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NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION

2016 Groundwater Quality Monitoring Beverly Channel Monitoring Wells

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Advisian

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

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NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2016 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

PROJECT 307075-01608-200 - 2016 GROUNDWATER QUALITY MONITORING

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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 monitoring of the Beverly Channel within the Study Area has been conducted since 2005. The objective of the groundwater monitoring program is to monitor for changes from baseline groundwater flow and quality in the Beverly Channel. The monitoring well network in the Study Area consists of 13 wells completed in the Beverly Channel aquifer and one well completed in the bedrock 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 Canada Services Ltd. (WorleyParsons; 2010, 2011, 2012, 2013, 2014, and 2015) 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 fluctuations have generally been 1 m or less.
- The lateral groundwater flow gradient within the Beverly Channel has historically ranged spatially from approximately 0.0005 to 0.005 m/m. Groundwater flow velocity has been estimated to vary from approximately 16 to 160 m/year in 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.

1.3 Scope of Work

The scope of the 2016 program was to conduct and report on annual groundwater level and quality monitoring at the existing monitoring network and to install one groundwater monitoring well at one location within the uppermost bedrock formation underlying the Beverly Channel. The bedrock monitoring well installation was completed on September 2, 2016 and the groundwater monitoring event was conducted on September 19 and 20, 2016. The 2016 program included the following tasks:



-
- borehole drilling, geophysical logging, and installation of a groundwater monitoring well (MW-02B) within the bedrock formation at the same location as an existing Beverly Channel well (MW-02);
 - hydraulic conductivity testing of MW-02B;
 - 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
 - preparation of 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 and continuing in 2016, stable isotope analyses for hydrogen (^2H ; deuterium) and oxygen (^{18}O) were conducted on 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, marginal marine to non-marine, grey thick-bedded sandstone; grey and green mudstone; grey, clayey siltstone; coal beds; and rare intermittent ironstone beds of the Belly River Group 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 Group, the Beverly Channel, sand lenses in the till, and surficial sand and gravel deposits (Stein 1976). Aquifers within the Belly River Group 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 and Regional Quality

A water well search of the Study Area was conducted in October 2016. The Alberta Water Well Information Database indicated that there were 1,212 water well records within the Study Area (Appendix 1). The majority of the wells were listed for domestic use, but included also stock and municipal use (e.g. Village of Bruderheim). About 93% of the water well records had a depth between 1 and 80 m, with a median depth of 27.4 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. There were 120 well records indicated as abandoned.

Groundwater quality in the Beverly Channel aquifer is variable, with reported mineralization as TDS ranging from less than 500 to over 1,000 mg/L. The groundwater is also chemically hard and has elevated iron concentrations.

Based on the results of the water well search, groundwater analytical data are available for 439 of the 1,212 water well records. A subset of the available chemistry data summarizing the ranges and mean concentrations of select parameters compiled from available water well record chemistry data is provided in Table A. The summary does not include groundwater chemistry statistics from any new water wells that have been identified since analysis of the data presented in Table A was conducted.

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 these 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 Beverly Channel and upper bedrock include chloride, sulphate, and iron concentrations. Within the Beverly Channel, mean chloride concentrations are lower while mean sulphate and iron concentrations are typically higher than in the upper bedrock.

3. FIELD PROGRAM

3.1 Bedrock Monitoring Well Installation

The borehole in which the monitoring well was completed was drilled using mud rotary drilling and was advanced using a truck-mounted water well rig supplied and operated by Lakeland Drilling Limited (LLD) of St. Paul, Alberta. The drilling and groundwater monitoring well installation program was conducted on September 2, 2016. Drilling fluids consisted of fresh water and natural formation materials. A 159 mm (6 ¼ inch) tri-cone rock bit was used to advance the borehole to a total depth of 42.7 mbgs. Upon completion of drilling, the test hole was logged with geophysical tools. Logs were collected for natural gamma radiation (gamma), and bulk EC using the Geonics logging tool.

The lithology encountered while drilling is provided in the borehole log in Appendix 2. Also included in Appendix 2 are the geophysical log completed by WorleyParsons Canada Services Ltd. (WorleyParsons), operating as Advisian, and the water well report prepared and submitted to Alberta Environment and Parks (AEP) by LLD.

Based on the observed lithology and the results of the geophysical log, the shale bedrock was encountered at a depth of 34.0 mbgs. The monitoring well was screened 5.6 m (top of well screen) below the Beverly Channel and bedrock contact depth. The monitoring well screen consisted of 1.5 m of 51 mm inner diameter (ID) Schedule 80-slotted (0.010-inch) PVC. The screen was threaded to 51 mm nominal diameter, solid, Schedule 80 PVC casing to meet the required length. The bottom of the completed monitoring well was set at a depth of 41.1 mbgs. A sand pack consisting of #10–20 Colorado environmental frac sand was placed down the annulus, with a tremie pipe, from 38.7 to 42.7 mbgs (from 1.1 m below the bottom of the screen to 1.4 m above the top of the screen). Bentonite pellets (peltonite) were then installed above the sand pack from 38.7 to 38.1 mbgs as a primary upper seal. The remaining annulus was sealed with bentonite grout from 38.1 to approximately 4.0 mbgs, followed by bentonite chips from 4.0 mbgs to ground surface. A 72 mm (ID) solid PVC pipe (casing) was installed around the 51 mm PVC well casing in order to prevent breakage of the monitoring well casing typically caused by heaving of the ground.

Once in place, the monitoring well was developed using filtered, compressed air supplied by an industrial air compressor owned and operated by LLD. Development was accomplished by lowering a 19 mm (3/4-inch) high-density polyethylene (HDPE) pipe inside the monitoring well and lifting the residual drilling fluid and water from the monitoring well via air-lifting. Well development continued until field parameters (i.e., pH, EC, and temperature) had stabilized and the clarity of the water had been established. Due to the slow recovery of the monitoring well, well development was carried out intermittently to allow for water to accumulate in the well.



3.2 Hydraulic Conductivity Testing

The hydraulic conductivity testing at monitoring well MW-02B consisted of measuring the rate at which water levels in the monitoring well recovered from displaced levels to pre-displacement levels (static levels). The water was displaced by purging water from the well to near dryness.

The following outlines the general field procedure for the hydraulic conductivity test.

- The static depth to water was measured prior to purging with the use of an electric water level meter. A transducer level logger was also lowered into the monitoring well to electronically record static condition and then removed prior to purging.
- Purging was accomplished with the use of a disposal bailer.
- The transducer was then lowered into the monitoring well to electronically record water level recovery every 10 seconds.
- Manual water level measurements were also recorded at pre-determined time intervals starting with 0.5 minutes for the first 5 minutes, followed by 1 minute intervals for 5 minutes, 2 minute intervals for next 10 minutes, and then every 5 minutes thereafter for a total of 30 minutes of manual measurements. Due to the slow recovery, additional measurements were obtained the following day at 1,080.5 minutes and at 1,816.5 minutes after the commencement of the test.

3.3 Monitoring Network

The monitoring well network consists of 14 monitoring wells (including the recently installed bedrock well), which have been installed at 13 different locations within the Study Area (Figure 2). Borehole logs of the 13 existing wells were compiled by Stantec (2006a) and are provided in Appendix 2.

3.4 Groundwater Sampling

Groundwater sampling was conducted according to Advisian's 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 electric water level tape. The tape was cleaned by rinsing with distilled water after each reading.
- Wells were purged of standing water using a Waterra pump, a Geosub submersible pump, or manually via the use of a bailer. 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 ALS Laboratory 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 DOC, dissolved metals, and phenols sample bottles as directed by ALS. Hydrocarbon parameter samples bottles were provided pre-charged with preservatives by ALS. Groundwater samples were also collected for the analysis of stable isotopes deuterium (^2H) and oxygen-18 (^{18}O).

- Groundwater samples were placed in coolers with ice for transport to ALS.
- 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, including temperature, pH, and EC. The pH meter was calibrated using pH 4, pH 7, and pH 10 buffer solutions, while the EC meter was calibrated with standard KCl solution (1,413 $\mu\text{S}/\text{cm}$ at 25°C).

3.4.1 Quality Assurance/Quality Control Procedures

The QA/QC procedures for the monitoring program were as follows.

- Thorough rinsing with distilled water of all equipment entering a well (e.g., water level tape and Geosub pump);
- A blind field blank was prepared in the field and submitted for analysis of major ions/routine potability; benzene, toluene, ethylbenzene, and xylenes (BTEX), petroleum hydrocarbon (PHC) fractions (F)1 and F2, dissolved metals and trace elements, volatile organic compounds (VOCs), and isotopes.
- A blind duplicate was prepared in the field and submitted for analysis of major ions/routine potability, BTEX, PHC F1 and F2, dissolved metals and trace elements, VOCs, and isotopes.
- 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 September 19 and 20, 2016. All groundwater samples were analyzed by ALS, with the exception of the stable isotope analyses, which ALS subcontracted to Isobrine Solutions Inc.

3.4.2 Analytical Schedule

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;
- PHC parameters, including BTEX, PHC F1 and F2;
- VOCs, styrene and phenols; and
- isotopes (²H and ¹⁸O).

Table B 2016 Analytical Schedule

Monitoring Well	Major Ions/ Routine Potability (see Table 3)	Dissolved Metals & Trace Elements (see Table 4)	Petroleum Hydrocarbons (see Table 5)	Volatile Organic Compounds (see Table 6)	Isotopes (²H and ¹⁸O) (see Table 7)
MW-01	✓	✓	✓	✓	✓
MW-02	✓	✓	✓	✓	✓
MW-02B	✓	✓	✓	✓	✓
MW-03	✓	✓	✓	✓	✓
MW-04	✓	✓	✓	✓	✓
MW-05	✓	✓	✓	✓	✓
MW-06	✓	✓	✓	✓	✓
MW-07	✓	✓	✓	✓	✓
MW-08	✓	✓	✓	✓	✓
MW-09	✓	✓	✓	✓	✓
MW-10	✓	✓	✓	✓	✓
MW-11	✓	✓	✓	✓	✓
MW-12	✓	✓	✓	✓	✓
MW-13	✓	✓	✓	✓	✓

3.5 Assessment Criteria

Historically, groundwater from the Beverly Channel aquifer has been used for domestic, stock and municipal uses (e.g. Village of Bruderheim). As such, the Health Canada (2014) Guidelines for Canadian Drinking Water Quality (GCDWQ) have been included in the summary tables for the analytical results. Their purpose is to provide a general reference for the groundwater quality in the

Beverly Channel aquifer in light of the historical use, while considering that the groundwater quality represents background conditions.

3.6 Data Analysis

3.6.1 MW-02B Hydraulic Conductivity Test

Analysis and interpretation of the hydraulic conductivity test at MW-02B was conducted as follows.

- Manually measured and transducer recovery data were used to calculate the displacement values required for analyzing the test. The transducer data was processed by downloading pressure readings (recorded as equivalent water column height [m H₂O]). Approximately 21 hours of the recovery was not captured in the recordings because the initial displacement level was below the installation depth of the transducer; however, a plot of the late recovery data was consistent with the manually measured data (Appendix 3).
- Analysis of the recovery data was accomplished with the use of commercial software (AQTESOLV). Time and displacement values were then imported into AQTESOLV.
- The Hvorslev method (Hvorslev 1951) was used to evaluate the data and estimate hydraulic conductivity. The Hvorslev method was developed for the analysis of slug tests on non-leaky confined aquifers with a partially or fully penetrating well.

3.6.2 Groundwater Monitoring Data

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 indicator parameters were then graphed and utilized for statistical and graphical analysis as described below.

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; and
 - 0.5 mg/L/yr for DOC.

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

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 Hydraulic Conductivity Test

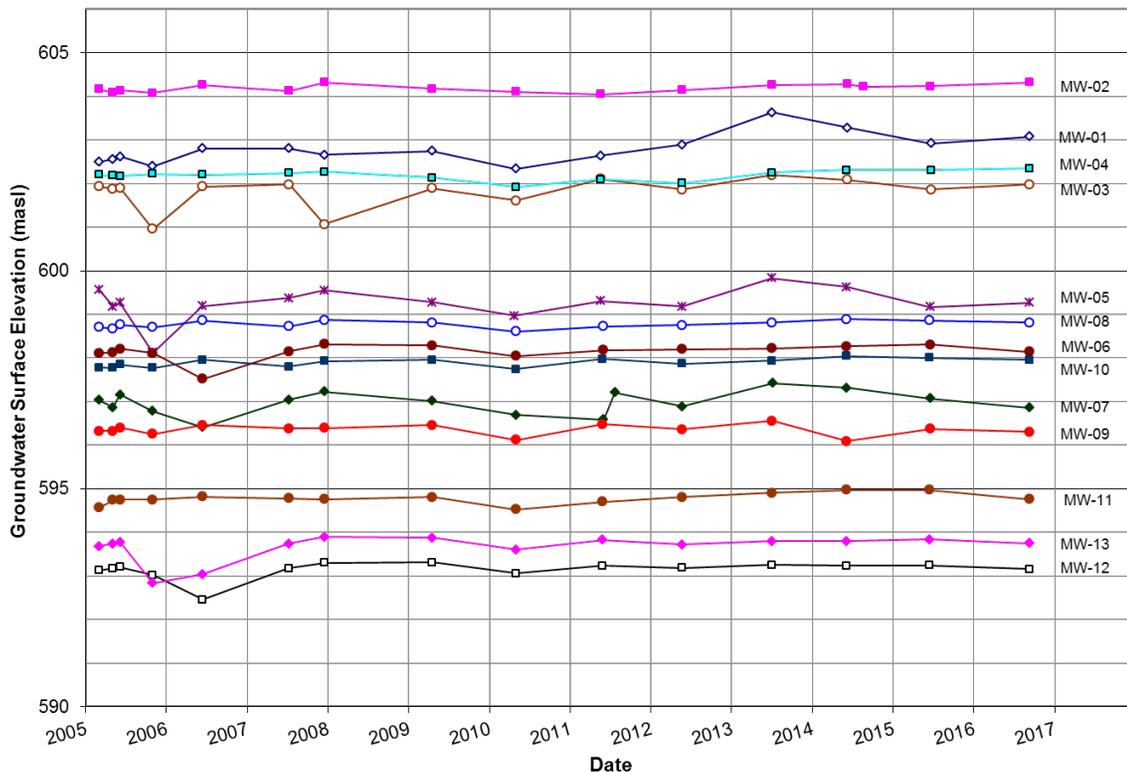
The estimated hydraulic conductivity value of the tested bedrock interval at MW-02B was 1.2×10^{-9} m/s (see Appendix 3), which is generally on the higher end of the measured range for shale (10^{-9} to 10^{-13} m/s; Freeze and Cherry 1979).

4.2 Groundwater Flow

4.2.1 Groundwater Surface Elevations

Groundwater level hydrographs are provided in Appendix 4 and summarized in Figure A. Groundwater surface elevations within the Beverly Channel ranged from 593.15 (MW-12) to 604.32 (MW-02) metres above sea level (masl) in 2016 (Table 1). All water levels were consistent with historical values. The groundwater surface elevation at monitoring well MW-02B was 602.88 masl.

Figure A Historical Groundwater Surface Elevations in Beverly Channel Monitoring Wells





4.2.2 Lateral Groundwater Flow

Lateral 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).

4.2.3 Vertical Groundwater Flow

Vertical hydraulic gradients and flow between the Beverly Channel aquifer and the bedrock were not determined since it is not confirmed that the water level at MW-02B has reached equilibrium. The hydraulic conductivity of the bedrock is low (1.2×10^{-9} m/s) and it is expected that some time will be required for water levels to reach equilibrium conditions.

4.3 Field-Measured Parameters

Results of the field parameters are presented in Table 2. Groundwater temperatures at the Beverly Channel monitoring wells ranged from 7.4 to 10°C; EC values ranged from 716 to 2,370 $\mu\text{S}/\text{cm}$; and pH ranged from 6.95 to 7.46 in 2016, and were consistent with historical results.

Field parameters measured in the bedrock at MW-02B were: temperature of 8°C, EC of 2,770 $\mu\text{S}/\text{cm}$, and pH of 7.84. The EC measured at MW-02B was higher than historically recorded at all Beverly Channel wells, except MW-07, where the EC has ranged from 1,750 to 2,910 $\mu\text{S}/\text{cm}$ (Table 2).

4.4 Groundwater Quality

Groundwater analytical data are presented in Tables 3, 4, 5, 6 and 7. Original laboratory analytical reports are included in Appendix 5. Hydrochemical control charts are provided in Appendix 6. A statistical table with basic statistical and Mann-Kendall analyses for indicator parameters is included in Appendix 7. A summary of the groundwater quality data for the last 10 sampling events for each monitoring well is included in Appendix 8.

4.4.1 Select Inorganic Data

Select inorganic parameter data are presented in Tables 3 and 4. Results from the 2016 sampling event are summarized as follows.

- Concentrations of dissolved iron and manganese were within historical ranges at all monitoring wells in 2016. Iron and manganese concentrations are typically higher than the Drinking Water aesthetic objectives of 0.3 and 0.05 mg/L, respectively.
- Concentrations of TDS continue to be within historical ranges (refer to Figure H). At the majority of the monitoring wells, TDS ranges from 500 to 1,300 mg/L. At monitoring wells MW-01 and

MW-13, TDS is less than 500 mg/L, while at monitoring well MW-07 TDS ranges from 1,300 to 2,400 mg/L. At the new monitoring well MW-02B, completed bedrock, TDS was 1,760 mg/L.

- Concentrations of dissolved sulphate continue to be within historical ranges (refer to Figure E). At the majority of the monitoring wells, sulphate concentrations are less than 500 mg/L. At monitoring well MW-06, sulphate concentrations range from 420 to 560 mg/L and at MW-07 from 622 to 1,270 mg/L.
- Concentrations of sodium continue to be within historical ranges (refer to Figure I). For all but two of the monitoring wells, sodium concentrations are less than 200 mg/L. At monitoring wells MW-07 and MW-09, sodium concentrations range from 189 to 320 mg/L.
- Chloride concentrations continue to be within historical ranges at all but MW-02, MW-03 and MW-05. Chloride concentrations have increased from 18 mg/L in April 2009 to 123 mg/L in September 2016 at MW-02; from 35 mg/L in April 2009 to 57.7 mg/L in September 2016 at MW-03; and from 30 mg/L in April 2009 to 38.4 mg/L in September 2016 at MW-05. Typically, chloride concentrations have been less than 50 mg/L at all but MW-04 where they ranged from 125 to 200 mg/L (refer to Figure D). The increasing trend in chloride concentrations are associated with discharge of groundwater with elevated chloride concentrations from bedrock, as verified in monitoring well MW-02B.
- The groundwater at MW-02B was a sodium-chloride hydrochemical type with TDS mineralization of 1,760 mg/L, chloride concentration of 812 mg/L, and sodium concentration of 571 mg/L. Compared to the Beverly Channel groundwater, dissolved chloride, fluoride, sodium, and TDS concentrations were higher, while dissolved sulphate, iron, and manganese were lower.

4.4.2 Dissolved Metals and Trace Elements

Dissolved metals parameter data are presented in Table 4 and the results from the 2016 sampling event are summarized below.

Dissolved metals and trace elements concentrations were within historical ranges and were below the Drinking Water guidelines at all monitoring wells (where guidelines exist), except for dissolved iron, manganese, and sodium.

4.4.3 Petroleum Hydrocarbons

PHC results are presented in Table 5. Dissolved toluene was reported by the laboratory at MW-01, MW-02, and MW-03 at concentrations below the GCDWQ. The laboratory-reported toluene concentration at MW-03 was greater than five times the reporting detection limit (RDL), while the laboratory-reported concentrations at MW-01 and MW-02 were below five times the RDL. Xylenes were also reported by the laboratory at MW-01 and MW-03 at concentrations less than five times the RDL and below the applied guideline. Analyte concentrations within five times the RDL for BTEX were within the expected range of error for analysis; as such, the reported toluene concentrations at MW-01 and MW-02 are not reliable. Given that MW-03 is not located near any industrial site, or any other



sources of PHCs, the reported toluene concentration is currently believed to be erroneous and not representative of the groundwater quality in the Beverly Channel.

There were no PHCs detected at MW-02B.

4.4.4 Volatile Organic Compounds

VOC results are presented in Table 6. Styrene and phenols were the only VOCs analyzed in 2016. There were no styrene or phenols detected at the Beverly Channel monitoring wells in 2016. Historically, dissolved phenols have mostly been reported at concentrations below the RDL at monitoring wells completed in the Beverly Channel. The dissolved phenols concentration in upper bedrock at MW-02B was 0.0101 mg/L.

4.4.5 Trends and Statistical Analysis

Mann-Kendall/Sen’s slope analysis and hydrochemical control charts are presented in Appendices 6 and 7, respectively. Results are summarized in Table C below.

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

Monitoring Station	Parameter	Mann-Kendall (Statistically Significant) Trend	Visual Trend Only
MW-02	Iron	↑	N/A
MW-02	Chloride	↑	N/A
MW-03	Chloride	- - -	↑
MW-04	Iron	↑	N/A
MW-05	Chloride	- - -	↑

Note: ↑ indicates an increasing trend, ↓ indicates a decreasing trend, - - - indicates no statistically significant trend. N/A = not applicable

4.5 Stable Isotopes

4.5.1 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 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):

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

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.

4.5.2 Results

Laboratory analytical results for stable isotopes oxygen-18 (^{18}O) and deuterium (^2H) from sampling in 2016 are presented in Table 6. The average isotope ratios of oxygen in water ($\delta^{18}\text{O}_{\text{water}}$) for the Beverly Channel monitoring wells varied from -19.03 ‰ (MW-03) to -16.26 ‰ (MW-05), while the average isotope ratios of deuterium in water ($\delta^2\text{H}_{\text{water}}$) varied from -149.1 ‰ (MW-03) to -131.8 ‰ (MW-05). The 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:

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

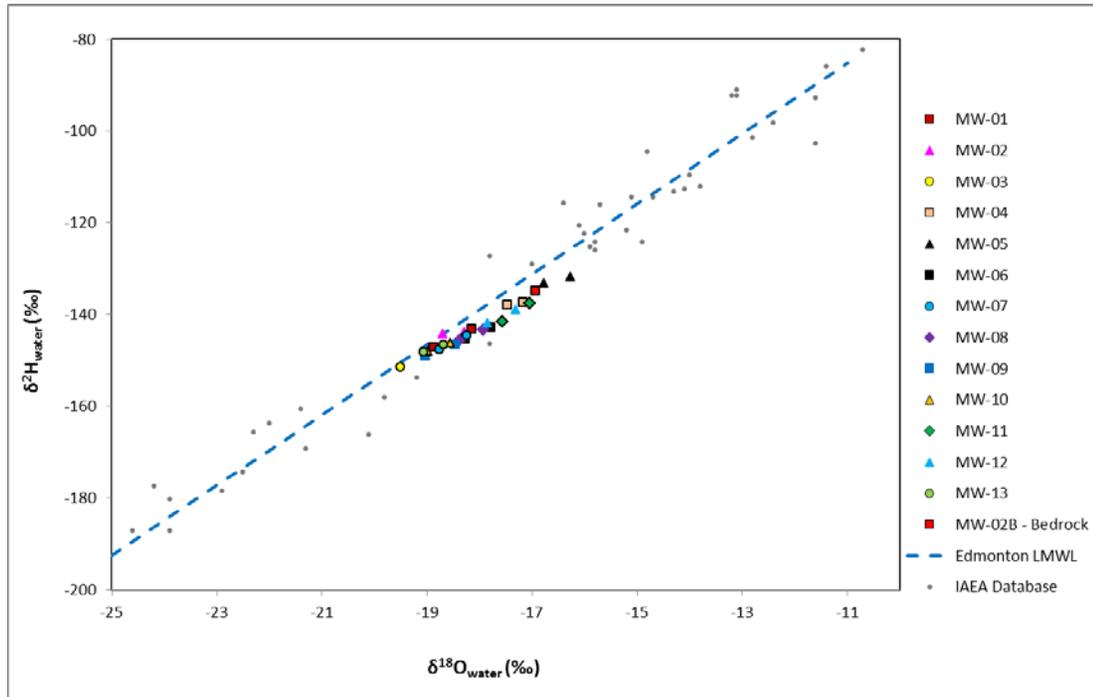
Where R is the ratio of the heavier to the lighter isotope and R_x and R_{VSMOW} are the ratios in the sample and standard, respectively (Kendall and McDonnell 1998).

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 and the bedrock monitoring well. On Figure B, the 2015 and 2016 analytical data for the Beverly Channel monitoring wells, and the 2016 analytical data for the bedrock monitoring well generally plotted below and to the right of the Edmonton LMWL; all data points appear within the range of the IAEA precipitation data



used to generate the Edmonton LMWL. These results would appear to suggest that groundwater in the Beverly Channel and the upper bedrock has an isotopic signature similar to recharging precipitation.

Figure B Comparison of Stable Isotope Results with the Edmonton LMWL



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

4.6 QA/QC Results and Summary

Zeiner (1994), after reviewing U.S. Environmental Protection Agency (EPA) data validation guidelines for field duplicate criteria, indicated 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 at MW-09 indicated that all results met Zeiner's (1994) criteria.

American Public Health Association (APHA) et al. (2005) indicate an ion balance of $\pm 10\%$ 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, dissolved metals and trace elements, PHCs, VOCs, and isotopes. Dissolved boron was detected at a concentration of 0.012 mg/L, which was within five times the RDL (0.05 mg/L) and is therefore considered an unreliable detection.

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The remaining parameters were below their respective RDLs, indicating that cross-contamination did not occur during sampling.

The laboratory blank, duplicates, RPD calculations, and control samples for groundwater analyses were within the acceptable limits.



5. DISCUSSION OF KEY GROUNDWATER QUALITY INDICATORS

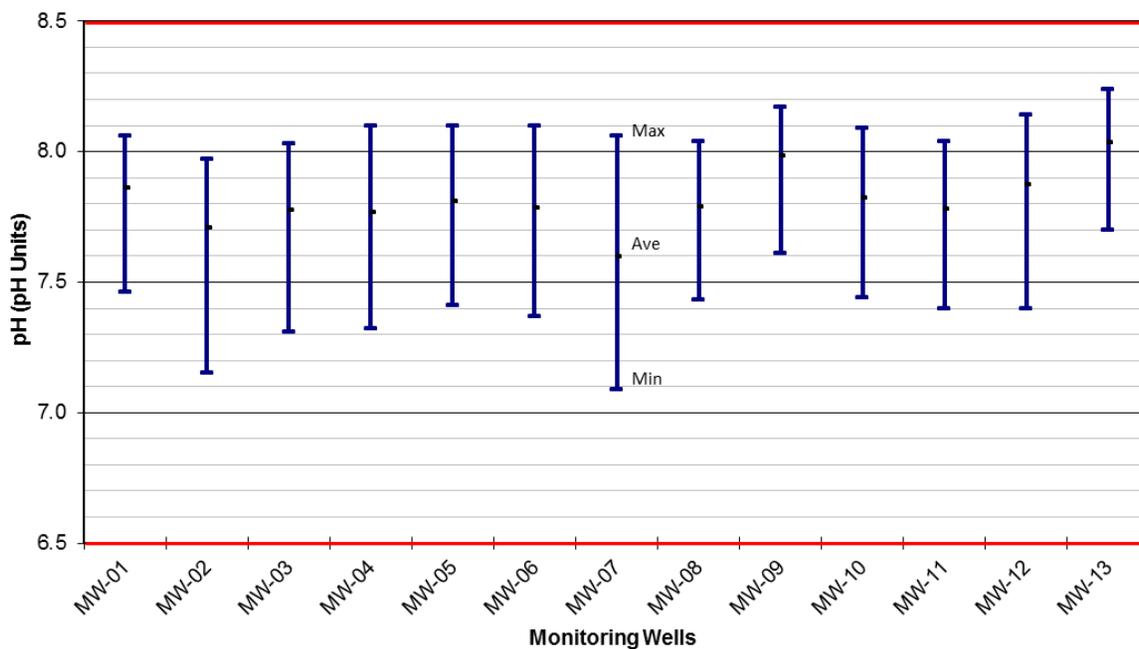
5.1 pH

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).

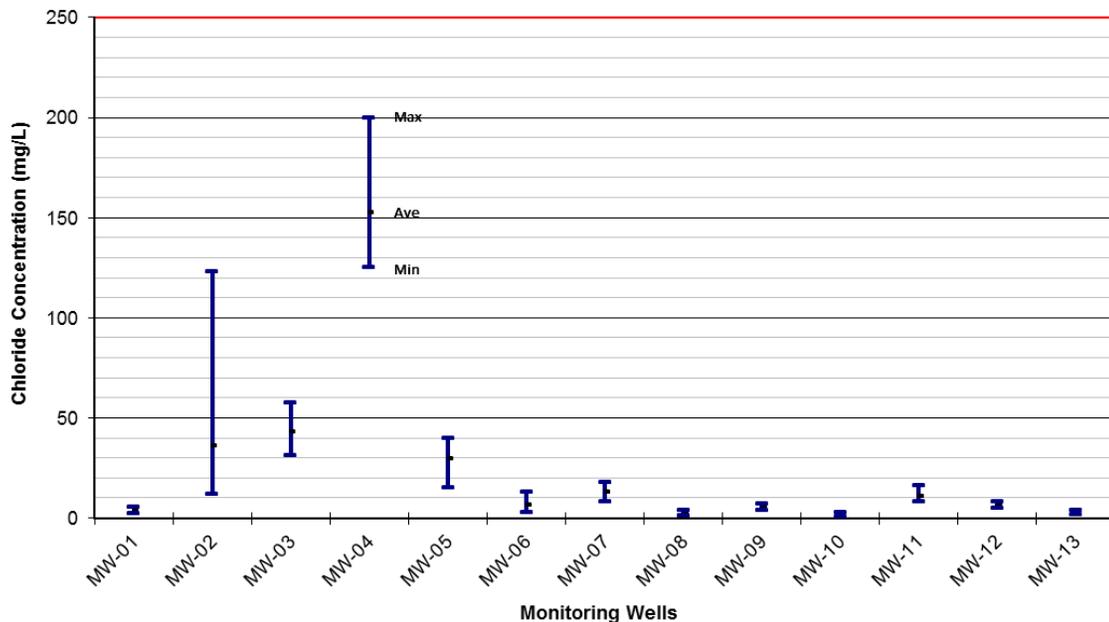
Figure C High, Low, and Average Values of pH in Beverly Channel Monitoring Wells



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) and 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. Chloride concentrations in Quaternary and bedrock groundwater are typically less than 50 mg/L in Sturgeon and Strathcona Counties (Hydrogeological Consultants Ltd. [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).

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



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 and 200 mg/L were observed at MW-04 and are considered natural, reflecting water quality in bedrock. Statistically increasing (MW-02) and visually increasing (MW-03 and MW-05) trends in chloride concentrations may also be caused by well screen proximity to shale bedrock. In 2016, the chloride concentration at MW-02 was 123 mg/L. The chloride concentration observed in the adjacent bedrock monitoring well



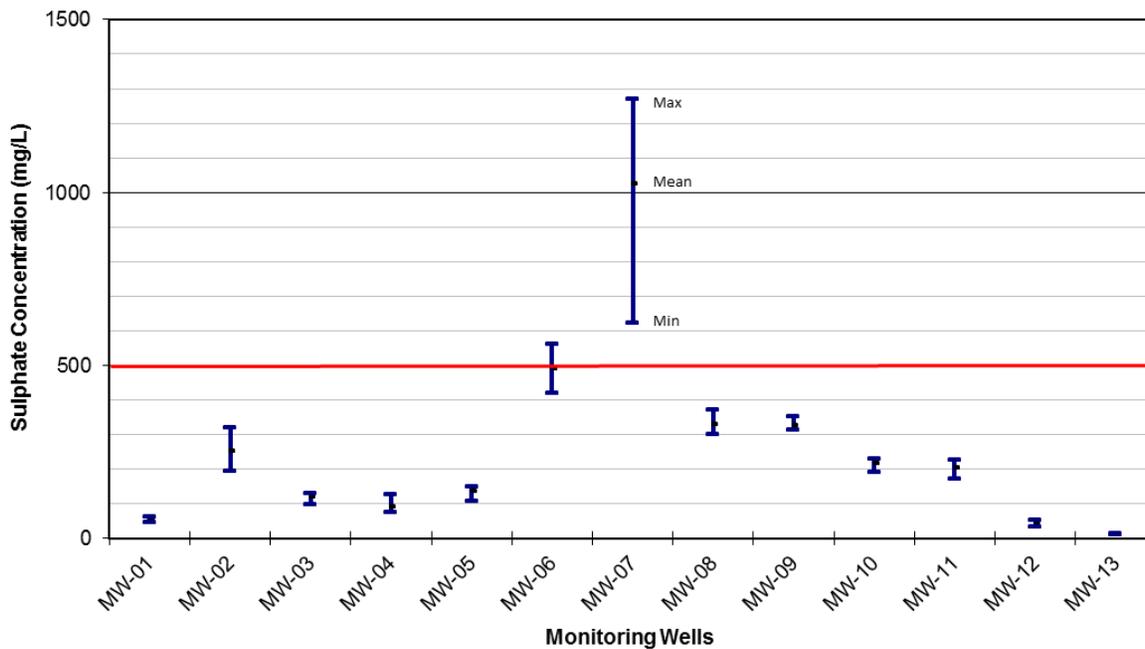
MW-02B was 812 mg/L, which may indicate that some mixing of Beverly Channel and bedrock groundwater is occurring in proximity of the well screen.

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 guideline 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.

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



In the Study Area, background sulphate concentrations are generally less than 100 mg/L in the surficial sand deposits, range from 100 to over 1,000 mg/L in shallow bedrock, and range from less than 1,000 to over 4,000 mg/L in till and clay deposits (BA Energy Inc. 2004; Komex International Ltd. [Komex] 2006; Petro-Canada Oil Sands Inc. [PCOSI] 2006; Shell 2005, 2007; TOTAL E&P Canada Inc. [TOTAL] 2007). In the Beverly Channel, sulphate concentrations are generally less than 500 mg/L

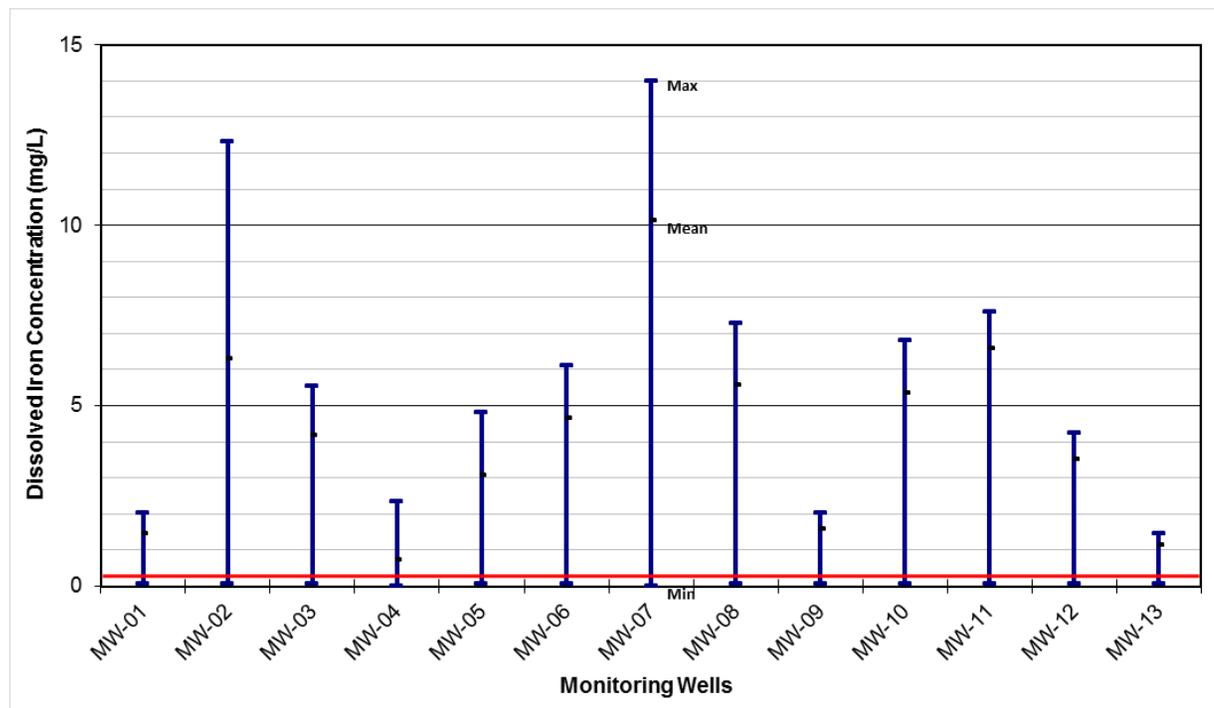
(Figure E). One monitoring well (MW-07) has sulphate concentrations in the range of 600 to 1,300 mg/L, which is similar to concentrations observed in the shallow bedrock.

5.4 Dissolved Iron

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 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.

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



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



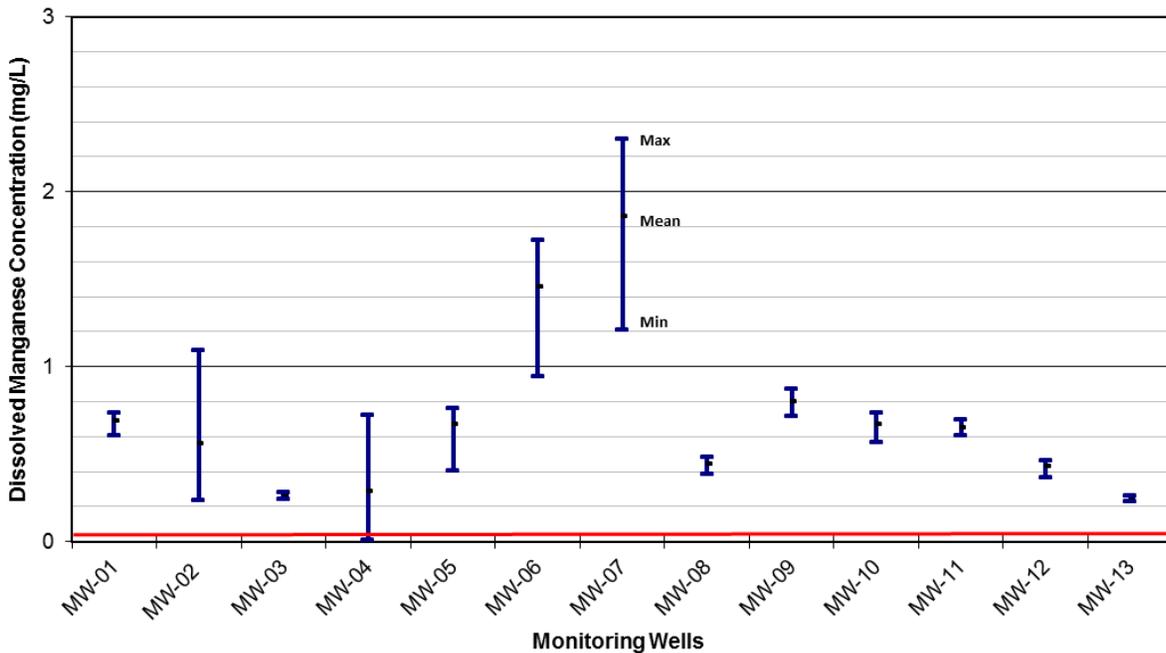
Bruderheim. Iron concentrations in the Beverly Channel monitoring wells range from non-detected values to 14 mg/L (Figure F).

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 due to the higher likelihood of reducing conditions in the subsurface (Health Canada 1979c).

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



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. On average, the

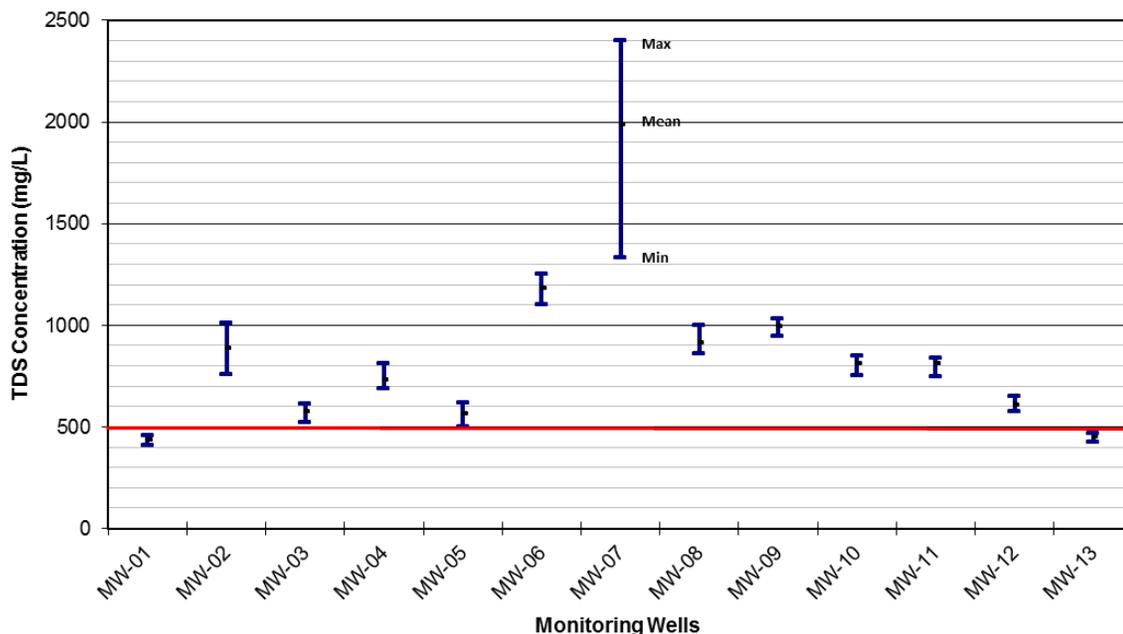
lowest concentrations of manganese were measured at monitoring wells MW-03, MW-04, and MW-13; the highest concentrations occurred at MW-06 and MW-07.

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, and nitrate) can affect human health (Health Canada 1978b; as updated 1991).

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



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

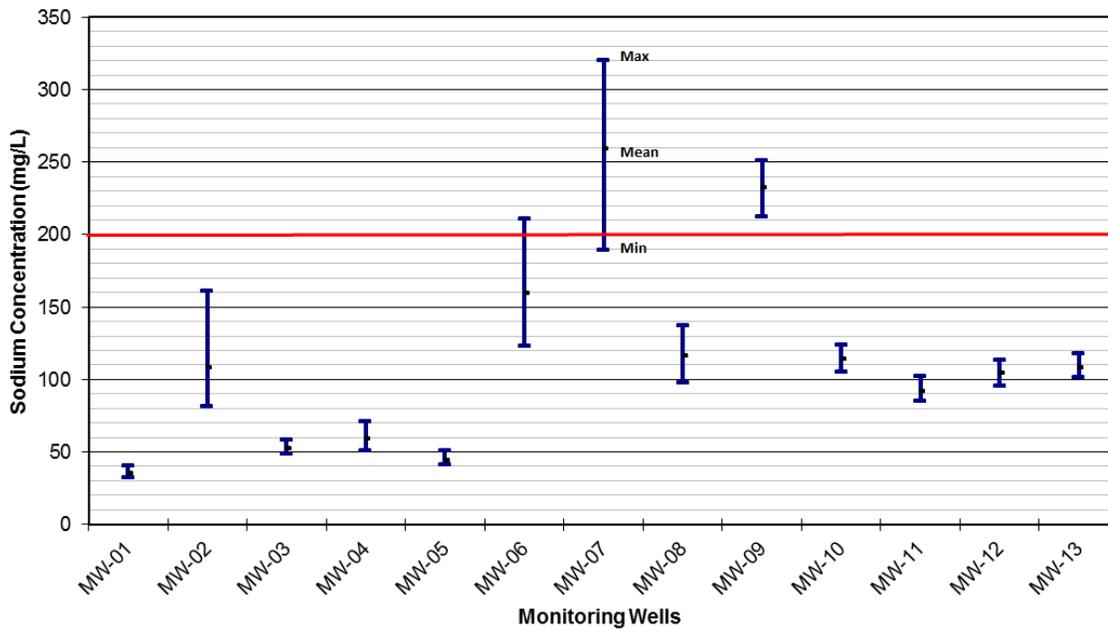


discharge from bedrock. The TDS concentration in the bedrock at MW-02B was 1,760 mg/L in 2016, consistent with the generally reported range of 1,000 to 2,000 mg/L (Stein 1976) in the area. TDS concentrations in groundwater may exceed 3,000 mg/L in some areas (HCL 2001a and 2001b).

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).

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



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, toxemia of pregnancy, and Meniere's disease (Health Canada 1979d).

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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 due to proximity of the monitoring wells to the bedrock, where sodium concentrations are generally higher.



6. SUMMARY AND RECOMMENDATIONS

Annual groundwater quality monitoring of the Beverly Channel aquifer was completed for the NCIA in September 2016. Results are summarized as follows.

- One monitoring well (MW-02B) was installed within the upper bedrock formation at a location adjacent to monitoring well MW-02. The bedrock lithology encountered consisted of bluish-gray shale. The groundwater was of a sodium chloride hydrochemical type with mineralization as TDS of 1,760 mg/L. Dissolved chloride, manganese, and sodium concentrations were 812, 0.109 and 571 mg/L, respectively. Compared to the Beverly Channel groundwater, dissolved chloride, fluoride, sodium, and TDS concentrations were higher, while dissolved sulphate, iron, and manganese were lower.
- The estimated hydraulic conductivity of the bedrock at MW-02B was 1.2×10^{-9} m/s.
- 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 historical ranges established by previous monitoring events. Elevated chloride concentrations noted at MW-04 are considered natural and may reflect bedrock conditions (WorleyParsons 2010). A statistically increasing trend in chloride concentration at MW-02 was noted in 2016. Chloride concentrations at this location were historically below 50 mg/L until 2015 when elevated concentrations were observed, which are believed to be a result of interaction with the bedrock.
- Within the Beverly Channel, dissolved iron, manganese, TDS, 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 in this area. 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.
- Dissolved toluene was detected at MW-01, MW-02, and MW-03 at concentrations below the Drinking Water guideline. The detected toluene concentration at MW-03 was more than five times the RDL, while the remaining two detections were below five times the RDL. Xylenes were also detected at MW-01 and MW-03 at concentrations below five times the RDL and below the Drinking Water guideline. The observed detections are currently not believed to be representative of the groundwater quality in the Beverly Channel. Analyte detections below five times the detection limit are considered to be within the range of measurement error and unreliable. Further groundwater monitoring is required to confirm the presence or absence of these dissolved hydrocarbons parameters.

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- Statistically significant trends were observed at MW-02 (increasing iron and chloride) and MW-04 (increasing iron). Visually assessed trends were observed at MW-03 and MW-05 (increasing chloride).
- Groundwater data to date has shown that indicator parameter concentrations are generally within natural ranges for groundwater within Sturgeon and Strathcona County.
- Analysis of the results of stable isotopes oxygen-18 (^{18}O) and deuterium (^2H) would appear to suggest that groundwater in the Beverly Channel has stable isotope composition similar to recharging precipitation. The 2015 and 2016 data were generally comparable. The results for the bedrock formation well also indicated values similar to recharging precipitation.

Recommendations are as follows:

- Complete annual groundwater monitoring in 2017. The analytical schedule should be the same as completed in 2016 (Table B), including stable isotopes (^2H and ^{18}O).
- Resample monitoring wells MW-01, MW-02, and MW-03 for confirmatory analysis of dissolved hydrocarbons.
- Consideration should be given to sampling MW-02 and MW-02B more than once per year to further investigate the variability and/or trend in select parameter concentrations at that location and possible correlation with bedrock water.
- Conduct another hydraulic conductivity test at monitoring well MW-02B to confirm the results reported herein. Electronic recording using a transducer placed below the initial displacement level should be kept in the well for several days to allow for sufficient collection of data.

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



Chisenga Mulenga, M.Sc.
Groundwater Scientist

Senior Review by



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

APEGA Permit to Practice No. P00725

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Tables



Monitoring Well Installation Details: Datum/Groundwater Surface Elevations and Hydraulic Conductivities

PROJECT No.: 307075-01608																
Monitoring Station	Status	Easting (m)	Northing (m)	Ground Elevation (masl)	Datum Elevation (masl)	Stickup (m)	Total Depth of Piezometer (mbgs)	Depth Interval of Screen (mbgs)	Depth Interval of Sand (mbgs)	Date (dd-mmm-yyyy)	Depth to Groundwater (mbtoc)	Depth to Groundwater (mbgs)	Groundwater Surface Elevation (masl)	Depth to Bottom of Well (mbgs)	Hydraulic Conductivity (m/s)	Lithology
Groundwater Monitoring																
MW-01	Active	350335.04	5951040.45	617.52	618.04	0.52	19.80	15.50 - 19.80	14.30 - 19.80	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
										19-Sep-2016	14.96	14.44	603.08			19.62
MW-02	Active	352457.8	5950583.37	630.71	631.31	0.60	33.80	27.60 - 33.80	26.20 - 33.80	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
19-Sep-2016	26.99	26.39	604.32	33.61												
MW-02B	Active	351457.8	5950583.37	630.67	631.38	0.71	41.10	39.60 - 41.10	38.70 - 42.70	20-Sep-2016	28.50	27.79	602.88	41.64	1.2E-09	Shale
MW-03	Active	353030.21	5952940.9	623.79	624.43	0.64	29.60	25.00 - 29.60	23.50 - 29.60	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
										19-Sep-2016	22.45	21.81	601.98			29.48
MW-04	Active	354823.41	5953959.76	620.25	620.79	0.54	26.20	21.60 - 26.20	19.50 - 26.20	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
										19-Sep-2016	18.44	17.90	602.35			26.36
MW-05	Active	354293.74	5954889.46	624.28	624.89	0.61	31.40	26.80 - 31.40	28.40 - 31.40	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
										19-Sep-2016	25.62	25.01	599.27			30.25
MW-06	Active	361559.34	5958812.22	629.61	630.28	0.67	39.00	34.40 - 39.00	32.90 - 39.00	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
										20-Sep-2016	32.14	31.47	598.14			38.41
MW-07	Active	359089.7	5959604.24	630.41	631.01	0.60	43.90	37.80 - 43.90	36.30 - 43.90	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
20-Sep-2016	34.15	33.55	596.86	41.40												
MW-08	Active	363133.77	5961204.95	625.87	626.44	0.57	33.50	30.50 - 33.50	28.70 - 33.50	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
										20-Sep-2016	27.63	27.06	598.81			33.45



Monitoring Well Installation Details: Datum/Groundwater Surface Elevations and Hydraulic Conductivities

PROJECT No.: 307075-01608																
Monitoring Station	Status	Easting (m)	Northing (m)	Ground Elevation (masl)	Datum Elevation (masl)	Stickup (m)	Total Depth of Piezometer (mbgs)	Depth Interval of Screen (mbgs)	Depth Interval of Sand (mbgs)	Date (dd-mmm-yyyy)	Depth to Groundwater (mbtoc)	Depth to Groundwater (mbgs)	Groundwater Surface Elevation (masl)	Depth to Bottom of Well (mbgs)	Hydraulic Conductivity (m/s)	Lithology
MW-09	Active	361003.46	5962032.28	624.06	624.73	0.67	36.60	32.00 - 36.60	30.50 - 36.60	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			
										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
										20-Sep-2016	28.43	27.76	596.30			36.10
										MW-10	Active	364954.62	5963505.11			624.06
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												
20-Sep-2016	26.72	26.11	597.95	41.25												
MW-11	Active	362564.36	5965300.71	624.49	625.16	0.67	44.20	38.10 - 44.20	35.10 - 47.20					10-Mar-2005	30.60	
										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		
										20-Sep-2016	30.40	29.73	594.76	44.40		
										MW-12	Active	366805.93	5968379.85	625.46	626.07	0.61
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												
20-Sep-2016	32.92	32.31	593.15	38.09												
MW-13	Active	365292.72	5968147.12	625.65	626.28	0.63	40.50	37.50 - 40.50	36.00 - 40.50							
										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		
										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		
										20-Sep-2016	32.53	31.90	593.75	40.35		

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. All coordinates are provided in the UTM NAD83 Zone 11.
 3. N/A - 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.



Groundwater Analytical Results: Field Measurements

PROJECT No.: 304075-01608-200

Monitoring Station	Date (dd-mmm-yyyy)	Electrical Conductivity			Temperature (°C)	Sample Comment
		(uS/cm)	pH (pH Units)			
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	
	19-Sep-2016	716	7.17	8.6	Clear	
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	
	19-Sep-2016	1217	6.96	8.7	Clear	
MW-02B	20-Sep-2016	2770	7.84	8.0	Brown and silty	
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)	
	19-Sep-2016	935	7.04	9.7	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	
	19-Sep-2016	1331	7.09	8.7	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	
	19-Sep-2016	958	7.16	8.1	Clear	
MW-06	06-May-2010	1773	7.21	5.7		
	07-Jun-2011	1762	7.22	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	
	20-Sep-2016	1562	7.12	7.9	Brown and silty	
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	
	25-Jun-2015	2570	7.06	8.8	Clear	



Groundwater Analytical Results: Field Measurements

PROJECT No.: 304075-01608-200

Monitoring Station	Date (dd-mmm-yyyy)	Electrical Conductivity		Temperature (°C)	Sample Comment
		(uS/cm)	pH (pH Units)		
MW-08	20-Sep-2016	2370	6.95	10.0	Clear
	05-May-2010	1359	7.09	5.4	
	07-Jun-2011	1378	7.41	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	20-Sep-2016	1268	7.31	7.5	Clear
	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	20-Sep-2016	1396	7.46	7.9	Cloudy
	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
	24-Jun-2015	1242	7.36	7.9	Colourless
MW-11	20-Sep-2016	1162	7.21	8.1	Clear
	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	20-Sep-2016	1156	7.04	8.2	Clear
	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	20-Sep-2016	941	7.18	7.6	Brown and silty
	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
20-Sep-2016	741	7.45	7.4	Brown and silty	

NOTES:

1. --- in detail data row(s) denotes parameter not analyzed.



Groundwater Analytical Results: Indicator Analysis Parameters

PROJECT No.: 307075-01608-200		Anions						Cations						General						Inorganic Nitrogen Compounds				Miscellaneous		
Monitoring Station	Date (dd-mmm-yyyy)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Sulphate (mg/L)	Hydroxide (mg/L)	Fluoride (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)	Alkalinity (PP; 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 (%)	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	---	---
MW-13	12-Jun-2014	598	< 5.0	7.20	47.4	< 5.0	0.064	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	8.3
	24-Jun-2015	660	< 0.50	7.7	45	< 0.50	0.084	93	4.0 ^{#1}	29	0.42 ^{#1}	5.0	110	540	< 0.50	1000	350	7.63	620 ^{#1}	620 ^{#1}	1.3	0.011	< 0.010	< 0.020	---	6.8
	20-Sep-2016	646	< 5.0	6.53	43.5	< 5.0	0.063	94.9	4.21 ^{#1}	28.4	0.442 ^{#1}	4.76	98.2	530	---	1000	354	7.93	615 ^{#1}	594 ^{#1}	1.39	< 0.020	< 0.010	< 0.022	98.2	7.4
	10-Mar-2005	531	< 5	2	10.6	< 5	0.2	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	4
	16-Nov-2005	537	< 5	4	12.5	< 5	0.14	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	5
	16-Jun-2006	715	541	4	10.1	< 5	0.14	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	5
	11-Jul-2007	541	< 5	2	9.1	< 5	0.13	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	5
	18-Dec-2007	560	< 1	2	9	< 1	0.2	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	5
	22-Apr-2009	520	< 0.5	3	9	< 0.5	0.15	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	4.5
	06-May-2010	530	< 5.0	2.15	9.54	< 5.0	0.160	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	4.1
	02-Jun-2011	530	< 5.0	1.92	9.12	< 5.0	0.162	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	5.2
	30-May-2012	529	< 5.0	1.81	9.24	< 5.0	0.119	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	4.6
	10-Jul-2013	525	< 5.0	2.28	10.0	< 5.0	0.147	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	4.4
	12-Jun-2014	485	< 5.0	2.63	11.0	< 5.0	0.129	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	6.3
	24-Jun-2015	530	< 0.50	2.9	13	< 0.50	0.16	49	1.3 ^{#1}	16	0.24 ^{#1}	3.9	110	430	< 0.50	780	190	7.70	460	460	1.3	< 0.010	< 0.010	< 0.020	---	4.9
20-Sep-2016	508	< 5.0	2.09	11.3	< 5.0	0.124	50.9	1.33 ^{#1}	15.4	0.235 ^{#1}	3.77	105	417	---	762	191	8.14	459	439	1.43	< 0.020	< 0.010	< 0.022	98.2	7.6	
QA/QC																										
FIELD BLANK	05-May-2010	< 5.0	< 5.0	< 0.50	< 0.50	< 5.0	< 0.050	< 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	LowTDS	< 1.0
	25-May-2011	< 5.0	< 5.0	< 0.50	< 0.50	< 5.0	< 0.050	< 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	LowTDS	< 1.0
	09-Jul-2013	< 5.0	< 5.0	< 0.50	< 0.50	< 5.0	< 0.020	< 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	3.5
	13-Jun-2014	< 5.0	< 5.0	< 0.50	< 0.50	< 5.0	< 0.020	< 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	< 1.0
	25-Jun-2015	< 0.50	< 0.50	< 1.0	< 1.0	< 0.50	< 0.050	< 0.30	< 0.060	< 0.20	< 0.0040	< 0.30	< 0.50	< 0.50	< 0.50	< 1.0	< 0.50	4.73 ^{#1}	< 10	< 10	< 0.050	< 0.010	< 0.010	< 0.020	---	0.56
	20-Sep-2016	< 5.0	< 5.0	< 0.50	< 0.30	< 5.0	< 0.020	< 0.050	< 0.010	< 0.0050	< 0.00010	< 0.050	< 0.050	< 2.0	---	< 2.0	< 1	5.41 ^{#1}	< 10	< 1	< 0.050	< 0.020	< 0.010	< 0.022	Low TDS	< 1.0
Relative Percent Difference (RPD) Report																										
MW-09	20-Sep-2016	598	< 5.0	5.0	318	< 5.0	0.157	97.0	1.93 ^{#1}	27.5	0.822 ^{#1}	4.08	231 ^{#1}	490	---	1530	355	8.07	1030 ^{#1}	977 ^{#1}	1.97	< 0.040	< 0.020	< 0.045	104	7.2
(Duplicate)	20-Sep-2016	626	< 5.0	4.9	319	< 5.0	0.158	97.4	1.88 ^{#1}	27.3	0.795 ^{#1}	4.04	223 ^{#1}	513	---	1530	356	8.10	1040 ^{#1}	984 ^{#1}	2.15	< 0.040	< 0.020	< 0.045	99.2	7.1
RPD(%)		4.58%	---	2.02%	0.31%	---	0.63%	0.41%	2.62%	0.73%	3.34%	0.99%	3.52%	4.59%	---	0.00%	0.28%	0.37%	0.97%	0.71%	8.74%	---	---	---	4.72%	1.40%

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. 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)
5. 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)
6. Superscript #3 - Detection limits raised due to dilution to bring analyte within the calibrated range.
7. Superscript #4 - The chloride concentration of 211 mg/L reported for MW-02 on 16 June, 2014 is considered anomalous based on resampling on 28 August 2014 which returned a concentration of 41.9 mg/L. The chloride concentration of 211 mg/L is not considered further in the analysis.



Groundwater Analytical Results: Dissolved Metals and Trace Elements

PROJECT No.: 307075-01608-200		Dissolved Metals																											Total Mercury				
Monitoring Station	Date (dd-mm-yyyy)	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 (Total) (mg/L)	Cobalt (mg/L)	Copper (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Manganese (mg/L)	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)	Mercury (ug/L)		
Canadian Drinking Water AO Guidelines 2014 #1		0.1	---	---	---	---	---	---	---	---	---	1	0.3	---	---	0.05	---	---	---	---	0.05	---	---	---	---	---	---	---	---	5	---		
Canadian Drinking Water MAC Guidelines 2014 #2		---	0.006	0.01	1	---	---	5	0.005	0.05	---	---	0.01	---	---	---	0.001	---	---	---	0.05	---	---	---	---	---	---	0.02	---	---	1		
(Duplicate)	05-May-2010	< 0.0050	< 0.00040	0.00459	0.0290	< 0.00050	---	0.177	< 0.00010	< 0.0050	0.00044	0.0015	6.80 #1	< 0.00010	---	0.735 #1	< 0.00010	0.00097	0.0029	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	0.00083	0.00115	< 0.00010	< 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	3.89 #1	< 0.00010	---	0.566 #1	< 0.00020	0.00481	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00133	0.00021	0.0030	---	---	
	30-May-2012	0.0139	< 0.00040	0.00420	0.0273	< 0.00050	---	0.150	< 0.00010	< 0.0050	0.00032	< 0.0010	5.98 #1	< 0.00010	---	0.655 #1	< 0.00020	0.000884	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00113	< 0.00010	< 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	6.11 #1	< 0.00010	---	0.729 #1	< 0.00020	0.000870	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00116	< 0.00010	< 0.0030	---	---	
	09-Jul-2013	< 0.0050	< 0.00040	0.00479	0.0293	< 0.00050	---	0.159	< 0.00010	< 0.0050	0.00031	< 0.0010	6.03 #1	< 0.00010	---	0.710 #1	< 0.00020	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	6.10 #1	< 0.00010	---	0.689 #1	< 0.000050	0.000770	< 0.0020	---	< 0.00040	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00117	< 0.00010	< 0.0030	---	---	
	12-Jun-2014	< 0.0050	< 0.00040	0.00450	0.0293	< 0.00050	---	0.129	< 0.00010	< 0.0050	0.00032	< 0.0010	6.08 #1	< 0.00010	---	0.740 #1	< 0.000050	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	< 0.00020	< 0.010	0.00030	< 0.00020	6.3 #1	< 0.00020	0.10	0.67 #1	---	0.00088	0.00085	< 0.10	< 0.0020	7.1	< 0.00010	1.4	< 0.00020	< 0.0010	< 0.0010	0.0012	< 0.0010	< 0.0030	< 0.0050	< 0.0050	
	24-Jun-2015	< 0.0030	< 0.00060	0.0040	0.030	< 0.0010	---	0.17	< 0.00020	< 0.010	0.00031	< 0.00020	6.4 #1	< 0.00020	0.10	0.67 #1	---	0.00087	0.00083	< 0.10	< 0.0020	7.1	< 0.00010	1.4	< 0.00020	< 0.0010	< 0.0010	0.0011	< 0.0010	< 0.0030	< 0.0050	< 0.0050	
	20-Sep-2016	< 0.0010	< 0.00010	0.00468	0.0300	< 0.0010	---	0.180	< 0.000050	< 0.0010	0.00031	< 0.00020	6.01 #1	< 0.000050	---	0.676 #1	< 0.000050	0.000633	0.00092	---	< 0.000050	---	< 0.00010	---	< 0.000050	---	< 0.00030	0.00113	< 0.00050	< 0.0010	---	---	



Groundwater Analytical Results: Dissolved Metals and Trace Elements

PROJECT No.: 307075-01608-200		Dissolved Metals																										Total Mercury			
Monitoring Station	Date (dd-mmm-yyyy)	Aluminium (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Bismuth (mg/L)	Boron (mg/L)	Cadmium (mg/L)	Chromium (Total) (mg/L)	Cobalt (mg/L)	Copper (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Manganese (mg/L)	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)	Mercury (ug/L)
Canadian Drinking Water AO Guidelines 2014 ^{#1}		0.1	---	---	---	---	---	---	---	---	---	1	0.3	---	---	0.05	---	---	---	---	---	---	---	---	---	---	---	---	---	5	---
Canadian Drinking Water MAC Guidelines 2014 ^{#2}		---	0.006	0.01	1	---	---	5	0.005	0.05	---	---	---	0.01	---	---	0.001	---	---	---	0.05	---	---	---	---	---	---	0.02	---	---	1
Relative Percent Difference (RPD) Report																															
MW-09	20-Sep-2016	< 0.0020	< 0.00020	0.00249	0.0227	< 0.00020	---	0.285	< 0.000010	< 0.00020	0.00118	< 0.00040	1.93 ^{#1}	< 0.00010	---	0.822 ^{#1}	< 0.0000050	0.00161	< 0.0010	---	< 0.00010	---	< 0.000020	---	< 0.000020	---	< 0.00060	0.00131	< 0.0010	< 0.0020	---
(Duplicate)	20-Sep-2016	< 0.0020	< 0.00020	0.00240	0.0227	< 0.00020	---	0.281	< 0.000010	< 0.00020	0.00117	< 0.00040	1.88 ^{#1}	< 0.00010	---	0.795 ^{#1}	< 0.0000050	0.00155	< 0.0010	---	< 0.00010	---	< 0.000020	---	< 0.000020	---	< 0.00060	0.00129	< 0.0010	< 0.0020	---
RPD(%)		---	---	3.68%	0.00%	---	---	1.41%	---	---	0.85%	---	2.62%	---	---	3.34%	---	3.80%	---	---	---	---	---	---	---	---	---	1.54%	---	---	---

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. --- in detail data row(s) denotes parameter not analyzed.
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)



Groundwater Analytical Results: Petroleum Hydrocarbons (PHCs)

PROJECT No.: 307075-01608-200

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	
	19-Sep-2016	< 0.00050	0.00112	< 0.00050	0.00171	0.00082	0.00253	< 0.0010	< 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	
19-Sep-2016		< 0.00050	0.00099	< 0.00050	0.00055	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.10	
MW-02B		20-Sep-2016	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 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	
	19-Sep-2016	< 0.00050	0.00309	< 0.00050	0.00164	0.00070	0.00234	< 0.0010	< 0.10	< 0.10	< 0.10	
	MW-04 (Duplicate)	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
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	
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	



Groundwater Analytical Results: Petroleum Hydrocarbons (PHCs)

PROJECT No.: 307075-01608-200

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	---	---	---	---
MW-05	19-Sep-2016	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.10
	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
	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
MW-06	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
	19-Sep-2016	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.10
	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
MW-07	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
	20-Sep-2016	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.10
	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
MW-08	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-09	20-Sep-2016	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.10
	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
(Duplicate)	09-Mar-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1	< 0.05
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	



Groundwater Analytical Results: Petroleum Hydrocarbons (PHCs)

PROJECT No.: 307075-01608-200

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	---	---	---	---
MW-10	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
	(Duplicate) 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
	(Duplicate) 02-Jun-2011	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	(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
	(Duplicate) 20-Sep-2016	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.10
	(Duplicate) 20-Sep-2016	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.10
	MW-11	09-Mar-2005	< 0.0005	< 0.0005	< 0.0005	---	---	< 0.0005	---	< 0.1	< 0.1
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
(Duplicate) 02-Jun-2011		< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
(Duplicate) 30-May-2012		---	---	---	---	---	---	---	---	---	< 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
(Duplicate) 09-Jul-2013		< 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
(Duplicate) 12-Jun-2014		< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.25
(Duplicate) 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
(Duplicate) 20-Sep-2016	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 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
	(Duplicate) 02-Jun-2011	< 0.00050	< 0.00075	< 0.00050	< 0.00050	< 0.00050	< 0.001	---	< 0.10	< 0.10	< 0.25
	(Duplicate) 30-May-2012	---	---	---	---	---	---	---	---	---	< 0.25
	(Duplicate) 10-Jul-2013	< 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
	(Duplicate) 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
	(Duplicate) 20-Sep-2016	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.10



Groundwater Analytical Results: Petroleum Hydrocarbons (PHCs)

PROJECT No.: 307075-01608-200

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 ₈ -C ₁₀) (mg/L)	PHC F1 (C ₈ -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	---	---	---	---
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
	20-Sep-2016	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.10
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
	20-Sep-2016	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.10
Relative Percent Difference (RPD) Report											
MW-09	20-Sep-2016	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.10
(Duplicate)	20-Sep-2016	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00071	< 0.0010	< 0.10	< 0.10	< 0.10
RPD(%)		---	---	---	---	---	---	---	---	---	---

NOTES:

1. --- in guideline row(s) denotes no criteria for that parameter.
2. --- in detail data row(s) denotes parameter not analyzed.
3. 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)
4. 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)



Groundwater Analytical Results: Volatile Organic Compounds (VOCs)

PROJECT No.: 307075-01608-200		Hydrocarbons	Phenols
Monitoring Station	Date (dd-mmm-yyyy)	Styrene (mg/L)	Phenols (mg/L)
Groundwater Monitoring			
MW-01	07-Mar-2005	---	< 0.001
	17-Nov-2005	---	< 0.001
	15-Jun-2006	---	< 0.001
	12-Jul-2007	---	< 0.001
	19-Dec-2007	---	0.002
	21-Apr-2009	---	0.003
	05-May-2010	< 0.0010	< 0.0010
	25-May-2011	< 0.0010	< 0.0010
	29-May-2012	---	< 0.0010
	10-Jul-2013	< 0.0010	< 0.0010
	16-Jun-2014	< 0.0010	< 0.0010
	29-Jun-2015	---	< 0.0020
	19-Sep-2016	< 0.0010	< 0.0010
MW-02	07-Mar-2005	---	< 0.001
	17-Nov-2005	---	< 0.001
	15-Jun-2006	---	< 0.001
	13-Jul-2007	---	0.002
	19-Dec-2007	---	0.002
	21-Apr-2009	---	0.002
	05-May-2010	< 0.0010	< 0.0010
	25-May-2011	< 0.0010	< 0.0010
	30-May-2012	---	< 0.0010
	10-Jul-2013	< 0.0010	< 0.0010
	16-Jun-2014	< 0.0010	< 0.0010
	28-Aug-2014	< 0.0010	< 0.0010
	25-Jun-2015	---	< 0.0020
19-Sep-2016	< 0.0010	< 0.0010	
MW-02B	20-Sep-2016	< 0.0010	0.0101
MW-03	07-Mar-2005	---	< 0.001
	17-Nov-2005	---	< 0.001
	15-Jun-2006	---	< 0.001
	12-Jul-2007	---	< 0.001
	19-Dec-2007	---	0.002
	21-Apr-2009	---	0.003
	06-May-2010	< 0.0010	< 0.0010
	02-Jun-2011	< 0.0010	< 0.0010
	29-May-2012	---	< 0.0010
	10-Jul-2013	< 0.0010	< 0.0010
	16-Jun-2014	< 0.0010	< 0.0010
	29-Jun-2015	---	< 0.0020
	19-Sep-2016	< 0.0010	< 0.0010
MW-04 (Duplicate)	08-Mar-2005	---	< 0.001
	17-Nov-2005	---	< 0.001
	17-Nov-2005	---	< 0.001
	14-Jun-2006	---	< 0.001
	13-Jul-2007	---	< 0.001
	19-Dec-2007	---	0.002
	21-Apr-2009	---	< 0.002



Groundwater Analytical Results: Volatile Organic Compounds (VOCs)

PROJECT No.: 307075-01608-200		Hydrocarbons	Phenols	
Monitoring Station	Date (dd-mmm-yyyy)	Styrene (mg/L)	Phenols (mg/L)	
(Duplicate)	06-May-2010	< 0.0010	< 0.0010	
	07-Jun-2011	< 0.0010	< 0.0010	
	30-May-2012	---	< 0.0010	
	30-May-2012	---	< 0.0010	
	09-Jul-2013	< 0.0010	< 0.0010	
	13-Jun-2014	< 0.0010	< 0.0010	
	29-Jun-2015	---	< 0.0020	
	19-Sep-2016	< 0.0010	< 0.0010	
MW-05	08-Mar-2005	---	< 0.001	
	17-Nov-2005	---	< 0.001	
	14-Jun-2006	---	< 0.001	
	13-Jul-2007	---	0.002	
	19-Dec-2007	---	< 0.001	
	21-Apr-2009	---	0.003	
	29-Apr-2010	< 0.0010	< 0.0010	
	25-May-2011	< 0.0010	< 0.0010	
	29-May-2012	---	< 0.0010	
	08-Jul-2013	< 0.0010	< 0.0010	
	13-Jun-2014	< 0.0010	< 0.0010	
	25-Jun-2015	---	< 0.0020	
	19-Sep-2016	< 0.0010	< 0.0010	
	MW-06	08-Mar-2005	---	< 0.001
		17-Nov-2005	---	< 0.001
16-Jun-2006		---	< 0.001	
12-Jul-2007		---	< 0.001	
19-Dec-2007		---	0.002	
22-Apr-2009		---	0.003	
06-May-2010		< 0.0010	< 0.0010	
07-Jun-2011		< 0.0010	< 0.0010	
29-May-2012		---	< 0.0010	
08-Jul-2013		< 0.0010	< 0.0010	
12-Jun-2014		< 0.0010	< 0.0010	
25-Jun-2015		---	< 0.0020	
20-Sep-2016		< 0.0010	< 0.0010	
MW-07		09-Mar-2005	---	< 0.001
		17-Nov-2005	---	< 0.001
	16-Jun-2006	---	< 0.001	
	12-Jul-2007	---	< 0.001	
	19-Dec-2007	---	0.002	
	22-Apr-2009	---	0.003	
	05-May-2010	< 0.0010	< 0.0010	
	08-Jun-2011	< 0.0010	0.0020	
	28-Jul-2011	< 0.0010	< 0.0010	
	30-May-2012	---	< 0.0010	
	11-Jul-2013	< 0.0010	0.0017	
	13-Jun-2014	< 0.0010	< 0.0010	
	25-Jun-2015	---	< 0.0020	
	20-Sep-2016	< 0.0010	< 0.0010	
	MW-08	09-Mar-2005	---	< 0.001
15-Nov-2005		---	< 0.001	



Groundwater Analytical Results: Volatile Organic Compounds (VOCs)

PROJECT No.: 307075-01608-200		Hydrocarbons	Phenols
Monitoring Station	Date (dd-mmm-yyyy)	Styrene (mg/L)	Phenols (mg/L)
	16-Jun-2006	---	< 0.001
	11-Jul-2007	---	< 0.001
	19-Dec-2007	---	0.001
	21-Apr-2009	---	0.002
	05-May-2010	< 0.0010	< 0.0010
	07-Jun-2011	< 0.0010	0.0016
	30-May-2012	---	< 0.0010
	09-Jul-2013	< 0.0010	< 0.0010
	12-Jun-2014	< 0.0010	< 0.0010
	24-Jun-2015	---	< 0.0020
	20-Sep-2016	< 0.0010	< 0.0010
MW-09	09-Mar-2005	---	< 0.001
(Duplicate)	09-Mar-2005	---	< 0.001
	17-Nov-2005	---	< 0.001
	16-Jun-2006	---	< 0.001
	11-Jul-2007	---	< 0.001
	18-Dec-2007	---	0.002
	22-Apr-2009	---	0.003
	06-May-2010	< 0.0010	< 0.0010
(Duplicate)	06-May-2010	< 0.0010	< 0.0010
	02-Jun-2011	< 0.0010	< 0.0010
(Duplicate)	02-Jun-2011	< 0.0010	< 0.0010
	29-May-2012	---	< 0.0010
	10-Jul-2013	< 0.0010	< 0.0010
	13-Jun-2014	< 0.0010	< 0.0010
	25-Jun-2015	---	< 0.0020
	20-Sep-2016	< 0.0010	< 0.0010
(Duplicate)	20-Sep-2016	< 0.0010	< 0.0010
MW-10	09-Mar-2005	---	< 0.001
	16-Nov-2005	---	< 0.001
	16-Jun-2006	---	< 0.001
	11-Jul-2007	---	< 0.001
	18-Dec-2007	---	0.002
	22-Apr-2009	---	0.002
	05-May-2010	< 0.0010	< 0.0010
	02-Jun-2011	< 0.0010	0.0018
	30-May-2012	---	< 0.0010
	09-Jul-2013	< 0.0010	< 0.0010
(Duplicate)	09-Jul-2013	< 0.0010	< 0.0010
	12-Jun-2014	< 0.0010	< 0.0010
(Duplicate)	12-Jun-2014	< 0.0010	< 0.0010
	24-Jun-2015	---	< 0.0020
(Duplicate)	24-Jun-2015	---	< 0.0020
	20-Sep-2016	< 0.0010	< 0.0010
MW-11	10-Mar-2005	---	< 0.001
	16-Nov-2005	---	< 0.001
	16-Jun-2006	---	< 0.001
	11-Jul-2007	---	< 0.001
	18-Dec-2007	---	0.002
	22-Apr-2009	---	0.004
	05-May-2010	< 0.0010	< 0.0010



Groundwater Analytical Results: Volatile Organic Compounds (VOCs)

PROJECT No.: 307075-01608-200		Hydrocarbons	Phenols
Monitoring Station	Date (dd-mmm-yyyy)	Styrene (mg/L)	Phenols (mg/L)
MW-12	02-Jun-2011	< 0.0010	< 0.0010
	30-May-2012	---	< 0.0010
	10-Jul-2013	< 0.0010	< 0.0010
	12-Jun-2014	< 0.0010	< 0.0010
	24-Jun-2015	---	< 0.0020
	20-Sep-2016	< 0.0010	< 0.0010
	10-Mar-2005	---	< 0.001
	16-Nov-2005	---	< 0.001
	16-Jun-2006	---	< 0.001
	11-Jul-2007	---	< 0.001
	18-Dec-2007	---	0.002
	22-Apr-2009	---	0.003
	06-May-2010	< 0.0010	< 0.0010
	02-Jun-2011	< 0.0010	< 0.0010
	30-May-2012	---	< 0.0010
MW-13	10-Jul-2013	< 0.0010	< 0.0010
	12-Jun-2014	< 0.0010	< 0.0010
	24-Jun-2015	---	< 0.0020
	20-Sep-2016	< 0.0010	< 0.0010
	10-Mar-2005	---	< 0.001
	16-Nov-2005	---	< 0.001
	16-Jun-2006	---	< 0.001
	11-Jul-2007	---	0.001
	18-Dec-2007	---	< 0.001
	22-Apr-2009	---	0.003
	06-May-2010	< 0.0010	< 0.0010
	02-Jun-2011	< 0.0010	< 0.0010
	30-May-2012	---	< 0.0010
	10-Jul-2013	< 0.0010	< 0.0010
	12-Jun-2014	< 0.0010	< 0.0010
24-Jun-2015	---	< 0.0020	
20-Sep-2016	< 0.0010	< 0.0010	
QA/QC			
FIELD BLANK	05-May-2010	< 0.0010	< 0.0010
	25-May-2011	< 0.0010	< 0.0010
	09-Jul-2013	< 0.0010	< 0.0010
	13-Jun-2014	< 0.0010	< 0.0010
	25-Jun-2015	---	< 0.0020
	20-Sep-2016	< 0.0010	< 0.0010
Relative Percent Difference (RPD) Report			
MW-09	20-Sep-2016	< 0.0010	< 0.0010
(Duplicate)	20-Sep-2016	< 0.0010	< 0.0010
RPD(%)		---	---

NOTES:

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



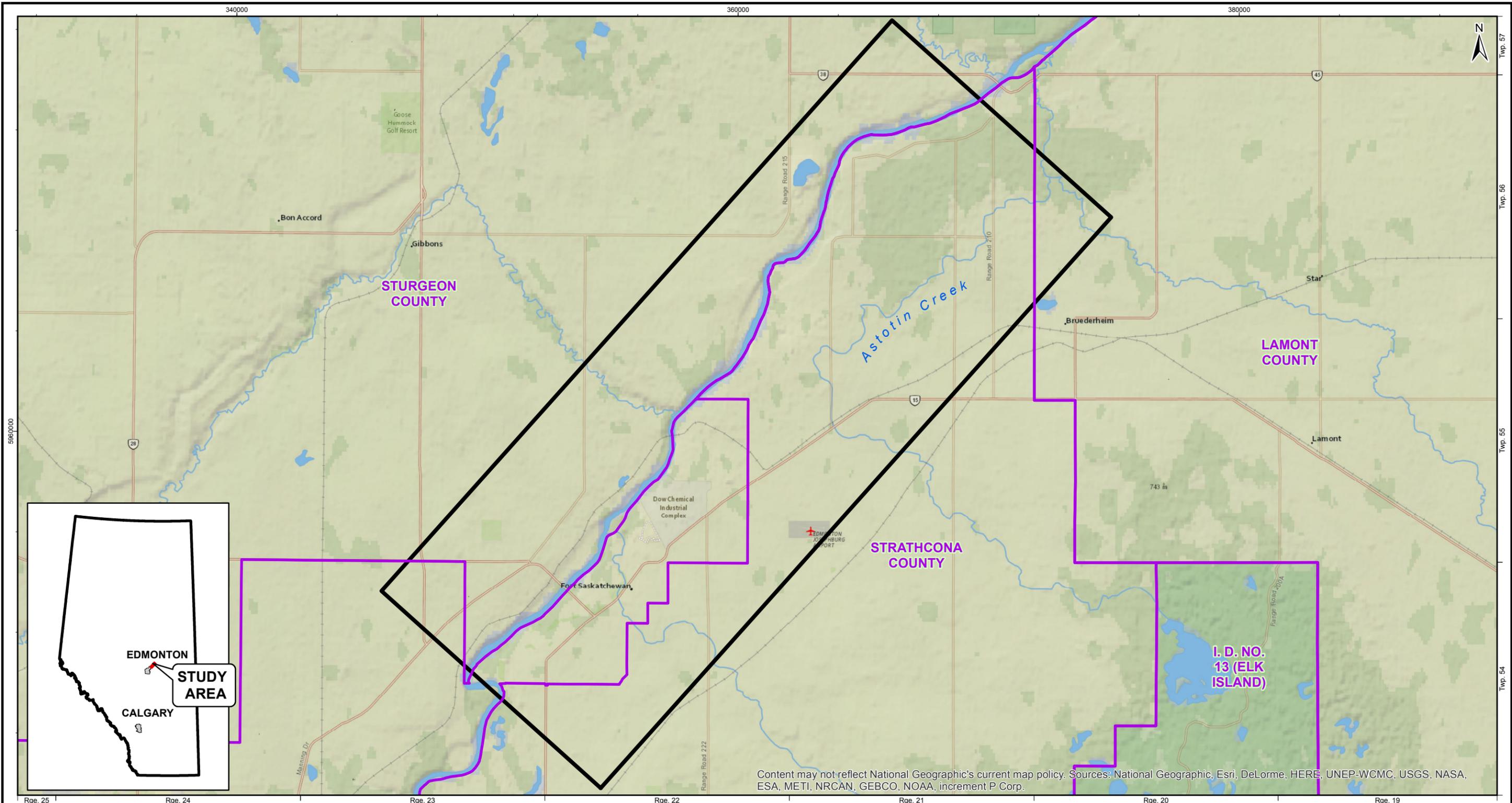
Groundwater Analytical Results: Isotopes

PROJECT No.: 307075-01608-200

Monitoring Station	Date (dd-mmm-yyyy)	delta ¹⁸ O (H ₂ O) (‰)	delta ² H (H ₂ O) (‰)
Groundwater Monitoring			
MW-01	29-Jun-2015	-18.87	-147.2
	19-Sep-2016	-18.15	-143.1
MW-02	25-Jun-2015	-18.69	-144.3
	19-Sep-2016	-18.28	-143.9
MW-02B	20-Sep-2016	-16.93	-134.9
MW-03	29-Jun-2015	-19.51	-151.5
	19-Sep-2016	-19.03	-149.1
MW-04	29-Jun-2015	-17.47	-137.9
	19-Sep-2016	-17.18	-137.5
MW-05	25-Jun-2015	-16.77	-133.2
	19-Sep-2016	-16.26	-131.8
MW-06	25-Jun-2015	-18.27	-145.3
	20-Sep-2016	-17.79	-142.8
MW-07	25-Jun-2015	-18.76	-147.7
	20-Sep-2016	-18.24	-144.7
MW-08	24-Jun-2015	-18.39	-145.7
	20-Sep-2016	-17.93	-143.4
MW-09	25-Jun-2015	-19.04	-149.1
	20-Sep-2016	-18.47	-146.7
	(Duplicate) 20-Sep-2016	-18.48	-146.6
MW-10	24-Jun-2015	-18.97	-148.1
	(Duplicate) 24-Jun-2015	-18.86	-148.0
	20-Sep-2016	-18.54	-146.3
MW-11	24-Jun-2015	-17.57	-141.6
	20-Sep-2016	-17.05	-137.6
MW-12	24-Jun-2015	-17.84	-142.0
	20-Sep-2016	-17.30	-139.0
MW-13	24-Jun-2015	-19.06	-148.2
	20-Sep-2016	-18.69	-146.7

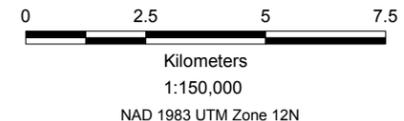
Relative Percent Difference (RPD) Report			
MW-09	20-Sep-2016	-18.47	-146.7
(Duplicate)	20-Sep-2016	-18.48	-146.6
RPD(%)		0.05%	0.07%

Figures



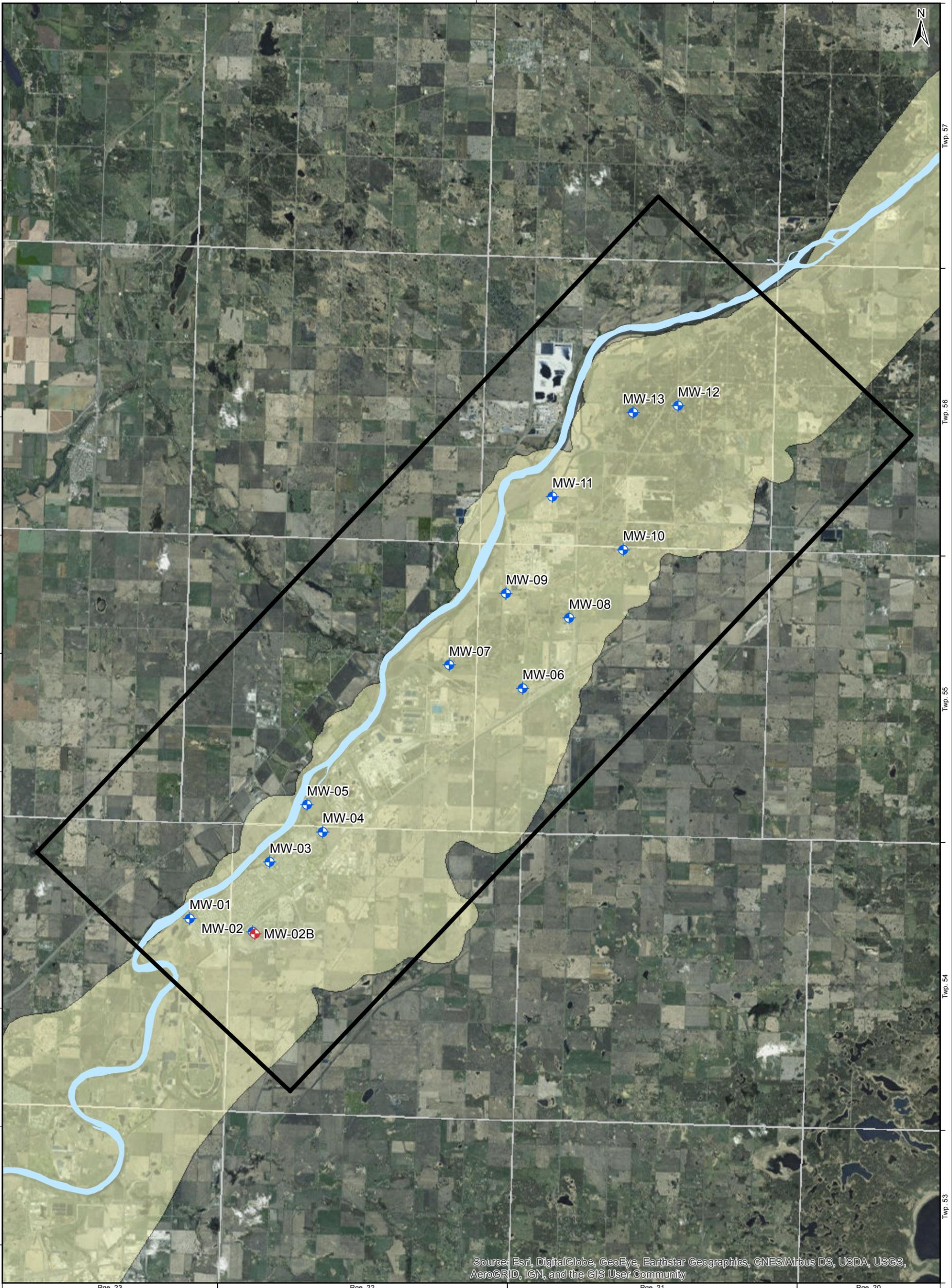
Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, DeLorme, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

- Study Area
- County Boundaries



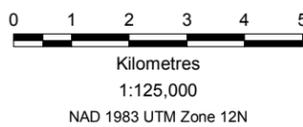
NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION 2016 GROUNDWATER QUALITY MONITORING BEVERLY CHANNEL MONITORING WELLS			
SITE LOCATION			
Date: 29-NOV-16	Drawn by: P.K.	Edited by: L.F.	App'd by:
		WorleyParsons Project No. 307075-01608-200	
FIG No 1		REV B	
This drawing is prepared solely for the use of our customers as specified in the accompanying report. WorleyParsons Canada Services Ltd. assumes no liability to any other party for any representations contained in this drawing.			

