

Real-Time Water Quality Report

Grieg NL Nurseries Ltd Monitoring Well

Annual Deployment:
January 1, 2025, to December 30, 2025



Government of Newfoundland & Labrador
Department of Environment, Conservation &
Climate Change
Water Resources Management Division

Prepared by:

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Grieg Monitoring Well

The Water Resources Management Division (WRMD) in partnership with Grieg NL Nurseries Ltd, maintain a real-time water quality groundwater monitoring station. The station is located near the Marystown YMCA and Track and Field Complex.

Grieg Seafood has two wells: a main production well that provides new water to the facility as needed; and a monitoring/backup well that houses the WRMD monitoring equipment. Both wells are functioning in good condition. In the event of a catastrophic failure of the main well, the monitoring well can serve as a backup.

To ensure the pump installed in the monitoring/backup well is functioning, the pump is operated periodically. Due to this well sharing its aquifer with the main pumping well, variations in the water parameters could be a result of pumping from either well. The water monitoring equipment, a YSI EXO1, is not removed during the pump test and as a result, there may be disruptions to the water quality data for a short period of time. Data can also be disrupted during routine calibration and maintenance of equipment by WRMD.



Figure 1: Location of Real-Time Groundwater Well



Figure 2: Hut Structure for groundwater well



Figure 3: View standing in front of well looking toward main road in Marystown, NL



Figure 4: Well Casing in the hut



Figure 5: View looking into well

Quality Assurance and Quality Control

WRMD staff (Environment, Conservation & Climate Change (ECC)) are responsible for maintenance of the real-time water quality monitoring equipment, as well as recording and managing the water quality data. Grab samples are collected at the beginning of each deployment period to compare against the initial in-situ logged data. The samples are collected from an internal tap located in the station hut. Grab samples complement the real-time data and provide an extra source of water quality data for comparisons when tracking changes over time at the station (Table 1). Combining both types of data can offer a more comprehensive understanding of water quality.

Initial in-situ instrument measurements are recorded shortly after the freshly calibrated instrument is deployed. The limited time for the sonde to reach equilibrium with its surroundings can occasionally lead to variations in values between grab sample results and instrument measurements.

Table 1: Comparison of the In-Situ instrument vs. Grab Sample Results at deployment of new instrument

Date	Parameter	Grab Sample Result	In-Situ Instrument
March 12, 2025	pH (pH units)	8.02	7.81
	Specific Conductivity (µS/cm)	330	413.4
June 17 2025	pH (pH units)	7.99	7.43
	Specific Conductivity (µS/cm)	280	280.4
August 21 2025	pH (pH units)	8.01	7.57
	Specific Conductivity (µS/cm)	320	334.2
November 24 2025	pH (pH units)	8.00	7.54
	Specific Conductivity (µS/cm)	290	301.1

Grieg Monitoring Well Water Quality Parameters

Water Temperature

Between January 1, 2025 and December 30, 2025, the water temperature fluctuated within the range of 7.32°C to 7.69°C, as illustrated in Figure 6. The annual average water temperature was recorded at 7.45°C.

The water temperatures remain consistent throughout the year of data. Due to the depth of the instrument in the well, there is very little influence from air temperatures on the water, therefore there is minimal variance between the minimum and maximum values.

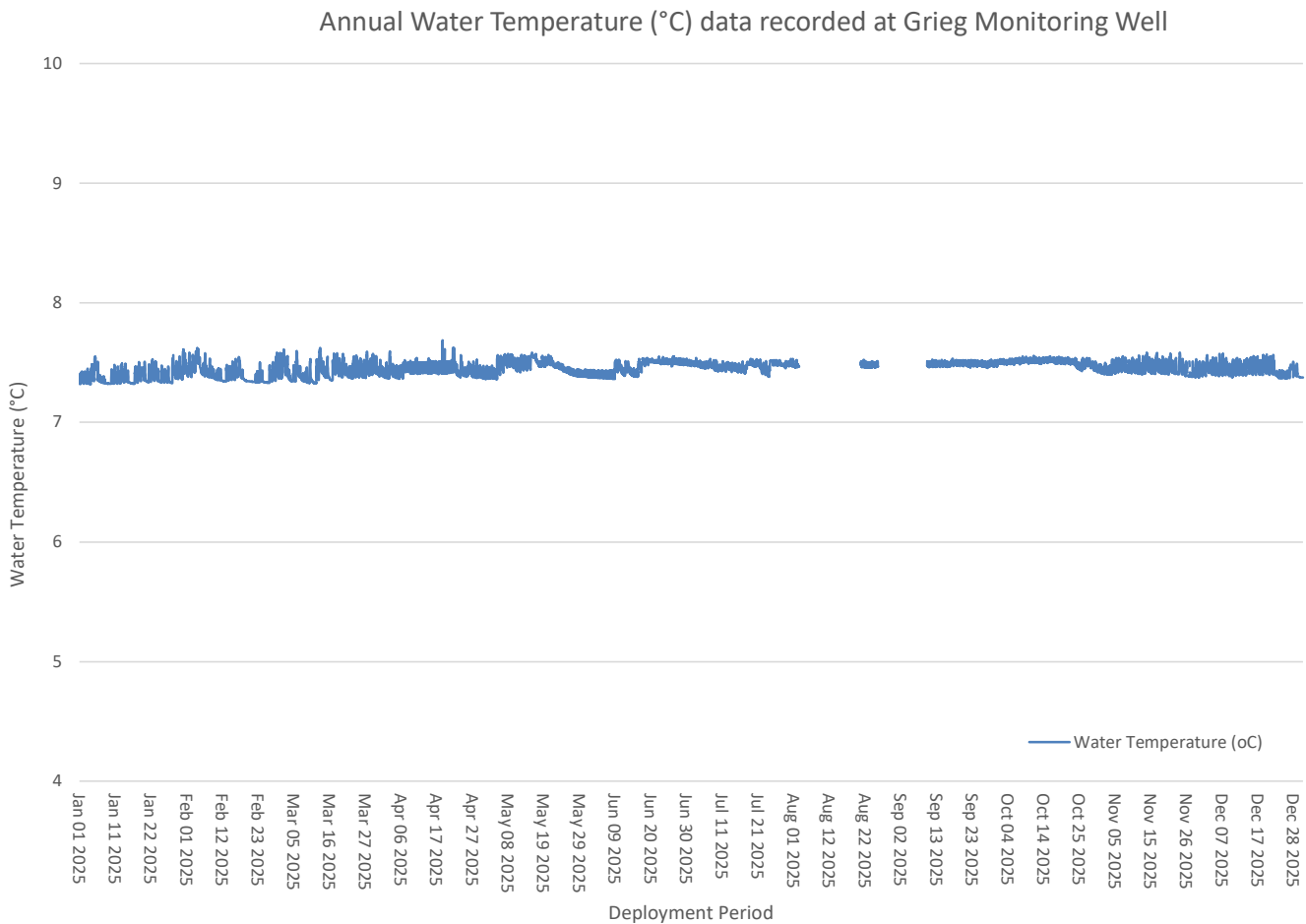


Figure 6: Water temperature (°C) values

pH

Between January 1, 2025, and December 30, 2025, pH values exhibited a range from 7.3 pH units to 8.02 pH units. pH remained reasonably consistent, with an average of 7.69 pH units.

A pH sensor measures the acidity or alkalinity of a water body and is a measure of the concentration of hydrogen ions (H^+) in a solution. Minor pH fluctuations were likely a consequence of aquifer pumping activities. The well's refilling process and subsequent level adjustments led to temporary variations in pH levels, as depicted in Figure 7.

The red points on the graph denote pH values derived from grab samples, offering complementary insights to the in-situ monitoring conducted by the water quality instrument (refer to Table 1). It is anticipated that there may be slight disparities between the pH values obtained from grab samples and the water quality instrument. Variations in the data could be attributed to factors such as delayed analysis of grab samples over several days and the pumping of the well before collecting grab samples, which may disturb the water column.

