



2023 to 2024 Groundwater Monitoring Report

Calahoo Resource Extraction District
Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M

**Prepared for
Sturgeon County**

November 2024

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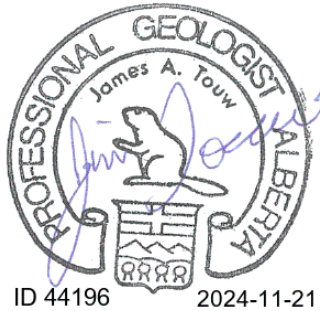


Groundwater and Surface Water Solutions for a Changing Environment

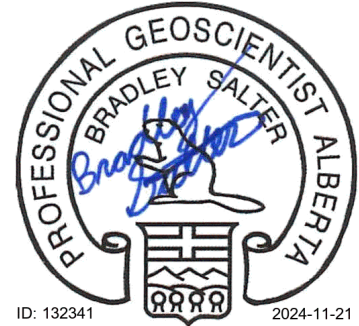
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Executive Summary

The Calahoo Resource Extraction District (CRED) is an area in Sturgeon County (the County) that is partially situated within Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M.

Hydrogeological Consultants Ltd. (HCL) was retained by the County to monitor groundwater levels and groundwater quality within the area of interest (AOI), which was previously referred to as the Villeneuve–Calahoo Sand and Gravel Extraction Area Structure Plan (ASP), and to present and review the data as part of a groundwater monitoring report associated with the activities of the aggregate extractions in the area. The present report, with information to at least April 25, 2024, includes the data collected since the previous groundwater monitoring report.

Groundwater monitoring began in 2001; the monitoring involves measuring water levels in and collecting groundwater samples from the monitoring wells for chemical analysis. In 2024, data were collected from 21 monitoring wells and 7 private water wells. All monitoring sites are near operating, suspended, or reclaimed aggregate pit operations.

There have been noteworthy groundwater-quality trends for two chemical parameters in the AOI; the trends are local and are related to five monitoring wells. One trend is related to the sulfate concentrations in the groundwaters from monitoring wells in the southeastern corner of the AOI, where there has been a history of elevated sulfate (HCL, 2023). The other noteworthy trend is related to the concentration of chloride, which has been on a rising trend in the groundwater from MW14-02 since monitoring began in 2015 and has also been on a rising trend in the groundwater from MW10-01 since 2019. Aggregate dewatering and extraction activities are not considered to be the cause of any changes in the sulfate or chloride concentrations in the groundwaters from these five monitoring wells.

The groundwaters from three monitoring wells had uranium or arsenic concentrations that exceeded the maximum acceptable concentrations (MACs) in 2024; uranium and arsenic are naturally occurring, and their concentrations in the groundwaters do not show an increasing or decreasing trend. The groundwater samples collected from all but two monitoring wells had manganese concentrations that exceeded the MAC in 2024; the elevated concentrations are not due to aggregate extraction but represent naturally occurring or background conditions.

Between 2015 and 2018, water levels in the west–central part of the AOI declined by as much as approximately 10 metres as a result of nearby active aggregate mining operations. The expectation is that the water levels will rise once aggregate operations cease in the area.

The water-level monitoring data continue to document the low level of impact on groundwater supplies that is resulting from aggregate extraction. The groundwater-quality monitoring data show no indication that the aggregate mining or processing activities in the area have had a significant effect on the groundwater quality.

It is recommended that the present groundwater monitoring program be continued. It is also recommended that:

- Local operators share future mining plans to allow for new monitoring wells to be added to the CRED groundwater monitoring program in advance of mining operations
- An abbreviated hydrogeological assessment be completed for the SW 28-054-27 W4M within the Group 1 area before mining activities begin in the quarter section
- The Sturgeon River water-level elevation be added to the monitoring network

1. Introduction

The Calahoo Resource Extraction District (CRED) is partially situated within Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, approximately 30 kilometres northwest of the City of Edmonton, as shown in Figure 1. The area of interest (AOI) within the CRED is approximately 5 to 20 kilometres northwest of the City of St. Albert, as shown in Figure 2.¹

1.1. Purpose

Hydrogeological Consultants Ltd. (HCL) was retained by Sturgeon County (the County) to monitor groundwater levels and groundwater quality within the AOI associated with the aggregate extraction activities in the area, and to prepare the present report. The present report includes information to at least April 25, 2024.

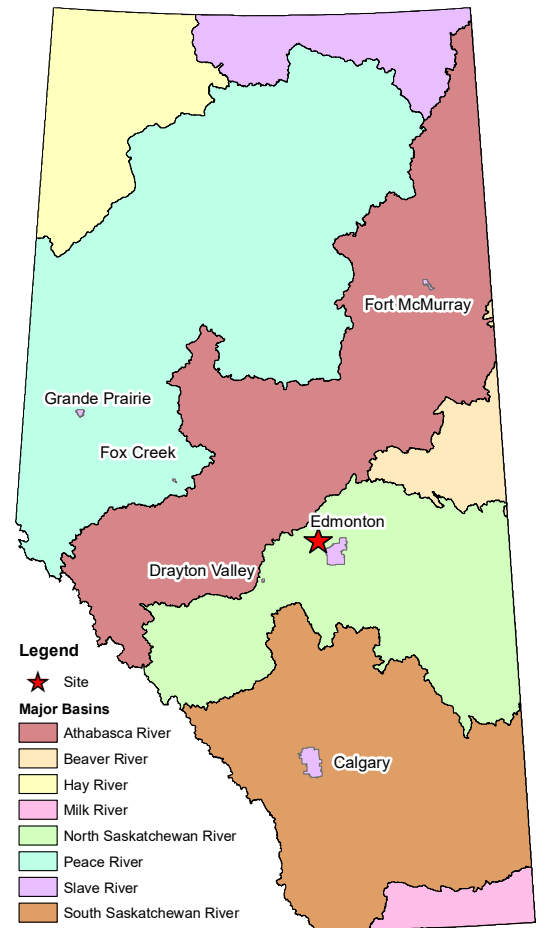


Figure 1. Index Map – Regional

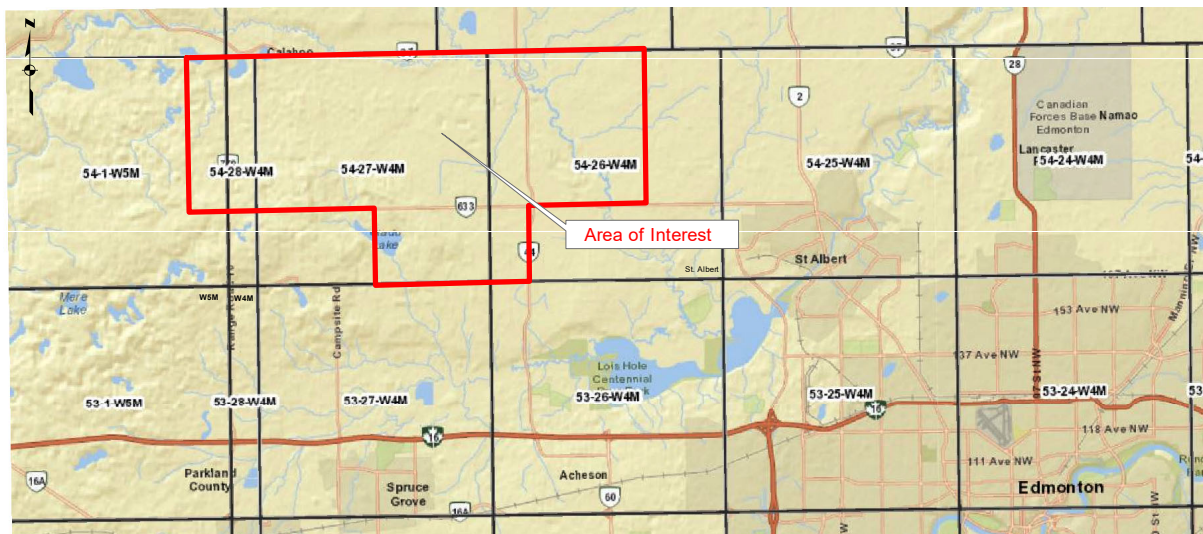


Figure 2. Index Map – Area of Interest

¹ The AOI was previously referred to as the Villeneuve–Calahoo Sand and Gravel Extraction Area Structure Plan (ASP).

1.2. Scope

The present program included the processing of water-level data provided by the County, annual collection of groundwater samples for chemical and physical analyses,² analysis and interpretation of the hydrogeological data, preparation of a report, and presentation of the results at a gravel committee meeting. The report includes data collected as part of the present program and documents the collection, synthesis, and interpretation of the data.

The County repealed the Calahoo–Villeneuve Sand and Gravel Extraction Area Structure Plan (ASP) on April 20, 2023. The County continues to regulate aggregate operations through both the Resource Extraction (RE) District and the Resource Extraction - Direct Control (RE-DC) District. Excerpts from Land Use Bylaw 1385/17 that refer to the RE District and the RE-DC District are in Appendix A.

The Terms of Reference for the groundwater monitoring program are included in Appendix A. Schedule B of the Terms of Reference lists 21 monitoring wells (MWs) that are to be included as part of the present monitoring report. Addendums to Schedule B resulted in the replacement of one monitoring well, the addition of nine monitoring wells, and the removal of two monitoring wells as itemized below, for a total of 28 monitoring wells:

- MW07-4-14, referred to in Schedule B, was replaced by MW10-01 in June 2010.
- MW05-01 and MW18-01 were added to the groundwater monitoring program in 2018.
- MW11-01 was removed from the groundwater monitoring program in 2020.
- Four domestic water wells³ were added to the groundwater monitoring program in 2020:
 - 1963 Water Well 12-19 (1963 WW 12-19)
 - 2001 Water Well 14-21 (2001 WW 14-21)
 - 2001 Water Well 16-28 (2001 WW 16-28)
 - 2013 Water Well 01-29 (2013 WW 01-29)
- MW01-03 was reclaimed in March 2022 at the request of the landowner and removed from the groundwater monitoring program.
- Two domestic water wells³ were added to the groundwater monitoring program in 2022:⁴
 - 1995 Water Well 09-34 (1995 WW 09-34)
 - 2006 Water Well 10-34 (2006 WW 10-34)
- One domestic water well³ was added to the groundwater monitoring program in 2023:⁵
 - 1987 Water Well 13-26 (1987 WW 13-26)

Because data downloads were conducted over several days in 2024, some monitoring sites have more recent data, with the most recent being June 11, 2024.

² In 2020, the frequency of groundwater sample collection was changed from twice per year to once per year; groundwater samples from the 28 monitoring wells for the current monitoring program were analyzed for routine parameters and dissolved metals.

³ Per Sturgeon County policy, identifying information for the domestic water well owners has been redacted in the present report.

⁴ Water levels in the two domestic water wells have been measured since 2020 as part of other monitoring programs in the area.

⁵ Water levels in this domestic water well have been measured since September 15, 2022, as part of other monitoring programs in the area.

2. Methodology

2.1. Existing Data Sources

2.1.1. Maps and Aerial Imagery

The map reference used is the 1:250,000 National Topographic Series map sheet, with local detail available from the 1:50,000 map sheet.

Digital ortho-imagery is obtained from various websites, depending on the detail available for the AOI.

2.1.2. Data from Government Sources

2.1.2.1.1. Alberta Water Well Information Database

The Alberta Water Well Information Database⁶ includes water well records prepared by water well drillers, water wells identified during various field programs with little or no information, and boreholes with varying amounts of information. The database also includes groundwater-quality information from before 1988 for groundwaters from some water wells. Data collected since 2006 as part of the Baseline Water Well Testing Program are in the Alberta Water Well Information Database.

Many of the records in the Alberta Water Well Information Database have horizontal spatial control based on a land location rather than a point location, and there is very little quality control related to the verification of the land location. Historically, the most commonly used designation is a quarter section, with an area of 640,000 square metres, and the horizontal coordinates given for the water well are the centre of the quarter section. More recently, horizontal coordinates are determined by the water well driller using a consumer-grade handheld GPS (global positioning system receiver).

2.1.2.1.2. Alberta Geological Survey

The Alberta Geological Survey (AGS) regional groundwater reports are referenced and various AGS shapefiles are used as required.

2.1.3. Data from Non-Government Sources

2.1.3.1. The Groundwater Centre Database

The Groundwater Centre (TGWC) is HCL's in-house database of groundwater information for the province of Alberta. The extensive database maintained by TGWC includes records for features within Alberta that directly and indirectly relate to non-saline and saline groundwater.

The data in TGWC database that are related to non-saline groundwater are enhanced versions of the data in the Alberta Water Well Information Database. TGWC database for the AOI also houses hydrogeological data collected during the present program.

Unless more detailed information is available, the horizontal coordinates assigned to groundwater records are the centres of their reported legal locations.

Information in TGWC database has been used in the preparation of thematic maps and to determine regional aquifer parameters.

⁶ <http://groundwater.alberta.ca/WaterWells>

2.1.3.2. HCL Hydrogeology Database

HCL maintains a database of geologic units (geounits) for the geologically undisturbed part of the province. The database includes surface contours for the tops of individual geounits; these surfaces are used on cross-sections and various figures in this report.

2.1.4. Published and Unpublished Reports

The Bibliography in Section 8 of this report includes documents that relate to hydrogeology in the general area of the present project.

2.2. Collection of New Data

2.2.1. Groundwater Sampling

Groundwater samples are collected wearing fresh nitrile gloves for each sampling site. The sample bottle(s) are rinsed with the groundwater to be sampled, unless the sample bottle contains preservatives provided by the laboratory doing the analysis. When samples are collected, the sample bottles are filled to capacity with little or no air space remaining. If the analysis is for dissolved metals, samples are field filtered using a 0.45 micron in-line disposable filter.

Groundwater-quality parameters analyzed by a laboratory can include chemical, physical, and microbiological parameters, which may include the following: (1) Inorganic Non-Metallic; (2) Dissolved Metals; (3) Total Metals; (4) Microbiological; (5) Routine Water; and (6) Physical and Aggregate properties. The groundwater samples are stored in a cooler with ice packs for transport to the laboratory, which is accredited in Alberta to perform the requested analyses.

Field parameters (pH, temperature, and electrical conductivity) are measured after laboratory samples are collected.

The groundwater samples are collected according to the procedures outlined in the HCL field manual.

2.2.1.1. Sampling from a Monitoring Well

The purging and groundwater sampling procedures are to be performed using a dedicated, a new, or a newly cleaned sampling device for each monitoring well.

Each monitoring well is purged prior to sampling to ensure that the groundwater samples are representative of the aquifer. This involves the removal of groundwater until electrical conductivity, pH, and temperature measurements have stabilized. Electrical conductivity of the purged groundwater is measured and recorded by a data logger. In the case of a monitoring well that cannot supply sufficient volumes for conductivity to stabilize, the monitoring well is purged until dry.

After purging and recovery (if necessary), groundwater samples are collected using a small diameter submersible pump; the sampling equipment is decontaminated between monitoring locations. If available, dedicated sampling equipment that has been previously installed in a monitoring well is used to collect groundwater samples.

2.3. Spatial Coordinates

Horizontal coordinates are based on a 10-degree Transverse Mercator AEPA (Alberta Environment and Protected Areas) Resource projection, with the central meridian of 115 degrees west longitude, using NAD83 (North American Datum of 1983). Horizontal coordinates are determined for features identified in the field using a consumer-grade handheld GPS. Vertical coordinates are from the digital elevation model (DEM) provided by AltaLIS Ltd., the agent for Alberta Data Partnerships Ltd.

2.4. Measurements

Vertical measurements associated with the present report may have been recorded to two or more decimal places. However, most vertical measurements are provided in the report to one decimal place and may therefore not agree with the number of decimals presented in the appendices and in tables. The reference point for water-level measurements is the top of casing, and all water-level measurements are reported as metres below top of casing (BTOC) unless otherwise noted; most other vertical measurements are reported as metres below ground level (BGL).

2.5. Other

All gridding uses the Kriging method with a linear variogram model as provided in Surfer, a Golden Software program. Cross-sections are created using AutoCAD and, for illustrative purposes, are enhanced using CorelDRAW. Maps are created and analyzed in ArcGIS.

3. Background

3.1. Maps and Aerial Imagery

The area of study is situated within the 83G and 83H 1:250,000 National Topographic Series map sheets, with local detail available from the 1:50,000 83G09 and 83H12 map sheets. Digital topographic control is from the 1:20,000 DEM prepared by AltaLIS Ltd.

Digital ortho-imagery for the present program was obtained from Lafarge Canada Inc. (Lafarge) and Google Inc.

3.2. General Hydrogeology

The regional groundwater assessment for Sturgeon County (HCL, 2001) shows the presence of a linear bedrock low identified as the Buried Onoway Valley in the southwestern part of the County. The Buried Onoway Valley mainly parallels the stretch of the present-day Sturgeon River northwest from St. Albert to Calahoo and to the County border. The Buried Onoway Valley is 2 to 8 kilometres wide within the County, with local bedrock relief of up to 60 metres. Sand and gravel deposits can be expected in association with this bedrock low, with the thickness of the sand and gravel deposits being generally less than 25 metres.

Figure 3 is a bedrock topography map showing that the Buried Onoway Valley underlies the northern and eastern portions of the AOI and is oriented in a northwest to southeast direction.

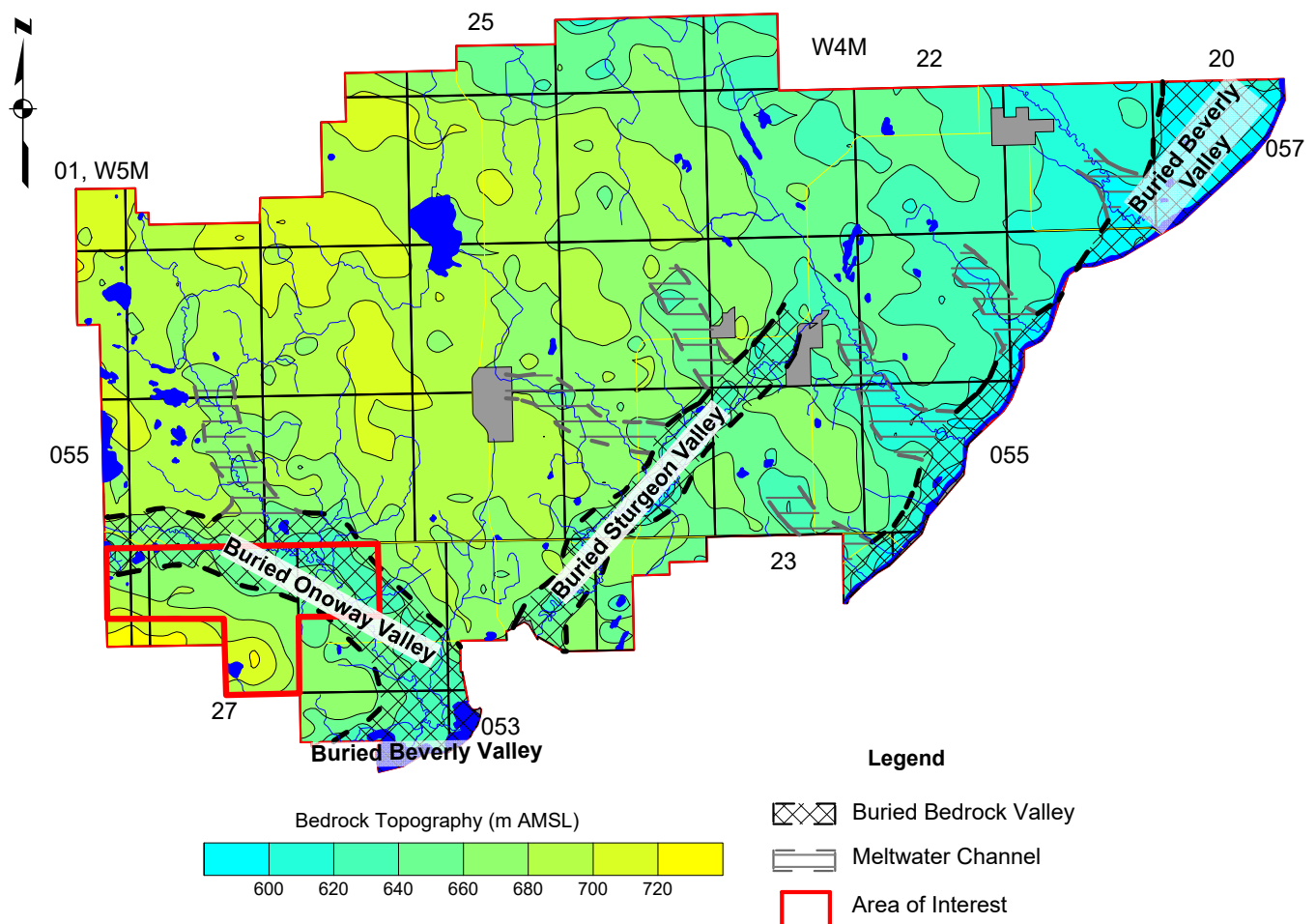


Figure 3. Bedrock Topography, Sturgeon County (adapted from HCL, 2001)

In the County, the upper bedrock includes the Horseshoe Canyon, the Bearpaw, and the Oldman formations, and the Birch Lake Member, which is part of the Foremost Formation. Figure 4 shows that the uppermost bedrock underlying the Buried Onoway Valley is the lower part of the Horseshoe Canyon Formation, which is comprised of mudstone, sandstone, and carbonaceous shale. The Buried Onoway Valley is shown on the left-hand side of the cross-section, which is in the southwestern part of the County. The Buried Onoway Valley is associated with deposits of sand and gravel that comprise a regional aquifer, which is a groundwater source for some residents in the Sturgeon County area. The base of the Buried Onoway Valley is approximately 40 metres BGL, an elevation of approximately 640 metres above mean sea level (AMSL).

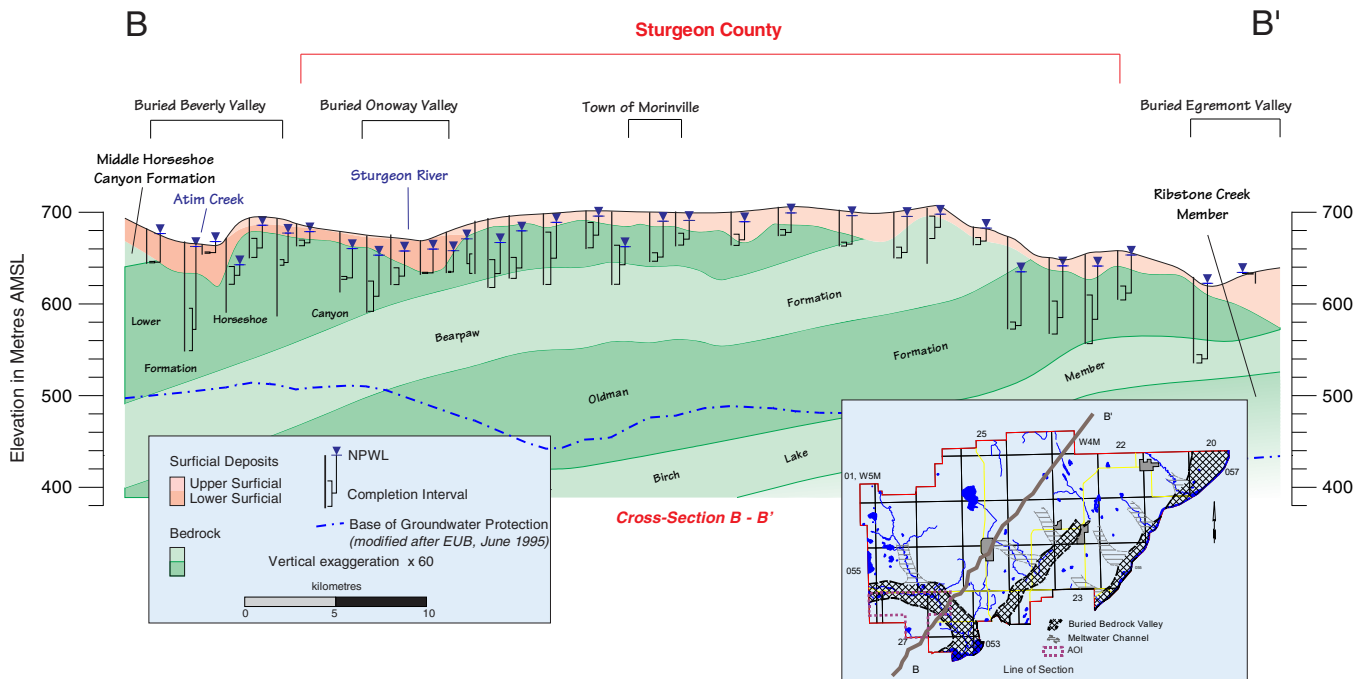


Figure 4. Cross-Section B-B' (adapted from HCL, 2001)

Figure 5 on the following page is a hydrogeological map for the area showing that the thalweg of the Buried Onoway Valley (Thalweg) passes beneath the northern and eastern parts of the AOI. The map also shows that groundwater yields from water wells completed in the AOI are expected to vary from 5 to 650 cubic metres per day (m^3/day ; Bibby, 1974a). The locations of the 28 monitoring wells that are included as part of the present groundwater monitoring program are also shown in Figure 5.

Stantec Consulting Ltd. (Stantec, 2009) stated that the sand and gravel aquifer within the Buried Onoway Valley is overlain by a confining layer; in the western part of the AOI, the potentiometric surface is above the bottom of the confining layer, resulting in confined conditions, while in the southeastern part of the AOI, groundwater levels are within the aquifer, indicating unconfined conditions.

Lafarge Canada Inc. (Lafarge) and Heidelberg Materials Canada Limited (Heidelberg Materials) are the only two aggregate mining companies that have been actively dewatering and extracting aggregate in the CRED since 2016. Figure 6 on the following page shows the 2023 and 2024 mining activities of Lafarge and Heidelberg Materials and the areas that were reclaimed in 2023 or 2024 within the AOI, including pits that were reclaimed by Sureway Construction Group (Sureway) in 2024.⁷

⁷ Activity locations were provided by Lafarge, Heidelberg Materials, and Sureway; Figures 13 and 19 in the present report also include areas that were reclaimed prior to 2023.

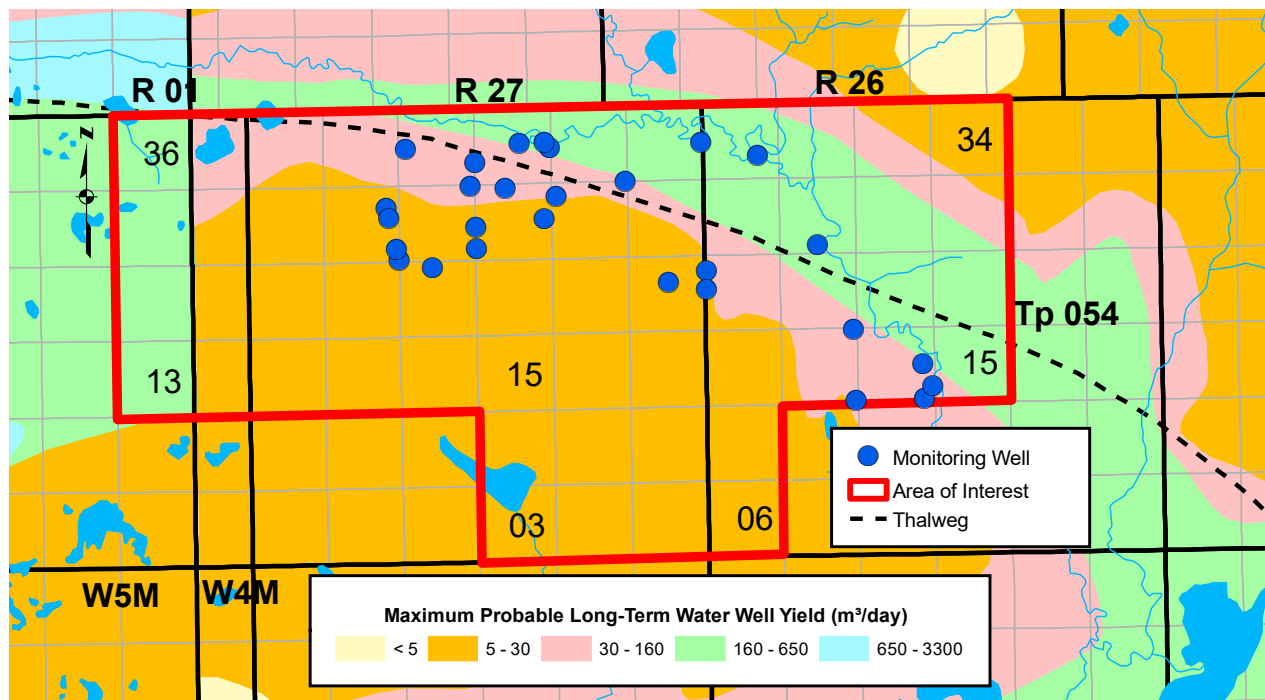
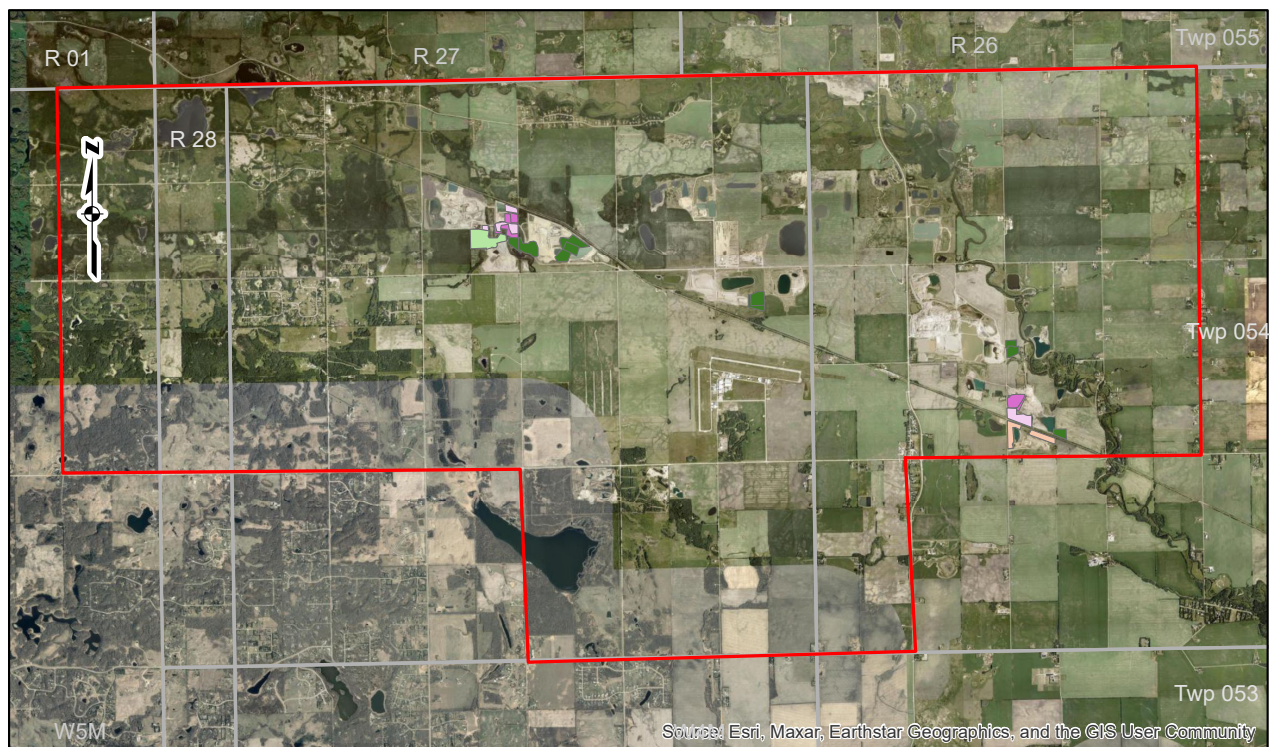


Figure 5. Hydrogeological Map (adapted from Bibby, 1974a, and Ozoray, 1972)



0 1 2 4
Kilometres

 AOI	 Active Mining - Heidelberg Materials	 Activating Mining - Lafarge
 Reclaimed Area - Sureway	 Reclaimed Area - Heidelberg Materials	 Reclaimed Area - Lafarge

Figure 6. 2023 and 2024 Aggregate Pit Activity in the AOI

3.3. Calahoo Resource Extraction District AOI

County personnel have indicated that the usual practice is for aggregate mining companies within the AOI to remove all the aggregate deposits once they are exposed. The typical geologic materials in the gravel areas are till, underlain by aggregate (sand and gravel layers) and bedrock (Horseshoe Canyon Formation); an example of a typical pit wall is shown in Figure 7. An aggregate pit generally encounters the top of aggregate at an approximate depth of 9 metres BGL and the top of bedrock at an approximate depth of 18 metres BGL, although these depths can change significantly from one area to the next.



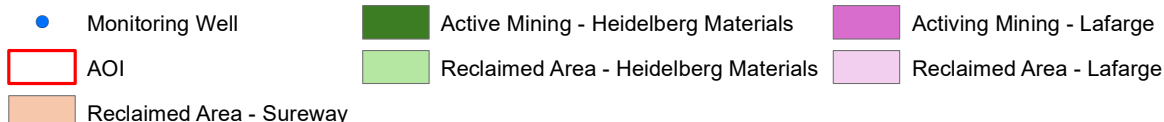
Figure 7. Typical Pit Wall

The County has also stated that reclamation is typically carried out after aggregate from a pit has been extracted. The materials used for reclamation are the unused sand and the clay strippings from a new pit. Once reclamation is completed, topsoil is spread onto the fields and the area is reclaimed as farmland, which is seeded and returned to the landowner; land that cannot be reclaimed is converted into end-pit lakes or ponds.

In areas where the bottom of the aggregate is below the top of the saturated zone, dewatering of pits is required for extraction. By employing a pit-to-pit dewatering scheme, the loss of groundwater is restricted to evaporation from pits and the groundwater that adheres to the aggregate that is being trucked off site. However, the replacement of the sand and gravel aquifer with a thinner layer of less permeable material has the potential to create mounding of the water-level surface in areas upgradient from the reclaimed areas. Therefore, the present groundwater monitoring program has four main purposes:

- To determine the local drawdown effects of dewatering
- To determine the extent of groundwater mounding in upgradient areas
- To determine whether the extraction and reclamation process is affecting groundwater quality
- To determine if aggregate extraction is affecting local groundwater users

The current groundwater monitoring well network includes 28 monitoring wells that are completed in the Buried Oneway Valley sand and gravel deposits within the AOI. The six monitoring wells in the MW01 series were installed in 2001 in support of a lower sand and gravel groundwater assessment (UMA, 2001). MW04-01 and MW04-02 were installed in 2004 on behalf of Yellowhead Aggregates (Westerra, 2004a); MW04-03 was installed in 2004 on behalf of Lafarge (Westerra, 2004b). MW05-01 was completed in 2005 on behalf of Inland Aggregates Ltd. (Inland). A-S&G (OV) and C-S&G (OV) were installed in 2007 in support of the Calahoo Bog Groundwater Study for Lafarge (Westwater, 2007). The three monitoring wells in the MW07 series were installed in 2006 and 2007 under the direction of Stantec on behalf of the County (Stantec, 2008). MW10-01 was drilled in 2010 on behalf of the County. MW11-02 was drilled in 2011 on behalf of Inland. MW14-01 and MW14-02 were installed in 2014 on behalf of the County. MW18-01 was drilled in the summer of 2018 on behalf of Heidelberg Materials. The MLM site is from the 1980s; very little completion information is available for this monitoring well. The four private water wells that were included in the groundwater monitoring program in 2020 were drilled between 1963 and 2013. Two private water wells that were drilled in 1995 and 2006 were added to the groundwater monitoring program in 2022. One private water well that was drilled in 1987 was added to the groundwater monitoring program in 2023. Two additional groundwater monitoring programs in the AOI, which include eight other private water wells, are conducted by HCL.⁸



⁸ HCL Project No. MR-0227 is conducted on behalf of Lafarge; HCL Project No. MR-0346 is conducted on behalf of Heidelberg Materials.

4. Results

4.1. 2023 and 2024 Site Visits

HCL personnel were on site between May 29 and June 2, 2023, and between April 25 and June 11, 2024. During the 2023 and 2024 site visits, water levels in the monitoring wells were measured, data loggers were downloaded, and groundwater samples were collected for chemical analysis and measurement of field parameters.

Notable field observations made by HCL personnel during the 2023 and 2024 site visits are summarized in Table 1.

Monitoring Well	TGWC ID	Date	Observation	Action
MW10-01	M40337.575466	2023-06-01	Solinst LevelVent 5 data logger issue	Sent data logger to manufacturer on 2023-06-05 for repair under warranty; re-installed data logger on 2023-08-21.
		2024-05-24	Level TROLL data logger memory full; data logger was last programmed to record 5-minute readings, but data logger stopped recording data on 2024-01-17 at 07:20 Hrs, resulting in a data gap	Deleted old records to free up memory; re-programmed data logger to record 1-hour measurements starting on 2024-05-24 at 11:00 Hrs.
MW18-01	M43326.424846	2023-06-02	Solinst LevelVent 5 data logger issue	Sent data logger to manufacturer on 2023-06-02 for repair under warranty; installed a backup LevelVent 5 data logger on 2023-06-02.
MW 01-04	M40000.647826	2024-04-26	Level TROLL data logger changed	Removed Level TROLL data logger (Serial No. 555357) and installed a LevelVent 5 data logger (Serial No. 2121362)

Table 1. 2023–2024 Notable Field Observations

4.2. Water-Level Monitoring

HCL personnel manually measured the water levels in 28 monitoring wells during the 2023 and 2024 site visits. Water levels were measured to the nearest centimetre from the top of the monitoring well casing using a water-level tape. Data loggers are installed in 26 of the 28 monitoring wells, as shown in Table 2. Each data logger is programmed to record a water-level measurement every hour. Figure 9 on the following page identifies the monitoring wells within the AOI that are equipped with data loggers. Water levels in MW07-1-33 and MW07-3-33 are manually measured during the annual site visits.

Monitoring Well	AEPA GIC ID	AEPA Approval No.	Required Monitoring Frequency	Data Logger Installed
A-S&G (OV)	—	00314180-00-00	Hourly	Yes
C-S&G (OV)	—	00314180-00-00	Hourly	Yes
MLM	—	00300286-00-00	Weekly	Yes
		00314180-00-00	Monthly	
MW01-01	—	—	—	Yes
MW01-04	—	00300286-00-00	Weekly	Yes
		00314180-00-00	Monthly	
MW01-05	—	00314180-00-00	Monthly	Yes
MW01-06	—	00300286-00-00	Weekly	Yes
		00314180-00-00	Monthly	
MW01-07	297525	—	—	Yes
MW01-08	297529	—	—	Yes
MW04-01	1270001	—	—	Yes
MW04-02	1270002	—	—	Yes
MW04-03	1270003	—	—	Yes
MW05-01	1495114	—	—	Yes
MW07-1-33	1420667	—	—	No
MW07-2-14	1420665	00314180-00-00	Monthly	Yes
MW07-3-33	1420666	—	—	No
MW10-01	—	—	—	Yes
MW11-02	—	—	—	Yes
MW14-01	—	—	—	Yes
MW14-02	—	—	—	Yes
MW18-01	—	—	—	Yes
1963 WW 12-19	—	—	—	Yes
1987 WW 13-26	264252	—	—	Yes
1995 WW 09-34	—	—	—	Yes
2001 WW 14-21	40335	—	—	Yes
2001 WW 16-28	297091	—	—	Yes
2006 WW 10-34	1715169	—	—	Yes
2013 WW 01-29	1495598	—	—	Yes

Table 2. Groundwater Monitoring Network Data Loggers

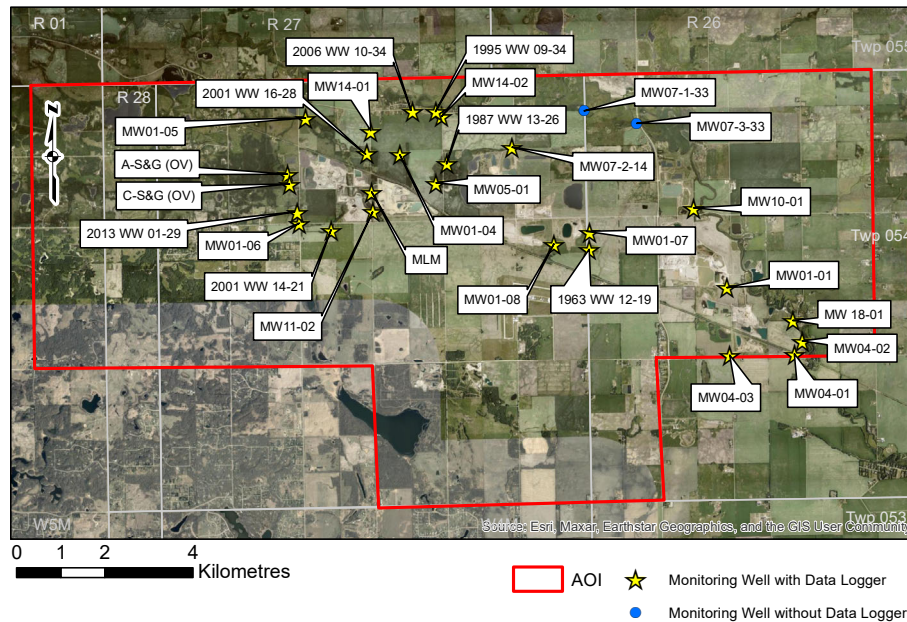


Figure 9. Data Logger Monitoring Network

Table 3 summarizes the manual water-level measurements recorded in 2024 by HCL personnel, prior to purging the monitoring wells. HCL personnel measured the water levels in metres BTOC; Table 3 also displays the water-level elevations in metres AMSL. For the monitoring wells that were not surveyed, the water-level elevations in metres AMSL were calculated by subtracting the depth to water in metres BGL⁹ from the ground elevation determined from the 1:20,000 DEM prepared by AltaLIS Ltd.

Monitoring Well Name	TGWC ID	Legal Location (W4M)	2024 Manual Water-Level Measurement	
			m BTOC	m AMSL
A-S&G (OV)	M40000.652035	09-29-054-27	8.26	677.54
C-S&G (OV)	M40000.652664	09-29-054-27	9.78	678.12
MLM	M40000.651289	05-27-054-27	18.18	668.02
MW01-01	M40000.647826	16-17-054-26	10.47	664.11
MW01-04	M40000.649295	14-27-054-27	8.58	667.32
MW01-05	M40000.649859	05-33-054-27	6.35	671.45
MW01-06	M40000.650496	01-29-054-27	15.18	675.42
MW01-07	M37490.031427	13-19-054-26	4.23	671.67
MW01-08	M37490.031431	10-26-054-27	11.21	670.79
MW04-01	M39227.477799	01-16-054-26	10.67	664.11
MW04-02	M39227.477802	01-16-054-26	9.87	657.03
MW04-03	M39227.477827	01-17-054-26	14.35	662.05
MW05-01	M39227.483721	09-27-054-27	10.30	670.90
MW07-1-33	M39859.704050	08-36-054-27	11.33	655.87
MW07-2-14	M39859.704048	01-35-054-27	5.22	666.18
MW07-3-33	M39859.704049	07-31-054-27	3.44	664.11
MW10-01	M40337.575466	03-29-054-26	10.38	661.02
MW11-02	M41457.432661	04-27-054-27	18.35	672.45
MW14-01	M42473.435942	05-34-054-27	7.24	668.36
MW14-02	M42475.578813	08-34-054-27	5.82	667.48
MW18-01	M43326.424846	08-16-054-26	11.67	658.23
1963 WW 12-19	M40235.411135	NW 19-054-26	8.85	664.11
1987 WW 13-26*	M35377.055706	NW 26-054-27	-	-
1995 WW 09-34	M43987.561869	09-34-054-27	6.13	667.37
2001 WW 14-21	M37841.689687	NW 21-054-27	16.29	675.91
2001 WW 16-28	M37490.030994	NE 28-054-27	8.32	669.38
2006 WW 10-34	M39227.496150	10-34-054-27	7.19	670.11
2013 WW 01-29	M41313.498215	SE 29-054-27	14.88	674.72

* Water levels were recorded with a remote telemetry unit (RTU); therefore, no manual water-level measurement is available

Table 3. 2024 Manual Water-Level Measurements

In addition to the manual water levels measured by HCL personnel and the hourly water levels recorded by the data loggers, semi-annual water levels measured by County personnel were submitted to HCL in previous years and have been entered into TGWC database. Hydrographs for each monitoring well are in Appendix B.

The maximum historical water-level declines, which ranged from approximately 2 to 10 metres, were generally recorded between 2015 and 2018 in the following nine monitoring wells: A-S&G (OV), C-S&G (OV), MLM, MW01-06, MW05-01, MW07-2-14, MW11-02, the 2001 WW 14-21, and the 2013 WW 01-29. These monitoring wells are all situated in the west-central part of the AOI near pits that were active during that time.

⁹ Water-level measurements in metres BGL were determined by subtracting the casing stick-up from the water-level measurement in metres BTOC at each site.

Between 2020 and 2024, a noticeable water-level decline was observed in five monitoring wells (MLM, MW01-08, MW05-01, MW11-02, and the 1987 WW 13-26), while a water-level rise was observed in four monitoring wells [A-S&G(OV), C-S&G(OV), MW01-06, and the 2013 WW 01-29]; 19 of the 28 current monitoring sites have shown no apparent rising or declining water-level trend since 2020.

The water-level rises between 2020 and 2024 were approximately one metre; the water-level declines ranged from approximately 1 to 6 metres, with the maximum decline measured in MW05-01. Of the seven domestic water wells that are being monitored, the largest decline was measured in the 1987 WW 13-26, which has shown a drawdown of approximately 6 metres since the earliest recorded water level in 2010.

4.3. Groundwater-Quality Monitoring

Groundwater samples from each of the 28 monitoring wells were collected by HCL personnel during the 2024 site visits. As standard protocol, HCL personnel performed the following during each sampling event:

- Inspection of monitoring well
- Purging of monitoring well
- Collection of a groundwater sample
- Storage and transportation of the groundwater sample to the laboratory

During HCL's initial inspection of each monitoring well, the coordinates were determined using a consumer-grade handheld GPS, the diameter and material of the casing were noted, the monitoring well was photographed, and the total depth and casing stick-up were measured. During every site visit, the condition of each monitoring well was inspected, and additional information was collected if deemed necessary; for example, if damage was noted, the monitoring well was photographed again, and the casing stick-up and total depth were re-measured.

For sample collection, the monitoring well was purged of the stagnant water with a dedicated bailer or Waterra tubing until at least three monitoring well volumes of groundwater had been removed or the monitoring well was purged dry, or until the groundwater being removed from the monitoring well had measured field parameters that were consistent.

The groundwater samples collected in the spring of 2024 were analyzed for routine parameters and dissolved metals. During each sampling event, all monitoring wells were sampled on the same day that they were purged. All groundwater samples were analyzed by Element Materials Technology Canada Inc. A letter was sent to each owner of a domestic water well that was sampled as part of the monitoring program; each letter included a copy of the chemical analysis results and a notification if any analyzed parameter exceeded the maximum acceptable concentration (MAC) for drinking water, per the Guidelines for Canadian Drinking Water Quality—Summary Tables (GCDWQ–ST; Health Canada, 2024).

4.3.1. Groundwater Quality

All available groundwater-quality data for each monitoring well have been entered into TGWC database. The 2024 chemical analysis results for the groundwater samples collected from the 28 monitoring wells are in Appendix B. Groundwater-quality parameters of particular interest are discussed briefly in the following sections.

Figure 10 on the following page is a Piper tri-linear diagram showing the groundwater quality for samples collected from the 28 monitoring wells in the spring of 2024. Figure 10 shows that most of the groundwater samples are classified as calcium-bicarbonate-type waters, which are typical of groundwaters from aquifers within the surficial deposits, although there is a range in water quality from a calcium type with no dominant anion to a bicarbonate type with no dominant cation.

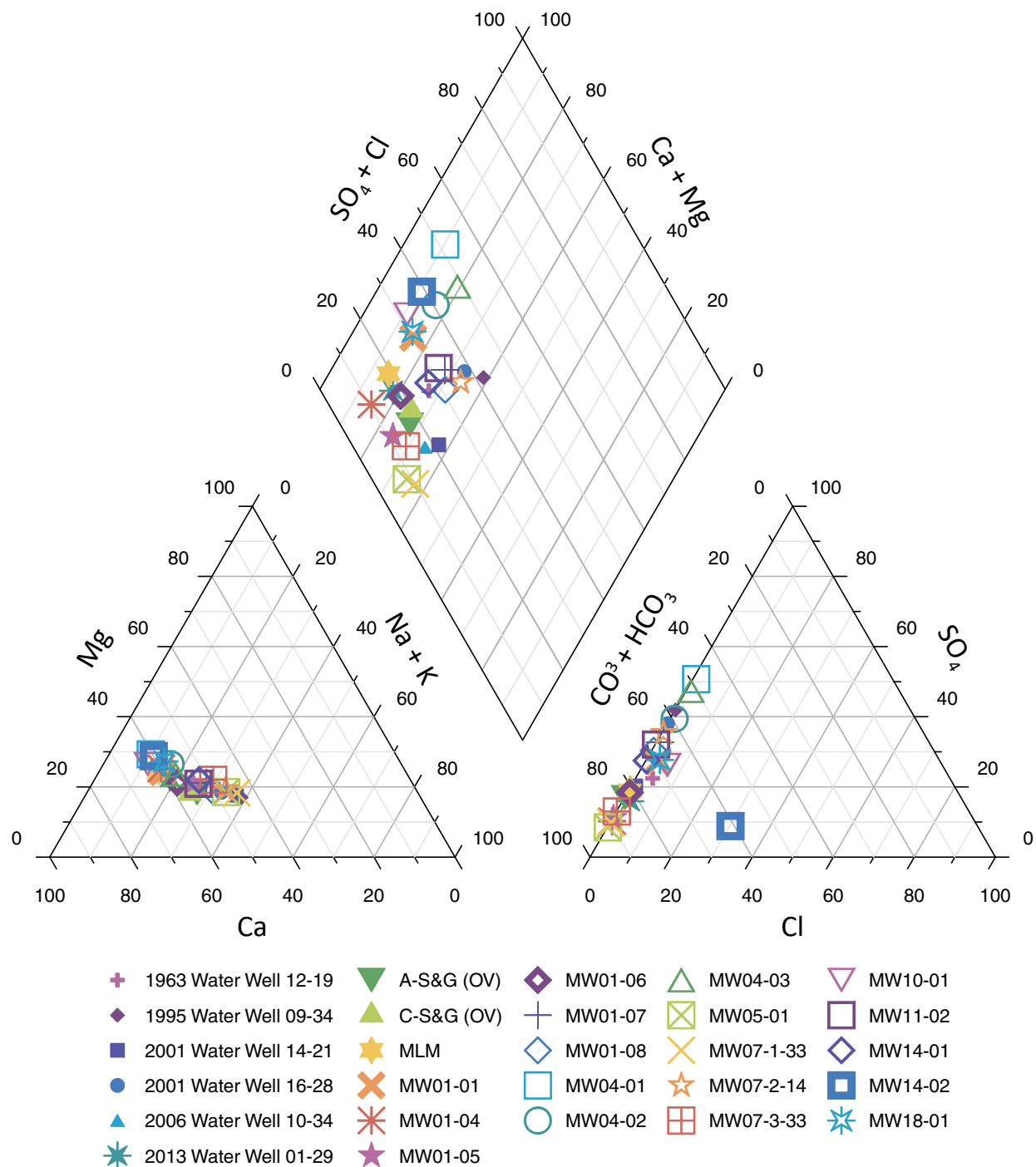


Figure 10. 2024 Piper Tri-Linear Diagram

In general, groundwater-quality parameters for samples collected in 2024 remained within historical ranges. The groundwaters from MW04-01 and MW04-02 were classified as calcium-bicarbonate-type waters in the early 2000s, as calcium-sulfate-type waters beginning in 2011, and as calcium-chloride-type waters in 2020 and 2021. In 2023 and 2024, the groundwaters from MW04-01 and MW04-02 were classified as calcium-bicarbonate-type waters and have a chemical quality that is similar to the groundwaters from the other monitoring wells. Figure 11 on the following page is a Piper tri-linear diagram showing the groundwater quality for samples collected from MW04-01 between 2004 and 2024; the Piper tri-linear diagram for MW04-02 is not shown but displays a similar range.

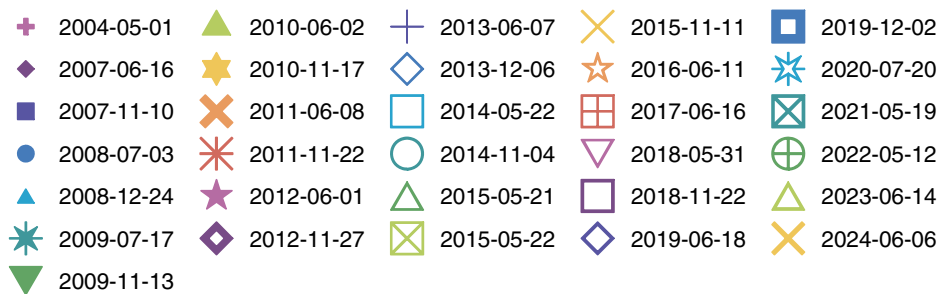
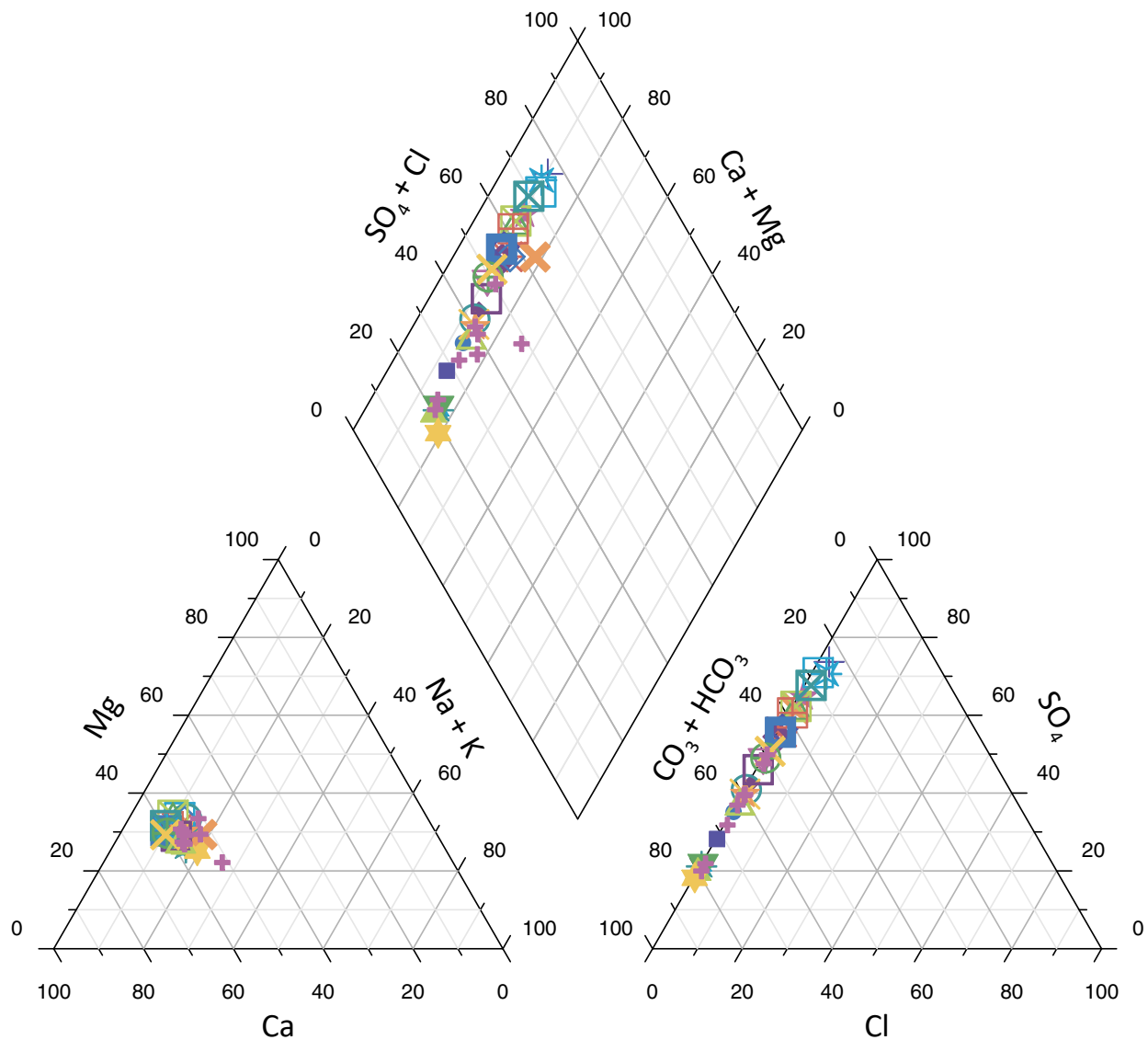


Figure 11. Piper Tri-Linear Diagram for MW04-01 (May 2004 to June 2024)

4.3.2. Chloride

Chloride concentrations in the groundwater samples collected in 2024 ranged from 0.4 to 24.6 milligrams per litre (mg/L), with an average concentration of 4.6 mg/L, for all monitoring wells except MW14-02, which had a chloride concentration of 181 mg/L. Chloride concentrations have been variable in the groundwaters from monitoring wells MW04-01, MW04-03, MW14-02, and MW10-01 throughout the years, as discussed below:

- The chloride concentration in the groundwater samples collected from MW04-01 has ranged from 0.9 to 41.4 mg/L since monitoring began in 2004, with an average concentration of 5.9 mg/L. The chloride concentration in 2024 was 6.0 mg/L, which is similar to the average.
- Groundwater samples collected from MW04-03 and MW14-02 have had consistently higher chloride concentrations than the groundwater samples collected from the other monitoring wells since sampling began:¹⁰
 - The chloride concentration in the groundwater sample collected from MW04-03 in 2024 was 9.3 mg/L; the historical high for chloride in the groundwater from this monitoring well is 104 mg/L, which occurred in the spring of 2004. Since 2016, there has been a general decreasing trend in the chloride concentration in the groundwater from MW04-03, from 96 to 9.3 mg/L.
 - Since 2015, there has been an increasing trend in the chloride concentration in the groundwater collected from MW14-02, from 13 to 211 mg/L in 2020. Although the chloride concentration temporarily decreased in 2021 and 2022 to 99.7 and 107 mg/L, respectively, the concentration increased to 163 mg/L in 2023 and 181 mg/L in 2024. Currently, there are no extraction activities taking place near MW14-02.
- Elevated chloride concentrations have also been observed in the groundwater samples collected from MW10-01, which has shown a rising trend since 2019. Prior to 2019, the average chloride concentration was 7.2 mg/L, and after 2019, the average concentration was 14.8 mg/L, with the highest concentration of 24.6 mg/L measured in 2024.

The monitoring wells with chloride exceedances are proximal to paved roads where road salt is used. No groundwater sample from any of the monitoring wells has ever exceeded the aesthetic objective (AO) of 250 mg/L for chloride (Health Canada, 2024).

4.3.3. Nitrate

The MAC for nitrate+nitrite (as N) in drinking water based on health objectives is 10 mg/L, with the lower limit of 1 mg/L for nitrite (as N), per the GCDWQ-ST (Health Canada, 2024). In the spring of 2024, no groundwater sample exceeded these limits; the highest concentration of nitrate+nitrite (as N) of 2.46 mg/L was in the groundwater sample collected from MW01-01.

4.3.4. Sulfate

The AO for sulfate is 500 mg/L (Health Canada, 2024). Sulfate concentrations ranged from 48.2 to 510 mg/L in the groundwater samples collected in 2024.

Since 2017, there has been a general increasing trend in the sulfate concentration in the groundwater collected from MW04-03, from 170 to 510 mg/L in 2024; this was the only groundwater sample collected in 2024 that exceeded the AO. The 2024 groundwater sample collected from the nearby MW04-02 had a sulfate concentration of 187 mg/L, while the 2024 groundwater sample collected from MW04-01 had a sulfate concentration of 496 mg/L.

¹⁰ Groundwater sampling from MW04-03 and MW14-02 began in 2004 and 2015, respectively.

Since 2020, there has been a general increasing trend in the sulfate concentration in the groundwater collected from MW11-02, from an average of 101 mg/L prior to 2020 to an average of 157 mg/L since 2020; the highest sulfate concentration of 219 mg/L was measured in 2024.

Concentrations of sulfate are also slightly elevated in the groundwaters from the 2001 WW 16-28 and the 1995 WW 09-34, although a rising trend has not been established.

The areas in which elevated sulfate concentrations have been observed include previously reclaimed pits and an active agricultural area in 17-054-26 W4M, near Highway 633.

4.3.5. Total Dissolved Solids

Total dissolved solids (TDS) concentrations ranged from 484 to 1,270 mg/L in the groundwater samples collected in 2024, with the lowest concentration collected from MW01-04; this was the only groundwater sample collected in 2024 that did not exceed the AO of 500 mg/L (Health Canada, 2024).

4.3.6. Electrical Conductivity

Electrical conductivity values ranged from 826 to 1,760 microsiemens per centimetre ($\mu\text{S}/\text{cm}$) for the groundwater samples collected in 2024.

4.3.7. Dissolved Metals

The groundwater samples collected from the monitoring wells in 2024 included an analysis for dissolved metals. The results indicated that the concentrations of uranium, arsenic, manganese, and selenium in the following groundwater samples exceeded the MACs for health objectives in 2024:

- Uranium (MAC of 0.02 mg/L): The MAC was exceeded in the 2024 groundwater sample from MW04-03 (0.0308 mg/L).
- Arsenic (MAC of 0.01 mg/L): MAC exceedances were observed in the 2024 groundwater samples from MW07-2-14 (0.0124 mg/L) and MW14-01 (0.0144 mg/L).
- Manganese (MAC of 0.12 mg/L; AO of 0.02 mg/L): MAC exceedances were observed in the 2024 groundwater samples from all monitoring wells except MW04-01 and MW04-03; groundwater samples from MW14-02 and the 1963 WW 12-19 did not exceed the MAC for manganese but did exceed the AO.
- Selenium (MAC of 0.05 mg/L): The MAC was exceeded in the 2024 groundwater sample from the 1963 WW 12-19 (0.0524 mg/L)

Dissolved metals were first analyzed during the November 2010 sampling event. The uranium concentration in the groundwater samples from MW04-03 has historically been above the MAC of 0.02 mg/L. The arsenic concentration in the groundwater samples from MW07-2-14 has historically been above the MAC of 0.01 mg/L, while the arsenic concentration in the groundwater samples from MW14-01 has only exceeded the MAC since the fall of 2018. The manganese concentrations in the groundwater samples from all monitoring wells except MW01-01, MW04-01, MW04-03, and the 1963 WW 12-19 have historically been above the MAC.¹¹

The results for the 2024 sampling event indicated that the dissolved iron concentrations in 18 of the 28 monitoring wells exceeded the AO of 0.3 mg/L (Health Canada, 2024).

None of the above exceedances exhibit a noteworthy trend.

¹¹ The MAC of 0.12 mg/L for manganese was first established by Health Canada in 2019. Prior to 2019, there was no MAC associated with manganese.

5. Interpretation

5.1. Water-Level Groups

Based on a review of the water-level measurements and the reported sites of pit activity, the 28 monitoring wells can be arranged into five groups, as shown in Figure 12:

- Group 1 consists of A-S&G (OV), C-S&G (OV), MLM, MW01-06, MW05-01, MW11-02, the 1987 WW 13-26, the 2001 WW 14-21, and the 2013 WW 01-29.
- Group 2 consists of MW01-04, MW01-05, MW14-01, MW14-02, the 1995 WW 09-34, the 2001 WW 16-28, and the 2006 WW 10-34.
- Group 3 consists of MW01-07, MW01-08, MW07-2-14, and the 1963 WW 12-19.
- Group 4 consists of MW07-1-33 and MW07-3-33.
- Group 5 consists of MW01-01, MW04-01, MW04-02, MW04-03, MW10-01, and MW18-01.

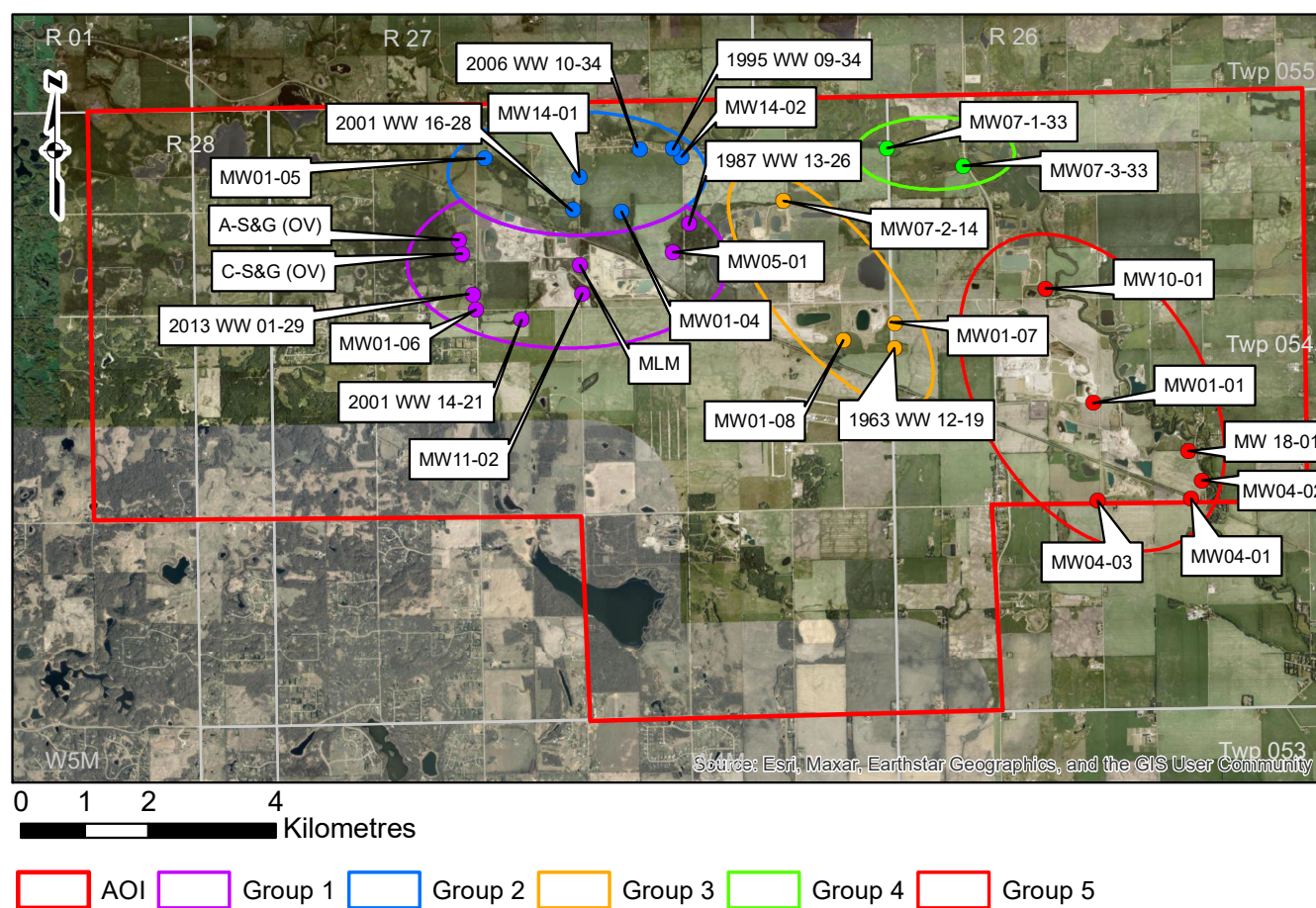


Figure 12. Monitoring Well Groupings Based on Proximity and Water-Level Change

Figure 12 shows the monitoring well groupings on a photomosaic overlay; Figure 13 on the following page shows the monitoring well groupings in relation to aggregate pit activities.

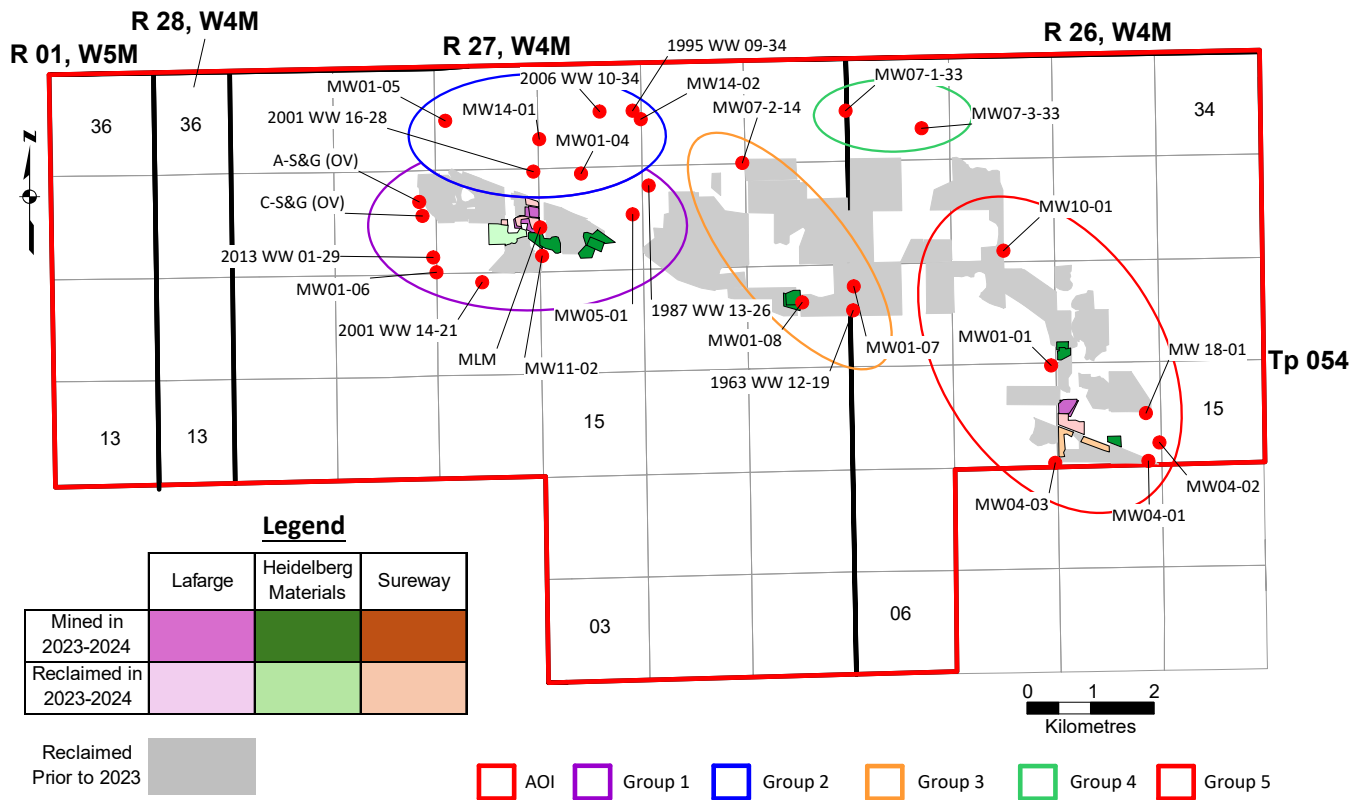


Figure 13. Monitoring Well Groupings Based on Pit Activity

Water-level characteristics of each monitoring well group is discussed below.

Group 1 is in the western portion of the AOI in the vicinity of the Calahoo bog and active aggregate pits operated by Lafarge and Heidelberg Materials. Figure 14 shows that there has been a general water-level decline in the Group 1 monitoring wells from 2013 through 2018 that is in the order of 3 to 6 metres, with smaller water-level recoveries in most of the monitoring wells since 2018. Some of the monitoring wells have had earlier water-level recoveries than others, corresponding with shorter distances to reclaimed areas.

In general, the five monitoring wells in the western half of the Group 1 area have shown a water-level rise since 2022; at the sites of A-S&G (OV) and C-S&G (OV), which are the farthest monitoring wells to the northwest, the rise in water levels began in 2019. The water-level recovery at the sites of these five monitoring wells is attributed to their locations being the farthest upgradient from the sites that were actively dewatered and mined in 2023 and 2024. The four monitoring wells in the eastern half of the Group 1 area continue to show an overall decline in water levels, which is attributed to their locations being the closest to the sites that were actively mined by Heidelberg Materials in 2023 and 2024.

Only monitoring wells in the eastern half of the Group 1 area and MW01-08 in Group 3 have shown a declining water-level trend in recent years.

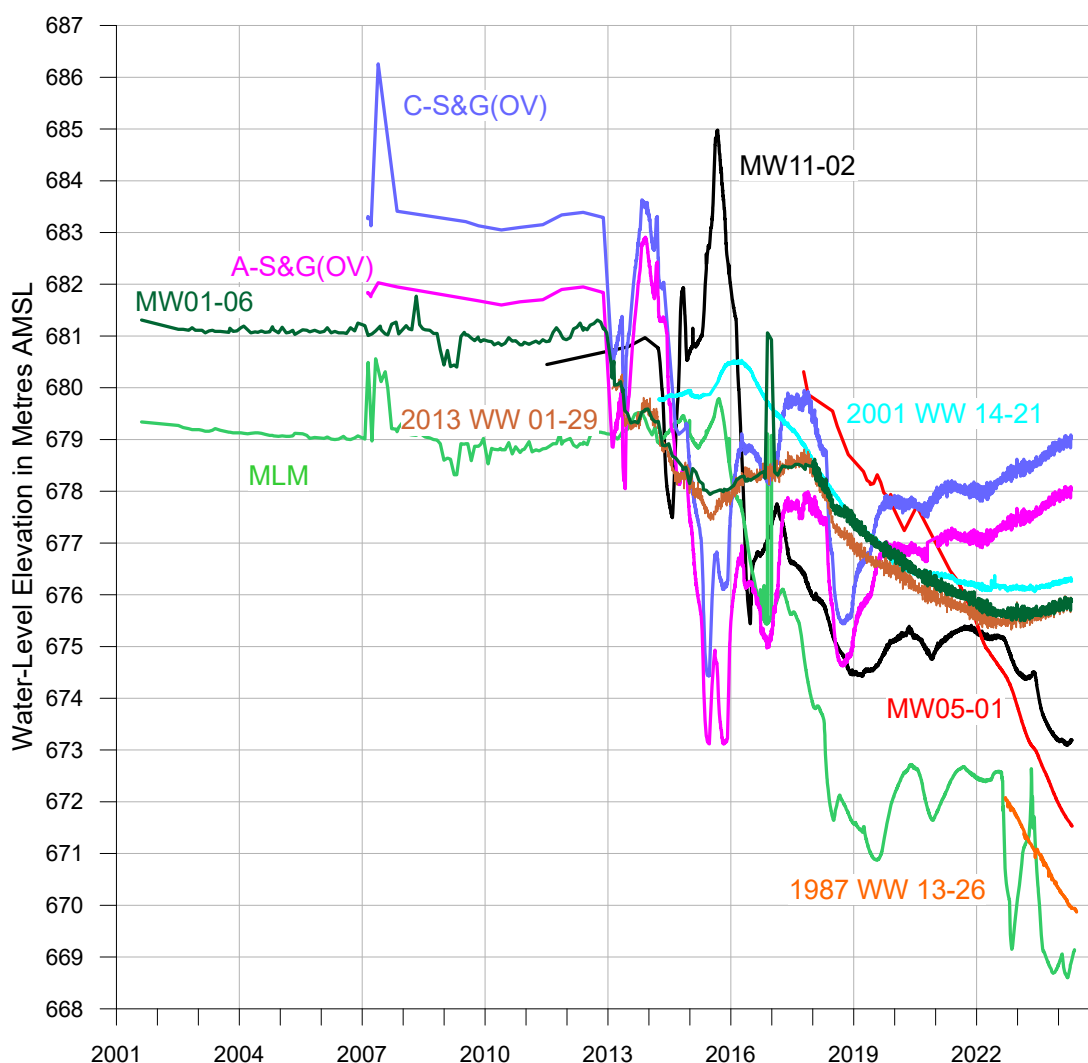


Figure 14. Group 1 Hydrograph

Group 2 is in the northwestern portion of the AOI, where water levels recorded in the monitoring wells have not changed significantly over the historical record. These monitoring wells are likely not affected by mining activities, as the active pits and reclamation sites are more than 600 metres south of the seven monitoring wells. Figure 15 shows that the Group 2 monitoring wells have an overall horizontal water-level trend, superimposed with seasonal water-level fluctuations of approximately one metre.¹² There was a large recharge event observed in all monitoring wells in 2020 that was due to increased precipitation and runoff; the water levels measured since 2020 are a continuation of the historical trend. In 2022, the 1995 WW 09-34 and the 2006 WW 10-34 were added to Group 2.

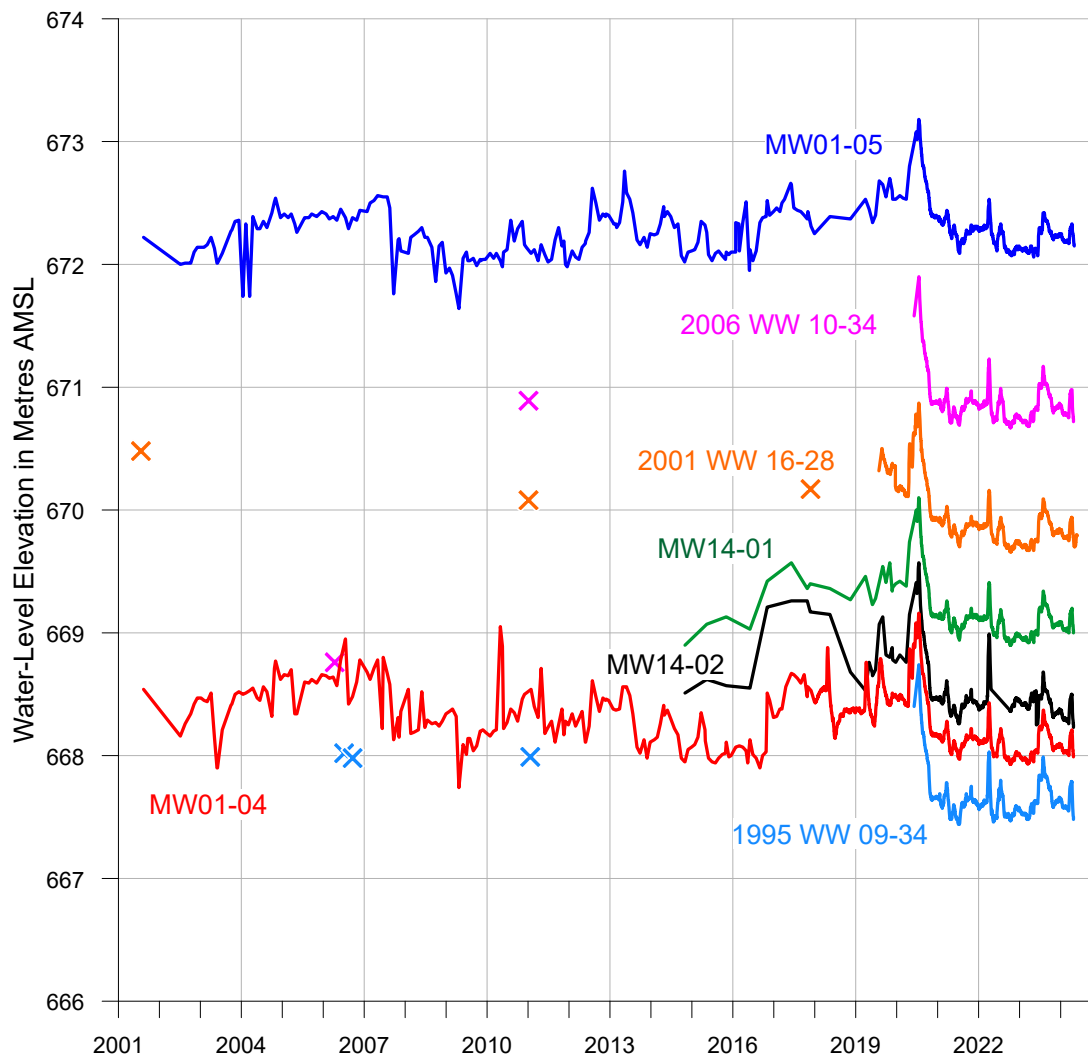


Figure 15. Group 2 Hydrograph

¹² The Xs on the graph are manually measured water levels prior to the monitoring wells being added to the groundwater monitoring program.

Group 3 is in the central portion of the AOI, which contains mainly reclaimed pits. Water levels in the Group 3 monitoring wells have fluctuated in the past, which reflects dewatering activities when the nearby pits were active. Figure 16 shows that the water levels in MW01-07 and MW01-08 have similar trends for much of the monitoring interval and have remained fairly constant since 2012, at an elevation that is approximately 3 metres higher than the measured water levels in the early 2000s. MW01-07 and MW01-08 are east of the Schafers 240 Pit and are situated on either side of a pond. In 2020, heavy precipitation, along with mining activities in the area, required water to be diverted into the Schafers 240 Pit, which is west of and upgradient from MW01-07, MW01-08, and the 1963 WW 12-19. The water-level rises observed in MW01-07 and MW01-08 are likely due to recharge from the large amounts of precipitation in 2019 and 2020, along with recharge from the Schafers 240 Pit. Since 2021, water levels in MW01-08 have declined by nearly 2 metres due to mining and dewatering activities to the west of the monitoring well.

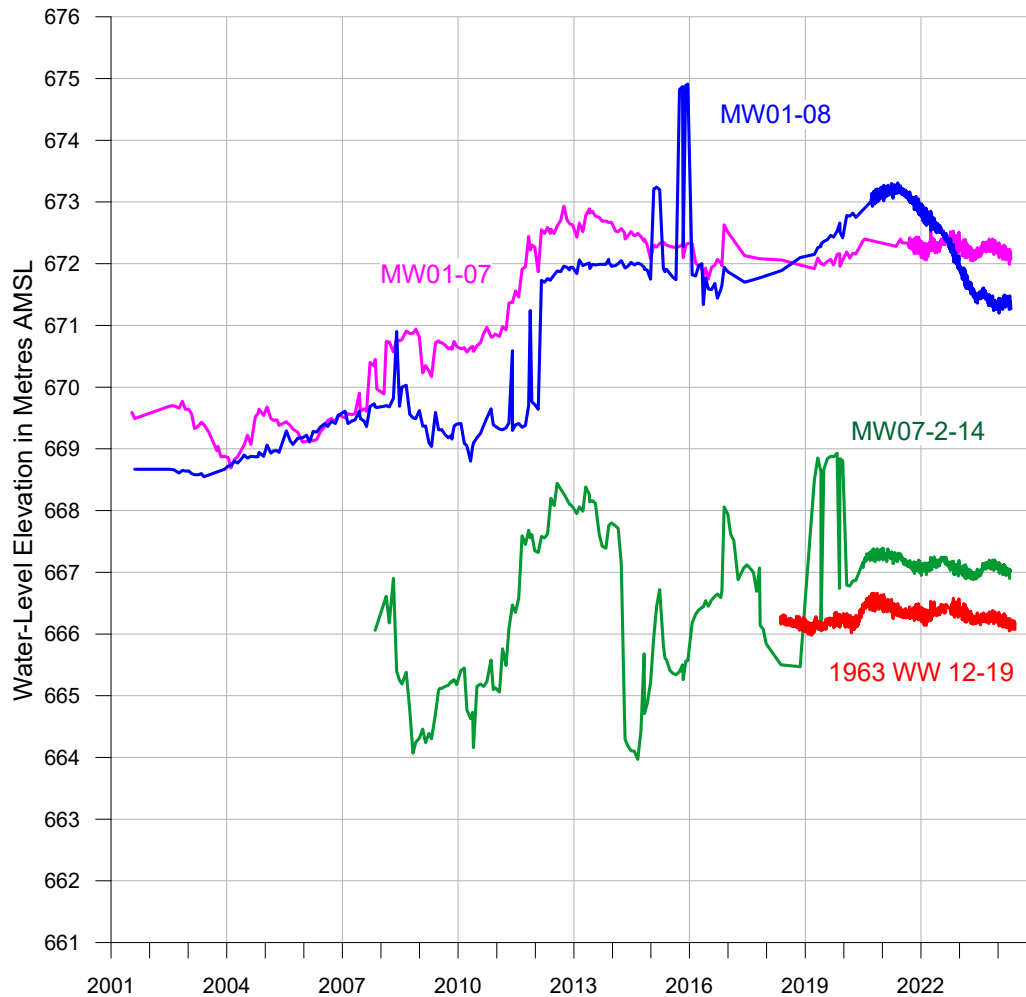


Figure 16. Group 3 Hydrograph

Water levels in the 1963 WW 12-19 have remained fairly flat since monitoring began in 2018.

Water levels in MW07-2-14 rose between 2018 and 2020, when dewatering ceased nearby, causing the water levels to recover. In 2020, the water level in MW07-2-14 levelled out and has remained fairly flat since then. The water-level changes observed in MW07-2-14 since 2020 may be due to natural processes taking over since mining activities have slowed down in the area.

Group 4 is in the northeastern portion of the AOI and is southwest of and in close proximity to the Sturgeon River. Figure 17 shows that water levels in this area rose by approximately 2 metres from 2016 to 2020, which may have been a result of the reclamation of previously active pits south of the two monitoring wells. The high water levels measured in 2020 are believed to be associated with the increased precipitation and runoff in that year, which resulted in a noticeable water-level rise in most of the monitoring wells, particularly in Group 2. From 2020 to mid-2023, the water levels in both Group 4 monitoring wells declined by approximately 0.6 metres and have since recovered by approximately 0.2 metres.

