05	NTU		22-JUN-07	BXD	R539684
pH								
PH	7.76		0.01	pH units		22-JUN-07	DVH	R540224
Total Coliform and E. Coli by MColi Blue								
Escherichia Coli mcoli blue MF								
E. Coli	10		1	CFU/100mL	22-JUN-07	23-JUN-07	TMT	R539496
Total Coliform mcoli blue MF								
Total Coliforms	32		1	CFU/100mL	22-JUN-07	23-JUN-07	TMT	R539496
L521223-5 STRM-3								
Sampled By: CS on 20-JUN-07 @ 13:30								
Matrix: WATER								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.665		0.005	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Cadmium (Cd)-Total	0.00003		0.00002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Iron (Fe)-Total	0.38		0.02	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Metal scan								
Arsenic (As)-Total	0.0006		0.0005	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Boron (B)-Total	<0.03		0.03	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Barium (Ba)-Total	0.0742		0.0003	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Beryllium (Be)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Calcium (Ca)-Total	11.1		0.1	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Cobalt (Co)-Total	0.0003		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Chromium (Cr)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Cesium (Cs)-Total	0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Copper (Cu)-Total	0.003		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L521223-5 STRM-3								
Sampled By: CS on 20-JUN-07 @ 13:30								
Matrix: WATER								
Metal scan, total with ultras								
Metal scan								
Potassium (K)-Total	1.9		0.1	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Magnesium (Mg)-Total	1.62		0.01	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Manganese (Mn)-Total	0.0134		0.0003	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Molybdenum (Mo)-Total	0.0003		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Sodium (Na)-Total	1.54		0.03	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Nickel (Ni)-Total	<0.002		0.002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Phosphorus (P)-Total	0.25	RAMB	0.05	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Lead (Pb)-Total	<0.0005		0.0005	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Rubidium (Rb)-Total	0.0018		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Antimony (Sb)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Selenium (Se)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Tin (Sn)-Total	<0.0006		0.0006	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Strontium (Sr)-Total	0.0347		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Tellurium (Te)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Titanium (Ti)-Total	0.0095		0.0009	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Uranium (U)-Total	0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Vanadium (V)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Tungsten (W)-Total	<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Zirconium (Zr)-Total	0.0007		0.0004	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Silver (Ag)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Zinc (Zn)-Total	0.03		0.01	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Ammonia (NH3) - Soluble	0.056	RAMB	0.003	mg/L		22-JUN-07	CLM	R539885
ROU4W Extractable								
Alkalinity								
Alkalinity, Total (as CaCO3)	37		1	mg/L		22-JUN-07	DVH	R540224
Bicarbonate (HCO3)	45		2	mg/L		22-JUN-07	DVH	R540224
Carbonate (CO3)	<0.6		0.6	mg/L		22-JUN-07	DVH	R540224
Hydroxide (OH)	<0.4		0.4	mg/L		22-JUN-07	DVH	R540224
Chloride Soluble								
Chloride (Cl) - Soluble	<9		9	mg/L		28-JUN-07	TJJ	R541653
Conductivity								
Conductivity	75.6		0.4	umhos/cm		22-JUN-07	DVH	R540224
Fluoride Soluble								
Fluoride (F) - Soluble	<0.1		0.1	mg/L		28-JUN-07	TJJ	R541653
Hardness (as CaCO3)	31.6		0.2	mg/L		27-JUN-07		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	0.288	RAMB	0.005	mg/L		22-JUN-07	CLM	R539885
Routine Metals								
Calcium (Ca)-Extractable	10.3		0.05	mg/L		26-JUN-07	DAG	R540797
Potassium (K)-Extractable	1.69		0.05	mg/L		26-JUN-07	DAG	R540797
Magnesium (Mg)-Extractable	1.41		0.01	mg/L		26-JUN-07	DAG	R540797
Sodium (Na)-Extractable	1.43		0.02	mg/L		26-JUN-07	DAG	R540797
Iron (Fe)-Extractable	0.24		0.01	mg/L		26-JUN-07	DAG	R540797
Manganese (Mn)-Extractable	0.0120		0.0002	mg/L		26-JUN-07	DAG	R540797
Sulphate Soluble								
Sulphate (SO4) - Soluble	12		9	mg/L		28-JUN-07	TJJ	R541653
TDS (Calculated)	50		5	mg/L		29-JUN-07		
Turbidity								
Turbidity	10		0.05	NTU		22-JUN-07	BXD	R539684
pH								

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L521223-5 STRM-3								
Sampled By: CS on 20-JUN-07 @ 13:30								
Matrix: WATER								
ROU4W Extractable								
pH								
PH	7.47		0.01	pH units		22-JUN-07	DVH	R540224
Total Coliform and E. Coli by MColi Blue								
Escherichia Coli mcoli blue MF								
E. Coli	12		1	CFU/100mL	22-JUN-07	23-JUN-07	TMT	R539496
Total Coliform mcoli blue MF								
Total Coliforms	73		1	CFU/100mL	22-JUN-07	23-JUN-07	TMT	R539496
L521223-6 STRM-4								
Sampled By: CS on 20-JUN-07 @ 17:45								
Matrix: WATER								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.077		0.005	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Cadmium (Cd)-Total	<0.00002		0.00002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Iron (Fe)-Total	0.04		0.02	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Metal scan								
Arsenic (As)-Total	<0.0005		0.0005	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Boron (B)-Total	<0.03		0.03	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Barium (Ba)-Total	0.0308		0.0003	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Beryllium (Be)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Calcium (Ca)-Total	4.0		0.1	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Cobalt (Co)-Total	<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Chromium (Cr)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Copper (Cu)-Total	0.002		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Potassium (K)-Total	0.6		0.1	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Magnesium (Mg)-Total	0.63		0.01	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Manganese (Mn)-Total	0.0005		0.0003	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Sodium (Na)-Total	0.78		0.03	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Nickel (Ni)-Total	<0.002		0.002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Phosphorus (P)-Total	0.07		0.05	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Lead (Pb)-Total	<0.0005		0.0005	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Rubidium (Rb)-Total	0.0006		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Antimony (Sb)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Selenium (Se)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Tin (Sn)-Total	<0.0006		0.0006	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Strontium (Sr)-Total	0.0142		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Tellurium (Te)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Titanium (Ti)-Total	<0.0009		0.0009	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Uranium (U)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Vanadium (V)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Tungsten (W)-Total	<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Zirconium (Zr)-Total	<0.0004		0.0004	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Silver (Ag)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Zinc (Zn)-Total	<0.01		0.01	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Ammonia (NH3) - Soluble	0.006	RAMB	0.003	mg/L		22-JUN-07	CLM	R539885
ROU4W Extractable								
Alkalinity								

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L521223-6 STRM-4								
Sampled By: CS on 20-JUN-07 @ 17:45								
Matrix: WATER								
ROU4W Extractable								
Alkalinity								
Alkalinity, Total (as CaCO ₃)	10		1	mg/L		25-JUN-07	DVH	R540290
Bicarbonate (HCO ₃)	13		2	mg/L		25-JUN-07	DVH	R540290
Carbonate (CO ₃)	<0.6		0.6	mg/L		25-JUN-07	DVH	R540290
Hydroxide (OH)	<0.4		0.4	mg/L		25-JUN-07	DVH	R540290
Chloride Soluble								
Chloride (Cl) - Soluble	<9		9	mg/L		28-JUN-07	TJJ	R541653
Conductivity								
Conductivity	30.5		0.4	umhos/cm		22-JUN-07	DVH	R540224
Fluoride Soluble								
Fluoride (F) - Soluble	0.1		0.1	mg/L		28-JUN-07	TJJ	R541653
Hardness (as CaCO ₃)	11.9		0.2	mg/L		27-JUN-07		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	0.020	RAMB	0.005	mg/L		22-JUN-07	CLM	R539885
Routine Metals								
Calcium (Ca)-Extractable	3.81		0.05	mg/L		26-JUN-07	DAG	R540797
Potassium (K)-Extractable	0.64		0.05	mg/L		26-JUN-07	DAG	R540797
Magnesium (Mg)-Extractable	0.58		0.01	mg/L		26-JUN-07	DAG	R540797
Sodium (Na)-Extractable	0.73		0.02	mg/L		26-JUN-07	DAG	R540797
Iron (Fe)-Extractable	0.02		0.01	mg/L		26-JUN-07	DAG	R540797
Manganese (Mn)-Extractable	0.0003		0.0002	mg/L		26-JUN-07	DAG	R540797
Sulphate Soluble								
Sulphate (SO ₄) - Soluble	10		9	mg/L		28-JUN-07	TJJ	R541653
TDS (Calculated)	22		5	mg/L		29-JUN-07		
Turbidity								
Turbidity	0.30		0.05	NTU		22-JUN-07	BXD	R539684
pH								
PH	7.03		0.01	pH units		22-JUN-07	DVH	R540224
Total Coliform and E. Coli by MColi Blue								
Escherichia Coli mcoli blue MF								
E. Coli	<1		1	CFU/100mL	22-JUN-07	23-JUN-07	TMT	R539496
Total Coliform mcoli blue MF								
Total Coliforms	<1		1	CFU/100mL	22-JUN-07	23-JUN-07	TMT	R539496
L521223-7 STRM-5								
Sampled By: CS on 20-JUN-07 @ 18:15								
Matrix: WATER								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.117		0.005	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Cadmium (Cd)-Total	<0.00002		0.00002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Iron (Fe)-Total	0.10		0.02	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Metal scan								
Arsenic (As)-Total	<0.0005		0.0005	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Boron (B)-Total	<0.03		0.03	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Barium (Ba)-Total	0.0373		0.0003	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Beryllium (Be)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Calcium (Ca)-Total	4.5		0.1	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Cobalt (Co)-Total	<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Chromium (Cr)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Copper (Cu)-Total	0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Potassium (K)-Total	0.6		0.1	mg/L	26-JUN-07	26-JUN-07	DAG	R540797

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L521223-7	STRM-5								
Sampled By:	CS on 20-JUN-07 @ 18:15								
Matrix:	WATER								
Metal scan, total with ultras									
Metal scan									
Magnesium (Mg)-Total		0.75		0.01	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Manganese (Mn)-Total		0.0040		0.0003	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Molybdenum (Mo)-Total		<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Sodium (Na)-Total		0.75		0.03	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Nickel (Ni)-Total		<0.002		0.002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Phosphorus (P)-Total		<0.05	RAMB	0.05	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Lead (Pb)-Total		<0.0005		0.0005	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Rubidium (Rb)-Total		0.0007		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Antimony (Sb)-Total		<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Selenium (Se)-Total		<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Tin (Sn)-Total		<0.0006		0.0006	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Strontium (Sr)-Total		0.0159		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Tellurium (Te)-Total		<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Titanium (Ti)-Total		0.0030		0.0009	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Thallium (Tl)-Total		<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Uranium (U)-Total		<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Vanadium (V)-Total		<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Tungsten (W)-Total		<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Zirconium (Zr)-Total		<0.0004		0.0004	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Silver (Ag)-Total		<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Zinc (Zn)-Total		<0.01		0.01	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Ammonia (NH3) - Soluble		0.005	RAMB	0.003	mg/L		22-JUN-07	CLM	R539885
ROU4W Extractable									
Alkalinity									
Alkalinity, Total (as CaCO3)		13		1	mg/L		25-JUN-07	DVH	R540290
Bicarbonate (HCO3)		16		2	mg/L		25-JUN-07	DVH	R540290
Carbonate (CO3)		<0.6		0.6	mg/L		25-JUN-07	DVH	R540290
Hydroxide (OH)		<0.4		0.4	mg/L		25-JUN-07	DVH	R540290
Chloride Soluble									
Chloride (Cl) - Soluble		<9		9	mg/L		28-JUN-07	TJJ	R541653
Conductivity									
Conductivity		30.9		0.4	umhos/cm		22-JUN-07	DVH	R540224
Fluoride Soluble									
Fluoride (F) - Soluble		<0.1		0.1	mg/L		28-JUN-07	TJJ	R541653
Hardness (as CaCO3)		12.9		0.2	mg/L		27-JUN-07		
Nitrate + Nitrite Soluble									
Nitrate+Nitrite-N - Soluble		0.013	RAMB	0.005	mg/L		22-JUN-07	CLM	R539885
Routine Metals									
Calcium (Ca)-Extractable		4.04		0.05	mg/L		26-JUN-07	DAG	R540797
Potassium (K)-Extractable		0.59		0.05	mg/L		26-JUN-07	DAG	R540797
Magnesium (Mg)-Extractable		0.68		0.01	mg/L		26-JUN-07	DAG	R540797
Sodium (Na)-Extractable		0.66		0.02	mg/L		26-JUN-07	DAG	R540797
Iron (Fe)-Extractable		0.06		0.01	mg/L		26-JUN-07	DAG	R540797
Manganese (Mn)-Extractable		0.0036		0.0002	mg/L		26-JUN-07	DAG	R540797
Sulphate Soluble									
Sulphate (SO4) - Soluble		10		9	mg/L		28-JUN-07	TJJ	R541653
TDS (Calculated)		23		5	mg/L		29-JUN-07		
Turbidity									
Turbidity		1.1		0.05	NTU		22-JUN-07	BXD	R539684
pH									
PH		7.14		0.01	pH units		22-JUN-07	DVH	R540224

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L521223-7 STRM-5 Sampled By: CS on 20-JUN-07 @ 18:15 Matrix: WATER ROU4W Extractable Total Coliform and E. coli by MColi Blue Escherichia coli mcoli blue MF E. coli	<1						TMT	R539496
Total Coliform mcoli blue MF Total Coliforms	<1						TMT	R539496
* Refer to Referenced Information for Qualifiers (if any) and Methodology.								

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
RAMB	Result Adjusted For Method Blank

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
AG-TOT-ULTRA-WP	Water	Silver (Ag)-Total		EPA 200.8 Rev 5.4 May 1994
AL-TOT-ULTRA-WP	Water	Aluminum (Al)-Total		EPA 200.8 Rev 5.4 May 1994
ALK-TOT-WP	Water	Alkalinity		APHA 2320B

Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. It is determined by titration with a standard solution of strong mineral acid to the successive HCO₃⁻ and H₂CO₃ endpoints indicated electrometrically.

BTX-R153-W1	Water	BTEX (O.Reg.153/04)		MOE DECPH-E3421/CCME Tier 1
CD-TOT-ULTRA-WP	Water	Cadmium (Cd)-Total		EPA 200.8 Rev 5.4 May 1994
CL-SOL-WP	Water	Chloride Soluble		APHA4500/LACHAT

Chloride - Colourimetric using Mercuric Thiocyanate

EC-MCOLIMF-WP	Water	Escherichia Coli mcoli blue MF		APHA 9222B and HACH 10029
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This procedure is applicable to E. coli analysis for water samples. It is also used for Total Coliform analysis when only one 100 mL samples is submitted for both Total Coliforms and E. coli. If two sample bottles are submitted for these analyses, E. coli analysis is performed by this procedure, and Total Coliform analysis can be performed by A151.

A suitable sample volume is poured through a membrane filter and placed in a petri dish prepared with m-Coli Blue 24 broth. The inverted plates are incubated at 35C +/- 0.5C for 24hrs. Coliforms that are not E. coli turn red because they reduce TTC (2,3,5 triphenyltetrazolium chloride) in the medium. E. coli turn blue due to the reaction between the enzyme beta glucuronidase and BCIG (5-bromo-4 chloro-3 indolyl-beta-D-glucuronide) in the medium.

EC-WP	Water	Conductivity		APHA 2510B
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Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.

ETL-HARDNESS-EXT-WP	Water	Hardness Calculated		Calculated
ETL-TVH,TEH-CCME-WT	Water	CCME Total Hydrocarbons		CCME CWS-PHC Dec-2000 - Pub# 1310

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.

In samples where BTEX and F1 were analyzed, F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:

1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:

1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F-SOL-WP	Water	Fluoride Soluble		APHA4500/LACHAT
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Fluoride - Ion selective electrode

F1-WT	Water	F1 (O.Reg.153/04)		MOE DECPH-E3421/CCME Tier 1
F2-F4-WT	Water	F2-F4 (O.Reg.153/04)		MOE DECPH-E3421/CCME Tier 1
		Iron (Fe)-Total		EPA 200.8 Rev 5.4 May 1994

Reference Information

FE-TOT-ULTRA-WP	Water		
HG-TOT-ULTRA-WP	Water	Mercury (Hg)-Total	EPA 200.8 Rev 5.4 May 1994
IONBALANCE-OP05-WP	Water		APHA 1030E
MET-SCNOU-TOT-LOW-WP	Water	Metal scan	EPA 200.8 Rev 5.4 May 1994
MET2-EXT-LOW-WP	Water	Routine Metals	EPA 200.8 Rev 5.4 May 1994
N2N3-SOL-WP	Water	Nitrate + Nitrite Soluble	APHA4500;2005/LACHAT;1997,1999
NH3-SOL-WP	Water	Ammonia Soluble	LACHAT;2003

Ammonia - Colourimetric using Salicylate-nitroprusside and hypochlorite, in an alkaline phosphate buffer.

PH-WP	Water	pH	APHA 4500H
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pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.

SO4-SOL-WP	Water	Sulphate Soluble	APHA4500/LACHAT
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Sulphate - Turbidimetric

TC-MCOLIMF-WP	Water	Total Coliform mcoli blue MF	APHA 9222B and HACH 10029
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This procedure is applicable to E. coli analysis for water samples. It is also used for Total Coliform analysis when only one 100 mL samples is submitted for both Total Coliforms and E. coli. If two sample bottles are submitted for these analyses, E. coli analysis is performed by this procedure, and Total Coliform analysis is performed by A151.