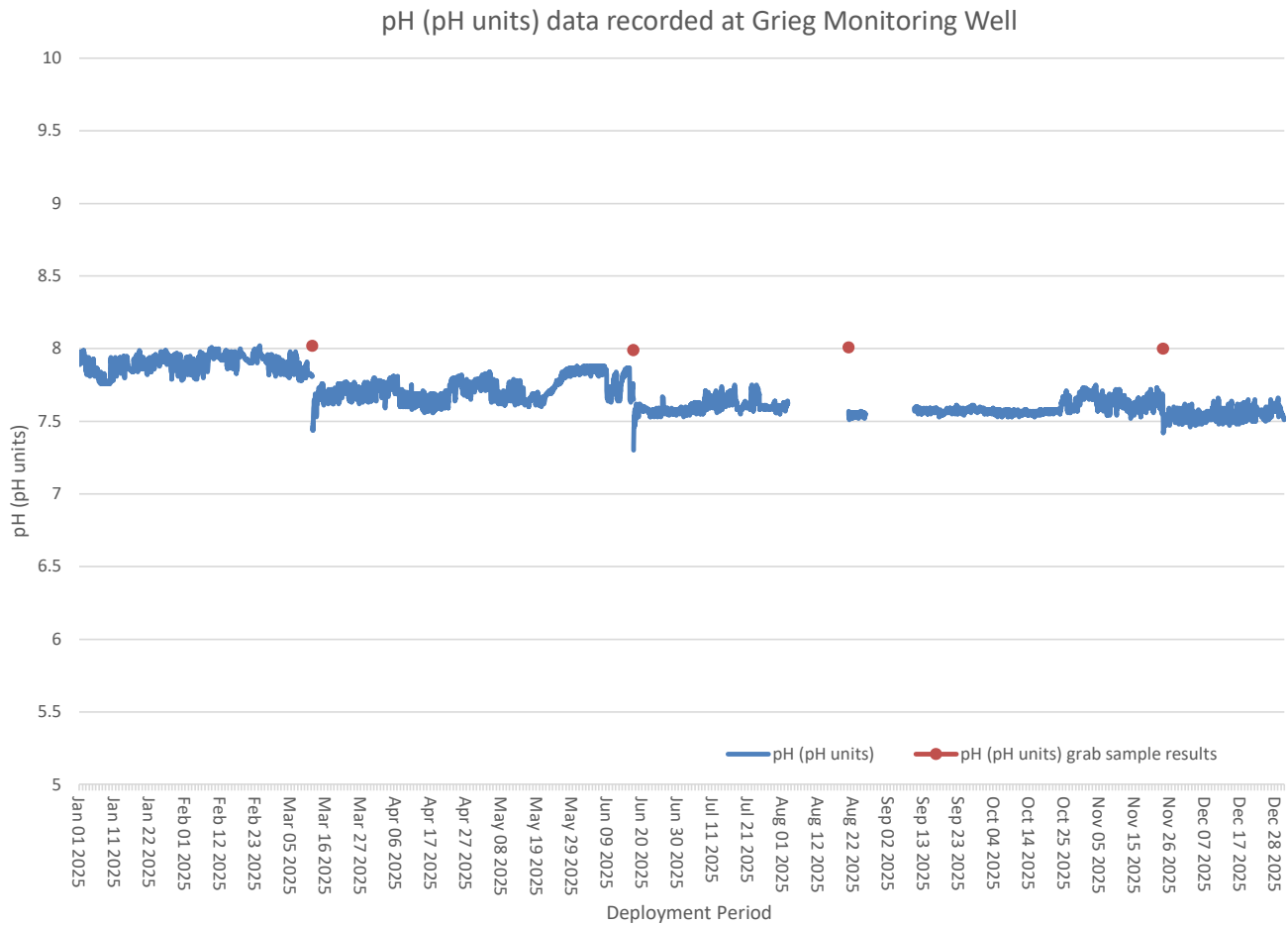


Figure 7: pH (pH units) values

Specific Conductivity & Total Dissolved Solids (TDS)

Throughout the annual deployment season, conductivity levels were within 248.88 $\mu\text{S}/\text{cm}$ and 481.30 $\mu\text{S}/\text{cm}$ (Figure 8), with an average of 303.24 $\mu\text{S}/\text{cm}$. The specific conductivity probe measures the presence of diluted salts and inorganic materials in a water source. In instances where there is minimal or no external influence, the conductivity in the groundwater well remains relatively stable, experiencing minimal fluctuations (Figure 8). Elevated spikes in conductivity are likely attributed to pumping activities and disturbances within the aquifer which can disturb the water column (Figure 9).

The red points on the graph represent the specific conductivity results from the grab samples collected at the beginning of a deployment (Table 1). It is expected that there are minor differences between the in-situ data and the grab sample data. Variations in the data can arise due to factors such as delayed analysis of grab samples spanning several days, as well as the pumping of the well prior to collecting grab samples.

Total Dissolved Solids data is derived from the specific conductivity data. The water quality instrument is programmed to calculate an estimated TDS value from a conductivity value. TDS data will mirror the movement of the specific conductivity data, however the TDS is calculated in g/L (Figure 10). For the deployment year, TDS ranged between 0.16 g/L to 0.31 g/L.

