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**Environmental Standards Division**

# BRADY ROAD RESOURCE MANAGEMENT FACILITY ANNUAL REPORT - 2024



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## BRADY ROAD RESOURCE MANAGEMENT FACILITY ANNUAL REPORT – 2024

### EXECUTIVE SUMMARY

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The Brady Road Resource Management Facility (BRRMF) is the City of Winnipeg’s only active landfill. The site is bordered by the Perimeter Highway on the north, Waverley Street on the east, Brady Road and the R.M. of Macdonald on the west, and Rue des Trappistes on the south. The landfill has been in operation since 1973 and is estimated to have sufficient capacity for over 100 years, assuming current waste diversion practices are continued.

Environment Act Licence No. 3081 R, issued on April 23, 2014, requires the City of Winnipeg to submit an annual report on or before April 15<sup>th</sup>, detailing activities conducted at BRRMF in the previous year. This report provides a summary of major expenditures and construction, major incidents, waste diversion operations, groundwater management, surface water management, leachate management, landfill gas management, and nuisance management for 2024.

In 2024, plans were finalized for Area B which is located on the west side of the site. This area is anticipated to be the active area for the next 37 years. In 2024, there was a fire in Cell 34 that significantly damaged the cell liner. Other than the fire, there were no disruptions or failures of waste management practices due to equipment breakdown, no major spills occurred, and no alarms were activated.

In 2024, approximately 28% of the 437,432 metric tonnes of material received at the BRRMF were beneficially re-used, composted, or removed from the site for further processing or beneficial re-use. In addition, 27,570 kL of leachate was hauled to the North End Sewage Treatment Plant for treatment.

Monitoring programs for leachate, groundwater, surface water, and subsurface gas migration followed the sampling and analysis plans in 2024 and contingency plans were not activated.

In 2024, we were able to finalize our re-evaluation of the SAP to put forth recommendations for sampling frequency and analyte changes. The recommendations for each sample matrix are summarized in their respective sections.

Statistical analyses of analytical results obtained for leachate, groundwater, and surface water indicate that the BRRMF has not had a negative impact on the groundwater and surface water downstream of the site.

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## BRADY ROAD RESOURCE MANAGEMENT FACILITY ANNUAL REPORT – 2024

### 1.0 INTRODUCTION

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The Brady Road Resource Management Facility (BRRMF) is located south of the Perimeter Highway, between Brady Road and Waverley Street. Residential land use is present within 500 m of the site to the east and within 120 m north of the site (Waverly West development), other surrounding land use is agricultural. Opened in 1973, the 790-hectare, Class 1 Solid Waste Disposal facility currently holds approximately 13 million metric tonnes of waste, with over 300,000 metric tonnes of waste materials landfilled on an annual basis. The site has capacity for over 100 additional years of waste disposal, assuming current waste diversion practices are continued.

The BRRMF operates in accordance with Environment Act Licence No. 3081 R, which was issued on April 23, 2014. Clause 127 of the license requires the City of Winnipeg to prepare and submit an Annual Report on the activities undertaken at the site during the previous year on or before April 15th of each year. This report contains results and/or comments for each of the clauses of Licence No. 3081 R under which the BRRMF has generated pertinent information during 2024. The report also provides information on the BRRMF proposed activities for 2025.

The layouts of the primary components of the BRRMF, groundwater sampling locations and leachate collection system are shown on Figure 1. Surface water flows are managed by perimeter ditching and retention ponds. The groundwater monitoring network consists of wells in the bedrock, till, and clay layers. The leachate collection system is a network of manholes/risers, drains, and sumps around the perimeter of the landfill cells, which feed into a centralized collection tank/truck fill station. The landfill gas (LFG) management system includes extraction wells, collection piping, and a blower/enclosed flare station.

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### 2.0 MAJOR ACTIVITIES AND CONSTRUCTION

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Major activities and construction undertaken in 2024 included:

- Finalization of the plans for Area B which is located on the west side of the site. This area is anticipated to be opened for use in the second half of 2025 and will be the active area for the next 37 years.

Major activities and construction planned for 2025 include:

- Begin construction of the first cell of Area B, Cell 35.

### 3.0 MAJOR INCIDENTS

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On April 8, 2024, there was a fire in Cell 34 that required fire suppression assistance from the local fire department. The fire was completely extinguished, but it damaged the cell liner which required a significant repair and approval from the province. Aside from the fire, there were no disruptions or failures of waste management practices due to equipment breakdown, no major spills occurred, and no alarms were activated.

The incident report is provided in Appendix A.

### 4.0 WASTE DIVERSION OPERATIONS

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In 2024, the BRRMF received 437,433 metric tonnes of material from a variety of sources including residential wastes, residential food wastes, commercial wastes, wastes from City operations, and materials dropped off at the 4R depots. Composting programs, on-site re-use of materials, and removal of materials from the site for re-use or further processing allowed 120,894 metric tonnes of material to be diverted from the landfill. The remaining 316,539 metric tonnes of material was landfilled. The 28% diversion rate in 2024 is an increase from the previous year due to an increase in the amount of clean fill and biosolids received, which are typically beneficially reused on-site.

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The 2-year Residential Food Waste Collection Pilot Project concluded in 2022. The data from this project provided supplemental information for the Organics Diversion Strategy, which was presented to council in Q3 of 2023 with the recommendation to proceed with the program. The current timeline is 2030 for the full implementation, although the city is looking at ways to expedite the process.

In 2024, 4,324 metric tonnes of biosolids were mixed with woodchips and clay to create a fabricated soil that will be used as final cover at the BRRMF. No biosolids were landfilled or composted at the biosolids composting facility. In 2025, biosolids composting will occur on an as-needed basis to meet final cover needs.

In 2025, we will continue with the Soil fabrication program at BRRMF and Summit Road Landfill (closed) through the diversion of Wood Waste, Street Sweepings and Biosolids material.

A summary of the BRRMF Waste Diversion Operations is provided in Table 1.

<b>Table 1. 2020-2024 BRRMF Waste Diversion Summary</b>					
	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>
<b>Materials Landfilled</b>					
Commercial Wastes	90,755	100,965	97,489	81,172	95,848
Residential Wastes	194,570	184,930	175,964	171,411	185,886
Wastes from City Operations	60,957	29,617	43,411	45,702	34,805
Wastes from Other Municipalities	0	0	0	0	0
<b>Total Materials Landfilled</b>	<b>346,282</b>	<b>315,511</b>	<b>316,864</b>	<b>298,285</b>	<b>316,539</b>
<b>Materials Diverted from Landfill</b>					
Batteries	79	84	92	82	98
Bicycles	14	15	18	15	17
Biosolids	1,219	8,793	9,925	4,418	4,324
Ceramic	281	290	249	273	262
Clean Fill	136,675	104,728	109,640	39,899	44,207
Compostable Materials	53,694	45,338	58,053	56,383	58,403
Concrete	10,145	8,170	9,822	7,093	10,327
Electronics	713	607	611	560	665
Glass	79	40	57	62	91
Household Hazardous Waste	826	660	569	519	577
Lumber	91	12	20	45	142
Mattresses	316	395	308	300	349
Oil	124	121	149	160	185
Oversized Plastics	22	15	14	31	24
Ozone-Containing Appliances	190	201	199	182	204
Recyclables	283	232	80	0	0
Residential Food Waste Collection	115	411	258	0	0
Scrap Metal	726	685	621	601	675
Tires	277	140	259	202	344
<b>Total Materials Diverted from Landfill</b>	<b>205,869</b>	<b>170,936</b>	<b>190,943</b>	<b>110,823</b>	<b>120,894</b>
<b>Total Materials Received</b>	<b>552,151</b>	<b>486,446</b>	<b>507,807</b>	<b>409,107</b>	<b>437,433</b>
<b>Diversion Rate</b>	<b>37%</b>	<b>35%</b>	<b>38%</b>	<b>27%</b>	<b>28%</b>

Note: biosolids weighed on arrival at the BRRMF scale

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### 5.0 GROUNDWATER, SURFACE WATER, LEACHATE, AND LANDFILL GAS MONITORING

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#### 5.1 GROUNDWATER

The land beneath the BRRMF consists of three layers: the uppermost layer is clay (averaging 12 m in thickness), the second layer is till (averaging 6 m in thickness), and the lowest layer is bedrock. Groundwater flows downwards through the clay and till layers into the bedrock aquifer, which flows in a north-east direction. The groundwater in all three layers is saline and non-potable. The major ions in the groundwater from the clay layer are calcium, magnesium, sulfate and bicarbonate. Sodium and chloride are the major ions in the bedrock aquifer. Groundwater in the till layer is generally intermediate in brackishness and shows a gradual change with depth. The groundwater monitoring system includes 34 nested wells: 13 bedrock wells, 12 till wells, and 9 clay wells. The locations of the groundwater monitoring wells are shown on Figure 1.

As per the BRRMF Operating Plan, groundwater is monitored in accordance with the Groundwater Sampling and Analysis Plan (SAP), as specified under Clause 123. Sampling frequency is twice per year for bedrock wells and downgradient till wells, and once per year for clay wells and other till wells distant from the waste areas. As neither Federal nor Manitoba Provincial Governments regulate non-potable groundwater quality, the Ontario Ministry of Environment (MOE) guidelines for non-potable groundwater quality are used as the regulatory guideline (MOE, 2011).

In 2024, a total of 52 groundwater samples were analyzed – 4 samples from wells upgradient of the site (background groundwater quality), and 48 samples from wells cross gradient and downgradient of the site. GWQ25-6N60D and GWQ256N60E were not submitted for PAHs, hydrocarbons, VOCs, pesticide and herbicide due to a sampling technician error, other than this omission, there were no deviations from the Groundwater SAP or from normal sample collection and preservation practices. Results for several parameters were variable between different wells of the same type, and also between spring and autumn results at the same well. The results met the guidelines with the exception of chloride in two till wells and most of the bedrock wells, and petroleum hydrocarbons in three till wells and one bedrock well. The 2024 groundwater results are provided in Appendix B.

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The 2020-2024 average results are provided in Tables 2.1 – 2.3. Although the average concentration of some metals is higher in the downgradient and cross gradient samples than in the upgradient samples, they are below the MOE guidelines. The average dissolved chloride concentration often exceeds the MOE guideline of 2,300 mg/L in upgradient, downgradient, and cross gradient samples.

The Piper diagrams provided in Appendix C display tight groupings of groundwater sampling data, which is indicative of no significant groundwater chemical changes.

Time versus concentration graphs provided in Appendix D show the historical relationship of the analytical parameters at each monitoring location. In general, the analytical results for groundwater obtained in 2024 were found to be similar to those obtained in 2020-2023, and are consistent with background levels.

The Contingency Action Plan identified under Clause 125 was not implemented in 2024.

In 2024, we finalized our re-evaluation of the Groundwater SAP. We are not recommending any changes for the compliance bedrock layer wells, but we are proposing changes for the overburden layer wells, which are not required to be monitored under EAL 3081 R. For till layer wells we propose biennial sampling for the parameters set out in Appendix F of EAL No. 3081, with the exception of total and fecal coliforms and *E. coli*. For clay layer wells we propose continuing with our current parameter list, which is a reduced indicator parameter list, but reducing the sampling frequency to once every five years. A summary of the proposed Groundwater SAP changes is provided in Appendix M.

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## Table 2.1 2020-2024 Groundwater Quality Comparison - Clay Wells

Inorganic Parameters	Units	Criteria	2020		2021		2022		2023		2024	
			Average		Average		Average		Average		Average	
			Upgradient	Downgradient								
Alkalinity - Bicarbonate	mg/L		528	555	519	509	512	462	523	481	540	533
Alkalinity - Carbonate	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Hydroxide	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Total	mg/L		528	555	519	509	512	462	523	481	540	533
Dissolved Hardness (CaCO3)	mg/L		1,370	1,777	1,360	1,713	1,430	1,434	1,510	1,630	2,150	2,897
pH	units		6.81	6.91	6.87	6.87	6.95	7.11	6.79	6.99	6.85	6.91
Specific Conductivity	(µS/cm)		4,820	6,523	4,680	6,528	4,640	6,208	4,380	5,882	4,440	6,066
Turbidity	(ntu)		122.0	329.5	26.8	51.8	50.6	227.7	65.3	31.5	96.0	89.1
Total Dissolved Solids	mg/L		3,960	5,376	3,900	4,823	3,870	4,850	4,280	5,502	3,870	5,513
Total Suspended Solids	mg/L		183	1,143	175	2,919	589	905	<3.0	1,136	422	2,197
Total Solids	mg/L		4,140	6,516	4,070	7,748	4,450	5,753	4,100	6,615	4,290	7,704
Dissolved Chloride (Cl)	mg/L	2,300 *	369	1,057	765	1,892	425	1,018	426	959	448	848
Dissolved Sulphate (SO4)	mg/L		1,680	2,110	1,730	2,052	2,070	2,056	1,570	1,990	1,710	1,960
<b>Nutrients</b>												
Ammonia - Dissolved	mg/L N		0.012	0.362	0.098	0.604	0.048	0.386	0.246	0.356	<0.003	0.293
Nitrate - Dissolved	mg/L N		0.923	0.408	0.654	0.200	0.788	0.335	0.420	0.334	1.210	0.477
Total Kjeldahl Nitrogen	mg/L N		0.2	1.2	1.2	1.6	0.3	1.0	0.8	1.0	<0.2	0.7
Phosphorus - Dissolved	mg/L P		0.027	0.027	<0.013	<0.013	<0.013	0.015	0.029	0.026	0.021	0.026
<b>Organic Indicators</b>												
Chemical Oxygen Demand	mg/L		47	97	37	80	54	105	71	98	54	149
Total Organic Carbon	mg/L		9.9	37.7	8.7	17.6	8.1	13.9	13.2	15.0	10.4	17.5
<b>Metals</b>												
Arsenic (As)- Dissolved	mg/L	1.9*	0.000480	0.000876	0.000500	0.000722	0.000370	0.00130	0.000410	0.001142	0.000660	0.000623
Barium (Ba)- Dissolved	mg/L	29*	0.00870	0.01166	0.00870	0.01157	0.01390	0.01340	0.00880	0.01115	0.01070	0.01076
Beryllium (Be)- Dissolved	mg/L	0.067*	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00003	<0.00002	0.00005	<0.00002
Cadmium (Cd)- Dissolved	mg/L	0.0027*	0.000026	0.000141	0.000050	0.000120	0.000043	0.000078	0.000079	0.000182	0.000078	0.000336
Calcium (Ca)- Dissolved	mg/L		405	597	652	610	532	614	676	541	641	641
Chromium (Cr)- Dissolved	mg/L	0.81*	<0.00010	<0.00010	<0.00010	<0.00010	0.00	0.00026	<0.00050	<0.00050	0.00181	<0.00050
Copper (Cu)- Dissolved	mg/L	0.087*	0.0019	0.0028	0.00313	0.00329	0.00282	0.00345	0.00156	0.00203	0.00236	0.00253
Iron (Fe)- Dissolved	mg/L		0.016	0.011	0.013	0.012	<0.010	0.017	0.033	0.054	0.373	0.042
Lead (Pb)- Dissolved	mg/L	0.025*	<0.000050	<0.000050	0.000106	0.000094	0.000078	0.000203	<0.000050	<0.000050	0.000499	0.000086
Magnesium (Mg)- Dissolved	mg/L		160	285	202	295	206	259	217	368	194	315
Manganese (Mn)- Dissolved	mg/L		1.10	1.47	1.42	1.67	0.16	1.49	1.66	1.70	1.85	1.83
Mercury (Hg)- Total	mg/L	0.0028	<0.0000050	0.0000680	<0.0000050	0.0000852	<0.0000050	<0.0000050	<0.0000050	0.0000095	<0.0000050	0.0000630
Nickel (Ni)- Dissolved	mg/L	0.49*	0.00640	0.00925	0.00696	0.01119	0.00672	0.00719	0.00756	0.01094	0.00758	0.00982
Potassium (K)- Dissolved	mg/L		9.8	10.7	9.7	11.4	9.9	17.5	10.1	12.1	11.0	12.5
Selenium (Se)- Dissolved	mg/L	0.063*	0.00007	0.00048	0.000114	0.00021	0.000121	0.000474	0.000072	0.00036	0.000072	0.00414
Silver (Ag)- Dissolved	mg/L	0.0015*	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000015	0.000011	<0.000010	<0.000010
Sodium (Na)- Dissolved	mg/L	2,300*	267	415	309	509	319	699	333	533	315	482
Zinc (Zn)- Dissolved	mg/L	1.1*	0.00640	0.00611	0.00530	0.00607	0.00480	0.00633	0.00510	0.00575	0.00560	0.01228
<b>Field Parameters</b>												
pH	units		7.44	7.34	7.24	7.26	7.19	7.19	nr	6.74	6.65	6.65
Specific Conductivity	(µS/cm)		4,050	5,010	4,310	5,693	4,570	5,613	nr	7,140	4,711	6,112
<b>Polycyclic Aromatic Hydrocarbons</b>												
Naphthalene	ug/L	6,400	<0.050		<0.050		ns		ns		ns	
Benzo(a)pyrene	ug/L	0.81	<0.0050		<0.0050		ns		ns		ns	
Anthracene	ug/L	2.40	<0.010		<0.010		ns		ns		ns	
<b>Petroleum Hydrocarbons</b>												
F1 (C6-C10 Hydrocarbons)	mg/L	0.75	<0.10		<0.10		ns		ns		ns	
F2 (C10-C16 Hydrocarbons)	mg/L	0.15	<0.10		<0.10		ns		ns		ns	
F3 (C16-C34 Hydrocarbons)	mg/L	0.50	<0.25		<0.25		ns		ns		ns	
F4 (C34-C50 Hydrocarbons)	mg/L	0.50	<0.25		<0.25		ns		ns		ns	
Benzene	ug/L	430	<0.50		<0.50		ns		ns		ns	
Ethylbenzene	ug/L	2,300	<0.50		<0.50		ns		ns		ns	
Toluene	ug/L	18,000	<0.50		<0.50		ns		ns		ns	
Xylene (Total)	ug/L	4,200	<0.64		<0.64		ns		ns		ns	
<b>Volatile Organic Carbons</b>												
Vinyl chloride	ug/L	1.7	<0.50		<0.50		ns		ns		ns	
<b>Pesticides</b>												
Diazinon	ug/L		<0.10		<0.10		ns		ns		ns	
<b>Herbicides</b>												
2,4-D	ug/L		<0.10		<0.10		ns		ns		ns	

Note: Criteria from Ontario Ministry of the Environment, (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition  
 \* Criteria for total chloride and total metals

Note: Where value is expressed as less than (<), the value is halved and used in the calculations, where value is expressed as (+), the value is used in the calculations.

ns - not submitted  
 nr - no result

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## Table 2.2 2020-2024 Groundwater Quality Comparison - Till Wells

Parameters	Units	Criteria	2020		2021		2022		2023		2024	
			Average		Average		Average		Average		Average	
			Upgradient	Downgradient								
<b>Inorganic Parameters</b>												
Alkalinity - Bicarbonate	mg/L		572	554	576	539	174	446	582	423	651	409
Alkalinity - Carbonate	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	32
Alkalinity - Hydroxide	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	49
Alkalinity - Total	mg/L		572	554	576	539	174	446	582	423	651	487
Dissolved Hardness (CaCO <sub>3</sub> )	mg/L		1,240	2,435	1,170	3,216	1,470	4,599	1,360	3,254	1,829	2,112
pH	units		6.95	7.13	6.90	7.12	6.81	7.16	6.83	7.16	6.87	7.08
Specific Conductivity	(µS/cm)		4,080	6,694	4,185	6,874	4,200	6,590	3,880	6,291	3,970	5,875
Turbidity	(ntu)		186	1,636	150	2,747	401	2,953	536	1,865	299	2,599
Total Dissolved Solids	mg/L		3,285	4,318	3,285	4,734	3,910	5,994	3,490	5,370	3,290	5,658
Total Suspended Solids	mg/L		581	7,044	325	11,398	780	12,110	712	8,500	2,580	12,106
Total Solids	mg/L		3,865	11,355	3,615	16,131	4,690	18,101	4,200	12,554	5,870	17,775
Dissolved Chloride (Cl)	mg/L	2,300 *	405	1,415	3,200	1,898	505	1,361	362	1,267	380	1,218
Dissolved Sulphate (SO <sub>4</sub> )	mg/L		1,405	1,500	1,063	1,340	3,590	1,478	1,360	1,466	1,390	1,511
<b>Nutrients</b>												
Ammonia - Dissolved	mg/L N		0.198	0.758	0.612	0.892	0.103	0.718	0.545	0.825	0.169	0.698
Nitrate - Dissolved	mg/L N		0.588	0.189	0.502	0.412	0.670	0.166	0.163	0.119	0.533	0.122
Total Kjeldahl Nitrogen	mg/L N		0.3	1.3	0.7	1.6	0.4	1.4	1.5	1.5	<0.2	1.5
Phosphorus - Dissolved	mg/L P		0.023	0.030	0.081	1.667	<0.013	0.018	0.026	0.028	0.020	0.026
<b>Other</b>												
Cyanide - Total (CN)	mg/L	0.066	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	ns	<0.0050
<b>Organic Indicators</b>												
Chemical Oxygen Demand	mg/L		43	252	42	299	60	579	59	331	50	333
Total Organic Carbon	mg/L		8.4	47.0	8.1	18.9	8.7	30.8	7.9	30.6	10.7	24.9
<b>Metals</b>												
Arsenic (As)- Dissolved	mg/L	1.9*	0.000975	0.001805	0.000865	0.002219	0.000970	0.002403	0.001250	0.003527	0.000630	0.002500
Barium (Ba)- Dissolved	mg/L	29*	0.00840	0.01268	0.00800	0.01244	0.00900	0.01415	0.00820	0.01639	0.00580	0.01431
Beryllium (Be)- Dissolved	mg/L	0.067*	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000030	0.000056	<0.00002	0.00030
Cadmium (Cd)- Dissolved	mg/L	0.0027*	0.000022	0.000050	0.000022	0.000027	0.000021	0.000037	0.000022	0.000061	0.000134	0.000068
Calcium (Ca)- Dissolved	mg/L		416	473	419	439	401	433	454	501	419	441
Chromium (Cr)- Dissolved	mg/L	0.81*	<0.00010	0.00010	<0.00010	0.00016	<0.00010	0.00039	<0.00050	0.00085	<0.00050	0.00123
Copper (Cu)- Dissolved	mg/L	0.087*	0.0016	0.0013	0.0025	0.0016	0.0023	0.0028	0.0016	0.0042	0.0075	0.0063
Iron (Fe)- Dissolved	mg/L		0.058	0.318	0.014	0.488	<0.010	0.454	0.104	1.032	<0.0100	0.978
Lead (Pb)- Dissolved	mg/L	0.025*	<0.000050	0.000064	0.000055	0.000142	0.000063	0.000217	<0.000050	0.000867	<0.000050	0.001054
Magnesium (Mg)- Dissolved	mg/L		166	214	174	224	151	258	192	302	190	253
Manganese (Mn)- Dissolved	mg/L		1.25	0.78	1.28	0.58	1.54	0.53	1.39	0.60	0.87	0.68
Mercury (Hg)- Total	mg/L	0.0028	0.000063	0.0001407	0.000090	0.000037	<0.000050	0.0000376	0.000050	0.0000173	<0.000050	0.00026
Nickel (Ni)- Dissolved	mg/L	0.49*	0.00763	0.00487	0.00768	0.00445	0.00840	0.00464	0.00802	0.00614	0.00777	0.00765
Potassium (K)- Dissolved	mg/L		8.6	16.9	7.8	17.6	7.8	15.7	8.6	20.0	9.1	15.8
Selenium (Se)- Dissolved	mg/L	0.063*	<0.000050	0.00010	0.00008	0.00008	0.000096	0.010769	<0.000050	0.000307	<0.000050	0.010985
Silver (Ag)- Dissolved	mg/L	0.0015*	0.000013	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000011	0.000021	<0.000010	0.000787
Sodium (Na)- Dissolved	mg/L	2,300*	318	676	311	717	633	281	344	755	308	635
Zinc (Zn)- Dissolved	mg/L	1.1*	0.00340	0.00380	0.00410	0.00350	0.00450	0.00416	0.00320	0.00647	0.00870	0.00571
<b>Field Parameters</b>												
pH	units		7.27	7.34	7.39	7.60	7.25	7.50	6.82	7.19	5.57	6.97
Specific Conductivity	(µS/cm)		3,875	5,768	3,620	6,181	4,380	6,291	4,309	7,585	4,433	7,082
<b>Polycyclic Aromatic Hydrocarbons</b>												
Naphthalene	ug/L	6,400	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	ns	<0.050
Benzo(a)pyrene	ug/L	0.81	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	ns	<0.0050
Anthracene	ug/L	2.40	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	ns	<0.010
<b>Petroleum Hydrocarbons</b>												
F1 (C6-C10 Hydrocarbons)	mg/L	0.75	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	ns	<0.10
F2 (C10-C16 Hydrocarbons)	mg/L	0.15	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	ns	<0.10
F3 (C16-C34 Hydrocarbons)	mg/L	0.50	<0.25	0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	ns	<0.25
F4 (C34-C50 Hydrocarbons)	mg/L	0.50	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	ns	<0.25
Benzene	ug/L	430	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	ns	<0.50
Ethylbenzene	ug/L	2,300	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	ns	<0.50
Toluene	ug/L	18,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	ns	<0.50
Xylene (Total)	ug/L	4,200	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.50	<0.50	ns	<0.50
<b>Volatile Organic Carbons</b>												
Vinyl chloride	ug/L	1.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	ns	<0.50
<b>Pesticides</b>												
Diazinon	ug/L		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	ns	<0.025
<b>Herbicides</b>												
2,4-D	ug/L		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.05	<0.50	ns	<2.50

Note: Criteria from Ontario Ministry of the Environment. (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition  
 \* Criteria for total chloride and total metals  
 Note: Where value is expressed as less than (<), the value is halved and used in the calculations, where value is expressed as (>), the value is used in the calculations.  
 ns - not submitted

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## Table 2.3 2020-2024 Groundwater Quality Comparison - Bedrock Wells

Inorganic Parameters	Units	Criteria	2020		2021		2022		2023		2024	
			Average		Average		Average		Average		Average	
			Upgradient	Downgradient								
Alkalinity - Bicarbonate	mg/L		141	138	137	140	145	145	144	148	145	146
Alkalinity - Carbonate	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Hydroxide	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Total	mg/L		141	138	137	140	145	144	144	148	145	146
Dissolved Hardness (CaCO3)	mg/L		819	811	908	809	865	760	693	773	1,333	1,261
pH	units		7.47	7.57	7.36	7.49	7.43	7.52	7.39	7.44	7.45	7.42
Specific Conductivity	(µS/cm)		10,105	8,263	10,050	8,400	10,100	8,401	9,330	7,778	9,000	7,682
Turbidity	(ntu)		11.6	9.6	8.0	10.4	6.5	9.5	7.7	17.2	9.9	25.9
Total Dissolved Solids	mg/L		6,245	5,032	6,370	5,263	6,255	5,115	6,215	5,263	6,280	5,129
Total Suspended Solids	mg/L		359	334	221	334	323	457	519	424	179	367
Total Solids	mg/L		6,610	5,366	6,515	5,484	6,580	5,570	6,730	5,685	6,455	5,502
Dissolved Chloride (Cl)	mg/L	2,300 *	2,800	2,393	5,185	3,045	3,100	2,439	2,770	2,223	2,710	2,294
Dissolved Sulphate (SO4)	mg/L		949	882	512	547	1,003	834	873	713	959	812
<b>Nutrients</b>												
Ammonia - Dissolved	mg/L N		1.43	1.12	1.27	1.06	1.32	1.15	1.35	1.19	0.84	1.16
Nitrate - Dissolved	mg/L N		0.010	0.005	0.013	0.023	0.069	0.017	0.008	0.170	0.043	0.121
Total Kjeldahl Nitrogen	mg/L N		1.7	1.1	1.7	1.3	1.4	1.1	1.4	0.9	0.9	1.3
Phosphorus - Dissolved	mg/L P		<0.013	<0.013	0.017	0.015	0.020	0.013	<0.013	0.023	0.017	0.016
<b>Other</b>												
Cyanide - Total (CN)	mg/L	0.066	0.0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic Indicators</b>												
Chemical Oxygen Demand	mg/L		177	115	185	119	128	105	134	115	151	103
Total Organic Carbon	mg/L		1.5	1.1	1.2	1.0	1.2	1.0	1.6	4.8	10.0	3.2
<b>Metals</b>												
Arsenic (As)- Dissolved	mg/L	1.9*	0.005830	0.006633	0.005455	0.005001	0.003620	0.004445	0.009160	0.005771	0.002550	0.004328
Barium (Ba)- Dissolved	mg/L	29*	0.01250	0.01287	0.01260	0.01287	0.01225	0.01315	0.01190	0.01259	0.01990	0.01148
Beryllium (Be)- Dissolved	mg/L	0.067*	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00002	0.000027	0.001000	0.000730
Cadmium (Cd)- Dissolved	mg/L	0.00027*	0.000006	<0.000005	0.000016	0.000008	0.000007	<0.000005	0.000008	0.000006	0.000109	0.000041
Calcium (Ca)- Dissolved	mg/L		315	295	331	294	359	302	355	287	306	269
Chromium (Cr)- Dissolved	mg/L	0.81*	<0.00010	0.00012	<0.00010	0.00015	<0.00010	<0.00010	<0.00050	<0.00050	0.00059	0.00057
Copper (Cu)- Dissolved	mg/L	0.087*	<0.0002	0.0003	0.0012	0.0009	0.0002	0.0004	0.0021	0.0006	0.0062	0.0007
Iron (Fe)- Dissolved	mg/L		1.305	0.750	1.310	0.772	0.650	0.421	1.380	1.024	0.412	0.685
Lead (Pb)- Dissolved	mg/L	0.025*	0.000152	<0.000050	0.000210	0.000085	0.000090	<0.000050	0.000089	<0.000050	0.000785	0.000811
Magnesium (Mg)- Dissolved	mg/L		151	160	162	152	166	160	159	138	143	143
Manganese (Mn)- Dissolved	mg/L		0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.05	0.04	0.04
Mercury (Hg)- Total	mg/L	0.0028	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000096	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)- Dissolved	mg/L	0.49*	0.00136	0.00119	0.00184	0.00145	0.00121	0.00122	0.00115	0.00111	0.00357	0.00425
Potassium (K)- Dissolved	mg/L		46.6	36.9	43.2	34.4	45.1	36.3	48.0	38.1	37.7	34.8
Selenium (Se)- Dissolved	mg/L	0.063*	<0.000050	<0.000050	<0.000050	0.00011	<0.000050	0.00006	<0.000050	0.00006	0.01100	0.009494
Silver (Ag)- Dissolved	mg/L	0.0015*	0.000020	0.000028	<0.000100	0.000069	<0.000010	<0.000010	<0.000010	0.000019	<0.0050	0.001261
Sodium (Na)- Dissolved	mg/L		1,645	1,306	1,675	1,308	1,585	1,285	1,600	1,318	1,515	1,170
Zinc (Zn)- Dissolved	mg/L	1.1*	0.00465	0.00400	0.00440	0.00421	0.00330	0.00368	0.00320	0.00513	0.01970	0.00573
<b>Bacteria</b>												
Total Coliforms (MTF)	MPN/100mL		<1	5	<1	<1	<1	2	<1	114	<1	16
Fecal Coliforms (MTF)	MPN/100mL		<1	<1	<1	<1	<1	<1	<1	24	<1	<1
E. coli (MTF)	MPN/100mL		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
<b>Field Parameters</b>												
pH	units		8.16	8.09	7.88	7.96	7.59	7.71	7.32	7.59	7.43	7.36
Specific Conductivity	(µS/cm)		9,185	7,403	8,735	6,635	8,155	9,436	10,061	7,917	10,234	8,446
<b>Polycyclic Aromatic Hydrocarbons</b>												
Naphthalene	ug/L	6,400	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	ug/L	0.81	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	ug/L	2.40	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
<b>Petroleum Hydrocarbons</b>												
F1 (C6-C10 Hydrocarbons)	mg/L	0.75	<0.10	<0.10	0	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
F2 (C10-C16 Hydrocarbons)	mg/L	0.15	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
F3 (C16-C34 Hydrocarbons)	mg/L	0.50	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
F4 (C34-C50 Hydrocarbons)	mg/L	0.50	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzene	ug/L	430	<0.50	<0.50	3.26	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Ethylbenzene	ug/L	2,300	<0.50	<0.50	7.58	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Toluene	ug/L	18,000	<0.50	<0.50	25.38	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Xylene (Total)	ug/L	4,200	<0.64	<0.64	32.86	<0.64	<0.64	<0.64	<0.50	<0.50	<0.50	<0.50
<b>Volatile Organic Carbons</b>												
Vinyl chloride	ug/L	1.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
<b>Pesticides</b>												
Diazinon	ug/L		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.025	<0.025
<b>Herbicides</b>												
2,4-D	ug/L		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.05	<0.05	<0.05	<0.25

Note: Criteria from Ontario Ministry of the Environment. (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition  
 \* Criteria for total chloride and total metals

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### 5.2 SURFACE WATER

Surface water flows at the BRRMF are managed by perimeter ditching and the central access road, which creates a barrier between the impacted water ditches on the north and the clean water ditches on the south; there are also eight surface water retention ponds. The system is designed to run dry for most of the year, as such, grab sampling is performed three times per year: spring run-off, summer run-off, and autumn run-off. The surface water sampling points are shown in Figure 2.

As per the BRRMF Operating Plan, surface water is managed in accordance with the Surface Water Sampling and Analysis Plan (SAP), as specified under Clause 115. Compliance parameters are applied to the upstream and downstream sampling points, with modifications at other locations interior to the site. Sampling for the clean water ponds (SWQ-25-9a and b) is similar to sampling for perimeter ditching. Sampling for impacted water ponds: Active Area Collection Pond (SWQ-25-6), Biosolids Storm Water Pond (SWQ-25-7), Leaf and Yard Waste Storm Water Pond (SWQ-25-8) and dry ponds (SWQ-25-11 a, b, and c) is performed prior to discharge events. The Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines for the Protection of Freshwater Aquatic Life are used as the regulatory guideline (CCME, 2019). Weekly field monitoring is performed at the weir from spring thaw to freeze-up.

In 2024, a total of 31 surface water samples were analyzed – two upstream samples, five downstream samples, eleven interior samples, and thirteen pond samples. No sample was collected at SWQ25-1 in the fall because the location was dry. There were no deviations from the Surface Water SAP or from normal sample collection and preservation practices. Weekly weir data is provided in Appendix E and the 2024 surface water results are provided in Appendix F.

The analytical results for some of the pond samples exceeded the guidelines for pH, arsenic, cadmium, copper, iron, lead, selenium and zinc; the water was retained in the ponds or hauled for treatment as required. Some of the analytical results for perimeter ditching were highly variable between sample points, and between sample dates at the same location, but most were below the CCME guidelines. The concentration of iron exceeded the CCME guideline at the upstream location, one of the downstream locations and at two interior locations. Arsenic, cadmium, copper, and selenium exceeded the guideline at some interior and downstream locations, this is due to its natural occurrence in Manitoba soils.

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The 2020-2024 results for upstream and downstream locations are provided in Table 3 and time versus concentration graphs showing the historical relationship of the analytical parameters at each monitoring location are provided in Appendix G. The analytical results for surface water are variable between locations and year over year, but are generally higher at the downstream locations, although only arsenic, cadmium, copper, iron, and selenium exceeded the CCME guidelines at downstream locations in 2024.

The Contingency Action Plan identified under Clause 125 was not implemented in 2024.

In 2024, we finalized our re-evaluation of the Surface Water SAP. The City is not proposing any changes to sampling frequency or parameters for upstream and downstream surface water monitoring locations, but is proposing to reduce frequency of sampling for the clean water ponds and intermediate points along the South Perimeter Ditch to an as-needed basis. A summary of the proposed Surface Water SAP changes is provided in Appendix M.