A suitable sample volume is poured through a membrane filter and placed in a petri dish prepared with m-Coli Blue 24 broth. The inverted plates are incubated at 35C +/- 0.5C for 24hrs. Coliforms that are not E. coli turn red because they reduce TTC (2,3,5 triphenyltetrazolium chloride) in the medium. E. coli turn blue due to the reaction between the enzyme beta glucuronidase and BCIG (5-bromo-4 chloro-3 indolyl-beta-D-glucuronide) in the medium.

TURBIDITY-WP	Water	Turbidity	APHA, 1998, 2130B
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A strong light beam is sent through a transparent tube containing the sample. Light that is reflected at 90 degrees to the axis by suspended particles is detected by the photocell. The electrical response is proportional to the sample turbidity.

ZN-TOT-ULTRA-WP	Water	Zinc (Zn)-Total	EPA 200.8 Rev 5.4 May 1994
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** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

Chain of Custody numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WP	ALS LABORATORY GROUP - WINNIPEG, MANITOBA, CANADA	WT	ALS LABORATORY GROUP - WATERLOO (SENTINEL), ONTARIO, CAN

Reference Information

GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds. The reported surrogate recovery value provides a measure of method efficiency. The Laboratory control limits are determined under column heading D.L.

mg/kg (units) - unit of concentration based on mass, parts per million.

mg/L (units) - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

UNLESS OTHERWISE STATED, SAMPLES ARE NOT CORRECTED FOR CLIENT FIELD BLANKS.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

12 - 1328 Mathews Road East
Whitby, Ontario, Canada R2J 3T4
Tel: (204) 255-0720
Fax: (204) 255-0721
Toll Free: 1-800-667-7555

**CHAIN OF CUSTODY
ANALYTICAL REQUEST FORM**

DATE SUBMITTED: June 21/07 DATE RECEIVED: ASAP
FACILITY (SAMPLE TYPE):
AS PER CLIENT: 015226
AS PER LAST PRICE: 2

SAMPLE ID	SAMPLE BY	DATE/TIME SAMPLED	SAMPLE TYPE	PREPARED	NUMBER
BL-12	AS	June 20/07 11:00	Grab		
BL-13	"	" 11:30	"		
STRM-1	"	" 12:00	"		
STRM-2	"	" 12:30	"		
STRM-3	"	" 13:00	"		
STRM-4	"	" 14:00	"		
STRM-5	"	" 14:30	"		

NOTES & COMMENTS:

1. Check for proper labeling of samples.
2. Check for proper labeling of containers.
3. Check for proper labeling of containers.

4. All samples must be labeled with the following information:
a. Sample ID
b. Date/Time Sampled
c. Sample Type
d. Preparer's Name
e. Number of Samples

NO. SAMPLES SUBMITTED: 5
NO. BOTTLES/SAMPLES: 5

E-MAIL: YES ☒ NO ☐

DEMAIL ADDRESS: AS per client file
E-MAIL ADDRESS: whitby@als.com

PO NO: 1015263

BOOKING: 1015263

ANALYSIS REQUESTED:

LAB USE ONLY

RECEIVED BY: ASAP
DATE: June 22/07
TIME: 9:25

RECEIVED BY: ASAP
DATE: June 22/07
TIME: 9:25

LAB SAMPLE NO.	1	2	3	4	5	6	7
1							
2							
3							
4							
5							
6							
7							

NOTE: Failure to properly complete all portions of this form may delay delivery of results.

RECEIVED BY: <u>ASAP</u>	DATE: <u>June 22/07</u>
RECEIVED BY: <u>ASAP</u>	DATE: <u>June 22/07</u>
RECEIVED BY: <u>ASAP</u>	DATE: <u>June 22/07</u>
RECEIVED BY: <u>ASAP</u>	DATE: <u>June 22/07</u>

SAMPLE CONDITION (PER RECEPT): ☐ ACCEPTABLE ☐ NON ACCEPTABLE

PROBES: COLE AMBER

OTHER (GREASE, LUBRICANT, ETC.):

WHITE - File Copy
GREEN - Final Report
PINK - Invoicing
BLUE - Client Support
YELLOW - Customer

REV. OCT. 2006

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



Environmental Division

ANALYTICAL REPORT

JACQUES WHITFORD LTD.

ATTN: CAREY SIBBALD

201, 5103 - 51ST AVE

YELLOWKNIFE NT X1A 2P3

Reported On: 06-JUL-07 05:57 PM

Lab Work Order #: **L521224**

Date Received: **22-JUN-07**

Project P.O. #:

Job Reference: 1015263

Legal Site Desc:

CofC Numbers:

Other Information:

Comments:

APPROVED BY:

GAIL HILL

Project Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 90 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

Manitoba Technology Centre Ltd.

Part of the **ALS Laboratory Group**
1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4

Phone: +1 204 255 9720 Fax: +1 204 255 9721 www.alsglobal.com

A Campbell Brothers Limited Company

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L521224-1 BL-14								
Sampled By: CS on 20-JUN-07 @ 15:45								
Matrix: WATER								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.108		0.005	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Cadmium (Cd)-Total	<0.00002		0.00002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Iron (Fe)-Total	0.07		0.02	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Metal scan								
Arsenic (As)-Total	<0.0005		0.0005	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Boron (B)-Total	<0.03		0.03	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Barium (Ba)-Total	0.0194		0.0003	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Beryllium (Be)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Calcium (Ca)-Total	2.8		0.1	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Cobalt (Co)-Total	<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Chromium (Cr)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Copper (Cu)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Potassium (K)-Total	0.5		0.1	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Magnesium (Mg)-Total	1.07		0.01	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Manganese (Mn)-Total	0.0058		0.0003	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Sodium (Na)-Total	0.97		0.03	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Nickel (Ni)-Total	<0.002		0.002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Phosphorus (P)-Total	<0.05	RAMB	0.05	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Lead (Pb)-Total	<0.0005		0.0005	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Rubidium (Rb)-Total	0.0009		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Antimony (Sb)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Selenium (Se)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Tin (Sn)-Total	<0.0006		0.0006	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Strontium (Sr)-Total	0.0167		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Tellurium (Te)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Titanium (Ti)-Total	0.0027		0.0009	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Uranium (U)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Vanadium (V)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Tungsten (W)-Total	<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Zirconium (Zr)-Total	<0.0004		0.0004	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Silver (Ag)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Zinc (Zn)-Total	<0.01		0.01	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Total Dissolved Solids	12		5	mg/L		03-JUL-07	B.JL	R543204
Total Suspended Solids	<5		5	mg/L		03-JUL-07	B.JL	R543204
ROU4W Extractable								
Alkalinity								
Alkalinity, Total (as CaCO3)	10		1	mg/L		25-JUN-07	DVH	R540290
Bicarbonate (HCO3)	13		2	mg/L		25-JUN-07	DVH	R540290
Carbonate (CO3)	<0.6		0.6	mg/L		25-JUN-07	DVH	R540290
Hydroxide (OH)	<0.4		0.4	mg/L		25-JUN-07	DVH	R540290
Chloride Soluble								
Chloride (Cl) - Soluble	<9		9	mg/L		28-JUN-07	TJJ	R541653
Conductivity								
Conductivity	31.4		0.4	umhos/cm		22-JUN-07	DVH	R540224
Fluoride Soluble								
Fluoride (F) - Soluble	<0.1		0.1	mg/L		28-JUN-07	TJJ	R541653

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L	Units	Extracted	Analyzed	By	Batch
L521224-1 BL-14								
Sampled By: CS on 20-JUN-07 @ 15:45								
Matrix: WATER								
ROU4W Extractable								
Hardness (as CaCO3)	11.2		0.2	mg/L		25-JUN-07		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	0.083	RAMB	0.005	mg/L		22-JUN-07	CLM	R539885
Routine Metals								
Calcium (Ca)-Extractable	2.76		0.05	mg/L		23-JUN-07	DAG	R539848
Potassium (K)-Extractable	0.58		0.05	mg/L		23-JUN-07	DAG	R539848
Magnesium (Mg)-Extractable	1.05		0.01	mg/L		23-JUN-07	DAG	R539848
Sodium (Na)-Extractable	1.05		0.02	mg/L		23-JUN-07	DAG	R539848
Iron (Fe)-Extractable	0.05		0.01	mg/L		23-JUN-07	DAG	R539848
Manganese (Mn)-Extractable	0.0049		0.0002	mg/L		23-JUN-07	DAG	R539848
Sulphate Soluble								
Sulphate (SO4) - Soluble	<9		9	mg/L		28-JUN-07	TJJ	R541653
TDS (Calculated)	12		5	mg/L		29-JUN-07		
Turbidity								
Turbidity	1.4		0.05	NTU		22-JUN-07	BXD	R539684
pH								
PH	7.12		0.01	pH units		22-JUN-07	DVH	R540224
Total Coliform and E. Coll by MColi Blue								
Escherichia Coli mcoli blue MF								
E. Coli	<1		1	CFU/100mL	22-JUN-07	23-JUN-07	TMT	R539496
Total Coliform mcoli blue MF								
Total Coliforms	<1		1	CFU/100mL	22-JUN-07	23-JUN-07	TMT	R539496
L521224-2 BL-15								
Sampled By: CS on 20-JUN-07 @ 16:30								
Matrix: WATER								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.124		0.005	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Cadmium (Cd)-Total	<0.00002		0.00002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Iron (Fe)-Total	0.07		0.02	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Metal scan								
Arsenic (As)-Total	<0.0005		0.0005	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Boron (B)-Total	<0.03		0.03	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Barium (Ba)-Total	0.0237		0.0003	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Beryllium (Be)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Calcium (Ca)-Total	3.5		0.1	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Cobalt (Co)-Total	<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Chromium (Cr)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Copper (Cu)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Potassium (K)-Total	0.5		0.1	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Magnesium (Mg)-Total	1.14		0.01	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Manganese (Mn)-Total	0.0060		0.0003	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Molybdenum (Mo)-Total	<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Sodium (Na)-Total	0.98		0.03	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Nickel (Ni)-Total	<0.002		0.002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Phosphorus (P)-Total	<0.05	RAMB	0.05	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Lead (Pb)-Total	<0.0005		0.0005	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Rubidium (Rb)-Total	0.0009		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Antimony (Sb)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Selenium (Se)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L521224-2 BL-15								
Sampled By: CS on 20-JUN-07 @ 16:30								
Matrix: WATER								
Metal scan, total with ultras								
Metal scan								
Tin (Sn)-Total	<0.0006		0.0006	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Strontium (Sr)-Total	0.0179		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Tellurium (Te)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Titanium (Ti)-Total	0.0014		0.0009	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Uranium (U)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Vanadium (V)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Tungsten (W)-Total	<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Zirconium (Zr)-Total	<0.0004		0.0004	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Silver (Ag)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Zinc (Zn)-Total	<0.01		0.01	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Total Dissolved Solids	28		5	mg/L		03-JUL-07	BJL	R543204
Total Suspended Solids	<5		5	mg/L		03-JUL-07	BJL	R543204
ROU4W Extractable								
Alkalinity								
Alkalinity, Total (as CaCO3)	11		1	mg/L		25-JUN-07	DVH	R540290
Bicarbonate (HCO3)	14		2	mg/L		25-JUN-07	DVH	R540290
Carbonate (CO3)	<0.6		0.6	mg/L		25-JUN-07	DVH	R540290
Hydroxide (OH)	<0.4		0.4	mg/L		25-JUN-07	DVH	R540290
Chloride Soluble								
Chloride (Cl) - Soluble	<9		9	mg/L		28-JUN-07	TJJ	R541653
Conductivity								
Conductivity	32.9		0.4	umhos/cm		22-JUN-07	DVH	R540224
Fluoride Soluble								
Fluoride (F) - Soluble	0.1		0.1	mg/L		28-JUN-07	TJJ	R541653
Hardness (as CaCO3)	12.9		0.2	mg/L		25-JUN-07		
Nitrate + Nitrite Soluble								
Nitrate+Nitrite-N - Soluble	0.073	RAMB	0.005	mg/L		22-JUN-07	CLM	R539885
Routine Metals								
Calcium (Ca)-Extractable	3.34		0.05	mg/L		23-JUN-07	DAG	R539848
Potassium (K)-Extractable	0.58		0.05	mg/L		23-JUN-07	DAG	R539848
Magnesium (Mg)-Extractable	1.10		0.01	mg/L		23-JUN-07	DAG	R539848
Sodium (Na)-Extractable	1.00		0.02	mg/L		23-JUN-07	DAG	R539848
Iron (Fe)-Extractable	0.09		0.01	mg/L		23-JUN-07	DAG	R539848
Manganese (Mn)-Extractable	0.0054		0.0002	mg/L		23-JUN-07	DAG	R539848
Sulphate Soluble								
Sulphate (SO4) - Soluble	<9		9	mg/L		28-JUN-07	TJJ	R541653
TDS (Calculated)	13		5	mg/L		29-JUN-07		
Turbidity								
Turbidity	2.2		0.05	NTU		22-JUN-07	BXD	R539684
pH								
PH	7.17		0.01	pH units		22-JUN-07	DVH	R540224
Total Coliform and E. Coll by MColi Blue								
Escherichia Coll mcoli blue MF								
E. Coll	2		1	CFU/100mL	22-JUN-07	23-JUN-07	TMT	R539496
Total Coliform mcoli blue MF								
Total Coliforms	2		1	CFU/100mL	22-JUN-07	23-JUN-07	TMT	R539496
L521224-3 BL-16								
Sampled By: CS on 20-JUN-07 @ 17:00								
Matrix: WATER								
Metal scan, total with ultras								

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L521224-3 BL-16								
Sampled By: CS on 20-JUN-07 @ 17:00								
Matrix: WATER								
Metal scan, total with ultras								
Aluminum (Al)-Total	0.167		0.005	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Cadmium (Cd)-Total	<0.00002		0.00002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Iron (Fe)-Total	0.08		0.02	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Mercury (Hg)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Metal scan								
Arsenic (As)-Total	<0.0005		0.0005	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Boron (B)-Total	<0.03		0.03	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Barium (Ba)-Total	0.0428		0.0003	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Beryllium (Be)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Bismuth (Bi)-Total	<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Calcium (Ca)-Total	8.8		0.1	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Cobalt (Co)-Total	<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Chromium (Cr)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Cesium (Cs)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Copper (Cu)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Potassium (K)-Total	0.9		0.1	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Magnesium (Mg)-Total	1.53		0.01	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Manganese (Mn)-Total	0.0051		0.0003	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Molybdenum (Mo)-Total	0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Sodium (Na)-Total	1.51		0.03	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Nickel (Ni)-Total	<0.002		0.002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Phosphorus (P)-Total	<0.05	RAMB	0.05	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Lead (Pb)-Total	<0.0005		0.0005	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Rubidium (Rb)-Total	0.0009		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Antimony (Sb)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Selenium (Se)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Tin (Sn)-Total	<0.0006		0.0006	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Strontium (Sr)-Total	0.0299		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Tellurium (Te)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Titanium (Ti)-Total	0.0024		0.0009	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Uranium (U)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Vanadium (V)-Total	<0.001		0.001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Tungsten (W)-Total	<0.0002		0.0002	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Zirconium (Zr)-Total	<0.0004		0.0004	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Silver (Ag)-Total	<0.0001		0.0001	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Zinc (Zn)-Total	0.01		0.01	mg/L	26-JUN-07	26-JUN-07	DAG	R540797
Total Dissolved Solids	36		5	mg/L		03-JUL-07	BJL	R543204
Total Suspended Solids	<5		5	mg/L		03-JUL-07	BJL	R543204
ROU4W Extractable								
Alkalinity								
Alkalinity, Total (as CaCO3)	34		1	mg/L		22-JUN-07	DVH	R540224
Bicarbonate (HCO3)	41		2	mg/L		22-JUN-07	DVH	R540224
Carbonate (CO3)	<0.6		0.6	mg/L		22-JUN-07	DVH	R540224
Hydroxide (OH)	<0.4		0.4	mg/L		22-JUN-07	DVH	R540224
Chloride Soluble								
Chloride (Cl) - Soluble	<9		9	mg/L		28-JUN-07	TJJ	R541653
Conductivity								
Conductivity	67.2		0.4	umhos/cm		22-JUN-07	DVH	R540224
Fluoride Soluble								
Fluoride (F) - Soluble	<0.1		0.1	mg/L		28-JUN-07	TJJ	R541653

ALS LABORATORY GROUP ANALYTICAL REPORT

[illegible]

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
RAMB	Result Adjusted For Method Blank

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
AG-TOT-ULTRA-WP	Water	Silver (Ag)-Total		EPA 200.8 Rev 5.4 May 1994
AL-TOT-ULTRA-WP	Water	Aluminum (Al)-Total		EPA 200.8 Rev 5.4 May 1994
ALK-TOT-WP	Water	Alkalinity		APHA 2320B

Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. It is determined by titration with a standard solution of strong mineral acid to the successive HCO₃⁻ and H₂CO₃ endpoints indicated electrometrically.

CD-TOT-ULTRA-WP	Water	Cadmium (Cd)-Total	EPA 200.8 Rev 5.4 May 1994
CL-SOL-WP	Water	Chloride Soluble	APHA4500/LACHAT

Chloride - Colourimetric using Mercuric Thiocyanate

EC-MCOLIMF-WP	Water	Escherichia Coli mcoli blue MF	APHA 9222B and HACH 10029
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This procedure is applicable to E. coli analysis for water samples. It is also used for Total Coliform analysis when only one 100 mL samples is submitted for both Total Coliforms and E. coli. If two sample bottles are submitted for these analyses, E. coli analysis is performed by this procedure, and Total Coliform analysis can be performed by A151.

A suitable sample volume is poured through a membrane filter and placed in a petri dish prepared with m-Coli Blue 24 broth. The inverted plates are incubated at 35C +/- 0.5C for 24hrs. Coliforms that are not E. coli turn red because they reduce TTC (2,3,5 triphenyltetrazolium chloride) in the medium. E. coli turn blue due to the reaction between the enzyme beta glucuronidase and BCIG (5-bromo-4 chloro-3 indolyl-beta-D-glucuronide) in the medium.

