



2024 to 2025 Groundwater Monitoring Report

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

**Prepared for
Sturgeon County**

September 2025

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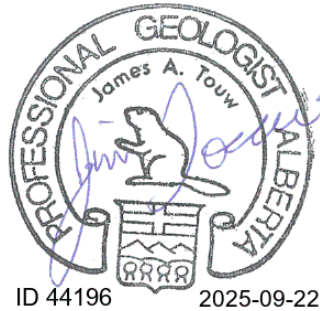
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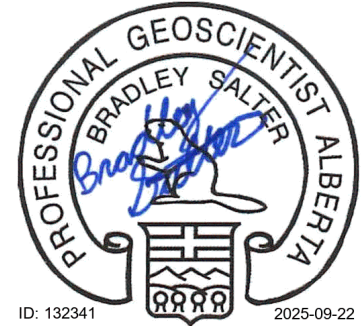
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Executive Summary

The Calahoo Resource Extraction District (CRED) is an area in Sturgeon County (the County) that is 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 May 1, 2025, 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 2025, data were collected from 21 monitoring wells and 7 private water wells. All monitoring sites are near operating, suspended, or reclaimed aggregate pit operations.

Within the AOI, two groundwater-quality parameters have shown noteworthy trends, which are local and are related to five monitoring wells. One trend is related to the concentration of sulfate in the groundwaters from monitoring two wells situated in the southeastern part of the AOI, where elevated sulfate concentrations have historically been observed. The other noteworthy trend is related to the concentration of chloride, which has been on a rising trend in the groundwaters from MW14-02 since monitoring began in 2015 and from MW10-01 since 2019; the concentration of chloride has been on a decreasing trend in the groundwater from MW04-03 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 from these five monitoring wells.

In 2025, the groundwaters from four monitoring wells had uranium or arsenic concentrations that exceeded the maximum acceptable concentrations (MACs); uranium and arsenic are naturally occurring, and their concentrations do not exhibit an increasing or decreasing trend. The groundwater samples collected from all but four monitoring wells had manganese concentrations that exceeded the MAC in 2025; the elevated concentrations are not due to aggregate extraction but represent naturally occurring or background conditions.

The water-level monitoring data continue to document that recent and historical water-level declines are mainly a result of nearby dewatering during aggregate mining operations, while recently recorded water-level rises are a result of the cessation of nearby aggregate dewatering and 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 in order to assess a correlation between groundwater levels and River levels

1. Introduction

1.1. Project Description

The Calahoo Resource Extraction District (CRED) is 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 on the following page.¹

1.2. 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 May 1, 2025.

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 aggregate 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.

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

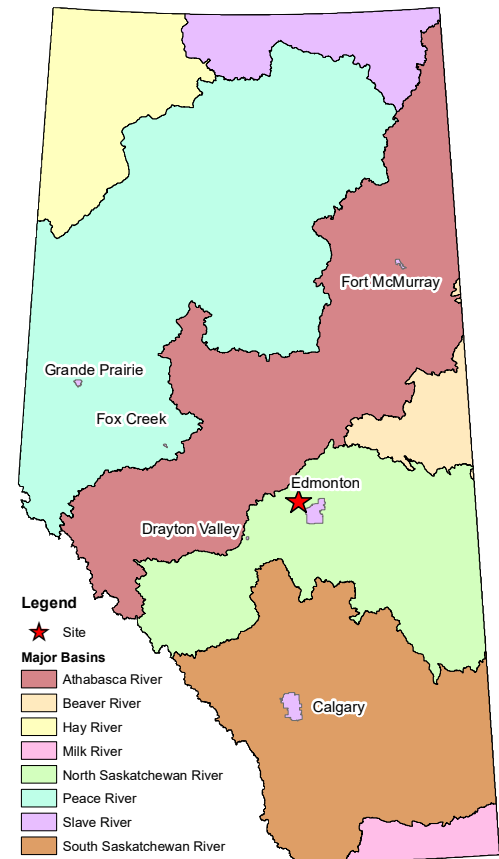


Figure 1. Index Map - Regional

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

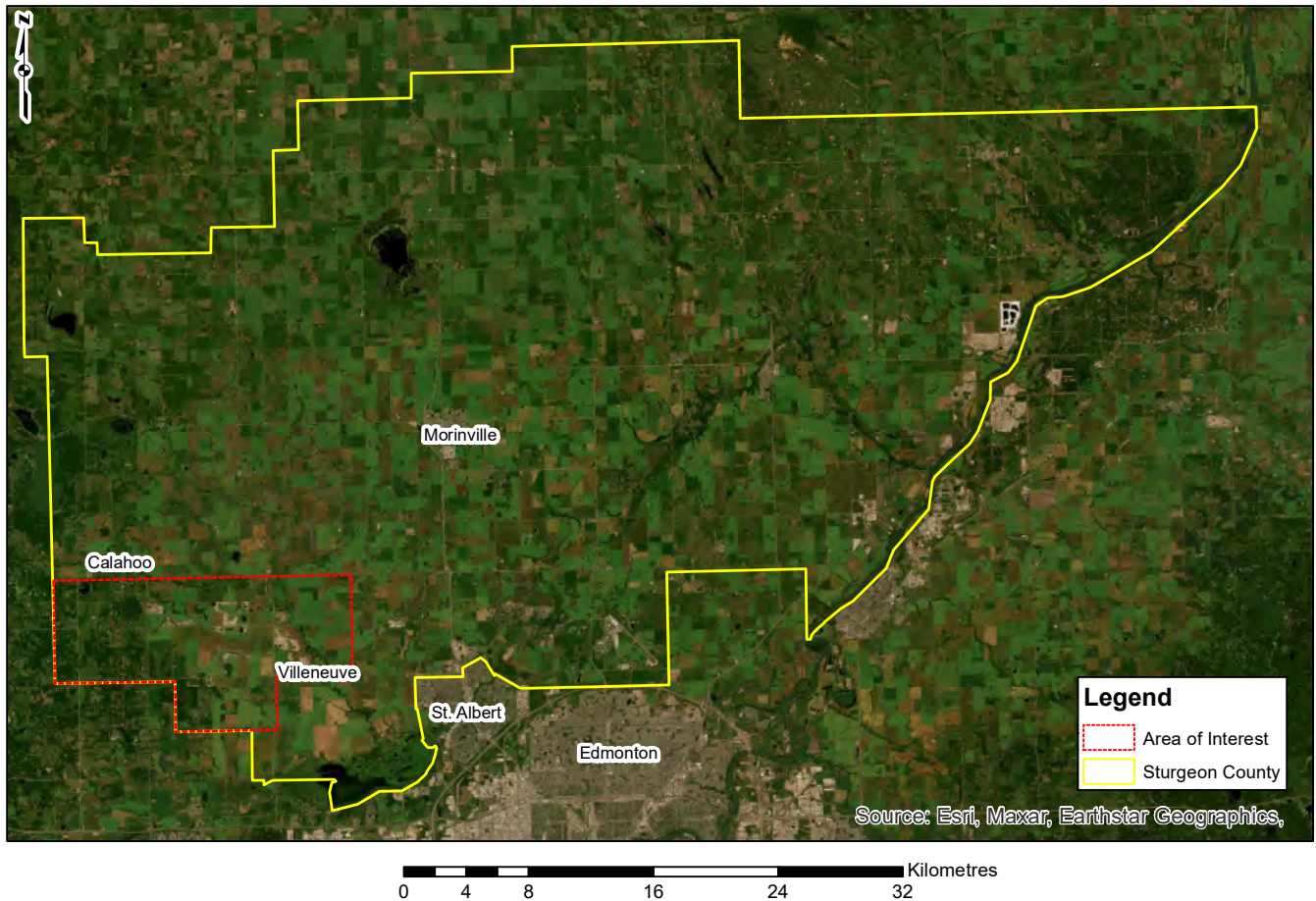


Figure 2. County Map – Area of Interest

1.3. Scope

The present program included annual collection of water-level data and 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 an annual groundwater monitoring report. Subsequent addenda to the Terms of Reference have resulted in the monitoring of 28 monitoring wells as part of the present program, as summarized in Table 1 on the following page.³

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.

Monitoring Well Name	TGWC ID	Legal Location (W4M)	Comments
Monitoring Program: Included in Schedule B			
A-S&G (OV)	M40000.652035	09-29-054-27	
C-S&G (OV)	M40000.652664	09-29-054-27	
MLM	M40000.651289	05-27-054-27	Reclaimed in 2025
MW01-01	M40000.647826	16-17-054-26	
MW01-03	M40000.648652	08-26-054-27	Reclaimed in 2022
MW01-04	M40000.649295	14-27-054-27	
MW01-05	M40000.649859	05-33-054-27	
MW01-06	M40000.650496	01-29-054-27	
MW01-07	M37490.031427	13-19-054-26	
MW01-08	M37490.031431	10-26-054-27	
MW04-01	M39227.477799	01-16-054-26	
MW04-02	M39227.477802	01-16-054-26	
MW04-03	M39227.477827	01-17-054-26	
MW07-1-33	M39859.704050	08-36-054-27	
MW07-4-14	M39859.704051	03-29-054-26	Replaced by MW10-01 in 2010
MW07-2-14	M39859.704048	01-35-054-27	
MW07-3-33	M39859.704049	07-31-054-27	
MW11-01	M41457.441850	04-27-054-27	Removed from program in 2020
MW11-02	M41457.432661	04-27-054-27	
MW14-01	M42473.435942	05-34-054-27	
MW14-02	M42475.578813	08-34-054-27	
Monitoring Program: Not Included in Schedule B			
MW10-01	M40337.575466	03-29-054-26	Replaced MW07-4-14 in 2010
MW05-01	M39227.483721	09-27-054-27	Added to program in 2018
MW18-01	M43326.424846	08-16-054-26	
1963 Water Well 12-19	M40235.411135	NW 19-054-26	
2001 Water Well 14-21	M37841.689687	NW 21-054-27	Added to program in 2020
2001 Water Well 16-28	M37490.030994	NE 28-054-27	
2013 Water Well 01-29	M41313.498215	SE 29-054-27	
1995 Water Well 09-34	M43987.561869	09-34-054-27	Added to program in 2022; water levels have been measured since 2020 as part of other monitoring programs in the area
2006 Water Well 10-34	M39227.496150	10-34-054-27	
1987 Water Well 13-26	M35377.055706	NW 26-054-27	Added to program in 2023; water levels have been measured since 2022-09-15 as part of other monitoring programs in the area

Table 1. Groundwater Monitoring Network

Because data downloads were conducted over several days in 2025, some monitoring sites have more recent data than May 1, 2025, with the most recent being June 25, 2025.

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 Database⁴ 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.

⁴ <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 before 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 field-parameter meter. 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 Amrize Canada Inc.⁵ (Amrize) and Esri ArcGIS Online.

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.

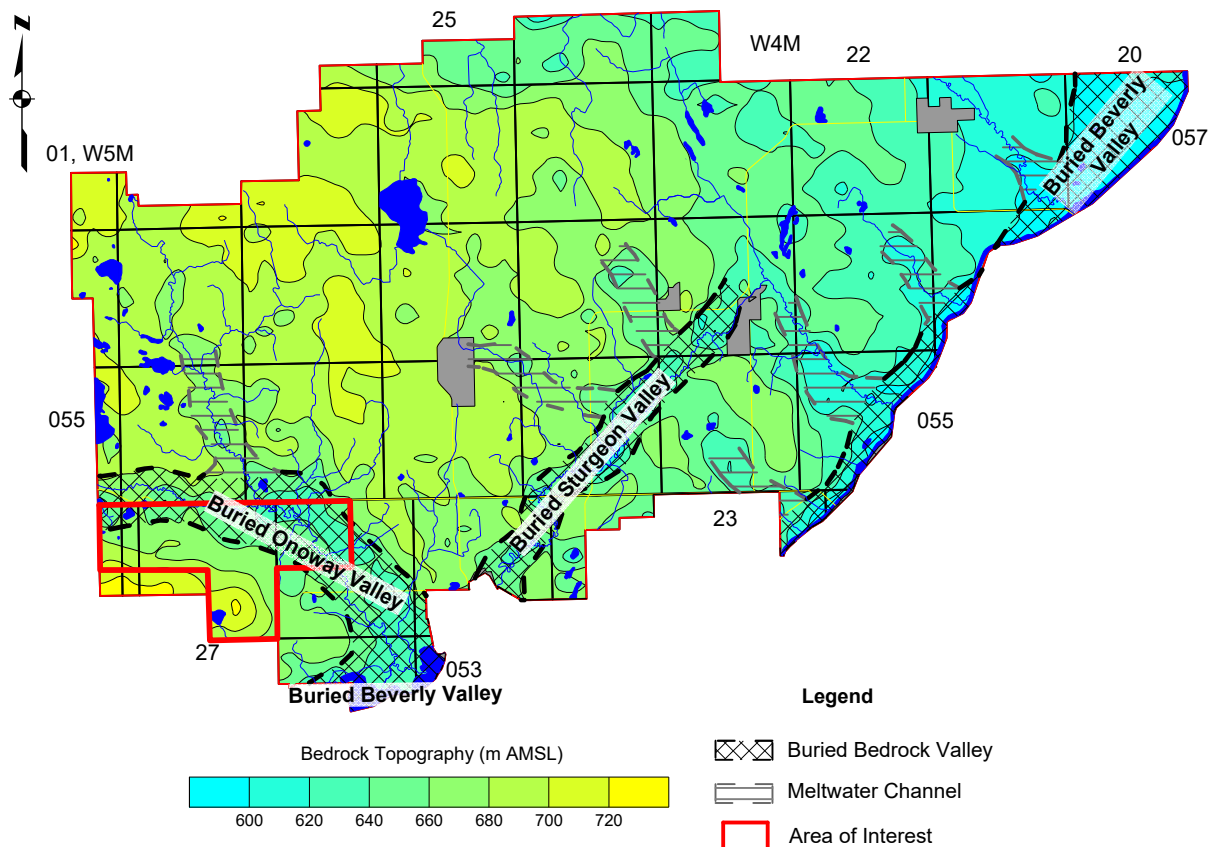


Figure 3. Bedrock Topography, Sturgeon County (adapted from HCL, 2001)

⁵ Previously known as Lafarge Canada Inc.

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 620 metres above mean sea level (AMSL).

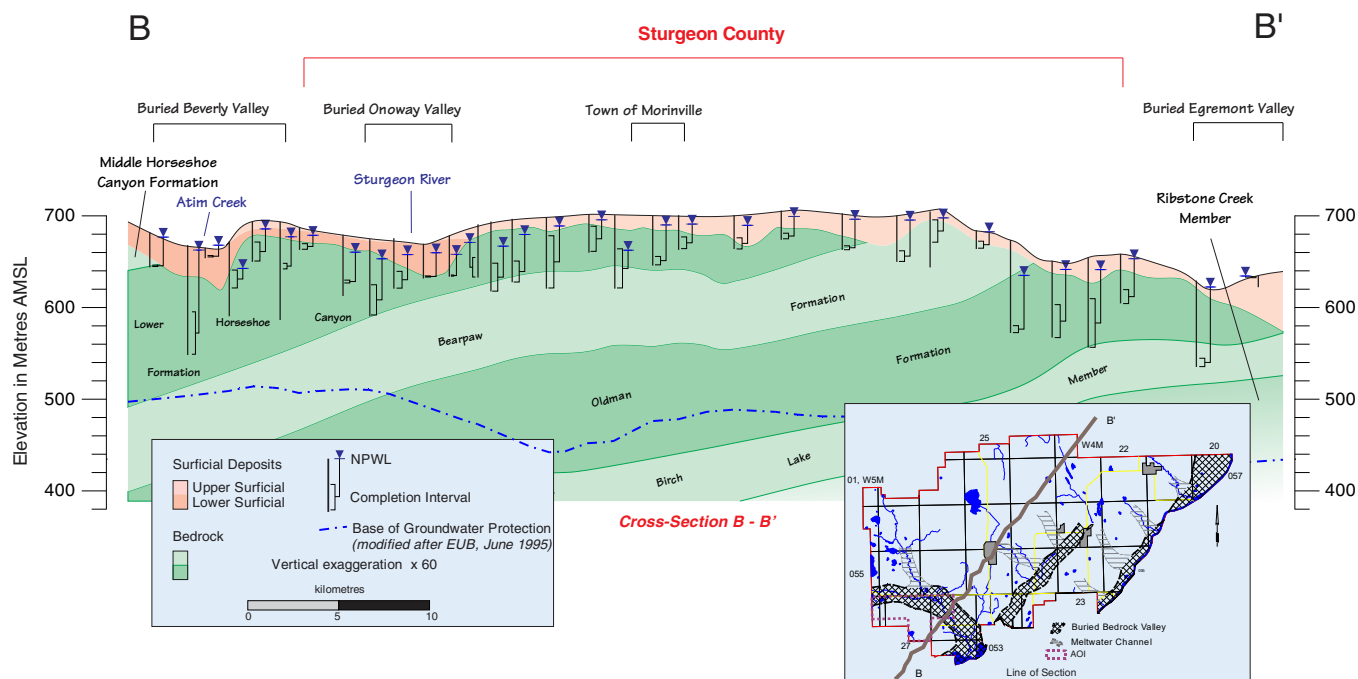


Figure 4. Cross-Section B-B' (adapted from HCL, 2001)

Amrize and Heidelberg Materials Canada Limited (Heidelberg Materials), and to a lesser extent Sureway Construction Group (Sureway), are the only aggregate mining companies that have been actively dewatering and extracting aggregate in the CRED since 2016. Figure 5 in Section 3.3 shows the 2024 and 2025 mining activities of Amrize and Heidelberg Materials and the areas that were reclaimed or were in the process of reclamation in either 2024 or 2025 within the AOI, including pits that were reclaimed by Sureway in 2024.⁶

⁶ Activity locations were provided by Amrize, Heidelberg Materials, and Sureway; Figure 8 and Figure 16 in the present report also include areas that were reclaimed prior to 2024.

3.3. Groundwater Monitoring Well Network

The current groundwater monitoring well network includes 28 monitoring wells that are completed in the Buried Onoway Valley sand and gravel deposits within the AOI. Information related to the completion of the various monitoring wells is summarized in Table 2, with their locations shown on Figure 5 on the following page.

Monitoring Well Name	TGWC ID	Legal Location (W4M)	Year Completed	On Behalf Of	Reporting Document
MW01-01	M40000.647826	16-17-054-26	2001	Sturgeon County	UMA (2001)
MW01-04	M40000.649295	14-27-054-27			
MW01-05	M40000.649859	05-33-054-27			
MW01-06	M40000.650496	01-29-054-27			
MW01-07	M37490.031427	13-19-054-26			
MW01-08	M37490.031431	10-26-054-27			
MW04-01	M39227.477799	01-16-054-26	2004	Yellowhead Aggregates	Westerra (2004a)
MW04-02	M39227.477802	01-16-054-26	2004	Amrize	Westerra (2004b)
MW04-03	M39227.477827	01-17-054-26			
MW05-01	M39227.483721	09-27-054-27	2007	Inland Aggregates Ltd.	-
A-S&G (OV)	M40000.652035	09-29-054-27	2007	Amrize	Westwater (2007)
C-S&G (OV)	M40000.652664	09-29-054-27			
MW07-1-33	M39859.704050	08-36-054-27	2006–2007	Sturgeon County	Stantec (2008)
MW07-2-14	M39859.704048	01-35-054-27			
MW07-3-33	M39859.704049	07-31-054-27			
MW10-01	M40337.575466	03-29-054-26	2010	Sturgeon County	-
MW11-02	M41457.432661	04-27-054-27	2011	Inland Aggregates Ltd.	-
MW14-01	M42473.435942	05-34-054-27	2014	Sturgeon County	-
MW14-02	M42475.578813	08-34-054-27			
MW18-01	M43326.424846	08-16-054-26	2018	Heidelberg Materials	-
MLM	M40000.651289	05-27-054-27	-	-	-
1963 Water Well 12-19	M40235.411135	NW 19-054-26	1963	Private Resident	-
2001 Water Well 14-21	M37841.689687	NW 21-054-27	2001	Private Resident	-
2001 Water Well 16-28	M37490.030994	NE 28-054-27	2001	Private Resident	-
2013 Water Well 01-29	M41313.498215	SE 29-054-27	2013	Private Resident	-
1995 Water Well 09-34	M43987.561869	09-34-054-27	1995	Private Resident	-
2006 Water Well 10-34	M39227.496150	10-34-054-27	2006	Private Resident	-
1987 Water Well 13-26	M35377.055706	NW 26-054-27	1987	Private Resident	-

" - " indicates not applicable or unknown

Table 2. Monitoring Well Completion Summary

Two additional groundwater monitoring programs in the AOI, which include eight other private water wells, are conducted by HCL.⁷ MLM was reclaimed in July 2025 after the annual data download.

Figure 5 on the following page is a map of the groundwater monitoring well network and shows the areas that were either actively mined or in the process of reclamation in 2024 and/or 2025. Monitoring well details are in Appendix B.

⁷ HCL Project No. MR-0227 is conducted on behalf of Amrize; HCL Project No. MR-0346 is conducted on behalf of Heidelberg Materials.

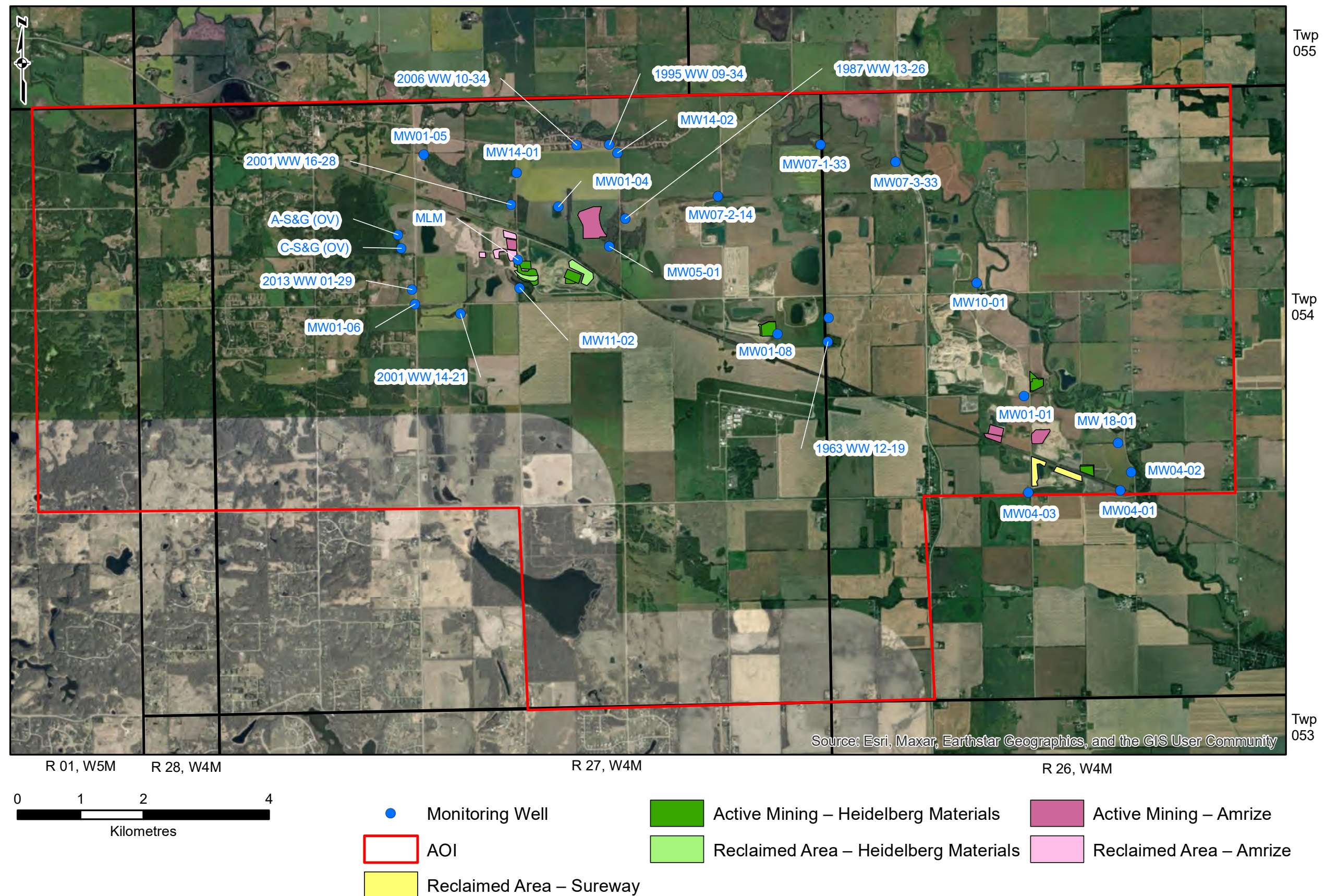


Figure 5. Groundwater Monitoring Well Network

4. Results

4.1. 2025 Site Visits

HCL personnel were on site in January, May, and June 2025:

- January 31, 2025
- May 1, 8, 13, 28 and 29, 2025
- June 1, 3, 12, and 25, 2025

During the 2025 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.

4.2. Water-Level Monitoring

HCL personnel manually measured the water levels in 28 monitoring wells during the 2025 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 all monitoring wells except MW07-1-33 and MW07-3-33, as shown in Table 3 on the following page. Each data logger is programmed to record a water-level measurement at least every hour; water levels in MW07-1-33 and MW07-3-33 are manually measured during the annual site visits.

Table 3 summarizes the water-level measurements required under various approvals and includes manual water levels measured by HCL personnel in 2025, prior to purging the monitoring wells; the water-level elevations are also displayed in metres AMSL. For the monitoring wells that were not surveyed, the water-level elevations were calculated by subtracting the depth to water in metres BGL⁸ from the ground elevation determined from the 1:20,000 DEM prepared by AltaLIS Ltd. Table 3 also identifies the sites where water levels are monitored with a remote telemetry unit (RTU).

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.

⁸ 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.

							2025 Manual Water-Level Measurement	
Monitoring Well Name	AEPA GIC ID	TGWC ID	Legal Location (W4M)	AEPA Approval No.	Required Monitoring Frequency	Data Logger Installed	m BTOC	m AMSL
A-S&G (OV)	–	M40000.652035	09-29-054-27	00314180-00-00	Hourly	Yes	8.06	677.74
C-S&G (OV)	–	M40000.652664	09-29-054-27	00314180-00-00	Hourly	Yes	9.59	678.31
MLM	–	M40000.651289	05-27-054-27	00300286-00-00	Weekly	Yes	18.96	667.24
				00314180-00-00	Monthly			
MW01-01	–	M40000.647826	16-17-054-26	–	–	Yes	12.78	664.11
MW01-04	–	M40000.649295	14-27-054-27	00300286-00-00	Weekly	Yes	7.93	667.97
				00314180-00-00	Monthly			
MW01-05	–	M40000.649859	05-33-054-27	00314180-00-00	Monthly	Yes	5.96	671.84
MW01-06	–	M40000.650496	01-29-054-27	00300286-00-00	Weekly	Yes	14.95	675.65
				00314180-00-00	Monthly			
MW01-07	297525	M37490.031427	13-19-054-26	–	–	Yes	4.27	671.63
MW01-08	297529	M37490.031431	10-26-054-27	–	–	Yes	13.38	668.62
MW04-01	1270001	M39227.477799	01-16-054-26	–	–	Yes	11.14	664.11
MW04-02*	1270002	M39227.477802	01-16-054-26	–	–	Yes	9.96	656.94
MW04-03	1270003	M39227.477827	01-17-054-26	–	–	Yes	14.54	661.86
MW05-01	1495114	M39227.483721	09-27-054-27	–	–	Yes	10.38	670.82
MW07-1-33	1420667	M39859.704050	08-36-054-27	–	–	No	5.45	661.75
MW07-2-14	1420665	M39859.704048	01-35-054-27	00314180-00-00	Monthly	Yes	5.32	666.08
MW07-3-33	1420666	M39859.704049	07-31-054-27	–	–	No	3.64	664.11
MW10-01	–	M40337.575466	03-29-054-26	–	–	Yes	8.09	663.31
MW11-02	–	M41457.432661	04-27-054-27	–	–	Yes	18.77	672.03
MW14-01	–	M42473.435942	05-34-054-27	–	–	Yes	6.68	668.92
MW14-02	–	M42475.578813	08-34-054-27	–	–	Yes	4.92	668.38
MW18-01*	–	M43326.424846	08-16-054-26	–	–	Yes	12.17	657.73
1963 Water Well 12-19*	–	M40235.411135	NW 19-054-26	–	–	Yes	8.97	664.11
1987 Water Well 13-26*	264252	M35377.055706	NW 26-054-27	–	–	Yes	6.33	669.37
1995 Water Well 09-34*	–	M43987.561869	09-34-054-27	–	–	Yes	5.28	668.22
2001 Water Well 14-21	40335	M37841.689687	NW 21-054-27	–	–	Yes	16.18	676.02
2001 Water Well 16-28*	297091	M37490.030994	NE 28-054-27	–	–	Yes	7.85	669.85
2006 Water Well 10-34*	1715169	M39227.496150	10-34-054-27	–	–	Yes	6.46	670.84
2013 Water Well 01-29*	1495598	M41313.498215	SE 29-054-27	–	–	Yes	13.93	675.67

* Water levels recorded with a remote telemetry unit (RTU)

Table 3. Approval Conditions and 2025 Manual Water-Level Measurements

4.3. Groundwater-Quality Monitoring

Groundwater samples from each of the 28 monitoring wells were collected by HCL personnel during the 2025 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 subsequent 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 2025 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. (Element).

4.3.1. Groundwater Quality

The 2025 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 6 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 2025. Figure 6 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.

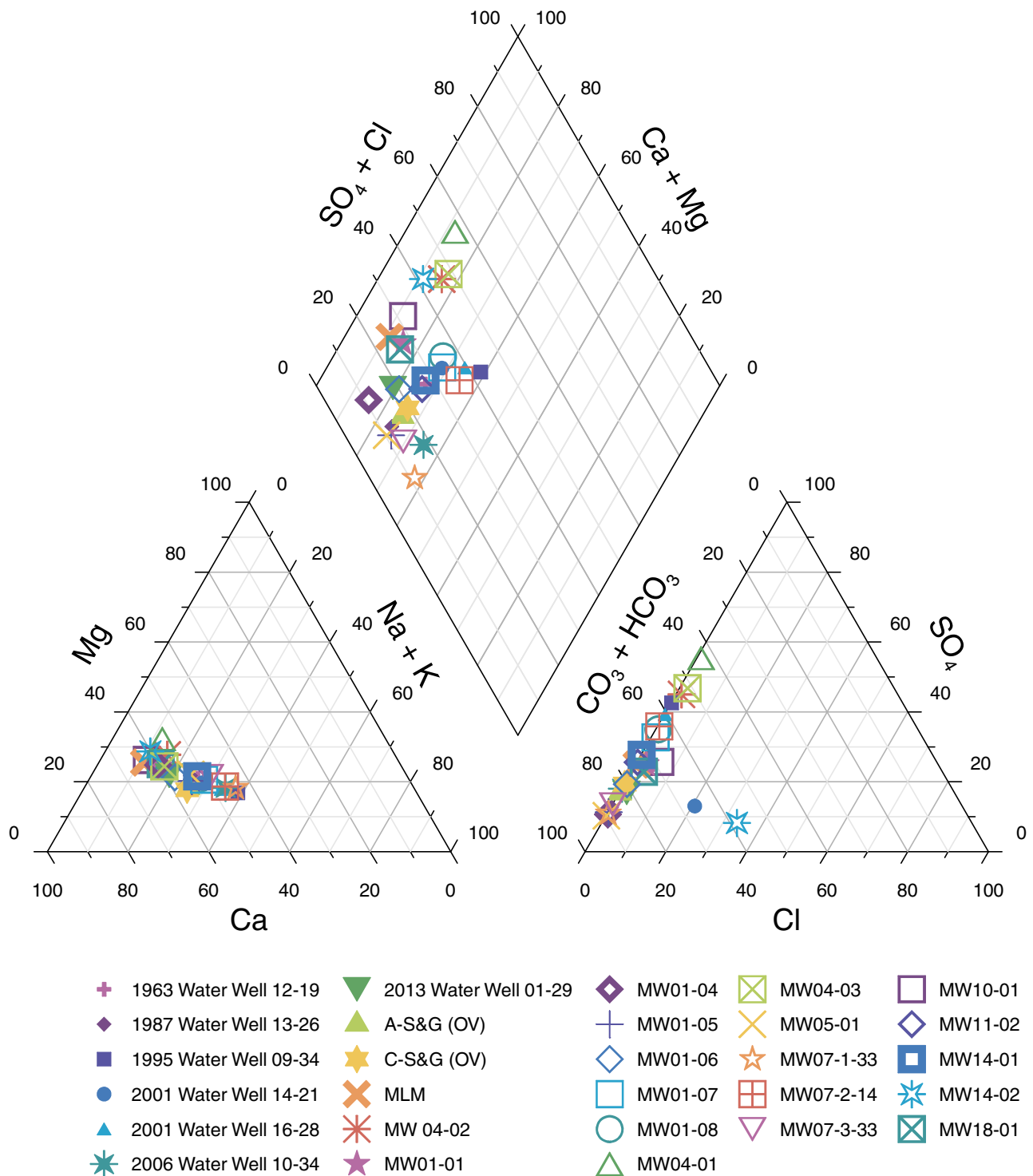


Figure 6. 2025 Piper Tri-Linear Diagram

Chloride concentrations in the groundwater samples collected in 2025 ranged from 0.4 to 108 milligrams per litre (mg/L), with an average concentration of 8.6 mg/L, for all monitoring wells except MW14-02, which had a chloride concentration of 185 mg/L.

The maximum acceptable concentration (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 Guidelines for Canadian Drinking Water Quality—Summary Tables (GCDWQ–ST; Health Canada, 2025). In the spring of 2025, the only groundwater sample that exceeded either of these limits was a concentration of 1.81 mg/L in the groundwater sample collected from MW04-02.

The AO for sulfate is 500 mg/L (Health Canada, 2025). Sulfate concentrations ranged from 50.5 to 484 mg/L in the groundwater samples collected in 2025.

Total dissolved solids (TDS) concentrations ranged from 490 to 1,230 mg/L in the groundwater samples collected in 2025, with the lowest concentration collected from MW01-04; this was the only groundwater sample collected in 2025 that did not exceed the AO of 500 mg/L (Health Canada, 2025).

Electrical conductivity values ranged from 840 to 1,730 microsiemens per centimetre (µS/cm) for the groundwater samples collected in 2025.

The groundwater samples collected from the monitoring wells in 2025 included an analysis for dissolved metals. The results indicated that the concentrations of uranium, arsenic, and manganese in the following groundwater samples collected in 2025 exceeded the MACs for health objectives (Health Canada, 2025):

- Uranium (MAC of 0.02 mg/L): The MAC was exceeded in the 2025 groundwater samples from MLM (0.0512 mg/L) and MW04-03 (0.0329 mg/L).
- Arsenic (MAC of 0.01 mg/L): MAC exceedances were observed in the 2025 groundwater samples from MW07-2-14 (0.0121 mg/L) and MW14-01 (0.0127 mg/L).
- Manganese (MAC of 0.12 mg/L; AO of 0.02 mg/L): MAC exceedances were observed in the 2025 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.

The results for the 2025 sampling event indicated that the dissolved iron concentrations in 22 of the 28 monitoring wells exceeded the AO of 0.1 mg/L (Health Canada, 2025).

In general, groundwater-quality parameters for samples collected in 2025 remained within historical ranges.

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 7:

- Based on recent water-level trends, Group 1 has been subdivided into Group 1a to the west and Group 1b to the east:
 - Group 1a consists of A-S&G (OV), C-S&G (OV), MW01-06, the 2001 Water Well (WW) 14-21, and the 2013 WW 01-29.
 - Group 1b consists of MLM, MW05-01, MW11-02, and the 1987 WW 13-26.
- 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.

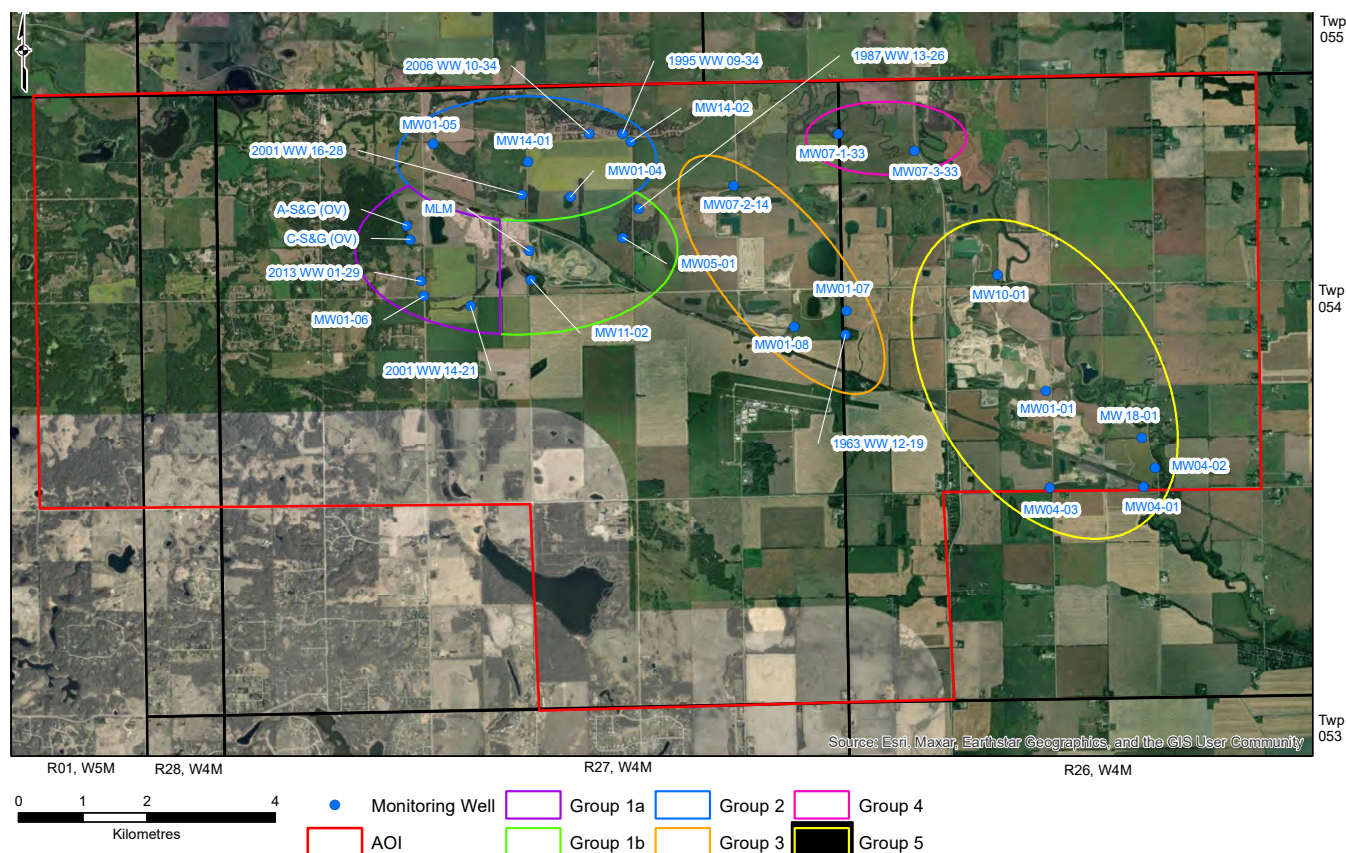


Figure 7. Monitoring Well Groupings Based on Proximity and Water-Level Change

Figure 7 shows the monitoring well groupings; Figure 8 on the following page shows the monitoring well groupings in relation to aggregate pit activities.

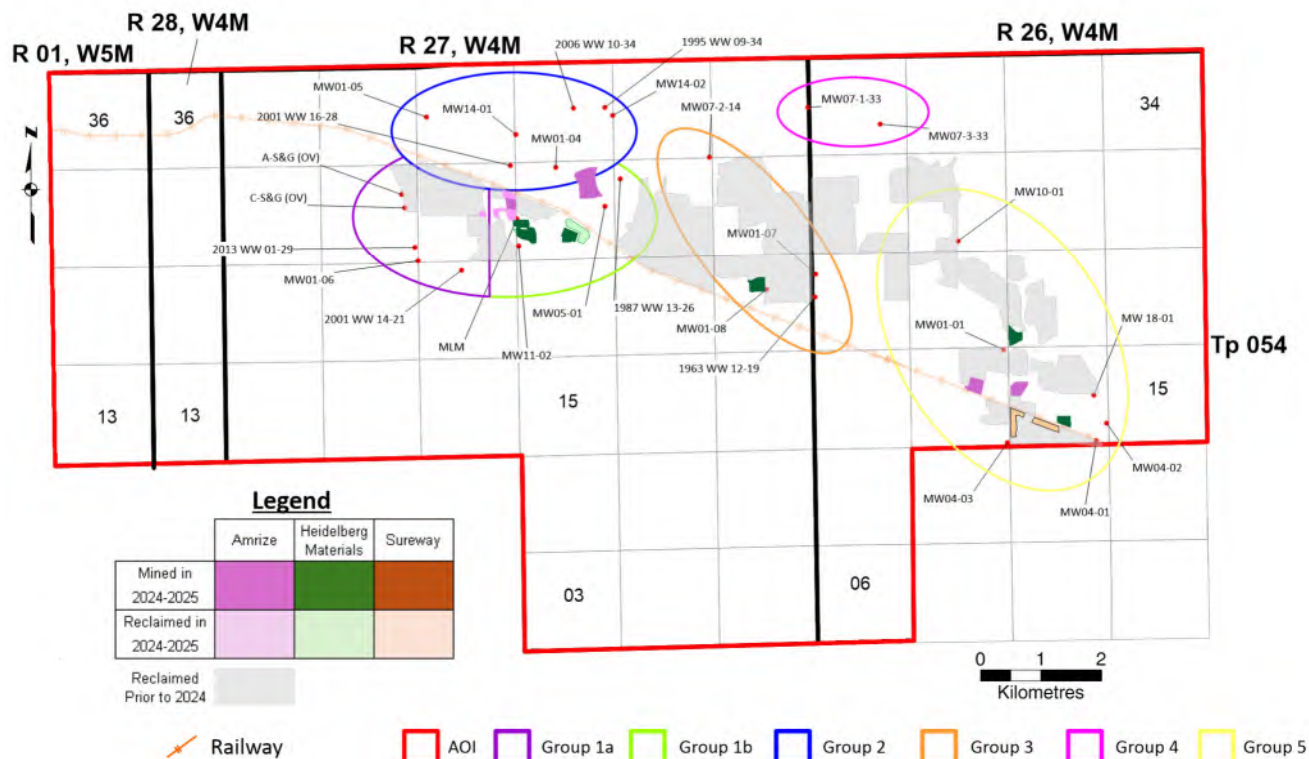


Figure 8. Monitoring Well Groupings Based on Pit Activity

Water-level characteristics of each monitoring well group are 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 Amrize and Heidelberg Materials. Figure 9 below and Figure 10 on the following page show 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, as shown in Figure 9 below; these five monitoring wells are considered to be within the subdivided Group 1a area. 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 the five Group 1a monitoring wells is attributed to their locations being the farthest upgradient from the sites that were actively dewatered and mined in 2023, 2024, and 2025.

The four monitoring wells in the eastern half of the Group 1 area continue to show an overall decline in water levels, as shown in Figure 10 on the following page; these four monitoring wells are considered to be within the subdivided Group 1b area. The declining water levels at the sites of the four Group 1b monitoring wells are attributed to their locations being the closest to the sites that were actively mined by Heidelberg Materials in 2023, 2024, and 2025.

The water-level decline in the 1987 WW 13-26 represents a trend that may result in an adverse effect on this water well.

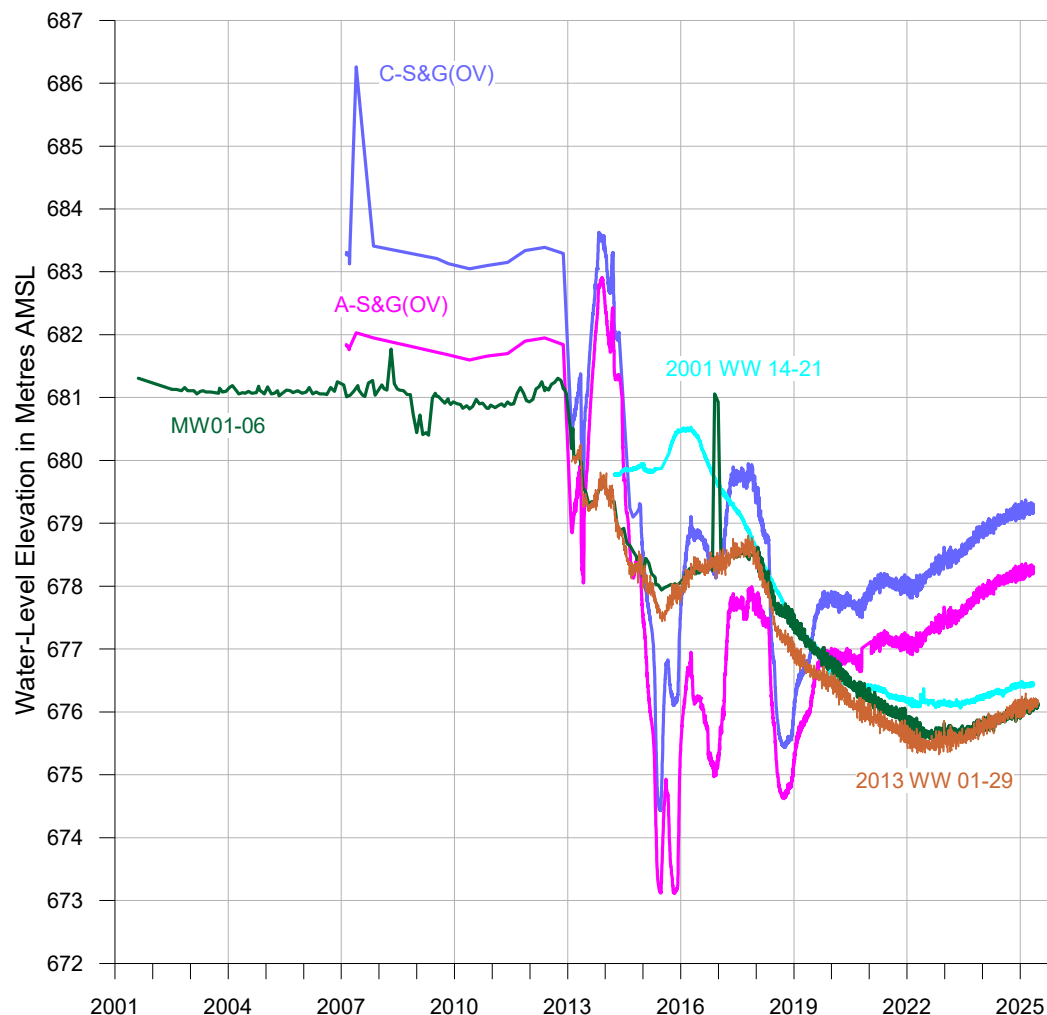


Figure 9. Group 1a Hydrograph

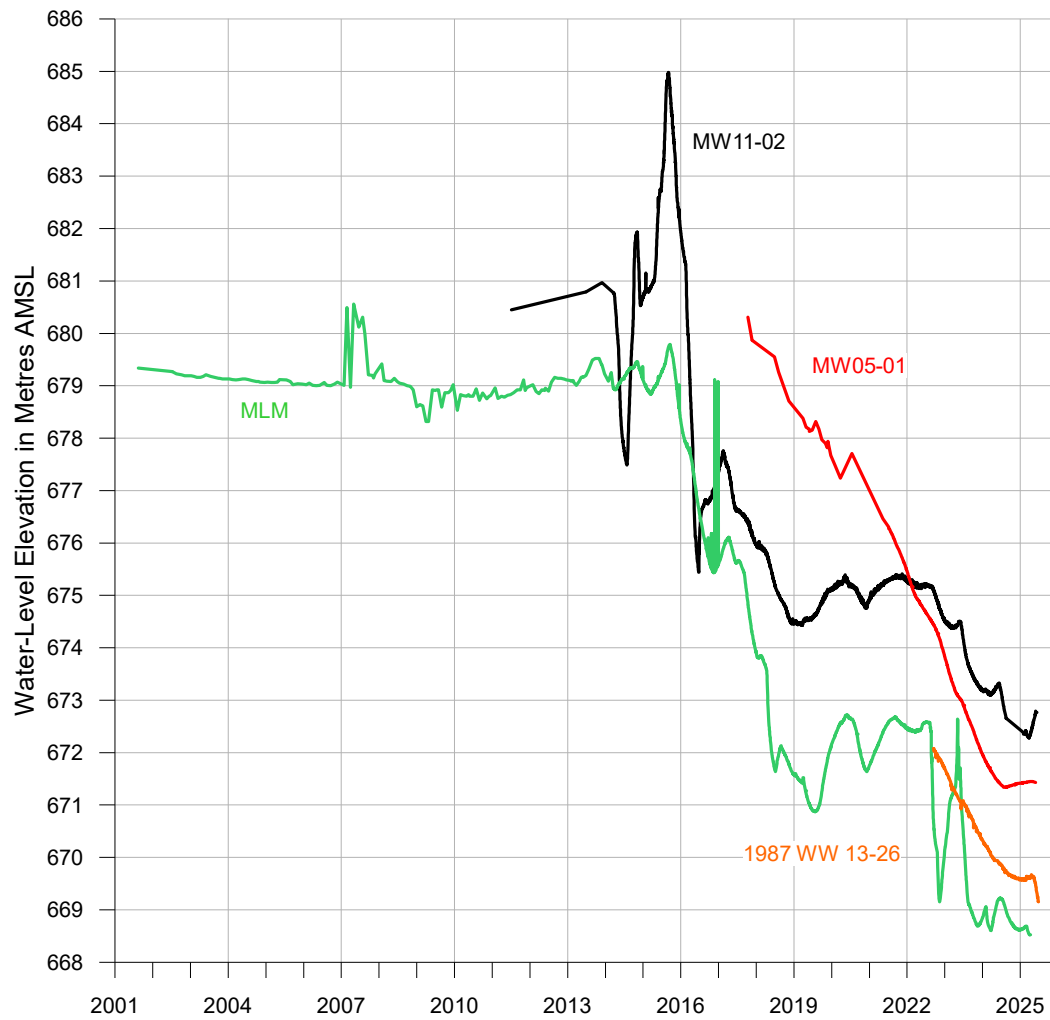


Figure 10. Group 1b Hydrograph

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 typically more than 300 metres south of the seven monitoring wells; however, Amrize’s recently opened pit in the NE 27-054-27 W4M may result in future water-level declines in nearby Group 2 monitoring sites. Figure 11 shows that the Group 2 monitoring wells have an overall horizontal water-level trend, superimposed with seasonal water-level fluctuations of approximately one metre.⁹ There was a large water-level rise observed in all monitoring wells in 2020 and a somewhat smaller rise in 2024 that were likely due to increased precipitation and runoff; the water levels measured since 2020 are generally a continuation of the historical trend.

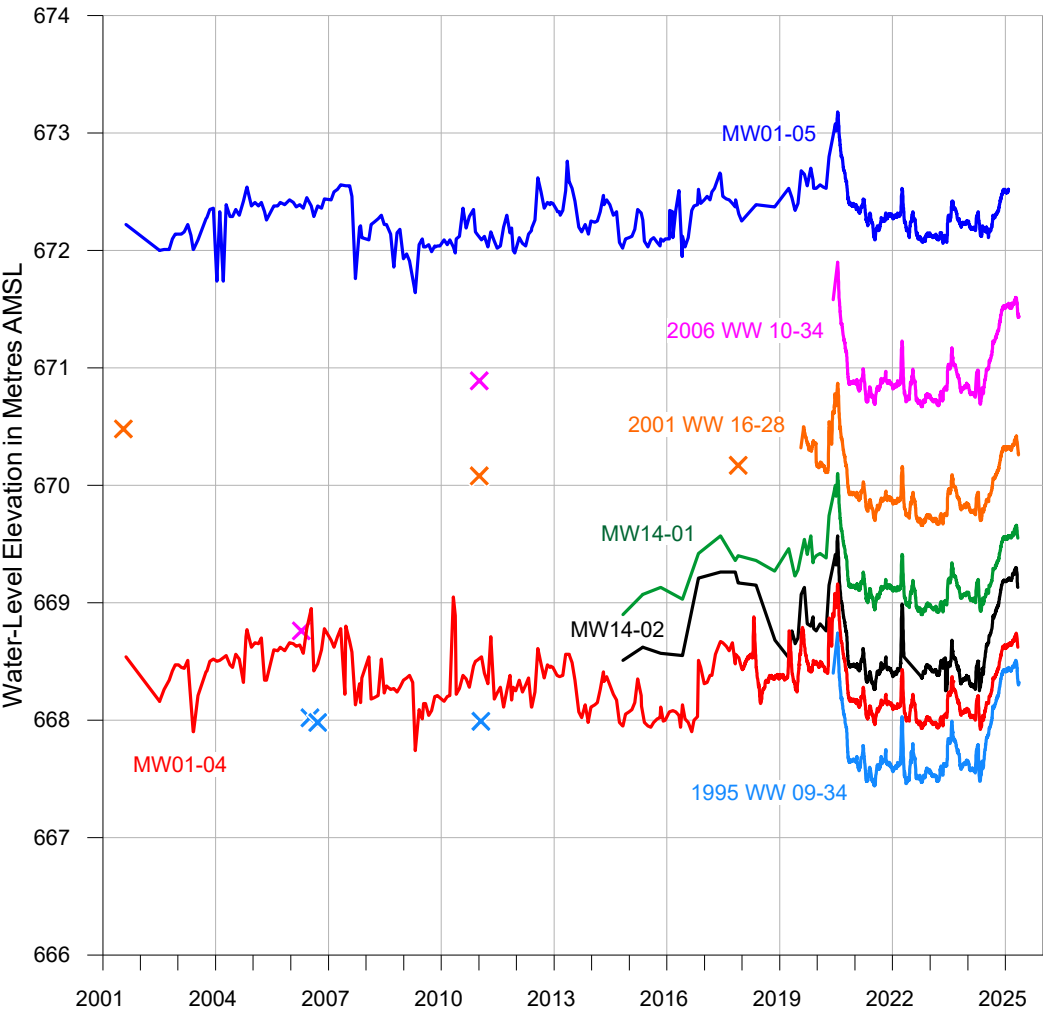


Figure 11. Group 2 Hydrograph

⁹ 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, although Heidelberg Materials has been actively dewatering and mining from the Schafers 240 Pit in the north half of 24-054-27 W4M. Water levels in the Group 3 monitoring wells have fluctuated in the past, which reflects dewatering activities when the nearby pits were active. Figure 12 shows that the water levels in MW01-07 and MW01-08 have similar trends for much of the monitoring interval until 2021, when the water-level elevations were 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, with MW-01-08 being the closest monitoring well to the Schafers 240 Pit, which was actively dewatered by Heidelberg Materials in 2024. 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. Because MW01-08 is the closest monitoring well to the Schafers 240 Pit, water levels in MW01-08 declined by nearly 2 metres between 2021 and 2024 and by an additional 3 metres in 2024 due to mining and dewatering activities to the west of the monitoring well; the water-level rise in MW01-08 in 2025 is a result of decreased dewatering from the nearby Schafers 240 Pit.

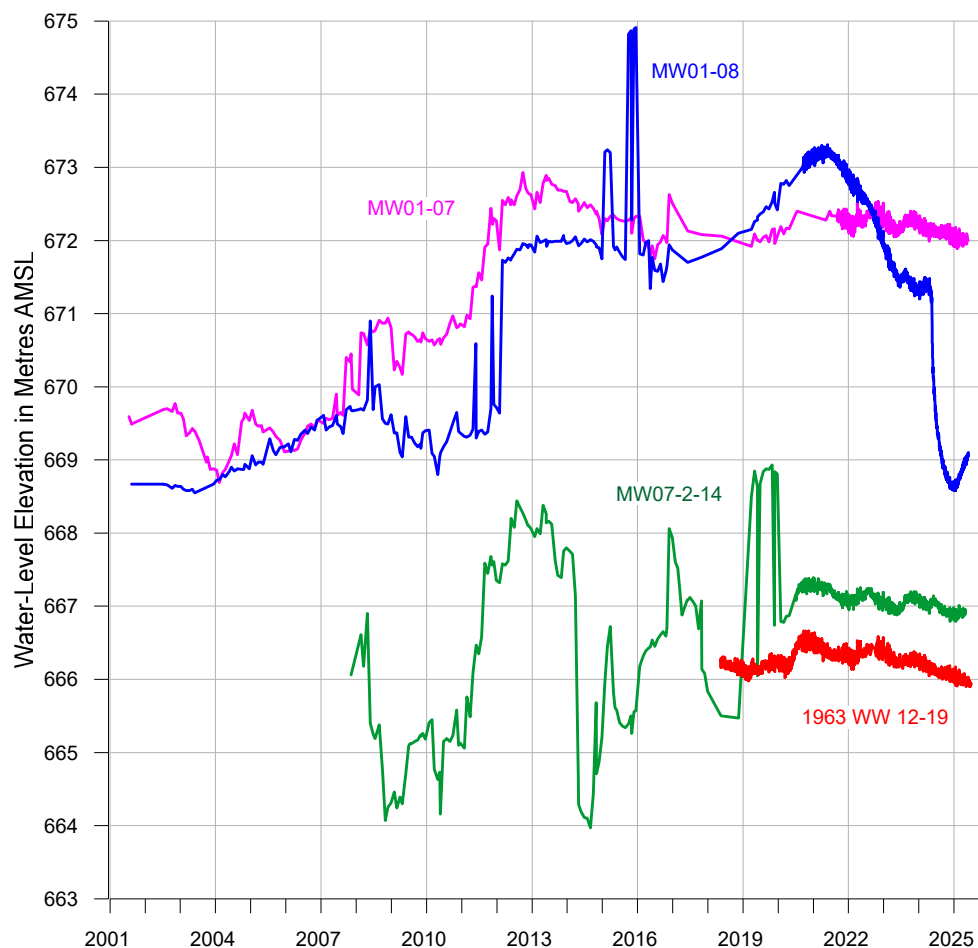


Figure 12. Group 3 Hydrograph

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 13 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-2025, the water levels in both Group 4 monitoring wells declined by approximately 0.7 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.

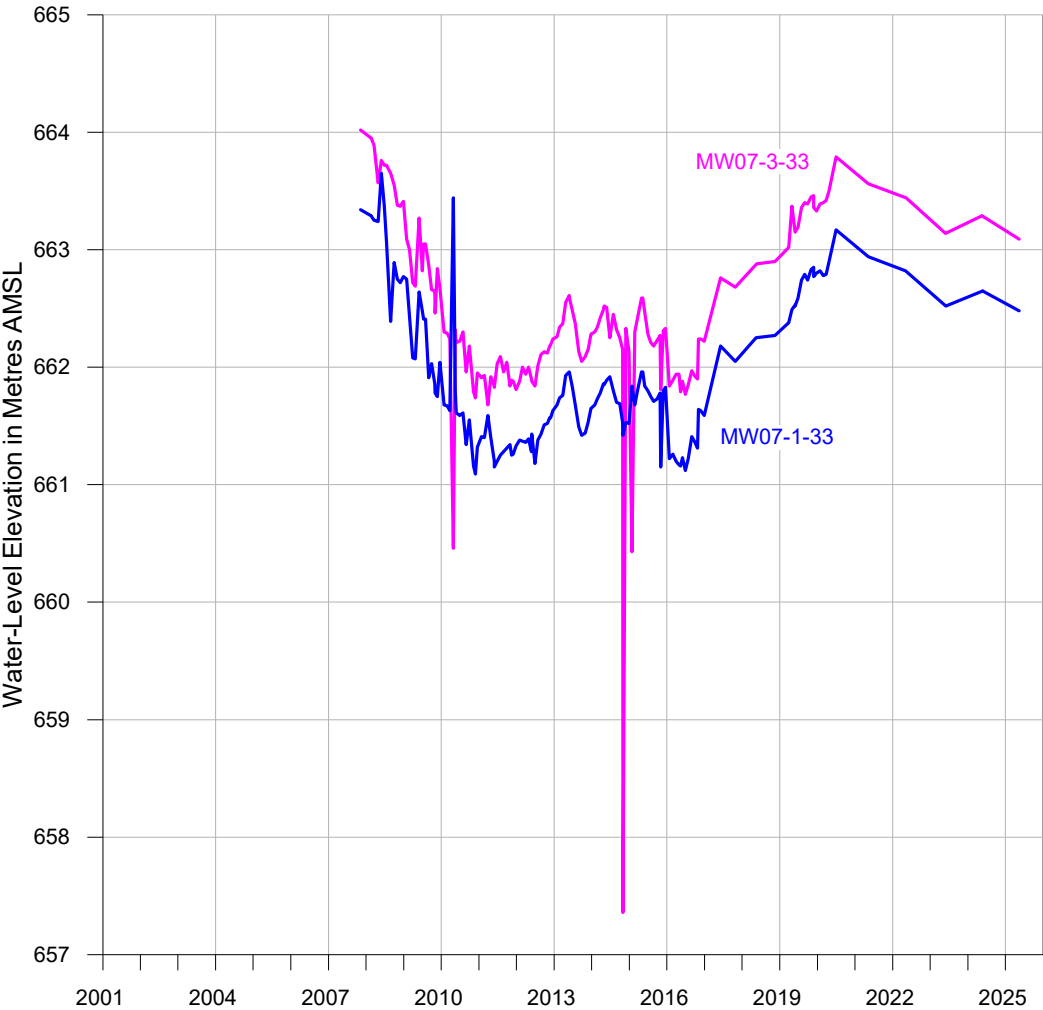


Figure 13. Group 4 Hydrograph

Group 5 is in the southeastern portion of the AOI. Similar to the northwestern portion of the AOI, water levels for most of the monitoring wells in this area have shown little change since 2021.

Figure 14 shows the generally stable nature of the water levels in the Group 5 monitoring wells since 2022, except for the water-level decline of more than 3 metres in MW01-01, which is attributed to the Heidelberg Materials aggregate dewatering activities in the nearby SW 21-054-26 W4M that have occurred since 2022. Since early 2024, smaller drawdowns of less than 1 metre have been observed in the other five monitoring wells, which are believed to be attributed to the recent dewatering by Heidelberg Materials in the SW 21 and by Sureway in 16-054-26 W4M. 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.

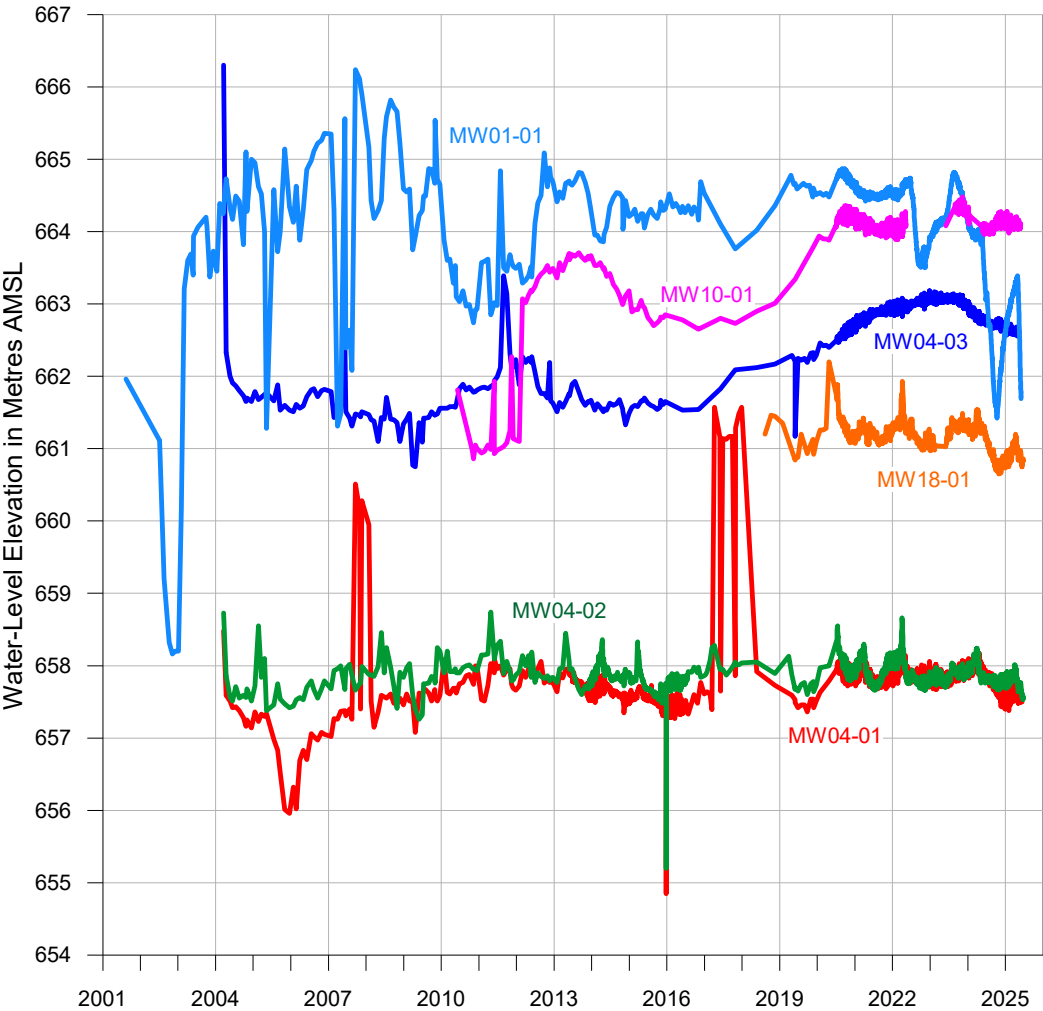


Figure 14. Group 5 Hydrograph

5.2. Water-Level Summary

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.

Only monitoring wells in the Group 1b area, MW01-08 in Group 3, and MW01-01 in Group 5 have shown a significant declining water-level trend in recent years. These monitoring wells are all close to aggregate extraction pits that have been dewatered since 2023.

A rising water-level trend following historical declines was observed in the following five monitoring wells: A-S&G(OV), C-S&G(OV), MW01-06, the 2001 WW 14-21, and the 2013 WW 01-29; 18 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 2025 were approximately one metre; the water-level declines ranged from approximately 1 to 8 metres, with the maximum decline measured in MW05-01. Of the seven domestic water wells that are being monitored, the largest water-level decline was measured in the 1987 WW 13-26, which has declined by approximately 6 metres since the earliest recorded water level in 2010. In June 2024, water levels in the 1987 WW 13-26 were approximately 4 metres above the top of the screened interval.

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 aggregate mining operations.

Table 4 on the following page 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 and June 2025.

	Water-Level Control Points			
	Elevation in Metres AMSL			Water-Level Change
Monitoring Site	Ground	Pre-Disturbance Water Level	2025 Water Level	
A-S&G (OV)	685.8		678.3	
C-S&G (OV)	687.9		679.3	
MLM	686.2	679.3	668.5	-10.8
MW01-01	674.0	665.5	661.7	-3.8
MW01-04	675.9		668.6	
MW01-05	677.8	673.0	672.5	-0.5
MW01-06	690.6	681.0	676.1	-4.9
MW01-07	675.9		672.0	
MW01-08	682.0		669.1	
MW04-01	667.9	658.0	657.5	-0.5
MW04-02	666.9	658.2	657.6	-0.6
MW04-03	676.4	663.0	662.6	-0.4
MW05-01	681.2		671.4	
MW07-1-33	667.2		662.5	
MW07-2-14	671.4		666.9	
MW07-3-33	666.0	664.0	663.1	-0.9
MW10-01	671.4		664.1	
MW11-02	690.8		672.8	
MW14-01	675.6		669.6	
MW14-02	673.3		669.1	
MW18-01	669.9		660.9	
1963 Water Well 12-19	677.3		666.0	
1995 Water Well 09-34	673.5		668.3	
2001 Water Well 14-21	692.2		676.4	
2001 Water Well 16-28	677.7		670.3	
2006 Water Well 10-34	674.5		671.4	
2013 Water Well 01-29	689.6		676.2	
1987 Water Well 13-26	675.6	675.6	669.2	-6.4

Table 4. Water Levels Used for Gradient Mapping

Figure 15 shows the contoured pre-disturbance water-level elevations, based on the data provided in Table 4. The map shows that the water level in the aggregate aquifer had an overall gradient of approximately 0.002 to the east.

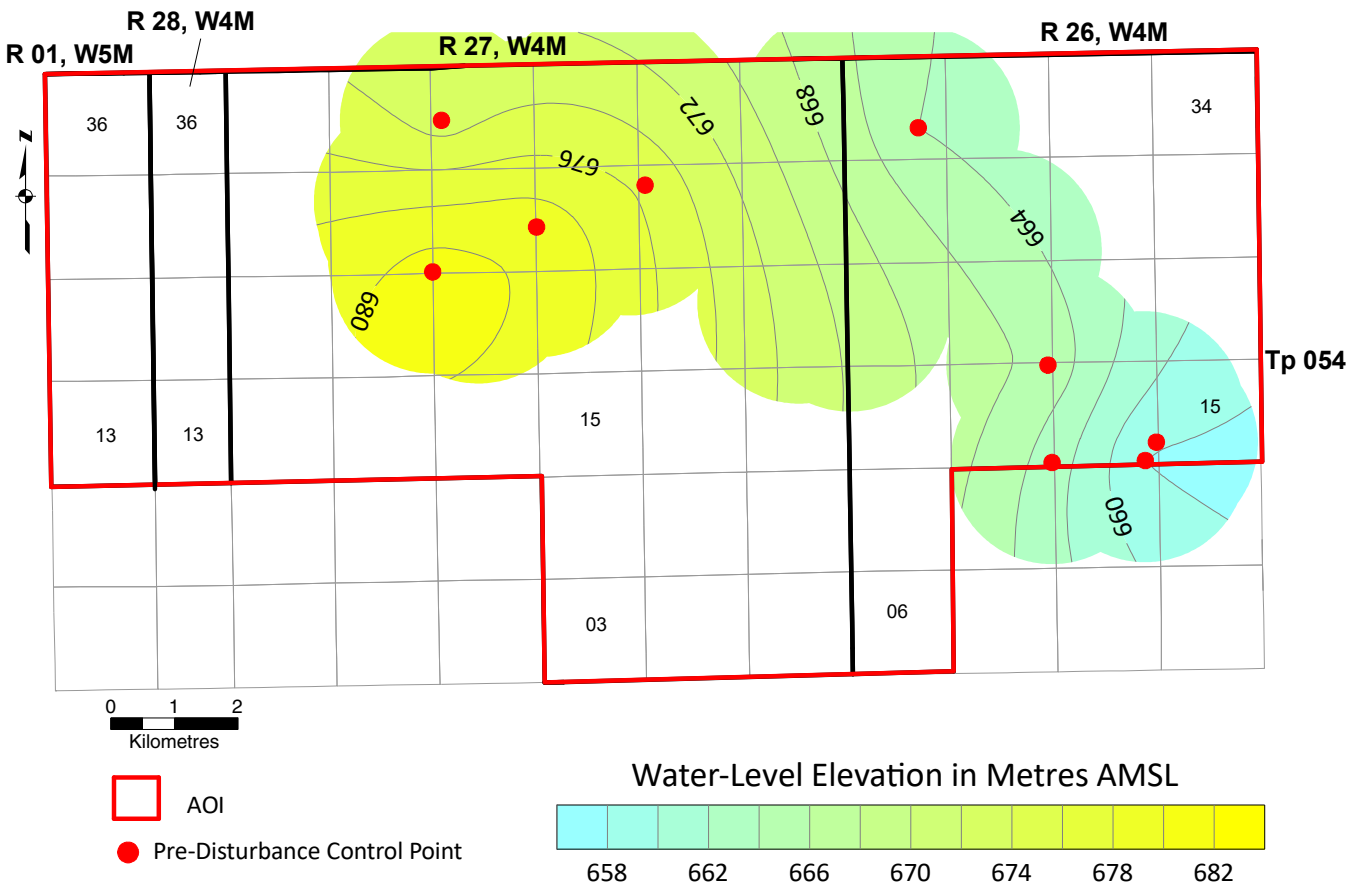


Figure 15. Contoured Water-Level Elevation (Pre-Disturbance)

Figure 16 on the following page 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 2025. The map shows a regional characteristic that is believed to represent current water-level conditions in the aggregate aquifer. The water-level decline that is centred near the active Amrize 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.

5.3. Groundwater Chemistry

A review of the groundwater-quality data collected from the monitoring wells in 2025 shows noteworthy concentrations of chloride, sulfate, uranium, arsenic, and manganese, which are discussed in the following sections.

5.3.1. Chloride

Chloride concentrations have been variable in the groundwaters from monitoring wells MW04-01, MW04-03, MW14-02, and MW10-01 throughout the years:

- 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 2025 was 5.7 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 in 2004 and 2015, respectively:
 - The dissolved chloride concentration in the groundwater sample collected from MW04-03 in 2025 was 15.1 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 15.1 mg/L; this trend coincides with an increasing sulfate trend in the groundwater from MW04-03 over the same monitoring interval, from approximately 100 to 484 mg/L in 2025.
 - The dissolved chloride concentration of 185 mg/L in the groundwater sample collected from MW14-02 is the highest chloride concentration that was measured in 2025. Since 2015, there has been an increasing trend in the chloride concentration in the groundwater collected from MW14-02, from 13 mg/L to 185 mg/L. Currently, the closest extraction activity is pit dewatering by Amrize approximately 900 metres southwest of MW14-02. 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 0.8 mg/L in 2025. This apparent discrepancy may be related to aquifer depth. Although the completion interval of the 1995 WW 09-34 is not recorded, its 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.
- Elevated chloride concentrations have also been observed in the groundwater samples collected from MW10-01, which showed a rising trend from 2019 to 2024. Prior to 2019, the average chloride concentration was 7.2 mg/L; after 2019, the average chloride concentration was 18.9 mg/L, with the highest concentration of 24.6 mg/L measured in 2024.

Investigation of elevated constituents is outside the scope of the project; however, the monitoring wells with chloride exceedances are in close proximity to paved roads where road salt is used. Additional sources of elevated chloride may come from water-softening systems. No groundwater sample from any of the monitoring wells has ever exceeded the aesthetic objective (AO) of 250 mg/L for chloride (Health Canada, 2025).

5.3.2. Sulfate

Groundwater samples from the southeastern part of the AOI near MW04-01 and MW04-03 show elevated concentrations of sulfate when compared to the rest of the AOI. The 2025 groundwater sample collected from the nearby MW04-02, which is approximately 340 metres northeast of MW04-01, had a sulfate concentration of 230 mg/L, while the groundwaters from MW04-01 and MW04-03 had sulfate concentrations of 407 mg/L and 484 mg/L, respectively. The sulfate concentration has been increasing in the groundwater from MW04-03 since 2019 and has been decreasing in the groundwater from MW04-02 since 2012. Sulfate concentrations are also slightly elevated in the groundwaters from the 2001 WW 16-28 and the 1995 WW 09-34, although the concentrations at these monitoring sites 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 a groundwater sample from the 1995 WW 09-34 was from 1997.

Since monitoring began in 2013, there has also been a general increasing trend in the sulfate concentration in the groundwater collected from MW11-02, from 63.1 mg/L in 2013 to an average of 151 mg/L since 2020; the highest sulfate concentration of 219 mg/L was measured in 2024.

Although water-quality 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 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.

Further investigation is required to determine the possible causes for the sulfate concentration variations 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 concentrations in the groundwaters.

5.3.3. Dissolved Metals

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. 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 manganese concentrations in the groundwater samples from all monitoring wells except MW04-01, MW04-03, and the 1963 WW 12-19 have historically been above the MAC. 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. Groundwaters from surficial deposits in Alberta are expected to be chemically hard and have elevated concentrations of iron and manganese.

None of the above exceedances of dissolved metals exhibit a noteworthy trend. 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 aggregate 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 four monitoring wells had uranium or arsenic concentrations that exceeded the MACs in 2025; uranium and arsenic are naturally occurring, and their concentrations in the groundwaters do not show an increasing or decreasing trend.

The 2025 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 2025 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 Group 1a 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 have been actively dewatered and mined since 2023. The four Group 1b 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 have been actively mined since 2023.

At this time, the 1987 WW 13-26 is the only residential water well in which the water-level decline may result in an adverse effect if the declining trend continues.

The water-level data show that there can be significant temporary water-level changes in the aggregate 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 Amrize 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 aggregate 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.

A draft of an abbreviated hydrogeological assessment was completed for the SW 28-054-27 W4M within the Group 1 area (HCL, 2025); the monitoring data collected from at least two additional sites near the Turfside and Hansen subdivisions,¹⁰ as recommended in that assessment, should be made available to the County and included in the County's future annual groundwater monitoring reports. Piezometer MLM, which was reclaimed in July 2025, does not need to be replaced, as there are at least two monitoring sites nearby (i.e. MW11-02 and the 2001 Water Well 16-28).

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 water-level elevation data from the Sturgeon River near Villeneuve monitoring station (Station Number 05EA005) 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.

If the observed trend of declining water levels in the 1987 Water Well 13-26 continues, this water well may be temporarily adversely affected due to the dewatering of nearby mining blocks. It is recommended that Amrize and Heidelberg Materials develop a contingency plan to provide a temporary water supply to the residents who rely on this water well for domestic or stock purposes. Contingency plans could consider installing and filling cisterns, hauling water, or completing a deeper water well.

¹⁰ The Turfside subdivision is in part of the NE 20-054-27 W4M, and the Hansen subdivision is in part of the SW 29-054-27 W4M.

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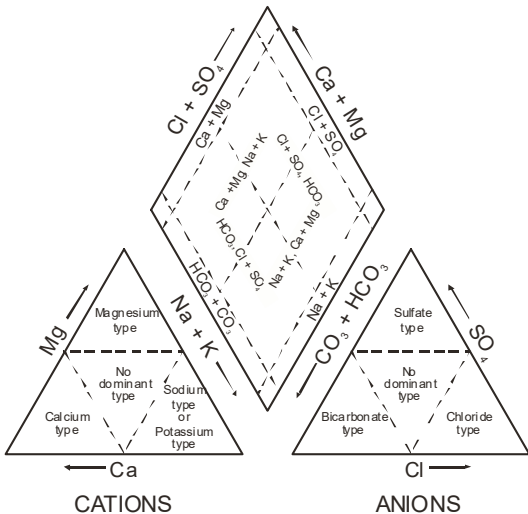
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9. Supplementary Information

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
BTOC	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	0.1	–
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, 2025)

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

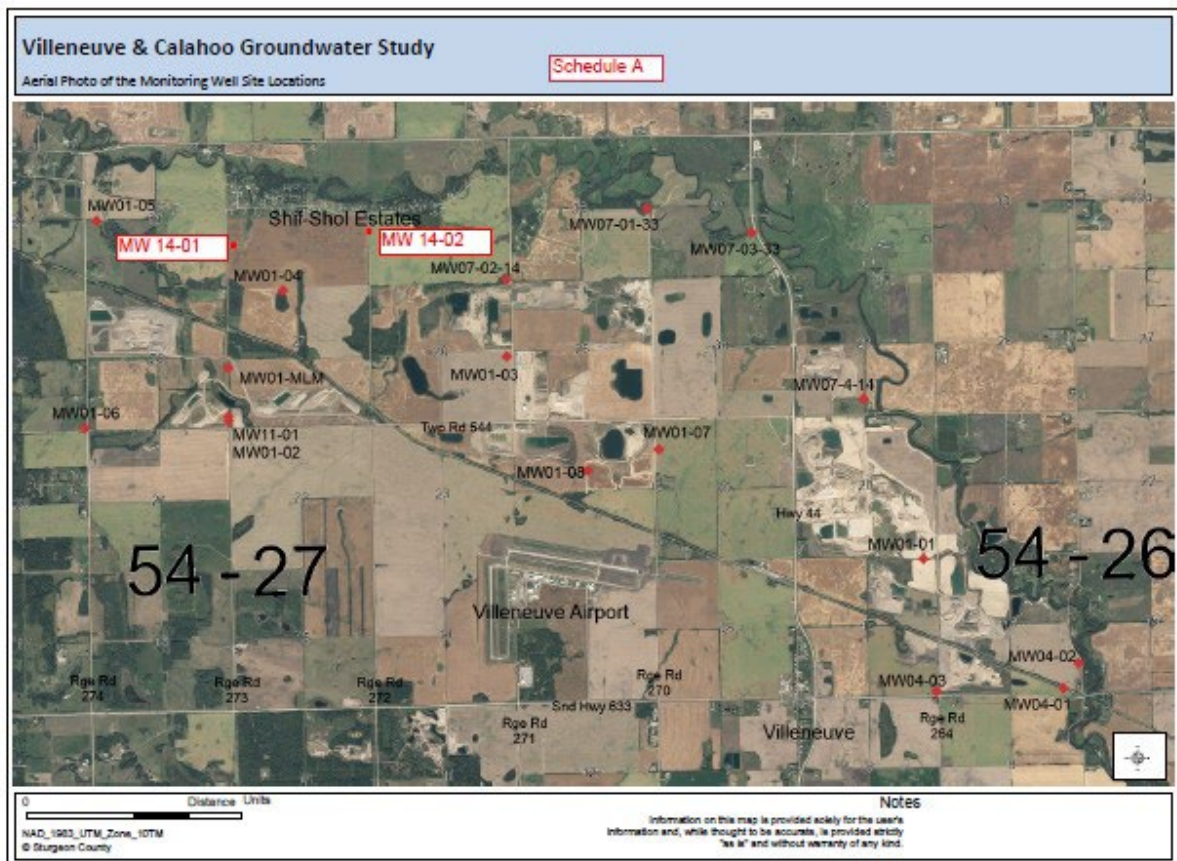
- A.1 Provide semi-annual testing of the existing ground water monitoring wells.
- A.2 Compile monthly water level readings provided by Sturgeon County
- A.3 Provide interpretation on groundwater monitoring results and gravel mining
- A.4 Prepare and present an annual report of the groundwater monitoring 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
<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 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 10, 2007**

Depth Drilled (m): **22.7**

Completion Interval (m): **17.1 – 18.0 ***

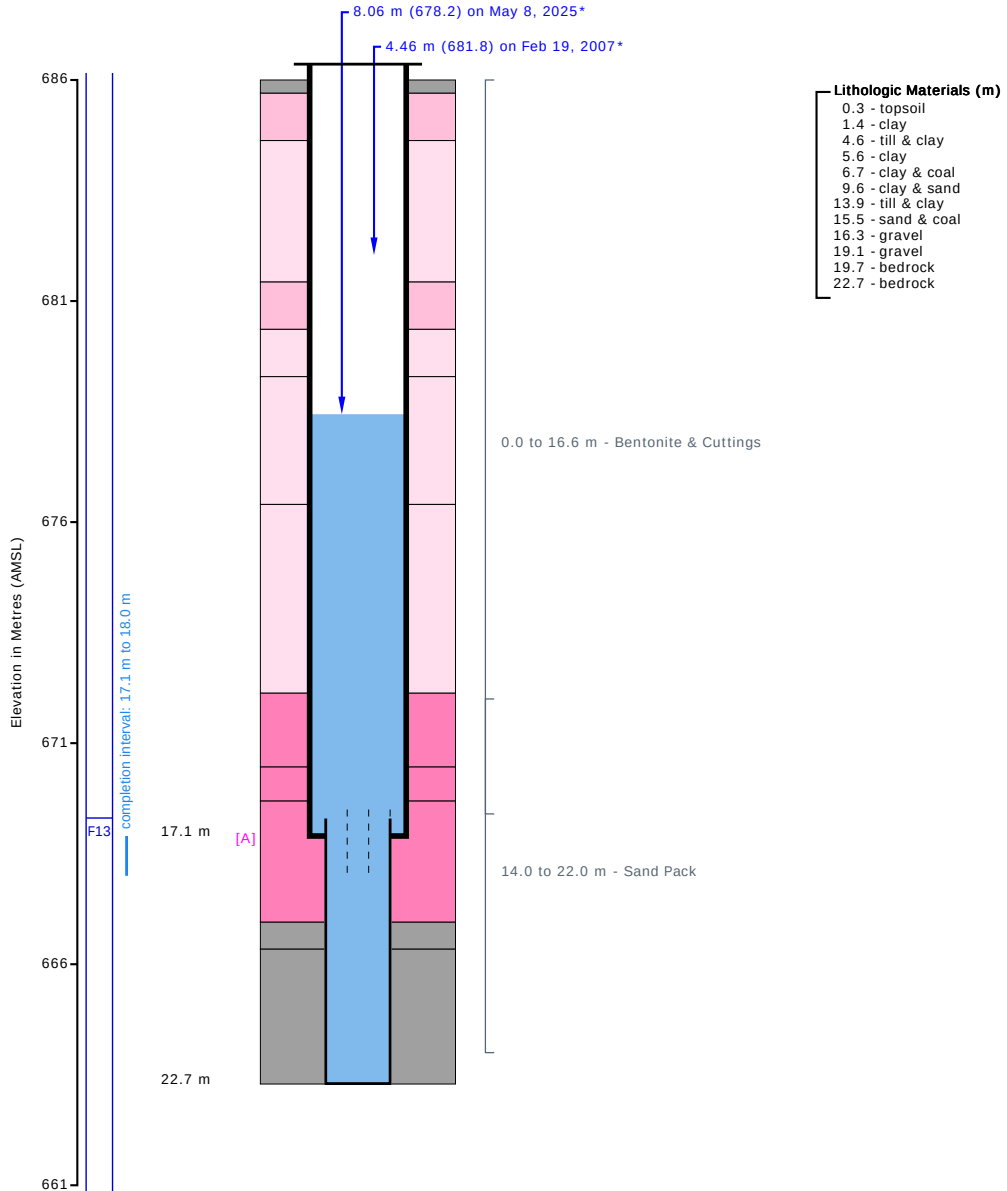
(TGWC determined value)*

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

Most Recent Water Level (m): **8.06 – May 8, 2025 @ 11:15**

GIC ID: **1300166**

A-S&G (OV) 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

TGWC ID: M40000.652035
Well Name: A-S&G (OV)
Legal Location: 09-29-054-27 W4M
Casing (OD): 152.4 mm; Plastic (6.0")
Screen (OD): 101.6 mm; Stainless Steel (4.0")
Casing Stick-Up: 0.5 m (not drawn to scale)
Completion [A]: 16.5 to 18.0 m; Slotted
Water Level (recent): 8.06 m (678.2 m AMSL) on May 8, 2025 @ 11:15 - Reference Point: Top of Casing
Water Level (oldest): 4.46 m (681.8 m AMSL) on Feb 19, 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: July 17, 2025 @ 09:24 --- <https://www.hcl.ca>

Owner: **Lafarge Canada Inc.**
8635 Stadium Road NW, Edmonton, AB T5H 3X1
Contractor: **[unknown contractor]**
Name: **A-S&G (OV)**
Field Action: **Confirmed - Physically, July 14, 2009**
Work Type: **Piezometer**
Drilling Method: **Drilled**
Proposed Use: **Monitoring**
Completion Type: **Screen**
Date Started: **February 7, 2007**
Date Completed: **February 10, 2007**
Well Status: **Observation**
Feature Class: **Piezometer**

09-29-054-27 W4M

Easting (m): 70,027 ²
Northing (m): 5,947,934 ²
Elevation (m): 686 ²

M40000.652035

Elog Taken: **Yes**
Gamma Taken: **No**
Flowing: **No**
Presence of Gas: **No**
Stick Up (m): **0.5**
2025-06-04

General Details

Depth Completed (m)*: 18.0
Depth Drilled (m)*: 22.7

Top of Bedrock (m): **Surficial Water Well**
Completion Interval (m): 17.1 – 18.0

Sand & Gravel Thickness (m): 5.2 (total) – 5.2 (below 15 m) *
Most Recent Water Level (m): 8.06 m – May 8, 2025

Completion Details

Surface Casing: **Plastic – 152.4 mm (O.D.) x 9.90 mm (thick) x 17.1 m (bottom)**
Screen Material: **Stainless Steel – 101.6 mm (O.D.) (Attached To Casing)**
Fittings: **Top: Coupler – Bottom: Washdown**

Intervals

Slotted: 16.5 to 18.0 m
Bentonite & Cuttings: 0.0 to 16.6 m
Sand Pack: 14.0 to 22.0 m

Lithology Details

Elevation (AMSL)	Depth (BGL)	Lithology Descriptions
685.5	0.3	Black Topsoil
684.4	1.4	Sandy Brown Clay
681.2	4.6	Silty Brown Till & Clay
680.2	5.6	Grey Clay
679.1	6.7	Sandy Grey Clay & Coal
676.2	9.6	Silty Grey Clay & Sand
671.9	13.9	Sandy Grey Till & Clay
670.3	15.5	Coarse Sand & Coal
669.5	16.3	Gravel
666.8	19.1	Sandy Gravel
666.1	19.7	Shaly Bedrock
663.1	22.7	Shaly Bedrock

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

(recently sampled first)

Sampling Details: May 8, 2025 @ 12:00

Report Date: May 28, 2025 - Element Materials Technology Canada Inc. (1816292-12)

Constituent	Result	Constituent	Result	Constituent	Result
Conductivity (µS/cm):	925	Nitrate as N:	< 0.01	Turbidity (NTU):	9.8
Total Dissolved Solids:	569	Nitrite as N:	< 0.005	Fluoride:	0.05
Hardness (as CaCO3):	402	pH (pH Unit):	7.35	Carbonate:	< 6
T-Alkalinity (as CaCO3):	448	Colour (TCU):	25	Bicarbonate:	546
P-Alkalinity (as CaCO3):	< 5	Ion Balance (%):	100	Hydroxide:	< 5
Nitrate + Nitrite as N:	< 0.01	Total Coliforms:**		Total Iron:	
Total Suspended Solids:		Fecal Coliforms:**		Total Mn:	
Temperature (°C):	20.8	Escherichia coli:**			

Constituent	Extractable	Dissolved	Constituent	Extractable	Dissolved
Calcium:		121	Mercury:		< 0.000005
Chloride:		0.7	Molybdenum:		< 0.001
Iron:		1.69	Magnesium:		24.3
Manganese:		0.752***	Sodium:		61.8
Aluminum:		< 0.002	Potassium:		3.5
Arsenic:		0.0084	Vanadium:		< 0.0001
Barium:		0.036	Strontium:		1.09
Beryllium:		< 0.0001	Nickel:		0.0012
Cadmium:		< 0.00001	Zinc:		0.001
Chromium:		< 0.0005	Copper:		< 0.0002
Cobalt:		0.0012	Lead:		< 0.0001
Sulfate:		88.8	Uranium:		0.0022

Comments: Sample collected by Hydrogeological Consultants Ltd. personnel.