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### Table 3. 2020-2024 Surface Water Monitoring - Perimeter Ditch Comparison

	Units	Criteria*	2020		2021		2022		2023		2024	
			Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream
<b>Inorganic Parameters</b>												
Alkalinity - Bicarbonate	mg/L		149	252	185	213	207	438	351	934	160	421
Alkalinity - Carbonate	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Hydroxide	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Total	mg/L		149	252	185	213	207	438	351	934	160	421
Dissolved Hardness (CaCO3)	mg/L		71	77	105	319	112	178	145	944	151	411
pH	units	6.5-9.0	7.35	7.76	7.28	8.00	7.21	7.77	7.48	7.90	7.36	7.73
Specific Conductivity	(µS/cm)		344	741	433	1,100	423	1,627	325	2,956	336	1,191
Turbidity	(ntu)		7.0	12.6	28.4	683.0	165.8	39.6	269.0	139.6	13.2	26.6
Total Dissolved Solids	mg/L		208	424	270	706	295	1,016	240	2,004	206	809
Total Suspended Solids	mg/L		54	252	52	2,750	351	135	490	210	65	476
Total Solids	mg/L		262	676	322	3,460	647	1,148	730	2,215	271	1,285
Dissolved Chloride (Cl)	mg/L	640*	13	51	22	89	18	171	14	493	9	156
Dissolved Sulphate (SO4)	mg/L		<0.4	55	20	285	1	181	3	103	1	11
<b>Nutrients</b>												
Ammonia - Dissolved	mg/L N		0.062	0.026	0.013	**na	0.174	0.805	0.131	0.154	<0.003	0.333
Nitrate - Dissolved	mg/L N	13	0.006	0.863	<0.003	<0.003	<0.003	0.554	0.034	0.682	0.039	0.093
Total Kjeldahl Nitrogen	mg/L N		0.30	2.10	0.97	2.74	1.43	5.23	0.60	7.40	1.30	6.10
Phosphorus - Dissolved	mg/L P		0.140	0.283	0.077	0.036	0.690	0.884	0.075	0.462	0.173	0.365
<b>Other</b>												
Cyanide - Total (CN)	mg/L	0.0050	<0.0010	0.0010	<0.0010	0.0026	<0.0010	0.0027	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic Indicators</b>												
Chemical Oxygen Demand	mg/L		49	154	63	220	149	158	133	300	54	248
Biochemical Oxygen Demand	mg/L		4	13	<4	<4	6	<4	7	18	3	15
<b>Metals</b>												
Arsenic (As)- Dissolved	mg/L	0.0050*	0.0030	0.0054	0.0045	0.0040	0.0049	0.0121	0.0022	0.0223	0.0033	0.0108
Barium (Ba)- Dissolved	mg/L		0.0276	0.0482	0.0422	0.0514	0.0334	0.1079	0.0309	0.2129	0.0268	0.1004
Beryllium (Be)- Dissolved	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00003	0.00005	<0.00002	0.00027
Cadmium (Cd)- Dissolved	mg/L	0.00009*	0.000013	0.000400	0.000024	0.000010	0.000006	0.000012	0.000025	0.000021	0.000007	0.000043
Calcium (Ca)- Dissolved	mg/L		30.7	45.1	37.9	70.8	40.7	71.3	28.5	106.7	30.3	56.2
Chromium (Cr)- Dissolved	mg/L		0.00014	0.00042	0.00015	0.00013	0.00018	0.00083	0.00111	0.00159	<0.00050	0.00170
Copper (Cu)- Dissolved	mg/L	0.0040*	0.00191	0.00117	0.00159	0.00286	0.00105	0.00430	0.00231	0.00213	0.00099	0.00359
Iron (Fe)- Dissolved	mg/L	0.30*	0.095	0.082	0.070	0.058	0.632	0.116	0.544	0.538	0.328	0.354
Lead (Pb)- Dissolved	mg/L	0.0070*	0.000096	0.000102	0.000089	<0.000050	0.000055	0.000108	0.000572	0.000542	0.000170	0.000500
Magnesium (Mg)- Dissolved	mg/L		20.1	44.8	20.8	61.6	21.0	82.4	18.0	164.6	18.3	67.0
Manganese (Mn)- Dissolved	mg/L		0.0616	0.0611	0.2550	0.0613	0.1977	0.3623	0.0295	0.7719	0.1299	0.3355
Mercury (Hg)- Dissolved	mg/L	0.000026*	<0.000010	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Nickel (Ni)- Dissolved	mg/L	0.150*	0.00214	0.00781	0.00263	0.00537	0.00426	0.01905	0.00237	0.04113	0.00207	0.02070
Potassium (K)- Dissolved	mg/L		9.2	22.9	9.5	30.3	8.7	83.3	9.3	98.1	6.7	51.5
Selenium (Se)- Dissolved	mg/L	0.0010*	0.000188	0.000370	0.000115	0.000411	0.000211	0.000464	0.000125	0.000450	0.000109	0.003480
Sodium (Na)- Dissolved	mg/L		9	39	13.9	49	9.8	95	8.7	262	8.7	94
Zinc (Zn)- Dissolved	mg/L	0.030*	0.0037	0.0057	0.0015	0.0058	0.0012	0.0048	0.0046	0.0052	0.0024	0.0030
<b>Bacteria</b>												
Total Coliforms (MTF)	MPN/100mL		365	461	>2,420	387	9,390	3,966	>2,420	1,842	1,393	2,277
Fecal Coliforms (MTF)	MPN/100mL		3	17	31	3	409	215	64	1,102	55	169
E. coli (MTF)	MPN/100mL		1	3	12	4	580	235	67	1,614	31	211
<b>Field Parameters</b>												
pH	units	6.5-9.0	8.19	8.02	8.95	9.16	7.28	7.68	6.83	8.04	7.30	7.80
Specific Conductivity	(µS/cm)		3,780	7,060	413	1,205	525	1,579	300	2,947	654	1,224
Temperature	°C		9.3	10.4	3.6	6.5	18.5	19.3	20.0	19.8	16.2	18.4

Note: Criteria from Canadian Council of Ministers of the Environment, Canadian Environmental Quality Guidelines Summary Table, Water Quality Guidelines for the Protection of Freshwater Aquatic Life, (CCME, 2019)  
\* Criteria for total chloride and total metals

**BRADY ROAD RESOURCE MANAGEMENT FACILITY ANNUAL REPORT – 2024****5.3 LEACHATE**

The leachate management system is a network of manholes/risers, drains, and sumps around the perimeter of the landfill cells, which feed into a header pipe. The leachate flows via gravity and lift stations into a 300,000L storage tank located at the intersection of Charette Road and the access road, which acts as a truck fill station for hauling to the North End Pollution Control Centre (NEWPCC) for treatment. Leachate can also be pumped from eleven collection manholes and one riser if needed; these sites also serve as sampling points. The locations of the manholes and riser are shown on Figure 1.

As per the BRRMF Operating Plan, leachate is managed in accordance with the Leachate Sampling and Analysis Plan (SAP), as specified under Clause 100. The MOE guidelines for non-potable groundwater quality are used as the regulatory guideline (MOE, 2011).

The total volume of leachate removed from the BRRMF in 2024 was 27,570 kL. There were no occurrences of leachate breakout from the development in 2024. The Contingency Action Plan identified under Clause 125 was not implemented in 2024.

In 2024, thirteen leachate samples were analyzed. Leachate samples were analyzed for soluble metals instead of total metals in 2024 because total metals are not required under EAL No. 3081 and they don't allow us to compare against our surface water and groundwater results. Other than total metals, there were no deviations from the Leachate SAP or from normal sample collection and preservation practices.

Monthly leachate elevations are provided in Appendix H, and the 2024 leachate results are provided in Appendix I. The majority of parameters were highly variable between manholes; some of the samples exceeded the MOE guidelines for chloride, extractables, petroleum hydrocarbons, and dioxins and furans. Leachate is highly variable due to waste composition, amount of precipitation, site hydrology, waste compaction, cover, and interaction of leachate with the environment.

The 2020-2024 average results are provided in Table 4, and Piper diagrams showing the historical relationship of cations and anions at each monitoring location are provided in Appendix J. Many of the parameters measured vary significantly from year to year, although the average results usually meet the MOE guidelines. In 2024, the averages for anthracene, polyaromatic hydrocarbons and petroleum hydrocarbons exceeded the MOE guidelines.

**BRADY ROAD RESOURCE MANAGEMENT FACILITY ANNUAL REPORT – 2024**

In 2024, we finalized our re-evaluation of the Leachate SAP. The proposed recommendation is to eliminate sampling of the individual manholes that are connected to the centralized collection tank and eliminate analysis of the parameters listed in NEWPCCs EAL No. 2684 RRR Schedule A. To facilitate comparison with Surface Water and Groundwater results, the Leachate parameter list has been updated to include the combined analytes from EAL No. 3081R Appendices F and G. A summary of the proposed Leachate SAP changes is provided in Appendix M.

## Brady Road Resource Management Facility Annual Report – 2024



**Water and Waste  
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### Table 4. 2020-2024 Leachate Quality Comparison

			2020	2021	2022	2023	2024
			Average	Average	Average	Average	Average
Field Parameters	Units	Criteria					
pH	units		7.39	7.80	7.38	7.09	7.20
Turbidity - NTU	ntu		77	112.0	125	222	412
Specific Conductivity	uS/cm		10,160	10,444	10,853	13,991	14,995
Temperature	°C		11.5	19.5	15.9	13.0	17.7
<b>Inorganic Parameters</b>							
Alkalinity - Bicarbonate	mg/L		5,438	5,346	4,549	11,743	5,452
Alkalinity - Carbonate	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Hydroxide	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Total	mg/L		5,438	5,346	4,549	11,743	5,452
Hardness (as CaCO <sub>3</sub> )	mg/L		2,164	871	1,505	1,546	1,218
pH - units	units		7.33	7.30	7.23	nr	7.16
Specific Conductivity	uS/cm		11,893	13,656	12,100	9,482	12,302
Turbidity - NTU	ntu		78	426.5	198	200	173
Total Dissolved Solids	mg/L		7,315	8,109	10,069	12,554	10,770
Total Suspended Solids	mg/L		374	1,495	540	621	1,097
Total Solids	mg/L		7,686	9,610	10,611	13,179	11,872
Chloride (dissolved)	mg/L	2300 *	1,456	1,628	1,611	1,639	1,355
Sulphate (dissolved)	mg/L		97	117	276	339	190
<b>Other</b>							
Cyanide (CN)	mg/L	0.066	0.011	0.015	0.017	0.054	0.009
<b>Nutrients</b>							
Dissolved Ammonia	mg/L		642	459	511	522	718
Nitrate Nitrogen	mg/L		1.75	1.82	0.27	0.21	0.80
Total Kjeldhal Nitrogen	mg/L		978	977	1,059	972	4,111
Phosphorus (Total)	mg/L		3.49	9.70	8.61	9.62	5.72
<b>Organic Indicators</b>							
Biological Oxygen Demand	mg/L		1,340	2,483	4,791	7,234	2,572
Chemical Oxygen Demand	mg/L		2,049	3,793	1,630	4,559	7,832
<b>Metals</b>							
Total Arsenic (As)	mg/L	1.9	0.0179	0.0218	0.0171	0.0283	ns
Total Barium (Ba)	mg/L	29	0.393	0.479	0.342	0.517	ns
Total Beryllium (Be)	mg/L	0.067	<0.00003	<0.00003	<0.00003	0	ns
Total Cadmium (Cd)	mg/L	0.0027	<0.000007	0.000582	0.000156	0.000590	ns
Total Calcium (Ca)	mg/L		297	349	603	634	490
Total Chromium (Cr)	mg/L	0.81	0.1253	0.1673	0.1278	0.1501	ns
Total Chromium (Hexavalent)	mg/L		0.0007	0.00067	0.00036	0.02046	<0.010
Total Copper (Cu)	mg/L	0.087	0.0147	0.0647	0.0244	0.0324	ns
Total Iron (Fe)	mg/L		24.3	49.2	45.4	68.3	ns
Total Lead (Pb)	mg/L	0.025	0.00345	0.02170	0.00471	0.01357	ns
Total Magnesium (Mg)	mg/L		345	323	325	359	322
Total Manganese (Mn)	mg/L		1.749	1.723	2.245	2.550	ns
Total Mercury (Hg)	mg/L	0.0028	0.000031	0.000044	0.000015	0.000047	0.000025
Total Nickel (Ni)	mg/L	0.49	0.2481	0.2903	0.2871	0.3189	ns
Total Potassium (K)	mg/L		392	401	429	464	408
Dissolved Selenium (Se)	mg/L	0.063 *	0.00176	0.00206	0.00215	0.00380	ns
Total Silver (Ag)	mg/L	0.0015	0.000092	0.000151	0.000102	0.000235	ns
Total Sodium (Na)	mg/L	2,300	1,103	1,116	1,155	1,262	1,155
Total Zinc (Zn)	mg/L	1.1	0.263	1.127	0.317	0.472	ns

Note: Criteria from Ontario Ministry of the Environment. (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.I of the Environmental Protection Act Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition

\*Criteria for total chloride and total metals

ns - not submitted

## Brady Road Resource Management Facility Annual Report – 2024



**Water and Waste  
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### Table 4. 2020-2024 Leachate Quality Comparison

			2020	2021	2022	2023	2024
			Average	Average	Average	Average	Average
	Units	Criteria					
<b>Extractables</b>							
Benzo (a) Pyrene (PAH)	ug/L	0.81	0.31	1.01	0.36	0.47	1.45
Anthracene	ug/L	2.4	1.01	1.44	1.51	2.93	3.91
4'4' Methylenebis 2 Chloroaniline	ug/L		<1.0	<5.0	<50.0	<4.0	<0.50
Benzo (a) anthracene (PAH)	ug/L	4.7	0.10	1.74	0.50	0.81	2.25
Benzo (b/j) fluoroanthene (PAH)	ug/L		0.81	0.69	0.47	0.46	1.49
Benzo (g,h,i) Perylene (PAH)	ug/L	0.2	0.17	0.85	0.15	0.18	1.05
Hexachlorobenzene	ug/L	3.1	<0.040	<0.080	0.0028	<0.0080	<0.040
Phenanthrene	ug/L	580	4.00	5.53	6.07	12.75	17.21
Phenol	mg/L	12	0.183	0.366	0.877	1.690	0.320
<b>Petroleum Hydrocarbons</b>							
CCME Petroleum Hydrocarbon Fraction F1	mg/L	0.75	0.92	2.75	2.45	1.65	0.42
CCME Petroleum Hydrocarbon Fraction F2	mg/L	0.15	0.47	1.91	2.71	27.28	1.34
CCME Petroleum Hydrocarbon Fraction F3	mg/L	0.50	8.45	19.0	2.49	5.03	2.23
CCME Petroleum Hydrocarbon Fraction F4	mg/L	0.50	1.61	2.68	0.40	0.74	0.34
<b>Volatile Organic Carbons</b>							
Vinyl Chloride	ug/L	1.7	0.90	0.60	0.40	0.43	<0.50
1,4 Dichlorobenzene	ug/L	67	3.80	3.80	3.90	4.11	4.08
Chloroform	ug/L	22	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene	ug/L	17	<0.50	0.59	<0.50	0.34	<0.50
Tetrachloroethene	ug/L	17	0.56	0.98	<0.50	0.31	<0.50
<b>Polychlorinated Biphenyls</b>							
Aroclor 1016	ug/L		<0.13	<2.0	<3.5	<1.0	<1.39
Aroclor 1221	ug/L		<0.13	<2.0	<3.5	<1.0	<1.39
Aroclor 1232	ug/L		<0.13	<2.0	<3.5	<1.0	<1.39
Aroclor 1242	ug/L		1.3	<2.0	0.4	0.21	0.15
Aroclor 1248	ug/L		<0.13	<2.0	<3.5	<1.0	<1.39
Aroclor 1254	ug/L		<0.10	0.15	0.04	0.06	<0.09
Aroclor 1260	ug/L		<0.20	<0.40	<0.40	<2.0	<0.10
Total PCBs	ug/L	15	1.3	<6.0	0.7	0.45	0.27
<b>Pesticides and Herbicides</b>							
Diazinon	ug/L		<62	<0.5	<0.4	<9.4	<0.025
2,4-D	ug/L		4.1	10.4	21.7	15.1	8.5
Aldrin	ug/L	8.5	<0.040	<0.080	<0.020	<0.0080	<0.040
gamma-Hexachlorocyclohexane (Lindane)	ug/L	1.2	<0.040	<0.080	0.0052	<0.0080	<0.040
MCPA	ug/L		5.0	5.0	<5.0	<10.0	<50.0
Methoxychlor	ug/L	6.5	<0.120	<0.030	<0.020	<0.056	0.022
Mirex	ug/L		<0.080	<0.040	0.033	<0.0080	<0.040
<b>Bacteria</b>							
Total Coliforms	MPN/100mL		9,056	309,209	11,836	4,114	8,952
Fecal Coliforms	MPN/100mL		831	77,707	2,581	134	3,896
E. coli	MPN/100mL		770	6,354	2,635	64	3,861

Note: Criteria from Ontario Ministry of the Environment. (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.I of the Environmental Protection Act Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition

**BRADY ROAD RESOURCE MANAGEMENT FACILITY ANNUAL REPORT – 2024****5.4 LANDFILL GAS****5.4.1 COLLECTION AND FLARING SYSTEM**

Landfill gas (LFG) produced at the BRRMF is comprised primarily of methane (CH<sub>4</sub>) and carbon dioxide (CO<sub>2</sub>) in approximately equal amounts. These greenhouse gases contribute to global warming, but CH<sub>4</sub> has a global warming potential 28 times that of CO<sub>2</sub>. To reduce emissions, the LFG is collected via a series of pipes beneath the BRRMF, and sent to a flare where the CH<sub>4</sub> is reduced to CO<sub>2</sub> and water vapor. The landfill gas collection and flaring system (LFGCFS) is run by Integrated Gas Recovery Systems Inc. on behalf of the City of Winnipeg.

As per the BRRMF Operating Plan, LFG operations and monitoring are managed through the Landfill Gas Operating Plan, submitted October 23, 2014, as per Clause 110.

During operation in 2024, the LFGCFS operated as was intended.

The 2024 Landfill Gas Collection and Flaring Report, prepared by Integrated Gas Recovery Services Inc., is attached in Appendix K.

**5.4.2 SUBSURFACE LANDFILL GAS MONITORING PROGRAM**

LFG that is not collected or that cannot escape into the atmosphere may migrate into neighboring land below the ground surface. The purpose of LFG migration monitoring is to detect gas migration before it becomes a safety hazard to neighbouring properties.

As per the BRRMF Operating Plan, subsurface LFG migration is managed in accordance with the Subsurface Landfill Gas Monitoring Program, submitted on October 23, 2014, as specified under Clause 111. Probes are monitored monthly for methane (CH<sub>4</sub>), oxygen (O<sub>2</sub>), carbon monoxide (CO), and hydrogen sulphide (H<sub>2</sub>S).

In 2024, the maximum level of CH<sub>4</sub> measured was 0.2%. The Subsurface Landfill Gas Contingency Plan was not activated, indicating that the LFGCFS is operating effectively.

The 2024 subsurface gas migration probe data is provided in Appendix L.

## BRADY ROAD RESOURCE MANAGEMENT FACILITY ANNUAL REPORT – 2024

### 6.0 NUISANCE MANAGEMENT

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In order to reduce odour, litter, and vector nuisances at the landfill, several best practices and operating procedures are used, such as placement of screens, minimizing the working face of each cell, application of appropriate cover material (daily, intermediate, or final), site landscaping, weekly litter control patrols, and odour monitoring. If necessary, a licensed professional will apply vector control products, ensuring that appropriate chemicals are used and are properly handled. Noise is not a significant issue due to the separation from surrounding homes. Fugitive dust emissions are minimized by spraying site roads with uncontaminated surface water.

In 2024, there were 105 odour complaints from 52 customers; in all cases the source of the odour was investigated. None of the complaints were due to litter or vector nuisances at the landfill. If the source of the odour could be located within the BRRMF, if possible, we immediately covered the odour causing material, moved the tipping face to a more favorable area if available, and used compost or wood chips to reduce the odour and prevent further occurrence.

**BRADY ROAD RESOURCE MANAGEMENT FACILITY ANNUAL REPORT – 2024****7.0 CONCLUSION**

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The diversion operations taking place at the BRRMF have been effective in diverting tens of thousands of metric tonnes of material from the landfill.

The quality of the groundwater beneath the site has not been negatively impacted, as demonstrated by the comparison of upstream to downstream groundwater quality.

The quality of the surface water measured at the weir is statistically similar to the quality of the surface water upstream of the BRRMF.

Leachate management was successful in 2024 as there were no breakouts of leachate.

The areas where landfill gas is escaping should be repaired.

The BRRMF will continue to operate so as to ensure that the environment is maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for present and future Manitobans.

**8.0 REFERENCES**

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1. Brady Road Resource Management Facility – Manitoba Environment Act Licence No. 3081 R

<https://www.winnipeg.ca/waterandwaste/pdfs/garbage/bradylicence.pdf>

2. Ontario Ministry of the Environment. (2011, July 1). Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition.

<https://www.ontario.ca/page/soil-ground-water-and-sediment-standards-use-under-part-xv1-environmental-protection-act>

3. Canadian Council of Ministers of the Environment. Canadian Environmental Quality Guidelines Summary Table. Water Quality Guidelines for the Protection of Freshwater Aquatic Life. (CCME, 2019).

<http://ceqg-rcqe.ccme.ca/download/en/221>

**FIGURE 1**  
**BRRMF LAYOUT,**  
**GROUNDWATER SAMPLING**  
**LOCATIONS, AND LEACHATE**  
**COLLECTION SYSTEM**



**FIGURE 2**  
**SURFACE WATER SAMPLING**  
**LOCATIONS**



**APPENDIX A**  
**2024 INCIDENT REPORTS**



Water and Waste Department • Service des eaux et des déchets

June 21, 2024

Our File No.: G-249

Manitoba Conservation and Climate  
Environmental Approvals Branch  
14 Fultz Blvd  
Winnipeg, MB R3Y 0L6

Attention: Mehak Bajwa, P. Eng., M.Eng

**RE: Emergency Liner Repair Cell 34, Environment Act Licence No. 3081 R, Brady Road Resource Management Facility, Client File No. 5556.00**

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Please accept this letter as a Notice of an Emergency Liner Repair for the above noted Environment Act Licence.

Brady Road Resource Management Facility (BRRMF) had a fire that occurred on April 8, 2024 in Cell 34 in the southeast corner of the new cell. Fire trucks responded to the fire around 8:30pm and the fire was extinguished by 6:00am on April 9<sup>th</sup>. After the fire was extinguished it was determined the 60 mil High Density Polyethylene (HDPE) liner received minor damage in two spots as a result of the incident. Sonja Bridges, Acting Regional Supervisor conducted a follow-up inspection on April 17<sup>th</sup>, 2024 with City of Winnipeg staff, Chris Kozak and Sean Steeves where a plan to repair the liner was discussed.

A specialized contractor was then called to repair the liner, the same contractor that initially installed the liner, and the only contractor that is currently available for this type of repair in the Province of Manitoba. Difficult site conditions (more than normal precipitation levels and specialized equipment being needed to remove the aggregate from the liner) resulted in preparation of the HDPE liner taking much longer than anticipated, this resulted in little notice of the repair to the HDPE liner as availability was extremely limited.

June 20<sup>th</sup>, 2024 Titan Environmental Containment came to BRRMF to repair the HDPE liner in the two damaged spots. The repairs were completed in accordance with Clause 33 of the above noted Environment Act Licence, a QA – QC report package is attached.

June 24<sup>th</sup>, 2024 Sonja Bridges, Acting Regional Supervisor and Desalegn Edossa, Environmental Engineer visited BRRMF and the repaired HDPE liner areas where it was determined a Letter of Notice was needed to grant final approval of the repaired areas and permission to use the repaired area of the landfill cell.

Should you have any questions or require additional information, please feel free to contact the undersigned at (204) 986-2384 or at [ckozak@winnipeg.ca](mailto:ckozak@winnipeg.ca). Thank you for your consideration.



**Water and Waste Department • Service des eaux et des déchets**

| Yours truly,

Chris Kozak, C.E.T.  
Superintendent of Operations, Solid Waste Services

**APPENDIX B**  
**2024 GROUND WATER DATA**



2024 Groundwater Monitoring  
- Clay Wells

	Sample Number Units Criteria*		Upgradient	Downgradient and Cross Gradient							
			GWQ25-6N60DR	GWQ25-5N62D	GWQ25-6N63E	GWQ25-6N57DR	GWQ25-6N58DR	GWQ25-6N59DR	GWQ25-6N67E	GWQ25-4N34B	GWQ25-4N34C
			656198/663017	656206/665090	656207/664724	656209/666604	656215/663684	656217/661841	656211/664422	656214/662709	656213/662708
		Spring	Spring	Spring	Spring	Spring	Spring	Spring	Spring	Spring	
<b>Inorganic Parameters</b>											
Alkalinity - Bicarbonate	mg/L		540	488	578	505	515	537	460	642	541
Alkalinity - Carbonate	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Hydroxide	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Total	mg/L		540	488	578	505	515	537	460	642	541
Dissolved Hardness (CaCO3)	mg/L		2,150	3,698	2,882	2,415	2,757	2,638	2,118	4,263	2,407
pH	units		6.85	6.82	6.85	6.82	6.77	6.85	6.84	7.17	7.18
Specific Conductivity	(µS/cm)		4,440	7,910	6,160	5,560	6,070	5,760	4,450	7,580	5,040
Turbidity	(ntu)		96.0	16.5	34.9	31.9	54.7	20.6	13.4	106	435
Total Dissolved Solids	mg/L		3,870	6,790	5,320	4,880	5,240	4,800	3,760	6,950	6,360
Total Suspended Solids	mg/L		422	1,871	430	59.5	556	1,299	297	982	12,080
Total Solids	mg/L		4,290	8,660	5,750	4,940	5,800	6,100	4,050	7,930	18,400
Dissolved Chloride (Cl)	mg/L	2,300*	448	1,850	904	750	1,030	49.0	512	nr	840
Dissolved Sulphate (SO4)	mg/L		1,710	2,440	2,200	2,000	2,010	1,700	1,350	2,840	1,140
<b>Nutrients</b>											
Ammonia - Dissolved	mg/L N		<0.003	0.638	0.485	0.237	0.037	0.261	0.586	0.034	0.065
Nitrate - Dissolved	mg/L N		1.21	0.203	0.201	0.683	0.999	0.980	0.138	0.139	0.470
Total Kjeldahl Nitrogen	mg/L N		<0.2	1.8	0.8	0.2	0.3	0.5	0.7	0.8	0.8
Phosphorus - Dissolved	mg/L P		0.021	0.019	0.020	0.029	<0.013	0.067	0.018	0.027	0.021
<b>Organic Indicators</b>											
Chemical Oxygen Demand	mg/L		54	161	72	53	93	59	49	90	616
Total Organic Carbon	mg/L		10.4	32.7	14.6	13.2	20.2	13.3	12.3	16.1	17.7
<b>Metals</b>											
Arsenic (As)- Dissolved	mg/L	1.9*	0.00066	0.00106	0.00058	0.00046	0.00050	0.00040	0.00044	0.00077	0.00077
Barium (Ba)- Dissolved	mg/L	29*	0.0107	0.0141	0.0099	0.0100	0.0097	0.0109	0.0089	0.0124	0.0102
Beryllium (Be)- Dissolved	mg/L	0.067*	0.00005	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Cadmium (Cd)- Dissolved	mg/L	0.0027*	0.000078	0.000184	0.000101	0.001970	0.000111	0.000076	0.000086	0.000080	0.000078
Calcium (Ca)- Dissolved	mg/L		541	866	684	586	659	672	505	683	474
Chromium (Cr)- Dissolved	mg/L	0.81*	0.00181	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Copper (Cu)- Dissolved	mg/L	0.087*	0.00236	0.00143	0.00143	0.00404	0.00322	0.00212	0.00179	0.00404	0.00218
Iron (Fe)- Dissolved	mg/L		0.3730	0.0470	0.0420	0.0210	0.0300	<0.0100	<0.0100	<0.0100	0.1780
Lead (Pb)- Dissolved	mg/L	0.025*	0.000499	0.000132	<0.000050	0.000204	0.000164	<0.000050	<0.000050	<0.000050	0.000086
Magnesium (Mg)- Dissolved	mg/L		194	373	285	231	270	233	208	621	297
Manganese (Mn)- Dissolved	mg/L		1.85	2.59	2.37	1.38	4.19	2.59	0.399	0.079	1.08
Nickel (Ni)- Total	mg/L	0.0028*	<0.000050	<0.000050	<0.000050	<0.000050	0.000052	<0.000050	<0.000050	0.000061	0.000480
Nickel (Ni)- Dissolved	mg/L	0.49*	0.00758	0.01300	0.01140	0.01020	0.01270	0.00869	0.00566	0.01000	0.00691
Potassium (K)- Dissolved	mg/L		11.0	17.0	11.8	11.8	13.3	12.1	9.89	12.8	11.2
Selenium (Se)- Dissolved	mg/L	0.063*	0.000072	0.000179	0.000568	0.000178	0.000188	0.000056	0.000109	0.027000	0.004820
Silver (Ag)- Dissolved	mg/L	0.0015*	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)- Dissolved	mg/L	2300*	315	648	502	466	500	490	293	518	437
Zinc (Zn)- Dissolved	mg/L	1.1*	0.0056	0.0184	0.0078	0.0497	0.0077	0.0050	0.0035	0.0024	0.0037
<b>Field Parameters</b>											
pH	units		6.65	7.05	5.42	6.93	6.90	6.81	5.36	7.23	7.53
Specific Conductivity	(µS/cm)		4,711	8,520	5,432	4,360	6,620	6,251	4,784	8,396	4,535
<b>Polycyclic Aromatic Hydrocarbons</b>											
Naphthalene	ug/L	6,400	ns								
Benzo(a)pyrene	ug/L	0.81	ns								
Anthracene	ug/L	2.40	ns								
<b>Petroleum Hydrocarbons</b>											
F1 (C6-C10 Hydrocarbons)	mg/L	0.75	ns								
F2 (C10-C16 Hydrocarbons)	mg/L	0.15	ns								
F3 (C16-C34 Hydrocarbons)	mg/L	0.50	ns								
F4 (C34-C50 Hydrocarbons)	mg/L	0.50	ns								
Benzene	ug/L	430	ns								
EthylBenzene	ug/L	2,300	ns								
Toluene	ug/L	18,000	ns								
Xylene (Total)	ug/L	4,200	ns								
<b>Volatile Organic Carbons</b>											
Vinyl chloride	ug/L	1.7	ns								
<b>Pesticides</b>											
Diazinon	µg/L		ns								
<b>Herbicides</b>											
2,4-D	ug/L		ns								

Note: Criteria from Ontario Ministry of the Environment, (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition  
 \* Criteria for total chloride and total metals  
 ns - not submitted  
 nr - no result, lab error



**Water and Waste  
Eaux et déchets**

**2024 Groundwater Monitoring  
- Till Wells**

	Sample Number		2024 Groundwater Monitoring - Till Wells								
			Upgradient			Downgradient and Cross Gradient					
			GWQ25-6N60ER	GWQ25-5N62E		GWQ25-W13A		GWQ25-W14A		GWQ25-W15A	
Units	Criteria*	656199/663018	656200/665091	686721/693718	656202/666273	686722/693926	656203/665401	686723/696763	656204/667188	686724/695195	
			Spring	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
<b>Inorganic Parameters</b>											
Alkalinity - Bicarbonate	mg/L		651	303	381	793	666	188	<3.0	430	450
Alkalinity - Carbonate	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	291	<3.0	<3.0
Alkalinity - Hydroxide	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	355	<3.0	<3.0
Alkalinity - Total	mg/L		651	303	381	793	666	188	646	430	450
Dissolved Hardness (CaCO3)	mg/L		1,829	1,467	1,243	2,203	1,775	1,737	1,330	3,186	2,314
pH	units		6.87	7.37	7.35	7.41	7.13	7.42	7.03	6.86	6.85
Specific Conductivity	(µS/cm)		3,970	7,880	7,420	4,580	4,930	7,570	6,950	6,610	5,760
Turbidity	(ntu)		299	987	232	>4,800	3,660	>4,800	>4,800	>4,800	3.62
Total Dissolved Solids	mg/L		3,290	5,170	5,190	15,800	7,650	3,970	3,620	3,680	5,400
Total Suspended Solids	mg/L		2,580	2,398	2,271	19,690	4,460	24,750	9,720	65,710	11,860
Total Solids	mg/L		5,870	7,570	7,460	35,500	12,100	28,700	13,300	69,700	17,300
Dissolved Chloride (Cl)	mg/L	2,300*	380	2,450	2,320	1,230	1,230	2,250	2,270	1,790	1,390
Dissolved Sulphate (SO4)	mg/L		1,390	655	746	1,160	900	955	825	2,120	3,020
<b>Nutrients</b>											
Ammonia - Dissolved	mg/L N		0.169	1.09	1.09	0.082	0.085	1.00	1.03	0.906	0.819
Nitrate - Dissolved	mg/L N		0.533	0.004	0.007	0.106	0.028	0.024	0.04	0.013	0.041
Total Kjeldahl Nitrogen	mg/L N		<0.2	1.3	1.4	1.0	5.0	1.6	2.6	0.7	2.2
Phosphorus - Dissolved	mg/L P		0.020	<0.013	0.016	0.062	0.033	0.015	0.026	0.028	0.034
<b>Other</b>											
Cyanide - Total (CN)	mg/L	0.066	ns	<0.0050	<0.0050	<0.0050		<0.0050		<0.0050	
<b>Organic Indicators</b>											
Chemical Oxygen Demand	mg/L		50	136	131	912	430	392	465	315	1,340
Total Organic Carbon	mg/L		10.7	3.8	3.4	57.7	35.4	20.0	22.4	68.5	57.4
<b>Metals</b>											
Arsenic (As)- Dissolved	mg/L	1.9*	0.00063	0.00406	0.00270	0.00180	0.00150	0.00194	0.00070	0.00249	0.00220
Barium (Ba)- Dissolved	mg/L	29*	0.0058	0.0119	0.0106	0.0224	0.0160	0.0134	0.0098	0.0142	0.0123
Beryllium (Be)- Dissolved	mg/L	0.067*	<0.00002	<0.00002	<0.00020	0.00009	0.00170	<0.00002	<0.00020	<0.00002	<0.00020
Cadmium (Cd)- Dissolved	mg/L	0.0027*	0.000134	0.000010	0.000126	0.000067	0.000185	0.000022	0.000047	0.000063	0.000084
Calcium (Ca)- Dissolved	mg/L		419	304	281	216	243	397	266	750	578
Chromium (Cr)- Dissolved	mg/L	0.81*	<0.00050	<0.00050	0.00127	0.00218	0.00235	<0.00050	0.00145	<0.00050	0.00159
Copper (Cu)- Dissolved	mg/L	0.087*	0.00753	0.00066	0.00052	0.00890	0.00496	0.00044	0.05454	0.00262	0.00345
Iron (Fe)- Dissolved	mg/L		<0.0100	0.410	0.247	1.680	0.701	0.478	0.365	1.240	1.058
Lead (Pb)- Dissolved	mg/L	0.025*	<0.000050	<0.000050	0.001780	0.001740	0.001620	<0.000050	0.001470	0.000199	0.001470
Magnesium (Mg)- Dissolved	mg/L		190.0	172.0	131.5	404.0	283.6	181.0	117.6	319.0	211.5
Manganese (Mn)- Dissolved	mg/L		0.870	0.051	0.052	0.159	0.243	0.536	0.301	2.240	1.446
Mercury (Hg)- Total	mg/L	0.0028*	<0.0000050	<0.0000050	<0.0000050	0.0003690	<0.0000050	0.0002190	<0.0000050	<0.0000050	<0.0000050
Nickel (Ni)- Dissolved	mg/L	0.49*	0.00777	0.00108	0.00918	0.00625	0.01141	0.00223	0.00860	0.01110	0.01449
Potassium (K)- Dissolved	mg/L		9.13	42.7	30.1	6.17	9.81	26.6	18.15	15.4	12.2
Selenium (Se)- Dissolved	mg/L	0.063*	<0.000050	<0.000050	0.01880	0.04890	0.02170	<0.000050	0.01610	0.00010	0.02530
Silver (Ag)- Dissolved	mg/L	0.0015*	<0.000010	<0.000010	<0.0050	0.000016	<0.0050	<0.000010	<0.0050	<0.000010	<0.0050
Sodium (Na)- Dissolved	mg/L	2300*	308	1,200	1,081	400	450	1,340	784	555	471
Zinc (Zn)- Dissolved	mg/L	1.1*	0.0087	0.0020	0.0009	0.0086	0.0060	0.0014	0.0025	0.0063	0.0192
<b>Field Parameters</b>											
pH	units		5.57	7.44	7.53	6.99	7.53	7.10	7.56	6.67	7.05
Specific Conductivity	(µS/cm)		4,433	8,471	9,970	6,020	9,867	8,077	9,057	7,231	7,238
<b>Polycyclic Aromatic Hydrocarbons</b>											
Naphthalene	ug/L	6,400	ns	<0.050	<0.050	<0.050		<0.050		<0.050	
Benzo(a)pyrene	ug/L	0.81	ns	<0.0050	<0.0050	<0.0050		<0.0050		<0.0050	
Anthracene	ug/L	2.40	ns	<0.010	<0.010	<0.010		<0.010		<0.010	
<b>Petroleum Hydrocarbons</b>											
F1 (C6-C10 Hydrocarbons)	mg/L	0.75	ns	<0.10	<0.10	<0.10		<0.10		<0.10	
F2 (C10-C16 Hydrocarbons)	mg/L	0.15	ns	0.10	<0.10	0.12		<0.10		<0.10	
F3 (C16-C34 Hydrocarbons)	mg/L	0.50	ns	<0.25	<0.25	<0.25		<0.25		<0.25	
F4 (C34-C50 Hydrocarbons)	mg/L	0.50	ns	<0.25	<0.25	<0.25		<0.25		<0.25	
Benzene	ug/L	430	ns	<0.50	<0.50	<0.50		<0.50		<0.50	
Ethylbenzene	ug/L	2,300	ns	<0.50	<0.50	<0.50		<0.50		<0.50	
Toluene	ug/L	18,000	ns	<0.50	<0.50	<0.50		<0.50		<0.50	
Xylene (Total)	ug/L	4,200	ns	<0.50	<0.50	<0.50		<0.50		<0.50	
<b>Volatile Organic Carbons</b>											
Vinyl chloride	ug/L	1.7	ns	<0.50	<0.50	<0.50		<0.50		<0.50	
<b>Pesticides</b>											
Diazinon	µg/L		ns	<0.025	<0.025	<0.025		<0.025		<0.025	
<b>Herbicides</b>											
2,4-D	ug/L		ns	<0.050	<0.10	<2.50		<0.250		<1.0	