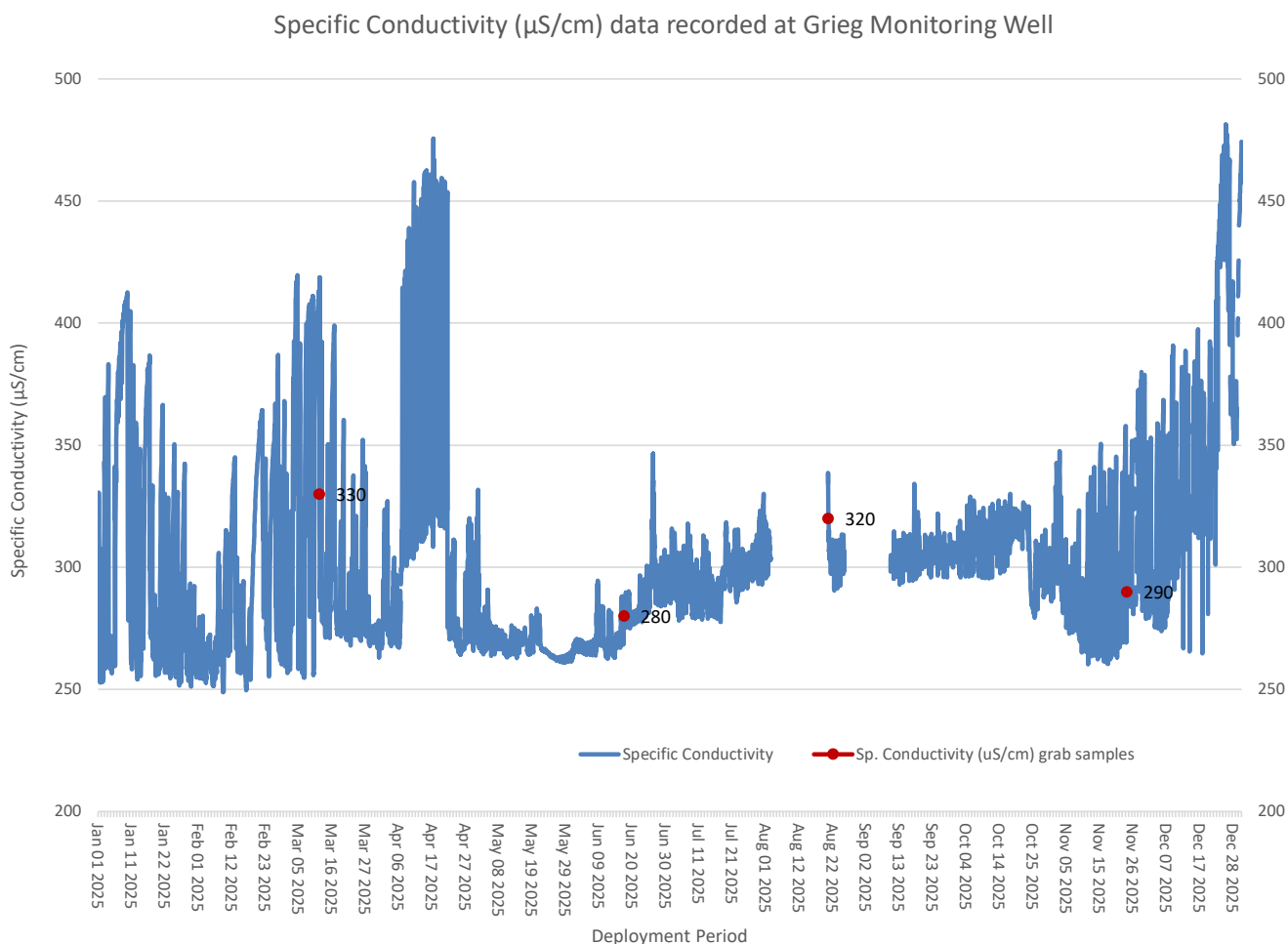


Figure 8: Specific conductivity ($\mu\text{S}/\text{cm}$) values

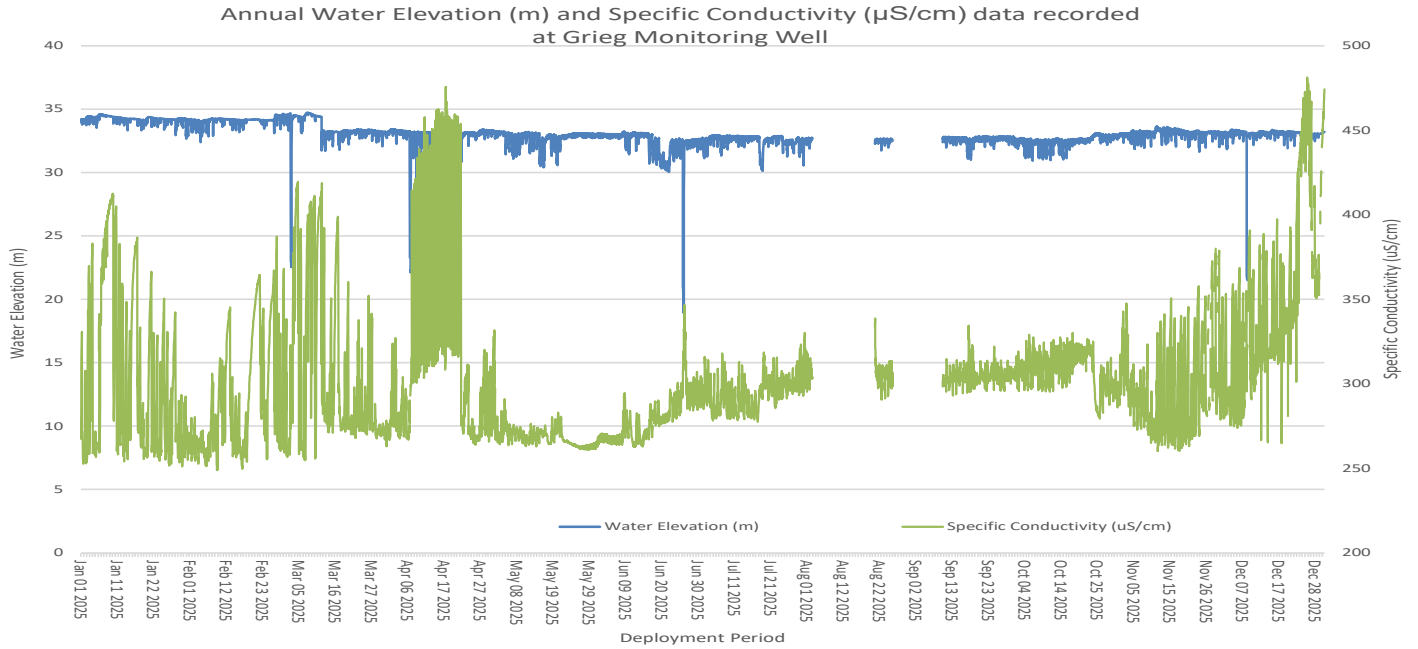


Figure 9: Annual Specific Conductivity & Water Elevation

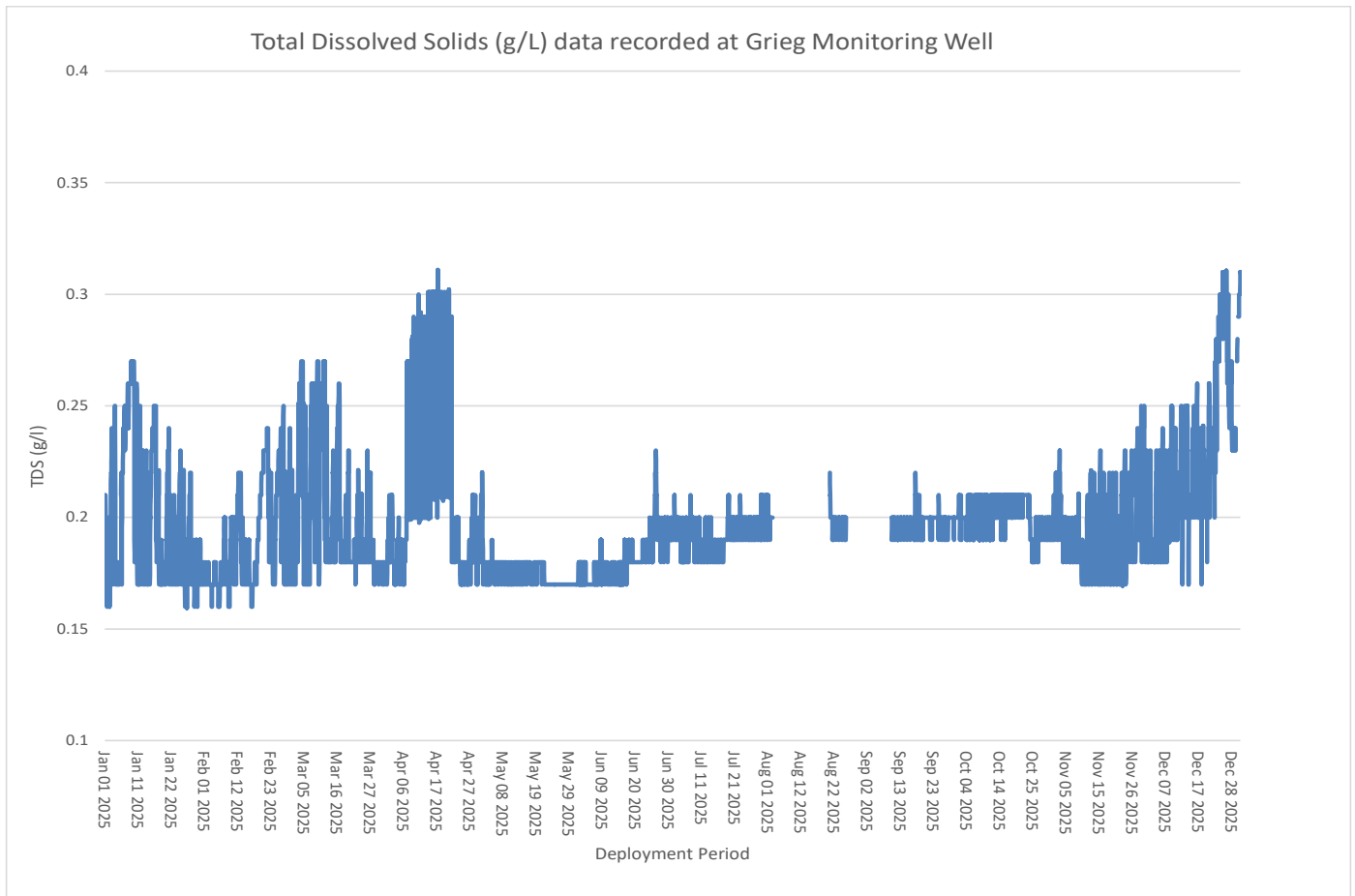


Figure 10: Total Dissolved Solids (TDS)

Oxidation-Reduction Potential (ORP)

ORP levels during the year of deployment ranged within 61.40 mV to 386.20 mV, with an average of 336.32 mV, an increase from the 2024 average of 322.66 mV (Table 2, Appendix I). As expected, due to periodic pumping of the well, fluctuations in ORP levels were observed, but values generally remained within typical ranges over the course of the year. The variations in ORP values throughout the deployment are visually evident in Figure 11, showcasing dips and increases. It's worth noting that ORP can take days to weeks to equilibrate in groundwater, which is why we see the lower values observed at the beginning of each deployment period.

ORP, measuring the oxidizing-reduction potential of groundwater, plays a crucial role in identifying the mobility and persistence of contaminants that could impact water quality. The values can be influenced by local conditions, the presence of specific contaminants, and the geochemical characteristics of the aquifer. Natural aquifer materials may release specific chemicals, leading to concentration changes over time. pH and ORP are inversely related, therefore pH can also play a role in influencing ORP (Figure 12). ORP values are unique to each water body and collecting background data is essential for understanding the significance of changes in the data and their potential implications.

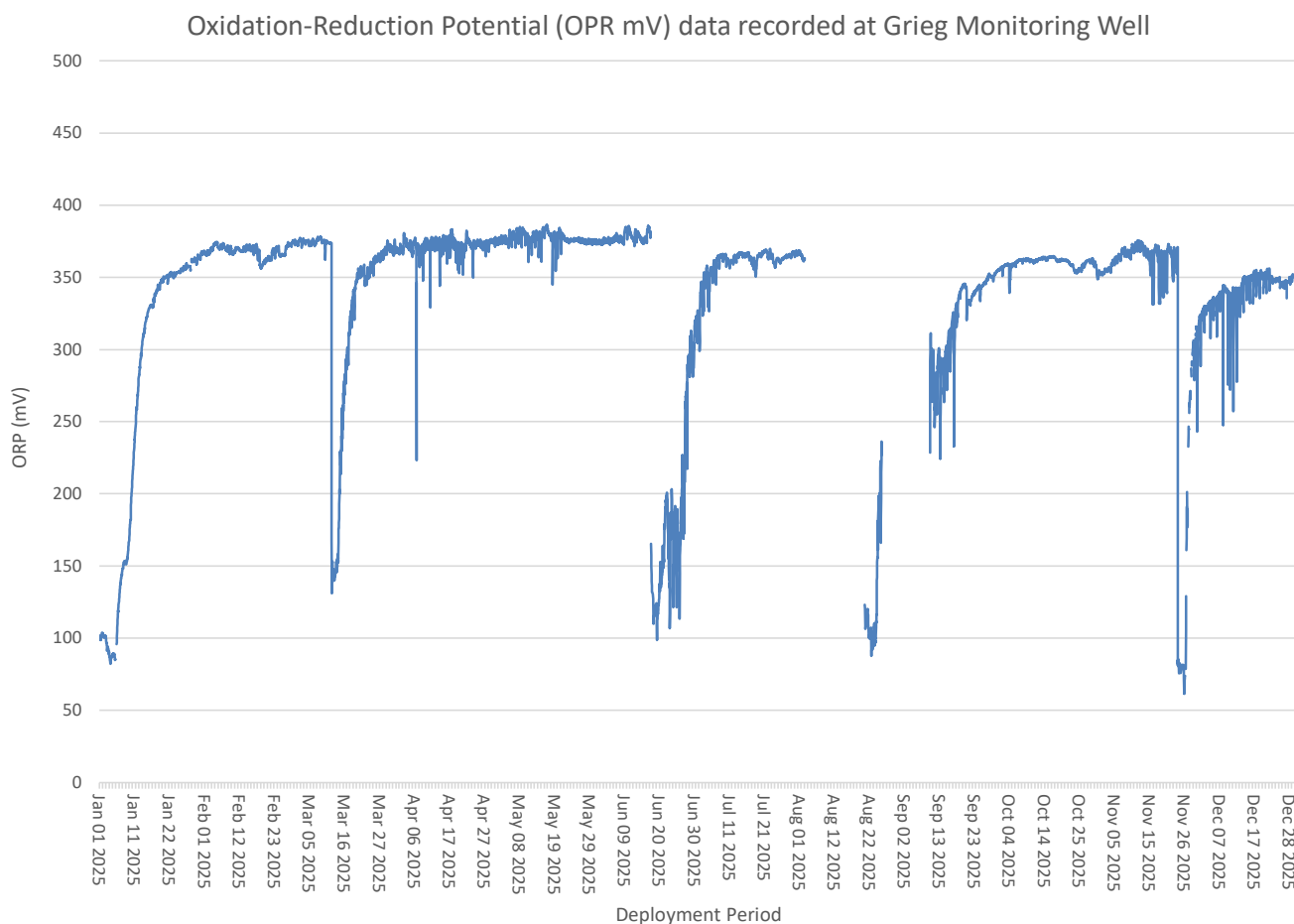


Figure 11: ORP values (mV)