360000



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- Study Area
- Beverly Channel
- Beverly Channel Monitoring Well
- Bedrock Monitoring Well



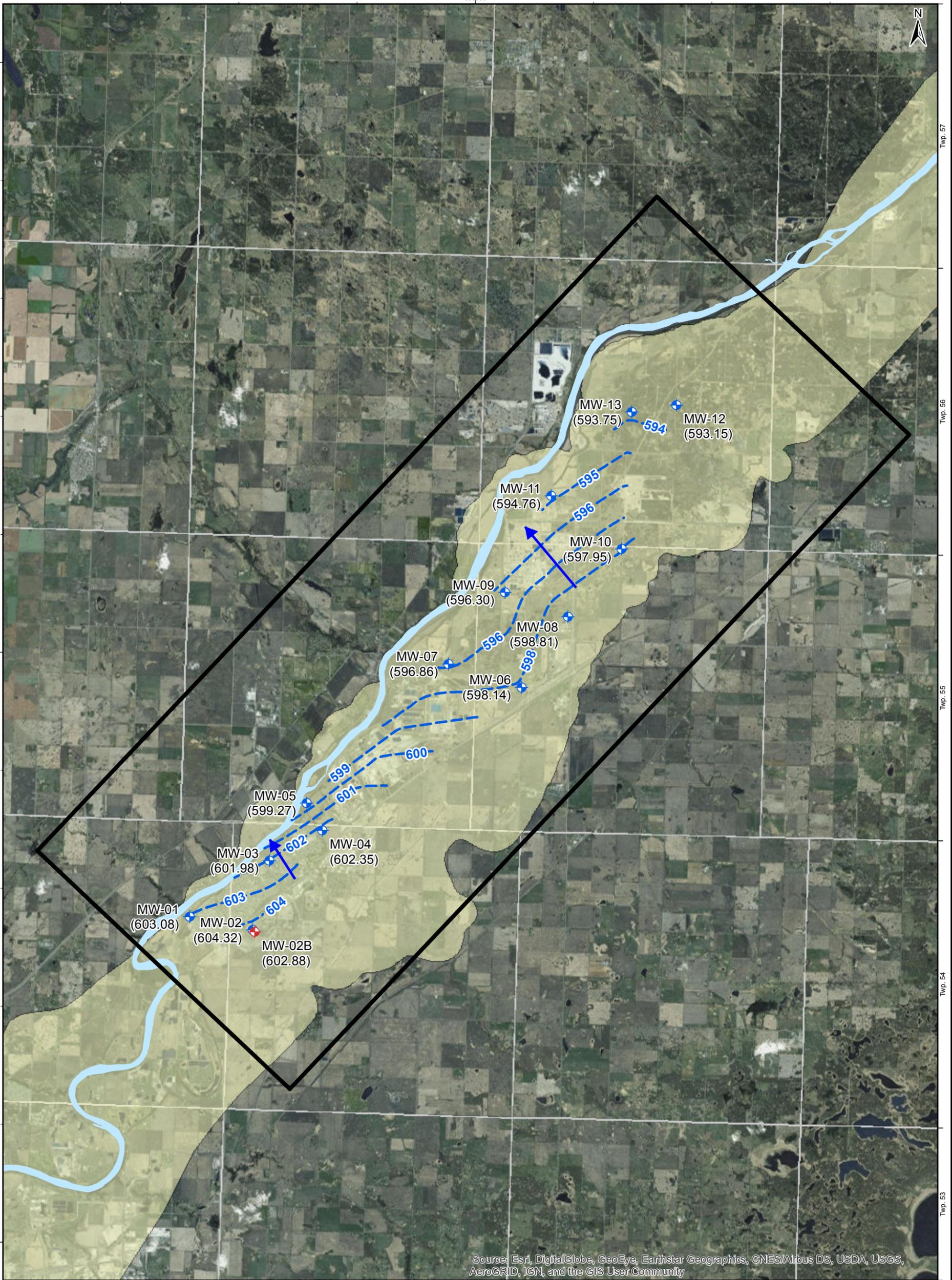
NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
 2016 GROUNDWATER QUALITY MONITORING
 BEVERLY CHANNEL MONITORING WELLS

MONITORING WELL LOCATIONS

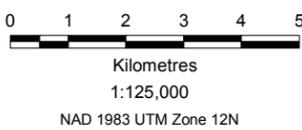
Date:	29-NOV-16	Drawn by:	P.K.	Edited by:	L.F.	App'd by:	
				WorleyParsons Project No.			
				307075-01608-200			
				FIG No.		REV	
				2		D	



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



NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2016 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS
GROUNDWATER SURFACE ELEVATIONS, SEPTEMBER 2016

Date:	29-NOV-16	Drawn by:	P.K.	Edited by:	L.F.	App'd by:	.
WorleyParsons Project No.		307075-01608-200					
FIG No.		3				REV	
						F	

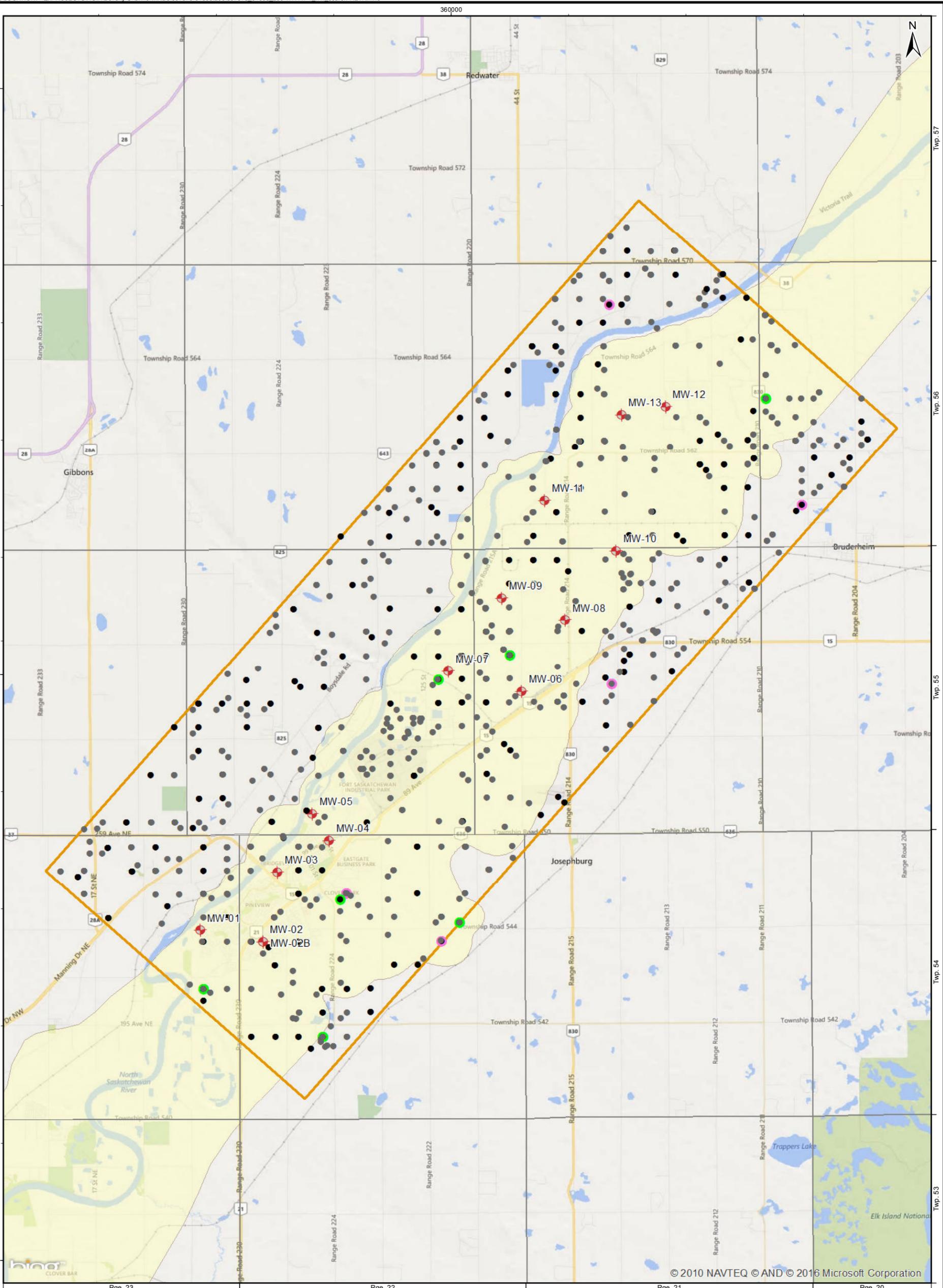


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NOTE: MW-02B NOT INCLUDED FOR GROUNDWATER FLOW INTERPRETATION

Appendices

Appendix 1 Water Well Records



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

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

NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2016 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

WATER WELL RECORDS WITHIN THE STUDY AREA

Date: 24-OCT-16	Drawn by: P.K.	Edited by: L.F.	App'd by:
WorleyParsons Project No. 307076-1608-200			
FIG No. A1 - 1			REV A

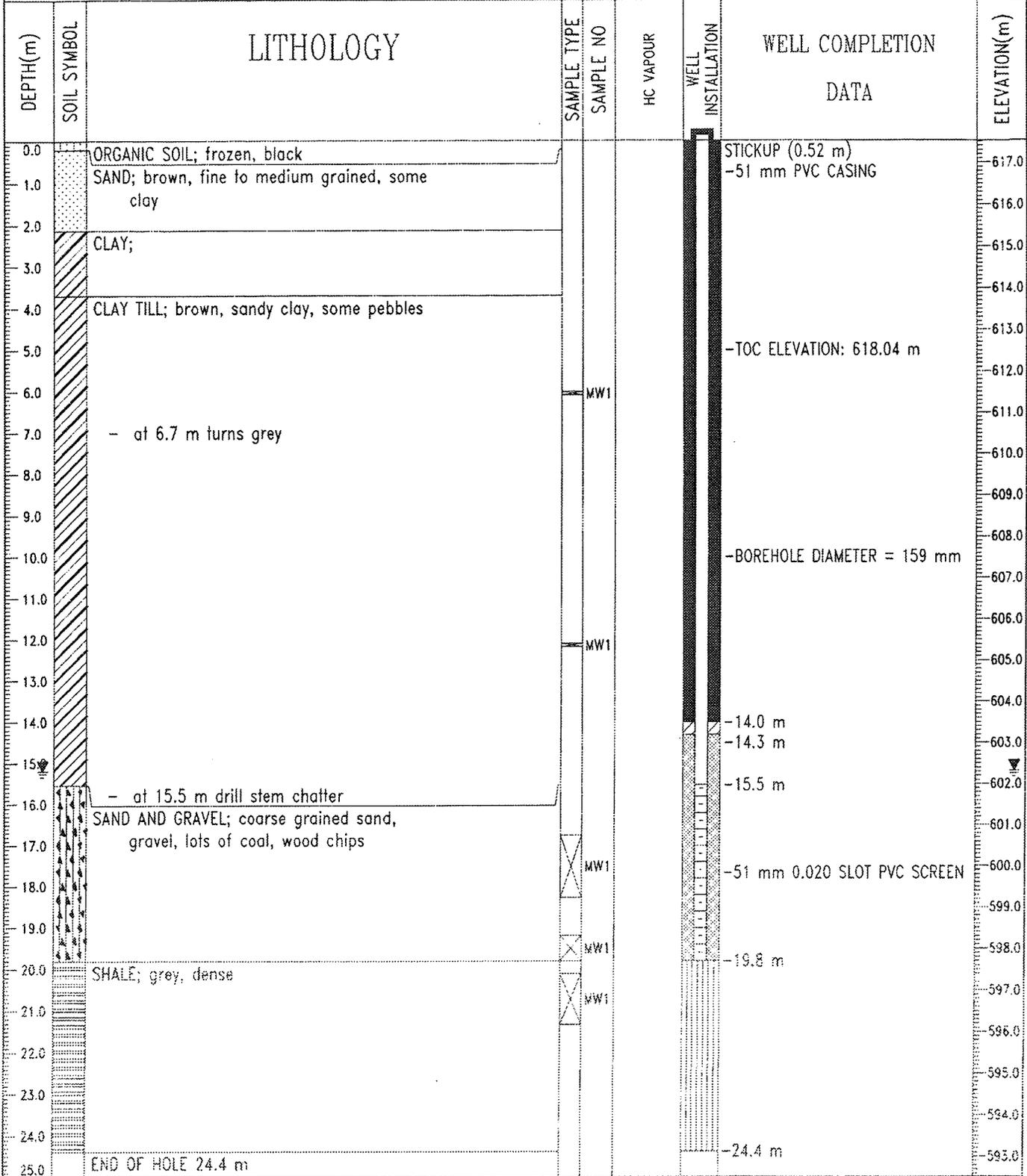
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Water Well Records Within the Study Area

Table with columns: WELL ID, LOCATION, WELL DEPTH (m), PERFORATIONS 1 (m), PERFORATIONS 2 (m), PERFORATIONS 3 (m), SCREENINGS 1 (m), SCREENINGS 2 (m), DATE, WELL OWNER, PROPOSED USE, TYPE OF WORK, DRILL METHOD, CHEMISTRY. The table lists numerous wells with their respective details.

Appendix 2 Borehole Logs

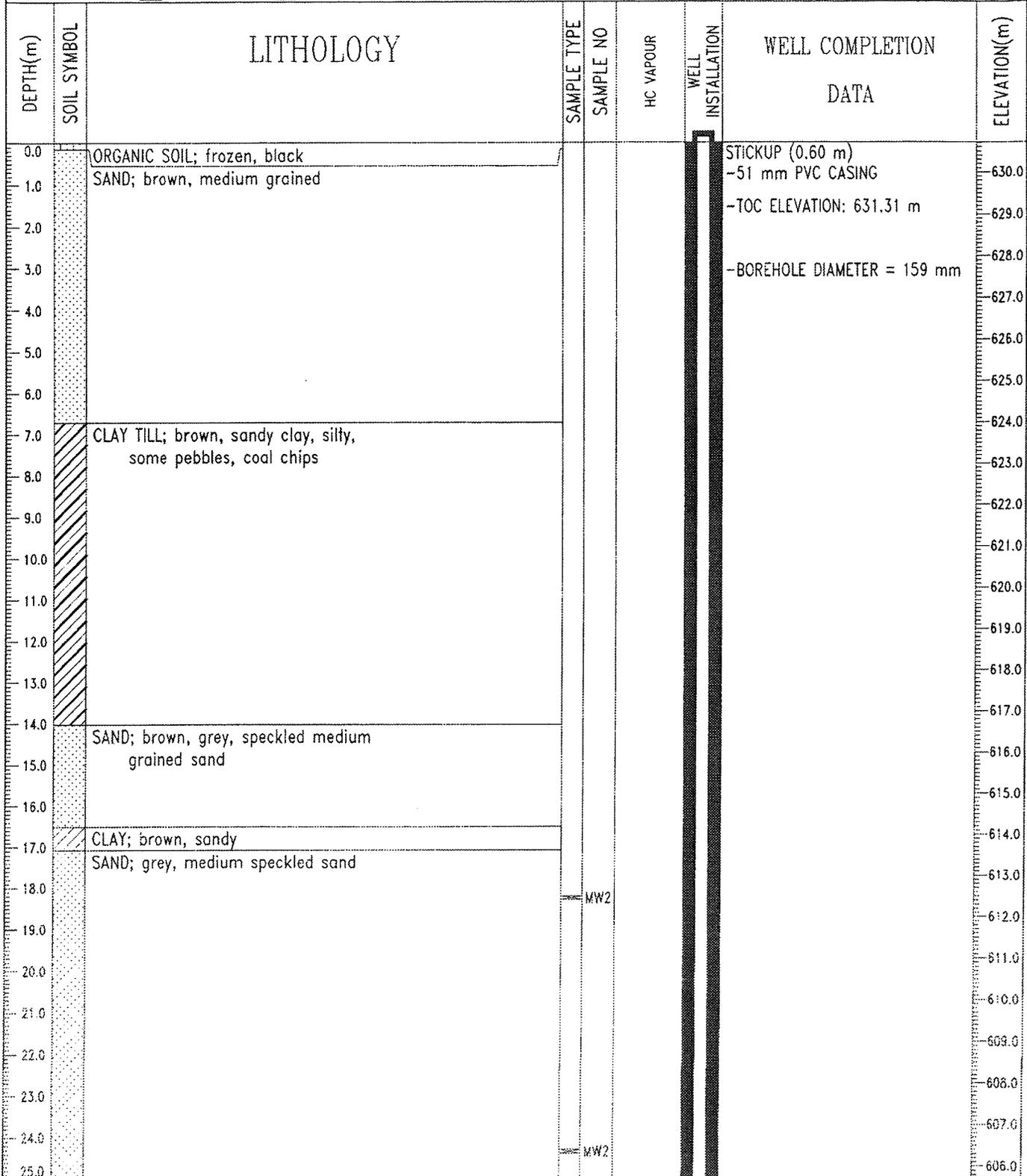
CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-01
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:350335.04 N:5951040.45	ELEVATION: 617.52 (m)
SAMPLE TYPE	<input checked="" type="checkbox"/> SHELBY TUBE <input type="checkbox"/> NO RECOVERY <input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SPT <input type="checkbox"/> A-CASING <input type="checkbox"/> CORE	
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLCUGH <input type="checkbox"/> GROUT <input type="checkbox"/> PELTONITE <input type="checkbox"/> SAND	



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

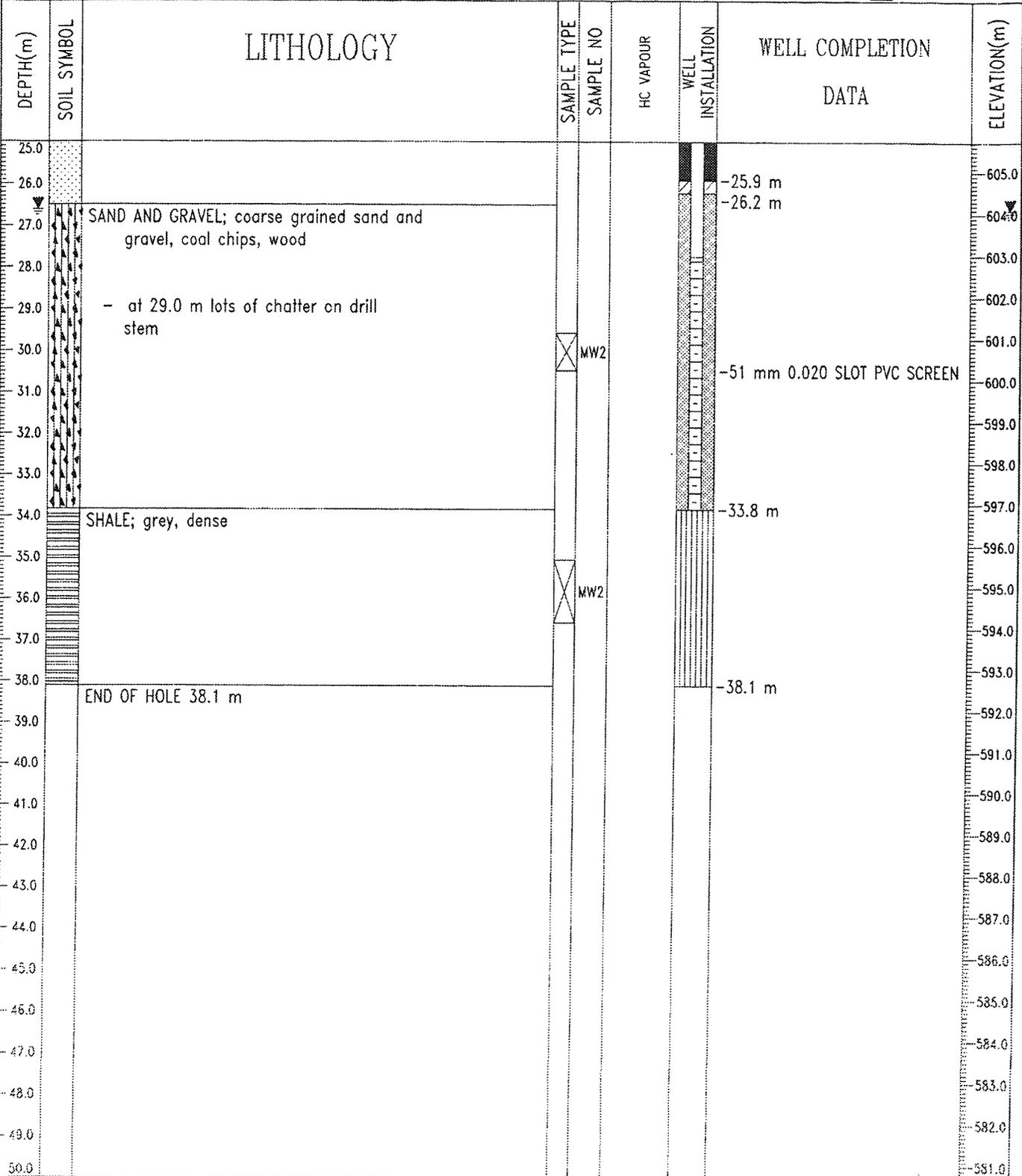
CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-02
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:352457.80 N:5950583.37	ELEVATION: 630.71 (m)
SAMPLE TYPE	<input checked="" type="checkbox"/> SHELBY TUBE <input type="checkbox"/> NO RECOVERY <input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SPT <input type="checkbox"/> A-CASING <input type="checkbox"/> CORE	
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> PELTONITE <input type="checkbox"/> SAND	



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

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	<input checked="" type="checkbox"/> SHELBY TUBE <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> GRAB <input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING <input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT	<input type="checkbox"/> PELTONITE <input type="checkbox"/> SAND



Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT

REVIEWED BY: O. YOSHISAKA

Fig. No: 17094

COMPLETION DEPTH: 38.1 m

COMPLETE: 01/24/05

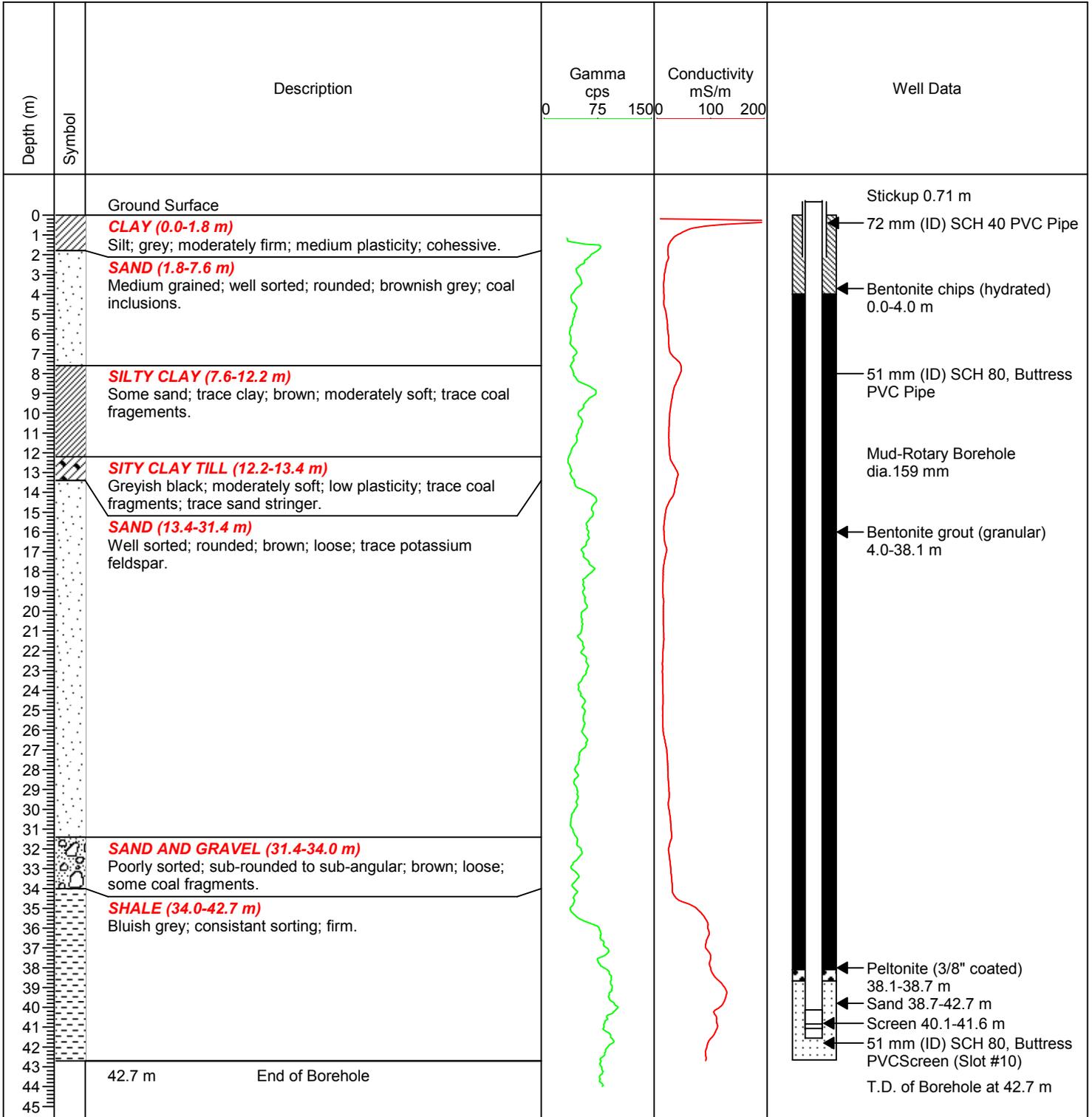
Page 2 of 2



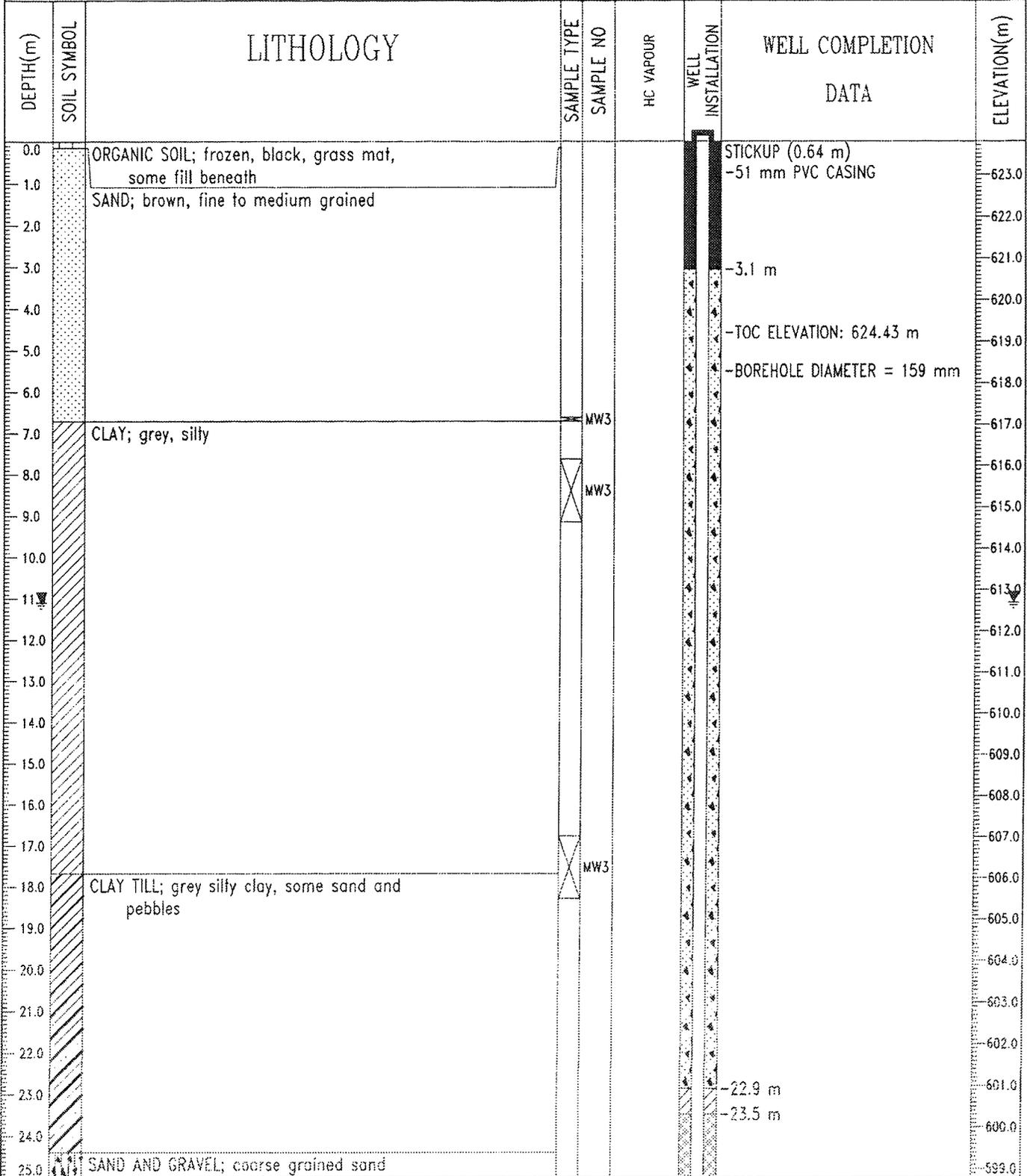
Borehole # MW-02B
PROJECT # 307075-01608-200

Project Name: 2016 Beverly Channel Groundwater Monitoring
Client: Northwest Capital Industry Association
Drilled by: Lakeland Drilling
Drilling Method: Mud-Rotary
Drill Date: 02-Sep-2016
Logged by: Josh Malkin

Location: 14-19-054-22 W4M
Northing: 5950323.21 m
Easting: 50604.05 m
Elevation: 630.67 masl



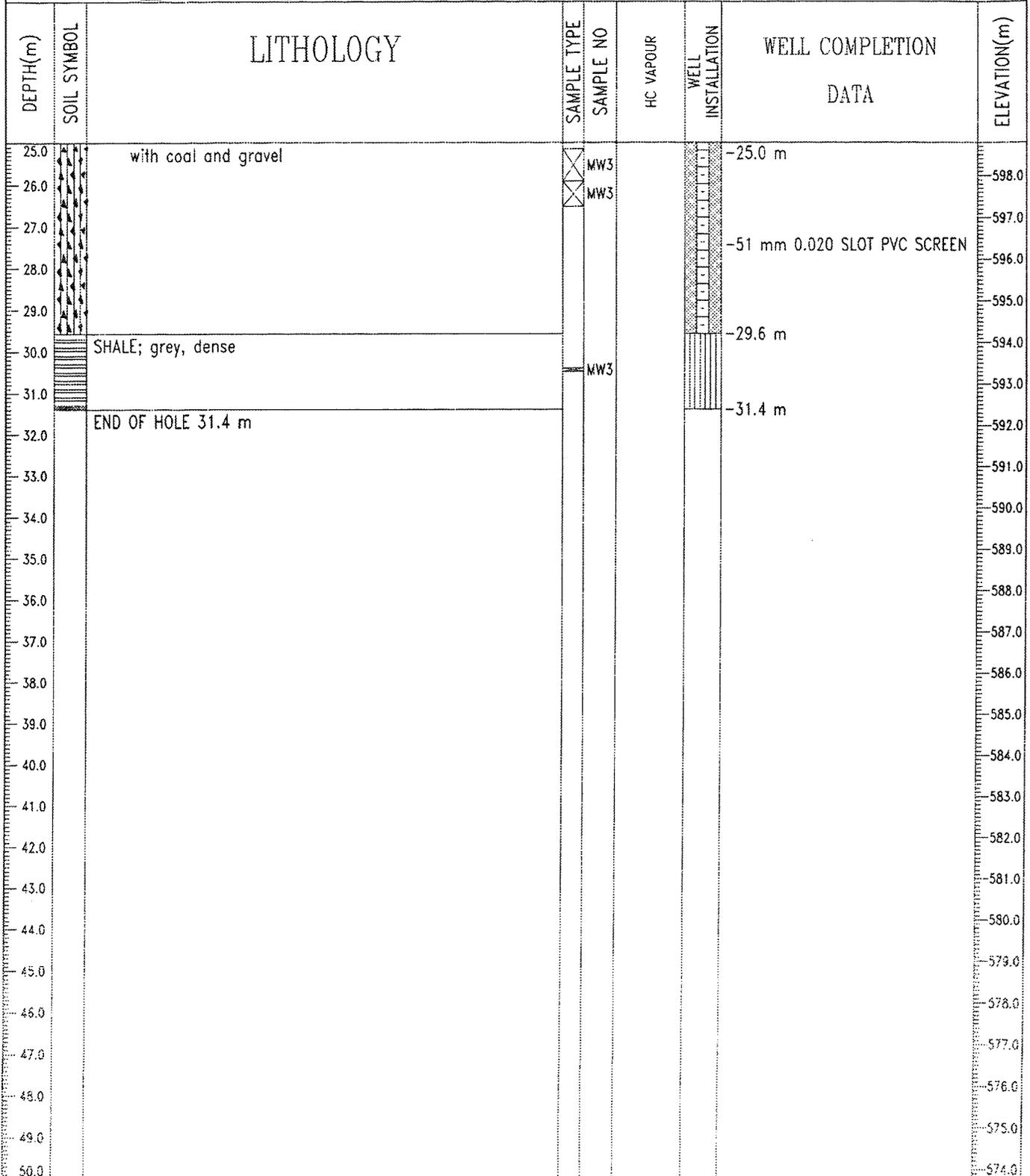
CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-03
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:353030.21 N:5952940.90	ELEVATION: 623.79 (m)
SAMPLE TYPE	<input checked="" type="checkbox"/> SHELBY TUBE <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> GRAB <input type="checkbox"/> SPT <input type="checkbox"/> A-CASING <input type="checkbox"/> CORE	
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> PELTONITE <input type="checkbox"/> SAND	



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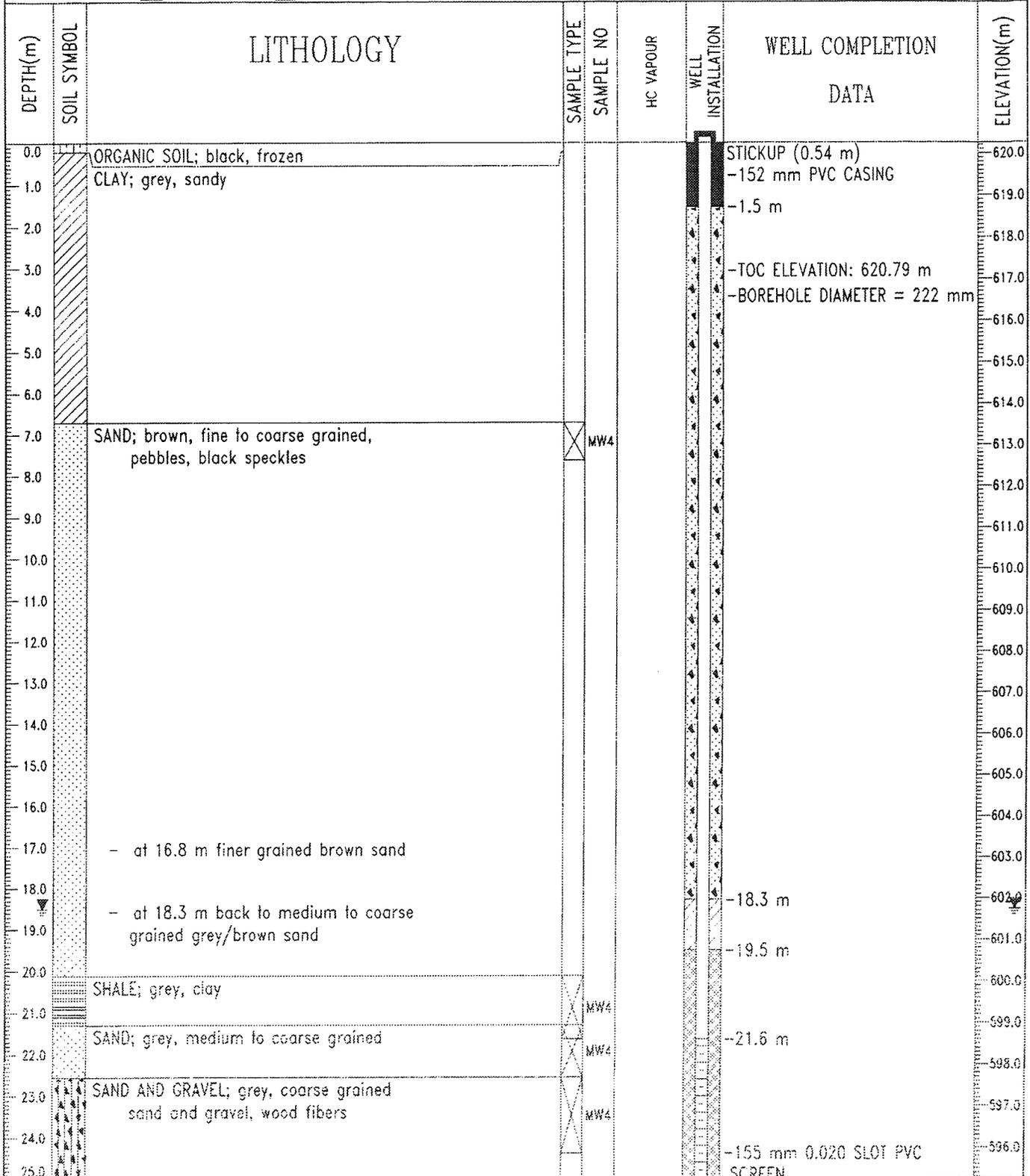
LOGGED BY: H. LOVETT COMPLETION DEPTH: 31.4 m
REVIEWED BY: D. YOSHISAKA COMPLETE: 01/25/05
Fig. No: 17094 Page 1 of 2

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	<input checked="" type="checkbox"/> SHELBY TUBE <input type="checkbox"/> NO RECOVERY <input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING <input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT	<input checked="" type="checkbox"/> PELTONITE <input type="checkbox"/> SAND



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

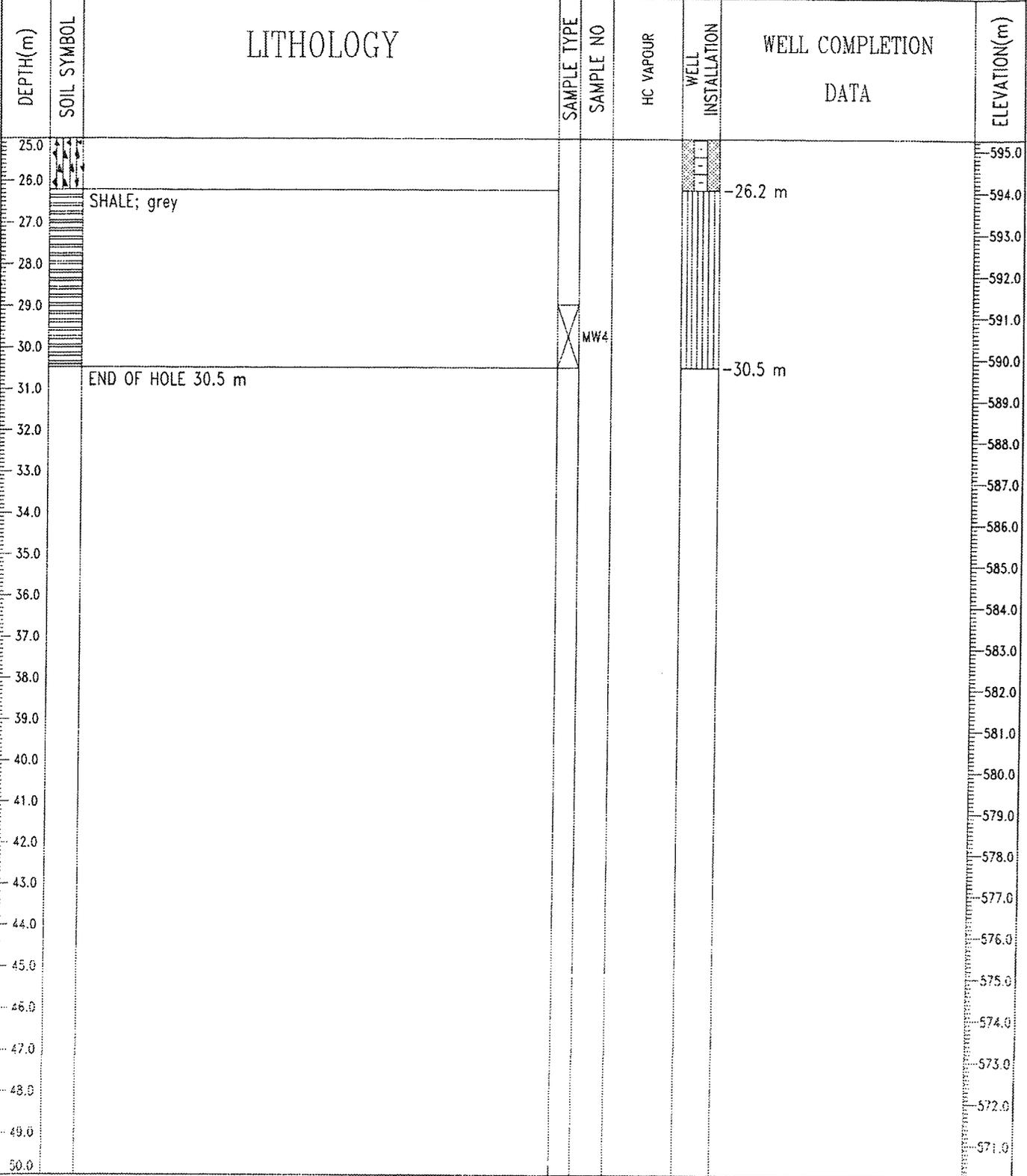
CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-04
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:354823.41 N:5953959.76	ELEVATION: 620.25 (m)
SAMPLE TYPE	<input checked="" type="checkbox"/> SHELBY TUBE <input type="checkbox"/> NO RECOVERY <input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SPT <input type="checkbox"/> A-CASING <input type="checkbox"/> CORE	
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> PELTONITE <input type="checkbox"/> SAND	



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

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	<input checked="" type="checkbox"/> SHELBY TUBE <input type="checkbox"/> NO RECOVERY <input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING <input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH	<input checked="" type="checkbox"/> GROUT <input type="checkbox"/> PELTONITE <input type="checkbox"/> SAND

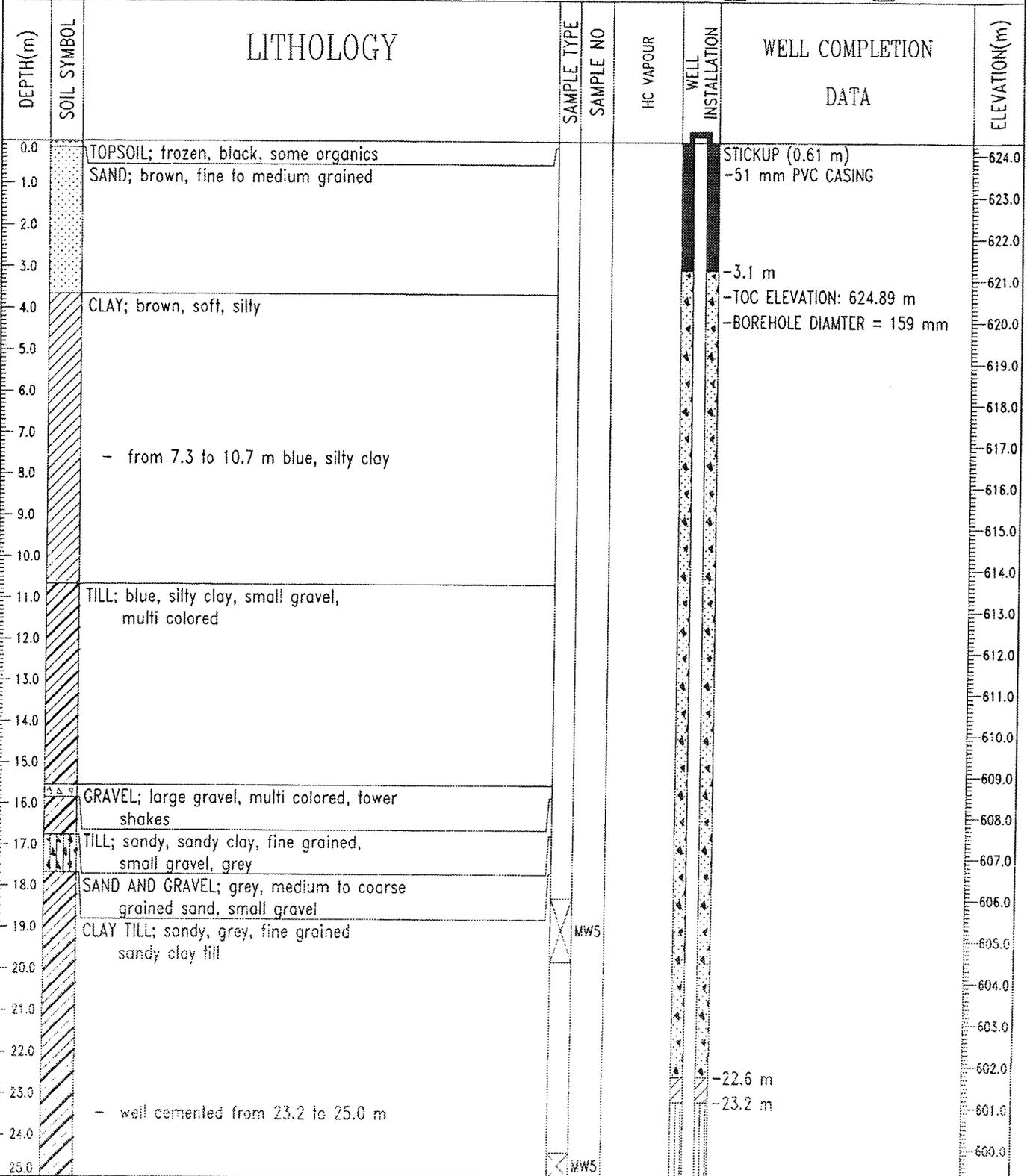


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LOGGED BY: H. LOVETT
REVIEWED BY: D. YOSHISAKA
Fig. No: 17094

COMPLETION DEPTH: 30.5 m
COMPLETE: 01/25/05
Page 2 of 2

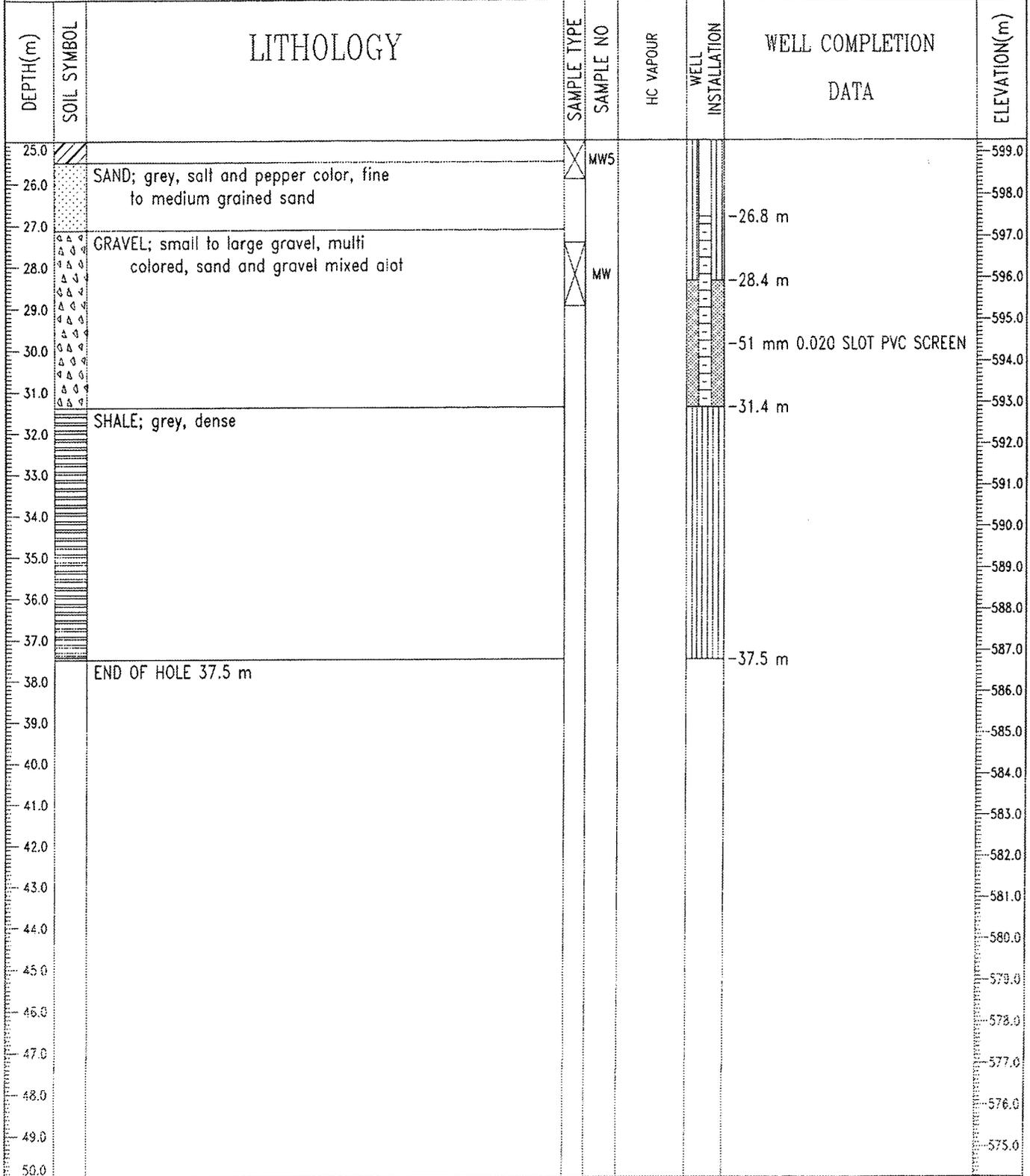
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PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:354293.74 N:5954889.46	ELEVATION: 624.28 (m)
SAMPLE TYPE	<input checked="" type="checkbox"/> SHELBY TUBE <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> GRAB <input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING <input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT	<input type="checkbox"/> PELTONITE <input type="checkbox"/> SAND



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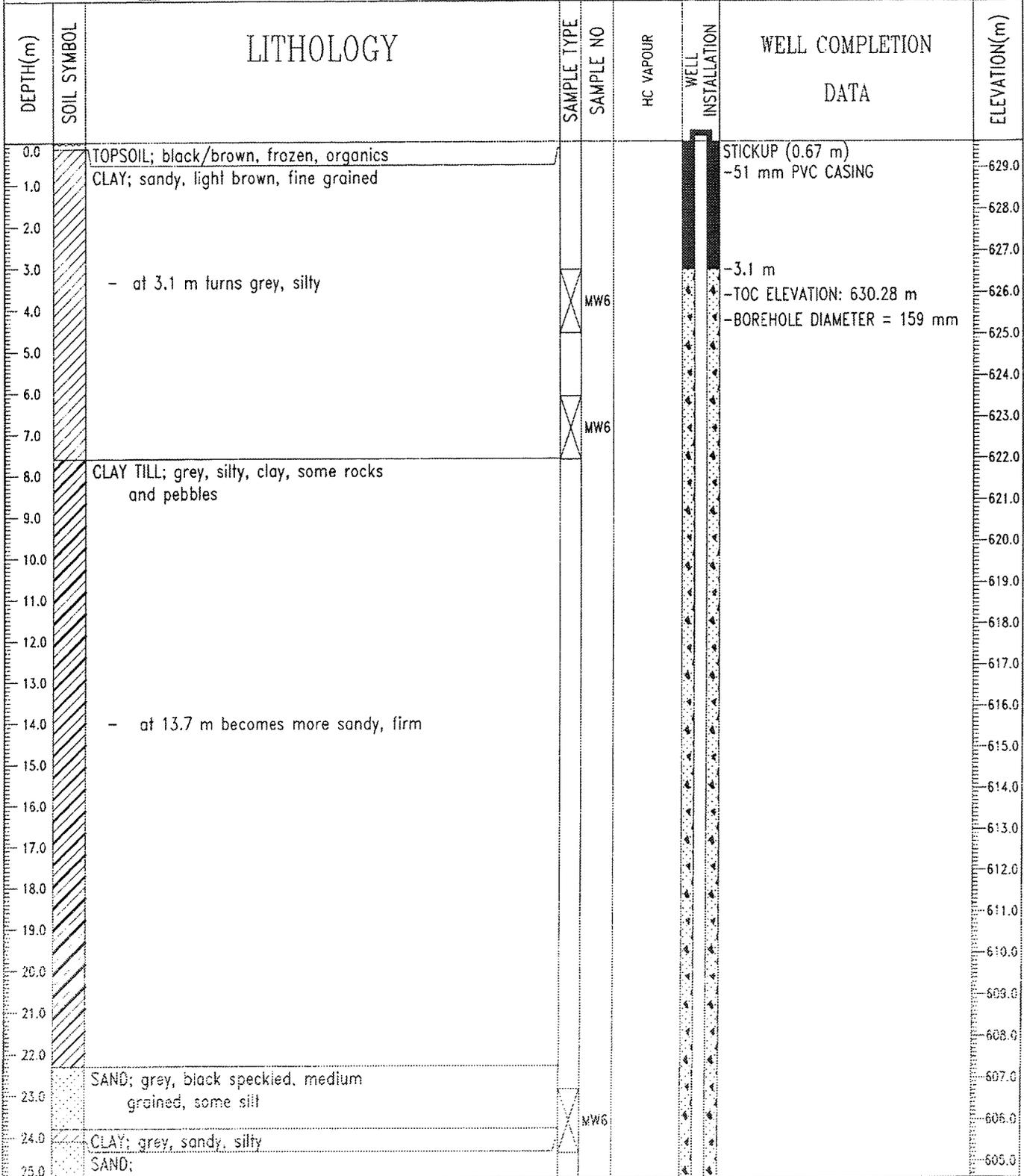
LOGGED BY: H. LOVETT	COMPLETION DEPTH: 37.5 m
REVIEWED BY: D. YGSHISAKA	COMPLETE: 02/03/05
Fig. No: 17094	Page 1 of 2

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	<input checked="" type="checkbox"/> SHELBY TUBE <input type="checkbox"/> NO RECOVERY <input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING <input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT <input type="checkbox"/> PELTONITE <input type="checkbox"/> SAND



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

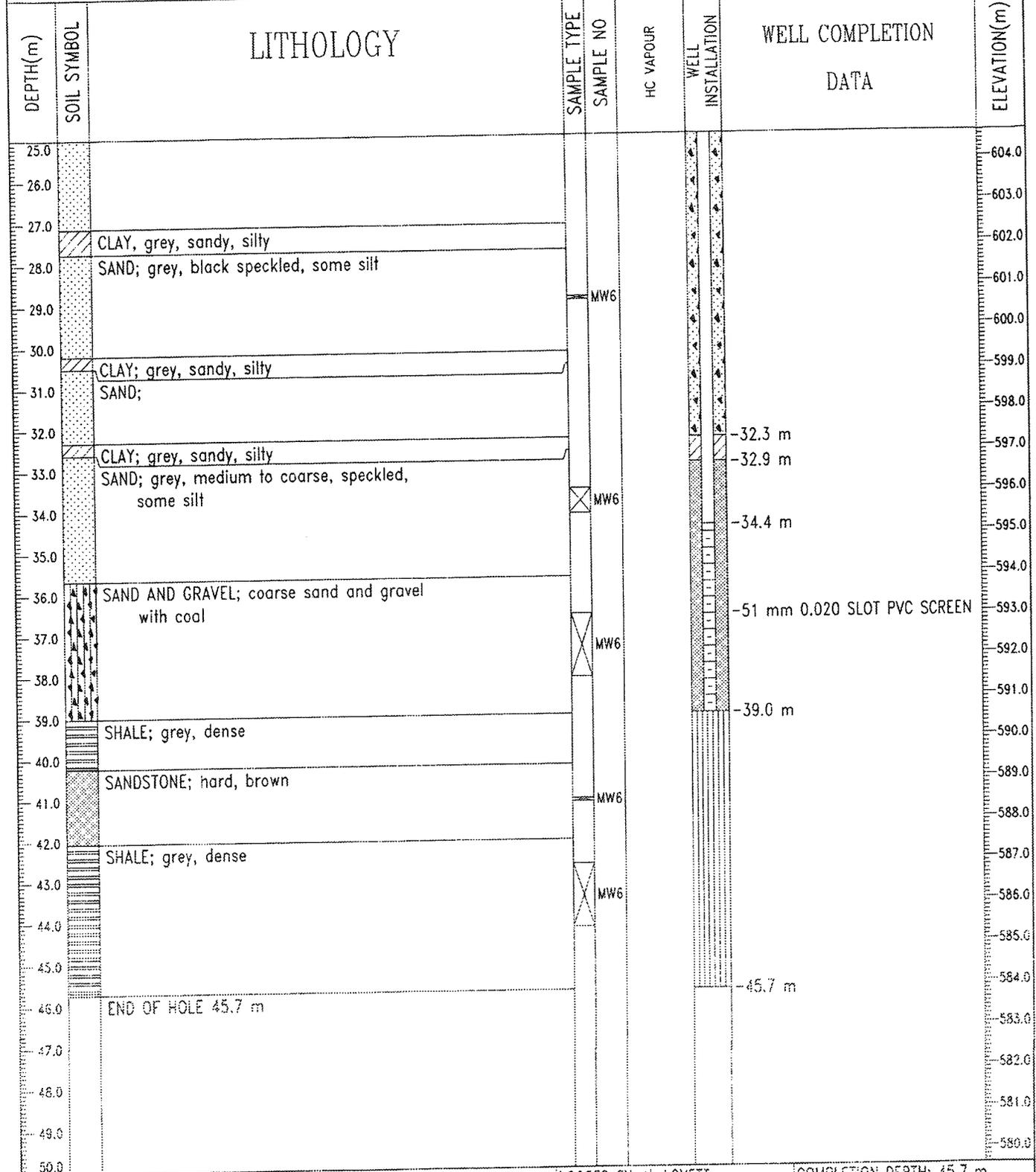
CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-06
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:361559.34 N:5958812.22	ELEVATION: 629.61 (m)
SAMPLE TYPE	<input checked="" type="checkbox"/> SHELBY TUBE <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> GRAB <input type="checkbox"/> SPT <input type="checkbox"/> A-CASING <input type="checkbox"/> CORE	
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> PELTONITE <input type="checkbox"/> SAND	



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LOGGED BY: H. LOVETT	COMPLETION DEPTH: 45.7 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/31/05
Fig. No: 17094	Page 1 of 2

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	<input checked="" type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> NO RECOVERY <input checked="" type="checkbox"/> GRAB <input checked="" type="checkbox"/> SPT <input type="checkbox"/> A-CASING <input type="checkbox"/> CORE	
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> PELTONITE <input type="checkbox"/> SAND	

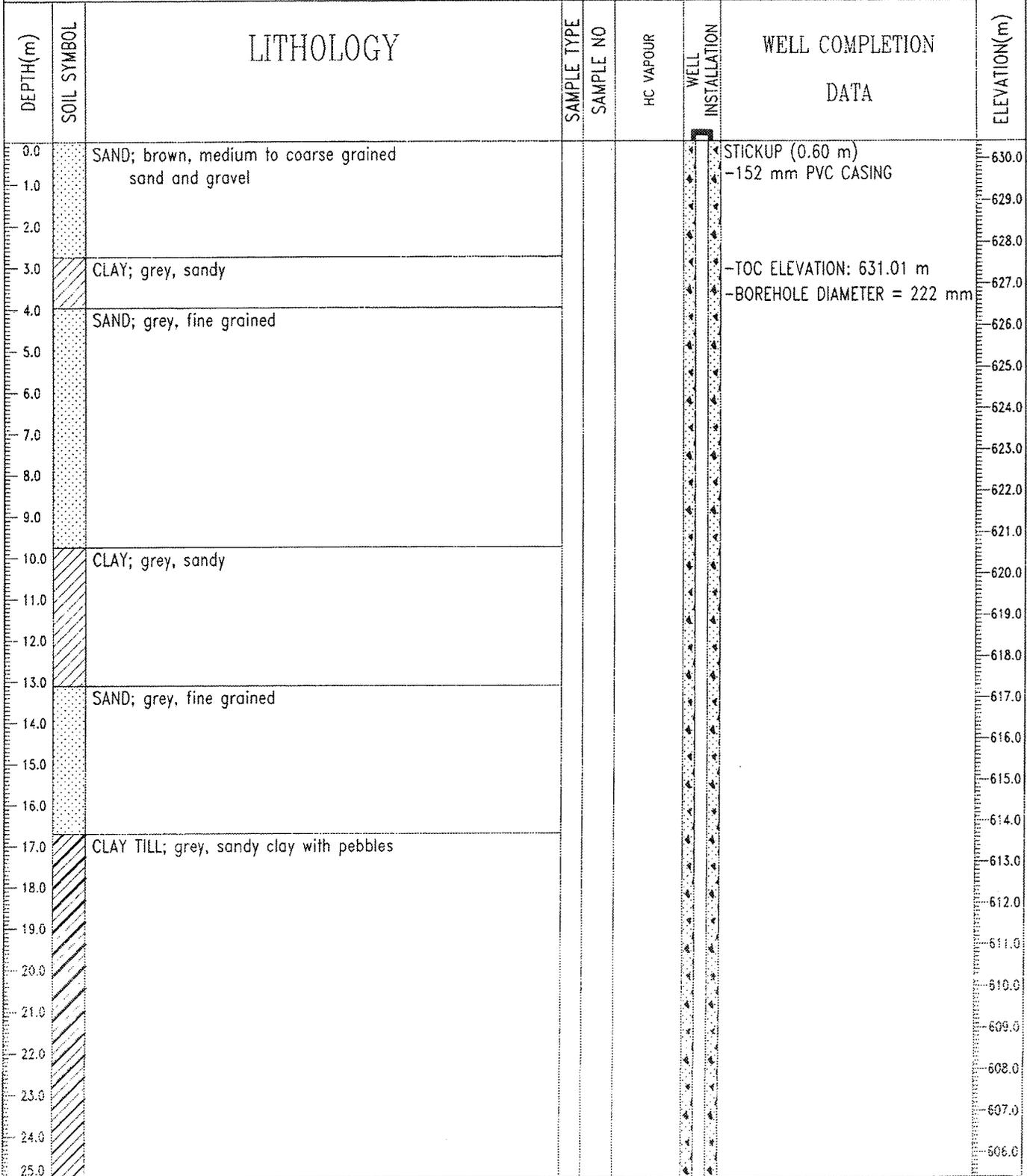


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Edmonton, Alberta

LOGGED BY: H. LOVETT
REVIEWED BY: D. YOSHISAKA
Fig. No: 17094

COMPLETION DEPTH: 45.7 m
COMPLETE: 01/31/05

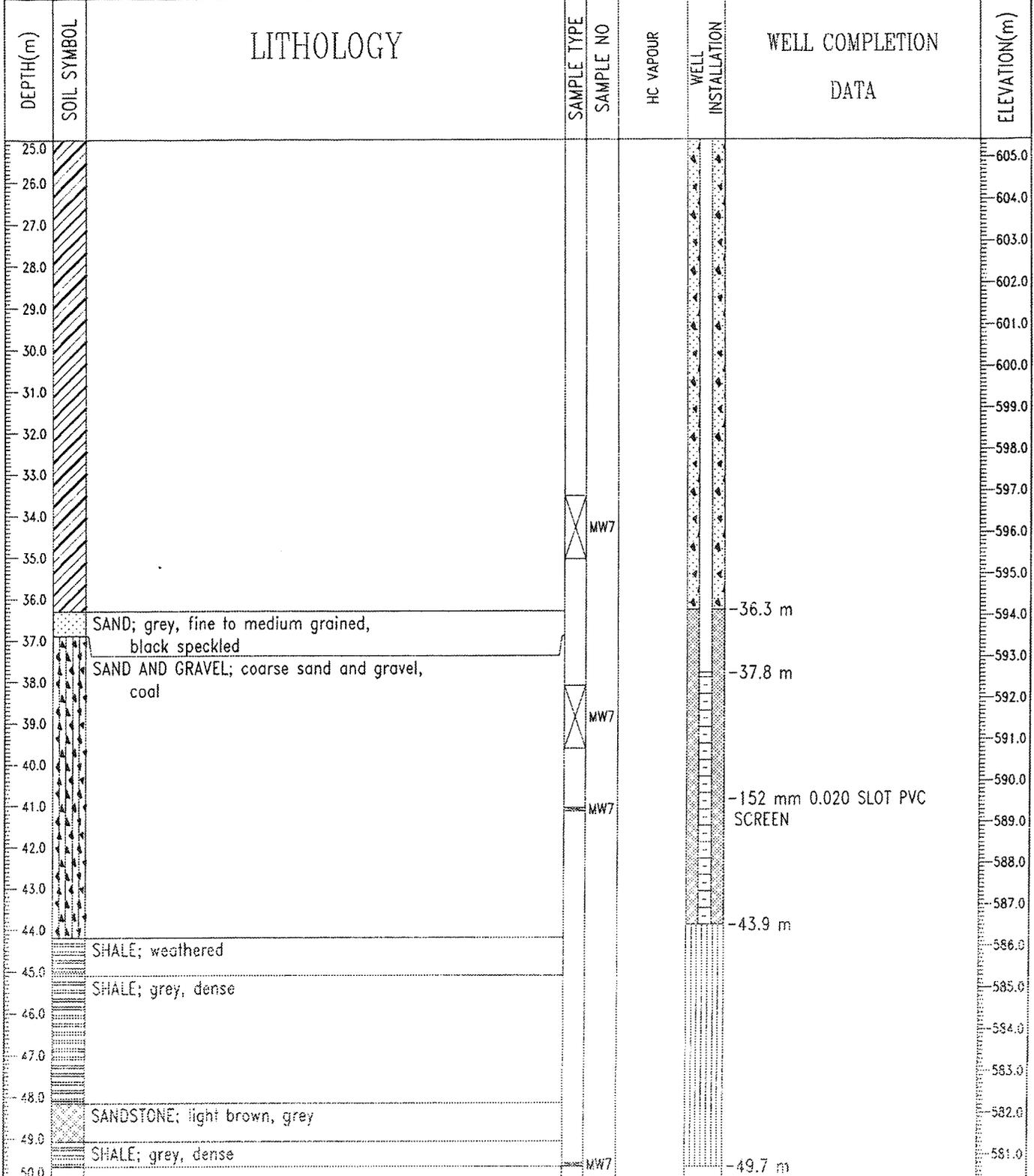
CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-07
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:359089.70 N:5959604.24	ELEVATION: 630.41 (m)
SAMPLE TYPE	<input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> GRAB <input type="checkbox"/> SPT <input type="checkbox"/> A-CASING <input type="checkbox"/> CORE	
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> PELTONITE <input type="checkbox"/> SAND	



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Edmonton, Alberta

LOGGED BY: H. LOVETT	COMPLETION DEPTH: 49.7 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 02/14/05
Fig. No: 17094	Page 1 of 2

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	<input checked="" type="checkbox"/> SHELBY TUBE <input type="checkbox"/> NO RECOVERY <input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SPT <input type="checkbox"/> A-CASING <input type="checkbox"/> CORE	
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> PELTONITE <input type="checkbox"/> SAND	

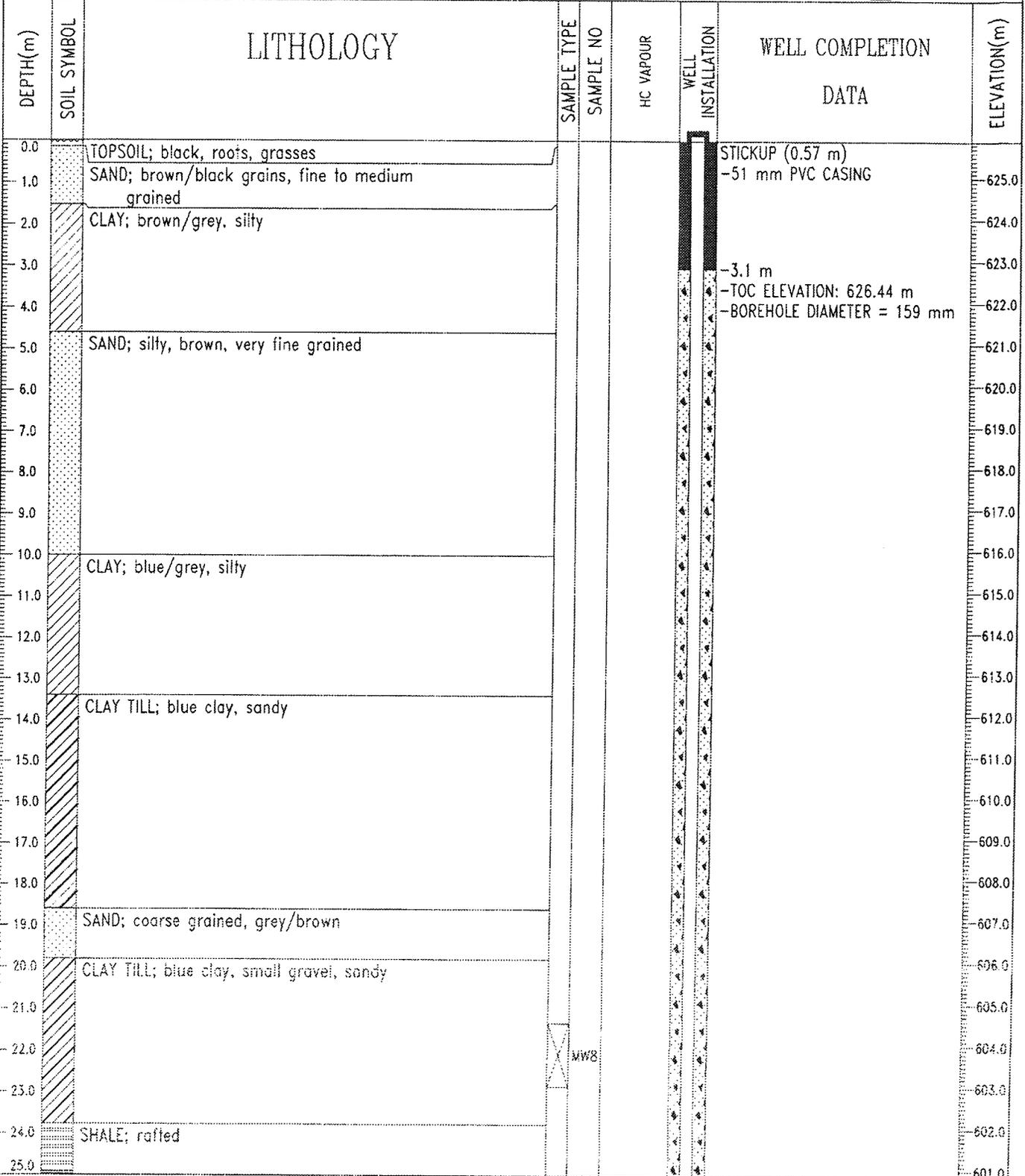


Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT
REVIEWED BY: D. YOSHISAKA
Fig. No: 17094

COMPLETION DEPTH: 49.7 m
COMPLETE: 02/14/05

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	<input checked="" type="checkbox"/> SHELBY TUBE <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> GRAB <input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING <input type="checkbox"/> CORE
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT	<input type="checkbox"/> PELTONITE <input type="checkbox"/> SAND



Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT

REVIEWED BY: D. YOSHISAKA

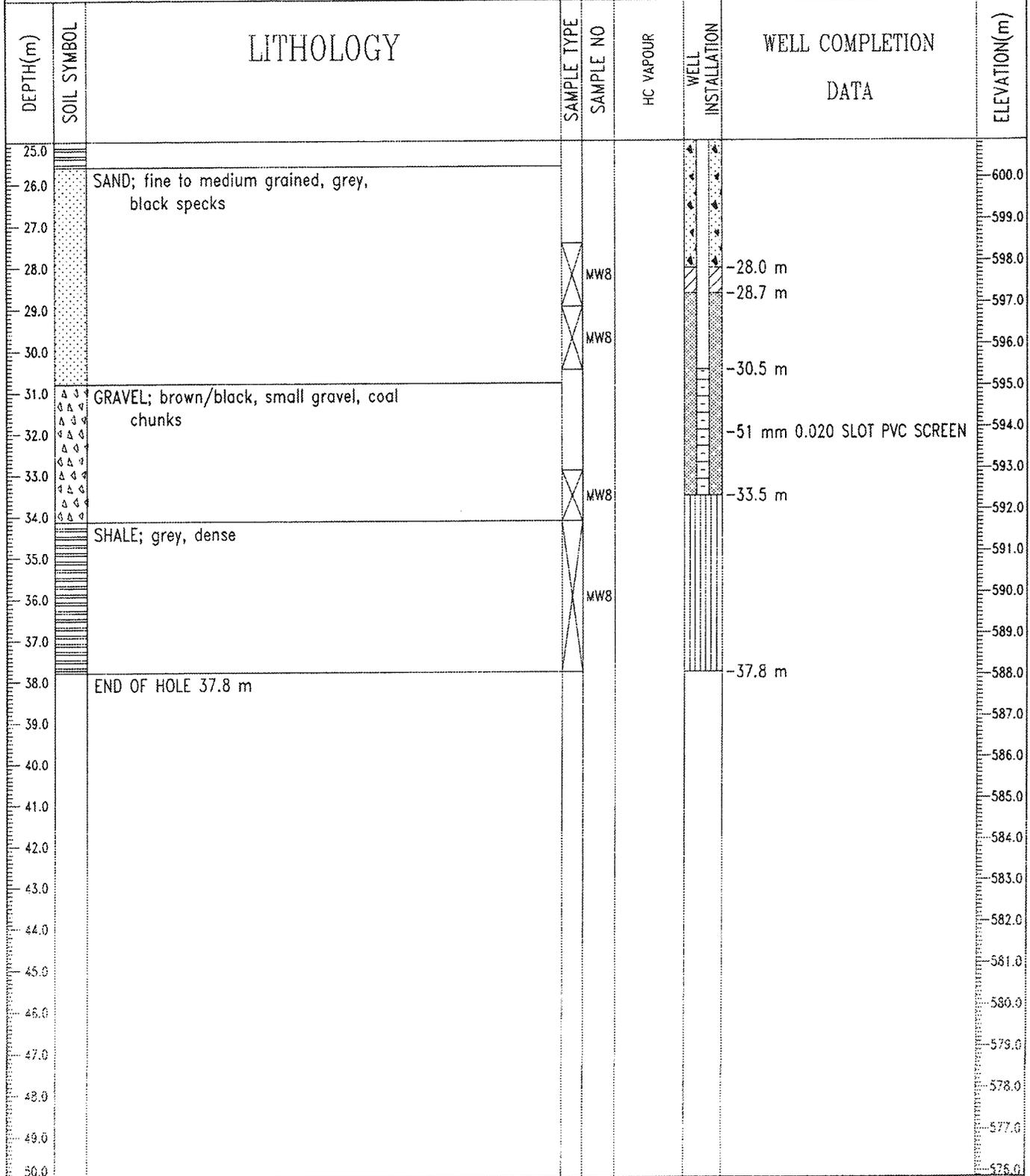
Fig. No: 17094

COMPLETION DEPTH: 37.8 m

COMPLETE: 02/03/05

Page 1 of 2

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	<input checked="" type="checkbox"/> SHELBY TUBE <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> GRAB <input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING <input type="checkbox"/> CORE
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT <input type="checkbox"/> PELTONITE <input type="checkbox"/> SAND