The water-level decline from 2008 through 2010 is believed to be a result of historical mining events and associated dewatering of pits in the area and may also be influenced by Sturgeon River flow fluctuations. The two Group 4 monitoring wells are the farthest monitored sites downgradient from the mining activities, which likely accounts for these two sites showing the slowest water-level recovery since the cessation of dewatering in the nearby reclaimed pits.

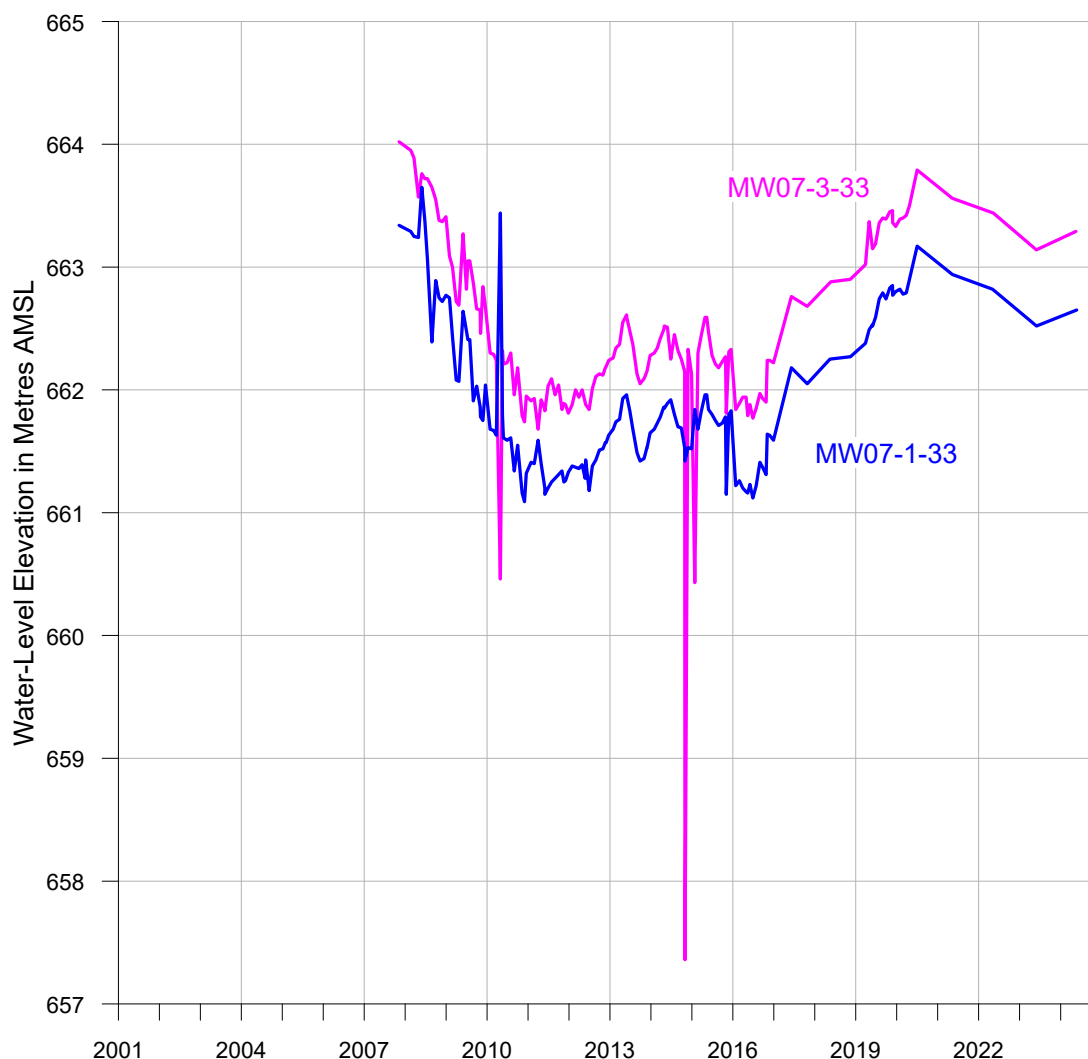


Figure 17. Group 4 Hydrograph

Group 5 is in the southeastern portion of the AOI. Similar to the northwestern portion of the AOI, water levels for the monitoring wells in this area have showed little change since 2021. Water-level fluctuations in MW04-01 in 2007 and 2017 are possibly due to reference-point inaccuracies when the measurements were taken. Due to errors in the data, the highs in 2007 and 2017 may be ignored, leaving the data set to follow the historical and the MW04-02 water-level trends more closely.

Figure 18 shows the generally stable nature of the water levels in the Group 5 monitoring wells in 2022 to 2024, indicating natural fluctuations in the water table and coinciding with the lack of mining activity in the area. There has been a water-level rise in MW10-01 and MW04-03 since 2016. This rise may be due to recovery since mining activities have ceased in the area. Water levels in MW01-01 decreased by approximately one metre in the summer of 2022, when mining by Lafarge began to take place north of the monitoring well. Since December 2022, water levels in MW01-01 have recovered by over 0.75 metres. The hydrograph for the Group 5 monitoring wells is broadly similar to the Group 3 hydrograph in that most of the water-level variations have occurred in the past, when there was active pit dewatering in areas that have since become reclaimed pits. The reclamation of the pits is evident in the reasonably horizontal water levels since 2012.

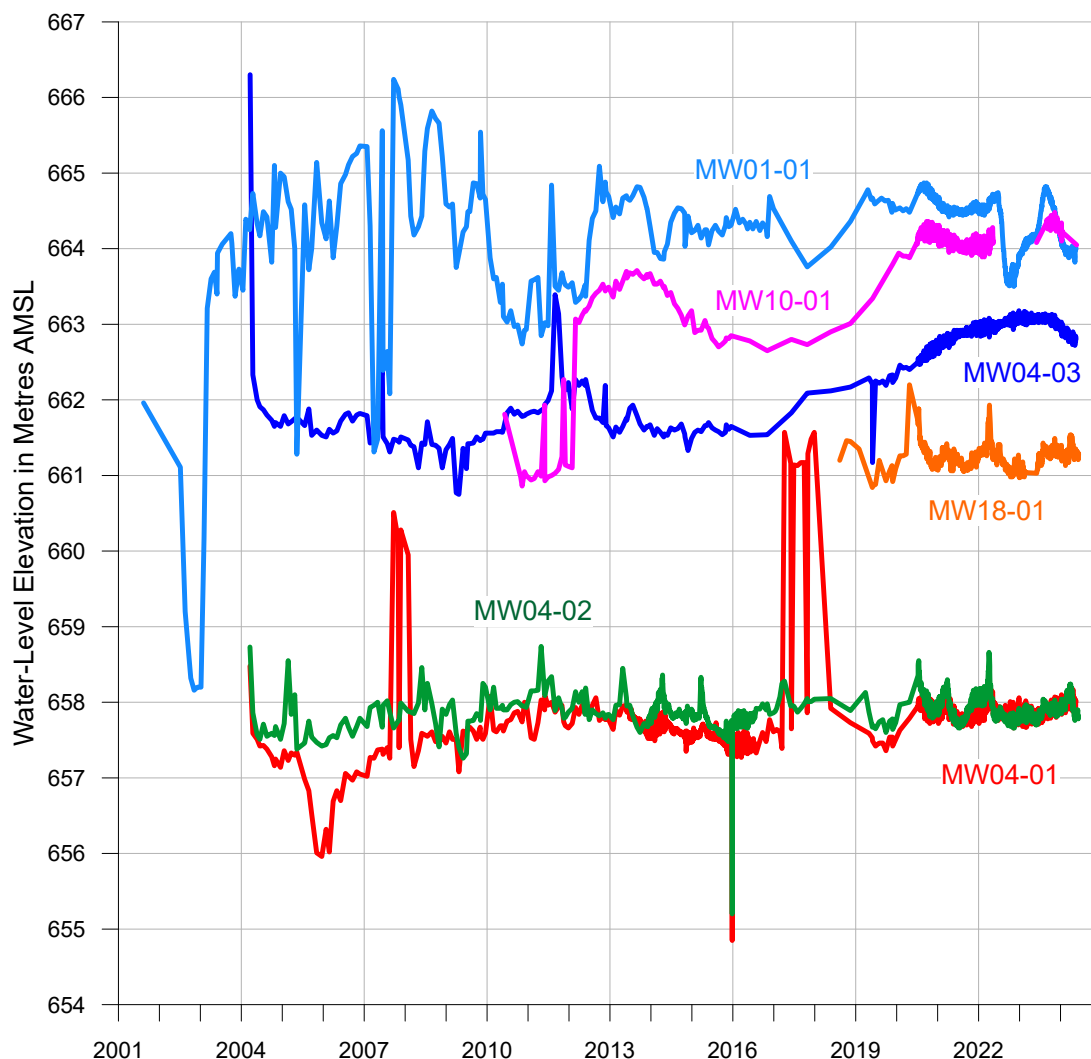


Figure 18. Group 5 Hydrograph

5.2. Water-Level Summary

Based on the review of water levels and reported pit activity, recently recorded water-level rises are a result of the cessation of nearby aggregate dewatering and extraction. Recent and historical water-level declines are mainly a result of nearby dewatering during mining operations.

Table 4 shows the measured water levels that were used to estimate the regional groundwater-level change that has occurred in the AOI as a result of historical and current aggregate dewatering and extraction. Although aggregate mining had been occurring in the AOI prior to the development of the Surgeon County water-level monitoring program, an attempt was made to assign “pre-disturbance” water-level elevations to monitoring sites that have a long history of measured water levels in areas that were presumed to be not in close proximity to active dewatering or extraction sites. The table shows nine monitoring sites that satisfy these criteria; these nine monitoring sites were then used to create a pre-disturbance water-level surface. The 28 water-level elevations in the fourth column of Table 4 were then used to create a water-level surface that is current to May 2024.

Monitoring Site	Water-Level Control Points			
	Elevation in Metres AMSL			Water-Level Change
	Ground	Pre-Disturbance Water Level	2024 Water Level	
A-S&G (OV)	685.8		678.1	
C-S&G (OV)	687.9		679.0	
MLM	686.2	679.3	669.1	-10.2
MW01-01	674.0	665.5	664.0	-1.5
MW01-04	675.9		668.0	
MW01-05	677.8	673.0	672.2	-0.9
MW01-06	690.6	681.0	675.9	-5.1
MW01-07	675.9		672.1	
MW01-08	682.0		671.3	
MW04-01	667.9	658.0	658.0	0.0
MW04-02	666.9	658.2	657.8	-0.4
MW04-03	676.4	663.0	662.8	-0.2
MW05-01	681.2		671.5	
MW07-1-33	667.2		662.7	
MW07-2-14	671.4		667.0	
MW07-3-33	666.0	664.0	663.3	-0.7
MW10-01	671.4		664.1	
MW11-02	690.8		673.2	
MW14-01	675.6		669.0	
MW14-02	673.3		668.2	
MW18-01	669.9		661.3	
1963 Water Well 12-19	677.3		666.2	
1995 Water Well 09-34	673.5		667.5	
2001 Water Well 14-21	692.2		676.3	
2001 Water Well 16-28	677.7		669.8	
2006 Water Well 10-34	674.5		670.7	
2013 Water Well 01-29	689.6		675.9	
1987 Water Well	675.6	675.6	669.9	-5.7

Table 4. Water-Level Control Points

Figure 19 shows the contoured water-level change in the AOI, which is calculated by subtracting the pre-disturbance water levels from the water levels measured in 2024. The map shows a regional characteristic that is believed to represent current water-level conditions in the sand and gravel aquifer. The water-level decline that is centred near the active Lafarge and Heidelberg Materials pits in the western part of the AOI is associated with nearby pits that have been active since 2020, while the water-level mounding near MW01-07 and MW18-01, which are centred near large areas of reclaimed land, is interpreted as groundwater mounding resulting from the replacement of the aggregate with less permeable material.

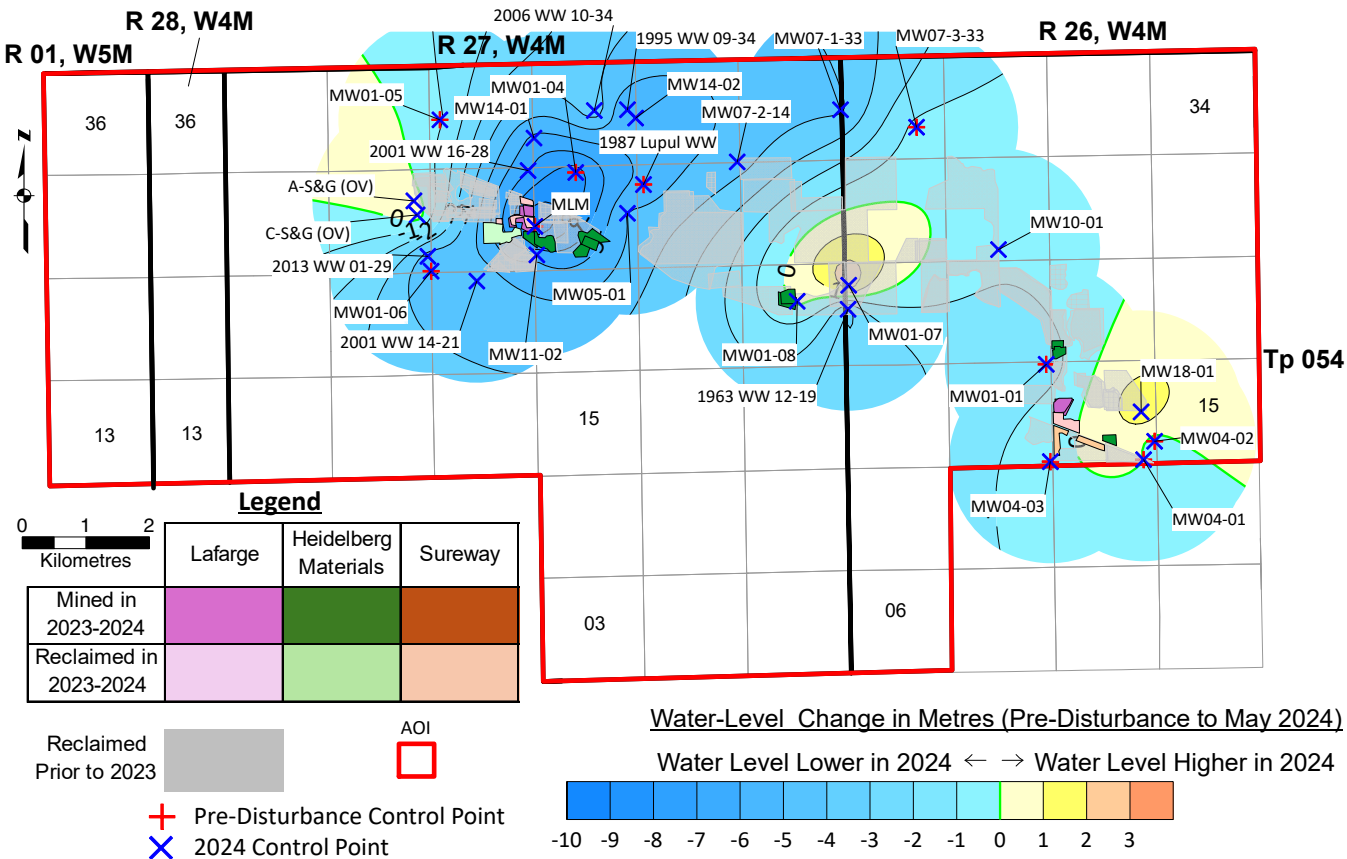


Figure 19. Contoured Water-Level Change (Pre-Disturbance to May 2024)

Figure 19 shows that temporary drawdown near active dewatering pits can be in the order of 4 to 9 metres; water-level recovery is expected after the cessation of dewatering, although full recovery may take several years.

The water-level data show that there can be significant temporary water-level changes in the sand and gravel aquifer associated with pit activities, but these changes typically do not represent an adverse effect on local groundwater users unless significant dewatering occurs in close proximity to a shallow domestic water well. However, there can also be a natural fluctuation in measured water levels that is associated with fluctuations in aquifer recharge from precipitation.

5.3. Groundwater Chemistry

A review of the groundwater-quality data collected from the monitoring wells in 2024 shows the following noteworthy concentrations:

- The southeastern part of the AOI near MW04-01 and MW04-03 shows an elevated concentration of sulfate when compared to the rest of the AOI. The 2024 groundwater sample collected from the nearby MW04-02, which is approximately 340 metres northeast of MW04-01, had a sulfate concentration of 187 mg/L, while the groundwaters from MW04-01 and MW04-03 had sulfate concentrations of 496 mg/L and 510 mg/L, respectively. Concentrations of sulfate are also slightly elevated in the groundwaters from the 2001 WW 16-28 and the 1995 WW 09-34, although sulfate concentrations at these locations are not trending upward. The collection of groundwater samples from the 2001 WW 16-28 began in 2020, and the earliest chemical analysis results for groundwater from the 1995 WW 09-34 was from 1997.
- Although the data show a correlation between sulfate and TDS concentrations, no trends or relationships are evident when comparing the concentrations of any of these parameters to water-level highs and lows or to the group in which the monitoring wells belong.
- The dissolved chloride concentration of 181 mg/L in the groundwater sample collected from MW14-02 is the highest chloride concentration measured in 2024; the concentration of chloride in the groundwater from MW14-02 has been trending upward since monitoring at this site began in 2015. The nearest monitoring site to MW14-02 is the 1995 WW 09-34, which is approximately 190 metres to the northwest; however, the chloride concentration in the groundwater sample from the 1995 WW 09-34 was 0.6 mg/L in 2024. This apparent discrepancy may be related to aquifer depth. Although the completion interval of the 1995 WW 09-34 is not recorded, the reported total depth of 33.5 metres BGL is deeper than the completion interval of 12.2 to 15.2 metres BGL for MW14-02. The chloride concentration in the groundwater from MW10-01 has also been trending upward since 2019, with a concentration of 24.6 mg/L measured in 2024. There has been a decreasing trend in the chloride concentration in the groundwater from MW04-03, from 96 mg/L in 2016 to 9.3 mg/L in 2024.

Further investigation is required to determine the possible causes for the sulfate concentration variations within the AOI and for the sudden increases and decreases in the chloride concentrations within the AOI, which may be associated with the amount of road salt that is used on nearby roads during the winter months.

Gravel dewatering and extraction activities are not considered to be the cause of any changes in the sulfate or chloride concentrations in the groundwaters. Elevated chloride concentrations may be naturally occurring or related to other activities, such as road maintenance or the use of water softeners.

The groundwater from MW04-03 and the groundwaters from MW07-2-14 and MW14-01 had uranium or arsenic concentrations, respectively, that exceeded the MACs in 2024. Uranium and arsenic are naturally occurring elements derived from parent material and not from aggregate extraction operations; their concentrations in the groundwaters do not show an increasing or decreasing trend. The selenium concentration in the groundwater from the 1963 WW 12-19 exceeded the MAC in 2024 but does not show a trend; further investigation and monitoring may be required in the future if an increasing trend is established.

The concentration of dissolved manganese in the groundwater samples from all monitoring wells except MW04-01 and MW04 03 exceeded the MAC in 2024; groundwater samples from MW14-02 and the 1963 WW 12-19 did not exceed the MAC for manganese but did exceed the AO. The MAC for manganese was established in 2019; prior to 2019, manganese was listed in the GCDWQ–ST but as an AO only. An AO is based on parameters such as taste, odour, or appearance that may affect the desirability of water for consumption but do not pose a health risk. Manganese is ubiquitous in groundwater within the Western Canadian sedimentary basin. In Alberta, approximately 40% of groundwaters have manganese concentrations that are above the MAC of 0.12 mg/L. Groundwaters from surficial deposits in Alberta are expected to be chemically hard and have elevated concentrations of iron and manganese.

At this time, there is no evidence that pit activities are resulting in any adverse effects on the groundwater quality within the AOI.

6. Conclusions

Water-level and chemical-quality data indicate that there have been some changes in the hydrogeological conditions of the sand and gravel aquifer in the AOI within the CRED since 2004.

There have been noteworthy groundwater-quality trends for two chemical parameters in the AOI; the trends are local and are related to five monitoring wells. One trend is related to the sulfate concentrations in the groundwaters from monitoring wells in the southeastern corner of the AOI, where there has been a history of elevated sulfate (HCL, 2023). The sulfate concentration in the groundwater from MW04-03 has continued to show a rising trend since 2019, while a declining trend has occurred in the groundwater from MW04-02 since 2012. The sulfate concentration in the groundwater from MW11-02 has also been on an increasing trend since monitoring began at that site in 2013. The other noteworthy trend is related to the concentration of chloride, which has been on a rising trend in the groundwater from MW14-02 since monitoring began in 2015 and has also been on a rising trend in the groundwater from MW10-01 since 2019. The chloride concentration in the groundwater from MW04-03 has been on a declining trend since 2016.

Aggregate dewatering and extraction activities are not considered to be the cause of any changes in the sulfate or chloride concentrations in the groundwaters. Elevated chloride concentrations may be naturally occurring or related to road maintenance or the use of water softeners.

The groundwaters from three monitoring wells had uranium or arsenic concentrations that exceeded the MACs in 2024; uranium and arsenic are naturally occurring, and their concentrations in the groundwaters do not show an increasing or decreasing trend. The selenium concentration in the groundwater from the 1963 WW 12-19 exceeded the MAC in 2024, but no apparent trend is observed; further investigation and monitoring may be required in the future if an increasing trend is established.

The 2024 groundwater samples from all monitoring wells except MW04-01 and MW04-03 had manganese concentrations that exceeded the MAC; the groundwater samples collected from MW14-02 and the 1963 WW 12-19 in 2014 did not exceed the MAC for manganese but did exceed the AO. The elevated concentrations are not due to aggregate extraction but represent naturally occurring or background conditions.

At this time, there is no evidence that pit activities are resulting in any adverse effects on the groundwater quality within the AOI.

There has previously been a water-level decline of approximately 10 metres in monitoring wells in the west-central part of the AOI that are in close proximity to areas that have been recently mined. In general, the five monitoring wells in the western half of the Group 1 area have shown a water-level rise since 2022, which is attributed to their locations being the farthest upgradient from the sites that were actively dewatered and mined in 2023 and 2024. The four monitoring wells in the eastern half of the Group 1 area continue to show an overall decline in water levels, which is attributed to their locations being the closest to the sites that were actively mined in 2023 and 2024.

The water-level data show that there can be significant temporary water-level changes in the sand and gravel aquifer associated with pit activities, but the magnitude of change has so far not represented an adverse effect on local groundwater users. In addition to water-level fluctuations caused by aggregate extraction activities, there can also be a natural fluctuation in measured water levels that is associated with fluctuations in aquifer recharge from precipitation.

7. Recommendations

The Sturgeon County groundwater monitoring program has continued for several years, and there have been no rapid changes in groundwater quality.

At this time, only Lafarge Canada Inc., Heidelberg Materials Canada Limited, and Sureway Construction Group are contacted for annual mining plans; it is recommended that the County contact all active operators on an annual basis to ensure that all mining activities are accounted for within the Calahoo Resource Extraction District.

Although the water-level monitoring is very helpful in assessing the impacts of aggregate extraction on the water level in the sand and gravel aquifer within the AOI, the water-level monitoring program should be reviewed annually and adjusted as necessary. It is recommended that local operators share future mining plans to allow for new monitoring wells to be added to the Calahoo Resource Extraction District groundwater monitoring program in advance of mining operations. This will allow for the collection of baseline data to gain a better understanding of pre-disturbance conditions. Installation of data loggers to collect hourly water-level data in all new monitoring sites is recommended.

An abbreviated hydrogeological assessment should be completed for the SW 28-054-27 W4M within the Group 1 area before mining activities begin in the quarter section, as there have been water-level declines in private water wells in the area, and proactive assessment could determine if further declines could impact domestic groundwater supplies.

It is recommended that the data loggers that are installed in the monitoring wells continue to be downloaded once per year, and that groundwater samples from the monitoring wells continue to be collected annually for analysis of dissolved metals and routine chemical parameters.

It is also recommended that the Sturgeon River water-level elevation be added to the monitoring network to determine if there is a correlation between the Sturgeon River water level and the water levels in the Group 4 monitoring wells.

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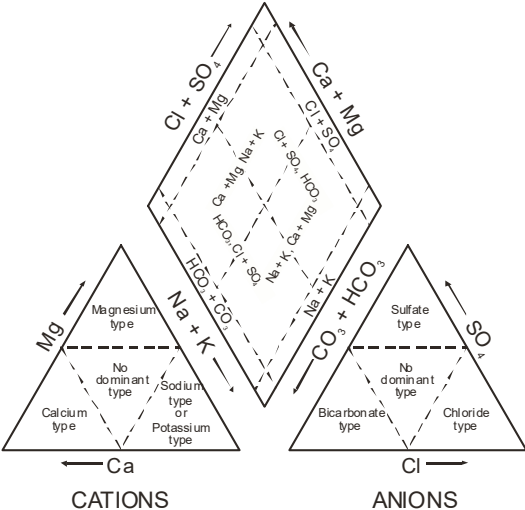
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9. Supplementary Information

9.1. Glossary of Terms

aesthetic objective	Health Canada aesthetic quality guidelines addressing parameters that may affect consumer acceptance of drinking water, such as taste, odour, and colour
aquifer	a formation, group of formations or part of a formation that contains saturated permeable rocks capable of transmitting groundwater to water wells or springs in economical quantities
aquitard	a confining bed that retards but does not prevent the flow of water to or from an adjacent aquifer
available drawdown	in a confined aquifer, the distance between the non-pumping water level and the top of the aquifer in an unconfined aquifer (water table aquifer), two thirds of the saturated thickness of the aquifer and water level within 5 metres of the top of the aquifer
base of groundwater protection	the depth below which groundwater is expected to have a total dissolved solids concentration of more than 4,000 milligrams per litre
geounit	a geologic unit categorized by a similarity in geological feature(s) such as stratigraphic interval, depositional environment, or hydrogeological properties
hydraulic conductivity	the rate of flow of water through a unit cross-section under a unit hydraulic gradient; units are length/time
maximum acceptable concentration	the highest level of chemical substances determined by Health Canada to be allowable in drinking water supplies; these substances are generally only a concern if exposure above guideline levels occurs over an extended time

Piper tri-linear diagram a method to show the composition of water based on major cation and anion composition. This diagram allows groupings or trends in the chemical-quality data to be identified. In Alberta, surface water and shallow groundwater are typically a Ca+Mg-HCO₃-type water, upper bedrock groundwaters are a Na+K-HCO₃-type water and deep groundwaters are a Na+K-Cl-type water.



storativity	the volume of water released from storage by a confined aquifer per unit surface area of aquifer per unit decline in hydraulic head (dimensionless)
surficial deposits	all sediments above the bedrock surface

till	a sediment deposited directly by a glacier that is unsorted and consisting of any grain size ranging from clay to boulders
transmissivity	the rate at which water is transmitted through a unit width of an aquifer under a unit hydraulic gradient; a measure of the ease with which groundwater can move through the aquifer <u>apparent transmissivity</u>: the value determined from a summary of aquifer test data, usually involving only two water-level readings <u>effective transmissivity</u>: the value determined from late pumping and/or late recovery water-level data from an aquifer test <u>aquifer transmissivity</u>: the value determined by multiplying the hydraulic conductivity of an aquifer by the thickness of the aquifer
yield	a regional analysis term referring to the rate at which a properly completed water well could be pumped, if fully penetrating the aquifer <u>apparent yield</u>: based mainly on apparent transmissivity <u>long-term yield</u>: based on effective transmissivity <u>sustainable yield</u>: based on aquifer parameters determined from long-term water-level and groundwater diversion monitoring

9.2. Glossary of Commonly Used Abbreviations, Acronyms, and Symbols

AEPA	Alberta Environment and Protected Areas
AER	Alberta Energy Regulator
AMSL	above mean sea level
AO	aesthetic objective
AOI	area of interest
ASP	Area Structure Plan
BGL	below ground level
BGWP	base of groundwater protection
BOC	below top of casing
CRED	Calahoo Resource Extraction District
DEM	digital elevation model
DST	drill-stem test
GCDWQ–ST	Guidelines for Canadian Drinking Water Quality – Summary Table
GPS	global positioning system receiver
GWUDI	groundwater under the direct influence of surface water
km	kilometre(s)
km ²	square kilometre(s)
Lpm	litre(s) per minute
Lpm/metre	litre(s) per minute per metre
LSD	legal subdivision
m	metre(s)
m ²	metre(s) squared
m ² /day	metre(s) squared per day
m ³	cubic metre(s)
m ³ /day	cubic metre(s) per day
m ³ /year	cubic metre(s) per year
MAC	maximum acceptable concentration
mg/L	milligram(s) per litre

mm	millimetre(s)
MW	monitoring well
NAD83	North American Datum of 1983
NPWL	non-pumping water level
Obs WW	observation water well
TDS	total dissolved solids
TGWC	The Groundwater Centre (www.tgwc.com)
VE	vertical exaggeration
WSW	water source well
WTH	water test hole
WW	water well

9.3. Stratigraphy of the “Undisturbed” Geology of Alberta

(as used by Hydrogeological Consultants Ltd.)

	upper surficial
	lower surficial
	Cypress Hills Fm
	Dalehurst Member
	upper part of Lacombe Member
	lower part of Lacombe Member
	Haynes Member
	upper part of Scollard Fm
	lower part of Scollard Fm
	Battle/Whitemud Fms
	upper part of Horseshoe Canyon Fm
	middle part of Horseshoe Canyon Fm
	lower part of Horseshoe Canyon Fm
	Bearpaw Fm
	Oldman Fm
	Foremost Fm
	Lea Park Fm
	Milk River Fm
	Colorado Shale
	Cardium Fm
	Kaskapau Fm
	Dunvegan Fm
	Shaftesbury Fm
	Viking Fm
	Joli Fou Fm
	upper part of Mannville Grp
	middle part of Mannville Grp
	lower part of Mannville Grp
	Jurassic
	Triassic
	upper part of Paleozoic
	Banff Fm
	Wabamun Group
	Winterburn Group
	Woodbend Group
	Beaverhill Lake Group
	Elk Point Group
	Precambrian

9.4. Guidelines for Canadian Drinking Water Quality – Summary Table

Constituent	AO	MAC
pH (pH units)	7.0–10.5	–
Conductivity (µS/cm)	–	–
Total Dissolved Solids	500	–
Sodium	200	–
Potassium	–	–
Calcium	–	–
Magnesium	–	–
Total Hardness	–	–
Manganese	0.02	0.12
Carbonate	–	–
Bicarbonate	–	–
Total Alkalinity	–	–
Sulfate	500	–
Chloride	250	–
Fluoride	–	1.5
Iron	0.3	–
Nitrate (as N)	–	10
Nitrate	–	45
Nitrite (as N)	–	1
Nitrite	–	3
Nitrate + Nitrite (as N)	–	10
Total Coliforms (CFU/100 mL)	–	0
Fecal Coliforms (CFU/100 mL)	–	0
Escherichia coli (CFU/100 mL)	–	0
Ionic Balance (%)	–	–

Concentrations are in milligrams per litre (mg/L) unless otherwise stated.

Note: Constituents marked with "–" do not have a recommended maximum concentration associated with them.

CFU/100 mL – Colony Forming Units per 100 millilitres

AO – Aesthetic Objective

MAC – Maximum Acceptable Concentration

GCDWQ–ST – Guidelines for Canadian Drinking Water Quality—Summary Tables
(Health Canada, 2024)

Appendix A – Sturgeon County Groundwater Monitoring Program

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TERMS OF REFERENCE

GROUNDWATER MONITORING PROGRAM

VILLENEUVE – CALAHOO GRAVEL EXTRACTION AREA

STURGEON COUNTY

Introduction

The Calahoo Villeneuve Gravel Extraction Area is located in Sturgeon County approximately eleven to twenty kilometers West of the City of St. Albert.

The plan area extends from Range Road 262 in the East to Range Road 11 in the West and from Highway 633 in the South to Highway 37 in the North.

Background

The Calahoo - Villeneuve- area has one of the largest reserves of gravel in the Edmonton area. The area has been actively mined for the past 50 years. Recent requests to expand the area has resulted in a two year process to develop an Area Structure Plan for the orderly development of the gravel resources.

Copies of the Calahoo-Villeneuve Sand and Gravel Extraction Area Structure Plan are available online in the Sturgeon County website. Excerpts from recent groundwater studies relevant to this groundwater monitoring program are available for background information.

Purpose of Study

The purpose of the proposed study is to provide semi-annual testing of the existing groundwater monitoring wells. The monthly water levels will be recorded by Sturgeon County and supplied to the consultant for inclusion in the report. Interpretation on the impact on available groundwater quality and quantity is required. A report shall be generated from this information and the information provided by Sturgeon County.

Scope of Study

The scope of the study is also to complete semi-annual testing of the groundwater monitoring wells as identified on Map labelled Schedule A. The testing will include the quantity and quality of the groundwater in each well. A total of 21 wells approximately 15m in depth are to be tested.

A. Groundwater sampling and analysis is required as follows (New Wells to be added once installation is completed):

- 1) Routine parameters for 21 wells – two sampling events per year in May and November (Calcium, Magnesium, Sodium, Potassium, Carbonate, Bicarbonate, Sulphate, Chloride, Nitrate-Nitrite, Alkalinity, Hardness, Total Dissolved Solids, pH, and electrical conductivity)

Dissolved Metals testing for 21 wells – one sampling event each year in November.

- 2) Monthly water level data of 19 wells will be provided by Sturgeon County, and is to be compiled and included within the report. Wells A-S&G (OV) / C-S&G (OV) currently have data loggers installed, and consultant is required to download and incorporate information into annual report. Additional Data loggers are continually being implemented, so additional download

information may also be provided). Well location information is as per Schedule "B"

- 3) Interpretation of groundwater analysis results and monthly water level information is to be provided. Consultant is to provide comments on comparative groundwater quality and quantity within reclaimed areas, areas adjacent to active mining operations and areas yet undisturbed by mining operations. The impact, if any, of gravel mining on the local groundwater is to be quantified.
- 4) An annual report compiling the groundwater testing results and interpretation is to be provided prior to March 1 of the following year. Two (2) hard copies of the report and one digital copy of the report in a pdf compatible format to be provided. The consultant is expected to present results at a committee meeting of local residents, political leaders, gravel operators and Albert Environment representatives. The report will also be posted on Sturgeon County website to be made available to the public.

Summary of Proposed Tasks

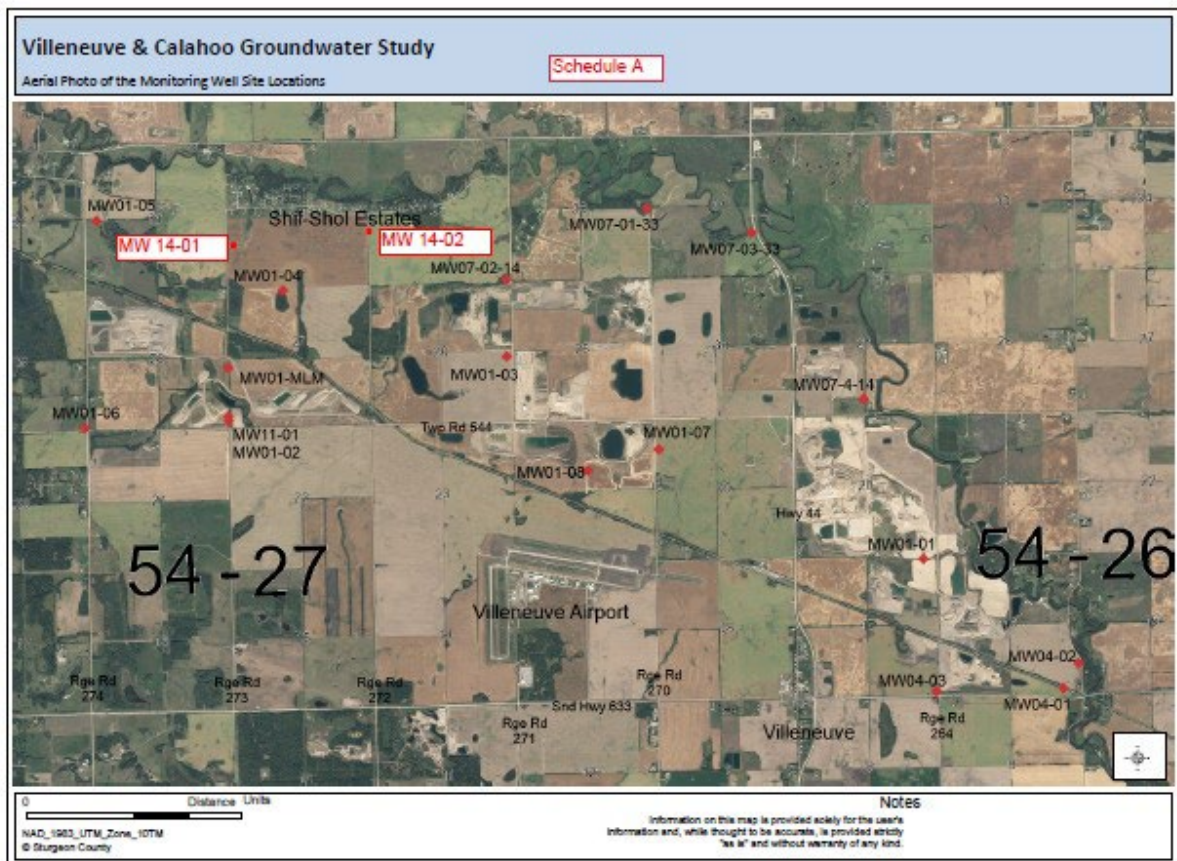
- A.1 Provide semi-annual testing of the existing ground water monitoring wells.
- A.2 Compile monthly water level readings provided by Sturgeon County
- A.3 Provide interpretation on groundwater monitoring results and gravel mining
- A.4 Prepare and present an annual report of the groundwater monitoring results.

Project Schedule

The project is expected to continue on a semiannual basis until either party provides thirty days notice to terminate the contract. The initial contract for this project is expected to last 2 years. Active Gravel Extraction Operations requiring long-term monitoring are expected to be in the area for the next 20 to 25 years.

Contact Personnel

Chris Pullen, Sturgeon County - (780)939-1319



Schedule B

Well Identification	Legal Location (W4M)	Easting	Northing	Ground Elevation (m asl)
A-S&G (OV)	09-29-054-27	305985.3	5953798.4	685.83
C-S&G(OV)	09-29-054-27	306019.61	5953581.67	687.92
MLM	05-27-054-27	307868.71	5953289.04	686.19
MW01-01	16-17-054-26	315793.79	5950667.83	674.03
MW01-03	14-27-054-27	311070.71	5953243.59	681.14
MW01-04	05-33-054-27	308561.26	5954101.09	675.88
MW01-05	01-29-054-27	308465.83	5955052.93	677.84
MW01-06	13-19-054-26	306195.72	5952686.44	690.64
MW01-07	10-26-054-27	312756.95	5952081.47	575.88
MW01-08	01-16-054-26	311926.29	5951883.29	682.01
MW04-01	01-16-054-26	317243.07	5949083.59	667.78
MW04-02	01-16-054-26	317432.63	5949363.31	666.83
MW04-03	01-17-054-26	315774.51	5949133.86	676.36
MW07-1-33	08-36-054-27	312775.96	5954856.52	667.17
MW07-2-14	01-35-054-27	311113.14	5954131.48	671.43
MW07-3-33	07-31-054-27	313967.36	595418.27	666.04
MW07-4-14	03-29-054-26	315138.86	5952647.5	671.4
MW11-01*	SW-27-054-27	71972	5947083	na
MW11-02*	SW-27-054-27	71965	5947084	691
MW14-01*	SW-34-054-27	307927	5954684	674.941
MW14-02*	SE-34-054-27	309549	5954909	672.241

11.2 RE – RESOURCE EXTRACTION DISTRICT 1607/22



.1 General Purpose

This district provides for the *extraction* and processing of *on-site* natural resources on lands. Once the *reclamation* process is complete, redistricting to the appropriate *use* is required.

.2 Uses

Permitted Uses	Discretionary Uses
Accessory, building	Temporary asphalt plant
Accessory, use	Temporary concrete batch plant
Natural resource extraction	Data Processing Facility
Secondary processing	

.3 Subdivision Regulations

The minimum parcel area shall be determined by the Subdivision Authority.

.4 Development Regulations

- (a) *Development* regulations for this district are at the discretion of the *Development Authority* in consideration of all application information.
- (b) *Natural resource extraction* activities having a disturbance area of less than 5.1ha (12.6ac) on a *parcel* at any time, including any associated infrastructure, *stockpiles* connected with the pit shall not be permitted.
- (c) The operating area of a *natural resource extraction* and *secondary processing use* shall not be located less than:
 - (i) 400m (1,312.3ft) from the outside wall of an existing *dwelling* or the district boundary of a multi-lot subdivision, hamlet, or area subject to an approved *planning document* that includes residential *development*.
 - (ii) Notwithstanding Subparagraph 11.2.4(c)(i), *natural resource extraction of silica sand* shall not be located less than 800m (2,624.6ft) from the outside wall of an existing *dwelling* or the district boundary of a multi-lot subdivision, hamlet, or area subject to an approved *planning document* that includes residential *development*.
 - (iii) Notwithstanding the above prescribed setbacks, the operating area of a *natural resource extraction* and *secondary processing use* has no defined setback from an existing *dwelling located on the subject parcel*.

.5 Additional Development Regulations

- (a) All *development* in this district is subject to the regulations stated in Parts 5 through 9 of this Bylaw.

.6 Landscaping Regulations

- (a) The *natural resource extraction* and *secondary processing* operation shall be landscaped in such a manner as to mitigate nuisance produced by the *development* and operations, which may include features such as, but not limited to, the installation of a berm and/or *fence* around the perimeter of the *excavation* area.
- (b) At the discretion of the *Development Authority*, *landscaping* or *screening* may be required along the *front, rear, or side yard parcel boundaries adjacent* to public, residential or other land uses.
- (c) Restricted and noxious weeds are to be controlled by the *developer* to prevent the spread of weeds to neighbouring lands in accordance with provincial regulations.

.7 Site Access and Traffic Regulations

In addition to the Parking Regulations contained in Part 9 of this Bylaw, the following regulations shall apply to all *development* in this district:

- (a) At the discretion of the *Development Authority*, a traffic impact assessment may be required with a *development permit* application.
- (b) All access to the *natural resource extraction* and *secondary processing development* area shall be approved by the Development Authority. Access to the *development* areas shall be developed in a manner that ensures safe and efficient truck movement and adequate site drainage. All access to *development* areas and/or *off-site* improvements are at the sole expense of the *developer*.
- (c) For *development* areas located within 0.8km (0.5mi) of a *highway*, the *developer* shall provide the *Development Authority* with an approved permit obtained from Alberta Transportation.
- (d) A *road use* agreement, between the County and the *developer* of a *natural resource extraction* and/or *secondary processing* use shall be required (where Sturgeon County roads will be utilized) and shall be a condition of the development permit, and shall include the following terms and conditions:
 - (i) The speed of haul vehicles shall be limited to 60km/h, or a different speed as identified in a *road use agreement* for safety purposes.
 - (ii) The *developer* shall maintain the roads daily during operations haulage. This maintenance shall keep the road surfaces in the same condition as they were prior to operations commencing.
 - (iii) No engine retarder brakes shall be allowed:
 - A. within 500 meters of a dwelling unit, and
 - B. where signs prohibit the use of engine retarder brakes
 - (iv) The *developer* is responsible for dust suppression on all gravel surfaced roads that will be used under a *road use agreement*.
 - (v) All drivers must be provided with an orientation to the requirements of hauling and *road use agreement* provisions in Sturgeon County.
 - (vi) The overloading of any trucks is strictly prohibited.
 - (vii) All loaded trucks shall be covered by tarps.
 - (viii) The *road use agreement* shall also include haul routes, anticipated maintenance, dust control methods, security, signage, and participation in the Alberta Sand and Gravel Association's Central Truck Registry numbering system and other related clauses and provisions deemed necessary by Sturgeon County.
- (e) Offsite improvements to municipal infrastructure that are identified as per the recommendations of a traffic impact assessment shall be completed at the sole expense of the *developer* prior to the operation of *natural resource extraction* or *secondary processing* and shall require a separate *Development Agreement* with Sturgeon County.

.8 Stripping

Topsoil shall be stripped and stockpiled on-site for future reclamation prior to commencing operations.

.9 Reclamation

A proposal to reclaim a *natural resource extraction* or *secondary processing* area shall be included in the *development permit* application.

.10 Operational Hours

- (a) *Natural resource extraction* may operate 24 hours a day, seven days a week.
- (b) *Secondary processing*:

- (i) All operations should be considered to operate on a 12-hour/day shift Monday to Friday basis unless site or operational conditions warrant consideration of extended operational hours.
- (ii) Where extended hours are being considered (less than 24hrs/day 7 days per week), the hours may be based upon consideration of site characteristics, results of noise-modelling analysis, feedback from *landowners* within the minimum separation distance, and *on-site* noise suppression applications.

.11 Hours for *Hauling*

- (a) The removal of natural resources from the pit location (*hauling*) shall take place only within the hours specified by the *Development Authority*. The *Development Authority* shall have regard to, but is not bound by, the following guidelines:
 - (i) 6:00a.m. to 6:00p.m. Monday to Friday; and
 - (ii) 8:00a.m. to 4:00p.m. Saturday to Sunday and Statutory Holidays.

.12 Dust and Noise

- (a) The *developer* shall:
 - (i) Prevent noise from becoming an annoyance to *adjacent landowners* at the request of, and to the satisfaction of, the *Development Authority*. Required prevention may include, but not be limited to, locating *stockpiles* and berms to act as sound barriers and using methods of minimizing or reducing noise created by machinery and equipment. Installation of noise monitors may be required as a condition of a *development permit*.
 - (ii) Ensure compliance with provincial legislation regarding dust and air quality.

.13 Water Requirements for *Natural Resource Extraction* and *Secondary Processing Uses*

- (a) Adherence is required to Sturgeon County's Groundwater Management Plans and Ground Water Monitoring Program, where applicable.
- (b) Where a water well report is required, adherence is required to the necessary mitigation measures in the report and the hydrogeological impact assessment.

.14 Application Requirements

A *development permit application* for *natural resource extraction* and *secondary processing* shall include, but is not limited to the following:

- (a) A copy of the application for registration under the Code of Practice for Pits;
- (b) A copy of any application for approvals under the *Water Act*, and
- (c) Supplemental information addressing those stated under Subparagraph 11.2.4 to 11.2.12 of this Bylaw.

.15 Community Communications Requirements for *Natural Resource Extraction* and *Secondary Processing Uses*

- (a) The *developer* of all their *natural resource extraction* and *secondary processing* operations shall be required as a condition of the development permit to host a community event annually to engage with surrounding communities.
- (b) The community event shall adhere to the following criteria.
 - (i) The *developer* must host a community event and invite all *landowners*:
 - A. within 1.6km(1mi) of the boundaries of the parcel where *natural resource extraction* or *secondary processing* has been approved; and
 - B. adjacent to haul routes for the natural resource extraction or secondary processing operation, as identified in related *road use agreements*.
 - (ii) Notice of the community event must be mailed a minimum of two (2) weeks in advance of the open house (invitations must be postmarked a minimum of 14 days prior to the date of the

- community event); and provide an alternate opportunity for information provision and discussion for those community members unable to attend the community event.
- (iii) The community event must be hosted with a minimum of one (1) representative from Sturgeon County's administration in attendance.
 - (iv) The community event must include an opportunity for residents to ask questions and discuss topics of interest with the *developer*.
 - (v) A report summarizing the results of the community event must be provided to Sturgeon County within three months of the date of the community event.
- (c) The *developer* must provide landowner communications on a semi-annual basis.
- (d) These semi-annual landowner communications must:
- (i) be sent by mail;
 - (ii) be sent to all landowners of parcels:
 - A. adjacent to the haul route, and
 - B. that are located within 1.6km of the parcel with *natural resource extraction* or *secondary processing* operations.
 - (iii) Provide updates on relevant information about the operation, including but not limited to:
 - A. updates on quarterly monitoring or reporting results, and
 - B. any changes or updates regarding the operation that may affect or be noticed by surrounding parcels.
- (e) The *developer* must post signage on the parcel on which *natural resource extraction* or *secondary processing* is occurring or expected to occur. The sign placed shall:
- (i) be a condition of the development permit for a *natural resource extraction* or *secondary processing*, and not require a separate sign permit under this Bylaw;
 - (ii) utilize the standard sign design for *natural resource extraction* or *secondary processing operations*, as identified by Sturgeon County;
 - (iii) identify the purpose for which the lands are to be used;
 - (iv) identify the approximate time over which extraction of the lands will take place;
 - (v) identify the location where additional information may be obtained;
 - (vi) identify the company name and contact information where the public may discuss and request information, and
 - (vii) be placed in a location easily visible to the public.

.16 Approval Timelines

- (a) *Development permits* for the purpose of *natural resource extraction* and *secondary processing* in the County are issued for five years and will require a new permit (renewal) every five years thereafter until a final *reclamation* certificate is received from the Provincial Government.
 - (i) A report prepared by a *practicing professional* shall be submitted with a *development permit* application for renewal addressing progression of pit activities, amendments to any previous approvals and the estimated lifespan of the pit.
- (b) Natural resource extraction and secondary processing operations that currently hold a valid *development permit* as of the date of adoption of this Bylaw are permitted to continue. Once the *development permit* has expired or where an amendment to the operation is proposed, a new *development permit* shall be required and is subject to the provisions of this Bylaw.

11.3 RE-DC – RESOURCE EXTRACTION - DIRECT CONTROL DISTRICT 1607/22; 1632/23**.1 General Purpose**

The purpose of this district is to provide for the *extraction* and processing of *on-site* natural resources that, due to their unique characteristics and/or site conditions, require specific direction unavailable in the conventional RE – Resource Extraction District and allows for reduced setbacks and specific performance and development standards as determined by Council.

.2 Uses

Permitted Uses	Discretionary Uses
<i>Accessory, building</i>	<i>Temporary asphalt plant</i>
<i>Accessory, use</i>	<i>Temporary concrete batch plant</i>
<i>Natural resource extraction</i>	<i>Data Processing Facility</i>
<i>Secondary processing</i>	

.3 Decision Making Authority

In this district, the Decision-Making Authority is the *Development Authority* and the *Subdivision Authority*.

.4 Development Regulations for Natural Resource Extraction and Secondary Processing Uses

- (a) *Natural resource extraction* activities having a disturbance area of less than 5.0ha (12.4ac) on a *parcel* at any time, including any associated infrastructure, *stockpiles* connected with the pit shall not be permitted.
- (b) Council is to consider the proposal *operating area* of *natural resource extraction* and/or a *secondary processing use* against the impacts to adjacent land uses to determine a suitable setback that is less than:
 - (i) 400m (1,312.3ft) from the outside wall of an existing *dwelling* to the nearest edge of the operating area of a *natural resource extraction* and *secondary processing use*.
 - (ii) in the case of the extraction of *silica sand*, 800m (2,624.6ft) from the outside wall of an existing dwelling or from the district boundary of a multi-lot subdivision, hamlet, or area subject to an approved *planning document* that includes residential *development*.
- (c) The operating area of a *natural resource extraction* or *secondary processing use* shall not be located within any setback areas as determined in the *Code of Practice for Pits*.
- (d) Setbacks from any Sturgeon County roads are to be determined by the *Development Authority* based on engineering requirements and Sturgeon County's roadway classifications.
- (e) Mining sequences shall be planned to commence extracting the resources and progressively reclaim in areas that pose the most impact to adjacent dwellings and identified sensitive areas.

.5 In accepting an application for the redistricting of land to a Resource Extraction DC District, the following pre-Application Community Consultation Requirements for *Natural Resource Extraction* and *Secondary Processing* Uses requirements will apply:

- (a) An application for *natural resource extraction* and/or an application for *secondary processing* shall require a pre-application community consultation, as noted in paragraph 11.3.6(m) of this Bylaw.
- (b) The pre-application community consultation shall adhere to the following criteria.
 - (i) The *developer* must host an open house and invite all residents who reside:
 - A. Within 1.6km (1mi) of the boundaries of the parcel subject to the application for natural resource extraction or secondary processing, and

- B. Adjacent to anticipated haul routes for the *natural resource extraction* or *secondary processing* application (as identified in the haul route plan specified in paragraph 11.3.6(g) of this Bylaw);
 - (ii) Notice of the open house must be mailed a minimum of (2) weeks in advance of the open house (invitations must be postmarked a minimum of 14 days prior to the date of the open house); and
 - A. Provide an alternate opportunity for information provision and discussion for those community members unable to attend the open house.
 - (iii) The open house must be hosted with a minimum of one (1) representative from Sturgeon County's administration in attendance.
 - (iv) The open house must include an opportunity for landowners to ask questions and discuss topics of interest with the *developer*.
 - (c) A report summarizing the results of the open house event must be provided to Sturgeon County in accordance with the application requirements in paragraph 11.3.6(m) of this Bylaw.
 - (d) Results from the pre-application community consultation may inform any other condition deemed appropriate by the Development Authority.
- .6 In considering an application for the redistricting of land to a Resource Extraction DC District as complete, an application shall include, but is not limited to the following:
 - (a) a copy of the application for registration under the Code of Practice for Pits;
 - (b) a copy of any application for approvals under the *Water Act*, and any other provincial or federal regulations;
 - (c) for development areas located within 0.8km (0.5mi) of a *highway*, an approved permit obtained from Alberta Transportation;
 - (d) a traffic impact assessment, where deemed to be required by Sturgeon County;
 - (e) a traffic related implementation plan that demonstrates how all traffic-related performance standards, monitoring and reporting requirements, as specified under paragraph 11.3.7(a) of this Bylaw will be met;
 - (f) a site access plan;
 - (g) a haul route plan identifying all County roads to be utilized during hauling;
 - (h) a track out management plan that identifies how roadways will be cleaned and maintained;
 - (i) a noise impact assessment deemed by a designated professional to assess the impacts of the operations;
 - (j) a noise related implementation plan that demonstrates how all noise related performance standards, monitoring, and reporting requirements, as specified under paragraph 11.3.7(c) of this Bylaw, will be met;
 - (k) an air quality impact assessment;
 - (l) an air quality implementation plan that demonstrates how all air quality related performance standards, monitoring, and reporting requirements, as specified under paragraph 11.3.7(d) of this Bylaw, will be met;
 - (m) evidence and results of pre-application community consultation undertaken in accordance with the requirements of subsection 11.3.5 of this Bylaw;
 - (n) a community communications plan, that identifies how the requirements of paragraph 11.3.7(f) of this Bylaw will be met;
 - (o) a water well report, for applications with operating areas within 800m (½mi) of a single dwelling, or 1200m (¾mi) of a multi-lot subdivision;

- (p) a hydrological impact assessment, where required by the Province of Alberta or where a potential impact is identified through the water well report required in paragraph 11.3.6(o) of this Bylaw;
 - (q) an implementation plan to mitigate identified effects that the aggregate operation might have on the local water table, based on the hydrological impact assessment, where applicable;
 - (r) a site-specific stormwater management plan that indicates the specific techniques to be used within the pit to responsibly manage surface drainage so as not to negatively impact positive surface drainage conditions situated up or downstream of the proposed operation;
 - (s) an emergency response plan; and,
 - (t) a visual impact assessment,
 - (u) expected number and type of jobs and expected economic impact,
 - (v) any other study, report or assessment required to assess the application.
- .7 In considering regulations for the redistricting of land to a Resource Extraction DC District, Administration will prepare an analysis of the proponent's redistricting application for Council's consideration. The analysis will utilize a defined methodology that considers the expected Economic, Environmental and Social impacts of the proposed development. Based on this site-specific evaluation, stakeholder input and other factors. Council may impose specific performance standards listed below as regulations for the proposed district. These regulations will form conditions of the subsequent development permit.
- (a) Transportation Requirements for Natural Resource Extraction and Secondary Processing Uses
 - (i) A *road use agreement*, between the County and the *developer* of a *natural resource extraction* and/or *secondary processing* use shall be required (where Sturgeon County roads will be utilized) and shall be a condition of the development permit, and shall include the following terms and conditions:
 - A. The speed of haul vehicles shall be limited to 60km/h, or a different speed as identified in a *road use agreement* for safety purposes.
 - B. The *developer* shall maintain the roads daily during operations haulage. This maintenance shall keep the road surfaces in the same condition as they were prior to operations commencing.
 - C. No engine retarder brakes shall be allowed:
 - a. within 500 meters of a dwelling unit, and
 - b. where signs prohibit the use of engine retarder brakes.
 - D. The *developer* is responsible for dust suppression on all gravel surfaced roads that will be used under a *road use agreement*.
 - E. All drivers must be provided with an orientation to the requirements of hauling and *road use agreement* provisions in Sturgeon County.
 - F. The overloading of any trucks is strictly prohibited.
 - G. All loaded trucks shall be covered by tarps.
 - H. The *road use agreement* shall also include haul routes, anticipated maintenance, dust control methods, security, signage, and participation in the Alberta Sand and Gravel Association's Central Truck Registry numbering system and other related clauses and provisions deemed necessary by Sturgeon County.
 - (ii) The *developer* shall adhere to the methods identified in the track out management plan submitted with the application.
 - (iii) Offsite improvements to municipal infrastructure that are identified as per the recommendations of a traffic impact assessment shall be completed at the sole expense of the *developer* prior to the operation of *natural resource extraction* or *secondary processing* and shall require a separate *Development Agreement* with Sturgeon County.

- (iv) All accesses to the *natural resource extraction* and/or *secondary processing* use area shall be approved by the *Development Authority*. Access to the *development* areas shall be developed in a manner that ensures safe and efficient truck movement and adequate site drainage. All access to *development* areas and/or off- site municipal *improvements* are at the sole expense of the *developer*.
- (b) Water Requirements for Natural Resource Extraction and Secondary Processing Uses
 - (i) Adherence is required to Sturgeon County's Groundwater Management Plans and Ground Water Monitoring Program, where applicable.
 - (ii) Where a water well report is required, adherence is required to the necessary mitigation measures in the report and the hydrogeological impact assessment.
 - (iii) Adherence to the measures identified in the implementation plan, as required in paragraph 11.3.6(g).
- (c) Noise Requirements for Natural Resource Extraction and Secondary Processing Uses
 - (i) Noise attenuation methods (as identified in the noise impact assessment) shall include, but not be limited to:
 - A. installing noise attenuation infrastructure in recommended locations (as identified in the noise impact assessment) on the *parcel*;
 - B. locating stockpiles and berms to act as sound barriers to impacted areas;
 - C. using methods of minimizing or reducing noise created by machinery and equipment related to the *natural resource extraction* or *secondary processing* use; and
 - D. ensuring noise reducing mufflers are fitted on all hauling trucks to be used.
 - (ii) Noise limits at the subject property's *parcel lines* of operation sites shall not exceed:
 - A. 75 dBA (Leg (1 hour)), between the hours of 7:00 a.m. to 7:00 p.m., Monday to Friday;
 - B. 55 dBA (Leg (1 hour)), on Saturday, Sunday, and statutory holiday, and between the hours of 7:00 p.m. to 7:00 a.m., Monday to Friday; and
 - C. notwithstanding the above, if ambient noise levels already exceed decibel levels outlined above, noise levels shall not exceed 5 dBA (Leg (1 hour)) above existing ambient noise levels.
 - (iii) Noise monitoring and reporting shall be required as a development permit condition in accordance with the following requirements:
 - A. Monitors shall be sited and installed on the subject property's *parcel lines*, subject to the location recommendations of the submitted noise impact assessment.
 - B. Quarterly reports on noise levels and evidence of compliance with subparagraph 11.3.7(c)(ii) of this Bylaw are required to be submitted to Sturgeon County.
 - C. Annual reports conducted by a qualified third party to provide quality assurance on reported noise levels and compliance with subparagraph 11.3.7(c)(ii) of this Bylaw are required to be submitted to Sturgeon County.
 - D. Notwithstanding the above, noise monitoring and reporting shall not be required during months where extraction, processing, and hauling are not occurring. The *developer* must provide notification to Sturgeon County prior to the first date of any month that operations and associated monitoring will not be conducted.
 - (iv) Notwithstanding the above, noise limits, monitoring and reporting requirements specified in subparagraphs 11.3.7(c)(i through iii) of this Bylaw shall not apply at portions of parcel lines of the parcel which border another parcel districted as:
 - A. RE – Resource Extraction districts and
 - B. I5 – Heavy Industrial district

- (v) Notwithstanding the above, noise limits and monitoring and reporting requirements as specified in subparagraphs 11.3.7(c)(i through iii) of this Bylaw shall not apply at *parcel lines* where there is no *dwelling* within 800m (½mi) of that parcel line.
- (d) Air Quality Requirements for Natural Resource Extraction and Secondary Processing Uses
 - (i) Air quality protection methods shall include, but not be limited to, the following methods (subject to the recommendations of the submitted air quality impact assessment):
 - A. locating pit accesses away from residential accesses, where possible;
 - B. treating access routes with dust suppressant, to prevent dust from trucks and other moving equipment, in accordance with an approved *road use agreement*;
 - C. setting truck speed limited, as outlined in clause 11.3.7(a)(i)(A) of this Bylaw;
 - D. secondary processing facilities must be enclosed or sited at the bottom of a pit, where possible;
 - E. ensuring all truck loads are covered with tarps, as outlined in clause 11.3.7(a)(i)(G) of this Bylaw;
 - F. perimeter vegetation, seeding berms and stockpiles, or other erosion control methods;
 - G. limiting the area(s) of active extraction open at any one time by performing progressive reclamation and extraction, and
 - H. ensuring compliance of PM2.5 air quality levels as identified in the Alberta Ambient Air Quality Objectives.
 - (ii) Air Quality monitoring and reporting shall be required as a *development permit* condition in accordance with the following requirement:
 - A. Monitors shall be sited and installed in the locations as recommended by the air quality impact assessment.
 - B. Quarterly reports on air quality levels and compliance with clause 11.3.7(d)(i)(H) of this Bylaw are required to be submitted to Sturgeon County.
 - C. Annual reports, conducted by a qualified third party to provide quality assurance on reported air quality levels and compliance with clause 11.3.7(d)(i)(H) of this Bylaw are required to be submitted to Sturgeon County.
 - (iii) Notwithstanding the above, air quality monitoring and reporting requirements specified in subparagraph 11.3.7(d)(ii) of this Bylaw shall not apply at portions of *parcel lines* of this *parcel* which border another *parcel* districted as:
 - A. RE – Resource Extraction districts and
 - B. I5 – Heavy Industrial district
 - (iv) Notwithstanding the above, air quality monitoring and reporting requirements as specified in subparagraph 11.3.7(d)(ii) of this Bylaw shall not apply at *parcel lines* where there is no *dwelling* within 800m (½mi) of that *parcel line*.
- (e) Landscaping and Visual Impacts for *Natural Resource Extraction* and *Secondary Processing* Uses
 - (i) All natural resource extraction and secondary processing operations shall require landscaping in such a manner as to mitigate visual impacts from the *development* and operations, which may include features such as, but not limited to:
 - A. The installation of a berm and/or fence around the perimeter of the excavation area.
 - B. Existing vegetation be retained where possible.
 - C. Equipment be stored away from *parcel lines* where possible and in the least obtrusive location possible.

- D. Restricted and noxious weeds are to be controlled by the *developer* to prevent the spread of weeds to neighbouring lands in accordance with provincial regulations.
- (ii) The community consultation results from the pre-application consultation as specified in paragraph 11.3.5(c) of this Bylaw, shall inform landscaping or screening that may be required along the operating boundaries of the pit.
- (iii) Visual impact monitoring and reporting shall be required as a development permit condition in accordance with the following requirements:
 - A. Quarterly reports on visual impacts and compliance with subparagraphs 11.3.7(e)(i through iii) of this Bylaw and recommendations adopted from the community consultation, are required to be submitted to Sturgeon County.
 - B. Annual reports to provide quality assurance on reported visual impacts and compliance with subparagraphs 11.3.7(e)(i through iii) of this Bylaw and recommendations adopted from the community consultation, are required to be submitted to Sturgeon County.
- (f) Community Communications Requirements for Natural Resource Extraction and Secondary Processing Uses
 - (i) The *developer* of *natural resource extraction* and *secondary processing* operations shall be required as a condition of the development permit to host a community event annually to engage with surrounding communities.
 - (ii) The community event shall adhere to the following criteria.
 - A. The *developer* must host a community event and invite all landowners:
 - a. within 1.6km (1mi) of the boundaries of the parcel where *natural resource extraction* or *secondary processing* has been approved; and
 - b. adjacent to haul routes for the natural resource extraction or secondary processing operation, as identified in related *road use agreements*.
 - B. Notice of the community event must be mailed a minimum of two (2) weeks in advance of the open house (invitations must be postmarked a minimum of 14 days prior to the date of the community event) and provide an alternate opportunity for information provision and discussion for those community members unable to attend the community event.
 - C. The community event must be hosted with a minimum of one (1) representative from Sturgeon County's administration in attendance.
 - D. The community event must include an opportunity for residents to ask questions and discuss topics of interest with the *developer*.
 - E. A report summarizing the results of the community event must be provided to Sturgeon County within three months of the date of the community event.
 - (iii) The *developer* must provide landowner communications on a semi-annual basis
 - (iv) These semi-annual landowner communications must:
 - A. be sent by mail;
 - B. be sent to all landowners of parcels:
 - a. adjacent to the haul route, and
 - b. are located within 1.6km of the parcel with *natural resource extraction* or *secondary processing* operations.
 - C. provide updates on relevant information about the operation, including but not limited to:
 - a. updates on quarterly monitoring or reporting results, and

- b. any changes or updates regarding the operation that may affect or be noticed by surrounding parcels.
 - (v) The *developer* must post signage on the parcel on which *natural resource extraction* or *secondary processing* is occurring or expected to occur. The sign placed shall:
 - A. be a condition of the development permit for *natural resource extraction* or *secondary processing* and not require a separate sign permit under this Bylaw;
 - B. utilize the standard sign design for *natural resource extraction* or *secondary processing operations*, as identified by Sturgeon County;
 - C. identify the purpose for which the lands are to be used;
 - D. identify the approximate time over which extraction of the lands will take place;
 - E. identify the location where additional information may be obtained;
 - F. identify the company name and contact information where the public may discuss request information, and
 - G. be placed in a location easily visible to the public
 - (g) Operational Hours for Natural Resource Extraction and Secondary Processing Uses
 - (i) Natural resource extraction and secondary processing operations may operate:
 - A. between 6:00a.m. to 10:00 p.m. Monday to Friday; and
 - B. between 7:00 a.m. to 6:00 p.m., Saturday, Sunday, and Statutory Holidays.
 - (ii) Extended or varied hours may be approved by the *Development Authority*. In such cases, the hours will be based upon consideration of site characteristics, results of a noise-modelling analysis, feedback from community consultation, location of haul routes and hauling accesses, and on-site noise mitigation measures.
 - (iii) The removal of natural resources from the pit location (*hauling*) shall take place only within the hours specified by the *Development Authority*. The *Development Authority* shall have regard to, but is not bound by, the following guidelines:
 - A. 6:00 a.m. to 6:00 p.m. Monday to Friday; and
 - B. 7:00 a.m. to 5:00 p.m. Saturday, Sunday, and Statutory Holidays
 - (iv) Extended or varied hours may be approved by the *Development Authority*. In such cases, the hours will be based on the consideration of site characteristics, results of a noise-modelling analysis, feedback from community consultation, location of haul routes and hauling accesses, and on-site noise mitigation measures.
 - (h) Stripping Requirements for Natural Resource Extraction and Secondary Processing Uses
 - (i) Topsoil shall be stripped and *stockpiled* on-site for future reclamation prior to commencing operations.
- .8 Reclamation Requirements for *Natural Resource Extraction* and *Secondary Processing* Uses
 - (a) A proposal to reclaim a *natural resource extraction* or *secondary processing* area shall be included in the development permit application.
- .9 Approval Timelines
 - (a) Development permits for the purpose of natural resource extraction and secondary processing in the County are issued for five years and will require a new permit (renewal) every five years thereafter until a final reclamation certificate is received from the Provincial Government.
 - (i) A report prepared by a practicing professional shall be submitted with a development permit application for renewal addressing progression of pit activities, amendments to any previous approvals and the estimated lifespan of the pit.

.10 Additional Development Regulations

- (a) All development in this district is subject to the regulations stated in Parts 5 through 9 of this Bylaw, where applicable.

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A-S&G (OV)

09-29-054-27 W4M
(M40000.652035)



Photograph taken on May 30, 2023

Spatial Location:

Easting: **70,027**

Northing: **5,947,934**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **686**

(elevation accuracy HCL DEM)

Date Completed: **February 9, 2007**

Depth Drilled (m): **22.0**

Completion Interval (m): **16.6 – 18.1 ***

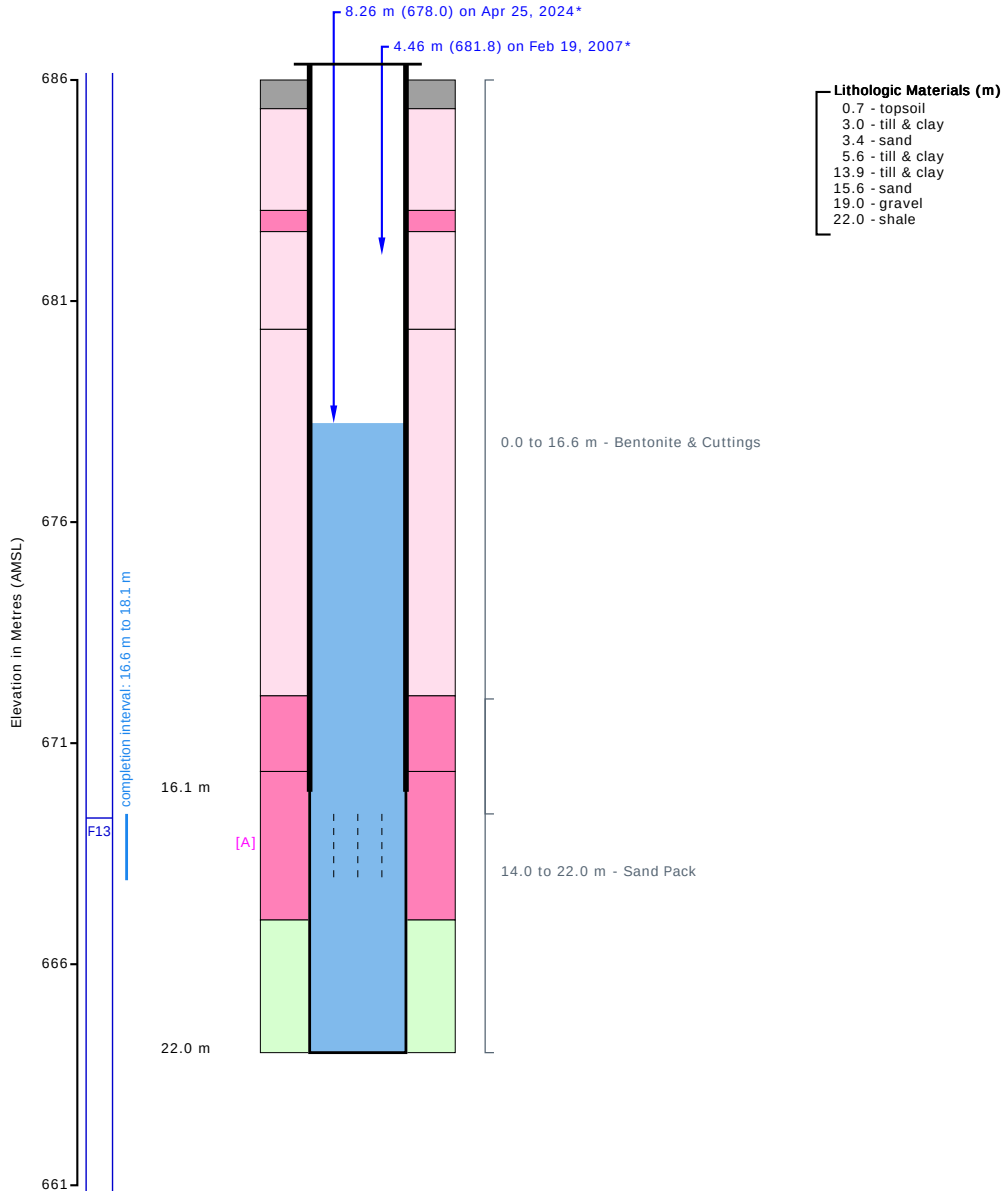
(TGWC determined value)*

Earliest Water Level (m): **4.46 – February 19, 2007**

Most Recent Water Level (m): **8.26 – April 25, 2024 @ 12:53**

GIC ID: **Unknown**

A-S&G (OV) Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		F13 - Lower Horseshoe Canyon Formation	
	Fine Grained			
	Coarse Grained			
Bedrock	Fine Grained			
	Coarse Grained			
	Other			

Summary	
TGWC ID: M40000.652035 Well Name: A-S&G (OV) Legal Location: 09-29-054-27 W4M Casing (OD): 152.0 mm; PVC (6.0") Casing Stick-Up: 0.5 m (not drawn to scale) Completion [A]: 16.6 to 18.1 m; Slotted Water Level (recent): 8.26 m (678.0 m AMSL) on Apr 25, 2024 @ 12:53 - Reference Point: Top of Casing Water Level (oldest): 4.46 m (681.8 m AMSL) on Feb 19, 2007 - Reference Point: Top of Casing	

* Water-Level Measurements are measured from reference point listed.
 NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (<http://www.hcl.ca>) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
 Drawn: October 10, 2024 @ 12:18 --- <https://www.hcl.ca>
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A-S&G (OV)
AEPA – Water Well Drilling Report

— AEPA water well drilling report not available —

A-S&G (OV)
Chemical Analysis Results (June 7, 2024)



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Page 1 of 12

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011529 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-12
Sample Date	April 25, 2024
Sample Time	13:35
Sample Location	M40000.652035
Sample Description	A-S&G (OV) / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	8.18	0.05		
Sulfur	Dissolved	mg/L	29.8	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0083	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.036	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.149	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	<0.00001	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	0.0012	0.0001		
Copper	Dissolved	mg/L	<0.0002	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.083	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0012	0.0005		
Selenium	Dissolved	mg/L	<0.0002	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	1.06	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0021	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	0.001	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	25	5	15	Above AO
Turbidity		NTU	17.0	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.72	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	20.7			
Electrical Conductivity	at 25 °C	µS/cm	927	1		
Calcium	Dissolved	mg/L	118	0.2		
Magnesium	Dissolved	mg/L	23.9	0.2		
Sodium	Dissolved	mg/L	65.5	0.4	200	Below AO

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011529 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Reference Number	1736660-12
Sample Date	April 25, 2024
Sample Time	13:35
Sample Location	M40000.652035
Sample Description	A-S&G (OV) / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	3.6	0.4		
Iron	Dissolved	mg/L	1.64	0.01	0.3	Above AO
Manganese	Dissolved	mg/L	0.729	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	0.5	0.4	250	Below AO
Fluoride		mg/L	0.06	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.53	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	0.53	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	89.3	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	540			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	443	5		
Total Dissolved Solids	Calculated	mg/L	567	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	393			
Ionic Balance	Dissolved	%	101			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011529
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460024 - Mercury (Dissolved) in water												
Blank	6479008	Jun 05, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479012	Jun 05, 2024	Mercury	mg/L	0.000094						7e-005 - 0.00013	yes
Control Sample	6479011	Jun 05, 2024	Mercury	mg/L	0.000019						6e-006 - 3.6e-005	yes
Replicate	6479013	Jun 05, 2024	Mercury	mg/L	<0.000005			<0.000005		0	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

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Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011529
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Attn: Jennifer Catt
Sampled By: HCL
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Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011529
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479114	Jun 05, 2024	Aluminum	µg/L	<2			<2		0	10 % or 11 Abs	yes
Replicate	6479114	Jun 05, 2024	Antimony	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Arsenic	µg/L	12.5			12.4		0.38	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Barium	µg/L	19			19		0.09	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Boron	µg/L	102			102		0.06	10 % or 4.4 Abs	yes
Replicate	6479114	Jun 05, 2024	Cadmium	µg/L	<0.01			<0.01		0	10 % or 0.022 Abs	yes
Replicate	6479114	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Cobalt	µg/L	0.8			0.8		3.91	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Copper	µg/L	<0.2			<0.2		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Lead	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3
Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011529
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479114	Jun 05, 2024	Lithium	µg/L	118			119		0.43	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Nickel	µg/L	0.7			0.8		2.6	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Selenium	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Strontium	µg/L	822			826		0.52	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479114	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Titanium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Uranium	µg/L	3.7			3.7		0.74	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Vanadium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Zinc	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479186	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Quality Control

Bill To: Hydrogeological Consultants
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Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011529
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Blank	6479192	Jun 05, 2024	Turbidity	NTU	0.1	0.1					0.1	yes
Control Sample	6479197	Jun 05, 2024	Turbidity	NTU	1990						1847.5 - 2041.9	yes
Control Sample	6479198	Jun 05, 2024	Turbidity	NTU	4760						4441.7 - 6661.7	yes
Control Sample	6479196	Jun 05, 2024	Turbidity	NTU	149						132.1 - 162.1	yes
Control Sample	6479195	Jun 05, 2024	Turbidity	NTU	14.8						12.6 - 15.6	yes
Control Sample	6479194	Jun 05, 2024	Turbidity	NTU	1.7						1 - 2.2	yes
Replicate	6479207	Jun 05, 2024	Turbidity	NTU	11.8			12.0		1.68	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478740	Jun 05, 2024	pH		6.94			6.96		0.23	0 % or 0.1 Abs	yes
Replicate	6478740	Jun 05, 2024	Electrical Conductivity	dS/m	0.129			0.131		1.38	10 % or 0.002 Abs	yes
Replicate	6478740	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478740	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	Bicarbonate	mg/L	65			66		0.9	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478740	Jun 05, 2024	T-Alkalinity	mg/L	54			54		0.9	10 % or 5 Abs	yes

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011529 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Batch: 2460219 - Anions (Routine) by Ion Chromatography												
Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479560	Jun 05, 2024	Fluoride	mg/L	10.1						9.39 - 10.59	yes
Control Sample	6479560	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479560	Jun 05, 2024	Nitrite - N	mg/L	9.80						9.01 - 10.99	yes
Control Sample	6479560	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479561	Jun 05, 2024	Fluoride	mg/L	4.95						4.56 - 5.22	yes
Control Sample	6479561	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479562	Jun 05, 2024	Fluoride	mg/L	0.52						0.45 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrite - N	mg/L	0.505						0.455 - 0.557	yes
Control Sample	6479562	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.01						0.85 - 1.15	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrate - N	mg/L	0.58			0.58		0.19	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Batch: 2460052 - Chloride in Water												
Blank	6479097	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479094	Jun 05, 2024	Chloride	mg/L	1910						1847.4 - 2256	yes
Control Sample	6479095	Jun 05, 2024	Chloride	mg/L	78.6						74.9 - 86.9	yes
Control Sample	6479096	Jun 05, 2024	Chloride	mg/L	14.7						13.3 - 16.5	yes
Replicate	6479093	Jun 05, 2024	Chloride	mg/L	0.8			0.8		5.13	10 % or 0.5 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011529
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

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SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011529 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-12; 9343644: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011529
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

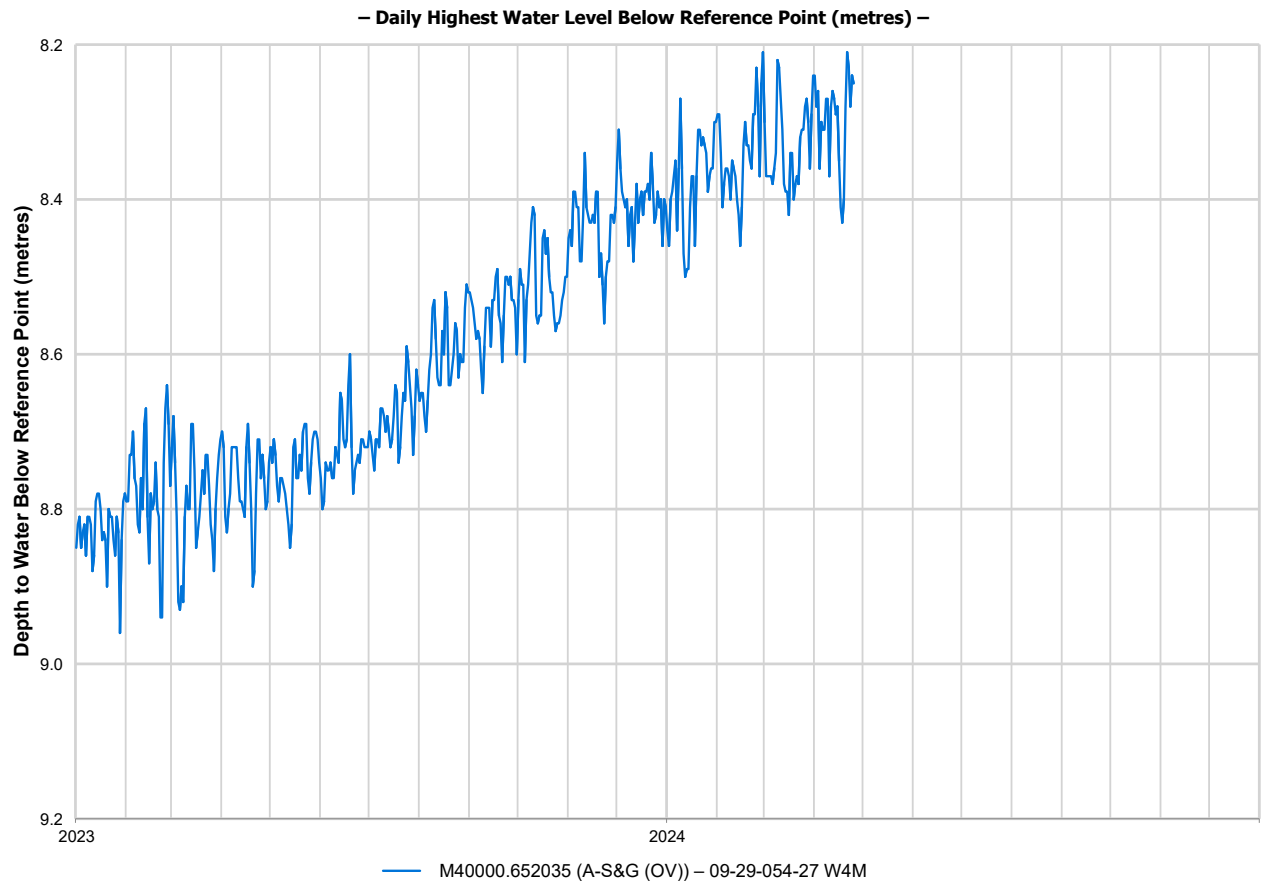
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

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A-S&G (OV)
2023 - 2024 Hydrograph



C-S&G (OV)

09-29-054-27 W4M
(M40000.652664)



Spatial Location:

Easting: **70,078**

Northing: **5,947,714**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **688**

(elevation accuracy HCL DEM)

Date Completed: **February 15, 2007**

Depth Drilled (m): **19.5**

Completion Interval (m): **16.1 – 17.6 ***

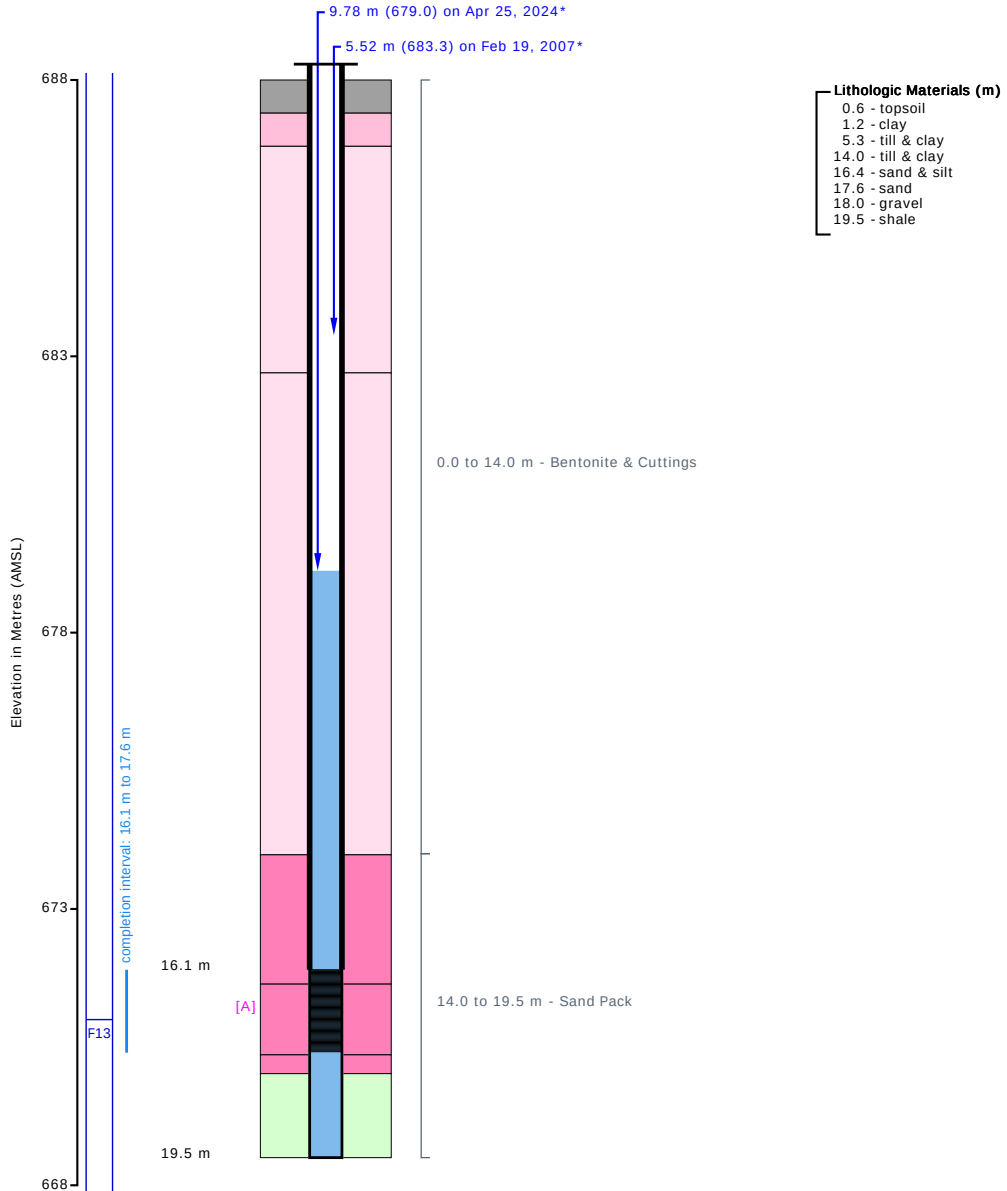
(* TGWC determined value)

