WorleyParsons
resources & energy

EcoNomics

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION

2015 Groundwater Quality Monitoring

Beverly Channel Monitoring Wells

307075-01608-100 – WR-REP-2015 Groundwater Quality Monitoring

16 December 2015

WorleyParsons Canada
Suite 300, 8615 51 Ave
Edmonton, AB T6E 6A8 CANADA
Phone: +1 780 496 9055
Facsimile: +1 780 496 9575
www.worleyparsons.com

PROJECT 307075-01608-100 - 2015 GROUNDWATER QUALITY MONITORING

REV	DESCRIPTION	ORIG	REVIEW	WORLEY – PARSONS APPROVAL	DATE	CLIENT APPROVAL	DATE
0	Issued for use	S. Ngueleu	T. Butterfield	T. Butterfield	16-Dec-15		

Disclaimer

The information presented in this document was compiled and interpreted exclusively for the purposes stated in Section 1 of the document. WorleyParsons provided this report for Northeast Capital Industrial Association solely for the purpose noted above.

WorleyParsons has exercised reasonable skill, care, and diligence to assess the information acquired during the preparation of this report, but makes no guarantees or warranties as to the accuracy or completeness of this information. The information contained in this report is based upon, and limited by, the circumstances and conditions acknowledged herein, and upon information available at the time of its preparation. The information provided by others is believed to be accurate but cannot be guaranteed.

WorleyParsons does not accept any responsibility for the use of this report for any purpose other than that stated in Section 1 and does not accept responsibility to any third party for the use in whole or in part of the contents of this report. Any alternative use, including that by a third party, or any reliance on, or decisions based on this document, is the responsibility of the alternative user or third party.

Any questions concerning the information or its interpretation should be directed to T. Butterfield or J.Küpper.

CONTENTS

Tables within Text

Tables

Figures within Text

Figures

Appendices

1. INTRODUCTION

1.1 General

The Northeast Capital Industrial Association (NCIA) Beverly Channel Study Area is located within Sturgeon and Strathcona Counties and is comprised of Townships 54, 55, and 56, Ranges 21 and 22, W4M (Figure 1). Groundwater quality monitoring within the Study Area has been conducted since 2005. The objective of the groundwater monitoring program is to monitor groundwater flow and quality in the Beverly Channel in order to compile baseline groundwater data for use in the development of a long-term monitoring strategy and response plan. The monitoring well network in the Study Area consists of 13 wells completed in the Beverly Channel within the NCIA study area.

1.2 Previous Work

Previous work conducted within the Study Area was described by Stantec Consulting Ltd. (Stantec 2006a, 2006b, 2007, 2008, and 2009) and WorleyParsons (WorleyParsons 2010, 2011, 2012, 2013, and 2014) and is summarized as follows:

- Depth to the groundwater surface in the Beverly Channel has historically ranged from approximately 15 to 35 metres below ground surface (mbgs). Annual groundwater level fluctuation has generally been 1 m or less.
- The lateral groundwater flow gradient within the Beverly Channel has historically ranged spatially from 0.0005 to 0.005 m/m. Groundwater flow velocity has been estimated to vary from 16 to 160 m/year for different areas of the Beverly Channel.
- Historically, sulphate concentrations have exceeded the applied guideline at MW-07, while total dissolved solids (TDS), iron, and manganese have exceeded the applied guidelines at several locations within the Study Area.
- Sodium concentrations have historically exceeded the applied guideline at MW-07 and MW-09.
- Chloride concentrations at MW-04 are higher than at other locations in the Beverly Channel. These chloride concentrations, nevertheless, are considered to be natural, reflecting the water quality in the underlying bedrock, and are well below the applied guideline.

1.3 Scope of Work

The main objective of the 2015 program was to conduct annual groundwater quality monitoring of the monitoring network. One sampling event was conducted in the summer and included the following tasks:

- field measurement of depth to groundwater at all monitoring wells;
- field measurement of electrical conductivity (EC), pH, and temperature for groundwater;
- sampling of groundwater and submission for laboratory analysis; and

- preparing a report summarizing the program methodology and results, and providing an analysis of the groundwater data.

A list of the chemical parameters analyzed is provided in section 3.2. Starting in 2015, stable isotope analyses for hydrogen (^{2}H) and oxygen (^{18}O) were conducted in all groundwater samples.

2. PHYSICAL SETTING

2.1 Topography and Drainage

The Study Area encompasses residential, agricultural and industrial areas. While local topography varies at each well location, the ground generally slopes toward the North Saskatchewan River, which crosses the Study Area from southwest to northeast. Surface drainage is expected to be generally toward the North Saskatchewan River or Astotin Creek, which ultimately discharges to the North Saskatchewan River (Figure 1).

2.2 Regional Geology and Hydrogeology

A detailed description of the geology and hydrogeology of the region was provided by Stantec (2006a). A brief summary is provided below.

Regional bedrock geology comprises Late Cretaceous-aged, non-marine, grey thick-bedded sandstone; grey and green mudstone; grey, clayey siltstone; coal beds; and rare intermittent ironstone beds of the Belly River Formation; or marine, dark grey blocky shale and silty shale; greenish glauconitic and grey clayey sandstone; thin concretionary ironstone and bentonitic beds of the Bearpaw Formation (Stein 1976). The Bearpaw Formation has been eroded over most of the Study Area, but seems to be present in the southwest of the Study Area. The Bearpaw Formation is generally considered an aquitard. The Horseshoe Canyon Formation is present outside of the Study Area toward the southwest.

Quaternary deposits consisting of pre-glacial, glacial, lacustrine and aeolian deposited sediments overlie the bedrock. The Beverly Channel is a major pre-glacial valley in the area that consists of buried sand and gravel deposits. The channel is roughly coincident with the present-day North Saskatchewan River Valley. Deposited in fast-flowing braided streams, the sand and gravels of the Beverly Channel form an important regional aquifer in the area.

Clay till is present above the Beverly Channel sand and gravels and clay overlies the clay till. The clay and clay till units provide an effective protective barrier for the Beverly Channel over much of the region. A saturated surficial sand unit may overlie the clay unit in some areas.

Aquifers can be found in the Belly River Formation, the Beverly Channel, sand lenses in the till, and surficial sand and gravel deposits (Stein 1976). Aquifers within the Belly River Formation exhibit TDS concentrations ranging from 1,000 to more than 6,000 mg/L (Stein 1976). Areas of high TDS concentrations are typically associated with high chloride and/or high sulphate content (Stein 1976).

The Beverly Channel is hydraulically connected to the North Saskatchewan River (Stein 1976). Mineralization in the Beverly Channel generally ranges from less than 500 to 3,000 mg/L TDS. Iron concentrations within the Channel can exceed 15 mg/L and iron staining and iron bacteria are common (Stein 1976).

2.3 Groundwater Use

A water well search of the Study Area was conducted in 2012. The Alberta Water Well Information Database indicated that there were 1091 water well records within the Study Area at that time (Appendix 1). The majority of the wells were listed for domestic usage. About 90% of the water well records had a depth between 1 m and 74 m, with a median depth of 28.3 m. The existence and location of these water wells has not been field verified. With the industrial development in the Heartland Area, many of the wells associated with the water well records are no longer in use and have been abandoned.

Groundwater analytical data is available for 258 of the 1091 water well records. Of the 258 records, it appears that eight of the wells have been completed within the Beverly Channel and six of the wells have been completed in the upper bedrock. Table A summarizes the ranges and mean concentrations of select parameters compiled from available water well record chemistry data.

Several water wells were identified as being completed within the Beverly Channel in the Study Area in Shell Canada Limited's (Shell) Environmental Impact Assessment for the Scotford Upgrader Expansion (Shell 2005). Water well chemistry data were unavailable for most of the water wells.

Table A: Select Parameter Concentrations from Available Water Well Records

Parameter	Beverly Channel		Upper Bedrock	
	Range	Mean	Range	Mean
pH	7.3 – 8.5	8.1	7.8 – 8.7	8.0
Chloride (mg/L)	1 – 38	13.5	2 – 901	197
Sulphate (mg/L)	40 – 726	316	5 – 741	193
Iron (mg/L)	0.02 – 4.84	1.24	0.08 – 1.48	0.36
TDS (mg/L)	362 – 1732	975	331 – 2021	1059
Sodium (mg/L)	54 – 417	200	8 – 825	274

Notable differences between the aquifers include chloride, sulphate, and iron concentrations. Within the Beverly Channel, average chloride concentrations are lower while average sulphate and iron concentrations are typically higher than in the upper bedrock.

3. FIELD PROGRAM

3.1 Monitoring Network

The monitoring well network consists of 13 existing wells, which have been installed at 13 different locations within the Study Area (Figure 2). Borehole logs of the 13 wells were compiled by Stantec (2006a) and are provided in Appendix 2.

3.2 Groundwater Sampling

Groundwater sampling was conducted according to WorleyParsons' groundwater sampling protocols. The following procedures were followed during sampling of all monitoring wells.

- Prior to sampling, the static groundwater level was measured with an electrical tape. The tape was cleaned by rinsing with distilled water after each reading.
- Wells were purged of standing water using a Geosub submersible pump, or by manual methods including a bailer, or a suitable length of Waterra tubing and a foot valve. The temperature, pH, and EC of the water were monitored during purging. The wells were purged until these field measured parameters stabilized.
- After purging and field measurements, groundwater samples were collected. Samples were collected in pre-cleaned bottles and vials provided by Maxxam Laboratory Group (Maxxam) in Edmonton, Alberta. Samples for dissolved metals, dissolved ammonia, and dissolved organic carbon (DOC) analyses were field-filtered using a 45 µm inline filter. Preservatives were added to select samples as directed by Maxxam.
- For the analysis of stable isotopes deuterium (^{2}H) and oxygen-18 (^{18}O), additional samples were collected.
- Groundwater samples were placed in coolers with ice for transport to Maxxam.
- Quality assurance/quality control (QA/QC) for the field sampling program consisted of collecting one duplicate sample and one field blank.
- Standard chain-of-custody (COC) protocols were followed.

Measurements of water quality indicator parameters were conducted during the field sampling program. These measurements comprised the following:

- **Temperature and pH:** WTW 3150i pH meter, calibrated daily using pH 4, pH 7, and pH 10 buffer solutions.
- **Electrical Conductivity:** WTW 3150i conductivity meter with a Tetracon 325 probe calibrated daily with standard KCl solution (1,413 µS/cm at 25°C).

QA/QC procedures utilized in the field program are listed below.

- Thorough rinsing with distilled water of all equipment entering a well (e.g., electrical tape and Geosub pump);
- A blind field blank analyzed for major ions / routine potability; benzene, toluene, ethylbenzene, and xylenes (BTEX); petroleum hydrocarbon (PHC) fractions (F) F1 and F2; dissolved metals; trace elements; and phenols.
- A blind duplicate for analysis of major ions/routine potability, BTEX, PHC F1 and F2, dissolved metals, trace elements, and phenols.
- Storing of samples in coolers maintained at approximately 4°C.
- Documentation of sample handling, transport, and delivery to the laboratory using appropriate COC procedures and documentation.

Groundwater samples were collected on June 24, 25, and 29, 2015. All groundwater samples were analyzed by Maxxam, with the exception of the stable isotope analyses, which Maxxam subcontracted to Isotope Tracer Technologies Inc.

The analytical schedule for each monitoring well is summarized in Table B. Groundwater samples from all monitoring wells were analyzed for the following:

- major ions/routine potability parameters, including EC, pH, total alkalinity, chloride, sulphate, iron, manganese, TDS, calcium, magnesium, potassium, sodium, bicarbonate, carbonate, hydroxide, fluoride, ion balance, dissolved organic carbon (DOC), nitrate-as-nitrogen, nitrite-as-nitrogen, and total ammonia;
- dissolved metal and trace element parameters, including aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, titanium, uranium, vanadium, and zinc;
- petroleum hydrocarbon parameters (PHCs), including BTEX, PHC F1 and F2;
- volatile organic compounds (VOCs), specifically phenols; and
- isotopes (^{2}H and ^{18}O).

Table B: 2015 Analytical Schedule

Station	Major Ions/ Routine Potability (see Table 3)	Volatile Organic Compounds (see Table 3)	Dissolved Metals & Trace Elements (see Table 4)	Petroleum Hydrocarbons (see Table 5)	Isotopes (^{2}H and ^{18}O) (see Table D)
MW-01	✓	✓	✓	✓	✓
MW-02	✓	✓	✓	✓	✓

Station	Major Ions/ Routine Potability (see Table 3)	Volatile Organic Compounds (see Table 3)	Dissolved Metals & Trace Elements (see Table 4)	Petroleum Hydrocarbons (see Table 5)	Isotopes (^{2}H and ^{18}O) (see Table D)
MW-03	✓	✓	✓	✓	✓
MW-04	✓	✓	✓	✓	✓
MW-05	✓	✓	✓	✓	✓
MW-06	✓	✓	✓	✓	✓
MW-07	✓	✓	✓	✓	✓
MW-08	✓	✓	✓	✓	✓
MW-09	✓	✓	✓	✓	✓
MW-10	✓	✓	✓	✓	✓
MW-11	✓	✓	✓	✓	✓
MW-12	✓	✓	✓	✓	✓
MW-13	✓	✓	✓	✓	✓

3.3 Assessment Criteria

Laboratory analytical results were compared to the Health Canada (2014) Guidelines for Canadian Drinking Water Quality (GCDWQ) where applicable.

3.4 Data Analysis

Upon completion of the field program, groundwater field measurements and analytical data were tabulated. Tables include a summary of historical parameters and minimum, maximum, and mean concentrations for each well. Select parameters were then graphed and utilized for statistical and graphical analysis as described below.

3.4.1 Statistical and Graphical Analysis

A Mann-Kendall test is a non-parametric test of a trend in a data set (Helsel and Hirsch 1992). The test evaluates whether parameter concentrations are rising or falling. Mann-Kendall analysis can be performed only on a monotonic time series data set with more than four sampling points. Sen's Method is used to assess the rate of change (increase or decrease) in a trending data set (Gilbert 1987). Mann-Kendall and Sen's Method analyses were applied to chloride, fluoride, sulphate, iron,

manganese, sodium, total dissolved solids, and dissolved organic carbon. pH was visually analyzed for potential trends.

Following completion of the statistical calculations, the data were evaluated and trends were considered potentially significant if:

- the data set contained six or more data points;
- the data was visually monotonic;
- the Mann-Kendall probability was greater than 95% or the inferred confidence level was greater than 95% (P-value of two-tailed test was less than or equal to 0.05)
- Sen's normalized slope (in absolute % change per year) was 10% or greater; and
- Absolute slope (in mg/L/yr) was greater than:
  - 2 mg/L/yr for chloride, TDS, sulphate, and sodium;
  - 0.1 mg/L/yr for fluoride, iron, and manganese;
  - 0.5 mg/L/yr for DOC.

Trends apparent from visual inspection of the graphical control charts, but not indicated statistically, were also noted.

3.4.2 High, Low, and Average Charts

The historical data for key indicator parameters at each monitoring well were summarized through charts that show the historical range (i.e. highest and lowest values) and the average value.

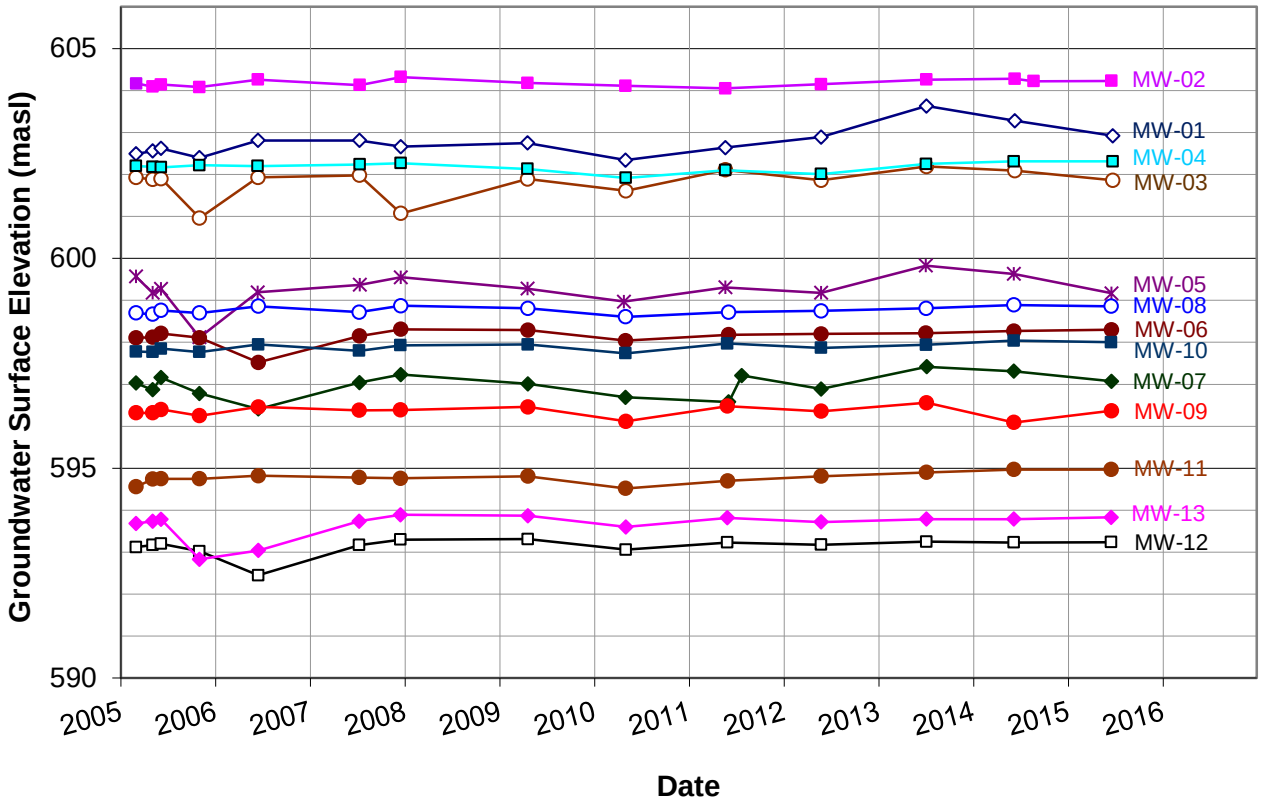
4. RESULTS

4.1 Groundwater Flow

4.1.1 Groundwater Surface Elevations

Groundwater hydrographs are provided in Appendix 3 and summarized in Figure A (below). Groundwater surface elevations within the Beverly Channel ranged from 593.24 (MW-12) to 604.23 (MW-02) metres above sea level (masl) in 2015 (Table 1). All water levels were consistent with historical values.

Figure A: Historical Groundwater Surface Elevations in Beverly Channel Monitoring Wells



4.1.2 Horizontal Groundwater Flow

Groundwater flow in the Beverly Channel was consistent with previous analyses and was generally to the northwest towards the North Saskatchewan River (Figure 3). The lateral hydraulic gradient across the Beverly Channel ranged from approximately 0.003 m/m in the south to approximately 0.001 m/m in the north. Based on a geometric mean hydraulic conductivity of 2.3×10^{-4} m/s, the hydraulic gradients of 0.001 and 0.003 m/m, and an assumed effective porosity of 0.25, the linear groundwater flow velocity ranged from approximately 30 m/year (in the north) to 90 m/year (in the south).

4.2 Field Measured Parameters

Results of the field parameters are presented in Table 2. Groundwater temperatures ranged from 6.6 to 10.8°C; EC values ranged from 708 to 2,570 µS/cm; and pH ranged from 7.05 to 7.69 in 2015, and were consistent with historical results.

4.3 Groundwater Quality

Groundwater analytical data are presented in Tables 3, 4, and 5. Original laboratory analytical reports are included in Appendix 4. Hydrochemical control charts and Mann-Kendall analysis are provided in Appendix 5. A statistical table with parameter minimum, maximum, mean, standard deviation, and count is included in Appendix 6.

4.3.1 Select Inorganic Data

Select inorganic parameter data are presented in Tables 3 and 4. Results from the 2015 sampling event are summarized as follows:

- Concentrations of dissolved iron and manganese exceeded the applied guideline at all monitoring wells in 2015. Their respective concentrations were generally within historical ranges.
- Concentrations of TDS exceeded the applied guideline at most monitoring wells in 2015, excluding MW-01 and MW-13. TDS concentrations were generally within historical ranges, except at MW-03 and MW-05, where historical highs were measured.
- Concentrations of dissolved sulphate continued to exceed the applied guideline at MW-07.
- Concentrations of sodium also continued to exceed the applied guideline at MW-07 and MW-09.
- Elevated concentrations of DOC at MW-02, MW-07, MW-08, and MW-12 noted in 2011 appear to have decreased to stable levels from 2012 through 2015.
- Chloride concentrations were below the applied guideline at all monitoring wells in 2015. At MW-02, the chloride concentration increased from 42 mg/L in August 2014 to 96 mg/L in June 2015.

4.3.2 Dissolved Metals and Trace Elements

Dissolved metals parameter data are presented in Table 4 and the results from the 2015 sampling event are summarized below:

- Dissolved metals and trace elements were measured at concentrations below the applied guidelines at all monitoring wells (where guidelines exist), except for the previously discussed concentrations of dissolved iron, manganese, and sodium.
- Total mercury was erroneously requested for analysis instead of dissolved mercury in 2015. Concentrations were below the reportable detection limit (RDL) at all monitoring wells in 2015, with the exception of MW-01 and MW-03, where total mercury concentrations were detected below the applied guideline.

4.3.3 Petroleum Hydrocarbons

PHC results are presented in Table 5. Concentrations of PHCs were below their corresponding RDLs at all monitoring wells in 2015, except at MW-02, where the PHC F2 (C_{10}-C_{16}) concentration was equal to the detection limit (0.10 mg/L). This was the second PHC F2 detection at this location in the past 3 years of sampling.

4.3.4 Volatile Organic Compounds

VOC results are presented in Table 3. Phenols were the only VOC analyzed in 2015. No phenols were detected in 2015.

4.3.5 Trends and Statistical Analysis

Hydrochemical control charts and Mann-Kendall/Sen's slope analysis are presented in Appendix 5. Results are summarized in Table C below. A visually increasing trend in DOC noted at MW-01 in 2014 (WorleyParsons 2014) was no longer applicable in 2015.

Table C: Summarized Results from Mann-Kendall/Sen's Slope Analysis and Visual Inspections

Monitoring Station	Parameter	Trend
MW-02	Iron	↑
MW-02	Chloride	↑?
MW-05	Chloride	↑?

Note: ↑ indicates a statistically significant increasing trend, ↓ indicates a statistically significant decreasing trend, ↑? Indicates a visual increasing trend, ↓? Indicates a visual decreasing trend.

4.4 Stable Isotopes

4.4.1 Background

Isotopes have become a common tool used in hydrological studies in the past half-century. For groundwater studies, in particular, they are useful to quantify recharge and discharge processes, assess inter-aquifer flow processes, and determine possible sources and mechanisms of industrial pollution. The basic principle is that the stable isotopes of hydrogen and oxygen remain constant in infiltrated groundwater, as long as there are no phase changes or fractionation (changes in relative abundance of isotopes) along the flow path. In this way, these stable isotopes become conservative tracers in the groundwater system (Clark and Fritz 1997).

The main purpose for the analysis of stable isotopes of hydrogen and oxygen, which was initiated in 2015, is to generate a baseline data set for the Beverly Channel monitoring network. Over time, once sufficient baseline data are accumulated, the stable isotopes would be used to help determine the origin(s) of groundwater at each of the monitoring locations in the Beverly Channel, the relative contribution of groundwater from bedrock, and whether sources associated with industrial activities could have contributed to changes in the groundwater quality in the Beverly Channel.

The main processes that affect the oxygen and hydrogen isotopic composition of groundwater include evaporation and simple mixing at or below the surface (Sidle 1998). Relationships known as local meteoric water lines (LMWLs) have been defined to characterize isotope ratios for precipitation in certain geographical areas. Historical International Atomic Energy Agency (IAEA) data of isotope ratios has thus been used to define the Edmonton LMWL, which is mathematically expressed as follows (Lemay 2002):

$$\delta^{2}\mathrm{H} = 7.66\,\delta^{18}\mathrm{O} - 1.00$$

The local meteoric water line provides a reference for the relative abundance of the stable isotopes and, thus, the possible origin of the water. For example, waters in ponds that experience evaporation would be expected to have an enrichment of the stable isotopes (as they are heavier) and plot below and to the right of the LMWL.

4.4.2 Results

Laboratory analytical results for stable isotopes oxygen-18 (^{18}O) and deuterium (^{2}H) from sampling in 2015 are presented in Table D. The average isotope ratios of oxygen in water ($\delta^{18}O_{water}$) for the monitoring wells varied from -19.51 ‰ (MW-03) to -16.77 ‰ (MW-05), while the average isotope ratios of deuterium in water ($\delta^{2}H_{water}$) varied from -151.5 ‰ (MW-03) to -133.2 ‰ (MW-05). These delta (δ) values are reported as per mil (‰) differences relative to Vienna Standard Mean Ocean Water (VSMOW), the IAEA standard defining the isotopic composition of fresh water. The δ values were reported by the laboratory according to the following relationship:

$$\delta_{sample} = \left(\frac{R_x}{R_{VSMOW}} - 1\right) * 1000$$

Where R is the ratio of the heavier to the lighter isotope and R_x and R_{VSMOW} are the ratios in the sample and standard, respectively (Kendall and McDonnell 1998)

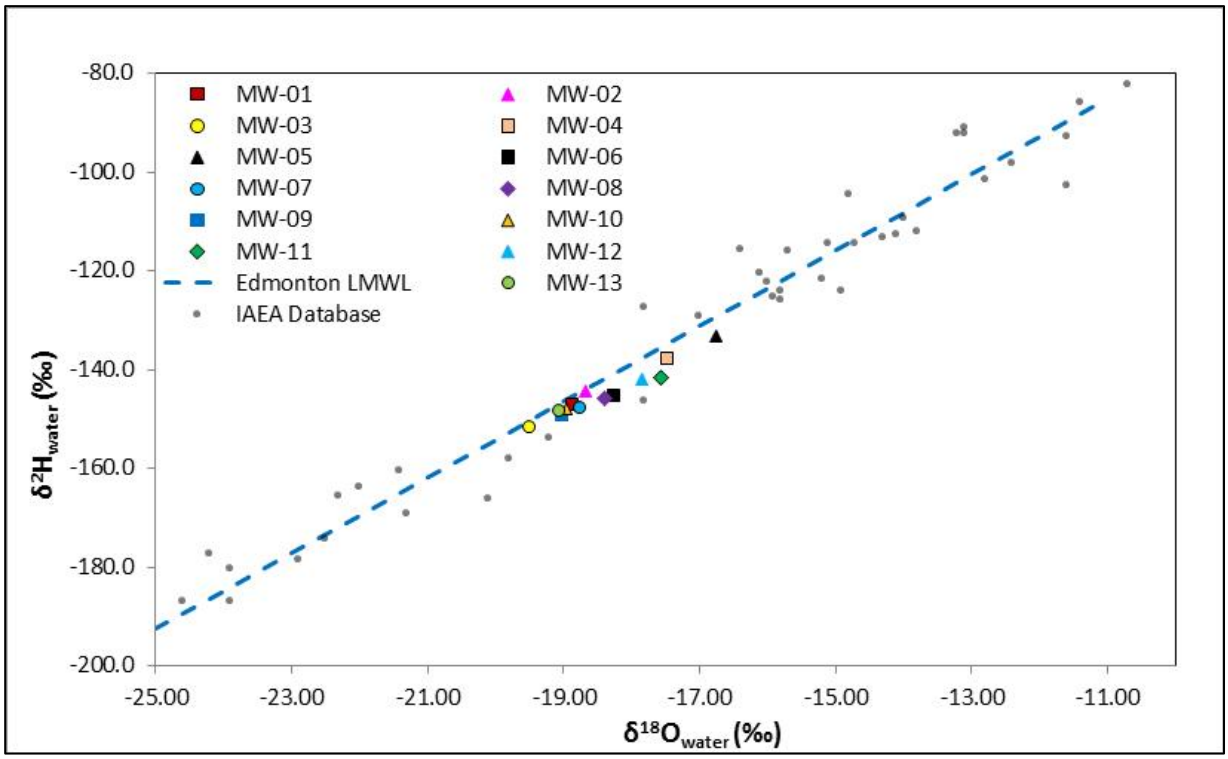
Figure B shows a plot that includes the Edmonton LMWL, the IAEA data used to generate the Edmonton LMWL, and the isotope data from the Beverly Channel monitoring wells. On Figure B, the measured 2015 data for the Beverly Channel monitoring wells generally plotted below and to the right of the Edmonton LMWL; data from MW-02 would appear to plot on the Edmonton LMWL, while data from MW-11 would appear to plot the farthest from the Edmonton LMWL, but all still within the range of the IAEA precipitation data used to generate the Edmonton LMWL. These preliminary results for one data set would appear to suggest that groundwater in the Beverly Channel has an isotopic signature similar to recharging precipitation.

Table D: Isotope Results

Monitoring Station	Sampling Date	$\delta^{18}O_{water}$ (‰)		$\delta^{2}H_{water}$ (‰)	
		Average	Standard Deviation	Average	Standard Deviation
		VSMOW		VSMOW	
MW-01	29-June-2015	-18.87	0.07	-147.2	0.3
MW-02	25-June-2015	-18.69	0.05	-144.3	0.5
MW-03	29-June-2015	-19.51	0.08	-151.5	0.5
MW-04	29-June-2015	-17.47	0.04	-137.9	0.4
MW-05	25-June-2015	-16.77	0.02	-133.2	0.2
MW-06	25-June-2015	-18.27	0.03	-145.3	0.5
MW-07	25-June-2015	-18.76	0.08	-147.7	0.3
MW-08	24-June-2015	-18.39	0.09	-145.7	0.2
MW-09	25-June-2015	-19.04	0.08	-149.1	0.3
MW-10	24-June-2015	-18.97	0.06	-148.1	0.4
MW-11	24-June-2015	-17.57	0.04	-141.6	0.4
MW-12	24-June-2015	-17.84	0.11	-142.0	0.3
MW-13	24-June-2015	-19.06	0.06	-148.2	0.5
QA/QC Samples					
D15-01	24-June-2015	-18.86	0.09	-148.0	0.2
F15-01	25-June-2015	-20.20	0.11	-153.2	0.2

Notes: D15-01 is the duplicate sample of MW-10 and F15-01 is the field blank.
VSMOW = Vienna Standard Mean Ocean Water

Figure B: Comparison of Stable Isotope Results with the Edmonton LMWL



Note - IAEA database values reflect precipitation data used to generate Edmonton LMWL

4.5 QA/QC Results and Summary

Zeiner (1994), states that the relative percent difference (RPD) between sample and duplicate results should be less than 20 percent for aqueous samples. Zeiner (1994) also states that when one or both values are less than five times the RDL, then the absolute value of the difference of the results should be less than or equal to the RDL for aqueous samples. A comparison of sample and duplicate results (Appendix 7) at MW-10 indicated that all results met the above criteria.

American Public Health Association (APHA) et al. (2005) indicate an ion balance of ±10% is typically acceptable. Values outside the commonly acceptable limits may arise for a number of reasons (e.g., analytical interference, unknown constituents, or reporting errors). Ion balance results were within this criterion (Table 3).

A field blank was collected and analyzed for major ions / routine potability, BTEX, PHC F1 and F2, dissolved metals, trace elements, and phenols. DOC was detected at a concentration of 0.56 mg/L in the field blank, which was within five times the RDL (0.50 mg/L). The remaining parameters were below their RDLs in the field blank, indicating that cross-contamination did not occur during sampling.

The laboratory blank, replicate and control samples for groundwater analyses were within the acceptable limits, with the following exceptions:

- For MW-02, MW-05, MW-06, MW-07, MW-09, and the field blank, the dissolved thallium matrix spike (76%) slightly exceeded the acceptance limit (80 – 100%) due to matrix interference, and the method blank concentration of DOC (0.82 mg/L) was above, but within five times, the RDL (0.50 mg/L). This means that DOC results for the samples listed above may be biased high. The detection of DOC in the field blank, therefore, does not necessarily imply that cross-contamination occurred during sampling.
- For MW-08, MW-10, MW-11, MW-12, MW-13, and the duplicate of MW-10, method blank concentration of dissolved lead (0.00023 mg/L) was slightly above but within five times the RDL (0.00020 mg/L).

5. DISCUSSION OF KEY GROUNDWATER QUALITY INDICATORS

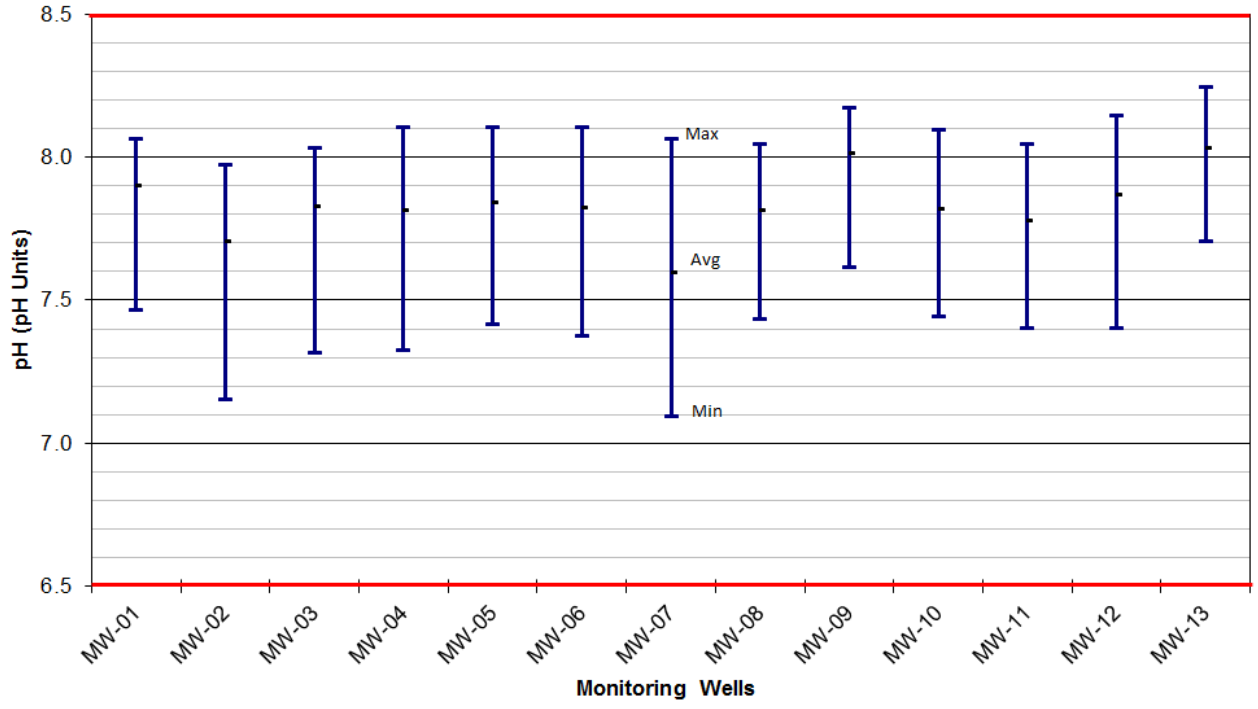
5.1 pH

Hem (1992) indicated that most groundwater has pH values ranging from about 6.0 to about 8.5, while river water in areas not influenced by pollution reportedly have a pH that ranged between 6.5 and 8.5.

The GCDWQ suggests an acceptable pH range of 6.5 to 8.5 for drinking water (Health Canada 2014, indicated by red lines on Figure C). As there are no specific health effects noted on which to base limits for the pH of drinking water, this guideline is an aesthetic objective (AO) rather than a maximum acceptable concentration (MAC). At a pH below 6.5, corrosion effects may become significant in the drinking water supply and distribution system, and at a pH above 8.5, encrustations and scaling may become an issue (Health Canada 1979a).

In the Beverly Channel, since the groundwater sampling began in 2005, laboratory-measured groundwater pH values have ranged from 7.09 to 8.24 (Figure C) and are within the range of natural waters as defined by Hem (1992) and within the AO guideline range established by Health Canada (2014).

Figure C: High, Low, and Average Values of pH in Beverly Channel Monitoring Wells

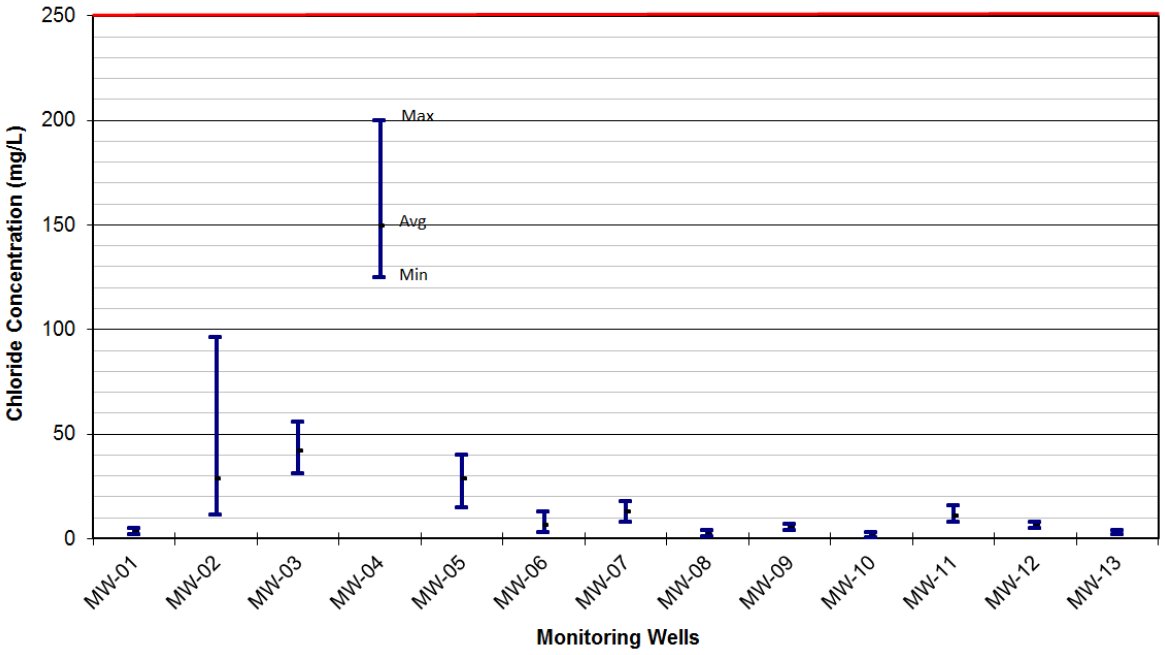


5.2 Chloride

Chloride is an inorganic, non-reactive ion that occurs widely in nature. When introduced into groundwater, chloride is highly mobile and difficult to remove due to its high solubility (Health Canada 1979b). With high mobility, high solubility, and its wide usage in anthropogenic activities, chloride is generally utilized as an indicator of groundwater contamination. Typical anthropogenic uses of chloride include control of ice and snow, effluents from chemical industries, oil well operations, sewage, irrigation drainage, and refuse leachates. Naturally occurring salt deposits also occur throughout Canada (Health Canada 1979b). Chloride concentrations in Quaternary and bedrock groundwater are typically less than 50 mg/L in Sturgeon and Strathcona Counties (HCL 2001a and 2001b) but can be naturally elevated in regional discharge areas. Health Canada (2014) suggests an AO guideline of less than or equal to 250 mg/L for chloride (indicated by the red line on Figure D) to minimize undesirable tastes in beverages. At higher concentrations, chloride may also cause corrosion in distribution systems (Health Canada 1979b).

Chloride concentrations in the Beverly Channel are typically less than 50 mg/L and in several cases less than 10 mg/L (Figure D). Elevated chloride concentrations between 125 mg/L and 200 mg/L were observed at MW-04 and are considered natural, reflecting water quality in bedrock (WorleyParsons 2010). Increasing trends in chloride concentrations noted at MW-03 and MW-05 may also be caused by well screen proximity to shale bedrock of marine origin. In 2015, the chloride concentration at MW-02 was 96 mg/L, more than double the concentration measured in August 2014. Variability is emerging in the chloride concentration at this location after historically being relatively stable below 40 mg/L.

Figure D: High, Low, and Average Values of Chloride Concentrations in Beverly Channel Monitoring Wells



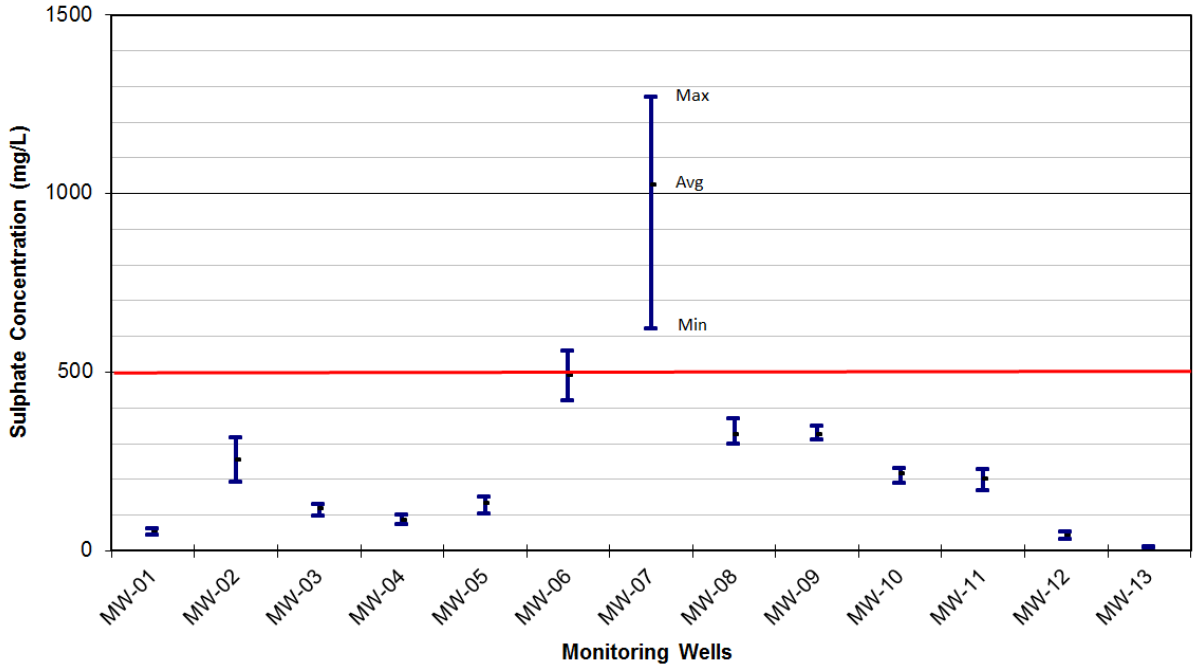
5.3 Sulphate

Sources of sulphur that can be found in the natural environment include certain igneous rock minerals, evaporite sediment (e.g., gypsum), and geothermal water (Hem 1992). Anthropogenic sources of sulphate are mainly introduced by the combustion of fuels and the smelting of ores (Hem 1992). Industrial uses of sulphur, usually in the form of sulphuric acid, include production of fertilizer, manufacturing of chemicals, dyes, glass, paper, soaps, textiles, fungicides, insecticides, astringents and emetics (review by Health Canada 1987).

The GCDWQ for sulphate suggested by Health Canada (2014) is less than or equal to 500 mg/L (indicated by the red line on Figure E). This value is an AO based on taste considerations, although there is the possibility of adverse physiological effects at higher concentrations. The lethal dose in humans, in the form of potassium or zinc sulphate, is 45 g, making it one of the least toxic anions (Health Canada 1987).

In the Study Area, background sulphate concentrations are generally less than 100 mg/L in the surficial sand deposits, range from 100 mg/L to over 1,000 mg/L in shallow bedrock, and range from less than 1,000 mg/L to over 4,000 mg/L in till and clay deposits (BA Energy 2004; Komex 2006; PCOSI 2006; Shell 2005, 2007; TOTAL 2007). In the Beverly Channel, sulphate concentrations are generally less than 500 mg/L (Figure E). One monitoring well (MW-07) has sulphate concentrations in the range of 600 to 1,300 mg/L, which is similar to concentrations observed in shallow bedrock.

Figure E: High, Low, and Average Values of Sulphate Concentrations in Beverly Channel Monitoring Wells



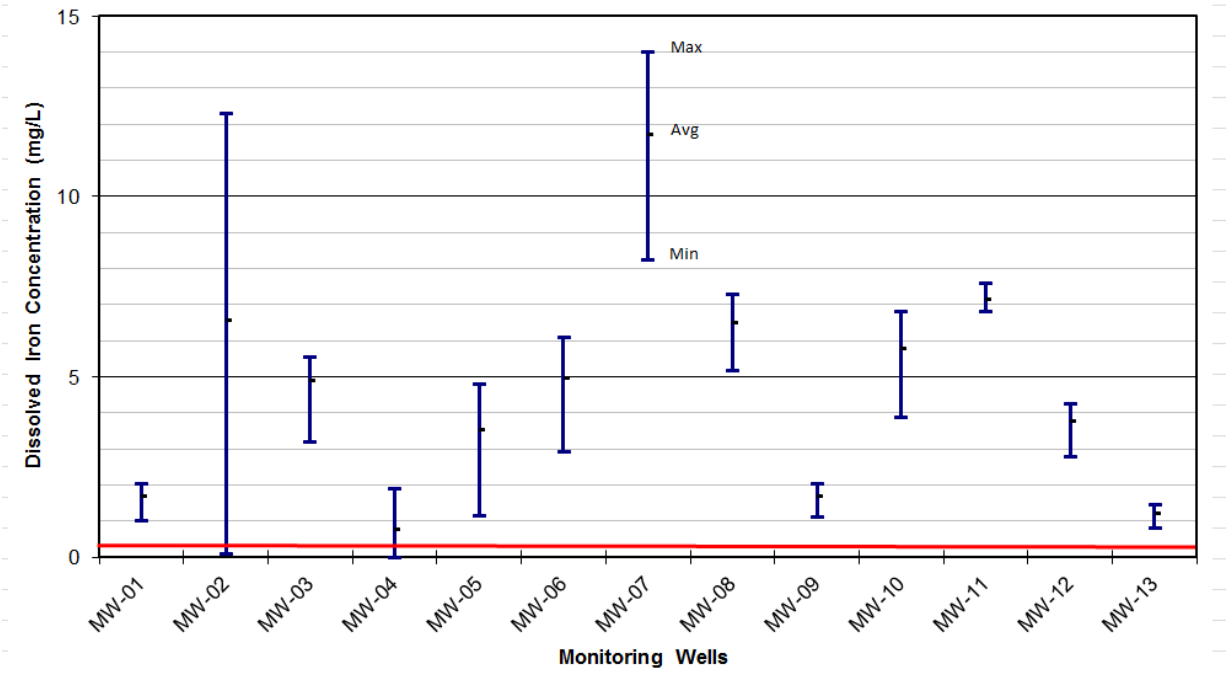
5.4 Dissolved Iron

A number of igneous rock minerals have a relatively high iron content which can act as a source of iron in groundwater. When iron is released into water, it is generally re-precipitated nearby as sedimentary species involving sulphide, carbonate, oxide or oxyhydroxide (Hem 1992). The availability of iron to aqueous solutions is strongly affected by environmental conditions, particularly the oxidation/reduction capacity and pH. Iron is also present in organic wastes, and in plant debris in soils (Hem 1992), which can then be released into groundwater via biodegradation processes. In aerated waters, the concentration of iron in waters is seldom high (Health Canada 1978a).

The AO suggested by Health Canada (2014) for iron in drinking water is less than or equal to 0.3 mg/L (indicated by the red line on Figure F). This objective is aimed to minimize objectionable taste and appearance, as well as inefficiency in the distribution system which can result from the precipitation of insoluble hydroxides and the development of slime produced by iron oxidizing bacteria. The reported lethal dose for an adult male is between 14 and 17.5 g (National Academy of Sciences, 1980).

Within the Beverly Channel, elevated iron concentrations are generally expected. Stein (1976) indicated that iron concentrations in excess of 15 mg/L were not uncommon. HCL (2001a) reported iron concentrations in excess of 7 mg/L for a Beverly Channel water supply well for the Village of Bruderheim. Iron concentrations in the Beverly Channel monitoring wells range from non-detected values to 14 mg/L (Figure F).

Figure F: High, Low, and Average Values of Dissolved Iron Concentrations in Beverly Channel Monitoring Wells



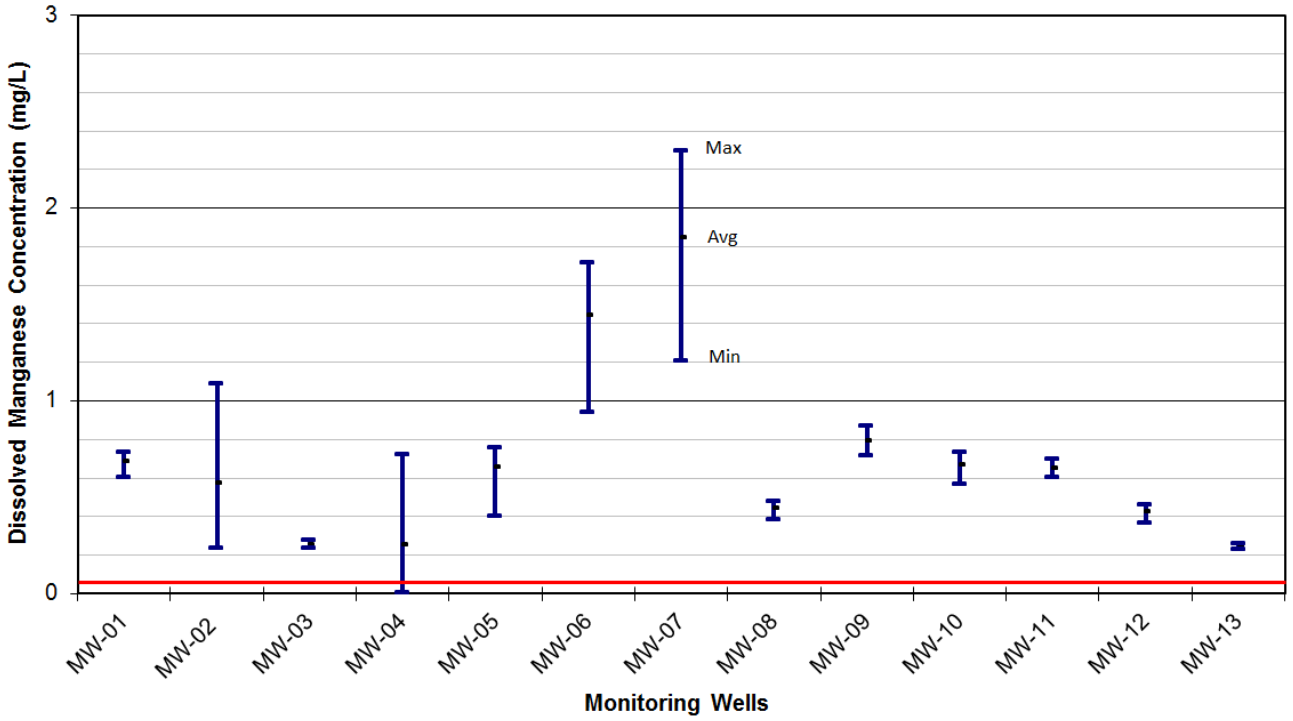
5.5 Dissolved Manganese

Manganese is most often present as a component of dioxide, carbonate or silicate minerals (Health Canada 1979c), and many igneous and metamorphic minerals contain manganese as a minor constituent (Hem 1992). Similar to iron, the presence of dissolved manganese in water is dependent on both redox and pH conditions, although it is somewhat more stable toward oxidation than ferrous iron (Hem 1992).

Health Canada (2014) suggests an AO guideline of less than or equal to 0.05 mg/L (indicated by the red line on Figure G) to minimize staining and undesirable tastes in beverages, as well as the accumulation of microbial growths in distribution systems (black precipitates; Health Canada 1979c). Higher concentrations of manganese are expected to be more prevalent in groundwater than surface water as a result of the higher likelihood of reducing conditions in the subsurface (Health Canada 1979c).

The manganese concentrations in the Beverly Channel (Figure G) are within the combined range of surface water/groundwater manganese concentrations from data compiled by Hem (1992). Generally, manganese concentrations may be expected to be higher in the Beverly Channel than in shallower geological units as there is a higher likelihood of reducing conditions with depth. Lowest concentrations of manganese were measured at monitoring wells MW-03, MW-04, and MW-13; the highest concentrations occurred at MW-06 and MW-07.

Figure G: High, Low, and Average Values of Dissolved Manganese Concentrations in Beverly Channel Monitoring Wells



5.6 Total Dissolved Solids

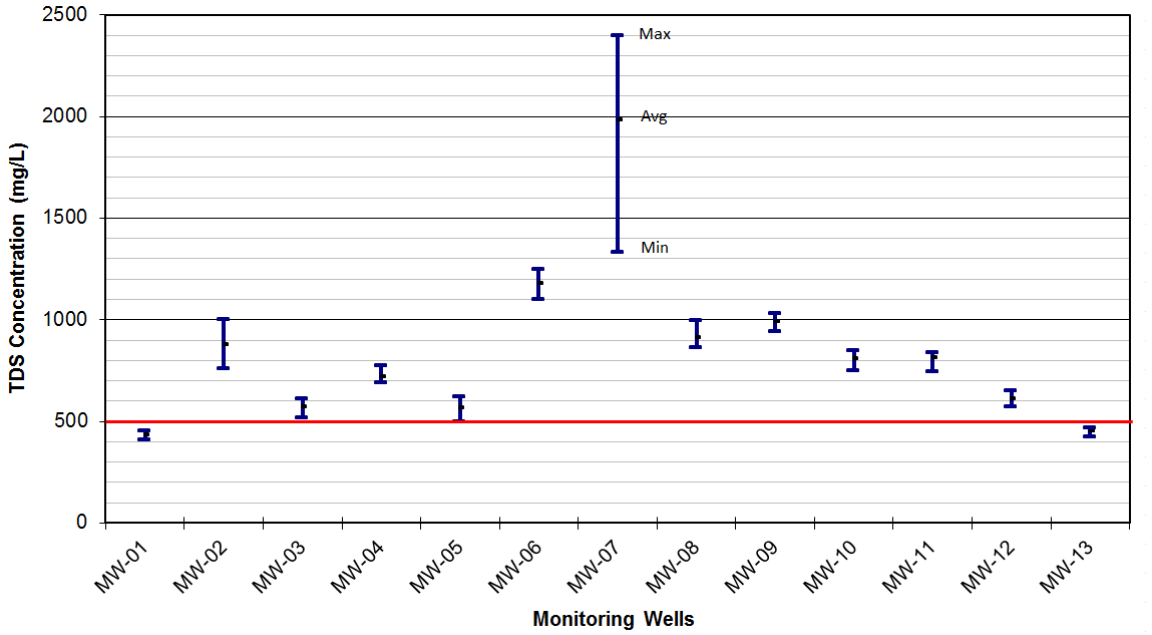
TDS are dissolved constituents which comprise inorganic salts, primarily the major cations and anions used for groundwater characterization, nitrate (when introduced by agricultural use), and small amounts of organic matter (Health Canada 1978b). Sources of TDS include natural mineral sources, sewage, urban and agricultural runoff and industrial water (Health Canada 1978b). Concentrations of TDS resulting from mineral dissolution vary with the solubility of the minerals present.

Health Canada (2014) suggests an AO of less than or equal to 500 mg/L for TDS (indicated by the red line on Figure H) to minimize hardness, unpalatability, mineral deposition and corrosion (Health Canada 1978b). Recent data on health effects associated with the ingestion of TDS in drinking water is limited and the data that are available are unclear; however, some individual components of TDS (e.g., chloride, sodium, nitrate) can affect human health (Health Canada 1978b; as updated 1991).

TDS concentrations in the Beverly Channel ranged from 410 to 2,400 mg/L (Figure H), with only two monitoring wells indicating TDS concentrations of less than 500 mg/L (MW-01 and MW-13). This is generally consistent with TDS values in excess of 1,000 mg/L reported by HCL (2001a and 2001b) for the Beverly Channel. The higher TDS concentration at MW-07 may be related to local groundwater

discharge from bedrock. TDS in bedrock is generally in the range of 1,000 to 2,000 mg/L (Stein 1976), but may exceed 3,000 mg/L (HCL 2001a and 2001b).

Figure H: High, Low, and Average Values of TDS Concentrations in Beverly Channel Monitoring Wells



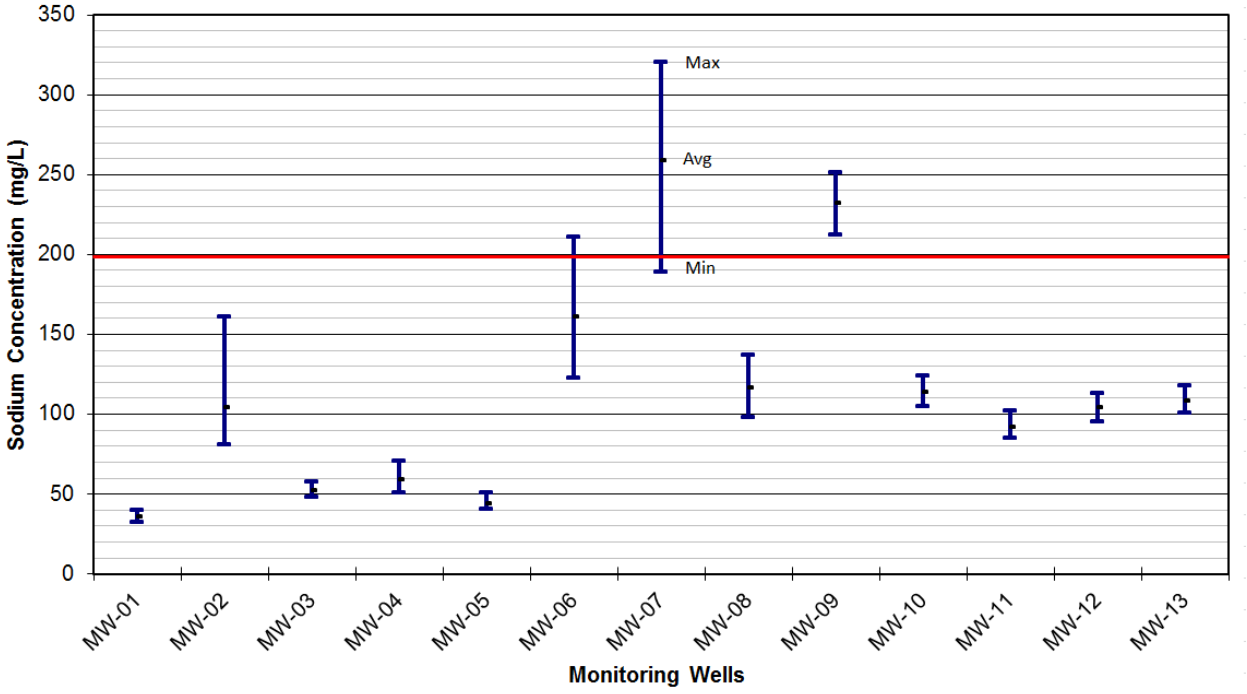
5.7 Sodium

Sodium may be present in feldspar minerals, which can release sodium into water through weathering. Sodium may be present as readily soluble salts, such as those left behind in the uplift of land surface or decline of sea level (Hem 1992). Anthropogenic sources of sodium include the use of salt for de-icing, brine disposal or leakage from oil wells, and water reuse for irrigation purposes (Hem 1992). Other potential anthropogenic sources include sewage and industrial effluents, and the use of sodium compounds for corrosion control and water-softening processes (Health Canada 1979d).

Health Canada (2014) suggests an AO of less than or equal to 200 mg/L for sodium (indicated by the red line on (Figure I). Because the human body has effective mechanisms to control sodium levels, sodium is not acutely toxic in the normal range of environmental or dietary concentrations (Health Canada 1979d). However, there is a relation in the human body between fluid volume and sodium retention, and changes in sodium intake may result in disturbances such as changes in hypertension, congestive cardiac failure, renal disease, cirrhosis, toxaemia of pregnancy, and Meniere's disease (Health Canada 1979d).

Within the Beverly Channel, sodium concentrations have ranged from approximately 33 to 320 mg/L (Figure I). The elevated (compared to the other monitoring wells) sodium concentrations at MW-06, MW-07, and MW-09 could be a reflection of discharging groundwater from bedrock.

Figure I: High, Low, and Average Values of Sodium Concentrations in Beverly Channel Monitoring Wells



6. SUMMARY AND RECOMMENDATIONS

Annual groundwater quality monitoring of the Beverly Channel aquifer was completed for the Northeast Capital Industrial Association in June 2015. Results are summarized as follows:

- Lateral groundwater flow was generally to the northwest. The linear groundwater flow velocity ranged spatially from approximately 30 to 90 m/year.
- Chloride concentrations were generally below 50 mg/L and within ranges established by previous monitoring. Elevated chloride concentrations noted at MW-04 are considered natural and potentially illustrate bedrock conditions (WorleyParsons 2010). Variability is emerging in the chloride concentration at MW-02.
- Iron, manganese, total dissolved solids, and sodium appear to be naturally elevated within the Study Area. However, their concentrations remain well within naturally occurring ranges (Stein 1976).
- The cause of the elevated sulphate at MW-07 is unknown. Elevated sulphate concentrations may result from saltwater intrusion, mineral dissolution, and domestic or industrial waste. Due to the absence of industry in the immediate area it is likely that the elevated sulphate is naturally occurring. Other parameters, including dissolved iron, manganese, TDS, and sodium, are also generally higher at MW-07. These elevated concentrations are likely natural and could be caused by interactions with bedrock material.
- Petroleum hydrocarbons and VOCs (phenols) were not detected at any sampling location in 2015, except for PHC F2 (C_{10}-C_{16}) which was detected at MW-02 at a concentration corresponding to its RDL. This was the second detection of PHC F2 in the last 3 sampling events at MW-02.
- A statistically significant trend was observed at MW-02 (increasing iron).
- Visually assessed trends were observed at MW-02 and MW-05 (increasing chloride). Elevated chloride concentrations may be due to well screen proximity to chloride rich shale bedrock of the Bearpaw Formation.
- Groundwater data to date has shown that indicator parameter concentrations are generally within natural ranges for groundwater within Sturgeon and Strathcona County.
- Initial analysis of the results of stable isotopes oxygen-18 (^{18}O) and deuterium (^{2}H) would appear to suggest that groundwater in the Beverly Channel has stable isotope composition similar to recharging precipitation. However, only one data set has been obtained.

Recommendations are as follows:

- Install a monitoring well at the location of MW-02 in the bedrock to confirm bedrock groundwater quality.

- Complete annual groundwater monitoring in 2016. The analytical schedule should be the same as completed in 2015 (Table B), including stable isotopes (^{2}H and ^{18}O).
- Consideration should be given to sampling MW-02 more than once per year to further investigate the emerging variability in select parameter concentrations at that location and possible correlation with bedrock water (once a bedrock well is installed).

7. CLOSURE

We trust that this report satisfies your current requirements and provides suitable documentation for your records. If you have any questions or require further details, please contact the undersigned at any time.

Report Prepared by

Stephane Ngueleu, Ph.D.
Environmental Scientist

Senior Review by

PROFESSIONAL GEOSCIENTIST ALBERTA
TREVOR R. BUTTERFIELD
16-Dec-2015

PERMIT TO PRACTICE
WORLEYPARSONS CANADA SERVICES LTD.
Signature
Date 16 Dec 2015
PERMIT NUMBER: P 0725
The Association of Professional Engineers and Geoscientists of Alberta

Trevor Butterfield, M.Sc., P.Geo.
Senior Hydrogeologist

WorleyParsons Canada Services Ltd

8. REFERENCES

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF). 2005. Standard Methods for the Examination of Water and Wastewater, 21st ed. American Public Health Association, Washington, D.C.

BA Energy Inc. 2004. BA Energy Heartland Upgrader, Project Application and Environmental Impact Assessment. May 2004.

Clark, I.D., and Fritz, P. 1997. Environmental Isotopes in Hydrogeology. Lewis Publishers, New York.

Gilbert, R.O. 1987. Statistical Methods for Environmental Pollution Monitoring. John Wiley & Sons Inc. Canada.

Health Canada, 1978a. Iron. Guidelines for Canadian Drinking Water Quality: Supporting Documentation. December 1978, updated November 1987.

Health Canada, 1978b. Total Dissolved Solids (TDS). Guidelines for Canadian Drinking Water Quality: Supporting Documentation. September 1978, updated January 1991.

Health Canada, 1979a. pH. Guidelines for Canadian Drinking Water Quality: Supporting Documentation. May 1979, reprinted 1995.

Health Canada, 1979b. Chloride. Technical document – Chemical/Physical Parameters. April 1979, updated November 1987.

Health Canada, 1979c. Manganese. Guidelines for Canadian Drinking Water Quality: Supporting Documentation. May 1979, updated November 1987.

Health Canada, 1979d. Sodium. Guidelines for Canadian Drinking Water Quality: Supporting Documentation. May 1979, updated December 1992.

Health Canada, 1987. Sulphate. Guidelines for Canadian Drinking Water Quality: Supporting Documentation. November 1987, updated September 1994.

Health Canada, 2014. Guidelines for Canadian Drinking Water Quality. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment. October 2014.

Helsel, D.R., and Hirsch, R.M. 1992. Statistical Methods in Water Resources. Elsevier Science Publishing Company Inc. New York, New York.

Hem, John D. 1992. Study and Interpretation of the Chemical Characteristics of Natural Water, 3rd Edition. United States Geological Survey Water Supply Paper 2254.

Hydrogeological Consultants Ltd. (HCL). 2001a. Strathcona County, Regional Groundwater Assessment. April 2001.

Hydrogeological Consultants Ltd. (HCL). 2001b. Sturgeon County, Regional Groundwater Assessment. September 2001.

Kendall, C. and McDonnell, J.J. (eds.) 1998. Isotope Tracers in Catchment Hydrology. Elsevier Science B.V., Amsterdam. pp. 51-86.

Komex International Ltd. (Komex). 2006. Hydrogeological Assessment, Proposed Upgrader. Report prepared for North West Upgrading Inc. January 2006.

Lemay, T.G. 2002. Geochemical and isotope data for formation water from selected wells, Cretaceous to Quaternary succession, Athabasca Oil Sands (in situ) Area, Alberta; Alberta Energy and Utilities Board, EUB/AGS Geo-Note 2002-02.

National Academy of Science. 1980. Recommended dietary allowances. 9th edtion. National Academy Press, Washington, DC.

Petro-Canada Oil Sands Inc. (PCOSI). 2006. Application for Approval of the Sturgeon Upgrader. Submitted to Alberta Energy and Utilities Board and Alberta Environment. December 2006. Section 11: Groundwater.

Shell Canada Limited (Shell). 2005. Application for Approval of the Scotford Upgrader Expansion Project. Submitted to Alberta Energy and Utilities Board and Alberta Environment. April 2005. Section 11: Groundwater.

Shell Canada Limited (Shell). 2007. Application for Approval of the Shell Scotford Upgrader 2 Project. Submitted to Alberta Energy and Utilities Board and Alberta Environment. July 2007. Section 11: Groundwater.

Sidle, W. 1998. Environmental isotopes for resolution of hydrology problems. Environmental Monitoring and Assessment, 52, 389—410.

Stantec Consulting Ltd. (Stantec). 2006a. Regional Groundwater Quality Study of the Beverly Channel in the Fort Saskatchewan Area – Phase II. Prepared for Northeast Capital Industrial Association (NCIA). October 2006. File 1102-17094. Website accessed March 15, 2010: http://www.ncia.ab.ca/documents/NCIA%20Phase%20II%20Report%20_Final_.pdf.

Stantec Consulting Ltd. (Stantec). 2006b. Spring, 2006 Groundwater Monitoring Field Program. Prepared for Northeast Capital Industrial Association (NCIA). November 16, 2006. File 110217444. Website: http://www.ncia.ab.ca/documents/Spring2006GroundwaterUpdateRAWDATA.pdf. Accessed March 15, 2010.

Stantec Consulting Ltd. (Stantec). 2007. Spring, 2007 Groundwater Monitoring Field Program. Prepared for Northeast Capital Industrial Association (NCIA). December 11, 2007. File 110217663. Website: http://www.ncia.ab.ca/documents/Spring2007GroundwaterUpdateRAWDATA.pdf. Accessed March 15, 2010.

Stantec Consulting Ltd. (Stantec). 2008. Fall, 2007 Groundwater Monitoring Field Program. Prepared for Northeast Capital Industrial Association (NCIA). May 9, 2008. File 110217729. Website: http://www.ncia.ab.ca/documents/PartBFall2007GroundwaterUpdateReportRAWDATA.pdf. Accessed March 15, 2010.

Stantec Consulting Ltd. (Stantec). 2009. Spring, 2009 Groundwater Monitoring Field Program. Prepared for Northeast Capital Industrial Association (NCIA). June 1, 2009. File 1102-17990. Website: http://www.ncia.ab.ca/documents/Spring2009GroundwaterUpdateRAWDATA.pdf. Accessed March 15, 2010.

Stein, R. 1976. Hydrogeology of the Edmonton Area (Northeast Segment), Alberta. Alberta Research Council Report 76-1. 21 p.

TOTAL E&P Canada Inc. (TOTAL). 2007. Integrated Application for Approval of the TOTAL Upgrader. Submitted to Alberta Energy and Utilities Board and Alberta Environment. December 2007. Section 7: Groundwater.

WorleyParsons Canada Services Ltd. 2010. 2010 Groundwater Quality Monitoring – Beverly Channel Monitoring Wells. Project No. E00100101. August 2010.

WorleyParsons Canada Services Ltd 2011. 2011 Groundwater Quality Monitoring – Beverly Channel Monitoring Wells. Project No. E00100102. September 2011.

WorleyParsons Canada Services Ltd 2012. 2012 Groundwater Quality Monitoring – Beverly Channel Monitoring Wells. Project No. 307075-01129. October 2012.

WorleyParsons Canada Services Ltd 2013. 2013 Groundwater Quality Monitoring – Beverly Channel Monitoring Wells. Project No. 307076-06086. September 2013.

WorleyParsons Canada Services Ltd 2014. 2014 Groundwater Quality Monitoring – Beverly Channel Monitoring Wells. Project No. 307076-06086. September 2014.

Zeiner, S.T. 1994. Realistic Criteria for the Evaluation of Field Duplicate Field Results. Proceedings of Superfund XV, November 29-December 1, 1994. Sheraton Washington Hotel, Washington, D.C.

Tables

Table 1

Groundwater Analytical Results: Datum/Groundwater Surface Elevations and Hydraulic Conductivities

PROJECT No.: 307075-01608-100

Monitoring Station	Easting (m)	Northing (m)	Ground Elevation (masl)	Datum Elevation (masl)	Stickup (m)	Total Depth of Piezometer (mbgs)	Bottom of Piezometer Elevation (masl)	Depth Interval of Screen (mbgs)	Elevation Interval of Screen (masl)	Depth Interval of Sand (mbgs)	Elevation Interval of Sand (masl)	Date (dd-mmm-yyyy)	Depth to Groundwater (mbtoc)	Depth to Groundwater (mbgs)	Groundwater Surface Elevation (masl)	Measured Depth to Bottom of Well (mbgs)	Hydraulic Conductivity (m/s)	Saturated Sand Pack Lithology	Completion Interval	Comments
Groundwater Monitoring																				
MW-01	350335.04	5951040.45	617.52	618.04	0.52	19.80	597.72	15.50 - 19.80	602.02 - 597.72	14.30 - 19.80	603.22 - 597.72	07-Mar-2005	15.55	15.03	602.49		6.8E-05	Sand and Gravel		
												04-May-2005	15.48	14.96	602.56					
												06-Jun-2005	15.42	14.90	602.62					
												17-Nov-2005	15.64	15.12	602.40					
												15-Jun-2006	15.23	14.71	602.81					
												12-Jul-2007	15.23	14.71	602.81					
												19-Dec-2007	15.38	14.86	602.66					
												21-Apr-2009	15.29	14.77	602.75					
												05-May-2010	15.70	15.18	602.34					
												25-May-2011	15.40	14.88	602.64					
												29-May-2012	15.15	14.63	602.89	19.62				
												10-Jul-2013	14.41	13.89	603.63	19.04				
												16-Jun-2014	14.76	14.24	603.28	18.78				
												29-Jun-2015	15.12	14.60	602.92	18.75				
MW-02	352457.8	5950583.37	630.71	631.31	0.60	33.80	596.91	27.60 - 33.80	603.11 - 596.91	26.20 - 33.80	604.51 - 596.91	07-Mar-2005	27.14	26.54	604.17		1.8E-04	Sand and Gravel		
												04-May-2005	27.22	26.62	604.09					
												06-Jun-2005	27.17	26.57	604.14					
												17-Nov-2005	27.23	26.63	604.08					
												15-Jun-2006	27.05	26.45	604.26					
												13-Jul-2007	27.18	26.58	604.13					
												19-Dec-2007	26.99	26.39	604.32					
												21-Apr-2009	27.13	26.53	604.18					
												05-May-2010	27.20	26.60	604.11					
												25-May-2011	27.26	26.66	604.05					
												29-May-2012	27.16	26.56	604.15	26.56				
												10-Jul-2013	27.05	26.45	604.26	33.70				
												16-Jun-2014	27.03	26.43	604.28	33.57				
												28-Aug-2014	27.09	26.49	604.22	33.58				
												25-Jun-2015	27.08	26.48	604.23	33.57				
MW-03	353030.21	5952940.9	623.79	624.43	0.64	29.60	594.19	25.00 - 29.60	598.79 - 594.19	23.50 - 29.60	600.29 - 594.19	08-Mar-2005	22.50	21.86	601.93		2.2E-04	Sand and Gravel		
												04-May-2005	22.55	21.91	601.88					
												06-Jun-2005	22.53	21.89	601.90					
												17-Nov-2005	23.47	22.83	600.96					
												15-Jun-2006	22.50	21.86	601.93					
												12-Jul-2007	22.45	21.81	601.98					
												19-Dec-2007	23.36	22.72	601.07					
												21-Apr-2009	22.54	21.90	601.89					
												06-May-2010	22.82	22.18	601.61					
												25-May-2011	22.32	21.68	602.11					
												29-May-2012	22.57	21.93	601.86	29.48				
												10-Jul-2013	22.24	21.60	602.19	29.57				
												16-Jun-2014	22.34	21.70	602.09	29.44				
												29-Jun-2015	22.57	21.93	601.86	29.44				
MW-04	354823.41	5953959.76	620.25	620.79	0.54	26.20	594.05	21.60 - 26.20	598.65 - 594.05	19.50 - 26.20	600.75 - 594.05	08-Mar-2005	18.59	18.05	602.20		1.8E-04	Sand and Gravel		
												04-May-2005	18.61	18.07	602.18					
												06-Jun-2005	18.62	18.08	602.17					
												17-Nov-2005	18.57	18.03	602.22					
												14-Jun-2006	18.59	18.05	602.20					
												13-Jul-2007	18.55	18.01	602.24					
												19-Dec-2007	18.52	17.98	602.27					
												21-Apr-2009	18.66	18.12	602.13					
												06-May-2010	18.87	18.33	601.92					
												07-Jun-2011	18.70	18.16	602.09					
												30-May-2012	18.78	18.24	602.01	26.39				
												09-Jul-2013	18.54	18.00	602.25	27.26				
												13-Jun-2014	18.48	17.94	602.31	26.21				
												29-Jun-2015	18.48	17.94	602.31	26.18				

Groundwater Analytical Results: Datum/Groundwater Surface Elevations and Hydraulic Conductivities

PROJECT No.: 307075-01608-100

Monitoring Station	Easting (m)	Northing (m)	Ground Elevation (masl)	Datum Elevation (masl)	Stickup (m)	Total Depth of Piezometer (mbgs)	Bottom of Piezometer Elevation (masl)	Depth Interval of Screen (mbgs)	Elevation Interval of Screen (masl)	Depth Interval of Sand (mbgs)	Elevation Interval of Sand (masl)	Date (dd-mmm-yyyy)	Depth to Groundwater (mbtoc)	Depth to Groundwater (mbgs)	Groundwater Surface Elevation (masl)	Measured Depth to Bottom of Well (mbgs)	Hydraulic Conductivity (m/s)	Saturated Sand Pack Lithology	Completion Interval	Comments
MW-05	354293.74	5954889.46	624.28	624.89	0.61	31.40	592.88	26.80 - 31.40	597.48 - 592.88	28.40 - 31.40	595.88 - 592.88	08-Mar-2005	25.32	24.71	599.57			Gravel		
												04-May-2005	25.71	25.10	599.18					
												06-Jun-2005	25.62	25.01	599.27					
												17-Nov-2005	26.77	26.16	598.12					
												14-Jun-2006	25.70	25.09	599.19					
												13-Jul-2007	25.52	24.91	599.37					
												19-Dec-2007	25.34	24.73	599.55					
												21-Apr-2009	25.61	25.00	599.28					
												29-Apr-2010	25.92	25.31	598.97					
												25-May-2011	25.58	24.97	599.31					
												29-May-2012	25.71	25.10	599.18	30.22				
												08-Jul-2013	25.06	24.45	599.83	30.27				
												13-Jun-2014	25.26	24.65	599.63	30.05				
												25-Jun-2015	25.72	25.11	599.17	30.06				
MW-06	361559.34	5958812.22	629.61	630.28	0.67	39.00	590.61	34.40 - 39.00	595.21 - 590.61	32.90 - 39.00	596.71 - 590.61	08-Mar-2005	32.17	31.50	598.11		1.5E-04	Sand and Gravel		
												04-May-2005	32.16	31.49	598.12					
												06-Jun-2005	32.07	31.40	598.21					
												17-Nov-2005	32.17	31.50	598.11					
												16-Jun-2006	32.76	32.09	597.52					
												12-Jul-2007	32.13	31.46	598.15					
												19-Dec-2007	31.97	31.30	598.31					
												22-Apr-2009	31.99	31.32	598.29					
												05-May-2010	32.24	31.57	598.04					
												07-Jun-2011	32.10	31.43	598.18					
												29-May-2012	32.08	31.41	598.20	38.57				
												08-Jul-2013	32.06	31.39	598.22	39.03				
												12-Jun-2014	32.01	31.34	598.27	38.50				
												25-Jun-2015	31.98	31.31	598.30	38.53				
MW-07	359089.7	5959604.24	630.41	631.01	0.60	43.90	586.51	37.80 - 43.90	592.61 - 586.51	36.30 - 43.90	594.11 - 586.51	09-Mar-2005	33.98	33.38	597.03			Sand and Gravel		
												04-May-2005	34.14	33.54	596.87					
												06-Jun-2005	33.85	33.25	597.16					
												17-Nov-2005	34.23	33.63	596.78					
												16-Jun-2006	34.60	34.00	596.41					
												12-Jul-2007	33.97	33.37	597.04					
												19-Dec-2007	33.78	33.18	597.23					
												22-Apr-2009	34.00	33.40	597.01					
												05-May-2010	34.32	33.72	596.69					
												08-Jun-2011	34.43	33.83	596.58					
												28-Jul-2011	33.80	33.20	597.21					
												30-May-2012	34.12	33.52	596.89	44.06				
												11-Jul-2013	33.59	32.99	597.42	41.40				
												13-Jun-2014	33.70	33.10	597.31	41.40				
												25-Jun-2015	33.94	33.34	597.07	41.40				
MW-08	363133.77	5961204.95	625.87	626.44	0.57	33.50	592.37	30.50 - 33.50	595.37 - 592.37	28.70 - 33.50	597.17 - 592.37	09-Mar-2005	27.74	27.17	598.70		9.5E-04	Gravel		
												04-May-2005	27.77	27.20	598.67					
												06-Jun-2005	27.68	27.11	598.76					
												15-Nov-2005	27.74	27.17	598.70					
												16-Jun-2006	27.58	27.01	598.86					
												11-Jul-2007	27.72	27.15	598.72					
												19-Dec-2007	27.57	27.00	598.87					
												22-Apr-2009	27.63	27.06	598.81					
												05-May-2010	27.83	27.26	598.61					
												07-Jun-2011	27.72	27.15	598.72					
												30-May-2012	27.69	27.12	598.75	33.50				
												09-Jul-2013	27.63	27.06	598.81	30.60				
												12-Jun-2014	27.55	26.98	598.89	33.43				
												24-Jun-2015	27.58	27.01	598.86	33.67				
MW-09	361003.46	5962032.28	624.06	624.73	0.67	36.60	587.46	32.00 - 36.60	592.06 - 587.46	30.50 - 36.60	593.56 - 587.46	09-Mar-2005	28.41	27.74	596.32		4.1E-04	Gravel, Sand and Gravel		
												04-May-2005	28.41	27.74	596.32					
												06-Jun-2005	28.33	27.66	596.40					
												17-Nov-2005	28.48	27.81	596.25					
												16-Jun-2006	28.27	27.60	596.46					

Groundwater Analytical Results: Datum/Groundwater Surface Elevations and Hydraulic Conductivities

PROJECT No.: 307075-01608-100

Monitoring Station	Easting (m)	Northing (m)	Ground Elevation (masl)	Datum Elevation (masl)	Stickup (m)	Total Depth of Piezometer (mbgs)	Bottom of Piezometer Elevation (masl)	Depth Interval of Screen (mbgs)	Elevation Interval of Screen (masl)	Depth Interval of Sand (mbgs)	Elevation Interval of Sand (masl)	Date (dd-mmm-yyyy)	Depth to Groundwater (mbtoc)	Depth to Groundwater (mbgs)	Groundwater Surface Elevation (masl)	Measured Depth to Bottom of Well (mbgs)	Hydraulic Conductivity (m/s)	Saturated Sand Pack Lithology	Completion Interval	Comments
MW-10	364954.62	5963505.11	624.06	624.67	0.61	41.80	582.26	35.70 - 41.80	588.36 - 582.26	N/A	N/A	11-Jul-2007	28.35	27.68	596.38					
												18-Dec-2007	28.34	27.67	596.39					
												22-Apr-2009	28.27	27.60	596.46					
												06-May-2010	28.61	27.94	596.12					
												02-Jun-2011	28.25	27.58	596.48					
												29-May-2012	28.37	27.70	596.36	36.39				
												10-Jul-2013	28.17	27.50	596.56	36.58				
												13-Jun-2014	28.64	27.97	596.09	36.03				
												25-Jun-2015	28.36	27.69	596.37	36.40				
												09-Mar-2005	26.89	26.28	597.78			Gravel, Sand and Gravel		
												04-May-2005	26.90	26.29	597.77					
												06-Jun-2005	26.82	26.21	597.85					
												16-Nov-2005	26.90	26.29	597.77					
												16-Jun-2006	26.72	26.11	597.95					
												11-Jul-2007	26.87	26.26	597.80					
												18-Dec-2007	26.74	26.13	597.93					
												22-Apr-2009	26.72	26.11	597.95					
												05-May-2010	26.93	26.32	597.74					
												02-Jun-2011	26.70	26.09	597.97					
												30-May-2012	26.80	26.19	597.87	41.17				
												09-Jul-2013	26.73	26.12	597.94	42.26				
												12-Jun-2014	26.63	26.02	598.04	41.18				
												24-Jun-2015	26.67	26.06	598.00	41.18				
MW-11	362564.36	5965300.71	624.49	625.16	0.67	44.20	580.29	38.10 - 44.20	586.39 - 580.29	35.10 - 47.20	589.39 - 577.29	10-Mar-2005	30.60	29.93	594.56		1.5E-04	Sand and Gravel		
												04-May-2005	30.42	29.75	594.74					
												06-Jun-2005	30.41	29.74	594.75					
												16-Nov-2005	30.41	29.74	594.75					
												16-Jun-2006	30.34	29.67	594.82					
												11-Jul-2007	30.38	29.71	594.78					
												18-Dec-2007	30.40	29.73	594.76					
												22-Apr-2009	30.35	29.68	594.81					
												05-May-2010	30.64	29.97	594.52					
												02-Jun-2011	30.46	29.79	594.70					
												30-May-2012	30.35	29.68	594.81	44.11				
												10-Jul-2013	30.26	29.59	594.90	44.21				
												12-Jun-2014	30.19	29.52	594.97	44.64				
												24-Jun-2015	30.19	29.52	594.97	44.67				
MW-12	366805.93	5968379.85	625.46	626.07	0.61	38.10	587.36	35.10 - 38.10	590.36 - 587.36	33.50 - 38.10	591.96 - 587.36	10-Mar-2005	32.95	32.34	593.12		1.4E-04	Sand, Sand and Gravel		
												04-May-2005	32.90	32.29	593.17					
												06-Jun-2005	32.87	32.26	593.20					
												16-Nov-2005	33.05	32.44	593.02					
												16-Jun-2006	33.62	33.01	592.45					
												11-Jul-2007	32.90	32.29	593.17					
												18-Dec-2007	32.77	32.16	593.30					
												22-Apr-2009	32.76	32.15	593.31					
												06-May-2010	33.01	32.40	593.06					
												02-Jun-2011	32.84	32.23	593.23					
												29-May-2012	32.89	32.28	593.18	38.11				
												10-Jul-2013	32.82	32.21	593.25	38.84				
												12-Jun-2014	32.84	32.23	593.23	38.09				
												24-Jun-2015	32.83	32.22	593.24	38.10				
MW-13	365292.72	5968147.12	625.65	626.28	0.63	40.50	585.15	37.50 - 40.50	588.15 - 585.15	36.00 - 40.50	589.65 - 585.15	10-Mar-2005	32.60	31.97	593.68			Gravel		
												04-May-2005	32.54	31.91	593.74					
												06-Jun-2005	32.50	31.87	593.78					
												16-Nov-2005	33.45	32.82	592.83					
												16-Jun-2006	33.24	32.61	593.04					
												11-Jul-2007	32.54	31.91	593.74					
												18-Dec-2007	32.39	31.76	593.89					
												22-Apr-2009	32.41	31.78	593.87					
												06-May-2010	32.68	32.05	593.60					
												02-Jun-2011	32.46	31.83	593.82					
												30-May-2012	32.56	31.93	593.72	40.44				

Groundwater Analytical Results: Datum/Groundwater Surface Elevations and Hydraulic Conductivities

PROJECT No.: 307075-01608-100

Monitoring Station	Easting (m)	Northing (m)	Ground Elevation (masl)	Datum Elevation (masl)	Stickup (m)	Total Depth of Piezometer (mbgs)	Bottom of Piezometer Elevation (masl)	Depth Interval of Screen (mbgs)	Elevation Interval of Screen (masl)	Depth Interval of Sand (mbgs)	Elevation Interval of Sand (masl)	Date (dd-mmm-yyyy)	Depth to Groundwater (mbtoc)	Depth to Groundwater (mbgs)	Groundwater Surface Elevation (masl)	Measured Depth to Bottom of Well (mbgs)	Hydraulic Conductivity (m/s)	Saturated Sand Pack Lithology	Completion Interval	Comments
												10-Jul-2013	32.49	31.86	593.79	40.51				
												12-Jun-2014	32.49	31.86	593.79	40.37				
												24-Jun-2015	32.45	31.82	593.83	40.60				

NOTES: 1. Data may be entered to the nearest mm, but are reported above to the nearest cm.
Apparent rounding errors may occasionally occur in calculated fields (e.g. Groundwater Surface Elevation).
2. Coordinates are provided in the UTM ZONE 12 NAD83
3. N/M - Denotes not measured.
4. N/A - Denotes not available.
5. masl - Denotes metres above sea level.
6. mbgs - Denotes metres below ground surface.
7. mbtoc - Denotes metres below top of PVC casing.

WorleyParsons
resources & energy

Table 2

Water Quality Results: Field Measurements

PROJECT No.: 307075-01608-100

Monitoring Station	Date (dd-mmm-yyyy)	Electrical Conductivity (uS/cm)	pH (pH Units)	Temperature (ºC)	Sample Comment
Groundwater Monitoring					
MW-01	05-May-2010	749	6.95	5.6	
	25-May-2011	741	7.11	7.7	
	29-May-2012	749	6.88	7.6	
	10-Jul-2013	720	7.21	6.8	Clear
	16-Jun-2014	765	7.38	7.0	Clear
	29-Jun-2015	708	7.37	7.8	Colourless
MW-02	05-May-2010	1306	7.04	4.8	
	25-May-2011	1397	7.02	8.3	
	29-May-2012	1023	7.49	7.3	
	29-Jul-2013	1161	7.10	10.9	Cloudy brown
	16-Jun-2014	1298	7.19	6.7	Clear, orange
	28-Aug-2014	1355	7.12	7.0	Clear
	25-Jun-2015	1238	7.05	7.6	Light brown
MW-03	06-May-2010	974	7.14	6.6	
	25-May-2011	976	7.08	8.9	Clear
	29-May-2012	958	7.72	8.3	
	10-Jul-2013	966	7.14	8.4	Cloudy brown
	16-Jun-2014	1003	7.35	8.2	Clear
	29-Jun-2015	947	7.25	8.5	Colourless (clear)
MW-04	06-May-2010	1213	7.14	8.2	
	07-Jun-2011	1230	7.12	8.1	Clear
	30-May-2012	1420	7.14	7.8	
	09-Jul-2013	1216	7.10	8.3	Clear
	13-Jun-2014	1289	7.27	8.0	Clear, yellow
	29-Jun-2015	1186	7.20	9.3	Clear
MW-05	29-Apr-2010	985	7.08	7.6	
	25-May-2011	1070	7.06	8.3	
	29-May-2012	982	7.28	9.7	
	08-Jul-2013	987	7.34	7.1	Silty
	13-Jun-2014	1004	7.41	7.6	Light grey
	25-Jun-2015	935	7.35	8.0	Light brown
MW-06	06-May-2010	1773	7.21	5.7	
	07-Jun-2011	1762	7.215	11.1	
	29-May-2012	1699	7.29	7.6	
	08-Jul-2013	1683	7.23	8.6	Clear
	12-Jun-2014	1755	7.33	8.6	Clear
	25-Jun-2015	1637	7.36	10.8	Clear
MW-07	05-May-2010	2640	6.91	7.2	
	08-Jun-2011	1750	7.73	6.6	
	28-Jul-2011	2680	7.11	7.2	
	30-May-2012	2540	7.04	8.1	
	11-Jul-2013	2610	6.98	7.5	Clear
	13-Jun-2014	2910	7.12	9.1	Clear. F14-01
	25-Jun-2015	2570	7.06	8.8	Clear

WorleyParsons
resources & energy

Table 2

Water Quality Results: Field Measurements

PROJECT No.: 307075-01608-100

Monitoring Station	Date (dd-mmm-yyyy)	Electrical Conductivity (uS/cm)	pH (pH Units)	Temperature (ºC)	Sample Comment
MW-08	05-May-2010	1359	7.09	5.4	
	07-Jun-2011	1378	7.408	9	Slight silt
	30-May-2012	1363	7.31	7.3	
	09-Jul-2013	1198	7.34	6.9	Clear / Silty
	12-Jun-2014	1387	7.41	7.3	Murky brown
	24-Jun-2015	1327	7.30	7.6	Colourless
MW-09	06-May-2010	1538	7.35	6.8	
	02-Jun-2011	1548	7.49	9.1	Very silty
	29-May-2012	1507	7.43	7.7	
	10-Jul-2013	1463	7.43	8.9	Cloudy brown
	13-Jun-2014	1537	7.67	7.1	Light brown
	25-Jun-2015	1427	7.59	7.7	Light grey
MW-10	05-May-2010	1287	7.11	6.6	
	25-May-2011	1192	7.36	9.1	Clear
	30-May-2012	1267	7.29	7.4	
	09-Jul-2013	1247	7.24	7.0	Clear
	12-Jun-2014	1292	7.42	7.8	Clear. D14-01
	24-Jun-2015	1242	7.36	7.9	Colourless
MW-11	05-May-2010	1303	7.06	7.2	
	03-Jun-2011	1341	7.42	6.9	
	30-May-2012	1282	7.19	9.8	
	10-Jul-2013	1258	7.18	7.4	Silty grey
	12-Jun-2014	1322	7.38	7.3	Cloudy brown
	24-Jun-2015	1241	7.26	7.3	light grey
MW-12	06-May-2010	1032	7.32	5.1	
	02-Jun-2011	983	6.95	8.7	Clear
	29-May-2012	1024	7.37	7.3	
	10-Jul-2013	998	7.34	6.1	Murky brown
	12-Jun-2014	1020	7.42	7.6	Cloudy brown
	24-Jun-2015	992	7.3	6.6	Colourless
MW-13	06-May-2010	776	7.53	7	
	02-Jun-2011	841	7.06	8.5	Clear
	30-May-2012	733	7.69	6.9	
	10-Jul-2013	759	7.60	10.1	Cloudy brown
	12-Jun-2014	775	7.77	7.2	Cloudy brown
	24-Jun-2015	734	7.69	7.0	Colourless

NOTES:

1. --- in guideline row(s) denotes no criteria for that parameter.
2. --- in detail data row(s) denotes parameter not analyzed.