***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2025. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.
850348; 1 / 31

Comments & Observations

Aquifer Tests

Date & Time	Testing Method / Type	Depth of Test Interval	Duration (minutes)		Avg. Rate (Lpm)	NPWL (metres)	Drawdown (metres)	Pump (metres)	Q20 (m³/day)*		Transmissivity (m²/day)*	
			Pumping	Recovery					Apparent	Effective	Apparent	Aquifer

Alias IDs

TGWC: M39597.443657
AEPA WellId: 1300166
AEPA WellReportId: 11312897

(1) July 17, 2025, "AS IS"; no warranty either expressed or implied. visit tgwc.com for additional details
Sturgeon County, 2024 to 2025 Groundwater Monitoring Report
Calahoo Resource Extraction District, Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, MR-0224.24

RTU
REMOTE TELEMETRY UNIT
HCL

B - 7

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



Water Well Drilling Report

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

GIC Well ID 1300166
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2015/01/20

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	
LAFARGE CANADA INC.		P.O. BOX 159 8635 STADIUM ROAD			EDMONTON		AB		CA		
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
	NE	29	54	27	4				SITE A - DEEP		
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation _____ m	
_____ m from					Latitude 53.696581 Longitude -113.938729					How Elevation Obtained	
_____ m from					How Location Obtained					Not Obtained	
					Surveyed GPS <1m						

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

Formation Log			Measurement in Metric
Depth from ground level (m)	Water Bearing	Lithology Description	
0.30		Topsoil	
1.37		Brown Sandy Clay	
4.57		Brown Silty Till & Clay	
5.64		Gray Clay	
6.71		Gray Sandy Clay & Coal	
9.60		Gray Silty Clay & Sand	
13.87		Gray Sandy Till & Clay	
15.54		Coarse Grained Sand & Coal	
16.31		Gravel	
19.05		Sandy Gravel	
19.66		Shaly Bedrock	
22.71		Shaly Bedrock	

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	
22.71 m		2007/02/07	2007/02/10	
Borehole				
Diameter (cm)	From (m)	To (m)		
22.23	0.00	22.71		
Surface Casing (if applicable)		Well Casing/Liner		
Plastic		Unknown		
Size OD :	15.24 cm	Size OD :	_____ cm	
Wall Thickness :	0.991 cm	Wall Thickness :	_____ cm	
Bottom at :	17.07 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 Unknown				
Placed from _____ m to _____ m				
Amount _____				
Other Seals				
Type		At (m)		
Screen Type Stainless Steel				
Size OD : 10.16 cm				
From (m)	To (m)	Slot Size (cm)		
16.46	17.98	0.030		
Attachment Attached To Casing				
Top Fittings Coupler		Bottom Fittings Washdown		
Pack				
Type Frac Sand		Grain Size 10-20		
Amount 12.00 Bags				

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well TERRY MCGINN	Certification No VC2893
Company Name GERALD MCGINN DRILLING 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 1300166
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2015/01/20

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	
LAFARGE CANADA INC.		P.O. BOX 159 8635 STADIUM ROAD			EDMONTON		AB		CA		
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
	NE	29	54	27	4				SITE A - DEEP		
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation _____ m	
_____ m from					Latitude 53.696581 Longitude -113.938729					How Elevation Obtained	
_____ m from					How Location Obtained					Not Obtained	
					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	Well Disinfected Upon Completion Yes _____
Gas _____										Depth _____ m	Geophysical Log Taken Electric _____
Remedial Action Taken _____										Submitted to ESRD _____	
										Sample Collected for Potability _____	Submitted to ESRD _____
Additional Comments on Well _____											

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
TERRY MCGINN	VC2893
Company Name	Copy of Well report provided to owner
GERALD MCGINN DRILLING LTD.	Date approval holder signed
	Yes

Printed on 7/17/2025 9:23:36 AM

Page: 2 / 2

A-S&G (OV)
Chemical Analysis Results (May 28, 2025)



Element
7217 Roper Road NW
Edmonton, Alberta
T6B 3J4, Canada

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E: info.Edmonton@element.com
W: www.element.com

Page 1 of 10

Analytical Report

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:		Date Received:	May 23, 2025
	T5S 2W3	LSD:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Reported:	May 28, 2025
Attn:	Jennifer Catt	P.O.:	20020	Report Number:	3140800
Sampled By:	Ben Gilham	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

Reference Number	1816292-12
Sample Date	May 08, 2025
Sample Time	12:00
Sample Location	M40000.652035
Sample Description	A-S&G (OV) / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	7.66	0.05		
Sulfur	Dissolved	mg/L	29.6	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	0.0084	0.0002	0.010	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	0.152	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	1.09	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	0.0022	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	0.001	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	25	5		
Turbidity		NTU	9.8	0.1		
Routine Water						
pH			7.35	1	7.0-10.5	Within Range
Temp. of observed pH		°C	20.8			
Electrical Conductivity	at 25 °C	µS/cm	925	1		
Calcium	Dissolved	mg/L	121	0.2		
Magnesium	Dissolved	mg/L	24.3	0.2		

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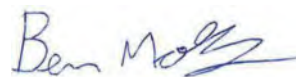
Analytical Report

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M 20020 P.O.: Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140800 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Reference Number	1816292-12
Sample Date	May 08, 2025
Sample Time	12:00
Sample Location	M40000.652035
Sample Description	A-S&G (OV) / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	61.8	0.4	200	Below AO
Potassium	Dissolved	mg/L	3.5	0.4		
Iron	Dissolved	mg/L	1.69	0.01	0.1	Above AO
Manganese	Dissolved	mg/L	0.752	0.005	0.02 AO, 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	0.7	0.4	250	Below AO
Fluoride		mg/L	0.05	0.05	1.5	Below MAC
Nitrate - N		mg/L	<0.01	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	<0.01	0.01		
Sulfate (SO4)	Dissolved	mg/L	88.8	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	546			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	448	5		
Total Dissolved Solids	Calculated	mg/L	569	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	402			
Ionic Balance	Dissolved	%	100			

Approved by:



Benjamin Morris, B.Sc
Operations 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.

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

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140800 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	-0.0104023	-0.04	0.05	yes
Sulfur	mg/L	0.0176456	-0.3	0.2	yes
Aluminum	µg/L	-0.142723	-2	2	yes
Antimony	µg/L	-0.00198253	-0.2	0.2	yes
Arsenic	µg/L	-0.00520747	-0.2	0.2	yes
Barium	µg/L	0.0155545	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.490366	-2	2	yes
Cadmium	µg/L	0.00106883	-0.01	0.01	yes
Chromium	µg/L	-0.0304354	-0.5	0.5	yes
Cobalt	µg/L	-0.000332921	-0.1	0.1	yes
Copper	µg/L	0.0100485	-0.2	0.2	yes
Lead	µg/L	0.00240083	-0.1	0.1	yes
Lithium	µg/L	-0.00113161	-1	1	yes
Molybdenum	µg/L	0.0194221	-1	1	yes
Nickel	µg/L	0.0142204	-0.5	0.5	yes
Selenium	µg/L	0.00150023	-0.2	0.2	yes
Silver	µg/L	0.00050935	-0.01	0.01	yes
Strontium	µg/L	0.0646959	-1	1	yes
Thallium	µg/L	0.00145131	-0.50	0.50	yes
Tin	µg/L	-0.0724984	-1	1	yes
Titanium	µg/L	-0.0940343	-0.5	0.5	yes
Uranium	µg/L	0.00233484	-0.5	0.5	yes
Vanadium	µg/L	-0.00529231	-0.1	0.1	yes
Zinc	µg/L	0.13059	-1	1	yes
Mercury	µg/L	-0.001039	-0.051000	0.051000	yes

Date Acquired: May 26, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	997	902	1058	yes
Antimony	µg/L	40.5	36.4	44.2	yes
Arsenic	µg/L	39.9	37.7	42.5	yes
Barium	µg/L	196	181	211	yes
Beryllium	µg/L	19.9	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	389	351	427	yes
Cadmium	µg/L	2.16	1.87	2.23	yes
Chromium	µg/L	100	90.8	108.8	yes
Cobalt	µg/L	20.0	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.2	18.3	21.3	yes
Lithium	µg/L	197	178	214	yes
Molybdenum	µg/L	198	178	219	yes
Nickel	µg/L	99.9	93.3	105.9	yes
Selenium	µg/L	39.9	36.9	42.9	yes

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140800 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	20.1	18.29	22.31	yes
Strontium	µg/L	200	183	219	yes
Thallium	µg/L	9.86	8.90	10.70	yes
Tin	µg/L	201	187	217	yes
Titanium	µg/L	101	91.0	109.0	yes
Uranium	µg/L	102	92.2	110.2	yes
Vanadium	µg/L	20.0	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: May 26, 2025					
Mercury	mg/L	0.000100	0.000070	0.000130	yes
Date Acquired: May 26, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.10	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.1	9.1	10.9	yes
Lead	µg/L	1.0	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.2	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.02	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	5.0	4.4	5.7	yes
Uranium	µg/L	5.2	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000020	0.000006	0.000036	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	9.62	9.51	10.89	yes
Sulfur	mg/L	150	141.6	156.6	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	2.03	1.88	2.24	yes
Sulfur	mg/L	10.2	9.1	10.6	yes
Date Acquired: May 26, 2025					

Quality Control

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Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.20	0.18	0.23	yes
Sulfur	mg/L	2.9	2.7	3.1	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.21	3.26	10	0.01	yes
Sulfur	mg/L	38.2	39.0	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	5.9	6.0	10	0.4	yes
Barium	µg/L	31	31	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	163	161	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	0.8	0.8	10	0.2	yes
Copper	µg/L	0.5	0.5	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	89	89	10	2	yes
Molybdenum	µg/L	<1	<1	10	2	yes
Nickel	µg/L	1.1	1.0	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	1090	1090	10	2	yes
Thallium	µg/L	<0.05	<0.05	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	2.8	2.8	10	1.1	yes
Vanadium	µg/L	<0.1	<0.1	10	0.2	yes
Zinc	µg/L	27	27	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: May 26, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.099	-0.1	0.1	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	0.114	0.0	0.1	yes
Date Acquired: May 27, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1930	1881.4	2091.4	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	4550	4020.0	5436.0	yes
Date Acquired: May 27, 2025					

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Quality Control

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Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Physical and Aggregate Properties - Continued

Continued							
Control Sample		Units	Measured	Lower Limit	Upper Limit	Passed QC	
Colour		Colour units	10	10	10	yes	
Turbidity		NTU	144	132.1	162.1	yes	
Date Acquired: May 27, 2025							
Turbidity		NTU	14.3	12.6	15.6	yes	
Date Acquired: May 27, 2025							
Turbidity		NTU	1.6	1.0	2.2	yes	
Date Acquired: May 27, 2025							
Client Sample Replicates		Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity		NTU	3.1	2.9	10	0.2	yes
Date Acquired: May 27, 2025							

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0.00594322	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Calcium	mg/L	0.0341995	-0.2	0.2	yes
Magnesium	mg/L	0.00865101	-0.1	0.1	yes
Sodium	mg/L	0.0649477	-0.4	0.4	yes
Potassium	mg/L	0.024503	-0.4	0.4	yes
Iron	mg/L	0.00335118	-0.01	0.01	yes
Manganese	mg/L	0.000111042	-0.004	0.004	yes
Chloride	mg/L	0.15	-0.4	0.4	yes
Date Acquired: May 26, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2140	1847.4	2256.0	yes
Date Acquired: May 26, 2025					
Electrical Conductivity	dS/m	32.9	27.200	36.800	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	9.90	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes
Nitrite - N	mg/L	9.61	9.010	10.990	yes
Nitrate and Nitrite - N	mg/L	19.6	19.10	20.90	yes
pH		9.18	8.90	9.44	yes
Temp. of observed pH	°C	20.1	15.5	24.5	yes
Electrical Conductivity	dS/m	2.77	2.631	2.829	yes
P-Alkalinity	mg/L	519	442	584	yes
T-Alkalinity	mg/L	997	958	1059	yes
Calcium	mg/L	242	235.3	262.9	yes
Magnesium	mg/L	97.6	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	241	238.3	262.3	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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140800 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Iron	mg/L	9.47	8.89	10.69		yes
Manganese	mg/L	2.39	2.200	2.680		yes
Date Acquired:	May 26, 2025					
Fluoride	mg/L	4.80	4.58	5.24		yes
Nitrate - N	mg/L	4.71	4.37	5.33		yes
Nitrite - N	mg/L	4.64	4.370	5.330		yes
Nitrate and Nitrite - N	mg/L	9.35	8.80	10.60		yes
pH		6.87	6.75	7.05		yes
Temp. of observed pH	°C	20.3	15.5	24.5		yes
Electrical Conductivity	dS/m	0.076	0.069	0.085		yes
P-Alkalinity	mg/L	52	28	72		yes
T-Alkalinity	mg/L	127	114	140		yes
Calcium	mg/L	51.2	44.9	56.9		yes
Magnesium	mg/L	20.4	17.9	22.0		yes
Sodium	mg/L	51.9	47.1	53.4		yes
Potassium	mg/L	50.3	45.8	55.8		yes
Iron	mg/L	1.98	1.89	2.11		yes
Manganese	mg/L	0.496	0.464	0.536		yes
Chloride	mg/L	83.5	74.9	86.9		yes
Date Acquired:	May 26, 2025					
Fluoride	mg/L	0.50	0.45	0.57		yes
Nitrate - N	mg/L	0.51	0.42	0.57		yes
Nitrite - N	mg/L	0.496	0.455	0.557		yes
Nitrate and Nitrite - N	mg/L	1.01	0.85	1.15		yes
Calcium	mg/L	5.1	4.7	5.4		yes
Magnesium	mg/L	2.1	1.9	2.2		yes
Sodium	mg/L	5.2	4.7	5.7		yes
Potassium	mg/L	4.8	4.6	5.6		yes
Iron	mg/L	0.19	0.18	0.22		yes
Manganese	mg/L	0.048	0.046	0.057		yes
Chloride	mg/L	15.2	13.3	16.5		yes
Date Acquired:	May 26, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Fluoride	mg/L	0.09	0.08	10	0.05	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
pH		7.56	7.53	0	0.10	yes
Electrical Conductivity	dS/m	0.944	0.942	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	583	583	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	478	478	10	5	yes
Calcium	mg/L	86.8	87.6	10	0.6	yes

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Quality Control

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Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Magnesium	mg/L	26.7	26.8	10	0.7	yes
Sodium	mg/L	77.9	79.0	10	1.2	yes
Potassium	mg/L	5.2	5.3	10	1.2	yes
Iron	mg/L	0.03	0.03	10	0.05	yes
Manganese	mg/L	0.071	0.072	10	0.010	yes
Chloride	mg/L	0.7	0.7	10	0.5	yes
Date Acquired: May 26, 2025						

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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140800 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	May 26, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	May 26, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	May 26, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	May 26, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	May 27, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	May 26, 2025	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	May 26, 2025	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	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	May 26, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	May 27, 2025	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, August 2024
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:

- Sample 1816292-12; 9956341: Sample received at 11.6 °C

Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater	Control Number:	
	Edmonton, AB, Canada		Monitoring	Date Received:	May 23, 2025
	T5S 2W3	Project Location:		Date Reported:	May 28, 2025
Attn:	Jennifer Catt	LSD:	Tp 054, R 26 to 28, W4M	Report Number:	3140800
Sampled By:	Ben Gilham		and Tp 054, R 01, W5M	Report Type:	Final Report
Company:	HCL	P.O.:	20020		
		Proj. Acct. code:			

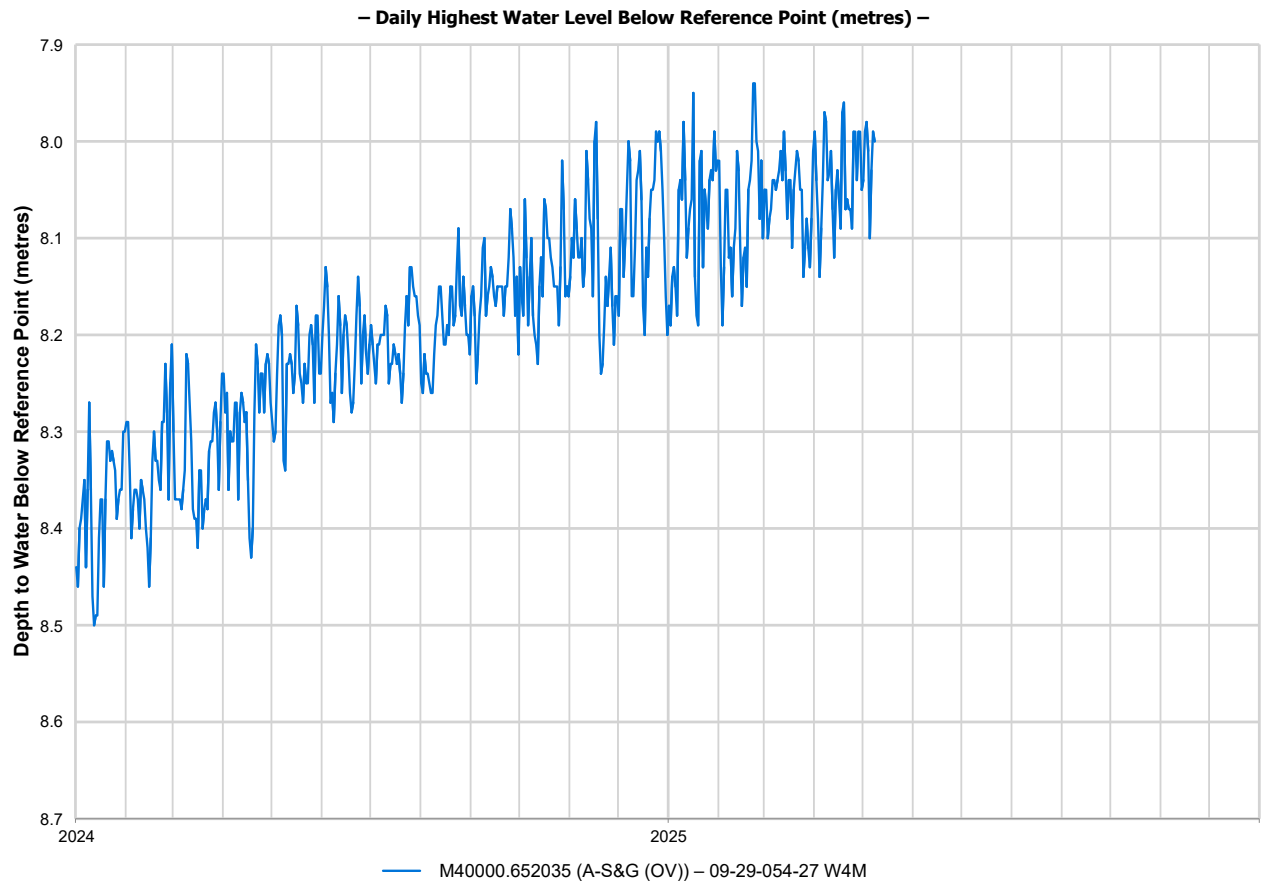
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to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

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A-S&G (OV)
2024 - 2025 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): **20.0**

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

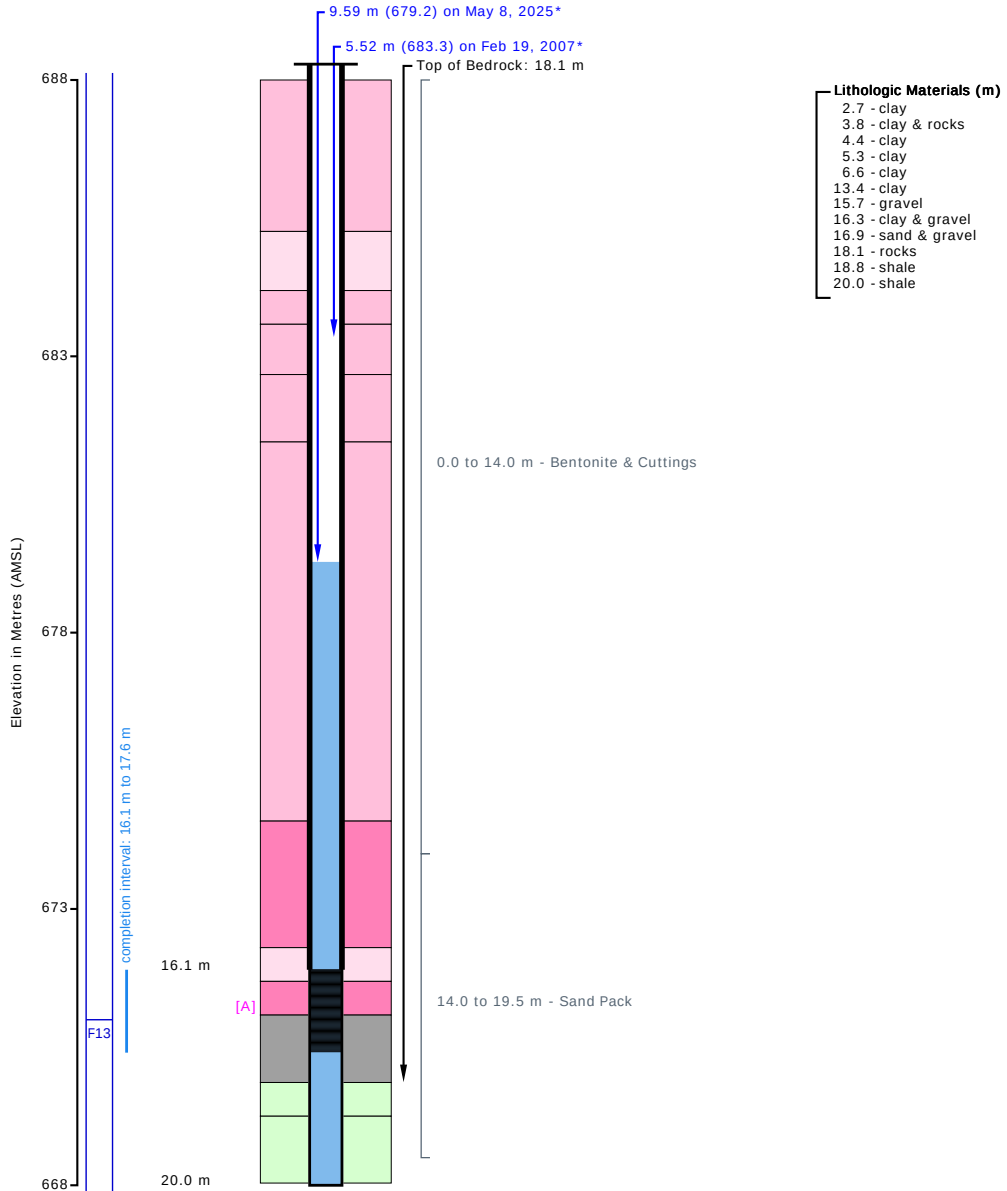
(* TGWC determined value)

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

Most Recent Water Level (m): **9.59 – May 8, 2025 @ 12:49**

GIC ID: **1300171**

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): 9.59 m (679.2 m AMSL) on May 8, 2025 @ 12:49 - 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: July 17, 2025 @ 09:24 --- https://www.hcl.ca	

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

Contractor: *Gerald McGinn Drilling Ltd.*
Name: *C-S&G (OV)*

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

Date Started: *February 15, 2007*
Date Completed: *February 15, 2007*
Well Status: *Observation*
Feature Class: *Piezometer*

09-29-054-27 W4M

Easting (m): *70,078²*
Northing (m): *5,947,714²*
Elevation (m): *688²*

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

Stick Up (m): *0.9*
2025-06-04

General Details

Depth Completed (m)*: *17.6*

Depth Drilled (m)*: *20.0*

Sand & Gravel Thickness (m): *2.9 (total) – 2.9 (below 15 m) **

Most Recent Water Level (m): *9.59 m – May 8, 2025*

Top of Bedrock (m): *18.1 m*

Completion Interval (m): *16.1 – 17.6*

Completion Details

Surface Casing: *PVC – 51.0 mm (O.D.) x 16.1 m (bottom)*

Screen Material: *[unknown] – ([unknown])*

Intervals

Screen: *16.1 to 17.6 m - 0.254 mm*

Bentonite & Cuttings: *0.0 to 14.0 m*

Sand Pack: *14.0 to 19.5 m*

Lithology Details

Elevation (AMSL)

Depth (BGL)

Lithology Descriptions

685.2

2.7

Silty Light Brown Clay

684.1

3.8

Silty Light Brown Clay & Rocks

683.5

4.4

Silty Dark Brown Clay

682.6

5.3

Dark Brown Clay

681.4

6.6

Silty Grey Clay

674.5

13.4

Sandy Grey Clay

672.2

15.7

Gravel

671.6

16.3

Clay & Gravel

671.0

16.9

Sand & Gravel

669.8

18.1

Rocks

669.2

18.8

Green Shale

668.0

20.0

Green Shale

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

(recently sampled first)

Sampling Details: *May 8, 2025 @ 13:15*

Report Date: *May 28, 2025 - Element Materials Technology Canada Inc. (1816292-9)*

Constituent

Result

Conductivity (µS/cm): *951*

Total Dissolved Solids: *590*

Hardness (as CaCO3): *413*

T-Alkalinity (as CaCO3): *445*

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

Nitrate + Nitrite as N: *< 0.01*

Total Suspended Solids:

Temperature (°C): *20.9*

Constituent

Result

Nitrate as N: *< 0.01*

Nitrite as N: *< 0.005*

pH (pH Unit): *7.34*

Colour (TCU): *30*

Ion Balance (%): *100*

Total Coliforms:**:

Fecal Coliforms:**:

Escherichia coli:**:

Constituent

Result

Turbidity (NTU): *17.4*

Fluoride: *0.09*

Carbonate: *< 6*

Bicarbonate: *543*

Hydroxide: *< 5*

Total Iron:

Total Mn:

Constituent

Extractable

Dissolved

Calcium: *125*

Chloride: *0.6*

Iron: *2.49*

Manganese: *0.655****

Aluminum: *< 0.002*

Arsenic: *0.0100*

Barium: *0.033*

Beryllium: *< 0.0001*

Cadmium: *< 0.00001*

Chromium: *< 0.0005*

Cobalt: *0.0015*

Sulfate: *105*

Constituent

Extractable

Dissolved

Mercury: *< 0.000005*

Molybdenum: *< 0.001*

Magnesium: *24.2*

Sodium: *62.5*

Potassium: *5.1*

Vanadium: *< 0.0001*

Strontium: *1.20*

Nickel: *0.0012*

Zinc: *0.001*

Copper: *< 0.0002*

Lead: *< 0.0001*

Uranium: *0.0019*

Extractable - unfiltered

Dissolved - filtered

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

***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2025. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.

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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

Alias IDs

Z614236

TGWC: *M39597.443700*

AEPA WellId: *1300171*

AEPA WellReportId: *11314056*

(1) July 17, 2025, "AS IS"; no warranty either expressed or implied. vist tgwc.com for additional details

Sturgeon County, 2024 to 2025 Groundwater Monitoring Report

Calahoo Resource Extraction District, Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, MR-0224.24

RTU

REMOTE TELEMETRY UNIT

HCL

B - 23

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



Water Well Drilling Report

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

GIC Well ID 1300171
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2015/01/20

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
LAFARGE CANADA INC		P.O. BOX 159 8635 STADIUM ROAD			EDMONTON		AB		CA		
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
	NE	29	54	27	4				SITE C DEEP		
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation _____ m	
_____ m from _____					Latitude <u>53.694822</u> Longitude <u>-113.938197</u>					How Elevation Obtained _____	
_____ m from _____					How Location Obtained _____					Not Obtained	
					Not Verified						

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

Formation Log			Measurement in Metric	
Depth from ground level (m)	Water Bearing	Lithology Description		
2.74		Light Brown Silty Clay		
3.81		Light Brown Silty Clay & Rocks		
4.42		Dark Brown Silty Clay		
5.33		Dark Brown Clay		
6.55		Gray Silty Clay		
13.41		Gray Sandy Clay		
15.70		Gravel		
16.31		Clay & Gravel		
16.92		Sand & Gravel		
18.14		Rocks		
18.75		Green Shale		
19.96		Green 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
Borehole						
Diameter (cm)		From (m)		To (m)		
Surface Casing (if applicable)				Well Casing/Liner		
Unknown				Unknown		
Size OD : _____ cm				Size OD : _____ cm		
Wall Thickness : _____ cm				Wall Thickness : _____ cm		
Bottom at : _____ 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 _____						
Annular Seal						
Placed from _____ m to _____ m						
Amount _____						
Other Seals						
Type			At (m)			
Screen Type						
Size OD : _____ cm						
From (m)	To (m)	Slot Size (cm)				
Attachment _____						
Top Fittings _____			Bottom Fittings _____			
Pack						
Type <u>Unknown</u>			Grain Size _____			
Amount _____			Unknown			

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well TERRY MCGINN	Certification No VC2893
Company Name GERALD MCGINN DRILLING LTD.	Copy of Well report provided to owner Date approval holder signed Yes

Printed on 7/17/2025 9:23:39 AM

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Water Well Drilling Report

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GIC Well ID 1300171

GoA Well Tag No.

Drilling Company Well ID

Date Report Received 2015/01/20

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		P.O. BOX 159 8635 STADIUM ROAD			EDMONTON		AB		CA		
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
	NE	29	54	27	4				SITE C DEEP		
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)						
m from					Latitude 53.694822		Longitude -113.938197		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 Yes
Remedial Action Taken										Depth m
										Geophysical Log Taken
										Submitted to ESRD
Additional Comments on Well										Sample Collected for Potability
										Submitted to ESRD
THE INFORMATION ON THIS REPORT IS AS RECEIVED FROM THE SUBMITTER, NO FOLLOW-UP REQUESTS FOR MISSING INFORMATION OR VERIFICATION OF THE INFORMATION ON THE REPORT HAS BEEN COMPLETED.										

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
TERRY MCGINN	VC2893
Company Name	Copy of Well report provided to owner
GERALD MCGINN DRILLING LTD.	Date approval holder signed
	Yes

Printed on 7/17/2025 9:23:39 AM

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C-S&G (OV)
Chemical Analysis Results (May 28, 2025)



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Analytical Report

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:		Date Received:	May 23, 2025
	T5S 2W3	LSD:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Reported:	May 28, 2025
Attn:	Jennifer Catt	P.O.:	20020	Report Number:	3140797
Sampled By:	Ben Gilham	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

Reference Number	1816292-9
Sample Date	May 08, 2025
Sample Time	13:15
Sample Location	M40000.652664
Sample Description	C-S&G (OV) / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	8.13	0.05		
Sulfur	Dissolved	mg/L	34.9	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	0.0100	0.0002	0.010	Above 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	0.146	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	0.0015	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	0.076	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	1.20	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	0.0019	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	0.001	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	30	5		
Turbidity		NTU	17.4	0.1		
Routine Water						
pH			7.34	1	7.0-10.5	Within Range
Temp. of observed pH		°C	20.9			
Electrical Conductivity	at 25 °C	µS/cm	951	1		
Calcium	Dissolved	mg/L	125	0.2		
Magnesium	Dissolved	mg/L	24.2	0.2		

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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M 20020 P.O.: Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140797 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Reference Number	1816292-9
Sample Date	May 08, 2025
Sample Time	13:15
Sample Location	M40000.652664
Sample Description	C-S&G (OV) / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	62.5	0.4	200	Below AO
Potassium	Dissolved	mg/L	5.1	0.4		
Iron	Dissolved	mg/L	2.49	0.01	0.1	Above AO
Manganese	Dissolved	mg/L	0.655	0.005	0.02 AO, 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	0.6	0.4	250	Below AO
Fluoride		mg/L	0.09	0.05	1.5	Below MAC
Nitrate - N		mg/L	<0.01	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	<0.01	0.01		
Sulfate (SO4)	Dissolved	mg/L	105	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	543			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	445	5		
Total Dissolved Solids	Calculated	mg/L	590	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	413			
Ionic Balance	Dissolved	%	100			

Approved by:

Benjamin Morris, B.Sc
Operations 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	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140797 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	-0.0104023	-0.04	0.05	yes
Sulfur	mg/L	0.0176456	-0.3	0.2	yes
Aluminum	µg/L	-0.142723	-2	2	yes
Antimony	µg/L	-0.00198253	-0.2	0.2	yes
Arsenic	µg/L	-0.00520747	-0.2	0.2	yes
Barium	µg/L	0.0155545	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.490366	-2	2	yes
Cadmium	µg/L	0.00106883	-0.01	0.01	yes
Chromium	µg/L	-0.0304354	-0.5	0.5	yes
Cobalt	µg/L	-0.000332921	-0.1	0.1	yes
Copper	µg/L	0.0100485	-0.2	0.2	yes
Lead	µg/L	0.00240083	-0.1	0.1	yes
Lithium	µg/L	-0.00113161	-1	1	yes
Molybdenum	µg/L	0.0194221	-1	1	yes
Nickel	µg/L	0.0142204	-0.5	0.5	yes
Selenium	µg/L	0.00150023	-0.2	0.2	yes
Silver	µg/L	0.00050935	-0.01	0.01	yes
Strontium	µg/L	0.0646959	-1	1	yes
Thallium	µg/L	0.00145131	-0.50	0.50	yes
Tin	µg/L	-0.0724984	-1	1	yes
Titanium	µg/L	-0.0940343	-0.5	0.5	yes
Uranium	µg/L	0.00233484	-0.5	0.5	yes
Vanadium	µg/L	-0.00529231	-0.1	0.1	yes
Zinc	µg/L	0.13059	-1	1	yes
Mercury	µg/L	-0.001039	-0.051000	0.051000	yes

Date Acquired: May 26, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	997	902	1058	yes
Antimony	µg/L	40.5	36.4	44.2	yes
Arsenic	µg/L	39.9	37.7	42.5	yes
Barium	µg/L	196	181	211	yes
Beryllium	µg/L	19.9	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	389	351	427	yes
Cadmium	µg/L	2.16	1.87	2.23	yes
Chromium	µg/L	100	90.8	108.8	yes
Cobalt	µg/L	20.0	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.2	18.3	21.3	yes
Lithium	µg/L	197	178	214	yes
Molybdenum	µg/L	198	178	219	yes
Nickel	µg/L	99.9	93.3	105.9	yes
Selenium	µg/L	39.9	36.9	42.9	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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140797 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	20.1	18.29	22.31	yes
Strontium	µg/L	200	183	219	yes
Thallium	µg/L	9.86	8.90	10.70	yes
Tin	µg/L	201	187	217	yes
Titanium	µg/L	101	91.0	109.0	yes
Uranium	µg/L	102	92.2	110.2	yes
Vanadium	µg/L	20.0	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: May 26, 2025					
Mercury	mg/L	0.000100	0.000070	0.000130	yes
Date Acquired: May 26, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.10	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.1	9.1	10.9	yes
Lead	µg/L	1.0	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.2	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.02	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	5.0	4.4	5.7	yes
Uranium	µg/L	5.2	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000020	0.000006	0.000036	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	9.62	9.51	10.89	yes
Sulfur	mg/L	150	141.6	156.6	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	2.03	1.88	2.24	yes
Sulfur	mg/L	10.2	9.1	10.6	yes
Date Acquired: May 26, 2025					

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140797 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.20	0.18	0.23	yes
Sulfur	mg/L	2.9	2.7	3.1	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.21	3.26	10	0.01	yes
Sulfur	mg/L	38.2	39.0	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	<0.2	<0.2	10	0.4	yes
Barium	µg/L	38	38	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	163	168	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	<0.1	<0.1	10	0.2	yes
Copper	µg/L	<0.2	<0.2	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	16	17	10	2	yes
Molybdenum	µg/L	3	2	10	2	yes
Nickel	µg/L	<0.5	<0.5	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	57	58	10	2	yes
Thallium	µg/L	<0.05	<0.05	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	<0.5	<0.5	10	1.1	yes
Vanadium	µg/L	0.2	0.1	10	0.2	yes
Zinc	µg/L	<1	2	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: May 26, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.099	-0.1	0.1	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	0.114	0.0	0.1	yes
Date Acquired: May 27, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1930	1881.4	2091.4	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	4550	4020.0	5436.0	yes
Date Acquired: May 27, 2025					

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

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140797 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Physical and Aggregate Properties - Continued

Continued							
Control Sample		Units	Measured	Lower Limit	Upper Limit	Passed QC	
Colour		Colour units	10	10	10	yes	
Turbidity		NTU	144	132.1	162.1	yes	
Date Acquired: May 27, 2025							
Turbidity		NTU	14.3	12.6	15.6	yes	
Date Acquired: May 27, 2025							
Turbidity		NTU	1.6	1.0	2.2	yes	
Date Acquired: May 27, 2025							
Client Sample Replicates		Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity		NTU	3.1	2.9	10	0.2	yes
Date Acquired: May 27, 2025							

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0.00152937	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Calcium	mg/L	0.0341995	-0.2	0.2	yes
Magnesium	mg/L	0.00865101	-0.1	0.1	yes
Sodium	mg/L	0.0649477	-0.4	0.4	yes
Potassium	mg/L	0.024503	-0.4	0.4	yes
Iron	mg/L	0.00335118	-0.01	0.01	yes
Manganese	mg/L	0.000111042	-0.004	0.004	yes
Chloride	mg/L	0.15	-0.4	0.4	yes
Date Acquired: May 26, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2140	1847.4	2256.0	yes
Date Acquired: May 26, 2025					
Electrical Conductivity	dS/m	32.9	27.200	36.800	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	9.90	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes
Nitrite - N	mg/L	9.61	9.010	10.990	yes
Nitrate and Nitrite - N	mg/L	19.6	19.10	20.90	yes
pH		9.18	8.90	9.44	yes
Temp. of observed pH	°C	20.1	15.5	24.5	yes
Electrical Conductivity	dS/m	2.77	2.631	2.829	yes
P-Alkalinity	mg/L	519	442	584	yes
T-Alkalinity	mg/L	997	958	1059	yes
Calcium	mg/L	242	235.3	262.9	yes
Magnesium	mg/L	97.6	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	241	238.3	262.3	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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140797 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Iron	mg/L	9.47	8.89	10.69		yes
Manganese	mg/L	2.39	2.200	2.680		yes
Date Acquired:	May 26, 2025					
Fluoride	mg/L	4.80	4.58	5.24		yes
Nitrate - N	mg/L	4.71	4.37	5.33		yes
Nitrite - N	mg/L	4.64	4.370	5.330		yes
Nitrate and Nitrite - N	mg/L	9.35	8.80	10.60		yes
pH		6.87	6.75	7.05		yes
Temp. of observed pH	°C	20.3	15.5	24.5		yes
Electrical Conductivity	dS/m	0.076	0.069	0.085		yes
P-Alkalinity	mg/L	52	28	72		yes
T-Alkalinity	mg/L	127	114	140		yes
Calcium	mg/L	51.2	44.9	56.9		yes
Magnesium	mg/L	20.4	17.9	22.0		yes
Sodium	mg/L	51.9	47.1	53.4		yes
Potassium	mg/L	50.3	45.8	55.8		yes
Iron	mg/L	1.98	1.89	2.11		yes
Manganese	mg/L	0.496	0.464	0.536		yes
Chloride	mg/L	83.5	74.9	86.9		yes
Date Acquired:	May 26, 2025					
Fluoride	mg/L	0.50	0.45	0.57		yes
Nitrate - N	mg/L	0.51	0.42	0.57		yes
Nitrite - N	mg/L	0.496	0.455	0.557		yes
Nitrate and Nitrite - N	mg/L	1.01	0.85	1.15		yes
Calcium	mg/L	5.1	4.7	5.4		yes
Magnesium	mg/L	2.1	1.9	2.2		yes
Sodium	mg/L	5.2	4.7	5.7		yes
Potassium	mg/L	4.8	4.6	5.6		yes
Iron	mg/L	0.19	0.18	0.22		yes
Manganese	mg/L	0.048	0.046	0.057		yes
Chloride	mg/L	15.2	13.3	16.5		yes
Date Acquired:	May 26, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Fluoride	mg/L	0.09	0.08	10	0.05	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
pH		7.56	7.53	0	0.10	yes
Electrical Conductivity	dS/m	0.944	0.942	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	583	583	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	478	478	10	5	yes
Calcium	mg/L	86.8	87.6	10	0.6	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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140797 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Magnesium	mg/L	26.7	26.8	10	0.7	yes
Sodium	mg/L	77.9	79.0	10	1.2	yes
Potassium	mg/L	5.2	5.3	10	1.2	yes
Iron	mg/L	0.03	0.03	10	0.05	yes
Manganese	mg/L	0.071	0.072	10	0.010	yes
Chloride	mg/L	0.7	0.7	10	0.5	yes
Date Acquired: May 26, 2025						

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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140797 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	May 26, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	May 26, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	May 26, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	May 26, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	May 27, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	May 26, 2025	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	May 26, 2025	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	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	May 26, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	May 27, 2025	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, August 2024
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:

- Sample 1816292-9; 9956338: Sample received at 11.6 °C
- Sample 1816292-9; 9956338: Sample turbidity may interfere with Apparent Colour analysis. A more accurate measure of sample colour would be obtained from True Colour Analysis.

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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater	Control Number:	
	Edmonton, AB, Canada		Monitoring	Date Received:	May 23, 2025
	T5S 2W3	Project Location:		Date Reported:	May 28, 2025
Attn:	Jennifer Catt	LSD:	Tp 054, R 26 to 28, W4M	Report Number:	3140797
Sampled By:	Ben Gilham		and Tp 054, R 01, W5M	Report Type:	Final Report
Company:	HCL	P.O.:	20020		
		Proj. Acct. code:			

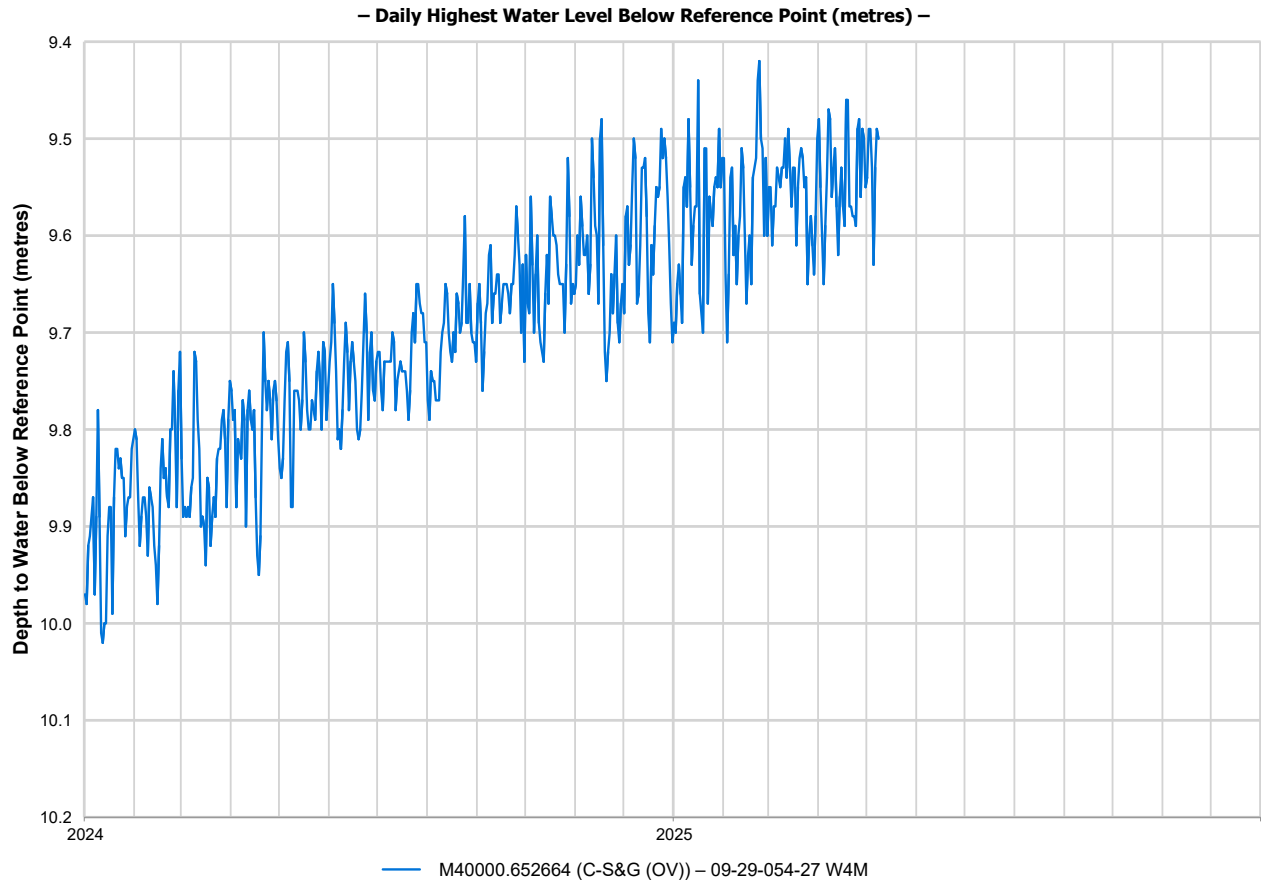
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to 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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C-S&G (OV)
2024 - 2025 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): **18.96 – June 3, 2025 @ 11:06**

GIC ID: **Unknown**

MLM
Water Well Diagram

Insufficient information available to draw a water well diagram:

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

Contractor: *[unknown contractor]*
Name: *MLM*

Field Action: *Confirmed - Physically, July 13, 2009*
Work Type: *Piezometer*
Drilling Method: *[unknown]*
Proposed Use: *Monitoring*

Well Status: *Observation*
Feature Class: *Piezometer*

05-27-054-27 W4M

Easting (m):
Northing (m):
Elevation (m):

71,935 ²
5,947,532 ²
686 ²

M40000.651289

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

Stick Up (m): *1.1*
2025-06-04

General Details

Top of Bedrock (m): *Surficial Water Well*

Depth Drilled (m)*: *19.4*

Most Recent Water Level (m): *18.96 m – June 3, 2025*

Completion Details

Surface Casing: *PVC – 50.8 mm (O.D.)*

Intervals

Lithology Details

Elevation
(*AMSL*)

666.8

Depth
(*BGL*)

19.4

Unknown

Lithology Descriptions

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

Sampling Details: *June 3, 2025 @ 11:45*
Report Date: *June 12, 2025 - Element Materials Technology Canada Inc. (1819420-5)*

Constituent

Result

Conductivity (µS/cm):
Total Dissolved Solids:
Hardness (as CaCO3):
T-Alkalinity (as CaCO3):
P-Alkalinity (as CaCO3):
Nitrate + Nitrite as N:
Total Suspended Solids:
Temperature (°C):

1520
996
828
705
< 5
< 0.01
20.2

Constituent

Result

Nitrate as N:
Nitrite as N:
pH (pH Unit):
Colour (TCU):
Ion Balance (%):
Total Coliforms:**:
Fecal Coliforms:**:
Escherichia coli:**:

< 0.01
< 0.005
7.04
> 60
99

Constituent

Result

Turbidity (NTU):
Fluoride:
Carbonate:
Bicarbonate:
Hydroxide:
Total Iron:
Total Mn:

1580
0.08
< 6
859
< 5

Constituent

Extractable

Dissolved

Calcium:
Chloride:
Iron:
Manganese:
Aluminum:
Arsenic:
Barium:
Beryllium:
Cadmium:
Chromium:
Cobalt:
Sulfate:

2.0
1.28
0.707***
0.066
0.0042
0.120
< 0.0001
0.00004
< 0.0005
0.0012
228

Constituent

Extractable

Dissolved

Mercury:
Molybdenum:
Magnesium:
Sodium:
Potassium:
Vanadium:
Strontium:
Nickel:
Zinc:
Copper:
Lead:
Uranium:

< 0.000005
< 0.001
58.8
45.1
4.6
0.0007
1.66
0.0059
0.005
0.0014
0.0004
0.0512***

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

***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2025. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada. Ottawa, Ontario.

850594; 1 / 37

Comments & Observations

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

Alias IDs

Z614234

* HCL GPS — 10TM Resource NAD83, * HCL DEM

(1) July 17, 2025, "AS IS"; no warranty either expressed or implied. vist tgwc.com for additional details

Sturgeon County, 2024 to 2025 Groundwater Monitoring Report
Calahoo Resource Extraction District, Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, MR-0224.24

RTU

REMOTE TELEMETRY UNIT

HCL

B - 39

MLM
AEPA - Water Well Drilling Report

— AEPA water well drilling report not available —

MLM
Chemical Analysis Results (June 12, 2025)



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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145426 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By:	P.O.: 20023	
Company: HCL	Proj. Acct. code:	

Reference Number	1819420-5
Sample Date	June 03, 2025
Sample Time	11:45
Sample Location	M40000.651289
Sample Description	MLM / 13.9 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	6.36	0.05		
Sulfur	Dissolved	mg/L	75.9	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	0.066	0.002	0.1 OG, 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	0.0008	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0042	0.0002	0.010	Below MAC
Barium	Dissolved	mg/L	0.120	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	0.093	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	0.0012	0.0001		
Copper	Dissolved	mg/L	0.0014	0.0002	1 AO, 2 MAC	Below AO
Lead	Dissolved	mg/L	0.0004	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.072	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0059	0.0005		
Selenium	Dissolved	mg/L	0.0027	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	1.66	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00001		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	0.0019	0.0005		
Uranium	Dissolved	mg/L	0.0512	0.0005	0.02	Above MAC
Vanadium	Dissolved	mg/L	0.0007	0.0001		
Zinc	Dissolved	mg/L	0.005	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	>60	5		
Turbidity		NTU	1580	0.1		
Routine Water						
pH			7.04	1	7.0-10.5	Within Range
Temp. of observed pH		°C	20.2			
Electrical Conductivity	at 25 °C	µS/cm	1520	1		
Calcium	Dissolved	mg/L	235	0.2		
Magnesium	Dissolved	mg/L	58.8	0.2		

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145426 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Reference Number	1819420-5
Sample Date	June 03, 2025
Sample Time	11:45
Sample Location	M40000.651289
Sample Description	MLM / 13.9 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	45.1	0.4	200	Below AO
Potassium	Dissolved	mg/L	4.6	0.4		
Iron	Dissolved	mg/L	1.28	0.01	0.1	Above AO
Manganese	Dissolved	mg/L	0.707	0.005	0.02 AO, 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	2.0	0.4	250	Below AO
Fluoride		mg/L	0.08	0.05	1.5	Below MAC
Nitrate - N		mg/L	<0.01	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	<0.01	0.01		
Sulfate (SO4)	Dissolved	mg/L	228	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	859			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	705	5		
Total Dissolved Solids	Calculated	mg/L	996	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	828			
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).
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	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145426 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.0005296	-0.04	0.05	yes
Sulfur	mg/L	0.0969684	-0.3	0.2	yes
Aluminum	µg/L	-0.159055	-2	2	yes
Antimony	µg/L	0.00527385	-0.2	0.2	yes
Arsenic	µg/L	-0.00838105	-0.2	0.2	yes
Barium	µg/L	0.0205324	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.747257	-2	2	yes
Cadmium	µg/L	0.00103929	-0.01	0.01	yes
Chromium	µg/L	-0.0370322	-0.5	0.5	yes
Cobalt	µg/L	-9.31717e-005	-0.1	0.1	yes
Copper	µg/L	0.0351031	-0.2	0.2	yes
Lead	µg/L	0.000707898	-0.1	0.1	yes
Lithium	µg/L	0.0347798	-1	1	yes
Molybdenum	µg/L	0.00840797	-1	1	yes
Nickel	µg/L	0.0185909	-0.5	0.5	yes
Selenium	µg/L	0.00058604	-0.2	0.2	yes
Silver	µg/L	0.000743061	-0.01	0.01	yes
Strontium	µg/L	0.0374449	-1	1	yes
Thallium	µg/L	0.00154219	-0.50	0.50	yes
Tin	µg/L	-0.0230673	-1	1	yes
Titanium	µg/L	-0.141492	-0.5	0.5	yes
Uranium	µg/L	0.00107718	-0.5	0.5	yes
Vanadium	µg/L	-0.0453782	-0.1	0.1	yes
Zinc	µg/L	0.25069	-1	1	yes
Mercury	µg/L	0.0001434	-0.051000	0.051000	yes

Date Acquired: June 09, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	990	902	1058	yes
Antimony	µg/L	40.1	36.4	44.2	yes
Arsenic	µg/L	40.0	37.7	42.5	yes
Barium	µg/L	198	181	211	yes
Beryllium	µg/L	19.6	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	378	351	427	yes
Cadmium	µg/L	2.08	1.87	2.23	yes
Chromium	µg/L	99.3	90.8	108.8	yes
Cobalt	µg/L	19.8	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.4	18.3	21.3	yes
Lithium	µg/L	196	178	214	yes
Molybdenum	µg/L	195	178	219	yes
Nickel	µg/L	99.5	93.3	105.9	yes
Selenium	µg/L	39.5	36.9	42.9	yes

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145426 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	19.7	18.29	22.31	yes
Strontium	µg/L	195	183	219	yes
Thallium	µg/L	9.71	8.90	10.70	yes
Tin	µg/L	196	187	217	yes
Titanium	µg/L	97.8	91.0	109.0	yes
Uranium	µg/L	101	92.2	110.2	yes
Vanadium	µg/L	19.7	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: June 09, 2025					
Mercury	mg/L	0.000099	0.000070	0.000130	yes
Date Acquired: June 09, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.11	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.0	9.1	10.9	yes
Lead	µg/L	1.1	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.1	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.01	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	4.9	4.4	5.7	yes
Uranium	µg/L	5.1	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000021	0.000006	0.000036	yes
Date Acquired: June 09, 2025					
Silicon	mg/L	10.2	9.51	10.89	yes
Sulfur	mg/L	151	141.6	156.6	yes
Date Acquired: June 09, 2025					
Silicon	mg/L	2.08	1.88	2.24	yes
Sulfur	mg/L	10.3	9.2	10.8	yes
Date Acquired: June 09, 2025					

Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145426 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.20	0.18	0.23	yes
Sulfur	mg/L	2.9	2.7	3.1	yes
Date Acquired: June 09, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.7	3.6	10	0.01	yes
Sulfur	mg/L	647	647	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	<0.2	<0.2	10	0.4	yes
Barium	µg/L	131	130	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	279	293	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	<0.1	<0.1	10	0.2	yes
Copper	µg/L	<0.2	<0.2	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	30	30	10	2	yes
Molybdenum	µg/L	<1	<1	10	2	yes
Nickel	µg/L	<0.5	<0.5	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	991	1010	10	2	yes
Thallium	µg/L	<0.01	<0.01	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	<0.5	<0.5	10	1.1	yes
Vanadium	µg/L	0.1	0.2	10	0.2	yes
Zinc	µg/L	<1	<1	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: June 09, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.09	-0.1	0.1	yes
Date Acquired: June 06, 2025					
Turbidity	NTU	0.112	0.0	0.1	yes
Date Acquired: June 06, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1920	1881.4	2091.4	yes
Date Acquired: June 06, 2025					
Turbidity	NTU	4530	4020.0	5436.0	yes
Date Acquired: June 06, 2025					

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145426 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By:	P.O.: 20023	
Company: HCL	Proj. Acct. code:	

Physical and Aggregate Properties - Continued

Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC	
Turbidity	NTU	143	132.1	162.1	yes	
Colour	Colour units	10	10	10	yes	
Date Acquired:	June 06, 2025					
Turbidity	NTU	14.2	12.6	15.6	yes	
Date Acquired:	June 06, 2025					
Turbidity	NTU	1.6	1.0	2.2	yes	
Date Acquired:	June 06, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity	NTU	3.2	3.2	10	0.2	yes
Date Acquired:	June 06, 2025					

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	0.0700376	-0.2	0.2	yes
Magnesium	mg/L	0.0599072	-0.1	0.1	yes
Sodium	mg/L	0.0357922	-0.4	0.4	yes
Potassium	mg/L	0.192832	-0.4	0.4	yes
Iron	mg/L	0.00324691	-0.01	0.01	yes
Manganese	mg/L	0.000677325	-0.004	0.004	yes
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Chloride	mg/L	0.09	-0.4	0.4	yes
Date Acquired: June 09, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2020	1847.4	2256.0	yes
Date Acquired: June 09, 2025					
Electrical Conductivity	dS/m	33.2	27.200	36.800	yes
Date Acquired: June 06, 2025					
pH		9.14	8.90	9.44	yes
Temp. of observed pH	°C	20.9	15.5	24.5	yes
Electrical Conductivity	dS/m	2.77	2.631	2.829	yes
P-Alkalinity	mg/L	540	442	584	yes
T-Alkalinity	mg/L	1020	958	1059	yes
Calcium	mg/L	251	235.3	262.9	yes
Magnesium	mg/L	101	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	250	238.3	262.3	yes
Iron	mg/L	9.92	8.89	10.69	yes
Manganese	mg/L	2.51	2.200	2.680	yes
Fluoride	mg/L	9.97	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes

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

Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145426 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Nitrite - N	mg/L	9.76	9.010	10.990		yes
Nitrate and Nitrite - N	mg/L	19.8	19.10	20.90		yes
Date Acquired: June 09, 2025						
pH		6.87	6.75	7.05		yes
Temp. of observed pH	°C	20.9	15.5	24.5		yes
Electrical Conductivity	dS/m	0.082	0.069	0.085		yes
P-Alkalinity	mg/L	56	28	72		yes
T-Alkalinity	mg/L	129	114	140		yes
Calcium	mg/L	52.7	44.9	56.9		yes
Magnesium	mg/L	21.3	17.9	22.0		yes
Sodium	mg/L	50.5	47.1	53.4		yes
Potassium	mg/L	51.7	45.8	55.8		yes
Iron	mg/L	2.04	1.89	2.11		yes
Manganese	mg/L	0.517	0.464	0.536		yes
Fluoride	mg/L	4.85	4.58	5.24		yes
Nitrate - N	mg/L	4.77	4.37	5.33		yes
Nitrite - N	mg/L	4.74	4.370	5.330		yes
Nitrate and Nitrite - N	mg/L	9.52	8.80	10.60		yes
Chloride	mg/L	82.5	74.9	86.9		yes
Date Acquired: June 09, 2025						
Calcium	mg/L	5.2	4.7	5.4		yes
Magnesium	mg/L	2.1	1.9	2.2		yes
Sodium	mg/L	5.1	4.7	5.7		yes
Potassium	mg/L	5.1	4.6	5.6		yes
Iron	mg/L	0.20	0.18	0.22		yes
Manganese	mg/L	0.051	0.046	0.057		yes
Fluoride	mg/L	0.51	0.45	0.57		yes
Nitrate - N	mg/L	0.51	0.42	0.57		yes
Nitrite - N	mg/L	0.509	0.455	0.557		yes
Nitrate and Nitrite - N	mg/L	1.02	0.85	1.15		yes
Chloride	mg/L	14.2	13.3	16.5		yes
Date Acquired: June 09, 2025						
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
pH		6.90	6.93	0	0.10	yes
Electrical Conductivity	dS/m	40.9	40.8	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	654	650	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	537	533	10	5	yes
Calcium	mg/L	317	318	10	0.6	yes
Magnesium	mg/L	304	305	10	0.7	yes
Sodium	mg/L	148	147	10	1.2	yes
Potassium	mg/L	6.4	6.5	10	1.2	yes

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



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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3 Attn: Jennifer Catt Sampled By: Company: HCL	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M LSD: P.O.: 20023 Proj. Acct. code:	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145426 Report Type: Final Report

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Iron	mg/L	<0.05	<0.05	10	0.05	yes
Manganese	mg/L	0.30	0.30	10	0.010	yes
Nitrate - N	mg/L	0.06	0.06	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
Fluoride	mg/L	0.05	0.05	10	0.05	yes
Chloride	mg/L	2.1	2.0	10	0.5	yes
Date Acquired: June 09, 2025						

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-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145426 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 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 06, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 06, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 06, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 09, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 06, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 09, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 06, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 09, 2025	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 09, 2025	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 09, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 09, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 09, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 06, 2025	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, August 2024
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:

- Sample 1819420-5; 9983493: Sample received at 13.9 °C
- Sample 1819420-5; 9983493: Sample turbidity may interfere with Apparent Colour analysis. A more accurate measure of sample colour would be obtained from True Colour Analysis.

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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.24	Lot ID:	1819420
	17740 - 118 Avenue NW	Project Name:	2025 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 5, 2025
	T5S 2W3	LSD:		Date Reported:	Jun 12, 2025
Attn:	Jennifer Catt	P.O.:	20023	Report Number:	3145426
Sampled By:		Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

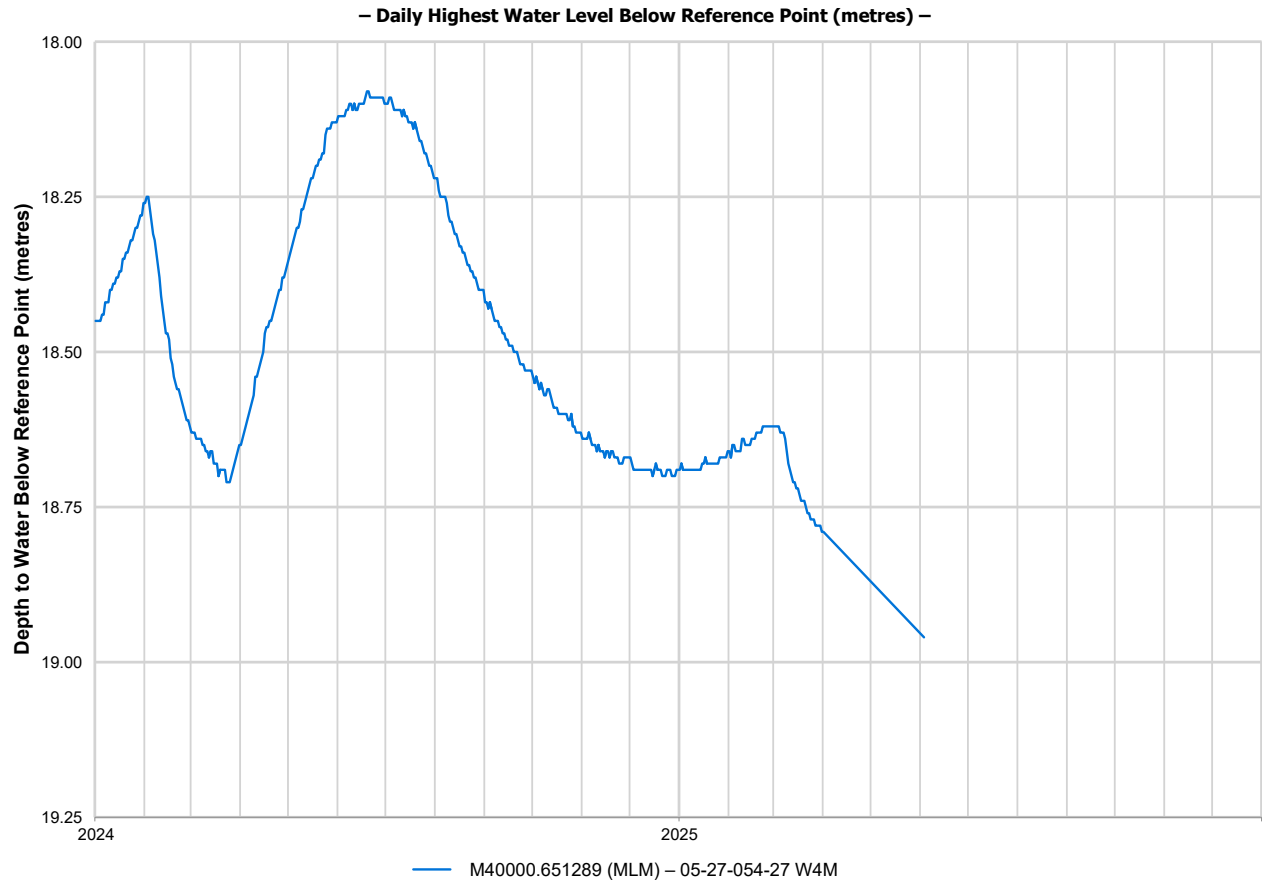
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to 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
2024 - 2025 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 ***

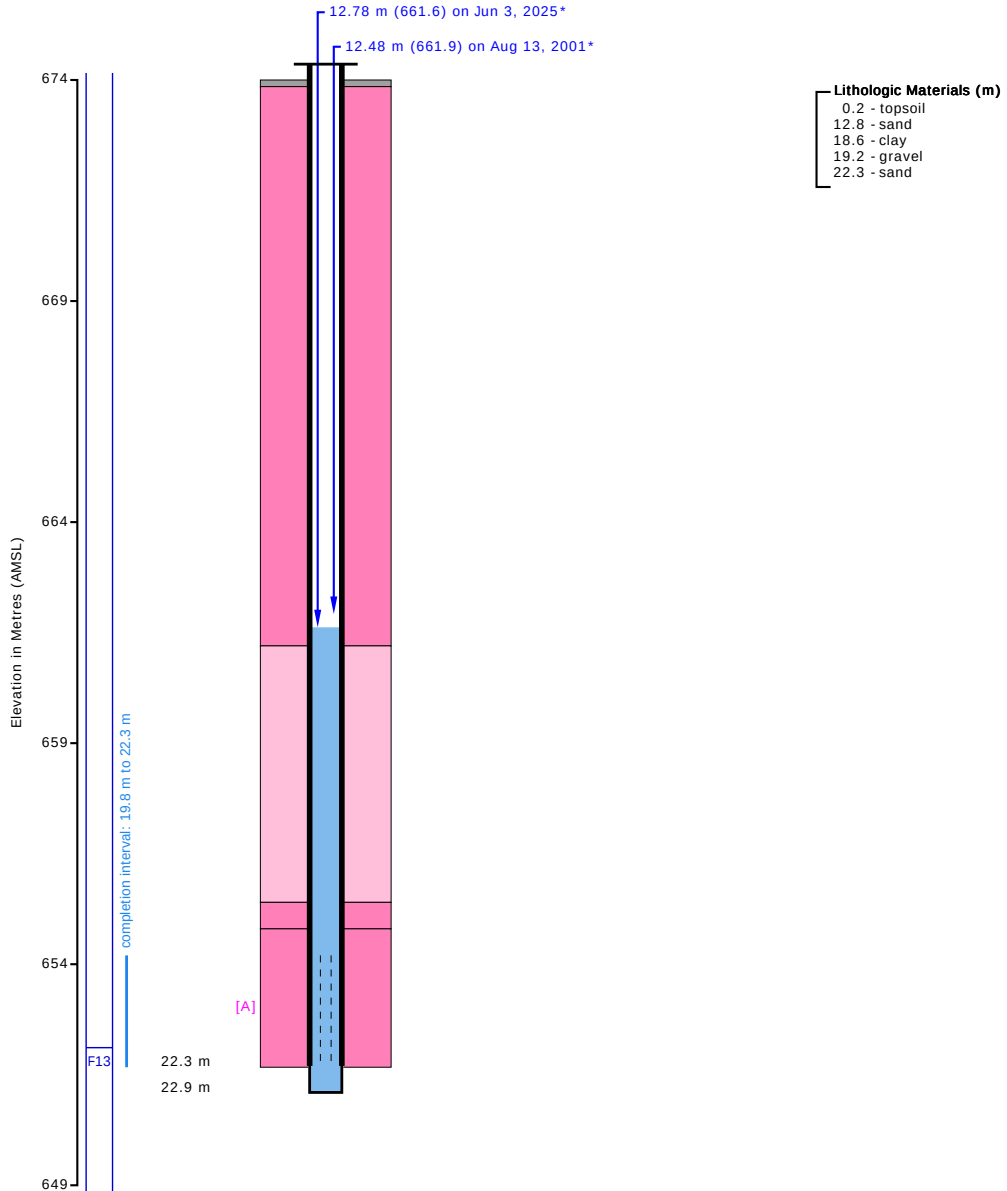
(* TGWC determined value)

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

Most Recent Water Level (m): **12.78 – June 3, 2025 @ 15:01**

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): 12.78 m (661.6 m AMSL) on Jun 3, 2025 @ 15:01 - 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: July 17, 2025 @ 09:25 --- https://www.hcl.ca	

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

Contractor: **Mar-Wayne Water Well Drilling Services Ltd.**
Name: **MW01-01**

Field Action: **Confirmed - Physically, April 11, 2025**

Work Type: **Piezometer**

Drilling Method: **Drilled**

Proposed Use: **Monitoring**

Date Started: **April 18, 2001**

Date Completed: **April 18, 2001**

Well Status: **Observation**

Feature Class: **Piezometer**

General Details

Depth Completed (m)*: **22.3**

Top of Bedrock (m): **Surficial Water Well**

Depth Drilled (m)*: **22.9**

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

Sand & Gravel Thickness (m): **16.4 (total) – 16.4 (below 15 m) ***

Most Recent Water Level (m): **12.78 m – June 3, 2025**

Completion Details

Surface Casing: **PVC – 50.8 mm (O.D.) x 22.3 m (bottom)**

Intervals

Slotted: **19.8 to 22.3 m**

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

(recently sampled first)

Sampling Details: **June 3, 2025 @ 15:25**

Report Date: **June 12, 2025 - Element Materials Technology Canada Inc. (1819420-7)**

Constituent	Result	Constituent	Result	Constituent	Result
Conductivity (µS/cm):	949	Nitrate as N:	0.35	Turbidity (NTU):	1.0
Total Dissolved Solids:	585	Nitrite as N:	0.108	Fluoride:	0.12
Hardness (as CaCO3):	460	pH (pH Unit):	7.30	Carbonate:	< 6
T-Alkalinity (as CaCO3):	395	Colour (TCU):	5	Bicarbonate:	481
P-Alkalinity (as CaCO3):	< 5	Ion Balance (%):	99	Hydroxide:	< 5
Nitrate + Nitrite as N:	0.46	Total Coliforms:**:		Total Iron:	
Total Suspended Solids:		Fecal Coliforms:**:		Total Mn:	
Temperature (°C):	20.3	Escherichia coli:**:			

Constituent	Extractable	Dissolved	Constituent	Extractable	Dissolved
Calcium:		130	Mercury:		< 0.000005
Chloride:		10.4	Molybdenum:		< 0.001
Iron:		0.02	Magnesium:		32.8
Manganese:		0.132***	Sodium:		35.5
Aluminum:		< 0.002	Potassium:		4.9
Arsenic:		0.0003	Vanadium:		< 0.0001
Barium:		0.165	Strontium:		0.801
Beryllium:		< 0.0001	Nickel:		0.0020
Cadmium:		< 0.00001	Zinc:		< 0.001
Chromium:		< 0.0005	Copper:		0.0004
Cobalt:		< 0.0001	Lead:		< 0.0001
Sulfate:		134	Uranium:		0.0117

Extractable - unfiltered
Dissolved - filtered

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

***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2025. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa, Ontario.

850596; 1 / 36

16-17-054-26 W4M

M40000.647826

Easting (m): 79,991 ²

Northing (m): 5,945,359 ²

Elevation (m): 674 ²

Elog Taken: **No**

Gamma Taken: **No**

Flowing: **No**

Presence of Gas: **No**

Stick Up (m): **0.4**

2025-06-04

Lithology Details

Elevation	Depth	
(AMSL)	(BGL)	Lithology Descriptions
673.9	0.2	Topsoil
661.2	12.8	Coarse-Grained Sand
655.4	18.6	Sandy Clay
654.8	19.2	Pebbly Gravel
651.7	22.3	Coarse-Grained Sand

Comments & Observations

Aquifer Tests

Date & Time	Testing	Depth of Test	Duration (minutes)		Avg. Rate	NPWL	Drawdown	Pump	Q20 (m³/day)*		Transmissivity (m²/day)*	
	Method / Type	Interval	Pumping	Recovery	(Lpm)	(metres)	(metres)	(metres)	Apparent	Effective	Apparent	Aquifer Effective

Alias IDs

2614229

¹HCL GPS — 10TM Resource NAD83, ²HCL DEM

RTU

MW01-01
AEPA – Water Well Drilling Report

— AEPA water well drilling report not available —

MW01-01
Chemical Analysis Results (June 12, 2025)



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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145428 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By:	P.O.: 20023	
Company: HCL	Proj. Acct. code:	

Reference Number	1819420-7
Sample Date	June 03, 2025
Sample Time	15:25
Sample Location	M40000.647826
Sample Description	MW01-01 / 13.9 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	6.66	0.05		
Sulfur	Dissolved	mg/L	44.7	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	0.010	Below MAC
Barium	Dissolved	mg/L	0.165	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	0.095	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	0.0004	0.0002	1 AO, 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.062	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0020	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	0.801	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00001		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0117	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	<0.001	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	5	5		
Turbidity		NTU	1.0	0.1		
Routine Water						
pH			7.30	1	7.0-10.5	Within Range
Temp. of observed pH		°C	20.3			
Electrical Conductivity	at 25 °C	µS/cm	949	1		
Calcium	Dissolved	mg/L	130	0.2		
Magnesium	Dissolved	mg/L	32.8	0.2		

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

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145428 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Reference Number	1819420-7
Sample Date	June 03, 2025
Sample Time	15:25
Sample Location	M40000.647826
Sample Description	MW01-01 / 13.9 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	35.5	0.4	200	Below AO
Potassium	Dissolved	mg/L	4.9	0.4		
Iron	Dissolved	mg/L	0.02	0.01	0.1	Below AO
Manganese	Dissolved	mg/L	0.132	0.005	0.02 AO, 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	10.4	0.4	250	Below AO
Fluoride		mg/L	0.12	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.35	0.01	10	Below MAC
Nitrite - N		mg/L	0.108	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	0.46	0.01		
Sulfate (SO4)	Dissolved	mg/L	134	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	481			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	395	5		
Total Dissolved Solids	Calculated	mg/L	585	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	460			
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).
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	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145428 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.0005296	-0.04	0.05	yes
Sulfur	mg/L	0.0969684	-0.3	0.2	yes
Aluminum	µg/L	-0.0503837	-2	2	yes
Antimony	µg/L	0.00299663	-0.2	0.2	yes
Arsenic	µg/L	-0.00512149	-0.2	0.2	yes
Barium	µg/L	0.0195816	-1	1	yes
Beryllium	µg/L	0.00322498	-0.1	0.1	yes
Boron	µg/L	0.481716	-2	2	yes
Cadmium	µg/L	0	-0.01	0.01	yes
Chromium	µg/L	-0.0381894	-0.5	0.5	yes
Cobalt	µg/L	-0.000104065	-0.1	0.1	yes
Copper	µg/L	0.103679	-0.2	0.2	yes
Lead	µg/L	0.00415681	-0.1	0.1	yes
Lithium	µg/L	0.024556	-1	1	yes
Molybdenum	µg/L	0.00699169	-1	1	yes
Nickel	µg/L	-0.00127806	-0.5	0.5	yes
Selenium	µg/L	0.000628284	-0.2	0.2	yes
Silver	µg/L	0.000782253	-0.01	0.01	yes
Strontium	µg/L	0.0543752	-1	1	yes
Thallium	µg/L	0.000491946	-0.50	0.50	yes
Tin	µg/L	-0.0247345	-1	1	yes
Titanium	µg/L	-0.116848	-0.5	0.5	yes
Uranium	µg/L	0.000437049	-0.5	0.5	yes
Vanadium	µg/L	-0.0361349	-0.1	0.1	yes
Zinc	µg/L	0.124181	-1	1	yes
Mercury	µg/L	0.0001434	-0.051000	0.051000	yes

Date Acquired: June 09, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	990	902	1058	yes
Antimony	µg/L	40.1	36.4	44.2	yes
Arsenic	µg/L	40.0	37.7	42.5	yes
Barium	µg/L	198	181	211	yes
Beryllium	µg/L	19.6	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	378	351	427	yes
Cadmium	µg/L	2.08	1.87	2.23	yes
Chromium	µg/L	99.3	90.8	108.8	yes
Cobalt	µg/L	19.8	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.4	18.3	21.3	yes
Lithium	µg/L	196	178	214	yes
Molybdenum	µg/L	195	178	219	yes
Nickel	µg/L	99.5	93.3	105.9	yes
Selenium	µg/L	39.5	36.9	42.9	yes

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Quality Control

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Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	19.7	18.29	22.31	yes
Strontium	µg/L	195	183	219	yes
Thallium	µg/L	9.71	8.90	10.70	yes
Tin	µg/L	196	187	217	yes
Titanium	µg/L	97.8	91.0	109.0	yes
Uranium	µg/L	101	92.2	110.2	yes
Vanadium	µg/L	19.7	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: June 09, 2025					
Mercury	mg/L	0.000099	0.000070	0.000130	yes
Date Acquired: June 09, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.11	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.0	9.1	10.9	yes
Lead	µg/L	1.1	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.1	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.01	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	4.9	4.4	5.7	yes
Uranium	µg/L	5.1	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000021	0.000006	0.000036	yes
Date Acquired: June 09, 2025					
Silicon	mg/L	10.2	9.51	10.89	yes
Sulfur	mg/L	151	141.6	156.6	yes
Date Acquired: June 09, 2025					
Silicon	mg/L	2.08	1.88	2.24	yes
Sulfur	mg/L	10.3	9.2	10.8	yes
Date Acquired: June 09, 2025					

Quality Control

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Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Silicon	mg/L	0.20	0.18	0.23		yes
Sulfur	mg/L	2.9	2.7	3.1		yes
Date Acquired: June 09, 2025						
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.7	3.6	10	0.01	yes
Sulfur	mg/L	647	647	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	<0.2	<0.2	10	0.4	yes
Barium	µg/L	131	130	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	279	293	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	<0.1	<0.1	10	0.2	yes
Copper	µg/L	<0.2	<0.2	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	30	30	10	2	yes
Molybdenum	µg/L	<1	<1	10	2	yes
Nickel	µg/L	<0.5	<0.5	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	991	1010	10	2	yes
Thallium	µg/L	<0.01	<0.01	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	<0.5	<0.5	10	1.1	yes
Vanadium	µg/L	0.1	0.2	10	0.2	yes
Zinc	µg/L	<1	<1	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: June 09, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.09	-0.1	0.1	yes
Date Acquired: June 06, 2025					
Turbidity	NTU	0.112	0.0	0.1	yes
Date Acquired: June 06, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1920	1881.4	2091.4	yes
Date Acquired: June 06, 2025					
Turbidity	NTU	4530	4020.0	5436.0	yes
Date Acquired: June 06, 2025					

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Quality Control

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Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Physical and Aggregate Properties - Continued

Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Turbidity	NTU	143	132.1	162.1		yes
Colour	Colour units	10	10	10		yes
Date Acquired:	June 06, 2025					
Turbidity	NTU	14.2	12.6	15.6		yes
Date Acquired:	June 06, 2025					
Turbidity	NTU	1.6	1.0	2.2		yes
Date Acquired:	June 06, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity	NTU	3.2	3.2	10	0.2	yes
Date Acquired:	June 06, 2025					

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	0.0700376	-0.2	0.2	yes
Magnesium	mg/L	0.0599072	-0.1	0.1	yes
Sodium	mg/L	0.0357922	-0.4	0.4	yes
Potassium	mg/L	0.192832	-0.4	0.4	yes
Iron	mg/L	0.00324691	-0.01	0.01	yes
Manganese	mg/L	0.000677325	-0.004	0.004	yes
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Chloride	mg/L	0.09	-0.4	0.4	yes
Date Acquired: June 09, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2020	1847.4	2256.0	yes
Date Acquired: June 09, 2025					
Electrical Conductivity	dS/m	33.2	27.200	36.800	yes
Date Acquired: June 06, 2025					
pH		9.15	8.90	9.44	yes
Temp. of observed pH	°C	20.6	15.5	24.5	yes
Electrical Conductivity	dS/m	2.78	2.631	2.829	yes
P-Alkalinity	mg/L	538	442	584	yes
T-Alkalinity	mg/L	1010	958	1059	yes
Calcium	mg/L	251	235.3	262.9	yes
Magnesium	mg/L	101	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	250	238.3	262.3	yes
Iron	mg/L	9.92	8.89	10.69	yes
Manganese	mg/L	2.51	2.200	2.680	yes
Fluoride	mg/L	9.97	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes

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Quality Control

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Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Routine Water - Continued

Control Sample		Units	Measured	Lower Limit	Upper Limit	Passed QC	
Nitrite - N		mg/L	9.76	9.010	10.990	yes	
Nitrate and Nitrite - N		mg/L	19.8	19.10	20.90	yes	
Date Acquired: June 09, 2025							
pH			6.87	6.75	7.05	yes	
Temp. of observed pH		°C	20.7	15.5	24.5	yes	
Electrical Conductivity		dS/m	0.080	0.069	0.085	yes	
P-Alkalinity		mg/L	55	28	72	yes	
T-Alkalinity		mg/L	129	114	140	yes	
Calcium		mg/L	52.7	44.9	56.9	yes	
Magnesium		mg/L	21.3	17.9	22.0	yes	
Sodium		mg/L	50.5	47.1	53.4	yes	
Potassium		mg/L	51.7	45.8	55.8	yes	
Iron		mg/L	2.04	1.89	2.11	yes	
Manganese		mg/L	0.517	0.464	0.536	yes	
Fluoride		mg/L	4.85	4.58	5.24	yes	
Nitrate - N		mg/L	4.77	4.37	5.33	yes	
Nitrite - N		mg/L	4.74	4.370	5.330	yes	
Nitrate and Nitrite - N		mg/L	9.52	8.80	10.60	yes	
Chloride		mg/L	82.5	74.9	86.9	yes	
Date Acquired: June 09, 2025							
Calcium		mg/L	5.2	4.7	5.4	yes	
Magnesium		mg/L	2.1	1.9	2.2	yes	
Sodium		mg/L	5.1	4.7	5.7	yes	
Potassium		mg/L	5.1	4.6	5.6	yes	
Iron		mg/L	0.20	0.18	0.22	yes	
Manganese		mg/L	0.051	0.046	0.057	yes	
Fluoride		mg/L	0.51	0.45	0.57	yes	
Nitrate - N		mg/L	0.51	0.42	0.57	yes	
Nitrite - N		mg/L	0.509	0.455	0.557	yes	
Nitrate and Nitrite - N		mg/L	1.02	0.85	1.15	yes	
Chloride		mg/L	14.2	13.3	16.5	yes	
Date Acquired: June 09, 2025							
Client Sample Replicates	Units		Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
pH			6.90	6.93	0	0.10	yes
Electrical Conductivity		dS/m	40.9	40.8	10	0.002	yes
Hydroxide		mg/L	<5	<5	10		yes
Carbonate		mg/L	<6	<6	10	6	yes
Bicarbonate		mg/L	654	650	10	6	yes
P-Alkalinity		mg/L	<5	<5	10	5	yes
T-Alkalinity		mg/L	537	533	10	5	yes
Calcium		mg/L	317	318	10	0.6	yes
Magnesium		mg/L	304	305	10	0.7	yes
Sodium		mg/L	148	147	10	1.2	yes
Potassium		mg/L	6.4	6.5	10	1.2	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: Company: HCL	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M LSD: P.O.: 20023 Proj. Acct. code:	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145428 Report Type: Final Report

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Iron	mg/L	<0.05	<0.05	10	0.05	yes
Manganese	mg/L	0.30	0.30	10	0.010	yes
Nitrate - N	mg/L	0.06	0.06	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
Fluoride	mg/L	0.05	0.05	10	0.05	yes
Chloride	mg/L	2.0	2.0	10	0.5	yes
Date Acquired: June 09, 2025						

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Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145428 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 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 06, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 06, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 06, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 09, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 06, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 09, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 06, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 09, 2025	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 09, 2025	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 09, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 09, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 09, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 06, 2025	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, August 2024
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:

- Sample 1819420-7; 9983495: Sample received at 13.9 °C

Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145428 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