Earliest Water Level (m): **5.52 – February 19, 2007**

Most Recent Water Level (m): **9.78 – April 25, 2024 @ 11:54**

GIC ID: **Unknown**

C-S&G (OV) Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		F13 - Lower Horseshoe Canyon Formation	
	Fine Grained			
	Coarse Grained			
Bedrock	Fine Grained			
	Coarse Grained			
	Other			

Summary	
TGWC ID: M40000.652664	
Well Name: C-S&G (OV)	
Legal Location: 09-29-054-27 W4M	
Casing (OD): 51.0 mm; PVC (2.0")	
Casing Stick-Up: 0.9 m (not drawn to scale)	
Completion [A]: 16.1 to 17.6 m; Screened	
Water Level (recent): 9.78 m (679.0 m AMSL) on Apr 25, 2024 @ 11:54 - Reference Point: Top of Casing	
Water Level (oldest): 5.52 m (683.3 m AMSL) on Feb 19, 2007 - Reference Point: Top of Casing	
* Water-Level Measurements are measured from reference point listed. NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (http://www.hcl.ca) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.). Drawn: October 10, 2024 @ 12:18 --- https://www.hcl.ca	

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C-S&G (OV)
AEPA – Water Well Drilling Report

— AEPA water well drilling report not available —

C-S&G (OV)
Chemical Analysis Results (June 7, 2024)



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Page 1 of 12

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011526 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-9
Sample Date	April 25, 2024
Sample Time	12:30
Sample Location	M40000.652664
Sample Description	C-S&G (OV) / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	8.50	0.05		
Sulfur	Dissolved	mg/L	35.0	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0099	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.033	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.143	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	<0.00001	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	0.0016	0.0001		
Copper	Dissolved	mg/L	<0.0002	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.075	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0014	0.0005		
Selenium	Dissolved	mg/L	<0.0002	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	1.21	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0018	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	0.001	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	50	5	15	Above AO
Turbidity		NTU	27.9	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.69	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	20.7			
Electrical Conductivity	at 25 °C	µS/cm	951	1		
Calcium	Dissolved	mg/L	123	0.2		
Magnesium	Dissolved	mg/L	24.0	0.2		
Sodium	Dissolved	mg/L	61.5	0.4	200	Below AO

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Analytical Report

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Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Reference Number	1736660-9
Sample Date	April 25, 2024
Sample Time	12:30
Sample Location	M40000.652664
Sample Description	C-S&G (OV) / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	3.9	0.4		
Iron	Dissolved	mg/L	2.45	0.01	0.3	Above AO
Manganese	Dissolved	mg/L	0.657	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	0.6	0.4	250	Below AO
Fluoride		mg/L	0.05	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.52	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	0.52	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	105	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	542			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	444	5		
Total Dissolved Solids	Calculated	mg/L	585	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	406			
Ionic Balance	Dissolved	%	100			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

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Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460024 - Mercury (Dissolved) in water												
Blank	6479008	Jun 05, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479012	Jun 05, 2024	Mercury	mg/L	0.000094						7e-005 - 0.00013	yes
Control Sample	6479011	Jun 05, 2024	Mercury	mg/L	0.000019						6e-006 - 3.6e-005	yes
Replicate	6479013	Jun 05, 2024	Mercury	mg/L	<0.000005			<0.000005		0	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011526
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011526
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479114	Jun 05, 2024	Aluminum	µg/L	<2			<2		0	10 % or 11 Abs	yes
Replicate	6479114	Jun 05, 2024	Antimony	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Arsenic	µg/L	12.5			12.4		0.38	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Barium	µg/L	19			19		0.09	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Boron	µg/L	102			102		0.06	10 % or 4.4 Abs	yes
Replicate	6479114	Jun 05, 2024	Cadmium	µg/L	<0.01			<0.01		0	10 % or 0.022 Abs	yes
Replicate	6479114	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Cobalt	µg/L	0.8			0.8		3.91	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Copper	µg/L	<0.2			<0.2		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Lead	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes

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Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011526
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479114	Jun 05, 2024	Lithium	µg/L	118			119		0.43	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Nickel	µg/L	0.7			0.8		2.6	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Selenium	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Strontium	µg/L	822			826		0.52	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479114	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Titanium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Uranium	µg/L	3.7			3.7		0.74	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Vanadium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Zinc	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479184	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Blank	6479192	Jun 05, 2024	Turbidity	NTU	0.1	0.1					0.1	yes
Control Sample	6479197	Jun 05, 2024	Turbidity	NTU	1990						1847.5 - 2041.9	yes
Control Sample	6479198	Jun 05, 2024	Turbidity	NTU	4760						4441.7 - 6661.7	yes
Control Sample	6479196	Jun 05, 2024	Turbidity	NTU	149						132.1 - 162.1	yes
Control Sample	6479195	Jun 05, 2024	Turbidity	NTU	14.8						12.6 - 15.6	yes
Control Sample	6479194	Jun 05, 2024	Turbidity	NTU	1.7						1 - 2.2	yes
Replicate	6479207	Jun 05, 2024	Turbidity	NTU	11.8			12.0		1.68	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478740	Jun 05, 2024	pH		6.94			6.96		0.23	0 % or 0.1 Abs	yes
Replicate	6478740	Jun 05, 2024	Electrical Conductivity	dS/m	0.129			0.131		1.38	10 % or 0.002 Abs	yes
Replicate	6478740	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478740	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	Bicarbonate	mg/L	65			66		0.9	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478740	Jun 05, 2024	T-Alkalinity	mg/L	54			54		0.9	10 % or 5 Abs	yes

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011526 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Batch: 2460219 - Anions (Routine) by Ion Chromatography												
Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479560	Jun 05, 2024	Fluoride	mg/L	10.1						9.39 - 10.59	yes
Control Sample	6479560	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479560	Jun 05, 2024	Nitrite - N	mg/L	9.80						9.01 - 10.99	yes
Control Sample	6479560	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479561	Jun 05, 2024	Fluoride	mg/L	4.95						4.56 - 5.22	yes
Control Sample	6479561	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479562	Jun 05, 2024	Fluoride	mg/L	0.52						0.45 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrite - N	mg/L	0.505						0.455 - 0.557	yes
Control Sample	6479562	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.01						0.85 - 1.15	yes
Replicate	6479558	Jun 05, 2024	Nitrate - N	mg/L	1.70			1.69		0.55	10 % or 0.01 Abs	yes
Replicate	6479558	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes
Batch: 2460052 - Chloride in Water												
Blank	6479097	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479094	Jun 05, 2024	Chloride	mg/L	1910						1847.4 - 2256	yes
Control Sample	6479095	Jun 05, 2024	Chloride	mg/L	78.6						74.9 - 86.9	yes
Control Sample	6479096	Jun 05, 2024	Chloride	mg/L	14.7						13.3 - 16.5	yes
Replicate	6479093	Jun 05, 2024	Chloride	mg/L	0.8			0.8		5.13	10 % or 0.5 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011526
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

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SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011526 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-9; 9343641: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011526
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

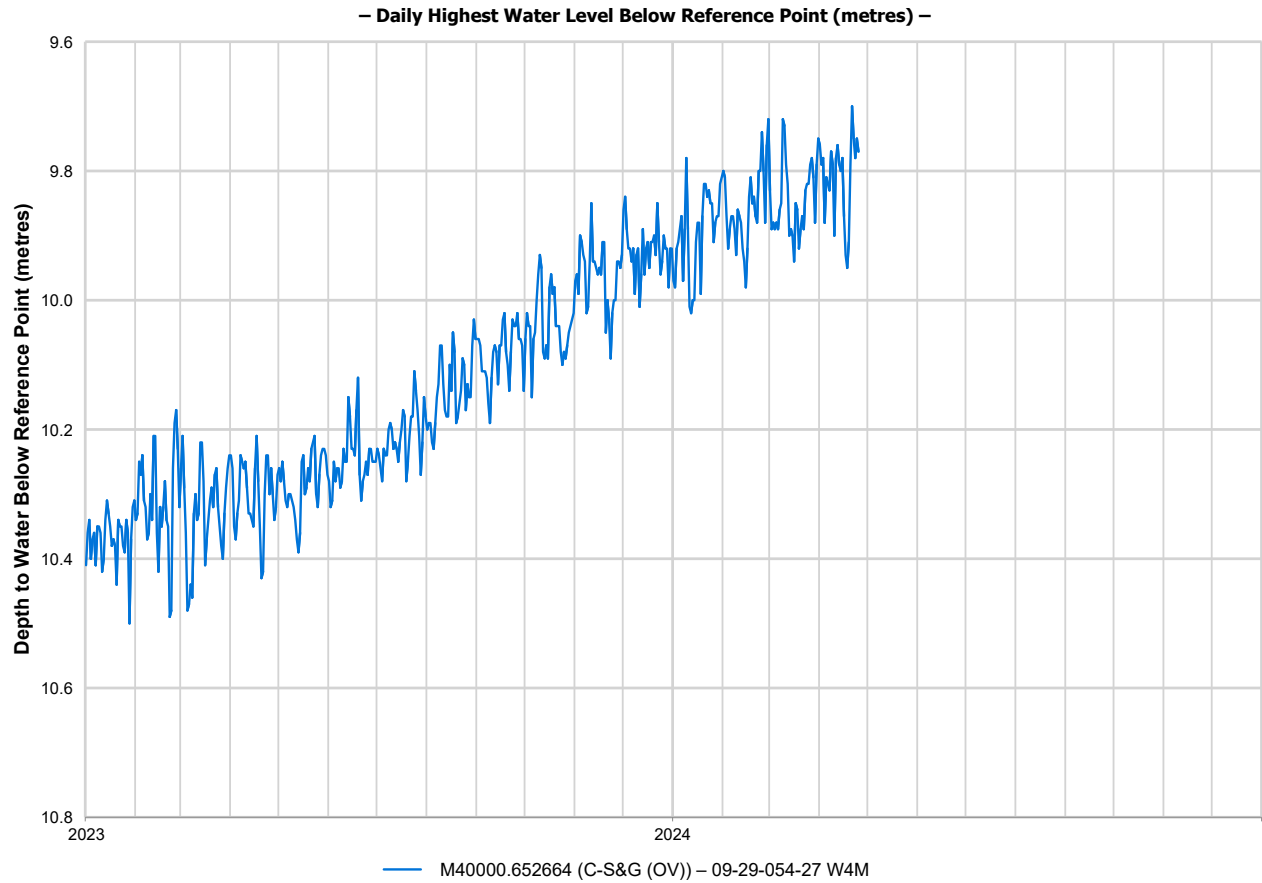
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C-S&G (OV)
2023 - 2024 Hydrograph



MLM

05-27-054-27 W4M
(M40000.651289)



Spatial Location:

Easting: **71,935**

Northing: **5,947,532**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **686**

(elevation accuracy HCL DEM)

Date Completed: **Not Available**

Depth Drilled (m): **19.4**

Completion Interval (m): **Not Available**

(* TGWC determined value)

Earliest Water Level (m): **7.97 – August 13, 2001**

Most Recent Water Level (m): **18.18 – May 24, 2024 @ 12:18**

GIC ID: **Unknown**

MLM
Water Well Diagram

Insufficient information available to draw a water well diagram:

MLM
AEPA - Water Well Drilling Report

— AEPA water well drilling report not available —

MLM
Chemical Analysis Results (June 7, 2024)



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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011535 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-18
Sample Date	May 24, 2024
Sample Time	12:45
Sample Location	M40000.651289
Sample Description	MLM / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	6.53	0.05		
Sulfur	Dissolved	mg/L	35.2	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	0.017	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	0.0004	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0009	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.075	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.086	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	0.00012	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	0.0006	0.0001		
Copper	Dissolved	mg/L	0.0012	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.055	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0034	0.0005		
Selenium	Dissolved	mg/L	0.0012	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	0.960	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	0.0009	0.0005		
Uranium	Dissolved	mg/L	0.0156	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	0.0003	0.0001		
Zinc	Dissolved	mg/L	0.004	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	>60	5	15	Above AO
Turbidity		NTU	2260	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.69	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	20.3			
Electrical Conductivity	at 25 °C	µS/cm	983	1		
Calcium	Dissolved	mg/L	146	0.2		
Magnesium	Dissolved	mg/L	35.5	0.2		
Sodium	Dissolved	mg/L	38.2	0.4	200	Below AO

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011535 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-18
Sample Date	May 24, 2024
Sample Time	12:45
Sample Location	M40000.651289
Sample Description	MLM / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	3.8	0.4		
Iron	Dissolved	mg/L	0.22	0.01	0.3	Below AO
Manganese	Dissolved	mg/L	0.520	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	1.4	0.4	250	Below AO
Fluoride		mg/L	0.09	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.60	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	0.60	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	106	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	566			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	464	5		
Total Dissolved Solids	Calculated	mg/L	609	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	511			
Ionic Balance	Dissolved	%	104			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011535
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460024 - Mercury (Dissolved) in water												
Blank	6479008	Jun 05, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479012	Jun 05, 2024	Mercury	mg/L	0.000094						7e-005 - 0.00013	yes
Control Sample	6479011	Jun 05, 2024	Mercury	mg/L	0.000019						6e-006 - 3.6e-005	yes
Replicate	6479013	Jun 05, 2024	Mercury	mg/L	<0.000005			<0.000005		0	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011535
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Quality Control

Bill To: Hydrogeological Consultants
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Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011535
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479114	Jun 05, 2024	Aluminum	µg/L	<2			<2		0	10 % or 11 Abs	yes
Replicate	6479114	Jun 05, 2024	Antimony	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Arsenic	µg/L	12.5			12.4		0.38	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Barium	µg/L	19			19		0.09	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Boron	µg/L	102			102		0.06	10 % or 4.4 Abs	yes
Replicate	6479114	Jun 05, 2024	Cadmium	µg/L	<0.01			<0.01		0	10 % or 0.022 Abs	yes
Replicate	6479114	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Cobalt	µg/L	0.8			0.8		3.91	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Copper	µg/L	<0.2			<0.2		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Lead	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes

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Quality Control

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Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011535
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479114	Jun 05, 2024	Lithium	µg/L	118			119		0.43	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Nickel	µg/L	0.7			0.8		2.6	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Selenium	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Strontium	µg/L	822			826		0.52	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479114	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Titanium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Uranium	µg/L	3.7			3.7		0.74	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Vanadium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Zinc	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479186	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011535 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Replicate	6479215	Jun 05, 2024	Turbidity	NTU	1.8			1.7		2.31	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478743	Jun 05, 2024	pH		7.77			7.76		0.17	0 % or 0.1 Abs	yes
Replicate	6478743	Jun 05, 2024	Electrical Conductivity	dS/m	1.23			1.23		0	10 % or 0.002 Abs	yes
Replicate	6478743	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478743	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	Bicarbonate	mg/L	649			653		0.66	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478743	Jun 05, 2024	T-Alkalinity	mg/L	532			536		0.66	10 % or 5 Abs	yes

Batch: 2460219 - Anions (Routine) by Ion Chromatography

Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479560	Jun 05, 2024	Fluoride	mg/L	10.1						9.39 - 10.59	yes

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Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011535
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479560	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479560	Jun 05, 2024	Nitrite - N	mg/L	9.80						9.01 - 10.99	yes
Control Sample	6479560	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479561	Jun 05, 2024	Fluoride	mg/L	4.95						4.56 - 5.22	yes
Control Sample	6479561	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479562	Jun 05, 2024	Fluoride	mg/L	0.52						0.45 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrite - N	mg/L	0.505						0.455 - 0.557	yes
Control Sample	6479562	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.01						0.85 - 1.15	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrate - N	mg/L	0.58			0.58		0.19	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Batch: 2460053 - Chloride in Water												
Blank	6479101	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479098	Jun 05, 2024	Chloride	mg/L	2030						1847.4 - 2256	yes
Control Sample	6479099	Jun 05, 2024	Chloride	mg/L	81.2						74.9 - 86.9	yes
Control Sample	6479100	Jun 05, 2024	Chloride	mg/L	15.4						13.3 - 16.5	yes
Replicate	6479102	Jun 05, 2024	Chloride	mg/L	3.9			4.0		1.53	10 % or 0.5 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes

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Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
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LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011535
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

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Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011535 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-18; 9343650: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011535
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

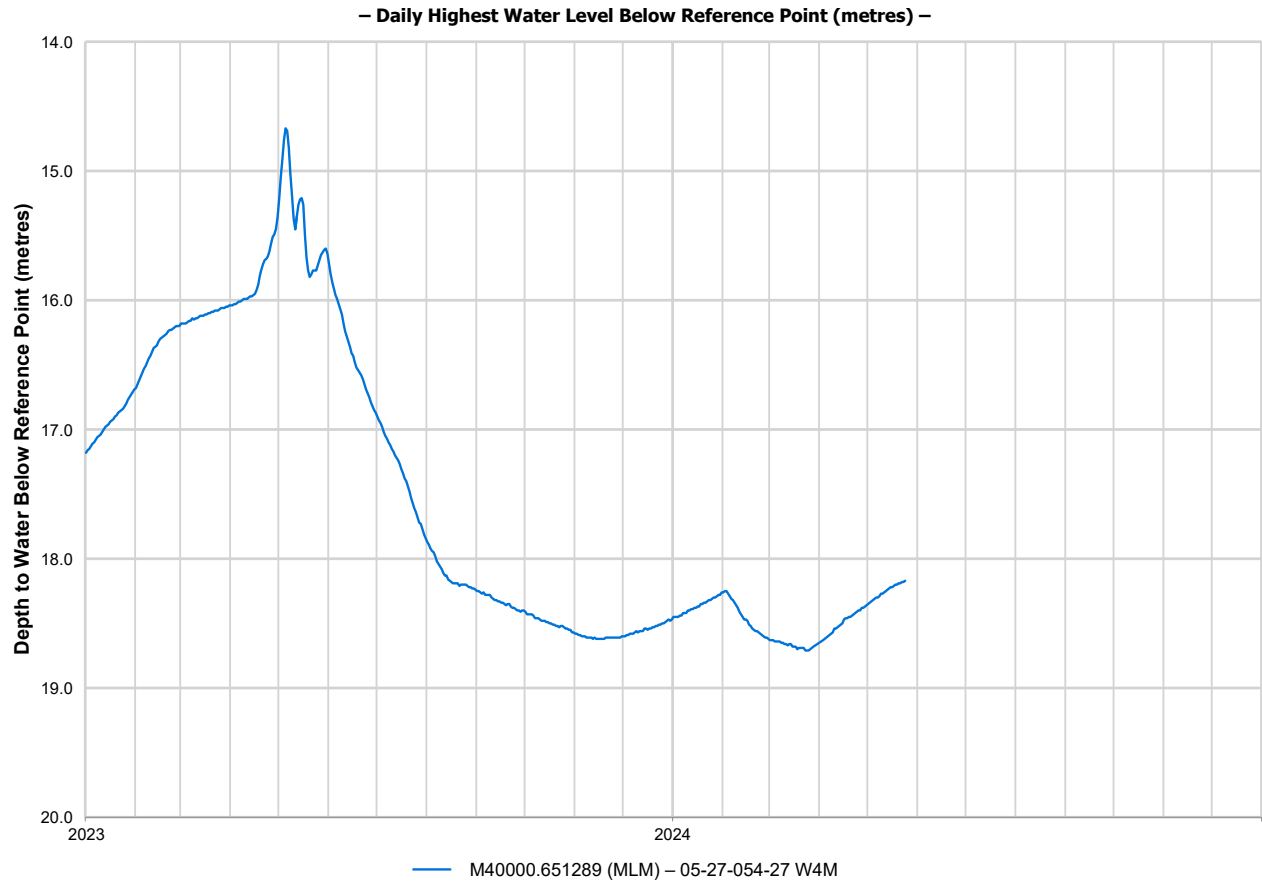
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

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MLM
2023 - 2024 Hydrograph



MW01-01

16-17-054-26 W4M
(M40000.647826)



Photograph taken on May 30, 2011

Spatial Location:

Easting: **79,991**

Northing: **5,945,359**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **674**

(elevation accuracy HCL DEM)

Date Completed: **April 18, 2001**

Depth Drilled (m): **22.9**

Completion Interval (m): **19.8 – 22.3 ***

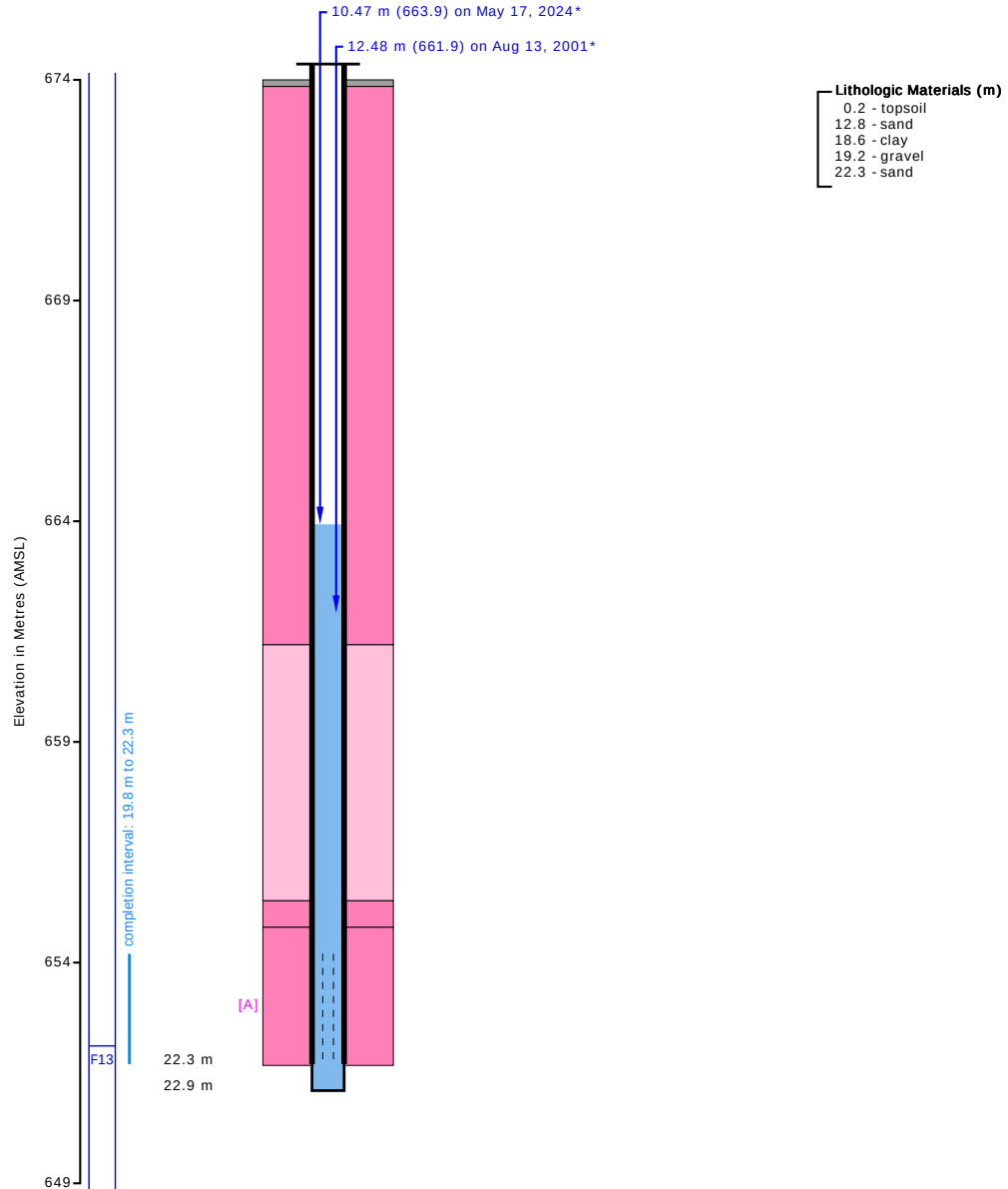
(* TGWC determined value)

Earliest Water Level (m): **12.48 – August 13, 2001**

Most Recent Water Level (m): **10.47 – May 17, 2024 @ 13:05**

GIC ID: **Unknown**

MW01-01 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		F13 - Lower Horseshoe Canyon Formation	
	Fine Grained			
	Coarse Grained			
Bedrock	Fine Grained			
	Coarse Grained			
	Other			

Summary	
TGWC ID: M40000.647826	
Well Name: MW01-01	
Legal Location: 16-17-054-26 W4M	
Casing (OD): 50.8 mm; PVC (2.0")	
Casing Stick-Up: 0.4 m (not drawn to scale)	
Completion [A]: 19.8 to 22.3 m; Slotted	
Water Level (recent): 10.47 m (663.9 m AMSL) on May 17, 2024 @ 13:05 - Reference Point: Top of Casing	
Water Level (oldest): 12.48 m (661.9 m AMSL) on Aug 13, 2001 - Reference Point: Top of Casing	
* Water-Level Measurements are measured from reference point listed. NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (http://www.hcl.ca) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.). Drawn: October 10, 2024 @ 12:19 --- https://www.hcl.ca	

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MW01-01
AEPA – Water Well Drilling Report

— AEPA water well drilling report not available —

MW01-01
Chemical Analysis Results (June 7, 2024)



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Page 1 of 11

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011540 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-23
Sample Date	May 17, 2024
Sample Time	13:30
Sample Location	M40000.647826
Sample Description	MW01-01 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	6.82	0.05		
Sulfur	Dissolved	mg/L	46.9	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	0.010	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0003	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.156	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.088	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	0.00001	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	<0.0001	0.0001		
Copper	Dissolved	mg/L	0.0005	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.061	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0019	0.0005		
Selenium	Dissolved	mg/L	0.0019	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	0.777	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	0.0007	0.0005		
Uranium	Dissolved	mg/L	0.0100	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	0.0002	0.0001		
Zinc	Dissolved	mg/L	<0.001	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	8	5	15	Below AO
Turbidity		NTU	3.8	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.91	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	20.3			
Electrical Conductivity	at 25 °C	µS/cm	925	1		
Calcium	Dissolved	mg/L	126	0.2		
Magnesium	Dissolved	mg/L	30.8	0.2		
Sodium	Dissolved	mg/L	34.6	0.4	200	Below AO

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011540 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-23
Sample Date	May 17, 2024
Sample Time	13:30
Sample Location	M40000.647826
Sample Description	MW01-01 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	5.3	0.4		
Iron	Dissolved	mg/L	0.02	0.01	0.3	Below AO
Manganese	Dissolved	mg/L	0.181	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	11.8	0.4	250	Below AO
Fluoride		mg/L	0.14	0.05	1.5	Below MAC
Nitrate - N		mg/L	2.46	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	2.46	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	141	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	445			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	365	5		
Total Dissolved Solids	Calculated	mg/L	569	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	442			
Ionic Balance	Dissolved	%	98			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3
Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011540
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460394 - Mercury (Dissolved) in water												
Blank	6479950	Jun 06, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479949	Jun 06, 2024	Mercury	mg/L	0.000092						7e-005 - 0.00013	yes
Control Sample	6479948	Jun 06, 2024	Mercury	mg/L	0.000020						6e-006 - 3.6e-005	yes
Replicate	6479951	Jun 06, 2024	Mercury	mg/L	<0.000005			<0.000005		0	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

Bill To: Hydrogeological Consultants
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Edmonton, AB, Canada
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Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011540
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011540
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479115	Jun 05, 2024	Aluminum	µg/L	15			17		16.97	10 % or 11 Abs	yes
Replicate	6479115	Jun 05, 2024	Antimony	µg/L	0.4			0.4		6.23	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Arsenic	µg/L	0.8			0.9		2.96	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Barium	µg/L	75			75		0.09	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Boron	µg/L	85			86		0.93	10 % or 4.4 Abs	yes
Replicate	6479115	Jun 05, 2024	Cadmium	µg/L	0.10			0.12		18.99	10 % or 0.022 Abs	yes
Replicate	6479115	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Cobalt	µg/L	0.6			0.6		0.05	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Copper	µg/L	1.1			1.2		7.9	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Lead	µg/L	<0.1			0.1		2.13	10 % or 0.22 Abs	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3
Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011540
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479115	Jun 05, 2024	Lithium	µg/L	55			55		0.61	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Nickel	µg/L	3.2			3.4		5.33	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Selenium	µg/L	1.2			1.2		3.21	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Strontium	µg/L	967			960		0.74	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479115	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Titanium	µg/L	<0.5			0.9		53.68	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Uranium	µg/L	15.6			15.6		0.48	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Vanadium	µg/L	0.2			0.3		13.69	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Zinc	µg/L	4			4		7.72	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479186	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011540 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Replicate	6479215	Jun 05, 2024	Turbidity	NTU	1.8			1.7		2.31	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478743	Jun 05, 2024	pH		7.77			7.76		0.17	0 % or 0.1 Abs	yes
Replicate	6478743	Jun 05, 2024	Electrical Conductivity	dS/m	1.23			1.23		0	10 % or 0.002 Abs	yes
Replicate	6478743	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478743	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	Bicarbonate	mg/L	649			653		0.66	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478743	Jun 05, 2024	T-Alkalinity	mg/L	532			536		0.66	10 % or 5 Abs	yes

Batch: 2460219 - Anions (Routine) by Ion Chromatography

Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479564	Jun 05, 2024	Fluoride	mg/L	10.0						9.39 - 10.59	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011540
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479564	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479564	Jun 05, 2024	Nitrite - N	mg/L	9.77						9.01 - 10.99	yes
Control Sample	6479564	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479565	Jun 05, 2024	Fluoride	mg/L	5.00						4.56 - 5.22	yes
Control Sample	6479565	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479565	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479565	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479566	Jun 05, 2024	Fluoride	mg/L	0.51						0.45 - 0.57	yes
Control Sample	6479566	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479566	Jun 05, 2024	Nitrite - N	mg/L	0.502						0.455 - 0.557	yes
Control Sample	6479566	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.00						0.85 - 1.15	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrate - N	mg/L	0.58			0.58		0.19	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Batch: 2460053 - Chloride in Water												
Blank	6479101	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479098	Jun 05, 2024	Chloride	mg/L	2030						1847.4 - 2256	yes
Control Sample	6479099	Jun 05, 2024	Chloride	mg/L	81.2						74.9 - 86.9	yes
Control Sample	6479100	Jun 05, 2024	Chloride	mg/L	15.4						13.3 - 16.5	yes
Replicate	6479102	Jun 05, 2024	Chloride	mg/L	3.9			4.0		1.53	10 % or 0.5 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011540
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

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Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011540 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 6, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-23; 9343655: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011540
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

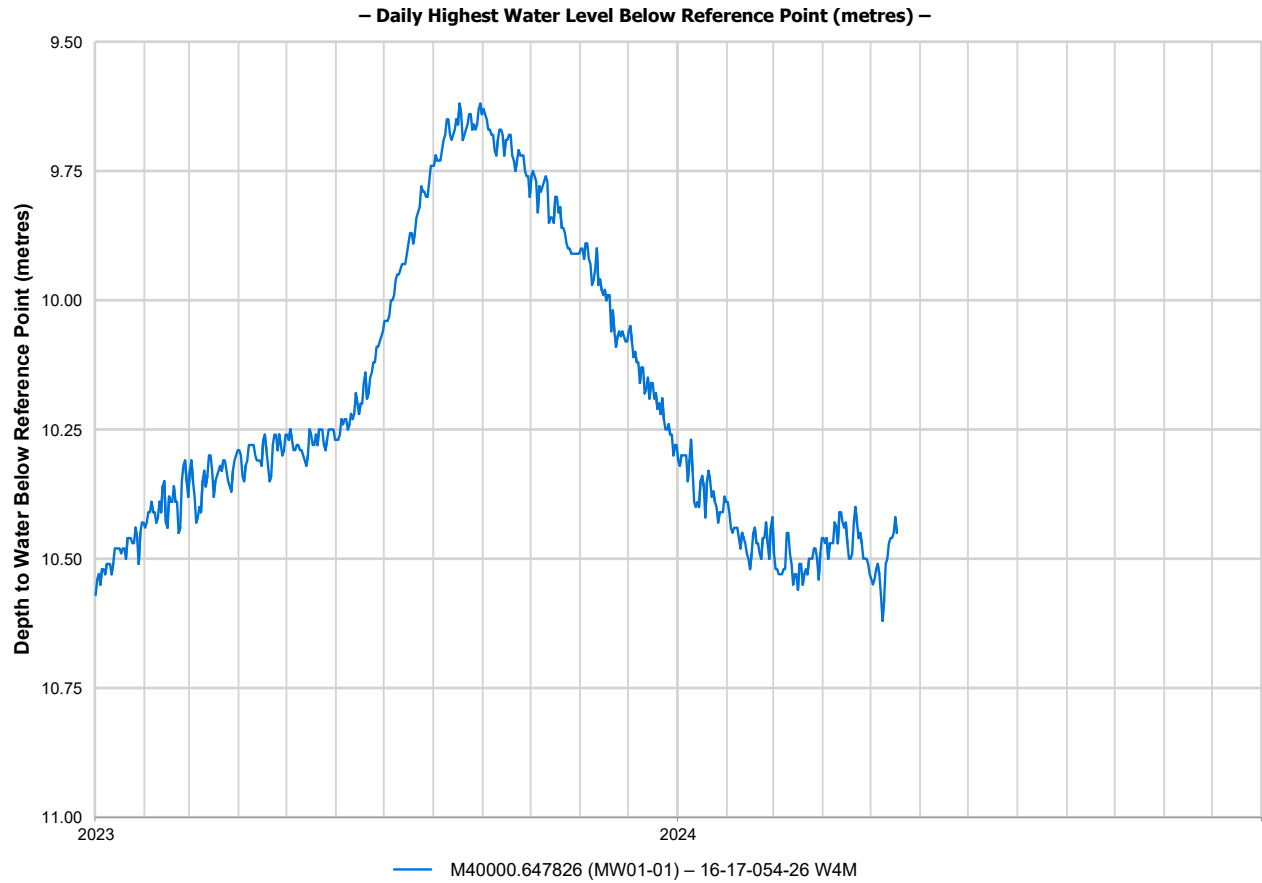
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MW01-01
2023 – 2024 Hydrograph



MW01-04

14-27-054-27 W4M
(M40000.649295)



Spatial Location:

Easting: **72,578**

Northing: **5,948,381**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **676**

(elevation accuracy HCL DEM)

Date Completed: **April 24, 2001**

Depth Drilled (m): **19.2**

Completion Interval (m): **15.2 – 18.3 ***

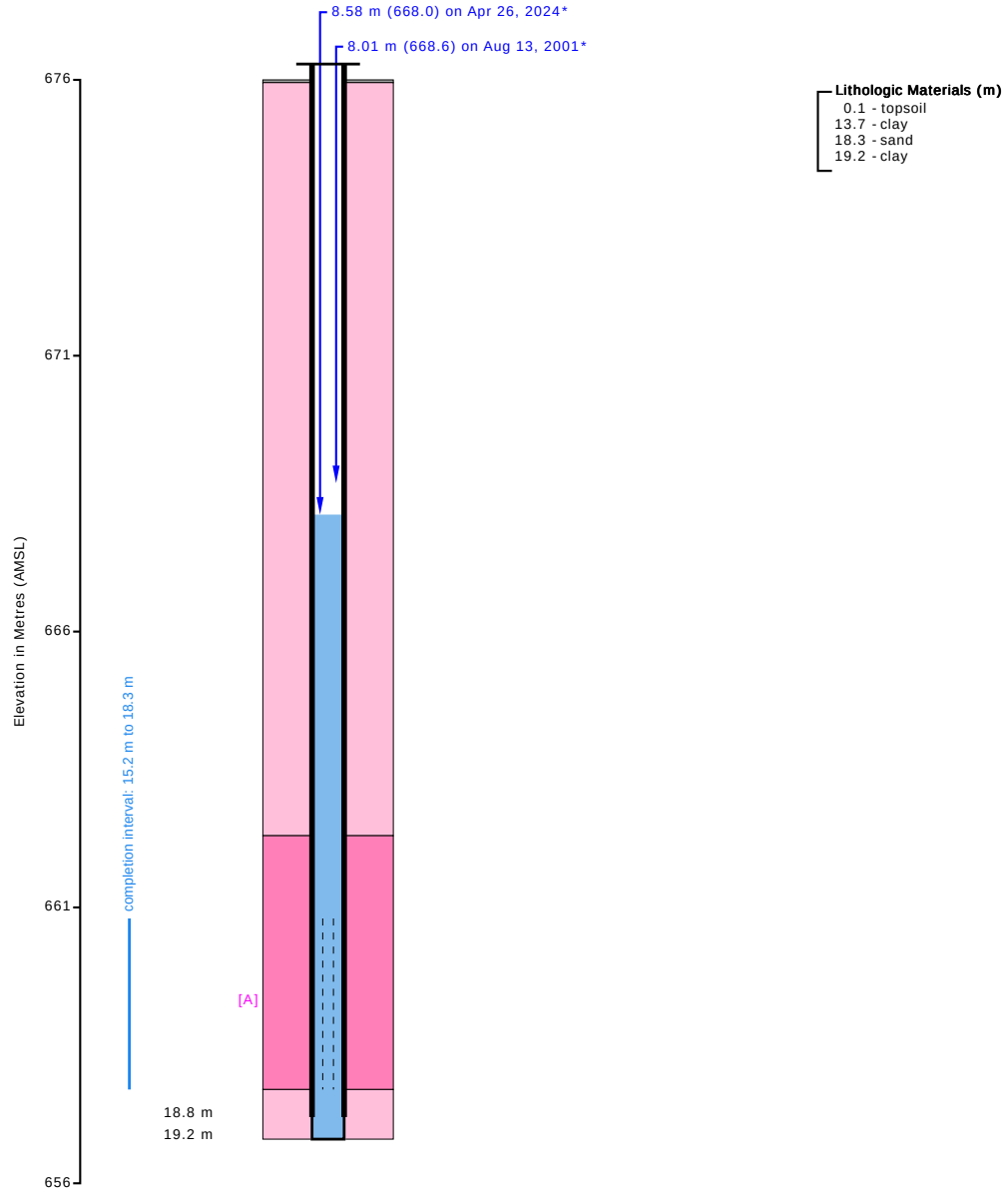
(* TGWC determined value)

Earliest Water Level (m): **8.01 – August 13, 2001**

Most Recent Water Level (m): **8.58 – April 26, 2024 @ 13:24**

GIC ID: **Unknown**

MW01-04 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		Geologic Unit details not available for this location	
	Fine Grained			
	Coarse Grained			
Bedrock	Fine Grained			
	Coarse Grained			
	Other			

Summary	
TGWC ID: M40000.649295	
Well Name: MW01-04	
Legal Location: 14-27-054-27 W4M	
Casing (OD): 50.8 mm; PVC (2.0")	
Casing Stick-Up: 0.7 m (not drawn to scale)	
Completion [A]: 15.2 to 18.3 m; Slotted	
Water Level (recent): 8.58 m (668.0 m AMSL) on Apr 26, 2024 @ 13:24 - Reference Point: Top of Casing	
Water Level (oldest): 8.01 m (668.6 m AMSL) on Aug 13, 2001 - Reference Point: Top of Casing	
* Water-Level Measurements are measured from reference point listed. NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (http://www.hcl.ca) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.). Drawn: October 10, 2024 @ 12:19 --- https://www.hcl.ca	

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MW01-04
AEPA – Water Well Drilling Report

— AEPA water well drilling report not available —

MW01-04
Chemical Analysis Results (June 7, 2024)



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Page 1 of 12

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011519 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-2
Sample Date	April 26, 2024
Sample Time	14:00
Sample Location	M40000.649295
Sample Description	MW01-04 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	7.32	0.05		
Sulfur	Dissolved	mg/L	16.1	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	0.005	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0062	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.061	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.070	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	<0.00001	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	0.0008	0.0001		
Copper	Dissolved	mg/L	<0.0002	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.059	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0008	0.0005		
Selenium	Dissolved	mg/L	<0.0002	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	0.840	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0057	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	<0.001	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	>60	5	15	Above AO
Turbidity		NTU	30.0	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.86	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	20.9			
Electrical Conductivity	at 25 °C	µS/cm	826	1		
Calcium	Dissolved	mg/L	114	0.2		
Magnesium	Dissolved	mg/L	29.2	0.2		
Sodium	Dissolved	mg/L	30.4	0.4	200	Below AO

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011519 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Reference Number	1736660-2
Sample Date	April 26, 2024
Sample Time	14:00
Sample Location	M40000.649295
Sample Description	MW01-04 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	3.6	0.4		
Iron	Dissolved	mg/L	2.92	0.01	0.3	Above AO
Manganese	Dissolved	mg/L	0.542	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	1.1	0.4	250	Below AO
Fluoride		mg/L	0.06	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.54	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	0.54	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	48.2	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	524			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	429	5		
Total Dissolved Solids	Calculated	mg/L	484	1	500	Below AO
Hardness	Dissolved as CaCO3	mg/L	405			
Ionic Balance	Dissolved	%	100			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

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Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011519
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed

Metals Dissolved

Batch: 2460024 - Mercury (Dissolved) in water

Blank	6479008	Jun 05, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479007	Jun 05, 2024	Mercury	mg/L	0.000092						7e-005 - 0.00013	yes
Control Sample	6479006	Jun 05, 2024	Mercury	mg/L	0.000020						6e-006 - 3.6e-005	yes
Replicate	6479010	Jun 05, 2024	Mercury	mg/L	0.000009			0.000010		12.93	10 % or 3e-005 Abs	yes

Batch: 2460055 - Metals ICP-MS (Dissolved) in water

Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

Bill To: Hydrogeological Consultants
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Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011519
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Project ID: MR-0224.23
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Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011519
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479114	Jun 05, 2024	Aluminum	µg/L	<2			<2		0	10 % or 11 Abs	yes
Replicate	6479114	Jun 05, 2024	Antimony	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Arsenic	µg/L	12.5			12.4		0.38	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Barium	µg/L	19			19		0.09	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Boron	µg/L	102			102		0.06	10 % or 4.4 Abs	yes
Replicate	6479114	Jun 05, 2024	Cadmium	µg/L	<0.01			<0.01		0	10 % or 0.022 Abs	yes
Replicate	6479114	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Cobalt	µg/L	0.8			0.8		3.91	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Copper	µg/L	<0.2			<0.2		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Lead	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes

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LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011519
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479114	Jun 05, 2024	Lithium	µg/L	118			119		0.43	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Nickel	µg/L	0.7			0.8		2.6	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Selenium	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Strontium	µg/L	822			826		0.52	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479114	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Titanium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Uranium	µg/L	3.7			3.7		0.74	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Vanadium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Zinc	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479184	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011519
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Blank	6479192	Jun 05, 2024	Turbidity	NTU	0.1	0.1					0.1	yes
Control Sample	6479197	Jun 05, 2024	Turbidity	NTU	1990						1847.5 - 2041.9	yes
Control Sample	6479198	Jun 05, 2024	Turbidity	NTU	4760						4441.7 - 6661.7	yes
Control Sample	6479196	Jun 05, 2024	Turbidity	NTU	149						132.1 - 162.1	yes
Control Sample	6479195	Jun 05, 2024	Turbidity	NTU	14.8						12.6 - 15.6	yes
Control Sample	6479194	Jun 05, 2024	Turbidity	NTU	1.7						1 - 2.2	yes
Replicate	6479207	Jun 05, 2024	Turbidity	NTU	11.8			12.0		1.68	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478736	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478736	Jun 05, 2024	Temp. of observed pH	°C	21.5						15.5 - 24.5	yes
Control Sample	6478736	Jun 05, 2024	Electrical Conductivity	dS/m	2.72						2.631 - 2.829	yes
Control Sample	6478736	Jun 05, 2024	P-Alkalinity	mg/L	534						442 - 584	yes
Control Sample	6478736	Jun 05, 2024	T-Alkalinity	mg/L	1020						958 - 1059	yes
Control Sample	6478737	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478737	Jun 05, 2024	Temp. of observed pH	°C	21.5						15.5 - 24.5	yes
Control Sample	6478737	Jun 05, 2024	Electrical Conductivity	dS/m	0.078						0.069 - 0.085	yes
Control Sample	6478737	Jun 05, 2024	P-Alkalinity	mg/L	47						28 - 73	yes
Control Sample	6478737	Jun 05, 2024	T-Alkalinity	mg/L	125						115 - 140	yes
Replicate	6478740	Jun 05, 2024	pH		6.94			6.96		0.23	0 % or 0.1 Abs	yes
Replicate	6478740	Jun 05, 2024	Electrical Conductivity	dS/m	0.129			0.131		1.38	10 % or 0.002 Abs	yes
Replicate	6478740	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478740	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	Bicarbonate	mg/L	65			66		0.9	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478740	Jun 05, 2024	T-Alkalinity	mg/L	54			54		0.9	10 % or 5 Abs	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011519
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed

Routine Water - Continued

Batch: 2460219 - Anions (Routine) by Ion Chromatography

Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479560	Jun 05, 2024	Fluoride	mg/L	10.1						9.39 - 10.59	yes
Control Sample	6479560	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479560	Jun 05, 2024	Nitrite - N	mg/L	9.80						9.01 - 10.99	yes
Control Sample	6479560	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479561	Jun 05, 2024	Fluoride	mg/L	4.95						4.56 - 5.22	yes
Control Sample	6479561	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479562	Jun 05, 2024	Fluoride	mg/L	0.52						0.45 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrite - N	mg/L	0.505						0.455 - 0.557	yes
Control Sample	6479562	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.01						0.85 - 1.15	yes
Replicate	6479558	Jun 05, 2024	Nitrate - N	mg/L	1.70			1.69		0.55	10 % or 0.01 Abs	yes
Replicate	6479558	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes

Batch: 2460052 - Chloride in Water

Blank	6479091	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479088	Jun 05, 2024	Chloride	mg/L	2000						1847.4 - 2256	yes
Control Sample	6479089	Jun 05, 2024	Chloride	mg/L	77.9						74.9 - 86.9	yes
Control Sample	6479090	Jun 05, 2024	Chloride	mg/L	14.7						13.3 - 16.5	yes
Replicate	6479092	Jun 05, 2024	Chloride	mg/L	3.2			3.2		3.13	10 % or 0.5 Abs	yes

Batch: 2460048 - Metals Trace (Dissolved) in water

Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011519
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

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SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011519 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-2; 9343634: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011519
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

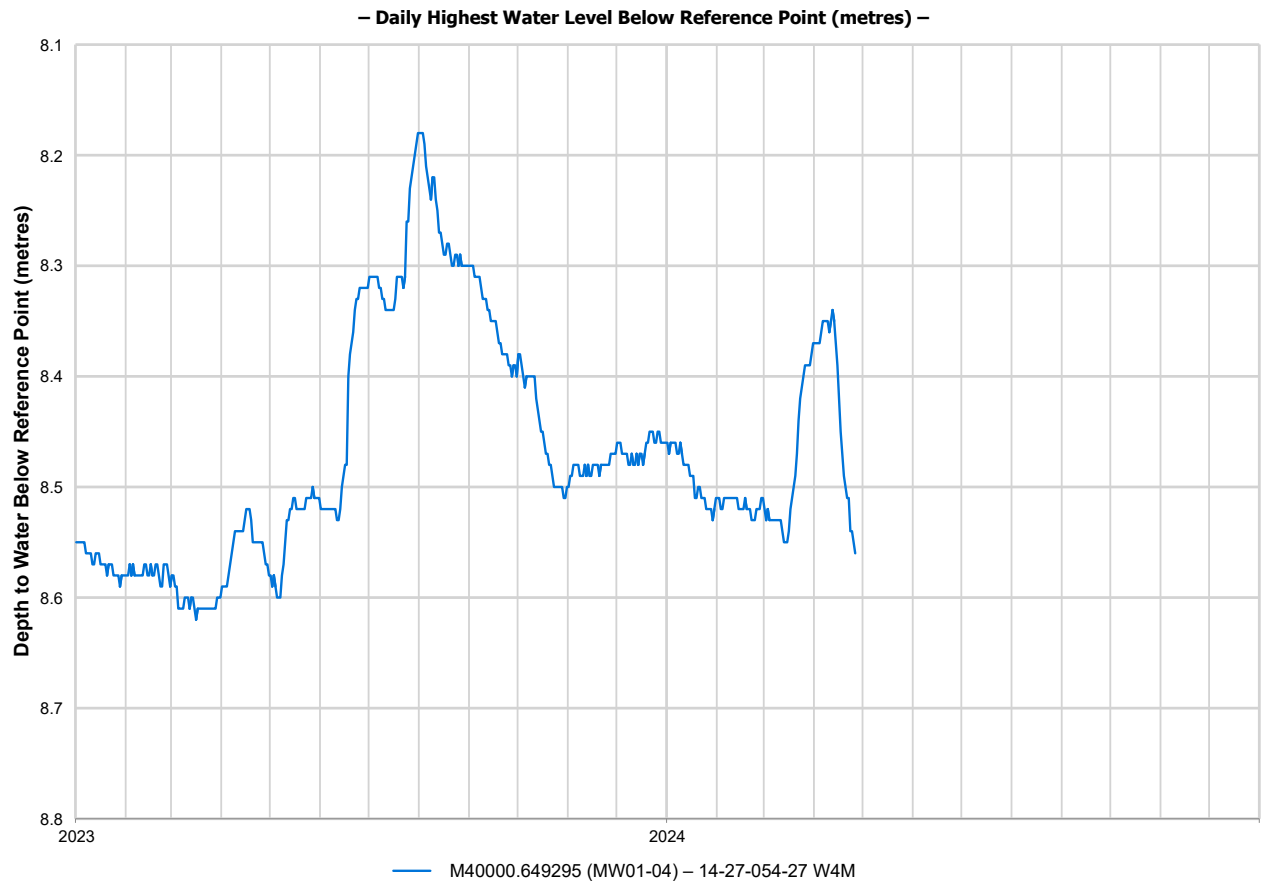
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

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MW01-04
2023 – 2024 Hydrograph



MW01-05

05-33-054-27 W4M
(M40000.649859)



Spatial Location:

Easting: **70,437**

Northing: **5,949,212**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **678**

(elevation accuracy HCL DEM)

Date Completed: **April 24, 2001**

Depth Drilled (m): **28.3**

Completion Interval (m): **18.6 – 21.7 ***

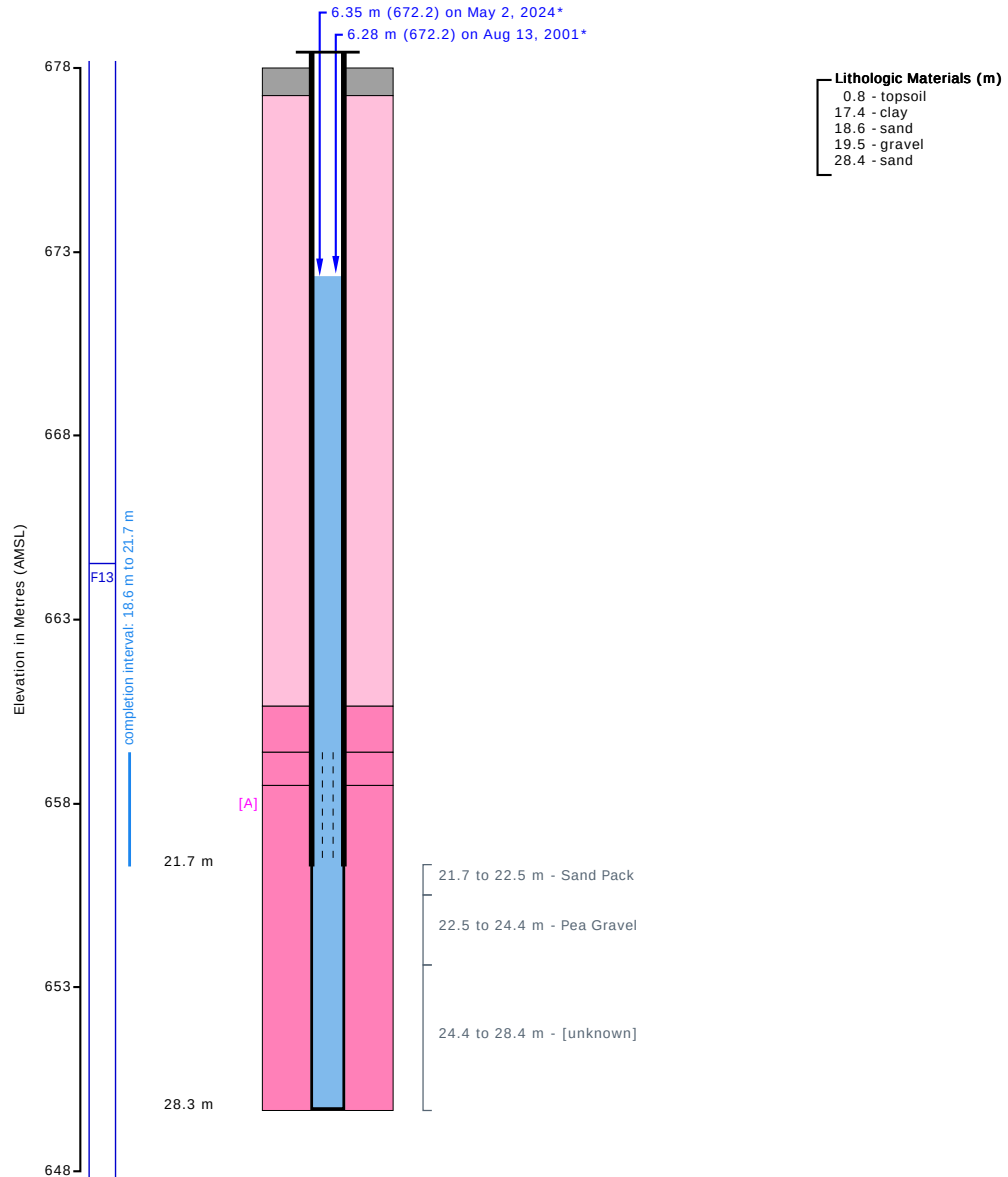
(* TGWC determined value)

Earliest Water Level (m): **6.28 – August 13, 2001**

Most Recent Water Level (m): **6.35 – May 2, 2024 @ 09:31**

GIC ID: **Unknown**

MW01-05 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		F13 - Lower Horseshoe Canyon Formation	
	Fine Grained			
	Coarse Grained			
Bedrock	Fine Grained			
	Coarse Grained			
	Other			

Summary	
TGWC ID: M40000.649859	
Well Name: MW01-05	
Legal Location: 05-33-054-27 W4M	
Casing (OD): 50.8 mm; PVC (2.0")	
Casing Stick-Up: 0.7 m (not drawn to scale)	
Completion [A]: 18.6 to 21.7 m; Slotted	
Water Level (recent): 6.35 m (672.2 m AMSL) on May 2, 2024 @ 09:31 - Reference Point: Top of Casing	
Water Level (oldest): 6.28 m (672.2 m AMSL) on Aug 13, 2001 - Reference Point: Top of Casing	
* Water-Level Measurements are measured from reference point listed. NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (http://www.hcl.ca) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.). Drawn: October 10, 2024 @ 12:19 --- https://www.hcl.ca	

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MW01-05
AEPA – Water Well Drilling Report

— AEPA water well drilling report not available —

MW01-05
Chemical Analysis Results (June 7, 2024)



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Page 1 of 12

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011521 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-4
Sample Date	May 02, 2024
Sample Time	10:23
Sample Location	M40000.649859
Sample Description	MW01-05 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	7.73	0.05		
Sulfur	Dissolved	mg/L	20.6	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0086	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.060	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.125	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	<0.00001	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	0.0007	0.0001		
Copper	Dissolved	mg/L	<0.0002	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.071	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0008	0.0005		
Selenium	Dissolved	mg/L	<0.0002	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	1.10	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0035	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	<0.001	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	30	5	15	Above AO
Turbidity		NTU	5.2	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.73	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	20.9			
Electrical Conductivity	at 25 °C	µS/cm	951	1		
Calcium	Dissolved	mg/L	120	0.2		
Magnesium	Dissolved	mg/L	28.2	0.2		
Sodium	Dissolved	mg/L	60.3	0.4	200	Below AO

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Analytical Report

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011521
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

Reference Number	1736660-4
Sample Date	May 02, 2024
Sample Time	10:23
Sample Location	M40000.649859
Sample Description	MW01-05 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	3.8	0.4		
Iron	Dissolved	mg/L	1.05	0.01	0.3	Above AO
Manganese	Dissolved	mg/L	0.885	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	0.8	0.4	250	Below AO
Fluoride		mg/L	0.08	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.79	0.01	10	Below MAC
Nitrite - N		mg/L	0.405	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	1.19	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	61.9	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	614			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	504	5		
Total Dissolved Solids	Calculated	mg/L	577	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	416			
Ionic Balance	Dissolved	%	97			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011521
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460024 - Mercury (Dissolved) in water												
Blank	6479008	Jun 05, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479007	Jun 05, 2024	Mercury	mg/L	0.000092						7e-005 - 0.00013	yes
Control Sample	6479006	Jun 05, 2024	Mercury	mg/L	0.000020						6e-006 - 3.6e-005	yes
Replicate	6479010	Jun 05, 2024	Mercury	mg/L	0.000009			0.000010		12.93	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011521 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011521
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479114	Jun 05, 2024	Aluminum	µg/L	<2			<2		0	10 % or 11 Abs	yes
Replicate	6479114	Jun 05, 2024	Antimony	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Arsenic	µg/L	12.5			12.4		0.38	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Barium	µg/L	19			19		0.09	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Boron	µg/L	102			102		0.06	10 % or 4.4 Abs	yes
Replicate	6479114	Jun 05, 2024	Cadmium	µg/L	<0.01			<0.01		0	10 % or 0.022 Abs	yes
Replicate	6479114	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Cobalt	µg/L	0.8			0.8		3.91	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Copper	µg/L	<0.2			<0.2		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Lead	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes

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Quality Control

Bill To: Hydrogeological Consultants
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Edmonton, AB, Canada
T5S 2W3
Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011521
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479114	Jun 05, 2024	Lithium	µg/L	118			119		0.43	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Nickel	µg/L	0.7			0.8		2.6	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Selenium	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Strontium	µg/L	822			826		0.52	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479114	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Titanium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Uranium	µg/L	3.7			3.7		0.74	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Vanadium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Zinc	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479184	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011521
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Blank	6479192	Jun 05, 2024	Turbidity	NTU	0.1	0.1					0.1	yes
Control Sample	6479197	Jun 05, 2024	Turbidity	NTU	1990						1847.5 - 2041.9	yes
Control Sample	6479198	Jun 05, 2024	Turbidity	NTU	4760						4441.7 - 6661.7	yes
Control Sample	6479196	Jun 05, 2024	Turbidity	NTU	149						132.1 - 162.1	yes
Control Sample	6479195	Jun 05, 2024	Turbidity	NTU	14.8						12.6 - 15.6	yes
Control Sample	6479194	Jun 05, 2024	Turbidity	NTU	1.7						1 - 2.2	yes
Replicate	6479207	Jun 05, 2024	Turbidity	NTU	11.8			12.0		1.68	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478736	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478736	Jun 05, 2024	Temp. of observed pH	°C	21.5						15.5 - 24.5	yes
Control Sample	6478736	Jun 05, 2024	Electrical Conductivity	dS/m	2.72						2.631 - 2.829	yes
Control Sample	6478736	Jun 05, 2024	P-Alkalinity	mg/L	534						442 - 584	yes
Control Sample	6478736	Jun 05, 2024	T-Alkalinity	mg/L	1020						958 - 1059	yes
Control Sample	6478737	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478737	Jun 05, 2024	Temp. of observed pH	°C	21.5						15.5 - 24.5	yes
Control Sample	6478737	Jun 05, 2024	Electrical Conductivity	dS/m	0.078						0.069 - 0.085	yes
Control Sample	6478737	Jun 05, 2024	P-Alkalinity	mg/L	47						28 - 73	yes
Control Sample	6478737	Jun 05, 2024	T-Alkalinity	mg/L	125						115 - 140	yes
Replicate	6478740	Jun 05, 2024	pH		6.94			6.96		0.23	0 % or 0.1 Abs	yes
Replicate	6478740	Jun 05, 2024	Electrical Conductivity	dS/m	0.129			0.131		1.38	10 % or 0.002 Abs	yes
Replicate	6478740	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478740	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	Bicarbonate	mg/L	65			66		0.9	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478740	Jun 05, 2024	T-Alkalinity	mg/L	54			54		0.9	10 % or 5 Abs	yes

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Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011521
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed

Routine Water - Continued

Batch: 2460219 - Anions (Routine) by Ion Chromatography

Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479560	Jun 05, 2024	Fluoride	mg/L	10.1						9.39 - 10.59	yes
Control Sample	6479560	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479560	Jun 05, 2024	Nitrite - N	mg/L	9.80						9.01 - 10.99	yes
Control Sample	6479560	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479561	Jun 05, 2024	Fluoride	mg/L	4.95						4.56 - 5.22	yes
Control Sample	6479561	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479562	Jun 05, 2024	Fluoride	mg/L	0.52						0.45 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrite - N	mg/L	0.505						0.455 - 0.557	yes
Control Sample	6479562	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.01						0.85 - 1.15	yes
Replicate	6479558	Jun 05, 2024	Nitrate - N	mg/L	1.70			1.69		0.55	10 % or 0.01 Abs	yes
Replicate	6479558	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes

Batch: 2460052 - Chloride in Water

Blank	6479091	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479088	Jun 05, 2024	Chloride	mg/L	2000						1847.4 - 2256	yes
Control Sample	6479089	Jun 05, 2024	Chloride	mg/L	77.9						74.9 - 86.9	yes
Control Sample	6479090	Jun 05, 2024	Chloride	mg/L	14.7						13.3 - 16.5	yes
Replicate	6479092	Jun 05, 2024	Chloride	mg/L	3.2			3.2		3.13	10 % or 0.5 Abs	yes

Batch: 2460048 - Metals Trace (Dissolved) in water

Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011521
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

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SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference



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Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011521 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-4; 9343636: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011521
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

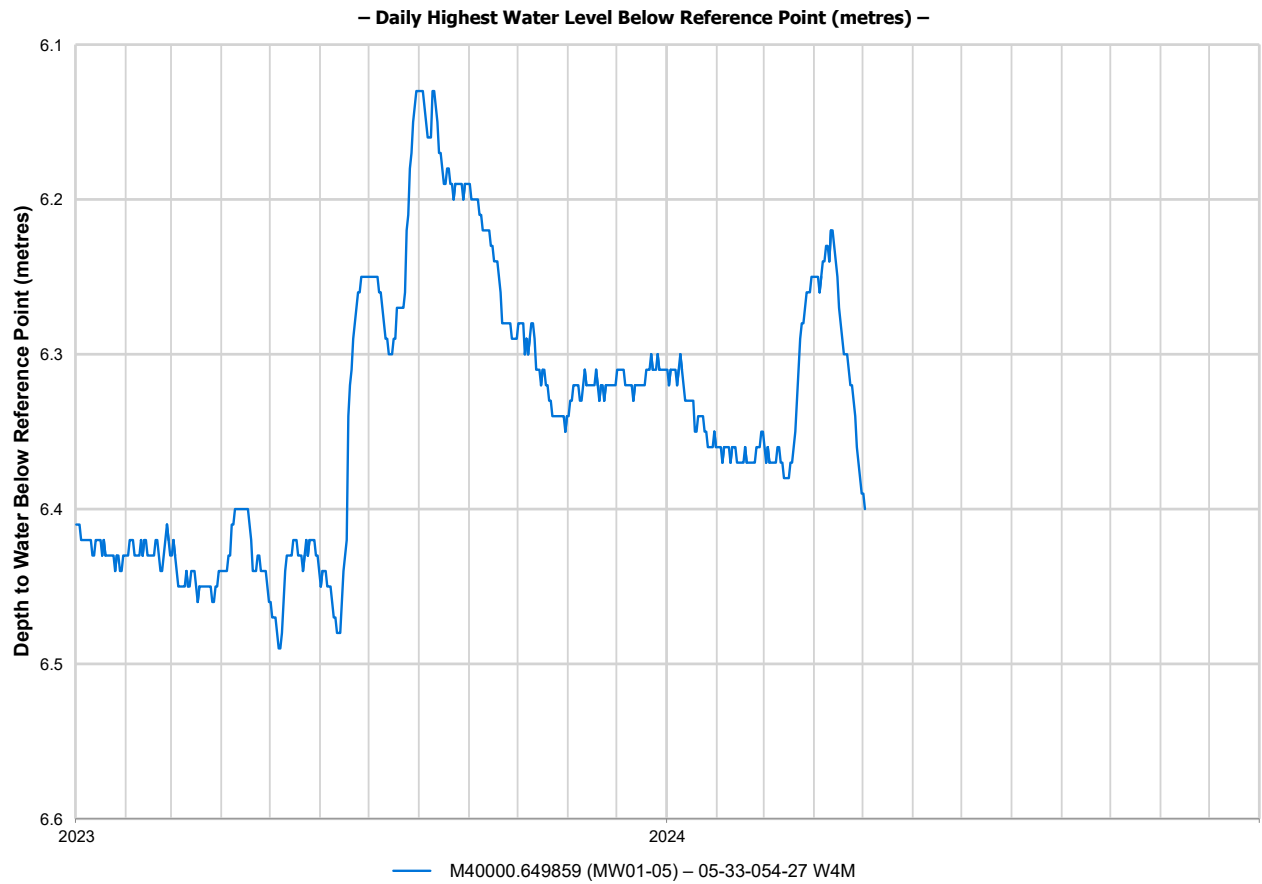
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

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MW01-05
2023 - 2024 Hydrograph



MW01-06

01-29-054-27 W4M

(M40000.650496)



Photograph taken on May 29, 2023

Spatial Location:

Easting: **70,299**

Northing: **5,946,826**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **691**

(elevation accuracy HCL DEM)

Date Completed: **April 25, 2001**

Depth Drilled (m): **18.3**

Completion Interval (m): **12.8 – 15.9 ***

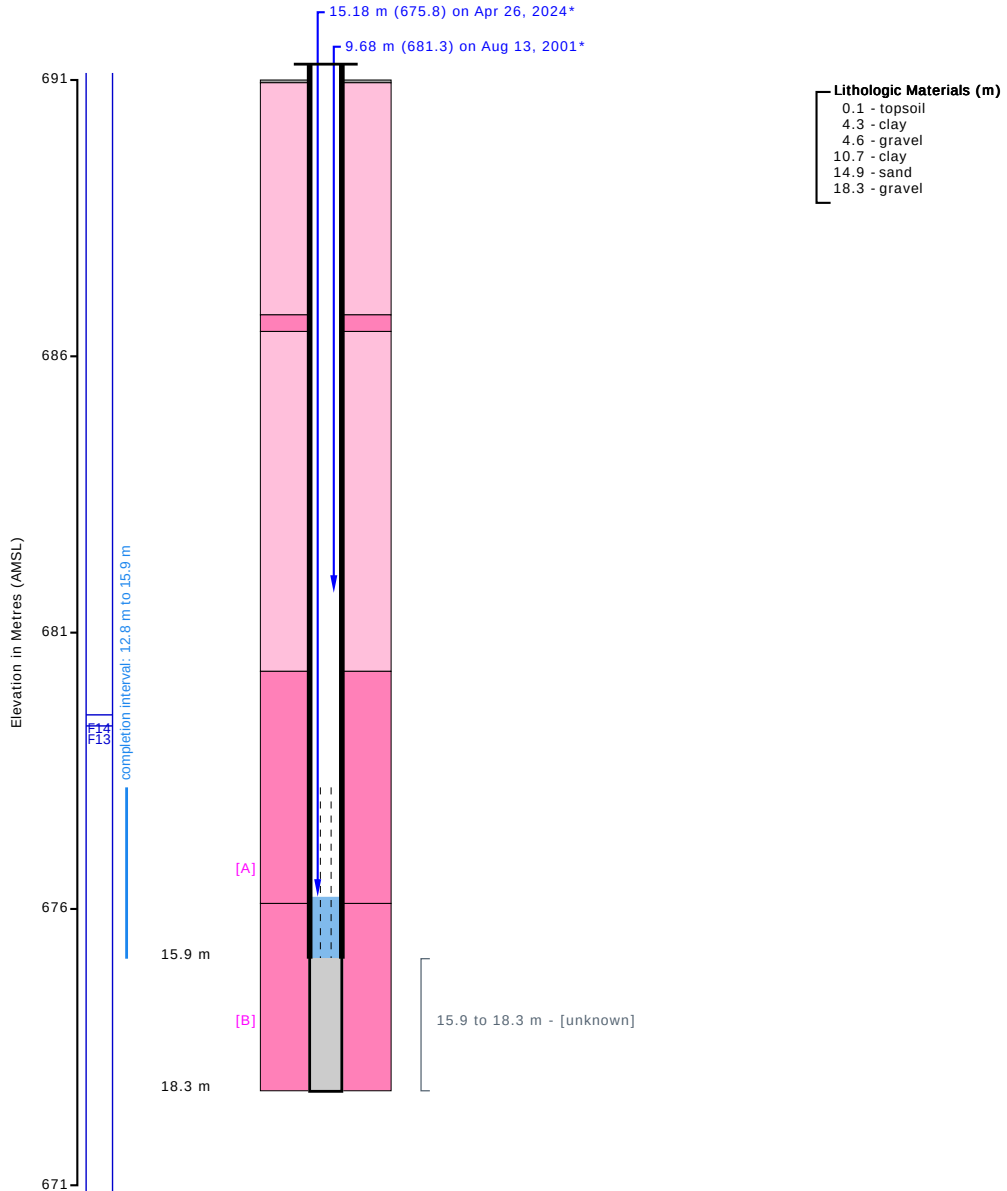
(* TGWC determined value)

Earliest Water Level (m): **9.68 – August 13, 2001**

Most Recent Water Level (m): **15.18 – April 26, 2024 @ 09:36**

GIC ID: **Unknown**

MW01-06 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis		
Surficial		Unsorted		F14 - Middle Horseshoe Canyon Formation F13 - Lower Horseshoe Canyon Formation	
		Fine Grained			
		Coarse Grained			
Bedrock		Fine Grained			Other
					
		Coarse Grained			

Summary

TGWC ID: M40000.650496
 Well Name: MW01-06
 Legal Location: 01-29-054-27 W4M
 Casing (OD): 50.8 mm; PVC (2.0")
 Casing Stick-Up: 0.4 m (not drawn to scale)
 Completion [A]: 12.8 to 15.9 m; Slotted
 Construction [B]: 15.9 to 18.3 m; Plugged; Slough
 Water Level (recent): 15.18 m (675.8 m AMSL) on Apr 26, 2024 @ 09:36 - Reference Point: Top of Casing
 Water Level (oldest): 9.68 m (681.3 m AMSL) on Aug 13, 2001 - Reference Point: Top of Casing

* Water-Level Measurements are measured from reference point listed.
 NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (<http://www.hcl.ca>) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
 Drawn: October 10, 2024 @ 12:19 --- <https://www.hcl.ca>

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Owner: *Sturgeon County*
9613-100 St, Morinville, AB T8R 1L9

Contractor: *Mar-Wayne Water Well Drilling Services Ltd.*
Name: *MW01-06*

Field Action: *Confirmed - Physically, July 13, 2009*
Work Type: *Piezometer*
Drilling Method: *Drilled*
Proposed Use: *Monitoring*
Completion Type: *Casing*

Date Started: *April 25, 2001*
Date Completed: *April 25, 2021*
Well Status: *Observation*
Feature Class: *Piezometer*

01-29-054-27 W4M

M40000.650496

Easting (m): 70,299.24 ¹
Northing (m): 5,946,825.77 ¹
Elevation (m): 691 ²

Elog Taken: *No*
Gamma Taken: *No*
Flowing: *No*
Presence of Gas: *No*

Stick Up (m): 0.4
544066; core; 2024-06-11

General Details

* TGWC calculated value

Depth Completed (m)*: 15.9
Depth Drilled (m): 18.3
Sand & Gravel Thickness (m): 22.8 (total) – 18.3 (below 15 m) *
Plugged / Backfilled (m): 15.9 – 18.3 (Slough)
Most Recent Water Level (m): 15.18 m – April 26, 2024

Top of Bedrock: *Surficial Water Well* *
Completion Interval (m): 12.8 – 15.9 *

Completion Details

Surface Casing: *PVC – 50.8 mm (O.D.) x 15.9 m (bottom)*

Intervals

Slotted: 12.8 to 15.9 m - Method: *[unknown]*
[unknown]: 15.9 to 18.3 m

Chemistry Summary Details (mg/L, except as noted)

(recently sampled first)

Sampling Details: *April 26, 2024 @ 10:10*
Report Date: *June 7, 2024 - Element Materials Technology Canada Inc. (1736660-16)*

Constituent	Result	Constituent	Result	Constituent	Result
Conductivity (µS/cm):	930	Nitrate as N:	0.85	Turbidity (NTU):	12.2
Total Dissolved Solids:	568	Nitrite as N:	< 0.005	Fluoride:	0.10
Hardness (as CaCO3):	416	pH (pH Unit):	7.73	Carbonate:	< 6
T-Alkalinity (as CaCO3):	444	Colour (TCU):	30	Bicarbonate:	541
P-Alkalinity (as CaCO3):	< 5	Ion Balance (%):	95	Hydroxide:	< 5
Nitrate + Nitrite as N:	0.85	Total Coliforms:**:		Total Iron:	
Total Suspended Solids:		Fecal Coliforms:**:		Total Mn:	
Temperature (°C):	20.6	Escherichia coli:**:			

Constituent	Extractable	Dissolved	Constituent	Extractable	Dissolved
Calcium:		122	Mercury:		< 0.000005
Chloride:		2.4	Molybdenum:		< 0.001
Iron:		< 0.01	Magnesium:		27.1
Manganese:		0.791***	Sodium:		48.3
Aluminum:		< 0.002	Potassium:		3.6
Arsenic:		0.0002	Vanadium:		0.0002
Barium:		0.041	Strontium:		1.06
Beryllium:		< 0.0001	Nickel:		0.0008
Cadmium:		0.00004	Zinc:		< 0.001
Chromium:		< 0.0005	Copper:		0.0016
Cobalt:		0.0004	Lead:		< 0.0001
Sulfate:		98.7	Uranium:		0.0030

Comments: *Sample collected by Hydrogeological Consultants Ltd. personnel.*

***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2024. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.

544066; 1 / 35

Lithology Details

Elevation (AMSL)	Depth (BGL)	Lithology Descriptions
690.6	0.1	Topsail
686.4	4.3	Medium Brown Clay
686.1	4.6	Cemented Gravel
679.9	10.7	Medium Grey Clay
675.7	14.9	Sand
672.3	18.3	Medium-Grained Gravel

Comments & Observations

Aquifer Tests

Alias IDs

Z614233

544066; 1 / 35

544066; 1 / 35

544066; 1 / 35

544066; 1 / 35

(1) October 10, 2024, "AS IS"; no warranty either expressed or implied. visit [tgwc.com](https://www.tgwc.com) for additional details

Sturgeon County, 2023 to 2024 Groundwater Monitoring Report
Calahoo Resource Extraction District, Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, MR-0224.23

B - 107

MW01-06
AEPA – Water Well Drilling Report

— AEPA water well drilling report not available —

MW01-06
Chemical Analysis Results (June 7, 2024)



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Page 1 of 11

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011533 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-16
Sample Date	April 26, 2024
Sample Time	10:10
Sample Location	M40000.650496
Sample Description	MW01-06 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	7.62	0.05		
Sulfur	Dissolved	mg/L	32.9	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0002	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.041	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.125	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	0.00004	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	0.0004	0.0001		
Copper	Dissolved	mg/L	0.0016	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.090	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0008	0.0005		
Selenium	Dissolved	mg/L	0.0005	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	1.06	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0030	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	0.0002	0.0001		
Zinc	Dissolved	mg/L	<0.001	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	30	5	15	Above AO
Turbidity		NTU	12.2	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.73	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	20.6			
Electrical Conductivity	at 25 °C	µS/cm	930	1		
Calcium	Dissolved	mg/L	122	0.2		
Magnesium	Dissolved	mg/L	27.1	0.2		
Sodium	Dissolved	mg/L	48.3	0.4	200	Below AO

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Analytical Report

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Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Reference Number	1736660-16
Sample Date	April 26, 2024
Sample Time	10:10
Sample Location	M40000.650496
Sample Description	MW01-06 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	3.6	0.4		
Iron	Dissolved	mg/L	<0.01	0.01	0.3	Below AO
Manganese	Dissolved	mg/L	0.791	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	2.4	0.4	250	Below AO
Fluoride		mg/L	0.10	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.85	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	0.85	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	98.7	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	541			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	444	5		
Total Dissolved Solids	Calculated	mg/L	568	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	416			
Ionic Balance	Dissolved	%	95			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

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Quality Control

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Attn: Jennifer Catt
Sampled By: HCL
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Project ID: MR-0224.23
Project Name: 2023 Groundwater
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Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011533
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460024 - Mercury (Dissolved) in water												
Blank	6479008	Jun 05, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479012	Jun 05, 2024	Mercury	mg/L	0.000094						7e-005 - 0.00013	yes
Control Sample	6479011	Jun 05, 2024	Mercury	mg/L	0.000019						6e-006 - 3.6e-005	yes
Replicate	6479013	Jun 05, 2024	Mercury	mg/L	<0.000005			<0.000005		0	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Attn: Jennifer Catt

Sampled By: HCL

Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011533
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011533
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479114	Jun 05, 2024	Aluminum	µg/L	<2			<2		0	10 % or 11 Abs	yes
Replicate	6479114	Jun 05, 2024	Antimony	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Arsenic	µg/L	12.5			12.4		0.38	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Barium	µg/L	19			19		0.09	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Boron	µg/L	102			102		0.06	10 % or 4.4 Abs	yes
Replicate	6479114	Jun 05, 2024	Cadmium	µg/L	<0.01			<0.01		0	10 % or 0.022 Abs	yes
Replicate	6479114	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Cobalt	µg/L	0.8			0.8		3.91	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Copper	µg/L	<0.2			<0.2		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Lead	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes

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Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011533
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479114	Jun 05, 2024	Lithium	µg/L	118			119		0.43	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Nickel	µg/L	0.7			0.8		2.6	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Selenium	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Strontium	µg/L	822			826		0.52	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479114	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Titanium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Uranium	µg/L	3.7			3.7		0.74	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Vanadium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Zinc	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479186	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011533
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed

Physical and Aggregate Properties - Continued

Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Replicate	6479215	Jun 05, 2024	Turbidity	NTU	1.8			1.7		2.31	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478743	Jun 05, 2024	pH		7.77			7.76		0.17	0 % or 0.1 Abs	yes
Replicate	6478743	Jun 05, 2024	Electrical Conductivity	dS/m	1.23			1.23		0	10 % or 0.002 Abs	yes
Replicate	6478743	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478743	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	Bicarbonate	mg/L	649			653		0.66	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478743	Jun 05, 2024	T-Alkalinity	mg/L	532			536		0.66	10 % or 5 Abs	yes

Batch: 2460219 - Anions (Routine) by Ion Chromatography

Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479560	Jun 05, 2024	Fluoride	mg/L	10.1						9.39 - 10.59	yes

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Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011533
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479560	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479560	Jun 05, 2024	Nitrite - N	mg/L	9.80						9.01 - 10.99	yes
Control Sample	6479560	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479561	Jun 05, 2024	Fluoride	mg/L	4.95						4.56 - 5.22	yes
Control Sample	6479561	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479562	Jun 05, 2024	Fluoride	mg/L	0.52						0.45 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrite - N	mg/L	0.505						0.455 - 0.557	yes
Control Sample	6479562	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.01						0.85 - 1.15	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrate - N	mg/L	0.58			0.58		0.19	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Batch: 2460052 - Chloride in Water												
Blank	6479097	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479094	Jun 05, 2024	Chloride	mg/L	1910						1847.4 - 2256	yes
Control Sample	6479095	Jun 05, 2024	Chloride	mg/L	78.6						74.9 - 86.9	yes
Control Sample	6479096	Jun 05, 2024	Chloride	mg/L	14.7						13.3 - 16.5	yes
Replicate	6479093	Jun 05, 2024	Chloride	mg/L	0.8			0.8		5.13	10 % or 0.5 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes

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W: www.element.com

Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011533
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

Terms and Conditions: <https://www.element.com/terms/terms-and-conditions>

Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011533 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-16; 9343648: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011533
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

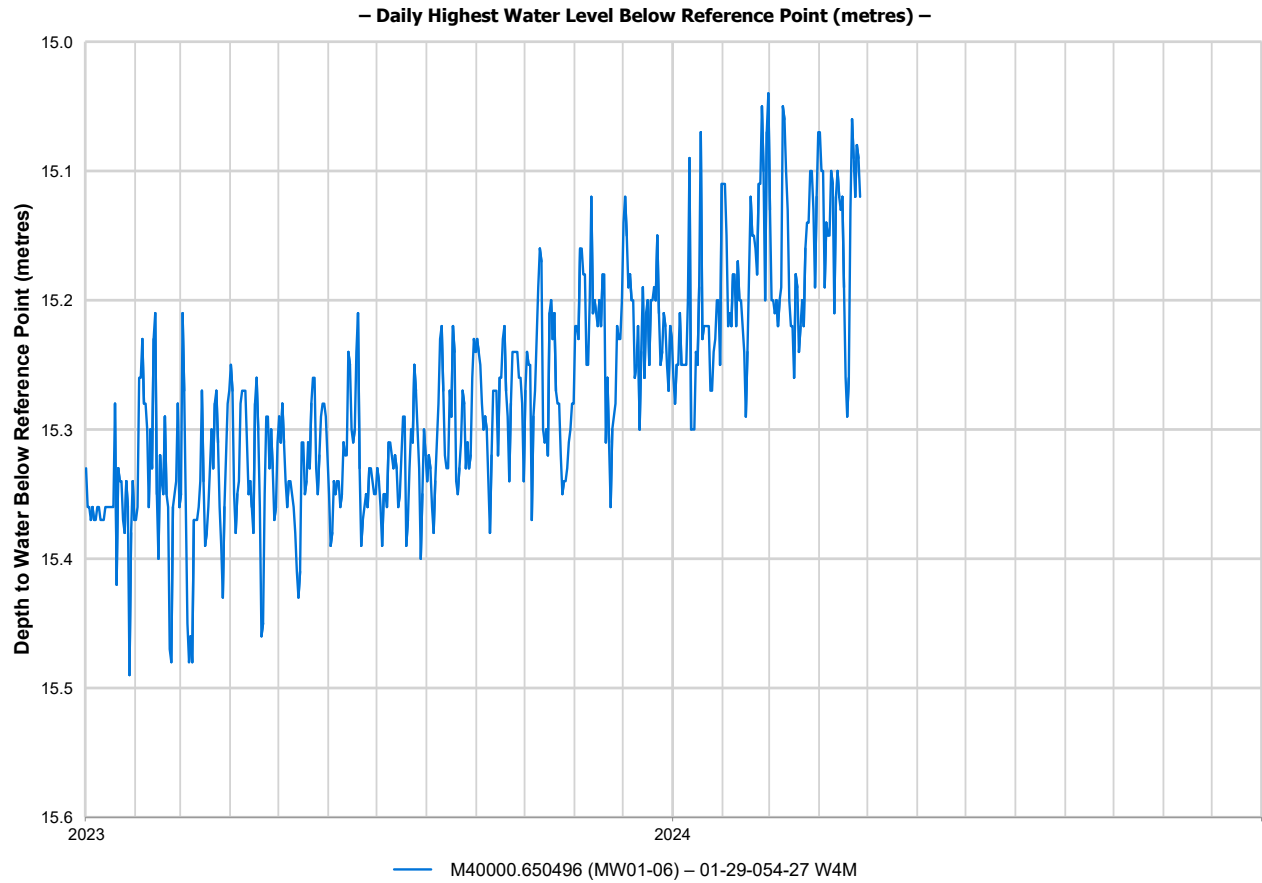
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

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MW01-06
2023 - 2024 Hydrograph



MW01-07

13-19-054-26 W4M
(M37490.031427)



Spatial Location:

Easting: **76,879**

Northing: **5,946,605**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **676**

(elevation accuracy HCL DEM)

Date Completed: **July 16, 2001**

Depth Drilled (m): **14.9**

Completion Interval (m): **12.8 – 14.3 ***

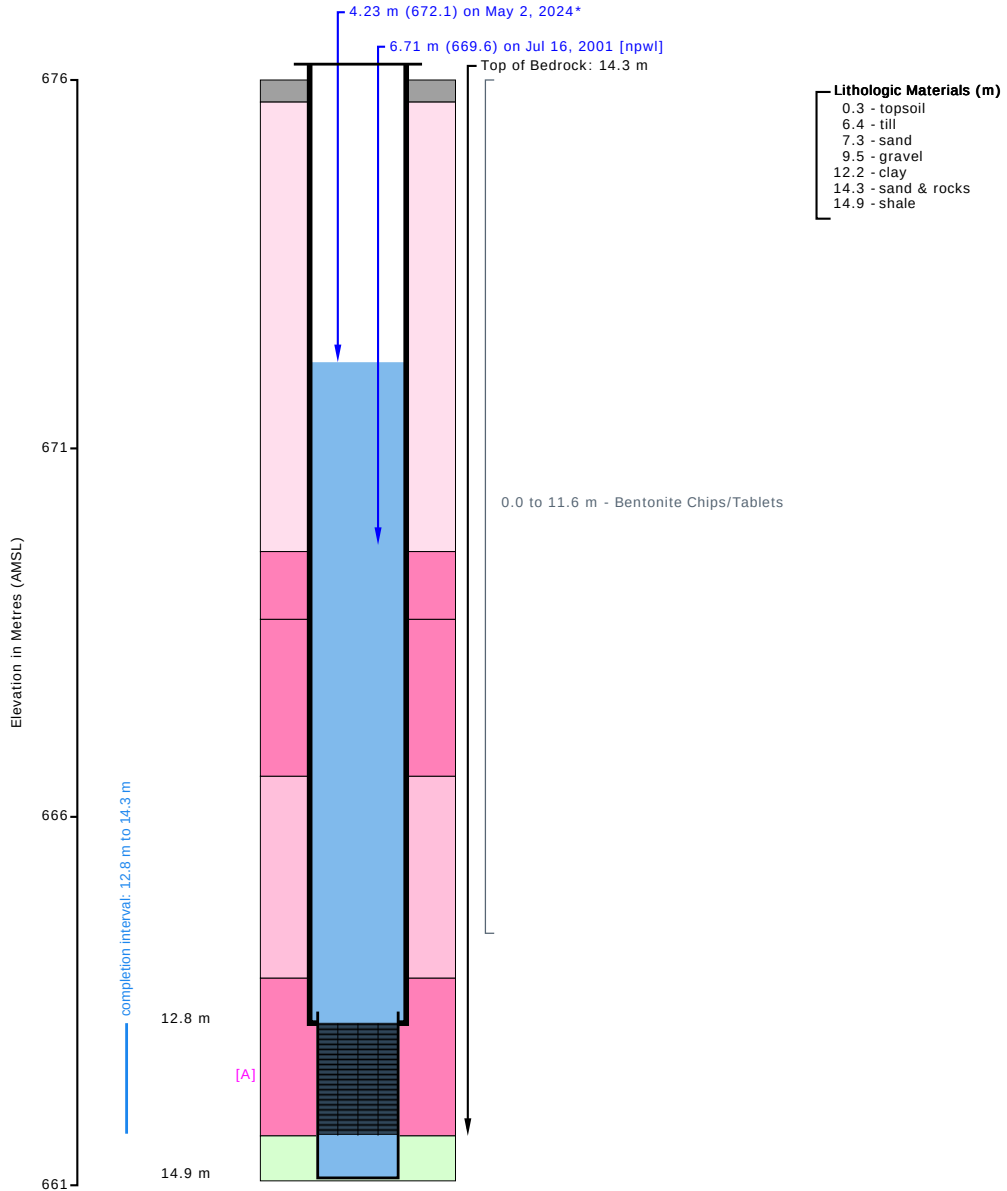
(* TGWC determined value)

Earliest Water Level (m): **6.71 – July 16, 2001**

Most Recent Water Level (m): **4.23 – May 2, 2024 @ 14:00**

GIC ID: **297525**

MW01-07 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		Geologic Unit details not available for this location	
	Fine Grained			
	Coarse Grained			
Bedrock	Fine Grained			
	Coarse Grained			
	Other			

Summary

TGWC ID: M37490.031427
 Well Name: MW01-07
 Legal Location: 13-19-054-26 W4M
 Casing (OD): 152.4 mm; Plastic (6.0")
 Screen (OD): 127.0 mm; Stainless Steel (5.0")
 Casing Stick-Up: 0.4 m (not drawn to scale)
 Completion [A]: 12.8 to 14.3 m; Screened
 Water Level (recent): 4.23 m (672.1 m AMSL) on May 2, 2024 @ 14:00 - Reference Point: Top of Casing
 Water Level (oldest): 6.71 m (669.6 m AMSL) on Jul 16, 2001 [npwl]
 Top of Liner assumed to be 5% of 'non-cased' interval.