WorleyParsons
resources & energy

Table 3

Groundwater Analytical Results: Indicator Analysis Parameters and Volatile Organic Compounds (VOCs)

PROJECT No.: 307075-01608-100

		Anions						Cations						General						Inorganic Nitrogen Compounds				Ion Balance		Phenols	Miscellaneous
Monitoring Station	Date (dd-mmm-yyyy)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Hydroxide (mg/L)	Sulphate (mg/L)	Calcium (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Alkalinity (Total; as $CaCO_3$) (mg/L)	Electrical Conductivity (uS/cm)	Hardness (Total; as $CaCO_3$) (mg/L)	pH (pH Units)	Total Dissolved Solids (mg/L)	Total Dissolved Solids (Calculated) (mg/L)	Ammonia (Total; as N) (mg/L)	Nitrate (as N) (mg/L)	Nitrite (as N) (mg/L)	Nitrite-plus-Nitrate (as N) (mg/L)	Ion Balance (%)	Ion Balance (Balance)	Phenols (mg/L)	Dissolved Organic Carbon (mg/L)
Canadian Drinking Water AO Guidelines 2014 [#1]		---	---	250	---	---	500	---	0.3	---	0.05	---	200	---	---	---	(6.5 - 8.5)	500	500	---	---	---	---	---	---	---	---
Canadian Drinking Water MAC Guidelines 2014 [#2]		---	---	---	1.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10	1	10	---	---	---	---
Groundwater Monitoring																											
MW-01	07-Mar-2005	444	< 5	4	0.19	< 5	57.4	94.6	**1.02** [#1]	24.8	**0.605** [#1]	3.1	40	364	762	338	7.7	---	442	0.39	< 0.1	< 0.05	< 0.1	100	---	< 0.001	3
	17-Nov-2005	451	< 5	4	0.13	< 5	61.1	94.8	**1.67** [#1]	26.9	**0.662** [#1]	2.3	36	370	760	347	7.9	---	447	0.212	< 0.1	< 0.05	< 0.1	97.6	---	< 0.001	3
	15-Jun-2006	448	< 5	4	0.14	< 5	56.8	99.7	**1.81** [#1]	27.3	**0.7** [#1]	2.9	37	367	748	361	8	---	448	0.274	< 0.1	< 0.05	< 0.1	103	---	< 0.001	3
	12-Jul-2007	445	< 5	3	0.13	< 5	54.6	95.1	**1.84** [#1]	26.1	**0.664** [#1]	2.3	33	365	718	345	7.8	---	433	0.185	< 0.1	< 0.05	< 0.1	98.6	---	< 0.001	3
	19-Dec-2007	470	< 1	2	0.2	< 1	60	87	< 0.06	23	**0.67** [#1]	2.2	34	390	770	310	7.8	---	442	0.26	< 0.2	< 0.06	< 0.2	0.87	---	0.002	2
	21-Apr-2009	450	< 0.5	5	0.14	< 0.5	44	84	< 0.06	24	**0.66** [#1]	2.4	36	370	770	310	7.67	---	410	0.22	0.003	< 0.003	0.003	93	---	0.003	2.3
	05-May-2010	453	< 5.0	3.46	0.150	< 5.0	62.0	98.6	**2.02** [#1]	28.4	**0.730** [#1]	---	38.1	371	762	363	8.06	---	456	0.221	< 0.050	< 0.050	< 0.071	102	---	< 0.0010	3.0
	25-May-2011	446	< 5.0	3.02	0.109	< 5.0	57.1	91.1	**1.53** [#1]	25.4	**0.675** [#1]	2.68	33.3	366	768	332	8.04	---	432	0.271	< 0.050	< 0.050	< 0.071	94.9	---	< 0.0010	3.4
	29-May-2012	450	< 5.0	3.13	0.106	< 5.0	56.2	93.0	**1.57** [#1]	23.7	**0.694** [#1]	2.70	35.0	369	769	330	8.00	---	435	0.228	< 0.050	< 0.050	< 0.071	94.7	---	< 0.0010	3.1
	10-Jul-2013	438	< 5.0	3.49	0.124	< 5.0	52.3	96.5	**1.82** [#1]	26.2	**0.729** [#1]	2.71	36.0	359	727	349	7.94	445	433	0.246	< 0.050	< 0.050	< 0.071	103	---	< 0.0010	3.5
	16-Jun-2014	408	< 5.0	4.58	0.119	< 5.0	59.8	87.2	**1.92** [#1]	26.4	**0.737** [#1]	2.80	32.7	334	677	326	7.94	470	414	0.254	< 0.050	< 0.020	< 0.054	99.4	---	< 0.0010	4.5
	29-Jun-2015	450	< 0.50	4.7	0.15	< 0.50	57	97	**1.9** [#1]	27	**0.71** [#1]	2.6	37	370	760	350	7.46	460	450	0.26	0.016	< 0.010	< 0.020	---	1.0	< 0.0020	2.5
MW-02	07-Mar-2005	514	< 5	13	0.21	< 5	227	113	0.275	34.5	**0.236** [#1]	6.8	111	422	1210	424	7.7	---	**759** [#1]	1.75	0.1	< 0.05	0.1	101	---	< 0.001	8
	17-Nov-2005	575	< 5	38	0.11	< 5	270	125	0.085	51.3	**0.671** [#1]	7.2	120	471	1400	523	7.9	---	**894** [#1]	1.34	< 0.1	< 0.05	< 0.1	98.4	---	< 0.001	6
	15-Jun-2006	629	< 5	23	0.09	< 5	274	162	**3.19** [#1]	55.4	**1.09** [#1]	5.5	95	516	1420	633	7.9	---	**925** [#1]	1.17	< 0.1	< 0.05	< 0.1	102	---	< 0.001	5
	13-Jul-2007	630	< 5	12	0.09	< 5	263	154	**8.72** [#1]	54.4	**0.841** [#1]	4.3	83	516	1360	609	7.9	---	**880** [#1]	0.756	< 0.1	< 0.05	< 0.1	98.7	---	0.002	6
	19-Dec-2007	660	< 1	13	0.1	< 1	290	140	< 0.06	46	**0.7** [#1]	4.5	83	540	1400	530	7.4	---	**895** [#1]	0.1	< 0.2	< 0.06	< 0.2	0.84	---	0.002	5
	21-Apr-2009	610	< 0.5	18	0.08	< 0.5	230	130	**1.5** [#1]	44	**0.53** [#1]	4.4	81	500	1400	500	7.36	---	**810** [#1]	0.56	0.005	< 0.003	0.005	89	---	0.002	4.1
	05-May-2010	597	< 5.0	11.6	0.094	< 5.0	268	147	**9.35** [#1]	54.0	**0.505** [#1]	---	87.2	489	1290	589	7.97	---	**866** [#1]	0.539	< 0.050	< 0.050	< 0.071	100	---	< 0.0010	5.4
	25-May-2011	628	< 5.0	22.3	< 0.050	< 5.0	318	141	**9.25** [#1]	51.3	**0.434** [#1]	4.25	97.9	515	1500	563	7.90	---	**944** [#1]	0.728	< 0.050	< 0.050	< 0.071	89.1	---	< 0.0010	11.3
	30-May-2012	605	< 5.0	29.6	0.061	< 5.0	231	135	**8.07** [#1]	44.8	**0.431** [#1]	5.18	82.9	496	1350	522	7.80	---	**826** [#1]	0.538	< 0.050	< 0.050	< 0.071	91.0	---	< 0.0010	4.9
	10-Jul-2013	588	< 5.0	24.2	0.080	< 5.0	194	172	**12.3** [#1]	56.4	**0.554** [#1]	5.25	161	482	1220	662	7.69	**805** [#1]	**902** [#1]	0.726	< 0.050	< 0.050	< 0.071	142	---	< 0.0010	5.4
	16-Jun-2014	563	< 5.0	211 [(a)]	0.080	< 5.0	282	144	**10.8** [#1]	52.0	**0.446** [#1]	4.75	122	461	1850	574	8.02	**1180** [#1]	**1090** [#1]	0.682	< 0.050	< 0.020	< 0.054	80.2 [(a)]	---	< 0.0010	4.5
	28-Aug-2014	590	< 5.0	41.9	0.067	< 5.0	211	139	**8.49** [#1]	48.5	**0.488** [#1]	4.66	90.8	484	1340	547	7.85	**861** [#1]	**826** [#1]	0.545	< 0.050	< 0.020	< 0.054	98.4	---	< 0.0010	5.3
	25-Jun-2015	610	< 0.50	96	0.078	< 0.50	270 [#3]	150	**11** [#1]	55	**0.41** [#1]	4.7	160	500	1600	610	7.15	**930** [#1]	**1000** [#1]	0.68	< 0.010	< 0.010	< 0.020	---	1.1	< 0.0020	4.7
MW-03	07-Mar-2005	442	< 5	31	0.14	< 5	113	106	**3.19** [#1]	36.1	**0.264** [#1]	3.5	56	362	937	413	7.4	---	**563** [#1]	0.38	< 0.1	< 0.05	< 0.1	103	---	< 0.001	5
	17-Nov-2005	445	< 5	35	0.1	< 5	122	104	**4.47** [#1]	36.4	**0.239** [#1]	3	54	365	949	410	7.8	---	**573** [#1]	0.306	< 0.1	< 0.05	< 0.1	98.1	---	< 0.001	4
	15-Jun-2006	439	< 5	35	0.1	< 5	116	109	**4.85** [#1]	36.6	**0.258** [#1]	3	52	360	943	423	8	---	**568** [#1]	0.359	< 0.1	< 0.05	< 0.1	102	---	< 0.001	3
	12-Jul-2007	440	< 5	36	0.11	< 5	122	108	**4.89** [#1]	37.7	**0.249** [#1]	3	55	361	930	425	8	---	**578** [#1]	0.291	< 0.1	< 0.05	< 0.1	102	---	< 0.001	3
	19-Dec-2007	460	< 1	35	0.1	< 1	130	98	< 0.06	32	**0.25** [#1]	2.7	49	380	960	370	7.7	---	**571** [#1]	0.06	< 0.2	< 0.06	< 0.2	0.87	---	0.002	3
	21-Apr-2009	430	< 0.5	35	0.11	< 0.5	98	92	< 0.06	32	**0.24** [#1]	2.8	51	350	950	360	7.57	---	**520** [#1]	0.33	0.009	< 0.003	0.009	95	---	0.003	2.5
	06-May-2010	435	< 5.0	44.3	0.117	< 5.0	124	104	**5.23** [#1]	36.8	**0.253** [#1]	---	52.3	357	967	411	8.03	---	**579** [#1]	0.339	< 0.050	< 0.050	< 0.071	96.4	---	< 0.0010	5.3
	02-Jun-2011	433	< 5.0	44.2	0.105	< 5.0	120	115	**5.55** [#1]	40.1	**0.277** [#1]	3.20	52.7	355	1000	452	7.98	---	**588** [#1]	0.302	< 0.050	< 0.050	< 0.071	105	---	< 0.0010	3.3
	29-May-2012	434	< 5.0	45.9	0.080	< 5.0	115	102	**4.83** [#1]	31.8	**0.246** [#1]	3.05	48.8	355	988	386	7.83	---	**560** [#1]	0.327	< 0.050	< 0.050	< 0.071	91.7	---	< 0.0010	3.4
	10-Jul-2013	427	< 5.0	48.3	0.105	< 5.0	119	109	**5.36** [#1]	38.3	**0.274** [#1]	3.20	57.9	350	963	430	7.81	**608** [#1]	**586** [#1]	0.369	< 0.050	< 0.050	< 0.071	103	---	< 0.0010	3.0
	16-Jun-2014	395	< 5.0	55.9	0.073	< 5.0	129	100	**5.13** [#1]	36.9	**0.263** [#1]	3.23	48.4	324	933	402	7.96	**612** [#1]	**568** [#1]	0.377	< 0.050	< 0.020	< 0.054	95.1	---	< 0.0010	5.9
	29-Jun-2015	430	< 0.50	56	0.13	< 0.50	130	110	**5.4** [#1]	39	**0.27** [#1]	3.1	51	350	1000	440	7.31	**610** [#1]	**610** [#1]	0.38	< 0.010	< 0.010	< 0.020	---	1.0	< 0.0020	3.5
MW-04	08-Mar-2005	458	< 5	137	0.15	< 5	81.4	142	0.173	37.7	**0.152** [#1]	9.9	57	375	1200	510	7.5	---	**694** [#1]	< 0.05	0.8	< 0.05	0.8	98.5	---	< 0.001	1
	17-Nov-2005	449	< 5	157	0.12	< 5	87	147	0.104	40	**0.053** [#1]	9.5	59	368	1280	532	7.8	---	**726** [#1]	0.013	1.2	< 0.05	1.2	98.2	---	< 0.001	5
(Duplicate)	17-Nov-2005	452	< 5	157	0.12	< 5	89	147	0.105	40.4	**0.053** [#1]	9.7	60	371	1290	533	7.9	---	**731** [#1]	0.01	1.2	< 0.05	1.2	98.1	---	< 0.001	4
	14-Jun-2006	455	< 5	155	0.13	< 5	86.2	147	0.005	42.7	**0.13** [#1]	10.2	57	373	1280	543	7.7	---	**724** [#1]	0.007	0.5	< 0.05	0.5	99.4	---	< 0.001	4

Groundwater Analytical Results: Indicator Analysis Parameters and Volatile Organic Compounds (VOCs)

PROJECT No.: 307075-01608-100

		Anions						Cations						General						Inorganic Nitrogen Compounds				Ion Balance		Phenols	Miscellaneous
Monitoring Station	Date (dd-mmm-yyyy)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Hydroxide (mg/L)	Sulphate (mg/L)	Calcium (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Alkalinity (Total; as $CaCO_3$) (mg/L)	Electrical Conductivity (uS/cm)	Hardness (Total; as $CaCO_3$) (mg/L)	pH (pH Units)	Total Dissolved Solids (mg/L)	Total Dissolved Solids (Calculated) (mg/L)	Ammonia (Total; as N) (mg/L)	Nitrate (as N) (mg/L)	Nitrite (as N) (mg/L)	Nitrite-plus-Nitrate (as N) (mg/L)	Ion Balance (%)	Ion Balance (Balance)	Phenols (mg/L)	Dissolved Organic Carbon (mg/L)
Canadian Drinking Water AO Guidelines 2014 [#1]		---	---	250	---	---	500	---	0.3	---	0.05	---	200	---	---	---	---	500	500	---	---	---	---	---	---	---	---
Canadian Drinking Water MAC Guidelines 2014 [#2]		---	---	---	1.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10	1	10	---	---	---	---
	13-Jul-2007	449	< 5	190	0.14	< 5	84.5	154	< 0.005	43.6	0.009	10.4	68	368	1360	564	7.9	---	774 [#1]	0.008	0.5	< 0.05	0.5	99.9	---	< 0.001	3
	19-Dec-2007	460	< 1	200	0.1	< 1	82	140	< 0.06	35	0.016	10	71	380	1400	500	7.7	---	763 [#1]	0.01	0.6	< 0.06	0.6	0.9	---	0.002	3
	21-Apr-2009	450	< 0.5	150	0.14	< 0.5	74	140	< 0.06	37	0.03	9.4	63	370	1200	500	7.62	---	690 [#1]	< 0.05	0.4	< 0.003	0.4	99	---	< 0.002	2.8
	06-May-10	470	< 5.0	131	0.129	< 5.0	92.1	152	0.078	44.0	0.258 [#1]	---	63.4	385	1220	561	8.01	---	724 [#1]	< 0.050	0.090	< 0.050	0.090	107	---	< 0.0010	3.0
	07-Jun-2011	482	< 5.0	125	0.119	< 5.0	88.9	140	0.028	41.3	0.114 [#1]	8.78	50.7	395	1280	520	7.95	---	693 [#1]	< 0.050	0.264	< 0.050	0.264	96.3	---	< 0.0010	3.0
	30-May-2012	500	< 5.0	126	0.089	< 5.0	88.2	141	1.47 [#1]	38.1	0.722 [#1]	8.93	50.9	409	1280	509	7.88	---	699 [#1]	< 0.050	< 0.050	< 0.050	< 0.071	92.8	---	< 0.0010	3.2
(Duplicate)	30-May-2012	499	< 5.0	126	0.094	< 5.0	88.6	161	1.73 [#1]	44.8	0.861 [#1]	11.4	58.9	409	1280	587	7.94	---	736 [#1]	< 0.050	< 0.050	< 0.050	< 0.071	107	---	< 0.0010	3.3
	09-Jul-2013	493	< 5.0	129	0.082	< 5.0	87.8	154	1.70 [#1]	44.0	0.561 [#1]	10.8	55.8	404	1230	566	7.76	761 [#1]	724 [#1]	< 0.050	< 0.050	< 0.050	< 0.071	103	---	< 0.0010	3.3
	13-Jun-2014	426	< 5.0	146	0.093	< 5.0	92.8	143	1.39 [#1]	40.8	0.494 [#1]	9.68	52.9	350	1190	525	8.10	808 [#1]	695 [#1]	< 0.050	< 0.050	< 0.020	< 0.054	100	---	< 0.0010	3.0
	29-Jun-2015	480	< 0.50	150	0.13	< 0.50	100	150	1.9 [#1]	44	0.54 [#1]	9.5	59	390	1300	550	7.32	780 [#1]	750 [#1]	< 0.050	0.030	< 0.010	0.030	---	0.98	< 0.0020	3.5
MW-05	08-Mar-2005	403	< 5	15	0.18	< 5	105	96.2	1.14 [#1]	27.5	0.402 [#1]	6.1	51	330	831	353	7.6	---	499	0.63	< 0.1	< 0.05	< 0.1	103	---	< 0.001	5
	17-Nov-2005	422	< 5	21	0.11	< 5	115	98.6	3.31 [#1]	30.1	0.531 [#1]	6.9	43	346	881	370	7.9	---	522 [#1]	0.331	< 0.1	< 0.05	< 0.1	95.4	---	< 0.001	4
	14-Jun-2006	421	< 5	22	0.11	< 5	124	107	3.48 [#1]	33.5	0.583 [#1]	7.6	44	345	902	405	7.7	---	545 [#1]	0.338	< 0.1	< 0.05	< 0.1	101	---	< 0.001	4
	13-Jul-2007	426	< 5	25	0.11	< 5	135	110	4 [#1]	34.3	0.682 [#1]	7.3	42	349	931	416	8.1	---	563 [#1]	0.216	< 0.1	< 0.05	< 0.1	98.5	---	0.002	4
	19-Dec-2007	440	< 1	22	0.1	< 1	150	100	< 0.06	30	0.66 [#1]	7.4	41	360	930	380	7.6	---	566 [#1]	0.05	< 0.2	< 0.06	< 0.2	0.88	---	< 0.001	3
	21-Apr-2009	420	< 0.5	30	0.12	< 0.5	130	120	< 0.06	34	0.72 [#1]	7.6	43	350	960	430	7.58	---	570 [#1]	0.22	0.007	< 0.003	0.007	100	---	0.003	2.5
	29-Apr-2010	428	< 5.0	30.6	0.107	< 5.0	144	120	3.39 [#1]	36.7	0.758 [#1]	---	46.1	351	969	451	7.95	---	596 [#1]	0.234	< 0.050	< 0.050	< 0.071	103	---	< 0.0010	3.3
	25-May-2011	433	< 5.0	30.9	0.075	< 5.0	141	105	3.82 [#1]	32.7	0.657 [#1]	7.29	41.7	355	990	397	8.05	---	572 [#1]	0.261	< 0.050	< 0.050	< 0.071	91.1	---	< 0.0010	4.4
	29-May-2012	442	< 5.0	33.7	0.061	< 5.0	138	112	3.83 [#1]	31.3	0.707 [#1]	8.00	42.6	362	1000	409	7.93	---	583 [#1]	0.233	< 0.050	< 0.050	< 0.071	92.3	---	< 0.0010	6.9
	08-Jul-2013	448	< 5.0	36.3	0.092	< 5.0	139	118	3.17 [#1]	33.5	0.754 [#1]	8.61	42.9	367	998	433	7.83	614 [#1]	599 [#1]	0.234	< 0.050	< 0.050	< 0.071	95.3	---	< 0.0010	4.1
	13-Jun-2014	341	< 5.0	37.8	0.073	< 5.0	143	117	4.37 [#1]	34.8	0.758 [#1]	8.31	42.0	279	853	435	8.00	635 [#1]	550 [#1]	0.272	< 0.050	< 0.020	< 0.054	111	---	< 0.0010	6.6
	25-Jun-2015	450	< 0.50	40	0.10	< 0.50	150	120	4.8 [#1]	38	0.71 [#1]	8.4	47	370	980	450	7.41	630 [#1]	620 [#1]	0.25	0.015	< 0.010	< 0.020	---	1.0	< 0.0020	3.2
MW-06	08-Mar-2005	560	< 5	4	0.18	< 5	451	171	2.92 [#1]	58.9	1.32 [#1]	6.1	138	459	1580	670	7.5	---	1100 [#1]	1.46	< 0.1	< 0.05	< 0.1	105	---	< 0.001	5
	17-Nov-2005	641	< 5	13	0.15	< 5	471	148	2.96 [#1]	52	0.943 [#1]	5	211 [#1]	526	1780	584	8	---	1220 [#1]	1.95	< 0.1	< 0.05	< 0.1	101	---	< 0.001	8
	16-Jun-2006	633	< 5	10	0.14	< 5	482	168	3.58 [#1]	57.7	1.01 [#1]	5.5	190	519	1700	657	7.7	---	1220 [#1]	2.38	< 0.1	< 0.05	< 0.1	104	---	< 0.001	7
	12-Jul-2007	637	< 5	10	0.17	< 5	478	157	4.5 [#1]	55.3	1.28 [#1]	4.8	182	522	1760	620	7.9	---	1200 [#1]	1.92	< 0.1	< 0.05	< 0.1	99.4	---	< 0.001	7
	19-Dec-2007	630	< 1	3	0.2	< 1	560 [#1]	160	< 0.06	54	1.5 [#1]	5	140	510	1700	620	7.7	---	1230 [#1]	1.9	< 0.2	< 0.06	< 0.2	0.85	---	0.002	6
	22-Apr-2009	590	< 0.5	6	0.14	< 0.5	420	180	5.7 [#1]	62	1.7 [#1]	5.5	150	490	1700	710	7.47	---	1100 [#1]	1.7	0.004	< 0.003	0.004	110	---	0.003	5.1
	06-May-2010	626	< 5.0	8.45	0.173	< 5.0	520 [#1]	156	5.38 [#1]	57.1	1.39 [#1]	---	194	513	1770	625	8.06	---	1250 [#1]	1.88	< 0.050	< 0.050	< 0.071	98.8	---	< 0.0010	6.7
	07-Jun-2011	603	< 5.0	3.45	0.129	< 5.0	501 [#1]	164	5.55 [#1]	60.4	1.64 [#1]	5.02	123	494	1760	658	7.96	---	1150 [#1]	1.57	< 0.050	< 0.050	< 0.071	91.3	---	< 0.0010	8.0
	29-May-2012	602	< 5.0	2.95	0.128	< 5.0	494	167	6.02 [#1]	56.5	1.70 [#1]	5.80	139	493	1730	650	7.81	---	1160 [#1]	1.55	< 0.050	< 0.050	< 0.071	94.7	---	< 0.0010	6.8
	08-Jul-2013	611	< 5.0	4.57	0.128	< 5.0	499	168	5.84 [#1]	55.2	1.72 [#1]	5.17	135	501	1720	647	7.81	1240 [#1]	1170 [#1]	1.66	< 0.050	< 0.050	< 0.071	92.2	---	< 0.0010	6.4
	12-Jun-2014	528	< 5.0	6.67	0.119	< 5.0	519 [#1]	163	5.93 [#1]	57.6	1.62 [#1]	5.56	152	433	1630	644	8.10	1260 [#1]	1160 [#1]	1.84	< 0.050	< 0.020	< 0.054	99.9	---	< 0.0010	5.8
	25-Jun-2015	620	< 0.50	6.4	0.15	< 0.50	490 [#3]	160	6.1 [#1]	60	1.5 [#1]	5.8	180	510	1700	650	7.37	1200 [#1]	1200 [#1]	1.8	< 0.010	< 0.010	< 0.020	---	1.0	< 0.0020	6.5
MW-07	09-Mar-2005	664	< 5	13	0.11	< 5	1130 [#1]	287	10.4 [#1]	100	1.88 [#1]	6.6	287 [#1]	544	2680	1130	7.5	---	2150 [#1]	2.24	0.1	< 0.05	0.1	102	---	< 0.001	5
	17-Nov-2005	666	< 5	16	0.08	< 5	1010 [#1]	270	10.9 [#1]	94.8	1.83 [#1]	5.5	268 [#1]	546	2670	1060	7.7	---	1990 [#1]	2.03	< 0.1	< 0.05	< 0.1	102	---	< 0.001	6
	16-Jun-2006	661	< 5	15	0.07	< 5	1010 [#1]	284	< 0.005	96.4	1.86 [#1]	6.2	269 [#1]	542	2530	1110	7.5	---	2010 [#1]	2.28	0.1	< 0.05	0.1	105	---	< 0.001	6
	12-Jul-2007	641	< 5	12	0.09	< 5	940 [#1]	257	10.9 [#1]	89.8	1.78 [#1]	4.6	248 [#1]	526	2290	1010	7.6	---	1870 [#1]	2.03	< 0.1	< 0.05	< 0.1	103	---	< 0.001	6
	19-Dec-2007	660	< 1	9	0.1	< 1	1000 [#1]	220	< 0.06	72	1.6 [#1]	5.1	230 [#1]	540	2500	850	7.5	---	1890 [#1]	0.26	< 0.2	< 0.06	< 0.2	0.84	---	0.002	6
	22-Apr-2009	730	< 0.5	18	0.08	< 0.5	1200 [#1]	330	14 [#1]	110	2.3 [#1]	6.6	320 [#1]	600	3000	1300	7.19	---	2400 [#1]	2.5	0.004	< 0.003	0.004	110	---	0.003	6.6

Groundwater Analytical Results: Indicator Analysis Parameters and Volatile Organic Compounds (VOCs)

PROJECT No.: 307075-01608-100

		Anions						Cations						General							Inorganic Nitrogen Compounds				Ion Balance		Phenols	Miscellaneous
Monitoring Station	Date (dd-mmm-yyyy)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Hydroxide (mg/L)	Sulphate (mg/L)	Calcium (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Alkalinity (Total; as $CaCO_3$) (mg/L)	Electrical Conductivity (uS/cm)	Hardness (Total; as $CaCO_3$) (mg/L)	pH (pH Units)	Total Dissolved Solids (mg/L)	Total Dissolved Solids (Calculated) (mg/L)		Ammonia (Total; as N) (mg/L)	Nitrate (as N) (mg/L)	Nitrite (as N) (mg/L)	Nitrite-plus-Nitrate (as N) (mg/L)	Ion Balance (%)	Ion Balance (Balance)	Phenols (mg/L)	Dissolved Organic Carbon (mg/L)
Canadian Drinking Water AO Guidelines 2014 [#1]		---	---	250	---	---	500	---	0.3	---	0.05	---	200	---	---	---	---	500	500		---	---	---	---	---	---	---	---	
Canadian Drinking Water MAC Guidelines 2014 [#2]		---	---	---	1.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---		---	10	1	10	---	---	---	---	
	05-May-2010	657	< 5.0	13.2	0.135	< 5.0	**1040** [#1]	262	**12.5** [#1]	93.5	**1.90** [#1]	---	**274** [#1]	538	2600	1040	7.90	---	**2010** [#1]		2.33	< 0.050	< 0.050	< 0.071	100	---	< 0.0010	5.8
	08-Jun-2011	537	< 5.0	8.07	0.116	< 5.0	**622** [#1]	178	**8.26** [#1]	68.8	**1.21** [#1]	4.38	189	440	1900	728	7.69	---	**1330** [#1]		1.83	< 0.050	< 0.050	< 0.071	104	---	0.0020	11.5
	28-Jul-2011	659	< 5.0	11.8	0.128	< 5.0	**1020** [#1]	256	**11.7** [#1]	87.9	**1.84** [#1]	5.55	**245** [#1]	540	2670	1000	7.98	---	**1950** [#1]		2.39	< 0.050	< 0.050	< 0.071	95.2	---	< 0.0010	6.3
	30-May-2012	648	< 5.0	12.6	0.093	< 5.0	**949** [#1]	247	**11.3** [#1]	80.4	**1.79** [#1]	6.96	**245** [#1]	531	2570	948	7.71	---	**1860** [#1]		2.22	< 0.050	< 0.050	< 0.071	96.9	---	< 0.0010	6.0
	11-Jul-2013	716	< 5.0	11.5	0.110	< 5.0	**1020** [#1]	269	**12.1** [#1]	82.4	**1.87** [#1]	5.37	**241** [#1]	586	2680	1010	7.30	**2180** [#1]	**1980** [#1]		2.39	< 0.050	< 0.050	< 0.071	92.6	---	0.0017	6.2
	13-Jun-2014	636	< 5.0	13.2	0.047	< 5.0	**1270** [#1]	289	**13.8** [#1]	97.9	**2.26** [#1]	6.09	**270** [#1]	521	2800	1120	8.06	**2320** [#1]	**2260** [#1]		2.68	< 0.050	< 0.020	< 0.054	92.3	---	< 0.0010	5.8
	25-Jun-2015	690	< 0.50	13	0.086	< 0.50	**1100** [#1,3]	270	**13** [#1]	97	**1.9** [#1]	6.0	**280** [#1]	570	2700	1100	7.09	**2200** [#1]	**2100** [#1]		2.3 [#3]	< 0.010	< 0.010	< 0.020	---	0.99	< 0.0020	6.0
MW-08	09-Mar-2005	593	< 5	3	0.13	< 5	369	147	**5.66** [#1]	45	**0.474** [#1]	6	137	486	1470	552	7.7	---	**999** [#1]		1.83	0.1	< 0.05	0.1	98.8	---	< 0.001	5
	15-Nov-2005	549	< 5	4	0.11	< 5	300	133	**5.16** [#1]	37.4	**0.384** [#1]	5.2	112	450	1310	486	7.5	---	**862** [#1]		1.5	< 0.1	< 0.05	< 0.1	95.9	---	< 0.001	6
	16-Jun-2006	594	< 5	3	0.09	< 5	341	161	**6.97** [#1]	44.2	**0.481** [#1]	6.1	132	487	1240	584	7.7	---	**980** [#1]		1.89	< 0.1	< 0.05	< 0.1	104	---	< 0.001	6
	11-Jul-2007	583	< 5	2	0.08	< 5	316	150	**7.29** [#1]	42.9	**0.454** [#1]	5	115	478	1390	551	7.9	---	**918** [#1]		1.61	< 0.1	< 0.05	< 0.1	100	---	< 0.001	7
	19-Dec-2007	630	< 1	2	0.1	< 1	370	130	< 0.06	36	**0.44** [#1]	5.4	120	520	1400	480	7.7	---	**977** [#1]		0.25	< 0.2	< 0.06	< 0.2	0.84	---	0.001	5
	21-Apr-2009	560	< 0.5	3	0.11	< 0.5	300	150	< 0.06	40	**0.45** [#1]	5.6	110	450	1400	530	7.62	---	**880** [#1]		1.7	0.007	< 0.003	0.007	100	---	0.002	5.3
	05-May-2010	558	< 5.0	1.43	0.130	< 5.0	333	146	**7.22** [#1]	43.2	**0.470** [#1]	---	122	458	1360	542	8.04	---	**927** [#1]		1.74	< 0.050	< 0.050	< 0.071	101	---	< 0.0010	5.3
	07-Jun-2011	565	< 5.0	0.97	0.082	< 5.0	320	136	**5.41** [#1]	38.3	**0.411** [#1]	5.12	98.0	463	1400	497	7.95	---	**876** [#1]		1.71	< 0.050	< 0.050	< 0.071	89.8	---	0.0016	10.3
	30-May-2012	560	< 5.0	0.86	0.084	< 5.0	308	135	**6.69** [#1]	35.0	**0.409** [#1]	5.69	107	459	1360	481	7.93	---	**867** [#1]		1.76	< 0.050	< 0.050	< 0.071	92.3	---	< 0.0010	5.7
	09-Jul-2013	535	< 5.0	1.37	0.093	< 5.0	304	149	**6.47** [#1]	40.4	**0.415** [#1]	6.47	112	439	1290	538	7.96	**876** [#1]	**877** [#1]		1.76	< 0.050	< 0.050	< 0.071	104	---	< 0.0010	5.5
	12-Jun-2014	474	< 5.0	1.23	0.083	< 5.0	345	144	**7.19** [#1]	38.5	**0.476** [#1]	5.95	110	388	1260	518	7.94	**938** [#1]	**878** [#1]		1.90	< 0.050	< 0.020	< 0.054	102	---	< 0.0010	5.1
	24-Jun-2015	570	< 0.50	1.6	0.10	< 0.50	320 [#3]	150	**7.1** [#1]	42	**0.44** [#1]	5.7	120	470	1400	540	7.43	**950** [#1]	**930** [#1]		1.7	< 0.010	< 0.010	< 0.020	---	1.0	< 0.0020	5.4
MW-09	09-Mar-2005	626	< 5	5	0.29	< 5	313	71.6	**1.11** [#1]	26	**0.714** [#1]	4.2	**226** [#1]	513	1520	286	7.9	---	**954** [#1]		1.81	0.1	< 0.05	0.1	93.2	---	< 0.001	5
(Duplicate)	09-Mar-2005	628	< 5	5	0.29	< 5	340	79.1	**1.07** [#1]	27.9	**0.705** [#1]	4.7	**243** [#1]	515	1520	312	7.9	---	**1010** [#1]		1.79	0.1	< 0.05	0.1	97.4	---	< 0.001	5
	17-Nov-2005	640	< 5	7	0.22	< 5	312	92.6	**1.4** [#1]	27.3	**0.752** [#1]	3.9	**227** [#1]	524	1550	344	8.1	---	**984** [#1]		1.85	< 0.1	< 0.05	< 0.1	98	---	< 0.001	6
	16-Jun-2006	644	< 5	7	0.23	< 5	316	98.1	**1.44** [#1]	27.7	**0.797** [#1]	3.9	**231** [#1]	528	1520	359	7.9	---	**1000** [#1]		2.09	< 0.1	< 0.05	< 0.1	99.9	---	< 0.001	8
	11-Jul-2007	656	< 5	6	0.21	< 5	322	94.9	**1.74** [#1]	27.6	**0.785** [#1]	3.3	**231** [#1]	538	1530	351	8.1	---	**1010** [#1]		1.8	< 0.1	< 0.05	< 0.1	97.9	---	< 0.001	7
	18-Dec-2007	670	< 1	4	0.2	< 1	350	83	< 0.06	22	**0.77** [#1]	3.5	**230** [#1]	550	1500	300	8	---	**1020** [#1]		0.23	< 0.2	< 0.06	< 0.2	0.86	---	0.002	9
	22-Apr-2009	630	< 0.5	6	0.22	< 0.5	330	97	**1.9** [#1]	27	**0.86** [#1]	4.1	**240** [#1]	520	1500	350	7.73	---	**1000** [#1]		1.9	0.005	< 0.003	0.005	100	---	0.003	5.5
	06-May-2010	639	< 5.0	5.57	0.251	< 5.0	342	93.1	**2.04** [#1]	27.8	**0.828** [#1]	---	**240** [#1]	524	1540	347	8.17	---	**1030** [#1]		2.02	< 0.050	< 0.050	< 0.071	98.4	---	< 0.0010	5.6
(Duplicate)	06-May-2010	641	< 5.0	5.63	0.243	< 5.0	345	93.1	**2.03** [#1]	27.6	**0.832** [#1]	---	**246** [#1]	526	1540	346	8.17	---	**1040** [#1]		2.00	< 0.050	< 0.050	< 0.071	99.2	---	< 0.0010	5.5
	02-Jun-2011	646	< 5.0	5.84	< 0.050	< 5.0	325	87.4	**1.46** [#1]	25.2	**0.754** [#1]	4.09	**212** [#1]	530	1580	322	8.17	---	**978** [#1]		2.05	< 0.050	< 0.050	< 0.071	90.0	---	< 0.0010	8.0
(Duplicate)	02-Jun-2011	646	< 5.0	5.64	< 0.050	< 5.0	325	89.5	**1.29** [#1]	26.0	**0.773** [#1]	4.16	**220** [#1]	530	1570	331	8.22	---	**988** [#1]		2.09	< 0.050	< 0.050	< 0.071	93.0	---	< 0.0010	7.1
	29-May-2012	643	< 5.0	4.82	0.184	< 5.0	319	88.3	**1.89** [#1]	23.7	**0.784** [#1]	4.22	**226** [#1]	527	1550	318	8.04	---	**982** [#1]		2.02	< 0.050	< 0.050	< 0.071	94.1	---	< 0.0010	6.0
	10-Jul-2013	644	< 5.0	5.29	0.203	< 5.0	327	96.2	**1.94** [#1]	26.8	**0.842** [#1]	4.06	**251** [#1]	527	1530	351	7.89	**1030** [#1]	**1030** [#1]		2.10	< 0.050	< 0.050	< 0.071	103	---	< 0.0010	5.9
	13-Jun-2014	525	< 5.0	5.39	0.199	< 5.0	341	87.8	**1.85** [#1]	25.6	**0.868** [#1]	4.23	**222** [#1]	430	1390	325	8.12	**1030** [#1]	**944** [#1]		2.17	< 0.050	< 0.020	< 0.054	102	---	< 0.0010	5.8
	25-Jun-2015	620	< 0.50	5.6	0.24	< 0.50	320 [#3]	93	**2.0** [#1]	28	**0.80** [#1]	4.2	**250** [#1]	500	1500	350	7.61	**1000** [#1]	**1000** [#1]		1.9	0.031	< 0.010	0.031	---	1.1	< 0.0020	5.4
MW-10	09-Mar-2005	628	< 5	< 1	0.18	< 5	221	131	**5.29** [#1]	36.1	**0.639** [#1]	5.3	117	514	1270	476	7.7	---	**819** [#1]		1.68	0.1	< 0.05	0.1	99.7	---	< 0.001	5
	16-Nov-2005	634	< 5	3	0.12	< 5	222	129	**5.49** [#1]	35.2	**0.642** [#1]	5	108	520	1260	467	7.5	---	**814** [#1]		1.36	< 0.1	< 0.05	< 0.1	93.8	---	< 0.001	6
	16-Jun-2006	641	< 5	2	0.13	< 5	212	139	**5.89** [#1]	37.8	**0.67** [#1]	5.6	119	525	1120	503	7.7	---	**831** [#1]		1.76	< 0.1	< 0.05	< 0.1	103	---	< 0.001	6
	11-Jul-2007	651	< 5	2	0.12	< 5	208	132	**5.93** [#1]	36.9	**0.656** [#1]	4.7	110	533	1270	482	8	---	**814** [#1]		1.65	< 0.1	< 0.05	< 0.1	97.2	---	< 0.001	5
	18-Dec-2007	660	< 1	< 1	0.2	< 1	230	120	< 0.06	29	**0.64** [#1]	4.8	110	540	1300	410	7.8	---	**822** [#1]		1.8	< 0.2	< 0.06	< 0.2	0.84	---	0.002	5
	22-Apr-2009	620	< 0.5	2	0.14	< 0.5	190	140	**5.9** [#1]	36	**0.71** [#1]	5.6	120	510	1300	490	7.51	---	**800** [#1]		1.8	0.005	< 0.003	0.005	110	---	0.002	4.7

Groundwater Analytical Results: Indicator Analysis Parameters and Volatile Organic Compounds (VOCs)

PROJECT No.: 307075-01608-100

		Anions						Cations						General						Inorganic Nitrogen Compounds				Ion Balance		Phenols	Miscellaneous
Monitoring Station	Date (dd-mmm-yyyy)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Hydroxide (mg/L)	Sulphate (mg/L)	Calcium (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Alkalinity (Total; as $CaCO_3$) (mg/L)	Electrical Conductivity (uS/cm)	Hardness (Total; as $CaCO_3$) (mg/L)	pH (pH Units)	Total Dissolved Solids (mg/L)	Total Dissolved Solids (Calculated) (mg/L)	Ammonia (Total; as N) (mg/L)	Nitrate (as N) (mg/L)	Nitrite (as N) (mg/L)	Nitrite-plus-Nitrate (as N) (mg/L)	Ion Balance (%)	Ion Balance (Balance)	Phenols (mg/L)	Dissolved Organic Carbon (mg/L)
Canadian Drinking Water AO Guidelines 2014 [#1]		---	---	250	---	---	500	---	0.3	---	0.05	---	200	---	---	---	(6.5 - 8.5)	500	500	---	---	---	---	---	---	---	---
Canadian Drinking Water MAC Guidelines 2014 [#2]		---	---	---	1.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10	1	10	---	---	---	---
	05-May-2010	633	< 5.0	0.73	0.169	< 5.0	227	139	**6.80** [#1]	39.1	**0.735** [#1]	---	124	519	1270	508	8.07	---	**847** [#1]	1.71	< 0.050	< 0.050	< 0.071	104	---	< 0.0010	5.1
	02-Jun-2011	607	< 5.0	1.19	< 0.050	< 5.0	206	113	**3.89** [#1]	30.2	**0.566** [#1]	5.58	105	497	1260	407	8.04	---	**759** [#1]	1.60	< 0.050	< 0.050	< 0.071	89.9	---	0.0018	6.7
	30-May-2012	639	< 5.0	0.53	0.113	< 5.0	211	127	**5.98** [#1]	31.6	**0.655** [#1]	5.79	111	524	1290	447	7.89	---	**801** [#1]	1.79	< 0.050	< 0.050	< 0.071	93.5	---	< 0.0010	5.9
	09-Jul-2013	638	< 5.0	0.68	0.107	< 5.0	215	141	**6.11** [#1]	37.3	**0.729** [#1]	6.22	118	523	1250	506	8.09	**833** [#1]	**832** [#1]	1.88	< 0.050	< 0.050	< 0.071	103	---	< 0.0010	5.4
(Duplicate)	09-Jul-2013	643	< 5.0	0.85	0.115	< 5.0	216	142	**6.03** [#1]	36.7	**0.710** [#1]	5.96	115	527	1250	506	8.04	**837** [#1]	**833** [#1]	1.93	< 0.050	< 0.050	< 0.071	101	---	< 0.0010	5.4
	12-Jun-2014	507	< 5.0	0.67	0.110	< 5.0	229	125	**6.10** [#1]	34.2	**0.689** [#1]	5.79	108	416	1110	453	8.05	**845** [#1]	**752** [#1]	1.77	< 0.050	< 0.020	< 0.054	106	---	< 0.0010	6.9
(Duplicate)	12-Jun-2014	543	< 5.0	0.82	0.104	< 5.0	229	124	**6.08** [#1]	34.5	**0.740** [#1]	5.84	110	445	1140	452	8.04	**834** [#1]	**771** [#1]	1.78	< 0.050	< 0.020	< 0.054	102	---	< 0.0010	5.0
	24-Jun-2015	640	< 0.50	1.1	0.16	< 0.50	210 [#3]	130	**6.3** [#1]	36	**0.67** [#1]	5.8	120	520	1300	480	7.44	**850** [#1]	**820** [#1]	1.8	< 0.010	< 0.010	< 0.020	---	1.0	< 0.0020	5.1
(Duplicate)	24-Jun-2015	630	< 0.50	1.2	0.14	< 0.50	200 [#3]	130	**6.4** [#1]	36	**0.67** [#1]	5.6	120	520	1300	480	7.41	**840** [#1]	**820** [#1]	1.8	< 0.010	< 0.010	< 0.020	---	1.0	< 0.0020	5.2
MW-11	10-Mar-2005	642	< 5	8	0.14	< 5	196	150	**6.89** [#1]	45.8	**0.668** [#1]	4.9	92	526	1270	563	7.7	---	**813** [#1]	1.5	0.1	< 0.05	0.1	104	---	< 0.001	15
	16-Nov-2005	654	< 5	16	0.09	< 5	199	140	**6.95** [#1]	42.5	**0.628** [#1]	4.5	85	536	1270	525	7.4	---	**809** [#1]	1.41	< 0.1	< 0.05	< 0.1	93.4	---	< 0.001	7
	16-Jun-2006	672	< 5	11	0.09	< 5	194	153	**7.23** [#1]	45.7	**0.659** [#1]	4.8	92	551	1100	570	7.7	---	**831** [#1]	1.56	< 0.1	< 0.05	< 0.1	101	---	< 0.001	7
	11-Jul-2007	662	< 5	8	0.09	< 5	193	143	**7.15** [#1]	45.3	**0.632** [#1]	3.9	88	542	1280	544	8	---	**806** [#1]	1.43	< 0.1	< 0.05	< 0.1	98.6	---	< 0.001	8
	18-Dec-2007	680	< 1	10	0.1	< 1	210	130	< 0.06	38	**0.61** [#1]	4.3	87	560	1300	480	7.7	---	**810** [#1]	0.2	< 0.2	< 0.06	< 0.2	0.87	---	0.002	6
	22-Apr-2009	640	< 0.5	10	0.11	< 0.5	170	150	**7** [#1]	45	**0.67** [#1]	4.9	91	530	1300	560	7.51	---	**800** [#1]	1.5	0.003	< 0.003	0.003	110	---	0.004	5.5
	05-May-2010	650	< 5.0	15.2	0.132	< 5.0	212	144	**7.61** [#1]	45.9	**0.663** [#1]	---	98.1	533	1290	549	8.04	---	**840** [#1]	1.48	< 0.050	< 0.050	< 0.071	99.1	---	< 0.0010	6.0
	02-Jun-2011	653	< 5.0	9.69	< 0.050	< 5.0	203	148	**6.99** [#1]	46.4	**0.687** [#1]	5.36	96.0	536	1320	561	8.00	---	**830** [#1]	1.55	< 0.050	< 0.050	< 0.071	102	---	< 0.0010	6.8
	30-May-2012	648	< 5.0	8.71	0.067	< 5.0	202	134	**6.82** [#1]	38.7	**0.605** [#1]	5.34	87.9	531	1300	494	7.90	---	**795** [#1]	1.51	< 0.050	< 0.050	< 0.071	91.8	---	< 0.0010	6.6
	10-Jul-2013	640	< 5.0	8.92	0.105	< 5.0	213	147	**7.52** [#1]	44.7	**0.697** [#1]	5.09	102	525	1270	551	7.93	**828** [#1]	**836** [#1]	1.57	< 0.050	< 0.050	< 0.071	103	---	< 0.0010	6.2
	12-Jun-2014	473	< 5.0	14.1	0.074	< 5.0	227	136	**7.07** [#1]	41.5	**0.672** [#1]	5.32	89.0	388	1090	510	7.99	**856** [#1]	**746** [#1]	1.58	< 0.050	< 0.020	< 0.054	110	---	< 0.0010	5.6
	24-Jun-2015	640	< 0.50	11	0.11	< 0.50	210 [#3]	140	**7.4** [#1]	45	**0.62** [#1]	5.0	97	520	1300	540	7.42	**850** [#1]	**830** [#1]	1.5	< 0.010	< 0.010	< 0.020	---	1.0	< 0.0020	6.3
MW-12	10-Mar-2005	636	< 5	6	0.13	< 5	45.9	95.7	**2.78** [#1]	27.9	**0.365** [#1]	5	106	521	1000	354	7.9	---	**600** [#1]	1.39	0.1	< 0.05	0.1	102	---	< 0.001	6
	16-Nov-2005	712	< 5	8	0.07	< 5	52.5	94.9	**3.37** [#1]	28.5	**0.402** [#1]	5.2	111	584	1020	354	7.4	---	**651** [#1]	1.2	< 0.1	< 0.05	< 0.1	92.7	---	< 0.001	7
	16-Jun-2006	669	< 5	7	0.07	< 5	44.2	100	**3.76** [#1]	29.1	**0.436** [#1]	5.1	106	549	904	370	7.8	---	**621** [#1]	1.34	< 0.1	< 0.05	< 0.1	100	---	< 0.001	7
	11-Jul-2007	670	< 5	7	0.08	< 5	42.4	95.4	**3.77** [#1]	29.2	**0.422** [#1]	4.2	101	550	1020	358	8	---	**609** [#1]	1.16	< 0.1	< 0.05	< 0.1	97.4	---	< 0.001	7
	18-Dec-2007	700	< 1	5	< 0.1	< 1	43	82	< 0.06	23	**0.4** [#1]	4.3	99	570	1000	300	7.8	---	**601** [#1]	0.29	< 0.2	< 0.06	< 0.2	0.84	---	0.002	7
	22-Apr-2009	650	< 0.5	8	0.09	< 0.5	32	98	**4.1** [#1]	29	**0.45** [#1]	4.9	110	540	1000	360	7.66	---	**610** [#1]	1.3	0.005	< 0.003	0.005	110	---	0.003	6.4
	06-May-2010	667	< 5.0	7.05	0.114	< 5.0	46.8	96.4	**4.24** [#1]	30.2	**0.456** [#1]	---	109	547	1030	365	8.13	---	**623** [#1]	1.32	< 0.050	< 0.050	< 0.071	100	---	< 0.0010	10.5
	02-Jun-2011	662	< 5.0	6.40	0.071	< 5.0	44.6	98.1	**3.34** [#1]	30.9	**0.450** [#1]	4.86	95.4	543	1050	372	8.14	---	**606** [#1]	1.31	0.054	< 0.050	< 0.071	97.9	---	< 0.0010	13.5
	30-May-2012	660	< 5.0	6.25	0.076	< 5.0	43.3	89.8	**4.14** [#1]	25.6	**0.435** [#1]	5.23	95.7	541	1030	330	8.03	---	**591** [#1]	1.32	< 0.050	< 0.050	< 0.071	91.5	---	< 0.0010	6.6
	10-Jul-2013	649	< 5.0	6.89	0.083	< 5.0	44.4	101	**3.99** [#1]	28.9	**0.457** [#1]	5.00	113	532	1000	371	7.89	**628** [#1]	**618** [#1]	1.36	< 0.050	< 0.050	< 0.071	106	---	< 0.0010	6.9
	12-Jun-2014	598	< 5.0	7.20	0.064	< 5.0	47.4	93.8	**3.88** [#1]	27.7	**0.462** [#1]	5.14	97.6	490	915	348	8.02	**619** [#1]	**573** [#1]	1.36	< 0.050	< 0.020	< 0.054	103	---	< 0.0010	8.3
	24-Jun-2015	660	< 0.50	7.7	0.084	< 0.50	45	93	**4.0** [#1]	29	**0.42** [#1]	5.0	110	540	1000	350	7.63	**620** [#1]	**620** [#1]	1.3	0.011	< 0.010	< 0.020	---	1.0	< 0.0020	6.8
MW-13	10-Mar-2005	531	< 5	2	0.2	< 5	10.6	53.7	**0.818** [#1]	16.5	**0.263** [#1]	4.2	112	435	784	202	8.1	---	460	1.4	0.1	< 0.05	0.1	100	---	< 0.001	4
	16-Nov-2005	537	< 5	4	0.14	< 5	12.5	51.2	**1.08** [#1]	16.2	**0.243** [#1]	3.4	103	440	782	195	7.8	---	454	1.29	< 0.1	< 0.05	< 0.1	92.2	---	< 0.001	5
	16-Jun-2006	715	541	4	0.14	< 5	10.1	55.6	**1.19** [#1]	17.1	**0.256** [#1]	3.9	112	443	715	209	8	---	470	1.31	0.2	< 0.05	0.2	99.4	---	< 0.001	5
	11-Jul-2007	541	< 5	2	0.13	< 5	9.1	53	**1.26** [#1]	16.9	**0.252** [#1]	3.5	105	444	782	202	8.2	---	456	1.22	< 0.1	< 0.05	< 0.1	96.3	---	0.001	5
	18-Dec-2007	560	< 1	2	0.2	< 1	9	45	< 0.06	14	**0.25** [#1]	3.5	110	460	790	170	8	---	457	0.23	< 0.2	< 0.06	< 0.2	0.87	---	< 0.001	5
	22-Apr-2009	520	< 0.5	3	0.15	< 0.5	9	54	**1.3** [#1]	17	**0.26** [#1]	3.9	110	430	770	200	7.81	---	460	1.3	0.005	< 0.003	0.005	100	---	0.003	4.5
	06-May-2010	530	< 5.0	2.15	0.160	< 5.0	9.54	50.0	**1.45** [#1]	16.4	**0.249** [#1]	---	110	435	776	192	8.22	---	453	1.30	< 0.050	< 0.050	< 0.071	97.5	---	< 0.0010	4.1

Groundwater Analytical Results: Indicator Analysis Parameters and Volatile Organic Compounds (VOCs)

PROJECT No.: 307075-01608-100

		Anions						Cations						General						Inorganic Nitrogen Compounds				Ion Balance		Phenols	Miscellaneous
Monitoring Station	Date (dd-mmm-yyyy)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Hydroxide (mg/L)	Sulphate (mg/L)	Calcium (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Alkalinity (Total; as $CaCO_3$) (mg/L)	Electrical Conductivity (uS/cm)	Hardness (Total; as $CaCO_3$) (mg/L)	pH (pH Units)	Total Dissolved Solids (mg/L)	Total Dissolved Solids (Calculated) (mg/L)	Ammonia (Total; as N) (mg/L)	Nitrate (as N) (mg/L)	Nitrite (as N) (mg/L)	Nitrite-plus-Nitrate (as N) (mg/L)	Ion Balance (%)	Ion Balance (Balance)	Phenols (mg/L)	Dissolved Organic Carbon (mg/L)
Canadian Drinking Water AO Guidelines 2014 #1		---	---	250	---	---	500	---	0.3	---	0.05	---	200	---	---	---	(6.5 - 8.5)	500	500	---	---	---	---	---	---	---	---	
Canadian Drinking Water MAC Guidelines 2014 #2		---	---	---	1.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10	1	10	---	---	---	---	
	02-Jun-2011	530	< 5.0	1.92	0.162	< 5.0	9.12	48.1	1.25 #1	15.3	0.231 #1	3.74	103	434	796	183	8.24	---	442	1.36	< 0.050	< 0.050	< 0.071	92.1	---	< 0.0010	5.2
	30-May-2012	529	< 5.0	1.81	0.119	< 5.0	9.24	48.0	1.33 #1	14.4	0.238 #1	4.00	101	433	786	179	8.18	---	438	1.31	< 0.050	< 0.050	< 0.071	90.5	---	< 0.0010	4.6
	10-Jul-2013	525	< 5.0	2.28	0.147	< 5.0	10.0	49.7	1.17 #1	16.2	0.252 #1	3.98	118	430	769	191	7.92	464	458	1.38	< 0.050	< 0.050	< 0.071	102	---	< 0.0010	4.4
	12-Jun-2014	485	< 5.0	2.63	0.129	< 5.0	11.0	48.8	1.30 #1	15.4	0.245 #1	4.07	104	398	698	185	8.16	457	425	1.33	< 0.050	< 0.020	< 0.054	101	---	< 0.0010	6.3
	24-Jun-2015	530	< 0.50	2.9	0.16	< 0.50	13	49	1.3 #1	16	0.24 #1	3.9	110	430	780	190	7.70	460	460	1.3	< 0.010	< 0.010	< 0.020	---	1.0	< 0.0020	4.9
QA/QC																											
FIELD BLANK	05-May-2010	< 5.0	< 5.0	< 0.50	< 0.050	< 5.0	< 0.50	< 0.50	< 0.020	< 0.10	< 0.0050	---	< 0.50	< 5.0	1.07	< 1.0	6.06 #1	---	< 1.0	< 0.050	< 0.050	< 0.050	< 0.071	Low TDS	---	< 0.0010	< 1.0
	25-May-2011	< 5.0	< 5.0	< 0.50	< 0.050	< 5.0	< 0.50	< 0.50	< 0.020	< 0.10	< 0.0050	< 0.10	< 0.50	< 5.0	1.06	< 1.0	6.02 #1	---	< 1.0	< 0.050	< 0.050	< 0.050	< 0.071	Low TDS	---	< 0.0010	< 1.0
	09-Jul-2013	< 5.0	< 5.0	< 0.50	< 0.020	< 5.0	< 0.50	< 0.50	< 0.010	< 0.10	< 0.0020	< 0.10	< 1.0	< 2.0	1.90	< 1	6.19 #1	< 10	< 1	< 0.050	< 0.050	< 0.050	< 0.071	Low TDS	---	< 0.0010	3.5
	13-Jun-2014	< 5.0	< 5.0	< 0.50	< 0.020	< 5.0	< 0.50	< 0.50	< 0.010	< 0.10	< 0.0020	< 0.10	< 1.0	< 2.0	1.80	< 1	5.52 #1	< 10	< 1	< 0.050	< 0.050	< 0.020	< 0.054	Low TDS	---	< 0.0010	< 1.0
	25-Jun-2015	< 0.50	< 0.50	< 1.0	< 0.050	< 0.50	< 1.0	< 0.30	< 0.060	< 0.20	< 0.0040	< 0.30	< 0.50	< 0.50	< 1.0	< 0.50	4.73 #1	< 10	< 10	< 0.050	< 0.010	< 0.010	< 0.020	---	< 0.010	< 0.0020	0.56

NOTES:

1. --- in guideline row(s) denotes no criteria for that parameter.
2. --- in detail data row(s) denotes parameter not analyzed.
3. Highlighting indicates parameters above applied guideline/criteria.
4. Highlighting indicates non-detect parameters above applied guideline/criteria.
5. Highlighting indicates parameters at applied guideline/criteria.
6. Superscript #1 denotes values exceeding
   (Health Canada, October 2014. Guidelines for Canadian Drinking Water Quality. Aesthetic Objective. Summary Table. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment)
7. Superscript #2 denotes values exceeding
   (Health Canada, October 2014. Guidelines for Canadian Drinking Water Quality. Maximum Acceptable Concentration. Summary Table. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment)
8. Superscript #3 - Detection limits raised due to dilution to bring analyte within the calibrated range.
9. Superscript (a) denotes that the 16-Jun-2014 chloride and ion balance results for MW-02 are considered anomalous. This was confirmed by re-sampling on 28-Aug-2014.

WorleyParsons
resources & energy

Table 3

Groundwater Analytical Results: Indicator Analysis Parameters and Volatile Organic Compounds (VOCs)

PROJECT No.: 307075-01608-100

		Anions						Cations						General						Inorganic Nitrogen Compounds				Ion Balance		Phenols	Miscellaneous
Monitoring Station	Date (dd-mmm-yyyy)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Hydroxide (mg/L)	Sulphate (mg/L)	Calcium (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Alkalinity (Total; as $CaCO_3$) (mg/L)	Electrical Conductivity (uS/cm)	Hardness (Total; as $CaCO_3$) (mg/L)	pH (pH Units)	Total Dissolved Solids (mg/L)	Total Dissolved Solids (Calculated) (mg/L)	Ammonia (Total; as N) (mg/L)	Nitrate (as N) (mg/L)	Nitrite (as N) (mg/L)	Nitrite-plus-Nitrate (as N) (mg/L)	Ion Balance (%)	Ion Balance (Balance)	Phenols (mg/L)	Dissolved Organic Carbon (mg/L)
Canadian Drinking Water AO Guidelines 2014 [#1]		---	---	250	---	---	500	---	0.3	---	0.05	---	200	---	---	---	(6.5 - 8.5)	500	500	---	---	---	---	---	---	---	---
Canadian Drinking Water MAC Guidelines 2014 [#2]		---	---	---	1.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10	1	10	---	---	---	---
Groundwater Monitoring																											
MW-01	07-Mar-2005	444	< 5	4	0.19	< 5	57.4	94.6	**1.02** [#1]	24.8	**0.605** [#1]	3.1	40	364	762	338	7.7	---	442	0.39	< 0.1	< 0.05	< 0.1	100	---	< 0.001	3
	17-Nov-2005	451	< 5	4	0.13	< 5	61.1	94.8	**1.67** [#1]	26.9	**0.662** [#1]	2.3	36	370	760	347	7.9	---	447	0.212	< 0.1	< 0.05	< 0.1	97.6	---	< 0.001	3
	15-Jun-2006	448	< 5	4	0.14	< 5	56.8	99.7	**1.81** [#1]	27.3	**0.7** [#1]	2.9	37	367	748	361	8	---	448	0.274	< 0.1	< 0.05	< 0.1	103	---	< 0.001	3
	12-Jul-2007	445	< 5	3	0.13	< 5	54.6	95.1	**1.84** [#1]	26.1	**0.664** [#1]	2.3	33	365	718	345	7.8	---	433	0.185	< 0.1	< 0.05	< 0.1	98.6	---	< 0.001	3
	19-Dec-2007	470	< 1	2	0.2	< 1	60	87	< 0.06	23	**0.67** [#1]	2.2	34	390	770	310	7.8	---	442	0.26	< 0.2	< 0.06	< 0.2	0.87	---	0.002	2
	21-Apr-2009	450	< 0.5	5	0.14	< 0.5	44	84	< 0.06	24	**0.66** [#1]	2.4	36	370	770	310	7.67	---	410	0.22	0.003	< 0.003	0.003	93	---	0.003	2.3
	05-May-2010	453	< 5.0	3.46	0.150	< 5.0	62.0	98.6	**2.02** [#1]	28.4	**0.730** [#1]	---	38.1	371	762	363	8.06	---	456	0.221	< 0.050	< 0.050	< 0.071	102	---	< 0.0010	3.0
	25-May-2011	446	< 5.0	3.02	0.109	< 5.0	57.1	91.1	**1.53** [#1]	25.4	**0.675** [#1]	2.68	33.3	366	768	332	8.04	---	432	0.271	< 0.050	< 0.050	< 0.071	94.9	---	< 0.0010	3.4
	29-May-2012	450	< 5.0	3.13	0.106	< 5.0	56.2	93.0	**1.57** [#1]	23.7	**0.694** [#1]	2.70	35.0	369	769	330	8.00	---	435	0.228	< 0.050	< 0.050	< 0.071	94.7	---	< 0.0010	3.1
	10-Jul-2013	438	< 5.0	3.49	0.124	< 5.0	52.3	96.5	**1.82** [#1]	26.2	**0.729** [#1]	2.71	36.0	359	727	349	7.94	445	433	0.246	< 0.050	< 0.050	< 0.071	103	---	< 0.0010	3.5
	16-Jun-2014	408	< 5.0	4.58	0.119	< 5.0	59.8	87.2	**1.92** [#1]	26.4	**0.737** [#1]	2.80	32.7	334	677	326	7.94	470	414	0.254	< 0.050	< 0.020	< 0.054	99.4	---	< 0.0010	4.5
	29-Jun-2015	450	< 0.50	4.7	0.15	< 0.50	57	97	**1.9** [#1]	27	**0.71** [#1]	2.6	37	370	760	350	7.46	460	450	0.26	0.016	< 0.010	< 0.020	---	1.0	< 0.0020	2.5
MW-02	07-Mar-2005	514	< 5	13	0.21	< 5	227	113	0.275	34.5	**0.236** [#1]	6.8	111	422	1210	424	7.7	---	**759** [#1]	1.75	0.1	< 0.05	0.1	101	---	< 0.001	8
	17-Nov-2005	575	< 5	38	0.11	< 5	270	125	0.085	51.3	**0.671** [#1]	7.2	120	471	1400	523	7.9	---	**894** [#1]	1.34	< 0.1	< 0.05	< 0.1	98.4	---	< 0.001	6
	15-Jun-2006	629	< 5	23	0.09	< 5	274	162	**3.19** [#1]	55.4	**1.09** [#1]	5.5	95	516	1420	633	7.9	---	**925** [#1]	1.17	< 0.1	< 0.05	< 0.1	102	---	< 0.001	5
	13-Jul-2007	630	< 5	12	0.09	< 5	263	154	**8.72** [#1]	54.4	**0.841** [#1]	4.3	83	516	1360	609	7.9	---	**880** [#1]	0.756	< 0.1	< 0.05	< 0.1	98.7	---	0.002	6
	19-Dec-2007	660	< 1	13	0.1	< 1	290	140	< 0.06	46	**0.7** [#1]	4.5	83	540	1400	530	7.4	---	**895** [#1]	0.1	< 0.2	< 0.06	< 0.2	0.84	---	0.002	5
	21-Apr-2009	610	< 0.5	18	0.08	< 0.5	230	130	**1.5** [#1]	44	**0.53** [#1]	4.4	81	500	1400	500	7.36	---	**810** [#1]	0.56	0.005	< 0.003	0.005	89	---	0.002	4.1
	05-May-2010	597	< 5.0	11.6	0.094	< 5.0	268	147	**9.35** [#1]	54.0	**0.505** [#1]	---	87.2	489	1290	589	7.97	---	**866** [#1]	0.539	< 0.050	< 0.050	< 0.071	100	---	< 0.0010	5.4
	25-May-2011	628	< 5.0	22.3	< 0.050	< 5.0	318	141	**9.25** [#1]	51.3	**0.434** [#1]	4.25	97.9	515	1500	563	7.90	---	**944** [#1]	0.728	< 0.050	< 0.050	< 0.071	89.1	---	< 0.0010	11.3
	30-May-2012	605	< 5.0	29.6	0.061	< 5.0	231	135	**8.07** [#1]	44.8	**0.431** [#1]	5.18	82.9	496	1350	522	7.80	---	**826** [#1]	0.538	< 0.050	< 0.050	< 0.071	91.0	---	< 0.0010	4.9
	10-Jul-2013	588	< 5.0	24.2	0.080	< 5.0	194	172	**12.3** [#1]	56.4	**0.554** [#1]	5.25	161	482	1220	662	7.69	**805** [#1]	**902** [#1]	0.726	< 0.050	< 0.050	< 0.071	142	---	< 0.0010	5.4
	16-Jun-2014	563	< 5.0	211 [(a)]	0.080	< 5.0	282	144	**10.8** [#1]	52.0	**0.446** [#1]	4.75	122	461	1850	574	8.02	**1180** [#1]	**1090** [#1]	0.682	< 0.050	< 0.020	< 0.054	80.2 [(a)]	---	< 0.0010	4.5
	28-Aug-2014	590	< 5.0	41.9	0.067	< 5.0	211	139	**8.49** [#1]	48.5	**0.488** [#1]	4.66	90.8	484	1340	547	7.85	**861** [#1]	**826** [#1]	0.545	< 0.050	< 0.020	< 0.054	98.4	---	< 0.0010	5.3
	25-Jun-2015	610	< 0.50	96	0.078	< 0.50	270 [#3]	150	**11** [#1]	55	**0.41** [#1]	4.7	160	500	1600	610	7.15	**930** [#1]	**1000** [#1]	0.68	< 0.010	< 0.010	< 0.020	---	1.1	< 0.0020	4.7
MW-03	07-Mar-2005	442	< 5	31	0.14	< 5	113	106	**3.19** [#1]	36.1	**0.264** [#1]	3.5	56	362	937	413	7.4	---	**563** [#1]	0.38	< 0.1	< 0.05	< 0.1	103	---	< 0.001	5
	17-Nov-2005	445	< 5	35	0.1	< 5	122	104	**4.47** [#1]	36.4	**0.239** [#1]	3	54	365	949	410	7.8	---	**573** [#1]	0.306	< 0.1	< 0.05	< 0.1	98.1	---	< 0.001	4
	15-Jun-2006	439	< 5	35	0.1	< 5	116	109	**4.85** [#1]	36.6	**0.258** [#1]	3	52	360	943	423	8	---	**568** [#1]	0.359	< 0.1	< 0.05	< 0.1	102	---	< 0.001	3
	12-Jul-2007	440	< 5	36	0.11	< 5	122	108	**4.89** [#1]	37.7	**0.249** [#1]	3	55	361	930	425	8	---	**578** [#1]	0.291	< 0.1	< 0.05	< 0.1	102	---	< 0.001	3
	19-Dec-2007	460	< 1	35	0.1	< 1	130	98	< 0.06	32	**0.25** [#1]	2.7	49	380	960	370	7.7	---	**571** [#1]	0.06	< 0.2	< 0.06	< 0.2	0.87	---	0.002	3
	21-Apr-2009	430	< 0.5	35	0.11	< 0.5	98	92	< 0.06	32	**0.24** [#1]	2.8	51	350	950	360	7.57	---	**520** [#1]	0.33	0.009	< 0.003	0.009	95	---	0.003	2.5
	06-May-2010	435	< 5.0	44.3	0.117	< 5.0	124	104	**5.23** [#1]	36.8	**0.253** [#1]	---	52.3	357	967	411	8.03	---	**579** [#1]	0.339	< 0.050	< 0.050	< 0.071	96.4	---	< 0.0010	5.3
	02-Jun-2011	433	< 5.0	44.2	0.105	< 5.0	120	115	**5.55** [#1]	40.1	**0.277** [#1]	3.20	52.7	355	1000	452	7.98	---	**588** [#1]	0.302	< 0.050	< 0.050	< 0.071	105	---	< 0.0010	3.3
	29-May-2012	434	< 5.0	45.9	0.080	< 5.0	115	102	**4.83** [#1]	31.8	**0.246** [#1]	3.05	48.8	355	988	386	7.83	---	**560** [#1]	0.327	< 0.050	< 0.050	< 0.071	91.7	---	< 0.0010	3.4
	10-Jul-2013	427	< 5.0	48.3	0.105	< 5.0	119	109	**5.36** [#1]	38.3	**0.274** [#1]	3.20	57.9	350	963	430	7.81	**608** [#1]	**586** [#1]	0.369	< 0.050	< 0.050	< 0.071	103	---	< 0.0010	3.0
	16-Jun-2014	395	< 5.0	55.9	0.073	< 5.0	129	100	**5.13** [#1]	36.9	**0.263** [#1]	3.23	48.4	324	933	402	7.96	**612** [#1]	**568** [#1]	0.377	< 0.050	< 0.020	< 0.054	95.1	---	< 0.0010	5.9
	29-Jun-2015	430	< 0.50	56	0.13	< 0.50	130	110	**5.4** [#1]	39	**0.27** [#1]	3.1	51	350	1000	440	7.31	**610** [#1]	**610** [#1]	0.38	< 0.010	< 0.010	< 0.020	---	1.0	< 0.0020	3.5
MW-04	08-Mar-2005	458	< 5	137	0.15	< 5	81.4	142	0.173	37.7	**0.152** [#1]	9.9	57	375	1200	510	7.5	---	**694** [#1]	< 0.05	0.8	< 0.05	0.8	98.5	---	< 0.001	1
	17-Nov-2005	449	< 5	157	0.12	< 5	87	147	0.104	40	**0.053** [#1]	9.5	59	368	1280	532	7.8	---	**726** [#1]	0.013	1.2	< 0.05	1.2	98.2	---	< 0.001	5
(Duplicate)	17-Nov-2005	452	< 5	157	0.12	< 5	89	147	0.105	40.4	**0.053** [#1]	9.7	60	371	1290	533	7.9	---	**731** [#1]	0.01	1.2	< 0.05	1.2	98.1	---	< 0.001	4
	14-Jun-2006	455	< 5	155	0.13	< 5	86.2	147	0.005	42.7	**0.13** [#1]	10.2	57	373	1280	543	7.7	---	**724** [#1]	0.007	0.5	< 0.05	0.5	99.4	---	< 0.001	4

Groundwater Analytical Results: Indicator Analysis Parameters and Volatile Organic Compounds (VOCs)

PROJECT No.: 307075-01608-100

		Anions						Cations						General						Inorganic Nitrogen Compounds				Ion Balance		Phenols	Miscellaneous
Monitoring Station	Date (dd-mmm-yyyy)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Hydroxide (mg/L)	Sulphate (mg/L)	Calcium (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Alkalinity (Total; as $CaCO_3$) (mg/L)	Electrical Conductivity (uS/cm)	Hardness (Total; as $CaCO_3$) (mg/L)	pH (pH Units)	Total Dissolved Solids (mg/L)	Total Dissolved Solids (Calculated) (mg/L)	Ammonia (Total; as N) (mg/L)	Nitrate (as N) (mg/L)	Nitrite (as N) (mg/L)	Nitrite-plus-Nitrate (as N) (mg/L)	Ion Balance (%)	Ion Balance (Balance)	Phenols (mg/L)	Dissolved Organic Carbon (mg/L)
Canadian Drinking Water AO Guidelines 2014 [#1]		---	---	250	---	---	500	---	0.3	---	0.05	---	200	---	---	---	---	500	500	---	---	---	---	---	---	---	---
Canadian Drinking Water MAC Guidelines 2014 [#2]		---	---	---	1.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10	1	10	---	---	---	---
	13-Jul-2007	449	< 5	190	0.14	< 5	84.5	154	< 0.005	43.6	0.009	10.4	68	368	1360	564	7.9	---	774 [#1]	0.008	0.5	< 0.05	0.5	99.9	---	< 0.001	3
	19-Dec-2007	460	< 1	200	0.1	< 1	82	140	< 0.06	35	0.016	10	71	380	1400	500	7.7	---	763 [#1]	0.01	0.6	< 0.06	0.6	0.9	---	0.002	3
	21-Apr-2009	450	< 0.5	150	0.14	< 0.5	74	140	< 0.06	37	0.03	9.4	63	370	1200	500	7.62	---	690 [#1]	< 0.05	0.4	< 0.003	0.4	99	---	< 0.002	2.8
	06-May-10	470	< 5.0	131	0.129	< 5.0	92.1	152	0.078	44.0	0.258 [#1]	---	63.4	385	1220	561	8.01	---	724 [#1]	< 0.050	0.090	< 0.050	0.090	107	---	< 0.0010	3.0
	07-Jun-2011	482	< 5.0	125	0.119	< 5.0	88.9	140	0.028	41.3	0.114 [#1]	8.78	50.7	395	1280	520	7.95	---	693 [#1]	< 0.050	0.264	< 0.050	0.264	96.3	---	< 0.0010	3.0
	30-May-2012	500	< 5.0	126	0.089	< 5.0	88.2	141	1.47 [#1]	38.1	0.722 [#1]	8.93	50.9	409	1280	509	7.88	---	699 [#1]	< 0.050	< 0.050	< 0.050	< 0.071	92.8	---	< 0.0010	3.2
(Duplicate)	30-May-2012	499	< 5.0	126	0.094	< 5.0	88.6	161	1.73 [#1]	44.8	0.861 [#1]	11.4	58.9	409	1280	587	7.94	---	736 [#1]	< 0.050	< 0.050	< 0.050	< 0.071	107	---	< 0.0010	3.3
	09-Jul-2013	493	< 5.0	129	0.082	< 5.0	87.8	154	1.70 [#1]	44.0	0.561 [#1]	10.8	55.8	404	1230	566	7.76	761 [#1]	724 [#1]	< 0.050	< 0.050	< 0.050	< 0.071	103	---	< 0.0010	3.3
	13-Jun-2014	426	< 5.0	146	0.093	< 5.0	92.8	143	1.39 [#1]	40.8	0.494 [#1]	9.68	52.9	350	1190	525	8.10	808 [#1]	695 [#1]	< 0.050	< 0.050	< 0.020	< 0.054	100	---	< 0.0010	3.0
	29-Jun-2015	480	< 0.50	150	0.13	< 0.50	100	150	1.9 [#1]	44	0.54 [#1]	9.5	59	390	1300	550	7.32	780 [#1]	750 [#1]	< 0.050	0.030	< 0.010	0.030	---	0.98	< 0.0020	3.5
MW-05	08-Mar-2005	403	< 5	15	0.18	< 5	105	96.2	1.14 [#1]	27.5	0.402 [#1]	6.1	51	330	831	353	7.6	---	499	0.63	< 0.1	< 0.05	< 0.1	103	---	< 0.001	5
	17-Nov-2005	422	< 5	21	0.11	< 5	115	98.6	3.31 [#1]	30.1	0.531 [#1]	6.9	43	346	881	370	7.9	---	522 [#1]	0.331	< 0.1	< 0.05	< 0.1	95.4	---	< 0.001	4
	14-Jun-2006	421	< 5	22	0.11	< 5	124	107	3.48 [#1]	33.5	0.583 [#1]	7.6	44	345	902	405	7.7	---	545 [#1]	0.338	< 0.1	< 0.05	< 0.1	101	---	< 0.001	4
	13-Jul-2007	426	< 5	25	0.11	< 5	135	110	4 [#1]	34.3	0.682 [#1]	7.3	42	349	931	416	8.1	---	563 [#1]	0.216	< 0.1	< 0.05	< 0.1	98.5	---	0.002	4
	19-Dec-2007	440	< 1	22	0.1	< 1	150	100	< 0.06	30	0.66 [#1]	7.4	41	360	930	380	7.6	---	566 [#1]	0.05	< 0.2	< 0.06	< 0.2	0.88	---	< 0.001	3
	21-Apr-2009	420	< 0.5	30	0.12	< 0.5	130	120	< 0.06	34	0.72 [#1]	7.6	43	350	960	430	7.58	---	570 [#1]	0.22	0.007	< 0.003	0.007	100	---	0.003	2.5
	29-Apr-2010	428	< 5.0	30.6	0.107	< 5.0	144	120	3.39 [#1]	36.7	0.758 [#1]	---	46.1	351	969	451	7.95	---	596 [#1]	0.234	< 0.050	< 0.050	< 0.071	103	---	< 0.0010	3.3
	25-May-2011	433	< 5.0	30.9	0.075	< 5.0	141	105	3.82 [#1]	32.7	0.657 [#1]	7.29	41.7	355	990	397	8.05	---	572 [#1]	0.261	< 0.050	< 0.050	< 0.071	91.1	---	< 0.0010	4.4
	29-May-2012	442	< 5.0	33.7	0.061	< 5.0	138	112	3.83 [#1]	31.3	0.707 [#1]	8.00	42.6	362	1000	409	7.93	---	583 [#1]	0.233	< 0.050	< 0.050	< 0.071	92.3	---	< 0.0010	6.9
	08-Jul-2013	448	< 5.0	36.3	0.092	< 5.0	139	118	3.17 [#1]	33.5	0.754 [#1]	8.61	42.9	367	998	433	7.83	614 [#1]	599 [#1]	0.234	< 0.050	< 0.050	< 0.071	95.3	---	< 0.0010	4.1
	13-Jun-2014	341	< 5.0	37.8	0.073	< 5.0	143	117	4.37 [#1]	34.8	0.758 [#1]	8.31	42.0	279	853	435	8.00	635 [#1]	550 [#1]	0.272	< 0.050	< 0.020	< 0.054	111	---	< 0.0010	6.6
	25-Jun-2015	450	< 0.50	40	0.10	< 0.50	150	120	4.8 [#1]	38	0.71 [#1]	8.4	47	370	980	450	7.41	630 [#1]	620 [#1]	0.25	0.015	< 0.010	< 0.020	---	1.0	< 0.0020	3.2
MW-06	08-Mar-2005	560	< 5	4	0.18	< 5	451	171	2.92 [#1]	58.9	1.32 [#1]	6.1	138	459	1580	670	7.5	---	1100 [#1]	1.46	< 0.1	< 0.05	< 0.1	105	---	< 0.001	5
	17-Nov-2005	641	< 5	13	0.15	< 5	471	148	2.96 [#1]	52	0.943 [#1]	5	211 [#1]	526	1780	584	8	---	1220 [#1]	1.95	< 0.1	< 0.05	< 0.1	101	---	< 0.001	8
	16-Jun-2006	633	< 5	10	0.14	< 5	482	168	3.58 [#1]	57.7	1.01 [#1]	5.5	190	519	1700	657	7.7	---	1220 [#1]	2.38	< 0.1	< 0.05	< 0.1	104	---	< 0.001	7
	12-Jul-2007	637	< 5	10	0.17	< 5	478	157	4.5 [#1]	55.3	1.28 [#1]	4.8	182	522	1760	620	7.9	---	1200 [#1]	1.92	< 0.1	< 0.05	< 0.1	99.4	---	< 0.001	7
	19-Dec-2007	630	< 1	3	0.2	< 1	560 [#1]	160	< 0.06	54	1.5 [#1]	5	140	510	1700	620	7.7	---	1230 [#1]	1.9	< 0.2	< 0.06	< 0.2	0.85	---	0.002	6
	22-Apr-2009	590	< 0.5	6	0.14	< 0.5	420	180	5.7 [#1]	62	1.7 [#1]	5.5	150	490	1700	710	7.47	---	1100 [#1]	1.7	0.004	< 0.003	0.004	110	---	0.003	5.1
	06-May-2010	626	< 5.0	8.45	0.173	< 5.0	520 [#1]	156	5.38 [#1]	57.1	1.39 [#1]	---	194	513	1770	625	8.06	---	1250 [#1]	1.88	< 0.050	< 0.050	< 0.071	98.8	---	< 0.0010	6.7
	07-Jun-2011	603	< 5.0	3.45	0.129	< 5.0	501 [#1]	164	5.55 [#1]	60.4	1.64 [#1]	5.02	123	494	1760	658	7.96	---	1150 [#1]	1.57	< 0.050	< 0.050	< 0.071	91.3	---	< 0.0010	8.0
	29-May-2012	602	< 5.0	2.95	0.128	< 5.0	494	167	6.02 [#1]	56.5	1.70 [#1]	5.80	139	493	1730	650	7.81	---	1160 [#1]	1.55	< 0.050	< 0.050	< 0.071	94.7	---	< 0.0010	6.8
	08-Jul-2013	611	< 5.0	4.57	0.128	< 5.0	499	168	5.84 [#1]	55.2	1.72 [#1]	5.17	135	501	1720	647	7.81	1240 [#1]	1170 [#1]	1.66	< 0.050	< 0.050	< 0.071	92.2	---	< 0.0010	6.4
	12-Jun-2014	528	< 5.0	6.67	0.119	< 5.0	519 [#1]	163	5.93 [#1]	57.6	1.62 [#1]	5.56	152	433	1630	644	8.10	1260 [#1]	1160 [#1]	1.84	< 0.050	< 0.020	< 0.054	99.9	---	< 0.0010	5.8
	25-Jun-2015	620	< 0.50	6.4	0.15	< 0.50	490 [#3]	160	6.1 [#1]	60	1.5 [#1]	5.8	180	510	1700	650	7.37	1200 [#1]	1200 [#1]	1.8	< 0.010	< 0.010	< 0.020	---	1.0	< 0.0020	6.5
MW-07	09-Mar-2005	664	< 5	13	0.11	< 5	1130 [#1]	287	10.4 [#1]	100	1.88 [#1]	6.6	287 [#1]	544	2680	1130	7.5	---	2150 [#1]	2.24	0.1	< 0.05	0.1	102	---	< 0.001	5
	17-Nov-2005	666	< 5	16	0.08	< 5	1010 [#1]	270	10.9 [#1]	94.8	1.83 [#1]	5.5	268 [#1]	546	2670	1060	7.7	---	1990 [#1]	2.03	< 0.1	< 0.05	< 0.1	102	---	< 0.001	6
	16-Jun-2006	661	< 5	15	0.07	< 5	1010 [#1]	284	< 0.005	96.4	1.86 [#1]	6.2	269 [#1]	542	2530	1110	7.5	---	2010 [#1]	2.28	0.1	< 0.05	0.1	105	---	< 0.001	6
	12-Jul-2007	641	< 5	12	0.09	< 5	940 [#1]	257	10.9 [#1]	89.8	1.78 [#1]	4.6	248 [#1]	526	2290	1010	7.6	---	1870 [#1]	2.03	< 0.1	< 0.05	< 0.1	103	---	< 0.001	6
	19-Dec-2007	660	< 1	9	0.1	< 1	1000 [#1]	220	< 0.06	72	1.6 [#1]	5.1	230 [#1]	540	2500	850	7.5	---	1890 [#1]	0.26	< 0.2	< 0.06	< 0.2	0.84	---	0.002	6
	22-Apr-2009	730	< 0.5	18	0.08	< 0.5	1200 [#1]	330	14 [#1]	110	2.3 [#1]	6.6	320 [#1]	600	3000	1300	7.19	---	2400 [#1]	2.5	0.004	< 0.003	0.004	110	---	0.003	6.6

Groundwater Analytical Results: Indicator Analysis Parameters and Volatile Organic Compounds (VOCs)

PROJECT No.: 307075-01608-100

		Anions						Cations						General							Inorganic Nitrogen Compounds				Ion Balance		Phenols	Miscellaneous
Monitoring Station	Date (dd-mmm-yyyy)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Hydroxide (mg/L)	Sulphate (mg/L)	Calcium (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Alkalinity (Total; as $CaCO_3$) (mg/L)	Electrical Conductivity (uS/cm)	Hardness (Total; as $CaCO_3$) (mg/L)	pH (pH Units)	Total Dissolved Solids (mg/L)	Total Dissolved Solids (Calculated) (mg/L)		Ammonia (Total; as N) (mg/L)	Nitrate (as N) (mg/L)	Nitrite (as N) (mg/L)	Nitrite-plus-Nitrate (as N) (mg/L)	Ion Balance (%)	Ion Balance (Balance)	Phenols (mg/L)	Dissolved Organic Carbon (mg/L)
Canadian Drinking Water AO Guidelines 2014 [#1]		---	---	250	---	---	500	---	0.3	---	0.05	---	200	---	---	---	---	500	500		---	---	---	---	---	---	---	---	
Canadian Drinking Water MAC Guidelines 2014 [#2]		---	---	---	1.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---		---	10	1	10	---	---	---	---	
	05-May-2010	657	< 5.0	13.2	0.135	< 5.0	**1040** [#1]	262	**12.5** [#1]	93.5	**1.90** [#1]	---	**274** [#1]	538	2600	1040	7.90	---	**2010** [#1]		2.33	< 0.050	< 0.050	< 0.071	100	---	< 0.0010	5.8
	08-Jun-2011	537	< 5.0	8.07	0.116	< 5.0	**622** [#1]	178	**8.26** [#1]	68.8	**1.21** [#1]	4.38	189	440	1900	728	7.69	---	**1330** [#1]		1.83	< 0.050	< 0.050	< 0.071	104	---	0.0020	11.5
	28-Jul-2011	659	< 5.0	11.8	0.128	< 5.0	**1020** [#1]	256	**11.7** [#1]	87.9	**1.84** [#1]	5.55	**245** [#1]	540	2670	1000	7.98	---	**1950** [#1]		2.39	< 0.050	< 0.050	< 0.071	95.2	---	< 0.0010	6.3
	30-May-2012	648	< 5.0	12.6	0.093	< 5.0	**949** [#1]	247	**11.3** [#1]	80.4	**1.79** [#1]	6.96	**245** [#1]	531	2570	948	7.71	---	**1860** [#1]		2.22	< 0.050	< 0.050	< 0.071	96.9	---	< 0.0010	6.0
	11-Jul-2013	716	< 5.0	11.5	0.110	< 5.0	**1020** [#1]	269	**12.1** [#1]	82.4	**1.87** [#1]	5.37	**241** [#1]	586	2680	1010	7.30	**2180** [#1]	**1980** [#1]		2.39	< 0.050	< 0.050	< 0.071	92.6	---	0.0017	6.2
	13-Jun-2014	636	< 5.0	13.2	0.047	< 5.0	**1270** [#1]	289	**13.8** [#1]	97.9	**2.26** [#1]	6.09	**270** [#1]	521	2800	1120	8.06	**2320** [#1]	**2260** [#1]		2.68	< 0.050	< 0.020	< 0.054	92.3	---	< 0.0010	5.8
	25-Jun-2015	690	< 0.50	13	0.086	< 0.50	**1100** [#1,3]	270	**13** [#1]	97	**1.9** [#1]	6.0	**280** [#1]	570	2700	1100	7.09	**2200** [#1]	**2100** [#1]		2.3 [#3]	< 0.010	< 0.010	< 0.020	---	0.99	< 0.0020	6.0
MW-08	09-Mar-2005	593	< 5	3	0.13	< 5	369	147	**5.66** [#1]	45	**0.474** [#1]	6	137	486	1470	552	7.7	---	**999** [#1]		1.83	0.1	< 0.05	0.1	98.8	---	< 0.001	5
	15-Nov-2005	549	< 5	4	0.11	< 5	300	133	**5.16** [#1]	37.4	**0.384** [#1]	5.2	112	450	1310	486	7.5	---	**862** [#1]		1.5	< 0.1	< 0.05	< 0.1	95.9	---	< 0.001	6
	16-Jun-2006	594	< 5	3	0.09	< 5	341	161	**6.97** [#1]	44.2	**0.481** [#1]	6.1	132	487	1240	584	7.7	---	**980** [#1]		1.89	< 0.1	< 0.05	< 0.1	104	---	< 0.001	6
	11-Jul-2007	583	< 5	2	0.08	< 5	316	150	**7.29** [#1]	42.9	**0.454** [#1]	5	115	478	1390	551	7.9	---	**918** [#1]		1.61	< 0.1	< 0.05	< 0.1	100	---	< 0.001	7
	19-Dec-2007	630	< 1	2	0.1	< 1	370	130	< 0.06	36	**0.44** [#1]	5.4	120	520	1400	480	7.7	---	**977** [#1]		0.25	< 0.2	< 0.06	< 0.2	0.84	---	0.001	5
	21-Apr-2009	560	< 0.5	3	0.11	< 0.5	300	150	< 0.06	40	**0.45** [#1]	5.6	110	450	1400	530	7.62	---	**880** [#1]		1.7	0.007	< 0.003	0.007	100	---	0.002	5.3
	05-May-2010	558	< 5.0	1.43	0.130	< 5.0	333	146	**7.22** [#1]	43.2	**0.470** [#1]	---	122	458	1360	542	8.04	---	**927** [#1]		1.74	< 0.050	< 0.050	< 0.071	101	---	< 0.0010	5.3
	07-Jun-2011	565	< 5.0	0.97	0.082	< 5.0	320	136	**5.41** [#1]	38.3	**0.411** [#1]	5.12	98.0	463	1400	497	7.95	---	**876** [#1]		1.71	< 0.050	< 0.050	< 0.071	89.8	---	0.0016	10.3
	30-May-2012	560	< 5.0	0.86	0.084	< 5.0	308	135	**6.69** [#1]	35.0	**0.409** [#1]	5.69	107	459	1360	481	7.93	---	**867** [#1]		1.76	< 0.050	< 0.050	< 0.071	92.3	---	< 0.0010	5.7
	09-Jul-2013	535	< 5.0	1.37	0.093	< 5.0	304	149	**6.47** [#1]	40.4	**0.415** [#1]	6.47	112	439	1290	538	7.96	**876** [#1]	**877** [#1]		1.76	< 0.050	< 0.050	< 0.071	104	---	< 0.0010	5.5
	12-Jun-2014	474	< 5.0	1.23	0.083	< 5.0	345	144	**7.19** [#1]	38.5	**0.476** [#1]	5.95	110	388	1260	518	7.94	**938** [#1]	**878** [#1]		1.90	< 0.050	< 0.020	< 0.054	102	---	< 0.0010	5.1
	24-Jun-2015	570	< 0.50	1.6	0.10	< 0.50	320 [#3]	150	**7.1** [#1]	42	**0.44** [#1]	5.7	120	470	1400	540	7.43	**950** [#1]	**930** [#1]		1.7	< 0.010	< 0.010	< 0.020	---	1.0	< 0.0020	5.4
MW-09	09-Mar-2005	626	< 5	5	0.29	< 5	313	71.6	**1.11** [#1]	26	**0.714** [#1]	4.2	**226** [#1]	513	1520	286	7.9	---	**954** [#1]		1.81	0.1	< 0.05	0.1	93.2	---	< 0.001	5
(Duplicate)	09-Mar-2005	628	< 5	5	0.29	< 5	340	79.1	**1.07** [#1]	27.9	**0.705** [#1]	4.7	**243** [#1]	515	1520	312	7.9	---	**1010** [#1]		1.79	0.1	< 0.05	0.1	97.4	---	< 0.001	5
	17-Nov-2005	640	< 5	7	0.22	< 5	312	92.6	**1.4** [#1]	27.3	**0.752** [#1]	3.9	**227** [#1]	524	1550	344	8.1	---	**984** [#1]		1.85	< 0.1	< 0.05	< 0.1	98	---	< 0.001	6
	16-Jun-2006	644	< 5	7	0.23	< 5	316	98.1	**1.44** [#1]	27.7	**0.797** [#1]	3.9	**231** [#1]	528	1520	359	7.9	---	**1000** [#1]		2.09	< 0.1	< 0.05	< 0.1	99.9	---	< 0.001	8
	11-Jul-2007	656	< 5	6	0.21	< 5	322	94.9	**1.74** [#1]	27.6	**0.785** [#1]	3.3	**231** [#1]	538	1530	351	8.1	---	**1010** [#1]		1.8	< 0.1	< 0.05	< 0.1	97.9	---	< 0.001	7
	18-Dec-2007	670	< 1	4	0.2	< 1	350	83	< 0.06	22	**0.77** [#1]	3.5	**230** [#1]	550	1500	300	8	---	**1020** [#1]		0.23	< 0.2	< 0.06	< 0.2	0.86	---	0.002	9
	22-Apr-2009	630	< 0.5	6	0.22	< 0.5	330	97	**1.9** [#1]	27	**0.86** [#1]	4.1	**240** [#1]	520	1500	350	7.73	---	**1000** [#1]		1.9	0.005	< 0.003	0.005	100	---	0.003	5.5
	06-May-2010	639	< 5.0	5.57	0.251	< 5.0	342	93.1	**2.04** [#1]	27.8	**0.828** [#1]	---	**240** [#1]	524	1540	347	8.17	---	**1030** [#1]		2.02	< 0.050	< 0.050	< 0.071	98.4	---	< 0.0010	5.6
(Duplicate)	06-May-2010	641	< 5.0	5.63	0.243	< 5.0	345	93.1	**2.03** [#1]	27.6	**0.832** [#1]	---	**246** [#1]	526	1540	346	8.17	---	**1040** [#1]		2.00	< 0.050	< 0.050	< 0.071	99.2	---	< 0.0010	5.5
	02-Jun-2011	646	< 5.0	5.84	< 0.050	< 5.0	325	87.4	**1.46** [#1]	25.2	**0.754** [#1]	4.09	**212** [#1]	530	1580	322	8.17	---	**978** [#1]		2.05	< 0.050	< 0.050	< 0.071	90.0	---	< 0.0010	8.0
(Duplicate)	02-Jun-2011	646	< 5.0	5.64	< 0.050	< 5.0	325	89.5	**1.29** [#1]	26.0	**0.773** [#1]	4.16	**220** [#1]	530	1570	331	8.22	---	**988** [#1]		2.09	< 0.050	< 0.050	< 0.071	93.0	---	< 0.0010	7.1
	29-May-2012	643	< 5.0	4.82	0.184	< 5.0	319	88.3	**1.89** [#1]	23.7	**0.784** [#1]	4.22	**226** [#1]	527	1550	318	8.04	---	**982** [#1]		2.02	< 0.050	< 0.050	< 0.071	94.1	---	< 0.0010	6.0
	10-Jul-2013	644	< 5.0	5.29	0.203	< 5.0	327	96.2	**1.94** [#1]	26.8	**0.842** [#1]	4.06	**251** [#1]	527	1530	351	7.89	**1030** [#1]	**1030** [#1]		2.10	< 0.050	< 0.050	< 0.071	103	---	< 0.0010	5.9
	13-Jun-2014	525	< 5.0	5.39	0.199	< 5.0	341	87.8	**1.85** [#1]	25.6	**0.868** [#1]	4.23	**222** [#1]	430	1390	325	8.12	**1030** [#1]	**944** [#1]		2.17	< 0.050	< 0.020	< 0.054	102	---	< 0.0010	5.8
	25-Jun-2015	620	< 0.50	5.6	0.24	< 0.50	320 [#3]	93	**2.0** [#1]	28	**0.80** [#1]	4.2	**250** [#1]	500	1500	350	7.61	**1000** [#1]	**1000** [#1]		1.9	0.031	< 0.010	0.031	---	1.1	< 0.0020	5.4
MW-10	09-Mar-2005	628	< 5	< 1	0.18	< 5	221	131	**5.29** [#1]	36.1	**0.639** [#1]	5.3	117	514	1270	476	7.7	---	**819** [#1]		1.68	0.1	< 0.05	0.1	99.7	---	< 0.001	5
	16-Nov-2005	634	< 5	3	0.12	< 5	222	129	**5.49** [#1]	35.2	**0.642** [#1]	5	108	520	1260	467	7.5	---	**814** [#1]		1.36	< 0.1	< 0.05	< 0.1	93.8	---	< 0.001	6
	16-Jun-2006	641	< 5	2	0.13	< 5	212	139	**5.89** [#1]	37.8	**0.67** [#1]	5.6	119	525	1120	503	7.7	---	**831** [#1]		1.76	< 0.1	< 0.05	< 0.1	103	---	< 0.001	6
	11-Jul-2007	651	< 5	2	0.12	< 5	208	132	**5.93** [#1]	36.9	**0.656** [#1]	4.7	110	533	1270	482	8	---	**814** [#1]		1.65	< 0.1	< 0.05	< 0.1	97.2	---	< 0.001	5
	18-Dec-2007	660	< 1	< 1	0.2	< 1	230	120	< 0.06	29	**0.64** [#1]	4.8	110	540	1300	410	7.8	---	**822** [#1]		1.8	< 0.2	< 0.06	< 0.2	0.84	---	0.002	5
	22-Apr-2009	620	< 0.5	2	0.14	< 0.5	190	140	**5.9** [#1]	36	**0.71** [#1]	5.6	120	510	1300	490	7.51	---	**800** [#1]		1.8	0.005	< 0.003	0.005	110	---	0.002	4.7

Groundwater Analytical Results: Indicator Analysis Parameters and Volatile Organic Compounds (VOCs)

PROJECT No.: 307075-01608-100

		Anions						Cations						General						Inorganic Nitrogen Compounds				Ion Balance		Phenols	Miscellaneous
Monitoring Station	Date (dd-mmm-yyyy)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Hydroxide (mg/L)	Sulphate (mg/L)	Calcium (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Alkalinity (Total; as $CaCO_3$) (mg/L)	Electrical Conductivity (uS/cm)	Hardness (Total; as $CaCO_3$) (mg/L)	pH (pH Units)	Total Dissolved Solids (mg/L)	Total Dissolved Solids (Calculated) (mg/L)	Ammonia (Total; as N) (mg/L)	Nitrate (as N) (mg/L)	Nitrite (as N) (mg/L)	Nitrite-plus-Nitrate (as N) (mg/L)	Ion Balance (%)	Ion Balance (Balance)	Phenols (mg/L)	Dissolved Organic Carbon (mg/L)
Canadian Drinking Water AO Guidelines 2014 [#1]		---	---	250	---	---	500	---	0.3	---	0.05	---	200	---	---	---	(6.5 - 8.5)	500	500	---	---	---	---	---	---	---	---
Canadian Drinking Water MAC Guidelines 2014 [#2]		---	---	---	1.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10	1	10	---	---	---	---
	05-May-2010	633	< 5.0	0.73	0.169	< 5.0	227	139	**6.80** [#1]	39.1	**0.735** [#1]	---	124	519	1270	508	8.07	---	**847** [#1]	1.71	< 0.050	< 0.050	< 0.071	104	---	< 0.0010	5.1
	02-Jun-2011	607	< 5.0	1.19	< 0.050	< 5.0	206	113	**3.89** [#1]	30.2	**0.566** [#1]	5.58	105	497	1260	407	8.04	---	**759** [#1]	1.60	< 0.050	< 0.050	< 0.071	89.9	---	0.0018	6.7
	30-May-2012	639	< 5.0	0.53	0.113	< 5.0	211	127	**5.98** [#1]	31.6	**0.655** [#1]	5.79	111	524	1290	447	7.89	---	**801** [#1]	1.79	< 0.050	< 0.050	< 0.071	93.5	---	< 0.0010	5.9
	09-Jul-2013	638	< 5.0	0.68	0.107	< 5.0	215	141	**6.11** [#1]	37.3	**0.729** [#1]	6.22	118	523	1250	506	8.09	**833** [#1]	**832** [#1]	1.88	< 0.050	< 0.050	< 0.071	103	---	< 0.0010	5.4
(Duplicate)	09-Jul-2013	643	< 5.0	0.85	0.115	< 5.0	216	142	**6.03** [#1]	36.7	**0.710** [#1]	5.96	115	527	1250	506	8.04	**837** [#1]	**833** [#1]	1.93	< 0.050	< 0.050	< 0.071	101	---	< 0.0010	5.4
	12-Jun-2014	507	< 5.0	0.67	0.110	< 5.0	229	125	**6.10** [#1]	34.2	**0.689** [#1]	5.79	108	416	1110	453	8.05	**845** [#1]	**752** [#1]	1.77	< 0.050	< 0.020	< 0.054	106	---	< 0.0010	6.9
(Duplicate)	12-Jun-2014	543	< 5.0	0.82	0.104	< 5.0	229	124	**6.08** [#1]	34.5	**0.740** [#1]	5.84	110	445	1140	452	8.04	**834** [#1]	**771** [#1]	1.78	< 0.050	< 0.020	< 0.054	102	---	< 0.0010	5.0
	24-Jun-2015	640	< 0.50	1.1	0.16	< 0.50	210 [#3]	130	**6.3** [#1]	36	**0.67** [#1]	5.8	120	520	1300	480	7.44	**850** [#1]	**820** [#1]	1.8	< 0.010	< 0.010	< 0.020	---	1.0	< 0.0020	5.1
(Duplicate)	24-Jun-2015	630	< 0.50	1.2	0.14	< 0.50	200 [#3]	130	**6.4** [#1]	36	**0.67** [#1]	5.6	120	520	1300	480	7.41	**840** [#1]	**820** [#1]	1.8	< 0.010	< 0.010	< 0.020	---	1.0	< 0.0020	5.2
MW-11	10-Mar-2005	642	< 5	8	0.14	< 5	196	150	**6.89** [#1]	45.8	**0.668** [#1]	4.9	92	526	1270	563	7.7	---	**813** [#1]	1.5	0.1	< 0.05	0.1	104	---	< 0.001	15
	16-Nov-2005	654	< 5	16	0.09	< 5	199	140	**6.95** [#1]	42.5	**0.628** [#1]	4.5	85	536	1270	525	7.4	---	**809** [#1]	1.41	< 0.1	< 0.05	< 0.1	93.4	---	< 0.001	7
	16-Jun-2006	672	< 5	11	0.09	< 5	194	153	**7.23** [#1]	45.7	**0.659** [#1]	4.8	92	551	1100	570	7.7	---	**831** [#1]	1.56	< 0.1	< 0.05	< 0.1	101	---	< 0.001	7
	11-Jul-2007	662	< 5	8	0.09	< 5	193	143	**7.15** [#1]	45.3	**0.632** [#1]	3.9	88	542	1280	544	8	---	**806** [#1]	1.43	< 0.1	< 0.05	< 0.1	98.6	---	< 0.001	8
	18-Dec-2007	680	< 1	10	0.1	< 1	210	130	< 0.06	38	**0.61** [#1]	4.3	87	560	1300	480	7.7	---	**810** [#1]	0.2	< 0.2	< 0.06	< 0.2	0.87	---	0.002	6
	22-Apr-2009	640	< 0.5	10	0.11	< 0.5	170	150	**7** [#1]	45	**0.67** [#1]	4.9	91	530	1300	560	7.51	---	**800** [#1]	1.5	0.003	< 0.003	0.003	110	---	0.004	5.5
	05-May-2010	650	< 5.0	15.2	0.132	< 5.0	212	144	**7.61** [#1]	45.9	**0.663** [#1]	---	98.1	533	1290	549	8.04	---	**840** [#1]	1.48	< 0.050	< 0.050	< 0.071	99.1	---	< 0.0010	6.0
	02-Jun-2011	653	< 5.0	9.69	< 0.050	< 5.0	203	148	**6.99** [#1]	46.4	**0.687** [#1]	5.36	96.0	536	1320	561	8.00	---	**830** [#1]	1.55	< 0.050	< 0.050	< 0.071	102	---	< 0.0010	6.8
	30-May-2012	648	< 5.0	8.71	0.067	< 5.0	202	134	**6.82** [#1]	38.7	**0.605** [#1]	5.34	87.9	531	1300	494	7.90	---	**795** [#1]	1.51	< 0.050	< 0.050	< 0.071	91.8	---	< 0.0010	6.6
	10-Jul-2013	640	< 5.0	8.92	0.105	< 5.0	213	147	**7.52** [#1]	44.7	**0.697** [#1]	5.09	102	525	1270	551	7.93	**828** [#1]	**836** [#1]	1.57	< 0.050	< 0.050	< 0.071	103	---	< 0.0010	6.2
	12-Jun-2014	473	< 5.0	14.1	0.074	< 5.0	227	136	**7.07** [#1]	41.5	**0.672** [#1]	5.32	89.0	388	1090	510	7.99	**856** [#1]	**746** [#1]	1.58	< 0.050	< 0.020	< 0.054	110	---	< 0.0010	5.6
	24-Jun-2015	640	< 0.50	11	0.11	< 0.50	210 [#3]	140	**7.4** [#1]	45	**0.62** [#1]	5.0	97	520	1300	540	7.42	**850** [#1]	**830** [#1]	1.5	< 0.010	< 0.010	< 0.020	---	1.0	< 0.0020	6.3
MW-12	10-Mar-2005	636	< 5	6	0.13	< 5	45.9	95.7	**2.78** [#1]	27.9	**0.365** [#1]	5	106	521	1000	354	7.9	---	**600** [#1]	1.39	0.1	< 0.05	0.1	102	---	< 0.001	6
	16-Nov-2005	712	< 5	8	0.07	< 5	52.5	94.9	**3.37** [#1]	28.5	**0.402** [#1]	5.2	111	584	1020	354	7.4	---	**651** [#1]	1.2	< 0.1	< 0.05	< 0.1	92.7	---	< 0.001	7
	16-Jun-2006	669	< 5	7	0.07	< 5	44.2	100	**3.76** [#1]	29.1	**0.436** [#1]	5.1	106	549	904	370	7.8	---	**621** [#1]	1.34	< 0.1	< 0.05	< 0.1	100	---	< 0.001	7
	11-Jul-2007	670	< 5	7	0.08	< 5	42.4	95.4	**3.77** [#1]	29.2	**0.422** [#1]	4.2	101	550	1020	358	8	---	**609** [#1]	1.16	< 0.1	< 0.05	< 0.1	97.4	---	< 0.001	7
	18-Dec-2007	700	< 1	5	< 0.1	< 1	43	82	< 0.06	23	**0.4** [#1]	4.3	99	570	1000	300	7.8	---	**601** [#1]	0.29	< 0.2	< 0.06	< 0.2	0.84	---	0.002	7
	22-Apr-2009	650	< 0.5	8	0.09	< 0.5	32	98	**4.1** [#1]	29	**0.45** [#1]	4.9	110	540	1000	360	7.66	---	**610** [#1]	1.3	0.005	< 0.003	0.005	110	---	0.003	6.4
	06-May-2010	667	< 5.0	7.05	0.114	< 5.0	46.8	96.4	**4.24** [#1]	30.2	**0.456** [#1]	---	109	547	1030	365	8.13	---	**623** [#1]	1.32	< 0.050	< 0.050	< 0.071	100	---	< 0.0010	10.5
	02-Jun-2011	662	< 5.0	6.40	0.071	< 5.0	44.6	98.1	**3.34** [#1]	30.9	**0.450** [#1]	4.86	95.4	543	1050	372	8.14	---	**606** [#1]	1.31	0.054	< 0.050	< 0.071	97.9	---	< 0.0010	13.5
	30-May-2012	660	< 5.0	6.25	0.076	< 5.0	43.3	89.8	**4.14** [#1]	25.6	**0.435** [#1]	5.23	95.7	541	1030	330	8.03	---	**591** [#1]	1.32	< 0.050	< 0.050	< 0.071	91.5	---	< 0.0010	6.6
	10-Jul-2013	649	< 5.0	6.89	0.083	< 5.0	44.4	101	**3.99** [#1]	28.9	**0.457** [#1]	5.00	113	532	1000	371	7.89	**628** [#1]	**618** [#1]	1.36	< 0.050	< 0.050	< 0.071	106	---	< 0.0010	6.9
	12-Jun-2014	598	< 5.0	7.20	0.064	< 5.0	47.4	93.8	**3.88** [#1]	27.7	**0.462** [#1]	5.14	97.6	490	915	348	8.02	**619** [#1]	**573** [#1]	1.36	< 0.050	< 0.020	< 0.054	103	---	< 0.0010	8.3
	24-Jun-2015	660	< 0.50	7.7	0.084	< 0.50	45	93	**4.0** [#1]	29	**0.42** [#1]	5.0	110	540	1000	350	7.63	**620** [#1]	**620** [#1]	1.3	0.011	< 0.010	< 0.020	---	1.0	< 0.0020	6.8
MW-13	10-Mar-2005	531	< 5	2	0.2	< 5	10.6	53.7	**0.818** [#1]	16.5	**0.263** [#1]	4.2	112	435	784	202	8.1	---	460	1.4	0.1	< 0.05	0.1	100	---	< 0.001	4
	16-Nov-2005	537	< 5	4	0.14	< 5	12.5	51.2	**1.08** [#1]	16.2	**0.243** [#1]	3.4	103	440	782	195	7.8	---	454	1.29	< 0.1	< 0.05	< 0.1	92.2	---	< 0.001	5
	16-Jun-2006	715	541	4	0.14	< 5	10.1	55.6	**1.19** [#1]	17.1	**0.256** [#1]	3.9	112	443	715	209	8	---	470	1.31	0.2	< 0.05	0.2	99.4	---	< 0.001	5
	11-Jul-2007	541	< 5	2	0.13	< 5	9.1	53	**1.26** [#1]	16.9	**0.252** [#1]	3.5	105	444	782	202	8.2	---	456	1.22	< 0.1	< 0.05	< 0.1	96.3	---	0.001	5
	18-Dec-2007	560	< 1	2	0.2	< 1	9	45	< 0.06	14	**0.25** [#1]	3.5	110	460	790	170	8	---	457	0.23	< 0.2	< 0.06	< 0.2	0.87	---	< 0.001	5
	22-Apr-2009	520	< 0.5	3	0.15	< 0.5	9	54	**1.3** [#1]	17	**0.26** [#1]	3.9	110	430	770	200	7.81	---	460	1.3	0.005	< 0.003	0.005	100	---	0.003	4.5
	06-May-2010	530	< 5.0	2.15	0.160	< 5.0	9.54	50.0	**1.45** [#1]	16.4	**0.249** [#1]	---	110	435	776	192	8.22	---	453	1.30	< 0.050	< 0.050	< 0.071	97.5	---	< 0.0010	4.1

Groundwater Analytical Results: Indicator Analysis Parameters and Volatile Organic Compounds (VOCs)

PROJECT No.: 307075-01608-100

		Anions						Cations						General						Inorganic Nitrogen Compounds				Ion Balance		Phenols	Miscellaneous
Monitoring Station	Date (dd-mmm-yyyy)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Hydroxide (mg/L)	Sulphate (mg/L)	Calcium (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Alkalinity (Total; as $CaCO_3$) (mg/L)	Electrical Conductivity (uS/cm)	Hardness (Total; as $CaCO_3$) (mg/L)	pH (pH Units)	Total Dissolved Solids (mg/L)	Total Dissolved Solids (Calculated) (mg/L)	Ammonia (Total; as N) (mg/L)	Nitrate (as N) (mg/L)	Nitrite (as N) (mg/L)	Nitrite-plus-Nitrate (as N) (mg/L)	Ion Balance (%)	Ion Balance (Balance)	Phenols (mg/L)	Dissolved Organic Carbon (mg/L)
Canadian Drinking Water AO Guidelines 2014 #1		---	---	250	---	---	500	---	0.3	---	0.05	---	200	---	---	---	(6.5 - 8.5)	500	500	---	---	---	---	---	---	---	---	
Canadian Drinking Water MAC Guidelines 2014 #2		---	---	---	1.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10	1	10	---	---	---	---	
	02-Jun-2011	530	< 5.0	1.92	0.162	< 5.0	9.12	48.1	1.25 #1	15.3	0.231 #1	3.74	103	434	796	183	8.24	---	442	1.36	< 0.050	< 0.050	< 0.071	92.1	---	< 0.0010	5.2
	30-May-2012	529	< 5.0	1.81	0.119	< 5.0	9.24	48.0	1.33 #1	14.4	0.238 #1	4.00	101	433	786	179	8.18	---	438	1.31	< 0.050	< 0.050	< 0.071	90.5	---	< 0.0010	4.6
	10-Jul-2013	525	< 5.0	2.28	0.147	< 5.0	10.0	49.7	1.17 #1	16.2	0.252 #1	3.98	118	430	769	191	7.92	464	458	1.38	< 0.050	< 0.050	< 0.071	102	---	< 0.0010	4.4
	12-Jun-2014	485	< 5.0	2.63	0.129	< 5.0	11.0	48.8	1.30 #1	15.4	0.245 #1	4.07	104	398	698	185	8.16	457	425	1.33	< 0.050	< 0.020	< 0.054	101	---	< 0.0010	6.3
	24-Jun-2015	530	< 0.50	2.9	0.16	< 0.50	13	49	1.3 #1	16	0.24 #1	3.9	110	430	780	190	7.70	460	460	1.3	< 0.010	< 0.010	< 0.020	---	1.0	< 0.0020	4.9
QA/QC																											
FIELD BLANK	05-May-2010	< 5.0	< 5.0	< 0.50	< 0.050	< 5.0	< 0.50	< 0.50	< 0.020	< 0.10	< 0.0050	---	< 0.50	< 5.0	1.07	< 1.0	6.06 #1	---	< 1.0	< 0.050	< 0.050	< 0.050	< 0.071	Low TDS	---	< 0.0010	< 1.0
	25-May-2011	< 5.0	< 5.0	< 0.50	< 0.050	< 5.0	< 0.50	< 0.50	< 0.020	< 0.10	< 0.0050	< 0.10	< 0.50	< 5.0	1.06	< 1.0	6.02 #1	---	< 1.0	< 0.050	< 0.050	< 0.050	< 0.071	Low TDS	---	< 0.0010	< 1.0
	09-Jul-2013	< 5.0	< 5.0	< 0.50	< 0.020	< 5.0	< 0.50	< 0.50	< 0.010	< 0.10	< 0.0020	< 0.10	< 1.0	< 2.0	1.90	< 1	6.19 #1	< 10	< 1	< 0.050	< 0.050	< 0.050	< 0.071	Low TDS	---	< 0.0010	3.5
	13-Jun-2014	< 5.0	< 5.0	< 0.50	< 0.020	< 5.0	< 0.50	< 0.50	< 0.010	< 0.10	< 0.0020	< 0.10	< 1.0	< 2.0	1.80	< 1	5.52 #1	< 10	< 1	< 0.050	< 0.050	< 0.020	< 0.054	Low TDS	---	< 0.0010	< 1.0
	25-Jun-2015	< 0.50	< 0.50	< 1.0	< 0.050	< 0.50	< 1.0	< 0.30	< 0.060	< 0.20	< 0.0040	< 0.30	< 0.50	< 0.50	< 1.0	< 0.50	4.73 #1	< 10	< 10	< 0.050	< 0.010	< 0.010	< 0.020	---	< 0.010	< 0.0020	0.56

NOTES:

1. --- in guideline row(s) denotes no criteria for that parameter.
2. --- in detail data row(s) denotes parameter not analyzed.
3. Highlighting indicates parameters above applied guideline/criteria.
4. Highlighting indicates non-detect parameters above applied guideline/criteria.
5. Highlighting indicates parameters at applied guideline/criteria.
6. Superscript #1 denotes values exceeding
   (Health Canada, October 2014. Guidelines for Canadian Drinking Water Quality. Aesthetic Objective. Summary Table. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment)
7. Superscript #2 denotes values exceeding
   (Health Canada, October 2014. Guidelines for Canadian Drinking Water Quality. Maximum Acceptable Concentration. Summary Table. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment)
8. Superscript #3 - Detection limits raised due to dilution to bring analyte within the calibrated range.
9. Superscript (a) denotes that the 16-Jun-2014 chloride and ion balance results for MW-02 are considered anomalous. This was confirmed by re-sampling on 28-Aug-2014.