Stantec Consulting Ltd.
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LOGGED BY: H. LOVETT

REVIEWED BY: D. YOSHISAKA

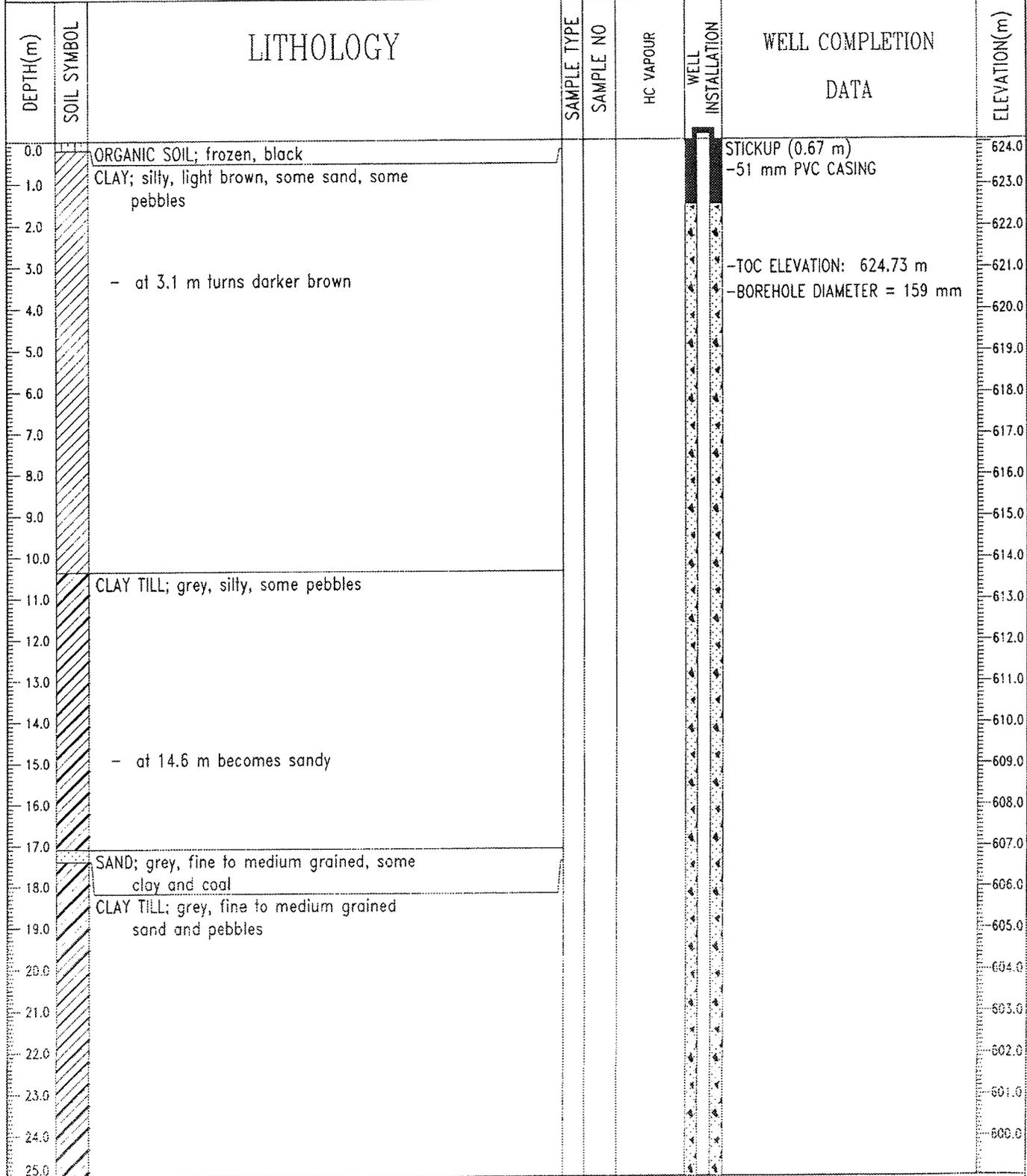
Fig. No: 17094

COMPLETION DEPTH: 37.8 m

COMPLETE: 02/03/05

Page 2 of 2

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	<input checked="" type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> NO RECOVERY	<input checked="" type="checkbox"/> GRAB	<input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input checked="" type="checkbox"/> PELTONITE	<input type="checkbox"/> SAND



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LOGGED BY: H. LOVETT

REVIEWED BY: O. YOSHISAKA

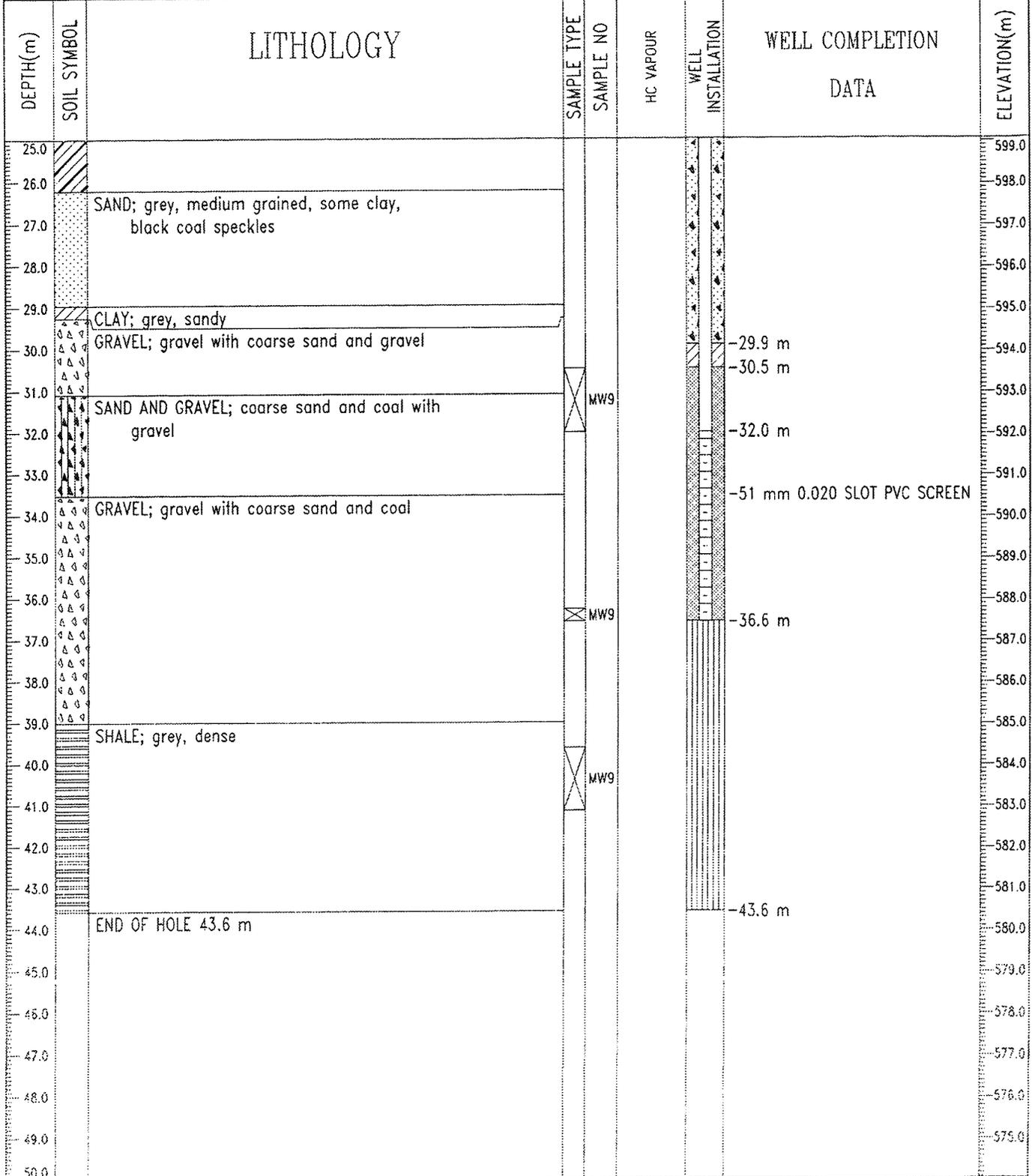
Fig. No: 17094

COMPLETION DEPTH: 43.6 m

COMPLETE: 01/28/05

Page 1 of 2

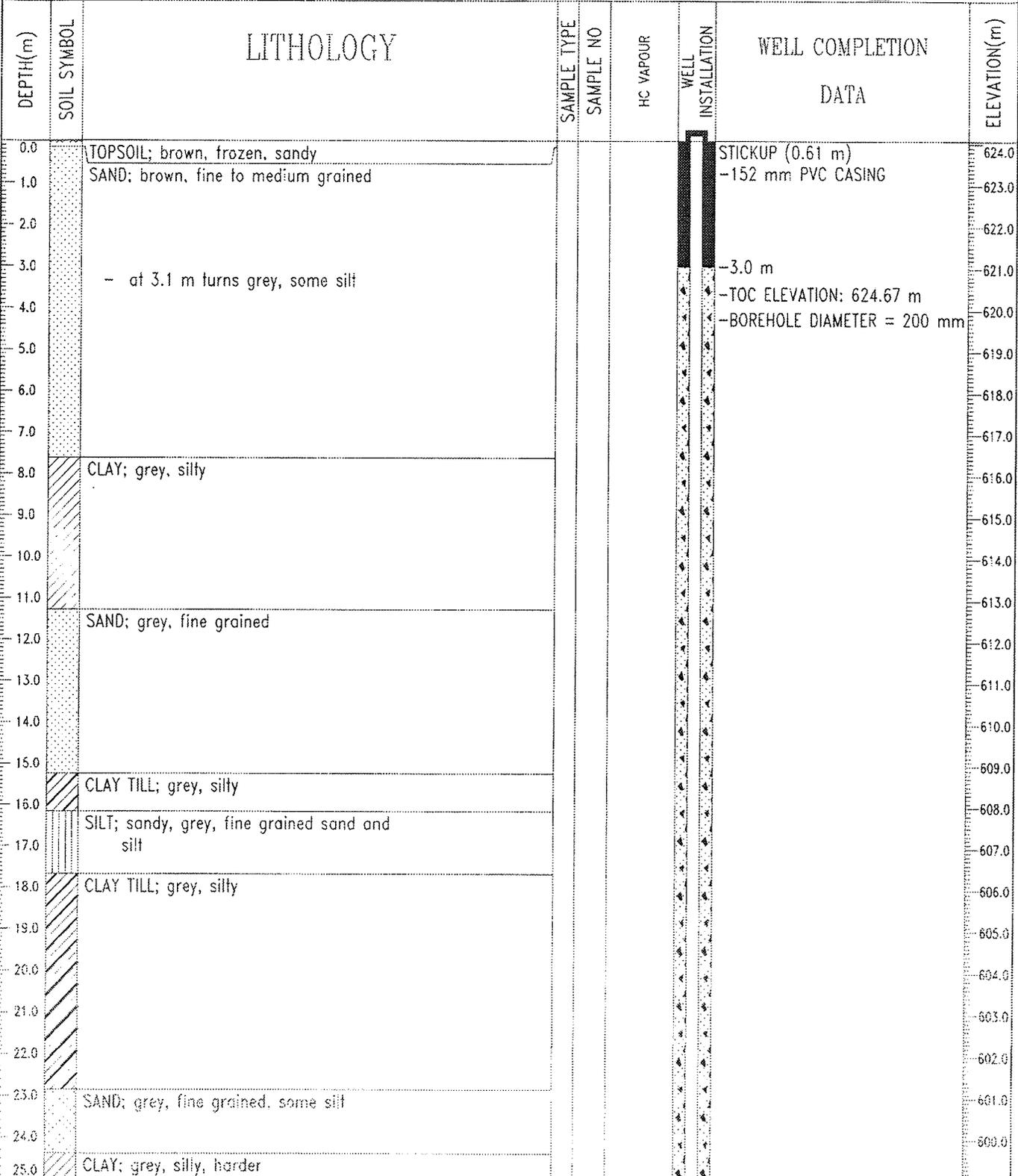
CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-09
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:361003.46 N:5962032.28	ELEVATION: 624.06 (m)
SAMPLE TYPE	<input checked="" type="checkbox"/> SHELBY TUBE <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> GRAB <input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING <input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT <input type="checkbox"/> PELTONITE <input type="checkbox"/> SAND



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

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	<input checked="" type="checkbox"/> SHELBY TUBE <input type="checkbox"/> NO RECOVERY <input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING <input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT <input type="checkbox"/> PELTONITE <input type="checkbox"/> SAND

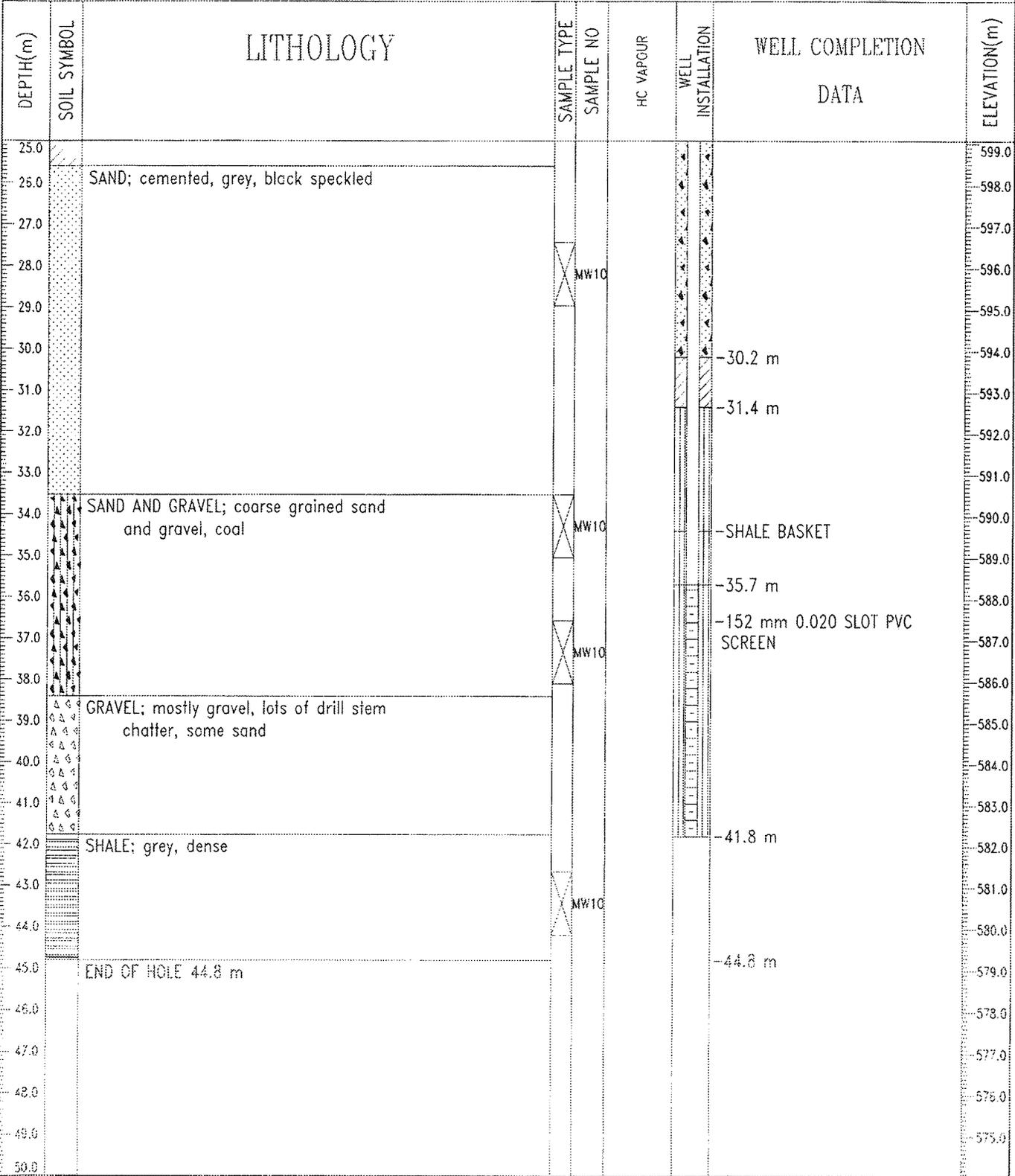


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LOGGED BY: H. LOVETT	COMPLETION DEPTH: 44.8 m
REVIEWED BY: D. YOSHISAKA	COMPLETE: 01/26/05
Fig. No: 17094	Page 1 of 2

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	<input checked="" type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> NO RECOVERY	<input checked="" type="checkbox"/> GRAB	<input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> PELTONITE	<input type="checkbox"/> SAND



Stantec Consulting Ltd.
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LOGGED BY: H. LOVETT

REVIEWED BY: D. YOSHISAKA

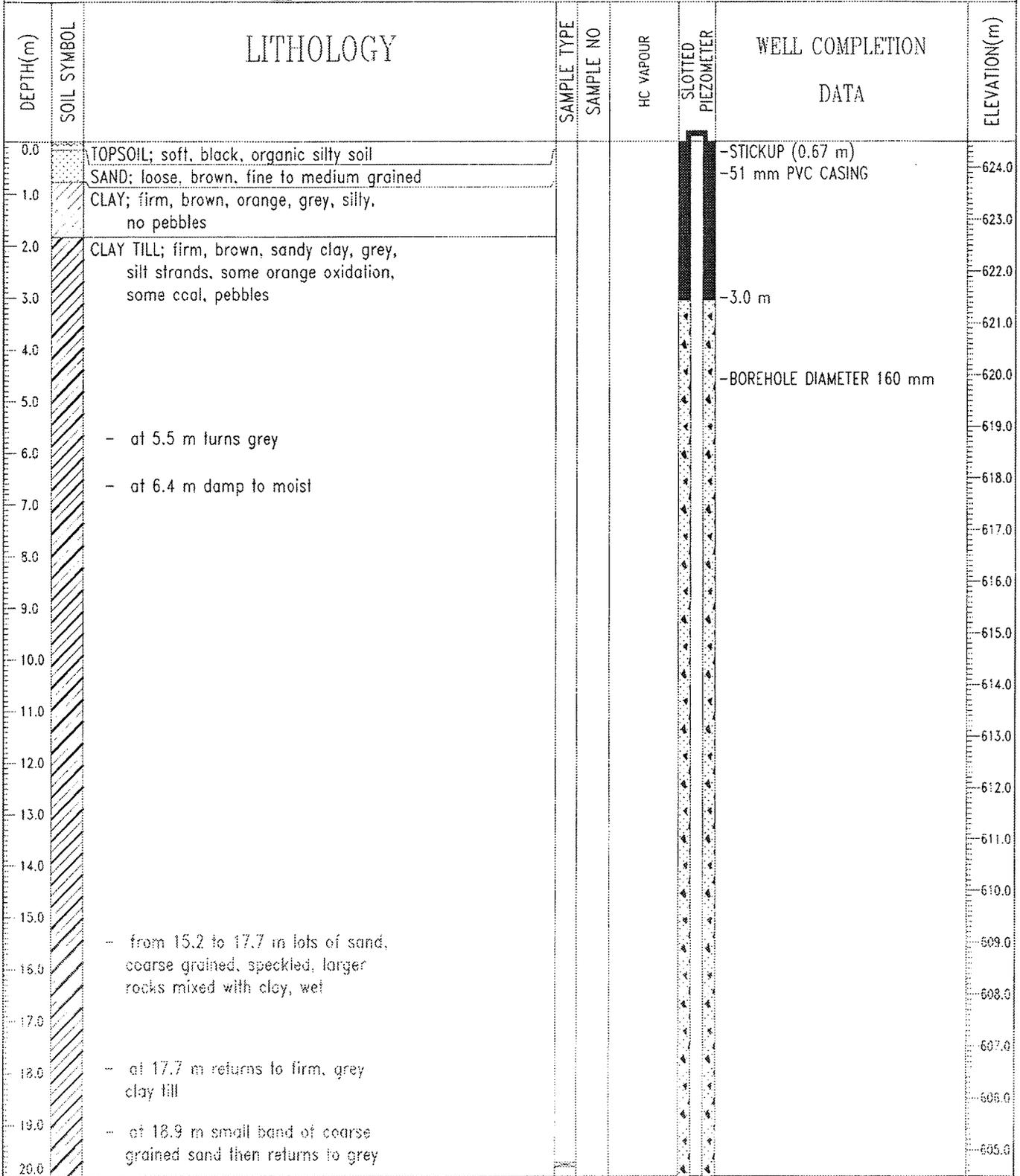
Fig. No: 17094

COMPLETION DEPTH: 44.8 m

COMPLETE: 01/26/05

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	<input checked="" type="checkbox"/> SHELBY TUBE <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> GRAB <input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING <input type="checkbox"/> CORE
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT <input type="checkbox"/> PELTONITE <input type="checkbox"/> SAND



Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT

REVIEWED BY: H. LOVETT

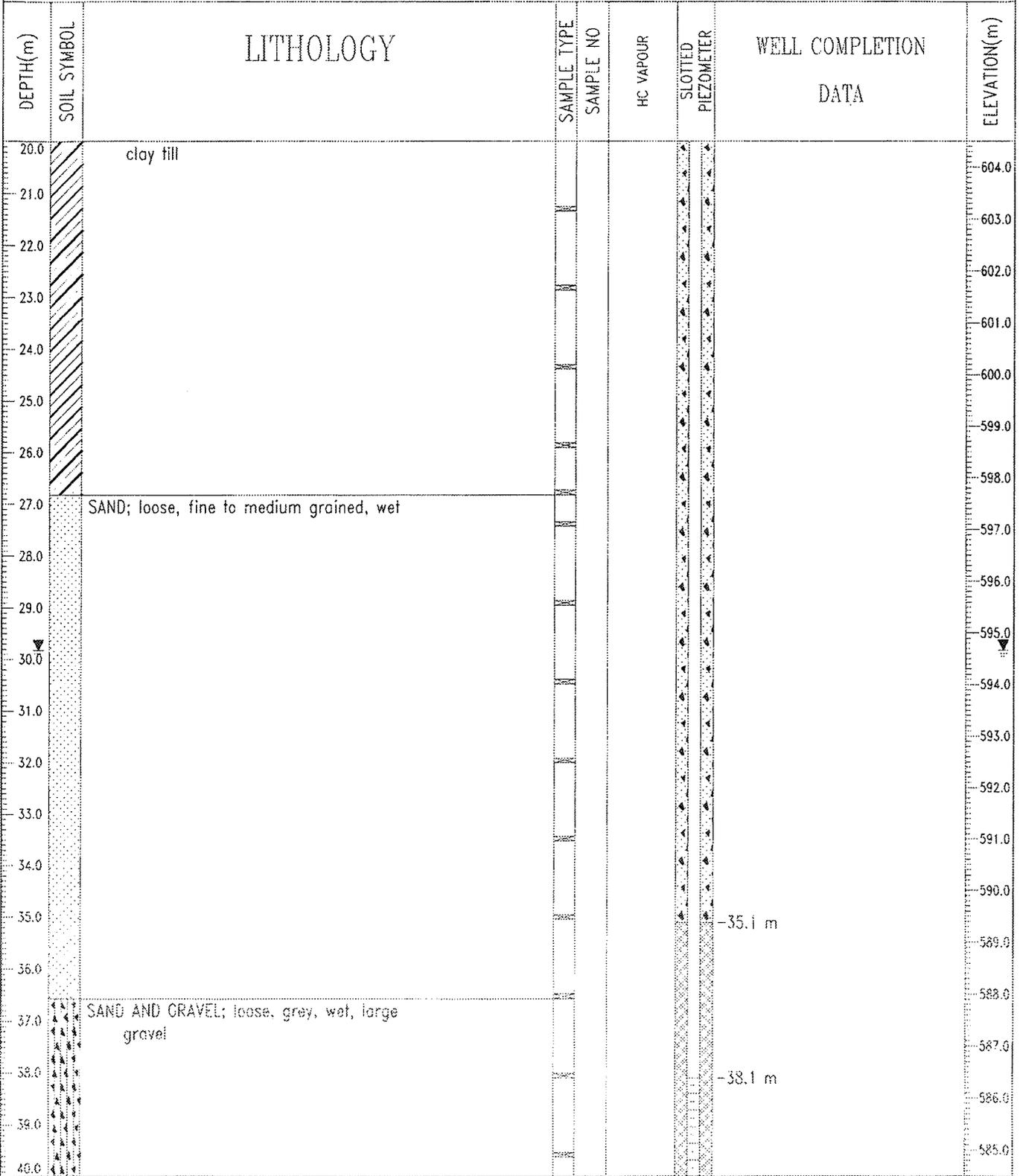
Fig. No: 17094

COMPLETION DEPTH: 44.2 m

COMPLETE: 09/24/04

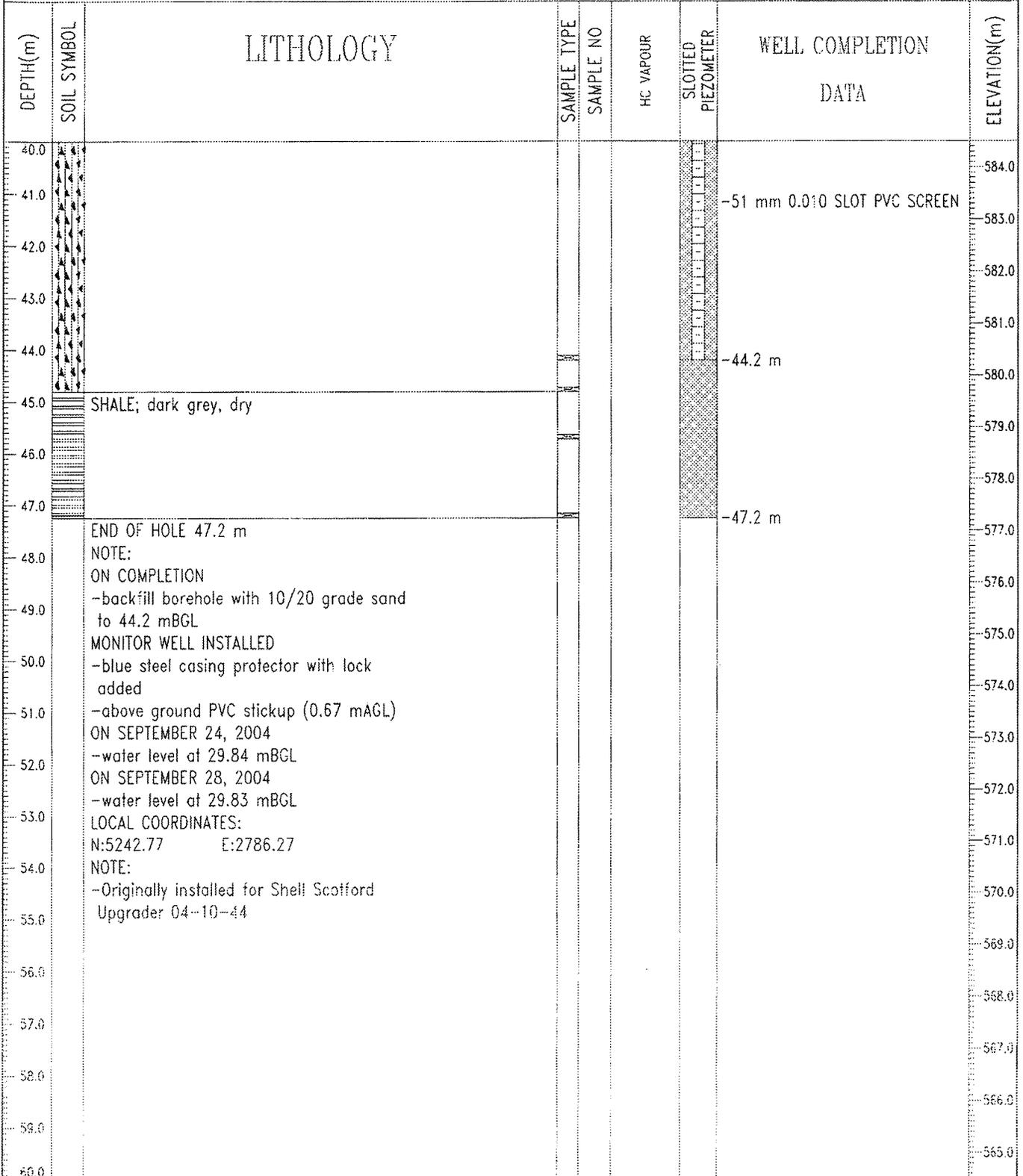
Page 1 of 3

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	<input checked="" type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> NO RECOVERY	<input type="checkbox"/> GRAB	<input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> PELTONITE	<input type="checkbox"/> SAND



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	<input checked="" type="checkbox"/> SHELBY TUBE <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> GRAB <input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING <input type="checkbox"/> CORE
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLCUGH	<input type="checkbox"/> GROUT <input type="checkbox"/> PELTONITE <input type="checkbox"/> SAND

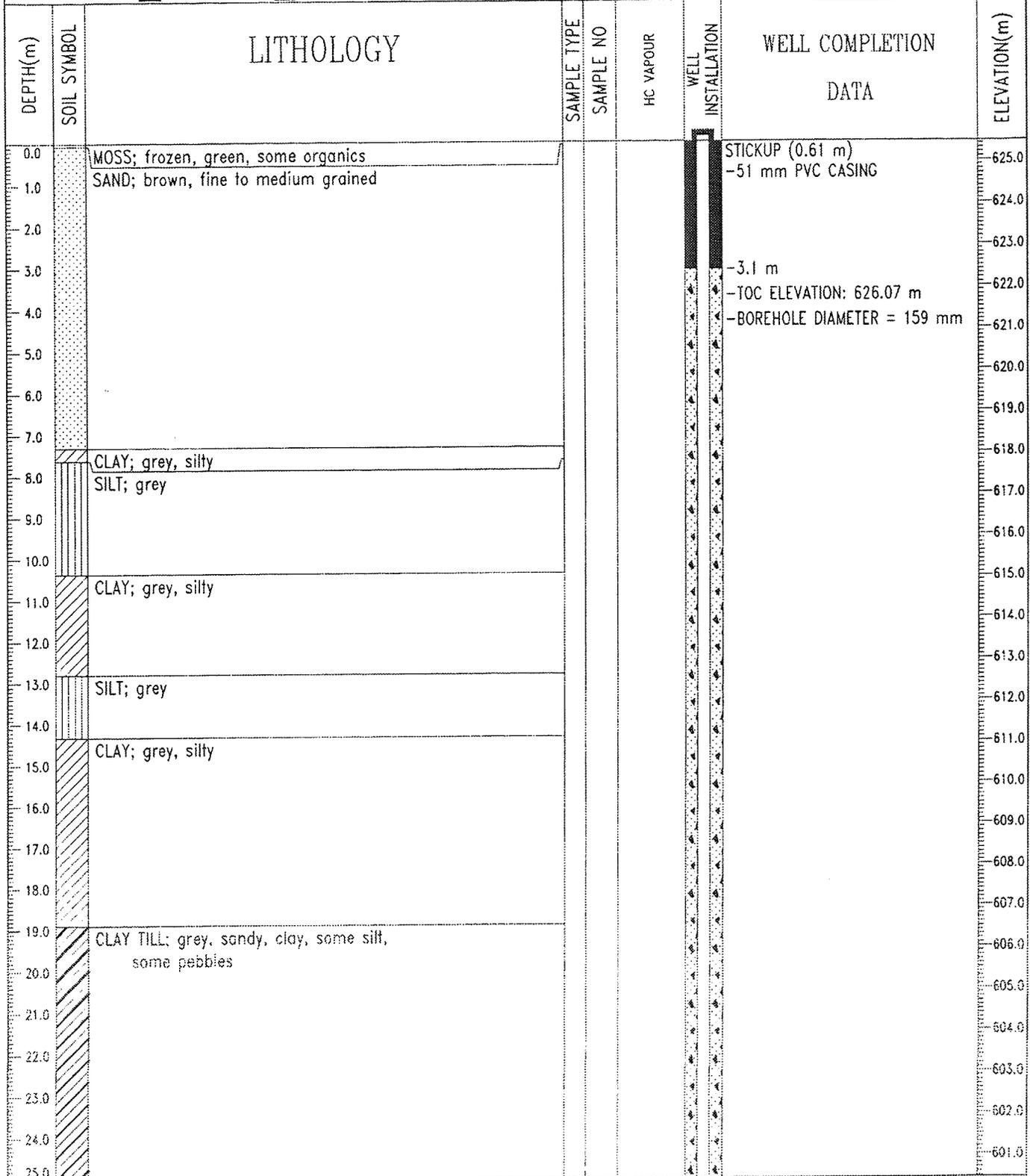


Stantec Consulting Ltd.
Edmonton, Alberta

LOGGED BY: H. LOVETT
REVIEWED BY: H. LOVETT
Fig. No: 17094

COMPLETION DEPTH: 44.2 m
COMPLETE: 09/24/04

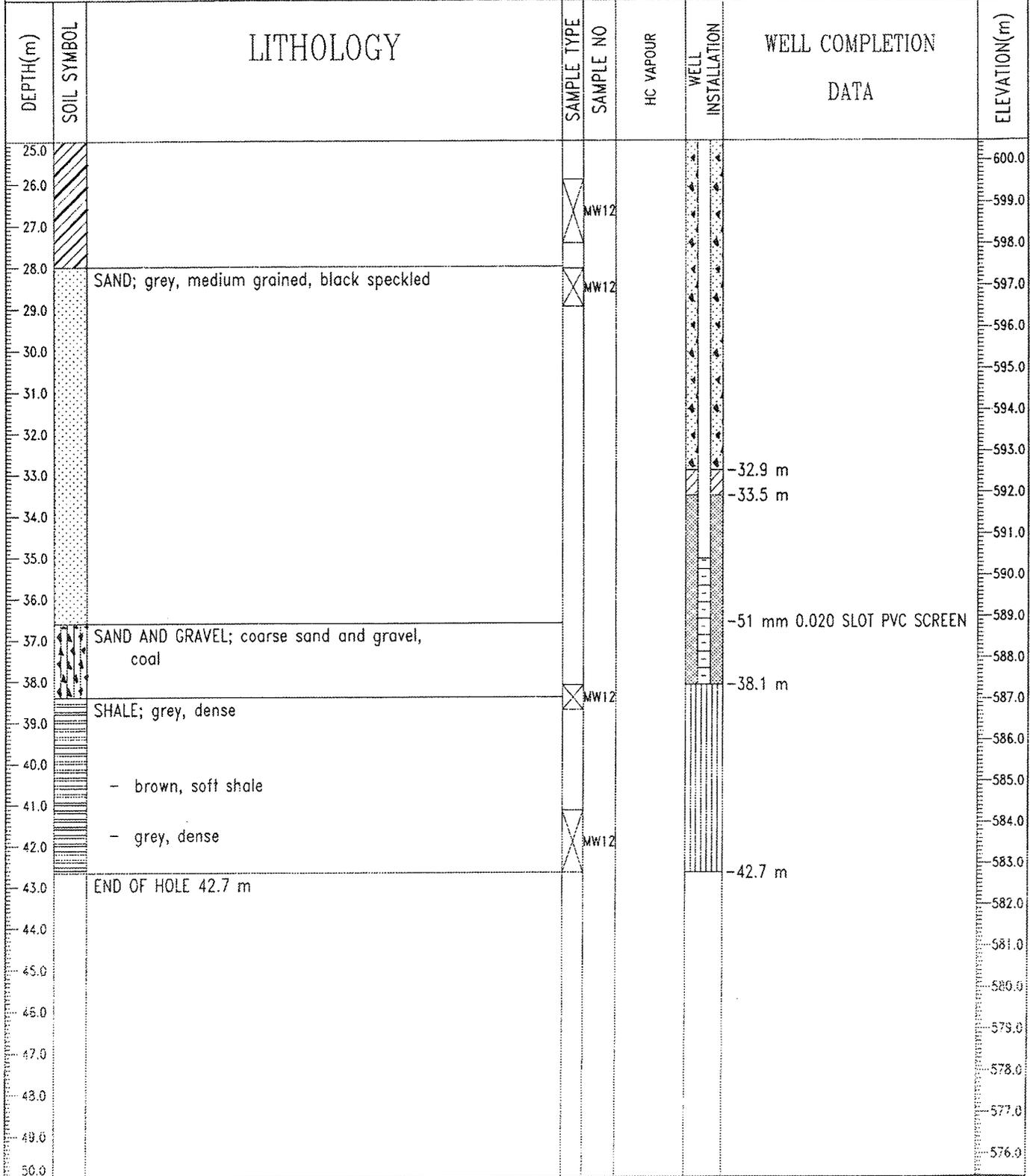
CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-12
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:366805.93 N:5968379.85	ELEVATION: 625.46 (m)
SAMPLE TYPE	<input checked="" type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> NO RECOVERY <input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING <input type="checkbox"/> CORE
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT <input type="checkbox"/> PELTONITE <input type="checkbox"/> SAND



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

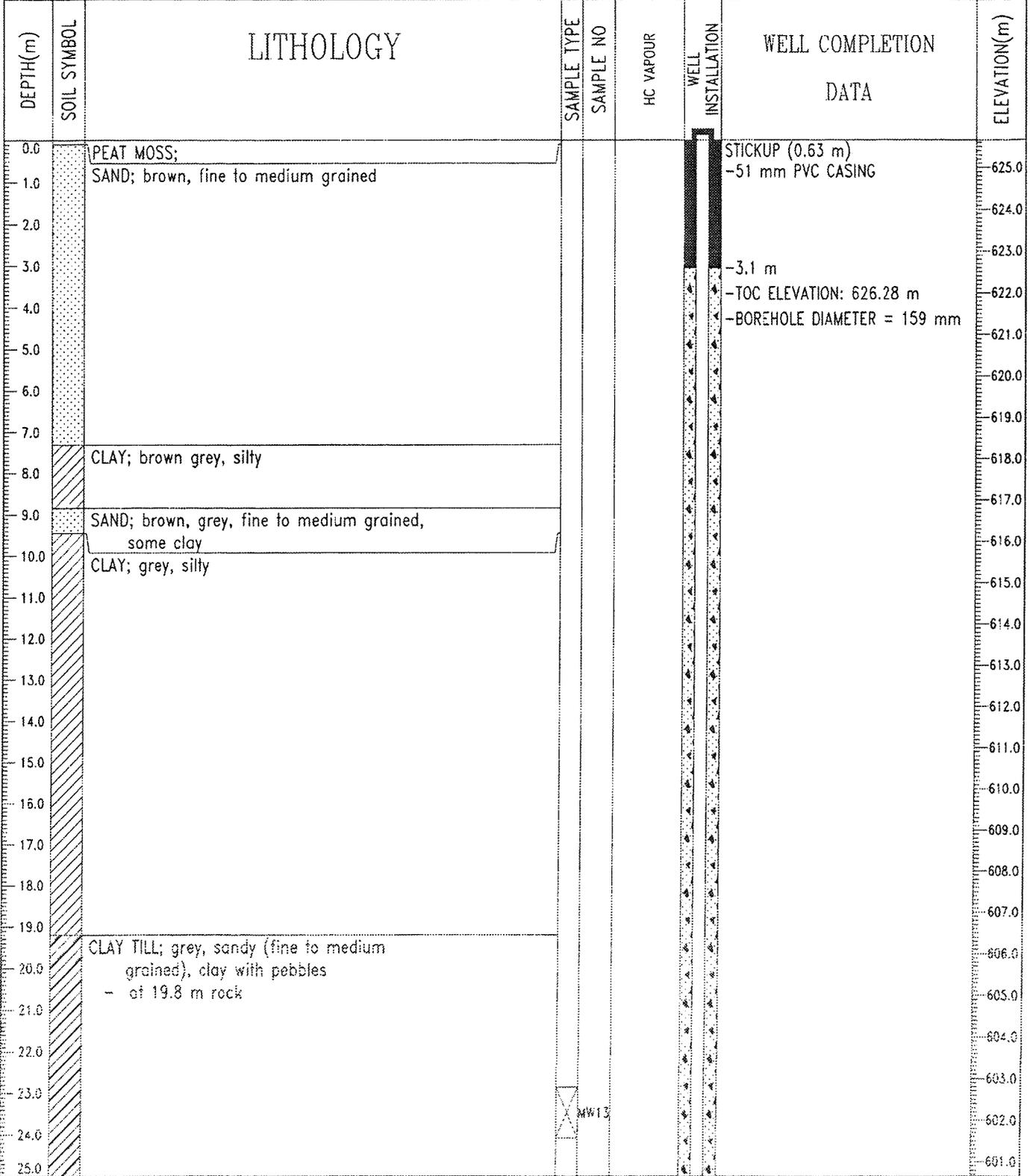
CLIENT: NCIA	FIELD PERSONNEL: H. LOVETT	BOREHOLE NO: MW-12
PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:366805.93 N:5968379.85	ELEVATION: 625.46 (m)
SAMPLE TYPE	<input checked="" type="checkbox"/> SHELBY TUBE <input type="checkbox"/> NO RECOVERY <input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SPT <input type="checkbox"/> A-CASING <input type="checkbox"/> CORE	
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> PELTONITE <input type="checkbox"/> SAND	



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

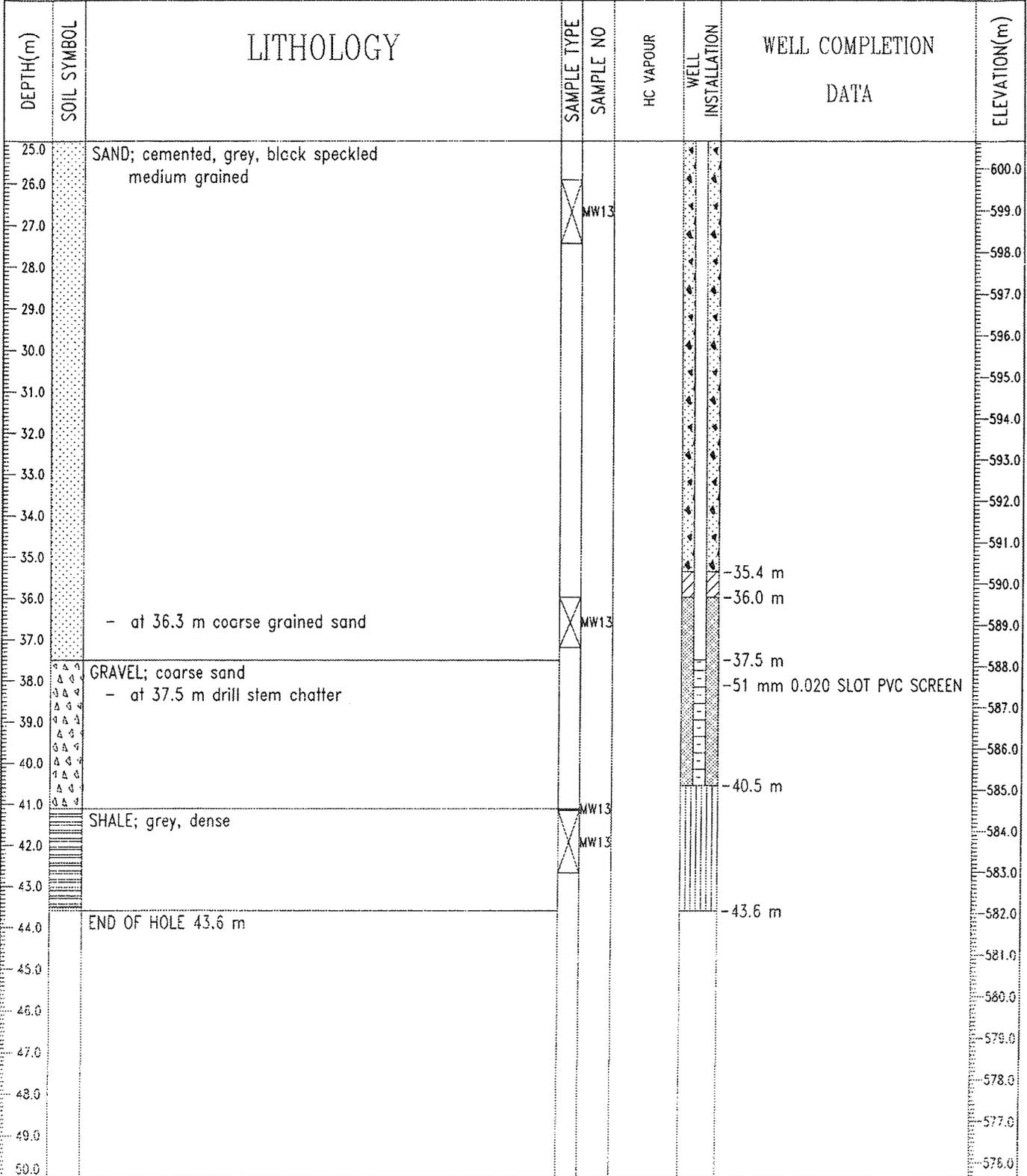
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PROJECT: BEVERLY CHANNEL INVESTIGATION	DRILLING METHOD: MUD ROTARY	PROJECT NO: 1102-17094/400
LOCATION: FORT SASKATCHEWAN, AB	COORDINATES: E:365292.72 N:5968147.12	ELEVATION: 625.65 (m)
SAMPLE TYPE	<input checked="" type="checkbox"/> SHELBY TUBE <input type="checkbox"/> NO RECOVERY <input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING <input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT <input type="checkbox"/> PELTONITE <input type="checkbox"/> SAND



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 02:43PM (PELTON-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	<input checked="" type="checkbox"/> SHELBY TUBE <input type="checkbox"/> NO RECOVERY <input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SPT <input type="checkbox"/> A-CASING <input type="checkbox"/> CORE	
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> PELTONITE <input type="checkbox"/> SAND	



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 2 of 2



Water Well Drilling Report

[View in Imperial](#) [Export to Excel](#)

GIC Well ID 1421865
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2016/09/06

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

Well Identification and Location										Measurement in Metric	
Owner Name NCIA		Address 9902 102 ST #204			Town FORT SASKATCHEWAN		Province ALBERTA	Country CANADA	Postal Code T8L 2C3		
Location	<i>1/4 or LSD</i> 14	<i>SEC</i> 19	<i>TWP</i> 54	<i>RGE</i> 22	<i>W of MER</i> 4	<i>Lot</i>	<i>Block</i>	<i>Plan</i>	<i>Additional Description</i>		
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)						
_____ m from _____					Latitude <u>53.684844</u>		Longitude <u>-113.236795</u>		Elevation _____ m		
_____ m from _____					How Location Obtained					How Elevation Obtained	
					Not Verified					Not Obtained	

Drilling Information	
Method of Drilling Rotary - Mud	Type of Work New Well
Proposed Well Use Observation	

Formation Log			Measurement in Metric
Depth from ground level (m)	Water Bearing	Lithology Description	
1.22		Brown Clay	
7.62		Sand	
9.45		Brown Till & Clay	
13.41		Sand	
15.54		Brown Clay	
20.42		Gray Sand & Clay	
31.39		Sand	
34.75		Gravel	
42.67		Shale	

Yield Test Summary			Measurement in Metric
Recommended Pump Rate		_____ L/min	
Test Date	Water Removal Rate (L/min)	Static Water Level (m)	

Well Completion				Measurement in Metric
Total Depth Drilled	Finished Well Depth	Start Date	End Date	
42.67 m	41.15 m	2016/09/02	2016/09/02	
Borehole				
Diameter (cm)	From (m)	To (m)		
15.88	0.00	42.67		
Surface Casing (if applicable)		Well Casing/Liner		
		Plastic		
Size OD : _____ cm		Size OD : 5.08 cm		
Wall Thickness : _____ cm		Wall Thickness : 0.554 cm		
Bottom at : _____ m		Top at : 0.00 m		
		Bottom at : 39.62 m		
Perforations				
From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval (cm)
Perforated by				
Annular Seal Bentonite Slurry				
Placed from 0.00 m to 38.71 m				
Amount 8.00 Bags				
Other Seals				
Type		At (m)		
Screen Type Plastic				
Size OD : 5.08 cm				
From (m)	To (m)	Slot Size (cm)		
39.62	41.15	0.025		
Attachment Attached To Casing				
Top Fittings Threaded		Bottom Fittings Plug		
Pack				
Type Artificial		Grain Size 10-20		
Amount 5.00 Bags				

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well DARELL LEPPER	Certification No 5449Q
Company Name LAKELAND DRILLING LTD.	Copy of Well report provided to owner Yes
	Date approval holder signed 2016/09/06



Water Well Drilling Report

[View in Imperial](#) [Export to Excel](#)

GIC Well ID 1421865
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2016/09/06

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

Well Identification and Location										Measurement in Metric	
Owner Name		Address			Town		Province	Country	Postal Code		
NCIA		9902 102 ST #204			FORT SASKATCHEWAN		ALBERTA	CANADA	T8L 2C3		
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
	14	19	54	22	4						
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)						
_____ m from _____					Latitude <u>53.684844</u>		Longitude <u>-113.236795</u>		Elevation _____ m		
_____ m from _____					How Location Obtained					How Elevation Obtained	
					Not Verified					Not Obtained	

Additional Information										Measurement in Metric	
Distance From Top of Casing to Ground Level _____										76.20 cm	
Is Artesian Flow _____					Is Flow Control Installed _____						
Rate _____ L/min					Describe _____						
Recommended Pump Rate _____					L/min		Pump Installed _____		Depth _____		m
Recommended Pump Intake Depth (From TOC) _____					m		Type _____		Make _____		H.P. _____
										Model (Output Rating) _____	
Did you Encounter Saline Water (>4000 ppm TDS) _____					Depth _____		m		Well Disinfected Upon Completion <u>Yes</u>		
Gas _____					Depth _____		m		Geophysical Log Taken <u>Electric, Gamma</u>		
										Submitted to ESRD _____	
Additional Comments on Well _____										Sample Collected for Potability _____	Submitted to ESRD _____

Yield Test			Taken From Ground Level	Measurement in Metric
Test Date _____	Start Time _____	Static Water Level _____		m
Method of Water Removal				
Type _____				
Removal Rate _____ L/min				
Depth Withdrawn From _____ m				
If water removal period was < 2 hours, explain why _____				

Water Diverted for Drilling			
Water Source	Amount Taken		Diversion Date & Time
FILL STATION	6819.14	L	2016/09/02 10:30 AM

Contractor Certification			
Name of Journeyman responsible for drilling/construction of well		Certification No	
DARELL LEPPER		5449Q	
Company Name		Copy of Well report provided to owner	Date approval holder signed
LAKELAND DRILLING LTD.		Yes	2016/09/06

Appendix 3 Hydraulic Conductivity Test



Single-Well Response Test Field Data

Monitoring Well:
MW-02B

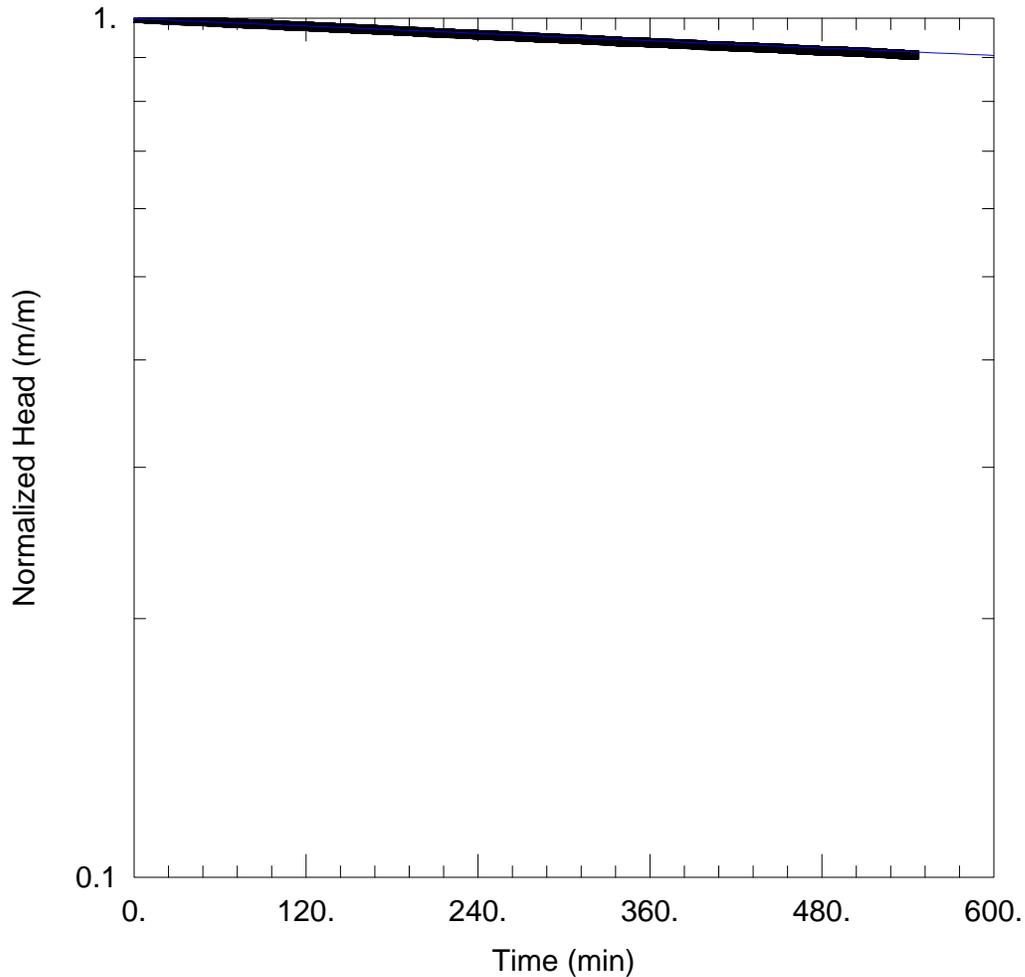
Client	NCIA	Project No	307075-01608-200
Project Title	2016 Groundwater Monitoring Program	Location	LSD LOCATION
Calculation Title	Analysis of Single-Well Response Test	Test Date	19-Sep-20416
Elec File Location	U:\EDM\GBS\307075-01608\200-2016_GWM\7.0_K-Test and GW Flow Analysis\7.1_K-Test\[Calculation Sheet_SlugTest.xls]Calculation Cover Sheet		
Project File Location	Edmonton	Page	1 of 1

Monitoring Well: MW-02B

Static Water Level:	28.5 mbtoc	27.79 mbgs
Total Depth:	42.35 mbtoc	41.64 mbgs
Stick-up:	0.71 m	
Well casing radius:	0.025 m	
Borehole Radius:	0.0795 m	
Saturated Thickness:	4 m	

Data Measurement: Water level data were measured manually with an electric tape.
Water level data were recorded through a transducer/data logger.

Time (min)	Depth to Water Level (mbtoc)	Displacement (m)
0		
0.5	41.349	12.849
1	41.345	12.845
1.5	41.341	12.841
2	41.34	12.84
2.5	41.355	12.855
3.5	41.348	12.848
4	41.348	12.848
4.5	41.342	12.842
5	41.342	12.842
6	41.339	12.839
6.5	41.319	12.819
7.5	41.311	12.811
8.5	41.328	12.828
9.5	41.309	12.809
10.5	41.302	12.802
12.5	41.299	12.799
14.5	41.291	12.791
16.5	41.29	12.79
18.5	41.299	12.799
20.5	41.284	12.784
25.5	41.271	12.771
30.5	41.265	12.765
1080.5	40.389	11.889
1816.5	38.932	10.432



WELL TEST ANALYSIS

Data Set: U:\...\MW-02B_K-Test Analysis_Transducer Data.aqt
 Date: 11/07/16 Time: 15:49:12

PROJECT INFORMATION

Company: Advisian
 Client: NCIA
 Project: 307075-01608
 Location: Edmonton
 Test Well: MW-02B
 Test Date: 19-Sep-2016

AQUIFER DATA

Saturated Thickness: 4. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (New Well)

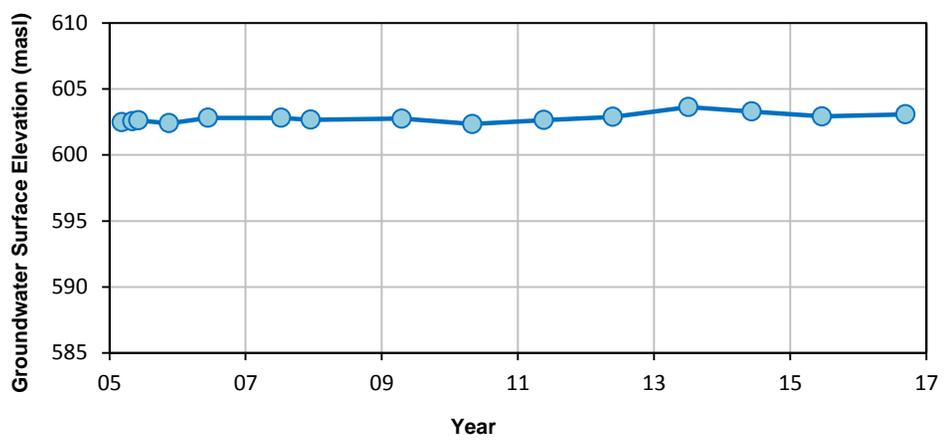
Initial Displacement: 11.28 m Static Water Column Height: 13.85 m
 Total Well Penetration Depth: 4. m Screen Length: 3.1 m
 Casing Radius: 0.025 m Well Radius: 0.0795 m
 Gravel Pack Porosity: 0.2

SOLUTION

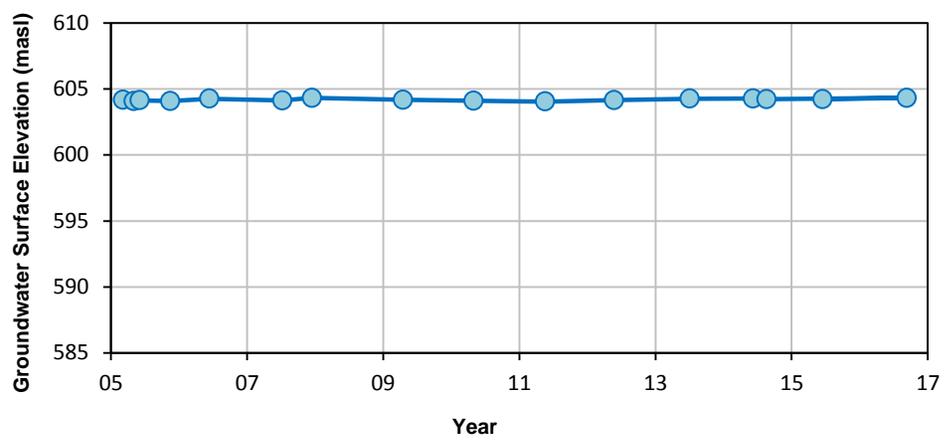
Aquifer Model: Confined Solution Method: Hvorslev
 K = 1.2E-9 m/sec y0 = 11.26 m

Appendix 4 Groundwater Hydrographs

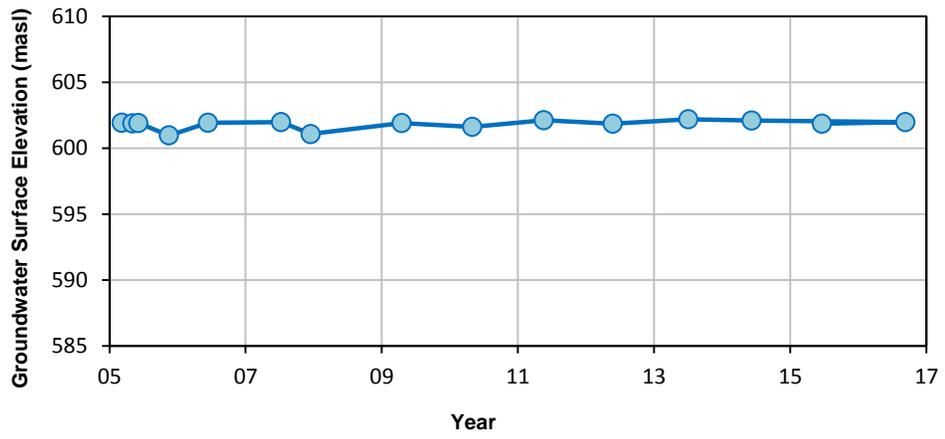
MW-01



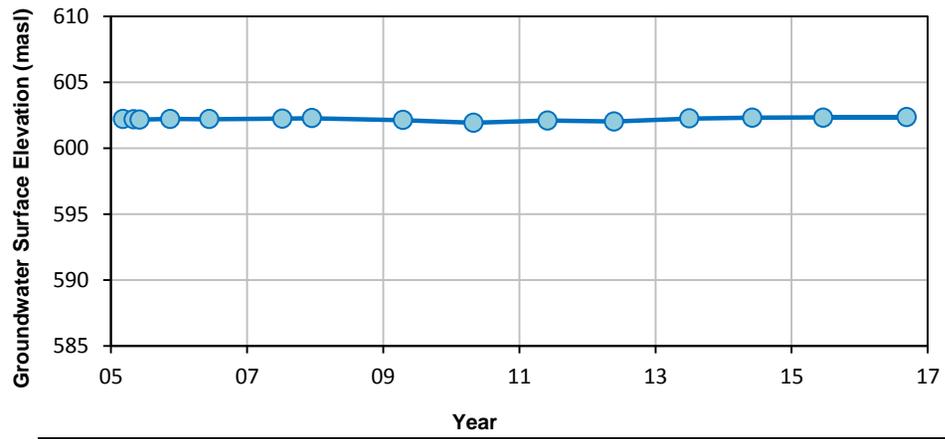
MW-02



MW-03



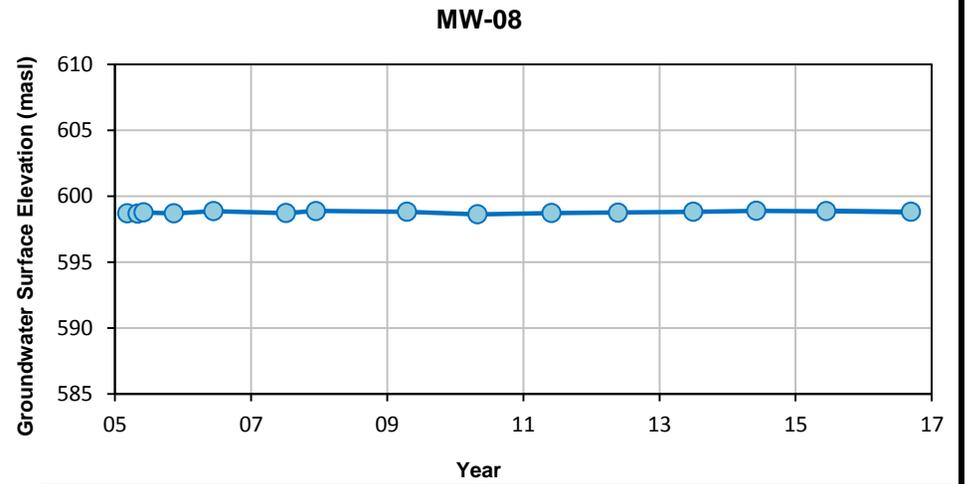
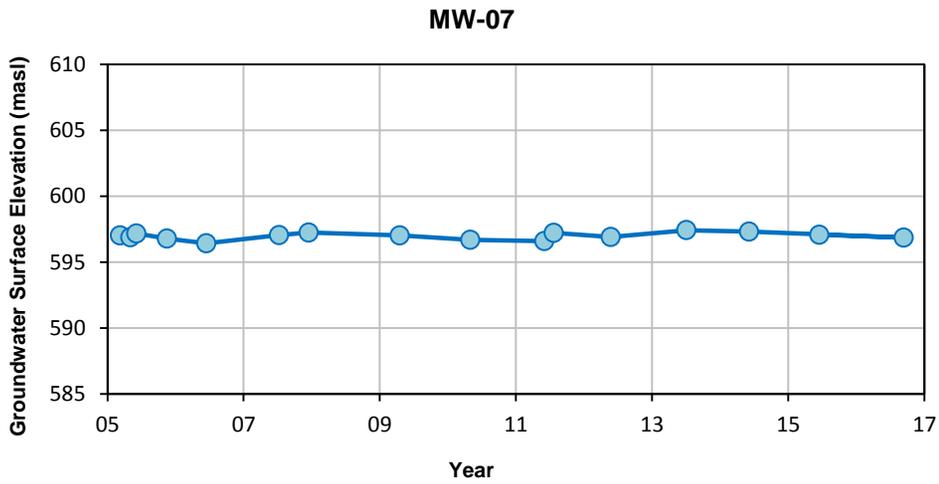
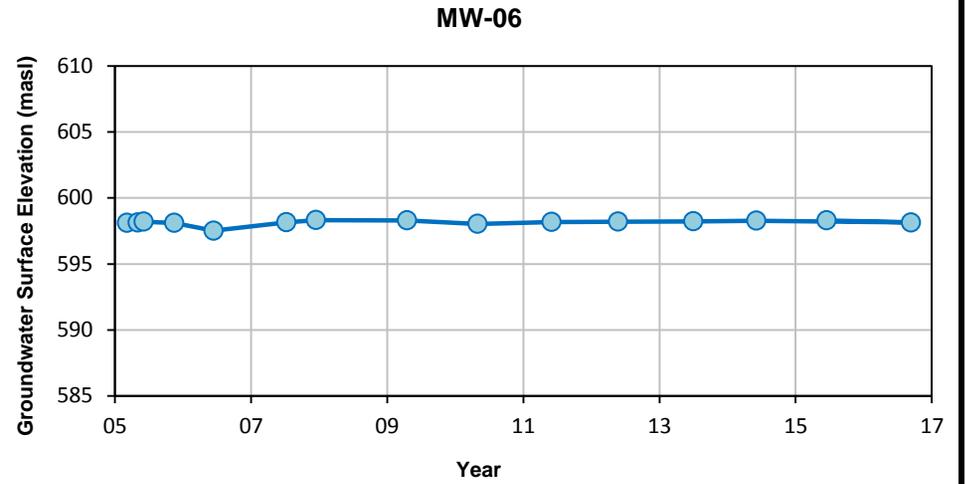
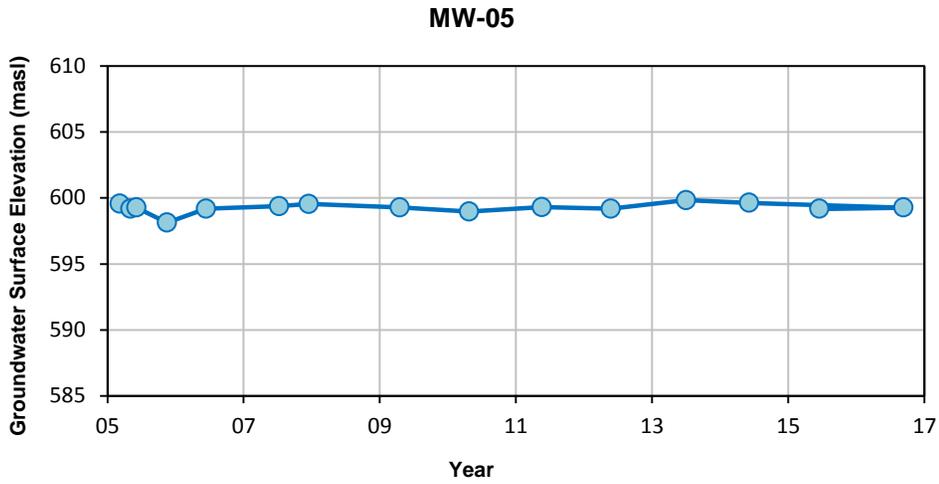
MW-04



NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2016 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

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

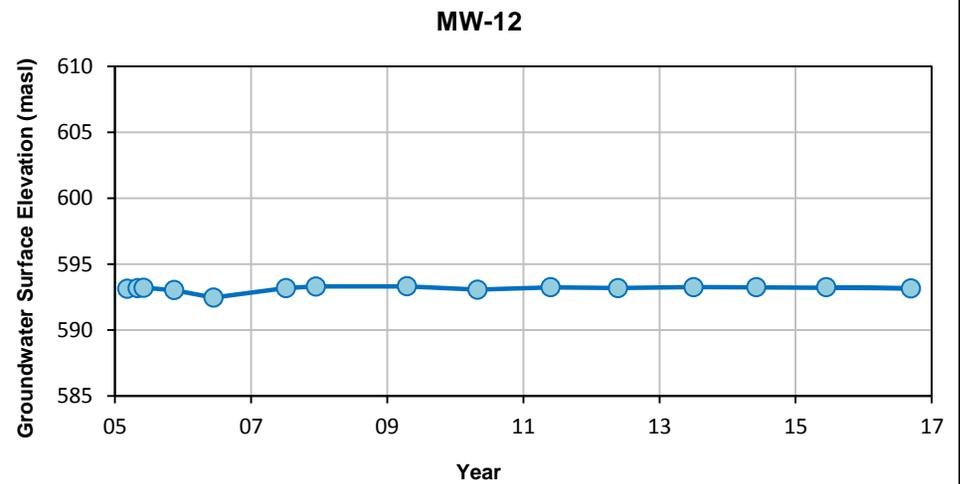
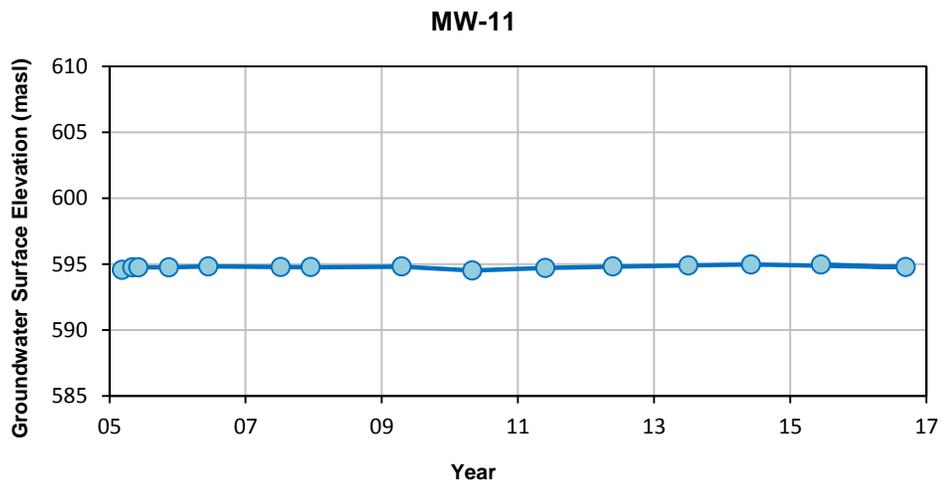
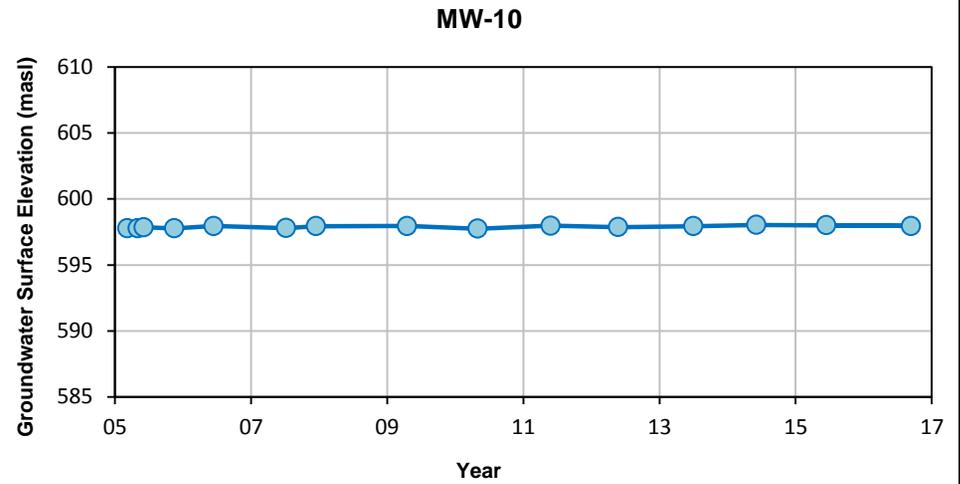
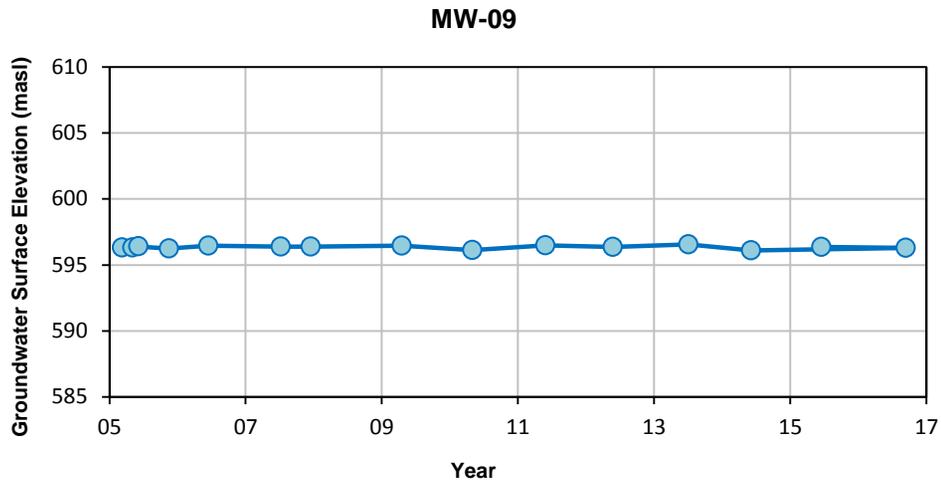
	Date: 18-Oct-16	Drawn by: CM	Edited by:	App'd by:
	WorleyParsons Project No. 307075-01608-200			
	FIG No. A4-1			REV A
<small>* This drawing is prepared solely for the use of our customer as specified in the accompanying report. WorleyParsons Canada Services Ltd. assumes no liability to any other party for any representations contained in this drawing.*</small>				



NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2016 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

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

	Date: 18-Oct-16	Drawn by: CM	Edited by:	App'd by:
				WorleyParsons Project No. 307075-01608-200
				FIG No. A4-2
* This drawing is prepared solely for the use of our customer as specified in the accompanying report. WorleyParsons Canada Services Ltd. assumes no liability to any other party for any representations contained in this drawing.				

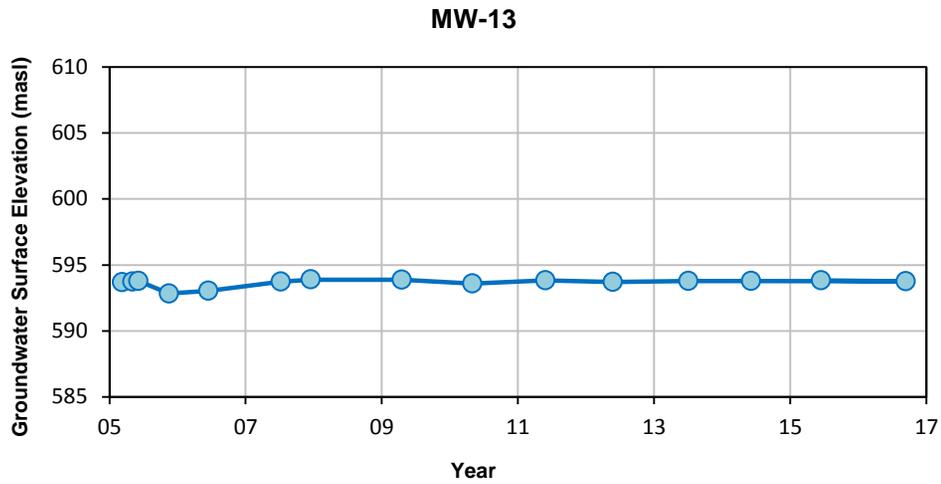


NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2016 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

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

	Date: 18-Oct-16	Drawn by: CM	Edited by:	App'd by:
	WorleyParsons Project No.			
	307075-01608-200			
FIG No.			REV	
A4-3			A	

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NORTHEAST CAPITAL INDUSTRIAL ASSOCIATION
2016 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

GROUNDWATER HYDROGRAPHS
MW-13

	Date: 18-Oct-16	Drawn by: CM	Edited by:	App'd by:
		WorleyParsons Project No. 307075-01608-200		
		FIG No. A3-4	REV A	
		* This drawing is prepared solely for the use of our customer as specified in the accompanying report. WorleyParsons Canada Services Ltd. assumes no liability to any other party for any representations contained in this drawing.		