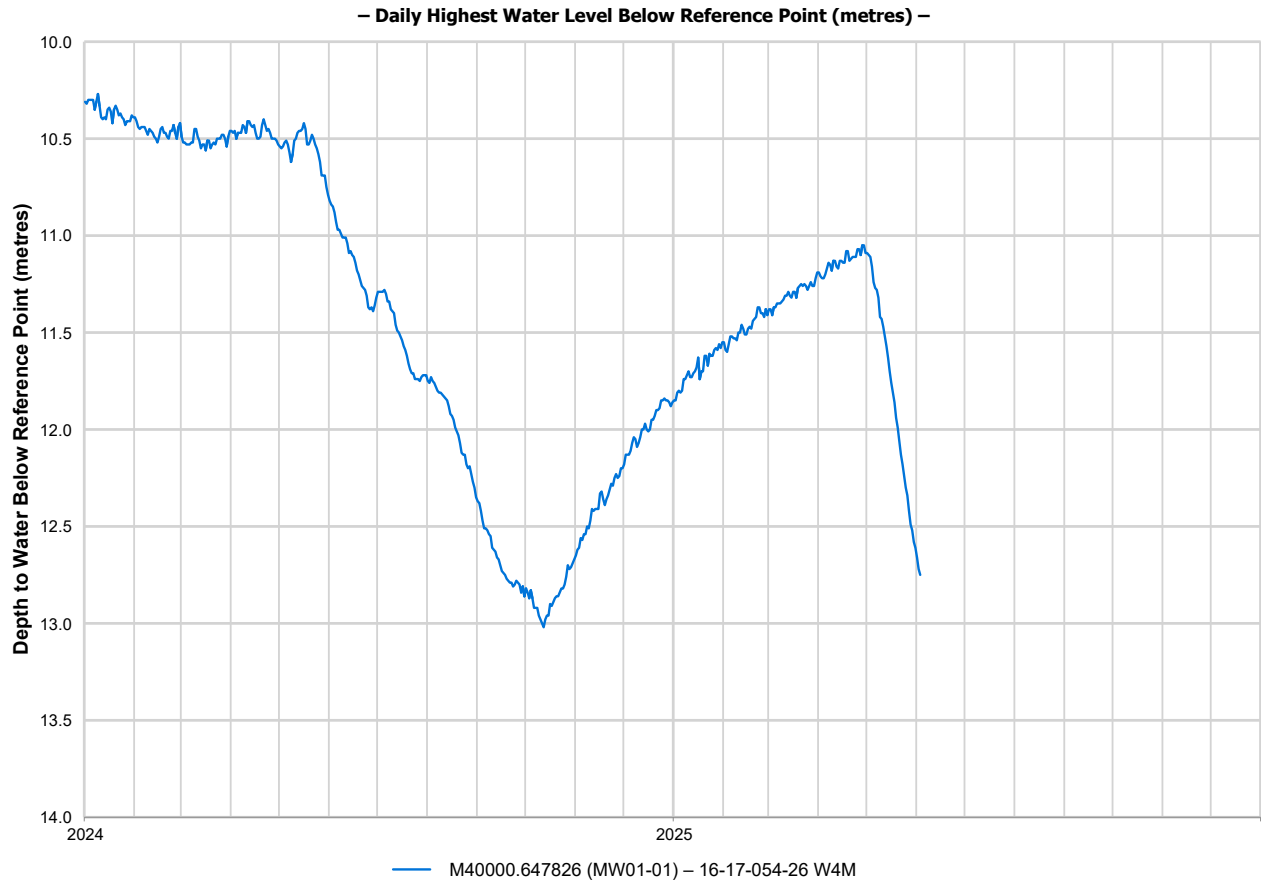
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to 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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MW01-01
2024 - 2025 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 ***

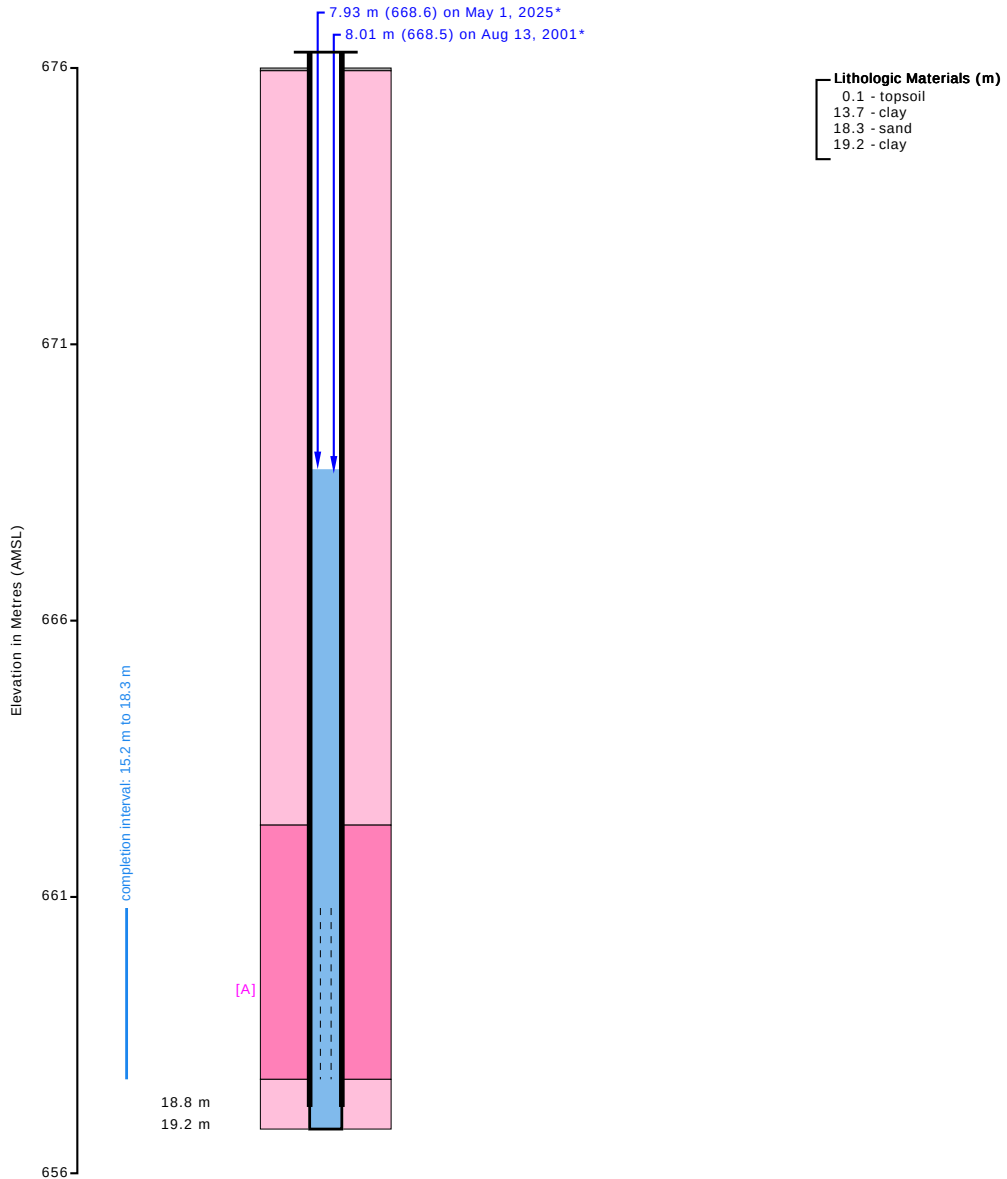
(* TGWC determined value)

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

Most Recent Water Level (m): **7.93 – May 1, 2025 @ 10:13**

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): 7.93 m (668.6 m AMSL) on May 1, 2025 @ 10:13 - Reference Point: Top of Casing	
Water Level (oldest): 8.01 m (668.5 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: July 17, 2025 @ 09:25 --- https://www.hcl.ca	

MW01-04
AEPA - Water Well Drilling Report

— AEPA water well drilling report not available —

MW01-04
Chemical Analysis Results (May 28, 2025)



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Analytical Report

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:		Date Received:	May 23, 2025
	T5S 2W3	LSD:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Reported:	May 28, 2025
Attn:	Jennifer Catt	P.O.:	20020	Report Number:	3140790
Sampled By:	Ben Gilham	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

Reference Number	1816292-2
Sample Date	May 01, 2025
Sample Time	10:45
Sample Location	M40000.649295
Sample Description	MW01-04 / 11.6 °C
Sample Matrix	Water

Analyte	Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved					
Silicon	Dissolved	mg/L	7.06	0.05	
Sulfur	Dissolved	mg/L	16.8	0.3	
Mercury	Dissolved	mg/L	<0.000005	0.000005	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG, 2.9 MAC
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006
Arsenic	Dissolved	mg/L	0.0054	0.0002	0.010
Barium	Dissolved	mg/L	0.058	0.001	2.0
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
Cadmium	Dissolved	mg/L	<0.00001	0.00001	0.007
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05
Cobalt	Dissolved	mg/L	0.0008	0.0001	
Copper	Dissolved	mg/L	0.0005	0.0002	1 AO, 2 MAC
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005
Lithium	Dissolved	mg/L	0.060	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
Silver	Dissolved	mg/L	<0.00001	0.00001	
Strontium	Dissolved	mg/L	0.816	0.001	7.0
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	0.0059	0.0005	0.02
Vanadium	Dissolved	mg/L	<0.0001	0.0001	
Zinc	Dissolved	mg/L	0.005	0.001	5.0
Subsample			Field Filtered		Below AO
Physical and Aggregate Properties					
Colour	Apparent, Potable	Colour units	>60	5	
Turbidity		NTU	49.1	0.1	
Routine Water					
pH			7.83	1	7.0-10.5
Temp. of observed pH		°C	21.5		Within Range
Electrical Conductivity	at 25 °C	µS/cm	840	1	
Calcium	Dissolved	mg/L	116	0.2	
Magnesium	Dissolved	mg/L	29.6	0.2	

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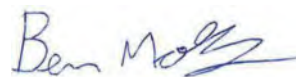
Analytical Report

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M 20020 P.O.: Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140790 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Reference Number	1816292-2
Sample Date	May 01, 2025
Sample Time	10:45
Sample Location	M40000.649295
Sample Description	MW01-04 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	31.0	0.4	200	Below AO
Potassium	Dissolved	mg/L	3.8	0.4		
Iron	Dissolved	mg/L	2.33	0.01	0.1	Above AO
Manganese	Dissolved	mg/L	0.557	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	<0.01	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	<0.01	0.01		
Sulfate (SO4)	Dissolved	mg/L	50.5	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	430	5		
Total Dissolved Solids	Calculated	mg/L	490	1	500	Below AO
Hardness	Dissolved as CaCO3	mg/L	411			
Ionic Balance	Dissolved	%	100			

Approved by:



Benjamin Morris, B.Sc
Operations 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	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140790 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.00704748	-0.04	0.05	yes
Sulfur	mg/L	0.107846	-0.3	0.2	yes
Aluminum	µg/L	-0.142723	-2	2	yes
Antimony	µg/L	-0.00198253	-0.2	0.2	yes
Arsenic	µg/L	-0.00520747	-0.2	0.2	yes
Barium	µg/L	0.0155545	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.490366	-2	2	yes
Cadmium	µg/L	0.00106883	-0.01	0.01	yes
Chromium	µg/L	-0.0304354	-0.5	0.5	yes
Cobalt	µg/L	-0.000332921	-0.1	0.1	yes
Copper	µg/L	0.0100485	-0.2	0.2	yes
Lead	µg/L	0.00240083	-0.1	0.1	yes
Lithium	µg/L	-0.00113161	-1	1	yes
Molybdenum	µg/L	0.0194221	-1	1	yes
Nickel	µg/L	0.0142204	-0.5	0.5	yes
Selenium	µg/L	0.00150023	-0.2	0.2	yes
Silver	µg/L	0.00050935	-0.01	0.01	yes
Strontium	µg/L	0.0646959	-1	1	yes
Thallium	µg/L	0.00145131	-0.50	0.50	yes
Tin	µg/L	-0.0724984	-1	1	yes
Titanium	µg/L	-0.0940343	-0.5	0.5	yes
Uranium	µg/L	0.00233484	-0.5	0.5	yes
Vanadium	µg/L	-0.00529231	-0.1	0.1	yes
Zinc	µg/L	0.13059	-1	1	yes
Mercury	µg/L	-0.001039	-0.051000	0.051000	yes

Date Acquired: May 26, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	997	902	1058	yes
Antimony	µg/L	40.5	36.4	44.2	yes
Arsenic	µg/L	39.9	37.7	42.5	yes
Barium	µg/L	196	181	211	yes
Beryllium	µg/L	19.9	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	389	351	427	yes
Cadmium	µg/L	2.16	1.87	2.23	yes
Chromium	µg/L	100	90.8	108.8	yes
Cobalt	µg/L	20.0	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.2	18.3	21.3	yes
Lithium	µg/L	197	178	214	yes
Molybdenum	µg/L	198	178	219	yes
Nickel	µg/L	99.9	93.3	105.9	yes
Selenium	µg/L	39.9	36.9	42.9	yes

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140790 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	20.1	18.29	22.31	yes
Strontium	µg/L	200	183	219	yes
Thallium	µg/L	9.86	8.90	10.70	yes
Tin	µg/L	201	187	217	yes
Titanium	µg/L	101	91.0	109.0	yes
Uranium	µg/L	102	92.2	110.2	yes
Vanadium	µg/L	20.0	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: May 26, 2025					
Mercury	mg/L	0.000100	0.000070	0.000130	yes
Date Acquired: May 26, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.10	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.1	9.1	10.9	yes
Lead	µg/L	1.0	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.2	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.02	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	5.0	4.4	5.7	yes
Uranium	µg/L	5.2	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000020	0.000006	0.000036	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	9.62	9.51	10.89	yes
Sulfur	mg/L	150	141.6	156.6	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	2.03	1.88	2.24	yes
Sulfur	mg/L	10.2	9.1	10.6	yes
Date Acquired: May 26, 2025					

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140790 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.20	0.18	0.23	yes
Sulfur	mg/L	2.9	2.7	3.1	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.21	3.26	10	0.01	yes
Sulfur	mg/L	38.2	39.0	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	<0.2	<0.2	10	0.4	yes
Barium	µg/L	38	38	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	163	168	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	<0.1	<0.1	10	0.2	yes
Copper	µg/L	<0.2	<0.2	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	16	17	10	2	yes
Molybdenum	µg/L	3	2	10	2	yes
Nickel	µg/L	<0.5	<0.5	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	57	58	10	2	yes
Thallium	µg/L	<0.05	<0.05	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	<0.5	<0.5	10	1.1	yes
Vanadium	µg/L	0.2	0.1	10	0.2	yes
Zinc	µg/L	<1	2	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: May 26, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.099	-0.1	0.1	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	0.114	0.0	0.1	yes
Date Acquired: May 27, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1930	1881.4	2091.4	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	4550	4020.0	5436.0	yes
Date Acquired: May 27, 2025					

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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140790 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Physical and Aggregate Properties - Continued

continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Colour	Colour units	10	10	10		yes
Turbidity	NTU	144	132.1	162.1		yes
Date Acquired:	May 27, 2025					
Turbidity	NTU	14.3	12.6	15.6		yes
Date Acquired:	May 27, 2025					
Turbidity	NTU	1.6	1.0	2.2		yes
Date Acquired:	May 27, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity	NTU	3.1	2.9	10	0.2	yes
Date Acquired:	May 27, 2025					

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0.00152937	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Calcium	mg/L	0.0798772	-0.2	0.2	yes
Magnesium	mg/L	0.0424654	-0.1	0.1	yes
Sodium	mg/L	0.144685	-0.4	0.4	yes
Potassium	mg/L	0.194533	-0.4	0.4	yes
Iron	mg/L	0.00603323	-0.01	0.01	yes
Manganese	mg/L	0.000767739	-0.004	0.004	yes
Chloride	mg/L	0.15	-0.4	0.4	yes
Date Acquired: May 26, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2140	1847.4	2256.0	yes
Date Acquired: May 26, 2025					
Electrical Conductivity	dS/m	32.7	27.200	36.800	yes
Date Acquired: May 26, 2025					
pH		9.20	8.90	9.44	yes
Temp. of observed pH	°C	21.2	15.5	24.5	yes
Electrical Conductivity	dS/m	2.79	2.631	2.829	yes
P-Alkalinity	mg/L	516	442	584	yes
T-Alkalinity	mg/L	1000	958	1059	yes
Fluoride	mg/L	9.88	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes
Nitrite - N	mg/L	9.63	9.010	10.990	yes
Nitrate and Nitrite - N	mg/L	19.6	19.10	20.90	yes
Calcium	mg/L	242	235.3	262.9	yes
Magnesium	mg/L	97.6	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	241	238.3	262.3	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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140790 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Iron	mg/L	9.47	8.89	10.69	yes
Manganese	mg/L	2.39	2.200	2.680	yes
Date Acquired: May 26, 2025					
pH		6.83	6.75	7.05	yes
Temp. of observed pH	°C	21.4	15.5	24.5	yes
Electrical Conductivity	dS/m	0.075	0.069	0.085	yes
P-Alkalinity	mg/L	47	28	72	yes
T-Alkalinity	mg/L	130	114	140	yes
Fluoride	mg/L	4.98	4.58	5.24	yes
Nitrate - N	mg/L	4.72	4.37	5.33	yes
Nitrite - N	mg/L	4.66	4.370	5.330	yes
Nitrate and Nitrite - N	mg/L	9.38	8.80	10.60	yes
Calcium	mg/L	51.2	44.9	56.9	yes
Magnesium	mg/L	20.4	17.9	22.0	yes
Sodium	mg/L	51.9	47.1	53.4	yes
Potassium	mg/L	50.3	45.8	55.8	yes
Iron	mg/L	1.98	1.89	2.11	yes
Manganese	mg/L	0.496	0.464	0.536	yes
Chloride	mg/L	83.5	74.9	86.9	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	0.50	0.45	0.57	yes
Nitrate - N	mg/L	0.51	0.42	0.57	yes
Nitrite - N	mg/L	0.498	0.455	0.557	yes
Nitrate and Nitrite - N	mg/L	1.01	0.85	1.15	yes
Calcium	mg/L	5.1	4.7	5.4	yes
Magnesium	mg/L	2.1	1.9	2.2	yes
Sodium	mg/L	5.2	4.7	5.7	yes
Potassium	mg/L	4.8	4.6	5.6	yes
Iron	mg/L	0.19	0.18	0.22	yes
Manganese	mg/L	0.048	0.046	0.057	yes
Chloride	mg/L	15.2	13.3	16.5	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
pH		7.29	7.26	0	0.10	yes
Electrical Conductivity	dS/m	1.09	1.08	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	602	599	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	494	491	10	5	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
Fluoride	mg/L	0.09	0.08	10	0.05	yes
Calcium	mg/L	86.8	87.6	10	0.6	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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140790 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Magnesium	mg/L	26.7	26.8	10	0.7	yes
Sodium	mg/L	77.9	79.0	10	1.2	yes
Potassium	mg/L	5.2	5.3	10	1.2	yes
Iron	mg/L	0.03	0.03	10	0.05	yes
Manganese	mg/L	0.071	0.072	10	0.010	yes
Chloride	mg/L	6070	6050	10	0.5	yes
Date Acquired: May 26, 2025						

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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140790 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	May 26, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	May 26, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	May 26, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	May 26, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	May 27, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	May 26, 2025	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	May 26, 2025	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	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	May 26, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	May 27, 2025	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, August 2024
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:

- Sample 1816292-2; 9956331: Sample received at 11.6 °C
- Sample 1816292-2; 9956331: Sample turbidity may interfere with Apparent Colour analysis. A more accurate measure of sample colour would be obtained from True Colour Analysis.

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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:		Date Received:	May 23, 2025
	T5S 2W3	LSD:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Reported:	May 28, 2025
Attn:	Jennifer Catt	P.O.:	20020	Report Number:	3140790
Sampled By:	Ben Gilham	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

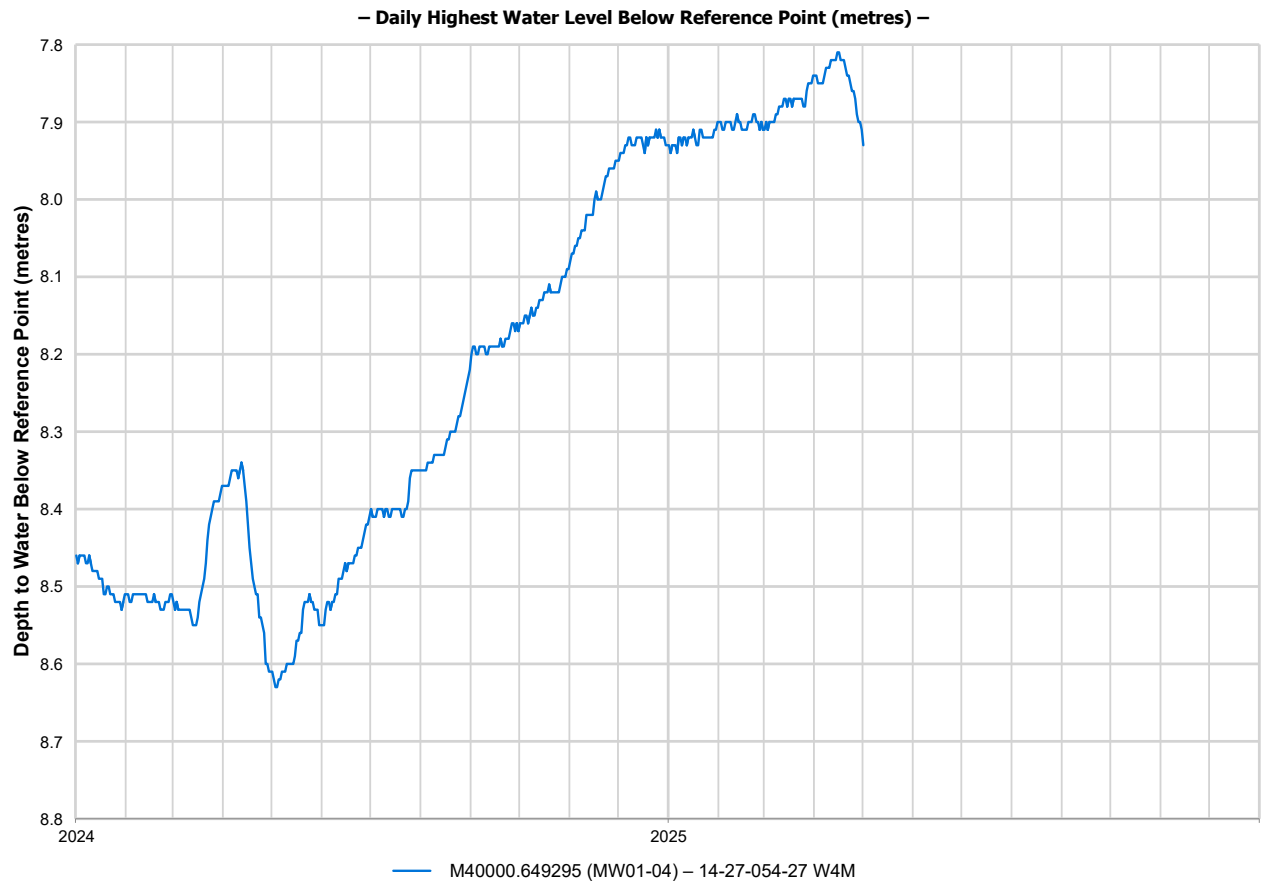
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to 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
2024 - 2025 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 ***

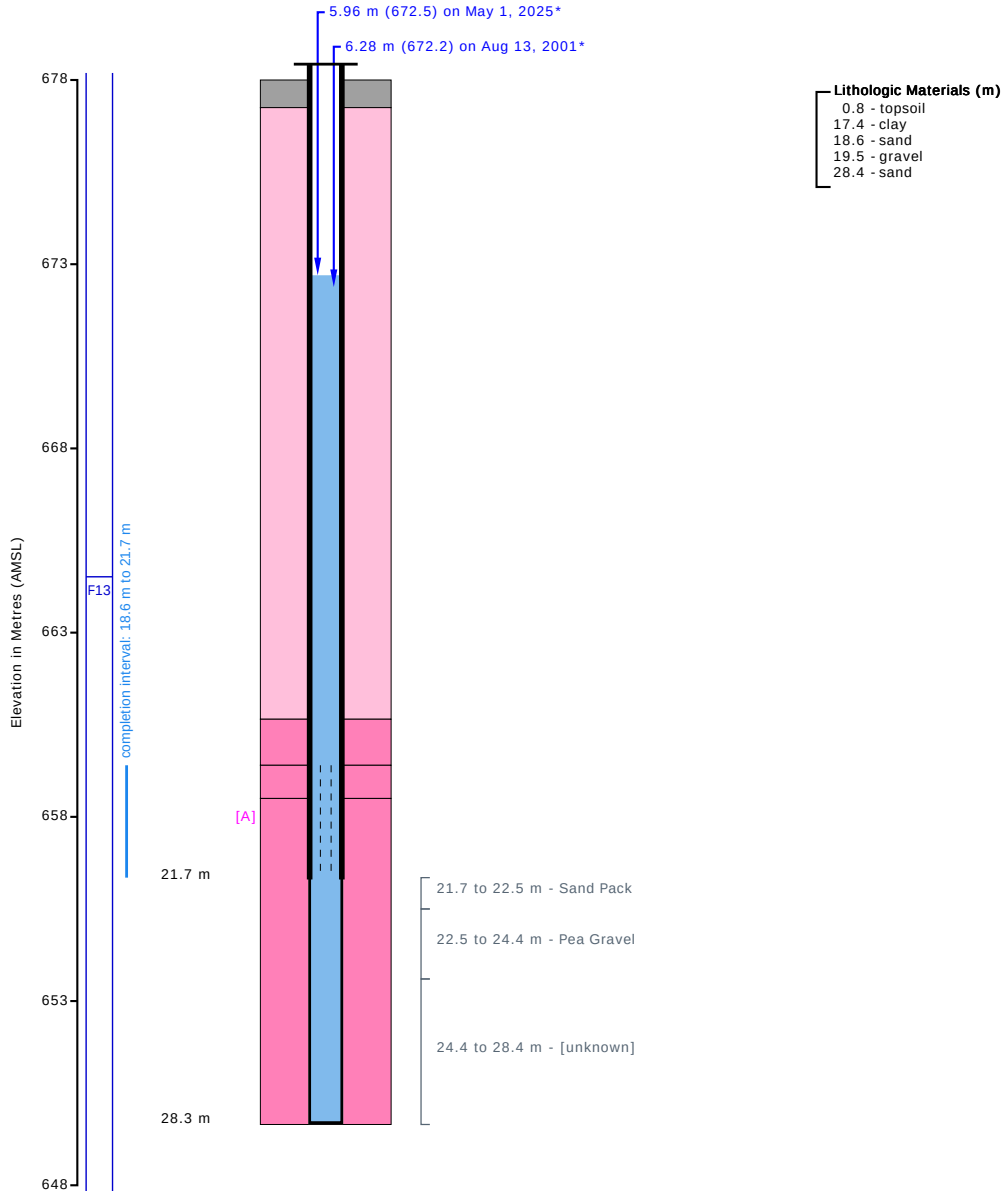
(TGWC determined value)*

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

Most Recent Water Level (m): **5.96 – May 1, 2025 @ 13:08**

GIC ID: **Unknown**

MW01-05 Water Well Diagram



* 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: July 17, 2025 @ 09:25 --- <https://www.hcl.ca>

Owner: **Sturgeon County**
9613-100 St, Morinville, AB T8R 1L9
Contractor: **Mar-Wayne Water Well Drilling Services Ltd.**
Name: **MW01-05**
Field Action: **Confirmed - Physically, July 13, 2009**
Work Type: **Piezometer**
Drilling Method: **Drilled**
Proposed Use: **Monitoring**
Completion Type: **Casing**
Date Started: **April 24, 2001**
Date Completed: **April 24, 2001**
Well Status: **Observation**
Feature Class: **Piezometer**

05-33-054-27 W4M

M40000.649859

Easting (m): 70,437 ²
Northing (m): 5,949,212 ²
Elevation (m): 678 ²

Elog Taken: **No**
Gamma Taken: **No**
Flowing: **No**
Presence of Gas: **No**
Stick Up (m): **0.7**
2025-06-04

General Details

Depth Completed (m)*: **21.7**
Depth Drilled (m)*: **28.3**

Top of Bedrock (m): **Surficial Water Well**
Completion Interval (m): **18.6 – 21.7**

Sand & Gravel Thickness (m): **11.0 (total) – 11.0 (below 15 m) ***
Most Recent Water Level (m): **5.96 m – May 1, 2025**

Completion Details

Surface Casing: **PVC – 50.8 mm (O.D.) x 21.7 m (bottom)**

Intervals

Slotted: **18.6 to 21.7 m**
Sand Pack: **21.7 to 22.5 m**
Pea Gravel: **22.5 to 24.4 m**
[unknown]: **24.4 to 28.4 m**

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

(recently sampled first)

Sampling Details: **May 1, 2025 @ 13:30**
Report Date: **May 28, 2025 - Element Materials Technology Canada Inc. (1816292-4)**

Constituent	Result	Constituent	Result	Constituent	Result
Conductivity (µS/cm):	970	Nitrate as N:	< 0.01	Turbidity (NTU):	10.8
Total Dissolved Solids:	580	Nitrite as N:	< 0.005	Fluoride:	0.07
Hardness (as CaCO3):	419	pH (pH Unit):	7.67	Carbonate:	< 6
T-Alkalinity (as CaCO3):	500	Colour (TCU):	50	Bicarbonate:	609
P-Alkalinity (as CaCO3):	< 5	Ion Balance (%):	100	Hydroxide:	< 5
Nitrate + Nitrite as N:	< 0.01	Total Coliforms:**:		Total Iron:	
Total Suspended Solids:		Fecal Coliforms:**:		Total Mn:	
Temperature (°C):	21.1	Escherichia coli:**:			

Constituent	Extractable	Dissolved	Constituent	Extractable	Dissolved
Calcium:		121	Mercury:		< 0.000005
Chloride:		0.7	Molybdenum:		< 0.001
Iron:		0.80	Magnesium:		28.1
Manganese:		0.891***	Sodium:		63.5
Aluminum:		< 0.002	Potassium:		3.9
Arsenic:		0.0080	Vanadium:		< 0.0001
Barium:		0.057	Strontium:		1.06
Beryllium:		< 0.0001	Nickel:		0.0008
Cadmium:		< 0.00001	Zinc:		0.004
Chromium:		< 0.0005	Copper:		0.0029
Cobalt:		0.0007	Lead:		< 0.0001
Sulfate:		62.3	Uranium:		0.0035

Comments: **Sample collected by Hydrogeological Consultants Ltd. personnel.**
***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2025. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario.
850340; 1 / 35

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

Alias IDs

Z614232

* HCL GPS — 10TM Resource NAD83, * HCL DEM

RTU

REMOTE TELEMETRY UNIT

HCL

B - 84

(1) July 17, 2025, "AS IS"; no warranty either expressed or implied. visit [tgwc.com](https://www.tgwc.com) for additional details

Sturgeon County, 2024 to 2025 Groundwater Monitoring Report
Calahoo Resource Extraction District, Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, MR-0224.24

MW01-05
AEPA – Water Well Drilling Report

— AEPA water well drilling report not available —

MW01-05
Chemical Analysis Results (May 28, 2025)



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Page 1 of 10

Analytical Report

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:		Date Received:	May 23, 2025
	T5S 2W3	LSD:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Reported:	May 28, 2025
Attn:	Jennifer Catt	P.O.:	20020	Report Number:	3140792
Sampled By:	Ben Gilham	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

Reference Number	1816292-4
Sample Date	May 01, 2025
Sample Time	13:30
Sample Location	M40000.649859
Sample Description	MW01-05 / 11.6 °C
Sample Matrix	Water

Analyte	Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved					
Silicon	Dissolved	mg/L	7.40	0.05	
Sulfur	Dissolved	mg/L	20.8	0.3	
Mercury	Dissolved	mg/L	<0.000005	0.000005	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG, 2.9 MAC
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006
Arsenic	Dissolved	mg/L	0.0080	0.0002	0.010
Barium	Dissolved	mg/L	0.057	0.001	2.0
Beryllium	Dissolved	mg/L	<0.0001	0.0001	
Bismuth	Dissolved	mg/L	<0.0005	0.0005	
Boron	Dissolved	mg/L	0.129	0.002	5
Cadmium	Dissolved	mg/L	<0.00001	0.00001	0.007
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05
Cobalt	Dissolved	mg/L	0.0007	0.0001	
Copper	Dissolved	mg/L	0.0029	0.0002	1 AO, 2 MAC
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005
Lithium	Dissolved	mg/L	0.073	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
Silver	Dissolved	mg/L	<0.00001	0.00001	
Strontium	Dissolved	mg/L	1.06	0.001	7.0
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
Vanadium	Dissolved	mg/L	<0.0001	0.0001	
Zinc	Dissolved	mg/L	0.004	0.001	5.0
Subsample			Field Filtered		
Physical and Aggregate Properties					
Colour	Apparent, Potable	Colour units	50	5	
Turbidity		NTU	10.8	0.1	
Routine Water					
pH			7.67	1	7.0-10.5
Temp. of observed pH		°C	21.1		Within Range
Electrical Conductivity	at 25 °C	µS/cm	970	1	
Calcium	Dissolved	mg/L	121	0.2	
Magnesium	Dissolved	mg/L	28.1	0.2	

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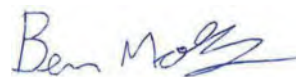
Analytical Report

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M 20020 P.O.: Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140792 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Reference Number	1816292-4
Sample Date	May 01, 2025
Sample Time	13:30
Sample Location	M40000.649859
Sample Description	MW01-05 / 11.6 °C
Sample Matrix	Water

Analyte	Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued					
Sodium Dissolved	mg/L	63.5	0.4	200	Below AO
Potassium Dissolved	mg/L	3.9	0.4		
Iron Dissolved	mg/L	0.80	0.01	0.1	Above AO
Manganese Dissolved	mg/L	0.891	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	<0.01	0.01	10	Below MAC
Nitrite - N	mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N	mg/L	<0.01	0.01		
Sulfate (SO4) Dissolved	mg/L	62.3	0.9	500	Below AO
Hydroxide	mg/L	<5			
Carbonate	mg/L	<6			
Bicarbonate	mg/L	609			
P-Alkalinity as CaCO3	mg/L	<5	5		
T-Alkalinity as CaCO3	mg/L	500	5		
Total Dissolved Solids Calculated	mg/L	580	1	500	Above AO
Hardness Dissolved as CaCO3	mg/L	419			
Ionic Balance Dissolved	%	100			

Approved by:



Benjamin Morris, B.Sc
Operations 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	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140792 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.00704748	-0.04	0.05	yes
Sulfur	mg/L	0.107846	-0.3	0.2	yes
Aluminum	µg/L	-0.142723	-2	2	yes
Antimony	µg/L	-0.00198253	-0.2	0.2	yes
Arsenic	µg/L	-0.00520747	-0.2	0.2	yes
Barium	µg/L	0.0155545	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.490366	-2	2	yes
Cadmium	µg/L	0.00106883	-0.01	0.01	yes
Chromium	µg/L	-0.0304354	-0.5	0.5	yes
Cobalt	µg/L	-0.000332921	-0.1	0.1	yes
Copper	µg/L	0.0100485	-0.2	0.2	yes
Lead	µg/L	0.00240083	-0.1	0.1	yes
Lithium	µg/L	-0.00113161	-1	1	yes
Molybdenum	µg/L	0.0194221	-1	1	yes
Nickel	µg/L	0.0142204	-0.5	0.5	yes
Selenium	µg/L	0.00150023	-0.2	0.2	yes
Silver	µg/L	0.00050935	-0.01	0.01	yes
Strontium	µg/L	0.0646959	-1	1	yes
Thallium	µg/L	0.00145131	-0.50	0.50	yes
Tin	µg/L	-0.0724984	-1	1	yes
Titanium	µg/L	-0.0940343	-0.5	0.5	yes
Uranium	µg/L	0.00233484	-0.5	0.5	yes
Vanadium	µg/L	-0.00529231	-0.1	0.1	yes
Zinc	µg/L	0.13059	-1	1	yes
Mercury	µg/L	-0.001039	-0.051000	0.051000	yes

Date Acquired: May 26, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	997	902	1058	yes
Antimony	µg/L	40.5	36.4	44.2	yes
Arsenic	µg/L	39.9	37.7	42.5	yes
Barium	µg/L	196	181	211	yes
Beryllium	µg/L	19.9	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	389	351	427	yes
Cadmium	µg/L	2.16	1.87	2.23	yes
Chromium	µg/L	100	90.8	108.8	yes
Cobalt	µg/L	20.0	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.2	18.3	21.3	yes
Lithium	µg/L	197	178	214	yes
Molybdenum	µg/L	198	178	219	yes
Nickel	µg/L	99.9	93.3	105.9	yes
Selenium	µg/L	39.9	36.9	42.9	yes

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Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	20.1	18.29	22.31	yes
Strontium	µg/L	200	183	219	yes
Thallium	µg/L	9.86	8.90	10.70	yes
Tin	µg/L	201	187	217	yes
Titanium	µg/L	101	91.0	109.0	yes
Uranium	µg/L	102	92.2	110.2	yes
Vanadium	µg/L	20.0	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: May 26, 2025					
Mercury	mg/L	0.000100	0.000070	0.000130	yes
Date Acquired: May 26, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.10	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.1	9.1	10.9	yes
Lead	µg/L	1.0	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.2	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.02	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	5.0	4.4	5.7	yes
Uranium	µg/L	5.2	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000020	0.000006	0.000036	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	9.62	9.51	10.89	yes
Sulfur	mg/L	150	141.6	156.6	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	2.03	1.88	2.24	yes
Sulfur	mg/L	10.2	9.1	10.6	yes
Date Acquired: May 26, 2025					

Quality Control

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Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.20	0.18	0.23	yes
Sulfur	mg/L	2.9	2.7	3.1	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.21	3.26	10	0.01	yes
Sulfur	mg/L	38.2	39.0	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	<0.2	<0.2	10	0.4	yes
Barium	µg/L	38	38	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	163	168	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	<0.1	<0.1	10	0.2	yes
Copper	µg/L	<0.2	<0.2	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	16	17	10	2	yes
Molybdenum	µg/L	3	2	10	2	yes
Nickel	µg/L	<0.5	<0.5	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	57	58	10	2	yes
Thallium	µg/L	<0.05	<0.05	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	<0.5	<0.5	10	1.1	yes
Vanadium	µg/L	0.2	0.1	10	0.2	yes
Zinc	µg/L	<1	2	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: May 26, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.099	-0.1	0.1	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	0.114	0.0	0.1	yes
Date Acquired: May 27, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1930	1881.4	2091.4	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	4550	4020.0	5436.0	yes
Date Acquired: May 27, 2025					

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Quality Control

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Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Physical and Aggregate Properties - Continued

Continued							
Control Sample		Units	Measured	Lower Limit	Upper Limit	Passed QC	
Colour		Colour units	10	10	10	yes	
Turbidity		NTU	144	132.1	162.1	yes	
Date Acquired: May 27, 2025							
Turbidity		NTU	14.3	12.6	15.6	yes	
Date Acquired: May 27, 2025							
Turbidity		NTU	1.6	1.0	2.2	yes	
Date Acquired: May 27, 2025							
Client Sample Replicates		Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity		NTU	3.1	2.9	10	0.2	yes
Date Acquired: May 27, 2025							

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0.00152937	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Calcium	mg/L	0.0798772	-0.2	0.2	yes
Magnesium	mg/L	0.0424654	-0.1	0.1	yes
Sodium	mg/L	0.144685	-0.4	0.4	yes
Potassium	mg/L	0.194533	-0.4	0.4	yes
Iron	mg/L	0.00603323	-0.01	0.01	yes
Manganese	mg/L	0.000767739	-0.004	0.004	yes
Chloride	mg/L	0.15	-0.4	0.4	yes
Date Acquired: May 26, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2140	1847.4	2256.0	yes
Date Acquired: May 26, 2025					
Electrical Conductivity	dS/m	32.7	27.200	36.800	yes
Date Acquired: May 26, 2025					
pH		9.20	8.90	9.44	yes
Temp. of observed pH	°C	21.2	15.5	24.5	yes
Electrical Conductivity	dS/m	2.79	2.631	2.829	yes
P-Alkalinity	mg/L	516	442	584	yes
T-Alkalinity	mg/L	1000	958	1059	yes
Fluoride	mg/L	9.90	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes
Nitrite - N	mg/L	9.61	9.010	10.990	yes
Nitrate and Nitrite - N	mg/L	19.6	19.10	20.90	yes
Calcium	mg/L	242	235.3	262.9	yes
Magnesium	mg/L	97.6	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	241	238.3	262.3	yes

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Quality Control

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Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Iron	mg/L	9.47	8.89	10.69		yes
Manganese	mg/L	2.39	2.200	2.680		yes
Date Acquired: May 26, 2025						
pH		6.83	6.75	7.05		yes
Temp. of observed pH	°C	21.4	15.5	24.5		yes
Electrical Conductivity	dS/m	0.075	0.069	0.085		yes
P-Alkalinity	mg/L	47	28	72		yes
T-Alkalinity	mg/L	130	114	140		yes
Fluoride	mg/L	4.80	4.58	5.24		yes
Nitrate - N	mg/L	4.71	4.37	5.33		yes
Nitrite - N	mg/L	4.64	4.370	5.330		yes
Nitrate and Nitrite - N	mg/L	9.35	8.80	10.60		yes
Calcium	mg/L	51.2	44.9	56.9		yes
Magnesium	mg/L	20.4	17.9	22.0		yes
Sodium	mg/L	51.9	47.1	53.4		yes
Potassium	mg/L	50.3	45.8	55.8		yes
Iron	mg/L	1.98	1.89	2.11		yes
Manganese	mg/L	0.496	0.464	0.536		yes
Chloride	mg/L	83.5	74.9	86.9		yes
Date Acquired: May 26, 2025						
Fluoride	mg/L	0.50	0.45	0.57		yes
Nitrate - N	mg/L	0.51	0.42	0.57		yes
Nitrite - N	mg/L	0.496	0.455	0.557		yes
Nitrate and Nitrite - N	mg/L	1.01	0.85	1.15		yes
Calcium	mg/L	5.1	4.7	5.4		yes
Magnesium	mg/L	2.1	1.9	2.2		yes
Sodium	mg/L	5.2	4.7	5.7		yes
Potassium	mg/L	4.8	4.6	5.6		yes
Iron	mg/L	0.19	0.18	0.22		yes
Manganese	mg/L	0.048	0.046	0.057		yes
Chloride	mg/L	15.2	13.3	16.5		yes
Date Acquired: May 26, 2025						
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
pH		7.29	7.26	0	0.10	yes
Electrical Conductivity	dS/m	1.09	1.08	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	602	599	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	494	491	10	5	yes
Fluoride	mg/L	0.09	0.08	10	0.05	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
Calcium	mg/L	86.8	87.6	10	0.6	yes

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Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Magnesium	mg/L	26.7	26.8	10	0.7	yes
Sodium	mg/L	77.9	79.0	10	1.2	yes
Potassium	mg/L	5.2	5.3	10	1.2	yes
Iron	mg/L	0.03	0.03	10	0.05	yes
Manganese	mg/L	0.071	0.072	10	0.010	yes
Chloride	mg/L	6070	6050	10	0.5	yes
Date Acquired: May 26, 2025						

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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140792 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	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	May 26, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	May 26, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	May 26, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	May 26, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	May 27, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	May 26, 2025	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	May 26, 2025	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	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	May 26, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	May 27, 2025	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, August 2024
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:

- Sample 1816292-4; 9956333: Sample received at 11.6 °C

Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater	Control Number:	
	Edmonton, AB, Canada		Monitoring	Date Received:	May 23, 2025
	T5S 2W3	Project Location:		Date Reported:	May 28, 2025
Attn:	Jennifer Catt	LSD:	Tp 054, R 26 to 28, W4M	Report Number:	3140792
Sampled By:	Ben Gilham		and Tp 054, R 01, W5M	Report Type:	Final Report
Company:	HCL	P.O.:	20020		
		Proj. Acct. code:			

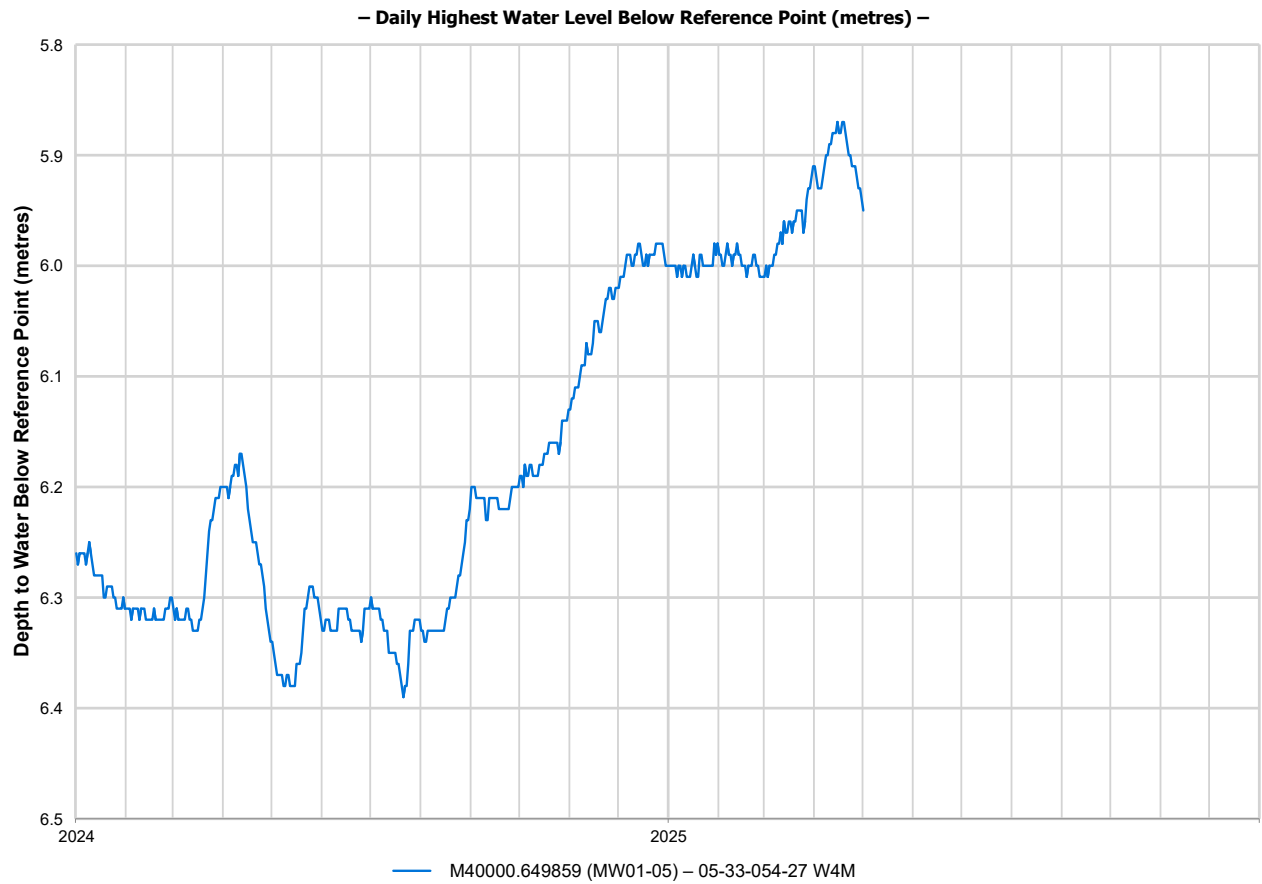
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to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

Please direct any inquiries regarding this report to our Client Services group.
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MW01-05
2024 - 2025 Hydrograph



MW01-06: QEA Pit – SW Corner

(MW01-06)

01-29-054-27 W4M

(M40000.650496)



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 ***

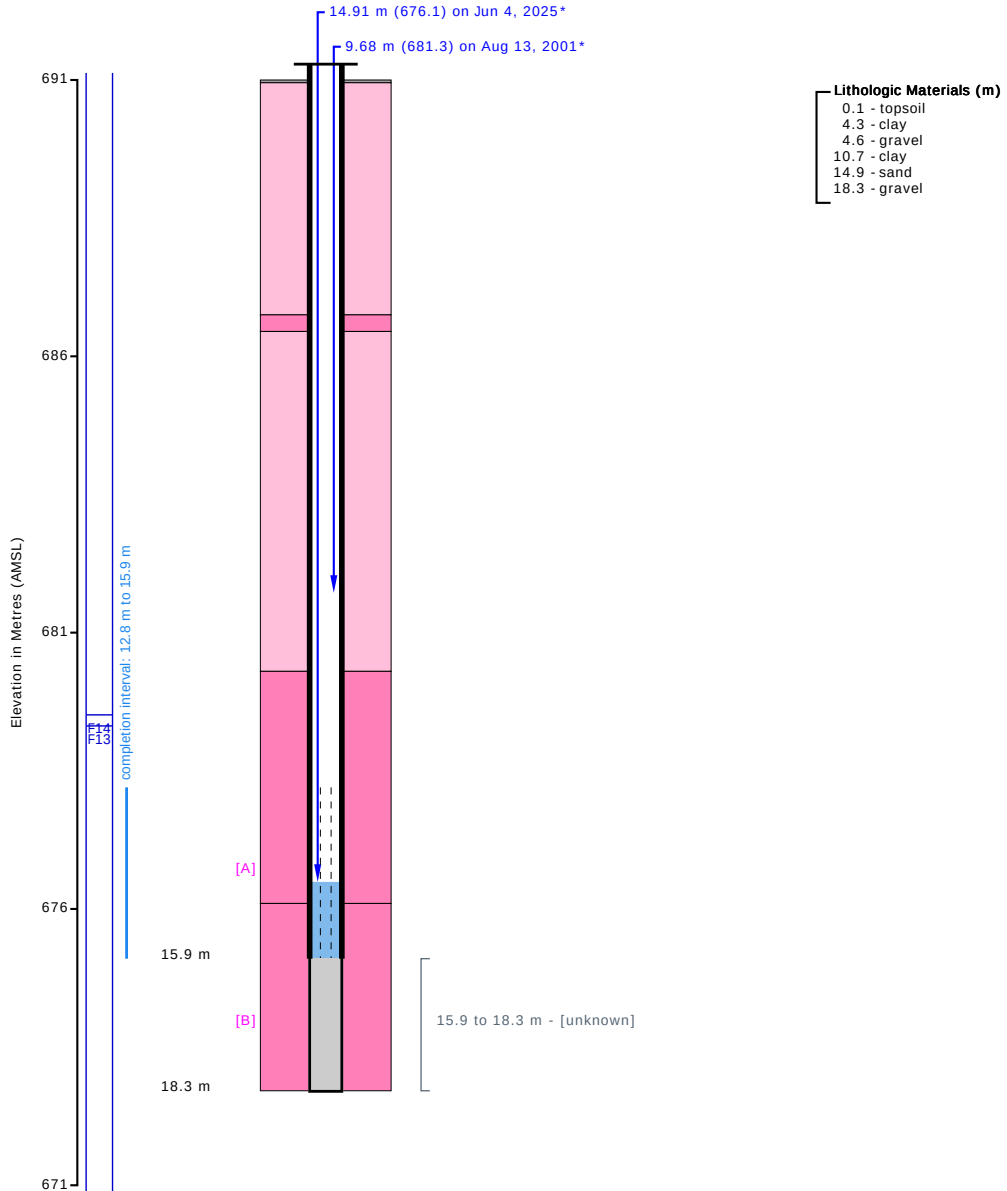
(* TGWC determined value)

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

Most Recent Water Level (m): **14.91 – June 4, 2025 @ 23:40**

GIC ID: **Unknown**

MW01-06: QEA Pit – SW Corner Water Well Diagram



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

Summary	
TGWC ID: M40000.650496	
Well Name: MW01-06: QEA Pit – SW Corner	
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): 14.91 m (676.1 m AMSL) on Jun 4, 2025 @ 23:40 - 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: July 17, 2025 @ 09:26 --- https://www.hcl.ca	

***MW01-06: QEA Pit - SW Corner
AEPA - Water Well Drilling Report***

— AEPA water well drilling report not available —

MW01-06: QEA Pit – SW Corner
Chemical Analysis Results (May 28, 2025)



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Analytical Report

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:		Date Received:	May 23, 2025
	T5S 2W3	LSD:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Reported:	May 28, 2025
Attn:	Jennifer Catt	P.O.:	20020	Report Number:	3140803
Sampled By:	Ben Gilham	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

Reference Number	1816292-15
Sample Date	May 08, 2025
Sample Time	14:50
Sample Location	M40000.650496
Sample Description	MW01-06 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	7.36	0.05		
Sulfur	Dissolved	mg/L	34.6	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
				5		
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	0.0002	0.0002	0.010	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	0.111	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	0.0015	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	0.0008	0.0005		
Selenium	Dissolved	mg/L	0.0008	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	1.05	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	0.0034	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	<0.001	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	>60	5		
Turbidity		NTU	19.2	0.1		
Routine Water						
pH			7.38	1	7.0-10.5	Within Range
Temp. of observed pH		°C	20.7			
Electrical Conductivity	at 25 °C	µS/cm	947	1		
Calcium	Dissolved	mg/L	129	0.2		
Magnesium	Dissolved	mg/L	28.9	0.2		

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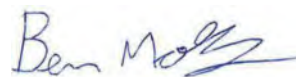
Analytical Report

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M 20020 P.O.: Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140803 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Reference Number	1816292-15
Sample Date	May 08, 2025
Sample Time	14:50
Sample Location	M40000.650496
Sample Description	MW01-06 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	51.6	0.4	200	Below AO
Potassium	Dissolved	mg/L	3.7	0.4		
Iron	Dissolved	mg/L	0.01	0.01	0.1	Below AO
Manganese	Dissolved	mg/L	0.833	0.005	0.02 AO, 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	2.8	0.4	250	Below AO
Fluoride		mg/L	0.13	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.01	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	0.01	0.01		
Sulfate (SO4)	Dissolved	mg/L	104	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	535			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	438	5		
Total Dissolved Solids	Calculated	mg/L	583	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	441			
Ionic Balance	Dissolved	%	101			

Approved by:



Benjamin Morris, B.Sc
Operations 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	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140803 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	-0.0104023	-0.04	0.05	yes
Sulfur	mg/L	0.0176456	-0.3	0.2	yes
Aluminum	µg/L	-0.142723	-2	2	yes
Antimony	µg/L	-0.00198253	-0.2	0.2	yes
Arsenic	µg/L	-0.00520747	-0.2	0.2	yes
Barium	µg/L	0.0155545	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.490366	-2	2	yes
Cadmium	µg/L	0.00106883	-0.01	0.01	yes
Chromium	µg/L	-0.0304354	-0.5	0.5	yes
Cobalt	µg/L	-0.000332921	-0.1	0.1	yes
Copper	µg/L	0.0100485	-0.2	0.2	yes
Lead	µg/L	0.00240083	-0.1	0.1	yes
Lithium	µg/L	-0.00113161	-1	1	yes
Molybdenum	µg/L	0.0194221	-1	1	yes
Nickel	µg/L	0.0142204	-0.5	0.5	yes
Selenium	µg/L	0.00150023	-0.2	0.2	yes
Silver	µg/L	0.00050935	-0.01	0.01	yes
Strontium	µg/L	0.0646959	-1	1	yes
Thallium	µg/L	0.00145131	-0.50	0.50	yes
Tin	µg/L	-0.0724984	-1	1	yes
Titanium	µg/L	-0.0940343	-0.5	0.5	yes
Uranium	µg/L	0.00233484	-0.5	0.5	yes
Vanadium	µg/L	-0.00529231	-0.1	0.1	yes
Zinc	µg/L	0.13059	-1	1	yes
Mercury	µg/L	-0.001039	-0.051000	0.051000	yes

Date Acquired: May 26, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	997	902	1058	yes
Antimony	µg/L	40.5	36.4	44.2	yes
Arsenic	µg/L	39.9	37.7	42.5	yes
Barium	µg/L	196	181	211	yes
Beryllium	µg/L	19.9	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	389	351	427	yes
Cadmium	µg/L	2.16	1.87	2.23	yes
Chromium	µg/L	100	90.8	108.8	yes
Cobalt	µg/L	20.0	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.2	18.3	21.3	yes
Lithium	µg/L	197	178	214	yes
Molybdenum	µg/L	198	178	219	yes
Nickel	µg/L	99.9	93.3	105.9	yes
Selenium	µg/L	39.9	36.9	42.9	yes

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Quality Control

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Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	20.1	18.29	22.31	yes
Strontium	µg/L	200	183	219	yes
Thallium	µg/L	9.86	8.90	10.70	yes
Tin	µg/L	201	187	217	yes
Titanium	µg/L	101	91.0	109.0	yes
Uranium	µg/L	102	92.2	110.2	yes
Vanadium	µg/L	20.0	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: May 26, 2025					
Mercury	mg/L	0.000100	0.000070	0.000130	yes
Date Acquired: May 26, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.10	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.1	9.1	10.9	yes
Lead	µg/L	1.0	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.2	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.02	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	5.0	4.4	5.7	yes
Uranium	µg/L	5.2	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000020	0.000006	0.000036	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	9.62	9.51	10.89	yes
Sulfur	mg/L	150	141.6	156.6	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	2.03	1.88	2.24	yes
Sulfur	mg/L	10.2	9.1	10.6	yes
Date Acquired: May 26, 2025					

Quality Control

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Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.20	0.18	0.23	yes
Sulfur	mg/L	2.9	2.7	3.1	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.21	3.26	10	0.01	yes
Sulfur	mg/L	38.2	39.0	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	5.9	6.0	10	0.4	yes
Barium	µg/L	31	31	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	163	161	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	0.8	0.8	10	0.2	yes
Copper	µg/L	0.5	0.5	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	89	89	10	2	yes
Molybdenum	µg/L	<1	<1	10	2	yes
Nickel	µg/L	1.1	1.0	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	1090	1090	10	2	yes
Thallium	µg/L	<0.05	<0.05	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	2.8	2.8	10	1.1	yes
Vanadium	µg/L	<0.1	<0.1	10	0.2	yes
Zinc	µg/L	27	27	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: May 26, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.099	-0.1	0.1	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	0.114	0.0	0.1	yes
Date Acquired: May 27, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1930	1881.4	2091.4	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	4540	4020.0	5436.0	yes
Date Acquired: May 27, 2025					

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Quality Control

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Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Physical and Aggregate Properties - Continued

Control Sample		Units	Measured	Lower Limit	Upper Limit	Passed QC
Colour	Colour units	10	10	10		yes
Turbidity	NTU	144	132.1	162.1		yes
Date Acquired:	May 27, 2025					
Turbidity	NTU	14.2	12.6	15.6		yes
Date Acquired:	May 27, 2025					
Turbidity	NTU	1.6	1.0	2.2		yes
Date Acquired:	May 27, 2025					
Client Sample Replicates		Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria
Turbidity	NTU	43.7	45.2	10	0.2	yes
Date Acquired:	May 27, 2025					

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0.00594322	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Calcium	mg/L	0.0341995	-0.2	0.2	yes
Magnesium	mg/L	0.00865101	-0.1	0.1	yes
Sodium	mg/L	0.0649477	-0.4	0.4	yes
Potassium	mg/L	0.024503	-0.4	0.4	yes
Iron	mg/L	0.00335118	-0.01	0.01	yes
Manganese	mg/L	0.000111042	-0.004	0.004	yes
Chloride	mg/L	0.15	-0.4	0.4	yes
Date Acquired: May 26, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2140	1847.4	2256.0	yes
Date Acquired: May 26, 2025					
Electrical Conductivity	dS/m	32.9	27.200	36.800	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	9.90	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes
Nitrite - N	mg/L	9.61	9.010	10.990	yes
Nitrate and Nitrite - N	mg/L	19.6	19.10	20.90	yes
pH		9.18	8.90	9.44	yes
Temp. of observed pH	°C	20.1	15.5	24.5	yes
Electrical Conductivity	dS/m	2.77	2.631	2.829	yes
P-Alkalinity	mg/L	519	442	584	yes
T-Alkalinity	mg/L	997	958	1059	yes
Calcium	mg/L	242	235.3	262.9	yes
Magnesium	mg/L	97.6	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	241	238.3	262.3	yes

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Quality Control

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Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Iron	mg/L	9.47	8.89	10.69	yes
Manganese	mg/L	2.39	2.200	2.680	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	4.80	4.58	5.24	yes
Nitrate - N	mg/L	4.71	4.37	5.33	yes
Nitrite - N	mg/L	4.64	4.370	5.330	yes
Nitrate and Nitrite - N	mg/L	9.35	8.80	10.60	yes
pH		6.87	6.75	7.05	yes
Temp. of observed pH	°C	20.3	15.5	24.5	yes
Electrical Conductivity	dS/m	0.076	0.069	0.085	yes
P-Alkalinity	mg/L	52	28	72	yes
T-Alkalinity	mg/L	127	114	140	yes
Calcium	mg/L	51.2	44.9	56.9	yes
Magnesium	mg/L	20.4	17.9	22.0	yes
Sodium	mg/L	51.9	47.1	53.4	yes
Potassium	mg/L	50.3	45.8	55.8	yes
Iron	mg/L	1.98	1.89	2.11	yes
Manganese	mg/L	0.496	0.464	0.536	yes
Chloride	mg/L	83.5	74.9	86.9	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	0.50	0.45	0.57	yes
Nitrate - N	mg/L	0.51	0.42	0.57	yes
Nitrite - N	mg/L	0.496	0.455	0.557	yes
Nitrate and Nitrite - N	mg/L	1.01	0.85	1.15	yes
Calcium	mg/L	5.1	4.7	5.4	yes
Magnesium	mg/L	2.1	1.9	2.2	yes
Sodium	mg/L	5.2	4.7	5.7	yes
Potassium	mg/L	4.8	4.6	5.6	yes
Iron	mg/L	0.19	0.18	0.22	yes
Manganese	mg/L	0.048	0.046	0.057	yes
Chloride	mg/L	15.2	13.3	16.5	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Fluoride	mg/L	0.09	0.08	10	0.05	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
pH		7.56	7.53	0	0.10	yes
Electrical Conductivity	dS/m	0.944	0.942	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	583	583	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	478	478	10	5	yes
Calcium	mg/L	86.8	87.6	10	0.6	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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140803 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Magnesium	mg/L	26.7	26.8	10	0.7	yes
Sodium	mg/L	77.9	79.0	10	1.2	yes
Potassium	mg/L	5.2	5.3	10	1.2	yes
Iron	mg/L	0.03	0.03	10	0.05	yes
Manganese	mg/L	0.071	0.072	10	0.010	yes
Chloride	mg/L	0.7	0.7	10	0.5	yes
Date Acquired: May 26, 2025						

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M 20020 P.O.: Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140803 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	May 26, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	May 26, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	May 26, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	May 26, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	May 27, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	May 26, 2025	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	May 26, 2025	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	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	May 26, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	May 27, 2025	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, August 2024
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:

- Sample 1816292-15; 9956344: Sample received at 11.6 °C
- Sample 1816292-15; 9956344: Sample turbidity may interfere with Apparent Colour analysis. A more accurate measure of sample colour would be obtained from True Colour Analysis.

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

Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater	Control Number:	
	Edmonton, AB, Canada		Monitoring	Date Received:	May 23, 2025
	T5S 2W3	Project Location:		Date Reported:	May 28, 2025
Attn:	Jennifer Catt	LSD:	Tp 054, R 26 to 28, W4M	Report Number:	3140803
Sampled By:	Ben Gilham		and Tp 054, R 01, W5M	Report Type:	Final Report
Company:	HCL	P.O.:	20020		
		Proj. Acct. code:			

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.

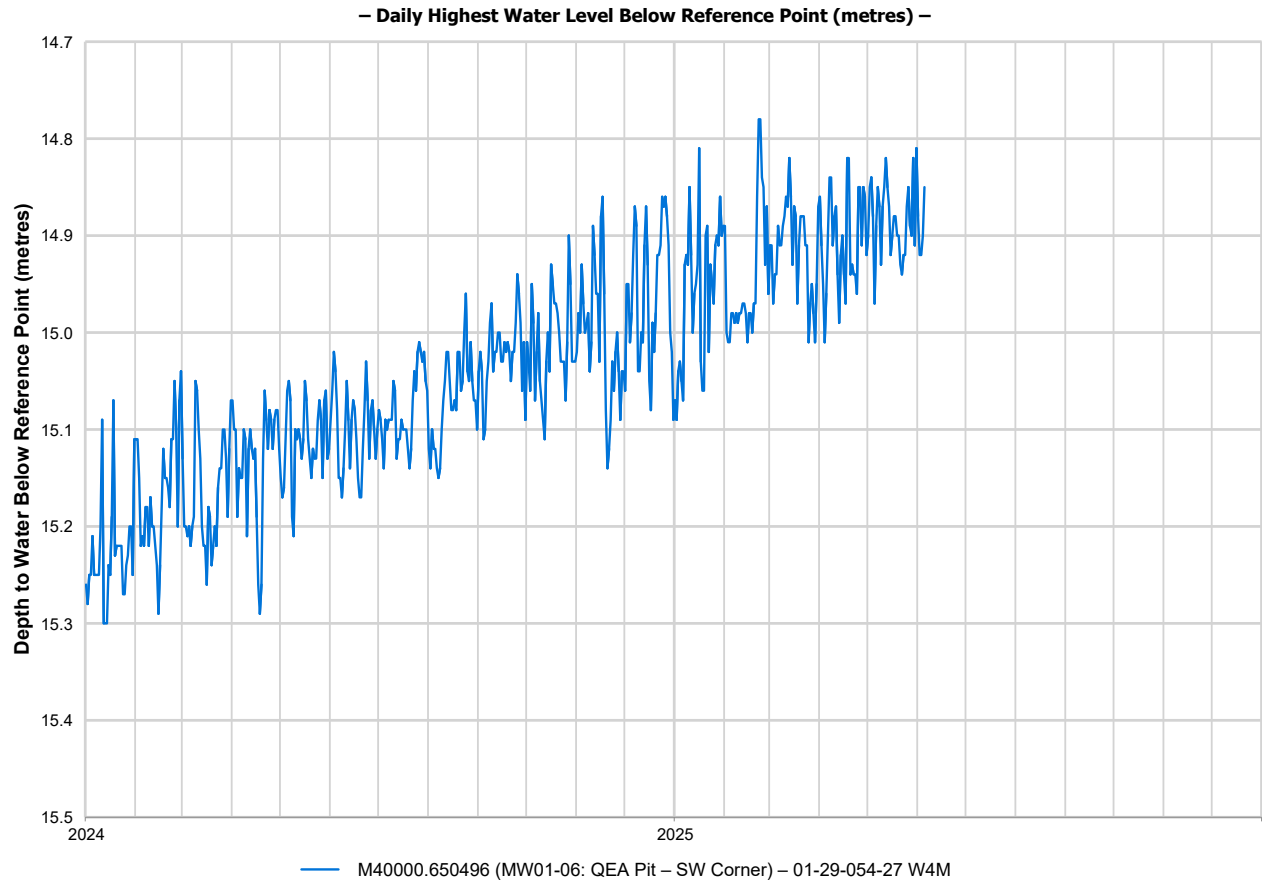
Please direct any inquiries regarding this report to our Client Services group.

Results relate only to samples as submitted.

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

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

MW01-06: QEA Pit – SW Corner
2024 – 2025 Hydrograph



MW01-07

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



Photograph taken on May 30, 2011

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 ***

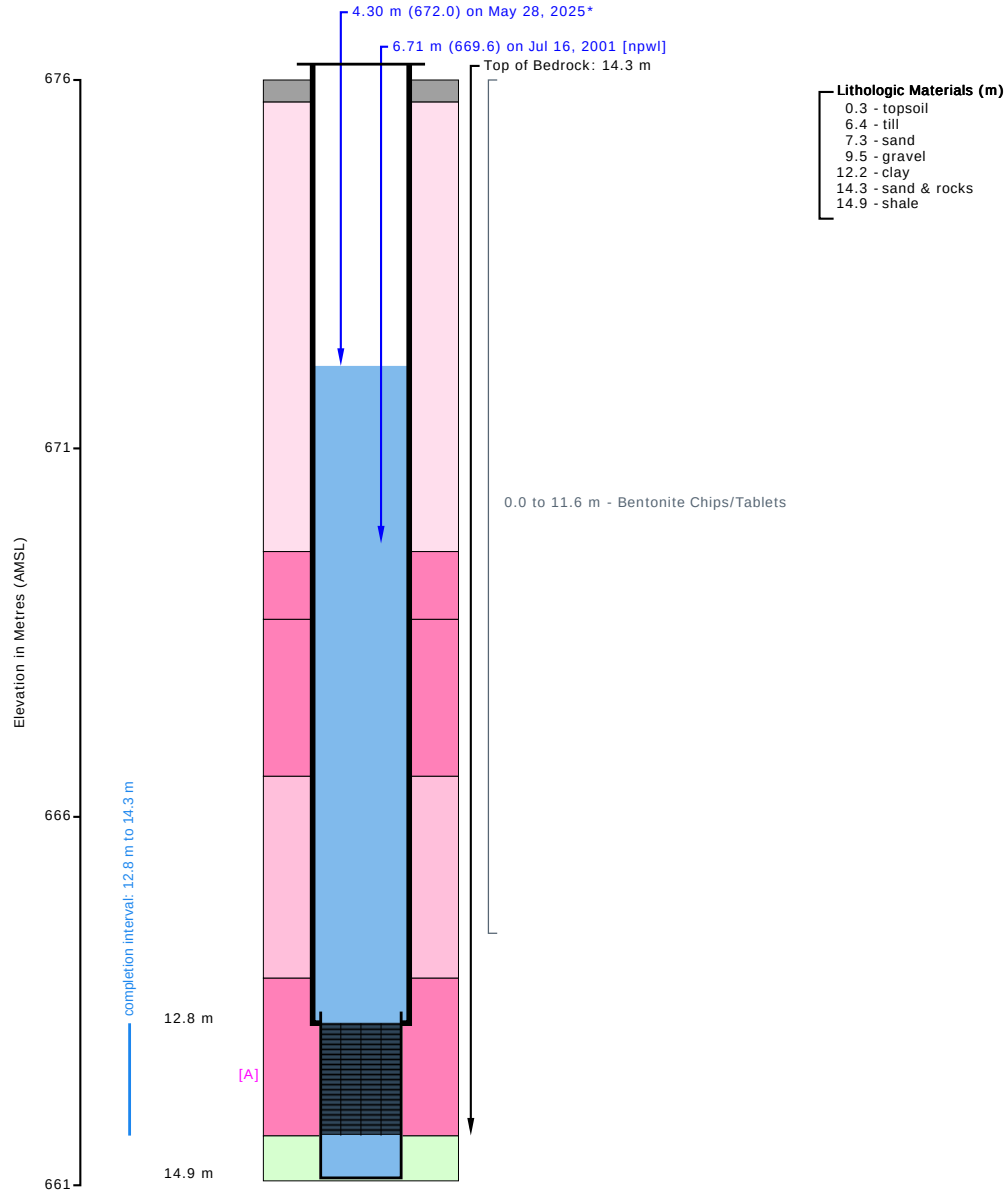
(* TGWC determined value)

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

Most Recent Water Level (m): **4.30 – May 28, 2025 @ 11:13**

GIC ID: **297525**

MW01-07 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		Fine Grained	Other
	Fine Grained			
	Coarse Grained			
Bedrock	Fine Grained		Coarse Grained	
	Coarse Grained			

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): 4.30 m (672.0 m AMSL) on May 28, 2025 @ 11:13 - 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: July 17, 2025 @ 09:26 --- <https://www.hcl.ca>

Owner: **Sturgeon County**
9613-100 St, Morinville, AB T8R 1L9
Contractor: **Mar-Wayne Water Well Drilling Services Ltd.**
Name: **MW01-07**
Field Action: **Confirmed - Physically, July 13, 2009**
Work Type: **Piezometer**
Drilling Method: **Rotary**
Proposed Use: **Monitoring**
Completion Type: **Screen**

Date Started: **July 16, 2001**
Date Completed: **July 16, 2001**
Well Status: **Observation**
Feature Class: **Piezometer**

13-19-054-26 W4M
Easting (m): **76,879 ²**
Northing (m): **5,946,605 ²**
Elevation (m): **676 ²**

M37490.031427
Elog Taken: **No**
Gamma Taken: **No**
Flowing: **No**
Presence of Gas: **No**
Stick Up (m): **0.4**
2025-06-04

General Details
* TGWC calculated value

Depth Completed (m)*: **14.3**
Depth Drilled (m)*: **14.9**
Sand & Gravel Thickness (m): **3.0 (total) ***
Most Recent Water Level (m): **4.30 m – May 28, 2025**

Completion Details

Surface Casing: **Plastic – 152.4 mm (O.D.) x 12.70 mm (thick) x 12.8 m (bottom)**
Screen Material: **Stainless Steel – 127.0 mm (O.D.) (Attached To Casing)**
Fittings: **Top: Coupler – Bottom: Washdown**

Intervals

Screen: **12.8 to 14.3 m - 0.3048 mm**
Bentonite Chips/Tablets: **0.0 to 11.6 m**

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

Sampling Details: **May 13, 2025 @ 13:50**
Report Date: **May 28, 2025 - Element Materials Technology Canada Inc. (1816292-7)**

Constituent	Result	Constituent	Result	Constituent	Result
Conductivity (µS/cm):	1270	Nitrate as N:	< 0.01	Turbidity (NTU):	10.8
Total Dissolved Solids:	843	Nitrite as N:	< 0.005	Fluoride:	0.08
Hardness (as CaCO3):	547	pH (pH Unit):	7.40	Carbonate:	< 6
T-Alkalinity (as CaCO3):	498	Colour (TCU):	40	Bicarbonate:	607
P-Alkalinity (as CaCO3):	< 5	Ion Balance (%):	101	Hydroxide:	< 5
Nitrate + Nitrite as N:	< 0.01	Total Coliforms:**		Total Iron:	
Total Suspended Solids:		Fecal Coliforms:**		Total Mn:	
Temperature (°C):	20.8	Escherichia coli:**			

Constituent	Extractable	Dissolved	Constituent	Extractable	Dissolved
Calcium:		156	Mercury:		< 0.000005
Chloride:		6.0	Molybdenum:		< 0.001
Iron:		1.43	Magnesium:		38.4
Manganese:		0.874***	Sodium:		97.6
Aluminum:		< 0.002	Potassium:		5.0
Arsenic:		0.0023	Vanadium:		< 0.0001
Barium:		0.030	Strontium:		1.15
Beryllium:		< 0.0001	Nickel:		0.0007
Cadmium:		< 0.00001	Zinc:		< 0.001
Chromium:		< 0.0005	Copper:		0.0003
Cobalt:		0.0003	Lead:		< 0.0001
Sulfate:		241	Uranium:		0.0181

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

***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2025. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.
850343; 1 / 34

Lithology Details

Elevation (AMSL)	Depth (BGL)	Lithology Descriptions
675.6	0.3	Black Topsoil
669.5	6.4	Brown Till
668.6	7.3	Sand
666.4	9.5	Gravel
663.7	12.2	Grey Clay
661.6	14.3	Sand & Rocks
660.9	14.9	Grey Shale

Comments & Observations

Initial, Jul 16, 2001: Villeneuve gravel study.

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 2001-07-16	Pump	[unknown]	120 120	57.7	6.7	5.0	12.5	47.9	20.8

Pump Intake BTOC (m): **12.5 on July 16, 2001**

Alias IDs
2445864

AEPA WellId: **297525**
AEPA WellReportId: **297525**

(1) July 17, 2025, "AS IS"; no warranty either expressed or implied. vist tgwc.com for additional details

Sturgeon County, 2024 to 2025 Groundwater Monitoring Report
Calahoo Resource Extraction District, Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, MR-0224.24

RTU
REMOTE TELEMETRY UNIT

B - 114

HCL

MW01-07
AEPA - Water Well Drilling Report



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	

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 _____
										Sample Collected for Potability _____
										Submitted to ESRD _____
Additional Comments on Well										
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	Recovery (m)
Type Pump				Minutes:Sec	
Removal Rate 57.74 L/min			6.74	0:00	11.72
Depth Withdrawn From 12.50 m			9.26	1:00	9.71
			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	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

Printed on 7/17/2025 9:23:43 AM

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MW01-07
Chemical Analysis Results (May 28, 2025)



Element
7217 Roper Road NW
Edmonton, Alberta
T6B 3J4, Canada

T: +1 (780) 438-5522
E: info.Edmonton@element.com
W: www.element.com

Page 1 of 10

Analytical Report

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:		Date Received:	May 23, 2025
	T5S 2W3	LSD:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Reported:	May 28, 2025
Attn:	Jennifer Catt	P.O.:	20020	Report Number:	3140795
Sampled By:	Ben Gilham	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

Reference Number	1816292-7
Sample Date	May 13, 2025
Sample Time	13:50
Sample Location	M37490.031427
Sample Description	MW01-07 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	6.04	0.05		
Sulfur	Dissolved	mg/L	80.5	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	0.0023	0.0002	0.010	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	0.0003	0.0001		
Copper	Dissolved	mg/L	0.0003	0.0002	1 AO, 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.141	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	1.15	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	0.0181	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	<0.001	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	40	5		
Turbidity		NTU	10.8	0.1		
Routine Water						
pH			7.40	1	7.0-10.5	Within Range
Temp. of observed pH		°C	20.8			
Electrical Conductivity	at 25 °C	µS/cm	1270	1		
Calcium	Dissolved	mg/L	156	0.2		
Magnesium	Dissolved	mg/L	38.4	0.2		

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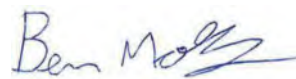
Analytical Report

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M 20020 P.O.: Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140795 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Reference Number	1816292-7
Sample Date	May 13, 2025
Sample Time	13:50
Sample Location	M37490.031427
Sample Description	MW01-07 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	97.6	0.4	200	Below AO
Potassium	Dissolved	mg/L	5.0	0.4		
Iron	Dissolved	mg/L	1.43	0.01	0.1	Above AO
Manganese	Dissolved	mg/L	0.874	0.005	0.02 AO, 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	6.0	0.4	250	Below AO
Fluoride		mg/L	0.08	0.05	1.5	Below MAC
Nitrate - N		mg/L	<0.01	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	<0.01	0.01		
Sulfate (SO4)	Dissolved	mg/L	241	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	843	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	547			
Ionic Balance	Dissolved	%	101			

Approved by:



Benjamin Morris, B.Sc
Operations Manager

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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140795 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	-0.0104023	-0.04	0.05	yes
Sulfur	mg/L	0.0176456	-0.3	0.2	yes
Aluminum	µg/L	-0.142723	-2	2	yes
Antimony	µg/L	-0.00198253	-0.2	0.2	yes
Arsenic	µg/L	-0.00520747	-0.2	0.2	yes
Barium	µg/L	0.0155545	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.490366	-2	2	yes
Cadmium	µg/L	0.00106883	-0.01	0.01	yes
Chromium	µg/L	-0.0304354	-0.5	0.5	yes
Cobalt	µg/L	-0.000332921	-0.1	0.1	yes
Copper	µg/L	0.0100485	-0.2	0.2	yes
Lead	µg/L	0.00240083	-0.1	0.1	yes
Lithium	µg/L	-0.00113161	-1	1	yes
Molybdenum	µg/L	0.0194221	-1	1	yes
Nickel	µg/L	0.0142204	-0.5	0.5	yes
Selenium	µg/L	0.00150023	-0.2	0.2	yes
Silver	µg/L	0.00050935	-0.01	0.01	yes
Strontium	µg/L	0.0646959	-1	1	yes
Thallium	µg/L	0.00145131	-0.50	0.50	yes
Tin	µg/L	-0.0724984	-1	1	yes
Titanium	µg/L	-0.0940343	-0.5	0.5	yes
Uranium	µg/L	0.00233484	-0.5	0.5	yes
Vanadium	µg/L	-0.00529231	-0.1	0.1	yes
Zinc	µg/L	0.13059	-1	1	yes
Mercury	µg/L	-0.001039	-0.051000	0.051000	yes

Date Acquired: May 26, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	997	902	1058	yes
Antimony	µg/L	40.5	36.4	44.2	yes
Arsenic	µg/L	39.9	37.7	42.5	yes
Barium	µg/L	196	181	211	yes
Beryllium	µg/L	19.9	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	389	351	427	yes
Cadmium	µg/L	2.16	1.87	2.23	yes
Chromium	µg/L	100	90.8	108.8	yes
Cobalt	µg/L	20.0	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.2	18.3	21.3	yes
Lithium	µg/L	197	178	214	yes
Molybdenum	µg/L	198	178	219	yes
Nickel	µg/L	99.9	93.3	105.9	yes
Selenium	µg/L	39.9	36.9	42.9	yes

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Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	20.1	18.29	22.31	yes
Strontium	µg/L	200	183	219	yes
Thallium	µg/L	9.86	8.90	10.70	yes
Tin	µg/L	201	187	217	yes
Titanium	µg/L	101	91.0	109.0	yes
Uranium	µg/L	102	92.2	110.2	yes
Vanadium	µg/L	20.0	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: May 26, 2025					
Mercury	mg/L	0.000100	0.000070	0.000130	yes
Date Acquired: May 26, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.10	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.1	9.1	10.9	yes
Lead	µg/L	1.0	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.2	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.02	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	5.0	4.4	5.7	yes
Uranium	µg/L	5.2	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000020	0.000006	0.000036	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	9.62	9.51	10.89	yes
Sulfur	mg/L	150	141.6	156.6	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	2.03	1.88	2.24	yes
Sulfur	mg/L	10.2	9.1	10.6	yes
Date Acquired: May 26, 2025					

Quality Control

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Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.20	0.18	0.23	yes
Sulfur	mg/L	2.9	2.7	3.1	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	7.36	7.37	10	0.01	yes
Sulfur	mg/L	34.6	35.0	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	5.9	6.0	10	0.4	yes
Barium	µg/L	31	31	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	163	161	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	0.8	0.8	10	0.2	yes
Copper	µg/L	0.5	0.5	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	89	89	10	2	yes
Molybdenum	µg/L	<1	<1	10	2	yes
Nickel	µg/L	1.1	1.0	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	1090	1090	10	2	yes
Thallium	µg/L	<0.05	<0.05	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	2.8	2.8	10	1.1	yes
Vanadium	µg/L	<0.1	<0.1	10	0.2	yes
Zinc	µg/L	27	27	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: May 26, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.099	-0.1	0.1	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	0.114	0.0	0.1	yes
Date Acquired: May 27, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1930	1881.4	2091.4	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	4550	4020.0	5436.0	yes
Date Acquired: May 27, 2025					

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Quality Control

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Physical and Aggregate Properties - Continued

Control Sample		Units	Measured	Lower Limit	Upper Limit	Passed QC	
Colour		Colour units	10	10	10	yes	
Turbidity		NTU	144	132.1	162.1	yes	
Date Acquired:	May 27, 2025						
Turbidity		NTU	14.3	12.6	15.6	yes	
Date Acquired:	May 27, 2025						
Turbidity		NTU	1.6	1.0	2.2	yes	
Date Acquired:	May 27, 2025						
Client Sample Replicates		Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity		NTU	3.1	2.9	10	0.2	yes
Date Acquired:	May 27, 2025						

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0.00594322	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Calcium	mg/L	0.0341995	-0.2	0.2	yes
Magnesium	mg/L	0.00865101	-0.1	0.1	yes
Sodium	mg/L	0.0649477	-0.4	0.4	yes
Potassium	mg/L	0.024503	-0.4	0.4	yes
Iron	mg/L	0.00335118	-0.01	0.01	yes
Manganese	mg/L	0.000111042	-0.004	0.004	yes
Chloride	mg/L	0.15	-0.4	0.4	yes
Date Acquired: May 26, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2140	1847.4	2256.0	yes
Date Acquired: May 26, 2025					
Electrical Conductivity	dS/m	32.9	27.200	36.800	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	9.90	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes
Nitrite - N	mg/L	9.61	9.010	10.990	yes
Nitrate and Nitrite - N	mg/L	19.6	19.10	20.90	yes
pH		9.18	8.90	9.44	yes
Temp. of observed pH	°C	20.1	15.5	24.5	yes
Electrical Conductivity	dS/m	2.77	2.631	2.829	yes
P-Alkalinity	mg/L	519	442	584	yes
T-Alkalinity	mg/L	997	958	1059	yes
Calcium	mg/L	242	235.3	262.9	yes
Magnesium	mg/L	97.6	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	241	238.3	262.3	yes

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Routine Water - Continued

Control Sample		Units	Measured	Lower Limit	Upper Limit	Passed QC
Iron		mg/L	9.47	8.89	10.69	yes
Manganese		mg/L	2.39	2.200	2.680	yes
Date Acquired: May 26, 2025						
Fluoride		mg/L	4.80	4.58	5.24	yes
Nitrate - N		mg/L	4.71	4.37	5.33	yes
Nitrite - N		mg/L	4.64	4.370	5.330	yes
Nitrate and Nitrite - N		mg/L	9.35	8.80	10.60	yes
pH			6.87	6.75	7.05	yes
Temp. of observed pH		°C	20.3	15.5	24.5	yes
Electrical Conductivity		dS/m	0.076	0.069	0.085	yes
P-Alkalinity		mg/L	52	28	72	yes
T-Alkalinity		mg/L	127	114	140	yes
Calcium		mg/L	51.2	44.9	56.9	yes
Magnesium		mg/L	20.4	17.9	22.0	yes
Sodium		mg/L	51.9	47.1	53.4	yes
Potassium		mg/L	50.3	45.8	55.8	yes
Iron		mg/L	1.98	1.89	2.11	yes
Manganese		mg/L	0.496	0.464	0.536	yes
Chloride		mg/L	83.5	74.9	86.9	yes
Date Acquired: May 26, 2025						
Fluoride		mg/L	0.50	0.45	0.57	yes
Nitrate - N		mg/L	0.51	0.42	0.57	yes
Nitrite - N		mg/L	0.496	0.455	0.557	yes
Nitrate and Nitrite - N		mg/L	1.01	0.85	1.15	yes
Calcium		mg/L	5.1	4.7	5.4	yes
Magnesium		mg/L	2.1	1.9	2.2	yes
Sodium		mg/L	5.2	4.7	5.7	yes
Potassium		mg/L	4.8	4.6	5.6	yes
Iron		mg/L	0.19	0.18	0.22	yes
Manganese		mg/L	0.048	0.046	0.057	yes
Chloride		mg/L	15.2	13.3	16.5	yes
Date Acquired: May 26, 2025						
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Fluoride	mg/L	0.09	0.08	10	0.05	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
pH		7.56	7.53	0	0.10	yes
Electrical Conductivity	dS/m	0.944	0.942	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	583	583	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	478	478	10	5	yes
Calcium	mg/L	129	129	10	0.6	yes

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Quality Control

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Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Magnesium	mg/L	28.9	28.7	10	0.7	yes
Sodium	mg/L	51.6	51.8	10	1.2	yes
Potassium	mg/L	3.7	3.8	10	1.2	yes
Iron	mg/L	0.01	0.01	10	0.05	yes
Manganese	mg/L	0.833	0.835	10	0.010	yes
Chloride	mg/L	0.7	0.7	10	0.5	yes
Date Acquired: May 26, 2025						

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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140795 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	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	May 26, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	May 26, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	May 26, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	May 26, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	May 27, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	May 26, 2025	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	May 26, 2025	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	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	May 26, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	May 27, 2025	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, August 2024
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:

- Sample 1816292-7; 9956336: Sample received at 11.6 °C

Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater	Control Number:	
	Edmonton, AB, Canada		Monitoring	Date Received:	May 23, 2025
	T5S 2W3	Project Location:		Date Reported:	May 28, 2025
Attn:	Jennifer Catt	LSD:	Tp 054, R 26 to 28, W4M	Report Number:	3140795
Sampled By:	Ben Gilham		and Tp 054, R 01, W5M	Report Type:	Final Report
Company:	HCL	P.O.:	20020		
		Proj. Acct. code:			

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.