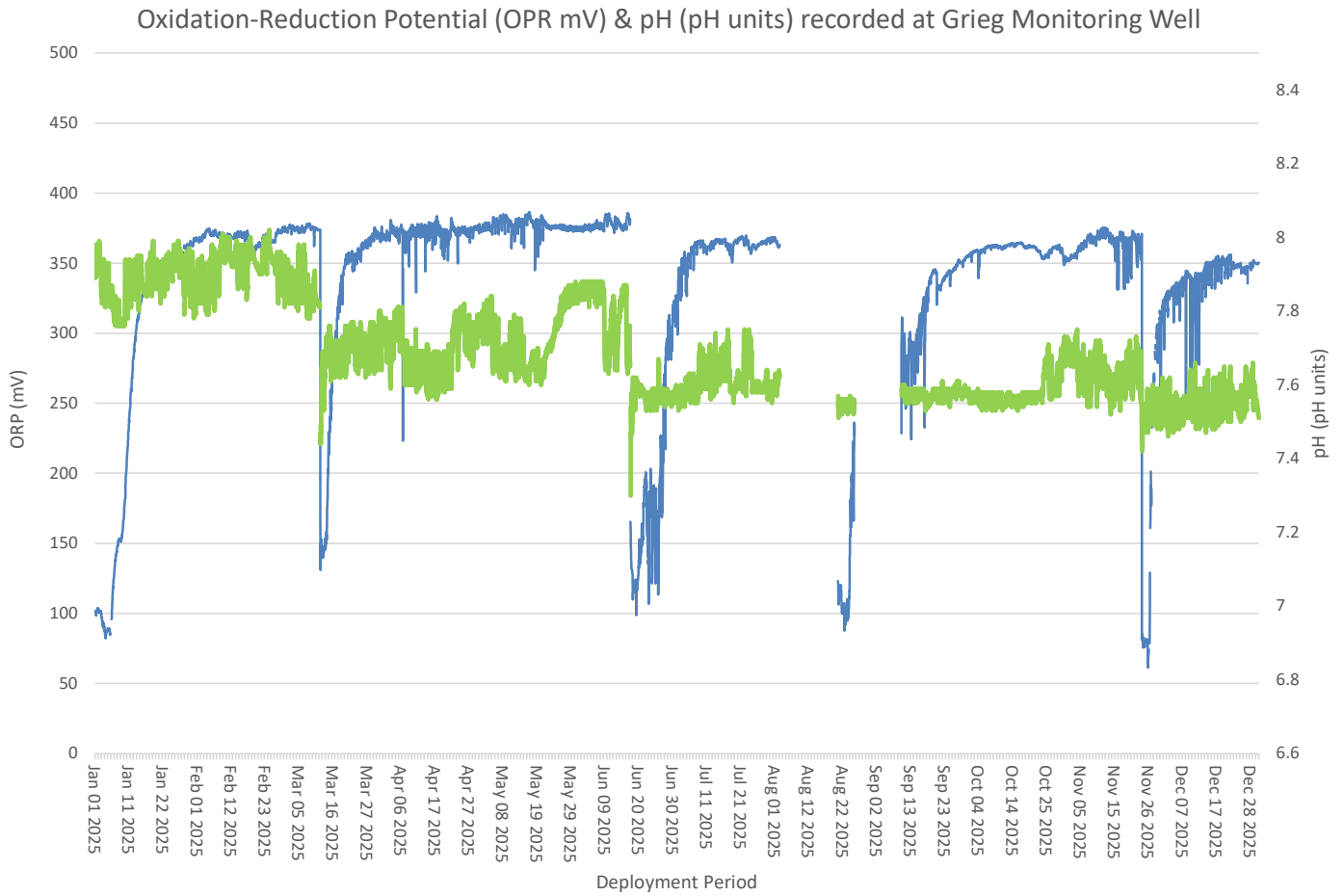


Figure 12: ORP (mV) graphed with pH (pH units) at Grieg Monitoring Well

Water Elevation

Water Elevation monitors the height of the water surface in the well measured to an assumed datum. Water Elevation at the monitoring well, ranged within 19.14 m to 34.81 m throughout the year of deployment, with an annual average of 33.24 m. Generally, the water elevation within this groundwater well remains constant. This well and its aquifer are intermittently accessed through pumping. There will be fluctuations in water elevation during deployment (Figure 13). Despite the larger dips in water elevation, the range of the elevation was reasonably consistent across deployment.

Fluctuations in the water elevation influence the other water parameters covered in this report (Figure 14). Figure 14 displays this relationship.

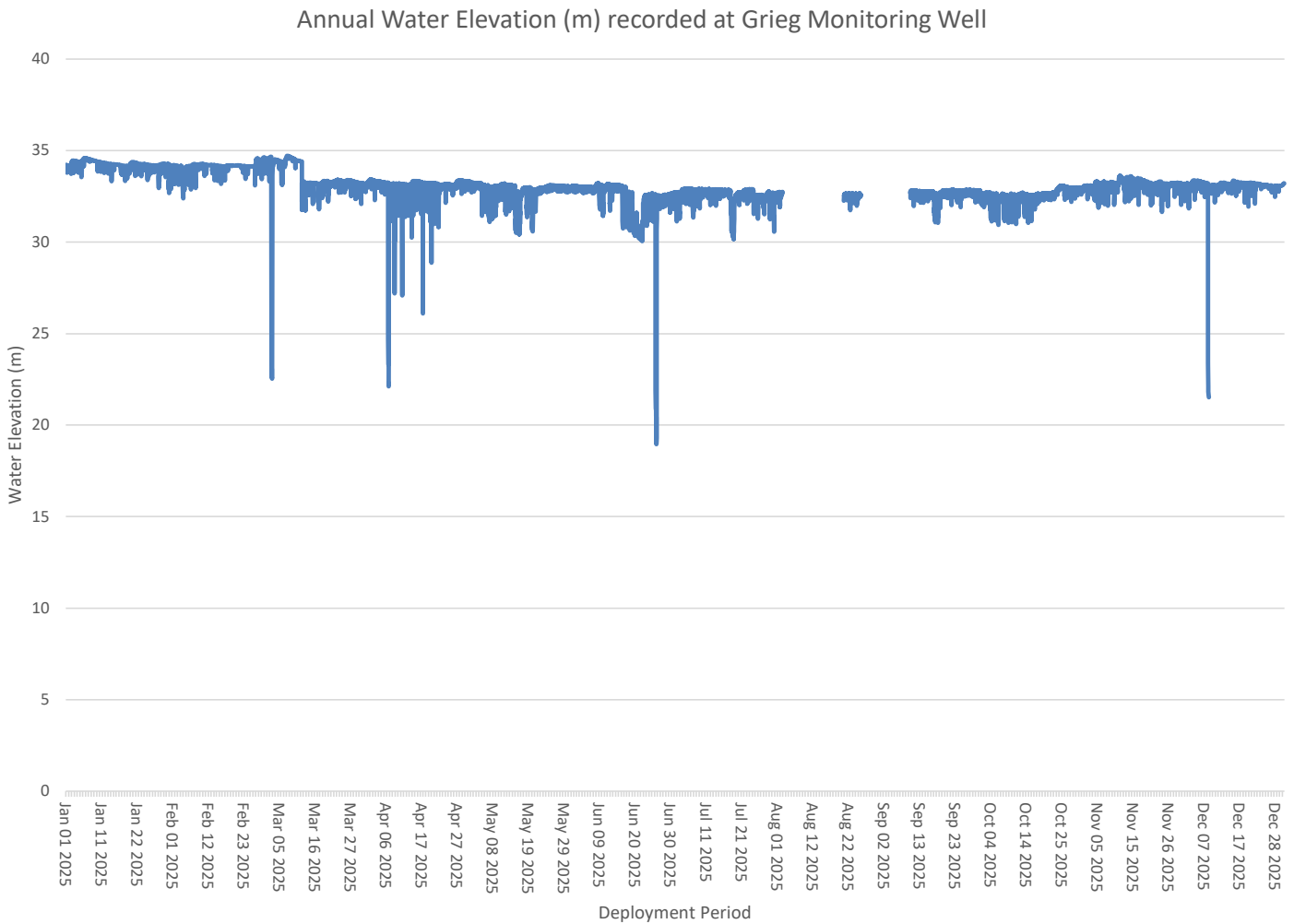


Figure 13: Water Elevation (m)