WorleyParsons
resources & energy

Table 4

Groundwater Analytical Results: Dissolved Metals and Trace Elements

PROJECT No.: 307075-01608-100

Monitoring Station	Date (dd-mmm-yyyy)	Dissolved Metals: Aluminum (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Bismuth (mg/L)	Boron (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Copper (mg/L)	Lead (mg/L)	Lithium (mg/L)	Mercury (mg/L)	Total Mercury (mg/L)	Molybdenum (mg/L)	Nickel (mg/L)	Phosphorus (mg/L)	Selenium (mg/L)	Silicon (mg/L)	Silver (mg/L)	Strontium (mg/L)	Thallium (mg/L)	Tin (mg/L)	Titanium (mg/L)	Uranium (mg/L)	Vanadium (mg/L)	Zinc (mg/L)
Canadian Drinking Water AO Guidelines 2014 #1		**0.1**	---	---	---	---	---	---	---	---	---	**1**	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	**5**
Canadian Drinking Water MAC Guidelines 2014 #2		---	**0.006**	**0.01**	**1**	---	---	**5**	**0.005**	**0.05**	---	---	**0.01**	---	**0.001**	**0.001**	---	---	---	**0.05**	---	---	---	---	---	---	**0.02**	---	---
Groundwater Monitoring																													
MW-01	07-Mar-2005	0.02	0.0008	0.0008	0.199	< 0.0005	< 0.00005	0.053	< 0.0001	0.0009	0.0017	< 0.0006	0.0004	---	< 0.0001	---	0.0007	0.0004	---	< 0.0004	---	< 0.0002	0.579	< 0.0005	< 0.0002	0.0013	0.0026	0.0003	0.004
	17-Nov-2005	0.01	0.0005	0.0009	0.143	< 0.0005	< 0.0001	0.046	< 0.0001	< 0.0004	0.0015	0.0007	< 0.0001	---	< 0.0001	---	0.0013	0.0012	---	< 0.0004	---	< 0.0002	0.551	< 0.0001	< 0.0002	0.0012	0.0023	0.0001	< 0.002
	15-Jun-2006	< 0.01	0.0006	0.0009	0.134	< 0.0005	< 0.00005	0.045	< 0.0001	0.0027	0.0008	< 0.0006	< 0.0001	---	< 0.0001	---	0.0004	< 0.0001	---	< 0.0004	---	< 0.0002	0.554	< 0.00005	< 0.0002	0.001	0.0022	< 0.0001	0.005
	12-Jul-2007	< 0.01	0.0004	0.0009	0.127	< 0.0005	< 0.00005	0.054	< 0.0001	0.0011	0.0009	< 0.0006	< 0.0001	---	< 0.0001	---	0.0009	0.003	---	0.0005	---	< 0.0002	0.558	< 0.00005	< 0.0002	0.0008	0.0022	< 0.0001	< 0.002
	19-Dec-2007	< 0.001	< 0.0002	< 0.001	0.11	< 0.001	---	0.05	< 0.0002	< 0.001	0.0009	< 0.0002	< 0.0002	---	< 0.00005	---	0.0008	0.0027	---	< 0.001	---	< 0.0001	0.53	< 0.0002	< 0.001	0.001	0.0024	< 0.001	< 0.003
	21-Apr-2009	< 0.001	< 0.0002	0.0008	---	< 0.001	---	---	< 0.000005	< 0.001	0.0008	0.0005	< 0.0002	---	0.000001	---	0.0004	0.0009	---	< 0.0002	---	< 0.0001	---	< 0.0002	< 0.001	< 0.001	0.0021	< 0.001	< 0.003
	05-May-2010	< 0.0050	< 0.00040	0.00095	0.132	< 0.00050	---	0.053	< 0.00010	< 0.0050	0.00088	< 0.0010	< 0.00010	---	< 0.00010	---	0.00046	0.0025	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	0.00081	0.00209	< 0.00010	< 0.0020
	25-May-2011	0.0051	< 0.00040	0.00093	0.147	< 0.00050	---	< 0.050	< 0.00010	< 0.0050	0.00084	0.0017	< 0.00010	---	< 0.000020	---	0.00039	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00205	0.00016	0.0074
	29-May-2012	< 0.0050	< 0.00040	0.00088	0.120	< 0.00050	---	< 0.050	< 0.00010	< 0.0050	0.00068	< 0.0010	< 0.00010	---	< 0.000020	---	0.000423	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00194	< 0.00010	0.0034
	10-Jul-2013	< 0.0050	< 0.00040	0.00098	0.147	< 0.00050	---	< 0.050	< 0.00010	< 0.0050	0.00075	< 0.0010	< 0.00010	---	< 0.000020	---	0.000360	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00223	< 0.00010	< 0.0030
	16-Jun-2014	< 0.0050	< 0.00040	0.00092	0.144	< 0.00050	---	< 0.050	< 0.00010	< 0.0050	0.00072	< 0.0010	< 0.00010	---	< 0.0000050	---	0.000281	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00212	< 0.00010	< 0.0030
	29-Jun-2015	0.0038	< 0.00060	0.00079	0.13	< 0.0010	---	0.051	< 0.000020	< 0.0010	0.00076	0.00046	< 0.00020	0.027	---	0.000027	0.00038	0.00091	< 0.10	< 0.00020	7.1	< 0.00010	0.55	< 0.00020	< 0.0010	< 0.0010	0.0021	< 0.0010	< 0.0030
MW-02	07-Mar-2005	0.02	0.001	0.0025	0.204	< 0.0005	< 0.00005	0.12	< 0.0001	0.0013	0.0008	0.0015	0.0004	---	0.0001	---	0.0046	< 0.0001	---	0.0008	---	< 0.0002	1.03	< 0.0005	< 0.0002	0.0012	0.0032	0.0017	0.004
	17-Nov-2005	0.03	0.0006	0.0014	0.152	< 0.0005	< 0.0001	0.189	< 0.0001	< 0.0004	0.0031	0.0021	< 0.0001	---	< 0.0001	---	0.0148	0.0644	---	0.0006	---	< 0.0002	1.54	0.00006	< 0.0002	0.0015	0.0053	0.0005	< 0.002
	15-Jun-2006	< 0.01	0.0007	0.0024	0.107	< 0.0005	0.00005	0.152	< 0.0001	0.004	0.0031	0.0011	< 0.0001	---	< 0.0001	---	0.0009	0.0012	---	0.0005	---	< 0.0002	1.46	< 0.00005	< 0.0002	0.0012	0.0023	< 0.0001	0.1012
	13-Jul-2007	< 0.01	0.0005	0.0036	0.0749	< 0.0005	< 0.00005	0.136	< 0.0001	< 0.0004	0.0032	0.0007	< 0.0001	---	< 0.0001	---	0.0008	0.0055	---	< 0.0004	---	< 0.0002	1.46	< 0.00005	< 0.0002	0.0011	0.0019	< 0.0001	< 0.002
	19-Dec-2007	< 0.001	< 0.0002	0.003	0.04	< 0.001	---	0.13	< 0.0002	0.004	0.0026	0.0005	0.0003	---	< 0.00005	---	0.0006	0.0046	---	< 0.001	---	< 0.0001	1.3	< 0.0002	< 0.001	0.002	0.0014	0.002	< 0.003
	21-Apr-2009	< 0.001	< 0.0002	0.0038	---	< 0.001	---	---	< 0.000005	< 0.001	0.0017	0.0002	< 0.0002	---	0.000001	---	0.0005	0.0019	---	< 0.0002	---	< 0.0001	---	< 0.0002	< 0.001	< 0.001	0.0014	< 0.001	< 0.003
	05-May-2010	< 0.0050	< 0.00040	0.00369	0.0544	< 0.00050	---	0.144	< 0.00010	< 0.0050	0.00157	< 0.0010	< 0.00010	---	< 0.00010	---	0.00041	0.0043	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	0.00104	0.00139	< 0.00010	0.0044
	25-May-2011	< 0.0050	< 0.00040	0.00327	0.0420	< 0.00050	---	0.135	< 0.00010	< 0.0050	0.00100	< 0.0010	< 0.00010	---	< 0.000020	---	0.00040	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00114	< 0.00010	0.0025
	30-May-2012	0.0106	< 0.00040	0.00312	0.0586	< 0.00050	---	0.133	< 0.00010	< 0.0050	0.00103	< 0.0010	< 0.00010	---	< 0.000020	---	0.000615	0.0027	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00123	< 0.00010	0.0031
	10-Jul-2013	< 0.0050	< 0.00040	0.00340	0.0850	< 0.00050	---	0.200	< 0.00010	< 0.0050	0.00072	< 0.0010	< 0.00010	---	< 0.000020	---	0.000324	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00102	< 0.00010	< 0.0030
	16-Jun-2014	< 0.0050	< 0.00040	0.00319	0.0659	< 0.00050	---	0.163	< 0.00010	< 0.0050	0.00059	< 0.0010	< 0.00010	---	< 0.0000050	---	0.00037	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00060	0.00097	< 0.00020	< 0.0030
	28-Aug-2014	< 0.0050	< 0.00040	0.00302	0.0686	---	---	0.144	< 0.00010	< 0.0050	---	< 0.0010	< 0.00010	---	0.0000059	---	---	< 0.0020	---	< 0.00040	---	< 0.00010	---	---	---	---	0.00132	---	< 0.0030
	25-Jun-2015	0.0035	< 0.00060	0.0028	0.092	< 0.0010	---	0.21	< 0.000020	< 0.0010	0.00043	< 0.00020	< 0.00020	0.078	---	< 0.0000050	0.00036	0.00072	< 0.10	< 0.00020	8.5	< 0.00010	1.5	< 0.00020	< 0.0010	< 0.0010	0.00086	< 0.0010	< 0.0030
MW-03	07-Mar-2005	< 0.01	0.0007	0.0012	0.0744	< 0.0005	< 0.00005	0.128	< 0.0001	0.0009	0.0012	< 0.0006	< 0.0001	---	< 0.0001	---	0.0008	< 0.0001	---	< 0.0004	---	< 0.0002	0.811	< 0.0005	< 0.0002	0.001	0.0007	< 0.0001	0.003
	17-Nov-2005	0.01	0.0006	0.0014	0.0418	< 0.0005	0.00009	0.119	< 0.0001	< 0.0004	0.0008	0.0008	< 0.0001	---	< 0.0001	---	0.0015	0.0003	---	0.0005	---	< 0.0002	0.828	< 0.0001	< 0.0002	0.0019	0.0007	< 0.0001	< 0.002
	15-Jun-2006	< 0.01	0.0006	0.0013	0.0411	< 0.00045	< 0.00005	0.109	< 0.0001	0.0029	0.0008	0.0007	< 0.0001	---	< 0.0001	---	0.0007	< 0.0001	---	0.0005	---	< 0.0002	0.845	< 0.00005	< 0.0002	0.001	0.0007	< 0.0001	0.01
	12-Jul-2007	< 0.01	0.0004	0.0014	0.0379	< 0.0005	< 0.00005	0.115	< 0.0001	0.0012	0.0008	< 0.0006	0.0005	---	0.00009	---	0.0029	< 0.00001	---	< 0.0002	---	< 0.0002	0.001	0.0007	0.882	< 0.00005	0.0002	< 0.001	< 0.002
	19-Dec-2007	< 0.001	< 0.0002	< 0.001	0.03	< 0.001	---	0.11	< 0.0002	0.002	0.0008	0.0002	0.0002	---	< 0.00005	---	0.0012	0.0042	---	< 0.001	---	< 0.0001	0.82	< 0.0002	< 0.001	0.002	0.0006	0.001	< 0.003
	21-Apr-2009	< 0.001	< 0.0002	0.0013	---	< 0.001	---	---	< 0.000005	< 0.001	0.0006	0.0007	< 0.0002	---	0.000001	---	0.0007	0.001	---	< 0.0002	---	< 0.0001	---	< 0.0002	< 0.001	< 0.001	0.0006	< 0.001	< 0.003
	06-May-2010	< 0.0050	< 0.00040	0.00154	0.0380	< 0.00050	---	0.116	< 0.00010	< 0.0050	0.00076	< 0.0010	< 0.00010	---	< 0.00010	---	0.00079	0.0027	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	0.00079	0.00056	0.00036	< 0.0020
	02-Jun-2011	< 0.0050	< 0.00040	0.00141	0.0389	< 0.00050	---	0.103	< 0.00010	< 0.0050	0.00061	< 0.0010	< 0.00010	---	< 0.000020	---	0.00056	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00058	< 0.00010	< 0.0020
	29-May-2012	< 0.0050	< 0.00040	0.00132	0.0350	< 0.00050	---	0.088	< 0.00010	< 0.0050	0.00062	< 0.0010	< 0.00010	---	< 0.000020	---	0.000535	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00051	< 0.00010	< 0.0030
	10-Jul-2013	< 0.0050	< 0.00040	0.00147	0.0431	< 0.00050	---	0.098	< 0.00010	< 0.0050	0.00073	< 0.0010	< 0.00010	---	< 0.000020	---	0.000682	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00064	< 0.00010	< 0.0030
	16-Jun-2014	< 0.0050	< 0.00040	0.00143	0.0428	< 0.00050	---	0.097	< 0.00010	< 0.0050	0.00070	< 0.0010	< 0.00010	---	< 0.0000050	---	0.000496	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00058	< 0.00010	< 0.0030
	29-Jun-2015	0.0031	< 0.00060	0.0014	0.043	< 0.0010	---	0.12	< 0.000020	< 0.0010	0.00074	0.00036	< 0.00020	0.042	---	0.0000061	0.00073	0.00083	< 0.10	< 0.00020	8.4	< 0.00010	0.88	< 0.00020	< 0.0010	< 0.0010	0.00059	< 0.0010	0.0097
MW-04	08-Mar-2005	< 0.01	0.0009	0.0011	0.0737	< 0.0005	< 0.00005	0.101	< 0.0001	0.0018	0.0007	0.0008	0.0002	---	< 0.0001	---	0.0005	< 0.0001	---	0.0006	---	< 0.0002	0.561	< 0.0005	< 0.0002	0.0007	0.0029	< 0.0001	0.004
	17-Nov-2005	< 0.01	0.0007	0.0006	0.0809	< 0.0005	0.00007	0.093	< 0.0001	0.0007	0.0049	0.0012	< 0.0001	---	0.0002	---	0.003	0.014	---	0.0009	---	< 0.0002	0.616	< 0.0001	< 0.0002	0.0004	0.0025	< 0.0001	0.029
(Duplicate)	17-Nov-2005	0.01	0.0006	0.0007	0.0817	< 0.0005	0.00005	0.097	< 0.0001	0.0009	0.0051	0.0012	< 0.0001	---	0.0001	---	0.0028	0.0132	---	0.0009	---	< 0.0002	0.609	< 0.0001	< 0.0002	0.0004	0.0026	< 0.0001	0.032
	14-Jun-2006	< 0.01	0.0008	0.0006	0.764	< 0.0005	< 0.00005	0.092	< 0.0001	0.0017	< 0.0001	0.0009	< 0.0001	---	< 0.0001	---	0.0005	0.0007	---	0.001	---	< 0.0002	0.585	< 0.00005	< 0.0002	0.0003	0.0028	0.0022	0.005
	13-Jul-2007	< 0.01	< 0.0004	0.0008	0.085	< 0.0005	< 0.00005	0.1	< 0.0001	0.0047	0.0001	< 0.0006	< 0.0001	---	0.0002	---	0.0005	0.0042	---	0.0006	---	< 0.0002	0.59	0.00024	< 0.0002	0.0004	0.0027	0.0009	0.005
	19-Dec-2007	< 0.001	< 0.0002	< 0.001	0.08	< 0.001	---	0.09	< 0.0002	0.001	< 0.0003	0.0006	0.0002	---	< 0.00005	---	0.0006	0.0052	---	< 0.001	---	< 0.0001	0.61	< 0.0002	< 0.001	0.002	0.0023	< 0.001	< 0.003
	21-Apr-2009	< 0.001	< 0.0002	< 0.0002	---	< 0.001	---	---	0.000024	< 0.001	< 0.0003	0.0009	< 0.0002	---	0.000003	---	0.0004	0.0021	---	< 0.0002	---	< 0.0001	---	< 0.0002	< 0.001	< 0.001	0.0029	< 0.001	< 0.003
	06-May-2010	< 0.0050	< 0.00040	0.00117	0.0843	< 0.00050	---	0.098	< 0.00010	< 0.0050	0.00054	< 0.0010	< 0.00010	---	< 0.00010	---	0.00038	0.0047	---	0.00106	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00046	0.00284	0.00072	< 0.0020
	07-Jun-2011	< 0.0050	< 0.00040	< 0.00040	0.0832	< 0.00050	---	0.090	< 0.00010	< 0.0050	0.00015	< 0.0010	< 0.00010	---	< 0.000020	---	0.00038	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00333	< 0.00010	< 0.0020
	30-May-2012	0.0135	< 0.00040	0.00054	0.0954	< 0.00050	---	0.086	< 0.00010	< 0.0050	0.00088	< 0.0010	< 0.00010	---	< 0.000020	---	0.000398	0.0024	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00396	< 0.00010	< 0.0030
(Duplicate)	30-May-2012	0.0112	< 0.00040	0.00059	0.0967	< 0.00050	---	0.087	< 0.00010	< 0.0050	0.00088	< 0.0010	< 0.00010	---	< 0.000020	---	0.000326	0.0022	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	0.00041	0.00404	< 0.00010	< 0.0030
	09-Jul-2013	< 0.0050	< 0.00040	0.00065	0.103	< 0.00050	---	0.091	< 0.00010	< 0.0050	0.00058	< 0.0010	< 0.00010	---	< 0.000020	---	0.000359	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00392	< 0.00010	< 0.0030
	13-Jun-2014	< 0.0050	< 0.00040	0.00053	0.109	< 0.00050	---	0.069	< 0.00010	< 0.0050	0.00035	< 0.0010	< 0.00010	---	< 0.0000050	---	0.000297	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00390	< 0.00010	< 0.0030
	29-Jun-2015	0.0035	< 0.00060	0.00057	0.11	< 0.0010	---	0.094	< 0.000020	< 0.0010	0.00042	< 0.00020	< 0.00020	0.041	---	< 0.0000050	0.00039	0.0018	< 0.10	< 0.00020	4.9	< 0.00010	0.63	< 0.00020	< 0.0010	< 0.0010	0.0038	< 0.0010	< 0.0030
MW-05	08-Mar-2005	< 0.01	0.0008	0.0035	0.0618	< 0.0005	< 0.00005	0.14	< 0.0001	0.0009	0.0008	< 0.0006	0.0002	---	< 0.0001	---	0.0022	< 0.0001	---	0.0004	---	< 0.0002	0.71	< 0.0005	< 0.0002	0.0008	0.0014	0.0002	0.003
	17-Nov-2005	< 0.01	0.0005	0.0081	0.0564	< 0.0005	0.00006	0.116	< 0.0001	< 0.0004	0.001	0.0007	< 0.0001	---	< 0.0001	---	0.0029	0.0022	---	0.0004	---	< 0.0002	0.667	< 0.0001	< 0.0002	0.0009	0.0008	0.0001	< 0.002
	14-Jun-2006	< 0.01	0.0007	0.0051	0.454	< 0.0005	< 0.00005	0.081	< 0.0001	0.0016	0.0007	0.0006	< 0.0001	---	< 0.0001	---	0.0013	0.0002	---	< 0.0004	---	< 0.0002	0.659	< 0.00005	< 0.0002	0.0005	0.0007	0.0008	0.004
	13-Jul-2007	< 0.01	0.0005	0.0018	0.0455	< 0.0005	< 0.00005	0.052	< 0.0001	0.0005	0.0008	0.0009	< 0.0001	---	< 0.0001	---	0.0006	0.0034	---	0.0005	---	< 0.0002	0.684	< 0.00005	< 0.0002	0.0006	0.0007	< 0.0001	0.005
	19-Dec-2007	< 0.001	< 0.0002	0.001	0.04	< 0.001	---	0.06	< 0.0002	0.003	0.0007	< 0.0002	0.0002	---	< 0.00005	---	0.0005	0.0029	---	< 0.001	---	< 0.0001	0.63	< 0.0002	< 0.001	0.002	0.0007	0.001	< 0.003
	21-Apr-2009	< 0.001	< 0.0002	0.0014	---	< 0.001	---	---	< 0.000005	< 0.001	0.0007	0.0008	< 0.0002	---	0.000001	---	0.0006	0.0014	---	< 0.0002	---	< 0.0001	---	< 0.0002	< 0.001	< 0.001	0.0007	< 0.001	< 0.003
	29-Apr-2010	< 0.0050	0.00052	0.00170	0.0478	< 0.00050	---	0.064	< 0.00010	< 0.0050	0.00082	< 0.0010	< 0.00010	---	< 0.00010	---	0.00063	0.0039	---	0.00086	---	< 0.00010	---	< 0.000050	---	0.00088	0.00070	0.00017	0.0025
	25-May-2011	< 0.0050	< 0.00040	0.00159	0.0552	< 0.00050	---	0.052	< 0.00010	< 0.0050	0.00075	< 0.0010	< 0.00010	---	< 0.000020	---	0.00042	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00066	< 0.00010	< 0.0020
	29-May-2012	< 0.0050	< 0.00040	0.00107	0.0455	< 0.00050	---	< 0.050	< 0.00010	< 0.0050	0.00067	< 0.0010	< 0.00010	---	< 0.000020	---	0.000321	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00063	< 0.00010	< 0.0030
	08-Jul-2013	< 0.0050	< 0.00040	0.00136	0.0547	< 0.00050	---	0.050	< 0.00010	< 0.0050	0.00082	< 0.0010	< 0.00010	---	< 0.000020	---	0.000414	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00060	< 0.00010	0.0049
	13-Jun-2014	< 0.0050	< 0.00040	0.00173	0.0486	< 0.00050	---	< 0.050	< 0.00010	< 0.0050	0.00081	< 0.0010	< 0.00010	---	< 0.0000050	---	0.000415	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00071	< 0.00010	< 0.0030

WorleyParsons
resources & energy

Table 4

Groundwater Analytical Results: Dissolved Metals and Trace Elements

PROJECT No.: 307075-01608-100

Monitoring Station	Date (dd-mmm-yyyy)	Dissolved Metals: Aluminum (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Bismuth (mg/L)	Boron (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Copper (mg/L)	Lead (mg/L)	Lithium (mg/L)	Mercury (mg/L)	Total Mercury (mg/L)	Molybdenum (mg/L)	Nickel (mg/L)	Phosphorus (mg/L)	Selenium (mg/L)	Silicon (mg/L)	Silver (mg/L)	Strontium (mg/L)	Thallium (mg/L)	Tin (mg/L)	Titanium (mg/L)	Uranium (mg/L)	Vanadium (mg/L)	Zinc (mg/L)
Canadian Drinking Water AO Guidelines 2014 #1		**0.1**	---	---	---	---	---	---	---	---	---	**1**	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	**5**
Canadian Drinking Water MAC Guidelines 2014 #2		---	**0.006**	**0.01**	**1**	---	---	**5**	**0.005**	**0.05**	---	---	**0.01**	---	**0.001**	**0.001**	---	---	---	**0.05**	---	---	---	---	---	---	---	**0.02**	---	---
	25-Jun-2015	< 0.0030	< 0.00060	0.0018	0.051	< 0.0010	---	0.059	< 0.000020	< 0.0010	0.00084	0.00056	< 0.00020	0.041	---	< 0.0000050	0.00054	0.00091	< 0.10	< 0.00020	6.6	< 0.00010	0.69	< 0.00020	< 0.0010	< 0.0010	0.00072	< 0.0010	0.0034
MW-06	08-Mar-2005	< 0.01	0.0009	0.0042	0.071	< 0.0005	< 0.00005	0.148	< 0.0001	0.0035	0.0012	0.0011	0.0004	---	< 0.0001	---	0.0014	< 0.0001	---	0.0005	---	< 0.0002	1.2	< 0.0005	< 0.0002	0.0008	0.0023	0.0002	0.004
	17-Nov-2005	0.01	0.0005	0.0038	0.0557	< 0.0005	0.00006	0.16	< 0.0001	< 0.0004	0.0012	0.0012	< 0.0001	---	< 0.0001	---	0.0015	0.0004	---	0.0005	---	< 0.0002	1.26	< 0.0001	< 0.0002	0.0015	0.0015	0.0001	< 0.002
	16-Jun-2006	< 0.01	0.0009	0.0034	0.0666	< 0.0005	< 0.00005	0.149	< 0.0001	0.0015	0.0007	0.0014	< 0.0001	---	< 0.0001	---	0.0014	< 0.0001	---	0.0007	---	< 0.0002	1.28	< 0.0005	< 0.0002	0.001	0.0016	< 0.001	0.008
	12-Jul-2007	< 0.01	0.0005	0.0042	0.043	< 0.0005	< 0.00005	0.159	< 0.0001	0.0014	0.0009	0.0014	< 0.0001	---	< 0.0001	---	0.0016	0.006	---	< 0.0004	---	< 0.00021	1.42	< 0.0005	< 0.0002	0.0014	0.0016	< 0.0001	0.003
	19-Dec-2007	< 0.001	< 0.0002	0.003	0.03	< 0.001	---	0.13	< 0.0002	0.002	0.0008	0.0011	0.0002	---	< 0.00005	---	0.0012	0.0052	---	< 0.001	---	< 0.0001	1.4	< 0.0002	< 0.001	0.002	0.0018	0.001	< 0.003
	22-Apr-2009	< 0.001	< 0.0002	0.005	---	< 0.001	---	---	0.000009	< 0.001	0.0004	< 0.0002	< 0.0002	---	< 0.000001	---	0.001	0.0015	---	< 0.0002	---	< 0.0001	---	< 0.0002	< 0.001	< 0.001	0.0017	< 0.001	< 0.003
	06-May-2010	< 0.0050	< 0.00040	0.00507	0.0353	< 0.00050	---	0.150	< 0.00010	< 0.0050	0.00052	0.0012	< 0.00010	---	< 0.00010	---	0.00094	0.0039	---	0.00041	---	< 0.00010	---	< 0.000050	---	0.00125	0.00146	0.00016	0.0063
	07-Jun-2011	0.0288	< 0.00040	0.00570	0.0309	< 0.00050	---	0.138	< 0.00010	< 0.0050	0.00036	< 0.0010	< 0.00010	---	< 0.000020	---	0.00080	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	0.00063	0.00180	0.00016	< 0.0020
	29-May-2012	0.0104	< 0.00040	0.00525	0.0265	< 0.00050	---	0.122	< 0.00010	< 0.0050	0.00030	< 0.0010	< 0.00010	---	< 0.000020	---	0.000878	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00173	< 0.00010	0.0036
	08-Jul-2013	< 0.0050	< 0.00040	0.00544	0.0315	< 0.0010	---	0.123	< 0.00010	< 0.0050	0.00036	< 0.0010	< 0.00010	---	< 0.000020	---	0.00097	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.00010	---	< 0.00060	0.00158	< 0.00020	< 0.0030
	12-Jun-2014	< 0.0050	< 0.00040	0.00505	0.0315	< 0.00050	---	0.112	< 0.00010	< 0.0050	0.00030	< 0.0010	< 0.00010	---	< 0.0000050	---	0.00084	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00060	0.00169	< 0.00020	< 0.0030
	25-Jun-2015	< 0.0030	< 0.00060	0.0045	0.033	< 0.0010	---	0.15	< 0.000020	< 0.0010	< 0.00030	< 0.00020	< 0.00020	0.11	---	< 0.0000050	0.0010	< 0.00050	0.18	< 0.00020	7.6	< 0.00010	1.4	< 0.00020	< 0.0010	< 0.0010	0.0016	< 0.0010	< 0.0030
MW-07	09-Mar-2005	< 0.01	0.0008	0.0017	0.0733	< 0.0005	< 0.00005	0.366	< 0.0001	0.0017	0.0026	0.0024	0.0004	---	< 0.0001	---	0.001	< 0.0001	---	0.0008	---	< 0.0002	2.49	< 0.0005	< 0.0002	0.0012	0.0018	< 0.0001	0.006
	17-Nov-2005	< 0.01	0.0007	0.0019	0.053	< 0.0005	0.00005	0.311	< 0.0001	< 0.0004	0.002	0.0018	< 0.0001	---	< 0.0001	---	0.001	< 0.0001	---	< 0.0004	---	< 0.0002	2.45	< 0.0001	< 0.0002	0.0009	0.0017	< 0.0001	< 0.002
	16-Jun-2006	< 0.01	0.0007	0.0022	0.0543	< 0.0005	< 0.00005	0.312	< 0.0001	0.0018	0.0012	0.0023	< 0.0001	---	< 0.0001	---	0.0008	< 0.0001	---	0.0007	---	< 0.0002	2.58	< 0.00005	< 0.0002	0.001	0.0017	< 0.0001	0.006
	12-Jul-2007	< 0.01	0.0005	0.0027	0.0596	< 0.0005	< 0.00005	0.289	< 0.0001	0.0011	0.0014	0.0015	< 0.0001	---	< 0.0001	---	0.0012	0.0056	---	0.0008	---	< 0.0002	2.49	< 0.00005	< 0.0002	0.0011	0.0016	< 0.0001	0.002
	19-Dec-2007	< 0.001	< 0.0002	0.001	0.04	< 0.001	---	0.26	< 0.0002	0.004	0.0013	0.0016	0.0003	---	< 0.00005	---	0.0011	0.0059	---	< 0.001	---	< 0.0001	2.2	< 0.0002	< 0.001	0.002	0.0014	0.002	0.003
	22-Apr-2009	< 0.001	< 0.0002	0.0021	---	< 0.001	---	---	0.000016	< 0.001	0.0013	0.0007	< 0.0002	---	< 0.000001	---	0.0004	0.0024	---	< 0.0002	---	< 0.0001	---	< 0.0002	< 0.001	< 0.001	0.0016	< 0.001	< 0.003
	05-May-2010	< 0.0050	< 0.00040	0.00361	0.0490	< 0.00050	---	0.279	< 0.00010	< 0.0050	0.00128	0.0014	< 0.00010	---	< 0.00010	---	0.00097	0.0056	---	0.00127	---	< 0.00010	---	< 0.000050	---	0.00109	0.00156	< 0.00010	0.0057
	08-Jun-2011	< 0.0050	< 0.00040	0.00570	0.0954	< 0.00050	---	0.215	< 0.00010	< 0.0050	0.00116	< 0.0010	< 0.00010	---	< 0.000020	---	0.00151	0.0021	---	< 0.00040	---	< 0.00010	---	0.000071	---	0.00030	0.00138	< 0.00010	0.0050
	28-Jul-2011	< 0.0050	< 0.00040	0.00333	0.0483	---	---	0.262	< 0.00010	< 0.0050	---	< 0.0010	< 0.00010	---	< 0.000020	---	---	< 0.0020	---	< 0.00040	---	< 0.00010	---	---	---	---	0.00152	---	< 0.0030
	30-May-2012	0.0116	< 0.00040	0.00376	0.0544	< 0.00050	---	0.240	< 0.00010	< 0.0050	0.00104	< 0.0010	< 0.00010	---	< 0.000020	---	0.000974	0.0026	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00143	< 0.00010	< 0.0030
	11-Jul-2013	< 0.0050	< 0.00050	0.00382	0.0466	< 0.0025	---	0.276	< 0.00010	< 0.0050	0.00097	< 0.0010	< 0.00025	---	< 0.000020	---	0.00088	< 0.0020	---	< 0.00050	---	< 0.00010	---	< 0.00025	---	< 0.0015	0.00140	< 0.00050	< 0.0050
	13-Jun-2014	< 0.0050	< 0.00050	0.00319	0.0298	< 0.00050	---	0.226	< 0.00010	< 0.0050	0.00105	< 0.0010	< 0.00025	---	< 0.0000050	---	0.00067	< 0.0020	---	< 0.00050	---	< 0.00010	---	< 0.000050	---	< 0.0015	0.00170	< 0.00050	< 0.0050
	25-Jun-2015	< 0.0030	< 0.00060	0.0038	0.047	< 0.0010	---	0.29	< 0.000020	< 0.0010	0.0010	< 0.00020	< 0.00020	0.16	---	< 0.0000050	0.0010	0.0011	< 0.10	< 0.00020	8.0	< 0.00010	2.6	< 0.00020	< 0.0010	< 0.0010	0.0016	< 0.0010	< 0.0030
MW-08	09-Mar-2005	< 0.01	0.0006	0.0042	0.084	< 0.0005	< 0.00005	0.244	< 0.0001	0.0011	0.0008	0.001	0.0004	---	< 0.0001	---	0.0012	< 0.0001	---	0.0004	---	< 0.0002	1.4	< 0.0005	< 0.0002	0.0008	0.0011	< 0.0001	0.003
	15-Nov-2005	< 0.01	0.0005	0.0046	0.115	< 0.0005	0.00009	0.184	< 0.0001	0.0005	0.0009	0.001	< 0.0001	---	< 0.0001	---	0.0025	< 0.0001	---	0.0005	---	< 0.0002	1.27	< 0.0001	< 0.0002	0.001	0.0015	< 0.0001	< 0.002
	16-Jun-2006	< 0.01	0.0006	0.0044	0.0629	< 0.0005	< 0.00005	0.206	< 0.0001	0.0012	0.0004	0.0011	< 0.0001	---	< 0.0001	---	0.0011	< 0.0001	---	< 0.0004	---	< 0.0002	1.45	< 0.00005	< 0.0002	0.0008	0.0009	< 0.0001	0.006
	11-Jul-2007	< 0.01	0.0005	0.0052	0.0519	< 0.0005	< 0.00005	0.176	< 0.0001	0.0016	0.0005	0.0012	< 0.0001	---	< 0.0001	---	0.0016	0.0031	---	< 0.0004	---	< 0.0002	1.59	< 0.00005	< 0.0002	0.0012	0.0008	0.0004	0.004
	19-Dec-2007	< 0.001	< 0.0002	0.002	0.03	< 0.001	---	0.17	< 0.0002	0.003	0.0004	0.0006	0.0002	---	< 0.00005	---	0.0014	0.0036	---	< 0.001	---	< 0.0001	1.4	< 0.0002	< 0.001	0.002	0.0008	0.001	< 0.003
	21-Apr-2009	< 0.001	< 0.0002	0.0062	---	< 0.001	---	---	< 0.000005	< 0.001	< 0.0003	0.0016	< 0.0002	---	< 0.000001	---	0.002	0.0017	---	< 0.0002	---	< 0.0001	---	< 0.0002	< 0.001	< 0.001	0.0007	< 0.001	< 0.003
	05-May-2010	< 0.0050	< 0.00040	0.00672	0.0675	< 0.00050	---	0.179	< 0.00010	< 0.0050	0.00035	< 0.0010	< 0.00010	---	< 0.00010	---	0.00168	0.0027	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	0.00094	0.00072	0.00017	0.0163
	07-Jun-2011	< 0.0050	< 0.00040	0.00667	0.0614	< 0.00050	---	0.180	< 0.00010	< 0.0050	0.00036	< 0.0010	< 0.00010	---	< 0.000020	---	0.00154	0.0025	---	0.00159	---	< 0.00010	---	< 0.000050	---	0.00144	0.00080	0.00018	0.0116
	30-May-2012	0.0104	< 0.00040	0.00600	0.0499	< 0.00050	---	0.154	< 0.00010	< 0.0050	0.00018	< 0.0010	< 0.00010	---	< 0.000020	---	0.00137	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00069	< 0.00010	0.0042
	09-Jul-2013	< 0.0050	< 0.00040	0.00767	0.0639	< 0.00050	---	0.163	< 0.00010	< 0.0050	0.00018	< 0.0010	< 0.00010	---	< 0.000020	---	0.00175	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00067	< 0.00010	< 0.0030
	12-Jun-2014	< 0.0050	< 0.00040	0.00675	0.0551	< 0.00050	---	0.130	< 0.00010	< 0.0050	0.00017	< 0.0010	< 0.00010	---	< 0.0000050	---	0.00129	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00071	< 0.00010	< 0.0030
	24-Jun-2015	< 0.0030	< 0.00060	0.0054	0.055	< 0.0010	---	0.18	< 0.000020	< 0.0010	< 0.00030	< 0.00020	< 0.00020	0.092	---	< 0.0000050	0.0014	< 0.00050	< 0.10	< 0.00020	7.7	< 0.00010	1.4	< 0.00020	< 0.0010	< 0.0010	0.00067	< 0.0010	< 0.0030
MW-09	09-Mar-2005	**0.14 #1**	0.0007	0.0019	0.0608	< 0.0005	< 0.00005	0.339	< 0.0001	0.0016	0.0011	0.001	0.0001	---	< 0.0001	---	0.0019	0.0002	---	< 0.0004	---	< 0.0002	0.843	< 0.0005	< 0.0002	0.0058	0.0019	0.0005	0.003
(Duplicate)	09-Mar-2005	**0.12 #1**	0.0007	0.0019	0.0616	< 0.0005	< 0.00005	0.332	< 0.0001	0.0012	0.0012	0.001	0.0003	---	< 0.0001	---	0.0019	0.0002	---	< 0.0004	---	< 0.0002	0.841	< 0.0005	< 0.0002	0.0059	0.0018	0.0004	0.004
	17-Nov-2005	0.02	0.0006	0.0018	0.052	< 0.0005	< 0.0001	0.294	< 0.0001	0.0006	0.0023	0.0011	< 0.0001	---	< 0.0001	---	0.0038	0.0087	---	0.0005	---	< 0.0002	0.869	< 0.0001	< 0.0002	0.0038	0.0015	0.0002	< 0.002
	16-Jun-2006	< 0.01	0.0006	0.0018	0.0389	< 0.0005	< 0.00005	0.289	< 0.0001	0.0013	0.0011	0.0012	< 0.0001	---	< 0.0001	---	0.0015	< 0.0001	---	< 0.0004	---	< 0.0002	0.861	< 0.00005	< 0.0002	0.0008	0.0014	< 0.0001	0.005
	11-Jul-2007	< 0.01	0.0004	0.002	0.0302	< 0.0005	< 0.00005	0.26	< 0.0001	0.0016	0.0009	0.0008	< 0.0001	---	< 0.0001	---	0.0017	0.003	---	< 0.0004	---	< 0.0002	0.961	< 0.00005	< 0.0002	0.0009	0.0014	0.0005	< 0.002
	18-Dec-2007	< 0.001	< 0.0002	0.002	0.02	< 0.001	---	0.26	< 0.0002	< 0.001	0.0009	0.0008	< 0.0002	---	< 0.00005	---	0.0018	0.0023	---	< 0.001	---	< 0.0001	0.81	< 0.0002	< 0.001	0.002	0.0014	< 0.001	0.003
	22-Apr-2009	0.1 #1	< 0.0002	0.0023	---	< 0.001	---	---	0.000008	< 0.001	0.0008	0.0003	< 0.0002	---	< 0.000001	---	0.0016	0.0017	---	< 0.0002	---	< 0.0001	---	< 0.0002	< 0.001	0.005	0.0012	< 0.001	< 0.003
	06-May-2010	< 0.0050	< 0.00040	0.00255	0.0250	< 0.00050	---	0.267	< 0.00010	< 0.0050	0.00085	< 0.0010	< 0.00010	---	< 0.00010	---	0.00158	0.0027	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	0.00078	0.00121	< 0.00010	< 0.0020
(Duplicate)	06-May-2010	< 0.0050	< 0.00040	0.00257	0.0247	< 0.00050	---	0.261	< 0.00010	< 0.0050	0.00086	< 0.0010	< 0.00010	---	< 0.00010	---	0.00154	0.0027	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	0.00077	0.00120	< 0.00010	0.0020
	02-Jun-2011	< 0.0050	< 0.00040	0.00280	0.0294	< 0.00050	---	0.255	< 0.00010	< 0.0050	0.00128	< 0.0010	< 0.00010	---	< 0.000020	---	0.00156	< 0.0020	---	< 0.00040	---	0.00013	---	< 0.000050	---	< 0.00030	0.00132	0.00012	0.0020
(Duplicate)	02-Jun-2011	< 0.0050	< 0.00040	0.00272	0.0296	< 0.00050	---	0.237	< 0.00010	< 0.0050	0.00126	< 0.0010	< 0.00010	---	< 0.000020	---	0.00152	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00128	0.00015	< 0.0020
	29-May-2012	0.0112	< 0.00040	0.00234	0.0209	< 0.00050	---	0.226	< 0.00010	< 0.0050	0.00080	< 0.0010	< 0.00010	---	< 0.000020	---	0.00143	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00121	< 0.00010	0.0030
	10-Jul-2013	< 0.0050	< 0.00040	0.00237	0.0243	< 0.0010	---	0.249	< 0.00010	< 0.0050	0.00138	< 0.0010	< 0.00010	---	< 0.000020	---	0.00154	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.00010	---	< 0.00060	0.00138	< 0.00020	< 0.0030
	13-Jun-2014	< 0.0050	< 0.00040	0.00232	0.0224	< 0.00050	---	0.196	< 0.00010	< 0.0050	0.00120	< 0.0010	< 0.00010	---	< 0.0000050	---	0.00131	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00132	< 0.00010	< 0.0030
	25-Jun-2015	< 0.0030	< 0.00060	0.0020	0.023	< 0.0010	---	0.27	< 0.000020	< 0.0010	0.0011	< 0.00020	< 0.00020	0.081	---	< 0.0000050	0.0016	0.00051	< 0.10	< 0.00020	6.4	< 0.00010	0.88	< 0.00020	< 0.0010	< 0.0010	0.0013	< 0.0010	< 0.0030
MW-10	09-Mar-2005	< 0.01	0.0007	0.003	0.0296	< 0.0005	< 0.00005	0.209	< 0.0001	0.0012	0.0003	0.0007	0.0004	---	< 0.0001	---	0.0009	< 0.0001	---	< 0.0004	---	< 0.0002	1.29	< 0.0005	< 0.0002	0.0008	0.0019	< 0.0001	0.003
	16-Nov-2005	< 0.01	0.0006	0.0037	0.0331	< 0.0005	< 0.0001	0.202	< 0.0001	< 0.0004	0.0005	0.0009	< 0.0001	---	< 0.0001	---	0.001	< 0.0001	---	0.0006	---	< 0.0002	1.43	< 0.0001	< 0.0002	0.0008	0.0015	< 0.0001	< 0.002
	16-Jun-2006	< 0.01	0.0006	0.0036	0.0319	< 0.0005	< 0.00005	0.187	< 0.0001	0.0011	0.0003	0.0009	< 0.0001	---	< 0.0001	---	0.0009	< 0.0001	---	< 0.0004	---	< 0.0002	1.41	< 0.00005	< 0.0002	0.0007	0.0014	< 0.0001	0.009
	11-Jul-2007	< 0.01	0.0005	0.0039	0.0291	< 0.0005	< 0.00005	0.168	< 0.0001	0.0015	0.0004	0.0008	< 0.0001	---	< 0.0001	---	0.0009	0.003	---	< 0.0004	---	< 0.0002	1.55	< 0.00005	< 0.0002	0.0007	0.0013	0.0004	0.015
	18-Dec-2007	< 0.001	< 0.0002	0.002	0.02	< 0.001	---	0.16	< 0.0002	< 0.001	0.0005	0.0006	< 0.0002	---	< 0.00005	---	0.0011	0.0029	---	< 0.001	---	< 0.0001	1.3	< 0.0002	< 0.001	0.002	0.0014	< 0.001	< 0.003
	22-Apr-2009	< 0.001	< 0.0002	0.0044	---	< 0.001	---	---	0.000007	< 0.001	< 0.0003	0.0006	< 0.0002	---	< 0.000001	---	0.0009	0.001	---	< 0.0002	---	< 0.0001	---	< 0.0002	< 0.001	< 0.001	0.0011	< 0.001	< 0.003
	05-May-2010	< 0.0050	< 0.00040	0.00459	0.0290	< 0.00050	---	0.177	< 0.00010	< 0.0050	0.00044	0.0015	< 0.00010	---	< 0.00010	---	0.00097	0.0029	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	0.00083	0.00115	< 0.00010	0.0023
	02-Jun-2011	< 0.0050	< 0.00040	0.00287	0.0321	< 0.00050	---	0.170	< 0.00010	< 0.0050	0.00031	< 0.0010	< 0.00010	---	< 0.000020	---	0.00481	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00133	0.00021	0.0030

WorleyParsons
resources & energy

Table 4

Groundwater Analytical Results: Dissolved Metals and Trace Elements

PROJECT No.: 307075-01608-100

Monitoring Station	Date (dd-mmm-yyyy)	Dissolved Metals: Aluminum (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Bismuth (mg/L)	Boron (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Copper (mg/L)	Lead (mg/L)	Lithium (mg/L)	Mercury (mg/L)	Total Mercury (mg/L)	Molybdenum (mg/L)	Nickel (mg/L)	Phosphorus (mg/L)	Selenium (mg/L)	Silicon (mg/L)	Silver (mg/L)	Strontium (mg/L)	Thallium (mg/L)	Tin (mg/L)	Titanium (mg/L)	Uranium (mg/L)	Vanadium (mg/L)	Zinc (mg/L)
Canadian Drinking Water AO Guidelines 2014 #1		**0.1**	---	---	---	---	---	---	---	---	---	**1**	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	**5**
Canadian Drinking Water MAC Guidelines 2014 #2		---	**0.006**	**0.01**	**1**	---	---	**5**	**0.005**	**0.05**	---	---	**0.01**	---	**0.001**	**0.001**	---	---	---	**0.05**	---	---	---	---	---	---	---	**0.02**	---	---
	30-May-2012	0.0139	< 0.00040	0.00420	0.0273	< 0.00050	---	0.150	< 0.00010	< 0.0050	0.00032	< 0.0010	< 0.00010	---	< 0.000020	---	0.000884	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00113	< 0.00010	< 0.0030
	09-Jul-2013	< 0.0050	< 0.00040	0.00485	0.0295	< 0.00050	---	0.162	< 0.00010	< 0.0050	0.00032	< 0.0010	< 0.00010	---	< 0.000020	---	0.000870	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00116	< 0.00010	< 0.0030
(Duplicate)	09-Jul-2013	< 0.0050	< 0.00040	0.00479	0.0293	< 0.00050	---	0.159	< 0.00010	< 0.0050	0.00031	< 0.0010	< 0.00010	---	< 0.000020	---	0.000863	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00115	< 0.00010	< 0.0030
	12-Jun-2014	< 0.0050	< 0.00040	0.00463	0.0282	< 0.00050	---	0.127	< 0.00010	< 0.0050	0.00031	< 0.0010	< 0.00010	---	< 0.0000050	---	0.000770	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00117	< 0.00010	< 0.0030
(Duplicate)	12-Jun-2014	< 0.0050	< 0.00040	0.00450	0.0293	< 0.00050	---	0.129	< 0.00010	< 0.0050	0.00032	< 0.0010	< 0.00010	---	< 0.0000050	---	0.000782	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00112	< 0.00010	< 0.0030
	24-Jun-2015	< 0.0030	< 0.00060	0.0039	0.030	< 0.0010	---	0.18	< 0.000020	< 0.0010	0.00030	< 0.00020	< 0.00020	0.10	---	< 0.0000050	0.00088	0.00085	< 0.10	< 0.00020	7.1	< 0.00010	1.4	< 0.00020	< 0.0010	< 0.0010	0.0012	< 0.0010	< 0.0030
(Duplicate)	24-Jun-2015	< 0.0030	< 0.00060	0.0040	0.030	< 0.0010	---	0.17	< 0.000020	< 0.0010	0.00031	< 0.00020	< 0.00020	0.10	---	< 0.0000050	0.00087	0.00083	< 0.10	< 0.00020	7.1	< 0.00010	1.4	< 0.00020	< 0.0010	< 0.0010	0.0011	< 0.0010	< 0.0030
MW-11	10-Mar-2005	< 0.01	0.0008	0.0022	0.0494	< 0.0005	< 0.00005	0.189	< 0.0001	0.0011	0.0006	< 0.0006	< 0.0001	---	< 0.0001	---	0.001	< 0.0001	---	< 0.0004	---	< 0.0002	1.27	< 0.0005	< 0.0002	0.0008	0.0012	0.0001	0.004
	16-Nov-2005	0.02	0.0006	0.0025	0.0466	< 0.0005	0.00008	0.227	< 0.0001	0.0006	0.0007	0.0009	< 0.0001	---	< 0.0001	---	0.0009	< 0.0001	---	< 0.0004	---	< 0.0002	1.24	< 0.0001	< 0.0002	0.001	0.0012	< 0.0001	< 0.002
	16-Jun-2006	< 0.01	0.0006	0.0022	0.044	< 0.0005	< 0.00005	0.205	< 0.0001	0.0013	0.0003	0.0009	< 0.0001	---	< 0.0001	---	0.0006	< 0.0001	---	0.0004	---	< 0.0002	1.22	< 0.00005	< 0.0002	0.001	0.0011	< 0.0001	0.009
	11-Jul-2007	< 0.01	0.0004	0.0023	0.0377	< 0.0005	< 0.00005	0.186	< 0.0001	0.0016	0.0004	< 0.0006	< 0.0001	---	< 0.0001	---	0.0007	0.0027	---	< 0.0004	---	< 0.0002	1.35	< 0.00005	< 0.0002	0.0024	0.0011	0.0004	< 0.002
	18-Dec-2007	< 0.001	< 0.0002	< 0.001	0.03	< 0.001	---	0.18	< 0.0002	< 0.001	0.0006	0.0008	< 0.0002	---	< 0.00005	---	0.001	0.0027	---	< 0.001	---	< 0.0001	1.1	< 0.0002	< 0.001	0.003	0.0013	< 0.001	< 0.003
	22-Apr-2009	< 0.001	< 0.0002	0.0024	---	< 0.001	---	---	0.000009	< 0.001	0.0004	0.0007	< 0.0002	---	0.000001	---	0.0007	0.0008	---	< 0.0002	---	< 0.0001	---	< 0.0002	< 0.001	< 0.001	0.001	< 0.001	< 0.003
	05-May-2010	< 0.0050	< 0.00040	0.00259	0.0396	< 0.00050	---	0.189	< 0.00010	< 0.0050	0.00047	< 0.0010	< 0.00010	---	< 0.00010	---	0.00072	0.0027	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	0.00102	0.00100	< 0.00010	0.0023
	02-Jun-2011	< 0.0050	< 0.00040	0.00239	0.0423	< 0.00050	---	0.199	< 0.00010	< 0.0050	0.00047	0.0017	< 0.00010	---	< 0.000020	---	0.00061	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00109	0.00010	0.0105
	30-May-2012	0.0106	< 0.00040	0.00232	0.0386	< 0.00050	---	0.161	< 0.00010	< 0.0050	0.00038	< 0.0010	< 0.00010	---	< 0.000020	---	0.000669	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00100	< 0.00010	< 0.0030
	10-Jul-2013	< 0.0050	< 0.00040	0.00260	0.0424	< 0.00050	---	0.173	< 0.00010	< 0.0050	0.00036	< 0.0010	< 0.00010	---	< 0.000020	---	0.000700	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00116	< 0.00010	< 0.0030
	12-Jun-2014	< 0.0050	< 0.00040	0.00255	0.0421	< 0.00050	---	0.135	< 0.00010	< 0.0050	0.00030	< 0.0010	< 0.00010	---	< 0.0000050	---	0.000539	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	0.00119	0.00099	< 0.00010	< 0.0030
	24-Jun-2015	< 0.0030	< 0.00060	0.0022	0.043	< 0.0010	---	0.19	< 0.000020	< 0.0010	< 0.00030	< 0.00020	< 0.00020	0.079	---	< 0.0000050	0.00065	< 0.00050	< 0.10	< 0.00020	8.0	< 0.00010	1.2	< 0.00020	< 0.0010	< 0.0010	0.0010	< 0.0010	< 0.0030
MW-12	10-Mar-2005	< 0.01	0.0008	0.0022	0.153	< 0.0005	< 0.00005	0.234	< 0.0001	0.0038	0.0008	< 0.0006	0.0004	---	< 0.0001	---	0.0015	< 0.0001	---	< 0.0004	---	< 0.0002	0.915	< 0.0005	< 0.0002	0.0011	0.001	< 0.0001	0.01
	16-Nov-2005	< 0.01	0.0005	0.0026	0.182	< 0.0005	0.00006	0.282	< 0.0001	< 0.0004	0.001	0.0008	< 0.0001	---	< 0.0001	---	0.0013	< 0.0001	---	< 0.0004	---	< 0.0002	0.903	< 0.0001	< 0.0002	0.0008	0.0011	< 0.0001	< 0.002
	16-Jun-2006	< 0.01	0.0006	0.0023	0.178	< 0.0005	< 0.00005	0.251	< 0.00012	0.0016	0.0007	< 0.0006	< 0.0001	---	< 0.0001	---	0.0012	< 0.0001	---	< 0.0004	---	< 0.0002	0.925	< 0.00005	< 0.0002	0.0008	0.001	< 0.0001	0.007
	11-Jul-2007	< 0.01	0.0005	0.0025	0.146	< 0.0005	< 0.00005	0.233	< 0.001	0.0015	0.0012	< 0.0006	< 0.0001	---	< 0.0001	---	0.0017	0.0033	---	< 0.0004	---	< 0.0002	0.972	< 0.00005	< 0.0002	0.0007	0.0009	0.0004	0.004
	18-Dec-2007	< 0.001	< 0.0002	0.002	0.1	< 0.001	---	0.22	< 0.0002	< 0.001	0.0007	< 0.0002	< 0.0002	---	0.00007	---	0.0014	0.0021	---	< 0.001	---	< 0.0001	0.84	< 0.0002	< 0.001	0.002	0.0011	< 0.001	< 0.003
	22-Apr-2009	< 0.001	< 0.0002	0.0026	---	< 0.001	---	---	0.000006	< 0.001	0.0006	0.0008	< 0.0002	---	0.000001	---	0.0012	0.0012	---	< 0.0002	---	< 0.0001	---	< 0.0002	< 0.001	< 0.001	0.0008	< 0.001	< 0.003
	06-May-2010	< 0.0050	< 0.00040	0.00285	0.143	< 0.00050	---	0.242	< 0.00010	< 0.0050	0.00065	< 0.0010	< 0.00010	---	< 0.00010	---	0.00115	0.0022	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	0.00081	0.00083	< 0.00010	< 0.0020
	02-Jun-2011	< 0.0050	< 0.00040	0.00199	0.130	< 0.00050	---	0.244	< 0.00010	< 0.0050	0.00043	< 0.0010	< 0.00010	---	< 0.000020	---	0.00102	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00087	< 0.00010	0.0021
	30-May-2012	0.0146	< 0.00040	0.00267	0.112	< 0.00050	---	0.219	< 0.00010	< 0.0050	0.00046	< 0.0010	< 0.00010	---	< 0.000020	---	0.00121	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00085	< 0.00010	< 0.0030
	10-Jul-2013	< 0.0050	< 0.00040	0.00285	0.143	< 0.00050	---	0.227	< 0.00010	< 0.0050	0.00045	< 0.0010	< 0.00010	---	< 0.000020	---	0.00115	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00094	< 0.00010	< 0.0030
	12-Jun-2014	< 0.0050	< 0.00040	0.00266	0.125	< 0.00050	---	0.178	< 0.00010	< 0.0050	0.00044	< 0.0010	< 0.00010	---	< 0.0000050	---	0.000921	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00080	< 0.00010	0.0044
	24-Jun-2015	< 0.0030	< 0.00060	0.0022	0.12	< 0.0010	---	0.24	0.000020	< 0.0010	0.00039	< 0.00020	< 0.00020	0.068	---	< 0.0000050	0.0010	0.0015	< 0.10	< 0.00020	7.3	< 0.00010	0.90	< 0.00020	< 0.0010	< 0.0010	0.00075	< 0.0010	< 0.0030
MW-13	10-Mar-2005	< 0.01	0.0008	0.0012	0.389	< 0.0005	< 0.00005	0.258	< 0.0001	0.0048	0.0008	< 0.0006	0.0002	---	< 0.0001	---	0.0023	0.0009	---	< 0.0004	---	< 0.0002	0.57	< 0.0005	< 0.0002	0.0006	0.0008	< 0.0001	0.005
	16-Nov-2005	0.07	0.0006	0.0016	0.413	< 0.0005	< 0.0001	0.301	< 0.0001	0.0007	0.0033	0.0007	0.0002	---	0.0001	---	0.0027	0.0015	---	0.0005	---	< 0.0002	0.542	< 0.0001	< 0.0002	0.0006	0.0009	< 0.0001	< 0.002
	16-Jun-2006	< 0.01	0.0006	0.0014	0.424	< 0.0005	< 0.00005	0.273	< 0.0001	0.0011	0.0007	< 0.0006	< 0.0001	---	< 0.0001	---	0.0021	< 0.0001	---	< 0.0004	---	< 0.0002	0.553	< 0.00005	< 0.0002	0.0006	0.0008	< 0.0001	0.009
	11-Jul-2007	< 0.01	0.0004	0.0014	0.428	< 0.0005	< 0.00005	0.246	< 0.0001	0.0016	0.0009	< 0.0006	< 0.0001	---	< 0.0001	---	0.0023	0.0022	---	< 0.0004	---	< 0.0002	0.58	< 0.00005	< 0.0002	0.0006	0.0008	0.0004	< 0.002
	18-Dec-2007	< 0.001	< 0.0002	0.001	0.29	< 0.001	---	0.25	< 0.0002	< 0.001	0.0009	< 0.0002	< 0.0002	---	0.00007	---	0.0028	0.0016	---	< 0.001	---	< 0.0001	0.5	< 0.0002	< 0.001	0.002	0.0009	< 0.001	< 0.003
	22-Apr-2009	< 0.001	< 0.0002	0.0015	---	< 0.001	---	---	0.000005	< 0.001	0.0007	0.0003	< 0.0002	---	< 0.000001	---	0.0022	0.0012	---	< 0.0002	---	< 0.0001	---	< 0.0002	< 0.001	< 0.001	0.0007	< 0.001	< 0.003
	06-May-2010	< 0.0050	< 0.00040	0.00162	0.407	< 0.00050	---	0.254	< 0.00010	< 0.0050	0.00092	< 0.0010	< 0.00010	---	< 0.00010	---	0.00219	0.0021	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	0.00070	0.00069	< 0.00010	< 0.0020
	02-Jun-2011	< 0.0050	< 0.00040	0.00157	0.411	< 0.00050	---	0.265	< 0.00010	< 0.0050	0.00062	< 0.0010	< 0.00010	---	< 0.000020	---	0.00194	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00073	< 0.00010	< 0.0020
	30-May-2012	< 0.0050	< 0.00040	0.00140	0.354	< 0.00050	---	0.197	< 0.00010	< 0.0050	0.00065	< 0.0010	< 0.00010	---	< 0.000020	---	0.00180	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00063	< 0.00010	< 0.0030
	10-Jul-2013	< 0.0050	< 0.00040	0.00176	0.462	< 0.00050	---	0.221	< 0.00010	< 0.0050	0.00128	< 0.0010	< 0.00010	---	< 0.000020	---	0.00484	0.0112	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00075	< 0.00010	< 0.0030
	12-Jun-2014	0.0371	< 0.00040	0.00179	0.420	< 0.00050	---	0.196	< 0.00010	< 0.0050	0.00074	< 0.0010	< 0.00010	---	< 0.0000050	---	0.00183	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	0.00148	0.00069	0.00013	< 0.0030
	24-Jun-2015	< 0.0030	< 0.00060	0.0014	0.40	< 0.0010	---	0.26	< 0.000020	< 0.0010	0.00062	< 0.00020	< 0.00020	0.048	---	< 0.0000050	0.0022	0.00086	< 0.10	< 0.00020	6.0	< 0.00010	0.52	< 0.00020	< 0.0010	< 0.0010	0.00065	< 0.0010	< 0.0030
QA/QC																													
FIELD BLANK	05-May-2010	< 0.0050	< 0.00040	< 0.00040	< 0.0050	< 0.00050	---	< 0.050	< 0.00010	< 0.0050	< 0.00010	< 0.0010	< 0.00010	---	< 0.00010	---	< 0.00010	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	< 0.00010	< 0.00010	< 0.0020
	25-May-2011	< 0.0050	< 0.00040	< 0.00040	< 0.0050	< 0.00050	---	< 0.050	< 0.00010	< 0.0050	< 0.00010	< 0.0010	< 0.00010	---	< 0.000020	---	< 0.00010	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	< 0.00010	< 0.00010	< 0.0020
	09-Jul-2013	< 0.0050	< 0.00040	< 0.00040	< 0.0050	< 0.00050	---	< 0.050	< 0.00010	< 0.0050	< 0.00010	< 0.0010	< 0.00010	---	< 0.000020	---	< 0.000050	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	< 0.00010	< 0.00010	< 0.0030
	13-Jun-2014	< 0.0050	< 0.00040	< 0.00040	< 0.0050	< 0.00050	---	< 0.050	< 0.00010	< 0.0050	< 0.00010	< 0.0010	< 0.00010	---	< 0.0000050	---	< 0.000050	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	< 0.00010	< 0.00010	< 0.0030
	25-Jun-2015	< 0.0030	< 0.00060	< 0.00020	< 0.010	< 0.0010	---	< 0.020	< 0.000020	< 0.0010	< 0.00030	< 0.00020	< 0.00020	< 0.020	---	< 0.0000050	< 0.00020	< 0.00050	< 0.10	< 0.00020	< 0.10	< 0.00010	< 0.020	< 0.00020	< 0.0010	< 0.0010	< 0.00010	< 0.0010	< 0.0030

NOTES:

1. --- in guideline row(s) denotes no criteria for that parameter.
2. --- in detail data row(s) denotes parameter not analyzed.
3. Highlighting indicates parameters above applied guideline/criteria.
4. Highlighting indicates non-detect parameters above applied guideline/criteria.
5. Highlighting indicates parameters at applied guideline/criteria.
6. Superscript #1 denotes values exceeding
   (Health Canada, October 2014. Guidelines for Canadian Drinking Water Quality. Aesthetic Objective. Summary Table. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment)
7. Superscript #2 denotes values exceeding
   (Health Canada, October 2014. Guidelines for Canadian Drinking Water Quality. Maximum Acceptable Concentration. Summary Table. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment)

WorleyParsons
resources & energy

Table 5

Groundwater Analytical Results: Petroleum Hydrocarbons (PHCs)

PROJECT No.: 307075-01608-100

Monitoring Station	Date (dd-mmm-yyyy)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	m&p-Xylene (mg/L)	o-Xylene (mg/L)	Xylenes (Total) (mg/L)	Styrene (mg/L)	PHC F1 (C_6-C_{10}) (mg/L)	PHC F1 (C_6-C_{10}) - BTEX (mg/L)	PHC F2 (C_{10}-C_{16}) (mg/L)
Canadian Drinking Water AO Guidelines 2014 [#1]		---	0.024	0.0016	---	---	0.02	---	---	---	---
Canadian Drinking Water MAC Guidelines 2014 [#2]		0.005	0.06	0.14	---	---	0.09	---	---	---	---
Groundwater Monitoring											
MW-01	07-Mar-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	17-Nov-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	15-Jun-2006	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	12-Jul-2007	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	19-Dec-2007	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	21-Apr-2009	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	05-May-2010	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	25-May-2011	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	29-May-2012	---	---	---	---	---	---	---	---	---	< 0.25
	10-Jul-2013	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	16-Jun-2014	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	29-Jun-2015	< 0.00040	< 0.00040	< 0.00040	< 0.00080	< 0.00040	< 0.00080	---	< 0.10	< 0.10	< 0.10
MW-02	07-Mar-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	17-Nov-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	15-Jun-2006	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	13-Jul-2007	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	19-Dec-2007	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	21-Apr-2009	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	05-May-2010	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	25-May-2011	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	30-May-2012	---	---	---	---	---	---	---	---	---	< 0.25
	10-Jul-2013	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	0.31
	16-Jun-2014	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	28-Aug-2014	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	25-Jun-2015	< 0.00040	< 0.00040	< 0.00040	< 0.00080	< 0.00040	< 0.00080	---	< 0.10	< 0.10	0.10
MW-03	07-Mar-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	17-Nov-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	15-Jun-2006	< 0.0005	0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	12-Jul-2007	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	19-Dec-2007	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	21-Apr-2009	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	06-May-2010	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	02-Jun-2011	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	29-May-2012	---	---	---	---	---	---	---	---	---	< 0.25
	10-Jul-2013	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	16-Jun-2014	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	29-Jun-2015	< 0.00040	< 0.00040	< 0.00040	< 0.00080	< 0.00040	< 0.00080	---	< 0.10	< 0.10	< 0.10
MW-04	08-Mar-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	17-Nov-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
(Duplicate)	17-Nov-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	14-Jun-2006	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	13-Jul-2007	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	19-Dec-2007	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	21-Apr-2009	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	06-May-2010	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	07-Jun-2011	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	30-May-2012	---	---	---	---	---	---	---	---	---	< 0.25
(Duplicate)	30-May-2012	---	---	---	---	---	---	---	---	---	< 0.25
	09-Jul-2013	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	13-Jun-2014	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	29-Jun-2015	< 0.00040	< 0.00040	< 0.00040	< 0.00080	< 0.00040	< 0.00080	---	< 0.10	< 0.10	< 0.10
MW-05	08-Mar-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	17-Nov-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05

Table 5

Groundwater Analytical Results: Petroleum Hydrocarbons (PHCs)

PROJECT No.: 307075-01608-100

Monitoring Station	Date (dd-mmm-yyyy)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	m&p-Xylene (mg/L)	o-Xylene (mg/L)	Xylenes (Total) (mg/L)	Styrene (mg/L)	PHC F1 (C_6-C_{10}) (mg/L)	PHC F1 (C_6-C_{10}) - BTEX (mg/L)	PHC F2 (C_{10}-C_{16}) (mg/L)
Canadian Drinking Water AO Guidelines 2014 [#1]		**---**	**0.024**	**0.0016**	**---**	**---**	**0.02**	**---**	**---**	**---**	**---**
Canadian Drinking Water MAC Guidelines 2014 [#2]		**0.005**	**0.06**	**0.14**	**---**	**---**	**0.09**	**---**	**---**	**---**	**---**
	14-Jun-2006	< 0.0005	0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	13-Jul-2007	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	19-Dec-2007	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	21-Apr-2009	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	29-Apr-2010	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	25-May-2011	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	29-May-2012	---	---	---	---	---	---	---	---	---	< 0.25
	08-Jul-2013	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	13-Jun-2014	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	25-Jun-2015	< 0.00040	< 0.00040	< 0.00040	< 0.00080	< 0.00040	< 0.00080	---	< 0.10	< 0.10	< 0.10
MW-06	08-Mar-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	17-Nov-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	16-Jun-2006	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	12-Jul-2007	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	19-Dec-2007	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	22-Apr-2009	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	06-May-2010	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	07-Jun-2011	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	29-May-2012	---	---	---	---	---	---	---	---	---	< 0.25
	08-Jul-2013	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	12-Jun-2014	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	25-Jun-2015	< 0.00040	< 0.00040	< 0.00040	< 0.00080	< 0.00040	< 0.00080	---	< 0.10	< 0.10	< 0.10
MW-07	09-Mar-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	17-Nov-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	16-Jun-2006	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	12-Jul-2007	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	19-Dec-2007	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	22-Apr-2009	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	05-May-2010	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	08-Jun-2011	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	28-Jul-2011	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	30-May-2012	---	---	---	---	---	---	---	---	---	< 0.25
	11-Jul-2013	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	13-Jun-2014	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	25-Jun-2015	< 0.00040	< 0.00040	< 0.00040	< 0.00080	< 0.00040	< 0.00080	---	< 0.10	< 0.10	< 0.10
MW-08	09-Mar-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	15-Nov-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	16-Jun-2006	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	11-Jul-2007	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	19-Dec-2007	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	21-Apr-2009	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	05-May-2010	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	07-Jun-2011	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	30-May-2012	---	---	---	---	---	---	---	---	---	< 0.25
	09-Jul-2013	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	12-Jun-2014	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	24-Jun-2015	< 0.00040	< 0.00040	< 0.00040	< 0.00080	< 0.00040	< 0.00080	---	< 0.10	< 0.10	< 0.10
MW-09	09-Mar-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
(Duplicate)	09-Mar-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	17-Nov-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	16-Jun-2006	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	11-Jul-2007	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	18-Dec-2007	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	22-Apr-2009	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	0.3
	06-May-2010	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
(Duplicate)	06-May-2010	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	02-Jun-2011	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25

Table 5

Groundwater Analytical Results: Petroleum Hydrocarbons (PHCs)

PROJECT No.: 307075-01608-100

Monitoring Station	Date (dd-mmm-yyyy)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	m&p-Xylene (mg/L)	o-Xylene (mg/L)	Xylenes (Total) (mg/L)	Styrene (mg/L)	PHC F1 (C_6-C_{10}) (mg/L)	PHC F1 (C_6-C_{10}) - BTEX (mg/L)	PHC F2 (C_{10}-C_{16}) (mg/L)
Canadian Drinking Water AO Guidelines 2014 #1		**---**	**0.024**	**0.0016**	**---**	**---**	**0.02**	**---**	**---**	**---**	**---**
Canadian Drinking Water MAC Guidelines 2014 #2		**0.005**	**0.06**	**0.14**	**---**	**---**	**0.09**	**---**	**---**	**---**	**---**
(Duplicate)	02-Jun-2011	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	29-May-2012	---	---	---	---	---	---	---	---	---	< 0.25
	10-Jul-2013	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	13-Jun-2014	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	25-Jun-2015	< 0.00040	< 0.00040	< 0.00040	< 0.00080	< 0.00040	< 0.00080	---	< 0.10	< 0.10	< 0.10
MW-10	09-Mar-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	16-Nov-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	16-Jun-2006	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	11-Jul-2007	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	18-Dec-2007	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	22-Apr-2009	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	05-May-2010	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	02-Jun-2011	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	30-May-2012	---	---	---	---	---	---	---	---	---	< 0.25
	09-Jul-2013	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
(Duplicate)	09-Jul-2013	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	12-Jun-2014	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
(Duplicate)	12-Jun-2014	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	24-Jun-2015	< 0.00040	< 0.00040	< 0.00040	< 0.00080	< 0.00040	< 0.00080	---	< 0.10	< 0.10	< 0.10
(Duplicate)	24-Jun-2015	< 0.00040	< 0.00040	< 0.00040	< 0.00080	< 0.00040	< 0.00080	---	< 0.10	< 0.10	< 0.10
MW-11	10-Mar-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	16-Nov-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	16-Jun-2006	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	11-Jul-2007	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	18-Dec-2007	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	22-Apr-2009	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	05-May-2010	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	02-Jun-2011	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	30-May-2012	---	---	---	---	---	---	---	---	---	< 0.25
	10-Jul-2013	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	12-Jun-2014	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	24-Jun-2015	< 0.00040	< 0.00040	< 0.00040	< 0.00080	< 0.00040	< 0.00080	---	< 0.10	< 0.10	< 0.10
MW-12	10-Mar-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	16-Nov-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	16-Jun-2006	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	11-Jul-2007	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	18-Dec-2007	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	22-Apr-2009	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	06-May-2010	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	02-Jun-2011	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	30-May-2012	---	---	---	---	---	---	---	---	---	< 0.25
	10-Jul-2013	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	12-Jun-2014	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	24-Jun-2015	< 0.00040	< 0.00040	< 0.00040	< 0.00080	< 0.00040	< 0.00080	---	< 0.10	< 0.10	< 0.10
MW-13	10-Mar-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	16-Nov-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	16-Jun-2006	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	11-Jul-2007	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
	18-Dec-2007	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	22-Apr-2009	< 0.0004	< 0.0004	< 0.0004	---	---	< 0.0008	---	< 0.1	< 0.1	< 0.1
	06-May-2010	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	02-Jun-2011	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	30-May-2012	---	---	---	---	---	---	---	---	---	< 0.25
	10-Jul-2013	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	12-Jun-2014	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	24-Jun-2015	< 0.00040	< 0.00040	< 0.00040	< 0.00080	< 0.00040	< 0.00080	---	< 0.10	< 0.10	< 0.10

WorleyParsons
resources & energy

Table 5

Groundwater Analytical Results: Petroleum Hydrocarbons (PHCs)

PROJECT No.: 307075-01608-100

Monitoring Station	Date (dd-mmm-yyyy)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	m&p-Xylene (mg/L)	o-Xylene (mg/L)	Xylenes (Total) (mg/L)	Styrene (mg/L)	PHC F1 (C_6-C_{10}) (mg/L)	PHC F1 (C_6-C_{10}) - BTEX (mg/L)	PHC F2 (C_{10}-C_{16}) (mg/L)
Canadian Drinking Water AO Guidelines 2014 #1		---	0.024	0.0016	---	---	0.02	---	---	---	---
Canadian Drinking Water MAC Guidelines 2014 #2		0.005	0.06	0.14	---	---	0.09	---	---	---	---
QA/QC											
FIELD BLANK	05-May-2010	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	25-May-2011	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	30-May-2012	---	---	---	---	---	---	---	---	---	< 0.25
	09-Jul-2013	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	13-Jun-2014	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
	25-Jun-2015	< 0.00040	< 0.00040	< 0.00040	< 0.00080	< 0.00040	< 0.00080	---	< 0.10	< 0.10	< 0.10

NOTES:

1. --- in guideline row(s) denotes no criteria for that parameter.
2. --- in detail data row(s) denotes parameter not analyzed.
3. Highlighting indicates parameters above applied guideline/criteria.
4. Highlighting indicates non-detect parameters above applied guideline/criteria.
5. Highlighting indicates parameters at applied guideline/criteria.
6. Superscript #1 denotes values exceeding

(Health Canada, October 2014. Guidelines for Canadian Drinking Water Quality. Aesthetic Objective. Summary Table. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment)

7. Superscript #2 denotes values exceeding

(Health Canada, October 2014. Guidelines for Canadian Drinking Water Quality. Maximum Acceptable Concentration. Summary Table. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment)

Figures

340000 360000 380000

5950000

Twp. 57 Twp. 56 Twp. 55 Twp. 54

Rge. 25 Rge. 24 Rge. 23 Rge. 22 Rge. 21 Rge. 20 Rge. 19

N

Bon Accord
Gibbons
Goose Hummock Golf Resort
STURGEON COUNTY
Range Road 215
Astotin Creek
Range Road 210
Broederheim
Star
LAMONT COUNTY
Lamont
743 m
Dow Chemical Industrial Complex
EDMONTON INTERNATIONAL AIRPORT
STRATHCONA COUNTY
Fort Saskatchewan
Range Road 222
Manning Dr
Range Road 210A
I. D. NO. 13 (ELK ISLAND)

EDMONTON
STUDY AREA
CALGARY

Study Area
County Boundaries

0 5 10 15
Kilometres
1:150,000
NAD 1983 UTM Zone 12N

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2015 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

SITE LOCATION

OneWay to zero harm

Date:	Drawn by:	Edited by:	App'd by:
06-AUG-15	P.K.	.	.

WorleyParsons resources & energy

WorleyParsons Project No. 307075-01608-100

FIG No 1 REV A

USER NAME: peter.kasanchuk ISSUING OFFICE: EDMONTON GIS
PLOT DATE & TIME: never never SAVE DATE & TIME: 06/08/2015 2:00:51 PM

FILE LOCATION: Q:\PROJECTS\NCIA\307076_06086\MXDs\307075-01608-100-WR-FIG-1_site_location.mxd

FILE LOCATION: Q:\PROJECTS\NCIA\307075_01608\MXDs\307075_01608_100-WR-FIG-2_well_locations.mxd

PLOT DATE & TIME: never never
SAVE DATE & TIME: 06/08/2015 2:10:14 PM
USER NAME: peter.kasianchuk
ISSUING OFFICE: EDMONTON GIS

360000

5980000

5960000

5940000

N

MW-13
MW-12
MW-11
MW-10
MW-09
MW-08
MW-07
MW-06
MW-05
MW-04
MW-03
MW-01
MW-02

Twp. 57
Twp. 56
Twp. 55
Twp. 54
Twp. 53

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Rge. 23
Rge. 22
Rge. 21
Rge. 20

Monitoring Well
Beverly Channel
Study Area

0 1 2 3 4 5
Kilometres
1:125,000
NAD 1983 UTM Zone 12N

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2015 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

MONITORING WELL LOCATIONS

OneWay to zero harm

Date: 06-AUG-15	Drawn by: P.K.	Edited by: .	App'd by: .

WorleyParsons resources & energy

WorleyParsons Project No. 307075-01608-100

FIG No 2 | REV A

FILE LOCATION: Q:\PROJECTS\NCIA\307075_01608\MXDs\307075_01608_100-WR-FIG-3_flow_contours.mxd

PLOT DATE & TIME: never never
SAVE DATE & TIME: 07/08/2015 9:55:18 AM
USER NAME: peter.kasianchuk
ISSUING OFFICE: EDMONTON GIS

360000

5980000

5960000

5940000

Twp. 57

Twp. 56

Twp. 55

Twp. 54

Twp. 53

Rge. 23

Rge. 22

Rge. 21

Rge. 20

N

MW-13 (593.83)

MW-12 (593.24)

MW-11 (594.97)

MW-10 (598.00)

MW-09 (596.37)

MW-08 (598.86)

MW-07 (597.07)

MW-06 (598.30)

MW-05 (599.17)

MW-04 (602.31)

MW-03 (601.86)

MW-02 (604.23)

MW-01 (602.92)

594

595

596

597

598

599

600

601

602

603

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

- Monitoring Well
- Groundwater Surface Elevation Contour (masl)
- Inferred Groundwater Flow Direction
- Beverly Channel
- Study Area

0 1 2 3 4 5

Kilometres

1:125,000

NAD 1983 UTM Zone 12N

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2015 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

GROUNDWATER SURFACE ELEVATIONS, JUNE 2015

OneWay to zero harm

WorleyParsons resources & energy

Date:	Drawn by:	Edited by:	App'd by:
25-AUG-15	P.K.	.	.

WorleyParsons Project No.: 307075-01608-100

FIG No: 3

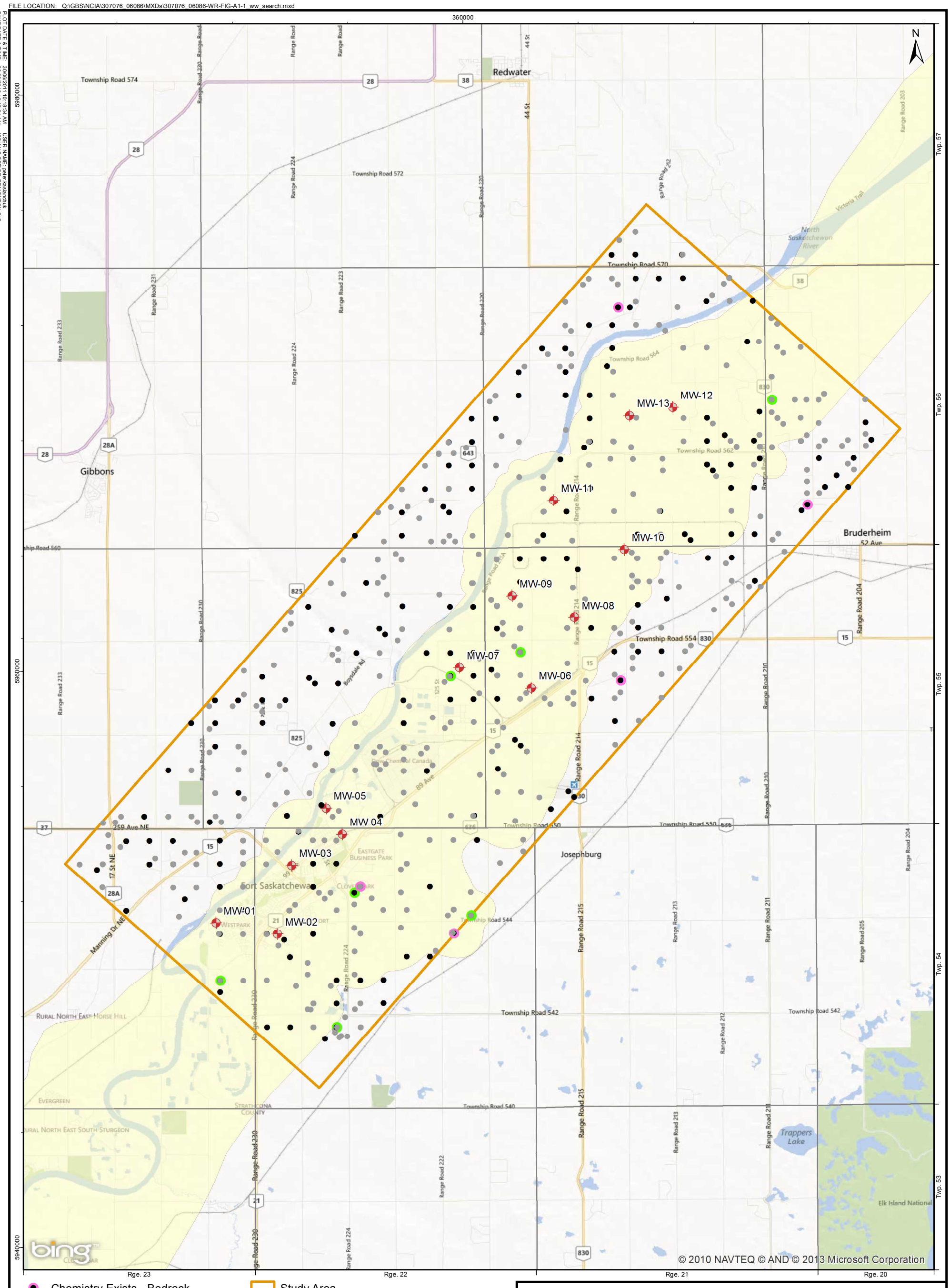
REV: A

Appendices

Appendix 1 Water Well Records

FILE LOCATION: Q:\GBS\NCIA\307076_06086\MXDs\307076_06086-WR-FIG-A1-1_ww_search.mxd

PLOT DATE & TIME: 30/06/2011 10:18:34 AM USER NAME: peter.kasianchuk
SAVE DATE & TIME: 28/08/2013 10:12:24 AM ISSUING OFFICE: EDMONTON GIS



- Chemistry Exists - Bedrock
- Chemistry Exists - Beverly Channel
- Chemistry Exists
- No Chemistry
- NCIA Monitoring Well
- Study Area
- Townships
- Beverly Channel

0 1 2 3 4 5
Kilometres
1:125,000
NAD 1983 UTM Zone 12N

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2015 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

WATER WELL RECORDS WITHIN THE STUDY AREA

OneWay to zero harm

Date: 05-AUG-15	Drawn by: P.K.	Edited by: S.N.	App'd by: .

WorleyParsons resources & energy

WorleyParsons Project No. 307075 - 01608 - 100

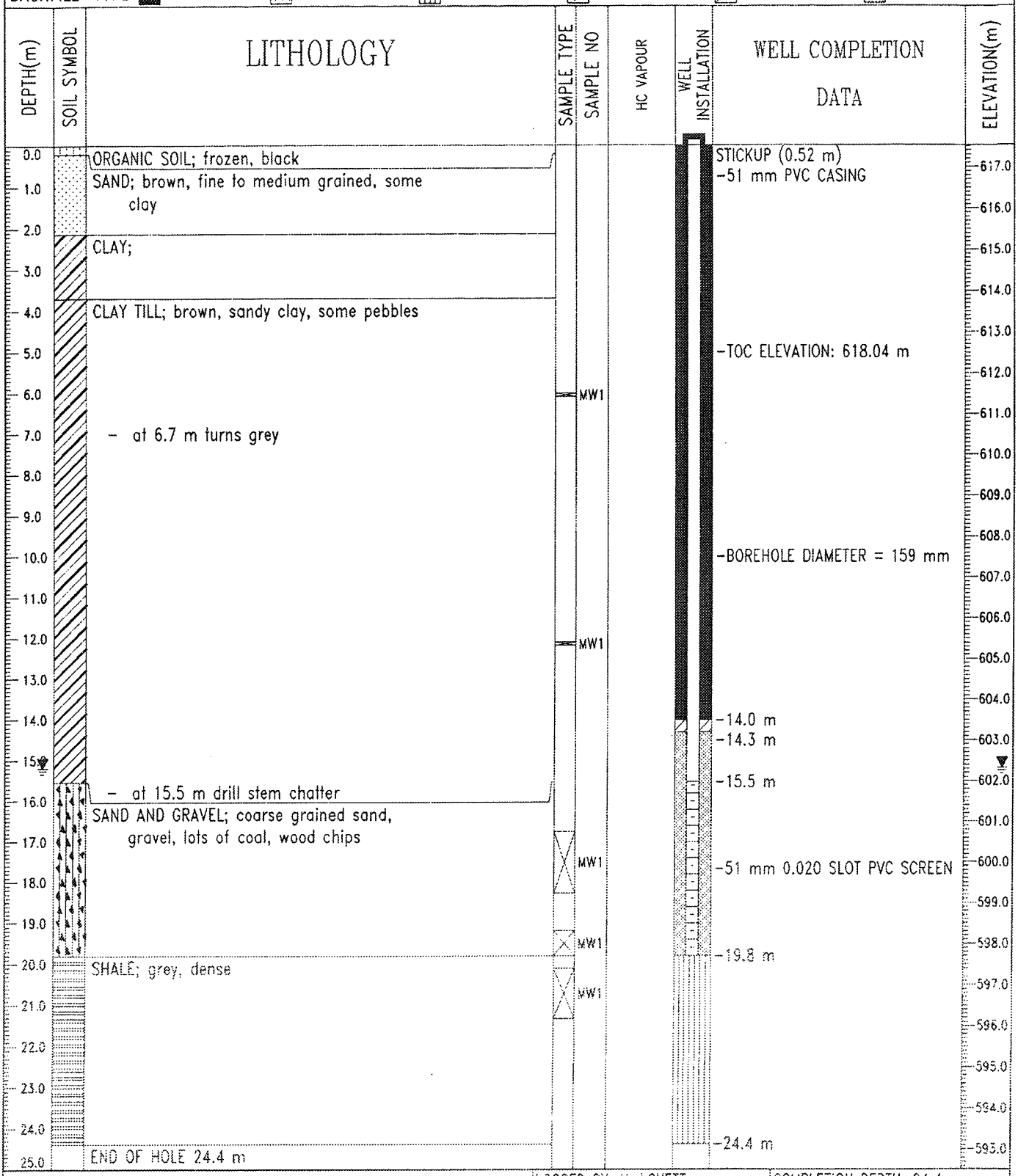
FIG No A1 - 1 | REV A

Appendix 2 Borehole Logs

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-01
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:350335.04 N:5951040.45	ELEVATION: 617.52 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND



Stantec Consulting Ltd.	LOGGED BY: H. LOVETT	COMPLETION DEPTH: 24.4 m
Edmonton, Alberta	REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/24/05
	Fig. No: 17094	Page 1 of 1

05/11/04 07:28PM (PETION-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-02
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:352457.80 N:5950583.37	ELEVATION: 630.71 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
0.0		ORGANIC SOIL; frozen, black					STICKUP (0.60 m)	630.0
1.0		SAND; brown, medium grained					-51 mm PVC CASING	
2.0							-TOC ELEVATION: 631.31 m	629.0
3.0							-BOREHOLE DIAMETER = 159 mm	628.0
4.0								627.0
5.0								626.0
6.0								625.0
7.0		CLAY TILL; brown, sandy clay, silty, some pebbles, coal chips						624.0
8.0								623.0
9.0								622.0
10.0								621.0
11.0								620.0
12.0								619.0
13.0								618.0
14.0		SAND; brown, grey, speckled medium grained sand						617.0
15.0								616.0
16.0								615.0
17.0		CLAY; brown, sandy						614.0
18.0		SAND; grey, medium speckled sand		MW2				613.0
19.0								612.0
20.0								611.0
21.0								610.0
22.0								609.0
23.0								608.0
24.0				MW2				607.0
25.0								606.0

Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT	COMPLETION DEPTH: 38.1 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/24/05
Fig. No: 17094	Page 1 of 2

05/11/04 02:28PM (PELTON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-02
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:352457.80 N:5950583.37	ELEVATION: 630.71 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
25.0								605.0
26.0							-25.9 m	
27.0		SAND AND GRAVEL; coarse grained sand and gravel, coal chips, wood					-26.2 m	604.0
28.0								603.0
29.0		- at 29.0 m lots of chatter on drill stem						602.0
30.0				MW2			-51 mm 0.020 SLOT PVC SCREEN	601.0
31.0								600.0
32.0								599.0
33.0								598.0
34.0		SHALE; grey, dense					-33.8 m	597.0
35.0								596.0
36.0				MW2				595.0
37.0								594.0
38.0		END OF HOLE 38.1 m					-38.1 m	593.0
39.0								592.0
40.0								591.0
41.0								590.0
42.0								589.0
43.0								588.0
44.0								587.0
45.0								586.0
46.0								585.0
47.0								584.0
48.0								583.0
49.0								582.0
50.0								581.0

Stantec Consulting Ltd.
Edmonton, Alberta

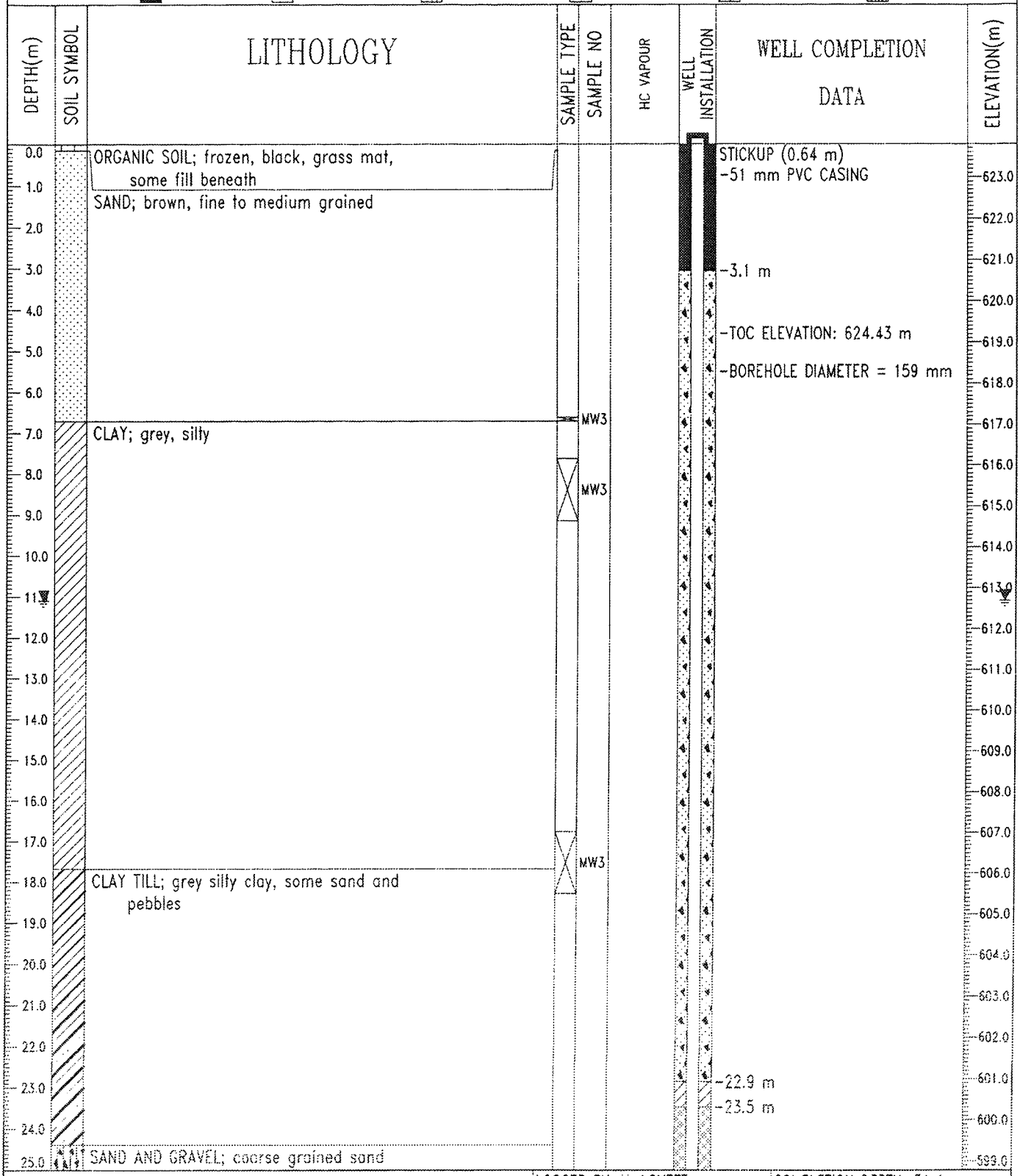
LOGGED BY: H. LOVETT	COMPLETION DEPTH: 38.1 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/24/05
Fig. No: 17094	Page 2 of 2

05/11/04 02:28PM (PELTON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-03
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:353030.21 N:5952940.90	ELEVATION: 623.79 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND



Stantec Consulting Ltd.	LOGGED BY: H. LOVETT	COMPLETION DEPTH: 31.4 m
Edmonton, Alberta	REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/25/05
	Fig. No: 17094	Page 1 of 2

05/11/04 02:28PM (PETCH-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-03
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:353030.21 N:5952940.90	ELEVATION: 623.79 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
25.0	with coal and gravel					-25.0 m	598.0
26.0			MW3				
27.0			MW3			-51 mm 0.020 SLOT PVC SCREEN	597.0
28.0							596.0
29.0							595.0
30.0	SHALE; grey, dense		MW3			-29.6 m	594.0
31.0						-31.4 m	593.0
32.0	END OF HOLE 31.4 m						592.0
33.0							591.0
34.0							590.0
35.0							589.0
36.0							588.0
37.0							587.0
38.0							586.0
39.0							585.0
40.0							584.0
41.0							583.0
42.0							582.0
43.0							581.0
44.0							580.0
45.0							579.0
46.0							578.0
47.0							577.0
48.0							576.0
49.0							575.0
50.0							574.0

Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT	COMPLETION DEPTH: 31.4 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/25/05
Fig. No: 17094	Page 2 of 2

05/11/04 02:26PM (PETION-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-04
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:354823.41 N:5953959.76	ELEVATION: 620.25 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	LITHOLOGY	SAMPLE TYPE / SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
0.0	ORGANIC SOIL; black, frozen				STICKUP (0.54 m)	620.0
1.0	CLAY; grey, sandy				-152 mm PVC CASING	619.0
2.0					-1.5 m	618.0
3.0					-TOC ELEVATION: 620.79 m	617.0
4.0					-BOREHOLE DIAMETER = 222 mm	616.0
5.0						615.0
6.0						614.0
7.0	SAND; brown, fine to coarse grained, pebbles, black speckles	MW4				613.0
8.0						612.0
9.0						611.0
10.0						610.0
11.0						609.0
12.0						608.0
13.0						607.0
14.0						606.0
15.0						605.0
16.0						604.0
17.0	- at 16.8 m finer grained brown sand					603.0
18.0 ▼					-18.3 m	602.0 ▼
19.0	- at 18.3 m back to medium to coarse grained grey/brown sand				-19.5 m	601.0
20.0	SHALE; grey, clay					600.0
21.0		MW4				599.0
22.0	SAND; grey, medium to coarse grained	MW4			-21.6 m	598.0
23.0	SAND AND GRAVEL; grey, coarse grained sand and gravel, wood fibers	MW4				597.0
24.0						596.0
25.0					-155 mm 0.020 SLOT PVC SCREEN	

Stantec Consulting Ltd.
Edmonton, Alberta

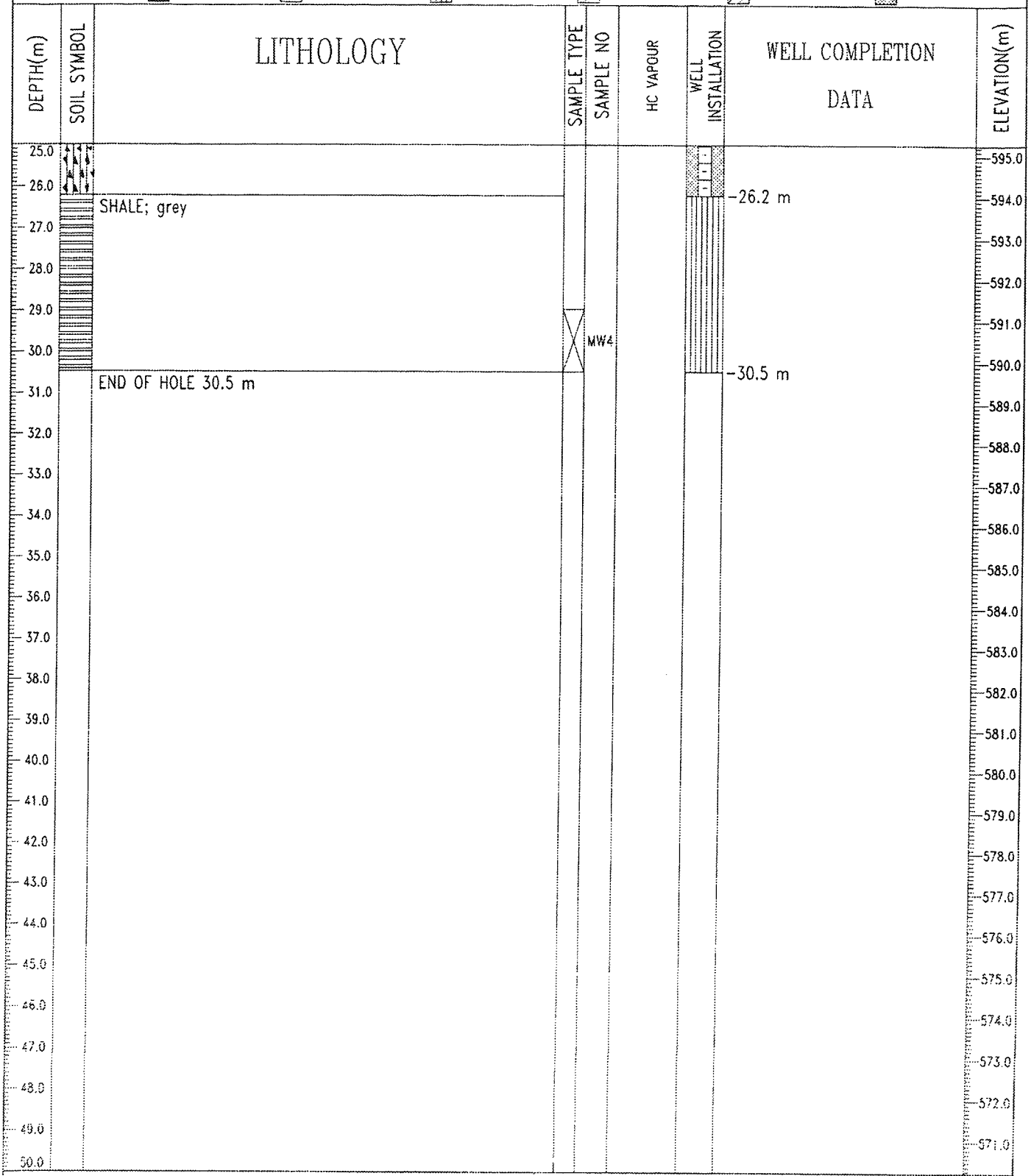
LOGGED BY: H. LOVETT	COMPLETION DEPTH: 30.5 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/25/05
Fig. No: 17094	Page 1 of 2

05/11/04 02:32PM (PETIOR-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-04
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:354823.41 N:5953959.76	ELEVATION: 620.25 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND



Stantec Consulting Ltd.	LOGGED BY: H. LOVETT	COMPLETION DEPTH: 30.5 m
Edmonton, Alberta	REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/25/05
	Fig. No: 17094	Page 2 of 2

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-05
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:354293.74 N:5954889.46	ELEVATION: 624.28 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
0.0		TOPSOIL; frozen, black, some organics					STICKUP (0.61 m)	624.0
1.0		SAND; brown, fine to medium grained					-51 mm PVC CASING	623.0
2.0								622.0
3.0							-3.1 m	621.0
4.0		CLAY; brown, soft, silty					-TOC ELEVATION: 624.89 m	620.0
5.0							-BOREHOLE DIAMTER = 159 mm	619.0
6.0								618.0
7.0		- from 7.3 to 10.7 m blue, silty clay						617.0
8.0								616.0
9.0								615.0
10.0								614.0
11.0		TILL; blue, silty clay, small gravel, multi colored						613.0
12.0								612.0
13.0								611.0
14.0								610.0
15.0								609.0
16.0		GRAVEL; large gravel, multi colored, tower shakes						608.0
17.0		TILL; sandy, sandy clay, fine grained, small gravel, grey						607.0
18.0		SAND AND GRAVEL; grey, medium to coarse grained sand, small gravel						606.0
19.0		CLAY TILL; sandy, grey, fine grained sandy clay till		MW5				605.0
20.0								604.0
21.0								603.0
22.0							-22.6 m	602.0
23.0		- well cemented from 23.2 to 25.0 m					-23.2 m	601.0
24.0								600.0
25.0				MW5				

Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT	COMPLETION DEPTH: 37.5 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 02/03/05
Fig. No: 17094	Page 1 of 2

05/11/04 01:29PM (PELTON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-05
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:354293.74 N:5954889.46	ELEVATION: 624.28 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	LITHOLOGY	SAMPLE NO	WELL COMPLETION DATA	ELEVATION(m)
25.0		MW5		599.0
26.0	SAND; grey, salt and pepper color, fine to medium grained sand			598.0
27.0			-26.8 m	597.0
28.0	GRAVEL; small to large gravel, multi colored, sand and gravel mixed alot	MW	-28.4 m	596.0
29.0				595.0
30.0			-51 mm 0.020 SLOT PVC SCREEN	594.0
31.0			-31.4 m	593.0
32.0	SHALE; grey, dense			592.0
33.0				591.0
34.0				590.0
35.0				589.0
36.0				588.0
37.0			-37.5 m	587.0
38.0	END OF HOLE 37.5 m			586.0
39.0				585.0
40.0				584.0
41.0				583.0
42.0				582.0
43.0				581.0
44.0				580.0
45.0				579.0
46.0				578.0
47.0				577.0
48.0				576.0
49.0				575.0
50.0				

Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT	COMPLETION DEPTH: 37.5 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 02/03/05
Fig. No: 17094	Page 2 of 2

05/11/04 02:29PM (PELTON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-06
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:361559.34 N:5958812.22	ELEVATION: 629.61 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
0.0		TOPSOIL; black/brown, frozen, organics					STICKUP (0.67 m)	629.0
1.0		CLAY; sandy, light brown, fine grained					-51 mm PVC CASING	
2.0								628.0
3.0		- at 3.1 m turns grey, silty					-3.1 m	627.0
4.0				MW6			-TOC ELEVATION: 630.28 m	626.0
5.0							-BOREHOLE DIAMETER = 159 mm	
6.0								625.0
7.0				MW6				624.0
8.0		CLAY TILL; grey, silty, clay, some rocks and pebbles						623.0
9.0								622.0
10.0								621.0
11.0								620.0
12.0								619.0
13.0								618.0
14.0		- at 13.7 m becomes more sandy, firm						617.0
15.0								616.0
16.0								615.0
17.0								614.0
18.0								613.0
19.0								612.0
20.0								611.0
21.0								610.0
22.0								609.0
23.0		SAND; grey, black speckled, medium grained, some silt		MW6				608.0
24.0		CLAY; grey, sandy, silty						607.0
25.0		SAND;						606.0
								605.0