Note: Criteria from Ontario Ministry of the Environment. (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.I of the Environmental Protection Act Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition  
\* Criteria for total chloride and total metals

ns - not submitted, sampler error



## 2024 Groundwater Monitoring - Till Wells

			Downgradient and Cross Gradient							
			GWQ25-W16A		GWQ25-6N63F	GWQ25-6N57F	GWQ25-6N58F	GWQ25-6N59F	GWQ25-6N67F	GWQ25-4N34DR
Sample Number			656205/666915	686725/696764	656208/664723	656210/666605	656216/663385	656218/661840	656212/664421	656342/662711
Units			Spring	Autumn	Spring	Spring	Spring	Spring	Spring	Spring
Criteria*										
<b>Inorganic Parameters</b>										
Alkalinity - Bicarbonate	mg/L		466	<3.0	394	385	278	555	404	852
Alkalinity - Carbonate	mg/L		<3.0	198	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Hydroxide	mg/L		<3.0	401	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Total	mg/L		466	599	394	385	278	555	404	852
Dissolved Hardness (CaCO3)	mg/L		1,966	1,120	2,504	2,153	3,507	2,488	1,933	2,873
pH	units		6.95	7.57	7.03	7.03	7.19	6.85	7.03	6.14
Specific Conductivity	(µS/cm)		5,210	4,500	6,310	5,810	5,870	5,630	3,660	5,310
Turbidity	(ntu)		>4,800	3110	615	3,940	>4,800	55.6	168	16.0
Total Dissolved Solids	mg/L		7,650	2,220	4,600	8,570	4,130	4,800	2,890	5,180
Total Suspended Solids	mg/L		3,980	8,420	1,647	3,853	28,870	700	1,130	4,230
Total Solids	mg/L		11,600	10,600	6,240	12,400	33,000	5,500	4,020	9,410
Dissolved Chloride (Cl)	mg/L	2,300*	668	730	1,410	678	1,370	40.1	544	14.3
Dissolved Sulphate (SO4)	mg/L		1,760	1,530	1,130	2,330	1,220	2,040	970	2,810
<b>Nutrients</b>										
Ammonia - Dissolved	mg/L N		0.839	0.675	0.693	0.839	1.27	0.257	0.494	<0.003
Nitrate - Dissolved	mg/L N		0.016	0.245	0.215	0.025	0.082	0.749	0.254	0.108
Total Kjeldahl Nitrogen	mg/L N		1.5	1.2	0.5	1.3	1.4	0.5	0.4	1.7
Phosphorus - Dissolved	mg/L P		0.052	0.027	0.016	0.029	<0.013	0.033	0.018	0.015
<b>Other</b>										
Cyanide - Total (CN)	mg/L	0.066	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic Indicators</b>										
Chemical Oxygen Demand	mg/L		224	420	99	155	77	64	52	118
Total Organic Carbon	mg/L		16.9	29.5	8.4	18.3	6.3	12.3	12.1	26.4
<b>Metals</b>										
Arsenic (As)- Dissolved	mg/L	1.9*	0.00070	0.00120	0.00116	0.00954	0.00552	0.00059	0.00226	0.00164
Barium (Ba)- Dissolved	mg/L	29*	0.0112	0.0157	0.0104	0.0088	0.0430	0.0091	0.0098	0.0104
Beryllium (Be)- Dissolved	mg/L	0.067*	<0.00002	0.0018	<0.00002	<0.00002	0.00025	<0.00002	<0.00002	<0.00002
Cadmium (Cd)- Dissolved	mg/L	0.0027*	0.000050	0.000115	0.000078	0.000007	0.000102	0.000091	0.000021	0.000013
Calcium (Ca)- Dissolved	mg/L		502	459	526	516	730	612	408	265
Chromium (Cr)- Dissolved	mg/L	0.81*	<0.00050	0.00298	<0.00050	<0.00050	0.00561	<0.00050	<0.00050	<0.00050
Copper (Cu)- Dissolved	mg/L	0.087*	0.00087	0.00394	0.00052	0.00045	0.00949	0.00132	0.00044	0.00749
Iron (Fe)- Dissolved	mg/L		0.150	1.372	0.620	1.76	4.84	0.016	0.700	0.010
Lead (Pb)- Dissolved	mg/L	0.025*	<0.000050	0.00156	<0.000050	<0.000050	0.00666	<0.000050	<0.000050	0.000185
Magnesium (Mg)- Dissolved	mg/L		173.0	158.7	289.0	210.0	409.0	233.0	222.0	537.0
Manganese (Mn)- Dissolved	mg/L		1.060	0.905	0.240	0.702	0.535	2.280	0.161	0.011
Mercury (Hg)- Total	mg/L	0.0028*	0.0031400	*ns	<0.000050	0.0000354	0.00012	<0.000050	0.0000107	0.0000272
Nickel (Ni)- Dissolved	mg/L	0.49*	0.00586	0.01625	0.00350	0.00599	0.00772	0.00975	0.00336	0.00555
Potassium (K)- Dissolved	mg/L		10.6	10.7	11.3	12.6	13.2	11.4	9.40	12.6
Selenium (Se)- Dissolved	mg/L	0.063*	0.00008	0.04350	<0.000050	0.00006	0.00006	0.000306	<0.000050	0.000752
Silver (Ag)- Dissolved	mg/L	0.0015*	<0.000010	<0.0050	<0.000010	<0.000010	0.000038	<0.000010	<0.000010	<0.000010
Sodium (Na)- Dissolved	mg/L	2300*	572	459	500	545	500	526	302	478
Zinc (Zn)- Dissolved	mg/L	1.1*	0.0025	0.0184	0.0012	0.0020	0.0118	0.0064	0.0016	<0.0010
<b>Field Parameters</b>										
pH	units		7.02	7.27	5.63	7.06	6.75	6.92	5.27	7.77
Specific Conductivity	(µS/cm)		5,251	5,852	6,753	6,138	6,628	6,139	4,468	6,159
<b>Polycyclic Aromatic Hydrocarbons</b>										
Naphthalene	ug/L	6,400	<0.050		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	ug/L	0.81	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	ug/L	2.40	<0.010		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
<b>Petroleum Hydrocarbons</b>										
F1 (C6-C10 Hydrocarbons)	mg/L	0.75	<0.10		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
F2 (C10-C16 Hydrocarbons)	mg/L	0.15	0.22		0.17	<0.10	0.11	0.15	0.17	<0.10
F3 (C16-C34 Hydrocarbons)	mg/L	0.50	0.83		<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
F4 (C34-C50 Hydrocarbons)	mg/L	0.50	0.42		<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzene	ug/L	430	<0.50		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
EthylBenzene	ug/L	2,300	<0.50		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Toluene	ug/L	18,000	<0.50		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Xylene (Total)	ug/L	4,200	<0.50		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
<b>Volatile Organic Carbons</b>										
Vinyl chloride	ug/L	1.7	<0.50		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
<b>Pesticides</b>										
Diazinon	ug/L		<0.025		<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
<b>Herbicides</b>										
2,4-D	ug/L		<2.50		<0.050	<2.50	<0.250	<0.50	<0.250	<0.50

Note: Criteria from Ontario Ministry of the Environment. (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.I of the Environmental Protection Act Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition  
\* Criteria for total chloride and total metals





2024 Groundwater Monitoring  
- Bedrock Wells

		Downgradient and Cross Gradient															
		GWQ25-W9		GWQ25-W10		GWQ25-W7		GWQ25-W12		GWQ25-W4		GWQ25-W5					
Sample Number		856190/664725	686717/693717	656191/663788	686729/693718	656188/667436	686730/695196	656193/664423	686731/696765	656185/667437	686718/694944	656186/661842	686720/694541				
Units		Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn				
Criteria*																	
<b>Inorganic Parameters</b>																	
Alkalinity - Bicarbonate	mg/L	146	148	202	187	129	123	149	151	64.7	51.4	141	141				
Alkalinity - Carbonate	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0				
Alkalinity - Hydroxide	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0				
Alkalinity - Total	mg/L	146	148	202	187	129	123	149	151	64.7	51.4	141	141				
Dissolved Hardness (CaCO3)	mg/L	1,477	1,251	1,469	1,171	1,152	830	1,413	1,533	839	740	1,509	1,259				
pH	units	7.39	7.37	7.36	7.37	7.38	7.42	7.47	7.57	7.50	7.41	7.48	7.52				
Specific Conductivity	(µS/cm)	9,070	8,410	8,770	8,110	6,750	6,180	8,510	7,700	7,140	6,450	7,940	7,210				
Turbidity	(ntu)	3.13	1.76	4.38	7.60	5.31	48.3	86.3	47.3	20.6	25.2	8.65	16.6				
Total Dissolved Solids	mg/L	6,040	5,890	5,640	5,630	4,210	4,050	5,500	5,540	4,230	4,130	5,070	5,190				
Total Suspended Solids	mg/L	243	554	359	485	149	422	535	130	167	196	453	341				
Total Solids	mg/L	6,280	6,440	6,000	6,110	4,470	4,470	6,030	5,670	4,450	4,330	5,520	5,530				
Dissolved Chloride (Cl)	mg/L	2,300*	2,470	2,440	2,560	2,180	1,560	2,290	2,840	2,220	2,170	2,160	2,240				
Dissolved Sulphate (SO4)	mg/L	715	756	795	958	645	742	780	916	610	642	745	1,040				
<b>Nutrients</b>																	
Ammonia - Dissolved	mg/L N	1.38	1.33	1.25	1.29	1.85	1.88	1.13	1.15	1.13	0.809	1.13	1.04				
Nitrate - Dissolved	mg/L N	0.905	0.909	0.011	0.006	+0.004	+0.004	0.046	0.046	0.058	0.006	+0.004	0.009				
Total Kjeldahl Nitrogen	mg/L N	1.1	2.2	1.1	1.6	2.2	2.2	1.1	2.1	0.4	0.9	2.0	1.3				
Phosphorus - Dissolved	mg/L P	0.017	0.017	<0.013	0.019	nr	0.021	0.015	0.016	nr	0.026	0.019	0.020				
<b>Other</b>																	
Cyanide - Total (CN)	mg/L	0.066	<0.0050	<0.0050	<0.0050		<0.0050		<0.0050		<0.0050	<0.0050	<0.0050				
<b>Organic Indicators</b>																	
Carbonaceous Oxygen Demand	mg/L	115	125	111	107	93	80	120	96	92	83	103	124				
Total Organic Carbon	mg/L	1.9	4.8	4.1	3.0	2.0	4.6	2.7	11.5	1.6	1.4	7.3	2.1				
<b>Metals</b>																	
Arsenic (As) - Dissolved	mg/L	1.9*	0.00705	0.00600	0.00523	0.00400	0.00270	0.00230	0.00479	0.00270	0.00035	0.00040	0.00532	0.00450			
Barium (Ba) - Dissolved	mg/L	29*	0.0123	0.0097	0.0153	0.0109	0.0124	0.0080	0.0130	0.0155	0.0093	0.0067	0.0143	0.0118			
Beryllium (Be) - Dissolved	mg/L	0.067*	<0.00002	0.0032	<0.00002	0.0008	<0.00002	0.0009	<0.00002	<0.0002	<0.00002	<0.0002	<0.0002	0.0044			
Cadmium (Cd) - Dissolved	mg/L	0.0027*	<0.000005	0.000134	<0.000005	0.000142	<0.000005	0.000048	<0.000005	0.000053	<0.000005	<0.000007	<0.000005	0.000051			
Calcium (Ca) - Dissolved	mg/L	316	275	303	259	242	193	307	359	166	150	309	271				
Chromium (Cr) - Dissolved	mg/L	0.81*	<0.00050	0.00033	<0.00050	0.00122	<0.00050	0.00058	<0.00050	0.00108	<0.00050	0.00060	<0.00050	0.00067			
Copper (Cu) - Dissolved	mg/L	0.087*	0.00046	0.00165	0.00021	0.00055	0.00037	0.00049	<0.00020	0.00117	<0.00020	0.00106	<0.00020	0.00034			
Iron (Fe) - Dissolved	mg/L	0.867	0.867	0.670	1.43	0.803	0.838	0.457	0.612	0.017	2.81	0.631	0.727	0.605			
Lead (Pb) - Dissolved	mg/L	0.025*	0.000056	0.001930	<0.000050	0.001660	<0.000050	0.001080	0.000093	0.001570	<0.000050	0.001250	<0.000050	0.001430			
Magnesium (Mg) - Dissolved	mg/L	167.0	136.9	173.0	127.3	133.0	90.31	157.0	166.7	103.0	88.89	179.0	141.4				
Manganese (Mn) - Dissolved	mg/L	0.0219	0.01816	0.1110	0.0616	0.0098	0.0084	0.0278	0.03147	0.0837	0.07219	0.0328	0.03327				
Mercury (Hg) - Total	mg/L	0.0028*	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050			
Nickel (Ni) - Dissolved	mg/L	0.49*	0.00141	0.00966	0.00258	0.00896	<0.00050	0.00335	0.00133	0.00395	<0.00050	0.00482	0.00124	0.00733			
Potassium (K) - Dissolved	mg/L	43.9	33.5	42.6	34.6	33.2	24.4	42.7	50.9	33.0	33.0	38.5	33.0				
Selenium (Se) - Dissolved	mg/L	0.063*	<0.000050	0.0184	<0.000050	0.0015	<0.000050	0.0361	<0.000050	0.0343	<0.000050	0.0023	<0.000050	0.0227			
Silver (Ag) - Dissolved	mg/L	0.0015*	<0.000010	<0.00050	0.000188	<0.00050	<0.000010	<0.00050	<0.000010	<0.00050	0.000015	<0.00050	<0.000010	<0.00050			
Sodium (Na) - Dissolved	mg/L	2,300*	1,360	1,305	1,360	1,157	1,010	776	1,290	1,322	1,260	1,091	1,230	1,089			
Zinc (Zn) - Dissolved	mg/L	1.1*	0.0016	0.0078	0.0016	0.0027	<0.0010	0.0019	0.0011	0.0037	<0.0010	0.0020	0.0428	0.0415			
<b>Bacteria</b>																	
Total Coliforms (MTF)	MPN/100mL	<3	<1	<1	30	<1	6	<1	<1	<10	<1	<1	<1	<1			
Fecal Coliforms (MTF)	MPN/100mL	<3	<1	<1	<10	<1	<1	<1	<1	<10	<1	<1	<1	<1			
E. coli (MTF)	MPN/100mL	<3	<1	<1	<10	<1	<1	<1	<1	<10	<1	<1	<1	<1			
<b>Field Parameters</b>																	
pH	units	6.20	7.53	6.43	7.59	6.69	7.69	6.67	7.69	7.81	7.83	7.57	7.71				
Specific Conductivity	(µS/cm)	9,759	9,876	9,712	9,997	6,601	7,158	8,812	9,790	6,666	7,517	8,502	8,539				
<b>Polycyclic Aromatic Hydrocarbons</b>																	
Naphthalene	ug/L	6.400	<0.050	<0.050	<0.050		<0.050		<0.050	0.097	<0.050	<0.050	<0.050				
Benzo(a)pyrene	ug/L	0.81	<0.0050	<0.0050	<0.0050		<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050				
Anthracene	ug/L	2.40	<0.010	<0.010	<0.010		<0.010		<0.010	<0.010	<0.010	<0.010	<0.010				
<b>Petroleum Hydrocarbons</b>																	
F1 (C6-C10 Hydrocarbons)	mg/L	0.75	<0.10	<0.10	<0.10		<0.10		<0.10	<0.10	<0.10	<0.10	<0.10				
F2 (C10-C16 Hydrocarbons)	mg/L	0.15	<0.10	<0.10	<0.10		<0.10		0.13	<0.10	<0.10	<0.10	<0.10				
F3 (C16-C34 Hydrocarbons)	mg/L	0.50	<0.250	<0.250	<0.250		<0.250		<0.250	<0.250	<0.250	<0.250	<0.250				
F4 (C34-C50 Hydrocarbons)	mg/L	0.50	<0.250	<0.250	<0.250		<0.250		<0.250	<0.250	<0.250	<0.250	<0.250				
Benzene	ug/L	430	<0.50	<0.50	<0.50		<0.50		<0.50	<0.50	<0.50	<0.50	<0.50				
Ethylbenzene	ug/L	2,300	<0.50	<0.50	<0.50		<0.50		<0.50	<0.50	<0.50	<0.50	<0.50				
Toluene	ug/L	18,000	<0.50	<0.50	<0.50		<0.50		<0.50	<0.50	<0.50	<0.50	<0.50				
Xylene (Total)	ug/L	4,200	<0.50	<0.50	<0.50		<0.50		<0.50	<0.50	<0.50	<0.50	<0.50				
<b>Volatile Organic Carbons</b>																	
Vinyl chloride	ug/L	1.7	<0.50	<0.50	<0.50		<0.50		<0.50	<0.50	<0.50	<0.50	<0.50				
<b>Pesticides</b>																	
Diazinon	ug/L		<0.0250	<0.0250	<0.0250		<0.0250		<0.0250		<0.0250	<0.0250	<0.0250				
<b>Herbicides</b>																	
2,4-D	ug/L		<0.050	<0.050	<0.050		<0.050		<0.050		<0.050	<0.050	<0.050				

Note: Criteria from Ontario Ministry of the Environment. (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition  
 \* Criteria for total chloride and total metals  
 nr - no result; suspected contamination

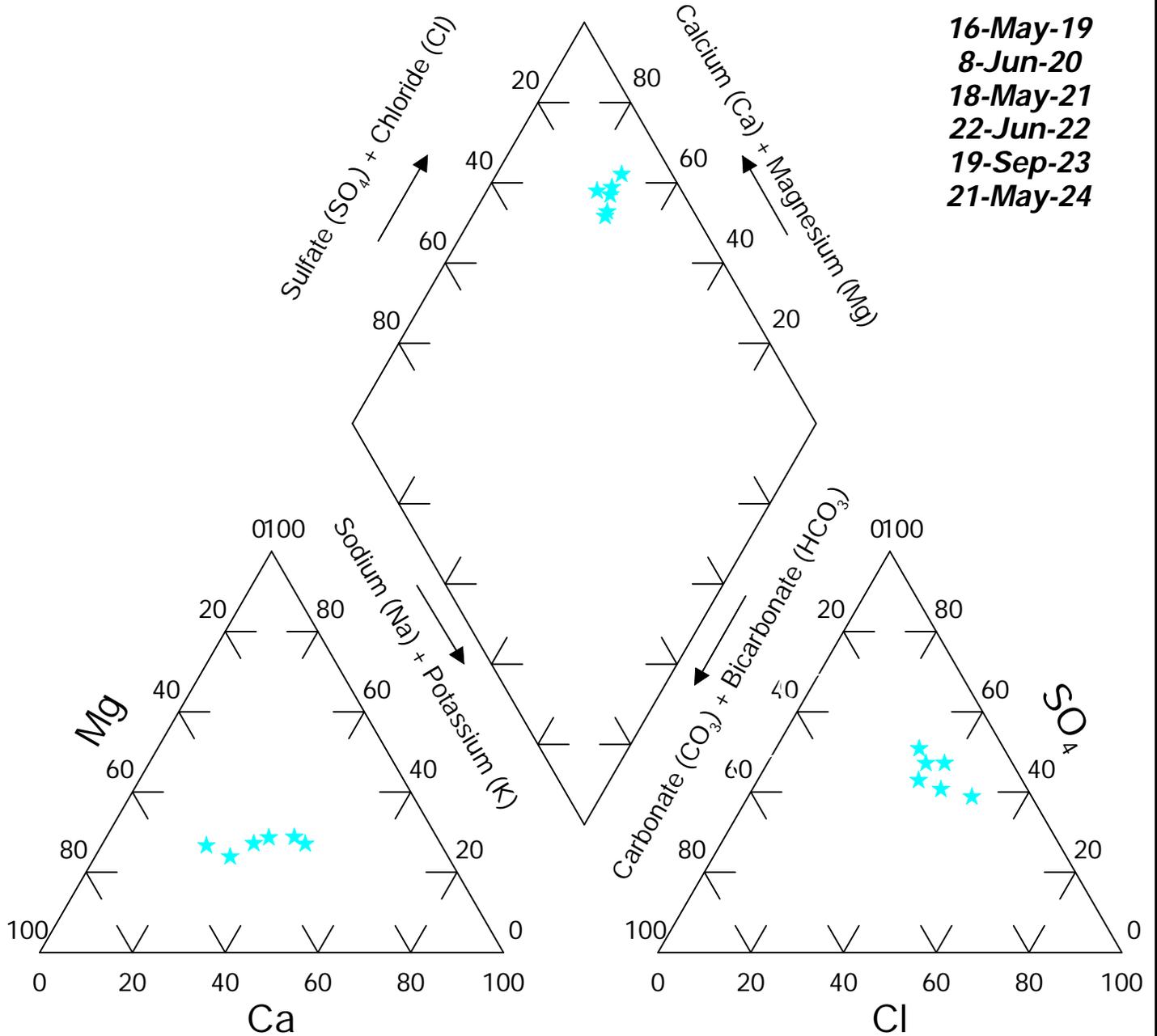
**APPENDIX C**  
**2024 GROUND WATER**  
**PIPER DIAGRAMS**

# Site: Brady

## Location : GWQ25-4N34-CR

Dates:

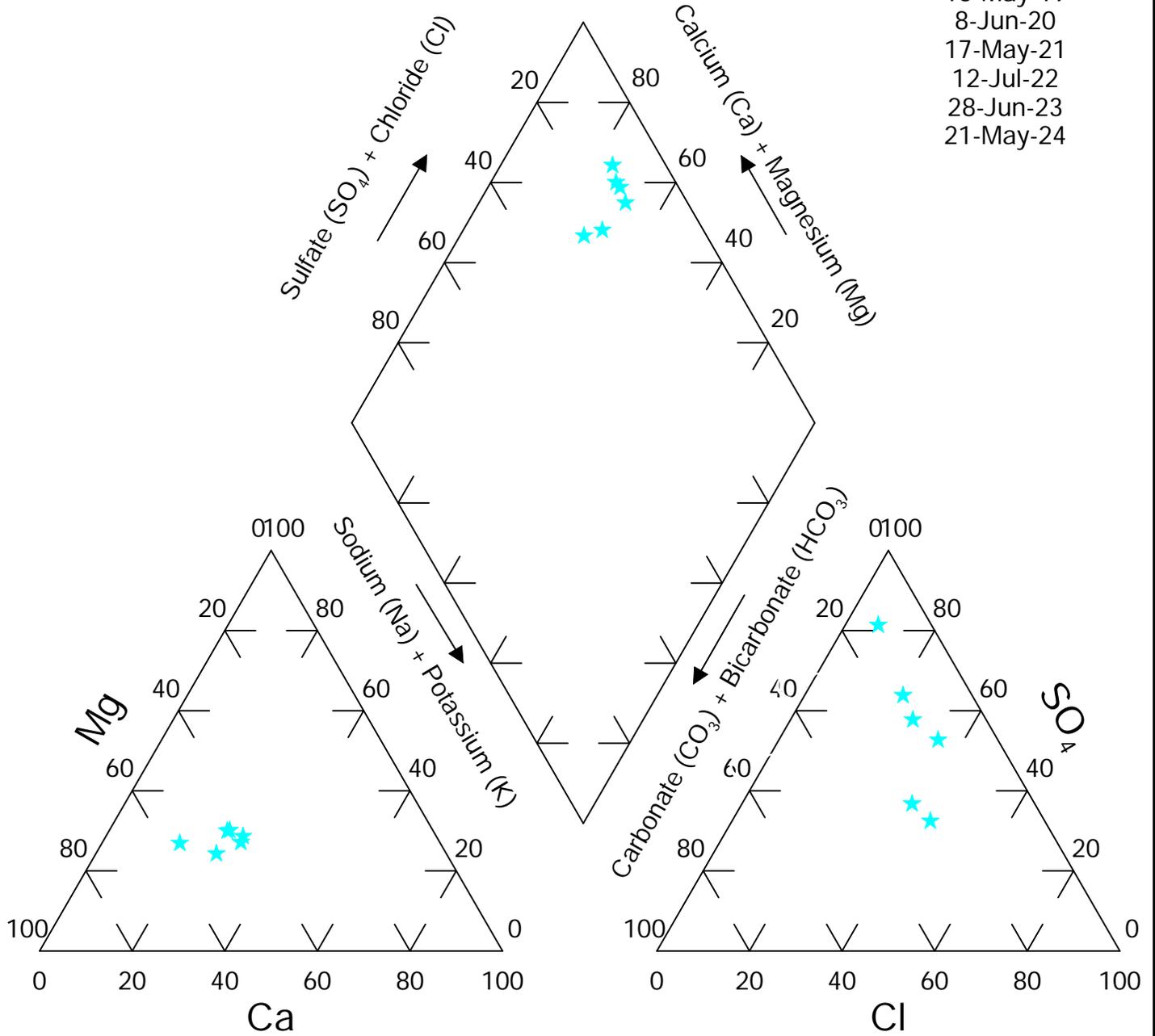
- 16-May-19
- 8-Jun-20
- 18-May-21
- 22-Jun-22
- 19-Sep-23
- 21-May-24



# Site: Brady Well #: 4N34-D/DR

**Dates:**

- 16-May-19
- 8-Jun-20
- 17-May-21
- 12-Jul-22
- 28-Jun-23
- 21-May-24



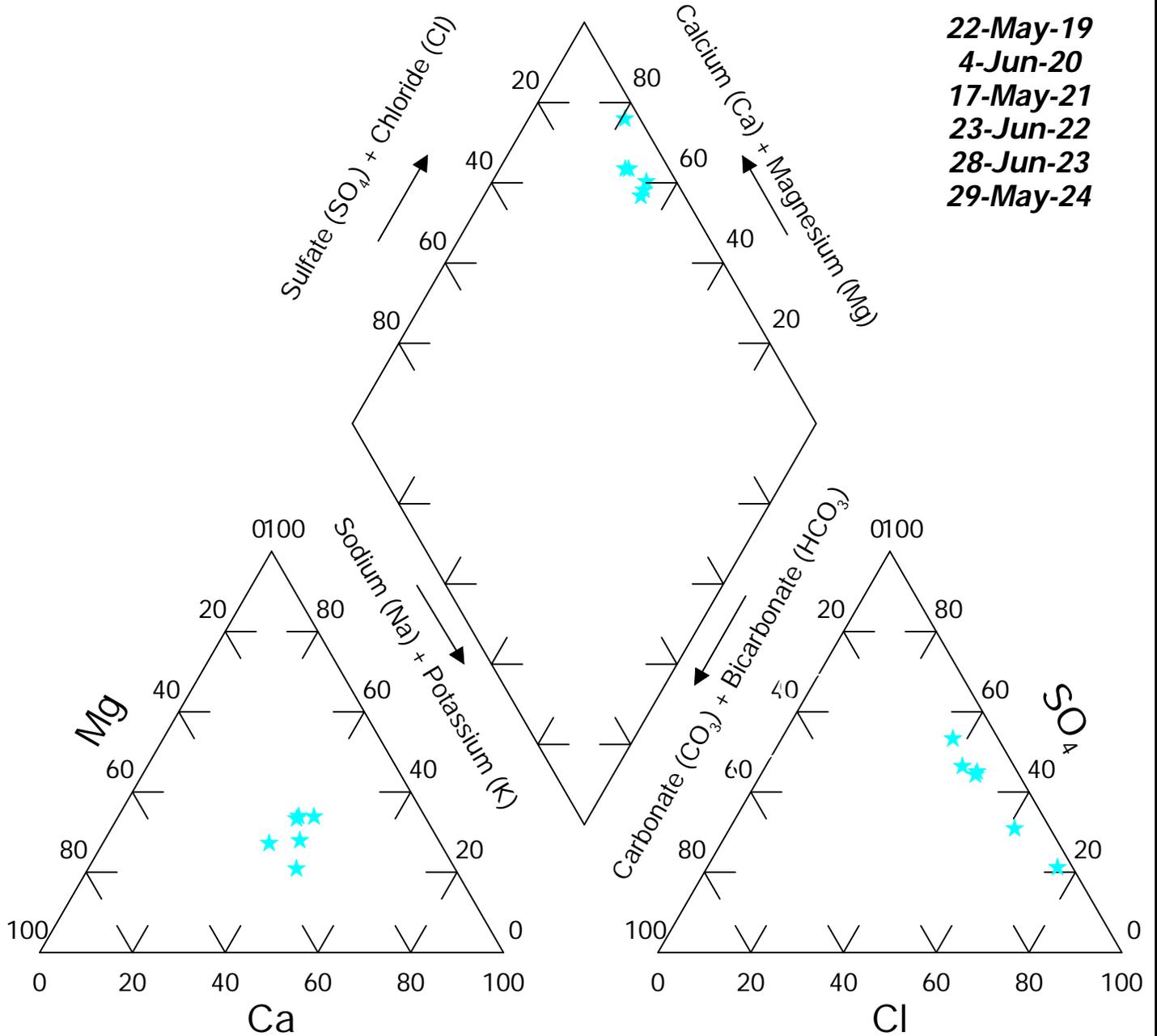
**FIGURE: 10P**

# Site: Brady

## Location : GWQ25-5N62-D

Dates:

- 22-May-19
- 4-Jun-20
- 17-May-21
- 23-Jun-22
- 28-Jun-23
- 29-May-24



# Site: Brady Well #: 5N62-E

## Dates:

- 22-May-19
- 3-Oct-19
- 4-Jun-20
- 13-Oct-20
- 17-May-21
- 5-Oct-21
- 12-Jul-22
- 20-Oct-22
- 28-Jun-23
- 19-Sep-23
- 29-May-24
- 19-Sep-24

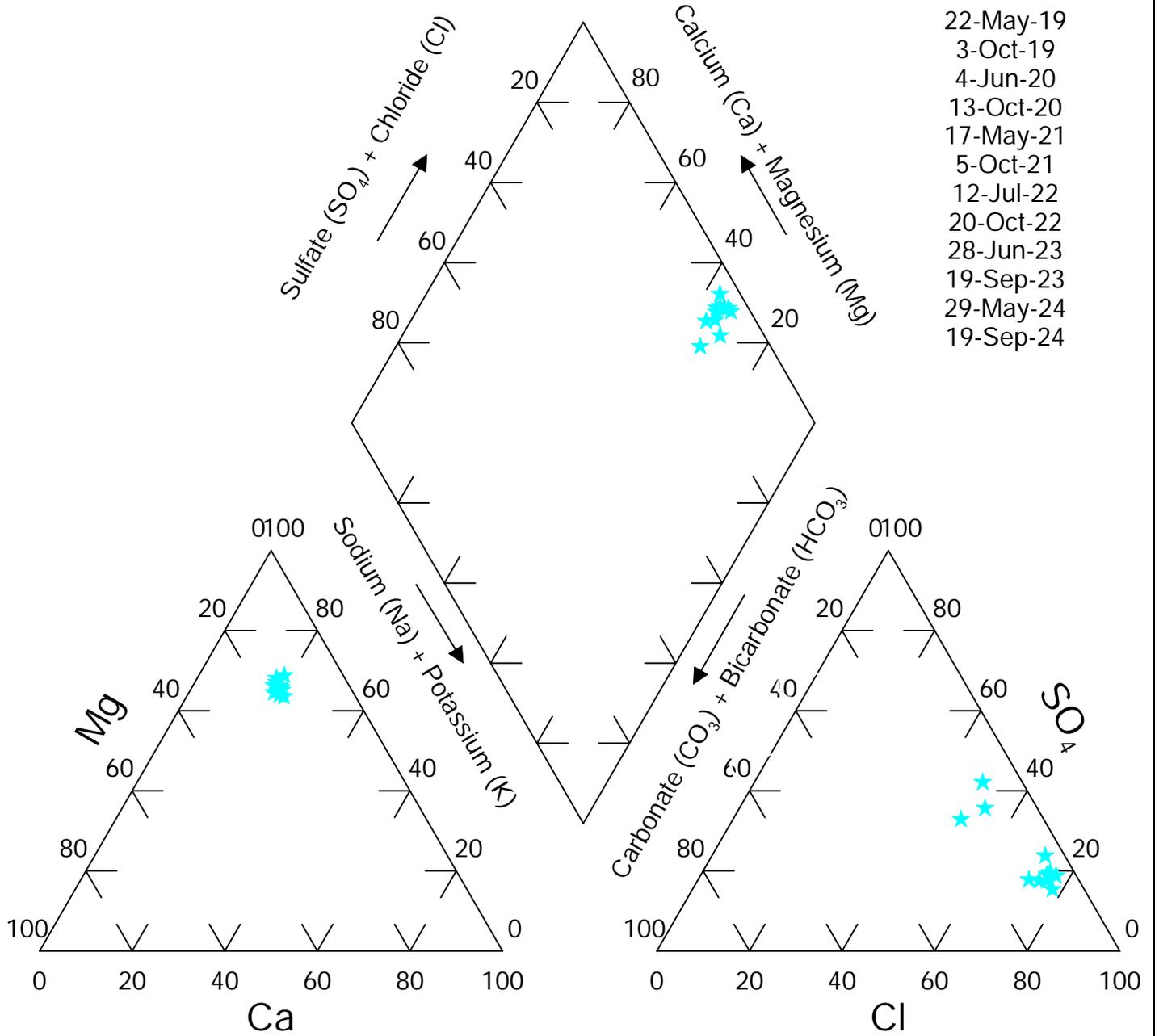


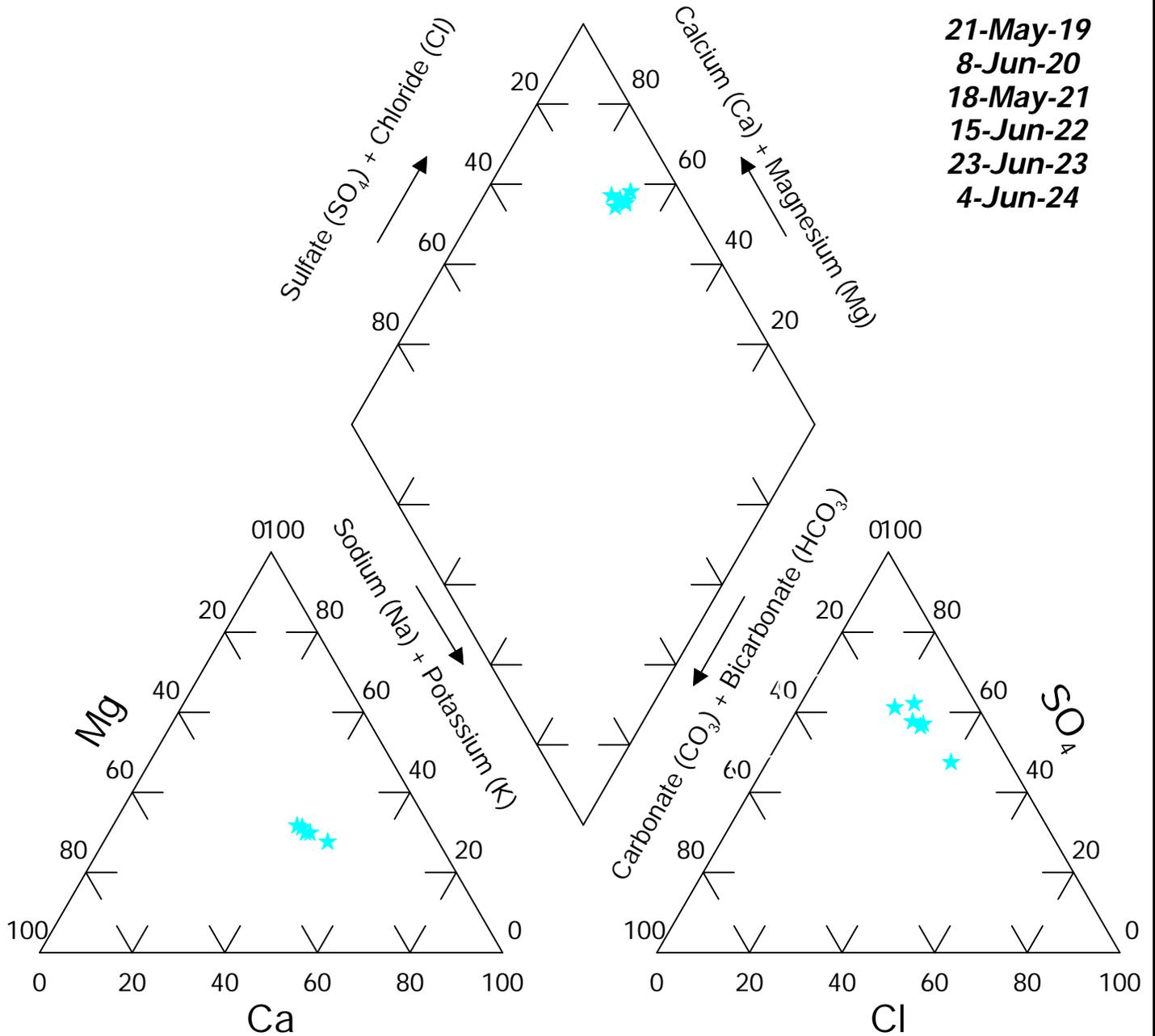
FIGURE: 11P

# Site: Brady

## Location : GWQ25-6N57-DR

Dates:

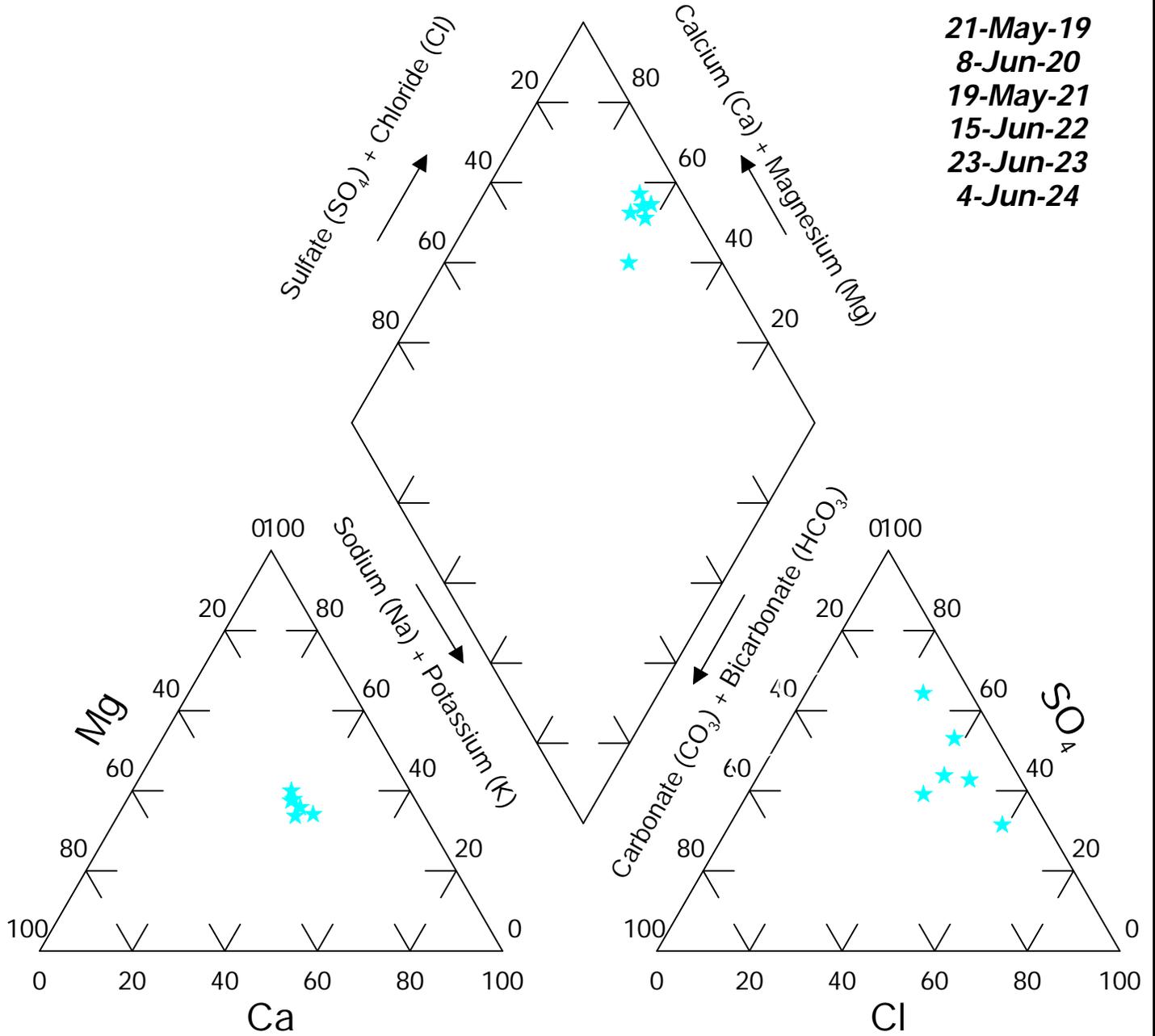
- 21-May-19
- 8-Jun-20
- 18-May-21
- 15-Jun-22
- 23-Jun-23
- 4-Jun-24



**Site: Brady**  
**Well #: 6N57-F/FR**

**Dates:**

- 21-May-19**
- 8-Jun-20**
- 19-May-21**
- 15-Jun-22**
- 23-Jun-23**
- 4-Jun-24**



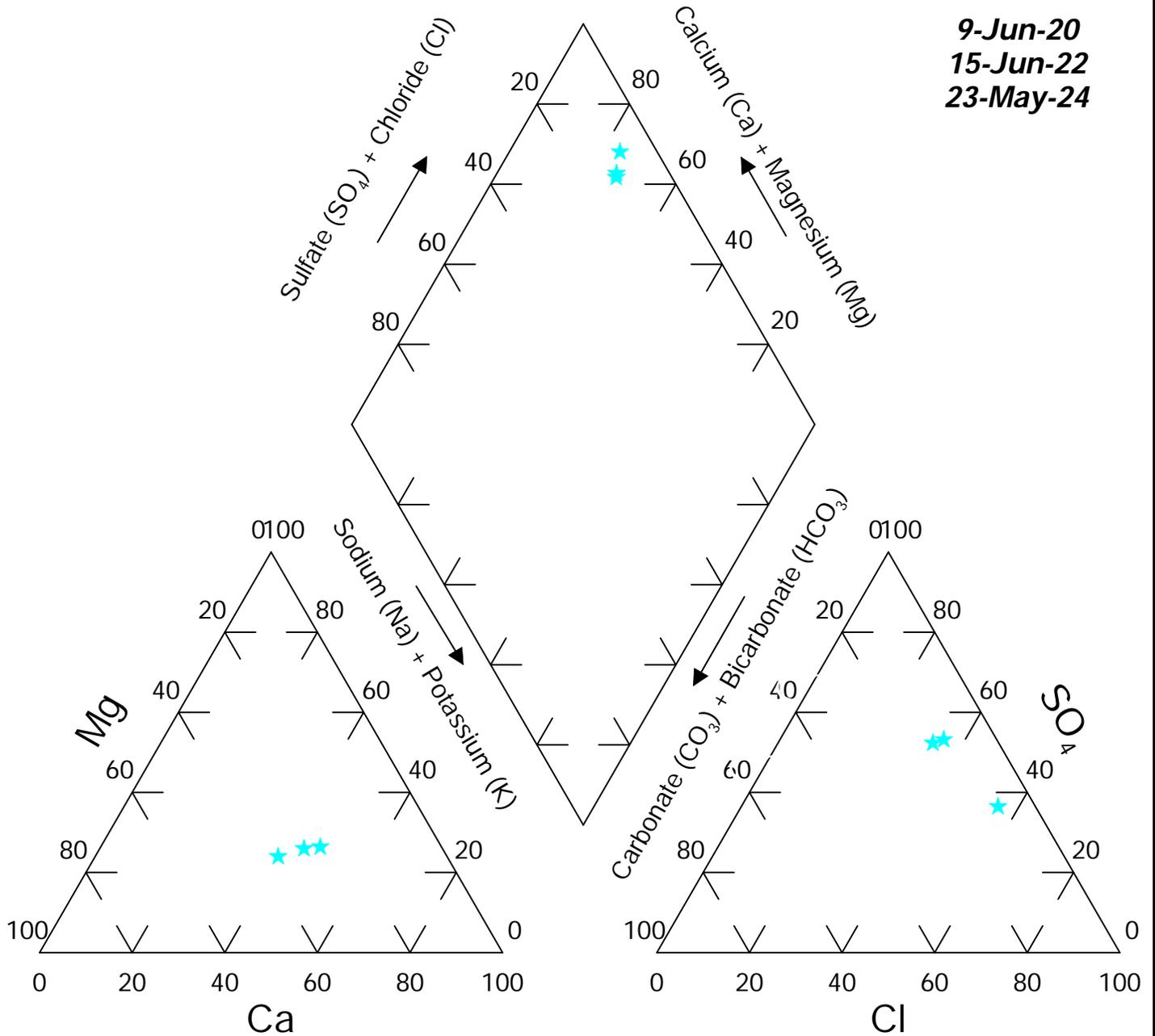
**FIGURE: 12P**

# Site: Brady

## Location : GWQ25-6N58-DR

Dates:

9-Jun-20  
15-Jun-22  
23-May-24

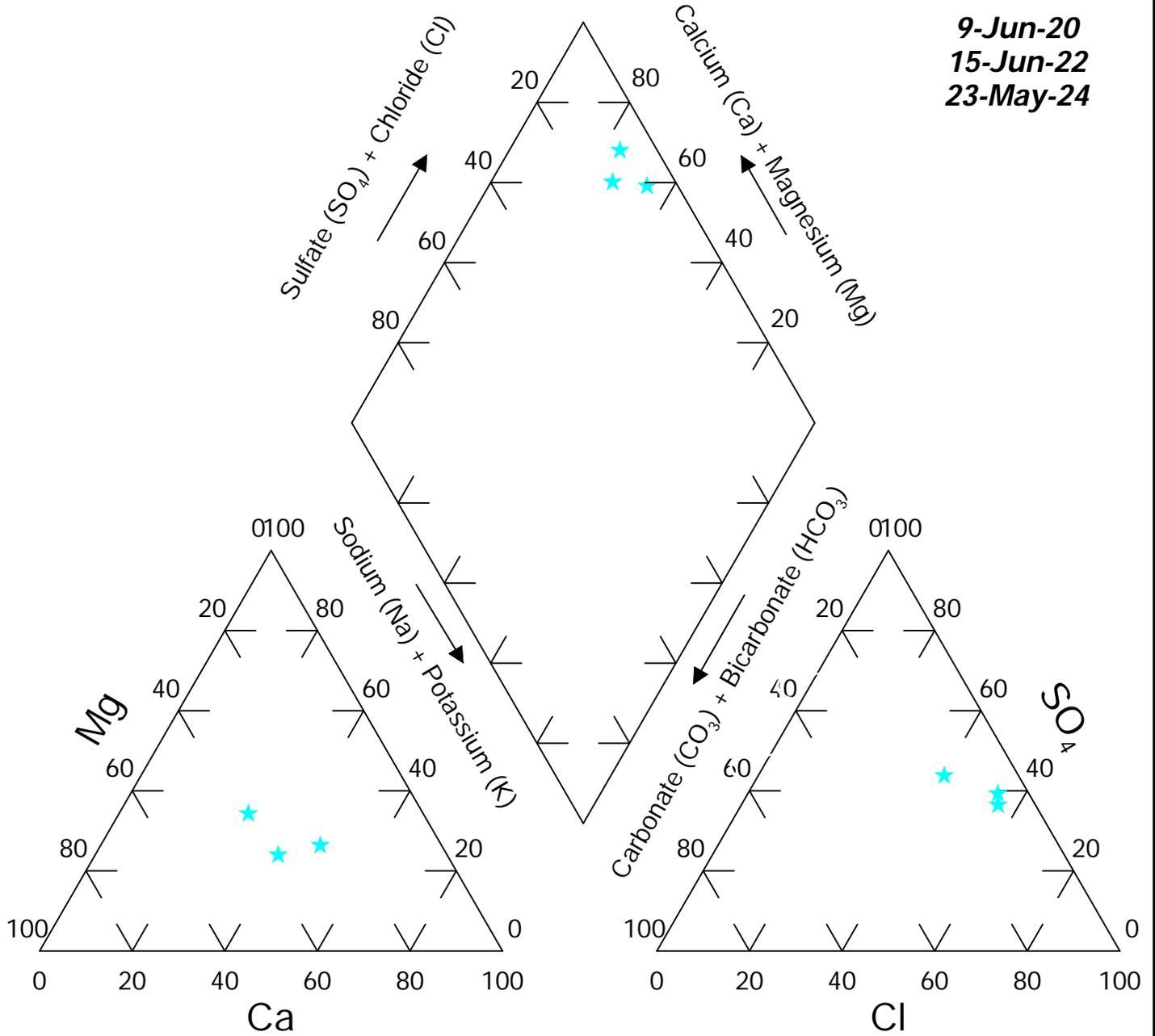


# Site: Brady

## Well #: 6N58FR

Dates:

9-Jun-20  
15-Jun-22  
23-May-24

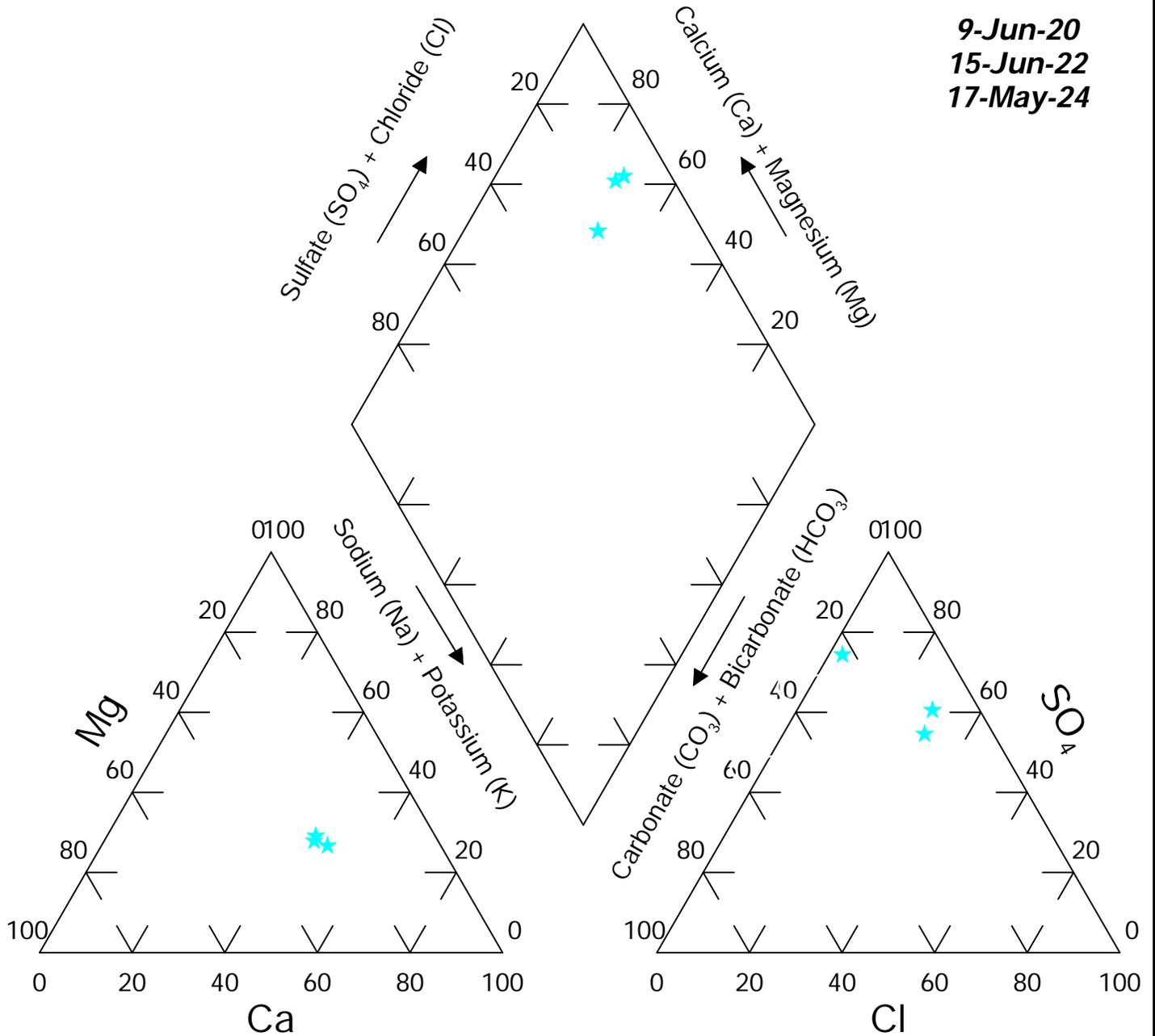


# Site: Brady

## Location : GWQ25-6N59-DR

Dates:

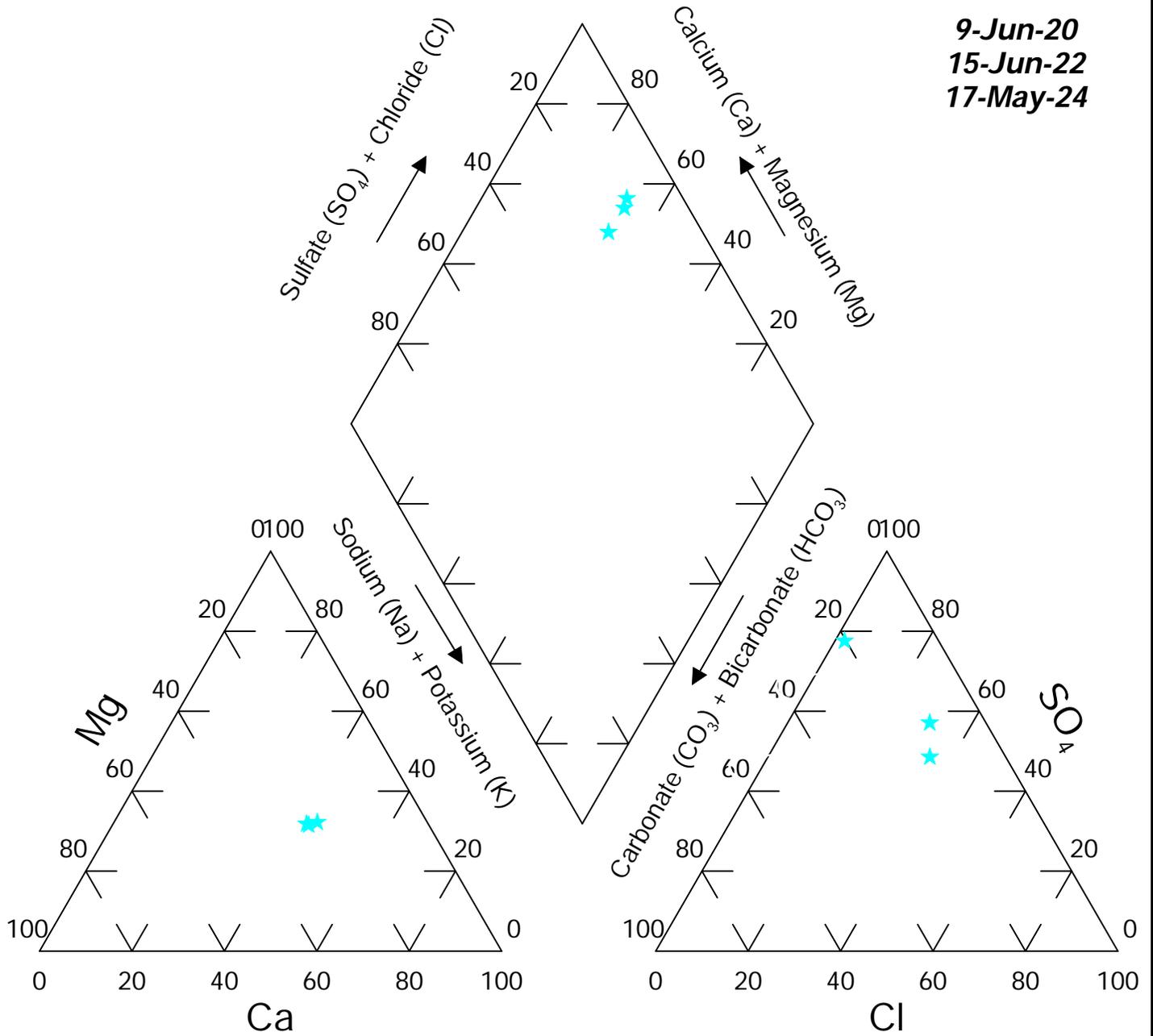
9-Jun-20  
15-Jun-22  
17-May-24



**Site: Brady**  
**Well #: 6N59-F/FR**

**Dates:**

**9-Jun-20**  
**15-Jun-22**  
**17-May-24**



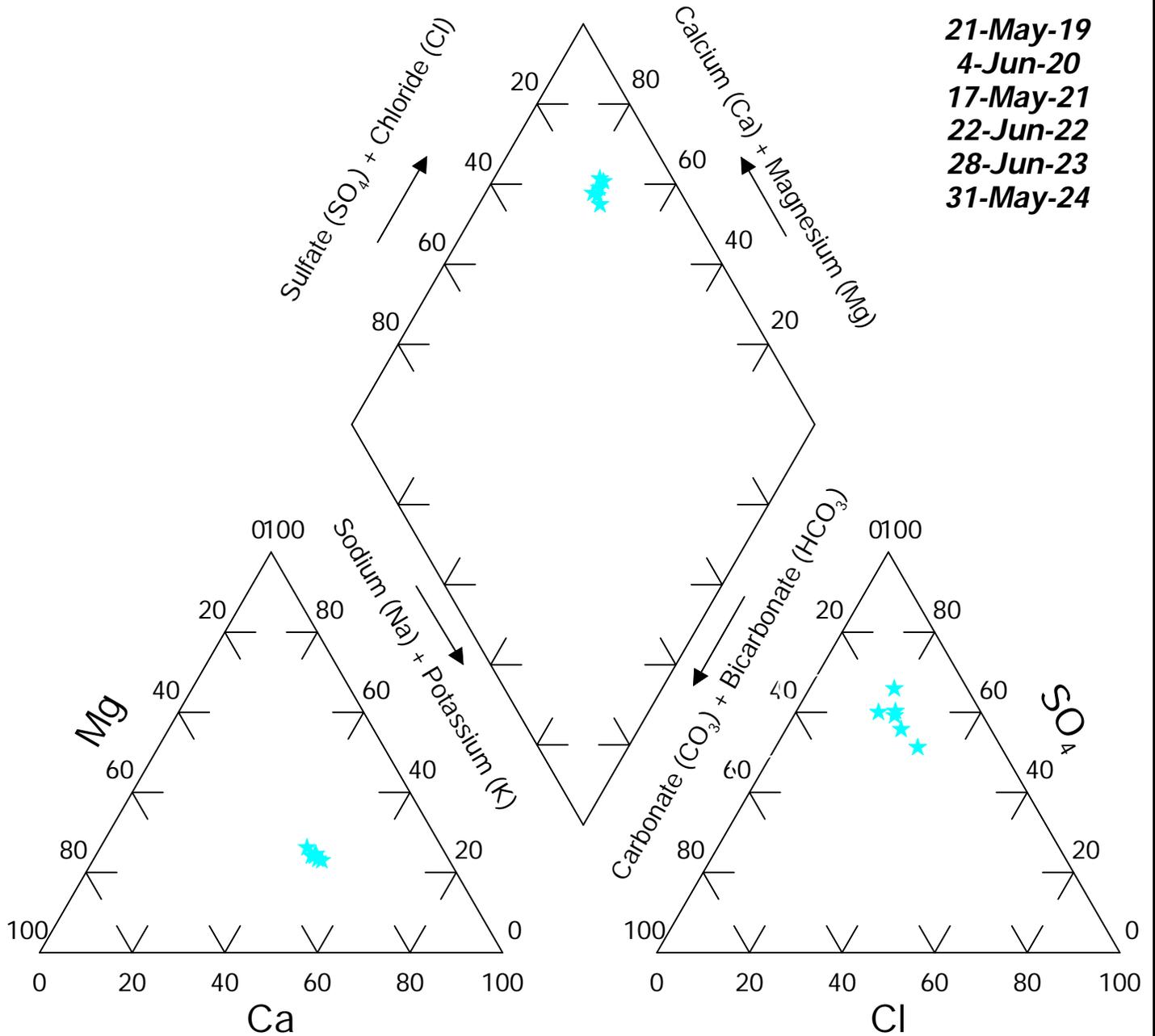
**FIGURE: 14P**

# Site: Brady

## Location : GWQ25-6N60-DR

Dates:

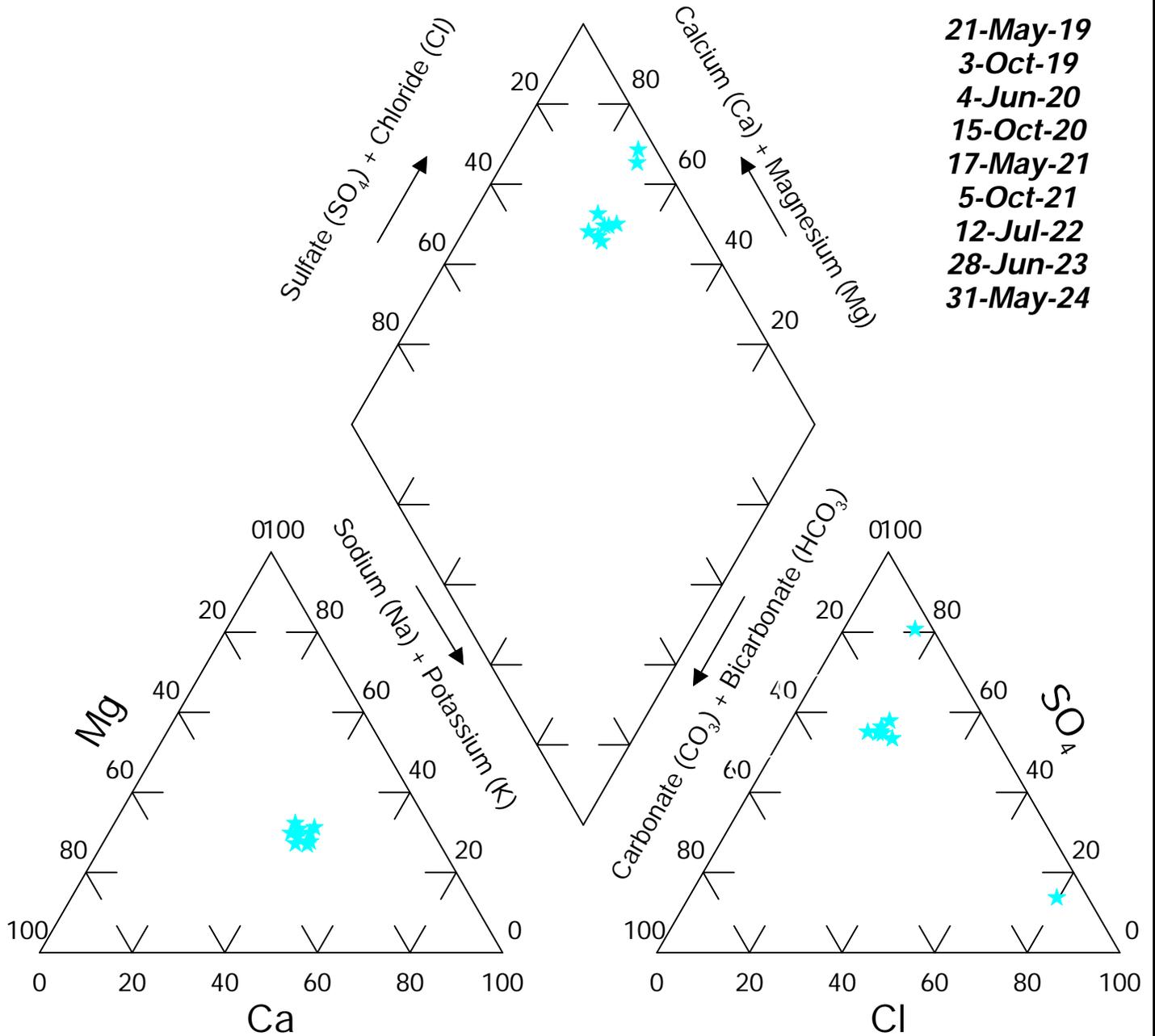
- 21-May-19
- 4-Jun-20
- 17-May-21
- 22-Jun-22
- 28-Jun-23
- 31-May-24



**Site: Brady**  
**Well #: 6N60-E/ER**

**Dates:**

- 21-May-19
- 3-Oct-19
- 4-Jun-20
- 15-Oct-20
- 17-May-21
- 5-Oct-21
- 12-Jul-22
- 28-Jun-23
- 31-May-24

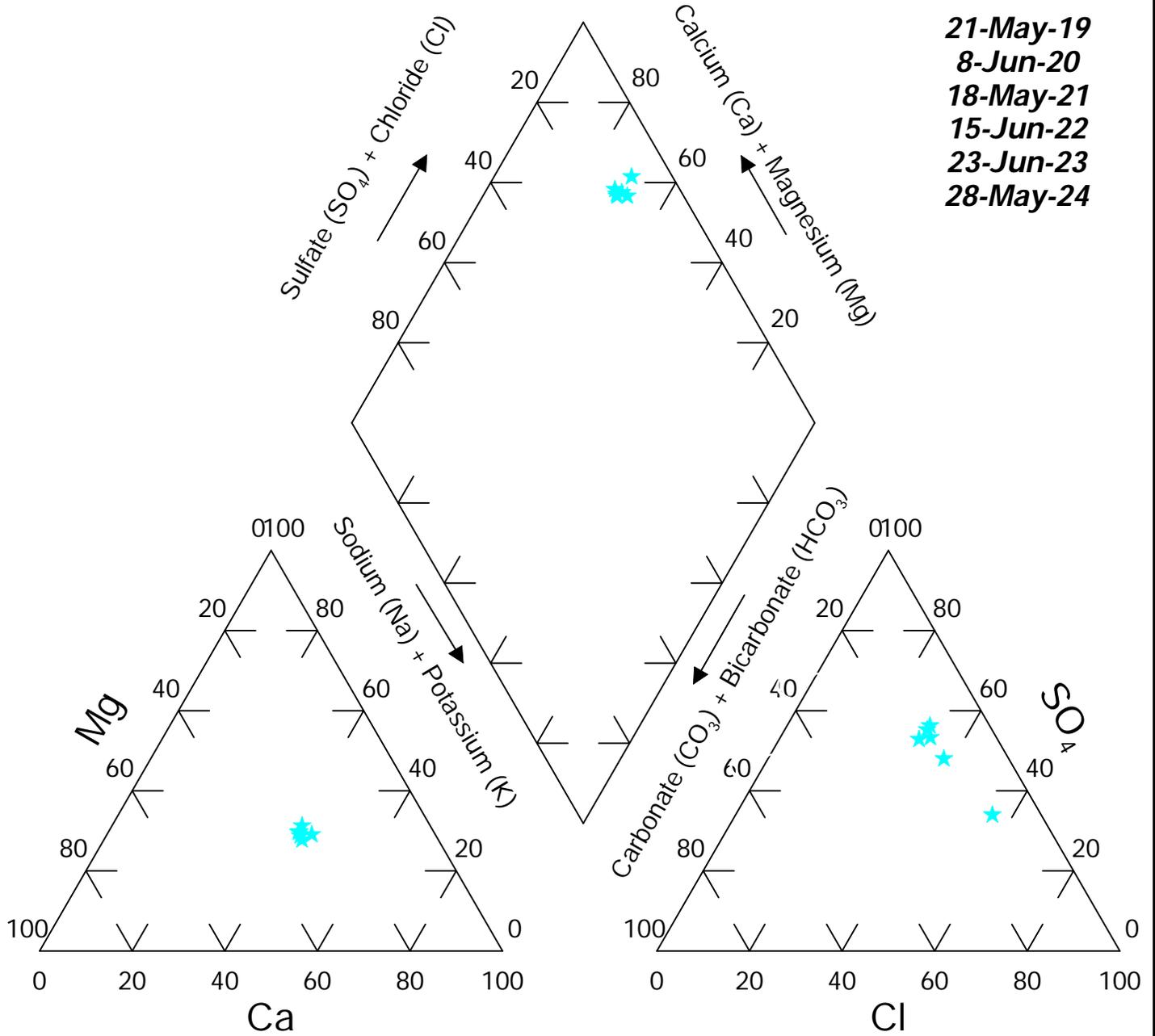


**FIGURE: 15P**

**Site: Brady**  
**Location : GWQ25-6N63-E**

**Dates:**

- 21-May-19**
- 8-Jun-20**
- 18-May-21**
- 15-Jun-22**
- 23-Jun-23**
- 28-May-24**



# Site: Brady Well #: 6N63-F

Dates:

- 21-May-19
- 10-Jun-20
- 18-May-21
- 15-Jun-22
- 28-Jun-23
- 28-May-24

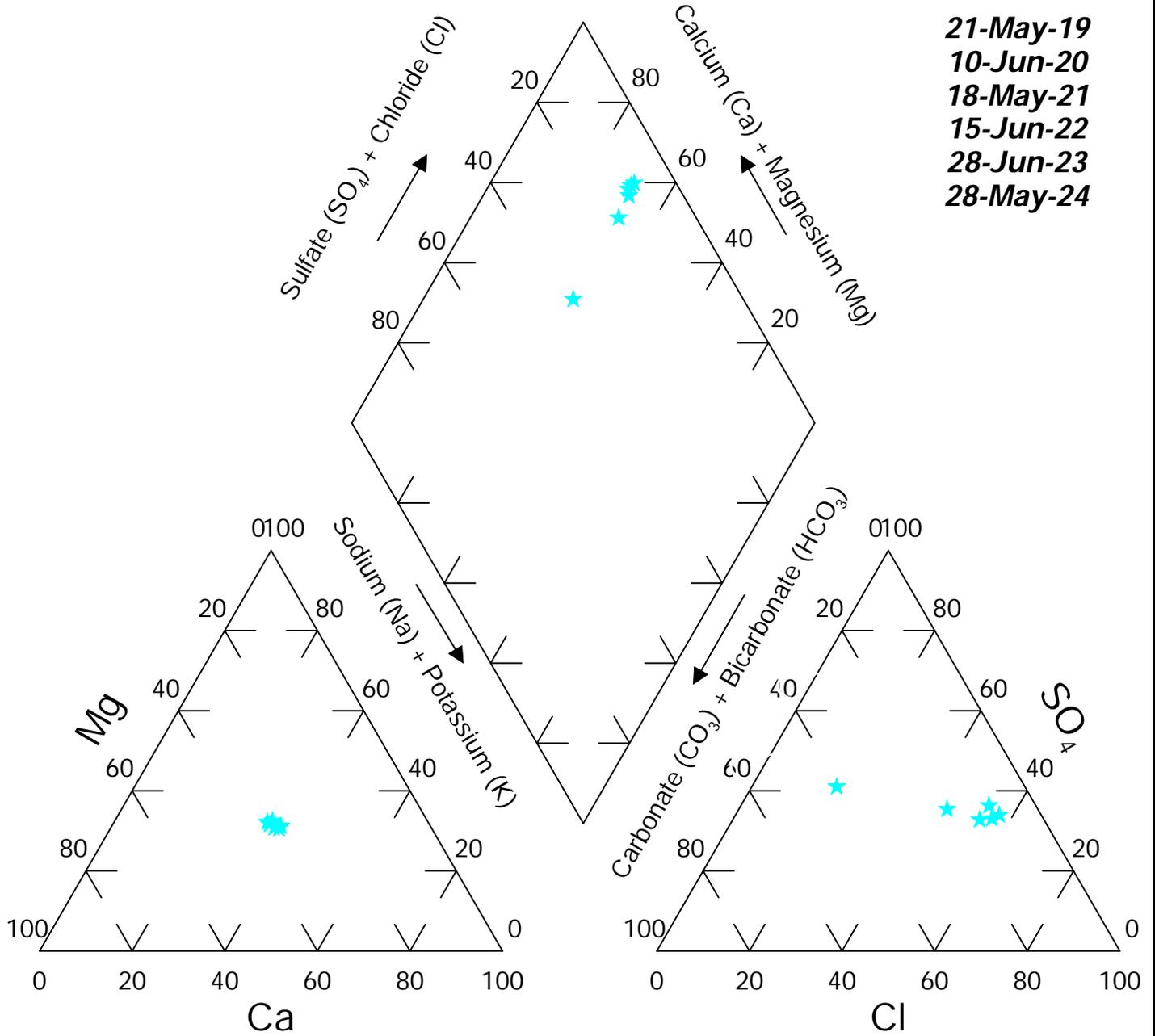


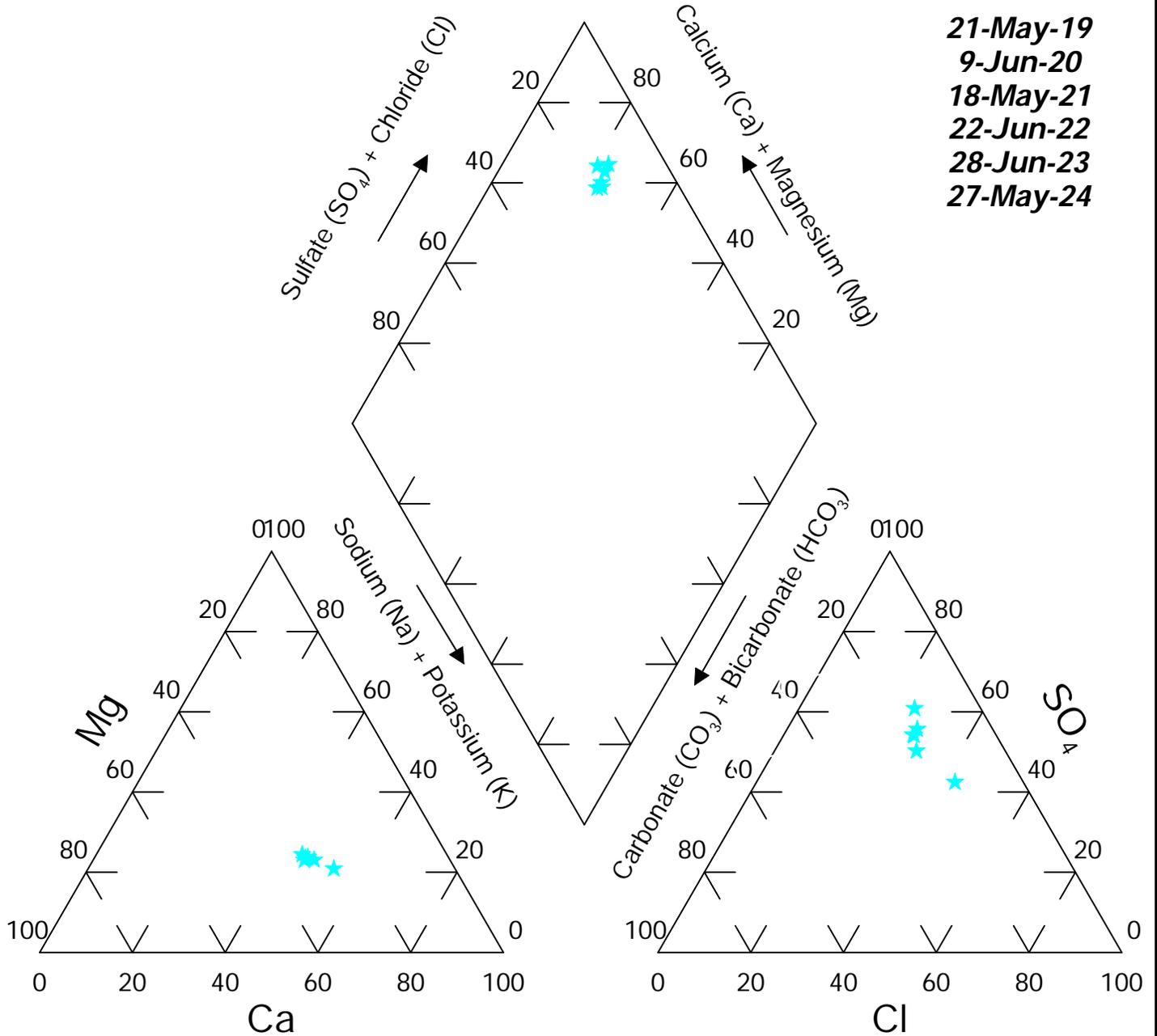
FIGURE: 16P

# Site: Brady

## Location : GWQ25-6N67-E

Dates:

- 21-May-19
- 9-Jun-20
- 18-May-21
- 22-Jun-22
- 28-Jun-23
- 27-May-24



# Site: Brady Well #: 6N67-F

Dates:

- 21-May-19
- 9-Jun-20
- 18-May-21
- 22-Jun-22
- 28-Jun-23
- 27-May-24

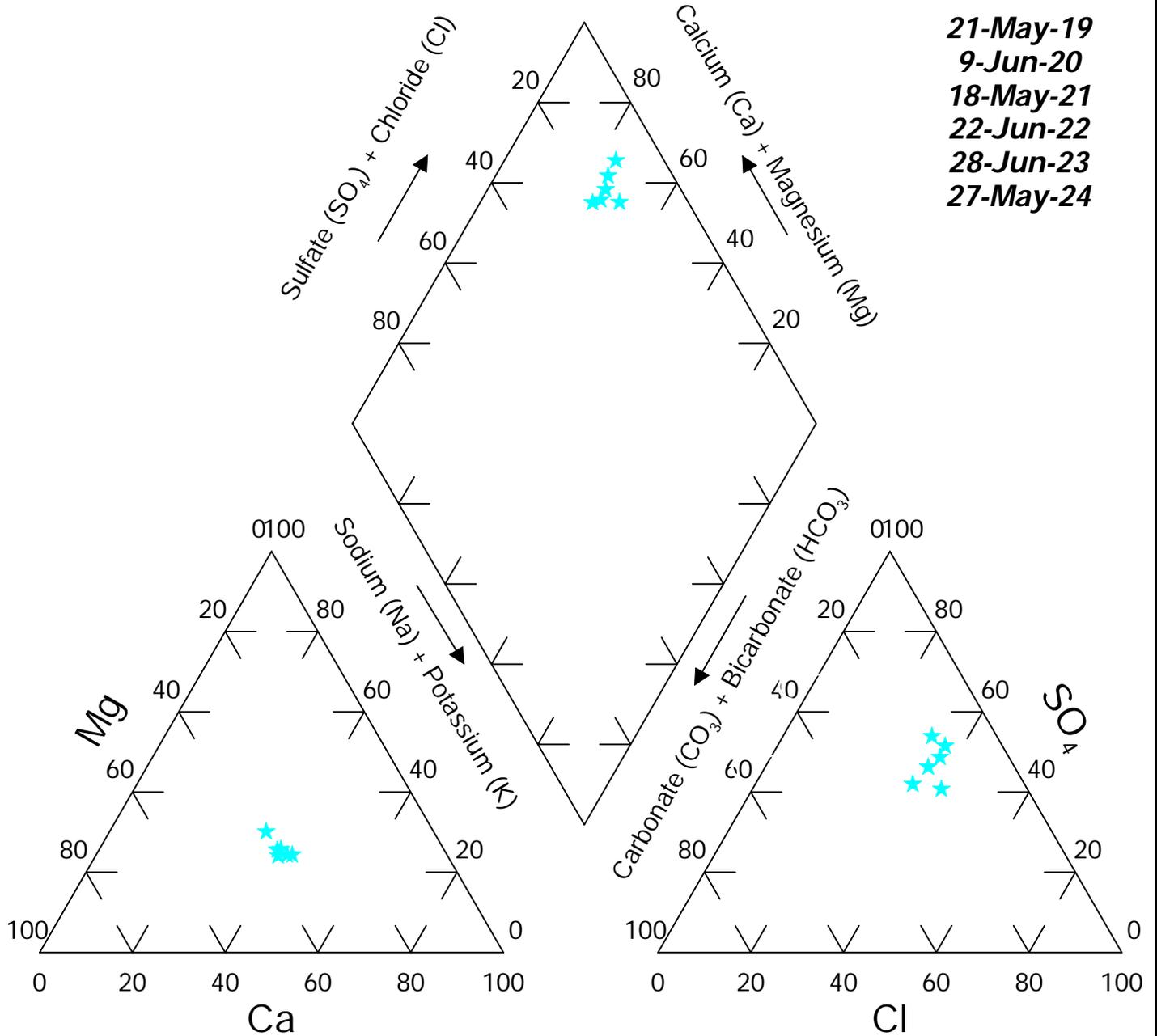
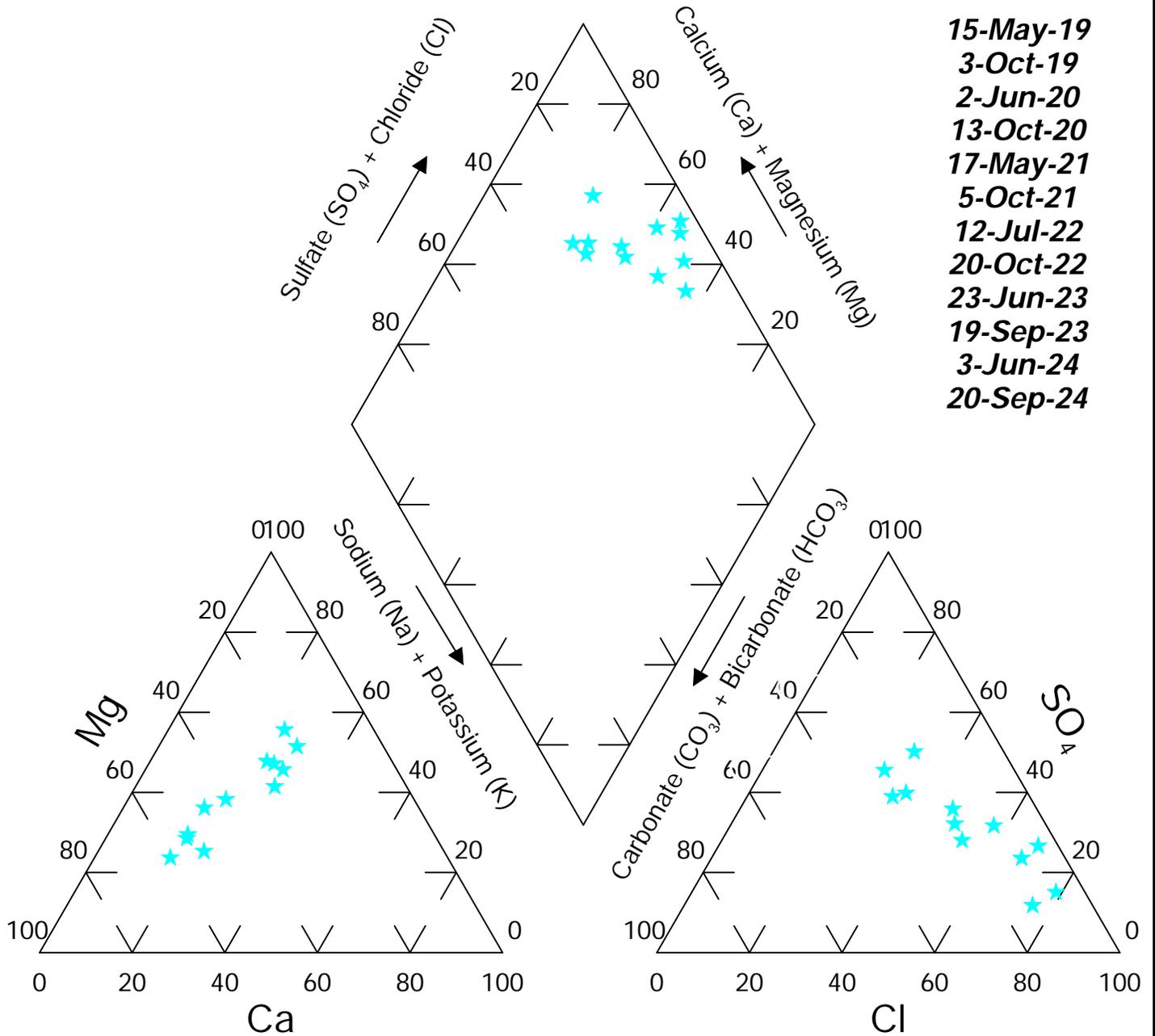


FIGURE: 17P

# Site: Brady Well #: 13A

## Dates:

- 15-May-19
- 3-Oct-19
- 2-Jun-20
- 13-Oct-20
- 17-May-21
- 5-Oct-21
- 12-Jul-22
- 20-Oct-22
- 23-Jun-23
- 19-Sep-23
- 3-Jun-24
- 20-Sep-24



# Site: Brady Well #: 14A

## Dates:

- 15-May-19
- 3-Oct-19
- 3-Jun-20
- 15-Oct-20
- 17-May-21
- 5-Oct-21
- 12-Jul-22
- 21-Oct-22
- 20-Jun-23
- 19-Sep-23
- 30-May-24
- 2-Oct-24

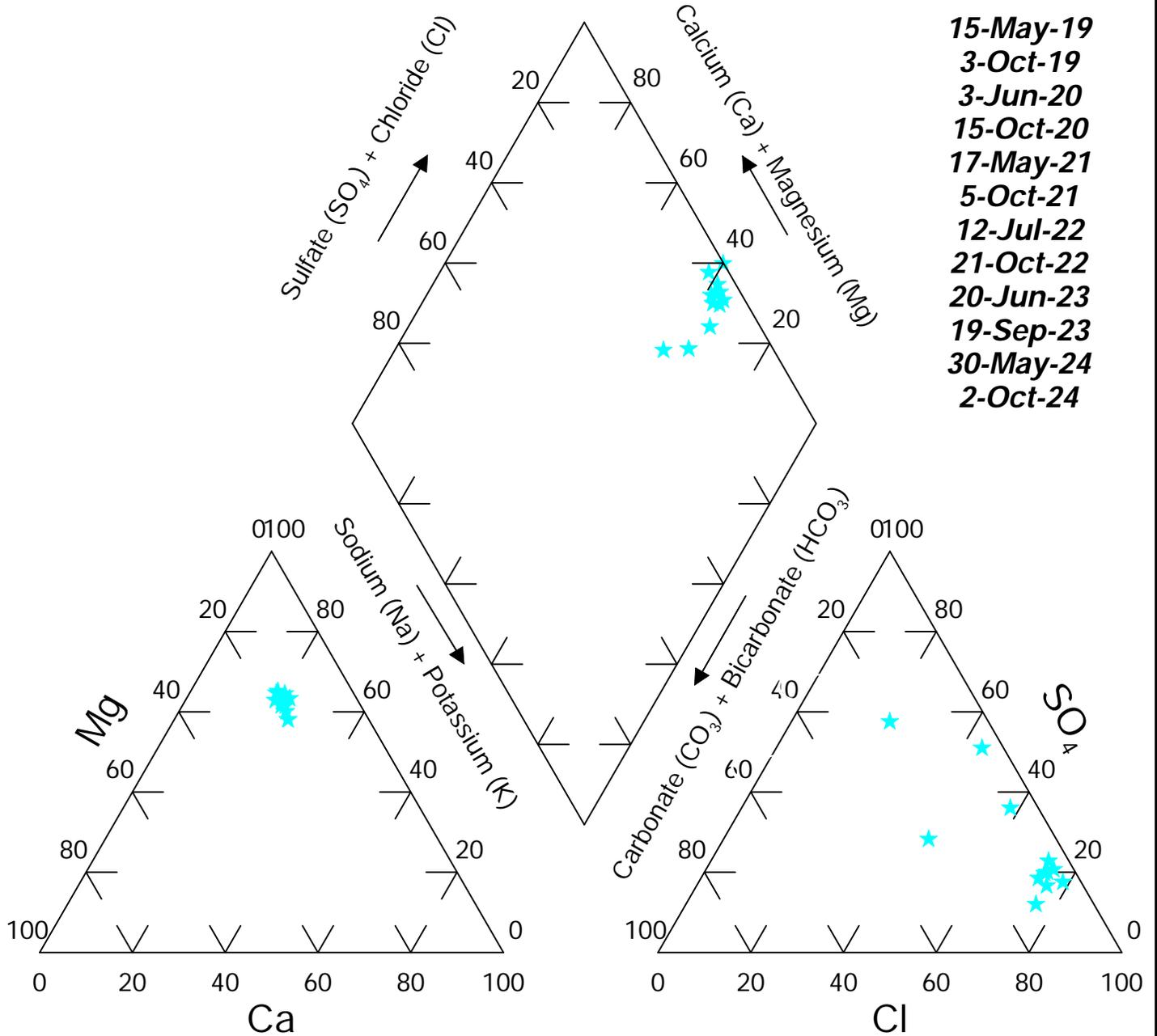
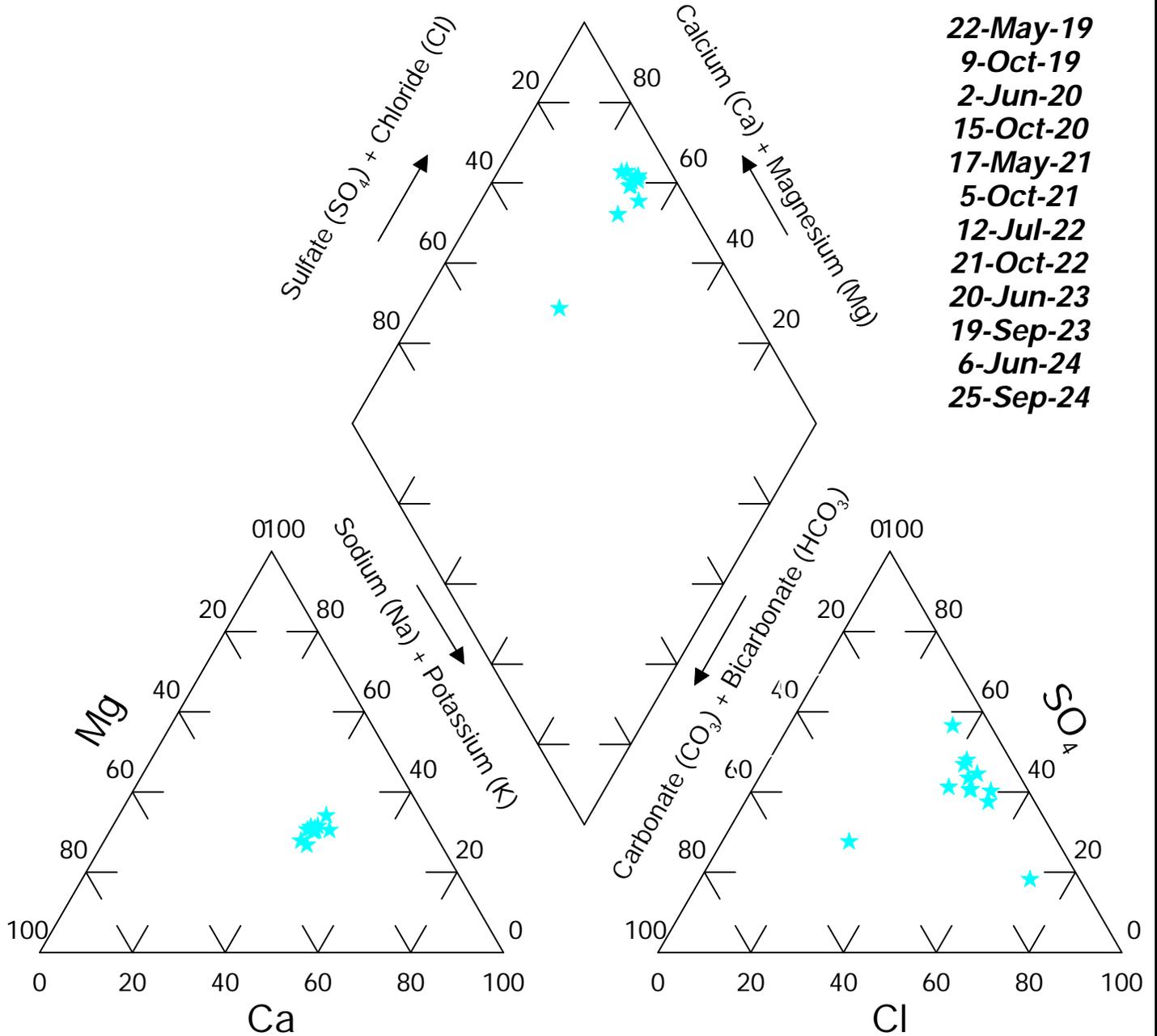


FIGURE: 13P

# Site: Brady Well #: 15A

## Dates:

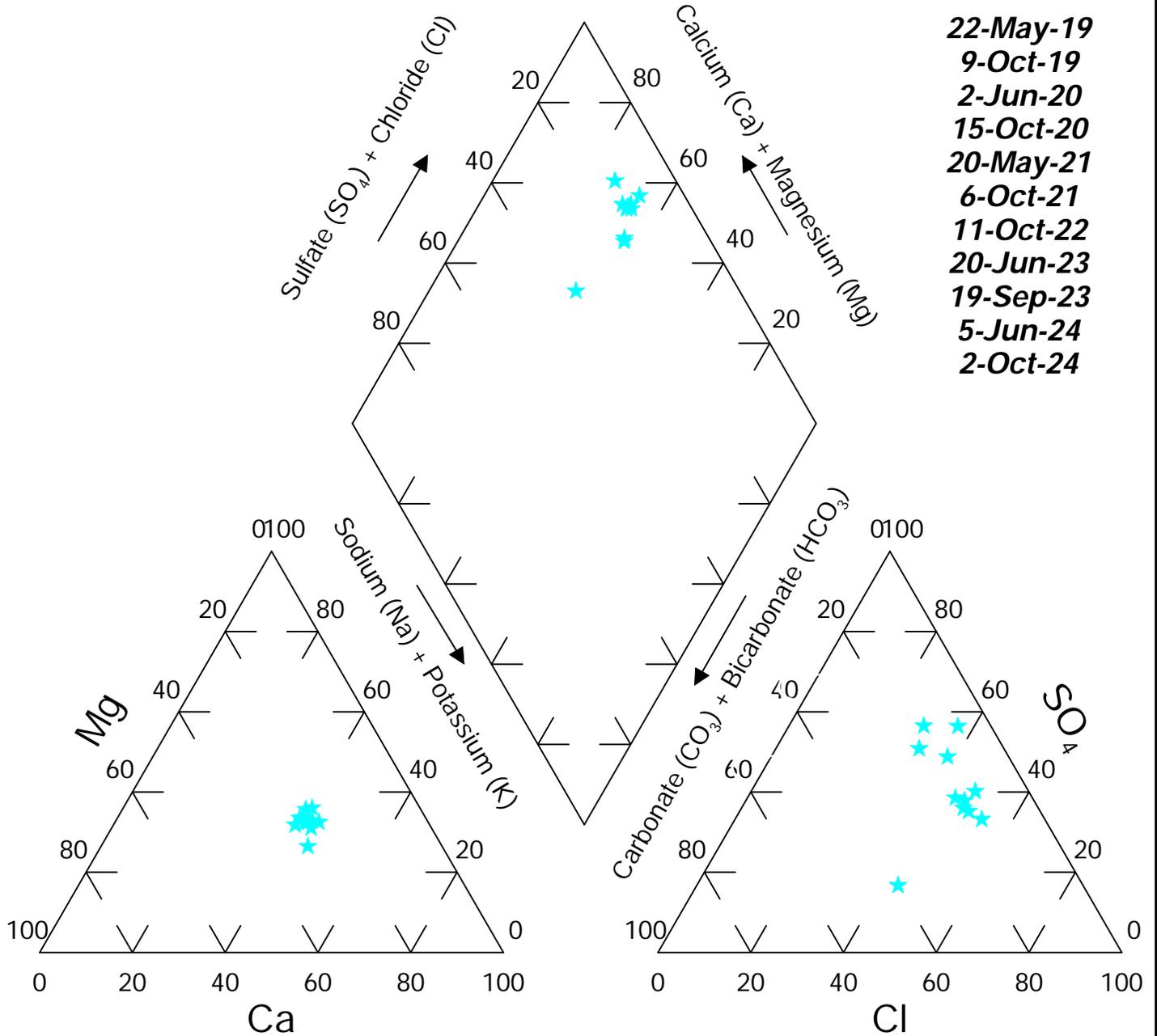
- 22-May-19
- 9-Oct-19
- 2-Jun-20
- 15-Oct-20
- 17-May-21
- 5-Oct-21
- 12-Jul-22
- 21-Oct-22
- 20-Jun-23
- 19-Sep-23
- 6-Jun-24
- 25-Sep-24



# Site: Brady Well #: 16A

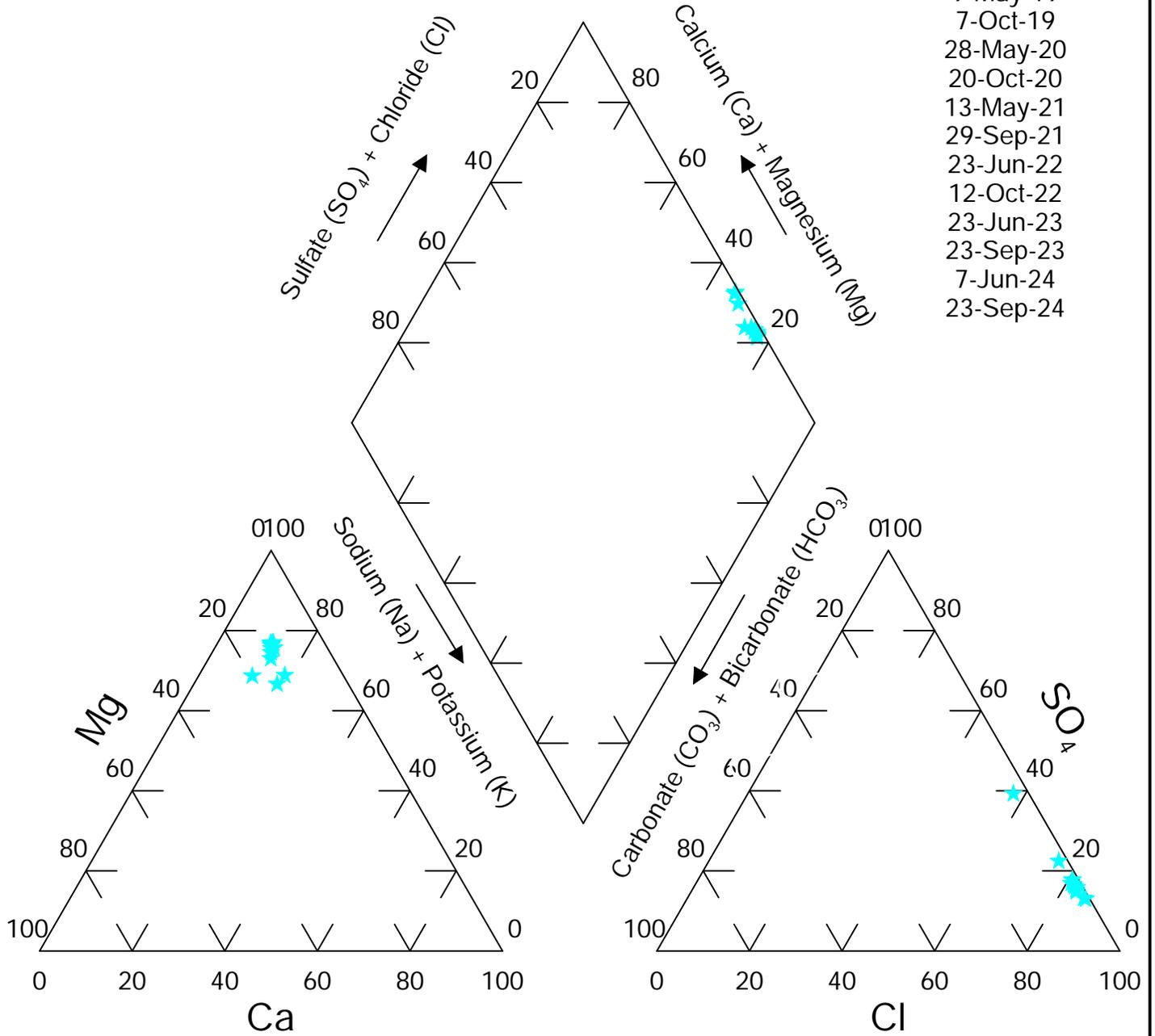
## Dates:

- 22-May-19
- 9-Oct-19
- 2-Jun-20
- 15-Oct-20
- 20-May-21
- 6-Oct-21
- 11-Oct-22
- 20-Jun-23
- 19-Sep-23
- 5-Jun-24
- 2-Oct-24



# Site: Brady Well #: W4

- Dates:**
- 9-May-19
  - 7-Oct-19
  - 28-May-20
  - 20-Oct-20
  - 13-May-21
  - 29-Sep-21
  - 23-Jun-22
  - 12-Oct-22
  - 23-Jun-23
  - 23-Sep-23
  - 7-Jun-24
  - 23-Sep-24

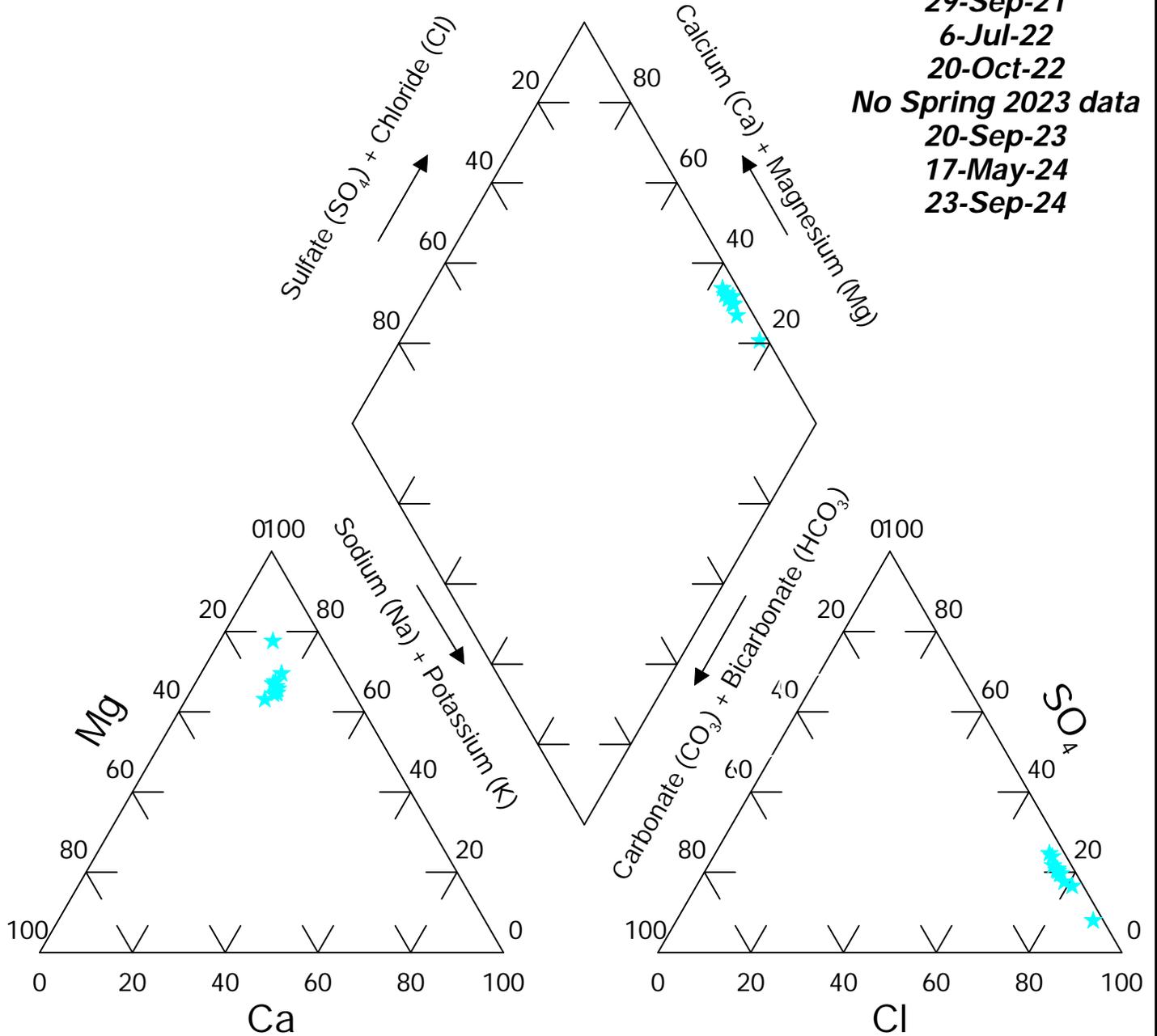


**FIGURE: 1P**

**Site: Brady**  
**Well #: W5**

**Dates:**

- 9-May-19
- 7-Oct-19
- 28-May-20
- 15-Oct-20
- 13-May-21
- 29-Sep-21
- 6-Jul-22
- 20-Oct-22
- No Spring 2023 data
- 20-Sep-23
- 17-May-24
- 23-Sep-24



**FIGURE: 2P**

# Site: Brady Well #: W6

## Dates:

- 14-May-19
- 13-Nov-19
- 4-Jun-20
- 15-Oct-20
- 13-May-21
- 4-Oct-21
- 7-Jul-22
- 6-Oct-22
- No Spring 2023 Data
- 18-Sep-23
- 31-May-24
- No Fall 2024 Data