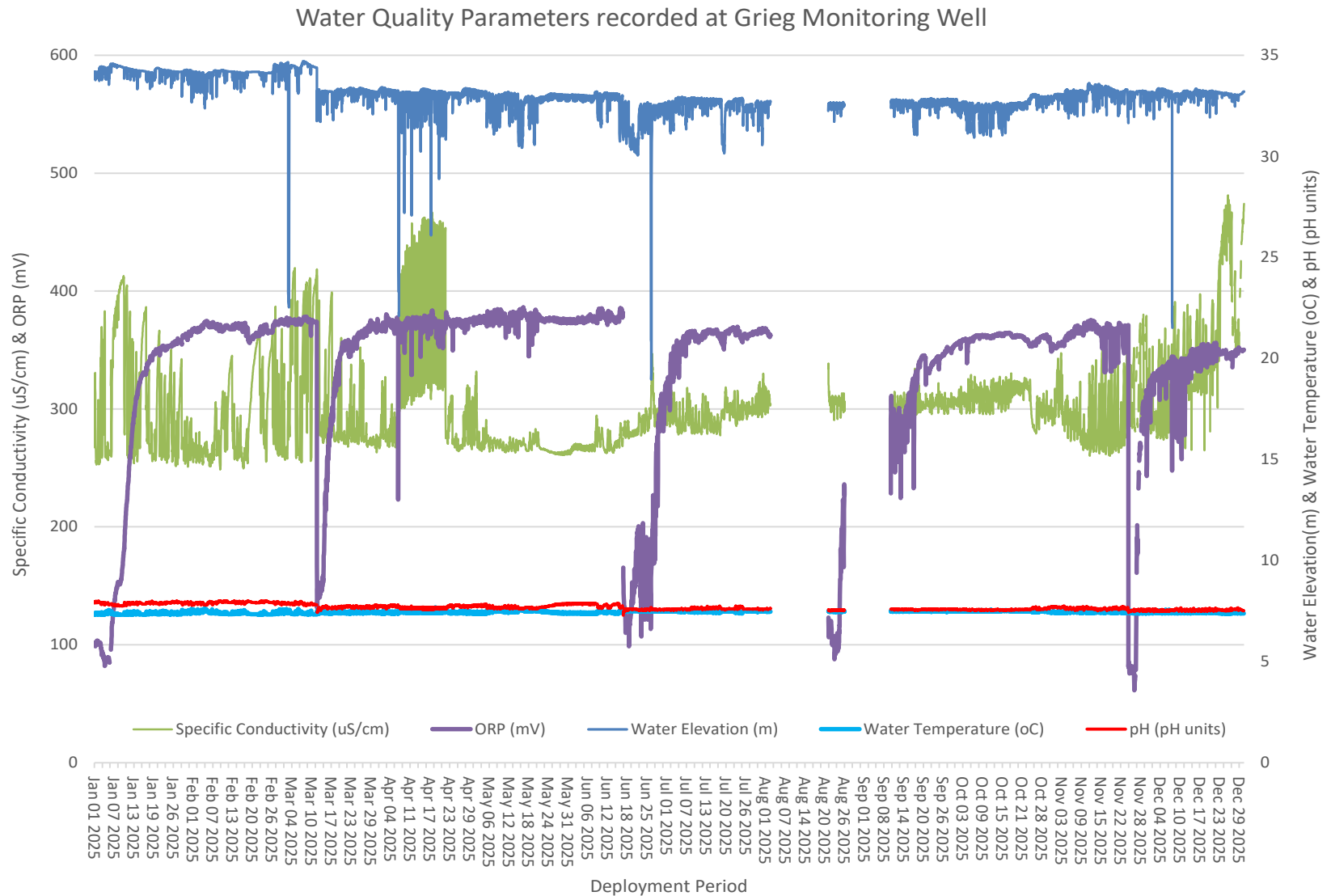


Figure 14: Water Elevation (m) and other water quality parameters.

Conclusion

The comprehensive monitoring of various parameters, including pH, conductivity, Total Dissolved Solids (TDS), and Oxidation-Reduction Potential (ORP) throughout 2025 has provided valuable insights into the dynamic nature of the groundwater well and its aquifer. Collecting background data is crucial for recognizing potential concerns in a water body. Different areas may have specific parameters that are inherent to their natural conditions but might appear abnormal elsewhere. It is essential to monitor and document background data of water bodies that are influenced by anthropogenic activity.

The water elevation measurements consistently demonstrated stability within an expected range, even amidst sporadic pumping activities. The pH levels exhibited relative consistency with minor fluctuations, and the specific conductivity and TDS data remained consistent other than periodic elevated spikes which corresponded with pumping events. The ORP levels showcased expected variations, underscoring the importance of continued monitoring to understand contaminant mobility and persistence. The integration of grab sample data, represented by red points on the graphs, complemented the in-situ monitoring, albeit acknowledging slight differences due to factors like delayed analysis and well pumping disturbances.

Other than the pumping of the aquifer and the management of the instrumentation in the well, there was no indication of any other external factors influencing the water quality parameters of this station. Given that this station is five years old, a better baseline dataset for water quality parameters will be established as the monitoring of this site continues.

Moving forward into the 2026 season, WRMD will maintain its schedule of maintenance and calibration activities approximately every 10-12 weeks, along with site visits in between when necessary to address any issues that arise.

Appendix I

Table 1.

2025 Water Quality Statistics for Grieg Groundwater Well

January 1, 2025, to December 30, 2025

2025 Statistics for Grieg Monitoring Well							
	Temp	pH	SpCond	TDS	ORP	Depth	Water Elevation
Minimum	7.3	7.3	248.9	0.2	61.4	19.1	19.0
Maximum	7.7	8.0	481.3	0.3	386.2	34.8	34.7
Median	7.5	7.7	294.9	0.2	362.2	33.3	33.1
Average	7.4	7.7	303.2	0.2	336.3	33.2	33.1

Table 2.

Data Comparison: Average Annual Water Quality Parameters Across Previous Deployment Years

Parameter Averages					
Parameter	2021	2022	2023	2024	2025
Water Temperature (°C)	7.254	7.325	7.4	7.44	7.45
pH (pH units)	7.63	7.55	7.56	7.69	7.69
Specific Conductivity (µS/cm)	288.8	284.95	287.6	319.42	303.2
Total Dissolved Solids (g/L)	0.18	0.19	0.19	0.23	0.19
ORP (mV)	265.9	288.7	322.66	314.23	336.3
Water Elevation (m)	32.16	33.59	33.19	33.73	33.05

Appendix II

Grab Sample Results collected 2025

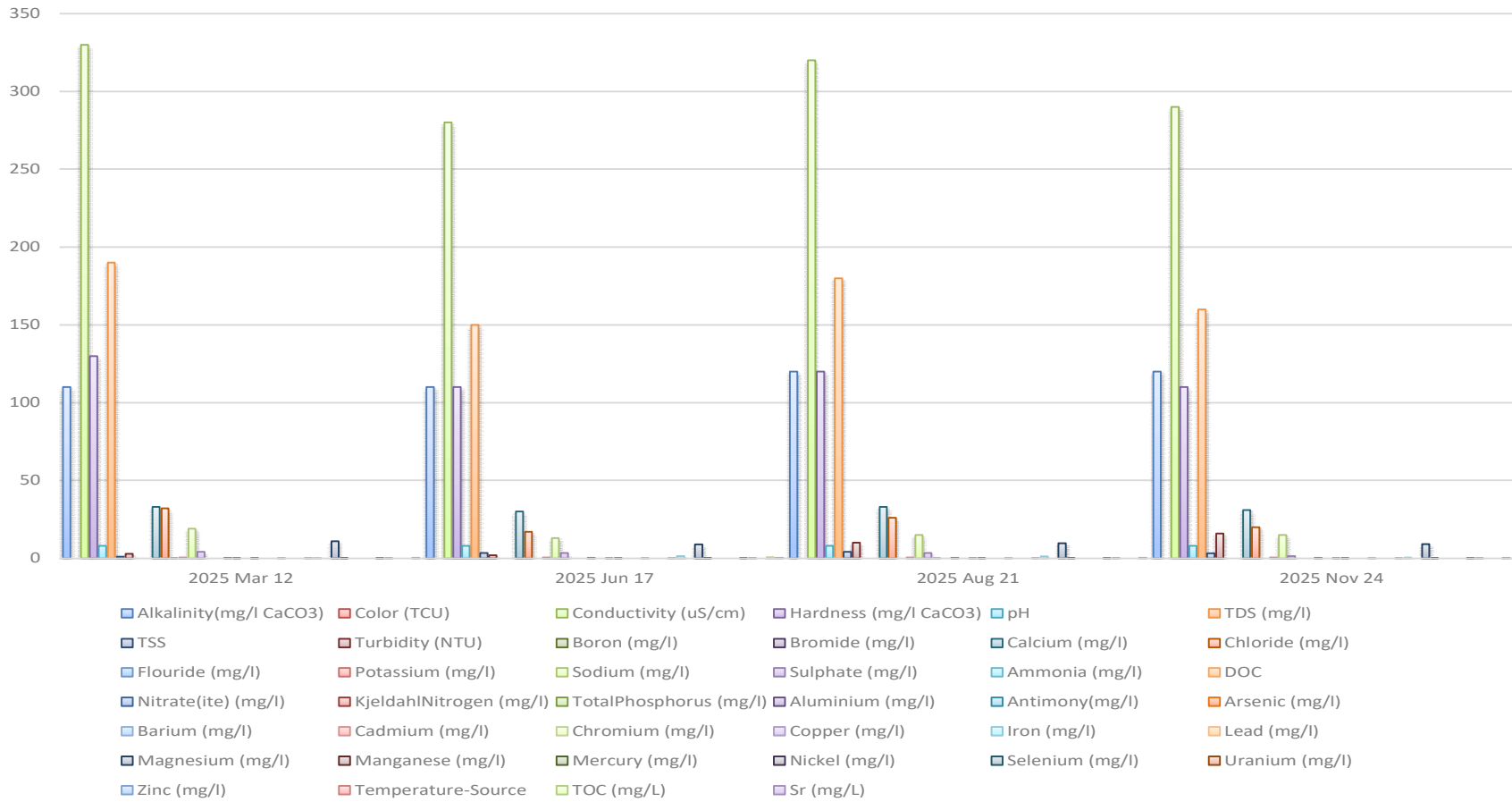


Figure 15. Graph of all parameters captured with the grab sample collection kit 2025