* Water-Level Measurements are measured from reference point listed.
 NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (<http://www.hcl.ca>) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
 Drawn: October 10, 2024 @ 12:20 --- <https://www.hcl.ca>

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Owner: <i>Sturgeon County</i> 9613-100 St, Morinville, AB T8R 1L9 Contractor: <i>Mar-Wayne Water Well Drilling Services Ltd.</i> Name: <i>MW01-07</i> Field Action: <i>Confirmed - Physically, July 13, 2009</i> Work Type: <i>Piezometer</i> Drilling Method: <i>Rotary</i> Proposed Use: <i>Monitoring</i> Completion Type: <i>Screen</i> Date Started: <i>July 16, 2001</i> Date Completed: <i>July 16, 2001</i> Well Status: <i>Observation</i> Feature Class: <i>Piezometer</i>				13-19-054-26 W4M		M37490.031427		Easting (m): 76,878.77 ¹ Northing (m): 5,946,604.83 ¹ Elevation (m): 676 ²		Elog Taken: <i>No</i> Gamma Taken: <i>No</i> Flowing: <i>No</i> Presence of Gas: <i>No</i> Stick Up (m): 0.4 544057; 334316; core; 2024-06-11																																																																													
General Details				* TGWC calculated value		Lithology Details																																																																																	
Depth Completed (m)*: 14.3 Depth Drilled (m): 14.9 Sand & Gravel Thickness (m): 3.1 (total) – 0.0 (below 15 m) * Most Recent Water Level (m): 4.23 m – May 2, 2024				Top of Bedrock (m): 14.33 * Completion Interval (m): 12.8 – 14.3 *		Elevation Depth (AMSL) (BGL) <u>Lithology Descriptions</u> 675.6 0.3 Black Topsoil 669.5 6.4 Brown Till 668.6 7.3 Sand 666.5 9.5 Gravel 663.7 12.2 Grey Clay 661.6 14.3 Sand & Rocks 661.0 14.9 Grey Shale																																																																																	
Completion Details																																																																																							
Surface Casing: <i>Plastic – 152.4 mm (O.D.) x 12.70 mm (thick) x 12.8 m (bottom)</i> Screen Material: <i>Stainless Steel – 127.0 mm (O.D.) (Attached To Casing)</i> Fittings: <i>Top: Coupler – Bottom: Washdown</i>																																																																																							
Intervals																																																																																							
Screen: 12.8 to 14.3 m - 12 Slot Bentonite Chips/Tablets: 0.0 to 11.6 m																																																																																							
Chemistry Summary Details (mg/L, except as noted)				(recently sampled first)																																																																																			
Sampling Details: <i>May 2, 2024 @ 14:17</i> Report Date: <i>June 7, 2024 - Element Materials Technology Canada Inc. (1736660-7)</i>																																																																																							
<table><tr><td>Constituent</td><td>Result</td><td>Constituent</td><td>Result</td><td>Constituent</td><td>Result</td></tr><tr><td>Conductivity (µS/cm):</td><td>1280</td><td>Nitrate as N:</td><td>0.51</td><td>Turbidity (NTU):</td><td>1.4</td></tr><tr><td>Total Dissolved Solids:</td><td>836</td><td>Nitrite as N:</td><td>< 0.005</td><td>Fluoride:</td><td>0.09</td></tr><tr><td>Hardness (as CaCO3):</td><td>544</td><td>pH (pH Unit):</td><td>8.05</td><td>Carbonate:</td><td>< 6</td></tr><tr><td>T-Alkalinity (as CaCO3):</td><td>498</td><td>Colour (TCU):</td><td>20</td><td>Bicarbonate:</td><td>607</td></tr><tr><td>P-Alkalinity (as CaCO3):</td><td>< 5</td><td>Ion Balance (%):</td><td>101</td><td>Hydroxide:</td><td>< 5</td></tr><tr><td>Nitrate + Nitrite as N:</td><td>0.51</td><td>Total Coliforms:**:</td><td></td><td>Total Iron:</td><td></td></tr><tr><td>Total Suspended Solids:</td><td></td><td>Fecal Coliforms:**:</td><td></td><td>Total Mn:</td><td></td></tr><tr><td>Temperature (°C):</td><td>20.7</td><td>Escherichia coli:**:</td><td></td><td></td><td></td></tr></table>				Constituent	Result	Constituent	Result	Constituent	Result	Conductivity (µS/cm):	1280	Nitrate as N:	0.51	Turbidity (NTU):	1.4	Total Dissolved Solids:	836	Nitrite as N:	< 0.005	Fluoride:	0.09	Hardness (as CaCO3):	544	pH (pH Unit):	8.05	Carbonate:	< 6	T-Alkalinity (as CaCO3):	498	Colour (TCU):	20	Bicarbonate:	607	P-Alkalinity (as CaCO3):	< 5	Ion Balance (%):	101	Hydroxide:	< 5	Nitrate + Nitrite as N:	0.51	Total Coliforms:**:		Total Iron:		Total Suspended Solids:		Fecal Coliforms:**:		Total Mn:		Temperature (°C):	20.7	Escherichia coli:**:																																	
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<table><tr><td>Constituent</td><td>Extractable</td><td>Dissolved</td><td>Constituent</td><td>Extractable</td><td>Dissolved</td></tr><tr><td>Calcium:</td><td></td><td>154</td><td>Mercury:</td><td></td><td>< 0.000005</td></tr><tr><td>Chloride:</td><td></td><td>4.8</td><td>Molybdenum:</td><td></td><td>< 0.001</td></tr><tr><td>Iron:</td><td></td><td>0.54</td><td>Magnesium:</td><td></td><td>39.0</td></tr><tr><td>Manganese:</td><td></td><td>0.800***</td><td>Sodium:</td><td></td><td>94.9</td></tr><tr><td>Aluminum:</td><td></td><td>< 0.002</td><td>Potassium:</td><td></td><td>4.9</td></tr><tr><td>Arsenic:</td><td></td><td>0.0019</td><td>Vanadium:</td><td></td><td>< 0.0001</td></tr><tr><td>Barium:</td><td></td><td>0.030</td><td>Strontium:</td><td></td><td>1.19</td></tr><tr><td>Beryllium:</td><td></td><td>< 0.0001</td><td>Nickel:</td><td></td><td>< 0.0005</td></tr><tr><td>Cadmium:</td><td></td><td>< 0.00001</td><td>Zinc:</td><td></td><td>< 0.001</td></tr><tr><td>Chromium:</td><td></td><td>< 0.0005</td><td>Copper:</td><td></td><td>< 0.0002</td></tr><tr><td>Cobalt:</td><td></td><td>< 0.0001</td><td>Lead:</td><td></td><td>< 0.0001</td></tr><tr><td>Sulfate:</td><td></td><td>240</td><td>Uranium:</td><td></td><td>0.0183</td></tr></table>				Constituent	Extractable	Dissolved	Constituent	Extractable	Dissolved	Calcium:		154	Mercury:		< 0.000005	Chloride:		4.8	Molybdenum:		< 0.001	Iron:		0.54	Magnesium:		39.0	Manganese:		0.800***	Sodium:		94.9	Aluminum:		< 0.002	Potassium:		4.9	Arsenic:		0.0019	Vanadium:		< 0.0001	Barium:		0.030	Strontium:		1.19	Beryllium:		< 0.0001	Nickel:		< 0.0005	Cadmium:		< 0.00001	Zinc:		< 0.001	Chromium:		< 0.0005	Copper:		< 0.0002	Cobalt:		< 0.0001	Lead:		< 0.0001	Sulfate:		240	Uranium:		0.0183	Extractable - unfiltered Dissolved - filtered					
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Comments: <i>Sample collected by Hydrogeological Consultants Ltd. personnel.</i>				Comments & Observations <i>Initial, Jul 16, 2001: Villeneuve gravel study.</i>																																																																																			
***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2024. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.				544057; 1 / 33																																																																																			
Aquifer Tests				Pump Intake BTOC (m): 12.5 on July 16, 2001																																																																																			
Date & Time		Testing Method / Type	Depth of Test Interval	Duration (minutes) Pumping Recovery	Avg. Rate (Lpm)	NPWL (metres)	Drawdown (metres)	Pump (metres)	Q20 (m³/day)* Apparent Effective	Transmissivity (m²/day)* Apparent Aquifer Effective																																																																													
1 2001-07-16		Pump	[unknown]	120 120	57.7	6.7	5.0	12.5	47.9	20.8																																																																													
Alias IDs				2445864				¹ HCL GPS — 10TM Resource NAD83, ² HCL DEM																																																																															
AEPA WellId: 297525 AEPA WellReportId: 297525																																																																																							



(1) October 10, 2024, "AS IS"; no warranty either expressed or implied. visit tgwc.com for additional details



MW01-07
AEPA - Water Well Drilling Report



Water Well Drilling Report

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GIC Well ID 297525
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2001/09/27

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
STURGEON, COUNTY OF		MORINVILLE									
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
	NW	19	54	26	4						
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation _____ m	
_____ m from					Latitude 53.683426 Longitude -113.830311					How Elevation Obtained	
_____ m from					How Location Obtained					Not Obtained	
					Not Verified						

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

Formation Log			Measurement in Metric		
Depth from ground level (m)	Water Bearing	Lithology Description			
0.30		Black Topsoil			
6.40		Brown Till			
7.32		Sand			
9.45		Gravel			
12.19		Gray Clay			
14.33		Sand & Rocks			
14.94		Gray Shale			

Yield Test Summary			Measurement in Metric		
Recommended Pump Rate 45.46 L/min					
Test Date	Water Removal Rate (L/min)	Static Water Level (m)			
2001/07/16	57.74	6.71			

Well Completion				Measurement in Metric			
Total Depth Drilled		Finished Well Depth		Start Date		End Date	
14.94 m				2001/07/16		2001/07/16	
Borehole							
Diameter (cm)		From (m)		To (m)			
0.00		0.00		14.94			
Surface Casing (if applicable)				Well Casing/Liner			
Plastic							
Size OD :		15.24 cm		Size OD :		0.00 cm	
Wall Thickness :		1.270 cm		Wall Thickness :		0.000 cm	
Bottom at :		12.80 m		Top at :		0.00 m	
				Bottom at :		0.00 m	
Perforations							
From (m)		To (m)		Diameter or Slot Width (cm)		Slot Length (cm)	
						Hole or Slot Interval(cm)	
Perforated by							
Annular Seal Bentonite Chips/Tablets							
Placed from 0.00 m to 11.58 m							
Amount							
Other Seals							
Type				At (m)			
Screen Type Stainless Steel							
Size OD :		12.70 cm					
From (m)		To (m)		Slot Size (cm)			
12.80		14.33		0.030			
Attachment Attached To Casing							
Top Fittings Coupler				Bottom Fittings Washdown			
Pack							
Type Silica Sand				Grain Size 10-20			
Amount 500.00 Pounds							

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well UNKNOWN NA DRILLER	Certification No 1
Company Name MAR-WAYNE WATER WELL DRILLING SERVICES LTD.	Copy of Well report provided to owner Date approval holder signed



Water Well Drilling Report

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

GIC Well ID 297525
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2001/09/27

GOWN ID

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.

Well Identification and Location										Measurement in Metric	
Owner Name		Address		Town		Province		Country		Postal Code	
STURGEON, COUNTY OF		MORINVILLE									
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
	NW	19	54	26	4						
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)						
m from					Latitude 53.683426 Longitude -113.830311					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 cm											
Is Artesian Flow										Is Flow Control Installed	
Rate L/min										Describe	
Recommended Pump Rate 45.46 L/min										Pump Installed	Depth m
Recommended Pump Intake Depth (From TOC) 12.50 m										Type	Make H.P.
										Model (Output Rating)	
Did you Encounter Saline Water (>4000 ppm TDS)										Depth m	Well Disinfected Upon Completion
Gas										Depth m	Geophysical Log Taken
Remedial Action Taken										Submitted to ESRD	
Additional Comments on Well										Sample Collected for Potability	Submitted to ESRD
DRILLER REPORTS DISTANCE FROM TOP OF CASING TO GROUND LEVEL: 40 CMS. VILLENEUVE GRAVEL STUDY.											

Yield Test			Taken From Ground Level		Measurement in Metric
			Depth to water level		
Test Date	Start Time	Static Water Level			
2001/07/16	12:00 AM	6.71 m			
Method of Water Removal			Pumping (m)	Elapsed Time Minutes:Sec	Recovery (m)
Type Pump			6.74	0:00	11.72
Removal Rate 57.74 L/min			9.26	1:00	9.71
Depth Withdrawn From 12.50 m			9.98	2:00	8.57
			10.31	3:00	8.14
			10.49	4:00	7.97
			10.59	5:00	7.88
			10.66	6:00	7.87
			10.69	7:00	7.85
			10.73	8:00	7.82
			10.77	9:00	7.81
			10.79	10:00	7.79
			10.83	12:00	7.75
			10.88	14:00	7.75
			10.90	16:00	7.73
			10.98	20:00	7.69
			11.05	25:00	7.67
			11.13	30:00	7.63
			11.21	35:00	7.60
			11.26	40:00	7.57
			11.36	50:00	7.56
			11.47	60:00	7.54
			11.53	75:00	7.50
			11.68	90:00	7.46
			11.70	105:00	7.45
			11.72	120:00	7.43

Water Diverted for Drilling		
Water Source	Amount Taken L	Diversion Date & Time

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
UNKNOWN NA DRILLER	1
Company Name	Copy of Well report provided to owner Date approval holder signed
MAR-WAYNE WATER WELL DRILLING SERVICES LTD.	

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MW01-07
Chemical Analysis Results (June 7, 2024)



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Page 1 of 12

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011524 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-7
Sample Date	May 02, 2024
Sample Time	14:17
Sample Location	M37490.031427
Sample Description	MW01-07 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	6.33	0.05		
Sulfur	Dissolved	mg/L	80.1	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	0.0003	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0019	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.030	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.111	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	<0.00001	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	<0.0001	0.0001		
Copper	Dissolved	mg/L	<0.0002	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.137	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	<0.0005	0.0005		
Selenium	Dissolved	mg/L	<0.0002	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	1.19	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0183	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	<0.001	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	20	5	15	Above AO
Turbidity		NTU	1.4	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			8.05	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	20.7			
Electrical Conductivity	at 25 °C	µS/cm	1280	1		
Calcium	Dissolved	mg/L	154	0.2		
Magnesium	Dissolved	mg/L	39.0	0.2		
Sodium	Dissolved	mg/L	94.9	0.4	200	Below AO

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Analytical Report

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Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Reference Number	1736660-7
Sample Date	May 02, 2024
Sample Time	14:17
Sample Location	M37490.031427
Sample Description	MW01-07 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	4.9	0.4		
Iron	Dissolved	mg/L	0.54	0.01	0.3	Above AO
Manganese	Dissolved	mg/L	0.800	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	4.8	0.4	250	Below AO
Fluoride		mg/L	0.09	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.51	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	0.51	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	240	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	607			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	498	5		
Total Dissolved Solids	Calculated	mg/L	836	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	544			
Ionic Balance	Dissolved	%	101			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

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Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011524
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460024 - Mercury (Dissolved) in water												
Blank	6479008	Jun 05, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479012	Jun 05, 2024	Mercury	mg/L	0.000094						7e-005 - 0.00013	yes
Control Sample	6479011	Jun 05, 2024	Mercury	mg/L	0.000019						6e-006 - 3.6e-005	yes
Replicate	6479010	Jun 05, 2024	Mercury	mg/L	0.000009			0.000010		12.93	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011524
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011524
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479114	Jun 05, 2024	Aluminum	µg/L	<2			<2		0	10 % or 11 Abs	yes
Replicate	6479114	Jun 05, 2024	Antimony	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Arsenic	µg/L	12.5			12.4		0.38	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Barium	µg/L	19			19		0.09	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Boron	µg/L	102			102		0.06	10 % or 4.4 Abs	yes
Replicate	6479114	Jun 05, 2024	Cadmium	µg/L	<0.01			<0.01		0	10 % or 0.022 Abs	yes
Replicate	6479114	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Cobalt	µg/L	0.8			0.8		3.91	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Copper	µg/L	<0.2			<0.2		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Lead	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes

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Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011524
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479114	Jun 05, 2024	Lithium	µg/L	118			119		0.43	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Nickel	µg/L	0.7			0.8		2.6	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Selenium	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Strontium	µg/L	822			826		0.52	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479114	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Titanium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Uranium	µg/L	3.7			3.7		0.74	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Vanadium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Zinc	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479184	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011524
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Blank	6479192	Jun 05, 2024	Turbidity	NTU	0.1	0.1					0.1	yes
Control Sample	6479197	Jun 05, 2024	Turbidity	NTU	1990						1847.5 - 2041.9	yes
Control Sample	6479198	Jun 05, 2024	Turbidity	NTU	4760						4441.7 - 6661.7	yes
Control Sample	6479196	Jun 05, 2024	Turbidity	NTU	149						132.1 - 162.1	yes
Control Sample	6479195	Jun 05, 2024	Turbidity	NTU	14.8						12.6 - 15.6	yes
Control Sample	6479194	Jun 05, 2024	Turbidity	NTU	1.7						1 - 2.2	yes
Replicate	6479207	Jun 05, 2024	Turbidity	NTU	11.8			12.0		1.68	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478740	Jun 05, 2024	pH		6.94			6.96		0.23	0 % or 0.1 Abs	yes
Replicate	6478740	Jun 05, 2024	Electrical Conductivity	dS/m	0.129			0.131		1.38	10 % or 0.002 Abs	yes
Replicate	6478740	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478740	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	Bicarbonate	mg/L	65			66		0.9	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478740	Jun 05, 2024	T-Alkalinity	mg/L	54			54		0.9	10 % or 5 Abs	yes

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011524 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Batch: 2460219 - Anions (Routine) by Ion Chromatography												
Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479560	Jun 05, 2024	Fluoride	mg/L	10.1						9.39 - 10.59	yes
Control Sample	6479560	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479560	Jun 05, 2024	Nitrite - N	mg/L	9.80						9.01 - 10.99	yes
Control Sample	6479560	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479561	Jun 05, 2024	Fluoride	mg/L	4.95						4.56 - 5.22	yes
Control Sample	6479561	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479562	Jun 05, 2024	Fluoride	mg/L	0.52						0.45 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrite - N	mg/L	0.505						0.455 - 0.557	yes
Control Sample	6479562	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.01						0.85 - 1.15	yes
Replicate	6479558	Jun 05, 2024	Nitrate - N	mg/L	1.70			1.69		0.55	10 % or 0.01 Abs	yes
Replicate	6479558	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes
Batch: 2460052 - Chloride in Water												
Blank	6479097	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479094	Jun 05, 2024	Chloride	mg/L	1910						1847.4 - 2256	yes
Control Sample	6479095	Jun 05, 2024	Chloride	mg/L	78.6						74.9 - 86.9	yes
Control Sample	6479096	Jun 05, 2024	Chloride	mg/L	14.7						13.3 - 16.5	yes
Replicate	6479093	Jun 05, 2024	Chloride	mg/L	0.8			0.8		5.13	10 % or 0.5 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011524
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

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SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011524 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-7; 9343639: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011524
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

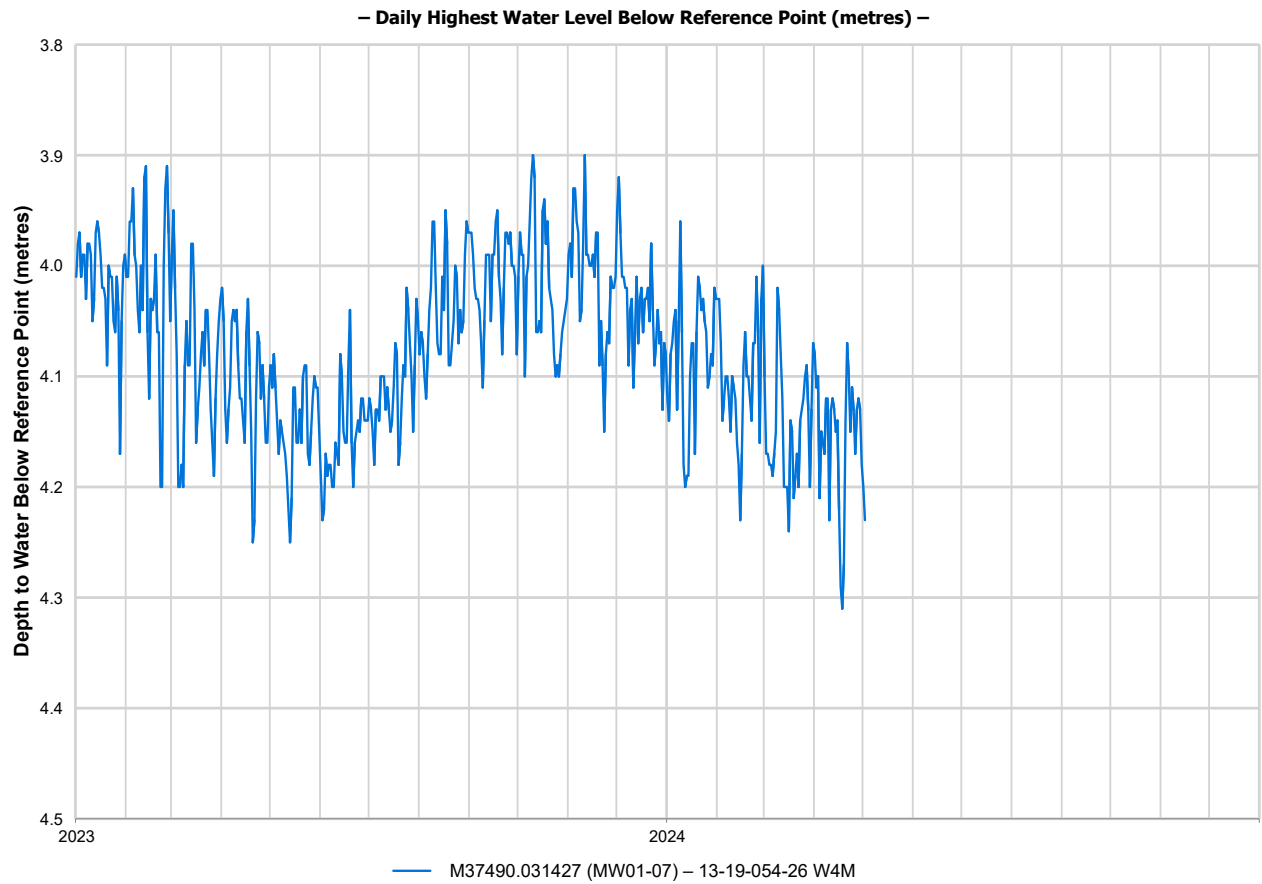
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

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MW01-07
2023 - 2024 Hydrograph



MW01-08

10-24-054-27 W4M
(M37490.031431)



Spatial Location:

Easting: **76,066**

Northing: **5,946,352**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **682**

(elevation accuracy HCL DEM)

Date Completed: **August 15, 2001**

Depth Drilled (m): **14.6**

Completion Interval (m): **13.1 – 14.6 ***

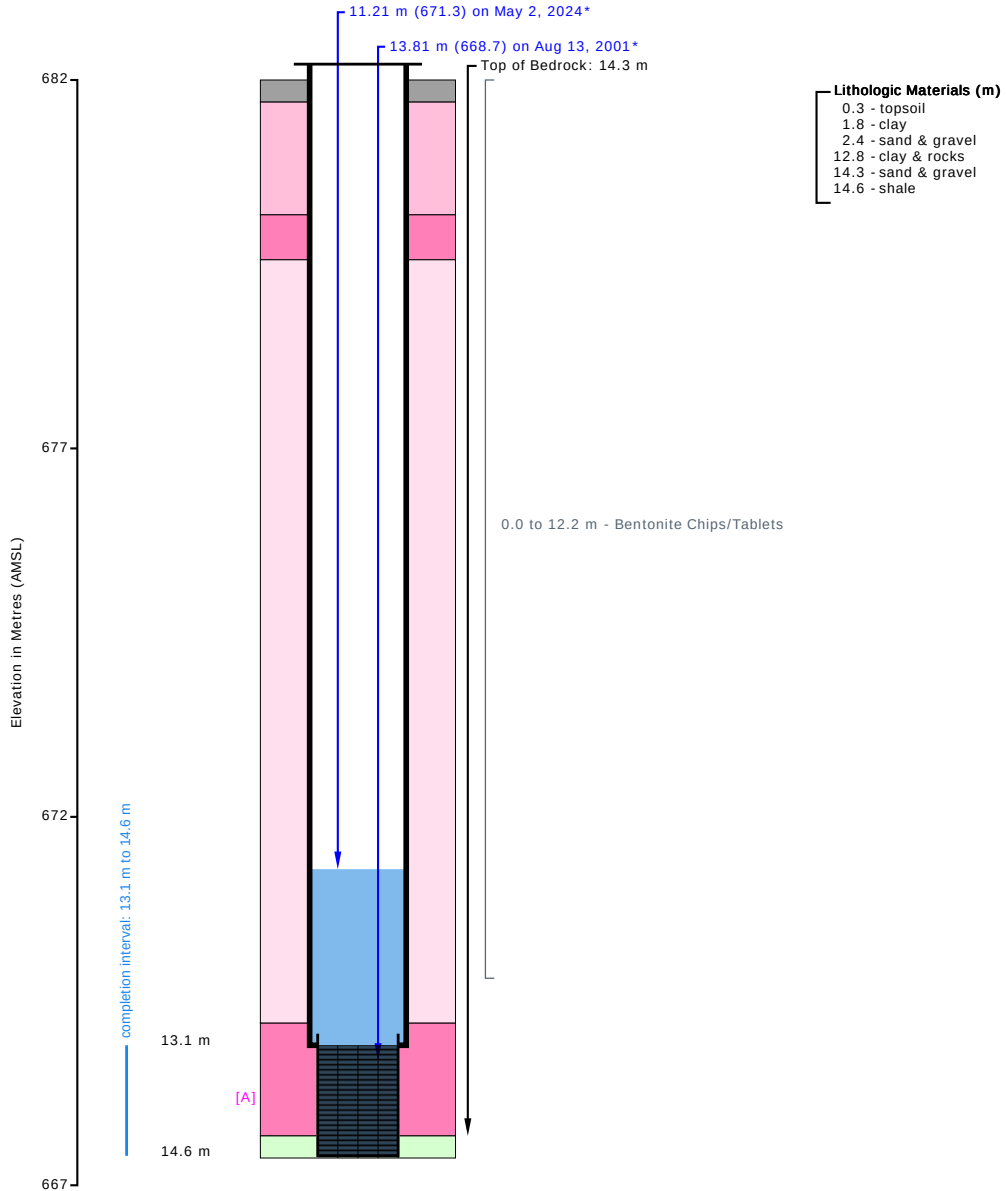
(* TGWC determined value)

Earliest Water Level (m): **13.81 – August 13, 2001**

Most Recent Water Level (m): **11.21 – May 2, 2024 @ 15:12**

GIC ID: **297529**

MW01-08 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		Geologic Unit details not available for this location	
	Fine Grained			
	Coarse Grained			
Bedrock	Fine Grained			
	Coarse Grained			
	Other			

Summary

TGWC ID: M37490.031431
 Well Name: MW01-08
 Legal Location: 10-24-054-27 W4M
 Casing (OD): 152.4 mm; Plastic (6.0")
 Screen (OD): 127.0 mm; Stainless Steel (5.0")
 Casing Stick-Up: 0.5 m (not drawn to scale)
 Completion [A]: 13.1 to 14.6 m; Screened
 Water Level (recent): 11.21 m (671.3 m AMSL) on May 2, 2024 @ 15:12 - Reference Point: Top of Casing
 Water Level (oldest): 13.81 m (668.7 m AMSL) on Aug 13, 2001 - Reference Point: Top of Casing
 Top of Liner assumed to be 5% of 'non-cased' interval.

* Water-Level Measurements are measured from reference point listed.
 NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (<http://www.hcl.ca>) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
 Drawn: October 10, 2024 @ 12:20 --- <https://www.hcl.ca>

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Owner: **Sturgeon County**
9613-100 St, Morinville, AB T8R 1L9

Contractor: **Mar-Wayne Water Well Drilling Services Ltd.**
Name: **MW01-08**

Field Action: **Confirmed - Physically, July 13, 2009**

Work Type: **Piezometer**

Drilling Method: **Rotary**

Proposed Use: **Monitoring**

Completion Type: **Screen**

Date Started: **August 15, 2001**

Date Completed: **August 15, 2021**

Well Status: **Observation**

Feature Class: **Piezometer**

10-24-054-27 W4M

M37490.031431

Easting (m): 76,066.35¹

Northing (m): 5,946,351.75¹

Elevation (m): 682²

Elog Taken: **No**

Gamma Taken: **No**

Flowing: **No**

Presence of Gas: **No**

Stick Up (m): 0.5

544070; core; 2024-06-11

General Details

* TGWC calculated value

Depth Completed (m)*: 14.6

Top of Bedrock (m): 14.33 *

Depth Drilled (m): 14.6

Completion Interval (m): 13.1 – 14.6 *

Sand & Gravel Thickness (m): 0.6 (total) – 0.0 (below 15 m) *

Most Recent Water Level (m): 11.21 m – May 2, 2024

Completion Details

Surface Casing: Plastic – 152.4 mm (O.D.) x 12.70 mm (thick) x 13.1 m (bottom)

Screen Material: Stainless Steel – 127.0 mm (O.D.) (Attached To Casing)

Fittings: Top: Coupler – Bottom: Plug

Intervals

Screen: 13.1 to 14.6 m - 12 Slot

Bentonite Chips/Tablets: 0.0 to 12.2 m

Lithology Details

Elevation (AMSL)

Depth (BGL)

Lithology Descriptions

681.7

0.3

Black Topsoil

680.2

1.8

Brown Clay

679.6

2.4

Sand & Gravel

669.2

12.8

Mixed Clay & Rocks

667.7

14.3

Sand & Gravel

667.4

14.6

Brown Shale

Chemistry Summary Details (mg/L, except as noted)

(recently sampled first)

Sampling Details: May 2, 2024 @ 15:25

Report Date: June 7, 2024 - Element Materials Technology Canada Inc. (1736660-20)

Constituent

Result

Conductivity (µS/cm): 1310

Total Dissolved Solids: 894

Hardness (as CaCO3): 529

T-Alkalinity (as CaCO3): 575

P-Alkalinity (as CaCO3): < 5

Nitrate + Nitrite as N: 0.58

Total Suspended Solids: 20.7

Temperature (°C): 20.7

Constituent

Result

Nitrate as N: 0.58

Nitrite as N: < 0.005

pH (pH Unit): 7.91

Colour (TCU): 25

Ion Balance (%): 92

Total Coliforms: **

Fecal Coliforms: **

Escherichia coli: **

Constituent

Result

Turbidity (NTU): 8.5

Fluoride: 0.16

Carbonate: < 6

Bicarbonate: 701

Hydroxide: < 5

Total Iron: 701

Total Mn: 701

Constituent

Extractable

Dissolved

Calcium: 154

Chloride: 3.1

Iron: 1.47

Manganese: 1.06***

Aluminum: 0.003

Arsenic: 0.0005

Barium: 0.100

Beryllium: < 0.0001

Cadmium: < 0.00001

Chromium: < 0.0005

Cobalt: < 0.0001

Sulfate: 246

Constituent

Extractable

Dissolved

Mercury: < 0.000005

Molybdenum: < 0.001

Magnesium: 34.8

Sodium: 105

Potassium: 6.4

Vanadium: < 0.0001

Strontium: 0.901

Nickel: < 0.0005

Zinc: < 0.001

Copper: < 0.0002

Lead: < 0.0001

Uranium: 0.0121

Extractable - unfiltered

Dissolved - filtered

Comments: Sample collected by Hydrogeological Consultants Ltd. personnel.

***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2024. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.

544070; 1 / 35

Aquifer Tests

Alias IDs

2445868

AEPA WellId: 297529

AEPA WellReportId: 297529

AEPA GicWellId: 297529

1) October 10, 2024, "AS IS"; no warranty either expressed or implied. vist tgwc.com for additional details

Sturgeon County, 2023 to 2024 Groundwater Monitoring Report

Calahoo Resource Extraction District, Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, MR-0224.23

HCL GPS — 10TM Resource NAD83, * HCL DEM

RTU

REMOTE TELEMETRY UNIT

HCL

B - 141

MW01-08
AEPA - Water Well Drilling Report



Water Well Drilling Report

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GIC Well ID 297529
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2001/09/27

GOWN ID

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.

Well Identification and Location										Measurement in Metric	
Owner Name	Address			Town		Province		Country	Postal Code		
STURGEON, COUNTY OF	MORINVILLE										
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
NE		24	54	27	4						
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)						
m from					Latitude 53.683412 Longitude -113.842480					Elevation m	
m from					How Location Obtained					How Elevation Obtained	
					Not Verified					Not Obtained	

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

Formation Log			Measurement in Metric
Depth from ground level (m)	Water Bearing	Lithology Description	
0.30		Black Topsoil	
1.83		Brown Clay	
2.44		Sand & Gravel	
12.80		Mixed Clay & Rocks	
14.33		Sand & Gravel	
14.63		Brown 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	
14.63 m		2001/08/15	2001/08/15	
Borehole				
Diameter (cm)	From (m)	To (m)		
0.00	0.00	14.63		
Surface Casing (if applicable)		Well Casing/Liner		
Plastic				
Size OD :	15.24 cm	Size OD :	0.00 cm	
Wall Thickness :	1.270 cm	Wall Thickness :	0.000 cm	
Bottom at :	13.11 m	Top at :	0.00 m	
		Bottom at :	0.00 m	
Perforations				
From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval(cm)
Perforated by				
Annular Seal Bentonite Chips/Tablets				
Placed from 0.00 m to 12.19 m				
Amount				
Other Seals				
Type		At (m)		
Screen Type Stainless Steel				
Size OD : 12.70 cm				
From (m)	To (m)	Slot Size (cm)		
13.11	14.63	0.030		
Attachment Attached To Casing				
Top Fittings Coupler		Bottom Fittings Plug		
Pack				
Type Silica Sand		Grain Size #3		
Amount 300.00 Pounds				

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well UNKNOWN NA DRILLER	Certification No 1
Company Name MAR-WAYNE WATER WELL DRILLING SERVICES LTD.	Copy of Well report provided to owner Date approval holder signed

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Owner Name		Address		Town		Province		Country		Postal Code	
STURGEON, COUNTY OF		MORINVILLE									
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
NE		24	54	27	4						
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)						
m from					Latitude 53.683412 Longitude -113.842480					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 cm										
Is Artesian Flow										Is Flow Control Installed
Rate L/min										Describe
Recommended Pump Rate L/min										Pump Installed
Recommended Pump Intake Depth (From TOC) m										Depth m
										Type
										Make
										H.P.
										Model (Output Rating)
Did you Encounter Saline Water (>4000 ppm TDS)										Depth m
Gas										Well Disinfected Upon Completion
Remedial Action Taken										Depth m
										Geophysical Log Taken
										Submitted to ESRD
Additional Comments on Well										Sample Collected for Potability
										Submitted to ESRD
DRILLER REPORTS DISTANCE FROM TOP OF CASING TO GROUND LEVEL: 39 CMS. VILLENEUVE GRAVEL STUDY.										

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
	L	

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
UNKNOWN NA DRILLER	1
Company Name	Copy of Well report provided to owner
MAR-WAYNE WATER WELL DRILLING SERVICES LTD.	Date approval holder signed

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MW01-08
Chemical Analysis Results (June 7, 2024)



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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011537 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-20
Sample Date	May 02, 2024
Sample Time	15:25
Sample Location	M37490.031431
Sample Description	MW01-08 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	7.29	0.05		
Sulfur	Dissolved	mg/L	81.9	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	0.003	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0005	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.100	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.084	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	<0.00001	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	<0.0001	0.0001		
Copper	Dissolved	mg/L	<0.0002	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.091	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	<0.0005	0.0005		
Selenium	Dissolved	mg/L	<0.0002	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	0.901	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0121	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	<0.001	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	25	5	15	Above AO
Turbidity		NTU	8.5	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.91	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	20.7			
Electrical Conductivity	at 25 °C	µS/cm	1310	1		
Calcium	Dissolved	mg/L	154	0.2		
Magnesium	Dissolved	mg/L	34.8	0.2		
Sodium	Dissolved	mg/L	105	0.4	200	Below AO

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Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Reference Number	1736660-20
Sample Date	May 02, 2024
Sample Time	15:25
Sample Location	M37490.031431
Sample Description	MW01-08 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	6.4	0.4		
Iron	Dissolved	mg/L	1.47	0.01	0.3	Above AO
Manganese	Dissolved	mg/L	1.06	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	3.1	0.4	250	Below AO
Fluoride		mg/L	0.16	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.58	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	0.58	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	246	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	701			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	575	5		
Total Dissolved Solids	Calculated	mg/L	894	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	529			
Ionic Balance	Dissolved	%	92			

Approved by:

Anthony Neumann

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
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Quality Control

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17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011537
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460024 - Mercury (Dissolved) in water												
Blank	6479008	Jun 05, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479012	Jun 05, 2024	Mercury	mg/L	0.000094						7e-005 - 0.00013	yes
Control Sample	6479011	Jun 05, 2024	Mercury	mg/L	0.000019						6e-006 - 3.6e-005	yes
Replicate	6479013	Jun 05, 2024	Mercury	mg/L	<0.000005			<0.000005		0	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Company: HCL

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Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011537
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479115	Jun 05, 2024	Aluminum	µg/L	15			17		16.97	10 % or 11 Abs	yes
Replicate	6479115	Jun 05, 2024	Antimony	µg/L	0.4			0.4		6.23	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Arsenic	µg/L	0.8			0.9		2.96	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Barium	µg/L	75			75		0.09	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Boron	µg/L	85			86		0.93	10 % or 4.4 Abs	yes
Replicate	6479115	Jun 05, 2024	Cadmium	µg/L	0.10			0.12		18.99	10 % or 0.022 Abs	yes
Replicate	6479115	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Cobalt	µg/L	0.6			0.6		0.05	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Copper	µg/L	1.1			1.2		7.9	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Lead	µg/L	<0.1			0.1		2.13	10 % or 0.22 Abs	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3
Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011537
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479115	Jun 05, 2024	Lithium	µg/L	55			55		0.61	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Nickel	µg/L	3.2			3.4		5.33	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Selenium	µg/L	1.2			1.2		3.21	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Strontium	µg/L	967			960		0.74	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479115	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Titanium	µg/L	<0.5			0.9		53.68	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Uranium	µg/L	15.6			15.6		0.48	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Vanadium	µg/L	0.2			0.3		13.69	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Zinc	µg/L	4			4		7.72	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479186	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011537
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed

Physical and Aggregate Properties - Continued

Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Replicate	6479215	Jun 05, 2024	Turbidity	NTU	1.8			1.7		2.31	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478743	Jun 05, 2024	pH		7.77			7.76		0.17	0 % or 0.1 Abs	yes
Replicate	6478743	Jun 05, 2024	Electrical Conductivity	dS/m	1.23			1.23		0	10 % or 0.002 Abs	yes
Replicate	6478743	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478743	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	Bicarbonate	mg/L	649			653		0.66	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478743	Jun 05, 2024	T-Alkalinity	mg/L	532			536		0.66	10 % or 5 Abs	yes

Batch: 2460219 - Anions (Routine) by Ion Chromatography

Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479564	Jun 05, 2024	Fluoride	mg/L	10.0						9.39 - 10.59	yes

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and Tp 054, R 01, W5M
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Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011537
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479564	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479564	Jun 05, 2024	Nitrite - N	mg/L	9.77						9.01 - 10.99	yes
Control Sample	6479564	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479565	Jun 05, 2024	Fluoride	mg/L	5.00						4.56 - 5.22	yes
Control Sample	6479565	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479565	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479565	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479566	Jun 05, 2024	Fluoride	mg/L	0.51						0.45 - 0.57	yes
Control Sample	6479566	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479566	Jun 05, 2024	Nitrite - N	mg/L	0.502						0.455 - 0.557	yes
Control Sample	6479566	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.00						0.85 - 1.15	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrate - N	mg/L	0.58			0.58		0.19	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Batch: 2460053 - Chloride in Water												
Blank	6479101	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479098	Jun 05, 2024	Chloride	mg/L	2030						1847.4 - 2256	yes
Control Sample	6479099	Jun 05, 2024	Chloride	mg/L	81.2						74.9 - 86.9	yes
Control Sample	6479100	Jun 05, 2024	Chloride	mg/L	15.4						13.3 - 16.5	yes
Replicate	6479102	Jun 05, 2024	Chloride	mg/L	3.9			4.0		1.53	10 % or 0.5 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes

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Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011537
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

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Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011537 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-20; 9343652: Sample received at 12.1 °C



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	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011537
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

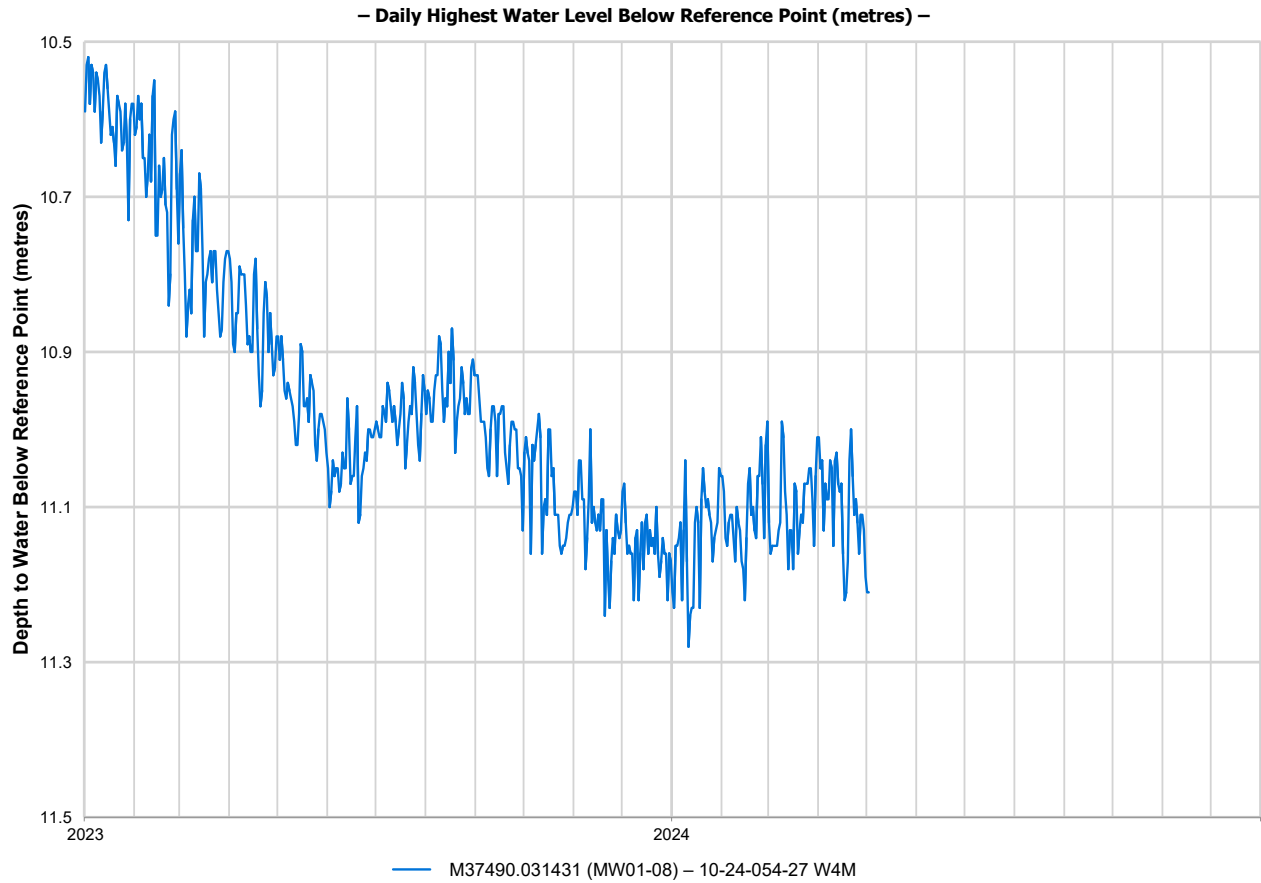
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

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MW01-08
2023 - 2024 Hydrograph



MW04-01

01-16-054-26 W4M
(M39227.477799)



Spatial Location:

Easting: **81,525**

Northing: **5,943,856**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **667.9**

(elevation accuracy Surveyed (other))

Date Completed: **March 18, 2004**

Depth Drilled (m): **21.6**

Completion Interval (m): **6.1 – 19.8 ***

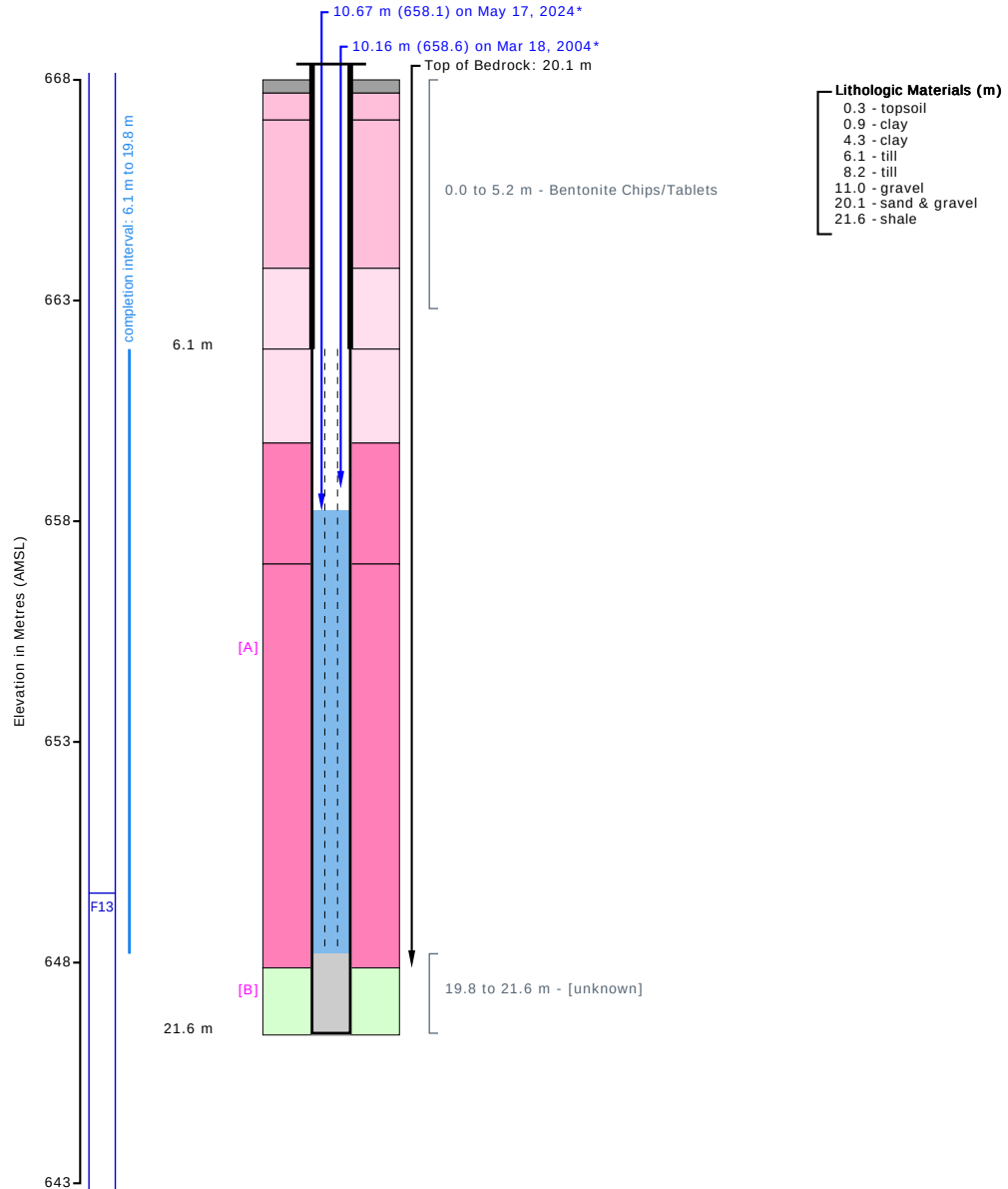
(* TGWC determined value)

Earliest Water Level (m): **10.16 – March 18, 2004**

Most Recent Water Level (m): **10.67 – May 17, 2024 @ 11:30**

GIC ID: **1270001**

MW04-01 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		F13 - Lower Horseshoe Canyon Formation	
	Fine Grained			
	Coarse Grained			
Bedrock	Fine Grained			
	Coarse Grained			
	Other			

Summary	
TGWC ID: M39227.477799	
Well Name: MW04-01	
Legal Location: 01-16-054-26 W4M	
Casing (OD): 60.5 mm; Plastic (2.4")	
Casing Stick-Up: 0.9 m (not drawn to scale)	
Completion [A]: 6.1 to 19.8 m; Slotted	
Construction [B]: 19.8 to 21.6 m; Plugged; [unknown]	
Water Level (recent): 10.67 m (658.1 m AMSL) on May 17, 2024 @ 11:30 - Reference Point: Top of Casing	
Water Level (oldest): 10.16 m (658.6 m AMSL) on Mar 18, 2004 - Reference Point: Top of Casing	

* Water-Level Measurements are measured from reference point listed.
 NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (<http://www.hcl.ca>) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
 Drawn: October 10, 2024 @ 12:20 --- <https://www.hcl.ca>

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Owner: *Sturgeon County*
9613-100 St, Morinville, AB T8R 1L9

Contractor: *Elk Point Drilling Corp.*
Name: *MW04-01*

Field Action: *Confirmed - Physically, July 13, 2009*
Work Type: *Piezometer*
Drilling Method: *Rotary*
Proposed Use: *Monitoring*
Completion Type: *Casing/Open Hole*

Date Started: *March 18, 2004*
Date Completed: *March 18, 2004*
Well Status: *Observation*
Feature Class: *Piezometer*

01-16-054-26 W4M

Easting (m): *81,525.00*¹
Northing (m): *5,943,856.00*¹
Elevation (m): *667.9*²

M39227.477799

Elog Taken: *Yes*
Gamma Taken: *No*
Flowing: *No*
Presence of Gas: *No*

Stick Up (m): *0.9*
544075; core; 2024-06-11

General Details

* TGWC calculated value

Depth Completed (m)*: *19.8*
Depth Drilled (m): *21.6*
Sand & Gravel Thickness (m): *2.7 (total) – 0.0 (below 15 m) **
Plugged / Backfilled (m): *19.8 – 21.6*
Most Recent Water Level (m): *10.67 m – May 17, 2024*

Top of Bedrock (m): *20.12 **
Completion Interval (m): *6.1 – 19.8 **

Completion Details

Surface Casing: *Plastic – 60.5 mm (O.D.) x 5.80 mm (thick) x 6.1 m (bottom)*

Screen Material: *[unknown] – ([unknown])*
Fittings: *Top: [unknown] – Bottom: Washdown*

Intervals

Slotted: *6.1 to 19.8 m - 0.010 x 2 Inches - Method: Machine*
Bentonite Chips/Tablets: *0.0 to 5.2 m*
[unknown]: 19.8 to 21.6 m

Chemistry Summary Details (mg/L, except as noted)

(recently sampled first)

Sampling Details: *May 24, 2024 @ 09:35*
Report Date: *June 7, 2024 - Element Materials Technology Canada Inc. (1736660-25)*

Constituent

Result

Conductivity (µS/cm): *1620*

Total Dissolved Solids: *1150*

Hardness (as CaCO3): *887*

T-Alkalinity (as CaCO3): *484*

P-Alkalinity (as CaCO3): *< 5*

Nitrate + Nitrite as N: *0.44*

Total Suspended Solids:

Temperature (°C): *19.9*

Constituent

Result

Nitrate as N: *0.44*

Nitrite as N: *< 0.005*

pH (pH Unit): *7.77*

Colour (TCU): *25*

Ion Balance (%): *98*

Total Coliforms:**:

Fecal Coliforms:**:

Escherichia coli:**:

Constituent

Result

Turbidity (NTU): *26.0*

Fluoride: *0.26*

Carbonate: *< 6*

Bicarbonate: *590*

Hydroxide: *< 5*

Total Iron:

Total Mn:

Constituent

Extractable

Dissolved

Calcium: *239*

Chloride: *6.0*

Iron: *< 0.01*

Manganese: *0.013*

Aluminum: *< 0.002*

Arsenic: *0.0004*

Barium: *0.017*

Beryllium: *< 0.0001*

Cadmium: *0.00013*

Chromium: *< 0.0005*

Cobalt: *< 0.0001*

Sulfate: *496*

Constituent

Extractable

Dissolved

Mercury: *< 0.000005*

Molybdenum: *< 0.001*

Magnesium: *70.2*

Sodium: *42.9*

Potassium: *6.3*

Vanadium: *< 0.0001*

Strontium: *0.968*

Nickel: *0.0036*

Zinc: *0.015*

Copper: *0.0014*

Lead: *< 0.0001*

Uranium: *0.0077*

Extractable - unfiltered
Dissolved - filtered

Comments: *Sample collected by Hydrogeological Consultants Ltd. personnel.*

Note: Constituents have been compared to the maximum acceptable concentration, Health Canada. 2024.
Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy
Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario. 544075; 1 / 38

Aquifer Tests

Alias IDs

2576450

AEPA WellId: *1270001*
AEPA WellReportId: *10781883*
AEPA GicWellId: *1270001*

1 HCL GPS — 10TM Resource NAD83, * Surveyed (other)

RTU

REMOTE TELEMETRY UNIT

HCL

B - 158

(1) October 10, 2024, "AS IS"; no warranty either expressed or implied. visit [tgwc.com](https://www.tgwc.com) for additional details

Sturgeon County, 2023 to 2024 Groundwater Monitoring Report
Calahoo Resource Extraction District, Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, MR-0224.23

MW04-01
AEPA - Water Well Drilling Report



Water Well Drilling Report

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GIC Well ID 1270001
GoA Well Tag No.
Drilling Company Well ID
Date Report Received

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	
YELLOWHEAD AGGRATES		7731 - 18 STREET		EDMONTON		AB		CA	T6P 1P9	
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description	
	1	16	54	26	4				#04-01	
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation
_____ m from _____					Latitude 53.658517 Longitude -113.765810					668.73 m
_____ m from _____					How Location Obtained					How Elevation Obtained
					Not Verified					Surveyed GPS <1m

Drilling Information	
Method of Drilling	Type of Work
Rotary	Piezometer
Proposed Well Use	
Monitoring	

Formation Log			Measurement in Metric
Depth from ground level (m)	Water Bearing	Lithology Description	
0.30		Black Loamy Topsoil	
0.91		Brown Clay	
4.27		Brown Clay	
6.10		Brown Sandy Till	
8.23		Gray Sandy Till	
10.97		Gravel	
20.12		Sand & Gravel	
21.64		Blue Gray 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	
		2004/03/18	2004/03/18	
Borehole				
Diameter (cm)	From (m)	To (m)		
Surface Casing (if applicable)		Well Casing/Liner		
Plastic		Unknown		
Size OD :	6.05 cm	Size OD :		
Wall Thickness :	0.584 cm	Wall Thickness :		
Bottom at :	6.10 m	Top at :		
		Bottom at :		
Perforations				
From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval (cm)
6.10	19.81	0.025		5.08
Perforated by Machine				
Annular Seal Bentonite Chips/Tablets				
Placed from 0.00 m to 5.18 m				
Amount				
Other Seals				
Type		At (m)		
Screen Type				
Size OD : cm				
From (m)	To (m)	Slot Size (cm)		
Attachment				
Top Fittings		Bottom Fittings Washdown		
Pack				
Type Silica Sand		Grain Size 10/20		
Amount 1250.00 Pounds				

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
GERALD TOPILKA	3490AD
Company Name	Copy of Well report provided to owner Date approval holder signed
ELK POINT DRILLING CORP.	



Water Well Drilling Report

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

GIC Well ID 1270001
GoA Well Tag No.
Drilling Company Well ID
Date Report Received

GOWN ID

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Well Identification and Location										Measurement in Metric	
Owner Name		Address			Town		Province		Country	Postal Code	
YELLOWHEAD AGGRATES		7731 - 18 STREET			EDMONTON		AB		CA	T6P 1P9	
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
	1	16	54	26	4				#04-01		
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation	
_____ m from					Latitude 53.658517 Longitude -113.765810					668.73 m	
_____ m from					How Location Obtained					How Elevation Obtained	
					Not Verified					Surveyed GPS <1m	

Additional Information										Measurement in Metric
Distance From Top of Casing to Ground Level _____ 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
Gas _____										Well Disinfected Upon Completion _____
Remedial Action Taken _____										Geophysical Log Taken Electric _____
										Submitted to ESRD _____
Additional Comments on Well _____										Sample Collected for Potability _____
										Submitted to ESRD _____
CASING IS 36" ABOVE GROUND LEVEL AND PIEZOMETER PIPE PROTECTED WITH LOCKABLE STEEL PROTECTOR PIPE										
N: 5949083.510 E: 317243.040 Z12 GL = 667.65M TOC = 668.64M										

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
	L	

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
GERALD TOPILKA	3490AD
Company Name	Copy of Well report provided to owner
ELK POINT DRILLING CORP.	Date approval holder signed

Printed on 10/10/2024 12:17:44 PM

Page: 2 / 2

MW04-01
Chemical Analysis Results (June 7, 2024)



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Page 1 of 11

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011542 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-25
Sample Date	May 24, 2024
Sample Time	09:35
Sample Location	M39227.477799
Sample Description	MW04-01 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	8.74	0.05		
Sulfur	Dissolved	mg/L	165	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0004	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.017	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.102	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	0.00013	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	<0.0001	0.0001		
Copper	Dissolved	mg/L	0.0014	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.090	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0036	0.0005		
Selenium	Dissolved	mg/L	<0.0002	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	0.968	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0077	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	0.015	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	25	5	15	Above AO
Turbidity		NTU	26.0	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.77	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	19.9			
Electrical Conductivity	at 25 °C	µS/cm	1620	1		
Calcium	Dissolved	mg/L	239	0.2		
Magnesium	Dissolved	mg/L	70.2	0.2		
Sodium	Dissolved	mg/L	42.9	0.4	200	Below AO

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011542 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-25
Sample Date	May 24, 2024
Sample Time	09:35
Sample Location	M39227.477799
Sample Description	MW04-01 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	6.3	0.4		
Iron	Dissolved	mg/L	<0.01	0.01	0.3	Below AO
Manganese	Dissolved	mg/L	0.013	0.005	0.02 AO; 0.12 MAC	Below AO
Chloride	Dissolved	mg/L	6.0	0.4	250	Below AO
Fluoride		mg/L	0.26	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.44	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	0.44	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	496	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	590			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	484	5		
Total Dissolved Solids	Calculated	mg/L	1150	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	887			
Ionic Balance	Dissolved	%	98			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

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Quality Control

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17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3
Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011542
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460394 - Mercury (Dissolved) in water												
Blank	6479950	Jun 06, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479949	Jun 06, 2024	Mercury	mg/L	0.000092						7e-005 - 0.00013	yes
Control Sample	6479948	Jun 06, 2024	Mercury	mg/L	0.000020						6e-006 - 3.6e-005	yes
Replicate	6479951	Jun 06, 2024	Mercury	mg/L	<0.000005			<0.000005		0	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011542
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011542
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479115	Jun 05, 2024	Aluminum	µg/L	15			17		16.97	10 % or 11 Abs	yes
Replicate	6479115	Jun 05, 2024	Antimony	µg/L	0.4			0.4		6.23	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Arsenic	µg/L	0.8			0.9		2.96	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Barium	µg/L	75			75		0.09	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Boron	µg/L	85			86		0.93	10 % or 4.4 Abs	yes
Replicate	6479115	Jun 05, 2024	Cadmium	µg/L	0.10			0.12		18.99	10 % or 0.022 Abs	yes
Replicate	6479115	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Cobalt	µg/L	0.6			0.6		0.05	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Copper	µg/L	1.1			1.2		7.9	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Lead	µg/L	<0.1			0.1		2.13	10 % or 0.22 Abs	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3
Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011542
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479115	Jun 05, 2024	Lithium	µg/L	55			55		0.61	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Nickel	µg/L	3.2			3.4		5.33	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Selenium	µg/L	1.2			1.2		3.21	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Strontium	µg/L	967			960		0.74	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479115	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Titanium	µg/L	<0.5			0.9		53.68	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Uranium	µg/L	15.6			15.6		0.48	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Vanadium	µg/L	0.2			0.3		13.69	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Zinc	µg/L	4			4		7.72	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479186	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011542 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Replicate	6479215	Jun 05, 2024	Turbidity	NTU	1.8			1.7		2.31	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478743	Jun 05, 2024	pH		7.77			7.76		0.17	0 % or 0.1 Abs	yes
Replicate	6478743	Jun 05, 2024	Electrical Conductivity	dS/m	1.23			1.23		0	10 % or 0.002 Abs	yes
Replicate	6478743	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478743	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	Bicarbonate	mg/L	649			653		0.66	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478743	Jun 05, 2024	T-Alkalinity	mg/L	532			536		0.66	10 % or 5 Abs	yes

Batch: 2460219 - Anions (Routine) by Ion Chromatography

Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479564	Jun 05, 2024	Fluoride	mg/L	10.0						9.39 - 10.59	yes

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Quality Control

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Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011542
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479564	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479564	Jun 05, 2024	Nitrite - N	mg/L	9.77						9.01 - 10.99	yes
Control Sample	6479564	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479565	Jun 05, 2024	Fluoride	mg/L	5.00						4.56 - 5.22	yes
Control Sample	6479565	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479565	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479565	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479566	Jun 05, 2024	Fluoride	mg/L	0.51						0.45 - 0.57	yes
Control Sample	6479566	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479566	Jun 05, 2024	Nitrite - N	mg/L	0.502						0.455 - 0.557	yes
Control Sample	6479566	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.00						0.85 - 1.15	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrate - N	mg/L	0.58			0.58		0.19	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Batch: 2460053 - Chloride in Water												
Blank	6479101	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479098	Jun 05, 2024	Chloride	mg/L	2030						1847.4 - 2256	yes
Control Sample	6479099	Jun 05, 2024	Chloride	mg/L	81.2						74.9 - 86.9	yes
Control Sample	6479100	Jun 05, 2024	Chloride	mg/L	15.4						13.3 - 16.5	yes
Replicate	6479102	Jun 05, 2024	Chloride	mg/L	3.9			4.0		1.53	10 % or 0.5 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011542
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

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Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011542 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 6, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-25; 9343657: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011542
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

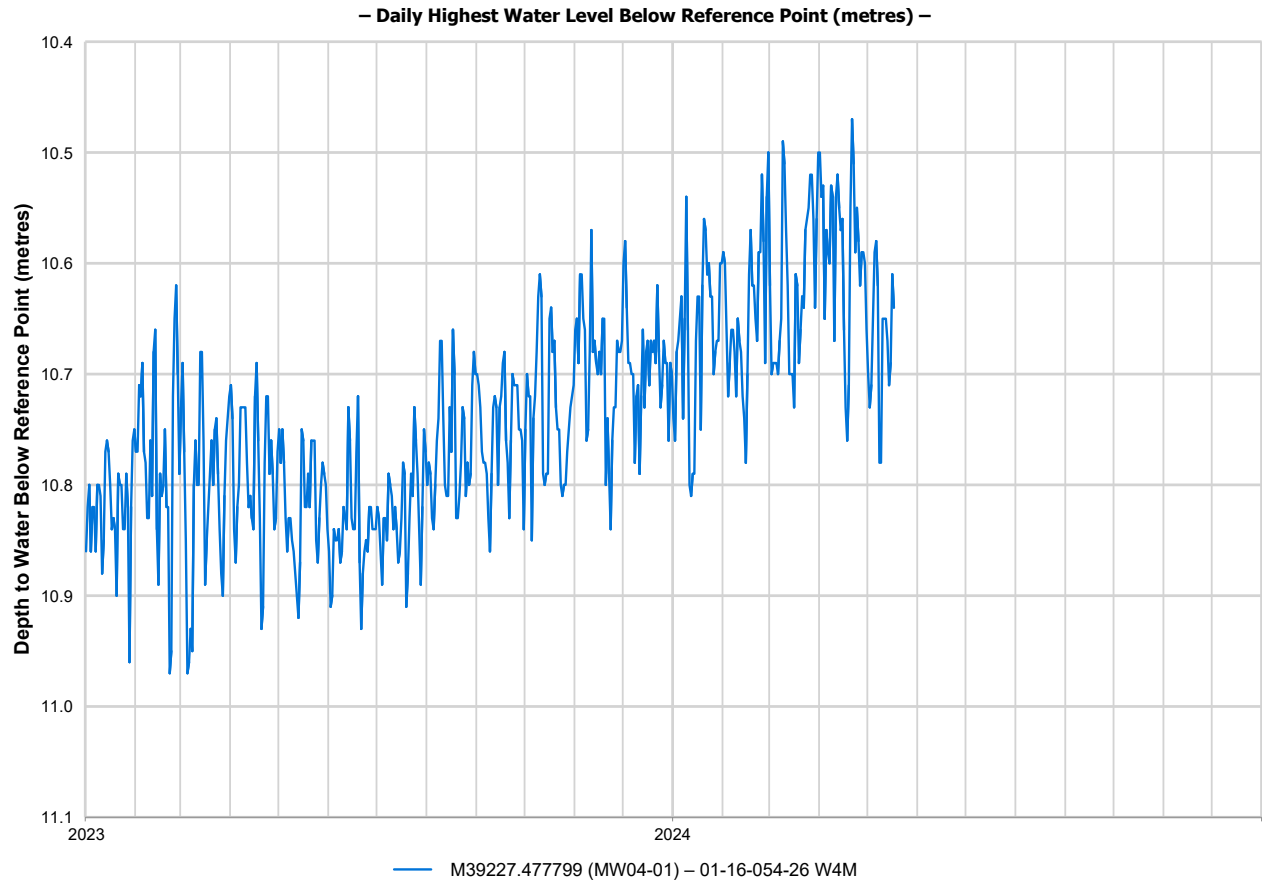
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

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MW04-01
2023 - 2024 Hydrograph



MW04-02

01-16-054-26 W4M
(M39227.477802)



Photograph taken on May 30, 2011

Spatial Location:

Easting: **81,699**

Northing: **5,944,146**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **666.9**

(elevation accuracy Surveyed (other))

Date Completed: **March 18, 2004**

Depth Drilled (m): **19.8**

Completion Interval (m): **7.6 – 18.3 ***

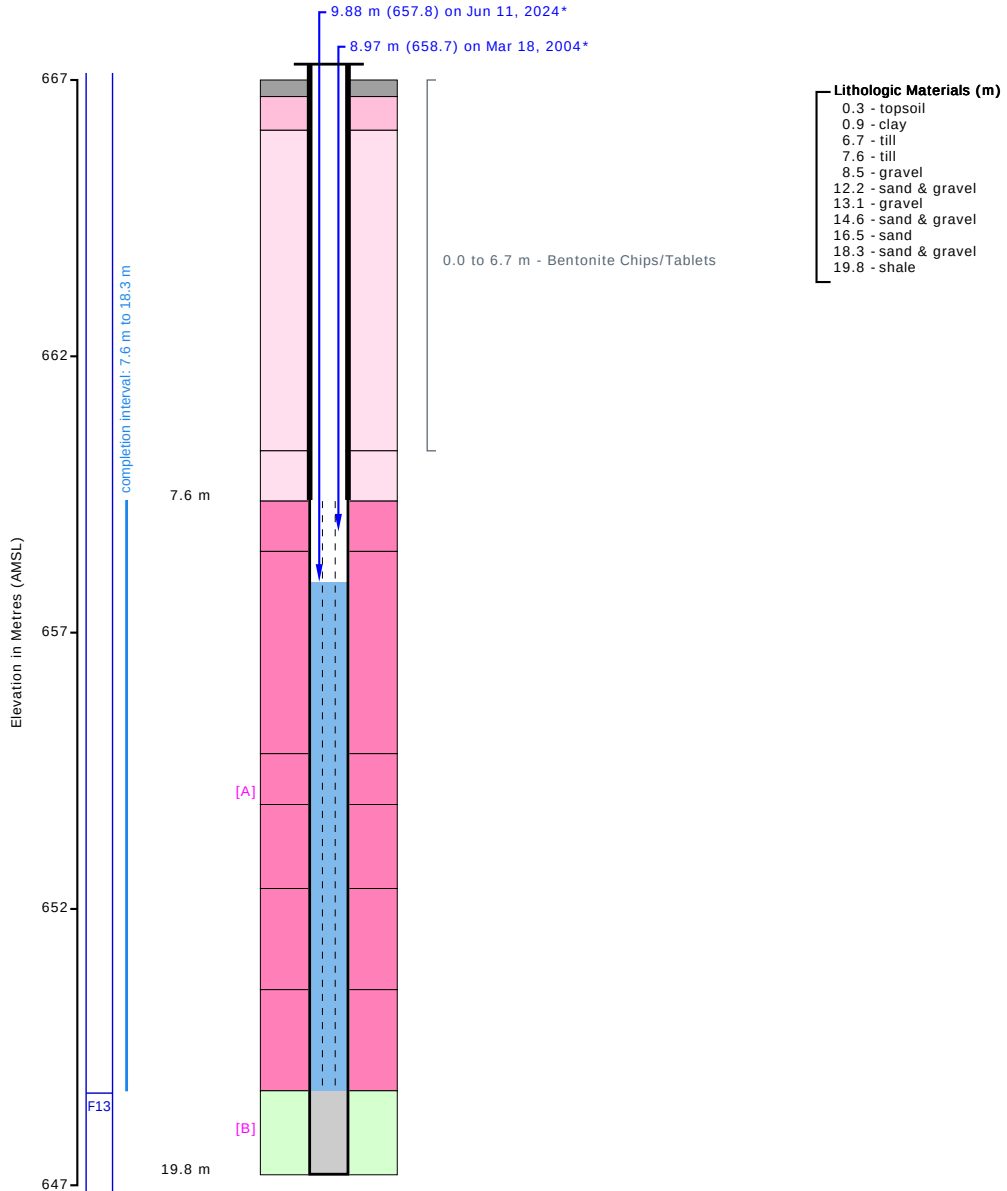
(* TGWC determined value)

Earliest Water Level (m): **8.97 – March 18, 2004**

Most Recent Water Level (m): **9.88 – June 11, 2024 @ 23:50**

GIC ID: **1270002**

MW04-02 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		F13 - Lower Horseshoe Canyon Formation	
	Fine Grained			
	Coarse Grained			
Bedrock	Fine Grained			
	Coarse Grained			
	Other			

Summary	
TGWC ID:	M39227.477802
Well Name:	MW04-02
Legal Location:	01-16-054-26 W4M
Casing (OD):	60.5 mm; Plastic (2.4")
Casing Stick-Up:	0.8 m (not drawn to scale)
Completion [A]:	7.6 to 18.3 m; Slotted
Construction [B]:	18.3 to 19.8 m; Plugged; [unknown]
Water Level (recent):	9.88 m (657.8 m AMSL) on Jun 11, 2024 @ 23:50 - Reference Point: Top of Casing
Water Level (oldest):	8.97 m (658.7 m AMSL) on Mar 18, 2004 - Reference Point: Top of Casing

* Water-Level Measurements are measured from reference point listed.
 NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (<http://www.hcl.ca>) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
 Drawn: October 10, 2024 @ 12:21 --- <https://www.hcl.ca>
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Owner: **Sturgeon County**
9613-100 St, Morinville, AB T8R 1L9

Contractor: **Elk Point Drilling Corp.**
Name: **MW04-02**

Field Action: **Confirmed - Physically, July 13, 2009**

Work Type: **Piezometer**

Drilling Method: **Rotary**

Proposed Use: **Monitoring**

Completion Type: **Casing/Open Hole**

Date Started: **March 18, 2004**

Date Completed: **March 18, 2004**

Well Status: **Observation**

Feature Class: **Piezometer**

01-16-054-26 W4M

M39227.477802

Easting (m): 81,699.00¹
Northing (m): 5,944,146.00¹
Elevation (m): 666.9²

Elog Taken: **Yes**
Gamma Taken: **No**
Flowing: **No**
Presence of Gas: **No**

Stick Up (m): 0.8
544069; 1449740; core; 2024-06-11

General Details

* TGWC calculated value

Depth Completed (m)*: 18.3
Depth Drilled (m): 19.8
Sand & Gravel Thickness (m): 10.7 (total) – 10.7 (below 15 m) *
Plugged / Backfilled (m): 18.3 – 19.8
Most Recent Water Level (m): 9.88 m – June 11, 2024

Top of Bedrock: **Surficial Water Well ***
Completion Interval (m): 7.6 – 18.3 *

Completion Details

Surface Casing: **Plastic – 60.5 mm (O.D.) x 5.80 mm (thick) x 7.6 m (bottom)**

Screen Material: **[unknown] – ([unknown])**
Fittings: **Top: Threaded – Bottom: Washdown**

Intervals

Slotted: **7.6 to 18.3 m - 0.012 x 2 Inches - Method: Machine**
Bentonite Chips/Tablets: 0.0 to 6.7 m

Chemistry Summary Details (mg/L, except as noted) (recently sampled first)

Sampling Details: **May 17, 2024 @ 10:43**
Report Date: **June 7, 2024 - Element Materials Technology Canada Inc. (1736660-19)**

Constituent

Result

Conductivity (µS/cm): 861

Total Dissolved Solids: 544

Hardness (as CaCO3): 409

T-Alkalinity (as CaCO3): 284

P-Alkalinity (as CaCO3): < 5

Nitrate + Nitrite as N: 1.71

Total Suspended Solids: 0.001

Temperature (°C): 20.6

Constituent

Result

Nitrate as N: 1.60

Nitrite as N: 0.111

pH (pH Unit): 7.91

Colour (TCU): < 5

Ion Balance (%): 101

Total Coliforms:**

Fecal Coliforms:**

Escherichia coli:**

Constituent

Result

Turbidity (NTU): 0.3

Fluoride: 0.11

Carbonate: < 6

Bicarbonate: 346

Hydroxide: < 5

Total Iron:

Total Mn:

Constituent

Extractable

Dissolved

Calcium: 112

Chloride: 4.0

Iron: < 0.01

Manganese: 0.817***

Aluminum: < 0.002

Arsenic: 0.0007

Barium: 0.024

Beryllium: < 0.0001

Cadmium: 0.00004

Chromium: < 0.0005

Cobalt: 0.0001

Sulfate: 187

Constituent

Extractable

Dissolved

Mercury: < 0.000005

Molybdenum: < 0.001

Magnesium: 31.6

Sodium: 34.4

Potassium: 5.1

Vanadium: 0.0001

Strontium: 0.721

Nickel: 0.0011

Zinc: 0.001

Copper: 0.0005

Lead: < 0.0001

Uranium: 0.0043

Extractable - unfiltered
Dissolved - filtered

Comments: **Sample collected by Hydrogeological Consultants Ltd. personnel.**

***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2024. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada. Ottawa, Ontario.

544069; 1 / 40

Aquifer Tests

Date & Time

Testing Method / Type

Depth of Test Interval

Duration (minutes) Pumping Recovery

Avg. Rate (Lpm)

NPWL (metres)

Drawdown (metres)

Pump (metres)

Q20 (m³/day)* Apparent Effective

Transmissivity (m²/day)* Apparent Aquifer Effective

1

2004-03-18

Other

[unknown]

0.0

—

—

—

Alias IDs

2576453

AEPA WellId: 1270002
AEPA WellReportId: 10781936
AEPA GicWellId: 1270002

(1) October 10, 2024, "AS IS"; no warranty either expressed or implied. visit tgwc.com for additional details

Sturgeon County, 2023 to 2024 Groundwater Monitoring Report
Calahoo Resource Extraction District, Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, MR-0224.23

544069; 1449740; core; 2024-06-11

Comments & Observations

Initial, Mar 18, 2004: Casing is 91.44 cm (36") above ground level and piezometer pipe is protected with lockable steel protector pipe. GL = 666.672 m; TOC = 667.622 m.

RTU

REMOTE TELEMETRY UNIT

HCL

B - 175

MW04-02
AEPA - Water Well Drilling Report



Water Well Drilling Report

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

GIC Well ID 1270002
GoA Well Tag No.
Drilling Company Well ID
Date Report Received

GOWN ID

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.

Well Identification and Location										Measurement in Metric
Owner Name		Address		Town		Province		Country	Postal Code	
YELLOWHEAD AGGRATES		7731 - 18 STREET				AB		CA	T6P 1P9	
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description	
	8	16	54	26	4				# 04-02	
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation
_____ m from _____					Latitude 53.661095 Longitude -113.763108					667.51 m
_____ m from _____					How Location Obtained					How Elevation Obtained
					Not Verified					Surveyed GPS <1m

Drilling Information	
Method of Drilling	Type of Work
Rotary	Piezometer
Proposed Well Use	
Monitoring	

Formation Log			Measurement in Metric
Depth from ground level (m)	Water Bearing	Lithology Description	
0.30		Black Loamy Topsoil	
0.91		Brown Clay	
6.71		Brown Till	
7.62		Gray Firm Till	
8.53		Coarse Grained Gravel	
12.19		Coarse Grained Sand & Gravel	
13.11		Coarse Grained Gravel	
14.63		Sand & Gravel	
16.46		Clayey Sand	
18.29		Sand & Gravel	
19.81		Shale	

Yield Test Summary			Measurement in Metric
Recommended Pump Rate			L/min
Test Date	Water Removal Rate (L/min)	Static Water Level (m)	
	0.00		

Well Completion			Measurement in Metric
Total Depth Drilled	Finished Well Depth	Start Date	End Date
18.29 m		2004/03/18	2004/03/18
Borehole			
Diameter (cm)	From (m)	To (m)	
15.56	0.00	18.29	
Surface Casing (if applicable)		Well Casing/Liner	
Plastic	Size OD : 6.05 cm	Unknown	
Wall Thickness : 0.579 cm	Bottom at : 7.62 m	Size OD : _____ cm	
		Wall Thickness : _____ cm	
		Top at : _____ m	
		Bottom at : _____ m	
Perforations			
From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)
7.62	18.29	0.030	Hole or Slot Interval(cm)
			5.08
Perforated by Machine			
Annular Seal Bentonite Chips/Tablets			
Placed from 0.00 m to 6.71 m			
Amount _____			
Other Seals			
Type		At (m)	
Screen Type Unknown			
Size OD : _____ cm			
From (m)	To (m)	Slot Size (cm)	
Attachment Unknown			
Top Fittings Threaded		Bottom Fittings Washdown	
Pack			
Type Silica Sand		Grain Size 10-20	
Amount 1000.00 Pounds			

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
GERALD TOPILKA	3490AD
Company Name	Copy of Well report provided to owner
ELK POINT DRILLING CORP.	Date approval holder signed



Water Well Drilling Report

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GIC Well ID 1270002
GoA Well Tag No.
Drilling Company Well ID
Date Report Received

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	
YELLOWHEAD AGGRATES		7731 - 18 STREET				AB		CA	T6P 1P9	
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description	
	8	16	54	26	4				# 04-02	
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					
m from					Latitude 53.661095 Longitude -113.763108					Elevation 667.51 m
m from					How Location Obtained					How Elevation Obtained
					Not Verified					Surveyed GPS <1m

Additional Information										Measurement in Metric
Distance From Top of Casing to Ground Level										cm
Is Artesian Flow										
Rate										L/min
Is Flow Control Installed										
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										
Gas										Depth m
Geophysical Log Taken										Electric
Remedial Action Taken										Submitted to ESRD
Sample Collected for Potability										Submitted to ESRD
Additional Comments on Well										
CASING IS 36" ABOVE GROUND LEVEL AND PIEZOMETER PIPE PROTECTED WITH LOCKABLE PROTECTOR PIPE. N: 5949363.299; E: = 317432.643 Z12; GL = 666.672M; TOC = 667.622M.										