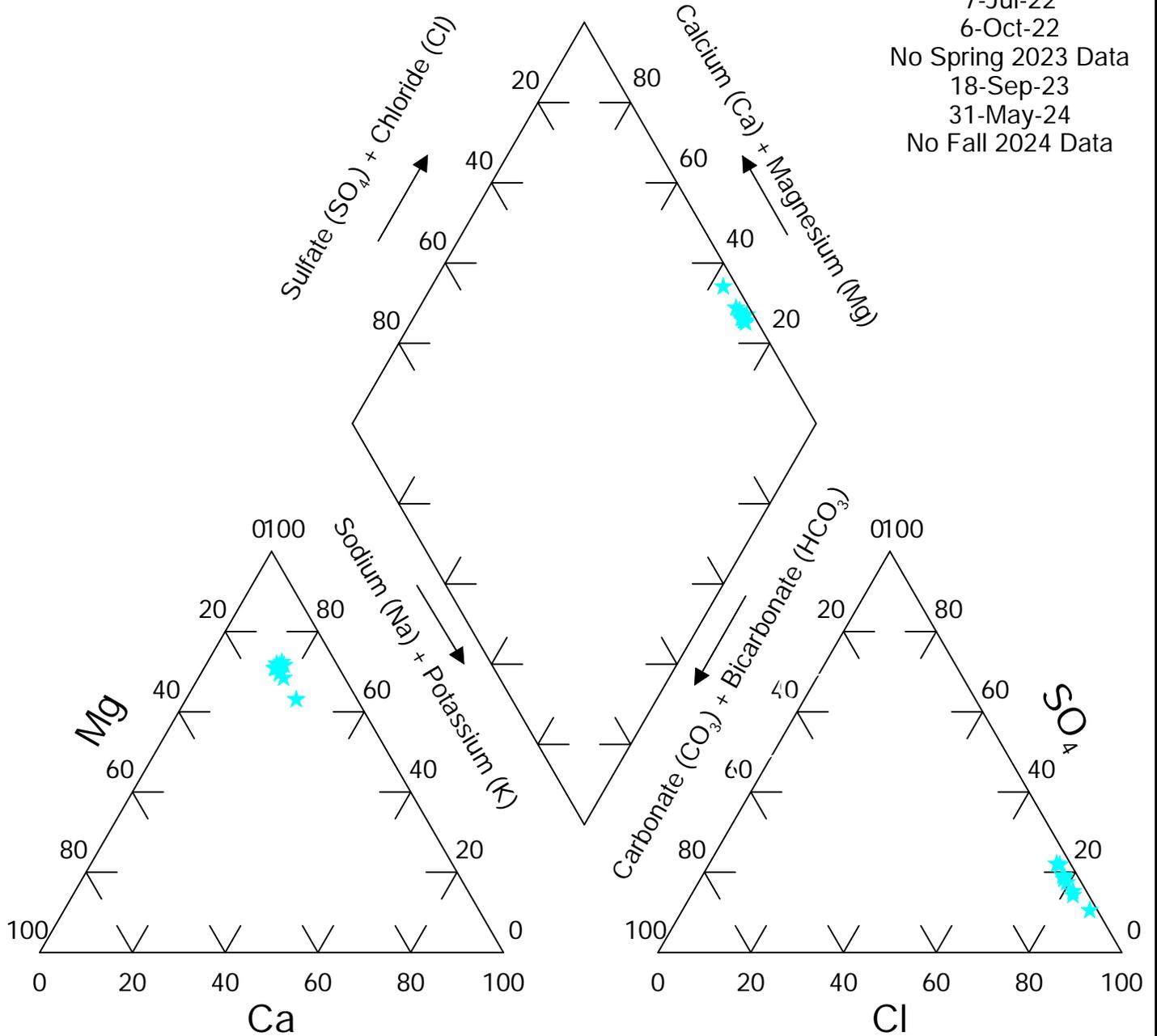


FIGURE: 3P

**Site: Brady  
Well #: W7**

**Dates:**

**14-May-19**

**13-Nov-19**

**4-Jun-20**

**20-Oct-20**

**13-May-21**

**5-Oct-21**

**23-Jun-22**

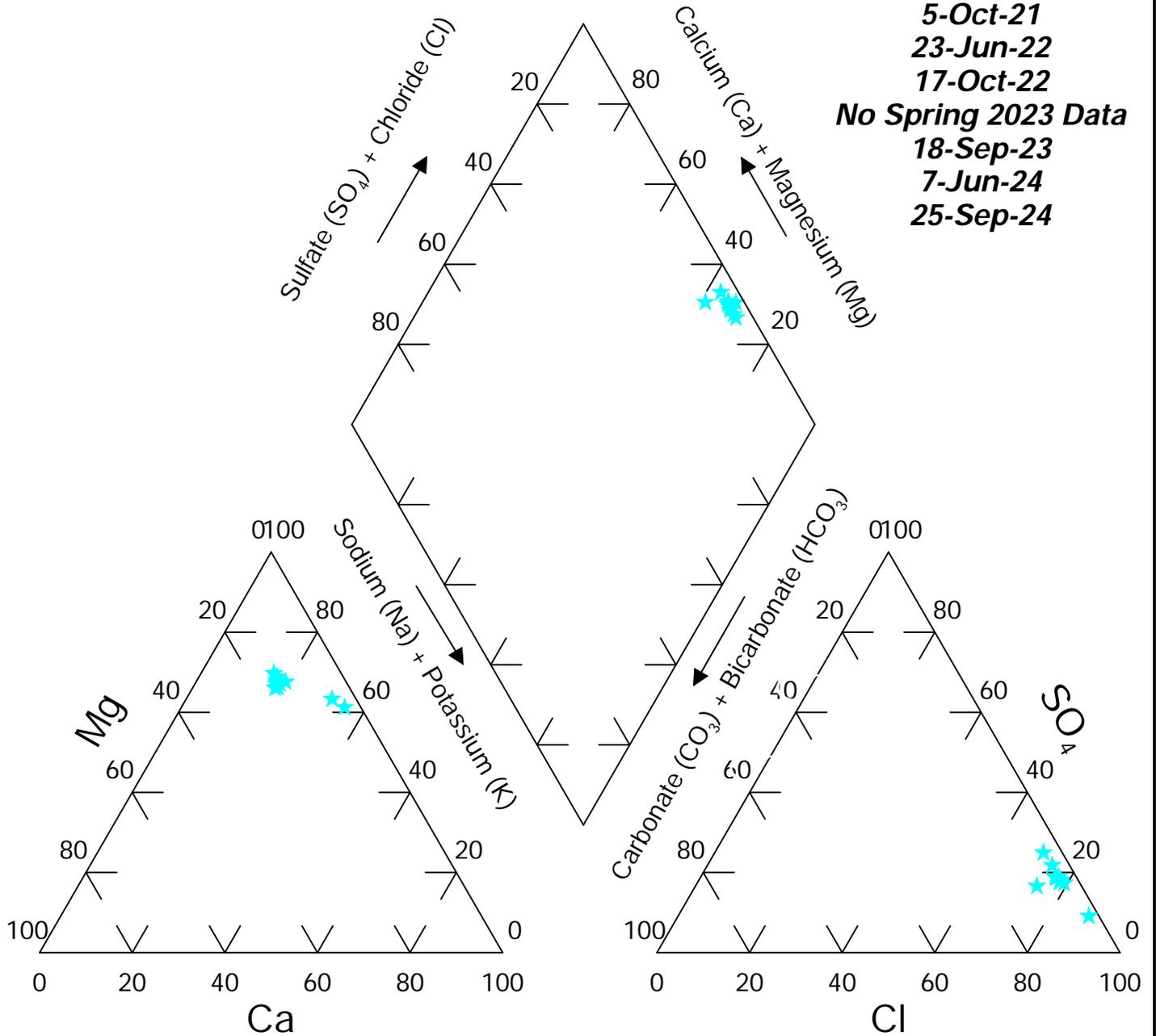
**17-Oct-22**

**No Spring 2023 Data**

**18-Sep-23**

**7-Jun-24**

**25-Sep-24**

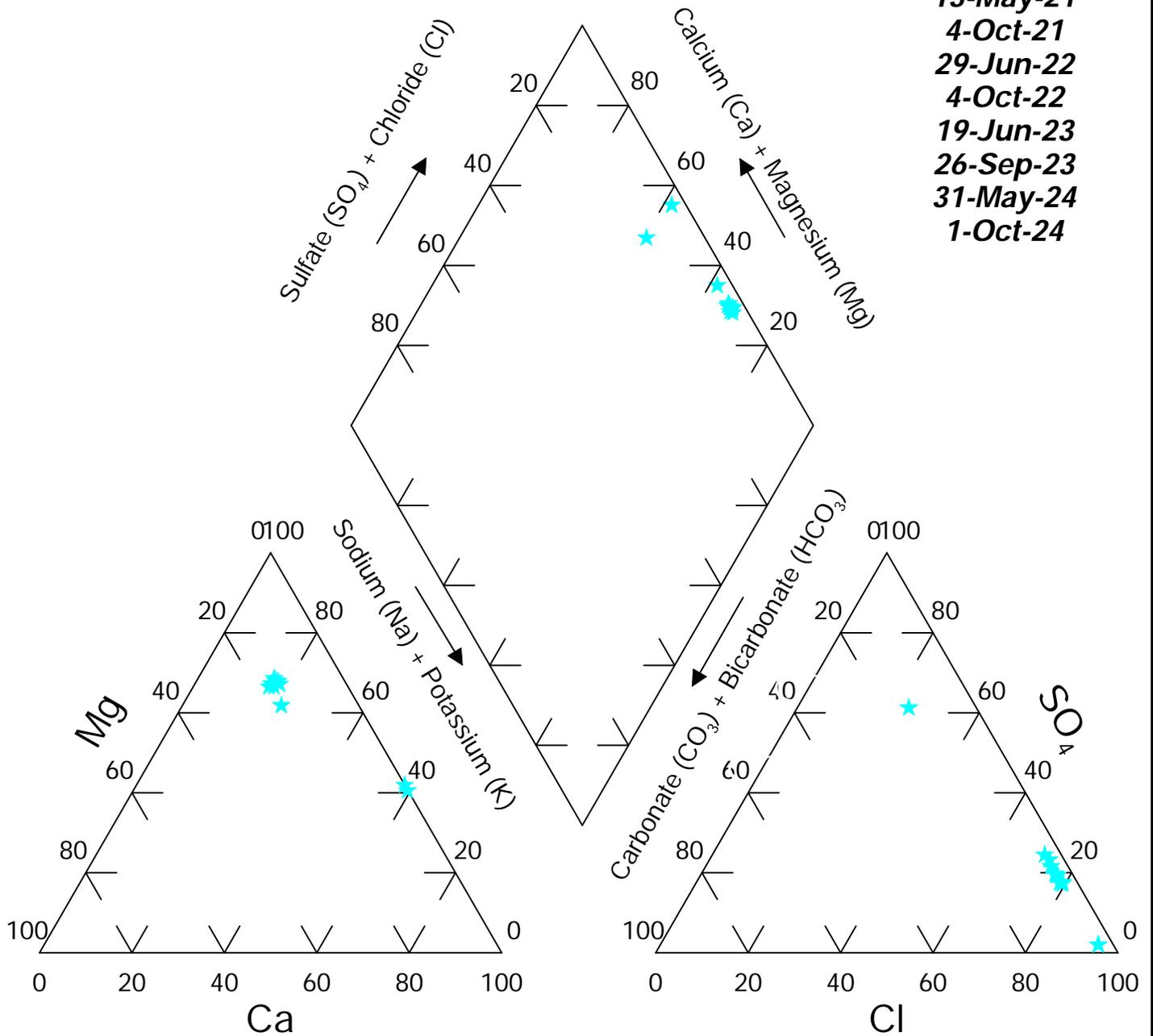


**FIGURE: 4P**

**Site: Brady**  
**Well #: W8**

**Dates:**

- 13-May-19
- 13-Nov-19
- 4-Jun-20
- 20-Oct-20
- 13-May-21
- 4-Oct-21
- 29-Jun-22
- 4-Oct-22
- 19-Jun-23
- 26-Sep-23
- 31-May-24
- 1-Oct-24



**FIGURE: 5P**

# Site: Brady Well #: W9

## Dates:

- 15-May-19
- 8-Oct-19
- 4-Jun-20
- 20-Oct-20
- 12-May-21
- 5-Oct-21
- 22-Jun-22
- 12-Oct-22
- 14-Jun-23
- 23-Sep-23
- 28-May-24
- 19-Sep-24

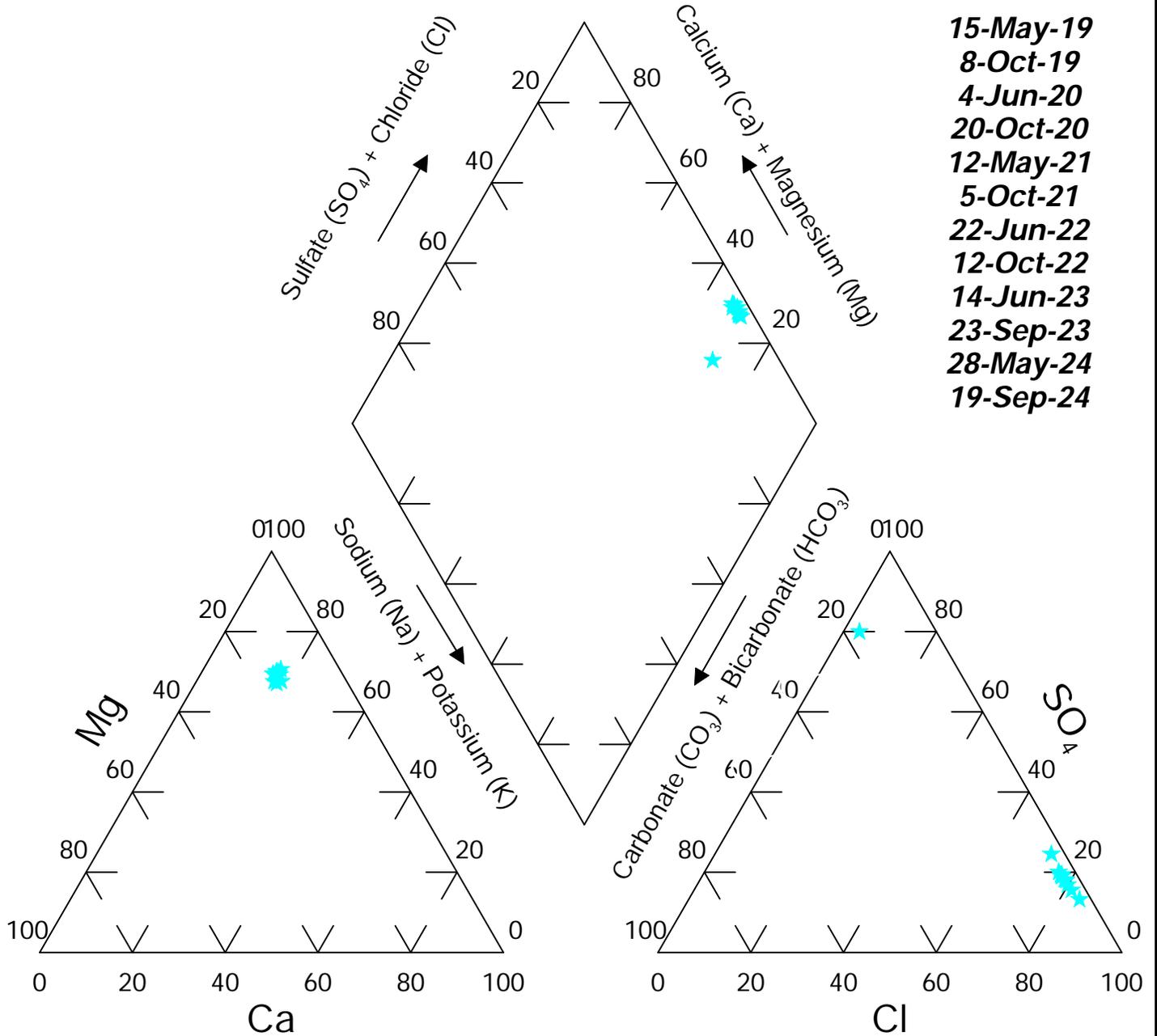


FIGURE: 6P

# Site: Brady

## Well #: W10/W10R

### Dates:

- 15-May-19
- 8-Oct-19
- 27-May-20
- 23-Jul-20
- 14-Oct-20
- 12-Mar-21
- 4-Oct-21
- 22-Jun-22
- 6-Oct-22
- 8-Jun-23
- 20-Sep-23
- 24-May-24
- 19-Sep-24

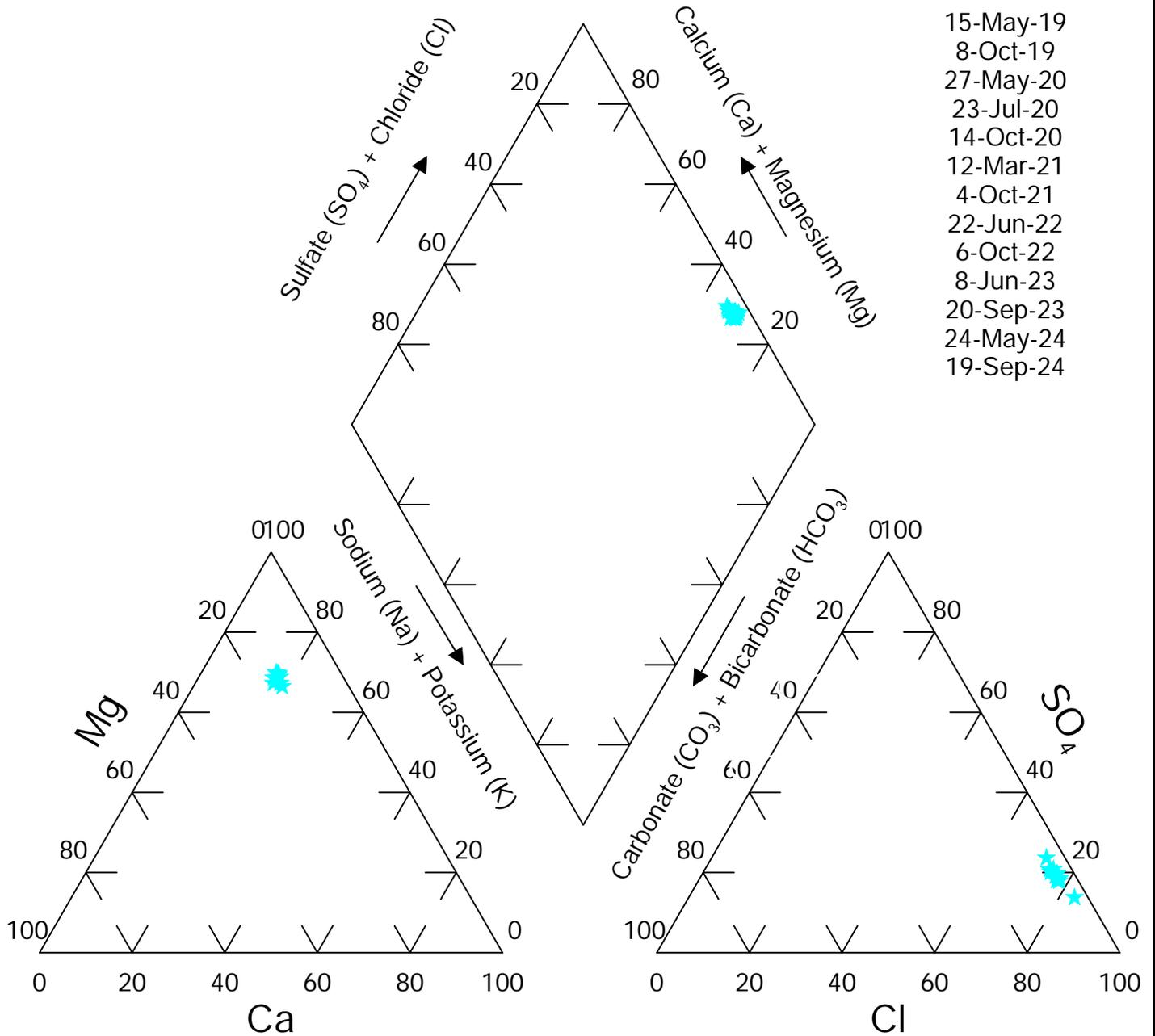


FIGURE: 7P

# Site: Brady Well #: W11

## Dates:

- 15-May-19
- 8-Oct-19
- 12-May-21
- 4-Oct-21
- 6-Jul-22
- 4-Oct-22
- 15-Jun-23
- 27-Sep-23
- 29-May-24
- 24-Sep-24

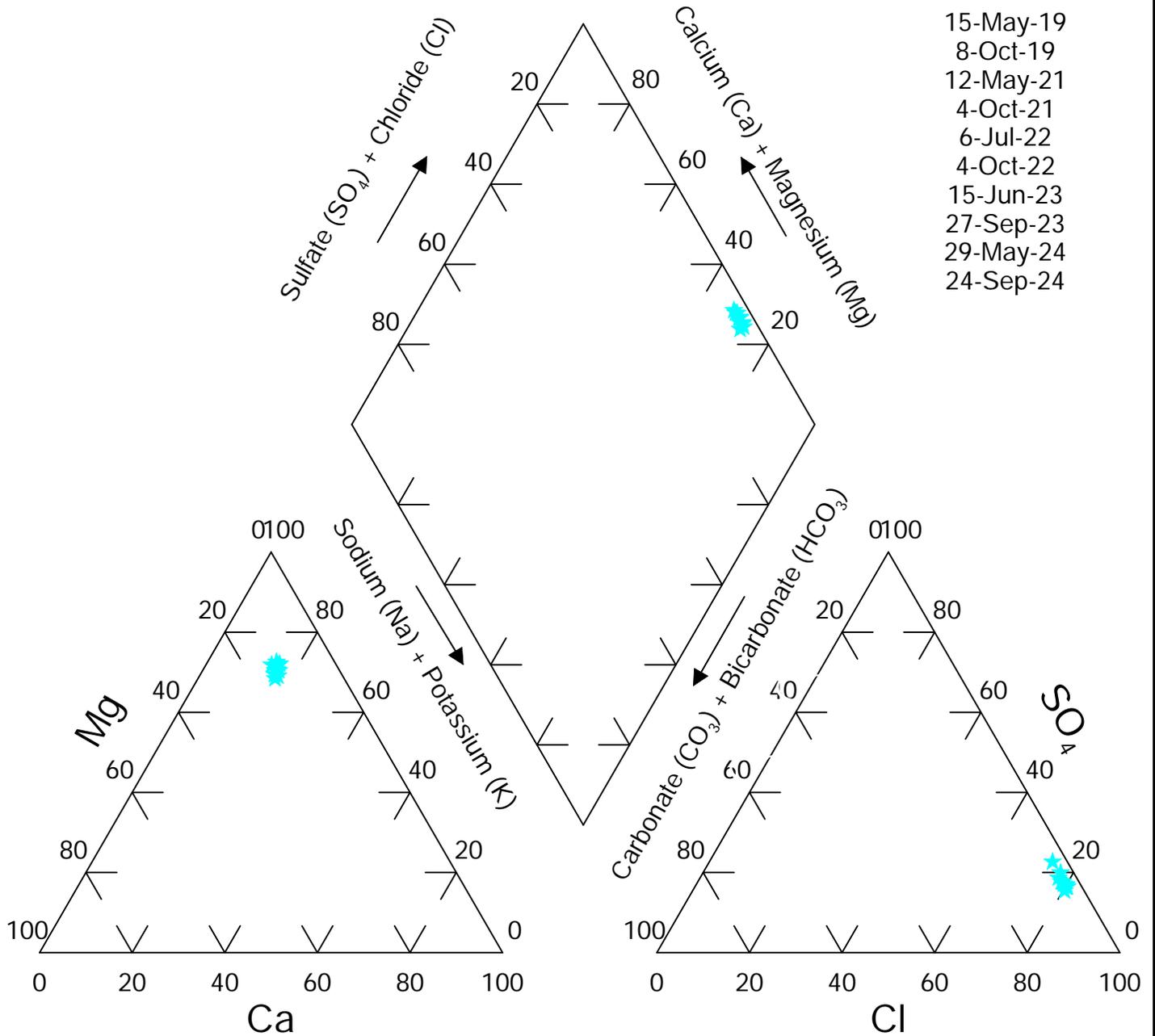
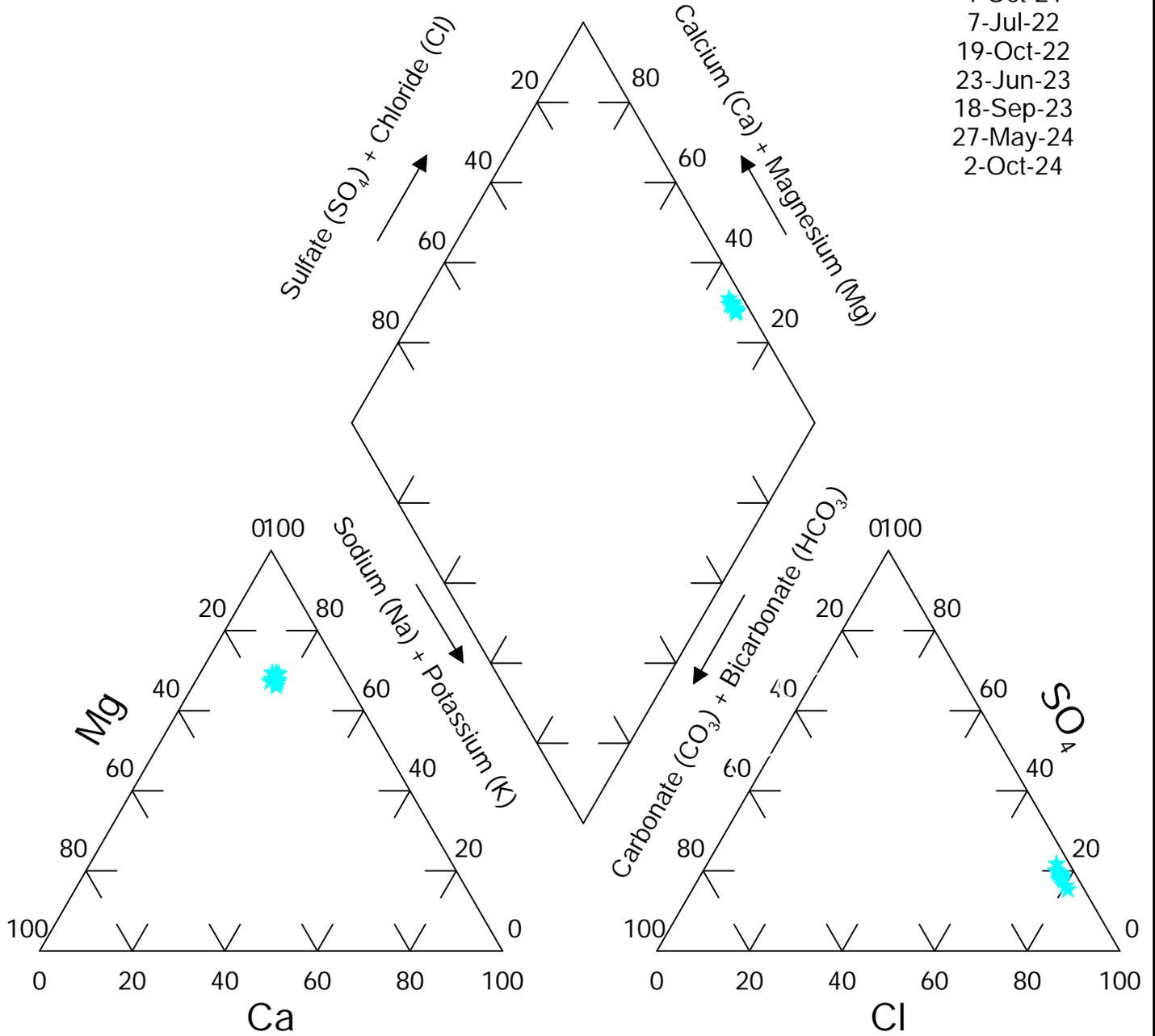


FIGURE: 8P

**Site: Brady**  
**Well #: W12**

**Dates:**

- 15-May-19
- 14-Oct-19
- 24-May-20
- 14-Oct-20
- 12-May-21
- 4-Oct-21
- 7-Jul-22
- 19-Oct-22
- 23-Jun-23
- 18-Sep-23
- 27-May-24
- 2-Oct-24



**FIGURE: 9P**

# Site: Brady Location : W13

Dates:

- 13-May-19
- 8-Oct-19
- 2-Jun-20
- 20-Oct-20
- 12-May-21
- 29-Sep-21
- 7-Jul-22
- 4-Oct-22
- No Spring 2023 Data
- 26-Sep-23
- 3-Jun-24
- 20-Sep-24

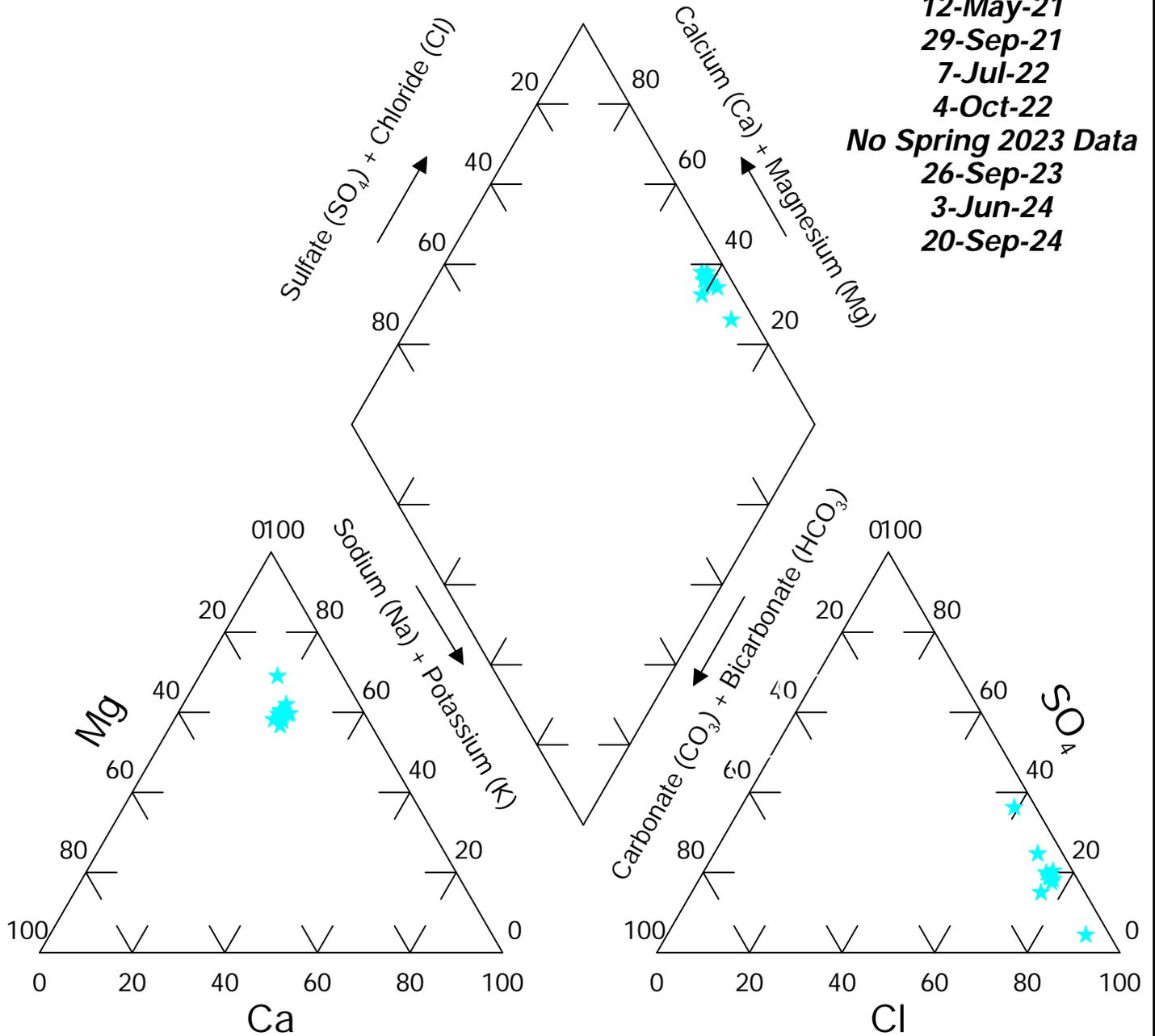


FIGURE: 1z

# Site: Brady

## Location : GWQ25-W14

Dates:

- 15-May-19
- 13-Nov-19
- 3-Jun-20
- 15-Oct-20
- 12-May-21
- 4-Oct-21
- 7-Jul-22
- 11-Oct-22
- 14-Jun-23
- 26-Sep-23
- 30-May-24
- 17-Sep-24

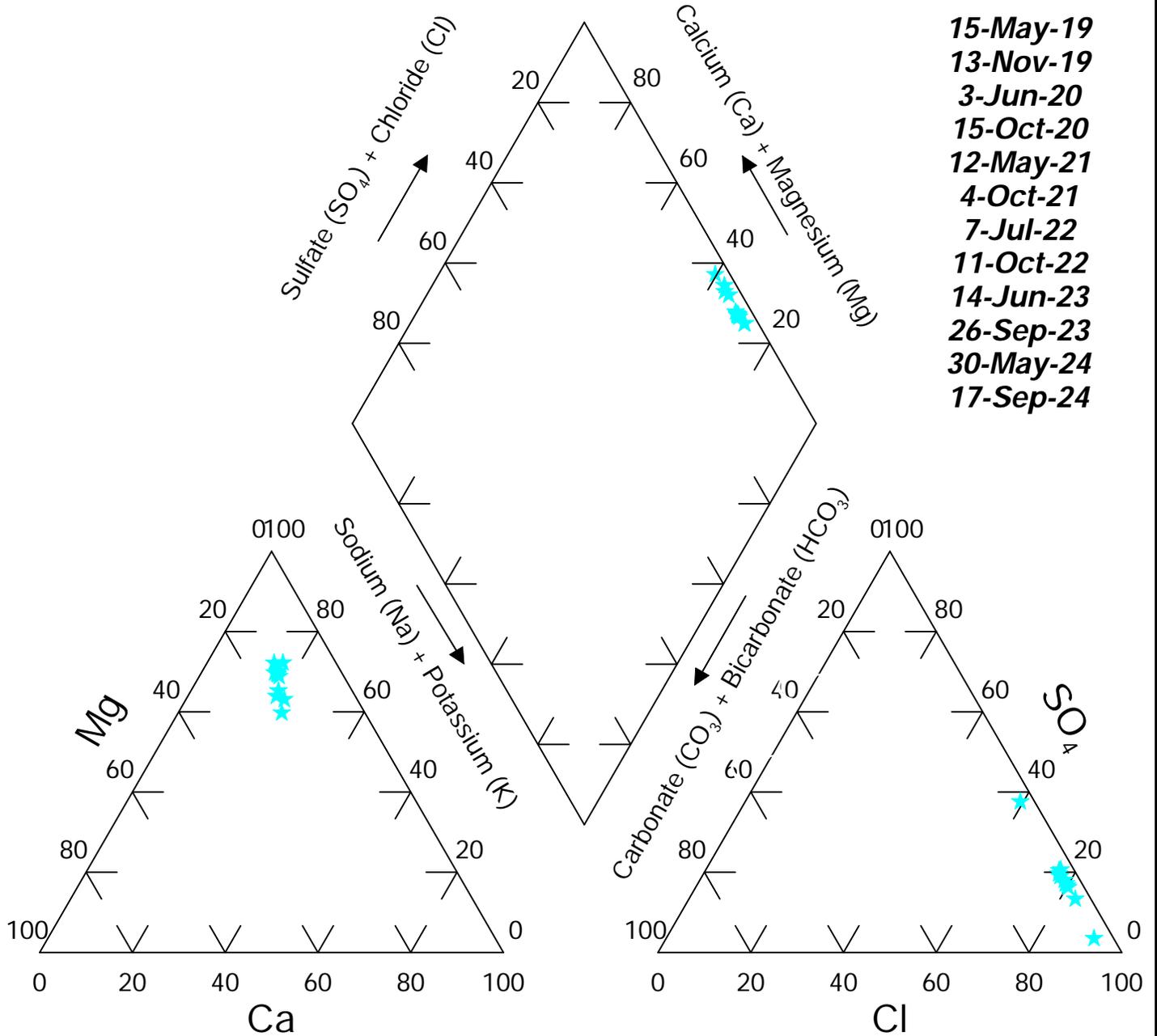


FIGURE: 2z

# Site: Brady

## Location : GWQ25-W15

Dates:

- 15-May-19
- 13-Oct-19
- 2-Jun-20
- 20-Oct-20
- 12-May-21
- 29-Sep-21
- 8-Jul-22
- 11-Oct-22
- 14-Jun-23
- 26-Sep-23
- 6-Jun-24
- 17-Sep-24

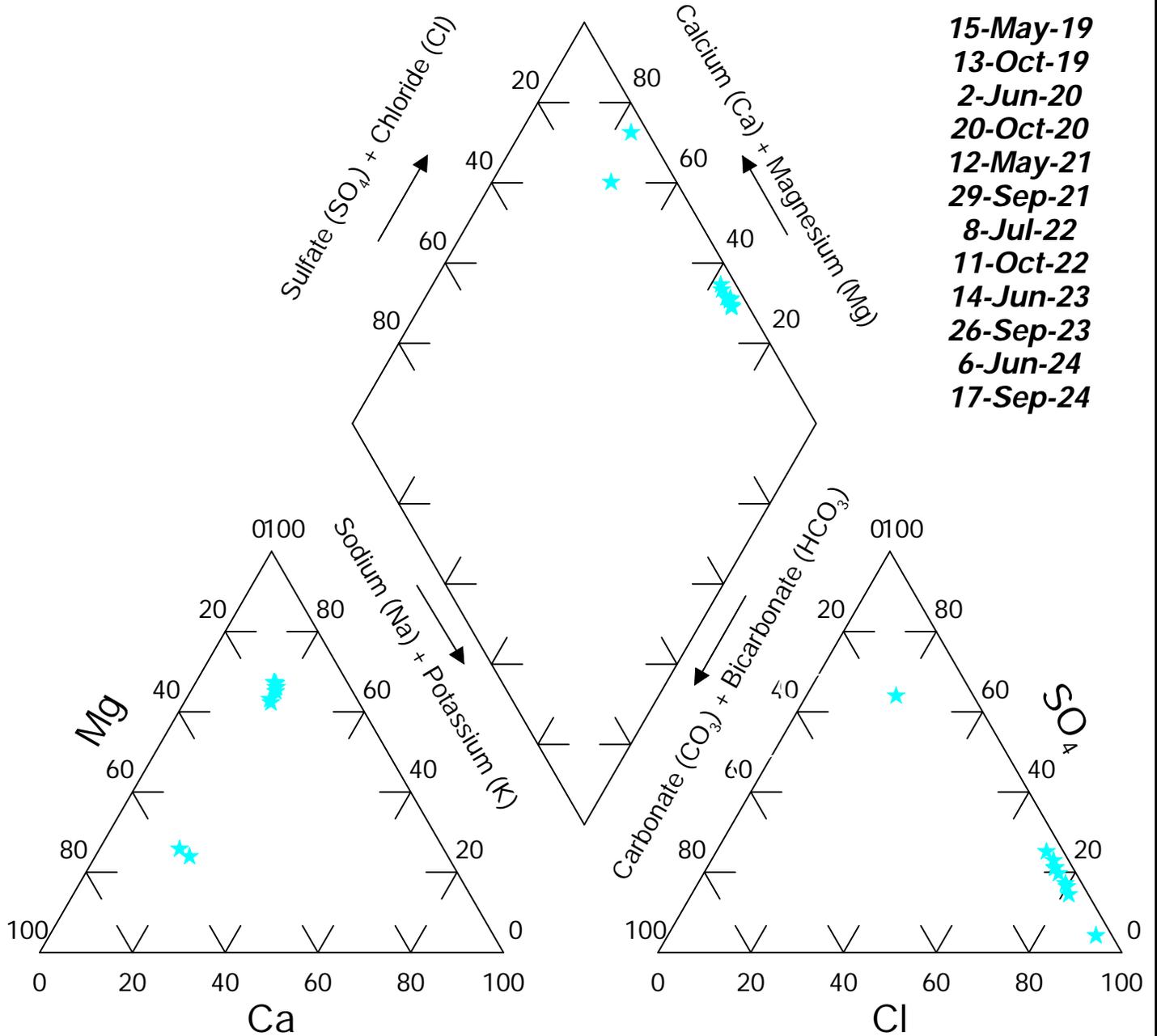


FIGURE: 3z

# Site: Brady

## Location : GWQ25-W16

Dates:

- 15-May-19
- 8-Dec-19
- 2-Jun-20
- 21-Oct-20
- 12-May-21
- 29-Sep-21
- 30-Jun-22
- 19-Oct-22
- 14-Jun-23
- 25-Sep-23
- 5-Jun-24
- 16-Sep-24