EC-WP	Water	Conductivity	APHA 2510B
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Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.

ETL-HARDNESS-EXT-WP	Water	Hardness Calculated	Calculated
F-SOL-WP	Water	Fluoride Soluble	APHA4500/LACHAT

Fluoride - Ion selective electrode

FE-TOT-ULTRA-WP	Water	Iron (Fe)-Total	EPA 200.8 Rev 5.4 May 1994
HG-TOT-ULTRA-WP	Water	Mercury (Hg)-Total	EPA 200.8 Rev 5.4 May 1994
IONBALANCE-OP05-WP	Water		APHA 1030E
MET-SCNOU-TOT-LOW-WP	Water	Metal scan	EPA 200.8 Rev 5.4 May 1994
MET2-EXT-LOW-WP	Water	Routine Metals	EPA 200.8 Rev 5.4 May 1994
N2N3-SOL-WP	Water	Nitrate + Nitrite Soluble	APHA4500;2005/LACHAT;1997,1999
PH-WP	Water	pH	APHA 4500H

pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.

SO4-SOL-WP	Water	Sulphate Soluble	APHA4500/LACHAT
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Sulphate - Turbidimetric

SOLIDS-TDS-WP	Water	Total Dissolved Solids	APHA 2540
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The residue remaining in a prepared casserole after passing the sample through a 1.2 um Whatman GF/C glass microfibre filter and drying at 180 degrees C. Samples may be dried at 105 degrees C if the client specifically requests this drying temperature.

SOLIDS-TOTSUS-WP	Water	Total Suspended Solids	APHA 2540
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The residue retained by a prepared 1.5 um Whatman 934-AH glass microfibre filter dried at 105 degrees C.

TC-MCOLIMF-WP	Water	Total Coliform mcoli blue MF	APHA 9222B and HACH 10029
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This procedure is applicable to E. coli analysis for water samples. It is also used for Total Coliform analysis when only one 100 mL samples is submitted for both Total Coliforms and E. coli. If two sample bottles are submitted for these analyses, E. coli analysis is performed by this procedure, and Total Coliform analysis is performed by A151.

A suitable sample volume is poured through a membrane filter and placed in a petri dish prepared with m-Coli Blue 24 broth. The inverted plates are incubated at 35C +/- 0.5C for 24hrs. Coliforms that are not E. coli turn red because they reduce TTC (2,3,5 triphenyltetrazolium chloride) in the medium. E. coli turn blue due to the reaction between the enzyme beta glucuronidase

Reference Information

and BCIG (5-bromo-4 chloro-3 indolyl-beta-D-glucuronide) in the medium.

TURBIDITY-WP Water Turbidity

APHA, 1998, 2130B

A strong light beam is sent through a transparent tube containing the sample. Light that is reflected at 90 degrees to the axis by suspended particles is detected by the photocell. The electrical response is proportional to the sample turbidity.

ZN-TOT-ULTRA-WP Water Zinc (Zn)-Total

EPA 200.8 Rev 5.4 May 1994

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

Chain of Custody numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WP	ALS LABORATORY GROUP - WINNIPEG, MANITOBA, CANADA		

GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds. The reported surrogate recovery value provides a measure of method efficiency. The Laboratory control limits are determined under column heading D.L.

mg/kg (units) - unit of concentration based on mass, parts per million.

mg/L (units) - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

UNLESS OTHERWISE STATED, SAMPLES ARE NOT CORRECTED FOR CLIENT FIELD BLANKS.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

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Winnipeg, Manitoba, Canada R2J 3T4
Tel: (204) 255-9720
Fax: (204) 255-9721
Toll Free: 1-800-607-7555

CHAIN OF CUSTODY ANALYTICAL REQUEST FORM

DATE SUBMITTED: June 21/07

DATE RECEIVED: ASAC

PRICING CHECKED
As per request of 6/20/07 M
As per last analysis

SAMPLE ID	SAMPLE NO.	DATE TIME SAMPLED	SAMPLE TIME	REMARKS	PLACED
BL-12	CS	June 20/07 11:00	Grab		
BL-13	"	" 11:00	"		
BL-14	"	" 11:00	"		
BL-15	"	" 11:00	"		
BL-16	"	" 11:00	"		
ST-1	"	" 11:00	"		

ANALYSIS REQUESTED:
LAB USE ONLY

SAMPLE RECEIVED (Y OR N)
SAMPLE BROKEN (Y OR N)

LAB SAMPLE NO.	REMARKS
1	
2	
3	
4	

NOTES & CONDITIONS:

1. Quota number must be provided to ensure proper pricing.

2. All samples must be submitted to ALS within 14 days of collection. Samples must be submitted in a cool box with dry ice or other suitable means to ensure proper storage.

3. ALS is not responsible for samples not received.

4. ALS is not responsible for samples not received.

NO. SAMPLES SUBMITTED: 4

NO. BOTTLES/SAMPLES: 4

RECEIVED BY: CS

DATE: June 20/07

TIME: 20:00

DATE: June 21/07

TIME: 9:25

RECEIVED BY: ALSLAB

DATE: June 20/07

TIME: 20:00

DATE: June 21/07

TIME: 9:25

E-MAIL: YES ☒ NO ☐

E-MAIL ADDRESS: alshlab@alshlab.com

PO. NO.:

JOB NO.: 1015263

SAMPLE CONDITION UPON RECEIPT: ☐ ACCEPTABLE ☐ NON-ACCEPTABLE

FREIGHT: ☐ COLD ☐ AMBIENT

WHITE: File Copy
GREEN: Final Report
PINK: Invoicing
BLUE: Client Support
YELLOW: Customer

REV. OCT. 1/2006

Appendix C Analytical Summary Figures & *In Situ* Data

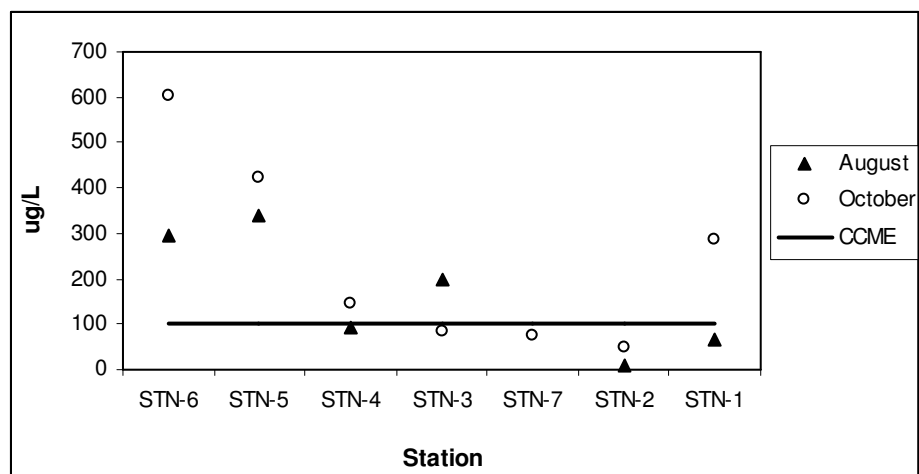


Figure 1 Aluminum levels in the Tundra Wetland at Qamani'tuaq, NU from STN-6 downstream to STN-1, August and October 2006

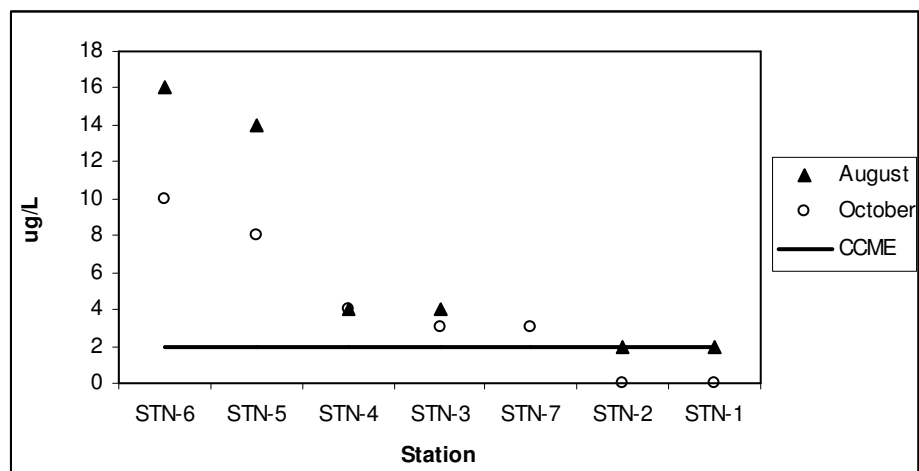


Figure 2 Copper levels in the Tundra Wetland at Qamani'tuaq, NU, from STN-6 downstream to STN-1, August and October 2006

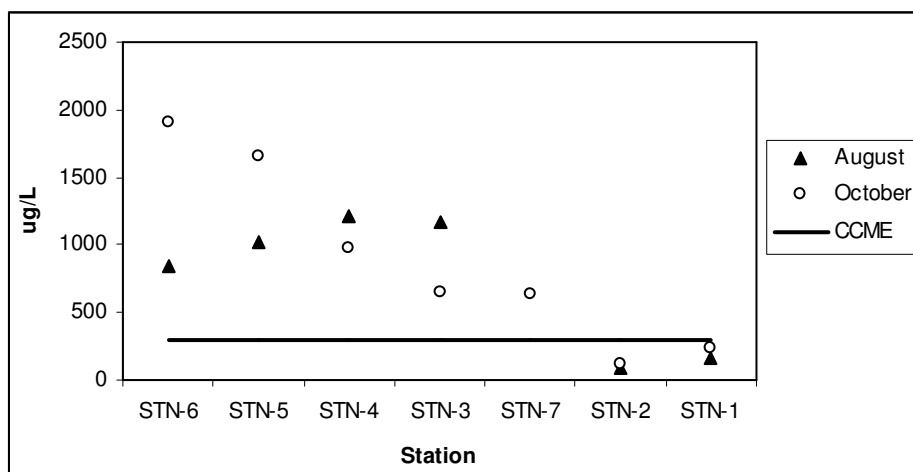


Figure 3 Iron levels in the Tundra Wetland at Qamani'tuaq, NU, from STN-6 downstream to STN-1, August and October 2006

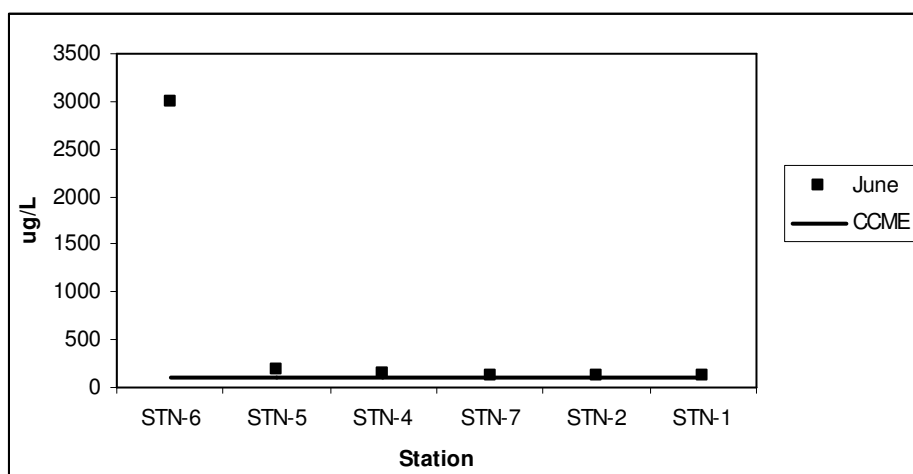


Figure 4 Aluminum levels through the Tundra Wetland at Qamani'tuaq, NU from STN-6 downstream to STN-1, June 2007

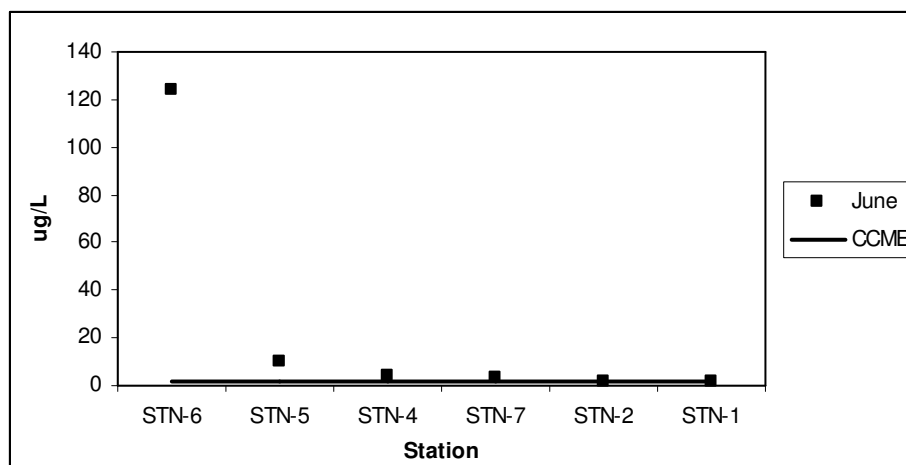


Figure 5 Copper levels in the Tundra Wetland at Qamani'tuaq, NU, from STN-6 downstream to STN-1, June 2007

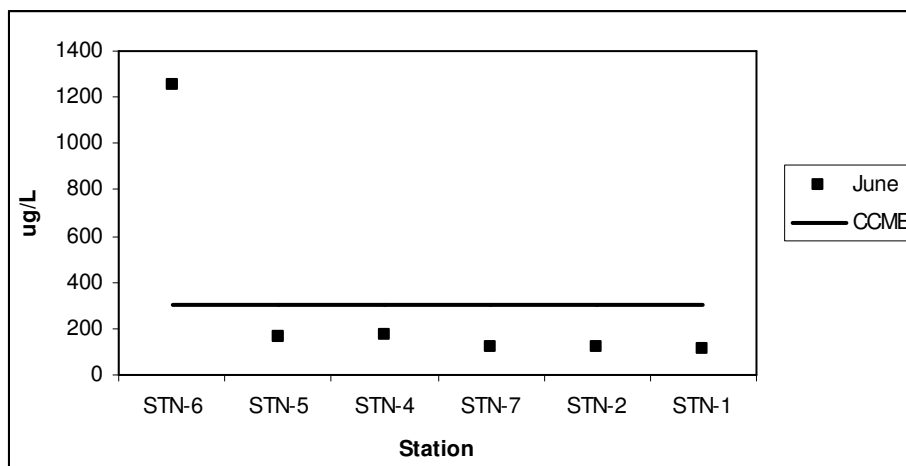


Figure 6 Iron levels in the Tundra Wetland at Qamani'tuaq, NU, from STN-6 downstream to STN-1, June 2007

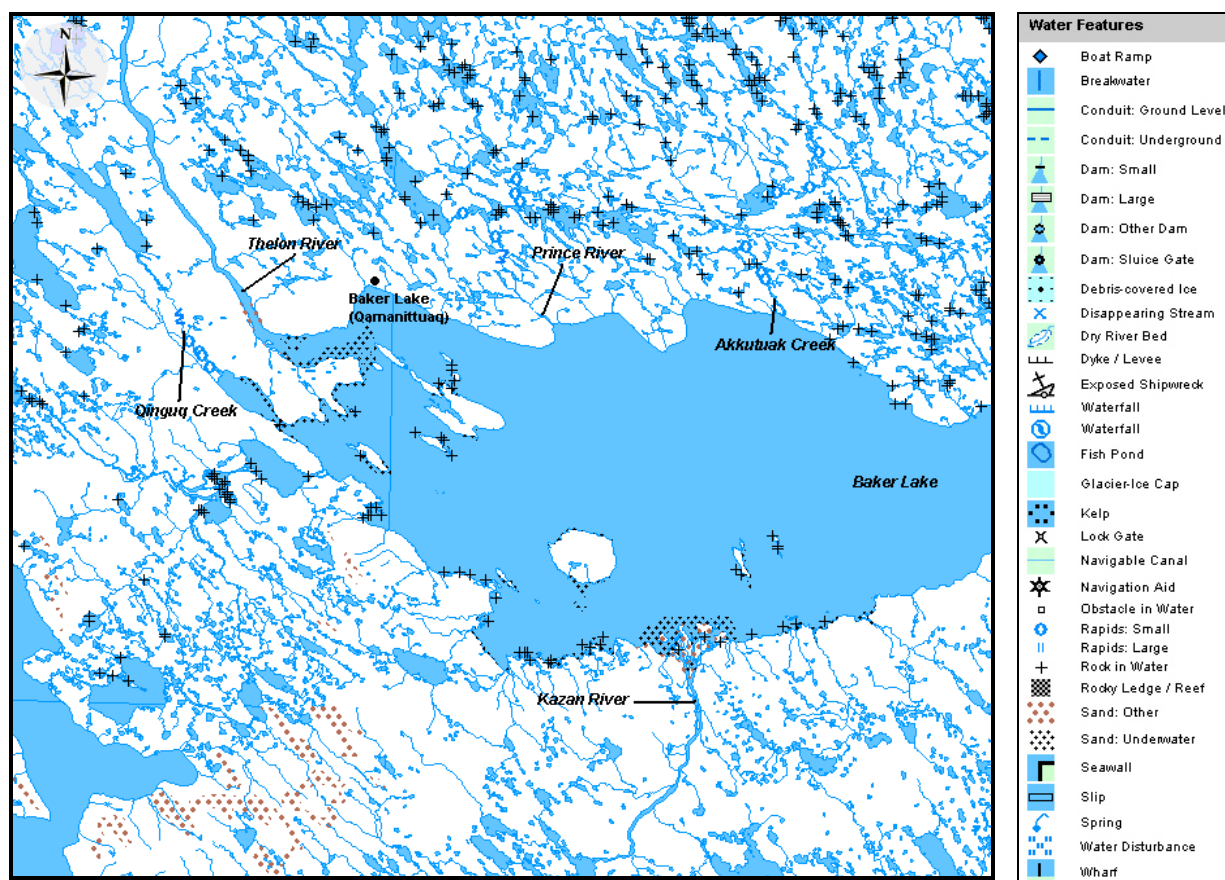


Figure 7: Hydrological Influences on Baker Lake, NU (Topographic Map and Legend © Her Majesty the Queen in Right of Canada, Department of Natural Resources. All Rights Reserved)