Stantec Consulting Ltd.
Edmonton, Alberta

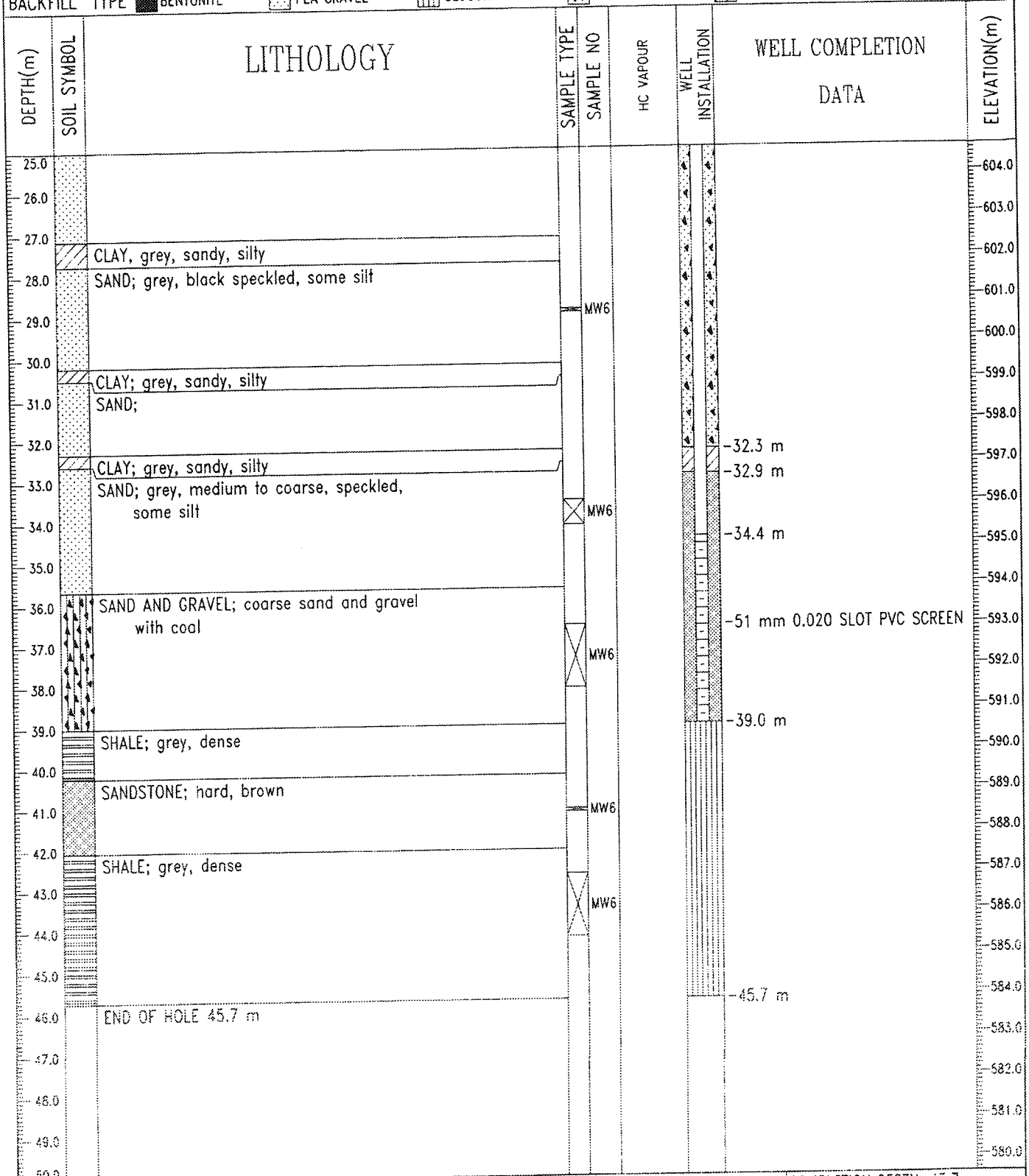
LOGGED BY: H. LOVETT | COMPLETION DEPTH: 45.7 m
REVIEWED BY: D. YOSHISAKA | COMPLETE: 01/31/05
Fig. No: 17094 |

05/11/04 02:42PM (PELTON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-06
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:361559.34 N:5958812.22	ELEVATION: 629.61 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND



Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT	COMPLETION DEPTH: 45.7 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/31/05
Fig. No: 17094	Page 2 of 2

05/11/04 02:42PM (PELTON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-07
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:359089.70 N:5959604.24	ELEVATION: 630.41 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
0.0		SAND; brown, medium to coarse grained sand and gravel					STICKUP (0.60 m)	630.0
1.0							-152 mm PVC CASING	629.0
2.0								628.0
3.0		CLAY; grey, sandy					-TOC ELEVATION: 631.01 m	627.0
4.0		SAND; grey, fine grained					-BOREHOLE DIAMETER = 222 mm	626.0
5.0								625.0
6.0								624.0
7.0								623.0
8.0								622.0
9.0								621.0
10.0		CLAY; grey, sandy						620.0
11.0								619.0
12.0								618.0
13.0		SAND; grey, fine grained						617.0
14.0								616.0
15.0								615.0
16.0								614.0
17.0		CLAY TILL; grey, sandy clay with pebbles						613.0
18.0								612.0
19.0								611.0
20.0								610.0
21.0								609.0
22.0								608.0
23.0								607.0
24.0								606.0
25.0								

Stantec Consulting Ltd.
Edmonton, Alberta

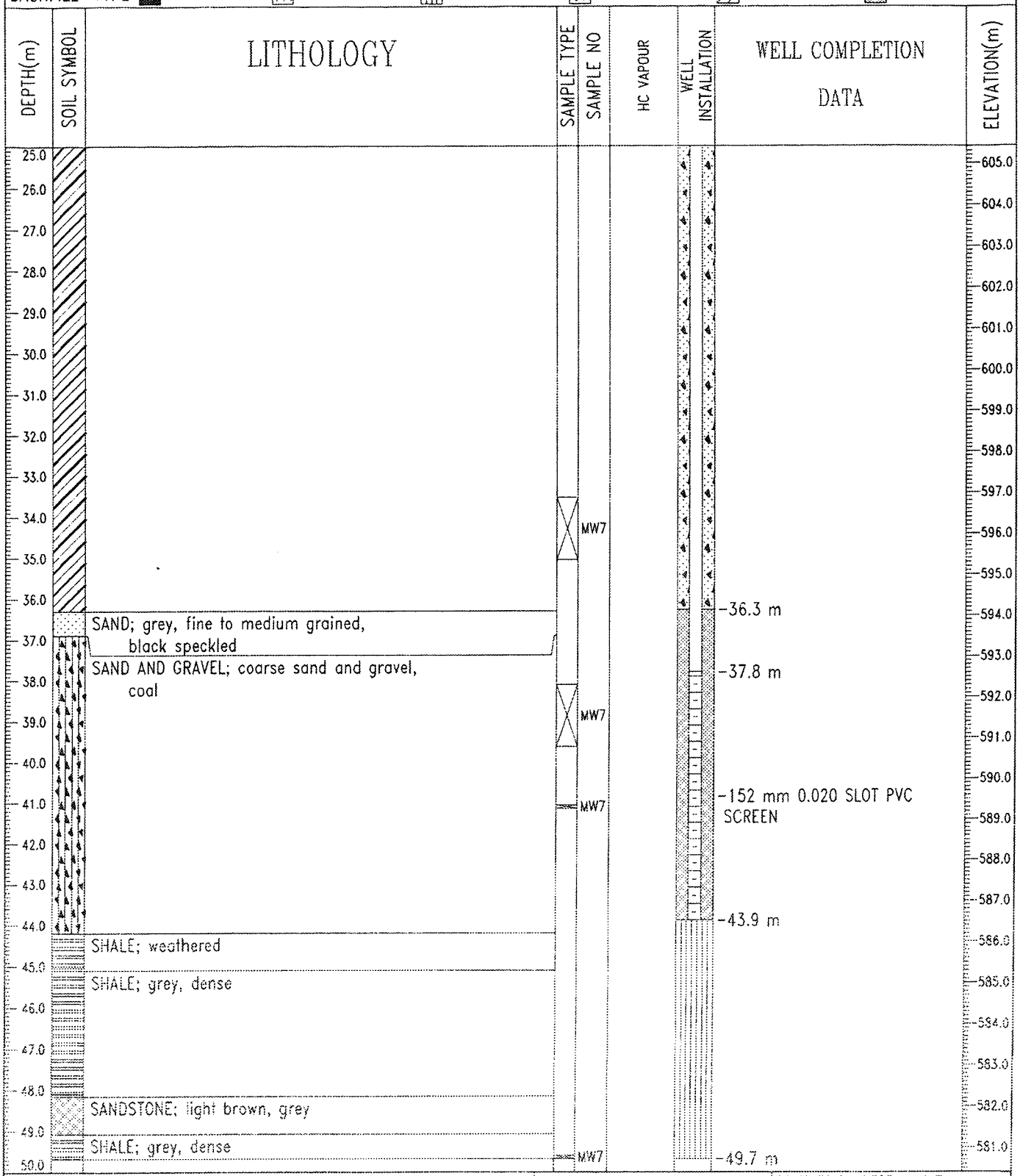
LOGGED BY: H. LOVETT | COMPLETION DEPTH: 49.7 m
REVIEWED BY: D. YOSHISAKA | COMPLETE: 02/14/05
Fig. No: 17094 |

05/11/04 02:47PM (PELTON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-07
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:359089.70 N:5959604.24	ELEVATION: 630.41 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND



Stantec Consulting Ltd. Edmonton, Alberta	LOGGED BY: H. LOVETT	COMPLETION DEPTH: 49.7 m
	REVIEWED BY: D. YOSHISAKA	COMPLETE: 02/14/05
	Fig. No: 17094	Page 2 of 2

05/11/04 02:47PM (PETION-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-08
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:363133.77 N:5961204.95	ELEVATION: 625.87 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
0.0	TOPSOIL; black, roots, grasses					STICKUP (0.57 m)	625.0
1.0	SAND; brown/black grains, fine to medium grained					-51 mm PVC CASING	
2.0	CLAY; brown/grey, silty						624.0
3.0							623.0
4.0						-3.1 m -TOC ELEVATION: 626.44 m -BOREHOLE DIAMETER = 159 mm	622.0
5.0	SAND; silty, brown, very fine grained						621.0
6.0							620.0
7.0							619.0
8.0							618.0
9.0							617.0
10.0	CLAY; blue/grey, silty						616.0
11.0							615.0
12.0							614.0
13.0							613.0
14.0	CLAY TILL; blue clay, sandy						612.0
15.0							611.0
16.0							610.0
17.0							609.0
18.0							608.0
19.0	SAND; coarse grained, grey/brown						607.0
20.0	CLAY TILL; blue clay, small gravel, sandy						606.0
21.0							605.0
22.0			MW8				604.0
23.0							603.0
24.0	SHALE; rafted						602.0
25.0							601.0

Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT	COMPLETION DEPTH: 37.8 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 02/03/05
Fig. No: 17094	Page 1 of 2

05/11/04 02:28PM (PELTON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-08
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:363133.77 N:5961204.95	ELEVATION: 625.87 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
25.0								600.0
26.0		SAND; fine to medium grained, grey, black specks						599.0
27.0								598.0
28.0				MW8			-28.0 m	597.0
29.0							-28.7 m	596.0
30.0				MW8			-30.5 m	595.0
31.0		GRAVEL; brown/black, small gravel, coal chunks					-51 mm 0.020 SLOT PVC SCREEN	594.0
32.0								593.0
33.0				MW8			-33.5 m	592.0
34.0		SHALE; grey, dense						591.0
35.0								590.0
36.0				MW8				589.0
37.0								588.0
38.0		END OF HOLE 37.8 m					-37.8 m	587.0
39.0								586.0
40.0								585.0
41.0								584.0
42.0								583.0
43.0								582.0
44.0								581.0
45.0								580.0
46.0								579.0
47.0								578.0
48.0								577.0
49.0								576.0
50.0								

Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT	COMPLETION DEPTH: 37.8 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 02/03/05
Fig. No: 17094	Page 2 of 2

05/11/24 02:29PM (PELTON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-09
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:361003.46 N:5962032.28	ELEVATION: 624.06 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
0.0		ORGANIC SOIL; frozen, black					STICKUP (0.67 m)	624.0
1.0		CLAY; silty, light brown, some sand, some pebbles					-51 mm PVC CASING	623.0
2.0								622.0
3.0		- at 3.1 m turns darker brown					-TOC ELEVATION: 624.73 m	621.0
4.0							-BOREHOLE DIAMETER = 159 mm	620.0
5.0								619.0
6.0								618.0
7.0								617.0
8.0								616.0
9.0								615.0
10.0								614.0
11.0		CLAY TILL; grey, silty, some pebbles						613.0
12.0								612.0
13.0								611.0
14.0								610.0
15.0		- at 14.6 m becomes sandy						609.0
16.0								608.0
17.0								607.0
18.0		SAND; grey, fine to medium grained, some clay and coal						606.0
19.0		CLAY TILL; grey, fine to medium grained sand and pebbles						605.0
20.0								604.0
21.0								603.0
22.0								602.0
23.0								601.0
24.0								600.0
25.0								

Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT	COMPLETION DEPTH: 43.6 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/28/05
Fig. No: 17094	Page 1 of 2

05/11/04 02:30PM (PETION-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-09
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:361003.46 N:5962032.28	ELEVATION: 624.06 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
25.0							599.0
26.0	SAND; grey, medium grained, some clay, black coal speckles						598.0
27.0							597.0
28.0							596.0
29.0	CLAY; grey, sandy						595.0
30.0	GRAVEL; gravel with coarse sand and gravel					-29.9 m -30.5 m	594.0
31.0			MW9				593.0
32.0	SAND AND GRAVEL; coarse sand and coal with gravel					-32.0 m	592.0
33.0						-51 mm 0.020 SLOT PVC SCREEN	591.0
34.0	GRAVEL; gravel with coarse sand and coal						590.0
35.0							589.0
36.0			MW9			-36.6 m	588.0
37.0							587.0
38.0							586.0
39.0	SHALE; grey, dense						585.0
40.0			MW9				584.0
41.0							583.0
42.0							582.0
43.0						-43.6 m	581.0
44.0	END OF HOLE 43.6 m						580.0
45.0							579.0
46.0							578.0
47.0							577.0
48.0							576.0
49.0							575.0
50.0							

Stantec Consulting Ltd Edmonton, Alberta	LOGGED BY: H. LOVETT	COMPLETION DEPTH: 43.6 m
	REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/28/05
	Fig. No: 17094	Page 2 of 2

05/11/04 02:50PM (PEL GN-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-10
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:364,954.62 N:5,963,505.11	ELEVATION: 624.06 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
0.0		TOPSOIL; brown, frozen, sandy					STICKUP (0.61 m)	624.0
1.0		SAND; brown, fine to medium grained					-152 mm PVC CASING	623.0
2.0								622.0
3.0		- at 3.1 m turns grey, some silt					-3.0 m	621.0
4.0							-TOC ELEVATION: 624.67 m	620.0
5.0							-BOREHOLE DIAMETER = 200 mm	619.0
6.0								618.0
7.0								617.0
8.0		CLAY; grey, silty						616.0
9.0								615.0
10.0								614.0
11.0								613.0
12.0		SAND; grey, fine grained						612.0
13.0								611.0
14.0								610.0
15.0								609.0
16.0		CLAY TILL; grey, silty						608.0
17.0		SILT; sandy, grey, fine grained sand and silt						607.0
18.0		CLAY TILL; grey, silty						606.0
19.0								605.0
20.0								604.0
21.0								603.0
22.0								602.0
23.0		SAND; grey, fine grained, some silt						601.0
24.0								600.0
25.0		CLAY; grey, silty, harder						

Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT | COMPLETION DEPTH: 44.8 m
REVIEWED BY: D. YOSHISAKA | COMPLETE: 01/26/05
Fig. No: 17094

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-10
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:364,954.62 N:5,963,505.11	ELEVATION: 624.06 (m)

SAMPLE TYPE: SHELBY TUBE, NO RECOVERY, GRAB, SPT, A-CASING, CORE

BACKFILL TYPE: BENTONITE, PEA GRAVEL, SLOUGH, GROUT, PELTONITE, SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
25.0								599.0
25.0		SAND; cemented, grey, black speckled						598.0
27.0								597.0
28.0			GRAB	MW10				596.0
29.0								595.0
30.0							-30.2 m	594.0
31.0							-31.4 m	593.0
32.0								592.0
33.0								591.0
34.0		SAND AND GRAVEL; coarse grained sand and gravel, coal	GRAB	MW10			-SHALE BASKET	590.0
35.0								589.0
36.0							-35.7 m	588.0
37.0			GRAB	MW10			-152 mm 0.020 SLOT PVC SCREEN	587.0
38.0								586.0
39.0		GRAVEL; mostly gravel, lots of drill stem chatter, some sand						585.0
40.0								584.0
41.0								583.0
42.0		SHALE; grey, dense					-41.8 m	582.0
43.0			GRAB	MW10				581.0
44.0								580.0
45.0		END OF HOLE 44.8 m					-44.8 m	579.0
46.0								578.0
47.0								577.0
48.0								576.0
49.0								575.0
50.0								

Stantec Consulting Ltd. Edmonton, Alberta	LOGGED BY: H. LOVETT	COMPLETION DEPTH: 44.8 m
	REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/26/05
	Fig. No: 17094	Page 2 of 2

CLIENT: NCIA	DRILLING COMPANY: SPT DRILLING LTD.	BOREHOLE NO: MW-11
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: N:5,965,300.71 E:362,564.36	ELEVATION: 624.491 (m)

SAMPLE TYPE: SHELBY TUBE, NO RECOVERY, GRAB, SPT, A-CASING, CORE

BACKFILL TYPE: BENTONITE, PEA GRAVEL, SLOUGH, GROUT, PELTONITE, SAND

DEPTH (m)	LITHOLOGY	WELL COMPLETION DATA	ELEVATION (m)
0.0	TOPSOIL; soft, black, organic silty soil	-STICKUP (0.67 m)	
	SAND; loose, brown, fine to medium grained	-51 mm PVC CASING	624.0
1.0	CLAY; firm, brown, orange, grey, silty, no pebbles		623.0
2.0	CLAY TILL; firm, brown, sandy clay, grey, silt strands, some orange oxidation, some coal, pebbles		622.0
3.0		-3.0 m	621.0
4.0		-BOREHOLE DIAMETER 160 mm	620.0
5.0	- at 5.5 m turns grey		619.0
6.0	- at 6.4 m damp to moist		618.0
7.0			617.0
8.0			616.0
9.0			615.0
10.0			614.0
11.0			613.0
12.0			612.0
13.0			611.0
14.0			610.0
15.0	- from 15.2 to 17.7 m lots of sand, coarse grained, speckled, larger rocks mixed with clay, wet		609.0
16.0			608.0
17.0	- at 17.7 m returns to firm, grey clay till		607.0
18.0			606.0
19.0	- at 18.9 m small band of coarse grained sand then returns to grey		605.0
20.0			

CLIENT: NCIA	DRILLING COMPANY: SPT DRILLING LTD.	BOREHOLE NO: MW-11
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: N:5,965,300.71 E:362,564.36	ELEVATION: 624.491 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	SLOTTED PIEZOMETER	WELL COMPLETION DATA	ELEVATION(m)
20.0		clay till						604.0
21.0								603.0
22.0								602.0
23.0								601.0
24.0								600.0
25.0								599.0
26.0								598.0
27.0		SAND; loose, fine to medium grained, wet						597.0
28.0								596.0
29.0								595.0
30.0								594.0
31.0								593.0
32.0								592.0
33.0								591.0
34.0								590.0
35.0							-35.1 m	589.0
36.0								588.0
37.0		SAND AND GRAVEL; loose, grey, wet, large gravel						587.0
38.0							-38.1 m	586.0
39.0								585.0
40.0								

Stantec Consulting Ltd. Edmonton, Alberta	LOGGED BY: H. LOVETT	COMPLETION DEPTH: 44.2 m
	REVIEWED BY: H. LOVETT	COMPLETE: 09/24/04
	Fig. No: 17094	Page 2 of 3

CLIENT: NCIA	DRILLING COMPANY: SPT DRILLING LTD.	BOREHOLE NO: MW-11
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: N:5,965,300.71 E:362,564.36	ELEVATION: 624.491 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	SLOTTED PIEZOMETER	WELL COMPLETION DATA	ELEVATION(m)
40.0								584.0
41.0							-51 mm 0.010 SLOT PVC SCREEN	583.0
42.0								582.0
43.0								581.0
44.0							-44.2 m	580.0
45.0		SHALE; dark grey, dry						579.0
46.0								578.0
47.0							-47.2 m	577.0
48.0		END OF HOLE 47.2 m NOTE: ON COMPLETION -backfill borehole with 10/20 grade sand to 44.2 mBGL MONITOR WELL INSTALLED -blue steel casing protector with lock added -above ground PVC stickup (0.67 mAGL) ON SEPTEMBER 24, 2004 -water level at 29.84 mBGL ON SEPTEMBER 28, 2004 -water level at 29.83 mBGL LOCAL COORDINATES: N:5242.77 E:2786.27 NOTE: -Originally installed for Shell Scotford Upgrader 04-10-44						576.0
49.0								575.0
50.0								574.0
51.0								573.0
52.0								572.0
53.0								571.0
54.0								570.0
55.0								569.0
56.0								568.0
57.0								567.0
58.0								566.0
59.0								565.0
60.0								

Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT | COMPLETION DEPTH: 44.2 m
REVIEWED BY: H. LOVETT | COMPLETE: 09/24/04
Fig. No: 17094 |

08/08/29 11:10AM (PETTOH-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-12
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:366805.93 N:5968379.85	ELEVATION: 625.46 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
0.0		MOSS; frozen, green, some organics					STICKUP (0.61 m)	625.0
1.0		SAND; brown, fine to medium grained					-51 mm PVC CASING	624.0
2.0								623.0
3.0							-3.1 m	622.0
4.0							-TOC ELEVATION: 626.07 m	621.0
5.0							-BOREHOLE DIAMETER = 159 mm	620.0
6.0								619.0
7.0								618.0
8.0		CLAY; grey, silty SILT; grey						617.0
9.0								616.0
10.0								615.0
11.0		CLAY; grey, silty						614.0
12.0								613.0
13.0		SILT; grey						612.0
14.0								611.0
15.0		CLAY; grey, silty						610.0
16.0								609.0
17.0								608.0
18.0								607.0
19.0		CLAY TILL; grey, sandy, clay, some silt,						606.0
20.0		some pebbles						605.0
21.0								604.0
22.0								603.0
23.0								602.0
24.0								601.0
25.0								

Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT	COMPLETION DEPTH: 42.7 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/02/05
Fig. No: 17094	Page 1 of 2

05/11/04 02:30PM (PELTON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-12
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:366805.93 N:5968379.85	ELEVATION: 625.46 (m)

SAMPLE TYPE: SHELBY TUBE, NO RECOVERY, GRAB, SPT, A-CASING, CORE

BACKFILL TYPE: BENTONITE, PEA GRAVEL, SLOUGH, GROUT, PELTONITE, SAND

DEPTH(m)	LITHOLOGY	SAMPLE NO	WELL COMPLETION DATA	ELEVATION(m)
25.0				600.0
26.0		MW12		599.0
27.0				598.0
28.0	SAND; grey, medium grained, black speckled	MW12		597.0
29.0				596.0
30.0				595.0
31.0				594.0
32.0				593.0
33.0			-32.9 m -33.5 m	592.0
34.0				591.0
35.0				590.0
36.0			-51 mm 0.020 SLOT PVC SCREEN	589.0
37.0	SAND AND GRAVEL; coarse sand and gravel, coal			588.0
38.0	SHALE; grey, dense	MW12	-38.1 m	587.0
39.0				586.0
40.0	- brown, soft shale			585.0
41.0				584.0
42.0	- grey, dense	MW12	-42.7 m	583.0
43.0	END OF HOLE 42.7 m			582.0
44.0				581.0
45.0				580.0
46.0				579.0
47.0				578.0
48.0				577.0
49.0				576.0
50.0				

Column headings also include: SOIL SYMBOL, SAMPLE TYPE, HC VAPOUR, WELL INSTALLATION

Stantec Consulting Ltd. Edmonton, Alberta	LOGGED BY: H. LOVETT	COMPLETION DEPTH: 42.7 m
	REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/02/05
	Fig. No: 17094	Page 2 of 2

05/11/04 07:50PM (PETCON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-13
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:365292.72 N:5968147.12	ELEVATION: 625.65 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

DEPTH(m)	SOIL SYMBOL	LITHOLOGY	SAMPLE TYPE	SAMPLE NO	HC VAPOUR	WELL INSTALLATION	WELL COMPLETION DATA	ELEVATION(m)
0.0		PEAT MOSS;					STICKUP (0.63 m)	625.0
1.0		SAND; brown, fine to medium grained					-51 mm PVC CASING	624.0
2.0								623.0
3.0							-3.1 m	622.0
4.0							-TOC ELEVATION: 626.28 m	621.0
5.0							-BOREHOLE DIAMETER = 159 mm	620.0
6.0								619.0
7.0								618.0
8.0		CLAY; brown grey, silty						617.0
9.0		SAND; brown, grey, fine to medium grained, some clay						616.0
10.0		CLAY; grey, silty						615.0
11.0								614.0
12.0								613.0
13.0								612.0
14.0								611.0
15.0								610.0
16.0								609.0
17.0								608.0
18.0								607.0
19.0								606.0
20.0		CLAY TILL; grey, sandy (fine to medium grained), clay with pebbles - at 19.8 m rock						605.0
21.0								604.0
22.0								603.0
23.0				MW13				602.0
24.0								601.0
25.0								

Stantec Consulting Ltd.
Edmonton, Alberta

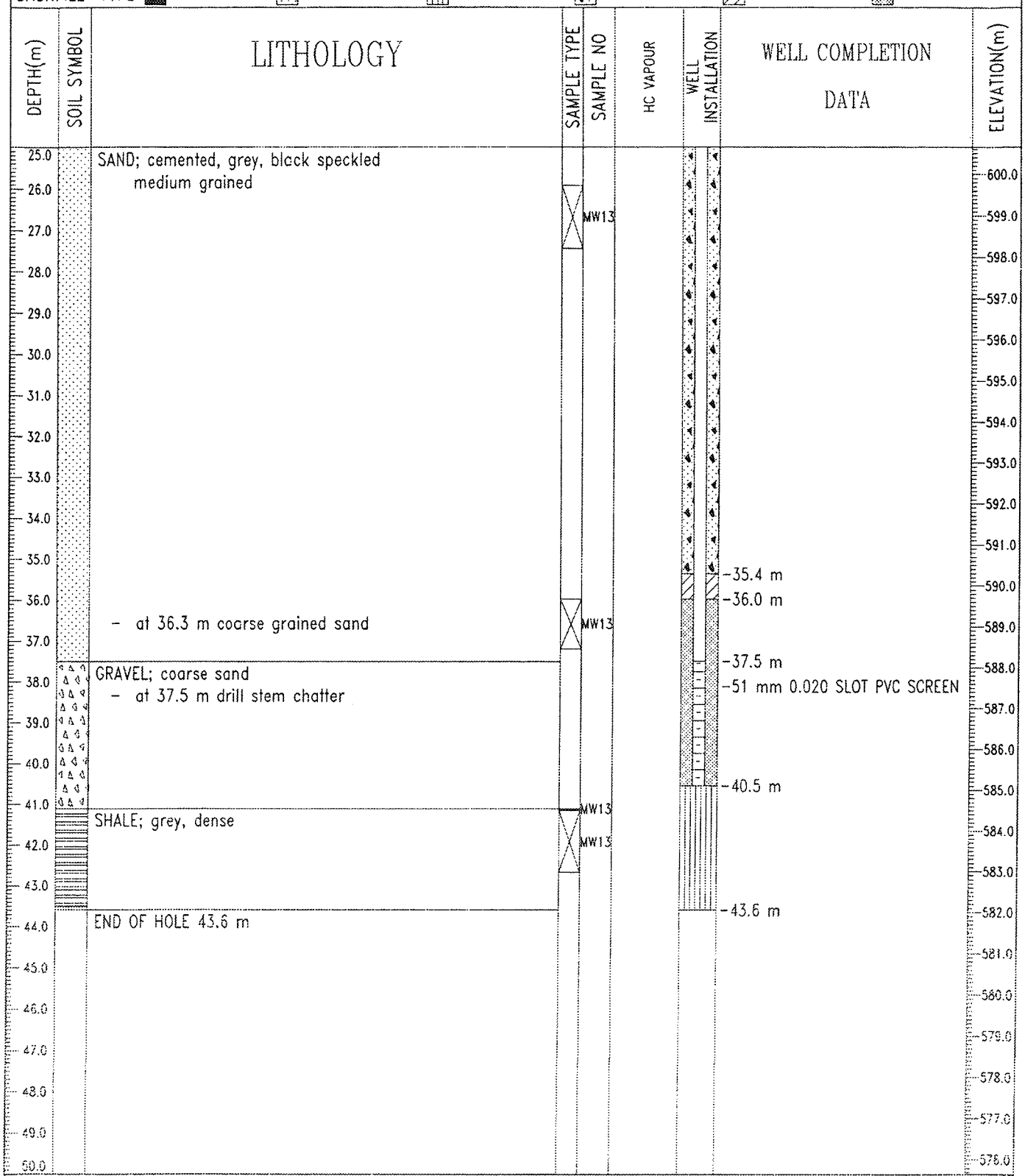
LOGGED BY: H. LOVETT | COMPLETION DEPTH: 43.6 m
REVIEWED BY: D. YOSHISAKA | COMPLETE: 01/02/05
Fig. No: 17094 | Page 1 of 2

05/11/04 02:48PM (FELTON-1)

CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-13
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:365292.72 N:5968147.12	ELEVATION: 625.65 (m)

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | GRAB | SPT | A-CASING | CORE

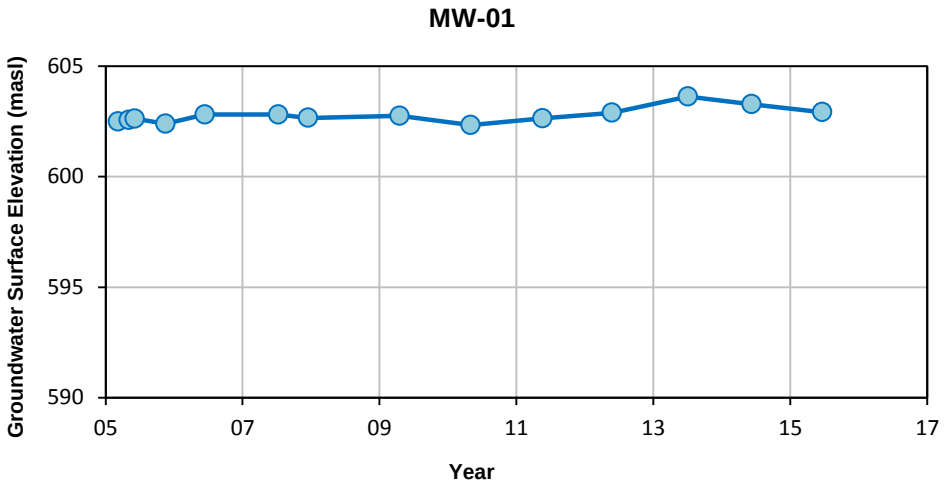
BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | PELTONITE | SAND

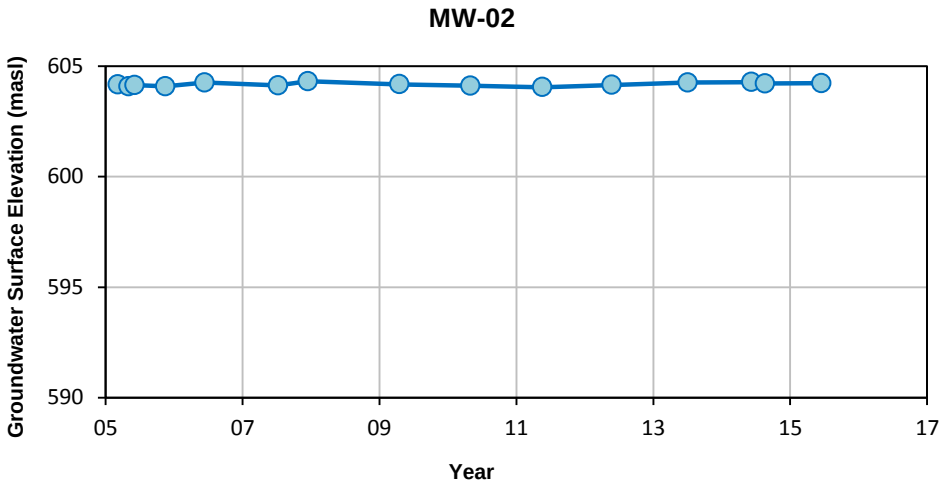


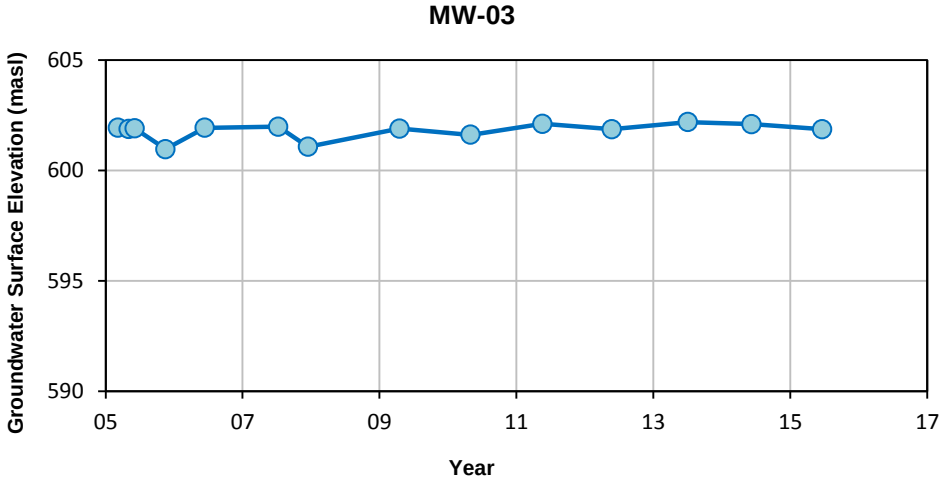
Stantec Consulting Ltd.	LOGGED BY: H. LOVETT	COMPLETION DEPTH: 43.6 m
Edmonton, Alberta	REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/02/05
	Fig. No: 17094	Page 2 of 2

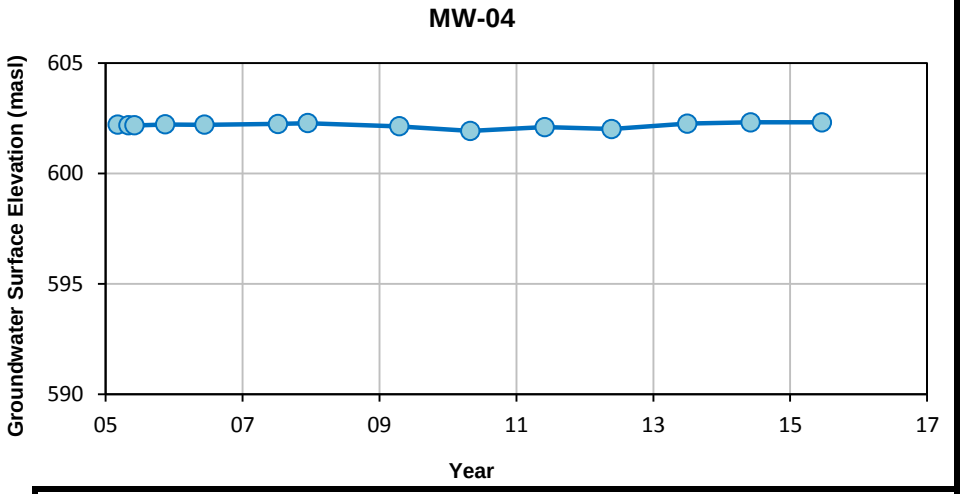
05/11/04 02:48PM (PELTON-1)

Appendix 3 Groundwater Hydrographs









NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2015 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

GROUNDWATER HYDROGRAPHS
MW-01, MW-02, MW-03 and MW-04

Date:	Drawn by:	Edited by:	App'd by:
27-Jul-15	SN		

OneWay to zero harm

WorleyParsons resources & energy

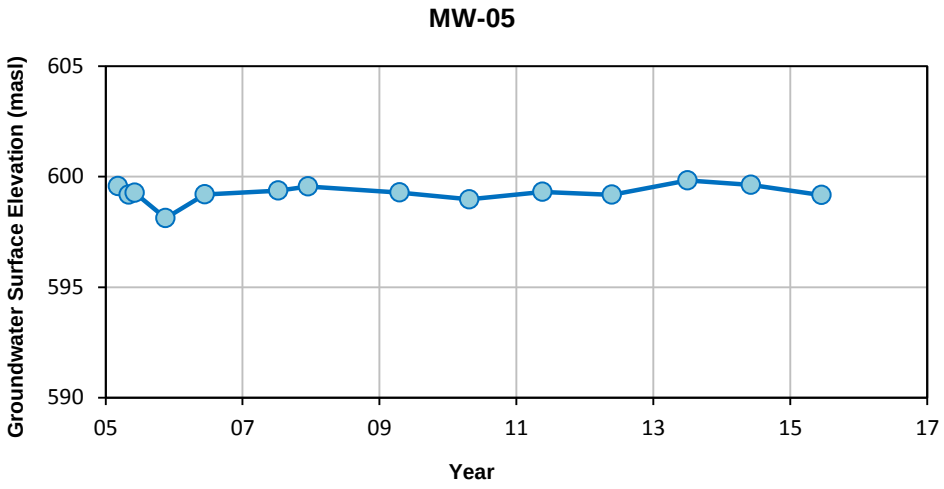
WorleyParsons Project No.: 307075-01608

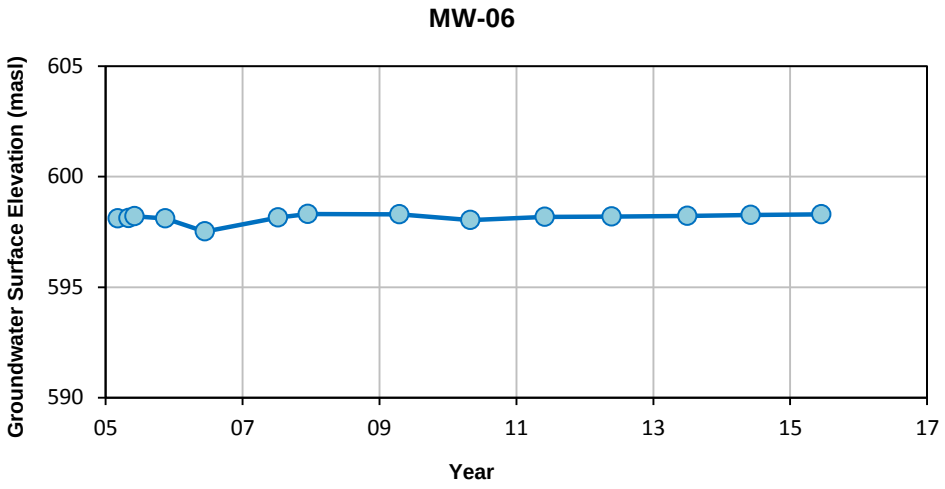
FIG No.: A3-1

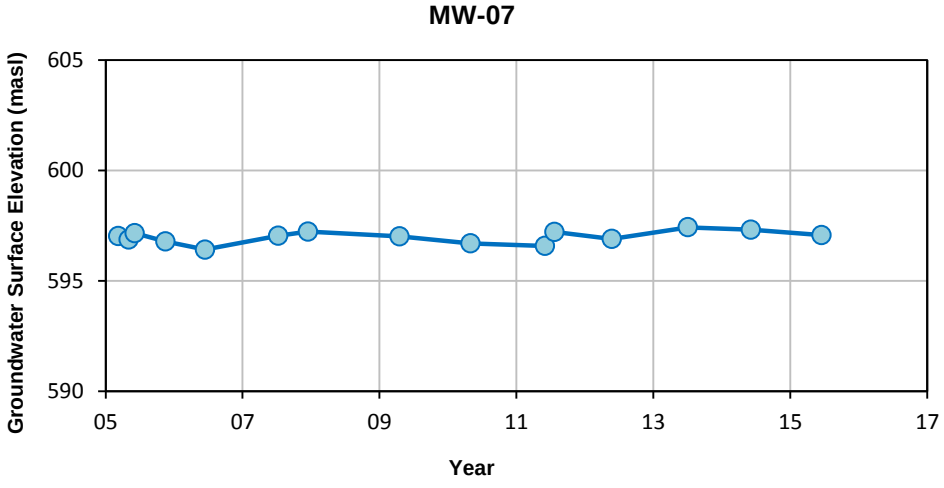
REV: A

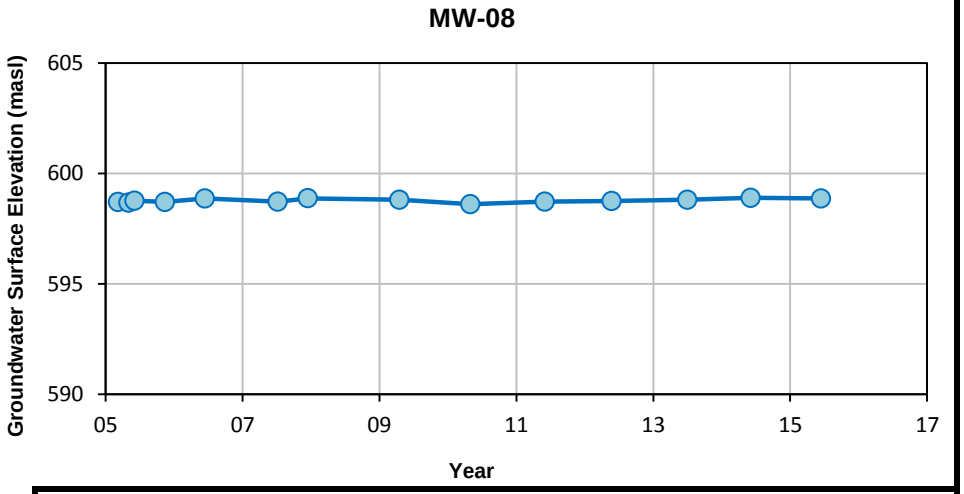
FILE LOCATION: EDMONTON

FILE DIRECTORY: U:\EDM\GBS\307075-01608\100-2015_GWM\12.0_REPORTS\12.3_BACKEND\APP 3-HYDROGRAPHS\EXCEL\









NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2015 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

GROUNDWATER HYDROGRAPHS
MW-05, MW-06, MW-07 and MW-08

Date:	Drawn by:	Edited by:	App'd by:
27-Jul-15	SN		

OneWay to zero harm

WorleyParsons resources & energy

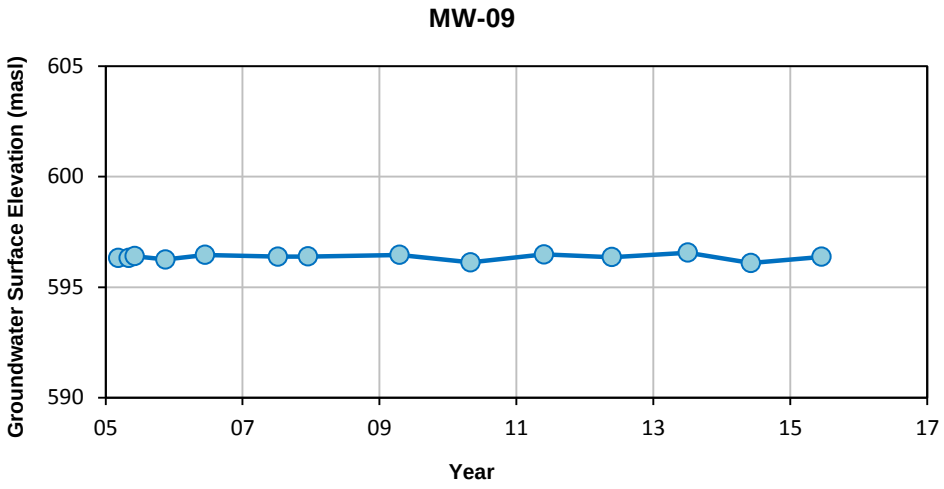
WorleyParsons Project No.: 307075-01608

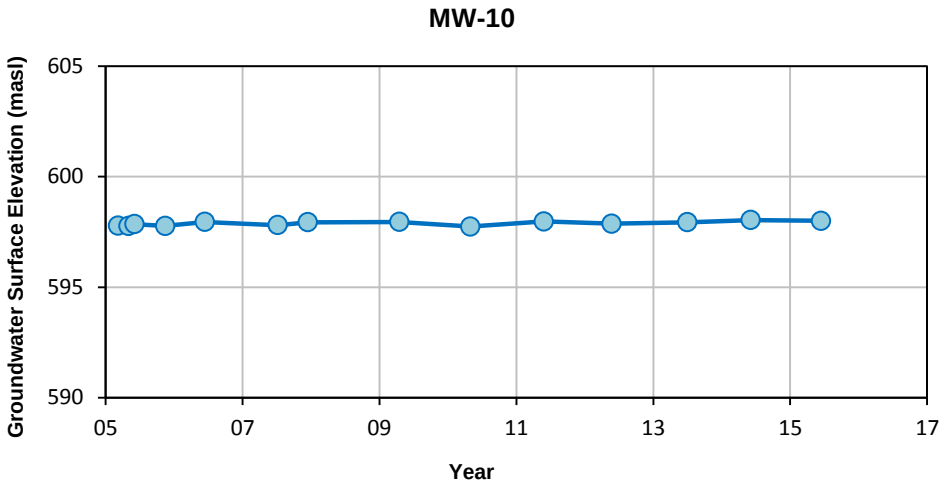
FIG No.: A3-2

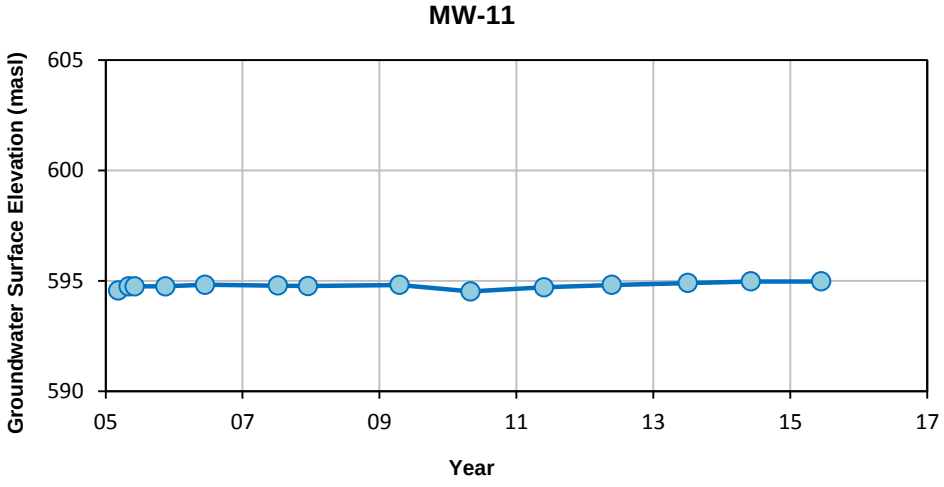
REV: A

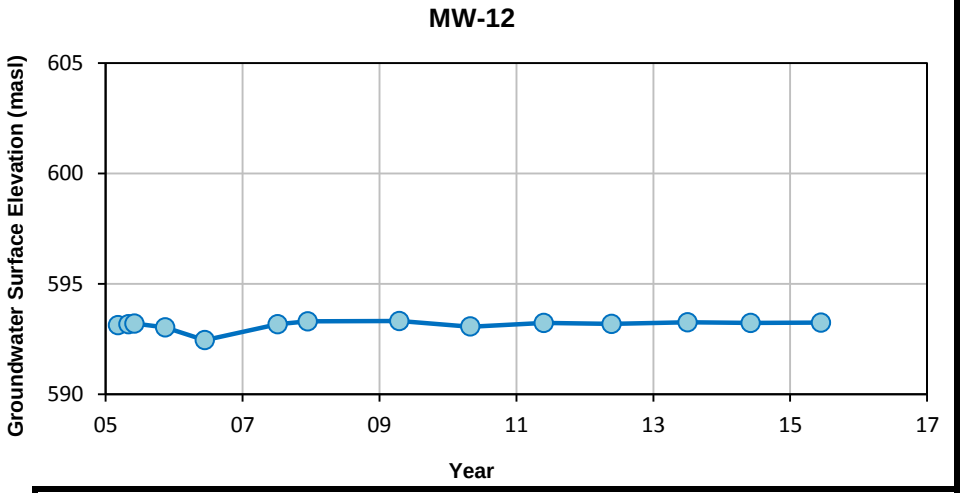
FILE LOCATION: EDMONTON

FILE DIRECTORY: U:\EDM\GBS\307075-01608\100-2015_GWM12.0_REPORTS\12.3_BACKEND\APP 3-HYDROGRAPHS\EXCEL\









NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2015 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

GROUNDWATER HYDROGRAPHS
MW-09, MW-10, MW-11 and MW-12

Date:	Drawn by:	Edited by:	App'd by:
27-Jul-15	SN		

OneWay to zero harm

WorleyParsons resources & energy

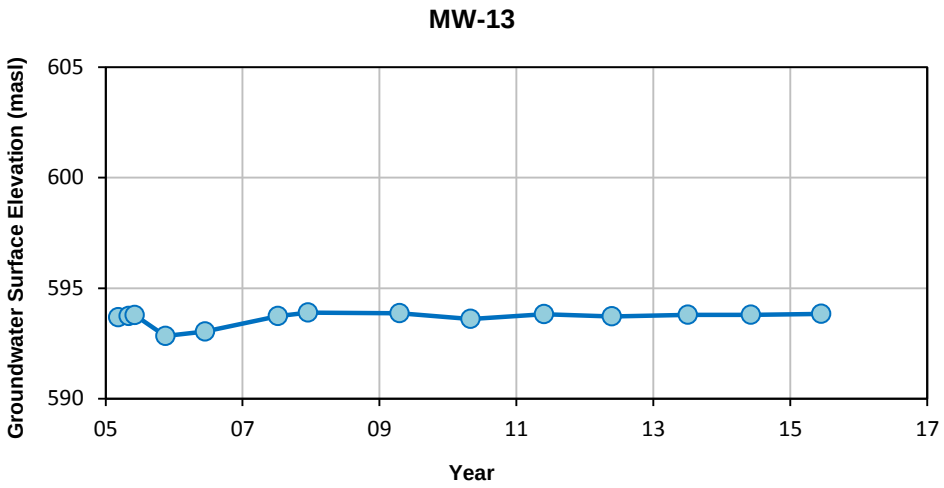
WorleyParsons Project No.: 307075-01608

FIG No.: A3-3

REV: A

FILE LOCATION: EDMONTON

FILE DIRECTORY: U:\EDM\GBS\307075-01608\100-2015_GWM12.0_REPORTS\12.3_BACKEND\APP 3-HYDROGRAPHS\EXCEL\



NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2015 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

GROUNDWATER HYDROGRAPHS
MW-13

Date:	Drawn by:	Edited by:	App'd by:
27-Jul-15	SN		

OneWay to zero harm

WorleyParsons resources & energy

WorleyParsons Project No.: 307075-01608

FIG No.: A3-4

REV: A

FILE LOCATION: EDMONTON

FILE DIRECTORY: U:\EDM\GBS\307075-01608\100-2015_GWM\12.0_REPORTS\12.3_BACKEND\APP 3-HYDROGRAPHS\EXCEL\

Appendix 4 Laboratory Analytical Data

Your Project #: 307075-01608-100
Site Location: NCIA
Your C.O.C. #: A118545

Attention:TREVOR BUTTERFIELD

WORLEYPARSONS
Suite 300, 8615 51 Ave
EDMONTON, AB
CANADA T6E 6A8

Report Date: 2015/08/07
Report #: R2013304
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B553893
Received: 2015/06/25, 07:30

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity @25C (pp, total), CO3,HCO3,OH	6	N/A	2015/06/26	AB SOP-00005	SM 22 2320 B m
BTEX/F1 in Water by HS GC/MS/FID	6	N/A	2015/06/29	AB SOP-00039	CCME CWS/EPA 8260C m
Cadmium - low level CCME - Dissolved	5	N/A	2015/06/27	AB WI-00065	Auto Calc
Cadmium - low level CCME - Dissolved	1	N/A	2015/07/03	AB WI-00065	Auto Calc
Chloride by Automated Colourimetry	6	N/A	2015/06/26	AB SOP-00020	SM 22 4500-Cl G m
Carbon (DOC) (2)	6	N/A	2015/06/26	EENVSOP-00060	MMCW 119 1996 m
Conductivity @25C	6	N/A	2015/06/26	AB SOP-00005	SM 22 2510 B m
Isotopes - Subcontract (1)	6	N/A	2015/08/06		
Fluoride	6	N/A	2015/06/26	AB SOP-00005	SM 22 4500-F C m
CCME Hydrocarbons in Water (F2; C10-C16)	6	2015/06/29	2015/06/30	AB SOP-00040 / AB SOP-00037	CCME PHC-CWS m
Hardness	6	N/A	2015/06/30	AB WI-00065	Auto Calc
Mercury (Total)	6	2015/07/02	2015/07/02	EENVSOP-00031	EPA 1631E/245.1 R3 m
Elements by ICP - Dissolved	6	N/A	2015/06/29	AB SOP-00042	EPA 200.7 CFR 2012 m
Elements by ICPMS - Dissolved	6	N/A	2015/06/26	AB SOP-00043	EPA 200.8 R5.4 m
Ion Balance	6	N/A	2015/06/30	AB WI-00065	Auto Calc
Sum of cations, anions	6	N/A	2015/06/30	AB WI-00065	Auto Calc
Ammonia-N (Dissolved)	6	N/A	2015/06/29	AB SOP-00007	EPA 350.1 R2.0 m
Nitrate and Nitrite	6	N/A	2015/06/26	AB WI-00065	Auto Calc
Nitrate + Nitrite-N (calculated)	6	N/A	2015/06/26	AB WI-00065	Auto Calc
Nitrogen, (Nitrite, Nitrate) by IC	6	N/A	2015/06/26	AB SOP-00023	SM 22 4110 B m
pH @25°C (Alkalinity titrator)	6	N/A	2015/06/26	AB SOP-00005	SM 22 4500 H+ B m
Phenols (4-AAP)	6	N/A	2015/06/26	EENVSOP-00061	MMCW 154 1996 m
Sulphate by Automated Colourimetry	6	N/A	2015/06/26	AB SOP-00018	SM 22 4500-SO4 E m
Total Dissolved Solids (Filt. Residue)	6	2015/06/28	2015/06/29	AB SOP-00065	SM 22 2540 C m
Total Dissolved Solids (Calculated)	6	N/A	2015/06/30	AB WI-00065	Auto Calc

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
(1) This test was performed by Sub Edmonton to ITT
(2) DOC present in the sample should be considered as non-purgeable DOC.

Your Project #: 307075-01608-100
Site Location: NCIA
Your C.O.C. #: A118545

Attention:TREVOR BUTTERFIELD

WORLEYPARSONS
Suite 300, 8615 51 Ave
EDMONTON, AB
CANADA T6E 6A8

Report Date: 2015/08/07
Report #: R2013304
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B553893
Received: 2015/06/25, 07:30

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Alaina Hunter, Dip. BioSci, Project Manager, Environmental
Email: AHunter@maxxam.ca
Phone# (780)577-7139

==========

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

Maxxam Job #: B553893
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN4481 MW-08							
Sampling Date 2015/06/24 12:05							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Parameter							
Subcontract Parameter	ATTACHED	N/A	Bq/l				7994556
Calculated Parameters							
Anion Sum	16	N/A	meq/L				7946734
Cation Sum	16	N/A	meq/L				7946734
Hardness (CaCO3)	540	0.50	mg/L				7946732
Ion Balance	1.0	0.010	N/A				7946733
Dissolved Nitrate (NO3)	<0.044	0.044	mg/L				7946735
Nitrate plus Nitrite (N)	<0.020	0.020	mg/L				7946736
Dissolved Nitrite (NO2)	<0.033	0.033	mg/L				7946735
Total Dissolved Solids	930	10	mg/L				7946743
Misc. Inorganics							
Conductivity	1400	1.0	uS/cm			CH7	7947003
Dissolved Organic Carbon (C)	5.4	0.50	mg/L			NB4	7946921
pH	7.43	N/A	pH			CH7	7946998
Total Dissolved Solids	950	10	mg/L			RPT	7949345
Low Level Elements							
Dissolved Cadmium (Cd)	<0.020	0.020	ug/L				7945946
Anions							
Dissolved Chloride (Cl)	1.6	1.0	mg/L			ARD	7947400
Alkalinity (PP as CaCO3)	<0.50	0.50	mg/L			CH7	7947001
Alkalinity (Total as CaCO3)	470	0.50	mg/L			CH7	7947001
Bicarbonate (HCO3)	570	0.50	mg/L			CH7	7947001
Carbonate (CO3)	<0.50	0.50	mg/L			CH7	7947001
Dissolved Fluoride (F)	0.10	0.050	mg/L			CH7	7947194
Hydroxide (OH)	<0.50	0.50	mg/L			CH7	7947001
Dissolved Sulphate (SO4)	320(1)	5.0	mg/L			ARD	7947402
Nutrients							
Dissolved Nitrite (N)	<0.010	0.010	mg/L			SB8	7947468
Dissolved Ammonia (N)	1.7	0.050	mg/L			MBB	7947810
Dissolved Nitrate (N)	<0.010	0.010	mg/L			SB8	7947468
Misc. Organics							
Phenols	<0.0020	0.0020	mg/L			YY	7947470
PETROLEUM HYDROCARBONS (CCME)							
Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	<0.10	0.10	mg/L			JR1	7947638
O-TERPHENYL (sur.)	117	50 - 130	%			JR1	7947638
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Aluminum (Al)	<0.0030	0.0030	mg/L			APY	7947667
Dissolved Antimony (Sb)	<0.00060	0.00060	mg/L			APY	7947667
Dissolved Arsenic (As)	0.0054	0.00020	mg/L			APY	7947667
Dissolved Barium (Ba)	0.055	0.010	mg/L			JPJ	7950496
Dissolved Beryllium (Be)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Boron (B)	0.18	0.020	mg/L			JPJ	7950496
Dissolved Calcium (Ca)	150	0.30	mg/L			JPJ	7950496
Dissolved Chromium (Cr)	<0.0010	0.0010	mg/L			APY	7947667

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B553893
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN4481 MW-08							
Sampling Date 2015/06/24 12:05							
Matrix W							
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Cobalt (Co)	<0.00030	0.00030	mg/L			APY	7947667
Dissolved Copper (Cu)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Iron (Fe)	7.1	0.060	mg/L			JPJ	7950496
Dissolved Lead (Pb)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Lithium (Li)	0.092	0.020	mg/L			JPJ	7950496
Dissolved Magnesium (Mg)	42	0.20	mg/L			JPJ	7950496
Dissolved Manganese (Mn)	0.44	0.0040	mg/L			JPJ	7950496
Dissolved Molybdenum (Mo)	0.0014	0.00020	mg/L			APY	7947667
Dissolved Nickel (Ni)	<0.00050	0.00050	mg/L			APY	7947667
Dissolved Phosphorus (P)	<0.10	0.10	mg/L			JPJ	7950496
Dissolved Potassium (K)	5.7	0.30	mg/L			JPJ	7950496
Dissolved Selenium (Se)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Silicon (Si)	7.7	0.10	mg/L			JPJ	7950496
Dissolved Silver (Ag)	<0.00010	0.00010	mg/L			APY	7947667
Dissolved Sodium (Na)	120	0.50	mg/L			JPJ	7950496
Dissolved Strontium (Sr)	1.4	0.020	mg/L			JPJ	7950496
Dissolved Sulphur (S)	110	0.20	mg/L			JPJ	7950496
Dissolved Thallium (Tl)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Tin (Sn)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Titanium (Ti)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Uranium (U)	0.00067	0.00010	mg/L			APY	7947667
Dissolved Vanadium (V)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Zinc (Zn)	<0.0030	0.0030	mg/L			APY	7947667
Low Level Elements							
Total Mercury (Hg)	<0.0050	0.0050	ug/L			JLO	7952648
VOLATILE ORGANICS BY GC-MS (WATER)							
Volatiles							
Benzene	<0.00040	0.00040	mg/L			NSE	7947680
Toluene	<0.00040	0.00040	mg/L			NSE	7947680
Ethylbenzene	<0.00040	0.00040	mg/L			NSE	7947680
m & p-Xylene	<0.00080	0.00080	mg/L			NSE	7947680
o-Xylene	<0.00040	0.00040	mg/L			NSE	7947680
Xylenes (Total)	<0.00080	0.00080	mg/L			NSE	7947680
F1 (C6-C10) - BTEX	<0.10	0.10	mg/L			NSE	7947680
F1 (C6-C10)	<0.10	0.10	mg/L			NSE	7947680
1,4-Difluorobenzene (sur.)	99	70 - 130	%			NSE	7947680
4-Bromofluorobenzene (sur.)	96	70 - 130	%			NSE	7947680
D4-1,2-Dichloroethane (sur.)	100	70 - 130	%			NSE	7947680
MN4482 MW-10							
Sampling Date 2015/06/24 18:51							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Parameter							
Subcontract Parameter	ATTACHED	N/A	Bq/l				7994556
Calculated Parameters							
Anion Sum	15	N/A	meq/L				7946734
Cation Sum	15	N/A	meq/L				7946734

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B553893
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN4482 MW-10							
Sampling Date 2015/06/24 18:51							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Calculated Parameters							
Hardness (CaCO3)	480	0.50	mg/L				7946732
Ion Balance	1.0	0.010	N/A				7946733
Dissolved Nitrate (NO3)	<0.044	0.044	mg/L				7946735
Nitrate plus Nitrite (N)	<0.020	0.020	mg/L				7946736
Dissolved Nitrite (NO2)	<0.033	0.033	mg/L				7946735
Total Dissolved Solids	820	10	mg/L				7946743
Misc. Inorganics							
Conductivity	1300	1.0	uS/cm			CH7	7947003
Dissolved Organic Carbon (C)	5.1	0.50	mg/L			NB4	7946921
pH	7.44	N/A	pH			CH7	7946998
Total Dissolved Solids	850	10	mg/L			RPT	7949345
Low Level Elements							
Dissolved Cadmium (Cd)	<0.020	0.020	ug/L				7945946
Anions							
Dissolved Chloride (Cl)	1.1	1.0	mg/L			ARD	7947400
Alkalinity (PP as CaCO3)	<0.50	0.50	mg/L			CH7	7947001
Alkalinity (Total as CaCO3)	520	0.50	mg/L			CH7	7947001
Bicarbonate (HCO3)	640	0.50	mg/L			CH7	7947001
Carbonate (CO3)	<0.50	0.50	mg/L			CH7	7947001
Dissolved Fluoride (F)	0.16	0.050	mg/L			CH7	7947194
Hydroxide (OH)	<0.50	0.50	mg/L			CH7	7947001
Dissolved Sulphate (SO4)	210(1)	5.0	mg/L			ARD	7947402
Nutrients							
Dissolved Nitrite (N)	<0.010	0.010	mg/L			SB8	7947468
Dissolved Ammonia (N)	1.8	0.050	mg/L			MBB	7947810
Dissolved Nitrate (N)	<0.010	0.010	mg/L			SB8	7947468
Misc. Organics							
Phenols	<0.0020	0.0020	mg/L			YY	7947470
PETROLEUM HYDROCARBONS (CCME)							
Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	<0.10	0.10	mg/L			JR1	7947638
O-TERPHENYL (sur.)	113	50 - 130	%			JR1	7947638
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Aluminum (Al)	<0.0030	0.0030	mg/L			APY	7947667
Dissolved Antimony (Sb)	<0.00060	0.00060	mg/L			APY	7947667
Dissolved Arsenic (As)	0.0039	0.00020	mg/L			APY	7947667
Dissolved Barium (Ba)	0.030	0.010	mg/L			JPJ	7950496
Dissolved Beryllium (Be)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Boron (B)	0.18	0.020	mg/L			JPJ	7950496
Dissolved Calcium (Ca)	130	0.30	mg/L			JPJ	7950496
Dissolved Chromium (Cr)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Cobalt (Co)	0.00030	0.00030	mg/L			APY	7947667
Dissolved Copper (Cu)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Iron (Fe)	6.3	0.060	mg/L			JPJ	7950496
Dissolved Lead (Pb)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Lithium (Li)	0.10	0.020	mg/L			JPJ	7950496

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B553893
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN4482 MW-10							
Sampling Date 2015/06/24 18:51							
Matrix W							
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Magnesium (Mg)	36	0.20	mg/L			JPJ	7950496
Dissolved Manganese (Mn)	0.67	0.0040	mg/L			JPJ	7950496
Dissolved Molybdenum (Mo)	0.00088	0.00020	mg/L			APY	7947667
Dissolved Nickel (Ni)	0.00085	0.00050	mg/L			APY	7947667
Dissolved Phosphorus (P)	<0.10	0.10	mg/L			JPJ	7950496
Dissolved Potassium (K)	5.8	0.30	mg/L			JPJ	7950496
Dissolved Selenium (Se)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Silicon (Si)	7.1	0.10	mg/L			JPJ	7950496
Dissolved Silver (Ag)	<0.00010	0.00010	mg/L			APY	7947667
Dissolved Sodium (Na)	120	0.50	mg/L			JPJ	7950496
Dissolved Strontium (Sr)	1.4	0.020	mg/L			JPJ	7950496
Dissolved Sulphur (S)	71	0.20	mg/L			JPJ	7950496
Dissolved Thallium (Tl)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Tin (Sn)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Titanium (Ti)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Uranium (U)	0.0012	0.00010	mg/L			APY	7947667
Dissolved Vanadium (V)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Zinc (Zn)	<0.0030	0.0030	mg/L			APY	7947667
Low Level Elements							
Total Mercury (Hg)	<0.0050	0.0050	ug/L			JLO	7952648
VOLATILE ORGANICS BY GC-MS (WATER)							
Volatiles							
Benzene	<0.00040	0.00040	mg/L			NSE	7947680
Toluene	<0.00040	0.00040	mg/L			NSE	7947680
Ethylbenzene	<0.00040	0.00040	mg/L			NSE	7947680
m & p-Xylene	<0.00080	0.00080	mg/L			NSE	7947680
o-Xylene	<0.00040	0.00040	mg/L			NSE	7947680
Xylenes (Total)	<0.00080	0.00080	mg/L			NSE	7947680
F1 (C6-C10) - BTEX	<0.10	0.10	mg/L			NSE	7947680
F1 (C6-C10)	<0.10	0.10	mg/L			NSE	7947680
1,4-Difluorobenzene (sur.)	98	70 - 130	%			NSE	7947680
4-Bromofluorobenzene (sur.)	94	70 - 130	%			NSE	7947680
D4-1,2-Dichloroethane (sur.)	98	70 - 130	%			NSE	7947680
MN4483 MW-11							
Sampling Date 2015/06/24 16:35							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Parameter							
Subcontract Parameter	ATTACHED	N/A	Bq/l				7994556
Calculated Parameters							
Anion Sum	15	N/A	meq/L				7946734
Cation Sum	16	N/A	meq/L				7946734
Hardness (CaCO3)	540	0.50	mg/L				7946732
Ion Balance	1.0	0.010	N/A				7946733
Dissolved Nitrate (NO3)	<0.044	0.044	mg/L				7946735
Nitrate plus Nitrite (N)	<0.020	0.020	mg/L				7946736
Dissolved Nitrite (NO2)	<0.033	0.033	mg/L				7946735

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B553893
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN4483 MW-11							
Sampling Date 2015/06/24 16:35							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Calculated Parameters							
Total Dissolved Solids	830	10	mg/L				7946743
Misc. Inorganics							
Conductivity	1300	1.0	uS/cm			CH7	7947003
Dissolved Organic Carbon (C)	6.3	0.50	mg/L			NB4	7946921
pH	7.42	N/A	pH			CH7	7946998
Total Dissolved Solids	850	10	mg/L			RPT	7949345
Low Level Elements							
Dissolved Cadmium (Cd)	<0.020	0.020	ug/L				7945946
Anions							
Dissolved Chloride (Cl)	11	1.0	mg/L			ARD	7947400
Alkalinity (PP as CaCO3)	<0.50	0.50	mg/L			CH7	7947001
Alkalinity (Total as CaCO3)	520	0.50	mg/L			CH7	7947001
Bicarbonate (HCO3)	640	0.50	mg/L			CH7	7947001
Carbonate (CO3)	<0.50	0.50	mg/L			CH7	7947001
Dissolved Fluoride (F)	0.11	0.050	mg/L			CH7	7947194
Hydroxide (OH)	<0.50	0.50	mg/L			CH7	7947001
Dissolved Sulphate (SO4)	210(1)	5.0	mg/L			ARD	7947402
Nutrients							
Dissolved Nitrite (N)	<0.010	0.010	mg/L			SB8	7947468
Dissolved Ammonia (N)	1.5	0.050	mg/L			MBB	7947810
Dissolved Nitrate (N)	<0.010	0.010	mg/L			SB8	7947468
Misc. Organics							
Phenols	<0.0020	0.0020	mg/L			YY	7947470
PETROLEUM HYDROCARBONS (CCME)							
Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	<0.10	0.10	mg/L			JR1	7947638
O-TERPHENYL (sur.)	111	50 - 130	%			JR1	7947638
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Aluminum (Al)	<0.0030	0.0030	mg/L			APY	7947667
Dissolved Antimony (Sb)	<0.00060	0.00060	mg/L			APY	7947667
Dissolved Arsenic (As)	0.0022	0.00020	mg/L			APY	7947667
Dissolved Barium (Ba)	0.043	0.010	mg/L			JPJ	7950496
Dissolved Beryllium (Be)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Boron (B)	0.19	0.020	mg/L			JPJ	7950496
Dissolved Calcium (Ca)	140	0.30	mg/L			JPJ	7950496
Dissolved Chromium (Cr)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Cobalt (Co)	<0.00030	0.00030	mg/L			APY	7947667
Dissolved Copper (Cu)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Iron (Fe)	7.4	0.060	mg/L			JPJ	7950496
Dissolved Lead (Pb)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Lithium (Li)	0.079	0.020	mg/L			JPJ	7950496
Dissolved Magnesium (Mg)	45	0.20	mg/L			JPJ	7950496
Dissolved Manganese (Mn)	0.62	0.0040	mg/L			JPJ	7950496
Dissolved Molybdenum (Mo)	0.00065	0.00020	mg/L			APY	7947667
Dissolved Nickel (Ni)	<0.00050	0.00050	mg/L			APY	7947667
Dissolved Phosphorus (P)	<0.10	0.10	mg/L			JPJ	7950496

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B553893
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN4483 MW-11							
Sampling Date 2015/06/24 16:35							
Matrix W							
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Potassium (K)	5.0	0.30	mg/L			JPJ	7950496
Dissolved Selenium (Se)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Silicon (Si)	8.0	0.10	mg/L			JPJ	7950496
Dissolved Silver (Ag)	<0.00010	0.00010	mg/L			APY	7947667
Dissolved Sodium (Na)	97	0.50	mg/L			JPJ	7950496
Dissolved Strontium (Sr)	1.2	0.020	mg/L			JPJ	7950496
Dissolved Sulphur (S)	70	0.20	mg/L			JPJ	7950496
Dissolved Thallium (Tl)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Tin (Sn)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Titanium (Ti)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Uranium (U)	0.0010	0.00010	mg/L			APY	7947667
Dissolved Vanadium (V)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Zinc (Zn)	<0.0030	0.0030	mg/L			APY	7947667
Low Level Elements							
Total Mercury (Hg)	<0.0050	0.0050	ug/L			JLO	7952648
VOLATILE ORGANICS BY GC-MS (WATER)							
Volatiles							
Benzene	<0.00040	0.00040	mg/L			NSE	7947680
Toluene	<0.00040	0.00040	mg/L			NSE	7947680
Ethylbenzene	<0.00040	0.00040	mg/L			NSE	7947680
m & p-Xylene	<0.00080	0.00080	mg/L			NSE	7947680
o-Xylene	<0.00040	0.00040	mg/L			NSE	7947680
Xylenes (Total)	<0.00080	0.00080	mg/L			NSE	7947680
F1 (C6-C10) - BTEX	<0.10	0.10	mg/L			NSE	7947680
F1 (C6-C10)	<0.10	0.10	mg/L			NSE	7947680
1,4-Difluorobenzene (sur.)	98	70 - 130	%			NSE	7947680
4-Bromofluorobenzene (sur.)	94	70 - 130	%			NSE	7947680
D4-1,2-Dichloroethane (sur.)	100	70 - 130	%			NSE	7947680
MN4484 MW-12							
Sampling Date 2015/06/24 10:11							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Parameter							
Subcontract Parameter	ATTACHED	N/A	Bq/l				7994556
Calculated Parameters							
Anion Sum	12	N/A	meq/L				7946734
Cation Sum	12	N/A	meq/L				7946734
Hardness (CaCO3)	350	0.50	mg/L				7946732
Ion Balance	1.0	0.010	N/A				7946733
Dissolved Nitrate (NO3)	0.047	0.044	mg/L				7946735
Nitrate plus Nitrite (N)	<0.020	0.020	mg/L				7946736
Dissolved Nitrite (NO2)	<0.033	0.033	mg/L				7946735
Total Dissolved Solids	620	10	mg/L				7946743
Misc. Inorganics							
Conductivity	1000	1.0	uS/cm			CH7	7947003
Dissolved Organic Carbon (C)	6.8	0.50	mg/L			NB4	7946921
pH	7.63	N/A	pH			CH7	7946998

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B553893
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN4484 MW-12							
Sampling Date 2015/06/24 10:11							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Misc. Inorganics							
Total Dissolved Solids	620	10	mg/L			RPT	7949345
Low Level Elements							
Dissolved Cadmium (Cd)	0.020	0.020	ug/L				7945946
Anions							
Dissolved Chloride (Cl)	7.7	1.0	mg/L			ARD	7947400
Alkalinity (PP as CaCO3)	<0.50	0.50	mg/L			CH7	7947001
Alkalinity (Total as CaCO3)	540	0.50	mg/L			CH7	7947001
Bicarbonate (HCO3)	660	0.50	mg/L			CH7	7947001
Carbonate (CO3)	<0.50	0.50	mg/L			CH7	7947001
Dissolved Fluoride (F)	0.084	0.050	mg/L			CH7	7947194
Hydroxide (OH)	<0.50	0.50	mg/L			CH7	7947001
Dissolved Sulphate (SO4)	45	1.0	mg/L			ARD	7947402
Nutrients							
Dissolved Nitrite (N)	<0.010	0.010	mg/L			SB8	7947468
Dissolved Ammonia (N)	1.3	0.050	mg/L			MBB	7947810
Dissolved Nitrate (N)	0.011	0.010	mg/L			SB8	7947468
Misc. Organics							
Phenols	<0.0020	0.0020	mg/L			YY	7947470
PETROLEUM HYDROCARBONS (CCME)							
Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	<0.10	0.10	mg/L			JR1	7947638
O-TERPHENYL (sur.)	115	50 - 130	%			JR1	7947638
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Aluminum (Al)	<0.0030	0.0030	mg/L			APY	7947667
Dissolved Antimony (Sb)	<0.00060	0.00060	mg/L			APY	7947667
Dissolved Arsenic (As)	0.0022	0.00020	mg/L			APY	7947667
Dissolved Barium (Ba)	0.12	0.010	mg/L			JPJ	7950496
Dissolved Beryllium (Be)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Boron (B)	0.24	0.020	mg/L			JPJ	7950496
Dissolved Calcium (Ca)	93	0.30	mg/L			JPJ	7950496
Dissolved Chromium (Cr)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Cobalt (Co)	0.00039	0.00030	mg/L			APY	7947667
Dissolved Copper (Cu)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Iron (Fe)	4.0	0.060	mg/L			JPJ	7950496
Dissolved Lead (Pb)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Lithium (Li)	0.068	0.020	mg/L			JPJ	7950496
Dissolved Magnesium (Mg)	29	0.20	mg/L			JPJ	7950496
Dissolved Manganese (Mn)	0.42	0.0040	mg/L			JPJ	7950496
Dissolved Molybdenum (Mo)	0.0010	0.00020	mg/L			APY	7947667
Dissolved Nickel (Ni)	0.0015	0.00050	mg/L			APY	7947667
Dissolved Phosphorus (P)	<0.10	0.10	mg/L			JPJ	7950496
Dissolved Potassium (K)	5.0	0.30	mg/L			JPJ	7950496
Dissolved Selenium (Se)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Silicon (Si)	7.3	0.10	mg/L			JPJ	7950496
Dissolved Silver (Ag)	<0.00010	0.00010	mg/L			APY	7947667
Dissolved Sodium (Na)	110	0.50	mg/L			JPJ	7950496

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B553893
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN4484 MW-12							
Sampling Date 2015/06/24 10:11							
Matrix W							
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Strontium (Sr)	0.90	0.020	mg/L			JPJ	7950496
Dissolved Sulphur (S)	14	0.20	mg/L			JPJ	7950496
Dissolved Thallium (Tl)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Tin (Sn)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Titanium (Ti)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Uranium (U)	0.00075	0.00010	mg/L			APY	7947667
Dissolved Vanadium (V)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Zinc (Zn)	<0.0030	0.0030	mg/L			APY	7947667
Low Level Elements							
Total Mercury (Hg)	<0.0050	0.0050	ug/L			JLO	7952648
VOLATILE ORGANICS BY GC-MS (WATER)							
Volatiles							
Benzene	<0.00040	0.00040	mg/L			NSE	7947680
Toluene	<0.00040	0.00040	mg/L			NSE	7947680
Ethylbenzene	<0.00040	0.00040	mg/L			NSE	7947680
m & p-Xylene	<0.00080	0.00080	mg/L			NSE	7947680
o-Xylene	<0.00040	0.00040	mg/L			NSE	7947680
Xylenes (Total)	<0.00080	0.00080	mg/L			NSE	7947680
F1 (C6-C10) - BTEX	<0.10	0.10	mg/L			NSE	7947680
F1 (C6-C10)	<0.10	0.10	mg/L			NSE	7947680
1,4-Difluorobenzene (sur.)	98	70 - 130	%			NSE	7947680
4-Bromofluorobenzene (sur.)	94	70 - 130	%			NSE	7947680
D4-1,2-Dichloroethane (sur.)	99	70 - 130	%			NSE	7947680
MN4485 MW-13							
Sampling Date 2015/06/24 14:20							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Parameter							
Subcontract Parameter	ATTACHED	N/A	Bq/l				7994556
Calculated Parameters							
Anion Sum	9.0	N/A	meq/L				7946734
Cation Sum	9.0	N/A	meq/L				7946734
Hardness (CaCO3)	190	0.50	mg/L				7946732
Ion Balance	1.0	0.010	N/A				7946733
Dissolved Nitrate (NO3)	<0.044	0.044	mg/L				7946735
Nitrate plus Nitrite (N)	<0.020	0.020	mg/L				7946736
Dissolved Nitrite (NO2)	<0.033	0.033	mg/L				7946735
Total Dissolved Solids	460	10	mg/L				7946743
Misc. Inorganics							
Conductivity	780	1.0	uS/cm			CH7	7947003
Dissolved Organic Carbon (C)	4.9	0.50	mg/L			NB4	7946921
pH	7.70	N/A	pH			CH7	7946998
Total Dissolved Solids	460	10	mg/L			RPT	7949345
Low Level Elements							
Dissolved Cadmium (Cd)	<0.020	0.020	ug/L				7945946

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B553893
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN4485 MW-13							
Sampling Date 2015/06/24 14:20							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Anions							
Dissolved Chloride (Cl)	2.9	1.0	mg/L			ARD	7947400
Alkalinity (PP as CaCO3)	<0.50	0.50	mg/L			CH7	7947001
Alkalinity (Total as CaCO3)	430	0.50	mg/L			CH7	7947001
Bicarbonate (HCO3)	530	0.50	mg/L			CH7	7947001
Carbonate (CO3)	<0.50	0.50	mg/L			CH7	7947001
Dissolved Fluoride (F)	0.16	0.050	mg/L			CH7	7947194
Hydroxide (OH)	<0.50	0.50	mg/L			CH7	7947001
Dissolved Sulphate (SO4)	13	1.0	mg/L			ARD	7947402
Nutrients							
Dissolved Nitrite (N)	<0.010	0.010	mg/L			SB8	7947468
Dissolved Ammonia (N)	1.3	0.050	mg/L			MBB	7947810
Dissolved Nitrate (N)	<0.010	0.010	mg/L			SB8	7947468
Misc. Organics							
Phenols	<0.0020	0.0020	mg/L			YY	7947470
PETROLEUM HYDROCARBONS (CCME)							
Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	<0.10	0.10	mg/L			JR1	7947638
O-TERPHENYL (sur.)	112	50 - 130	%			JR1	7947638
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Aluminum (Al)	<0.0030	0.0030	mg/L			APY	7947667
Dissolved Antimony (Sb)	<0.00060	0.00060	mg/L			APY	7947667
Dissolved Arsenic (As)	0.0014	0.00020	mg/L			APY	7947667
Dissolved Barium (Ba)	0.40	0.010	mg/L			JPJ	7950496
Dissolved Beryllium (Be)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Boron (B)	0.26	0.020	mg/L			JPJ	7950496
Dissolved Calcium (Ca)	49	0.30	mg/L			JPJ	7950496
Dissolved Chromium (Cr)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Cobalt (Co)	0.00062	0.00030	mg/L			APY	7947667
Dissolved Copper (Cu)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Iron (Fe)	1.3	0.060	mg/L			JPJ	7950496
Dissolved Lead (Pb)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Lithium (Li)	0.048	0.020	mg/L			JPJ	7950496
Dissolved Magnesium (Mg)	16	0.20	mg/L			JPJ	7950496
Dissolved Manganese (Mn)	0.24	0.0040	mg/L			JPJ	7950496
Dissolved Molybdenum (Mo)	0.0022	0.00020	mg/L			APY	7947667
Dissolved Nickel (Ni)	0.00086	0.00050	mg/L			APY	7947667
Dissolved Phosphorus (P)	<0.10	0.10	mg/L			JPJ	7950496
Dissolved Potassium (K)	3.9	0.30	mg/L			JPJ	7950496
Dissolved Selenium (Se)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Silicon (Si)	6.0	0.10	mg/L			JPJ	7950496
Dissolved Silver (Ag)	<0.00010	0.00010	mg/L			APY	7947667
Dissolved Sodium (Na)	110	0.50	mg/L			JPJ	7950496
Dissolved Strontium (Sr)	0.52	0.020	mg/L			JPJ	7950496
Dissolved Sulphur (S)	3.8	0.20	mg/L			JPJ	7950496
Dissolved Thallium (Tl)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Tin (Sn)	<0.0010	0.0010	mg/L			APY	7947667

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B553893
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN4485 MW-13							
Sampling Date 2015/06/24 14:20							
Matrix W							
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Titanium (Ti)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Uranium (U)	0.00065	0.00010	mg/L			APY	7947667
Dissolved Vanadium (V)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Zinc (Zn)	<0.0030	0.0030	mg/L			APY	7947667
Low Level Elements							
Total Mercury (Hg)	<0.0050	0.0050	ug/L			JLO	7952648
VOLATILE ORGANICS BY GC-MS (WATER)							
Volatiles							
Benzene	<0.00040	0.00040	mg/L			NSE	7947680
Toluene	<0.00040	0.00040	mg/L			NSE	7947680
Ethylbenzene	<0.00040	0.00040	mg/L			NSE	7947680
m & p-Xylene	<0.00080	0.00080	mg/L			NSE	7947680
o-Xylene	<0.00040	0.00040	mg/L			NSE	7947680
Xylenes (Total)	<0.00080	0.00080	mg/L			NSE	7947680
F1 (C6-C10) - BTEX	<0.10	0.10	mg/L			NSE	7947680
F1 (C6-C10)	<0.10	0.10	mg/L			NSE	7947680
1,4-Difluorobenzene (sur.)	99	70 - 130	%			NSE	7947680
4-Bromofluorobenzene (sur.)	96	70 - 130	%			NSE	7947680
D4-1,2-Dichloroethane (sur.)	100	70 - 130	%			NSE	7947680
MN4486 D15-01							
Sampling Date 2015/06/24 18:50							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Parameter							
Subcontract Parameter	ATTACHED	N/A	Bq/l				7994556
Calculated Parameters							
Anion Sum	15	N/A	meq/L				7946734
Cation Sum	15	N/A	meq/L				7946734
Hardness (CaCO3)	480	0.50	mg/L				7946732
Ion Balance	1.0	0.010	N/A				7946733
Dissolved Nitrate (NO3)	<0.044	0.044	mg/L				7946735
Nitrate plus Nitrite (N)	<0.020	0.020	mg/L				7946736
Dissolved Nitrite (NO2)	<0.033	0.033	mg/L				7946735
Total Dissolved Solids	820	10	mg/L				7946743
Misc. Inorganics							
Conductivity	1300	1.0	uS/cm			CH7	7947003
Dissolved Organic Carbon (C)	5.2	0.50	mg/L			NB4	7946921
pH	7.41	N/A	pH			CH7	7946998
Total Dissolved Solids	840	10	mg/L			RPT	7949345
Low Level Elements							
Dissolved Cadmium (Cd)	<0.020	0.020	ug/L				7945946
Anions							
Dissolved Chloride (Cl)	1.2	1.0	mg/L			ARD	7947400
Alkalinity (PP as CaCO3)	<0.50	0.50	mg/L			CH7	7947001
Alkalinity (Total as CaCO3)	520	0.50	mg/L			CH7	7947001
Bicarbonate (HCO3)	630	0.50	mg/L			CH7	7947001

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B553893
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN4486 D15-01							
Sampling Date 2015/06/24 18:50							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Anions							
Carbonate (CO3)	<0.50	0.50	mg/L			CH7	7947001
Dissolved Fluoride (F)	0.14	0.050	mg/L			CH7	7947194
Hydroxide (OH)	<0.50	0.50	mg/L			CH7	7947001
Dissolved Sulphate (SO4)	200(1)	5.0	mg/L			ARD	7947402
Nutrients							
Dissolved Nitrite (N)	<0.010	0.010	mg/L			SB8	7947468
Dissolved Ammonia (N)	1.8	0.050	mg/L			MBB	7947810
Dissolved Nitrate (N)	<0.010	0.010	mg/L			SB8	7947468
Misc. Organics							
Phenols	<0.0020	0.0020	mg/L			YY	7947470
PETROLEUM HYDROCARBONS (CCME)							
Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	<0.10	0.10	mg/L			JR1	7947638
O-TERPHENYL (sur.)	113	50 - 130	%			JR1	7947638
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Aluminum (Al)	<0.0030	0.0030	mg/L			APY	7947667
Dissolved Antimony (Sb)	<0.00060	0.00060	mg/L			APY	7947667
Dissolved Arsenic (As)	0.0040	0.00020	mg/L			APY	7947667
Dissolved Barium (Ba)	0.030	0.010	mg/L			JPJ	7950496
Dissolved Beryllium (Be)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Boron (B)	0.17	0.020	mg/L			JPJ	7950496
Dissolved Calcium (Ca)	130	0.30	mg/L			JPJ	7950496
Dissolved Chromium (Cr)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Cobalt (Co)	0.00031	0.00030	mg/L			APY	7947667
Dissolved Copper (Cu)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Iron (Fe)	6.4	0.060	mg/L			JPJ	7950496
Dissolved Lead (Pb)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Lithium (Li)	0.10	0.020	mg/L			JPJ	7950496
Dissolved Magnesium (Mg)	36	0.20	mg/L			JPJ	7950496
Dissolved Manganese (Mn)	0.67	0.0040	mg/L			JPJ	7950496
Dissolved Molybdenum (Mo)	0.00087	0.00020	mg/L			APY	7947667
Dissolved Nickel (Ni)	0.00083	0.00050	mg/L			APY	7947667
Dissolved Phosphorus (P)	<0.10	0.10	mg/L			JPJ	7950496
Dissolved Potassium (K)	5.6	0.30	mg/L			JPJ	7950496
Dissolved Selenium (Se)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Silicon (Si)	7.1	0.10	mg/L			JPJ	7950496
Dissolved Silver (Ag)	<0.00010	0.00010	mg/L			APY	7947667
Dissolved Sodium (Na)	120	0.50	mg/L			JPJ	7950496
Dissolved Strontium (Sr)	1.4	0.020	mg/L			JPJ	7950496
Dissolved Sulphur (S)	71	0.20	mg/L			JPJ	7950496
Dissolved Thallium (Tl)	<0.00020	0.00020	mg/L			APY	7947667
Dissolved Tin (Sn)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Titanium (Ti)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Uranium (U)	0.0011	0.00010	mg/L			APY	7947667
Dissolved Vanadium (V)	<0.0010	0.0010	mg/L			APY	7947667
Dissolved Zinc (Zn)	<0.0030	0.0030	mg/L			APY	7947667

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B553893
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN4486 D15-01							
Sampling Date 2015/06/24 18:50							
Matrix W							
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Low Level Elements							
Total Mercury (Hg)	<0.0050	0.0050	ug/L			JLO	7952648
VOLATILE ORGANICS BY GC-MS (WATER)							
Volatiles							
Benzene	<0.00040	0.00040	mg/L			NSE	7947680
Toluene	<0.00040	0.00040	mg/L			NSE	7947680
Ethylbenzene	<0.00040	0.00040	mg/L			NSE	7947680
m & p-Xylene	<0.00080	0.00080	mg/L			NSE	7947680
o-Xylene	<0.00040	0.00040	mg/L			NSE	7947680
Xylenes (Total)	<0.00080	0.00080	mg/L			NSE	7947680
F1 (C6-C10) - BTEX	<0.10	0.10	mg/L			NSE	7947680
F1 (C6-C10)	<0.10	0.10	mg/L			NSE	7947680
1,4-Difluorobenzene (sur.)	97	70 - 130	%			NSE	7947680
4-Bromofluorobenzene (sur.)	94	70 - 130	%			NSE	7947680
D4-1,2-Dichloroethane (sur.)	101	70 - 130	%			NSE	7947680

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B553893
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NU

GENERAL COMMENTS

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

Package 1	5.0°C
Package 2	6.0°C

Meq % is based on dissolved calcium, magnesium, sodium, potassium, carbonate, bicarbonate, sulphate and chloride

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B553893
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NU

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
7946921	NB4	Matrix Spike	Dissolved Organic Carbon (C)	2015/06/26		NC	%	80 - 120
7946921	NB4	Spiked Blank	Dissolved Organic Carbon (C)	2015/06/26		108	%	80 - 120
7946921	NB4	Method Blank	Dissolved Organic Carbon (C)	2015/06/26	<0.50		mg/L	
7946921	NB4	RPD	Dissolved Organic Carbon (C)	2015/06/26	1.8		%	20
7946998	CH7	Spiked Blank	pH	2015/06/26		100	%	97 - 103
7946998	CH7	RPD [MN4481-02]	pH	2015/06/26	0.74		%	N/A
7947001	CH7	Spiked Blank	Alkalinity (Total as CaCO3)	2015/06/26		101	%	80 - 120
7947001	CH7	Method Blank	Alkalinity (PP as CaCO3)	2015/06/26	<0.50		mg/L	
			Alkalinity (Total as CaCO3)	2015/06/26	<0.50		mg/L	
			Bicarbonate (HCO3)	2015/06/26	<0.50		mg/L	
			Carbonate (CO3)	2015/06/26	<0.50		mg/L	
			Hydroxide (OH)	2015/06/26	<0.50		mg/L	
7947001	CH7	RPD [MN4481-02]	Alkalinity (PP as CaCO3)	2015/06/26	NC		%	20
			Alkalinity (Total as CaCO3)	2015/06/26	0.36		%	20
			Bicarbonate (HCO3)	2015/06/26	0.37		%	20
			Carbonate (CO3)	2015/06/26	NC		%	20
			Hydroxide (OH)	2015/06/26	NC		%	20
7947003	CH7	Spiked Blank	Conductivity	2015/06/26		100	%	90 - 110
7947003	CH7	Method Blank	Conductivity	2015/06/26	<1.0		uS/cm	
7947003	CH7	RPD [MN4481-02]	Conductivity	2015/06/26	0.72		%	20
7947194	CH7	Matrix Spike [MN4481-02]	Dissolved Fluoride (F)	2015/06/26		103	%	80 - 120
7947194	CH7	Spiked Blank	Dissolved Fluoride (F)	2015/06/26		104	%	80 - 120
7947194	CH7	Method Blank	Dissolved Fluoride (F)	2015/06/26	<0.050		mg/L	
7947194	CH7	RPD [MN4481-02]	Dissolved Fluoride (F)	2015/06/26	NC		%	20
7947400	ARD	Matrix Spike [MN4481-02]	Dissolved Chloride (Cl)	2015/06/26		105	%	80 - 120
7947400	ARD	Spiked Blank	Dissolved Chloride (Cl)	2015/06/26		104	%	80 - 120
7947400	ARD	Method Blank	Dissolved Chloride (Cl)	2015/06/26	<1.0		mg/L	
7947400	ARD	RPD [MN4481-02]	Dissolved Chloride (Cl)	2015/06/26	NC		%	20
7947402	ARD	Matrix Spike [MN4481-02]	Dissolved Sulphate (SO4)	2015/06/26		NC	%	80 - 120
7947402	ARD	Spiked Blank	Dissolved Sulphate (SO4)	2015/06/26		105	%	80 - 120
7947402	ARD	Method Blank	Dissolved Sulphate (SO4)	2015/06/26	<1.0		mg/L	
7947402	ARD	RPD [MN4481-02]	Dissolved Sulphate (SO4)	2015/06/26	0.25		%	20
7947468	SB8	Matrix Spike [MN4481-02]	Dissolved Nitrite (N)	2015/06/26		101	%	80 - 120
			Dissolved Nitrate (N)	2015/06/26		104	%	80 - 120
7947468	SB8	Spiked Blank	Dissolved Nitrite (N)	2015/06/26		100	%	80 - 120
			Dissolved Nitrate (N)	2015/06/26		104	%	80 - 120
7947468	SB8	Method Blank	Dissolved Nitrite (N)	2015/06/26	<0.010		mg/L	
			Dissolved Nitrate (N)	2015/06/26	<0.010		mg/L	
7947468	SB8	RPD [MN4481-02]	Dissolved Nitrite (N)	2015/06/26	NC		%	20
			Dissolved Nitrate (N)	2015/06/26	NC		%	20
7947470	YY	Matrix Spike	Phenols	2015/06/26		99	%	80 - 120
7947470	YY	Spiked Blank	Phenols	2015/06/26		90	%	80 - 120
7947470	YY	Method Blank	Phenols	2015/06/26	<0.0020		mg/L	
7947470	YY	RPD	Phenols	2015/06/26	NC		%	20
7947638	JR1	Matrix Spike	O-TERPHENYL (sur.)	2015/06/30		115	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2015/06/30		109	%	50 - 130
7947638	JR1	Spiked Blank	O-TERPHENYL (sur.)	2015/06/30		122	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2015/06/30		119	%	70 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B553893
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NU

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
7947638	JR1	Method Blank	O-TERPHENYL (sur.)	2015/06/30		113	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2015/06/30	<0.10		mg/L	
7947638	JR1	RPD	F2 (C10-C16 Hydrocarbons)	2015/06/30	NC		%	40
7947667	APY	Matrix Spike	Dissolved Aluminum (Al)	2015/06/26		91	%	80 - 120
			Dissolved Antimony (Sb)	2015/06/26		103	%	80 - 120
			Dissolved Arsenic (As)	2015/06/26		104	%	80 - 120
			Dissolved Beryllium (Be)	2015/06/26		96	%	80 - 120
			Dissolved Chromium (Cr)	2015/06/26		102	%	80 - 120
			Dissolved Cobalt (Co)	2015/06/26		101	%	80 - 120
			Dissolved Copper (Cu)	2015/06/26		96	%	80 - 120
			Dissolved Lead (Pb)	2015/06/26		94	%	80 - 120
			Dissolved Molybdenum (Mo)	2015/06/26		108	%	80 - 120
			Dissolved Nickel (Ni)	2015/06/26		98	%	80 - 120
			Dissolved Selenium (Se)	2015/06/26		109	%	80 - 120
			Dissolved Silver (Ag)	2015/06/26		94	%	80 - 120
			Dissolved Thallium (Tl)	2015/06/26		91	%	80 - 120
			Dissolved Tin (Sn)	2015/06/26		107	%	80 - 120
			Dissolved Titanium (Ti)	2015/06/26		109	%	80 - 120
			Dissolved Uranium (U)	2015/06/26		NC	%	80 - 120
			Dissolved Vanadium (V)	2015/06/26		108	%	80 - 120
			Dissolved Zinc (Zn)	2015/06/26		101	%	80 - 120
7947667	APY	Spiked Blank	Dissolved Aluminum (Al)	2015/06/26		98	%	80 - 120
			Dissolved Antimony (Sb)	2015/06/26		96	%	80 - 120
			Dissolved Arsenic (As)	2015/06/26		99	%	80 - 120
			Dissolved Beryllium (Be)	2015/06/26		97	%	80 - 120
			Dissolved Chromium (Cr)	2015/06/26		100	%	80 - 120
			Dissolved Cobalt (Co)	2015/06/26		102	%	80 - 120
			Dissolved Copper (Cu)	2015/06/26		100	%	80 - 120
			Dissolved Lead (Pb)	2015/06/26		98	%	80 - 120
			Dissolved Molybdenum (Mo)	2015/06/26		99	%	80 - 120
			Dissolved Nickel (Ni)	2015/06/26		102	%	80 - 120
			Dissolved Selenium (Se)	2015/06/26		101	%	80 - 120
			Dissolved Silver (Ag)	2015/06/26		97	%	80 - 120
			Dissolved Thallium (Tl)	2015/06/26		97	%	80 - 120
			Dissolved Tin (Sn)	2015/06/26		100	%	80 - 120
			Dissolved Titanium (Ti)	2015/06/26		94	%	80 - 120
			Dissolved Uranium (U)	2015/06/26		98	%	80 - 120
			Dissolved Vanadium (V)	2015/06/26		103	%	80 - 120
			Dissolved Zinc (Zn)	2015/06/26		105	%	80 - 120
7947667	APY	Method Blank	Dissolved Aluminum (Al)	2015/06/26	<0.0030		mg/L	
			Dissolved Antimony (Sb)	2015/06/26	<0.00060		mg/L	
			Dissolved Arsenic (As)	2015/06/26	<0.00020		mg/L	
			Dissolved Beryllium (Be)	2015/06/26	<0.0010		mg/L	
			Dissolved Chromium (Cr)	2015/06/26	<0.0010		mg/L	
			Dissolved Cobalt (Co)	2015/06/26	<0.00030		mg/L	
			Dissolved Copper (Cu)	2015/06/26	<0.00020		mg/L	
			Dissolved Lead (Pb)	2015/06/26	0.00023, RDL=0.00020		mg/L	
			Dissolved Molybdenum (Mo)	2015/06/26	<0.00020		mg/L	
			Dissolved Nickel (Ni)	2015/06/26	<0.00050		mg/L	
			Dissolved Selenium (Se)	2015/06/26	<0.00020		mg/L	
			Dissolved Silver (Ag)	2015/06/26	<0.00010		mg/L	

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B553893
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NU

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Dissolved Thallium (Tl)	2015/06/26	<0.00020		mg/L	
			Dissolved Tin (Sn)	2015/06/26	<0.0010		mg/L	
			Dissolved Titanium (Ti)	2015/06/26	<0.0010		mg/L	
			Dissolved Uranium (U)	2015/06/26	<0.00010		mg/L	
			Dissolved Vanadium (V)	2015/06/26	<0.0010		mg/L	
			Dissolved Zinc (Zn)	2015/06/26	<0.0030		mg/L	
7947667	APY	RPD	Dissolved Aluminum (Al)	2015/06/26	NC		%	20
			Dissolved Antimony (Sb)	2015/06/26	NC		%	20
			Dissolved Arsenic (As)	2015/06/26	6.8		%	20
			Dissolved Beryllium (Be)	2015/06/26	NC		%	20
			Dissolved Chromium (Cr)	2015/06/26	NC		%	20
			Dissolved Cobalt (Co)	2015/06/26	NC		%	20
			Dissolved Copper (Cu)	2015/06/26	1.8		%	20
			Dissolved Lead (Pb)	2015/06/26	NC		%	20
			Dissolved Molybdenum (Mo)	2015/06/26	NC		%	20
			Dissolved Nickel (Ni)	2015/06/26	0.34		%	20
			Dissolved Selenium (Se)	2015/06/26	NC		%	20
			Dissolved Silver (Ag)	2015/06/26	NC		%	20
			Dissolved Thallium (Tl)	2015/06/26	NC		%	20
			Dissolved Tin (Sn)	2015/06/26	NC		%	20
			Dissolved Titanium (Ti)	2015/06/26	NC		%	20
			Dissolved Uranium (U)	2015/06/26	1.6		%	20
			Dissolved Vanadium (V)	2015/06/26	NC		%	20
			Dissolved Zinc (Zn)	2015/06/26	NC		%	20
7947680	NSE	Matrix Spike	1,4-Difluorobenzene (sur.)	2015/06/29		99	%	70 - 130
			4-Bromofluorobenzene (sur.)	2015/06/29		96	%	70 - 130
			D4-1,2-Dichloroethane (sur.)	2015/06/29		99	%	70 - 130
			Benzene	2015/06/29		98	%	70 - 130
			Toluene	2015/06/29		96	%	70 - 130
			Ethylbenzene	2015/06/29		97	%	70 - 130
			m & p-Xylene	2015/06/29		98	%	70 - 130
			o-Xylene	2015/06/29		97	%	70 - 130
			F1 (C6-C10)	2015/06/29		94	%	70 - 130
7947680	NSE	Spiked Blank	1,4-Difluorobenzene (sur.)	2015/06/29		99	%	70 - 130
			4-Bromofluorobenzene (sur.)	2015/06/29		95	%	70 - 130
			D4-1,2-Dichloroethane (sur.)	2015/06/29		98	%	70 - 130
			Benzene	2015/06/29		98	%	70 - 130
			Toluene	2015/06/29		96	%	70 - 130
			Ethylbenzene	2015/06/29		97	%	70 - 130
			m & p-Xylene	2015/06/29		96	%	70 - 130
			o-Xylene	2015/06/29		97	%	70 - 130
			F1 (C6-C10)	2015/06/29		85	%	70 - 130
7947680	NSE	Method Blank	1,4-Difluorobenzene (sur.)	2015/06/29		97	%	70 - 130
			4-Bromofluorobenzene (sur.)	2015/06/29		94	%	70 - 130
			D4-1,2-Dichloroethane (sur.)	2015/06/29		100	%	70 - 130
			Benzene	2015/06/29	<0.00040		mg/L	
			Toluene	2015/06/29	<0.00040		mg/L	
			Ethylbenzene	2015/06/29	<0.00040		mg/L	
			m & p-Xylene	2015/06/29	<0.00080		mg/L	
			o-Xylene	2015/06/29	<0.00040		mg/L	
			Xylenes (Total)	2015/06/29	<0.00080		mg/L	
			F1 (C6-C10) - BTEX	2015/06/29	<0.10		mg/L	

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B553893
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NU

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			F1 (C6-C10)	2015/06/29	<0.10		mg/L	
7947680	NSE	RPD	Benzene	2015/06/29	NC		%	40
			Toluene	2015/06/29	NC		%	40
			Ethylbenzene	2015/06/29	NC		%	40
			m & p-Xylene	2015/06/29	NC		%	40
			o-Xylene	2015/06/29	NC		%	40
			Xylenes (Total)	2015/06/29	NC		%	40
			F1 (C6-C10) - BTEX	2015/06/29	NC		%	40
			F1 (C6-C10)	2015/06/29	NC		%	40
7947810	MBB	Matrix Spike [MN4481-07]	Dissolved Ammonia (N)	2015/06/29		NC	%	80 - 120
7947810	MBB	Spiked Blank	Dissolved Ammonia (N)	2015/06/29		103	%	80 - 120
7947810	MBB	Method Blank	Dissolved Ammonia (N)	2015/06/29	<0.050		mg/L	
7947810	MBB	RPD [MN4481-07]	Dissolved Ammonia (N)	2015/06/29	2.4		%	20
7949345	RPT	Matrix Spike	Total Dissolved Solids	2015/06/29		NC	%	80 - 120
7949345	RPT	Spiked Blank	Total Dissolved Solids	2015/06/29		100	%	80 - 120
7949345	RPT	Method Blank	Total Dissolved Solids	2015/06/29	<10		mg/L	
7949345	RPT	RPD	Total Dissolved Solids	2015/06/29	0		%	20
7950496	JPJ	Matrix Spike	Dissolved Barium (Ba)	2015/06/29		101	%	80 - 120
			Dissolved Boron (B)	2015/06/29		100	%	80 - 120
			Dissolved Calcium (Ca)	2015/06/29		NC	%	80 - 120
			Dissolved Iron (Fe)	2015/06/29		99	%	80 - 120
			Dissolved Lithium (Li)	2015/06/29		104	%	80 - 120
			Dissolved Magnesium (Mg)	2015/06/29		NC	%	80 - 120
			Dissolved Manganese (Mn)	2015/06/29		92	%	80 - 120
			Dissolved Phosphorus (P)	2015/06/29		107	%	80 - 120
			Dissolved Potassium (K)	2015/06/29		106	%	80 - 120
			Dissolved Silicon (Si)	2015/06/29		NC	%	80 - 120
			Dissolved Sodium (Na)	2015/06/29		105	%	80 - 120
			Dissolved Strontium (Sr)	2015/06/29		96	%	80 - 120
7950496	JPJ	Spiked Blank	Dissolved Barium (Ba)	2015/06/29		100	%	80 - 120
			Dissolved Boron (B)	2015/06/29		101	%	80 - 120
			Dissolved Calcium (Ca)	2015/06/29		99	%	80 - 120
			Dissolved Iron (Fe)	2015/06/29		103	%	80 - 120
			Dissolved Lithium (Li)	2015/06/29		101	%	80 - 120
			Dissolved Magnesium (Mg)	2015/06/29		104	%	80 - 120
			Dissolved Manganese (Mn)	2015/06/29		98	%	80 - 120
			Dissolved Phosphorus (P)	2015/06/29		103	%	80 - 120
			Dissolved Potassium (K)	2015/06/29		106	%	80 - 120
			Dissolved Silicon (Si)	2015/06/29		102	%	80 - 120
			Dissolved Sodium (Na)	2015/06/29		105	%	80 - 120
			Dissolved Strontium (Sr)	2015/06/29		99	%	80 - 120
			Dissolved Sulphur (S)	2015/06/29		96	%	80 - 120
7950496	JPJ	Method Blank	Dissolved Barium (Ba)	2015/06/29	<0.010		mg/L	
			Dissolved Boron (B)	2015/06/29	<0.020		mg/L	
			Dissolved Calcium (Ca)	2015/06/29	<0.30		mg/L	
			Dissolved Iron (Fe)	2015/06/29	<0.060		mg/L	
			Dissolved Lithium (Li)	2015/06/29	<0.020		mg/L	
			Dissolved Magnesium (Mg)	2015/06/29	<0.20		mg/L	
			Dissolved Manganese (Mn)	2015/06/29	<0.0040		mg/L	
			Dissolved Phosphorus (P)	2015/06/29	<0.10		mg/L	
			Dissolved Potassium (K)	2015/06/29	<0.30		mg/L	

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B553893
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NU

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Dissolved Silicon (Si)	2015/06/29	<0.10		mg/L	
			Dissolved Sodium (Na)	2015/06/29	<0.50		mg/L	
			Dissolved Strontium (Sr)	2015/06/29	<0.020		mg/L	
			Dissolved Sulphur (S)	2015/06/29	<0.20		mg/L	
7950496	JPJ	RPD	Dissolved Barium (Ba)	2015/06/29	0.35		%	20
			Dissolved Boron (B)	2015/06/29	NC		%	20
			Dissolved Calcium (Ca)	2015/06/29	0.33		%	20
			Dissolved Iron (Fe)	2015/06/29	NC		%	20
			Dissolved Lithium (Li)	2015/06/29	NC		%	20
			Dissolved Magnesium (Mg)	2015/06/29	0.20		%	20
			Dissolved Manganese (Mn)	2015/06/29	0.14		%	20
			Dissolved Phosphorus (P)	2015/06/29	NC		%	20
			Dissolved Potassium (K)	2015/06/29	0.33		%	20
			Dissolved Silicon (Si)	2015/06/29	0.20		%	20
			Dissolved Sodium (Na)	2015/06/29	0.14		%	20
			Dissolved Strontium (Sr)	2015/06/29	0.61		%	20
			Dissolved Sulphur (S)	2015/06/29	0.32		%	20
7952648	JLO	Matrix Spike	Total Mercury (Hg)	2015/07/02		NC	%	85 - 115
7952648	JLO	QC Standard	Total Mercury (Hg)	2015/07/02		101	%	85 - 115
7952648	JLO	Spiked Blank	Total Mercury (Hg)	2015/07/02		104	%	85 - 115
7952648	JLO	Method Blank	Total Mercury (Hg)	2015/07/02	<0.0050		ug/L	
7952648	JLO	RPD	Total Mercury (Hg)	2015/07/02	NC		%	20

N/A = Not Applicable

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

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

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

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

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

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

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B553893
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NU

VALIDATION SIGNATURE PAGE

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

Anna Koksharova, M.Sc., Senior Analyst

Kelly Gip, B.Sc., Senior Analyst

Poonam Sharma, Chem. Tech., Senior Analyst, Organics Department

Sandy Yuan, M.Sc., Scientific Specialist

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

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam

Calgary: 4000 19st St. NE T2E 6P8 Ph: (403) 291-3077, Fax: (403) 735-2240, Toll free: (800) 386-7247
Edmonton: 9331 - 48 Street T6B 2R4 Ph: (780) 577-7100, Fax: (780) 450-4187, Toll free: (877) 465-8889
www.maxxamanalytics.com

06/1133 SBF (2)

Chain of Custody A118545

Page: 1 of 1

	Invoice To:	C/O Report Address ☐	Report To:	Same as Invoice ☒	Report Distribution (E-Mail):	REGULATORY GUIDELINES:
Company:	WORLEYPARSONS				trevor.butterfield@worleyparsons.com	☐ AT1
Contact:	Trevor Butterfield					☒ CCME
Address:	Suite 300, 8615 51 Ave, Edmonton					☐ Regulated Drinking Water
	Prov: ALBERTA	PC:	Prov:	PC:		☐ Other:
Contact #s:	Ph:	Cell:	Ph:	Cell:		

All samples are held for 60 calendar days after sample receipt, unless specified otherwise.