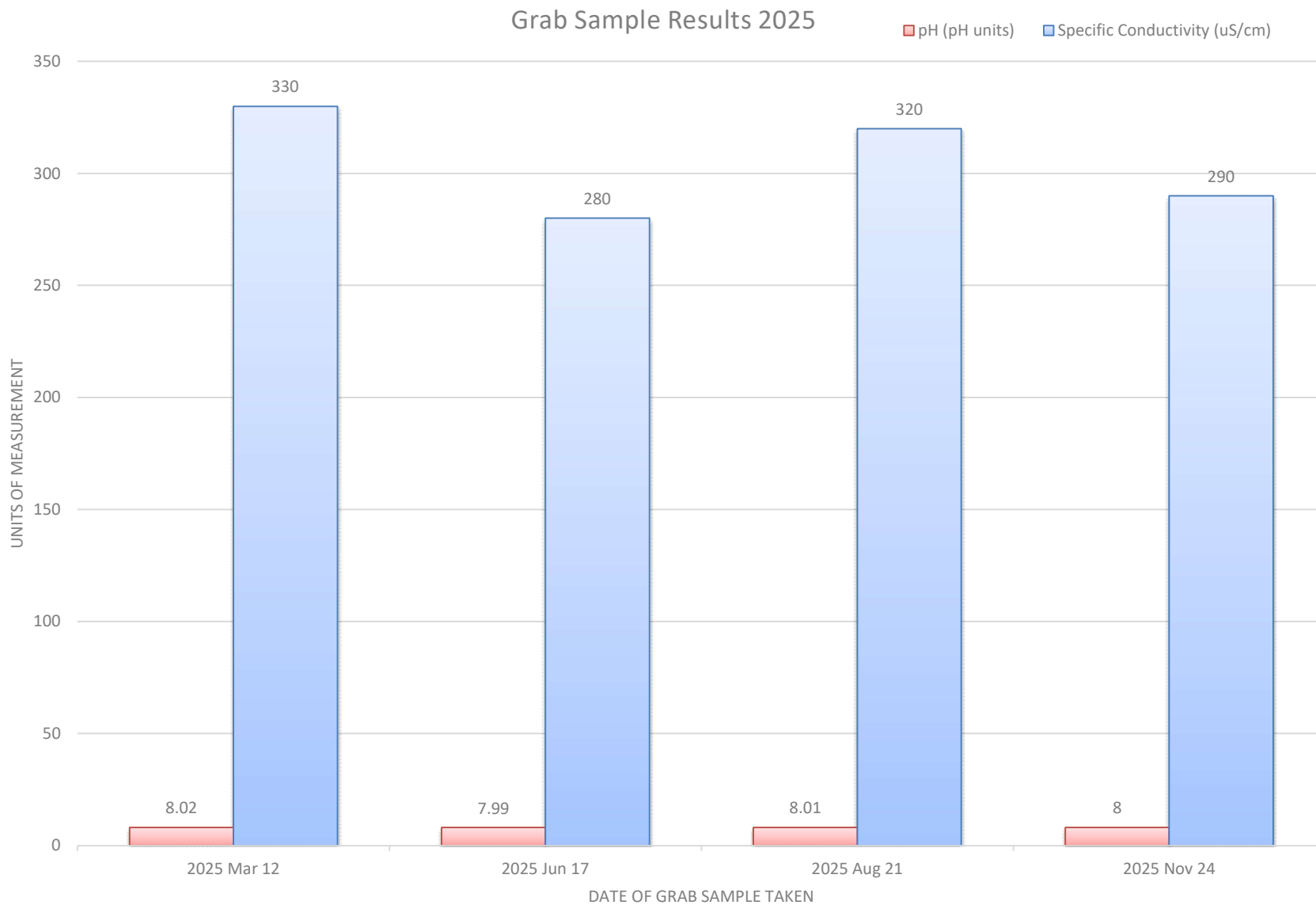


Figure 16. Graph of the parameters used for QAQC Comparison



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Bureau Veritas Job #: C528145
Report Date: 2025/03/24

NL Department of Environment, Climate Change and
Municipalities
Your P.O. #: 224006869-3
Sampler Initials: TC

Sample Details/Parameters	A	Result	RDL	UNITS	Extracted	Analyzed	By	Batch
AOYL67 GRIEG MONITORING WELL								
Sampling Date		2025/03/12 14:00						
Matrix		DR						
Sample #		2025-1900-00-SI-SP						
Registration #		SA-0000						
RESULTS OF ANALYSES OF DRINKING WATER								
Calculated Parameters								
Hardness (CaCO3)	-	130	1.0	mg/L	N/A	2025/03/20		9891829
Nitrate (N)	-	0.24	0.050	mg/L	N/A	2025/03/21		9891832
Total dissolved solids (calc., EC)	-	190	1.0	mg/L	N/A	2025/03/21		9891906
Inorganics								
Conductivity	-	330	1.0	uS/cm	N/A	2025/03/20	M2C	9894303
Chloride (Cl-)	-	32	1.0	mg/L	N/A	2025/03/20	VP2	9893669
Dup.Chloride (Cl-)	-	32	1.0	mg/L	N/A	2025/03/20	VP2	9893669
Bromide (Br-)	-	ND	1.0	mg/L	N/A	2025/03/20	VP2	9893669
Dup.Bromide (Br-)	-	ND	1.0	mg/L	N/A	2025/03/20	VP2	9893669
Sulphate (SO4)	-	4.1	1.0	mg/L	N/A	2025/03/20	VP2	9893669
Dup.Sulphate (SO4)	-	4.2	1.0	mg/L	N/A	2025/03/20	VP2	9893669
Total Alkalinity (Total as CaCO3)	-	110	2.0	mg/L	N/A	2025/03/20	M2C	9894304
Colour	-	ND	5.0	TCU	N/A	2025/03/21	MCN	9895125
Dissolved Fluoride (F-)	-	0.12	0.10	mg/L	N/A	2025/03/20	M2C	9894305
Total Kjeldahl Nitrogen (TKN)	-	0.17	0.10	mg/L	2025/03/18	2025/03/19	KJP	9893184
Nitrate + Nitrite (N)	-	0.24	0.050	mg/L	N/A	2025/03/21	MCN	9895124
Nitrite (N)	-	ND	0.010	mg/L	N/A	2025/03/21	MCN	9894819
Nitrogen (Ammonia Nitrogen)	-	ND	0.050	mg/L	N/A	2025/03/21	MCN	9895344
Dissolved Organic Carbon (C)	-	ND	0.50	mg/L	N/A	2025/03/20	SSI	9894275
Total Organic Carbon (C)	-	ND	0.50	mg/L	N/A	2025/03/18	SSI	9892851
pH	-	8.02		pH	N/A	2025/03/20	M2C	9894299
Total Phosphorus	-	ND	0.004	mg/L	2025/03/18	2025/03/20	VKH	9893185
Total Suspended Solids	-	1.0	1.0	mg/L	2025/03/19	2025/03/19	RD4	9893330
Turbidity	-	2.8	0.10	NTU	N/A	2025/03/20	M2C	9894787
MERCURY BY COLD VAPOUR AA (DRINKING WATER)								
Metals								
Total Mercury (Hg)	-	ND	0.000013	mg/L	2025/03/21	2025/03/21	JEP	9894722
ELEMENTS BY ICP/MS (DRINKING WATER)								
Metals								
Total Aluminum (Al)	-	0.041	0.0050	mg/L	2025/03/19	2025/03/20	MOA	9893341
Total Antimony (Sb)	-	ND	0.0010	mg/L	2025/03/19	2025/03/20	MOA	9893341
Total Arsenic (As)	-	ND	0.0010	mg/L	2025/03/19	2025/03/20	MOA	9893341
Total Barium (Ba)	-	0.086	0.0010	mg/L	2025/03/19	2025/03/20	MOA	9893341
Total Boron (B)	-	ND	0.050	mg/L	2025/03/19	2025/03/20	MOA	9893341
Total Cadmium (Cd)	-	ND	0.000010	mg/L	2025/03/19	2025/03/20	MOA	9893341
Total Calcium (Ca)	-	33	0.10	mg/L	2025/03/19	2025/03/20	MOA	9893341
Total Chromium (Cr)	-	ND	0.0010	mg/L	2025/03/19	2025/03/20	MOA	9893341
Total Copper (Cu)	-	0.00056	0.00050	mg/L	2025/03/19	2025/03/20	MOA	9893341



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Bureau Veritas Job #: C528145
Report Date: 2025/03/24

NL Department of Environment, Climate Change and
Municipalities
Your P.O. #: 224006869-3
Sampler Initials: TC

Sample Details/Parameters	A	Result	RDL	UNITS	Extracted	Analyzed	By	Batch
AOYL67 GRIEG MONITORING WELL								
Sampling Date		2025/03/12 14:00						
Matrix		DR						
Sample #		2025-1900-00-SI-SP						
Registration #		SA-0000						
ELEMENTS BY ICP/MS (DRINKING WATER)								
Metals								
Total Iron (Fe)	-	0.13	0.050	mg/L	2025/03/19	2025/03/20	MOA	9893341
Total Lead (Pb)	-	ND	0.00050	mg/L	2025/03/19	2025/03/20	MOA	9893341
Total Magnesium (Mg)	-	11	0.10	mg/L	2025/03/19	2025/03/20	MOA	9893341
Total Manganese (Mn)	-	0.0081	0.0020	mg/L	2025/03/19	2025/03/20	MOA	9893341
Total Nickel (Ni)	-	ND	0.0020	mg/L	2025/03/19	2025/03/20	MOA	9893341
Total Phosphorus (P)	-	ND	0.10	mg/L	2025/03/19	2025/03/20	MOA	9893341
Total Potassium (K)	-	0.36	0.10	mg/L	2025/03/19	2025/03/20	MOA	9893341
Total Selenium (Se)	-	ND	0.00050	mg/L	2025/03/19	2025/03/20	MOA	9893341
Total Sodium (Na)	-	19	0.10	mg/L	2025/03/19	2025/03/20	MOA	9893341
Total Strontium (Sr)	-	0.32	0.0020	mg/L	2025/03/19	2025/03/20	MOA	9893341
Total Uranium (U)	-	0.00015	0.00010	mg/L	2025/03/19	2025/03/20	MOA	9893341
Total Zinc (Zn)	-	0.016	0.0050	mg/L	2025/03/19	2025/03/20	MOA	9893341