Yield Test			Taken From Ground Level	Measurement in Metric
			Depth to water level	
Test Date	Start Time	Static Water Level		
	12:00 AM	m		
			Pumping (m)	Elapsed Time
				Minutes:Sec
				Recovery (m)
Method of Water Removal				
Type Unknown				
Removal Rate 0.00 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
	L	

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
GERALD TOPILKA	3490AD
Company Name	Copy of Well report provided to owner
ELK POINT DRILLING CORP.	Date approval holder signed

Printed on 10/10/2024 12:17:48 PM

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MW04-02
Chemical Analysis Results (June 7, 2024)



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Page 1 of 11

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011536 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-19
Sample Date	May 17, 2024
Sample Time	10:43
Sample Location	M39227.477802
Sample Description	MW04-02 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	7.12	0.05		
Sulfur	Dissolved	mg/L	62.2	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0007	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.024	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.088	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	0.00004	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	0.0001	0.0001		
Copper	Dissolved	mg/L	0.0005	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.071	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0011	0.0005		
Selenium	Dissolved	mg/L	0.0028	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	0.721	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0043	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	0.0001	0.0001		
Zinc	Dissolved	mg/L	0.001	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	<5	5	15	Below AO
Turbidity		NTU	0.3	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.91	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	20.6			
Electrical Conductivity	at 25 °C	µS/cm	861	1		
Calcium	Dissolved	mg/L	112	0.2		
Magnesium	Dissolved	mg/L	31.6	0.2		
Sodium	Dissolved	mg/L	34.4	0.4	200	Below AO

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011536 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-19
Sample Date	May 17, 2024
Sample Time	10:43
Sample Location	M39227.477802
Sample Description	MW04-02 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	5.1	0.4		
Iron	Dissolved	mg/L	<0.01	0.01	0.3	Below AO
Manganese	Dissolved	mg/L	0.817	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	4.0	0.4	250	Below AO
Fluoride		mg/L	0.11	0.05	1.5	Below MAC
Nitrate - N		mg/L	1.60	0.01	10	Below MAC
Nitrite - N		mg/L	0.111	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	1.71	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	187	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	346			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	284	5		
Total Dissolved Solids	Calculated	mg/L	544	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	409			
Ionic Balance	Dissolved	%	101			

Approved by:

Anthony Neumann, MSc
General Manager

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011536
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed

Metals Dissolved

Batch: 2460024 - Mercury (Dissolved) in water

Blank	6479008	Jun 05, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479012	Jun 05, 2024	Mercury	mg/L	0.000094						7e-005 - 0.00013	yes
Control Sample	6479011	Jun 05, 2024	Mercury	mg/L	0.000019						6e-006 - 3.6e-005	yes
Replicate	6479013	Jun 05, 2024	Mercury	mg/L	<0.000005			<0.000005		0	10 % or 3e-005 Abs	yes

Batch: 2460055 - Metals ICP-MS (Dissolved) in water

Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011536
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011536
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479115	Jun 05, 2024	Aluminum	µg/L	15			17		16.97	10 % or 11 Abs	yes
Replicate	6479115	Jun 05, 2024	Antimony	µg/L	0.4			0.4		6.23	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Arsenic	µg/L	0.8			0.9		2.96	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Barium	µg/L	75			75		0.09	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Boron	µg/L	85			86		0.93	10 % or 4.4 Abs	yes
Replicate	6479115	Jun 05, 2024	Cadmium	µg/L	0.10			0.12		18.99	10 % or 0.022 Abs	yes
Replicate	6479115	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Cobalt	µg/L	0.6			0.6		0.05	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Copper	µg/L	1.1			1.2		7.9	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Lead	µg/L	<0.1			0.1		2.13	10 % or 0.22 Abs	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3
Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011536
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479115	Jun 05, 2024	Lithium	µg/L	55			55		0.61	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Nickel	µg/L	3.2			3.4		5.33	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Selenium	µg/L	1.2			1.2		3.21	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Strontium	µg/L	967			960		0.74	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479115	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Titanium	µg/L	<0.5			0.9		53.68	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Uranium	µg/L	15.6			15.6		0.48	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Vanadium	µg/L	0.2			0.3		13.69	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Zinc	µg/L	4			4		7.72	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479186	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011536 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Replicate	6479215	Jun 05, 2024	Turbidity	NTU	1.8			1.7		2.31	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478743	Jun 05, 2024	pH		7.77			7.76		0.17	0 % or 0.1 Abs	yes
Replicate	6478743	Jun 05, 2024	Electrical Conductivity	dS/m	1.23			1.23		0	10 % or 0.002 Abs	yes
Replicate	6478743	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478743	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	Bicarbonate	mg/L	649			653		0.66	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478743	Jun 05, 2024	T-Alkalinity	mg/L	532			536		0.66	10 % or 5 Abs	yes

Batch: 2460219 - Anions (Routine) by Ion Chromatography

Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479560	Jun 05, 2024	Fluoride	mg/L	10.1						9.39 - 10.59	yes

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Quality Control

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Edmonton, AB, Canada
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Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011536
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479560	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479560	Jun 05, 2024	Nitrite - N	mg/L	9.80						9.01 - 10.99	yes
Control Sample	6479560	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479561	Jun 05, 2024	Fluoride	mg/L	4.95						4.56 - 5.22	yes
Control Sample	6479561	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479562	Jun 05, 2024	Fluoride	mg/L	0.52						0.45 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrite - N	mg/L	0.505						0.455 - 0.557	yes
Control Sample	6479562	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.01						0.85 - 1.15	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrate - N	mg/L	0.58			0.58		0.19	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Batch: 2460053 - Chloride in Water												
Blank	6479101	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479098	Jun 05, 2024	Chloride	mg/L	2030						1847.4 - 2256	yes
Control Sample	6479099	Jun 05, 2024	Chloride	mg/L	81.2						74.9 - 86.9	yes
Control Sample	6479100	Jun 05, 2024	Chloride	mg/L	15.4						13.3 - 16.5	yes
Replicate	6479102	Jun 05, 2024	Chloride	mg/L	3.9			4.0		1.53	10 % or 0.5 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes

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Quality Control

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T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
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Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011536
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

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Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011536 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-19; 9343651: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011536
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

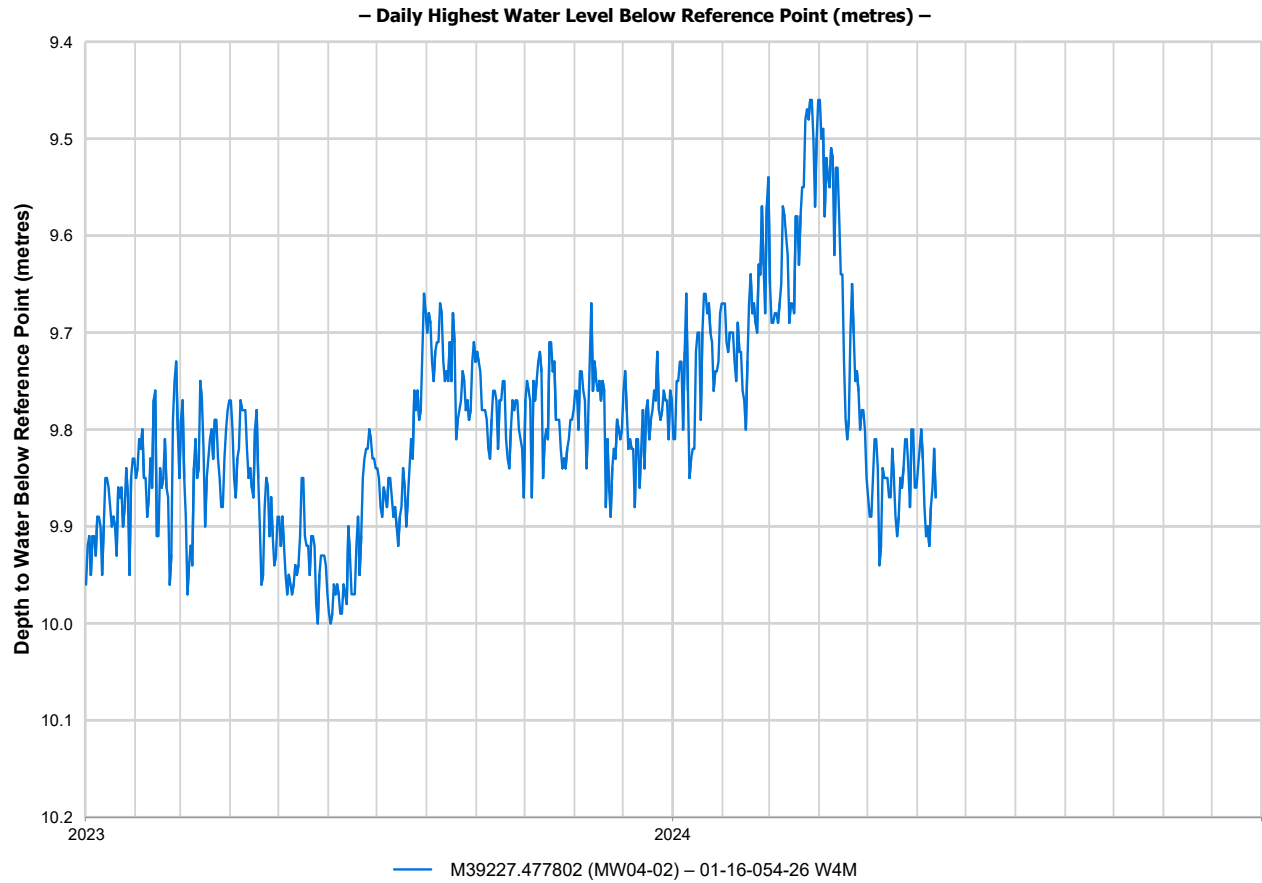
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

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MW04-02
2023 - 2024 Hydrograph



MW04-03

01-17-054-26 W4M
(M39227.477827)



Photograph taken on May 30, 2011

Spatial Location:

Easting: **80,056**

Northing: **5,943,825**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **676**

(elevation accuracy HCL DEM)

Date Completed: **March 19, 2004**

Depth Drilled (m): **17.7**

Completion Interval (m): **8.2 – 15.8 ***

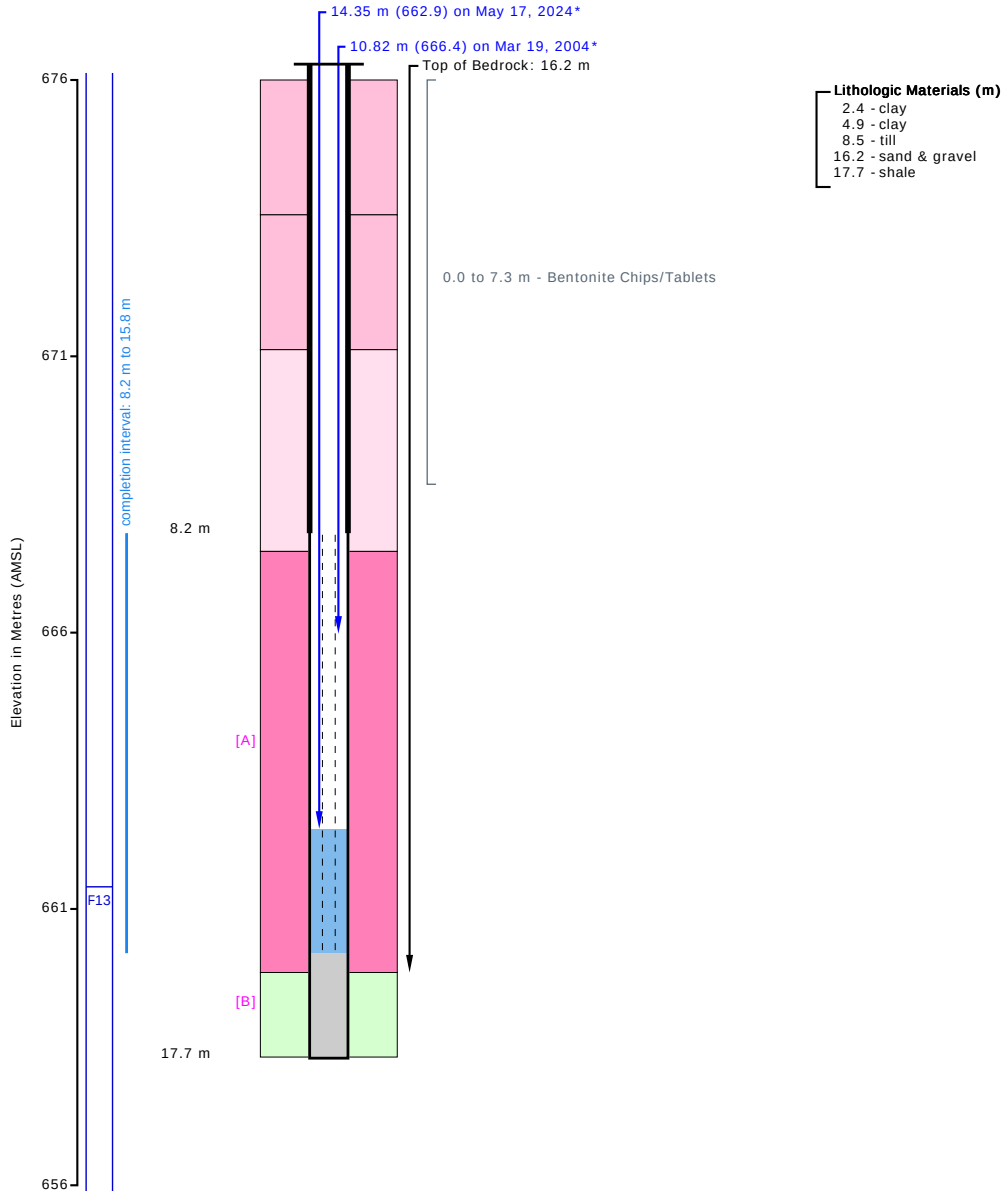
(TGWC determined value)*

Earliest Water Level (m): **10.82 – March 19, 2004**

Most Recent Water Level (m): **14.35 – May 17, 2024 @ 12:13**

GIC ID: **1270003**

MW04-03 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		F13 - Lower Horseshoe Canyon Formation	
	Fine Grained			
	Coarse Grained			
Bedrock	Fine Grained			
	Coarse Grained			
	Other			

Summary

TGWC ID: M39227.477827
 Well Name: MW04-03
 Legal Location: 01-17-054-26 W4M
 Casing (OD): 60.5 mm; Plastic (2.4")
 Casing Stick-Up: 0.8 m (not drawn to scale)
 Completion [A]: 8.2 to 15.8 m; Slotted
 Construction [B]: 15.8 to 17.7 m; Plugged; Unknown
 Water Level (recent): 14.35 m (662.9 m AMSL) on May 17, 2024 @ 12:13 - Reference Point: Top of Casing
 Water Level (oldest): 10.82 m (666.4 m AMSL) on Mar 19, 2004 - Reference Point: Top of Casing

* Water-Level Measurements are measured from reference point listed.
 NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (<http://www.hcl.ca>) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
 Drawn: October 10, 2024 @ 12:21 --- <https://www.hcl.ca>

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Owner: **Sturgeon County**

9613-100 St, Morinville, AB T8R 1L9

Contractor: **Elk Point Drilling Corp.**

Name: **MW04-03**

Field Action: **Confirmed - Physically, July 13, 2009**

Work Type: **Piezometer**

Drilling Method: **Rotary**

Proposed Use: **Monitoring**

Completion Type: **Casing/Open Hole**

Date Started: **March 19, 2004**

Date Completed: **March 19, 2004**

Well Status: **Observation**

Feature Class: **Piezometer**

General Details

* TGWC calculated value

Depth Completed (m)*: **15.8**

Top of Bedrock (m): **16.15 ***

Depth Drilled (m): **17.7**

Completion Interval (m): **8.2 – 15.8 ***

Plugged / Backfilled (m): **15.8 – 17.7 (Unknown)**

Most Recent Water Level (m): **14.35 m – May 17, 2024**

Completion Details

Surface Casing: **Plastic – 60.5 mm (O.D.) x 5.80 mm (thick) x 8.2 m (bottom)**

Screen Material: **[unknown] – ([unknown])**

Fittings: **Top: Threaded – Bottom: Washdown**

Intervals

Slotted: **8.2 to 15.8 m - 0.010 x 2 Inches - Method: Machine**

Bentonite Chips/Tablets: **0.0 to 7.3 m**

Chemistry Summary Details (mg/L, except as noted)

(recently sampled first)

Sampling Details: **May 17, 2024 @ 12:32**

Report Date: **June 7, 2024 - Element Materials Technology Canada Inc. (1736660-24)**

Constituent

Result

Conductivity (µS/cm): **1760**

Total Dissolved Solids: **1270**

Hardness (as CaCO3): **884**

T-Alkalinity (as CaCO3): **567**

P-Alkalinity (as CaCO3): **< 5**

Nitrate + Nitrite as N: **1.95**

Total Suspended Solids: **20.1**

Temperature (°C): **20.1**

Constituent

Result

Nitrate as N: **1.95**

Nitrite as N: **< 0.005**

pH (pH Unit): **7.69**

Colour (TCU): **< 5**

Ion Balance (%): **98**

Total Coliforms:**:

Fecal Coliforms:**:

Escherichia coli:**:

Constituent

Result

Turbidity (NTU): **0.3**

Fluoride: **0.18**

Carbonate: **< 6**

Bicarbonate: **691**

Hydroxide: **< 5**

Total Iron:

Total Mn:

Constituent

Extractable

Dissolved

Calcium: **251**

Chloride: **9.3**

Iron: **< 0.01**

Manganese: **< 0.005**

Aluminum: **< 0.002**

Arsenic: **0.0003**

Barium: **0.056**

Beryllium: **< 0.0001**

Cadmium: **0.00001**

Chromium: **< 0.0005**

Cobalt: **< 0.0001**

Sulfate: **510**

Constituent

Extractable

Dissolved

Mercury: **< 0.000005**

Molybdenum: **< 0.001**

Magnesium: **62.7**

Sodium: **92.2**

Potassium: **8.3**

Vanadium: **0.0001**

Strontium: **1.78**

Nickel: **0.0007**

Zinc: **< 0.001**

Copper: **0.0006**

Lead: **< 0.0001**

Uranium: **0.0308*****

Extractable - unfiltered

Dissolved - filtered

Comments: **Sample collected by Hydrogeological Consultants Ltd. personnel.**

***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2024. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa, Ontario.

544074; 1 / 34

01-17-054-26 W4M

Easting (m): **80,056.02 ¹**

Northing (m): **5,943,824.91 ¹**

Elevation (m): **676 ²**

M39227.477827

Elog Taken: **Yes**

Gamma Taken: **No**

Flowing: **No**

Presence of Gas: **No**

Stick Up (m): **0.8**

544074; core; 2024-06-11

Lithology Details

Elevation

Depth

(AMSL)

(BGL)

Lithology Descriptions

674.0

2.4

Grey Clay

671.5

4.9

Brown Clay

667.9

8.5

Brown Till

660.3

16.2

Sand & Gravel

658.7

17.7

Grey Shale

Comments & Observations

Initial, Mar 19, 2004: Casing is 91.44 cm (36") above ground level and piezometer pipe is protected with a lockable steel protector pipe. GL = 674.573 m; TOC = 675.434 m.

Alias IDs

AEPA WellId: **1270003**

AEPA WellReportId: **10782647**

AEPA GicWellId: **1270003**

544074

544074; 1 / 34

5¹HCL GPS — 10TM Resource NAD83, 2²HCL DEM

RTU

MW04-03
AEPA - Water Well Drilling Report



Water Well Drilling Report

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GIC Well ID 1270003
GoA Well Tag No.
Drilling Company Well ID
Date Report Received

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	
LAFARGE CANADA INC		8635 STADIUM ROAD			EDMONTON		AB		CA	T5J 2J1	
Location	1/4 or LSD	SEC	TPW	RGE	W of MER	Lot	Block	Plan	Additional Description		
	1	17	54	26	4				# 04 - 03		
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation	
_____ m from					Latitude 53.658454 Longitude -113.788035					675.44 m	
_____ m from					How Location Obtained					How Elevation Obtained	
					Not Verified					Surveyed GPS <1m	

Drilling Information	
Method of Drilling	Type of Work
Rotary	New Well
Proposed Well Use	
Monitoring	

Formation Log			Measurement in Metric
Depth from ground level (m)	Water Bearing	Lithology Description	
2.44		Gray Clay	
4.88		Brown Clay	
8.53		Brown Till	
16.15		Sand & Gravel	
17.68		Gray 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
15.85 m		2004/03/19	2004/03/19
Borehole			
Diameter (cm)	From (m)	To (m)	
15.56	0.00	15.85	
Surface Casing (if applicable)		Well Casing/Liner	
Plastic		Unknown	
Size OD :	6.05 cm	Size OD :	cm
Wall Thickness :	0.584 cm	Wall Thickness :	cm
Bottom at :	8.23 m	Top at :	m
		Bottom at :	m
Perforations			
From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)
8.23	15.85	0.025	
Hole or Slot Interval (cm)			
5.08			
Perforated by Machine			
Annular Seal Bentonite Chips/Tablets			
Placed from 0.00 m to 7.32 m			
Amount			
Other Seals			
Type		At (m)	
Screen Type Unknown			
Size OD : cm			
From (m)	To (m)	Slot Size (cm)	
Attachment Unknown			
Top Fittings Threaded		Bottom Fittings Washdown	
Pack			
Type Silica Sand		Grain Size 10 - 20	
Amount 750.00 Pounds			

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
GERALD TOPILKA	3490AD
Company Name	Copy of Well report provided to owner
ELK POINT DRILLING CORP.	Date approval holder signed



Water Well Drilling Report

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GIC Well ID 1270003
GoA Well Tag No.
Drilling Company Well ID
Date Report Received

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	
LAFARGE CANADA INC		8635 STADIUM ROAD			EDMONTON		AB		CA	T5J 2J1	
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
	1	17	54	26	4				# 04 - 03		
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation	
_____ m from					Latitude 53.658454 Longitude -113.788035					675.44 m	
_____ m from					How Location Obtained					How Elevation Obtained	
					Not Verified					Surveyed GPS <1m	

Additional Information										Measurement in Metric
Distance From Top of Casing to Ground Level _____ 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
Gas _____										Well Disinfected Upon Completion _____
Remedial Action Taken _____										Geophysical Log Taken Electric _____
										Submitted to ESRD _____
Additional Comments on Well _____										Sample Collected for Potability _____
										Submitted to ESRD _____
CASING IS 36" ABOVE GROUND LEVEL AND IS PROTECTED WITH A LOCKABLE STEEL PROTECTOR PIPE. N: 5949133.840; E: 315774.526 Z12; GL = 674.573M; TOC = 675.434M										

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
	L	

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
GERALD TOPILKA	3490AD
Company Name	Copy of Well report provided to owner
ELK POINT DRILLING CORP.	Date approval holder signed

Printed on 10/10/2024 12:17:52 PM

Page: 2 / 2

MW04-03
Chemical Analysis Results (June 7, 2024)



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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011541 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-24
Sample Date	May 17, 2024
Sample Time	12:32
Sample Location	M39227.477827
Sample Description	MW04-03 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	8.62	0.05		
Sulfur	Dissolved	mg/L	170	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0003	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.056	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.159	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	0.00001	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	<0.0001	0.0001		
Copper	Dissolved	mg/L	0.0006	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.173	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0007	0.0005		
Selenium	Dissolved	mg/L	0.0133	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	1.78	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0308	0.0005	0.02	Above MAC
Vanadium	Dissolved	mg/L	0.0001	0.0001		
Zinc	Dissolved	mg/L	<0.001	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	<5	5	15	Below AO
Turbidity		NTU	0.3	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.69	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	20.1			
Electrical Conductivity	at 25 °C	µS/cm	1760	1		
Calcium	Dissolved	mg/L	251	0.2		
Magnesium	Dissolved	mg/L	62.7	0.2		
Sodium	Dissolved	mg/L	92.2	0.4	200	Below AO

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011541 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Reference Number	1736660-24
Sample Date	May 17, 2024
Sample Time	12:32
Sample Location	M39227.477827
Sample Description	MW04-03 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	8.3	0.4		
Iron	Dissolved	mg/L	<0.01	0.01	0.3	Below AO
Manganese	Dissolved	mg/L	<0.005	0.005	0.02 AO; 0.12 MAC	Below AO
Chloride	Dissolved	mg/L	9.3	0.4	250	Below AO
Fluoride		mg/L	0.18	0.05	1.5	Below MAC
Nitrate - N		mg/L	1.95	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	1.95	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	510	0.9	500	Above AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	691			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	567	5		
Total Dissolved Solids	Calculated	mg/L	1270	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	884			
Ionic Balance	Dissolved	%	98			

Approved by:

Anthony Neumann, MSc
General Manager

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011541
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460394 - Mercury (Dissolved) in water												
Blank	6479950	Jun 06, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479949	Jun 06, 2024	Mercury	mg/L	0.000092						7e-005 - 0.00013	yes
Control Sample	6479948	Jun 06, 2024	Mercury	mg/L	0.000020						6e-006 - 3.6e-005	yes
Replicate	6479951	Jun 06, 2024	Mercury	mg/L	<0.000005			<0.000005		0	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011541
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011541
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479115	Jun 05, 2024	Aluminum	µg/L	15			17		16.97	10 % or 11 Abs	yes
Replicate	6479115	Jun 05, 2024	Antimony	µg/L	0.4			0.4		6.23	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Arsenic	µg/L	0.8			0.9		2.96	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Barium	µg/L	75			75		0.09	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Boron	µg/L	85			86		0.93	10 % or 4.4 Abs	yes
Replicate	6479115	Jun 05, 2024	Cadmium	µg/L	0.10			0.12		18.99	10 % or 0.022 Abs	yes
Replicate	6479115	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Cobalt	µg/L	0.6			0.6		0.05	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Copper	µg/L	1.1			1.2		7.9	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Lead	µg/L	<0.1			0.1		2.13	10 % or 0.22 Abs	yes

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Quality Control

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Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011541
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479115	Jun 05, 2024	Lithium	µg/L	55			55		0.61	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Nickel	µg/L	3.2			3.4		5.33	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Selenium	µg/L	1.2			1.2		3.21	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Strontium	µg/L	967			960		0.74	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479115	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Titanium	µg/L	<0.5			0.9		53.68	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Uranium	µg/L	15.6			15.6		0.48	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Vanadium	µg/L	0.2			0.3		13.69	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Zinc	µg/L	4			4		7.72	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479186	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Company: HCL

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Monitoring
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Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
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Report Number: 3011541
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Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed

Physical and Aggregate Properties - Continued

Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Replicate	6479215	Jun 05, 2024	Turbidity	NTU	1.8			1.7		2.31	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478743	Jun 05, 2024	pH		7.77			7.76		0.17	0 % or 0.1 Abs	yes
Replicate	6478743	Jun 05, 2024	Electrical Conductivity	dS/m	1.23			1.23		0	10 % or 0.002 Abs	yes
Replicate	6478743	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478743	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	Bicarbonate	mg/L	649			653		0.66	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478743	Jun 05, 2024	T-Alkalinity	mg/L	532			536		0.66	10 % or 5 Abs	yes

Batch: 2460219 - Anions (Routine) by Ion Chromatography

Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479564	Jun 05, 2024	Fluoride	mg/L	10.0						9.39 - 10.59	yes

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Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
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Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011541
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479564	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479564	Jun 05, 2024	Nitrite - N	mg/L	9.77						9.01 - 10.99	yes
Control Sample	6479564	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479565	Jun 05, 2024	Fluoride	mg/L	5.00						4.56 - 5.22	yes
Control Sample	6479565	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479565	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479565	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479566	Jun 05, 2024	Fluoride	mg/L	0.51						0.45 - 0.57	yes
Control Sample	6479566	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479566	Jun 05, 2024	Nitrite - N	mg/L	0.502						0.455 - 0.557	yes
Control Sample	6479566	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.00						0.85 - 1.15	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrate - N	mg/L	0.58			0.58		0.19	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Batch: 2460053 - Chloride in Water												
Blank	6479101	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479098	Jun 05, 2024	Chloride	mg/L	2030						1847.4 - 2256	yes
Control Sample	6479099	Jun 05, 2024	Chloride	mg/L	81.2						74.9 - 86.9	yes
Control Sample	6479100	Jun 05, 2024	Chloride	mg/L	15.4						13.3 - 16.5	yes
Replicate	6479102	Jun 05, 2024	Chloride	mg/L	3.9			4.0		1.53	10 % or 0.5 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes

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Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

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Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011541 Report Type: Final Report
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Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 6, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-24; 9343656: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011541
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

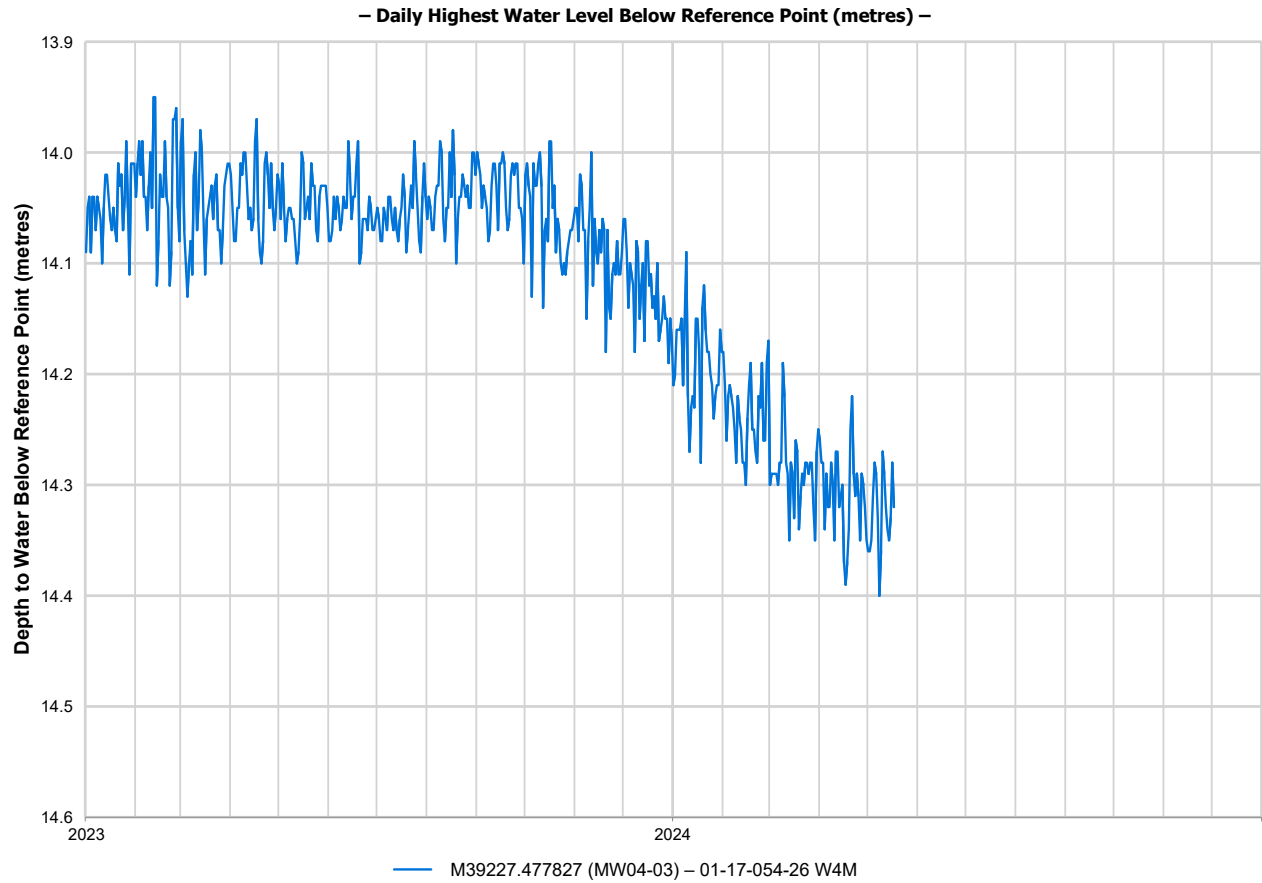
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

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MW04-03
2023 – 2024 Hydrograph



MW05-01

(2005 Observation Water Well No. 09-27)

09-27-054-27 W4M

(M39227.483721)



Spatial Location:

Easting: **73,392**

Northing: **5,947,739**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **681**

(elevation accuracy HCL DEM)

Date Completed: **April 26, 2005**

Depth Drilled (m): **17.1**

Completion Interval (m): **15.2 – 16.8 ***

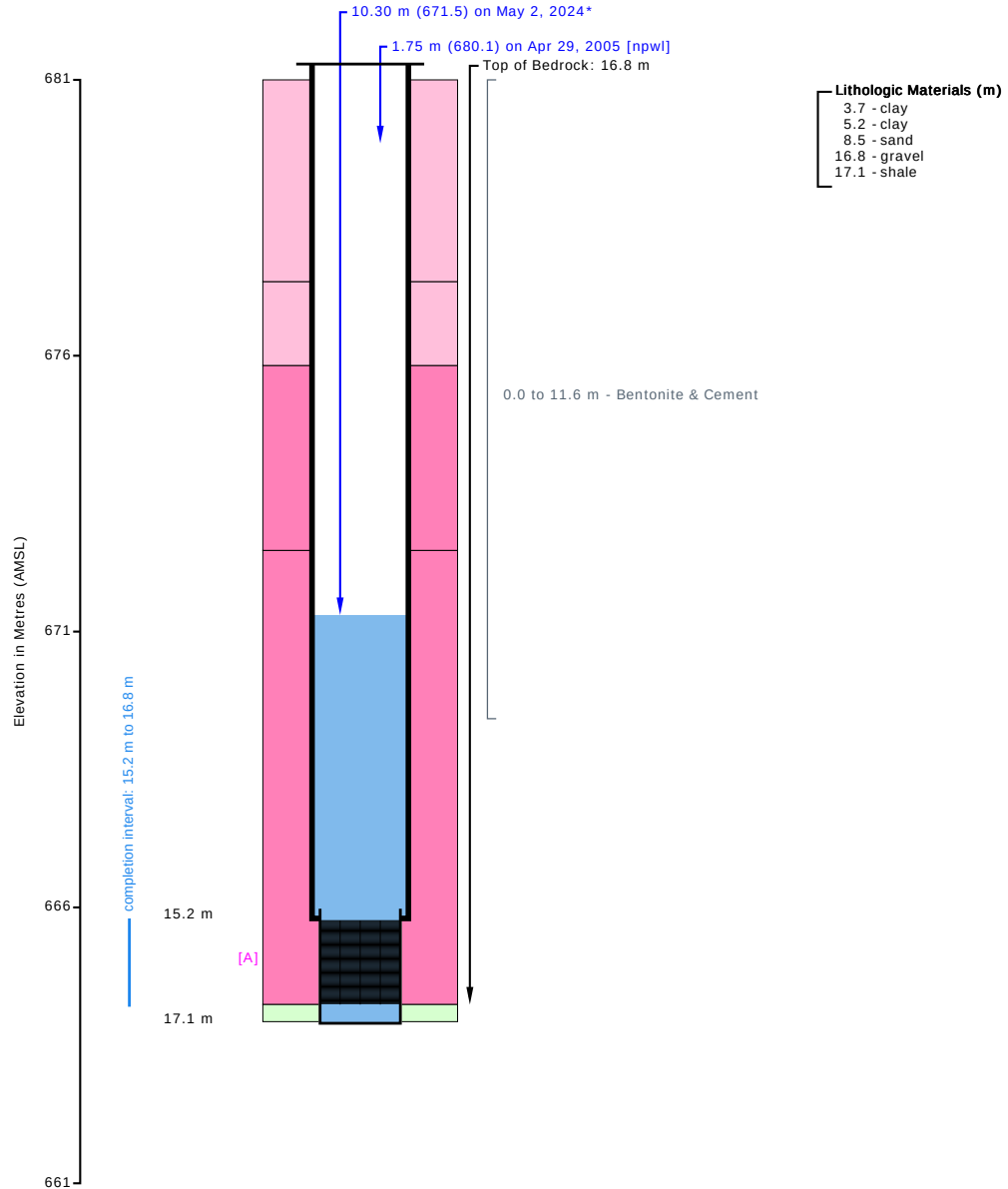
(* TGWC determined value)

Earliest Water Level (m): **1.75 – April 29, 2005**

Most Recent Water Level (m): **10.30 – May 2, 2024 @ 13:00**

GIC ID: **1495114**

MW05-01 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis			
Surficial		Unsorted		Fine Grained	 Other	Geologic Unit details not available for this location
		Fine Grained				
						
		Coarse Grained				
Bedrock		Fine Grained				
						
		Coarse Grained				

Summary

TGWC ID: M39227.483721
 Well Name: MW05-01
 Legal Location: 09-27-054-27 W4M
 Casing (OD): 152.4 mm; Plastic (6.0")
 Screen (OD): 127.0 mm; Stainless Steel (5.0")
 Casing Stick-Up: 0.6 m (not drawn to scale)
 Completion [A]: 15.2 to 16.8 m; Screened
 Water Level (recent): 10.30 m (671.5 m AMSL) on May 2, 2024 @ 13:00 - Reference Point: Top of Casing
 Water Level (oldest): 1.75 m (680.1 m AMSL) on Apr 29, 2005 [npwl]
 Top of Liner assumed to be 5% of 'non-cased' interval.

* Water-Level Measurements are measured from reference point listed.
 NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (<http://www.hcl.ca>) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
 Drawn: October 10, 2024 @ 12:21 --- <https://www.hcl.ca>

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MW05-01
AEPA - Water Well Drilling Report



Water Well Drilling Report

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

GIC Well ID 1495114
GoA Well Tag No.
Drilling Company Well ID
Date Report Received

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	
INLAND AGGREGATES		15015 - 123 AVE		EDMONTON		AB		CA	T5V 1J7	
Location	1/4 or LSD	SEC	TPW	RGE	W of MER	Lot	Block	Plan	Additional Description	
	SE	27	54	27	4					
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					
_____ m from _____					Latitude 53.690500 Longitude -113.892000					Elevation _____ m
_____ m from _____					How Location Obtained					How Elevation Obtained
					Not Verified					Not Obtained

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

Formation Log			Measurement in Metric
Depth from ground level (m)	Water Bearing	Lithology Description	
3.66		Gray Clay	
5.18		Brown Silty Clay	
8.53		Coarse Grained Sand	
16.76		Gravel	
17.07		Green Soft Shale	

Yield Test Summary			Measurement in Metric
Recommended Pump Rate			60.01 L/min
Test Date	Water Removal Rate (L/min)	Static Water Level (m)	
2005/04/29	60.01	1.75	

Well Completion				Measurement in Metric
Total Depth Drilled	Finished Well Depth	Start Date	End Date	
17.07 m		2005/04/26	2005/04/26	
Borehole				
Diameter (cm)	From (m)	To (m)		
20.32	0.00	17.07		
Surface Casing (if applicable)		Well Casing/Liner		
Plastic		Unknown		
Size OD :	15.24 cm	Size OD :		
Wall Thickness :	1.270 cm	Wall Thickness :		
Bottom at :	15.24 m	Top at :		
		Bottom at :		
Perforations				
From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval(cm)
Perforated by Unknown				
Annular Seal Bentonite & Cement				
Placed from 0.00 m to 11.58 m				
Amount				
Other Seals				
Type		At (m)		
Screen Type Stainless Steel				
Size OD : 12.70 cm				
From (m)	To (m)	Slot Size (cm)		
15.24	16.76	0.030		
Attachment Attached To Casing				
Top Fittings Coupler		Bottom Fittings Plug		
Pack				
Type Artificial		Grain Size #3 GRIT		
Amount 250.00 Pounds				

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
TERRY BERGSTREISER	41955A
Company Name	Copy of Well report provided to owner Date approval holder signed
MAR-WAYNE WATER WELL DRILLING SERVICES LTD.	

Printed on 10/10/2024 12:17:56 PM

Page: 1 / 2



Water Well Drilling Report

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GIC Well ID 1495114
GoA Well Tag No.
Drilling Company Well ID
Date Report Received

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	
INLAND AGGREGATES		15015 - 123 AVE		EDMONTON		AB		CA		T5V 1J7	
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
	SE	27	54	27	4						
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)						
_____ m from					Latitude 53.690500		Longitude -113.892000		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 50.01 cm										
Is Artesian Flow _____										Is Flow Control Installed _____
Rate _____ L/min										Describe _____
Recommended Pump Rate 60.01 L/min										Pump Installed _____ Depth _____ m
Recommended Pump Intake Depth (From TOC) 13.00 m										Type _____ Make _____ H.P. _____
										Model (Output Rating) _____
Did you Encounter Saline Water (>4000 ppm TDS) _____										Depth _____ m
Gas _____										Depth _____ m
Remedial Action Taken _____										Well Disinfected Upon Completion _____
										Geophysical Log Taken _____
										Submitted to ESRD _____
Additional Comments on Well _____										Sample Collected for Potability _____
										Submitted to ESRD _____

Yield Test			Taken From Ground Level	Measurement in Metric
			Depth to water level	
Test Date	Start Time	Static Water Level		
2005/04/29	12:00 AM	1.75 m		
Method of Water Removal			Pumping (m)	Elapsed Time Minutes:Sec
Type Pump				Recovery (m)
Removal Rate 60.01 L/min			1.75	0:00
Depth Withdrawn From 13.00 m			4.83	1:00
			6.61	2:00
			7.74	3:00
			8.50	4:00
			8.99	5:00
			9.32	6:00
			9.55	7:00
			9.71	8:00
			9.83	9:00
			9.93	10:00
			10.06	12:00
			10.15	14:00
			10.22	16:00
			10.33	20:00
			10.45	25:00
			10.53	30:00
			10.55	35:00
			10.58	40:00
			10.70	50:00
			10.75	60:00
			10.77	75:00
			10.84	90:00
			10.89	105:00
			10.92	120:00

Water Diverted for Drilling		
Water Source	Amount Taken	Diversion Date & Time
	L	

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
TERRY BERGSTREISER	41955A
Company Name	Copy of Well report provided to owner
MAR-WAYNE WATER WELL DRILLING SERVICES LTD.	Date approval holder signed

MW05-01
Chemical Analysis Results (June 7, 2024)



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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011522 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-5
Sample Date	May 02, 2024
Sample Time	13:16
Sample Location	M39227.483721
Sample Description	MW05-01 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	7.16	0.05		
Sulfur	Dissolved	mg/L	16.5	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0007	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.066	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.083	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	<0.00001	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	<0.0001	0.0001		
Copper	Dissolved	mg/L	<0.0002	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.078	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	<0.0005	0.0005		
Selenium	Dissolved	mg/L	<0.0002	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	0.771	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0028	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	<0.001	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	10	5	15	Below AO
Turbidity		NTU	3.3	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.79	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	21.1			
Electrical Conductivity	at 25 °C	µS/cm	961	1		
Calcium	Dissolved	mg/L	104	0.2		
Magnesium	Dissolved	mg/L	24.8	0.2		
Sodium	Dissolved	mg/L	84.6	0.4	200	Below AO

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011522 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Reference Number	1736660-5
Sample Date	May 02, 2024
Sample Time	13:16
Sample Location	M39227.483721
Sample Description	MW05-01 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	3.4	0.4		
Iron	Dissolved	mg/L	0.47	0.01	0.3	Above AO
Manganese	Dissolved	mg/L	0.580	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	0.7	0.4	250	Below AO
Fluoride		mg/L	0.06	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.65	0.01	10	Below MAC
Nitrite - N		mg/L	0.087	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	0.73	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	49.5	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	667			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	547	5		
Total Dissolved Solids	Calculated	mg/L	595	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	362			
Ionic Balance	Dissolved	%	92			

Approved by:

Anthony Neumann

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011522
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460024 - Mercury (Dissolved) in water												
Blank	6479008	Jun 05, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479007	Jun 05, 2024	Mercury	mg/L	0.000092						7e-005 - 0.00013	yes
Control Sample	6479006	Jun 05, 2024	Mercury	mg/L	0.000020						6e-006 - 3.6e-005	yes
Replicate	6479010	Jun 05, 2024	Mercury	mg/L	0.000009			0.000010		12.93	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011522
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011522
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479114	Jun 05, 2024	Aluminum	µg/L	<2			<2		0	10 % or 11 Abs	yes
Replicate	6479114	Jun 05, 2024	Antimony	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Arsenic	µg/L	12.5			12.4		0.38	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Barium	µg/L	19			19		0.09	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Boron	µg/L	102			102		0.06	10 % or 4.4 Abs	yes
Replicate	6479114	Jun 05, 2024	Cadmium	µg/L	<0.01			<0.01		0	10 % or 0.022 Abs	yes
Replicate	6479114	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Cobalt	µg/L	0.8			0.8		3.91	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Copper	µg/L	<0.2			<0.2		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Lead	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3
Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011522
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479114	Jun 05, 2024	Lithium	µg/L	118			119		0.43	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Nickel	µg/L	0.7			0.8		2.6	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Selenium	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Strontium	µg/L	822			826		0.52	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479114	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Titanium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Uranium	µg/L	3.7			3.7		0.74	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Vanadium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Zinc	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479184	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011522
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Blank	6479192	Jun 05, 2024	Turbidity	NTU	0.1	0.1					0.1	yes
Control Sample	6479197	Jun 05, 2024	Turbidity	NTU	1990						1847.5 - 2041.9	yes
Control Sample	6479198	Jun 05, 2024	Turbidity	NTU	4760						4441.7 - 6661.7	yes
Control Sample	6479196	Jun 05, 2024	Turbidity	NTU	149						132.1 - 162.1	yes
Control Sample	6479195	Jun 05, 2024	Turbidity	NTU	14.8						12.6 - 15.6	yes
Control Sample	6479194	Jun 05, 2024	Turbidity	NTU	1.7						1 - 2.2	yes
Replicate	6479207	Jun 05, 2024	Turbidity	NTU	11.8			12.0		1.68	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478740	Jun 05, 2024	pH		6.94			6.96		0.23	0 % or 0.1 Abs	yes
Replicate	6478740	Jun 05, 2024	Electrical Conductivity	dS/m	0.129			0.131		1.38	10 % or 0.002 Abs	yes
Replicate	6478740	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478740	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	Bicarbonate	mg/L	65			66		0.9	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478740	Jun 05, 2024	T-Alkalinity	mg/L	54			54		0.9	10 % or 5 Abs	yes

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011522 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Batch: 2460219 - Anions (Routine) by Ion Chromatography												
Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479560	Jun 05, 2024	Fluoride	mg/L	10.1						9.39 - 10.59	yes
Control Sample	6479560	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479560	Jun 05, 2024	Nitrite - N	mg/L	9.80						9.01 - 10.99	yes
Control Sample	6479560	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479561	Jun 05, 2024	Fluoride	mg/L	4.95						4.56 - 5.22	yes
Control Sample	6479561	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479562	Jun 05, 2024	Fluoride	mg/L	0.52						0.45 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrite - N	mg/L	0.505						0.455 - 0.557	yes
Control Sample	6479562	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.01						0.85 - 1.15	yes
Replicate	6479558	Jun 05, 2024	Nitrate - N	mg/L	1.70			1.69		0.55	10 % or 0.01 Abs	yes
Replicate	6479558	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes
Batch: 2460052 - Chloride in Water												
Blank	6479091	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479088	Jun 05, 2024	Chloride	mg/L	2000						1847.4 - 2256	yes
Control Sample	6479089	Jun 05, 2024	Chloride	mg/L	77.9						74.9 - 86.9	yes
Control Sample	6479090	Jun 05, 2024	Chloride	mg/L	14.7						13.3 - 16.5	yes
Replicate	6479093	Jun 05, 2024	Chloride	mg/L	0.8			0.8		5.13	10 % or 0.5 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes

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Attn: Jennifer Catt
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Project ID: MR-0224.23
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Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
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Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011522
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

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SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011522 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-5; 9343637: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011522
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

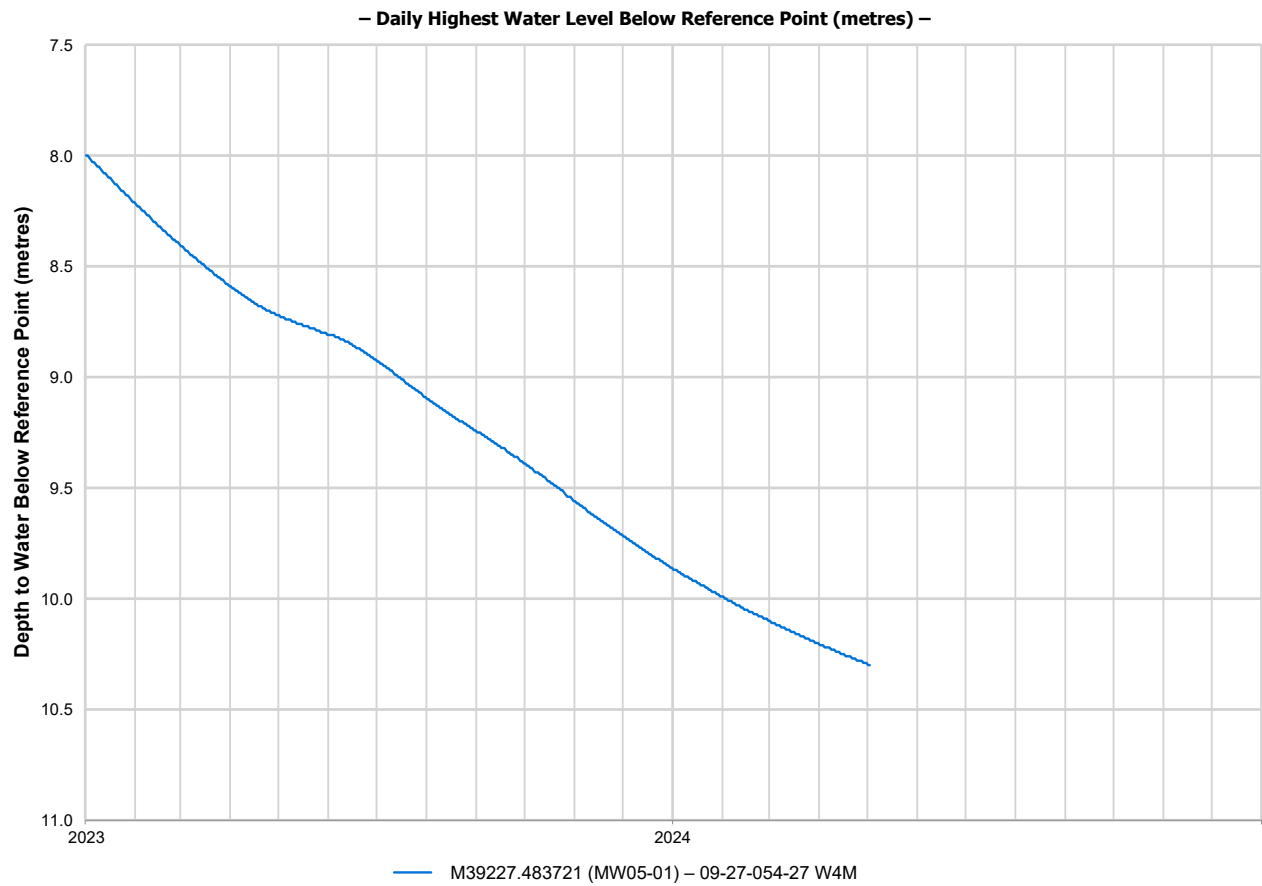
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

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MW05-01
2023 - 2024 Hydrograph



MW07-1-33

08-36-054-27 W4M
(M39859.704050)



Photograph taken on July 13, 2009

Spatial Location:

Easting: **76,750**

Northing: **5,949,371**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **667**

(elevation accuracy HCL DEM)

Date Completed: **July 24, 2007**

Depth Drilled (m): **36.6**

Completion Interval (m): **26.8 – 32.9 ***

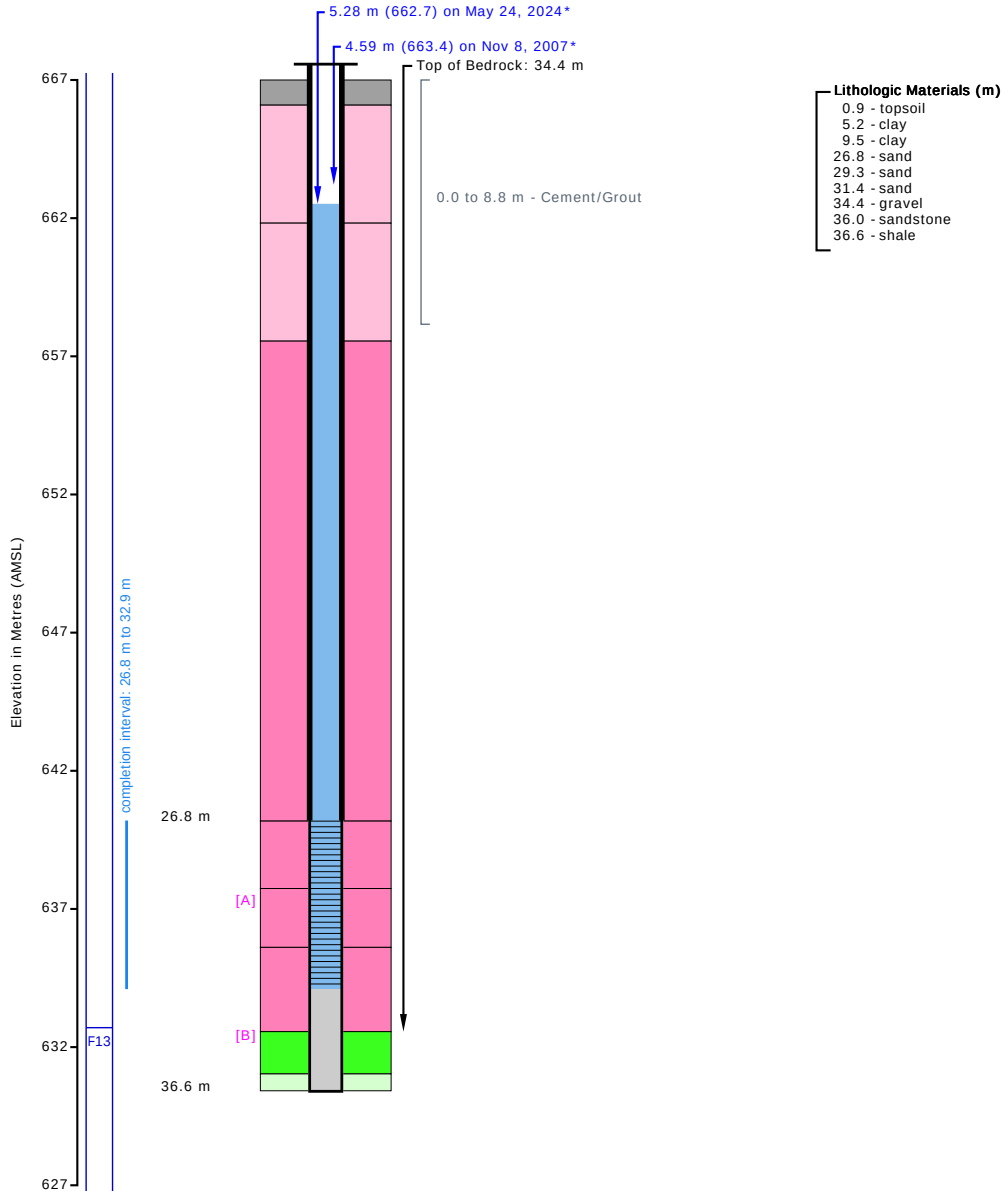
(TGWC determined value)*

Earliest Water Level (m): **4.59 – November 8, 2007**

Most Recent Water Level (m): **5.28 – May 24, 2024 @ 11:33**

GIC ID: **1420667**

MW07-1-33 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		F13 - Lower Horseshoe Canyon Formation	
	Fine Grained			
	Coarse Grained			
Bedrock	Fine Grained			
	Coarse Grained			
	Other			

Summary	
TGWC ID: M39859.704050	
Well Name: MW07-1-33	
Legal Location: 08-36-054-27 W4M	
Casing (OD): 50.8 mm; Plastic (2.0")	
Screen (OD): 50.8 mm; Plastic (2.0")	
Casing Stick-Up: 0.8 m (not drawn to scale)	
Completion [A]: 26.8 to 32.9 m; Screened	
Construction [B]: 32.9 to 36.6 m; Plugged; Unknown	
Water Level (recent): 5.28 m (662.7 m AMSL) on May 24, 2024 @ 11:33 - Reference Point: Top of Casing	
Water Level (oldest): 4.59 m (663.4 m AMSL) on Nov 8, 2007 - Reference Point: Top of Casing	
Top of Liner assumed to be 5% of 'non-cased' interval.	

* Water-Level Measurements are measured from reference point listed.
NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (<http://www.hcl.ca>) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
Drawn: October 10, 2024 @ 12:21 --- <https://www.hcl.ca>

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Owner: *Sturgeon County*
9613-100 St, Morinville, AB T8R 1L9

Contractor: *Lakeland Drilling Ltd.*
Name: *MW07-1-33*

Field Action: *Confirmed - Physically, July 13, 2009*

Work Type: *Piezometer*

Drilling Method: *Rotary*

Proposed Use: *Monitoring*

Completion Type: *Screen*

Date Started: *July 24, 2007*

Date Completed: *July 24, 2007*

Well Status: *Observation*

Feature Class: *Piezometer*

08-36-054-27 W4M

M39859.704050

Easting (m): 76,749.72 ¹

Northing (m): 5,949,370.73 ¹

Elevation (m): 667 ²

Elog Taken: *No*

Gamma Taken: *No*

Flowing: *No*

Presence of Gas: *No*

Stick Up (m): 0.8

544071; 2235002; core; 2024-06-11

General Details

* TGWC calculated value

Depth Completed (m)*: 32.9

Top of Bedrock (m): 34.44 *

Depth Drilled (m): 36.6

Completion Interval (m): 26.8 – 32.9 *

Sand & Gravel Thickness (m): 22.0 (total) – 22.0 (below 15 m) *

Plugged / Backfilled (m): 32.9 – 36.6 (Unknown)

Most Recent Water Level (m): 5.28 m – May 24, 2024

Completion Details

Surface Casing: *Plastic – 50.8 mm (O.D.) x 5.50 mm (thick) x 26.8 m (bottom)*

Screen Material: *Plastic – 50.8 mm (O.D.) (Attached To Casing)*

Fittings: *Top: Coupler – Bottom: Plug*

Intervals

Screen: 26.8 to 32.9 m - .051 cm ([unknown])

Cement/Grout: 0.0 to 8.8 m

Chemistry Summary Details (mg/L, except as noted)

(recently sampled first)

Sampling Details: *May 24, 2024 @ 11:43*

Report Date: *June 7, 2024 - Element Materials Technology Canada Inc. (1736660-21)*

Constituent

Result

Conductivity (µS/cm): 867

Total Dissolved Solids: 534

Hardness (as CaCO3): 309

T-Alkalinity (as CaCO3): 478

P-Alkalinity (as CaCO3): < 5

Nitrate + Nitrite as N: 0.52

Total Suspended Solids:

Temperature (°C): 20.8

Constituent

Result

Nitrate as N: 0.52

Nitrite as N: < 0.005

pH (pH Unit): 7.90

Colour (TCU): 25

Ion Balance (%): 92

Total Coliforms:**:

Fecal Coliforms:**:

Escherichia coli:**:

Constituent

Result

Turbidity (NTU): 7.1

Fluoride: 0.08

Carbonate: < 6

Bicarbonate: 583

Hydroxide: < 5

Total Iron:

Total Mn:

Constituent

Extractable

Dissolved

Calcium: 87.7

Chloride: 0.7

Iron: 0.79

Manganese: 0.861***

Aluminum: < 0.002

Arsenic: 0.0034

Barium: 0.055

Beryllium: < 0.0001

Cadmium: < 0.00001

Chromium: < 0.0005

Cobalt: 0.0005

Sulfate: 51.4

Constituent

Extractable

Dissolved

Mercury: < 0.000005

Molybdenum: < 0.001

Magnesium: 21.8

Sodium: 80.9

Potassium: 4.1

Vanadium: < 0.0001

Strontium: 0.648

Nickel: 0.0005

Zinc: < 0.001

Copper: < 0.0002

Lead: < 0.0001

Uranium: 0.0030

Extractable - unfiltered

Dissolved - filtered

Comments: *Sample collected by Hydrogeological Consultants Ltd. personnel.*

***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2024. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.

544071; 1 / 28

Aquifer Tests

Date & Time

Testing

Method / Type

Depth of Test

Interval

Duration (minutes)

Pumping

Recovery

Avg. Rate

(Lpm)

NPWL

(metres)

Drawdown

(metres)

Pump

(metres)

Q20 (m³/day)*

Apparent

Effective

Transmissivity (m²/day)*

Apparent

Aquifer

Effective

1

2007-07-24

[unknown]

[unknown]

Alias IDs

Z598136

* HCL GPS — 10TM Resource NAD83, * HCL DEM

AEPA WellId: 1420667

AEPA WellReportId: 11427134

AEPA GicWellId: 1420667

(1) October 10, 2024, "AS IS"; no warranty either expressed or implied. visit tgwc.com for additional details

Sturgeon County, 2023 to 2024 Groundwater Monitoring Report

Calahoo Resource Extraction District, Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, MR-0224.23

B - 227

RTU

REMOTE TELEMETRY UNIT

HCL

MW07-1-33
AEPA - Water Well Drilling Report



Water Well Drilling Report

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GIC Well ID 1420667
GoA Well Tag No.
Drilling Company Well ID
Date Report Received

GOWN ID

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.

Well Identification and Location										Measurement in Metric
Owner Name		Address		Town		Province		Country	Postal Code	
STANTEC		10160 - 112 ST		EDMONTON		AB		CA	T5K 2L6	
Location	1/4 or LSD	SEC	TPW	RGE	W of MER	Lot	Block	Plan	Additional Description	
	SE	36	54	27	4				WELL # 07-7-33	
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation _____ m
_____ m from					Latitude 53.705300 Longitude -113.843000					How Elevation Obtained
_____ m from					How Location Obtained					Not Obtained
					Not Verified					

Drilling Information	
Method of Drilling	Type of Work
Rotary	Piezometer
Proposed Well Use	
Observation	

Formation Log			Measurement in Metric
Depth from ground level (m)	Water Bearing	Lithology Description	
0.91		Black Topsoil	
5.18		Green Clay	
9.45		Gray Clay	
26.82		Salt & Pepper Sand	
29.26		Gray Coarse Grained Sand	
31.39		Gray Coarse Grained Sand	
34.44		Coarse Grained Gravel	
35.97		Fine Grained Sandstone	
36.58		Gray Shale	

Yield Test Summary			Measurement in Metric
Recommended Pump Rate _____ L/min			
Test Date	Water Removal Rate (L/min)	Static Water Level (m)	
2007/07/24			

Well Completion			Measurement in Metric
Total Depth Drilled	Finished Well Depth	Start Date	End Date
36.58 m		2007/07/24	2007/07/24
Borehole			
Diameter (cm)	From (m)	To (m)	
15.88	0.00	36.58	
Surface Casing (if applicable)		Well Casing/Liner	
Plastic		Unknown	
Size OD :	5.08 cm	Size OD :	_____ cm
Wall Thickness :	0.554 cm	Wall Thickness :	_____ cm
Bottom at :	26.82 m	Top at :	_____ m
		Bottom at :	_____ m
Perforations			
From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)
			Hole or Slot Interval(cm)
Perforated by Unknown			
Annular Seal Cement/Grout			
Placed from 0.00 m to 8.84 m			
Amount _____			
Other Seals			
Type		At (m)	
Screen Type Plastic			
Size OD : 5.08 cm			
From (m)	To (m)	Slot Size (cm)	
26.82	32.92	0.051	
Attachment Attached To Casing			
Top Fittings Coupler		Bottom Fittings Plug	
Pack			
Type Artificial		Grain Size 10-20	
Amount 42.00 Bags			

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
LEONARD MUDRYK	28916A
Company Name	Copy of Well report provided to owner
LAKELAND DRILLING LTD.	Date approval holder signed



Water Well Drilling Report

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

GIC Well ID 1420667
GoA Well Tag No.
Drilling Company Well ID
Date Report Received

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	
STANTEC		10160 - 112 ST			EDMONTON		AB		CA	T5K 2L6	
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
	SE	36	54	27	4				WELL # 07-7-33		
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation _____ m	
_____ m from					Latitude 53.705300 Longitude -113.843000					How Elevation Obtained	
_____ m from					How Location Obtained					Not Obtained	
					Not Verified						

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
Gas _____										Depth _____ m
Remedial Action Taken _____										Well Disinfected Upon Completion _____
										Geophysical Log Taken _____
										Submitted to ESRD _____
Additional Comments on Well										Sample Collected for Potability _____
										Submitted to ESRD _____
96' - 103' VERY COARSE GRAY SAND, 103' - 113' COARSE CLEAN GRAVEL, PROPOSED WELL USE - PIEZOMETER										

Yield Test			Taken From Ground Level	Measurement in Metric
			Depth to water level	
Test Date	Start Time	Static Water Level		
2007/07/24	12:00 AM	m		
			Pumping (m)	Recovery (m)
			Elapsed Time	
			Minutes:Sec	
Method of Water Removal				
Type Unknown				
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
	L	

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
LEONARD MUDRYK	28916A
Company Name	Copy of Well report provided to owner
LAKELAND DRILLING LTD.	Date approval holder signed

Printed on 10/10/2024 12:17:59 PM

Page: 2 / 2

MW07-1-33
Chemical Analysis Results (June 7, 2024)



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Page 1 of 11

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011538 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-21
Sample Date	May 24, 2024
Sample Time	11:43
Sample Location	M39859.704050
Sample Description	MW07-1-33 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	6.61	0.05		
Sulfur	Dissolved	mg/L	17.1	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0034	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.055	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.071	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	<0.00001	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	0.0005	0.0001		
Copper	Dissolved	mg/L	<0.0002	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.058	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0005	0.0005		
Selenium	Dissolved	mg/L	<0.0002	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	0.648	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0030	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	<0.001	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	25	5	15	Above AO
Turbidity		NTU	7.1	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.90	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	20.8			
Electrical Conductivity	at 25 °C	µS/cm	867	1		
Calcium	Dissolved	mg/L	87.7	0.2		
Magnesium	Dissolved	mg/L	21.8	0.2		
Sodium	Dissolved	mg/L	80.9	0.4	200	Below AO

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011538 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Reference Number	1736660-21
Sample Date	May 24, 2024
Sample Time	11:43
Sample Location	M39859.704050
Sample Description	MW07-1-33 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	4.1	0.4		
Iron	Dissolved	mg/L	0.79	0.01	0.3	Above AO
Manganese	Dissolved	mg/L	0.861	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	0.7	0.4	250	Below AO
Fluoride		mg/L	0.08	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.52	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	0.52	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	51.4	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	583			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	478	5		
Total Dissolved Solids	Calculated	mg/L	534	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	309			
Ionic Balance	Dissolved	%	92			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011538
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460024 - Mercury (Dissolved) in water												
Blank	6479008	Jun 05, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479012	Jun 05, 2024	Mercury	mg/L	0.000094						7e-005 - 0.00013	yes
Control Sample	6479011	Jun 05, 2024	Mercury	mg/L	0.000019						6e-006 - 3.6e-005	yes
Replicate	6479013	Jun 05, 2024	Mercury	mg/L	<0.000005			<0.000005		0	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011538
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Bill To: Hydrogeological Consultants
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Edmonton, AB, Canada
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Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011538
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479115	Jun 05, 2024	Aluminum	µg/L	15			17		16.97	10 % or 11 Abs	yes
Replicate	6479115	Jun 05, 2024	Antimony	µg/L	0.4			0.4		6.23	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Arsenic	µg/L	0.8			0.9		2.96	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Barium	µg/L	75			75		0.09	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Boron	µg/L	85			86		0.93	10 % or 4.4 Abs	yes
Replicate	6479115	Jun 05, 2024	Cadmium	µg/L	0.10			0.12		18.99	10 % or 0.022 Abs	yes
Replicate	6479115	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Cobalt	µg/L	0.6			0.6		0.05	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Copper	µg/L	1.1			1.2		7.9	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Lead	µg/L	<0.1			0.1		2.13	10 % or 0.22 Abs	yes

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Quality Control

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Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011538
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479115	Jun 05, 2024	Lithium	µg/L	55			55		0.61	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Nickel	µg/L	3.2			3.4		5.33	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Selenium	µg/L	1.2			1.2		3.21	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Strontium	µg/L	967			960		0.74	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479115	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Titanium	µg/L	<0.5			0.9		53.68	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Uranium	µg/L	15.6			15.6		0.48	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Vanadium	µg/L	0.2			0.3		13.69	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Zinc	µg/L	4			4		7.72	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479186	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011538 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Replicate	6479215	Jun 05, 2024	Turbidity	NTU	1.8			1.7		2.31	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478743	Jun 05, 2024	pH		7.77			7.76		0.17	0 % or 0.1 Abs	yes
Replicate	6478743	Jun 05, 2024	Electrical Conductivity	dS/m	1.23			1.23		0	10 % or 0.002 Abs	yes
Replicate	6478743	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478743	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	Bicarbonate	mg/L	649			653		0.66	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478743	Jun 05, 2024	T-Alkalinity	mg/L	532			536		0.66	10 % or 5 Abs	yes

Batch: 2460219 - Anions (Routine) by Ion Chromatography

Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479564	Jun 05, 2024	Fluoride	mg/L	10.0						9.39 - 10.59	yes

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Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011538
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479564	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479564	Jun 05, 2024	Nitrite - N	mg/L	9.77						9.01 - 10.99	yes
Control Sample	6479564	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479565	Jun 05, 2024	Fluoride	mg/L	5.00						4.56 - 5.22	yes
Control Sample	6479565	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479565	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479565	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479566	Jun 05, 2024	Fluoride	mg/L	0.51						0.45 - 0.57	yes
Control Sample	6479566	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479566	Jun 05, 2024	Nitrite - N	mg/L	0.502						0.455 - 0.557	yes
Control Sample	6479566	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.00						0.85 - 1.15	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrate - N	mg/L	0.58			0.58		0.19	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Batch: 2460053 - Chloride in Water												
Blank	6479101	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479098	Jun 05, 2024	Chloride	mg/L	2030						1847.4 - 2256	yes
Control Sample	6479099	Jun 05, 2024	Chloride	mg/L	81.2						74.9 - 86.9	yes
Control Sample	6479100	Jun 05, 2024	Chloride	mg/L	15.4						13.3 - 16.5	yes
Replicate	6479102	Jun 05, 2024	Chloride	mg/L	3.9			4.0		1.53	10 % or 0.5 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes

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Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011538
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

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Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011538 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-21; 9343653: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011538
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

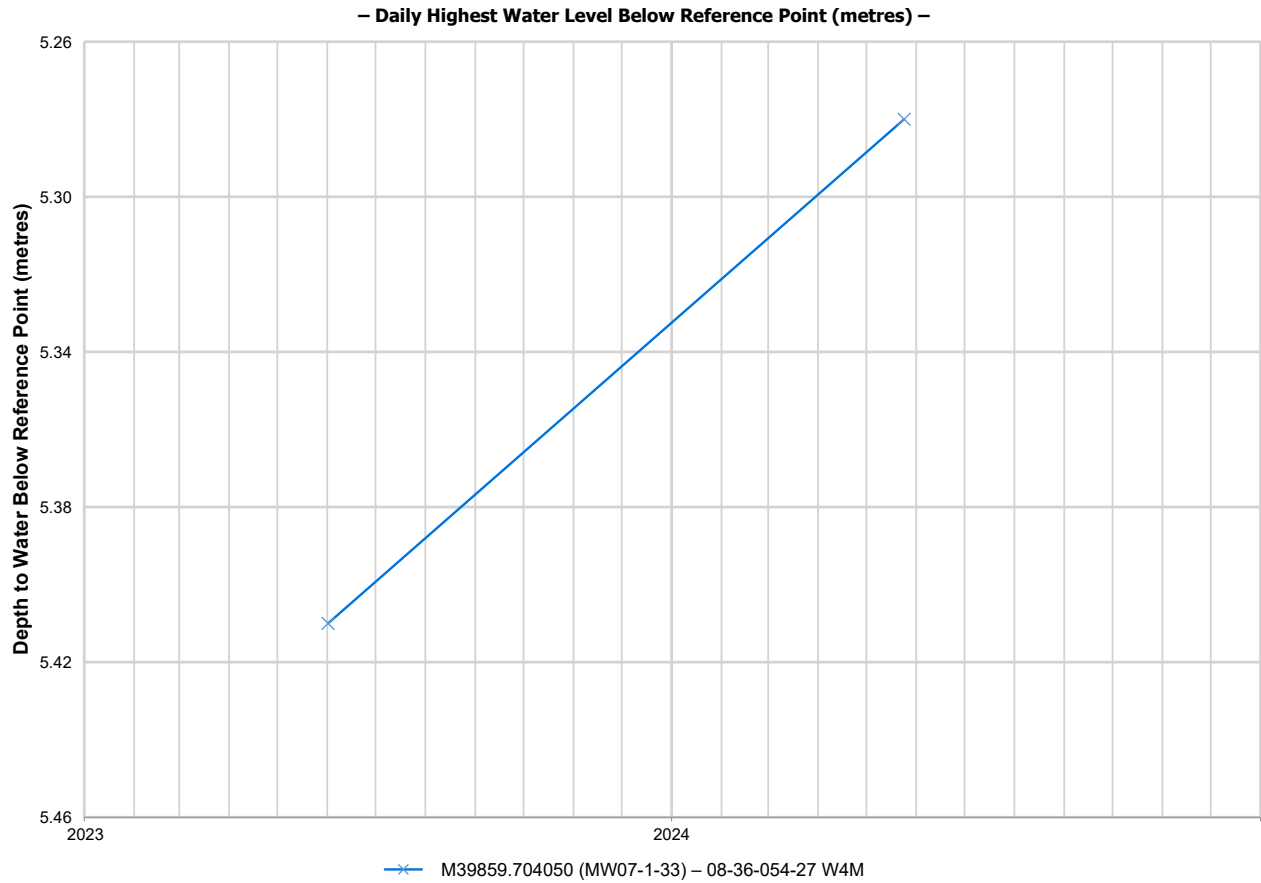
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

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MW07-1-33
2023 - 2024 Hydrograph



MW07-2-14

01-35-054-27 W4M
(M39859.704048)



Photograph taken on July 13, 2009

Spatial Location:

Easting: **75,121**

Northing: **5,948,549**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **671**

(elevation accuracy HCL DEM)

Date Completed: **July 24, 2007**

Depth Drilled (m): **14.3**

Completion Interval (m): **11.6 – 13.7 ***

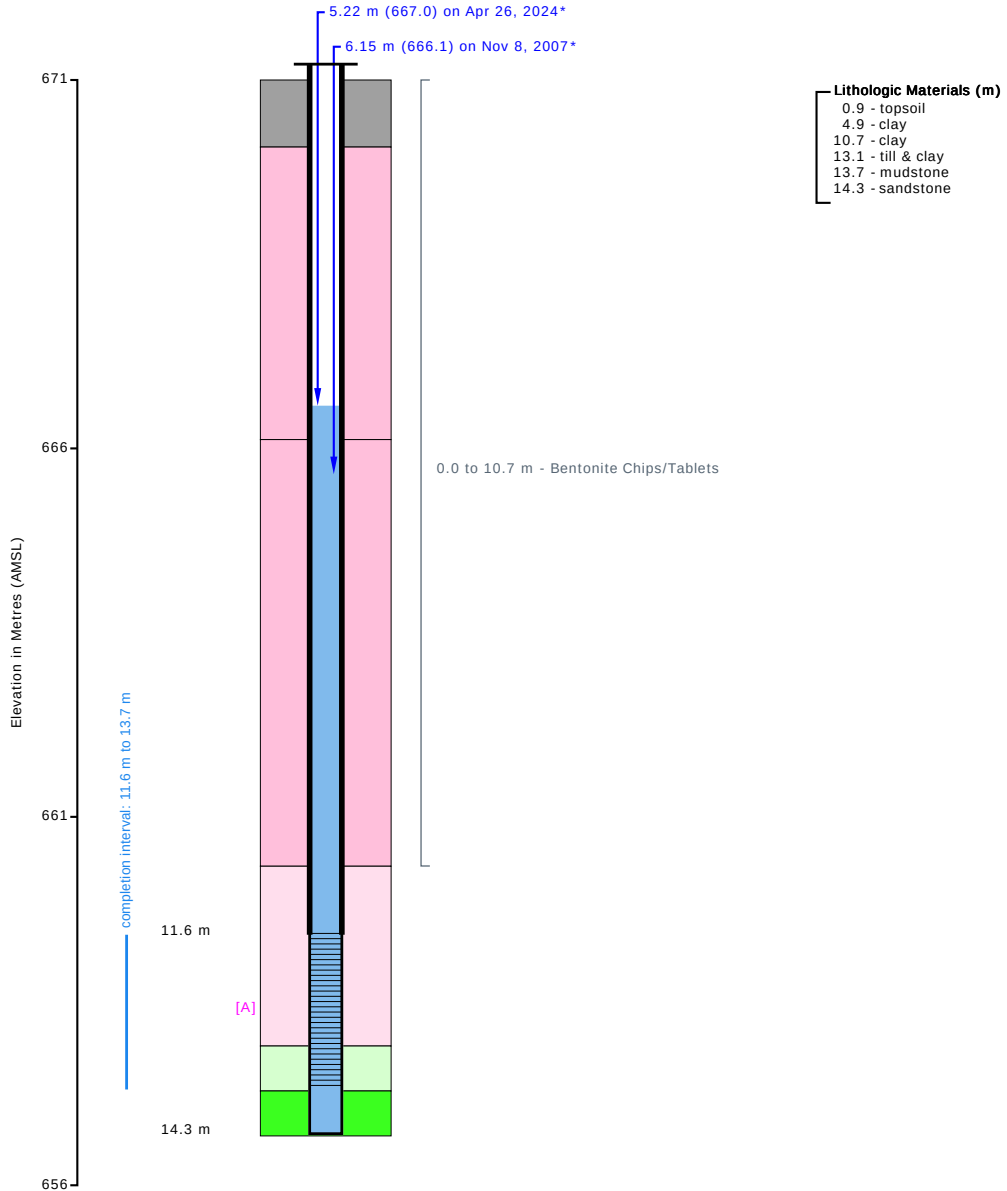
(TGWC determined value)*

Earliest Water Level (m): **6.15 – November 8, 2007**

Most Recent Water Level (m): **5.22 – April 26, 2024 @ 15:14**

GIC ID: **1420665**

MW07-2-14 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		Geologic Unit details not available for this location	
	Fine Grained			
	Coarse Grained			
Bedrock	Fine Grained			
	Coarse Grained			
	Other			

Summary

TGWC ID: M39859.704048
 Well Name: MW07-2-14
 Legal Location: 01-35-054-27 W4M
 Casing (OD): 50.8 mm; Plastic (2.0")
 Screen (OD): 50.8 mm; Plastic (2.0")
 Casing Stick-Up: 0.8 m (not drawn to scale)
 Completion [A]: 11.6 to 13.7 m; Screened
 Water Level (recent): 5.22 m (667.0 m AMSL) on Apr 26, 2024 @ 15:14 - Reference Point: Top of Casing
 Water Level (oldest): 6.15 m (666.1 m AMSL) on Nov 8, 2007 - Reference Point: Top of Casing
 Top of Liner assumed to be 5% of 'non-cased' interval.