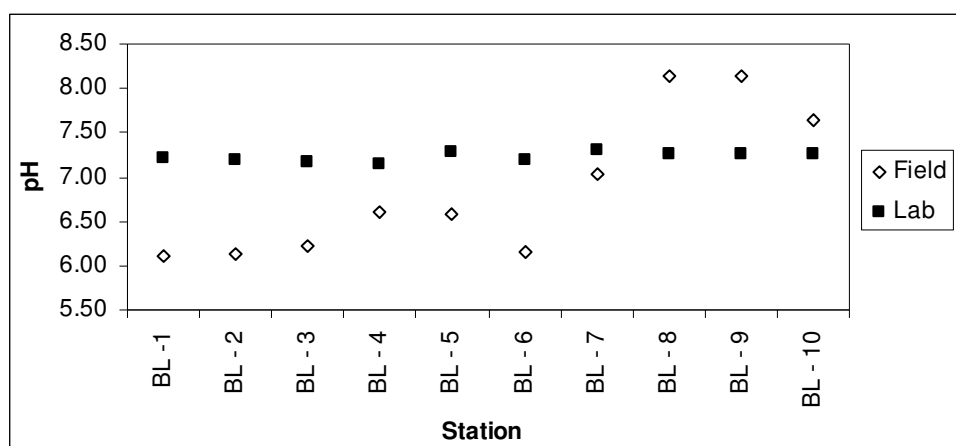


Figure 8 Comparison of laboratory and field pH at Baker Lake stations, August 2006

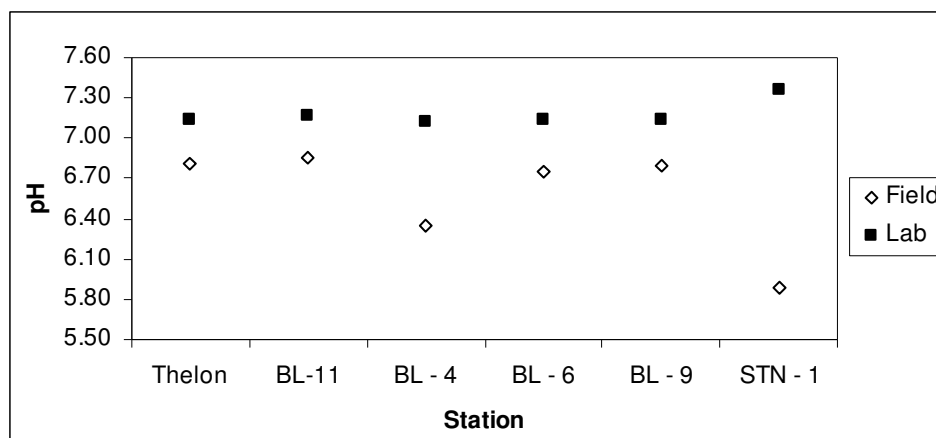


Figure 9 Comparison of laboratory and field pH at Baker Lake stations, October 2006

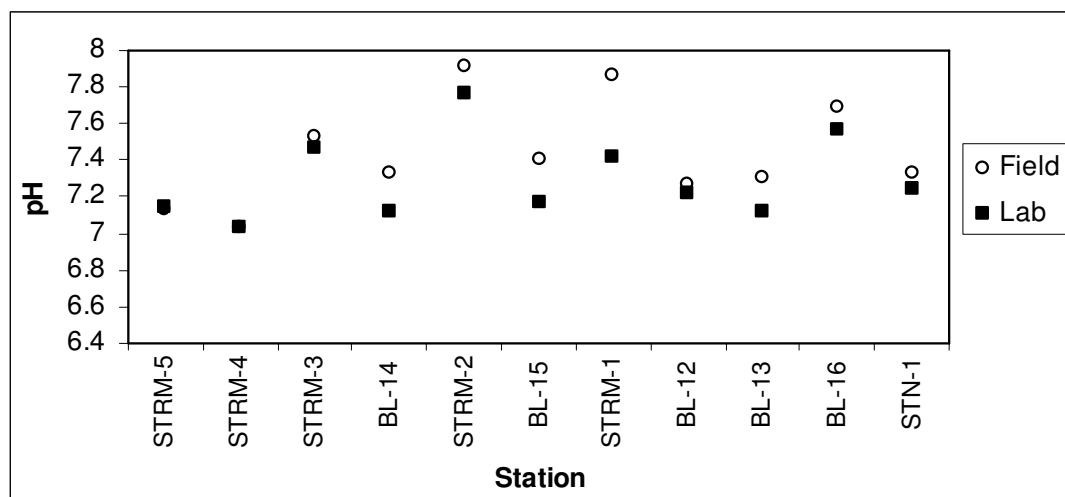


Figure 10 Comparison of laboratory and field pH at onshore Baker Lake and stream stations, June 2007

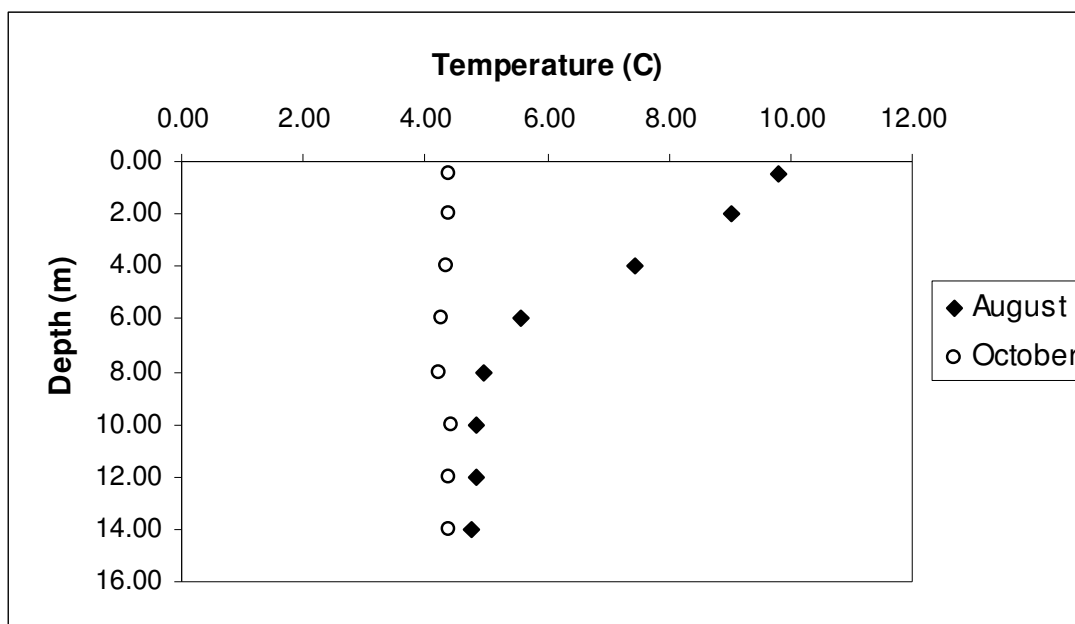


Figure 11 Mean temperature-depth profile in Baker Lake, August and October 2006

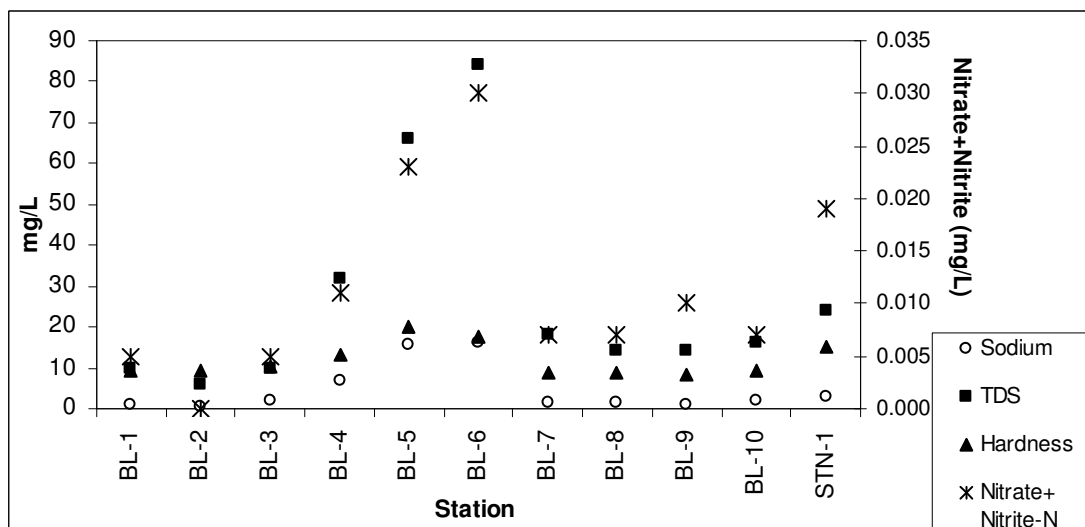


Figure 12 Sodium, total dissolved solids (TDS), hardness and nitrate+nitrite levels at 0.5 m depth across Baker Lake and at STN-1, August 2006

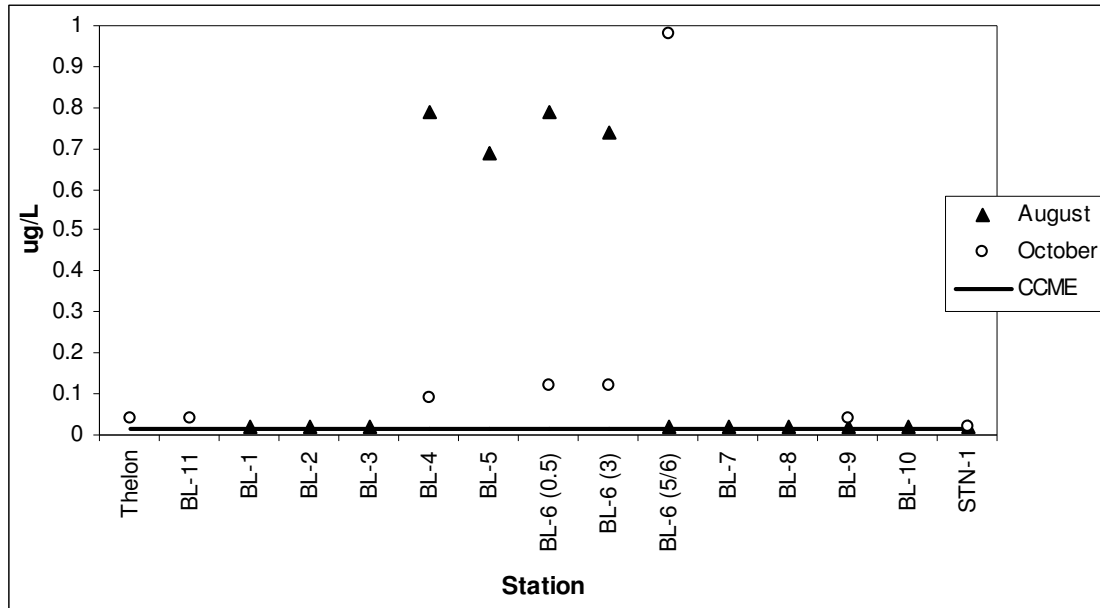


Figure 13 Cadmium levels across Baker Lake at 0.5 m depth, August and October 2006; Health Canada Drinking Water Standard is 5 µg/L

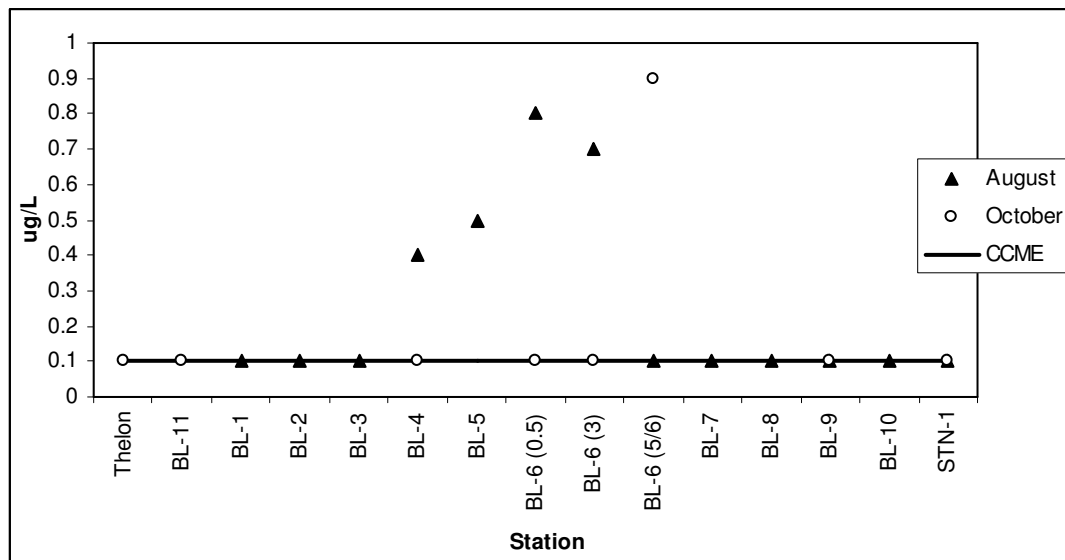


Figure 14 Silver levels across Baker Lake at 0.5 m depth, August and October 2006 (no applicable Health Canada Drinking Water Standard)

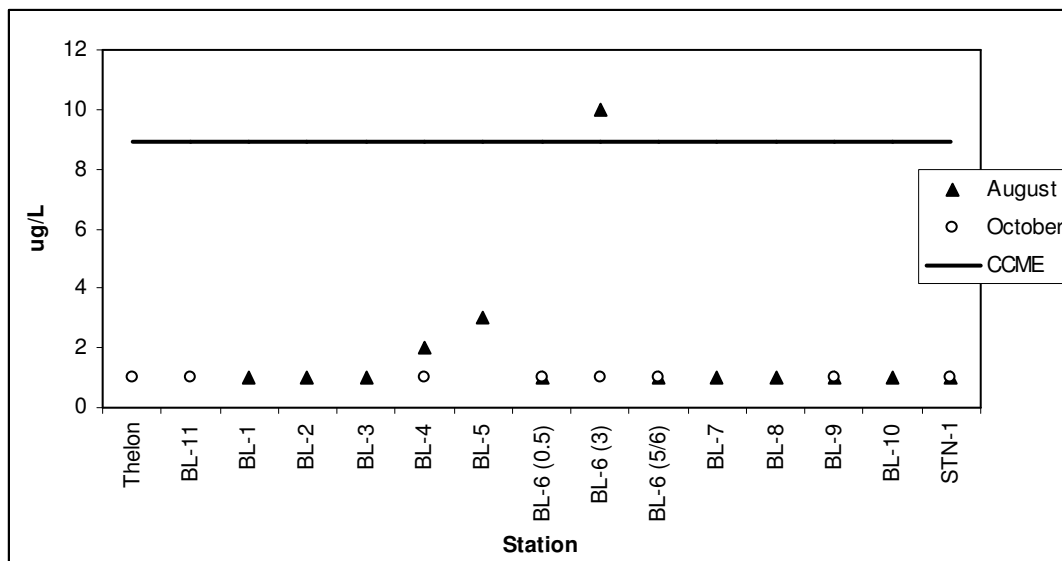


Figure 15 Chromium levels across Baker Lake at 0.5 m depth, August and October 2006; Health Canada Drinking Water Guideline is 50 µg/L

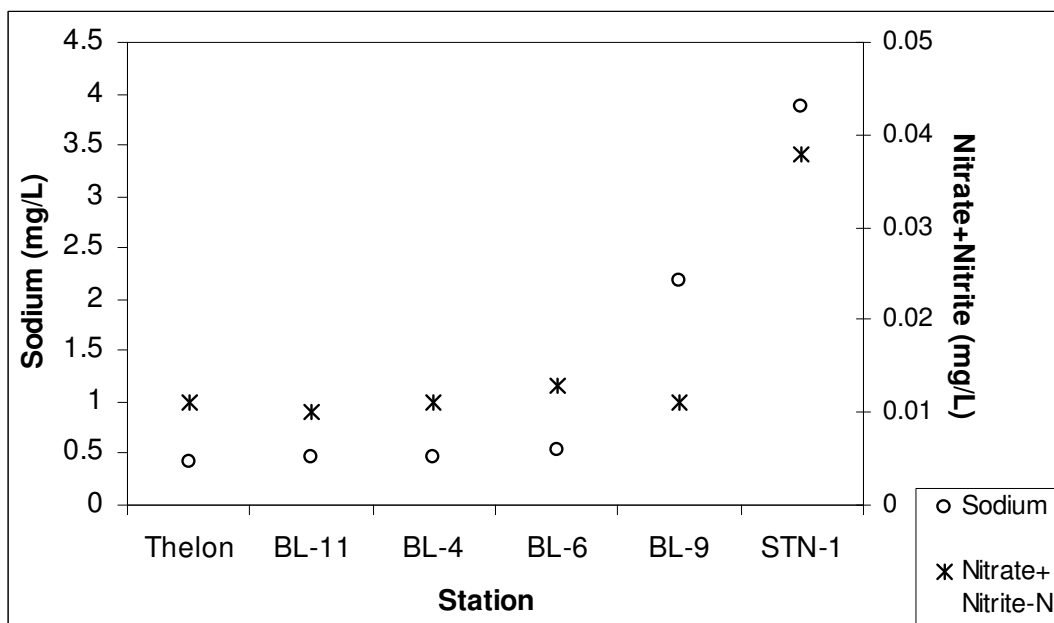


Figure 16 Sodium and nitrate+nitrite levels at 0.5 m depth across Baker Lake and at STN-1, October 2006