Appendix 5 Laboratory Analytical Data



WorleyParsons Canada
ATTN: TREVOR BUTTERFIELD
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6

Date Received: 21-SEP-16
Report Date: 18-OCT-16 13:04 (MT)
Version: FINAL

Client Phone: 780-496-9055

Certificate of Analysis

Lab Work Order #: L1831974
Project P.O. #: NOT SUBMITTED
Job Reference: 307075-01608-200
C of C Numbers: 15-278068, 15-578067
Legal Site Desc:

Dana Brown, Chem. Tech. DIPL
Account Manager

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ADDRESS: 9936-67 Avenue, Edmonton, AB T6E 0P5 Canada | Phone: +1 780 413 5227 | Fax: +1 780 437 2311
ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-1 MW-04							
Sampled By: PERD on 19-SEP-16 @ 09:42							
Matrix: GW							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Toluene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
EthylBenzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
o-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
m+p-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Styrene	<0.0010		0.0010	mg/L	22-SEP-16	22-SEP-16	R3552104
F1(C6-C10)	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
F1-BTEX	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
Xylenes	<0.00071		0.00071	mg/L	22-SEP-16	22-SEP-16	R3552104
Surrogate: 1,4-Difluorobenzene (SS)	97.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 4-Bromofluorobenzene (SS)	94.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 3,4-Dichlorotoluene (SS)	95.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
F2 (>C10-C16)							
F2 (C10-C16)	<0.10		0.10	mg/L	26-SEP-16	26-SEP-16	R3558789
Surrogate: 2-Bromobenzotrifluoride	107.4		60-140	%	26-SEP-16	26-SEP-16	R3558789
Miscellaneous Parameters							
Ammonia, Total Dissolved (as N)	<0.050		0.050	mg/L		05-OCT-16	R3564452
Dissolved Organic Carbon	3.6		1.0	mg/L		17-OCT-16	R3573406
Phenols (4AAP)	<0.0010		0.0010	mg/L		05-OCT-16	R3564788
Special Request	See Attached					14-OCT-16	R3572652
Total Dissolved Solids	833		10	mg/L		23-SEP-16	R3556027
Major Ions & Trace Dissolved Metals							
Chloride in Water by IC							
Chloride (Cl)	190		0.50	mg/L		22-SEP-16	R3554579
Dissolved Mercury in Water by CVAAS							
Dissolved Mercury Filtration Location	FIELD					03-OCT-16	R3562588
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L		04-OCT-16	R3563403
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					04-OCT-16	R3563800
Aluminum (Al)-Dissolved	<0.0010		0.0010	mg/L		04-OCT-16	R3563621
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Arsenic (As)-Dissolved	0.00062		0.00010	mg/L		04-OCT-16	R3563621
Barium (Ba)-Dissolved	0.123		0.000050	mg/L		04-OCT-16	R3563621
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Boron (B)-Dissolved	0.094		0.010	mg/L		04-OCT-16	R3563621
Cadmium (Cd)-Dissolved	<0.0000050		0.0000050	mg/L		04-OCT-16	R3563621
Calcium (Ca)-Dissolved	165		0.050	mg/L		04-OCT-16	R3563621
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Cobalt (Co)-Dissolved	0.00044		0.00010	mg/L		04-OCT-16	R3563621
Copper (Cu)-Dissolved	<0.00020		0.00020	mg/L		04-OCT-16	R3563621
Iron (Fe)-Dissolved	2.33		0.010	mg/L		04-OCT-16	R3563621
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Magnesium (Mg)-Dissolved	47.9		0.0050	mg/L		04-OCT-16	R3563621
Manganese (Mn)-Dissolved	0.621		0.00010	mg/L		04-OCT-16	R3563621
Molybdenum (Mo)-Dissolved	0.000220		0.000050	mg/L		04-OCT-16	R3563621
Nickel (Ni)-Dissolved	0.00221		0.00050	mg/L		04-OCT-16	R3563621
Potassium (K)-Dissolved	9.96		0.050	mg/L		04-OCT-16	R3563621
Selenium (Se)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L		04-OCT-16	R3563621
Sodium (Na)-Dissolved	59.5		0.050	mg/L		04-OCT-16	R3563621

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-1 MW-04							
Sampled By: PERD on 19-SEP-16 @ 09:42							
Matrix: GW							
Dissolved Metals in Water by CRC ICPMS							
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L		04-OCT-16	R3563621
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		04-OCT-16	R3563621
Uranium (U)-Dissolved	0.00348		0.000010	mg/L		04-OCT-16	R3563621
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L		04-OCT-16	R3563621
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L		04-OCT-16	R3563621
Fluoride in Water by IC							
Fluoride (F)	0.090		0.020	mg/L		22-SEP-16	R3554579
Ion Balance Calculation							
Ion Balance	100			%		05-OCT-16	
TDS (Calculated)	809			mg/L		05-OCT-16	
Hardness (as CaCO3)	609			mg/L		05-OCT-16	
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		22-SEP-16	R3554579
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.022		0.022	mg/L		27-SEP-16	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		22-SEP-16	R3554579
Sulfate in Water by IC							
Sulfate (SO4)	125		0.30	mg/L		22-SEP-16	R3554579
pH, Conductivity and Total Alkalinity							
pH	7.76		0.10	pH		23-SEP-16	R3555919
Conductivity (EC)	1410		2.0	uS/cm		23-SEP-16	R3555919
Bicarbonate (HCO3)	430		5.0	mg/L		23-SEP-16	R3555919
Carbonate (CO3)	<5.0		5.0	mg/L		23-SEP-16	R3555919
Hydroxide (OH)	<5.0		5.0	mg/L		23-SEP-16	R3555919
Alkalinity, Total (as CaCO3)	353		2.0	mg/L		23-SEP-16	R3555919
L1831974-2 MW-05							
Sampled By: PERD on 19-SEP-16 @ 11:32							
Matrix: GW							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Toluene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
EthylBenzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
o-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
m+p-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Styrene	<0.0010		0.0010	mg/L	22-SEP-16	22-SEP-16	R3552104
F1(C6-C10)	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
F1-BTEX	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
Xylenes	<0.00071		0.00071	mg/L	22-SEP-16	22-SEP-16	R3552104
Surrogate: 1,4-Difluorobenzene (SS)	97.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 4-Bromofluorobenzene (SS)	100.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 3,4-Dichlorotoluene (SS)	95.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
F2 (>C10-C16)							
F2 (C10-C16)	<0.10		0.10	mg/L	26-SEP-16	26-SEP-16	R3558789
Surrogate: 2-Bromobenzotrifluoride	105.7		60-140	%	26-SEP-16	26-SEP-16	R3558789
Miscellaneous Parameters							
Ammonia, Total Dissolved (as N)	0.235		0.050	mg/L		05-OCT-16	R3564452
Dissolved Organic Carbon	4.8		1.0	mg/L		17-OCT-16	R3573406
Phenols (4AAP)	<0.0010		0.0010	mg/L		05-OCT-16	R3564788
Special Request	See Attached					14-OCT-16	R3572652

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-2 MW-05							
Sampled By: PERD on 19-SEP-16 @ 11:32							
Matrix: GW							
Total Dissolved Solids	620		10	mg/L		23-SEP-16	R3556027
Major Ions & Trace Dissolved Metals							
Chloride in Water by IC							
Chloride (Cl)	38.4		0.50	mg/L		22-SEP-16	R3554579
Dissolved Mercury in Water by CVAAS							
Dissolved Mercury Filtration Location	FIELD					03-OCT-16	R3562588
Mercury (Hg)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563403
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					04-OCT-16	R3563800
Aluminum (Al)-Dissolved	<0.0010		0.0010	mg/L		04-OCT-16	R3563621
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Arsenic (As)-Dissolved	0.00122		0.00010	mg/L		04-OCT-16	R3563621
Barium (Ba)-Dissolved	0.0504		0.000050	mg/L		04-OCT-16	R3563621
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Boron (B)-Dissolved	0.057		0.010	mg/L		04-OCT-16	R3563621
Cadmium (Cd)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Calcium (Ca)-Dissolved	121		0.050	mg/L		04-OCT-16	R3563621
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Cobalt (Co)-Dissolved	0.00076		0.00010	mg/L		04-OCT-16	R3563621
Copper (Cu)-Dissolved	<0.00020		0.00020	mg/L		04-OCT-16	R3563621
Iron (Fe)-Dissolved	4.39		0.010	mg/L		04-OCT-16	R3563621
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Magnesium (Mg)-Dissolved	36.3		0.0050	mg/L		04-OCT-16	R3563621
Manganese (Mn)-Dissolved	0.757		0.00010	mg/L		04-OCT-16	R3563621
Molybdenum (Mo)-Dissolved	0.000272		0.000050	mg/L		04-OCT-16	R3563621
Nickel (Ni)-Dissolved	0.00130		0.00050	mg/L		04-OCT-16	R3563621
Potassium (K)-Dissolved	7.99		0.050	mg/L		04-OCT-16	R3563621
Selenium (Se)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L		04-OCT-16	R3563621
Sodium (Na)-Dissolved	43.3		0.050	mg/L		04-OCT-16	R3563621
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L		04-OCT-16	R3563621
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		04-OCT-16	R3563621
Uranium (U)-Dissolved	0.000706		0.000010	mg/L		04-OCT-16	R3563621
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L		04-OCT-16	R3563621
Zinc (Zn)-Dissolved	0.0013		0.0010	mg/L		04-OCT-16	R3563621
Fluoride in Water by IC							
Fluoride (F)	0.076		0.020	mg/L		22-SEP-16	R3554579
Ion Balance Calculation							
Ion Balance	105			%		05-OCT-16	
TDS (Calculated)	584			mg/L		05-OCT-16	
Hardness (as CaCO3)	452			mg/L		05-OCT-16	
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		22-SEP-16	R3554579
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.022		0.022	mg/L		27-SEP-16	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		22-SEP-16	R3554579
Sulfate in Water by IC							
Sulfate (SO4)	137		0.30	mg/L		22-SEP-16	R3554579
pH, Conductivity and Total Alkalinity							
pH	7.85		0.10	pH		23-SEP-16	R3555919
Conductivity (EC)	987		2.0	uS/cm		23-SEP-16	R3555919
Bicarbonate (HCO3)	406		5.0	mg/L		23-SEP-16	R3555919

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-2 MW-05 Sampled By: PERD on 19-SEP-16 @ 11:32 Matrix: GW							
pH, Conductivity and Total Alkalinity							
Carbonate (CO3)	<5.0		5.0	mg/L		23-SEP-16	R3555919
Hydroxide (OH)	<5.0		5.0	mg/L		23-SEP-16	R3555919
Alkalinity, Total (as CaCO3)	333		2.0	mg/L		23-SEP-16	R3555919
L1831974-3 MW-02 Sampled By: PERD on 19-SEP-16 @ 13:00 Matrix: GW							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Toluene	0.00099		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
EthylBenzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
o-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
m+p-Xylene	0.00055		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Styrene	<0.0010		0.0010	mg/L	22-SEP-16	22-SEP-16	R3552104
F1(C6-C10)	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
F1-BTEX	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
Xylenes	<0.00071		0.00071	mg/L	22-SEP-16	22-SEP-16	R3552104
Surrogate: 1,4-Difluorobenzene (SS)	99.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 4-Bromofluorobenzene (SS)	97.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 3,4-Dichlorotoluene (SS)	97.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
F2 (>C10-C16)							
F2 (C10-C16)	<0.10		0.10	mg/L	26-SEP-16	26-SEP-16	R3558789
Surrogate: 2-Bromobenzotrifluoride	101.5		60-140	%	26-SEP-16	26-SEP-16	R3558789
Miscellaneous Parameters							
Ammonia, Total Dissolved (as N)	0.602		0.050	mg/L		05-OCT-16	R3564452
Dissolved Organic Carbon	5.9		1.0	mg/L		17-OCT-16	R3573406
Phenols (4AAP)	<0.0010		0.0010	mg/L		05-OCT-16	R3564788
Special Request	See Attached					14-OCT-16	R3572652
Total Dissolved Solids	1070		10	mg/L		23-SEP-16	R3556027
Major Ions & Trace Dissolved Metals							
Chloride in Water by IC							
Chloride (Cl)	123	DLDS	1.0	mg/L		22-SEP-16	R3554579
Dissolved Mercury in Water by CVAAS							
Dissolved Mercury Filtration Location	FIELD					03-OCT-16	R3562588
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L		04-OCT-16	R3563403
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					04-OCT-16	R3563800
Aluminum (Al)-Dissolved	<0.0020	DLDS	0.0020	mg/L		04-OCT-16	R3563621
Antimony (Sb)-Dissolved	<0.00020	DLDS	0.00020	mg/L		04-OCT-16	R3563621
Arsenic (As)-Dissolved	0.00322		0.00020	mg/L		04-OCT-16	R3563621
Barium (Ba)-Dissolved	0.114		0.00010	mg/L		04-OCT-16	R3563621
Beryllium (Be)-Dissolved	<0.00020	DLDS	0.00020	mg/L		04-OCT-16	R3563621
Boron (B)-Dissolved	0.235		0.020	mg/L		04-OCT-16	R3563621
Cadmium (Cd)-Dissolved	<0.000010	DLDS	0.000010	mg/L		04-OCT-16	R3563621
Calcium (Ca)-Dissolved	157		0.10	mg/L		04-OCT-16	R3563621
Chromium (Cr)-Dissolved	<0.00020	DLDS	0.00020	mg/L		04-OCT-16	R3563621
Cobalt (Co)-Dissolved	0.00035		0.00020	mg/L		04-OCT-16	R3563621
Copper (Cu)-Dissolved	<0.00040	DLDS	0.00040	mg/L		04-OCT-16	R3563621
Iron (Fe)-Dissolved	9.74		0.020	mg/L		04-OCT-16	R3563621
Lead (Pb)-Dissolved	<0.00010	DLDS	0.00010	mg/L		04-OCT-16	R3563621
Magnesium (Mg)-Dissolved	53.9		0.010	mg/L		04-OCT-16	R3563621

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-3 MW-02							
Sampled By: PERD on 19-SEP-16 @ 13:00							
Matrix: GW							
Dissolved Metals in Water by CRC ICPMS							
Manganese (Mn)-Dissolved	0.384		0.00020	mg/L		04-OCT-16	R3563621
Molybdenum (Mo)-Dissolved	0.00048		0.00010	mg/L		04-OCT-16	R3563621
Nickel (Ni)-Dissolved	<0.0010	DLDS	0.0010	mg/L		04-OCT-16	R3563621
Potassium (K)-Dissolved	4.73		0.10	mg/L		04-OCT-16	R3563621
Selenium (Se)-Dissolved	<0.00010	DLDS	0.00010	mg/L		04-OCT-16	R3563621
Silver (Ag)-Dissolved	<0.000020	DLDS	0.000020	mg/L		04-OCT-16	R3563621
Sodium (Na)-Dissolved	150		0.10	mg/L		04-OCT-16	R3563621
Thallium (Tl)-Dissolved	<0.000020	DLDS	0.000020	mg/L		04-OCT-16	R3563621
Titanium (Ti)-Dissolved	<0.00060	DLDS	0.00060	mg/L		04-OCT-16	R3563621
Uranium (U)-Dissolved	0.000897		0.000020	mg/L		04-OCT-16	R3563621
Vanadium (V)-Dissolved	<0.0010	DLDS	0.0010	mg/L		04-OCT-16	R3563621
Zinc (Zn)-Dissolved	0.0042		0.0020	mg/L		04-OCT-16	R3563621
Fluoride in Water by IC							
Fluoride (F)	<0.040	DLDS	0.040	mg/L		22-SEP-16	R3554579
Ion Balance Calculation							
Ion Balance	106			%		05-OCT-16	
TDS (Calculated)	1010			mg/L		05-OCT-16	
Hardness (as CaCO3)	614			mg/L		05-OCT-16	
Nitrate in Water by IC							
Nitrate (as N)	<0.040	DLDS	0.040	mg/L		22-SEP-16	R3554579
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.045		0.045	mg/L		27-SEP-16	
Nitrite in Water by IC							
Nitrite (as N)	<0.020	DLDS	0.020	mg/L		22-SEP-16	R3554579
Sulfate in Water by IC							
Sulfate (SO4)	241	DLDS	0.60	mg/L		22-SEP-16	R3554579
pH, Conductivity and Total Alkalinity							
pH	7.69		0.10	pH		23-SEP-16	R3555919
Conductivity (EC)	1650		2.0	uS/cm		23-SEP-16	R3555919
Bicarbonate (HCO3)	575		5.0	mg/L		23-SEP-16	R3555919
Carbonate (CO3)	<5.0		5.0	mg/L		23-SEP-16	R3555919
Hydroxide (OH)	<5.0		5.0	mg/L		23-SEP-16	R3555919
Alkalinity, Total (as CaCO3)	471		2.0	mg/L		23-SEP-16	R3555919
L1831974-4 MW-03							
Sampled By: PERD on 19-SEP-16 @ 13:30							
Matrix: GW							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Toluene	0.00309		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
EthylBenzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
o-Xylene	0.00070		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
m+p-Xylene	0.00164		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Styrene	<0.0010		0.0010	mg/L	22-SEP-16	22-SEP-16	R3552104
F1(C6-C10)	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
F1-BTEX	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
Xylenes	0.00234		0.00071	mg/L	22-SEP-16	22-SEP-16	R3552104
Surrogate: 1,4-Difluorobenzene (SS)	96.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 4-Bromofluorobenzene (SS)	93.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 3,4-Dichlorotoluene (SS)	95.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
F2 (>C10-C16)							

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-4 MW-03							
Sampled By: PERD on 19-SEP-16 @ 13:30							
Matrix: GW							
F2 (>C10-C16)							
F2 (C10-C16)	<0.10		0.10	mg/L	26-SEP-16	26-SEP-16	R3558789
Surrogate: 2-Bromobenzotrifluoride	102.7		60-140	%	26-SEP-16	26-SEP-16	R3558789
Miscellaneous Parameters							
Ammonia, Total Dissolved (as N)	0.405		0.050	mg/L		05-OCT-16	R3564452
Dissolved Organic Carbon	5.1		1.0	mg/L		17-OCT-16	R3573406
Phenols (4AAP)	<0.0010		0.0010	mg/L		05-OCT-16	R3564788
Special Request	See Attached					14-OCT-16	R3572652
Total Dissolved Solids	630		10	mg/L		23-SEP-16	R3556027
Major Ions & Trace Dissolved Metals							
Chloride in Water by IC							
Chloride (Cl)	57.7		0.50	mg/L		22-SEP-16	R3554579
Dissolved Mercury in Water by CVAAS							
Dissolved Mercury Filtration Location	FIELD					03-OCT-16	R3562588
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L		04-OCT-16	R3563403
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					04-OCT-16	R3563800
Aluminum (Al)-Dissolved	<0.0010		0.0010	mg/L		04-OCT-16	R3563621
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Arsenic (As)-Dissolved	0.00154		0.00010	mg/L		04-OCT-16	R3563621
Barium (Ba)-Dissolved	0.0426		0.000050	mg/L		04-OCT-16	R3563621
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Boron (B)-Dissolved	0.122		0.010	mg/L		04-OCT-16	R3563621
Cadmium (Cd)-Dissolved	<0.0000050		0.0000050	mg/L		04-OCT-16	R3563621
Calcium (Ca)-Dissolved	121		0.050	mg/L		04-OCT-16	R3563621
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Cobalt (Co)-Dissolved	0.00069		0.00010	mg/L		04-OCT-16	R3563621
Copper (Cu)-Dissolved	<0.00020		0.00020	mg/L		04-OCT-16	R3563621
Iron (Fe)-Dissolved	5.22		0.010	mg/L		04-OCT-16	R3563621
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Magnesium (Mg)-Dissolved	38.5		0.0050	mg/L		04-OCT-16	R3563621
Manganese (Mn)-Dissolved	0.269		0.00010	mg/L		04-OCT-16	R3563621
Molybdenum (Mo)-Dissolved	0.000443		0.000050	mg/L		04-OCT-16	R3563621
Nickel (Ni)-Dissolved	0.00098		0.00050	mg/L		04-OCT-16	R3563621
Potassium (K)-Dissolved	3.14		0.050	mg/L		04-OCT-16	R3563621
Selenium (Se)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L		04-OCT-16	R3563621
Sodium (Na)-Dissolved	50.1		0.050	mg/L		04-OCT-16	R3563621
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L		04-OCT-16	R3563621
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		04-OCT-16	R3563621
Uranium (U)-Dissolved	0.000561		0.000010	mg/L		04-OCT-16	R3563621
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L		04-OCT-16	R3563621
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L		04-OCT-16	R3563621
Fluoride in Water by IC							
Fluoride (F)	0.079		0.020	mg/L		22-SEP-16	R3554579
Ion Balance Calculation							
Ion Balance	103			%		05-OCT-16	
TDS (Calculated)	602			mg/L		05-OCT-16	
Hardness (as CaCO3)	461			mg/L		05-OCT-16	
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		22-SEP-16	R3554579
Nitrate+Nitrite							

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-4 MW-03 Sampled By: PERD on 19-SEP-16 @ 13:30 Matrix: GW							
Nitrate+Nitrite Nitrate and Nitrite (as N)	<0.022		0.022	mg/L		27-SEP-16	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		22-SEP-16	R3554579
Sulfate in Water by IC Sulfate (SO4)	123		0.30	mg/L		22-SEP-16	R3554579
pH, Conductivity and Total Alkalinity pH	7.71		0.10	pH		23-SEP-16	R3555919
Conductivity (EC)	1000		2.0	uS/cm		23-SEP-16	R3555919
Bicarbonate (HCO3)	423		5.0	mg/L		23-SEP-16	R3555919
Carbonate (CO3)	<5.0		5.0	mg/L		23-SEP-16	R3555919
Hydroxide (OH)	<5.0		5.0	mg/L		23-SEP-16	R3555919
Alkalinity, Total (as CaCO3)	347		2.0	mg/L		23-SEP-16	R3555919
L1831974-5 MW-01 Sampled By: PERD on 19-SEP-16 @ 14:36 Matrix: GW							
BTEX, Styrene & F1-F2 BTEX, Styrene and F1 (C6-C10) Benzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Toluene	0.00112		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
EthylBenzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
o-Xylene	0.00082		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
m+p-Xylene	0.00171		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Styrene	<0.0010		0.0010	mg/L	22-SEP-16	22-SEP-16	R3552104
F1(C6-C10)	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
F1-BTEX	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
Xylenes	0.00253		0.00071	mg/L	22-SEP-16	22-SEP-16	R3552104
Surrogate: 1,4-Difluorobenzene (SS)	99.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 4-Bromofluorobenzene (SS)	107.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 3,4-Dichlorotoluene (SS)	101.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
F2 (>C10-C16) F2 (C10-C16)	<0.10		0.10	mg/L	26-SEP-16	26-SEP-16	R3558789
Surrogate: 2-Bromobenzotrifluoride	103.0		60-140	%	26-SEP-16	26-SEP-16	R3558789
Miscellaneous Parameters Ammonia, Total Dissolved (as N)	0.277		0.050	mg/L		05-OCT-16	R3564452
Dissolved Organic Carbon	4.3		1.0	mg/L		17-OCT-16	R3573406
Phenols (4AAP)	<0.0010		0.0010	mg/L		05-OCT-16	R3564788
Special Request	See Attached					14-OCT-16	R3572652
Total Dissolved Solids	449		10	mg/L		23-SEP-16	R3556027
Major Ions & Trace Dissolved Metals Chloride in Water by IC Chloride (Cl)	5.46		0.50	mg/L		22-SEP-16	R3555435
Dissolved Mercury in Water by CVAAS Dissolved Mercury Filtration Location	FIELD					03-OCT-16	R3562588
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L		04-OCT-16	R3563403
Dissolved Metals in Water by CRC ICPMS Dissolved Metals Filtration Location	FIELD					04-OCT-16	R3563800
Aluminum (Al)-Dissolved	<0.0010		0.0010	mg/L		04-OCT-16	R3563621
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Arsenic (As)-Dissolved	0.00095		0.00010	mg/L		04-OCT-16	R3563621
Barium (Ba)-Dissolved	0.137		0.000050	mg/L		04-OCT-16	R3563621
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-5 MW-01							
Sampled By: PERD on 19-SEP-16 @ 14:36							
Matrix: GW							
Dissolved Metals in Water by CRC ICPMS							
Boron (B)-Dissolved	0.054		0.010	mg/L		04-OCT-16	R3563621
Cadmium (Cd)-Dissolved	<0.0000050		0.0000050	mg/L		04-OCT-16	R3563621
Calcium (Ca)-Dissolved	92.8		0.050	mg/L		04-OCT-16	R3563621
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Cobalt (Co)-Dissolved	0.00073		0.00010	mg/L		04-OCT-16	R3563621
Copper (Cu)-Dissolved	<0.00020		0.00020	mg/L		04-OCT-16	R3563621
Iron (Fe)-Dissolved	1.76		0.010	mg/L		04-OCT-16	R3563621
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Magnesium (Mg)-Dissolved	26.0		0.0050	mg/L		04-OCT-16	R3563621
Manganese (Mn)-Dissolved	0.699		0.00010	mg/L		04-OCT-16	R3563621
Molybdenum (Mo)-Dissolved	0.000264		0.000050	mg/L		04-OCT-16	R3563621
Nickel (Ni)-Dissolved	0.00100		0.00050	mg/L		04-OCT-16	R3563621
Potassium (K)-Dissolved	2.63		0.050	mg/L		04-OCT-16	R3563621
Selenium (Se)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L		04-OCT-16	R3563621
Sodium (Na)-Dissolved	32.5		0.050	mg/L		04-OCT-16	R3563621
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L		04-OCT-16	R3563621
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		04-OCT-16	R3563621
Uranium (U)-Dissolved	0.00199		0.000010	mg/L		04-OCT-16	R3563621
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L		04-OCT-16	R3563621
Zinc (Zn)-Dissolved	0.0013		0.0010	mg/L		04-OCT-16	R3563621
Fluoride in Water by IC							
Fluoride (F)	0.114		0.020	mg/L		22-SEP-16	R3555435
Ion Balance Calculation							
Ion Balance	98.1			%		05-OCT-16	
TDS (Calculated)	428			mg/L		05-OCT-16	
Hardness (as CaCO3)	339			mg/L		05-OCT-16	
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		22-SEP-16	R3555435
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.022		0.022	mg/L		28-SEP-16	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		22-SEP-16	R3555435
Sulfate in Water by IC							
Sulfate (SO4)	54.6		0.30	mg/L		22-SEP-16	R3555435
pH, Conductivity and Total Alkalinity							
pH	7.87		0.10	pH		23-SEP-16	R3555919
Conductivity (EC)	744		2.0	uS/cm		23-SEP-16	R3555919
Bicarbonate (HCO3)	434		5.0	mg/L		23-SEP-16	R3555919
Carbonate (CO3)	<5.0		5.0	mg/L		23-SEP-16	R3555919
Hydroxide (OH)	<5.0		5.0	mg/L		23-SEP-16	R3555919
Alkalinity, Total (as CaCO3)	356		2.0	mg/L		23-SEP-16	R3555919
L1831974-6 MW-08							
Sampled By: PERD on 20-SEP-16 @ 10:00							
Matrix: GW							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Toluene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
EthylBenzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
o-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-6 MW-08							
Sampled By: PERD on 20-SEP-16 @ 10:00							
Matrix: GW							
BTEX, Styrene and F1 (C6-C10)							
m+p-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Styrene	<0.0010		0.0010	mg/L	22-SEP-16	22-SEP-16	R3552104
F1(C6-C10)	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
F1-BTEX	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
Xylenes	<0.00071		0.00071	mg/L	22-SEP-16	22-SEP-16	R3552104
Surrogate: 1,4-Difluorobenzene (SS)	99.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 4-Bromofluorobenzene (SS)	97.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 3,4-Dichlorotoluene (SS)	93.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
F2 (>C10-C16)							
F2 (C10-C16)	<0.10		0.10	mg/L	26-SEP-16	26-SEP-16	R3558789
Surrogate: 2-Bromobenzotrifluoride	103.6		60-140	%	26-SEP-16	26-SEP-16	R3558789
Miscellaneous Parameters							
Ammonia, Total Dissolved (as N)	1.85	DLHC	0.10	mg/L		05-OCT-16	R3564452
Dissolved Organic Carbon	7.5		1.0	mg/L		17-OCT-16	R3573406
Phenols (4AAP)	<0.0010		0.0010	mg/L		05-OCT-16	R3564788
Special Request	See Attached					14-OCT-16	R3572652
Total Dissolved Solids	928		10	mg/L		23-SEP-16	R3556027
Major Ions & Trace Dissolved Metals							
Chloride in Water by IC							
Chloride (Cl)	1.37		0.50	mg/L		22-SEP-16	R3555435
Dissolved Mercury in Water by CVAAS							
Dissolved Mercury Filtration Location	FIELD					03-OCT-16	R3562588
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L		04-OCT-16	R3563403
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					04-OCT-16	R3563800
Aluminum (Al)-Dissolved	<0.0010		0.0010	mg/L		04-OCT-16	R3563621
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Arsenic (As)-Dissolved	0.00700		0.00010	mg/L		04-OCT-16	R3563621
Barium (Ba)-Dissolved	0.0658		0.000050	mg/L		04-OCT-16	R3563621
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Boron (B)-Dissolved	0.183		0.010	mg/L		04-OCT-16	R3563621
Cadmium (Cd)-Dissolved	0.0000056		0.0000050	mg/L		04-OCT-16	R3563621
Calcium (Ca)-Dissolved	152		0.050	mg/L		04-OCT-16	R3563621
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Cobalt (Co)-Dissolved	0.00016		0.00010	mg/L		04-OCT-16	R3563621
Copper (Cu)-Dissolved	<0.00020		0.00020	mg/L		04-OCT-16	R3563621
Iron (Fe)-Dissolved	6.96		0.010	mg/L		04-OCT-16	R3563621
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Magnesium (Mg)-Dissolved	41.4		0.0050	mg/L		04-OCT-16	R3563621
Manganese (Mn)-Dissolved	0.441		0.00010	mg/L		04-OCT-16	R3563621
Molybdenum (Mo)-Dissolved	0.00108		0.000050	mg/L		04-OCT-16	R3563621
Nickel (Ni)-Dissolved	0.00053		0.00050	mg/L		04-OCT-16	R3563621
Potassium (K)-Dissolved	5.86		0.050	mg/L		04-OCT-16	R3563621
Selenium (Se)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L		04-OCT-16	R3563621
Sodium (Na)-Dissolved	113		0.050	mg/L		04-OCT-16	R3563621
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L		04-OCT-16	R3563621
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		04-OCT-16	R3563621
Uranium (U)-Dissolved	0.000699		0.000010	mg/L		04-OCT-16	R3563621
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L		04-OCT-16	R3563621
Zinc (Zn)-Dissolved	0.0015		0.0010	mg/L		04-OCT-16	R3563621

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-6 MW-08 Sampled By: PERD on 20-SEP-16 @ 10:00 Matrix: GW							
Fluoride in Water by IC							
Fluoride (F)	0.082		0.020	mg/L		22-SEP-16	R3555435
Ion Balance Calculation							
Ion Balance	104			%		05-OCT-16	
TDS (Calculated)	898			mg/L		05-OCT-16	
Hardness (as CaCO3)	550			mg/L		05-OCT-16	
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		22-SEP-16	R3555435
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.022		0.022	mg/L		28-SEP-16	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		22-SEP-16	R3555435
Sulfate in Water by IC							
Sulfate (SO4)	331		0.30	mg/L		22-SEP-16	R3555435
pH, Conductivity and Total Alkalinity							
pH	7.86		0.10	pH		23-SEP-16	R3555919
Conductivity (EC)	1370		2.0	uS/cm		23-SEP-16	R3555919
Bicarbonate (HCO3)	515		5.0	mg/L		23-SEP-16	R3555919
Carbonate (CO3)	<5.0		5.0	mg/L		23-SEP-16	R3555919
Hydroxide (OH)	<5.0		5.0	mg/L		23-SEP-16	R3555919
Alkalinity, Total (as CaCO3)	422		2.0	mg/L		23-SEP-16	R3555919
L1831974-7 MW-09 Sampled By: PERD on 20-SEP-16 @ 11:00 Matrix: GW							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Toluene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Ethylbenzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
o-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
m+p-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Styrene	<0.0010		0.0010	mg/L	22-SEP-16	22-SEP-16	R3552104
F1(C6-C10)	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
F1-BTEX	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
Xylenes	<0.00071		0.00071	mg/L	22-SEP-16	22-SEP-16	R3552104
Surrogate: 1,4-Difluorobenzene (SS)	90.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 4-Bromofluorobenzene (SS)	100.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 3,4-Dichlorotoluene (SS)	93.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
F2 (>C10-C16)							
F2 (C10-C16)	<0.10		0.10	mg/L	26-SEP-16	26-SEP-16	R3558789
Surrogate: 2-Bromobenzotrifluoride	103.9		60-140	%	26-SEP-16	26-SEP-16	R3558789
Miscellaneous Parameters							
Ammonia, Total Dissolved (as N)	1.97	DLHC	0.10	mg/L		05-OCT-16	R3564452
Dissolved Organic Carbon	7.2		1.0	mg/L		17-OCT-16	R3573406
Phenols (4AAP)	<0.0010		0.0010	mg/L		05-OCT-16	R3564788
Special Request	See Attached					14-OCT-16	R3572652
Total Dissolved Solids	1030		10	mg/L		23-SEP-16	R3556027
Major Ions & Trace Dissolved Metals							
Chloride in Water by IC							
Chloride (Cl)	5.0	DLDS	1.0	mg/L		22-SEP-16	R3555435
Dissolved Mercury in Water by CVAAS							
Dissolved Mercury Filtration Location	FIELD					03-OCT-16	R3562588

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-7 MW-09							
Sampled By: PERD on 20-SEP-16 @ 11:00							
Matrix: GW							
Dissolved Mercury in Water by CVAAS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L		04-OCT-16	R3563403
Dissolved Metals in Water by CRC IC PMS							
Dissolved Metals Filtration Location	FIELD					04-OCT-16	R3563800
Aluminum (Al)-Dissolved	<0.0020	DLDS	0.0020	mg/L		04-OCT-16	R3563621
Antimony (Sb)-Dissolved	<0.00020	DLDS	0.00020	mg/L		04-OCT-16	R3563621
Arsenic (As)-Dissolved	0.00249		0.00020	mg/L		04-OCT-16	R3563621
Barium (Ba)-Dissolved	0.0227		0.00010	mg/L		04-OCT-16	R3563621
Beryllium (Be)-Dissolved	<0.00020	DLDS	0.00020	mg/L		04-OCT-16	R3563621
Boron (B)-Dissolved	0.285		0.020	mg/L		04-OCT-16	R3563621
Cadmium (Cd)-Dissolved	<0.000010	DLDS	0.000010	mg/L		04-OCT-16	R3563621
Calcium (Ca)-Dissolved	97.0		0.10	mg/L		04-OCT-16	R3563621
Chromium (Cr)-Dissolved	<0.00020	DLDS	0.00020	mg/L		04-OCT-16	R3563621
Cobalt (Co)-Dissolved	0.00118		0.00020	mg/L		04-OCT-16	R3563621
Copper (Cu)-Dissolved	<0.00040	DLDS	0.00040	mg/L		04-OCT-16	R3563621
Iron (Fe)-Dissolved	1.93		0.020	mg/L		04-OCT-16	R3563621
Lead (Pb)-Dissolved	<0.00010	DLDS	0.00010	mg/L		04-OCT-16	R3563621
Magnesium (Mg)-Dissolved	27.5		0.010	mg/L		04-OCT-16	R3563621
Manganese (Mn)-Dissolved	0.822		0.00020	mg/L		04-OCT-16	R3563621
Molybdenum (Mo)-Dissolved	0.00161		0.00010	mg/L		04-OCT-16	R3563621
Nickel (Ni)-Dissolved	<0.0010	DLDS	0.0010	mg/L		04-OCT-16	R3563621
Potassium (K)-Dissolved	4.08		0.10	mg/L		04-OCT-16	R3563621
Selenium (Se)-Dissolved	<0.00010	DLDS	0.00010	mg/L		04-OCT-16	R3563621
Silver (Ag)-Dissolved	<0.000020	DLDS	0.000020	mg/L		04-OCT-16	R3563621
Sodium (Na)-Dissolved	231		0.10	mg/L		04-OCT-16	R3563621
Thallium (Tl)-Dissolved	<0.000020	DLDS	0.000020	mg/L		04-OCT-16	R3563621
Titanium (Ti)-Dissolved	<0.00060	DLDS	0.00060	mg/L		04-OCT-16	R3563621
Uranium (U)-Dissolved	0.00131		0.000020	mg/L		04-OCT-16	R3563621
Vanadium (V)-Dissolved	<0.0010	DLDS	0.0010	mg/L		04-OCT-16	R3563621
Zinc (Zn)-Dissolved	<0.0020	DLDS	0.0020	mg/L		04-OCT-16	R3563621
Fluoride in Water by IC							
Fluoride (F)	0.157	DLDS	0.040	mg/L		22-SEP-16	R3555435
Ion Balance Calculation							
Ion Balance	104			%		05-OCT-16	
TDS (Calculated)	977			mg/L		05-OCT-16	
Hardness (as CaCO3)	355			mg/L		05-OCT-16	
Nitrate in Water by IC							
Nitrate (as N)	<0.040	DLDS	0.040	mg/L		22-SEP-16	R3555435
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.045		0.045	mg/L		28-SEP-16	
Nitrite in Water by IC							
Nitrite (as N)	<0.020	DLDS	0.020	mg/L		22-SEP-16	R3555435
Sulfate in Water by IC							
Sulfate (SO4)	318	DLDS	0.60	mg/L		22-SEP-16	R3555435
pH, Conductivity and Total Alkalinity							
pH	8.07		0.10	pH		23-SEP-16	R3555919
Conductivity (EC)	1530		2.0	uS/cm		23-SEP-16	R3555919
Bicarbonate (HCO3)	598		5.0	mg/L		23-SEP-16	R3555919
Carbonate (CO3)	<5.0		5.0	mg/L		23-SEP-16	R3555919
Hydroxide (OH)	<5.0		5.0	mg/L		23-SEP-16	R3555919
Alkalinity, Total (as CaCO3)	490		2.0	mg/L		23-SEP-16	R3555919

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-8 MW-10							
Sampled By: PERD on 20-SEP-16 @ 13:06							
Matrix: GW							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Toluene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
EthylBenzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
o-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
m+p-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Styrene	<0.0010		0.0010	mg/L	22-SEP-16	22-SEP-16	R3552104
F1(C6-C10)	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
F1-BTEX	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
Xylenes	<0.00071		0.00071	mg/L	22-SEP-16	22-SEP-16	R3552104
Surrogate: 1,4-Difluorobenzene (SS)	94.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 4-Bromofluorobenzene (SS)	104.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 3,4-Dichlorotoluene (SS)	93.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
F2 (>C10-C16)							
F2 (C10-C16)	<0.10		0.10	mg/L	26-SEP-16	26-SEP-16	R3558789
Surrogate: 2-Bromobenzotrifluoride	105.3		60-140	%	26-SEP-16	26-SEP-16	R3558789
Miscellaneous Parameters							
Ammonia, Total Dissolved (as N)	1.96		0.050	mg/L		05-OCT-16	R3564452
Dissolved Organic Carbon	6.6		1.0	mg/L		17-OCT-16	R3573406
Phenols (4AAP)	<0.0010		0.0010	mg/L		05-OCT-16	R3564788
Special Request	See Attached					14-OCT-16	R3572652
Total Dissolved Solids	825		10	mg/L		23-SEP-16	R3556027
Major Ions & Trace Dissolved Metals							
Chloride in Water by IC							
Chloride (Cl)	0.66		0.50	mg/L		22-SEP-16	R3555435
Dissolved Mercury in Water by CVAAS							
Dissolved Mercury Filtration Location	FIELD					03-OCT-16	R3562588
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L		04-OCT-16	R3563403
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					04-OCT-16	R3563800
Aluminum (Al)-Dissolved	<0.0010		0.0010	mg/L		04-OCT-16	R3563621
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Arsenic (As)-Dissolved	0.00468		0.00010	mg/L		04-OCT-16	R3563621
Barium (Ba)-Dissolved	0.0300		0.000050	mg/L		04-OCT-16	R3563621
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Boron (B)-Dissolved	0.180		0.010	mg/L		04-OCT-16	R3563621
Cadmium (Cd)-Dissolved	<0.0000050		0.0000050	mg/L		04-OCT-16	R3563621
Calcium (Ca)-Dissolved	131		0.050	mg/L		04-OCT-16	R3563621
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Cobalt (Co)-Dissolved	0.00031		0.00010	mg/L		04-OCT-16	R3563621
Copper (Cu)-Dissolved	<0.00020		0.00020	mg/L		04-OCT-16	R3563621
Iron (Fe)-Dissolved	6.01		0.010	mg/L		04-OCT-16	R3563621
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Magnesium (Mg)-Dissolved	35.9		0.0050	mg/L		04-OCT-16	R3563621
Manganese (Mn)-Dissolved	0.676		0.00010	mg/L		04-OCT-16	R3563621
Molybdenum (Mo)-Dissolved	0.000633		0.000050	mg/L		04-OCT-16	R3563621
Nickel (Ni)-Dissolved	0.00092		0.00050	mg/L		04-OCT-16	R3563621
Potassium (K)-Dissolved	5.74		0.050	mg/L		04-OCT-16	R3563621
Selenium (Se)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L		04-OCT-16	R3563621
Sodium (Na)-Dissolved	111		0.050	mg/L		04-OCT-16	R3563621

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-8 MW-10							
Sampled By: PERD on 20-SEP-16 @ 13:06							
Matrix: GW							
Dissolved Metals in Water by CRC ICPMS							
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L		04-OCT-16	R3563621
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		04-OCT-16	R3563621
Uranium (U)-Dissolved	0.00113		0.000010	mg/L		04-OCT-16	R3563621
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L		04-OCT-16	R3563621
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L		04-OCT-16	R3563621
Fluoride in Water by IC							
Fluoride (F)	0.114		0.020	mg/L		22-SEP-16	R3555435
Ion Balance Calculation							
Ion Balance	97.8			%		05-OCT-16	
TDS (Calculated)	811			mg/L		05-OCT-16	
Hardness (as CaCO3)	475			mg/L		05-OCT-16	
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		22-SEP-16	R3555435
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.022		0.022	mg/L		28-SEP-16	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		22-SEP-16	R3555435
Sulfate in Water by IC							
Sulfate (SO4)	222		0.30	mg/L		22-SEP-16	R3555435
pH, Conductivity and Total Alkalinity							
pH	7.90		0.10	pH		24-SEP-16	R3555919
Conductivity (EC)	1270		2.0	uS/cm		24-SEP-16	R3555919
Bicarbonate (HCO3)	619		5.0	mg/L		24-SEP-16	R3555919
Carbonate (CO3)	<5.0		5.0	mg/L		24-SEP-16	R3555919
Hydroxide (OH)	<5.0		5.0	mg/L		24-SEP-16	R3555919
Alkalinity, Total (as CaCO3)	508		2.0	mg/L		24-SEP-16	R3555919
L1831974-9 MW-11							
Sampled By: PERD on 20-SEP-16 @ 13:52							
Matrix: GW							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Toluene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
EthylBenzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
o-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
m+p-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Styrene	<0.0010		0.0010	mg/L	22-SEP-16	22-SEP-16	R3552104
F1(C6-C10)	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
F1-BTEX	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
Xylenes	<0.00071		0.00071	mg/L	22-SEP-16	22-SEP-16	R3552104
Surrogate: 1,4-Difluorobenzene (SS)	101.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 4-Bromofluorobenzene (SS)	87.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 3,4-Dichlorotoluene (SS)	98.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
F2 (>C10-C16)							
F2 (C10-C16)	<0.10		0.10	mg/L	26-SEP-16	26-SEP-16	R3558789
Surrogate: 2-Bromobenzotrifluoride	107.2		60-140	%	26-SEP-16	26-SEP-16	R3558789
Miscellaneous Parameters							
Ammonia, Total Dissolved (as N)	1.49		0.050	mg/L		05-OCT-16	R3564452
Dissolved Organic Carbon	7.5		1.0	mg/L		17-OCT-16	R3573406
Phenols (4AAP)	<0.0010		0.0010	mg/L		05-OCT-16	R3564788
Special Request	See Attached					14-OCT-16	R3572652

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-9 MW-11							
Sampled By: PERD on 20-SEP-16 @ 13:52							
Matrix: GW							
Total Dissolved Solids	845		10	mg/L		23-SEP-16	R3556027
Major Ions & Trace Dissolved Metals							
Chloride in Water by IC							
Chloride (Cl)	11.4		0.50	mg/L		22-SEP-16	R3555435
Dissolved Mercury in Water by CVAAS							
Dissolved Mercury Filtration Location	FIELD					03-OCT-16	R3562588
Mercury (Hg)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563403
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					04-OCT-16	R3563800
Aluminum (Al)-Dissolved	<0.0010		0.0010	mg/L		04-OCT-16	R3563621
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Arsenic (As)-Dissolved	0.00262		0.00010	mg/L		04-OCT-16	R3563621
Barium (Ba)-Dissolved	0.0415		0.000050	mg/L		04-OCT-16	R3563621
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Boron (B)-Dissolved	0.206		0.010	mg/L		04-OCT-16	R3563621
Cadmium (Cd)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Calcium (Ca)-Dissolved	148		0.050	mg/L		04-OCT-16	R3563621
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Cobalt (Co)-Dissolved	0.00028		0.00010	mg/L		04-OCT-16	R3563621
Copper (Cu)-Dissolved	<0.00020		0.00020	mg/L		04-OCT-16	R3563621
Iron (Fe)-Dissolved	6.91		0.010	mg/L		04-OCT-16	R3563621
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Magnesium (Mg)-Dissolved	44.3		0.0050	mg/L		04-OCT-16	R3563621
Manganese (Mn)-Dissolved	0.609		0.00010	mg/L		04-OCT-16	R3563621
Molybdenum (Mo)-Dissolved	0.000471		0.000050	mg/L		04-OCT-16	R3563621
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L		04-OCT-16	R3563621
Potassium (K)-Dissolved	4.97		0.050	mg/L		04-OCT-16	R3563621
Selenium (Se)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L		04-OCT-16	R3563621
Sodium (Na)-Dissolved	90.7		0.050	mg/L		04-OCT-16	R3563621
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L		04-OCT-16	R3563621
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		04-OCT-16	R3563621
Uranium (U)-Dissolved	0.000977		0.000010	mg/L		04-OCT-16	R3563621
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L		04-OCT-16	R3563621
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L		04-OCT-16	R3563621
Fluoride in Water by IC							
Fluoride (F)	0.087		0.020	mg/L		22-SEP-16	R3555435
Ion Balance Calculation							
Ion Balance	103			%		05-OCT-16	
TDS (Calculated)	813			mg/L		05-OCT-16	
Hardness (as CaCO3)	552			mg/L		05-OCT-16	
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		22-SEP-16	R3555435
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.022		0.022	mg/L		28-SEP-16	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		22-SEP-16	R3555435
Sulfate in Water by IC							
Sulfate (SO4)	221		0.30	mg/L		22-SEP-16	R3555435
pH, Conductivity and Total Alkalinity							
pH	7.87		0.10	pH		24-SEP-16	R3555919
Conductivity (EC)	1270		2.0	uS/cm		24-SEP-16	R3555919
Bicarbonate (HCO3)	595		5.0	mg/L		24-SEP-16	R3555919

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-9 MW-11 Sampled By: PERD on 20-SEP-16 @ 13:52 Matrix: GW							
pH, Conductivity and Total Alkalinity							
Carbonate (CO3)	<5.0		5.0	mg/L		24-SEP-16	R3555919
Hydroxide (OH)	<5.0		5.0	mg/L		24-SEP-16	R3555919
Alkalinity, Total (as CaCO3)	488		2.0	mg/L		24-SEP-16	R3555919
L1831974-10 MW-12 Sampled By: PERD on 20-SEP-16 @ 16:30 Matrix: GW							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Toluene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
EthylBenzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
o-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
m+p-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Styrene	<0.0010		0.0010	mg/L	22-SEP-16	22-SEP-16	R3552104
F1(C6-C10)	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
F1-BTEX	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
Xylenes	<0.00071		0.00071	mg/L	22-SEP-16	22-SEP-16	R3552104
Surrogate: 1,4-Difluorobenzene (SS)	98.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 4-Bromofluorobenzene (SS)	95.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 3,4-Dichlorotoluene (SS)	96.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
F2 (>C10-C16)							
F2 (C10-C16)	<0.10		0.10	mg/L	26-SEP-16	26-SEP-16	R3558789
Surrogate: 2-Bromobenzotrifluoride	100.5		60-140	%	26-SEP-16	26-SEP-16	R3558789
Miscellaneous Parameters							
Ammonia, Total Dissolved (as N)	1.39		0.050	mg/L		05-OCT-16	R3564452
Dissolved Organic Carbon	7.4		1.0	mg/L		17-OCT-16	R3573406
Phenols (4AAP)	<0.0010		0.0010	mg/L		05-OCT-16	R3564788
Special Request	See Attached					14-OCT-16	R3572652
Total Dissolved Solids	615		10	mg/L		23-SEP-16	R3556027
Major Ions & Trace Dissolved Metals							
Chloride in Water by IC							
Chloride (Cl)	6.53		0.50	mg/L		22-SEP-16	R3555435
Dissolved Mercury in Water by CVAAS							
Dissolved Mercury Filtration Location	FIELD					03-OCT-16	R3562588
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L		04-OCT-16	R3563403
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					04-OCT-16	R3563800
Aluminum (Al)-Dissolved	0.0024		0.0010	mg/L		04-OCT-16	R3563621
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Arsenic (As)-Dissolved	0.00280		0.00010	mg/L		04-OCT-16	R3563621
Barium (Ba)-Dissolved	0.125		0.000050	mg/L		04-OCT-16	R3563621
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Boron (B)-Dissolved	0.245		0.010	mg/L		04-OCT-16	R3563621
Cadmium (Cd)-Dissolved	<0.0000050		0.0000050	mg/L		04-OCT-16	R3563621
Calcium (Ca)-Dissolved	94.9		0.050	mg/L		04-OCT-16	R3563621
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Cobalt (Co)-Dissolved	0.00041		0.00010	mg/L		04-OCT-16	R3563621
Copper (Cu)-Dissolved	<0.00020		0.00020	mg/L		04-OCT-16	R3563621
Iron (Fe)-Dissolved	4.21		0.010	mg/L		04-OCT-16	R3563621
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Magnesium (Mg)-Dissolved	28.4		0.0050	mg/L		04-OCT-16	R3563621

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-10 MW-12							
Sampled By: PERD on 20-SEP-16 @ 16:30							
Matrix: GW							
Dissolved Metals in Water by CRC ICPMS							
Manganese (Mn)-Dissolved	0.442		0.00010	mg/L		04-OCT-16	R3563621
Molybdenum (Mo)-Dissolved	0.000685		0.000050	mg/L		04-OCT-16	R3563621
Nickel (Ni)-Dissolved	0.00062		0.00050	mg/L		04-OCT-16	R3563621
Potassium (K)-Dissolved	4.76		0.050	mg/L		04-OCT-16	R3563621
Selenium (Se)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L		04-OCT-16	R3563621
Sodium (Na)-Dissolved	98.2		0.050	mg/L		04-OCT-16	R3563621
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L		04-OCT-16	R3563621
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		04-OCT-16	R3563621
Uranium (U)-Dissolved	0.000810		0.000010	mg/L		04-OCT-16	R3563621
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L		04-OCT-16	R3563621
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L		04-OCT-16	R3563621
Fluoride in Water by IC							
Fluoride (F)	0.063		0.020	mg/L		22-SEP-16	R3555435
Ion Balance Calculation							
Ion Balance	98.2			%		05-OCT-16	
TDS (Calculated)	594			mg/L		05-OCT-16	
Hardness (as CaCO3)	354			mg/L		05-OCT-16	
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		22-SEP-16	R3555435
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.022		0.022	mg/L		28-SEP-16	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		22-SEP-16	R3555435
Sulfate in Water by IC							
Sulfate (SO4)	43.5		0.30	mg/L		22-SEP-16	R3555435
pH, Conductivity and Total Alkalinity							
pH	7.93		0.10	pH		24-SEP-16	R3555919
Conductivity (EC)	1000		2.0	uS/cm		24-SEP-16	R3555919
Bicarbonate (HCO3)	646		5.0	mg/L		24-SEP-16	R3555919
Carbonate (CO3)	<5.0		5.0	mg/L		24-SEP-16	R3555919
Hydroxide (OH)	<5.0		5.0	mg/L		24-SEP-16	R3555919
Alkalinity, Total (as CaCO3)	530		2.0	mg/L		24-SEP-16	R3555919
L1831974-11 MW-13							
Sampled By: PERD on 20-SEP-16 @ 17:30							
Matrix: GW							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Toluene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
EthylBenzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
o-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
m+p-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Styrene	<0.0010		0.0010	mg/L	22-SEP-16	22-SEP-16	R3552104
F1(C6-C10)	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
F1-BTEX	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
Xylenes	<0.00071		0.00071	mg/L	22-SEP-16	22-SEP-16	R3552104
Surrogate: 1,4-Difluorobenzene (SS)	100.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 4-Bromofluorobenzene (SS)	92.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 3,4-Dichlorotoluene (SS)	98.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
F2 (>C10-C16)							

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-11 MW-13							
Sampled By: PERD on 20-SEP-16 @ 17:30							
Matrix: GW							
F2 (>C10-C16)							
F2 (C10-C16)	<0.10		0.10	mg/L	26-SEP-16	26-SEP-16	R3558789
Surrogate: 2-Bromobenzotrifluoride	102.2		60-140	%	26-SEP-16	26-SEP-16	R3558789
Miscellaneous Parameters							
Ammonia, Total Dissolved (as N)	1.43		0.050	mg/L		05-OCT-16	R3564452
Dissolved Organic Carbon	7.6		1.0	mg/L		17-OCT-16	R3573406
Phenols (4AAP)	<0.0010		0.0010	mg/L		05-OCT-16	R3564788
Special Request	See Attached					14-OCT-16	R3572652
Total Dissolved Solids	459		10	mg/L		23-SEP-16	R3556027
Major Ions & Trace Dissolved Metals							
Chloride in Water by IC							
Chloride (Cl)	2.09		0.50	mg/L		22-SEP-16	R3555435
Dissolved Mercury in Water by CVAAS							
Dissolved Mercury Filtration Location	FIELD					03-OCT-16	R3562588
Mercury (Hg)-Dissolved	0.000212		0.0000050	mg/L		04-OCT-16	R3563403
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					04-OCT-16	R3563800
Aluminum (Al)-Dissolved	0.0023		0.0010	mg/L		04-OCT-16	R3563621
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Arsenic (As)-Dissolved	0.00167		0.00010	mg/L		04-OCT-16	R3563621
Barium (Ba)-Dissolved	0.394		0.000050	mg/L		04-OCT-16	R3563621
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Boron (B)-Dissolved	0.266		0.010	mg/L		04-OCT-16	R3563621
Cadmium (Cd)-Dissolved	<0.0000050		0.0000050	mg/L		04-OCT-16	R3563621
Calcium (Ca)-Dissolved	50.9		0.050	mg/L		04-OCT-16	R3563621
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Cobalt (Co)-Dissolved	0.00064		0.00010	mg/L		04-OCT-16	R3563621
Copper (Cu)-Dissolved	<0.00020		0.00020	mg/L		04-OCT-16	R3563621
Iron (Fe)-Dissolved	1.33		0.010	mg/L		04-OCT-16	R3563621
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Magnesium (Mg)-Dissolved	15.4		0.0050	mg/L		04-OCT-16	R3563621
Manganese (Mn)-Dissolved	0.235		0.00010	mg/L		04-OCT-16	R3563621
Molybdenum (Mo)-Dissolved	0.00157		0.000050	mg/L		04-OCT-16	R3563621
Nickel (Ni)-Dissolved	0.00090		0.00050	mg/L		04-OCT-16	R3563621
Potassium (K)-Dissolved	3.77		0.050	mg/L		04-OCT-16	R3563621
Selenium (Se)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L		04-OCT-16	R3563621
Sodium (Na)-Dissolved	105		0.050	mg/L		04-OCT-16	R3563621
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L		04-OCT-16	R3563621
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		04-OCT-16	R3563621
Uranium (U)-Dissolved	0.000664		0.000010	mg/L		04-OCT-16	R3563621
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L		04-OCT-16	R3563621
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L		04-OCT-16	R3563621
Fluoride in Water by IC							
Fluoride (F)	0.124		0.020	mg/L		22-SEP-16	R3555435
Ion Balance Calculation							
Ion Balance	98.2			%		05-OCT-16	
TDS (Calculated)	439			mg/L		05-OCT-16	
Hardness (as CaCO3)	191			mg/L		05-OCT-16	
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		22-SEP-16	R3555435
Nitrate+Nitrite							

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-11 MW-13 Sampled By: PERD on 20-SEP-16 @ 17:30 Matrix: GW							
Nitrate+Nitrite Nitrate and Nitrite (as N)	<0.022		0.022	mg/L		28-SEP-16	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		22-SEP-16	R3555435
Sulfate in Water by IC Sulfate (SO4)	11.3		0.30	mg/L		22-SEP-16	R3555435
pH, Conductivity and Total Alkalinity pH	8.14		0.10	pH		24-SEP-16	R3555919
Conductivity (EC)	762		2.0	uS/cm		24-SEP-16	R3555919
Bicarbonate (HCO3)	508		5.0	mg/L		24-SEP-16	R3555919
Carbonate (CO3)	<5.0		5.0	mg/L		24-SEP-16	R3555919
Hydroxide (OH)	<5.0		5.0	mg/L		24-SEP-16	R3555919
Alkalinity, Total (as CaCO3)	417		2.0	mg/L		24-SEP-16	R3555919
L1831974-12 MW-07 Sampled By: PERD on 20-SEP-16 @ 18:23 Matrix: GW							
BTEX, Styrene & F1-F2 BTEX, Styrene and F1 (C6-C10) Benzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Toluene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
EthylBenzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
o-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
m+p-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Styrene	<0.0010		0.0010	mg/L	22-SEP-16	22-SEP-16	R3552104
F1(C6-C10)	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
F1-BTEX	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
Xylenes	<0.00071		0.00071	mg/L	22-SEP-16	22-SEP-16	R3552104
Surrogate: 1,4-Difluorobenzene (SS)	100.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 4-Bromofluorobenzene (SS)	85.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 3,4-Dichlorotoluene (SS)	94.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
F2 (>C10-C16) F2 (C10-C16)	<0.10		0.10	mg/L	26-SEP-16	26-SEP-16	R3558789
Surrogate: 2-Bromobenzotrifluoride	102.5		60-140	%	26-SEP-16	26-SEP-16	R3558789
Miscellaneous Parameters Ammonia, Total Dissolved (as N)	2.66	DLHC	0.20	mg/L		05-OCT-16	R3564452
Dissolved Organic Carbon	7.2		1.0	mg/L		17-OCT-16	R3573406
Phenols (4AAP)	<0.0010		0.0010	mg/L		05-OCT-16	R3564788
Special Request	See Attached					14-OCT-16	R3572652
Total Dissolved Solids	2200		10	mg/L		23-SEP-16	R3556027
Major Ions & Trace Dissolved Metals Chloride in Water by IC Chloride (Cl)	11.3	DLDS	1.0	mg/L		22-SEP-16	R3555435
Dissolved Mercury in Water by CVAAS Dissolved Mercury Filtration Location	FIELD					03-OCT-16	R3562588
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L		04-OCT-16	R3563403
Dissolved Metals in Water by CRC ICPMS Dissolved Metals Filtration Location	FIELD					04-OCT-16	R3563800
Aluminum (Al)-Dissolved	<0.0050	DLDS	0.0050	mg/L		04-OCT-16	R3563621
Antimony (Sb)-Dissolved	<0.00050	DLDS	0.00050	mg/L		04-OCT-16	R3563621
Arsenic (As)-Dissolved	0.00383		0.00050	mg/L		04-OCT-16	R3563621
Barium (Ba)-Dissolved	0.0416		0.00025	mg/L		04-OCT-16	R3563621
Beryllium (Be)-Dissolved	<0.00050	DLDS	0.00050	mg/L		04-OCT-16	R3563621

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-12 MW-07							
Sampled By: PERD on 20-SEP-16 @ 18:23							
Matrix: GW							
Dissolved Metals in Water by CRC ICPMS							
Boron (B)-Dissolved	0.300		0.050	mg/L		04-OCT-16	R3563621
Cadmium (Cd)-Dissolved	<0.000025	DLDS	0.000025	mg/L		04-OCT-16	R3563621
Calcium (Ca)-Dissolved	283		0.25	mg/L		04-OCT-16	R3563621
Chromium (Cr)-Dissolved	<0.00050	DLDS	0.00050	mg/L		04-OCT-16	R3563621
Cobalt (Co)-Dissolved	0.00088		0.00050	mg/L		04-OCT-16	R3563621
Copper (Cu)-Dissolved	<0.0010	DLDS	0.0010	mg/L		04-OCT-16	R3563621
Iron (Fe)-Dissolved	12.9		0.050	mg/L		04-OCT-16	R3563621
Lead (Pb)-Dissolved	<0.00025	DLDS	0.00025	mg/L		04-OCT-16	R3563621
Magnesium (Mg)-Dissolved	97.8		0.025	mg/L		04-OCT-16	R3563621
Manganese (Mn)-Dissolved	2.01		0.00050	mg/L		04-OCT-16	R3563621
Molybdenum (Mo)-Dissolved	0.00078		0.00025	mg/L		04-OCT-16	R3563621
Nickel (Ni)-Dissolved	<0.0025	DLDS	0.0025	mg/L		04-OCT-16	R3563621
Potassium (K)-Dissolved	6.02		0.25	mg/L		04-OCT-16	R3563621
Selenium (Se)-Dissolved	<0.00025	DLDS	0.00025	mg/L		04-OCT-16	R3563621
Silver (Ag)-Dissolved	<0.000050	DLDS	0.000050	mg/L		04-OCT-16	R3563621
Sodium (Na)-Dissolved	259		0.25	mg/L		04-OCT-16	R3563621
Thallium (Tl)-Dissolved	<0.000050	DLDS	0.000050	mg/L		04-OCT-16	R3563621
Titanium (Ti)-Dissolved	<0.0015	DLDS	0.0015	mg/L		04-OCT-16	R3563621
Uranium (U)-Dissolved	0.00159		0.000050	mg/L		04-OCT-16	R3563621
Vanadium (V)-Dissolved	<0.0025	DLDS	0.0025	mg/L		04-OCT-16	R3563621
Zinc (Zn)-Dissolved	<0.0050	DLDS	0.0050	mg/L		04-OCT-16	R3563621
Fluoride in Water by IC							
Fluoride (F)	0.042	DLDS	0.040	mg/L		22-SEP-16	R3555435
Ion Balance Calculation							
Ion Balance	103			%		05-OCT-16	
TDS (Calculated)	2020			mg/L		05-OCT-16	
Hardness (as CaCO3)	1110			mg/L		05-OCT-16	
Nitrate in Water by IC							
Nitrate (as N)	<0.040	DLDS	0.040	mg/L		22-SEP-16	R3555435
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.045		0.045	mg/L		28-SEP-16	
Nitrite in Water by IC							
Nitrite (as N)	<0.020	DLDS	0.020	mg/L		22-SEP-16	R3555435
Sulfate in Water by IC							
Sulfate (SO4)	1040	DLDS	0.60	mg/L		22-SEP-16	R3555435
pH, Conductivity and Total Alkalinity							
pH	7.64		0.10	pH		24-SEP-16	R3555919
Conductivity (EC)	2680		2.0	uS/cm		24-SEP-16	R3555919
Bicarbonate (HCO3)	656		5.0	mg/L		24-SEP-16	R3555919
Carbonate (CO3)	<5.0		5.0	mg/L		24-SEP-16	R3555919
Hydroxide (OH)	<5.0		5.0	mg/L		24-SEP-16	R3555919
Alkalinity, Total (as CaCO3)	537		2.0	mg/L		24-SEP-16	R3555919
L1831974-13 MW-06							
Sampled By: PERD on 20-SEP-16 @ 19:15							
Matrix: GW							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Toluene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
EthylBenzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
o-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-13 MW-06							
Sampled By: PERD on 20-SEP-16 @ 19:15							
Matrix: GW							
BTEX, Styrene and F1 (C6-C10)							
m+p-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Styrene	<0.0010		0.0010	mg/L	22-SEP-16	22-SEP-16	R3552104
F1(C6-C10)	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
F1-BTEX	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
Xylenes	<0.00071		0.00071	mg/L	22-SEP-16	22-SEP-16	R3552104
Surrogate: 1,4-Difluorobenzene (SS)	98.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 4-Bromofluorobenzene (SS)	98.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 3,4-Dichlorotoluene (SS)	94.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
F2 (>C10-C16)							
F2 (C10-C16)	<0.10		0.10	mg/L	26-SEP-16	26-SEP-16	R3558789
Surrogate: 2-Bromobenzotrifluoride	105.7		60-140	%	26-SEP-16	26-SEP-16	R3558789
Miscellaneous Parameters							
Ammonia, Total Dissolved (as N)	1.85		0.050	mg/L		05-OCT-16	R3564452
Dissolved Organic Carbon	9.0		1.0	mg/L		17-OCT-16	R3573406
Phenols (4AAP)	<0.0010		0.0010	mg/L		05-OCT-16	R3564788
Special Request	See Attached					14-OCT-16	R3572652
Total Dissolved Solids	1180	DLHC	20	mg/L		23-SEP-16	R3556027
Major Ions & Trace Dissolved Metals							
Chloride in Water by IC							
Chloride (Cl)	5.6	DLDS	1.0	mg/L		22-SEP-16	R3555435
Dissolved Mercury in Water by CVAAS							
Dissolved Mercury Filtration Location	FIELD					03-OCT-16	R3562588
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L		04-OCT-16	R3563403
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					04-OCT-16	R3563800
Aluminum (Al)-Dissolved	<0.0020	DLDS	0.0020	mg/L		04-OCT-16	R3563621
Antimony (Sb)-Dissolved	<0.00020	DLDS	0.00020	mg/L		04-OCT-16	R3563621
Arsenic (As)-Dissolved	0.00556		0.00020	mg/L		04-OCT-16	R3563621
Barium (Ba)-Dissolved	0.0303		0.00010	mg/L		04-OCT-16	R3563621
Beryllium (Be)-Dissolved	<0.00020	DLDS	0.00020	mg/L		04-OCT-16	R3563621
Boron (B)-Dissolved	0.147		0.020	mg/L		04-OCT-16	R3563621
Cadmium (Cd)-Dissolved	<0.000010	DLDS	0.000010	mg/L		04-OCT-16	R3563621
Calcium (Ca)-Dissolved	167		0.10	mg/L		04-OCT-16	R3563621
Chromium (Cr)-Dissolved	<0.00020	DLDS	0.00020	mg/L		04-OCT-16	R3563621
Cobalt (Co)-Dissolved	0.00025		0.00020	mg/L		04-OCT-16	R3563621
Copper (Cu)-Dissolved	<0.00040	DLDS	0.00040	mg/L		04-OCT-16	R3563621
Iron (Fe)-Dissolved	5.88		0.020	mg/L		04-OCT-16	R3563621
Lead (Pb)-Dissolved	<0.00010	DLDS	0.00010	mg/L		04-OCT-16	R3563621
Magnesium (Mg)-Dissolved	61.0		0.010	mg/L		04-OCT-16	R3563621
Manganese (Mn)-Dissolved	1.63		0.00020	mg/L		04-OCT-16	R3563621
Molybdenum (Mo)-Dissolved	0.00089		0.00010	mg/L		04-OCT-16	R3563621
Nickel (Ni)-Dissolved	<0.0010	DLDS	0.0010	mg/L		04-OCT-16	R3563621
Potassium (K)-Dissolved	5.53		0.10	mg/L		04-OCT-16	R3563621
Selenium (Se)-Dissolved	<0.00010	DLDS	0.00010	mg/L		04-OCT-16	R3563621
Silver (Ag)-Dissolved	<0.000020	DLDS	0.000020	mg/L		04-OCT-16	R3563621
Sodium (Na)-Dissolved	143		0.10	mg/L		04-OCT-16	R3563621
Thallium (Tl)-Dissolved	<0.000020	DLDS	0.000020	mg/L		04-OCT-16	R3563621
Titanium (Ti)-Dissolved	<0.00060	DLDS	0.00060	mg/L		04-OCT-16	R3563621
Uranium (U)-Dissolved	0.00179		0.000020	mg/L		04-OCT-16	R3563621
Vanadium (V)-Dissolved	<0.0010	DLDS	0.0010	mg/L		04-OCT-16	R3563621
Zinc (Zn)-Dissolved	<0.0020	DLDS	0.0020	mg/L		04-OCT-16	R3563621

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-13 MW-06 Sampled By: PERD on 20-SEP-16 @ 19:15 Matrix: GW							
Fluoride in Water by IC							
Fluoride (F)	0.086	DLDS	0.040	mg/L		22-SEP-16	R3555435
Ion Balance Calculation							
Ion Balance	97.7			%		05-OCT-16	
TDS (Calculated)	1170			mg/L		05-OCT-16	
Hardness (as CaCO3)	668			mg/L		05-OCT-16	
Nitrate in Water by IC							
Nitrate (as N)	<0.040	DLDS	0.040	mg/L		22-SEP-16	R3555435
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.045		0.045	mg/L		28-SEP-16	
Nitrite in Water by IC							
Nitrite (as N)	<0.020	DLDS	0.020	mg/L		22-SEP-16	R3555435
Sulfate in Water by IC							
Sulfate (SO4)	490	DLDS	0.60	mg/L		22-SEP-16	R3555435
pH, Conductivity and Total Alkalinity							
pH	7.84		0.10	pH		24-SEP-16	R3555919
Conductivity (EC)	1720		2.0	uS/cm		24-SEP-16	R3555919
Bicarbonate (HCO3)	599		5.0	mg/L		24-SEP-16	R3555919
Carbonate (CO3)	<5.0		5.0	mg/L		24-SEP-16	R3555919
Hydroxide (OH)	<5.0		5.0	mg/L		24-SEP-16	R3555919
Alkalinity, Total (as CaCO3)	491		2.0	mg/L		24-SEP-16	R3555919
L1831974-14 MW-02B Sampled By: PERD on 20-SEP-16 @ 20:15 Matrix: GW							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Toluene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Ethylbenzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
o-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
m+p-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Styrene	<0.0010		0.0010	mg/L	22-SEP-16	22-SEP-16	R3552104
F1(C6-C10)	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
F1-BTEX	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
Xylenes	<0.00071		0.00071	mg/L	22-SEP-16	22-SEP-16	R3552104
Surrogate: 1,4-Difluorobenzene (SS)	99.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 4-Bromofluorobenzene (SS)	89.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 3,4-Dichlorotoluene (SS)	97.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
F2 (>C10-C16)							
F2 (C10-C16)	<0.10		0.10	mg/L	26-SEP-16	26-SEP-16	R3558789
Surrogate: 2-Bromobenzotrifluoride	104.5		60-140	%	26-SEP-16	26-SEP-16	R3558789
Miscellaneous Parameters							
Ammonia, Total Dissolved (as N)	1.68		0.050	mg/L		05-OCT-16	R3564452
Dissolved Organic Carbon	9.8		1.0	mg/L		17-OCT-16	R3573406
Phenols (4AAP)	0.0101	RRV	0.0010	mg/L		05-OCT-16	R3564788
Special Request	See Attached					14-OCT-16	R3572652
Total Dissolved Solids	1760	DLHC	20	mg/L		23-SEP-16	R3556027
Major Ions & Trace Dissolved Metals							
Chloride in Water by IC							
Chloride (Cl)	812	DLDS	2.5	mg/L		22-SEP-16	R3555435
Dissolved Mercury in Water by CVAAS							
Dissolved Mercury Filtration Location	FIELD					03-OCT-16	R3562588

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-14 MW-02B							
Sampled By: PERD on 20-SEP-16 @ 20:15							
Matrix: GW							
Dissolved Mercury in Water by CVAAS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L		04-OCT-16	R3563403
Dissolved Metals in Water by CRC IC PMS							
Dissolved Metals Filtration Location	FIELD					04-OCT-16	R3563800
Aluminum (Al)-Dissolved	0.0076		0.0050	mg/L		04-OCT-16	R3563621
Antimony (Sb)-Dissolved	<0.00050	DLDS	0.00050	mg/L		04-OCT-16	R3563621
Arsenic (As)-Dissolved	0.00141		0.00050	mg/L		04-OCT-16	R3563621
Barium (Ba)-Dissolved	0.497		0.00025	mg/L		04-OCT-16	R3563621
Beryllium (Be)-Dissolved	<0.00050	DLDS	0.00050	mg/L		04-OCT-16	R3563621
Boron (B)-Dissolved	0.651		0.050	mg/L		04-OCT-16	R3563621
Cadmium (Cd)-Dissolved	<0.000025	DLDS	0.000025	mg/L		04-OCT-16	R3563621
Calcium (Ca)-Dissolved	40.4		0.25	mg/L		04-OCT-16	R3563621
Chromium (Cr)-Dissolved	<0.00050	DLDS	0.00050	mg/L		04-OCT-16	R3563621
Cobalt (Co)-Dissolved	<0.00050	DLDS	0.00050	mg/L		04-OCT-16	R3563621
Copper (Cu)-Dissolved	<0.0010	DLDS	0.0010	mg/L		04-OCT-16	R3563621
Iron (Fe)-Dissolved	<0.050	DLDS	0.050	mg/L		04-OCT-16	R3563621
Lead (Pb)-Dissolved	<0.00025	DLDS	0.00025	mg/L		04-OCT-16	R3563621
Magnesium (Mg)-Dissolved	8.75		0.025	mg/L		04-OCT-16	R3563621
Manganese (Mn)-Dissolved	0.109		0.00050	mg/L		04-OCT-16	R3563621
Molybdenum (Mo)-Dissolved	0.0157		0.00025	mg/L		04-OCT-16	R3563621
Nickel (Ni)-Dissolved	<0.0025	DLDS	0.0025	mg/L		04-OCT-16	R3563621
Potassium (K)-Dissolved	4.85		0.25	mg/L		04-OCT-16	R3563621
Selenium (Se)-Dissolved	<0.00025	DLDS	0.00025	mg/L		04-OCT-16	R3563621
Silver (Ag)-Dissolved	<0.000050	DLDS	0.000050	mg/L		04-OCT-16	R3563621
Sodium (Na)-Dissolved	571		0.25	mg/L		04-OCT-16	R3563621
Thallium (Tl)-Dissolved	<0.000050	DLDS	0.000050	mg/L		04-OCT-16	R3563621
Titanium (Ti)-Dissolved	<0.0015	DLDS	0.0015	mg/L		04-OCT-16	R3563621
Uranium (U)-Dissolved	0.00449		0.000050	mg/L		04-OCT-16	R3563621
Vanadium (V)-Dissolved	<0.0025	DLDS	0.0025	mg/L		04-OCT-16	R3563621
Zinc (Zn)-Dissolved	0.0065		0.0050	mg/L		04-OCT-16	R3563621
Fluoride in Water by IC							
Fluoride (F)	0.41	DLDS	0.10	mg/L		22-SEP-16	R3555435
Ion Balance Calculation							
Ion Balance	93.4			%		05-OCT-16	
TDS (Calculated)	1650			mg/L		05-OCT-16	
Hardness (as CaCO3)	137			mg/L		05-OCT-16	
Nitrate in Water by IC							
Nitrate (as N)	<0.10	DLDS	0.10	mg/L		22-SEP-16	R3555435
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.11		0.11	mg/L		28-SEP-16	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLDS	0.050	mg/L		22-SEP-16	R3555435
Sulfate in Water by IC							
Sulfate (SO4)	41.7	DLDS	1.5	mg/L		22-SEP-16	R3555435
pH, Conductivity and Total Alkalinity							
pH	8.28		0.10	pH		24-SEP-16	R3555919
Conductivity (EC)	3180		2.0	uS/cm		24-SEP-16	R3555919
Bicarbonate (HCO3)	357		5.0	mg/L		24-SEP-16	R3555919
Carbonate (CO3)	<5.0		5.0	mg/L		24-SEP-16	R3555919
Hydroxide (OH)	<5.0		5.0	mg/L		24-SEP-16	R3555919
Alkalinity, Total (as CaCO3)	293		2.0	mg/L		24-SEP-16	R3555919

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-15 DUP16-01							
Sampled By: PERD on 19-SEP-16 @ 11:00							
Matrix: GW							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Toluene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
EthylBenzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
o-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
m+p-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Styrene	<0.0010		0.0010	mg/L	22-SEP-16	22-SEP-16	R3552104
F1(C6-C10)	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
F1-BTEX	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
Xylenes	<0.00071		0.00071	mg/L	22-SEP-16	22-SEP-16	R3552104
Surrogate: 1,4-Difluorobenzene (SS)	100.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 4-Bromofluorobenzene (SS)	89.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 3,4-Dichlorotoluene (SS)	97.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
F2 (>C10-C16)							
F2 (C10-C16)	<0.10		0.10	mg/L	26-SEP-16	26-SEP-16	R3558789
Surrogate: 2-Bromobenzotrifluoride	107.8		60-140	%	26-SEP-16	26-SEP-16	R3558789
Miscellaneous Parameters							
Ammonia, Total Dissolved (as N)	2.15	DLHC	0.10	mg/L		05-OCT-16	R3564452
Dissolved Organic Carbon	7.1		1.0	mg/L		17-OCT-16	R3573406
Phenols (4AAP)	<0.0010		0.0010	mg/L		05-OCT-16	R3564788
Special Request	See Attached					14-OCT-16	R3572652
Total Dissolved Solids	1040		10	mg/L		23-SEP-16	R3556027
Major Ions & Trace Dissolved Metals							
Chloride in Water by IC							
Chloride (Cl)	4.9	DLDS	1.0	mg/L		22-SEP-16	R3555435
Dissolved Mercury in Water by CVAAS							
Dissolved Mercury Filtration Location	FIELD					03-OCT-16	R3562588
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L		04-OCT-16	R3563403
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					04-OCT-16	R3563800
Aluminum (Al)-Dissolved	<0.0020	DLDS	0.0020	mg/L		04-OCT-16	R3563621
Antimony (Sb)-Dissolved	<0.00020	DLDS	0.00020	mg/L		04-OCT-16	R3563621
Arsenic (As)-Dissolved	0.00240		0.00020	mg/L		04-OCT-16	R3563621
Barium (Ba)-Dissolved	0.0227		0.00010	mg/L		04-OCT-16	R3563621
Beryllium (Be)-Dissolved	<0.00020	DLDS	0.00020	mg/L		04-OCT-16	R3563621
Boron (B)-Dissolved	0.281		0.020	mg/L		04-OCT-16	R3563621
Cadmium (Cd)-Dissolved	<0.000010	DLDS	0.000010	mg/L		04-OCT-16	R3563621
Calcium (Ca)-Dissolved	97.4		0.10	mg/L		04-OCT-16	R3563621
Chromium (Cr)-Dissolved	<0.00020	DLDS	0.00020	mg/L		04-OCT-16	R3563621
Cobalt (Co)-Dissolved	0.00117		0.00020	mg/L		04-OCT-16	R3563621
Copper (Cu)-Dissolved	<0.00040	DLDS	0.00040	mg/L		04-OCT-16	R3563621
Iron (Fe)-Dissolved	1.88		0.020	mg/L		04-OCT-16	R3563621
Lead (Pb)-Dissolved	<0.00010	DLDS	0.00010	mg/L		04-OCT-16	R3563621
Magnesium (Mg)-Dissolved	27.3		0.010	mg/L		04-OCT-16	R3563621
Manganese (Mn)-Dissolved	0.795		0.00020	mg/L		04-OCT-16	R3563621
Molybdenum (Mo)-Dissolved	0.00155		0.00010	mg/L		04-OCT-16	R3563621
Nickel (Ni)-Dissolved	<0.0010	DLDS	0.0010	mg/L		04-OCT-16	R3563621
Potassium (K)-Dissolved	4.04		0.10	mg/L		04-OCT-16	R3563621
Selenium (Se)-Dissolved	<0.00010	DLDS	0.00010	mg/L		04-OCT-16	R3563621
Silver (Ag)-Dissolved	<0.000020	DLDS	0.000020	mg/L		04-OCT-16	R3563621
Sodium (Na)-Dissolved	223		0.10	mg/L		04-OCT-16	R3563621

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-15 DUP16-01							
Sampled By: PERD on 19-SEP-16 @ 11:00							
Matrix: GW							
Dissolved Metals in Water by CRC ICPMS							
Thallium (Tl)-Dissolved	<0.000020	DLDS	0.000020	mg/L		04-OCT-16	R3563621
Titanium (Ti)-Dissolved	<0.00060	DLDS	0.00060	mg/L		04-OCT-16	R3563621
Uranium (U)-Dissolved	0.00129		0.000020	mg/L		04-OCT-16	R3563621
Vanadium (V)-Dissolved	<0.0010	DLDS	0.0010	mg/L		04-OCT-16	R3563621
Zinc (Zn)-Dissolved	<0.0020	DLDS	0.0020	mg/L		04-OCT-16	R3563621
Fluoride in Water by IC							
Fluoride (F)	0.158	DLDS	0.040	mg/L		22-SEP-16	R3555435
Ion Balance Calculation							
Ion Balance	99.2			%		05-OCT-16	
TDS (Calculated)	984			mg/L		05-OCT-16	
Hardness (as CaCO3)	356			mg/L		05-OCT-16	
Nitrate in Water by IC							
Nitrate (as N)	<0.040	DLDS	0.040	mg/L		22-SEP-16	R3555435
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.045		0.045	mg/L		28-SEP-16	
Nitrite in Water by IC							
Nitrite (as N)	<0.020	DLDS	0.020	mg/L		22-SEP-16	R3555435
Sulfate in Water by IC							
Sulfate (SO4)	319	DLDS	0.60	mg/L		22-SEP-16	R3555435
pH, Conductivity and Total Alkalinity							
pH	8.10		0.10	pH		24-SEP-16	R3555919
Conductivity (EC)	1530		2.0	uS/cm		24-SEP-16	R3555919
Bicarbonate (HCO3)	626		5.0	mg/L		24-SEP-16	R3555919
Carbonate (CO3)	<5.0		5.0	mg/L		24-SEP-16	R3555919
Hydroxide (OH)	<5.0		5.0	mg/L		24-SEP-16	R3555919
Alkalinity, Total (as CaCO3)	513		2.0	mg/L		24-SEP-16	R3555919
L1831974-16 DUP16-02							
Sampled By: PERD on 19-SEP-16 @ 13:00							
Matrix: GW							
BTEX, Styrene & F1-F2							
BTEX, Styrene and F1 (C6-C10)							
Benzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Toluene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
EthylBenzene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
o-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
m+p-Xylene	<0.00050		0.00050	mg/L	22-SEP-16	22-SEP-16	R3552104
Styrene	<0.0010		0.0010	mg/L	22-SEP-16	22-SEP-16	R3552104
F1(C6-C10)	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
F1-BTEX	<0.10		0.10	mg/L	22-SEP-16	22-SEP-16	R3552104
Xylenes	<0.00071		0.00071	mg/L	22-SEP-16	22-SEP-16	R3552104
Surrogate: 1,4-Difluorobenzene (SS)	98.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 4-Bromofluorobenzene (SS)	90.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
Surrogate: 3,4-Dichlorotoluene (SS)	94.0		70-130	%	22-SEP-16	22-SEP-16	R3552104
F2 (>C10-C16)							
F2 (C10-C16)	<0.10		0.10	mg/L	26-SEP-16	26-SEP-16	R3558789
Surrogate: 2-Bromobenzotrifluoride	103.7		60-140	%	26-SEP-16	26-SEP-16	R3558789
Miscellaneous Parameters							
Ammonia, Total Dissolved (as N)	<0.050		0.050	mg/L		05-OCT-16	R3564452
Dissolved Organic Carbon	<1.0		1.0	mg/L		17-OCT-16	R3573406
Phenols (4AAP)	<0.0010		0.0010	mg/L		05-OCT-16	R3564788
Special Request	See Attached					14-OCT-16	R3572652

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-16 DUP16-02							
Sampled By: PERD on 19-SEP-16 @ 13:00							
Matrix: GW							
Total Dissolved Solids	<10		10	mg/L		23-SEP-16	R3556027
Major Ions & Trace Dissolved Metals							
Chloride in Water by IC							
Chloride (Cl)	<0.50		0.50	mg/L		22-SEP-16	R3555435
Dissolved Mercury in Water by CVAAS							
Dissolved Mercury Filtration Location	FIELD					03-OCT-16	R3562588
Mercury (Hg)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563403
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					04-OCT-16	R3563800
Aluminum (Al)-Dissolved	<0.0010		0.0010	mg/L		04-OCT-16	R3563621
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Arsenic (As)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Barium (Ba)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Boron (B)-Dissolved	0.012		0.010	mg/L		04-OCT-16	R3563621
Cadmium (Cd)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Calcium (Ca)-Dissolved	<0.050		0.050	mg/L		04-OCT-16	R3563621
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Cobalt (Co)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Copper (Cu)-Dissolved	<0.00020		0.00020	mg/L		04-OCT-16	R3563621
Iron (Fe)-Dissolved	<0.010		0.010	mg/L		04-OCT-16	R3563621
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Magnesium (Mg)-Dissolved	<0.0050		0.0050	mg/L		04-OCT-16	R3563621
Manganese (Mn)-Dissolved	<0.00010		0.00010	mg/L		04-OCT-16	R3563621
Molybdenum (Mo)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L		04-OCT-16	R3563621
Potassium (K)-Dissolved	<0.050		0.050	mg/L		04-OCT-16	R3563621
Selenium (Se)-Dissolved	<0.000050		0.000050	mg/L		04-OCT-16	R3563621
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L		04-OCT-16	R3563621
Sodium (Na)-Dissolved	<0.050		0.050	mg/L		04-OCT-16	R3563621
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L		04-OCT-16	R3563621
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L		04-OCT-16	R3563621
Uranium (U)-Dissolved	<0.000010		0.000010	mg/L		04-OCT-16	R3563621
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L		04-OCT-16	R3563621
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L		04-OCT-16	R3563621
Fluoride in Water by IC							
Fluoride (F)	<0.020		0.020	mg/L		22-SEP-16	R3555435
Ion Balance Calculation							
Ion Balance	Low TDS			%		05-OCT-16	
TDS (Calculated)	<1.0			mg/L		05-OCT-16	
Hardness (as CaCO3)	<1.0			mg/L		05-OCT-16	
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		22-SEP-16	R3555435
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.022		0.022	mg/L		28-SEP-16	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		22-SEP-16	R3555435
Sulfate in Water by IC							
Sulfate (SO4)	<0.30		0.30	mg/L		22-SEP-16	R3555435
pH, Conductivity and Total Alkalinity							
pH	5.41		0.10	pH		24-SEP-16	R3556360
Conductivity (EC)	<2.0		2.0	uS/cm		24-SEP-16	R3556360
Bicarbonate (HCO3)	<5.0		5.0	mg/L		24-SEP-16	R3556360

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1831974-16 DUP16-02 Sampled By: PERD on 19-SEP-16 @ 13:00 Matrix: GW pH, Conductivity and Total Alkalinity Carbonate (CO3) Hydroxide (OH) Alkalinity, Total (as CaCO3)	<5.0 <5.0 <2.0		5.0 5.0 2.0	mg/L mg/L mg/L		24-SEP-16 24-SEP-16 24-SEP-16	R3556360 R3556360 R3556360

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

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BTXS,F1-ED	Water	BTEX, Styrene and F1 (C6-C10)	EPA 5021/8015&8260 GC-MS & FID
C-DIS-ORG-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.

TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-ED	Water	Chloride in Water by IC	EPA 300.1 (mod)
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Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

F-IC-N-ED	Water	Fluoride in Water by IC	EPA 300.1 (mod)
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Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

F2-ED	Water	F2 (>C10-C16)	EPA 3510/CCME PHC CWS-GC-FID
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HG-D-CVAA-ED	Water	Dissolved Mercury in Water by CVAAS	APHA 3030B/EPA 1631E (mod)
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Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

IONBALANCE-ED	Water	Ion Balance Calculation	APHA 1030E
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MET-D-CCMS-ED	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)
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Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-D-CFA-ED	Water	Ammonia in Water by Colour	APHA 4500 NH3-NITROGEN (AMMONIA)
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This analysis is carried out using procedures adapted from APHA Method 4500 NH3 "NITROGEN (AMMONIA)". Ammonia is determined using the automated phenate colourimetric method.

NO2+NO3-CALC-ED	Water	Nitrate+Nitrite	CALCULATION
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NO2-IC-N-ED	Water	Nitrite in Water by IC	EPA 300.1 (mod)
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Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-ED	Water	Nitrate in Water by IC	EPA 300.1 (mod)
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Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

PH/EC/ALK-ED	Water	pH, Conductivity and Total Alkalinity	APHA 4500-H, 2510, 2320
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All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed).

pH measurement is determined from the activity of the hydrogen ions using a hydrogen electrode and a reference electrode.

Alkalinity measurement is based on the sample's capacity to neutralize acid. Auto-titration to pH 4.5 using 0.02N H2SO4 is performed.

Conductivity measurement is based on the sample's capacity to convey an electric current, and is measured with a conductivity meter.

PHENOLS-4AAP-ED	Water	Phenols (4AAP)	AB ENV.06537-COLORIMETRIC
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This analysis is carried out using procedures adapted from ENVIRODAT VMV 06537 689, Method Code 154, in "Methods Manual for Chemical Analysis of Water and Wastes" published by the Alberta Environmental Centre. This automated method is based on the distillation of phenol and subsequent reaction of the distillate with alkaline ferricyanide and 4-aminoantipyrine to form a red complex which is measured at 505 nm.

SO4-IC-N-ED	Water	Sulfate in Water by IC	EPA 300.1 (mod)
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Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
SOLIDS-TDS-ED	Water	Total Dissolved Solids	APHA 2540 C
Gravimetric determination of solids in waters by filtration and evaporating filtrate to dryness at 180 degrees Celsius.			
SPECIAL REQUEST-IS	Misc.	Special Request Isobrine Solutions	SEE SUBLET LAB RESULTS

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

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

Laboratory Definition Code	Laboratory Location
IS	ISOBRINE SOLUTIONS INC
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

15-278068 15-578067

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

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

< - Less than.

D.L. - The reporting limit.

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

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

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

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



Environmental

Quality Control Report

Workorder: L1831974

Report Date: 18-OCT-16

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Client: WorleyParsons Canada
 705 - 10240 124 ST NW
 EDMONTON AB T5N 3W6

Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTXS,F1-ED		Water						
Batch	R3552104							
WG2395055-4	DUP	L1831974-1						
Benzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	22-SEP-16
Toluene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	22-SEP-16
EthylBenzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	22-SEP-16
o-Xylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	24	22-SEP-16
m+p-Xylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	24	22-SEP-16
Styrene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	50	22-SEP-16
F1(C6-C10)		<0.10	<0.10	RPD-NA	mg/L	N/A	30	22-SEP-16
WG2395055-8	DUP	L1831209-2						
Benzene		0.0105	0.0124		mg/L	16	30	22-SEP-16
Toluene		0.0166	0.0192		mg/L	14	30	22-SEP-16
EthylBenzene		0.00141	0.00141		mg/L	0.6	30	22-SEP-16
o-Xylene		0.00268	0.00295		mg/L	9.8	24	22-SEP-16
m+p-Xylene		0.00362	0.00416		mg/L	14	24	22-SEP-16
Styrene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	50	22-SEP-16
F1(C6-C10)		<0.10	<0.10	RPD-NA	mg/L	N/A	30	22-SEP-16
WG2395055-2	LCS							
Benzene			90.2		%		70-130	22-SEP-16
Toluene			91.5		%		70-130	22-SEP-16
EthylBenzene			93.6		%		70-130	22-SEP-16
o-Xylene			93.9		%		70-130	22-SEP-16
m+p-Xylene			92.7		%		70-130	22-SEP-16
Styrene			85.7		%		70-130	22-SEP-16
WG2395055-3	LCS							
F1(C6-C10)			82.5		%		70-130	22-SEP-16
WG2395055-6	LCS							
Benzene			77.9		%		70-130	22-SEP-16
Toluene			85.4		%		70-130	22-SEP-16
EthylBenzene			81.5		%		70-130	22-SEP-16
o-Xylene			85.0		%		70-130	22-SEP-16
m+p-Xylene			79.7		%		70-130	22-SEP-16
Styrene			77.5		%		70-130	22-SEP-16
WG2395055-7	LCS							
F1(C6-C10)			81.5		%		70-130	22-SEP-16
WG2395055-1	MB							



Quality Control Report

Workorder: L1831974

Report Date: 18-OCT-16

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Client: WorleyParsons Canada
 705 - 10240 124 ST NW
 EDMONTON AB T5N 3W6

Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTXS,F1-ED								
	Water							
Batch	R3552104							
WG2395055-1 MB								
Benzene			<0.00050		mg/L		0.0005	22-SEP-16
Toluene			<0.00050		mg/L		0.0005	22-SEP-16
EthylBenzene			<0.00050		mg/L		0.0005	22-SEP-16
o-Xylene			<0.00050		mg/L		0.0005	22-SEP-16
m+p-Xylene			<0.00050		mg/L		0.0005	22-SEP-16
Styrene			<0.0010		mg/L		0.001	22-SEP-16
F1(C6-C10)			<0.10		mg/L		0.1	22-SEP-16
Surrogate: 1,4-Difluorobenzene (SS)			96.0		%		70-130	22-SEP-16
Surrogate: 4-Bromofluorobenzene (SS)			90.0		%		70-130	22-SEP-16
Surrogate: 3,4-Dichlorotoluene (SS)			91.0		%		70-130	22-SEP-16
WG2395055-5 MB								
Benzene			<0.00050		mg/L		0.0005	22-SEP-16
Toluene			<0.00050		mg/L		0.0005	22-SEP-16
EthylBenzene			<0.00050		mg/L		0.0005	22-SEP-16
o-Xylene			<0.00050		mg/L		0.0005	22-SEP-16
m+p-Xylene			<0.00050		mg/L		0.0005	22-SEP-16
Styrene			<0.0010		mg/L		0.001	22-SEP-16
F1(C6-C10)			<0.10		mg/L		0.1	22-SEP-16
Surrogate: 1,4-Difluorobenzene (SS)			97.0		%		70-130	22-SEP-16
Surrogate: 4-Bromofluorobenzene (SS)			91.0		%		70-130	22-SEP-16
Surrogate: 3,4-Dichlorotoluene (SS)			91.0		%		70-130	22-SEP-16
C-DIS-ORG-CL								
	Water							
Batch	R3573406							
WG2412662-3 DUP		L1831974-16						
Dissolved Organic Carbon		<1.0	<1.0	RPD-NA	mg/L	N/A	20	17-OCT-16
WG2412662-2 LCS								
Dissolved Organic Carbon			110.4		%		80-120	17-OCT-16
WG2412662-1 MB								
Dissolved Organic Carbon			<1.0		mg/L		1	17-OCT-16
WG2412662-4 MS		L1831974-16						
Dissolved Organic Carbon			108.6		%		70-130	17-OCT-16
CL-IC-N-ED								
	Water							



Quality Control Report

Workorder: L1831974

Report Date: 18-OCT-16

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Client: WorleyParsons Canada
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6

Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-IC-N-ED								
	Water							
Batch	R3554579							
WG2394654-3	DUP	L1831619-8						
Chloride (Cl)		27.7	27.5		mg/L	0.9	20	22-SEP-16
WG2394654-7	DUP	L1832414-8						
Chloride (Cl)		2.88	2.87		mg/L	0.4	20	22-SEP-16
WG2394654-11	LCS							
Chloride (Cl)			103.5		%		90-110	22-SEP-16
WG2394654-13	LCS							
Chloride (Cl)			103.9		%		90-110	22-SEP-16
WG2394654-2	LCS							
Chloride (Cl)			103.8		%		90-110	22-SEP-16
WG2394654-9	LCS							
Chloride (Cl)			102.6		%		90-110	22-SEP-16
WG2394654-1	MB							
Chloride (Cl)			<0.50		mg/L		0.5	22-SEP-16
WG2394654-10	MB							
Chloride (Cl)			<0.50		mg/L		0.5	22-SEP-16
WG2394654-12	MB							
Chloride (Cl)			<0.50		mg/L		0.5	22-SEP-16
WG2394654-14	MB							
Chloride (Cl)			<0.50		mg/L		0.5	22-SEP-16
WG2394654-4	MS	L1831619-8						
Chloride (Cl)			96.4		%		75-125	22-SEP-16
WG2394654-8	MS	L1832414-8						
Chloride (Cl)			98.0		%		75-125	22-SEP-16
Batch	R3555435							
WG2394991-11	DUP	L1833654-6						
Chloride (Cl)		22.2	22.3		mg/L	0.2	20	23-SEP-16
WG2394991-3	DUP	L1831974-11						
Chloride (Cl)		2.09	2.07		mg/L	0.8	20	22-SEP-16
WG2394991-5	DUP	L1832427-6						
Chloride (Cl)		33.5	33.6		mg/L	0.3	20	22-SEP-16
WG2394991-7	DUP	L1833098-20						
Chloride (Cl)		20.5	20.5		mg/L	0.0	20	23-SEP-16
WG2394991-9	DUP	L1833092-6						
Chloride (Cl)		4.17	4.19		mg/L	0.4	20	23-SEP-16
WG2394991-13	LCS							
Chloride (Cl)			104.0		%		90-110	22-SEP-16
WG2394991-15	LCS							



Environmental

Quality Control Report

Workorder: L1831974

Report Date: 18-OCT-16

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Client: WorleyParsons Canada
 705 - 10240 124 ST NW
 EDMONTON AB T5N 3W6

Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-IC-N-ED								
	Water							
Batch	R3555435							
WG2394991-15	LCS							
Chloride (Cl)			104.5		%		90-110	22-SEP-16
WG2394991-17	LCS							
Chloride (Cl)			104.6		%		90-110	23-SEP-16
WG2394991-19	LCS							
Chloride (Cl)			104.8		%		90-110	23-SEP-16
WG2394991-2	LCS							
Chloride (Cl)			103.1		%		90-110	22-SEP-16
WG2394991-21	LCS							
Chloride (Cl)			106.0		%		90-110	23-SEP-16
WG2394991-1	MB							
Chloride (Cl)			<0.50		mg/L		0.5	23-SEP-16
WG2394991-14	MB							
Chloride (Cl)			<0.50		mg/L		0.5	22-SEP-16
WG2394991-16	MB							
Chloride (Cl)			<0.50		mg/L		0.5	22-SEP-16
WG2394991-18	MB							
Chloride (Cl)			<0.50		mg/L		0.5	23-SEP-16
WG2394991-20	MB							
Chloride (Cl)			<0.50		mg/L		0.5	23-SEP-16
WG2394991-22	MB							
Chloride (Cl)			<0.50		mg/L		0.5	23-SEP-16
WG2394991-10	MS	L1833092-6						
Chloride (Cl)			102.4		%		75-125	23-SEP-16
WG2394991-12	MS	L1833654-6						
Chloride (Cl)			102.3		%		75-125	23-SEP-16
WG2394991-4	MS	L1831974-11						
Chloride (Cl)			100.7		%		75-125	22-SEP-16
WG2394991-6	MS	L1832427-6						
Chloride (Cl)			100.0		%		75-125	22-SEP-16
WG2394991-8	MS	L1833098-20						
Chloride (Cl)			102.0		%		75-125	23-SEP-16
F-IC-N-ED								
	Water							
Batch	R3554579							
WG2394654-3	DUP	L1831619-8						
Fluoride (F)		0.059	0.063		mg/L	6.8	20	22-SEP-16
WG2394654-7	DUP	L1832414-8						
Fluoride (F)		0.374	0.377		mg/L	0.8	20	22-SEP-16



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Client: WorleyParsons Canada
 705 - 10240 124 ST NW
 EDMONTON AB T5N 3W6

Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-ED		Water						
Batch	R3554579							
WG2394654-11	LCS							
Fluoride (F)			102.9		%		90-110	22-SEP-16
WG2394654-13	LCS							
Fluoride (F)			102.2		%		90-110	22-SEP-16
WG2394654-2	LCS							
Fluoride (F)			101.0		%		90-110	22-SEP-16
WG2394654-9	LCS							
Fluoride (F)			98.0		%		90-110	22-SEP-16
WG2394654-1	MB							
Fluoride (F)			<0.020		mg/L		0.02	22-SEP-16
WG2394654-10	MB							
Fluoride (F)			<0.020		mg/L		0.02	22-SEP-16
WG2394654-12	MB							
Fluoride (F)			<0.020		mg/L		0.02	22-SEP-16
WG2394654-14	MB							
Fluoride (F)			<0.020		mg/L		0.02	22-SEP-16
WG2394654-4	MS	L1831619-8						
Fluoride (F)			95.5		%		75-125	22-SEP-16
WG2394654-8	MS	L1832414-8						
Fluoride (F)			100.1		%		75-125	22-SEP-16
Batch	R3555435							
WG2394991-11	DUP	L1833654-6						
Fluoride (F)		0.068	0.068		mg/L	0.1	20	23-SEP-16
WG2394991-3	DUP	L1831974-11						
Fluoride (F)		0.124	0.124		mg/L	0.4	20	22-SEP-16
WG2394991-5	DUP	L1832427-6						
Fluoride (F)		0.150	0.151		mg/L	0.7	20	22-SEP-16
WG2394991-7	DUP	L1833098-20						
Fluoride (F)		0.029	0.030		mg/L	3.4	20	23-SEP-16
WG2394991-9	DUP	L1833092-6						
Fluoride (F)		0.265	0.267		mg/L	0.6	20	23-SEP-16
WG2394991-13	LCS							
Fluoride (F)			96.9		%		90-110	22-SEP-16
WG2394991-15	LCS							
Fluoride (F)			97.6		%		90-110	22-SEP-16
WG2394991-17	LCS							
Fluoride (F)			101.4		%		90-110	23-SEP-16
WG2394991-19	LCS							



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Client: WorleyParsons Canada
 705 - 10240 124 ST NW
 EDMONTON AB T5N 3W6

Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-ED								
	Water							
Batch	R3555435							
WG2394991-19	LCS							
Fluoride (F)			99.6		%		90-110	23-SEP-16
WG2394991-2	LCS							
Fluoride (F)			99.7		%		90-110	22-SEP-16
WG2394991-21	LCS							
Fluoride (F)			105.4		%		90-110	23-SEP-16
WG2394991-1	MB							
Fluoride (F)			<0.020		mg/L		0.02	23-SEP-16
WG2394991-14	MB							
Fluoride (F)			<0.020		mg/L		0.02	22-SEP-16
WG2394991-16	MB							
Fluoride (F)			<0.020		mg/L		0.02	22-SEP-16
WG2394991-18	MB							
Fluoride (F)			<0.020		mg/L		0.02	23-SEP-16
WG2394991-20	MB							
Fluoride (F)			<0.020		mg/L		0.02	23-SEP-16
WG2394991-22	MB							
Fluoride (F)			<0.020		mg/L		0.02	23-SEP-16
WG2394991-10	MS	L1833092-6						
Fluoride (F)			98.1		%		75-125	23-SEP-16
WG2394991-12	MS	L1833654-6						
Fluoride (F)			106.6		%		75-125	23-SEP-16
WG2394991-4	MS	L1831974-11						
Fluoride (F)			101.6		%		75-125	22-SEP-16
WG2394991-6	MS	L1832427-6						
Fluoride (F)			103.9		%		75-125	22-SEP-16
WG2394991-8	MS	L1833098-20						
Fluoride (F)			97.9		%		75-125	23-SEP-16
F2-ED								
	Water							
Batch	R3558789							
WG2395551-2	LCS							
F2 (C10-C16)			100.7		%		70-130	26-SEP-16
WG2395551-1	MB							
F2 (C10-C16)			<0.10		mg/L		0.1	26-SEP-16
Surrogate: 2-Bromobenzotrifluoride			101.2		%		60-140	26-SEP-16
HG-D-CVAA-ED								
	Water							



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Client: WorleyParsons Canada
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 EDMONTON AB T5N 3W6

Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-CVAA-ED								
	Water							
Batch	R3563403							
WG2402460-3	DUP	L1831974-1						
Mercury (Hg)-Dissolved		<0.0000050	<0.0000050	RPD-NA	mg/L	N/A	20	04-OCT-16
WG2402460-2	LCS							
Mercury (Hg)-Dissolved			108.0		%		80-120	04-OCT-16
WG2402460-1	MB							
Mercury (Hg)-Dissolved			<0.0000050		mg/L		0.000005	04-OCT-16
WG2402460-4	MS	L1831974-2						
Mercury (Hg)-Dissolved			112.0		%		70-130	04-OCT-16
MET-D-CCMS-ED								
	Water							
Batch	R3563621							
WG2403671-2	CRM	ED-HIGH-WATRM						
Aluminum (Al)-Dissolved			102.1		%		80-120	04-OCT-16
Antimony (Sb)-Dissolved			96.0		%		80-120	04-OCT-16
Arsenic (As)-Dissolved			103.5		%		80-120	04-OCT-16
Barium (Ba)-Dissolved			104.4		%		80-120	04-OCT-16
Beryllium (Be)-Dissolved			100.4		%		80-120	04-OCT-16
Boron (B)-Dissolved			98.4		%		80-120	04-OCT-16
Cadmium (Cd)-Dissolved			103.5		%		80-120	04-OCT-16
Calcium (Ca)-Dissolved			100.5		%		80-120	04-OCT-16
Chromium (Cr)-Dissolved			98.3		%		80-120	04-OCT-16
Cobalt (Co)-Dissolved			99.1		%		80-120	04-OCT-16
Copper (Cu)-Dissolved			99.7		%		80-120	04-OCT-16
Iron (Fe)-Dissolved			94.9		%		80-120	04-OCT-16
Lead (Pb)-Dissolved			96.3		%		80-120	04-OCT-16
Magnesium (Mg)-Dissolved			103.6		%		80-120	04-OCT-16
Manganese (Mn)-Dissolved			101.7		%		80-120	04-OCT-16
Molybdenum (Mo)-Dissolved			103.4		%		80-120	04-OCT-16
Nickel (Ni)-Dissolved			101.0		%		80-120	04-OCT-16
Potassium (K)-Dissolved			101.5		%		80-120	04-OCT-16
Selenium (Se)-Dissolved			97.1		%		80-120	04-OCT-16
Silver (Ag)-Dissolved			110.0		%		80-120	04-OCT-16
Sodium (Na)-Dissolved			99.6		%		80-120	04-OCT-16
Thallium (Tl)-Dissolved			93.4		%		80-120	04-OCT-16
Titanium (Ti)-Dissolved			99.3		%		80-120	04-OCT-16
Uranium (U)-Dissolved			98.5		%		80-120	04-OCT-16



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Client: WorleyParsons Canada
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6

Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-ED		Water						
Batch	R3563621							
WG2403671-2	CRM	ED-HIGH-WATRM						
Vanadium (V)-Dissolved			101.7		%		80-120	04-OCT-16
Zinc (Zn)-Dissolved			97.0		%		80-120	04-OCT-16
WG2403671-3	DUP	L1831974-16						
Aluminum (Al)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	04-OCT-16
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-16
Arsenic (As)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-16
Barium (Ba)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	04-OCT-16
Beryllium (Be)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-16
Boron (B)-Dissolved		0.012	0.012		mg/L	6.8	20	04-OCT-16
Cadmium (Cd)-Dissolved		<0.0000050	<0.0000050	RPD-NA	mg/L	N/A	20	04-OCT-16
Calcium (Ca)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	04-OCT-16
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-16
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-16
Copper (Cu)-Dissolved		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	04-OCT-16
Iron (Fe)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	04-OCT-16
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	04-OCT-16
Magnesium (Mg)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	04-OCT-16
Manganese (Mn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-16
Molybdenum (Mo)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	04-OCT-16
Nickel (Ni)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	04-OCT-16
Potassium (K)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	04-OCT-16
Selenium (Se)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	04-OCT-16
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	04-OCT-16
Sodium (Na)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	04-OCT-16
Thallium (Tl)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	04-OCT-16
Titanium (Ti)-Dissolved		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	04-OCT-16
Uranium (U)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	04-OCT-16
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	04-OCT-16
Zinc (Zn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	04-OCT-16
WG2403671-1	MB							
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	04-OCT-16
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	04-OCT-16
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	04-OCT-16



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Client: WorleyParsons Canada
 705 - 10240 124 ST NW
 EDMONTON AB T5N 3W6

Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-ED		Water						
Batch	R3563621							
WG2403671-1	MB							
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	04-OCT-16
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	04-OCT-16
Boron (B)-Dissolved			<0.010		mg/L		0.01	04-OCT-16
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	04-OCT-16
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	04-OCT-16
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	04-OCT-16
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	04-OCT-16
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	04-OCT-16
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	04-OCT-16
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	04-OCT-16
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	04-OCT-16
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	04-OCT-16
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	04-OCT-16
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	04-OCT-16
Potassium (K)-Dissolved			<0.050		mg/L		0.05	04-OCT-16
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	04-OCT-16
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	04-OCT-16
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	04-OCT-16
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	04-OCT-16
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	04-OCT-16
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	04-OCT-16
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	04-OCT-16
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	04-OCT-16
NH3-D-CFA-ED		Water						
Batch	R3564452							
WG2404334-18	DUP		L1831974-16					
Ammonia, Total Dissolved (as N)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	05-OCT-16
WG2404334-6	DUP		L1827959-3					
Ammonia, Total Dissolved (as N)		1.34	1.27		mg/L	5.2	20	05-OCT-16
WG2404334-14	LCS							
Ammonia, Total Dissolved (as N)			104.5		%		85-115	05-OCT-16
WG2404334-15	LCS							
Ammonia, Total Dissolved (as N)			103.2		%		85-115	05-OCT-16
WG2404334-16	LCS							



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Client: WorleyParsons Canada
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 EDMONTON AB T5N 3W6

Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-D-CFA-ED								
	Water							
Batch	R3564452							
WG2404334-16	LCS							
Ammonia, Total Dissolved (as N)			104.7		%		85-115	05-OCT-16
WG2404334-2	LCS							
Ammonia, Total Dissolved (as N)			105.0		%		85-115	05-OCT-16
WG2404334-1	MB							
Ammonia, Total Dissolved (as N)			<0.050		mg/L		0.05	05-OCT-16
WG2404334-19	MS	L1831974-16						
Ammonia, Total Dissolved (as N)			114.3		%		75-125	05-OCT-16
WG2404334-7	MS	L1827959-3						
Ammonia, Total Dissolved (as N)			N/A	MS-B	%		-	05-OCT-16
NO2-IC-N-ED								
	Water							
Batch	R3554579							
WG2394654-3	DUP	L1831619-8						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	22-SEP-16
WG2394654-7	DUP	L1832414-8						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	22-SEP-16
WG2394654-11	LCS							
Nitrite (as N)			97.5		%		90-110	22-SEP-16
WG2394654-13	LCS							
Nitrite (as N)			97.6		%		90-110	22-SEP-16
WG2394654-2	LCS							
Nitrite (as N)			99.0		%		90-110	22-SEP-16
WG2394654-9	LCS							
Nitrite (as N)			95.9		%		90-110	22-SEP-16
WG2394654-1	MB							
Nitrite (as N)			<0.010		mg/L		0.01	22-SEP-16
WG2394654-10	MB							
Nitrite (as N)			<0.010		mg/L		0.01	22-SEP-16
WG2394654-12	MB							
Nitrite (as N)			<0.010		mg/L		0.01	22-SEP-16
WG2394654-14	MB							
Nitrite (as N)			<0.010		mg/L		0.01	22-SEP-16
WG2394654-4	MS	L1831619-8						
Nitrite (as N)			94.8		%		75-125	22-SEP-16
WG2394654-8	MS	L1832414-8						
Nitrite (as N)			91.1		%		75-125	22-SEP-16



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Client: WorleyParsons Canada
 705 - 10240 124 ST NW
 EDMONTON AB T5N 3W6

Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO2-IC-N-ED								
	Water							
Batch	R3555435							
WG2394991-11	DUP	L1833654-6						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	23-SEP-16
WG2394991-3	DUP	L1831974-11						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	22-SEP-16
WG2394991-5	DUP	L1832427-6						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	22-SEP-16
WG2394991-7	DUP	L1833098-20						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	23-SEP-16
WG2394991-9	DUP	L1833092-6						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	23-SEP-16
WG2394991-13	LCS							
Nitrite (as N)			100.6		%		90-110	22-SEP-16
WG2394991-15	LCS							
Nitrite (as N)			103.1		%		90-110	22-SEP-16
WG2394991-17	LCS							
Nitrite (as N)			102.3		%		90-110	23-SEP-16
WG2394991-19	LCS							
Nitrite (as N)			102.7		%		90-110	23-SEP-16
WG2394991-2	LCS							
Nitrite (as N)			98.8		%		90-110	22-SEP-16
WG2394991-21	LCS							
Nitrite (as N)			105.5		%		90-110	23-SEP-16
WG2394991-1	MB							
Nitrite (as N)			<0.010		mg/L		0.01	23-SEP-16
WG2394991-14	MB							
Nitrite (as N)			<0.010		mg/L		0.01	22-SEP-16
WG2394991-16	MB							
Nitrite (as N)			<0.010		mg/L		0.01	22-SEP-16
WG2394991-18	MB							
Nitrite (as N)			<0.010		mg/L		0.01	23-SEP-16
WG2394991-20	MB							
Nitrite (as N)			<0.010		mg/L		0.01	23-SEP-16
WG2394991-22	MB							
Nitrite (as N)			<0.010		mg/L		0.01	23-SEP-16
WG2394991-10	MS	L1833092-6						
Nitrite (as N)			92.6		%		75-125	23-SEP-16
WG2394991-12	MS	L1833654-6						
Nitrite (as N)			97.8		%		75-125	23-SEP-16



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Client: WorleyParsons Canada
 705 - 10240 124 ST NW
 EDMONTON AB T5N 3W6

Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO2-IC-N-ED		Water						
Batch	R3555435							
WG2394991-4	MS	L1831974-11						
Nitrite (as N)			96.4		%		75-125	22-SEP-16
WG2394991-6	MS	L1832427-6						
Nitrite (as N)			96.5		%		75-125	22-SEP-16
WG2394991-8	MS	L1833098-20						
Nitrite (as N)			99.3		%		75-125	23-SEP-16
NO3-IC-N-ED		Water						
Batch	R3554579							
WG2394654-3	DUP	L1831619-8						
Nitrate (as N)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	22-SEP-16
WG2394654-5	DUP	L1832402-12						
Nitrate (as N)		1.18	1.18		mg/L	0.1	20	22-SEP-16
WG2394654-7	DUP	L1832414-8						
Nitrate (as N)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	22-SEP-16
WG2394654-11	LCS							
Nitrate (as N)			100.2		%		90-110	22-SEP-16
WG2394654-13	LCS							
Nitrate (as N)			100.6		%		90-110	22-SEP-16
WG2394654-2	LCS							
Nitrate (as N)			100.9		%		90-110	22-SEP-16
WG2394654-9	LCS							
Nitrate (as N)			99.5		%		90-110	22-SEP-16
WG2394654-1	MB							
Nitrate (as N)			<0.020		mg/L		0.02	22-SEP-16
WG2394654-10	MB							
Nitrate (as N)			<0.020		mg/L		0.02	22-SEP-16
WG2394654-12	MB							
Nitrate (as N)			<0.020		mg/L		0.02	22-SEP-16
WG2394654-14	MB							
Nitrate (as N)			<0.020		mg/L		0.02	22-SEP-16
WG2394654-4	MS	L1831619-8						
Nitrate (as N)			94.2		%		75-125	22-SEP-16
WG2394654-6	MS	L1832402-12						
Nitrate (as N)			93.3		%		75-125	22-SEP-16
WG2394654-8	MS	L1832414-8						
Nitrate (as N)			93.4		%		75-125	22-SEP-16



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Client: WorleyParsons Canada
 705 - 10240 124 ST NW
 EDMONTON AB T5N 3W6

Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-N-ED								
	Water							
Batch	R3555435							
WG2394991-11	DUP	L1833654-6						
Nitrate (as N)		0.037	0.037		mg/L	0.5	20	23-SEP-16
WG2394991-3	DUP	L1831974-11						
Nitrate (as N)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	22-SEP-16
WG2394991-5	DUP	L1832427-6						
Nitrate (as N)		0.189	0.192		mg/L	1.7	20	22-SEP-16
WG2394991-7	DUP	L1833098-20						
Nitrate (as N)		1.00	1.01		mg/L	1.2	20	23-SEP-16
WG2394991-9	DUP	L1833092-6						
Nitrate (as N)		0.068	0.067		mg/L	0.9	20	23-SEP-16
WG2394991-13	LCS							
Nitrate (as N)			103.5		%		90-110	22-SEP-16
WG2394991-15	LCS							
Nitrate (as N)			105.2		%		90-110	22-SEP-16
WG2394991-17	LCS							
Nitrate (as N)			104.6		%		90-110	23-SEP-16
WG2394991-19	LCS							
Nitrate (as N)			104.5		%		90-110	23-SEP-16
WG2394991-2	LCS							
Nitrate (as N)			102.6		%		90-110	22-SEP-16
WG2394991-21	LCS							
Nitrate (as N)			106.4		%		90-110	23-SEP-16
WG2394991-1	MB							
Nitrate (as N)			<0.020		mg/L		0.02	23-SEP-16
WG2394991-14	MB							
Nitrate (as N)			<0.020		mg/L		0.02	22-SEP-16
WG2394991-16	MB							
Nitrate (as N)			<0.020		mg/L		0.02	22-SEP-16
WG2394991-18	MB							
Nitrate (as N)			<0.020		mg/L		0.02	23-SEP-16
WG2394991-20	MB							
Nitrate (as N)			<0.020		mg/L		0.02	23-SEP-16
WG2394991-22	MB							
Nitrate (as N)			<0.020		mg/L		0.02	23-SEP-16
WG2394991-10	MS	L1833092-6						
Nitrate (as N)			101.4		%		75-125	23-SEP-16
WG2394991-12	MS	L1833654-6						
Nitrate (as N)			103.3		%		75-125	23-SEP-16



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Client: WorleyParsons Canada
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 EDMONTON AB T5N 3W6

Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH/EC/ALK-ED		Water						
Batch	R3555919							
WG2395716-15	LCS							
Alkalinity, Total (as CaCO3)			96.7		%		85-115	24-SEP-16
WG2395716-16	LCS							
Conductivity (EC)			96.8		%		90-110	24-SEP-16
WG2395716-2	LCS							
Conductivity (EC)			95.6		%		90-110	23-SEP-16
WG2395716-20	LCS							
Conductivity (EC)			98.2		%		90-110	24-SEP-16
WG2395716-21	LCS							
pH			6.04		pH		5.9-6.1	24-SEP-16
WG2395716-22	LCS							
Alkalinity, Total (as CaCO3)			96.8		%		85-115	24-SEP-16
WG2395716-23	LCS							
Conductivity (EC)			95.8		%		90-110	24-SEP-16
WG2395716-26	LCS							
Conductivity (EC)			96.6		%		90-110	24-SEP-16
WG2395716-29	LCS							
Conductivity (EC)			94.9		%		90-110	24-SEP-16
WG2395716-3	LCS							
pH			6.04		pH		5.9-6.1	23-SEP-16
WG2395716-4	LCS							
Alkalinity, Total (as CaCO3)			96.5		%		85-115	23-SEP-16
WG2395716-5	LCS							
Conductivity (EC)			94.5		%		90-110	23-SEP-16
WG2395716-7	LCS							
Conductivity (EC)			98.8		%		90-110	23-SEP-16
WG2395716-8	LCS							
pH			6.05		pH		5.9-6.1	23-SEP-16
WG2395716-9	LCS							
Alkalinity, Total (as CaCO3)			97.9		%		85-115	23-SEP-16
WG2395716-1	MB							
Conductivity (EC)			<2.0		uS/cm		2	23-SEP-16
Bicarbonate (HCO3)			<5.0		mg/L		5	23-SEP-16
Carbonate (CO3)			<5.0		mg/L		5	23-SEP-16
Hydroxide (OH)			<5.0		mg/L		5	23-SEP-16
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	23-SEP-16
WG2395716-11	MB							
Conductivity (EC)			<2.0		uS/cm		2	23-SEP-16



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Client: WorleyParsons Canada
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 EDMONTON AB T5N 3W6

Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH/EC/ALK-ED		Water						
Batch R3555919								
WG2395716-11 MB								
Bicarbonate (HCO3)			<5.0		mg/L		5	23-SEP-16
Carbonate (CO3)			<5.0		mg/L		5	23-SEP-16
Hydroxide (OH)			<5.0		mg/L		5	23-SEP-16
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	23-SEP-16
WG2395716-17 MB								
Conductivity (EC)			<2.0		uS/cm		2	24-SEP-16
Bicarbonate (HCO3)			<5.0		mg/L		5	24-SEP-16
Carbonate (CO3)			<5.0		mg/L		5	24-SEP-16
Hydroxide (OH)			<5.0		mg/L		5	24-SEP-16
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	24-SEP-16
WG2395716-24 MB								
Conductivity (EC)			<2.0		uS/cm		2	24-SEP-16
Bicarbonate (HCO3)			<5.0		mg/L		5	24-SEP-16
Carbonate (CO3)			<5.0		mg/L		5	24-SEP-16
Hydroxide (OH)			<5.0		mg/L		5	24-SEP-16
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	24-SEP-16
Batch R3556360								
WG2396162-6 DUP		L1832430-3						
pH		7.80	7.81	J	pH	0.01	0.2	24-SEP-16
Conductivity (EC)		2080	2090		uS/cm	0.5	10	24-SEP-16
Bicarbonate (HCO3)		664	669		mg/L	0.9	25	24-SEP-16
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	24-SEP-16
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	24-SEP-16
Alkalinity, Total (as CaCO3)		544	549		mg/L	0.9	20	24-SEP-16
WG2396162-7 DUP		L1832423-3						
pH		7.82	7.79	J	pH	0.03	0.2	24-SEP-16
Conductivity (EC)		9980	9970		uS/cm	0.1	10	24-SEP-16
Bicarbonate (HCO3)		816	847		mg/L	3.8	25	24-SEP-16
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	24-SEP-16
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	25	24-SEP-16
Alkalinity, Total (as CaCO3)		669	695		mg/L	3.8	20	24-SEP-16
WG2396162-10 LCS								
pH			6.05		pH		5.9-6.1	24-SEP-16
WG2396162-11 LCS								



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Client: WorleyParsons Canada
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 EDMONTON AB T5N 3W6

Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH/EC/ALK-ED		Water						
Batch	R3556360							
WG2396162-11	LCS							
Alkalinity, Total (as CaCO3)			92.2		%		85-115	24-SEP-16
WG2396162-12	LCS							
Conductivity (EC)			95.5		%		90-110	24-SEP-16
WG2396162-2	LCS							
Conductivity (EC)			95.0		%		90-110	24-SEP-16
WG2396162-3	LCS							
pH			6.04		pH		5.9-6.1	24-SEP-16
WG2396162-4	LCS							
Alkalinity, Total (as CaCO3)			96.4		%		85-115	24-SEP-16
WG2396162-5	LCS							
Conductivity (EC)			93.5		%		90-110	24-SEP-16
WG2396162-9	LCS							
Conductivity (EC)			97.4		%		90-110	24-SEP-16
WG2396162-1	MB							
Conductivity (EC)			<2.0		uS/cm		2	24-SEP-16
Bicarbonate (HCO3)			<5.0		mg/L		5	24-SEP-16
Carbonate (CO3)			<5.0		mg/L		5	24-SEP-16
Hydroxide (OH)			<5.0		mg/L		5	24-SEP-16
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	24-SEP-16
WG2396162-8	MB							
Conductivity (EC)			<2.0		uS/cm		2	25-SEP-16
Bicarbonate (HCO3)			<5.0		mg/L		5	25-SEP-16
Carbonate (CO3)			<5.0		mg/L		5	25-SEP-16
Hydroxide (OH)			<5.0		mg/L		5	25-SEP-16
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	25-SEP-16
PHENOLS-4AAP-ED		Water						
Batch	R3564788							
WG2404676-11	DUP	L1836472-1						
Phenols (4AAP)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	05-OCT-16
WG2404676-13	DUP	L1836533-2						
Phenols (4AAP)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	05-OCT-16
WG2404676-3	DUP	L1831974-16						
Phenols (4AAP)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	05-OCT-16
WG2404676-7	DUP	L1829513-6						
Phenols (4AAP)		<0.0010	0.0012	RPD-NA	mg/L	N/A	20	05-OCT-16
WG2404676-10	LCS							



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Client: WorleyParsons Canada
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 EDMONTON AB T5N 3W6

Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PHENOLS-4AAP-ED								
	Water							
Batch	R3564788							
WG2404676-10	LCS							
Phenols (4AAP)			93.0		%		85-115	05-OCT-16
WG2404676-2	LCS							
Phenols (4AAP)			98.0		%		85-115	05-OCT-16
WG2404676-6	LCS							
Phenols (4AAP)			101.0		%		85-115	05-OCT-16
WG2404676-1	MB							
Phenols (4AAP)			<0.0010		mg/L		0.001	05-OCT-16
WG2404676-5	MB							
Phenols (4AAP)			<0.0010		mg/L		0.001	05-OCT-16
WG2404676-9	MB							
Phenols (4AAP)			<0.0010		mg/L		0.001	05-OCT-16
WG2404676-12	MS	L1836472-1						
Phenols (4AAP)			101.5		%		75-125	05-OCT-16
WG2404676-14	MS	L1836533-2						
Phenols (4AAP)			108.0		%		75-125	05-OCT-16
WG2404676-4	MS	L1831974-16						
Phenols (4AAP)			89.0		%		75-125	05-OCT-16
WG2404676-8	MS	L1829513-6						
Phenols (4AAP)			95.0		%		75-125	05-OCT-16
SO4-IC-N-ED								
	Water							
Batch	R3554579							
WG2394654-3	DUP	L1831619-8						
Sulfate (SO4)		16.7	16.6		mg/L	0.3	20	22-SEP-16
WG2394654-7	DUP	L1832414-8						
Sulfate (SO4)		<0.30	<0.30	RPD-NA	mg/L	N/A	20	22-SEP-16
WG2394654-11	LCS							
Sulfate (SO4)			103.2		%		90-110	22-SEP-16
WG2394654-13	LCS							
Sulfate (SO4)			103.2		%		90-110	22-SEP-16
WG2394654-2	LCS							
Sulfate (SO4)			103.1		%		90-110	22-SEP-16
WG2394654-9	LCS							
Sulfate (SO4)			102.5		%		90-110	22-SEP-16
WG2394654-1	MB							
Sulfate (SO4)			<0.30		mg/L		0.3	22-SEP-16
WG2394654-10	MB							
Sulfate (SO4)			<0.30		mg/L		0.3	22-SEP-16



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Client: WorleyParsons Canada
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 EDMONTON AB T5N 3W6

Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-ED								
	Water							
Batch	R3554579							
WG2394654-12	MB							
Sulfate (SO4)			<0.30		mg/L		0.3	22-SEP-16
WG2394654-14	MB							
Sulfate (SO4)			<0.30		mg/L		0.3	22-SEP-16
WG2394654-4	MS	L1831619-8						
Sulfate (SO4)			100.7		%		75-125	22-SEP-16
WG2394654-8	MS	L1832414-8						
Sulfate (SO4)			95.6		%		75-125	22-SEP-16
Batch	R3555435							
WG2394991-11	DUP	L1833654-6						
Sulfate (SO4)		0.68	0.67		mg/L	1.2	20	23-SEP-16
WG2394991-3	DUP	L1831974-11						
Sulfate (SO4)		11.3	11.2		mg/L	1.1	20	22-SEP-16
WG2394991-5	DUP	L1832427-6						
Sulfate (SO4)		41.8	41.9		mg/L	0.2	20	22-SEP-16
WG2394991-7	DUP	L1833098-20						
Sulfate (SO4)		195	196		mg/L	0.5	20	23-SEP-16
WG2394991-9	DUP	L1833092-6						
Sulfate (SO4)		122	122		mg/L	0.1	20	23-SEP-16
WG2394991-13	LCS							
Sulfate (SO4)			103.5		%		90-110	22-SEP-16
WG2394991-15	LCS							
Sulfate (SO4)			103.9		%		90-110	22-SEP-16
WG2394991-17	LCS							
Sulfate (SO4)			104.2		%		90-110	23-SEP-16
WG2394991-19	LCS							
Sulfate (SO4)			104.6		%		90-110	23-SEP-16
WG2394991-2	LCS							
Sulfate (SO4)			102.7		%		90-110	22-SEP-16
WG2394991-21	LCS							
Sulfate (SO4)			106.3		%		90-110	23-SEP-16
WG2394991-1	MB							
Sulfate (SO4)			<0.30		mg/L		0.3	23-SEP-16
WG2394991-14	MB							
Sulfate (SO4)			<0.30		mg/L		0.3	22-SEP-16
WG2394991-16	MB							
Sulfate (SO4)			<0.30		mg/L		0.3	22-SEP-16
WG2394991-18	MB							



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Client: WorleyParsons Canada
705 - 10240 124 ST NW
EDMONTON AB T5N 3W6

Contact: TREVOR BUTTERFIELD

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-ED								
	Water							
Batch	R3555435							
WG2394991-18 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	23-SEP-16
WG2394991-20 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	23-SEP-16
WG2394991-22 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	23-SEP-16
WG2394991-10 MS		L1833092-6						
Sulfate (SO4)			N/A	MS-B	%		-	23-SEP-16
WG2394991-12 MS		L1833654-6						
Sulfate (SO4)			102.0		%		75-125	23-SEP-16
WG2394991-4 MS		L1831974-11						
Sulfate (SO4)			98.4		%		75-125	22-SEP-16
WG2394991-6 MS		L1832427-6						
Sulfate (SO4)			97.2		%		75-125	22-SEP-16
WG2394991-8 MS		L1833098-20						
Sulfate (SO4)			N/A	MS-B	%		-	23-SEP-16
SOLIDS-TDS-ED								
	Water							
Batch	R3556027							
WG2395441-3 DUP		L1832548-1						
Total Dissolved Solids		170	175		mg/L	2.9	20	23-SEP-16
WG2395441-2 LCS								
Total Dissolved Solids			96.8		%		85-115	23-SEP-16
WG2395441-1 MB								
Total Dissolved Solids			<10		mg/L		10	23-SEP-16

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Client: WorleyParsons Canada
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EDMONTON AB T5N 3W6
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Legend:

Limit ALS Control Limit (Data Quality Objectives)
DUP Duplicate
RPD Relative Percent Difference
N/A Not Available
LCS Laboratory Control Sample
SRM Standard Reference Material
MS Matrix Spike
MSD Matrix Spike Duplicate
ADE Average Desorption Efficiency
MB Method Blank
IRM Internal Reference Material
CRM Certified Reference Material
CCV Continuing Calibration Verification
CVS Calibration Verification Standard
LCSD Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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Client: WorleyParsons Canada
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EDMONTON AB T5N 3W6
Contact: TREVOR BUTTERFIELD

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Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Anions and Nutrients							
Nitrate in Water by IC							
	1	19-SEP-16 09:42	22-SEP-16 08:00	48	70	hours	EHTR
	2	19-SEP-16 11:32	22-SEP-16 08:00	48	68	hours	EHTL
	3	19-SEP-16 13:00	22-SEP-16 08:00	48	67	hours	EHTL
	4	19-SEP-16 13:30	22-SEP-16 08:00	48	66	hours	EHTL
	5	19-SEP-16 14:36	22-SEP-16 08:00	48	66	hours	EHTL
	15	19-SEP-16 11:00	22-SEP-16 08:00	48	69	hours	EHTR
	16	19-SEP-16 13:00	22-SEP-16 08:00	48	67	hours	EHTL
Nitrite in Water by IC							
	1	19-SEP-16 09:42	22-SEP-16 08:00	48	70	hours	EHTR
	2	19-SEP-16 11:32	22-SEP-16 08:00	48	68	hours	EHTL
	3	19-SEP-16 13:00	22-SEP-16 08:00	48	67	hours	EHTL
	4	19-SEP-16 13:30	22-SEP-16 08:00	48	66	hours	EHTL
	5	19-SEP-16 14:36	22-SEP-16 08:00	48	66	hours	EHTL
	15	19-SEP-16 11:00	22-SEP-16 08:00	48	69	hours	EHTR
	16	19-SEP-16 13:00	22-SEP-16 08:00	48	67	hours	EHTL

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L1831974 were received on 21-SEP-16 11:30.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Client: ALS Environmental
 Report date: 7-Oct-16

WATER ANALYSIS RESULTS



Isobrine ID	Client sample IDs		Client project ID	Collected	Received	$\delta^{18}\text{O}$
						‰ VSMOW
IB-17-135	L1831974-1	MW-01	L1831974	19-Sep-16	29-Sep-16	-17.18
IB-17-136	L1831974-2	MW-05	L1831974	19-Sep-16	29-Sep-16	-16.26
IB-17-137	L1831974-3	MW-02	L1831974	19-Sep-16	29-Sep-16	-18.28
IB-17-138	L1831974-4	MW-03	L1831974	19-Sep-16	29-Sep-16	-19.03
IB-17-139	L1831974-5	MW-01	L1831974	19-Sep-16	29-Sep-16	-18.15
IB-17-140	L1831974-6	MW-08	L1831974	19-Sep-16	29-Sep-16	-17.93
IB-17-141	L1831974-7	MW-09	L1831974	19-Sep-16	29-Sep-16	-18.47
IB-17-142	L1831974-8	MW-10	L1831974	19-Sep-16	29-Sep-16	-18.54
IB-17-143	L1831974-9	MW-11	L1831974	19-Sep-16	29-Sep-16	-17.05
IB-17-144	L1831974-10	MW-12	L1831974	19-Sep-16	29-Sep-16	-17.30
IB-17-145	L1831974-11	MW-13	L1831974	19-Sep-16	29-Sep-16	-18.69
IB-17-146	L1831974-12	MW-07	L1831974	19-Sep-16	29-Sep-16	-18.24
IB-17-147	L1831974-13	MW-06	L1831974	19-Sep-16	29-Sep-16	-17.79
IB-17-148	L1831974-14	MW-02B	L1831974	19-Sep-16	29-Sep-16	-16.93
IB-17-149	L1831974-15	DUP16-01	L1831974	19-Sep-16	29-Sep-16	-18.48
IB-17-150	L1831974-16	DUP16-02	L1831974	19-Sep-16	29-Sep-16	-18.73

Oxygen and hydrogen stable isotope compositions determined on mechanically and chemically cleaned samples using a CRDS (Cavity Ring-down Mass Spectrometer). Standard deviations for $\delta^{18}\text{O}$ and $\delta^2\text{H}$ are equal to or better than 0.2 ‰ and 2.0 ‰, respectively ($\pm 1\sigma$).



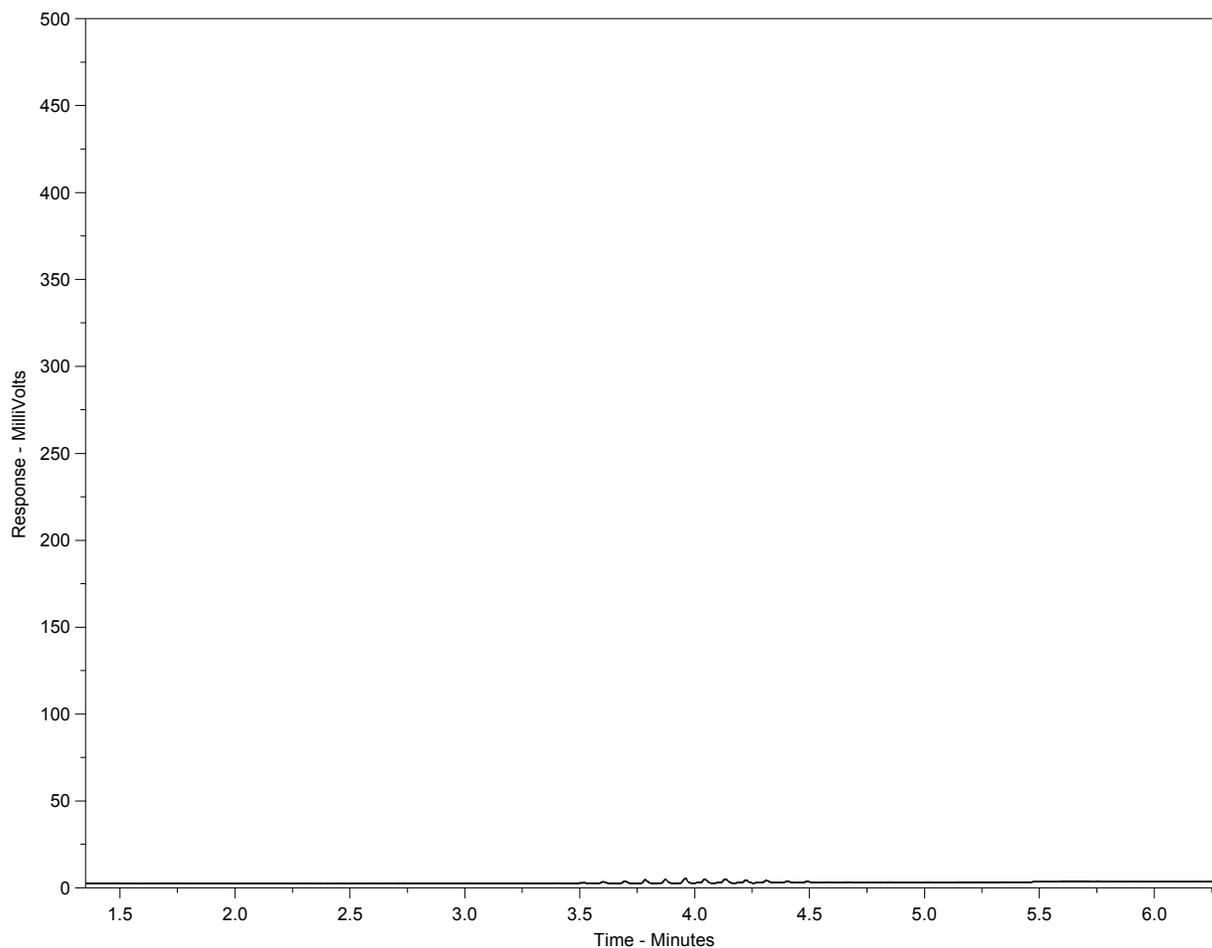
Isobrine Solutions Inc.
 4-341 Enterprise Square
 10230 Jasper Ave
 Edmonton, AB, T5J 4P6

	$\delta^2\text{H}$	
$\pm 1\sigma$	‰ VSMOW	$\pm 1\sigma$
0.02	-137.5	0.17
0.02	-131.8	0.21
0.02	-143.9	0.11
0.02	-149.1	0.11
0.04	-143.1	0.36
0.03	-143.4	0.17
0.02	-146.7	0.21
0.02	-146.3	0.12
0.03	-137.6	0.41
0.02	-139.0	0.18
0.04	-146.7	0.15
0.03	-144.7	0.22
0.02	-142.8	0.10
0.05	-134.9	0.15
0.01	-146.6	0.17
0.03	-143.5	0.07

Hydrocarbon Distribution Report



ALS Sample ID: L1831974-1
Client ID: MW-04



← F2 →		← F3 →		← F4 →		← F4 →	
nC10	nC16	nC34	nC50				
174°C	287°C	481°C	575°C				
346°F	549°F	898°F	1067°F				
← Gasoline →		← Diesel/ Jet Fuels →				← Motor Oils/ Lube Oils/ Grease →	

The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

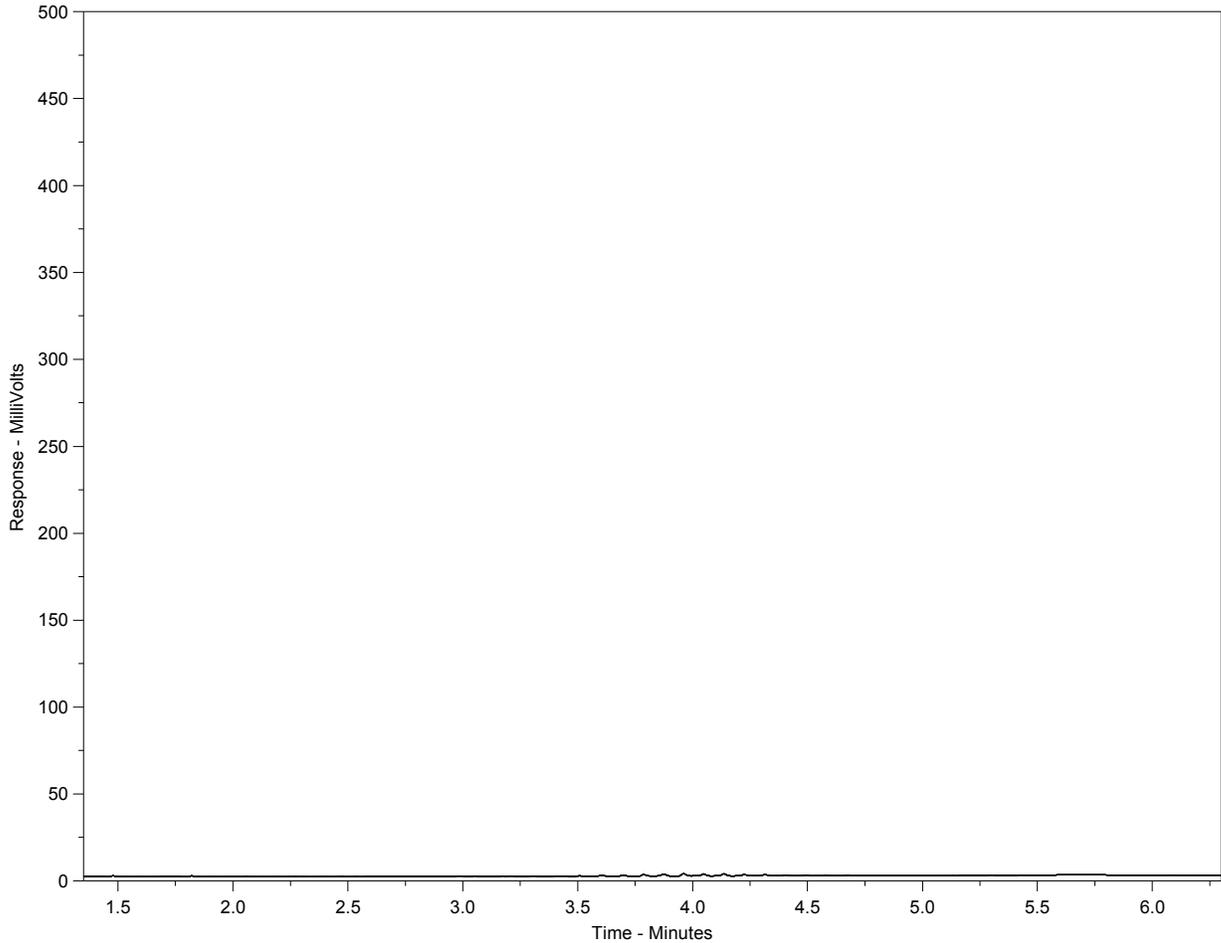
Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L1831974-2
Client ID: MW-05



← F2 →		← F3 →		← F4 →		← F4 →	
nC10	nC16	nC34	nC50				
174°C	287°C	481°C	575°C				
346°F	549°F	898°F	1067°F				
← Gasoline →			← Motor Oils/ Lube Oils/ Grease →				
← Diesel/ Jet Fuels →							

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Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

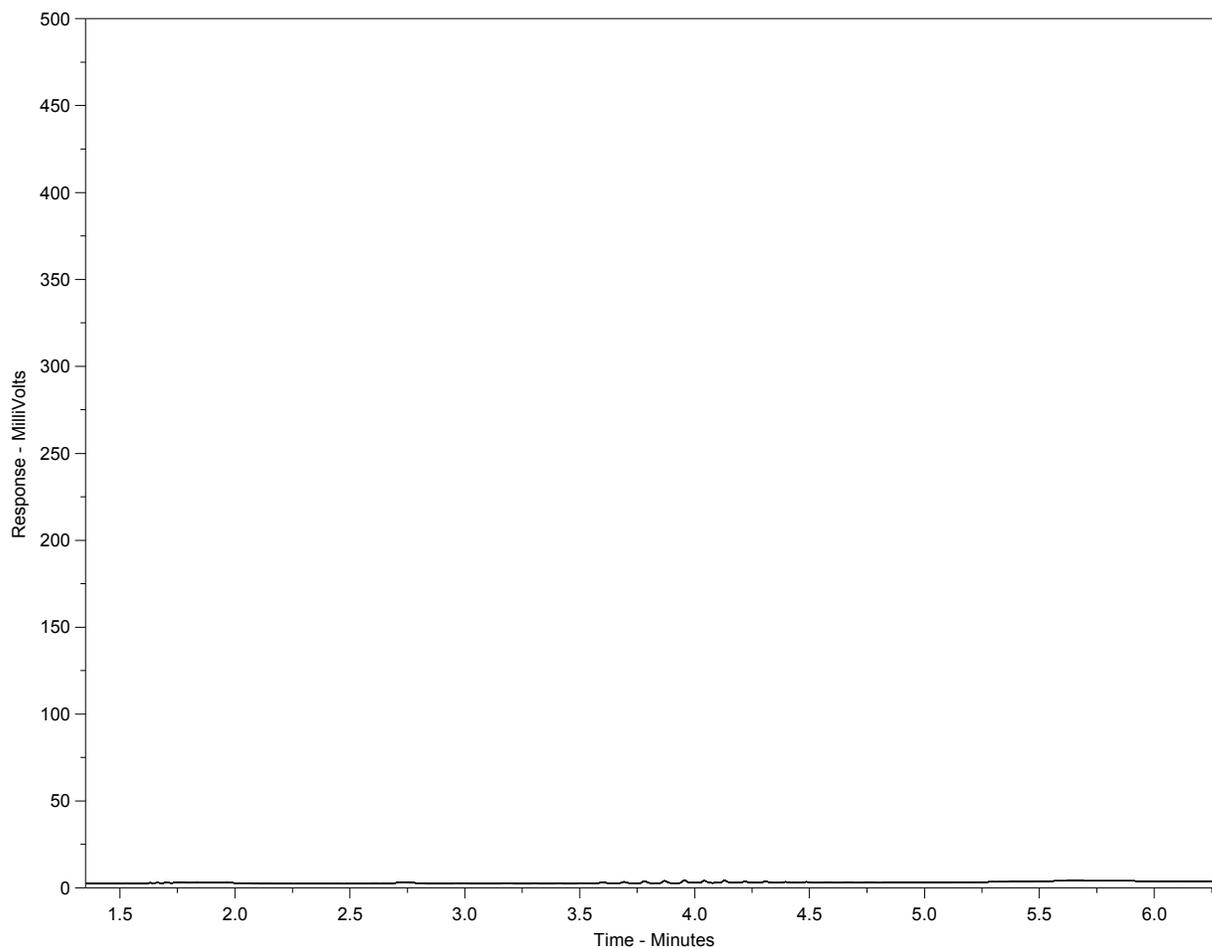
Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L1831974-3
Client ID: MW-02



← F2 →		← F3 →		← F4 →		← F4 →	
nC10	nC16	nC34	nC50				
174°C	287°C	481°C	575°C				
346°F	549°F	898°F	1067°F				
← Gasoline →		← Diesel/ Jet Fuels →				← Motor Oils/ Lube Oils/ Grease →	

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Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

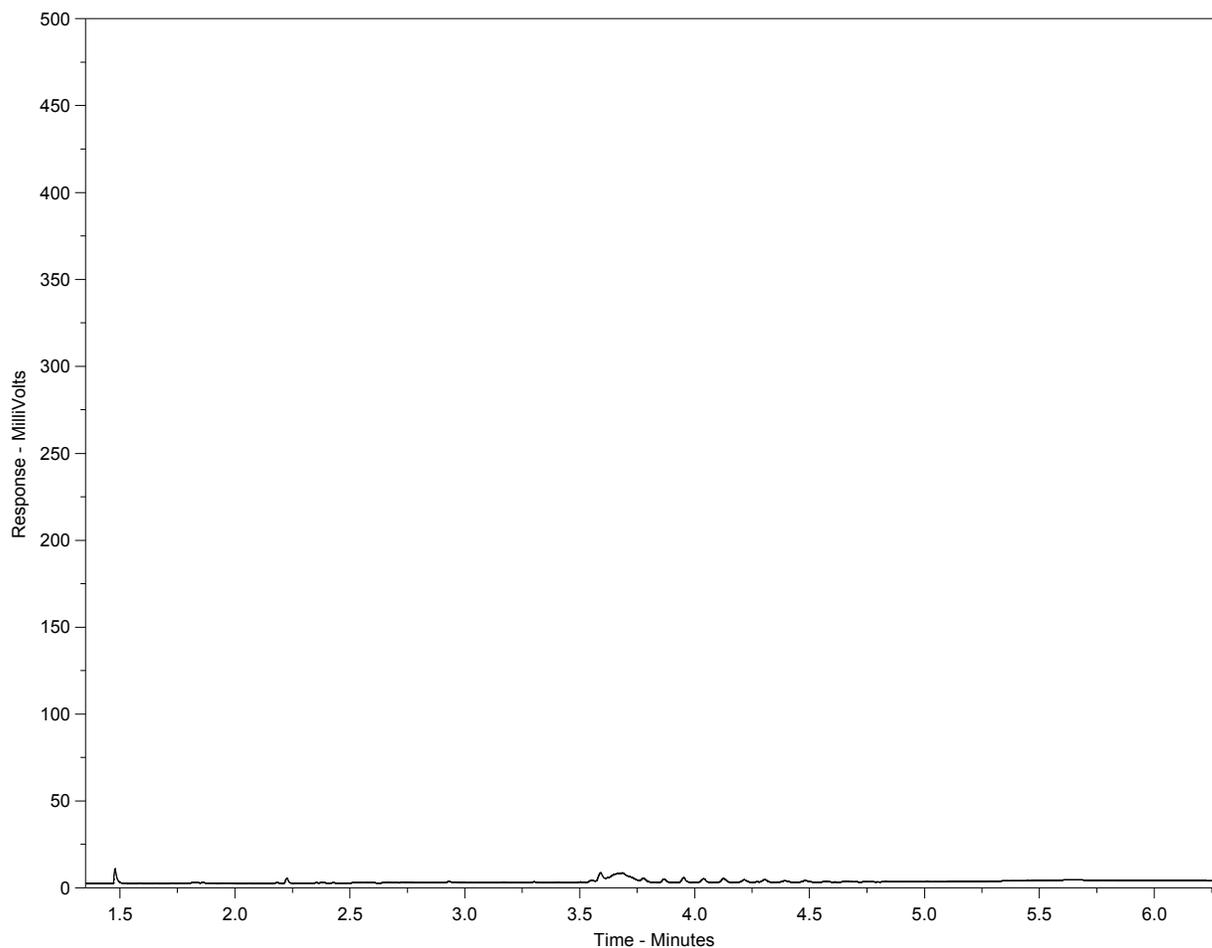
Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L1831974-4
Client ID: MW-03



← F2 →		← F3 →		← F4 →		← F4 →	
nC10	nC16	nC34	nC50				
174°C	287°C	481°C	575°C				
346°F	549°F	898°F	1067°F				
← Gasoline →		← Diesel/ Jet Fuels →		← Motor Oils/ Lube Oils/ Grease →			

The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

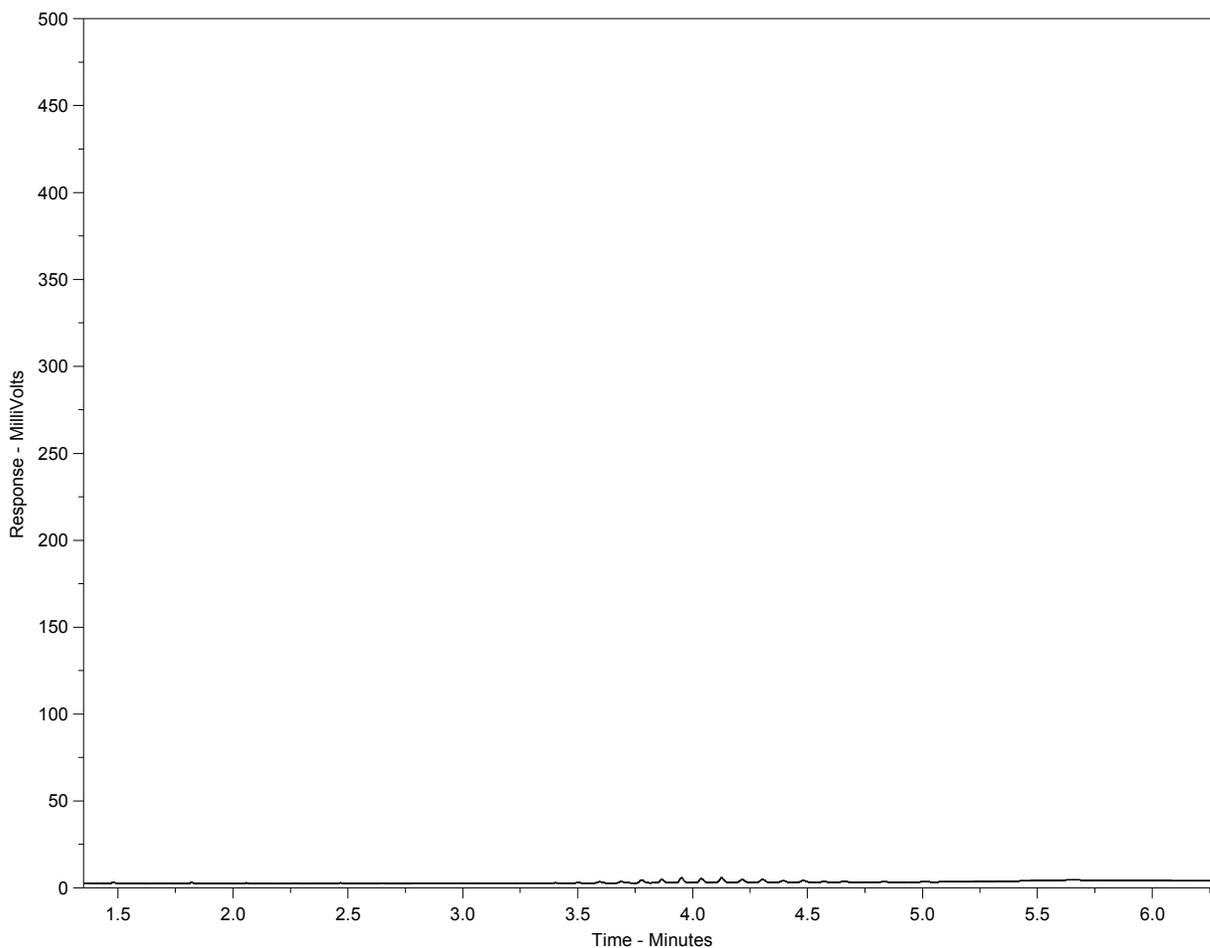
Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L1831974-5
Client ID: MW-01



← F2 →		← F3 →		← F4 →		← F4 →	
nC10	nC16	nC34	nC50				
174°C	287°C	481°C	575°C				
346°F	549°F	898°F	1067°F				
← Gasoline →		← Diesel/ Jet Fuels →				← Motor Oils/ Lube Oils/ Grease →	

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Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

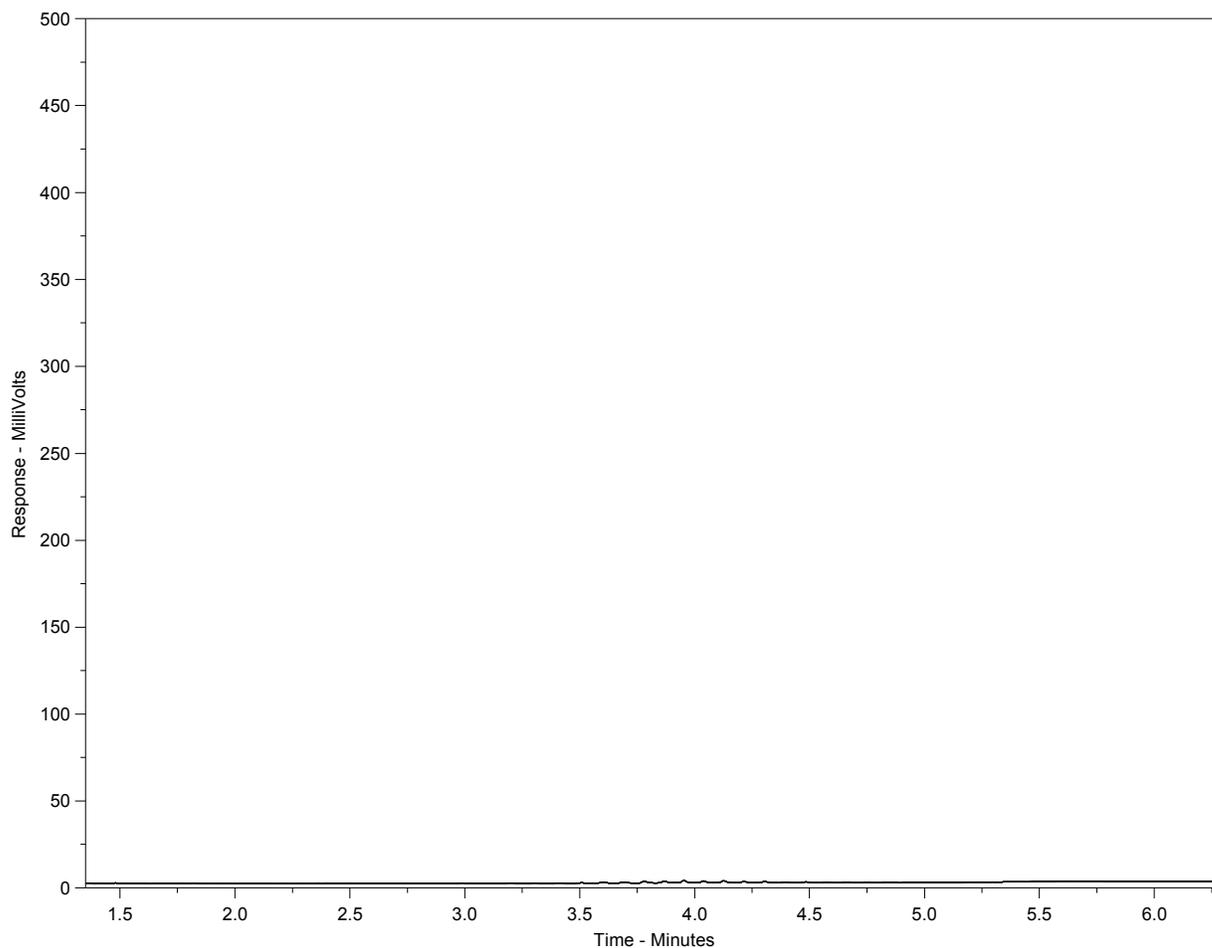
Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L1831974-6
Client ID: MW-08



← F2 →		← F3 →		← F4 →		← F4 →	
nC10	nC16	nC34	nC50				
174°C	287°C	481°C	575°C				
346°F	549°F	898°F	1067°F				
← Gasoline →		← Diesel/ Jet Fuels →				← Motor Oils/ Lube Oils/ Grease →	

The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

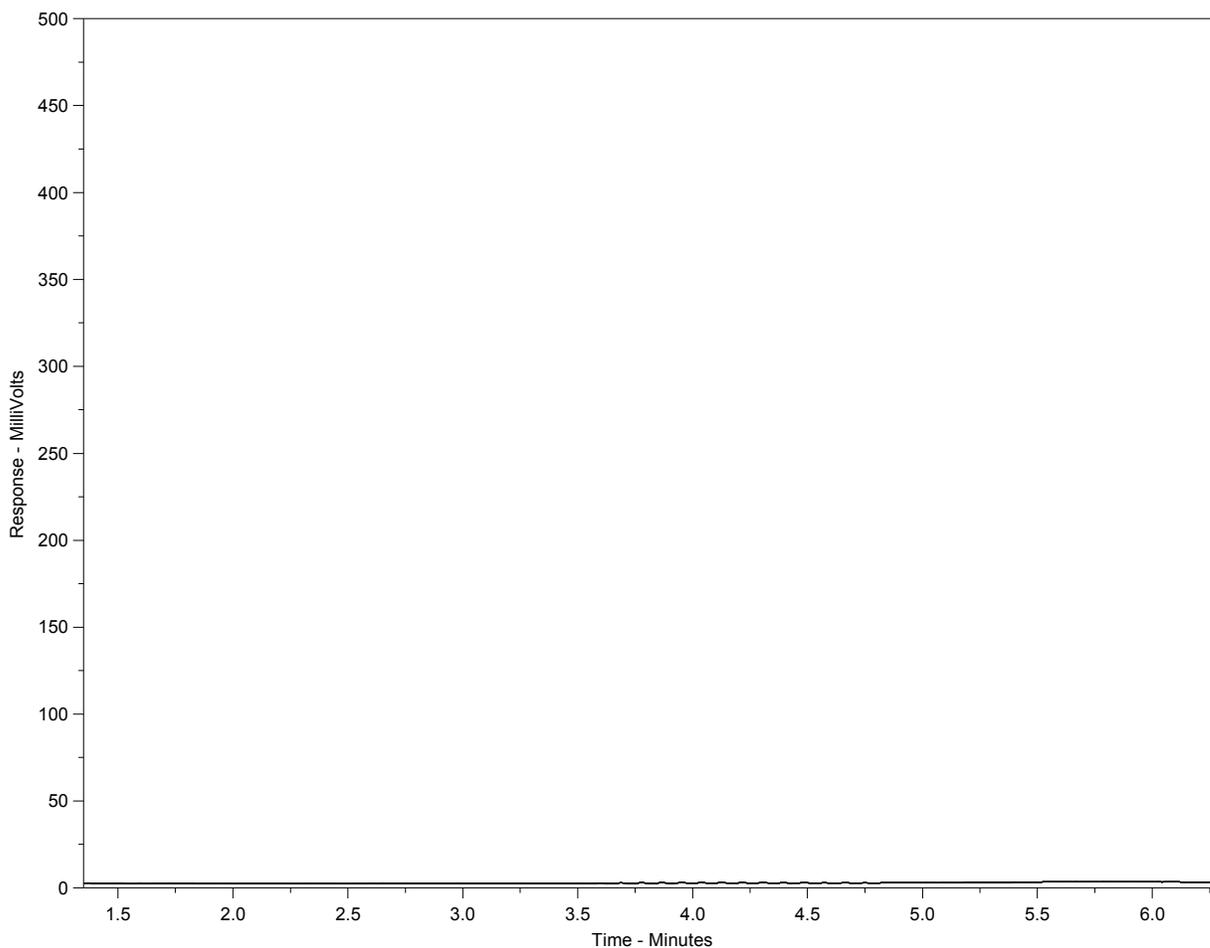
Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L1831974-7
Client ID: MW-09



← F2 →		← F3 →		← F4 →		← F4 →	
nC10	nC16	nC34	nC50				
174°C	287°C	481°C	575°C				
346°F	549°F	898°F	1067°F				
← Gasoline →		← Diesel/ Jet Fuels →				← Motor Oils/ Lube Oils/ Grease →	

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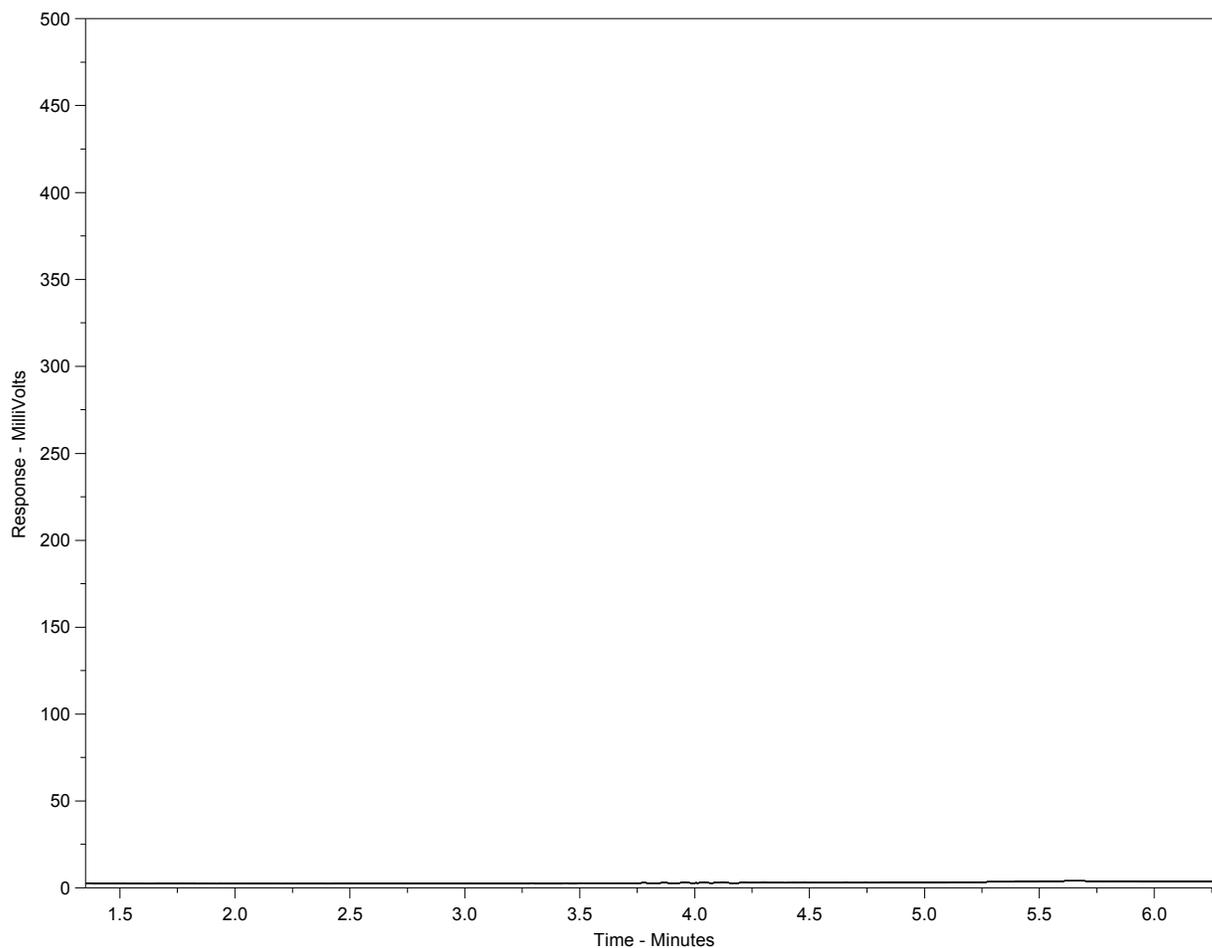
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note:
 This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L1831974-8
Client ID: MW-10



← F2 →		← F3 →		← F4 →		← F4 →	
nC10	nC16	nC34	nC50				
174°C	287°C	481°C	575°C				
346°F	549°F	898°F	1067°F				
← Gasoline →		← Diesel/ Jet Fuels →				← Motor Oils/ Lube Oils/ Grease →	