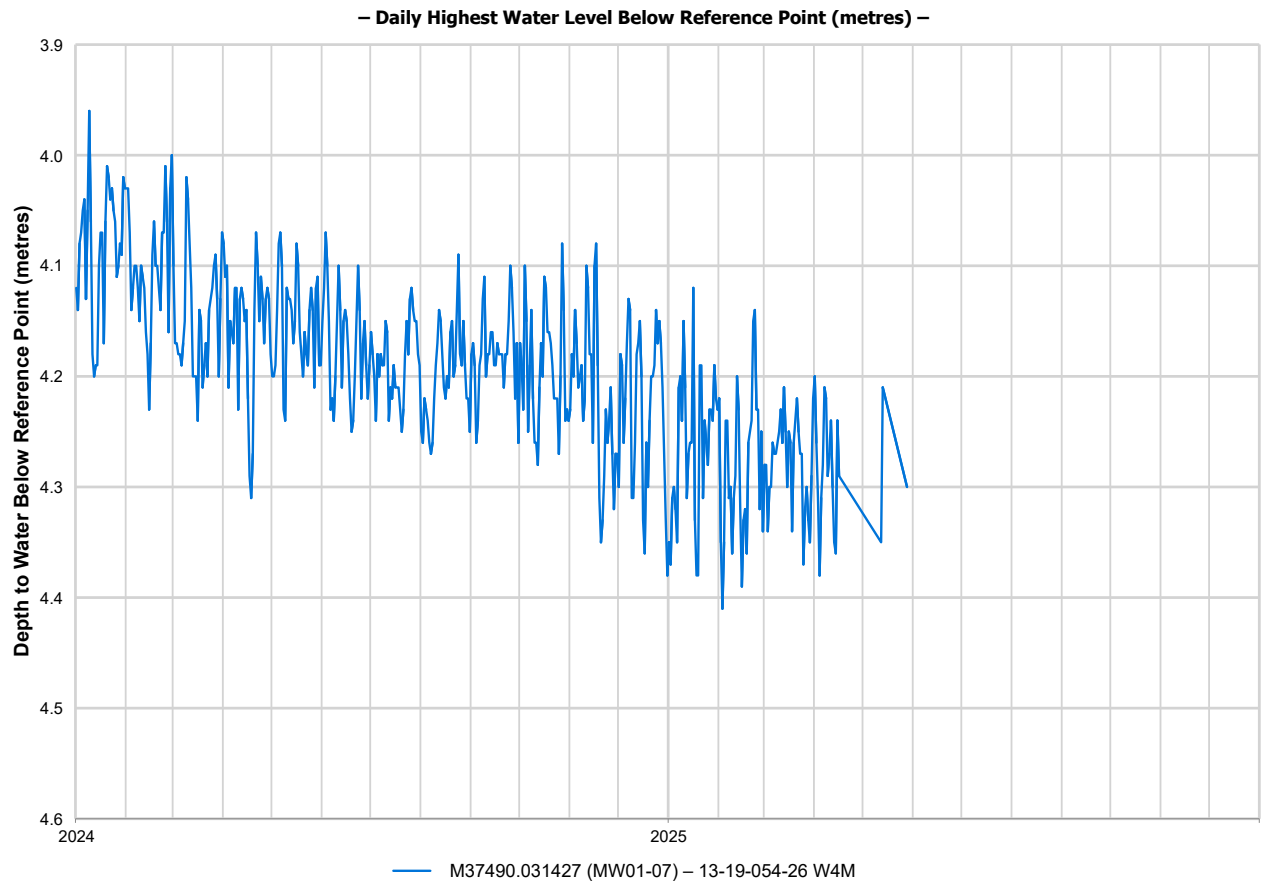
Please direct any inquiries regarding this report to our Client Services group.

Results relate only to samples as submitted.

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MW01-07
2024 - 2025 Hydrograph



MW01-08

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



Photograph taken on June 1, 2023

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 ***

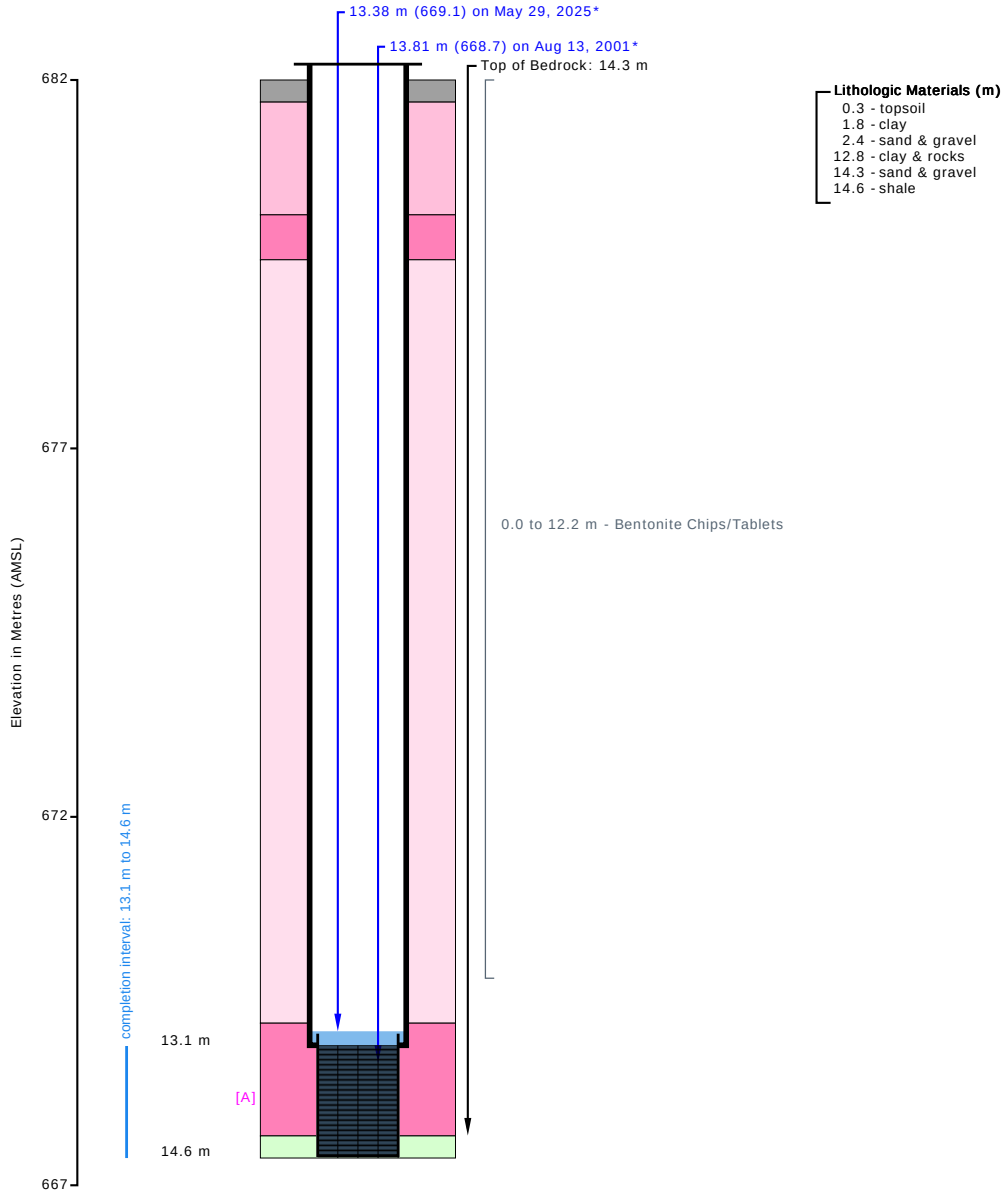
(* TGWC determined value)

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

Most Recent Water Level (m): **13.38 – May 29, 2025 @ 11:27**

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): 13.38 m (669.1 m AMSL) on May 29, 2025 @ 11:27 - 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: July 17, 2025 @ 09:26 --- <https://www.hcl.ca>

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, 2001*

Well Status: *Observation*

Feature Class: *Piezometer*

10-24-054-27 W4M

M37490.031431

Easting (m): 76,066 ²

Northing (m): 5,946,352 ²

Elevation (m): 682 ²

Elog Taken: *No*

Gamma Taken: *No*

Flowing: *No*

Presence of Gas: *No*

Stick Up (m): 0.5

2025-06-04

General Details

* TGWC calculated value

Depth Completed (m)*: 14.6

Top of Bedrock (m): 14.3 m

Depth Drilled (m)*: 14.6

Completion Interval (m): 13.1 – 14.6

Sand & Gravel Thickness (m): 0.6 (total) *

Most Recent Water Level (m): 13.38 m – May 29, 2025

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 - 0.3048 mm

Bentonite Chips/Tablets: 0.0 to 12.2 m

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

(recently sampled first)

Sampling Details: *May 29, 2025 @ 12:00*

Report Date: *June 12, 2025 - Element Materials Technology Canada Inc. (1819420-2)*

Constituent

Result

Conductivity (µS/cm): 1270

Total Dissolved Solids: 860

Hardness (as CaCO3): 570

T-Alkalinity (as CaCO3): 488

P-Alkalinity (as CaCO3): < 5

Nitrate + Nitrite as N: 0.02

Total Suspended Solids:

Temperature (°C): 20.1

Constituent

Result

Nitrate as N: 0.02

Nitrite as N: < 0.005

pH (pH Unit): 7.38

Colour (TCU): > 60

Ion Balance (%): 103

Total Coliforms:**:

Fecal Coliforms:**:

Escherichia coli:**:

Constituent

Result

Turbidity (NTU): 49.4

Fluoride: 0.12

Carbonate: < 6

Bicarbonate: 595

Hydroxide: < 5

Total Iron:

Total Mn:

Constituent

Extractable

Dissolved

Calcium: 164

Chloride: 3.3

Iron: 1.89

Manganese: 0.509***

Aluminum: 0.006

Arsenic: 0.0048

Barium: 0.091

Beryllium: < 0.0001

Cadmium: 0.00003

Chromium: < 0.0005

Cobalt: 0.0020

Sulfate: 260

Constituent

Extractable

Dissolved

Mercury: < 0.000005

Molybdenum: 0.001

Magnesium: 39.1

Sodium: 94.1

Potassium: 7.1

Vanadium: 0.0004

Strontium: 0.925

Nickel: 0.0065

Zinc: 0.002

Copper: < 0.0002

Lead: < 0.0001

Uranium: 0.0165

Extractable - unfiltered
Dissolved - filtered

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

***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2025. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada. Ottawa, Ontario.

850591; 1 / 36

Comments & Observations

Initial, Aug 14, 2001: Villeneuve gravel study.

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

Alias IDs

Z445868

AEPA WellId: 297529

AEPA WellReportId: 297529

AEPA GicWellId: 297529

(1) July 17, 2025, "AS IS"; no warranty either expressed or implied. vist tgwc.com for additional details

Sturgeon County, 2024 to 2025 Groundwater Monitoring Report

Calahoo Resource Extraction District, Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, MR-0224.24

RTU

REMOTE TELEMETRY UNIT

HCL

B - 130

MW01-08
AEPA - Water Well Drilling Report



Water Well Drilling Report

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

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)					Elevation _____ m	
_____ m from					Latitude 53.683412 Longitude -113.842480					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		
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



Water Well Drilling Report

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

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	

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 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.	

Printed on 7/17/2025 9:23:46 AM

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MW01-08
Chemical Analysis Results (June 12, 2025)



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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145423 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By:	P.O.: 20023	
Company: HCL	Proj. Acct. code:	

Reference Number	1819420-2
Sample Date	May 29, 2025
Sample Time	12:00
Sample Location	M37490.031431
Sample Description	MW01-08 / 13.9 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	7.29	0.05		
Sulfur	Dissolved	mg/L	86.6	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	0.006	0.002	0.1 OG, 2.9 MAC	Below OG
Antimony	Dissolved	mg/L	0.0007	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0048	0.0002	0.010	Below MAC
Barium	Dissolved	mg/L	0.091	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	0.082	0.002	5	Below MAC
Cadmium	Dissolved	mg/L	0.00003	0.00001	0.007	Below MAC
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05	Below MAC
Cobalt	Dissolved	mg/L	0.0020	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	0.089	0.001		
Molybdenum	Dissolved	mg/L	0.001	0.001		
Nickel	Dissolved	mg/L	0.0065	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	0.925	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00001		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0165	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	0.0004	0.0001		
Zinc	Dissolved	mg/L	0.002	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	>60	5		
Turbidity		NTU	49.4	0.1		
Routine Water						
pH			7.38	1	7.0-10.5	Within Range
Temp. of observed pH		°C	20.1			
Electrical Conductivity	at 25 °C	µS/cm	1270	1		
Calcium	Dissolved	mg/L	164	0.2		
Magnesium	Dissolved	mg/L	39.1	0.2		

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145423 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Reference Number	1819420-2
Sample Date	May 29, 2025
Sample Time	12:00
Sample Location	M37490.031431
Sample Description	MW01-08 / 13.9 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	94.1	0.4	200	Below AO
Potassium	Dissolved	mg/L	7.1	0.4		
Iron	Dissolved	mg/L	1.89	0.01	0.1	Above AO
Manganese	Dissolved	mg/L	0.509	0.005	0.02 AO, 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	3.3	0.4	250	Below AO
Fluoride		mg/L	0.12	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.02	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	0.02	0.01		
Sulfate (SO4)	Dissolved	mg/L	260	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	860	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	570			
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).
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	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145423 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.0005296	-0.04	0.05	yes
Sulfur	mg/L	0.0969684	-0.3	0.2	yes
Aluminum	µg/L	-0.159055	-2	2	yes
Antimony	µg/L	0.00527385	-0.2	0.2	yes
Arsenic	µg/L	-0.00838105	-0.2	0.2	yes
Barium	µg/L	0.0205324	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.747257	-2	2	yes
Cadmium	µg/L	0.00103929	-0.01	0.01	yes
Chromium	µg/L	-0.0370322	-0.5	0.5	yes
Cobalt	µg/L	-9.31717e-005	-0.1	0.1	yes
Copper	µg/L	0.0351031	-0.2	0.2	yes
Lead	µg/L	0.000707898	-0.1	0.1	yes
Lithium	µg/L	0.0347798	-1	1	yes
Molybdenum	µg/L	0.00840797	-1	1	yes
Nickel	µg/L	0.0185909	-0.5	0.5	yes
Selenium	µg/L	0.00058604	-0.2	0.2	yes
Silver	µg/L	0.000743061	-0.01	0.01	yes
Strontium	µg/L	0.0374449	-1	1	yes
Thallium	µg/L	0.00154219	-0.50	0.50	yes
Tin	µg/L	-0.0230673	-1	1	yes
Titanium	µg/L	-0.141492	-0.5	0.5	yes
Uranium	µg/L	0.00107718	-0.5	0.5	yes
Vanadium	µg/L	-0.0453782	-0.1	0.1	yes
Zinc	µg/L	0.25069	-1	1	yes
Mercury	µg/L	0.0001434	-0.051000	0.051000	yes

Date Acquired: June 09, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	990	902	1058	yes
Antimony	µg/L	40.1	36.4	44.2	yes
Arsenic	µg/L	40.0	37.7	42.5	yes
Barium	µg/L	198	181	211	yes
Beryllium	µg/L	19.6	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	378	351	427	yes
Cadmium	µg/L	2.08	1.87	2.23	yes
Chromium	µg/L	99.3	90.8	108.8	yes
Cobalt	µg/L	19.8	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.4	18.3	21.3	yes
Lithium	µg/L	196	178	214	yes
Molybdenum	µg/L	195	178	219	yes
Nickel	µg/L	99.5	93.3	105.9	yes
Selenium	µg/L	39.5	36.9	42.9	yes

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145423 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	19.7	18.29	22.31	yes
Strontium	µg/L	195	183	219	yes
Thallium	µg/L	9.71	8.90	10.70	yes
Tin	µg/L	196	187	217	yes
Titanium	µg/L	97.8	91.0	109.0	yes
Uranium	µg/L	101	92.2	110.2	yes
Vanadium	µg/L	19.7	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: June 09, 2025					
Mercury	mg/L	0.000099	0.000070	0.000130	yes
Date Acquired: June 09, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.11	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.0	9.1	10.9	yes
Lead	µg/L	1.1	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.1	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.01	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	4.9	4.4	5.7	yes
Uranium	µg/L	5.1	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000021	0.000006	0.000036	yes
Date Acquired: June 09, 2025					
Silicon	mg/L	10.2	9.51	10.89	yes
Sulfur	mg/L	151	141.6	156.6	yes
Date Acquired: June 09, 2025					
Silicon	mg/L	2.08	1.88	2.24	yes
Sulfur	mg/L	10.3	9.2	10.8	yes
Date Acquired: June 09, 2025					

Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145423 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By:	P.O.: 20023	
Company: HCL	Proj. Acct. code:	

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.20	0.18	0.23	yes
Sulfur	mg/L	2.9	2.7	3.1	yes
Date Acquired: June 09, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.7	3.6	10	0.01	yes
Sulfur	mg/L	647	647	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	<0.2	<0.2	10	0.4	yes
Barium	µg/L	131	130	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	279	293	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	<0.1	<0.1	10	0.2	yes
Copper	µg/L	<0.2	<0.2	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	30	30	10	2	yes
Molybdenum	µg/L	<1	<1	10	2	yes
Nickel	µg/L	<0.5	<0.5	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	991	1010	10	2	yes
Thallium	µg/L	<0.01	<0.01	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	<0.5	<0.5	10	1.1	yes
Vanadium	µg/L	0.1	0.2	10	0.2	yes
Zinc	µg/L	<1	<1	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: June 09, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.09	-0.1	0.1	yes
Date Acquired: June 06, 2025					
Turbidity	NTU	0.112	0.0	0.1	yes
Date Acquired: June 06, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1920	1881.4	2091.4	yes
Date Acquired: June 06, 2025					
Turbidity	NTU	4530	4020.0	5436.0	yes
Date Acquired: June 06, 2025					

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

Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145423 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By:	P.O.: 20023	
Company: HCL	Proj. Acct. code:	

Physical and Aggregate Properties - Continued

Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC	
Turbidity	NTU	143	132.1	162.1	yes	
Colour	Colour units	10	10	10	yes	
Date Acquired:	June 06, 2025					
Turbidity	NTU	14.2	12.6	15.6	yes	
Date Acquired:	June 06, 2025					
Turbidity	NTU	1.6	1.0	2.2	yes	
Date Acquired:	June 06, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity	NTU	3.2	3.2	10	0.2	yes
Date Acquired:	June 06, 2025					

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	0.0700376	-0.2	0.2	yes
Magnesium	mg/L	0.0599072	-0.1	0.1	yes
Sodium	mg/L	0.0357922	-0.4	0.4	yes
Potassium	mg/L	0.192832	-0.4	0.4	yes
Iron	mg/L	0.00324691	-0.01	0.01	yes
Manganese	mg/L	0.000677325	-0.004	0.004	yes
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Chloride	mg/L	0.09	-0.4	0.4	yes
Date Acquired: June 09, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2020	1847.4	2256.0	yes
Date Acquired: June 09, 2025					
Electrical Conductivity	dS/m	33.2	27.200	36.800	yes
Date Acquired: June 06, 2025					
pH		9.14	8.90	9.44	yes
Temp. of observed pH	°C	20.9	15.5	24.5	yes
Electrical Conductivity	dS/m	2.77	2.631	2.829	yes
P-Alkalinity	mg/L	540	442	584	yes
T-Alkalinity	mg/L	1020	958	1059	yes
Calcium	mg/L	251	235.3	262.9	yes
Magnesium	mg/L	101	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	250	238.3	262.3	yes
Iron	mg/L	9.92	8.89	10.69	yes
Manganese	mg/L	2.51	2.200	2.680	yes
Fluoride	mg/L	9.97	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes

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

Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145423 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Nitrite - N	mg/L	9.76	9.010	10.990		yes
Nitrate and Nitrite - N	mg/L	19.8	19.10	20.90		yes
Date Acquired: June 09, 2025						
pH		6.87	6.75	7.05		yes
Temp. of observed pH	°C	20.9	15.5	24.5		yes
Electrical Conductivity	dS/m	0.082	0.069	0.085		yes
P-Alkalinity	mg/L	56	28	72		yes
T-Alkalinity	mg/L	129	114	140		yes
Calcium	mg/L	52.7	44.9	56.9		yes
Magnesium	mg/L	21.3	17.9	22.0		yes
Sodium	mg/L	50.5	47.1	53.4		yes
Potassium	mg/L	51.7	45.8	55.8		yes
Iron	mg/L	2.04	1.89	2.11		yes
Manganese	mg/L	0.517	0.464	0.536		yes
Fluoride	mg/L	4.85	4.58	5.24		yes
Nitrate - N	mg/L	4.77	4.37	5.33		yes
Nitrite - N	mg/L	4.74	4.370	5.330		yes
Nitrate and Nitrite - N	mg/L	9.52	8.80	10.60		yes
Chloride	mg/L	82.5	74.9	86.9		yes
Date Acquired: June 09, 2025						
Calcium	mg/L	5.2	4.7	5.4		yes
Magnesium	mg/L	2.1	1.9	2.2		yes
Sodium	mg/L	5.1	4.7	5.7		yes
Potassium	mg/L	5.1	4.6	5.6		yes
Iron	mg/L	0.20	0.18	0.22		yes
Manganese	mg/L	0.051	0.046	0.057		yes
Fluoride	mg/L	0.51	0.45	0.57		yes
Nitrate - N	mg/L	0.51	0.42	0.57		yes
Nitrite - N	mg/L	0.509	0.455	0.557		yes
Nitrate and Nitrite - N	mg/L	1.02	0.85	1.15		yes
Chloride	mg/L	14.2	13.3	16.5		yes
Date Acquired: June 09, 2025						
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
pH		6.90	6.93	0	0.10	yes
Electrical Conductivity	dS/m	40.9	40.8	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	654	650	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	537	533	10	5	yes
Calcium	mg/L	317	318	10	0.6	yes
Magnesium	mg/L	304	305	10	0.7	yes
Sodium	mg/L	148	147	10	1.2	yes
Potassium	mg/L	6.4	6.5	10	1.2	yes

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



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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3 Attn: Jennifer Catt Sampled By: Company: HCL	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M LSD: P.O.: 20023 Proj. Acct. code:	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145423 Report Type: Final Report

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Iron	mg/L	<0.05	<0.05	10	0.05	yes
Manganese	mg/L	0.30	0.30	10	0.010	yes
Nitrate - N	mg/L	0.06	0.06	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
Fluoride	mg/L	0.05	0.05	10	0.05	yes
Chloride	mg/L	2.1	2.0	10	0.5	yes
Date Acquired: June 09, 2025						

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-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145423 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 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 06, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 06, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 06, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 09, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 06, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 09, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 06, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 09, 2025	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 09, 2025	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 09, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 09, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 09, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 06, 2025	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, August 2024
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:

- Sample 1819420-2; 9983490: Sample received at 13.9 °C

Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.24	Lot ID:	1819420
	17740 - 118 Avenue NW	Project Name:	2025 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 5, 2025
	T5S 2W3	LSD:		Date Reported:	Jun 12, 2025
Attn:	Jennifer Catt	P.O.:	20023	Report Number:	3145423
Sampled By:		Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

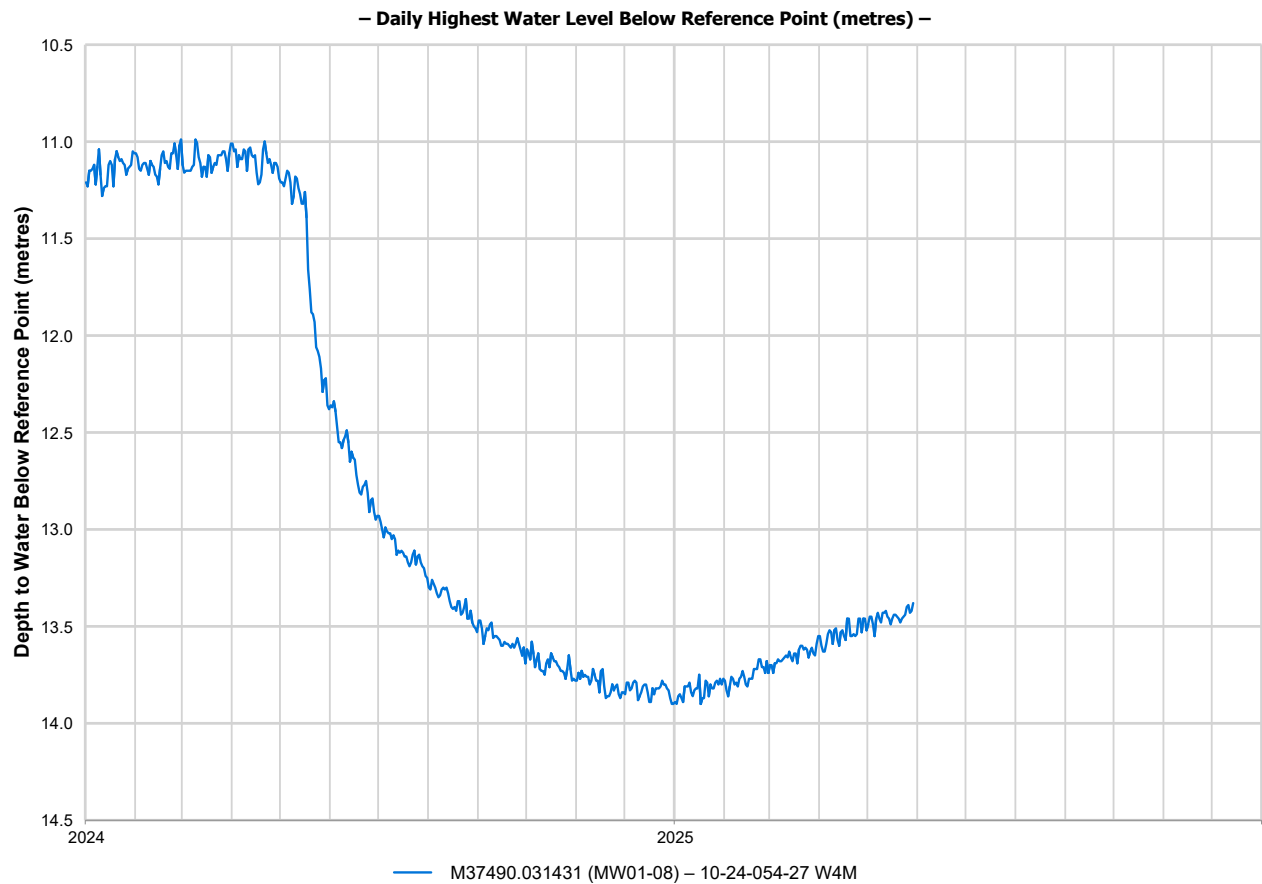
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to 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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MW01-08
2024 - 2025 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 ***

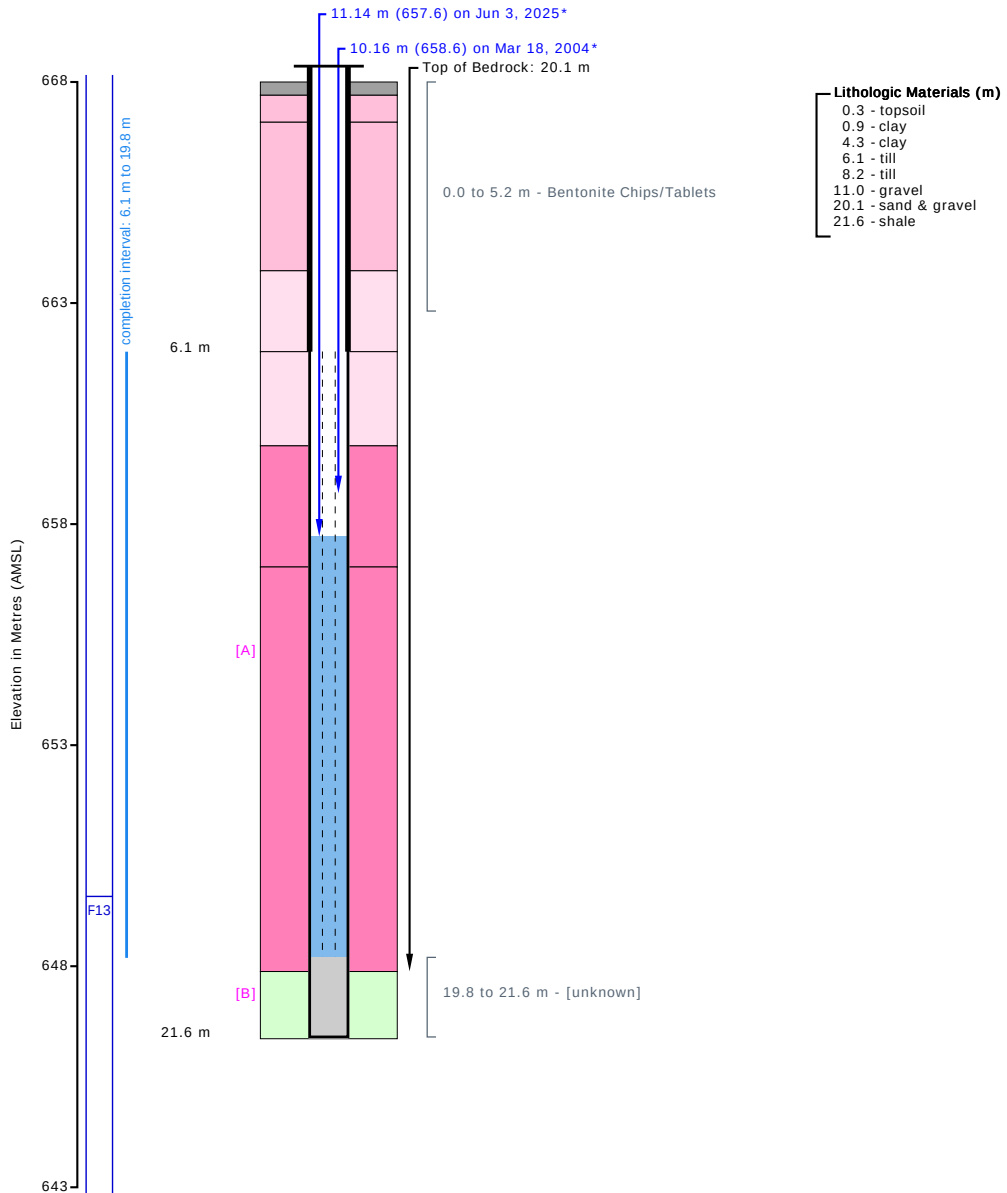
(* TGWC determined value)

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

Most Recent Water Level (m): **11.14 – June 3, 2025 @ 16:01**

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): 11.14 m (657.6 m AMSL) on Jun 3, 2025 @ 16:01 - 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: July 17, 2025 @ 09:26 --- https://www.hcl.ca	

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):
Northing (m):
Elevation (m):

81,525²
5,943,856²
667.9²

M39227.477799

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

Stick Up (m): *0.9*

2025-06-04

General Details

Depth Completed (m)*: *19.8*
Depth Drilled (m)*: *21.6*

Top of Bedrock (m): *20.1 m*
Completion Interval (m): *6.1 – 19.8*

Sand & Gravel Thickness (m): *2.7 (total) **
Plugged / Backfilled (m): *19.8 – 21.6*
Most Recent Water Level (m): *11.14 m – June 3, 2025*

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 - Ø 0.254 mm x 50.8 mm (interval) - 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: *June 3, 2025 @ 16:25*
Report Date: *June 12, 2025 - Element Materials Technology Canada Inc. (1819420-8)*

Constituent

Result

Conductivity (µS/cm): *1310*

Total Dissolved Solids: *885*

Hardness (as CaCO3): *678*

T-Alkalinity (as CaCO3): *323*

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

Nitrate + Nitrite as N: *0.02*

Total Suspended Solids:

Temperature (°C): *20.4*

Constituent

Result

Nitrate as N: *0.02*

Nitrite as N: *< 0.005*

pH (pH Unit): *7.56*

Colour (TCU): *> 60*

Ion Balance (%): *103*

Total Coliforms:**:

Fecal Coliforms:**:

Escherichia coli:**:

Constituent

Result

Turbidity (NTU): *95.3*

Fluoride: *0.12*

Carbonate: *< 6*

Bicarbonate: *394*

Hydroxide: *< 5*

Total Iron:

Total Mn:

Constituent

Extractable

Dissolved

Calcium: *172*

Chloride: *5.7*

Iron: *< 0.01*

Manganese: *0.006*

Aluminum: *< 0.002*

Arsenic: *0.0003*

Barium: *0.017*

Beryllium: *< 0.0001*

Cadmium: *0.00002*

Chromium: *< 0.0005*

Cobalt: *< 0.0001*

Sulfate: *407*

Constituent

Extractable

Dissolved

Mercury: *< 0.000005*

Molybdenum: *< 0.001*

Magnesium: *60.2*

Sodium: *40.7*

Potassium: *5.5*

Vanadium: *< 0.0001*

Strontium: *0.881*

Nickel: *0.0010*

Zinc: *0.003*

Copper: *0.0008*

Lead: *< 0.0001*

Uranium: *0.0061*

Extractable - unfiltered

Dissolved - filtered

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

Note: Constituents have been compared to the maximum acceptable concentration, Health Canada. 2025.
Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy
Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.

850597; 1 / 39

Aquifer Tests

Testing

Depth of Test

Duration (minutes)

Avg. Rate

NPWL

Drawdown

Pump

Q20 (m³/day)*

Transmissivity (m²/day)*

Date & Time

Method / Type

Interval

Pumping Recovery

(Lpm)

(metres)

(metres)

(metres)

Apparent Effective

Apparent Aquifer Effective

Alias IDs

2576450

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

(1) July 17, 2025, "AS IS"; no warranty either expressed or implied. vist tgwc.com for additional details

Sturgeon County, 2024 to 2025 Groundwater Monitoring Report
Calahoo Resource Extraction District, Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, MR-0224.24

B - 146

RTU

REMOTE TELEMETRY UNIT

HCL

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

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		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 :	cm
Wall Thickness :	0.584 cm	Wall Thickness :	cm
Bottom at :	6.10 m	Top at :	m
		Bottom at :	m
Perforations			
From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)
6.10	19.81	0.025	
Hole or Slot Interval(cm)			
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
ELK POINT DRILLING CORP.	Date approval holder signed



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

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		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)					
_____ m from					Latitude 53.658517 Longitude -113.765810					Elevation 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 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 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 Date approval holder signed
ELK POINT DRILLING CORP.	

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MW04-01
Chemical Analysis Results (June 12, 2025)



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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145429 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By:	P.O.: 20023	
Company: HCL	Proj. Acct. code:	

Reference Number	1819420-8
Sample Date	June 03, 2025
Sample Time	16:25
Sample Location	M39227.477799
Sample Description	MW04-01 / 13.9 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	7.85	0.05		
Sulfur	Dissolved	mg/L	136	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	0.010	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	0.100	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	0.0008	0.0002	1 AO, 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.086	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0010	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	0.881	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00001		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0061	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	0.003	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	>60	5		
Turbidity		NTU	95.3	0.1		
Routine Water						
pH			7.56	1	7.0-10.5	Within Range
Temp. of observed pH		°C	20.4			
Electrical Conductivity	at 25 °C	µS/cm	1310	1		
Calcium	Dissolved	mg/L	172	0.2		
Magnesium	Dissolved	mg/L	60.2	0.2		

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145429 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Reference Number	1819420-8
Sample Date	June 03, 2025
Sample Time	16:25
Sample Location	M39227.477799
Sample Description	MW04-01 / 13.9 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	40.7	0.4	200	Below AO
Potassium	Dissolved	mg/L	5.5	0.4		
Iron	Dissolved	mg/L	<0.01	0.01	0.1	Below AO
Manganese	Dissolved	mg/L	0.006	0.005	0.02 AO, 0.12 MAC	Below AO
Chloride	Dissolved	mg/L	5.7	0.4	250	Below AO
Fluoride		mg/L	0.12	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.02	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	0.02	0.01		
Sulfate (SO4)	Dissolved	mg/L	407	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	394			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	323	5		
Total Dissolved Solids	Calculated	mg/L	885	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	678			
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).
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	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145429 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.0005296	-0.04	0.05	yes
Sulfur	mg/L	0.0969684	-0.3	0.2	yes
Aluminum	µg/L	-0.0503837	-2	2	yes
Antimony	µg/L	0.00299663	-0.2	0.2	yes
Arsenic	µg/L	-0.00512149	-0.2	0.2	yes
Barium	µg/L	0.0195816	-1	1	yes
Beryllium	µg/L	0.00322498	-0.1	0.1	yes
Boron	µg/L	0.481716	-2	2	yes
Cadmium	µg/L	0	-0.01	0.01	yes
Chromium	µg/L	-0.0381894	-0.5	0.5	yes
Cobalt	µg/L	-0.000104065	-0.1	0.1	yes
Copper	µg/L	0.103679	-0.2	0.2	yes
Lead	µg/L	0.00415681	-0.1	0.1	yes
Lithium	µg/L	0.024556	-1	1	yes
Molybdenum	µg/L	0.00699169	-1	1	yes
Nickel	µg/L	-0.00127806	-0.5	0.5	yes
Selenium	µg/L	0.000628284	-0.2	0.2	yes
Silver	µg/L	0.000782253	-0.01	0.01	yes
Strontium	µg/L	0.0543752	-1	1	yes
Thallium	µg/L	0.000491946	-0.50	0.50	yes
Tin	µg/L	-0.0247345	-1	1	yes
Titanium	µg/L	-0.116848	-0.5	0.5	yes
Uranium	µg/L	0.000437049	-0.5	0.5	yes
Vanadium	µg/L	-0.0361349	-0.1	0.1	yes
Zinc	µg/L	0.124181	-1	1	yes
Mercury	µg/L	0.0001434	-0.051000	0.051000	yes

Date Acquired: June 09, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	990	902	1058	yes
Antimony	µg/L	40.1	36.4	44.2	yes
Arsenic	µg/L	40.0	37.7	42.5	yes
Barium	µg/L	198	181	211	yes
Beryllium	µg/L	19.6	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	378	351	427	yes
Cadmium	µg/L	2.08	1.87	2.23	yes
Chromium	µg/L	99.3	90.8	108.8	yes
Cobalt	µg/L	19.8	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.4	18.3	21.3	yes
Lithium	µg/L	196	178	214	yes
Molybdenum	µg/L	195	178	219	yes
Nickel	µg/L	99.5	93.3	105.9	yes
Selenium	µg/L	39.5	36.9	42.9	yes

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Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	19.7	18.29	22.31	yes
Strontium	µg/L	195	183	219	yes
Thallium	µg/L	9.71	8.90	10.70	yes
Tin	µg/L	196	187	217	yes
Titanium	µg/L	97.8	91.0	109.0	yes
Uranium	µg/L	101	92.2	110.2	yes
Vanadium	µg/L	19.7	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: June 09, 2025					
Mercury	mg/L	0.000099	0.000070	0.000130	yes
Date Acquired: June 09, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.11	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.0	9.1	10.9	yes
Lead	µg/L	1.1	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.1	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.01	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	4.9	4.4	5.7	yes
Uranium	µg/L	5.1	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000021	0.000006	0.000036	yes
Date Acquired: June 09, 2025					
Silicon	mg/L	10.2	9.51	10.89	yes
Sulfur	mg/L	151	141.6	156.6	yes
Date Acquired: June 09, 2025					
Silicon	mg/L	2.08	1.88	2.24	yes
Sulfur	mg/L	10.3	9.2	10.8	yes
Date Acquired: June 09, 2025					

Quality Control

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Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Silicon	mg/L	0.20	0.18	0.23		yes
Sulfur	mg/L	2.9	2.7	3.1		yes
Date Acquired: June 09, 2025						
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.7	3.6	10	0.01	yes
Sulfur	mg/L	647	647	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	<0.2	<0.2	10	0.4	yes
Barium	µg/L	131	130	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	279	293	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	<0.1	<0.1	10	0.2	yes
Copper	µg/L	<0.2	<0.2	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	30	30	10	2	yes
Molybdenum	µg/L	<1	<1	10	2	yes
Nickel	µg/L	<0.5	<0.5	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	991	1010	10	2	yes
Thallium	µg/L	<0.01	<0.01	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	<0.5	<0.5	10	1.1	yes
Vanadium	µg/L	0.1	0.2	10	0.2	yes
Zinc	µg/L	<1	<1	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: June 09, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.09	-0.1	0.1	yes
Date Acquired: June 06, 2025					
Turbidity	NTU	0.112	0.0	0.1	yes
Date Acquired: June 06, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1920	1881.4	2091.4	yes
Date Acquired: June 06, 2025					
Turbidity	NTU	4530	4020.0	5436.0	yes
Date Acquired: June 06, 2025					

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Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Physical and Aggregate Properties - Continued

Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC	
Turbidity	NTU	143	132.1	162.1	yes	
Colour	Colour units	10	10	10	yes	
Date Acquired:	June 06, 2025					
Turbidity	NTU	14.2	12.6	15.6	yes	
Date Acquired:	June 06, 2025					
Turbidity	NTU	1.6	1.0	2.2	yes	
Date Acquired:	June 06, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity	NTU	3.2	3.2	10	0.2	yes
Date Acquired:	June 06, 2025					

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	0.0700376	-0.2	0.2	yes
Magnesium	mg/L	0.0599072	-0.1	0.1	yes
Sodium	mg/L	0.0357922	-0.4	0.4	yes
Potassium	mg/L	0.192832	-0.4	0.4	yes
Iron	mg/L	0.00324691	-0.01	0.01	yes
Manganese	mg/L	0.000677325	-0.004	0.004	yes
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Chloride	mg/L	0.09	-0.4	0.4	yes
Date Acquired: June 09, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2020	1847.4	2256.0	yes
Date Acquired: June 09, 2025					
Electrical Conductivity	dS/m	33.2	27.200	36.800	yes
Date Acquired: June 06, 2025					
pH		9.15	8.90	9.44	yes
Temp. of observed pH	°C	20.6	15.5	24.5	yes
Electrical Conductivity	dS/m	2.78	2.631	2.829	yes
P-Alkalinity	mg/L	538	442	584	yes
T-Alkalinity	mg/L	1010	958	1059	yes
Calcium	mg/L	251	235.3	262.9	yes
Magnesium	mg/L	101	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	250	238.3	262.3	yes
Iron	mg/L	9.92	8.89	10.69	yes
Manganese	mg/L	2.51	2.200	2.680	yes
Fluoride	mg/L	9.97	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes

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Quality Control

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Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Nitrite - N	mg/L	9.76	9.010	10.990		yes
Nitrate and Nitrite - N	mg/L	19.8	19.10	20.90		yes
Date Acquired: June 09, 2025						
pH		6.87	6.75	7.05		yes
Temp. of observed pH	°C	20.7	15.5	24.5		yes
Electrical Conductivity	dS/m	0.080	0.069	0.085		yes
P-Alkalinity	mg/L	55	28	72		yes
T-Alkalinity	mg/L	129	114	140		yes
Calcium	mg/L	52.7	44.9	56.9		yes
Magnesium	mg/L	21.3	17.9	22.0		yes
Sodium	mg/L	50.5	47.1	53.4		yes
Potassium	mg/L	51.7	45.8	55.8		yes
Iron	mg/L	2.04	1.89	2.11		yes
Manganese	mg/L	0.517	0.464	0.536		yes
Fluoride	mg/L	4.85	4.58	5.24		yes
Nitrate - N	mg/L	4.77	4.37	5.33		yes
Nitrite - N	mg/L	4.74	4.370	5.330		yes
Nitrate and Nitrite - N	mg/L	9.52	8.80	10.60		yes
Chloride	mg/L	82.5	74.9	86.9		yes
Date Acquired: June 09, 2025						
Calcium	mg/L	5.2	4.7	5.4		yes
Magnesium	mg/L	2.1	1.9	2.2		yes
Sodium	mg/L	5.1	4.7	5.7		yes
Potassium	mg/L	5.1	4.6	5.6		yes
Iron	mg/L	0.20	0.18	0.22		yes
Manganese	mg/L	0.051	0.046	0.057		yes
Fluoride	mg/L	0.51	0.45	0.57		yes
Nitrate - N	mg/L	0.51	0.42	0.57		yes
Nitrite - N	mg/L	0.509	0.455	0.557		yes
Nitrate and Nitrite - N	mg/L	1.02	0.85	1.15		yes
Chloride	mg/L	14.2	13.3	16.5		yes
Date Acquired: June 09, 2025						
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
pH		6.90	6.93	0	0.10	yes
Electrical Conductivity	dS/m	40.9	40.8	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	654	650	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	537	533	10	5	yes
Calcium	mg/L	317	318	10	0.6	yes
Magnesium	mg/L	304	305	10	0.7	yes
Sodium	mg/L	148	147	10	1.2	yes
Potassium	mg/L	6.4	6.5	10	1.2	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: Company: HCL	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M LSD: P.O.: 20023 Proj. Acct. code:	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145429 Report Type: Final Report

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Iron	mg/L	<0.05	<0.05	10	0.05	yes
Manganese	mg/L	0.30	0.30	10	0.010	yes
Nitrate - N	mg/L	0.06	0.06	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
Fluoride	mg/L	0.05	0.05	10	0.05	yes
Chloride	mg/L	2.0	2.0	10	0.5	yes
Date Acquired: June 09, 2025						

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-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145429 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 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 06, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 06, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 06, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 09, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 06, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 09, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 06, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 09, 2025	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 09, 2025	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 09, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 09, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 09, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 06, 2025	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, August 2024
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:

- Sample 1819420-8; 9983496: Sample received at 13.9 °C
- Sample 1819420-8; 9983496: Sample turbidity may interfere with Apparent Colour analysis. A more accurate measure of sample colour would be obtained from True Colour Analysis.

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

Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.24	Lot ID:	1819420
	17740 - 118 Avenue NW	Project Name:	2025 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 5, 2025
	T5S 2W3	LSD:		Date Reported:	Jun 12, 2025
Attn:	Jennifer Catt	P.O.:	20023	Report Number:	3145429
Sampled By:		Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

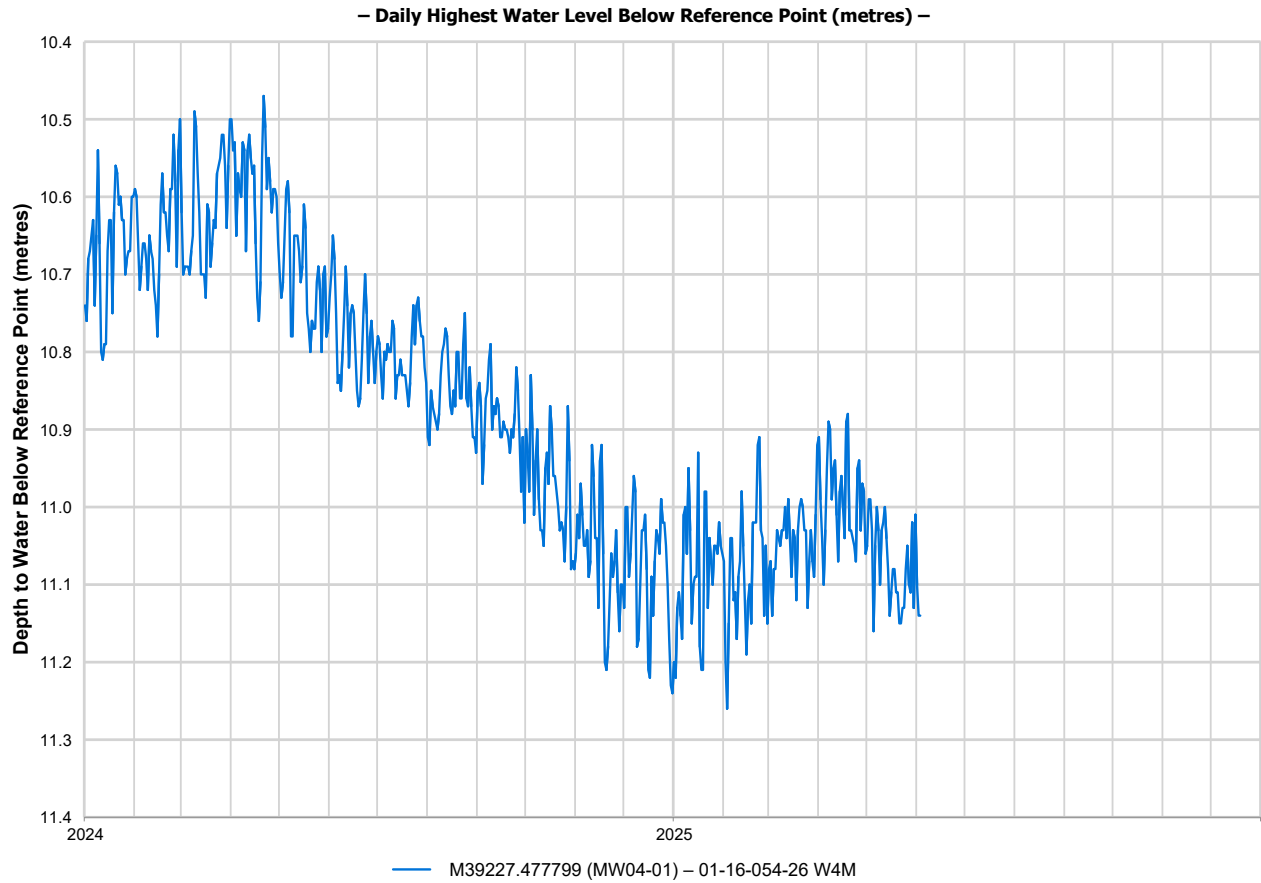
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to 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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MW04-01
2024 - 2025 Hydrograph



MW04-02: SE16 Pit – Eastern Edge

(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 ***

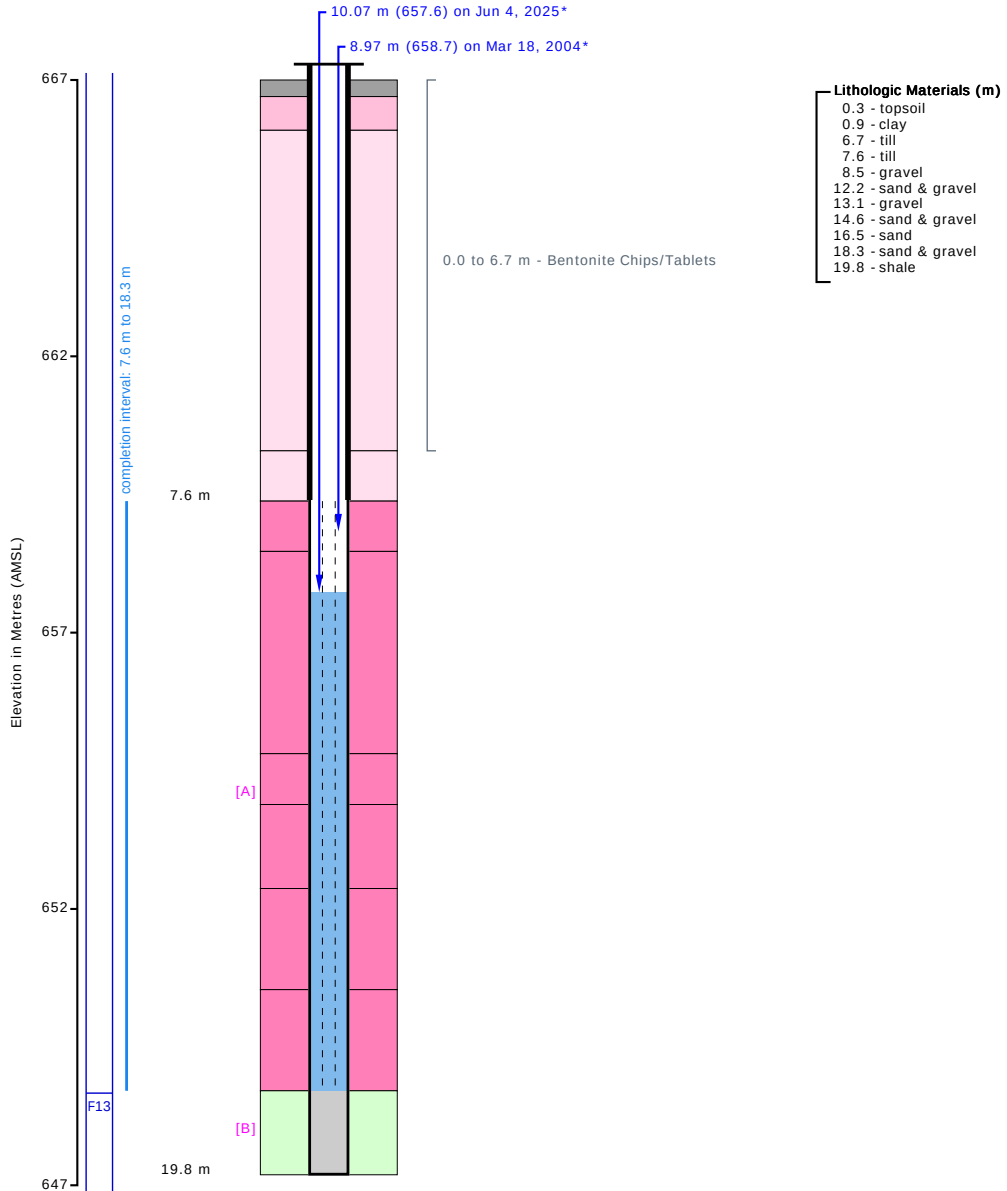
(* TGWC determined value)

Earliest Water Level (m): **8.97 – March 18, 2004**

Most Recent Water Level (m): **10.07 – June 4, 2025 @ 23:40**

GIC ID: **1270002**

MW04-02: SE16 Pit – Eastern Edge 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: SE16 Pit – Eastern Edge	
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): 10.07 m (657.6 m AMSL) on Jun 4, 2025 @ 23:40 - 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: July 17, 2025 @ 09:26 --- https://www.hcl.ca	

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

Contractor: *Elk Point Drilling Corp.*

Name: *MW04-02: SE16 Pit – Eastern Edge (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):
Northing (m):
Elevation (m):

81,699 ²
5,944,146 ²
666.9 ²

Elog Taken: *Yes*

Gamma Taken: *No*

Flowing: *No*

Presence of Gas: *No*

Stick Up (m): *0.8*

2025-06-04

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): *10.07 m – June 4, 2025*

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 - Ø 0.3048 mm x 50.8 mm (interval) - Method: Machine*
Bentonite Chips/Tables: *0.0 to 6.7 m*

Lithology Details

Elevation
(AMSL)

Depth
(BGL)

Lithology Descriptions

666.6

0.3

Loamy Black Topsoil

666.0

0.9

Brown Clay

660.2

6.7

Brown Till

659.3

7.6

Firm Grey Till

658.4

8.5

Coarse-Grained Gravel

654.7

12.2

Coarse-Grained Sand & Gravel

653.8

13.1

Coarse-Grained Gravel

652.3

14.6

Sand & Gravel

650.4

16.5

Clayey Sand

648.6

18.3

Sand & Gravel

647.1

19.8

Shale

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

(recently sampled first)

Sampling Details: *May 29, 2025 @ 15:00*
Report Date: *June 12, 2025 - Element Materials Technology Canada Inc. (1819420-4)*

Constituent

Result

Conductivity (µS/cm):
Total Dissolved Solids:
Hardness (as CaCO3):
T-Alkalinity (as CaCO3):
P-Alkalinity (as CaCO3):
Nitrate + Nitrite as N:
Total Suspended Solids:
Temperature (°C):

938
601
454
276
< 5
1.81
0.001
20.1

Constituent

Result

Nitrate as N:
Nitrite as N:
pH (pH Unit):
Colour (TCU):
Ion Balance (%):
Total Coliforms:**:
Fecal Coliforms:**:
Escherichia coli:**:

1.81
< 0.005
7.34
< 5
102
0.000
0.000
0.000

Constituent

Result

Turbidity (NTU):
Fluoride:
Carbonate:
Bicarbonate:
Hydroxide:
Total Iron:
Total Mn:

0.8
0.07
< 6
336
< 5
0.000
0.000

Constituent

Extractable

Dissolved

Calcium:
Chloride:
Iron:
Manganese:
Aluminum:
Arsenic:
Barium:
Beryllium:
Cadmium:
Chromium:
Cobalt:
Sulfate:

123
5.2
< 0.01
*0.607****
< 0.002
0.0005
0.024
< 0.0001
< 0.00001
< 0.0005
0.0001
230

Constituent

Extractable

Dissolved

Mercury:
Molybdenum:
Magnesium:
Sodium:
Potassium:
Vanadium:
Strontium:
Nickel:
Zinc:
Copper:
Lead:
Uranium:

< 0.000005
< 0.001
36.0
36.5
5.3
< 0.0001
0.832
0.0007
< 0.001
0.0004
< 0.0001
0.0048

Extractable - unfiltered
Dissolved - filtered

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

***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2025. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario.

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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

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

AEPA WellId: *1270002*

AEPA WellReportId: *10781936*

AEPA GicWellId: *1270002*

(1) July 17, 2025, "AS IS"; no warranty either expressed or implied. vist tgwc.com for additional details

Sturgeon County, 2024 to 2025 Groundwater Monitoring Report
Calahoo Resource Extraction District, Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, MR-0224.24

B - 162

RTU
REMOTE TELEMETRY UNIT
HCL

MW04-02: SE16 Pit - Eastern Edge
AEPA - Water Well Drilling Report



Water Well Drilling Report

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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)					
_____ 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

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

[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)					
_____ 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 _____		Is Flow Control Installed _____		
Rate _____ L/min		Describe _____		
Recommended Pump Rate _____ L/min		Pump Installed _____		Depth _____ m
Recommended Pump Intake Depth (From TOC) _____ m		Type _____	Make _____	H.P. _____
		Model (Output Rating) _____		
Did you Encounter Saline Water (>4000 ppm TDS) _____		Depth _____ m	Well Disinfected Upon Completion _____	
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 7/17/2025 9:23:52 AM

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MW04-02: SE16 Pit – Eastern Edge
Chemical Analysis Results (June 12, 2025)



Element
7217 Roper Road NW
Edmonton, Alberta
T6B 3J4, Canada

T: +1 (780) 438-5522
E: info.Edmonton@element.com
W: www.element.com

Page 1 of 10

Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145425 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By:	P.O.: 20023	
Company: HCL	Proj. Acct. code:	

Reference Number	1819420-4
Sample Date	May 29, 2025
Sample Time	15:00
Sample Location	M39227.477802
Sample Description	MW04-02 / 13.9 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	6.99	0.05		
Sulfur	Dissolved	mg/L	76.6	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	0.0005	0.0002	0.010	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	<0.00001	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	0.0004	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	0.0007	0.0005		
Selenium	Dissolved	mg/L	0.0043	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	0.832	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00001		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0048	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	<0.001	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	<5	5		
Turbidity		NTU	0.8	0.1		
Routine Water						
pH			7.34	1	7.0-10.5	Within Range
Temp. of observed pH		°C	20.1			
Electrical Conductivity	at 25 °C	µS/cm	938	1		
Calcium	Dissolved	mg/L	123	0.2		
Magnesium	Dissolved	mg/L	36.0	0.2		

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145425 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Reference Number	1819420-4
Sample Date	May 29, 2025
Sample Time	15:00
Sample Location	M39227.477802
Sample Description	MW04-02 / 13.9 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	36.5	0.4	200	Below AO
Potassium	Dissolved	mg/L	5.3	0.4		
Iron	Dissolved	mg/L	<0.01	0.01	0.1	Below AO
Manganese	Dissolved	mg/L	0.607	0.005	0.02 AO, 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	5.2	0.4	250	Below AO
Fluoride		mg/L	0.07	0.05	1.5	Below MAC
Nitrate - N		mg/L	1.81	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	1.81	0.01		
Sulfate (SO4)	Dissolved	mg/L	230	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	336			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	276	5		
Total Dissolved Solids	Calculated	mg/L	601	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	454			
Ionic Balance	Dissolved	%	102			

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	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145425 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.0005296	-0.04	0.05	yes
Sulfur	mg/L	0.0969684	-0.3	0.2	yes
Aluminum	µg/L	-0.159055	-2	2	yes
Antimony	µg/L	0.00527385	-0.2	0.2	yes
Arsenic	µg/L	-0.00838105	-0.2	0.2	yes
Barium	µg/L	0.0205324	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.747257	-2	2	yes
Cadmium	µg/L	0.00103929	-0.01	0.01	yes
Chromium	µg/L	-0.0370322	-0.5	0.5	yes
Cobalt	µg/L	-9.31717e-005	-0.1	0.1	yes
Copper	µg/L	0.0351031	-0.2	0.2	yes
Lead	µg/L	0.000707898	-0.1	0.1	yes
Lithium	µg/L	0.0347798	-1	1	yes
Molybdenum	µg/L	0.00840797	-1	1	yes
Nickel	µg/L	0.0185909	-0.5	0.5	yes
Selenium	µg/L	0.00058604	-0.2	0.2	yes
Silver	µg/L	0.000743061	-0.01	0.01	yes
Strontium	µg/L	0.0374449	-1	1	yes
Thallium	µg/L	0.00154219	-0.50	0.50	yes
Tin	µg/L	-0.0230673	-1	1	yes
Titanium	µg/L	-0.141492	-0.5	0.5	yes
Uranium	µg/L	0.00107718	-0.5	0.5	yes
Vanadium	µg/L	-0.0453782	-0.1	0.1	yes
Zinc	µg/L	0.25069	-1	1	yes
Mercury	µg/L	0.0001434	-0.051000	0.051000	yes

Date Acquired: June 09, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	990	902	1058	yes
Antimony	µg/L	40.1	36.4	44.2	yes
Arsenic	µg/L	40.0	37.7	42.5	yes
Barium	µg/L	198	181	211	yes
Beryllium	µg/L	19.6	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	378	351	427	yes
Cadmium	µg/L	2.08	1.87	2.23	yes
Chromium	µg/L	99.3	90.8	108.8	yes
Cobalt	µg/L	19.8	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.4	18.3	21.3	yes
Lithium	µg/L	196	178	214	yes
Molybdenum	µg/L	195	178	219	yes
Nickel	µg/L	99.5	93.3	105.9	yes
Selenium	µg/L	39.5	36.9	42.9	yes

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Quality Control

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Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	19.7	18.29	22.31	yes
Strontium	µg/L	195	183	219	yes
Thallium	µg/L	9.71	8.90	10.70	yes
Tin	µg/L	196	187	217	yes
Titanium	µg/L	97.8	91.0	109.0	yes
Uranium	µg/L	101	92.2	110.2	yes
Vanadium	µg/L	19.7	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: June 09, 2025					
Mercury	mg/L	0.000099	0.000070	0.000130	yes
Date Acquired: June 09, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.11	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.0	9.1	10.9	yes
Lead	µg/L	1.1	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.1	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.01	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	4.9	4.4	5.7	yes
Uranium	µg/L	5.1	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000021	0.000006	0.000036	yes
Date Acquired: June 09, 2025					
Silicon	mg/L	10.2	9.51	10.89	yes
Sulfur	mg/L	151	141.6	156.6	yes
Date Acquired: June 09, 2025					
Silicon	mg/L	2.08	1.88	2.24	yes
Sulfur	mg/L	10.3	9.2	10.8	yes
Date Acquired: June 09, 2025					

Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145425 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Silicon	mg/L	0.20	0.18	0.23		yes
Sulfur	mg/L	2.9	2.7	3.1		yes
Date Acquired: June 09, 2025						
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.7	3.6	10	0.01	yes
Sulfur	mg/L	647	647	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	<0.2	<0.2	10	0.4	yes
Barium	µg/L	131	130	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	279	293	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	<0.1	<0.1	10	0.2	yes
Copper	µg/L	<0.2	<0.2	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	30	30	10	2	yes
Molybdenum	µg/L	<1	<1	10	2	yes
Nickel	µg/L	<0.5	<0.5	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	991	1010	10	2	yes
Thallium	µg/L	<0.01	<0.01	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	<0.5	<0.5	10	1.1	yes
Vanadium	µg/L	0.1	0.2	10	0.2	yes
Zinc	µg/L	<1	<1	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: June 09, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.09	-0.1	0.1	yes
Date Acquired: June 06, 2025					
Turbidity	NTU	0.112	0.0	0.1	yes
Date Acquired: June 06, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1920	1881.4	2091.4	yes
Date Acquired: June 06, 2025					
Turbidity	NTU	4530	4020.0	5436.0	yes
Date Acquired: June 06, 2025					

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145425 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Physical and Aggregate Properties - Continued

Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC	
Turbidity	NTU	143	132.1	162.1	yes	
Colour	Colour units	10	10	10	yes	
Date Acquired:	June 06, 2025					
Turbidity	NTU	14.2	12.6	15.6	yes	
Date Acquired:	June 06, 2025					
Turbidity	NTU	1.6	1.0	2.2	yes	
Date Acquired:	June 06, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity	NTU	3.2	3.2	10	0.2	yes
Date Acquired:	June 06, 2025					

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	0.0700376	-0.2	0.2	yes
Magnesium	mg/L	0.0599072	-0.1	0.1	yes
Sodium	mg/L	0.0357922	-0.4	0.4	yes
Potassium	mg/L	0.192832	-0.4	0.4	yes
Iron	mg/L	0.00324691	-0.01	0.01	yes
Manganese	mg/L	0.000677325	-0.004	0.004	yes
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Chloride	mg/L	0.09	-0.4	0.4	yes
Date Acquired: June 09, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2020	1847.4	2256.0	yes
Date Acquired: June 09, 2025					
Electrical Conductivity	dS/m	33.2	27.200	36.800	yes
Date Acquired: June 06, 2025					
pH		9.14	8.90	9.44	yes
Temp. of observed pH	°C	20.9	15.5	24.5	yes
Electrical Conductivity	dS/m	2.77	2.631	2.829	yes
P-Alkalinity	mg/L	540	442	584	yes
T-Alkalinity	mg/L	1020	958	1059	yes
Calcium	mg/L	251	235.3	262.9	yes
Magnesium	mg/L	101	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	250	238.3	262.3	yes
Iron	mg/L	9.92	8.89	10.69	yes
Manganese	mg/L	2.51	2.200	2.680	yes
Fluoride	mg/L	9.97	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145425 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Routine Water - Continued

Control Sample		Units	Measured	Lower Limit	Upper Limit	Passed QC	
Nitrite - N		mg/L	9.76	9.010	10.990	yes	
Nitrate and Nitrite - N		mg/L	19.8	19.10	20.90	yes	
Date Acquired: June 09, 2025							
pH			6.87	6.75	7.05	yes	
Temp. of observed pH		°C	20.9	15.5	24.5	yes	
Electrical Conductivity		dS/m	0.082	0.069	0.085	yes	
P-Alkalinity		mg/L	56	28	72	yes	
T-Alkalinity		mg/L	129	114	140	yes	
Calcium		mg/L	52.7	44.9	56.9	yes	
Magnesium		mg/L	21.3	17.9	22.0	yes	
Sodium		mg/L	50.5	47.1	53.4	yes	
Potassium		mg/L	51.7	45.8	55.8	yes	
Iron		mg/L	2.04	1.89	2.11	yes	
Manganese		mg/L	0.517	0.464	0.536	yes	
Fluoride		mg/L	4.85	4.58	5.24	yes	
Nitrate - N		mg/L	4.77	4.37	5.33	yes	
Nitrite - N		mg/L	4.74	4.370	5.330	yes	
Nitrate and Nitrite - N		mg/L	9.52	8.80	10.60	yes	
Chloride		mg/L	82.5	74.9	86.9	yes	
Date Acquired: June 09, 2025							
Calcium		mg/L	5.2	4.7	5.4	yes	
Magnesium		mg/L	2.1	1.9	2.2	yes	
Sodium		mg/L	5.1	4.7	5.7	yes	
Potassium		mg/L	5.1	4.6	5.6	yes	
Iron		mg/L	0.20	0.18	0.22	yes	
Manganese		mg/L	0.051	0.046	0.057	yes	
Fluoride		mg/L	0.51	0.45	0.57	yes	
Nitrate - N		mg/L	0.51	0.42	0.57	yes	
Nitrite - N		mg/L	0.509	0.455	0.557	yes	
Nitrate and Nitrite - N		mg/L	1.02	0.85	1.15	yes	
Chloride		mg/L	14.2	13.3	16.5	yes	
Date Acquired: June 09, 2025							
Client Sample Replicates	Units		Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
pH			6.90	6.93	0	0.10	yes
Electrical Conductivity		dS/m	40.9	40.8	10	0.002	yes
Hydroxide		mg/L	<5	<5	10		yes
Carbonate		mg/L	<6	<6	10	6	yes
Bicarbonate		mg/L	654	650	10	6	yes
P-Alkalinity		mg/L	<5	<5	10	5	yes
T-Alkalinity		mg/L	537	533	10	5	yes
Calcium		mg/L	317	318	10	0.6	yes
Magnesium		mg/L	304	305	10	0.7	yes
Sodium		mg/L	148	147	10	1.2	yes
Potassium		mg/L	6.4	6.5	10	1.2	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: Company: HCL	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M LSD: P.O.: 20023 Proj. Acct. code:	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145425 Report Type: Final Report

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Iron	mg/L	<0.05	<0.05	10	0.05	yes
Manganese	mg/L	0.30	0.30	10	0.010	yes
Nitrate - N	mg/L	0.06	0.06	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
Fluoride	mg/L	0.05	0.05	10	0.05	yes
Chloride	mg/L	2.1	2.0	10	0.5	yes
Date Acquired: June 09, 2025						

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Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145425 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 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 06, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 06, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 06, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 09, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 06, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 09, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 06, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 09, 2025	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 09, 2025	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 09, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 09, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 09, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 06, 2025	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, August 2024
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:

- Sample 1819420-4; 9983492: Sample received at 13.9 °C

Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.24	Lot ID:	1819420
	17740 - 118 Avenue NW	Project Name:	2025 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 5, 2025
	T5S 2W3	LSD:		Date Reported:	Jun 12, 2025
Attn:	Jennifer Catt	P.O.:	20023	Report Number:	3145425
Sampled By:		Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

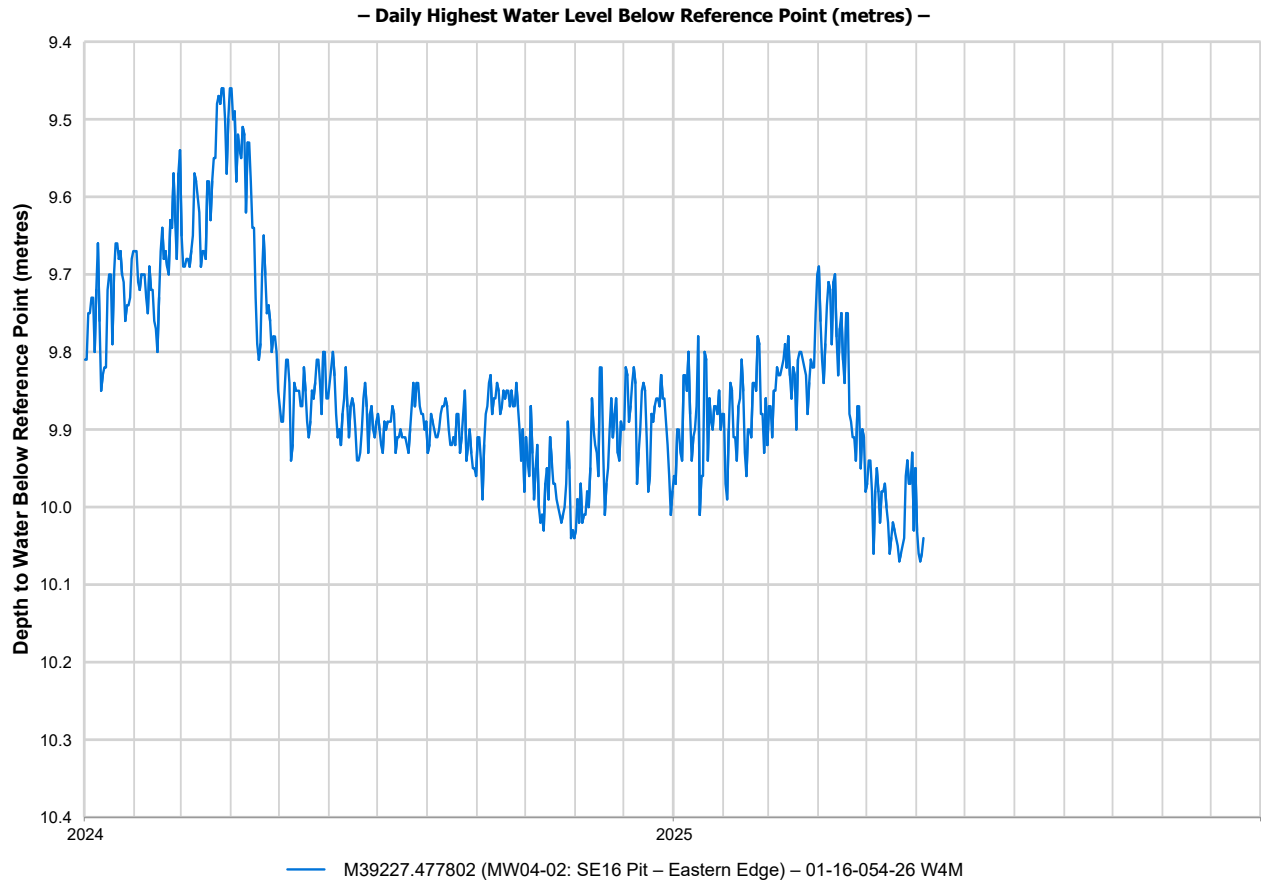
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to 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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MW04-02: SE16 Pit – Eastern Edge
2024 – 2025 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 ***

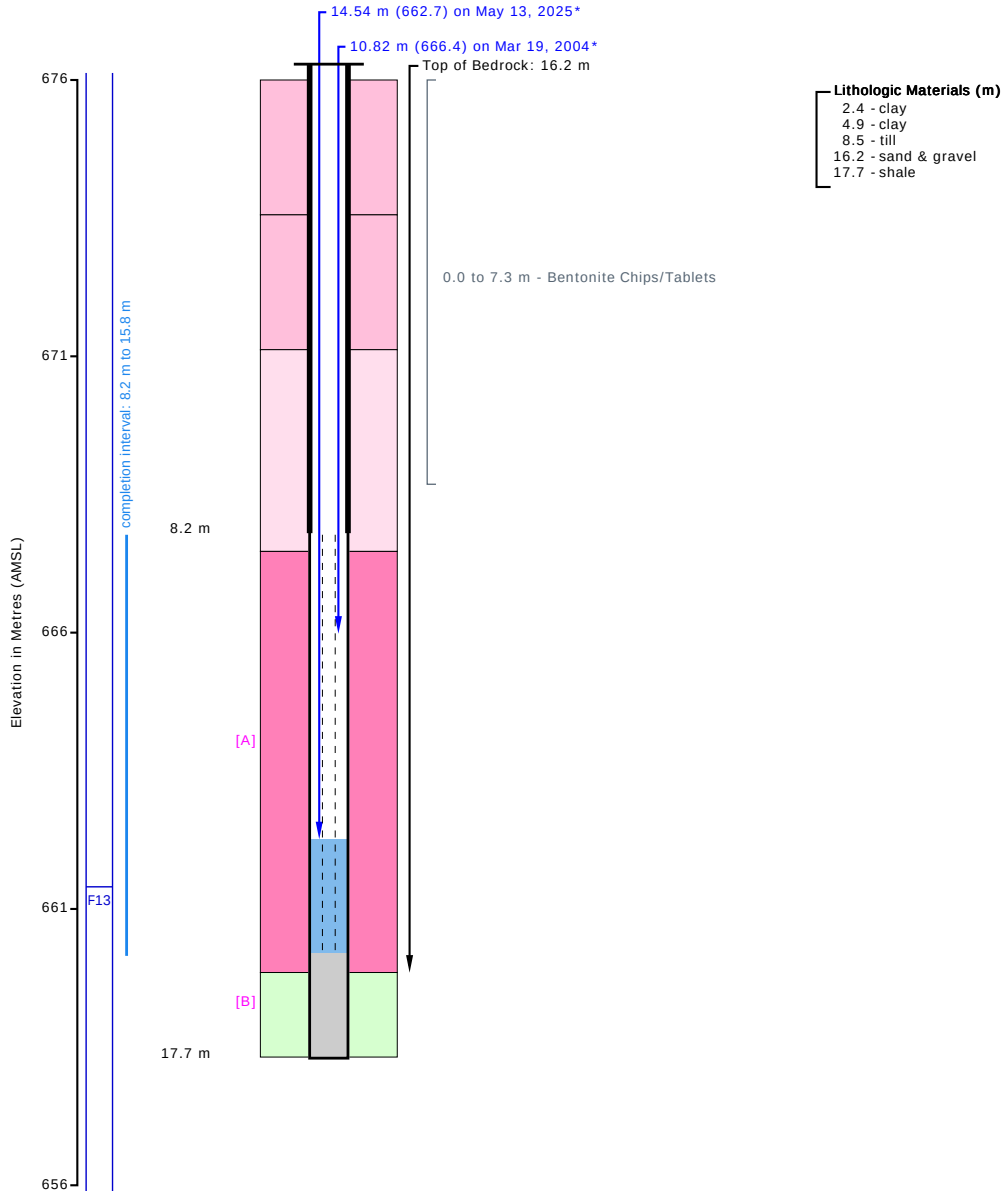
(TGWC determined value)*

Earliest Water Level (m): **10.82 – March 19, 2004**

Most Recent Water Level (m): **14.54 – May 13, 2025 @ 15:28**

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): 14.54 m (662.7 m AMSL) on May 13, 2025 @ 15:28 - 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: July 17, 2025 @ 09:27 --- <https://www.hcl.ca>

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

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	
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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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

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MW04-03
Chemical Analysis Results (May 28, 2025)



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Analytical Report

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:		Date Received:	May 23, 2025
	T5S 2W3	LSD:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Reported:	May 28, 2025
Attn:	Jennifer Catt	P.O.:	20020	Report Number:	3140806
Sampled By:	Ben Gilham	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

Reference Number	1816292-18
Sample Date	May 13, 2025
Sample Time	16:00
Sample Location	M39227.477827
Sample Description	MW04-03 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	8.27	0.05		
Sulfur	Dissolved	mg/L	161	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	0.010	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	0.169	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	0.0008	0.0002	1 AO, 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.178	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0007	0.0005		
Selenium	Dissolved	mg/L	0.0106	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	1.75	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	0.0329	0.0005	0.02	Above MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	<0.001	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	<5	5		
Turbidity		NTU	1.2	0.1		
Routine Water						
pH			7.19	1	7.0-10.5	Within Range
Temp. of observed pH		°C	20.5			
Electrical Conductivity	at 25 °C	µS/cm	1730	1		
Calcium	Dissolved	mg/L	256	0.2		
Magnesium	Dissolved	mg/L	64.0	0.2		

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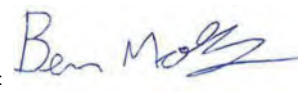
Analytical Report

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M 20020 P.O.: Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140806 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Reference Number	1816292-18
Sample Date	May 13, 2025
Sample Time	16:00
Sample Location	M39227.477827
Sample Description	MW04-03 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	79.1	0.4	200	Below AO
Potassium	Dissolved	mg/L	8.0	0.4		
Iron	Dissolved	mg/L	<0.01	0.01	0.1	Below AO
Manganese	Dissolved	mg/L	<0.005	0.005	0.02 AO, 0.12 MAC	Below AO
Chloride	Dissolved	mg/L	15.1	0.4	250	Below AO
Fluoride		mg/L	0.28	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.04	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	0.04	0.01		
Sulfate (SO4)	Dissolved	mg/L	484	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	661			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	543	5		
Total Dissolved Solids	Calculated	mg/L	1230	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	903			
Ionic Balance	Dissolved	%	102			

Approved by:



Benjamin Morris, B.Sc
Operations 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	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140806 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	-0.0104023	-0.04	0.05	yes
Sulfur	mg/L	0.0176456	-0.3	0.2	yes
Aluminum	µg/L	-0.142723	-2	2	yes
Antimony	µg/L	-0.00198253	-0.2	0.2	yes
Arsenic	µg/L	-0.00520747	-0.2	0.2	yes
Barium	µg/L	0.0155545	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.490366	-2	2	yes
Cadmium	µg/L	0.00106883	-0.01	0.01	yes
Chromium	µg/L	-0.0304354	-0.5	0.5	yes
Cobalt	µg/L	-0.000332921	-0.1	0.1	yes
Copper	µg/L	0.0100485	-0.2	0.2	yes
Lead	µg/L	0.00240083	-0.1	0.1	yes
Lithium	µg/L	-0.00113161	-1	1	yes
Molybdenum	µg/L	0.0194221	-1	1	yes
Nickel	µg/L	0.0142204	-0.5	0.5	yes
Selenium	µg/L	0.00150023	-0.2	0.2	yes
Silver	µg/L	0.00050935	-0.01	0.01	yes
Strontium	µg/L	0.0646959	-1	1	yes
Thallium	µg/L	0.00145131	-0.50	0.50	yes
Tin	µg/L	-0.0724984	-1	1	yes
Titanium	µg/L	-0.0940343	-0.5	0.5	yes
Uranium	µg/L	0.00233484	-0.5	0.5	yes
Vanadium	µg/L	-0.00529231	-0.1	0.1	yes
Zinc	µg/L	0.13059	-1	1	yes
Mercury	µg/L	-0.001039	-0.051000	0.051000	yes

Date Acquired: May 26, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	997	902	1058	yes
Antimony	µg/L	40.5	36.4	44.2	yes
Arsenic	µg/L	39.9	37.7	42.5	yes
Barium	µg/L	196	181	211	yes
Beryllium	µg/L	19.9	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	389	351	427	yes
Cadmium	µg/L	2.16	1.87	2.23	yes
Chromium	µg/L	100	90.8	108.8	yes
Cobalt	µg/L	20.0	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.2	18.3	21.3	yes
Lithium	µg/L	197	178	214	yes
Molybdenum	µg/L	198	178	219	yes
Nickel	µg/L	99.9	93.3	105.9	yes
Selenium	µg/L	39.9	36.9	42.9	yes

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Quality Control

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Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	20.1	18.29	22.31	yes
Strontium	µg/L	200	183	219	yes
Thallium	µg/L	9.86	8.90	10.70	yes
Tin	µg/L	201	187	217	yes
Titanium	µg/L	101	91.0	109.0	yes
Uranium	µg/L	102	92.2	110.2	yes
Vanadium	µg/L	20.0	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: May 26, 2025					
Mercury	mg/L	0.000100	0.000070	0.000130	yes
Date Acquired: May 26, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.10	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.1	9.1	10.9	yes
Lead	µg/L	1.0	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.2	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.02	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	5.0	4.4	5.7	yes
Uranium	µg/L	5.2	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000020	0.000006	0.000036	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	9.62	9.51	10.89	yes
Sulfur	mg/L	150	141.6	156.6	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	2.03	1.88	2.24	yes
Sulfur	mg/L	10.2	9.1	10.6	yes
Date Acquired: May 26, 2025					

Quality Control

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Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.20	0.18	0.23	yes
Sulfur	mg/L	2.9	2.7	3.1	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	7.36	7.37	10	0.01	yes
Sulfur	mg/L	34.6	35.0	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	5.9	6.0	10	0.4	yes
Barium	µg/L	31	31	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	163	161	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	0.8	0.8	10	0.2	yes
Copper	µg/L	0.5	0.5	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	89	89	10	2	yes
Molybdenum	µg/L	<1	<1	10	2	yes
Nickel	µg/L	1.1	1.0	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	1090	1090	10	2	yes
Thallium	µg/L	<0.05	<0.05	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	2.8	2.8	10	1.1	yes
Vanadium	µg/L	<0.1	<0.1	10	0.2	yes
Zinc	µg/L	27	27	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: May 26, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.099	-0.1	0.1	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	0.114	0.0	0.1	yes
Date Acquired: May 27, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1930	1881.4	2091.4	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	4540	4020.0	5436.0	yes
Date Acquired: May 27, 2025					

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Quality Control

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Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Physical and Aggregate Properties - Continued

Control Sample		Units	Measured	Lower Limit	Upper Limit	Passed QC	
Colour		Colour units	10	10	10	yes	
Turbidity		NTU	144	132.1	162.1	yes	
Date Acquired:	May 27, 2025						
Turbidity		NTU	14.2	12.6	15.6	yes	
Date Acquired:	May 27, 2025						
Turbidity		NTU	1.6	1.0	2.2	yes	
Date Acquired:	May 27, 2025						
Client Sample Replicates		Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity		NTU	43.7	45.2	10	0.2	yes
Date Acquired:	May 27, 2025						

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0.00594322	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Calcium	mg/L	0.0341995	-0.2	0.2	yes
Magnesium	mg/L	0.00865101	-0.1	0.1	yes
Sodium	mg/L	0.0649477	-0.4	0.4	yes
Potassium	mg/L	0.024503	-0.4	0.4	yes
Iron	mg/L	0.00335118	-0.01	0.01	yes
Manganese	mg/L	0.000111042	-0.004	0.004	yes
Chloride	mg/L	0.15	-0.4	0.4	yes
Date Acquired: May 26, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2140	1847.4	2256.0	yes
Date Acquired: May 26, 2025					
Electrical Conductivity	dS/m	32.9	27.200	36.800	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	9.90	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes
Nitrite - N	mg/L	9.61	9.010	10.990	yes
Nitrate and Nitrite - N	mg/L	19.6	19.10	20.90	yes
pH		9.18	8.90	9.44	yes
Temp. of observed pH	°C	20.1	15.5	24.5	yes
Electrical Conductivity	dS/m	2.77	2.631	2.829	yes
P-Alkalinity	mg/L	519	442	584	yes
T-Alkalinity	mg/L	997	958	1059	yes
Calcium	mg/L	242	235.3	262.9	yes
Magnesium	mg/L	97.6	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	241	238.3	262.3	yes

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

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140806 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC	
Iron	mg/L	9.47	8.89	10.69	yes	
Manganese	mg/L	2.39	2.200	2.680	yes	
Date Acquired:	May 26, 2025					
Fluoride	mg/L	4.80	4.58	5.24	yes	
Nitrate - N	mg/L	4.71	4.37	5.33	yes	
Nitrite - N	mg/L	4.64	4.370	5.330	yes	
Nitrate and Nitrite - N	mg/L	9.35	8.80	10.60	yes	
pH		6.87	6.75	7.05	yes	
Temp. of observed pH	°C	20.3	15.5	24.5	yes	
Electrical Conductivity	dS/m	0.076	0.069	0.085	yes	
P-Alkalinity	mg/L	52	28	72	yes	
T-Alkalinity	mg/L	127	114	140	yes	
Calcium	mg/L	51.2	44.9	56.9	yes	
Magnesium	mg/L	20.4	17.9	22.0	yes	
Sodium	mg/L	51.9	47.1	53.4	yes	
Potassium	mg/L	50.3	45.8	55.8	yes	
Iron	mg/L	1.98	1.89	2.11	yes	
Manganese	mg/L	0.496	0.464	0.536	yes	
Chloride	mg/L	83.5	74.9	86.9	yes	
Date Acquired:	May 26, 2025					
Fluoride	mg/L	0.50	0.45	0.57	yes	
Nitrate - N	mg/L	0.51	0.42	0.57	yes	
Nitrite - N	mg/L	0.496	0.455	0.557	yes	
Nitrate and Nitrite - N	mg/L	1.01	0.85	1.15	yes	
Calcium	mg/L	5.1	4.7	5.4	yes	
Magnesium	mg/L	2.1	1.9	2.2	yes	
Sodium	mg/L	5.2	4.7	5.7	yes	
Potassium	mg/L	4.8	4.6	5.6	yes	
Iron	mg/L	0.19	0.18	0.22	yes	
Manganese	mg/L	0.048	0.046	0.057	yes	
Chloride	mg/L	15.2	13.3	16.5	yes	
Date Acquired:	May 26, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Fluoride	mg/L	0.09	0.08	10	0.05	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
pH		7.56	7.53	0	0.10	yes
Electrical Conductivity	dS/m	0.944	0.942	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	583	583	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	478	478	10	5	yes
Calcium	mg/L	129	129	10	0.6	yes

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



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E: info.Edmonton@element.com
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Page 8 of 10

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140806 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Magnesium	mg/L	28.9	28.7	10	0.7	yes
Sodium	mg/L	51.6	51.8	10	1.2	yes
Potassium	mg/L	3.7	3.8	10	1.2	yes
Iron	mg/L	0.01	0.01	10	0.05	yes
Manganese	mg/L	0.833	0.835	10	0.010	yes
Chloride	mg/L	0.7	0.7	10	0.5	yes
Date Acquired: May 26, 2025						

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140806 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	May 26, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	May 26, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	May 26, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	May 26, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	May 27, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	May 26, 2025	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	May 26, 2025	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	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	May 26, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	May 27, 2025	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, August 2024
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:

- Sample 1816292-18; 9956347: Sample received at 11.6 °C

Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater	Control Number:	
	Edmonton, AB, Canada		Monitoring	Date Received:	May 23, 2025
	T5S 2W3	Project Location:		Date Reported:	May 28, 2025
Attn:	Jennifer Catt	LSD:	Tp 054, R 26 to 28, W4M	Report Number:	3140806
Sampled By:	Ben Gilham		and Tp 054, R 01, W5M	Report Type:	Final Report
Company:	HCL	P.O.:	20020		
		Proj. Acct. code:			

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.