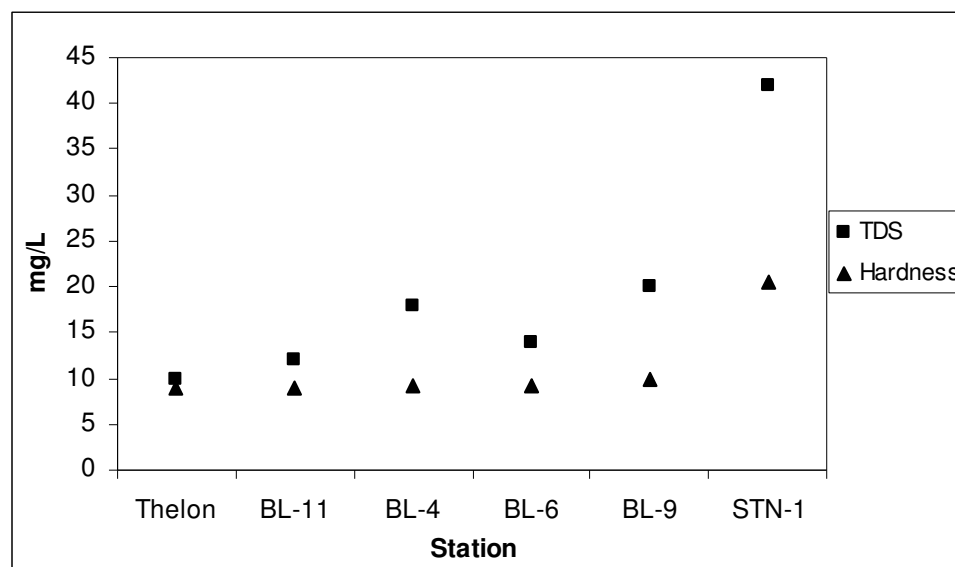


Figure 17 Hardness and total dissolved solids (TDS) levels at 0.5 m depth across Baker Lake and at STN-1, October 2006

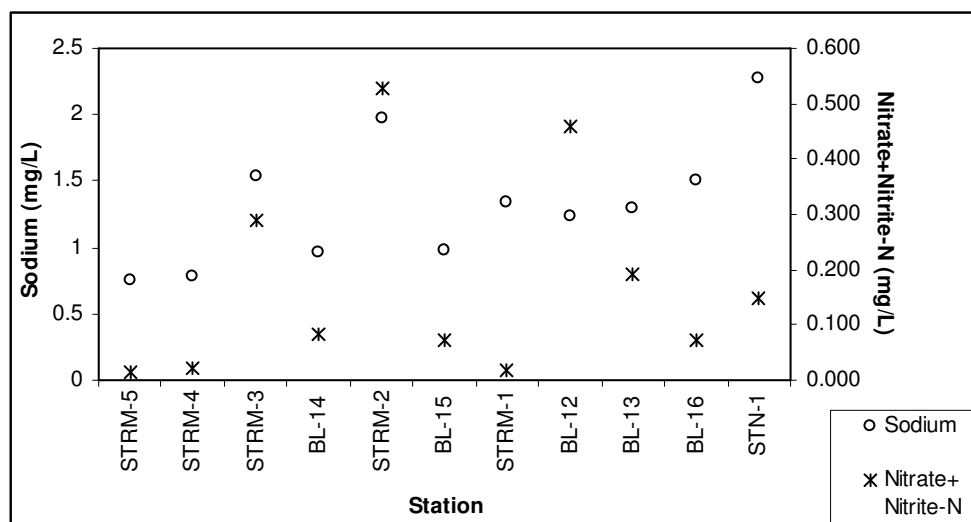


Figure 18 Sodium and nitrate+nitrite levels at onshore Baker Lake stations, Stream stations, and at STN-1, June 2007

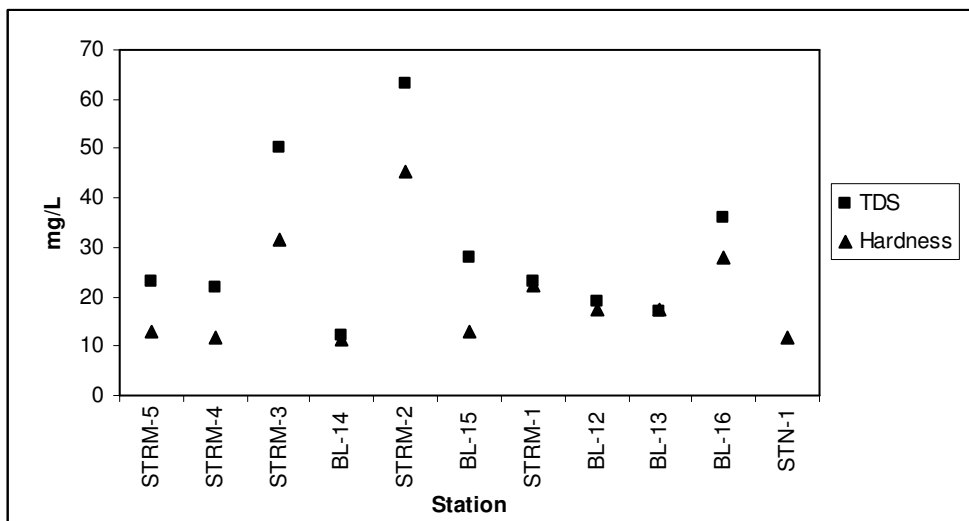


Figure 19 Hardness and total dissolved solids (TDS) levels at onshore Baker Lake stations, Stream stations, and at STN-1, June 2007

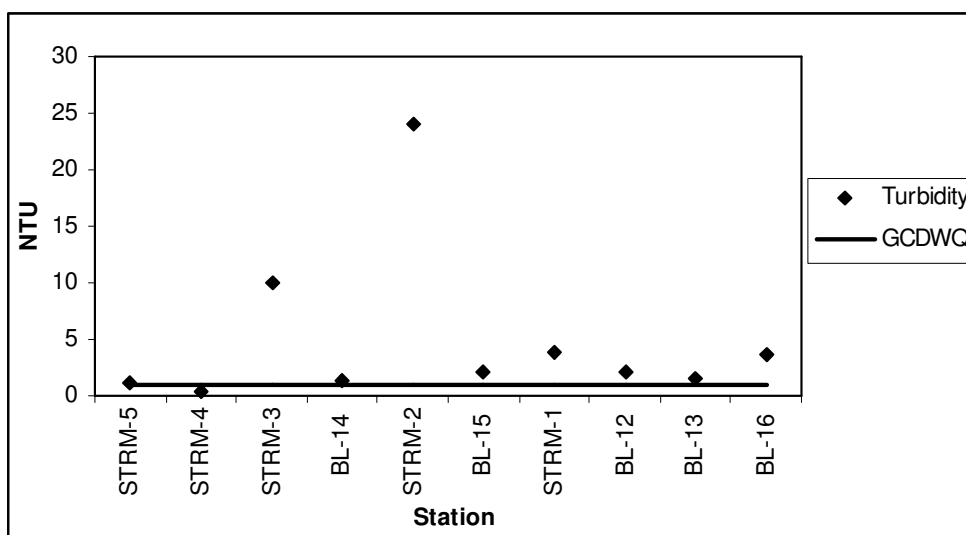


Figure 20 Turbidity levels at onshore Baker Lake and Stream stations, June 2007; Nunavut *Consolidation of Public Water Supply Regulations* maximum allowable value for a surface water source is 5 NTU

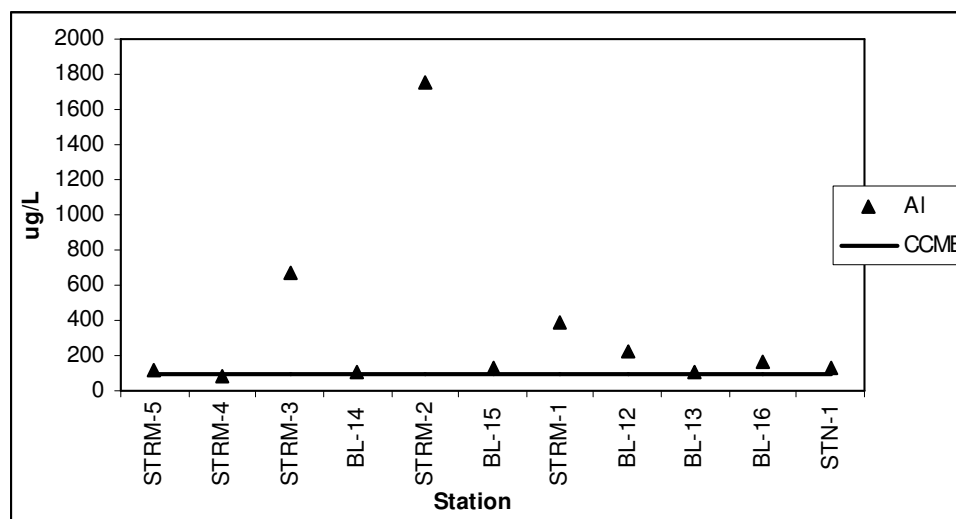


Figure 21 Aluminum (Al) levels at onshore Baker Lake and stream stations, June 2007 (stations listed from west to east); Health Canada operational guidance value is 200 µg/L

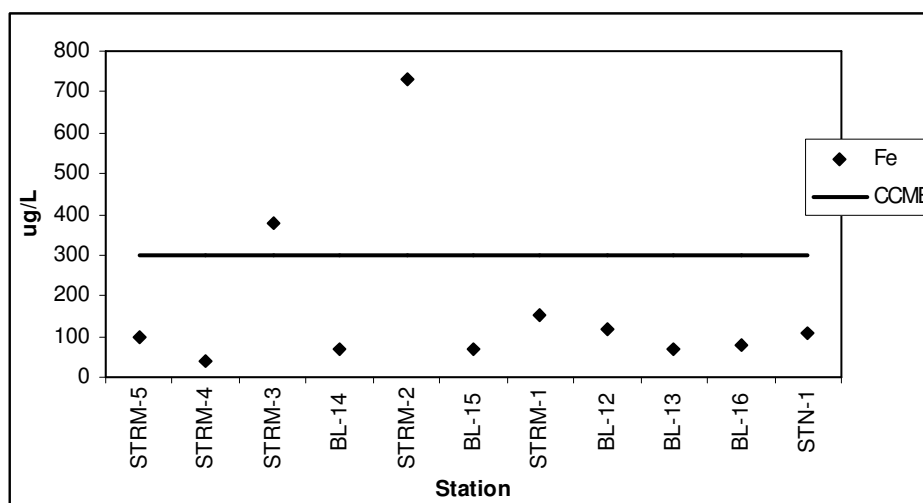


Figure 22 Iron (Fe) levels at onshore Baker Lake and stream stations in June 2007 (stations listed from west to east); Health Canada Drinking Water Guideline is 300 µg/L

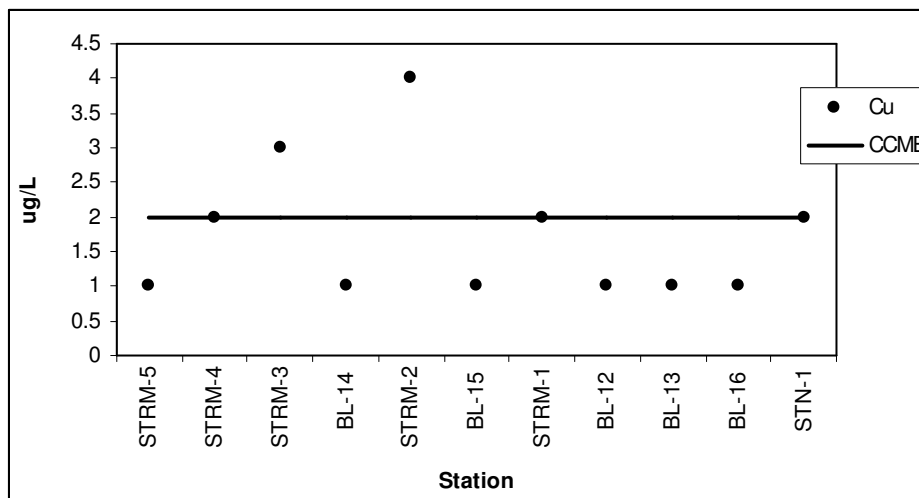


Figure 23 Copper (Cu) levels at onshore Baker Lake and streams stations in June 2007 (stations listed from west to east); Health Canada Drinking Water Guideline is 1000 $\mu\text{g/L}$

Table C-1 Baker Lake *In Situ* Data from August 2006 sampling (using a Hydrolab Quanta)

c	Location	Total Depth (~ m)	Depth (m)	Temperature (C)	pH	D.O. (mg/L)	Conductivity (mS/cm)	Conductivity (uS/cm)	ORP (mV)	Salinity (PSS)
8/2/06	BL - 1	6.10	0.50	11.01	6.10	13.99	0.025	25	199	0.02
			2.00	10.96	6.13	13.66	0.025	25	202	0.01
			4.00	10.85	6.15	13.42	0.025	25	200	0.01
			5.85	10.71	6.26	13.21	0.023	23	201	0.01
8/2/06	Insitu - 1	3.10	0.50	10.45	6.19	14.09	0.030	30	165	0.02
			2.00	10.26	6.13	13.62	0.032	32	168	0.02
			2.90	9.78	6.17	13.69	0.032	32	167	0.02
8/2/06	Insitu - 2	5.30	0.50	10.39	6.01	13.06	0.028	28	169	0.02
			2.00	10.43	5.98	13.08	0.027	27	174	0.02
			4.00	10.10	5.95	13.06	0.027	27	177	0.01
			5.00	9.85	6.07	13.08	-	-	177	0.02
8/2/06	BL - 2	5.80	0.50	10.41	6.14	12.76	0.025	25	165	0.01
			2.00	10.37	6.14	12.76	0.024	24	169	0.01
			4.00	10.18	6.18	12.77	0.023	23	174	0.01
			5.60	9.85	6.20	12.81	0.023	23	175	0.01
8/2/06	Insitu - 3	9.20	0.50	10.51	6.35	12.34	0.024	24	146	0.01
			2.00	10.37	6.08	12.38	0.024	24	162	0.01
			4.00	9.81	6.06	12.40	0.023	23	164	0.01
			6.00	8.34	6.26	12.63	0.058	58	164	0.03
			8.00	4.92	6.33	13.34	0.147	147	164	0.07
			8.80	4.91	6.33	13.41	0.147	147	164	0.07
8/2/06	Insitu - 4	10.50	0.50	10.23	6.15	12.15	0.025	25	164	0.01
			2.00	10.20	6.18	12.20	0.025	25	166	0.01
			4.00	10.04	6.21	12.21	0.026	26	168	0.01
			6.00	7.12	6.32	12.74	0.089	89	168	0.04
			8.00	4.78	6.37	13.37	0.151	151	168	0.07
			10.00	4.79	6.37	13.43	0.151	151	169	0.07
8/2/06	BL - 3	10.80	0.50	9.95	6.23	12.17	0.032	32	173	0.02
			2.00	9.89	6.24	12.14	0.031	31	174	0.02
			4.00	8.70	6.29	12.15	0.053	53	175	0.03
			6.00	5.06	6.38	12.85	0.146	146	175	0.06
			8.00	4.72	6.41	13.28	0.154	154	176	0.07
			10.00	4.63	6.41	13.26	0.156	156	176	0.07
8/2/06	Insitu - 5	12.80	0.50	9.89	6.30	12.31	0.043	43	174	0.02
			2.00	9.83	6.29	12.13	0.042	42	174	0.02
			4.00	9.08	6.33	12.23	0.055	55	177	0.03
			6.00	6.32	6.41	13.05	0.126	126	177	0.06
			8.00	4.75	6.43	13.31	0.152	152	177	0.07
			10.00	4.60	6.41	13.29	0.156	156	177	0.07
			12.00	4.58	6.40	13.19	0.156	156	178	0.07