* Water-Level Measurements are measured from reference point listed.
 NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (<http://www.hcl.ca>) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
 Drawn: October 10, 2024 @ 12:21 --- <https://www.hcl.ca>

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MW07-2-14
AEPA - Water Well Drilling Report



Water Well Drilling Report

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GIC Well ID 1420665
GoA Well Tag No.
Drilling Company Well ID
Date Report Received

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	
STANTEC		10160 - 112 ST		EDMONTON		AB		CA	T5K 2L6	
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description	
	SE	35	54	27	4				WELL # 07-2-14	
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation _____ m
_____ m from					Latitude 53.705200 Longitude -113.867000					How Elevation Obtained
_____ m from					How Location Obtained					Not Obtained
					Not Verified					

Drilling Information	
Method of Drilling	Type of Work
Rotary	Piezometer
Proposed Well Use	
Observation	

Formation Log			Measurement in Metric
Depth from ground level (m)	Water Bearing	Lithology Description	
0.91		Topsoil	
4.88		Green Clay	
10.67		Gray Clay	
13.11		Gray Till & Clay	
13.72		Gray Mudstone	
14.33		Gray Sandstone	

Yield Test Summary			Measurement in Metric
Recommended Pump Rate _____ L/min			
Test Date	Water Removal Rate (L/min)	Static Water Level (m)	
2007/07/24			

Well Completion				Measurement in Metric
Total Depth Drilled	Finished Well Depth	Start Date	End Date	
14.33 m		2007/07/24	2007/07/24	
Borehole				
Diameter (cm)	From (m)	To (m)		
15.88	0.00	14.33		
Surface Casing (if applicable)		Well Casing/Liner		
Plastic		Unknown		
Size OD :	5.08 cm	Size OD :		
Wall Thickness :	0.554 cm	Wall Thickness :		
Bottom at :	11.58 m	Top at :		
		Bottom at :		
Perforations				
From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval (cm)
Perforated by Unknown				
Annular Seal Bentonite Chips/Tablets				
Placed from 0.00 m to 10.67 m				
Amount _____				
Other Seals				
Type		At (m)		
Screen Type Plastic				
Size OD : 5.08 cm				
From (m)	To (m)	Slot Size (cm)		
11.58	13.72	0.051		
Attachment Attached To Casing				
Top Fittings Coupler		Bottom Fittings Plug		
Pack				
Type Artificial		Grain Size 10-20		
Amount 4.00 Bags				

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
LEONARD MUDRYK	28916A
Company Name	Copy of Well report provided to owner
LAKELAND DRILLING LTD.	Date approval holder signed



Water Well Drilling Report

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

GIC Well ID 1420665
GoA Well Tag No.
Drilling Company Well ID
Date Report Received

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	
STANTEC		10160 - 112 ST			EDMONTON		AB		CA	T5K 2L6	
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
	SE	35	54	27	4				WELL # 07-2-14		
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation _____ m	
_____ m from					Latitude 53.705200 Longitude -113.867000					How Elevation Obtained	
_____ m from					How Location Obtained					Not Obtained	
					Not Verified						

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
Gas _____										Depth _____ m
Remedial Action Taken _____										Well Disinfected Upon Completion _____
										Geophysical Log Taken _____
										Submitted to ESRD _____
Additional Comments on Well										Sample Collected for Potability _____
PROPOSED WELL USE - PIEZOMETER										Submitted to ESRD _____

Yield Test			Taken From Ground Level	Measurement in Metric
			Depth to water level	
Test Date	Start Time	Static Water Level		
2007/07/24	12:00 AM	m		
			Pumping (m)	Recovery (m)
			Elapsed Time	
			Minutes:Sec	
Method of Water Removal				
Type Unknown				
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
	L	

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
LEONARD MUDRYK	28916A
Company Name	Copy of Well report provided to owner
LAKELAND DRILLING LTD.	Date approval holder signed

Printed on 10/10/2024 12:18:03 PM

Page: 2 / 2

MW07-2-14
Chemical Analysis Results (June 7, 2024)



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Page 1 of 12

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011520 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-3
Sample Date	April 26, 2024
Sample Time	15:45
Sample Location	M39859.704048
Sample Description	MW07-2-14 / 12.1 °C
Sample Matrix	Water

Sample Matrix			Water		Nominal Detection	Guideline	Guideline
Analyte		Units	Result	Limit	Limit	Limit	Comments
Metals Dissolved							
Silicon	Dissolved	mg/L	7.56	0.05			
Sulfur	Dissolved	mg/L	70.0	0.3			
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001		Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC		Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006		Below MAC
Arsenic	Dissolved	mg/L	0.0124	0.0002	0.01		Above MAC
Barium	Dissolved	mg/L	0.019	0.001	2.0		Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001			
Bismuth	Dissolved	mg/L	<0.0005	0.0005			
Boron	Dissolved	mg/L	0.102	0.002	5		Below MAC
Cadmium	Dissolved	mg/L	<0.00001	0.00001	0.007		Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05		Below MAC
Cobalt	Dissolved	mg/L	0.0008	0.0001			
Copper	Dissolved	mg/L	<0.0002	0.0002	1 AO; 2 MAC		Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005		Below MAC
Lithium	Dissolved	mg/L	0.119	0.001			
Molybdenum	Dissolved	mg/L	<0.001	0.001			
Nickel	Dissolved	mg/L	0.0008	0.0005			
Selenium	Dissolved	mg/L	<0.0002	0.0002	0.05		Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001			
Strontium	Dissolved	mg/L	0.826	0.001	7.0		Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005			
Tin	Dissolved	mg/L	<0.001	0.001			
Titanium	Dissolved	mg/L	<0.0005	0.0005			
Uranium	Dissolved	mg/L	0.0037	0.0005	0.02		Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001			
Zinc	Dissolved	mg/L	<0.001	0.001	5		Below AO
Subsample			Field Filtered				
Physical and Aggregate Properties							
Colour	Apparent, Potable	Colour units	45	5	15		Above AO
Turbidity		NTU	27.3	0.1	0.1/0.3/1.0 OG		
Routine Water							
pH			7.70	1	7.0-10.5		Within OG Range
Temp. of observed pH		°C	21.0				
Electrical Conductivity	at 25 °C	µS/cm	1050	1			
Calcium	Dissolved	mg/L	112	0.2			
Magnesium	Dissolved	mg/L	28.0	0.2			
Sodium	Dissolved	mg/L	90.0	0.4	200		Below AO

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011520 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Reference Number	1736660-3
Sample Date	April 26, 2024
Sample Time	15:45
Sample Location	M39859.704048
Sample Description	MW07-2-14 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	4.2	0.4		
Iron	Dissolved	mg/L	2.61	0.01	0.3	Above AO
Manganese	Dissolved	mg/L	0.882	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	1.9	0.4	250	Below AO
Fluoride		mg/L	0.09	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.40	0.01	10	Below MAC
Nitrite - N		mg/L	0.019	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	0.42	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	210	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	473			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	388	5		
Total Dissolved Solids	Calculated	mg/L	679	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	395			
Ionic Balance	Dissolved	%	99			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011520
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed

Metals Dissolved

Batch: 2460024 - Mercury (Dissolved) in water

Blank	6479008	Jun 05, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479007	Jun 05, 2024	Mercury	mg/L	0.000092						7e-005 - 0.00013	yes
Control Sample	6479006	Jun 05, 2024	Mercury	mg/L	0.000020						6e-006 - 3.6e-005	yes
Replicate	6479010	Jun 05, 2024	Mercury	mg/L	0.000009			0.000010		12.93	10 % or 3e-005 Abs	yes

Batch: 2460055 - Metals ICP-MS (Dissolved) in water

Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011520
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011520
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479114	Jun 05, 2024	Aluminum	µg/L	<2			<2		0	10 % or 11 Abs	yes
Replicate	6479114	Jun 05, 2024	Antimony	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Arsenic	µg/L	12.5			12.4		0.38	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Barium	µg/L	19			19		0.09	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Boron	µg/L	102			102		0.06	10 % or 4.4 Abs	yes
Replicate	6479114	Jun 05, 2024	Cadmium	µg/L	<0.01			<0.01		0	10 % or 0.022 Abs	yes
Replicate	6479114	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Cobalt	µg/L	0.8			0.8		3.91	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Copper	µg/L	<0.2			<0.2		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Lead	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes

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Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011520
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479114	Jun 05, 2024	Lithium	µg/L	118			119		0.43	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Nickel	µg/L	0.7			0.8		2.6	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Selenium	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Strontium	µg/L	822			826		0.52	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479114	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Titanium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Uranium	µg/L	3.7			3.7		0.74	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Vanadium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Zinc	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479184	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Company: HCL

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Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011520
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Blank	6479192	Jun 05, 2024	Turbidity	NTU	0.1	0.1					0.1	yes
Control Sample	6479197	Jun 05, 2024	Turbidity	NTU	1990						1847.5 - 2041.9	yes
Control Sample	6479198	Jun 05, 2024	Turbidity	NTU	4760						4441.7 - 6661.7	yes
Control Sample	6479196	Jun 05, 2024	Turbidity	NTU	149						132.1 - 162.1	yes
Control Sample	6479195	Jun 05, 2024	Turbidity	NTU	14.8						12.6 - 15.6	yes
Control Sample	6479194	Jun 05, 2024	Turbidity	NTU	1.7						1 - 2.2	yes
Replicate	6479207	Jun 05, 2024	Turbidity	NTU	11.8			12.0		1.68	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478736	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478736	Jun 05, 2024	Temp. of observed pH	°C	21.5						15.5 - 24.5	yes
Control Sample	6478736	Jun 05, 2024	Electrical Conductivity	dS/m	2.72						2.631 - 2.829	yes
Control Sample	6478736	Jun 05, 2024	P-Alkalinity	mg/L	534						442 - 584	yes
Control Sample	6478736	Jun 05, 2024	T-Alkalinity	mg/L	1020						958 - 1059	yes
Control Sample	6478737	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478737	Jun 05, 2024	Temp. of observed pH	°C	21.5						15.5 - 24.5	yes
Control Sample	6478737	Jun 05, 2024	Electrical Conductivity	dS/m	0.078						0.069 - 0.085	yes
Control Sample	6478737	Jun 05, 2024	P-Alkalinity	mg/L	47						28 - 73	yes
Control Sample	6478737	Jun 05, 2024	T-Alkalinity	mg/L	125						115 - 140	yes
Replicate	6478740	Jun 05, 2024	pH		6.94			6.96		0.23	0 % or 0.1 Abs	yes
Replicate	6478740	Jun 05, 2024	Electrical Conductivity	dS/m	0.129			0.131		1.38	10 % or 0.002 Abs	yes
Replicate	6478740	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478740	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	Bicarbonate	mg/L	65			66		0.9	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478740	Jun 05, 2024	T-Alkalinity	mg/L	54			54		0.9	10 % or 5 Abs	yes

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Company: HCL

Project ID: MR-0224.23
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Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011520
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed

Routine Water - Continued

Batch: 2460219 - Anions (Routine) by Ion Chromatography

Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479560	Jun 05, 2024	Fluoride	mg/L	10.1						9.39 - 10.59	yes
Control Sample	6479560	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479560	Jun 05, 2024	Nitrite - N	mg/L	9.80						9.01 - 10.99	yes
Control Sample	6479560	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479561	Jun 05, 2024	Fluoride	mg/L	4.95						4.56 - 5.22	yes
Control Sample	6479561	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479562	Jun 05, 2024	Fluoride	mg/L	0.52						0.45 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrite - N	mg/L	0.505						0.455 - 0.557	yes
Control Sample	6479562	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.01						0.85 - 1.15	yes
Replicate	6479558	Jun 05, 2024	Nitrate - N	mg/L	1.70			1.69		0.55	10 % or 0.01 Abs	yes
Replicate	6479558	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes

Batch: 2460052 - Chloride in Water

Blank	6479091	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479088	Jun 05, 2024	Chloride	mg/L	2000						1847.4 - 2256	yes
Control Sample	6479089	Jun 05, 2024	Chloride	mg/L	77.9						74.9 - 86.9	yes
Control Sample	6479090	Jun 05, 2024	Chloride	mg/L	14.7						13.3 - 16.5	yes
Replicate	6479092	Jun 05, 2024	Chloride	mg/L	3.2			3.2		3.13	10 % or 0.5 Abs	yes

Batch: 2460048 - Metals Trace (Dissolved) in water

Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes

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LSD:
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Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011520
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

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SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011520 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-3; 9343635: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011520
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

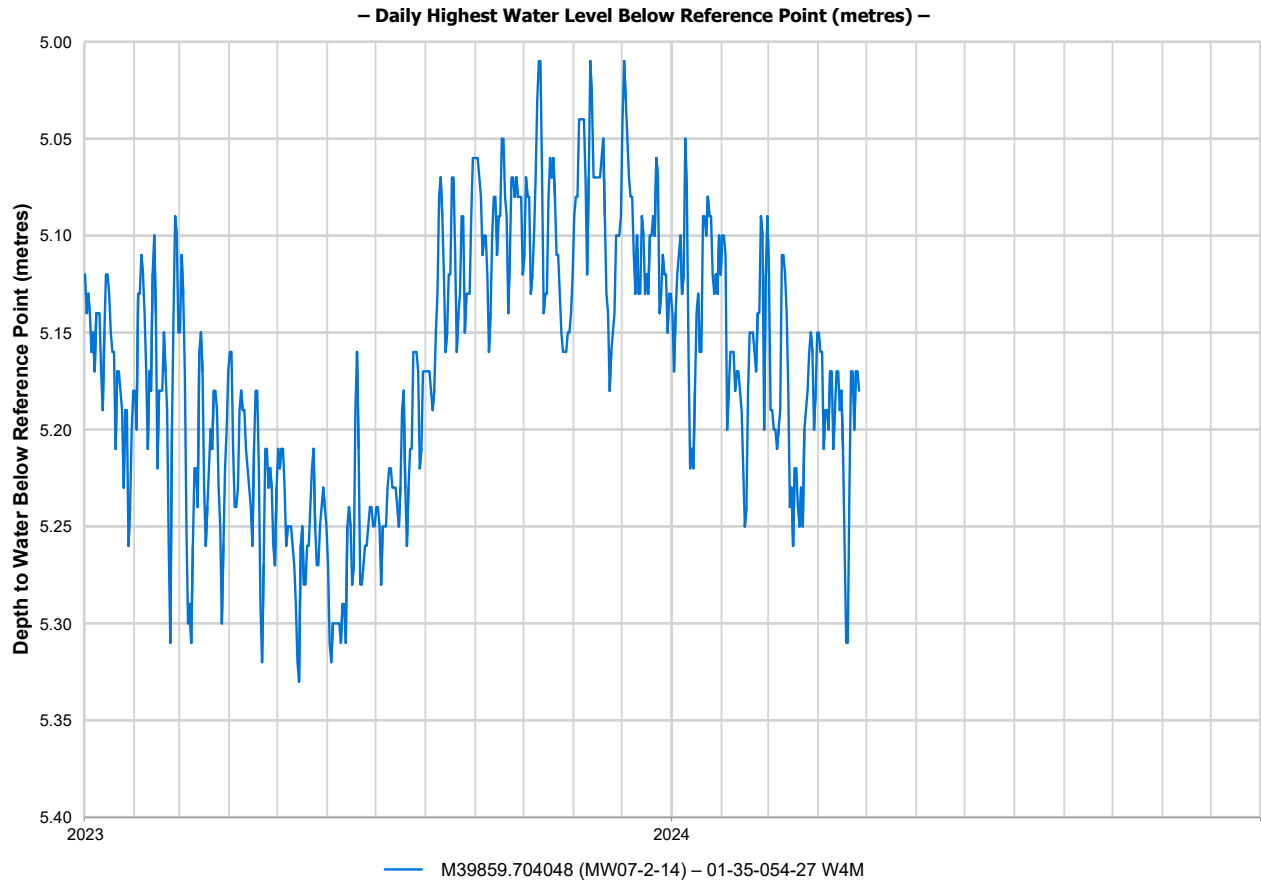
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

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MW07-2-14
2023 - 2024 Hydrograph



MW07-3-33

07-31-054-26 W4M
(M39859.704049)



Photograph taken on May 30, 2011

Spatial Location:

Easting: **77,948**

Northing: **5,949,095**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **666**

(elevation accuracy HCL DEM)

Date Completed: **July 26, 2006**

Depth Drilled (m): **35.7**

Completion Interval (m): **27.1 – 33.2 ***

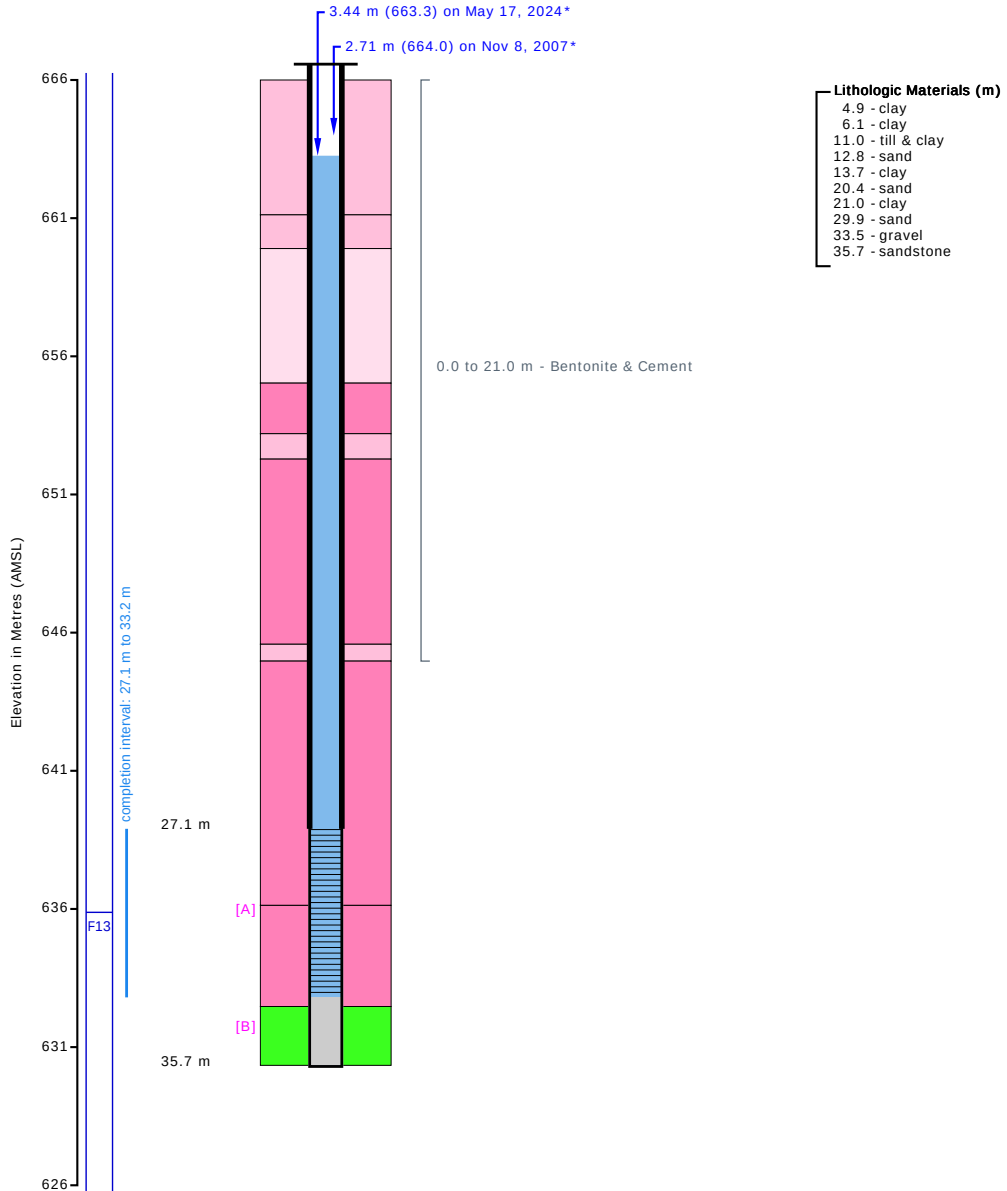
(TGWC determined value)*

Earliest Water Level (m): **2.71 – November 8, 2007**

Most Recent Water Level (m): **3.44 – May 17, 2024 @ 14:36**

GIC ID: **1420666**

MW07-3-33 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial		Unsorted	Bedrock	 Other
		Fine Grained		
				
		Coarse Grained		
				Fine Grained
				
				Coarse Grained
F13 - Lower Horseshoe Canyon Formation				
Summary				

Summary	
TGWC ID: M39859.704049	
Well Name: MW07-3-33	
Legal Location: 07-31-054-26 W4M	
Casing (OD): 50.8 mm; Plastic (2.0")	
Screen (OD): 50.8 mm; Plastic (2.0")	
Casing Stick-Up: 0.7 m (not drawn to scale)	
Completion [A]: 27.1 to 33.2 m; Screened	
Construction [B]: 33.2 to 35.7 m; Plugged; Unknown	
Water Level (recent): 3.44 m (663.3 m AMSL) on May 17, 2024 @ 14:36 - Reference Point: Top of Casing	
Water Level (oldest): 2.71 m (664.0 m AMSL) on Nov 8, 2007 - Reference Point: Top of Casing	
Top of Liner assumed to be 5% of 'non-cased' interval.	

* Water-Level Measurements are measured from reference point listed.
NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (<http://www.hcl.ca>) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
Drawn: October 10, 2024 @ 12:22 --- <https://www.hcl.ca>

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Owner: *Sturgeon County*
9613-100 St, Morinville, AB T8R 1L9

Contractor: *Lakeland Drilling Ltd.*
Name: *MW07-3-33*

Field Action: *Confirmed - Physically, July 13, 2009*

Work Type: *Piezometer*

Drilling Method: *Rotary*

Proposed Use: *Monitoring*

Completion Type: *Screen*

Date Started: *July 26, 2006*

Date Completed: *July 26, 2006*

Well Status: *Observation*

Feature Class: *Piezometer*

07-31-054-26 W4M

M39859.704049

Easting (m): *77,947.78¹*
Northing (m): *5,949,094.52¹*
Elevation (m): *666²*

Elog Taken: *No*
Gamma Taken: *No*
Flowing: *No*
Presence of Gas: *No*

Stick Up (m): *0.7*
544056; 2235001; core; 2024-06-11

General Details

* *TGWC calculated value*

Depth Completed (m)*: *33.2*
Depth Drilled (m): *35.7*
Sand & Gravel Thickness (m): *21.0 (total) – 21.0 (below 15 m) **
Plugged / Backfilled (m): *33.2 – 35.7 (Unknown)*
Most Recent Water Level (m): *3.44 m – May 17, 2024*

Completion Details

Surface Casing: *Plastic – 50.8 mm (O.D.) x 5.50 mm (thick) x 27.1 m (bottom)*
Screen Material: *Plastic – 50.8 mm (O.D.) (Attached To Casing)*
Fittings: *Top: Coupler – Bottom: Plug*

Intervals

Screen: *27.1 to 33.2 m - 0.05 cm ([unknown])*
Bentonite & Cement: *0.0 to 21.0 m*

Lithology Details

Elevation
(*AMSL*)

Depth
(*BGL*)

Lithology Descriptions

661.1

4.9

Brown Clay

659.9

6.1

Grey Clay

655.0

11.0

Soft Grey Till & Clay

653.2

12.8

Coarse-Grained Grey Sand

652.3

13.7

Silty Clay

645.6

20.4

Coarse-Grained Grey Sand

645.0

21.0

Grey Clay

636.1

29.9

Coarse-Grained Grey Sand

632.5

33.5

Coarse-Grained Gravel

630.3

35.7

Sandstone

Chemistry Summary Details (mg/L, except as noted)

(recently sampled first)

Sampling Details: *May 17, 2024 @ 17:10*
Report Date: *June 7, 2024 - Element Materials Technology Canada Inc. (1736660-6)*

Constituent

Result

Conductivity (µS/cm): *945*

Total Dissolved Solids: *574*

Hardness (as CaCO3): *384*

T-Alkalinity (as CaCO3): *488*

P-Alkalinity (as CaCO3): *< 5*

Nitrate + Nitrite as N: *0.57*

Total Suspended Solids:

Temperature (°C): *20.9*

Constituent

Result

Nitrate as N: *0.57*

Nitrite as N: *< 0.005*

pH (pH Unit): *7.86*

Colour (TCU): *45*

Ion Balance (%): *98*

Total Coliforms:**:

Fecal Coliforms:**:

Escherichia coli:**:

Constituent

Result

Turbidity (NTU): *22.0*

Fluoride: *0.17*

Carbonate: *< 6*

Bicarbonate: *595*

Hydroxide: *< 5*

Total Iron:

Total Mn:

Constituent

Extractable

Dissolved

Calcium: *106*

Chloride: *0.4*

Iron: *1.72*

Manganese: *0.943****

Aluminum: *< 0.002*

Arsenic: *0.0045*

Barium: *0.046*

Beryllium: *< 0.0001*

Cadmium: *< 0.00001*

Chromium: *< 0.0005*

Cobalt: *0.0007*

Sulfate: *71.5*

Constituent

Extractable

Dissolved

Mercury: *< 0.000005*

Molybdenum: *< 0.001*

Magnesium: *29.1*

Sodium: *71.2*

Potassium: *3.7*

Vanadium: *< 0.0001*

Strontium: *0.702*

Nickel: *0.0007*

Zinc: *< 0.001*

Copper: *< 0.0002*

Lead: *< 0.0001*

Uranium: *0.0038*

Extractable - unfiltered

Dissolved - filtered

Comments: *Sample collected by Hydrogeological Consultants Ltd. personnel.*

***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2024. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.

544056; 1 / 27

Aquifer Tests

Date & Time

Testing Method / Type

Depth of Test Interval

Duration (minutes) Pumping Recovery

Avg. Rate (Lpm)

NPWL (metres)

Drawdown (metres)

Pump (metres)

Q20 (m³/day)* Apparent Effective

Transmissivity (m²/day)* Apparent Aquifer Effective

1

2006-07-26

[unknown]

[unknown]

Alias IDs

Z598135

* HCL GPS — 10TM Resource NAD83, * HCL DEM

AEPA WellId: *1420666*

AEPA WellReportId: *11427112*

AEPA GicWellId: *1420666*

(1) October 10, 2024, "AS IS"; no warranty either expressed or implied. visit tgwc.com for additional details

Sturgeon County, 2023 to 2024 Groundwater Monitoring Report

Calahoo Resource Extraction District, Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, MR-0224.23

B - 262

RTU

REMOTE TELEMETRY UNIT

HCL

MW07-3-33
AEPA - Water Well Drilling Report



Water Well Drilling Report

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GIC Well ID 1420666
GoA Well Tag No.
Drilling Company Well ID
Date Report Received

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	
STANTEC		10160 - 112 ST			EDMONTON		AB		CA	T5K 2L6	
Location	1/4 or LSD	SEC	TPW	RGE	W of MER	Lot	Block	Plan	Additional Description		
	SE	36	54	27	4				WELL # 07-3-33		
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation _____ m	
_____ m from					Latitude 53.705300 Longitude -113.843000					How Elevation Obtained	
_____ m from					How Location Obtained					Not Obtained	
					Not Verified						

Drilling Information	
Method of Drilling	Type of Work
Rotary	Piezometer
Proposed Well Use	
Observation	

Formation Log			Measurement in Metric
Depth from ground level (m)	Water Bearing	Lithology Description	
4.88		Brown Clay	
6.10		Gray Clay	
10.97		Gray Soft Till & Clay	
12.80		Gray Coarse Grained Sand	
13.72		Silty Clay	
20.42		Gray Coarse Grained Sand	
21.03		Gray Clay	
29.87		Gray Coarse Grained Sand	
33.53		Coarse Grained Gravel	
35.66		Sandstone	

Yield Test Summary			Measurement in Metric
Recommended Pump Rate _____ L/min			
Test Date	Water Removal Rate (L/min)	Static Water Level (m)	
2006/07/26			

Well Completion			Measurement in Metric
Total Depth Drilled	Finished Well Depth	Start Date	End Date
35.66 m		2006/07/26	2006/07/26
Borehole			
Diameter (cm)	From (m)	To (m)	
15.88	0.00	35.66	
Surface Casing (if applicable)		Well Casing/Liner	
Plastic	Size OD : 5.08 cm	Unknown	
Wall Thickness : 0.554 cm	Bottom at : 27.13 m	Size OD : _____ cm	
		Wall Thickness : _____ cm	
		Top at : _____ m	
		Bottom at : _____ m	
Perforations			
From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)
			Hole or Slot Interval(cm)
Perforated by Unknown			
Annular Seal Bentonite & Cement			
Placed from 0.00 m to 21.03 m			
Amount _____			
Other Seals			
Type		At (m)	
Screen Type Plastic			
Size OD : 5.08 cm			
From (m)	To (m)	Slot Size (cm)	
27.13	33.22	0.051	
Attachment Attached To Casing			
Top Fittings Coupler		Bottom Fittings Plug	
Pack			
Type Artificial		Grain Size 10-20	
Amount 42.00 Bags			

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
LEONARD MUDRYK	28916A
Company Name	Copy of Well report provided to owner
LAKELAND DRILLING LTD.	Date approval holder signed



Water Well Drilling Report

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GIC Well ID 1420666
GoA Well Tag No.
Drilling Company Well ID
Date Report Received

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	
STANTEC		10160 - 112 ST			EDMONTON		AB		CA	T5K 2L6	
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
	SE	36	54	27	4				WELL # 07-3-33		
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation _____ m	
_____ m from					Latitude 53.705300 Longitude -113.843000					How Elevation Obtained	
_____ m from					How Location Obtained					Not Obtained	
					Not Verified						

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
Gas _____										Depth _____ m
Remedial Action Taken _____										Well Disinfected Upon Completion _____
										Geophysical Log Taken _____
										Submitted to ESRD _____
Additional Comments on Well										Sample Collected for Potability _____
PROPOSED WELL USE - PIEZOMETER										Submitted to ESRD _____

Yield Test			Taken From Ground Level	Measurement in Metric
			Depth to water level	
Test Date	Start Time	Static Water Level		
2006/07/26	12:00 AM	m		
			Pumping (m)	Recovery (m)
			Elapsed Time	
			Minutes:Sec	
Method of Water Removal				
Type Unknown				
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
	L	

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
LEONARD MUDRYK	28916A
Company Name	Copy of Well report provided to owner
LAKELAND DRILLING LTD.	Date approval holder signed

Printed on 10/10/2024 12:18:06 PM

Page: 2 / 2

MW07-3-33
Chemical Analysis Results (June 7, 2024)



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Page 1 of 12

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011523 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-6
Sample Date	May 17, 2024
Sample Time	17:10
Sample Location	M39859.704049
Sample Description	MW07-3-33 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	6.78	0.05		
Sulfur	Dissolved	mg/L	23.8	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0045	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.046	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.098	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	<0.00001	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	0.0007	0.0001		
Copper	Dissolved	mg/L	<0.0002	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.081	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0007	0.0005		
Selenium	Dissolved	mg/L	<0.0002	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	0.702	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0038	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	<0.001	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	45	5	15	Above AO
Turbidity		NTU	22.0	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.86	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	20.9			
Electrical Conductivity	at 25 °C	µS/cm	945	1		
Calcium	Dissolved	mg/L	106	0.2		
Magnesium	Dissolved	mg/L	29.1	0.2		
Sodium	Dissolved	mg/L	71.2	0.4	200	Below AO

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011523 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-6
Sample Date	May 17, 2024
Sample Time	17:10
Sample Location	M39859.704049
Sample Description	MW07-3-33 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	3.7	0.4		
Iron	Dissolved	mg/L	1.72	0.01	0.3	Above AO
Manganese	Dissolved	mg/L	0.943	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	0.4	0.4	250	Below AO
Fluoride		mg/L	0.17	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.57	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	0.57	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	71.5	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	595			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	488	5		
Total Dissolved Solids	Calculated	mg/L	574	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	384			
Ionic Balance	Dissolved	%	98			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011523
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460024 - Mercury (Dissolved) in water												
Blank	6479008	Jun 05, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479007	Jun 05, 2024	Mercury	mg/L	0.000092						7e-005 - 0.00013	yes
Control Sample	6479006	Jun 05, 2024	Mercury	mg/L	0.000020						6e-006 - 3.6e-005	yes
Replicate	6479010	Jun 05, 2024	Mercury	mg/L	0.000009			0.000010		12.93	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

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17740 - 118 Avenue NW
Edmonton, AB, Canada
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Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011523
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011523
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479114	Jun 05, 2024	Aluminum	µg/L	<2			<2		0	10 % or 11 Abs	yes
Replicate	6479114	Jun 05, 2024	Antimony	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Arsenic	µg/L	12.5			12.4		0.38	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Barium	µg/L	19			19		0.09	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Boron	µg/L	102			102		0.06	10 % or 4.4 Abs	yes
Replicate	6479114	Jun 05, 2024	Cadmium	µg/L	<0.01			<0.01		0	10 % or 0.022 Abs	yes
Replicate	6479114	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Cobalt	µg/L	0.8			0.8		3.91	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Copper	µg/L	<0.2			<0.2		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Lead	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes

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Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011523
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479114	Jun 05, 2024	Lithium	µg/L	118			119		0.43	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Nickel	µg/L	0.7			0.8		2.6	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Selenium	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Strontium	µg/L	822			826		0.52	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479114	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Titanium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Uranium	µg/L	3.7			3.7		0.74	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Vanadium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Zinc	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479184	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011523
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Blank	6479192	Jun 05, 2024	Turbidity	NTU	0.1	0.1					0.1	yes
Control Sample	6479197	Jun 05, 2024	Turbidity	NTU	1990						1847.5 - 2041.9	yes
Control Sample	6479198	Jun 05, 2024	Turbidity	NTU	4760						4441.7 - 6661.7	yes
Control Sample	6479196	Jun 05, 2024	Turbidity	NTU	149						132.1 - 162.1	yes
Control Sample	6479195	Jun 05, 2024	Turbidity	NTU	14.8						12.6 - 15.6	yes
Control Sample	6479194	Jun 05, 2024	Turbidity	NTU	1.7						1 - 2.2	yes
Replicate	6479207	Jun 05, 2024	Turbidity	NTU	11.8			12.0		1.68	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478740	Jun 05, 2024	pH		6.94			6.96		0.23	0 % or 0.1 Abs	yes
Replicate	6478740	Jun 05, 2024	Electrical Conductivity	dS/m	0.129			0.131		1.38	10 % or 0.002 Abs	yes
Replicate	6478740	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478740	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	Bicarbonate	mg/L	65			66		0.9	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478740	Jun 05, 2024	T-Alkalinity	mg/L	54			54		0.9	10 % or 5 Abs	yes

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Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011523
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed

Routine Water - Continued

Batch: 2460219 - Anions (Routine) by Ion Chromatography

Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479560	Jun 05, 2024	Fluoride	mg/L	10.1						9.39 - 10.59	yes
Control Sample	6479560	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479560	Jun 05, 2024	Nitrite - N	mg/L	9.80						9.01 - 10.99	yes
Control Sample	6479560	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479561	Jun 05, 2024	Fluoride	mg/L	4.95						4.56 - 5.22	yes
Control Sample	6479561	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479562	Jun 05, 2024	Fluoride	mg/L	0.52						0.45 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrite - N	mg/L	0.505						0.455 - 0.557	yes
Control Sample	6479562	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.01						0.85 - 1.15	yes
Replicate	6479558	Jun 05, 2024	Nitrate - N	mg/L	1.70			1.69		0.55	10 % or 0.01 Abs	yes
Replicate	6479558	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes

Batch: 2460052 - Chloride in Water

Blank	6479097	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479094	Jun 05, 2024	Chloride	mg/L	1910						1847.4 - 2256	yes
Control Sample	6479095	Jun 05, 2024	Chloride	mg/L	78.6						74.9 - 86.9	yes
Control Sample	6479096	Jun 05, 2024	Chloride	mg/L	14.7						13.3 - 16.5	yes
Replicate	6479093	Jun 05, 2024	Chloride	mg/L	0.8			0.8		5.13	10 % or 0.5 Abs	yes

Batch: 2460048 - Metals Trace (Dissolved) in water

Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes

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17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011523
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

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SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011523 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-6; 9343638: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011523
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

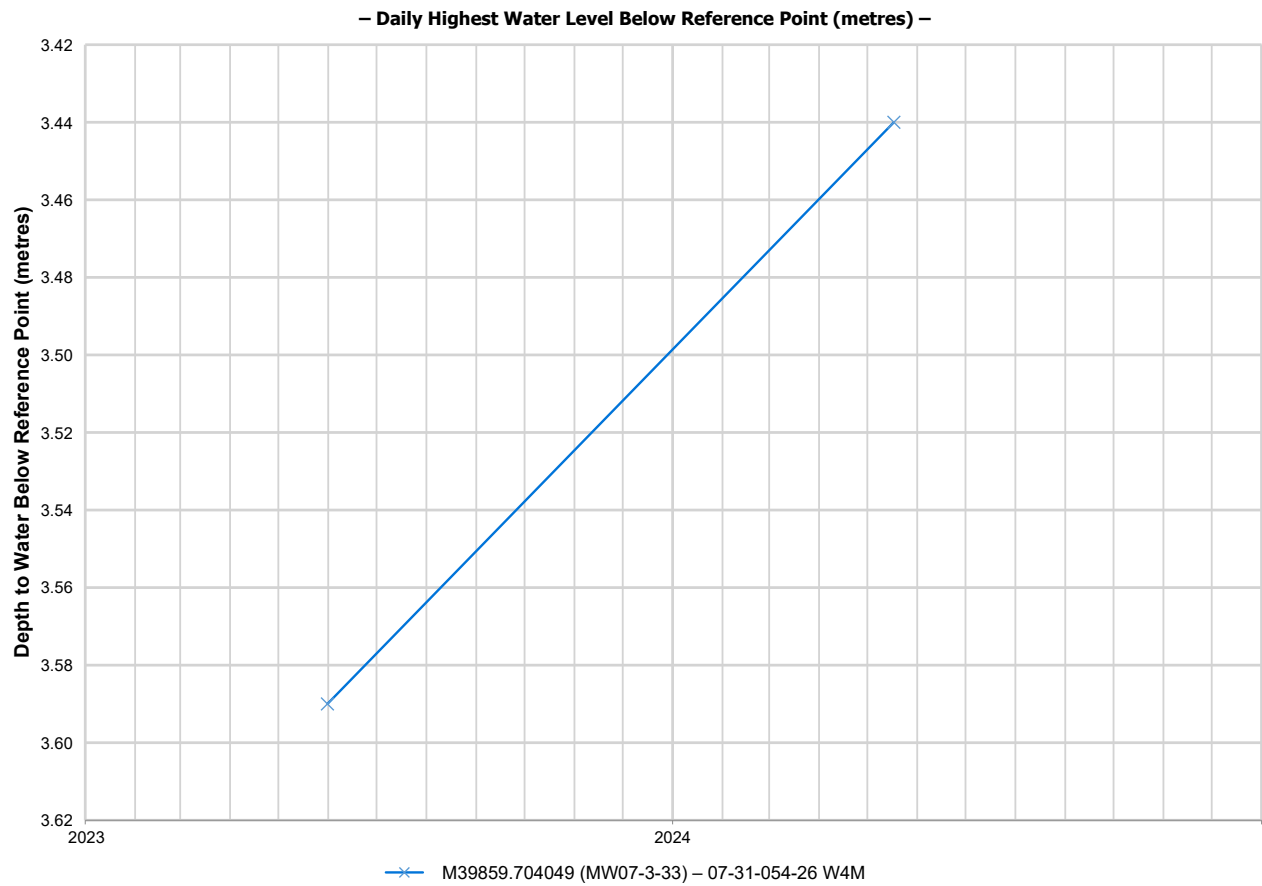
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

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MW07-3-33
2023 - 2024 Hydrograph



MW10-01

(Water Test Hole No. 1-10)

03-29-054-26 W4M

(M40337.575466)



Spatial Location:

Easting: **79,239**

Northing: **5,947,166**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **671.4**

(elevation accuracy MT Surveyed)

Date Completed: **June 7, 2010**

Depth Drilled (m): **18.3**

Completion Interval (m): **9.0 – 12.0 ***

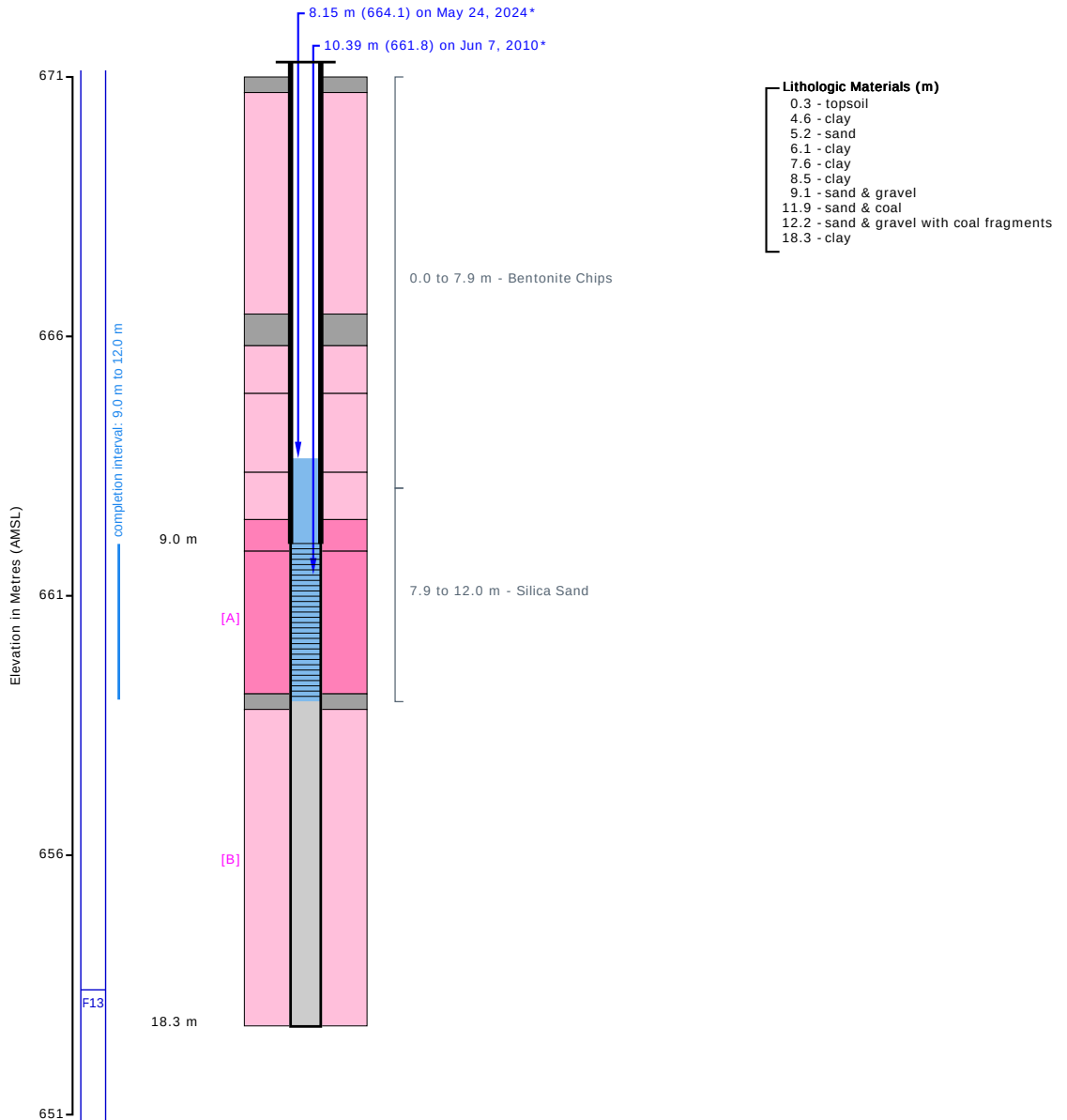
(* TGWC determined value)

Earliest Water Level (m): **10.39 – June 7, 2010 @ 13:42**

Most Recent Water Level (m): **8.15 – May 24, 2024 @ 10:38**

GIC ID: **Unknown**

MW10-01 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial		Unsorted	Bedrock	 Other
		Fine Grained		
				
		Coarse Grained		
				Fine Grained
				
				Coarse Grained
			F13 - Lower Horseshoe Canyon Formation	
Summary				

Summary

TGWC ID: M40337.575466
 Well Name: MW10-01
 Legal Location: 03-29-054-26 W4M
 Casing (OD): 50.8 mm; Plastic (2.0")
 Screen (OD): 50.8 mm; Plastic (2.0")
 Casing Stick-Up: 0.8 m (not drawn to scale)
 Completion [A]: 9.0 to 12.0 m; Screened
 Construction [B]: 12.0 to 18.3 m; Plugged; Bentonite Chips
 Water Level (recent): 8.15 m (664.1 m AMSL) on May 24, 2024 @ 10:38 - Reference Point: Top of Casing
 Water Level (oldest): 10.39 m (661.8 m AMSL) on Jun 7, 2010 @ 13:42 - Reference Point: Top of Casing
 Top of Liner assumed to be 5% of 'non-cased' interval.

* Water-Level Measurements are measured from reference point listed.
 NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (<http://www.hcl.ca>) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
 Drawn: October 10, 2024 @ 12:22 --- <https://www.hcl.ca>

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MW10-01
AEPA - Water Well Drilling Report

— AEPA water well drilling report not available —

MW10-01
Chemical Analysis Results (June 7, 2024)



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Page 1 of 11

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011539 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-22
Sample Date	May 24, 2024
Sample Time	10:50
Sample Location	M40337.575466
Sample Description	MW10-01 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	4.29	0.05		
Sulfur	Dissolved	mg/L	48.6	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	0.0016	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0003	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.077	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.113	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	0.00083	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	0.0004	0.0001		
Copper	Dissolved	mg/L	0.0035	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.073	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0027	0.0005		
Selenium	Dissolved	mg/L	<0.0002	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	1.03	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0049	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	0.019	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	8	5	15	Below AO
Turbidity		NTU	2.6	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.89	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	20.5			
Electrical Conductivity	at 25 °C	µS/cm	990	1		
Calcium	Dissolved	mg/L	140	0.2		
Magnesium	Dissolved	mg/L	36.0	0.2		
Sodium	Dissolved	mg/L	21.0	0.4	200	Below AO

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Analytical Report

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011539
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

Reference Number	1736660-22
Sample Date	May 24, 2024
Sample Time	10:50
Sample Location	M40337.575466
Sample Description	MW10-01 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	11.7	0.4		
Iron	Dissolved	mg/L	<0.01	0.01	0.3	Below AO
Manganese	Dissolved	mg/L	0.770	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	24.6	0.4	250	Below AO
Fluoride		mg/L	0.18	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.52	0.01	10	Below MAC
Nitrite - N		mg/L	0.014	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	0.53	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	146	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	468			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	384	5		
Total Dissolved Solids	Calculated	mg/L	610	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	498			
Ionic Balance	Dissolved	%	98			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
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T5S 2W3
Attn: Jennifer Catt
Sampled By: HCL
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Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
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Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011539
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460024 - Mercury (Dissolved) in water												
Blank	6479008	Jun 05, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479012	Jun 05, 2024	Mercury	mg/L	0.000094						7e-005 - 0.00013	yes
Control Sample	6479011	Jun 05, 2024	Mercury	mg/L	0.000019						6e-006 - 3.6e-005	yes
Replicate	6479013	Jun 05, 2024	Mercury	mg/L	<0.000005			<0.000005		0	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Date Reported: Jun 7, 2024
Report Number: 3011539
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3
Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011539
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479115	Jun 05, 2024	Aluminum	µg/L	15			17		16.97	10 % or 11 Abs	yes
Replicate	6479115	Jun 05, 2024	Antimony	µg/L	0.4			0.4		6.23	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Arsenic	µg/L	0.8			0.9		2.96	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Barium	µg/L	75			75		0.09	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Boron	µg/L	85			86		0.93	10 % or 4.4 Abs	yes
Replicate	6479115	Jun 05, 2024	Cadmium	µg/L	0.10			0.12		18.99	10 % or 0.022 Abs	yes
Replicate	6479115	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Cobalt	µg/L	0.6			0.6		0.05	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Copper	µg/L	1.1			1.2		7.9	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Lead	µg/L	<0.1			0.1		2.13	10 % or 0.22 Abs	yes

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Quality Control

Bill To: Hydrogeological Consultants
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Edmonton, AB, Canada
T5S 2W3
Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011539
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479115	Jun 05, 2024	Lithium	µg/L	55			55		0.61	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Nickel	µg/L	3.2			3.4		5.33	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Selenium	µg/L	1.2			1.2		3.21	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Strontium	µg/L	967			960		0.74	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479115	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Titanium	µg/L	<0.5			0.9		53.68	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Uranium	µg/L	15.6			15.6		0.48	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Vanadium	µg/L	0.2			0.3		13.69	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Zinc	µg/L	4			4		7.72	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479186	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011539 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Replicate	6479215	Jun 05, 2024	Turbidity	NTU	1.8			1.7		2.31	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478743	Jun 05, 2024	pH		7.77			7.76		0.17	0 % or 0.1 Abs	yes
Replicate	6478743	Jun 05, 2024	Electrical Conductivity	dS/m	1.23			1.23		0	10 % or 0.002 Abs	yes
Replicate	6478743	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478743	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	Bicarbonate	mg/L	649			653		0.66	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478743	Jun 05, 2024	T-Alkalinity	mg/L	532			536		0.66	10 % or 5 Abs	yes

Batch: 2460219 - Anions (Routine) by Ion Chromatography

Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479564	Jun 05, 2024	Fluoride	mg/L	10.0						9.39 - 10.59	yes

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Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011539
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479564	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479564	Jun 05, 2024	Nitrite - N	mg/L	9.77						9.01 - 10.99	yes
Control Sample	6479564	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479565	Jun 05, 2024	Fluoride	mg/L	5.00						4.56 - 5.22	yes
Control Sample	6479565	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479565	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479565	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479566	Jun 05, 2024	Fluoride	mg/L	0.51						0.45 - 0.57	yes
Control Sample	6479566	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479566	Jun 05, 2024	Nitrite - N	mg/L	0.502						0.455 - 0.557	yes
Control Sample	6479566	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.00						0.85 - 1.15	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrate - N	mg/L	0.58			0.58		0.19	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Batch: 2460053 - Chloride in Water												
Blank	6479101	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479098	Jun 05, 2024	Chloride	mg/L	2030						1847.4 - 2256	yes
Control Sample	6479099	Jun 05, 2024	Chloride	mg/L	81.2						74.9 - 86.9	yes
Control Sample	6479100	Jun 05, 2024	Chloride	mg/L	15.4						13.3 - 16.5	yes
Replicate	6479102	Jun 05, 2024	Chloride	mg/L	3.9			4.0		1.53	10 % or 0.5 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes

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LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011539
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

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Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011539 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-22; 9343654: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011539
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

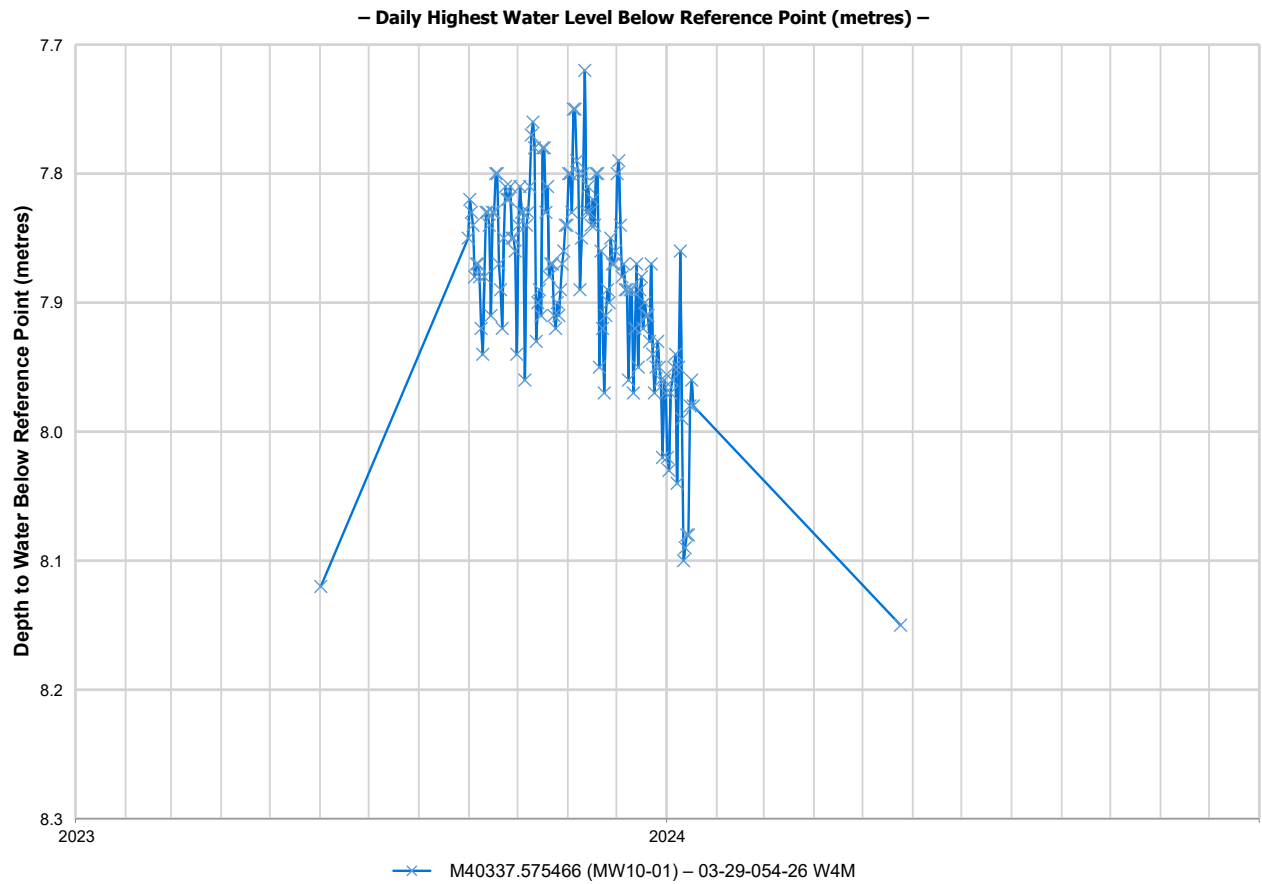
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

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MW10-01
2023 - 2024 Hydrograph



MW11-02

04-27-054-27 W4M
(M41457.432661)



Photograph taken on June 27, 2013

Spatial Location:

Easting: **71,965**

Northing: **5,947,084**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **691**

(elevation accuracy MT GPS (Elevation))

Date Completed: **May 20, 2011**

Depth Drilled (m): **23.2**

Completion Interval (m): **10.4 – 22.6 ***

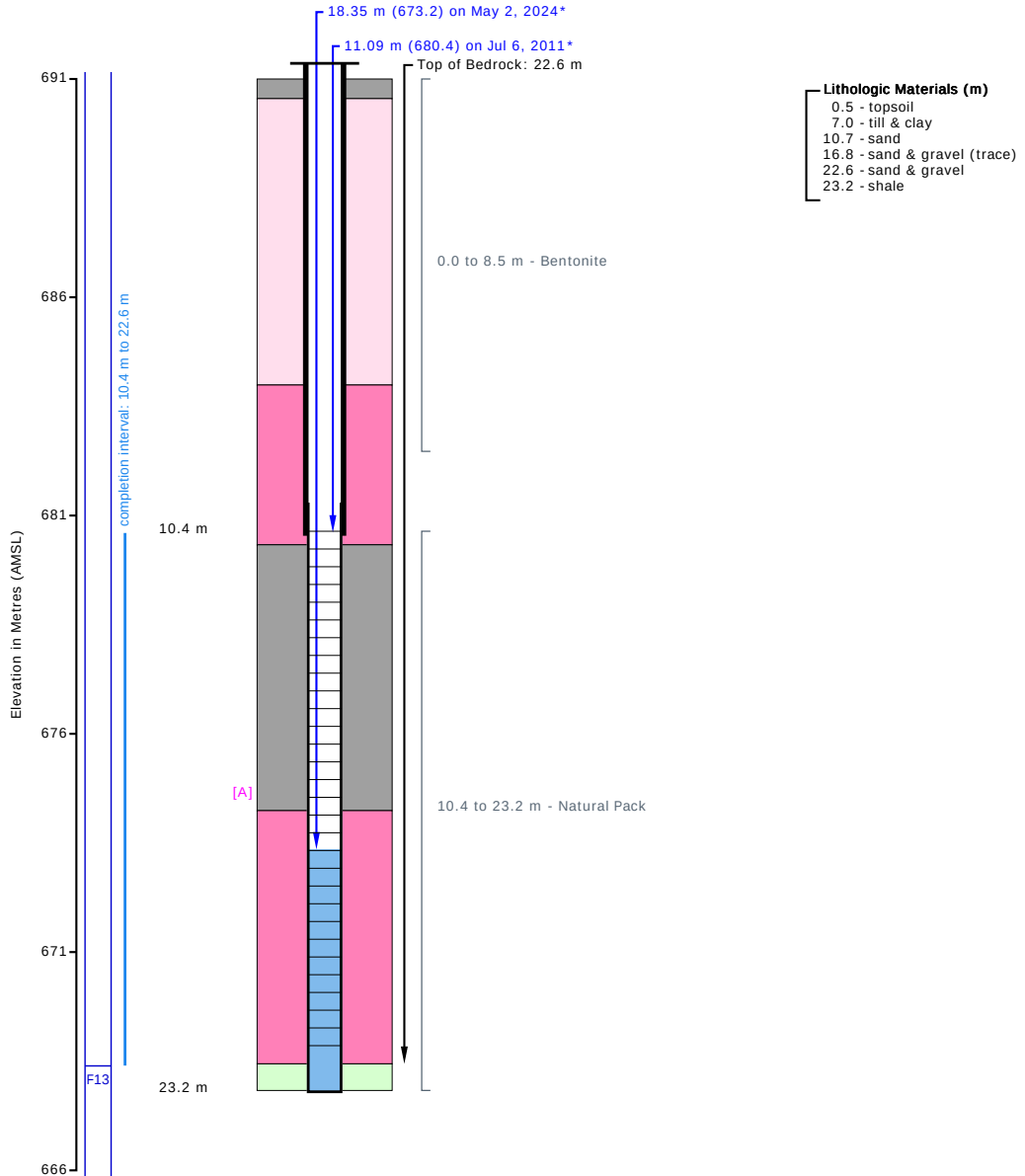
(TGWC determined value)*

Earliest Water Level (m): **11.09 – July 6, 2011 @ 12:00**

Most Recent Water Level (m): **18.35 – May 2, 2024 @ 11:15**

GIC ID: **Unknown**

MW11-02 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		F13 - Lower Horseshoe Canyon Formation	
	Fine Grained			
	Coarse Grained			
Bedrock	Fine Grained			
	Coarse Grained			
	Other			

Summary

TGWC ID: M41457.432661
 Well Name: MW11-02
 Legal Location: 04-27-054-27 W4M
 Casing (OD): 60.3 mm; PVC (2.4")
 Screen (OD): 52.5 mm; PVC (2.1")
 Casing Stick-Up: 0.7 m (not drawn to scale)
 Completion [A]: 10.4 to 22.6 m; Screened
 Water Level (recent): 18.35 m (673.2 m AMSL) on May 2, 2024 @ 11:15 - Reference Point: Top of Casing
 Water Level (oldest): 11.09 m (680.4 m AMSL) on Jul 6, 2011 @ 12:00 - Reference Point: Top of Casing
 Top of Liner assumed to be 5% of 'non-cased' interval.

* Water-Level Measurements are measured from reference point listed.
 NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (<http://www.hcl.ca>) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
 Drawn: October 10, 2024 @ 12:22 --- <https://www.hcl.ca>

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Owner: Heidelberg Materials Canada Limited

Suite 100, 15015 123 Avenue Northwest, Edmonton, AB T5V 1J7

Contractor: Moblie Augers and Research Ltd.

Name: MW11-02

Field Action: Confirmed - Physically, June 27, 2013

Work Type: Piezometer

Drilling Method: Hollow-Stem Auger

Proposed Use: Monitoring

Completion Type: Screen

Date Started: May 20, 2011

Date Completed: May 20, 2011

Well Status: Monitoring

Feature Class: Piezometer

04-27-054-27 W4M

Easting (m): 71,964.95 ¹

Northing (m): 5,947,084.13 ¹

Elevation (m): 691 ²

M41457.432661

Elog Taken: No

Gamma Taken: No

Flowing: No

Presence of Gas: No

Stick Up (m): 0.7

544065; core; 2024-06-11

General Details

* TGWC calculated value

Depth Completed (m)*: 22.6

Top of Bedrock (m): 22.56 *

Depth Drilled (m): 23.2

Completion Interval (m): 10.4 – 22.6 *

Sand & Gravel Thickness (m): 9.5 (total) – 9.5 (below 15 m) *

Most Recent Water Level (m): 18.35 m – May 2, 2024

Completion Details

Surface Casing: PVC – 60.3 mm (O.D.) x 7.80 mm (thick) x 10.4 m (bottom)

Screen Material: PVC – 52.5 mm (O.D.) (Attached To Casing)

Fittings: Top: Threaded – Bottom: [unknown]

Intervals

Screen: 10.4 to 22.6 m - 10 (Machine)

Bentonite: 0.0 to 8.5 m

Natural Pack: 10.4 to 23.2 m

Chemistry Summary Details (mg/L, except as noted)

(recently sampled first)

Sampling Details: May 2, 2024 @ 11:50

Report Date: June 7, 2024 - Element Materials Technology Canada Inc. (1736660-15)

Constituent

Result

Conductivity (µS/cm): 1190

Total Dissolved Solids: 781

Hardness (as CaCO3): 532

T-Alkalinity (as CaCO3): 472

P-Alkalinity (as CaCO3): < 5

Nitrate + Nitrite as N: 0.57

Total Suspended Solids:

Temperature (°C): 20.8

Constituent

Result

Nitrate as N: 0.57

Nitrite as N: < 0.005

pH (pH Unit): 7.81

Colour (TCU): > 60

Ion Balance (%): 103

Total Coliforms:**

Fecal Coliforms:**

Escherichia coli:**

Constituent

Result

Turbidity (NTU): 139

Fluoride: 0.09

Carbonate: < 6

Bicarbonate: 575

Hydroxide: < 5

Total Iron:

Total Mn:

Constituent

Extractable

Dissolved

Calcium: 153

Chloride: 1.1

Iron: 0.07

Manganese: 0.861***

Aluminum: 0.002

Arsenic: 0.0003

Barium: 0.106

Beryllium: < 0.0001

Cadmium: 0.00009

Chromium: < 0.0005

Cobalt: 0.0013

Sulfate: 219

Constituent

Extractable

Dissolved

Mercury: < 0.000005

Molybdenum: < 0.001

Magnesium: 36.7

Sodium: 84.5

Potassium: 4.6

Vanadium: < 0.0001

Strontium: 1.04

Nickel: 0.0021

Zinc: 0.005

Copper: 0.0008

Lead: < 0.0001

Uranium: 0.0087

Extractable - unfiltered
Dissolved - filtered

Comments: Sample collected by Hydrogeological Consultants Ltd. personnel.

***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2024. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.

544065; 1 / 18

Aquifer Tests

Alias IDs

Z980232

HCL GPS — 10TM Resource NAD83, * MT GPS (Elevation)

(1) October 10, 2024, "AS IS"; no warranty either expressed or implied. visit tgwc.com for additional details

Sturgeon County, 2023 to 2024 Groundwater Monitoring Report
Calahoo Resource Extraction District, Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, MR-0224.23

B - 296

MW11-02
AEPA – Water Well Drilling Report

— AEPA water well drilling report not available —

MW11-02
Chemical Analysis Results (June 7, 2024)



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Page 1 of 11

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011532 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-15
Sample Date	May 02, 2024
Sample Time	11:50
Sample Location	M41457.432661
Sample Description	MW11-02 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	5.98	0.05		
Sulfur	Dissolved	mg/L	72.9	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	0.002	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0003	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.106	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.102	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	0.00009	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	0.0013	0.0001		
Copper	Dissolved	mg/L	0.0008	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.090	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0021	0.0005		
Selenium	Dissolved	mg/L	0.0010	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	1.04	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0087	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	0.005	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	>60	5	15	Above AO
Turbidity		NTU	139	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.81	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	20.8			
Electrical Conductivity	at 25 °C	µS/cm	1190	1		
Calcium	Dissolved	mg/L	153	0.2		
Magnesium	Dissolved	mg/L	36.7	0.2		
Sodium	Dissolved	mg/L	84.5	0.4	200	Below AO

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011532 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Reference Number	1736660-15
Sample Date	May 02, 2024
Sample Time	11:50
Sample Location	M41457.432661
Sample Description	MW11-02 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	4.6	0.4		
Iron	Dissolved	mg/L	0.07	0.01	0.3	Below AO
Manganese	Dissolved	mg/L	0.861	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	1.1	0.4	250	Below AO
Fluoride		mg/L	0.09	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.57	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	0.57	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	219	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	575			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	472	5		
Total Dissolved Solids	Calculated	mg/L	781	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	532			
Ionic Balance	Dissolved	%	103			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011532
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460024 - Mercury (Dissolved) in water												
Blank	6479008	Jun 05, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479012	Jun 05, 2024	Mercury	mg/L	0.000094						7e-005 - 0.00013	yes
Control Sample	6479011	Jun 05, 2024	Mercury	mg/L	0.000019						6e-006 - 3.6e-005	yes
Replicate	6479013	Jun 05, 2024	Mercury	mg/L	<0.000005			<0.000005		0	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
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Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011532
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Attn: Jennifer Catt
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Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011532
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479114	Jun 05, 2024	Aluminum	µg/L	<2			<2		0	10 % or 11 Abs	yes
Replicate	6479114	Jun 05, 2024	Antimony	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Arsenic	µg/L	12.5			12.4		0.38	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Barium	µg/L	19			19		0.09	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Boron	µg/L	102			102		0.06	10 % or 4.4 Abs	yes
Replicate	6479114	Jun 05, 2024	Cadmium	µg/L	<0.01			<0.01		0	10 % or 0.022 Abs	yes
Replicate	6479114	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Cobalt	µg/L	0.8			0.8		3.91	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Copper	µg/L	<0.2			<0.2		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Lead	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3
Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011532
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479114	Jun 05, 2024	Lithium	µg/L	118			119		0.43	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Nickel	µg/L	0.7			0.8		2.6	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Selenium	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Strontium	µg/L	822			826		0.52	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479114	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Titanium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Uranium	µg/L	3.7			3.7		0.74	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Vanadium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Zinc	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479186	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011532 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Replicate	6479215	Jun 05, 2024	Turbidity	NTU	1.8			1.7		2.31	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478743	Jun 05, 2024	pH		7.77			7.76		0.17	0 % or 0.1 Abs	yes
Replicate	6478743	Jun 05, 2024	Electrical Conductivity	dS/m	1.23			1.23		0	10 % or 0.002 Abs	yes
Replicate	6478743	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478743	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	Bicarbonate	mg/L	649			653		0.66	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478743	Jun 05, 2024	T-Alkalinity	mg/L	532			536		0.66	10 % or 5 Abs	yes

Batch: 2460219 - Anions (Routine) by Ion Chromatography

Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479560	Jun 05, 2024	Fluoride	mg/L	10.1						9.39 - 10.59	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011532
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479560	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479560	Jun 05, 2024	Nitrite - N	mg/L	9.80						9.01 - 10.99	yes
Control Sample	6479560	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479561	Jun 05, 2024	Fluoride	mg/L	4.95						4.56 - 5.22	yes
Control Sample	6479561	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479562	Jun 05, 2024	Fluoride	mg/L	0.52						0.45 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrite - N	mg/L	0.505						0.455 - 0.557	yes
Control Sample	6479562	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.01						0.85 - 1.15	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrate - N	mg/L	0.58			0.58		0.19	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Batch: 2460052 - Chloride in Water												
Blank	6479097	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479094	Jun 05, 2024	Chloride	mg/L	1910						1847.4 - 2256	yes
Control Sample	6479095	Jun 05, 2024	Chloride	mg/L	78.6						74.9 - 86.9	yes
Control Sample	6479096	Jun 05, 2024	Chloride	mg/L	14.7						13.3 - 16.5	yes
Replicate	6479093	Jun 05, 2024	Chloride	mg/L	0.8			0.8		5.13	10 % or 0.5 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011532
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

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Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011532 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-15; 9343647: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011532
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

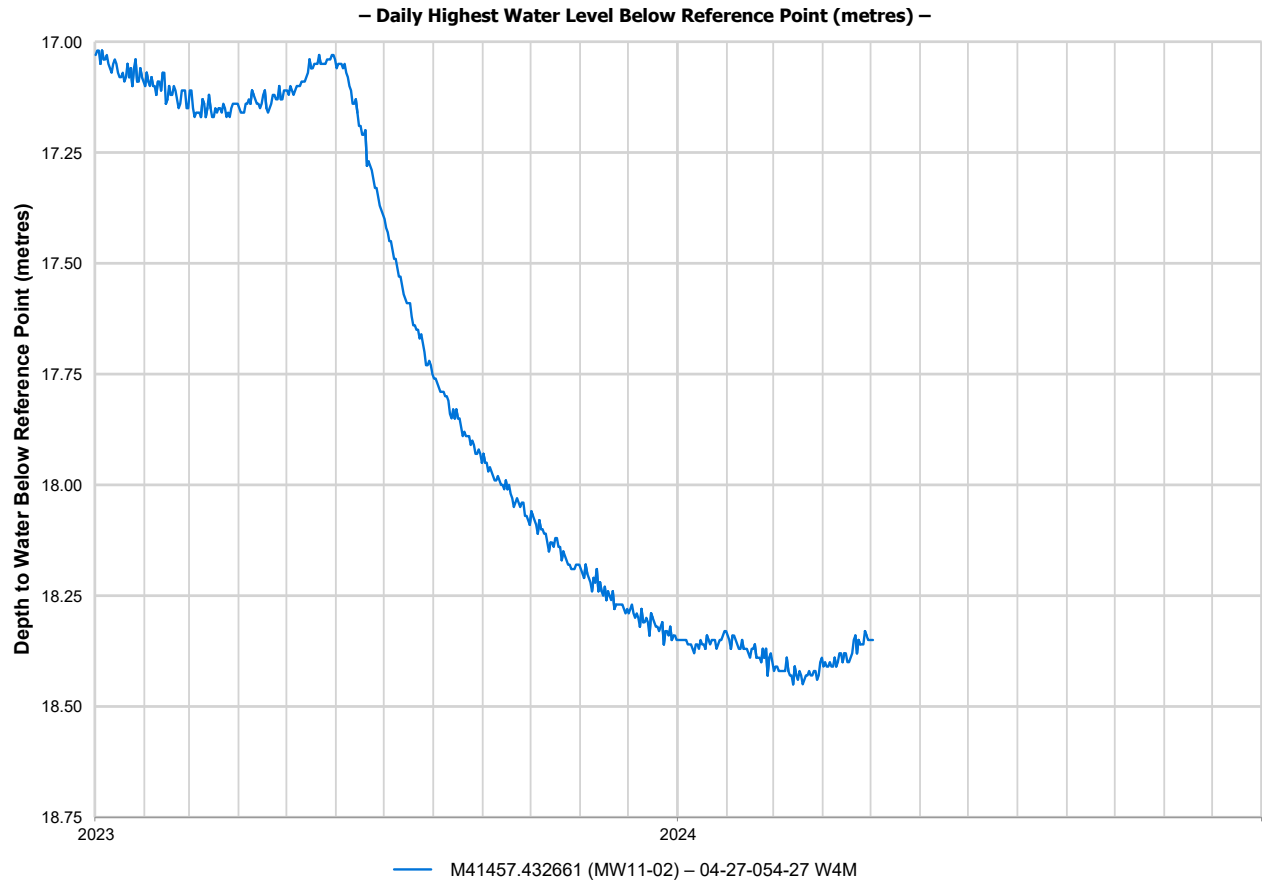
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

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MW11-02
2023 - 2024 Hydrograph



MW14-01

05-34-054-27 W4M
(M42473.435942)



Spatial Location:

Easting: **71,919**

Northing: **5,948,923**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **676**

(elevation accuracy HCL DEM)

Date Completed: **October 10, 2014**

Depth Drilled (m): **18.3**

Completion Interval (m): **13.8 – 16.8 ***

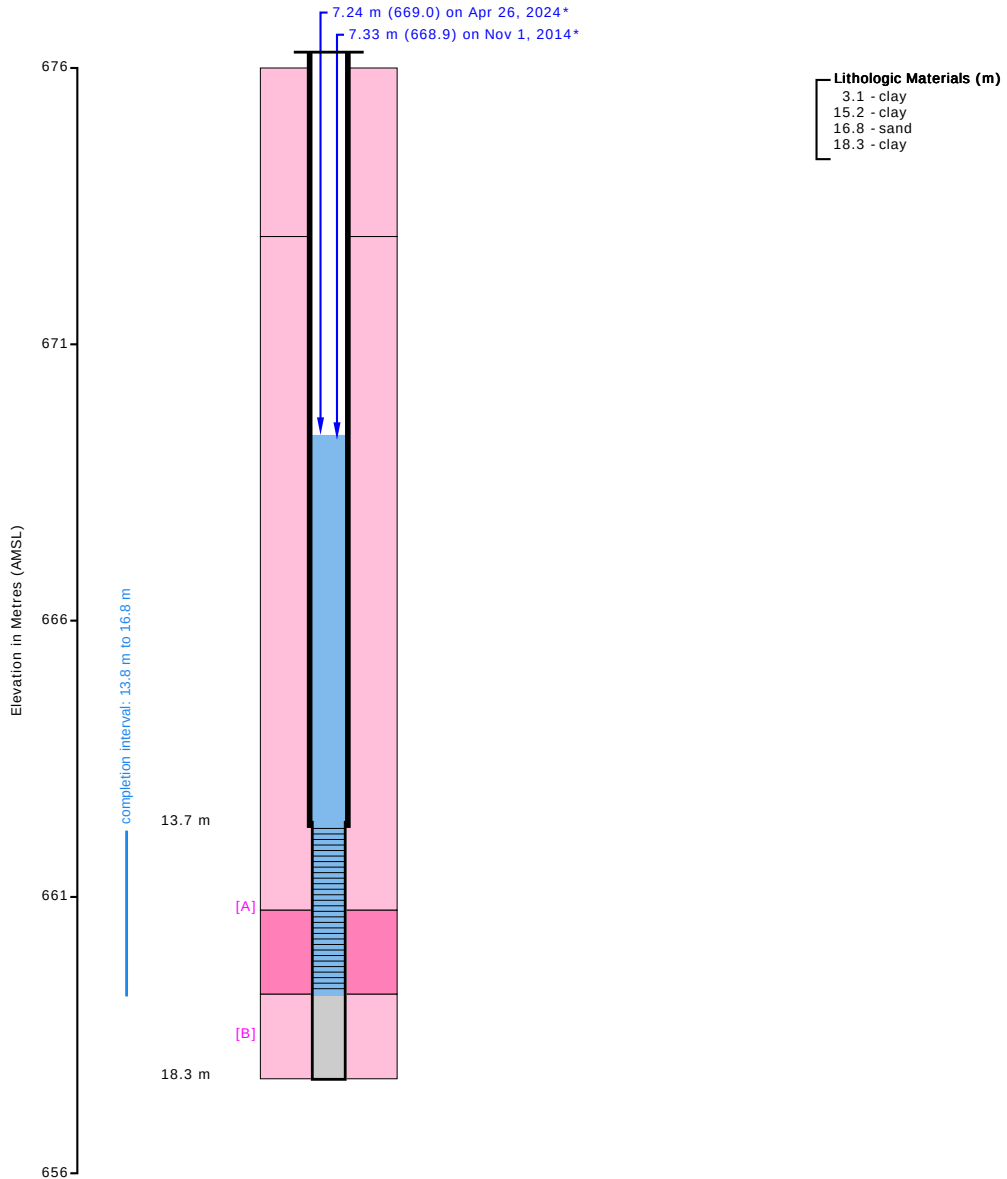
(TGWC determined value)*

Earliest Water Level (m): **7.33 – November 1, 2014**

Most Recent Water Level (m): **7.24 – April 26, 2024 @ 11:00**

GIC ID: **Unknown**

MW14-01 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		Geologic Unit details not available for this location	
	Fine Grained			
	Coarse Grained			
Bedrock	Fine Grained		Geologic Unit details not available for this location	
	Coarse Grained			
	Other			

Summary

TGWC ID: M42473.435942
 Well Name: MW14-01
 Legal Location: 05-34-054-27 W4M
 Casing (OD): 60.3 mm; PVC (2.4")
 Screen (OD): 52.0 mm; PVC (2.0")
 Casing Stick-Up: 0.6 m (not drawn to scale)
 Completion [A]: 13.8 to 16.8 m; Screened
 Construction [B]: 16.8 to 18.3 m; Plugged; Slough
 Water Level (recent): 7.24 m (669.0 m AMSL) on Apr 26, 2024 @ 11:00 - Reference Point: Top of Casing
 Water Level (oldest): 7.33 m (668.9 m AMSL) on Nov 1, 2014 - Reference Point: Top of Casing

* Water-Level Measurements are measured from reference point listed.
 NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (<http://www.hcl.ca>) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
 Drawn: October 10, 2024 @ 12:22 --- <https://www.hcl.ca>

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MW14-01
AEPA – Water Well Drilling Report

— AEPA water well drilling report not available —

MW14-01
Chemical Analysis Results (June 7, 2024)



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Page 1 of 12

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011531 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-14
Sample Date	April 26, 2024
Sample Time	11:35
Sample Location	M42473.435942
Sample Description	MW14-01 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	8.02	0.05		
Sulfur	Dissolved	mg/L	66.2	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0144	0.0002	0.01	Above MAC
Barium	Dissolved	mg/L	0.024	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.185	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	<0.00001	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	0.0018	0.0001		
Copper	Dissolved	mg/L	<0.0002	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.139	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0014	0.0005		
Selenium	Dissolved	mg/L	<0.0002	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	1.49	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0033	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	0.001	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	55	5	15	Above AO
Turbidity		NTU	27.3	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.76	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	20.6			
Electrical Conductivity	at 25 °C	µS/cm	1230	1		
Calcium	Dissolved	mg/L	150	0.2		
Magnesium	Dissolved	mg/L	38.3	0.2		
Sodium	Dissolved	mg/L	82.3	0.4	200	Below AO

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Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Reference Number	1736660-14
Sample Date	April 26, 2024
Sample Time	11:35
Sample Location	M42473.435942
Sample Description	MW14-01 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	4.9	0.4		
Iron	Dissolved	mg/L	2.80	0.01	0.3	Above AO
Manganese	Dissolved	mg/L	0.478	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	0.8	0.4	250	Below AO
Fluoride		mg/L	0.10	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.56	0.01	10	Below MAC
Nitrite - N		mg/L	0.460	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	1.02	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	199	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	653			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	536	5		
Total Dissolved Solids	Calculated	mg/L	796	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	531			
Ionic Balance	Dissolved	%	97			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

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Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011531
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed

Metals Dissolved

Batch: 2460024 - Mercury (Dissolved) in water

Blank	6479008	Jun 05, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479012	Jun 05, 2024	Mercury	mg/L	0.000094						7e-005 - 0.00013	yes
Control Sample	6479011	Jun 05, 2024	Mercury	mg/L	0.000019						6e-006 - 3.6e-005	yes
Replicate	6479013	Jun 05, 2024	Mercury	mg/L	<0.000005			<0.000005		0	10 % or 3e-005 Abs	yes

Batch: 2460055 - Metals ICP-MS (Dissolved) in water

Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

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T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011531
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011531
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479114	Jun 05, 2024	Aluminum	µg/L	<2			<2		0	10 % or 11 Abs	yes
Replicate	6479114	Jun 05, 2024	Antimony	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Arsenic	µg/L	12.5			12.4		0.38	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Barium	µg/L	19			19		0.09	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Boron	µg/L	102			102		0.06	10 % or 4.4 Abs	yes
Replicate	6479114	Jun 05, 2024	Cadmium	µg/L	<0.01			<0.01		0	10 % or 0.022 Abs	yes
Replicate	6479114	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Cobalt	µg/L	0.8			0.8		3.91	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Copper	µg/L	<0.2			<0.2		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Lead	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes

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Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011531
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479114	Jun 05, 2024	Lithium	µg/L	118			119		0.43	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Nickel	µg/L	0.7			0.8		2.6	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Selenium	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Strontium	µg/L	822			826		0.52	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479114	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Titanium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Uranium	µg/L	3.7			3.7		0.74	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Vanadium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Zinc	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479186	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011531
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Blank	6479192	Jun 05, 2024	Turbidity	NTU	0.1	0.1					0.1	yes
Control Sample	6479197	Jun 05, 2024	Turbidity	NTU	1990						1847.5 - 2041.9	yes
Control Sample	6479198	Jun 05, 2024	Turbidity	NTU	4760						4441.7 - 6661.7	yes
Control Sample	6479196	Jun 05, 2024	Turbidity	NTU	149						132.1 - 162.1	yes
Control Sample	6479195	Jun 05, 2024	Turbidity	NTU	14.8						12.6 - 15.6	yes
Control Sample	6479194	Jun 05, 2024	Turbidity	NTU	1.7						1 - 2.2	yes
Replicate	6479207	Jun 05, 2024	Turbidity	NTU	11.8			12.0		1.68	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478740	Jun 05, 2024	pH		6.94			6.96		0.23	0 % or 0.1 Abs	yes
Replicate	6478740	Jun 05, 2024	Electrical Conductivity	dS/m	0.129			0.131		1.38	10 % or 0.002 Abs	yes
Replicate	6478740	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478740	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	Bicarbonate	mg/L	65			66		0.9	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478740	Jun 05, 2024	T-Alkalinity	mg/L	54			54		0.9	10 % or 5 Abs	yes

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011531 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Batch: 2460219 - Anions (Routine) by Ion Chromatography												
Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479560	Jun 05, 2024	Fluoride	mg/L	10.1						9.39 - 10.59	yes
Control Sample	6479560	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479560	Jun 05, 2024	Nitrite - N	mg/L	9.80						9.01 - 10.99	yes
Control Sample	6479560	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479561	Jun 05, 2024	Fluoride	mg/L	4.95						4.56 - 5.22	yes
Control Sample	6479561	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479562	Jun 05, 2024	Fluoride	mg/L	0.52						0.45 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrite - N	mg/L	0.505						0.455 - 0.557	yes
Control Sample	6479562	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.01						0.85 - 1.15	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrate - N	mg/L	0.58			0.58		0.19	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Batch: 2460052 - Chloride in Water												
Blank	6479097	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479094	Jun 05, 2024	Chloride	mg/L	1910						1847.4 - 2256	yes
Control Sample	6479095	Jun 05, 2024	Chloride	mg/L	78.6						74.9 - 86.9	yes
Control Sample	6479096	Jun 05, 2024	Chloride	mg/L	14.7						13.3 - 16.5	yes
Replicate	6479093	Jun 05, 2024	Chloride	mg/L	0.8			0.8		5.13	10 % or 0.5 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011531
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

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SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011531 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-14; 9343646: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011531
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

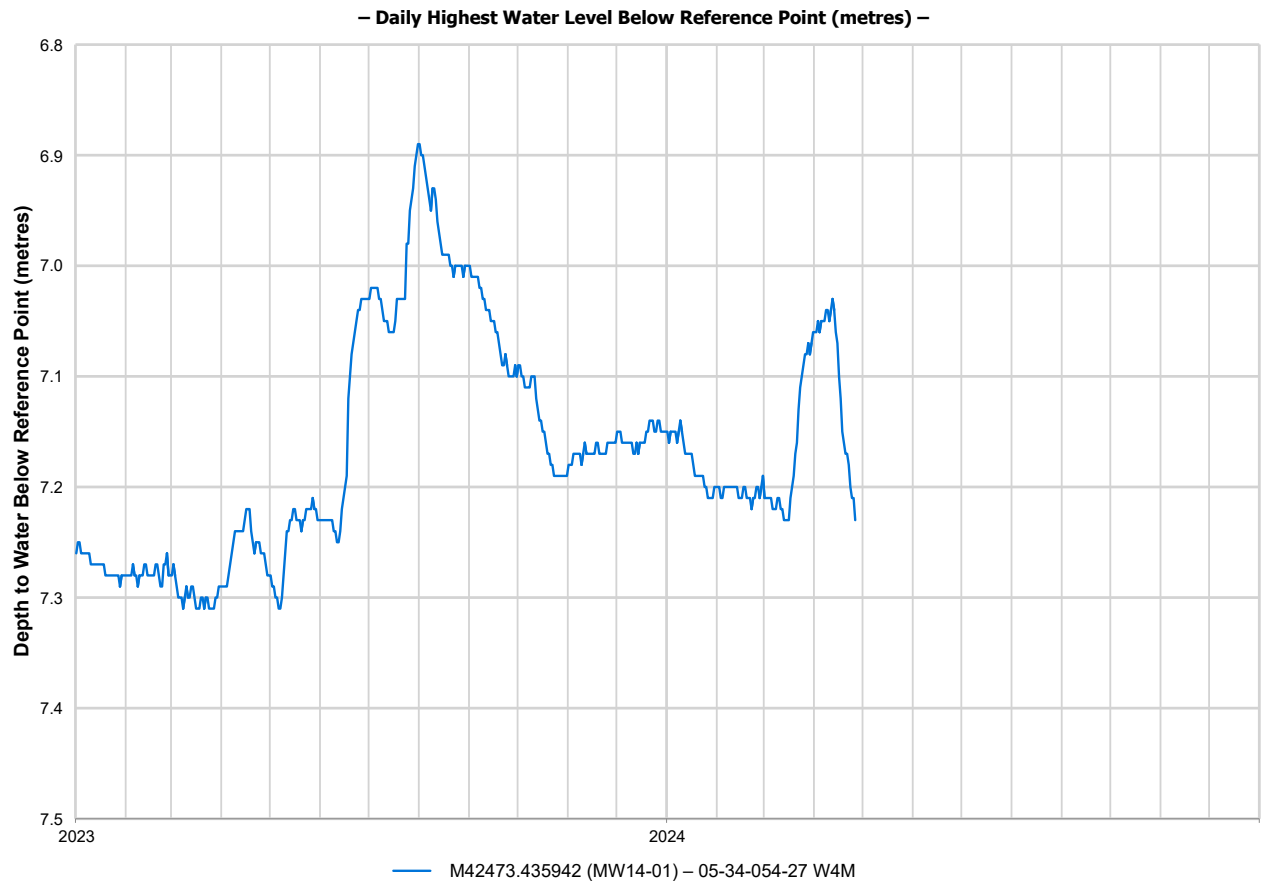
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

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MW14-01
2023 – 2024 Hydrograph



MW14-02

08-34-054-27 W4M
(M42475.578813)



Photograph taken on November 22, 2017

Spatial Location:

Easting: **73,520**

Northing: **5,949,238**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): 673

(elevation accuracy HCL DEM)

Date Completed: October 10, 2014

Depth Drilled (m): 18.3

Completion Interval (m): 12.2 – 15.2 *

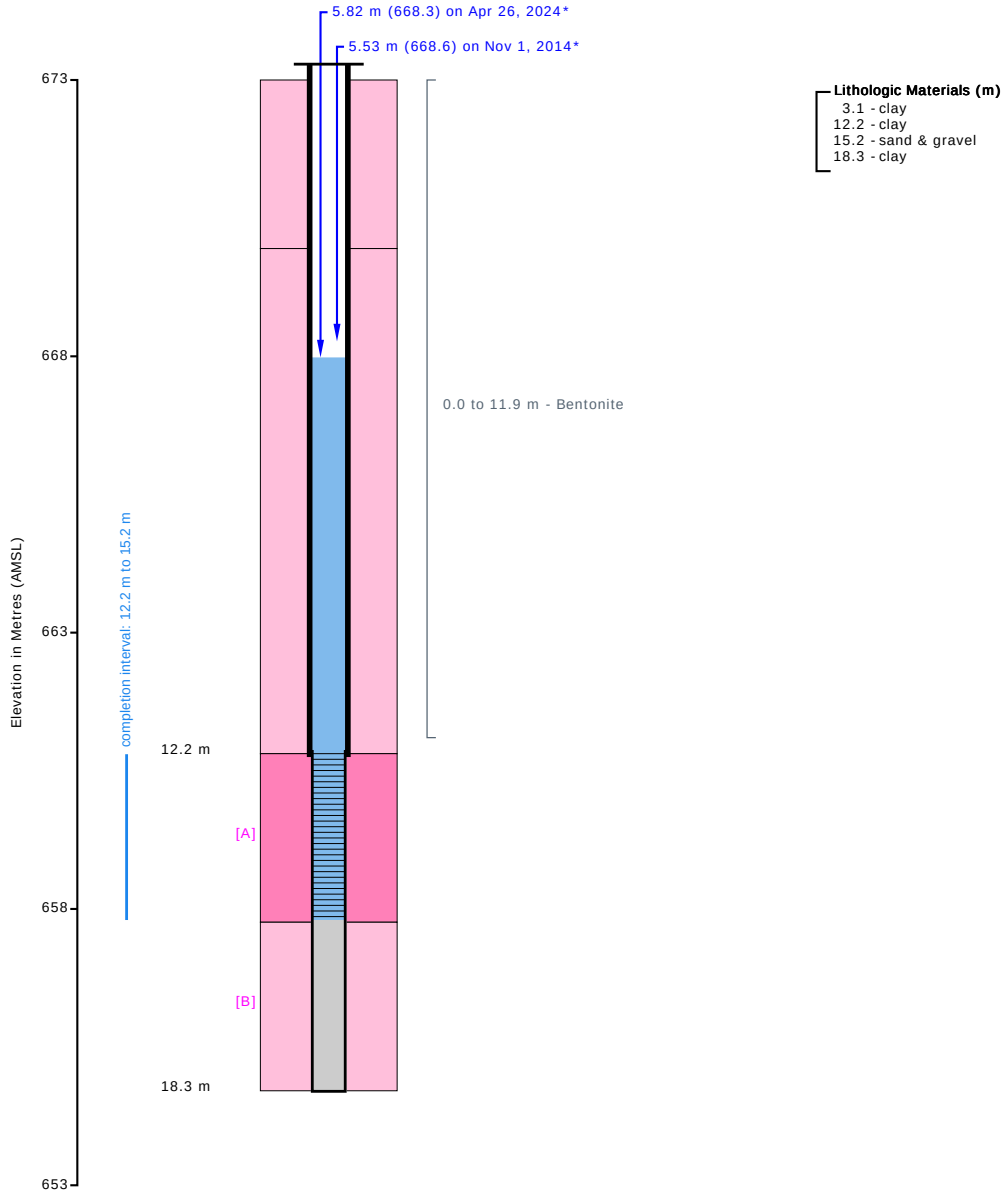
(* TGWC determined value)

Earliest Water Level (m): 5.53 – November 1, 2014

Most Recent Water Level (m): 5.82 – April 26, 2024 @ 14:05

GIC ID: Unknown

MW14-02 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		Geologic Unit details not available for this location	
	Fine Grained			
	Coarse Grained			
Bedrock	Fine Grained			
	Coarse Grained			
	Other			

Summary

TGWC ID: M42475.578813
 Well Name: MW14-02
 Legal Location: 08-34-054-27 W4M
 Casing (OD): 60.3 mm; PVC (2.4")
 Screen (OD): 52.0 mm; PVC (2.0")
 Casing Stick-Up: 0.8 m (not drawn to scale)
 Completion [A]: 12.2 to 15.2 m; Screened
 Construction [B]: 15.2 to 18.3 m; Plugged; Slough
 Water Level (recent): 5.82 m (668.3 m AMSL) on Apr 26, 2024 @ 14:05 - Reference Point: Top of Casing
 Water Level (oldest): 5.53 m (668.6 m AMSL) on Nov 1, 2014 - Reference Point: Top of Casing

* Water-Level Measurements are measured from reference point listed.
 NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (<http://www.hcl.ca>) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
 Drawn: October 10, 2024 @ 12:22 --- <https://www.hcl.ca>

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MW14-02
AEPA - Water Well Drilling Report

— AEPA water well drilling report not available —

MW14-02
Chemical Analysis Results (June 7, 2024)



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Page 1 of 12

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011530 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-13
Sample Date	April 26, 2024
Sample Time	12:37
Sample Location	M42475.578813
Sample Description	MW14-02 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	7.71	0.05		
Sulfur	Dissolved	mg/L	24.0	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0010	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.320	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.089	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	0.00002	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	0.0005	0.0001		
Copper	Dissolved	mg/L	0.0006	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.102	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0047	0.0005		
Selenium	Dissolved	mg/L	0.0003	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	1.40	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0070	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	0.0001	0.0001		
Zinc	Dissolved	mg/L	0.003	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	<5	5	15	Below AO
Turbidity		NTU	0.2	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.76	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	20.5			
Electrical Conductivity	at 25 °C	µS/cm	1490	1		
Calcium	Dissolved	mg/L	195	0.2		
Magnesium	Dissolved	mg/L	56.7	0.2		
Sodium	Dissolved	mg/L	40.0	0.4	200	Below AO

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011530 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Reference Number	1736660-13
Sample Date	April 26, 2024
Sample Time	12:37
Sample Location	M42475.578813
Sample Description	MW14-02 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	3.3	0.4		
Iron	Dissolved	mg/L	0.02	0.01	0.3	Below AO
Manganese	Dissolved	mg/L	0.035	0.005	0.02 AO; 0.12 MAC	Above AO
Chloride	Dissolved	mg/L	181	0.4	250	Below AO
Fluoride		mg/L	0.28	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.52	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	0.52	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	71.9	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	616			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	505	5		
Total Dissolved Solids	Calculated	mg/L	851	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	720			
Ionic Balance	Dissolved	%	97			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
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Quality Control

Bill To: Hydrogeological Consultants
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Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011530
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460024 - Mercury (Dissolved) in water												
Blank	6479008	Jun 05, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479012	Jun 05, 2024	Mercury	mg/L	0.000094						7e-005 - 0.00013	yes
Control Sample	6479011	Jun 05, 2024	Mercury	mg/L	0.000019						6e-006 - 3.6e-005	yes
Replicate	6479013	Jun 05, 2024	Mercury	mg/L	<0.000005			<0.000005		0	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011530 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
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Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011530
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479114	Jun 05, 2024	Aluminum	µg/L	<2			<2		0	10 % or 11 Abs	yes
Replicate	6479114	Jun 05, 2024	Antimony	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Arsenic	µg/L	12.5			12.4		0.38	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Barium	µg/L	19			19		0.09	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Boron	µg/L	102			102		0.06	10 % or 4.4 Abs	yes
Replicate	6479114	Jun 05, 2024	Cadmium	µg/L	<0.01			<0.01		0	10 % or 0.022 Abs	yes
Replicate	6479114	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Cobalt	µg/L	0.8			0.8		3.91	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Copper	µg/L	<0.2			<0.2		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Lead	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3
Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011530
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479114	Jun 05, 2024	Lithium	µg/L	118			119		0.43	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Nickel	µg/L	0.7			0.8		2.6	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Selenium	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Strontium	µg/L	822			826		0.52	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479114	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Titanium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Uranium	µg/L	3.7			3.7		0.74	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Vanadium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Zinc	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479186	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011530
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Blank	6479192	Jun 05, 2024	Turbidity	NTU	0.1	0.1					0.1	yes
Control Sample	6479197	Jun 05, 2024	Turbidity	NTU	1990						1847.5 - 2041.9	yes
Control Sample	6479198	Jun 05, 2024	Turbidity	NTU	4760						4441.7 - 6661.7	yes
Control Sample	6479196	Jun 05, 2024	Turbidity	NTU	149						132.1 - 162.1	yes
Control Sample	6479195	Jun 05, 2024	Turbidity	NTU	14.8						12.6 - 15.6	yes
Control Sample	6479194	Jun 05, 2024	Turbidity	NTU	1.7						1 - 2.2	yes
Replicate	6479207	Jun 05, 2024	Turbidity	NTU	11.8			12.0		1.68	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478740	Jun 05, 2024	pH		6.94			6.96		0.23	0 % or 0.1 Abs	yes
Replicate	6478740	Jun 05, 2024	Electrical Conductivity	dS/m	0.129			0.131		1.38	10 % or 0.002 Abs	yes
Replicate	6478740	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478740	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	Bicarbonate	mg/L	65			66		0.9	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478740	Jun 05, 2024	T-Alkalinity	mg/L	54			54		0.9	10 % or 5 Abs	yes