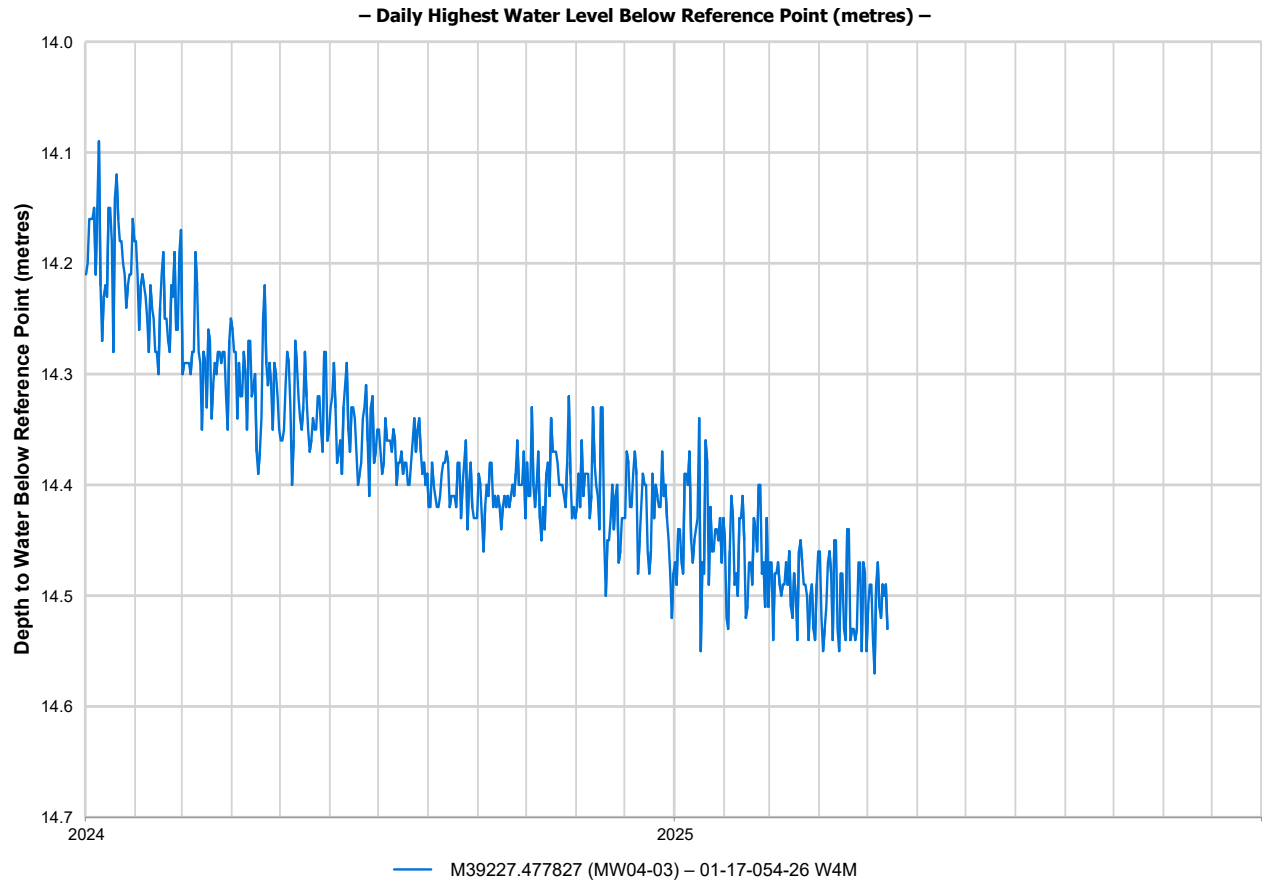
Please direct any inquiries regarding this report to our Client Services group.

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
2024 - 2025 Hydrograph



MW05-01

(2005 Observation Water Well No. 09-27)

09-27-054-27 W4M

(M39227.483721)



Photograph taken on May 31, 2023

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 ***

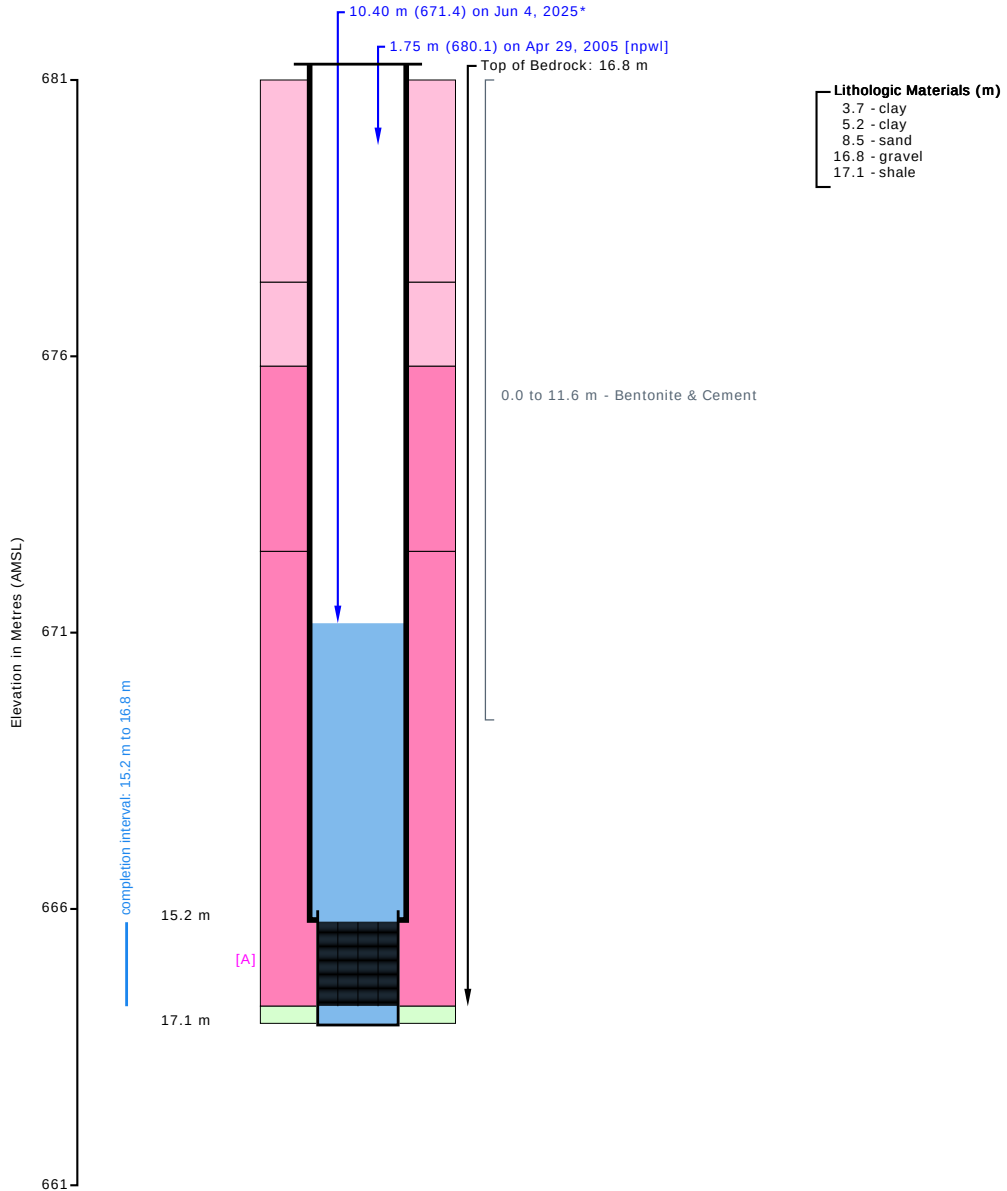
(* TGWC determined value)

Earliest Water Level (m): **1.75 – April 29, 2005**

Most Recent Water Level (m): **10.40 – June 4, 2025 @ 23:00**

GIC ID: **1495114**

MW05-01 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			
	Coarse Grained			
	Other			

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): 10.40 m (671.4 m AMSL) on Jun 4, 2025 @ 23:00 - 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: July 17, 2025 @ 09:27 --- <https://www.hcl.ca>

Owner: Inland Aggregates Ltd. 15015 123rd Avenue, Edmonton, AB T5V 1J7 Contractor: Mar-Wayne Water Well Drilling Services Ltd. Name: MW05-01 (2005 Observation Water Well No. 09-27) Field Action: Confirmed - Physically, October 12, 2017 Work Type: New Well Drilling Method: Rotary Proposed Use: Observation Completion Type: Screen Date Started: April 26, 2005 Date Completed: April 26, 2005 Well Status: Observation Feature Class: Water Well			09-27-054-27 W4M Easting (m): 73,392 ² Northing (m): 5,947,739 ² Elevation (m): 681 ²		M39227.483721 Elog Taken: No Gamma Taken: No Flowing: No Presence of Gas: No Stick Up (m): 0.6 2025-06-04																																																																																																																																					
General Details * TGWC calculated value Depth Completed (m)*: 16.8 Top of Bedrock (m): 16.8 m Depth Drilled (m)*: 17.1 Completion Interval (m): 15.2 – 16.8 Sand & Gravel Thickness (m): 3.4 (total) * Most Recent Water Level (m): 10.40 m – June 4, 2025			Lithology Details <table><tr><th>Elevation</th><th>Depth</th><th></th></tr><tr><th>(AMSL)</th><th>(BGL)</th><th>Lithology Descriptions</th></tr><tr><td>677.6</td><td>3.7</td><td>Grey Clay</td></tr><tr><td>676.1</td><td>5.2</td><td>Silty Brown Clay</td></tr><tr><td>672.7</td><td>8.5</td><td>Coarse-Grained Sand</td></tr><tr><td>664.5</td><td>16.8</td><td>Gravel</td></tr><tr><td>664.2</td><td>17.1</td><td>Soft Green Shale</td></tr></table>				Elevation	Depth		(AMSL)	(BGL)	Lithology Descriptions	677.6	3.7	Grey Clay	676.1	5.2	Silty Brown Clay	672.7	8.5	Coarse-Grained Sand	664.5	16.8	Gravel	664.2	17.1	Soft Green Shale																																																																																																															
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Completion Details Surface Casing: Plastic – 152.4 mm (O.D.) x 12.70 mm (thick) x 15.2 m (bottom) Screen Material: Stainless Steel – 127.0 mm (O.D.) (Attached To Casing) Fittings: Top: Coupler – Bottom: Plug Intervals Screen: 15.2 to 16.8 m - 0.3048 mm Bentonite & Cement: 0.0 to 11.6 m																																																																																																																																										
Chemistry Summary Details (mg/L, except as noted) (recently sampled first) Sampling Details: May 1, 2025 @ 15:05 Report Date: May 28, 2025 - Element Materials Technology Canada Inc. (1816292-5) <table><tr><th>Constituent</th><th>Result</th><th>Constituent</th><th>Result</th><th>Constituent</th><th>Result</th></tr><tr><td>Conductivity (µS/cm):</td><td>980</td><td>Nitrate as N:</td><td>< 0.01</td><td>Turbidity (NTU):</td><td>23.0</td></tr><tr><td>Total Dissolved Solids:</td><td>581</td><td>Nitrite as N:</td><td>< 0.005</td><td>Fluoride:</td><td>0.08</td></tr><tr><td>Hardness (as CaCO3):</td><td>434</td><td>pH (pH Unit):</td><td>7.81</td><td>Carbonate:</td><td>< 6</td></tr><tr><td>T-Alkalinity (as CaCO3):</td><td>507</td><td>Colour (TCU):</td><td>> 60</td><td>Bicarbonate:</td><td>618</td></tr><tr><td>P-Alkalinity (as CaCO3):</td><td>< 5</td><td>Ion Balance (%):</td><td>102</td><td>Hydroxide:</td><td>< 5</td></tr><tr><td>Nitrate + Nitrite as N:</td><td>< 0.01</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>21.2</td><td>Escherichia coli:**</td><td></td><td></td><td></td></tr></table> <table><tr><th>Constituent</th><th>Extractable</th><th>Dissolved</th><th>Constituent</th><th>Extractable</th><th>Dissolved</th></tr><tr><td>Calcium:</td><td></td><td>123</td><td>Mercury:</td><td></td><td>< 0.000005</td></tr><tr><td>Chloride:</td><td></td><td>0.6</td><td>Molybdenum:</td><td></td><td>< 0.001</td></tr><tr><td>Iron:</td><td></td><td>1.33</td><td>Magnesium:</td><td></td><td>30.9</td></tr><tr><td>Manganese:</td><td></td><td>0.832***</td><td>Sodium:</td><td></td><td>62.7</td></tr><tr><td>Aluminum:</td><td></td><td>< 0.002</td><td>Potassium:</td><td></td><td>3.7</td></tr><tr><td>Arsenic:</td><td></td><td>0.0016</td><td>Vanadium:</td><td></td><td>< 0.0001</td></tr><tr><td>Barium:</td><td></td><td>0.068</td><td>Strontium:</td><td></td><td>0.837</td></tr><tr><td>Beryllium:</td><td></td><td>< 0.0001</td><td>Nickel:</td><td></td><td>0.0009</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>0.0007</td><td>Lead:</td><td></td><td>< 0.0001</td></tr><tr><td>Sulfate:</td><td></td><td>56.7</td><td>Uranium:</td><td></td><td>0.0070</td></tr></table>			Constituent	Result	Constituent	Result	Constituent	Result	Conductivity (µS/cm):	980	Nitrate as N:	< 0.01	Turbidity (NTU):	23.0	Total Dissolved Solids:	581	Nitrite as N:	< 0.005	Fluoride:	0.08	Hardness (as CaCO3):	434	pH (pH Unit):	7.81	Carbonate:	< 6	T-Alkalinity (as CaCO3):	507	Colour (TCU):	> 60	Bicarbonate:	618	P-Alkalinity (as CaCO3):	< 5	Ion Balance (%):	102	Hydroxide:	< 5	Nitrate + Nitrite as N:	< 0.01	Total Coliforms:**		Total Iron:		Total Suspended Solids:		Fecal Coliforms:**		Total Mn:		Temperature (°C):	21.2	Escherichia coli:**				Constituent	Extractable	Dissolved	Constituent	Extractable	Dissolved	Calcium:		123	Mercury:		< 0.000005	Chloride:		0.6	Molybdenum:		< 0.001	Iron:		1.33	Magnesium:		30.9	Manganese:		0.832***	Sodium:		62.7	Aluminum:		< 0.002	Potassium:		3.7	Arsenic:		0.0016	Vanadium:		< 0.0001	Barium:		0.068	Strontium:		0.837	Beryllium:		< 0.0001	Nickel:		0.0009	Cadmium:		< 0.00001	Zinc:		0.001	Chromium:		< 0.0005	Copper:		< 0.0002	Cobalt:		0.0007	Lead:		< 0.0001	Sulfate:		56.7	Uranium:		0.0070	Comments & Observations Field Survey (HCL), Oct 12, 2017: Hydrogeological Consultants Ltd. (HCL) confirmed observation water well is situated along treeline. HCL padlock installed. Observation water well was drilled and completed for Inland but is situated on Lafarge property; Bill Gowdy with Lafarge confirmed that observation water well is on Lafarge property. Original legal location on water well drilling report: SE 27-054-27 W4M; legal location updated to 09-27 after field confirmation. Initial, Apr 26, 2005: LSD: North PM. SE. Water well drilling report listed screen O.D.			
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Comments: Sample collected by Hydrogeological Consultants Ltd. personnel. ***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2025. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario. 850341; 1 / 10																																																																																																																																										
Aquifer Tests <table><tr><th>Date & Time</th><th>Testing Method / Type</th><th>Depth of Test Interval</th><th>Duration (minutes) Pumping Recovery</th><th>Avg. Rate (Lpm)</th><th>NPWL (metres)</th><th>Drawdown (metres)</th><th>Pump (metres)</th><th>Q20 (m³/day)* Apparent Effective</th><th>Transmissivity (m²/day)* Apparent Aquifer Effective</th></tr><tr><td>1 2005-04-29</td><td>Pump</td><td>[unknown]</td><td>120 120</td><td>60.0</td><td>1.8</td><td>9.2</td><td>13.0</td><td>57.7</td><td>11.3</td></tr></table>			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 2005-04-29	Pump	[unknown]	120 120	60.0	1.8	9.2	13.0	57.7	11.3	Pump Intake BTQC (m): 13.0 on April 29, 2005																																																																																																																			
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 2005-04-29	Pump	[unknown]	120 120	60.0	1.8	9.2	13.0	57.7	11.3																																																																																																																																	
Alias IDs AEPA WellId: 1495114 AEPA WellReportId: 10958608 AEPA GicWellId: 1495114			Z582372 ¹HCL GPS — 10TM Resource NAD83, ²HCL DEM																																																																																																																																							



(1) July 17, 2025, "AS IS"; no warranty either expressed or implied. visit tgwc.com for additional details

MW05-01
AEPA - Water Well Drilling Report



Water Well Drilling Report

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GIC Well ID 1495114
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	
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
MAR-WAYNE WATER WELL DRILLING SERVICES LTD.	Date approval holder signed

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

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	
<i>Owner Name</i>		<i>Address</i>			<i>Town</i>		<i>Province</i>		<i>Country</i>	<i>Postal Code</i>	
INLAND AGGREGATES		15015 - 123 AVE			EDMONTON		AB		CA	T5V 1J7	
<i>Location</i>	<i>1/4 or LSD</i>	<i>SEC</i>	<i>TWP</i>	<i>RGE</i>	<i>W of MER</i>	<i>Lot</i>	<i>Block</i>	<i>Plan</i>	<i>Additional Description</i>		
	SE	27	54	27	4						
<i>Measured from Boundary of</i>					<i>GPS Coordinates in Decimal Degrees (NAD 83)</i>						
					<i>Latitude</i>		<i>Longitude</i>		<i>Elevation</i>		<i>m</i>
					53.690500		-113.892000				
					<i>How Location Obtained</i>					<i>How Elevation Obtained</i>	
					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 _____			Well Disinfected Upon Completion _____		
Remedial Action Taken _____			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					
Type	Pump				
Removal Rate	60.01 L/min				
Depth Withdrawn From	13.00 m				
If water removal period was < 2 hours, explain why					
			Pumping (m)	Elapsed Time Minutes:Sec	Recovery (m)
			1.75	0:00	10.92
			4.83	1:00	7.36
			6.61	2:00	5.18
			7.74	3:00	3.88
			8.50	4:00	3.08
			8.99	5:00	2.59
			9.32	6:00	2.27
			9.55	7:00	2.10
			9.71	8:00	1.99
			9.83	9:00	1.93
			9.93	10:00	1.89
			10.06	12:00	1.86
			10.15	14:00	1.84
			10.22	16:00	1.83
			10.33	20:00	1.82
			10.45	25:00	1.81
			10.53	30:00	1.81
			10.55	35:00	1.80
			10.58	40:00	1.80
			10.70	50:00	1.79
			10.75	60:00	1.79
			10.77	75:00	1.78
			10.84	90:00	1.78
			10.89	105:00	1.77
			10.92	120:00	1.77

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

Contractor Certification <i>Name of Journeyman responsible for drilling/construction of well</i> TERRY BERGSTREISER <i>Company Name</i> MAR-WAYNE WATER WELL DRILLING SERVICES LTD.		<i>Certification No</i> 41955A <i>Copy of Well report provided to owner</i> <i>Date approval holder signed</i>

MW05-01
Chemical Analysis Results (May 28, 2025)



Element
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Page 1 of 10

Analytical Report

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:		Date Received:	May 23, 2025
	T5S 2W3	LSD:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Reported:	May 28, 2025
Attn:	Jennifer Catt	P.O.:	20020	Report Number:	3140793
Sampled By:	Ben Gilham	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

Reference Number	1816292-5
Sample Date	May 01, 2025
Sample Time	15:05
Sample Location	M39227.483721
Sample Description	MW05-01 / 11.6 °C
Sample Matrix	Water

Analyte	Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved					
Silicon	Dissolved	mg/L	7.02	0.05	
Sulfur	Dissolved	mg/L	18.9	0.3	
Mercury	Dissolved	mg/L	<0.000005	0.000005	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG, 2.9 MAC
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006
Arsenic	Dissolved	mg/L	0.0016	0.0002	0.010
Barium	Dissolved	mg/L	0.068	0.001	2.0
Beryllium	Dissolved	mg/L	<0.0001	0.0001	
Bismuth	Dissolved	mg/L	<0.0005	0.0005	
Boron	Dissolved	mg/L	0.078	0.002	5
Cadmium	Dissolved	mg/L	<0.00001	0.00001	0.007
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05
Cobalt	Dissolved	mg/L	0.0007	0.0001	
Copper	Dissolved	mg/L	<0.0002	0.0002	1 AO, 2 MAC
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005
Lithium	Dissolved	mg/L	0.078	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
Silver	Dissolved	mg/L	<0.00001	0.00001	
Strontium	Dissolved	mg/L	0.837	0.001	7.0
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
Vanadium	Dissolved	mg/L	<0.0001	0.0001	
Zinc	Dissolved	mg/L	0.001	0.001	5.0
Subsample			Field Filtered		Below AO
Physical and Aggregate Properties					
Colour	Apparent, Potable	Colour units	>60	5	
Turbidity		NTU	23.0	0.1	
Routine Water					
pH			7.81	1	7.0-10.5
Temp. of observed pH		°C	21.2		Within Range
Electrical Conductivity	at 25 °C	µS/cm	980	1	
Calcium	Dissolved	mg/L	123	0.2	
Magnesium	Dissolved	mg/L	30.9	0.2	

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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M 20020 P.O.: Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140793 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Reference Number	1816292-5
Sample Date	May 01, 2025
Sample Time	15:05
Sample Location	M39227.483721
Sample Description	MW05-01 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	62.7	0.4	200	Below AO
Potassium	Dissolved	mg/L	3.7	0.4		
Iron	Dissolved	mg/L	1.33	0.01	0.1	Above AO
Manganese	Dissolved	mg/L	0.832	0.005	0.02 AO, 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	0.6	0.4	250	Below AO
Fluoride		mg/L	0.08	0.05	1.5	Below MAC
Nitrate - N		mg/L	<0.01	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	<0.01	0.01		
Sulfate (SO4)	Dissolved	mg/L	56.7	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	618			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	507	5		
Total Dissolved Solids	Calculated	mg/L	581	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	434			
Ionic Balance	Dissolved	%	102			

Approved by:

Benjamin Morris, B.Sc
Operations 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	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140793 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.00704748	-0.04	0.05	yes
Sulfur	mg/L	0.107846	-0.3	0.2	yes
Aluminum	µg/L	-0.142723	-2	2	yes
Antimony	µg/L	-0.00198253	-0.2	0.2	yes
Arsenic	µg/L	-0.00520747	-0.2	0.2	yes
Barium	µg/L	0.0155545	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.490366	-2	2	yes
Cadmium	µg/L	0.00106883	-0.01	0.01	yes
Chromium	µg/L	-0.0304354	-0.5	0.5	yes
Cobalt	µg/L	-0.000332921	-0.1	0.1	yes
Copper	µg/L	0.0100485	-0.2	0.2	yes
Lead	µg/L	0.00240083	-0.1	0.1	yes
Lithium	µg/L	-0.00113161	-1	1	yes
Molybdenum	µg/L	0.0194221	-1	1	yes
Nickel	µg/L	0.0142204	-0.5	0.5	yes
Selenium	µg/L	0.00150023	-0.2	0.2	yes
Silver	µg/L	0.00050935	-0.01	0.01	yes
Strontium	µg/L	0.0646959	-1	1	yes
Thallium	µg/L	0.00145131	-0.50	0.50	yes
Tin	µg/L	-0.0724984	-1	1	yes
Titanium	µg/L	-0.0940343	-0.5	0.5	yes
Uranium	µg/L	0.00233484	-0.5	0.5	yes
Vanadium	µg/L	-0.00529231	-0.1	0.1	yes
Zinc	µg/L	0.13059	-1	1	yes
Mercury	µg/L	-0.001039	-0.051000	0.051000	yes

Date Acquired: May 26, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	997	902	1058	yes
Antimony	µg/L	40.5	36.4	44.2	yes
Arsenic	µg/L	39.9	37.7	42.5	yes
Barium	µg/L	196	181	211	yes
Beryllium	µg/L	19.9	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	389	351	427	yes
Cadmium	µg/L	2.16	1.87	2.23	yes
Chromium	µg/L	100	90.8	108.8	yes
Cobalt	µg/L	20.0	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.2	18.3	21.3	yes
Lithium	µg/L	197	178	214	yes
Molybdenum	µg/L	198	178	219	yes
Nickel	µg/L	99.9	93.3	105.9	yes
Selenium	µg/L	39.9	36.9	42.9	yes

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140793 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	20.1	18.29	22.31	yes
Strontium	µg/L	200	183	219	yes
Thallium	µg/L	9.86	8.90	10.70	yes
Tin	µg/L	201	187	217	yes
Titanium	µg/L	101	91.0	109.0	yes
Uranium	µg/L	102	92.2	110.2	yes
Vanadium	µg/L	20.0	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: May 26, 2025					
Mercury	mg/L	0.000100	0.000070	0.000130	yes
Date Acquired: May 26, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.10	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.1	9.1	10.9	yes
Lead	µg/L	1.0	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.2	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.02	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	5.0	4.4	5.7	yes
Uranium	µg/L	5.2	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000020	0.000006	0.000036	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	9.62	9.51	10.89	yes
Sulfur	mg/L	150	141.6	156.6	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	2.03	1.88	2.24	yes
Sulfur	mg/L	10.2	9.1	10.6	yes
Date Acquired: May 26, 2025					

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140793 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.20	0.18	0.23	yes
Sulfur	mg/L	2.9	2.7	3.1	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.21	3.26	10	0.01	yes
Sulfur	mg/L	38.2	39.0	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	<0.2	<0.2	10	0.4	yes
Barium	µg/L	38	38	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	163	168	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	<0.1	<0.1	10	0.2	yes
Copper	µg/L	<0.2	<0.2	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	16	17	10	2	yes
Molybdenum	µg/L	3	2	10	2	yes
Nickel	µg/L	<0.5	<0.5	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	57	58	10	2	yes
Thallium	µg/L	<0.05	<0.05	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	<0.5	<0.5	10	1.1	yes
Vanadium	µg/L	0.2	0.1	10	0.2	yes
Zinc	µg/L	<1	2	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: May 26, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.099	-0.1	0.1	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	0.114	0.0	0.1	yes
Date Acquired: May 27, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1930	1881.4	2091.4	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	4550	4020.0	5436.0	yes
Date Acquired: May 27, 2025					

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

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140793 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Physical and Aggregate Properties - Continued

continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Colour	Colour units	10	10	10		yes
Turbidity	NTU	144	132.1	162.1		yes
Date Acquired:	May 27, 2025					
Turbidity	NTU	14.3	12.6	15.6		yes
Date Acquired:	May 27, 2025					
Turbidity	NTU	1.6	1.0	2.2		yes
Date Acquired:	May 27, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity	NTU	3.1	2.9	10	0.2	yes
Date Acquired:	May 27, 2025					

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0.00152937	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Calcium	mg/L	0.0798772	-0.2	0.2	yes
Magnesium	mg/L	0.0424654	-0.1	0.1	yes
Sodium	mg/L	0.144685	-0.4	0.4	yes
Potassium	mg/L	0.194533	-0.4	0.4	yes
Iron	mg/L	0.00603323	-0.01	0.01	yes
Manganese	mg/L	0.000767739	-0.004	0.004	yes
Chloride	mg/L	0.15	-0.4	0.4	yes
Date Acquired: May 26, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2140	1847.4	2256.0	yes
Date Acquired: May 26, 2025					
Electrical Conductivity	dS/m	32.7	27.200	36.800	yes
Date Acquired: May 26, 2025					
pH		9.20	8.90	9.44	yes
Temp. of observed pH	°C	21.2	15.5	24.5	yes
Electrical Conductivity	dS/m	2.79	2.631	2.829	yes
P-Alkalinity	mg/L	516	442	584	yes
T-Alkalinity	mg/L	1000	958	1059	yes
Fluoride	mg/L	9.90	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes
Nitrite - N	mg/L	9.61	9.010	10.990	yes
Nitrate and Nitrite - N	mg/L	19.6	19.10	20.90	yes
Calcium	mg/L	242	235.3	262.9	yes
Magnesium	mg/L	97.6	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	241	238.3	262.3	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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140793 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Iron	mg/L	9.47	8.89	10.69		yes
Manganese	mg/L	2.39	2.200	2.680		yes
Date Acquired: May 26, 2025						
pH		6.83	6.75	7.05		yes
Temp. of observed pH	°C	21.4	15.5	24.5		yes
Electrical Conductivity	dS/m	0.075	0.069	0.085		yes
P-Alkalinity	mg/L	47	28	72		yes
T-Alkalinity	mg/L	130	114	140		yes
Fluoride	mg/L	4.80	4.58	5.24		yes
Nitrate - N	mg/L	4.71	4.37	5.33		yes
Nitrite - N	mg/L	4.64	4.370	5.330		yes
Nitrate and Nitrite - N	mg/L	9.35	8.80	10.60		yes
Calcium	mg/L	51.2	44.9	56.9		yes
Magnesium	mg/L	20.4	17.9	22.0		yes
Sodium	mg/L	51.9	47.1	53.4		yes
Potassium	mg/L	50.3	45.8	55.8		yes
Iron	mg/L	1.98	1.89	2.11		yes
Manganese	mg/L	0.496	0.464	0.536		yes
Chloride	mg/L	83.5	74.9	86.9		yes
Date Acquired: May 26, 2025						
Fluoride	mg/L	0.50	0.45	0.57		yes
Nitrate - N	mg/L	0.51	0.42	0.57		yes
Nitrite - N	mg/L	0.496	0.455	0.557		yes
Nitrate and Nitrite - N	mg/L	1.01	0.85	1.15		yes
Calcium	mg/L	5.1	4.7	5.4		yes
Magnesium	mg/L	2.1	1.9	2.2		yes
Sodium	mg/L	5.2	4.7	5.7		yes
Potassium	mg/L	4.8	4.6	5.6		yes
Iron	mg/L	0.19	0.18	0.22		yes
Manganese	mg/L	0.048	0.046	0.057		yes
Chloride	mg/L	15.2	13.3	16.5		yes
Date Acquired: May 26, 2025						
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
pH		7.29	7.26	0	0.10	yes
Electrical Conductivity	dS/m	1.09	1.08	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	602	599	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	494	491	10	5	yes
Fluoride	mg/L	0.09	0.08	10	0.05	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
Calcium	mg/L	86.8	87.6	10	0.6	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: Ben Gilham Company: HCL	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140793 Report Type: Final Report

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Magnesium	mg/L	26.7	26.8	10	0.7	yes
Sodium	mg/L	77.9	79.0	10	1.2	yes
Potassium	mg/L	5.2	5.3	10	1.2	yes
Iron	mg/L	0.03	0.03	10	0.05	yes
Manganese	mg/L	0.071	0.072	10	0.010	yes
Chloride	mg/L	0.7	0.7	10	0.5	yes
Date Acquired: May 26, 2025						

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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: T5S 2W3 LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140793 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	May 26, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	May 26, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	May 26, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	May 26, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	May 27, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	May 26, 2025	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	May 26, 2025	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	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	May 26, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	May 27, 2025	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, August 2024
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:

- Sample 1816292-5; 9956334: Sample received at 11.6 °C

Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:		Date Received:	May 23, 2025
	T5S 2W3	LSD:	Tp 054, R 26 to 28, W4M	Date Reported:	May 28, 2025
Attn:	Jennifer Catt		and Tp 054, R 01, W5M	Report Number:	3140793
Sampled By:	Ben Gilham	P.O.:	20020	Report Type:	Final Report
Company:	HCL	Proj. Acct. code:			

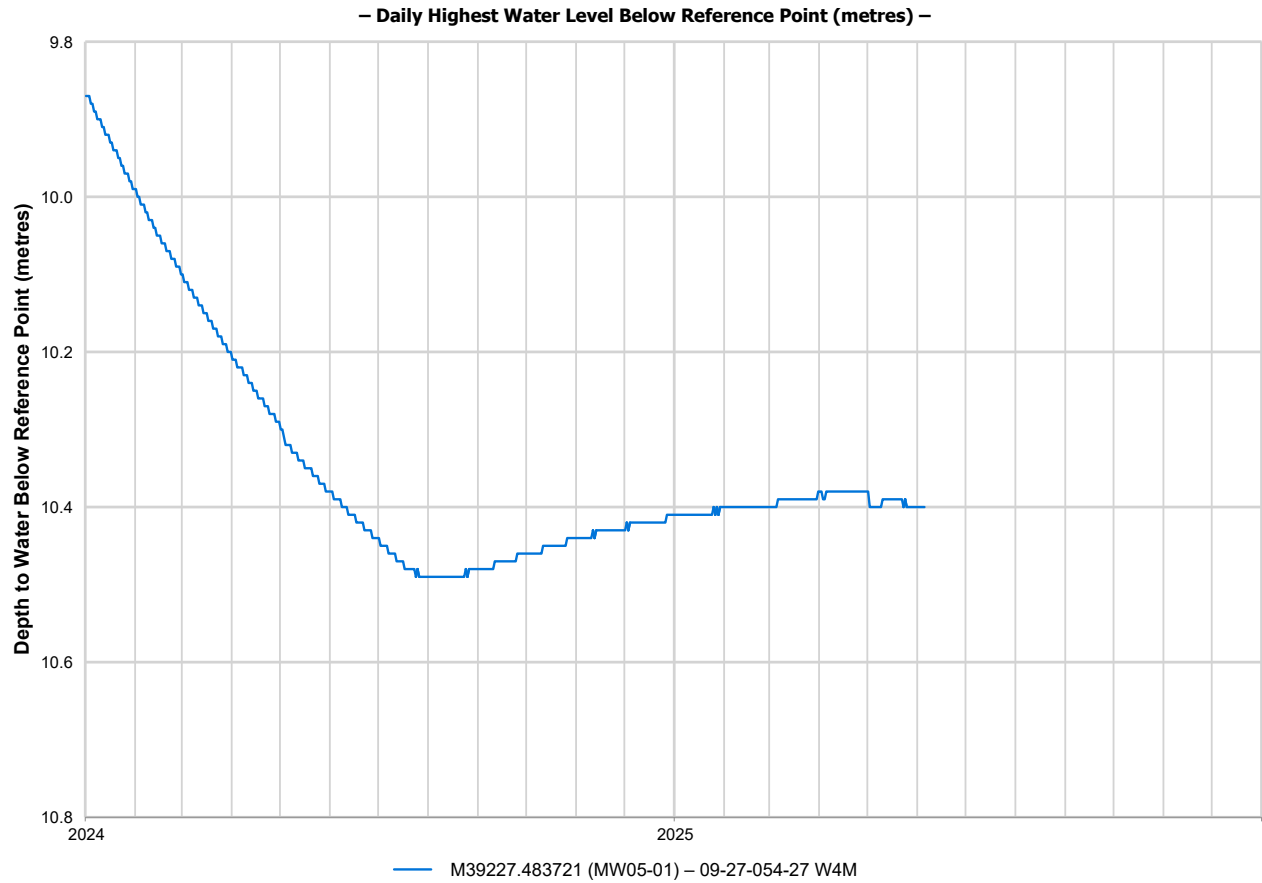
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to 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
2024 - 2025 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 ***

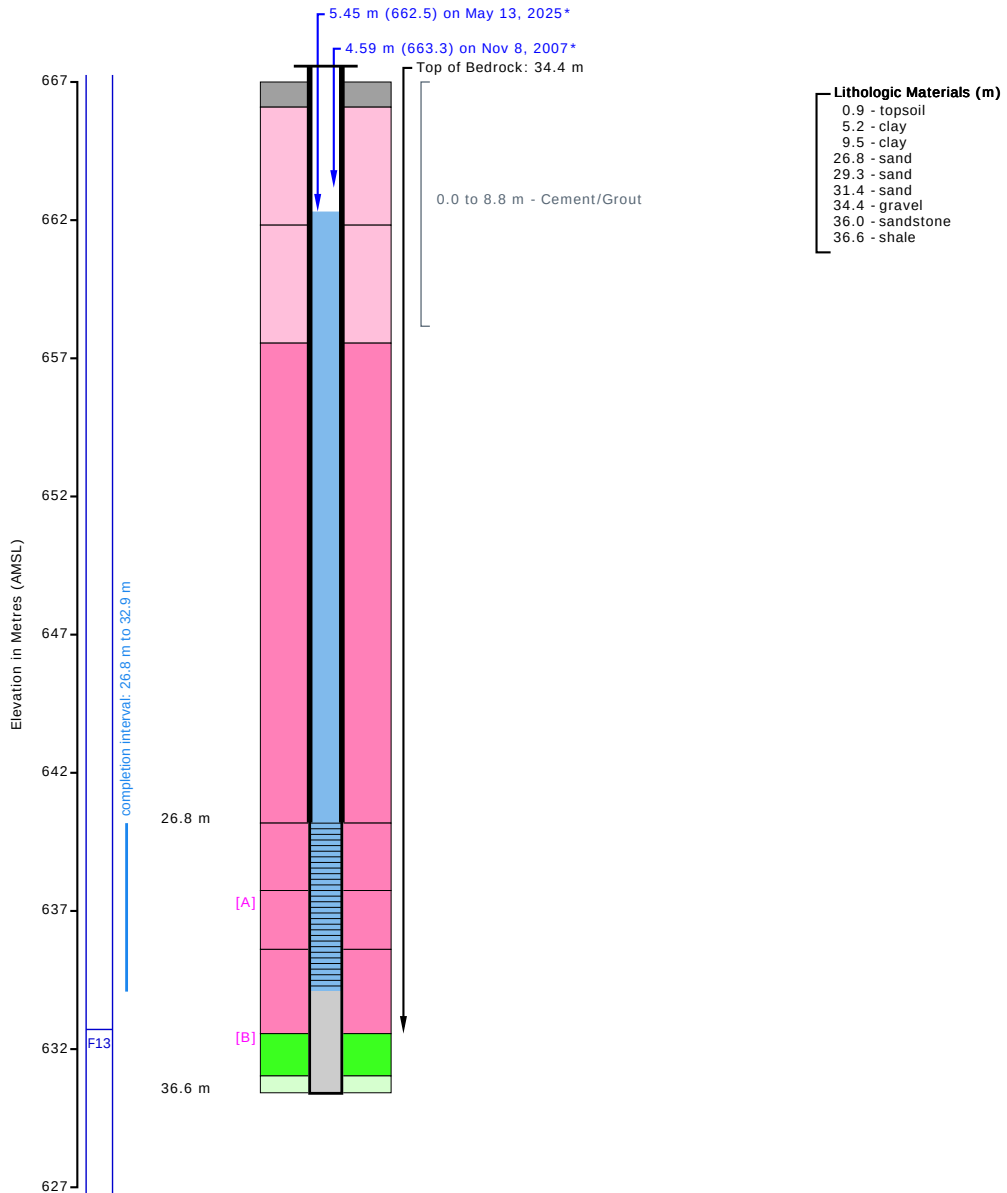
(TGWC determined value)*

Earliest Water Level (m): **4.59 – November 8, 2007**

Most Recent Water Level (m): **5.45 – May 13, 2025 @ 14:13**

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): 5.45 m (662.5 m AMSL) on May 13, 2025 @ 14:13 - Reference Point: Top of Casing	
Water Level (oldest): 4.59 m (663.3 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: July 17, 2025 @ 09:27 --- <https://www.hcl.ca>

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): 76,750 ²

Northing (m): 5,949,371 ²

Elevation (m): 667 ²

Elog Taken: **No**

Gamma Taken: **No**

Flowing: **No**

Presence of Gas: **No**

Stick Up (m): 0.8

2025-06-04

General Details

* TGWC calculated value

Depth Completed (m)*: 32.9

Top of Bedrock (m): 34.4 m

Depth Drilled (m)*: 36.6

Completion Interval (m): 26.8 – 32.9

Sand & Gravel Thickness (m): 21.9 (total) – 21.9 (below 15 m) *

Plugged / Backfilled (m): 32.9 – 36.6 (Unknown)

Most Recent Water Level (m): 5.45 m – May 13, 2025

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 - 0.508 mm

Cement/Grout: 0.0 to 8.8 m

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

(recently sampled first)

Sampling Details: May 13, 2025 @ 14:30

Report Date: May 28, 2025 - Element Materials Technology Canada Inc. (1816292-17)

Constituent

Result

Conductivity (µS/cm): 869

Total Dissolved Solids: 530

Hardness (as CaCO3): 324

T-Alkalinity (as CaCO3): 447

P-Alkalinity (as CaCO3): < 5

Nitrate + Nitrite as N: < 0.01

Total Suspended Solids: 20.6

Temperature (°C): 20.6

Constituent

Result

Nitrate as N: < 0.01

Nitrite as N: < 0.005

pH (pH Unit): 7.52

Colour (TCU): 15

Ion Balance (%): 103

Total Coliforms:**

Fecal Coliforms:**

Escherichia coli:**

Constituent

Result

Turbidity (NTU): 6.2

Fluoride: 0.07

Carbonate: < 6

Bicarbonate: 545

Hydroxide: < 5

Total Iron:

Total Mn:

Constituent

Extractable

Dissolved

Calcium: 92.1

Chloride: 1.1

Iron: 0.85

Manganese: 0.917***

Aluminum: < 0.002

Arsenic: 0.0032

Barium: 0.053

Beryllium: < 0.0001

Cadmium: < 0.00001

Chromium: < 0.0005

Cobalt: 0.0005

Sulfate: 53.8

Constituent

Extractable

Dissolved

Mercury: < 0.000005

Molybdenum: < 0.001

Magnesium: 22.8

Sodium: 87.2

Potassium: 4.4

Vanadium: < 0.0001

Strontium: 0.629

Nickel: 0.0005

Zinc: < 0.001

Copper: < 0.0002

Lead: < 0.0001

Uranium: 0.0032

Extractable - unfiltered

Dissolved - filtered

Comments: Sample collected by Hydrogeological Consultants Ltd. personnel.

***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2025. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada. Ottawa, Ontario.

850353; 1 / 29

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) July 17, 2025, "AS IS"; no warranty either expressed or implied. vist tgwc.com for additional details

Sturgeon County, 2024 to 2025 Groundwater Monitoring Report

Calahoo Resource Extraction District, Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, MR-0224.24

B - 210

RTU

REMOTE TELEMETRY UNIT

HCL

MW07-1-33
AEPA - Water Well Drilling Report



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

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)					
_____ m from					Latitude 53.705300 Longitude -113.843000					Elevation _____ m
_____ m from					How Location Obtained					How Elevation Obtained
					Not Verified					Not Obtained

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	Well Disinfected Upon Completion _____
Gas _____										Depth _____ m	Geophysical Log Taken _____
Remedial Action Taken _____										Submitted to ESRD _____	
										Sample Collected for Potability _____	Submitted to ESRD _____
Additional Comments on Well											
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 7/17/2025 9:24:02 AM

Page: 2 / 2

MW07-1-33
Chemical Analysis Results (May 28, 2025)



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Page 1 of 10

Analytical Report

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:		Date Received:	May 23, 2025
	T5S 2W3	LSD:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Reported:	May 28, 2025
Attn:	Jennifer Catt	P.O.:	20020	Report Number:	3140805
Sampled By:	Ben Gilham	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

Reference Number	1816292-17
Sample Date	May 13, 2025
Sample Time	14:30
Sample Location	M39859.704050
Sample Description	MW07-1-33 / 11.6 °C
Sample Matrix	Water

Analyte	Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved					
Silicon	Dissolved	mg/L	6.54	0.05	
Sulfur	Dissolved	mg/L	17.9	0.3	
Mercury	Dissolved	mg/L	<0.000005	0.000005	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG, 2.9 MAC
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006
Arsenic	Dissolved	mg/L	0.0032	0.0002	0.010
Barium	Dissolved	mg/L	0.053	0.001	2.0
Beryllium	Dissolved	mg/L	<0.0001	0.0001	
Bismuth	Dissolved	mg/L	<0.0005	0.0005	
Boron	Dissolved	mg/L	0.076	0.002	5
Cadmium	Dissolved	mg/L	<0.00001	0.00001	0.007
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05
Cobalt	Dissolved	mg/L	0.0005	0.0001	
Copper	Dissolved	mg/L	<0.0002	0.0002	1 AO, 2 MAC
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005
Lithium	Dissolved	mg/L	0.061	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
Silver	Dissolved	mg/L	<0.00001	0.00001	
Strontium	Dissolved	mg/L	0.629	0.001	7.0
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	0.0032	0.0005	0.02
Vanadium	Dissolved	mg/L	<0.0001	0.0001	
Zinc	Dissolved	mg/L	<0.001	0.001	5.0
Subsample			Field Filtered		Below AO
Physical and Aggregate Properties					
Colour	Apparent, Potable	Colour units	15	5	
Turbidity		NTU	6.2	0.1	
Routine Water					
pH			7.52	1	7.0-10.5
Temp. of observed pH		°C	20.6		Within Range
Electrical Conductivity	at 25 °C	µS/cm	869	1	
Calcium	Dissolved	mg/L	92.1	0.2	
Magnesium	Dissolved	mg/L	22.8	0.2	

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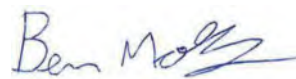
Analytical Report

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M 20020 P.O.: Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140805 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Reference Number	1816292-17
Sample Date	May 13, 2025
Sample Time	14:30
Sample Location	M39859.704050
Sample Description	MW07-1-33 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	87.2	0.4	200	Below AO
Potassium	Dissolved	mg/L	4.4	0.4		
Iron	Dissolved	mg/L	0.85	0.01	0.1	Above AO
Manganese	Dissolved	mg/L	0.917	0.005	0.02 AO, 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	1.1	0.4	250	Below AO
Fluoride		mg/L	0.07	0.05	1.5	Below MAC
Nitrate - N		mg/L	<0.01	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	<0.01	0.01		
Sulfate (SO4)	Dissolved	mg/L	53.8	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	545			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	447	5		
Total Dissolved Solids	Calculated	mg/L	530	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	324			
Ionic Balance	Dissolved	%	103			

Approved by:



Benjamin Morris, B.Sc
Operations 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	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140805 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	-0.0104023	-0.04	0.05	yes
Sulfur	mg/L	0.0176456	-0.3	0.2	yes
Aluminum	µg/L	-0.142723	-2	2	yes
Antimony	µg/L	-0.00198253	-0.2	0.2	yes
Arsenic	µg/L	-0.00520747	-0.2	0.2	yes
Barium	µg/L	0.0155545	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.490366	-2	2	yes
Cadmium	µg/L	0.00106883	-0.01	0.01	yes
Chromium	µg/L	-0.0304354	-0.5	0.5	yes
Cobalt	µg/L	-0.000332921	-0.1	0.1	yes
Copper	µg/L	0.0100485	-0.2	0.2	yes
Lead	µg/L	0.00240083	-0.1	0.1	yes
Lithium	µg/L	-0.00113161	-1	1	yes
Molybdenum	µg/L	0.0194221	-1	1	yes
Nickel	µg/L	0.0142204	-0.5	0.5	yes
Selenium	µg/L	0.00150023	-0.2	0.2	yes
Silver	µg/L	0.00050935	-0.01	0.01	yes
Strontium	µg/L	0.0646959	-1	1	yes
Thallium	µg/L	0.00145131	-0.50	0.50	yes
Tin	µg/L	-0.0724984	-1	1	yes
Titanium	µg/L	-0.0940343	-0.5	0.5	yes
Uranium	µg/L	0.00233484	-0.5	0.5	yes
Vanadium	µg/L	-0.00529231	-0.1	0.1	yes
Zinc	µg/L	0.13059	-1	1	yes
Mercury	µg/L	-0.001039	-0.051000	0.051000	yes

Date Acquired: May 26, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	997	902	1058	yes
Antimony	µg/L	40.5	36.4	44.2	yes
Arsenic	µg/L	39.9	37.7	42.5	yes
Barium	µg/L	196	181	211	yes
Beryllium	µg/L	19.9	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	389	351	427	yes
Cadmium	µg/L	2.16	1.87	2.23	yes
Chromium	µg/L	100	90.8	108.8	yes
Cobalt	µg/L	20.0	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.2	18.3	21.3	yes
Lithium	µg/L	197	178	214	yes
Molybdenum	µg/L	198	178	219	yes
Nickel	µg/L	99.9	93.3	105.9	yes
Selenium	µg/L	39.9	36.9	42.9	yes

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Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	20.1	18.29	22.31	yes
Strontium	µg/L	200	183	219	yes
Thallium	µg/L	9.86	8.90	10.70	yes
Tin	µg/L	201	187	217	yes
Titanium	µg/L	101	91.0	109.0	yes
Uranium	µg/L	102	92.2	110.2	yes
Vanadium	µg/L	20.0	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: May 26, 2025					
Mercury	mg/L	0.000100	0.000070	0.000130	yes
Date Acquired: May 26, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.10	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.1	9.1	10.9	yes
Lead	µg/L	1.0	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.2	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.02	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	5.0	4.4	5.7	yes
Uranium	µg/L	5.2	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000020	0.000006	0.000036	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	9.62	9.51	10.89	yes
Sulfur	mg/L	150	141.6	156.6	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	2.03	1.88	2.24	yes
Sulfur	mg/L	10.2	9.1	10.6	yes
Date Acquired: May 26, 2025					

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140805 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.20	0.18	0.23	yes
Sulfur	mg/L	2.9	2.7	3.1	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	7.36	7.37	10	0.01	yes
Sulfur	mg/L	34.6	35.0	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	5.9	6.0	10	0.4	yes
Barium	µg/L	31	31	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	163	161	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	0.8	0.8	10	0.2	yes
Copper	µg/L	0.5	0.5	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	89	89	10	2	yes
Molybdenum	µg/L	<1	<1	10	2	yes
Nickel	µg/L	1.1	1.0	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	1090	1090	10	2	yes
Thallium	µg/L	<0.05	<0.05	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	2.8	2.8	10	1.1	yes
Vanadium	µg/L	<0.1	<0.1	10	0.2	yes
Zinc	µg/L	27	27	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: May 26, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.099	-0.1	0.1	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	0.114	0.0	0.1	yes
Date Acquired: May 27, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1930	1881.4	2091.4	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	4540	4020.0	5436.0	yes
Date Acquired: May 27, 2025					

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Quality Control

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Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Physical and Aggregate Properties - Continued

Control Sample		Units	Measured	Lower Limit	Upper Limit	Passed QC
Colour		Colour units	10	10	10	yes
Turbidity		NTU	144	132.1	162.1	yes
Date Acquired: May 27, 2025						
Turbidity		NTU	14.2	12.6	15.6	yes
Date Acquired: May 27, 2025						
Turbidity		NTU	1.6	1.0	2.2	yes
Date Acquired: May 27, 2025						
Client Sample Replicates		Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria
Turbidity		NTU	43.7	45.2	10	0.2
Date Acquired: May 27, 2025						yes

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0.00594322	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Calcium	mg/L	0.0341995	-0.2	0.2	yes
Magnesium	mg/L	0.00865101	-0.1	0.1	yes
Sodium	mg/L	0.0649477	-0.4	0.4	yes
Potassium	mg/L	0.024503	-0.4	0.4	yes
Iron	mg/L	0.00335118	-0.01	0.01	yes
Manganese	mg/L	0.000111042	-0.004	0.004	yes
Chloride	mg/L	0.15	-0.4	0.4	yes
Date Acquired: May 26, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2140	1847.4	2256.0	yes
Date Acquired: May 26, 2025					
Electrical Conductivity	dS/m	32.9	27.200	36.800	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	9.90	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes
Nitrite - N	mg/L	9.61	9.010	10.990	yes
Nitrate and Nitrite - N	mg/L	19.6	19.10	20.90	yes
pH		9.18	8.90	9.44	yes
Temp. of observed pH	°C	20.1	15.5	24.5	yes
Electrical Conductivity	dS/m	2.77	2.631	2.829	yes
P-Alkalinity	mg/L	519	442	584	yes
T-Alkalinity	mg/L	997	958	1059	yes
Calcium	mg/L	242	235.3	262.9	yes
Magnesium	mg/L	97.6	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	241	238.3	262.3	yes

Quality Control

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Routine Water - Continued

Control Sample		Units	Measured	Lower Limit	Upper Limit	Passed QC
Iron		mg/L	9.47	8.89	10.69	yes
Manganese		mg/L	2.39	2.200	2.680	yes
Date Acquired: May 26, 2025						
Fluoride		mg/L	4.80	4.58	5.24	yes
Nitrate - N		mg/L	4.71	4.37	5.33	yes
Nitrite - N		mg/L	4.64	4.370	5.330	yes
Nitrate and Nitrite - N		mg/L	9.35	8.80	10.60	yes
pH			6.87	6.75	7.05	yes
Temp. of observed pH		°C	20.3	15.5	24.5	yes
Electrical Conductivity		dS/m	0.076	0.069	0.085	yes
P-Alkalinity		mg/L	52	28	72	yes
T-Alkalinity		mg/L	127	114	140	yes
Calcium		mg/L	51.2	44.9	56.9	yes
Magnesium		mg/L	20.4	17.9	22.0	yes
Sodium		mg/L	51.9	47.1	53.4	yes
Potassium		mg/L	50.3	45.8	55.8	yes
Iron		mg/L	1.98	1.89	2.11	yes
Manganese		mg/L	0.496	0.464	0.536	yes
Chloride		mg/L	83.5	74.9	86.9	yes
Date Acquired: May 26, 2025						
Fluoride		mg/L	0.50	0.45	0.57	yes
Nitrate - N		mg/L	0.51	0.42	0.57	yes
Nitrite - N		mg/L	0.496	0.455	0.557	yes
Nitrate and Nitrite - N		mg/L	1.01	0.85	1.15	yes
Calcium		mg/L	5.1	4.7	5.4	yes
Magnesium		mg/L	2.1	1.9	2.2	yes
Sodium		mg/L	5.2	4.7	5.7	yes
Potassium		mg/L	4.8	4.6	5.6	yes
Iron		mg/L	0.19	0.18	0.22	yes
Manganese		mg/L	0.048	0.046	0.057	yes
Chloride		mg/L	15.2	13.3	16.5	yes
Date Acquired: May 26, 2025						
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Fluoride	mg/L	0.09	0.08	10	0.05	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
pH		7.56	7.53	0	0.10	yes
Electrical Conductivity	dS/m	0.944	0.942	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	583	583	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	478	478	10	5	yes
Calcium	mg/L	129	129	10	0.6	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: Ben Gilham Company: HCL	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140805 Report Type: Final Report

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Magnesium	mg/L	28.9	28.7	10	0.7	yes
Sodium	mg/L	51.6	51.8	10	1.2	yes
Potassium	mg/L	3.7	3.8	10	1.2	yes
Iron	mg/L	0.01	0.01	10	0.05	yes
Manganese	mg/L	0.833	0.835	10	0.010	yes
Chloride	mg/L	0.7	0.7	10	0.5	yes
Date Acquired: May 26, 2025						

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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140805 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	May 26, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	May 26, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	May 26, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	May 26, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	May 27, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	May 26, 2025	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	May 26, 2025	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	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	May 26, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	May 27, 2025	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, August 2024
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:

- Sample 1816292-17; 9956346: Sample received at 11.6 °C

Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:		Date Received:	May 23, 2025
	T5S 2W3	LSD:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Reported:	May 28, 2025
Attn:	Jennifer Catt	P.O.:	20020	Report Number:	3140805
Sampled By:	Ben Gilham	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

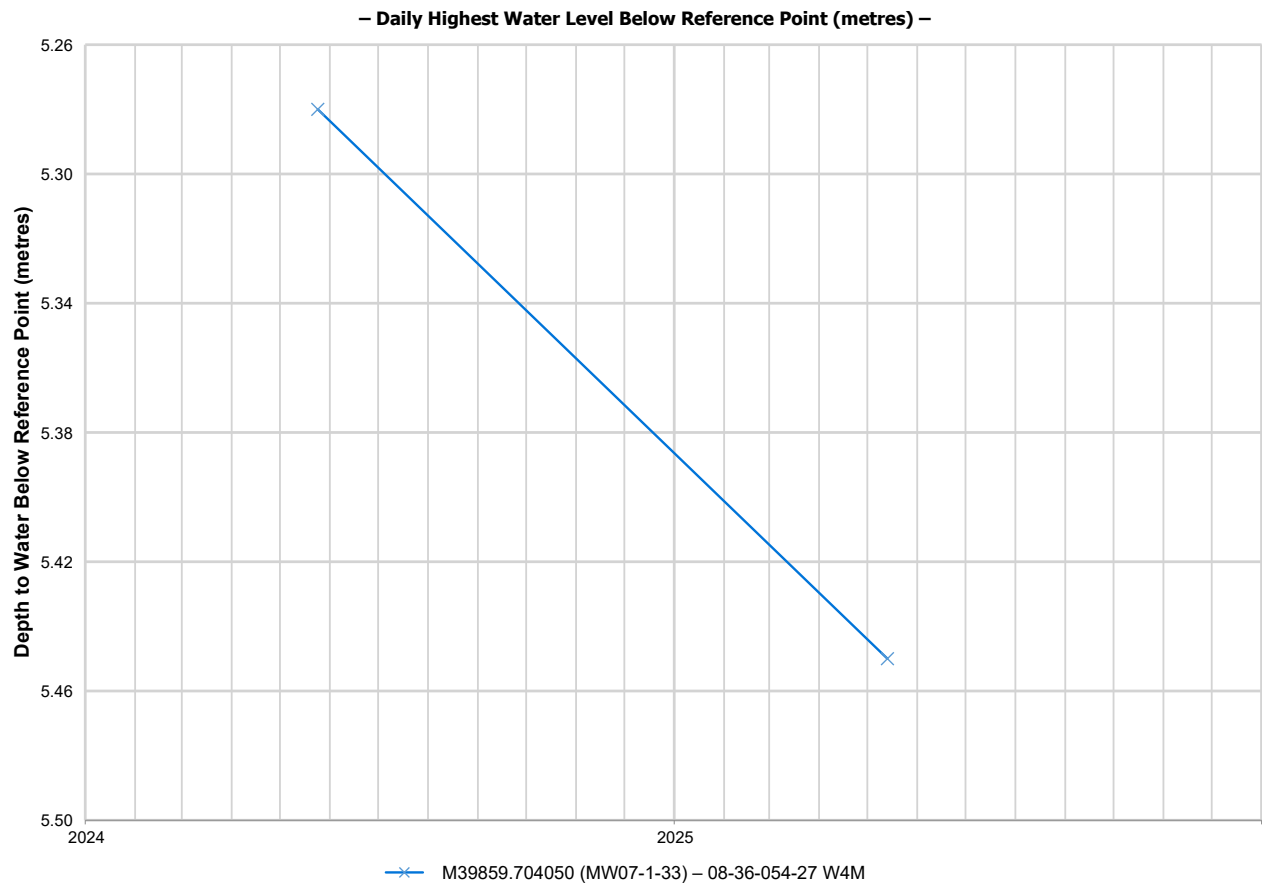
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to 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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MW07-1-33
2024 - 2025 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 ***

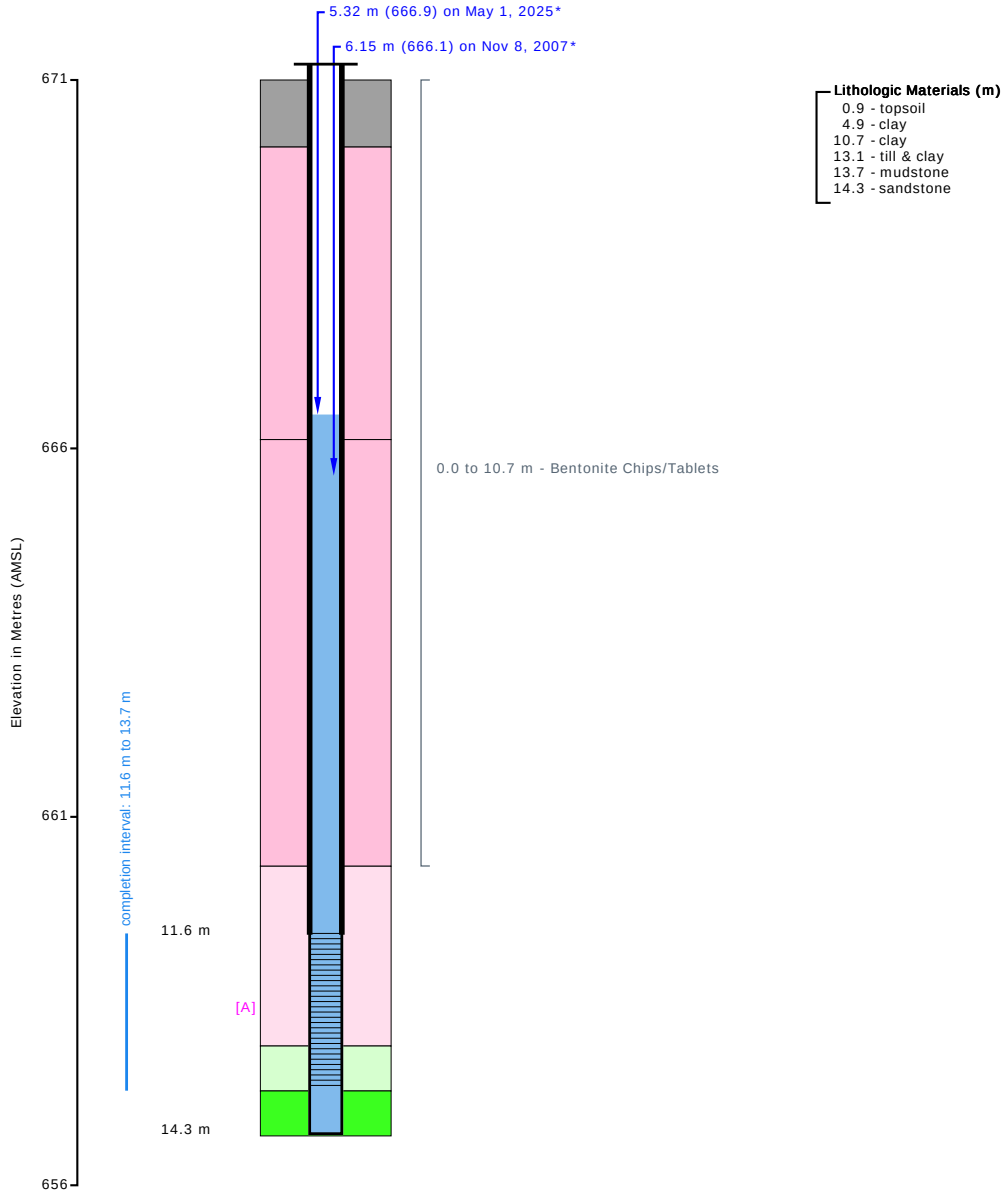
(TGWC determined value)*

Earliest Water Level (m): **6.15 – November 8, 2007**

Most Recent Water Level (m): **5.32 – May 1, 2025 @ 15:24**

GIC ID: **1420665**

MW07-2-14 Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial		Unsorted		Fine Grained
		Fine Grained		
		Coarse Grained		
Bedrock		Fine Grained		Coarse Grained
		Fine Grained		
		Coarse Grained		
		Other		

Geologic Unit details not available for this location

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): 5.32 m (666.9 m AMSL) on May 1, 2025 @ 15:24 - 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: July 17, 2025 @ 09:27 --- <https://www.hcl.ca>

MW07-2-14
AEPA - Water Well Drilling Report



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

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 STANTEC		Address 10160 - 112 ST			Town EDMONTON		Province AB	Country CA	Postal Code T5K 2L6		
Location	1/4 or LSD SE	SEC 35	TWP 54	RGE 27	W of MER 4	Lot	Block	Plan	Additional Description WELL # 07-2-14		
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)						
_____ m from _____					Latitude <u>53.705200</u> Longitude <u>-113.867000</u>					Elevation _____ m	
_____ m from _____					How Location Obtained					How Elevation Obtained	
					Not Verified					Not Obtained	

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

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 : <u>5.08 cm</u>		Size OD : _____ cm		
Wall Thickness : <u>0.554 cm</u>		Wall Thickness : _____ cm		
Bottom at : <u>11.58 m</u>		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 Chips/Tablets				
Placed from <u>0.00 m</u> to <u>10.67 m</u>				
Amount _____				
Other Seals				
Type		At (m)		
Screen Type Plastic				
Size OD : <u>5.08 cm</u>				
From (m)	To (m)	Slot Size (cm)		
11.58	13.72	0.051		
Attachment <u>Attached To Casing</u>				
Top Fittings <u>Coupler</u>		Bottom Fittings <u>Plug</u>		
Pack				
Type <u>Artificial</u>		Grain Size <u>10-20</u>		
Amount <u>4.00</u> Bags				

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well LEONARD MUDRYK Company Name LAKELAND DRILLING LTD.	Certification No 28916A Copy of Well report provided to owner 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 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 _____
PROPOSED WELL USE - PIEZOMETER										

Yield Test			Taken From Ground Level	Measurement in Metric
			Depth to water level	
Test Date	Start Time	Static Water Level	Pumping (m)	Elapsed Time
2007/07/24	12:00 AM	m		Minutes:Sec
				Recovery (m)
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 Date approval holder signed
LAKELAND DRILLING LTD.	

MW07-2-14
Chemical Analysis Results (May 28, 2025)



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Page 1 of 10

Analytical Report

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:		Date Received:	May 23, 2025
	T5S 2W3	LSD:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Reported:	May 28, 2025
Attn:	Jennifer Catt	P.O.:	20020	Report Number:	3140791
Sampled By:	Ben Gilham	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

Reference Number	1816292-3
Sample Date	May 01, 2025
Sample Time	15:40
Sample Location	M39859.704048
Sample Description	MW07-2-14 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	8.84	0.05		
Sulfur	Dissolved	mg/L	70.9	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	0.249	0.002	0.1 OG, 2.9 MAC	Above OG
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006	Below MAC
Arsenic	Dissolved	mg/L	0.0121	0.0002	0.010	Above MAC
Barium	Dissolved	mg/L	0.025	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	0.105	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	0.0014	0.0002	1 AO, 2 MAC	Below AO
Lead	Dissolved	mg/L	0.0003	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.121	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	0.801	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	0.0104	0.0005		
Uranium	Dissolved	mg/L	0.0038	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	0.0007	0.0001		
Zinc	Dissolved	mg/L	0.005	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	>60	5		
Turbidity		NTU	336	0.1		
Routine Water						
pH			7.88	1	7.0-10.5	Within Range
Temp. of observed pH		°C	21.4			
Electrical Conductivity	at 25 °C	µS/cm	1060	1		
Calcium	Dissolved	mg/L	113	0.2		
Magnesium	Dissolved	mg/L	27.9	0.2		

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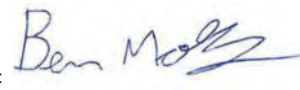
Analytical Report

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M 20020 P.O.: Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140791 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Reference Number	1816292-3
Sample Date	May 01, 2025
Sample Time	15:40
Sample Location	M39859.704048
Sample Description	MW07-2-14 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	93.9	0.4	200	Below AO
Potassium	Dissolved	mg/L	4.5	0.4		
Iron	Dissolved	mg/L	2.73	0.01	0.1	Above AO
Manganese	Dissolved	mg/L	0.890	0.005	0.02 AO, 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	2.0	0.4	250	Below AO
Fluoride		mg/L	0.09	0.05	1.5	Below MAC
Nitrate - N		mg/L	<0.01	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	<0.01	0.01		
Sulfate (SO4)	Dissolved	mg/L	213	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	684	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	397			
Ionic Balance	Dissolved	%	100			

Approved by:



Benjamin Morris, B.Sc
Operations 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	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140791 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.00704748	-0.04	0.05	yes
Sulfur	mg/L	0.107846	-0.3	0.2	yes
Aluminum	µg/L	-0.142723	-2	2	yes
Antimony	µg/L	-0.00198253	-0.2	0.2	yes
Arsenic	µg/L	-0.00520747	-0.2	0.2	yes
Barium	µg/L	0.0155545	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.490366	-2	2	yes
Cadmium	µg/L	0.00106883	-0.01	0.01	yes
Chromium	µg/L	-0.0304354	-0.5	0.5	yes
Cobalt	µg/L	-0.000332921	-0.1	0.1	yes
Copper	µg/L	0.0100485	-0.2	0.2	yes
Lead	µg/L	0.00240083	-0.1	0.1	yes
Lithium	µg/L	-0.00113161	-1	1	yes
Molybdenum	µg/L	0.0194221	-1	1	yes
Nickel	µg/L	0.0142204	-0.5	0.5	yes
Selenium	µg/L	0.00150023	-0.2	0.2	yes
Silver	µg/L	0.00050935	-0.01	0.01	yes
Strontium	µg/L	0.0646959	-1	1	yes
Thallium	µg/L	0.00145131	-0.50	0.50	yes
Tin	µg/L	-0.0724984	-1	1	yes
Titanium	µg/L	-0.0940343	-0.5	0.5	yes
Uranium	µg/L	0.00233484	-0.5	0.5	yes
Vanadium	µg/L	-0.00529231	-0.1	0.1	yes
Zinc	µg/L	0.13059	-1	1	yes
Mercury	µg/L	-0.001039	-0.051000	0.051000	yes

Date Acquired: May 26, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	997	902	1058	yes
Antimony	µg/L	40.5	36.4	44.2	yes
Arsenic	µg/L	39.9	37.7	42.5	yes
Barium	µg/L	196	181	211	yes
Beryllium	µg/L	19.9	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	389	351	427	yes
Cadmium	µg/L	2.16	1.87	2.23	yes
Chromium	µg/L	100	90.8	108.8	yes
Cobalt	µg/L	20.0	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.2	18.3	21.3	yes
Lithium	µg/L	197	178	214	yes
Molybdenum	µg/L	198	178	219	yes
Nickel	µg/L	99.9	93.3	105.9	yes
Selenium	µg/L	39.9	36.9	42.9	yes

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140791 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	20.1	18.29	22.31	yes
Strontium	µg/L	200	183	219	yes
Thallium	µg/L	9.86	8.90	10.70	yes
Tin	µg/L	201	187	217	yes
Titanium	µg/L	101	91.0	109.0	yes
Uranium	µg/L	102	92.2	110.2	yes
Vanadium	µg/L	20.0	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: May 26, 2025					
Mercury	mg/L	0.000100	0.000070	0.000130	yes
Date Acquired: May 26, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.10	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.1	9.1	10.9	yes
Lead	µg/L	1.0	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.2	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.02	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	5.0	4.4	5.7	yes
Uranium	µg/L	5.2	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000020	0.000006	0.000036	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	9.62	9.51	10.89	yes
Sulfur	mg/L	150	141.6	156.6	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	2.03	1.88	2.24	yes
Sulfur	mg/L	10.2	9.1	10.6	yes
Date Acquired: May 26, 2025					

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140791 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.20	0.18	0.23	yes
Sulfur	mg/L	2.9	2.7	3.1	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.21	3.26	10	0.01	yes
Sulfur	mg/L	38.2	39.0	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	<0.2	<0.2	10	0.4	yes
Barium	µg/L	38	38	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	163	168	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	<0.1	<0.1	10	0.2	yes
Copper	µg/L	<0.2	<0.2	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	16	17	10	2	yes
Molybdenum	µg/L	3	2	10	2	yes
Nickel	µg/L	<0.5	<0.5	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	57	58	10	2	yes
Thallium	µg/L	<0.05	<0.05	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	<0.5	<0.5	10	1.1	yes
Vanadium	µg/L	0.2	0.1	10	0.2	yes
Zinc	µg/L	<1	2	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: May 26, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.099	-0.1	0.1	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	0.114	0.0	0.1	yes
Date Acquired: May 27, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1930	1881.4	2091.4	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	4550	4020.0	5436.0	yes
Date Acquired: May 27, 2025					

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

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140791 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Physical and Aggregate Properties - Continued

continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Colour	Colour units	10	10	10		yes
Turbidity	NTU	144	132.1	162.1		yes
Date Acquired:	May 27, 2025					
Turbidity	NTU	14.3	12.6	15.6		yes
Date Acquired:	May 27, 2025					
Turbidity	NTU	1.6	1.0	2.2		yes
Date Acquired:	May 27, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity	NTU	3.1	2.9	10	0.2	yes
Date Acquired:	May 27, 2025					

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0.00152937	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Calcium	mg/L	0.0798772	-0.2	0.2	yes
Magnesium	mg/L	0.0424654	-0.1	0.1	yes
Sodium	mg/L	0.144685	-0.4	0.4	yes
Potassium	mg/L	0.194533	-0.4	0.4	yes
Iron	mg/L	0.00603323	-0.01	0.01	yes
Manganese	mg/L	0.000767739	-0.004	0.004	yes
Chloride	mg/L	0.15	-0.4	0.4	yes
Date Acquired: May 26, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2140	1847.4	2256.0	yes
Date Acquired: May 26, 2025					
Electrical Conductivity	dS/m	32.7	27.200	36.800	yes
Date Acquired: May 26, 2025					
pH		9.20	8.90	9.44	yes
Temp. of observed pH	°C	21.2	15.5	24.5	yes
Electrical Conductivity	dS/m	2.79	2.631	2.829	yes
P-Alkalinity	mg/L	516	442	584	yes
T-Alkalinity	mg/L	1000	958	1059	yes
Fluoride	mg/L	9.88	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes
Nitrite - N	mg/L	9.63	9.010	10.990	yes
Nitrate and Nitrite - N	mg/L	19.6	19.10	20.90	yes
Calcium	mg/L	242	235.3	262.9	yes
Magnesium	mg/L	97.6	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	241	238.3	262.3	yes

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

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140791 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Iron	mg/L	9.47	8.89	10.69		yes
Manganese	mg/L	2.39	2.200	2.680		yes
Date Acquired: May 26, 2025						
pH		6.83	6.75	7.05		yes
Temp. of observed pH	°C	21.4	15.5	24.5		yes
Electrical Conductivity	dS/m	0.075	0.069	0.085		yes
P-Alkalinity	mg/L	47	28	72		yes
T-Alkalinity	mg/L	130	114	140		yes
Fluoride	mg/L	4.98	4.58	5.24		yes
Nitrate - N	mg/L	4.72	4.37	5.33		yes
Nitrite - N	mg/L	4.66	4.370	5.330		yes
Nitrate and Nitrite - N	mg/L	9.38	8.80	10.60		yes
Calcium	mg/L	51.2	44.9	56.9		yes
Magnesium	mg/L	20.4	17.9	22.0		yes
Sodium	mg/L	51.9	47.1	53.4		yes
Potassium	mg/L	50.3	45.8	55.8		yes
Iron	mg/L	1.98	1.89	2.11		yes
Manganese	mg/L	0.496	0.464	0.536		yes
Chloride	mg/L	83.5	74.9	86.9		yes
Date Acquired: May 26, 2025						
Fluoride	mg/L	0.50	0.45	0.57		yes
Nitrate - N	mg/L	0.51	0.42	0.57		yes
Nitrite - N	mg/L	0.498	0.455	0.557		yes
Nitrate and Nitrite - N	mg/L	1.01	0.85	1.15		yes
Calcium	mg/L	5.1	4.7	5.4		yes
Magnesium	mg/L	2.1	1.9	2.2		yes
Sodium	mg/L	5.2	4.7	5.7		yes
Potassium	mg/L	4.8	4.6	5.6		yes
Iron	mg/L	0.19	0.18	0.22		yes
Manganese	mg/L	0.048	0.046	0.057		yes
Chloride	mg/L	15.2	13.3	16.5		yes
Date Acquired: May 26, 2025						
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
pH		7.29	7.26	0	0.10	yes
Electrical Conductivity	dS/m	1.09	1.08	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	602	599	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	494	491	10	5	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
Fluoride	mg/L	0.09	0.08	10	0.05	yes
Calcium	mg/L	86.8	87.6	10	0.6	yes

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



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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140791 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Magnesium	mg/L	26.7	26.8	10	0.7	yes
Sodium	mg/L	77.9	79.0	10	1.2	yes
Potassium	mg/L	5.2	5.3	10	1.2	yes
Iron	mg/L	0.03	0.03	10	0.05	yes
Manganese	mg/L	0.071	0.072	10	0.010	yes
Chloride	mg/L	6070	6050	10	0.5	yes
Date Acquired: May 26, 2025						

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140791 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	May 26, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	May 26, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	May 26, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	May 26, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	May 27, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	May 26, 2025	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	May 26, 2025	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	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	May 26, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	May 27, 2025	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, August 2024
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:

- Sample 1816292-3; 9956332: Sample received at 11.6 °C
- Sample 1816292-3; 9956332: Sample turbidity may interfere with Apparent Colour analysis. A more accurate measure of sample colour would be obtained from True Colour Analysis.

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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater	Control Number:	
	Edmonton, AB, Canada		Monitoring	Date Received:	May 23, 2025
	T5S 2W3	Project Location:		Date Reported:	May 28, 2025
Attn:	Jennifer Catt	LSD:	Tp 054, R 26 to 28, W4M	Report Number:	3140791
Sampled By:	Ben Gilham		and Tp 054, R 01, W5M	Report Type:	Final Report
Company:	HCL	P.O.:	20020		
		Proj. Acct. code:			

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.

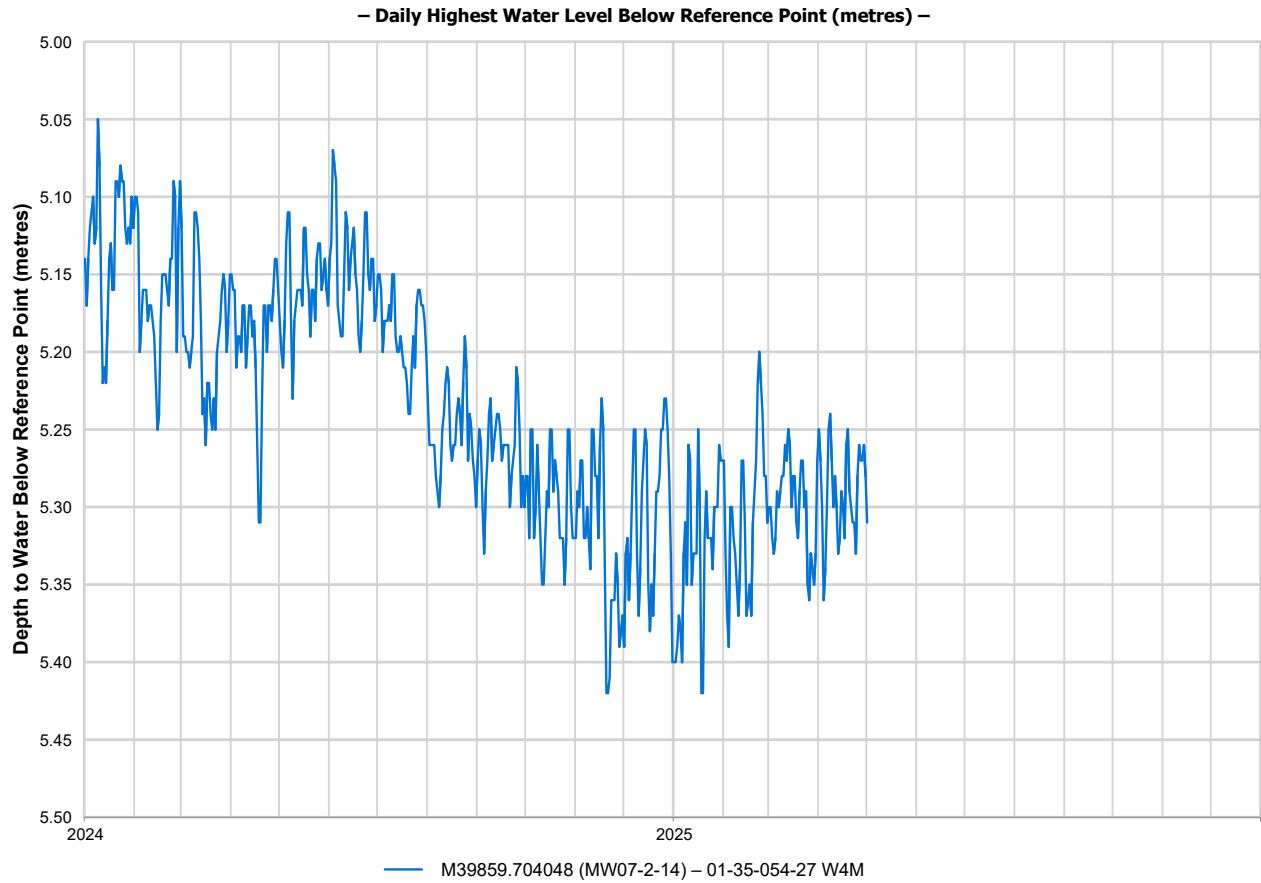
Please direct any inquiries regarding this report to our Client Services group.

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
2024 - 2025 Hydrograph



MW07-3-33

07-31-054-26 W4M
(M39859.704049)



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 ***

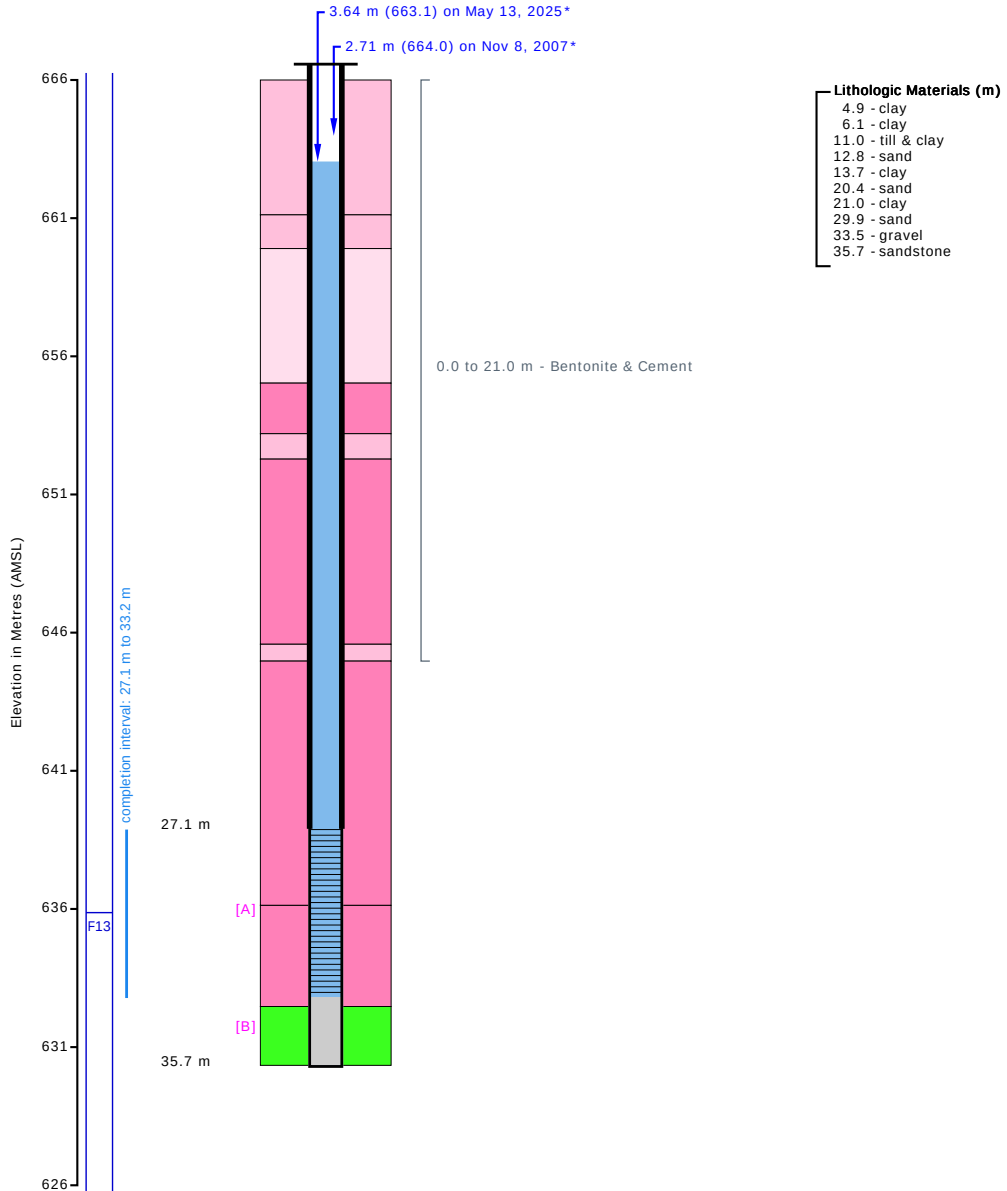
(TGWC determined value)*

Earliest Water Level (m): **2.71 – November 8, 2007**

Most Recent Water Level (m): **3.64 – May 13, 2025 @ 14:50**

GIC ID: **1420666**

MW07-3-33 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: M39859.704049	
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): 3.64 m (663.1 m AMSL) on May 13, 2025 @ 14:50 - 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: July 17, 2025 @ 09:27 --- <https://www.hcl.ca>

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): 77,948 ²
Northing (m): 5,949,095 ²
Elevation (m): 666 ²

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

Stick Up (m): 0.7

2025-06-04

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): 3.64 m – May 13, 2025

Top of Bedrock (m): Surficial Water Well
Completion Interval (m): 27.1 – 33.2

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 - 0.508 mm
Bentonite & Cement: 0.0 to 21.0 m

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

Sampling Details: May 13, 2025 @ 15:05
Report Date: May 28, 2025 - Element Materials Technology Canada Inc. (1816292-6)

Constituent	Result	Constituent	Result	Constituent	Result
Conductivity (µS/cm):	944	Nitrate as N:	< 0.01	Turbidity (NTU):	18.7
Total Dissolved Solids:	576	Nitrite as N:	< 0.005	Fluoride:	0.12
Hardness (as CaCO3):	394	pH (pH Unit):	7.56	Carbonate:	< 6
T-Alkalinity (as CaCO3):	478	Colour (TCU):	> 60	Bicarbonate:	583
P-Alkalinity (as CaCO3):	< 5	Ion Balance (%):	101	Hydroxide:	< 5
Nitrate + Nitrite as N:	< 0.01	Total Coliforms:**		Total Iron:	
Total Suspended Solids:		Fecal Coliforms:**		Total Mn:	
Temperature (°C):	20.8	Escherichia coli:**			

Constituent	Extractable	Dissolved	Constituent	Extractable	Dissolved
Calcium:		109	Mercury:		< 0.000005
Chloride:		0.4	Molybdenum:		0.001
Iron:		1.75	Magnesium:		29.6
Manganese:		0.972***	Sodium:		73.5
Aluminum:		< 0.002	Potassium:		3.8
Arsenic:		0.0048	Vanadium:		< 0.0001
Barium:		0.044	Strontium:		0.693
Beryllium:		< 0.0001	Nickel:		0.0007
Cadmium:		< 0.00001	Zinc:		0.002
Chromium:		< 0.0005	Copper:		< 0.0002
Cobalt:		0.0007	Lead:		< 0.0001
Sulfate:		73.1	Uranium:		0.0038

Comments: Sample collected by Hydrogeological Consultants Ltd. personnel.