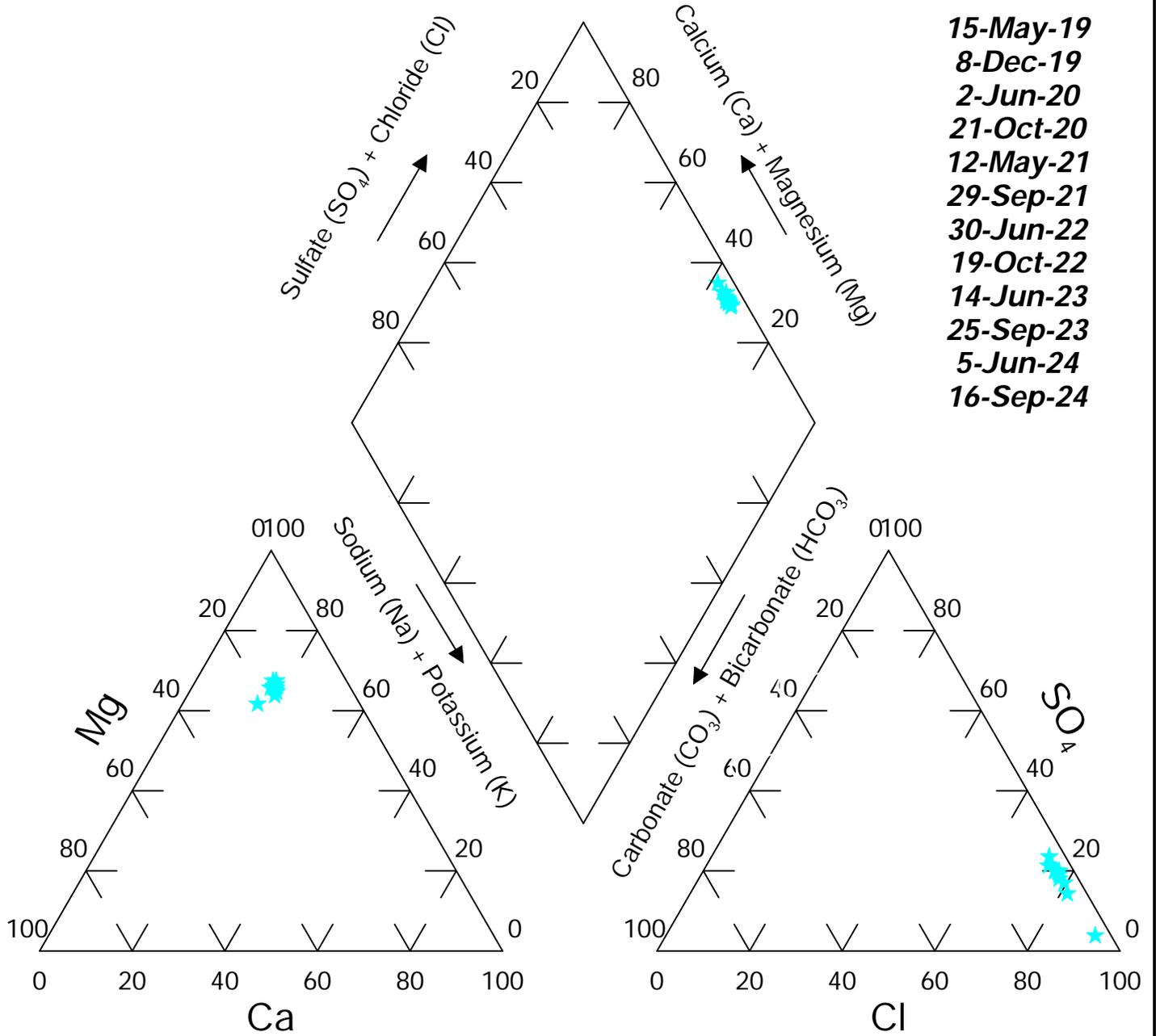
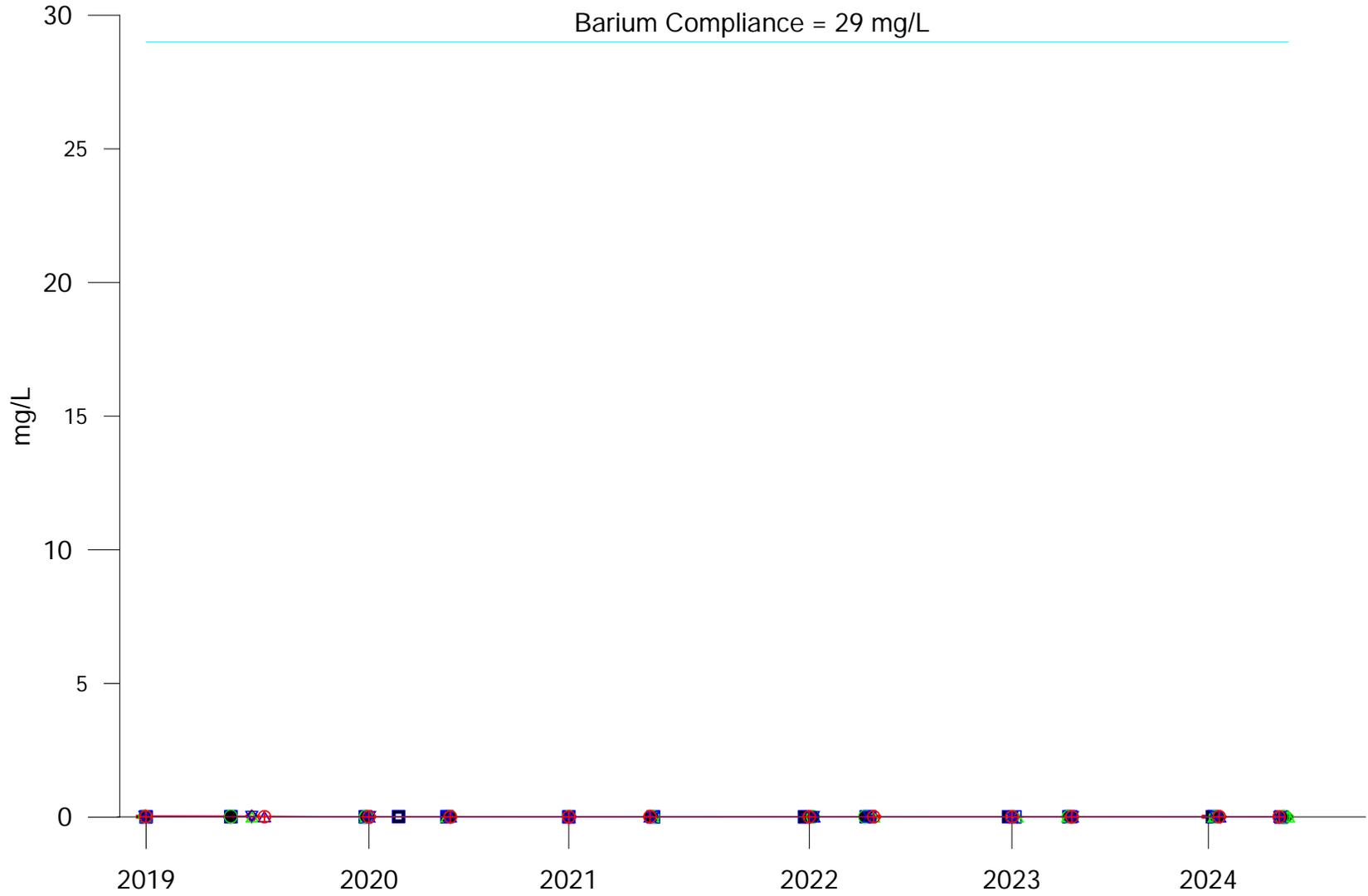


FIGURE: 4z

**APPENDIX D**  
**2024 GROUND WATER**  
**TVC GRAPHS**



**Cross gradient**

- W9
- W10
- ▽ W14
- △ W15

**Up gradient**

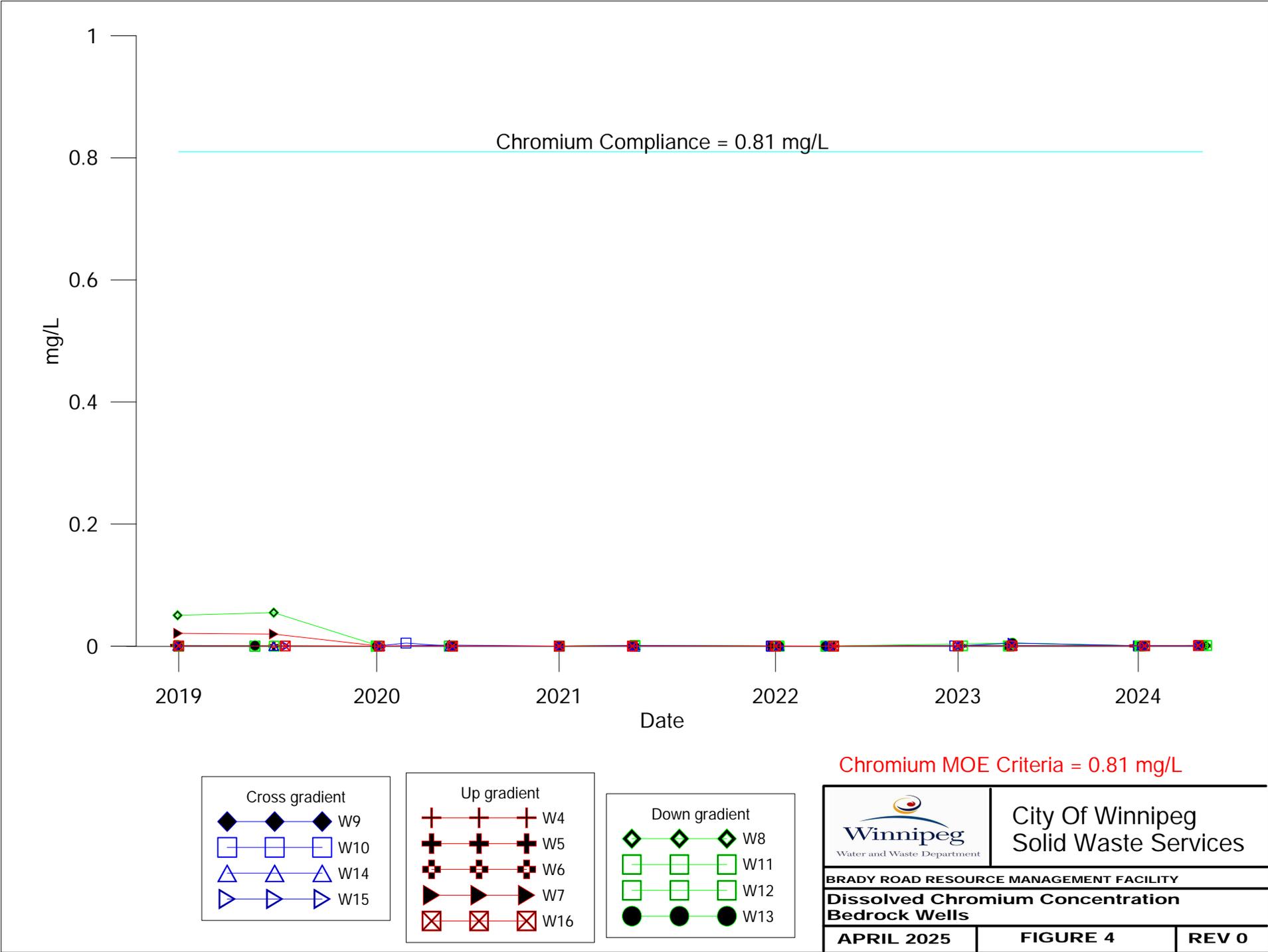
- + W4
- ⊕ W5
- ◇ W6
- ◊ W7
- ⊗ W16

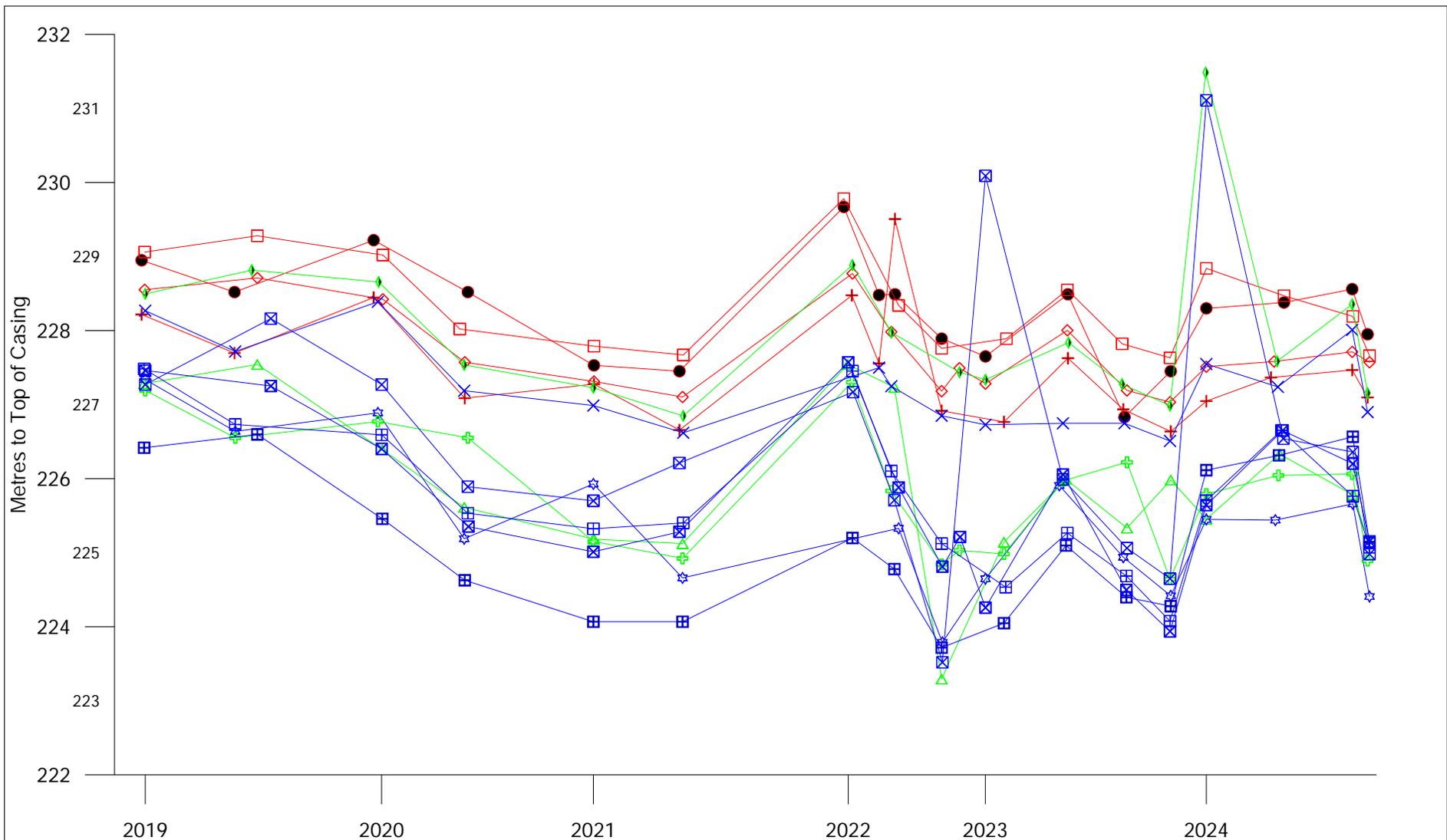
**Down Gradient**

- ◆ W8
- W10
- W11
- △ W12
- W13

Barium MOE Criteria = 29 mg/L

	City of Winnipeg Solid Waste Services	
	BRADY ROAD RESOURCE MANAGEMENT FACILITY	
Dissolved Barium Concentration Bedrock Wells		
APRIL 2025	FIGURE 2	REV 0





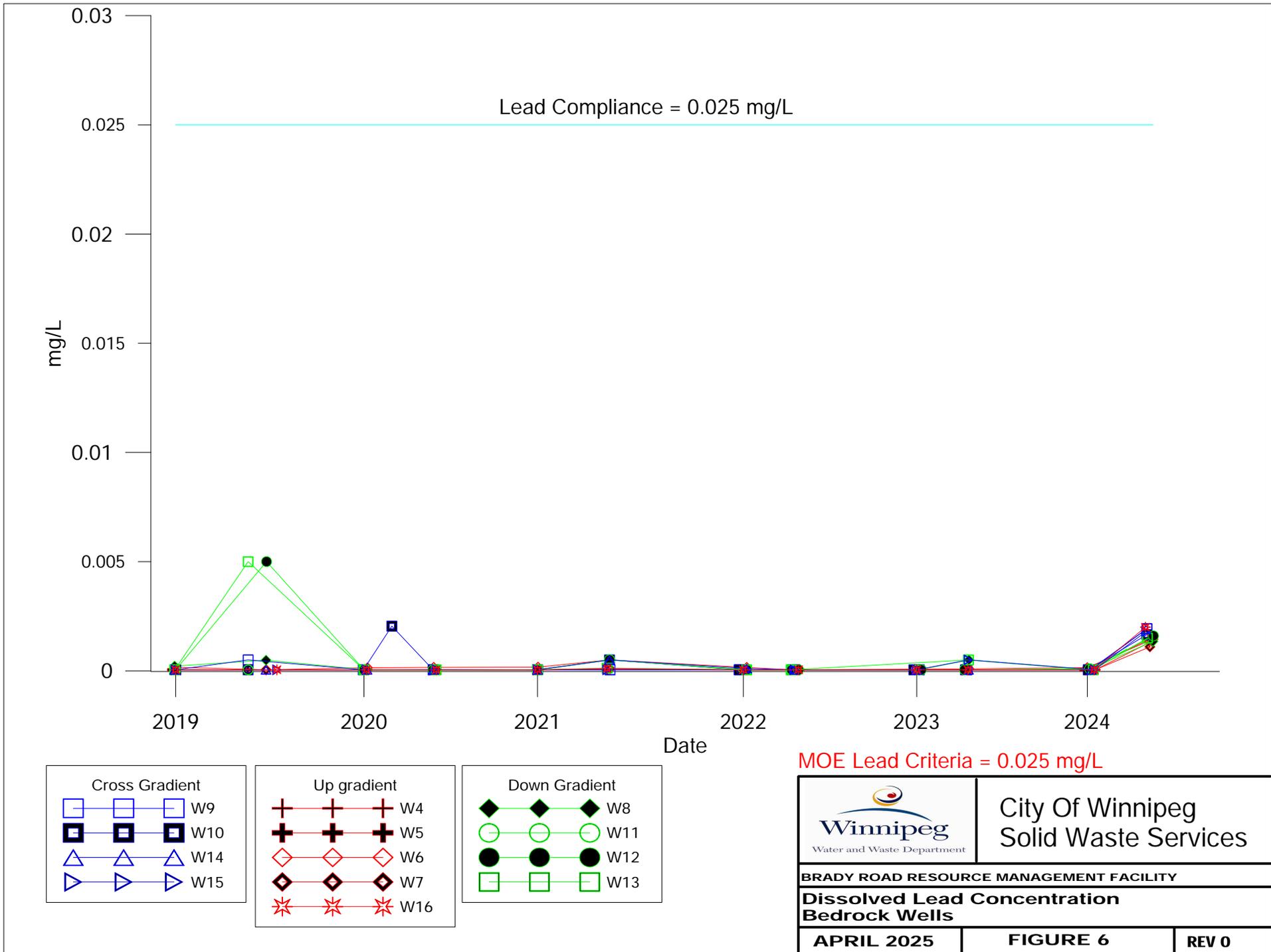
Cross gradient	
	W13
	W14
	W15
	W16

Cross gradient	
	W10
	W9

Up gradient	
	W11
	W12
	W8

Down gradient	
	W4
	W5
	W6
	W7

	<b>City of Winnipeg</b> Solid Waste Services
	<b>BRADY ROAD RESOURCE MANAGEMENT FACILITY</b>
<b>GROUNDWATER ELEVATION</b> <b>Bedrock Wells</b>	
<b>APRIL 2025</b>	<b>FIGURE GW-2   REV 0</b>



**Cross Gradient**

- W9
- W10
- △ W14
- ▷ W15

**Up gradient**

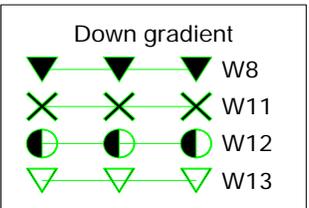
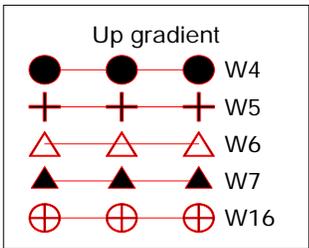
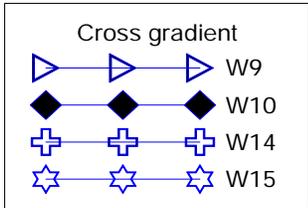
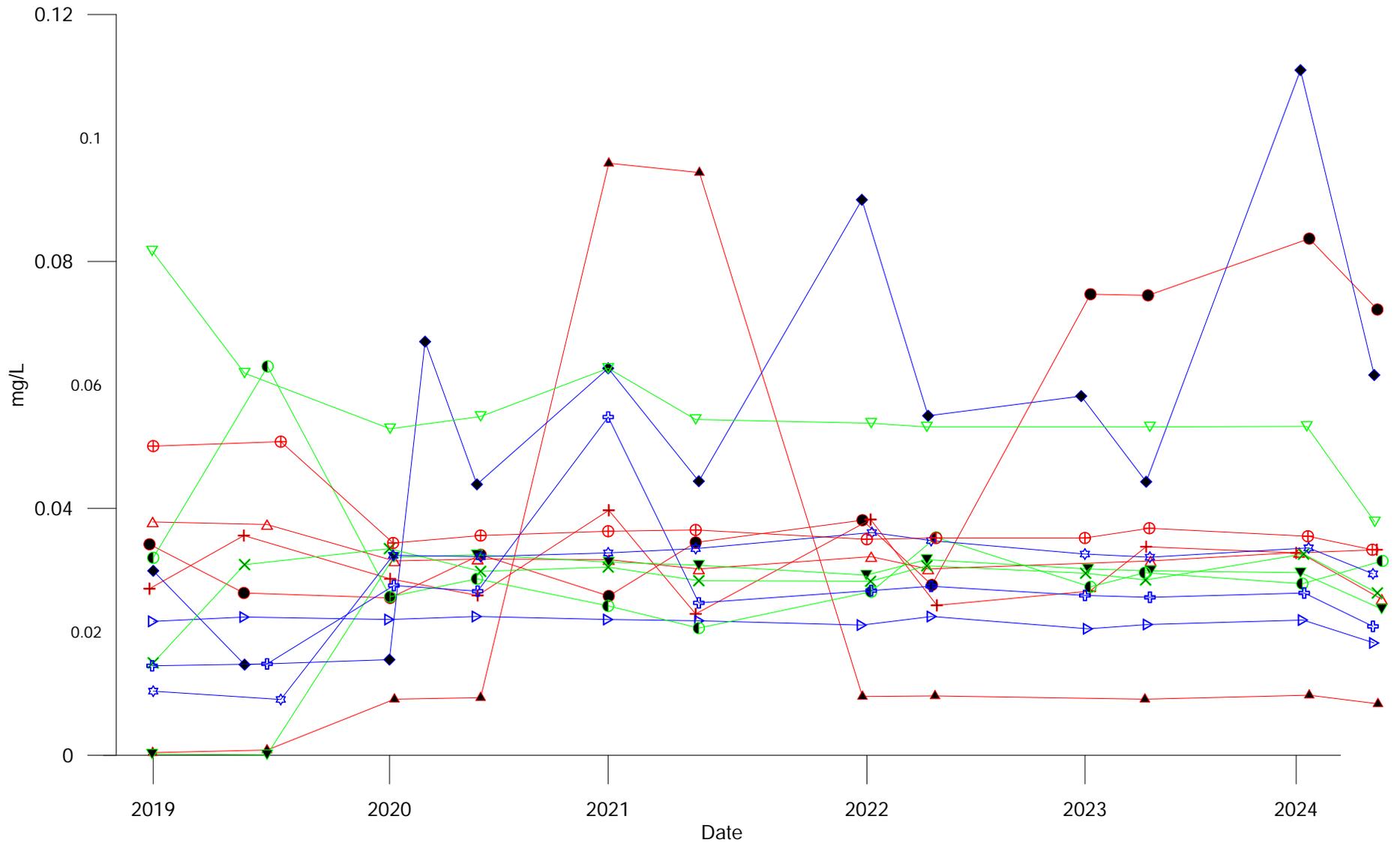
- + W4
- + W5
- ◇ W6
- ◇ W7
- \* W16

**Down Gradient**

- ◆ W8
- W11
- W12
- W13

MOE Lead Criteria = 0.025 mg/L

	City Of Winnipeg Solid Waste Services	
	BRADY ROAD RESOURCE MANAGEMENT FACILITY	
Dissolved Lead Concentration Bedrock Wells		
APRIL 2025	FIGURE 6	REV 0



City Of Winnipeg  
Solid Waste Services

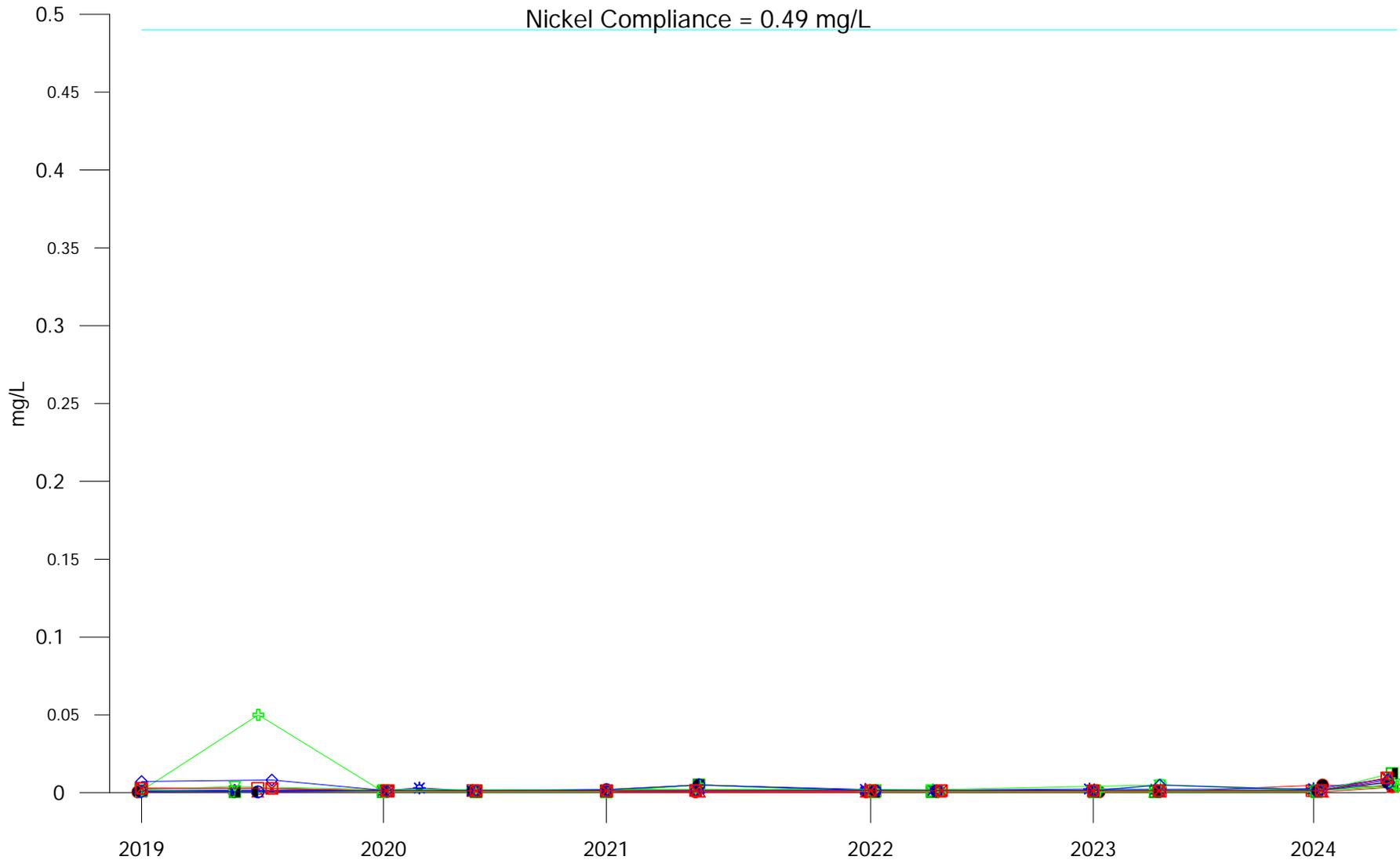
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Manganese Concentration  
Bedrock Wells

APRIL 2025

FIGURE 7

REV 0



**Cross gradient**

- ☆ W9
- ⊛ W10
- ◐ W14
- ◇ W15

**Up gradient**

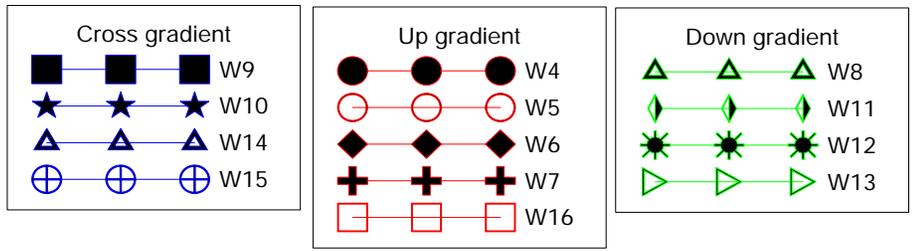
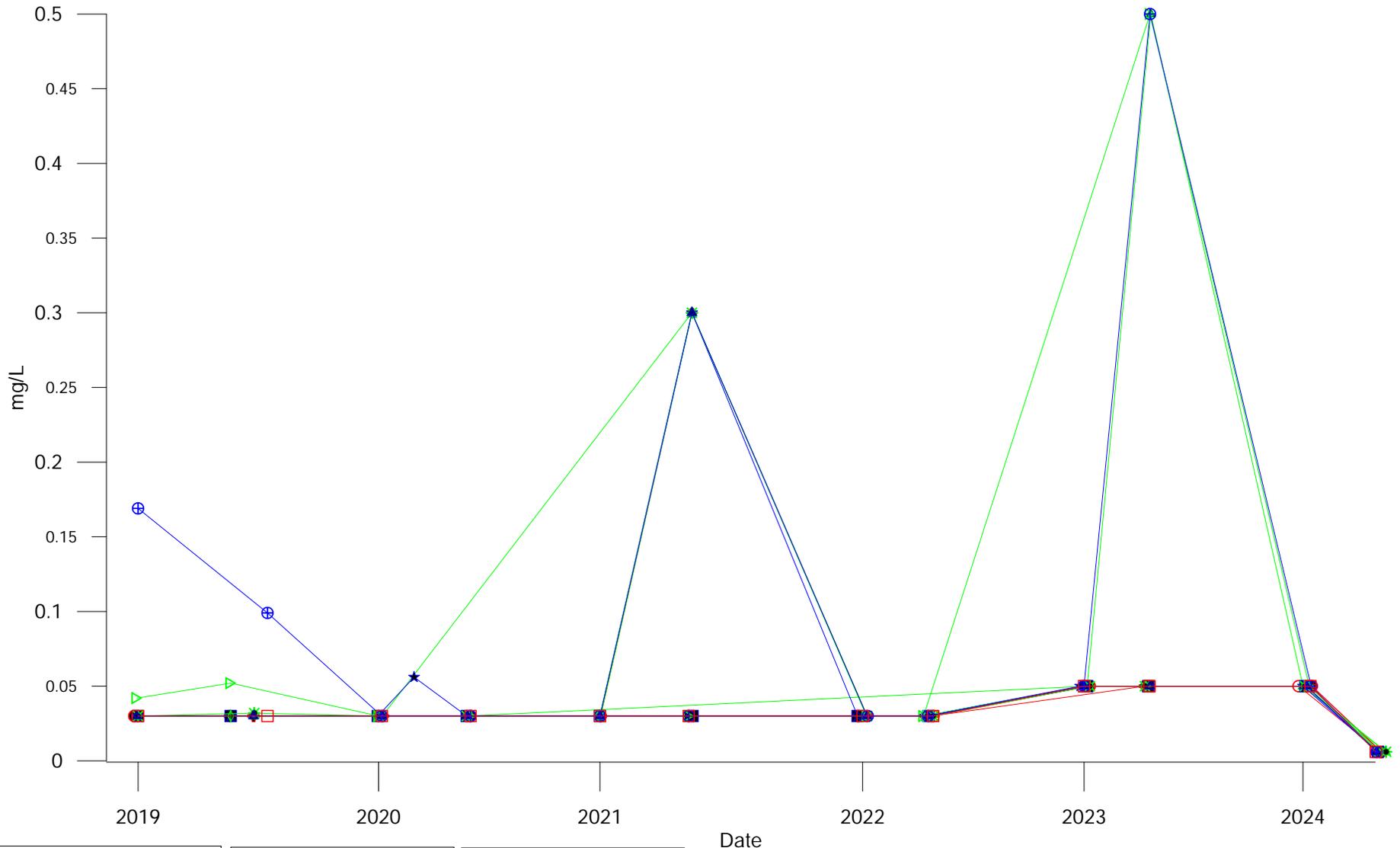
- W4
- ◆ W5
- W6
- △ W7
- ⊠ W16

**Down gradient**

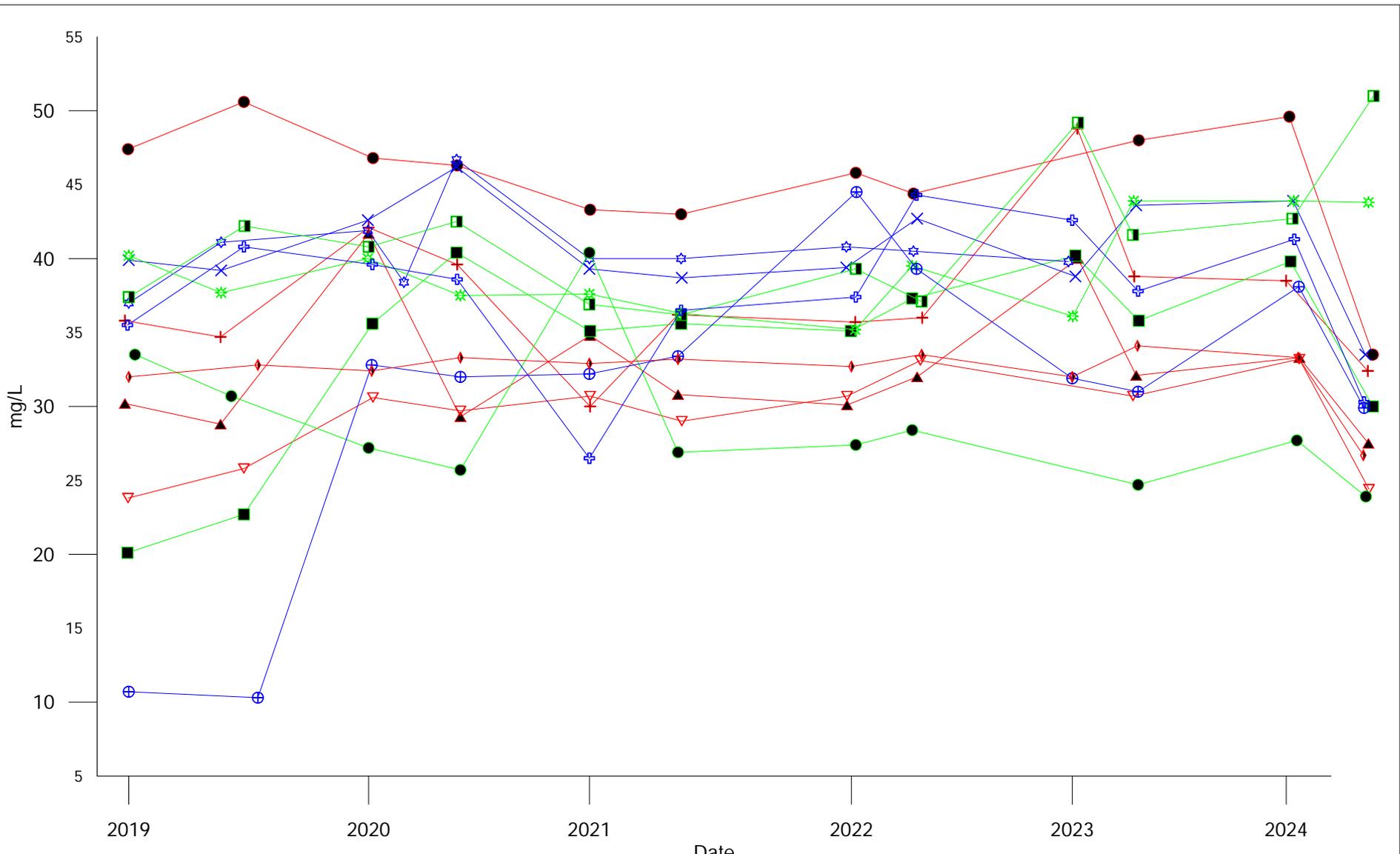
- ⊕ W8
- W11
- ⊕ W12
- ▽ W13

MOE Nickel Criteria = 0.49 mg/L

	<b>City Of Winnipeg</b> Solid Waste Services
<b>BRADY ROAD RESOURCE MANAGEMENT FACILITY</b>	
<b>Dissolved Nickel Concentration</b> <b>Bedrock Wells</b>	
<b>APRIL 2025</b>	<b>FIGURE 9</b>
<b>REV 0</b>	



	<b>City Of Winnipeg Solid Waste Services</b>	
	<b>BRADY ROAD RESOURCE MANAGEMENT FACILITY</b>	
<b>Phosphorus Concentration Bedrock Wells</b>		
<b>APRIL 2025</b>	<b>FIGURE 10</b>	<b>REV 0</b>