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Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011530 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed

Routine Water - Continued

Batch: 2460219 - Anions (Routine) by Ion Chromatography

Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479560	Jun 05, 2024	Fluoride	mg/L	10.1						9.39 - 10.59	yes
Control Sample	6479560	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479560	Jun 05, 2024	Nitrite - N	mg/L	9.80						9.01 - 10.99	yes
Control Sample	6479560	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479561	Jun 05, 2024	Fluoride	mg/L	4.95						4.56 - 5.22	yes
Control Sample	6479561	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479562	Jun 05, 2024	Fluoride	mg/L	0.52						0.45 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrite - N	mg/L	0.505						0.455 - 0.557	yes
Control Sample	6479562	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.01						0.85 - 1.15	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrate - N	mg/L	0.58			0.58		0.19	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes

Batch: 2460052 - Chloride in Water

Blank	6479097	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479094	Jun 05, 2024	Chloride	mg/L	1910						1847.4 - 2256	yes
Control Sample	6479095	Jun 05, 2024	Chloride	mg/L	78.6						74.9 - 86.9	yes
Control Sample	6479096	Jun 05, 2024	Chloride	mg/L	14.7						13.3 - 16.5	yes
Replicate	6479093	Jun 05, 2024	Chloride	mg/L	0.8			0.8		5.13	10 % or 0.5 Abs	yes

Batch: 2460048 - Metals Trace (Dissolved) in water

Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes

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Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3
Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011530
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

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SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011530 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-13; 9343645: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011530
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

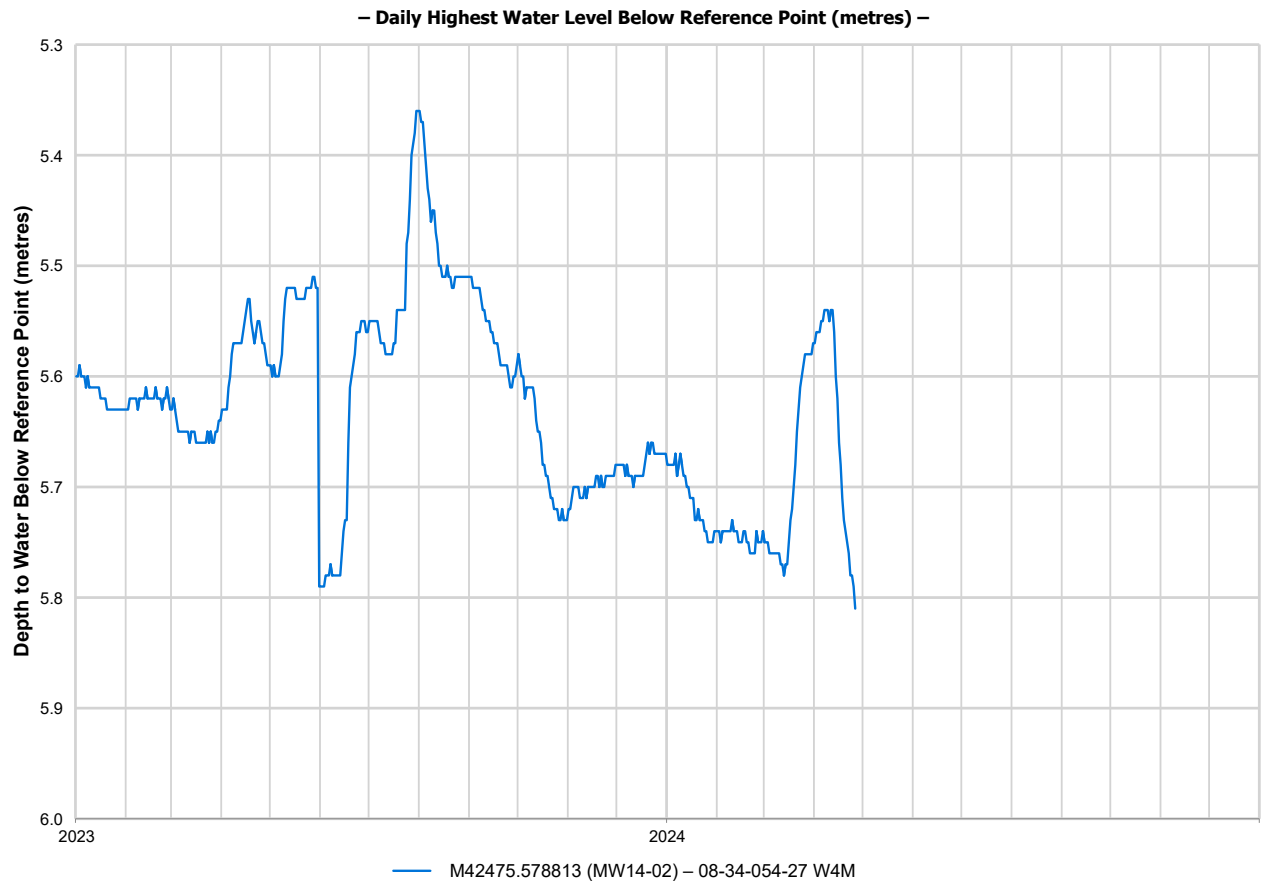
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

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MW14-02
2023 - 2024 Hydrograph



MW18-01

08-16-054-26 W4M
(M43326.424846)



Spatial Location:

Easting: **81,486**

Northing: **5,944,609**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): 672

(elevation accuracy HCL DEM (2016))

Date Completed: August 11, 2018

Depth Drilled (m): 25.3

Completion Interval (m): 13.1 – 22.3 *

(* TGWC determined value)

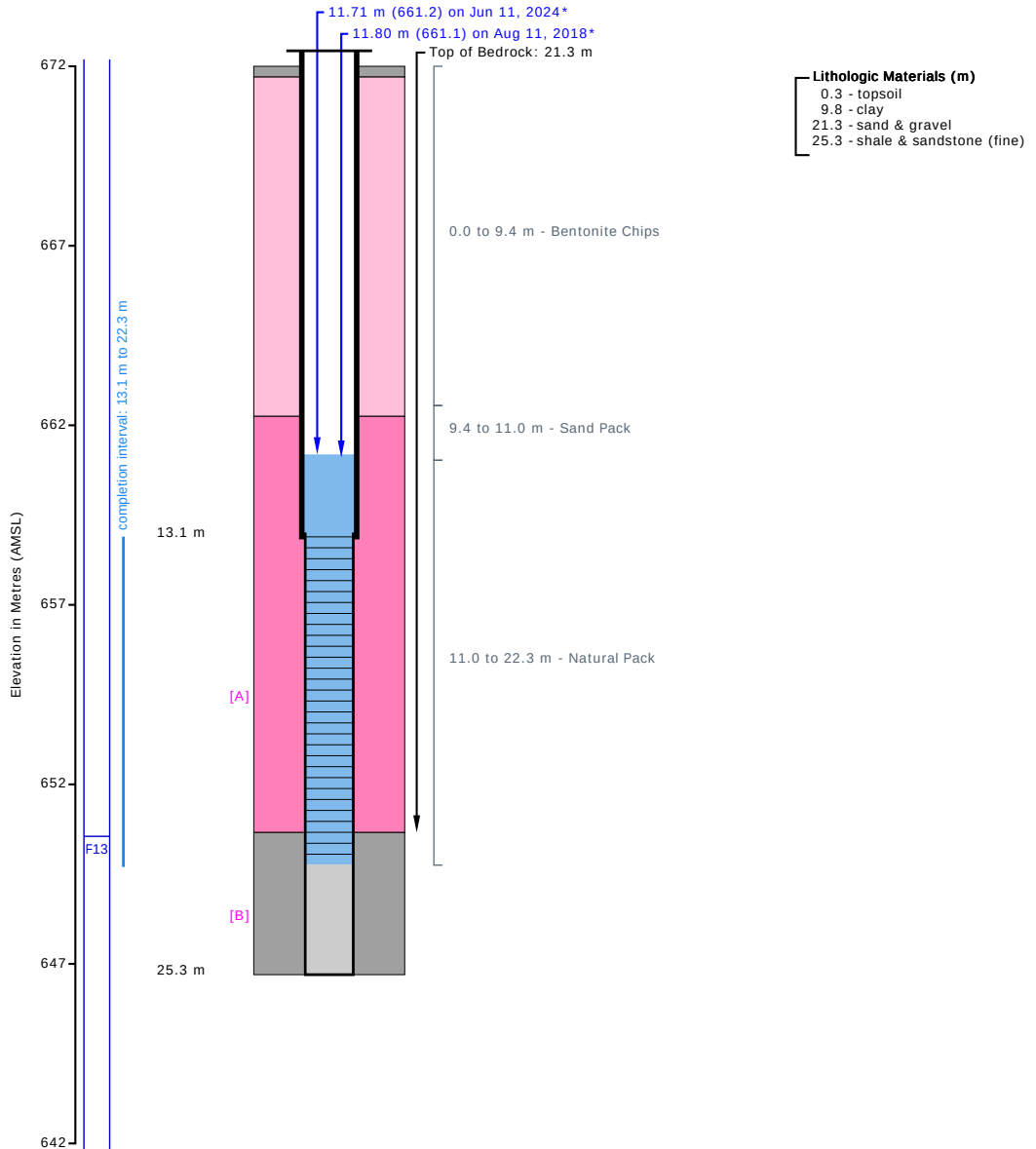
Earliest Water Level (m): 11.80 – August 11, 2018 @ 11:00

Most Recent Water Level (m): 11.71 – June 11, 2024 @ 23:50

GIC ID: Unknown

MW18-01

Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted	Bedrock	Fine Grained	Other
	Fine Grained		Coarse Grained	
	Coarse Grained			

Summary

TGWC ID: M43326.424846
 Well Name: MW18-01
 Legal Location: 08-16-054-26 W4M
 Casing (OD): 88.9 mm; PVC (3.5")
 Screen (OD): 77.9 mm; PVC (3.1")
 Casing Stick-Up: 0.9 m (not drawn to scale)
 Completion [A]: 13.1 to 22.3 m; Screened
 Construction [B]: 22.3 to 25.3 m; Plugged; Slough
 Water Level (recent): 11.71 m (661.2 m AMSL) on Jun 11, 2024 @ 23:50 - Reference Point: Top of Casing
 Water Level (oldest): 11.80 m (661.1 m AMSL) on Aug 11, 2018 @ 11:00 - Reference Point: Top of Casing

* Water-Level Measurements are measured from reference point listed.
 NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (<http://www.hcl.ca>) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
 Drawn: October 10, 2024 @ 12:23 --- <https://www.hcl.ca>

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MW18-01
AEPA - Water Well Drilling Report

— AEPA water well drilling report not available —

MW18-01
Chemical Analysis Results (June 7, 2024)



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Page 1 of 11

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011544 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-27
Sample Date	May 17, 2024
Sample Time	09:53
Sample Location	M43326.424846
Sample Description	MW18-01 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	7.84	0.05		
Sulfur	Dissolved	mg/L	55.3	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0036	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.035	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.067	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	<0.00001	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	0.0008	0.0001		
Copper	Dissolved	mg/L	<0.0002	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.050	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0014	0.0005		
Selenium	Dissolved	mg/L	<0.0002	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	0.836	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0047	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	<0.001	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	25	5	15	Above AO
Turbidity		NTU	10.6	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.90	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	19.6			
Electrical Conductivity	at 25 °C	µS/cm	1040	1		
Calcium	Dissolved	mg/L	137	0.2		
Magnesium	Dissolved	mg/L	39.0	0.2		
Sodium	Dissolved	mg/L	36.2	0.4	200	Below AO

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Analytical Report

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011544
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

Reference Number	1736660-27
Sample Date	May 17, 2024
Sample Time	09:53
Sample Location	M43326.424846
Sample Description	MW18-01 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	5.8	0.4		
Iron	Dissolved	mg/L	1.35	0.01	0.3	Above AO
Manganese	Dissolved	mg/L	2.21	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	14.9	0.4	250	Below AO
Fluoride		mg/L	0.13	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.47	0.01	10	Below MAC
Nitrite - N		mg/L	0.131	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	0.60	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	166	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	513			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	421	5		
Total Dissolved Solids	Calculated	mg/L	652	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	504			
Ionic Balance	Dissolved	%	97			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011544
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460394 - Mercury (Dissolved) in water												
Blank	6479950	Jun 06, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479949	Jun 06, 2024	Mercury	mg/L	0.000092						7e-005 - 0.00013	yes
Control Sample	6479948	Jun 06, 2024	Mercury	mg/L	0.000020						6e-006 - 3.6e-005	yes
Replicate	6479952	Jun 06, 2024	Mercury	mg/L	<0.000005			<0.000005		0	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011544
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479115	Jun 05, 2024	Aluminum	µg/L	15			17		16.97	10 % or 11 Abs	yes
Replicate	6479115	Jun 05, 2024	Antimony	µg/L	0.4			0.4		6.23	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Arsenic	µg/L	0.8			0.9		2.96	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Barium	µg/L	75			75		0.09	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Boron	µg/L	85			86		0.93	10 % or 4.4 Abs	yes
Replicate	6479115	Jun 05, 2024	Cadmium	µg/L	0.10			0.12		18.99	10 % or 0.022 Abs	yes
Replicate	6479115	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Cobalt	µg/L	0.6			0.6		0.05	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Copper	µg/L	1.1			1.2		7.9	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Lead	µg/L	<0.1			0.1		2.13	10 % or 0.22 Abs	yes

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Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011544
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479115	Jun 05, 2024	Lithium	µg/L	55			55		0.61	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Nickel	µg/L	3.2			3.4		5.33	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Selenium	µg/L	1.2			1.2		3.21	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Strontium	µg/L	967			960		0.74	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479115	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Titanium	µg/L	<0.5			0.9		53.68	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Uranium	µg/L	15.6			15.6		0.48	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Vanadium	µg/L	0.2			0.3		13.69	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Zinc	µg/L	4			4		7.72	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479186	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
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Report Number: 3011544
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed

Physical and Aggregate Properties - Continued

Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Replicate	6479215	Jun 05, 2024	Turbidity	NTU	1.8			1.7		2.31	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478743	Jun 05, 2024	pH		7.77			7.76		0.17	0 % or 0.1 Abs	yes
Replicate	6478743	Jun 05, 2024	Electrical Conductivity	dS/m	1.23			1.23		0	10 % or 0.002 Abs	yes
Replicate	6478743	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478743	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	Bicarbonate	mg/L	649			653		0.66	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478743	Jun 05, 2024	T-Alkalinity	mg/L	532			536		0.66	10 % or 5 Abs	yes

Batch: 2460219 - Anions (Routine) by Ion Chromatography

Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479564	Jun 05, 2024	Fluoride	mg/L	10.0						9.39 - 10.59	yes

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Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
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Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011544
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479564	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479564	Jun 05, 2024	Nitrite - N	mg/L	9.77						9.01 - 10.99	yes
Control Sample	6479564	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479565	Jun 05, 2024	Fluoride	mg/L	5.00						4.56 - 5.22	yes
Control Sample	6479565	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479565	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479565	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479566	Jun 05, 2024	Fluoride	mg/L	0.51						0.45 - 0.57	yes
Control Sample	6479566	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479566	Jun 05, 2024	Nitrite - N	mg/L	0.502						0.455 - 0.557	yes
Control Sample	6479566	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.00						0.85 - 1.15	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrate - N	mg/L	0.58			0.58		0.19	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Batch: 2460053 - Chloride in Water												
Blank	6479101	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479098	Jun 05, 2024	Chloride	mg/L	2030						1847.4 - 2256	yes
Control Sample	6479099	Jun 05, 2024	Chloride	mg/L	81.2						74.9 - 86.9	yes
Control Sample	6479100	Jun 05, 2024	Chloride	mg/L	15.4						13.3 - 16.5	yes
Replicate	6479102	Jun 05, 2024	Chloride	mg/L	3.9			4.0		1.53	10 % or 0.5 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes

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Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

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Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011544 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 6, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-27; 9343659: Sample received at 12.1 °C



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Methodology and Notes

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	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011544
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

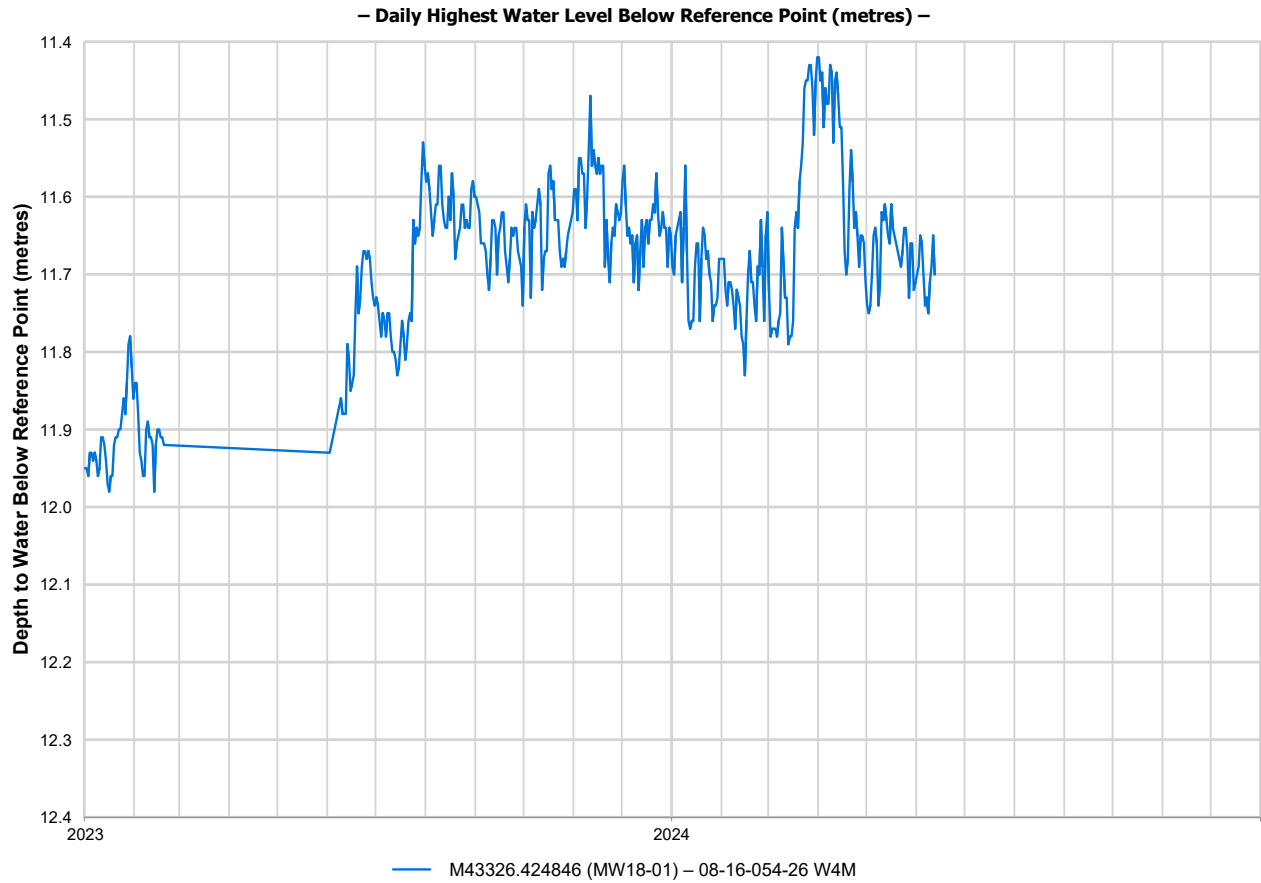
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

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MW18-01
2023 - 2024 Hydrograph



1963 Water Well 12-19

12-19-054-26 W4M
(M40235.411135)



Photograph taken on May 14, 2018

Spatial Location:

Easting: **76,869**

Northing: **5,946,227**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **677**

(elevation accuracy HCL DEM)

Date Completed: **January 1, 1963**

Depth Drilled (m): **14.7**

Completion Interval (m): **Not Available**

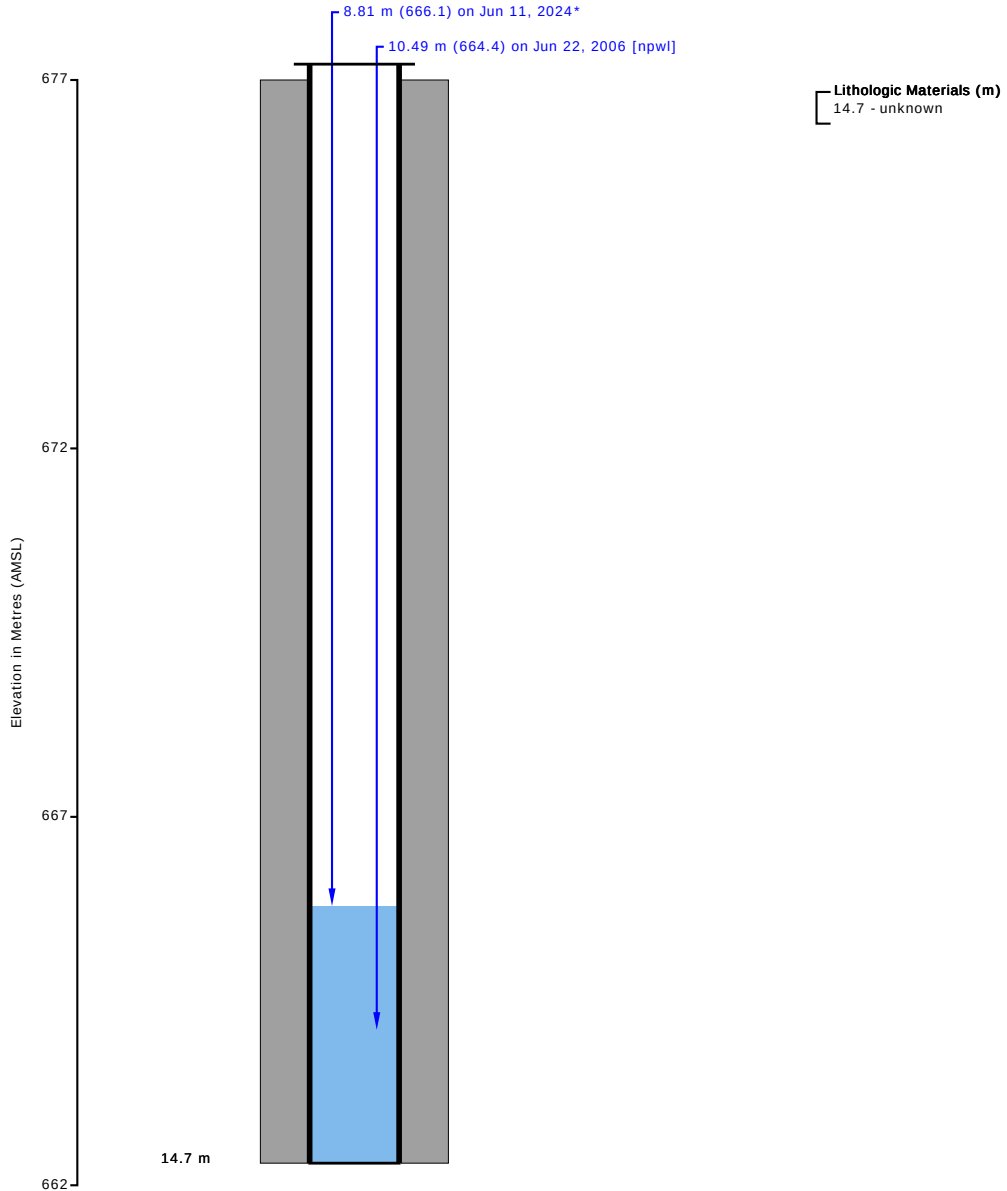
(* TGWC determined value)

Earliest Water Level (m): **10.49 – June 22, 2006 @ 11:53**

Most Recent Water Level (m): **8.81 – June 11, 2024 @ 23:50**

GIC ID: **Unknown**

1963 Water Well 12-19 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		Fine Grained	Other
	Fine Grained			
	Coarse Grained			
Bedrock			Coarse Grained	

Summary

TGWC ID: M40235.411135
Well Name: 1963 Water Well 12-19
Legal Location: 12-19-054-26 W4M
Casing (OD): 141.2 mm; Steel (5.6")
Casing Stick-Up: -2.4 m (not drawn to scale)
Water Level (recent): 8.81 m (666.1 m AMSL) on Jun 11, 2024 @ 23:50 - Reference Point: Top of Casing
Water Level (oldest): 10.49 m (664.4 m AMSL) on Jun 22, 2006 @ 11:53 [npwl]

* Water-Level Measurements are measured from reference point listed.
NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (<http://www.hcl.ca>) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
Drawn: October 10, 2024 @ 12:23 --- <https://www.hcl.ca>

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***1963 Water Well 12-19
AEPA - Water Well Drilling Report***

— AEPA water well drilling report not available —

1963 Water Well 12-19
Chemical Analysis Results (June 7, 2024)



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Page 1 of 11

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011543 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-26
Sample Date	May 30, 2024
Sample Time	10:50
Sample Location	M40235.411135
Sample Description	1963 WW 12-19 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	6.74	0.05		
Sulfur	Dissolved	mg/L	42.5	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	<0.0002	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.053	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.074	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	0.00002	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	<0.0001	0.0001		
Copper	Dissolved	mg/L	0.0057	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.089	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0013	0.0005		
Selenium	Dissolved	mg/L	0.0524	0.0002	0.05	Above MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	0.885	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0150	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	0.004	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	5	5	15	Below AO
Turbidity		NTU	0.2	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.80	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	19.8			
Electrical Conductivity	at 25 °C	µS/cm	1000	1		
Calcium	Dissolved	mg/L	120	0.2		
Magnesium	Dissolved	mg/L	28.2	0.2		
Sodium	Dissolved	mg/L	67.7	0.4	200	Below AO

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011543 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Reference Number	1736660-26
Sample Date	May 30, 2024
Sample Time	10:50
Sample Location	M40235.411135
Sample Description	1963 WW 12-19 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	5.7	0.4		
Iron	Dissolved	mg/L	<0.01	0.01	0.3	Below AO
Manganese	Dissolved	mg/L	0.088	0.005	0.02 AO; 0.12 MAC	Above AO
Chloride	Dissolved	mg/L	17.6	0.4	250	Below AO
Fluoride		mg/L	0.12	0.05	1.5	Below MAC
Nitrate - N		mg/L	1.05	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	1.05	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	127	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	515			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	423	5		
Total Dissolved Solids	Calculated	mg/L	620	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	416			
Ionic Balance	Dissolved	%	98			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

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Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011543
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed

Metals Dissolved

Batch: 2460394 - Mercury (Dissolved) in water

Blank	6479950	Jun 06, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479949	Jun 06, 2024	Mercury	mg/L	0.000092						7e-005 - 0.00013	yes
Control Sample	6479948	Jun 06, 2024	Mercury	mg/L	0.000020						6e-006 - 3.6e-005	yes
Replicate	6479952	Jun 06, 2024	Mercury	mg/L	<0.000005			<0.000005		0	10 % or 3e-005 Abs	yes

Batch: 2460055 - Metals ICP-MS (Dissolved) in water

Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

Bill To: Hydrogeological Consultants
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Edmonton, AB, Canada
T5S 2W3
Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011543
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Attn: Jennifer Catt

Sampled By: HCL
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Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011543
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479115	Jun 05, 2024	Aluminum	µg/L	15			17		16.97	10 % or 11 Abs	yes
Replicate	6479115	Jun 05, 2024	Antimony	µg/L	0.4			0.4		6.23	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Arsenic	µg/L	0.8			0.9		2.96	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Barium	µg/L	75			75		0.09	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Boron	µg/L	85			86		0.93	10 % or 4.4 Abs	yes
Replicate	6479115	Jun 05, 2024	Cadmium	µg/L	0.10			0.12		18.99	10 % or 0.022 Abs	yes
Replicate	6479115	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Cobalt	µg/L	0.6			0.6		0.05	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Copper	µg/L	1.1			1.2		7.9	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Lead	µg/L	<0.1			0.1		2.13	10 % or 0.22 Abs	yes

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LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011543
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479115	Jun 05, 2024	Lithium	µg/L	55			55		0.61	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Nickel	µg/L	3.2			3.4		5.33	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Selenium	µg/L	1.2			1.2		3.21	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Strontium	µg/L	967			960		0.74	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479115	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Titanium	µg/L	<0.5			0.9		53.68	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Uranium	µg/L	15.6			15.6		0.48	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Vanadium	µg/L	0.2			0.3		13.69	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Zinc	µg/L	4			4		7.72	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479186	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011543 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Replicate	6479215	Jun 05, 2024	Turbidity	NTU	1.8			1.7		2.31	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478743	Jun 05, 2024	pH		7.77			7.76		0.17	0 % or 0.1 Abs	yes
Replicate	6478743	Jun 05, 2024	Electrical Conductivity	dS/m	1.23			1.23		0	10 % or 0.002 Abs	yes
Replicate	6478743	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478743	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	Bicarbonate	mg/L	649			653		0.66	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478743	Jun 05, 2024	T-Alkalinity	mg/L	532			536		0.66	10 % or 5 Abs	yes

Batch: 2460219 - Anions (Routine) by Ion Chromatography

Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479564	Jun 05, 2024	Fluoride	mg/L	10.0						9.39 - 10.59	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3
Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011543
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479564	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479564	Jun 05, 2024	Nitrite - N	mg/L	9.77						9.01 - 10.99	yes
Control Sample	6479564	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479565	Jun 05, 2024	Fluoride	mg/L	5.00						4.56 - 5.22	yes
Control Sample	6479565	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479565	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479565	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479566	Jun 05, 2024	Fluoride	mg/L	0.51						0.45 - 0.57	yes
Control Sample	6479566	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479566	Jun 05, 2024	Nitrite - N	mg/L	0.502						0.455 - 0.557	yes
Control Sample	6479566	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.00						0.85 - 1.15	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrate - N	mg/L	0.58			0.58		0.19	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Batch: 2460053 - Chloride in Water												
Blank	6479101	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479098	Jun 05, 2024	Chloride	mg/L	2030						1847.4 - 2256	yes
Control Sample	6479099	Jun 05, 2024	Chloride	mg/L	81.2						74.9 - 86.9	yes
Control Sample	6479100	Jun 05, 2024	Chloride	mg/L	15.4						13.3 - 16.5	yes
Replicate	6479102	Jun 05, 2024	Chloride	mg/L	3.9			4.0		1.53	10 % or 0.5 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011543
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

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Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011543 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 6, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-26; 9343658: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011543
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

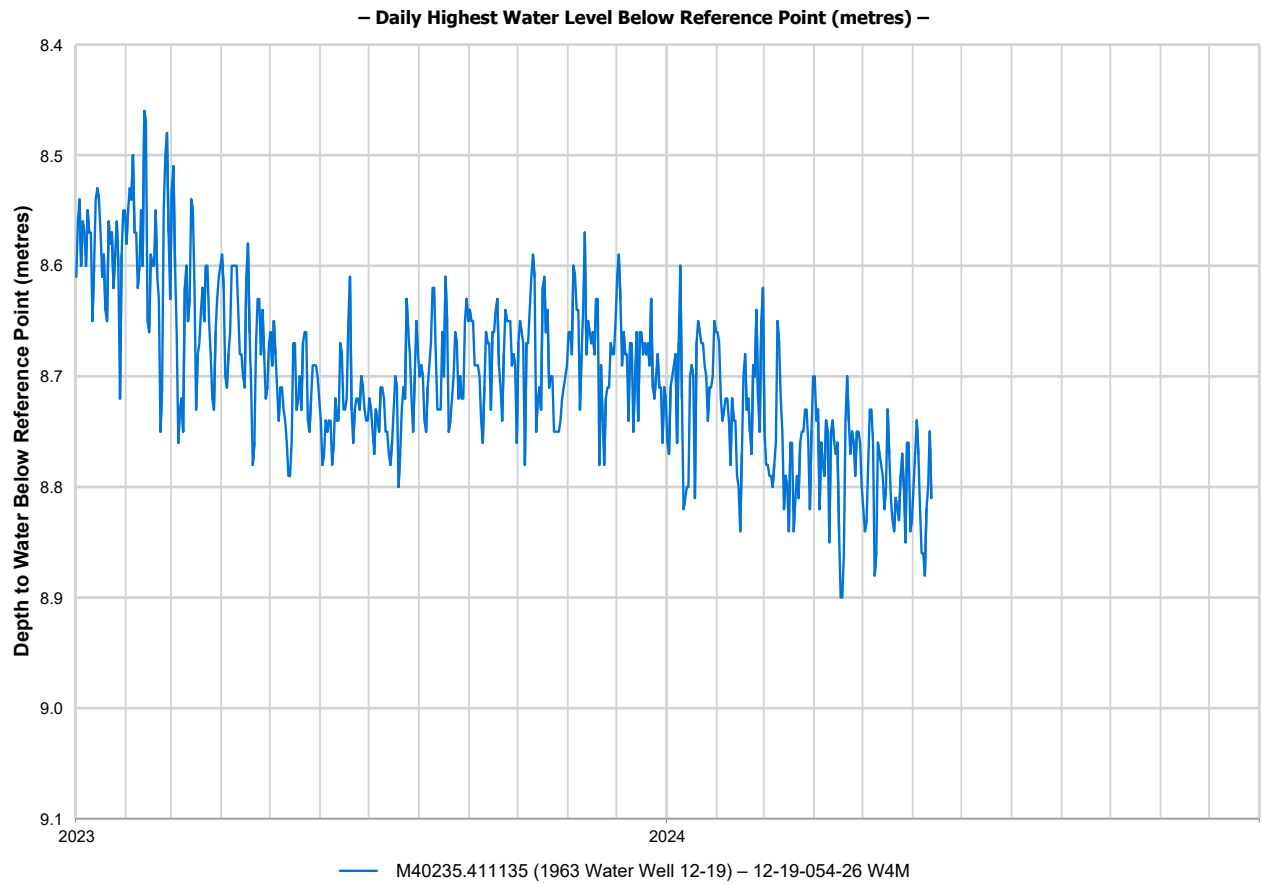
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

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1963 Water Well 12-19
2023 - 2024 Hydrograph



1987 Water Well 13-26

13-26-054-27 W4M
(M35377.055706)



Spatial Location:

Easting: **73,645**

Northing: **5,948,192**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **675**

(elevation accuracy LiDAR)

Date Completed: **May 12, 1987**

Depth Drilled (m): **18.3**

Completion Interval (m): **10.4 – 11.6 ***

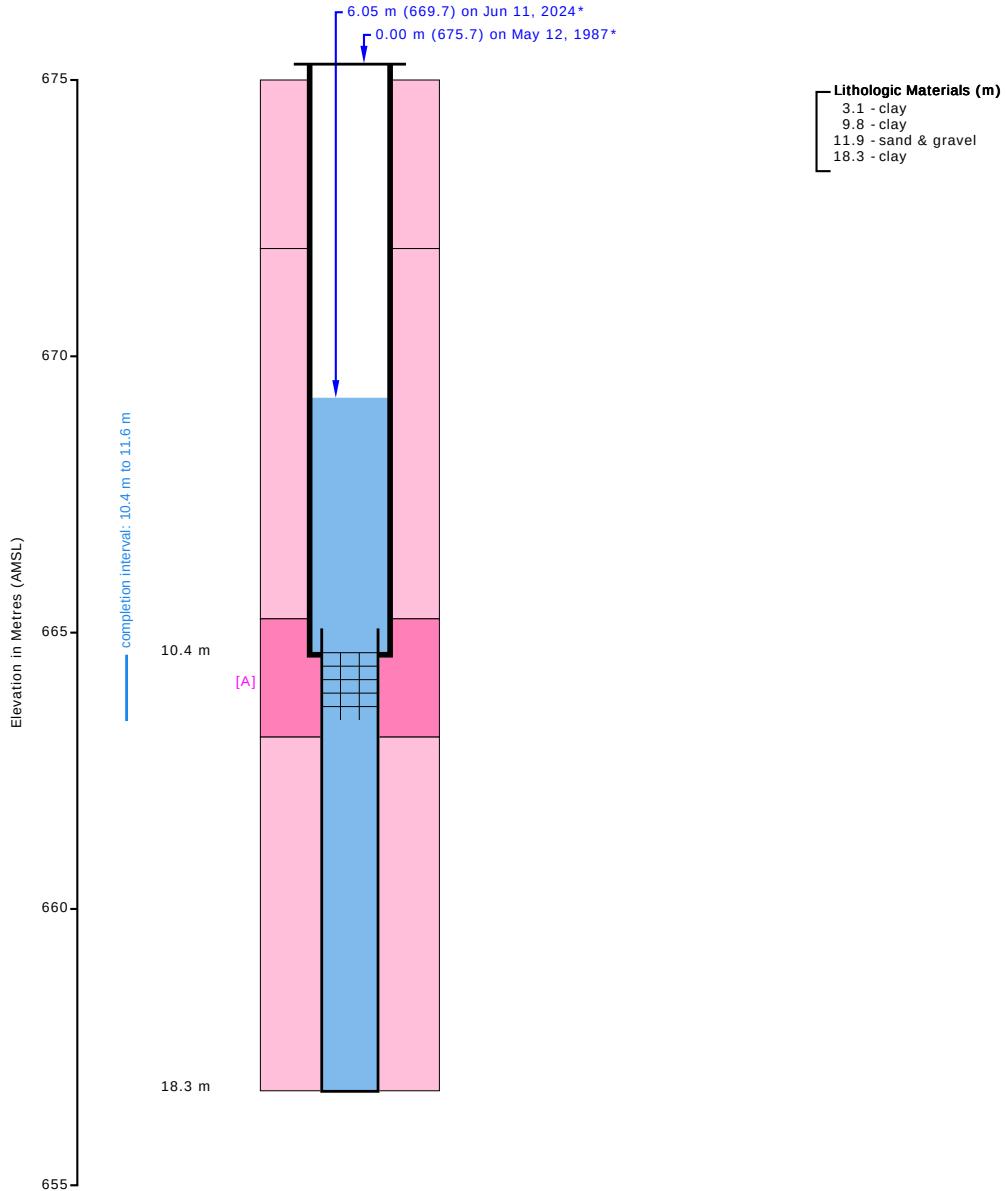
(* TGWC determined value)

Earliest Water Level (m): **0.00 – May 12, 1987**

Most Recent Water Level (m): **6.05 – June 11, 2024 @ 23:50**

GIC ID: **264252**

1987 Water Well 13-26 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis			
Surficial		Unsorted		Fine Grained	 Other	Geologic Unit details not available for this location
		Fine Grained				
		Coarse Grained				
Bedrock		Fine Grained		Coarse Grained		
		Coarse Grained				

Summary

TGWC ID: M35377.055706
 Well Name: 1987 Water Well 13-26
 Legal Location: 13-26-054-27 W4M
 Casing (OD): 127.0 mm; Plastic (5.0")
 Screen (OD): 88.9 mm; Stainless Steel (3.5")
 Casing Stick-Up: 0.3 m (not drawn to scale)
 Completion [A]: 10.4 to 11.6 m; Screened
 Water Level (recent): 6.05 m (669.7 m AMSL) on Jun 11, 2024 @ 23:50 - Reference Point: Top of Casing
 Water Level (oldest): 0.00 m (675.7 m AMSL) on May 12, 1987 - Reference Point: Top of Casing
 Top of Liner assumed to be 5% of 'non-cased' interval.

* Water-Level Measurements are measured from reference point listed.
 NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (<http://www.hcl.ca>) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
 Drawn: October 10, 2024 @ 12:23 --- <https://www.hcl.ca>

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1987 Water Well 13-26
AEPA - Water Well Drilling Report



Water Well Drilling Report

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GIC Well ID 264252
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 1987/06/01

GOWN ID

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.

Well Identification and Location										Measurement in Metric	
Owner Name	Address				Town		Province		Country	Postal Code	
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
	NW	26	54	27	4						
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)						
m from					Latitude 53.697942 Longitude -113.879201					Elevation m	
m from					How Location Obtained					How Elevation Obtained	
					Map					Not Obtained	

Drilling Information	
Method of Drilling	Type of Work
Rotary	New Well
Proposed Well Use	
Domestic	

Formation Log			Measurement in Metric
Depth from ground level (m)	Water Bearing	Lithology Description	
3.05		Brown Clay	
9.75		Gray Clay	
11.89		Sand & Gravel	
18.29		Clay	

Yield Test Summary			Measurement in Metric
Recommended Pump Rate			27.28 L/min
Test Date	Water Removal Rate (L/min)	Static Water Level (m)	
1987/05/12	45.46	0.00	

Well Completion				Measurement in Metric
Total Depth Drilled	Finished Well Depth	Start Date	End Date	
18.29 m		1987/05/12	1987/05/12	
Borehole				
Diameter (cm)	From (m)	To (m)		
0.00	0.00	18.29		
Surface Casing (if applicable)		Well Casing/Liner		
Plastic				
Size OD :	12.70 cm	Size OD :	0.00 cm	
Wall Thickness :	0.000 cm	Wall Thickness :	0.000 cm	
Bottom at :	10.36 m	Top at :	0.00 m	
		Bottom at :	0.00 m	
Perforations				
From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval (cm)
Perforated by				
Annular Seal Unknown				
Placed from 0.00 m to 0.00 m				
Amount				
Other Seals				
Type		At (m)		
Screen Type Stainless Steel				
Size OD : 8.89 cm				
From (m)	To (m)	Slot Size (cm)		
10.36	11.58	0.025		
Attachment Attached To Casing				
Top Fittings Threaded		Bottom Fittings Plug		
Pack				
Type Washed Sand		Grain Size		
Amount 1200.00 Pounds				

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
UNKNOWN NA DRILLER	1
Company Name	Copy of Well report provided to owner Date approval holder signed
MAR-WAYNE WATER WELL DRILLING SERVICES LTD.	



Water Well Drilling Report

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GIC Well ID 264252
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 1987/06/01

GOWN ID

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.

Well Identification and Location										Measurement in Metric
Owner Name	Address			Town		Province		Country	Postal Code	
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description	
	NW	26	54	27	4					
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					
m from					Latitude 53.697942 Longitude -113.879201					Elevation m
m from					How Location Obtained					How Elevation Obtained
					Map					Not Obtained

Additional Information										Measurement in Metric
Distance From Top of Casing to Ground Level cm										
Is Artesian Flow Yes										Is Flow Control Installed
Rate 45.46 L/min										Describe
Recommended Pump Rate 27.28 L/min										Pump Installed Yes
Recommended Pump Intake Depth (From TOC) 7.62 m										Depth m
										Type SUB
										Make H.P. .5
										Model (Output Rating)
Did you Encounter Saline Water (>4000 ppm TDS)										Depth m
Gas										Well Disinfected Upon Completion
Remedial Action Taken										Depth m
										Geophysical Log Taken
										Submitted to ESRD
Additional Comments on Well										Sample Collected for Potability
ORIGINAL LSD WH										Submitted to ESRD

Yield Test				Taken From Ground Level	Measurement in Metric
				Depth to water level	
Test Date	Start Time	Static Water Level		Pumping (m)	Recovery (m)
1987/05/12	12:00 AM	0.00 m		Elapsed Time	
				Minutes:Sec	
Method of Water Removal					
Type Air					
Removal Rate 45.46 L/min					
Depth Withdrawn From 0.00 m					
If water removal period was < 2 hours, explain why					

Water Diverted for Drilling		
Water Source	Amount Taken	Diversion Date & Time
	L	

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
UNKNOWN NA DRILLER	1
Company Name	Copy of Well report provided to owner
MAR-WAYNE WATER WELL DRILLING SERVICES LTD.	Date approval holder signed

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Page: 2 / 2

1987 Water Well 13-26
Chemical Analysis Results (June 7, 2024)



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Page 1 of 11

Analytical Report

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011545
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

Reference Number	1736660-28
Sample Date	May 23, 2024
Sample Time	10:45
Sample Location	
Sample Description	/ 12.1 °C / EXTRA
Sample Matrix	Water

Analyte	Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved					
Silicon	Dissolved	mg/L	7.31	0.05	
Sulfur	Dissolved	mg/L	22.0	0.3	
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001 Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006 Below MAC
Arsenic	Dissolved	mg/L	0.0077	0.0002	0.01 Below MAC
Barium	Dissolved	mg/L	0.055	0.001	2.0 Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001	
Bismuth	Dissolved	mg/L	<0.0005	0.0005	
Boron	Dissolved	mg/L	0.079	0.002	5 Below MAC
Cadmium	Dissolved	mg/L	<0.00001	0.00001	0.007 Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05 Below MAC
Cobalt	Dissolved	mg/L	0.0006	0.0001	
Copper	Dissolved	mg/L	0.0010	0.0002	1 AO; 2 MAC Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005 Below MAC
Lithium	Dissolved	mg/L	0.074	0.001	
Molybdenum	Dissolved	mg/L	<0.001	0.001	
Nickel	Dissolved	mg/L	0.0007	0.0005	
Selenium	Dissolved	mg/L	<0.0002	0.0002	0.05 Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001	
Strontium	Dissolved	mg/L	0.842	0.001	7.0 Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005	
Tin	Dissolved	mg/L	<0.001	0.001	
Titanium	Dissolved	mg/L	<0.0005	0.0005	
Uranium	Dissolved	mg/L	0.0050	0.0005	0.02 Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001	
Zinc	Dissolved	mg/L	0.012	0.001	5 Below AO
Subsample			Field Filtered		
Physical and Aggregate Properties					
Colour	Apparent, Potable	Colour units	40	5	15 Above AO
Turbidity		NTU	22.1	0.1	0.1/0.3/1.0 OG
Routine Water					
pH			7.83	1	7.0-10.5 Within OG Range
Temp. of observed pH		°C	19.7		
Electrical Conductivity	at 25 °C	µS/cm	967	1	
Calcium	Dissolved	mg/L	120	0.2	
Magnesium	Dissolved	mg/L	30.0	0.2	
Sodium	Dissolved	mg/L	59.2	0.4	200 Below AO

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011545 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Reference Number	1736660-28
Sample Date	May 23, 2024
Sample Time	10:45
Sample Location	
Sample Description	/ 12.1 °C / EXTRA
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	3.6	0.4		
Iron	Dissolved	mg/L	1.59	0.01	0.3	Above AO
Manganese	Dissolved	mg/L	1.22	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	0.5	0.4	250	Below AO
Fluoride		mg/L	0.06	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.61	0.01	10	Below MAC
Nitrite - N		mg/L	0.056	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	0.67	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	66.0	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	613			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	503	5		
Total Dissolved Solids	Calculated	mg/L	581	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	424			
Ionic Balance	Dissolved	%	98			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011545
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460394 - Mercury (Dissolved) in water												
Blank	6479950	Jun 06, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479949	Jun 06, 2024	Mercury	mg/L	0.000092						7e-005 - 0.00013	yes
Control Sample	6479948	Jun 06, 2024	Mercury	mg/L	0.000020						6e-006 - 3.6e-005	yes
Replicate	6479952	Jun 06, 2024	Mercury	mg/L	<0.000005			<0.000005		0	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3
Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011545
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011545
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479115	Jun 05, 2024	Aluminum	µg/L	15			17		16.97	10 % or 11 Abs	yes
Replicate	6479115	Jun 05, 2024	Antimony	µg/L	0.4			0.4		6.23	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Arsenic	µg/L	0.8			0.9		2.96	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Barium	µg/L	75			75		0.09	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Boron	µg/L	85			86		0.93	10 % or 4.4 Abs	yes
Replicate	6479115	Jun 05, 2024	Cadmium	µg/L	0.10			0.12		18.99	10 % or 0.022 Abs	yes
Replicate	6479115	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Cobalt	µg/L	0.6			0.6		0.05	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Copper	µg/L	1.1			1.2		7.9	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Lead	µg/L	<0.1			0.1		2.13	10 % or 0.22 Abs	yes

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Quality Control

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Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011545
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479115	Jun 05, 2024	Lithium	µg/L	55			55		0.61	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Nickel	µg/L	3.2			3.4		5.33	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Selenium	µg/L	1.2			1.2		3.21	10 % or 0.44 Abs	yes
Replicate	6479115	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Strontium	µg/L	967			960		0.74	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479115	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479115	Jun 05, 2024	Titanium	µg/L	<0.5			0.9		53.68	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Uranium	µg/L	15.6			15.6		0.48	10 % or 1.1 Abs	yes
Replicate	6479115	Jun 05, 2024	Vanadium	µg/L	0.2			0.3		13.69	10 % or 0.22 Abs	yes
Replicate	6479115	Jun 05, 2024	Zinc	µg/L	4			4		7.72	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479186	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011545
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed

Physical and Aggregate Properties - Continued

Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Replicate	6479215	Jun 05, 2024	Turbidity	NTU	1.8			1.7		2.31	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478743	Jun 05, 2024	pH		7.77			7.76		0.17	0 % or 0.1 Abs	yes
Replicate	6478743	Jun 05, 2024	Electrical Conductivity	dS/m	1.23			1.23		0	10 % or 0.002 Abs	yes
Replicate	6478743	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478743	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	Bicarbonate	mg/L	649			653		0.66	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478743	Jun 05, 2024	T-Alkalinity	mg/L	532			536		0.66	10 % or 5 Abs	yes

Batch: 2460219 - Anions (Routine) by Ion Chromatography

Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479564	Jun 05, 2024	Fluoride	mg/L	10.0						9.39 - 10.59	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3
Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011545
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479564	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479564	Jun 05, 2024	Nitrite - N	mg/L	9.77						9.01 - 10.99	yes
Control Sample	6479564	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479565	Jun 05, 2024	Fluoride	mg/L	5.00						4.56 - 5.22	yes
Control Sample	6479565	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479565	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479565	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479566	Jun 05, 2024	Fluoride	mg/L	0.51						0.45 - 0.57	yes
Control Sample	6479566	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479566	Jun 05, 2024	Nitrite - N	mg/L	0.502						0.455 - 0.557	yes
Control Sample	6479566	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.00						0.85 - 1.15	yes
Replicate	6479567	Jun 05, 2024	Fluoride	mg/L	0.13			0.13		2.11	10 % or 0.05 Abs	yes
Replicate	6479567	Jun 05, 2024	Nitrate - N	mg/L	0.47			0.47		0.26	10 % or 0.01 Abs	yes
Replicate	6479567	Jun 05, 2024	Nitrite - N	mg/L	0.127			0.131		2.91	10 % or 0.01 Abs	yes
Batch: 2460053 - Chloride in Water												
Blank	6479101	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479098	Jun 05, 2024	Chloride	mg/L	2030						1847.4 - 2256	yes
Control Sample	6479099	Jun 05, 2024	Chloride	mg/L	81.2						74.9 - 86.9	yes
Control Sample	6479100	Jun 05, 2024	Chloride	mg/L	15.4						13.3 - 16.5	yes
Replicate	6479102	Jun 05, 2024	Chloride	mg/L	3.9			4.0		1.53	10 % or 0.5 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011545
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

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Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011545 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 6, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-28; 9343660: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011545
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

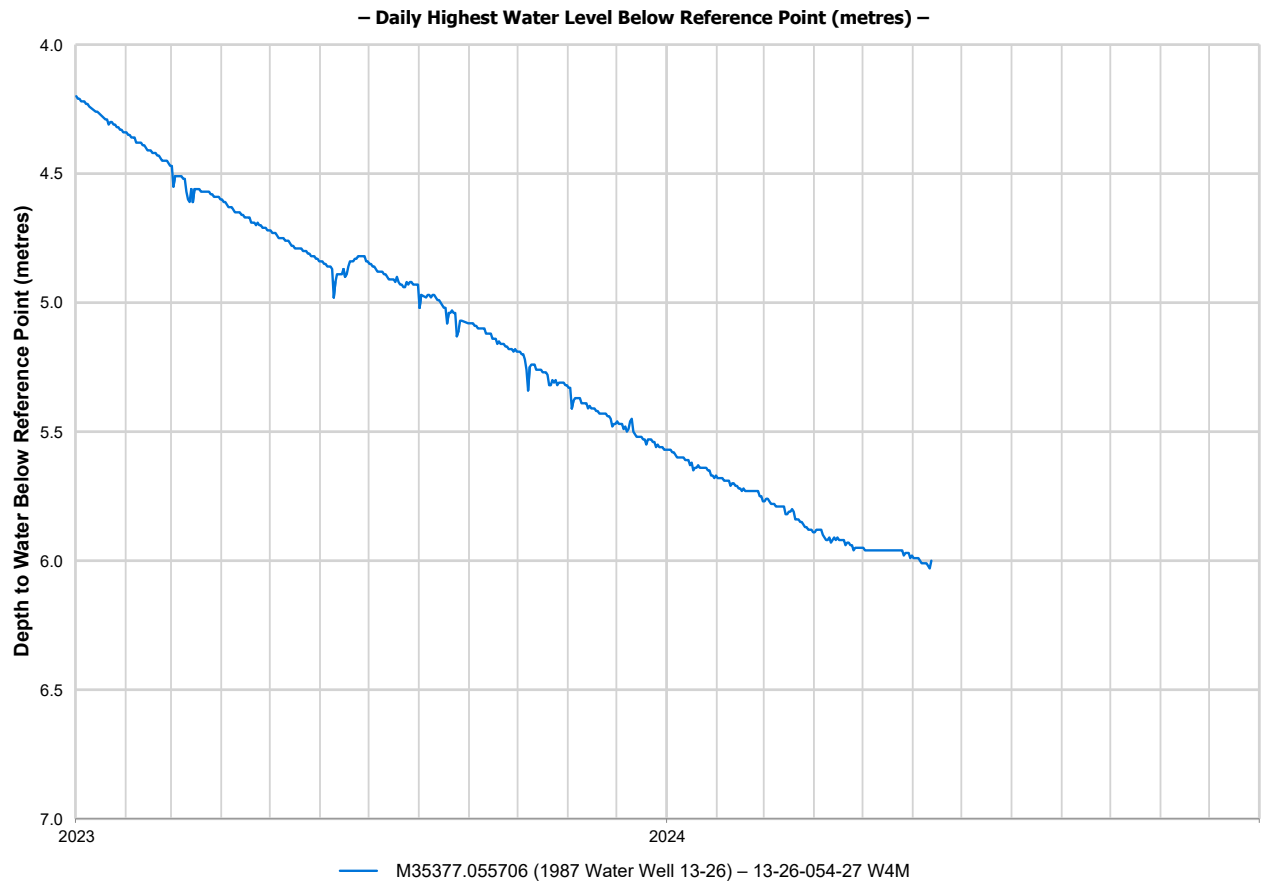
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

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*1987 Water Well 13-26
2023 - 2024 Hydrograph*



1995 Water Well 09-34

09-34-054-27 W4M
(M43987.561869)



Photograph taken on June 5, 2020

Spatial Location:

Easting: **73,391**

Northing: **5,949,371**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **674**

(elevation accuracy HCL DEM (2016))

Date Completed: **Not Available**

Depth Drilled (m): **33.5**

Completion Interval (m): **Not Available**

(* TGWC determined value)

Earliest Water Level (m): **5.58 – July 6, 2006 @ 11:00**

Most Recent Water Level (m): **6.13 – April 26, 2024 @ 12:09**

GIC ID: **Unknown**

1995 Water Well 09-34
Water Well Diagram

Insufficient information available to draw a water well diagram:

Contractor: *Mar-Wayne Water Well Drilling Services Ltd.*

Name: *1995 Water Well 09-34*

Field Action: *Confirmed - Physically, June 5, 2020*

Work Type: *Well Inventory*

Drilling Method: *Rotary - Mud*

Proposed Use: *Domestic*

Completion Type: *Other*

Well Status: *Producing*

Feature Class: *Water Well*

General Details

Depth Drilled (m): *33.5*

Most Recent Water Level (m): *6.13 m – April 26, 2024*

Completion Details

Surface Casing: *PVC – 152.4 mm (O.D.)*

Intervals

Chemistry Summary Details (mg/L, except as noted)

Sampling Details: *April 26, 2024 @ 12:30*

Report Date: *June 7, 2024 - Element Materials Technology Canada Inc. (1736660-10)*

Constituent	Result	Constituent	Result	Constituent	Result
Conductivity (µS/cm):	<i>1390</i>	Nitrate as N:	<i>0.45</i>	Turbidity (NTU):	<i>17.4</i>
Total Dissolved Solids:	<i>966</i>	Nitrite as N:	<i>< 0.005</i>	Fluoride:	<i>< 0.05</i>
Hardness (as CaCO3):	<i>511</i>	pH (pH Unit):	<i>7.81</i>	Carbonate:	<i>< 6</i>
T-Alkalinity (as CaCO3):	<i>484</i>	Colour (TCU):	<i>30</i>	Bicarbonate:	<i>590</i>
P-Alkalinity (as CaCO3):	<i>< 5</i>	Ion Balance (%):	<i>100</i>	Hydroxide:	<i>< 5</i>
Nitrate + Nitrite as N:	<i>0.45</i>	Total Coliforms:**:		Total Iron:	
Total Suspended Solids:		Fecal Coliforms:**:		Total Mn:	
Temperature (°C):	<i>20.8</i>	Escherichia coli:**:			

Constituent	Extractable	Dissolved	Constituent	Extractable	Dissolved
Calcium:		<i>148</i>	Mercury:		<i>< 0.000005</i>
Chloride:		<i>0.6</i>	Molybdenum:		<i>< 0.001</i>
Iron:		<i>1.52</i>	Magnesium:		<i>34.5</i>
Manganese:		<i>1.50***</i>	Sodium:		<i>146</i>
Aluminum:		<i>< 0.002</i>	Potassium:		<i>4.1</i>
Arsenic:		<i>0.0047</i>	Vanadium:		<i>< 0.0001</i>
Barium:		<i>0.018</i>	Strontium:		<i>1.19</i>
Beryllium:		<i>< 0.0001</i>	Nickel:		<i>0.0013</i>
Cadmium:		<i>< 0.00001</i>	Zinc:		<i>0.009</i>
Chromium:		<i>< 0.0005</i>	Copper:		<i>0.0016</i>
Cobalt:		<i>0.0011</i>	Lead:		<i>< 0.0001</i>
Sulfate:		<i>343</i>	Uranium:		<i>0.0028</i>

Comments: *Sample collected by Hydrogeological Consultants Ltd. personnel.*

***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2024. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.

544060; 1 / 6

09-34-054-27 W4M

Easting (m): *73,391.00 ¹*

Northing (m): *5,949,371.00 ¹*

Elevation (m): *674 ²*

Lot: *29*

Block: *2*

Plan: *8020013*

Rural Address: *72, 54519 RR 273*

M43987.561869

Elog Taken: *No*

Gamma Taken: *No*

Flowing: *No*

Presence of Gas: *No*

Stick Up (m): *0.1*

544060; 1606528; core; 2024-06-11

Lithology Details

Elevation (AMSL)

Depth (BGL)

Lithology Descriptions

lithology not available

Comments & Observations

Field Survey (HCL), Jun 5, 2020: Water well is 5 metres west of the house. Landowner confirmed that water well is 33.5 metres deep and that Mar-Wayne Water Well Drilling Services Ltd. drilled water well in 1995. Confirmed with Marv Perrott that Mar-Wayne did drill water well, but the water well drilling report is not available.

Aquifer Tests

Date & Time	Testing Method / Type	Depth of Test Interval	Duration (minutes) Pumping Recovery	Avg. Rate (Lpm)	NPWL (metres)	Drawdown (metres)	Pump (metres)	Q20 (m³/day)* Apparent Effective	Transmissivity (m²/day)* Apparent Aquifer Effective
2 2006-09-19 11:00	Pump	[unknown]	60 7	22.7	5.6	0.4	—		114
1 2006-07-06 11:00	Pump	[unknown]	60 2	22.7	5.6	0.4	—		110

Alias IDs

Z1020100

¹ HCL GPS — 10TM Resource NAD83, ² HCL DEM (2016)

(1) October 10, 2024, "AS IS"; no warranty either expressed or implied. visit [tgwc.com](https://www.tgwc.com) for additional details

Sturgeon County, 2023 to 2024 Groundwater Monitoring Report

Calahoo Resource Extraction District, Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, MR-0224.23

B - 395

RTU

REMOTE TELEMETRY UNIT

HCL

***1995 Water Well 09-34
AEPA - Water Well Drilling Report***

— AEPA water well drilling report not available —

1995 Water Well 09-34
Chemical Analysis Results (June 7, 2024)



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Page 1 of 12

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011527 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-10
Sample Date	April 26, 2024
Sample Time	12:30
Sample Location	M43987.561869
Sample Description	1995 WW 09-34 / 12.1 °C
Sample Matrix	Water

Sample Matrix			Water		Nominal Detection	Guideline	Guideline
Analyte		Units	Result	Limit	Limit	Limit	Comments
Metals Dissolved							
Silicon	Dissolved	mg/L	7.01	0.05			
Sulfur	Dissolved	mg/L	114	0.3			
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001		Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC		Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006		Below MAC
Arsenic	Dissolved	mg/L	0.0047	0.0002	0.01		Below MAC
Barium	Dissolved	mg/L	0.018	0.001	2.0		Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001			
Bismuth	Dissolved	mg/L	<0.0005	0.0005			
Boron	Dissolved	mg/L	0.151	0.002	5		Below MAC
Cadmium	Dissolved	mg/L	<0.00001	0.00001	0.007		Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05		Below MAC
Cobalt	Dissolved	mg/L	0.0011	0.0001			
Copper	Dissolved	mg/L	0.0016	0.0002	1 AO; 2 MAC		Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005		Below MAC
Lithium	Dissolved	mg/L	0.118	0.001			
Molybdenum	Dissolved	mg/L	<0.001	0.001			
Nickel	Dissolved	mg/L	0.0013	0.0005			
Selenium	Dissolved	mg/L	<0.0002	0.0002	0.05		Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001			
Strontium	Dissolved	mg/L	1.19	0.001	7.0		Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005			
Tin	Dissolved	mg/L	<0.001	0.001			
Titanium	Dissolved	mg/L	<0.0005	0.0005			
Uranium	Dissolved	mg/L	0.0028	0.0005	0.02		Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001			
Zinc	Dissolved	mg/L	0.009	0.001	5		Below AO
Subsample			Field Filtered				
Physical and Aggregate Properties							
Colour	Apparent, Potable	Colour units	30	5	15		Above AO
Turbidity		NTU	17.4	0.1	0.1/0.3/1.0 OG		
Routine Water							
pH			7.81	1	7.0-10.5		Within OG Range
Temp. of observed pH		°C	20.8				
Electrical Conductivity	at 25 °C	µS/cm	1390	1			
Calcium	Dissolved	mg/L	148	0.2			
Magnesium	Dissolved	mg/L	34.5	0.2			
Sodium	Dissolved	mg/L	146	0.4	200		Below AO

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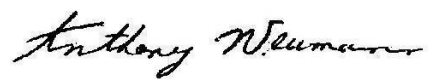
Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011527 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Reference Number	1736660-10
Sample Date	April 26, 2024
Sample Time	12:30
Sample Location	M43987.561869
Sample Description	1995 WW 09-34 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	4.1	0.4		
Iron	Dissolved	mg/L	1.52	0.01	0.3	Above AO
Manganese	Dissolved	mg/L	1.50	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	0.6	0.4	250	Below AO
Fluoride		mg/L	<0.05	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.45	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	0.45	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	343	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	590			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	484	5		
Total Dissolved Solids	Calculated	mg/L	966	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	511			
Ionic Balance	Dissolved	%	100			

Approved by:



Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

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Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
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Report Number: 3011527
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460024 - Mercury (Dissolved) in water												
Blank	6479008	Jun 05, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479012	Jun 05, 2024	Mercury	mg/L	0.000094						7e-005 - 0.00013	yes
Control Sample	6479011	Jun 05, 2024	Mercury	mg/L	0.000019						6e-006 - 3.6e-005	yes
Replicate	6479013	Jun 05, 2024	Mercury	mg/L	<0.000005			<0.000005		0	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

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Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011527
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
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Report Number: 3011527
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479114	Jun 05, 2024	Aluminum	µg/L	<2			<2		0	10 % or 11 Abs	yes
Replicate	6479114	Jun 05, 2024	Antimony	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Arsenic	µg/L	12.5			12.4		0.38	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Barium	µg/L	19			19		0.09	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Boron	µg/L	102			102		0.06	10 % or 4.4 Abs	yes
Replicate	6479114	Jun 05, 2024	Cadmium	µg/L	<0.01			<0.01		0	10 % or 0.022 Abs	yes
Replicate	6479114	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Cobalt	µg/L	0.8			0.8		3.91	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Copper	µg/L	<0.2			<0.2		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Lead	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes

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and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011527
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479114	Jun 05, 2024	Lithium	µg/L	118			119		0.43	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Nickel	µg/L	0.7			0.8		2.6	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Selenium	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Strontium	µg/L	822			826		0.52	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479114	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Titanium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Uranium	µg/L	3.7			3.7		0.74	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Vanadium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Zinc	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes
Physical and Aggregate Properties												
Batch: 2460110 - Colour (Apparent) in water												
Control Sample	6479186	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes
Batch: 2460114 - Turbidity in Water												

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Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Blank	6479192	Jun 05, 2024	Turbidity	NTU	0.1	0.1					0.1	yes
Control Sample	6479197	Jun 05, 2024	Turbidity	NTU	1990						1847.5 - 2041.9	yes
Control Sample	6479198	Jun 05, 2024	Turbidity	NTU	4760						4441.7 - 6661.7	yes
Control Sample	6479196	Jun 05, 2024	Turbidity	NTU	149						132.1 - 162.1	yes
Control Sample	6479195	Jun 05, 2024	Turbidity	NTU	14.8						12.6 - 15.6	yes
Control Sample	6479194	Jun 05, 2024	Turbidity	NTU	1.7						1 - 2.2	yes
Replicate	6479207	Jun 05, 2024	Turbidity	NTU	11.8			12.0		1.68	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478740	Jun 05, 2024	pH		6.94			6.96		0.23	0 % or 0.1 Abs	yes
Replicate	6478740	Jun 05, 2024	Electrical Conductivity	dS/m	0.129			0.131		1.38	10 % or 0.002 Abs	yes
Replicate	6478740	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478740	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	Bicarbonate	mg/L	65			66		0.9	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478740	Jun 05, 2024	T-Alkalinity	mg/L	54			54		0.9	10 % or 5 Abs	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011527
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed

Routine Water - Continued

Batch: 2460219 - Anions (Routine) by Ion Chromatography

Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479560	Jun 05, 2024	Fluoride	mg/L	10.1						9.39 - 10.59	yes
Control Sample	6479560	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479560	Jun 05, 2024	Nitrite - N	mg/L	9.80						9.01 - 10.99	yes
Control Sample	6479560	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479561	Jun 05, 2024	Fluoride	mg/L	4.95						4.56 - 5.22	yes
Control Sample	6479561	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479562	Jun 05, 2024	Fluoride	mg/L	0.52						0.45 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrite - N	mg/L	0.505						0.455 - 0.557	yes
Control Sample	6479562	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.01						0.85 - 1.15	yes
Replicate	6479558	Jun 05, 2024	Nitrate - N	mg/L	1.70			1.69		0.55	10 % or 0.01 Abs	yes
Replicate	6479558	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes

Batch: 2460052 - Chloride in Water

Blank	6479097	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479094	Jun 05, 2024	Chloride	mg/L	1910						1847.4 - 2256	yes
Control Sample	6479095	Jun 05, 2024	Chloride	mg/L	78.6						74.9 - 86.9	yes
Control Sample	6479096	Jun 05, 2024	Chloride	mg/L	14.7						13.3 - 16.5	yes
Replicate	6479093	Jun 05, 2024	Chloride	mg/L	0.8			0.8		5.13	10 % or 0.5 Abs	yes

Batch: 2460048 - Metals Trace (Dissolved) in water

Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011527
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

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SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011527 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-10; 9343642: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011527
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

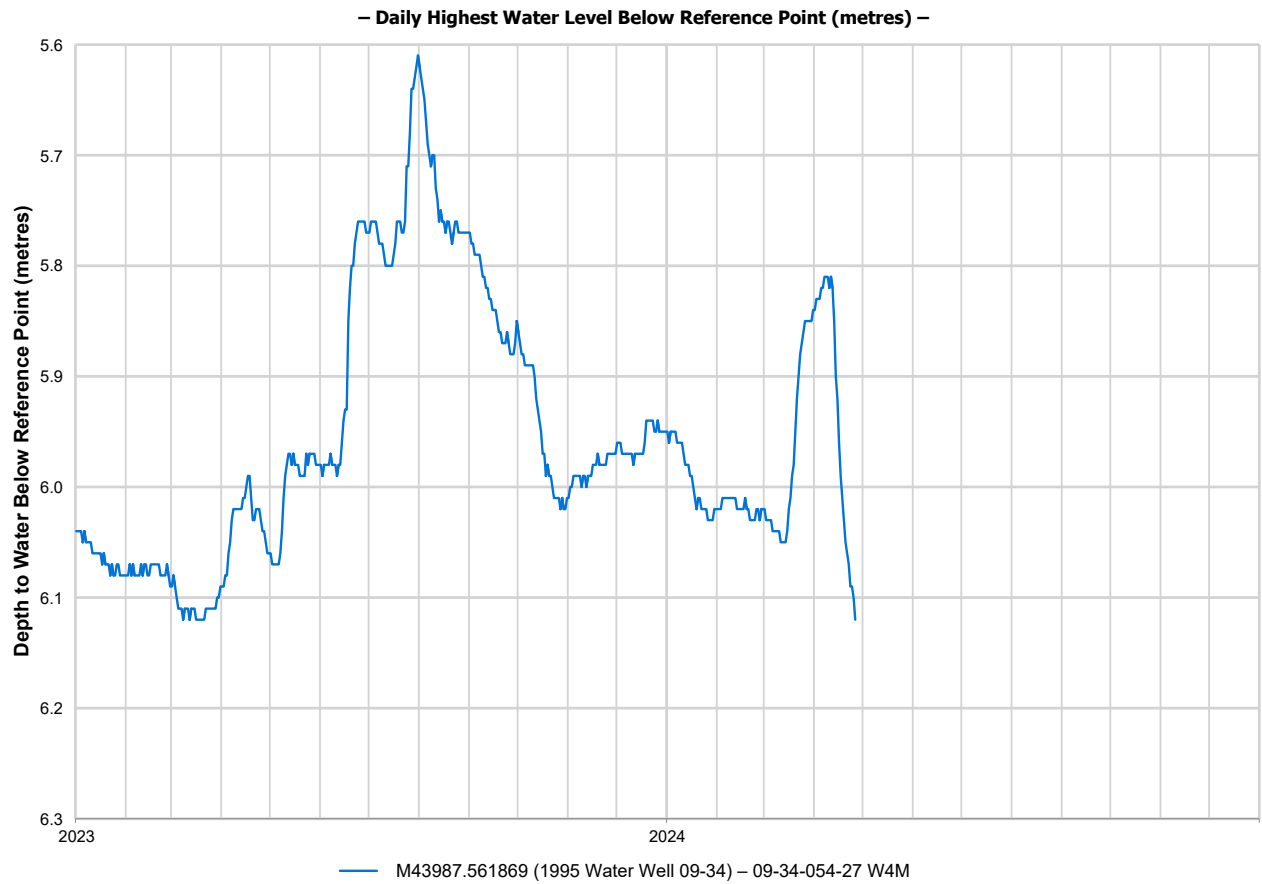
Please direct any inquiries regarding this report to our Client Services group.

Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

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*1995 Water Well 09-34
2023 - 2024 Hydrograph*



2001 Water Well 14-21

14-21-054-27 W4M
(M37841.689687)



Spatial Location:

Easting: **71,020**

Northing: **5,946,669**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **692**

(elevation accuracy MT GPS (Elevation))

Date Completed: **September 10, 2001**

Depth Drilled (m): **30.5**

Completion Interval (m): **18.3 – 19.8 ***

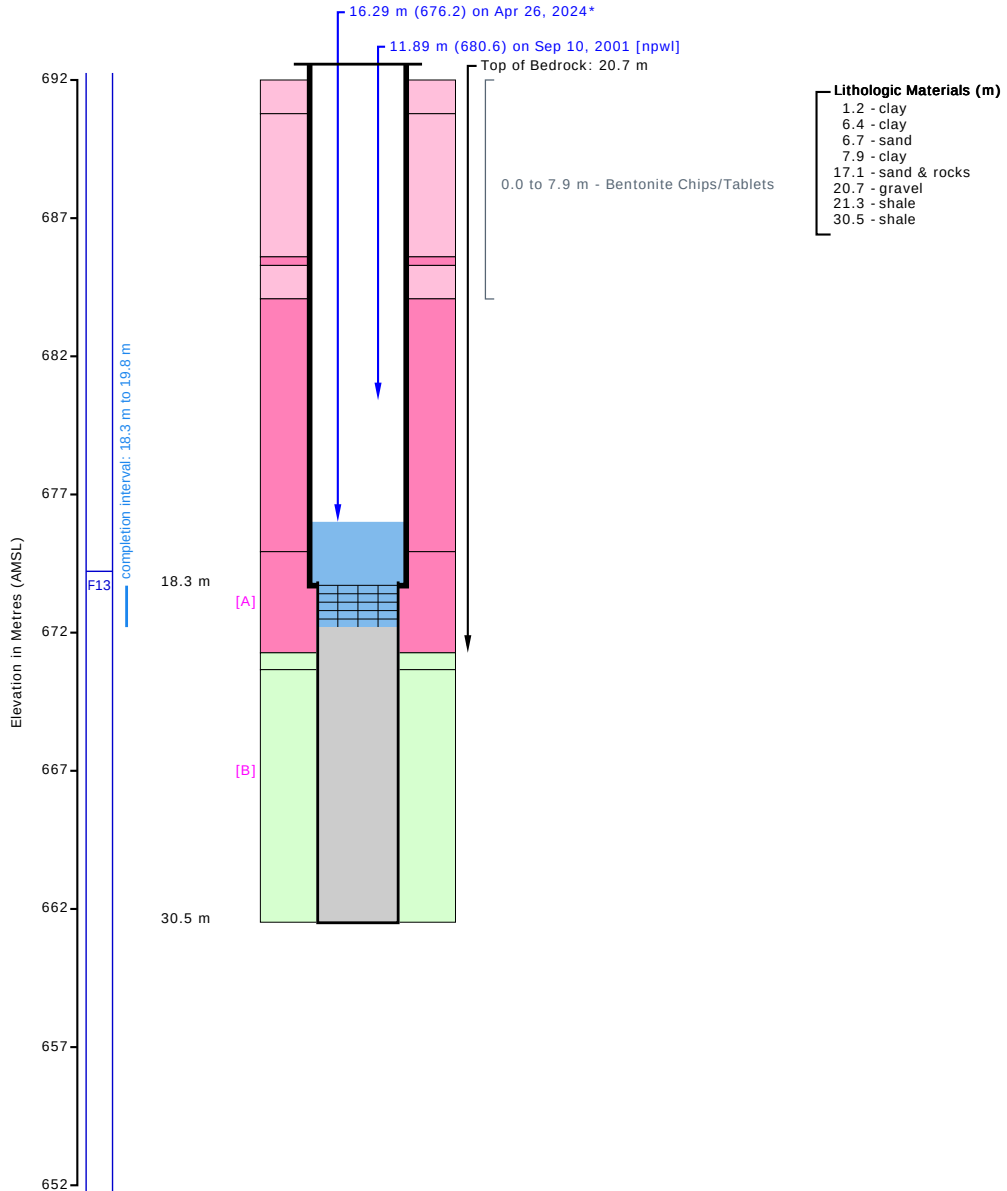
(* TGWC determined value)

Earliest Water Level (m): **11.89 – September 10, 2001**

Most Recent Water Level (m): **16.29 – April 26, 2024 @ 10:19**

GIC ID: **40335**

2001 Water Well 14-21 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		F13 - Lower Horseshoe Canyon Formation	
	Fine Grained			
	Coarse Grained			
Bedrock	Fine Grained			
	Coarse Grained			
	Other			

Summary	
TGWC ID: M37841.689687	
Well Name: 2001 Water Well 14-21	
Legal Location: 14-21-054-27 W4M	
Casing (OD): 152.4 mm; Plastic (6.0")	
Screen (OD): 127.0 mm; Stainless Steel (5.0")	
Casing Stick-Up: 0.3 m (not drawn to scale)	
Completion [A]: 18.3 to 19.8 m; Screened	
Construction [B]: 19.8 to 30.5 m; Plugged; Natural Material	
Water Level (recent): 16.29 m (676.2 m AMSL) on Apr 26, 2024 @ 10:19 - Reference Point: Top of Casing	
Water Level (oldest): 11.89 m (680.6 m AMSL) on Sep 10, 2001 [npwl]	

* Water-Level Measurements are measured from reference point listed.
 NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (<http://www.hcl.ca>) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
 Drawn: October 10, 2024 @ 12:24 --- <https://www.hcl.ca>
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2001 Water Well 14-21
AEPA - Water Well Drilling Report



Water Well Drilling Report

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

GIC Well ID 40335
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2001/09/27

GOWN ID

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.

Well Identification and Location										Measurement in Metric		
Owner Name		Address			Town		Province		Country		Postal Code	
Location		1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
NW		21	54	27	4							
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation _____ m		
_____ m from					Latitude 53.683028 Longitude -113.928572					How Elevation Obtained		
_____ m from					How Location Obtained					Not Obtained		
Map												

Drilling Information	
Method of Drilling Rotary	Type of Work New Well
Proposed Well Use Domestic	

Formation Log			Measurement in Metric	
Depth from ground level (m)	Water Bearing	Lithology Description		
1.22		Brown Clay		
6.40		Brown Silty Clay		
6.71		Sand		
7.92		Gray Clay		
17.07		Brown Sand & Rocks		
20.73		Gravel		
21.34		Brown Shale		
30.48		Gray Shale		

Yield Test Summary			Measurement in Metric	
Recommended Pump Rate 45.46 L/min				
Test Date	Water Removal Rate (L/min)	Static Water Level (m)		
2001/09/10	45.46	11.89		

Well Completion			Measurement in Metric	
Total Depth Drilled	Finished Well Depth	Start Date	End Date	
30.48 m		2001/09/10	2001/09/10	
Borehole				
Diameter (cm)	From (m)	To (m)		
0.00	0.00	30.48		
Surface Casing (if applicable)		Well Casing/Liner		
Plastic				
Size OD :	15.24 cm	Size OD :	0.00 cm	
Wall Thickness :	1.270 cm	Wall Thickness :	0.000 cm	
Bottom at :	18.29 m	Top at :	0.00 m	
		Bottom at :	0.00 m	
Perforations				
From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval(cm)
Perforated by				
Annular Seal Bentonite Chips/Tablets				
Placed from 0.00 m to 7.92 m				
Amount				
Other Seals				
Type		At (m)		
Screen Type Stainless Steel				
Size OD : 12.70 cm				
From (m)	To (m)	Slot Size (cm)		
18.29	19.81	0.025		
Attachment Attached To Casing				
Top Fittings Coupler		Bottom Fittings Plug		
Pack				
Type Artificial		Grain Size .275		
Amount 550.00 Pounds				

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well UNKNOWN NA DRILLER	Certification No 1
Company Name MAR-WAYNE WATER WELL DRILLING SERVICES LTD.	Copy of Well report provided to owner Date approval holder signed



Water Well Drilling Report

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GIC Well ID 40335
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2001/09/27

GOWN ID

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.

Well Identification and Location										Measurement in Metric	
Owner Name		Address			Town		Province		Country	Postal Code	
[REDACTED]		[REDACTED]			[REDACTED]		[REDACTED]		[REDACTED]	[REDACTED]	
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
NW		21	54	27	4						
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)						
m from					Latitude 53.683028 Longitude -113.928572					Elevation m	
m from					How Location Obtained					How Elevation Obtained	
					Map					Not Obtained	

Additional Information										Measurement in Metric	
Distance From Top of Casing to Ground Level cm											
Is Artesian Flow										Is Flow Control Installed	
Rate L/min										Describe	
Recommended Pump Rate 45.46 L/min										Pump Installed Yes	Depth m
Recommended Pump Intake Depth (From TOC) 17.98 m										Type SUB	Make H.P.
										Model (Output Rating)	
Did you Encounter Saline Water (>4000 ppm TDS)										Depth m	Well Disinfected Upon Completion
Gas										Depth m	Geophysical Log Taken
Remedial Action Taken										Submitted to ESRD	
Additional Comments on Well										Sample Collected for Potability	Submitted to ESRD
DRILLER REPORTS DISTANCE FROM TOP OF CASING TO GROUND LEVEL: 39 CM.											