Table C-1 Baker Lake *In Situ* Data from August 2006 sampling (using a Hydrolab Quanta) (cont'd)

c	Location	Total Depth (~ m)	Depth (m)	Temperature (C)	pH	D.O. (mg/L)	Conductivity (mS/cm)	Conductivity (uS/cm)	ORP (mV)	Salinity (PSS)
8/2/06	Insitu - 6	> 15.00	0.50	9.10	6.57	12.37	0.060	60	132	0.03
			2.00	8.77	6.41	12.33	0.063	63	134	0.03
			4.00	6.27	6.38	12.88	0.123	123	132	0.06
			6.00	5.49	6.35	13.16	0.135	135	133	0.06
			8.00	4.90	6.34	13.15	0.148	148	136	0.07
			10.00	4.69	6.33	13.26	0.155	155	138	0.07
			12.00	4.63	6.33	13.30	0.156	156	140	0.07
			14.00	4.62	6.31	13.27	0.156	156	141	0.07
8/2/06	BL - 4		15.00	4.58	6.28	13.25	0.157	157	142	0.07
		14.85	0.50	8.64	6.61	12.21	0.071	71	111	0.03
			2.00	6.64	6.61	12.80	0.117	117	110	0.05
			4.00	5.73	6.40	13.05	0.134	134	110	0.06
			6.00	5.42	6.38	13.12	0.139	139	113	0.06
			8.00	5.09	6.31	13.19	0.147	147	114	0.07
			10.00	4.67	6.28	13.22	0.156	156	117	0.07
			12.00	4.63	6.24	13.30	0.155	155	118	0.07
8/3/06	Insitu - 7	11.20	0.50	9.83	7.32	12.45	0.044	44	44	0.02
			2.00	9.25	7.18	12.45	0.060	60	52	0.03
			4.00	5.82	7.15	13.31	0.129	129	50	0.06
			6.00	5.47	6.97	13.45	0.135	135	53	0.06
			8.00	5.16	7.52	13.53	0.143	143	43	0.06
			10.00	4.68	7.88	13.59	0.154	154	36	0.07
			14.00	4.62	6.22	13.26	0.156	156	119	0.07
8/2/06	BL - 5	8.00	0.50	5.55	6.58	13.03	0.141	141	75	0.06
			2.00	5.46	6.46	13.08	0.142	142	79	0.06
			4.00	5.20	6.44	13.08	0.143	143	81	0.07
			6.00	4.78	6.43	13.16	0.151	151	86	0.07
			7.50	4.78	6.34	13.10	0.151	151	90	0.07
8/3/06	BL - 6	6.10	0.50	5.19	6.16	13.80	0.150	150	84	0.07
			2.00	5.06	6.03	13.52	0.149	149	96	0.07
			4.00	5.00	6.08	13.48	0.149	149	94	0.07
			6.00	5.02	6.62	13.48	0.149	149	84	0.07
8/3/06	BL - 7	7.00	0.50	10.60	7.03	12.43	0.032	32	52	0.02
			2.00	9.81	7.03	12.14	0.035	35	49	0.02
			4.00	6.96	7.14	12.84	0.114	114	50	0.05
			6.00	5.70	7.14	13.15	0.136	136	55	0.06
8/3/06	Insitu - 8	7.30	0.50	10.49	8.21	11.94	0.030	30	15	0.02
			2.00	9.89	8.34	11.95	0.032	32	12	0.02
			4.00	7.68	8.33	12.54	0.093	93	4	0.04
			6.00	5.55	8.21	13.05	0.141	141	4	0.06

Table C-1 Baker Lake *In Situ* Data from August 2006 sampling (using a Hydrolab Quanta) (cont'd)

c	Location	Total Depth (~ m)	Depth (m)	Temperature (C)	pH	D.O. (mg/L)	Conductivity (mS/cm)	Conductivity (uS/cm)	ORP (mV)	Salinity (PSS)
8/3/06	BL - 8	8.20	0.50	10.51	8.14	11.91	0.029	29	7	0.02
			2.00	9.52	8.25	12.00	0.048	48	13	0.02
			4.00	7.93	8.31	12.35	0.090	90	2	0.04
			6.00	5.42	8.28	13.15	0.144	144	7	0.07
			8.00	5.26	8.11	13.10	0.146	146	12	0.07
8/3/06	Insitu - 9	9.10	0.50	10.57	6.53	11.91	0.030	30	80	0.02
			2.00	9.80	6.76	11.91	0.037	37	77	0.02
			4.00	7.94	6.82	12.48	0.090	90	70	0.04
			6.00	5.23	6.83	13.20	0.144	144	74	0.07
			8.00	5.10	7.23	13.17	0.148	148	72	0.07
8/3/06	Insitu - 10	10.20	0.50	10.65	7.25	12.18	0.032	32	44	0.02
			2.00	9.13	7.89	12.13	0.045	45	34	0.02
			4.00	7.74	8.05	12.64	0.093	93	32	0.04
			6.00	5.42	8.19	13.14	0.143	143	34	0.07
			8.00	5.14	8.23	13.23	0.147	147	34	0.07
			10.00	5.04	8.23	13.25	0.148	148	34	0.07
8/3/06	BL - 9	> 15.00	0.50	10.61	8.15	11.95	0.026	26	-	0.01
			2.00	10.06	8.00	11.98	0.023	23	19	0.01
			4.00	7.75	8.39	12.75	0.095	95	8	0.04
			6.00	5.25	8.46	13.28	0.145	145	7	0.07
			8.00	5.00	8.60	13.22	0.146	146	9	0.07
			10.00	4.96	8.59	13.30	0.147	147	10	0.07
			12.00	4.92	8.65	13.33	0.148	148	10	0.07
			14.00	4.76	8.56	13.36	0.151	151	10	0.07
			15.00	4.76	8.61	13.25	0.152	152	13	0.07
8/3/06	Insitu - 11	> 15.00	0.50	10.48	7.35	12.05	0.028	28	11	0.02
			2.00	9.07	7.48	12.16	0.049	49	10	0.02
			4.00	7.21	7.61	12.62	0.106	106	11	0.05
			6.00	5.23	7.48	13.11	0.144	144	17	0.07
			8.00	5.02	7.63	13.20	0.146	146	28	0.07
			10.00	5.03	7.63	13.13	0.146	146	34	0.07
			12.00	5.00	7.61	13.10	0.146	146	31	0.07
			14.00	4.93	7.38	13.13	0.147	147	27	0.07
			15.00	4.92	6.67	13.07	0.147	147	45	0.07

Table C-1 Baker Lake *In Situ* Data from August 2006 sampling (using a Hydrolab Quanta) (cont'd)

c	Location	Total Depth (~ m)	Depth (m)	Temperature (C)	pH	D.O. (mg/L)	Conductivity (mS/cm)	Conductivity (uS/cm)	ORP (mV)	Salinity (PSS)
8/3/06	Insitu - 12	> 15.00	0.50	10.48	7.06	11.75	0.029	29	18	0.02
			2.00	8.40	7.06	12.16	0.066	66	27	0.03
			4.00	5.50	7.22	13.04	0.139	139	27	0.06
			6.00	5.23	7.37	12.77	0.146	146	24	0.07
			8.00	5.03	7.43	13.04	0.148	148	24	0.07
			10.00	5.02	7.25	12.81	0.148	148	24	0.07
			12.00	4.97	7.02	12.82	0.149	149	41	0.07
			14.00	4.72	7.10	12.80	0.152	152	39	0.07
8/3/06	BL - 10		15.00	4.68	7.21	12.94	0.152	152	37	0.07
		14.80	0.50	10.26	7.65	12.31	0.034	34	13	0.02
			2.00	8.52	7.67	12.66	0.063	63	10	0.03
			4.00	5.63	7.74	13.35	0.140	140	11	0.06
			6.00	5.14	7.73	13.53	0.147	147	9	0.07
			8.00	4.95	7.87	13.51	0.149	149	10	0.07
			10.00	4.97	7.94	13.48	0.150	150	10	0.07
			12.00	4.94	7.97	13.49	0.149	149	11	0.07
8/3/06	Insitu - 13		14.00	4.77	7.99	13.42	0.150	150	10	0.07
		14.20	0.50	10.04	7.46	12.70	0.036	36	26	0.02
			2.00	8.41	6.84	12.74	0.066	66	39	0.03
			4.00	5.37	6.63	13.35	0.144	144	76	0.07
			6.00	5.00	7.13	13.34	0.149	149	60	0.07
			8.00	4.96	7.24	13.37	0.148	148	56	0.07
			10.00	4.93	6.58	13.39	0.148	148	80	0.07
			12.00	4.90	6.90	13.38	0.149	149	72	0.07
8/3/06	Insitu - 14		14.00	4.77	7.04	13.39	0.151	151	62	0.07
		10.70	0.50	9.31	7.70	12.24	0.065	65	17	0.03
			2.00	6.84	7.10	12.94	0.133	133	52	0.06
			4.00	4.99	7.11	13.44	0.148	148	52	0.07
			6.00	4.84	7.32	13.37	0.151	151	51	0.07
			8.00	4.80	7.27	13.40	0.151	151	50	0.07
8/3/06	STN - 1		10.00	4.73	7.23	13.44	0.152	152	59	0.07
		0.30	0.20	18.02	-	10.62	0.063	63	54	0.03

Table C-2 Tundra Wetland *In Situ* Data from October 2006 sampling (using a Hydrolab Quanta)

Date	Location	Total Depth (~ m)	Depth (m)	Temperature (C)	pH	D.O. (mg/L)	Conductivity (mS/cm)	Conductivity (uS/cm)	ORP (mV)	Salinity (PSS)
10/4/06	STN-1	0.2	0.1	0.86	5.89	14.76	0.066	66	86	0.03
10/4/06	STN-2	0.17	0.15	2.79	6.70	14.32	0.055	55	90	0.02
10/4/06	STN-7	0.3	0.2	0.20	6.70	14.85	0.183	183	106	0.08
10/4/06	STN-3	0.25	0.2	0.44	6.51	15.22	0.184	184	110	0.08
10/4/06	STN-4	0.5	0.3	1.17	6.86	12.86	0.212	212	111	0.1
10/4/06	STN-5	0.25	0.2	2.06	7.01	5.87	0.43	430	128	0.2
10/4/06	STN-6		0.3	1.86	7.32	4.61	0.462	462	127	0.22

Table C-3 Baker Lake *In Situ* data from October 2006 sampling (using a Hydrolab Quanta)

Date	Location	Total Depth (~ m)	Depth (m)	Temperature (C)	pH	D.O. (mg/L)	Conductivity (mS/cm)	Conductivity (uS/cm)	ORP (mV)	Salinity (PSS)
10/5/06	BL - 4	13.8	0.5	4.54	6.35	12.65	0.022	22	165	0.01
			2	4.50	6.41	12.35	0.022	22	162	0.01
			4	4.40	6.45	12.31	0.024	24	162	0.01
			6	4.31	6.48	12.23	0.024	24	162	0.01
			8	4.31	6.49	12.23	0.029	29	163	0.01
			10	4.38	6.51	12.15	0.033	33	163	0.01
			12	4.37	6.57	11.97	0.034	34	163	0.02
10/5/06	BL - 6		13	4.38	6.60	11.89	0.033	33	162	0.01
		7.5	0.5	4.07	6.75	12.37	0.023	23	146	0.01
			2	4.08	6.72	12.25	0.023	23	149	0.01
			4	4.05	6.73	12.16	0.023	23	151	0.01
			6	4.01	6.72	12.14	0.024	24	152	0.01
10/5/06	BL - 9		7	3.98	6.75	12.09	0.024	24	152	0.01
		> 15	0.5	4.47	6.80	12.18	0.037	37	148	0.02
			2	4.46	6.77	12.17	0.038	38	149	0.02
			4	4.47	6.79	12.05	0.038	38	152	0.02
			6	4.47	6.80	11.85	0.038	38	151	0.02
			8	4.46	6.81	11.88	0.038	38	152	0.02
			10	4.47	6.82	11.85	0.038	38	153	0.02
			12	4.45	6.82	11.89	0.038	38	154	0.02
10/5/06	BL - 11		14	4.42	6.81	11.8	0.038	38	155	0.02
			15	4.42	6.82	11.76	0.038	38	155	0.02
		5.5	0.5	4.38	6.85	12.13	0.022	22	152	0.01
			2	4.38	6.80	12.09	0.022	22	154	0.01
10/5/06	Thelon		4	4.31	6.77	12.1	0.022	22	156	0.01
			5	4.25	6.81	12.07	0.022	22	155	0.01
		3.8	0.5	4.58	6.81	12.16	0.022	22	154	0.01
10/5/06	Thelon		2	4.58	6.80	12.05	0.022	22	155	0.01
			3	4.58	6.79	12.07	0.022	22	155	0.01

Table C-4 Tundra Wetland *In Situ* Data from June 2007 sampling (using a Hydrolab Quanta)

Date	Location	Total Depth (~ m)	Depth (m)	Temperature (C)	pH	D.O. (mg/L)	Conductivity (mS/cm)	Conductivity (uS/cm)	ORP (mV)	Salinity (PSS)
6/19/07	STN-1	0.70	0.20	1.38	7.33	19.20	0.010	10	135	0.00
6/19/07	STN-2	0.60	0.20	1.98	7.11	14.53	0.026	26	147	0.01
6/19/07	STN-7	1.00	0.20	2.34	7.07	13.35	0.025	25	145	0.01
6/19/07	STN-3	-	0.20	1.98	7.36	13.12	0.048	48	155	0.02
6/19/07	STN-4	1.20	0.20	2.48	7.58	12.20	0.067	67	157	0.03
6/19/07	STN-5	0.50	0.15	0.23	8.96	12.41	0.613	613	179	0.28
6/19/07	STN-6	0.70	0.20	1.38	7.33	19.20	0.010	10	135	0.00

Table C-5 Baker Lake onshore *In Situ* Data from June 2007 sampling (using a Hydrolab Quanta)

Date	Location	Total Depth (~ m)	Depth (m)	Temperature (C)	pH	D.O. (mg/L)	Conductivity (mS/cm)	Conductivity (uS/cm)	ORP (mV)	Salinity (PSS)
6/20/07	BL-12	0.40	0.20	1.16	7.27	14.78	0.025	25	130	0.01
6/20/07	BL-13	0.50	0.20	1.89	7.31	14.90	0.023	23	127	0.01
6/20/07	STRM-1	0.20	0.15	5.59	7.86	13.81	0.029	29	121	0.01
6/20/07	STRM-2	0.20	0.10	4.82	7.91	14.35	0.073	73	145	0.03
6/20/07	STRM-3	0.25	0.10	6.64	7.53	12.84	0.049	49	129	0.02
6/20/07	BL-14	0.30	0.15	2.20	7.33	14.80	0.018	18	127	0.01
6/20/07	BL-15	0.50	0.10	3.81	7.40	15.01	0.018	18	121	0.01
6/20/07	BL-16	0.40	0.10	5.88	7.69	13.76	0.041	41	131	0.02
6/20/07	STRM-4	0.35	0.15	8.76	7.03	11.79	0.017	17	120	0.01
6/20/07	STRM-5	1.00	0.10	8.74	7.13	11.83	0.017	17	120	0.01

Appendix D Jacques Whitford NAWÉ Field Report & Recommendations



Baker Lake Field Observations

July 3, 2007

On July 3, 2007, Matt Wildman of Jacques Whitford NAWE, Inc. visited the Baker Lake wastewater treatment facility. Mr. Wildman was given a tour of the wastewater site and landfill area by Mr. Hugh Ikoe prior to walking the site from the dump site and lagoon down to the discharge point from Airplane Lake. Mr. Ikoe gave a brief history of the site and the community. The purpose of the visit was to delineate the areas where leachate from the wastewater treatment facility and the solid waste facility was flowing and determine effective locations for flow attenuation berms or other means of increasing the effectiveness of treatment of the community's wastewater.

Wastewater Lagoon

More than 8 trucks were observed dumping sewage into the lagoon (**Figure 1**) during the site visit. The lagoon area was very small and it appeared that solids from the lagoon were used on the outside of the berm in an attempt to seal the berm and prevent water from leaking out of the lagoon (**Figures 2 and 3**). Examination of the dike showed that water was leaking out of the middle of the north side at the base of the dike (**Figure 4**). The water was leaking at a fairly rapid rate. There was evidence of significant erosion of material that had been piled on the north side of the dike.

Recommendation: Increase the size of the wastewater lagoon to adequately treat flow from the community. Place a liner in the lagoon to prevent water from leaking through the dike. With the materials that appear to be available in the area, it will be very difficult to provide impervious materials that would provide a leakproof environment. It appears that any efforts that are made to prevent water from leaking with addition of materials will ultimately contribute more sediment to the wetlands downstream of the lagoon.

Wastewater Lagoon to Lagoon Lake

After the water discharged from the lagoon, it flowed through two main channels (**Figure 5**). These channels diverged in a few places, creating multiple channels that flowed into Lagoon Lake. The water flowing through these channels was turbid and there was significant algae growth in and around these channels (**Figure 6**). There was evidence of solids on the ice and on the grasses in the wetland area between the lagoon and Lagoon Lake. There was also evidence of more significant flow, presumably from the major spring melt period. Grasses were matted down and covered with solids (**Figure 7**). Evidence of fats, oils, and grease (FOG) was also present in the small pools of water off of the main flow channels. There was ice that had formed over the winter at the inlet zone to Lagoon Lake, indicating that the lagoon continued seeping through the winter (**Figures 8 and 9**). The only other ice in the entire area was on Airport Lake and Baker Lake, so it was evident that the ice was formed from the leaking lagoon.

Recommendation: Provide additional filtering of water prior to discharge to Lagoon Lake. Additional filtering would prevent some of the major sediment transport that is occurring. This sediment transport is contributing to turbidity in the water and nutrient transport downstream. Filtering could come in the form of pervious dikes that could serve three purposes: 1. Attenuate flow and spread it out evenly over the area, 2. Filter water, and 3. Provide a medium for bacteria to grow and help with additional treatment of the wastewater

water prior to discharge to Lagoon Lake. Two potential locations for a flow attenuation dike were entered into the GPS.

There were also odors present in the area between the lagoon and Lagoon Lake, even with the wind blowing out of the northwest. In Lagoon Lake, there was algae growth evident along the shore. There were also ducks present in the Lake. Bluebills and Oldsquaw were identified in Lagoon Lake. They appeared to be diving for food and appeared to be nesting in the area.

Lagoon Lake to Finger Lake

The channel between Lagoon Lake and Finger Lake had significant algae growth on rocks in the channels and in the pools off the main channel (**Figures 10, 11, and 12**). There was evidence in this area of higher flows, presumably from the spring melt period. As the water receded, the pools that were left have evidence of solids and FOG as well as significant algae growth.

Recommendation: A flow attenuation dike may also be beneficial in the channel between Lagoon Lake and Finger Lake. GPS coordinates were taken of a proposed location for a new dike. This dike could also be a pervious dike to spread out the flow and provide treatment through bacterial growth. A dike in this location would spread the water out over a larger area, likely backing up and raising the water level of Lagoon Lake as well. This would increase the area of the tundra wetland and thus increase treatment efficiency prior to discharge into Finger Lake.