PO #:
Project # / Name: 307075-01608-100
Site Location: NCIA
Quote #:
Sampled By: Nick Unonius

SERVICE REQUESTED: ☐ RUSH (Contact lab to reserve) Date Required:
☒ REGULAR (5 to 7 Days)

See reverse for package specifics

SOIL: BTEX F1-F4; Sieve (75 micron); Regulated Metals (CCME / AT1); Salinity 4; Assessment ICP Metals; Basic Class II Landfill

WATER: ☒ BTEX F1 / ☐ VOCs; ☒ BTEX F1-F2 / ☐ BTEX F1-F4; ☒ Routine Water ☐ Turb ☒ F; ☐ TOC / ☒ DOC + DNH3; Regulated Metals (CCME / AT1): Total, Dissolved; Mercury ☒ Total ☐ Dissolved

Other Analysis: PHENOLS; TDS actual; NH4 total; Isotopes - 2H and 18O

#	Sample ID	Depth (unit)	Matrix GW / SW Soil	Date/Time Sampled YY/MM/DD 24:00	BTEX F1	BTEX F1-F2	Routine Water	DOC + DNH3	Regulated Metals Total	Regulated Metals Dissolved	Mercury	PHENOLS	TDS actual	NH4 total	Isotopes	HOLD - Do not Analyze	# of Containers Submitted
1	MW-08		GW	15/06/24 12:05	X	X	X	X		X	X	X	X	X	X		12
2	MW-10		GW	15/06/24 18:50	X	X	X	X		X	X	X	X	X	X		12
3	MW-11		GW	15/06/24 16:35	X	X	X	X		X	X	X	X	X	X		12
4	MW-12		GW	15/06/24 10:11	X	X	X	X		X	X	X	X	X	X		12
5	MW-13		GW	15/06/24 14:20	X	X	X	X		X	X	X	X	X	X		12
6	D15-01		GW	15/06/24 18:50	X	X	X	X		X	X	X	X	X	X		12
7																	
8																	
9																	
10																	
11																	
12																	

Please indicate Filtered, Preserved or Both (F, P, F/P) → P P P/F F/P P P P P DW2 / pmk F/P

Relinquished By (Signature/Print):	Date (YY/MM/DD):	Time (24:00):
NUnonius / Nick Unonius	15/06/24	23:28
Relinquished By (Signature/Print): [signature] / Stephane Nguelleu	Date (YY/MM/DD): 15/06/24	Time (24:00): 23:28
Special Instructions: Limited sample available. Hold NH4-Total: do not analyze		# of Jars Used & Not Submitted

LAB USE ONLY

Received By:	Date:	Time:	Maxxam Job #: B553893
Jenna Walter [signature]	20150625	0730	
Lab Comments:		Custody Seal: present both	Temperature: 3,7,5 / 5,7,6	Ice: present both

AB FCD-00331 Rev3 2010/05

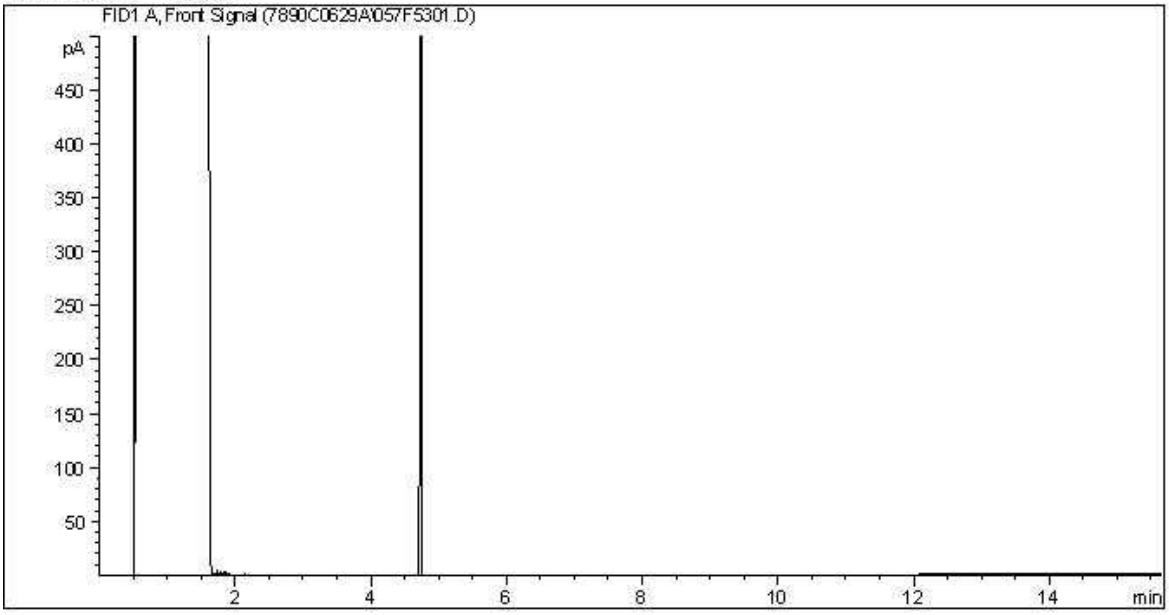
Maxxam Analytics International Corporation o/a Maxxam Analytics

Maxxam Job #: B553893
Report Date: 2015/08/07
Maxxam Sample: MN4481

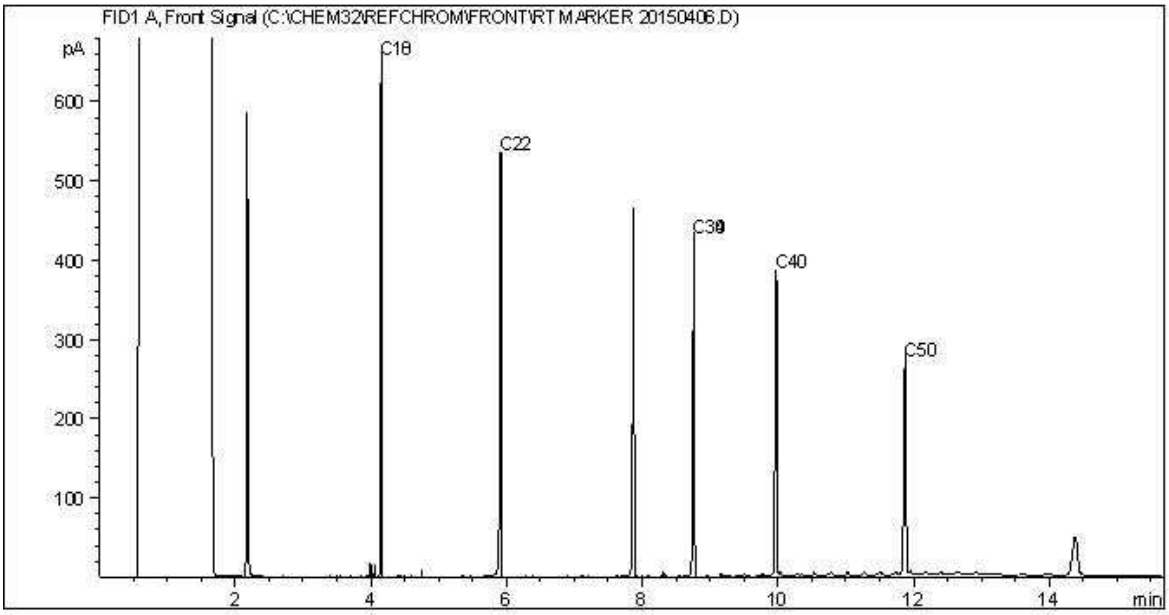
WORLEYPARSONS
Attention: TREVOR BUTTERFIELD
Client Project #: 307075-01608-100
Site Reference: NCIA
Client ID: MW-08

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890C



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

Page 1 of 1

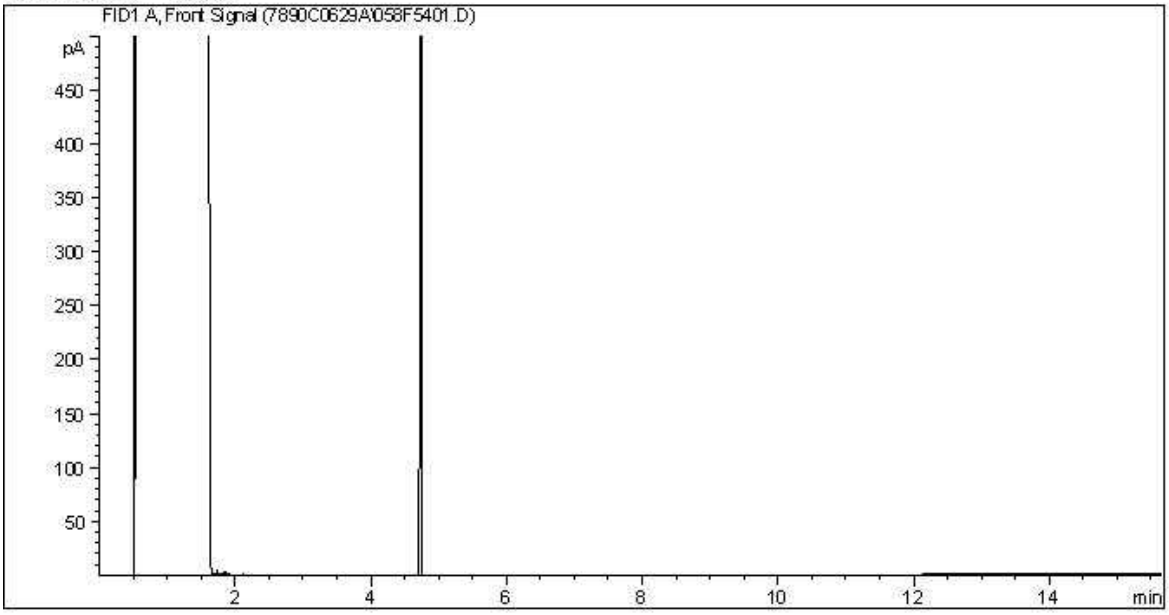
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B553893
Report Date: 2015/08/07
Maxxam Sample: MN4482

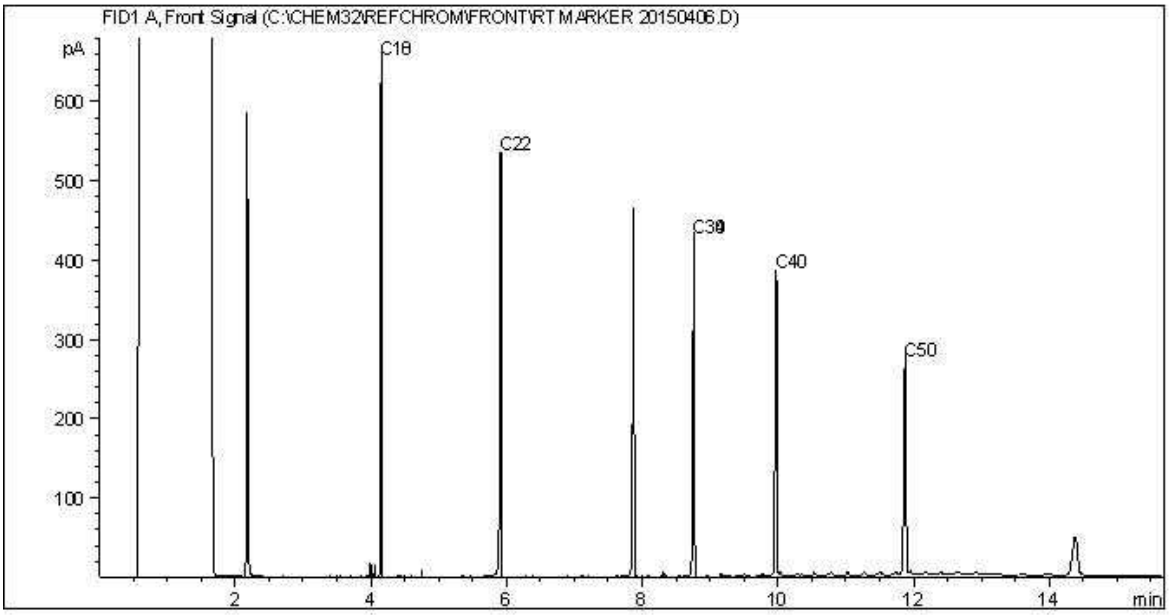
WORLEYPARSONS
Attention: TREVOR BUTTERFIELD
Client Project #: 307075-01608-100
Site Reference: NCIA
Client ID: MW-10

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890C



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

Page 1 of 1

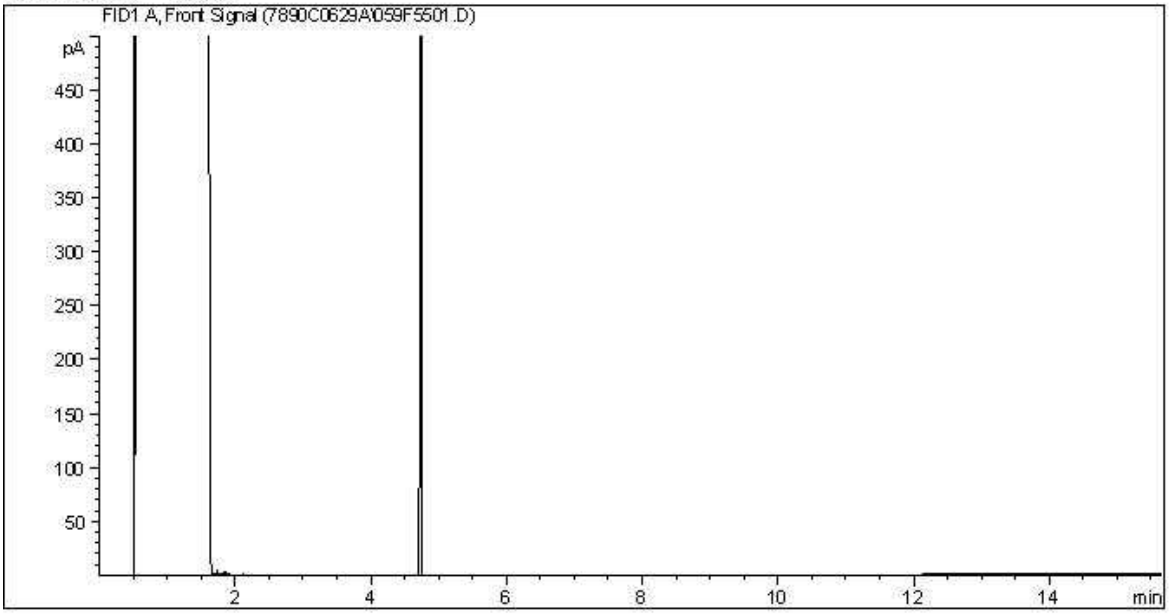
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B553893
Report Date: 2015/08/07
Maxxam Sample: MN4483

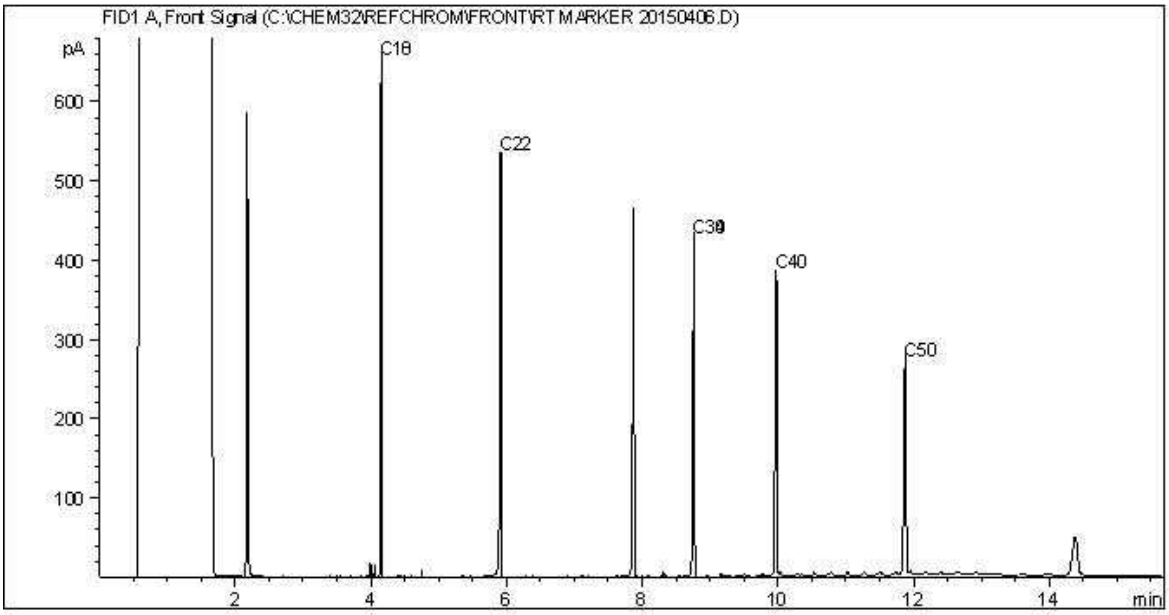
WORLEYPARSONS
Attention: TREVOR BUTTERFIELD
Client Project #: 307075-01608-100
Site Reference: NCIA
Client ID: MW-11

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890C



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

Page 1 of 1

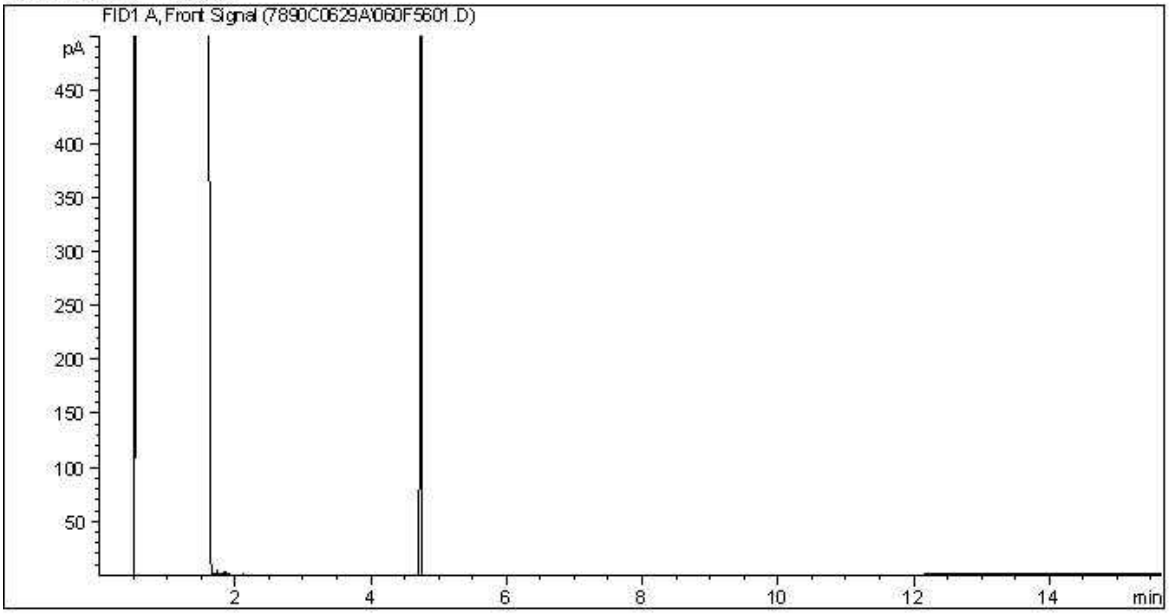
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B553893
Report Date: 2015/08/07
Maxxam Sample: MN4484

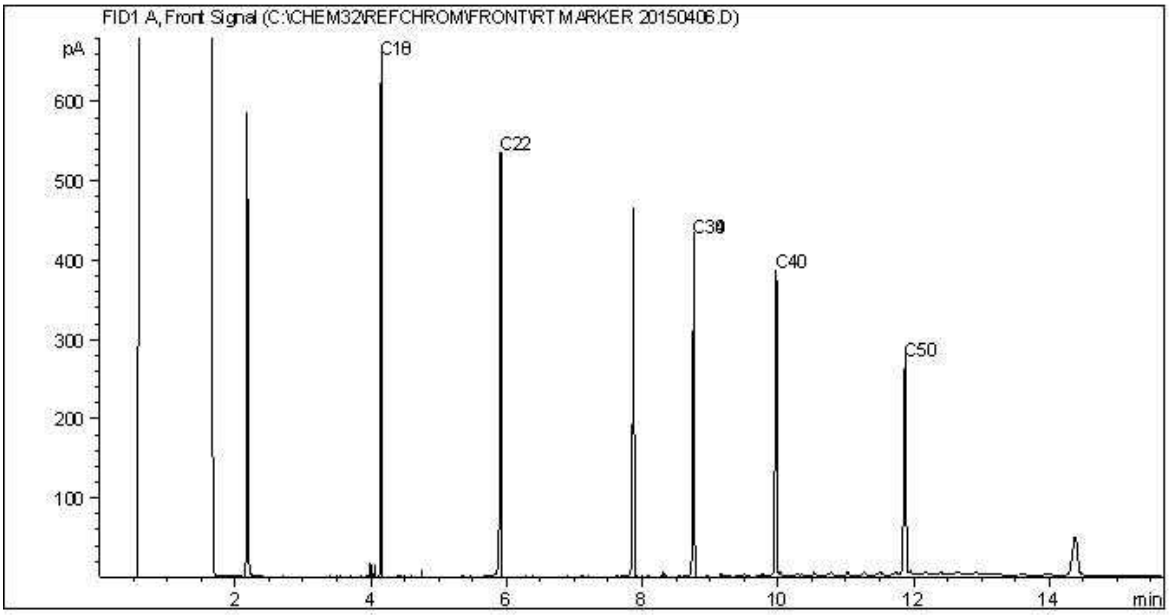
WORLEYPARSONS
Attention: TREVOR BUTTERFIELD
Client Project #: 307075-01608-100
Site Reference: NCIA
Client ID: MW-12

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890C



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

Page 1 of 1

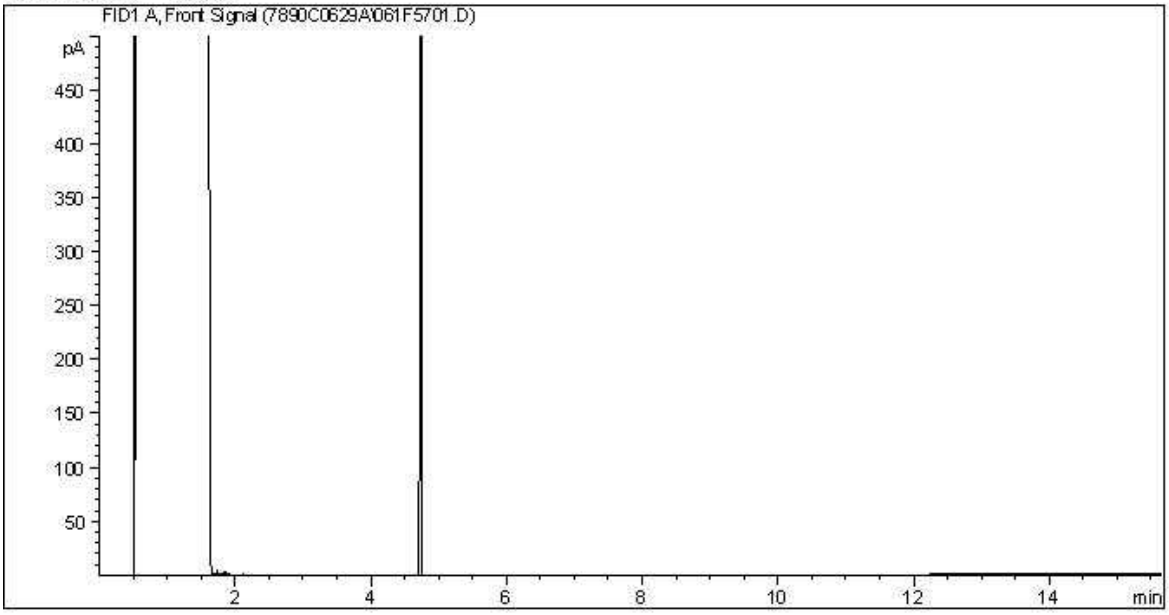
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B553893
Report Date: 2015/08/07
Maxxam Sample: MN4485

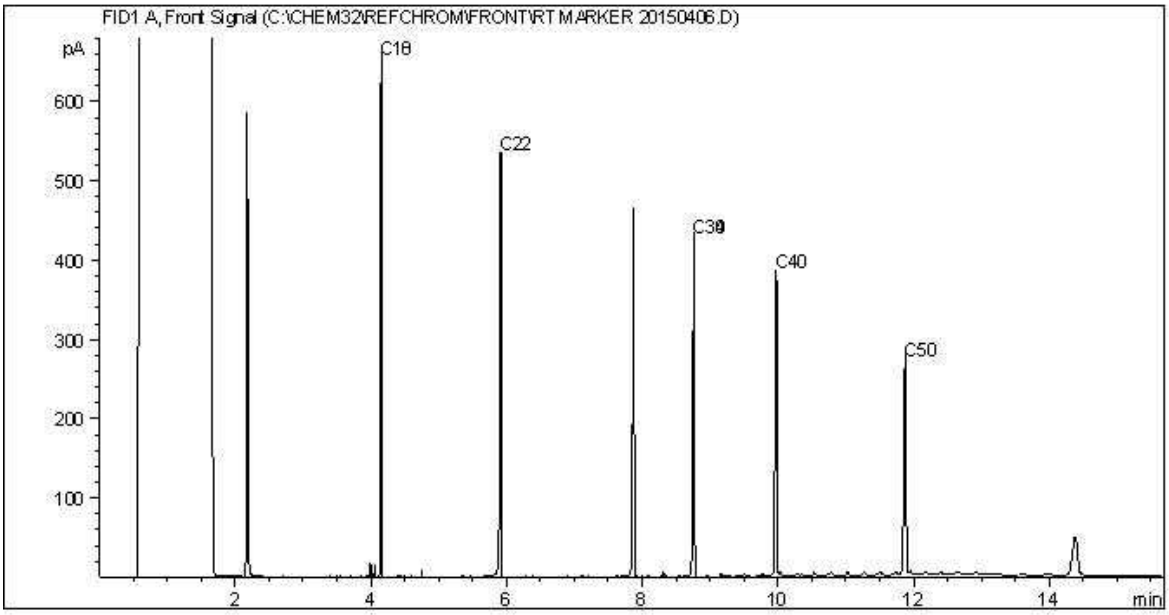
WORLEYPARSONS
Attention: TREVOR BUTTERFIELD
Client Project #: 307075-01608-100
Site Reference: NCIA
Client ID: MW-13

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890C



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

Page 1 of 1

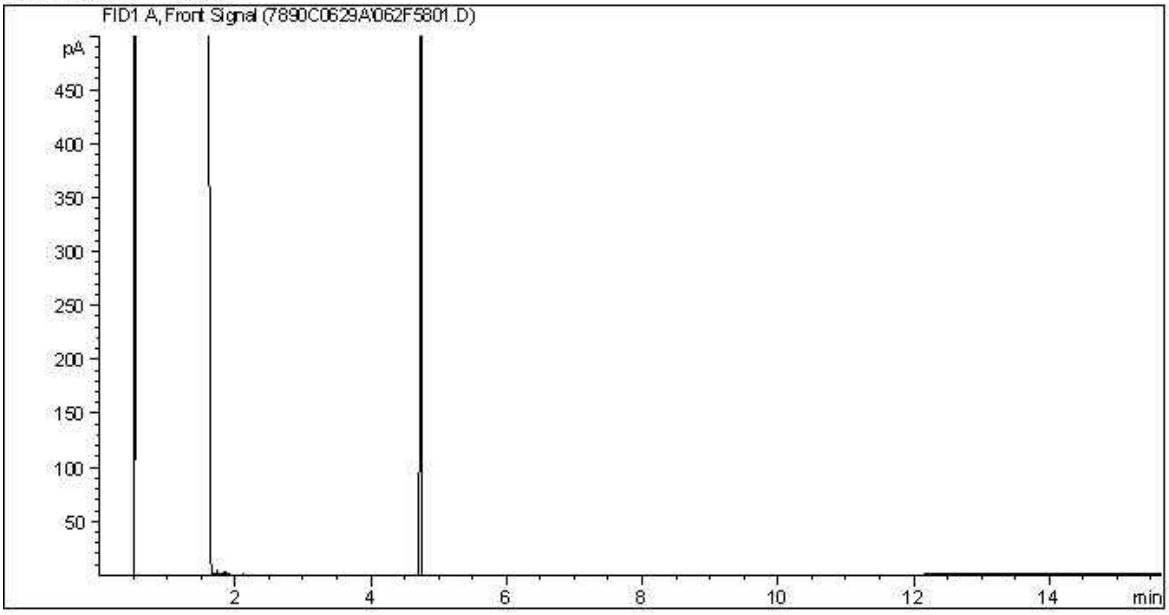
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B553893
Report Date: 2015/08/07
Maxxam Sample: MN4486

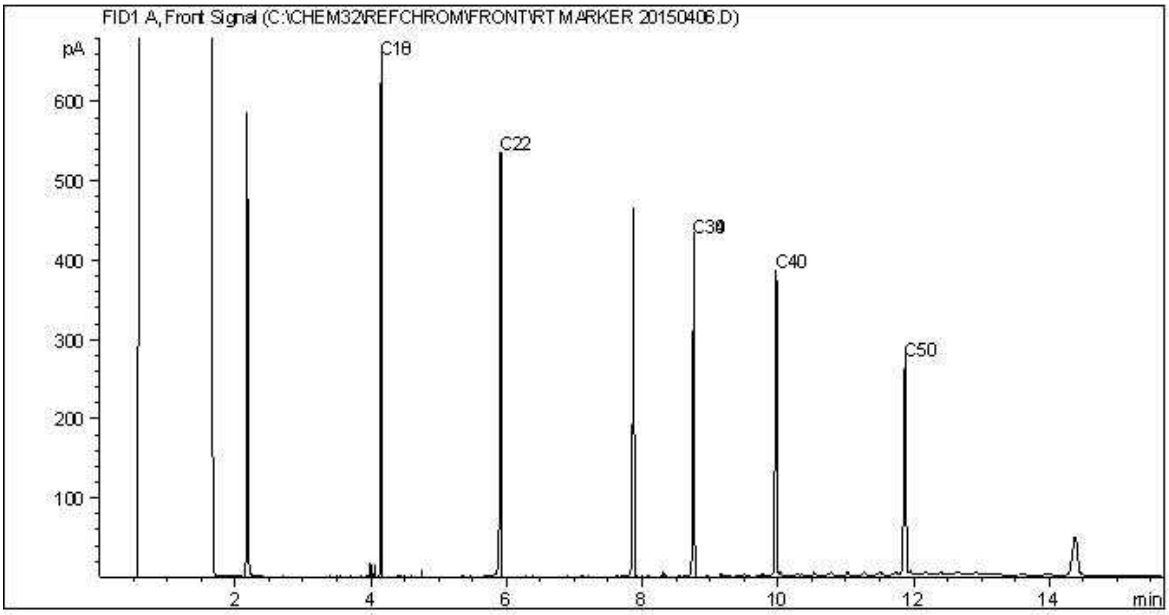
WORLEYPARSONS
Attention: TREVOR BUTTERFIELD
Client Project #: 307075-01608-100
Site Reference: NCIA
Client ID: D15-01

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890C



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

Page 1 of 1

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

ISOTOPE TRACER TECHNOLOGIES INC

Isotope Analyses for:
Maxxam Analytics

IT2 FILE # 150175-A B553893

2015-08-07

2015-08-07

Client: Maxxam Analytics
9331-48th Street
Edmonton, Alberta
T6B 2R4
Tel: 1 (780) 577-7139
Attn.: Alaina Hunter
E-mail: AHunter@maxxam.ca

$\delta^{18}O$ Analyses Results :

File Number: **150175-A**
Project Number: **B553893**

#	Sample ID	Collection		Sample #	$\delta^{18}O$	Aver	Stdv
	B553893	Date			H_2O	VSMOW	
1	MN4481-MW-08	June 24, 2015	12:05	32335	X	-18.39	0.09
2	MN4482-MW-10	June 24, 2015	18:51	32336	X	-18.97	0.06
3	MN4483-MW-11	June 24, 2015	16:35	32337	X	-17.57	0.04
4	MN4484-MW-12	June 24, 2015	10:11	32338	X	-17.84	0.11
5	MN4485-MW-13	June 24, 2015	14:20	32339	X	-19.06	0.06
6	MN4486-D15-01	June 24, 2015	18:50	32340	X	-18.86	0.09

Insturment Used: Cavity Ring Down Spectroscopy (CRDS)
CRDS (Model L1102-i) (Piccaro, California, USA).
Standard Used:
IT^2-13 / IT^2-11 / IT^2-12 Calabirated with IAEA Standards (V-SMOW, SLAP, and GISP)
Typical Standard deviation:
±0.1‰

2015-08-07

Client: Maxxam Analytics
9331-48th Street
Edmonton, Alberta
T6B 2R4
Tel: 1 (780) 577-7139
Attn.: Alaina Hunter
E-mail: AHunter@maxxam.ca

δ^2H Analyses Results :

File Number: **150175-A**
Project Number: **B553893**

#	Sample ID	Collection		Sample #	δ^2H	Aver	Stdv
	B553893	Date			H_2O	VSMOW	
1	MN4481-MW-08	June 24, 2015	12:05	32335	X	-145.7	0.2
2	MN4482-MW-10	June 24, 2015	18:51	32336	X	-148.1	0.4
3	MN4483-MW-11	June 24, 2015	16:35	32337	X	-141.6	0.4
4	MN4484-MW-12	June 24, 2015	10:11	32338	X	-142.0	0.3
5	MN4485-MW-13	June 24, 2015	14:20	32339	X	-148.2	0.5
6	MN4486-D15-01	June 24, 2015	18:50	32340	X	-148.0	0.2

Insturment Used: Cavity Ring Down Spectroscopy (CRDS)
CRDS (Model L1102-i) (Piccaro, California, USA).
Standard Used:
IT^2-13 / IT^2-11 / IT^2-12 Calibrated with IAEA Standards (V-SMOW, SLAP, and GISP)
Typical Standard deviation:
±1‰

Laboratory Report Data Checklist

WorleyParsons resources & energy

Both Database and Project Staff sections to be completed within 5 calendar days of receipt of Lab Confirmation Package and Certificate Of Analysis

DATABASE STAFF TO COMPLETE SECTIONS 1, 2 AND 4:

1. BACKGROUND

Client	NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION	**Date(s) sampled**	2015/06/24
Laboratory	Maxxam, Edmonton	**Project No.**	307075-01608-100
Lab Submission No.	B553893	**Site name**	NCIA

2. SAMPLE RECEIPT CONFIRMATION (SRC) – PART A

SRC cross-checked against the chain of custody (COC) (sample names, analytical packages)? ☒ Yes ☐ No **Comments**

(Maxxam Only) Fundamental Laboratory Acceptance Guideline (FLAG) received? ☒ Yes ☐ N/A

If yes, FLAG type and comments: No discrepancies noted.

Date samples submitted 2015/06/25

Due date for lab report on SRC 2015/07/03

Data check completed by Alice Liu **Date** 05-Aug-2015

4. CERTIFICATE OF ANALYSIS (COA) LAB QA/QC REPORT

Lab data received (pdf/dbf) with signature? ☒ Yes ☐ No **Comments**

(Imperial Oil only) Data Quality Waver (DQW) issued? ☐ Yes ☒ No **If yes, contact PM. DQW *MUST BE* signed and returned to lab in 5 working days.**

Date returned to lab:

Extractions and analysis conducted within acceptable hold times? ☒ Yes ☐ No

Lab has warranted all tests were in statistical control? (look for trend rule failure notes) ☒ Yes ☐ No

Lab QA/QC samples are within Acceptance Criteria?

Instrument Surrogate Recovery	☐ Yes ☐ No ☒ N/A	
Extraction Surrogate Recovery	☒ Yes ☐ No ☐ N/A	
Method Blank Concentration	☐ Yes ☒ No ☐ N/A	Dissolved Lead (Pb) 0.00023, RDL=0.00020
Matrix Duplicate RPD	☒ Yes ☐ No ☐ N/A	Some NC.
Matrix Spike Recovery	☒ Yes ☐ No ☐ N/A	Some NC.
Spiked Blank Recovery	☐ Yes ☐ No ☒ N/A	
Lab Control Sample (LCS) recovery	☒ Yes ☐ No ☐ N/A	

Data check completed by Alice Liu **Date** 05-Aug-2015

WorleyParsons
resources & energy

Laboratory Report Data Checklist

Both Database and Project Staff sections to be completed within 5 calendar days of receipt of Lab Confirmation Package and Certificate Of Analysis

PROJECT STAFF TO COMPLETE SECTIONS 3 AND 5 THROUGH 8:

3. SAMPLE RECEIPT CONFIRMATION (SRC) – PART B

SRC cross-checked with program planning / analytical schedule (sample names, analytical packages correct as per schedule)? ☒ Yes ☐ No **Comments**

Data check completed by Stephane Ngueleu **Date** 31-Aug-2015

5. CERTIFICATE OF ANALYSIS (COA) LAB QA/QC REPORT

Lab reports have all the requested packages, on the correct samples? ☒ Yes ☐ No

Detection limits are suitable for the project purpose? (What was requested on the COC and is that correct? Have any been raised?) ☒ Yes ☐ No

Data check completed by Stephane Ngueleu **Date** 31-Aug-2015

6. CERTIFICATE OF ANALYSIS (COA) FIELD DUPLICATES, BLANKS

Field duplicates decoded and RPDs acceptable?	☒ Yes	☐ No	☐ N/A	**Comments**
Trip Blank results acceptable?	☐ Yes	☐ No	☒ N/A	**Comments**
Field Blank results acceptable?	☐ Yes	☐ No	☒ N/A	**Comments**
Equipment Blank results acceptable?	☐ Yes	☐ No	☒ N/A	**Comments**
Correspondence re: lab QA/QC issues attached (and saved under correct job #)?	☐ Yes	☐ No	☒ N/A	**Comments**

Data check completed by Stephane Ngueleu **Date** 31-Aug-2015

7. LAB DATA/FIELD DATA/HISTORICAL DATA CHECKS

Field EC vs. Lab EC RPDs acceptable?	☒ Yes	☐ No	☐ N/A	**Comments**
Field pH vs. Lab pH RPDs acceptable?	☒ Yes	☐ No	☐ N/A	**Comments**
Is lab collected data within acceptable/expected historical ranges (if applicable)? Check against historical data tables if they exist.	☒ Yes	☐ No	☐ N/A	**Comments**

Data check completed by Stephane Ngueleu **Date** 31-Aug-2015

8. CERTIFICATE OF ANALYSIS (COA) RESULTS INTERPRETATION

Are data in this report considered to be Fit for Purpose? ☒ Yes ☐ No

Explain rationale for yes/no:

Request lab to recheck data? If so give details ☐ Yes ☐ No ☐ N/A **Comments**

If Yes, Lab request to recheck must be approved by Project Manager Name: **Date**

Data check completed by **Date**

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Your Project #: 307075-01608-100
Site Location: NCIA
Your C.O.C. #: A118552

Attention:TREVOR BUTTERFIELD

WORLEYPARSONS
Suite 300, 8615 51 Ave
EDMONTON, AB
CANADA T6E 6A8

Report Date: 2015/08/07
Report #: R2013299
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B554422
Received: 2015/06/26, 07:30

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity @25C (pp, total), CO3,HCO3,OH	6	N/A	2015/06/28	AB SOP-00005	SM 22 2320 B m
BTEX/F1 in Water by HS GC/MS/FID	6	N/A	2015/07/03	AB SOP-00039	CCME CWS/EPA 8260C m
Cadmium - low level CCME - Dissolved	6	N/A	2015/07/02	AB WI-00065	Auto Calc
Chloride by Automated Colourimetry	6	N/A	2015/06/29	AB SOP-00020	SM 22 4500-Cl G m
Carbon (DOC) (2)	6	N/A	2015/07/02	EENVSOP-00060	MMCW 119 1996 m
Conductivity @25C	6	N/A	2015/06/28	AB SOP-00005	SM 22 2510 B m
Isotopes - Subcontract (1)	6	N/A	2015/08/06		
Fluoride	6	N/A	2015/06/28	AB SOP-00005	SM 22 4500-F C m
CCME Hydrocarbons in Water (F2; C10-C16)	6	2015/07/02	2015/07/02	AB SOP-00040 / AB SOP-00037	CCME PHC-CWS m
Hardness	6	N/A	2015/06/30	AB WI-00065	Auto Calc
Mercury (Total)	6	2015/07/02	2015/07/02	EENVSOP-00031	EPA 1631E/245.1 R3 m
Elements by ICP - Dissolved	6	N/A	2015/06/29	AB SOP-00042	EPA 200.7 CFR 2012 m
Elements by ICPMS - Dissolved	6	N/A	2015/06/30	AB SOP-00043	EPA 200.8 R5.4 m
Ion Balance	6	N/A	2015/06/30	AB WI-00065	Auto Calc
Sum of cations, anions	6	N/A	2015/06/30	AB WI-00065	Auto Calc
Ammonia-N (Dissolved)	6	N/A	2015/06/29	AB SOP-00007	EPA 350.1 R2.0 m
Nitrate and Nitrite	6	N/A	2015/06/29	AB WI-00065	Auto Calc
Nitrate + Nitrite-N (calculated)	6	N/A	2015/06/29	AB WI-00065	Auto Calc
Nitrogen, (Nitrite, Nitrate) by IC	6	N/A	2015/06/28	AB SOP-00023	SM 22 4110 B m
pH @25°C (Alkalinity titrator)	6	N/A	2015/06/28	AB SOP-00005	SM 22 4500 H+ B m
Phenols (4-AAP)	6	N/A	2015/06/29	EENVSOP-00061	MMCW 154 1996 m
Sulphate by Automated Colourimetry	6	N/A	2015/06/29	AB SOP-00018	SM 22 4500-SO4 E m
Total Dissolved Solids (Filt. Residue)	6	2015/06/29	2015/07/02	AB SOP-00065	SM 22 2540 C m
Total Dissolved Solids (Calculated)	6	N/A	2015/06/30	AB WI-00065	Auto Calc

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
(1) This test was performed by Sub Edmonton to ITT
(2) DOC present in the sample should be considered as non-purgeable DOC.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Your Project #: 307075-01608-100
Site Location: NCIA
Your C.O.C. #: A118552

Attention:TREVOR BUTTERFIELD

WORLEYPARSONS
Suite 300, 8615 51 Ave
EDMONTON, AB
CANADA T6E 6A8

Report Date: 2015/08/07
Report #: R2013299
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B554422
Received: 2015/06/26, 07:30

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Alaina Hunter, Dip. BioSci, Project Manager, Environmental
Email: AHunter@maxxam.ca
Phone# (780)577-7139

==========

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

Maxxam Job #: B554422
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NS, NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN7556 MW-02							
Sampling Date 2015/06/25 11:00							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Parameter							
Subcontract Parameter	ATTACHED	N/A	Bq/l				7994556
Calculated Parameters							
Anion Sum	18	N/A	meq/L				7949308
Cation Sum	20	N/A	meq/L				7949308
Hardness (CaCO3)	610	0.50	mg/L				7949306
Ion Balance	1.1	0.010	N/A				7949307
Dissolved Nitrate (NO3)	<0.044	0.044	mg/L				7949309
Nitrate plus Nitrite (N)	<0.020	0.020	mg/L				7949310
Dissolved Nitrite (NO2)	<0.033	0.033	mg/L				7949309
Total Dissolved Solids	1000	10	mg/L				7949313
Misc. Inorganics							
Conductivity	1600	1.0	uS/cm			MA4	7949488
Dissolved Organic Carbon (C)	4.7	0.50	mg/L			NB4	7953099
pH	7.15	N/A	pH			MA4	7949485
Total Dissolved Solids	930	10	mg/L			GM4	7950485
Low Level Elements							
Dissolved Cadmium (Cd)	<0.020	0.020	ug/L				7949267
Anions							
Dissolved Chloride (Cl)	96	1.0	mg/L			KD5	7949804
Alkalinity (PP as CaCO3)	<0.50	0.50	mg/L			MA4	7949487
Alkalinity (Total as CaCO3)	500	0.50	mg/L			MA4	7949487
Bicarbonate (HCO3)	610	0.50	mg/L			MA4	7949487
Carbonate (CO3)	<0.50	0.50	mg/L			MA4	7949487
Dissolved Fluoride (F)	0.078	0.050	mg/L			MA4	7949489
Hydroxide (OH)	<0.50	0.50	mg/L			MA4	7949487
Dissolved Sulphate (SO4)	270(1)	5.0	mg/L			KD5	7949807
Nutrients							
Dissolved Nitrite (N)	<0.010	0.010	mg/L			MPH	7949605
Dissolved Ammonia (N)	0.68	0.050	mg/L			MBB	7947810
Dissolved Nitrate (N)	<0.010	0.010	mg/L			MPH	7949605
Misc. Organics							
Phenols	<0.0020	0.0020	mg/L			YY	7950593
PETROLEUM HYDROCARBONS (CCME)							
Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	0.10	0.10	mg/L			GG3	7950811
O-TERPHENYL (sur.)	110	50 - 130	%			GG3	7950811
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Aluminum (Al)	0.0035	0.0030	mg/L			APY	7952174
Dissolved Antimony (Sb)	<0.00060	0.00060	mg/L			APY	7952174
Dissolved Arsenic (As)	0.0028	0.00020	mg/L			APY	7952174
Dissolved Barium (Ba)	0.092	0.010	mg/L			JPJ	7950798
Dissolved Beryllium (Be)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Boron (B)	0.21	0.020	mg/L			JPJ	7950798
Dissolved Calcium (Ca)	150	0.30	mg/L			JPJ	7950798
Dissolved Chromium (Cr)	<0.0010	0.0010	mg/L			APY	7952174

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B554422
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NS, NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN7556 MW-02							
Sampling Date 2015/06/25 11:00							
Matrix W							
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Cobalt (Co)	0.00043	0.00030	mg/L			APY	7952174
Dissolved Copper (Cu)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Iron (Fe)	11	0.060	mg/L			JPJ	7950798
Dissolved Lead (Pb)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Lithium (Li)	0.078	0.020	mg/L			JPJ	7950798
Dissolved Magnesium (Mg)	55	0.20	mg/L			JPJ	7950798
Dissolved Manganese (Mn)	0.41	0.0040	mg/L			JPJ	7950798
Dissolved Molybdenum (Mo)	0.00036	0.00020	mg/L			APY	7952174
Dissolved Nickel (Ni)	0.00072	0.00050	mg/L			APY	7952174
Dissolved Phosphorus (P)	<0.10	0.10	mg/L			JPJ	7950798
Dissolved Potassium (K)	4.7	0.30	mg/L			JPJ	7950798
Dissolved Selenium (Se)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Silicon (Si)	8.5	0.10	mg/L			JPJ	7950798
Dissolved Silver (Ag)	<0.00010	0.00010	mg/L			APY	7952174
Dissolved Sodium (Na)	160	0.50	mg/L			JPJ	7950798
Dissolved Strontium (Sr)	1.5	0.020	mg/L			JPJ	7950798
Dissolved Sulphur (S)	94	0.20	mg/L			JPJ	7950798
Dissolved Thallium (Tl)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Tin (Sn)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Titanium (Ti)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Uranium (U)	0.00086	0.00010	mg/L			APY	7952174
Dissolved Vanadium (V)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Zinc (Zn)	<0.0030	0.0030	mg/L			APY	7952174
Low Level Elements							
Total Mercury (Hg)	<0.0050	0.0050	ug/L			JLO	7952648
VOLATILE ORGANICS BY GC-MS (WATER)							
Volatiles							
Benzene	<0.00040	0.00040	mg/L			KE4	7950616
Toluene	<0.00040	0.00040	mg/L			KE4	7950616
Ethylbenzene	<0.00040	0.00040	mg/L			KE4	7950616
m & p-Xylene	<0.00080	0.00080	mg/L			KE4	7950616
o-Xylene	<0.00040	0.00040	mg/L			KE4	7950616
Xylenes (Total)	<0.00080	0.00080	mg/L			KE4	7950616
F1 (C6-C10) - BTEX	<0.10	0.10	mg/L			KE4	7950616
F1 (C6-C10)	<0.10	0.10	mg/L			KE4	7950616
1,4-Difluorobenzene (sur.)	99	70 - 130	%			KE4	7950616
4-Bromofluorobenzene (sur.)	97	70 - 130	%			KE4	7950616
D4-1,2-Dichloroethane (sur.)	102	70 - 130	%			KE4	7950616
MN7557 MW-05							
Sampling Date 2015/06/25 12:35							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Parameter							
Subcontract Parameter	ATTACHED	N/A	Bq/l				7994556
Calculated Parameters							
Anion Sum	11	N/A	meq/L				7949308
Cation Sum	12	N/A	meq/L				7949308

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B554422
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NS, NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN7557 MW-05							
Sampling Date 2015/06/25 12:35							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Calculated Parameters							
Hardness (CaCO3)	450	0.50	mg/L				7949306
Ion Balance	1.0	0.010	N/A				7949307
Dissolved Nitrate (NO3)	0.065	0.044	mg/L				7949309
Nitrate plus Nitrite (N)	<0.020	0.020	mg/L				7949310
Dissolved Nitrite (NO2)	<0.033	0.033	mg/L				7949309
Total Dissolved Solids	620	10	mg/L				7949313
Misc. Inorganics							
Conductivity	980	1.0	uS/cm			MA4	7949488
Dissolved Organic Carbon (C)	3.2	0.50	mg/L			NB4	7953099
pH	7.41	N/A	pH			MA4	7949485
Total Dissolved Solids	630	10	mg/L			GM4	7950485
Low Level Elements							
Dissolved Cadmium (Cd)	<0.020	0.020	ug/L				7949267
Anions							
Dissolved Chloride (Cl)	40	1.0	mg/L			KD5	7949804
Alkalinity (PP as CaCO3)	<0.50	0.50	mg/L			MA4	7949487
Alkalinity (Total as CaCO3)	370	0.50	mg/L			MA4	7949487
Bicarbonate (HCO3)	450	0.50	mg/L			MA4	7949487
Carbonate (CO3)	<0.50	0.50	mg/L			MA4	7949487
Dissolved Fluoride (F)	0.10	0.050	mg/L			MA4	7949489
Hydroxide (OH)	<0.50	0.50	mg/L			MA4	7949487
Dissolved Sulphate (SO4)	150	1.0	mg/L			KD5	7949807
Nutrients							
Dissolved Nitrite (N)	<0.010	0.010	mg/L			MPH	7949605
Dissolved Ammonia (N)	0.25	0.050	mg/L			MBB	7947810
Dissolved Nitrate (N)	0.015	0.010	mg/L			MPH	7949605
Misc. Organics							
Phenols	<0.0020	0.0020	mg/L			YY	7950593
PETROLEUM HYDROCARBONS (CCME)							
Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	<0.10	0.10	mg/L			GG3	7950811
O-TERPHENYL (sur.)	116	50 - 130	%			GG3	7950811
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Aluminum (Al)	<0.0030	0.0030	mg/L			APY	7952174
Dissolved Antimony (Sb)	<0.00060	0.00060	mg/L			APY	7952174
Dissolved Arsenic (As)	0.0018	0.00020	mg/L			APY	7952174
Dissolved Barium (Ba)	0.051	0.010	mg/L			JPJ	7950798
Dissolved Beryllium (Be)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Boron (B)	0.059	0.020	mg/L			JPJ	7950798
Dissolved Calcium (Ca)	120	0.30	mg/L			JPJ	7950798
Dissolved Chromium (Cr)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Cobalt (Co)	0.00084	0.00030	mg/L			APY	7952174
Dissolved Copper (Cu)	0.00056	0.00020	mg/L			APY	7952174
Dissolved Iron (Fe)	4.8	0.060	mg/L			JPJ	7950798
Dissolved Lead (Pb)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Lithium (Li)	0.041	0.020	mg/L			JPJ	7950798

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B554422
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NS, NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN7557 MW-05							
Sampling Date 2015/06/25 12:35							
Matrix W							
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Magnesium (Mg)	38	0.20	mg/L			JPJ	7950798
Dissolved Manganese (Mn)	0.71	0.0040	mg/L			JPJ	7950798
Dissolved Molybdenum (Mo)	0.00054	0.00020	mg/L			APY	7952174
Dissolved Nickel (Ni)	0.00091	0.00050	mg/L			APY	7952174
Dissolved Phosphorus (P)	<0.10	0.10	mg/L			JPJ	7950798
Dissolved Potassium (K)	8.4	0.30	mg/L			JPJ	7950798
Dissolved Selenium (Se)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Silicon (Si)	6.6	0.10	mg/L			JPJ	7950798
Dissolved Silver (Ag)	<0.00010	0.00010	mg/L			APY	7952174
Dissolved Sodium (Na)	47	0.50	mg/L			JPJ	7950798
Dissolved Strontium (Sr)	0.69	0.020	mg/L			JPJ	7950798
Dissolved Sulphur (S)	45	0.20	mg/L			JPJ	7950798
Dissolved Thallium (Tl)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Tin (Sn)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Titanium (Ti)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Uranium (U)	0.00072	0.00010	mg/L			APY	7952174
Dissolved Vanadium (V)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Zinc (Zn)	0.0034	0.0030	mg/L			APY	7952174
Low Level Elements							
Total Mercury (Hg)	<0.0050	0.0050	ug/L			JLO	7952648
VOLATILE ORGANICS BY GC-MS (WATER)							
Volatiles							
Benzene	<0.00040	0.00040	mg/L			KE4	7950616
Toluene	<0.00040	0.00040	mg/L			KE4	7950616
Ethylbenzene	<0.00040	0.00040	mg/L			KE4	7950616
m & p-Xylene	<0.00080	0.00080	mg/L			KE4	7950616
o-Xylene	<0.00040	0.00040	mg/L			KE4	7950616
Xylenes (Total)	<0.00080	0.00080	mg/L			KE4	7950616
F1 (C6-C10) - BTEX	<0.10	0.10	mg/L			KE4	7950616
F1 (C6-C10)	<0.10	0.10	mg/L			KE4	7950616
1,4-Difluorobenzene (sur.)	99	70 - 130	%			KE4	7950616
4-Bromofluorobenzene (sur.)	98	70 - 130	%			KE4	7950616
D4-1,2-Dichloroethane (sur.)	102	70 - 130	%			KE4	7950616
MN7558 MW-06							
Sampling Date 2015/06/25 20:07							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Parameter							
Subcontract Parameter	ATTACHED	N/A	Bq/l				7994556
Calculated Parameters							
Anion Sum	20	N/A	meq/L				7949308
Cation Sum	21	N/A	meq/L				7949308
Hardness (CaCO3)	650	0.50	mg/L				7949306
Ion Balance	1.0	0.010	N/A				7949307
Dissolved Nitrate (NO3)	<0.044	0.044	mg/L				7949309
Nitrate plus Nitrite (N)	<0.020	0.020	mg/L				7949310
Dissolved Nitrite (NO2)	<0.033	0.033	mg/L				7949309

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B554422
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NS, NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN7558 MW-06							
Sampling Date 2015/06/25 20:07							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Calculated Parameters							
Total Dissolved Solids	1200	10	mg/L				7949313
Misc. Inorganics							
Conductivity	1700	1.0	uS/cm			MA4	7949488
Dissolved Organic Carbon (C)	6.5	0.50	mg/L			NB4	7953099
pH	7.37	N/A	pH			MA4	7949485
Total Dissolved Solids	1200	10	mg/L			GM4	7950485
Low Level Elements							
Dissolved Cadmium (Cd)	<0.020	0.020	ug/L				7949267
Anions							
Dissolved Chloride (Cl)	6.4	1.0	mg/L			KD5	7949804
Alkalinity (PP as CaCO3)	<0.50	0.50	mg/L			MA4	7949487
Alkalinity (Total as CaCO3)	510	0.50	mg/L			MA4	7949487
Bicarbonate (HCO3)	620	0.50	mg/L			MA4	7949487
Carbonate (CO3)	<0.50	0.50	mg/L			MA4	7949487
Dissolved Fluoride (F)	0.15	0.050	mg/L			MA4	7949489
Hydroxide (OH)	<0.50	0.50	mg/L			MA4	7949487
Dissolved Sulphate (SO4)	490(1)	5.0	mg/L			KD5	7949807
Nutrients							
Dissolved Nitrite (N)	<0.010	0.010	mg/L			MPH	7949605
Dissolved Ammonia (N)	1.8	0.050	mg/L			MBB	7947810
Dissolved Nitrate (N)	<0.010	0.010	mg/L			MPH	7949605
Misc. Organics							
Phenols	<0.0020	0.0020	mg/L			YY	7950593
PETROLEUM HYDROCARBONS (CCME)							
Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	<0.10	0.10	mg/L			GG3	7950811
O-TERPHENYL (sur.)	125	50 - 130	%			GG3	7950811
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Aluminum (Al)	<0.0030	0.0030	mg/L			APY	7952174
Dissolved Antimony (Sb)	<0.00060	0.00060	mg/L			APY	7952174
Dissolved Arsenic (As)	0.0045	0.00020	mg/L			APY	7952174
Dissolved Barium (Ba)	0.033	0.010	mg/L			JPJ	7950798
Dissolved Beryllium (Be)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Boron (B)	0.15	0.020	mg/L			JPJ	7950798
Dissolved Calcium (Ca)	160	0.30	mg/L			JPJ	7950798
Dissolved Chromium (Cr)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Cobalt (Co)	<0.00030	0.00030	mg/L			APY	7952174
Dissolved Copper (Cu)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Iron (Fe)	6.1	0.060	mg/L			JPJ	7950798
Dissolved Lead (Pb)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Lithium (Li)	0.11	0.020	mg/L			JPJ	7950798
Dissolved Magnesium (Mg)	60	0.20	mg/L			JPJ	7950798
Dissolved Manganese (Mn)	1.5	0.0040	mg/L			JPJ	7950798
Dissolved Molybdenum (Mo)	0.0010	0.00020	mg/L			APY	7952174
Dissolved Nickel (Ni)	<0.00050	0.00050	mg/L			APY	7952174
Dissolved Phosphorus (P)	0.18	0.10	mg/L			JPJ	7950798

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B554422
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NS, NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN7558 MW-06							
Sampling Date 2015/06/25 20:07							
Matrix W							
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Potassium (K)	5.8	0.30	mg/L			JPJ	7950798
Dissolved Selenium (Se)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Silicon (Si)	7.6	0.10	mg/L			JPJ	7950798
Dissolved Silver (Ag)	<0.00010	0.00010	mg/L			APY	7952174
Dissolved Sodium (Na)	180	0.50	mg/L			JPJ	7950798
Dissolved Strontium (Sr)	1.4	0.020	mg/L			JPJ	7950798
Dissolved Sulphur (S)	160	0.20	mg/L			JPJ	7950798
Dissolved Thallium (Tl)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Tin (Sn)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Titanium (Ti)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Uranium (U)	0.0016	0.00010	mg/L			APY	7952174
Dissolved Vanadium (V)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Zinc (Zn)	<0.0030	0.0030	mg/L			APY	7952174
Low Level Elements							
Total Mercury (Hg)	<0.0050	0.0050	ug/L			JLO	7952648
VOLATILE ORGANICS BY GC-MS (WATER)							
Volatiles							
Benzene	<0.00040	0.00040	mg/L			KE4	7950616
Toluene	<0.00040	0.00040	mg/L			KE4	7950616
Ethylbenzene	<0.00040	0.00040	mg/L			KE4	7950616
m & p-Xylene	<0.00080	0.00080	mg/L			KE4	7950616
o-Xylene	<0.00040	0.00040	mg/L			KE4	7950616
Xylenes (Total)	<0.00080	0.00080	mg/L			KE4	7950616
F1 (C6-C10) - BTEX	<0.10	0.10	mg/L			KE4	7950616
F1 (C6-C10)	<0.10	0.10	mg/L			KE4	7950616
1,4-Difluorobenzene (sur.)	98	70 - 130	%			KE4	7950616
4-Bromofluorobenzene (sur.)	98	70 - 130	%			KE4	7950616
D4-1,2-Dichloroethane (sur.)	103	70 - 130	%			KE4	7950616
MN7559 F15-01							
Sampling Date 2015/06/25 19:55							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Parameter							
Subcontract Parameter	ATTACHED	N/A	Bq/l				7994556
Calculated Parameters							
Anion Sum	0.0000	N/A	meq/L				7949308
Cation Sum	0.018	N/A	meq/L				7949308
Hardness (CaCO3)	<0.50	0.50	mg/L				7949306
Ion Balance	NC	0.010	N/A				7949307
Dissolved Nitrate (NO3)	<0.044	0.044	mg/L				7949309
Nitrate plus Nitrite (N)	<0.020	0.020	mg/L				7949310
Dissolved Nitrite (NO2)	<0.033	0.033	mg/L				7949309
Total Dissolved Solids	<10	10	mg/L				7949313
Misc. Inorganics							
Conductivity	<1.0	1.0	uS/cm			MA4	7949488
Dissolved Organic Carbon (C)	0.56	0.50	mg/L			NB4	7953099
pH	4.73	N/A	pH			MA4	7949485

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B554422
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NS, NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN7559 F15-01							
Sampling Date 2015/06/25 19:55							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Misc. Inorganics							
Total Dissolved Solids	<10	10	mg/L			GM4	7950485
Low Level Elements							
Dissolved Cadmium (Cd)	<0.020	0.020	ug/L				7949267
Anions							
Dissolved Chloride (Cl)	<1.0	1.0	mg/L			KD5	7949804
Alkalinity (PP as CaCO3)	<0.50	0.50	mg/L			MA4	7949487
Alkalinity (Total as CaCO3)	<0.50	0.50	mg/L			MA4	7949487
Bicarbonate (HCO3)	<0.50	0.50	mg/L			MA4	7949487
Carbonate (CO3)	<0.50	0.50	mg/L			MA4	7949487
Dissolved Fluoride (F)	<0.050	0.050	mg/L			MA4	7949489
Hydroxide (OH)	<0.50	0.50	mg/L			MA4	7949487
Dissolved Sulphate (SO4)	<1.0	1.0	mg/L			KD5	7949807
Nutrients							
Dissolved Nitrite (N)	<0.010	0.010	mg/L			MPH	7949605
Dissolved Ammonia (N)	<0.050	0.050	mg/L			MBB	7947810
Dissolved Nitrate (N)	<0.010	0.010	mg/L			MPH	7949605
Misc. Organics							
Phenols	<0.0020	0.0020	mg/L			YY	7950593
PETROLEUM HYDROCARBONS (CCME)							
Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	<0.10	0.10	mg/L			GG3	7950811
O-TERPHENYL (sur.)	118	50 - 130	%			GG3	7950811
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Aluminum (Al)	<0.0030	0.0030	mg/L			APY	7952174
Dissolved Antimony (Sb)	<0.00060	0.00060	mg/L			APY	7952174
Dissolved Arsenic (As)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Barium (Ba)	<0.010	0.010	mg/L			JPJ	7950798
Dissolved Beryllium (Be)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Boron (B)	<0.020	0.020	mg/L			JPJ	7950798
Dissolved Calcium (Ca)	<0.30	0.30	mg/L			JPJ	7950798
Dissolved Chromium (Cr)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Cobalt (Co)	<0.00030	0.00030	mg/L			APY	7952174
Dissolved Copper (Cu)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Iron (Fe)	<0.060	0.060	mg/L			JPJ	7950798
Dissolved Lead (Pb)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Lithium (Li)	<0.020	0.020	mg/L			JPJ	7950798
Dissolved Magnesium (Mg)	<0.20	0.20	mg/L			JPJ	7950798
Dissolved Manganese (Mn)	<0.0040	0.0040	mg/L			JPJ	7950798
Dissolved Molybdenum (Mo)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Nickel (Ni)	<0.00050	0.00050	mg/L			APY	7952174
Dissolved Phosphorus (P)	<0.10	0.10	mg/L			JPJ	7950798
Dissolved Potassium (K)	<0.30	0.30	mg/L			JPJ	7950798
Dissolved Selenium (Se)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Silicon (Si)	<0.10	0.10	mg/L			JPJ	7950798
Dissolved Silver (Ag)	<0.00010	0.00010	mg/L			APY	7952174
Dissolved Sodium (Na)	<0.50	0.50	mg/L			JPJ	7950798

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B554422
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NS, NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN7559 F15-01							
Sampling Date 2015/06/25 19:55							
Matrix W							
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Strontium (Sr)	<0.020	0.020	mg/L			JPJ	7950798
Dissolved Sulphur (S)	<0.20	0.20	mg/L			JPJ	7950798
Dissolved Thallium (Tl)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Tin (Sn)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Titanium (Ti)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Uranium (U)	<0.00010	0.00010	mg/L			APY	7952174
Dissolved Vanadium (V)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Zinc (Zn)	<0.0030	0.0030	mg/L			APY	7952174
Low Level Elements							
Total Mercury (Hg)	<0.0050	0.0050	ug/L			JLO	7952648
VOLATILE ORGANICS BY GC-MS (WATER)							
Volatiles							
Benzene	<0.00040	0.00040	mg/L			KE4	7950616
Toluene	<0.00040	0.00040	mg/L			KE4	7950616
Ethylbenzene	<0.00040	0.00040	mg/L			KE4	7950616
m & p-Xylene	<0.00080	0.00080	mg/L			KE4	7950616
o-Xylene	<0.00040	0.00040	mg/L			KE4	7950616
Xylenes (Total)	<0.00080	0.00080	mg/L			KE4	7950616
F1 (C6-C10) - BTEX	<0.10	0.10	mg/L			KE4	7950616
F1 (C6-C10)	<0.10	0.10	mg/L			KE4	7950616
1,4-Difluorobenzene (sur.)	99	70 - 130	%			KE4	7950616
4-Bromofluorobenzene (sur.)	98	70 - 130	%			KE4	7950616
D4-1,2-Dichloroethane (sur.)	103	70 - 130	%			KE4	7950616
MN7560 MW-07							
Sampling Date 2015/06/25 17:57							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Parameter							
Subcontract Parameter	ATTACHED	N/A	Bq/l				7994556
Calculated Parameters							
Anion Sum	35	N/A	meq/L				7949308
Cation Sum	34	N/A	meq/L				7949308
Hardness (CaCO3)	1100	0.50	mg/L				7949306
Ion Balance	0.99	0.010	N/A				7949307
Dissolved Nitrate (NO3)	<0.044	0.044	mg/L				7949309
Nitrate plus Nitrite (N)	<0.020	0.020	mg/L				7949310
Dissolved Nitrite (NO2)	<0.033	0.033	mg/L				7949309
Total Dissolved Solids	2100	10	mg/L				7949313
Misc. Inorganics							
Conductivity	2700	1.0	uS/cm			MA4	7949488
Dissolved Organic Carbon (C)	6.0	0.50	mg/L			NB4	7953099
pH	7.09	N/A	pH			MA4	7949485
Total Dissolved Solids	2200	10	mg/L			GM4	7950485
Low Level Elements							
Dissolved Cadmium (Cd)	<0.020	0.020	ug/L				7949267

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B554422
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NS, NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN7560 MW-07							
Sampling Date 2015/06/25 17:57							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Anions							
Dissolved Chloride (Cl)	13	1.0	mg/L			KD5	7949804
Alkalinity (PP as CaCO3)	<0.50	0.50	mg/L			MA4	7949487
Alkalinity (Total as CaCO3)	570	0.50	mg/L			MA4	7949487
Bicarbonate (HCO3)	690	0.50	mg/L			MA4	7949487
Carbonate (CO3)	<0.50	0.50	mg/L			MA4	7949487
Dissolved Fluoride (F)	0.086	0.050	mg/L			MA4	7949489
Hydroxide (OH)	<0.50	0.50	mg/L			MA4	7949487
Dissolved Sulphate (SO4)	1100(1)	10	mg/L			KD5	7949807
Nutrients							
Dissolved Nitrite (N)	<0.010	0.010	mg/L			MPH	7949605
Dissolved Ammonia (N)	2.3(1)	0.25	mg/L			MBB	7947810
Dissolved Nitrate (N)	<0.010	0.010	mg/L			MPH	7949605
Misc. Organics							
Phenols	<0.0020	0.0020	mg/L			YY	7950593
PETROLEUM HYDROCARBONS (CCME)							
Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	<0.10	0.10	mg/L			GG3	7950811
O-TERPHENYL (sur.)	110	50 - 130	%			GG3	7950811
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Aluminum (Al)	<0.0030	0.0030	mg/L			APY	7952174
Dissolved Antimony (Sb)	<0.00060	0.00060	mg/L			APY	7952174
Dissolved Arsenic (As)	0.0038	0.00020	mg/L			APY	7952174
Dissolved Barium (Ba)	0.047	0.010	mg/L			JPJ	7950798
Dissolved Beryllium (Be)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Boron (B)	0.29	0.020	mg/L			JPJ	7950798
Dissolved Calcium (Ca)	270	0.30	mg/L			JPJ	7950798
Dissolved Chromium (Cr)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Cobalt (Co)	0.0010	0.00030	mg/L			APY	7952174
Dissolved Copper (Cu)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Iron (Fe)	13	0.060	mg/L			JPJ	7950798
Dissolved Lead (Pb)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Lithium (Li)	0.16	0.020	mg/L			JPJ	7950798
Dissolved Magnesium (Mg)	97	0.20	mg/L			JPJ	7950798
Dissolved Manganese (Mn)	1.9	0.0040	mg/L			JPJ	7950798
Dissolved Molybdenum (Mo)	0.0010	0.00020	mg/L			APY	7952174
Dissolved Nickel (Ni)	0.0011	0.00050	mg/L			APY	7952174
Dissolved Phosphorus (P)	<0.10	0.10	mg/L			JPJ	7950798
Dissolved Potassium (K)	6.0	0.30	mg/L			JPJ	7950798
Dissolved Selenium (Se)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Silicon (Si)	8.0	0.10	mg/L			JPJ	7950798
Dissolved Silver (Ag)	<0.00010	0.00010	mg/L			APY	7952174
Dissolved Sodium (Na)	280	0.50	mg/L			JPJ	7950798
Dissolved Strontium (Sr)	2.6	0.020	mg/L			JPJ	7950798
Dissolved Sulphur (S)	350	0.20	mg/L			JPJ	7950798
Dissolved Thallium (Tl)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Tin (Sn)	<0.0010	0.0010	mg/L			APY	7952174

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B554422
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NS, NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN7560 MW-07							
Sampling Date 2015/06/25 17:57							
Matrix W							
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Titanium (Ti)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Uranium (U)	0.0016	0.00010	mg/L			APY	7952174
Dissolved Vanadium (V)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Zinc (Zn)	<0.0030	0.0030	mg/L			APY	7952174
Low Level Elements							
Total Mercury (Hg)	<0.0050	0.0050	ug/L			JLO	7952648
VOLATILE ORGANICS BY GC-MS (WATER)							
Volatiles							
Benzene	<0.00040	0.00040	mg/L			KE4	7950616
Toluene	<0.00040	0.00040	mg/L			KE4	7950616
Ethylbenzene	<0.00040	0.00040	mg/L			KE4	7950616
m & p-Xylene	<0.00080	0.00080	mg/L			KE4	7950616
o-Xylene	<0.00040	0.00040	mg/L			KE4	7950616
Xylenes (Total)	<0.00080	0.00080	mg/L			KE4	7950616
F1 (C6-C10) - BTEX	<0.10	0.10	mg/L			KE4	7950616
F1 (C6-C10)	<0.10	0.10	mg/L			KE4	7950616
1,4-Difluorobenzene (sur.)	100	70 - 130	%			KE4	7950616
4-Bromofluorobenzene (sur.)	98	70 - 130	%			KE4	7950616
D4-1,2-Dichloroethane (sur.)	96	70 - 130	%			KE4	7950616
MN7561 MW-09							
Sampling Date 2015/06/25 14:31							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Parameter							
Subcontract Parameter	ATTACHED	N/A	Bq/l				7994556
Calculated Parameters							
Anion Sum	17	N/A	meq/L				7949308
Cation Sum	18	N/A	meq/L				7949308
Hardness (CaCO3)	350	0.50	mg/L				7949306
Ion Balance	1.1	0.010	N/A				7949307
Dissolved Nitrate (NO3)	0.14	0.044	mg/L				7949309
Nitrate plus Nitrite (N)	0.031	0.020	mg/L				7949310
Dissolved Nitrite (NO2)	<0.033	0.033	mg/L				7949309
Total Dissolved Solids	1000	10	mg/L				7949313
Misc. Inorganics							
Conductivity	1500	1.0	uS/cm			MA4	7949488
Dissolved Organic Carbon (C)	5.4	0.50	mg/L			NB4	7953099
pH	7.61	N/A	pH			MA4	7949485
Total Dissolved Solids	1000	10	mg/L			GM4	7950485
Low Level Elements							
Dissolved Cadmium (Cd)	<0.020	0.020	ug/L				7949267
Anions							
Dissolved Chloride (Cl)	5.6	1.0	mg/L			KD5	7949804
Alkalinity (PP as CaCO3)	<0.50	0.50	mg/L			MA4	7949487
Alkalinity (Total as CaCO3)	500	0.50	mg/L			MA4	7949487
Bicarbonate (HCO3)	620	0.50	mg/L			MA4	7949487

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B554422
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NS, NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN7561 MW-09							
Sampling Date 2015/06/25 14:31							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Anions							
Carbonate (CO3)	<0.50	0.50	mg/L			MA4	7949487
Dissolved Fluoride (F)	0.24	0.050	mg/L			MA4	7949489
Hydroxide (OH)	<0.50	0.50	mg/L			MA4	7949487
Dissolved Sulphate (SO4)	320(1)	5.0	mg/L			KD5	7949807
Nutrients							
Dissolved Nitrite (N)	<0.010	0.010	mg/L			MPH	7949605
Dissolved Ammonia (N)	1.9	0.050	mg/L			MBB	7947810
Dissolved Nitrate (N)	0.031	0.010	mg/L			MPH	7949605
Misc. Organics							
Phenols	<0.0020	0.0020	mg/L			YY	7950593
PETROLEUM HYDROCARBONS (CCME)							
Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	<0.10	0.10	mg/L			GG3	7950811
O-TERPHENYL (sur.)	108	50 - 130	%			GG3	7950811
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Aluminum (Al)	<0.0030	0.0030	mg/L			APY	7952174
Dissolved Antimony (Sb)	<0.00060	0.00060	mg/L			APY	7952174
Dissolved Arsenic (As)	0.0020	0.00020	mg/L			APY	7952174
Dissolved Barium (Ba)	0.023	0.010	mg/L			JPJ	7950798
Dissolved Beryllium (Be)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Boron (B)	0.27	0.020	mg/L			JPJ	7950798
Dissolved Calcium (Ca)	93	0.30	mg/L			JPJ	7950798
Dissolved Chromium (Cr)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Cobalt (Co)	0.0011	0.00030	mg/L			APY	7952174
Dissolved Copper (Cu)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Iron (Fe)	2.0	0.060	mg/L			JPJ	7950798
Dissolved Lead (Pb)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Lithium (Li)	0.081	0.020	mg/L			JPJ	7950798
Dissolved Magnesium (Mg)	28	0.20	mg/L			JPJ	7950798
Dissolved Manganese (Mn)	0.80	0.0040	mg/L			JPJ	7950798
Dissolved Molybdenum (Mo)	0.0016	0.00020	mg/L			APY	7952174
Dissolved Nickel (Ni)	0.00051	0.00050	mg/L			APY	7952174
Dissolved Phosphorus (P)	<0.10	0.10	mg/L			JPJ	7950798
Dissolved Potassium (K)	4.2	0.30	mg/L			JPJ	7950798
Dissolved Selenium (Se)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Silicon (Si)	6.4	0.10	mg/L			JPJ	7950798
Dissolved Silver (Ag)	<0.00010	0.00010	mg/L			APY	7952174
Dissolved Sodium (Na)	250	0.50	mg/L			JPJ	7950798
Dissolved Strontium (Sr)	0.88	0.020	mg/L			JPJ	7950798
Dissolved Sulphur (S)	110	0.20	mg/L			JPJ	7950798
Dissolved Thallium (Tl)	<0.00020	0.00020	mg/L			APY	7952174
Dissolved Tin (Sn)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Titanium (Ti)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Uranium (U)	0.0013	0.00010	mg/L			APY	7952174
Dissolved Vanadium (V)	<0.0010	0.0010	mg/L			APY	7952174
Dissolved Zinc (Zn)	<0.0030	0.0030	mg/L			APY	7952174

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B554422
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NS, NU

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MN7561 MW-09							
Sampling Date 2015/06/25 14:31							
Matrix W							
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Low Level Elements							
Total Mercury (Hg)	<0.0050	0.0050	ug/L			JLO	7952648
VOLATILE ORGANICS BY GC-MS (WATER)							
Volatiles							
Benzene	<0.00040	0.00040	mg/L			KE4	7950616
Toluene	<0.00040	0.00040	mg/L			KE4	7950616
Ethylbenzene	<0.00040	0.00040	mg/L			KE4	7950616
m & p-Xylene	<0.00080	0.00080	mg/L			KE4	7950616
o-Xylene	<0.00040	0.00040	mg/L			KE4	7950616
Xylenes (Total)	<0.00080	0.00080	mg/L			KE4	7950616
F1 (C6-C10) - BTEX	<0.10	0.10	mg/L			KE4	7950616
F1 (C6-C10)	<0.10	0.10	mg/L			KE4	7950616
1,4-Difluorobenzene (sur.)	101	70 - 130	%			KE4	7950616
4-Bromofluorobenzene (sur.)	98	70 - 130	%			KE4	7950616
D4-1,2-Dichloroethane (sur.)	95	70 - 130	%			KE4	7950616

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B554422
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NS, NU

GENERAL COMMENTS

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

Package 1	5.3°C
Package 2	5.7°C

Meq % is based on dissolved calcium, magnesium, sodium, potassium, carbonate, bicarbonate, sulphate and chloride

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B554422
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NS, NU

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
7947810	MBB	Matrix Spike	Dissolved Ammonia (N)	2015/06/29		NC	%	80 - 120
7947810	MBB	Spiked Blank	Dissolved Ammonia (N)	2015/06/29		103	%	80 - 120
7947810	MBB	Method Blank	Dissolved Ammonia (N)	2015/06/29	<0.050		mg/L	
7947810	MBB	RPD	Dissolved Ammonia (N)	2015/06/29	2.4		%	20
7949485	MA4	Spiked Blank	pH	2015/06/28		100	%	97 - 103
7949485	MA4	RPD	pH	2015/06/28	0.018		%	N/A
7949487	MA4	Spiked Blank	Alkalinity (Total as CaCO3)	2015/06/28		101	%	80 - 120
7949487	MA4	Method Blank	Alkalinity (PP as CaCO3)	2015/06/28	<0.50		mg/L	
			Alkalinity (Total as CaCO3)	2015/06/28	<0.50		mg/L	
			Bicarbonate (HCO3)	2015/06/28	<0.50		mg/L	
			Carbonate (CO3)	2015/06/28	<0.50		mg/L	
			Hydroxide (OH)	2015/06/28	<0.50		mg/L	
7949487	MA4	RPD	Alkalinity (PP as CaCO3)	2015/06/28	1.2		%	20
			Alkalinity (Total as CaCO3)	2015/06/28	0.0075		%	20
			Bicarbonate (HCO3)	2015/06/28	0.064		%	20
			Carbonate (CO3)	2015/06/28	1.2		%	20
			Hydroxide (OH)	2015/06/28	NC		%	20
7949488	MA4	Spiked Blank	Conductivity	2015/06/28		99	%	90 - 110
7949488	MA4	Method Blank	Conductivity	2015/06/28	<1.0		uS/cm	
7949488	MA4	RPD	Conductivity	2015/06/28	0.39		%	20
7949489	MA4	Matrix Spike	Dissolved Fluoride (F)	2015/06/28		NC	%	80 - 120
7949489	MA4	Spiked Blank	Dissolved Fluoride (F)	2015/06/28		99	%	80 - 120
7949489	MA4	Method Blank	Dissolved Fluoride (F)	2015/06/28	<0.050		mg/L	
7949489	MA4	RPD	Dissolved Fluoride (F)	2015/06/28	0.92		%	20
7949605	MPH	Matrix Spike	Dissolved Nitrite (N)	2015/06/29		101	%	80 - 120
			Dissolved Nitrate (N)	2015/06/29		103	%	80 - 120
7949605	MPH	Spiked Blank	Dissolved Nitrite (N)	2015/06/28		99	%	80 - 120
			Dissolved Nitrate (N)	2015/06/28		101	%	80 - 120
7949605	MPH	Method Blank	Dissolved Nitrite (N)	2015/06/28	<0.010		mg/L	
			Dissolved Nitrate (N)	2015/06/28	<0.010		mg/L	
7949605	MPH	RPD	Dissolved Nitrite (N)	2015/06/29	NC		%	20
			Dissolved Nitrate (N)	2015/06/29	NC		%	20
7949804	KD5	Matrix Spike	Dissolved Chloride (Cl)	2015/06/29		NC	%	80 - 120
7949804	KD5	Spiked Blank	Dissolved Chloride (Cl)	2015/06/29		102	%	80 - 120
7949804	KD5	Method Blank	Dissolved Chloride (Cl)	2015/06/29	<1.0		mg/L	
7949804	KD5	RPD	Dissolved Chloride (Cl)	2015/06/29	0.047		%	20
7949807	KD5	Matrix Spike	Dissolved Sulphate (SO4)	2015/06/29		NC	%	80 - 120
7949807	KD5	Spiked Blank	Dissolved Sulphate (SO4)	2015/06/29		105	%	80 - 120
7949807	KD5	Method Blank	Dissolved Sulphate (SO4)	2015/06/29	<1.0		mg/L	
7949807	KD5	RPD	Dissolved Sulphate (SO4)	2015/06/29	0.016		%	20
7950485	GM4	Matrix Spike	Total Dissolved Solids	2015/07/02		NC	%	80 - 120
7950485	GM4	Spiked Blank	Total Dissolved Solids	2015/07/02		99	%	80 - 120
7950485	GM4	Method Blank	Total Dissolved Solids	2015/07/02	<10		mg/L	
7950485	GM4	RPD	Total Dissolved Solids	2015/07/02	1.6		%	20
7950593	YY	Matrix Spike	Phenols	2015/06/29		98	%	80 - 120
7950593	YY	Spiked Blank	Phenols	2015/06/29		91	%	80 - 120
7950593	YY	Method Blank	Phenols	2015/06/29	<0.0020		mg/L	
7950593	YY	RPD	Phenols	2015/06/29	NC		%	20
7950616	KE4	Matrix Spike [MN7557-09]	1,4-Difluorobenzene (sur.)	2015/07/03		99	%	70 - 130
			4-Bromofluorobenzene (sur.)	2015/07/03		98	%	70 - 130
			D4-1,2-Dichloroethane (sur.)	2015/07/03		92	%	70 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B554422
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NS, NU

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Benzene	2015/07/03		98	%	70 - 130
			Toluene	2015/07/03		97	%	70 - 130
			Ethylbenzene	2015/07/03		96	%	70 - 130
			m & p-Xylene	2015/07/03		102	%	70 - 130
			o-Xylene	2015/07/03		97	%	70 - 130
			F1 (C6-C10)	2015/07/03		96	%	70 - 130
7950616	KE4	Spiked Blank	1,4-Difluorobenzene (sur.)	2015/07/03		99	%	70 - 130
			4-Bromofluorobenzene (sur.)	2015/07/03		99	%	70 - 130
			D4-1,2-Dichloroethane (sur.)	2015/07/03		94	%	70 - 130
			Benzene	2015/07/03		93	%	70 - 130
			Toluene	2015/07/03		93	%	70 - 130
			Ethylbenzene	2015/07/03		91	%	70 - 130
			m & p-Xylene	2015/07/03		96	%	70 - 130
			o-Xylene	2015/07/03		93	%	70 - 130
			F1 (C6-C10)	2015/07/03		93	%	70 - 130
7950616	KE4	Method Blank	1,4-Difluorobenzene (sur.)	2015/07/03		99	%	70 - 130
			4-Bromofluorobenzene (sur.)	2015/07/03		98	%	70 - 130
			D4-1,2-Dichloroethane (sur.)	2015/07/03		101	%	70 - 130
			Benzene	2015/07/03	<0.00040		mg/L	
			Toluene	2015/07/03	<0.00040		mg/L	
			Ethylbenzene	2015/07/03	<0.00040		mg/L	
			m & p-Xylene	2015/07/03	<0.00080		mg/L	
			o-Xylene	2015/07/03	<0.00040		mg/L	
			Xylenes (Total)	2015/07/03	<0.00080		mg/L	
			F1 (C6-C10) - BTEX	2015/07/03	<0.10		mg/L	
			F1 (C6-C10)	2015/07/03	<0.10		mg/L	
7950616	KE4	RPD [MN7556-09]	Benzene	2015/07/03	NC		%	40
			Toluene	2015/07/03	NC		%	40
			Ethylbenzene	2015/07/03	NC		%	40
			m & p-Xylene	2015/07/03	NC		%	40
			o-Xylene	2015/07/03	NC		%	40
			Xylenes (Total)	2015/07/03	NC		%	40
			F1 (C6-C10) - BTEX	2015/07/03	NC		%	40
			F1 (C6-C10)	2015/07/03	NC		%	40
7950798	JPJ	Matrix Spike	Dissolved Barium (Ba)	2015/06/29		99	%	80 - 120
			Dissolved Boron (B)	2015/06/29		99	%	80 - 120
			Dissolved Calcium (Ca)	2015/06/29		NC	%	80 - 120
			Dissolved Iron (Fe)	2015/06/29		100	%	80 - 120
			Dissolved Lithium (Li)	2015/06/29		103	%	80 - 120
			Dissolved Magnesium (Mg)	2015/06/29		99	%	80 - 120
			Dissolved Manganese (Mn)	2015/06/29		92	%	80 - 120
			Dissolved Phosphorus (P)	2015/06/29		105	%	80 - 120
			Dissolved Potassium (K)	2015/06/29		105	%	80 - 120
			Dissolved Silicon (Si)	2015/06/29		NC	%	80 - 120
			Dissolved Sodium (Na)	2015/06/29		NC	%	80 - 120
			Dissolved Strontium (Sr)	2015/06/29		95	%	80 - 120
7950798	JPJ	Spiked Blank	Dissolved Barium (Ba)	2015/06/29		99	%	80 - 120
			Dissolved Boron (B)	2015/06/29		99	%	80 - 120
			Dissolved Calcium (Ca)	2015/06/29		95	%	80 - 120
			Dissolved Iron (Fe)	2015/06/29		100	%	80 - 120
			Dissolved Lithium (Li)	2015/06/29		99	%	80 - 120
			Dissolved Magnesium (Mg)	2015/06/29		101	%	80 - 120

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B554422
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NS, NU

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Dissolved Manganese (Mn)	2015/06/29		96	%	80 - 120
			Dissolved Phosphorus (P)	2015/06/29		101	%	80 - 120
			Dissolved Potassium (K)	2015/06/29		102	%	80 - 120
			Dissolved Silicon (Si)	2015/06/29		100	%	80 - 120
			Dissolved Sodium (Na)	2015/06/29		103	%	80 - 120
			Dissolved Strontium (Sr)	2015/06/29		98	%	80 - 120
			Dissolved Sulphur (S)	2015/06/29		96	%	80 - 120
7950798	JPJ	Method Blank	Dissolved Barium (Ba)	2015/06/29	<0.010		mg/L	
			Dissolved Boron (B)	2015/06/29	<0.020		mg/L	
			Dissolved Calcium (Ca)	2015/06/29	<0.30		mg/L	
			Dissolved Iron (Fe)	2015/06/29	<0.060		mg/L	
			Dissolved Lithium (Li)	2015/06/29	<0.020		mg/L	
			Dissolved Magnesium (Mg)	2015/06/29	<0.20		mg/L	
			Dissolved Manganese (Mn)	2015/06/29	<0.0040		mg/L	
			Dissolved Phosphorus (P)	2015/06/29	<0.10		mg/L	
			Dissolved Potassium (K)	2015/06/29	<0.30		mg/L	
			Dissolved Silicon (Si)	2015/06/29	<0.10		mg/L	
			Dissolved Sodium (Na)	2015/06/29	<0.50		mg/L	
			Dissolved Strontium (Sr)	2015/06/29	<0.020		mg/L	
			Dissolved Sulphur (S)	2015/06/29	<0.20		mg/L	
7950798	JPJ	RPD	Dissolved Barium (Ba)	2015/06/29	0.92		%	20
			Dissolved Boron (B)	2015/06/29	1.4		%	20
			Dissolved Calcium (Ca)	2015/06/29	0.39		%	20
			Dissolved Iron (Fe)	2015/06/29	NC		%	20
			Dissolved Lithium (Li)	2015/06/29	NC		%	20
			Dissolved Magnesium (Mg)	2015/06/29	1.3		%	20
			Dissolved Manganese (Mn)	2015/06/29	0.54		%	20
			Dissolved Phosphorus (P)	2015/06/29	NC		%	20
			Dissolved Potassium (K)	2015/06/29	0.077		%	20
			Dissolved Silicon (Si)	2015/06/29	1.0		%	20
			Dissolved Sodium (Na)	2015/06/29	0.79		%	20
			Dissolved Strontium (Sr)	2015/06/29	0.97		%	20
			Dissolved Sulphur (S)	2015/06/29	0.84		%	20
7950811	GG3	Matrix Spike	O-TERPHENYL (sur.)	2015/07/02		113	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2015/07/02		118	%	50 - 130
7950811	GG3	Spiked Blank	O-TERPHENYL (sur.)	2015/07/02		112	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2015/07/02		118	%	70 - 130
7950811	GG3	Method Blank	O-TERPHENYL (sur.)	2015/07/02		118	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2015/07/02	<0.10		mg/L	
7950811	GG3	RPD	F2 (C10-C16 Hydrocarbons)	2015/07/02	NC		%	40
7952174	APY	Matrix Spike	Dissolved Aluminum (Al)	2015/06/30		97	%	80 - 120
			Dissolved Antimony (Sb)	2015/06/30		104	%	80 - 120
			Dissolved Arsenic (As)	2015/06/30		96	%	80 - 120
			Dissolved Beryllium (Be)	2015/06/30		95	%	80 - 120
			Dissolved Chromium (Cr)	2015/06/30		93	%	80 - 120
			Dissolved Cobalt (Co)	2015/06/30		92	%	80 - 120
			Dissolved Copper (Cu)	2015/06/30		91	%	80 - 120
			Dissolved Lead (Pb)	2015/06/30		90	%	80 - 120
			Dissolved Molybdenum (Mo)	2015/06/30		101	%	80 - 120
			Dissolved Nickel (Ni)	2015/06/30		94	%	80 - 120
			Dissolved Selenium (Se)	2015/06/30		96	%	80 - 120
			Dissolved Silver (Ag)	2015/06/30		94	%	80 - 120

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B554422
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NS, NU

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Dissolved Thallium (Tl)	2015/06/30		76 (1)	%	80 - 120
			Dissolved Tin (Sn)	2015/06/30		103	%	80 - 120
			Dissolved Titanium (Ti)	2015/06/30		97	%	80 - 120
			Dissolved Uranium (U)	2015/06/30		94	%	80 - 120
			Dissolved Vanadium (V)	2015/06/30		100	%	80 - 120
			Dissolved Zinc (Zn)	2015/06/30		101	%	80 - 120
7952174	APY	Spiked Blank	Dissolved Aluminum (Al)	2015/06/30		97	%	80 - 120
			Dissolved Antimony (Sb)	2015/06/30		101	%	80 - 120
			Dissolved Arsenic (As)	2015/06/30		99	%	80 - 120
			Dissolved Beryllium (Be)	2015/06/30		96	%	80 - 120
			Dissolved Chromium (Cr)	2015/06/30		98	%	80 - 120
			Dissolved Cobalt (Co)	2015/06/30		98	%	80 - 120
			Dissolved Copper (Cu)	2015/06/30		98	%	80 - 120
			Dissolved Lead (Pb)	2015/06/30		99	%	80 - 120
			Dissolved Molybdenum (Mo)	2015/06/30		100	%	80 - 120
			Dissolved Nickel (Ni)	2015/06/30		99	%	80 - 120
			Dissolved Selenium (Se)	2015/06/30		99	%	80 - 120
			Dissolved Silver (Ag)	2015/06/30		97	%	80 - 120
			Dissolved Thallium (Tl)	2015/06/30		98	%	80 - 120
			Dissolved Tin (Sn)	2015/06/30		101	%	80 - 120
			Dissolved Titanium (Ti)	2015/06/30		99	%	80 - 120
			Dissolved Uranium (U)	2015/06/30		100	%	80 - 120
			Dissolved Vanadium (V)	2015/06/30		101	%	80 - 120
			Dissolved Zinc (Zn)	2015/06/30		103	%	80 - 120
7952174	APY	Method Blank	Dissolved Aluminum (Al)	2015/06/30	<0.0030		mg/L	
			Dissolved Antimony (Sb)	2015/06/30	<0.00060		mg/L	
			Dissolved Arsenic (As)	2015/06/30	<0.00020		mg/L	
			Dissolved Beryllium (Be)	2015/06/30	<0.0010		mg/L	
			Dissolved Chromium (Cr)	2015/06/30	<0.0010		mg/L	
			Dissolved Cobalt (Co)	2015/06/30	<0.00030		mg/L	
			Dissolved Copper (Cu)	2015/06/30	<0.00020		mg/L	
			Dissolved Lead (Pb)	2015/06/30	<0.00020		mg/L	
			Dissolved Molybdenum (Mo)	2015/06/30	<0.00020		mg/L	
			Dissolved Nickel (Ni)	2015/06/30	<0.00050		mg/L	
			Dissolved Selenium (Se)	2015/06/30	<0.00020		mg/L	
			Dissolved Silver (Ag)	2015/06/30	<0.00010		mg/L	
			Dissolved Thallium (Tl)	2015/06/30	<0.00020		mg/L	
			Dissolved Tin (Sn)	2015/06/30	<0.0010		mg/L	
			Dissolved Titanium (Ti)	2015/06/30	<0.0010		mg/L	
			Dissolved Uranium (U)	2015/06/30	<0.00010		mg/L	
			Dissolved Vanadium (V)	2015/06/30	<0.0010		mg/L	
			Dissolved Zinc (Zn)	2015/06/30	<0.0030		mg/L	
7952174	APY	RPD	Dissolved Aluminum (Al)	2015/06/30	NC		%	20
			Dissolved Antimony (Sb)	2015/06/30	NC		%	20
			Dissolved Arsenic (As)	2015/06/30	NC		%	20
			Dissolved Beryllium (Be)	2015/06/30	NC		%	20
			Dissolved Chromium (Cr)	2015/06/30	NC		%	20
			Dissolved Cobalt (Co)	2015/06/30	NC		%	20
			Dissolved Copper (Cu)	2015/06/30	NC		%	20
			Dissolved Lead (Pb)	2015/06/30	NC		%	20
			Dissolved Molybdenum (Mo)	2015/06/30	2.9		%	20
			Dissolved Nickel (Ni)	2015/06/30	NC		%	20

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B554422
Report Date: 2015/08/07

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NS, NU

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Dissolved Selenium (Se)	2015/06/30	NC		%	20
			Dissolved Silver (Ag)	2015/06/30	NC		%	20
			Dissolved Thallium (Tl)	2015/06/30	NC		%	20
			Dissolved Tin (Sn)	2015/06/30	NC		%	20
			Dissolved Titanium (Ti)	2015/06/30	NC		%	20
			Dissolved Uranium (U)	2015/06/30	12		%	20
			Dissolved Vanadium (V)	2015/06/30	NC		%	20
			Dissolved Zinc (Zn)	2015/06/30	NC		%	20
7952648	JLO	Matrix Spike	Total Mercury (Hg)	2015/07/02		NC	%	85 - 115
7952648	JLO	QC Standard	Total Mercury (Hg)	2015/07/02		101	%	85 - 115
7952648	JLO	Spiked Blank	Total Mercury (Hg)	2015/07/02		104	%	85 - 115
7952648	JLO	Method Blank	Total Mercury (Hg)	2015/07/02	<0.0050		ug/L	
7952648	JLO	RPD	Total Mercury (Hg)	2015/07/02	NC		%	20
7953099	NB4	Matrix Spike [MN7556-06]	Dissolved Organic Carbon (C)	2015/07/02		98	%	80 - 120
7953099	NB4	Spiked Blank	Dissolved Organic Carbon (C)	2015/07/02		106	%	80 - 120
7953099	NB4	Method Blank	Dissolved Organic Carbon (C)	2015/07/02	0.82, RDL=0.50		mg/L	
7953099	NB4	RPD [MN7556-06]	Dissolved Organic Carbon (C)	2015/07/02	2.2		%	20

N/A = Not Applicable

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

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

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

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

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

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

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Matrix spike exceeds acceptance limits due to matrix interference.

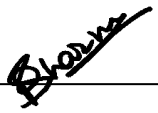
Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B554422
Report Date: 2015/08/07

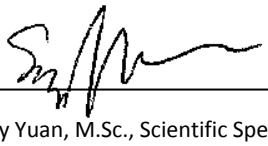
WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA
Sampler Initials: NS, NU

VALIDATION SIGNATURE PAGE

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



Poonam Sharma, Chem. Tech., Senior Analyst, Organics Department



Sandy Yuan, M.Sc., Scientific Specialist

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

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam

Calgary: 4000 19st St. NE, T2E 6P8. Ph: (403) 291-3077, Fax: (403) 735-2240, Toll free: (800) 386-7247
Edmonton: 9331 - 48 Street, T6B 2R4. Ph: (780) 577-7100, Fax: (780) 450-4187, Toll free: (877) 465-8889
www.maxxamanalytics.com

06/1194(2)

Chain of Custody A118552

Page: 1 of 1

	Invoice To: C/O Report Address ☐	Report To: Same as Invoice ☒	Report Distribution (E-Mail):
Company:	WORLEYPARSONS		trevor.butterfield@worleyparsons.com
Contact:	TREVOR BUTTERFIELD		
Address:	Suite 300, 8615 51 Ave, Edmonton		
	Prov: ALBERTA PC:	Prov: PC:	
Contact #s:	Ph: Cell:	Ph: Cell:	

REGULATORY GUIDELINES:
☐ AT1
☒ CCME
☐ Regulated Drinking Water
☐ Other:

All samples are held for 60 calendar days after sample receipt, unless specified otherwise.