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Bureau Veritas Job #: C573423
Report Date: 2025/07/04

NL Department of Environment, Climate Change and
Municipalities
Your P.O. #: 224006869-5
Sampler Initials: AR

Sample Details/Parameters	A	Result	RDL	UNITS	Extracted	Analyzed	By	Batch
ASDU03 GRIEG MONITORING WELL								
Sampling Date		2025/06/17 14:35						
Matrix		W						
Sample #		2025-6506-00-SI-SP						
Registration #		SA-0000						
RESULTS OF ANALYSES OF WATER								
Calculated Parameters								
Hardness (CaCO3)	-	110	1.0	mg/L	N/A	2025/06/26		9954227
Total Kjeldahl Nitrogen (TKN)	-	ND	0.10	mg/L	N/A	2025/07/03		9954089
Nitrate (N)	-	0.22	0.050	mg/L	N/A	2025/07/04		9954230
Total dissolved solids (calc., EC)	-	150	1.0	mg/L	N/A	2025/07/02		9954088
Inorganics								
Conductivity	-	280	1.0	uS/cm	N/A	2025/06/30	M2C	9960553
Chloride (Cl-)	-	17	1.0	mg/L	N/A	2025/06/25	VP2	9955630
Bromide (Br-)	-	ND	1.0	mg/L	N/A	2025/06/25	VP2	9955630
Sulphate (SO4)	-	3.4	1.0	mg/L	N/A	2025/06/25	VP2	9955630
Total Alkalinity (Total as CaCO3)	-	110	2.0	mg/L	N/A	2025/06/30	M2C	9960554
Colour	-	ND	5.0	TCU	N/A	2025/07/03	EMT	9961551
Dissolved Fluoride (F-)	-	ND	0.10	mg/L	N/A	2025/06/30	M2C	9960555
Nitrate + Nitrite (N)	-	0.22	0.050	mg/L	N/A	2025/07/03	MCN	9961552
Nitrite (N)	-	ND	0.010	mg/L	N/A	2025/07/03	EMT	9961554
Nitrogen (Ammonia Nitrogen)	-	ND	0.050	mg/L	N/A	2025/07/02	MCN	9961240
Total Nitrogen (N)	-	0.18	0.10	mg/L	N/A	2025/06/29	KMC	9960078
Dissolved Organic Carbon (C)	-	ND	0.50	mg/L	N/A	2025/06/30	S6S	9960364
Total Organic Carbon (C)	-	0.63	0.50	mg/L	N/A	2025/07/03	S6S	9962231
pH	-	7.99		pH	N/A	2025/06/30	M2C	9960552
Total Phosphorus	-	0.017	0.004	mg/L	2025/06/26	2025/06/29	SSV	9958562
Total Suspended Solids	-	3.4	1.0	mg/L	2025/06/24	2025/06/26	ISM	9956209
Turbidity	-	2.0	0.10	NTU	N/A	2025/07/03	KMC	9962179
MERCURY BY COLD VAPOUR AA (WATER)								
Metals								
Total Mercury (Hg)	-	0.000017	0.000013	mg/L	2025/07/03	2025/07/03	JEP	9961570
ELEMENTS BY ICP/MS (WATER)								
Metals								
Total Aluminum (Al)	-	0.11	0.050	mg/L	2025/06/24	2025/06/26	MTZ	9956174
Total Antimony (Sb)	-	ND	0.0010	mg/L	2025/06/24	2025/06/26	MTZ	9956174
Total Arsenic (As)	-	ND	0.0010	mg/L	2025/06/24	2025/06/26	MTZ	9956174
Total Barium (Ba)	-	0.076	0.0010	mg/L	2025/06/24	2025/06/26	MTZ	9956174
Total Boron (B)	-	ND	0.050	mg/L	2025/06/24	2025/06/26	MTZ	9956174
Total Cadmium (Cd)	-	ND	0.000010	mg/L	2025/06/24	2025/06/26	MTZ	9956174
Total Calcium (Ca)	-	30	0.10	mg/L	2025/06/24	2025/06/26	MTZ	9956174
Total Chromium (Cr)	-	ND	0.0010	mg/L	2025/06/24	2025/06/26	MTZ	9956174
Total Copper (Cu)	-	0.0051	0.00050	mg/L	2025/06/24	2025/06/26	MTZ	9956174
Total Iron (Fe)	-	1.3	0.050	mg/L	2025/06/24	2025/06/26	MTZ	9956174
Total Lead (Pb)	-	ND	0.00050	mg/L	2025/06/24	2025/06/26	MTZ	9956174
Total Magnesium (Mg)	-	8.9	0.10	mg/L	2025/06/24	2025/06/26	MTZ	9956174



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Bureau Veritas Job #: C573423
Report Date: 2025/07/04

NL Department of Environment, Climate Change and
Municipalities
Your P.O. #: 224006869-5
Sampler Initials: AR

Sample Details/Parameters	A	Result	RDL	UNITS	Extracted	Analyzed	By	Batch
ASDU03 GRIEG MONITORING WELL								
Sampling Date		2025/06/17 14:35						
Matrix		W						
Sample #		2025-6506-00-SI-SP						
Registration #		SA-0000						
ELEMENTS BY ICP/MS (WATER)								
Metals								
Total Manganese (Mn)	-	0.015	0.0020	mg/L	2025/06/24	2025/06/26	MTZ	9956174
Total Nickel (Ni)	-	ND	0.0020	mg/L	2025/06/24	2025/06/26	MTZ	9956174
Total Phosphorus (P)	-	ND	0.10	mg/L	2025/06/24	2025/06/26	MTZ	9956174
Total Potassium (K)	-	0.37	0.10	mg/L	2025/06/24	2025/06/26	MTZ	9956174
Total Selenium (Se)	-	ND	0.00050	mg/L	2025/06/24	2025/06/26	MTZ	9956174
Total Sodium (Na)	-	13	0.10	mg/L	2025/06/24	2025/06/26	MTZ	9956174
Total Strontium (Sr)	-	0.26	0.0020	mg/L	2025/06/24	2025/06/26	MTZ	9956174
Total Uranium (U)	-	0.00014	0.00010	mg/L	2025/06/24	2025/06/26	MTZ	9956174
Total Zinc (Zn)	-	0.019	0.0050	mg/L	2025/06/24	2025/06/26	MTZ	9956174



BUREAU
VERITAS

Bureau Veritas Job #: C5A4323
Report Date: 2025/09/08

NL Department of Environment, Climate Change and
Municipalities
Your P.O. #: 224006869

Sample Details/Parameters	A	Result	RDL	UNITS	Extracted	Analyzed	By	Batch
AUKS51 GRIEG MONITORING WELL								
Sampling Date		2025/08/21 12:45						
Matrix		W						
Sample #		2025-6518-00-SI-SP						
Registration #		SA-0000						
RESULTS OF ANALYSES OF WATER								
Calculated Parameters								
Hardness (CaCO3)	-	120	1.0	mg/L	N/A	2025/08/28		9996324
Total Kjeldahl Nitrogen (TKN)	-	ND	0.10	mg/L	N/A	2025/09/05		9996387
Nitrate (N)	-	0.19	0.050	mg/L	N/A	2025/09/05		9996327
Total dissolved solids (calc., EC)	-	180	1.0	mg/L	N/A	2025/09/02		9996500
Inorganics								
Conductivity	-	320	1.0	uS/cm	N/A	2025/08/29	J1A	9999730
Chloride (Cl-)	-	26	1.0	mg/L	N/A	2025/08/30	VP2	9999972
Bromide (Br-)	-	ND	1.0	mg/L	N/A	2025/08/30	VP2	9999972
Sulphate (SO4)	-	3.4	1.0	mg/L	N/A	2025/08/30	VP2	9999972
Total Alkalinity (Total as CaCO3)	-	120	2.0	mg/L	N/A	2025/08/29	J1A	9999732
Colour	-	ND	5.0	TCU	N/A	2025/09/04	EMT	A002336
Dissolved Fluoride (F-)	-	ND	0.10	mg/L	N/A	2025/08/29	J1A	9999733
Nitrate + Nitrite (N)	-	0.19	0.050	mg/L	N/A	2025/09/04	EMT	A002337
Nitrite (N)	-	ND	0.010	mg/L	N/A	2025/09/04	EMT	A002338
Nitrogen (Ammonia Nitrogen)	-	0.063	0.050	mg/L	N/A	2025/09/05	MCN	A004052
Total Nitrogen (N)	-	0.19	0.10	mg/L	N/A	2025/09/02	S6S	A001316
Dissolved Organic Carbon (C)	-	ND	0.50	mg/L	N/A	2025/09/04	S6S	A003169
Total Organic Carbon (C)	-	ND	0.50	mg/L	N/A	2025/09/05	S6S	A004325
pH	-	8.01		pH	N/A	2025/08/29	J1A	9999728
Total Phosphorus	-	0.026	0.004	mg/L	2025/08/28	2025/08/29	VKH	9999895
Total Suspended Solids	-	4.2	1.0	mg/L	2025/08/26	2025/08/27	ISM	9997206
Turbidity	-	10	0.10	NTU	N/A	2025/09/07	KMC	A004348
MERCURY BY COLD VAPOUR AA (WATER)								
Metals								
Total Mercury (Hg)	-	0.000013	0.000013	mg/L	2025/09/04	2025/09/04	JEP	A002562
ELEMENTS BY ICP/MS (WATER)								
Metals								
Total Aluminum (Al)	-	0.082	0.0050	mg/L	2025/08/26	2025/08/27	MOA	9997195
Total Antimony (Sb)	-	ND	0.0010	mg/L	2025/08/26	2025/08/27	MOA	9997195
Total Arsenic (As)	-	ND	0.0010	mg/L	2025/08/26	2025/08/27	MOA	9997195
Total Barium (Ba)	-	0.086	0.0010	mg/L	2025/08/26	2025/08/27	MOA	9997195
Total Boron (B)	-	ND	0.050	mg/L	2025/08/26	2025/08/27	MOA	9997195
Total Cadmium (Cd)	-	ND	0.000010	mg/L	2025/08/26	2025/08/27	MOA	9997195
Total Calcium (Ca)	-	33	0.10	mg/L	2025/08/26	2025/08/27	MOA	9997195
Total Chromium (Cr)	-	ND	0.0010	mg/L	2025/08/26	2025/08/27	MOA	9997195
Total Copper (Cu)	-	0.00086	0.00050	mg/L	2025/08/26	2025/08/27	MOA	9997195
Total Iron (Fe)	-	1.2	0.050	mg/L	2025/08/26	2025/08/27	MOA	9997195
Total Lead (Pb)	-	ND	0.00050	mg/L	2025/08/26	2025/08/27	MOA	9997195
Total Magnesium (Mg)	-	9.7	0.10	mg/L	2025/08/26	2025/08/27	MOA	9997195
Total Manganese (Mn)	-	0.038	0.0020	mg/L	2025/08/26	2025/08/27	MOA	9997195
Total Nickel (Ni)	-	ND	0.0020	mg/L	2025/08/26	2025/08/27	MOA	9997195
Total Phosphorus (P)	-	ND	0.10	mg/L	2025/08/26	2025/08/27	MOA	9997195
Total Potassium (K)	-	0.37	0.10	mg/L	2025/08/26	2025/08/27	MOA	9997195
Total Selenium (Se)	-	ND	0.00050	mg/L	2025/08/26	2025/08/27	MOA	9997195