***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2025. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.

850342; 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 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) July 17, 2025, "AS IS"; no warranty either expressed or implied. vist tgwc.com for additional details

Sturgeon County, 2024 to 2025 Groundwater Monitoring Report
Calahoo Resource Extraction District, Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, MR-0224.24

RTU

REMOTE TELEMETRY UNIT

HCL

B - 242

MW07-3-33
AEPA - Water Well Drilling Report



Water Well Drilling Report

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

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					

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		Unknown	
Size OD :	5.08 cm	Size OD :	_____ cm
Wall Thickness :	0.554 cm	Wall Thickness :	_____ cm
Bottom at :	27.13 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 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

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

GIC Well ID 1420666
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	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 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 _____
PROPOSED WELL USE - PIEZOMETER										

Yield Test			Taken From Ground Level	Measurement in Metric
			Depth to water level	
Test Date	Start Time	Static Water Level	Pumping (m)	Elapsed Time
2006/07/26	12:00 AM	m		Minutes:Sec
				Recovery (m)
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 Date approval holder signed
LAKELAND DRILLING LTD.	

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MW07-3-33
Chemical Analysis Results (May 28, 2025)



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Page 1 of 10

Analytical Report

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:		Date Received:	May 23, 2025
	T5S 2W3	LSD:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Reported:	May 28, 2025
Attn:	Jennifer Catt	P.O.:	20020	Report Number:	3140794
Sampled By:	Ben Gilham	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

Reference Number	1816292-6
Sample Date	May 13, 2025
Sample Time	15:05
Sample Location	M39859.704049
Sample Description	MW07-3-33 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	6.53	0.05		
Sulfur	Dissolved	mg/L	24.4	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	0.0048	0.0002	0.010	Below MAC
Barium	Dissolved	mg/L	0.044	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	0.100	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	0.082	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	0.693	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	0.002	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	>60	5		
Turbidity		NTU	18.7	0.1		
Routine Water						
pH			7.56	1	7.0-10.5	Within Range
Temp. of observed pH		°C	20.8			
Electrical Conductivity	at 25 °C	µS/cm	944	1		
Calcium	Dissolved	mg/L	109	0.2		
Magnesium	Dissolved	mg/L	29.6	0.2		

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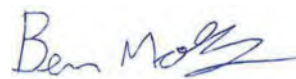
Analytical Report

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M 20020 P.O.: Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140794 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Reference Number	1816292-6
Sample Date	May 13, 2025
Sample Time	15:05
Sample Location	M39859.704049
Sample Description	MW07-3-33 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	73.5	0.4	200	Below AO
Potassium	Dissolved	mg/L	3.8	0.4		
Iron	Dissolved	mg/L	1.75	0.01	0.1	Above AO
Manganese	Dissolved	mg/L	0.972	0.005	0.02 AO, 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	0.4	0.4	250	Below AO
Fluoride		mg/L	0.12	0.05	1.5	Below MAC
Nitrate - N		mg/L	<0.01	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	<0.01	0.01		
Sulfate (SO4)	Dissolved	mg/L	73.1	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	576	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	394			
Ionic Balance	Dissolved	%	101			

Approved by:



Benjamin Morris, B.Sc
Operations 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	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140794 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.00704748	-0.04	0.05	yes
Sulfur	mg/L	0.107846	-0.3	0.2	yes
Aluminum	µg/L	-0.142723	-2	2	yes
Antimony	µg/L	-0.00198253	-0.2	0.2	yes
Arsenic	µg/L	-0.00520747	-0.2	0.2	yes
Barium	µg/L	0.0155545	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.490366	-2	2	yes
Cadmium	µg/L	0.00106883	-0.01	0.01	yes
Chromium	µg/L	-0.0304354	-0.5	0.5	yes
Cobalt	µg/L	-0.000332921	-0.1	0.1	yes
Copper	µg/L	0.0100485	-0.2	0.2	yes
Lead	µg/L	0.00240083	-0.1	0.1	yes
Lithium	µg/L	-0.00113161	-1	1	yes
Molybdenum	µg/L	0.0194221	-1	1	yes
Nickel	µg/L	0.0142204	-0.5	0.5	yes
Selenium	µg/L	0.00150023	-0.2	0.2	yes
Silver	µg/L	0.00050935	-0.01	0.01	yes
Strontium	µg/L	0.0646959	-1	1	yes
Thallium	µg/L	0.00145131	-0.50	0.50	yes
Tin	µg/L	-0.0724984	-1	1	yes
Titanium	µg/L	-0.0940343	-0.5	0.5	yes
Uranium	µg/L	0.00233484	-0.5	0.5	yes
Vanadium	µg/L	-0.00529231	-0.1	0.1	yes
Zinc	µg/L	0.13059	-1	1	yes
Mercury	µg/L	-0.001039	-0.051000	0.051000	yes

Date Acquired: May 26, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	997	902	1058	yes
Antimony	µg/L	40.5	36.4	44.2	yes
Arsenic	µg/L	39.9	37.7	42.5	yes
Barium	µg/L	196	181	211	yes
Beryllium	µg/L	19.9	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	389	351	427	yes
Cadmium	µg/L	2.16	1.87	2.23	yes
Chromium	µg/L	100	90.8	108.8	yes
Cobalt	µg/L	20.0	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.2	18.3	21.3	yes
Lithium	µg/L	197	178	214	yes
Molybdenum	µg/L	198	178	219	yes
Nickel	µg/L	99.9	93.3	105.9	yes
Selenium	µg/L	39.9	36.9	42.9	yes

Quality Control

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Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	20.1	18.29	22.31	yes
Strontium	µg/L	200	183	219	yes
Thallium	µg/L	9.86	8.90	10.70	yes
Tin	µg/L	201	187	217	yes
Titanium	µg/L	101	91.0	109.0	yes
Uranium	µg/L	102	92.2	110.2	yes
Vanadium	µg/L	20.0	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: May 26, 2025					
Mercury	mg/L	0.000100	0.000070	0.000130	yes
Date Acquired: May 26, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.10	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.1	9.1	10.9	yes
Lead	µg/L	1.0	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.2	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.02	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	5.0	4.4	5.7	yes
Uranium	µg/L	5.2	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000020	0.000006	0.000036	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	9.62	9.51	10.89	yes
Sulfur	mg/L	150	141.6	156.6	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	2.03	1.88	2.24	yes
Sulfur	mg/L	10.2	9.1	10.6	yes
Date Acquired: May 26, 2025					

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140794 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.20	0.18	0.23	yes
Sulfur	mg/L	2.9	2.7	3.1	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.21	3.26	10	0.01	yes
Sulfur	mg/L	38.2	39.0	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	<0.2	<0.2	10	0.4	yes
Barium	µg/L	38	38	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	163	168	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	<0.1	<0.1	10	0.2	yes
Copper	µg/L	<0.2	<0.2	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	16	17	10	2	yes
Molybdenum	µg/L	3	2	10	2	yes
Nickel	µg/L	<0.5	<0.5	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	57	58	10	2	yes
Thallium	µg/L	<0.05	<0.05	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	<0.5	<0.5	10	1.1	yes
Vanadium	µg/L	0.2	0.1	10	0.2	yes
Zinc	µg/L	<1	2	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: May 26, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.099	-0.1	0.1	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	0.114	0.0	0.1	yes
Date Acquired: May 27, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1930	1881.4	2091.4	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	4550	4020.0	5436.0	yes
Date Acquired: May 27, 2025					

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Quality Control

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Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Physical and Aggregate Properties - Continued

continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Colour	Colour units	10	10	10		yes
Turbidity	NTU	144	132.1	162.1		yes
Date Acquired:	May 27, 2025					
Turbidity	NTU	14.3	12.6	15.6		yes
Date Acquired:	May 27, 2025					
Turbidity	NTU	1.6	1.0	2.2		yes
Date Acquired:	May 27, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity	NTU	3.1	2.9	10	0.2	yes
Date Acquired:	May 27, 2025					

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0.00152937	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Calcium	mg/L	0.0798772	-0.2	0.2	yes
Magnesium	mg/L	0.0424654	-0.1	0.1	yes
Sodium	mg/L	0.144685	-0.4	0.4	yes
Potassium	mg/L	0.194533	-0.4	0.4	yes
Iron	mg/L	0.00603323	-0.01	0.01	yes
Manganese	mg/L	0.000767739	-0.004	0.004	yes
Chloride	mg/L	0.15	-0.4	0.4	yes
Date Acquired: May 26, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2140	1847.4	2256.0	yes
Date Acquired: May 26, 2025					
Electrical Conductivity	dS/m	32.9	27.200	36.800	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	9.90	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes
Nitrite - N	mg/L	9.61	9.010	10.990	yes
Nitrate and Nitrite - N	mg/L	19.6	19.10	20.90	yes
pH		9.18	8.90	9.44	yes
Temp. of observed pH	°C	20.1	15.5	24.5	yes
Electrical Conductivity	dS/m	2.77	2.631	2.829	yes
P-Alkalinity	mg/L	519	442	584	yes
T-Alkalinity	mg/L	997	958	1059	yes
Calcium	mg/L	242	235.3	262.9	yes
Magnesium	mg/L	97.6	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	241	238.3	262.3	yes

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Quality Control

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Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Iron	mg/L	9.47	8.89	10.69		yes
Manganese	mg/L	2.39	2.200	2.680		yes
Date Acquired:	May 26, 2025					
Fluoride	mg/L	4.80	4.58	5.24		yes
Nitrate - N	mg/L	4.71	4.37	5.33		yes
Nitrite - N	mg/L	4.64	4.370	5.330		yes
Nitrate and Nitrite - N	mg/L	9.35	8.80	10.60		yes
pH		6.87	6.75	7.05		yes
Temp. of observed pH	°C	20.3	15.5	24.5		yes
Electrical Conductivity	dS/m	0.076	0.069	0.085		yes
P-Alkalinity	mg/L	52	28	72		yes
T-Alkalinity	mg/L	127	114	140		yes
Calcium	mg/L	51.2	44.9	56.9		yes
Magnesium	mg/L	20.4	17.9	22.0		yes
Sodium	mg/L	51.9	47.1	53.4		yes
Potassium	mg/L	50.3	45.8	55.8		yes
Iron	mg/L	1.98	1.89	2.11		yes
Manganese	mg/L	0.496	0.464	0.536		yes
Chloride	mg/L	83.5	74.9	86.9		yes
Date Acquired:	May 26, 2025					
Fluoride	mg/L	0.50	0.45	0.57		yes
Nitrate - N	mg/L	0.51	0.42	0.57		yes
Nitrite - N	mg/L	0.496	0.455	0.557		yes
Nitrate and Nitrite - N	mg/L	1.01	0.85	1.15		yes
Calcium	mg/L	5.1	4.7	5.4		yes
Magnesium	mg/L	2.1	1.9	2.2		yes
Sodium	mg/L	5.2	4.7	5.7		yes
Potassium	mg/L	4.8	4.6	5.6		yes
Iron	mg/L	0.19	0.18	0.22		yes
Manganese	mg/L	0.048	0.046	0.057		yes
Chloride	mg/L	15.2	13.3	16.5		yes
Date Acquired:	May 26, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Fluoride	mg/L	0.09	0.08	10	0.05	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
pH		7.56	7.53	0	0.10	yes
Electrical Conductivity	dS/m	0.944	0.942	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	583	583	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	478	478	10	5	yes
Calcium	mg/L	86.8	87.6	10	0.6	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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140794 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Magnesium	mg/L	26.7	26.8	10	0.7	yes
Sodium	mg/L	77.9	79.0	10	1.2	yes
Potassium	mg/L	5.2	5.3	10	1.2	yes
Iron	mg/L	0.03	0.03	10	0.05	yes
Manganese	mg/L	0.071	0.072	10	0.010	yes
Chloride	mg/L	0.7	0.7	10	0.5	yes
Date Acquired: May 26, 2025						

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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: T5S 2W3 LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140794 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	May 26, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	May 26, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	May 26, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	May 26, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	May 27, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	May 26, 2025	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	May 26, 2025	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	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	May 26, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	May 27, 2025	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, August 2024
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:

- Sample 1816292-6; 9956335: Sample received at 11.6 °C

Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater	Control Number:	
	Edmonton, AB, Canada		Monitoring	Date Received:	May 23, 2025
	T5S 2W3	Project Location:		Date Reported:	May 28, 2025
Attn:	Jennifer Catt	LSD:	Tp 054, R 26 to 28, W4M	Report Number:	3140794
Sampled By:	Ben Gilham		and Tp 054, R 01, W5M	Report Type:	Final Report
Company:	HCL	P.O.:	20020		
		Proj. Acct. code:			

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.

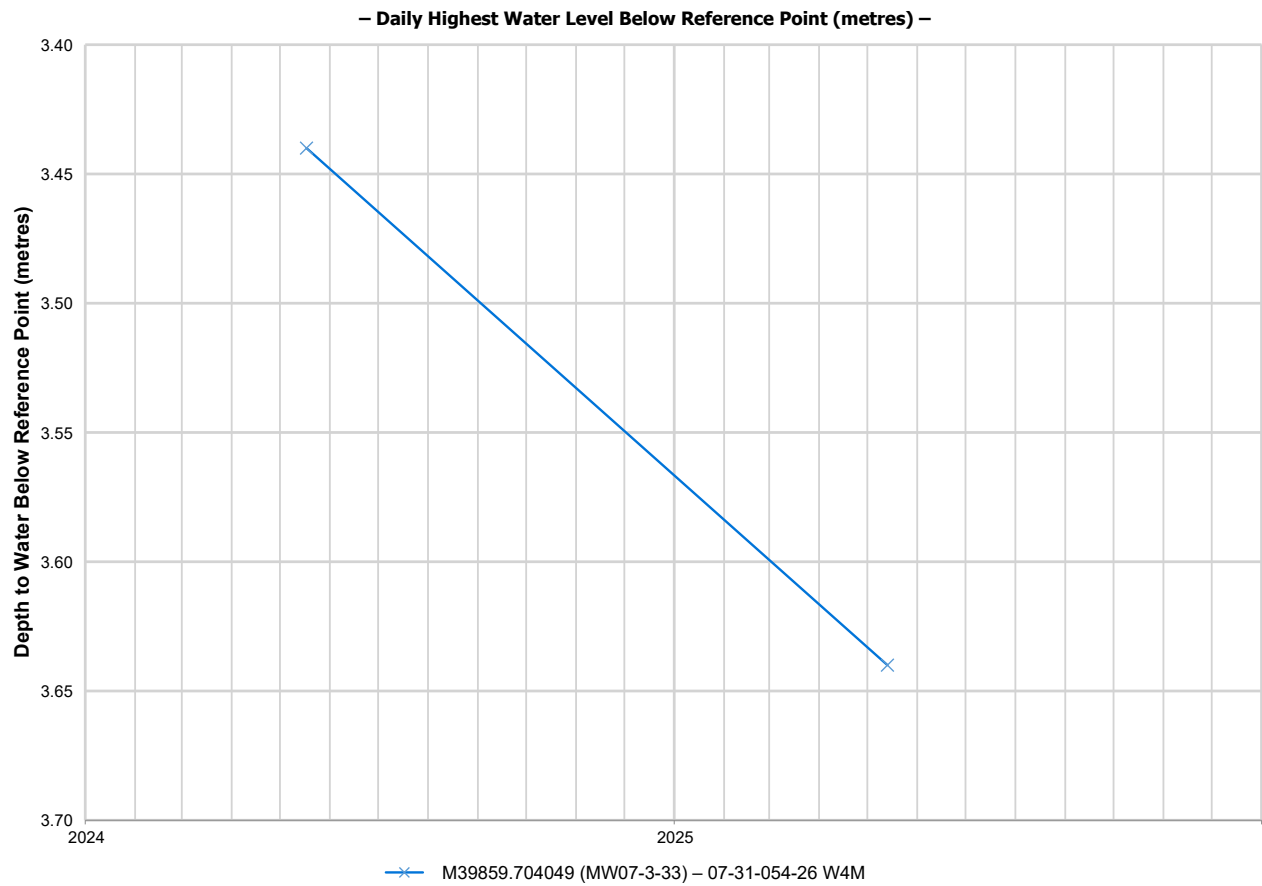
Please direct any inquiries regarding this report to our Client Services group.

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
2024 - 2025 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)

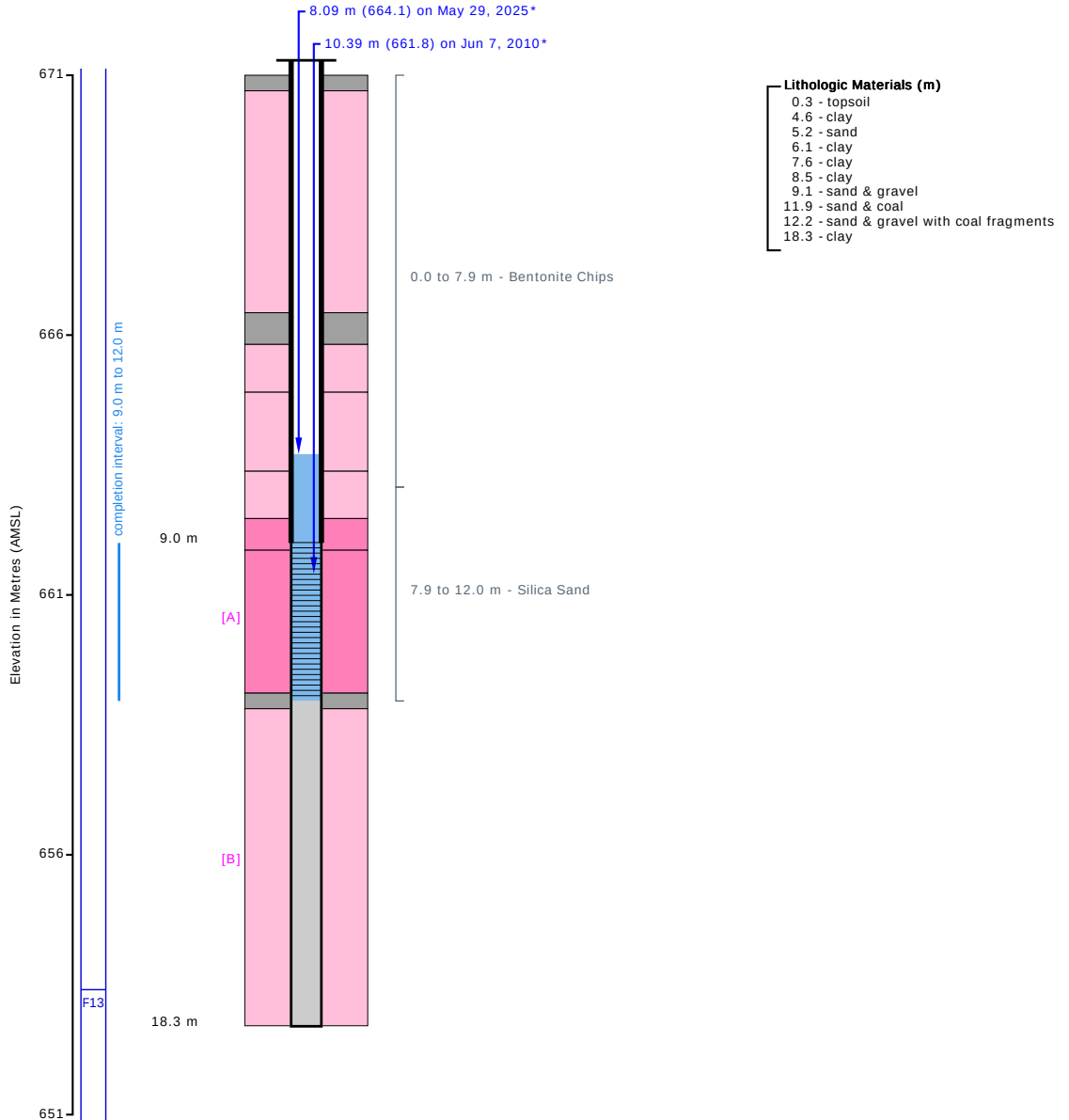
Earliest Water Level (m): **10.39 – June 7, 2010 @ 13:42**

Most Recent Water Level (m): **8.09 – May 29, 2025 @ 13:15**

GIC ID: **Unknown**

MW10-01

Water Well Diagram



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

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): 8.09 m (664.1 m AMSL) on May 29, 2025 @ 13:15 - 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: July 17, 2025 @ 09:28 --- <https://www.hcl.ca>

MW10-01
AEPA – Water Well Drilling Report

— AEPA water well drilling report not available —

MW10-01
Chemical Analysis Results (June 12, 2025)



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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145424 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By:	P.O.: 20023	
Company: HCL	Proj. Acct. code:	

Reference Number	1819420-3
Sample Date	May 29, 2025
Sample Time	13:50
Sample Location	M40337.575466
Sample Description	MW10-01 / 13.9 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	5.75	0.05		
Sulfur	Dissolved	mg/L	46.2	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	0.0068	0.0002	0.010	Below MAC
Barium	Dissolved	mg/L	0.042	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	0.091	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	0.067	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0016	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	0.827	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00001		
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	0.004	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	>60	5		
Turbidity		NTU	36.2	0.1		
Routine Water						
pH			7.15	1	7.0-10.5	Within Range
Temp. of observed pH		°C	19.8			
Electrical Conductivity	at 25 °C	µS/cm	964	1		
Calcium	Dissolved	mg/L	138	0.2		
Magnesium	Dissolved	mg/L	35.8	0.2		

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145424 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Reference Number	1819420-3
Sample Date	May 29, 2025
Sample Time	13:50
Sample Location	M40337.575466
Sample Description	MW10-01 / 13.9 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	22.7	0.4	200	Below AO
Potassium	Dissolved	mg/L	11.3	0.4		
Iron	Dissolved	mg/L	1.28	0.01	0.1	Above AO
Manganese	Dissolved	mg/L	0.615	0.005	0.02 AO, 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	23.2	0.4	250	Below AO
Fluoride		mg/L	0.08	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.01	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	0.01	0.01		
Sulfate (SO4)	Dissolved	mg/L	139	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	459			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	377	5		
Total Dissolved Solids	Calculated	mg/L	595	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	491			
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).
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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145424 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.0005296	-0.04	0.05	yes
Sulfur	mg/L	0.0969684	-0.3	0.2	yes
Aluminum	µg/L	-0.159055	-2	2	yes
Antimony	µg/L	0.00527385	-0.2	0.2	yes
Arsenic	µg/L	-0.00838105	-0.2	0.2	yes
Barium	µg/L	0.0205324	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.747257	-2	2	yes
Cadmium	µg/L	0.00103929	-0.01	0.01	yes
Chromium	µg/L	-0.0370322	-0.5	0.5	yes
Cobalt	µg/L	-9.31717e-005	-0.1	0.1	yes
Copper	µg/L	0.0351031	-0.2	0.2	yes
Lead	µg/L	0.000707898	-0.1	0.1	yes
Lithium	µg/L	0.0347798	-1	1	yes
Molybdenum	µg/L	0.00840797	-1	1	yes
Nickel	µg/L	0.0185909	-0.5	0.5	yes
Selenium	µg/L	0.00058604	-0.2	0.2	yes
Silver	µg/L	0.000743061	-0.01	0.01	yes
Strontium	µg/L	0.0374449	-1	1	yes
Thallium	µg/L	0.00154219	-0.50	0.50	yes
Tin	µg/L	-0.0230673	-1	1	yes
Titanium	µg/L	-0.141492	-0.5	0.5	yes
Uranium	µg/L	0.00107718	-0.5	0.5	yes
Vanadium	µg/L	-0.0453782	-0.1	0.1	yes
Zinc	µg/L	0.25069	-1	1	yes
Mercury	µg/L	0.0001434	-0.051000	0.051000	yes

Date Acquired: June 09, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	990	902	1058	yes
Antimony	µg/L	40.1	36.4	44.2	yes
Arsenic	µg/L	40.0	37.7	42.5	yes
Barium	µg/L	198	181	211	yes
Beryllium	µg/L	19.6	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	378	351	427	yes
Cadmium	µg/L	2.08	1.87	2.23	yes
Chromium	µg/L	99.3	90.8	108.8	yes
Cobalt	µg/L	19.8	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.4	18.3	21.3	yes
Lithium	µg/L	196	178	214	yes
Molybdenum	µg/L	195	178	219	yes
Nickel	µg/L	99.5	93.3	105.9	yes
Selenium	µg/L	39.5	36.9	42.9	yes

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145424 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	19.7	18.29	22.31	yes
Strontium	µg/L	195	183	219	yes
Thallium	µg/L	9.71	8.90	10.70	yes
Tin	µg/L	196	187	217	yes
Titanium	µg/L	97.8	91.0	109.0	yes
Uranium	µg/L	101	92.2	110.2	yes
Vanadium	µg/L	19.7	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: June 09, 2025					
Mercury	mg/L	0.000099	0.000070	0.000130	yes
Date Acquired: June 09, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.11	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.0	9.1	10.9	yes
Lead	µg/L	1.1	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.1	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.01	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	4.9	4.4	5.7	yes
Uranium	µg/L	5.1	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000021	0.000006	0.000036	yes
Date Acquired: June 09, 2025					
Silicon	mg/L	10.2	9.51	10.89	yes
Sulfur	mg/L	151	141.6	156.6	yes
Date Acquired: June 09, 2025					
Silicon	mg/L	2.08	1.88	2.24	yes
Sulfur	mg/L	10.3	9.2	10.8	yes
Date Acquired: June 09, 2025					

Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145424 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC	
Silicon	mg/L	0.20	0.18	0.23		yes
Sulfur	mg/L	2.9	2.7	3.1		yes
Date Acquired: June 09, 2025						
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.7	3.6	10	0.01	yes
Sulfur	mg/L	647	647	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	<0.2	<0.2	10	0.4	yes
Barium	µg/L	131	130	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	279	293	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	<0.1	<0.1	10	0.2	yes
Copper	µg/L	<0.2	<0.2	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	30	30	10	2	yes
Molybdenum	µg/L	<1	<1	10	2	yes
Nickel	µg/L	<0.5	<0.5	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	991	1010	10	2	yes
Thallium	µg/L	<0.01	<0.01	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	<0.5	<0.5	10	1.1	yes
Vanadium	µg/L	0.1	0.2	10	0.2	yes
Zinc	µg/L	<1	<1	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: June 09, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.09	-0.1	0.1	yes
Date Acquired: June 06, 2025					
Turbidity	NTU	0.112	0.0	0.1	yes
Date Acquired: June 06, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1920	1881.4	2091.4	yes
Date Acquired: June 06, 2025					
Turbidity	NTU	4530	4020.0	5436.0	yes
Date Acquired: June 06, 2025					

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145424 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Physical and Aggregate Properties - Continued

Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC	
Turbidity	NTU	143	132.1	162.1	yes	
Colour	Colour units	10	10	10	yes	
Date Acquired:	June 06, 2025					
Turbidity	NTU	14.2	12.6	15.6	yes	
Date Acquired:	June 06, 2025					
Turbidity	NTU	1.6	1.0	2.2	yes	
Date Acquired:	June 06, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity	NTU	3.2	3.2	10	0.2	yes
Date Acquired:	June 06, 2025					

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	0.0700376	-0.2	0.2	yes
Magnesium	mg/L	0.0599072	-0.1	0.1	yes
Sodium	mg/L	0.0357922	-0.4	0.4	yes
Potassium	mg/L	0.192832	-0.4	0.4	yes
Iron	mg/L	0.00324691	-0.01	0.01	yes
Manganese	mg/L	0.000677325	-0.004	0.004	yes
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Chloride	mg/L	0.09	-0.4	0.4	yes
Date Acquired: June 09, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2020	1847.4	2256.0	yes
Date Acquired: June 09, 2025					
Electrical Conductivity	dS/m	33.2	27.200	36.800	yes
Date Acquired: June 06, 2025					
pH		9.14	8.90	9.44	yes
Temp. of observed pH	°C	20.9	15.5	24.5	yes
Electrical Conductivity	dS/m	2.77	2.631	2.829	yes
P-Alkalinity	mg/L	540	442	584	yes
T-Alkalinity	mg/L	1020	958	1059	yes
Calcium	mg/L	251	235.3	262.9	yes
Magnesium	mg/L	101	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	250	238.3	262.3	yes
Iron	mg/L	9.92	8.89	10.69	yes
Manganese	mg/L	2.51	2.200	2.680	yes
Fluoride	mg/L	9.97	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145424 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC	
Nitrite - N	mg/L	9.76	9.010	10.990	yes	
Nitrate and Nitrite - N	mg/L	19.8	19.10	20.90	yes	
Date Acquired: June 09, 2025						
pH		6.87	6.75	7.05	yes	
Temp. of observed pH	°C	20.9	15.5	24.5	yes	
Electrical Conductivity	dS/m	0.082	0.069	0.085	yes	
P-Alkalinity	mg/L	56	28	72	yes	
T-Alkalinity	mg/L	129	114	140	yes	
Calcium	mg/L	52.7	44.9	56.9	yes	
Magnesium	mg/L	21.3	17.9	22.0	yes	
Sodium	mg/L	50.5	47.1	53.4	yes	
Potassium	mg/L	51.7	45.8	55.8	yes	
Iron	mg/L	2.04	1.89	2.11	yes	
Manganese	mg/L	0.517	0.464	0.536	yes	
Fluoride	mg/L	4.85	4.58	5.24	yes	
Nitrate - N	mg/L	4.77	4.37	5.33	yes	
Nitrite - N	mg/L	4.74	4.370	5.330	yes	
Nitrate and Nitrite - N	mg/L	9.52	8.80	10.60	yes	
Chloride	mg/L	82.5	74.9	86.9	yes	
Date Acquired: June 09, 2025						
Calcium	mg/L	5.2	4.7	5.4	yes	
Magnesium	mg/L	2.1	1.9	2.2	yes	
Sodium	mg/L	5.1	4.7	5.7	yes	
Potassium	mg/L	5.1	4.6	5.6	yes	
Iron	mg/L	0.20	0.18	0.22	yes	
Manganese	mg/L	0.051	0.046	0.057	yes	
Fluoride	mg/L	0.51	0.45	0.57	yes	
Nitrate - N	mg/L	0.51	0.42	0.57	yes	
Nitrite - N	mg/L	0.509	0.455	0.557	yes	
Nitrate and Nitrite - N	mg/L	1.02	0.85	1.15	yes	
Chloride	mg/L	14.2	13.3	16.5	yes	
Date Acquired: June 09, 2025						
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
pH		6.90	6.93	0	0.10	yes
Electrical Conductivity	dS/m	40.9	40.8	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	654	650	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	537	533	10	5	yes
Calcium	mg/L	317	318	10	0.6	yes
Magnesium	mg/L	304	305	10	0.7	yes
Sodium	mg/L	148	147	10	1.2	yes
Potassium	mg/L	6.4	6.5	10	1.2	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: Company: HCL	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M LSD: P.O.: 20023 Proj. Acct. code:	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145424 Report Type: Final Report

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Iron	mg/L	<0.05	<0.05	10	0.05	yes
Manganese	mg/L	0.30	0.30	10	0.010	yes
Nitrate - N	mg/L	0.06	0.06	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
Fluoride	mg/L	0.05	0.05	10	0.05	yes
Chloride	mg/L	2.1	2.0	10	0.5	yes
Date Acquired: June 09, 2025						

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Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145424 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 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 06, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 06, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 06, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 09, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 06, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 09, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 06, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 09, 2025	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 09, 2025	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 09, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 09, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 09, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 06, 2025	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, August 2024
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:

- Sample 1819420-3; 9983491: Sample received at 13.9 °C
- Sample 1819420-3; 9983491: Sample turbidity may interfere with Apparent Colour analysis. A more accurate measure of sample colour would be obtained from True Colour Analysis.

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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.24	Lot ID:	1819420
	17740 - 118 Avenue NW	Project Name:	2025 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 5, 2025
	T5S 2W3	LSD:		Date Reported:	Jun 12, 2025
Attn:	Jennifer Catt	P.O.:	20023	Report Number:	3145424
Sampled By:		Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

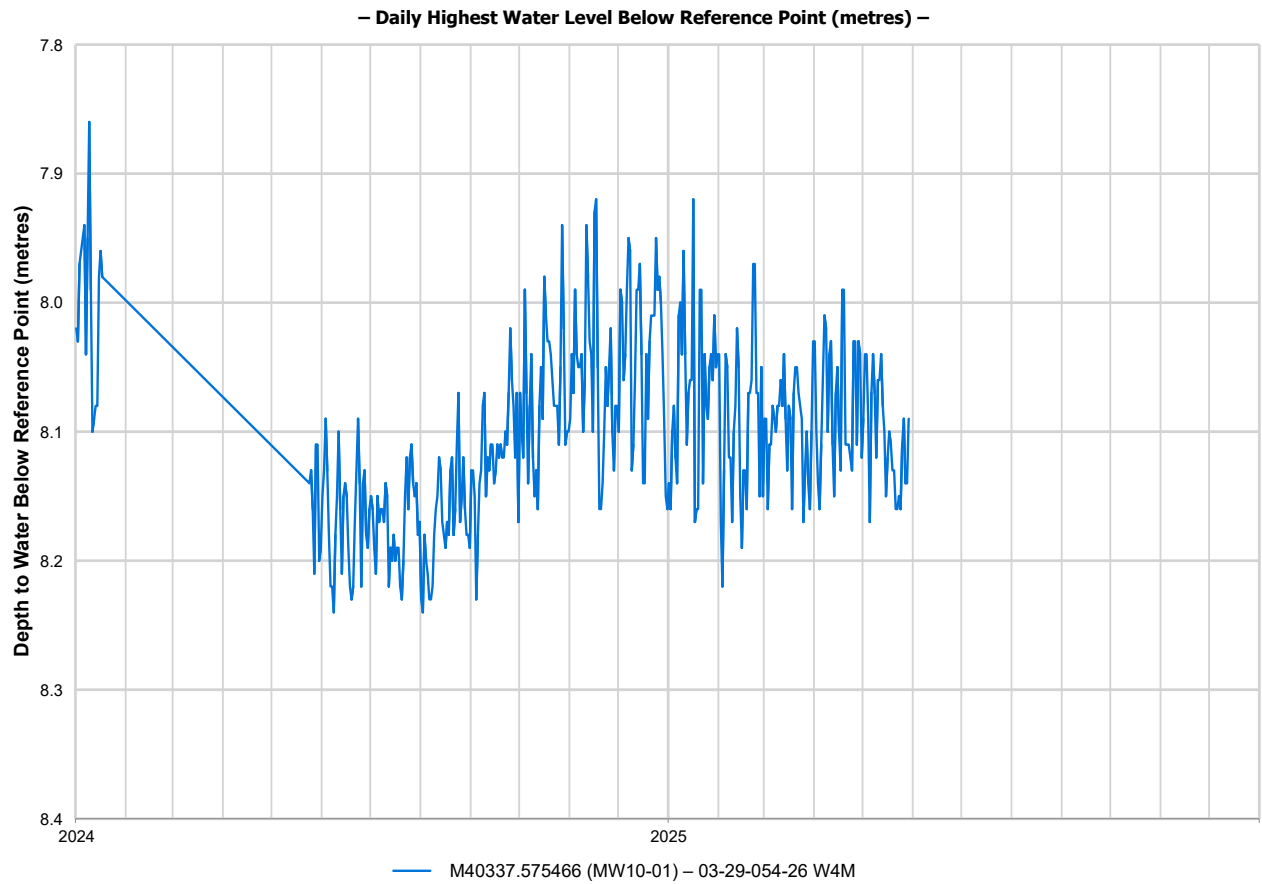
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to 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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MW10-01
2024 - 2025 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 ***

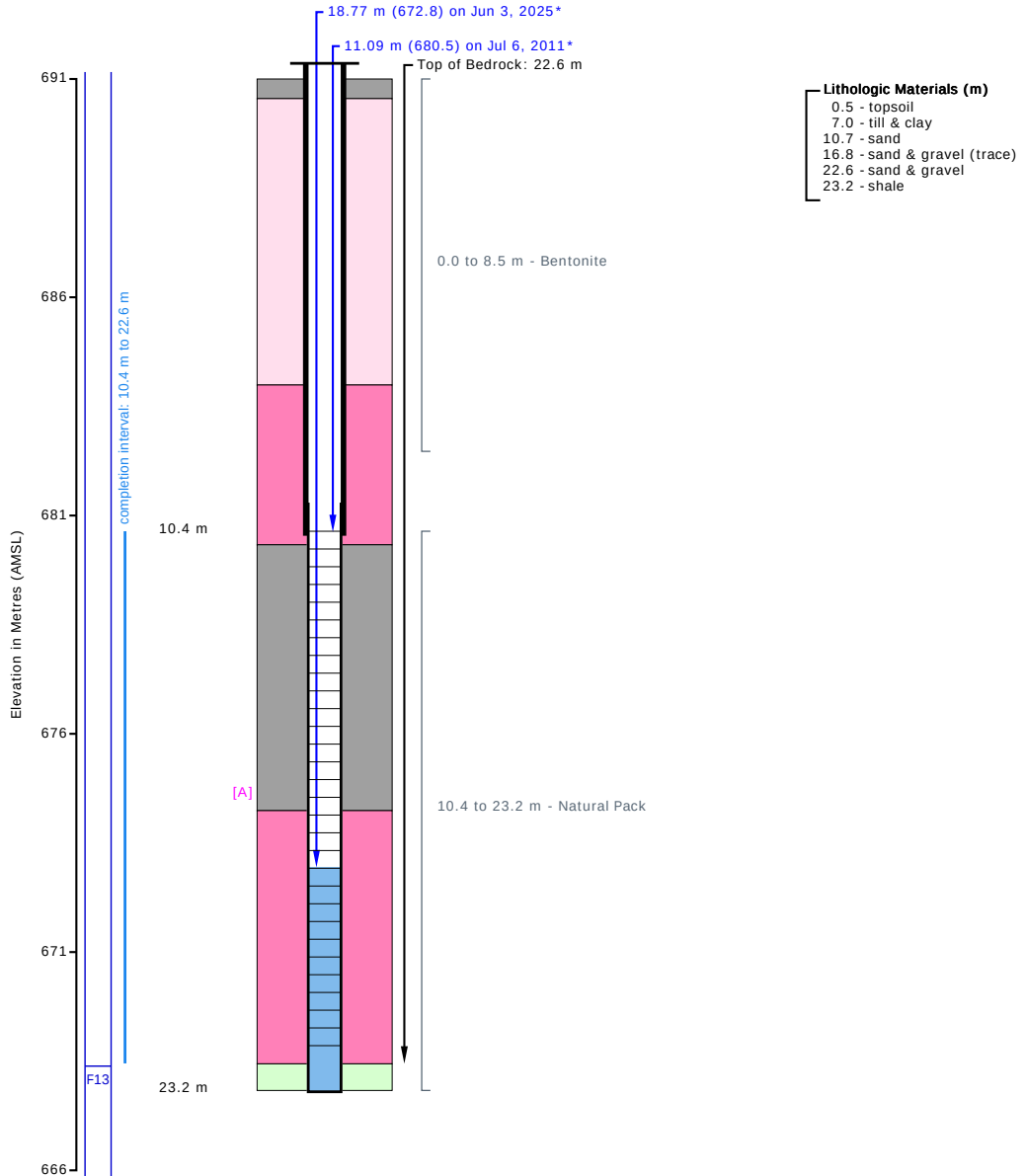
(TGWC determined value)*

Earliest Water Level (m): **11.09 – July 6, 2011 @ 12:00**

Most Recent Water Level (m): **18.77 – June 3, 2025 @ 13:30**

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): 18.77 m (672.8 m AMSL) on Jun 3, 2025 @ 13:30 - Reference Point: Top of Casing	
Water Level (oldest): 11.09 m (680.5 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: July 17, 2025 @ 09:28 --- <https://www.hcl.ca>

MW11-02
AEPA - Water Well Drilling Report

— AEPA water well drilling report not available —

MW11-02
Chemical Analysis Results (June 12, 2025)



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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145427 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By:	P.O.: 20023	
Company: HCL	Proj. Acct. code:	

Reference Number	1819420-6
Sample Date	June 03, 2025
Sample Time	14:00
Sample Location	M41457.432661
Sample Description	MW11-02 / 13.9 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	5.49	0.05		
Sulfur	Dissolved	mg/L	54.3	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
Aluminum	Dissolved	mg/L	0.007	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	0.010	Below MAC
Barium	Dissolved	mg/L	0.101	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	0.092	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	0.0009	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	0.078	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0015	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	0.958	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00001		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0102	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	0.003	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	>60	5		
Turbidity		NTU	164	0.1		
Routine Water						
pH			7.24	1	7.0-10.5	Within Range
Temp. of observed pH		°C	20.2			
Electrical Conductivity	at 25 °C	µS/cm	1120	1		
Calcium	Dissolved	mg/L	137	0.2		
Magnesium	Dissolved	mg/L	33.3	0.2		

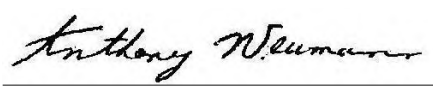
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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145427 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Reference Number	1819420-6
Sample Date	June 03, 2025
Sample Time	14:00
Sample Location	M41457.432661
Sample Description	MW11-02 / 13.9 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	77.4	0.4	200	Below AO
Potassium	Dissolved	mg/L	4.2	0.4		
Iron	Dissolved	mg/L	0.21	0.01	0.1	Above AO
Manganese	Dissolved	mg/L	0.827	0.005	0.02 AO, 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	1.1	0.4	250	Below AO
Fluoride		mg/L	<0.05	0.05	1.5	Below MAC
Nitrate - N		mg/L	<0.01	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	<0.01	0.01		
Sulfate (SO4)	Dissolved	mg/L	163	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	589			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	483	5		
Total Dissolved Solids	Calculated	mg/L	706	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	480			
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).
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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145427 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.0005296	-0.04	0.05	yes
Sulfur	mg/L	0.0969684	-0.3	0.2	yes
Aluminum	µg/L	-0.159055	-2	2	yes
Antimony	µg/L	0.00527385	-0.2	0.2	yes
Arsenic	µg/L	-0.00838105	-0.2	0.2	yes
Barium	µg/L	0.0205324	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.747257	-2	2	yes
Cadmium	µg/L	0.00103929	-0.01	0.01	yes
Chromium	µg/L	-0.0370322	-0.5	0.5	yes
Cobalt	µg/L	-9.31717e-005	-0.1	0.1	yes
Copper	µg/L	0.0351031	-0.2	0.2	yes
Lead	µg/L	0.000707898	-0.1	0.1	yes
Lithium	µg/L	0.0347798	-1	1	yes
Molybdenum	µg/L	0.00840797	-1	1	yes
Nickel	µg/L	0.0185909	-0.5	0.5	yes
Selenium	µg/L	0.00058604	-0.2	0.2	yes
Silver	µg/L	0.000743061	-0.01	0.01	yes
Strontium	µg/L	0.0374449	-1	1	yes
Thallium	µg/L	0.00154219	-0.50	0.50	yes
Tin	µg/L	-0.0230673	-1	1	yes
Titanium	µg/L	-0.141492	-0.5	0.5	yes
Uranium	µg/L	0.00107718	-0.5	0.5	yes
Vanadium	µg/L	-0.0453782	-0.1	0.1	yes
Zinc	µg/L	0.25069	-1	1	yes
Mercury	µg/L	0.0001434	-0.051000	0.051000	yes

Date Acquired: June 09, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	990	902	1058	yes
Antimony	µg/L	40.1	36.4	44.2	yes
Arsenic	µg/L	40.0	37.7	42.5	yes
Barium	µg/L	198	181	211	yes
Beryllium	µg/L	19.6	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	378	351	427	yes
Cadmium	µg/L	2.08	1.87	2.23	yes
Chromium	µg/L	99.3	90.8	108.8	yes
Cobalt	µg/L	19.8	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.4	18.3	21.3	yes
Lithium	µg/L	196	178	214	yes
Molybdenum	µg/L	195	178	219	yes
Nickel	µg/L	99.5	93.3	105.9	yes
Selenium	µg/L	39.5	36.9	42.9	yes

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145427 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	19.7	18.29	22.31	yes
Strontium	µg/L	195	183	219	yes
Thallium	µg/L	9.71	8.90	10.70	yes
Tin	µg/L	196	187	217	yes
Titanium	µg/L	97.8	91.0	109.0	yes
Uranium	µg/L	101	92.2	110.2	yes
Vanadium	µg/L	19.7	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: June 09, 2025					
Mercury	mg/L	0.000099	0.000070	0.000130	yes
Date Acquired: June 09, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.11	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.0	9.1	10.9	yes
Lead	µg/L	1.1	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.1	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.01	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	4.9	4.4	5.7	yes
Uranium	µg/L	5.1	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000021	0.000006	0.000036	yes
Date Acquired: June 09, 2025					
Silicon	mg/L	10.2	9.51	10.89	yes
Sulfur	mg/L	151	141.6	156.6	yes
Date Acquired: June 09, 2025					
Silicon	mg/L	2.08	1.88	2.24	yes
Sulfur	mg/L	10.3	9.2	10.8	yes
Date Acquired: June 09, 2025					

Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145427 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Silicon	mg/L	0.20	0.18	0.23		yes
Sulfur	mg/L	2.9	2.7	3.1		yes
Date Acquired: June 09, 2025						
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.7	3.6	10	0.01	yes
Sulfur	mg/L	647	647	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	<0.2	<0.2	10	0.4	yes
Barium	µg/L	131	130	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	279	293	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	<0.1	<0.1	10	0.2	yes
Copper	µg/L	<0.2	<0.2	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	30	30	10	2	yes
Molybdenum	µg/L	<1	<1	10	2	yes
Nickel	µg/L	<0.5	<0.5	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	991	1010	10	2	yes
Thallium	µg/L	<0.01	<0.01	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	<0.5	<0.5	10	1.1	yes
Vanadium	µg/L	0.1	0.2	10	0.2	yes
Zinc	µg/L	<1	<1	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: June 09, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.09	-0.1	0.1	yes
Date Acquired: June 06, 2025					
Turbidity	NTU	0.112	0.0	0.1	yes
Date Acquired: June 06, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1920	1881.4	2091.4	yes
Date Acquired: June 06, 2025					
Turbidity	NTU	4530	4020.0	5436.0	yes
Date Acquired: June 06, 2025					

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

Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145427 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Physical and Aggregate Properties - Continued

Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC	
Turbidity	NTU	143	132.1	162.1	yes	
Colour	Colour units	10	10	10	yes	
Date Acquired:	June 06, 2025					
Turbidity	NTU	14.2	12.6	15.6	yes	
Date Acquired:	June 06, 2025					
Turbidity	NTU	1.6	1.0	2.2	yes	
Date Acquired:	June 06, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity	NTU	3.2	3.2	10	0.2	yes
Date Acquired:	June 06, 2025					

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	0.0700376	-0.2	0.2	yes
Magnesium	mg/L	0.0599072	-0.1	0.1	yes
Sodium	mg/L	0.0357922	-0.4	0.4	yes
Potassium	mg/L	0.192832	-0.4	0.4	yes
Iron	mg/L	0.00324691	-0.01	0.01	yes
Manganese	mg/L	0.000677325	-0.004	0.004	yes
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Chloride	mg/L	0.09	-0.4	0.4	yes
Date Acquired: June 09, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2020	1847.4	2256.0	yes
Date Acquired: June 09, 2025					
Electrical Conductivity	dS/m	33.2	27.200	36.800	yes
Date Acquired: June 06, 2025					
pH		9.14	8.90	9.44	yes
Temp. of observed pH	°C	20.9	15.5	24.5	yes
Electrical Conductivity	dS/m	2.77	2.631	2.829	yes
P-Alkalinity	mg/L	540	442	584	yes
T-Alkalinity	mg/L	1020	958	1059	yes
Calcium	mg/L	251	235.3	262.9	yes
Magnesium	mg/L	101	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	250	238.3	262.3	yes
Iron	mg/L	9.92	8.89	10.69	yes
Manganese	mg/L	2.51	2.200	2.680	yes
Fluoride	mg/L	9.97	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145427 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Nitrite - N	mg/L	9.76	9.010	10.990		yes
Nitrate and Nitrite - N	mg/L	19.8	19.10	20.90		yes
Date Acquired: June 09, 2025						
pH		6.87	6.75	7.05		yes
Temp. of observed pH	°C	20.9	15.5	24.5		yes
Electrical Conductivity	dS/m	0.082	0.069	0.085		yes
P-Alkalinity	mg/L	56	28	72		yes
T-Alkalinity	mg/L	129	114	140		yes
Calcium	mg/L	52.7	44.9	56.9		yes
Magnesium	mg/L	21.3	17.9	22.0		yes
Sodium	mg/L	50.5	47.1	53.4		yes
Potassium	mg/L	51.7	45.8	55.8		yes
Iron	mg/L	2.04	1.89	2.11		yes
Manganese	mg/L	0.517	0.464	0.536		yes
Fluoride	mg/L	4.85	4.58	5.24		yes
Nitrate - N	mg/L	4.77	4.37	5.33		yes
Nitrite - N	mg/L	4.74	4.370	5.330		yes
Nitrate and Nitrite - N	mg/L	9.52	8.80	10.60		yes
Chloride	mg/L	82.5	74.9	86.9		yes
Date Acquired: June 09, 2025						
Calcium	mg/L	5.2	4.7	5.4		yes
Magnesium	mg/L	2.1	1.9	2.2		yes
Sodium	mg/L	5.1	4.7	5.7		yes
Potassium	mg/L	5.1	4.6	5.6		yes
Iron	mg/L	0.20	0.18	0.22		yes
Manganese	mg/L	0.051	0.046	0.057		yes
Fluoride	mg/L	0.51	0.45	0.57		yes
Nitrate - N	mg/L	0.51	0.42	0.57		yes
Nitrite - N	mg/L	0.509	0.455	0.557		yes
Nitrate and Nitrite - N	mg/L	1.02	0.85	1.15		yes
Chloride	mg/L	14.2	13.3	16.5		yes
Date Acquired: June 09, 2025						
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
pH		6.90	6.93	0	0.10	yes
Electrical Conductivity	dS/m	40.9	40.8	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	654	650	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	537	533	10	5	yes
Calcium	mg/L	317	318	10	0.6	yes
Magnesium	mg/L	304	305	10	0.7	yes
Sodium	mg/L	148	147	10	1.2	yes
Potassium	mg/L	6.4	6.5	10	1.2	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: Company: HCL	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M LSD: P.O.: 20023 Proj. Acct. code:	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145427 Report Type: Final Report

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Iron	mg/L	<0.05	<0.05	10	0.05	yes
Manganese	mg/L	0.30	0.30	10	0.010	yes
Nitrate - N	mg/L	0.06	0.06	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
Fluoride	mg/L	0.05	0.05	10	0.05	yes
Chloride	mg/L	2.0	2.0	10	0.5	yes
Date Acquired: June 09, 2025						

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-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145427 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 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 06, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 06, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 06, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 09, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 06, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 09, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 06, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 09, 2025	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 09, 2025	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 09, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 09, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 09, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 06, 2025	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, August 2024
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:

- Sample 1819420-6; 9983494: Sample received at 13.9 °C
- Sample 1819420-6; 9983494: Sample turbidity may interfere with Apparent Colour analysis. A more accurate measure of sample colour would be obtained from True Colour Analysis.

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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.24	Lot ID:	1819420
	17740 - 118 Avenue NW	Project Name:	2025 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 5, 2025
	T5S 2W3	LSD:		Date Reported:	Jun 12, 2025
Attn:	Jennifer Catt	P.O.:	20023	Report Number:	3145427
Sampled By:		Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

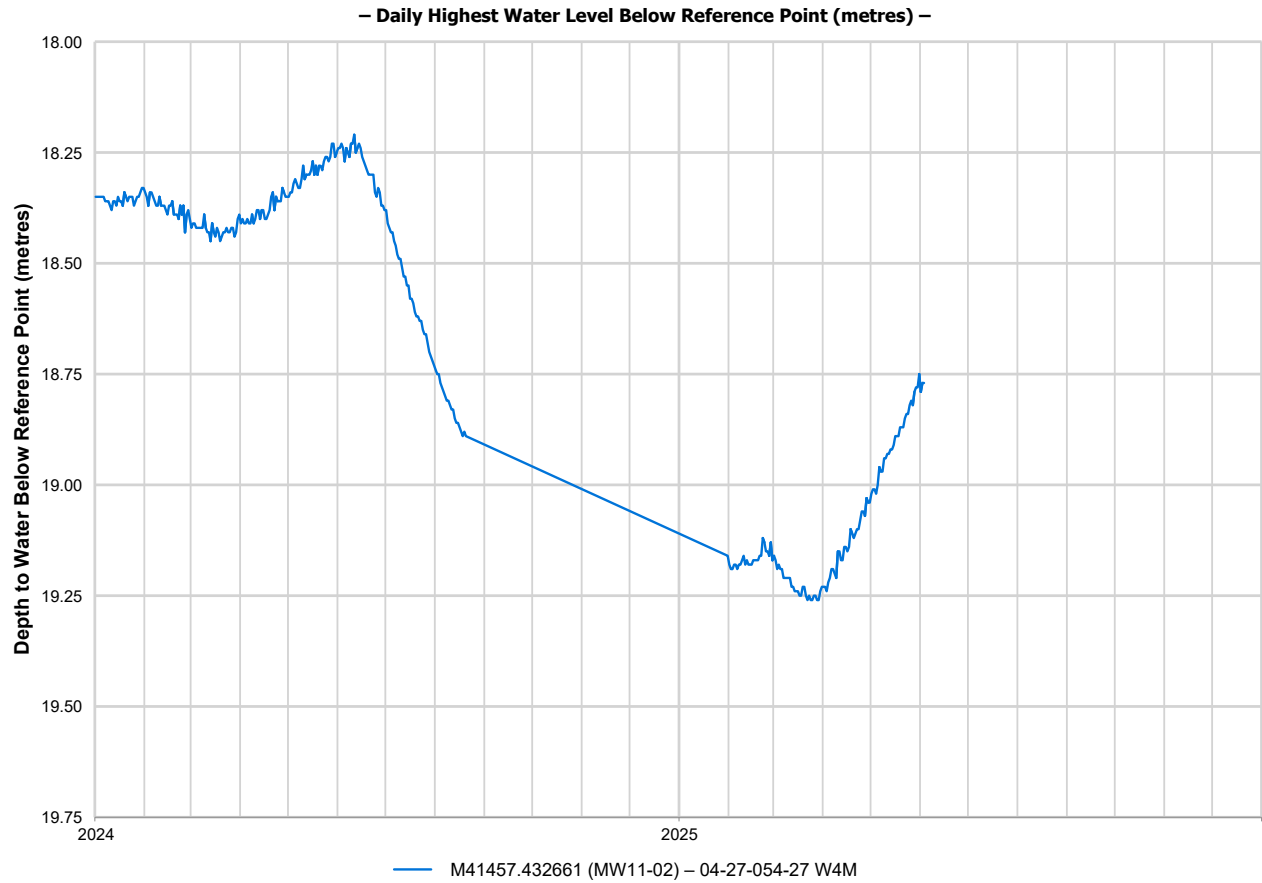
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to 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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MW11-02
2024 - 2025 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 ***

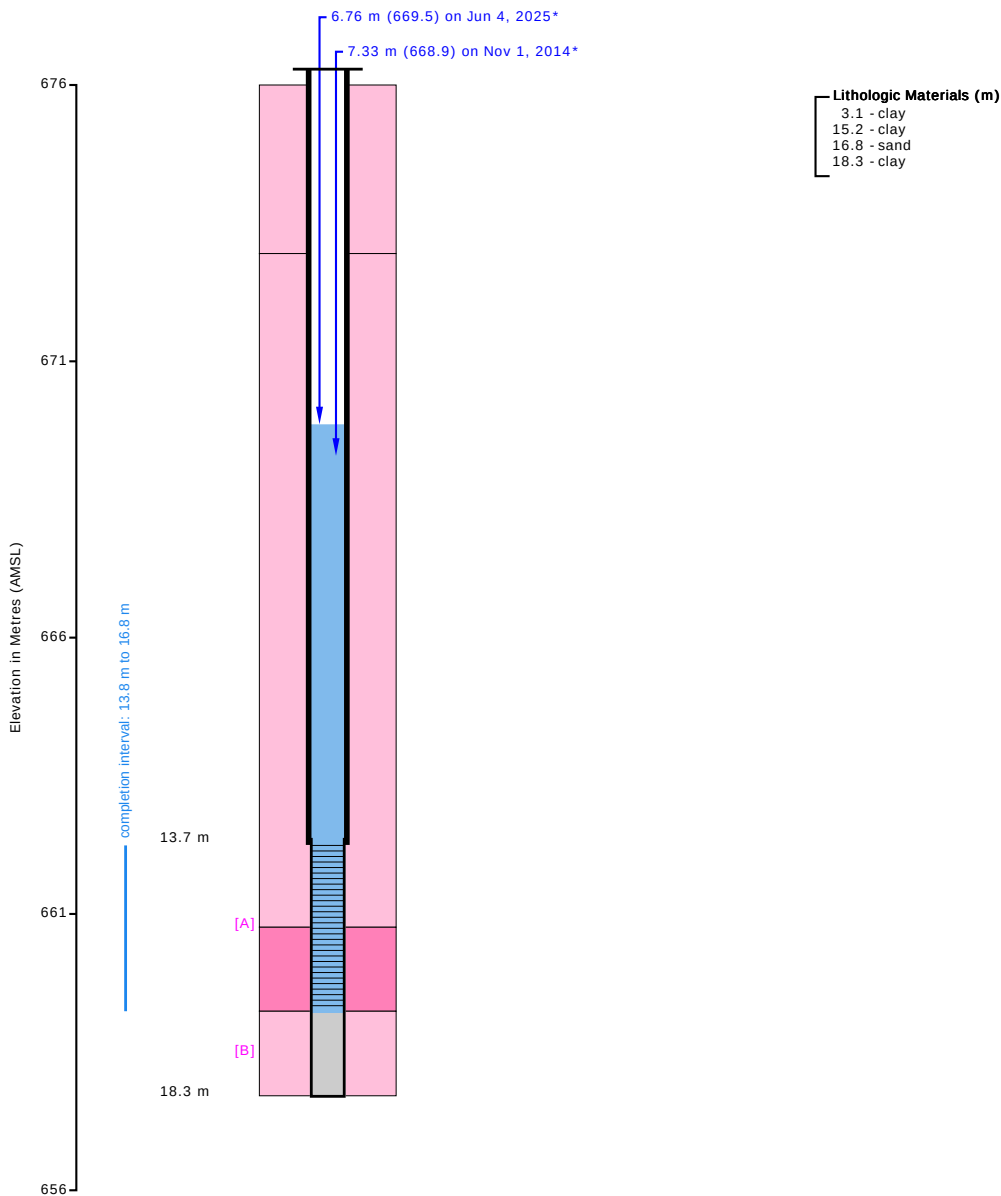
(TGWC determined value)*

Earliest Water Level (m): **7.33 – November 1, 2014**

Most Recent Water Level (m): **6.76 – June 4, 2025 @ 23:00**

GIC ID: **Unknown**

MW14-01
Water Well Diagram



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

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): 6.76 m (669.5 m AMSL) on Jun 4, 2025 @ 23:00 - 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: July 17, 2025 @ 09:28 --- <https://www.hcl.ca>

Owner: *Sturgeon County*
9613 100 St, Morinville, AB T8R 1L9
Contractor: *Summers Drilling Ltd.*
Name: *MW14-01*
Field Action: *Confirmed - Physically, November 22, 2017*
Work Type: *Piezometer*
Drilling Method: *Rotary - Mud*
Proposed Use: *Observation*
Completion Type: *Casing/Liner/Screen*
Date Started: *October 10, 2014*
Date Completed: *October 10, 2014*
Well Status: *Monitoring*
Feature Class: *Piezometer*

05-34-054-27 W4M
Easting (m): 71,919 ²
Northing (m): 5,948,923 ²
Elevation (m): 676 ²

M42473.435942
Elog Taken: *No*
Gamma Taken: *No*
Flowing: *No*
Presence of Gas: *No*
Stick Up (m): 0.6
2025-06-04

General Details
* TGWC calculated value

Depth Completed (m)*: 16.8
Depth Drilled (m)*: 18.3
Sand & Gravel Thickness (m): 1.5 (total) – 1.5 (below 15 m) *
Plugged / Backfilled (m): 16.8 – 18.3 (Slough)
Most Recent Water Level (m): 6.76 m – June 4, 2025
Top of Bedrock (m): *Surficial Water Well*
Completion Interval (m): 13.8 – 16.8

Completion Details

Surface Casing: *PVC – 60.3 mm (O.D.) x 3.40 mm (thick) x 13.7 m (bottom)*
Screen Material: *PVC – 52.0 mm (O.D.) (Attached To Casing)*
Fittings: *Top: Tie On – Bottom: Plug*

Intervals

Screen: 13.8 to 16.8 m - 0.0254 mm (Other)

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

Sampling Details: *May 1, 2025 @ 11:30*
Report Date: *May 28, 2025 - Element Materials Technology Canada Inc. (1816292-14)*

Constituent	Result	Constituent	Result	Constituent	Result
Conductivity (µS/cm):	1210	Nitrate as N:	< 0.01	Turbidity (NTU):	43.7
Total Dissolved Solids:	791	Nitrite as N:	0.013	Fluoride:	0.06
Hardness (as CaCO3):	539	pH (pH Unit):	7.34	Carbonate:	< 6
T-Alkalinity (as CaCO3):	522	Colour (TCU):	> 60	Bicarbonate:	636
P-Alkalinity (as CaCO3):	< 5	Ion Balance (%):	101	Hydroxide:	< 5
Nitrate + Nitrite as N:	0.01	Total Coliforms:**:		Total Iron:	
Total Suspended Solids:		Fecal Coliforms:**:		Total Mn:	
Temperature (°C):	20.6	Escherichia coli:**:			

Constituent	Extractable	Dissolved	Constituent	Extractable	Dissolved
Calcium:		152	Mercury:		< 0.000005
Chloride:		0.9	Molybdenum:		< 0.001
Iron:		2.38	Magnesium:		38.5
Manganese:		0.495***	Sodium:		85.3
Aluminum:		< 0.002	Potassium:		4.9
Arsenic:		0.0127***	Vanadium:		< 0.0001
Barium:		0.024	Strontium:		1.43
Beryllium:		< 0.0001	Nickel:		0.0014
Cadmium:		< 0.00001	Zinc:		0.004
Chromium:		< 0.0005	Copper:		0.0002
Cobalt:		0.0017	Lead:		< 0.0001
Sulfate:		196	Uranium:		0.0034

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

***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2025. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario. 850350; 1 / 16

Lithology Details

Elevation (AMSL)	Depth (BGL)	Lithology Descriptions
672.6	3.1	Brown Clay
660.4	15.2	Grey Clay
658.8	16.8	Grey Sand
657.3	18.3	Grey Clay

Comments & Observations
Field Survey (HCL), Nov 22, 2017: Piezometer in ditch along road; no padlock.

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

Alias IDs
Z993052

* HCL GPS — 10TM Resource NAD83, * HCL DEM

(1) July 17, 2025, "AS IS"; no warranty either expressed or implied. visit [tgwc.com](https://www.tgwc.com) for additional details

Sturgeon County, 2024 to 2025 Groundwater Monitoring Report
Calahoo Resource Extraction District, Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, MR-0224.24

B - 288

RTU
REMOTE TELEMETRY UNIT
HCL

MW14-01
AEPA – Water Well Drilling Report

— AEPA water well drilling report not available —

MW14-01
Chemical Analysis Results (May 28, 2025)



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W: www.element.com

Page 1 of 10

Analytical Report

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:		Date Received:	May 23, 2025
	T5S 2W3	LSD:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Reported:	May 28, 2025
Attn:	Jennifer Catt	P.O.:	20020	Report Number:	3140802
Sampled By:	Ben Gilham	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

Reference Number	1816292-14
Sample Date	May 01, 2025
Sample Time	11:30
Sample Location	M42473.435942
Sample Description	MW14-01 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	7.77	0.05		
Sulfur	Dissolved	mg/L	65.4	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
				5		
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	0.0127	0.0002	0.010	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	0.184	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	0.0017	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	0.135	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	1.43	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	0.0034	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	0.004	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	>60	5		
Turbidity		NTU	43.7	0.1		
Routine Water						
pH			7.34	1	7.0-10.5	Within Range
Temp. of observed pH		°C	20.6			
Electrical Conductivity	at 25 °C	µS/cm	1210	1		
Calcium	Dissolved	mg/L	152	0.2		
Magnesium	Dissolved	mg/L	38.5	0.2		

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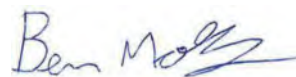
Analytical Report

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M 20020 P.O.: Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140802 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Reference Number	1816292-14
Sample Date	May 01, 2025
Sample Time	11:30
Sample Location	M42473.435942
Sample Description	MW14-01 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	85.3	0.4	200	Below AO
Potassium	Dissolved	mg/L	4.9	0.4		
Iron	Dissolved	mg/L	2.38	0.01	0.1	Above AO
Manganese	Dissolved	mg/L	0.495	0.005	0.02 AO, 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	0.9	0.4	250	Below AO
Fluoride		mg/L	0.06	0.05	1.5	Below MAC
Nitrate - N		mg/L	<0.01	0.01	10	Below MAC
Nitrite - N		mg/L	0.013	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	0.01	0.01		
Sulfate (SO4)	Dissolved	mg/L	196	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	636			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	522	5		
Total Dissolved Solids	Calculated	mg/L	791	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	539			
Ionic Balance	Dissolved	%	101			

Approved by:



Benjamin Morris, B.Sc
Operations 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	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140802 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	-0.0104023	-0.04	0.05	yes
Sulfur	mg/L	0.0176456	-0.3	0.2	yes
Aluminum	µg/L	-0.142723	-2	2	yes
Antimony	µg/L	-0.00198253	-0.2	0.2	yes
Arsenic	µg/L	-0.00520747	-0.2	0.2	yes
Barium	µg/L	0.0155545	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.490366	-2	2	yes
Cadmium	µg/L	0.00106883	-0.01	0.01	yes
Chromium	µg/L	-0.0304354	-0.5	0.5	yes
Cobalt	µg/L	-0.000332921	-0.1	0.1	yes
Copper	µg/L	0.0100485	-0.2	0.2	yes
Lead	µg/L	0.00240083	-0.1	0.1	yes
Lithium	µg/L	-0.00113161	-1	1	yes
Molybdenum	µg/L	0.0194221	-1	1	yes
Nickel	µg/L	0.0142204	-0.5	0.5	yes
Selenium	µg/L	0.00150023	-0.2	0.2	yes
Silver	µg/L	0.00050935	-0.01	0.01	yes
Strontium	µg/L	0.0646959	-1	1	yes
Thallium	µg/L	0.00145131	-0.50	0.50	yes
Tin	µg/L	-0.0724984	-1	1	yes
Titanium	µg/L	-0.0940343	-0.5	0.5	yes
Uranium	µg/L	0.00233484	-0.5	0.5	yes
Vanadium	µg/L	-0.00529231	-0.1	0.1	yes
Zinc	µg/L	0.13059	-1	1	yes
Mercury	µg/L	-0.001039	-0.051000	0.051000	yes

Date Acquired: May 26, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	997	902	1058	yes
Antimony	µg/L	40.5	36.4	44.2	yes
Arsenic	µg/L	39.9	37.7	42.5	yes
Barium	µg/L	196	181	211	yes
Beryllium	µg/L	19.9	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	389	351	427	yes
Cadmium	µg/L	2.16	1.87	2.23	yes
Chromium	µg/L	100	90.8	108.8	yes
Cobalt	µg/L	20.0	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.2	18.3	21.3	yes
Lithium	µg/L	197	178	214	yes
Molybdenum	µg/L	198	178	219	yes
Nickel	µg/L	99.9	93.3	105.9	yes
Selenium	µg/L	39.9	36.9	42.9	yes

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140802 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	20.1	18.29	22.31	yes
Strontium	µg/L	200	183	219	yes
Thallium	µg/L	9.86	8.90	10.70	yes
Tin	µg/L	201	187	217	yes
Titanium	µg/L	101	91.0	109.0	yes
Uranium	µg/L	102	92.2	110.2	yes
Vanadium	µg/L	20.0	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: May 26, 2025					
Mercury	mg/L	0.000100	0.000070	0.000130	yes
Date Acquired: May 26, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.10	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.1	9.1	10.9	yes
Lead	µg/L	1.0	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.2	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.02	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	5.0	4.4	5.7	yes
Uranium	µg/L	5.2	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000020	0.000006	0.000036	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	9.62	9.51	10.89	yes
Sulfur	mg/L	150	141.6	156.6	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	2.03	1.88	2.24	yes
Sulfur	mg/L	10.2	9.1	10.6	yes
Date Acquired: May 26, 2025					

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140802 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.20	0.18	0.23	yes
Sulfur	mg/L	2.9	2.7	3.1	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.21	3.26	10	0.01	yes
Sulfur	mg/L	38.2	39.0	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	5.9	6.0	10	0.4	yes
Barium	µg/L	31	31	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	163	161	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	0.8	0.8	10	0.2	yes
Copper	µg/L	0.5	0.5	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	89	89	10	2	yes
Molybdenum	µg/L	<1	<1	10	2	yes
Nickel	µg/L	1.1	1.0	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	1090	1090	10	2	yes
Thallium	µg/L	<0.05	<0.05	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	2.8	2.8	10	1.1	yes
Vanadium	µg/L	<0.1	<0.1	10	0.2	yes
Zinc	µg/L	27	27	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: May 26, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.099	-0.1	0.1	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	0.114	0.0	0.1	yes
Date Acquired: May 27, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1930	1881.4	2091.4	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	4550	4020.0	5436.0	yes
Date Acquired: May 27, 2025					

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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140802 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Physical and Aggregate Properties - Continued

Continued							
Control Sample		Units	Measured	Lower Limit	Upper Limit	Passed QC	
Colour		Colour units	10	10	10	yes	
Turbidity		NTU	144	132.1	162.1	yes	
Date Acquired: May 27, 2025							
Turbidity		NTU	14.3	12.6	15.6	yes	
Date Acquired: May 27, 2025							
Turbidity		NTU	1.6	1.0	2.2	yes	
Date Acquired: May 27, 2025							
Client Sample Replicates		Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity		NTU	3.1	2.9	10	0.2	yes
Date Acquired: May 27, 2025							

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0.00594322	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Calcium	mg/L	0.0341995	-0.2	0.2	yes
Magnesium	mg/L	0.00865101	-0.1	0.1	yes
Sodium	mg/L	0.0649477	-0.4	0.4	yes
Potassium	mg/L	0.024503	-0.4	0.4	yes
Iron	mg/L	0.00335118	-0.01	0.01	yes
Manganese	mg/L	0.000111042	-0.004	0.004	yes
Chloride	mg/L	0.15	-0.4	0.4	yes
Date Acquired: May 26, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2140	1847.4	2256.0	yes
Date Acquired: May 26, 2025					
Electrical Conductivity	dS/m	32.9	27.200	36.800	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	9.90	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes
Nitrite - N	mg/L	9.61	9.010	10.990	yes
Nitrate and Nitrite - N	mg/L	19.6	19.10	20.90	yes
pH		9.18	8.90	9.44	yes
Temp. of observed pH	°C	20.1	15.5	24.5	yes
Electrical Conductivity	dS/m	2.77	2.631	2.829	yes
P-Alkalinity	mg/L	519	442	584	yes
T-Alkalinity	mg/L	997	958	1059	yes
Calcium	mg/L	242	235.3	262.9	yes
Magnesium	mg/L	97.6	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	241	238.3	262.3	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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140802 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Iron	mg/L	9.47	8.89	10.69	yes
Manganese	mg/L	2.39	2.200	2.680	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	4.80	4.58	5.24	yes
Nitrate - N	mg/L	4.71	4.37	5.33	yes
Nitrite - N	mg/L	4.64	4.370	5.330	yes
Nitrate and Nitrite - N	mg/L	9.35	8.80	10.60	yes
pH		6.87	6.75	7.05	yes
Temp. of observed pH	°C	20.3	15.5	24.5	yes
Electrical Conductivity	dS/m	0.076	0.069	0.085	yes
P-Alkalinity	mg/L	52	28	72	yes
T-Alkalinity	mg/L	127	114	140	yes
Calcium	mg/L	51.2	44.9	56.9	yes
Magnesium	mg/L	20.4	17.9	22.0	yes
Sodium	mg/L	51.9	47.1	53.4	yes
Potassium	mg/L	50.3	45.8	55.8	yes
Iron	mg/L	1.98	1.89	2.11	yes
Manganese	mg/L	0.496	0.464	0.536	yes
Chloride	mg/L	83.5	74.9	86.9	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	0.50	0.45	0.57	yes
Nitrate - N	mg/L	0.51	0.42	0.57	yes
Nitrite - N	mg/L	0.496	0.455	0.557	yes
Nitrate and Nitrite - N	mg/L	1.01	0.85	1.15	yes
Calcium	mg/L	5.1	4.7	5.4	yes
Magnesium	mg/L	2.1	1.9	2.2	yes
Sodium	mg/L	5.2	4.7	5.7	yes
Potassium	mg/L	4.8	4.6	5.6	yes
Iron	mg/L	0.19	0.18	0.22	yes
Manganese	mg/L	0.048	0.046	0.057	yes
Chloride	mg/L	15.2	13.3	16.5	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Fluoride	mg/L	0.09	0.08	10	0.05	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
pH		7.56	7.53	0	0.10	yes
Electrical Conductivity	dS/m	0.944	0.942	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	583	583	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	478	478	10	5	yes
Calcium	mg/L	86.8	87.6	10	0.6	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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140802 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Magnesium	mg/L	26.7	26.8	10	0.7	yes
Sodium	mg/L	77.9	79.0	10	1.2	yes
Potassium	mg/L	5.2	5.3	10	1.2	yes
Iron	mg/L	0.03	0.03	10	0.05	yes
Manganese	mg/L	0.071	0.072	10	0.010	yes
Chloride	mg/L	0.7	0.7	10	0.5	yes
Date Acquired: May 26, 2025						

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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M 20020 P.O.: Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140802 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	May 26, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	May 26, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	May 26, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	May 26, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	May 27, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	May 26, 2025	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	May 26, 2025	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	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	May 26, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	May 27, 2025	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, August 2024
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:

- Sample 1816292-14; 9956343: Sample received at 11.6 °C
- Sample 1816292-14; 9956343: Sample turbidity may interfere with Apparent Colour analysis. A more accurate measure of sample colour would be obtained from True Colour Analysis.

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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater	Control Number:	
	Edmonton, AB, Canada		Monitoring	Date Received:	May 23, 2025
	T5S 2W3	Project Location:		Date Reported:	May 28, 2025
Attn:	Jennifer Catt	LSD:	Tp 054, R 26 to 28, W4M	Report Number:	3140802
Sampled By:	Ben Gilham		and Tp 054, R 01, W5M	Report Type:	Final Report
Company:	HCL	P.O.:	20020		
		Proj. Acct. code:			

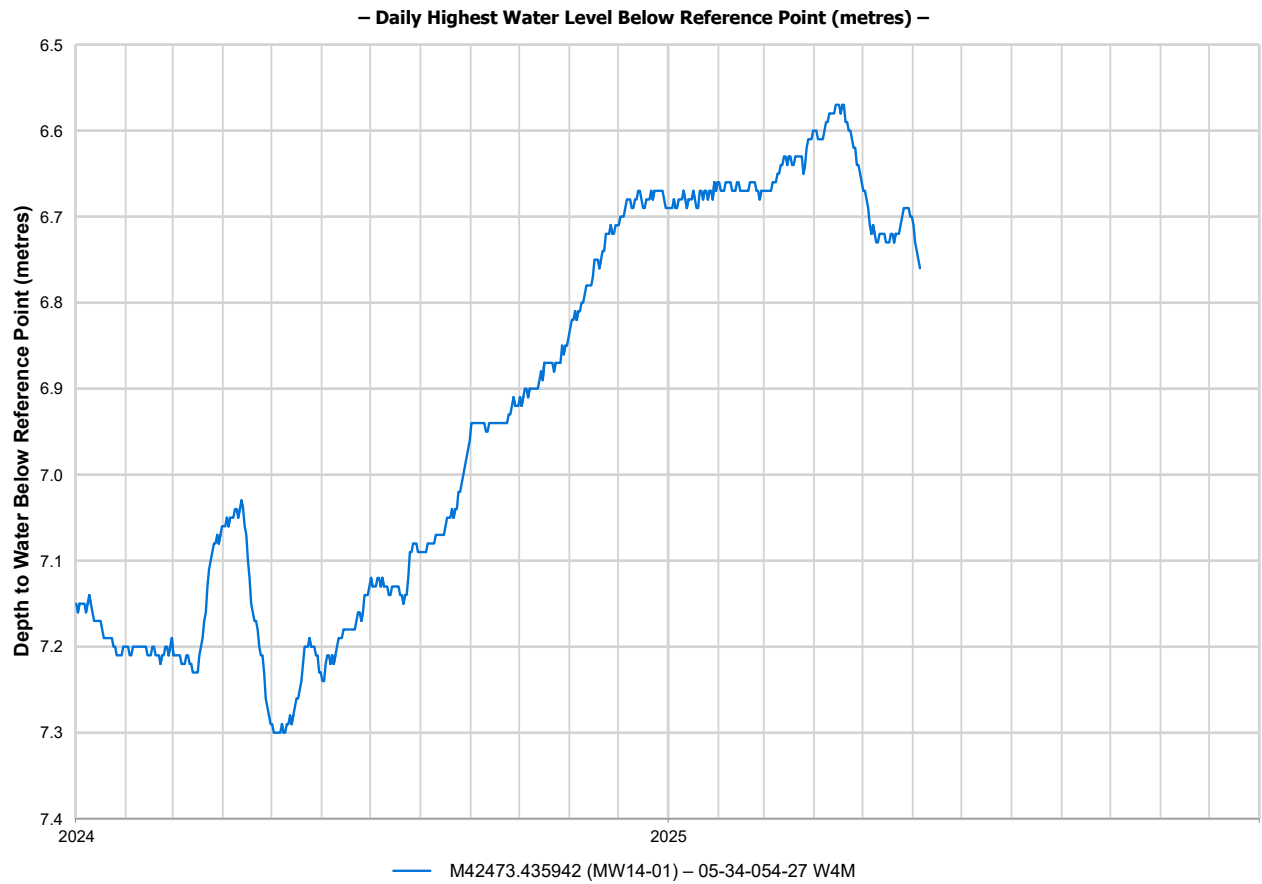
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to 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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MW14-01
2024 - 2025 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 *

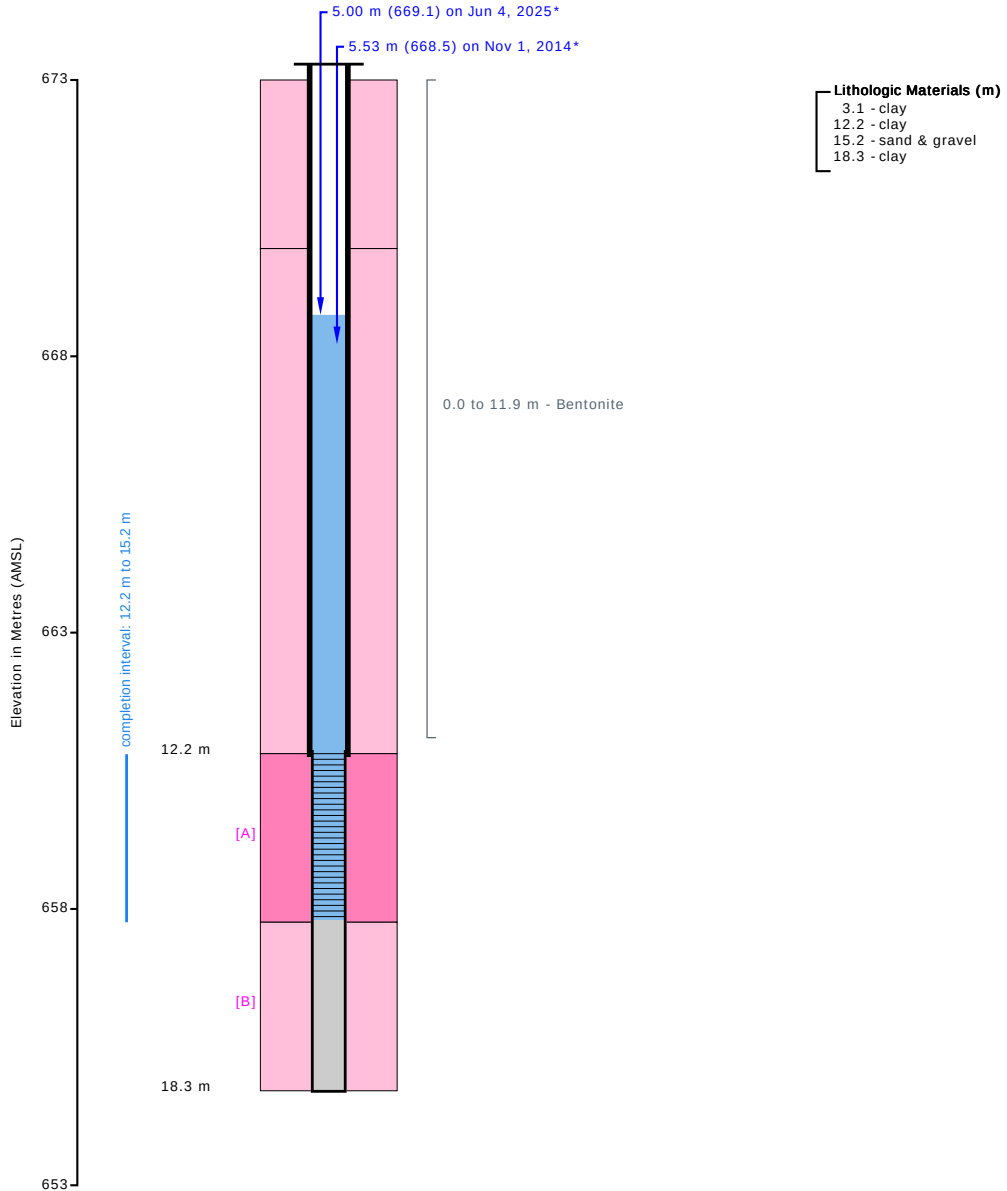
(TGWC determined value)*

Earliest Water Level (m): 5.53 – November 1, 2014

Most Recent Water Level (m): 5.00 – June 4, 2025 @ 23:00

GIC ID: Unknown

MW14-02 Water Well Diagram



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

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: 0.7 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): 5.00 m (669.1 m AMSL) on Jun 4, 2025 @ 23:00 - Reference Point: Top of Casing	
Water Level (oldest): 5.53 m (668.5 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: July 17, 2025 @ 09:28 --- <https://www.hcl.ca>

MW14-02
AEPA - Water Well Drilling Report

— AEPA water well drilling report not available —

MW14-02
Chemical Analysis Results (May 28, 2025)



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Analytical Report

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:		Date Received:	May 23, 2025
	T5S 2W3	LSD:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Reported:	May 28, 2025
Attn:	Jennifer Catt	P.O.:	20020	Report Number:	3140801
Sampled By:	Ben Gilham	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

Reference Number	1816292-13
Sample Date	May 01, 2025
Sample Time	14:15
Sample Location	M42475.578813
Sample Description	MW14-02 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	6.98	0.05		
Sulfur	Dissolved	mg/L	20.5	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	0.010	Below MAC
Barium	Dissolved	mg/L	0.277	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	0.00003	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	0.0010	0.0002	1 AO, 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.101	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0046	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	1.32	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	0.0069	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	0.004	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	10	5		
Turbidity		NTU	7.4	0.1		
Routine Water						
pH			7.41	1	7.0-10.5	Within Range
Temp. of observed pH		°C	20.7			
Electrical Conductivity	at 25 °C	µS/cm	1420	1		
Calcium	Dissolved	mg/L	185	0.2		
Magnesium	Dissolved	mg/L	54.1	0.2		

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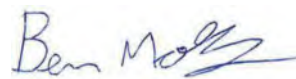
Analytical Report

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M 20020 P.O.: Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140801 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Reference Number	1816292-13
Sample Date	May 01, 2025
Sample Time	14:15
Sample Location	M42475.578813
Sample Description	MW14-02 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	37.5	0.4	200	Below AO
Potassium	Dissolved	mg/L	3.3	0.4		
Iron	Dissolved	mg/L	0.03	0.01	0.1	Below AO
Manganese	Dissolved	mg/L	0.060	0.005	0.02 AO, 0.12 MAC	Above AO
Chloride	Dissolved	mg/L	185	0.4	250	Below AO
Fluoride		mg/L	0.22	0.05	1.5	Below MAC
Nitrate - N		mg/L	<0.01	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	<0.01	0.01		
Sulfate (SO4)	Dissolved	mg/L	61.6	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	793	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	684			
Ionic Balance	Dissolved	%	100			

Approved by:



Benjamin Morris, B.Sc
Operations 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	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140801 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	-0.0104023	-0.04	0.05	yes
Sulfur	mg/L	0.0176456	-0.3	0.2	yes
Aluminum	µg/L	-0.142723	-2	2	yes
Antimony	µg/L	-0.00198253	-0.2	0.2	yes
Arsenic	µg/L	-0.00520747	-0.2	0.2	yes
Barium	µg/L	0.0155545	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.490366	-2	2	yes
Cadmium	µg/L	0.00106883	-0.01	0.01	yes
Chromium	µg/L	-0.0304354	-0.5	0.5	yes
Cobalt	µg/L	-0.000332921	-0.1	0.1	yes
Copper	µg/L	0.0100485	-0.2	0.2	yes
Lead	µg/L	0.00240083	-0.1	0.1	yes
Lithium	µg/L	-0.00113161	-1	1	yes
Molybdenum	µg/L	0.0194221	-1	1	yes
Nickel	µg/L	0.0142204	-0.5	0.5	yes
Selenium	µg/L	0.00150023	-0.2	0.2	yes
Silver	µg/L	0.00050935	-0.01	0.01	yes
Strontium	µg/L	0.0646959	-1	1	yes
Thallium	µg/L	0.00145131	-0.50	0.50	yes
Tin	µg/L	-0.0724984	-1	1	yes
Titanium	µg/L	-0.0940343	-0.5	0.5	yes
Uranium	µg/L	0.00233484	-0.5	0.5	yes
Vanadium	µg/L	-0.00529231	-0.1	0.1	yes
Zinc	µg/L	0.13059	-1	1	yes
Mercury	µg/L	-0.001039	-0.051000	0.051000	yes

Date Acquired: May 26, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	997	902	1058	yes
Antimony	µg/L	40.5	36.4	44.2	yes
Arsenic	µg/L	39.9	37.7	42.5	yes
Barium	µg/L	196	181	211	yes
Beryllium	µg/L	19.9	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	389	351	427	yes
Cadmium	µg/L	2.16	1.87	2.23	yes
Chromium	µg/L	100	90.8	108.8	yes
Cobalt	µg/L	20.0	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.2	18.3	21.3	yes
Lithium	µg/L	197	178	214	yes
Molybdenum	µg/L	198	178	219	yes
Nickel	µg/L	99.9	93.3	105.9	yes
Selenium	µg/L	39.9	36.9	42.9	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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140801 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	20.1	18.29	22.31	yes
Strontium	µg/L	200	183	219	yes
Thallium	µg/L	9.86	8.90	10.70	yes
Tin	µg/L	201	187	217	yes
Titanium	µg/L	101	91.0	109.0	yes
Uranium	µg/L	102	92.2	110.2	yes
Vanadium	µg/L	20.0	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: May 26, 2025					
Mercury	mg/L	0.000100	0.000070	0.000130	yes
Date Acquired: May 26, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.10	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.1	9.1	10.9	yes
Lead	µg/L	1.0	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.2	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.02	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	5.0	4.4	5.7	yes
Uranium	µg/L	5.2	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000020	0.000006	0.000036	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	9.62	9.51	10.89	yes
Sulfur	mg/L	150	141.6	156.6	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	2.03	1.88	2.24	yes
Sulfur	mg/L	10.2	9.1	10.6	yes
Date Acquired: May 26, 2025					

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140801 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.20	0.18	0.23	yes
Sulfur	mg/L	2.9	2.7	3.1	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.21	3.26	10	0.01	yes
Sulfur	mg/L	38.2	39.0	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	5.9	6.0	10	0.4	yes
Barium	µg/L	31	31	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	163	161	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	0.8	0.8	10	0.2	yes
Copper	µg/L	0.5	0.5	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	89	89	10	2	yes
Molybdenum	µg/L	<1	<1	10	2	yes
Nickel	µg/L	1.1	1.0	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	1090	1090	10	2	yes
Thallium	µg/L	<0.05	<0.05	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	2.8	2.8	10	1.1	yes
Vanadium	µg/L	<0.1	<0.1	10	0.2	yes
Zinc	µg/L	27	27	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: May 26, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.099	-0.1	0.1	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	0.114	0.0	0.1	yes
Date Acquired: May 27, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1930	1881.4	2091.4	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	4550	4020.0	5436.0	yes
Date Acquired: May 27, 2025					

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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140801 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Physical and Aggregate Properties - Continued

continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Colour	Colour units	10	10	10		yes
Turbidity	NTU	144	132.1	162.1		yes
Date Acquired:	May 27, 2025					
Turbidity	NTU	14.3	12.6	15.6		yes
Date Acquired:	May 27, 2025					
Turbidity	NTU	1.6	1.0	2.2		yes
Date Acquired:	May 27, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity	NTU	3.1	2.9	10	0.2	yes
Date Acquired:	May 27, 2025					

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0.00594322	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Calcium	mg/L	0.0341995	-0.2	0.2	yes
Magnesium	mg/L	0.00865101	-0.1	0.1	yes
Sodium	mg/L	0.0649477	-0.4	0.4	yes
Potassium	mg/L	0.024503	-0.4	0.4	yes
Iron	mg/L	0.00335118	-0.01	0.01	yes
Manganese	mg/L	0.000111042	-0.004	0.004	yes
Chloride	mg/L	0.15	-0.4	0.4	yes
Date Acquired: May 26, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2140	1847.4	2256.0	yes
Date Acquired: May 26, 2025					
Electrical Conductivity	dS/m	32.9	27.200	36.800	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	9.90	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes
Nitrite - N	mg/L	9.61	9.010	10.990	yes
Nitrate and Nitrite - N	mg/L	19.6	19.10	20.90	yes
pH		9.18	8.90	9.44	yes
Temp. of observed pH	°C	20.1	15.5	24.5	yes
Electrical Conductivity	dS/m	2.77	2.631	2.829	yes
P-Alkalinity	mg/L	519	442	584	yes
T-Alkalinity	mg/L	997	958	1059	yes
Calcium	mg/L	242	235.3	262.9	yes
Magnesium	mg/L	97.6	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	241	238.3	262.3	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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140801 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Iron	mg/L	9.47	8.89	10.69	yes
Manganese	mg/L	2.39	2.200	2.680	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	4.80	4.58	5.24	yes
Nitrate - N	mg/L	4.71	4.37	5.33	yes
Nitrite - N	mg/L	4.64	4.370	5.330	yes
Nitrate and Nitrite - N	mg/L	9.35	8.80	10.60	yes
pH		6.87	6.75	7.05	yes
Temp. of observed pH	°C	20.3	15.5	24.5	yes
Electrical Conductivity	dS/m	0.076	0.069	0.085	yes
P-Alkalinity	mg/L	52	28	72	yes
T-Alkalinity	mg/L	127	114	140	yes
Calcium	mg/L	51.2	44.9	56.9	yes
Magnesium	mg/L	20.4	17.9	22.0	yes
Sodium	mg/L	51.9	47.1	53.4	yes
Potassium	mg/L	50.3	45.8	55.8	yes
Iron	mg/L	1.98	1.89	2.11	yes
Manganese	mg/L	0.496	0.464	0.536	yes
Chloride	mg/L	83.5	74.9	86.9	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	0.50	0.45	0.57	yes
Nitrate - N	mg/L	0.51	0.42	0.57	yes
Nitrite - N	mg/L	0.496	0.455	0.557	yes
Nitrate and Nitrite - N	mg/L	1.01	0.85	1.15	yes
Calcium	mg/L	5.1	4.7	5.4	yes
Magnesium	mg/L	2.1	1.9	2.2	yes
Sodium	mg/L	5.2	4.7	5.7	yes
Potassium	mg/L	4.8	4.6	5.6	yes
Iron	mg/L	0.19	0.18	0.22	yes
Manganese	mg/L	0.048	0.046	0.057	yes
Chloride	mg/L	15.2	13.3	16.5	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Fluoride	mg/L	0.09	0.08	10	0.05	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
pH		7.56	7.53	0	0.10	yes
Electrical Conductivity	dS/m	0.944	0.942	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	583	583	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	478	478	10	5	yes
Calcium	mg/L	86.8	87.6	10	0.6	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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140801 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Magnesium	mg/L	26.7	26.8	10	0.7	yes
Sodium	mg/L	77.9	79.0	10	1.2	yes
Potassium	mg/L	5.2	5.3	10	1.2	yes
Iron	mg/L	0.03	0.03	10	0.05	yes
Manganese	mg/L	0.071	0.072	10	0.010	yes
Chloride	mg/L	0.7	0.7	10	0.5	yes
Date Acquired: May 26, 2025						

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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140801 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	May 26, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	May 26, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	May 26, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	May 26, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	May 27, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	May 26, 2025	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	May 26, 2025	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	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	May 26, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	May 27, 2025	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, August 2024
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:

- Sample 1816292-13; 9956342: Sample received at 11.6 °C

Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater	Control Number:	
	Edmonton, AB, Canada		Monitoring	Date Received:	May 23, 2025
	T5S 2W3	Project Location:		Date Reported:	May 28, 2025
Attn:	Jennifer Catt	LSD:	Tp 054, R 26 to 28, W4M	Report Number:	3140801
Sampled By:	Ben Gilham		and Tp 054, R 01, W5M	Report Type:	Final Report
Company:	HCL	P.O.:	20020		
		Proj. Acct. code:			

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.