Significant algae growth was observed throughout the entire channel between Lagoon Lake and Finger Lake. Leftover snowpack north of the channel was melting and water was filtering through the tundra to the channel. The pools on the north side of the channel did not have any evidence of algae growth. The water was clear with no evidence of sediment transport, indicating that the algae growth and the turbid water are being created from the lagoon discharge.

Finger Lake and Solid Waste Facility

At the discharge into Finger Lake, there was a larger pool with algae growth. Odors were not evident at this location. Examination of the area between the solid waste dump and Finger Lake showed pools of water with significant algae growth and evidence of hydrocarbons on the surface of the pools (**Figure 13**). These pools were above the high flow elevation of the discharge channel between Lagoon Lake and Finger Lake. It was evident that the contamination and nutrients were coming from leachate from the solid waste facility.

Recommendation: The leachate from the solid waste facility should be diverted and treated prior to discharge into Finger Lake. This could be done by routing the piping to the east and creating a lagoon, or by building a long permeable dike to provide treatment and flow attenuation.

Algae growth was observed around the south shore of Finger Lake (**Figure 14**). Greater and Lesser Bluebills, Oldsquaw, White Fronted Geese, Canada Geese, Northern Pintails, Green-Winged Teal, Sandhill Cranes and Seagulls were observed around Finger Lake.

Finger Lake to Airport Lake

The channel between Finger Lake and Airport Lake had algae growth along the entire reach of the channel. This channel was well defined and contained a series of rapids and pools (**Figures 15, 16,**

17, and 18). The rapids were providing aeration of the water and the pool areas contained more submergent vegetation and algae. There was evidence in this channel of higher flows earlier in the year during snow melt. There was algae growing in the side pools left behind, although not as significant as in the upstream channels. The amount of algae present decreased closer to Airplane Lake.

Airplane Lake

At the discharge into Airport Lake, the water had a green tint to it (**Figure 19**). There was also algae growth on the rocks at the discharge location (**Figure 20**). At the discharge of Airport Lake, there was very little algae present and the water was clear (**Figures 21 and 22**).

Summary of Recommendations:

- Increase the size of the lagoon to adequately handle flow from the community.
- Place a liner in the lagoon to eliminate water from leaking through the lagoon berms.
- Create a permeable dike(s) in the wetland area between the lagoon and Lagoon Lake to filter solids, spread out the flow, and provide attached growth treatment of the wastewater.
- Create a permeable dike in the channel between Lagoon Lake and Finger Lake to spread out flow and provide additional attached growth treatment of the wastewater.
- Construct an additional lagoon or create a permeable dike between the solid waste dump site and Finger Lake to spread out the leachate and provide treatment of the leachate before it enters Finger Lake.



Figure 1: Trucks dumping wastewater into the lagoon.



Figure 2: Solids on the surface of the lagoon.



Figure 3: Solids piled on the outside of the lagoon berms



Figure 4: Water leaking out the base of the berm at the center of the north side of the berm.



Figure 5: Water leaking out of the base of the berm flowing through two channels towards Lagoon Lake.



Figure 6: Algae growth and turbid water flowing in a channel between the wastewater lagoon and Lagoon Lake.



Figure 7: Grass matted down and covered with solids, evidence of higher flows and solids transport from the lagoon.



Figure 8: Ice formation prior to discharge into Lagoon Lake. The lagoon is in the background in front of the sewage hauling truck.



Figure 9: Ice formation and Lagoon Lake. Finger Lake in the background.



Figure 10: Outlet from Lagoon Lake into channel that goes to Finger Lake.



Figure 11: Algae growth in channel between Lagoon Lake and Finger Lake. Solid waste facility in background, far right.



Figure 12: Algae growth on rocks in channel between Lagoon Lake and Finger Lake.



Figure 13: Algae growing in leachate water from landfill between landfill and Finger Lake.



Figure 14: Finger Lake looking back towards landfill.



Figure 15: Outlet of Finger Lake.



Figure 16: Channel between Finger Lake and Airplane Lake. Series of rapids and pools.



Figure 17: Channel between Finger Lake and Airplane Lake. Algae growing on the rocks.



Figure 18: Channel between Finger Lake and Airplane Lake. Algae growing in channel just prior to discharge into Airplane Lake.



Figure 19: Water discharging into Airplane Lake through culvert under road.



Figure 20: Channel discharge into Airplane Lake.



Figure 21: Channel exiting Airplane Lake.



Figure 22: Channel between Airplane Lake and Baker Lake.

Appendix E Photographs



Photo 1 **Holding Cell (foreground) looking to Lagoon Lake, main discharge is through breach in berm (August 2006).**



Photo 2 **Holding Cell in October 2006, after berm repaired, discharged by exfiltration.**



Photo 3 **Main discharge channel from Holding Cell to Lagoon Lake (August 2006).**



Photo 4 **Close-up of discharge between Holding Cell and Lagoon Lake (August 2006).**



Photo 5 **Effluent flow between Holding Cell and Lagoon Lake (October 2006).**



Photo 6 **Effluent flow between Holding Cell and Lagoon Lake (October 2006).**



Photo 7 **Holding Cell and Lagoon Lake (background) in June 2007, discharge from holding cell by exfiltration.**



Photo 8 **Channel through snow between Holding Cell and Lagoon Lake (background) in June 2007.**



Photo 8 **East end of Lagoon Lake, outlet to Finger Lake in centre of picture (August 2006).**



Photo 9 **Water in creek between Lagoon Lake and Finger Lake (August 2006).**



Photo 10 **Wetland vegetation between Lagoon and Finger Lakes (August 2006)**



Photo 11 **Expanded flow between Lagoon and Finger Lakes, with solid waste facility, in June 2007**



Photo 12 **Finger Lake looking east from southwest end (August 2006).**



Photo 13 **Emergent vegetation and periphyton in Finger Lake (August 2006).**



Photo 14 **Finger Lake, looking west from east end of Lake towards Landfill.**



Photo 15 **STN 3, along creek between Finger and Airplane Lakes (August 2006).**



Photo 16 **Creek flowing from Finger Lake, before entering Airplane Lake (August 2006).**



Photo 17 **Landfill with Finger Lake in Background (August 2006).**



Photo 18 **Drainage from landfill to Finger Lake (October 2006).**



Photo 19 **Sample collection outflow of Garbage Creek from Airplane Lake, STN-2 (August 2006).**



Photo 20 **Water Sampling on Baker Lake with Van Dorn Sampler (August 2006).**



Photo 21 **Algae on shore of Baker Lake (August 2006).**

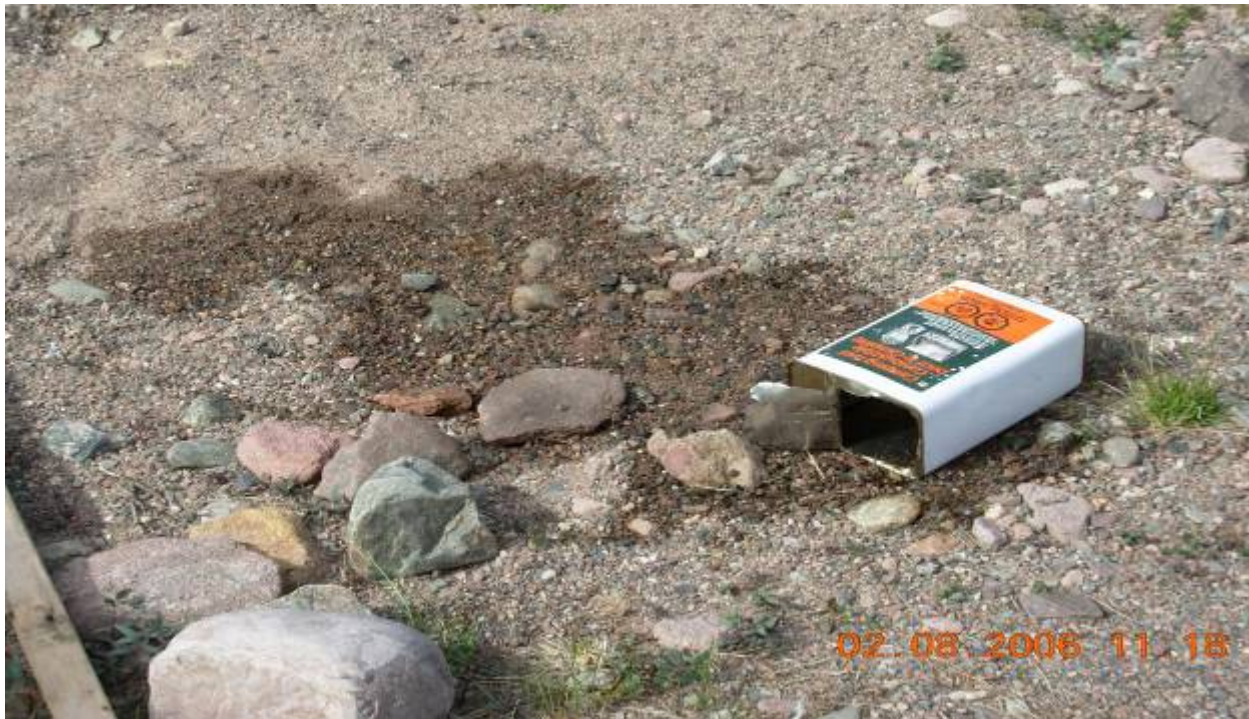


Photo 22 **Spilled camping fuel along shore of Baker Lake (October 2006).**



Photo 23 **Abandoned fuel drum on ice of Baker Lake (June 2007).**



Photo 24 **Community drainage stream (STRM-3) at its outflow to Baker Lake (June 2007).**

Appendix F Water Source Protection Plan

1.0 WATER SOURCE PROTECTION PLAN

1.1 Introduction

Preventing drinking water problems is the most cost-effective way of ensuring a safe drinking water source. This is best accomplished through development of a water source protection plan (GNS 2004). Source water quality can be threatened through many means, including land development, runoff from commercial and industrial sites and inadequate wastewater treatment. A water source protection plan helps protect source waters in three ways: by controlling or preventing contamination; by eliminating or treating impurities; and, by continuously monitoring water quality to detect and swiftly correct any problems (GNS 2004).

This Water Source Protection Plan has been developed for use within the Hamlet of Qamani'tuaq. Baker Lake is the drinking water source within the community and concerns have been raised by residents and regulators about current or potential impacts to the water source. These concerns are related to the presence of the Tundra Wetland sewage treatment system, and industrial sites and land use practices within the community.

1.1.1 Background & Benefits

Several Canadian provinces (e.g. British Columbia, Newfoundland & Labrador, Nova Scotia, Ontario, Saskatchewan) either already employ water source protection plans or are currently developing protection plans for specific watersheds throughout their province. Ontario recently passed the *Clean Water Act*, as part of the recommendations from the Walkerton Inquiry. This Act ensures municipalities are able to protect their drinking water by developing water source protection plans that are science-based, locally-driven, and a shared responsibility (MoE 2006). There are many local benefits derived from developing and implementing a water source protection plan, including the following listed by the Norfolk Ram Group (2002) for the Massachusetts Department of Environmental Protection:

- protection of public health from the contamination of drinking water by waterborne diseases and other contaminants;
- decrease in water treatment costs (a cleaner water source requires less treatment effort);
- greater longevity of the water supply resulting from a reduced potential for eutrophication, and the protection and conservation of the source waters that provide the annual volumes of water required; and,
- increased public awareness and management of clean water as a valued resource.

The main aim of a water source protection plan is to maintain healthy water sources by using all elements required to prevent contaminants from entering source waters (INAC 2006). In all circumstances where water source protection plans have been, or are being, developed, source water protection is recognized as the first step in a multi-barrier approach to ensuring high quality drinking water; it is generally thought there are five basic steps, or barriers, in the multi-barrier method (O'Connor 2002). Source water protection is recognized as the first proactive

step as all known and potential hazards are identified, and additional barriers are then established to manage, reduce or eliminate contamination risk (SWA & MJRWAC 2006).

1.1.2 Purpose

The following water source protection plan (WSPP), developed by NJWL, serves as a preliminary plan to provide information and recommendations for handling current known and potential impacts to Baker Lake, Qamani'tuaq's drinking water source. This WSPP is intended to provide a foundation and starting point for water source protection, education and management; implementation of the plan is a dynamic and evolving process. The WSPP should be used as a flexible and adaptive strategy, initially offered as a guide for action based on current conditions, potential hazards and risks, and required water quality objectives. It is by no means a complete WSPP, as it primarily deals with the first step, protection of the water source. Further steps in the WSPP have been provided as recommendations in the Dillon Consulting Limited 2006 document "Water Pumphouse and Intake System Upgrades, Baker Lake, Nunavut". The WSPP provided here should be molded and expanded as its implementation moves forward, utilizing all recommendations. The overall goals of this WSPP include:

1. delineating the water source protection area where this WSPP should apply, and recognizing any existing and potential land uses that may impact the water source;
2. identifying sources of existing and potential contaminants and land use impacts to the water source; and,
3. developing a preliminary WSPP that the Hamlet and government officials can use as a tool to manage and improve water source protection for future generations.

Through NJWL's study, some steps have been completed already. A number of potential impacts to the water source were identified and described in NJWL's Interim Report in 2006, and further impacts were described here in the Final Report. Current impacts were assessed through the 2006 and 2007 water sampling programs. Current and potential impacts to the water source are discussed further in this WSPP.

Development of a local WSPP committee is strongly recommended because incorporation of multi-stakeholders into preparation of the WSPP is the most effective way of encouraging participation and cooperation of the community. In Qamani'tuaq, where there is much skepticism about the quality of the drinking water, the involvement of community members, along with municipal officers and government officials, would greatly benefit the success of the Hamlet's WSPP. Involvement of local community members and the cooperation of all stakeholders would help ensure the community will carry out a mutually beneficial, locally developed and managed water protection program that will provide high quality drinking water in the long-term (GNS 2004). To NJWL's knowledge, in all areas where WSPPs have been, or are being, developed, local involvement comes from the establishment of a local advisory committee(s). Although there has been no local input into developing this preliminary WSPP, a local committee should be established to provide input and support and to participate in the WSPP's implementation.

The following WSPP is organized according to the objectives described above. It describes the water source protection area and any current and potential impacts to the water source. It then provides recommended controls to reduce or eliminate risks and hazards, based on reasonable expectations, community practicability, and federal, territorial or municipal regulations.

1.2 Water Source Protection Area

The aim of Qamani'tuaq's WSPP will be to manage source water protection from a community perspective, so will only be concerned with the area and water within control of the Hamlet. The Baker Lake Watershed is fed by the surrounding small lakes and streams, as well as the Thelon River, the Kazan River, and partly by the Quioch River (NRCan 2006). In total, the Baker Lake Watershed is approximately 230,000 km² (McKee *et. al.* 1989) and the Thelon River Watershed, which has been inferred to have the greatest impact on water at the Hamlet water intake, is approximately 142,400 km² (Nunavut Parks 2004). These watersheds are very large areas to deal with for this preliminary WSPP. Additionally, NJWL only has information pertaining to the Hamlet's immediate area, therefore cannot fully comment on the remainder of the watershed.

WSPPs typically involve large parts of a watershed, or protect the entire watershed area. Examples include the WSPP developed for the Moose Jaw River Watershed in Saskatchewan, and specified watershed zones for Yellowknife and Inuvik. If the GN decides to develop a larger protection plan for the Baker Lake and/or Thelon Watershed areas, specific zones of the watershed(s) could be delineated and regulations applied appropriately. This was completed for the both the Yellowknife and Inuvik Watershed areas, which have separate zones accompanied by different degrees of protection.

To further delineate the water source protection area for Qamani'tuaq's WSPP, the areas of concern are contained within the municipal boundaries of the Hamlet and encompass the drinking water intake, located approximately 120 m offshore of the built-up area of the community. Qamani'tuaq's water source protection area should be managed to minimize the risk of contamination to the water source. Management should occur in this way as the water supply area co-exists with other uses, such as residential, commercial and industrial (Water and Rivers Commission 2001). Hence, the water source protection area for Qamani'tuaq includes:

- the Baker Lake shoreline from Garbage Creek in the west and to Hornet Point in the southeast;
- the tundra wetland sewage treatment system;
- the current solid waste facility on the shore of Finger Lake;
- the previous solid waste facility south of Airplane Lake;
- all lands, drainage ditches and ponds contained within the Hamlet boundaries; and,
- the area of water around the drinking water intake.

This management strategy contrasts with other strategies or degrees of protection such as risk avoidance, where land development is not permitted in the watershed used for drinking water to ensure there is no degradation of the water source, and risk management, where only conditional land development, typically rural, is permitted to ensure there is no increased risk of contamination (Water and Rivers Commission 2001).

1.3 Land Use Impacts

Land use impacts are any land uses that impact, or have potential to impact, the water quality of Baker Lake. Undeniably, the risk of contamination increases with certain land use types; particularly those associated with the use, production or storage of potential contaminants (Norfolk 2002). It is, therefore, important to have an inventory of land use types within the water source protection area so that existing or potential risks can be identified, mitigated and/or monitored (Norfolk 2002). The following sections contain an inventory to date of any existing or potential threats to the water source identified by NJWL within the Hamlet of Qamani'tuaq.