BUREAU
VERITAS

Bureau Veritas Job #: C5A4323
Report Date: 2025/09/08

NL Department of Environment, Climate Change and
Municipalities
Your P.O. #: 224006869

Sample Details/Parameters	A	Result	RDL	UNITS	Extracted	Analyzed	By	Batch
AUKS51 GRIEG MONITORING WELL								
Sampling Date 2025/08/21 12:45								
Matrix W								
Sample # 2025-6518-00-SI-SP								
Registration # SA-0000								
ELEMENTS BY ICP/MS (WATER)								
Metals								
Total Sodium (Na)	-	15	0.10	mg/L	2025/08/26	2025/08/27	MOA	9997195
Total Strontium (Sr)	-	0.28	0.0020	mg/L	2025/08/26	2025/08/27	MOA	9997195
Total Uranium (U)	-	0.00013	0.00010	mg/L	2025/08/26	2025/08/27	MOA	9997195
Total Zinc (Zn)	-	0.010	0.0050	mg/L	2025/08/26	2025/08/27	MOA	9997195



BUREAU
VERITAS

Bureau Veritas Job #: C5F0330
Report Date: 2025/12/15

NL Department of Environment, Climate Change and
Municipalities
Your P.O. #: 224006869

Sample Details/Parameters	A	Result	RDL	UNITS	Extracted	Analyzed	By	Batch
AXTV05 GRIEG MONITORING WELL								
Sampling Date		2025/11/24 12:30						
Matrix		W						
Sample #		2025-6524-00-SI-SP						
Registration #		SA-0000						
RESULTS OF ANALYSES OF WATER								
Calculated Parameters								
Hardness (CaCO3)	-	110	1.0	mg/L	N/A	2025/12/03		A063175
Total Kjeldahl Nitrogen (TKN)	-	ND	0.10	mg/L	N/A	2025/12/11		A062930
Nitrate (N)	-	0.20	0.050	mg/L	N/A	2025/12/09		A063179
Total dissolved solids (calc., EC)	-	160	1.0	mg/L	N/A	2025/12/08		A063183
Inorganics								
Conductivity	-	290	1.0	uS/cm	N/A	2025/12/05	J1A	A068121
Chloride (Cl-)	-	20	1.0	mg/L	N/A	2025/12/01	VP2	A062424
Dup.Chloride (Cl-)	-	20	1.0	mg/L	N/A	2025/12/01	VP2	A062424
Bromide (Br-)	-	ND	1.0	mg/L	N/A	2025/12/01	VP2	A062424
Dup.Bromide (Br-)	-	ND	1.0	mg/L	N/A	2025/12/01	VP2	A062424
Sulphate (SO4)	-	1.4	1.0	mg/L	N/A	2025/12/01	VP2	A062424
Dup.Sulphate (SO4)	-	2.1	1.0	mg/L	N/A	2025/12/01	VP2	A062424
Total Alkalinity (Total as CaCO3)	-	120	2.0	mg/L	N/A	2025/12/05	J1A	A068122
Colour	-	ND	5.0	TCU	N/A	2025/12/08	M2C	A069652
Dup.Colour	-	ND	5.0	TCU	N/A	2025/12/08	M2C	A069652
Dissolved Fluoride (F-)	-	ND	0.10	mg/L	N/A	2025/12/05	J1A	A068123
Nitrate + Nitrite (N)	-	0.20	0.050	mg/L	N/A	2025/12/09	MCN	A069654
Dup.Nitrate + Nitrite (N)	-	0.19	0.050	mg/L	N/A	2025/12/09	MCN	A069654
Nitrite (N)	-	ND	0.010	mg/L	N/A	2025/12/08	MCN	A069658
Dup.Nitrite (N)	-	ND	0.010	mg/L	N/A	2025/12/08	MCN	A069658
Nitrogen (Ammonia Nitrogen)	-	ND	0.050	mg/L	N/A	2025/12/09	MCN	A070375
Total Nitrogen (N)	-	0.15	0.10	mg/L	N/A	2025/12/09	S6S	A069282
Dissolved Organic Carbon (C)	-	ND	0.50	mg/L	N/A	2025/12/12	S6S	A071816
Total Organic Carbon (C)	-	ND	0.50	mg/L	N/A	2025/12/11	S6S	A071814
pH	-	8.00		pH	N/A	2025/12/05	J1A	A068120
Total Phosphorus	-	0.004	0.004	mg/L	2025/12/03	2025/12/08	VKH	A066553
Total Suspended Solids	-	3.2	1.0	mg/L	2025/12/01	2025/12/02	DME	A064858
Turbidity	-	16	0.10	NTU	N/A	2025/12/11	KMC	A071365
MERCURY BY COLD VAPOUR AA (WATER)								
Metals								
Total Mercury (Hg)	-	ND	0.000013	mg/L	2025/12/10	2025/12/10	JEP	A070431
ELEMENTS BY ICP/MS (WATER)								
Metals								
Total Aluminum (Al)	-	0.058	0.0050	mg/L	2025/12/02	2025/12/02	MOA	A065295
Total Antimony (Sb)	-	ND	0.0010	mg/L	2025/12/02	2025/12/02	MOA	A065295
Total Arsenic (As)	-	ND	0.0010	mg/L	2025/12/02	2025/12/02	MOA	A065295
Total Barium (Ba)	-	0.077	0.0010	mg/L	2025/12/02	2025/12/02	MOA	A065295
Total Boron (B)	-	ND	0.050	mg/L	2025/12/02	2025/12/02	MOA	A065295
Total Cadmium (Cd)	-	ND	0.000010	mg/L	2025/12/02	2025/12/02	MOA	A065295
Total Calcium (Ca)	-	31	0.10	mg/L	2025/12/02	2025/12/02	MOA	A065295
Total Chromium (Cr)	-	ND	0.0010	mg/L	2025/12/02	2025/12/02	MOA	A065295
Total Copper (Cu)	-	0.0019	0.00050	mg/L	2025/12/02	2025/12/02	MOA	A065295
Total Iron (Fe)	-	0.57	0.050	mg/L	2025/12/02	2025/12/02	MOA	A065295
Total Lead (Pb)	-	ND	0.00050	mg/L	2025/12/02	2025/12/02	MOA	A065295



BUREAU
VERITAS

Bureau Veritas Job #: C5F0330
Report Date: 2025/12/15

NL Department of Environment, Climate Change and
Municipalities
Your P.O. #: 224006869

Sample Details/Parameters	A	Result	RDL	UNITS	Extracted	Analyzed	By	Batch
AXTV05 GRIEG MONITORING WELL								
Sampling Date 2025/11/24 12:30								
Matrix W								
Sample # 2025-6524-00-SI-SP								
Registration # SA-0000								
ELEMENTS BY ICP/MS (WATER)								
Metals								
Total Magnesium (Mg)	-	9.1	0.10	mg/L	2025/12/02	2025/12/02	MOA	A065295
Total Manganese (Mn)	-	0.017	0.0020	mg/L	2025/12/02	2025/12/02	MOA	A065295
Total Nickel (Ni)	-	ND	0.0020	mg/L	2025/12/02	2025/12/02	MOA	A065295
Total Phosphorus (P)	-	ND	0.10	mg/L	2025/12/02	2025/12/02	MOA	A065295
Total Potassium (K)	-	0.36	0.10	mg/L	2025/12/02	2025/12/02	MOA	A065295
Total Selenium (Se)	-	ND	0.00050	mg/L	2025/12/02	2025/12/02	MOA	A065295
Total Sodium (Na)	-	15	0.10	mg/L	2025/12/02	2025/12/02	MOA	A065295
Total Strontium (Sr)	-	0.23	0.0020	mg/L	2025/12/02	2025/12/02	MOA	A065295
Total Uranium (U)	-	0.00011	0.00010	mg/L	2025/12/02	2025/12/02	MOA	A065295
Total Zinc (Zn)	-	0.020	0.0050	mg/L	2025/12/02	2025/12/02	MOA	A065295