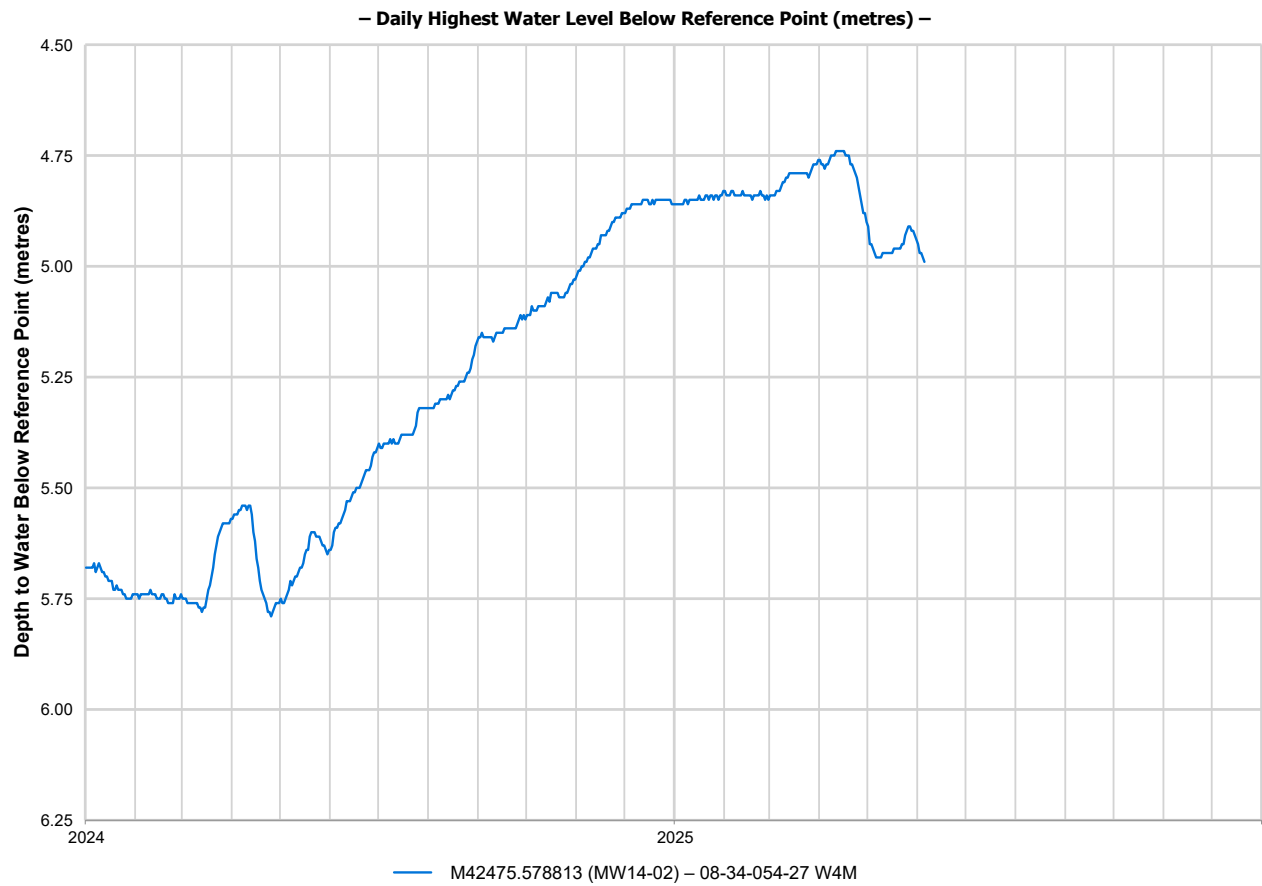
Please direct any inquiries regarding this report to our Client Services group.

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
2024 - 2025 Hydrograph



MW18-01: SE16 Pit – NE Corner

(MW18-01)

08-16-054-26 W4M

(M43326.424846)



Photograph taken on May 22, 2024

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 ***

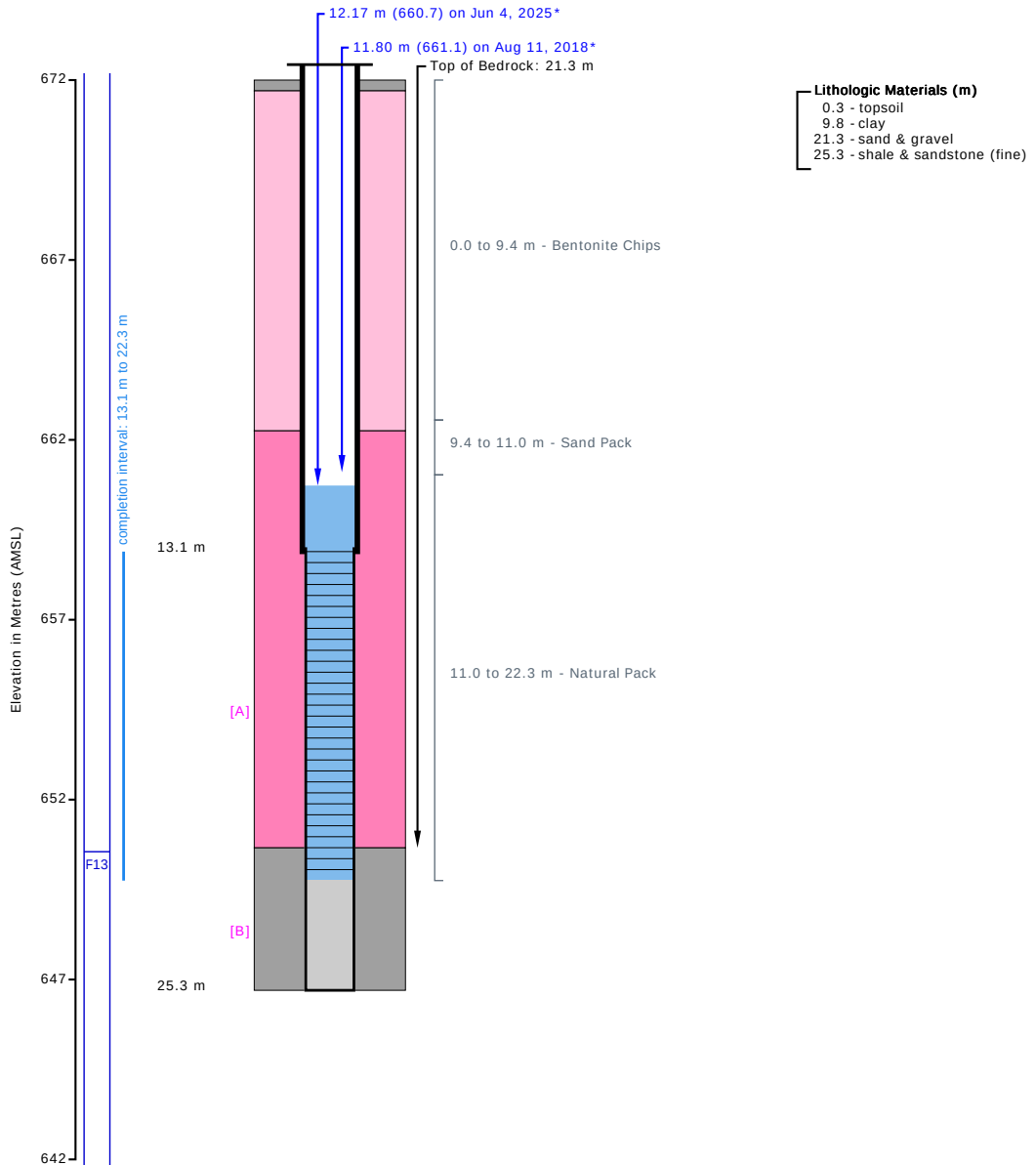
(* TGWC determined value)

Earliest Water Level (m): **11.80 – August 11, 2018 @ 11:00**

Most Recent Water Level (m): **12.17 – June 4, 2025 @ 23:40**

GIC ID: **Unknown**

MW18-01: SE16 Pit - NE Corner
Water Well Diagram



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

Summary

TGWC ID: M43326.424846
Well Name: MW18-01: SE16 Pit – NE Corner
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): 12.17 m (660.7 m AMSL) on Jun 4, 2025 @ 23:40 - 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: July 17, 2025 @ 09:29 --- <https://www.hcl.ca>

***MW18-01: SE16 Pit - NE Corner
AEPA - Water Well Drilling Report***

— AEPA water well drilling report not available —

MW18-01: SE16 Pit – NE Corner
Chemical Analysis Results (June 12, 2025)



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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145430 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By:	P.O.: 20023	
Company: HCL	Proj. Acct. code:	

Reference Number	1819420-9
Sample Date	June 04, 2025
Sample Time	09:35
Sample Location	M43326.424846
Sample Description	MW18-01 / 13.9 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	7.79	0.05		
Sulfur	Dissolved	mg/L	48.5	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	0.0022	0.0002	0.010	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	0.067	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	0.0007	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	0.051	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	0.830	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00001		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0048	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	<0.001	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	25	5		
Turbidity		NTU	9.1	0.1		
Routine Water						
pH			7.40	1	7.0-10.5	Within Range
Temp. of observed pH		°C	20.5			
Electrical Conductivity	at 25 °C	µS/cm	1020	1		
Calcium	Dissolved	mg/L	134	0.2		
Magnesium	Dissolved	mg/L	39.1	0.2		

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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145430 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Reference Number	1819420-9
Sample Date	June 04, 2025
Sample Time	09:35
Sample Location	M43326.424846
Sample Description	MW18-01 / 13.9 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	37.0	0.4	200	Below AO
Potassium	Dissolved	mg/L	5.6	0.4		
Iron	Dissolved	mg/L	0.95	0.01	0.1	Above AO
Manganese	Dissolved	mg/L	2.10	0.005	0.02 AO, 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	14.6	0.4	250	Below AO
Fluoride		mg/L	0.05	0.05	1.5	Below MAC
Nitrate - N		mg/L	<0.01	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	<0.01	0.01		
Sulfate (SO4)	Dissolved	mg/L	146	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	588			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	482	5		
Total Dissolved Solids	Calculated	mg/L	666	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	497			
Ionic Balance	Dissolved	%	90			

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	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145430 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.0005296	-0.04	0.05	yes
Sulfur	mg/L	0.0969684	-0.3	0.2	yes
Aluminum	µg/L	-0.0503837	-2	2	yes
Antimony	µg/L	0.00299663	-0.2	0.2	yes
Arsenic	µg/L	-0.00512149	-0.2	0.2	yes
Barium	µg/L	0.0195816	-1	1	yes
Beryllium	µg/L	0.00322498	-0.1	0.1	yes
Boron	µg/L	0.481716	-2	2	yes
Cadmium	µg/L	0	-0.01	0.01	yes
Chromium	µg/L	-0.0381894	-0.5	0.5	yes
Cobalt	µg/L	-0.000104065	-0.1	0.1	yes
Copper	µg/L	0.103679	-0.2	0.2	yes
Lead	µg/L	0.00415681	-0.1	0.1	yes
Lithium	µg/L	0.024556	-1	1	yes
Molybdenum	µg/L	0.00699169	-1	1	yes
Nickel	µg/L	-0.00127806	-0.5	0.5	yes
Selenium	µg/L	0.000628284	-0.2	0.2	yes
Silver	µg/L	0.000782253	-0.01	0.01	yes
Strontium	µg/L	0.0543752	-1	1	yes
Thallium	µg/L	0.000491946	-0.50	0.50	yes
Tin	µg/L	-0.0247345	-1	1	yes
Titanium	µg/L	-0.116848	-0.5	0.5	yes
Uranium	µg/L	0.000437049	-0.5	0.5	yes
Vanadium	µg/L	-0.0361349	-0.1	0.1	yes
Zinc	µg/L	0.124181	-1	1	yes
Mercury	µg/L	0.0001434	-0.051000	0.051000	yes

Date Acquired: June 09, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	990	902	1058	yes
Antimony	µg/L	40.1	36.4	44.2	yes
Arsenic	µg/L	40.0	37.7	42.5	yes
Barium	µg/L	198	181	211	yes
Beryllium	µg/L	19.6	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	378	351	427	yes
Cadmium	µg/L	2.08	1.87	2.23	yes
Chromium	µg/L	99.3	90.8	108.8	yes
Cobalt	µg/L	19.8	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.4	18.3	21.3	yes
Lithium	µg/L	196	178	214	yes
Molybdenum	µg/L	195	178	219	yes
Nickel	µg/L	99.5	93.3	105.9	yes
Selenium	µg/L	39.5	36.9	42.9	yes

Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145430 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	19.7	18.29	22.31	yes
Strontium	µg/L	195	183	219	yes
Thallium	µg/L	9.71	8.90	10.70	yes
Tin	µg/L	196	187	217	yes
Titanium	µg/L	97.8	91.0	109.0	yes
Uranium	µg/L	101	92.2	110.2	yes
Vanadium	µg/L	19.7	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: June 09, 2025					
Mercury	mg/L	0.000099	0.000070	0.000130	yes
Date Acquired: June 09, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.11	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.0	9.1	10.9	yes
Lead	µg/L	1.1	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.1	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.01	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	4.9	4.4	5.7	yes
Uranium	µg/L	5.1	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000021	0.000006	0.000036	yes
Date Acquired: June 09, 2025					
Silicon	mg/L	10.2	9.51	10.89	yes
Sulfur	mg/L	151	141.6	156.6	yes
Date Acquired: June 09, 2025					
Silicon	mg/L	2.08	1.88	2.24	yes
Sulfur	mg/L	10.3	9.2	10.8	yes
Date Acquired: June 09, 2025					

Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145430 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Silicon	mg/L	0.20	0.18	0.23		yes
Sulfur	mg/L	2.9	2.7	3.1		yes
Date Acquired: June 09, 2025						
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.7	3.6	10	0.01	yes
Sulfur	mg/L	647	647	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	<0.2	<0.2	10	0.4	yes
Barium	µg/L	131	130	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	279	293	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	<0.1	<0.1	10	0.2	yes
Copper	µg/L	<0.2	<0.2	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	30	30	10	2	yes
Molybdenum	µg/L	<1	<1	10	2	yes
Nickel	µg/L	<0.5	<0.5	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	991	1010	10	2	yes
Thallium	µg/L	<0.01	<0.01	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	<0.5	<0.5	10	1.1	yes
Vanadium	µg/L	0.1	0.2	10	0.2	yes
Zinc	µg/L	<1	<1	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: June 09, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.09	-0.1	0.1	yes
Date Acquired: June 06, 2025					
Turbidity	NTU	0.112	0.0	0.1	yes
Date Acquired: June 06, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1920	1881.4	2091.4	yes
Date Acquired: June 06, 2025					
Turbidity	NTU	4530	4020.0	5436.0	yes
Date Acquired: June 06, 2025					

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145430 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Physical and Aggregate Properties - Continued

Control Sample		Units	Measured	Lower Limit	Upper Limit	Passed QC	
Turbidity		NTU	143	132.1	162.1	yes	
Colour		Colour units	10	10	10	yes	
Date Acquired:		June 06, 2025					
Turbidity		NTU	14.2	12.6	15.6	yes	
Date Acquired:		June 06, 2025					
Turbidity		NTU	1.6	1.0	2.2	yes	
Date Acquired:		June 06, 2025					
Client Sample Replicates		Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity		NTU	3.2	3.2	10	0.2	yes
Date Acquired:		June 06, 2025					

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	0.0700376	-0.2	0.2	yes
Magnesium	mg/L	0.0599072	-0.1	0.1	yes
Sodium	mg/L	0.0357922	-0.4	0.4	yes
Potassium	mg/L	0.192832	-0.4	0.4	yes
Iron	mg/L	0.00324691	-0.01	0.01	yes
Manganese	mg/L	0.000677325	-0.004	0.004	yes
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Chloride	mg/L	0.21	-0.4	0.4	yes
Date Acquired: June 09, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2020	1847.4	2256.0	yes
Date Acquired: June 09, 2025					
Electrical Conductivity	dS/m	33.2	27.200	36.800	yes
Date Acquired: June 06, 2025					
pH		9.15	8.90	9.44	yes
Temp. of observed pH	°C	20.6	15.5	24.5	yes
Electrical Conductivity	dS/m	2.78	2.631	2.829	yes
P-Alkalinity	mg/L	538	442	584	yes
T-Alkalinity	mg/L	1010	958	1059	yes
Calcium	mg/L	251	235.3	262.9	yes
Magnesium	mg/L	101	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	250	238.3	262.3	yes
Iron	mg/L	9.92	8.89	10.69	yes
Manganese	mg/L	2.51	2.200	2.680	yes
Fluoride	mg/L	9.97	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145430 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Nitrite - N	mg/L	9.76	9.010	10.990	yes
Nitrate and Nitrite - N	mg/L	19.8	19.10	20.90	yes
Date Acquired: June 09, 2025					
pH		6.87	6.75	7.05	yes
Temp. of observed pH	°C	20.7	15.5	24.5	yes
Electrical Conductivity	dS/m	0.080	0.069	0.085	yes
P-Alkalinity	mg/L	55	28	72	yes
T-Alkalinity	mg/L	129	114	140	yes
Calcium	mg/L	52.7	44.9	56.9	yes
Magnesium	mg/L	21.3	17.9	22.0	yes
Sodium	mg/L	50.5	47.1	53.4	yes
Potassium	mg/L	51.7	45.8	55.8	yes
Iron	mg/L	2.04	1.89	2.11	yes
Manganese	mg/L	0.517	0.464	0.536	yes
Fluoride	mg/L	4.85	4.58	5.24	yes
Nitrate - N	mg/L	4.77	4.37	5.33	yes
Nitrite - N	mg/L	4.74	4.370	5.330	yes
Nitrate and Nitrite - N	mg/L	9.52	8.80	10.60	yes
Chloride	mg/L	80.5	74.9	86.9	yes
Date Acquired: June 09, 2025					
Calcium	mg/L	5.2	4.7	5.4	yes
Magnesium	mg/L	2.1	1.9	2.2	yes
Sodium	mg/L	5.1	4.7	5.7	yes
Potassium	mg/L	5.1	4.6	5.6	yes
Iron	mg/L	0.20	0.18	0.22	yes
Manganese	mg/L	0.051	0.046	0.057	yes
Fluoride	mg/L	0.51	0.45	0.57	yes
Nitrate - N	mg/L	0.51	0.42	0.57	yes
Nitrite - N	mg/L	0.509	0.455	0.557	yes
Nitrate and Nitrite - N	mg/L	1.02	0.85	1.15	yes
Chloride	mg/L	15.6	13.3	16.5	yes
Date Acquired: June 09, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
pH		6.90	6.93	0	0.10	yes
Electrical Conductivity	dS/m	40.9	40.8	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	654	650	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	537	533	10	5	yes
Calcium	mg/L	317	318	10	0.6	yes
Magnesium	mg/L	304	305	10	0.7	yes
Sodium	mg/L	148	147	10	1.2	yes
Potassium	mg/L	6.4	6.5	10	1.2	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: Company: HCL	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M LSD: P.O.: 20023 Proj. Acct. code:	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145430 Report Type: Final Report

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Iron	mg/L	<0.05	<0.05	10	0.05	yes
Manganese	mg/L	0.30	0.30	10	0.010	yes
Nitrate - N	mg/L	0.06	0.06	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
Fluoride	mg/L	0.05	0.05	10	0.05	yes
Chloride	mg/L	19.9	19.8	10	0.5	yes
Date Acquired: June 09, 2025						

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Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145430 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 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 06, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 06, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 06, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 09, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 06, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 09, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 06, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 09, 2025	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 09, 2025	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 09, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 09, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 09, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 06, 2025	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, August 2024
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:

- Sample 1819420-9; 9983497: Sample received at 13.9 °C

Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.24	Lot ID:	1819420
	17740 - 118 Avenue NW	Project Name:	2025 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 5, 2025
	T5S 2W3	LSD:		Date Reported:	Jun 12, 2025
Attn:	Jennifer Catt	P.O.:	20023	Report Number:	3145430
Sampled By:		Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

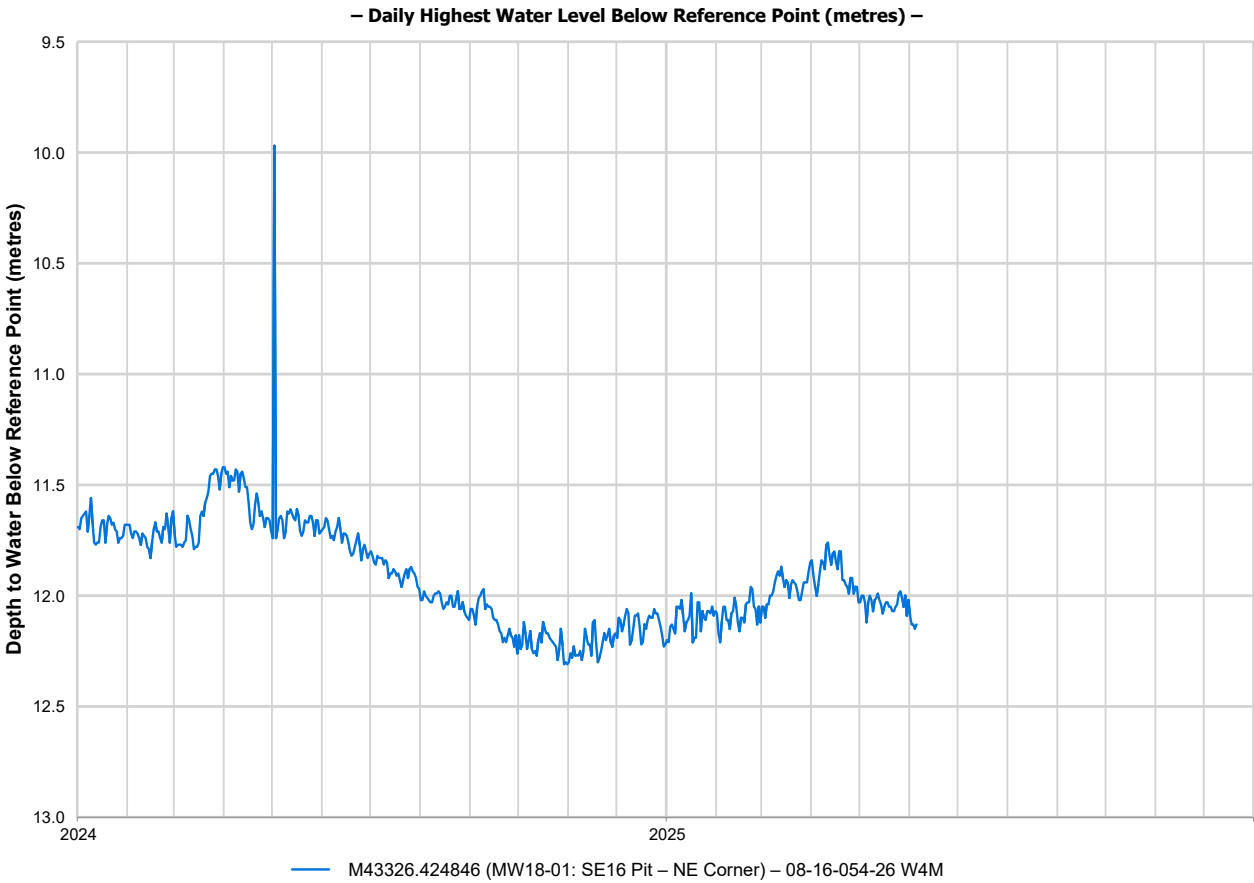
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to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

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MW18-01: SE16 Pit – NE Corner
2024 – 2025 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**

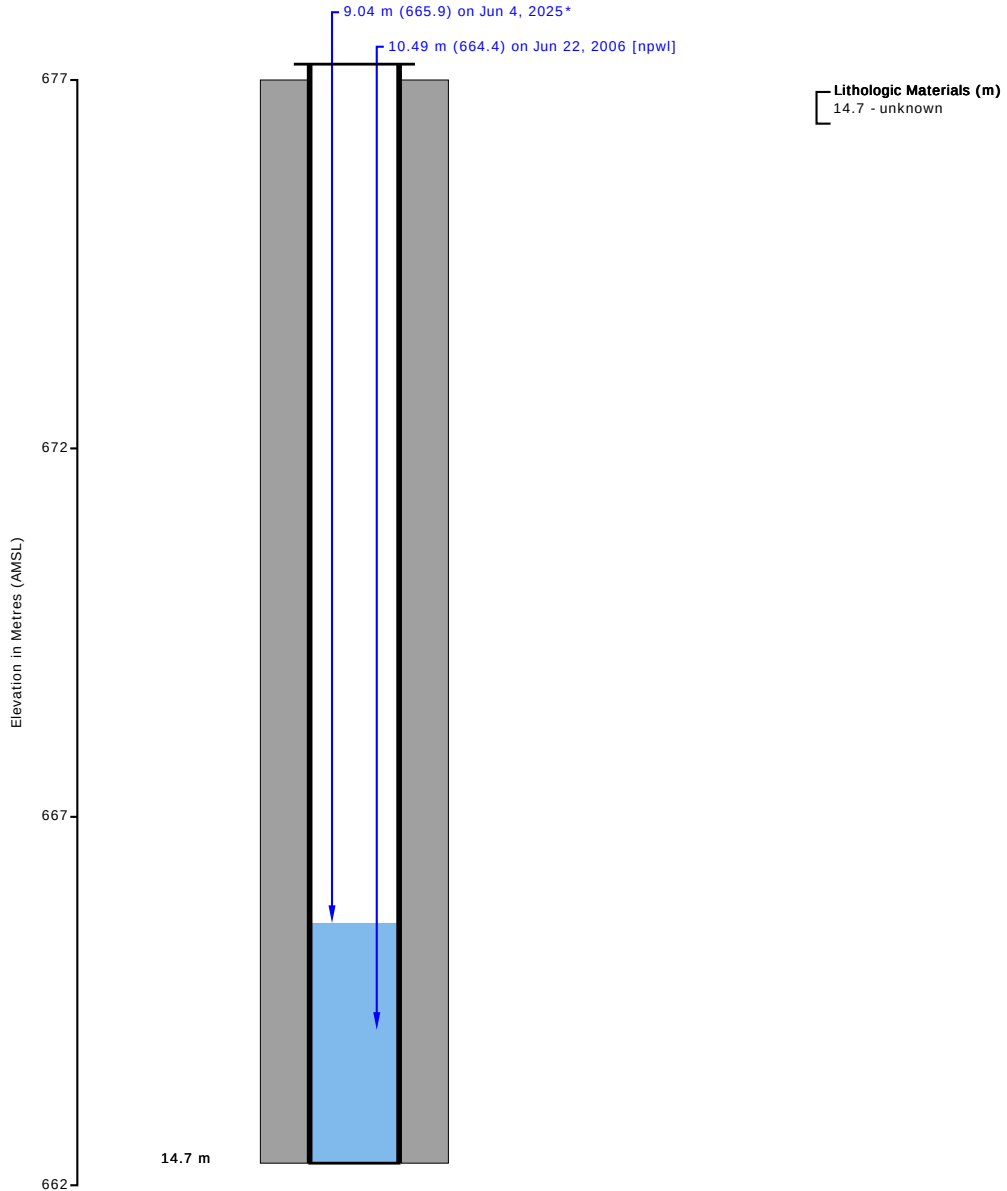
(* TGWC determined value)

Earliest Water Level (m): **10.49 – June 22, 2006 @ 11:53**

Most Recent Water Level (m): **9.04 – June 4, 2025 @ 23:40**

GIC ID: **Unknown**

1963 Water Well 12-19 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: 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): 9.04 m (665.9 m AMSL) on Jun 4, 2025 @ 23:40 - 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: July 17, 2025 @ 09:29 --- https://www.hcl.ca	

***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 12, 2025)



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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145422 Report Type: Final Report
Attn: Jennifer Catt	LSD:	
Sampled By:	P.O.: 20023	
Company: HCL	Proj. Acct. code:	

Reference Number	1819420-1
Sample Date	May 29, 2025
Sample Time	11:00
Sample Location	M40235.411135
Sample Description	1963 WW 12-19 / 13.9 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	6.63	0.05		
Sulfur	Dissolved	mg/L	44.7	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	0.010	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	0.075	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	0.0012	0.0002	1 AO, 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.091	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0012	0.0005		
Selenium	Dissolved	mg/L	0.0436	0.0002	0.05	Below MAC
Silver	Dissolved	mg/L	<0.00001	0.00001		
Strontium	Dissolved	mg/L	0.902	0.001	7.0	Below MAC
Thallium	Dissolved	mg/L	<0.00005	0.00001		
Tin	Dissolved	mg/L	<0.001	0.001		
Titanium	Dissolved	mg/L	<0.0005	0.0005		
Uranium	Dissolved	mg/L	0.0160	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	0.003	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	15	5		
Turbidity		NTU	6.4	0.1		
Routine Water						
pH			7.29	1	7.0-10.5	Within Range
Temp. of observed pH		°C	20.3			
Electrical Conductivity	at 25 °C	µS/cm	1040	1		
Calcium	Dissolved	mg/L	126	0.2		
Magnesium	Dissolved	mg/L	30.4	0.2		

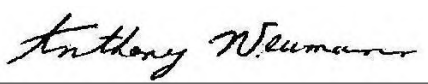
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Analytical Report

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145422 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Reference Number	1819420-1
Sample Date	May 29, 2025
Sample Time	11:00
Sample Location	M40235.411135
Sample Description	1963 WW 12-19 / 13.9 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	70.8	0.4	200	Below AO
Potassium	Dissolved	mg/L	5.7	0.4		
Iron	Dissolved	mg/L	0.61	0.01	0.1	Above AO
Manganese	Dissolved	mg/L	0.110	0.005	0.02 AO, 0.12 MAC	Above AO
Chloride	Dissolved	mg/L	15.8	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	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	0.79	0.01		
Sulfate (SO4)	Dissolved	mg/L	134	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	514			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	421	5		
Total Dissolved Solids	Calculated	mg/L	636	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	440			
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).
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	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145422 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.0005296	-0.04	0.05	yes
Sulfur	mg/L	0.0969684	-0.3	0.2	yes
Aluminum	µg/L	-0.159055	-2	2	yes
Antimony	µg/L	0.00527385	-0.2	0.2	yes
Arsenic	µg/L	-0.00838105	-0.2	0.2	yes
Barium	µg/L	0.0205324	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.747257	-2	2	yes
Cadmium	µg/L	0.00103929	-0.01	0.01	yes
Chromium	µg/L	-0.0370322	-0.5	0.5	yes
Cobalt	µg/L	-9.31717e-005	-0.1	0.1	yes
Copper	µg/L	0.0351031	-0.2	0.2	yes
Lead	µg/L	0.000707898	-0.1	0.1	yes
Lithium	µg/L	0.0347798	-1	1	yes
Molybdenum	µg/L	0.00840797	-1	1	yes
Nickel	µg/L	0.0185909	-0.5	0.5	yes
Selenium	µg/L	0.00058604	-0.2	0.2	yes
Silver	µg/L	0.000743061	-0.01	0.01	yes
Strontium	µg/L	0.0374449	-1	1	yes
Thallium	µg/L	0.00154219	-0.50	0.50	yes
Tin	µg/L	-0.0230673	-1	1	yes
Titanium	µg/L	-0.141492	-0.5	0.5	yes
Uranium	µg/L	0.00107718	-0.5	0.5	yes
Vanadium	µg/L	-0.0453782	-0.1	0.1	yes
Zinc	µg/L	0.25069	-1	1	yes
Mercury	µg/L	0.0001434	-0.051000	0.051000	yes

Date Acquired: June 09, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	990	902	1058	yes
Antimony	µg/L	40.1	36.4	44.2	yes
Arsenic	µg/L	40.0	37.7	42.5	yes
Barium	µg/L	198	181	211	yes
Beryllium	µg/L	19.6	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	378	351	427	yes
Cadmium	µg/L	2.08	1.87	2.23	yes
Chromium	µg/L	99.3	90.8	108.8	yes
Cobalt	µg/L	19.8	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.4	18.3	21.3	yes
Lithium	µg/L	196	178	214	yes
Molybdenum	µg/L	195	178	219	yes
Nickel	µg/L	99.5	93.3	105.9	yes
Selenium	µg/L	39.5	36.9	42.9	yes

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Quality Control

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Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	19.7	18.29	22.31	yes
Strontium	µg/L	195	183	219	yes
Thallium	µg/L	9.71	8.90	10.70	yes
Tin	µg/L	196	187	217	yes
Titanium	µg/L	97.8	91.0	109.0	yes
Uranium	µg/L	101	92.2	110.2	yes
Vanadium	µg/L	19.7	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: June 09, 2025					
Mercury	mg/L	0.000099	0.000070	0.000130	yes
Date Acquired: June 09, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.11	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.0	9.1	10.9	yes
Lead	µg/L	1.1	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.1	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.01	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	4.9	4.4	5.7	yes
Uranium	µg/L	5.1	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000021	0.000006	0.000036	yes
Date Acquired: June 09, 2025					
Silicon	mg/L	10.2	9.51	10.89	yes
Sulfur	mg/L	151	141.6	156.6	yes
Date Acquired: June 09, 2025					
Silicon	mg/L	2.08	1.88	2.24	yes
Sulfur	mg/L	10.3	9.2	10.8	yes
Date Acquired: June 09, 2025					

Quality Control

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Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.20	0.18	0.23	yes
Sulfur	mg/L	2.9	2.7	3.1	yes
Date Acquired: June 09, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.7	3.6	10	0.01	yes
Sulfur	mg/L	647	647	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	<0.2	<0.2	10	0.4	yes
Barium	µg/L	131	130	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	279	293	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	<0.1	<0.1	10	0.2	yes
Copper	µg/L	<0.2	<0.2	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	30	30	10	2	yes
Molybdenum	µg/L	<1	<1	10	2	yes
Nickel	µg/L	<0.5	<0.5	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	991	1010	10	2	yes
Thallium	µg/L	<0.01	<0.01	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	<0.5	<0.5	10	1.1	yes
Vanadium	µg/L	0.1	0.2	10	0.2	yes
Zinc	µg/L	<1	<1	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: June 09, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.09	-0.1	0.1	yes
Date Acquired: June 06, 2025					
Turbidity	NTU	0.112	0.0	0.1	yes
Date Acquired: June 06, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1920	1881.4	2091.4	yes
Date Acquired: June 06, 2025					
Turbidity	NTU	4530	4020.0	5436.0	yes
Date Acquired: June 06, 2025					

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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145422 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Physical and Aggregate Properties - Continued

Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC	
Turbidity	NTU	143	132.1	162.1	yes	
Colour	Colour units	10	10	10	yes	
Date Acquired:	June 06, 2025					
Turbidity	NTU	14.2	12.6	15.6	yes	
Date Acquired:	June 06, 2025					
Turbidity	NTU	1.6	1.0	2.2	yes	
Date Acquired:	June 06, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity	NTU	3.2	3.2	10	0.2	yes
Date Acquired:	June 06, 2025					

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	0.0700376	-0.2	0.2	yes
Magnesium	mg/L	0.0599072	-0.1	0.1	yes
Sodium	mg/L	0.0357922	-0.4	0.4	yes
Potassium	mg/L	0.192832	-0.4	0.4	yes
Iron	mg/L	0.00324691	-0.01	0.01	yes
Manganese	mg/L	0.000677325	-0.004	0.004	yes
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Chloride	mg/L	0.09	-0.4	0.4	yes
Date Acquired: June 09, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2020	1847.4	2256.0	yes
Date Acquired: June 09, 2025					
Electrical Conductivity	dS/m	33.2	27.200	36.800	yes
Date Acquired: June 06, 2025					
pH		9.14	8.90	9.44	yes
Temp. of observed pH	°C	20.9	15.5	24.5	yes
Electrical Conductivity	dS/m	2.77	2.631	2.829	yes
P-Alkalinity	mg/L	540	442	584	yes
T-Alkalinity	mg/L	1020	958	1059	yes
Calcium	mg/L	251	235.3	262.9	yes
Magnesium	mg/L	101	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	250	238.3	262.3	yes
Iron	mg/L	9.92	8.89	10.69	yes
Manganese	mg/L	2.51	2.200	2.680	yes
Fluoride	mg/L	9.98	9.39	10.59	yes
Nitrate - N	mg/L	10.1	9.03	11.13	yes

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Quality Control

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Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 Proj. Acct. code:	

Routine Water - Continued

Control Sample		Units	Measured	Lower Limit	Upper Limit	Passed QC	
Nitrite - N		mg/L	9.70	9.010	10.990	yes	
Nitrate and Nitrite - N		mg/L	19.8	19.10	20.90	yes	
Date Acquired: June 09, 2025							
pH			6.87	6.75	7.05	yes	
Temp. of observed pH		°C	20.9	15.5	24.5	yes	
Electrical Conductivity		dS/m	0.082	0.069	0.085	yes	
P-Alkalinity		mg/L	56	28	72	yes	
T-Alkalinity		mg/L	129	114	140	yes	
Calcium		mg/L	52.7	44.9	56.9	yes	
Magnesium		mg/L	21.3	17.9	22.0	yes	
Sodium		mg/L	50.5	47.1	53.4	yes	
Potassium		mg/L	51.7	45.8	55.8	yes	
Iron		mg/L	2.04	1.89	2.11	yes	
Manganese		mg/L	0.517	0.464	0.536	yes	
Fluoride		mg/L	4.77	4.58	5.24	yes	
Nitrate - N		mg/L	4.80	4.37	5.33	yes	
Nitrite - N		mg/L	4.71	4.370	5.330	yes	
Nitrate and Nitrite - N		mg/L	9.51	8.80	10.60	yes	
Chloride		mg/L	82.5	74.9	86.9	yes	
Date Acquired: June 09, 2025							
Calcium		mg/L	5.2	4.7	5.4	yes	
Magnesium		mg/L	2.1	1.9	2.2	yes	
Sodium		mg/L	5.1	4.7	5.7	yes	
Potassium		mg/L	5.1	4.6	5.6	yes	
Iron		mg/L	0.20	0.18	0.22	yes	
Manganese		mg/L	0.051	0.046	0.057	yes	
Fluoride		mg/L	0.52	0.45	0.57	yes	
Nitrate - N		mg/L	0.51	0.42	0.57	yes	
Nitrite - N		mg/L	0.501	0.455	0.557	yes	
Nitrate and Nitrite - N		mg/L	1.01	0.85	1.15	yes	
Chloride		mg/L	14.2	13.3	16.5	yes	
Date Acquired: June 09, 2025							
Client Sample Replicates	Units		Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
pH			6.90	6.93	0	0.10	yes
Electrical Conductivity		dS/m	40.9	40.8	10	0.002	yes
Hydroxide		mg/L	<5	<5	10		yes
Carbonate		mg/L	<6	<6	10	6	yes
Bicarbonate		mg/L	654	650	10	6	yes
P-Alkalinity		mg/L	<5	<5	10	5	yes
T-Alkalinity		mg/L	537	533	10	5	yes
Calcium		mg/L	317	318	10	0.6	yes
Magnesium		mg/L	304	305	10	0.7	yes
Sodium		mg/L	148	147	10	1.2	yes
Potassium		mg/L	6.4	6.5	10	1.2	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: Company: HCL	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M LSD: P.O.: 20023 Proj. Acct. code:	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145422 Report Type: Final Report

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Iron	mg/L	<0.05	<0.05	10	0.05	yes
Manganese	mg/L	0.30	0.30	10	0.010	yes
Nitrate - N	mg/L	0.06	0.06	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
Fluoride	mg/L	0.05	0.05	10	0.05	yes
Chloride	mg/L	2.1	2.0	10	0.5	yes
Date Acquired: June 09, 2025						

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Methodology and Notes

Bill To: Hydrogeological Consultants 17740 - 118 Avenue NW Edmonton, AB, Canada T5S 2W3	Project ID: MR-0224.24 Project Name: 2025 Groundwater Monitoring Project Location: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Lot ID: 1819420 Control Number: Date Received: Jun 5, 2025 Date Reported: Jun 12, 2025 Report Number: 3145422 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Company: HCL	LSD: P.O.: 20023 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 06, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 06, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 06, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jun 09, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Jun 06, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	Jun 09, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Jun 06, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 09, 2025	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 09, 2025	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 09, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	Jun 09, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 09, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Jun 06, 2025	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, August 2024
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:

- Sample 1819420-1; 9983489: Sample received at 13.9 °C

Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.24	Lot ID:	1819420
	17740 - 118 Avenue NW	Project Name:	2025 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 5, 2025
	T5S 2W3	LSD:		Date Reported:	Jun 12, 2025
Attn:	Jennifer Catt	P.O.:	20023	Report Number:	3145422
Sampled By:		Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

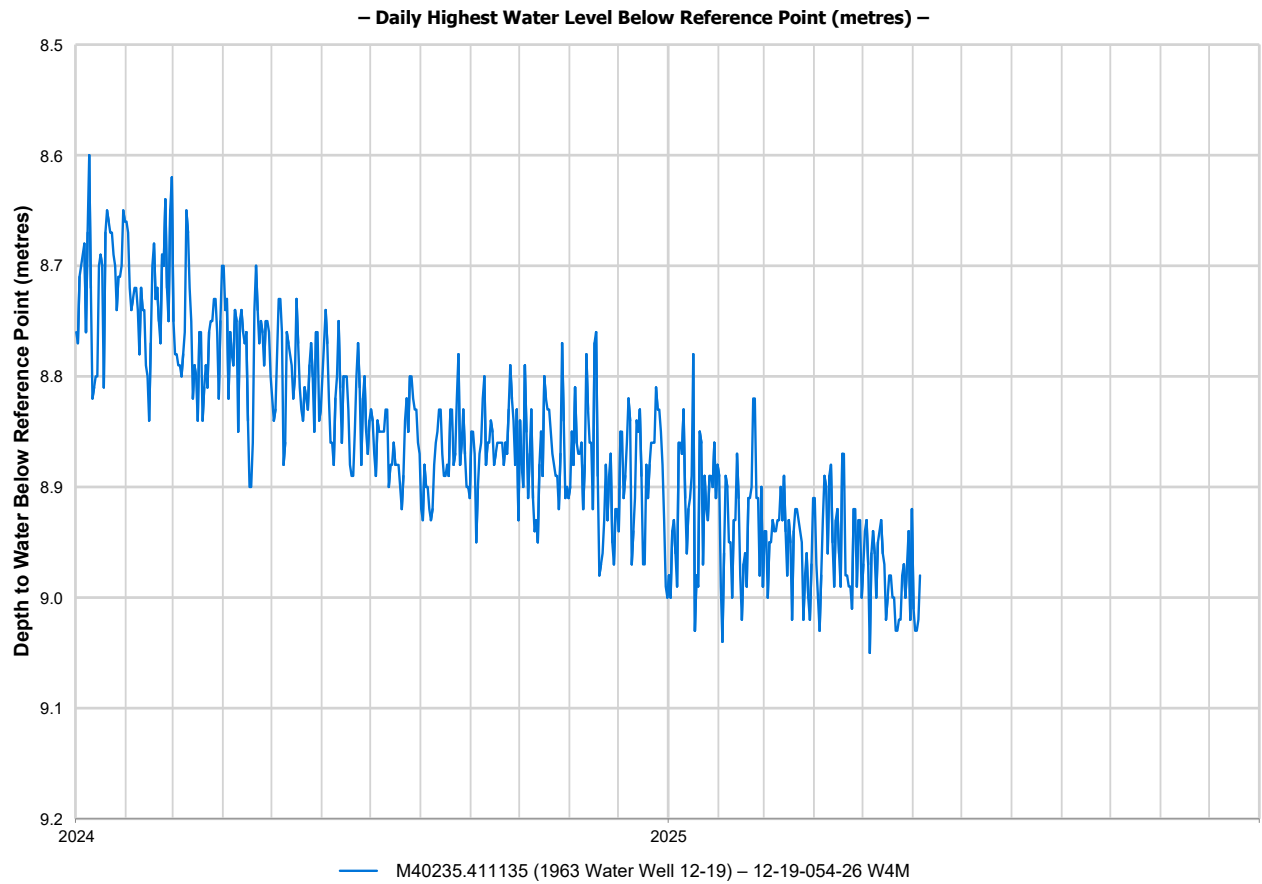
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to 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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*1963 Water Well 12-19
2024 - 2025 Hydrograph*



1987 Water Well 13-26

13-26-054-27 W4M
(M35377.055706)



Photograph taken on June 29, 2023

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 ***

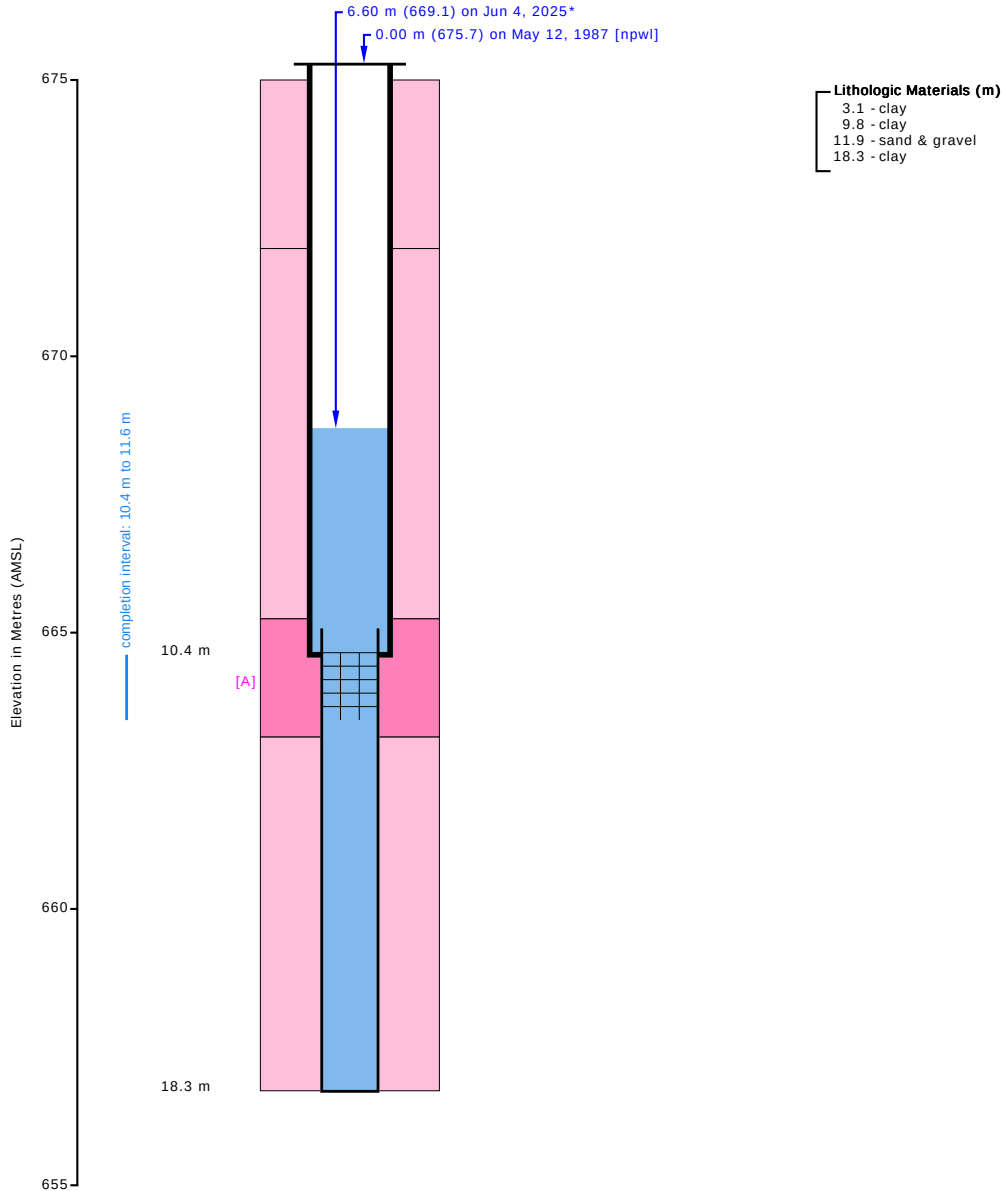
(* TGWC determined value)

Earliest Water Level (m): **0.00 – May 12, 1987**

Most Recent Water Level (m): **6.60 – June 4, 2025 @ 23:40**

GIC ID: **264252**

1987 Water Well 13-26 Water Well Diagram

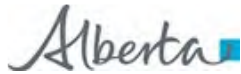


Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		Geologic Unit details not available for this location	
	Fine Grained			
	Coarse Grained			
Bedrock	Fine Grained			
	Coarse Grained			
	Other			

Summary	
TGWC ID: 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): 6.60 m (669.1 m AMSL) on Jun 4, 2025 @ 23:40 - Reference Point: Top of Casing	
Water Level (oldest): 0.00 m (675.7 m AMSL) on May 12, 1987 [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: July 17, 2025 @ 09:29 --- <https://www.hcl.ca>

1987 Water Well 13-26
AEPA - Water Well Drilling Report



Water Well Drilling Report

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

GIC Well ID 264252
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 1987/06/01

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	
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)					Elevation _____ m		
_____ m from					Latitude 53.697942 Longitude -113.879201					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			
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 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 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)	Elapsed Time
1987/05/12	12:00 AM	0.00 m		Minutes:Sec
			Recovery (m)	
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

Printed on 7/17/2025 9:24:14 AM

Page: 2 / 2

1987 Water Well 13-26
Chemical Analysis Results (May 28, 2025)



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Page 1 of 10

Analytical Report

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:		Date Received:	May 23, 2025
	T5S 2W3	LSD:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Reported:	May 28, 2025
Attn:	Jennifer Catt	P.O.:	20020	Report Number:	3140807
Sampled By:	Ben Gilham	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

Reference Number	1816292-19
Sample Date	May 13, 2025
Sample Time	12:00
Sample Location	M35377.055706
Sample Description	██████████ / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	6.95	0.05		
Sulfur	Dissolved	mg/L	23.5	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	0.0082	0.0002	0.010	Below MAC
Barium	Dissolved	mg/L	0.054	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	0.0006	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	0.081	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0006	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	0.830	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	0.004	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	55	5		
Turbidity		NTU	18.3	0.1		
Routine Water						
pH			7.35	1	7.0-10.5	Within Range
Temp. of observed pH		°C	20.5			
Electrical Conductivity	at 25 °C	µS/cm	972	1		
Calcium	Dissolved	mg/L	123	0.2		
Magnesium	Dissolved	mg/L	30.4	0.2		

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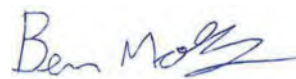
Analytical Report

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M 20020 P.O.: Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140807 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Reference Number	1816292-19
Sample Date	May 13, 2025
Sample Time	12:00
Sample Location	M35377.055706
Sample Description	██████████ / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	62.4	0.4	200	Below AO
Potassium	Dissolved	mg/L	3.6	0.4		
Iron	Dissolved	mg/L	1.62	0.01	0.1	Above AO
Manganese	Dissolved	mg/L	1.23	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	<0.01	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	<0.01	0.01		
Sulfate (SO4)	Dissolved	mg/L	70.5	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	600			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	492	5		
Total Dissolved Solids	Calculated	mg/L	586	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	432			
Ionic Balance	Dissolved	%	101			

Approved by:



Benjamin Morris, B.Sc
Operations 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	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140807 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	-0.0104023	-0.04	0.05	yes
Sulfur	mg/L	0.0176456	-0.3	0.2	yes
Aluminum	µg/L	-0.142723	-2	2	yes
Antimony	µg/L	-0.00198253	-0.2	0.2	yes
Arsenic	µg/L	-0.00520747	-0.2	0.2	yes
Barium	µg/L	0.0155545	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.490366	-2	2	yes
Cadmium	µg/L	0.00106883	-0.01	0.01	yes
Chromium	µg/L	-0.0304354	-0.5	0.5	yes
Cobalt	µg/L	-0.000332921	-0.1	0.1	yes
Copper	µg/L	0.0100485	-0.2	0.2	yes
Lead	µg/L	0.00240083	-0.1	0.1	yes
Lithium	µg/L	-0.00113161	-1	1	yes
Molybdenum	µg/L	0.0194221	-1	1	yes
Nickel	µg/L	0.0142204	-0.5	0.5	yes
Selenium	µg/L	0.00150023	-0.2	0.2	yes
Silver	µg/L	0.00050935	-0.01	0.01	yes
Strontium	µg/L	0.0646959	-1	1	yes
Thallium	µg/L	0.00145131	-0.50	0.50	yes
Tin	µg/L	-0.0724984	-1	1	yes
Titanium	µg/L	-0.0940343	-0.5	0.5	yes
Uranium	µg/L	0.00233484	-0.5	0.5	yes
Vanadium	µg/L	-0.00529231	-0.1	0.1	yes
Zinc	µg/L	0.13059	-1	1	yes
Mercury	µg/L	-0.001039	-0.051000	0.051000	yes

Date Acquired: May 26, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	997	902	1058	yes
Antimony	µg/L	40.5	36.4	44.2	yes
Arsenic	µg/L	39.9	37.7	42.5	yes
Barium	µg/L	196	181	211	yes
Beryllium	µg/L	19.9	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	389	351	427	yes
Cadmium	µg/L	2.16	1.87	2.23	yes
Chromium	µg/L	100	90.8	108.8	yes
Cobalt	µg/L	20.0	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.2	18.3	21.3	yes
Lithium	µg/L	197	178	214	yes
Molybdenum	µg/L	198	178	219	yes
Nickel	µg/L	99.9	93.3	105.9	yes
Selenium	µg/L	39.9	36.9	42.9	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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140807 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	20.1	18.29	22.31	yes
Strontium	µg/L	200	183	219	yes
Thallium	µg/L	9.86	8.90	10.70	yes
Tin	µg/L	201	187	217	yes
Titanium	µg/L	101	91.0	109.0	yes
Uranium	µg/L	102	92.2	110.2	yes
Vanadium	µg/L	20.0	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: May 26, 2025					
Mercury	mg/L	0.000100	0.000070	0.000130	yes
Date Acquired: May 26, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.10	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.1	9.1	10.9	yes
Lead	µg/L	1.0	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.2	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.02	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	5.0	4.4	5.7	yes
Uranium	µg/L	5.2	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000020	0.000006	0.000036	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	9.62	9.51	10.89	yes
Sulfur	mg/L	150	141.6	156.6	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	2.03	1.88	2.24	yes
Sulfur	mg/L	10.2	9.1	10.6	yes
Date Acquired: May 26, 2025					

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140807 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.20	0.18	0.23	yes
Sulfur	mg/L	2.9	2.7	3.1	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	7.36	7.37	10	0.01	yes
Sulfur	mg/L	34.6	35.0	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	5.9	6.0	10	0.4	yes
Barium	µg/L	31	31	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	163	161	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	0.8	0.8	10	0.2	yes
Copper	µg/L	0.5	0.5	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	89	89	10	2	yes
Molybdenum	µg/L	<1	<1	10	2	yes
Nickel	µg/L	1.1	1.0	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	1090	1090	10	2	yes
Thallium	µg/L	<0.05	<0.05	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	2.8	2.8	10	1.1	yes
Vanadium	µg/L	<0.1	<0.1	10	0.2	yes
Zinc	µg/L	27	27	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: May 26, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.099	-0.1	0.1	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	0.114	0.0	0.1	yes
Date Acquired: May 27, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1930	1881.4	2091.4	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	4540	4020.0	5436.0	yes
Date Acquired: May 27, 2025					

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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140807 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Physical and Aggregate Properties - Continued

Control Sample		Units	Measured	Lower Limit	Upper Limit	Passed QC
Colour	Colour units	10	10	10		yes
Turbidity	NTU	144	132.1	162.1		yes
Date Acquired:	May 27, 2025					
Turbidity	NTU	14.2	12.6	15.6		yes
Date Acquired:	May 27, 2025					
Turbidity	NTU	1.6	1.0	2.2		yes
Date Acquired:	May 27, 2025					
Client Sample Replicates		Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria
Turbidity	NTU	43.7	45.2	10	0.2	yes
Date Acquired:	May 27, 2025					

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0.00594322	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Calcium	mg/L	0.0341995	-0.2	0.2	yes
Magnesium	mg/L	0.00865101	-0.1	0.1	yes
Sodium	mg/L	0.0649477	-0.4	0.4	yes
Potassium	mg/L	0.024503	-0.4	0.4	yes
Iron	mg/L	0.00335118	-0.01	0.01	yes
Manganese	mg/L	0.000111042	-0.004	0.004	yes
Chloride	mg/L	0.15	-0.4	0.4	yes
Date Acquired: May 26, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2140	1847.4	2256.0	yes
Date Acquired: May 26, 2025					
Electrical Conductivity	dS/m	32.9	27.200	36.800	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	9.90	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes
Nitrite - N	mg/L	9.61	9.010	10.990	yes
Nitrate and Nitrite - N	mg/L	19.6	19.10	20.90	yes
pH		9.18	8.90	9.44	yes
Temp. of observed pH	°C	20.1	15.5	24.5	yes
Electrical Conductivity	dS/m	2.77	2.631	2.829	yes
P-Alkalinity	mg/L	519	442	584	yes
T-Alkalinity	mg/L	997	958	1059	yes
Calcium	mg/L	242	235.3	262.9	yes
Magnesium	mg/L	97.6	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	241	238.3	262.3	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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140807 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Iron	mg/L	9.47	8.89	10.69		yes
Manganese	mg/L	2.39	2.200	2.680		yes
Date Acquired:	May 26, 2025					
Fluoride	mg/L	4.80	4.58	5.24		yes
Nitrate - N	mg/L	4.71	4.37	5.33		yes
Nitrite - N	mg/L	4.64	4.370	5.330		yes
Nitrate and Nitrite - N	mg/L	9.35	8.80	10.60		yes
pH		6.87	6.75	7.05		yes
Temp. of observed pH	°C	20.3	15.5	24.5		yes
Electrical Conductivity	dS/m	0.076	0.069	0.085		yes
P-Alkalinity	mg/L	52	28	72		yes
T-Alkalinity	mg/L	127	114	140		yes
Calcium	mg/L	51.2	44.9	56.9		yes
Magnesium	mg/L	20.4	17.9	22.0		yes
Sodium	mg/L	51.9	47.1	53.4		yes
Potassium	mg/L	50.3	45.8	55.8		yes
Iron	mg/L	1.98	1.89	2.11		yes
Manganese	mg/L	0.496	0.464	0.536		yes
Chloride	mg/L	83.5	74.9	86.9		yes
Date Acquired:	May 26, 2025					
Fluoride	mg/L	0.50	0.45	0.57		yes
Nitrate - N	mg/L	0.51	0.42	0.57		yes
Nitrite - N	mg/L	0.496	0.455	0.557		yes
Nitrate and Nitrite - N	mg/L	1.01	0.85	1.15		yes
Calcium	mg/L	5.1	4.7	5.4		yes
Magnesium	mg/L	2.1	1.9	2.2		yes
Sodium	mg/L	5.2	4.7	5.7		yes
Potassium	mg/L	4.8	4.6	5.6		yes
Iron	mg/L	0.19	0.18	0.22		yes
Manganese	mg/L	0.048	0.046	0.057		yes
Chloride	mg/L	15.2	13.3	16.5		yes
Date Acquired:	May 26, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Fluoride	mg/L	0.09	0.08	10	0.05	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
pH		7.56	7.53	0	0.10	yes
Electrical Conductivity	dS/m	0.944	0.942	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	583	583	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	478	478	10	5	yes
Calcium	mg/L	129	129	10	0.6	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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140807 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Magnesium	mg/L	28.9	28.7	10	0.7	yes
Sodium	mg/L	51.6	51.8	10	1.2	yes
Potassium	mg/L	3.7	3.8	10	1.2	yes
Iron	mg/L	0.01	0.01	10	0.05	yes
Manganese	mg/L	0.833	0.835	10	0.010	yes
Chloride	mg/L	0.7	0.7	10	0.5	yes
Date Acquired: May 26, 2025						

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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: T5S 2W3 LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140807 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	May 26, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	May 26, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	May 26, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	May 26, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	May 27, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	May 26, 2025	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	May 26, 2025	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	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	May 26, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	May 27, 2025	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, August 2024
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:

- Sample 1816292-19; 9956348: Sample received at 11.6 °C

Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater	Control Number:	
	Edmonton, AB, Canada		Monitoring	Date Received:	May 23, 2025
	T5S 2W3	Project Location:		Date Reported:	May 28, 2025
Attn:	Jennifer Catt	LSD:	Tp 054, R 26 to 28, W4M	Report Number:	3140807
Sampled By:	Ben Gilham		and Tp 054, R 01, W5M	Report Type:	Final Report
Company:	HCL	P.O.:	20020		
		Proj. Acct. code:			

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.

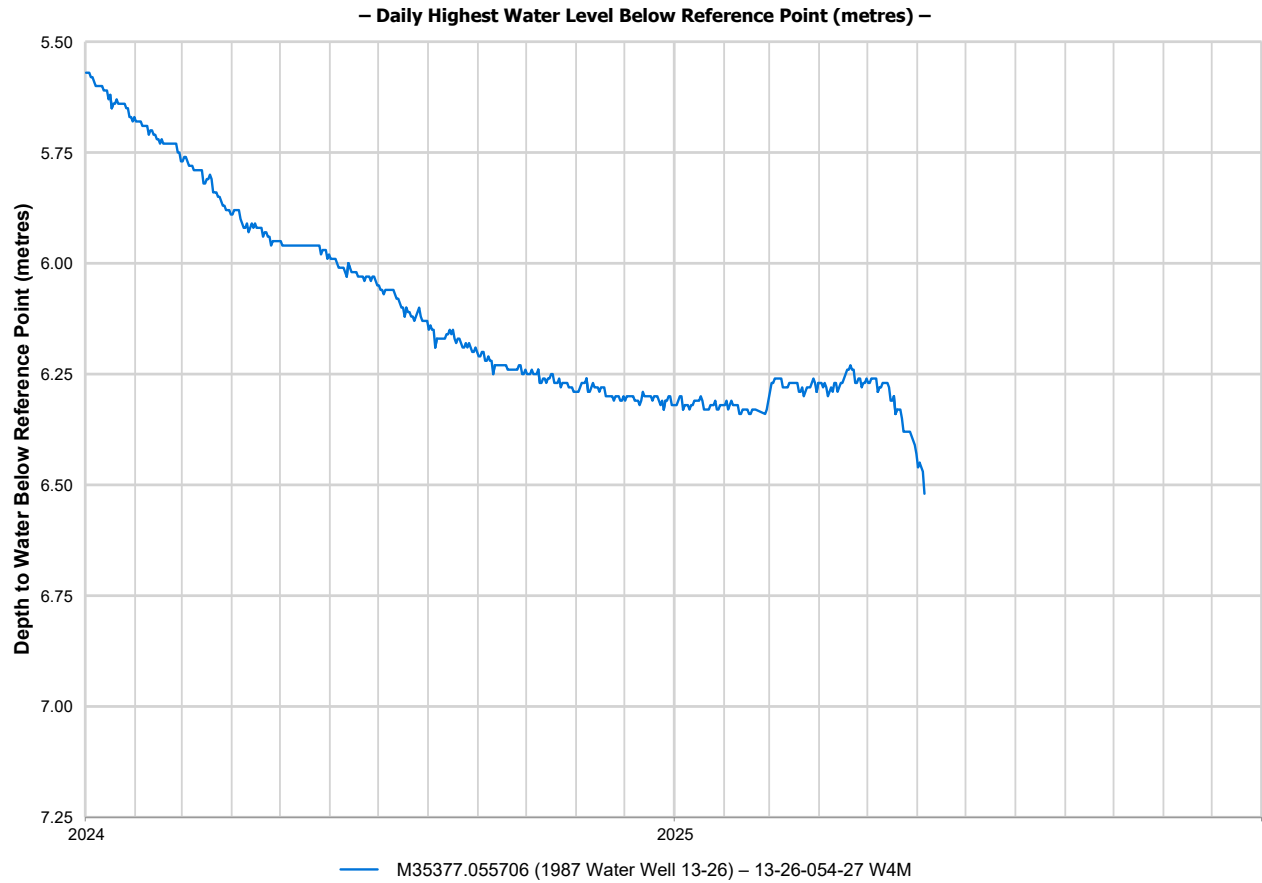
Please direct any inquiries regarding this report to our Client Services group.

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
2024 - 2025 Hydrograph*



1995 Water Well 09-34

09-34-054-27 W4M

(M43987.561869)



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): **5.33 – June 4, 2025 @ 23:00**

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): **5.33 m – June 4, 2025**

Completion Details

Surface Casing: **PVC – 152.4 mm (O.D.)**

Intervals

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

Sampling Details: **May 13, 2025 @ 09:50**
Report Date: **May 28, 2025 - Element Materials Technology Canada Inc. (1816292-10)**

Conductivity (µS/cm):	1400	Nitrate as N:	< 0.01	Turbidity (NTU):	15.5
Total Dissolved Solids:	963	Nitrite as N:	< 0.005	Fluoride:	0.06
Hardness (as CaCO3):	516	pH (pH Unit):	7.41	Carbonate:	< 6
T-Alkalinity (as CaCO3):	471	Colour (TCU):	30	Bicarbonate:	574
P-Alkalinity (as CaCO3):	< 5	Ion Balance (%):	102	Hydroxide:	< 5
Nitrate + Nitrite as N:	< 0.01	Total Coliforms:**		Total Iron:	
Total Suspended Solids:		Fecal Coliforms:**		Total Mn:	
Temperature (°C):	20.8	Escherichia coli:**			

Constituent	Extractable	Dissolved	Constituent	Extractable	Dissolved
Calcium:		150	Mercury:		< 0.000005
Chloride:		0.8	Molybdenum:		< 0.001
Iron:		1.55	Magnesium:		34.4
Manganese:		1.51***	Sodium:		148
Aluminum:		< 0.002	Potassium:		4.2
Arsenic:		0.0043	Vanadium:		< 0.0001
Barium:		0.017	Strontium:		1.17
Beryllium:		< 0.0001	Nickel:		0.0013
Cadmium:		< 0.00001	Zinc:		0.009
Chromium:		< 0.0005	Copper:		0.0006
Cobalt:		0.0010	Lead:		< 0.0001
Sulfate:		343	Uranium:		0.0029

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

***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2025. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.

09-34-054-27 W4M

Easting (m): **73,391 ²**
Northing (m): **5,949,371 ²**
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**
2025-06-04

Lithology Details

Elevation (AMSL)	Depth (BGL)	Lithology Descriptions

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

* HCL GPS — 10TM Resource NAD83, * HCL DEM (2016)

(1) July 17, 2025, "AS IS"; no warranty either expressed or implied. vist tgwc.com for additional details

Sturgeon County, 2024 to 2025 Groundwater Monitoring Report
Calahoo Resource Extraction District, Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, MR-0224.24

RTU

REMOTE TELEMETRY UNIT

HCL

B - 364

***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 (May 28, 2025)



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Analytical Report

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:		Date Received:	May 23, 2025
	T5S 2W3	LSD:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Reported:	May 28, 2025
Attn:	Jennifer Catt	P.O.:	20020	Report Number:	3140798
Sampled By:	Ben Gilham	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

Reference Number	1816292-10
Sample Date	May 13, 2025
Sample Time	09:50
Sample Location	M43987.561869
Sample Description	1995 WW 09-34 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	6.67	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	0.0043	0.0002	0.010	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	0.153	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	0.0013	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	1.17	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	0.0029	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	0.009	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	30	5		
Turbidity		NTU	15.5	0.1		
Routine Water						
pH			7.41	1	7.0-10.5	Within Range
Temp. of observed pH		°C	20.8			
Electrical Conductivity	at 25 °C	µS/cm	1400	1		
Calcium	Dissolved	mg/L	150	0.2		
Magnesium	Dissolved	mg/L	34.4	0.2		

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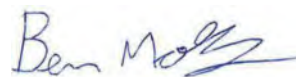
Analytical Report

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Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Reference Number	1816292-10
Sample Date	May 13, 2025
Sample Time	09:50
Sample Location	M43987.561869
Sample Description	1995 WW 09-34 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	148	0.4	200	Below AO
Potassium	Dissolved	mg/L	4.2	0.4		
Iron	Dissolved	mg/L	1.55	0.01	0.1	Above AO
Manganese	Dissolved	mg/L	1.51	0.005	0.02 AO, 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	0.8	0.4	250	Below AO
Fluoride		mg/L	0.06	0.05	1.5	Below MAC
Nitrate - N		mg/L	<0.01	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	<0.01	0.01		
Sulfate (SO4)	Dissolved	mg/L	343	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	574			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	471	5		
Total Dissolved Solids	Calculated	mg/L	963	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	516			
Ionic Balance	Dissolved	%	102			

Approved by:



Benjamin Morris, B.Sc
Operations 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	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140798 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	-0.0104023	-0.04	0.05	yes
Sulfur	mg/L	0.0176456	-0.3	0.2	yes
Aluminum	µg/L	-0.142723	-2	2	yes
Antimony	µg/L	-0.00198253	-0.2	0.2	yes
Arsenic	µg/L	-0.00520747	-0.2	0.2	yes
Barium	µg/L	0.0155545	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.490366	-2	2	yes
Cadmium	µg/L	0.00106883	-0.01	0.01	yes
Chromium	µg/L	-0.0304354	-0.5	0.5	yes
Cobalt	µg/L	-0.000332921	-0.1	0.1	yes
Copper	µg/L	0.0100485	-0.2	0.2	yes
Lead	µg/L	0.00240083	-0.1	0.1	yes
Lithium	µg/L	-0.00113161	-1	1	yes
Molybdenum	µg/L	0.0194221	-1	1	yes
Nickel	µg/L	0.0142204	-0.5	0.5	yes
Selenium	µg/L	0.00150023	-0.2	0.2	yes
Silver	µg/L	0.00050935	-0.01	0.01	yes
Strontium	µg/L	0.0646959	-1	1	yes
Thallium	µg/L	0.00145131	-0.50	0.50	yes
Tin	µg/L	-0.0724984	-1	1	yes
Titanium	µg/L	-0.0940343	-0.5	0.5	yes
Uranium	µg/L	0.00233484	-0.5	0.5	yes
Vanadium	µg/L	-0.00529231	-0.1	0.1	yes
Zinc	µg/L	0.13059	-1	1	yes
Mercury	µg/L	-0.001039	-0.051000	0.051000	yes

Date Acquired: May 26, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	997	902	1058	yes
Antimony	µg/L	40.5	36.4	44.2	yes
Arsenic	µg/L	39.9	37.7	42.5	yes
Barium	µg/L	196	181	211	yes
Beryllium	µg/L	19.9	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	389	351	427	yes
Cadmium	µg/L	2.16	1.87	2.23	yes
Chromium	µg/L	100	90.8	108.8	yes
Cobalt	µg/L	20.0	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.2	18.3	21.3	yes
Lithium	µg/L	197	178	214	yes
Molybdenum	µg/L	198	178	219	yes
Nickel	µg/L	99.9	93.3	105.9	yes
Selenium	µg/L	39.9	36.9	42.9	yes

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140798 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	20.1	18.29	22.31	yes
Strontium	µg/L	200	183	219	yes
Thallium	µg/L	9.86	8.90	10.70	yes
Tin	µg/L	201	187	217	yes
Titanium	µg/L	101	91.0	109.0	yes
Uranium	µg/L	102	92.2	110.2	yes
Vanadium	µg/L	20.0	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: May 26, 2025					
Mercury	mg/L	0.000100	0.000070	0.000130	yes
Date Acquired: May 26, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.10	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.1	9.1	10.9	yes
Lead	µg/L	1.0	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.2	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.02	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	5.0	4.4	5.7	yes
Uranium	µg/L	5.2	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000020	0.000006	0.000036	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	9.62	9.51	10.89	yes
Sulfur	mg/L	150	141.6	156.6	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	2.03	1.88	2.24	yes
Sulfur	mg/L	10.2	9.1	10.6	yes
Date Acquired: May 26, 2025					

Quality Control

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Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.20	0.18	0.23	yes
Sulfur	mg/L	2.9	2.7	3.1	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.21	3.26	10	0.01	yes
Sulfur	mg/L	38.2	39.0	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	<0.2	<0.2	10	0.4	yes
Barium	µg/L	38	38	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	163	168	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	<0.1	<0.1	10	0.2	yes
Copper	µg/L	<0.2	<0.2	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	16	17	10	2	yes
Molybdenum	µg/L	3	2	10	2	yes
Nickel	µg/L	<0.5	<0.5	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	57	58	10	2	yes
Thallium	µg/L	<0.05	<0.05	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	<0.5	<0.5	10	1.1	yes
Vanadium	µg/L	0.2	0.1	10	0.2	yes
Zinc	µg/L	<1	2	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: May 26, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.099	-0.1	0.1	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	0.114	0.0	0.1	yes
Date Acquired: May 27, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1930	1881.4	2091.4	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	4550	4020.0	5436.0	yes
Date Acquired: May 27, 2025					

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Quality Control

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Physical and Aggregate Properties - Continued

continued							
Control Sample		Units	Measured	Lower Limit	Upper Limit	Passed QC	
Colour		Colour units	10	10	10	yes	
Turbidity		NTU	144	132.1	162.1	yes	
Date Acquired: May 27, 2025							
Turbidity		NTU	14.3	12.6	15.6	yes	
Date Acquired: May 27, 2025							
Turbidity		NTU	1.6	1.0	2.2	yes	
Date Acquired: May 27, 2025							
Client Sample Replicates		Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity		NTU	3.1	2.9	10	0.2	yes
Date Acquired: May 27, 2025							

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0.00152937	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Calcium	mg/L	0.0341995	-0.2	0.2	yes
Magnesium	mg/L	0.00865101	-0.1	0.1	yes
Sodium	mg/L	0.0649477	-0.4	0.4	yes
Potassium	mg/L	0.024503	-0.4	0.4	yes
Iron	mg/L	0.00335118	-0.01	0.01	yes
Manganese	mg/L	0.000111042	-0.004	0.004	yes
Chloride	mg/L	0.15	-0.4	0.4	yes
Date Acquired: May 26, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2140	1847.4	2256.0	yes
Date Acquired: May 26, 2025					
Electrical Conductivity	dS/m	32.9	27.200	36.800	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	9.90	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes
Nitrite - N	mg/L	9.61	9.010	10.990	yes
Nitrate and Nitrite - N	mg/L	19.6	19.10	20.90	yes
pH		9.18	8.90	9.44	yes
Temp. of observed pH	°C	20.1	15.5	24.5	yes
Electrical Conductivity	dS/m	2.77	2.631	2.829	yes
P-Alkalinity	mg/L	519	442	584	yes
T-Alkalinity	mg/L	997	958	1059	yes
Calcium	mg/L	242	235.3	262.9	yes
Magnesium	mg/L	97.6	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	241	238.3	262.3	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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140798 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Iron	mg/L	9.47	8.89	10.69		yes
Manganese	mg/L	2.39	2.200	2.680		yes
Date Acquired:	May 26, 2025					
Fluoride	mg/L	4.80	4.58	5.24		yes
Nitrate - N	mg/L	4.71	4.37	5.33		yes
Nitrite - N	mg/L	4.64	4.370	5.330		yes
Nitrate and Nitrite - N	mg/L	9.35	8.80	10.60		yes
pH		6.87	6.75	7.05		yes
Temp. of observed pH	°C	20.3	15.5	24.5		yes
Electrical Conductivity	dS/m	0.076	0.069	0.085		yes
P-Alkalinity	mg/L	52	28	72		yes
T-Alkalinity	mg/L	127	114	140		yes
Calcium	mg/L	51.2	44.9	56.9		yes
Magnesium	mg/L	20.4	17.9	22.0		yes
Sodium	mg/L	51.9	47.1	53.4		yes
Potassium	mg/L	50.3	45.8	55.8		yes
Iron	mg/L	1.98	1.89	2.11		yes
Manganese	mg/L	0.496	0.464	0.536		yes
Chloride	mg/L	83.5	74.9	86.9		yes
Date Acquired:	May 26, 2025					
Fluoride	mg/L	0.50	0.45	0.57		yes
Nitrate - N	mg/L	0.51	0.42	0.57		yes
Nitrite - N	mg/L	0.496	0.455	0.557		yes
Nitrate and Nitrite - N	mg/L	1.01	0.85	1.15		yes
Calcium	mg/L	5.1	4.7	5.4		yes
Magnesium	mg/L	2.1	1.9	2.2		yes
Sodium	mg/L	5.2	4.7	5.7		yes
Potassium	mg/L	4.8	4.6	5.6		yes
Iron	mg/L	0.19	0.18	0.22		yes
Manganese	mg/L	0.048	0.046	0.057		yes
Chloride	mg/L	15.2	13.3	16.5		yes
Date Acquired:	May 26, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Fluoride	mg/L	0.09	0.08	10	0.05	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
pH		7.56	7.53	0	0.10	yes
Electrical Conductivity	dS/m	0.944	0.942	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	583	583	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	478	478	10	5	yes
Calcium	mg/L	86.8	87.6	10	0.6	yes

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Quality Control

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Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Magnesium	mg/L	26.7	26.8	10	0.7	yes
Sodium	mg/L	77.9	79.0	10	1.2	yes
Potassium	mg/L	5.2	5.3	10	1.2	yes
Iron	mg/L	0.03	0.03	10	0.05	yes
Manganese	mg/L	0.071	0.072	10	0.010	yes
Chloride	mg/L	0.7	0.7	10	0.5	yes
Date Acquired: May 26, 2025						

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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140798 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	May 26, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	May 26, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	May 26, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	May 26, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	May 27, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	May 26, 2025	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	May 26, 2025	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	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	May 26, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	May 27, 2025	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, August 2024
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:

- Sample 1816292-10; 9956339: Sample received at 11.6 °C
- Sample 1816292-10; 9956339: Sample turbidity may interfere with Apparent Colour analysis. A more accurate measure of sample colour would be obtained from True Colour Analysis.