PO #:
Project # / Name: 307075-01608-100
Site Location: NCIA
Quote #:
Sampled By: Nick Unonius / Stephane Nguelen

SERVICE REQUESTED: ☐ RUSH (Contact lab to reserve) Date Required: ☒ REGULAR (5 to 7 Days)

See reverse for package specifics

	Sample ID	Depth (unit)	Matrix GW / SW Soil	Date/Time Sampled YY/MM/DD 24:00	SOIL: BTEX F1-F4	Sieve (75 micron)	Regulated Metals (CCME / AT1)	Salinity 4	Assessment ICP Metals	Basic Class II Landfill	WATER: ☒BTEX F1 ☐VOCs	☐BTEX F1-F4 (F2) ☐BTEX F1-F4	☒ Routine Water ☐ Turb ☒ F	☐ TOC ☒ DOC + DNH3	Regulated Metals (CCME / AT1) Total	Dissolved	Mercury ☒ Total ☐ Dissolved	Other Analysis: PHENOLS	TDS actual	~~pH~~ and ISO	HOLD - Do not Analyze	# of Containers Submitted
1	MW-02		GW	15/06/25 11:00							X	X	X	X		X	X	X	X	X		11
2	MW-05		GW	15/06/25 12:35							X	X	X	X		X	X	X	X	X		11
3	~~MW-03~~		~~GW~~	~~15/06/25 17:57~~							X	X	X	X		X	X	X	X	X		0
4	MW-06		GW	15/06/25 20:07							X	X	X	X		X	X	X	X	X		11
5	F15-01		GW	15/06/25 19:55							X	X	X	X		X	X	X	X	X		11
6	MW-07		GW	15/06/25 17:57							X	X	X	X		X	X	X	X	X		11
7	MW-09		GW	15/06/25 14:31							X	X	X	X		X	X	X	X	X		11
8																						
9																						
10																						
11																						
12																						

Please indicate Filtered, Preserved or Both (F, P, F/P) → F P F/P F/P P P F/P

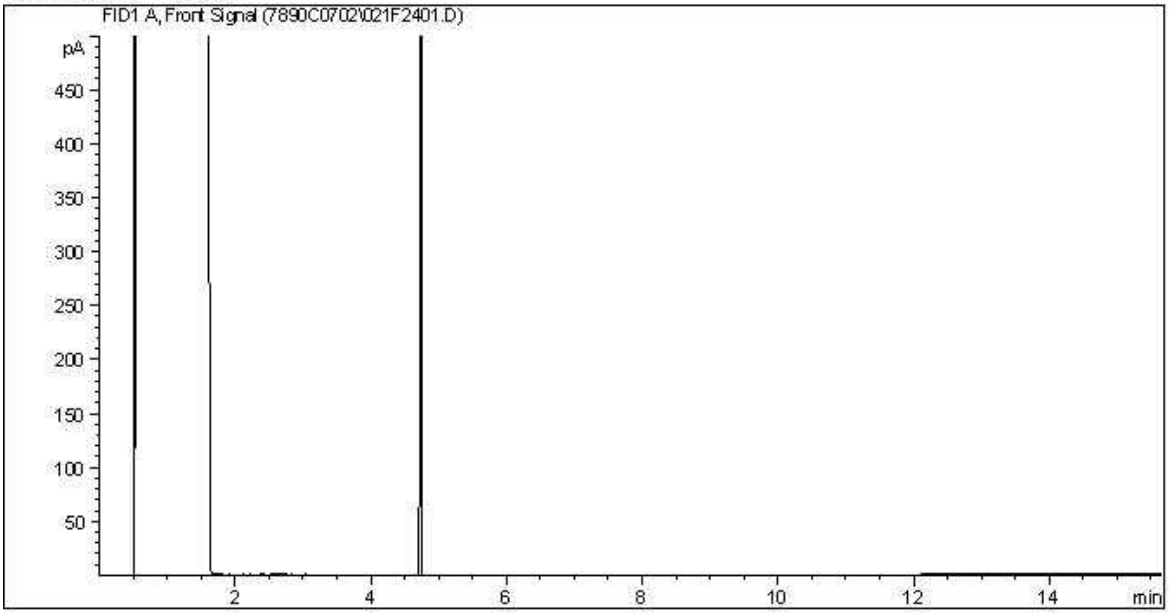
Relinquished By (Signature/Print):	Date (YY/MM/DD):	Time (24:00):	**LAB USE ONLY**
Nick Unonius	15/06/25	21:57	Received By: Jenna Walter Date: 20150626 Time: 0730
Relinquished By (Signature/Print): Stephane Nguelen	Date (YY/MM/DD): 15/06/25	Time (24:00): 21:59	Maxxam Job #: B554422
Special Instructions:	# of Jars Used & Not Submitted		Custody Seal: present on both / Temperature: 6,7,3 8,6,3 / Ice: present in both
			Lab Comments: MPC/AHS

Maxxam Job #: B554422
Report Date: 2015/08/07
Maxxam Sample: MN7556

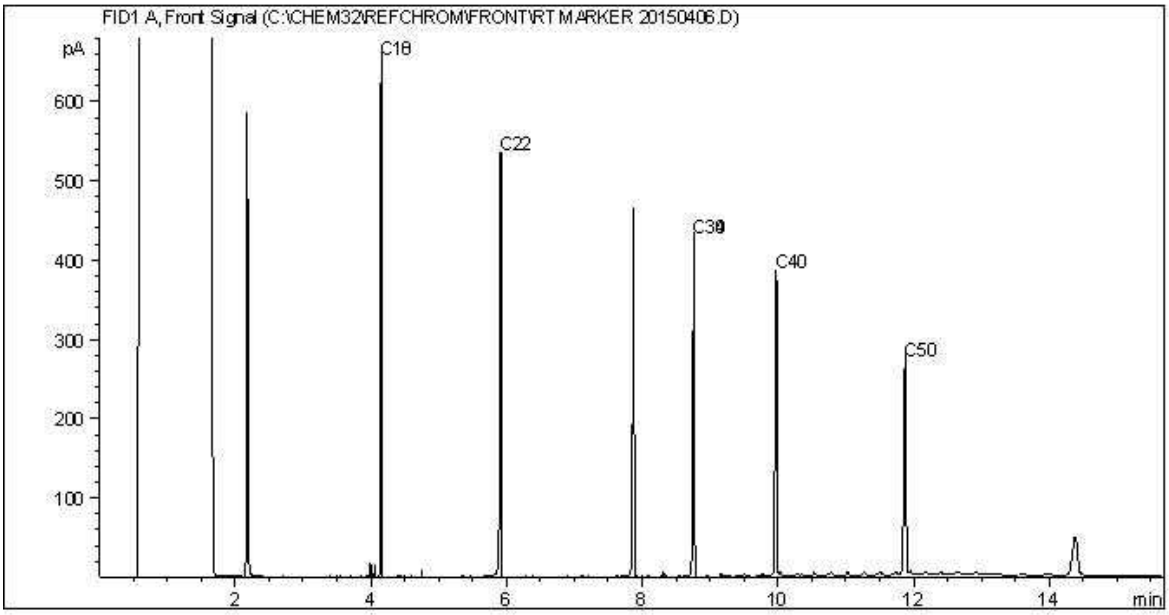
WORLEYPARSONS
Attention: TREVOR BUTTERFIELD
Client Project #: 307075-01608-100
Site Reference: NCIA
Client ID: MW-02

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890C



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

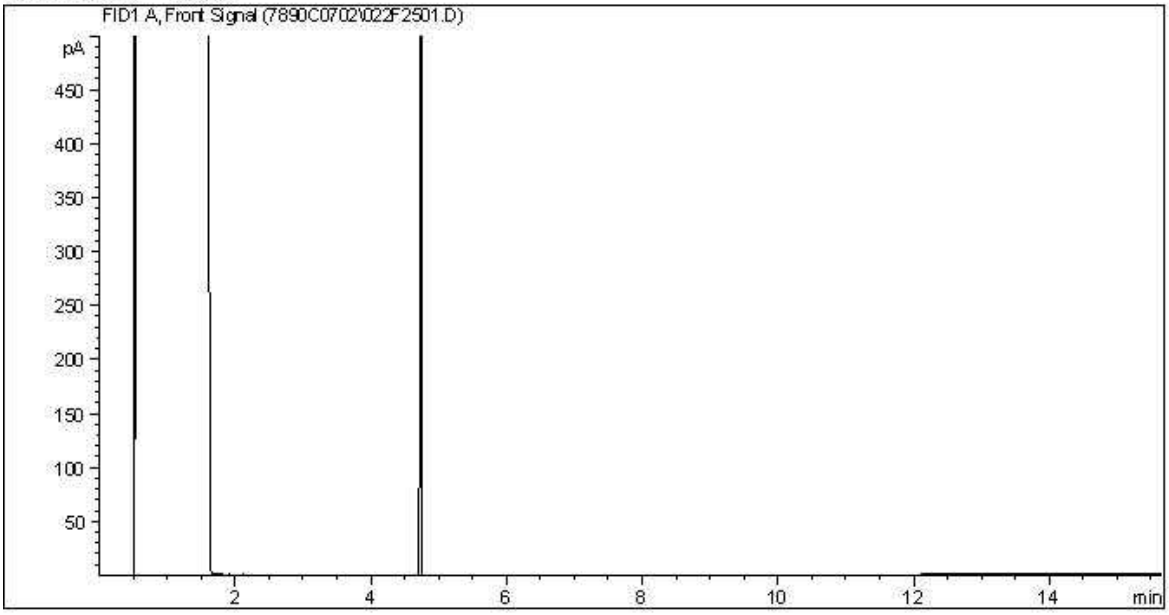
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B554422
Report Date: 2015/08/07
Maxxam Sample: MN7557

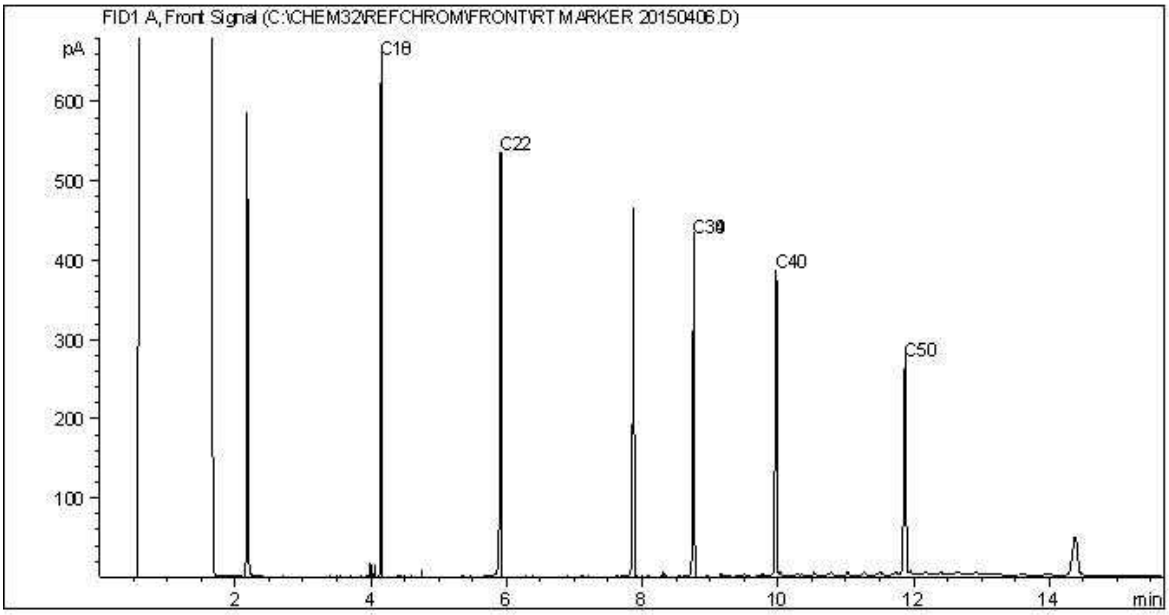
WORLEYPARSONS
Attention: TREVOR BUTTERFIELD
Client Project #: 307075-01608-100
Site Reference: NCIA
Client ID: MW-05

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890C



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

Page 1 of 1

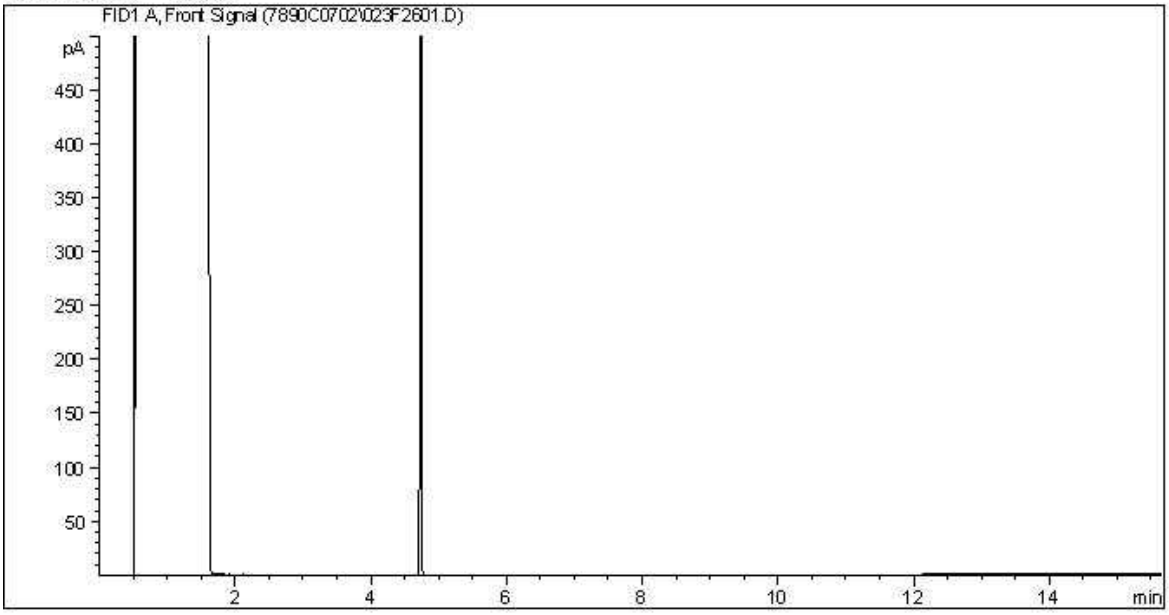
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B554422
Report Date: 2015/08/07
Maxxam Sample: MN7558

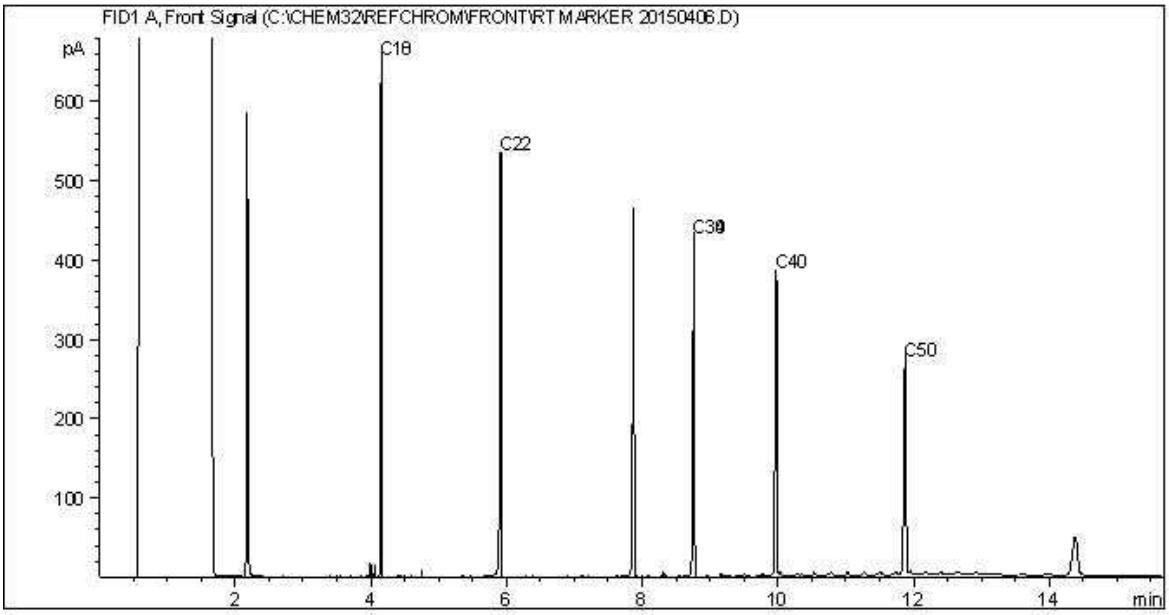
WORLEYPARSONS
Attention: TREVOR BUTTERFIELD
Client Project #: 307075-01608-100
Site Reference: NCIA
Client ID: MW-06

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890C



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

Page 1 of 1

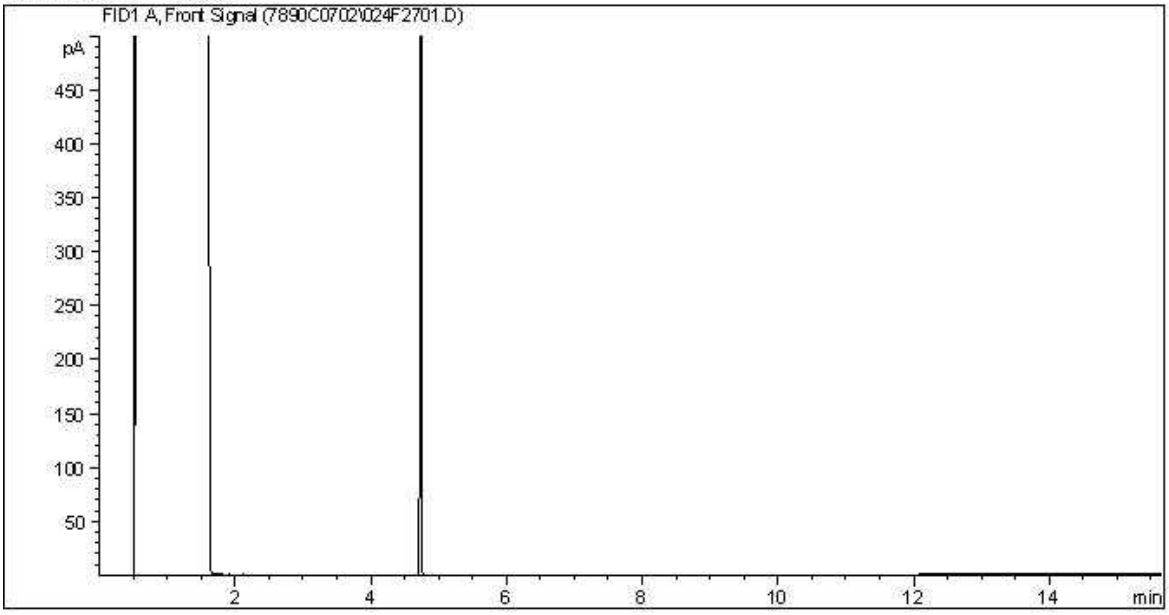
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B554422
Report Date: 2015/08/07
Maxxam Sample: MN7559

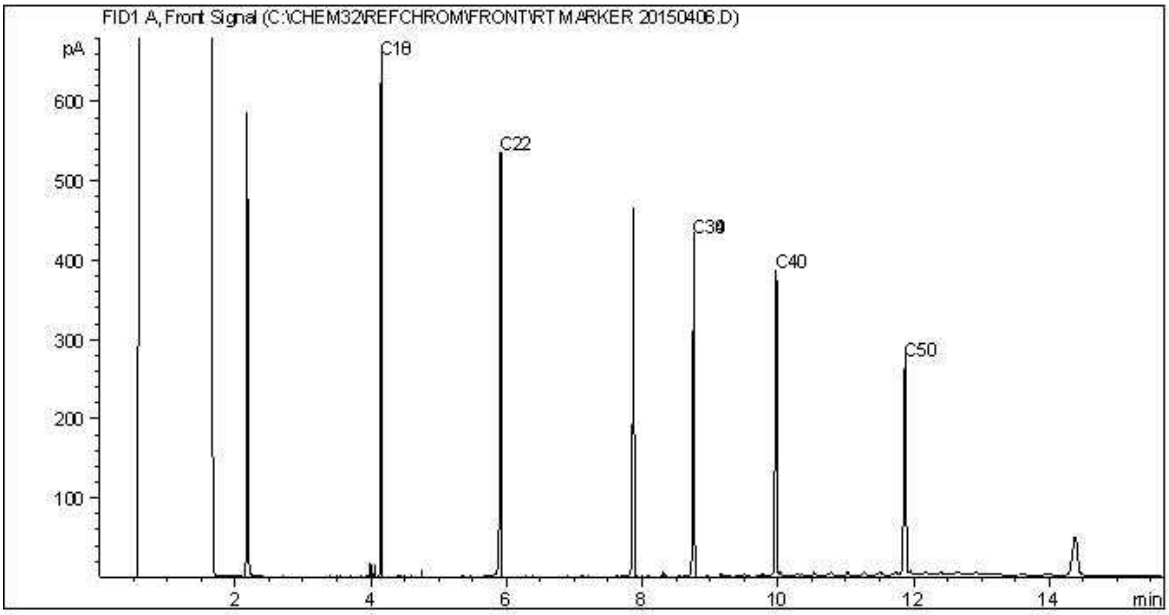
WORLEYPARSONS
Attention: TREVOR BUTTERFIELD
Client Project #: 307075-01608-100
Site Reference: NCIA
Client ID: F15-01

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890C



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

Page 1 of 1

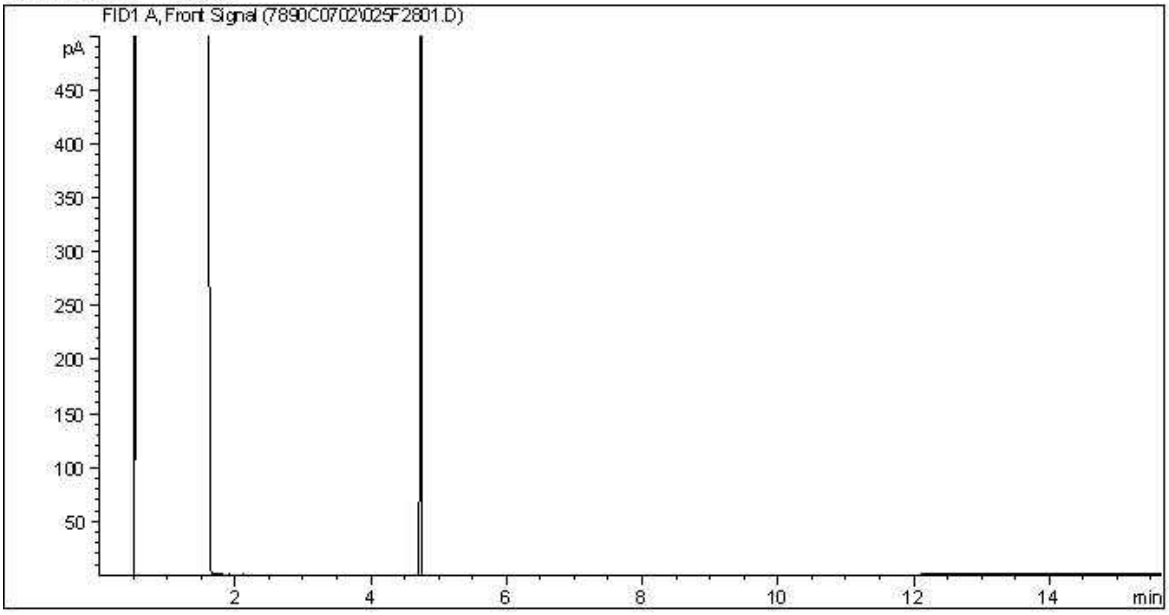
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B554422
Report Date: 2015/08/07
Maxxam Sample: MN7560

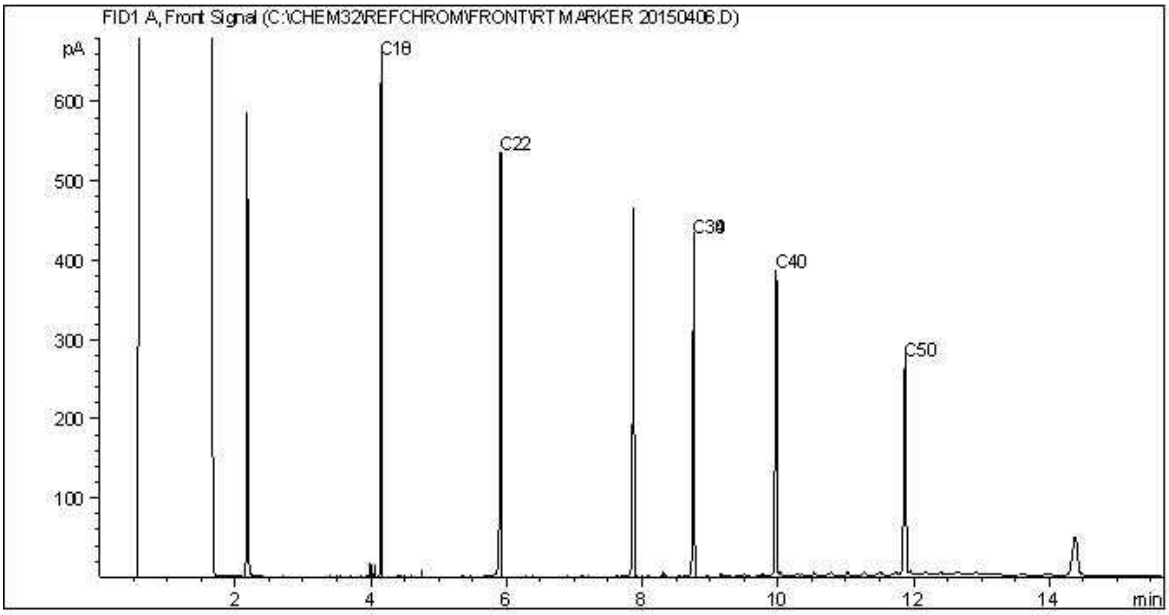
WORLEYPARSONS
Attention: TREVOR BUTTERFIELD
Client Project #: 307075-01608-100
Site Reference: NCIA
Client ID: MW-07

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890C



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

Page 1 of 1

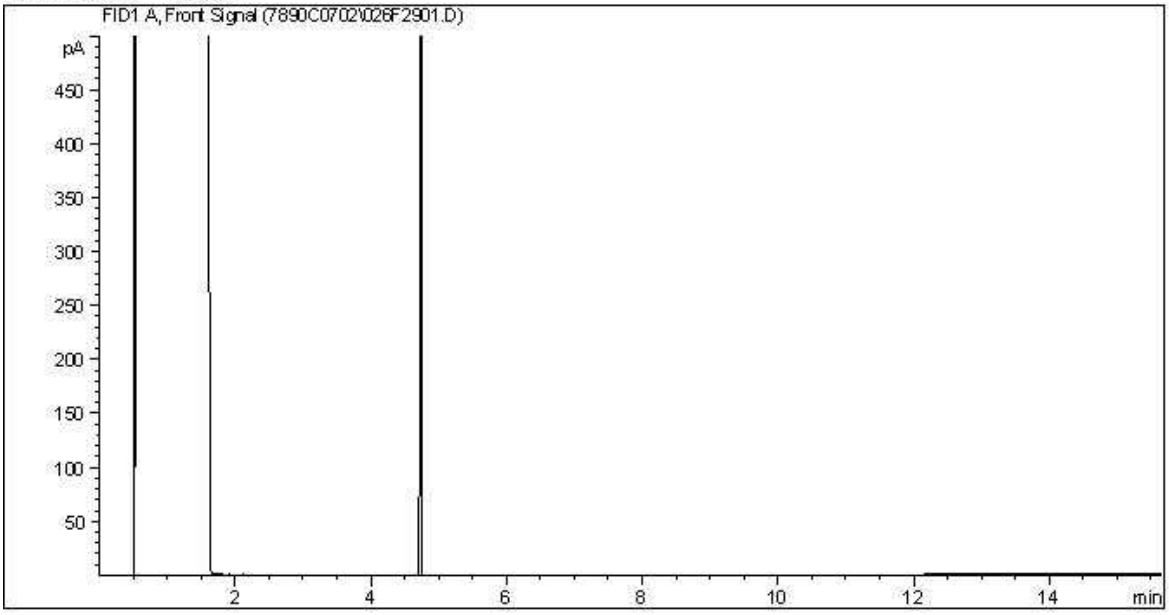
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B554422
Report Date: 2015/08/07
Maxxam Sample: MN7561

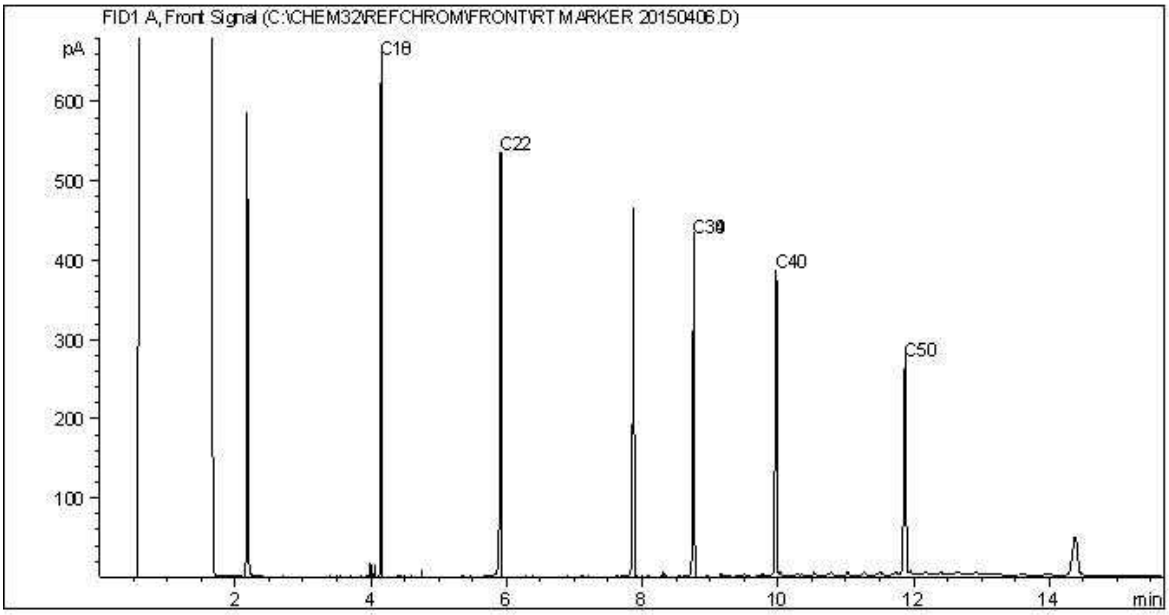
WORLEYPARSONS
Attention: TREVOR BUTTERFIELD
Client Project #: 307075-01608-100
Site Reference: NCIA
Client ID: MW-09

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890C



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

Page 1 of 1

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

ISOTOPE TRACER TECHNOLOGIES INC

Isotope Analyses for:
Maxxam Analytics

IT2 FILE # 150175-B B554422

2015-08-07

2015-08-07

Client: Maxxam Analytics
9331-48th Street
Edmonton, Alberta
T6B 2R4
Tel: 1 (780) 577-7139
Attn.: Alaina Hunter
E-mail: AHunter@maxxam.ca

$\delta^{18}O$ Analyses Results :

File Number: **150175-B**
Project Number: **B554422**

#	Sample ID	Collection		Sample #	$\delta^{18}O$	Aver	Stdv
	B554422	Date			H_2O	VSMOW	
1	MN7556-MW-02	June 25, 2015	11:00	32341	X	-18.69	0.05
2	MN7557-MW-05	June 25, 2015	12:35	32342	X	-16.77	0.02
3	MN7558-MW-06	June 25, 2015	20:07	32343	X	-18.27	0.03
4	MN7559-F15-01	June 25, 2015	19:55	32344	X	-20.20	0.11
5	MN7560-MW-07	June 25, 2015	17:57	32345	X	-18.76	0.08
6	MN7561-MW-09	June 25, 2015	14:31	32346	X	-19.04	0.08

Insturment Used: Cavity Ring Down Spectroscopy (CRDS)
CRDS (Model L1102-i) (Piccaro, California, USA).
Standard Used:
IT^2-13 / IT^2-11 / IT^2-12 Calabirated with IAEA Standards (V-SMOW, SLAP, and GISP)
Typical Standard deviation:
±0.1‰

2015-08-07

Client: Maxxam Analytics
9331-48th Street
Edmonton, Alberta
T6B 2R4
Tel: 1 (780) 577-7139
Attn.: Alaina Hunter
E-mail: AHunter@maxxam.ca

δ^2H Analyses Results :

File Number: **150175-B**
Project Number: **B554422**

#	Sample ID	Collection		Sample #	δ^2H	Aver	Stdv
	B554422	Date			H_2O	VSMOW	
1	MN7556-MW-02	June 25, 2015	11:00	32341	X	-144.3	0.5
2	MN7557-MW-05	June 25, 2015	12:35	32342	X	-133.2	0.2
3	MN7558-MW-06	June 25, 2015	20:07	32343	X	-145.3	0.5
4	MN7559-F15-01	June 25, 2015	19:55	32344	X	-153.2	0.2
5	MN7560-MW-07	June 25, 2015	17:57	32345	X	-147.7	0.3
6	MN7561-MW-09	June 25, 2015	14:31	32346	X	-149.1	0.3

Insturment Used: Cavity Ring Down Spectroscopy (CRDS)
CRDS (Model L1102-i) (Piccaro, California, USA).
Standard Used:
IT^2-13 / IT^2-11/ IT^2-12 Calibrated with IAEA Standards (V-SMOW, SLAP, and GISP)
Typical Standard deviation:
±1‰

Laboratory Report Data Checklist

WorleyParsons resources & energy

Both Database and Project Staff sections to be completed within 5 calendar days of receipt of Lab Confirmation Package and Certificate Of Analysis

DATABASE STAFF TO COMPLETE SECTIONS 1, 2 AND 4:

1. BACKGROUND

Client	NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION	**Date(s) sampled**	2015/06/25
Laboratory	Maxxam, Edmonton	**Project No.**	307075-01608-100
Lab Submission No.	B554422	**Site name**	NCIA

2. SAMPLE RECEIPT CONFIRMATION (SRC) – PART A

SRC cross-checked against the chain of custody (COC) (sample names, analytical packages)? ☒ Yes ☐ No **Comments**

(Maxxam Only) Fundamental Laboratory Acceptance Guideline (FLAG) received? ☒ Yes ☐ N/A

If yes, FLAG type and comments: No discrepancies noted.

Date samples submitted 2015/06/25

Due date for lab report on SRC 2015/07/06

Data check completed by Alice Liu **Date** 05-Aug-2015

4. CERTIFICATE OF ANALYSIS (COA) LAB QA/QC REPORT

Lab data received (pdf/dbf) with signature?	☒ Yes ☐ No	**Comments**
(Imperial Oil only) Data Quality Waver (DQW) issued?	☐ Yes ☒ No	**If yes, contact PM. DQW *MUST BE* signed and returned to lab in 5 working days.** **Date returned to lab:**
Extractions and analysis conducted within acceptable hold times?	☒ Yes ☐ No	
Lab has warranted all tests were in statistical control? (look for trend rule failure notes)	☒ Yes ☐ No	

Lab QA/QC samples are within Acceptance Criteria?

Instrument Surrogate Recovery	☐ Yes ☐ No ☒ N/A	
Extraction Surrogate Recovery	☒ Yes ☐ No ☐ N/A	
Method Blank Concentration	☐ Yes ☒ No ☐ N/A	Dissolved Organic Carbon (C) 0.82, RDL=0.50
Matrix Duplicate RPD	☒ Yes ☐ No ☐ N/A	Some NC.
Matrix Spike Recovery	☐ Yes ☒ No ☐ N/A	Some NC.Dissolved Thallium (Tl) Matrix spike exceeds acceptance limits due to matrix interference
Spiked Blank Recovery	☒ Yes ☐ No ☐ N/A	
Lab Control Sample (LCS) recovery	☐ Yes ☐ No ☒ N/A	

Data check completed by Alice Liu **Date** 05-Aug-2015

WorleyParsons
resources & energy

Laboratory Report Data Checklist

Both Database and Project Staff sections to be completed within 5 calendar days of receipt of Lab Confirmation Package and Certificate Of Analysis

PROJECT STAFF TO COMPLETE SECTIONS 3 AND 5 THROUGH 8:

3. SAMPLE RECEIPT CONFIRMATION (SRC) – PART B

SRC cross-checked with program planning / analytical schedule (sample names, analytical packages correct as per schedule)?	☒ Yes ☐ No	**Comments**	
Data check completed by	Stephane Ngueleu	**Date**	31-Aug-2015

5. CERTIFICATE OF ANALYSIS (COA) LAB QA/QC REPORT

Lab reports have all the requested packages, on the correct samples?	☒ Yes ☐ No		
Detection limits are suitable for the project purpose? (What was requested on the COC and is that correct? Have any been raised?)	☒ Yes ☐ No		
Data check completed by	Stephane Ngueleu	**Date**	31-Aug-2015

6. CERTIFICATE OF ANALYSIS (COA) FIELD DUPLICATES, BLANKS

Field duplicates decoded and RPDs acceptable?	☐ Yes ☐ No ☒ N/A	**Comments**	
Trip Blank results acceptable?	☐ Yes ☐ No ☒ N/A	**Comments**	
Field Blank results acceptable?	☒ Yes ☐ No ☐ N/A	**Comments**	
Equipment Blank results acceptable?	☐ Yes ☐ No ☒ N/A	**Comments**	
Correspondence re: lab QA/QC issues attached (and saved under correct job #)?	☐ Yes ☐ No ☒ N/A	**Comments**	
Data check completed by	Stephane Ngueleu	**Date**	31-Aug-2015

7. LAB DATA/FIELD DATA/HISTORICAL DATA CHECKS

Field EC vs. Lab EC RPDs acceptable?	☒ Yes ☐ No ☐ N/A	**Comments**	Except for MW-02 where EC RPD = 25%
Field pH vs. Lab pH RPDs acceptable?	☒ Yes ☐ No ☐ N/A	**Comments**	
Is lab collected data within acceptable/expected historical ranges (if applicable)? Check against historical data tables if they exist.	☒ Yes ☐ No ☐ N/A	**Comments**	
Data check completed by	Stephane Ngueleu	**Date**	31-Aug-2015

8. CERTIFICATE OF ANALYSIS (COA) RESULTS INTERPRETATION

Are data in this report considered to be Fit for Purpose?	☒ Yes ☐ No		
Explain rationale for yes/no:			
Request lab to recheck data? If so give details	☐ Yes ☐ No ☐ N/A	**Comments**	
If Yes, Lab request to recheck must be approved by Project Manager Name:		**Date**	
Data check completed by		**Date**	

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Your Project #: 307075-01608-100
Site Location: NCIA-FORT SASKATCHEWAN
Your C.O.C. #: A084947

Attention:TREVOR BUTTERFIELD

WORLEYPARSONS
Suite 300, 8615 51 Ave
EDMONTON, AB
CANADA T6E 6A8

Report Date: 2015/08/06
Report #: R2012182
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B555168
Received: 2015/06/29, 17:03

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity @25C (pp, total), CO3,HCO3,OH	3	N/A	2015/07/03	AB SOP-00005	SM 22 2320 B m
BTEX/F1 in Water by HS GC/MS/FID	3	N/A	2015/07/08	AB SOP-00039	CCME CWS/EPA 8260C m
Cadmium - low level CCME - Dissolved	3	N/A	2015/07/03	AB WI-00065	Auto Calc
Chloride by Automated Colourimetry	3	N/A	2015/07/02	AB SOP-00020	SM 22 4500-Cl G m
Carbon (DOC) (2)	3	N/A	2015/07/07	EENVSOP-00060	MMCW 119 1996 m
Conductivity @25C	3	N/A	2015/07/03	AB SOP-00005	SM 22 2510 B m
Isotopes - Subcontract (1)	3	N/A	2015/08/06		
Fluoride	3	N/A	2015/07/03	AB SOP-00005	SM 22 4500-F C m
CCME Hydrocarbons in Water (F2; C10-C16)	3	2015/07/06	2015/07/07	AB SOP-00040 / AB SOP-00037	CCME PHC-CWS m
Hardness	3	N/A	2015/07/02	AB WI-00065	Auto Calc
Mercury (Total)	3	2015/07/07	2015/07/07	EENVSOP-00031	EPA 1631E/245.1 R3 m
Elements by ICP - Dissolved	3	N/A	2015/07/02	AB SOP-00042	EPA 200.7 CFR 2012 m
Elements by ICPMS - Dissolved	3	N/A	2015/07/02	AB SOP-00043	EPA 200.8 R5.4 m
Ion Balance	3	N/A	2015/07/02	AB WI-00065	Auto Calc
Sum of cations, anions	3	N/A	2015/07/02	AB WI-00065	Auto Calc
Ammonia-N (Dissolved)	3	N/A	2015/07/02	AB SOP-00007	EPA 350.1 R2.0 m
Nitrate and Nitrite	3	N/A	2015/07/03	AB WI-00065	Auto Calc
Nitrate + Nitrite-N (calculated)	3	N/A	2015/07/03	AB WI-00065	Auto Calc
Nitrogen, (Nitrite, Nitrate) by IC	3	N/A	2015/07/02	AB SOP-00023	SM 22 4110 B m
pH @25°C (Alkalinity titrator)	3	N/A	2015/07/03	AB SOP-00005	SM 22 4500 H+ B m
Phenols (4-AAP)	3	N/A	2015/07/02	EENVSOP-00061	MMCW 154 1996 m
Sulphate by Automated Colourimetry	3	N/A	2015/07/02	AB SOP-00018	SM 22 4500-SO4 E m
Total Dissolved Solids (Filt. Residue)	3	2015/07/03	2015/07/04	AB SOP-00065	SM 22 2540 C m
Total Dissolved Solids (Calculated)	3	N/A	2015/07/03	AB WI-00065	Auto Calc

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
(1) This test was performed by Sub Edmonton to ITT
(2) DOC present in the sample should be considered as non-purgeable DOC.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Your Project #: 307075-01608-100
Site Location: NCIA-FORT SASKATCHEWAN
Your C.O.C. #: A084947

Attention:TREVOR BUTTERFIELD

WORLEYPARSONS
Suite 300, 8615 51 Ave
EDMONTON, AB
CANADA T6E 6A8

Report Date: 2015/08/06
Report #: R2012182
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B555168
Received: 2015/06/29, 17:03

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Alaina Hunter, Dip. BioSci, Project Manager, Environmental
Email: AHunter@maxxam.ca
Phone# (780)577-7139

==========

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

Maxxam Job #: B555168
Report Date: 2015/08/06

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA-FORT SASKATCHEWAN
Sampler Initials: NU, SN

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MO3192 MW-01							
Sampling Date 2015/06/29 12:44							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Parameter							
Subcontract Parameter	ATTACHED	N/A	Bq/l				7993499
Calculated Parameters							
Anion Sum	8.8	N/A	meq/L				7951386
Cation Sum	8.9	N/A	meq/L				7951386
Hardness (CaCO3)	350	0.50	mg/L				7951383
Ion Balance	1.0	0.010	N/A				7951385
Dissolved Nitrate (NO3)	0.069	0.044	mg/L				7951192
Nitrate plus Nitrite (N)	<0.020	0.020	mg/L				7951193
Dissolved Nitrite (NO2)	<0.033	0.033	mg/L				7951192
Total Dissolved Solids	450	10	mg/L				7951387
Misc. Inorganics							
Conductivity	760	1.0	uS/cm			CH7	7954314
Dissolved Organic Carbon (C)	2.5	0.50	mg/L			MRD	7958379
pH	7.46	N/A	pH			CH7	7954308
Total Dissolved Solids	460	10	mg/L			GM4	7954117
Low Level Elements							
Dissolved Cadmium (Cd)	<0.020	0.020	ug/L				7951382
Anions							
Dissolved Chloride (Cl)	4.7	1.0	mg/L			ARD	7953155
Alkalinity (PP as CaCO3)	<0.50	0.50	mg/L			CH7	7954313
Alkalinity (Total as CaCO3)	370	0.50	mg/L			CH7	7954313
Bicarbonate (HCO3)	450	0.50	mg/L			CH7	7954313
Carbonate (CO3)	<0.50	0.50	mg/L			CH7	7954313
Dissolved Fluoride (F)	0.15	0.050	mg/L			CH7	7954315
Hydroxide (OH)	<0.50	0.50	mg/L			CH7	7954313
Dissolved Sulphate (SO4)	57	1.0	mg/L			ARD	7953161
Nutrients							
Dissolved Nitrite (N)	<0.010	0.010	mg/L			LMD	7953141
Dissolved Ammonia (N)	0.26	0.050	mg/L			MBB	7953017
Dissolved Nitrate (N)	0.016	0.010	mg/L			LMD	7953141
Misc. Organics							
Phenols	<0.0020	0.0020	mg/L			YY	7953565
PETROLEUM HYDROCARBONS (CCME)							
Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	<0.10	0.10	mg/L			SHM	7954396
O-TERPHENYL (sur.)	102	50 - 130	%			SHM	7954396
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Aluminum (Al)	0.0038	0.0030	mg/L			APY	7953786
Dissolved Antimony (Sb)	<0.00060	0.00060	mg/L			APY	7953786
Dissolved Arsenic (As)	0.00079	0.00020	mg/L			APY	7953786
Dissolved Barium (Ba)	0.13	0.010	mg/L			JK9	7953227
Dissolved Beryllium (Be)	<0.0010	0.0010	mg/L			APY	7953786
Dissolved Boron (B)	0.051	0.020	mg/L			JK9	7953227
Dissolved Calcium (Ca)	97	0.30	mg/L			JK9	7953227
Dissolved Chromium (Cr)	<0.0010	0.0010	mg/L			APY	7953786
Dissolved Cobalt (Co)	0.00076	0.00030	mg/L			APY	7953786
Dissolved Copper (Cu)	0.00046	0.00020	mg/L			APY	7953786

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B555168
Report Date: 2015/08/06

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA-FORT SASKATCHEWAN
Sampler Initials: NU, SN

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MO3192 MW-01							
Sampling Date 2015/06/29 12:44							
Matrix W							
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Iron (Fe)	1.9	0.060	mg/L			JK9	7953227
Dissolved Lead (Pb)	<0.00020	0.00020	mg/L			APY	7953786
Dissolved Lithium (Li)	0.027	0.020	mg/L			JK9	7953227
Dissolved Magnesium (Mg)	27	0.20	mg/L			JK9	7953227
Dissolved Manganese (Mn)	0.71	0.0040	mg/L			JK9	7953227
Dissolved Molybdenum (Mo)	0.00038	0.00020	mg/L			APY	7953786
Dissolved Nickel (Ni)	0.00091	0.00050	mg/L			APY	7953786
Dissolved Phosphorus (P)	<0.10	0.10	mg/L			JK9	7953227
Dissolved Potassium (K)	2.6	0.30	mg/L			JK9	7953227
Dissolved Selenium (Se)	<0.00020	0.00020	mg/L			APY	7953786
Dissolved Silicon (Si)	7.1	0.10	mg/L			JK9	7953227
Dissolved Silver (Ag)	<0.00010	0.00010	mg/L			APY	7953786
Dissolved Sodium (Na)	37	0.50	mg/L			JK9	7953227
Dissolved Strontium (Sr)	0.55	0.020	mg/L			JK9	7953227
Dissolved Sulphur (S)	19	0.20	mg/L			JK9	7953227
Dissolved Thallium (Tl)	<0.00020	0.00020	mg/L			APY	7953786
Dissolved Tin (Sn)	<0.0010	0.0010	mg/L			APY	7953786
Dissolved Titanium (Ti)	<0.0010	0.0010	mg/L			APY	7953786
Dissolved Uranium (U)	0.0021	0.00010	mg/L			APY	7953786
Dissolved Vanadium (V)	<0.0010	0.0010	mg/L			APY	7953786
Dissolved Zinc (Zn)	<0.0030	0.0030	mg/L			APY	7953786
Low Level Elements							
Total Mercury (Hg)	0.027	0.0050	ug/L			JLO	7957666
VOLATILE ORGANICS BY GC-MS (WATER)							
Volatiles							
Benzene	<0.00040	0.00040	mg/L			RC6	7954417
Toluene	<0.00040	0.00040	mg/L			RC6	7954417
Ethylbenzene	<0.00040	0.00040	mg/L			RC6	7954417
m & p-Xylene	<0.00080	0.00080	mg/L			RC6	7954417
o-Xylene	<0.00040	0.00040	mg/L			RC6	7954417
Xylenes (Total)	<0.00080	0.00080	mg/L			RC6	7954417
F1 (C6-C10) - BTEX	<0.10	0.10	mg/L			RC6	7954417
F1 (C6-C10)	<0.10	0.10	mg/L			RC6	7954417
1,4-Difluorobenzene (sur.)	103	70 - 130	%			RC6	7954417
4-Bromofluorobenzene (sur.)	102	70 - 130	%			RC6	7954417
D4-1,2-Dichloroethane (sur.)	93	70 - 130	%			RC6	7954417
MO3193 MW-03							
Sampling Date 2015/06/29 11:45							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Parameter							
Subcontract Parameter	ATTACHED	N/A	Bq/l				7993499
Calculated Parameters							
Anion Sum	11	N/A	meq/L				7951386
Cation Sum	11	N/A	meq/L				7951386
Hardness (CaCO3)	440	0.50	mg/L				7951383
Ion Balance	1.0	0.010	N/A				7951385
Dissolved Nitrate (NO3)	<0.044	0.044	mg/L				7951192

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B555168
Report Date: 2015/08/06

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA-FORT SASKATCHEWAN
Sampler Initials: NU, SN

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MO3193 MW-03							
Sampling Date 2015/06/29 11:45							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Calculated Parameters							
Nitrate plus Nitrite (N)	<0.020	0.020	mg/L				7951193
Dissolved Nitrite (NO2)	<0.033	0.033	mg/L				7951192
Total Dissolved Solids	610	10	mg/L				7951387
Misc. Inorganics							
Conductivity	1000	1.0	uS/cm			CH7	7954314
Dissolved Organic Carbon (C)	3.5	0.50	mg/L			MRD	7958379
pH	7.31	N/A	pH			CH7	7954308
Total Dissolved Solids	610	10	mg/L			GM4	7954117
Low Level Elements							
Dissolved Cadmium (Cd)	<0.020	0.020	ug/L				7951382
Anions							
Dissolved Chloride (Cl)	56	1.0	mg/L			ARD	7953155
Alkalinity (PP as CaCO3)	<0.50	0.50	mg/L			CH7	7954313
Alkalinity (Total as CaCO3)	350	0.50	mg/L			CH7	7954313
Bicarbonate (HCO3)	430	0.50	mg/L			CH7	7954313
Carbonate (CO3)	<0.50	0.50	mg/L			CH7	7954313
Dissolved Fluoride (F)	0.13	0.050	mg/L			CH7	7954315
Hydroxide (OH)	<0.50	0.50	mg/L			CH7	7954313
Dissolved Sulphate (SO4)	130	1.0	mg/L			ARD	7953161
Nutrients							
Dissolved Nitrite (N)	<0.010	0.010	mg/L			LMD	7953141
Dissolved Ammonia (N)	0.38	0.050	mg/L			MBB	7953017
Dissolved Nitrate (N)	<0.010	0.010	mg/L			LMD	7953141
Misc. Organics							
Phenols	<0.0020	0.0020	mg/L			YY	7953565
PETROLEUM HYDROCARBONS (CCME)							
Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	<0.10	0.10	mg/L			SHM	7954396
O-TERPHENYL (sur.)	103	50 - 130	%			SHM	7954396
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Aluminum (Al)	0.0031	0.0030	mg/L			APY	7953786
Dissolved Antimony (Sb)	<0.00060	0.00060	mg/L			APY	7953786
Dissolved Arsenic (As)	0.0014	0.00020	mg/L			APY	7953786
Dissolved Barium (Ba)	0.043	0.010	mg/L			JK9	7953227
Dissolved Beryllium (Be)	<0.0010	0.0010	mg/L			APY	7953786
Dissolved Boron (B)	0.12	0.020	mg/L			JK9	7953227
Dissolved Calcium (Ca)	110	0.30	mg/L			JK9	7953227
Dissolved Chromium (Cr)	<0.0010	0.0010	mg/L			APY	7953786
Dissolved Cobalt (Co)	0.00074	0.00030	mg/L			APY	7953786
Dissolved Copper (Cu)	0.00036	0.00020	mg/L			APY	7953786
Dissolved Iron (Fe)	5.4	0.060	mg/L			JK9	7953227
Dissolved Lead (Pb)	<0.00020	0.00020	mg/L			APY	7953786
Dissolved Lithium (Li)	0.042	0.020	mg/L			JK9	7953227
Dissolved Magnesium (Mg)	39	0.20	mg/L			JK9	7953227
Dissolved Manganese (Mn)	0.27	0.0040	mg/L			JK9	7953227
Dissolved Molybdenum (Mo)	0.00073	0.00020	mg/L			APY	7953786
Dissolved Nickel (Ni)	0.00083	0.00050	mg/L			APY	7953786

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B555168
Report Date: 2015/08/06

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA-FORT SASKATCHEWAN
Sampler Initials: NU, SN

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MO3193 MW-03							
Sampling Date 2015/06/29 11:45							
Matrix W							
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Phosphorus (P)	<0.10	0.10	mg/L			JK9	7953227
Dissolved Potassium (K)	3.1	0.30	mg/L			JK9	7953227
Dissolved Selenium (Se)	<0.00020	0.00020	mg/L			APY	7953786
Dissolved Silicon (Si)	8.4	0.10	mg/L			JK9	7953227
Dissolved Silver (Ag)	<0.00010	0.00010	mg/L			APY	7953786
Dissolved Sodium (Na)	51	0.50	mg/L			JK9	7953227
Dissolved Strontium (Sr)	0.88	0.020	mg/L			JK9	7953227
Dissolved Sulphur (S)	40	0.20	mg/L			JK9	7953227
Dissolved Thallium (Tl)	<0.00020	0.00020	mg/L			APY	7953786
Dissolved Tin (Sn)	<0.0010	0.0010	mg/L			APY	7953786
Dissolved Titanium (Ti)	<0.0010	0.0010	mg/L			APY	7953786
Dissolved Uranium (U)	0.00059	0.00010	mg/L			APY	7953786
Dissolved Vanadium (V)	<0.0010	0.0010	mg/L			APY	7953786
Dissolved Zinc (Zn)	0.0097	0.0030	mg/L			APY	7953786
Low Level Elements							
Total Mercury (Hg)	0.0061	0.0050	ug/L			JLO	7957666
VOLATILE ORGANICS BY GC-MS (WATER)							
Volatiles							
Benzene	<0.00040	0.00040	mg/L			RC6	7954417
Toluene	<0.00040	0.00040	mg/L			RC6	7954417
Ethylbenzene	<0.00040	0.00040	mg/L			RC6	7954417
m & p-Xylene	<0.00080	0.00080	mg/L			RC6	7954417
o-Xylene	<0.00040	0.00040	mg/L			RC6	7954417
Xylenes (Total)	<0.00080	0.00080	mg/L			RC6	7954417
F1 (C6-C10) - BTEX	<0.10	0.10	mg/L			RC6	7954417
F1 (C6-C10)	<0.10	0.10	mg/L			RC6	7954417
1,4-Difluorobenzene (sur.)	104	70 - 130	%			RC6	7954417
4-Bromofluorobenzene (sur.)	103	70 - 130	%			RC6	7954417
D4-1,2-Dichloroethane (sur.)	94	70 - 130	%			RC6	7954417
MO3194 MW-04							
Sampling Date 2015/06/29 14:20							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Parameter							
Subcontract Parameter	ATTACHED	N/A	Bq/l				7993499
Calculated Parameters							
Anion Sum	14	N/A	meq/L				7951386
Cation Sum	14	N/A	meq/L				7951386
Hardness (CaCO3)	550	0.50	mg/L				7951383
Ion Balance	0.98	0.010	N/A				7951385
Dissolved Nitrate (NO3)	0.13	0.044	mg/L				7951192
Nitrate plus Nitrite (N)	0.030	0.020	mg/L				7951193
Dissolved Nitrite (NO2)	<0.033	0.033	mg/L				7951192
Total Dissolved Solids	750	10	mg/L				7951387
Misc. Inorganics							
Conductivity	1300	1.0	uS/cm			CH7	7954314
Dissolved Organic Carbon (C)	3.5	0.50	mg/L			MRD	7958379
pH	7.32	N/A	pH			CH7	7954308

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B555168
Report Date: 2015/08/06

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA-FORT SASKATCHEWAN
Sampler Initials: NU, SN

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MO3194 MW-04							
Sampling Date 2015/06/29 14:20							
Matrix W							
RESULTS OF CHEMICAL ANALYSES OF WATER							
Misc. Inorganics							
Total Dissolved Solids	780	10	mg/L			GM4	7954117
Low Level Elements							
Dissolved Cadmium (Cd)	<0.020	0.020	ug/L				7951382
Anions							
Dissolved Chloride (Cl)	150	1.0	mg/L			ARD	7953155
Alkalinity (PP as CaCO3)	<0.50	0.50	mg/L			CH7	7954313
Alkalinity (Total as CaCO3)	390	0.50	mg/L			CH7	7954313
Bicarbonate (HCO3)	480	0.50	mg/L			CH7	7954313
Carbonate (CO3)	<0.50	0.50	mg/L			CH7	7954313
Dissolved Fluoride (F)	0.13	0.050	mg/L			CH7	7954315
Hydroxide (OH)	<0.50	0.50	mg/L			CH7	7954313
Dissolved Sulphate (SO4)	100	1.0	mg/L			ARD	7953161
Nutrients							
Dissolved Nitrite (N)	<0.010	0.010	mg/L			LMD	7953141
Dissolved Ammonia (N)	<0.050	0.050	mg/L			MBB	7953017
Dissolved Nitrate (N)	0.030	0.010	mg/L			LMD	7953141
Misc. Organics							
Phenols	<0.0020	0.0020	mg/L			YY	7953565
PETROLEUM HYDROCARBONS (CCME)							
Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	<0.10	0.10	mg/L			SHM	7954396
O-TERPHENYL (sur.)	118	50 - 130	%			SHM	7954396
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Aluminum (Al)	0.0035	0.0030	mg/L			APY	7953786
Dissolved Antimony (Sb)	<0.00060	0.00060	mg/L			APY	7953786
Dissolved Arsenic (As)	0.00057	0.00020	mg/L			APY	7953786
Dissolved Barium (Ba)	0.11	0.010	mg/L			JK9	7953227
Dissolved Beryllium (Be)	<0.0010	0.0010	mg/L			APY	7953786
Dissolved Boron (B)	0.094	0.020	mg/L			JK9	7953227
Dissolved Calcium (Ca)	150	0.30	mg/L			JK9	7953227
Dissolved Chromium (Cr)	<0.0010	0.0010	mg/L			APY	7953786
Dissolved Cobalt (Co)	0.00042	0.00030	mg/L			APY	7953786
Dissolved Copper (Cu)	<0.00020	0.00020	mg/L			APY	7953786
Dissolved Iron (Fe)	1.9	0.060	mg/L			JK9	7953227
Dissolved Lead (Pb)	<0.00020	0.00020	mg/L			APY	7953786
Dissolved Lithium (Li)	0.041	0.020	mg/L			JK9	7953227
Dissolved Magnesium (Mg)	44	0.20	mg/L			JK9	7953227
Dissolved Manganese (Mn)	0.54	0.0040	mg/L			JK9	7953227
Dissolved Molybdenum (Mo)	0.00039	0.00020	mg/L			APY	7953786
Dissolved Nickel (Ni)	0.0018	0.00050	mg/L			APY	7953786
Dissolved Phosphorus (P)	<0.10	0.10	mg/L			JK9	7953227
Dissolved Potassium (K)	9.5	0.30	mg/L			JK9	7953227
Dissolved Selenium (Se)	<0.00020	0.00020	mg/L			APY	7953786
Dissolved Silicon (Si)	4.9	0.10	mg/L			JK9	7953227
Dissolved Silver (Ag)	<0.00010	0.00010	mg/L			APY	7953786
Dissolved Sodium (Na)	59	0.50	mg/L			JK9	7953227
Dissolved Strontium (Sr)	0.63	0.020	mg/L			JK9	7953227

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B555168
Report Date: 2015/08/06

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA-FORT SASKATCHEWAN
Sampler Initials: NU, SN

Sample Details/Parameters	Result	RDL	Units	meq/L	meq %	By	Batch
MO3194 MW-04							
Sampling Date 2015/06/29 14:20							
Matrix W							
ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)							
Elements							
Dissolved Sulphur (S)	33	0.20	mg/L			JK9	7953227
Dissolved Thallium (Tl)	<0.00020	0.00020	mg/L			APY	7953786
Dissolved Tin (Sn)	<0.0010	0.0010	mg/L			APY	7953786
Dissolved Titanium (Ti)	<0.0010	0.0010	mg/L			APY	7953786
Dissolved Uranium (U)	0.0038	0.00010	mg/L			APY	7953786
Dissolved Vanadium (V)	<0.0010	0.0010	mg/L			APY	7953786
Dissolved Zinc (Zn)	<0.0030	0.0030	mg/L			APY	7953786
Low Level Elements							
Total Mercury (Hg)	<0.0050	0.0050	ug/L			JLO	7957666
VOLATILE ORGANICS BY GC-MS (WATER)							
Volatiles							
Benzene	<0.00040	0.00040	mg/L			RC6	7954417
Toluene	<0.00040	0.00040	mg/L			RC6	7954417
Ethylbenzene	<0.00040	0.00040	mg/L			RC6	7954417
m & p-Xylene	<0.00080	0.00080	mg/L			RC6	7954417
o-Xylene	<0.00040	0.00040	mg/L			RC6	7954417
Xylenes (Total)	<0.00080	0.00080	mg/L			RC6	7954417
F1 (C6-C10) - BTEX	<0.10	0.10	mg/L			RC6	7954417
F1 (C6-C10)	<0.10	0.10	mg/L			RC6	7954417
1,4-Difluorobenzene (sur.)	104	70 - 130	%			RC6	7954417
4-Bromofluorobenzene (sur.)	103	70 - 130	%			RC6	7954417
D4-1,2-Dichloroethane (sur.)	94	70 - 130	%			RC6	7954417

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B555168
Report Date: 2015/08/06

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA-FORT SASKATCHEWAN
Sampler Initials: NU, SN

GENERAL COMMENTS

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

Package 1	10.7°C

Meq % is based on dissolved calcium, magnesium, sodium, potassium, carbonate, bicarbonate, sulphate and chloride

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B555168
Report Date: 2015/08/06

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA-FORT SASKATCHEWAN
Sampler Initials: NU, SN

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
7953017	MBB	Matrix Spike [MO3192-03]	Dissolved Ammonia (N)	2015/07/02		100	%	80 - 120
7953017	MBB	Spiked Blank	Dissolved Ammonia (N)	2015/07/02		104	%	80 - 120
7953017	MBB	Method Blank	Dissolved Ammonia (N)	2015/07/02	<0.050		mg/L	
7953017	MBB	RPD [MO3192-03]	Dissolved Ammonia (N)	2015/07/02	NC		%	20
7953141	LMD	Matrix Spike	Dissolved Nitrite (N)	2015/07/02		104	%	80 - 120
			Dissolved Nitrate (N)	2015/07/02		105	%	80 - 120
7953141	LMD	Spiked Blank	Dissolved Nitrite (N)	2015/07/02		99	%	80 - 120
			Dissolved Nitrate (N)	2015/07/02		101	%	80 - 120
7953141	LMD	Method Blank	Dissolved Nitrite (N)	2015/07/02	<0.010		mg/L	
			Dissolved Nitrate (N)	2015/07/02	<0.010		mg/L	
7953141	LMD	RPD	Dissolved Nitrite (N)	2015/07/02	NC		%	20
			Dissolved Nitrate (N)	2015/07/02	NC		%	20
7953155	ARD	Matrix Spike	Dissolved Chloride (Cl)	2015/07/02		NC	%	80 - 120
7953155	ARD	Spiked Blank	Dissolved Chloride (Cl)	2015/07/02		104	%	80 - 120
7953155	ARD	Method Blank	Dissolved Chloride (Cl)	2015/07/02	<1.0		mg/L	
7953155	ARD	RPD	Dissolved Chloride (Cl)	2015/07/02	1.4		%	20
7953161	ARD	Matrix Spike	Dissolved Sulphate (SO4)	2015/07/02		NC	%	80 - 120
7953161	ARD	Spiked Blank	Dissolved Sulphate (SO4)	2015/07/02		106	%	80 - 120
7953161	ARD	Method Blank	Dissolved Sulphate (SO4)	2015/07/02	<1.0		mg/L	
7953161	ARD	RPD	Dissolved Sulphate (SO4)	2015/07/02	0.85		%	20
7953227	JK9	Matrix Spike	Dissolved Barium (Ba)	2015/07/02		99	%	80 - 120
			Dissolved Boron (B)	2015/07/02		102	%	80 - 120
			Dissolved Calcium (Ca)	2015/07/02		NC	%	80 - 120
			Dissolved Iron (Fe)	2015/07/02		102	%	80 - 120
			Dissolved Lithium (Li)	2015/07/02		95	%	80 - 120
			Dissolved Magnesium (Mg)	2015/07/02		102	%	80 - 120
			Dissolved Manganese (Mn)	2015/07/02		99	%	80 - 120
			Dissolved Phosphorus (P)	2015/07/02		110	%	80 - 120
			Dissolved Potassium (K)	2015/07/02		100	%	80 - 120
			Dissolved Silicon (Si)	2015/07/02		NC	%	80 - 120
			Dissolved Sodium (Na)	2015/07/02		NC	%	80 - 120
			Dissolved Strontium (Sr)	2015/07/02		96	%	80 - 120
7953227	JK9	Spiked Blank	Dissolved Barium (Ba)	2015/07/02		99	%	80 - 120
			Dissolved Boron (B)	2015/07/02		102	%	80 - 120
			Dissolved Calcium (Ca)	2015/07/02		100	%	80 - 120
			Dissolved Iron (Fe)	2015/07/02		102	%	80 - 120
			Dissolved Lithium (Li)	2015/07/02		95	%	80 - 120
			Dissolved Magnesium (Mg)	2015/07/02		104	%	80 - 120
			Dissolved Manganese (Mn)	2015/07/02		100	%	80 - 120
			Dissolved Phosphorus (P)	2015/07/02		106	%	80 - 120
			Dissolved Potassium (K)	2015/07/02		102	%	80 - 120
			Dissolved Silicon (Si)	2015/07/02		108	%	80 - 120
			Dissolved Sodium (Na)	2015/07/02		102	%	80 - 120
			Dissolved Strontium (Sr)	2015/07/02		97	%	80 - 120
			Dissolved Sulphur (S)	2015/07/02		99	%	80 - 120
7953227	JK9	Method Blank	Dissolved Barium (Ba)	2015/07/02	<0.010		mg/L	
			Dissolved Boron (B)	2015/07/02	<0.020		mg/L	
			Dissolved Calcium (Ca)	2015/07/02	<0.30		mg/L	
			Dissolved Iron (Fe)	2015/07/02	<0.060		mg/L	
			Dissolved Lithium (Li)	2015/07/02	<0.020		mg/L	
			Dissolved Magnesium (Mg)	2015/07/02	<0.20		mg/L	

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B555168
Report Date: 2015/08/06

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA-FORT SASKATCHEWAN
Sampler Initials: NU, SN

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Dissolved Manganese (Mn)	2015/07/02	<0.0040		mg/L	
			Dissolved Phosphorus (P)	2015/07/02	<0.10		mg/L	
			Dissolved Potassium (K)	2015/07/02	<0.30		mg/L	
			Dissolved Silicon (Si)	2015/07/02	<0.10		mg/L	
			Dissolved Sodium (Na)	2015/07/02	<0.50		mg/L	
			Dissolved Strontium (Sr)	2015/07/02	<0.020		mg/L	
			Dissolved Sulphur (S)	2015/07/02	<0.20		mg/L	
7953227	JK9	RPD	Dissolved Barium (Ba)	2015/07/02	0.13		%	20
			Dissolved Boron (B)	2015/07/02	0.26		%	20
			Dissolved Calcium (Ca)	2015/07/02	0.020		%	20
			Dissolved Iron (Fe)	2015/07/02	NC		%	20
			Dissolved Lithium (Li)	2015/07/02	NC		%	20
			Dissolved Magnesium (Mg)	2015/07/02	0.26		%	20
			Dissolved Manganese (Mn)	2015/07/02	0.21		%	20
			Dissolved Phosphorus (P)	2015/07/02	NC		%	20
			Dissolved Potassium (K)	2015/07/02	0.050		%	20
			Dissolved Silicon (Si)	2015/07/02	0.22		%	20
			Dissolved Sodium (Na)	2015/07/02	0.47		%	20
			Dissolved Strontium (Sr)	2015/07/02	0.24		%	20
			Dissolved Sulphur (S)	2015/07/02	0.61		%	20
7953565	YY	Matrix Spike [MO3193-06]	Phenols	2015/07/02		99	%	80 - 120
7953565	YY	Spiked Blank	Phenols	2015/07/02		93	%	80 - 120
7953565	YY	Method Blank	Phenols	2015/07/02	<0.0020		mg/L	
7953565	YY	RPD [MO3193-06]	Phenols	2015/07/02	NC		%	20
7953786	APY	Matrix Spike	Dissolved Aluminum (Al)	2015/07/02		87	%	80 - 120
			Dissolved Antimony (Sb)	2015/07/02		101	%	80 - 120
			Dissolved Arsenic (As)	2015/07/02		96	%	80 - 120
			Dissolved Beryllium (Be)	2015/07/02		91	%	80 - 120
			Dissolved Chromium (Cr)	2015/07/02		90	%	80 - 120
			Dissolved Cobalt (Co)	2015/07/02		86	%	80 - 120
			Dissolved Copper (Cu)	2015/07/02		87	%	80 - 120
			Dissolved Lead (Pb)	2015/07/02		88	%	80 - 120
			Dissolved Molybdenum (Mo)	2015/07/02		98	%	80 - 120
			Dissolved Nickel (Ni)	2015/07/02		NC	%	80 - 120
			Dissolved Selenium (Se)	2015/07/02		97	%	80 - 120
			Dissolved Silver (Ag)	2015/07/02		90	%	80 - 120
			Dissolved Thallium (Tl)	2015/07/02		90	%	80 - 120
			Dissolved Tin (Sn)	2015/07/02		101	%	80 - 120
			Dissolved Titanium (Ti)	2015/07/02		98	%	80 - 120
			Dissolved Uranium (U)	2015/07/02		90	%	80 - 120
			Dissolved Vanadium (V)	2015/07/02		96	%	80 - 120
			Dissolved Zinc (Zn)	2015/07/02		91	%	80 - 120
7953786	APY	Spiked Blank	Dissolved Aluminum (Al)	2015/07/02		97	%	80 - 120
			Dissolved Antimony (Sb)	2015/07/02		100	%	80 - 120
			Dissolved Arsenic (As)	2015/07/02		99	%	80 - 120
			Dissolved Beryllium (Be)	2015/07/02		95	%	80 - 120
			Dissolved Chromium (Cr)	2015/07/02		95	%	80 - 120
			Dissolved Cobalt (Co)	2015/07/02		94	%	80 - 120
			Dissolved Copper (Cu)	2015/07/02		96	%	80 - 120
			Dissolved Lead (Pb)	2015/07/02		99	%	80 - 120
			Dissolved Molybdenum (Mo)	2015/07/02		99	%	80 - 120

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B555168
Report Date: 2015/08/06

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA-FORT SASKATCHEWAN
Sampler Initials: NU, SN

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Dissolved Nickel (Ni)	2015/07/02		97	%	80 - 120
			Dissolved Selenium (Se)	2015/07/02		99	%	80 - 120
			Dissolved Silver (Ag)	2015/07/02		96	%	80 - 120
			Dissolved Thallium (Tl)	2015/07/02		97	%	80 - 120
			Dissolved Tin (Sn)	2015/07/02		100	%	80 - 120
			Dissolved Titanium (Ti)	2015/07/02		97	%	80 - 120
			Dissolved Uranium (U)	2015/07/02		98	%	80 - 120
			Dissolved Vanadium (V)	2015/07/02		101	%	80 - 120
			Dissolved Zinc (Zn)	2015/07/02		99	%	80 - 120
7953786	APY	Method Blank	Dissolved Aluminum (Al)	2015/07/02	<0.0030		mg/L	
			Dissolved Antimony (Sb)	2015/07/02	<0.00060		mg/L	
			Dissolved Arsenic (As)	2015/07/02	<0.00020		mg/L	
			Dissolved Beryllium (Be)	2015/07/02	<0.0010		mg/L	
			Dissolved Chromium (Cr)	2015/07/02	<0.0010		mg/L	
			Dissolved Cobalt (Co)	2015/07/02	<0.00030		mg/L	
			Dissolved Copper (Cu)	2015/07/02	<0.00020		mg/L	
			Dissolved Lead (Pb)	2015/07/02	<0.00020		mg/L	
			Dissolved Molybdenum (Mo)	2015/07/02	<0.00020		mg/L	
			Dissolved Nickel (Ni)	2015/07/02	<0.00050		mg/L	
			Dissolved Selenium (Se)	2015/07/02	<0.00020		mg/L	
			Dissolved Silver (Ag)	2015/07/02	<0.00010		mg/L	
			Dissolved Thallium (Tl)	2015/07/02	<0.00020		mg/L	
			Dissolved Tin (Sn)	2015/07/02	<0.0010		mg/L	
			Dissolved Titanium (Ti)	2015/07/02	<0.0010		mg/L	
			Dissolved Uranium (U)	2015/07/02	<0.00010		mg/L	
			Dissolved Vanadium (V)	2015/07/02	<0.0010		mg/L	
			Dissolved Zinc (Zn)	2015/07/02	<0.0030		mg/L	
7953786	APY	RPD	Dissolved Aluminum (Al)	2015/07/02	NC		%	20
			Dissolved Antimony (Sb)	2015/07/02	NC		%	20
			Dissolved Arsenic (As)	2015/07/02	2.3		%	20
			Dissolved Beryllium (Be)	2015/07/02	NC		%	20
			Dissolved Chromium (Cr)	2015/07/02	NC		%	20
			Dissolved Cobalt (Co)	2015/07/02	2.9		%	20
			Dissolved Copper (Cu)	2015/07/02	0.37		%	20
			Dissolved Lead (Pb)	2015/07/02	NC		%	20
			Dissolved Molybdenum (Mo)	2015/07/02	4.0		%	20
			Dissolved Nickel (Ni)	2015/07/02	0.82		%	20
			Dissolved Selenium (Se)	2015/07/02	NC		%	20
			Dissolved Silver (Ag)	2015/07/02	NC		%	20
			Dissolved Thallium (Tl)	2015/07/02	NC		%	20
			Dissolved Tin (Sn)	2015/07/02	NC		%	20
			Dissolved Titanium (Ti)	2015/07/02	NC		%	20
			Dissolved Uranium (U)	2015/07/02	1.2		%	20
			Dissolved Vanadium (V)	2015/07/02	NC		%	20
			Dissolved Zinc (Zn)	2015/07/02	NC		%	20
7954117	GM4	Matrix Spike	Total Dissolved Solids	2015/07/04		NC	%	80 - 120
7954117	GM4	Spiked Blank	Total Dissolved Solids	2015/07/04		99	%	80 - 120
7954117	GM4	Method Blank	Total Dissolved Solids	2015/07/04	<10		mg/L	
7954117	GM4	RPD	Total Dissolved Solids	2015/07/04	1.3		%	20
7954308	CH7	Spiked Blank	pH	2015/07/03		100	%	97 - 103
7954308	CH7	RPD	pH	2015/07/03	0.19		%	N/A
7954313	CH7	Spiked Blank	Alkalinity (Total as CaCO3)	2015/07/03		101	%	80 - 120

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B555168
Report Date: 2015/08/06

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA-FORT SASKATCHEWAN
Sampler Initials: NU, SN

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
7954313	CH7	Method Blank	Alkalinity (PP as CaCO3)	2015/07/03	<0.50		mg/L	
			Alkalinity (Total as CaCO3)	2015/07/03	<0.50		mg/L	
			Bicarbonate (HCO3)	2015/07/03	<0.50		mg/L	
			Carbonate (CO3)	2015/07/03	<0.50		mg/L	
			Hydroxide (OH)	2015/07/03	<0.50		mg/L	
7954313	CH7	RPD	Alkalinity (PP as CaCO3)	2015/07/03	0.98		%	20
			Alkalinity (Total as CaCO3)	2015/07/03	1.4		%	20
			Bicarbonate (HCO3)	2015/07/03	1.7		%	20
			Carbonate (CO3)	2015/07/03	0.97		%	20
			Hydroxide (OH)	2015/07/03	NC		%	20
7954314	CH7	Spiked Blank	Conductivity	2015/07/03		99	%	90 - 110
7954314	CH7	Method Blank	Conductivity	2015/07/03	<1.0		uS/cm	
7954314	CH7	RPD	Conductivity	2015/07/03	2.5		%	20
7954315	CH7	Matrix Spike	Dissolved Fluoride (F)	2015/07/03		NC	%	80 - 120
7954315	CH7	Spiked Blank	Dissolved Fluoride (F)	2015/07/03		102	%	80 - 120
7954315	CH7	Method Blank	Dissolved Fluoride (F)	2015/07/03	<0.050		mg/L	
7954315	CH7	RPD	Dissolved Fluoride (F)	2015/07/03	1.4		%	20
7954396	SHM	Matrix Spike [MO3193-07]	O-TERPHENYL (sur.)	2015/07/07		105	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2015/07/07		114	%	50 - 130
7954396	SHM	Spiked Blank	O-TERPHENYL (sur.)	2015/07/07		105	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2015/07/07		112	%	70 - 130
7954396	SHM	Method Blank	O-TERPHENYL (sur.)	2015/07/07		104	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2015/07/07	<0.10		mg/L	
7954396	SHM	RPD [MO3192-07]	F2 (C10-C16 Hydrocarbons)	2015/07/07	NC		%	40
7954417	RC6	Matrix Spike [MO3193-08]	1,4-Difluorobenzene (sur.)	2015/07/08		97	%	70 - 130
			4-Bromofluorobenzene (sur.)	2015/07/08		99	%	70 - 130
			D4-1,2-Dichloroethane (sur.)	2015/07/08		97	%	70 - 130
			Benzene	2015/07/08		91	%	70 - 130
			Toluene	2015/07/08		86	%	70 - 130
			Ethylbenzene	2015/07/08		94	%	70 - 130
			m & p-Xylene	2015/07/08		92	%	70 - 130
			o-Xylene	2015/07/08		93	%	70 - 130
			F1 (C6-C10)	2015/07/08		102	%	70 - 130
7954417	RC6	Spiked Blank	1,4-Difluorobenzene (sur.)	2015/07/08		97	%	70 - 130
			4-Bromofluorobenzene (sur.)	2015/07/08		99	%	70 - 130
			D4-1,2-Dichloroethane (sur.)	2015/07/08		97	%	70 - 130
			Benzene	2015/07/08		110	%	70 - 130
			Toluene	2015/07/08		105	%	70 - 130
			Ethylbenzene	2015/07/08		115	%	70 - 130
			m & p-Xylene	2015/07/08		113	%	70 - 130
			o-Xylene	2015/07/08		112	%	70 - 130
			F1 (C6-C10)	2015/07/08		117	%	70 - 130
7954417	RC6	Method Blank	1,4-Difluorobenzene (sur.)	2015/07/08		103	%	70 - 130
			4-Bromofluorobenzene (sur.)	2015/07/08		104	%	70 - 130
			D4-1,2-Dichloroethane (sur.)	2015/07/08		92	%	70 - 130
			Benzene	2015/07/08	<0.00040		mg/L	
			Toluene	2015/07/08	<0.00040		mg/L	
			Ethylbenzene	2015/07/08	<0.00040		mg/L	
			m & p-Xylene	2015/07/08	<0.00080		mg/L	
			o-Xylene	2015/07/08	<0.00040		mg/L	

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B555168
Report Date: 2015/08/06

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA-FORT SASKATCHEWAN
Sampler Initials: NU, SN

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Xylenes (Total)	2015/07/08	<0.00080		mg/L	
			F1 (C6-C10) - BTEX	2015/07/08	<0.10		mg/L	
			F1 (C6-C10)	2015/07/08	<0.10		mg/L	
7954417	RC6	RPD [MO3192-08]	Benzene	2015/07/08	NC		%	40
			Toluene	2015/07/08	NC		%	40
			Ethylbenzene	2015/07/08	NC		%	40
			m & p-Xylene	2015/07/08	NC		%	40
			o-Xylene	2015/07/08	NC		%	40
			Xylenes (Total)	2015/07/08	NC		%	40
			F1 (C6-C10) - BTEX	2015/07/08	NC		%	40
			F1 (C6-C10)	2015/07/08	NC		%	40
7957666	JLO	Matrix Spike [MO3194-05]	Total Mercury (Hg)	2015/07/07		100	%	85 - 115
7957666	JLO	QC Standard	Total Mercury (Hg)	2015/07/07		95	%	85 - 115
7957666	JLO	Spiked Blank	Total Mercury (Hg)	2015/07/07		100	%	85 - 115
7957666	JLO	Method Blank	Total Mercury (Hg)	2015/07/07	<0.0050		ug/L	
7957666	JLO	RPD [MO3194-05]	Total Mercury (Hg)	2015/07/07	NC		%	20
7958379	MRD	Matrix Spike	Dissolved Organic Carbon (C)	2015/07/07		NC	%	80 - 120
7958379	MRD	Spiked Blank	Dissolved Organic Carbon (C)	2015/07/07		101	%	80 - 120
7958379	MRD	Method Blank	Dissolved Organic Carbon (C)	2015/07/07	<0.50		mg/L	
7958379	MRD	RPD	Dissolved Organic Carbon (C)	2015/07/07	0.25		%	20

N/A = Not Applicable

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

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

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

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

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

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

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam Job #: B555168
Report Date: 2015/08/06

WORLEYPARSONS
Client Project #: 307075-01608-100
Site Location: NCIA-FORT SASKATCHEWAN
Sampler Initials: NU, SN

VALIDATION SIGNATURE PAGE

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

Anna Koksharova, M.Sc., Senior Analyst

Kale Edwards, Senior Analyst

Kelly Gip, B.Sc., Senior Analyst

Sandy Yuan, M.Sc., Scientific Specialist

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

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Maxxam

Calgary: 4000 19st St. NE, T2E 6P8. Ph: (403) 291-3077, Fax: (403) 735-2240. Toll free: (800) 386-7247
Edmonton: 9331 - 48 Street, T6B 2R4. Ph: (780) 577-7100, Fax: (780) 450-4187. Toll free: (877) 465-8889
www.maxxamanalytics.com

06/13/14 (1) JM

Chain of Custody

A084947

Page: 01 of 01

	Invoice To: C/O Report Address ☐	Report To: Same as Invoice ☒	Report Distribution (E-Mail):	REGULATORY GUIDELINES:
Company:	Worley Parsons		trevor.butterfield@worleyparsons.com	☐ AT1 ☒ CCME ☐ Regulated Drinking Water ☐ Other:
Contact:	Trevor Butterfield			
Address:	Suite 300, 8615-51 Ave, EDM			
	Prov: Alberta PC: T6E 6A8	Prov: PC:		
Contact #s:	Ph: Cell:	Ph: Cell:		

All samples are held for 60 calendar days after sample receipt, unless specified otherwise.

PO #:	
Project # / Name:	307075-01608-100
Site Location:	NCIA - Fort Saskatchewan
Quote #:	
Sampled By:	Nick Uuonius / Stephane Nguelen

SERVICE REQUESTED: ☐ RUSH (Contact lab to reserve) Date Required: ☒ REGULAR (5 to 7 Days)

See reverse for package specifics

	Sample ID	Depth (unit)	Matrix GW / SW Soil	Date/Time Sampled YY/MM/DD 24:00	SOIL: BTEX F1-F4	Sieve (75 micron)	Regulated Metals (CCME / AT1)	Salinity 4	Assessment ICP Metals	Basic Class II Landfill	WATER: ☒BTEX F1 ☐VOCs	☒BTEX F1-F4 (F2) ☐BTEX F1-F4	☒ Routine Water ☐ Turb ☒ F	☐ TOC ☒ DOC + TDNH3	Regulated Metals (CCME / AT1) Total	Dissolved	Mercury	☒ Total ☐ Dissolved	Other Analysis: Phenols	TDS Actual	24 and 180	HOLD - Do not Analyze	# of Containers Submitted
1	MW-01		GW	15/06/29 12:44							X	X	X	X		X	X	X	X	X	X		11
2	MW-03		GW	15/06/29 11:45							X	X	X	X		X	X	X	X	X	X		11
3	MW-04		GW	15/06/29 14:20							X	X	X	X		X	X	X	X	X	X		11
4																							
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							

Please indicate Filtered, Preserved or Both (F, P, F/P) → P P F/P F/P P P F/P

Relinquished By (Signature/Print): Nickie Uuonius	Date (YY/MM/DD): 15/06/29	Time (24:00): 16:55	
Relinquished By (Signature/Print): Stéphane Nguelen	Date (YY/MM/DD): 15/06/29	Time (24:00): 16:55	
Special Instructions:		# of Jars Used & Not Submitted	

LAB USE ONLY

Received By:	Date:	Time:	Maxxam Job #: B555168
Delaney/McKerricher	2015/06/29	17:03	Custody Seal: present / Temperature: 12, 9, 11 / Ice: present

Lab Comments:

AB FCD-00331 Rev3 2010/05

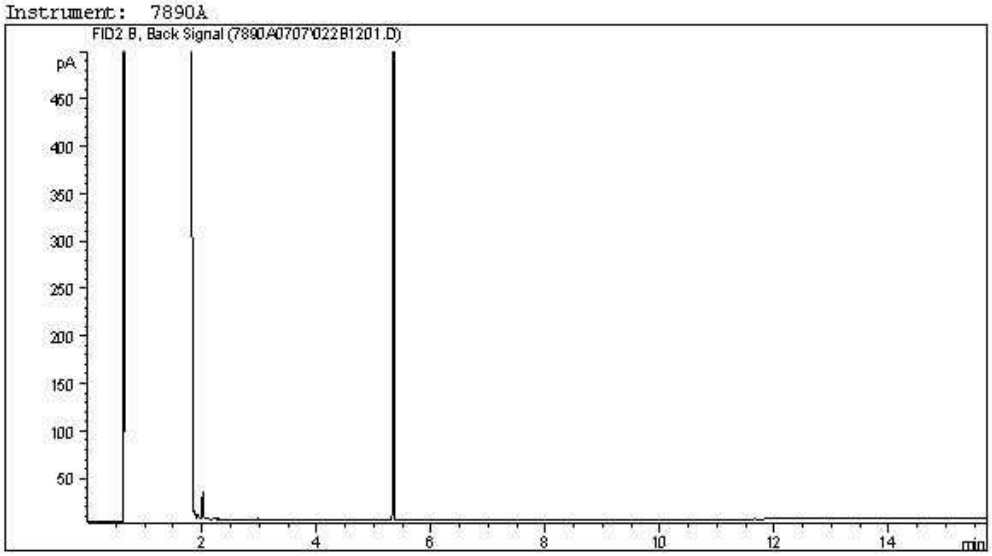
Maxxam Analytics International Corporation o/a Maxxam Analytics

Maxxam Job #: B555168
Report Date: 2015/08/06
Maxxam Sample: MO3192

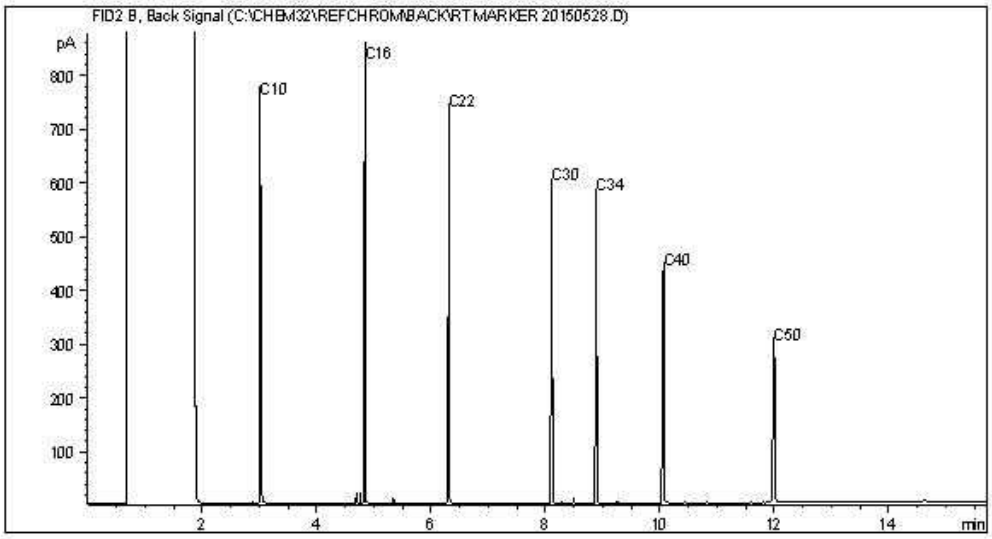
WORLEYPARSONS
Attention: TREVOR BUTTERFIELD
Client Project #: 307075-01608-100
Site Reference: NCIA-FORT SASKATCHEWAN
Client ID: MW-01

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890A



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

Page 1 of 1

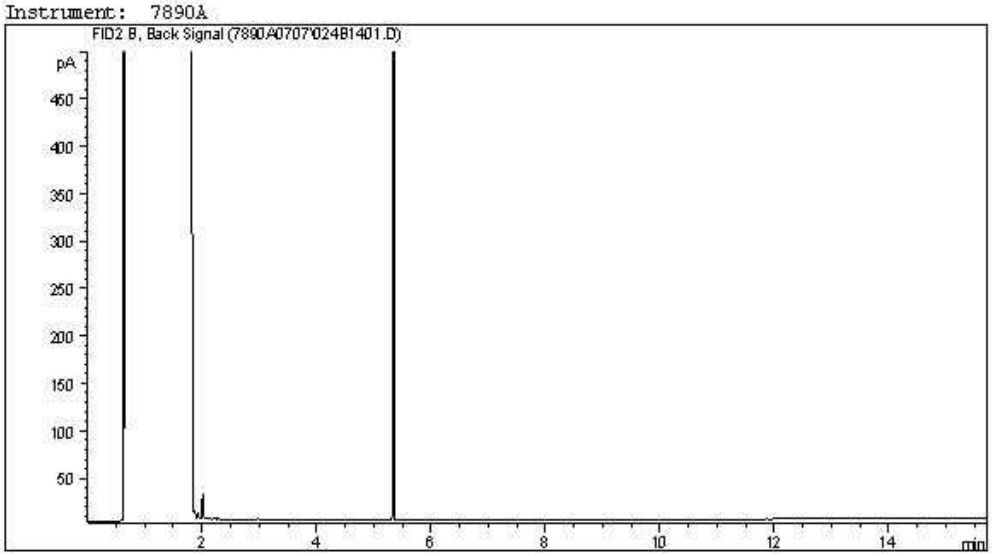
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B555168
Report Date: 2015/08/06
Maxxam Sample: MO3193

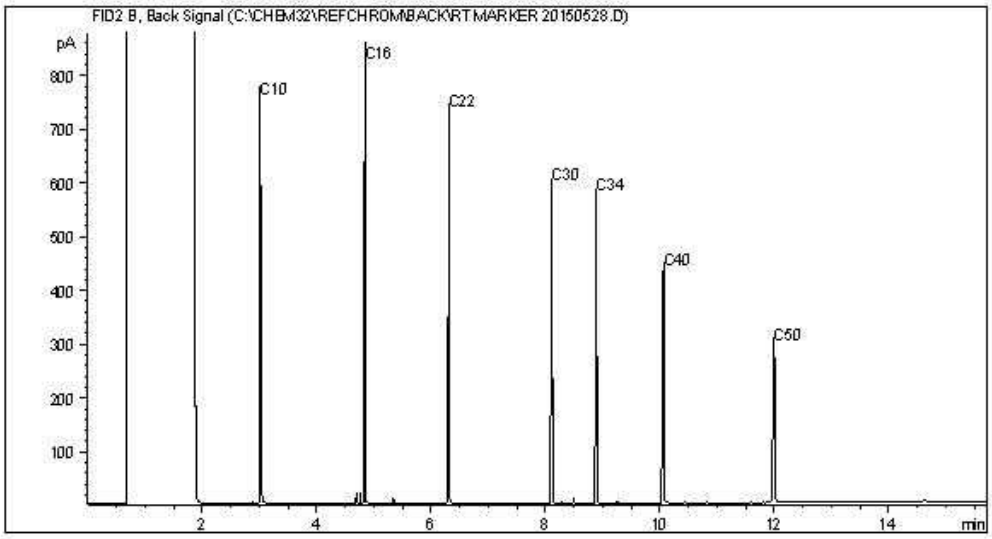
WORLEYPARSONS
Attention: TREVOR BUTTERFIELD
Client Project #: 307075-01608-100
Site Reference: NCIA-FORT SASKATCHEWAN
Client ID: MW-03

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890A



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

Page 1 of 1

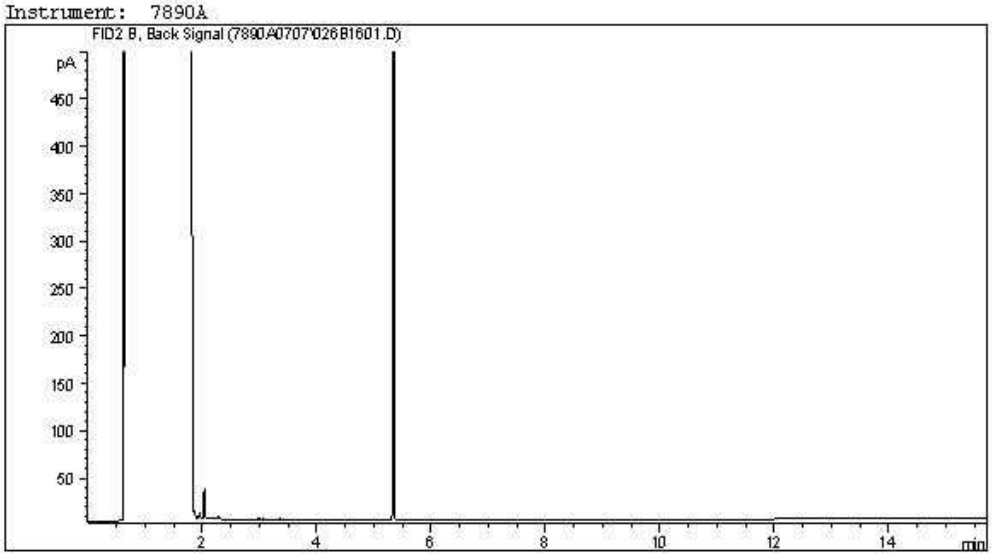
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B555168
Report Date: 2015/08/06
Maxxam Sample: MO3194

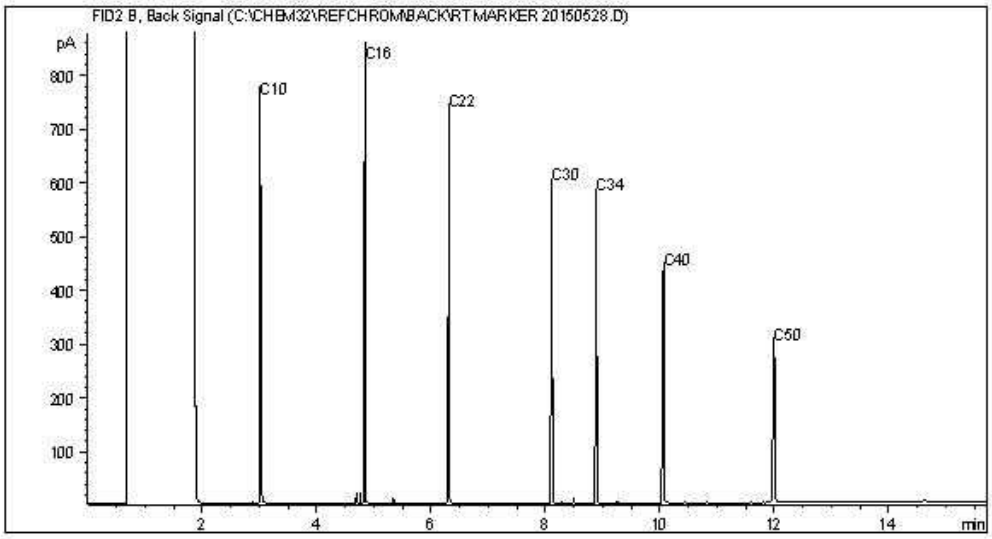
WORLEYPARSONS
Attention: TREVOR BUTTERFIELD
Client Project #: 307075-01608-100
Site Reference: NCIA-FORT SASKATCHEWAN
Client ID: MW-04

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: 7890A



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

Page 1 of 1

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

IT2#: 150176Contact: Alaina HunterCompany: Maxxam Analytics

#	Sample ID	Sample #	Collection		$\delta^{18}O$	Aver	Stdv	$\delta^{2}H$	Aver	Stdv	Sample Size
	B555168		Date	Time	H_2O	VSMOW		H_2O	VSMOW		
1	MO3192-MW-01	32347	June-29-15	12:44:00	X	-18.87	0.07	X	-147.2	0.3	1 x 1L Bottle
2	MO3192-MW-03	32348	June-29-15	11:45:00	X	-19.51	0.08	X	-151.5	0.5	1 x 1L Bottle
3	MO3192-MW-04	32349	June-29-15	14:20:00	X	-17.47	0.04	X	-137.9	0.4	1 x 1L Bottle

Laboratory Report Data Checklist

WorleyParsons resources & energy

Both Database and Project Staff sections to be completed within 5 calendar days of receipt of Lab Confirmation Package and Certificate Of Analysis

DATABASE STAFF TO COMPLETE SECTIONS 1, 2 AND 4:

1. BACKGROUND

Client	NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION	**Date(s) sampled**	2015/06/29
Laboratory	Maxxam, Edmonton	**Project No.**	307075-01608-100
Lab Submission No.	B555168	**Site name**	NCIA-FORT SASKATCHEWAN

2. SAMPLE RECEIPT CONFIRMATION (SRC) – PART A

SRC cross-checked against the chain of custody (COC) (sample names, analytical packages)? ☒ Yes ☐ No **Comments**

(Maxxam Only) Fundamental Laboratory Acceptance Guideline (FLAG) received? ☒ Yes ☐ N/A

If yes, FLAG type and comments: No discrepancies noted.

Date samples submitted 2015/06/29

Due date for lab report on SRC 2015/07/15

Data check completed by Alice Liu **Date** 05-Aug-2015

4. CERTIFICATE OF ANALYSIS (COA) LAB QA/QC REPORT

Lab data received (pdf/dbf) with signature?	☒ Yes ☐ No	**Comments**
(Imperial Oil only) Data Quality Waver (DQW) issued?	☐ Yes ☒ No	**If yes, contact PM. DQW *MUST BE* signed and returned to lab in 5 working days.** **Date returned to lab:**
Extractions and analysis conducted within acceptable hold times?	☒ Yes ☐ No	
Lab has warranted all tests were in statistical control? (look for trend rule failure notes)	☒ Yes ☐ No	

Lab QA/QC samples are within Acceptance Criteria?