The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

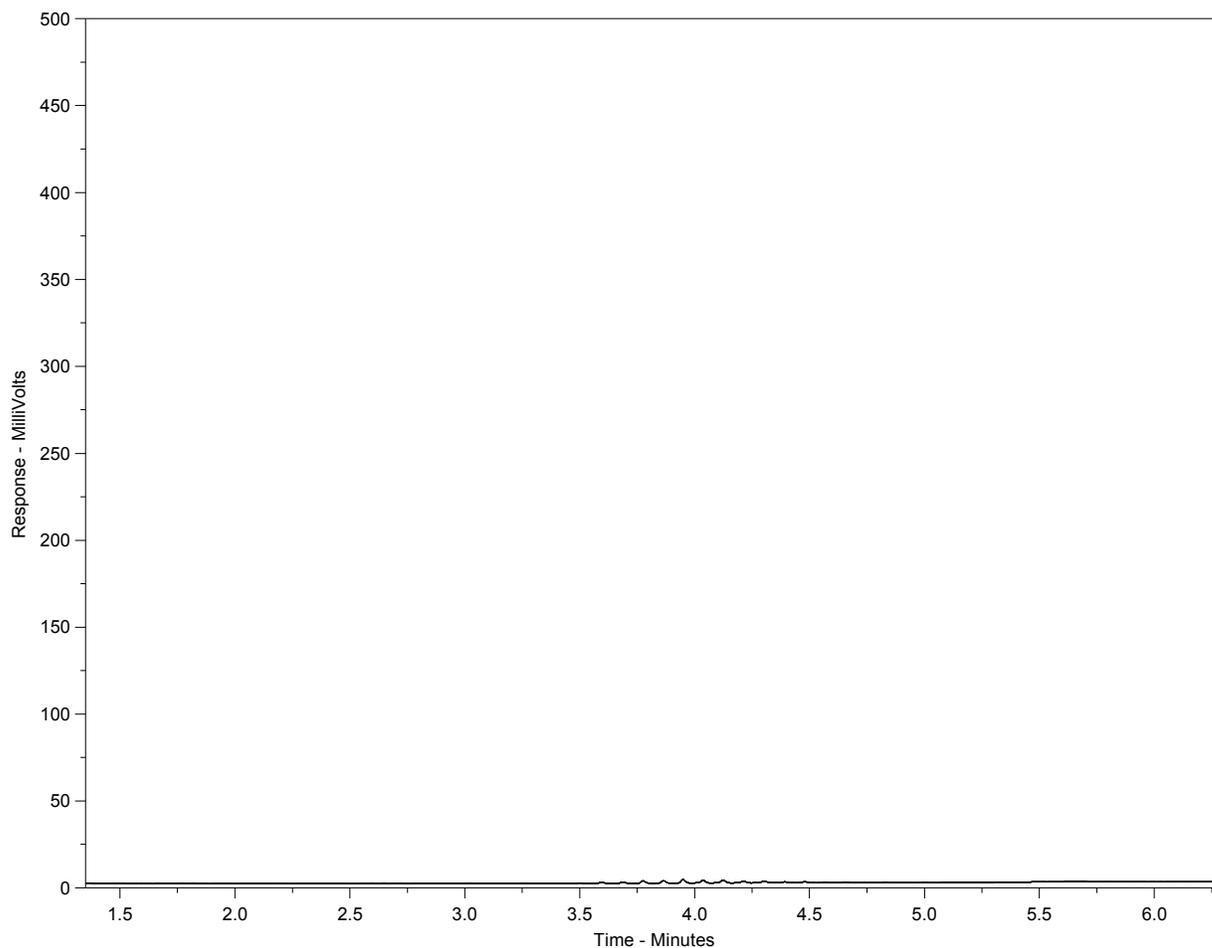
Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L1831974-9
Client ID: MW-11



← F2 →		← F3 →		← F4 →		← F4 →	
nC10	nC16	nC34	nC50				
174°C	287°C	481°C	575°C				
346°F	549°F	898°F	1067°F				
← Gasoline →		← Diesel/ Jet Fuels →				← Motor Oils/ Lube Oils/ Grease →	

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Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

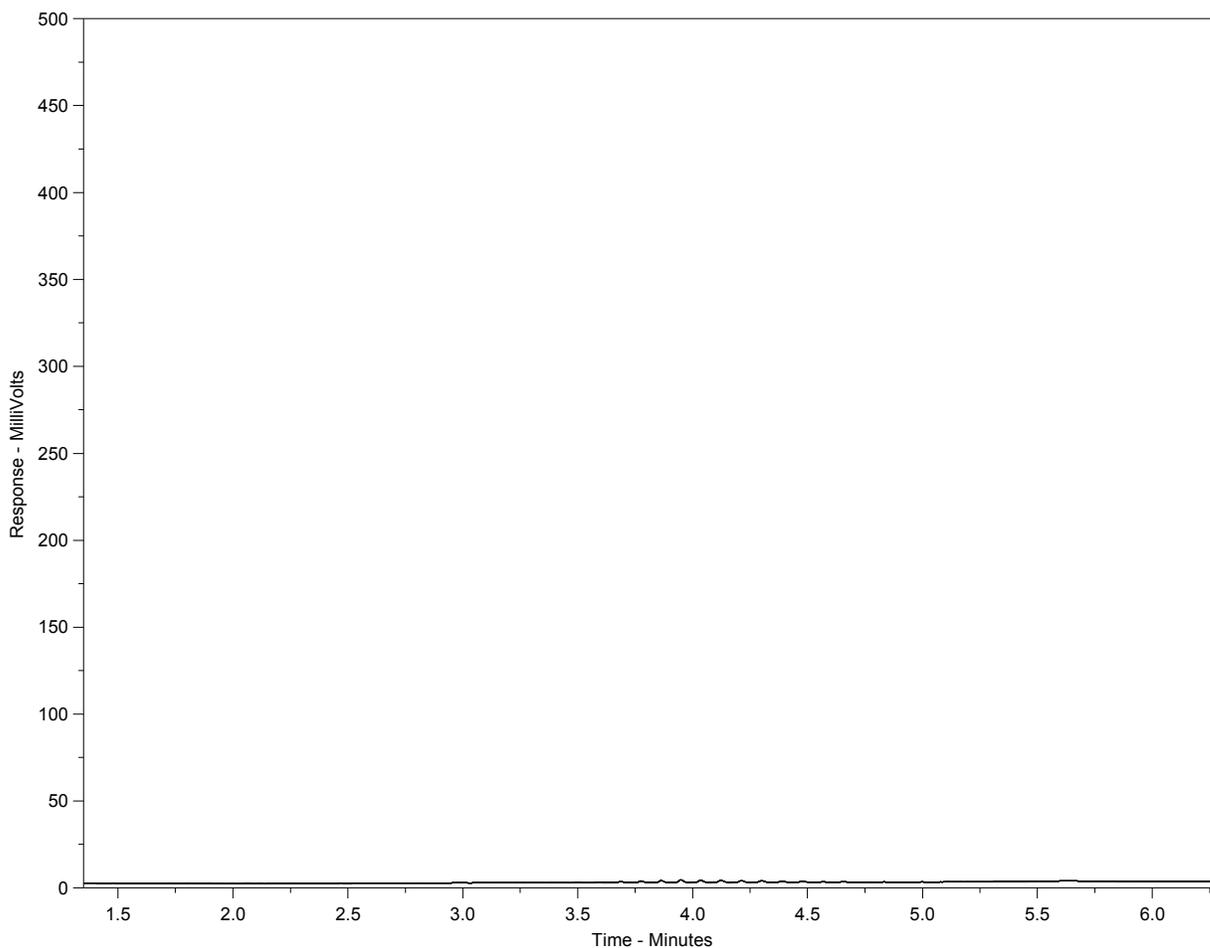
Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L1831974-10
Client ID: MW-12



← F2 →		← F3 →		← F4 →		← F4 →	
nC10	nC16	nC34	nC50				
174°C	287°C	481°C	575°C				
346°F	549°F	898°F	1067°F				
← Gasoline →		← Diesel/ Jet Fuels →				← Motor Oils/ Lube Oils/ Grease →	

The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

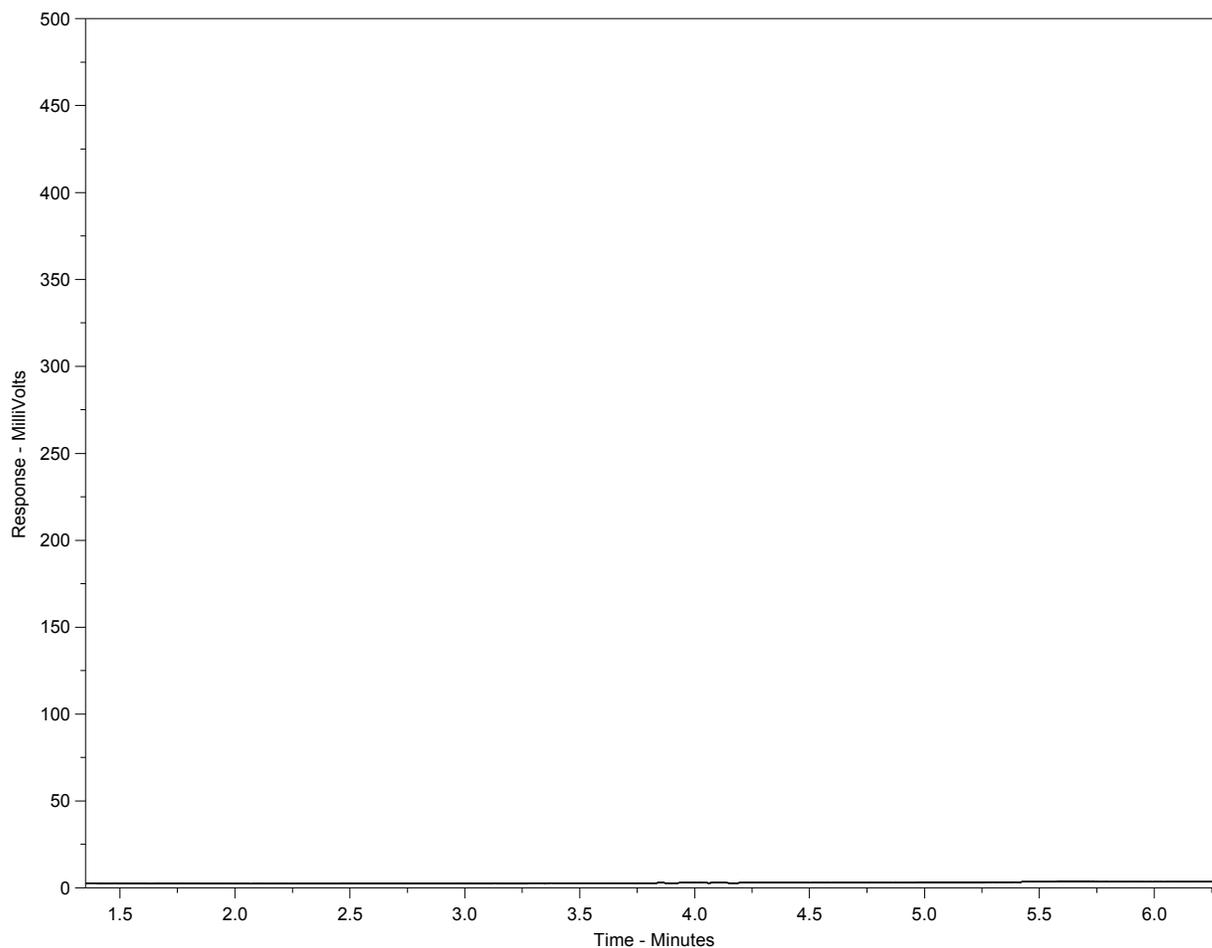
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note:
 This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L1831974-11
Client ID: MW-13



← F2 →		← F3 →		← F4 →		← F4 →	
nC10	nC16	nC34	nC50				
174°C	287°C	481°C	575°C				
346°F	549°F	898°F	1067°F				
← Gasoline →		← Diesel/ Jet Fuels →				← Motor Oils/ Lube Oils/ Grease →	

The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

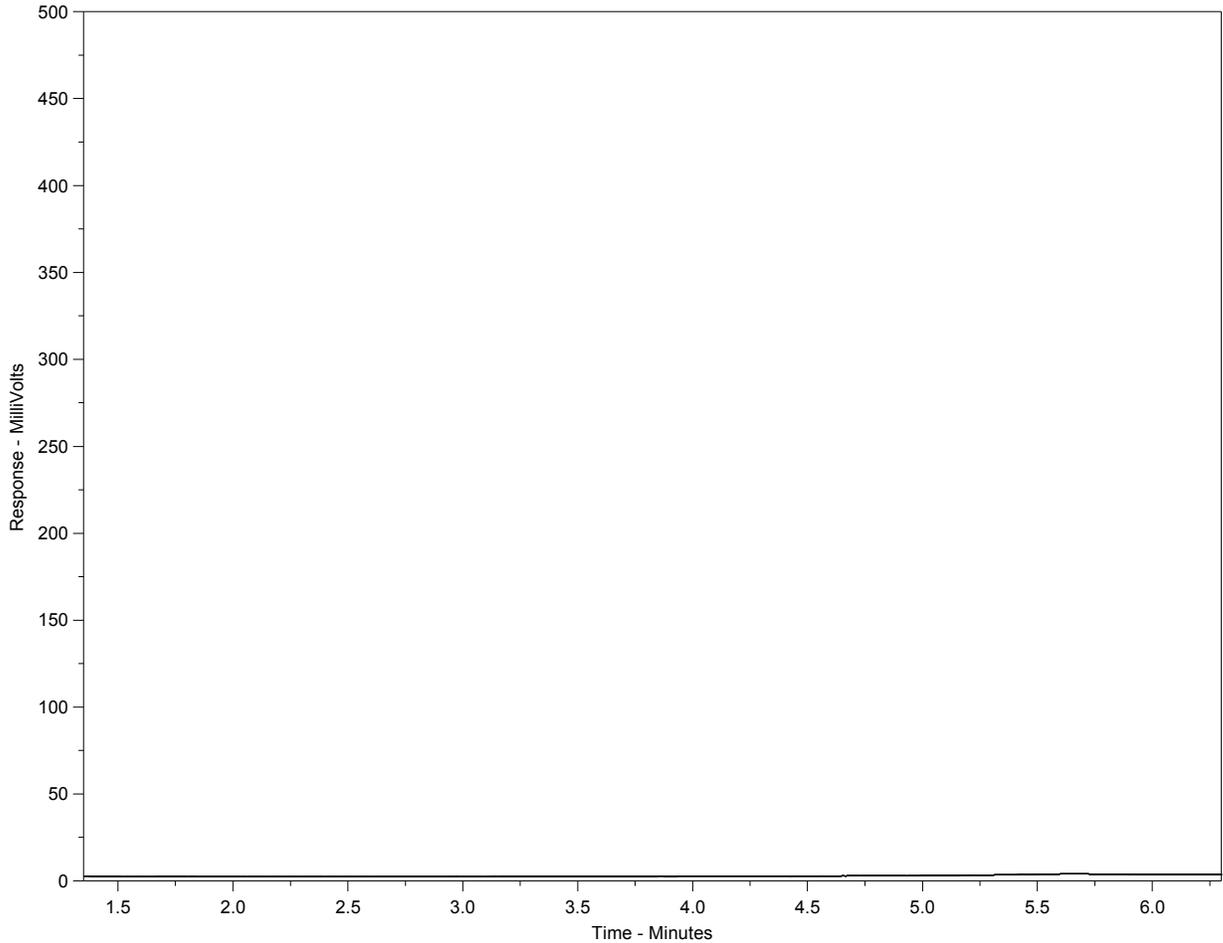
Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L1831974-12
Client ID: MW-07



← F2 →		← F3 →		← F4 →		← F4 →	
nC10	nC16	nC34	nC50				
174°C	287°C	481°C	575°C				
346°F	549°F	898°F	1067°F				
← Gasoline →		← Diesel/ Jet Fuels →				← Motor Oils/ Lube Oils/ Grease →	

The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

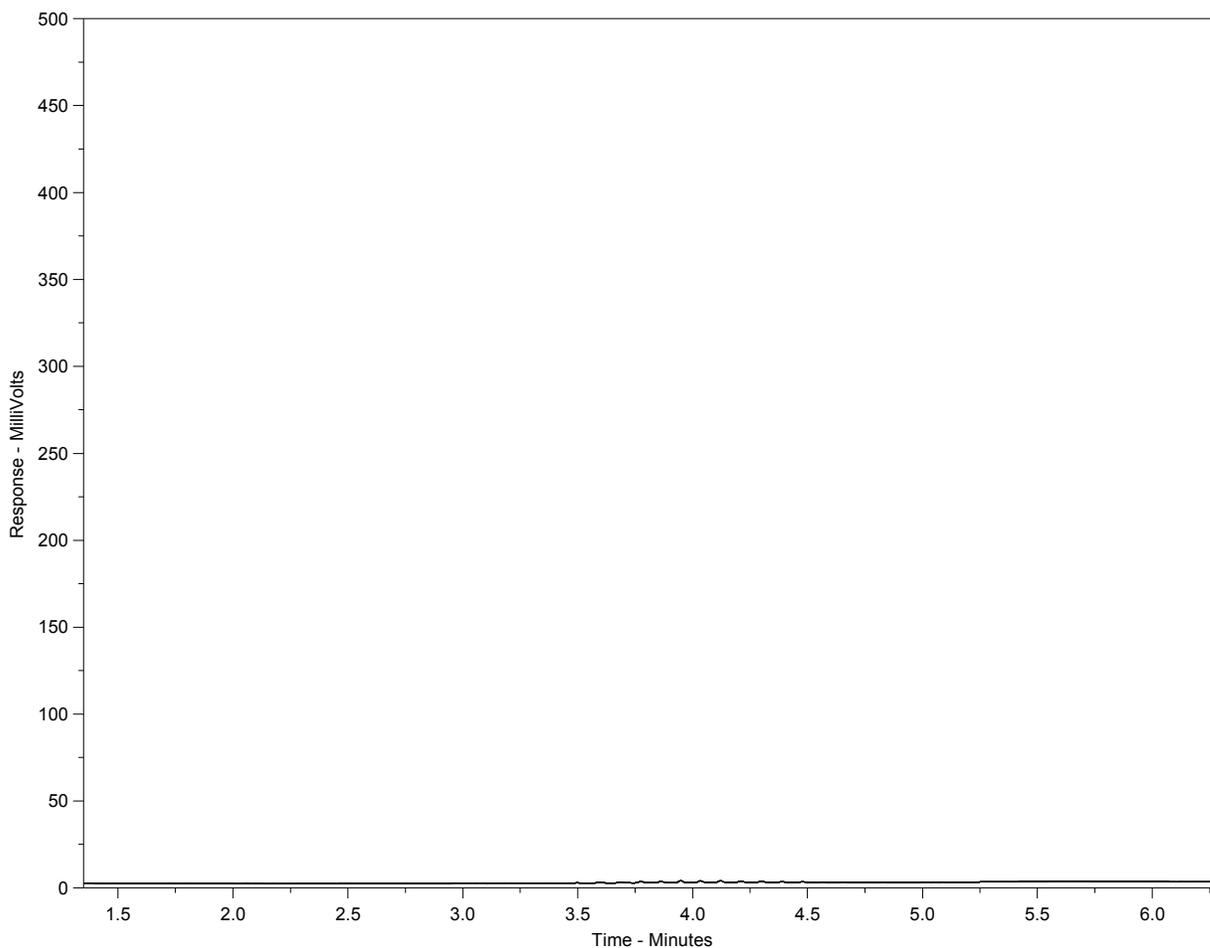
Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L1831974-13
Client ID: MW-06



← F2 →		← F3 →		← F4 →		← F4 →	
nC10	nC16	nC34	nC50				
174°C	287°C	481°C	575°C				
346°F	549°F	898°F	1067°F				
← Gasoline →		← Diesel/ Jet Fuels →				← Motor Oils/ Lube Oils/ Grease →	

The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

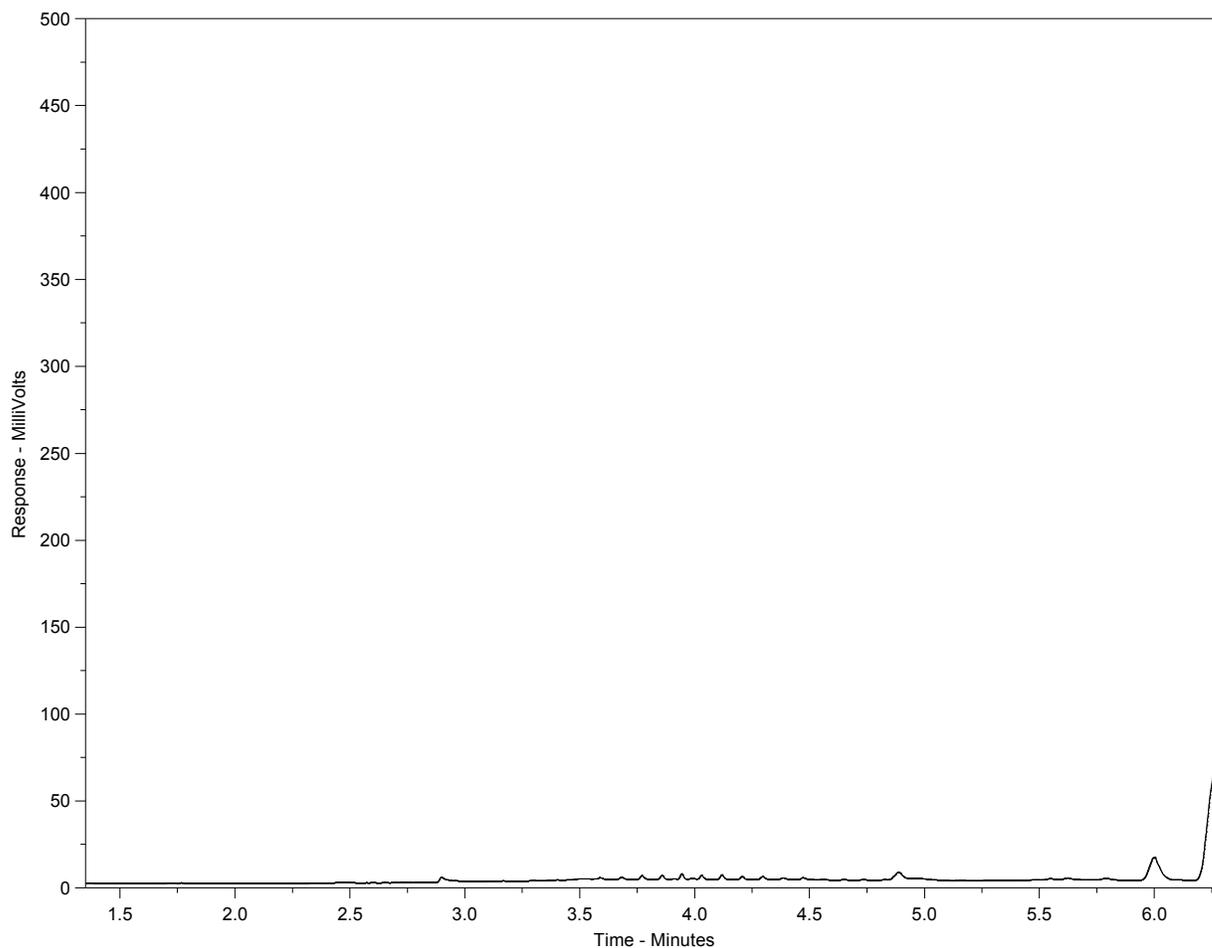
Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L1831974-14
Client ID: MW-02B



← F2 →		← F3 →		← F4 →		← F4 →	
nC10	nC16	nC34	nC50				
174°C	287°C	481°C	575°C				
346°F	549°F	898°F	1067°F				
← Gasoline →		← Diesel/ Jet Fuels →				← Motor Oils/ Lube Oils/ Grease →	

The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

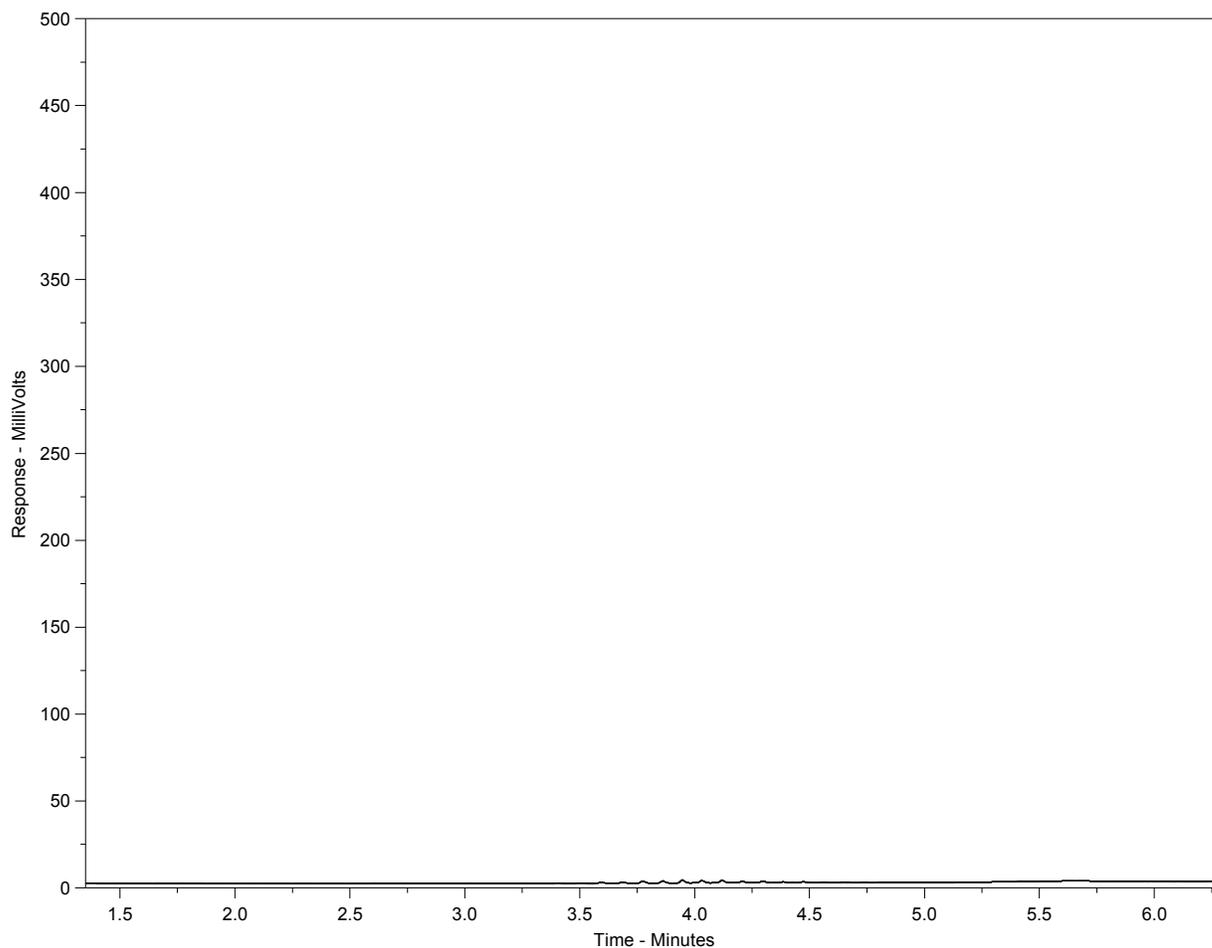
Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L1831974-15
Client ID: DUP16-01



← F2 →		← F3 →		← F4 →		← F4 →	
nC10	nC16	nC34	nC50				
174°C	287°C	481°C	575°C				
346°F	549°F	898°F	1067°F				
← Gasoline →		← Diesel/ Jet Fuels →				← Motor Oils/ Lube Oils/ Grease →	

The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

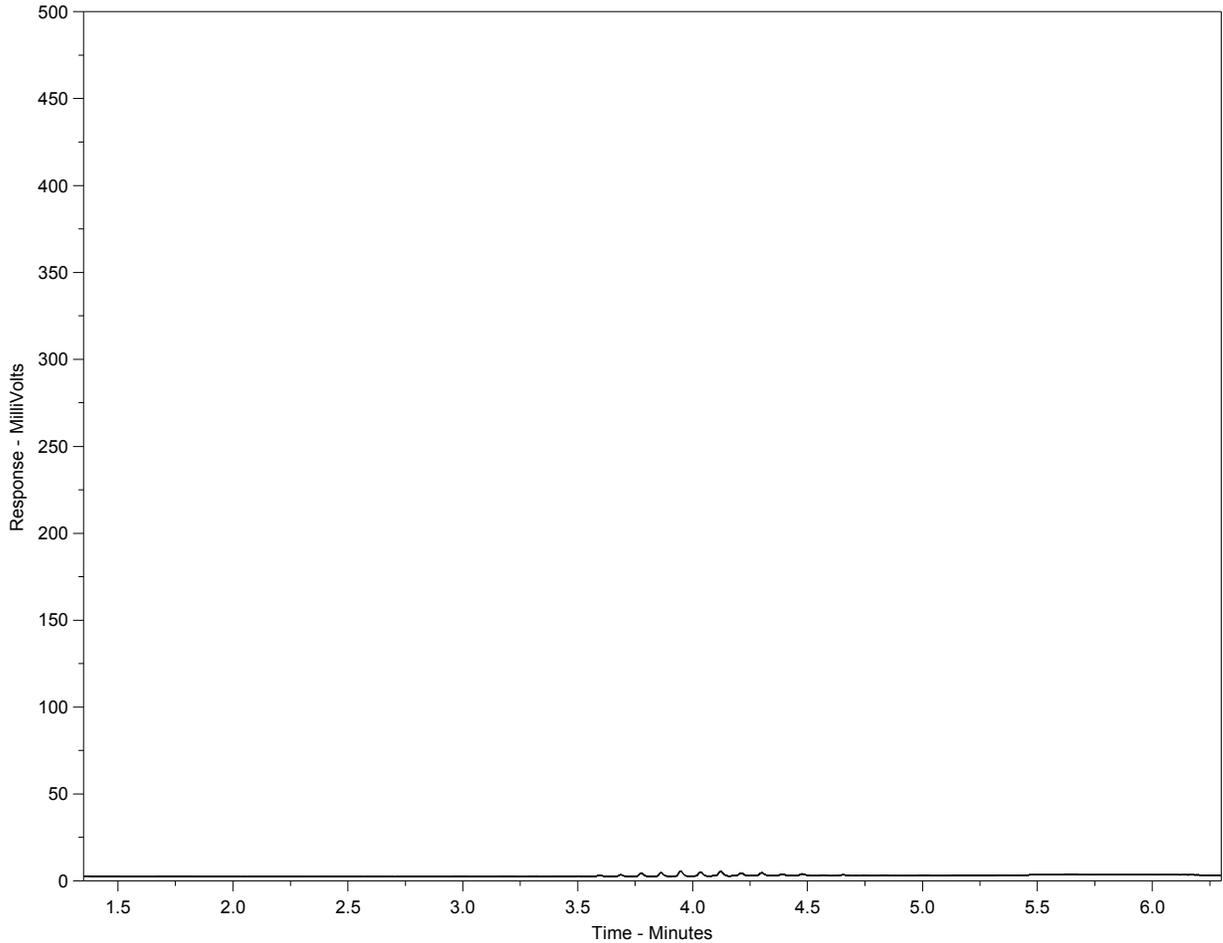
Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L1831974-16
Client ID: DUP16-02



← F2 →		← F3 →		← F4 →		← F4 →	
nC10	nC16	nC34	nC50				
174°C	287°C	481°C	575°C				
346°F	549°F	898°F	1067°F				
← Gasoline →				← Motor Oils/ Lube Oils/ Grease →			
← Diesel/ Jet Fuels →							

The Canada Wide Standard Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.



Environmental
www.alsglobal.com

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(lab use only)

COC Number: 15 - 578067

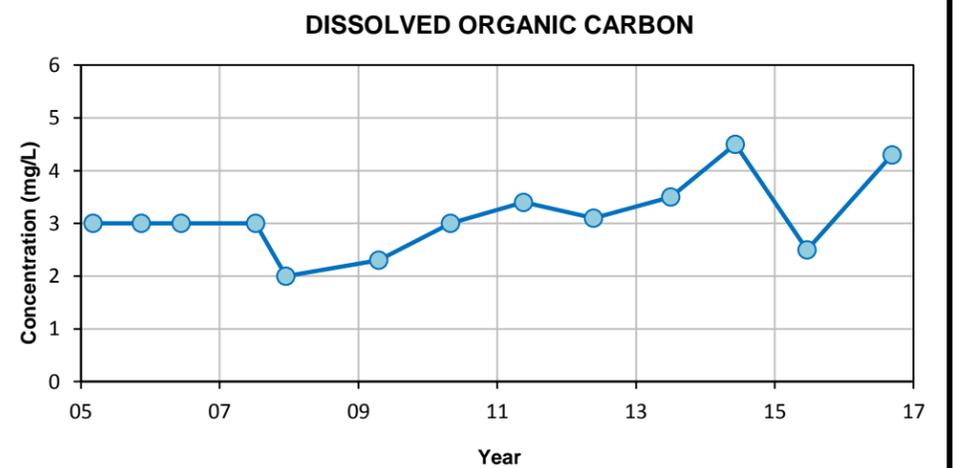
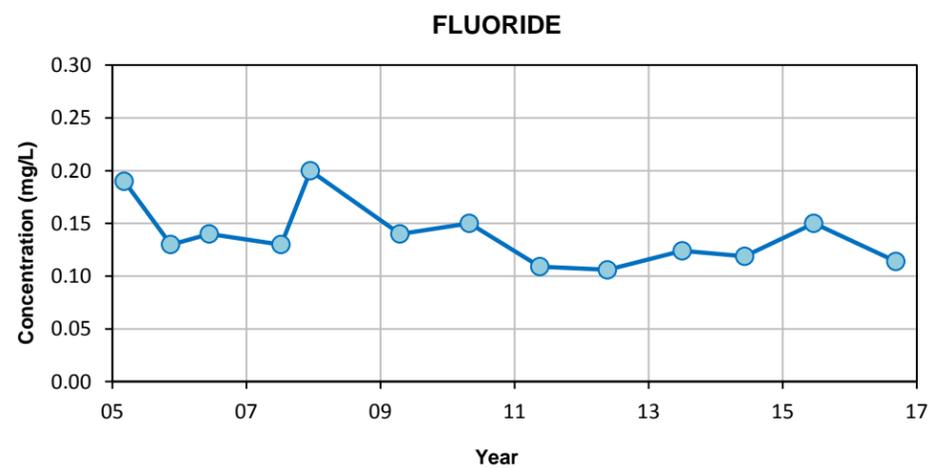
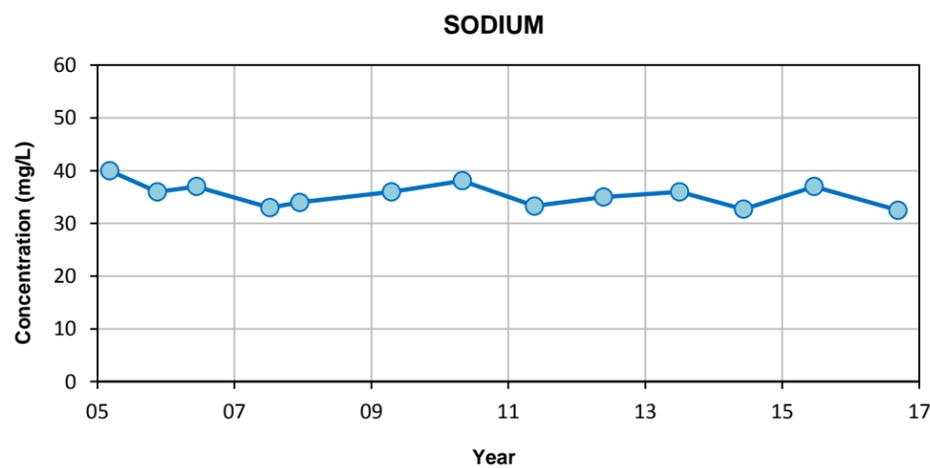
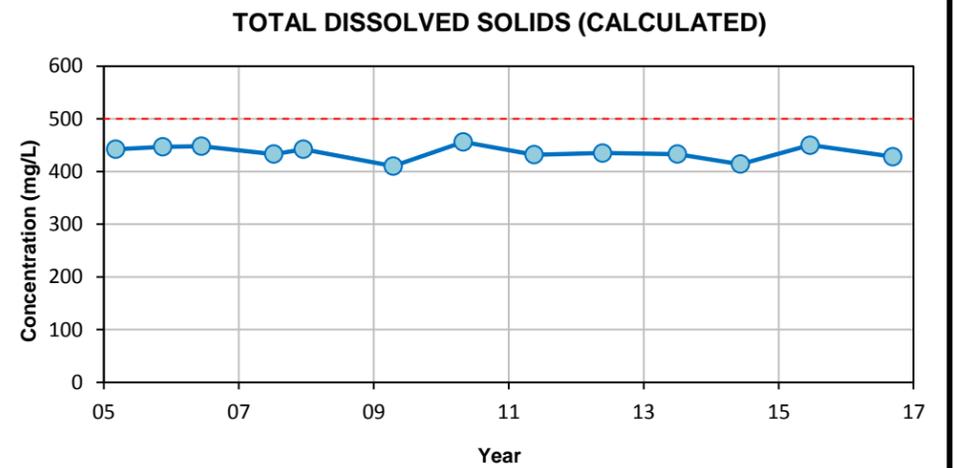
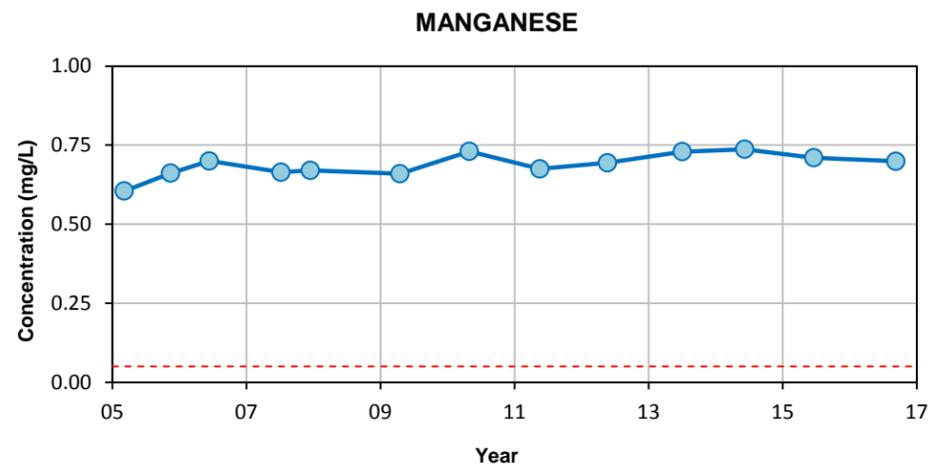
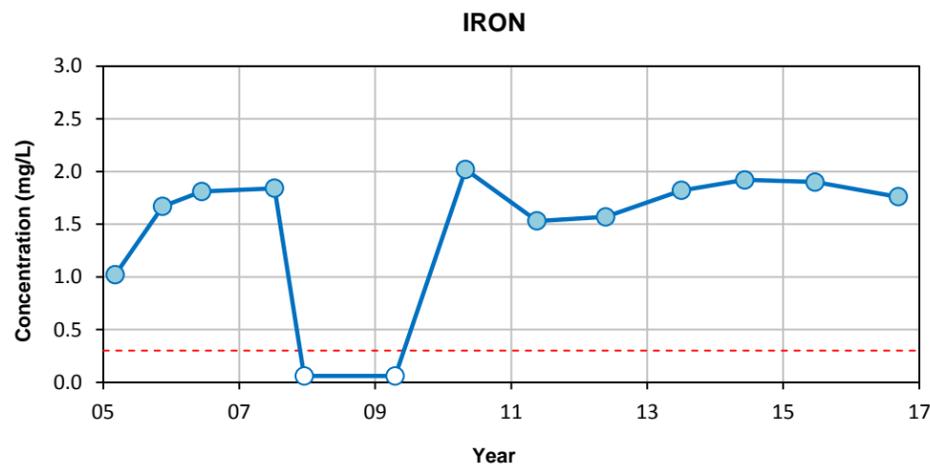
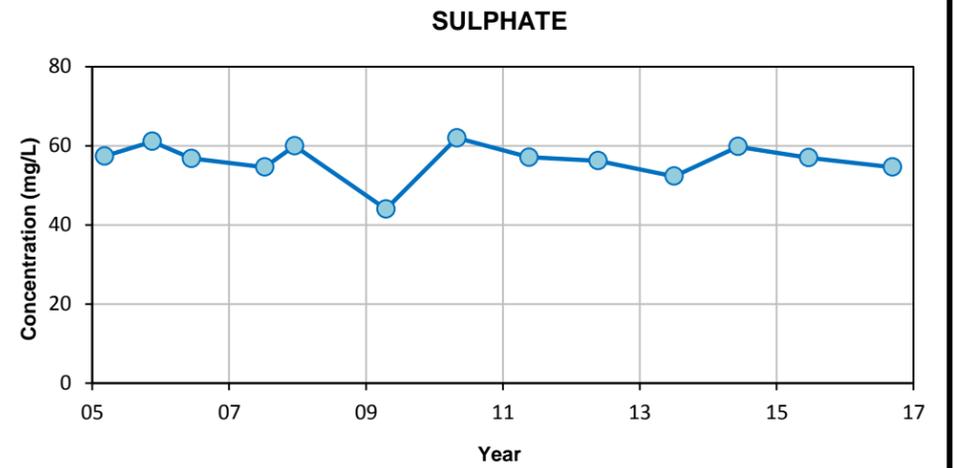
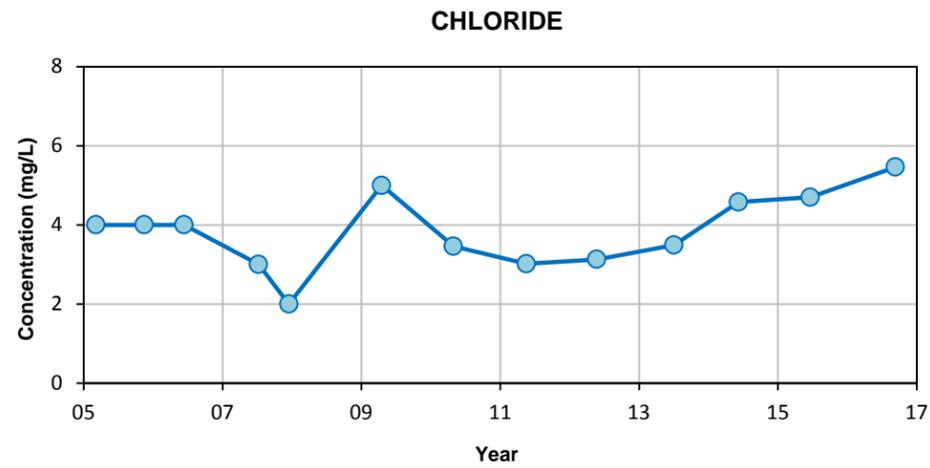
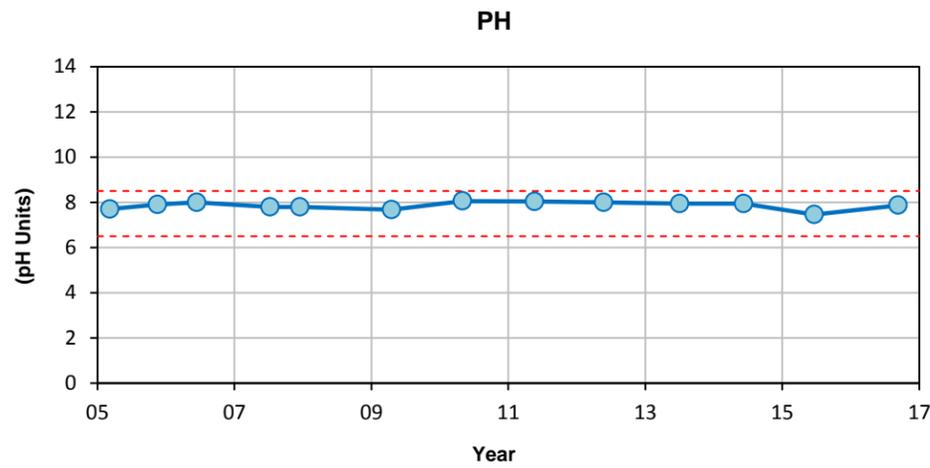
Page 1 of 2

Report To Contact and company name below will appear on the final report		Report Format / Distribution			Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply																										
Company: <u>WorleyParsons</u>		Select Report Format: <input checked="" type="checkbox"/> PDF <input type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply		1 Business day [E1] <input type="checkbox"/>																								
Contact: <u>Trevor Butterfield</u>		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			4 day [P4] <input type="checkbox"/>		Same Day, Weekend or Statutory holiday [E0] <input type="checkbox"/>																								
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			3 day [P3] <input type="checkbox"/>																										
Company address below will appear on the final report		Select Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			2 day [P2] <input type="checkbox"/>																										
Street: <u>Suite 300 8E15 St-Ave, Edmonton</u>		Email 1 or Fax			Date and Time Required for E&P TATs																										
City/Province: <u>AB</u>		Email 2			For tests that can not be performed according to the service level selected, you will be contacted.																										
Postal Code: <u>T6E 6A8</u>		Email 3			Analysis Request																										
Invoice To: Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																										
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Email 1 or Fax <u>Trevor.Butterfield@Aduision.com</u>			P P FIP FIP P																										
Company:		Email 2 <u>Canada.Chemistry@WorleyParsons.com</u>			F1 F2 Routine/Major ions DOC & DNHS Dissolved metals & Hg Phenols H2, O18 isotopes																										
Contact:		Oil and Gas Required Fields (client use)			Number of Containers																										
Project Information		AFE/Cost Center: PO#			A B C D E F G H I J K L M N O P Q R S T U V W X Y Z																										
ALS Account # / Quote #: <u>Q56189</u>		Major/Minor Code: Routing Code:																													
Job #: <u>307075-01608-200</u>		Requisitioner:																													
PO / AFE:		Location:																													
LSD:		ALS Contact: <u>Dana</u> Sampler: <u>PERD</u>																													
ALS Lab Work Order # (lab use only) <u>W1831974</u>																															
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	Number of Containers
	MW-04	19-Sep-16	09:42	GW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X											12
	MW-05		11:32		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X											12
	MW-02		13:00		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X											12
	MW-02B		12:30																												
	MW-03		13:30		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X											12
	MW-01		14:36		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X											12
	MW-08	20-Sep-16	10:00		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X											12
	MW-09		11:00		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X											12
	MW-10		13:06		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X											12
	MW-11		13:52		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X											12
	MW-12		16:30		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X											12
	MW-13		17:30		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X											12
Drinking Water (DW) Sample		Barcode:			SAMPLE CONDITION AS RECEIVED (lab use only)																										
Are samples taken from a Regulated DW <input type="checkbox"/> YES <input type="checkbox"/> NO		L1831974-COFC			Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>																										
Are samples for human drinking water use <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>																										
					Cooling Initiated <input type="checkbox"/>																										
					INITIAL COOLER TEMPERATURES °C																										
					FINAL COOLER TEMPERATURES °C																										
					83.9, 7.6, 63																										
					INITIAL SHIPMENT RECEPTION (lab use only)																										
Released by: <u>Dave Pereira</u>		Date: <u>21-Sep-16</u> Time: <u>11:30</u>			Received by: <u>[Signature]</u> Date: <u>21-Sep-16</u> Time: <u>11:30am</u>																										

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.
1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Report To		Report Format / Distribution			Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply									
Company: <u>Same AS</u>		Select Report Format: <input type="checkbox"/> PDF <input type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply									
Contact: <u>Same AS</u>		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			4 day [P4] <input type="checkbox"/>					1 Business day [E1] <input type="checkbox"/>				
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			3 day [P3] <input type="checkbox"/>					Same Day, Weekend or Statutory holiday [E0] <input type="checkbox"/>				
Company address below will appear on the final report		Select Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			2 day [P2] <input type="checkbox"/>									
Street:		Email 1 or Fax			Data and Time Required for all E&P TATs:									
City/Province:		Email 2			For tests that can not be performed according to the service level selected, you will be contacted.									
Postal Code:		Email 3			Analysis Request									
Invoice To		Invoice Distribution			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below									
Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			P P F/P F/P P									
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Email 1 or Fax			BTEX, F1									
Company:		Email 2			F2									
Contact:		Email 3			Routine / Major ions									
Project Information		Oil and Gas Required Fields (client use)			DOC ± DMH3									
ALS Account # / Quote #: <u>PAGE 1</u>		AFE/Cost Center:			PO#			Dissolved metals ± Ag						
Job #:		Major/Minor Code:			Routing Code:			Phenols						
PO / AFE:		Requisitioner:			Location:			H ² , O ¹⁸ isotopes						
LSD:		ALS Contact:			Sampler:							Number of Containers		
ALS Lab Work Order # (lab use only)														
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BTEX, F1	F2	Routine / Major ions	DOC ± DMH3	Dissolved metals ± Ag	Phenols	H ² , O ¹⁸ isotopes			
	MW-07	20-Sep-16	18:23	GW	X	X	X	X	X	X	X	#12		
	MW-07 MW-06		19:15		X	X	X	X	X	X	X	#12		
	MW-06 MW-02B		20:15		X	X	X	X	X	X	X	11		
	MW-02B DUP16-01		11:00		X	X	X	X	X	X	X	#12		
	DUP16-02		13:00		X	X	X	X	X	X	X	#12		
Drinking Water (DW) Samples ¹ (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)												
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		Only 2 BTEX vials for MW-02B												
Are samples for human drinking water use? <input type="checkbox"/> YES <input type="checkbox"/> NO		- No O ¹⁸ , H ² vials provided for MW-02B, please take water from bottles marked H ² , O ¹⁸ for these analyses												
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (lab use only)												
Released by: <u>Dave Pereira</u>	Date: <u>21-Sep-16</u>	Time: <u>11:30</u>	Received by:	Date:	L1831974-COFC									

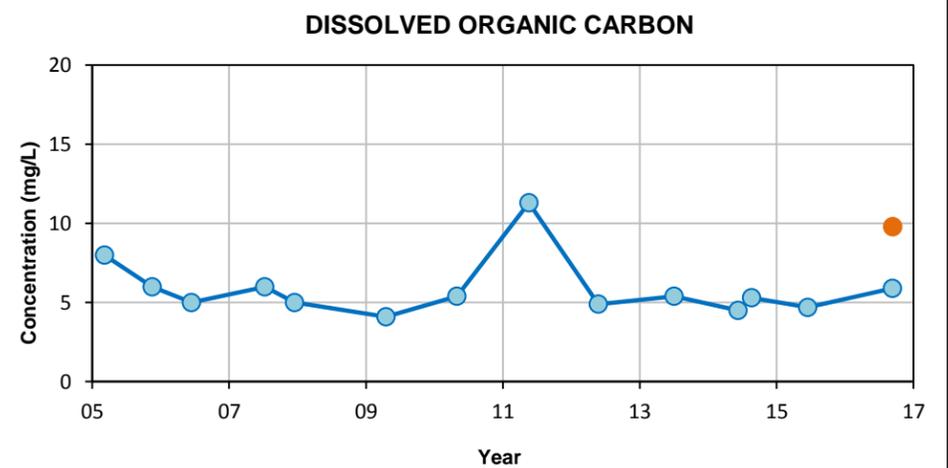
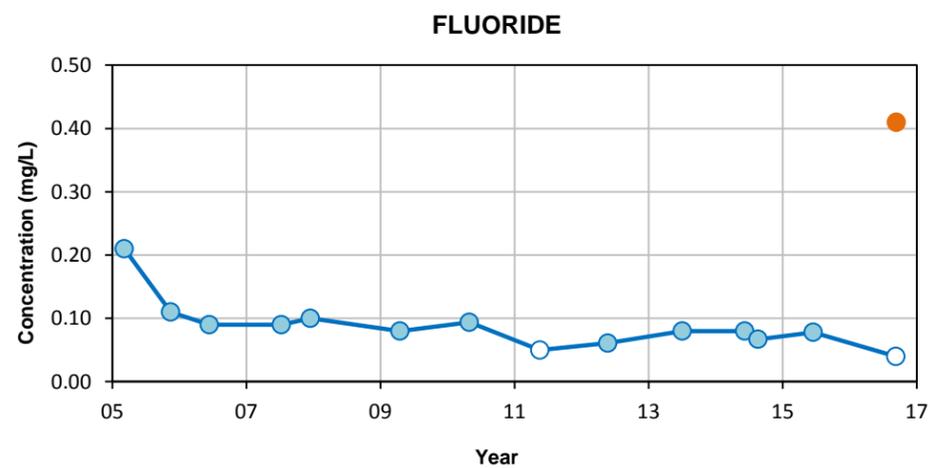
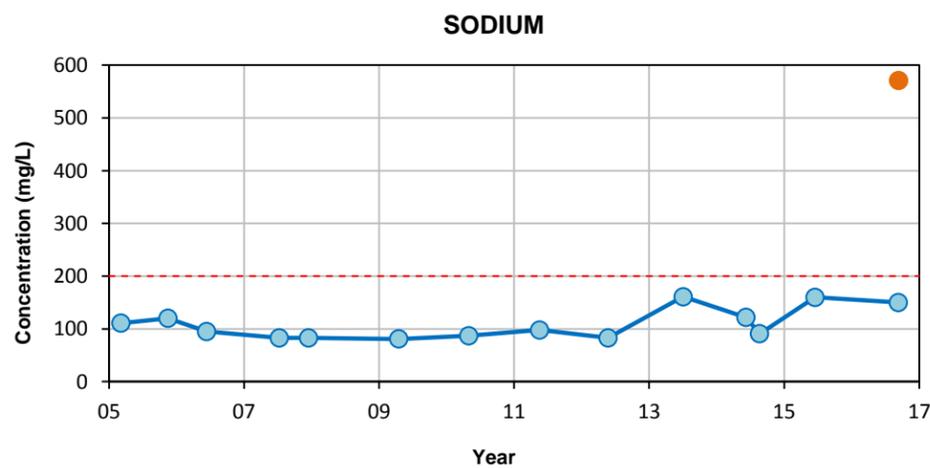
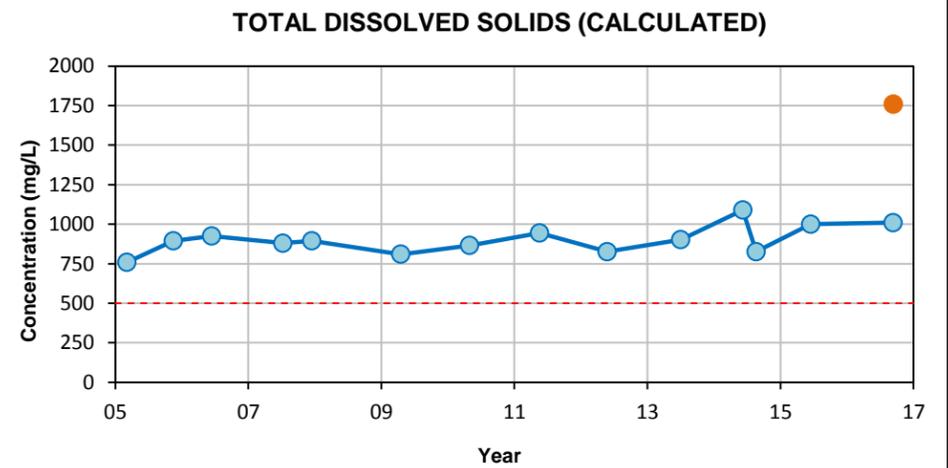
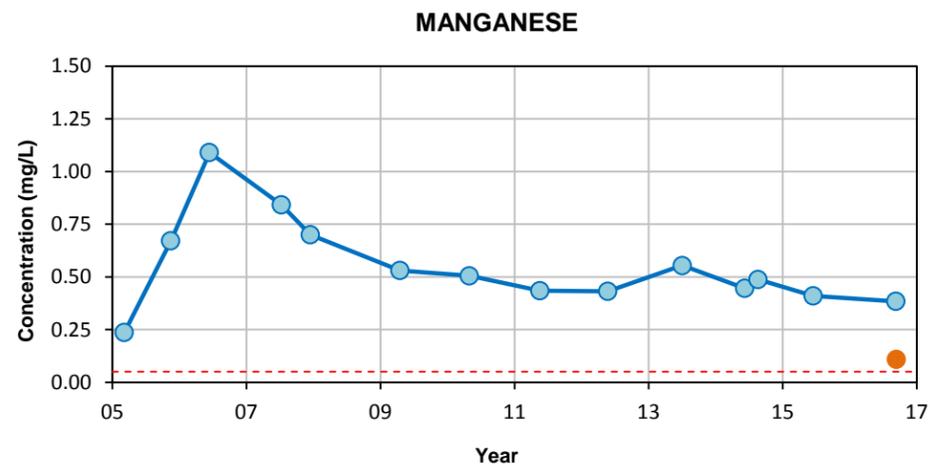
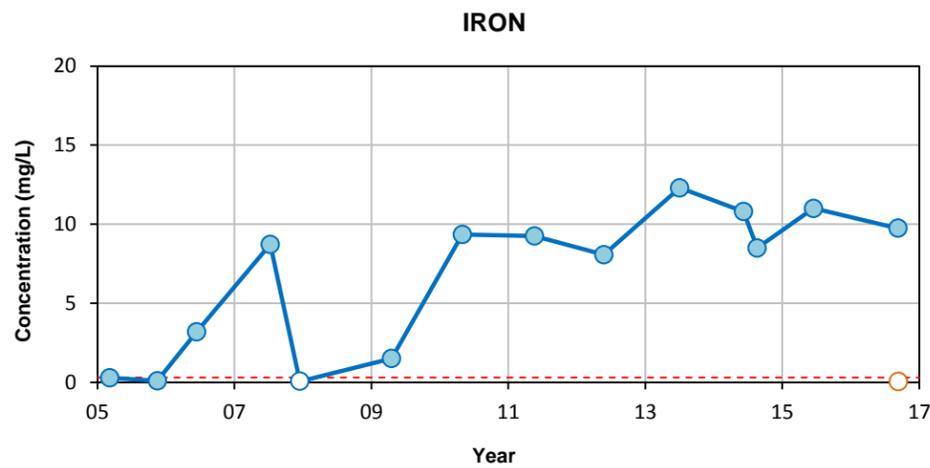
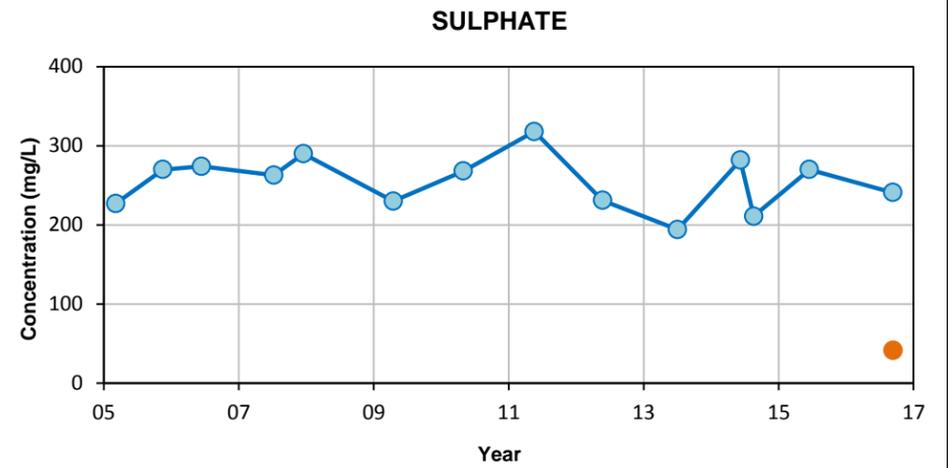
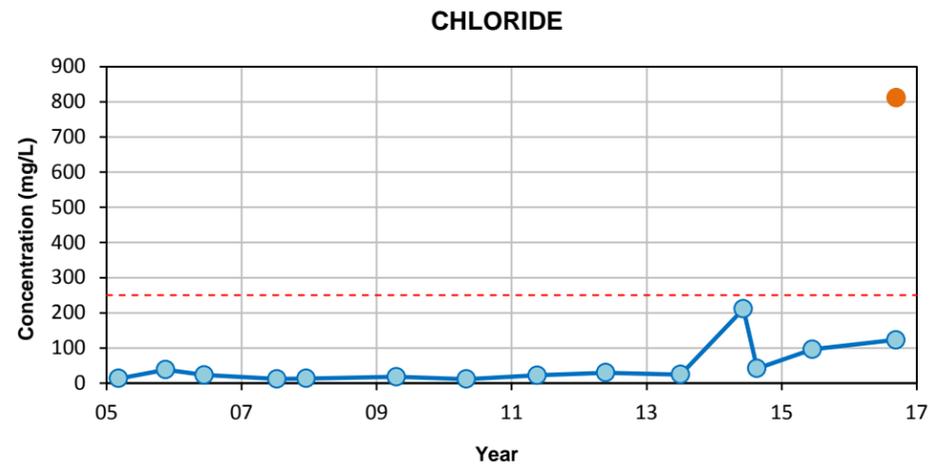
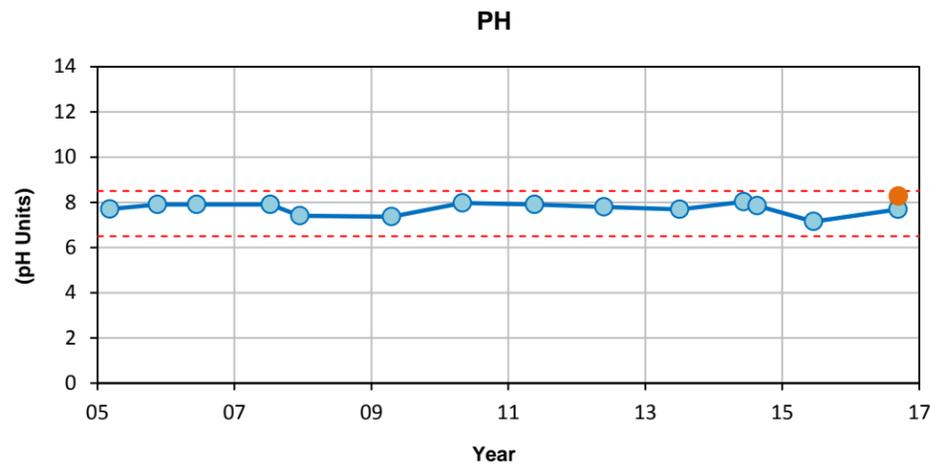
Appendix 6 Hydrochemical Control Charts



Notes:

- Filled symbols denote sample values; unfilled symbols denote values less than detection limit(s)
- Dashed line between data points indicates data gap of more than two years
- Canadian Drinking Water AO Guidelines 2014:
- Canadian Drinking Water MAC 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: 1.5 mg/L
 - Sulphate: 500 mg/L
 - Total Dissolved Solids (Calculated): 500 mg/L
 - Dissolved Organic Carbon: N/A

NORTHEAST CAPITAL INDUSTRY ASSOCIATION 2016 GROUNDWATER QUALITY MONITORING BEVERLY CHANNEL MONITORING WELLS			
HYDROCHEMICAL CONTROL CHARTS MW-01			
Date: 20-Oct-16	Drawn by: CM	Edited by:	App'd by:
		WorleyParsons Project No. 307075-01608-200	
FIG No.		REV	A
A6-1			
* This drawing is prepared solely for the use of our customer as specified in the accompanying report. WorleyParsons Canada Services Ltd. assumes no liability to any other party for any representations contained in this drawing.			



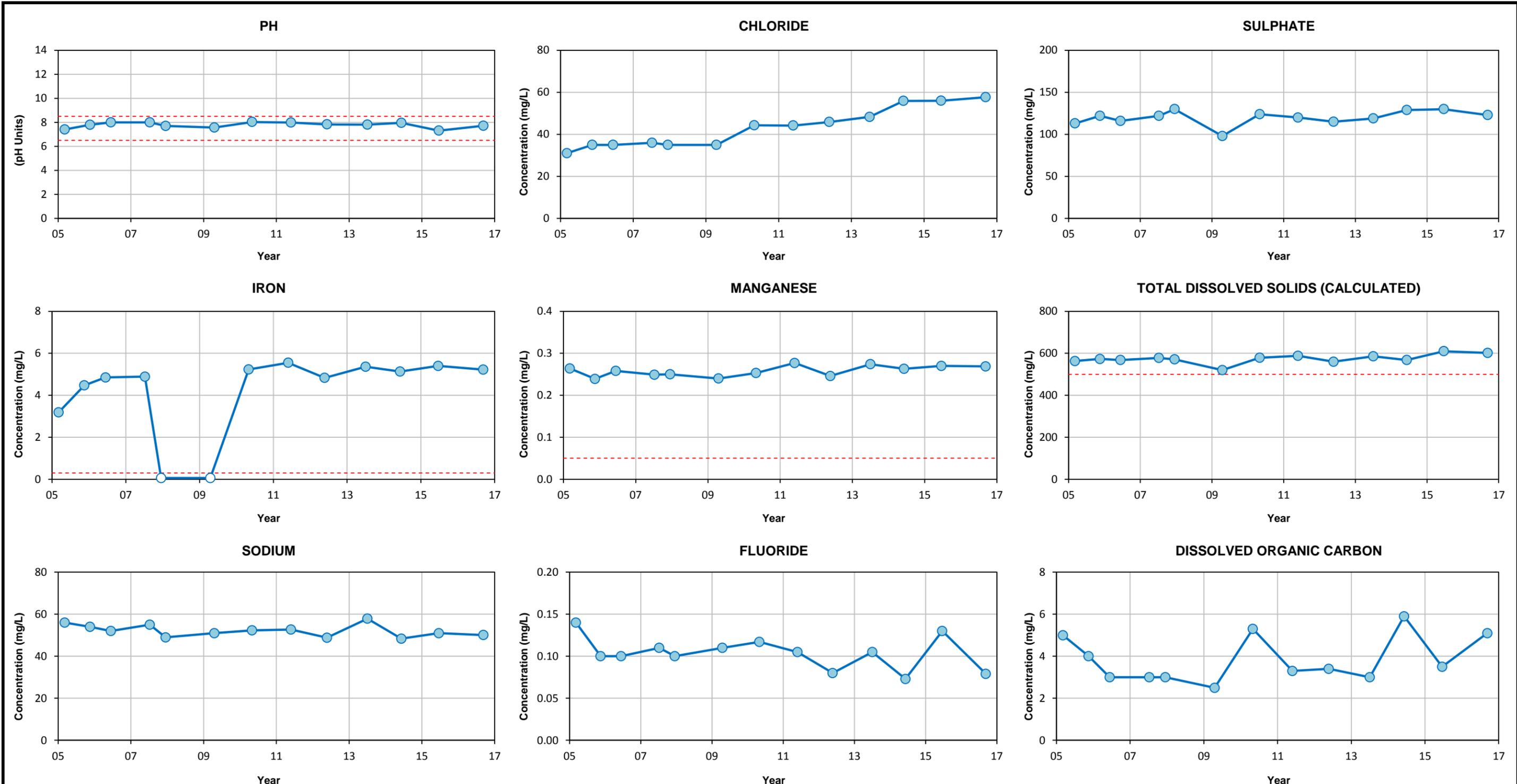
Notes:

- Filled symbols denote sample values; unfilled symbols denote values less than detection limit(s)
- Dashed line between data points indicates data gap of more than two years
- --- Canadian Drinking Water AO Guidelines 2014:
- --- Canadian Drinking Water MAC 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: 1.5 mg/L

● Bedrock Monitoring Well (MW-02B) data point.

- Sulphate: 500 mg/L
- Total Dissolved Solids (Calculated): 500 mg/L
- Dissolved Organic Carbon: N/A

NORTHEAST CAPITAL INDUSTRY ASSOCIATION 2016 GROUNDWATER QUALITY MONITORING BEVERLY CHANNEL MONITORING WELLS			
HYDROCHEMICAL CONTROL CHARTS MW-02 & MW-02B			
Date: 20-Oct-16	Drawn by: CM	Edited by:	App'd by:
		WorleyParsons Project No. 307075-01608-200	
FIG No.		REV	
A6-2		A	
* This drawing is prepared solely for the use of our customer as specified in the accompanying report. WorleyParsons Canada Services Ltd. assumes no liability to any other party for any representations contained in this drawing.			



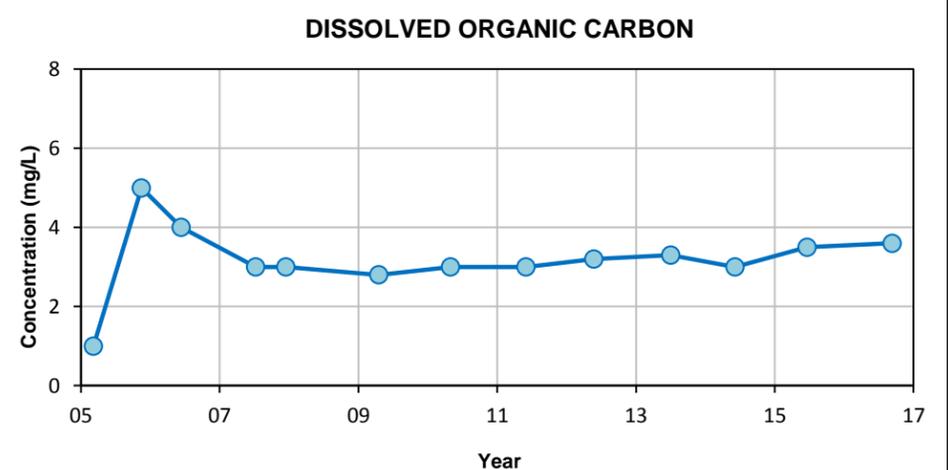
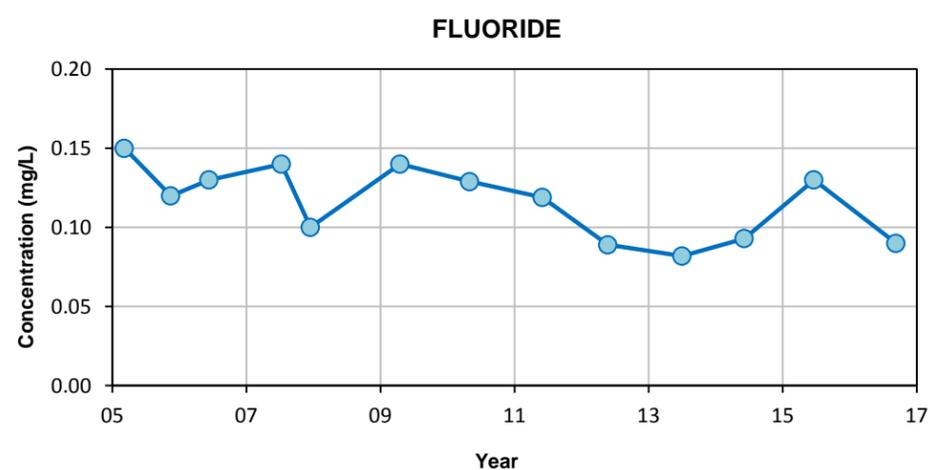
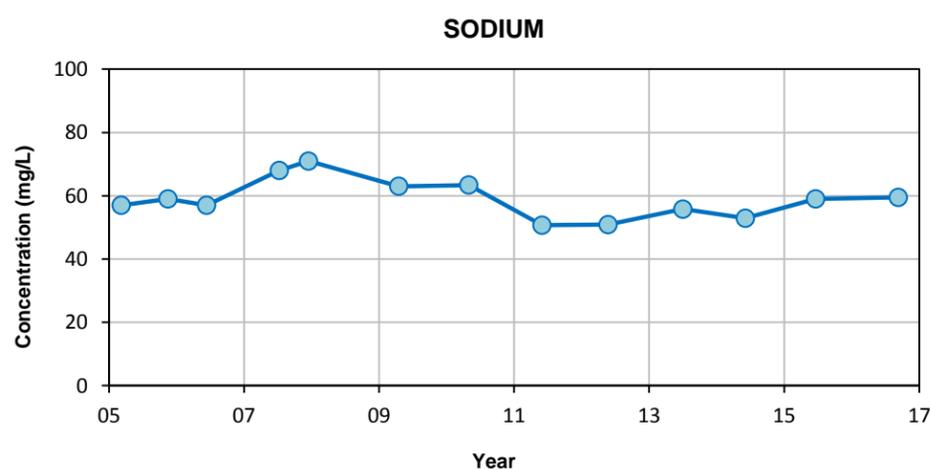
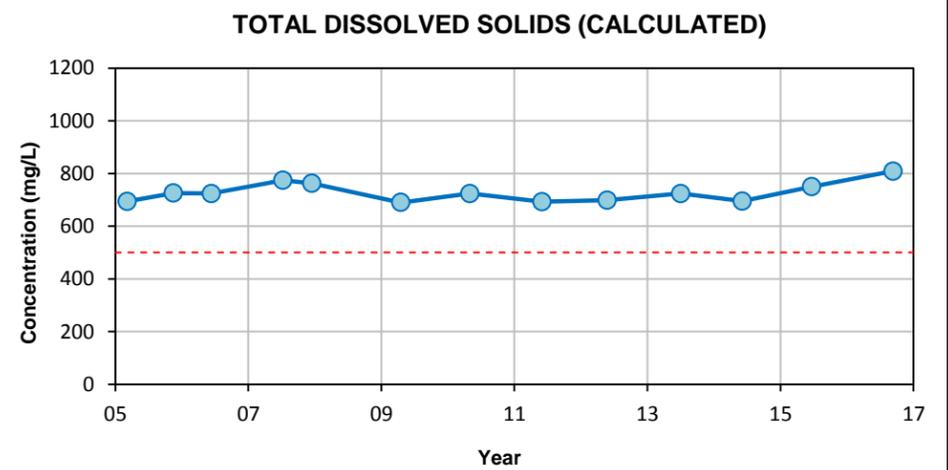
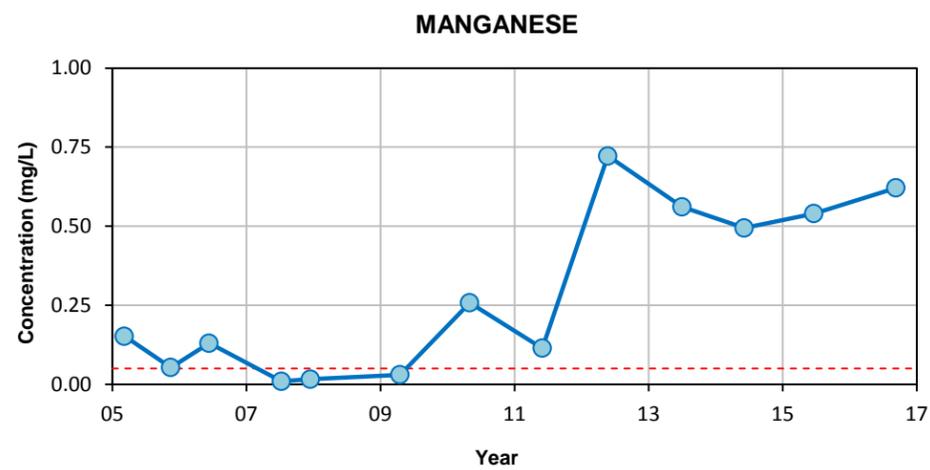
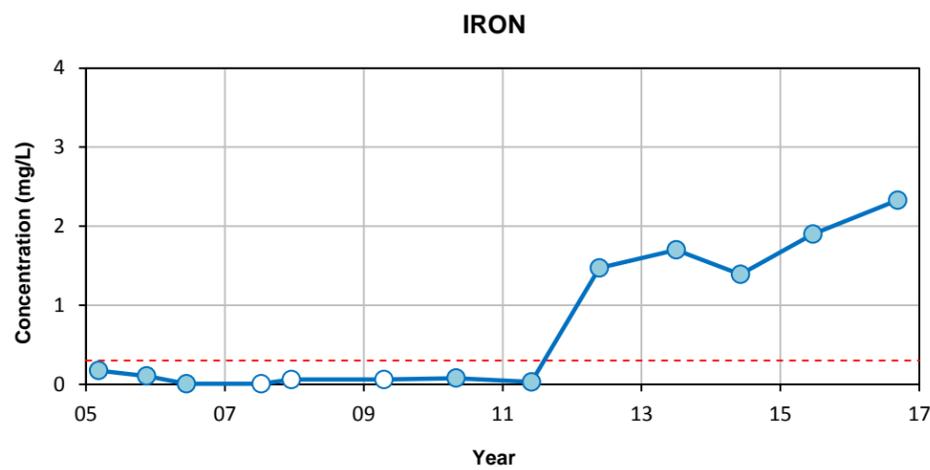
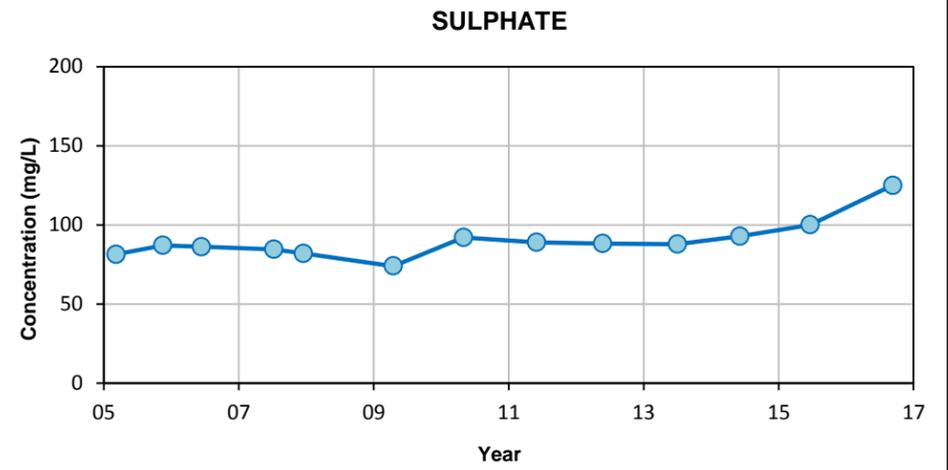
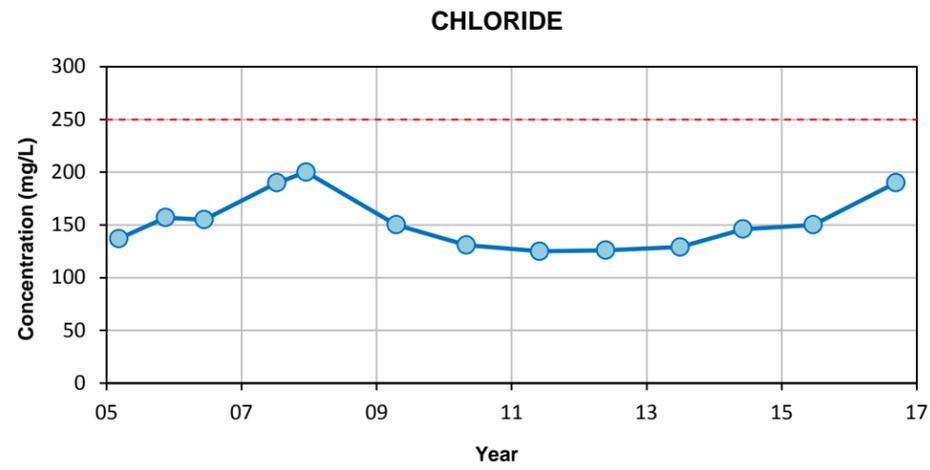
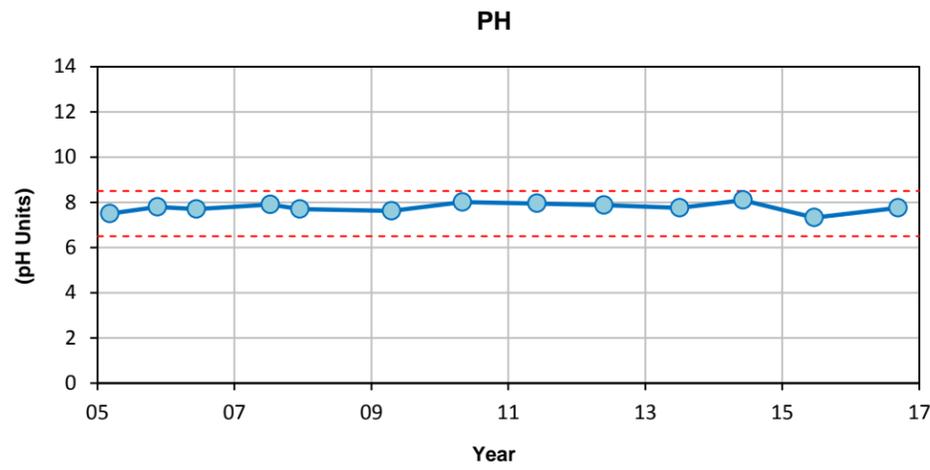
Notes:

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- Dashed line between data points indicates data gap of more than two years
- --- Canadian Drinking Water AO Guidelines 2014:
- --- Canadian Drinking Water MAC Guidelines 2014:
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 - Iron: 0.3 mg/L
 - Sodium: 200 mg/L
 - Chloride: 250 mg/L
 - Manganese: 0.05 mg/L
 - Fluoride: 1.5 mg/L
 - Sulphate: 500 mg/L
 - Total Dissolved Solids (Calculated): 500 mg/L
 - Dissolved Organic Carbon: N/A

NORTHEAST CAPITAL INDUSTRY ASSOCIATION 2016 GROUNDWATER QUALITY MONITORING BEVERLY CHANNEL MONITORING WELLS				
HYDROCHEMICAL CONTROL CHARTS				
MW-03				
Date:	20-Oct-16	Drawn by:	CM	App'd by:
WorleyParsons Project No.		307075-01608-200		
FIG No.	A6-3	REV	A	
<small>* This drawing is prepared solely for the use of our customer as specified in the accompanying report. WorleyParsons Canada Services Ltd. assumes no liability to any other party for any representations contained in this drawing.*</small>				