Yield Test			Taken From Ground Level	Measurement in Metric
			Depth to water level	
Test Date	Start Time	Static Water Level		
2001/09/10	12:00 AM	11.89 m		
Method of Water Removal			Pumping (m)	Elapsed Time Minutes:Sec
Type Air				0:00
Removal Rate 45.46 L/min				1:00
Depth Withdrawn From 0.00 m				2:00
				3:00
				4:00
				5:00
				6:00
If water removal period was < 2 hours, explain why				Recovery (m)
				15.00
				13.01
				12.30
				12.13
				12.07
				12.06
				12.05

Water Diverted for Drilling		
Water Source	Amount Taken	Diversion Date & Time
	L	

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
UNKNOWN NA DRILLER	1
Company Name	Copy of Well report provided to owner
MAR-WAYNE WATER WELL DRILLING SERVICES LTD.	Date approval holder signed

2001 Water Well 14-21
Chemical Analysis Results (June 7, 2024)



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Page 1 of 11

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011534 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-17
Sample Date	April 26, 2024
Sample Time	10:35
Sample Location	M37841.689687
Sample Description	2001 WW 14-21 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	7.56	0.05		
Sulfur	Dissolved	mg/L	42.0	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0011	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.047	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.121	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	<0.00001	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	0.0005	0.0001		
Copper	Dissolved	mg/L	0.0009	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.093	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0009	0.0005		
Selenium	Dissolved	mg/L	<0.0002	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	0.857	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0055	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	0.007	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	20	5	15	Above AO
Turbidity		NTU	4.0	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.85	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	20.4			
Electrical Conductivity	at 25 °C	µS/cm	1080	1		
Calcium	Dissolved	mg/L	112	0.2		
Magnesium	Dissolved	mg/L	26.6	0.2		
Sodium	Dissolved	mg/L	104	0.4	200	Below AO

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011534 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Reference Number	1736660-17
Sample Date	April 26, 2024
Sample Time	10:35
Sample Location	M37841.689687
Sample Description	2001 WW 14-21 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	3.5	0.4		
Iron	Dissolved	mg/L	0.78	0.01	0.3	Above AO
Manganese	Dissolved	mg/L	0.827	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	5.1	0.4	250	Below AO
Fluoride		mg/L	0.09	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.60	0.01	10	Below MAC
Nitrite - N		mg/L	0.142	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	0.74	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	126	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	608			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	499	5		
Total Dissolved Solids	Calculated	mg/L	676	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	388			
Ionic Balance	Dissolved	%	97			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
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Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011534
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460024 - Mercury (Dissolved) in water												
Blank	6479008	Jun 05, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479012	Jun 05, 2024	Mercury	mg/L	0.000094						7e-005 - 0.00013	yes
Control Sample	6479011	Jun 05, 2024	Mercury	mg/L	0.000019						6e-006 - 3.6e-005	yes
Replicate	6479013	Jun 05, 2024	Mercury	mg/L	<0.000005			<0.000005		0	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Sampled By: HCL
Company: HCL

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Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011534
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479114	Jun 05, 2024	Aluminum	µg/L	<2			<2		0	10 % or 11 Abs	yes
Replicate	6479114	Jun 05, 2024	Antimony	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Arsenic	µg/L	12.5			12.4		0.38	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Barium	µg/L	19			19		0.09	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Boron	µg/L	102			102		0.06	10 % or 4.4 Abs	yes
Replicate	6479114	Jun 05, 2024	Cadmium	µg/L	<0.01			<0.01		0	10 % or 0.022 Abs	yes
Replicate	6479114	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Cobalt	µg/L	0.8			0.8		3.91	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Copper	µg/L	<0.2			<0.2		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Lead	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes

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Metals Dissolved - Continued												
Replicate	6479114	Jun 05, 2024	Lithium	µg/L	118			119		0.43	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Nickel	µg/L	0.7			0.8		2.6	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Selenium	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Strontium	µg/L	822			826		0.52	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479114	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Titanium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Uranium	µg/L	3.7			3.7		0.74	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Vanadium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Zinc	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479186	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Replicate	6479215	Jun 05, 2024	Turbidity	NTU	1.8			1.7		2.31	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478743	Jun 05, 2024	pH		7.77			7.76		0.17	0 % or 0.1 Abs	yes
Replicate	6478743	Jun 05, 2024	Electrical Conductivity	dS/m	1.23			1.23		0	10 % or 0.002 Abs	yes
Replicate	6478743	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478743	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	Bicarbonate	mg/L	649			653		0.66	10 % or 6 Abs	yes
Replicate	6478743	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478743	Jun 05, 2024	T-Alkalinity	mg/L	532			536		0.66	10 % or 5 Abs	yes

Batch: 2460219 - Anions (Routine) by Ion Chromatography

Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479560	Jun 05, 2024	Fluoride	mg/L	10.1						9.39 - 10.59	yes

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Routine Water - Continued												
Control Sample	6479560	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479560	Jun 05, 2024	Nitrite - N	mg/L	9.80						9.01 - 10.99	yes
Control Sample	6479560	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479561	Jun 05, 2024	Fluoride	mg/L	4.95						4.56 - 5.22	yes
Control Sample	6479561	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479562	Jun 05, 2024	Fluoride	mg/L	0.52						0.45 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrite - N	mg/L	0.505						0.455 - 0.557	yes
Control Sample	6479562	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.01						0.85 - 1.15	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrate - N	mg/L	0.58			0.58		0.19	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Batch: 2460053 - Chloride in Water												
Blank	6479101	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479098	Jun 05, 2024	Chloride	mg/L	2030						1847.4 - 2256	yes
Control Sample	6479099	Jun 05, 2024	Chloride	mg/L	81.2						74.9 - 86.9	yes
Control Sample	6479100	Jun 05, 2024	Chloride	mg/L	15.4						13.3 - 16.5	yes
Replicate	6479102	Jun 05, 2024	Chloride	mg/L	3.9			4.0		1.53	10 % or 0.5 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011534
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

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Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011534 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-17; 9343649: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011534
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

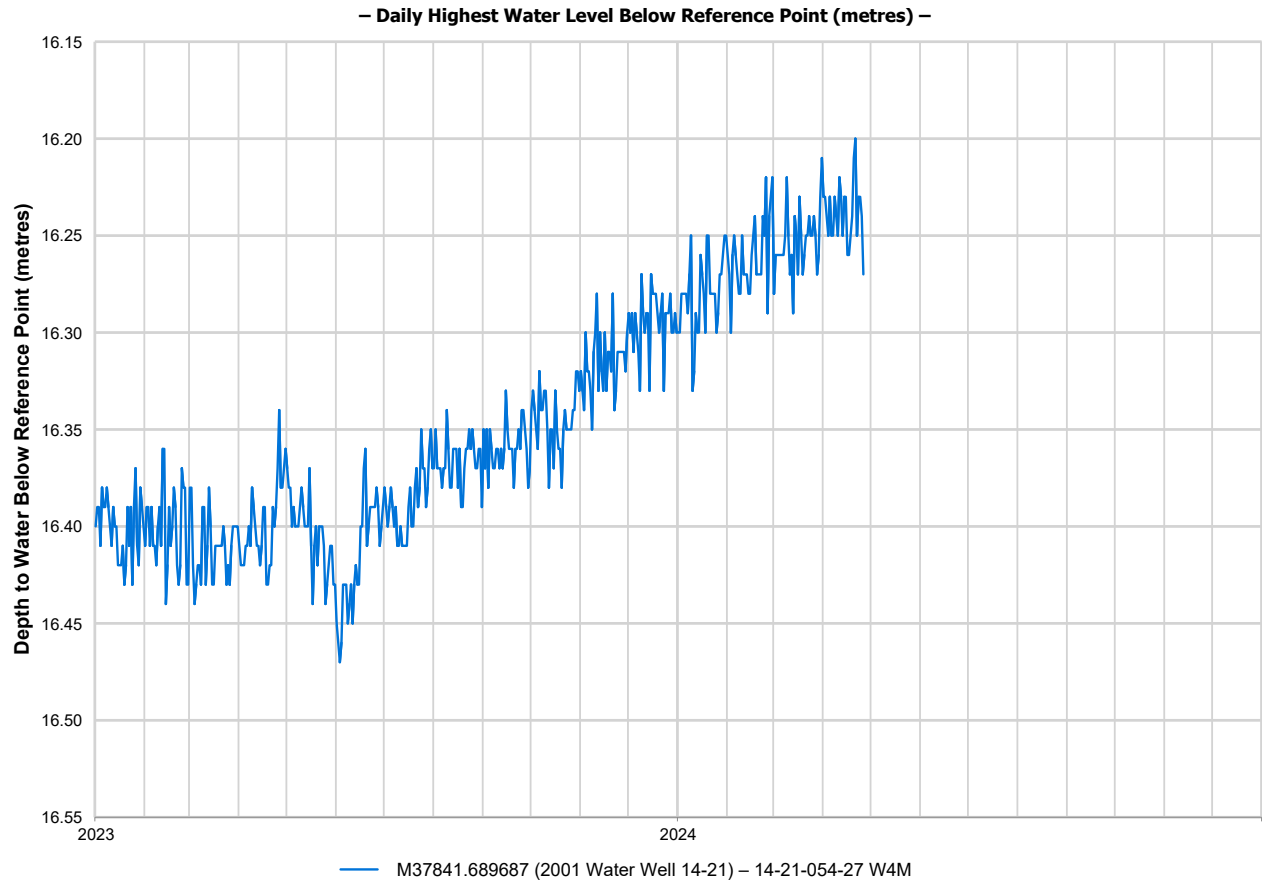
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

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*2001 Water Well 14-21
2023 - 2024 Hydrograph*



2001 Water Well 16-28

16-28-054-27 W4M
(M37490.030994)



Spatial Location:

Easting: **71,826**

Northing: **5,948,412**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **678**

(elevation accuracy HCL DEM (2016))

Date Completed: **July 20, 2001**

Depth Drilled (m): **37.5**

Completion Interval (m): **30.2 – 31.7 ***

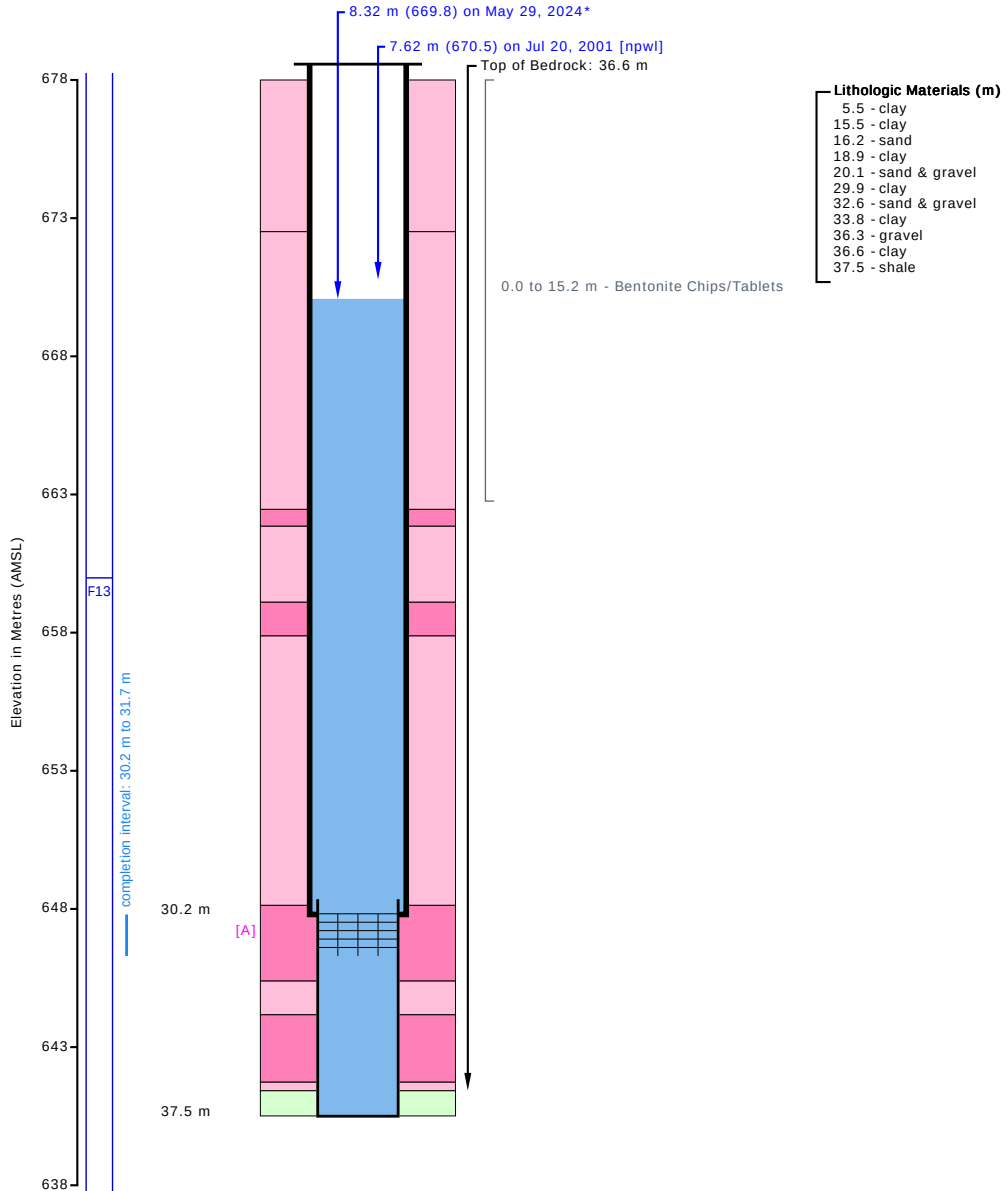
(* TGWC determined value)

Earliest Water Level (m): **7.62 – July 20, 2001**

Most Recent Water Level (m): **8.32 – May 29, 2024 @ 15:16**

GIC ID: **297091**

2001 Water Well 16-28 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		F13 - Lower Horseshoe Canyon Formation	
	Fine Grained			
	Coarse Grained			
Bedrock	Fine Grained			
	Coarse Grained			
	Other			

Summary	
TGWC ID: M37490.030994	
Well Name: 2001 Water Well 16-28	
Legal Location: 16-28-054-27 W4M	
Casing (OD): 152.4 mm; Plastic (6.0")	
Screen (OD): 127.0 mm; Stainless Steel (5.0")	
Casing Stick-Up: 0.4 m (not drawn to scale)	
Completion [A]: 30.2 to 31.7 m; Screened	
Water Level (recent): 8.32 m (669.8 m AMSL) on May 29, 2024 @ 15:16 - Reference Point: Top of Casing	
Water Level (oldest): 7.62 m (670.5 m AMSL) on Jul 20, 2001 [npwl]	
Top of Liner assumed to be 5% of 'non-cased' interval.	

* Water-Level Measurements are measured from reference point listed.
 NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (<http://www.hcl.ca>) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
 Drawn: October 10, 2024 @ 12:24 --- <https://www.hcl.ca>
 do not copy, cite, or distribute without the express written consent of The Groundwater Centre, a division of hydrogeological consultants Ltd.

Contractor: **Mar-Wayne Water Well Drilling Services Ltd.**

Name: **2001 Water Well 16-28**

Field Action: **Confirmed - Physically, November 24, 2017**

Work Type: **New Well**

Drilling Method: **Rotary**

Proposed Use: **Domestic**

Completion Type: **Screen**

Date Started: **July 19, 2001**

Date Completed: **July 20, 2001**

Well Status: **Producing**

Feature Class: **Water Well**

16-28-054-27 W4M

Easting (m): **71,826.20 ¹**

Northing (m): **5,948,412.40 ¹**

Elevation (m): **678 ²**

Rural Address: **54432 RR 273**

M37490.030994

Elog Taken: **No**

Gamma Taken: **No**

Flowing: **No**

Presence of Gas: **No**

Stick Up (m): **0.4**

544058; 333974; core; 2024-06-11

General Details

* TGWC calculated value

Depth Completed (m)*: **31.7**

Top of Bedrock (m): **36.57 ***

Depth Drilled (m): **37.5**

Completion Interval (m): **30.2 – 31.7 ***

Sand & Gravel Thickness (m): **7.0 (total) – 7.0 (below 15 m) ***

Most Recent Water Level (m): **8.32 m – May 29, 2024**

Completion Details

Surface Casing: **Plastic – 152.4 mm (O.D.) x 12.70 mm (thick) x 30.2 m (bottom)**

Screen Material: **Stainless Steel – 127.0 mm (O.D.) (Attached To Casing)**

Fittings: **Top: Coupler – Bottom: Plug**

Intervals

Screen: **30.2 to 31.7 m - 10 Slot**

Bentonite Chips/Tablets: **0.0 to 15.2 m**

Chemistry Summary Details (mg/L, except as noted) (recently sampled first)

Sampling Details: **May 29, 2024 @ 15:35**

Report Date: **June 7, 2024 - Element Materials Technology Canada Inc. (1736660-8)**

Constituent	Result	Constituent	Result	Constituent	Result
Conductivity (µS/cm):	1300	Nitrate as N:	0.46	Turbidity (NTU):	26.7
Total Dissolved Solids:	876	Nitrite as N:	< 0.005	Fluoride:	0.07
Hardness (as CaCO3):	507	pH (pH Unit):	7.68	Carbonate:	< 6
T-Alkalinity (as CaCO3):	475	Colour (TCU):	40	Bicarbonate:	580
P-Alkalinity (as CaCO3):	< 5	Ion Balance (%):	98	Hydroxide:	< 5
Nitrate + Nitrite as N:	0.46	Total Coliforms:**:		Total Iron:	
Total Suspended Solids:		Fecal Coliforms:**:		Total Mn:	
Temperature (°C):	20.5	Escherichia coli:**:			

Constituent	Extractable	Dissolved	Constituent	Extractable	Dissolved
Calcium:		147	Mercury:		< 0.000005
Chloride:		0.7	Molybdenum:		< 0.001
Iron:		2.00	Magnesium:		33.8
Manganese:		1.41***	Sodium:		114
Aluminum:		< 0.002	Potassium:		3.9
Arsenic:		0.0047	Vanadium:		< 0.0001
Barium:		0.015	Strontium:		1.17
Beryllium:		< 0.0001	Nickel:		0.0009
Cadmium:		< 0.00001	Zinc:		0.087
Chromium:		< 0.0005	Copper:		0.0006
Cobalt:		0.0010	Lead:		< 0.0001
Sulfate:		291	Uranium:		0.0024

Comments: **Sample collected by Hydrogeological Consultants Ltd. personnel.**

***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2024. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.

544058; 1 / 5

Aquifer Tests

Pump Intake BTOC (m): **24.1 on July 20, 2001**

Date & Time	Testing Method / Type	Depth of Test Interval	Duration (minutes) Pumping Recovery	Avg. Rate (Lpm)	NPWL (metres)	Drawdown (metres)	Pump (metres)	Q20 (m³/day)* Apparent Effective	Transmissivity (m²/day)* Apparent Aquifer Effective
1 2001-07-20	Pump & Air	30.2 to 31.7	120 120	53.6	7.6	6.9	24.1	116.6	13.6

Alias IDs

Z445456

AEPA WellId: **297091**

AEPA WellReportId: **297091**

AEPA GicWellId: **297091**

(1) October 10, 2024, "AS IS"; no warranty either expressed or implied. visit tgwc.com for additional details

Sturgeon County, 2023 to 2024 Groundwater Monitoring Report

Calahoo Resource Extraction District, Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, MR-0224.23

B - 429

RTU

REMOTE TELEMETRY UNIT

HCL

2001 Water Well 16-28
AEPA - Water Well Drilling Report



Water Well Drilling Report

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

GIC Well ID 297091
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2001/08/14

GOWN ID

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.

Well Identification and Location										Measurement in Metric	
Owner Name	Address			Town		Province		Country	Postal Code		
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
NE		28	54	27	4						
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation	m
m from					Latitude 53.697665 Longitude -113.916417					How Elevation Obtained	
m from					How Location Obtained					Not Obtained	
					Not Verified						

Drilling Information	
Method of Drilling Rotary	Type of Work New Well
Proposed Well Use Domestic	

Formation Log			Measurement in Metric
Depth from ground level (m)	Water Bearing	Lithology Description	
5.49		Brown Clay	
15.54		Gray Clay	
16.15		Sand	
18.90		Clay	
20.12		Sand & Gravel	
29.87		Mixed Clay	
32.61		Sand & Gravel	
33.83		Gray Clay	
36.27		Gravel	
36.58		Clay	
37.49		Shale	

Yield Test Summary			Measurement in Metric
Recommended Pump Rate	50.01 L/min		
Test Date	Water Removal Rate (L/min)	Static Water Level (m)	
2001/07/20	53.64	7.62	

Well Completion				Measurement in Metric
Total Depth Drilled	Finished Well Depth	Start Date	End Date	
37.49 m		2001/07/19	2001/07/20	
Borehole				
Diameter (cm)	From (m)	To (m)		
0.00	0.00	37.49		
Surface Casing (if applicable)		Well Casing/Liner		
Plastic				
Size OD :	15.24 cm	Size OD :	0.00 cm	
Wall Thickness :	1.270 cm	Wall Thickness :	0.000 cm	
Bottom at :	30.18 m	Top at :	0.00 m	
		Bottom at :	0.00 m	
Perforations				
From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval (cm)
Perforated by				
Annular Seal Bentonite Chips/Tablets				
Placed from 0.00 m to 15.24 m				
Amount				
Other Seals				
Type		At (m)		
Screen Type Stainless Steel				
Size OD : 12.70 cm				
From (m)	To (m)	Slot Size (cm)		
30.18	31.70	0.025		
Attachment Attached To Casing				
Top Fittings Coupler		Bottom Fittings Plug		
Pack				
Type Silica Sand		Grain Size #3		
Amount 700.00 Pounds				

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well UNKNOWN NA DRILLER	Certification No 1
Company Name MAR-WAYNE WATER WELL DRILLING SERVICES LTD.	Copy of Well report provided to owner Date approval holder signed



Water Well Drilling Report

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

GIC Well ID 297091
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2001/08/14

GOWN ID

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.

Well Identification and Location										Measurement in Metric
Owner Name	Address			Town		Province		Country	Postal Code	
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description	
NE		28	54	27	4					
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					
m from					Latitude 53.697665 Longitude -113.916417					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 cm										
Is Artesian Flow										Is Flow Control Installed
Rate L/min										Describe
Recommended Pump Rate 50.01 L/min										Pump Installed Yes
Recommended Pump Intake Depth (From TOC) 28.04 m										Depth m
										Type SUB
										Make H.P. .5
										Model (Output Rating)
Did you Encounter Saline Water (>4000 ppm TDS)										Depth m
Gas										Well Disinfected Upon Completion
Remedial Action Taken										Depth m
										Geophysical Log Taken
										Submitted to ESRD
Additional Comments on Well										Sample Collected for Potability
										Submitted to ESRD
DRILLER REPORTS DISTANCE FROM TOP OF CASING TO GROUND LEVEL: 40 CMS.										

Yield Test			Taken From Ground Level	Measurement in Metric
			Depth to water level	
Test Date	Start Time	Static Water Level	Pumping (m)	Elapsed Time
2001/07/20	12:00 AM	7.62 m		Minutes:Sec
Method of Water Removal				Recovery (m)
Type Air			10.46	0:00
Removal Rate 53.64 L/min			11.90	1:00
Depth Withdrawn From 24.08 m			12.70	2:00
			13.27	3:00
			13.62	4:00
			13.89	5:00
			14.04	6:00
			14.14	7:00
			14.23	8:00
			14.27	9:00
			14.31	10:00
			14.36	12:00
			14.37	14:00
			14.39	16:00
			14.40	20:00
			14.43	25:00
			14.43	30:00
			14.45	35:00
			14.46	40:00
			14.48	50:00
			14.49	60:00
			14.50	75:00
			14.50	90:00
			14.50	105:00
			14.51	120:00

Water Diverted for Drilling		
Water Source	Amount Taken	Diversion Date & Time
	L	

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
UNKNOWN NA DRILLER	1
Company Name	Copy of Well report provided to owner
MAR-WAYNE WATER WELL DRILLING SERVICES LTD.	Date approval holder signed

2001 Water Well 16-28
Chemical Analysis Results (June 7, 2024)



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Page 1 of 12

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011525 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-8
Sample Date	May 29, 2024
Sample Time	15:35
Sample Location	M37490.030994
Sample Description	2001 WW 16-28 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	7.09	0.05		
Sulfur	Dissolved	mg/L	96.9	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0047	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.015	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.160	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	<0.00001	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	0.0010	0.0001		
Copper	Dissolved	mg/L	0.0006	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.120	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0009	0.0005		
Selenium	Dissolved	mg/L	<0.0002	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	1.17	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0024	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	0.087	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	40	5	15	Above AO
Turbidity		NTU	26.7	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.68	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	20.5			
Electrical Conductivity	at 25 °C	µS/cm	1300	1		
Calcium	Dissolved	mg/L	147	0.2		
Magnesium	Dissolved	mg/L	33.8	0.2		
Sodium	Dissolved	mg/L	114	0.4	200	Below AO

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011525 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Reference Number	1736660-8
Sample Date	May 29, 2024
Sample Time	15:35
Sample Location	M37490.030994
Sample Description	2001 WW 16-28 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	3.9	0.4		
Iron	Dissolved	mg/L	2.00	0.01	0.3	Above AO
Manganese	Dissolved	mg/L	1.41	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	0.7	0.4	250	Below AO
Fluoride		mg/L	0.07	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.46	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	0.46	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	291	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	580			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	475	5		
Total Dissolved Solids	Calculated	mg/L	876	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	507			
Ionic Balance	Dissolved	%	98			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

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Quality Control

Bill To: Hydrogeological Consultants
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Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011525
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460024 - Mercury (Dissolved) in water												
Blank	6479008	Jun 05, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479012	Jun 05, 2024	Mercury	mg/L	0.000094						7e-005 - 0.00013	yes
Control Sample	6479011	Jun 05, 2024	Mercury	mg/L	0.000019						6e-006 - 3.6e-005	yes
Replicate	6479010	Jun 05, 2024	Mercury	mg/L	0.000009			0.000010		12.93	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011525 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Quality Control

Bill To: Hydrogeological Consultants
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Edmonton, AB, Canada
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Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011525
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479114	Jun 05, 2024	Aluminum	µg/L	<2			<2		0	10 % or 11 Abs	yes
Replicate	6479114	Jun 05, 2024	Antimony	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Arsenic	µg/L	12.5			12.4		0.38	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Barium	µg/L	19			19		0.09	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Boron	µg/L	102			102		0.06	10 % or 4.4 Abs	yes
Replicate	6479114	Jun 05, 2024	Cadmium	µg/L	<0.01			<0.01		0	10 % or 0.022 Abs	yes
Replicate	6479114	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Cobalt	µg/L	0.8			0.8		3.91	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Copper	µg/L	<0.2			<0.2		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Lead	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3
Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011525
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479114	Jun 05, 2024	Lithium	µg/L	118			119		0.43	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Nickel	µg/L	0.7			0.8		2.6	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Selenium	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Strontium	µg/L	822			826		0.52	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479114	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Titanium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Uranium	µg/L	3.7			3.7		0.74	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Vanadium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Zinc	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479184	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Sampled By: HCL
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Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011525
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Blank	6479192	Jun 05, 2024	Turbidity	NTU	0.1	0.1					0.1	yes
Control Sample	6479197	Jun 05, 2024	Turbidity	NTU	1990						1847.5 - 2041.9	yes
Control Sample	6479198	Jun 05, 2024	Turbidity	NTU	4760						4441.7 - 6661.7	yes
Control Sample	6479196	Jun 05, 2024	Turbidity	NTU	149						132.1 - 162.1	yes
Control Sample	6479195	Jun 05, 2024	Turbidity	NTU	14.8						12.6 - 15.6	yes
Control Sample	6479194	Jun 05, 2024	Turbidity	NTU	1.7						1 - 2.2	yes
Replicate	6479207	Jun 05, 2024	Turbidity	NTU	11.8			12.0		1.68	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478740	Jun 05, 2024	pH		6.94			6.96		0.23	0 % or 0.1 Abs	yes
Replicate	6478740	Jun 05, 2024	Electrical Conductivity	dS/m	0.129			0.131		1.38	10 % or 0.002 Abs	yes
Replicate	6478740	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478740	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	Bicarbonate	mg/L	65			66		0.9	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478740	Jun 05, 2024	T-Alkalinity	mg/L	54			54		0.9	10 % or 5 Abs	yes

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011525 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Batch: 2460219 - Anions (Routine) by Ion Chromatography												
Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479560	Jun 05, 2024	Fluoride	mg/L	10.1						9.39 - 10.59	yes
Control Sample	6479560	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479560	Jun 05, 2024	Nitrite - N	mg/L	9.80						9.01 - 10.99	yes
Control Sample	6479560	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479561	Jun 05, 2024	Fluoride	mg/L	4.95						4.56 - 5.22	yes
Control Sample	6479561	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479562	Jun 05, 2024	Fluoride	mg/L	0.52						0.45 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrite - N	mg/L	0.505						0.455 - 0.557	yes
Control Sample	6479562	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.01						0.85 - 1.15	yes
Replicate	6479558	Jun 05, 2024	Nitrate - N	mg/L	1.70			1.69		0.55	10 % or 0.01 Abs	yes
Replicate	6479558	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes
Batch: 2460052 - Chloride in Water												
Blank	6479097	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479094	Jun 05, 2024	Chloride	mg/L	1910						1847.4 - 2256	yes
Control Sample	6479095	Jun 05, 2024	Chloride	mg/L	78.6						74.9 - 86.9	yes
Control Sample	6479096	Jun 05, 2024	Chloride	mg/L	14.7						13.3 - 16.5	yes
Replicate	6479093	Jun 05, 2024	Chloride	mg/L	0.8			0.8		5.13	10 % or 0.5 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011525
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

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SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011525 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-8; 9343640: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011525
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

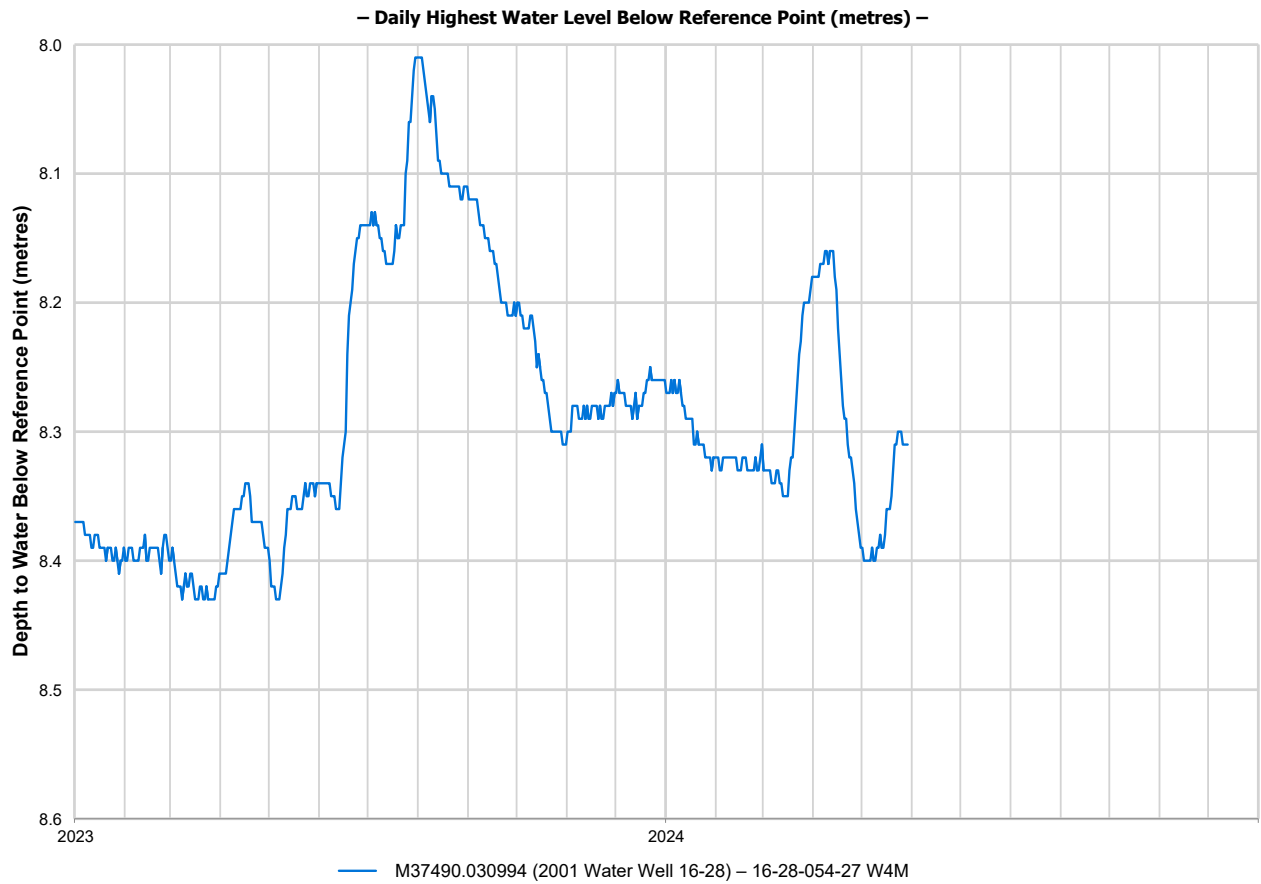
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

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2001 Water Well 16-28
2023 - 2024 Hydrograph



2006 Water Well 10-34

10-34-054-27 W4M
(M39227.496150)



Photograph taken on June 5, 2020

Spatial Location:

Easting: **72,870**

Northing: **5,949,358**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **675**

(elevation accuracy HCL DEM (2016))

Date Completed: **April 13, 2006**

Depth Drilled (m): **32.0**

Completion Interval (m): **29.0 – 30.5 ***

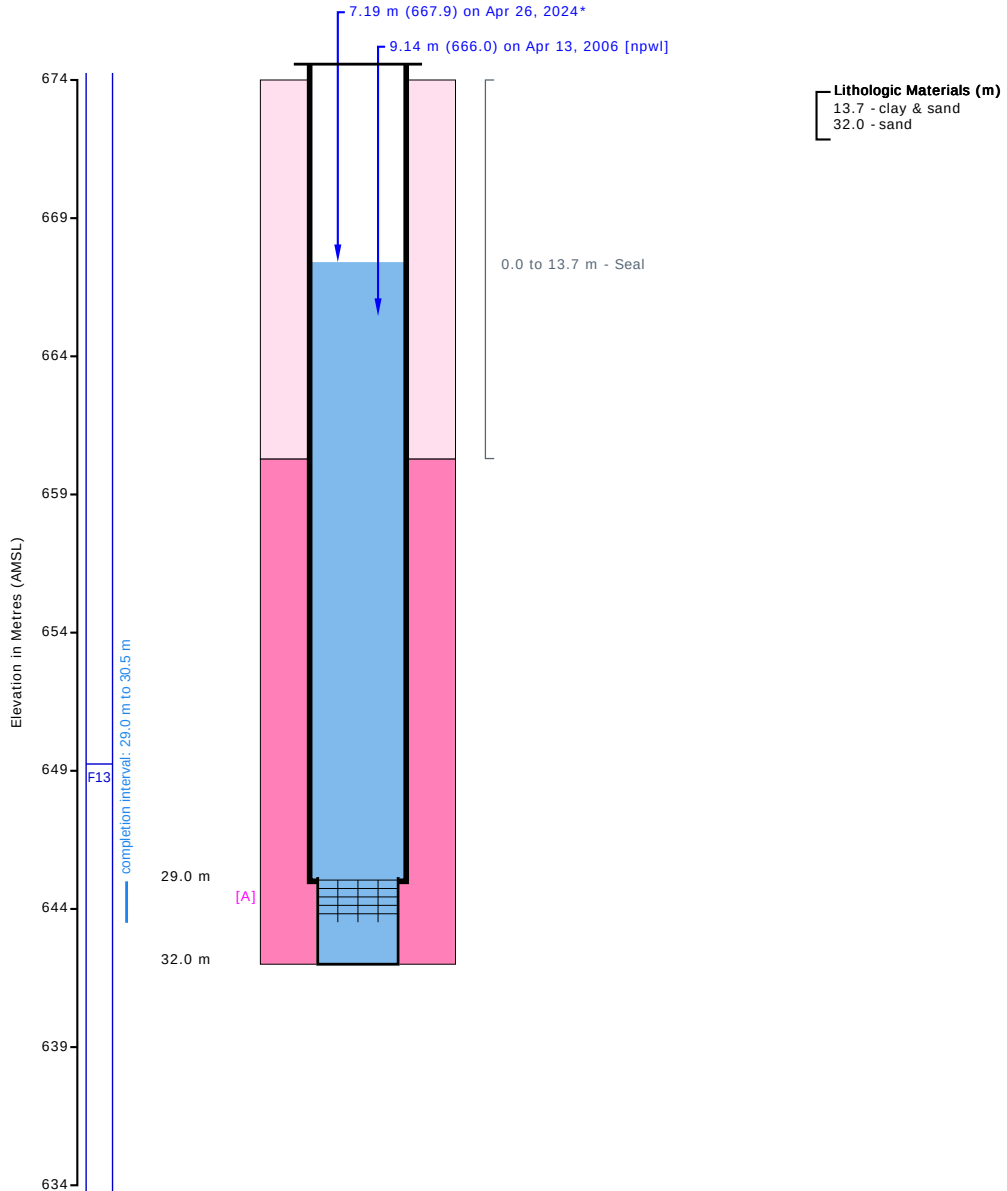
(* TGWC determined value)

Earliest Water Level (m): **9.14 – April 13, 2006**

Most Recent Water Level (m): **7.19 – April 26, 2024 @ 11:27**

GIC ID: **1715169**

2006 Water Well 10-34 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		F13 - Lower Horseshoe Canyon Formation	
	Fine Grained			
	Coarse Grained			
Bedrock	Fine Grained			
	Coarse Grained			
	Other			

Summary
TGWC ID: M39227.496150
Well Name: 2006 Water Well 10-34
Legal Location: 10-34-054-27 W4M
Casing (OD): 152.4 mm; Plastic (6.0")
Screen (OD): 127.0 mm; Stainless Steel (5.0")
Casing Stick-Up: 0.6 m (not drawn to scale)
Completion [A]: 29.0 to 30.5 m; Screened
Water Level (recent): 7.19 m (667.9 m AMSL) on Apr 26, 2024 @ 11:27 - Reference Point: Top of Casing
Water Level (oldest): 9.14 m (666.0 m AMSL) on Apr 13, 2006 [npwl]

* Water-Level Measurements are measured from reference point listed.
 NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (<http://www.hcl.ca>) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
 Drawn: October 10, 2024 @ 12:25 --- <https://www.hcl.ca>
 do not copy, cite, or distribute without the express written consent of The Groundwater Centre, a division of hydrogeological consultants Ltd.

Contractor: Summers Drilling Ltd. Name: 2006 Water Well 10-34 Field Action: Confirmed - Physically, June 5, 2020 Work Type: New Well Drilling Method: Rotary - Mud Proposed Use: Domestic Completion Type: Screen Date Started: April 13, 2006 Date Completed: April 13, 2006 Well Status: Producing Feature Class: Water Well				10-34-054-27 W4M		M39227.496150											
				Easting (m): 72,870.43 ¹ Northing (m): 5,949,358.08 ¹ Elevation (m): 675 ² Lot: 8A Block: 4 Plan: 0620740 Rural Address: 15, 54519 RR 273		Elog Taken: No Gamma Taken: No Flowing: No Presence of Gas: No Stick Up (m): 0.6 544061; 473574; core; 2024-06-11											
General Details * TGWC calculated value				Lithology Details													
Depth Completed (m)*: 30.5		Top of Bedrock: Surficial Water Well *		Elevation	Depth	Lithology Descriptions											
Depth Drilled (m): 32.0		Completion Interval (m): 29.0 – 30.5 *		(AMSL)	(BGL)												
Sand & Gravel Thickness (m): 18.3 (total) – 18.3 (below 15 m) *				660.8	13.7			Clay & Sand									
Most Recent Water Level (m): 7.19 m – April 26, 2024				642.5	32.0	Sand											
Completion Details																	
Surface Casing: Plastic – 152.4 mm (O.D.) x 9.90 mm (thick) x 29.0 m (bottom)																	
Screen Material: Stainless Steel – 127.0 mm (O.D.) (Attached To Casing)																	
Fittings: Top: Coupler – Bottom: Plug																	
Intervals																	
Screen: 29.0 to 30.5 m - 12 Slot																	
Seal: 0.0 to 13.7 m																	
Chemistry Summary Details (mg/L, except as noted) (recently sampled first)																	
Sampling Details: April 26, 2024 @ 11:45																	
Report Date: June 7, 2024 - Element Materials Technology Canada Inc. (1736660-11)																	
Constituent Conductivity (µS/cm): 1100 Total Dissolved Solids: 696 Hardness (as CaCO3): 423 T-Alkalinity (as CaCO3): 548 P-Alkalinity (as CaCO3): < 5 Nitrate + Nitrite as N: 0.58 Total Suspended Solids: 21.0 Temperature (°C): 21.0		Constituent Nitrate as N: 0.58 Nitrite as N: < 0.005 pH (pH Unit): 7.86 Colour (TCU): 35 Ion Balance (%): 97 Total Coliforms:**: Fecal Coliforms:**: Escherichia coli:**:		Constituent Turbidity (NTU): 11.1 Fluoride: < 0.05 Carbonate: < 6 Bicarbonate: 668 Hydroxide: < 5 Total Iron: Total Mn:													
Constituent Calcium: 120 Chloride: 0.6 Iron: 1.64 Manganese: 1.47*** Aluminum: < 0.002 Arsenic: 0.0056 Barium: 0.032 Beryllium: < 0.0001 Cadmium: < 0.00001 Chromium: < 0.0005 Cobalt: 0.0009 Sulfate: 114		Constituent Mercury: < 0.000005 Molybdenum: < 0.001 Magnesium: 29.8 Sodium: 98.8 Potassium: 3.4 Vanadium: < 0.0001 Strontium: 1.11 Nickel: 0.0014 Zinc: 0.008 Copper: 0.0013 Lead: < 0.0001 Uranium: 0.0026		Extractable - unfiltered Dissolved - filtered													
Comments: Sample collected by Hydrogeological Consultants Ltd. personnel.				Comments & Observations (2 total events)													
				Field Survey (HCL), Jun 5, 2020: Water well is 5 metres northeast of the house. Casing stick-up measured and updated.													
				Initial, Apr 13, 2006: Screen diameter (ID) not provided; assumed to be same as casing diameter (OD).													
***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2024. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safetv Branch. Health Canada. Ottawa. Ontario. 544061; 1 / 3																	
Aquifer Tests				Pump Intake BTOC (m): 27.4 on April 13, 2006													
Testing Date & Time Method / Type		Depth of Test Interval		Duration (minutes) Pumping Recovery		Avg. Rate (Lpm)		NPWL (metres)		Drawdown (metres)		Pump (metres)		Q20 (m³/day)* Apparent Effective		Transmissivity (m²/day)* Apparent Aquifer Effective	
1 2006-04-13 Air		[unknown]		120 5		90.9		9.1		18.3		27.4		63.4		8.4	
Alias IDs				Z594881				* HCL GPS — 10TM Resource NAD83, * HCL DEM (2016)									
AEPA WellId: 1715169																	
AEPA WellReportId: 11301534																	
AEPA GicWellId: 1715169																	
												RTU					

2006 Water Well 10-34
AEPA - Water Well Drilling Report



Water Well Drilling Report

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GIC Well ID 1715169
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2006/07/06

GOWN ID

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.

Well Identification and Location										Measurement in Metric	
Owner Name	Address			Town		Province		Country	Postal Code		
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
10	34	54	27	4	8A	4	0620740				
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation _____ m	
_____ m from					Latitude 53.708944 Longitude -113.895548					How Elevation Obtained	
_____ m from					How Location Obtained					Not Obtained	
					Lat/Long calculated to centre of lot						

Drilling Information	
Method of Drilling Unknown	Type of Work New Well
Proposed Well Use Domestic	

Formation Log			Measurement in Metric
Depth from ground level (m)	Water Bearing	Lithology Description	
13.72		Clay & Sand	
32.00		Sand	

Yield Test Summary			Measurement in Metric
Recommended Pump Rate	45.46 L/min		
Test Date	Water Removal Rate (L/min)	Static Water Level (m)	
2006/04/13	90.92	9.14	

Well Completion				Measurement in Metric
Total Depth Drilled	Finished Well Depth	Start Date	End Date	
32.00 m	32.00 m	2006/04/13	2006/04/13	
Borehole				
Diameter (cm)	From (m)	To (m)		
20.00	0.00	32.00		
Surface Casing (if applicable)		Well Casing/Liner		
Plastic		Unknown		
Size OD :	15.24 cm	Size OD :		
Wall Thickness :	0.991 cm	Wall Thickness :		
Bottom at :	28.96 m	Top at :		
		Bottom at :		
Perforations				
From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval (cm)
Perforated by				
Annular Seal Unknown				
Placed from 0.00 m to 13.72 m				
Amount				
Other Seals				
Type		At (m)		
Screen Type Stainless Steel				
Size OD : 12.70 cm				
From (m)	To (m)	Slot Size (cm)		
28.96	30.48	0.030		
Attachment Attached To Casing				
Top Fittings Coupler		Bottom Fittings Plug		
Pack				
Type Unknown Grain Size COARSE				
Amount 1000.00 Pounds				

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well DARIN (NEW) CAOQUETTE	Certification No 3537713
Company Name SUMMERS DRILLING LTD.	Copy of Well report provided to owner Yes
	Date approval holder signed 2006/04/13



Water Well Drilling Report

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GIC Well ID 1715169
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2006/07/06

GOWN ID

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.

Well Identification and Location										Measurement in Metric	
Owner Name		Address			Town		Province		Country	Postal Code	
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
10		34	54	27	4	8A	4	0620740			
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)						
m from					Latitude 53.708944 Longitude -113.895548					Elevation m	
m from					How Location Obtained					How Elevation Obtained	
					Lat/Long calculated to centre of lot					Not Obtained	

Additional Information										Measurement in Metric	
Distance From Top of Casing to Ground Level 45.72 cm											
Is Artesian Flow										Is Flow Control Installed	
Rate L/min										Describe	
Recommended Pump Rate 45.46 L/min										Pump Installed	Depth m
Recommended Pump Intake Depth (From TOC) 18.29 m										Type	Make H.P.
										Model (Output Rating)	
Did you Encounter Saline Water (>4000 ppm TDS)										Depth m	Well Disinfected Upon Completion
Gas										Depth m	Geophysical Log Taken
Remedial Action Taken										Submitted to ESRD	
Additional Comments on Well										Sample Collected for Potability	Submitted to ESRD

Yield Test			Taken From Ground Level	Measurement in Metric	
			Depth to water level		
Test Date	Start Time	Static Water Level			
2006/04/13	12:00 AM	9.14 m			
Method of Water Removal			Pumping (m)	Elapsed Time Minutes:Sec	Recovery (m)
Type Air				0:00	27.43
Removal Rate 90.92 L/min				1:00	12.80
Depth Withdrawn From 27.43 m				2:00	10.97
				3:00	10.36
				4:00	9.75
				5:00	9.45
If water removal period was < 2 hours, explain why					

Water Diverted for Drilling		
Water Source	Amount Taken L	Diversion Date & Time

Contractor Certification			
Name of Journeyman responsible for drilling/construction of well		Certification No	
DARIN (NEW) CAOQUETTE		3537713	
Company Name		Copy of Well report provided to owner	
SUMMERS DRILLING LTD.		Date approval holder signed	
		2006/04/13	

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2006 Water Well 10-34
Chemical Analysis Results (June 7, 2024)



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Page 1 of 12

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011528 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-11
Sample Date	April 26, 2024
Sample Time	11:45
Sample Location	M39227.496150
Sample Description	2006 WW 10-34 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	6.82	0.05		
Sulfur	Dissolved	mg/L	38.1	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0056	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.032	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.158	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	<0.00001	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	0.0009	0.0001		
Copper	Dissolved	mg/L	0.0013	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.089	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0014	0.0005		
Selenium	Dissolved	mg/L	<0.0002	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	1.11	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0026	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	0.008	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	35	5	15	Above AO
Turbidity		NTU	11.1	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.86	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	21.0			
Electrical Conductivity	at 25 °C	µS/cm	1100	1		
Calcium	Dissolved	mg/L	120	0.2		
Magnesium	Dissolved	mg/L	29.8	0.2		
Sodium	Dissolved	mg/L	98.8	0.4	200	Below AO

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011528 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Reference Number	1736660-11
Sample Date	April 26, 2024
Sample Time	11:45
Sample Location	M39227.496150
Sample Description	2006 WW 10-34 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	3.4	0.4		
Iron	Dissolved	mg/L	1.64	0.01	0.3	Above AO
Manganese	Dissolved	mg/L	1.47	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	0.6	0.4	250	Below AO
Fluoride		mg/L	<0.05	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.58	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	0.58	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	114	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	668			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	548	5		
Total Dissolved Solids	Calculated	mg/L	696	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	423			
Ionic Balance	Dissolved	%	97			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

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Quality Control

Bill To: Hydrogeological Consultants
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Edmonton, AB, Canada
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Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011528
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460024 - Mercury (Dissolved) in water												
Blank	6479008	Jun 05, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479012	Jun 05, 2024	Mercury	mg/L	0.000094						7e-005 - 0.00013	yes
Control Sample	6479011	Jun 05, 2024	Mercury	mg/L	0.000019						6e-006 - 3.6e-005	yes
Replicate	6479013	Jun 05, 2024	Mercury	mg/L	<0.000005			<0.000005		0	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt

Sampled By: HCL

Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011528
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011528
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479114	Jun 05, 2024	Aluminum	µg/L	<2			<2		0	10 % or 11 Abs	yes
Replicate	6479114	Jun 05, 2024	Antimony	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Arsenic	µg/L	12.5			12.4		0.38	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Barium	µg/L	19			19		0.09	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Boron	µg/L	102			102		0.06	10 % or 4.4 Abs	yes
Replicate	6479114	Jun 05, 2024	Cadmium	µg/L	<0.01			<0.01		0	10 % or 0.022 Abs	yes
Replicate	6479114	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Cobalt	µg/L	0.8			0.8		3.91	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Copper	µg/L	<0.2			<0.2		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Lead	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes

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Sampled By: HCL
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Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011528
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479114	Jun 05, 2024	Lithium	µg/L	118			119		0.43	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Nickel	µg/L	0.7			0.8		2.6	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Selenium	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Strontium	µg/L	822			826		0.52	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479114	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Titanium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Uranium	µg/L	3.7			3.7		0.74	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Vanadium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Zinc	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479186	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3
Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011528
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Blank	6479192	Jun 05, 2024	Turbidity	NTU	0.1	0.1					0.1	yes
Control Sample	6479197	Jun 05, 2024	Turbidity	NTU	1990						1847.5 - 2041.9	yes
Control Sample	6479198	Jun 05, 2024	Turbidity	NTU	4760						4441.7 - 6661.7	yes
Control Sample	6479196	Jun 05, 2024	Turbidity	NTU	149						132.1 - 162.1	yes
Control Sample	6479195	Jun 05, 2024	Turbidity	NTU	14.8						12.6 - 15.6	yes
Control Sample	6479194	Jun 05, 2024	Turbidity	NTU	1.7						1 - 2.2	yes
Replicate	6479207	Jun 05, 2024	Turbidity	NTU	11.8			12.0		1.68	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478741	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478741	Jun 05, 2024	Temp. of observed pH	°C	20.8						15.5 - 24.5	yes
Control Sample	6478741	Jun 05, 2024	Electrical Conductivity	dS/m	2.71						2.631 - 2.829	yes
Control Sample	6478741	Jun 05, 2024	P-Alkalinity	mg/L	541						442 - 584	yes
Control Sample	6478741	Jun 05, 2024	T-Alkalinity	mg/L	1040						958 - 1059	yes
Control Sample	6478742	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478742	Jun 05, 2024	Temp. of observed pH	°C	20.7						15.5 - 24.5	yes
Control Sample	6478742	Jun 05, 2024	Electrical Conductivity	dS/m	0.076						0.069 - 0.085	yes
Control Sample	6478742	Jun 05, 2024	P-Alkalinity	mg/L	51						28 - 73	yes
Control Sample	6478742	Jun 05, 2024	T-Alkalinity	mg/L	122						115 - 140	yes
Replicate	6478740	Jun 05, 2024	pH		6.94			6.96		0.23	0 % or 0.1 Abs	yes
Replicate	6478740	Jun 05, 2024	Electrical Conductivity	dS/m	0.129			0.131		1.38	10 % or 0.002 Abs	yes
Replicate	6478740	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478740	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	Bicarbonate	mg/L	65			66		0.9	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478740	Jun 05, 2024	T-Alkalinity	mg/L	54			54		0.9	10 % or 5 Abs	yes

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011528 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed

Routine Water - Continued

Batch: 2460219 - Anions (Routine) by Ion Chromatography

Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479560	Jun 05, 2024	Fluoride	mg/L	10.1						9.39 - 10.59	yes
Control Sample	6479560	Jun 05, 2024	Nitrate - N	mg/L	10.0						9.03 - 11.13	yes
Control Sample	6479560	Jun 05, 2024	Nitrite - N	mg/L	9.80						9.01 - 10.99	yes
Control Sample	6479560	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.8						19.1 - 20.9	yes
Control Sample	6479561	Jun 05, 2024	Fluoride	mg/L	4.95						4.56 - 5.22	yes
Control Sample	6479561	Jun 05, 2024	Nitrate - N	mg/L	4.86						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrite - N	mg/L	4.78						4.37 - 5.33	yes
Control Sample	6479561	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.64						8.8 - 10.6	yes
Control Sample	6479562	Jun 05, 2024	Fluoride	mg/L	0.52						0.45 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479562	Jun 05, 2024	Nitrite - N	mg/L	0.505						0.455 - 0.557	yes
Control Sample	6479562	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.01						0.85 - 1.15	yes
Replicate	6479558	Jun 05, 2024	Nitrate - N	mg/L	1.70			1.69		0.55	10 % or 0.01 Abs	yes
Replicate	6479558	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes

Batch: 2460052 - Chloride in Water

Blank	6479097	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479094	Jun 05, 2024	Chloride	mg/L	1910						1847.4 - 2256	yes
Control Sample	6479095	Jun 05, 2024	Chloride	mg/L	78.6						74.9 - 86.9	yes
Control Sample	6479096	Jun 05, 2024	Chloride	mg/L	14.7						13.3 - 16.5	yes
Replicate	6479093	Jun 05, 2024	Chloride	mg/L	0.8			0.8		5.13	10 % or 0.5 Abs	yes

Batch: 2460048 - Metals Trace (Dissolved) in water

Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011528
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

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SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011528 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-11; 9343643: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011528
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

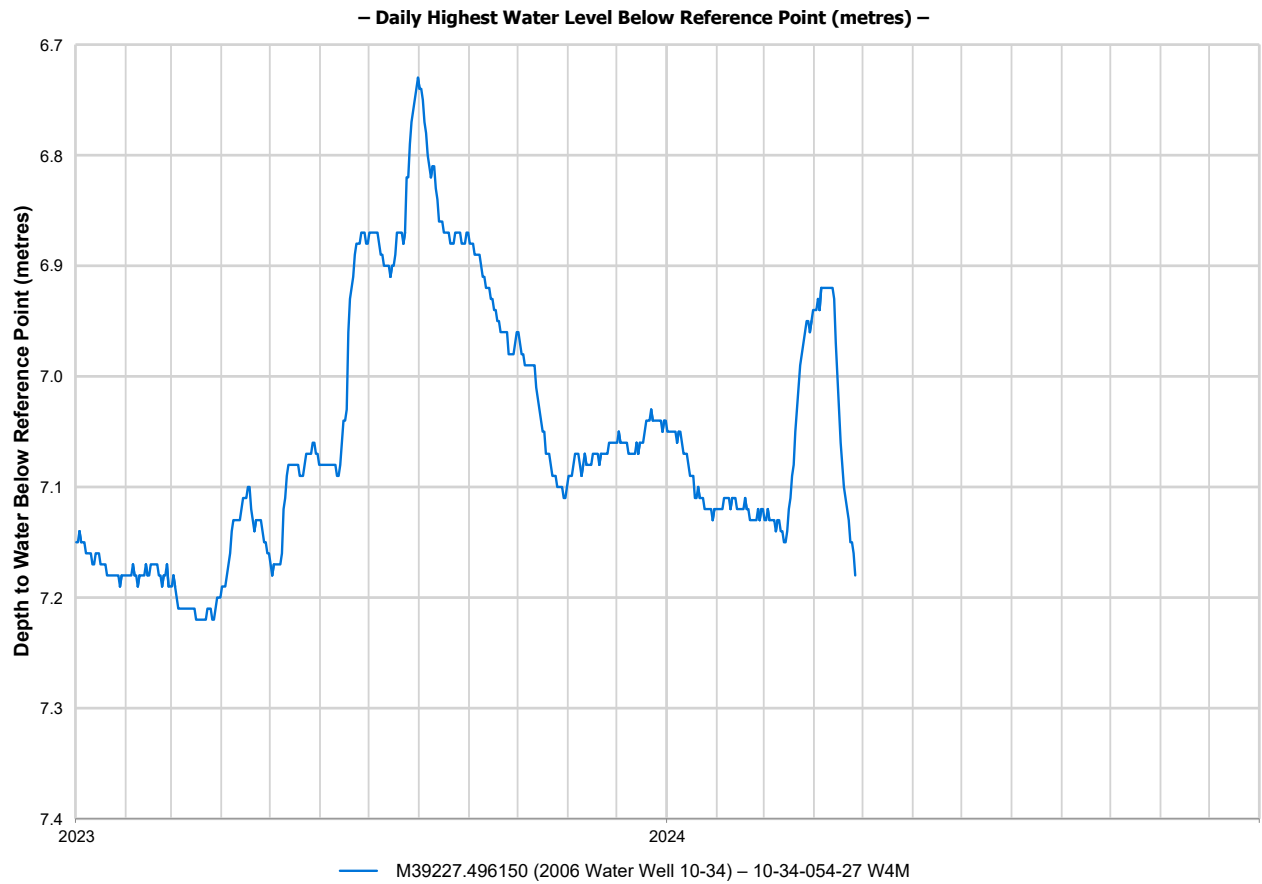
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

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*2006 Water Well 10-34
2023 - 2024 Hydrograph*



2013 Water Well 01-29

01-29-054-27 W4M
(M41313.498215)



Spatial Location:

Easting: **70,248**

Northing: **5,947,060**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): **690**

(elevation accuracy HCL DEM)

Date Completed: **February 7, 2013**

Depth Drilled (m): **22.9**

Completion Interval (m): **20.4 – 21.9 ***

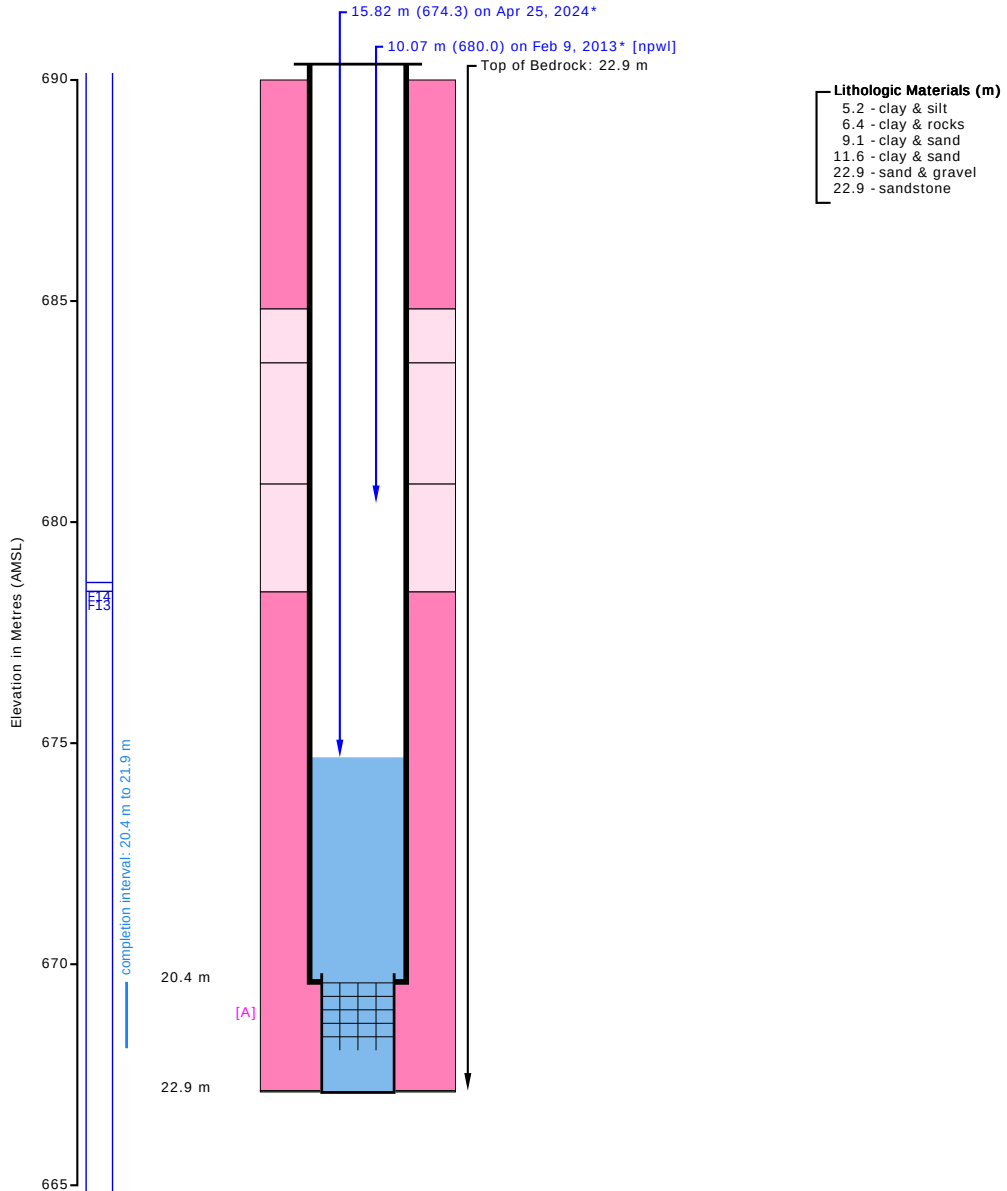
(TGWC determined value)*

Earliest Water Level (m): **10.07 – February 9, 2013 @ 11:00**

Most Recent Water Level (m): **15.82 – April 25, 2024 @ 11:00**

GIC ID: **1495598**

2013 Water Well 01-29 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		F14 - Middle Horseshoe Canyon Formation F13 - Lower Horseshoe Canyon Formation	
	Fine Grained			
	Coarse Grained			
Bedrock	Fine Grained			
	Coarse Grained			
	Other			

Summary

TGWC ID: M41313.498215
 Well Name: 2013 Water Well 01-29
 Legal Location: 01-29-054-27 W4M
 Casing (OD): 152.4 mm; PVC (6.0")
 Screen (OD): 114.3 mm; Stainless Steel (4.5")
 Casing Stick-Up: 0.5 m (not drawn to scale)
 Completion [A]: 20.4 to 21.9 m; Screened
 Water Level (recent): 15.82 m (674.3 m AMSL) on Apr 25, 2024 @ 11:00 - Reference Point: Top of Casing
 Water Level (oldest): 10.07 m (680.0 m AMSL) on Feb 9, 2013 @ 11:00 - Reference Point: Top of Casing [npwl]
 Top of Liner assumed to be 5% of 'non-cased' interval.

* Water-Level Measurements are measured from reference point listed.
 NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (<http://www.hcl.ca>) on behalf of Sturgeon County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
 Drawn: October 10, 2024 @ 12:25 --- <https://www.hcl.ca>

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2013 Water Well 01-29
AEPA - Water Well Drilling Report



Water Well Drilling Report

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GIC Well ID 1495598
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2013/03/05

GOWN ID

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.

Well Identification and Location										Measurement in Metric	
Owner Name	Address			Town		Province		Country	Postal Code		
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
1	29	54	27	4							
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation _____ m	
_____ m from					Latitude 53.688980 Longitude -113.935792					How Elevation Obtained	
_____ m from					How Location Obtained					Not Obtained	
					Hand held autonomous GPS 20-30m						

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

Formation Log			Measurement in Metric
Depth from ground level (m)	Water Bearing	Lithology Description	
5.18		Brown Clayey Clay & Silt	
6.40		Brown Clay & Rocks	
9.14		Dark Gray Clay & Sand	
11.58		Brown Sand & Clay	
22.86	Yes	Sand & Gravel	
22.86		Gray Salt & Pepper Sandstone	

Yield Test Summary			Measurement in Metric
Recommended Pump Rate	45.46 L/min		
Test Date	Water Removal Rate (L/min)	Static Water Level (m)	
2013/02/09	59.10	10.07	

Well Completion				Measurement in Metric
Total Depth Drilled	Finished Well Depth	Start Date	End Date	
22.86 m	21.95 m	2013/02/07	2013/02/07	
Borehole				
Diameter (cm)	From (m)	To (m)		
20.00	0.00	21.95		
Surface Casing (if applicable)		Well Casing/Liner		
Plastic				
Size OD :	15.24 cm	Size OD :		
Wall Thickness :	0.953 cm	Wall Thickness :		
Bottom at :	20.42 m	Top at :		
		Bottom at :		
Perforations				
From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval(cm)
Perforated by				
Annular Seal				
Placed from _____ m to _____ m				
Amount _____				
Other Seals				
Type		At (m)		
Screen Type Stainless Steel				
Size OD : 12.00 cm				
From (m)	To (m)	Slot Size (cm)		
20.42	21.95	0.254		
Attachment Attached To Casing				
Top Fittings Coupler		Bottom Fittings Plug		
Pack				
Type Washed Sand		Grain Size _____		
Amount _____				

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well TERRY BERGSTREISER	Certification No 41955A
Company Name MAR-WAYNE WATER WELL DRILLING SERVICES LTD.	Copy of Well report provided to owner Date approval holder signed Yes



Water Well Drilling Report

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

GIC Well ID 1495598
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2013/03/05

GOWN ID

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.

Well Identification and Location										Measurement in Metric		
Owner Name		Address			Town		Province		Country		Postal Code	
[REDACTED]		[REDACTED]			[REDACTED]		[REDACTED]		[REDACTED]		[REDACTED]	
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description			
1		29	54	27	4							
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation		m
m from					Latitude 53.688980 Longitude -113.935792					How Location Obtained		How Elevation Obtained
m from					Hand held autonomous GPS 20-30m					Not Obtained		

Additional Information										Measurement in Metric		
Distance From Top of Casing to Ground Level										40.64 cm		
Is Artesian Flow										Is Flow Control Installed		
Rate										L/min		
Describe												
Recommended Pump Rate										45.46 L/min		
Pump Installed										Yes		
Recommended Pump Intake Depth (From TOC)										19.81 m		
Type										Submersible		
Make										H.P. 0.75		
Model (Output Rating)												
Did you Encounter Saline Water (>4000 ppm TDS)										Depth		m
Gas										Depth		m
Remedial Action Taken										Well Disinfected Upon Completion		Yes
										Geophysical Log Taken		
										Submitted to ESRD		
Additional Comments on Well										Sample Collected for Potability		
										Submitted to ESRD		

Yield Test			Taken From Top of Casing		Measurement in Metric	
			Depth to water level			
Test Date	Start Time	Static Water Level				
2013/02/09	11:00 AM	10.07 m				
Method of Water Removal			Pumping (m)	Elapsed Time	Recovery (m)	
Type PUMP				Minutes:Sec		
Removal Rate				0:00	17.39	
59.10 L/min				1:00	13.88	
Depth Withdrawn From				2:00	12.06	
18.29 m				3:00	11.13	
				4:00	10.63	
				5:00	10.38	
				6:00	10.27	
				7:00	10.21	
				8:00	10.18	
				9:00	10.17	
				10:00	10.16	
If water removal period was < 2 hours, explain why						

Water Diverted for Drilling		
Water Source	Amount Taken	Diversion Date & Time
SHOP WELL	13638.28 L	2013/02/06 9:00 AM

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
TERRY BERGSTREISER	41955A
Company Name	Copy of Well report provided to owner
MAR-WAYNE WATER WELL DRILLING SERVICES LTD.	Date approval holder signed
	Yes

2013 Water Well 01-29
Chemical Analysis Results (June 7, 2024)



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Page 1 of 12

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011518 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By: HCL	P.O.: 19891	
Company: HCL	Proj. Acct. code:	

Reference Number	1736660-1
Sample Date	April 25, 2024
Sample Time	11:30
Sample Location	M41313.498215
Sample Description	2013 WW 01-29 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	8.28	0.05		
Sulfur	Dissolved	mg/L	30.5	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG; 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0004	0.0002	0.01	Below MAC
Barium	Dissolved	mg/L	0.066	0.001	2.0	Below MAC
Beryllium	Dissolved	mg/L	<0.0001	0.0001		
Bismuth	Dissolved	mg/L	<0.0005	0.0005		
Boron	Dissolved	mg/L	0.110	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	0.00015	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	0.0004	0.0001		
Copper	Dissolved	mg/L	0.0191	0.0002	1 AO; 2 MAC	Below AO
Lead	Dissolved	mg/L	0.0033	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.073	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0014	0.0005		
Selenium	Dissolved	mg/L	<0.0002	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	1.06	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00005		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0051	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	0.023	0.001	5	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	25	5	15	Above AO
Turbidity		NTU	3.7	0.1	0.1/0.3/1.0 OG	
Routine Water						
pH			7.63	1	7.0-10.5	Within OG Range
Temp. of observed pH		°C	20.8			
Electrical Conductivity	at 25 °C	µS/cm	976	1		
Calcium	Dissolved	mg/L	135	0.2		
Magnesium	Dissolved	mg/L	31.5	0.2		
Sodium	Dissolved	mg/L	45.8	0.4	200	Below AO

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011518 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Reference Number	1736660-1
Sample Date	April 25, 2024
Sample Time	11:30
Sample Location	M41313.498215
Sample Description	2013 WW 01-29 / 12.1 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Routine Water - Continued						
Potassium	Dissolved	mg/L	3.5	0.4		
Iron	Dissolved	mg/L	0.50	0.01	0.3	Above AO
Manganese	Dissolved	mg/L	0.638	0.005	0.02 AO; 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	8.1	0.4	250	Below AO
Fluoride		mg/L	0.13	0.05	1.5	Below MAC
Nitrate - N		mg/L	1.49	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	1.49	0.01	10	Below MAC
Sulfate (SO4)	Dissolved	mg/L	91.4	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	587			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	481	5		
Total Dissolved Solids	Calculated	mg/L	604	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	466			
Ionic Balance	Dissolved	%	97			

Approved by:

Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011518
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved												
Batch: 2460024 - Mercury (Dissolved) in water												
Blank	6479008	Jun 05, 2024	Mercury	µg/L	<0.000005	0.000005	0.0				0.051	yes
Control Sample	6479007	Jun 05, 2024	Mercury	mg/L	0.000092						7e-005 - 0.00013	yes
Control Sample	6479006	Jun 05, 2024	Mercury	mg/L	0.000020						6e-006 - 3.6e-005	yes
Replicate	6479010	Jun 05, 2024	Mercury	mg/L	0.000009			0.000010		12.93	10 % or 3e-005 Abs	yes
Batch: 2460055 - Metals ICP-MS (Dissolved) in water												
Blank	6479112	Jun 05, 2024	Aluminum	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Antimony	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Arsenic	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Barium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Beryllium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Boron	µg/L	<2	2	0.0				2	yes
Blank	6479112	Jun 05, 2024	Cadmium	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Chromium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Cobalt	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Copper	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Lead	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Lithium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Molybdenum	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Nickel	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Selenium	µg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479112	Jun 05, 2024	Silver	µg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479112	Jun 05, 2024	Strontium	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Thallium	µg/L	<0.05	0.05	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Tin	µg/L	<1	1	0.0				1	yes
Blank	6479112	Jun 05, 2024	Titanium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Uranium	µg/L	<0.5	0.5	0.0				0.5	yes
Blank	6479112	Jun 05, 2024	Vanadium	µg/L	<0.1	0.1	0.0				0.1	yes
Blank	6479112	Jun 05, 2024	Zinc	µg/L	<1	1	0.0				1	yes

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011518 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479111	Jun 05, 2024	Aluminum	µg/L	1000						902 - 1058	yes
Control Sample	6479111	Jun 05, 2024	Antimony	µg/L	40.5						36.4 - 44.2	yes
Control Sample	6479111	Jun 05, 2024	Arsenic	µg/L	40.1						37.7 - 42.5	yes
Control Sample	6479111	Jun 05, 2024	Barium	µg/L	200						181 - 211	yes
Control Sample	6479111	Jun 05, 2024	Beryllium	µg/L	20.6						17.6 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Bismuth	µg/L	98.5						90.6 - 106.8	yes
Control Sample	6479111	Jun 05, 2024	Boron	µg/L	390						351 - 427	yes
Control Sample	6479111	Jun 05, 2024	Cadmium	µg/L	2.03						1.87 - 2.23	yes
Control Sample	6479111	Jun 05, 2024	Chromium	µg/L	101						90.8 - 108.8	yes
Control Sample	6479111	Jun 05, 2024	Cobalt	µg/L	20.1						18.4 - 21.2	yes
Control Sample	6479111	Jun 05, 2024	Copper	µg/L	201						185.4 - 215.4	yes
Control Sample	6479111	Jun 05, 2024	Lead	µg/L	19.9						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Lithium	µg/L	196						178 - 214	yes
Control Sample	6479111	Jun 05, 2024	Molybdenum	µg/L	193						179 - 219	yes
Control Sample	6479111	Jun 05, 2024	Nickel	µg/L	102						93.3 - 105.9	yes
Control Sample	6479111	Jun 05, 2024	Selenium	µg/L	40.5						36.9 - 42.9	yes
Control Sample	6479111	Jun 05, 2024	Silver	µg/L	20.3						18.29 - 22.31	yes
Control Sample	6479111	Jun 05, 2024	Strontium	µg/L	200						183 - 219	yes
Control Sample	6479111	Jun 05, 2024	Thallium	µg/L	9.56						8.9 - 10.7	yes
Control Sample	6479111	Jun 05, 2024	Tin	µg/L	205						187 - 217	yes
Control Sample	6479111	Jun 05, 2024	Titanium	µg/L	102						91 - 109	yes
Control Sample	6479111	Jun 05, 2024	Uranium	µg/L	102						89.5 - 107.5	yes
Control Sample	6479111	Jun 05, 2024	Vanadium	µg/L	20.2						18.3 - 21.3	yes
Control Sample	6479111	Jun 05, 2024	Zinc	µg/L	199						184 - 217	yes
Control Sample	6479110	Jun 05, 2024	Aluminum	µg/L	50						46 - 56	yes
Control Sample	6479110	Jun 05, 2024	Antimony	µg/L	2.0						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Arsenic	µg/L	2.1						1.8 - 2.2	yes
Control Sample	6479110	Jun 05, 2024	Barium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Beryllium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Bismuth	µg/L	5.0						4.4 - 5.6	yes

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T5S 2W3
Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011518
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Control Sample	6479110	Jun 05, 2024	Boron	µg/L	21						18 - 22	yes
Control Sample	6479110	Jun 05, 2024	Cadmium	µg/L	0.11						0.09 - 0.12	yes
Control Sample	6479110	Jun 05, 2024	Chromium	µg/L	5.1						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Cobalt	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Copper	µg/L	10.3						9.1 - 10.9	yes
Control Sample	6479110	Jun 05, 2024	Lead	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Lithium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Molybdenum	µg/L	10						9 - 10	yes
Control Sample	6479110	Jun 05, 2024	Nickel	µg/L	5.2						4.6 - 5.4	yes
Control Sample	6479110	Jun 05, 2024	Selenium	µg/L	2.0						1.8 - 2.1	yes
Control Sample	6479110	Jun 05, 2024	Silver	µg/L	1.02						0.92 - 1.12	yes
Control Sample	6479110	Jun 05, 2024	Strontium	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Thallium	µg/L	0.48						0.45 - 0.55	yes
Control Sample	6479110	Jun 05, 2024	Tin	µg/L	10						9 - 11	yes
Control Sample	6479110	Jun 05, 2024	Titanium	µg/L	5.0						4.4 - 5.5	yes
Control Sample	6479110	Jun 05, 2024	Uranium	µg/L	5.2						4.5 - 5.6	yes
Control Sample	6479110	Jun 05, 2024	Vanadium	µg/L	1.0						0.9 - 1.1	yes
Control Sample	6479110	Jun 05, 2024	Zinc	µg/L	10						9 - 11	yes
Replicate	6479114	Jun 05, 2024	Aluminum	µg/L	<2			<2		0	10 % or 11 Abs	yes
Replicate	6479114	Jun 05, 2024	Antimony	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Arsenic	µg/L	12.5			12.4		0.38	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Barium	µg/L	19			19		0.09	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Beryllium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Bismuth	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Boron	µg/L	102			102		0.06	10 % or 4.4 Abs	yes
Replicate	6479114	Jun 05, 2024	Cadmium	µg/L	<0.01			<0.01		0	10 % or 0.022 Abs	yes
Replicate	6479114	Jun 05, 2024	Chromium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Cobalt	µg/L	0.8			0.8		3.91	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Copper	µg/L	<0.2			<0.2		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Lead	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes

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Quality Control

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Attn: Jennifer Catt
Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011518
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Metals Dissolved - Continued												
Replicate	6479114	Jun 05, 2024	Lithium	µg/L	118			119		0.43	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Molybdenum	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Nickel	µg/L	0.7			0.8		2.6	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Selenium	µg/L	<0.2			<0.2		0	10 % or 0.44 Abs	yes
Replicate	6479114	Jun 05, 2024	Silver	µg/L	<0.01			<0.01		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Strontium	µg/L	822			826		0.52	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Thallium	µg/L	<0.05			<0.05		0	10 % or 0.11 Abs	yes
Replicate	6479114	Jun 05, 2024	Tin	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Replicate	6479114	Jun 05, 2024	Titanium	µg/L	<0.5			<0.5		0	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Uranium	µg/L	3.7			3.7		0.74	10 % or 1.1 Abs	yes
Replicate	6479114	Jun 05, 2024	Vanadium	µg/L	<0.1			<0.1		0	10 % or 0.22 Abs	yes
Replicate	6479114	Jun 05, 2024	Zinc	µg/L	<1			<1		0	10 % or 2.2 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Silicon	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479079	Jun 05, 2024	Sulfur	mg/L	<0.3	0.3	0.0				0.3	yes
Control Sample	6479077	Jun 05, 2024	Silicon	mg/L	10.5						9.51 - 10.89	yes
Control Sample	6479077	Jun 05, 2024	Sulfur	mg/L	150						141.6 - 156.6	yes
Control Sample	6479076	Jun 05, 2024	Silicon	mg/L	2.11						1.88 - 2.24	yes
Control Sample	6479076	Jun 05, 2024	Sulfur	mg/L	10.1						9.1 - 10.6	yes
Control Sample	6479075	Jun 05, 2024	Silicon	mg/L	0.20						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Sulfur	mg/L	2.9						2.7 - 3.1	yes
Replicate	6479080	Jun 05, 2024	Silicon	mg/L	8.25			8.02		2.75	10 % or 0.012 Abs	yes
Replicate	6479080	Jun 05, 2024	Sulfur	mg/L	68.0			66.2		2.69	10 % or 0.1 Abs	yes

Physical and Aggregate Properties

Batch: 2460110 - Colour (Apparent) in water

Control Sample	6479184	Jun 05, 2024	Colour	Colour units	10						10 - 10	yes

Batch: 2460114 - Turbidity in Water

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Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M
LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011518
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Physical and Aggregate Properties - Continued												
Blank	6479193	Jun 05, 2024	Turbidity	NTU	<0.1	0.1					0.1	yes
Blank	6479192	Jun 05, 2024	Turbidity	NTU	0.1	0.1					0.1	yes
Control Sample	6479197	Jun 05, 2024	Turbidity	NTU	1990						1847.5 - 2041.9	yes
Control Sample	6479198	Jun 05, 2024	Turbidity	NTU	4760						4441.7 - 6661.7	yes
Control Sample	6479196	Jun 05, 2024	Turbidity	NTU	149						132.1 - 162.1	yes
Control Sample	6479195	Jun 05, 2024	Turbidity	NTU	14.8						12.6 - 15.6	yes
Control Sample	6479194	Jun 05, 2024	Turbidity	NTU	1.7						1 - 2.2	yes
Replicate	6479207	Jun 05, 2024	Turbidity	NTU	11.8			12.0		1.68	10 % or 0.2 Abs	yes

Routine Water

Batch: 2459956 - Alkalinity, pH, and EC in water

Control Sample	6478747	Jun 05, 2024	Electrical Conductivity	dS/m	32.3						27.2 - 36.8	yes
Control Sample	6478736	Jun 05, 2024	pH		9.23						8.9 - 9.44	yes
Control Sample	6478736	Jun 05, 2024	Temp. of observed pH	°C	21.5						15.5 - 24.5	yes
Control Sample	6478736	Jun 05, 2024	Electrical Conductivity	dS/m	2.72						2.631 - 2.829	yes
Control Sample	6478736	Jun 05, 2024	P-Alkalinity	mg/L	534						442 - 584	yes
Control Sample	6478736	Jun 05, 2024	T-Alkalinity	mg/L	1020						958 - 1059	yes
Control Sample	6478737	Jun 05, 2024	pH		6.92						6.79 - 6.97	yes
Control Sample	6478737	Jun 05, 2024	Temp. of observed pH	°C	21.5						15.5 - 24.5	yes
Control Sample	6478737	Jun 05, 2024	Electrical Conductivity	dS/m	0.078						0.069 - 0.085	yes
Control Sample	6478737	Jun 05, 2024	P-Alkalinity	mg/L	47						28 - 73	yes
Control Sample	6478737	Jun 05, 2024	T-Alkalinity	mg/L	125						115 - 140	yes
Replicate	6478740	Jun 05, 2024	pH		6.94			6.96		0.23	0 % or 0.1 Abs	yes
Replicate	6478740	Jun 05, 2024	Electrical Conductivity	dS/m	0.129			0.131		1.38	10 % or 0.002 Abs	yes
Replicate	6478740	Jun 05, 2024	Hydroxide	mg/L	<5			<5		0	10 %	yes
Replicate	6478740	Jun 05, 2024	Carbonate	mg/L	<6			<6		0	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	Bicarbonate	mg/L	65			66		0.9	10 % or 6 Abs	yes
Replicate	6478740	Jun 05, 2024	P-Alkalinity	mg/L	<5			<5		0	10 % or 5 Abs	yes
Replicate	6478740	Jun 05, 2024	T-Alkalinity	mg/L	54			54		0.9	10 % or 5 Abs	yes

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011518 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Batch: 2460219 - Anions (Routine) by Ion Chromatography												
Blank	6479559	Jun 05, 2024	Fluoride	mg/L	<0.05	0.05	0.0				0.05	yes
Blank	6479559	Jun 05, 2024	Nitrate - N	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479559	Jun 05, 2024	Nitrite - N	mg/L	<0.005	0.005	0.0				0.005	yes
Control Sample	6479555	Jun 05, 2024	Fluoride	mg/L	9.99						9.39 - 10.59	yes
Control Sample	6479555	Jun 05, 2024	Nitrate - N	mg/L	9.98						9.03 - 11.13	yes
Control Sample	6479555	Jun 05, 2024	Nitrite - N	mg/L	9.77						9.01 - 10.99	yes
Control Sample	6479555	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	19.80						19.1 - 20.9	yes
Control Sample	6479556	Jun 05, 2024	Fluoride	mg/L	4.92						4.56 - 5.22	yes
Control Sample	6479556	Jun 05, 2024	Nitrate - N	mg/L	4.87						4.37 - 5.33	yes
Control Sample	6479556	Jun 05, 2024	Nitrite - N	mg/L	4.79						4.37 - 5.33	yes
Control Sample	6479556	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	9.65						8.8 - 10.6	yes
Control Sample	6479557	Jun 05, 2024	Fluoride	mg/L	0.52						0.45 - 0.57	yes
Control Sample	6479557	Jun 05, 2024	Nitrate - N	mg/L	0.50						0.43 - 0.57	yes
Control Sample	6479557	Jun 05, 2024	Nitrite - N	mg/L	0.507						0.455 - 0.557	yes
Control Sample	6479557	Jun 05, 2024	Nitrate and Nitrite - N	mg/L	1.01						0.85 - 1.15	yes
Replicate	6479558	Jun 05, 2024	Nitrate - N	mg/L	1.70			1.69		0.55	10 % or 0.01 Abs	yes
Replicate	6479558	Jun 05, 2024	Nitrite - N	mg/L	<0.005			<0.005		0	10 % or 0.01 Abs	yes
Replicate	6479563	Jun 05, 2024	Fluoride	mg/L	<0.05			<0.05		0	10 % or 0.05 Abs	yes
Batch: 2460052 - Chloride in Water												
Blank	6479091	Jun 05, 2024	Chloride	mg/L	<0.4	0.4	0.0				0.4	yes
Control Sample	6479088	Jun 05, 2024	Chloride	mg/L	2000						1847.4 - 2256	yes
Control Sample	6479089	Jun 05, 2024	Chloride	mg/L	77.9						74.9 - 86.9	yes
Control Sample	6479090	Jun 05, 2024	Chloride	mg/L	14.7						13.3 - 16.5	yes
Replicate	6479092	Jun 05, 2024	Chloride	mg/L	3.2			3.2		3.13	10 % or 0.5 Abs	yes
Batch: 2460048 - Metals Trace (Dissolved) in water												
Blank	6479079	Jun 05, 2024	Calcium	mg/L	<0.2	0.2	0.0				0.2	yes
Blank	6479079	Jun 05, 2024	Magnesium	mg/L	<0.2	0.2	0.0				0.1	yes

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Quality Control

Bill To: Hydrogeological Consultants
17740 - 118 Avenue NW
Edmonton, AB, Canada
T5S 2W3

Attn: Jennifer Catt

Sampled By: HCL
Company: HCL

Project ID: MR-0224.23
Project Name: 2023 Groundwater
Monitoring
Project Location: Tp 054, R 26 to 28, W4M
and Tp 054, R 01, W5M

LSD:
P.O.: 19891
Proj. Acct. code:

Lot ID: **1736660**
Control Number:
Date Received: Jun 4, 2024
Date Reported: Jun 7, 2024
Report Number: 3011518
Report Type: Final Report

Sample Type	Sample ID	Analysis Date	Analyte	Units	Result	RDL	SPK Value	Ref Value	%REC	RPD	Limits	Passed
Routine Water - Continued												
Blank	6479079	Jun 05, 2024	Sodium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Potassium	mg/L	<0.4	0.4	0.0				0.4	yes
Blank	6479079	Jun 05, 2024	Iron	mg/L	<0.01	0.01	0.0				0.01	yes
Blank	6479079	Jun 05, 2024	Manganese	mg/L	<0.005	0.005	0.0				0.004	yes
Control Sample	6479077	Jun 05, 2024	Calcium	mg/L	247						235.3 - 262.9	yes
Control Sample	6479077	Jun 05, 2024	Magnesium	mg/L	100.0						92.6 - 104.6	yes
Control Sample	6479077	Jun 05, 2024	Sodium	mg/L	249						234.6 - 259.2	yes
Control Sample	6479077	Jun 05, 2024	Potassium	mg/L	246						238.3 - 262.3	yes
Control Sample	6479077	Jun 05, 2024	Iron	mg/L	9.71						9.38 - 10.16	yes
Control Sample	6479077	Jun 05, 2024	Manganese	mg/L	2.43						2.32 - 2.56	yes
Control Sample	6479076	Jun 05, 2024	Calcium	mg/L	51.5						44.9 - 56.9	yes
Control Sample	6479076	Jun 05, 2024	Magnesium	mg/L	20.7						17.9 - 22	yes
Control Sample	6479076	Jun 05, 2024	Sodium	mg/L	51.3						47.3 - 52.7	yes
Control Sample	6479076	Jun 05, 2024	Potassium	mg/L	51.3						45.8 - 55.8	yes
Control Sample	6479076	Jun 05, 2024	Iron	mg/L	2.01						1.89 - 2.11	yes
Control Sample	6479076	Jun 05, 2024	Manganese	mg/L	0.504						0.468 - 0.552	yes
Control Sample	6479075	Jun 05, 2024	Calcium	mg/L	5.1						4.7 - 5.4	yes
Control Sample	6479075	Jun 05, 2024	Magnesium	mg/L	2.1						1.9 - 2.2	yes
Control Sample	6479075	Jun 05, 2024	Sodium	mg/L	5.2						4.7 - 5.7	yes
Control Sample	6479075	Jun 05, 2024	Potassium	mg/L	5.2						4.6 - 5.6	yes
Control Sample	6479075	Jun 05, 2024	Iron	mg/L	0.19						0.18 - 0.22	yes
Control Sample	6479075	Jun 05, 2024	Manganese	mg/L	0.050						0.047 - 0.057	yes
Replicate	6479080	Jun 05, 2024	Calcium	mg/L	153			150		2.23	10 % or 0.6 Abs	yes
Replicate	6479080	Jun 05, 2024	Magnesium	mg/L	39.7			38.3		3.59	10 % or 0.7 Abs	yes
Replicate	6479080	Jun 05, 2024	Sodium	mg/L	85.0			82.3		3.21	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Potassium	mg/L	4.9			4.9		1.27	10 % or 1.2 Abs	yes
Replicate	6479080	Jun 05, 2024	Iron	mg/L	2.87			2.80		2.34	10 % or 0.05 Abs	yes
Replicate	6479080	Jun 05, 2024	Manganese	mg/L	0.495			0.478		3.54	10 % or 0.01 Abs	yes

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SPK Value = Spike Value
Ref Value = Reference Value

%REC = Percent Recovery
RPD = Relative Percent Difference

Abs = Absolute Difference

Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1736660 Control Number: Date Received: Jun 4, 2024 Date Reported: Jun 7, 2024 Report Number: 3011518 Report Type: Final Report
Attn: Jennifer Catt Sampled By: HCL Company: HCL	LSD: P.O.: 19891 Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 5, 2024	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 5, 2024	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 5, 2024	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 4, 2024	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 5, 2024	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 5, 2024	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 5, 2024	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 5, 2024	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 5, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Jun 04, 2024 - Sample 1736660-1; 9343633: Sample received at 12.1 °C



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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1736660
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Received:	Jun 4, 2024
	T5S 2W3	LSD:		Date Reported:	Jun 7, 2024
Attn:	Jennifer Catt	P.O.:	19891	Report Number:	3011518
Sampled By:	HCL	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

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2023 - 2024 Hydrograph*