Instrument Surrogate Recovery	☐ Yes ☐ No ☒ N/A	
Extraction Surrogate Recovery	☒ Yes ☐ No ☐ N/A	
Method Blank Concentration	☒ Yes ☐ No ☐ N/A	
Matrix Duplicate RPD	☒ Yes ☐ No ☐ N/A	Some NC.
Matrix Spike Recovery	☒ Yes ☐ No ☐ N/A	Some NC.
Spiked Blank Recovery	☒ Yes ☐ No ☐ N/A	
Lab Control Sample (LCS) recovery	☐ Yes ☐ No ☒ N/A	

Data check completed by Alice Liu **Date** 05-Aug-2015

WorleyParsons
resources & energy

Laboratory Report Data Checklist

Both Database and Project Staff sections to be completed within 5 calendar days of receipt of Lab Confirmation Package and Certificate Of Analysis

PROJECT STAFF TO COMPLETE SECTIONS 3 AND 5 THROUGH 8:

3. SAMPLE RECEIPT CONFIRMATION (SRC) – PART B

SRC cross-checked with program planning / analytical schedule (sample names, analytical packages correct as per schedule)? ☒ Yes ☐ No **Comments**

Data check completed by Stephane Ngueleu **Date** 31-Aug-2015

5. CERTIFICATE OF ANALYSIS (COA) LAB QA/QC REPORT

Lab reports have all the requested packages, on the correct samples? ☒ Yes ☐ No

Detection limits are suitable for the project purpose? (What was requested on the COC and is that correct? Have any been raised?) ☒ Yes ☐ No

Data check completed by Stephane Ngueleu **Date** 31-Aug-2015

6. CERTIFICATE OF ANALYSIS (COA) FIELD DUPLICATES, BLANKS

Field duplicates decoded and RPDs acceptable?	☐ Yes ☐ No ☒ N/A	**Comments**
Trip Blank results acceptable?	☐ Yes ☐ No ☒ N/A	**Comments**
Field Blank results acceptable?	☐ Yes ☐ No ☒ N/A	**Comments**
Equipment Blank results acceptable?	☐ Yes ☐ No ☒ N/A	**Comments**
Correspondence re: lab QA/QC issues attached (and saved under correct job #)?	☐ Yes ☐ No ☒ N/A	**Comments**

Data check completed by Stephane Ngueleu **Date** 31-Aug-2015

7. LAB DATA/FIELD DATA/HISTORICAL DATA CHECKS

Field EC vs. Lab EC RPDs acceptable?	☒ Yes ☐ No ☐ N/A	**Comments**
Field pH vs. Lab pH RPDs acceptable?	☒ Yes ☐ No ☐ N/A	**Comments**
Is lab collected data within acceptable/expected historical ranges (if applicable)? Check against historical data tables if they exist.	☒ Yes ☐ No ☐ N/A	**Comments**

Data check completed by Stephane Ngueleu **Date** 31-Aug-2015

8. CERTIFICATE OF ANALYSIS (COA) RESULTS INTERPRETATION

Are data in this report considered to be Fit for Purpose? ☒ Yes ☐ No

Explain rationale for yes/no:

Request lab to recheck data? If so give details ☐ Yes ☐ No ☐ N/A **Comments**

If Yes, Lab request to recheck must be approved by Project Manager Name: **Date**

Data check completed by **Date**

Appendix 5 Mann-Kendall/Sen's Slope Analysis and Hydrochemical Control Charts

WorleyParsons
resources & energy

Table 5-1

Statistical Analysis

Project No.: 307075-01608-100		Trend Analysis						
Monitoring Station	Parameter	Count	P Value of Two Tailed Test (-)	Inferred Confidence Level (of Trend Present in Data Set) (%)	Slope (mg/L/yr)	Normalized Slope (%/yr)	Meets Trend Assumptions? [3]	Mann-Kendall Trend [2]
MW-01	Chloride	12	0.58	42.0%	0.04	1.19	Y	---
	Fluoride	12	0.27	73.1%	0.00	-2.46	Y	---
	Sulphate	12	0.54	46.3%	-0.13	-0.22	Y	---
	Iron	10	0.11	89.3%	0.04	2.18	Y	---
	Manganese	12	0.01	98.9%	0.01	1.21	Y	---
	Sodium	12	0.45	55.4%	-0.20	-0.55	Y	---
	Total Dissolved Solids	12	0.54	46.5%	-1.37	-0.31	Y	---
	Dissolved Organic Carbon	12	0.17	82.5%	0.04	1.32	Y	---
MW-02	Chloride	12	0.07	92.6%	2.30	10.16	Y	---
	Fluoride	12	0.01	98.9%	0.00	-5.41	Y	---
	Sulphate	12	0.68	32.0%	-1.62	-0.61	Y	---
	Iron	11	0.02	98.0%	0.96	11.28	Y	U
	Manganese	12	0.09	91.4%	-0.03	-6.14	Y	---
	Sodium	12	0.89	10.9%	0.60	0.64	Y	---
	Total Dissolved Solids	12	0.41	59.1%	4.50	0.51	Y	---
	Dissolved Organic Carbon	12	0.17	83.3%	-0.09	-1.74	Y	---
MW-03	Chloride	12	0.00	100.0%	2.17	5.41	Y	---
	Fluoride	12	0.68	32.3%	0.00	-0.86	Y	---
	Sulphate	12	0.24	75.9%	0.90	0.74	Y	---
	Iron	10	0.02	98.0%	0.10	1.95	Y	---
	Manganese	12	0.24	75.6%	0.00	0.77	Y	---
	Sodium	12	0.17	83.1%	-0.42	-0.81	Y	---
	Total Dissolved Solids	12	0.17	83.1%	2.70	0.47	Y	---
	Dissolved Organic Carbon	12	0.73	27.4%	0.02	0.48	Y	---
MW-04	Chloride	12	0.27	72.9%	-1.40	-0.95	Y	---
	Fluoride	12	0.06	93.7%	0.00	-3.35	Y	---
	Sulphate	12	0.03	96.6%	1.13	1.30	Y	---
	Iron	9	0.12	88.2%	0.18	101.92	Y	---
	Manganese	12	0.06	93.6%	0.05	32.42	Y	---
	Sodium	12	0.45	55.1%	-0.58	-1.00	Y	---
	Total Dissolved Solids	12	0.89	11.0%	-0.08	-0.01	Y	---
	Dissolved Organic Carbon	12	0.52	48.0%	0.02	0.65	Y	---
MW-05	Chloride	12	0.00	100.0%	2.02	6.66	Y	---
	Fluoride	12	0.01	99.0%	0.00	-4.59	Y	---
	Sulphate	12	0.01	99.1%	3.18	2.30	Y	---
	Iron	10	0.03	96.8%	0.18	4.94	Y	---
	Manganese	12	0.01	99.4%	0.02	3.39	Y	---
	Sodium	12	0.63	37.0%	-0.07	-0.16	Y	---
	Total Dissolved Solids	12	0.00	99.9%	8.53	1.50	Y	---
	Dissolved Organic Carbon	12	0.89	11.0%	0.01	0.16	Y	---
MW-06	Chloride	12	0.34	66.4%	-0.40	-6.43	Y	---
	Fluoride	12	0.04	96.2%	0.00	-2.41	Y	---
	Sulphate	12	0.19	80.7%	3.80	0.77	Y	---
	Iron	11	0.00	100.0%	0.31	5.59	Y	---
	Manganese	12	0.02	97.7%	0.05	3.46	Y	---
	Sodium	12	0.45	54.9%	-2.56	-1.70	Y	---
	Total Dissolved Solids	12	1.00	0.0%	0.00	0.00	Y	---
	Dissolved Organic Carbon	12	0.63	37.0%	-0.04	-0.61	Y	---
MW-07	Chloride	13	0.43	57.4%	-0.18	-1.41	Y	---
	Fluoride	13	0.95	4.9%	0.00	0.33	Y	---
	Sulphate	13	0.58	41.8%	1.90	0.19	Y	---
	Iron	11	0.10	89.9%	0.20	1.75	Y	---
	Manganese	13	0.54	45.9%	0.00	0.22	Y	---
	Sodium	13	0.62	37.5%	-1.07	-0.40	Y	---
	Total Dissolved Solids	13	1.00	0.0%	-0.65	-0.03	Y	---
	Dissolved Organic Carbon	13	0.56	43.9%	0.00	0.00	Y	---
MW-08	Chloride	12	0.01	99.0%	-0.23	-12.71	Y	---
	Fluoride	12	0.41	59.3%	0.00	-1.49	Y	---
	Sulphate	12	0.73	27.0%	-2.03	-0.63	Y	---
	Iron	10	0.47	52.6%	0.10	1.42	Y	---
	Manganese	12	0.58	41.8%	0.00	-0.43	Y	---
	Sodium	12	0.17	83.3%	-1.49	-1.31	Y	---
	Total Dissolved Solids	12	0.30	69.6%	-6.48	-0.72	Y	---
	Dissolved Organic Carbon	12	1.00	0.0%	0.00	0.00	Y	---
MW-09	Chloride	12	0.30	69.9%	-0.08	-1.47	Y	---
	Fluoride	12	0.22	78.4%	0.00	-1.79	Y	---
	Sulphate	12	0.19	80.7%	1.31	0.41	Y	---
	Iron	11	0.01	98.7%	0.07	3.74	Y	---
	Manganese	12	0.05	95.3%	0.01	1.11	Y	---
	Sodium	12	0.41	59.3%	2.03	0.88	Y	---
	Total Dissolved Solids	12	0.73	27.1%	1.73	0.17	Y	---
	Dissolved Organic Carbon	12	0.54	46.5%	-0.05	-0.85	Y	---
MW-10	Chloride	12	0.37	63.3%	-0.10	-10.73	Y	---
	Fluoride	12	0.27	72.9%	0.00	-1.63	Y	---
	Sulphate	12	0.84	16.3%	-0.19	-0.09	Y	---
	Iron	11	0.02	98.0%	0.07	1.20	Y	---
	Manganese	12	0.22	78.4%	0.00	0.63	Y	---
	Sodium	12	0.68	32.1%	0.16	0.14	Y	---
	Total Dissolved Solids	12	0.58	41.8%	-2.23	-0.27	Y	---
	Dissolved Organic Carbon	12	0.40	59.6%	0.03	0.52	Y	---
MW-11	Chloride	12	0.89	11.0%	0.05	0.49	Y	---
	Fluoride	12	0.84	16.5%	0.00	-0.62	Y	---

Table 5-1

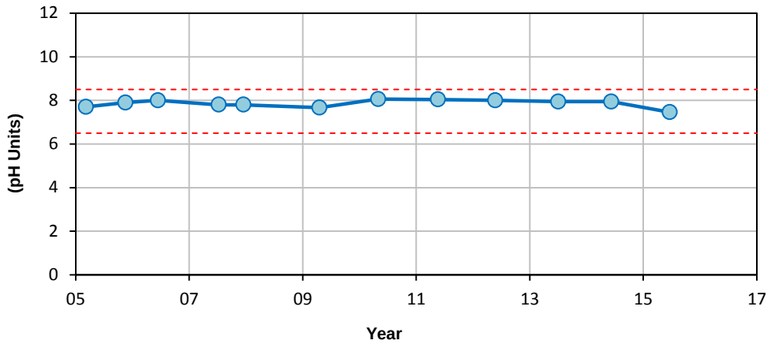
Statistical Analysis

Project No.: 307075-01608-100		Trend Analysis						
Monitoring Station	Parameter	Count	P Value of Two Tailed Test (-)	Inferred Confidence Level (of Trend Present in Data Set) (%)	Slope (mg/L/yr)	Normalized Slope (%/yr)	Meets Trend Assumptions? [3]	Mann-Kendall Trend [2]
MW-12	Sulphate	12	0.05	94.6%	1.84	0.91	Y	---
	Iron	11	0.35	65.0%	0.02	0.28	Y	---
	Manganese	12	0.63	36.9%	0.00	0.18	Y	---
	Sodium	12	0.22	78.4%	0.60	0.65	Y	---
	Total Dissolved Solids	12	0.78	21.7%	-0.64	-0.08	Y	---
	Dissolved Organic Carbon	12	0.06	93.7%	-0.17	-2.62	Y	---
	Chloride	12	0.63	37.0%	0.03	0.39	Y	---
	Fluoride	12	1.00	0.0%	0.00	0.12	Y	---
	Sulphate	12	0.84	16.3%	0.07	0.17	Y	---
	Iron	11	0.09	91.3%	0.07	1.69	Y	---
	Manganese	12	0.04	96.1%	0.01	1.20	Y	---
	Sodium	12	0.73	27.0%	-0.25	-0.24	Y	---
	Total Dissolved Solids	12	0.54	46.3%	-1.41	-0.23	Y	---
	Dissolved Organic Carbon	12	0.62	37.6%	0.06	0.92	Y	---
MW-13	Chloride	12	0.84	16.5%	-0.01	-0.29	Y	---
	Fluoride	12	0.58	41.9%	0.00	-0.67	Y	---
	Sulphate	12	0.58	41.8%	0.05	0.49	Y	---
	Iron	11	0.07	93.0%	0.02	1.78	Y	---
	Manganese	12	0.07	92.6%	0.00	-0.65	Y	---
	Sodium	12	0.62	37.8%	-0.07	-0.07	Y	---
	Total Dissolved Solids	12	0.21	78.7%	-1.69	-0.37	Y	---
	Dissolved Organic Carbon	12	0.73	27.4%	0.01	0.20	Y	---

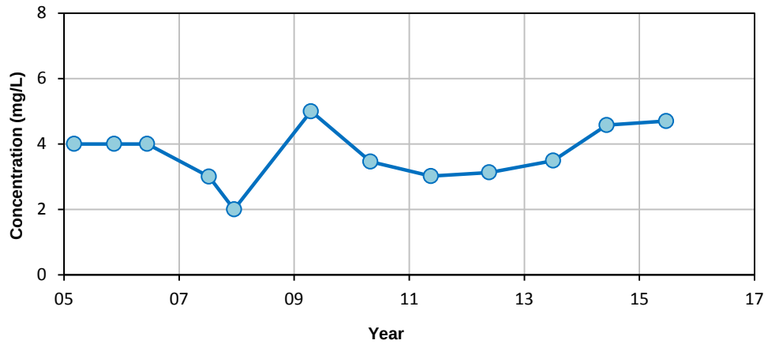
NOTES:

1. *Shading in the parameter column indicates one or more analyses returned notable results (analysis-specific shading is further specified below)*
2. *Trend Analysis:*
   - *Non-detect multiplier of 0.5 applied to <DL sample data*
   - *Statistically signficant trend defined as:*
     - *Inferred confidence level greater than 95% (in other words, P-value of two-tailed test is less than or equal to 0.05)*
     - *Absolute value of Sen's normalized slope is greater than 10%*
     - *Absolute value of Sen's slope is greater than 2 mg/L/yr for chloride, total dissolved solids, sulphate, and sodium; greater than 0.1 mg/L/yr for fluoride, iron, and manganese; and greater than 0.5 mg/L/yr for dissolved organic carbon*
   - *U: Denotes statistically significant upward trend*
   - *D: Denotes statistically significant downward trend*
   - *"---": Denotes no trend*
   - *Shading of trend analysis cells indicates a Mann-Kendall trend has been detected*
3. *Legend for trend assumptions:*
   - *Y: All conditions are met*
   - *N: Not all conditions are met, specified as follows:*
     - *No new data: No sample data present for years reported*
     - *Ins. trend data: Found fewer than 6 data points in the date range specified from which to calculate Mann-Kendall information*
     - *Ins. >DL data: Less than 50% of trend data was above detection limit*
     - *U Trend: An upward Mann-Kendall trend is present*
     - *D Trend: A downward Mann-Kendall trend is present*
     - *Non-Monotonic: Trend is non-monotonic (ie. trend reversal or termination is not present)*
     - *Damaged: The well is damaged*
4. *Anomalous iron concentrations from Spring 2006 at one well (MW-07), from Summer 2007 at one well (MW-04), from Fall 2007 at all wells, and from Spring 2009 at five wells (MW-01, MW-03, MW-04, MW-05, and MW-08) are not included in calculations*
5. *For MW-02, results from 16-June-2014 are not included in calculations as chloride concentrations and ion balance are considered anomalous*

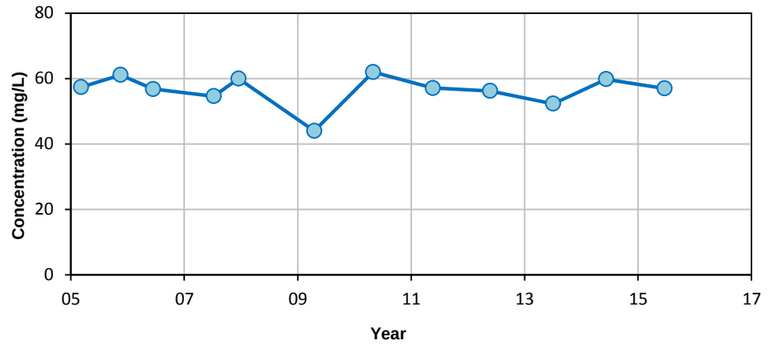
PH (LABORATORY MEASURED)



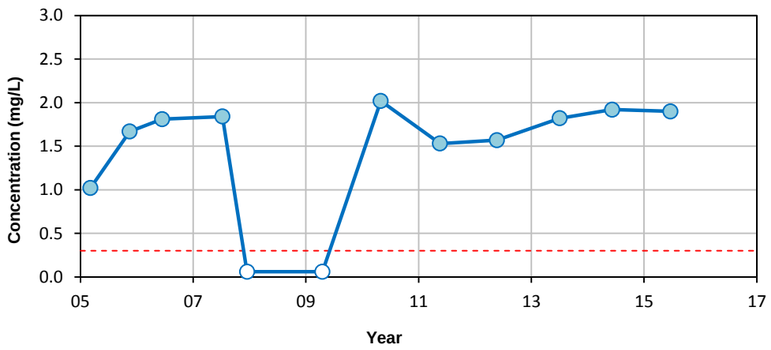
CHLORIDE



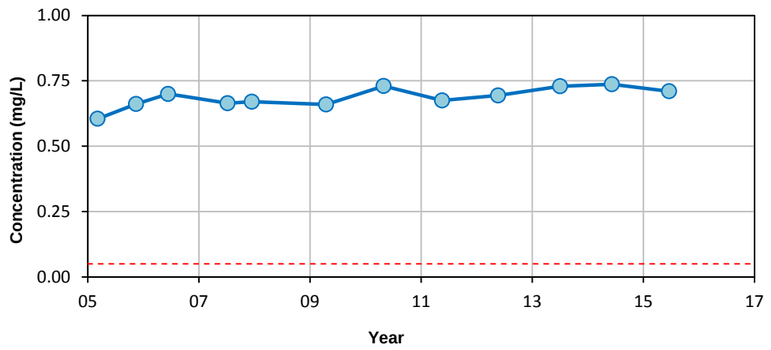
SULPHATE



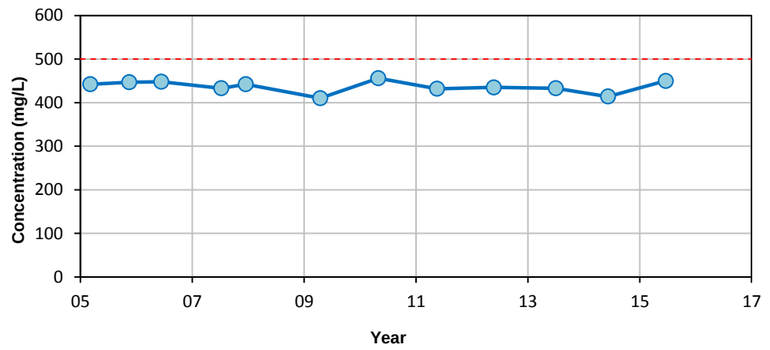
IRON



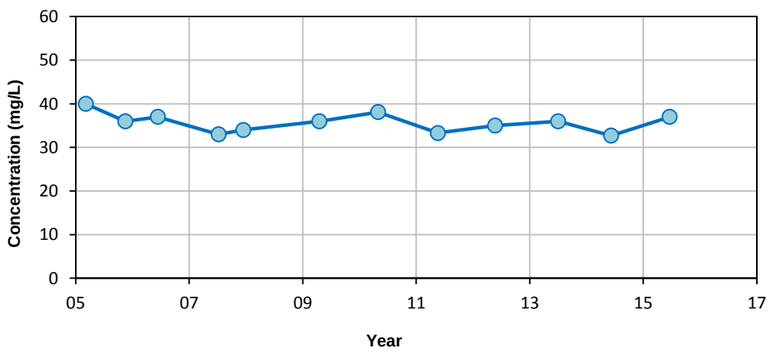
MANGANESE



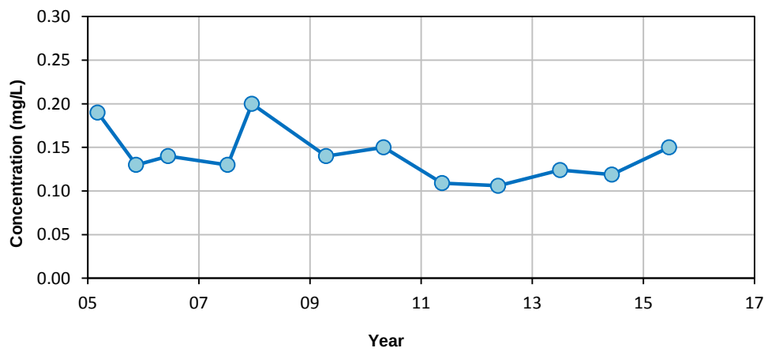
TOTAL DISSOLVED SOLIDS



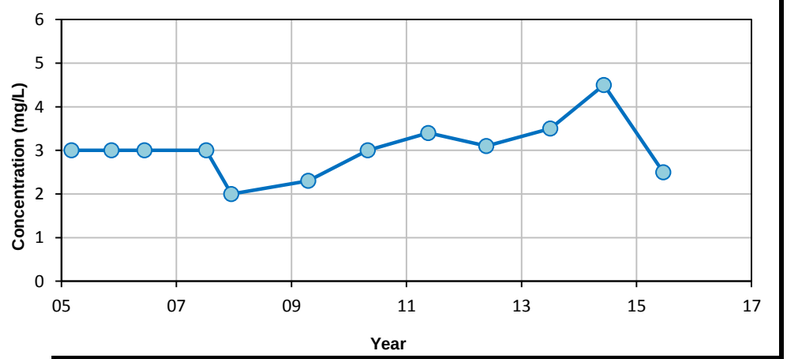
SODIUM



FLUORIDE



DISSOLVED ORGANIC CARBON



Notes:

- Filled symbols denote sample values; unfilled symbols denote values less than detection limit(s)
- Dashed line indicates data gap of more than two years
- Canadian Drinking Water AO Guidelines 2014 :
  - pH: 6.5-8.5 pH Units
  - IRON: 0.3 mg/L
  - SODIUM: 200 mg/L
  - CHLORIDE: 250 mg/L
  - MANGANESE: 0.05 mg/L
  - FLUORIDE: N/A
  - SULPHATE: 500 mg/L
  - TOTAL DISSOLVED SOLIDS: 500 mg/L
  - DISSOLVED ORGANIC CARBON: N/A

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2015 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

HYDROCHEMICAL CONTROL CHARTS
MW-01

Date:	Drawn by:	Edited by:	App'd by:
05-Aug-15	SN		

OneWay to zero harm

WorleyParsons resources & energy

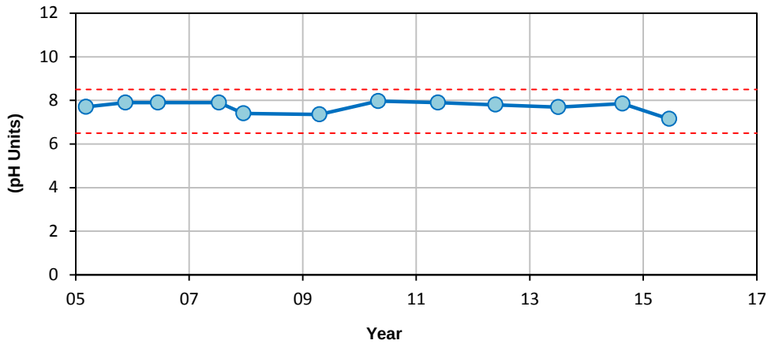
WorleyParsons Project No.: 307075-01608-100

FIG No.: A5-1 REV: A

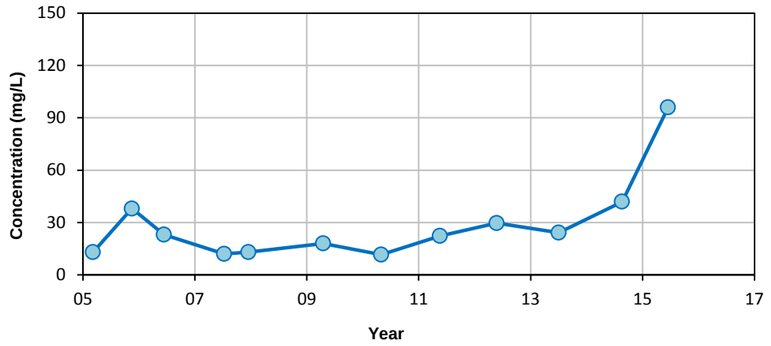
FILE LOCATION: EDMONTON

FILE DIRECTORY: U:\EDM\GBS\307075-01608\100-2015_GWM\12.0_REPORTS\12.3_BACKEND\APP 5- MK AND TRENDCHARTS\EXCEL\

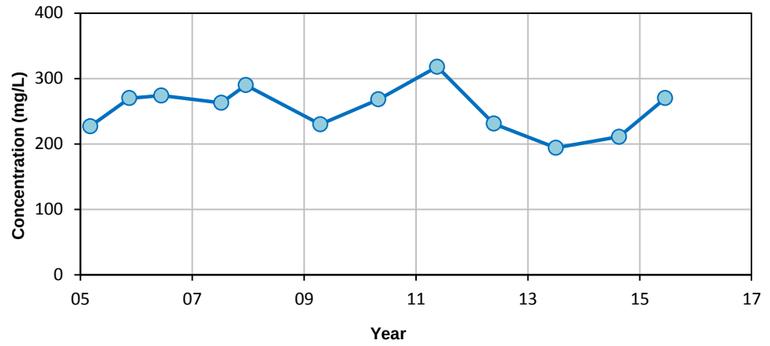
PH (LABORATORY MEASURED)



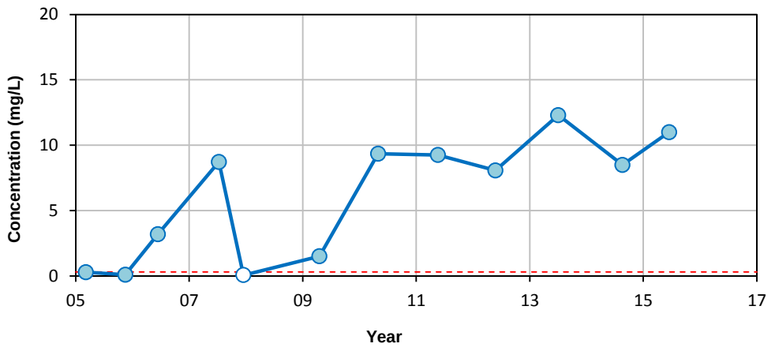
CHLORIDE



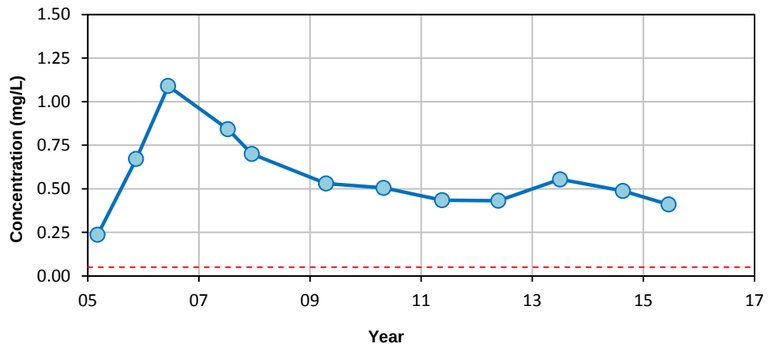
SULPHATE



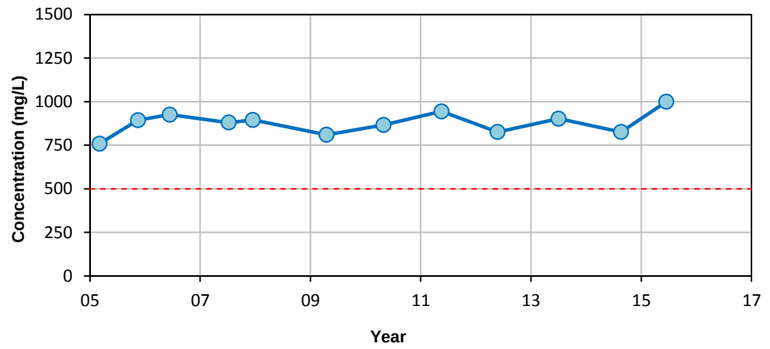
IRON



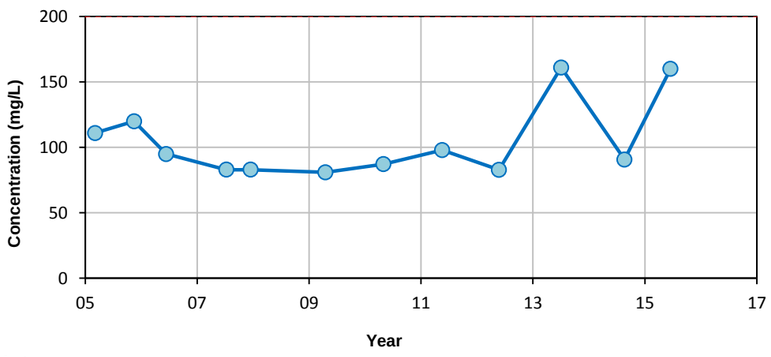
MANGANESE



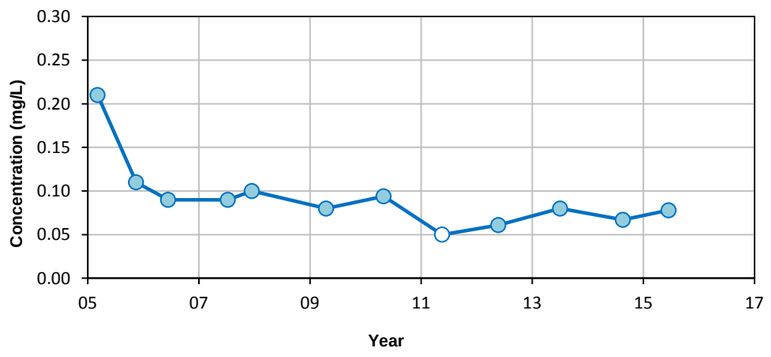
TOTAL DISSOLVED SOLIDS



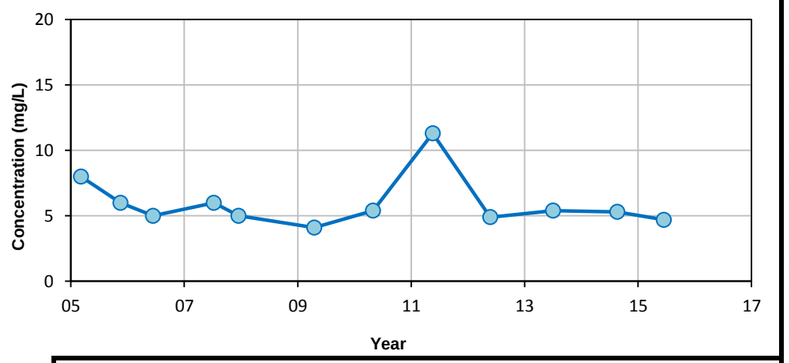
SODIUM



FLUORIDE



DISSOLVED ORGANIC CARBON



Notes:

- Filled symbols denote sample values; unfilled symbols denote values less than detection limit(s)
- Dashed line indicates data gap of more than two years
- Canadian Drinking Water AO Guidelines 2014 :
  - pH: 6.5-8.5 pH Units
  - IRON: 0.3 mg/L
  - SODIUM: 200 mg/L
  - CHLORIDE: 250 mg/L
  - MANGANESE: 0.05 mg/L
  - FLUORIDE: N/A
  - SULPHATE: 500 mg/L
  - TOTAL DISSOLVED SOLIDS: 500 mg/L
  - DISSOLVED ORGANIC CARBON: N/A

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2015 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

HYDROCHEMICAL CONTROL CHARTS
MW-02

Date:	Drawn by:	Edited by:	App'd by:
06-Aug-15	SN		

OneWay to zero harm

WorleyParsons resources & energy

WorleyParsons Project No.: 307075-01608-100

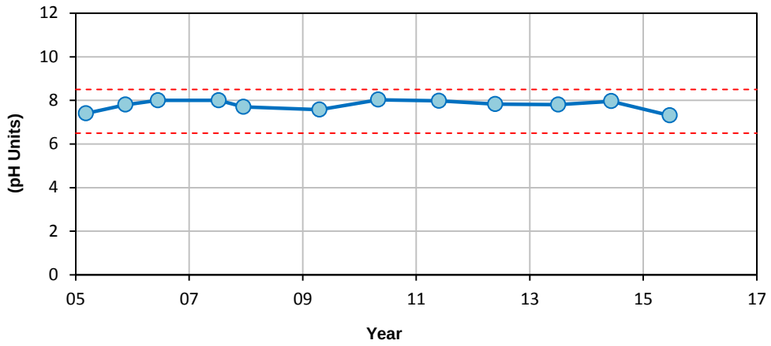
FIG No.: A5-2

REV: A

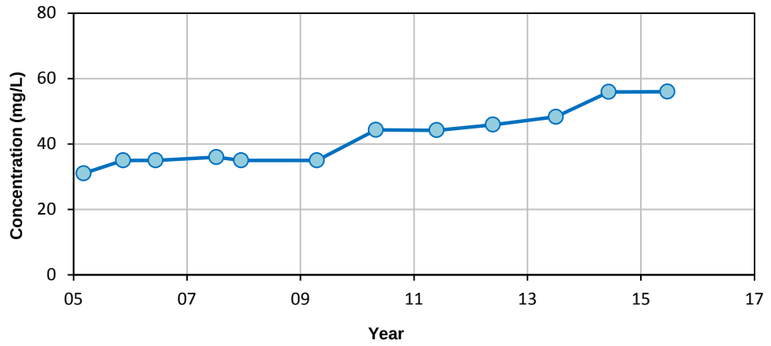
FILE LOCATION: EDMONTON

FILE DIRECTORY: U:\EDM\GBS\307075-01608\100-2015_GWM\12.0_REPORTS\12.3_BACKEND\APP 5- MK AND TRENDCHARTS\EXCEL\

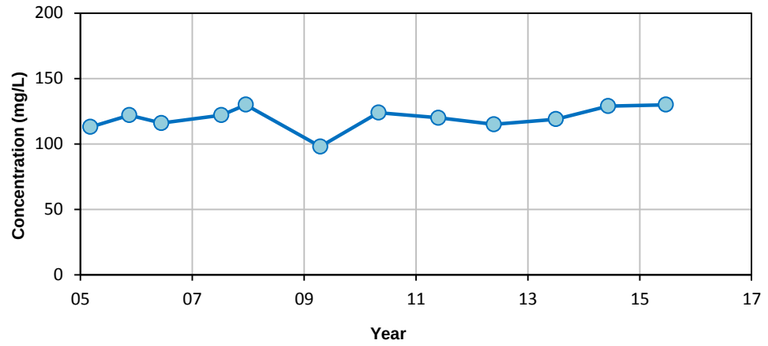
PH (LABORATORY MEASURED)



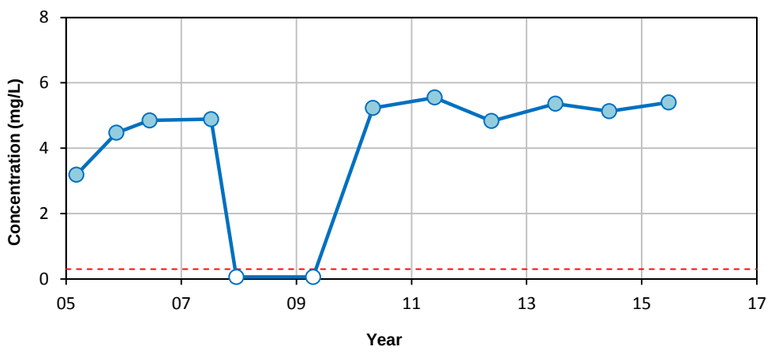
CHLORIDE



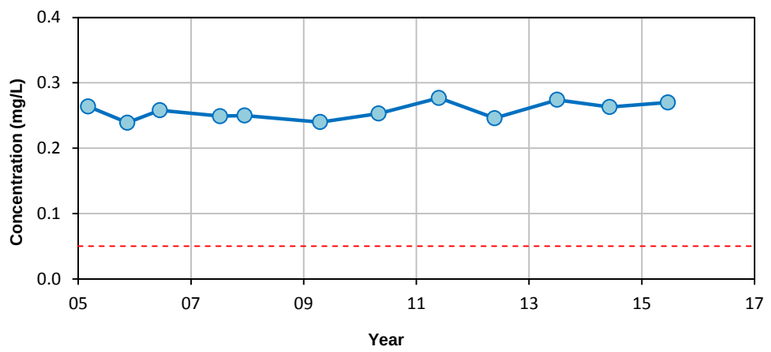
SULPHATE



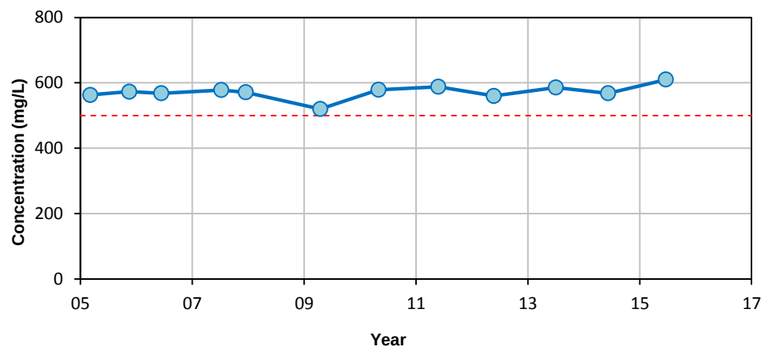
IRON



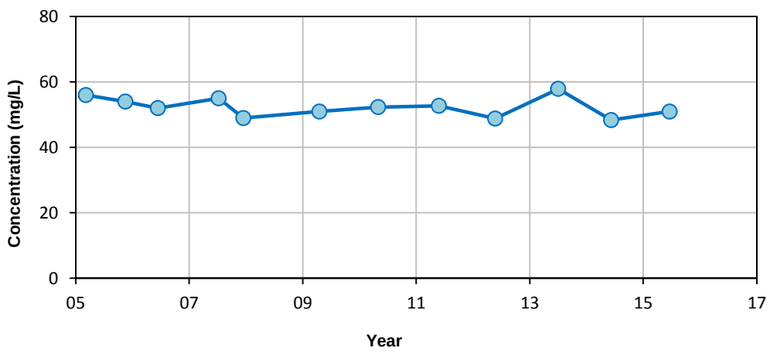
MANGANESE



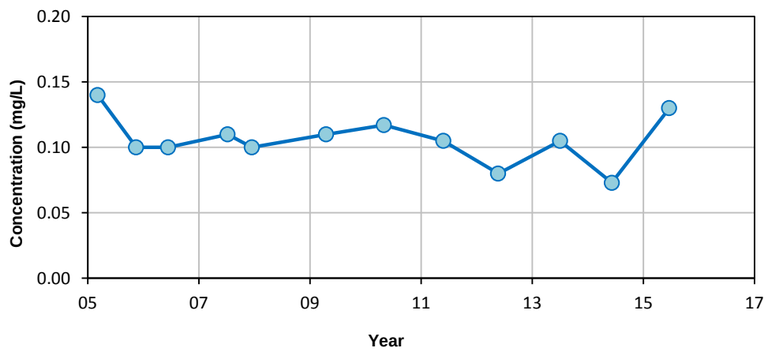
TOTAL DISSOLVED SOLIDS



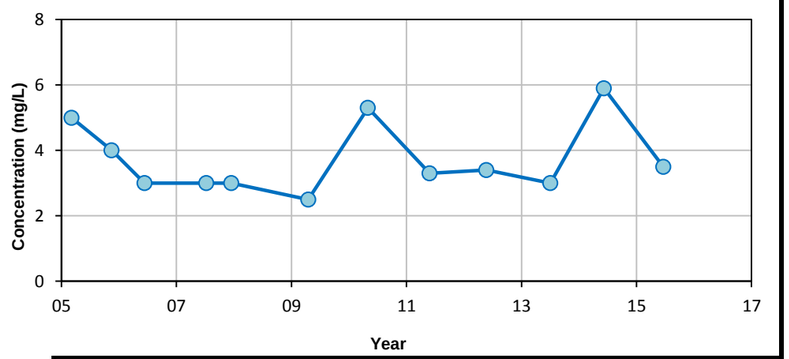
SODIUM



FLUORIDE



DISSOLVED ORGANIC CARBON



Notes:

- Filled symbols denote sample values; unfilled symbols denote values less than detection limit(s)
- Dashed line indicates data gap of more than two years
- Canadian Drinking Water AO Guidelines 2014 :
  - pH: 6.5-8.5 pH Units
  - IRON: 0.3 mg/L
  - SODIUM: 200 mg/L
  - CHLORIDE: 250 mg/L
  - MANGANESE: 0.05 mg/L
  - FLUORIDE: N/A
  - SULPHATE: 500 mg/L
  - TOTAL DISSOLVED SOLIDS: 500 mg/L
  - DISSOLVED ORGANIC CARBON: N/A

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2015 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

HYDROCHEMICAL CONTROL CHARTS
MW-03

Date:	Drawn by:	Edited by:	App'd by:
05-Aug-15	SN		

OneWay to zero harm

WorleyParsons resources & energy

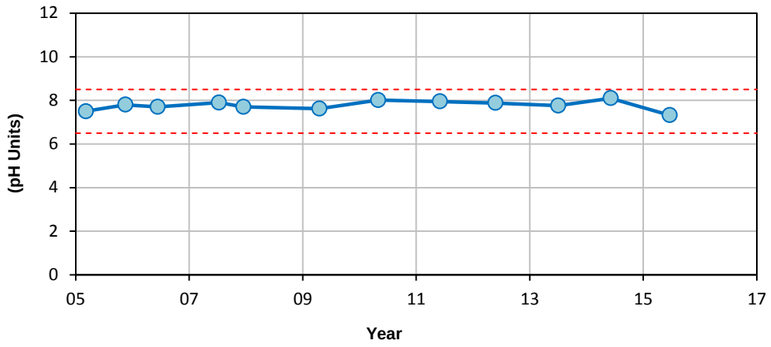
WorleyParsons Project No.: 307075-01608-100

FIG No.: A5-3 REV: A

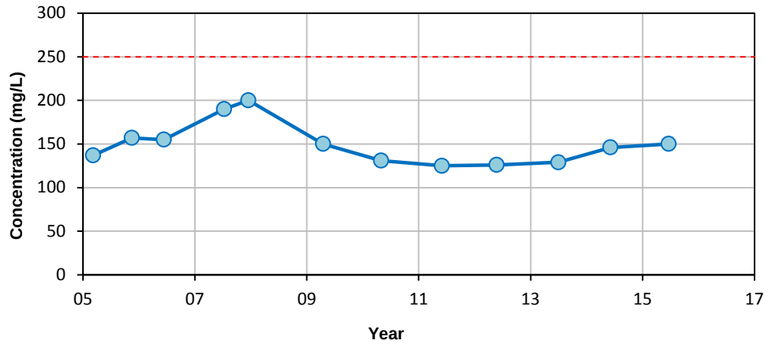
FILE LOCATION: EDMONTON

FILE DIRECTORY: U:\EDM\GBS\307075-01608\100-2015_GWM\12.0_REPORTS\12.3_BACKEND\APP 5- MK AND TRENDCHARTS\EXCEL\

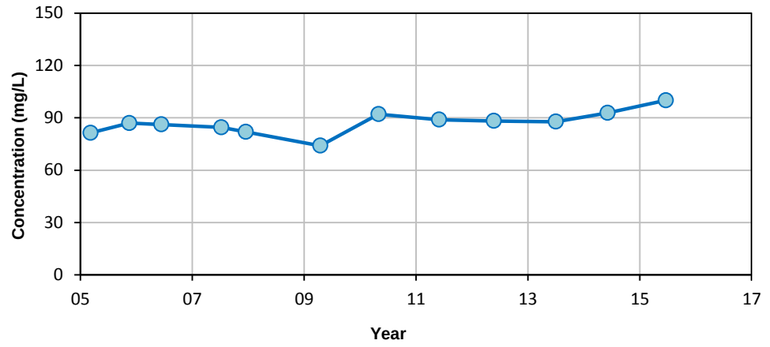
PH (LABORATORY MEASURED)



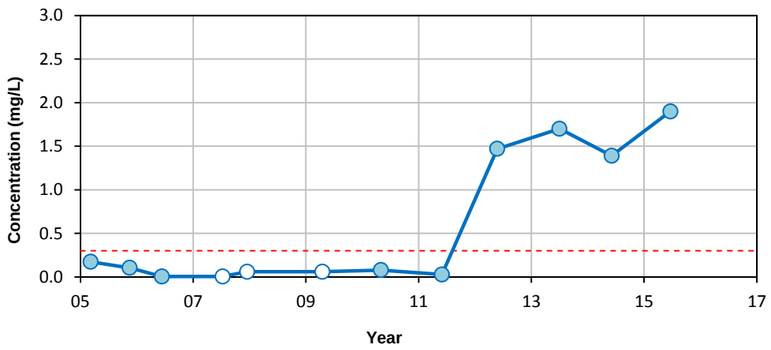
CHLORIDE



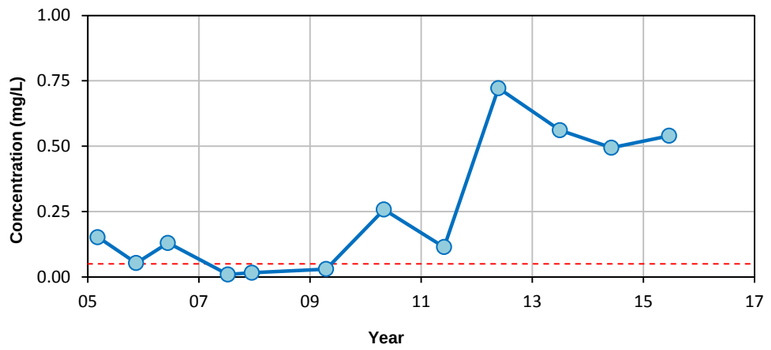
SULPHATE



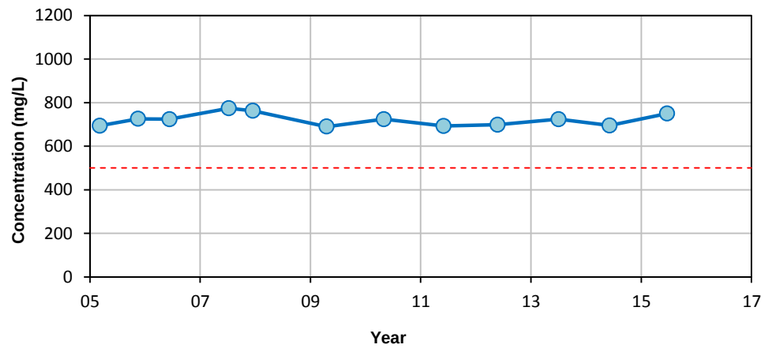
IRON



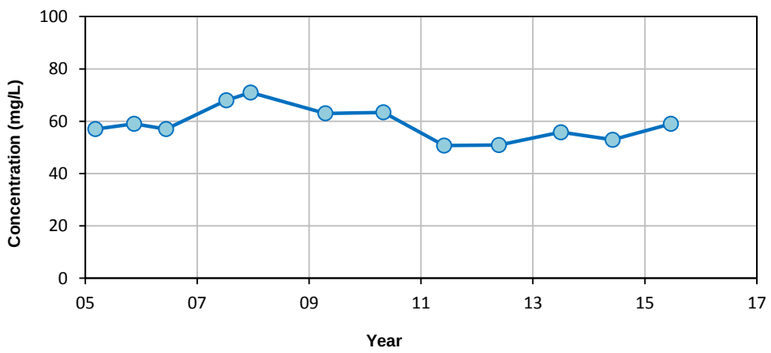
MANGANESE



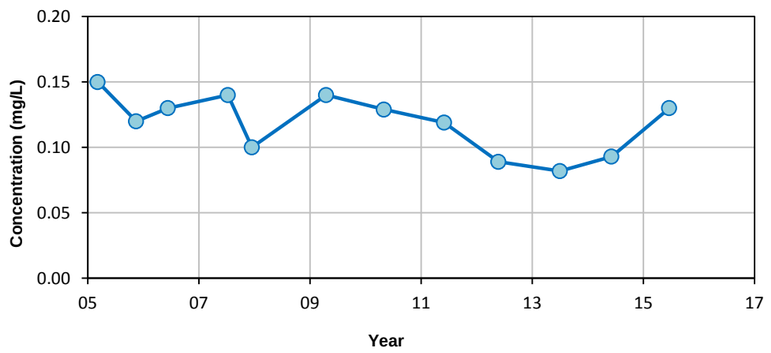
TOTAL DISSOLVED SOLIDS



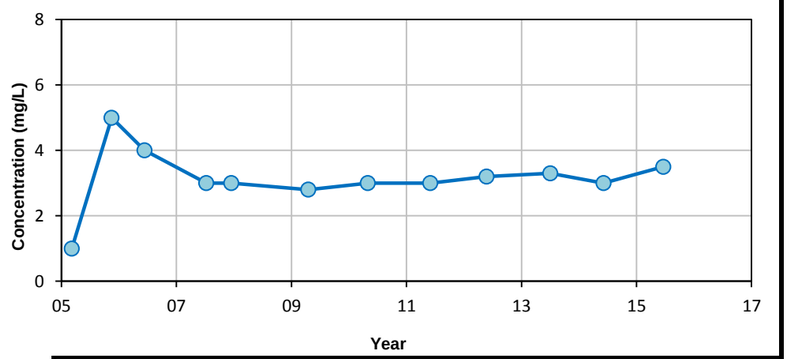
SODIUM



FLUORIDE



DISSOLVED ORGANIC CARBON



Notes:

- Filled symbols denote sample values; unfilled symbols denote values less than detection limit(s)
- Dashed line indicates data gap of more than two years
- Canadian Drinking Water AO Guidelines 2014 :
  - pH: 6.5-8.5 pH Units
  - IRON: 0.3 mg/L
  - SODIUM: 200 mg/L
  - CHLORIDE: 250 mg/L
  - MANGANESE: 0.05 mg/L
  - FLUORIDE: N/A
  - SULPHATE: 500 mg/L
  - TOTAL DISSOLVED SOLIDS: 500 mg/L
  - DISSOLVED ORGANIC CARBON: N/A

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2015 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

HYDROCHEMICAL CONTROL CHARTS
MW-04

Date:	Drawn by:	Edited by:	App'd by:
05-Aug-15	SN		

OneWay to zero harm

WorleyParsons resources & energy

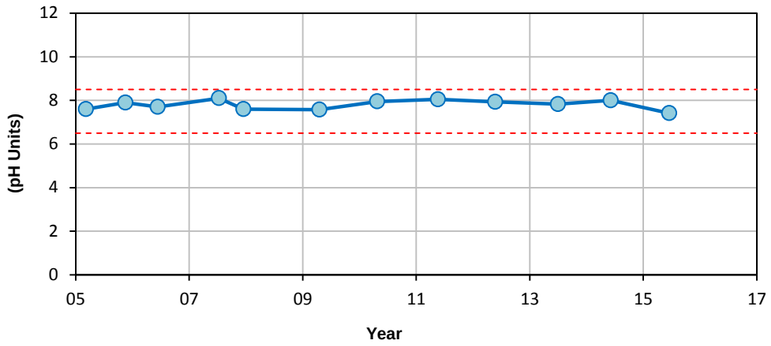
WorleyParsons Project No.: 307075-01608-100

FIG No.: A5-4 REV: A

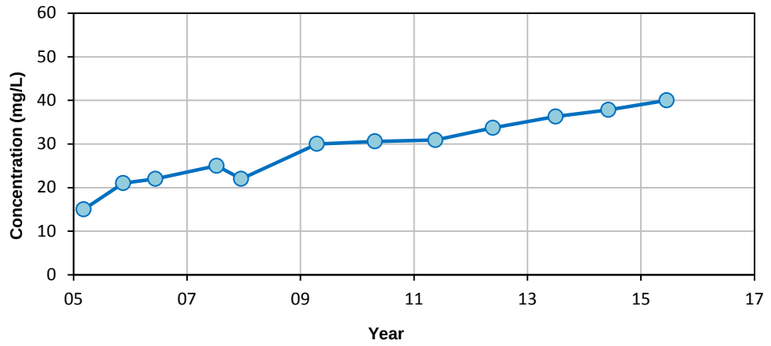
FILE LOCATION: EDMONTON

FILE DIRECTORY: U:\EDM\GBS\307075-01608\100-2015_GWM\12.0_REPORTS\12.3_BACKEND\APP 5- MK AND TRENDCHARTS\EXCEL\

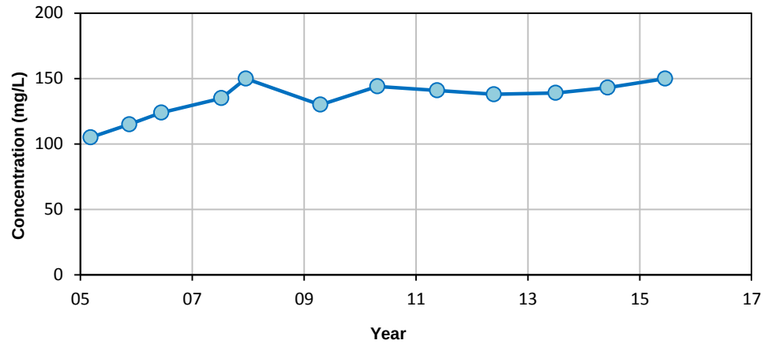
PH (LABORATORY MEASURED)



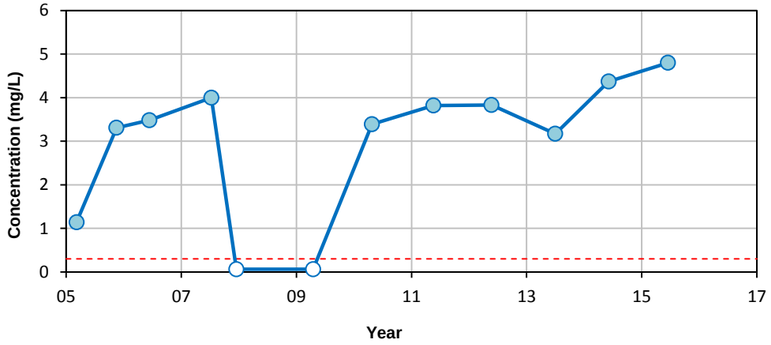
CHLORIDE



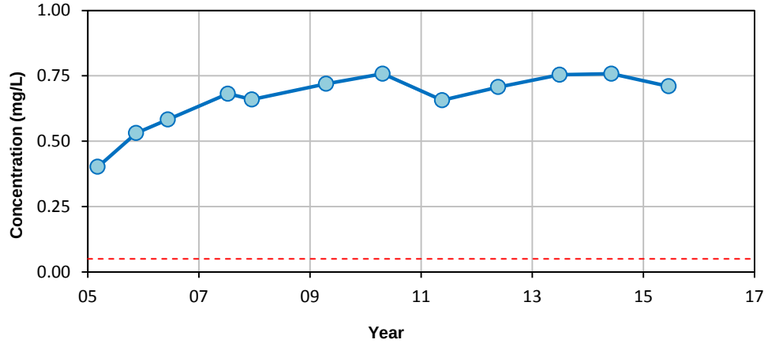
SULPHATE



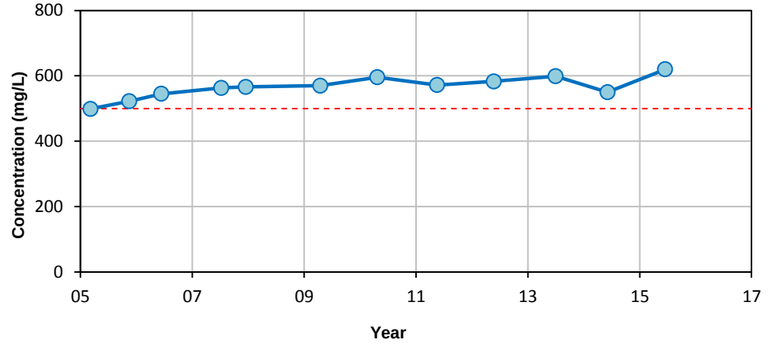
IRON



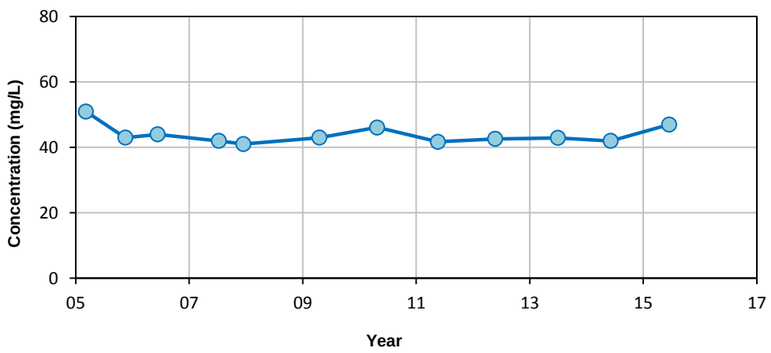
MANGANESE



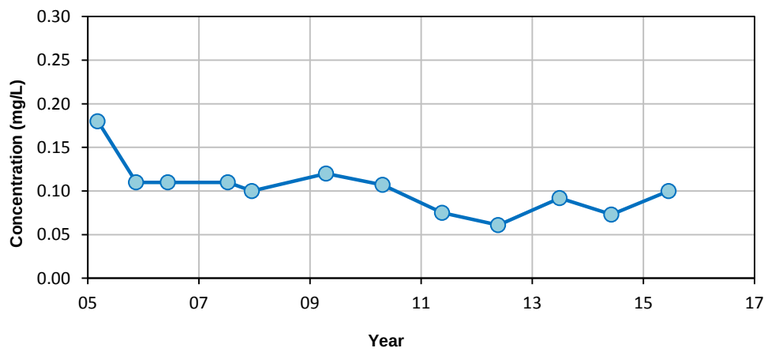
TOTAL DISSOLVED SOLIDS



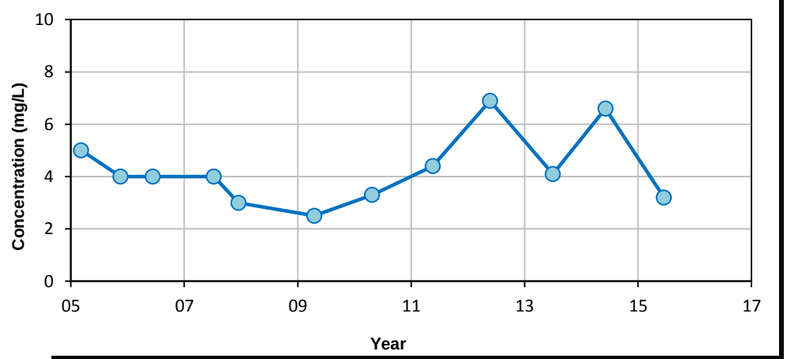
SODIUM



FLUORIDE



DISSOLVED ORGANIC CARBON



Notes:

- Filled symbols denote sample values; unfilled symbols denote values less than detection limit(s)
- Dashed line indicates data gap of more than two years
- Canadian Drinking Water AO Guidelines 2014 :
  - pH: 6.5-8.5 pH Units
  - IRON: 0.3 mg/L
  - SODIUM: 200 mg/L
  - CHLORIDE: 250 mg/L
  - MANGANESE: 0.05 mg/L
  - FLUORIDE: N/A
  - SULPHATE: 500 mg/L
  - TOTAL DISSOLVED SOLIDS: 500 mg/L
  - DISSOLVED ORGANIC CARBON: N/A

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2015 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

HYDROCHEMICAL CONTROL CHARTS
MW-05

Date:	Drawn by:	Edited by:	App'd by:
05-Aug-15	SN		

OneWay to zero harm

WorleyParsons resources & energy

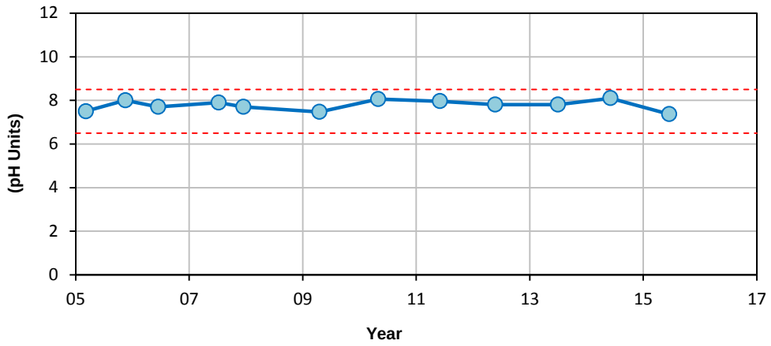
WorleyParsons Project No.: 307075-01608-100

FIG No.: A5-5 REV: A

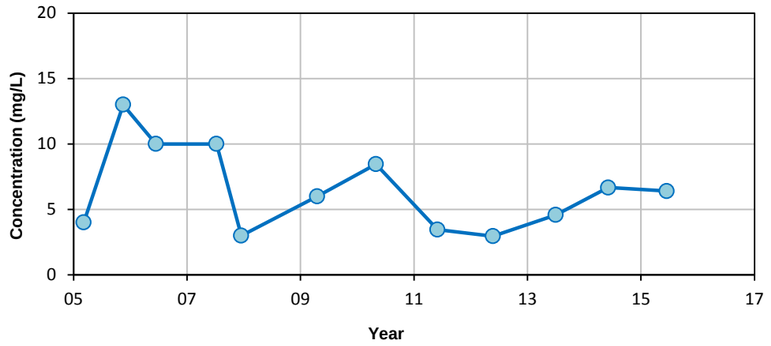
FILE LOCATION: EDMONTON

FILE DIRECTORY: U:\EDM\GBS\307075-01608\100-2015_GWM\12.0_REPORTS\12.3_BACKEND\APP 5- MK AND TRENDCHARTS\EXCEL\

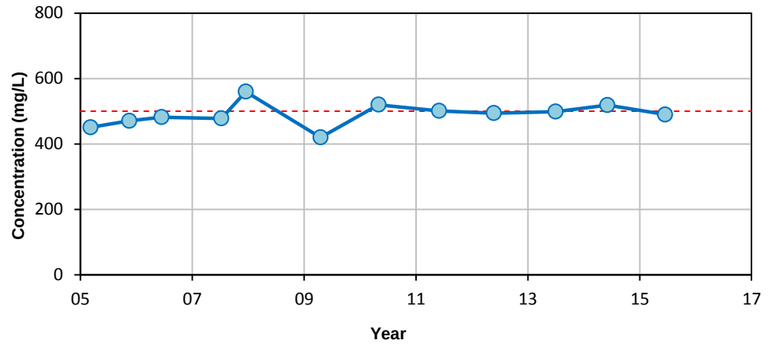
PH (LABORATORY MEASURED)



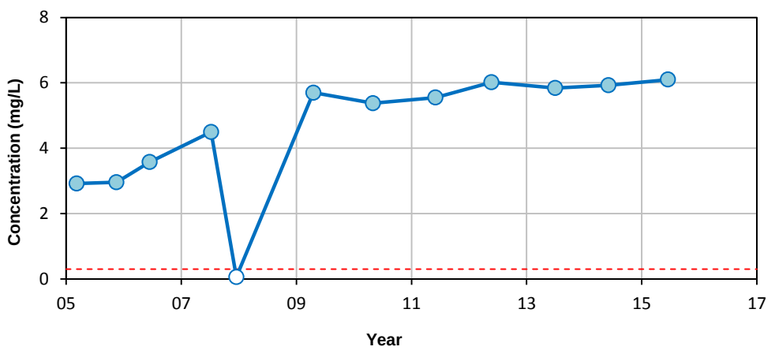
CHLORIDE



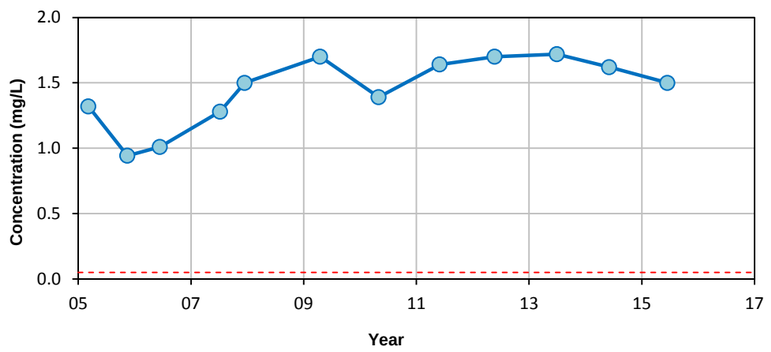
SULPHATE



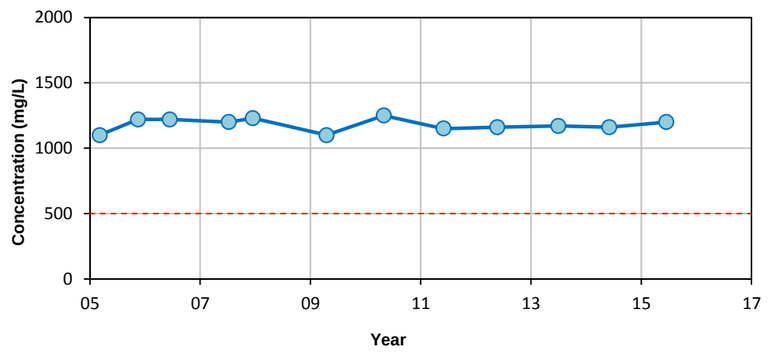
IRON



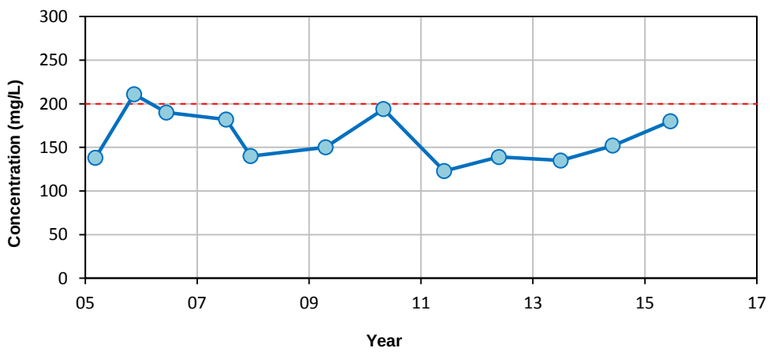
MANGANESE



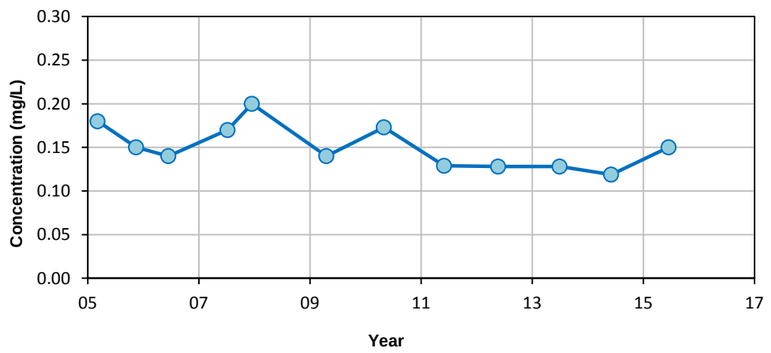
TOTAL DISSOLVED SOLIDS



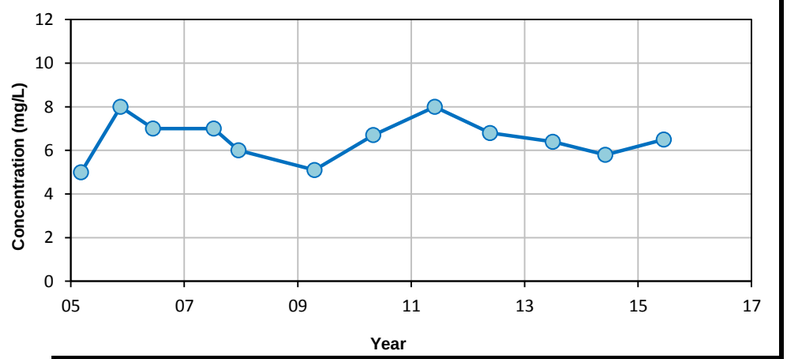
SODIUM



FLUORIDE



DISSOLVED ORGANIC CARBON



Notes:

- Filled symbols denote sample values; unfilled symbols denote values less than detection limit(s)
- Dashed line indicates data gap of more than two years
- Canadian Drinking Water AO Guidelines 2014 :
  - pH: 6.5-8.5 pH Units
  - IRON: 0.3 mg/L
  - SODIUM: 200 mg/L
  - CHLORIDE: 250 mg/L
  - MANGANESE: 0.05 mg/L
  - FLUORIDE: N/A
  - SULPHATE: 500 mg/L
  - TOTAL DISSOLVED SOLIDS: 500 mg/L
  - DISSOLVED ORGANIC CARBON: N/A

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2015 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

HYDROCHEMICAL CONTROL CHARTS
MW-06

Date:	Drawn by:	Edited by:	App'd by:
05-Aug-15	SN		

OneWay to zero harm

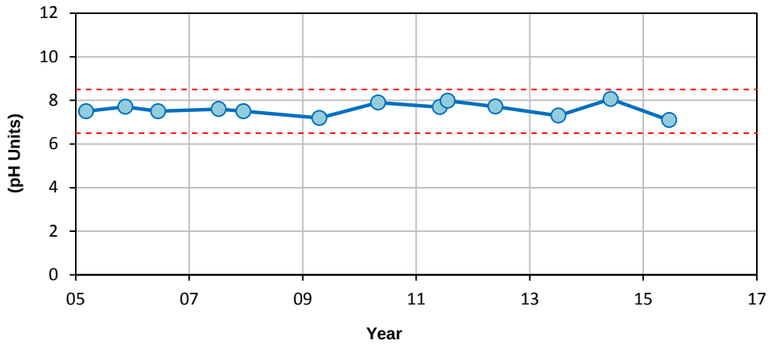
WorleyParsons resources & energy

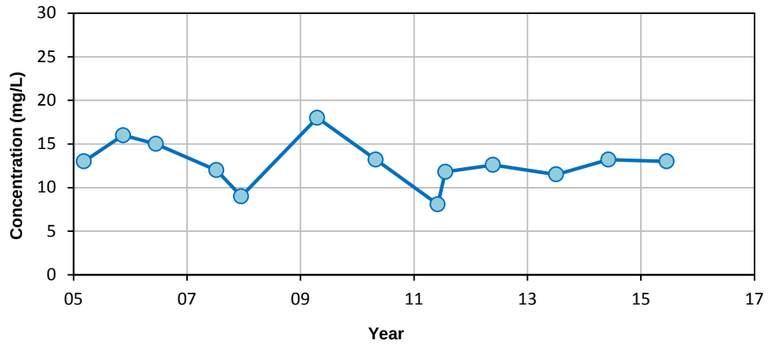
WorleyParsons Project No.: 307075-01608-100

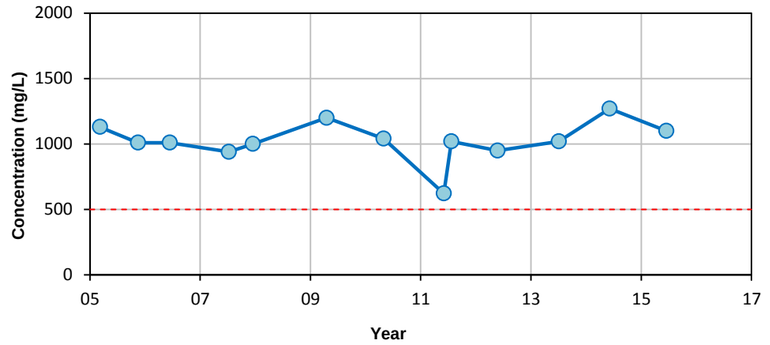
FIG No.: A5-6 REV: A

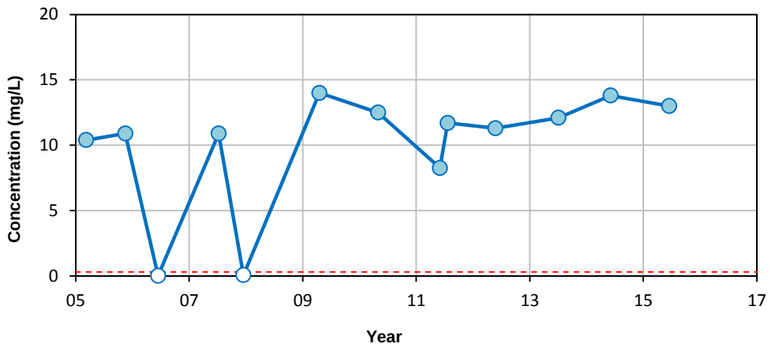
FILE LOCATION: EDMONTON

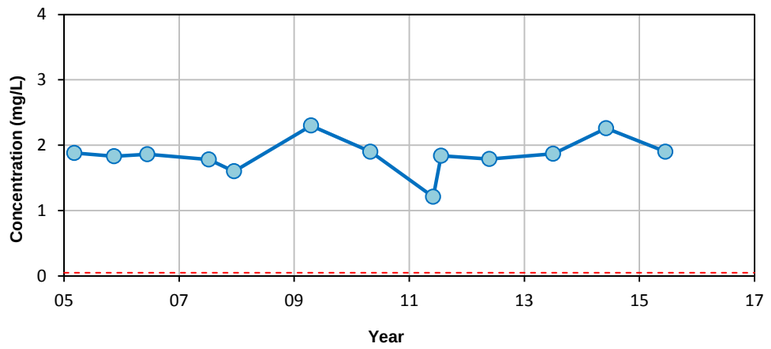
FILE DIRECTORY: U:\EDM\GBS\307075-01608\100-2015_GWM\12.0_REPORTS\12.3_BACKEND\APP 5- MK AND TRENDCHARTS\EXCEL\

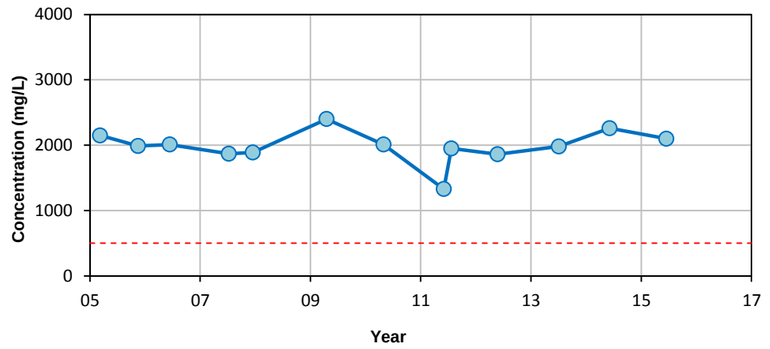


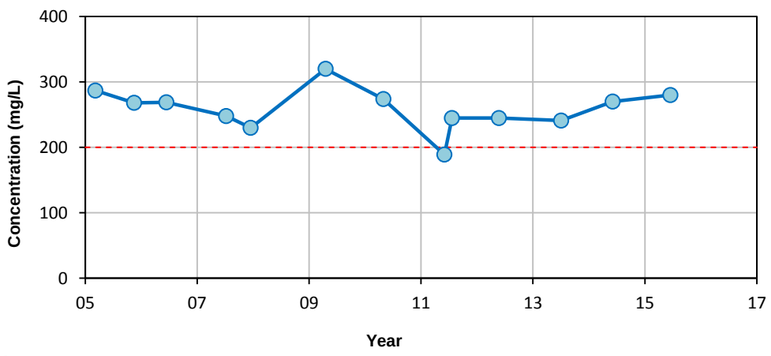


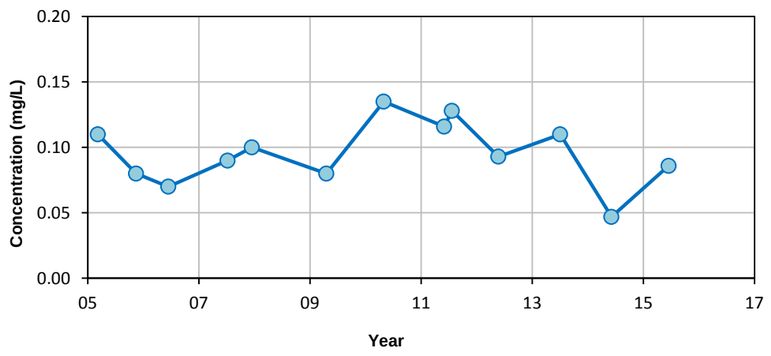


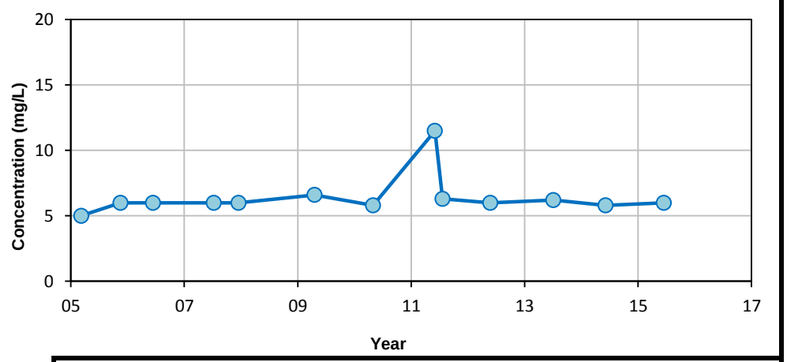












Notes:

- Filled symbols denote sample values; unfilled symbols denote values less than detection limit(s)
- Dashed line indicates data gap of more than two years
- Canadian Drinking Water AO Guidelines 2014 :
  - pH: 6.5-8.5 pH Units
  - IRON: 0.3 mg/L
  - SODIUM: 200 mg/L
  - CHLORIDE: 250 mg/L
  - MANGANESE: 0.05 mg/L
  - FLUORIDE: N/A
  - SULPHATE: 500 mg/L
  - TOTAL DISSOLVED SOLIDS: 500 mg/L
  - DISSOLVED ORGANIC CARBON: N/A

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2015 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

HYDROCHEMICAL CONTROL CHARTS
MW-07

Date:	Drawn by:	Edited by:	App'd by:
05-Aug-15	SN		

WorleyParsons Project No.: 307075-01608-100

FIG No.: A5-7 REV: A

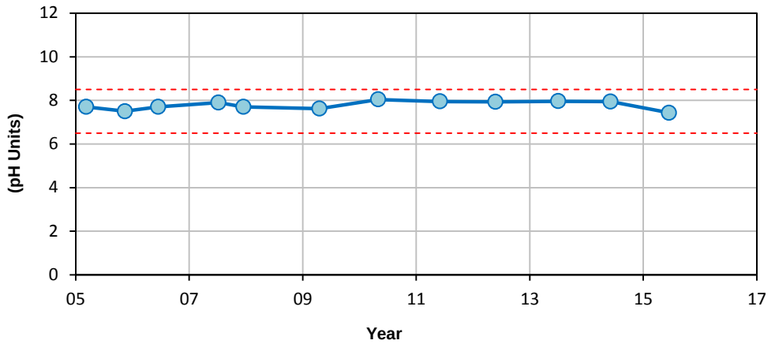
OneWay to zero harm

WorleyParsons resources & energy

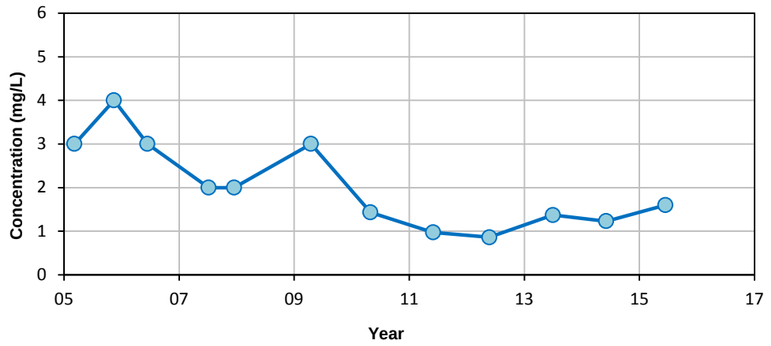
FILE LOCATION: EDMONTON

FILE DIRECTORY: U:\EDM\GBS\307075-01608\100-2015_GWM\12.0_REPORTS\12.3_BACKEND\APP 5- MK AND TRENDCHARTS\EXCEL\

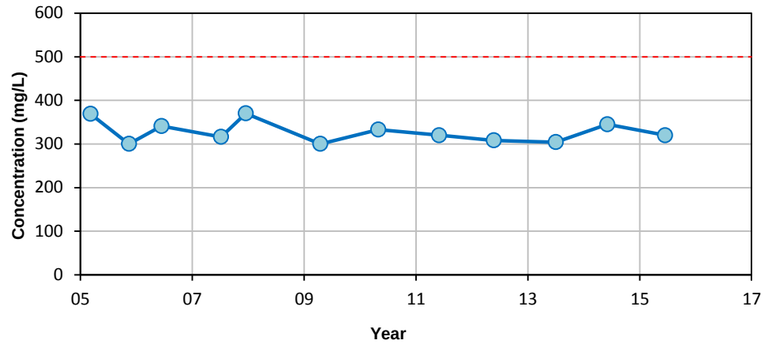
PH (LABORATORY MEASURED)



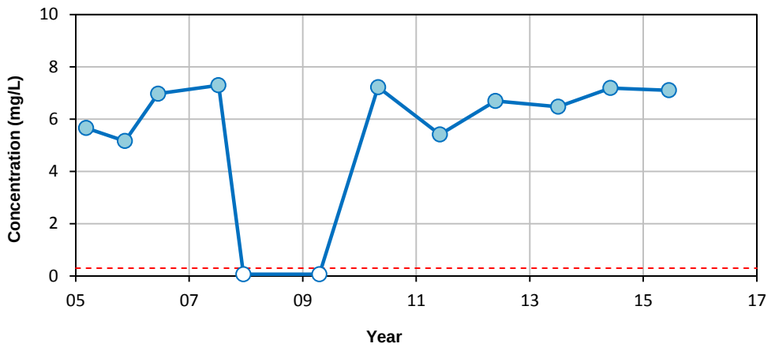
CHLORIDE



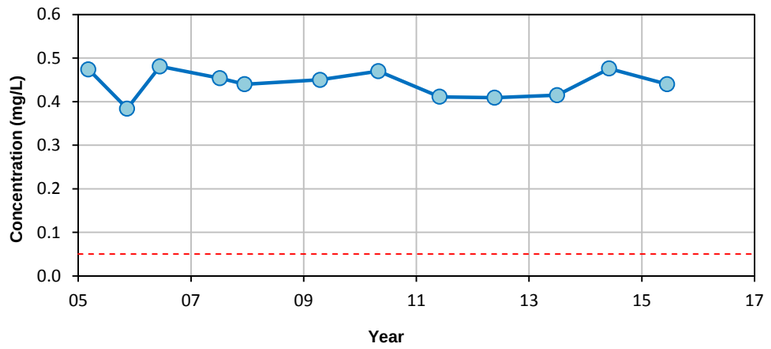
SULPHATE



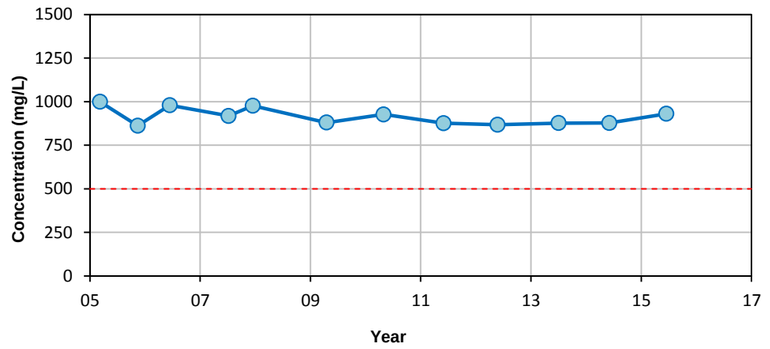
IRON



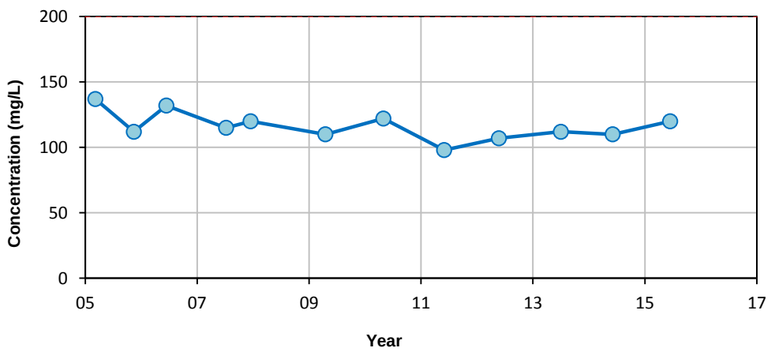
MANGANESE



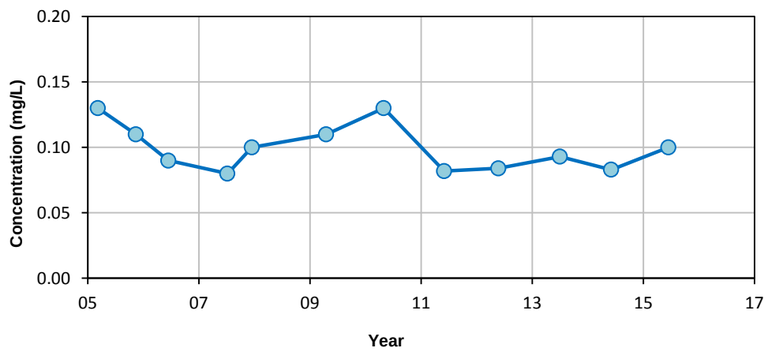
TOTAL DISSOLVED SOLIDS



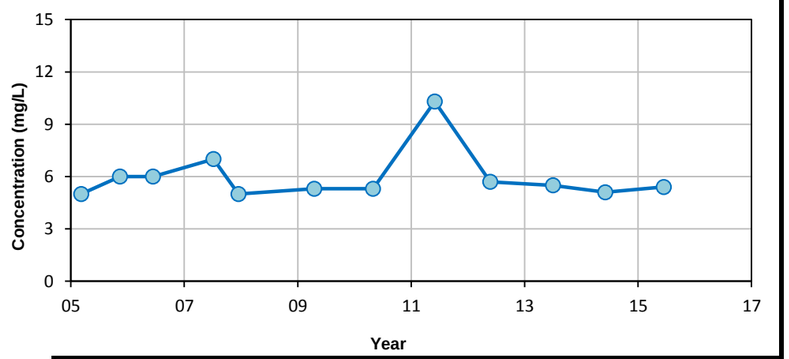
SODIUM



FLUORIDE



DISSOLVED ORGANIC CARBON



Notes:

- Filled symbols denote sample values; unfilled symbols denote values less than detection limit(s)
- Dashed line indicates data gap of more than two years
- Canadian Drinking Water AO Guidelines 2014 :
  - pH: 6.5-8.5 pH Units
  - IRON: 0.3 mg/L
  - SODIUM: 200 mg/L
  - CHLORIDE: 250 mg/L
  - MANGANESE: 0.05 mg/L
  - FLUORIDE: N/A
  - SULPHATE: 500 mg/L
  - TOTAL DISSOLVED SOLIDS: 500 mg/L
  - DISSOLVED ORGANIC CARBON: N/A

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2015 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

HYDROCHEMICAL CONTROL CHARTS
MW-08

Date:	Drawn by:	Edited by:	App'd by:
05-Aug-15	SN		

OneWay to zero harm

WorleyParsons resources & energy

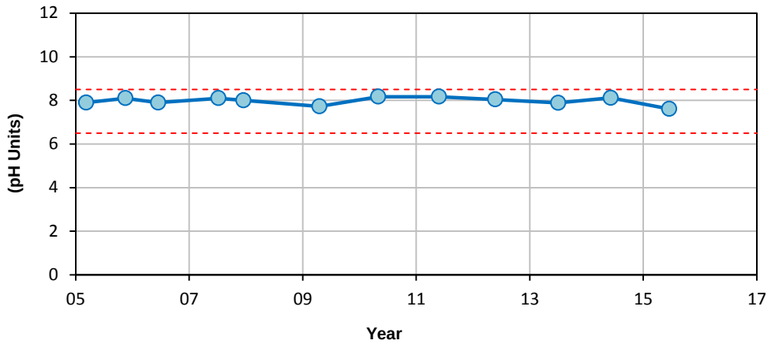
WorleyParsons Project No.: 307075-01608-100

FIG No.: A5-8 REV: A

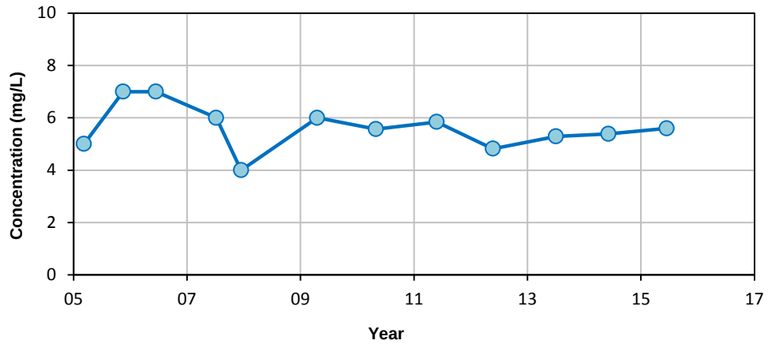
FILE LOCATION: EDMONTON

FILE DIRECTORY: U:\EDM\GBS\307075-01608\100-2015_GWM\12.0_REPORTS\12.3_BACKEND\APP 5- MK AND TRENDCHARTS\EXCEL\

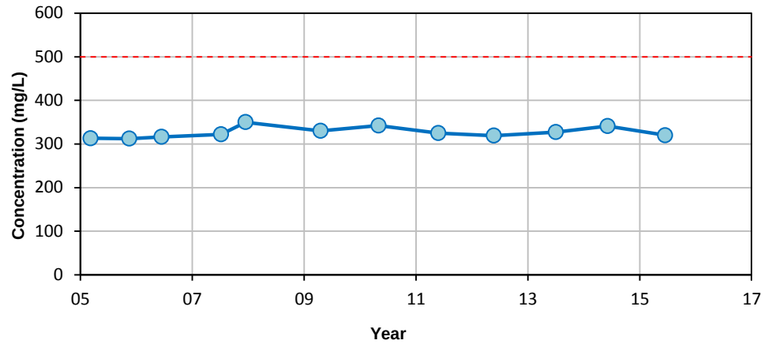
PH (LABORATORY MEASURED)



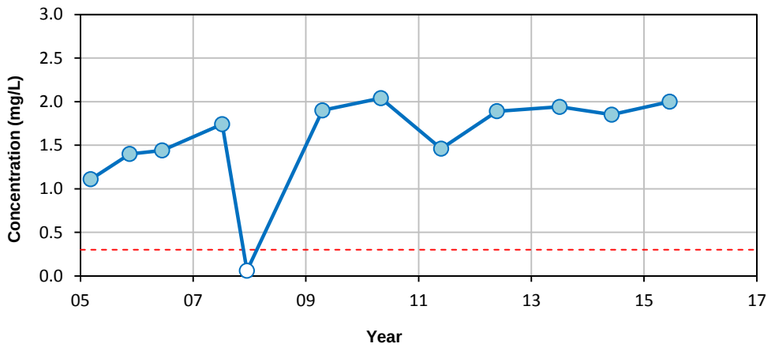
CHLORIDE



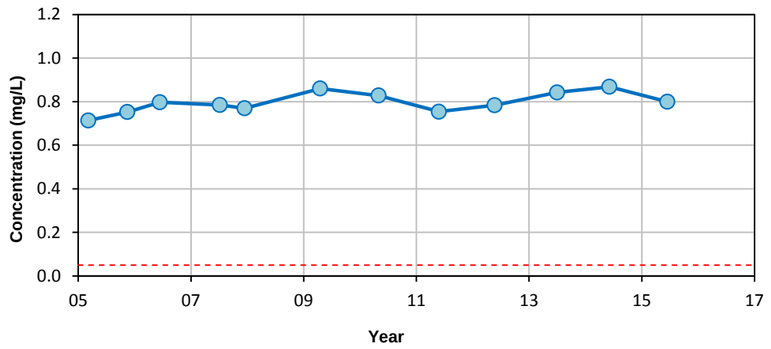
SULPHATE



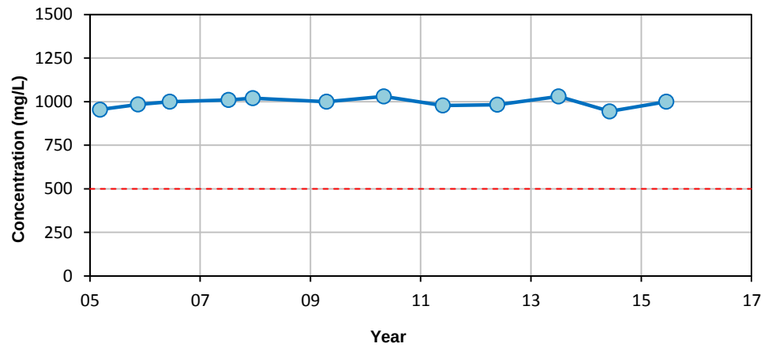
IRON



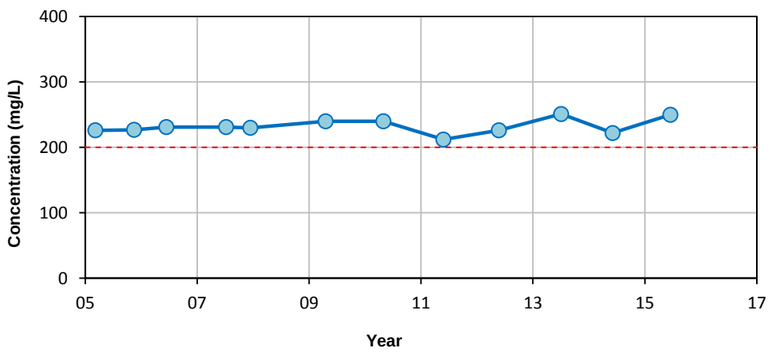
MANGANESE



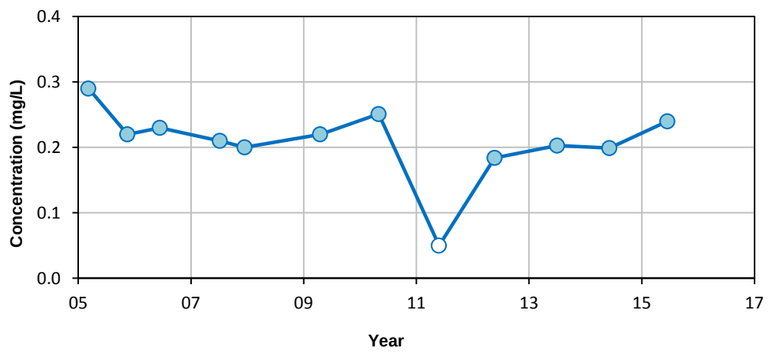
TOTAL DISSOLVED SOLIDS



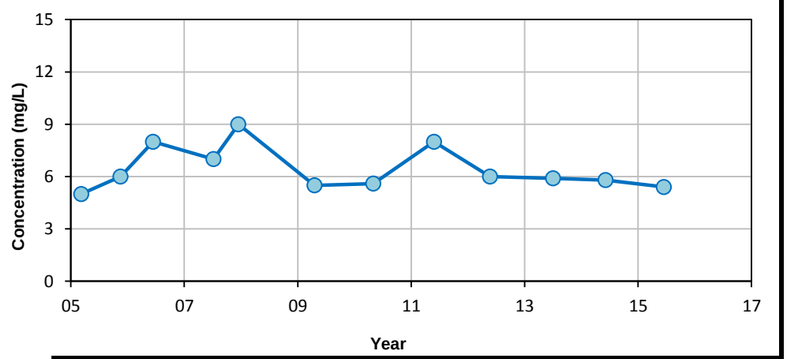
SODIUM



FLUORIDE



DISSOLVED ORGANIC CARBON



Notes:

- Filled symbols denote sample values; unfilled symbols denote values less than detection limit(s)
- Dashed line indicates data gap of more than two years
- Canadian Drinking Water AO Guidelines 2014 :
  - pH: 6.5-8.5 pH Units
  - IRON: 0.3 mg/L
  - SODIUM: 200 mg/L
  - CHLORIDE: 250 mg/L
  - MANGANESE: 0.05 mg/L
  - FLUORIDE: N/A
  - SULPHATE: 500 mg/L
  - TOTAL DISSOLVED SOLIDS: 500 mg/L
  - DISSOLVED ORGANIC CARBON: N/A

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2015 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

HYDROCHEMICAL CONTROL CHARTS
MW-09

Date:	Drawn by:	Edited by:	App'd by:
05-Aug-15	SN		

OneWay to zero harm

WorleyParsons resources & energy

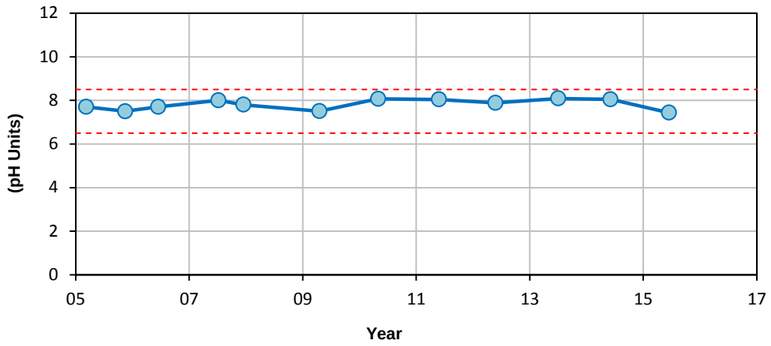
WorleyParsons Project No.: 307075-01608-100

FIG No.: A5-9 REV: A

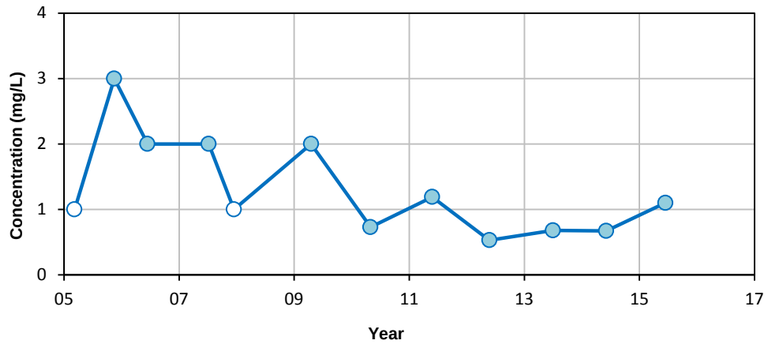
FILE LOCATION: EDMONTON

FILE DIRECTORY: U:\EDM\GBS\307075-01608\100-2015_GWM\12.0_REPORTS\12.3_BACKEND\APP 5- MK AND TRENDCHARTS\EXCEL\

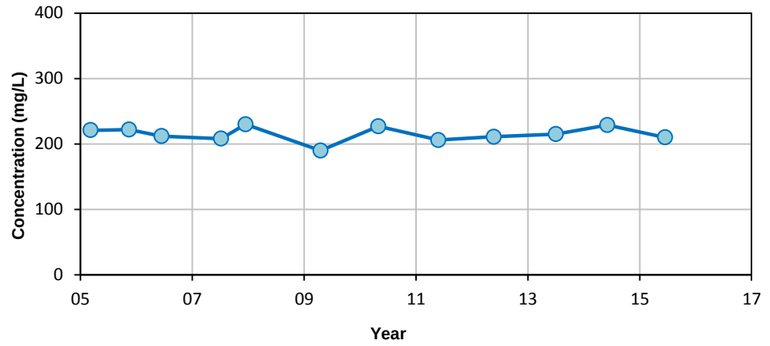
PH (LABORATORY MEASURED)



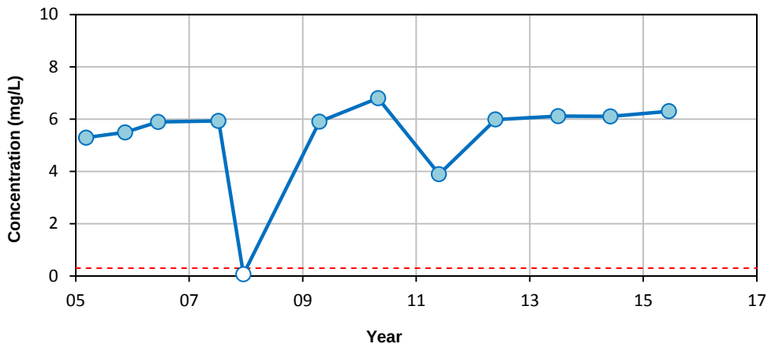
CHLORIDE



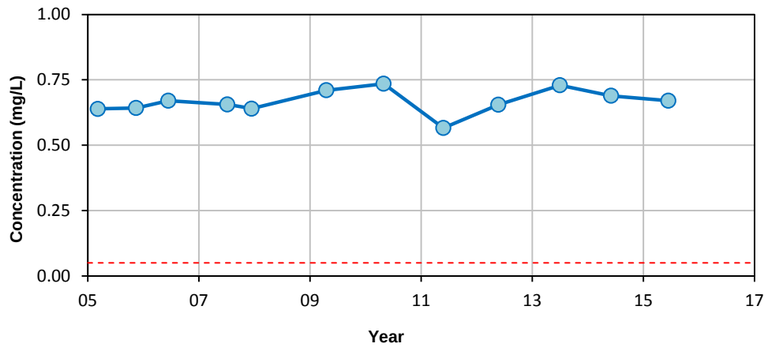
SULPHATE



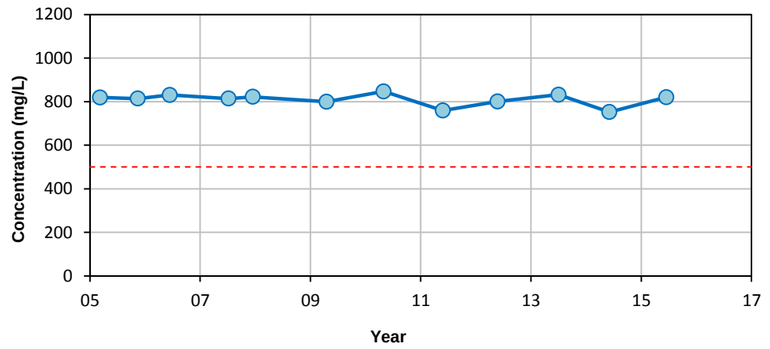
IRON



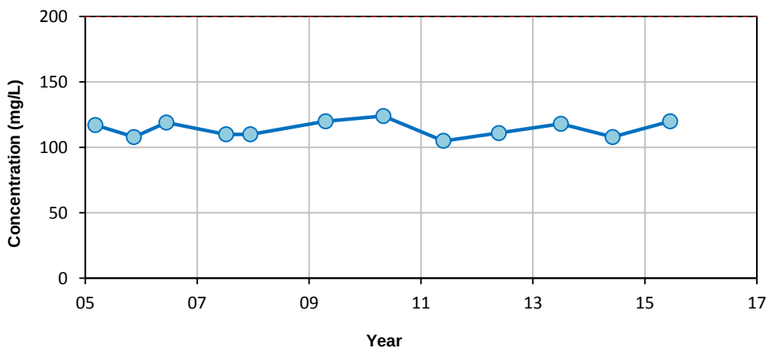
MANGANESE



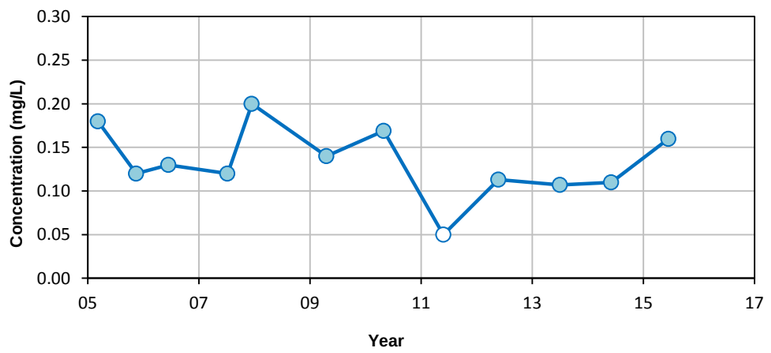
TOTAL DISSOLVED SOLIDS



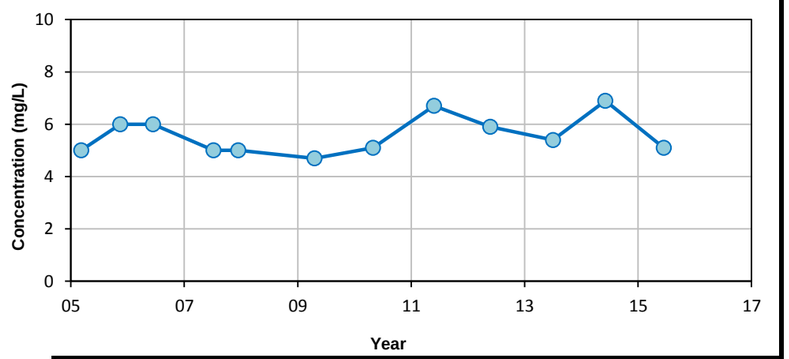
SODIUM



FLUORIDE



DISSOLVED ORGANIC CARBON



Notes:

- Filled symbols denote sample values; unfilled symbols denote values less than detection limit(s)
- Dashed line indicates data gap of more than two years
- Canadian Drinking Water AO Guidelines 2014 :
  - pH: 6.5-8.5 pH Units
  - IRON: 0.3 mg/L
  - SODIUM: 200 mg/L
  - CHLORIDE: 250 mg/L
  - MANGANESE: 0.05 mg/L
  - FLUORIDE: N/A
  - SULPHATE: 500 mg/L
  - TOTAL DISSOLVED SOLIDS: 500 mg/L
  - DISSOLVED ORGANIC CARBON: N/A

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2015 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

HYDROCHEMICAL CONTROL CHARTS
MW-10

Date:	Drawn by:	Edited by:	App'd by:
05-Aug-15	SN		

OneWay to zero harm

WorleyParsons resources & energy

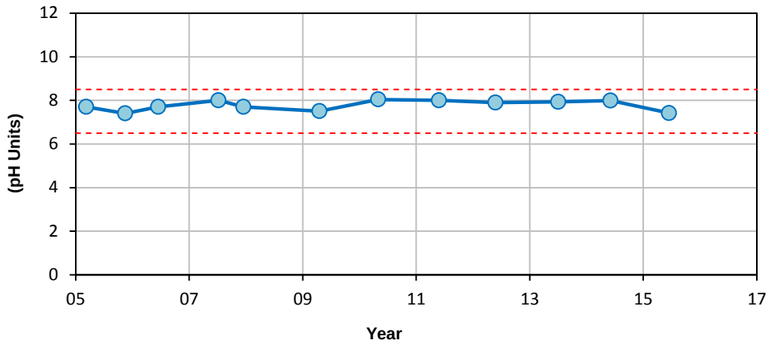
WorleyParsons Project No.: 307075-01608-100

FIG No.: A5-10 REV: A

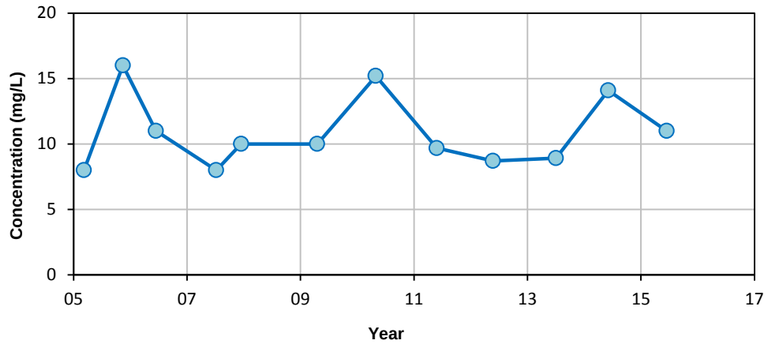
FILE LOCATION: EDMONTON

FILE DIRECTORY: U:\EDM\GBS\307075-01608\100-2015_GWM\12.0_REPORTS\12.3_BACKEND\APP 5- MK AND TRENDCHARTS\EXCEL\

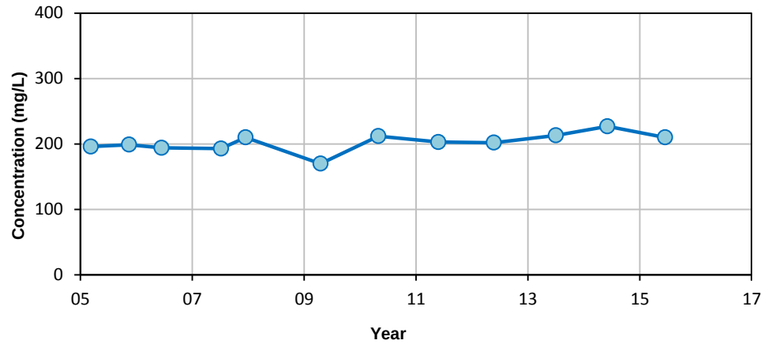
PH (LABORATORY MEASURED)