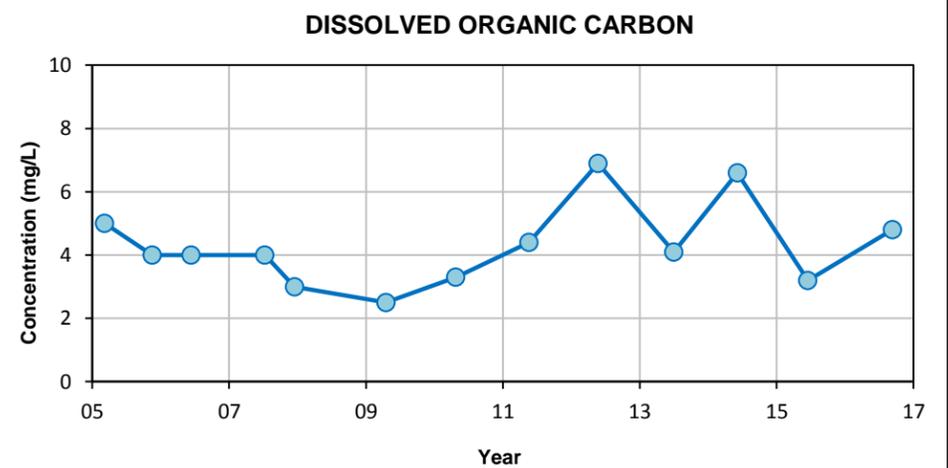
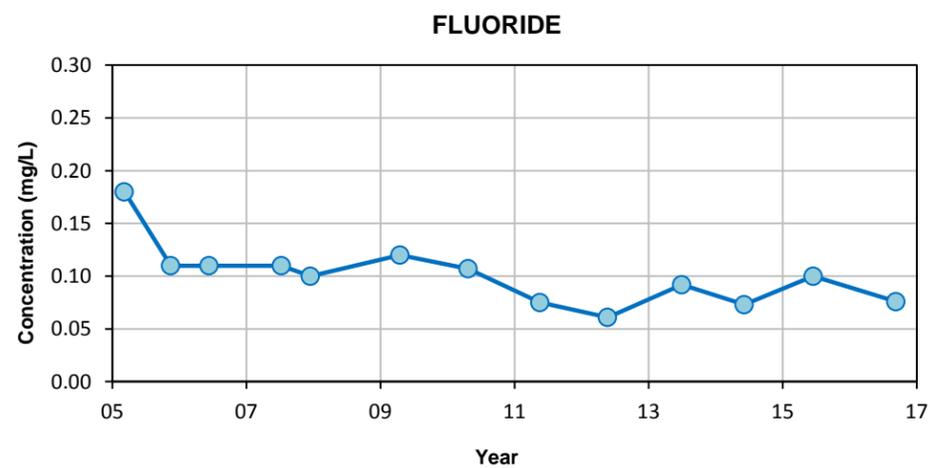
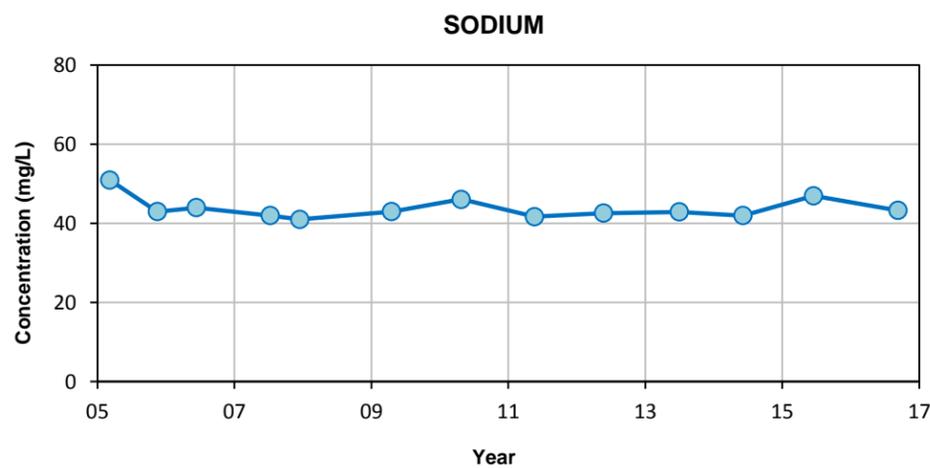
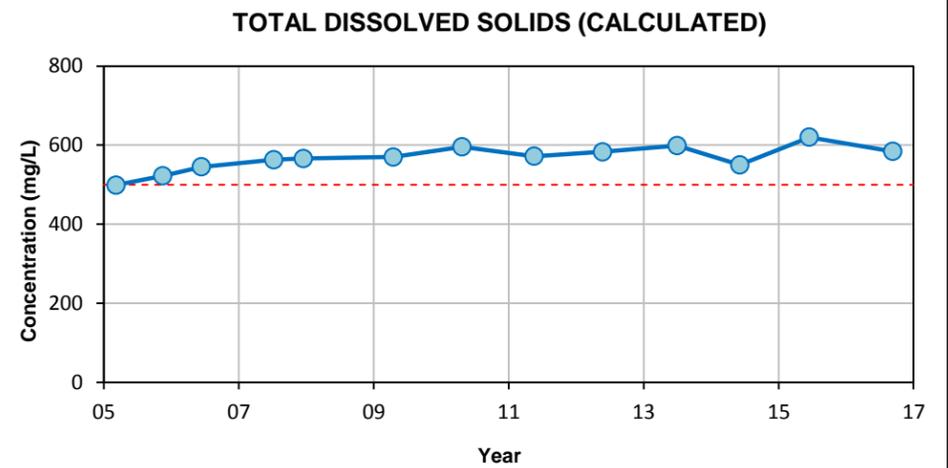
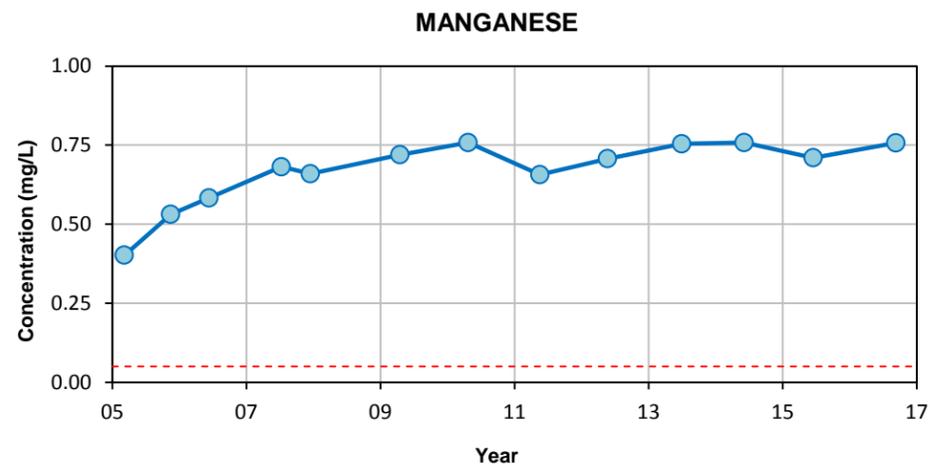
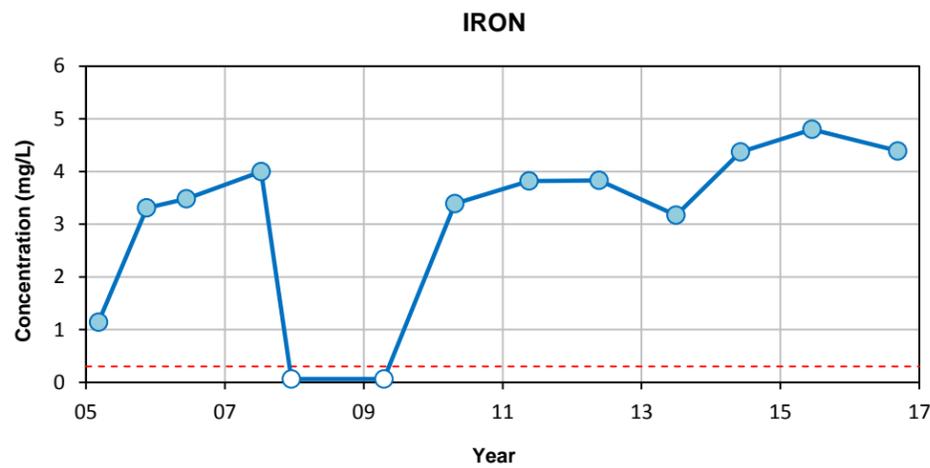
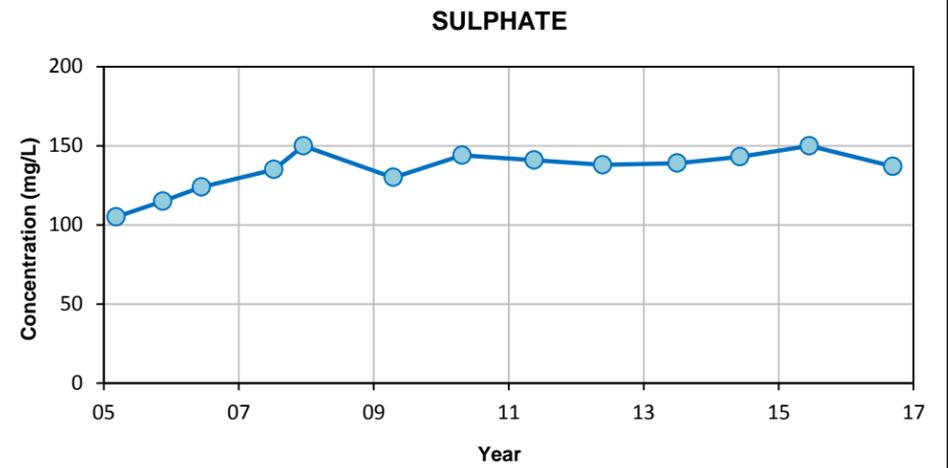
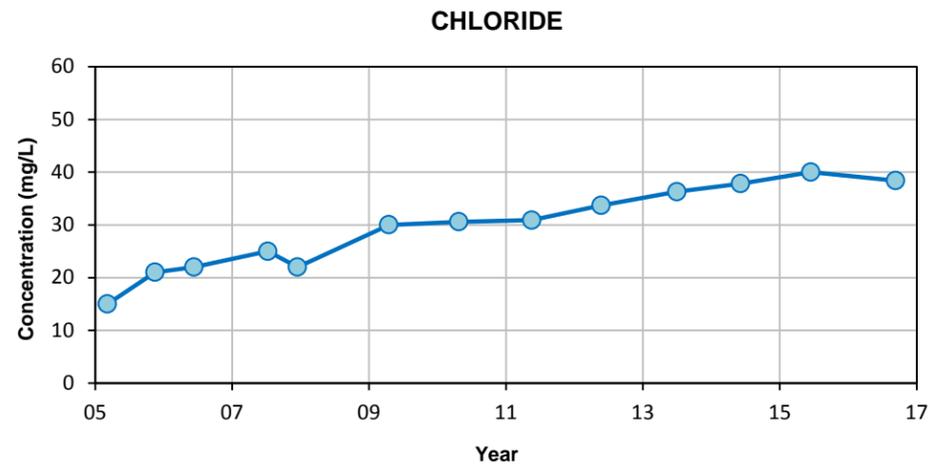
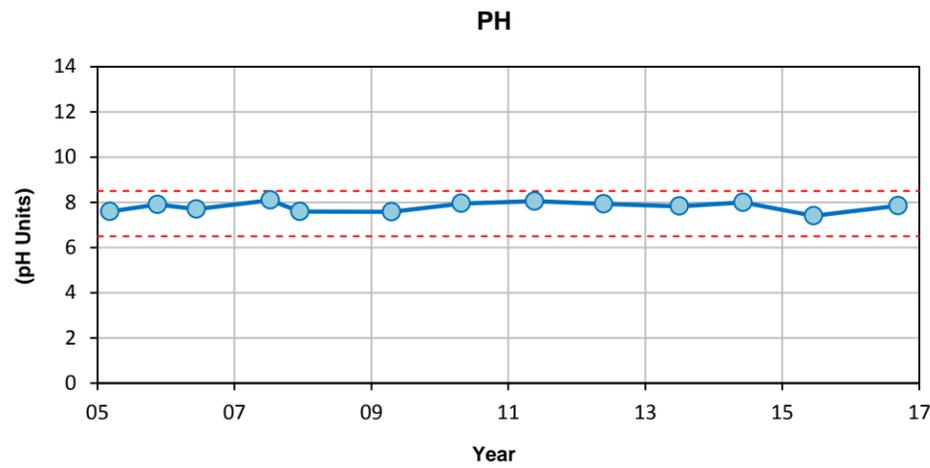
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TRENDCARTS/TRENDCARTS
GWM12_0_REPORTS/12.3_BACKENDAPP 5- TRENDCARTS/TRENDCARTS



Notes:

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- --- Canadian Drinking Water MAC Guidelines 2014:
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- Chloride: 250 mg/L
- Manganese: 0.05 mg/L
- Fluoride: 1.5 mg/L
- Sulphate: 500 mg/L
- Total Dissolved Solids (Calculated): 500 mg/L
- Dissolved Organic Carbon: N/A

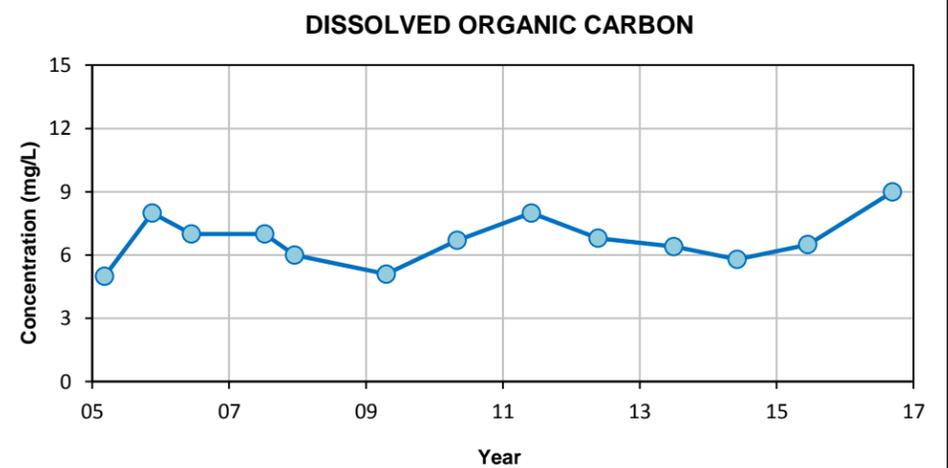
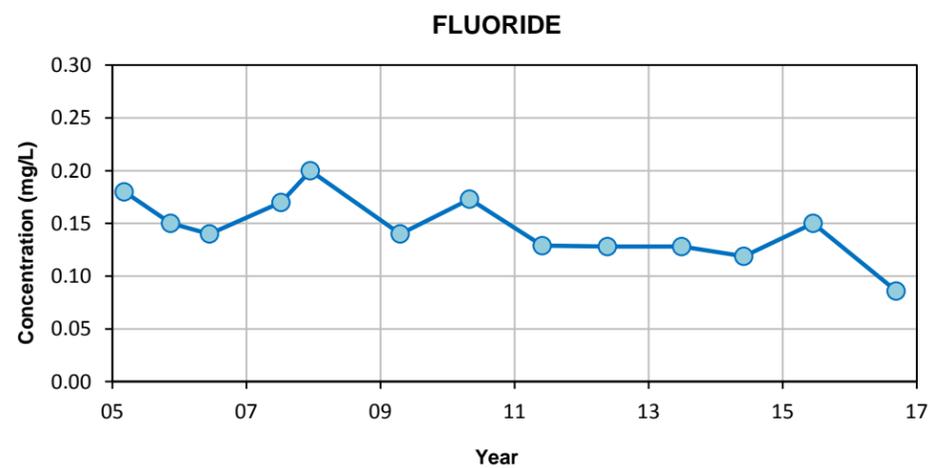
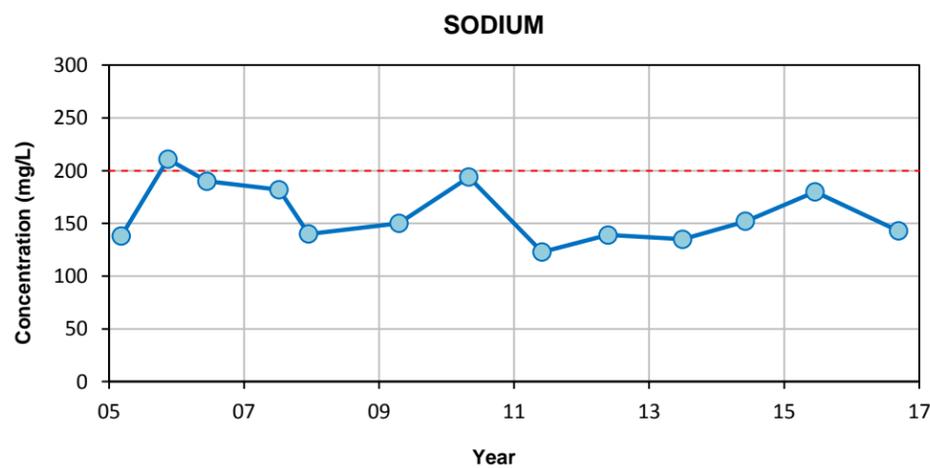
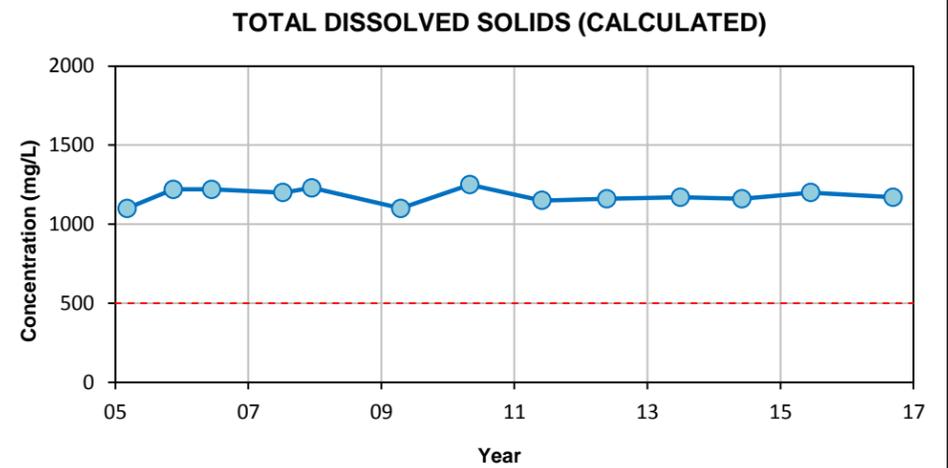
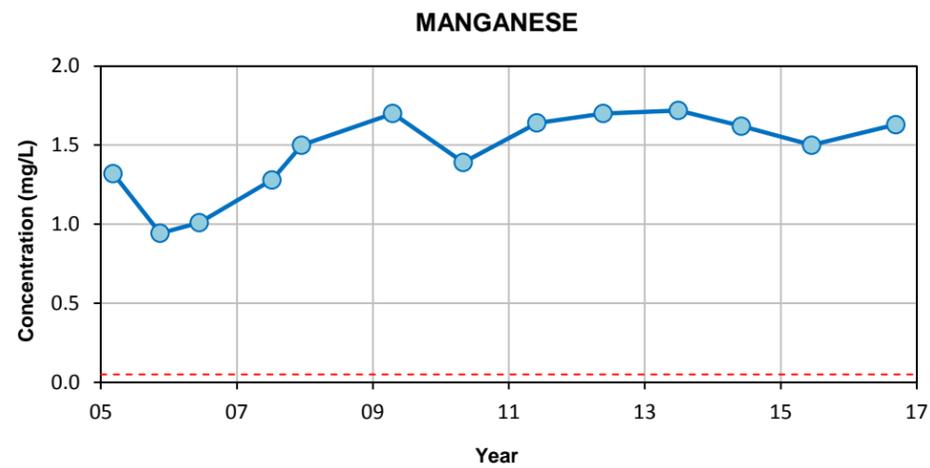
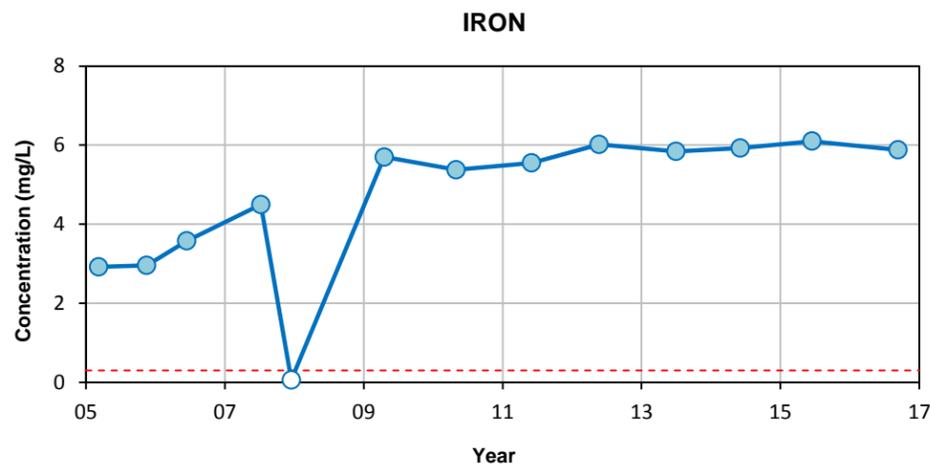
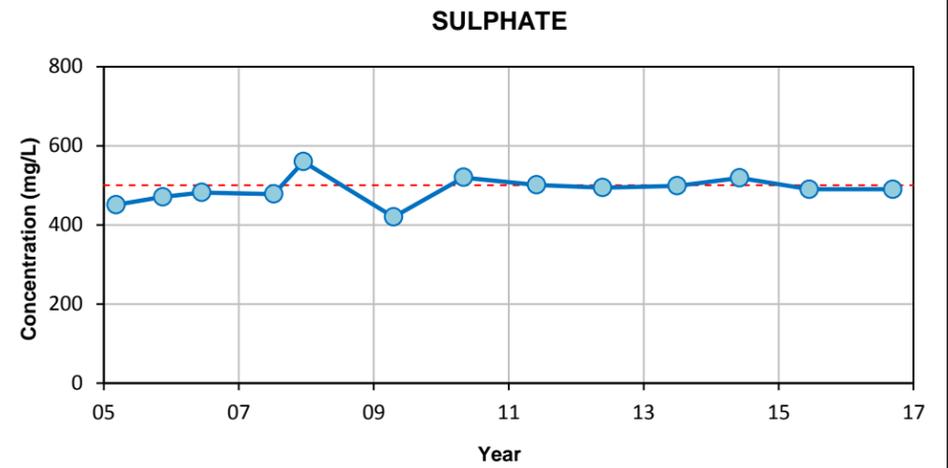
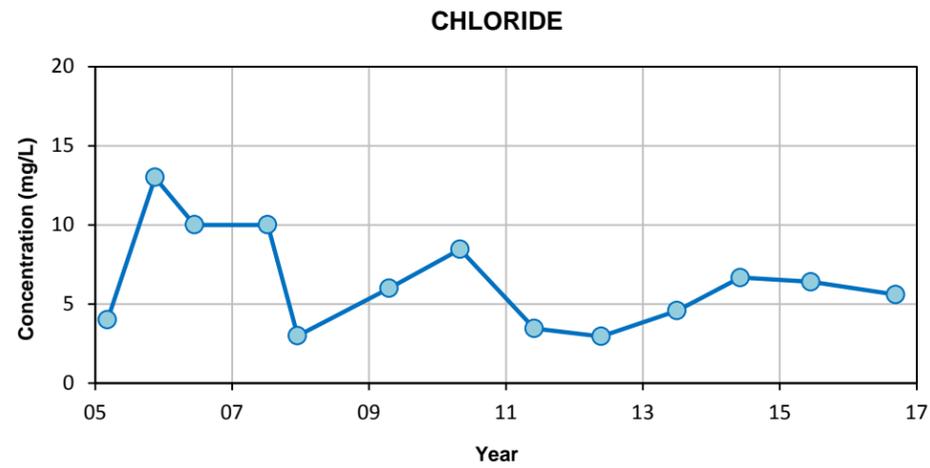
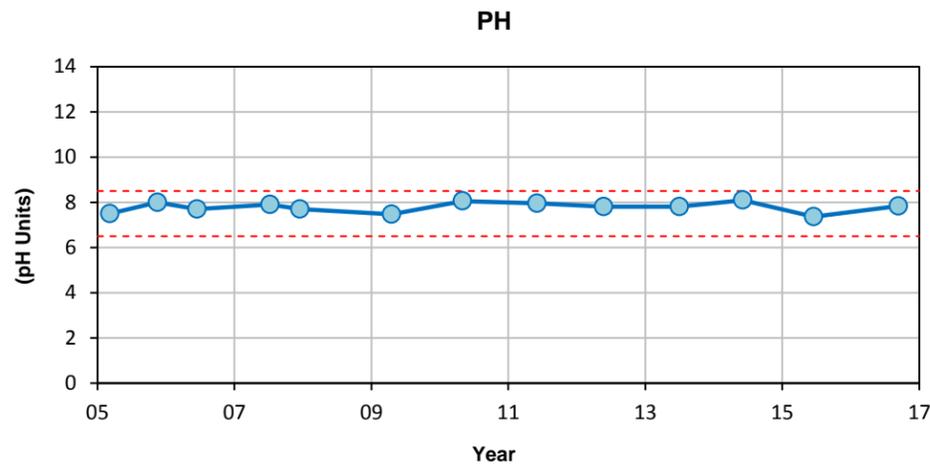
NORTHEAST CAPITAL INDUSTRY ASSOCIATION 2016 GROUNDWATER QUALITY MONITORING BEVERLY CHANNEL MONITORING WELLS			
HYDROCHEMICAL CONTROL CHARTS MW-04			
Date: 20-Oct-16	Drawn by: CM	Edited by:	App'd by:
		WorleyParsons Project No. 307075-01608-200	
FIG No.		REV	
4		A	
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Notes:

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- Canadian Drinking Water AO Guidelines 2014:
- Canadian Drinking Water MAC Guidelines 2014:
- pH: 6.5-8.5 pH Units
- Chloride: 250 mg/L
- Iron: 0.3 mg/L
- Manganese: 0.05 mg/L
- Sodium: 200 mg/L
- Fluoride: 1.5 mg/L
- Sulphate: 500 mg/L
- Total Dissolved Solids (Calculated): 500 mg/L
- Dissolved Organic Carbon: N/A

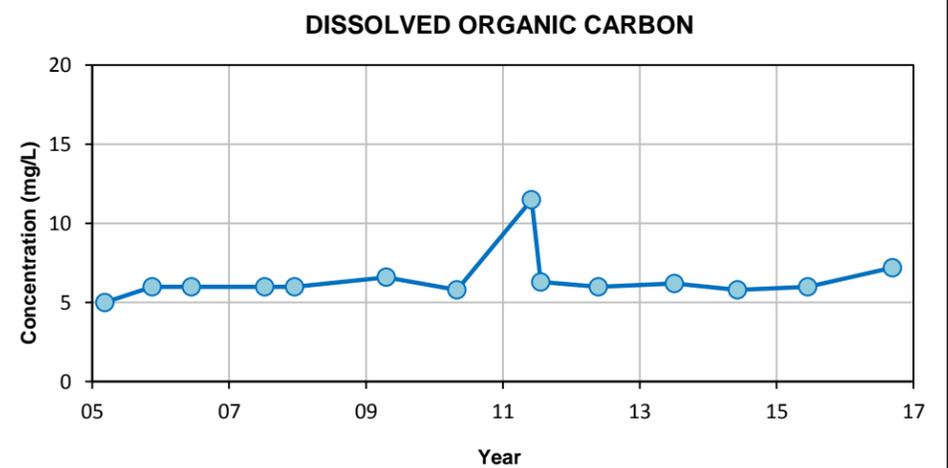
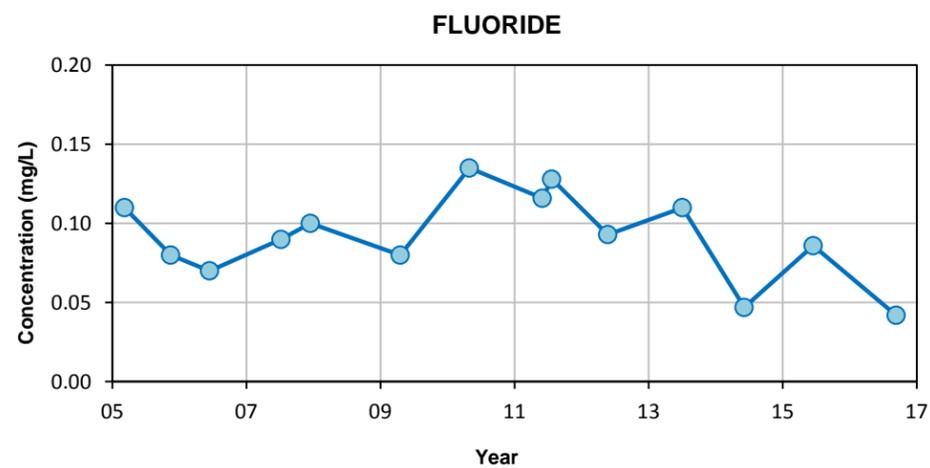
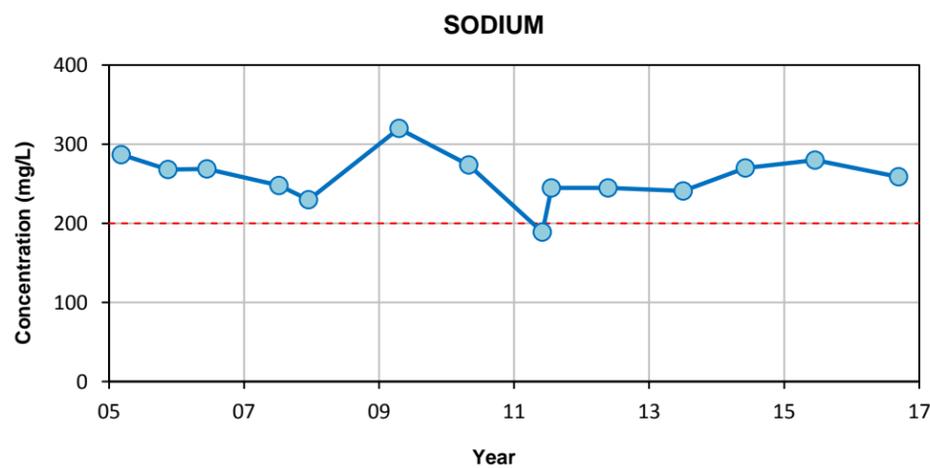
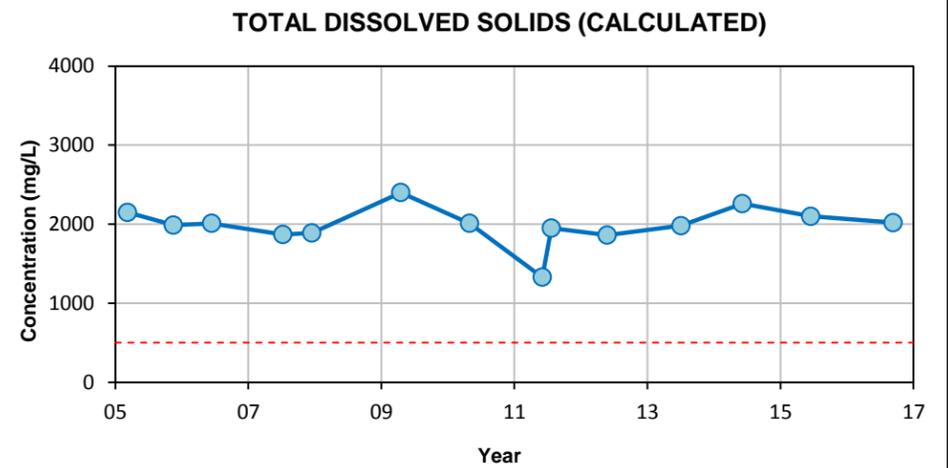
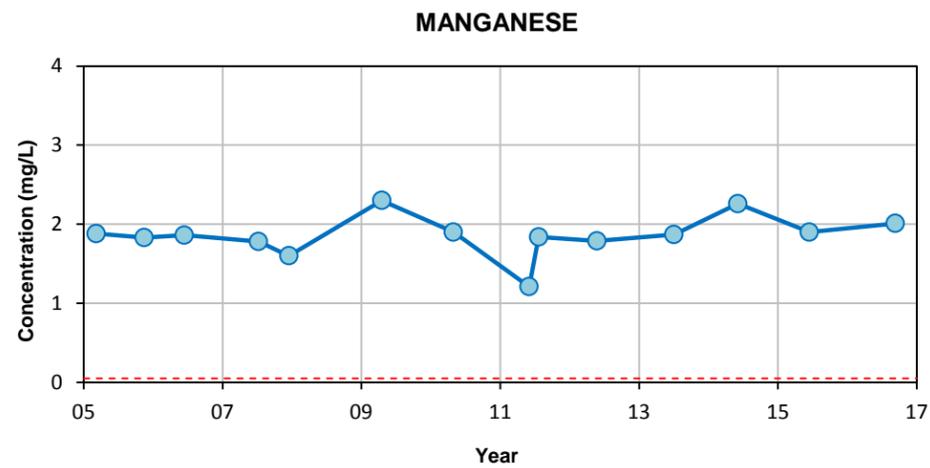
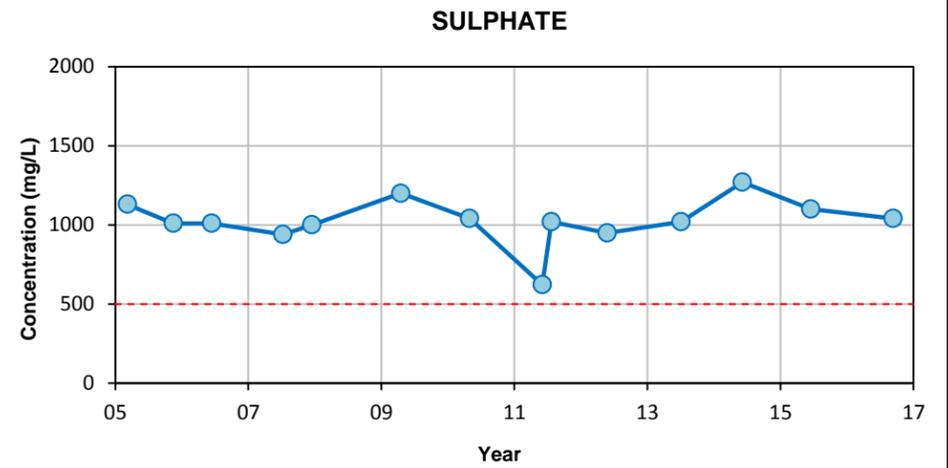
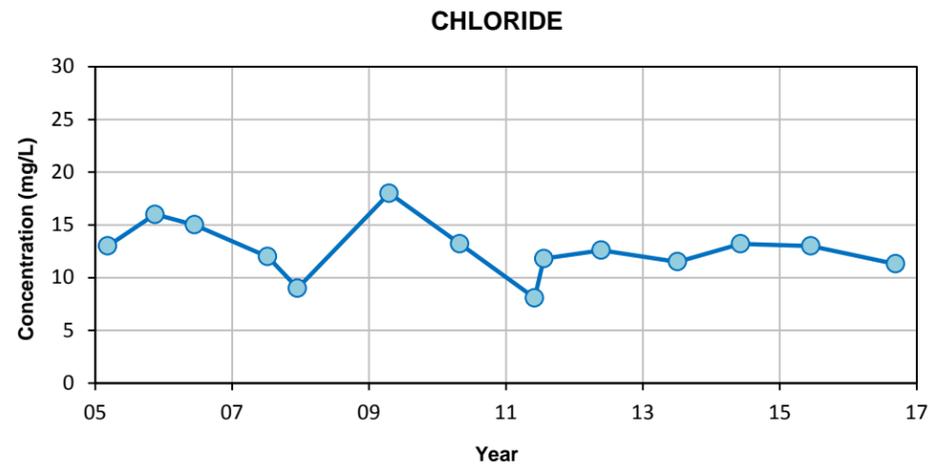
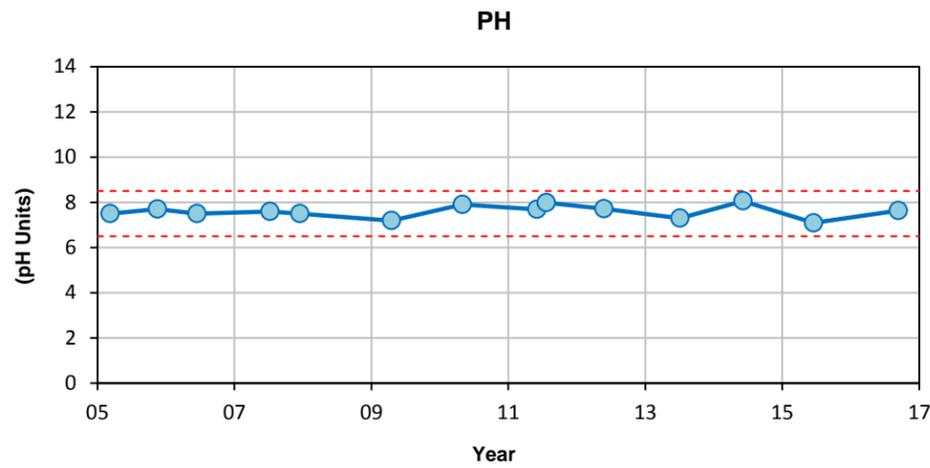
NORTHEAST CAPITAL INDUSTRY ASSOCIATION 2016 GROUNDWATER QUALITY MONITORING BEVERLY CHANNEL MONITORING WELLS			
HYDROCHEMICAL CONTROL CHARTS MW-05			
Date: 20-Oct-16	Drawn by: CM	Edited by:	App'd by:
		WorleyParsons Project No. 307075-01608-200	
FIG No.		REV	
A6-5		A	
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- --- Canadian Drinking Water AO Guidelines 2014:
- --- Canadian Drinking Water MAC Guidelines 2014:
- pH: 6.5-8.5 pH Units
- Chloride: 250 mg/L
- Iron: 0.3 mg/L
- Manganese: 0.05 mg/L
- Sodium: 200 mg/L
- Fluoride: 1.5 mg/L
- Sulphate: 500 mg/L
- Total Dissolved Solids (Calculated): 500 mg/L
- Dissolved Organic Carbon: N/A

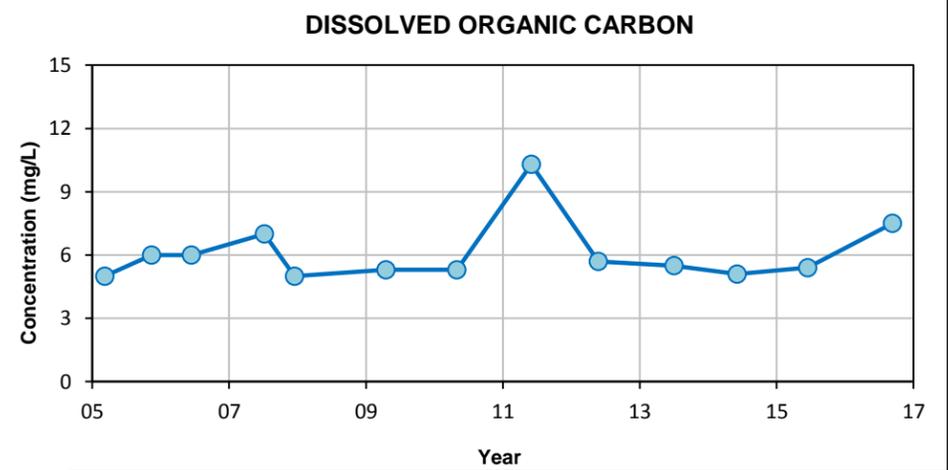
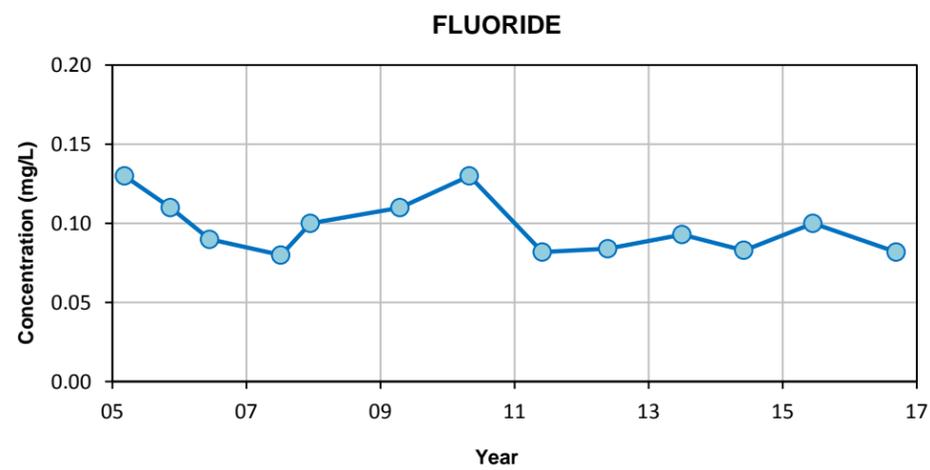
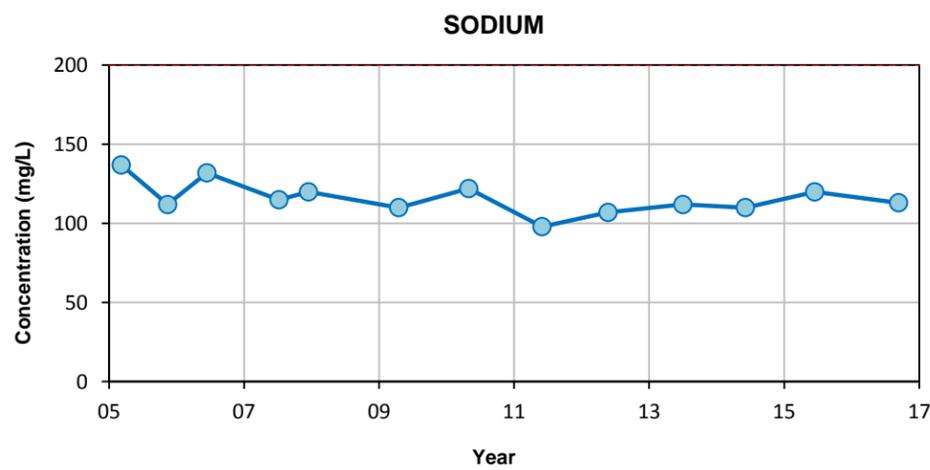
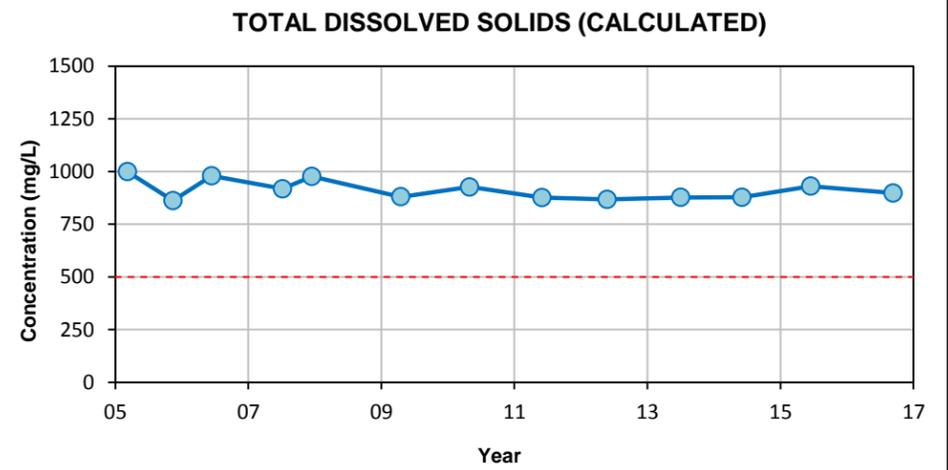
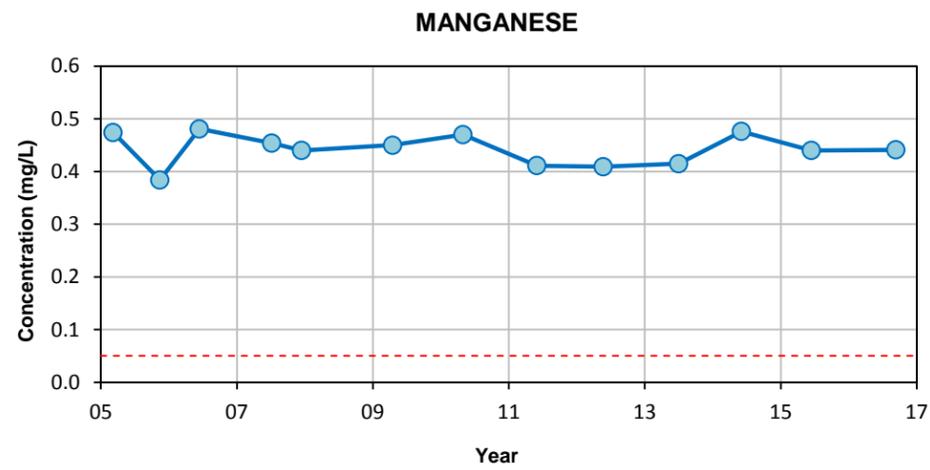
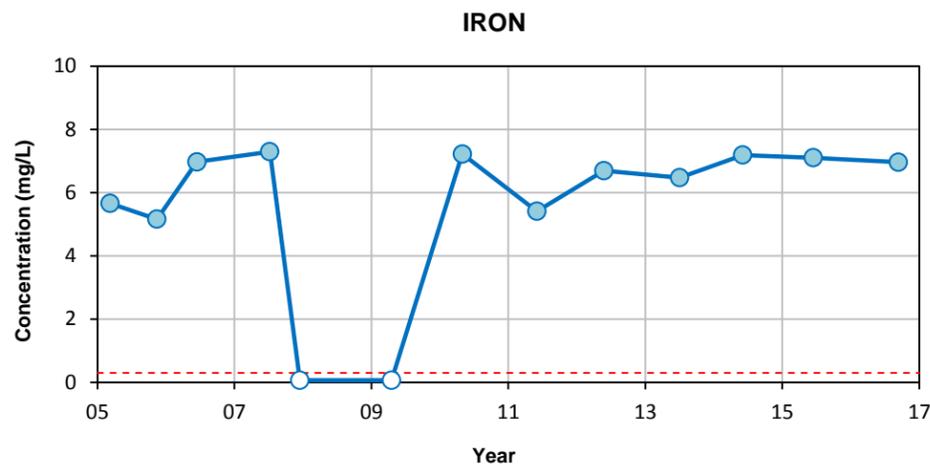
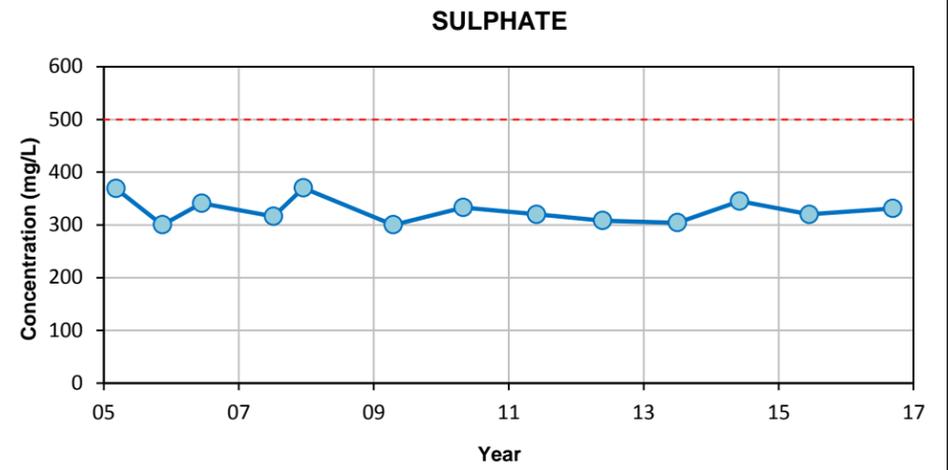
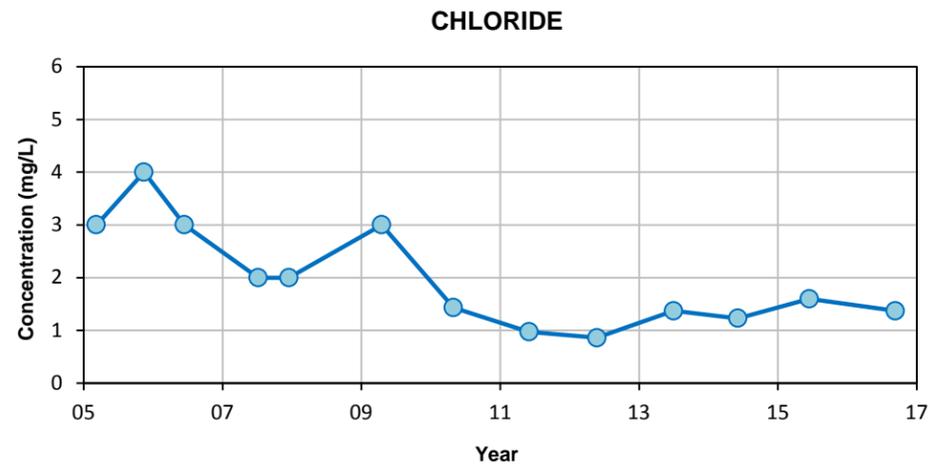
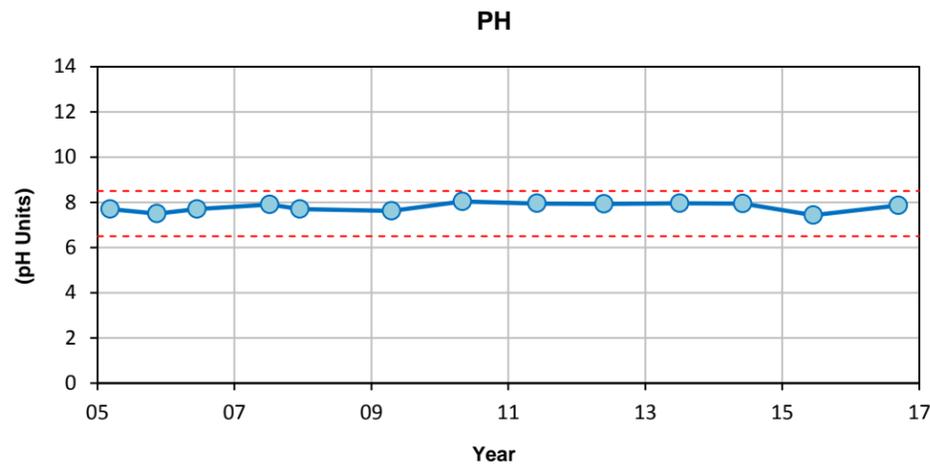
NORTHEAST CAPITAL INDUSTRY ASSOCIATION 2016 GROUNDWATER QUALITY MONITORING BEVERLY CHANNEL MONITORING WELLS			
HYDROCHEMICAL CONTROL CHARTS MW-06			
Date: 20-Oct-16	Drawn by: CM	Edited by:	App'd by:
		WorleyParsons Project No. 307075-01608-200	
FIG No.		REV	
A6-6		A	
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- --- Canadian Drinking Water MAC Guidelines 2014:
- pH: 6.5-8.5 pH Units
- Chloride: 250 mg/L
- Iron: 0.3 mg/L
- Manganese: 0.05 mg/L
- Sodium: 200 mg/L
- Fluoride: 1.5 mg/L
- Sulphate: 500 mg/L
- Total Dissolved Solids (Calculated): 500 mg/L
- Dissolved Organic Carbon: N/A

NORTHEAST CAPITAL INDUSTRY ASSOCIATION 2016 GROUNDWATER QUALITY MONITORING BEVERLY CHANNEL MONITORING WELLS			
HYDROCHEMICAL CONTROL CHARTS MW-07			
Date: 20-Oct-16	Drawn by: CM	Edited by:	App'd by:
		WorleyParsons Project No. 307075-01608-200	
FIG No.		REV	
A6-7		A	
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- --- Canadian Drinking Water MAC Guidelines 2014:
- pH: 6.5-8.5 pH Units
- Chloride: 250 mg/L
- Iron: 0.3 mg/L
- Manganese: 0.05 mg/L
- Sodium: 200 mg/L
- Fluoride: 1.5 mg/L
- Sulphate: 500 mg/L
- Total Dissolved Solids (Calculated): 500 mg/L
- Dissolved Organic Carbon: N/A

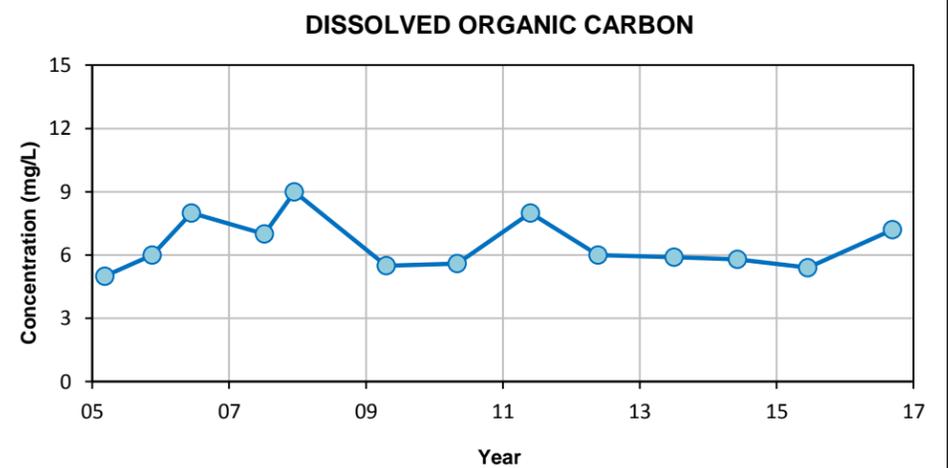
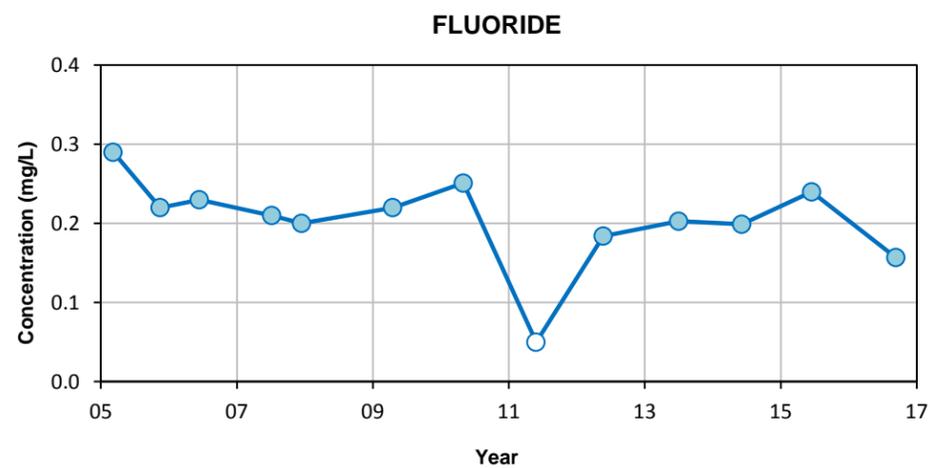
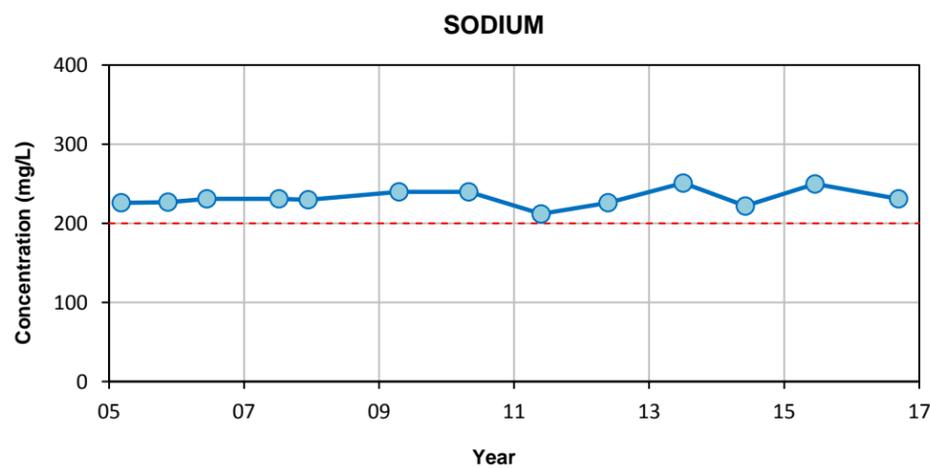
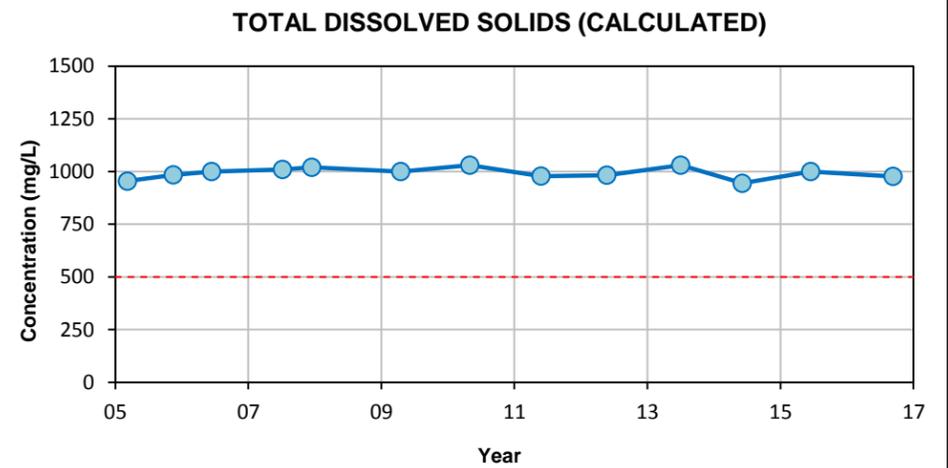
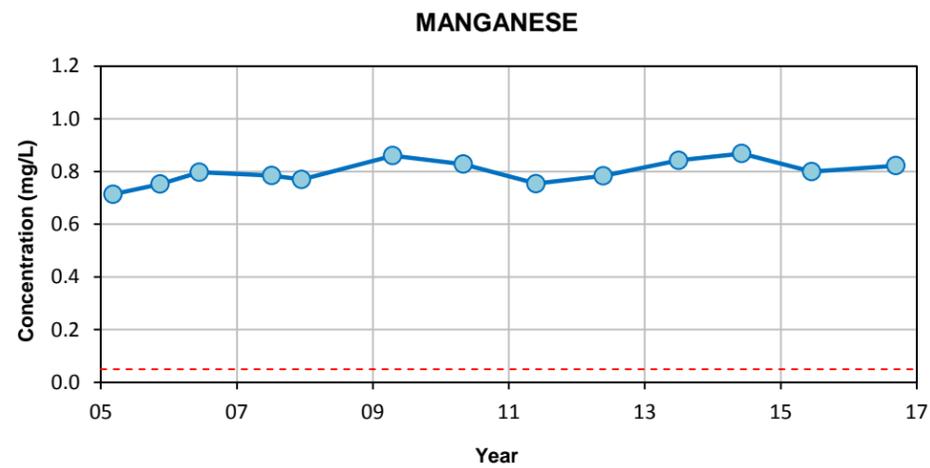
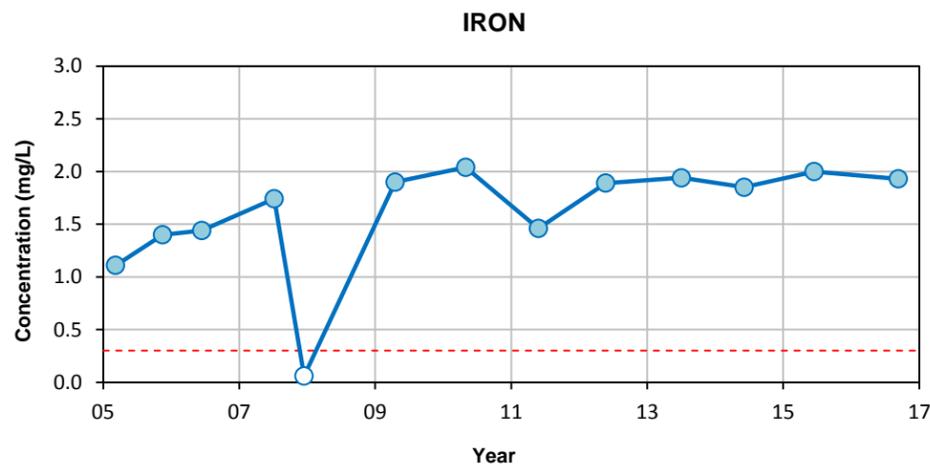
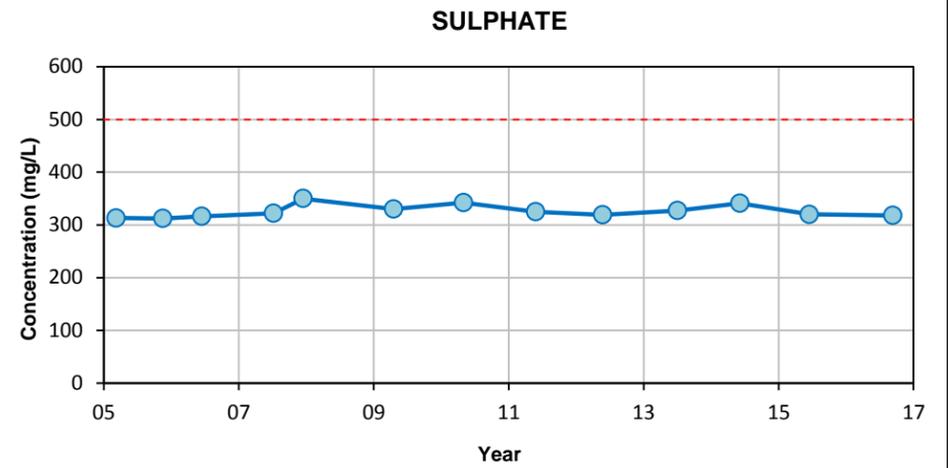
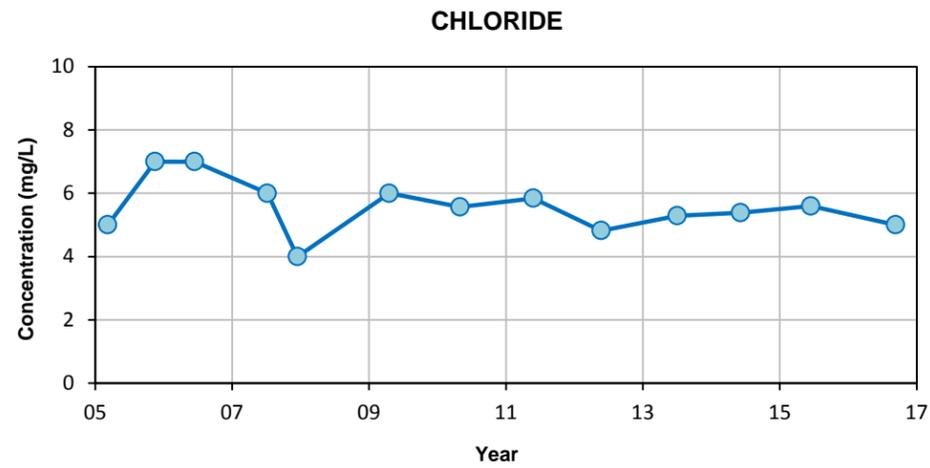
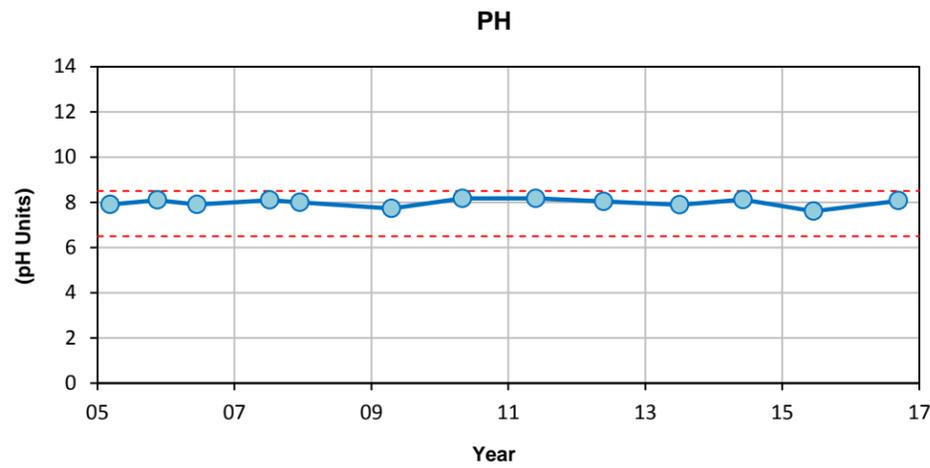
**NORTHEAST CAPITAL INDUSTRY ASSOCIATION
2016 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS**

HYDROCHEMICAL CONTROL CHARTS

MW-08

Date: 20-Oct-16	Drawn by: CM	Edited by:	App'd by:
		WorleyParsons Project No. 307075-01608-200	
FIG No.		REV	
A6-8		A	

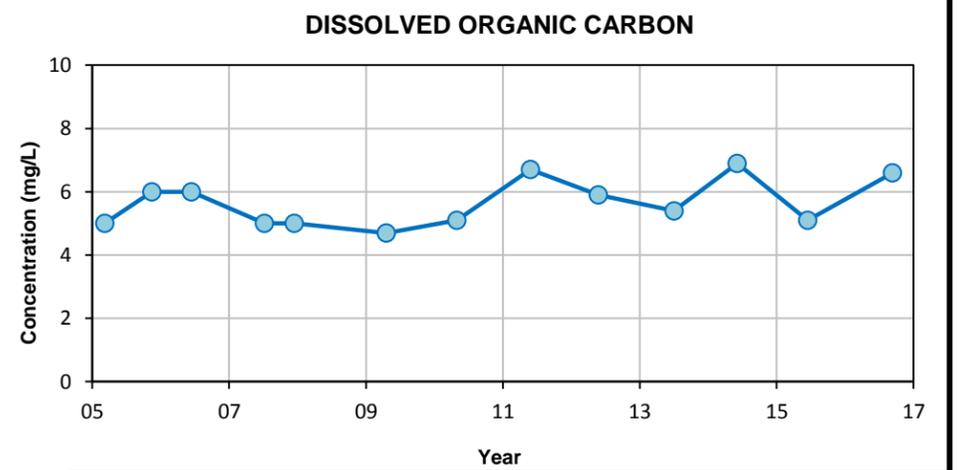
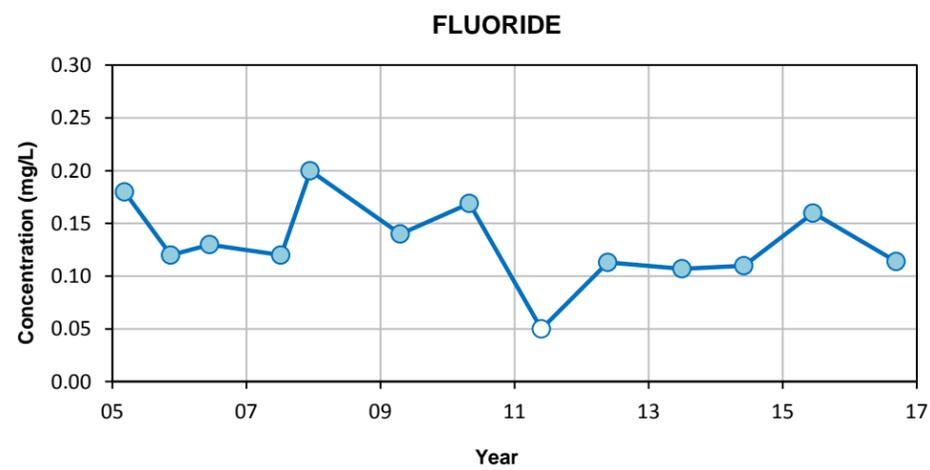
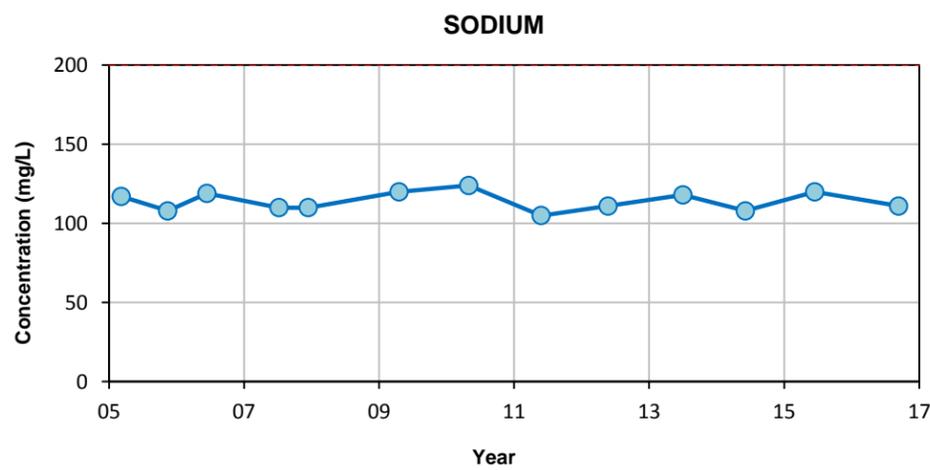
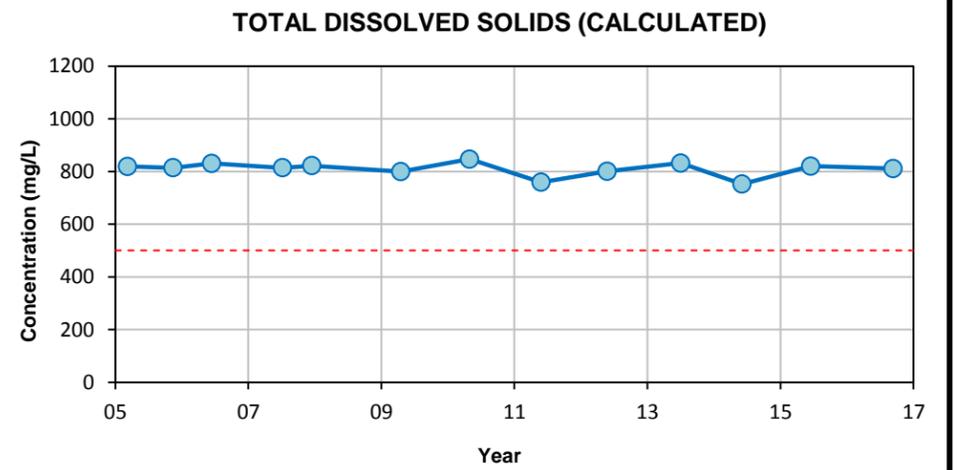
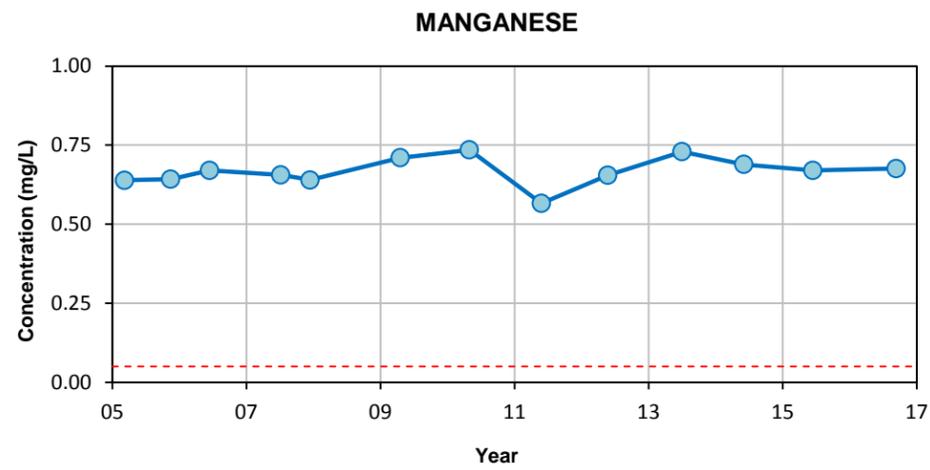
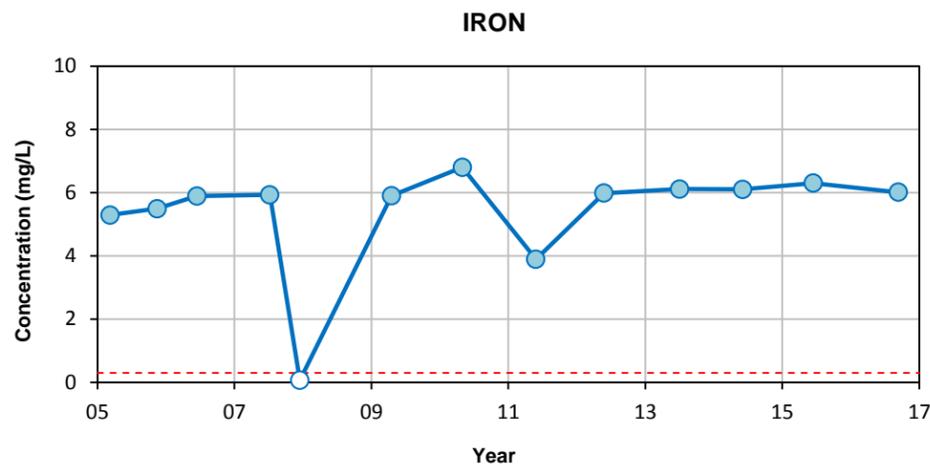
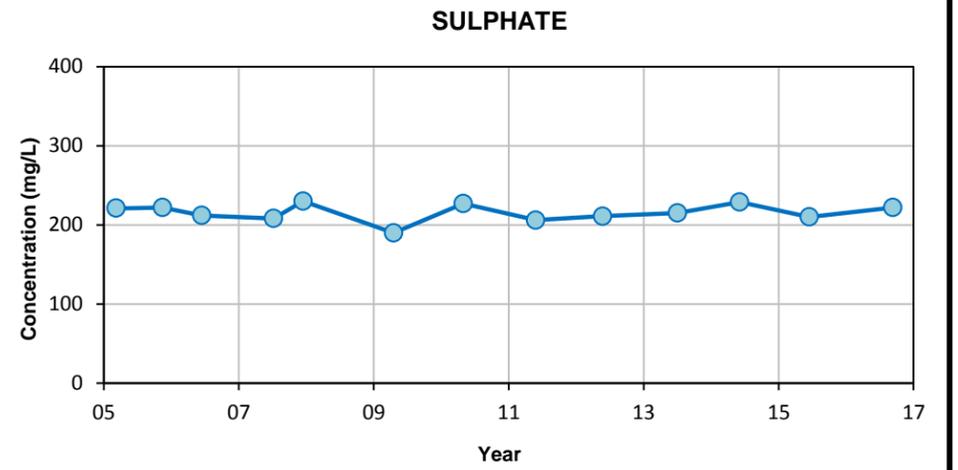
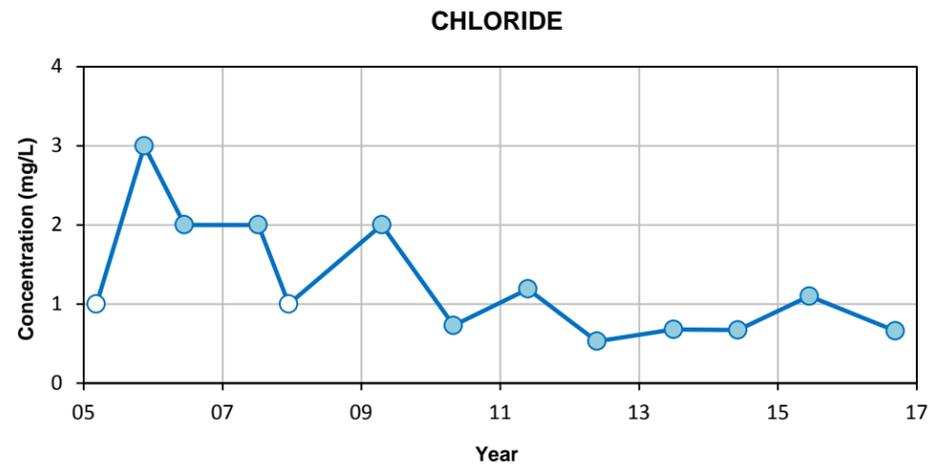
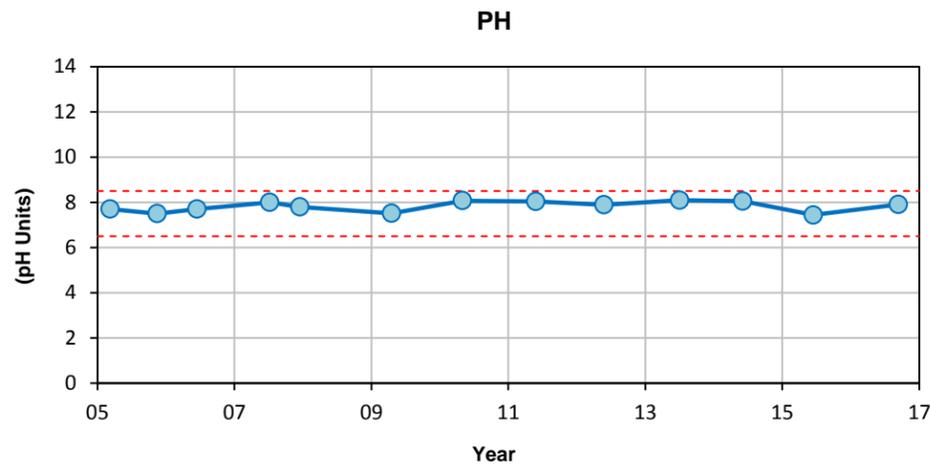
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Notes:

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- Dashed line between data points indicates data gap of more than two years
- - - - - Canadian Drinking Water AO Guidelines 2014:
- - - - - Canadian Drinking Water MAC Guidelines 2014:
- pH: 6.5-8.5 pH Units
- Chloride: 250 mg/L
- Iron: 0.3 mg/L
- Manganese: 0.05 mg/L
- Sodium: 200 mg/L
- Fluoride: 1.5 mg/L
- Sulphate: 500 mg/L
- Total Dissolved Solids (Calculated): 500 mg/L
- Dissolved Organic Carbon: N/A