1.3.1 Existing Land Use Impacts

1.3.1.1 Surface Drainage

Due to local topography, all surface drainage from the community flows directly to Baker Lake. Waste or contaminants from locations throughout the community can be carried by surface drainage directly into Baker Lake. Drawing No. 6, **Appendix A**, illustrates the location of surface drainage routes within the community. Results from the June 2007 sampling program indicated four of the five streams sampled exceeded CCME PFAL Guidelines for one or more parameters. The two drainage streams that traverse the community contained significantly elevated levels of several metals, some nutrients and coliforms, indicating the introduction fecal waste and other pollutants from within the community. Though the localized onshore water quality of Baker Lake during spring was reduced, most likely as a result of surface runoff and drainage, it remains acceptable for drinking water and meets applicable Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ). The precise source(s) of these contaminants is not known; however, as development pressures increase, these impacts could become more pronounced, and eventually result in unsuitable drinking water quality

Dogs tied up near the shore of Baker Lake, near streams and drainages, or allowed to wander through the community, can also impact water quality. As previously mentioned, dog waste is a source of fecal coliforms including *E. coli* and *Salmonella*, nutrients such as excess nitrate and ammonia, and a potential source of protozoans, such as *Cryptosporidium* and *Giardia*. All of these may be easily transported to Baker Lake through direct runoff into the lake or through streams. The two community drainage streams showed evidence of recent fecal contamination, presumably from dog feces. Over time, drinking water can become unsuitable due to bacterial or protozoan contamination from dog feces, as well as resultant eutrophication from the input of excess nutrients.

1.3.1.2 Contaminated Sites

EBA (2007) recently completed a Phase III Environmental Site Assessment at the former Nunavut Power Generating Station and its associated facilities, located 100 m north of the shore of Baker Lake. These sites have a history of fuel spills and EBA estimated that approximately 42,500 m³ of hydrocarbon impacted soil is present in this area. EBA further delineated five plumes caused by the releases of fuel, two of which extended to the shore of Baker Lake, with all plumes migrating downslope toward the lake. In groundwater wells sampled, dissolved hydrocarbon constituents (BTEX, F1) were detectable and, though these constituents are

amenable to biodegradation by native microbes, there is some potential for the plumes to reach Baker Lake before adequate biodegradation occurs. NJWL sampling in June 2007 indicated that the plumes had not reached the lake at that time.

1.3.2 Potential Land Use Impacts

In the summer and fall of 2006 and spring of 2007, NJWL walked along the lakeshore in front of the community from Garbage Creek west to the edge of the community, where the shore turns south towards the airport. A number of potential impacts to the water quality of Baker Lake were observed on the beach during all occasions, including scattered garbage, small fuel spills, abandoned batteries and vehicles, and left over carcasses of animals (e.g. caribou, birds). Numerous items were also observed on the ice in the spring of 2007, and several were at the edge of the melting ice, either in the water or soon to be. These items included an abandoned snowmobile, fuel drum, fire extinguisher, and other pieces of metal or plastic debris. All materials and items observed on-shore or on-ice throughout the sampling program have the potential to impact the water quality of Baker Lake as many of these items contain contaminants such as fuel, oils, heavy metals and coliforms, or are a contaminant itself due to its container or packaging (i.e. metal drum).

1.4 Recommended Controls

Controls recommended for these existing and potential impacts include education, land use and regulations. Based on WSPPs in other jurisdictions, education of the community and public is an important component in the successful implementation of any protection plan. The land use controls recommended were developed specific to existing and potential impacts in Qamani'tuaq. Regulatory controls include action by the Hamlet and applicable Territorial or Federal legislation that may be utilized.

1.4.1 Education

Education is a key step in creating change. Few people will change their actions without understanding what changes need to be made, why and how the changes will affect them (GNS 2004). Educating residents and the community about the importance of source water protection will help produce changes in attitudes and actions. As well, since the entire community of Qamani'tuaq lies in the water source protection area, education can begin to foster a sense of ownership and shared responsibility for the protection of the water source (GNS 2004).

Some examples of tools or events that can be used to educate residents within Qamani'tuaq include:

- open houses to spread information about the impacts of runoff and other activities, and the importance of protecting the water source and to provide take-home materials to reinforce the message; open houses should also be a platform for residents to express their concerns and opinions;
- contests in the local schools related to aspects of water pollution and protection;
- information bulletins, brochures and newsletters to distribute in public places; and

- community events, such as shoreline clean-up days, community clean-up days, and barbeques to create positive action and further spread information.

Involving the community from the start is an important way to gain trust, support and understanding for the WSPP. Educational events and promotion could be organized through a local WSPP committee, with support from the Hamlet and the GN.

1.4.2 Land Use Controls

Controlling the existing and future land use within a source water protection area is one of the most effective methods of ensuring the long-term availability of surface water sources (Norfolk 2002). Other communities that implement WSPP sometimes acquire land within the protection area and/or utilize deed restriction to control development on those lands. Unfortunately this option is largely unavailable to the Hamlet as lands outside the Hamlet boundaries are either Crown or Inuit-owned lands.

Another option to control land development is the creation and enforcement of development zones. This option, only applicable within Hamlet lands, would allow responsible development through planning and protection of sensitive areas. Presently there is no zoning within the Hamlet; this can contribute to the location of inappropriate land uses within sensitive areas. Though a community development plan for Qamani'tuaq is currently being produced, water source protection should be kept in mind and include participation from the Hamlet. Zones applied within the Hamlet can include buffer zones around streams, restriction of certain developments within a specific distance to a waterbody, and the development of open space or nature preservation zones around waterbodies.

As part of zoning designations, other communities enact protection zones around the immediate area of their water source, restricting development and public access. Examples are seen in the groundwater management strategy for Perth County in Ontario, and in the Bunbury Water Reserve in Australia, where Wellhead Protection Zones were established in a 300 to 500 m radius around groundwater production bores to protect their water source from contamination in the immediate area of withdrawal. Establishing a protection zone around the water intake structure or restricting public access to the intake area and shoreline in Qamani'tuaq may not be feasible. The entire community rests against the shoreline, and many homes are situated near shore. Additionally, the area is presently used by many individuals who keep boats, motors and snowmobiles on shore, ready for use, and who also maintain storage sheds within 5 to 10 m of the lake edge.

However concern does arise from the heavy use of the water intake area and shoreline, as the risk of contamination consequently increases. To help mitigate this risk, it is recommended that signs be erected along the beach, informing residents of their proximity to the water intake and the potential impact their activities may have. This helps bring the level of responsibility for the water source and its protection back on to the community. Additionally, it may be of use to deploy a buoy permanently located near the water intake to serve as a visual reminder of its location and allow residents to stay clear of this structure (e.g. no boating, snowmobiling or swimming within 50 m).

Inevitably tied to the creation and enforcement of regulations and by-laws includes the proper disposal of waste within the community. As reviewed in Section 5.2.4 and 5.2.6.3 of the final report, many materials, debris and scattered garbage were noted immediately along the shoreline of Baker Lake and on the melting ice in spring. The current solid waste landfill provides a facility for the disposal of many of the materials observed along the shore and ice of Baker Lake. An initial clean-up of the shoreline is needed to remove many materials and potential contaminants, and to deal with the several spills noted along the shore. This clean-up effort should be community-wide and come from a local perspective, being coordinated by the Hamlet or local committee for the WSPP. Once the shoreline is clean, a continual effort would be required to keep the shoreline and ice surface free from potential contaminants. Installing waste bins at regular intervals along the shore may also help promote a clean waterfront. These bins would need to be collected on a regular basis to ensure they do not overfill and overflow onto the beach.

Discussed in Section 5.2.6.3 is the existing and future potential impact from community drainage into Baker Lake. As all community drainage eventually flows towards Baker Lake, based on the topography, efforts should be made to control drainage to some extent. Re-routing and collecting surface water drainage is a large task; however, many jurisdictions are now required to control and manage stormwater due to its significance in water pollution. Many stormwater solutions come through use of best management practices (BMPs) that aim to control stormwater volume and decrease contaminant loadings by changing urban land and existing sewage systems (Environment Canada 2001). Marsalek (2000) states that BMPs generally fall into one of four categories, including:

1. policies and source controls – non-structural measures that aim to reduce the quantities of contaminants entering drainage and wastewater systems. This can come through public education and development planning, among others.
2. site BMPs – practices that aim to confine run-off within the area where it occurs. This can occur through structural and land changes, such as even grading to reduce and slow down runoff, as well as application of biofiltration.
3. community BMPs – intended to treat greater volumes of collected stormwater and drainage before discharge to receiving waters. Ponds and constructed wetlands are the most commonly used community BMP.
4. watershed-level measures – recognize the variety of stresses affecting stormwater and drainage quality in a given watershed area. These measures aim to control impacts through land use restrictions, protection of wetlands, buffer zones, floodplains, etc. (Environment Canada 2001).

The Hamlet and the GN can use policies, source controls and site BMPs in attempts to alleviate the impact community drainage may have on Qamani'tuaq's water source. Efforts are needed within Qamani'tuaq to manage drainage and reduce non-point source pollution from within the community. In addition to the management of community drainage, the management of spills or fuel releases is required, again, due to the topography of the community. The development of spill response plans should firstly occur within a company to manage spills on their property or land. If a spill enters community drainage, or has potential to, a community-level emergency response plan is needed to deal this situation, ensuring hydrocarbons not permitted to enter

Baker Lake. Company spill response plans could be made a requirement by the Hamlet or GN, as any spill could potentially threaten drinking water quality. The development of emergency response plans is a further step in the multi-barrier approach to protecting drinking water.

Dealing with historic spills is also required within Qamani'tuaq. The hydrocarbon plumes at the former Nunavut Power Generating Station appear to be migrating toward Baker Lake. These plumes should be monitored on a regular basis to evaluate their movement, concentration of hydrocarbons, and downslope water quality of Baker Lake.

1.4.3 Regulatory Controls

Where other protection measures are not appropriate or effective, regulatory controls can be used on their own, or combined with other protection options. Local regulations, such as by-laws and zoning, are the primary types of control that could be implemented in Qamani'tuaq. By-laws and zoning are powerful tools to ensure that any potential contaminants, threats or unsuitable activities are sited away from the water source (GNS 2004) and, further, they provide a means for responding to breaches of the by-law or zoning regulations. Some zoning options were previously discussed; however, examples of by-laws that could pertain to Qamani'tuaq include:

- proper disposal of animal carcasses (caribou, dogs, etc) at the solid waste facility, in the proper location (if available);
- prohibition against keeping dogs within 15 m (49 feet) of any waterbody (including Baker Lake and streams) year round;
- prohibition on the deposition, or the cause of deposition, of any into any lake, river, creek or other body of water in the water source protection area any human waste, garbage, refuse, petroleum products, herbicide, pesticide or any other substance which may reduce the quality of water in the protection area for any purpose of human consumption;
- following the above,
 - disposal of abandoned vehicles, machinery or other debris at the solid waste facility in the proper location
 - disposal of hazardous waste (waste fuels, oils, paints, etc) at the solid waste facility, in the proper location
 - prohibition against storage of petroleum products within 15 m (49 feet) of any waterbody (including Baker Lake and streams) all year round
 - prohibition against storing more than 200 L of petroleum products without written permission

Some of these by-law examples are included in the restrictions in the watershed development areas of Inuvik and Yellowknife, NT. These watershed development areas are administered under the Northwest Territories' *Area Development Act*, similar to Nunavut's legislation and allows the GN to make regulations on areas required for the supply, purification and treatment of water. Although these watershed development areas are larger in size and scope than Qamani'tuaq's water source protection area, they provide the GN and the Hamlet insight into watershed regulations currently in place in the North.

Contravention of any by-law created for the protection of the water source must have penalties attached. In Qamani'tuaq, there is a by-law in place that prohibits dog owners from tying their

dogs near the lake, especially west (or up current) of the drinking water intake (Dillon 2006). This by-law needs to be enforced. Under the territorial *Hamlets Act*, municipalities can develop and enforce by-laws with respect to sewage and drainage systems, garbage and waste, water supply systems and public health. This Act, gives municipalities authority to regulate the proper use of a sewage and drainage system, require residents to use established garbage and waste disposal systems, and even develop annual or seasonal community clean-up days.

Other legislation, including Federal and Territorial, can also be followed by the Hamlet when developing management strategies, by-laws and implementing land use controls. One federally administered Act includes the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (2002, c. 10 N-28.8), which respects the water resources of Nunavut and prohibits the deposition of waste into its waters. Territorial Acts or Regulations that may be used include the *Public Water Supply Regulations*, where any activity that can adversely affect a surface water source may not be done without approval; the *Water Resources Agreement Act*, allowing the GN and Government of Canada to make agreements with respect to the conservation, development and use of water resources; and, the *Planning Act*, which gives municipal councils authority to plan development, giving consideration to orderliness, economy and convenience.

1.5 Future Directions

Further steps of the multi-barrier approach to source water protection may also be implemented to ensure drinking water quality can be protected, even in the event one barrier fails. The existence of one barrier to protect drinking water does not mean the others can be ignored; multiple barriers involves the balanced presence of all five steps/barriers, to the fullest extent possible (O'Connor 2002).

Upgrades to the water treatment and distribution system at Qamani'tuaq were recommended by Dillon Consulting Ltd in their 2006 Inspection Report, adding to the second and third steps of the multi-barrier approach. Completion of the recommended upgrades, such as the potential use of filtration, re-integration of water storage tanks, installation of a second chlorine pump, and regular cleaning of trucks, would make certain sufficient free chlorine residual is in the system. If an earlier step fails or contamination to the source is present, filtration and sufficient free chlorine residual can ensure drinking water remains safe.

Developing a monitoring program is also an essential step in the multi-barrier approach. This monitoring plan should examine raw water quality at the water intake, as well as raw water at the pipe, treated water at the truck fill, treated water at the truck, and water from an end user (e.g. residence, business). Monitoring these water supplies on a regular basis will alert the Hamlet of a potential emergency situation earlier, and provide feedback on the entire WSPP to determine if it is meeting objectives and how well.

A final step in the multi-barrier approach would be the development of emergency response plans. In the event of a water emergency, or potential water emergency, certain actions can be mobilized to mitigate the emergency and either prevent drinking water contamination, or prevent impacts to human health. Emergency response plans, such as spill response plans (discussed

above in Section 1.4.2) also feedback into source protection by preventing contamination to the drinking water source.

1.6 Conclusion

Identification of existing and potential impacts and following recommendations, are only part of the first step in the multi-barrier approach to protecting source water. All recommendations provided deal with protecting the water source and preventing further and future contamination. Dillon Consulting Ltd in their 2006 Inspection Report provided recommendations for improving the water treatment system and distribution at Baker Lake, considered the second and third steps of the multi-barrier approach. Further steps in the development of a complete WSPP deal with the development of emergency response and contingency plans, and the establishment of monitoring plans/programs to ensure source water remains safe and emergency situations can be identified as soon as possible. These recommendations are also intended to be used in conjunction with those provided by NJWL to improve the effectiveness of the tundra wetland sewage treatment system, included as part of the water source protection area. Those recommendations would improve treatment of sewage and wastewater, thereby reducing the probability of contamination from that source

With the combination of source water protection, enhancements for water treatment and distribution, and improvements to the Tundra Wetland, the GN and the Hamlet are well on their way to minimizing the risk of contamination to the water source and providing safe and secure drinking water to the residents of Qamani'tuaq.

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Appendix G Elder Interview Notes

Meeting with Ms. Lucy Iyago (Elder) in Qamani'tuaq, NU

August 4, 2006

Also present was Mr. Michael Haqpi (Interpreter)

1. Do you know what the past activity was in the wetland area, before the sewage was there?
 - Yes, she knows the area
 - A few lakes behind (north of) the sewage area where people fished; fished in lake where old dump was/is (Airplane Lake)
 - Catch lake trout, grayling; mostly lake trout in Airplane Lake
 - Area was mainly used for fishing, all along the river system there and behind
 - People would jig when it started to melt and after (in the summer)
2. Have you seen any changes in the land around the community? In the wildlife or fish?
 - Yes, quite a few changes since the sewage system was there
 - More animals around and closer to town – noticeable change in this
 - Now people don't want to catch or hunt those animals (seen in the sewage wetland) because they might have diseases if eating (vegetation, etc) from the sewage area
 - (Asked about bears) More grizzlies coming around since sewage and landfill – before those sorts of animals never came that close to town
 - (Asked about change in taste of fish at Airplane Lake – heard that people still fish there) Maybe some people fish there, maybe kids, but no one really does anymore
 - (She also mentioned) There used to be more water flowing through the area before
3. Any concerns/worries that you have (regarding sewage wetland and/or water quality)?
 - She is on the Hamlet Council
 - Have to do something about the sewage dump site – concerned for future generations
 - Concerned Lake (Baker) is getting smaller
 - (Asked what must be done?) She answered with a question – If the sewage wetland area is changed, how will the area be cleaned? How will it be returned to its natural state?
 - (Concerned that) the amount of water flowing into Lagoon Lake has decreased – Lagoon Lake is fed from lakes North, by VOR area - it's a system
4. Asked how long in the community/area?
 - Doesn't remember when came here but she has been here for awhile
5. Asked about the algae on the shore of Baker Lake, has it always been here?
 - Yes, algae has always been here but not always like what it is now
 - There is a different growth of the algae – called it 'sewage growth'
 - Can smell the sewage in town sometimes if the wind blows the right way
6. Any ideas why water flowing through the system has decreased? Has it happened before (i.e. natural cycle) or is it something new?

- Has noticed, in atmosphere, land, melting and weather, a complete difference from way back to recent years
 - More thawing of snow and ice – used to see snow & ice all year round (on hills by town), but now (there is) nothing
7. Asked where she got her water from? (As many people in town get their drinking water from other sources)
- Gets her water from the Prince River system, by bridge
 - Before the sewage wetland system, people used to get water right outside, on the shore of Baker Lake – now people don't, but still do in the winter (drill hole in ice)
8. Any concern/worry about the current landfill and things/contaminants running into the wetland?
- Both (sewage & landfill) contributing to pollution in water system
 - When burn garbage, can smell it in town
(Asked if at the old dump site, were people worried about it affecting the water?) – Can't really comment on the old dump site, but can say the community was not consulted before the sewage dump and current landfill was installed.