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Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:		Date Received:	May 23, 2025
	T5S 2W3	LSD:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Reported:	May 28, 2025
Attn:	Jennifer Catt	P.O.:	20020	Report Number:	3140798
Sampled By:	Ben Gilham	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

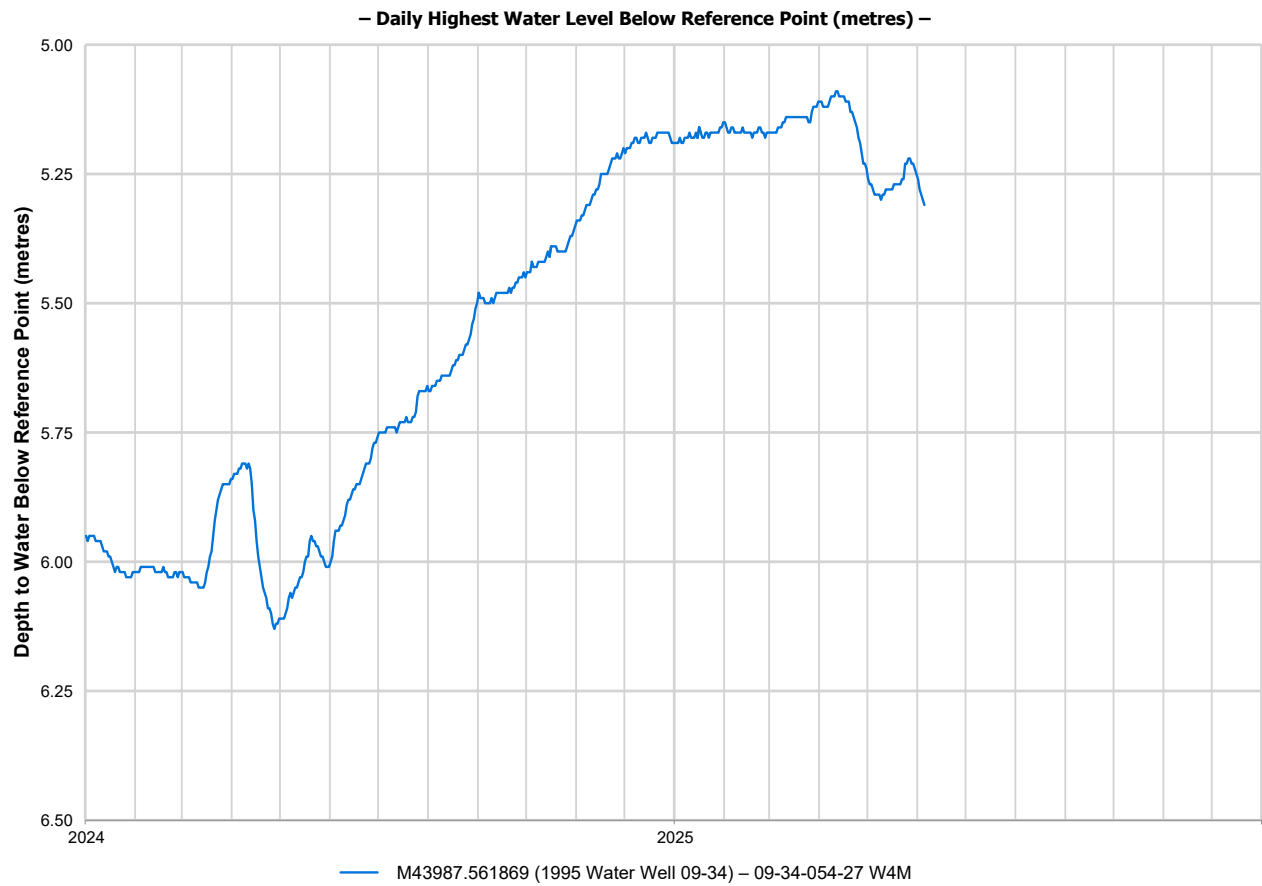
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to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

Please direct any inquiries regarding this report to our Client Services group.
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1995 Water Well 09-34
2024 - 2025 Hydrograph



2001 Water Well 14-21

14-21-054-27 W4M
(M37841.689687)



Photograph taken on June 27, 2013

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 ***

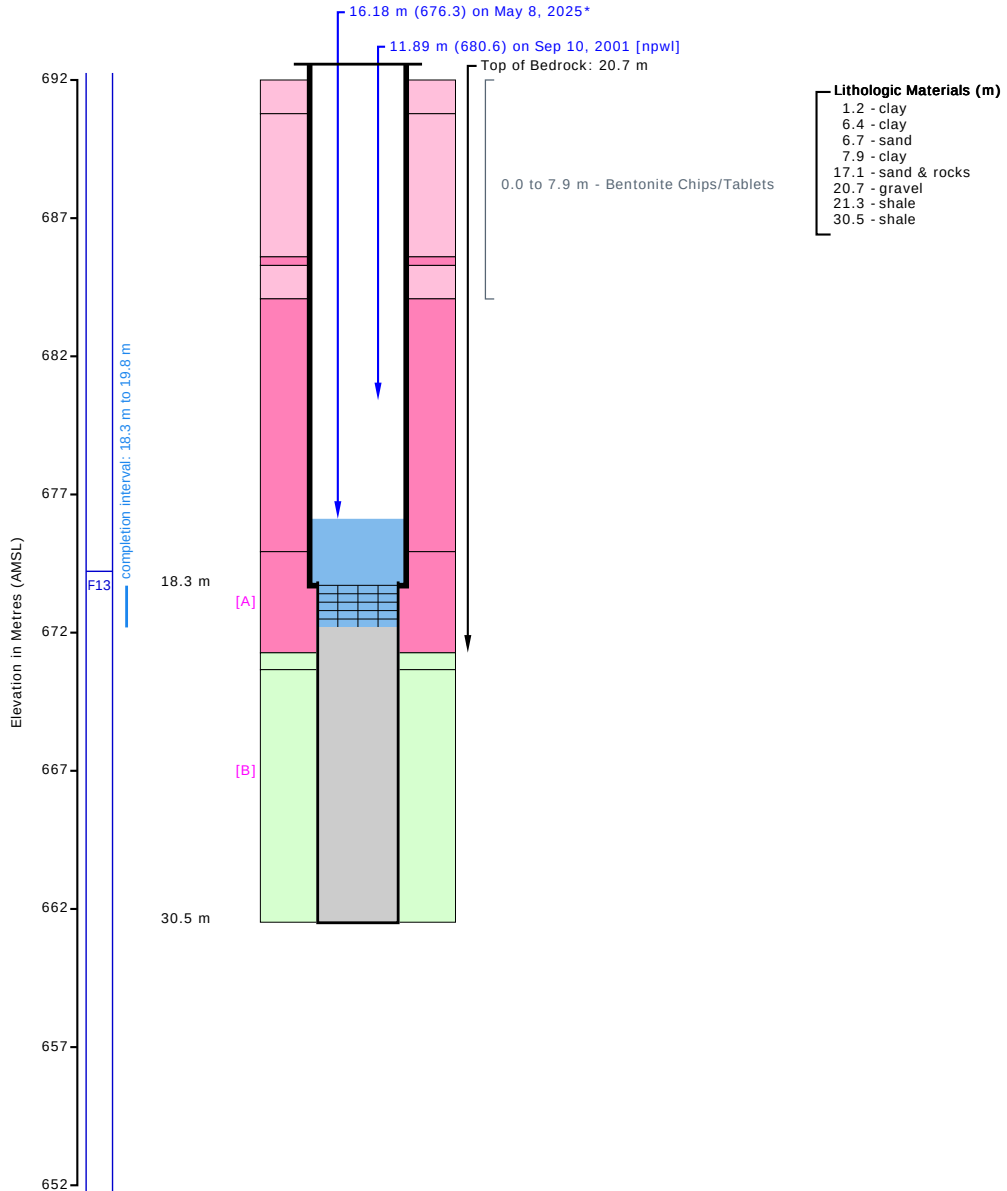
(* TGWC determined value)

Earliest Water Level (m): **11.89 – September 10, 2001**

Most Recent Water Level (m): **16.18 – May 8, 2025 @ 10:31**

GIC ID: **40335**

2001 Water Well 14-21 Water Well Diagram



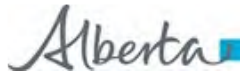
Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial	Unsorted		F13 - Lower Horseshoe Canyon Formation	
	Fine Grained			
	Coarse Grained			
Bedrock	Fine Grained			
	Coarse Grained			
	Other			

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): 16.18 m (676.3 m AMSL) on May 8, 2025 @ 10:31 - 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: July 17, 2025 @ 09:30 --- <https://www.hcl.ca>

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

[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	
[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
Recommended Pump Intake Depth (From TOC)		17.98 m		Depth 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
		Sample Collected for Potability		Submitted to ESRD
Additional Comments on Well				
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				Recovery (m)
Removal Rate 45.46 L/min				0:00 15.00
Depth Withdrawn From 0.00 m				1:00 13.01
				2:00 12.30
				3:00 12.13
				4:00 12.07
				5:00 12.06
				6:00 12.05
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
UNKNOWN NA DRILLER	1
Company Name	Copy of Well report provided to owner Date approval holder signed
MAR-WAYNE WATER WELL DRILLING SERVICES LTD.	

2001 Water Well 14-21
Chemical Analysis Results (May 28, 2025)



Element
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Page 1 of 10

Analytical Report

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:		Date Received:	May 23, 2025
	T5S 2W3	LSD:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Reported:	May 28, 2025
Attn:	Jennifer Catt	P.O.:	20020	Report Number:	3140804
Sampled By:	Ben Gilham	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

Reference Number	1816292-16
Sample Date	May 08, 2025
Sample Time	10:45
Sample Location	M37841.689687
Sample Description	2001 WW 14-21 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	7.20	0.05		
Sulfur	Dissolved	mg/L	30.8	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
				5		
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	0.0008	0.0002	0.010	Below MAC
Barium	Dissolved	mg/L	0.064	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	<0.00001	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	0.0003	0.0002	1 AO, 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.097	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0011	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	1.09	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	0.0062	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	0.007	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	25	5		
Turbidity		NTU	8.4	0.1		
Routine Water						
pH			7.40	1	7.0-10.5	Within Range
Temp. of observed pH		°C	20.8			
Electrical Conductivity	at 25 °C	µS/cm	1300	1		
Calcium	Dissolved	mg/L	148	0.2		
Magnesium	Dissolved	mg/L	35.2	0.2		

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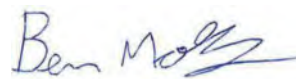
Analytical Report

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M 20020 P.O.: Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140804 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Reference Number	1816292-16
Sample Date	May 08, 2025
Sample Time	10:45
Sample Location	M37841.689687
Sample Description	2001 WW 14-21 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	91.9	0.4	200	Below AO
Potassium	Dissolved	mg/L	3.7	0.4		
Iron	Dissolved	mg/L	1.05	0.01	0.1	Above AO
Manganese	Dissolved	mg/L	1.04	0.005	0.02 AO, 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	108	0.4	250	Below AO
Fluoride		mg/L	0.07	0.05	1.5	Below MAC
Nitrate - N		mg/L	<0.01	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	<0.01	0.01		
Sulfate (SO4)	Dissolved	mg/L	92.4	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	585			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	480	5		
Total Dissolved Solids	Calculated	mg/L	767	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	514			
Ionic Balance	Dissolved	%	99			

Approved by:



Benjamin Morris, B.Sc
Operations 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	Project ID: MR-0224.23 Project Name: 2023 Groundwater Monitoring Project Location: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140804 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	-0.0104023	-0.04	0.05	yes
Sulfur	mg/L	0.0176456	-0.3	0.2	yes
Aluminum	µg/L	-0.142723	-2	2	yes
Antimony	µg/L	-0.00198253	-0.2	0.2	yes
Arsenic	µg/L	-0.00520747	-0.2	0.2	yes
Barium	µg/L	0.0155545	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.490366	-2	2	yes
Cadmium	µg/L	0.00106883	-0.01	0.01	yes
Chromium	µg/L	-0.0304354	-0.5	0.5	yes
Cobalt	µg/L	-0.000332921	-0.1	0.1	yes
Copper	µg/L	0.0100485	-0.2	0.2	yes
Lead	µg/L	0.00240083	-0.1	0.1	yes
Lithium	µg/L	-0.00113161	-1	1	yes
Molybdenum	µg/L	0.0194221	-1	1	yes
Nickel	µg/L	0.0142204	-0.5	0.5	yes
Selenium	µg/L	0.00150023	-0.2	0.2	yes
Silver	µg/L	0.00050935	-0.01	0.01	yes
Strontium	µg/L	0.0646959	-1	1	yes
Thallium	µg/L	0.00145131	-0.50	0.50	yes
Tin	µg/L	-0.0724984	-1	1	yes
Titanium	µg/L	-0.0940343	-0.5	0.5	yes
Uranium	µg/L	0.00233484	-0.5	0.5	yes
Vanadium	µg/L	-0.00529231	-0.1	0.1	yes
Zinc	µg/L	0.13059	-1	1	yes
Mercury	µg/L	-0.001039	-0.051000	0.051000	yes

Date Acquired: May 26, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	997	902	1058	yes
Antimony	µg/L	40.5	36.4	44.2	yes
Arsenic	µg/L	39.9	37.7	42.5	yes
Barium	µg/L	196	181	211	yes
Beryllium	µg/L	19.9	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	389	351	427	yes
Cadmium	µg/L	2.16	1.87	2.23	yes
Chromium	µg/L	100	90.8	108.8	yes
Cobalt	µg/L	20.0	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.2	18.3	21.3	yes
Lithium	µg/L	197	178	214	yes
Molybdenum	µg/L	198	178	219	yes
Nickel	µg/L	99.9	93.3	105.9	yes
Selenium	µg/L	39.9	36.9	42.9	yes

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 LSD: 20020 P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140804 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	20.1	18.29	22.31	yes
Strontium	µg/L	200	183	219	yes
Thallium	µg/L	9.86	8.90	10.70	yes
Tin	µg/L	201	187	217	yes
Titanium	µg/L	101	91.0	109.0	yes
Uranium	µg/L	102	92.2	110.2	yes
Vanadium	µg/L	20.0	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: May 26, 2025					
Mercury	mg/L	0.000100	0.000070	0.000130	yes
Date Acquired: May 26, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.10	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.1	9.1	10.9	yes
Lead	µg/L	1.0	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.2	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.02	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	5.0	4.4	5.7	yes
Uranium	µg/L	5.2	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000020	0.000006	0.000036	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	9.62	9.51	10.89	yes
Sulfur	mg/L	150	141.6	156.6	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	2.03	1.88	2.24	yes
Sulfur	mg/L	10.2	9.1	10.6	yes
Date Acquired: May 26, 2025					

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140804 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.20	0.18	0.23	yes
Sulfur	mg/L	2.9	2.7	3.1	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	7.36	7.37	10	0.01	yes
Sulfur	mg/L	34.6	35.0	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	5.9	6.0	10	0.4	yes
Barium	µg/L	31	31	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	163	161	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	0.8	0.8	10	0.2	yes
Copper	µg/L	0.5	0.5	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	89	89	10	2	yes
Molybdenum	µg/L	<1	<1	10	2	yes
Nickel	µg/L	1.1	1.0	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	1090	1090	10	2	yes
Thallium	µg/L	<0.05	<0.05	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	2.8	2.8	10	1.1	yes
Vanadium	µg/L	<0.1	<0.1	10	0.2	yes
Zinc	µg/L	27	27	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.099	-0.1	0.1	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	0.114	0.0	0.1	yes
Date Acquired: May 27, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1930	1881.4	2091.4	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	4540	4020.0	5436.0	yes
Date Acquired: May 27, 2025					

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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140804 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Physical and Aggregate Properties - Continued

continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Colour	Colour units	10	10	10		yes
Turbidity	NTU	144	132.1	162.1		yes
Date Acquired:	May 27, 2025					
Turbidity	NTU	14.2	12.6	15.6		yes
Date Acquired:	May 27, 2025					
Turbidity	NTU	1.6	1.0	2.2		yes
Date Acquired:	May 27, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity	NTU	43.7	45.2	10	0.2	yes
Date Acquired:	May 27, 2025					

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0.00594322	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Calcium	mg/L	0.0341995	-0.2	0.2	yes
Magnesium	mg/L	0.00865101	-0.1	0.1	yes
Sodium	mg/L	0.0649477	-0.4	0.4	yes
Potassium	mg/L	0.024503	-0.4	0.4	yes
Iron	mg/L	0.00335118	-0.01	0.01	yes
Manganese	mg/L	0.000111042	-0.004	0.004	yes
Chloride	mg/L	0.15	-0.4	0.4	yes
Date Acquired: May 26, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2140	1847.4	2256.0	yes
Date Acquired: May 26, 2025					
Electrical Conductivity	dS/m	32.9	27.200	36.800	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	9.90	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes
Nitrite - N	mg/L	9.61	9.010	10.990	yes
Nitrate and Nitrite - N	mg/L	19.6	19.10	20.90	yes
pH		9.18	8.90	9.44	yes
Temp. of observed pH	°C	20.1	15.5	24.5	yes
Electrical Conductivity	dS/m	2.77	2.631	2.829	yes
P-Alkalinity	mg/L	519	442	584	yes
T-Alkalinity	mg/L	997	958	1059	yes
Calcium	mg/L	242	235.3	262.9	yes
Magnesium	mg/L	97.6	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	241	238.3	262.3	yes

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

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140804 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Iron	mg/L	9.47	8.89	10.69		yes
Manganese	mg/L	2.39	2.200	2.680		yes
Date Acquired:	May 26, 2025					
Fluoride	mg/L	4.80	4.58	5.24		yes
Nitrate - N	mg/L	4.71	4.37	5.33		yes
Nitrite - N	mg/L	4.64	4.370	5.330		yes
Nitrate and Nitrite - N	mg/L	9.35	8.80	10.60		yes
pH		6.87	6.75	7.05		yes
Temp. of observed pH	°C	20.3	15.5	24.5		yes
Electrical Conductivity	dS/m	0.076	0.069	0.085		yes
P-Alkalinity	mg/L	52	28	72		yes
T-Alkalinity	mg/L	127	114	140		yes
Calcium	mg/L	51.2	44.9	56.9		yes
Magnesium	mg/L	20.4	17.9	22.0		yes
Sodium	mg/L	51.9	47.1	53.4		yes
Potassium	mg/L	50.3	45.8	55.8		yes
Iron	mg/L	1.98	1.89	2.11		yes
Manganese	mg/L	0.496	0.464	0.536		yes
Chloride	mg/L	83.5	74.9	86.9		yes
Date Acquired:	May 26, 2025					
Fluoride	mg/L	0.50	0.45	0.57		yes
Nitrate - N	mg/L	0.51	0.42	0.57		yes
Nitrite - N	mg/L	0.496	0.455	0.557		yes
Nitrate and Nitrite - N	mg/L	1.01	0.85	1.15		yes
Calcium	mg/L	5.1	4.7	5.4		yes
Magnesium	mg/L	2.1	1.9	2.2		yes
Sodium	mg/L	5.2	4.7	5.7		yes
Potassium	mg/L	4.8	4.6	5.6		yes
Iron	mg/L	0.19	0.18	0.22		yes
Manganese	mg/L	0.048	0.046	0.057		yes
Chloride	mg/L	15.2	13.3	16.5		yes
Date Acquired:	May 26, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Fluoride	mg/L	0.09	0.08	10	0.05	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
pH		7.56	7.53	0	0.10	yes
Electrical Conductivity	dS/m	0.944	0.942	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	583	583	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	478	478	10	5	yes
Calcium	mg/L	129	129	10	0.6	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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140804 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Magnesium	mg/L	28.9	28.7	10	0.7	yes
Sodium	mg/L	51.6	51.8	10	1.2	yes
Potassium	mg/L	3.7	3.8	10	1.2	yes
Iron	mg/L	0.01	0.01	10	0.05	yes
Manganese	mg/L	0.833	0.835	10	0.010	yes
Chloride	mg/L	0.7	0.7	10	0.5	yes
Date Acquired: May 26, 2025						

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: T5S 2W3	Lot ID: 1816292
Attn: Jennifer Catt	LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Control Number:
Sampled By: Ben Gilham	P.O.: 20020	Date Received: May 23, 2025
Company: HCL	Proj. Acct. code:	Date Reported: May 28, 2025
		Report Number: 3140804
		Report Type: Final Report

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	May 26, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	May 26, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	May 26, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	May 26, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	May 27, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	May 26, 2025	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	May 26, 2025	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	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	May 26, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	May 27, 2025	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, August 2024
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:

- Sample 1816292-16; 9956345: Sample received at 11.6 °C

Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater	Control Number:	
	Edmonton, AB, Canada		Monitoring	Date Received:	May 23, 2025
	T5S 2W3	Project Location:		Date Reported:	May 28, 2025
Attn:	Jennifer Catt	LSD:	Tp 054, R 26 to 28, W4M	Report Number:	3140804
Sampled By:	Ben Gilham		and Tp 054, R 01, W5M	Report Type:	Final Report
Company:	HCL	P.O.:	20020		
		Proj. Acct. code:			

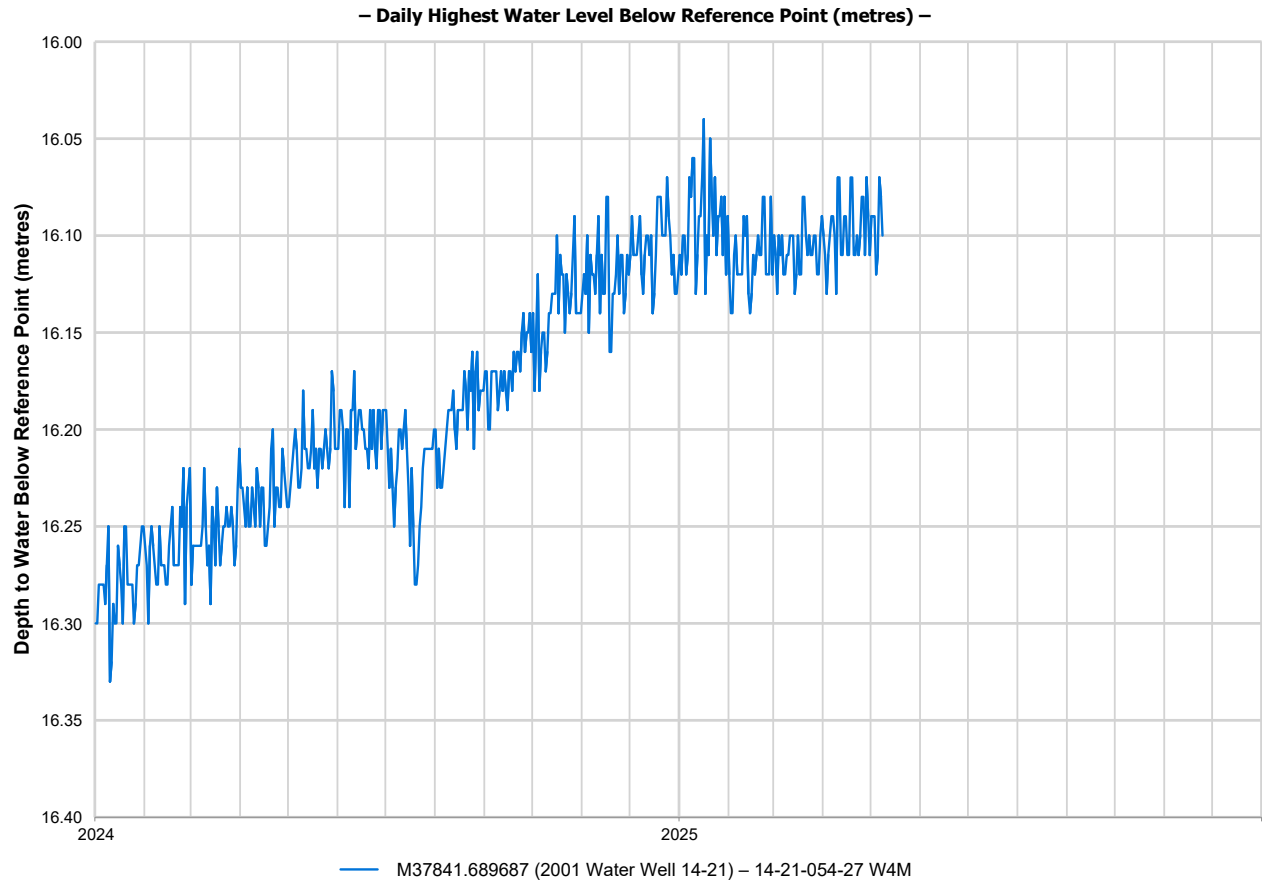
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to 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
2024 - 2025 Hydrograph*



2001 Water Well 16-28

16-28-054-27 W4M
(M37490.030994)



Photograph taken on July 26, 2019

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 ***

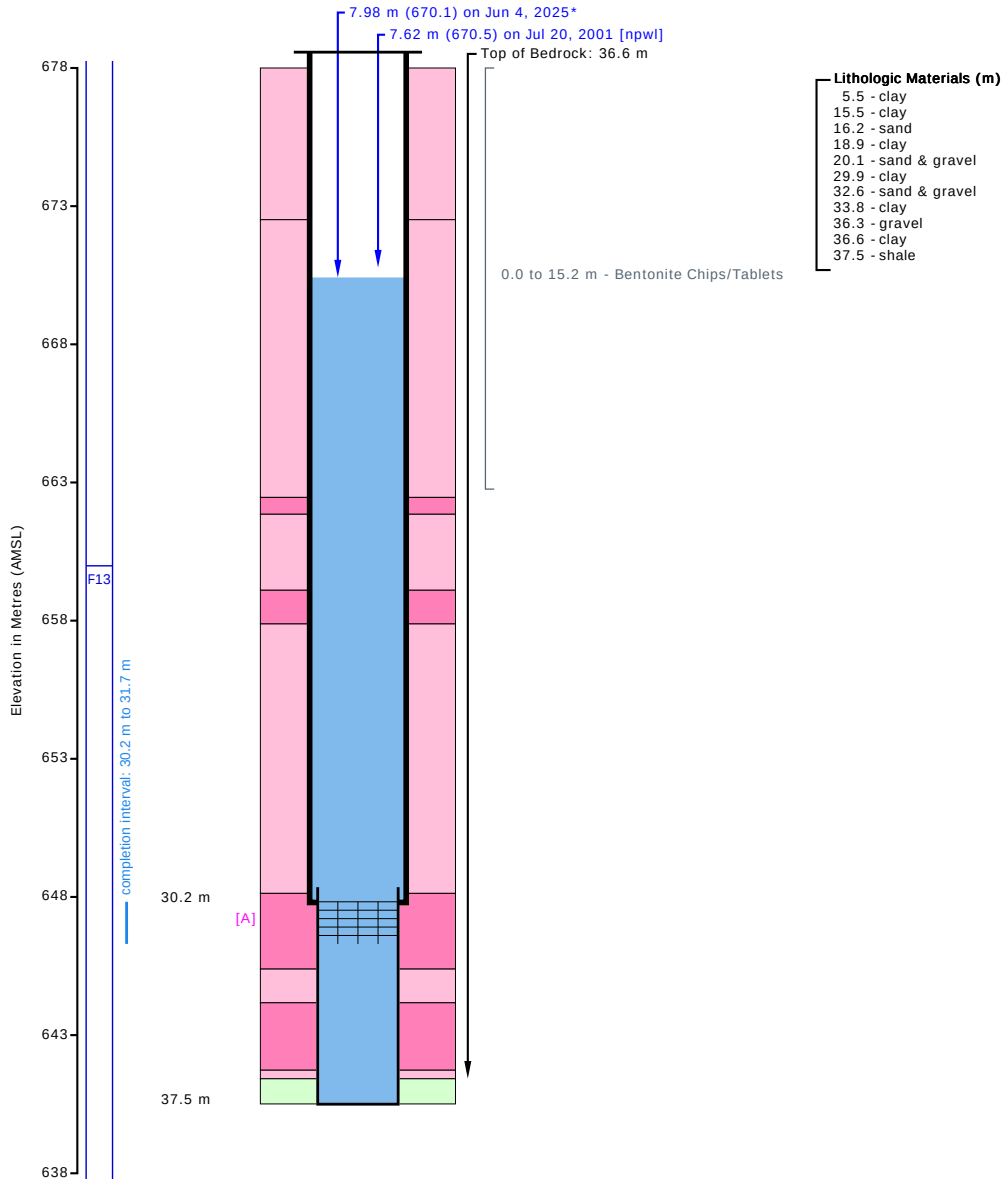
(* TGWC determined value)

Earliest Water Level (m): **7.62 – July 20, 2001**

Most Recent Water Level (m): **7.98 – June 4, 2025 @ 23:00**

GIC ID: **297091**

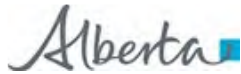
2001 Water Well 16-28
Water Well Diagram



Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial		Unsorted	Bedrock	 Other
		Fine Grained		
				
		Coarse Grained		

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): 7.98 m (670.1 m AMSL) on Jun 4, 2025 @ 23:00 - 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: July 17, 2025 @ 09:30 --- https://www.hcl.ca	

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)						
m from					Latitude 53.697665		Longitude -113.916417		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 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

Printed on 7/17/2025 9:24:21 AM

Page: 2 / 2

2001 Water Well 16-28
Chemical Analysis Results (May 28, 2025)



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Page 1 of 10

Analytical Report

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:		Date Received:	May 23, 2025
	T5S 2W3	LSD:	Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Date Reported:	May 28, 2025
Attn:	Jennifer Catt	P.O.:	20020	Report Number:	3140796
Sampled By:	Ben Gilham	Proj. Acct. code:		Report Type:	Final Report
Company:	HCL				

Reference Number	1816292-8
Sample Date	May 08, 2025
Sample Time	15:25
Sample Location	M37490.030994
Sample Description	2001 WW 16-28 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	6.77	0.05		
Sulfur	Dissolved	mg/L	97.6	0.3		
Mercury	Dissolved	mg/L	<0.000005	0.000005	0.001	Below MAC
				5		
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	0.0044	0.0002	0.010	Below MAC
Barium	Dissolved	mg/L	0.014	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	0.0004	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	0.0008	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	1.16	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	0.0025	0.0005	0.02	Below MAC
Vanadium	Dissolved	mg/L	<0.0001	0.0001		
Zinc	Dissolved	mg/L	0.061	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	>60	5		
Turbidity		NTU	25.6	0.1		
Routine Water						
pH			7.42	1	7.0-10.5	Within Range
Temp. of observed pH		°C	20.9			
Electrical Conductivity	at 25 °C	µS/cm	1300	1		
Calcium	Dissolved	mg/L	148	0.2		
Magnesium	Dissolved	mg/L	33.6	0.2		

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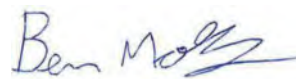
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Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Reference Number	1816292-8
Sample Date	May 08, 2025
Sample Time	15:25
Sample Location	M37490.030994
Sample Description	2001 WW 16-28 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	119	0.4	200	Below AO
Potassium	Dissolved	mg/L	3.9	0.4		
Iron	Dissolved	mg/L	2.07	0.01	0.1	Above AO
Manganese	Dissolved	mg/L	1.42	0.005	0.02 AO, 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	1.0	0.4	250	Below AO
Fluoride		mg/L	0.06	0.05	1.5	Below MAC
Nitrate - N		mg/L	<0.01	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	<0.01	0.01		
Sulfate (SO4)	Dissolved	mg/L	293	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	563			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	462	5		
Total Dissolved Solids	Calculated	mg/L	875	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	507			
Ionic Balance	Dissolved	%	100			

Approved by:



Benjamin Morris, B.Sc
Operations Manager

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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140796 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.00704748	-0.04	0.05	yes
Sulfur	mg/L	0.107846	-0.3	0.2	yes
Aluminum	µg/L	-0.142723	-2	2	yes
Antimony	µg/L	-0.00198253	-0.2	0.2	yes
Arsenic	µg/L	-0.00520747	-0.2	0.2	yes
Barium	µg/L	0.0155545	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.490366	-2	2	yes
Cadmium	µg/L	0.00106883	-0.01	0.01	yes
Chromium	µg/L	-0.0304354	-0.5	0.5	yes
Cobalt	µg/L	-0.000332921	-0.1	0.1	yes
Copper	µg/L	0.0100485	-0.2	0.2	yes
Lead	µg/L	0.00240083	-0.1	0.1	yes
Lithium	µg/L	-0.00113161	-1	1	yes
Molybdenum	µg/L	0.0194221	-1	1	yes
Nickel	µg/L	0.0142204	-0.5	0.5	yes
Selenium	µg/L	0.00150023	-0.2	0.2	yes
Silver	µg/L	0.00050935	-0.01	0.01	yes
Strontium	µg/L	0.0646959	-1	1	yes
Thallium	µg/L	0.00145131	-0.50	0.50	yes
Tin	µg/L	-0.0724984	-1	1	yes
Titanium	µg/L	-0.0940343	-0.5	0.5	yes
Uranium	µg/L	0.00233484	-0.5	0.5	yes
Vanadium	µg/L	-0.00529231	-0.1	0.1	yes
Zinc	µg/L	0.13059	-1	1	yes
Mercury	µg/L	-0.001039	-0.051000	0.051000	yes

Date Acquired: May 26, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	997	902	1058	yes
Antimony	µg/L	40.5	36.4	44.2	yes
Arsenic	µg/L	39.9	37.7	42.5	yes
Barium	µg/L	196	181	211	yes
Beryllium	µg/L	19.9	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	389	351	427	yes
Cadmium	µg/L	2.16	1.87	2.23	yes
Chromium	µg/L	100	90.8	108.8	yes
Cobalt	µg/L	20.0	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.2	18.3	21.3	yes
Lithium	µg/L	197	178	214	yes
Molybdenum	µg/L	198	178	219	yes
Nickel	µg/L	99.9	93.3	105.9	yes
Selenium	µg/L	39.9	36.9	42.9	yes

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140796 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	20.1	18.29	22.31	yes
Strontium	µg/L	200	183	219	yes
Thallium	µg/L	9.86	8.90	10.70	yes
Tin	µg/L	201	187	217	yes
Titanium	µg/L	101	91.0	109.0	yes
Uranium	µg/L	102	92.2	110.2	yes
Vanadium	µg/L	20.0	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: May 26, 2025					
Mercury	mg/L	0.000100	0.000070	0.000130	yes
Date Acquired: May 26, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.10	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.1	9.1	10.9	yes
Lead	µg/L	1.0	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.2	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.02	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	5.0	4.4	5.7	yes
Uranium	µg/L	5.2	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000020	0.000006	0.000036	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	9.62	9.51	10.89	yes
Sulfur	mg/L	150	141.6	156.6	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	2.03	1.88	2.24	yes
Sulfur	mg/L	10.2	9.1	10.6	yes
Date Acquired: May 26, 2025					

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: T5S 2W3 LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140796 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.20	0.18	0.23	yes
Sulfur	mg/L	2.9	2.7	3.1	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.21	3.26	10	0.01	yes
Sulfur	mg/L	38.2	39.0	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	<0.2	<0.2	10	0.4	yes
Barium	µg/L	38	38	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	163	168	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	<0.1	<0.1	10	0.2	yes
Copper	µg/L	<0.2	<0.2	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	16	17	10	2	yes
Molybdenum	µg/L	3	2	10	2	yes
Nickel	µg/L	<0.5	<0.5	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	57	58	10	2	yes
Thallium	µg/L	<0.05	<0.05	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	<0.5	<0.5	10	1.1	yes
Vanadium	µg/L	0.2	0.1	10	0.2	yes
Zinc	µg/L	<1	2	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: May 26, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.099	-0.1	0.1	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	0.114	0.0	0.1	yes
Date Acquired: May 27, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1930	1881.4	2091.4	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	4550	4020.0	5436.0	yes
Date Acquired: May 27, 2025					

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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140796 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Physical and Aggregate Properties - Continued

continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Colour	Colour units	10	10	10		yes
Turbidity	NTU	144	132.1	162.1		yes
Date Acquired:	May 27, 2025					
Turbidity	NTU	14.3	12.6	15.6		yes
Date Acquired:	May 27, 2025					
Turbidity	NTU	1.6	1.0	2.2		yes
Date Acquired:	May 27, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity	NTU	3.1	2.9	10	0.2	yes
Date Acquired:	May 27, 2025					

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0.00152937	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Calcium	mg/L	0.0798772	-0.2	0.2	yes
Magnesium	mg/L	0.0424654	-0.1	0.1	yes
Sodium	mg/L	0.144685	-0.4	0.4	yes
Potassium	mg/L	0.194533	-0.4	0.4	yes
Iron	mg/L	0.00603323	-0.01	0.01	yes
Manganese	mg/L	0.000767739	-0.004	0.004	yes
Chloride	mg/L	0.15	-0.4	0.4	yes
Date Acquired: May 26, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2140	1847.4	2256.0	yes
Date Acquired: May 26, 2025					
Electrical Conductivity	dS/m	32.9	27.200	36.800	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	9.90	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes
Nitrite - N	mg/L	9.61	9.010	10.990	yes
Nitrate and Nitrite - N	mg/L	19.6	19.10	20.90	yes
pH		9.18	8.90	9.44	yes
Temp. of observed pH	°C	20.1	15.5	24.5	yes
Electrical Conductivity	dS/m	2.77	2.631	2.829	yes
P-Alkalinity	mg/L	519	442	584	yes
T-Alkalinity	mg/L	997	958	1059	yes
Calcium	mg/L	242	235.3	262.9	yes
Magnesium	mg/L	97.6	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	241	238.3	262.3	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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140796 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Iron	mg/L	9.47	8.89	10.69	yes
Manganese	mg/L	2.39	2.200	2.680	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	4.80	4.58	5.24	yes
Nitrate - N	mg/L	4.71	4.37	5.33	yes
Nitrite - N	mg/L	4.64	4.370	5.330	yes
Nitrate and Nitrite - N	mg/L	9.35	8.80	10.60	yes
pH		6.87	6.75	7.05	yes
Temp. of observed pH	°C	20.3	15.5	24.5	yes
Electrical Conductivity	dS/m	0.076	0.069	0.085	yes
P-Alkalinity	mg/L	52	28	72	yes
T-Alkalinity	mg/L	127	114	140	yes
Calcium	mg/L	51.2	44.9	56.9	yes
Magnesium	mg/L	20.4	17.9	22.0	yes
Sodium	mg/L	51.9	47.1	53.4	yes
Potassium	mg/L	50.3	45.8	55.8	yes
Iron	mg/L	1.98	1.89	2.11	yes
Manganese	mg/L	0.496	0.464	0.536	yes
Chloride	mg/L	83.5	74.9	86.9	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	0.50	0.45	0.57	yes
Nitrate - N	mg/L	0.51	0.42	0.57	yes
Nitrite - N	mg/L	0.496	0.455	0.557	yes
Nitrate and Nitrite - N	mg/L	1.01	0.85	1.15	yes
Calcium	mg/L	5.1	4.7	5.4	yes
Magnesium	mg/L	2.1	1.9	2.2	yes
Sodium	mg/L	5.2	4.7	5.7	yes
Potassium	mg/L	4.8	4.6	5.6	yes
Iron	mg/L	0.19	0.18	0.22	yes
Manganese	mg/L	0.048	0.046	0.057	yes
Chloride	mg/L	15.2	13.3	16.5	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Fluoride	mg/L	0.09	0.08	10	0.05	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
pH		7.56	7.53	0	0.10	yes
Electrical Conductivity	dS/m	0.944	0.942	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	583	583	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	478	478	10	5	yes
Calcium	mg/L	86.8	87.6	10	0.6	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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140796 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Magnesium	mg/L	26.7	26.8	10	0.7	yes
Sodium	mg/L	77.9	79.0	10	1.2	yes
Potassium	mg/L	5.2	5.3	10	1.2	yes
Iron	mg/L	0.03	0.03	10	0.05	yes
Manganese	mg/L	0.071	0.072	10	0.010	yes
Chloride	mg/L	0.7	0.7	10	0.5	yes
Date Acquired: May 26, 2025						

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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: T5S 2W3	Lot ID: 1816292
Attn: Jennifer Catt	LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Control Number:
Sampled By: Ben Gilham	P.O.: 20020	Date Received: May 23, 2025
Company: HCL	Proj. Acct. code:	Date Reported: May 28, 2025
		Report Number: 3140796
		Report Type: Final Report

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	May 26, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	May 26, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	May 26, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	May 26, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	May 27, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	May 26, 2025	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	May 26, 2025	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	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	May 26, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	May 27, 2025	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, August 2024
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:

- Sample 1816292-8; 9956337: Sample received at 11.6 °C

Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater	Control Number:	
	Edmonton, AB, Canada		Monitoring	Date Received:	May 23, 2025
	T5S 2W3	Project Location:		Date Reported:	May 28, 2025
Attn:	Jennifer Catt	LSD:	Tp 054, R 26 to 28, W4M	Report Number:	3140796
Sampled By:	Ben Gilham		and Tp 054, R 01, W5M	Report Type:	Final Report
Company:	HCL	P.O.:	20020		
		Proj. Acct. code:			

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.

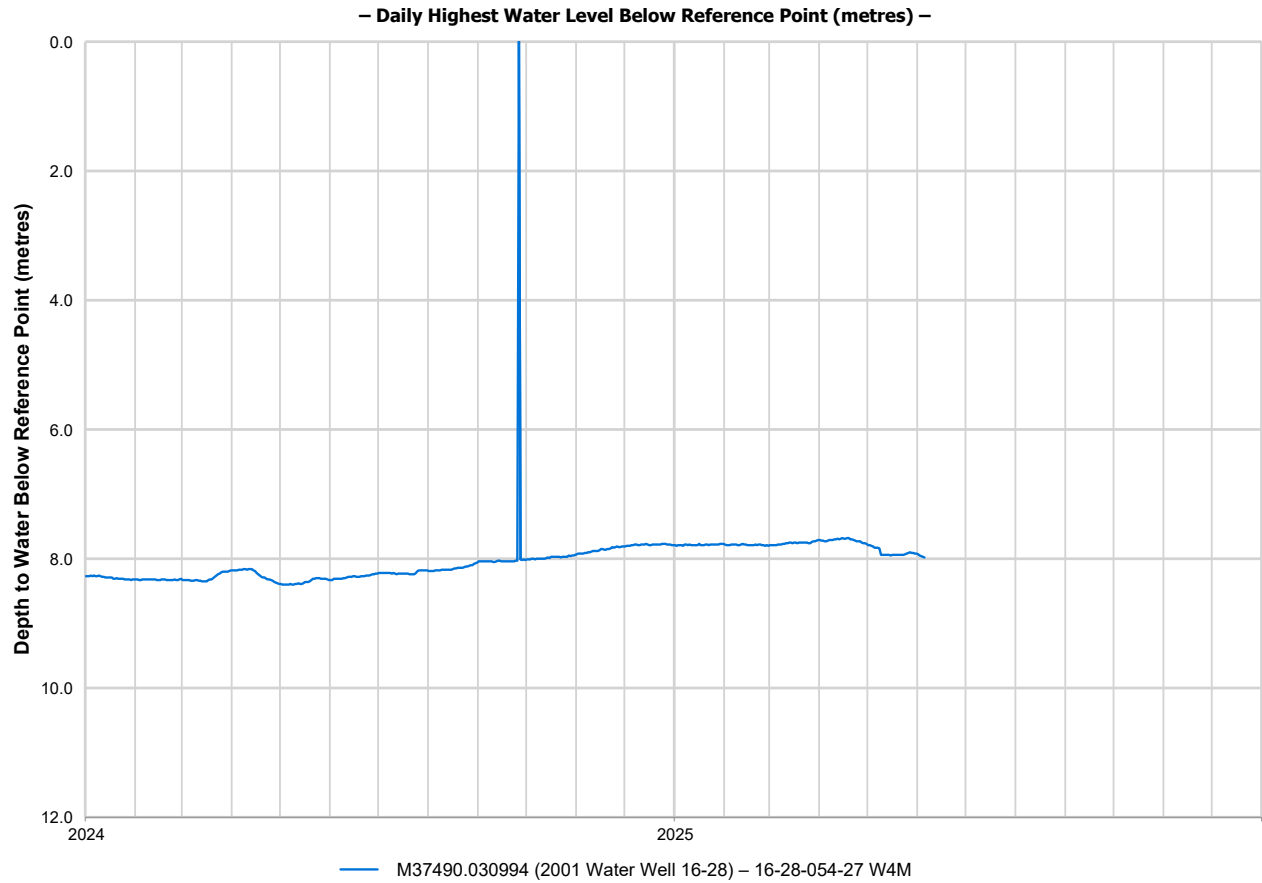
Please direct any inquiries regarding this report to our Client Services group.

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
2024 - 2025 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 ***

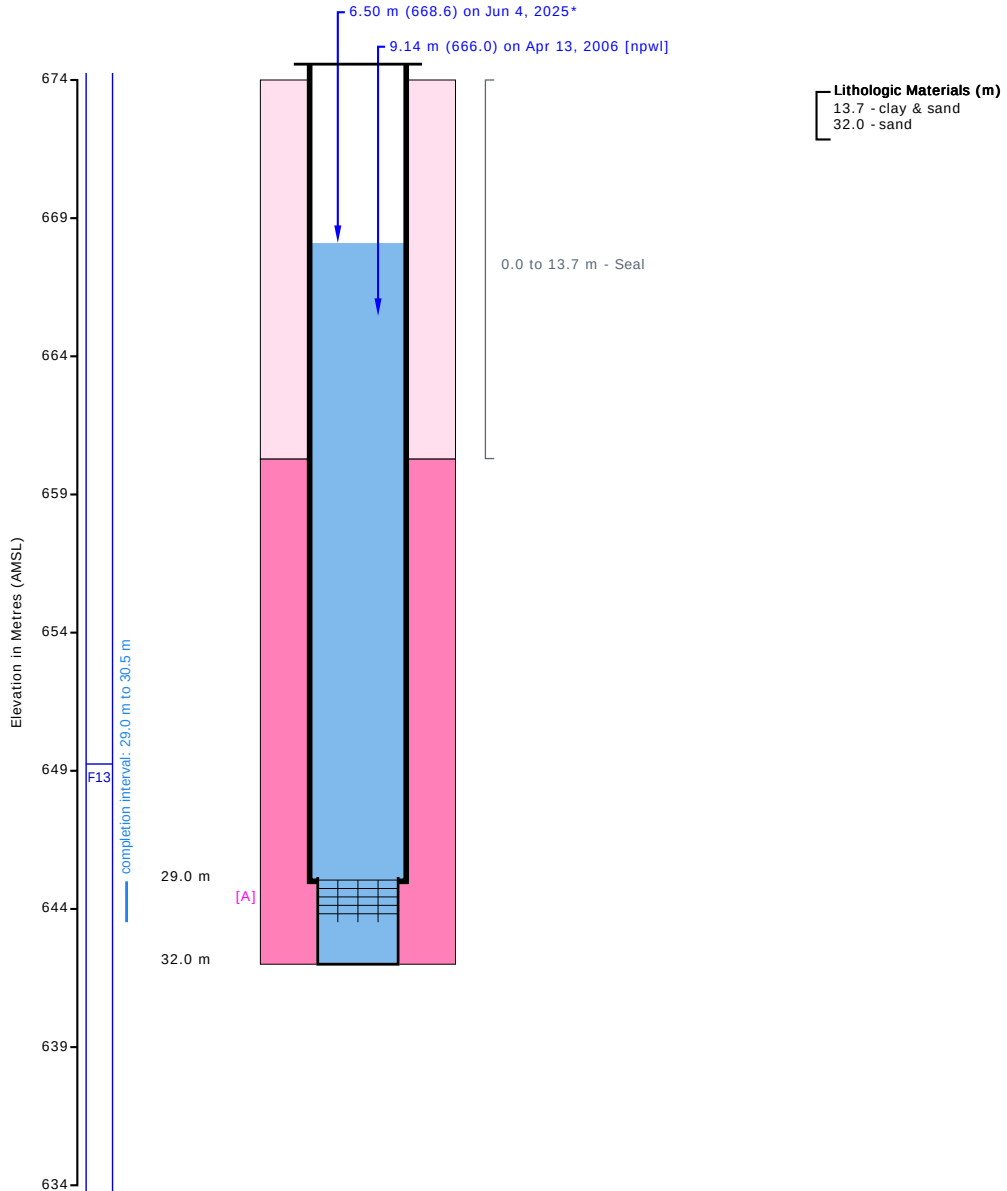
(TGWC determined value)*

Earliest Water Level (m): **9.14 – April 13, 2006**

Most Recent Water Level (m): **6.50 – June 4, 2025 @ 23:00**

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): 6.50 m (668.6 m AMSL) on Jun 4, 2025 @ 23:00 - 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: July 17, 2025 @ 09:30 --- https://www.hcl.ca	

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

Easting (m): *72,870 ²*

Northing (m): *5,949,358 ²*

Elevation (m): *675 ²*

Lot: *8A*

Block: *4*

Plan: *0620740*

Rural Address: *15, 54519 RR 273*

M39227.496150

Elog Taken: *No*

Gamma Taken: *No*

Flowing: *No*

Presence of Gas: *No*

Stick Up (m): *0.6*

2025-06-04

General Details

* TGWC calculated value

Depth Completed (m)*: *30.5*

Top of Bedrock (m): *Surficial Water Well*

Depth Drilled (m)*: *32.0*

Completion Interval (m): *29.0 – 30.5*

Sand & Gravel Thickness (m): *18.3 (total) – 18.3 (below 15 m) **

Most Recent Water Level (m): *6.50 m – June 4, 2025*

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 - 0.3048 mm*

Seal: *0.0 to 13.7 m*

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

Sampling Details: *May 13, 2025 @ 10:45*

Report Date: *May 28, 2025 - Element Materials Technology Canada Inc. (1816292-11)*

Constituent	Result	Constituent	Result	Constituent	Result
Conductivity (µS/cm):	<i>1110</i>	Nitrate as N:	<i>< 0.01</i>	Turbidity (NTU):	<i>13.4</i>
Total Dissolved Solids:	<i>698</i>	Nitrite as N:	<i>< 0.005</i>	Fluoride:	<i>0.10</i>
Hardness (as CaCO3):	<i>427</i>	pH (pH Unit):	<i>7.60</i>	Carbonate:	<i>< 6</i>
T-Alkalinity (as CaCO3):	<i>539</i>	Colour (TCU):	<i>50</i>	Bicarbonate:	<i>658</i>
P-Alkalinity (as CaCO3):	<i>< 5</i>	Ion Balance (%):	<i>99</i>	Hydroxide:	<i>< 5</i>
Nitrate + Nitrite as N:	<i>< 0.01</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>122</i>	Mercury:		<i>< 0.000005</i>
Chloride:		<i>0.7</i>	Molybdenum:		<i>< 0.001</i>
Iron:		<i>1.62</i>	Magnesium:		<i>29.6</i>
Manganese:		<i>1.49***</i>	Sodium:		<i>103</i>
Aluminum:		<i>< 0.002</i>	Potassium:		<i>3.5</i>
Arsenic:		<i>0.0059</i>	Vanadium:		<i>< 0.0001</i>
Barium:		<i>0.031</i>	Strontium:		<i>1.09</i>
Beryllium:		<i>< 0.0001</i>	Nickel:		<i>0.0011</i>
Cadmium:		<i>< 0.00001</i>	Zinc:		<i>0.027</i>
Chromium:		<i>< 0.0005</i>	Copper:		<i>0.0005</i>
Cobalt:		<i>0.0008</i>	Lead:		<i>< 0.0001</i>
Sulfate:		<i>116</i>	Uranium:		<i>0.0028</i>

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

***Exceeded the maximum acceptable concentration (MAC), Health Canada. 2025. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.

850347; 1 / 4

Comments & Observations

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).

Aquifer Tests

Pump Intake BTQC (m): *27.4 on April 13, 2006*

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 2006-04-13	<i>Air</i>	<i>[unknown]</i>	<i>120 5</i>	<i>90.9</i>	<i>9.1</i>	<i>18.3</i>	<i>27.4</i>	<i>63.4</i>	<i>8.4</i>

Alias IDs

Z594881

AEPA WellId: *1715169*

AEPA WellReportId: *11301534*

AEPA GicWellId: *1715169*

* HCL GPS — 10TM Resource NAD83, * HCL DEM (2016)

(1) July 17, 2025, "AS IS"; no warranty either expressed or implied. vist tgwc.com for additional details

Sturgeon County, 2024 to 2025 Groundwater Monitoring Report

Calahoo Resource Extraction District, Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M, MR-0224.24

RTU

REMOTE TELEMETRY UNIT

HCL

B - 411

2006 Water Well 10-34
AEPA - Water Well Drilling Report



Water Well Drilling Report

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

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

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

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	Pumping (m)	Elapsed Time Minutes:Sec	Recovery (m)
2006/04/13	12:00 AM	9.14 m		0:00	27.43
				1:00	12.80
				2:00	10.97
				3:00	10.36
				4:00	9.75
				5:00	9.45
Method of Water Removal					
Type Air					
Removal Rate 90.92 L/min					
Depth Withdrawn From 27.43 m					
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	

2006 Water Well 10-34
Chemical Analysis Results (May 28, 2025)



Element
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Edmonton, Alberta
T6B 3J4, Canada

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W: www.element.com

Page 1 of 10

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M 20020 P.O.: Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140799 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Reference Number	1816292-11
Sample Date	May 13, 2025
Sample Time	10:45
Sample Location	M39227.496150
Sample Description	2006 WW 10-34 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved						
Silicon	Dissolved	mg/L	6.56	0.05		
Sulfur	Dissolved	mg/L	38.5	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	0.0059	0.0002	0.010	Below MAC
Barium	Dissolved	mg/L	0.031	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	0.163	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	0.0005	0.0002	1 AO, 2 MAC	Below AO
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005	Below MAC
Lithium	Dissolved	mg/L	0.089	0.001		
Molybdenum	Dissolved	mg/L	<0.001	0.001		
Nickel	Dissolved	mg/L	0.0011	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	1.09	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	0.027	0.001	5.0	Below AO
Subsample			Field Filtered			
Physical and Aggregate Properties						
Colour	Apparent, Potable	Colour units	50	5		
Turbidity		NTU	13.4	0.1		
Routine Water						
pH			7.60	1	7.0-10.5	Within Range
Temp. of observed pH		°C	20.8			
Electrical Conductivity	at 25 °C	µS/cm	1110	1		
Calcium	Dissolved	mg/L	122	0.2		
Magnesium	Dissolved	mg/L	29.6	0.2		

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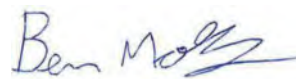
Analytical Report

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M 20020 P.O.: Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140799 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Reference Number	1816292-11
Sample Date	May 13, 2025
Sample Time	10:45
Sample Location	M39227.496150
Sample Description	2006 WW 10-34 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	103	0.4	200	Below AO
Potassium	Dissolved	mg/L	3.5	0.4		
Iron	Dissolved	mg/L	1.62	0.01	0.1	Above AO
Manganese	Dissolved	mg/L	1.49	0.005	0.02 AO, 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	0.7	0.4	250	Below AO
Fluoride		mg/L	0.10	0.05	1.5	Below MAC
Nitrate - N		mg/L	<0.01	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	<0.01	0.01		
Sulfate (SO4)	Dissolved	mg/L	116	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	658			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	539	5		
Total Dissolved Solids	Calculated	mg/L	698	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	427			
Ionic Balance	Dissolved	%	99			

Approved by:



Benjamin Morris, B.Sc
Operations Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
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Terms and Conditions: <https://www.element.com/terms/terms-and-conditions>

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140799 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	-0.0104023	-0.04	0.05	yes
Sulfur	mg/L	0.0176456	-0.3	0.2	yes
Aluminum	µg/L	-0.142723	-2	2	yes
Antimony	µg/L	-0.00198253	-0.2	0.2	yes
Arsenic	µg/L	-0.00520747	-0.2	0.2	yes
Barium	µg/L	0.0155545	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.490366	-2	2	yes
Cadmium	µg/L	0.00106883	-0.01	0.01	yes
Chromium	µg/L	-0.0304354	-0.5	0.5	yes
Cobalt	µg/L	-0.000332921	-0.1	0.1	yes
Copper	µg/L	0.0100485	-0.2	0.2	yes
Lead	µg/L	0.00240083	-0.1	0.1	yes
Lithium	µg/L	-0.00113161	-1	1	yes
Molybdenum	µg/L	0.0194221	-1	1	yes
Nickel	µg/L	0.0142204	-0.5	0.5	yes
Selenium	µg/L	0.00150023	-0.2	0.2	yes
Silver	µg/L	0.00050935	-0.01	0.01	yes
Strontium	µg/L	0.0646959	-1	1	yes
Thallium	µg/L	0.00145131	-0.50	0.50	yes
Tin	µg/L	-0.0724984	-1	1	yes
Titanium	µg/L	-0.0940343	-0.5	0.5	yes
Uranium	µg/L	0.00233484	-0.5	0.5	yes
Vanadium	µg/L	-0.00529231	-0.1	0.1	yes
Zinc	µg/L	0.13059	-1	1	yes
Mercury	µg/L	-0.001039	-0.051000	0.051000	yes

Date Acquired: May 26, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	997	902	1058	yes
Antimony	µg/L	40.5	36.4	44.2	yes
Arsenic	µg/L	39.9	37.7	42.5	yes
Barium	µg/L	196	181	211	yes
Beryllium	µg/L	19.9	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	389	351	427	yes
Cadmium	µg/L	2.16	1.87	2.23	yes
Chromium	µg/L	100	90.8	108.8	yes
Cobalt	µg/L	20.0	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.2	18.3	21.3	yes
Lithium	µg/L	197	178	214	yes
Molybdenum	µg/L	198	178	219	yes
Nickel	µg/L	99.9	93.3	105.9	yes
Selenium	µg/L	39.9	36.9	42.9	yes

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140799 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	20.1	18.29	22.31	yes
Strontium	µg/L	200	183	219	yes
Thallium	µg/L	9.86	8.90	10.70	yes
Tin	µg/L	201	187	217	yes
Titanium	µg/L	101	91.0	109.0	yes
Uranium	µg/L	102	92.2	110.2	yes
Vanadium	µg/L	20.0	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: May 26, 2025					
Mercury	mg/L	0.000100	0.000070	0.000130	yes
Date Acquired: May 26, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.10	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.1	9.1	10.9	yes
Lead	µg/L	1.0	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.2	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.02	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	5.0	4.4	5.7	yes
Uranium	µg/L	5.2	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000020	0.000006	0.000036	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	9.62	9.51	10.89	yes
Sulfur	mg/L	150	141.6	156.6	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	2.03	1.88	2.24	yes
Sulfur	mg/L	10.2	9.1	10.6	yes
Date Acquired: May 26, 2025					

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140799 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.20	0.18	0.23	yes
Sulfur	mg/L	2.9	2.7	3.1	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.21	3.26	10	0.01	yes
Sulfur	mg/L	38.2	39.0	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	<0.2	<0.2	10	0.4	yes
Barium	µg/L	38	38	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	163	168	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	<0.1	<0.1	10	0.2	yes
Copper	µg/L	<0.2	<0.2	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	16	17	10	2	yes
Molybdenum	µg/L	3	2	10	2	yes
Nickel	µg/L	<0.5	<0.5	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	57	58	10	2	yes
Thallium	µg/L	<0.05	<0.05	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	<0.5	<0.5	10	1.1	yes
Vanadium	µg/L	0.2	0.1	10	0.2	yes
Zinc	µg/L	<1	2	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: May 26, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.099	-0.1	0.1	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	0.114	0.0	0.1	yes
Date Acquired: May 27, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1930	1881.4	2091.4	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	4550	4020.0	5436.0	yes
Date Acquired: May 27, 2025					

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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140799 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Physical and Aggregate Properties - Continued

continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Colour	Colour units	10	10	10		yes
Turbidity	NTU	144	132.1	162.1		yes
Date Acquired:	May 27, 2025					
Turbidity	NTU	14.3	12.6	15.6		yes
Date Acquired:	May 27, 2025					
Turbidity	NTU	1.6	1.0	2.2		yes
Date Acquired:	May 27, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity	NTU	3.1	2.9	10	0.2	yes
Date Acquired:	May 27, 2025					

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0.00594322	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Calcium	mg/L	0.0341995	-0.2	0.2	yes
Magnesium	mg/L	0.00865101	-0.1	0.1	yes
Sodium	mg/L	0.0649477	-0.4	0.4	yes
Potassium	mg/L	0.024503	-0.4	0.4	yes
Iron	mg/L	0.00335118	-0.01	0.01	yes
Manganese	mg/L	0.000111042	-0.004	0.004	yes
Chloride	mg/L	0.15	-0.4	0.4	yes
Date Acquired: May 26, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2140	1847.4	2256.0	yes
Date Acquired: May 26, 2025					
Electrical Conductivity	dS/m	32.9	27.200	36.800	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	9.90	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes
Nitrite - N	mg/L	9.61	9.010	10.990	yes
Nitrate and Nitrite - N	mg/L	19.6	19.10	20.90	yes
pH		9.18	8.90	9.44	yes
Temp. of observed pH	°C	20.1	15.5	24.5	yes
Electrical Conductivity	dS/m	2.77	2.631	2.829	yes
P-Alkalinity	mg/L	519	442	584	yes
T-Alkalinity	mg/L	997	958	1059	yes
Calcium	mg/L	242	235.3	262.9	yes
Magnesium	mg/L	97.6	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	241	238.3	262.3	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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140799 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Iron	mg/L	9.47	8.89	10.69	yes
Manganese	mg/L	2.39	2.200	2.680	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	4.80	4.58	5.24	yes
Nitrate - N	mg/L	4.71	4.37	5.33	yes
Nitrite - N	mg/L	4.64	4.370	5.330	yes
Nitrate and Nitrite - N	mg/L	9.35	8.80	10.60	yes
pH		6.87	6.75	7.05	yes
Temp. of observed pH	°C	20.3	15.5	24.5	yes
Electrical Conductivity	dS/m	0.076	0.069	0.085	yes
P-Alkalinity	mg/L	52	28	72	yes
T-Alkalinity	mg/L	127	114	140	yes
Calcium	mg/L	51.2	44.9	56.9	yes
Magnesium	mg/L	20.4	17.9	22.0	yes
Sodium	mg/L	51.9	47.1	53.4	yes
Potassium	mg/L	50.3	45.8	55.8	yes
Iron	mg/L	1.98	1.89	2.11	yes
Manganese	mg/L	0.496	0.464	0.536	yes
Chloride	mg/L	83.5	74.9	86.9	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	0.50	0.45	0.57	yes
Nitrate - N	mg/L	0.51	0.42	0.57	yes
Nitrite - N	mg/L	0.496	0.455	0.557	yes
Nitrate and Nitrite - N	mg/L	1.01	0.85	1.15	yes
Calcium	mg/L	5.1	4.7	5.4	yes
Magnesium	mg/L	2.1	1.9	2.2	yes
Sodium	mg/L	5.2	4.7	5.7	yes
Potassium	mg/L	4.8	4.6	5.6	yes
Iron	mg/L	0.19	0.18	0.22	yes
Manganese	mg/L	0.048	0.046	0.057	yes
Chloride	mg/L	15.2	13.3	16.5	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Fluoride	mg/L	0.09	0.08	10	0.05	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
pH		7.56	7.53	0	0.10	yes
Electrical Conductivity	dS/m	0.944	0.942	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	583	583	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	478	478	10	5	yes
Calcium	mg/L	86.8	87.6	10	0.6	yes

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



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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M P.O.: 20020 Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140799 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Magnesium	mg/L	26.7	26.8	10	0.7	yes
Sodium	mg/L	77.9	79.0	10	1.2	yes
Potassium	mg/L	5.2	5.3	10	1.2	yes
Iron	mg/L	0.03	0.03	10	0.05	yes
Manganese	mg/L	0.071	0.072	10	0.010	yes
Chloride	mg/L	0.7	0.7	10	0.5	yes
Date Acquired: May 26, 2025						

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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: T5S 2W3	Lot ID: 1816292
Attn: Jennifer Catt	LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Control Number:
Sampled By: Ben Gilham	P.O.: 20020	Date Received: May 23, 2025
Company: HCL	Proj. Acct. code:	Date Reported: May 28, 2025
		Report Number: 3140799
		Report Type: Final Report

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	May 26, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	May 26, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	May 26, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	May 26, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	May 27, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	May 26, 2025	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	May 26, 2025	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	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	May 26, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	May 27, 2025	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, August 2024
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:

- Sample 1816292-11; 9956340: Sample received at 11.6 °C

Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater	Control Number:	
	Edmonton, AB, Canada		Monitoring	Date Received:	May 23, 2025
	T5S 2W3	Project Location:		Date Reported:	May 28, 2025
Attn:	Jennifer Catt	LSD:	Tp 054, R 26 to 28, W4M	Report Number:	3140799
Sampled By:	Ben Gilham		and Tp 054, R 01, W5M	Report Type:	Final Report
Company:	HCL	P.O.:	20020		
		Proj. Acct. code:			

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.

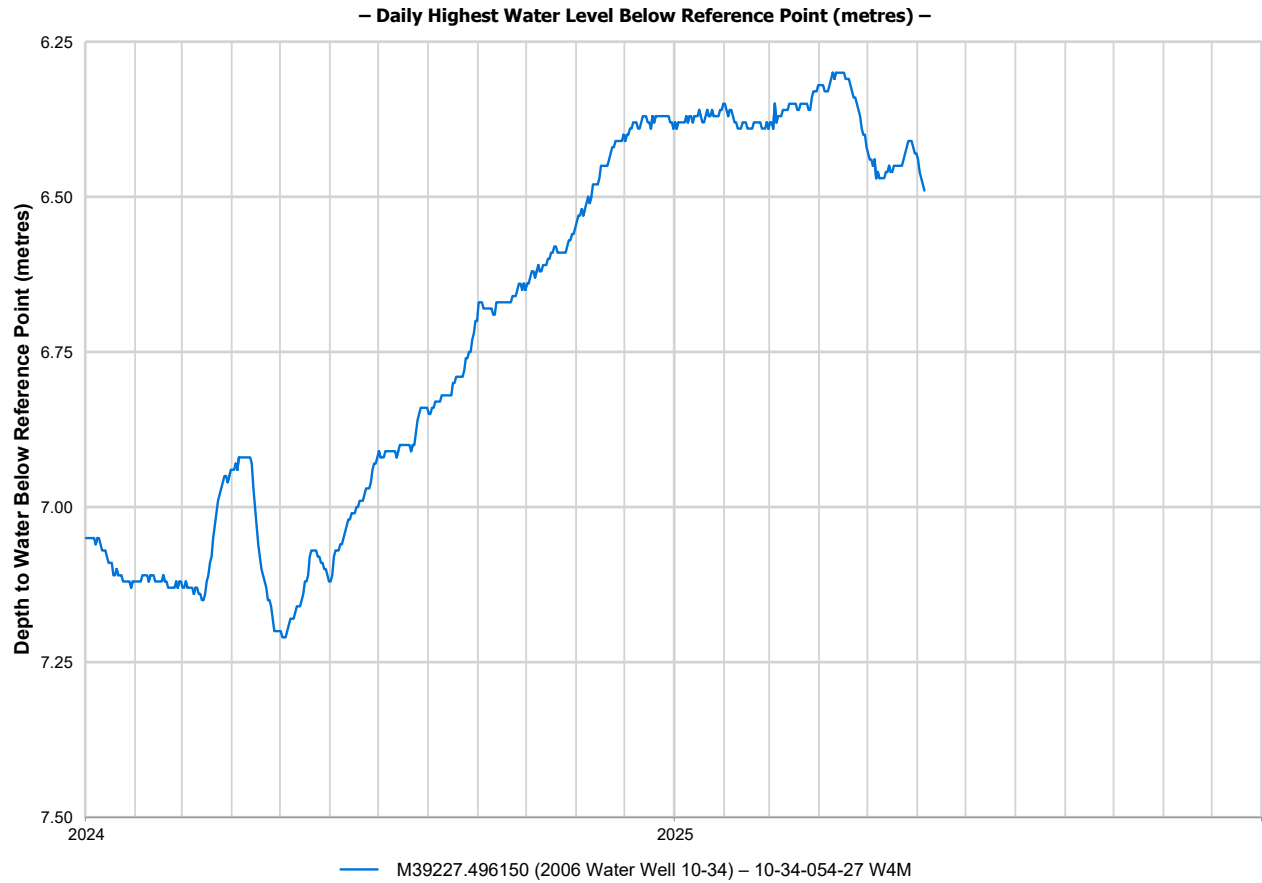
Please direct any inquiries regarding this report to our Client Services group.

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
2024 - 2025 Hydrograph



2013 Water Well 01-29: QEA Pit

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 ***

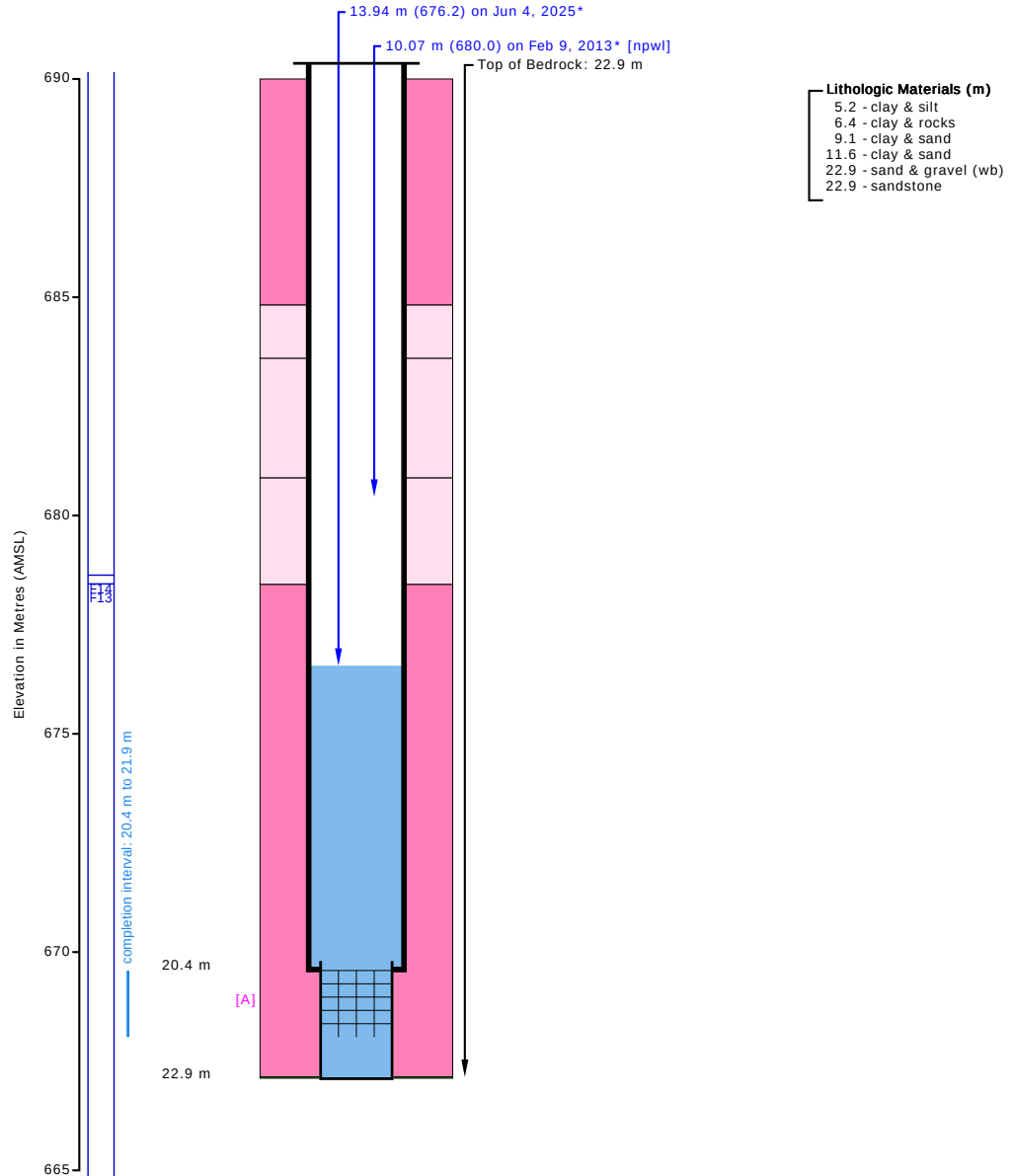
(TGWC determined value)*

Earliest Water Level (m): **10.07 – February 9, 2013 @ 11:00**

Most Recent Water Level (m): **13.94 – June 4, 2025 @ 23:00**

GIC ID: **1495598**

2013 Water Well 01-29: QEA Pit Water Well Diagram

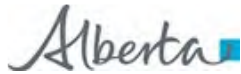


Lithology Legend			Geologic Unit Legend (Top) - Regional Analysis	
Surficial		Unsorted		F14 - Middle Horseshoe Canyon Formation
		Fine Grained		
		Coarse Grained		
Bedrock		Fine Grained		F13 - Lower Horseshoe Canyon Formation
		Coarse Grained		
		Other		

Summary	
TGWC ID: M41313.498215	
Well Name: 2013 Water Well 01-29: QEA Pit	
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): 13.94 m (676.2 m AMSL) on Jun 4, 2025 @ 23:00 - 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: July 17, 2025 @ 09:30 --- <https://www.hcl.ca>

**2013 Water Well 01-29: QEA Pit
AEPA - Water Well Drilling Report**



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		
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 : _____ cm		
Wall Thickness :	0.953 cm	Wall Thickness : _____ cm		
Bottom at :	20.42 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				
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

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	
[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		
m from					Hand held autonomous GPS 20-30m					How Elevation Obtained		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.	Yes
	Date approval holder signed

**2013 Water Well 01-29: QEA Pit
Chemical Analysis Results (May 28, 2025)**



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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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M 20020 P.O.: Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140789 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Reference Number	1816292-1
Sample Date	May 08, 2025
Sample Time	08:55
Sample Location	M41313.498215
Sample Description	2013 WW 01-29 / 11.6 °C
Sample Matrix	Water

Analyte	Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Dissolved					
Silicon	Dissolved	mg/L	7.87	0.05	
Sulfur	Dissolved	mg/L	31.0	0.3	
Mercury	Dissolved	mg/L	<0.000005	0.000005	Below MAC
Aluminum	Dissolved	mg/L	<0.002	0.002	0.1 OG, 2.9 MAC
Antimony	Dissolved	mg/L	<0.0002	0.0002	0.006
Arsenic	Dissolved	mg/L	0.0003	0.0002	0.010
Barium	Dissolved	mg/L	0.051	0.001	2.0
Beryllium	Dissolved	mg/L	<0.0001	0.0001	
Bismuth	Dissolved	mg/L	<0.0005	0.0005	
Boron	Dissolved	mg/L	0.116	0.002	5
Cadmium	Dissolved	mg/L	<0.00001	0.00001	0.007
Chromium	Dissolved	mg/L	<0.0005	0.0005	0.05
Cobalt	Dissolved	mg/L	0.0005	0.0001	
Copper	Dissolved	mg/L	0.0024	0.0002	1 AO, 2 MAC
Lead	Dissolved	mg/L	<0.0001	0.0001	0.005
Lithium	Dissolved	mg/L	0.074	0.001	
Molybdenum	Dissolved	mg/L	<0.001	0.001	
Nickel	Dissolved	mg/L	0.0011	0.0005	
Selenium	Dissolved	mg/L	<0.0002	0.0002	0.05
Silver	Dissolved	mg/L	<0.00001	0.00001	
Strontium	Dissolved	mg/L	1.01	0.001	7.0
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	0.0045	0.0005	0.02
Vanadium	Dissolved	mg/L	<0.0001	0.0001	
Zinc	Dissolved	mg/L	0.009	0.001	5.0
Subsample			Field Filtered		
Physical and Aggregate Properties					
Colour	Apparent, Potable	Colour units	5	5	
Turbidity		NTU	0.5	0.1	
Routine Water					
pH			7.75	1	7.0-10.5
Temp. of observed pH		°C	21.6		Within Range
Electrical Conductivity	at 25 °C	µS/cm	978	1	
Calcium	Dissolved	mg/L	132	0.2	
Magnesium	Dissolved	mg/L	30.2	0.2	

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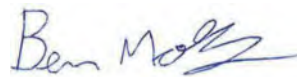
Analytical Report

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: LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M 20020 P.O.: Proj. Acct. code:	Lot ID: 1816292 Control Number: Date Received: May 23, 2025 Date Reported: May 28, 2025 Report Number: 3140789 Report Type: Final Report
Attn: Jennifer Catt Sampled By: Ben Gilham Company: HCL		

Reference Number	1816292-1
Sample Date	May 08, 2025
Sample Time	08:55
Sample Location	M41313.498215
Sample Description	2013 WW 01-29 / 11.6 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Sodium	Dissolved	mg/L	47.6	0.4	200	Below AO
Potassium	Dissolved	mg/L	3.4	0.4		
Iron	Dissolved	mg/L	0.30	0.01	0.1	Above AO
Manganese	Dissolved	mg/L	0.672	0.005	0.02 AO, 0.12 MAC	Above MAC
Chloride	Dissolved	mg/L	7.6	0.4	250	Below AO
Fluoride		mg/L	0.15	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.03	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1.0	Below MAC
Nitrate and Nitrite - N		mg/L	0.03	0.01		
Sulfate (SO4)	Dissolved	mg/L	92.9	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	558			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	458	5		
Total Dissolved Solids	Calculated	mg/L	589	1	500	Above AO
Hardness	Dissolved as CaCO3	mg/L	455			
Ionic Balance	Dissolved	%	100			

Approved by:



Benjamin Morris, B.Sc
Operations 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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Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.00704748	-0.04	0.05	yes
Sulfur	mg/L	0.107846	-0.3	0.2	yes
Aluminum	µg/L	-0.142723	-2	2	yes
Antimony	µg/L	-0.00198253	-0.2	0.2	yes
Arsenic	µg/L	-0.00520747	-0.2	0.2	yes
Barium	µg/L	0.0155545	-1	1	yes
Beryllium	µg/L	0	-0.1	0.1	yes
Boron	µg/L	0.490366	-2	2	yes
Cadmium	µg/L	0.00106883	-0.01	0.01	yes
Chromium	µg/L	-0.0304354	-0.5	0.5	yes
Cobalt	µg/L	-0.000332921	-0.1	0.1	yes
Copper	µg/L	0.0100485	-0.2	0.2	yes
Lead	µg/L	0.00240083	-0.1	0.1	yes
Lithium	µg/L	-0.00113161	-1	1	yes
Molybdenum	µg/L	0.0194221	-1	1	yes
Nickel	µg/L	0.0142204	-0.5	0.5	yes
Selenium	µg/L	0.00150023	-0.2	0.2	yes
Silver	µg/L	0.00050935	-0.01	0.01	yes
Strontium	µg/L	0.0646959	-1	1	yes
Thallium	µg/L	0.00145131	-0.50	0.50	yes
Tin	µg/L	-0.0724984	-1	1	yes
Titanium	µg/L	-0.0940343	-0.5	0.5	yes
Uranium	µg/L	0.00233484	-0.5	0.5	yes
Vanadium	µg/L	-0.00529231	-0.1	0.1	yes
Zinc	µg/L	0.13059	-1	1	yes
Mercury	µg/L	-0.001039	-0.051000	0.051000	yes

Date Acquired: May 26, 2025

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	997	902	1058	yes
Antimony	µg/L	40.5	36.4	44.2	yes
Arsenic	µg/L	39.9	37.7	42.5	yes
Barium	µg/L	196	181	211	yes
Beryllium	µg/L	19.9	18.6	21.6	yes
Bismuth	µg/L	97.1	90.6	106.8	yes
Boron	µg/L	389	351	427	yes
Cadmium	µg/L	2.16	1.87	2.23	yes
Chromium	µg/L	100	90.8	108.8	yes
Cobalt	µg/L	20.0	18.5	21.5	yes
Copper	µg/L	197	185.4	215.4	yes
Lead	µg/L	20.2	18.3	21.3	yes
Lithium	µg/L	197	178	214	yes
Molybdenum	µg/L	198	178	219	yes
Nickel	µg/L	99.9	93.3	105.9	yes
Selenium	µg/L	39.9	36.9	42.9	yes

Quality Control

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Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silver	µg/L	20.1	18.29	22.31	yes
Strontium	µg/L	200	183	219	yes
Thallium	µg/L	9.86	8.90	10.70	yes
Tin	µg/L	201	187	217	yes
Titanium	µg/L	101	91.0	109.0	yes
Uranium	µg/L	102	92.2	110.2	yes
Vanadium	µg/L	20.0	18.3	21.3	yes
Zinc	µg/L	198	184	217	yes
Date Acquired: May 26, 2025					
Mercury	mg/L	0.000100	0.000070	0.000130	yes
Date Acquired: May 26, 2025					
Aluminum	µg/L	51	46	56	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	2.0	1.8	2.2	yes
Barium	µg/L	10	9	11	yes
Beryllium	µg/L	1.0	0.9	1.1	yes
Bismuth	µg/L	5.0	4.4	5.6	yes
Boron	µg/L	20	18	22	yes
Cadmium	µg/L	0.10	0.09	0.12	yes
Chromium	µg/L	5.1	4.6	5.4	yes
Cobalt	µg/L	1.0	0.9	1.1	yes
Copper	µg/L	10.1	9.1	10.9	yes
Lead	µg/L	1.0	0.9	1.1	yes
Lithium	µg/L	10	9	11	yes
Molybdenum	µg/L	10	9	10	yes
Nickel	µg/L	5.2	4.7	5.5	yes
Selenium	µg/L	2.0	1.8	2.2	yes
Silver	µg/L	1.02	0.92	1.12	yes
Strontium	µg/L	10	9	11	yes
Thallium	µg/L	0.49	0.45	0.55	yes
Tin	µg/L	10	9	11	yes
Titanium	µg/L	5.0	4.4	5.7	yes
Uranium	µg/L	5.2	4.5	5.6	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10	9	11	yes
Mercury	mg/L	0.000020	0.000006	0.000036	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	9.62	9.51	10.89	yes
Sulfur	mg/L	150	141.6	156.6	yes
Date Acquired: May 26, 2025					
Silicon	mg/L	2.03	1.88	2.24	yes
Sulfur	mg/L	10.2	9.1	10.6	yes
Date Acquired: May 26, 2025					

Quality Control

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Metals Dissolved - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	0.20	0.18	0.23	yes
Sulfur	mg/L	2.9	2.7	3.1	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	3.21	3.26	10	0.01	yes
Sulfur	mg/L	38.2	39.0	10	0.1	yes
Aluminum	µg/L	<2	<2	10	11	yes
Antimony	µg/L	<0.2	<0.2	10	0.4	yes
Arsenic	µg/L	<0.2	<0.2	10	0.4	yes
Barium	µg/L	38	38	10	2	yes
Beryllium	µg/L	<0.1	<0.1	10	0.2	yes
Bismuth	µg/L	<0.5	<0.5	10	1.1	yes
Boron	µg/L	163	168	10	4	yes
Cadmium	µg/L	<0.01	<0.01	10	0.02	yes
Chromium	µg/L	<0.5	<0.5	10	1.1	yes
Cobalt	µg/L	<0.1	<0.1	10	0.2	yes
Copper	µg/L	<0.2	<0.2	10	2.2	yes
Lead	µg/L	<0.1	<0.1	10	0.2	yes
Lithium	µg/L	16	17	10	2	yes
Molybdenum	µg/L	3	2	10	2	yes
Nickel	µg/L	<0.5	<0.5	10	1.1	yes
Selenium	µg/L	<0.2	<0.2	10	0.4	yes
Silver	µg/L	<0.01	<0.01	10	0.22	yes
Strontium	µg/L	57	58	10	2	yes
Thallium	µg/L	<0.05	<0.05	10	0.11	yes
Tin	µg/L	<1	<1	10	2	yes
Titanium	µg/L	<0.5	<0.5	10	1.1	yes
Uranium	µg/L	<0.5	<0.5	10	1.1	yes
Vanadium	µg/L	0.2	0.1	10	0.2	yes
Zinc	µg/L	<1	2	10	2	yes
Mercury	mg/L	<0.000005	<0.000005	10	0.000030	yes
Date Acquired: May 26, 2025						

Physical and Aggregate Properties

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	0.099	-0.1	0.1	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	0.114	0.0	0.1	yes
Date Acquired: May 27, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	1930	1881.4	2091.4	yes
Date Acquired: May 27, 2025					
Turbidity	NTU	4550	4020.0	5436.0	yes
Date Acquired: May 27, 2025					

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Quality Control

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Physical and Aggregate Properties - Continued

continued

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Colour	Colour units	10	10	10		yes
Turbidity	NTU	144	132.1	162.1		yes
Date Acquired:	May 27, 2025					
Turbidity	NTU	14.3	12.6	15.6		yes
Date Acquired:	May 27, 2025					
Turbidity	NTU	1.6	1.0	2.2		yes
Date Acquired:	May 27, 2025					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity	NTU	3.1	2.9	10	0.2	yes
Date Acquired:	May 27, 2025					

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Fluoride	mg/L	0	-0.05	0.05	yes
Nitrate - N	mg/L	0.00152937	-0.01	0.01	yes
Nitrite - N	mg/L	0	-0.005	0.005	yes
Calcium	mg/L	0.0798772	-0.2	0.2	yes
Magnesium	mg/L	0.0424654	-0.1	0.1	yes
Sodium	mg/L	0.144685	-0.4	0.4	yes
Potassium	mg/L	0.194533	-0.4	0.4	yes
Iron	mg/L	0.00603323	-0.01	0.01	yes
Manganese	mg/L	0.000767739	-0.004	0.004	yes
Chloride	mg/L	0.16	-0.4	0.4	yes
Date Acquired: May 26, 2025					
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2160	1847.4	2256.0	yes
Date Acquired: May 26, 2025					
Electrical Conductivity	dS/m	32.7	27.200	36.800	yes
Date Acquired: May 26, 2025					
pH		9.20	8.90	9.44	yes
Temp. of observed pH	°C	21.2	15.5	24.5	yes
Electrical Conductivity	dS/m	2.79	2.631	2.829	yes
P-Alkalinity	mg/L	516	442	584	yes
T-Alkalinity	mg/L	1000	958	1059	yes
Fluoride	mg/L	9.88	9.39	10.59	yes
Nitrate - N	mg/L	10.0	9.03	11.13	yes
Nitrite - N	mg/L	9.63	9.010	10.990	yes
Nitrate and Nitrite - N	mg/L	19.6	19.10	20.90	yes
Calcium	mg/L	242	235.3	262.9	yes
Magnesium	mg/L	97.6	92.6	104.6	yes
Sodium	mg/L	250	236.2	263.8	yes
Potassium	mg/L	241	238.3	262.3	yes

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Quality Control

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Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Iron	mg/L	9.47	8.89	10.69	yes
Manganese	mg/L	2.39	2.200	2.680	yes
Date Acquired: May 26, 2025					
pH		6.83	6.75	7.05	yes
Temp. of observed pH	°C	21.4	15.5	24.5	yes
Electrical Conductivity	dS/m	0.075	0.069	0.085	yes
P-Alkalinity	mg/L	47	28	72	yes
T-Alkalinity	mg/L	130	114	140	yes
Fluoride	mg/L	4.98	4.58	5.24	yes
Nitrate - N	mg/L	4.72	4.37	5.33	yes
Nitrite - N	mg/L	4.66	4.370	5.330	yes
Nitrate and Nitrite - N	mg/L	9.38	8.80	10.60	yes
Calcium	mg/L	51.2	44.9	56.9	yes
Magnesium	mg/L	20.4	17.9	22.0	yes
Sodium	mg/L	51.9	47.1	53.4	yes
Potassium	mg/L	50.3	45.8	55.8	yes
Iron	mg/L	1.98	1.89	2.11	yes
Manganese	mg/L	0.496	0.464	0.536	yes
Chloride	mg/L	83.9	74.9	86.9	yes
Date Acquired: May 26, 2025					
Fluoride	mg/L	0.50	0.45	0.57	yes
Nitrate - N	mg/L	0.51	0.42	0.57	yes
Nitrite - N	mg/L	0.498	0.455	0.557	yes
Nitrate and Nitrite - N	mg/L	1.01	0.85	1.15	yes
Calcium	mg/L	5.1	4.7	5.4	yes
Magnesium	mg/L	2.1	1.9	2.2	yes
Sodium	mg/L	5.2	4.7	5.7	yes
Potassium	mg/L	4.8	4.6	5.6	yes
Iron	mg/L	0.19	0.18	0.22	yes
Manganese	mg/L	0.048	0.046	0.057	yes
Chloride	mg/L	15.3	13.3	16.5	yes
Date Acquired: May 26, 2025					

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
pH		7.29	7.26	0	0.10	yes
Electrical Conductivity	dS/m	1.09	1.08	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	602	599	10	6	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	494	491	10	5	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.010	yes
Fluoride	mg/L	0.09	0.08	10	0.05	yes
Calcium	mg/L	86.8	87.6	10	0.6	yes

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Quality Control

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Routine Water - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Magnesium	mg/L	26.7	26.8	10	0.7	yes
Sodium	mg/L	77.9	79.0	10	1.2	yes
Potassium	mg/L	5.2	5.3	10	1.2	yes
Iron	mg/L	0.03	0.03	10	0.05	yes
Manganese	mg/L	0.071	0.072	10	0.010	yes
Chloride	mg/L	6070	6050	10	0.5	yes
Date Acquired: May 26, 2025						

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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: T5S 2W3	Lot ID: 1816292
Attn: Jennifer Catt	LSD: Tp 054, R 26 to 28, W4M and Tp 054, R 01, W5M	Control Number:
Sampled By: Ben Gilham	P.O.: 20020	Date Received: May 23, 2025
Company: HCL	Proj. Acct. code:	Date Reported: May 28, 2025
		Report Number: 3140789
		Report Type: Final Report

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	May 26, 2025	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	May 26, 2025	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	May 26, 2025	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	May 26, 2025	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	May 26, 2025	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	May 27, 2025	Element Edmonton - Roper Road
Mercury (Dissolved) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	May 26, 2025	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	May 26, 2025	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	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	Hardness by Calculation, 2340 B	May 26, 2025	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	May 26, 2025	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	May 27, 2025	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, August 2024
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:

- Sample 1816292-1; 9956330: Sample received at 11.6 °C

Methodology and Notes

Bill To:	Hydrogeological Consultants	Project ID:	MR-0224.23	Lot ID:	1816292
	17740 - 118 Avenue NW	Project Name:	2023 Groundwater Monitoring	Control Number:	
	Edmonton, AB, Canada	Project Location:		Date Received:	May 23, 2025
	T5S 2W3	LSD:	Tp 054, R 26 to 28, W4M	Date Reported:	May 28, 2025
Attn:	Jennifer Catt		and Tp 054, R 01, W5M	Report Number:	3140789
Sampled By:	Ben Gilham	P.O.:	20020	Report Type:	Final Report
Company:	HCL	Proj. Acct. code:			

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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**2013 Water Well 01-29: QEA Pit
2024 - 2025 Hydrograph**