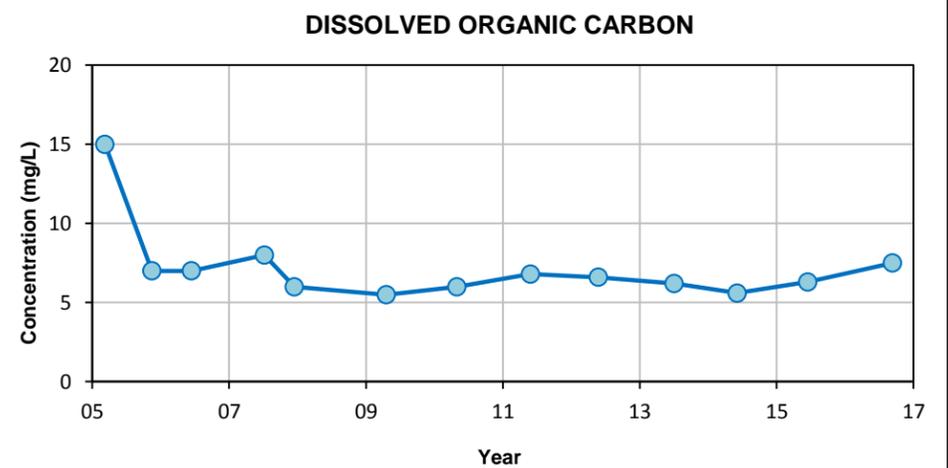
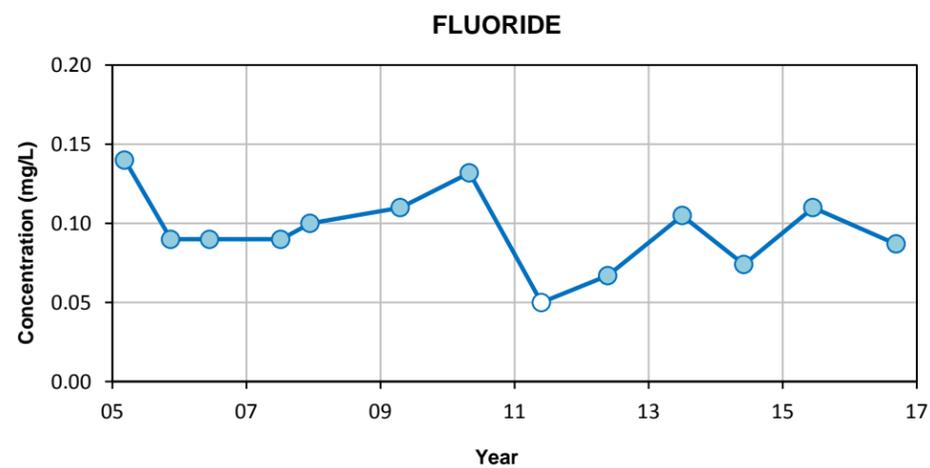
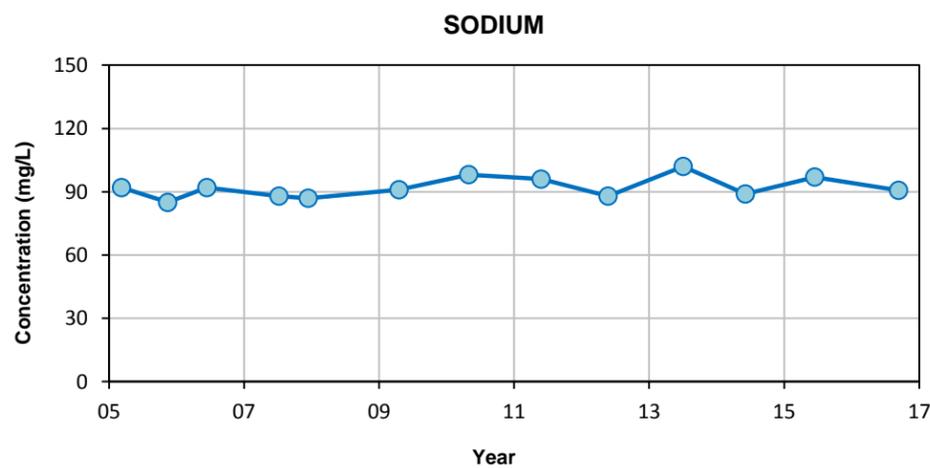
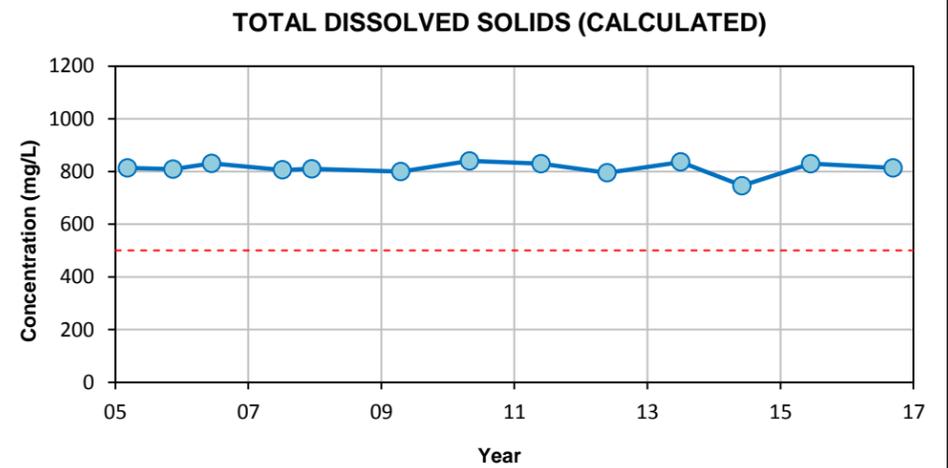
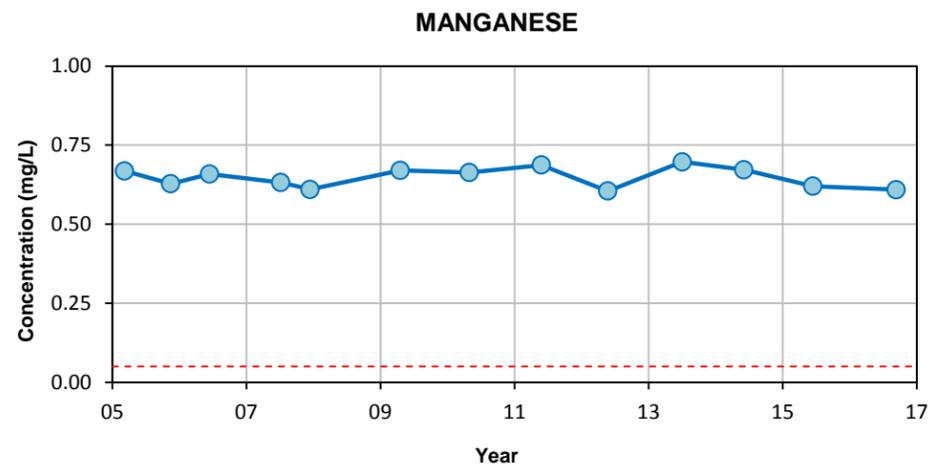
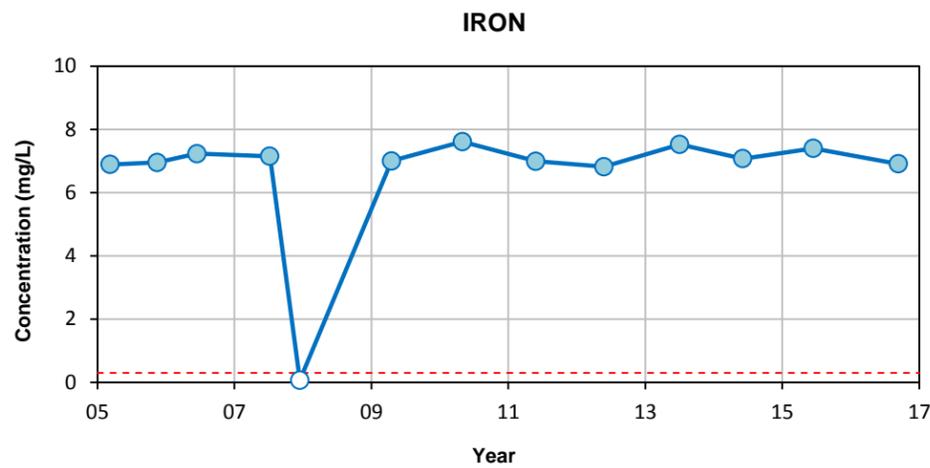
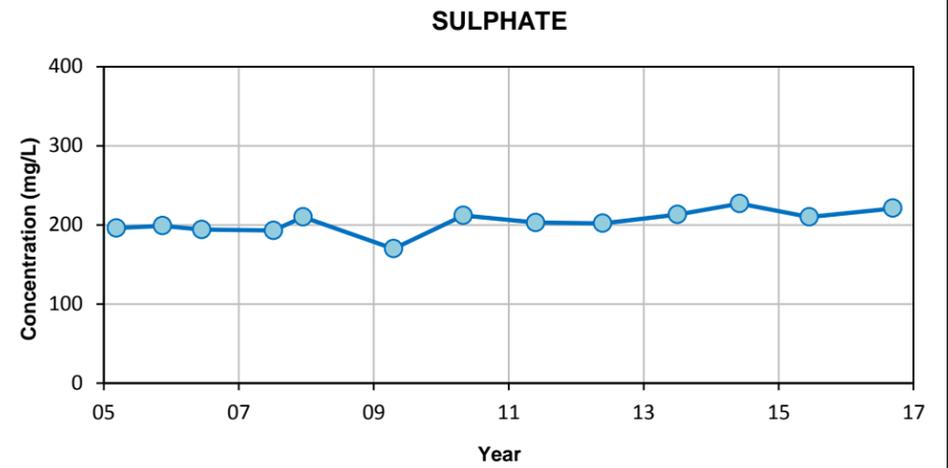
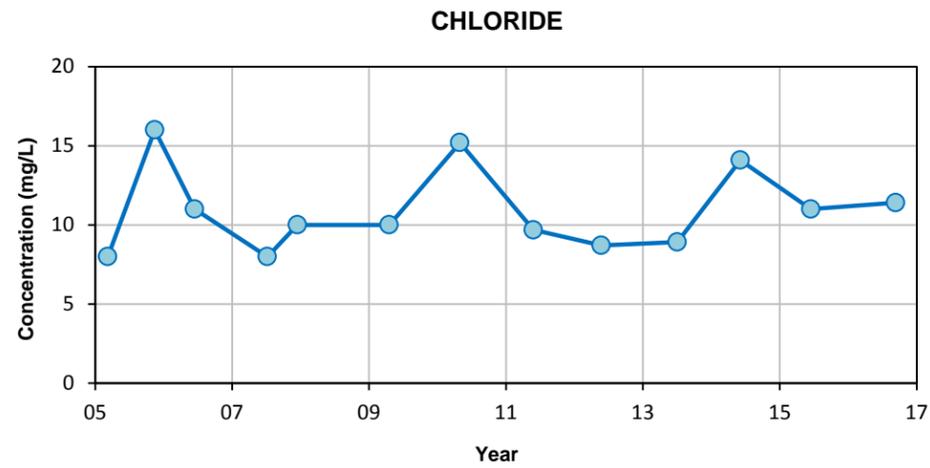
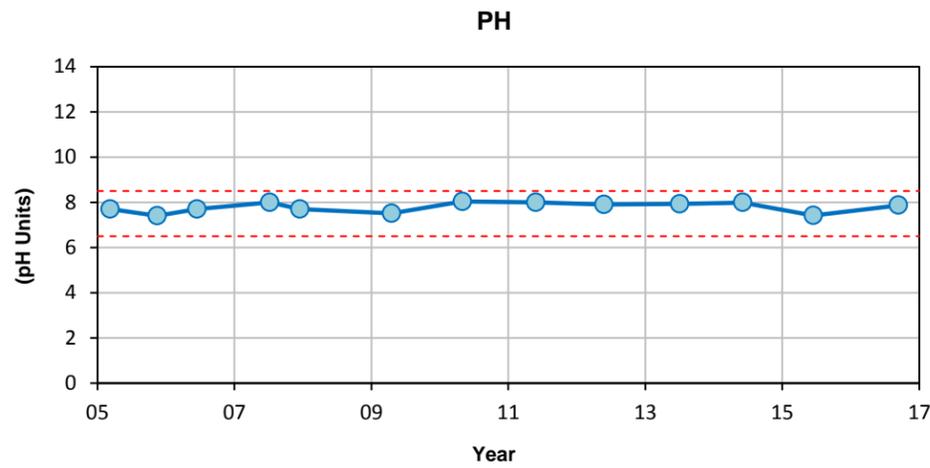
NORTHEAST CAPITAL INDUSTRY ASSOCIATION 2016 GROUNDWATER QUALITY MONITORING BEVERLY CHANNEL MONITORING WELLS			
HYDROCHEMICAL CONTROL CHARTS MW-09			
Date: 20-Oct-16	Drawn by: CM	Edited by:	App'd by:
		WorleyParsons Project No. 307075-01608-200	
FIG No.		REV	
A6-9		A	
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- Manganese: 0.05 mg/L
- Sodium: 200 mg/L
- Fluoride: 1.5 mg/L
- Sulphate: 500 mg/L
- Total Dissolved Solids (Calculated): 500 mg/L
- Dissolved Organic Carbon: N/A

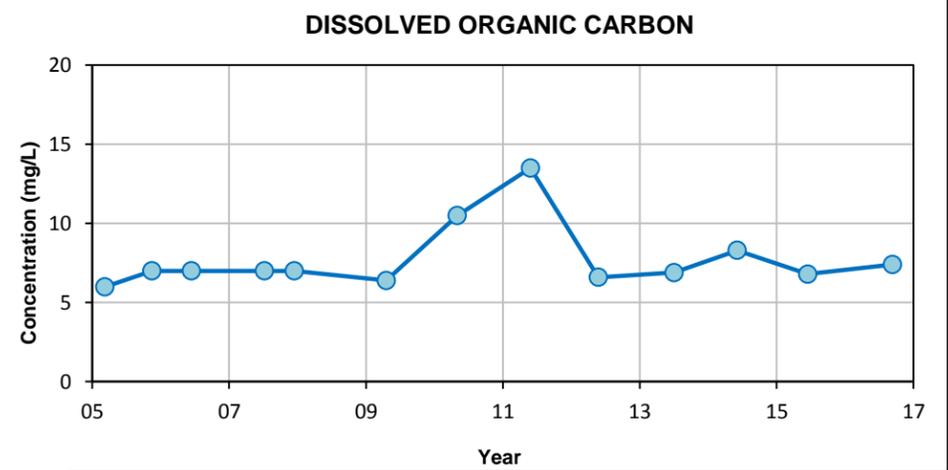
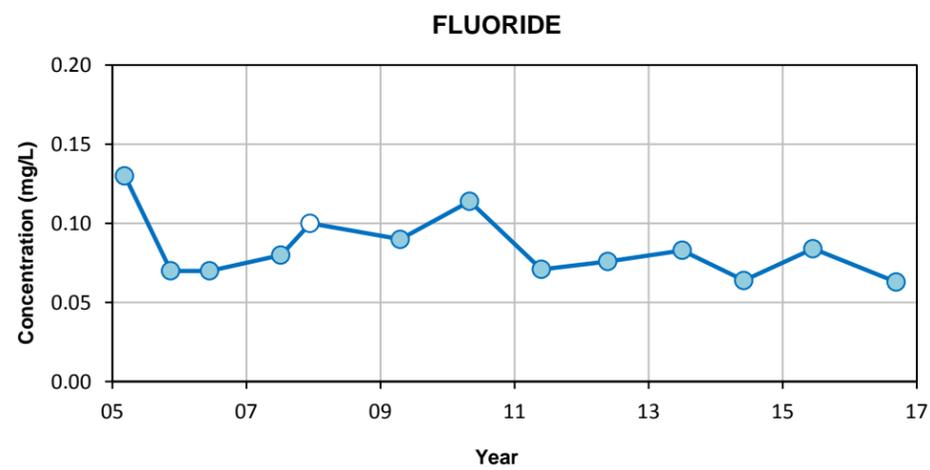
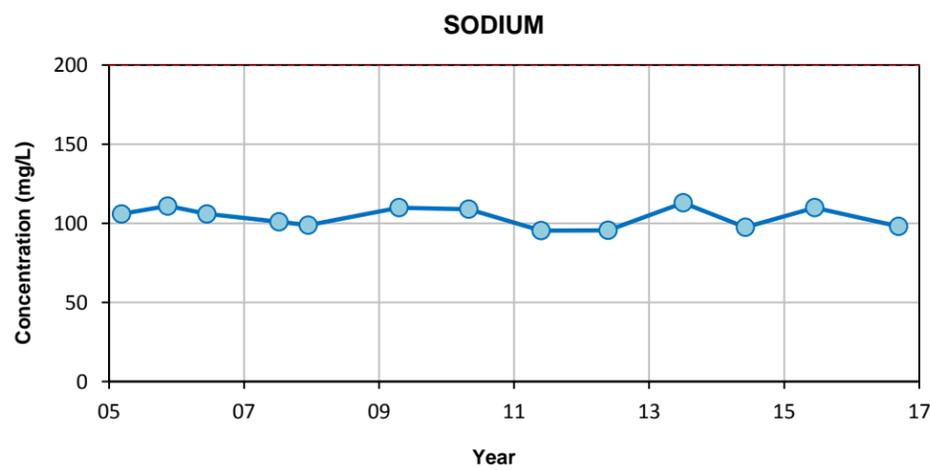
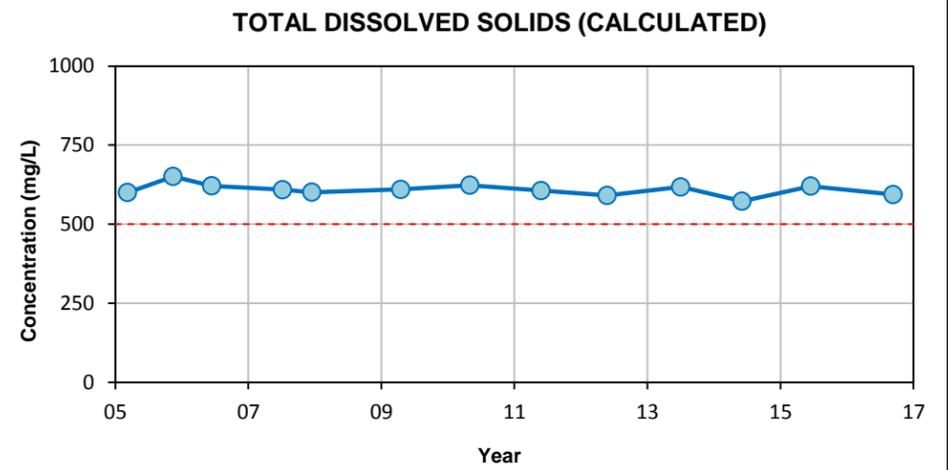
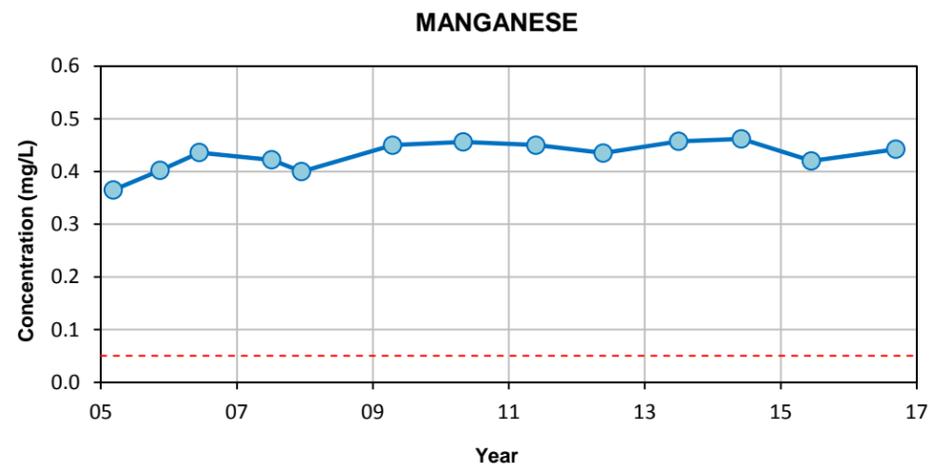
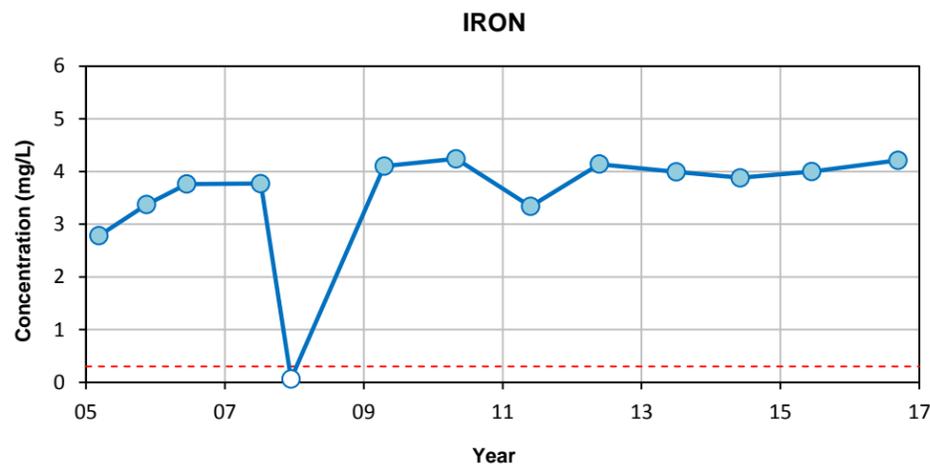
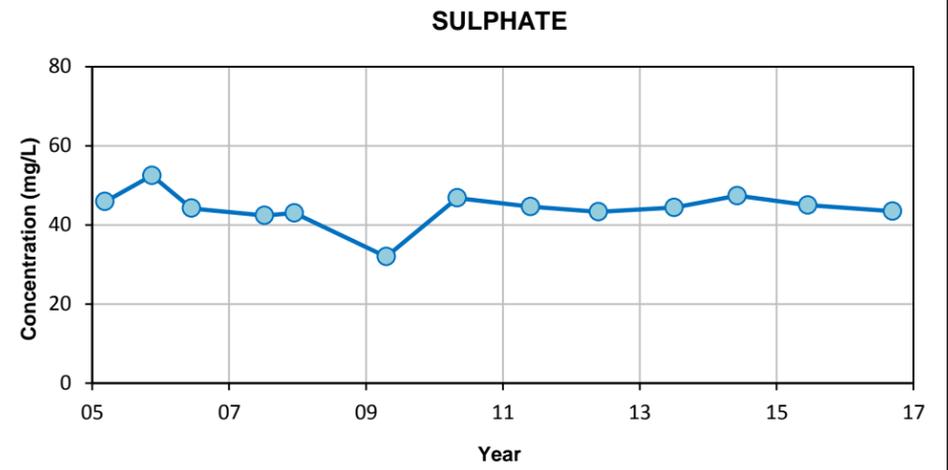
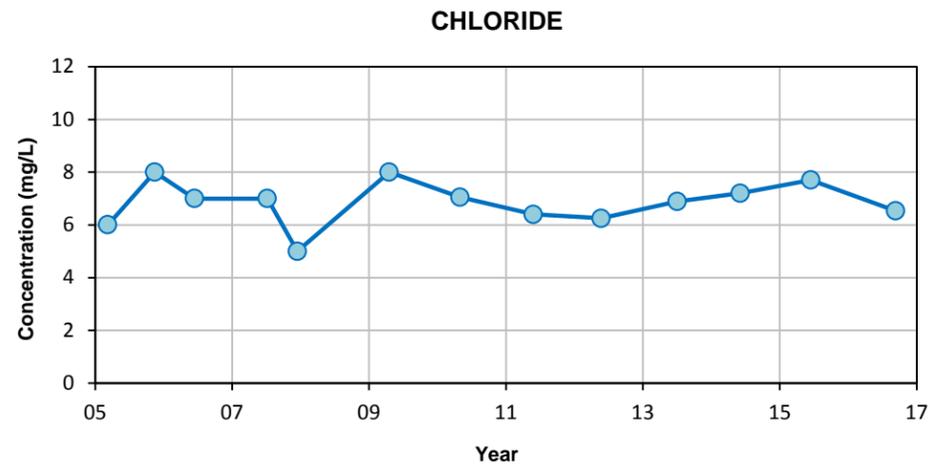
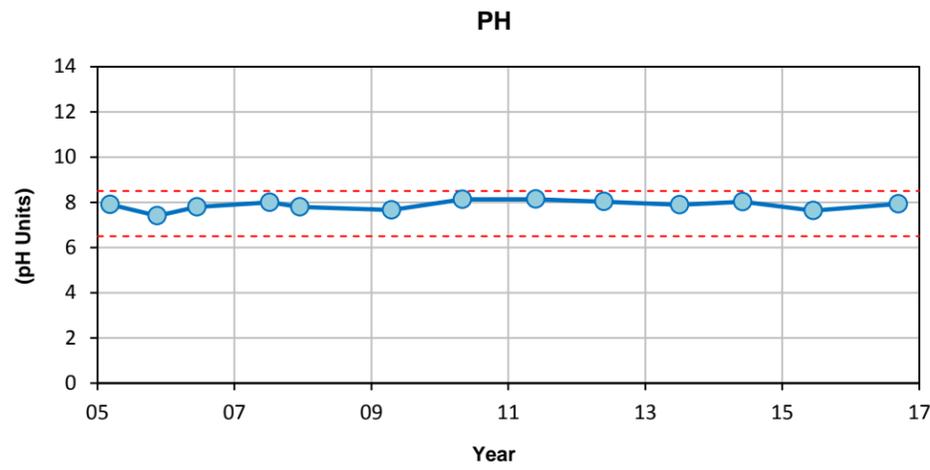
NORTHEAST CAPITAL INDUSTRY ASSOCIATION 2016 GROUNDWATER QUALITY MONITORING BEVERLY CHANNEL MONITORING WELLS			
HYDROCHEMICAL CONTROL CHARTS MW-10			
Date: 20-Oct-16	Drawn by: CM	Edited by:	App'd by:
		WorleyParsons Project No. 307075-01608-200	
FIG No. A6-10		REV A	
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- --- Canadian Drinking Water MAC Guidelines 2014:
- pH: 6.5-8.5 pH Units
- Chloride: 250 mg/L
- Iron: 0.3 mg/L
- Manganese: 0.05 mg/L
- Sodium: 200 mg/L
- Fluoride: 1.5 mg/L
- Sulphate: 500 mg/L
- Total Dissolved Solids (Calculated): 500 mg/L
- Dissolved Organic Carbon: N/A

NORTHEAST CAPITAL INDUSTRY ASSOCIATION 2016 GROUNDWATER QUALITY MONITORING BEVERLY CHANNEL MONITORING WELLS			
HYDROCHEMICAL CONTROL CHARTS MW-11			
Date: 20-Oct-16	Drawn by: CM	Edited by:	App'd by:
		WorleyParsons Project No. 307075-01608-200	
FIG No. A6-11		REV A	
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Notes:

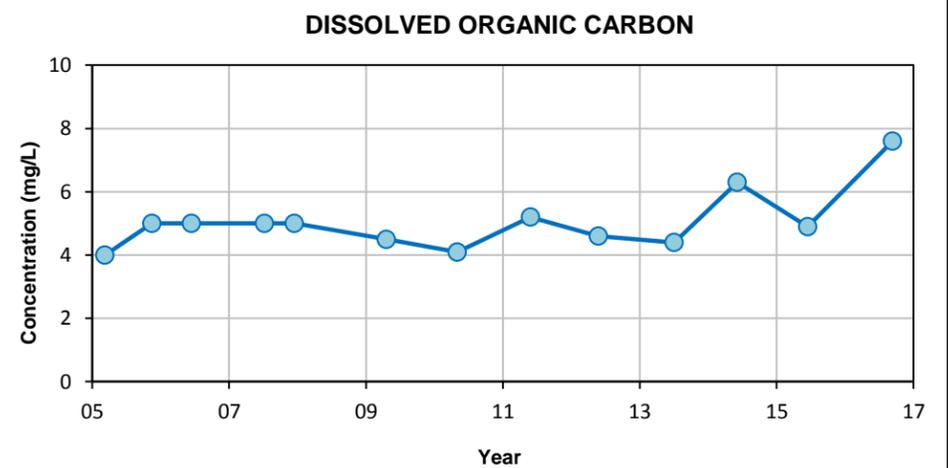
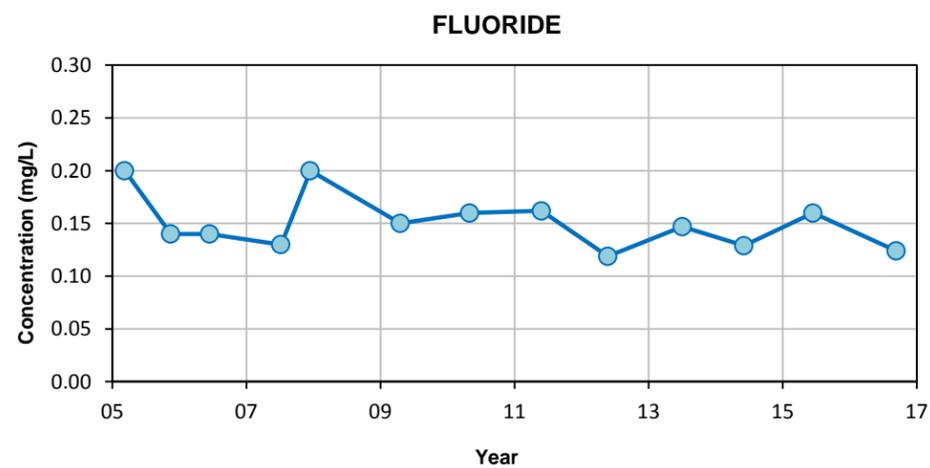
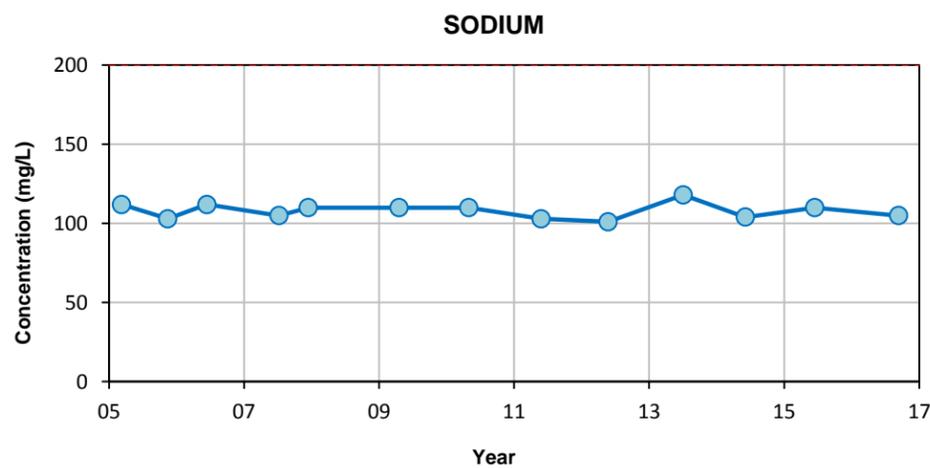
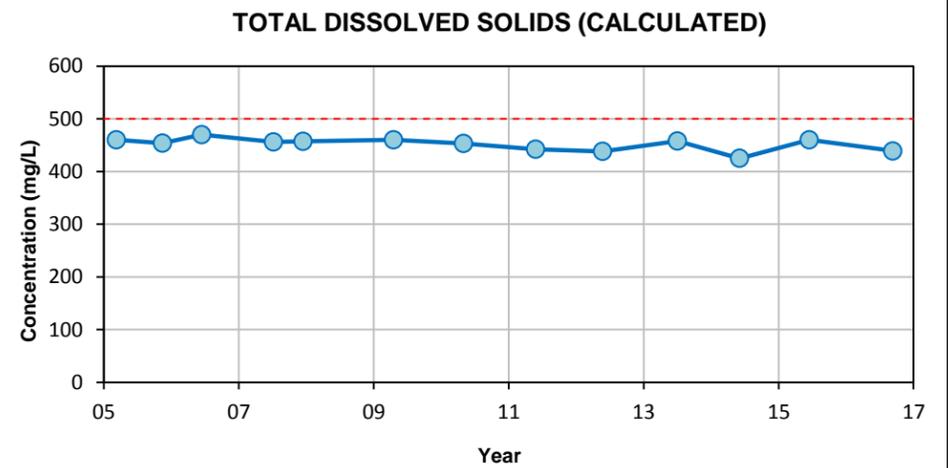
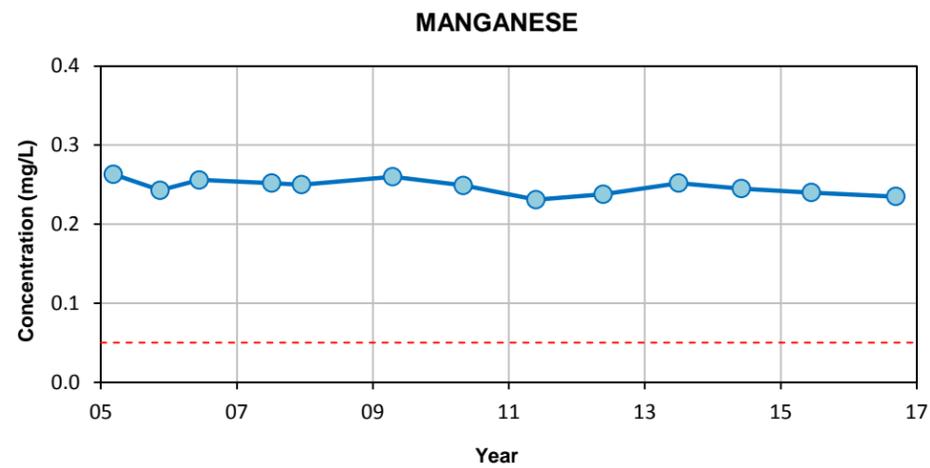
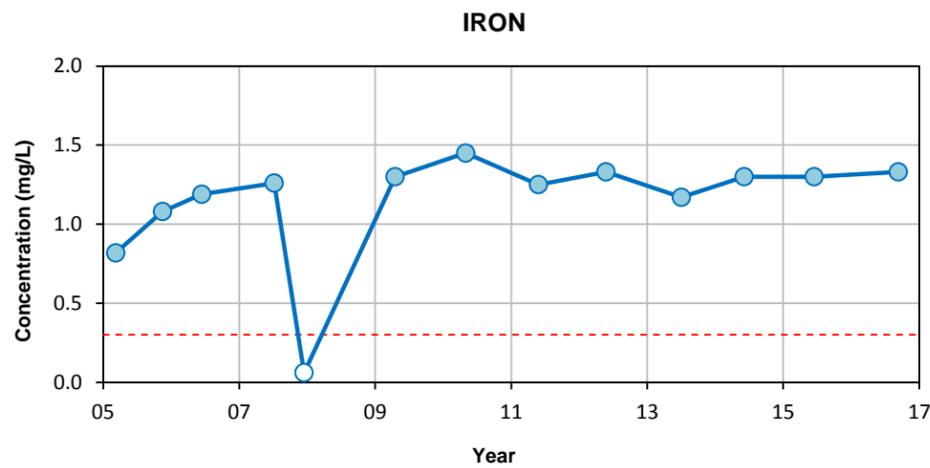
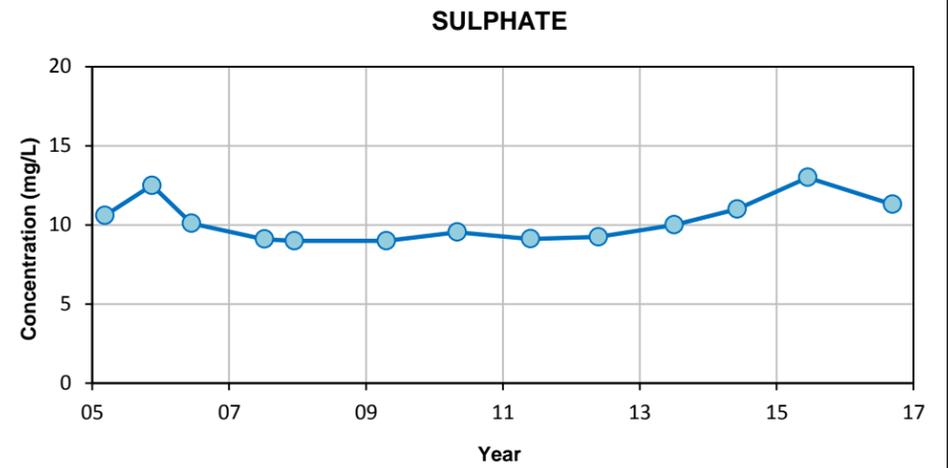
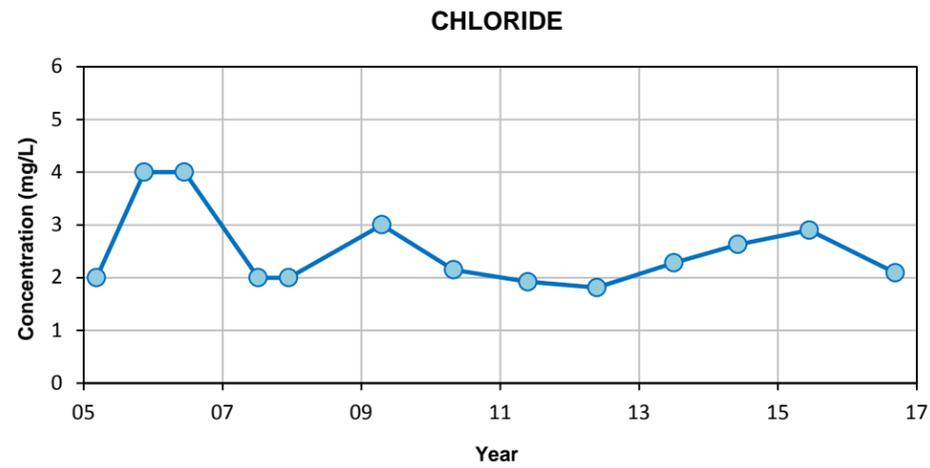
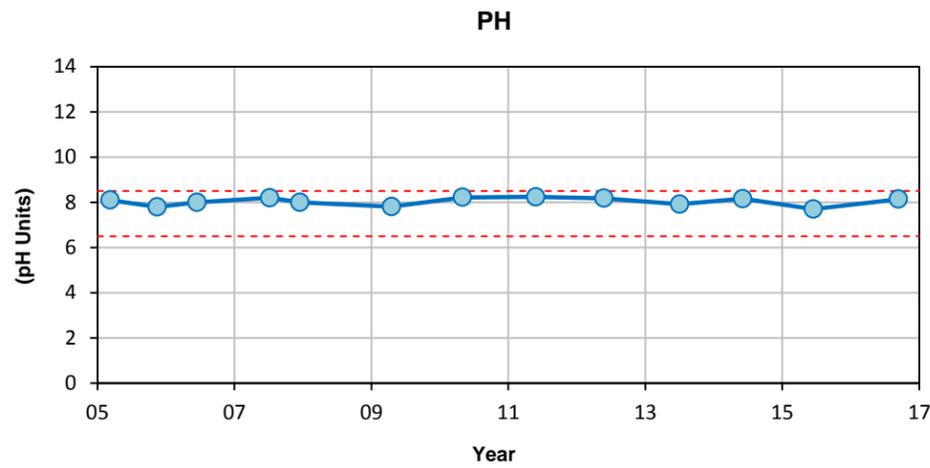
- Filled symbols denote sample values; unfilled symbols denote values less than detection limit(s)
- Dashed line between data points indicates data gap of more than two years
- --- Canadian Drinking Water AO Guidelines 2014:
- --- Canadian Drinking Water MAC Guidelines 2014:
- pH: 6.5-8.5 pH Units
- Chloride: 250 mg/L
- Iron: 0.3 mg/L
- Manganese: 0.05 mg/L
- Sodium: 200 mg/L
- Fluoride: 1.5 mg/L
- Sulphate: 500 mg/L
- Total Dissolved Solids (Calculated): 500 mg/L
- Dissolved Organic Carbon: N/A

NORTHEAST CAPITAL INDUSTRY ASSOCIATION
2016 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

HYDROCHEMICAL CONTROL CHARTS
MW-12

Date: 20-Oct-16	Drawn by: CM	Edited by:	App'd by:
		WorleyParsons Project No. 307075-01608-200	
FIG No. A6-12		REV A	

* This drawing is prepared solely for the use of our customer as specified in the accompanying report.
WorleyParsons Canada Services Ltd. assumes no liability to any other party for any representations contained in this drawing.*



Notes:

- Filled symbols denote sample values; unfilled symbols denote values less than detection limit(s)
- Dashed line between data points indicates data gap of more than two years
- --- Canadian Drinking Water AO Guidelines 2014:
- --- Canadian Drinking Water MAC Guidelines 2014:
- pH: 6.5-8.5 pH Units
- Chloride: 250 mg/L
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- Manganese: 0.05 mg/L
- Sodium: 200 mg/L
- Fluoride: 1.5 mg/L
- Sulphate: 500 mg/L
- Total Dissolved Solids (Calculated): 500 mg/L
- Dissolved Organic Carbon: N/A

NORTHEAST CAPITAL INDUSTRY ASSOCIATION
2016 GROUNDWATER QUALITY MONITORING
BEVERLY CHANNEL MONITORING WELLS

HYDROCHEMICAL CONTROL CHARTS
MW-13

Date: 20-Oct-16	Drawn by: CM	Edited by:	App'd by:
		WorleyParsons Project No. 307075-01608-200	
FIG No. A6-13		REV A	

* This drawing is prepared solely for the use of our customer as specified in the accompanying report.
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Appendix 7 Mann-Kendall/Sen's Slope Analysis and Statistical Table

Project No.: 307075-01608-200		Trend Analysis								Basic Analysis				
Monitoring Station	Parameter	S-Stat	Z-Stat	P Value of Two Tailed Test	Inferred Confidence Level (of Trend Present in Data Set)	Slope	Normalized Slope	Meets Trend Assumptions? ⁴	Statistically Significant Mann-Kendall Trend ³	Count	Min	Max	Average	Standard Deviation
		(-)	(-)	(-)	(%)	(mg/L/yr)	(%/yr)			(mg/L)	(mg/L)	(mg/L)	(mg/L)	
MW-12	Chloride	4	0.18	0.85	14.6%	0.02	0.22	Y	---	13	5	8	6.85	0.84
	Sulphate	0	0.00	1.00	0.0%	-0.02	-0.04	Y	---	13	32	52.5	44.23	4.51
	Fluoride	-17	0.98	0.33	67.2%	-1.6E-03	-1.98	Y	---	13	0.063	0.13	0.08	0.02
	Iron	36	2.14	0.03	96.7%	0.08	1.97	Y	---	13	0.06	4.24	3.51	1.12
	Manganese	33	1.96	0.05	95.0%	4.4E-03	1.00	Y	---	13	0.365	0.462	0.43	0.03
	Sodium	-12	0.67	0.50	49.9%	-0.38	-0.35	Y	---	13	95.4	113	103.99	6.37
	pH	11	0.61	0.54	45.9%	0.01	0.16	Y	---	13	7.4	8.14	7.87	0.21
	Total Dissolved Solids (Calculated)	-18	1.04	0.30	70.0%	-1.76	-0.29	Y	---	13	573	651	609.00	18.94
	Dissolved Organic Carbon	14	0.81	0.42	58.0%	0.06	0.79	Y	---	13	6	13.5	7.72	2.06
	MW-13	Chloride	-6	0.31	0.76	24.2%	-0.01	-0.52	Y	---	13	1.81	4	2.52
Sulphate		17	0.98	0.33	67.2%	0.07	0.69	Y	---	13	9	13	10.27	1.35
Fluoride		-19	1.10	0.27	73.1%	-1.9E-03	-1.28	Y	---	13	0.119	0.2	0.15	0.03
Iron		36	2.15	0.03	96.9%	0.02	1.80	Y	---	13	0.06	1.45	1.14	0.36
Manganese		-37	2.20	0.03	97.2%	-1.8E-03	-0.72	Y	---	13	0.231	0.263	0.25	0.01
Sodium		-11	0.62	0.53	46.7%	-0.17	-0.15	Y	---	13	101	118	107.92	4.84
pH		1	0.00	1.00	0.0%	1.5E-03	0.02	Y	---	13	7.7	8.24	8.04	0.18
Total Dissolved Solids (Calculated)		-27	1.60	0.11	89.0%	-1.77	-0.39	Y	---	13	425	470	451.69	12.22
Dissolved Organic Carbon		18	1.05	0.29	70.8%	0.05	1.09	Y	---	13	4	7.6	5.05	0.96
MW-02B		Chloride	---	---	---	---	---	---	N (Ins. trend data)	---	1	812	812	812.00
	Sulphate	---	---	---	---	---	---	N (Ins. trend data)	---	1	41.7	41.7	41.70	---
	Fluoride	---	---	---	---	---	---	N (Ins. trend data)	---	1	0.41	0.41	0.41	---
	Iron	---	---	---	---	---	---	N (Ins. trend data)	---	1	0.05	0.05	0.05	---
	Manganese	---	---	---	---	---	---	N (Ins. trend data)	---	1	0.109	0.109	0.11	---
	Sodium	---	---	---	---	---	---	N (Ins. trend data)	---	1	571	571	571.00	---
	pH	---	---	---	---	---	---	N (Ins. trend data)	---	1	8.28	8.28	8.28	---
	Total Dissolved Solids (Calculated)	---	---	---	---	---	---	N (Ins. trend data)	---	1	1650	1650	1650.00	---
	Dissolved Organic Carbon	---	---	---	---	---	---	N (Ins. trend data)	---	1	9.8	9.8	9.80	---

- Shading in the parameter column indicates one or more analyses returned notable results (analysis-specific shading is further specified below)
- Basic analysis performed with the following conditions:
 - Analyses performed on all sample data before 31-Dec-2016 (inclusive)
- Trend Analysis:
 - Analyses performed on all sample data before 31-Dec-2016 (inclusive)
 - Statistically significant 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%
 - 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
- Legend for trend assumptions:
 - Y: All conditions are met
 - N: Not all conditions are met, specified as follows:
 - 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

Appendix 8 Summary of Groundwater Quality Data

PROJECT NO.: 307075-01608-200

Table with columns for Monitoring Station, Units, Spring 2005, Fall 2005, Spring 2006, Summer 2007, Fall 2007, Spring 2009, Spring 2010, Spring 2011, Spring 2012, Summer 2013, Summer 2014 (June), Summer 2014 (August), Summer 2015, Summer 2016, Minimum, Maximum, Mean, Standard Deviation, and Count. It lists various groundwater parameters such as Elevation, Conductivity, pH, Temperature, and various metals.

NOTES:

- 1. Electrical conductivity values standardized to 25°C (within the limitations of the equipment).
2. --- Denotes parameter not measured.
3. N/A Denotes that statistics are not available due to limited detected values.
4. Highlighting indicates parameters exceeding Canadian Drinking Water AO Guidelines (Health Canada, 2014).
5. No parameters exceed Canadian Drinking Water MAC Guidelines (Health Canada 2014).
6. Anomalous iron concentrations from Fall 2007 are not included in calculations.
7. Results from 16-June-2014 are not included in the calculations as chloride concentrations and ion balance are considered anomalous.

PROJECT NO.: 307075-01608-200																				
Monitoring Station	Units	Spring 2005	Fall 2005	Spring 2006	Summer 2007	Fall 2007	Spring 2009	Spring 2010	Spring 2011	Spring 2012	Summer 2013	Summer 2014	Summer 2015	Summer 2016	Minimum	Maximum	Mean	Standard Deviation	Count	
		Groundwater Elevation	(m btoc)	26.89	26.9	26.72	26.87	26.74	26.72	26.93	26.70	26.80	26.73	26.63	26.67	26.72	26.63	26.93	26.77	0.10
Depth To Groundwater	(m asl)	597.78	597.77	597.95	597.8	597.93	597.95	597.74	597.97	597.81	597.94	598.04	598	597.95	597.74	598.04	597.89	0.10	13	
Field-Measured Parameters																				
Electrical Conductivity	(µS/cm)	---	---	---	---	---	---	1,287	1,192	1,267	1,247	1,292	1,242	1,162	1,162	1,292	1,241.29	48.43	7	
pH	(--)	---	---	---	---	---	---	7.11	7.36	7.29	7.24	7.42	7.36	7.21	7.11	7.42	7.28	0.11	7	
Temperature	(°C)	---	---	---	---	---	---	6.6	9.1	7.4	7.0	7.8	7.9	8.1	6.6	9.1	7.70	0.81	7	
Select Indicator Parameters																				
Calcium	(mg/L)	131	129	139	132	120	140	139	113	127	141	125	130	131	113	141	130.54	8.21	13	
Chloride	(mg/L)	<1	3	2	2	<1	2	0.73	1.19	0.53	0.68	0.67	1.1	0.66	0.53	3	N/A	N/A	13	
Fluoride	(mg/L)	0.18	0.12	0.13	0.12	0.2	0.14	0.169	<0.050	0.113	0.107	0.110	0.16	0.114	0.107	0.2	N/A	N/A	13	
Iron	(mg/L)	5.29	5.49	5.89	5.93	<0.06	5.9	6.8	3.89	5.98	6.11	6.10	6.3	6.01	3.89	6.8	5.81	0.71	13	
Magnesium	(mg/L)	36.1	35.2	37.8	36.9	29	36	39.1	30.2	31.6	37.3	34.2	36	35.9	29	39.1	35.02	3.01	13	
Manganese	(mg/L)	0.639	0.642	0.67	0.656	0.64	0.71	0.735	0.566	0.655	0.729	0.689	0.67	0.676	0.566	0.735	0.67	0.04	13	
Potassium	(mg/L)	5.3	5	5.6	4.7	4.8	5.6	---	5.58	5.79	6.22	5.79	5.8	5.74	4.7	6.22	5.49	0.46	12	
Sodium	(mg/L)	117	108	119	110	110	120	124	105	111	118	108	120	111	105	124	113.92	5.95	13	
Bicarbonate	(mg/L)	628	634	641	651	660	620	633	607	639	638	507	640	619	507	660	624.38	37.86	13	
Carbonate	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	N/A	N/A	N/A	N/A	13	
Hydroxide	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	N/A	N/A	N/A	N/A	13	
Nitrite-as-Nitrogen	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.06	<0.003	<0.050	<0.050	<0.050	<0.050	<0.020	<0.010	<0.010	N/A	N/A	N/A	N/A	13	
Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	<0.1	<0.1	<0.2	0.005	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.020	0.005	0.1	N/A	N/A	13	
Nitrite-plus-Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	<0.1	<0.1	<0.2	0.005	<0.071	<0.071	<0.071	<0.071	<0.054	<0.020	<0.022	0.005	0.1	N/A	N/A	13	
Sulphate	(mg/L)	221	222	212	208	230	190	227	206	211	215	229	210	222	190	230	215.62	11.18	13	
Dissolved Organic Carbon	(mg/L)	5	6	6	5	5	4.7	5.1	6.7	5.9	5.4	6.9	5.1	6.6	4.7	6.9	5.65	0.75	13	
Electrical Conductivity	(µS/cm)	1270	1260	1120	1270	1300	1300	1270	1260	1290	1250	1110	1300	1270	1110	1300	1251.54	62.83	13	
Ion Balance	(%)	99.7	93.8	103	97.2	0.84	110	104	89.9	93.5	103	106	---	97.8	0.84	110	91.56	29.14	12	
pH	(--)	7.7	7.5	7.7	8	7.8	7.51	8.07	8.04	7.89	8.09	8.05	7.44	7.9	7.44	8.09	7.82	0.23	13	
Phenols	(mg/L)	<0.001	<0.001	<0.001	<0.001	0.002	0.002	<0.0010	0.0018	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	0.0018	0.002	N/A	N/A	13	
Total Dissolved Solids	(mg/L)	819	814	831	814	822	800	847	759	801	833	845	820	811	759	847	816.62	22.61	13	
Total Alkalinity as CaCO ₃	(mg/L)	514	520	525	533	540	510	519	497	524	523	416	520	508	416	540	511.46	30.68	13	
Total Hardness as CaCO ₃	(mg/L)	476	467	503	482	410	490	508	407	447	506	453	480	475	407	508	469.54	32.82	13	
Dissolved Metals Parameters																				
Aluminum	(mg/L)	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.0050	<0.0050	0.0139	<0.0050	<0.0050	<0.0030	<0.0010	0.0139	0.0139	N/A	N/A	13	
Antimony	(mg/L)	0.0007	0.0006	0.0006	0.0005	<0.0002	<0.0002	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00060	<0.00010	0.0005	0.0007	N/A	N/A	13	
Arsenic	(mg/L)	0.003	0.0037	0.0036	0.0039	0.002	0.0044	0.00459	0.00287	0.0042	0.00485	0.00463	0.0039	0.00468	0.002	0.00485	0.00	0.00	13	
Barium	(mg/L)	0.0296	0.0331	0.0319	0.0291	0.02	---	0.029	0.0321	0.0273	0.0295	0.0282	0.03	0.03	0.02	0.0331	0.03	0.00	12	
Beryllium	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00010	N/A	N/A	N/A	N/A	13	
Bismuth	(mg/L)	<0.00005	<0.0001	<0.00005	<0.00005	---	---	---	---	---	---	---	---	---	N/A	N/A	N/A	N/A	4	
Boron	(mg/L)	0.209	0.202	0.187	0.168	0.16	---	0.177	0.17	0.15	0.162	0.127	0.18	0.18	0.127	0.209	0.17	0.02	12	
Cadmium	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	0.000007	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.000050	0.000007	0.000007	N/A	N/A	13	
Chromium	(mg/L)	0.0012	<0.0004	0.0011	0.0015	<0.001	<0.001	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0010	<0.00010	0.0011	0.0015	N/A	N/A	13	
Cobalt	(mg/L)	0.0003	0.0005	0.0003	0.0004	0.0005	<0.0003	0.00044	0.00031	0.00032	0.00032	0.00031	0.0003	0.00031	0.0003	0.0005	N/A	N/A	13	
Copper	(mg/L)	0.0007	0.0009	0.0009	0.0008	0.0006	0.0006	0.0015	<0.0010	<0.0010	<0.0010	<0.0010	<0.00020	<0.00020	0.0006	0.0015	N/A	N/A	13	
Lead	(mg/L)	0.0004	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.000050	0.0004	0.0004	N/A	N/A	13	
Mercury	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.00005	<0.00001	<0.00010	<0.000020	<0.000020	<0.000020	<0.000050	---	<0.000050	N/A	N/A	N/A	N/A	12	
Molybdenum	(mg/L)	0.0009	0.001	0.0009	0.0009	0.0011	0.0009	0.00097	0.00481	0.000884	0.00087	0.000770	0.00088	0.000633	0.000633	0.00481	0.00	0.00	13	
Nickel	(mg/L)	<0.0001	<0.0001	<0.0001	0.003	0.0029	0.001	0.0029	<0.0020	<0.0020	<0.0020	<0.0020	0.00085	0.00092	0.00085	0.003	N/A	N/A	13	
Selenium	(mg/L)	<0.0004	0.0006	<0.0004	<0.0004	<0.001	<0.0002	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00020	<0.000050	0.0006	0.0006	N/A	N/A	13	
Silver	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000010	N/A	N/A	N/A	N/A	13	
Strontium	(mg/L)	1.29	1.43	1.41	1.55	1.3	---	---	---	---	---	---	1.4	---	1.29	1.55	1.40	0.10	6	
Thallium	(mg/L)	<0.0005	<0.0001	<0.00005	<0.00005	<0.0002	<0.0002	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00020	<0.000010	N/A	N/A	N/A	N/A	13	
Tin	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.001	---	---	---	---	---	<0.0010	---	N/A	N/A	N/A	N/A	7	
Titanium	(mg/L)	0.0008	0.0008	0.0007	0.0007	0.002	<0.001	0.00083	<0.00030	<0.00030	<0.00030	<0.00030	<0.0010	<0.00030	0.0007	0.002	N/A	N/A	13	
Uranium	(mg/L)	0.0019	0.0015	0.0014	0.0013	0.0014	0.0011	0.00115	0.00133	0.00113	0.00116	0.00117	0.0012	0.00113	0.0011	0.0019	0.00	0.00	13	
Vanadium	(mg/L)	<0.0001	<0.0001	<0.0001	0.0004	<0.001	<0.001	<0.00010	0.00021	<0.00010	<0.00010	<0.00010	<0.0010	<0.00050	0.00021	0.0004	N/A	N/A	13	
Zinc	(mg/L)	0.003	<0.002	0.009	0.015	<0.003	<0.003	0.0023	0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0010	0.0023	0.015	N/A	N/A	13	
Petroleum Hydrocarbon Parameters																				
Benzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	N/A	N/A	N/A	N/A	13	
Toluene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00075	<0.00075	<0.00075	<0.00050	<0.00050	<0.00040							

PROJECT NO.: 307075-01608-200

Monitoring Station	Units	Spring 2005	Fall 2005	Spring 2006	Summer 2007	Fall 2007	Spring 2009	Spring 2010	Spring 2011	Spring 2012	Summer 2013	Summer 2014	Summer 2015	Summer 2016	Minimum	Maximum	Mean	Standard Deviation	Count	
Groundwater Elevation	(m btoc)	30.6	30.41	30.34	30.38	30.4	30.35	30.64	30.46	30.35	30.26	30.19	30.19	30.40	30.19	30.64	30.38	0.13	13	
Depth To Groundwater	(m asi)	594.56	594.75	594.82	594.78	594.76	594.81	594.52	594.7	594.81	594.9	594.97	594.97	594.76	594.52	594.97	594.78	0.13	13	
Field-Measured Parameters																				
Electrical Conductivity	(µS/cm)	---	---	---	---	---	---	1,303	1,341	1282	1258	1322	1241	1156	1156	1341	1271.86	61.83	7	
pH	(--)	---	---	---	---	---	---	7.06	7.42	7.19	7.18	7.38	7.26	7.04	7.04	7.42	7.22	0.15	7	
Temperature	(°C)	---	---	---	---	---	---	7.2	6.9	9.8	7.4	7.3	7.3	8.2	6.9	9.8	7.73	1.00	7	
Select Indicator Parameters																				
Calcium	(mg/L)	150	140	153	143	130	150	144	148	134	147	136	140	148	130	153	143.31	6.96	13	
Chloride	(mg/L)	8	16	11	8	10	10	15.2	9.69	8.71	8.92	14.1	11	11.4	8	16	10.92	2.64	13	
Fluoride	(mg/L)	0.14	0.09	0.09	0.09	0.1	0.11	0.132	<0.050	0.067	0.105	0.074	0.11	0.087	0.067	0.14	N/A	N/A	13	
Iron	(mg/L)	6.89	6.95	7.23	7.15	<0.06	7	7.61	6.99	6.82	7.52	7.07	7.4	6.91	6.82	7.61	7.13	0.26	13	
Magnesium	(mg/L)	45.8	42.5	45.7	45.3	38	45	45.9	46.4	38.7	44.7	41.5	45	44.3	38	46.4	43.75	2.76	13	
Manganese	(mg/L)	0.668	0.628	0.659	0.632	0.61	0.67	0.663	0.687	0.605	0.697	0.672	0.62	0.609	0.605	0.697	0.65	0.03	13	
Potassium	(mg/L)	4.9	4.5	4.8	3.9	4.3	4.9	---	5.36	5.34	5.09	5.32	5	4.97	3.9	5.36	4.87	0.44	12	
Sodium	(mg/L)	92	85	92	88	87	91	98.1	96	87.9	102	89.0	97	90.7	85	102	91.98	4.97	13	
Bicarbonate	(mg/L)	642	654	672	662	680	640	650	653	648	640	473	640	595	473	680	634.54	52.57	13	
Carbonate	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	N/A	N/A	N/A	N/A	13	
Hydroxide	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	N/A	N/A	N/A	N/A	13	
Nitrite-as-Nitrogen	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.06	<0.003	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	N/A	N/A	N/A	N/A	13	
Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	<0.1	<0.1	<0.2	0.003	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.003	0.1	N/A	N/A	13	
Nitrite-plus-Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	<0.1	<0.1	<0.2	0.003	<0.071	<0.071	<0.071	<0.071	<0.071	<0.071	<0.071	0.003	0.1	N/A	N/A	13	
Sulphate	(mg/L)	196	199	194	193	210	170	212	203	202	213	227	210	221	170	227	203.85	14.45	13	
Dissolved Organic Carbon	(mg/L)	15	7	7	8	6	5.5	6	6.8	6.6	6.2	5.6	6.3	7.5	5.5	15	7.19	2.45	13	
Electrical Conductivity	(µS/cm)	1270	1270	1100	1280	1300	1300	1290	1320	1300	1270	1090	1300	1270	1090	1320	1258.46	74.26	13	
Ion Balance	(%)	104	93.4	101	98.6	0.87	110	99.1	102	91.8	103	110	---	103	0.87	110	93.06	29.55	12	
pH	(--)	7.7	7.4	7.7	8	7.7	7.51	8.04	8	7.9	7.93	7.99	7.42	7.87	7.4	8.04	7.78	0.23	13	
Phenols	(mg/L)	<0.001	<0.001	<0.001	<0.001	0.002	0.004	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.002	0.004	N/A	N/A	13	
Total Dissolved Solids	(mg/L)	813	809	831	806	810	800	840	830	795	828	856	830	813	795	856	820.08	17.37	13	
Total Alkalinity as CaCO ₃	(mg/L)	526	536	551	542	560	530	533	536	531	525	388	520	488	388	560	520.46	43.26	13	
Total Hardness as CaCO ₃	(mg/L)	563	525	570	544	480	560	549	561	494	551	510	540	552	480	570	538.38	28.05	13	
Dissolved Metals Parameters																				
Aluminum	(mg/L)	<0.01	0.02	<0.01	<0.01	<0.001	<0.001	<0.0050	<0.0050	0.0106	<0.0050	<0.0050	<0.0030	<0.0010	0.0106	0.02	N/A	N/A	13	
Antimony	(mg/L)	0.0008	0.0006	0.0006	0.0004	<0.0002	<0.0002	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00060	<0.00010	0.0004	0.0008	N/A	N/A	13	
Arsenic	(mg/L)	0.0022	0.0025	0.0022	0.0023	<0.001	0.0024	0.00259	0.00239	0.00232	0.0026	0.00255	0.0022	0.00262	0.0022	0.00262	N/A	N/A	13	
Barium	(mg/L)	0.0494	0.0466	0.044	0.0377	0.03	---	0.0396	0.0423	0.0386	0.0424	0.0421	0.043	0.0415	0.03	0.0494	0.04	0.00	12	
Beryllium	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	N/A	N/A	N/A	N/A	13	
Bismuth	(mg/L)	<0.00005	0.00008	<0.00005	<0.00005	---	---	---	---	---	---	---	---	---	0.00008	0.00008	N/A	N/A	4	
Boron	(mg/L)	0.189	0.227	0.205	0.186	0.18	---	0.189	0.199	0.161	0.173	0.135	0.19	0.206	0.135	0.227	0.19	0.02	12	
Cadmium	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	0.000009	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.000050	0.000009	0.000009	N/A	N/A	13	
Chromium	(mg/L)	0.0011	0.0006	0.0013	0.0016	<0.001	<0.001	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0010	<0.00010	0.0006	0.0016	N/A	N/A	13	
Cobalt	(mg/L)	0.0006	0.0007	0.0003	0.0004	0.0006	0.0004	0.00047	0.00038	0.00036	0.00030	0.00030	<0.00030	<0.00020	0.00028	0.00028	0.0007	0.00	0.00	13
Copper	(mg/L)	<0.0006	0.0009	0.0009	<0.0006	0.0008	0.0007	<0.0010	0.0017	<0.0010	<0.0010	<0.0010	<0.00020	<0.00020	0.0007	0.0017	N/A	N/A	13	
Lead	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.000050	N/A	N/A	N/A	N/A	13	
Mercury	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.00005	0.000001	<0.00010	<0.00020	<0.00020	<0.00020	<0.000050	---	<0.000050	0.000001	0.000001	N/A	N/A	12	
Molybdenum	(mg/L)	0.001	0.0009	0.0006	0.0007	0.001	0.0007	0.00072	0.00061	0.00069	0.0007	0.000539	0.00065	0.000471	0.000471	0.001	0.00	0.00	13	
Nickel	(mg/L)	<0.0001	<0.0001	<0.0001	0.0027	0.0027	0.0008	0.0027	<0.0020	<0.0020	<0.0020	<0.0020	<0.00050	<0.00050	0.0008	0.0027	N/A	N/A	13	
Selenium	(mg/L)	<0.0004	<0.0004	0.0004	<0.0004	<0.001	<0.0002	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00020	<0.000050	0.0004	0.0004	N/A	N/A	13	
Silver	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000010	N/A	N/A	N/A	N/A	13	
Strontium	(mg/L)	1.27	1.24	1.22	1.35	1.1	---	---	---	---	---	---	1.2	---	1.1	1.35	1.23	0.08	6	
Thallium	(mg/L)	<0.0005	<0.0001	<0.0005	<0.0005	<0.0002	<0.0002	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00020	<0.000010	N/A	N/A	N/A	N/A	13	
Tin	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.001	---	---	---	---	---	<0.0010	---	N/A	N/A	N/A	N/A	7	
Titanium	(mg/L)	0.0008	0.001	0.001	0.0024	0.003	<0.001	0.00102	<0.00030	<0.00030	<0.00030	0.00119	<0.0010	<0.00030	0.0008	0.003	N/A	N/A	13	
Uranium	(mg/L)	0.0012	0.0012	0.0011	0.0011	0.0013	0.001	0.001	0.00109	0.001	0.00116	0.00099	0.001	0.000977	0.000977	0.0013	0.00	0.00	13	
Vanadium	(mg/L)	0.0001	<0.0001	<0.0001	0.0004	<0.001	<0.001	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050	0.0001	0.0004	N/A	N/A	13	
Zinc	(mg/L)	0.004	<0.002	0.009	<0.002	<0.003	<0.003	0.0023	0.0105	<0.0030	<0.0030	<0.0030	<0.0030	<0.0010	0.0023	0.0105	N/A	N/A	13	
Petroleum Hydrocarbon Parameters																				
Benzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	N/A	N/A	N/A	N/A	13	
Toluene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00075	<0.00075	<0.00075	<0.00075	<0.00050	<0.00040	<0.00050	N/A	N/A	N/A	N/A	13	
Ethylbenzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.000													

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Monitoring Station	Units	Spring 2005	Fall 2005	Spring 2006	Summer 2007	Fall 2007	Spring 2009	Spring 2010	Spring 2011	Spring 2012	Summer 2013	Summer 2014	Summer 2015	Summer 2016	Minimum	Maximum	Mean	Standard Deviation	Count
Groundwater Elevation	(m btoc)	32.95	33.05	33.62	32.9	32.77	32.76	33.01	32.84	32.89	32.82	32.84	32.83	32.92	32.76	33.62	32.94	0.22	13
Depth To Groundwater	(m asl)	593.12	593.02	592.45	593.17	593.3	593.31	593.06	593.23	593.18	593.25	593.23	593.24	593.15	592.45	593.31	593.13	0.22	13
Field-Measured Parameters																			
Electrical Conductivity	(µS/cm)	---	---	---	---	---	---	1,032	983	1024	998	1020	992	941	941	1032	998.57	31.15	7
pH	(--)	---	---	---	---	---	---	---	6.95	7.37	7.34	7.42	7.3	7.18	6.95	7.42	7.27	0.16	7
Temperature	(°C)	---	---	---	---	---	---	5.1	8.7	7.3	6.1	7.6	6.6	7.6	5.1	8.7	7.00	1.17	7
Select Indicator Parameters																			
Calcium	(mg/L)	95.7	94.9	100	95.4	82	98	96.4	98.1	89.8	101	93.8	93	94.9	82	101	94.85	4.86	13
Chloride	(mg/L)	6	8	7	7	5	8	7.05	6.4	6.25	6.89	7.2	7.7	6.53	5	8	6.85	0.84	13
Fluoride	(mg/L)	0.13	0.07	0.07	0.08	<0.1	0.09	0.114	0.071	0.076	0.083	0.0064	0.084	0.063	0.0064	0.13	N/A	N/A	13
Iron	(mg/L)	2.78	3.37	3.76	3.77	<0.06	4.1	4.24	3.34	4.14	3.99	3.88	4	4.21	2.78	4.24	3.80	0.44	13
Magnesium	(mg/L)	27.9	28.5	29.1	29.2	23	29	30.2	30.9	25.6	28.9	27.7	29	28.4	23	30.9	28.26	2.02	13
Manganese	(mg/L)	0.365	0.402	0.436	0.422	0.4	0.45	0.456	0.45	0.435	0.457	0.462	0.42	0.442	0.365	0.462	0.43	0.03	13
Potassium	(mg/L)	5	5.2	5.1	4.2	4.3	4.9	---	4.86	5.23	5	5.14	5	4.76	4.2	5.23	4.89	0.33	12
Sodium	(mg/L)	106	111	106	101	99	110	109	95.4	95.7	113	97.6	110	98.2	95.4	113	103.99	6.37	13
Bicarbonate	(mg/L)	636	712	669	670	700	650	667	662	660	649	598	660	646	598	712	659.92	27.95	13
Carbonate	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	<5.0	<5.0	<5.0	<0.50	<5.0	N/A	N/A	N/A	N/A	13
Hydroxide	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	<5.0	<5.0	<5.0	<0.50	<5.0	N/A	N/A	N/A	N/A	13
Nitrite-as-Nitrogen	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.06	<0.003	<0.050	<0.050	<0.050	<0.050	<0.050	<0.020	<0.010	<0.010	N/A	N/A	N/A	13
Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	<0.1	<0.1	<0.2	0.005	<0.050	<0.050	<0.050	<0.050	<0.050	0.011	<0.020	0.005	0.1	N/A	N/A	13
Nitrite-plus-Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	<0.1	<0.1	<0.2	0.005	<0.071	<0.071	<0.071	<0.071	<0.054	<0.020	<0.022	0.005	0.1	N/A	N/A	13
Sulphate	(mg/L)	46	53	44	42.4	43	32	47	---	43	44	47.4	45	43.5	32	52.5	44.20	4.71	12
Dissolved Organic Carbon	(mg/L)	6	7	7	7	7	6.4	10.5	13.5	6.6	6.9	8.3	6.8	7.4	6	13.5	7.72	2.06	13
Electrical Conductivity	(µS/cm)	1000	1020	904	1020	1000	1000	1030	1050	1030	1000	915	1000	1000	904	1050	997.62	42.30	13
Ion Balance	(%)	102	92.7	100	97.4	0.84	110	100	97.9	91.5	106	103	---	98.2	0.84	110	91.63	29.05	12
pH	(--)	7.9	7.4	7.8	8	7.8	7.66	8.13	8.14	8.03	7.89	8.02	7.63	7.93	7.4	8.14	7.87	0.21	13
Phenols	(mg/L)	<0.001	<0.001	<0.001	<0.001	0.002	0.003	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.002	0.003	N/A	N/A	13
Total Dissolved Solids	(mg/L)	600	651	621	609	601	610	623	606	591	628	619	620	594	591	651	613.31	16.20	13
Total Alkalinity as CaCO ₃	(mg/L)	521	584	549	550	570	540	547	543	541	532	490	540	530	490	584	541.31	22.51	13
Total Hardness as CaCO ₃	(mg/L)	354	354	370	358	300	360	365	372	330	371	348	350	354	300	372	352.77	19.51	13
Dissolved Metals Parameters																			
Aluminum	(mg/L)	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.0050	<0.0050	0.0146	<0.0050	<0.0050	<0.0030	0.0024	0.0024	0.0146	N/A	N/A	13
Antimony	(mg/L)	0.0008	0.0005	0.0006	0.0005	<0.0002	<0.0002	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00060	<0.00010	0.0005	0.0008	N/A	N/A	13
Arsenic	(mg/L)	0.0022	0.0026	0.0023	0.0025	0.002	0.0026	0.00285	0.00199	0.00267	0.00285	0.00266	0.0022	0.0028	0.00199	0.00285	0.002	0.002	13
Barium	(mg/L)	0.153	0.182	0.178	0.146	0.1	---	0.143	0.13	0.112	0.143	0.125	0.12	0.125	0.1	0.182	0.14	0.02	12
Beryllium	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00010	<0.00010	N/A	N/A	N/A	13
Bismuth	(mg/L)	<0.00005	0.00006	<0.00005	<0.00005	---	---	---	---	---	---	---	---	---	0.00006	0.00006	N/A	N/A	4
Boron	(mg/L)	0.234	0.282	0.251	0.233	0.22	---	0.242	0.244	0.219	0.227	0.178	0.24	0.245	0.178	0.282	0.23	0.02	12
Cadmium	(mg/L)	<0.0001	<0.0001	<0.00012	<0.001	<0.0002	0.000006	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00002	<0.000050	0.000006	0.00002	N/A	N/A	13
Chromium	(mg/L)	0.0038	<0.0004	0.0016	0.0015	<0.001	<0.001	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0010	<0.00010	0.0015	0.0038	N/A	N/A	13
Cobalt	(mg/L)	0.0008	0.001	0.0007	0.0012	0.0007	0.0006	0.00065	0.00043	0.00046	0.00045	0.00044	0.00039	0.00041	0.00039	0.0012	0.001	0.00	13
Copper	(mg/L)	<0.0006	0.0008	<0.0006	<0.0006	<0.0002	0.0008	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.00020	<0.00020	0.0008	0.0008	N/A	N/A	13
Lead	(mg/L)	0.0004	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.000050	0.0004	0.0004	N/A	N/A	13
Mercury	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	0.00007	0.000001	<0.00010	<0.00020	<0.00020	<0.00020	<0.000050	---	<0.000050	0.000001	0.00007	N/A	N/A	12
Molybdenum	(mg/L)	0.0015	0.0013	0.0012	0.0017	0.0014	0.0012	0.00115	0.00102	0.00121	0.00115	0.000921	0.001	0.000685	0.000685	0.0017	0.00	0.00	13
Nickel	(mg/L)	<0.0001	<0.0001	<0.0001	0.0033	0.0021	0.0012	0.0022	<0.0020	<0.0020	<0.0020	<0.0020	0.0015	0.00062	0.00062	0.0033	N/A	N/A	13
Selenium	(mg/L)	<0.0004	<0.0004	<0.0004	<0.0004	<0.001	<0.0002	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00020	<0.000050	N/A	N/A	N/A	N/A	13
Silver	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000010	N/A	N/A	N/A	N/A	13
Strontium	(mg/L)	0.915	0.903	0.925	0.972	0.84	---	---	---	---	---	---	---	---	0.84	0.972	0.91	0.04	6
Thallium	(mg/L)	<0.0005	<0.0001	<0.0005	<0.0005	<0.0002	<0.0002	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00020	<0.000010	N/A	N/A	N/A	N/A	13
Tin	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	N/A	N/A	N/A	N/A	7
Titanium	(mg/L)	0.0011	0.0008	0.0008	0.0007	0.002	<0.001	0.00081	<0.00030	<0.00030	<0.00030	<0.00030	<0.0010	<0.00030	0.0007	0.002	N/A	N/A	13
Uranium	(mg/L)	0.001	0.0011	0.001	0.0009	0.0011	0.0008	0.00083	0.00087	0.00085	0.00094	0.00080	0.00075	0.00081	0.00075	0.0011	0.00	0.00	13
Vanadium	(mg/L)	<0.0001	<0.0001	<0.0001	0.0004	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.00050	0.0004	0.0004	N/A	N/A	13
Zinc	(mg/L)	0.01	<0.002	0.007	0.004	<0.003	<0.003	<0.0020	0.0021	<0.0030	<0.0030	0.0044	<0.0030	<0.0010	0.0021	0.01	N/A	N/A	13
Petroleum Hydrocarbon Parameters																			
Benzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	N/A	N/A	N/A	N/A	13
Toluene	(mg/L)	<0.																	

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Monitoring Station	Units	Year													Minimum	Maximum	Mean	Standard Deviation	Count	
		Spring 2005	Fall 2005	Spring 2006	Summer 2007	Fall 2007	Spring 2009	Spring 2010	Spring 2011	Spring 2012	Summer 2013	Summer 2014	Summer 2015	Summer 2016						
Groundwater Elevation																				
Depth To Groundwater	(m btoc)	32.6	33.45	33.24	32.54	32.39	32.41	32.68	32.46	32.56	32.49	32.49	32.45	12.43	32.39	33.45	32.64	0.33	13	
Groundwater Surface Elevation	(m asl)	593.68	592.83	593.04	593.74	593.89	593.87	593.6	593.82	593.72	593.79	593.79	593.83	18:00	592.83	593.89	593.63	0.33	13	
Field-Measured Parameters																				
Electrical Conductivity	(µS/cm)	---	---	---	---	---	---	776	541	733	759	775	734	741	541	776	719.67	82.14	7	
pH	(--)	---	---	---	---	---	---	7.53	7.06	7.69	7.6	7.77	7.69	7.45	7.06	7.77	7.56	0.24	7	
Temperature	(°C)	---	---	---	---	---	---	7.0	8.5	6.9	10.1	7.2	7	7.4	6.9	10.1	7.78	1.18	7	
Select Indicator Parameters																				
Calcium	(mg/L)	53.7	51.2	55.6	53	45	54	50	48.1	48	49.7	48.8	49	50.9	45	55.6	50.51	2.94	13	
Chloride	(mg/L)	2	4	4	2	2	3	2.15	1.92	1.81	2.28	2.63	2.9	2.09	1.81	4	2.56	0.75	13	
Fluoride	(mg/L)	0.2	0.14	0.14	0.13	0.2	0.15	0.16	0.162	0.119	0.147	0.129	0.16	0.124	0.119	0.2	0.15	0.03	13	
Iron	(mg/L)	0.818	1.08	1.19	1.26	<0.06	1.3	1.45	1.25	1.33	1.17	1.3	1.3	1.33	0.818	1.45	1.22	0.16	13	
Magnesium	(mg/L)	16.5	16.2	17.1	16.9	14	17	16.4	15.3	14.4	16.2	15.4	16	15.4	14	17.1	15.95	0.96	13	
Manganese	(mg/L)	0.263	0.243	0.256	0.252	0.25	0.26	0.249	0.231	0.238	0.252	0.245	0.24	0.235	0.231	0.263	0.25	0.01	13	
Potassium	(mg/L)	4.2	3.4	3.9	3.5	3.5	3.9	---	3.74	4	3.98	4.07	3.9	3.77	3.4	4.2	3.83	0.25	12	
Sodium	(mg/L)	112	103	112	105	110	110	110	103	101	118	104	110	105	101	118	108.17	4.84	13	
Bicarbonate	(mg/L)	531	537	715	541	560	520	530	530	529	525	485	530	508	485	715	544.42	54.91	13	
Carbonate	(mg/L)	<5	<5	541	<5	<1	<0.5	<5.0	<5.0	<5.0	<5.0	<5.0	<0.50	<5.0	541	541	N/A	N/A	13	
Hydroxide	(mg/L)	<5	<5	<5	<5	<1	<0.5	<5.0	<5.0	<5.0	<5.0	<5.0	<0.50	<5.0	N/A	N/A	N/A	N/A	13	
Nitrite-as-Nitrogen	(mg/L)	<0.05	<0.05	<0.05	<0.05	<0.06	<0.003	<0.050	<0.050	<0.050	<0.050	<0.050	<0.020	<0.010	N/A	N/A	N/A	N/A	13	
Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	0.2	<0.1	<0.2	0.005	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.020	0.005	0.2	N/A	N/A	13	
Nitrite-plus-Nitrate-as-Nitrogen	(mg/L)	0.1	<0.1	0.2	<0.1	<0.2	0.005	<0.071	<0.071	<0.071	<0.071	<0.054	<0.020	<0.022	0.005	0.2	N/A	N/A	13	
Sulphate	(mg/L)	10.6	12.5	10.1	9.1	9.0	9.0	9.5	9.1	9.2	10.0	11.0	13	11.3	9	13	10.18	1.35	13	
Dissolved Organic Carbon																				
Dissolved Organic Carbon	(mg/L)	4	5	5	5	5	4.5	4.1	5.2	4.6	4.4	6.3	4.9	7.6	4	7.6	4.83	0.96	13	
Electrical Conductivity	(µS/cm)	784	782	715	782	790	770	776	796	786	769	698	780	762	698	796	769.00	29.15	13	
Ion Balance	(%)	100	92.2	99.4	96.3	0.87	100	97.5	92.1	90.5	102	101	---	98.2	0.87	102	88.35	28.06	12	
pH	(--)	8.1	7.8	8	8.2	8	7.81	8.22	8.24	8.18	7.92	8.16	7.7	8.14	7.7	8.24	8.03	0.18	13	
Phenols	(mg/L)	<0.001	<0.001	<0.001	0.001	<0.001	0.003	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	0.001	0.003	N/A	N/A	13	
Total Dissolved Solids	(mg/L)	460	454	470	456	457	460	453	442	438	464	457	460	439	438	470	455.92	9.61	13	
Total Alkalinity as CaCO ₃	(mg/L)	435	440	443	444	460	430	435	434	433	430	398	430	417	398	460	434.33	14.48	13	
Total Hardness as CaCO ₃	(mg/L)	202	195	209	202	170	200	192	183	179	191	185	190	191	170	209	191.50	10.60	13	
Dissolved Metals Parameters																				
Aluminum	(mg/L)	<0.01	0.07	<0.01	<0.01	<0.001	<0.001	<0.0050	<0.0050	<0.0050	<0.0050	0.0371	<0.0030	0.0023	0.0023	0.07	N/A	N/A	13	
Antimony	(mg/L)	0.0008	0.0006	0.0006	0.0004	<0.0002	<0.0002	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.00060	<0.00010	0.0004	0.0008	N/A	N/A	13	
Arsenic	(mg/L)	0.0012	0.0016	0.0014	0.0014	0.001	0.0015	0.00162	0.00157	0.0014	0.00176	0.00179	0.0014	0.00167	0.001	0.00179	0.00	0.00	13	
Barium	(mg/L)	0.389	0.413	0.424	0.428	0.29	---	0.407	0.411	0.354	0.462	0.420	0.4	0.394	0.29	0.462	0.40	0.04	12	
Beryllium	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00010	N/A	N/A	N/A	N/A	13	
Bismuth	(mg/L)	<0.00005	<0.0001	<0.00005	<0.00005	---	---	---	---	---	---	---	---	---	N/A	N/A	N/A	N/A	4	
Boron	(mg/L)	0.258	0.301	0.273	0.246	0.25	---	0.254	0.265	0.197	0.221	0.196	0.26	0.266	0.196	0.301	0.25	0.03	12	
Cadmium	(mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	0.000005	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.000050	0.000005	0.000005	N/A	N/A	13	
Chromium	(mg/L)	0.0048	0.0007	0.0011	0.0016	<0.001	<0.001	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0010	<0.00010	0.0007	0.0048	N/A	N/A	13	
Cobalt	(mg/L)	0.0008	0.0033	0.0007	0.0009	0.0009	0.0007	0.00092	0.00062	0.00065	0.00128	0.00074	0.00062	<0.00064	0.00062	0.0033	0.00	0.00	13	
Copper	(mg/L)	<0.0006	0.0007	<0.0006	<0.0006	<0.0002	0.0003	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.00020	<0.00020	0.0003	0.0007	N/A	N/A	13	
Lead	(mg/L)	0.0002	0.0002	<0.0001	<0.0001	<0.0002	<0.0002	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.000050	0.0002	0.0002	N/A	N/A	13	
Mercury	(mg/L)	<0.0001	0.0001	<0.0001	<0.0001	0.00007	<0.000001	<0.00010	<0.00020	<0.00020	<0.00020	<0.000050	---	0.000212	0.00007	0.000212	N/A	N/A	12	
Molybdenum	(mg/L)	0.0023	0.0027	0.0021	0.0023	0.0028	0.0022	0.00219	0.00194	0.0018	0.00484	0.00183	0.0022	0.00157	0.00157	0.00484	0.00	0.00	13	
Nickel	(mg/L)	0.0009	0.0015	<0.0001	0.0022	0.0016	0.0012	0.0021	<0.0020	<0.0020	0.0112	<0.0020	0.00086	0.0009	0.00086	0.0112	N/A	N/A	13	
Selenium	(mg/L)	<0.0004	0.0005	<0.0004	<0.0004	<0.001	<0.0002	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00020	<0.000050	0.0005	0.0005	N/A	N/A	13	
Silver	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000010	N/A	N/A	N/A	N/A	13	
Strontium	(mg/L)	0.57	0.542	0.553	0.58	0.5	---	---	---	---	---	---	---	---	0.5	0.58	0.54	0.03	6	
Thallium	(mg/L)	<0.0005	<0.0001	<0.0005	<0.0005	<0.0002	<0.0002	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00020	<0.000010	N/A	N/A	N/A	N/A	13	
Tin	(mg/L)	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.001	---	---	---	---	---	<0.0010	---	N/A	N/A	N/A	N/A	7	
Titanium	(mg/L)	0.0006	0.0006	0.0006	0.0006	0.002	<0.001	0.0007	<0.00030	<0.00030	<0.00030	0.00148	<0.0010	<0.00030	0.0006	0.002	N/A	N/A	13	
Uranium	(mg/L)	0.0008	0.0009	0.0008	0.0008	0.0009	0.0007	0.00069	0.00073	0.00063	0.00075	0.00069	0.00065	0.000664	0.00063	0.0009	0.00	0.00	13	
Vanadium	(mg/L)	<0.0001	<0.0001	<0.0001	0.0004	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	0.00013	<0.0010	<0.00050	0.00013	0.0004	N/A	N/A	13	
Zinc	(mg/L)	0.005	<0.002	0.009	<0.002	<0.003	<0.003	<0.0020	<0.0020	<0.0030	<0.0030	<0.0030	<0.0030	<0.0010	0.005	0.009	N/A	N/A	13	
Petroleum Hydrocarbon Parameters																				
Benzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	N/A	N/A	N/A	N/A	13	
Toluene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00040	<0.00050	N/A	N/A	N/A	N/A	13	
Ethylbenzene	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	N/A	N/A	N/A	N/A	13	
Xylenes-total	(mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0008	<0.0008	<0.001	<0.001	<0.00071	<0.00071	<0.00071	<0.00080	<0.00071	N/A	N/A	N/A	N/A	13	
PHC F1 (C ₆ -C ₁₀)	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	N/A	N/A	N/A	N/A	13	
PHC F1 (C ₆ -C ₁₀) - BTEX	(mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	N/A	N/A	N/A	N/A	13	
PHC F2 (C ₁₀ -C ₁₆)	(mg/L																			