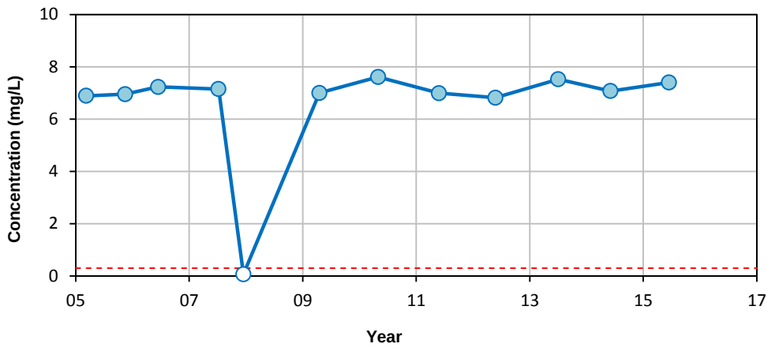
CHLORIDE



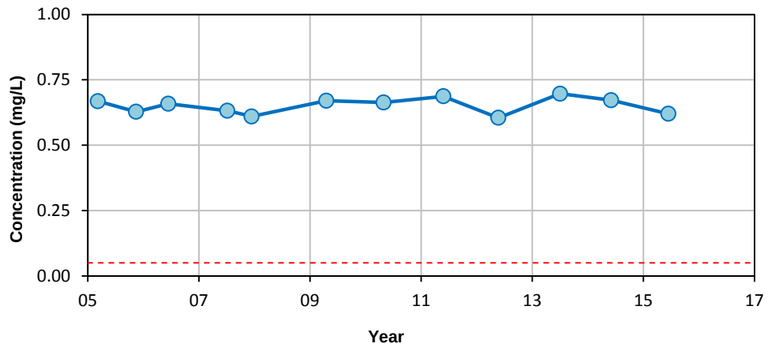
SULPHATE



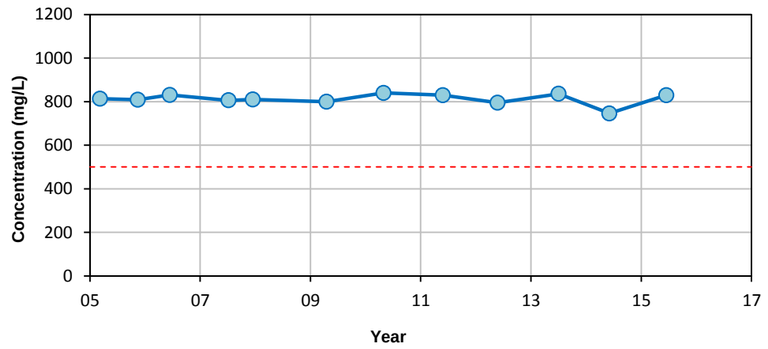
IRON



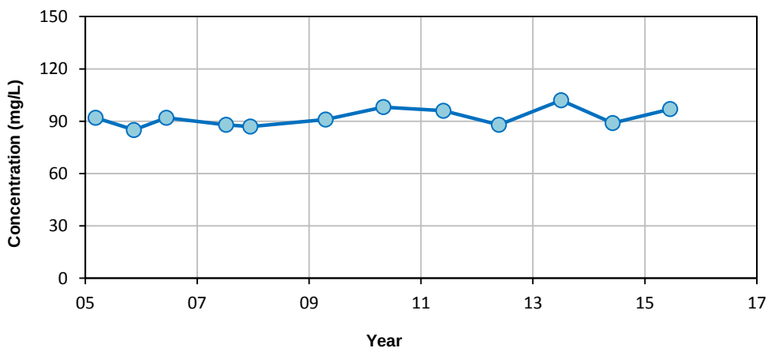
MANGANESE



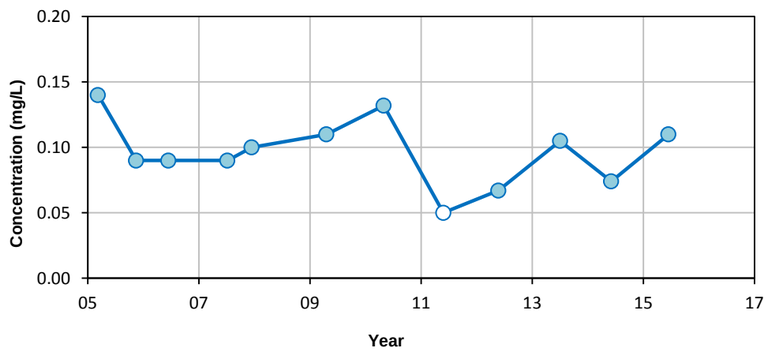
TOTAL DISSOLVED SOLIDS



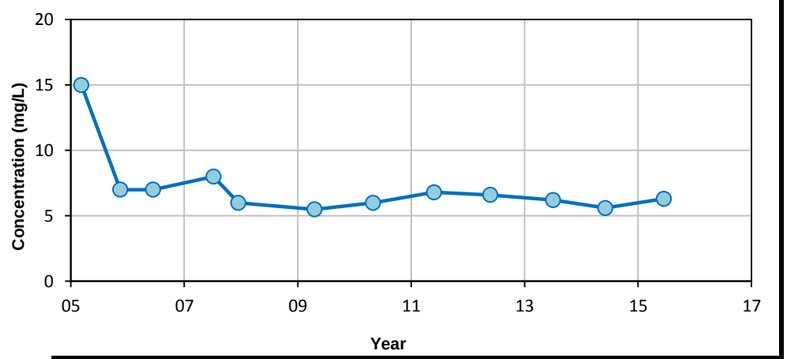
SODIUM



FLUORIDE



DISSOLVED ORGANIC CARBON



Notes:

- Filled symbols denote sample values; unfilled symbols denote values less than detection limit(s)
- Dashed line indicates data gap of more than two years
- Canadian Drinking Water AO Guidelines 2014 :
  - pH: 6.5-8.5 pH Units
  - IRON: 0.3 mg/L
  - SODIUM: 200 mg/L
  - CHLORIDE: 250 mg/L
  - MANGANESE: 0.05 mg/L
  - FLUORIDE: N/A
  - SULPHATE: 500 mg/L
  - TOTAL DISSOLVED SOLIDS: 500 mg/L
  - DISSOLVED ORGANIC CARBON: N/A

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2015 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

HYDROCHEMICAL CONTROL CHARTS
MW-11

Date:	Drawn by:	Edited by:	App'd by:
05-Aug-15	SN		

OneWay to zero harm

WorleyParsons resources & energy

WorleyParsons Project No.: 307075-01608-100

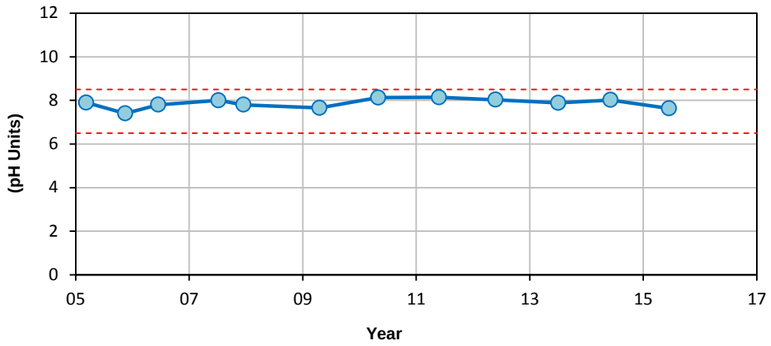
FIG No.: A5-11

REV: A

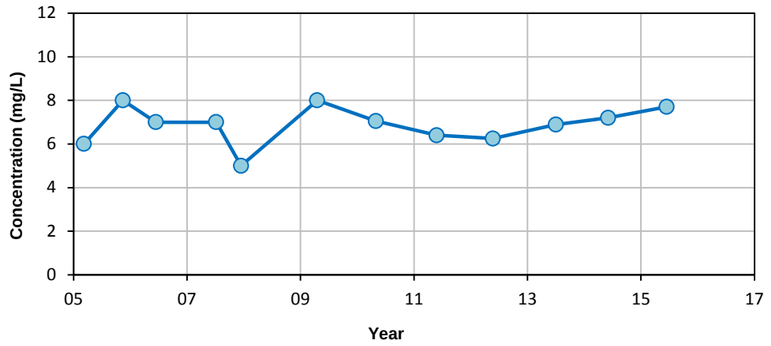
FILE LOCATION: EDMONTON

FILE DIRECTORY: U:\EDM\GBS\307075-01608\100-2015_GWM\12.0_REPORTS\12.3_BACKEND\APP 5- MK AND TRENDCHARTS\EXCEL\

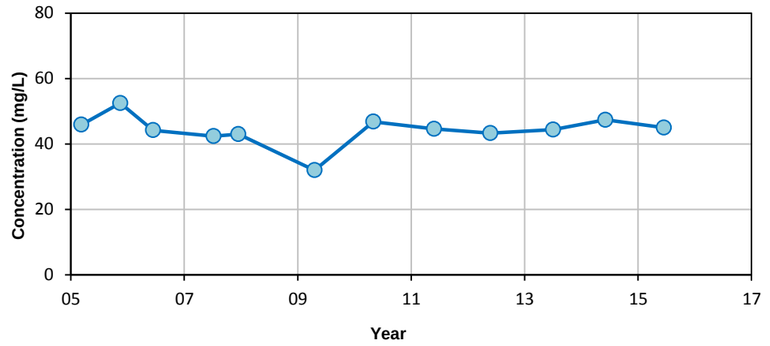
PH (LABORATORY MEASURED)



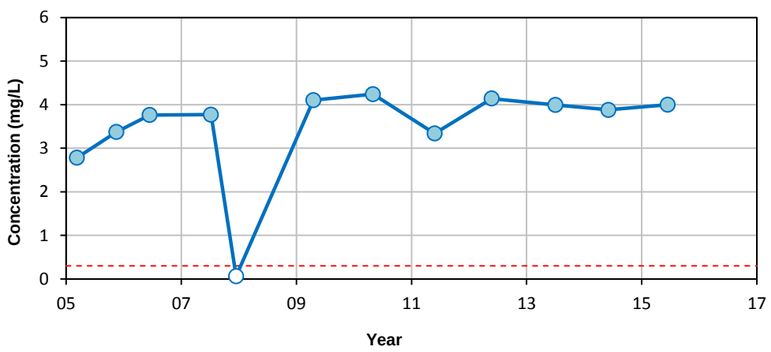
CHLORIDE



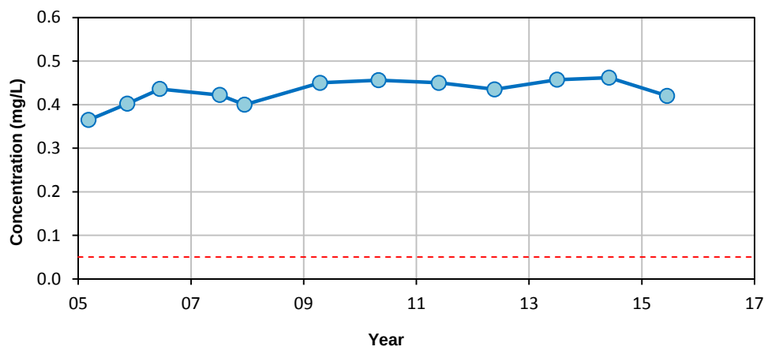
SULPHATE



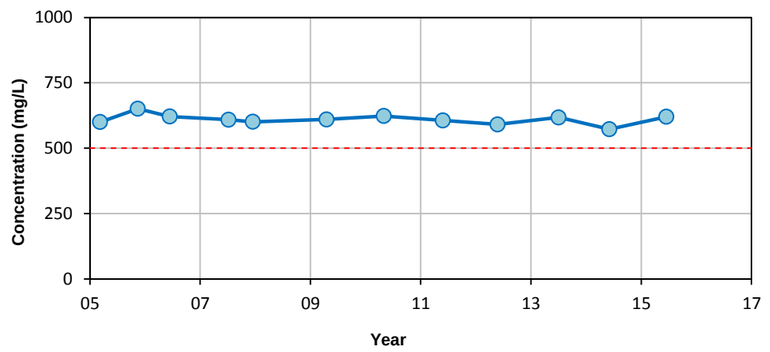
IRON



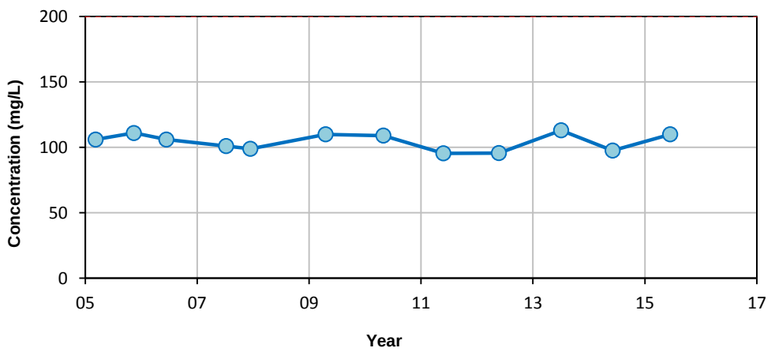
MANGANESE



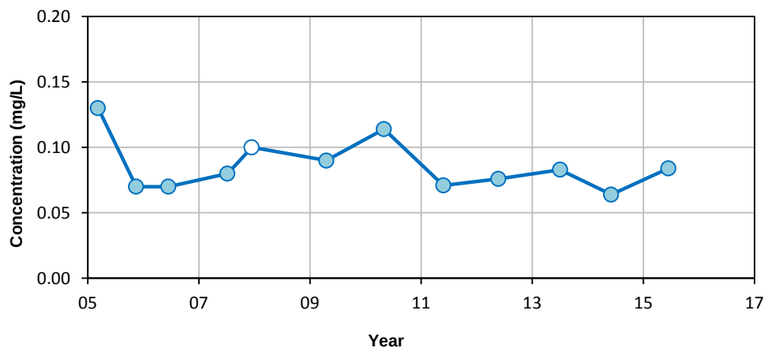
TOTAL DISSOLVED SOLIDS



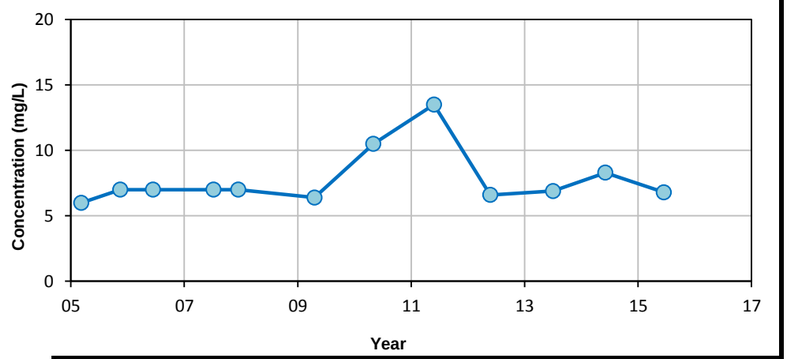
SODIUM



FLUORIDE



DISSOLVED ORGANIC CARBON



Notes:

- Filled symbols denote sample values; unfilled symbols denote values less than detection limit(s)
- Dashed line indicates data gap of more than two years
- Canadian Drinking Water AO Guidelines 2014 :
  - pH: 6.5-8.5 pH Units
  - IRON: 0.3 mg/L
  - SODIUM: 200 mg/L
  - CHLORIDE: 250 mg/L
  - MANGANESE: 0.05 mg/L
  - FLUORIDE: N/A
  - SULPHATE: 500 mg/L
  - TOTAL DISSOLVED SOLIDS: 500 mg/L
  - DISSOLVED ORGANIC CARBON: N/A

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2015 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

HYDROCHEMICAL CONTROL CHARTS
MW-12

OneWay to zero harm

Date:	Drawn by:	Edited by:	App'd by:
05-Aug-15	SN		

WorleyParsons resources & energy

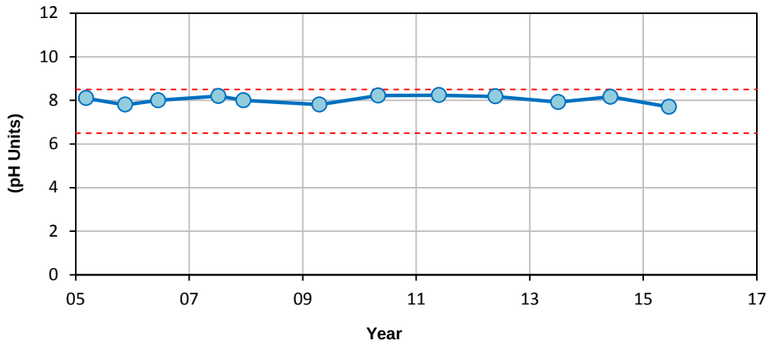
WorleyParsons Project No.: 307075-01608-100

FIG No.: A5-12 REV: A

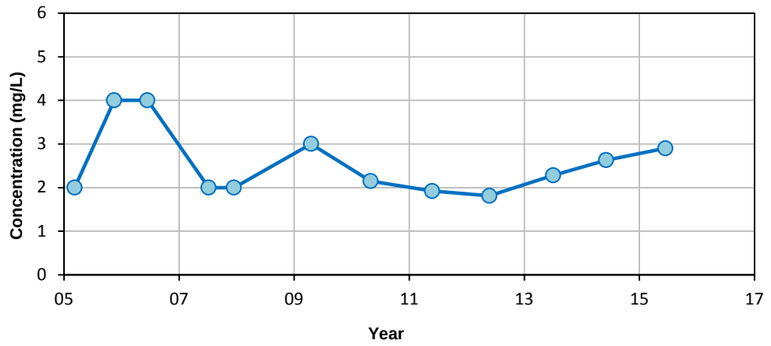
FILE LOCATION: EDMONTON

FILE DIRECTORY: U:\EDM\GBS\307075-01608\100-2015_GWM\12.0_REPORTS\12.3_BACKEND\APP 5- MK AND TRENDCHARTS\EXCEL\

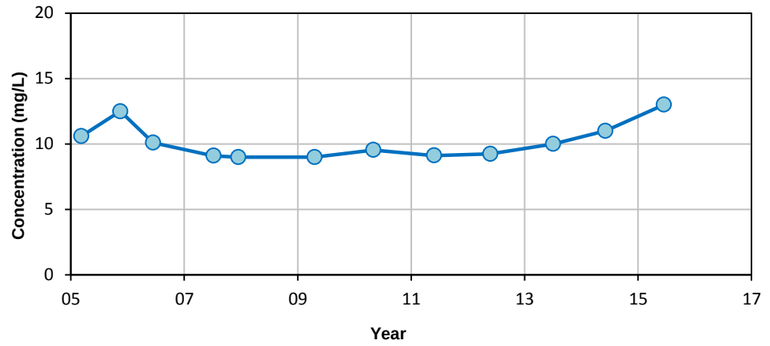
PH (LABORATORY MEASURED)



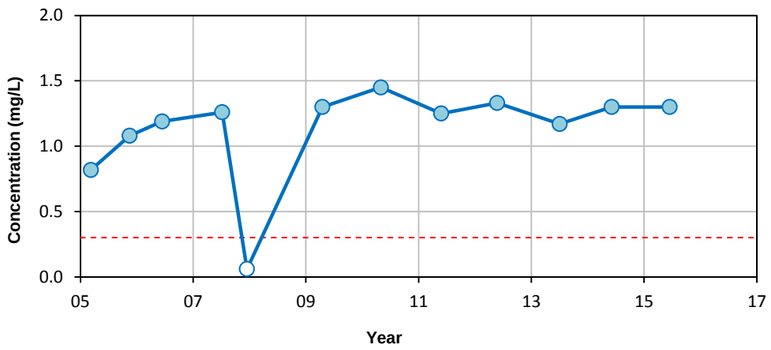
CHLORIDE



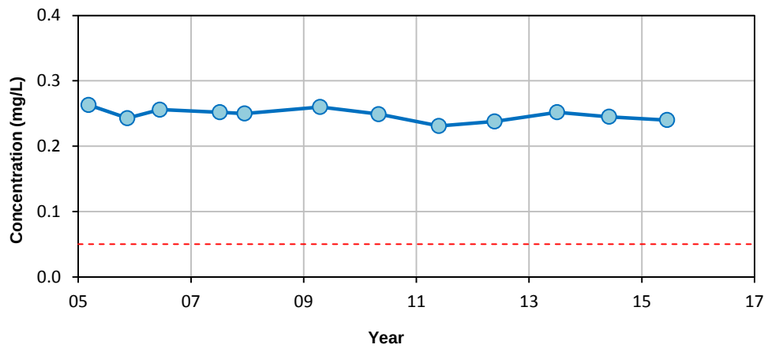
SULPHATE



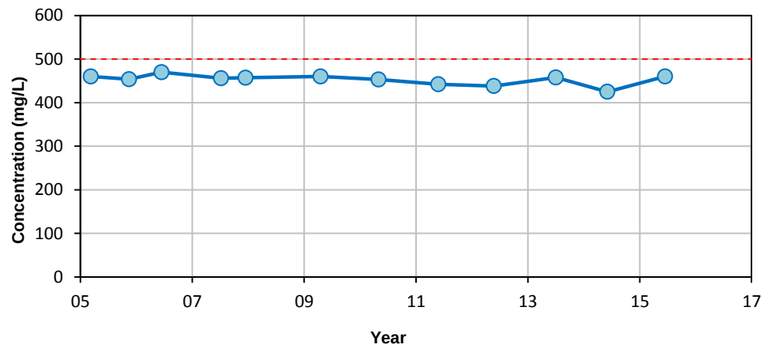
IRON



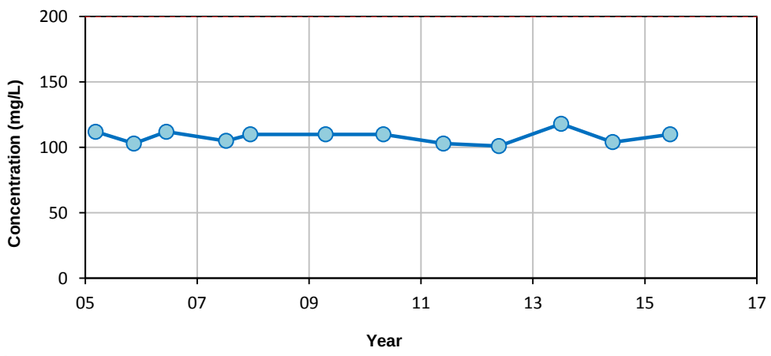
MANGANESE



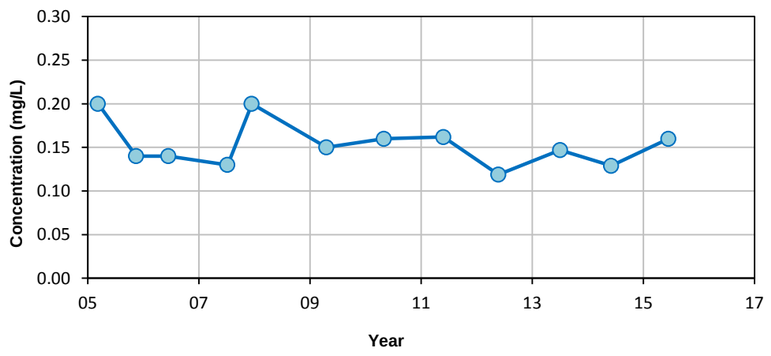
TOTAL DISSOLVED SOLIDS



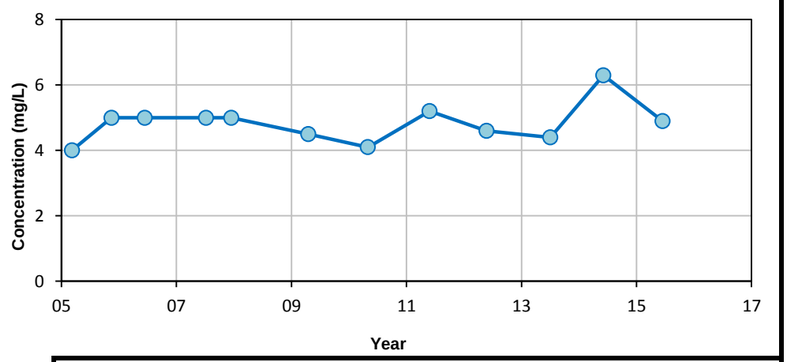
SODIUM



FLUORIDE



DISSOLVED ORGANIC CARBON



Notes:

- Filled symbols denote sample values; unfilled symbols denote values less than detection limit(s)
- Dashed line indicates data gap of more than two years
- Canadian Drinking Water AO Guidelines 2014 :
  - pH: 6.5-8.5 pH Units
  - IRON: 0.3 mg/L
  - SODIUM: 200 mg/L
  - CHLORIDE: 250 mg/L
  - MANGANESE: 0.05 mg/L
  - FLUORIDE: N/A
  - SULPHATE: 500 mg/L
  - TOTAL DISSOLVED SOLIDS: 500 mg/L
  - DISSOLVED ORGANIC CARBON: N/A

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2015 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

HYDROCHEMICAL CONTROL CHARTS
MW-13

Date:	Drawn by:	Edited by:	App'd by:
05-Aug-15	SN		

OneWay to zero harm

WorleyParsons resources & energy

WorleyParsons Project No.: 307075-01608-100

FIG No.: A5-13 REV: A

FILE LOCATION: EDMONTON

FILE DIRECTORY: U:\EDM\GBS\307075-01608\100-2015_GWM\12.0_REPORTS\12.3_BACKEND\APP 5- MK AND TRENDCHARTS\EXCEL\

Appendix 6 Statistical Table

WorleyParsons
resources & energy

Appendix 6

Statistical Table

Project No.: 307075-01608-100

Monitoring Station	Parameter	Unit	Count	Minimum	Maximum	Mean	Standard Deviation
MW-01	**Groundwater Elevation**						
	Depth to Groundwater	(mbtoc)	14	14.41	15.7	15.3	0.3
	Groundwater Surface Elevation	(masl)	14	602.34	603.63	602.8	0.3
	Field-Measured Parameters						
	Electrical Conductivity	(uS/cm)	6	708	765	738.7	21.0
	pH	(pH Units)	6	6.88	7.38	7.2	0.2
	Temperature	(ºC)	6	5.6	7.8	7.1	0.8
	Select Indicator Parameters						
	Bicarbonate	(mg/L)	12	408	470	446.1	14.2
	Carbonate	(mg/L)	12	0.25	2.5	2.0	1.0
	Chloride	(mg/L)	12	2	5	3.7	0.9
	Fluoride	(mg/L)	12	0.106	0.2	0.1	0.03
	Hydroxide	(mg/L)	12	0.25	2.5	2.0	1.0
	Sulphate	(mg/L)	12	44	62	56.5	4.8
	Calcium	(mg/L)	12	84	99.7	93.2	4.9
	Iron	(mg/L)	10	1.02	2.02	1.7	0.3
	Magnesium	(mg/L)	12	23	28.4	25.8	1.6
	Manganese	(mg/L)	12	0.605	0.737	0.7	0.04
	Potassium	(mg/L)	11	2.2	3.1	2.6	0.3
	Sodium	(mg/L)	12	32.7	40	35.7	2.2
	Alkalinity (Total; as CaCO3)	(mg/L)	12	334	390	366.3	12.6
	Electrical Conductivity	(uS/cm)	12	677	770	749.3	28.4
	Hardness (Total; as CaCO3)	(mg/L)	12	310	363	338.4	17.5
	pH	(pH Units)	12	7.46	8.06	7.9	0.2
	Total Dissolved Solids	(mg/L)	12	410	456	436.8	13.9
	Ammonia (Total; as N)	(mg/L)	12	0.185	0.39	0.3	0.1
	Nitrate (as N)	(mg/L)	12	0.003	0.1	0.04	0.03
	Nitrite (as N)	(mg/L)	12	0.0015	0.03	0.02	0.01
	Nitrite-plus-Nitrate (as N)	(mg/L)	12	0.003	0.1	0.04	0.02
	Ion Balance	(%)	12	0.87	103	90.6	28.4
	Dissolved Organic Carbon	(mg/L)	12	2	4.5	3.0	0.6
	Dissolved Metals Parameters						
	Aluminium	(mg/L)	12	0.0005	0.02	0.005	0.005
	Antimony	(mg/L)	12	0.0001	0.0008	0.0003	0.0002
	Arsenic	(mg/L)	12	0.0005	0.00098	0.0009	0.0001
	Barium	(mg/L)	11	0.11	0.199	0.1	0.02
	Beryllium	(mg/L)	12	0.00025	0.0005	0.0003	0.0001
	Bismuth	(mg/L)	4	0.000025	0.00005	0.00003	0.00001
	Boron	(mg/L)	11	0.025	0.054	0.04	0.01
	Cadmium	(mg/L)	12	0.0000025	0.0001	0.00005	0.00002
	Chromium	(mg/L)	12	0.0002	0.0027	0.002	0.001
	Cobalt	(mg/L)	12	0.00068	0.0017	0.001	0.0003
	Copper	(mg/L)	12	0.0001	0.0017	0.0005	0.0004
	Lead	(mg/L)	12	0.00005	0.0004	0.00009	0.0001
	Lithium	(mg/L)	1	0.027	0.027	0.03	---
	Mercury	(mg/L)	11	0.000001	0.00005	0.00003	0.00002
	Total Mercury	(ug/L)	1	0.027	0.027	0.03	---
	Molybdenum	(mg/L)	12	0.000281	0.0013	0.0006	0.0003
	Nickel	(mg/L)	12	0.00005	0.003	0.001	0.001
	Phosphorus	(mg/L)	1	0.05	0.05	0.05	---
	Selenium	(mg/L)	12	0.0001	0.0005	0.0002	0.0001
	Silicon	(mg/L)	1	7.1	7.1	7.1	---
	Silver	(mg/L)	12	0.00005	0.0001	0.00007	0.00002
	Strontium	(mg/L)	6	0.53	0.579	0.6	0.02
	Thallium	(mg/L)	12	0.000025	0.00025	0.00006	0.00007
	Tin	(mg/L)	7	0.0001	0.0005	0.00027	0.00021
	Titanium	(mg/L)	12	0.00015	0.0013	0.00064	0.00043
	Uranium	(mg/L)	12	0.00194	0.0026	0.0022	0.00018
	Vanadium	(mg/L)	12	0.00005	0.0005	0.00020	0.00020
	Zinc	(mg/L)	12	0.001	0.0074	0.0025	0.0020
	Petroleum Hydrocarbon Parameters						
	Benzene	(mg/L)	11	0.0002	0.00025	0.00024	0.00002
	Toluene	(mg/L)	11	0.0002	0.000375	0.00026	0.00006
	Ethylbenzene	(mg/L)	11	0.0002	0.00025	0.00024	0.00002
	m&p-Xylene	(mg/L)	5	0.00025	0.0004	0.00028	0.00007
	o-Xylene	(mg/L)	5	0.0002	0.00025	0.00024	0.00002
	Xylenes (Total)	(mg/L)	11	0.00025	0.0005	0.00036	0.00010
	Styrene	(mg/L)	2	0.0005	0.0005	0.00050	0
	PHC F1 (C6-C10)	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F1 (C6-C10) - BTEX	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F2 (C10-C16)	(mg/L)	12	0.025	0.125	0.07	0.05
	Volatile Organic Compounds						
	Phenols	(mg/L)	12	0.0005	0.003	0.0009	0.0008
MW-02	**Groundwater Elevation**						
	Depth to Groundwater	(mbtoc)	15	26.99	27.26	27.1	0.1
	Groundwater Surface Elevation	(masl)	15	604.05	604.32	604.2	0.1
	Field-Measured Parameters						
	Electrical Conductivity	(uS/cm)	6	1023	1397	1246.7	138.1
	pH	(pH Units)	6	7.02	7.49	7.1	0.2
	Temperature	(ºC)	6	4.8	10.9	7.7	2.0
	Select Indicator Parameters						
	Bicarbonate	(mg/L)	12	514	660	603	36.3
	Carbonate	(mg/L)	12	0.25	2.5	2.0	1.0
	Chloride	(mg/L)	12	11.6	96	28.6	23.5
	Fluoride	(mg/L)	12	0.025	0.21	0.09	0.04
	Hydroxide	(mg/L)	12	0.25	2.5	2.0	1.0
	Sulphate	(mg/L)	12	194	318	253.8	35.5
	Calcium	(mg/L)	12	113	172	142.3	16.1
	Iron	(mg/L)	11	0.085	12.3	6.6	4.4
	Magnesium	(mg/L)	12	34.5	56.4	49.6	6.4
	Manganese	(mg/L)	12	0.236	1.09	0.6	0.2
	Potassium	(mg/L)	11	4.25	7.2	5.2	1.0
	Sodium	(mg/L)	12	81	161	104.4	28.8
	Alkalinity (Total; as CaCO3)	(mg/L)	12	422	540	494.3	29.5

Appendix 6

Statistical Table

Project No.: 307075-01608-100

Monitoring Station	Parameter	Unit	Count	Minimum	Maximum	Mean	Standard Deviation
	Electrical Conductivity	(uS/cm)	12	1210	1600	1374.2	109.0
	Hardness (Total; as CaCO3)	(mg/L)	12	424	662	559.3	65.7
	pH	(pH Units)	12	7.15	7.97	7.7	0.3
	Total Dissolved Solids	(mg/L)	12	759	1000	877.3	65.3
	Ammonia (Total; as N)	(mg/L)	12	0.1	1.75	0.8	0.4
	Nitrate (as N)	(mg/L)	12	0.005	0.1	0.04	0.03
	Nitrite (as N)	(mg/L)	12	0.0015	0.03	0.02	0.01
	Nitrite-plus-Nitrate (as N)	(mg/L)	12	0.005	0.1	0.04	0.03
	Ion Balance	(%)	12	0.84	142	93.4	32.3
	Dissolved Organic Carbon	(mg/L)	12	4.1	11.3	5.9	1.9
	Dissolved Metals Parameters						
	Aluminium	(mg/L)	12	0.0005	0.03	0.007	0.009
	Antimony	(mg/L)	12	0.0001	0.001	0.0004	0.0003
	Arsenic	(mg/L)	12	0.0014	0.0038	0.003	0.0007
	Barium	(mg/L)	11	0.04	0.204	0.09	0.05
	Beryllium	(mg/L)	11	0.00025	0.0005	0.0003	0.0001
	Bismuth	(mg/L)	4	0.000025	0.00005	0.00004	0.00001
	Boron	(mg/L)	11	0.12	0.21	0.2	0.03
	Cadmium	(mg/L)	12	0.0000025	0.0001	0.00005	0.00002
	Chromium	(mg/L)	12	0.0002	0.004	0.002	0.001
	Cobalt	(mg/L)	11	0.00043	0.0032	0.002	0.001
	Copper	(mg/L)	12	0.0001	0.0021	0.0007	0.0006
	Lead	(mg/L)	12	0.00005	0.0004	0.0001	0.0001
	Lithium	(mg/L)	1	0.078	0.078	0.08	---
	Mercury	(mg/L)	11	0.000001	0.0001	0.00003	0.00003
	Total Mercury	(ug/L)	1	0.0025	0.0025	0.003	---
	Molybdenum	(mg/L)	11	0.000324	0.0148	0.002	0.004
	Nickel	(mg/L)	12	0.00005	0.0644	0.007	0.02
	Phosphorus	(mg/L)	1	0.05	0.05	0.050	---
	Selenium	(mg/L)	12	0.0001	0.0008	0.0003	0.0002
	Silicon	(mg/L)	1	8.5	8.5	8.5	---
	Silver	(mg/L)	12	0.00005	0.0001	0.00007	0.00002
	Strontium	(mg/L)	6	1.03	1.54	1.4	0.2
	Thallium	(mg/L)	11	0.000025	0.00025	0.00007	0.00007
	Tin	(mg/L)	7	0.0001	0.0005	0.0003	0.0002
	Titanium	(mg/L)	11	0.00015	0.002	0.0009	0.0006
	Uranium	(mg/L)	12	0.00086	0.0053	0.002	0.001
	Vanadium	(mg/L)	11	0.00005	0.002	0.0005	0.0007
	Zinc	(mg/L)	12	0.001	0.1012	0.01	0.03
	Petroleum Hydrocarbon Parameters						
	Benzene	(mg/L)	11	0.0002	0.00025	0.0002	2.3E-05
	Toluene	(mg/L)	11	0.0002	0.000375	0.0003	6.2E-05
	Ethylbenzene	(mg/L)	11	0.0002	0.00025	0.0002	2.3E-05
	m&p-Xylene	(mg/L)	5	0.00025	0.0004	0.0003	6.7E-05
	o-Xylene	(mg/L)	5	0.0002	0.00025	0.0002	2.2E-05
	Xylenes (Total)	(mg/L)	11	0.00025	0.0005	0.0004	9.6E-05
	Styrene	(mg/L)	2	0.0005	0.0005	0.0005	0
	PHC F1 (C6-C10)	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F1 (C6-C10) - BTEX	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F2 (C10-C16)	(mg/L)	12	0.025	0.31	0.09	8.2E-02
	Volatile Organic Compounds						
	Phenols	(mg/L)	12	0.0005	0.002	0.0009	0.0007
MW-03	**Groundwater Elevation**						
	Depth to Groundwater	(mbtoc)	14	22.24	23.47	22.6	0.4
	Groundwater Surface Elevation	(masl)	14	600.96	602.19	601.8	0.4
	Field-Measured Parameters						
	Electrical Conductivity	(uS/cm)	6	947	1003	970.7	19.1
	pH	(pH Units)	6	7.08	7.72	7.3	0.2
	Temperature	(ºC)	6	6.6	8.9	8.2	0.8
	Select Indicator Parameters						
	Bicarbonate	(mg/L)	12	395	460	434.2	15.2
	Carbonate	(mg/L)	12	0.25	2.5	2.0	1.0
	Chloride	(mg/L)	12	31	56	41.8	8.6
	Fluoride	(mg/L)	12	0.073	0.14	0.1	0.02
	Hydroxide	(mg/L)	12	0.25	2.5	2.0	1.0
	Sulphate	(mg/L)	12	98	130	119.8	8.9
	Calcium	(mg/L)	12	92	115	104.8	6.2
	Iron	(mg/L)	10	3.19	5.55	4.9	0.7
	Magnesium	(mg/L)	12	31.8	40.1	36.1	2.8
	Manganese	(mg/L)	12	0.239	0.277	0.3	0.01
	Potassium	(mg/L)	11	2.7	3.5	3.1	0.2
	Sodium	(mg/L)	12	48.4	57.9	52.3	3.0
	Alkalinity (Total; as CaCO3)	(mg/L)	12	324	380	355.8	13.0
	Electrical Conductivity	(uS/cm)	12	930	1000	960	24.7
	Hardness (Total; as CaCO3)	(mg/L)	12	360	452	410.2	27.3
	pH	(pH Units)	12	7.31	8.03	7.8	0.2
	Total Dissolved Solids	(mg/L)	12	520	610	572	21.2
	Ammonia (Total; as N)	(mg/L)	12	0.06	0.38	0.32	0.09
	Nitrate (as N)	(mg/L)	12	0.005	0.1	0.04	0.03
	Nitrite (as N)	(mg/L)	12	0.0015	0.03	0.02	0.009
	Nitrite-plus-Nitrate (as N)	(mg/L)	12	0.009	0.1	0.04	0.02
	Ion Balance	(%)	12	0.87	105	91.0	28.7
	Dissolved Organic Carbon	(mg/L)	12	2.5	5.9	3.7	1.1
	Dissolved Metals Parameters						
	Aluminium	(mg/L)	12	0.0005	0.01	0.003	0.003
	Antimony	(mg/L)	12	0.0001	0.0007	0.0003	0.0002
	Arsenic	(mg/L)	12	0.0005	0.00154	0.001	0.0003
	Barium	(mg/L)	11	0.03	0.0744	0.04	0.01
	Beryllium	(mg/L)	12	0.000225	0.0005	0.0003	0.0001
	Bismuth	(mg/L)	4	0.000025	0.00009	0.00004	0.00003
	Boron	(mg/L)	11	0.088	0.128	0.1	0.01
	Cadmium	(mg/L)	12	0.0000025	0.0001	0.00005	0.00002
	Chromium	(mg/L)	12	0.0002	0.0029	0.002	0.001
	Cobalt	(mg/L)	12	0.0006	0.0012	0.0008	0.0002

Appendix 6

Statistical Table

Project No.: 307075-01608-100

Monitoring Station	Parameter	Unit	Count	Minimum	Maximum	Mean	Standard Deviation
	Copper	(mg/L)	12	0.0002	0.0008	0.0005	0.0002
	Lead	(mg/L)	12	0.00005	0.0005	0.0001	0.0001
	Lithium	(mg/L)	1	0.042	0.042	0.04	---
	Mercury	(mg/L)	11	0.000001	0.00009	0.00003	0.00003
	Total Mercury	(ug/L)	1	0.0061	0.0061	0.006	---
	Molybdenum	(mg/L)	12	0.000496	0.0029	0.001	0.0007
	Nickel	(mg/L)	12	0.000005	0.0042	0.001	0.001
	Phosphorus	(mg/L)	1	0.05	0.05	0.05	---
	Selenium	(mg/L)	12	0.0001	0.0005	0.0003	0.0002
	Silicon	(mg/L)	1	8.4	8.4	8.4	---
	Silver	(mg/L)	12	0.00005	0.0001	0.00007	0.00002
	Strontium	(mg/L)	6	0.001	0.88	0.7	0.3
	Thallium	(mg/L)	12	0.000025	0.0007	0.0001	0.0002
	Tin	(mg/L)	7	0.0001	0.882	0.1	0.3
	Titanium	(mg/L)	12	0.000025	0.002	0.0007	0.0007
	Uranium	(mg/L)	12	0.0002	0.0007	0.0006	0.0001
	Vanadium	(mg/L)	12	0.00005	0.001	0.0003	0.0003
	Zinc	(mg/L)	12	0.001	0.01	0.003	0.003
	Petroleum Hydrocarbon Parameters						
	Benzene	(mg/L)	11	0.0002	0.00025	0.0002	0.00002
	Toluene	(mg/L)	11	0.0002	0.0005	0.0003	0.00009
	Ethylbenzene	(mg/L)	11	0.0002	0.00025	0.0002	0.00002
	m&p-Xylene	(mg/L)	5	0.00025	0.0004	0.0003	0.00007
	o-Xylene	(mg/L)	5	0.0002	0.00025	0.0002	0.00002
	Xylenes (Total)	(mg/L)	11	0.00025	0.0005	0.0004	0.0001
	Styrene	(mg/L)	2	0.0005	0.0005	0.0005	0
	PHC F1 (C6-C10)	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F1 (C6-C10) - BTEX	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F2 (C10-C16)	(mg/L)	12	0.025	0.125	0.07	0.05
	Volatile Organic Compounds						
	Phenols	(mg/L)	12	0.0005	0.003	0.0009	0.0008
MW-04	**Groundwater Elevation**						
	Depth to Groundwater	(mbtoc)	14	18.48	18.87	18.6	0.1
	Groundwater Surface Elevation	(masl)	14	601.92	602.31	602.2	0.1
	Field-Measured Parameters						
	Electrical Conductivity	(uS/cm)	6	1186	1420	1259	86.0
	pH	(pH Units)	6	7.1	7.27	7.2	0.06
	Temperature	(ºC)	6	7.8	9.3	8.3	0.5
	Select Indicator Parameters						
	Bicarbonate	(mg/L)	12	426	500	464.3	21.3
	Carbonate	(mg/L)	12	0.25	2.5	2.0	1.0
	Chloride	(mg/L)	12	125	200	149.7	24.0
	Fluoride	(mg/L)	12	0.082	0.15	0.1	0.02
	Hydroxide	(mg/L)	12	0.25	2.5	2.0	1.0
	Sulphate	(mg/L)	12	74	100	87.1	6.5
	Calcium	(mg/L)	12	140	154	145.8	5.6
	Iron	(mg/L)	9	0.005	1.9	0.8	0.8
	Magnesium	(mg/L)	12	35	44	40.7	3.1
	Manganese	(mg/L)	12	0.009	0.722	0.3	0.3
	Potassium	(mg/L)	11	8.78	10.8	9.7	0.6
	Sodium	(mg/L)	12	50.7	71	59.0	6.4
	Alkalinity (Total; as CaCO3)	(mg/L)	12	350	409	380.6	16.9
	Electrical Conductivity	(uS/cm)	12	1190	1400	1268.3	65.1
	Hardness (Total; as CaCO3)	(mg/L)	12	500	566	531.7	24.7
	pH	(pH Units)	12	7.32	8.1	7.8	0.2
	Total Dissolved Solids	(mg/L)	12	690	774	721.3	28.8
	Ammonia (Total; as N)	(mg/L)	12	0.007	0.025	0.02	0.008
	Nitrate (as N)	(mg/L)	12	0.025	1.2	0.4	0.4
	Nitrite (as N)	(mg/L)	12	0.0015	0.03	0.02	0.0094
	Nitrite-plus-Nitrate (as N)	(mg/L)	12	0.027	1.2	0.4	0.4
	Ion Balance	(%)	12	0.9	107	91.1	28.6
	Dissolved Organic Carbon	(mg/L)	12	1	5	3.2	0.9
	Dissolved Metals Parameters						
	Aluminium	(mg/L)	12	0.0005	0.0135	0.004	0.003
	Antimony	(mg/L)	12	0.0001	0.0009	0.0003	0.0003
	Arsenic	(mg/L)	12	0.0001	0.00117	0.0006	0.0003
	Barium	(mg/L)	11	0.0737	0.764	0.2	0.2
	Beryllium	(mg/L)	12	0.00025	0.0005	0.0003	0.0001
	Bismuth	(mg/L)	4	0.000025	0.00007	0.00004	0.00002
	Boron	(mg/L)	11	0.069	0.101	0.09	0.009
	Cadmium	(mg/L)	12	0.00001	0.0001	0.00005	0.00002
	Chromium	(mg/L)	12	0.0005	0.0047	0.002	0.001
	Cobalt	(mg/L)	12	0.00005	0.0049	0.0007	0.001
	Copper	(mg/L)	12	0.0001	0.0012	0.0006	0.0003
	Lead	(mg/L)	12	0.00005	0.0002	0.00008	0.00006
	Lithium	(mg/L)	1	0.041	0.041	0.04	---
	Mercury	(mg/L)	11	0.0000025	0.0002	0.00006	0.00007
	Total Mercury	(ug/L)	1	0.0025	0.0025	0.003	---
	Molybdenum	(mg/L)	12	0.000297	0.003	0.0006	0.0007
	Nickel	(mg/L)	12	0.00005	0.014	0.003	0.004
	Phosphorus	(mg/L)	1	0.05	0.05	0.05	---
	Selenium	(mg/L)	12	0.0001	0.00106	0.0005	0.0004
	Silicon	(mg/L)	1	4.9	4.9	4.9	---
	Silver	(mg/L)	12	0.00005	0.0001	0.00007	0.00002
	Strontium	(mg/L)	6	0.561	0.63	0.6	0.02
	Thallium	(mg/L)	12	0.000025	0.00025	0.00008	0.00008
	Tin	(mg/L)	7	0.0001	0.0005	0.0003	0.0002
	Titanium	(mg/L)	12	0.00015	0.002	0.0005	0.0005
	Uranium	(mg/L)	12	0.0023	0.00396	0.003	0.0006
	Vanadium	(mg/L)	12	0.00005	0.0022	0.0005	0.0006
	Zinc	(mg/L)	12	0.001	0.029	0.005	0.008
	Petroleum Hydrocarbon Parameters						
	Benzene	(mg/L)	11	0.0002	0.00025	0.0002	0.00002
	Toluene	(mg/L)	11	0.0002	0.000375	0.0003	0.00006
	Ethylbenzene	(mg/L)	11	0.0002	0.00025	0.0002	0.00002

Appendix 6

Statistical Table

Project No.: 307075-01608-100

Monitoring Station	Parameter	Unit	Count	Minimum	Maximum	Mean	Standard Deviation
	m&p-Xylene	(mg/L)	5	0.00025	0.0004	0.0003	0.00007
	o-Xylene	(mg/L)	5	0.0002	0.00025	0.0002	0.00002
	Xylenes (Total)	(mg/L)	11	0.00025	0.0005	0.0004	0.0001
	Styrene	(mg/L)	2	0.0005	0.0005	0.0005	0
	PHC F1 (C6-C10)	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F1 (C6-C10) - BTEX	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F2 (C10-C16)	(mg/L)	12	0.025	0.125	0.07	0.05
	Volatile Organic Compounds						
	Phenols	(mg/L)	12	0.0005	0.002	0.0007	0.0005
MW-05	**Groundwater Elevation**						
	Depth to Groundwater	(mbtoc)	14	25.06	26.77	25.6	0.4
	Groundwater Surface Elevation	(masl)	14	598.12	599.83	599.3	0.4
	Field-Measured Parameters						
	Electrical Conductivity	(uS/cm)	6	935	1070	993.8	43.9
	pH	(pH Units)	6	7.06	7.41	7.3	0.1
	Temperature	(ºC)	6	7.1	9.7	8.05	0.9
	Select Indicator Parameters						
	Bicarbonate	(mg/L)	12	341	450	422.8	29.04
	Carbonate	(mg/L)	12	0.25	2.5	2.0	1.0
	Chloride	(mg/L)	12	15	40	28.7	7.7
	Fluoride	(mg/L)	12	0.061	0.18	0.1	0.03
	Hydroxide	(mg/L)	12	0.25	2.5	2.0	1.0
	Sulphate	(mg/L)	12	105	150	134.5	13.8
	Calcium	(mg/L)	12	96.2	120	110.3	8.9
	Iron	(mg/L)	10	1.14	4.8	3.5	1.0
	Magnesium	(mg/L)	12	27.5	38	33.03	3.0
	Manganese	(mg/L)	12	0.402	0.758	0.7	0.1
	Potassium	(mg/L)	11	6.1	8.61	7.6	0.7
	Sodium	(mg/L)	12	41	51	43.9	2.9
	Alkalinity (Total; as CaCO3)	(mg/L)	12	279	370	347.0	24.0
	Electrical Conductivity	(uS/cm)	12	831	1000	935.4	57.7
	Hardness (Total; as CaCO3)	(mg/L)	12	353	451	410.8	31.3
	pH	(pH Units)	12	7.41	8.1	7.8	0.2
	Total Dissolved Solids	(mg/L)	12	499	620	565.4	33.5
	Ammonia (Total; as N)	(mg/L)	12	0.05	0.63	0.3	0.1
	Nitrate (as N)	(mg/L)	12	0.007	0.1	0.04	0.02
	Nitrite (as N)	(mg/L)	12	0.0015	0.03	0.02	0.01
	Nitrite-plus-Nitrate (as N)	(mg/L)	12	0.007	0.1	0.04	0.02
	Ion Balance	(%)	12	0.88	111	91.0	28.9
	Dissolved Organic Carbon	(mg/L)	12	2.5	6.9	4.3	1.3
	Dissolved Metals Parameters						
	Aluminium	(mg/L)	12	0.0005	0.005	0.003	0.002
	Antimony	(mg/L)	12	0.0001	0.0008	0.0004	0.0002
	Arsenic	(mg/L)	12	0.001	0.0081	0.003	0.002
	Barium	(mg/L)	11	0.04	0.454	0.09	0.1
	Beryllium	(mg/L)	12	0.00025	0.0005	0.0003	0.0001
	Bismuth	(mg/L)	4	0.000025	0.00006	0.00003	0.00002
	Boron	(mg/L)	11	0.025	0.14	0.07	0.04
	Cadmium	(mg/L)	12	0.0000025	0.0001	0.00005	0.00002
	Chromium	(mg/L)	12	0.0002	0.003	0.002	0.001
	Cobalt	(mg/L)	12	0.00067	0.001	0.0008	0.00009
	Copper	(mg/L)	12	0.0001	0.0009	0.0005	0.0002
	Lead	(mg/L)	12	0.00005	0.0002	0.0001	0.00006
	Lithium	(mg/L)	1	0.041	0.041	0.04	---
	Mercury	(mg/L)	11	0.000001	0.00005	0.00003	0.00002
	Total Mercury	(ug/L)	1	0.0025	0.0025	0.003	---
	Molybdenum	(mg/L)	12	0.000321	0.0029	0.0009	0.0008
	Nickel	(mg/L)	12	0.00005	0.0039	0.002	0.001
	Phosphorus	(mg/L)	1	0.05	0.05	0.05	---
	Selenium	(mg/L)	12	0.0001	0.00086	0.0003	0.0002
	Silicon	(mg/L)	1	6.6	6.6	6.6	---
	Silver	(mg/L)	12	0.00005	0.0001	0.00007	0.00002
	Strontium	(mg/L)	6	0.63	0.71	0.7	0.03
	Thallium	(mg/L)	12	0.000025	0.00025	0.00006	0.00007
	Tin	(mg/L)	7	0.0001	0.0005	0.0003	0.0002
	Titanium	(mg/L)	12	0.00015	0.002	0.0006	0.0005
	Uranium	(mg/L)	12	0.0006	0.0014	0.0008	0.0002
	Vanadium	(mg/L)	12	0.00005	0.001	0.0003	0.0003
	Zinc	(mg/L)	12	0.001	0.005	0.003	0.001
	Petroleum Hydrocarbon Parameters						
	Benzene	(mg/L)	11	0.0002	0.00025	0.0002	0.00002
	Toluene	(mg/L)	11	0.0002	0.0005	0.0003	0.00009
	Ethylbenzene	(mg/L)	11	0.0002	0.00025	0.0002	0.00002
	m&p-Xylene	(mg/L)	5	0.00025	0.0004	0.0003	0.00007
	o-Xylene	(mg/L)	5	0.0002	0.00025	0.0002	0.00002
	Xylenes (Total)	(mg/L)	11	0.00025	0.0005	0.0004	0.0001
	Styrene	(mg/L)	2	0.0005	0.0005	0.0005	0
	PHC F1 (C6-C10)	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F1 (C6-C10) - BTEX	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F2 (C10-C16)	(mg/L)	12	0.025	0.125	0.07	0.05
	Volatile Organic Compounds						
	Phenols	(mg/L)	12	0.0005	0.003	0.0009	0.0008
MW-06	**Groundwater Elevation**						
	Depth to Groundwater	(mbtoc)	14	31.97	32.76	32.1	0.2
	Groundwater Surface Elevation	(masl)	14	597.52	598.31	598.1	0.2
	Field-Measured Parameters						
	Electrical Conductivity	(uS/cm)	6	1637	1773	1718.2	53.8
	pH	(pH Units)	6	7.21	7.36	7.3	0.06
	Temperature	(ºC)	6	5.7	11.1	8.7	2.02
	Select Indicator Parameters						
	Bicarbonate	(mg/L)	12	528	641	606.8	33.8
	Carbonate	(mg/L)	12	0.25	2.5	2.0	1.0
	Chloride	(mg/L)	12	2.95	13	6.5	3.2

Appendix 6

Statistical Table

Project No.: 307075-01608-100

Monitoring Station	Parameter	Unit	Count	Minimum	Maximum	Mean	Standard Deviation
	Fluoride	(mg/L)	12	0.119	0.2	0.2	0.03
	Hydroxide	(mg/L)	12	0.25	2.5	2.0	1.0
	Sulphate	(mg/L)	12	420	560	490.4	35.5
	Calcium	(mg/L)	12	148	180	163.5	8.2
	Iron	(mg/L)	11	2.92	6.1	5.0	1.2
	Magnesium	(mg/L)	12	52	62	57.2	2.9
	Manganese	(mg/L)	12	0.943	1.72	1.4	0.3
	Potassium	(mg/L)	11	4.8	6.1	5.4	0.4
	Sodium	(mg/L)	12	123	211	161.2	28.6
	Alkalinity (Total; as CaCO3)	(mg/L)	12	433	526	497.5	27.3
	Electrical Conductivity	(uS/cm)	12	1580	1780	1710.8	58.5
	Hardness (Total; as CaCO3)	(mg/L)	12	584	710	644.6	31.02
	pH	(pH Units)	12	7.37	8.1	7.8	0.2
	Total Dissolved Solids	(mg/L)	12	1100	1250	1180.0	48.6
	Ammonia (Total; as N)	(mg/L)	12	1.46	2.38	1.8	0.2
	Nitrate (as N)	(mg/L)	12	0.004	0.1	0.04	0.03
	Nitrite (as N)	(mg/L)	12	0.0015	0.03	0.02	0.01
	Nitrite-plus-Nitrate (as N)	(mg/L)	12	0.004	0.1	0.04	0.02
	Ion Balance	(%)	12	0.85	110	91.4	29.01
	Dissolved Organic Carbon	(mg/L)	12	5	8	6.5	1.0
	Dissolved Metals Parameters						
	Aluminium	(mg/L)	12	0.0005	0.0288	0.006	0.008
	Antimony	(mg/L)	12	0.0001	0.0009	0.0004	0.0003
	Arsenic	(mg/L)	12	0.003	0.0057	0.005	0.0008
	Barium	(mg/L)	11	0.0265	0.071	0.04	0.02
	Beryllium	(mg/L)	12	0.00025	0.0005	0.0003	0.0001
	Bismuth	(mg/L)	4	0.000025	0.00006	0.00003	0.00002
	Boron	(mg/L)	11	0.112	0.16	0.1	0.02
	Cadmium	(mg/L)	12	0.000009	0.0001	0.00005	0.00002
	Chromium	(mg/L)	12	0.0002	0.0035	0.002	0.001
	Cobalt	(mg/L)	12	0.00015	0.0012	0.0006	0.0004
	Copper	(mg/L)	12	0.0001	0.0014	0.0008	0.0005
	Lead	(mg/L)	12	0.00005	0.0004	0.0001	0.0001
	Lithium	(mg/L)	1	0.11	0.11	0.1	---
	Mercury	(mg/L)	11	0.0000005	0.00005	0.00003	0.00002
	Total Mercury	(ug/L)	1	0.0025	0.0025	0.003	---
	Molybdenum	(mg/L)	12	0.0008	0.0016	0.001	0.0003
	Nickel	(mg/L)	12	0.00005	0.006	0.002	0.002
	Phosphorus	(mg/L)	1	0.18	0.18	0.2	---
	Selenium	(mg/L)	12	0.0001	0.0007	0.0003	0.0002
	Silicon	(mg/L)	1	7.6	7.6	7.6	---
	Silver	(mg/L)	12	0.00005	0.000105	0.00007	0.00003
	Strontium	(mg/L)	6	1.2	1.42	1.3	0.09
	Thallium	(mg/L)	12	0.000025	0.00025	0.0001	0.00009
	Tin	(mg/L)	7	0.0001	0.0005	0.0003	0.0002
	Titanium	(mg/L)	12	0.00015	0.002	0.0009	0.0006
	Uranium	(mg/L)	12	0.00146	0.0023	0.002	0.0002
	Vanadium	(mg/L)	12	0.00005	0.001	0.0003	0.0003
	Zinc	(mg/L)	12	0.001	0.008	0.003	0.002
	Petroleum Hydrocarbon Parameters						
	Benzene	(mg/L)	11	0.0002	0.00025	0.0002	0.00002
	Toluene	(mg/L)	11	0.0002	0.000375	0.0003	0.0001
	Ethylbenzene	(mg/L)	11	0.0002	0.00025	0.0002	0.0000
	m&p-Xylene	(mg/L)	5	0.00025	0.0004	0.0003	0.0001
	o-Xylene	(mg/L)	5	0.0002	0.00025	0.0002	0.00002
	Xylenes (Total)	(mg/L)	11	0.00025	0.0005	0.0004	0.0001
	Styrene	(mg/L)	2	0.0005	0.0005	0.0005	0
	PHC F1 (C6-C10)	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F1 (C6-C10) - BTEX	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F2 (C10-C16)	(mg/L)	12	0.025	0.125	0.07	0.05
	Volatile Organic Compounds						
	Phenols	(mg/L)	12	0.0005	0.003	0.0009	0.0008
MW-07	**Groundwater Elevation**						
	Depth to Groundwater	(mbtoc)	15	33.59	34.6	34.03	0.3
	Groundwater Surface Elevation	(masl)	15	596.41	597.42	597.0	0.3
	Field-Measured Parameters						
	Electrical Conductivity	(uS/cm)	7	1750	2910	2528.6	364.1
	pH	(pH Units)	7	6.91	7.73	7.1	0.3
	Temperature	(ºC)	7	6.6	9.1	7.8	0.9
	Select Indicator Parameters						
	Bicarbonate	(mg/L)	13	537	730	658.8	45.8
	Carbonate	(mg/L)	13	0.25	2.5	2.0	1.0
	Chloride	(mg/L)	13	8.07	18	12.8	2.6
	Fluoride	(mg/L)	13	0.047	0.135	0.1	0.02
	Hydroxide	(mg/L)	13	0.25	2.5	2	1.0
	Sulphate	(mg/L)	13	622	1270	1023.9	153.9
	Calcium	(mg/L)	13	178	330	263	36.2
	Iron	(mg/L)	11	8.26	14	11.7	1.6
	Magnesium	(mg/L)	13	68.8	110	90.07	11.6
	Manganese	(mg/L)	13	1.21	2.3	1.8	0.3
	Potassium	(mg/L)	12	4.38	6.96	5.7	0.8
	Sodium	(mg/L)	13	189	320	258.9	31.7
	Alkalinity (Total; as CaCO3)	(mg/L)	13	440	600	540.3	38.0
	Electrical Conductivity	(uS/cm)	13	1900	3000	2583.8	263.2
	Hardness (Total; as CaCO3)	(mg/L)	13	728	1300	1031.2	140.03
	pH	(pH Units)	13	7.09	8.06	7.6	0.3
	Total Dissolved Solids	(mg/L)	13	1330	2400	1984.6	251.3
	Ammonia (Total; as N)	(mg/L)	13	0.26	2.68	2.1	0.6
	Nitrate (as N)	(mg/L)	13	0.004	0.1	0.04	0.04
	Nitrite (as N)	(mg/L)	13	0.0015	0.03	0.02	0.01
	Nitrite-plus-Nitrate (as N)	(mg/L)	13	0.004	0.1	0.05	0.03
	Ion Balance	(%)	13	0.84	110	92.5	28.01
	Dissolved Organic Carbon	(mg/L)	13	5	11.5	6.4	1.6
	Dissolved Metals Parameters						
	Aluminium	(mg/L)	13	0.0005	0.0116	0.004	0.003

Appendix 6

Statistical Table

Project No.: 307075-01608-100

Monitoring Station	Parameter	Unit	Count	Minimum	Maximum	Mean	Standard Deviation
	Antimony	(mg/L)	13	0.0001	0.0008	0.0003	0.0002
	Arsenic	(mg/L)	13	0.001	0.0057	0.003	0.001
	Barium	(mg/L)	12	0.0298	0.0954	0.05	0.02
	Beryllium	(mg/L)	12	0.00025	0.00125	0.0004	0.0003
	Bismuth	(mg/L)	4	0.000025	0.00005	0.00003	0.00001
	Boron	(mg/L)	12	0.215	0.366	0.3	0.04
	Cadmium	(mg/L)	13	0.00001	0.0001	0.00005	0.00002
	Chromium	(mg/L)	13	0.0002	0.004	0.002	0.001
	Cobalt	(mg/L)	12	0.00097	0.0026	0.001	0.0005
	Copper	(mg/L)	13	0.0001	0.0024	0.001	0.0008
	Lead	(mg/L)	13	0.00005	0.0004	0.0001	0.0001
	Lithium	(mg/L)	1	0.16	0.16	0.2	---
	Mercury	(mg/L)	12	0.0000005	0.00005	0.00003	0.00002
	Total Mercury	(ug/L)	1	0.0025	0.0025	0.003	---
	Molybdenum	(mg/L)	12	0.0004	0.00151	0.001	0.0003
	Nickel	(mg/L)	13	0.00005	0.0059	0.002	0.002
	Phosphorus	(mg/L)	1	0.05	0.05	0.05	---
	Selenium	(mg/L)	13	0.0001	0.00127	0.0004	0.0004
	Silicon	(mg/L)	1	8	8	8	---
	Silver	(mg/L)	13	0.00005	0.0001	0.00007	0.00002
	Strontium	(mg/L)	6	2.2	2.6	2.5	0.1
	Thallium	(mg/L)	12	0.000025	0.00025	0.00008	0.00007
	Tin	(mg/L)	7	0.0001	0.0005	0.0003	0.0002
	Titanium	(mg/L)	12	0.00015	0.002	0.0009	0.0005
	Uranium	(mg/L)	13	0.00138	0.0018	0.002	0.0001
	Vanadium	(mg/L)	12	0.00005	0.002	0.0003	0.0006
	Zinc	(mg/L)	13	0.001	0.006	0.003	0.002
	Petroleum Hydrocarbon Parameters						
	Benzene	(mg/L)	12	0.0002	0.00025	0.0002	0.00002
	Toluene	(mg/L)	12	0.0002	0.000375	0.0003	0.00007
	Ethylbenzene	(mg/L)	12	0.0002	0.00025	0.0002	0.00002
	m&p-Xylene	(mg/L)	6	0.00025	0.0004	0.0003	0.00006
	o-Xylene	(mg/L)	6	0.0002	0.00025	0.0002	0.00002
	Xylenes (Total)	(mg/L)	12	0.00025	0.0005	0.0004	0.0001
	Styrene	(mg/L)	2	0.0005	0.0005	0.0005	0
	PHC F1 (C6-C10)	(mg/L)	12	0.05	0.05	0.05	7.2E-18
	PHC F1 (C6-C10) - BTEX	(mg/L)	12	0.05	0.05	0.05	7.2E-18
	PHC F2 (C10-C16)	(mg/L)	13	0.025	0.125	0.08	0.05
	Volatile Organic Compounds						
	Phenols	(mg/L)	13	0.0005	0.003	0.001	0.0008
MW-08	**Groundwater Elevation**						
	Depth to Groundwater	(mbtoc)	14	27.55	27.83	27.7	0.09
	Groundwater Surface Elevation	(masl)	14	598.61	598.89	598.8	0.09
	Field-Measured Parameters						
	Electrical Conductivity	(uS/cm)	6	1198	1387	1335.3	70.3
	pH	(pH Units)	6	7.09	7.41	7.3	0.1
	Temperature	(ºC)	6	5.4	9	7.3	1.2
	Select Indicator Parameters						
	Bicarbonate	(mg/L)	12	474	630	564.3	37.8
	Carbonate	(mg/L)	12	0.25	2.5	2.0	1.0
	Chloride	(mg/L)	12	0.86	4	2.04	1.0
	Fluoride	(mg/L)	12	0.08	0.13	0.1	0.02
	Hydroxide	(mg/L)	12	0.25	2.5	2.0	1.0
	Sulphate	(mg/L)	12	300	370	327.2	24.7
	Calcium	(mg/L)	12	130	161	144.3	9.03
	Iron	(mg/L)	10	5.16	7.29	6.5	0.8
	Magnesium	(mg/L)	12	35	45	40.2	3.3
	Manganese	(mg/L)	12	0.384	0.481	0.4	0.03
	Potassium	(mg/L)	11	5	6.47	5.7	0.5
	Sodium	(mg/L)	12	98	137	116.3	10.8
	Alkalinity (Total; as CaCO3)	(mg/L)	12	388	520	462.3	31.9
	Electrical Conductivity	(uS/cm)	12	1240	1470	1356.7	68.1
	Hardness (Total; as CaCO3)	(mg/L)	12	480	584	524.9	32.9
	pH	(pH Units)	12	7.43	8.04	7.8	0.2
	Total Dissolved Solids	(mg/L)	12	862	999	914.3	48.8
	Ammonia (Total; as N)	(mg/L)	12	0.25	1.9	1.6	0.4
	Nitrate (as N)	(mg/L)	12	0.005	0.1	0.04	0.03
	Nitrite (as N)	(mg/L)	12	0.0015	0.03	0.02	0.009
	Nitrite-plus-Nitrate (as N)	(mg/L)	12	0.007	0.1	0.04	0.03
	Ion Balance	(%)	12	0.84	104	90.7	28.6
	Dissolved Organic Carbon	(mg/L)	12	5	10.3	6.0	1.5
	Dissolved Metals Parameters						
	Aluminium	(mg/L)	12	0.0005	0.0104	0.004	0.003
	Antimony	(mg/L)	12	0.0001	0.0006	0.0003	0.0002
	Arsenic	(mg/L)	12	0.002	0.00767	0.005	0.002
	Barium	(mg/L)	11	0.03	0.115	0.06	0.02
	Beryllium	(mg/L)	12	0.00025	0.0005	0.0003	0.0001
	Bismuth	(mg/L)	4	0.000025	0.00009	0.00004	0.00003
	Boron	(mg/L)	11	0.13	0.244	0.2	0.03
	Cadmium	(mg/L)	12	0.0000025	0.0001	0.00005	0.00002
	Chromium	(mg/L)	12	0.0005	0.003	0.002	0.0009
	Cobalt	(mg/L)	12	0.00015	0.0009	0.0004	0.0003
	Copper	(mg/L)	12	0.0001	0.0016	0.0008	0.0004
	Lead	(mg/L)	12	0.00005	0.0004	0.0001	0.0001
	Lithium	(mg/L)	1	0.092	0.092	0.09	---
	Mercury	(mg/L)	11	0.0000005	0.00005	0.00003	0.00002
	Total Mercury	(ug/L)	1	0.0025	0.0025	0.003	---
	Molybdenum	(mg/L)	12	0.0011	0.0025	0.002	0.0004
	Nickel	(mg/L)	12	0.00005	0.0036	0.001	0.001
	Phosphorus	(mg/L)	1	0.05	0.05	0.05	---
	Selenium	(mg/L)	12	0.0001	0.00159	0.0004	0.0004
	Silicon	(mg/L)	1	7.7	7.7	7.7	---
	Silver	(mg/L)	12	0.00005	0.0001	0.00007	0.00002
	Strontium	(mg/L)	6	1.27	1.59	1.4	0.1
	Thallium	(mg/L)	12	0.000025	0.00025	0.00006	0.00007

Appendix 6
Statistical Table

Project No.: 307075-01608-100

Monitoring Station	Parameter	Unit	Count	Minimum	Maximum	Mean	Standard Deviation
	Tin	(mg/L)	7	0.0001	0.0005	0.0003	0.0002
	Titanium	(mg/L)	12	0.00015	0.002	0.0008	0.0006
	Uranium	(mg/L)	12	0.00067	0.0015	0.0008	0.0002
	Vanadium	(mg/L)	12	0.00005	0.001	0.0003	0.0003
	Zinc	(mg/L)	12	0.001	0.0163	0.004	0.005
	Petroleum Hydrocarbon Parameters						
	Benzene	(mg/L)	11	0.0002	0.00025	0.0002	0.00002
	Toluene	(mg/L)	11	0.0002	0.000375	0.0003	0.00006
	Ethylbenzene	(mg/L)	11	0.0002	0.00025	0.0002	0.00002
	m&p-Xylene	(mg/L)	5	0.00025	0.0004	0.0003	0.00007
	o-Xylene	(mg/L)	5	0.0002	0.00025	0.0002	0.00002
	Xylenes (Total)	(mg/L)	11	0.00025	0.0005	0.0004	0.0001
	Styrene	(mg/L)	2	0.0005	0.0005	0.0005	0
	PHC F1 (C6-C10)	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F1 (C6-C10) - BTEX	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F2 (C10-C16)	(mg/L)	12	0.025	0.125	0.07	0.05
	Volatile Organic Compounds						
	Phenols	(mg/L)	12	0.0005	0.002	0.0008	0.0005
MW-09	**Groundwater Elevation**						
	Depth to Groundwater	(mbtoc)	14	28.17	28.64	28.4	0.1
	Groundwater Surface Elevation	(masl)	14	596.09	596.56	596.4	0.1
	Field-Measured Parameters						
	Electrical Conductivity	(uS/cm)	6	1427	1548	1503.3	48.6
	pH	(pH Units)	6	7.35	7.67	7.5	0.1
	Temperature	(ºC)	6	6.8	9.1	7.9	0.9
	Select Indicator Parameters						
	Bicarbonate	(mg/L)	12	525	670	631.9	36.1
	Carbonate	(mg/L)	12	0.25	2.5	2.0	1.0
	Chloride	(mg/L)	12	4	7	5.6	0.9
	Fluoride	(mg/L)	12	0.025	0.29	0.2	0.1
	Hydroxide	(mg/L)	12	0.25	2.5	2.0	1.0
	Sulphate	(mg/L)	12	312	350	326.4	12.2
	Calcium	(mg/L)	12	71.6	98.1	90.3	7.4
	Iron	(mg/L)	11	1.11	2.04	1.7	0.3
	Magnesium	(mg/L)	12	22	28	26.2	1.8
	Manganese	(mg/L)	12	0.714	0.868	0.8	0.05
	Potassium	(mg/L)	11	3.3	4.23	4.0	0.3
	Sodium	(mg/L)	12	212	251	232.2	11.3
	Alkalinity (Total; as CaCO3)	(mg/L)	12	430	550	517.6	30.1
	Electrical Conductivity	(uS/cm)	12	1390	1580	1517.5	46.7
	Hardness (Total; as CaCO3)	(mg/L)	12	286	359	333.6	23.2
	pH	(pH Units)	12	7.61	8.17	8.0	0.2
	Total Dissolved Solids	(mg/L)	12	944	1030	994.3	27.4
	Ammonia (Total; as N)	(mg/L)	12	0.23	2.17	1.8	0.52
	Nitrate (as N)	(mg/L)	12	0.005	0.1	0.04	0.03
	Nitrite (as N)	(mg/L)	12	0.0015	0.03	0.02	0.01
	Nitrite-plus-Nitrate (as N)	(mg/L)	12	0.005	0.1	0.05	0.03
	Ion Balance	(%)	12	0.86	110	90.6	28.7
	Dissolved Organic Carbon	(mg/L)	12	5	9	6.4	1.3
	Dissolved Metals Parameters						
	Aluminium	(mg/L)	12	0.0005	0.14	0.02	0.05
	Antimony	(mg/L)	12	0.0001	0.0007	0.0003	0.0002
	Arsenic	(mg/L)	12	0.0018	0.0028	0.002	0.0003
	Barium	(mg/L)	11	0.02	0.0608	0.03	0.01
	Beryllium	(mg/L)	12	0.00025	0.0005	0.0003	0.0001
	Bismuth	(mg/L)	4	0.000025	0.00005	0.00003	0.00001
	Boron	(mg/L)	11	0.196	0.339	0.3	0.04
	Cadmium	(mg/L)	12	0.000008	0.0001	0.00005	0.00002
	Chromium	(mg/L)	12	0.0005	0.0025	0.002	0.0009
	Cobalt	(mg/L)	12	0.0008	0.0023	0.001	0.0004
	Copper	(mg/L)	12	0.0001	0.0012	0.0007	0.0003
	Lead	(mg/L)	12	0.00005	0.0001	0.00007	0.00002
	Lithium	(mg/L)	1	0.081	0.081	0.08	---
	Mercury	(mg/L)	11	0.0000005	0.00005	0.00003	0.00002
	Total Mercury	(ug/L)	1	0.0025	0.0025	0.003	---
	Molybdenum	(mg/L)	12	0.00131	0.0038	0.002	0.0007
	Nickel	(mg/L)	12	0.00005	0.0087	0.002	0.002
	Phosphorus	(mg/L)	1	0.05	0.05	0.05	---
	Selenium	(mg/L)	12	0.0001	0.0005	0.0002	0.0001
	Silicon	(mg/L)	1	6.4	6.4	6.4	---
	Silver	(mg/L)	12	0.00005	0.00013	0.00007	0.00003
	Strontium	(mg/L)	6	0.81	0.961	0.9	0.05
	Thallium	(mg/L)	12	0.000025	0.00025	0.00007	0.00007
	Tin	(mg/L)	7	0.0001	0.0005	0.0003	0.0002
	Titanium	(mg/L)	12	0.00015	0.0058	0.002	0.002
	Uranium	(mg/L)	12	0.0012	0.0019	0.001	0.0002
	Vanadium	(mg/L)	12	0.00005	0.0005	0.0003	0.0002
	Zinc	(mg/L)	12	0.001	0.005	0.002	0.001
	Petroleum Hydrocarbon Parameters						
	Benzene	(mg/L)	11	0.0002	0.00025	0.0002	0.00002
	Toluene	(mg/L)	11	0.0002	0.000375	0.0003	0.00006
	Ethylbenzene	(mg/L)	11	0.0002	0.00025	0.0002	0.00002
	m&p-Xylene	(mg/L)	5	0.00025	0.0004	0.0003	0.00007
	o-Xylene	(mg/L)	5	0.0002	0.00025	0.0002	0.00002
	Xylenes (Total)	(mg/L)	11	0.00025	0.0005	0.0004	0.0001
	Styrene	(mg/L)	2	0.0005	0.0005	0.0005	0
	PHC F1 (C6-C10)	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F1 (C6-C10) - BTEX	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F2 (C10-C16)	(mg/L)	12	0.025	0.3	0.09	0.08
	Volatile Organic Compounds						
	Phenols	(mg/L)	12	0.0005	0.003	0.0009	0.0008
MW-10	**Groundwater Elevation**						
	Depth to Groundwater	(mbtoc)	14	26.63	26.93	26.8	0.1
	Groundwater Surface Elevation	(masl)	14	597.74	598.04	597.9	0.1

Appendix 6

Statistical Table

Project No.: 307075-01608-100

Monitoring Station	Parameter	Unit	Count	Minimum	Maximum	Mean	Standard Deviation
	Field-Measured Parameters						
	Electrical Conductivity	(uS/cm)	6	1192	1292	1254.5	36.7
	pH	(pH Units)	6	7.11	7.42	7.3	0.1
	Temperature	(ºC)	6	6.6	9.1	7.6	0.9
	Select Indicator Parameters						
	Bicarbonate	(mg/L)	12	507	660	624.8	39.5
	Carbonate	(mg/L)	12	0.25	2.5	2.0	1.0
	Chloride	(mg/L)	12	0.5	3	1.2	0.8
	Fluoride	(mg/L)	12	0.025	0.2	0.1	0.05
	Hydroxide	(mg/L)	12	0.25	2.5	2.0	1.0
	Sulphate	(mg/L)	12	190	230	215.1	11.5
	Calcium	(mg/L)	12	113	141	130.5	8.6
	Iron	(mg/L)	11	3.89	6.8	5.8	0.7
	Magnesium	(mg/L)	12	29	39.1	35.0	3.1
	Manganese	(mg/L)	12	0.566	0.735	0.7	0.05
	Potassium	(mg/L)	11	4.7	6.22	5.5	0.5
	Sodium	(mg/L)	12	105	124	114.2	6.1
	Alkalinity (Total; as CaCO3)	(mg/L)	12	416	540	511.8	32.03
	Electrical Conductivity	(uS/cm)	12	1110	1300	1250	65.4
	Hardness (Total; as CaCO3)	(mg/L)	12	407	508	469.08	34.2
	pH	(pH Units)	12	7.44	8.09	7.8	0.2
	Total Dissolved Solids	(mg/L)	12	752	847	809.3	28.3
	Ammonia (Total; as N)	(mg/L)	12	1.36	1.88	1.7	0.1
	Nitrate (as N)	(mg/L)	12	0.005	0.1	0.04	0.03
	Nitrite (as N)	(mg/L)	12	0.0015	0.03	0.02	0.01
	Nitrite-plus-Nitrate (as N)	(mg/L)	12	0.005	0.1	0.04	0.03
	Ion Balance	(%)	12	0.84	110	91.7	29.2
	Dissolved Organic Carbon	(mg/L)	12	4.7	6.9	5.6	0.7
	Dissolved Metals Parameters						
	Aluminium	(mg/L)	12	0.0005	0.0139	0.004	0.004
	Antimony	(mg/L)	12	0.0001	0.0007	0.0003	0.0002
	Arsenic	(mg/L)	12	0.002	0.00485	0.004	0.0008
	Barium	(mg/L)	11	0.02	0.0331	0.03	0.003
	Beryllium	(mg/L)	12	0.00025	0.0005	0.0003	0.0001
	Bismuth	(mg/L)	4	0.000025	0.00005	0.00003	0.00001
	Boron	(mg/L)	11	0.127	0.209	0.2	0.02
	Cadmium	(mg/L)	12	0.000007	0.0001	0.00005	0.00002
	Chromium	(mg/L)	12	0.0002	0.0025	0.002	0.001
	Cobalt	(mg/L)	12	0.00015	0.0005	0.0003	0.0001
	Copper	(mg/L)	12	0.0001	0.0015	0.0007	0.0003
	Lead	(mg/L)	12	0.00005	0.0004	0.00009	0.0001
	Lithium	(mg/L)	1	0.1	0.1	0.1	---
	Mercury	(mg/L)	11	0.0000005	0.00005	0.00003	0.00002
	Total Mercury	(ug/L)	1	0.0025	0.0025	0.003	---
	Molybdenum	(mg/L)	12	0.00077	0.00481	0.001	0.001
	Nickel	(mg/L)	12	0.00005	0.003	0.001	0.001
	Phosphorus	(mg/L)	1	0.05	0.05	0.05	---
	Selenium	(mg/L)	12	0.0001	0.0006	0.0002	0.0002
	Silicon	(mg/L)	1	7.1	7.1	7.1	---
	Silver	(mg/L)	12	0.00005	0.0001	0.00007	0.00002
	Strontium	(mg/L)	6	1.29	1.55	1.4	0.1
	Thallium	(mg/L)	12	0.000025	0.00025	0.00006	0.00007
	Tin	(mg/L)	7	0.0001	0.0005	0.0003	0.0002
	Titanium	(mg/L)	12	0.00015	0.002	0.0006	0.0005
	Uranium	(mg/L)	12	0.0011	0.0019	0.001	0.0002
	Vanadium	(mg/L)	12	0.00005	0.0005	0.0002	0.0002
	Zinc	(mg/L)	12	0.001	0.015	0.004	0.004
	Petroleum Hydrocarbon Parameters						
	Benzene	(mg/L)	11	0.0002	0.00025	0.0002	0.00002
	Toluene	(mg/L)	11	0.0002	0.000375	0.0003	0.00006
	Ethylbenzene	(mg/L)	11	0.0002	0.00025	0.0002	0.00002
	m&p-Xylene	(mg/L)	5	0.00025	0.0004	0.0003	0.00007
	o-Xylene	(mg/L)	5	0.0002	0.00025	0.0002	0.00002
	Xylenes (Total)	(mg/L)	11	0.00025	0.0005	0.0004	0.00010
	Styrene	(mg/L)	2	0.0005	0.0005	0.0005	0
	PHC F1 (C6-C10)	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F1 (C6-C10) - BTEX	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F2 (C10-C16)	(mg/L)	12	0.025	0.125	0.07	0.047
	Volatile Organic Compounds						
	Phenols	(mg/L)	12	0.0005	0.002	0.0009	0.0006
MW-11	**Groundwater Elevation**						
	Depth to Groundwater	(mbtoc)	14	30.19	30.64	30.4	0.1
	Groundwater Surface Elevation	(masl)	14	594.52	594.97	594.8	0.1
	Field-Measured Parameters						
	Electrical Conductivity	(uS/cm)	6	1241	1341	1291.2	38.1
	pH	(pH Units)	6	7.06	7.42	7.2	0.1
	Temperature	(ºC)	6	6.9	9.8	7.7	1.07
	Select Indicator Parameters						
	Bicarbonate	(mg/L)	12	473	680	637.8	53.5
	Carbonate	(mg/L)	12	0.25	2.5	2.0	1.0
	Chloride	(mg/L)	12	8	16	10.9	2.8
	Fluoride	(mg/L)	12	0.025	0.14	0.09	0.03
	Hydroxide	(mg/L)	12	0.25	2.5	2.0	1.0
	Sulphate	(mg/L)	12	170	227	202.4	14.1
	Calcium	(mg/L)	12	130	153	142.9	7.1
	Iron	(mg/L)	11	6.82	7.61	7.1	0.3
	Magnesium	(mg/L)	12	38	46.4	43.7	2.9
	Manganese	(mg/L)	12	0.605	0.697	0.7	0.03
	Potassium	(mg/L)	11	3.9	5.36	4.9	0.5
	Sodium	(mg/L)	12	85	102	92.1	5.2
	Alkalinity (Total; as CaCO3)	(mg/L)	12	388	560	523.2	44.0
	Electrical Conductivity	(uS/cm)	12	1090	1320	1257.5	77.5
	Hardness (Total; as CaCO3)	(mg/L)	12	480	570	537.3	29.0
	pH	(pH Units)	12	7.4	8.04	7.8	0.2

Appendix 6

Statistical Table

Project No.: 307075-01608-100

Monitoring Station	Parameter	Unit	Count	Minimum	Maximum	Mean	Standard Deviation
	Total Dissolved Solids	(mg/L)	12	746	840	812.2	25.6
	Ammonia (Total; as N)	(mg/L)	12	0.2	1.58	1.4	0.4
	Nitrate (as N)	(mg/L)	12	0.003	0.1	0.04	0.03
	Nitrite (as N)	(mg/L)	12	0.0015	0.03	0.02	0.009
	Nitrite-plus-Nitrate (as N)	(mg/L)	12	0.003	0.1	0.04	0.03
	Ion Balance	(%)	12	0.87	110	92.8	29.5
	Dissolved Organic Carbon	(mg/L)	12	5.5	15	7.2	2.6
	Dissolved Metals Parameters						
	Aluminium	(mg/L)	12	0.0005	0.02	0.005	0.006
	Antimony	(mg/L)	12	0.0001	0.0008	0.0003	0.0002
	Arsenic	(mg/L)	12	0.0005	0.0026	0.002	0.0006
	Barium	(mg/L)	11	0.03	0.0494	0.04	0.005
	Beryllium	(mg/L)	12	0.00025	0.0005	0.0003	0.0001
	Bismuth	(mg/L)	4	0.000025	0.00008	0.00004	0.00003
	Boron	(mg/L)	11	0.135	0.227	0.2	0.02
	Cadmium	(mg/L)	12	0.000009	0.0001	0.00005	0.00002
	Chromium	(mg/L)	12	0.0005	0.0025	0.002	0.0009
	Cobalt	(mg/L)	12	0.00015	0.0007	0.0004	0.0002
	Copper	(mg/L)	12	0.0001	0.0017	0.0006	0.0004
	Lead	(mg/L)	12	0.00005	0.0001	0.00006	0.00002
	Lithium	(mg/L)	1	0.079	0.079	0.08	---
	Mercury	(mg/L)	11	0.000001	0.00005	0.00003	0.00002
	Total Mercury	(ug/L)	1	0.0025	0.0025	0.003	---
	Molybdenum	(mg/L)	12	0.000539	0.001	0.0007	0.0002
	Nickel	(mg/L)	12	0.00005	0.0027	0.001	0.001
	Phosphorus	(mg/L)	1	0.05	0.05	0.05	---
	Selenium	(mg/L)	12	0.0001	0.0005	0.0002	0.0001
	Silicon	(mg/L)	1	8	8	8	---
	Silver	(mg/L)	12	0.00005	0.0001	0.00007	0.00002
	Strontium	(mg/L)	6	1.1	1.35	1.2	0.08
	Thallium	(mg/L)	12	0.000025	0.00025	0.00006	0.00007
	Tin	(mg/L)	7	0.0001	0.0005	0.0003	0.0002
	Titanium	(mg/L)	12	0.00015	0.003	0.001	0.0009
	Uranium	(mg/L)	12	0.00099	0.0013	0.001	0.0001
	Vanadium	(mg/L)	12	0.00005	0.0005	0.0002	0.0002
	Zinc	(mg/L)	12	0.001	0.0105	0.003	0.003
	Petroleum Hydrocarbon Parameters						
	Benzene	(mg/L)	11	0.0002	0.00025	0.0002	0.00002
	Toluene	(mg/L)	11	0.0002	0.000375	0.0003	0.00006
	Ethylbenzene	(mg/L)	11	0.0002	0.00025	0.0002	0.00002
	m&p-Xylene	(mg/L)	5	0.00025	0.0004	0.0003	0.00007
	o-Xylene	(mg/L)	5	0.0002	0.00025	0.0002	0.00002
	Xylenes (Total)	(mg/L)	11	0.00025	0.0005	0.0004	0.0001
	Styrene	(mg/L)	2	0.0005	0.0005	0.0005	0
	PHC F1 (C6-C10)	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F1 (C6-C10) - BTEX	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F2 (C10-C16)	(mg/L)	12	0.025	0.125	0.07	0.05
	Volatile Organic Compounds						
	Phenols	(mg/L)	12	0.0005	0.004	0.001	0.001
MW-12	**Groundwater Elevation**						
	Depth to Groundwater	(mbtoc)	14	32.76	33.62	32.9	0.2
	Groundwater Surface Elevation	(masl)	14	592.45	593.31	593.1	0.2
	Field-Measured Parameters						
	Electrical Conductivity	(uS/cm)	6	983	1032	1008.2	19.8
	pH	(pH Units)	6	6.95	7.42	7.3	0.2
	Temperature	(ºC)	6	5.1	8.7	6.9	1.3
	Select Indicator Parameters						
	Bicarbonate	(mg/L)	12	598	712	661.1	28.9
	Carbonate	(mg/L)	12	0.25	2.5	2.0	1.0
	Chloride	(mg/L)	12	5	8	6.9	0.9
	Fluoride	(mg/L)	12	0.05	0.13	0.08	0.02
	Hydroxide	(mg/L)	12	0.25	2.5	2.0	1.0
	Sulphate	(mg/L)	12	32	52.5	44.3	4.7
	Calcium	(mg/L)	12	82	101	94.8	5.1
	Iron	(mg/L)	11	2.78	4.24	3.8	0.4
	Magnesium	(mg/L)	12	23	30.9	28.3	2.1
	Manganese	(mg/L)	12	0.365	0.462	0.4	0.03
	Potassium	(mg/L)	11	4.2	5.23	4.9	0.3
	Sodium	(mg/L)	12	95.4	113	104.5	6.4
	Alkalinity (Total; as CaCO3)	(mg/L)	12	490	584	542.3	23.2
	Electrical Conductivity	(uS/cm)	12	904	1050	997.4	44.2
	Hardness (Total; as CaCO3)	(mg/L)	12	300	372	352.7	20.4
	pH	(pH Units)	12	7.4	8.14	7.9	0.2
	Total Dissolved Solids	(mg/L)	12	573	651	610.3	19.2
	Ammonia (Total; as N)	(mg/L)	12	0.29	1.39	1.2	0.3
	Nitrate (as N)	(mg/L)	12	0.005	0.1	0.04	0.03
	Nitrite (as N)	(mg/L)	12	0.0015	0.03	0.02	0.009
	Nitrite-plus-Nitrate (as N)	(mg/L)	12	0.005	0.1	0.04	0.03
	Ion Balance	(%)	12	0.84	110	91.8	29.1
	Dissolved Organic Carbon	(mg/L)	12	6	13.5	7.8	2.2
	Dissolved Metals Parameters						
	Aluminium	(mg/L)	12	0.0005	0.0146	0.004	0.004
	Antimony	(mg/L)	12	0.0001	0.0008	0.0003	0.0002
	Arsenic	(mg/L)	12	0.00199	0.00285	0.002	0.0003
	Barium	(mg/L)	11	0.1	0.182	0.1	0.03
	Beryllium	(mg/L)	12	0.00025	0.0005	0.0003	0.0001
	Bismuth	(mg/L)	4	0.000025	0.00006	0.00003	0.00002
	Boron	(mg/L)	11	0.178	0.282	0.2	0.03
	Cadmium	(mg/L)	12	0.000006	0.0005	0.00009	0.0001
	Chromium	(mg/L)	12	0.0002	0.0038	0.0018	0.001
	Cobalt	(mg/L)	12	0.00039	0.0012	0.0007	0.0003
	Copper	(mg/L)	12	0.0001	0.0008	0.0004	0.0002
	Lead	(mg/L)	12	0.00005	0.0004	0.00009	0.0001
	Lithium	(mg/L)	1	0.068	0.068	0.07	---
	Mercury	(mg/L)	11	0.000001	0.00007	0.00003	0.00003

Appendix 6

Statistical Table

Project No.: 307075-01608-100

Monitoring Station	Parameter	Unit	Count	Minimum	Maximum	Mean	Standard Deviation
	Total Mercury	(ug/L)	1	0.0025	0.0025	0.003	---
	Molybdenum	(mg/L)	12	0.000921	0.0017	0.001	0.0002
	Nickel	(mg/L)	12	0.00005	0.0033	0.001	0.001
	Phosphorus	(mg/L)	1	0.05	0.05	0.05	---
	Selenium	(mg/L)	12	0.0001	0.0005	0.0002	0.0001
	Silicon	(mg/L)	1	7.3	7.3	7.3	---
	Silver	(mg/L)	12	0.00005	0.0001	0.00007	0.00002
	Strontium	(mg/L)	6	0.84	0.972	0.9	0.04
	Thallium	(mg/L)	12	0.000025	0.00025	0.00006	0.00007
	Tin	(mg/L)	7	0.0001	0.0005	0.0003	0.0002
	Titanium	(mg/L)	12	0.00015	0.002	0.0007	0.0005
	Uranium	(mg/L)	12	0.00075	0.0011	0.0009	0.0001
	Vanadium	(mg/L)	12	0.00005	0.0005	0.0002	0.0002
	Zinc	(mg/L)	12	0.001	0.01	0.003	0.003
	Petroleum Hydrocarbon Parameters						
	Benzene	(mg/L)	11	0.0002	0.00025	0.0002	0.00002
	Toluene	(mg/L)	11	0.0002	0.000375	0.0003	0.00006
	Ethylbenzene	(mg/L)	11	0.0002	0.00025	0.0002	0.00002
	m&p-Xylene	(mg/L)	5	0.00025	0.0004	0.0003	0.00007
	o-Xylene	(mg/L)	5	0.0002	0.00025	0.0002	0.00002
	Xylenes (Total)	(mg/L)	11	0.00025	0.0005	0.0004	0.0001
	Styrene	(mg/L)	2	0.0005	0.0005	0.0005	0
	PHC F1 (C6-C10)	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F1 (C6-C10) - BTEX	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F2 (C10-C16)	(mg/L)	12	0.025	0.125	0.07	0.05
	Volatile Organic Compounds						
	Phenols	(mg/L)	12	0.0005	0.003	0.0009	0.0008
MW-13	**Groundwater Elevation**						
	Depth to Groundwater	(mbtoc)	14	32.39	33.45	32.6	0.3
	Groundwater Surface Elevation	(masl)	14	592.83	593.89	593.7	0.3
	Field-Measured Parameters						
	Electrical Conductivity	(uS/cm)	6	733	841	769.7	39.7
	pH	(pH Units)	6	7.06	7.77	7.6	0.3
	Temperature	(ºC)	6	6.9	10.1	7.8	1.3
	Select Indicator Parameters						
	Bicarbonate	(mg/L)	12	485	715	544.4	56.4
	Carbonate	(mg/L)	12	0.25	541	46.8	155.6
	Chloride	(mg/L)	12	1.81	4	2.6	0.8
	Fluoride	(mg/L)	12	0.119	0.2	0.2	0.03
	Hydroxide	(mg/L)	12	0.25	2.5	2.0	1.0
	Sulphate	(mg/L)	12	9	13	10.2	1.4
	Calcium	(mg/L)	12	45	55.6	50.5	3.1
	Iron	(mg/L)	11	0.818	1.45	1.2	0.2
	Magnesium	(mg/L)	12	14	17.1	16.0	1.0
	Manganese	(mg/L)	12	0.231	0.263	0.2	0.01
	Potassium	(mg/L)	11	3.4	4.2	3.8	0.3
	Sodium	(mg/L)	12	101	118	108.2	5.0
	Alkalinity (Total; as CaCO3)	(mg/L)	12	398	460	434.3	14.3
	Electrical Conductivity	(uS/cm)	12	698	796	769.0	30.4
	Hardness (Total; as CaCO3)	(mg/L)	12	170	209	191.5	11.1
	pH	(pH Units)	12	7.7	8.24	8.0	0.2
	Total Dissolved Solids	(mg/L)	12	425	470	452.8	12.1
	Ammonia (Total; as N)	(mg/L)	12	0.23	1.4	1.2	0.3
	Nitrate (as N)	(mg/L)	12	0.005	0.2	0.05	0.06
	Nitrite (as N)	(mg/L)	12	0.0015	0.03	0.02	0.01
	Nitrite-plus-Nitrate (as N)	(mg/L)	12	0.005	0.2	0.06	0.05
	Ion Balance	(%)	12	0.87	102	89.3	28.1
	Dissolved Organic Carbon	(mg/L)	12	4	6.3	4.8	0.6
	Dissolved Metals Parameters						
	Aluminium	(mg/L)	12	0.0005	0.07	0.01	0.02
	Antimony	(mg/L)	12	0.0001	0.0008	0.0003	0.0002
	Arsenic	(mg/L)	12	0.001	0.00179	0.001	0.0002
	Barium	(mg/L)	11	0.29	0.462	0.4	0.05
	Beryllium	(mg/L)	12	0.00025	0.0005	0.0003	0.0001
	Bismuth	(mg/L)	4	0.000025	0.00005	0.00003	0.00001
	Boron	(mg/L)	11	0.196	0.301	0.2	0.03
	Cadmium	(mg/L)	12	0.000005	0.0001	0.00005	0.00002
	Chromium	(mg/L)	12	0.0005	0.0048	0.002	0.001
	Cobalt	(mg/L)	12	0.00062	0.0033	0.001	0.0007
	Copper	(mg/L)	12	0.0001	0.0007	0.0004	0.0002
	Lead	(mg/L)	12	0.00005	0.0002	0.00009	0.00006
	Lithium	(mg/L)	1	0.048	0.048	0.05	---
	Mercury	(mg/L)	11	0.0000005	0.0001	0.00004	0.00003
	Total Mercury	(ug/L)	1	0.0025	0.0025	0.003	---
	Molybdenum	(mg/L)	12	0.0018	0.00484	0.002	0.001
	Nickel	(mg/L)	12	0.00005	0.0112	0.002	0.003
	Phosphorus	(mg/L)	1	0.05	0.05	0.05	---
	Selenium	(mg/L)	12	0.0001	0.0005	0.0002	0.0001
	Silicon	(mg/L)	1	6	6	6	---
	Silver	(mg/L)	12	0.00005	0.0001	0.00007	0.00002
	Strontium	(mg/L)	6	0.5	0.58	0.5	0.03
	Thallium	(mg/L)	12	0.000025	0.00025	0.00006	0.00007
	Tin	(mg/L)	7	0.0001	0.0005	0.0003	0.0002
	Titanium	(mg/L)	12	0.00015	0.002	0.0007	0.0005
	Uranium	(mg/L)	12	0.00063	0.0009	0.0008	0.0001
	Vanadium	(mg/L)	12	0.00005	0.0005	0.0002	0.0002
	Zinc	(mg/L)	12	0.001	0.009	0.002	0.002
	Petroleum Hydrocarbon Parameters						
	Benzene	(mg/L)	11	0.0002	0.00025	0.0002	0.00002
	Toluene	(mg/L)	11	0.0002	0.000375	0.0003	0.00006
	Ethylbenzene	(mg/L)	11	0.0002	0.00025	0.0002	0.00002
	m&p-Xylene	(mg/L)	5	0.00025	0.0004	0.0003	0.00007
	o-Xylene	(mg/L)	5	0.0002	0.00025	0.0002	0.00002
	Xylenes (Total)	(mg/L)	11	0.00025	0.0005	0.0004	0.0001
	Styrene	(mg/L)	2	0.0005	0.0005	0.0005	0

WorleyParsons
resources & energy

Appendix 6

Statistical Table

Project No.: 307075-01608-100

Monitoring Station	Parameter	Unit	Count	Minimum	Maximum	Mean	Standard Deviation
	PHC F1 (C6-C10)	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F1 (C6-C10) - BTEX	(mg/L)	11	0.05	0.05	0.05	7.3E-18
	PHC F2 (C10-C16)	(mg/L)	12	0.025	0.125	0.07	0.05
	Volatile Organic Compounds						
	Phenols	(mg/L)	12	0.0005	0.003	0.0008	0.0007

NOTES:

1. *Basic analysis performed with the following condition:*
   - Non-detect multiplier of 0.5 applied to <Detection Limit sample data
2. *--- Denotes that statistics are not available due to limited detected values*
3. *Anomalous iron concentrations from Spring 2006 at one well (MW-07), from Summer 2007 at one well (MW-04), from Fall 2007 at all wells, and from Spring 2009 at five wells (MW-01, MW-03, MW-04, MW-05, and MW-08) are not included in calculations*
4. *For MW-02, results from 16-June-2014 are not included in calculations as chloride concentrations and ion balance are considered anomalous, except for the results of depth to groundwater and groundwater surface elevation*

Appendix 7 QA/QC Results Summary

Appendix 7

QA/QC FOR DUPLICATE SAMPLES
June 2015 Sampling Event

Parameters	Units	RDL	MW-10	Duplicate from MW-10	RPD	AD
Date			24-Jun-2015	24-Jun-2015		
TDS-calculated	mg/L	10	820	820	0.0	---
Total Hardness (as $CaCO_3$)	mg/L	0.5	480	480	0.0	---
Total Alkalinity (as $CaCO_3$)	mg/L	0.5	520	520	0.0	---
EC	µS/cm	1	1300	1300	0.0	---
pH	pH Units	0.1	7.44	7.41	0.4	---
Bicarbonate	mg/L	0.5	640	630	1.6	---
Carbonate	mg/L	0.5	<0.5	<0.5	---	---
Chloride:D	mg/L	1	1.1	1.2	---	0.1
Fluoride:D	mg/L	0.05	0.16	0.14	---	0.02
Sulphate:D	mg/L	5	210.	200.	4.9	---
Nitrate as N	mg/L-N	0.01	<0.01	<0.01	---	---
Nitrite as N	mg/L-N	0.01	<0.01	<0.01	---	---
Calcium:D	mg/L	0.3	130.	130.	0.0	---
Magnesium:D	mg/L	0.2	36.	36.	0.0	---
Potassium:D	mg/L	0.3	5.8	5.6	3.5	---
Sodium:D	mg/L	0.5	120.	120.	0.0	---
Iron:D	mg/L	0.06	6.3	6.4	1.6	---
Manganese:D	mg/L	0.004	0.67	0.67	0.0	---
Phenols	mg/L	0.002	<0.002	<0.002	---	---
DOC	mg/L	0.5	5.1	5.2	1.9	---
Ion Balance		0.01	1.	1.	0.0	---
Aluminum:D	mg/L	0.003	<0.003	<0.003	---	---
Antimony:D	mg/L	0.0006	<0.0006	<0.0006	---	---
Arsenic:D	mg/L	0.0002	0.0039	0.004	2.5	---
Barium:D	mg/L	0.01	0.03	0.03	---	0
Beryllium:D	mg/L	0.001	<0.001	<0.001	---	---
Bismuth:D	mg/L	----	---	---	---	---
Boron:D	mg/L	0.02	0.18	0.17	5.7	---
Cadmium:D	mg/L	0.00002	<0.00002	<0.00002	---	---
Chromium:D	mg/L	0.001	<0.001	<0.001	---	---
Cobalt:D	mg/L	0.0003	0.0003	0.00031	---	0.00001
Copper:D	mg/L	0.0002	<0.0002	<0.0002	---	---
Lead:D	mg/L	0.0002	<0.0002	<0.0002	---	---
Mercury:D	mg/L	0.000005	---	---	---	---
Mercury:T	mg/L	0.000005	<0.000005	<0.000005	---	---
Molybdenum:D	mg/L	0.0002	0.00088	0.00087	---	0.00001
Nickel:D	mg/L	0.0005	0.00085	0.00083	---	0.00002
Selenium:D	mg/L	0.0002	<0.0002	<0.0002	---	---
Silver:D	mg/L	0.0001	<0.0001	<0.0001	---	---
Strontium:D	mg/L	0.02	1.4	1.4	0.0	---
Thallium:D	mg/L	0.0002	<0.0002	<0.0002	---	---
Tin:D	mg/L	0.001	<0.001	<0.001	---	---
Titanium:D	mg/L	0.001	<0.001	<0.001	---	---
Uranium:D	mg/L	0.0001	0.0012	0.0011	8.7	---
Vanadium:D	mg/L	0.001	<0.001	<0.001	---	---
Zinc:D	mg/L	0.003	<0.003	<0.003	---	---
Benzene	mg/L	0.0004	<0.0004	<0.0004	---	---
Toluene	mg/L	0.0004	<0.0004	<0.0004	---	---
Ethylbenzene	mg/L	0.0004	<0.0004	<0.0004	---	---
Xylenes-total	mg/L	0.0008	<0.0008	<0.0008	---	---
F1 (C_6-C_{10})-BTEX	mg/L	0.1	<0.1	<0.1	---	---
F2 (C_{11}-C_{16})	mg/L	0.1	<0.1	<0.1	---	---

RPD: Relative Percent Difference. Zeiner (1994) indicated that RPD < 20% is acceptable.
AD: Absolute Difference. Zeiner (1994) indicated that AD < RDL is acceptable.
If either of the parent or duplicate values are < 5x RDL, then the AD is calculated instead of the RPD (Zeiner 1994).
Highlighted values exceed Zeiner (1994) criteria.