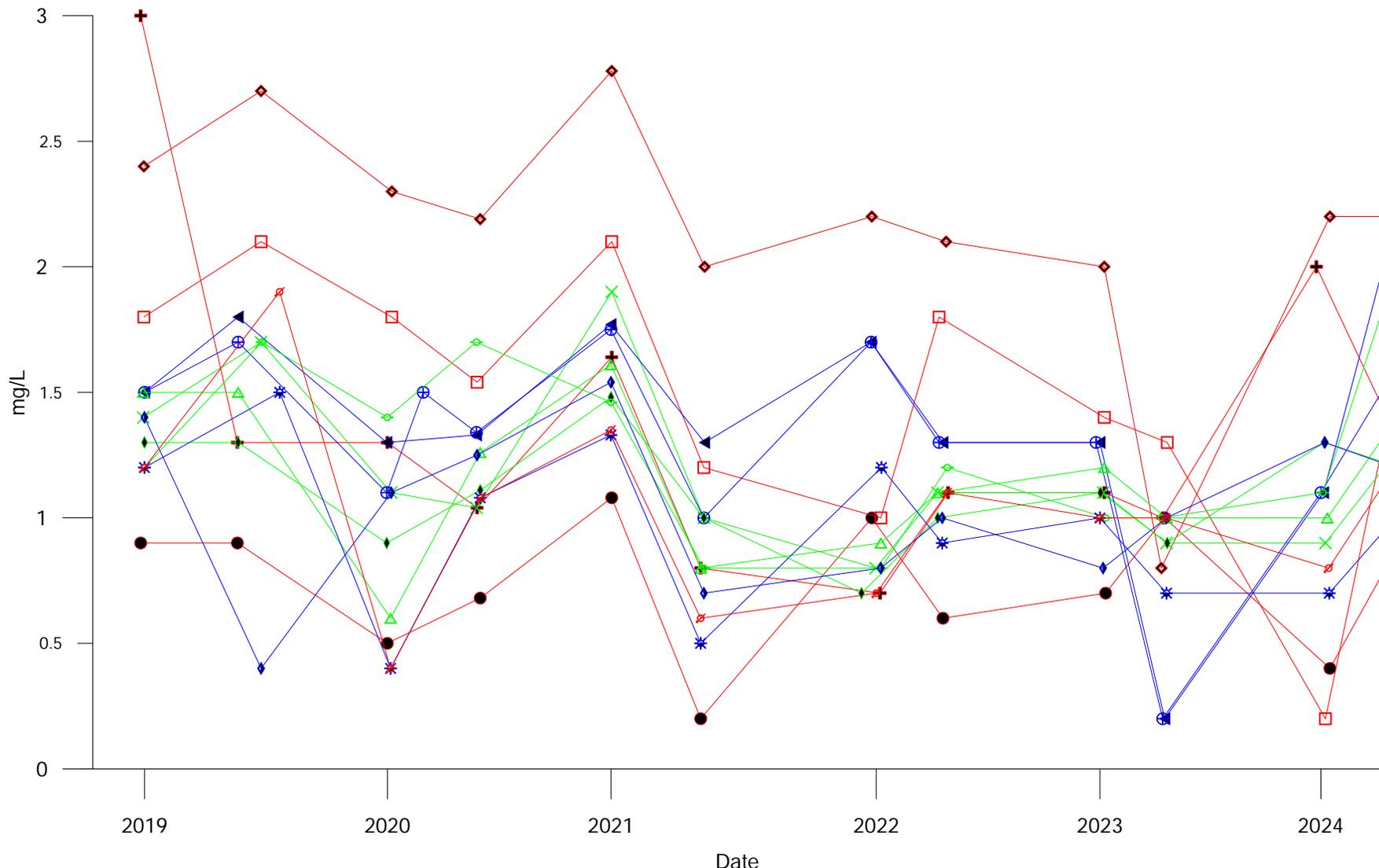


Cross gradient	
×	W9
☆	W10
+	W14
⊕	W15

Up gradient	
▲	W4
+	W5
●	W6
▽	W7
◆	W16

Down gradient	
■	W8
☼	W11
◻	W12
●	W13

	City Of Winnipeg Solid Waste Services	
	BRADY ROAD RESOURCE MANAGEMENT FACILITY	
Dissolved Potassium Concentration Bedrock Wells		
APRIL 2025	FIGURE 5	REV 0



**Cross gradient**

- ← W9
- ⊕ W10
- ◇ W14
- ✱ W15

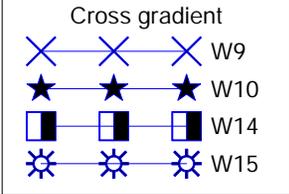
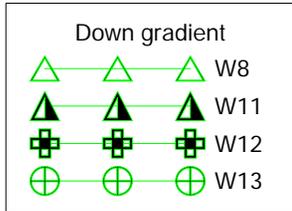
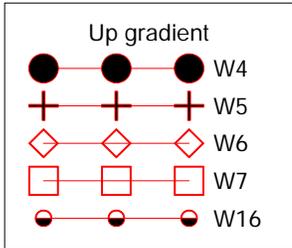
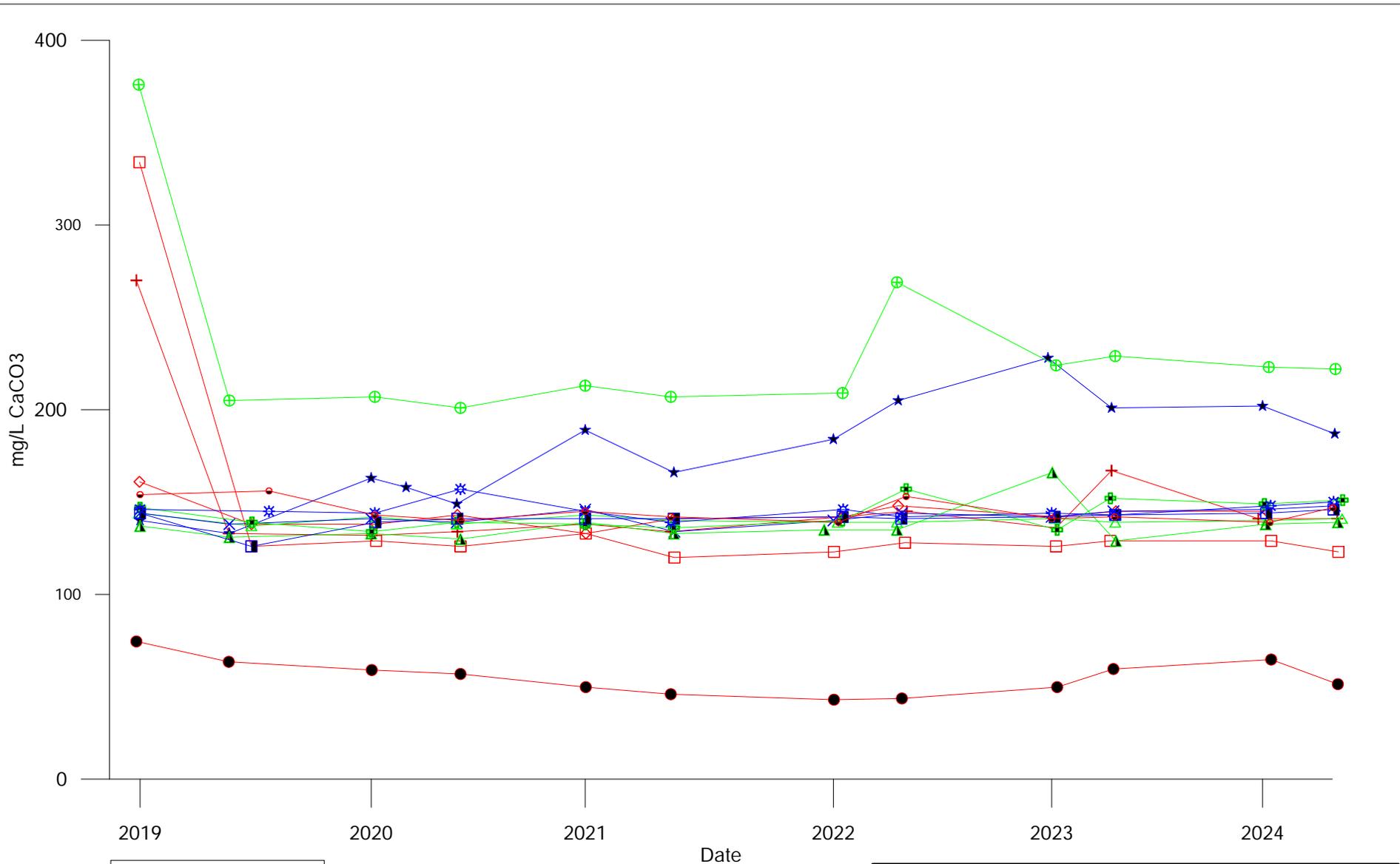
**Up gradient**

- W4
- ⊕ W5
- W6
- ◇ W7
- ⊘ W16

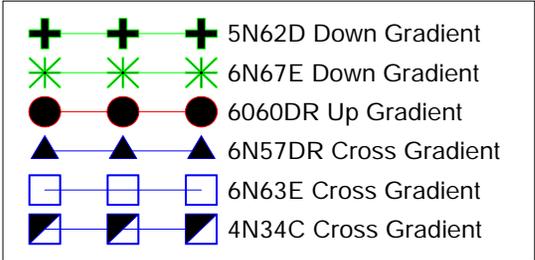
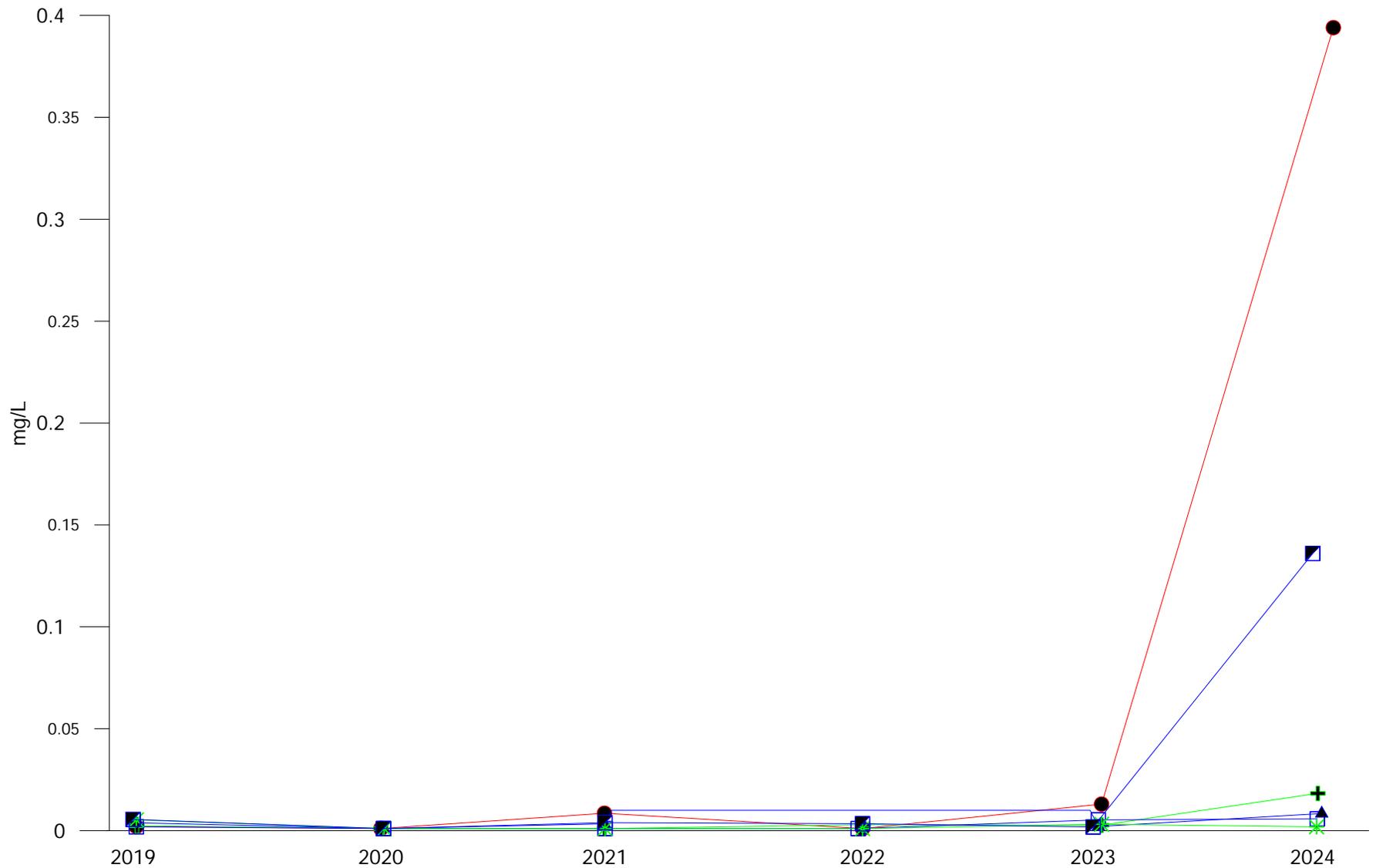
**Down gradient**

- × W8
- ◇ W11
- W12
- △ W13

		<b>City Of Winnipeg</b> Solid Waste Services	
<b>BRADY ROAD RESOURCE MANAGEMENT FACILITY</b>			
<b>TKN Concentration</b> <b>Bedrock Wells</b>			
<b>APRIL 2025</b>	<b>FIGURE 12</b>	<b>REV 0</b>	

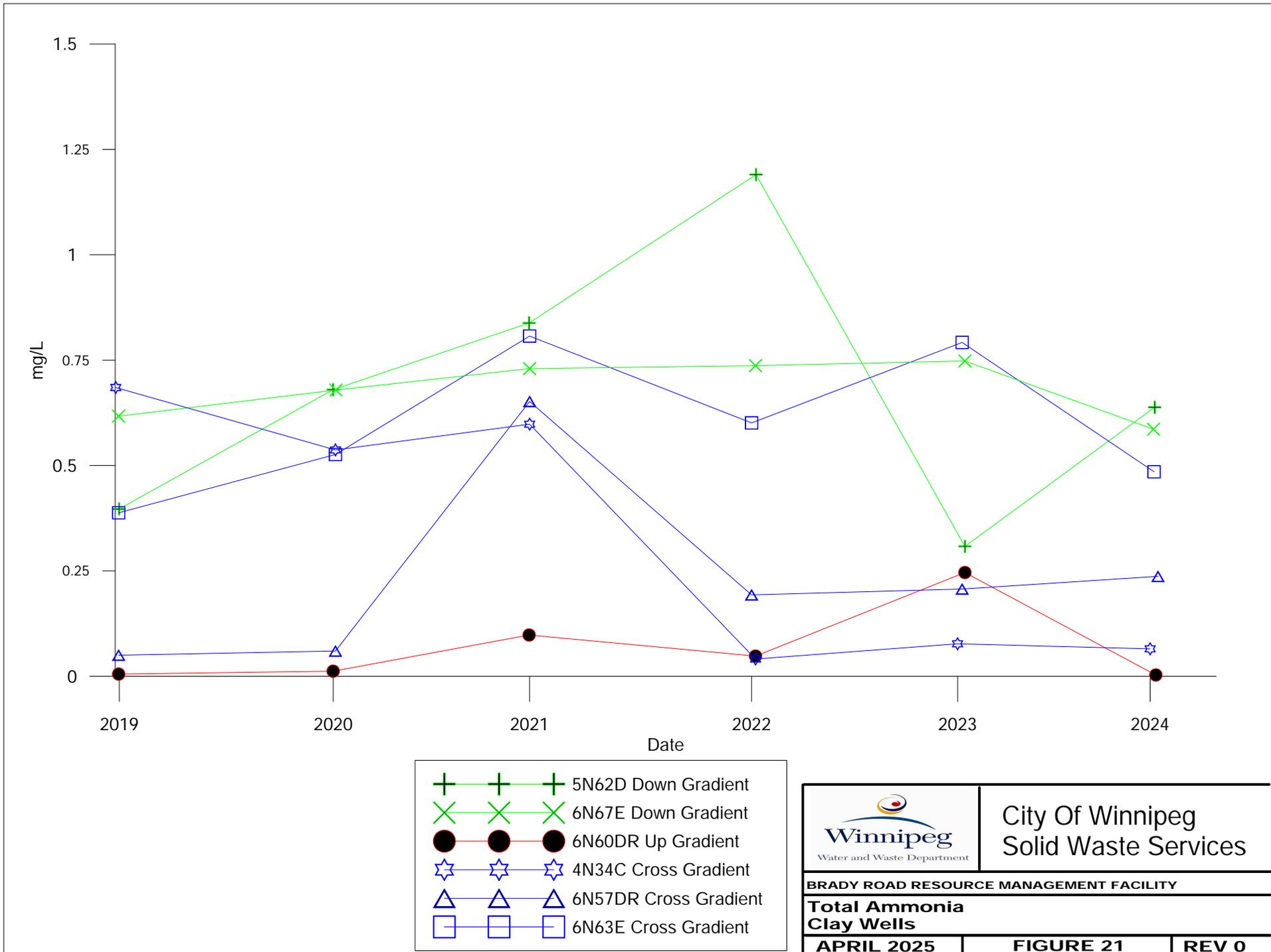


	City Of Winnipeg Solid Waste Services	
	BRADY ROAD RESOURCE MANAGEMENT FACILITY	
Total Alkalinity Bedrock Wells		
APRIL 2025	FIGURE 12	REV 0

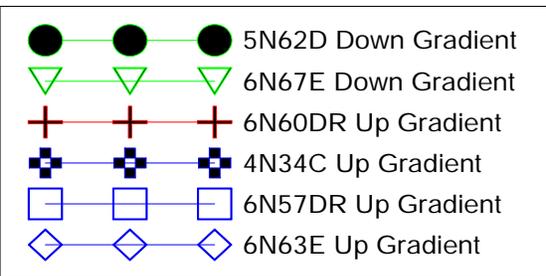
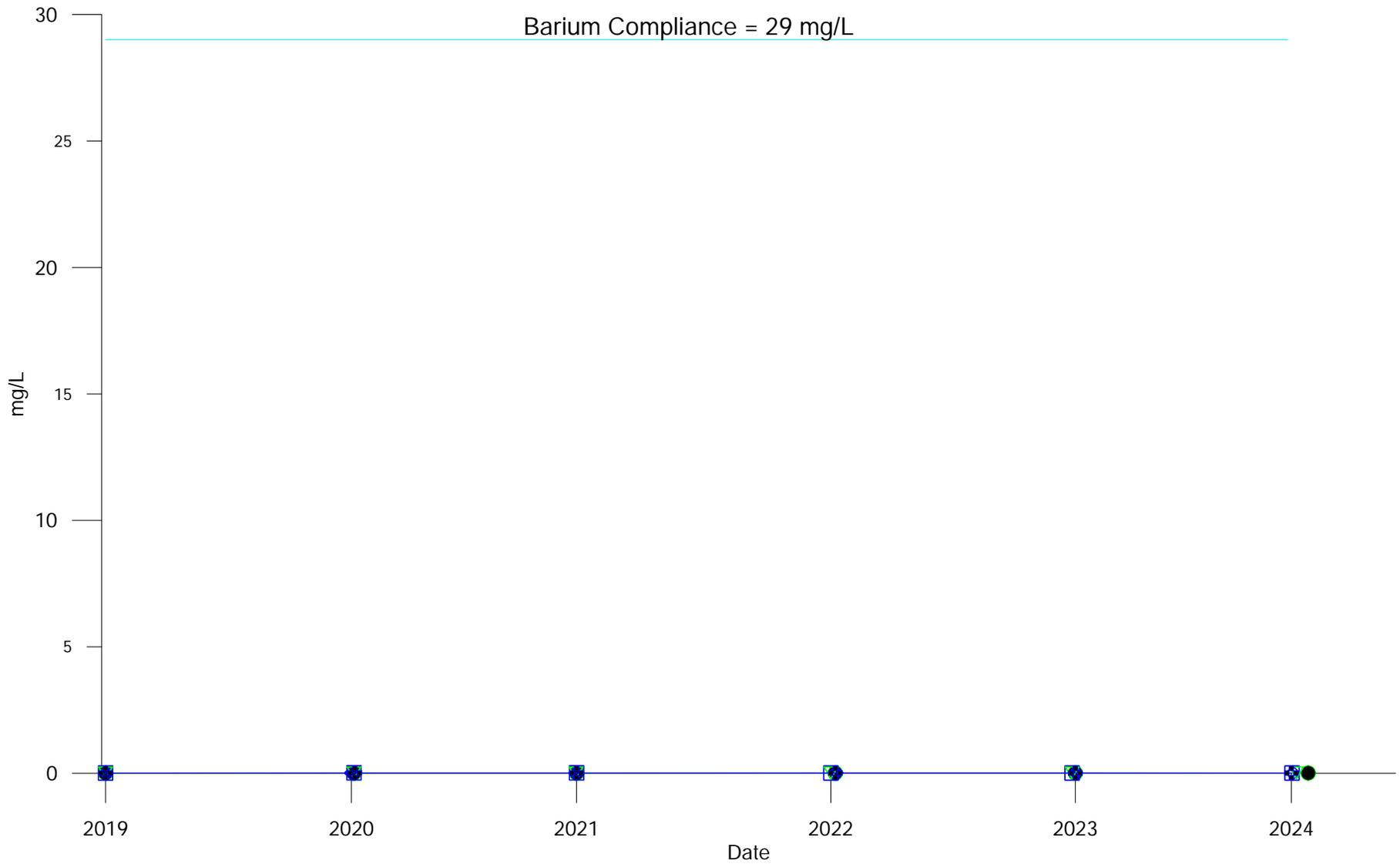


Date

		<b>City Of Winnipeg Solid Waste Services</b>	
<b>BRADY ROAD RESOURCE MANAGEMENT FACILITY</b>			
<b>Dissolved Aluminium Clay Wells</b>			
<b>APRIL 2025</b>		<b>FIGURE 15</b>	
		<b>REV 0</b>	

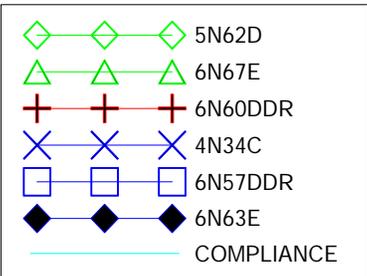
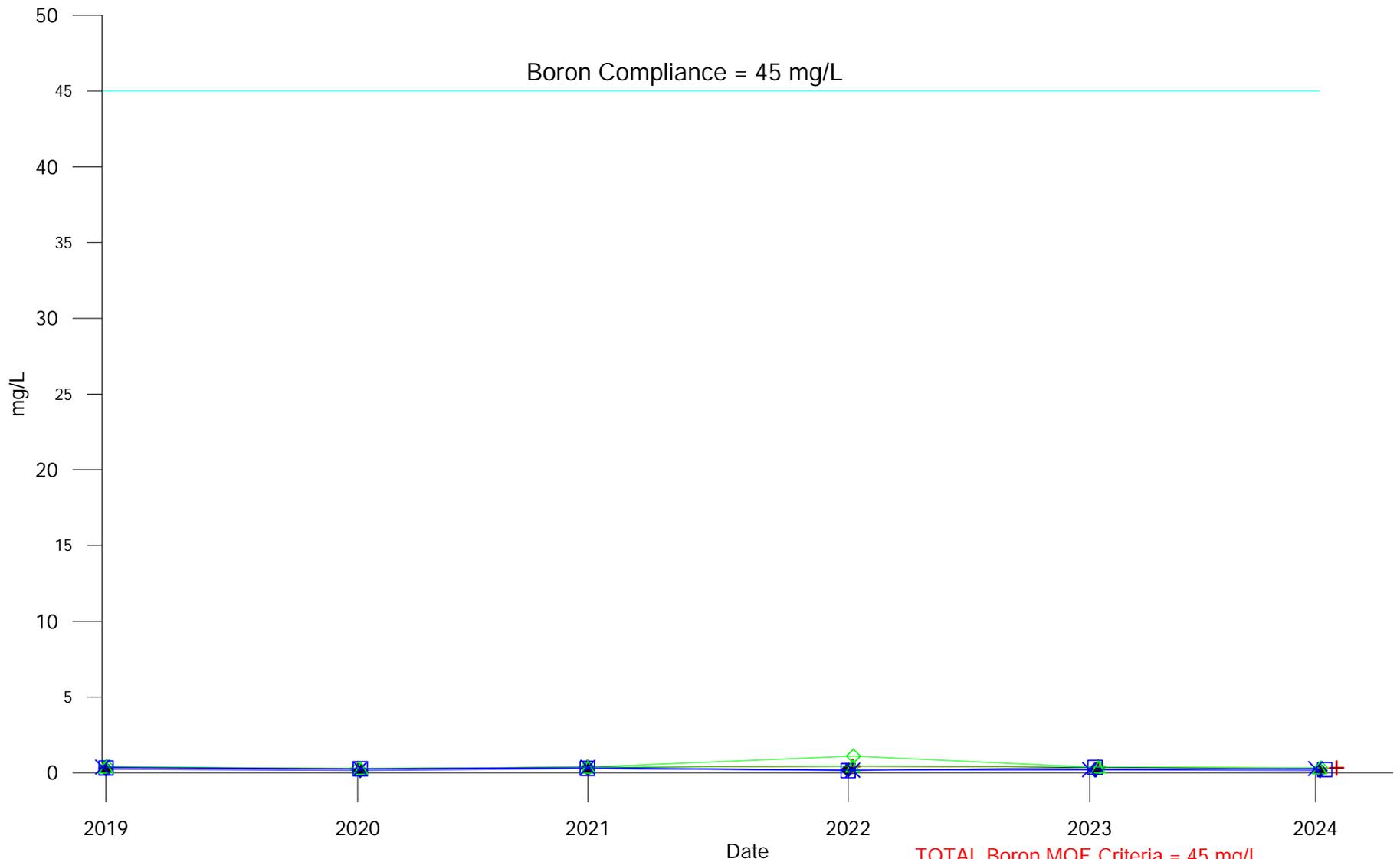


City Of Winnipeg  
Solid Waste Services



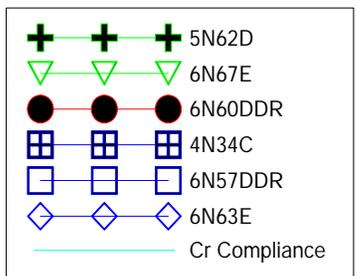
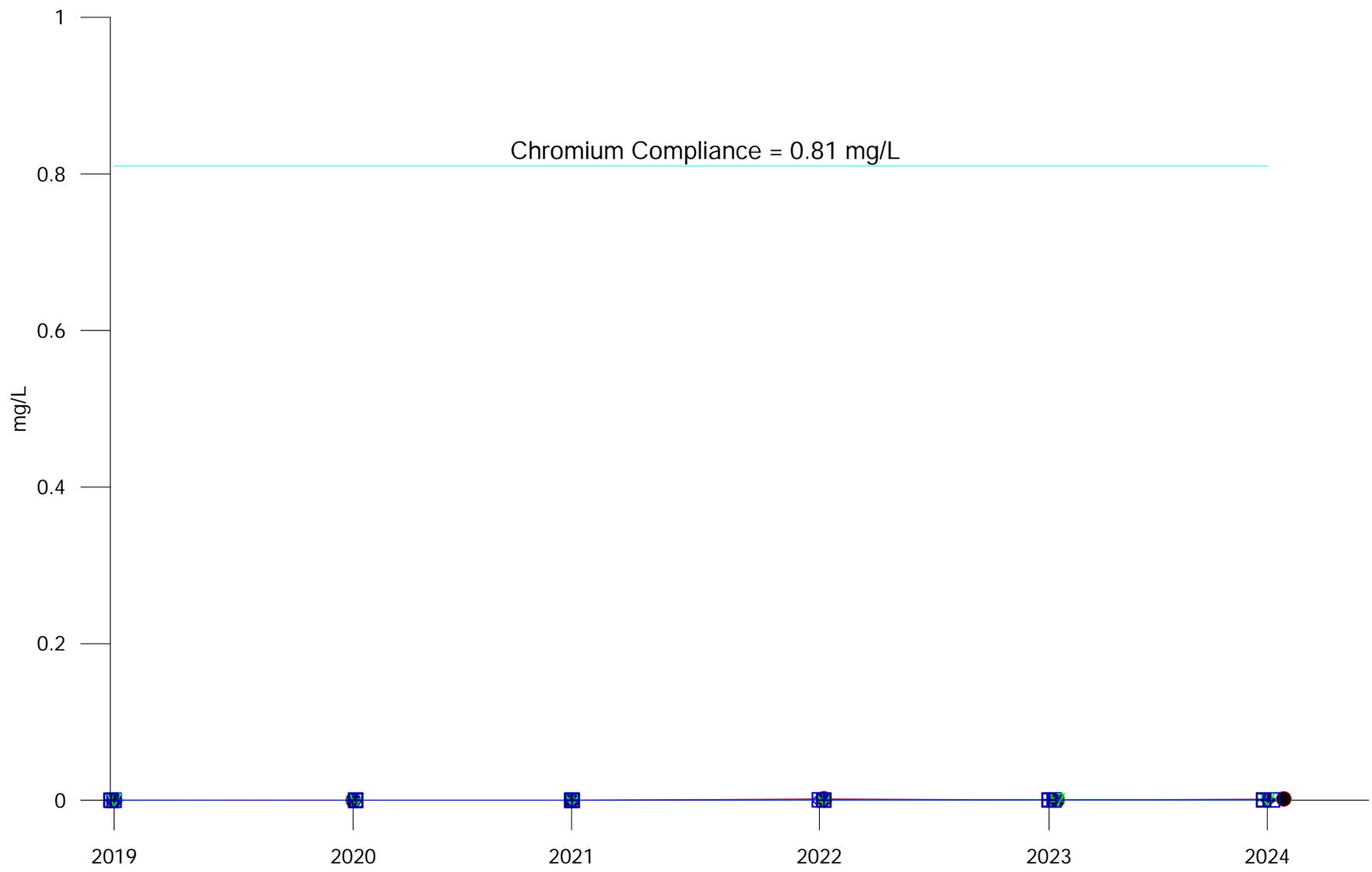
Barium MOE Criteria = 29 mg/L

	City Of Winnipeg Solid Waste Services	
	BRADY ROAD RESOURCE MANAGEMENT FACILITY	
Dissolved Barium Clay Wells		
APRIL 2025	FIGURE 17	REV 0



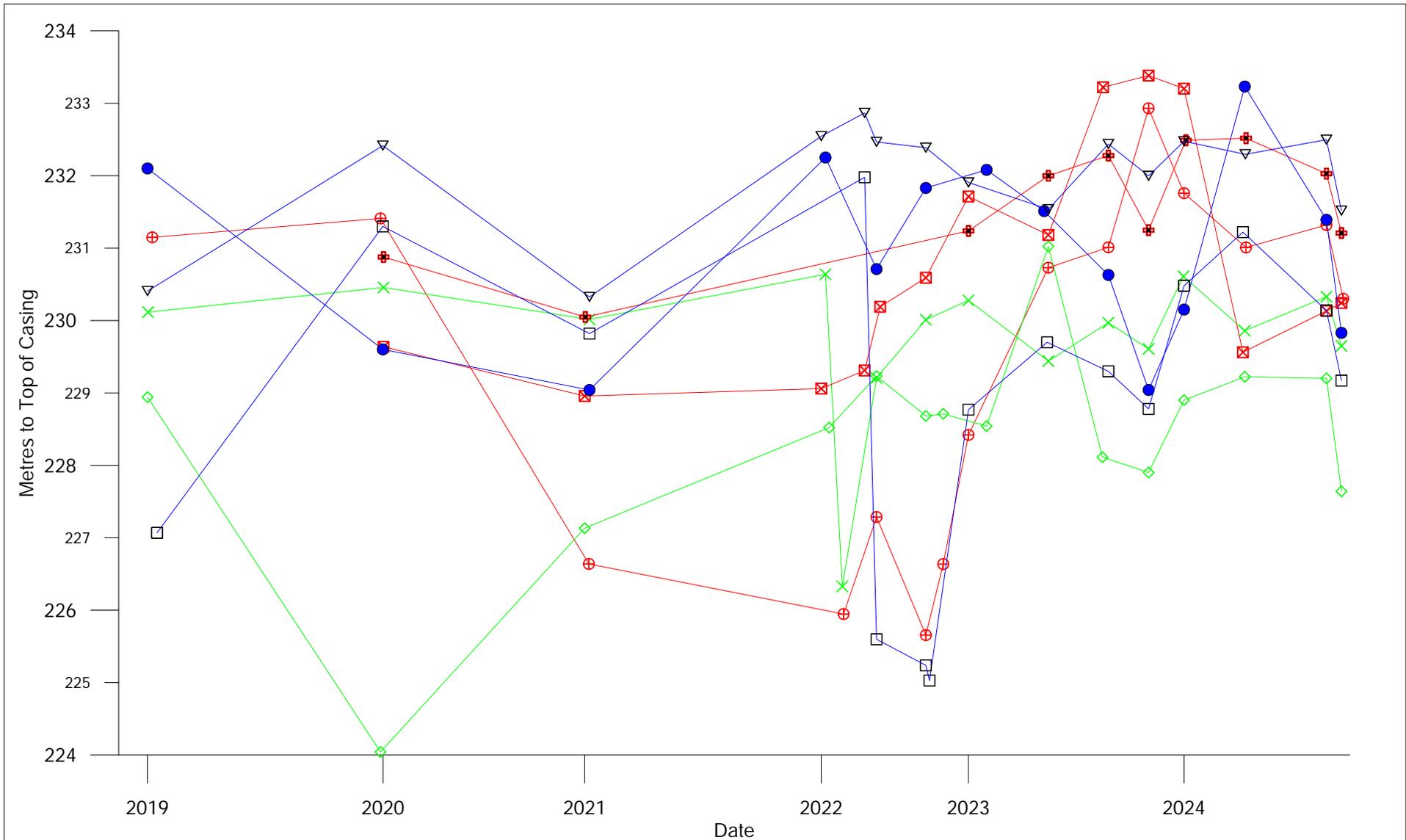
TOTAL Boron MOE Criteria = 45 mg/L

	<b>City Of Winnipeg Solid Waste Services</b>	
	<b>BRADY ROAD RESOURCE MANAGEMENT FACILITY</b>	
<b>Dissolved Boron Clay Wells</b>		
<b>APRIL 2025</b>	<b>FIGURE 16</b>	<b>REV 0</b>



Chromium MOE Criteria = 0.81 mg/L

	City Of Winnipeg Solid Waste Services	
	BRADY ROAD RESOURCE MANAGEMENT FACILITY	
Dissolved Chromium Clay Wells		
APRIL 2025	FIGURE 18	REV 0



Down gradient

- 5N62D
- 6N67E

Cross gradient

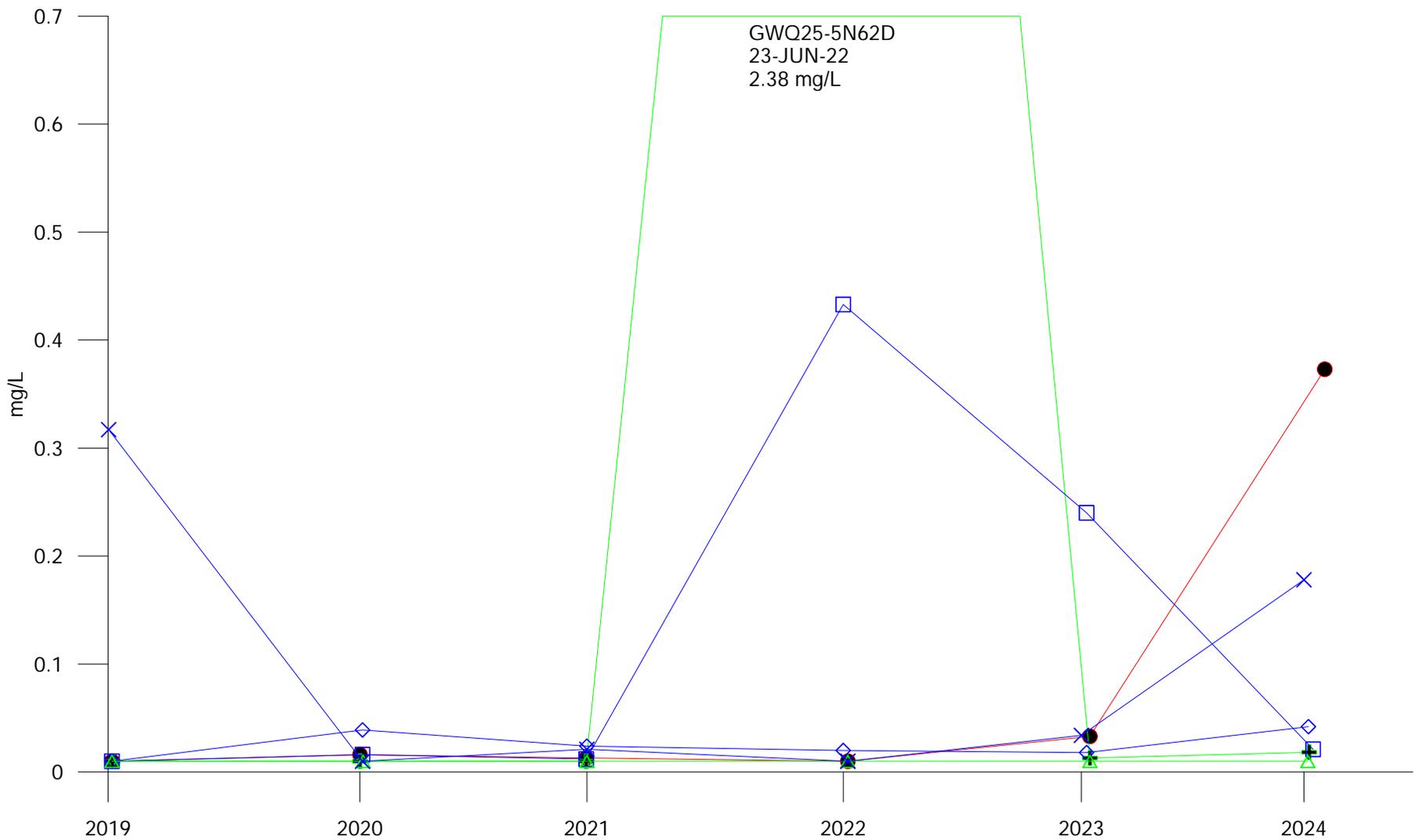
- 4N34CR
- 6N57DR
- 6N63E

Up gradient

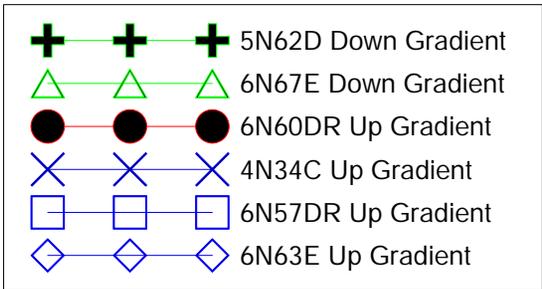
- 6N58DR
- 6N59DR
- 6N60DR



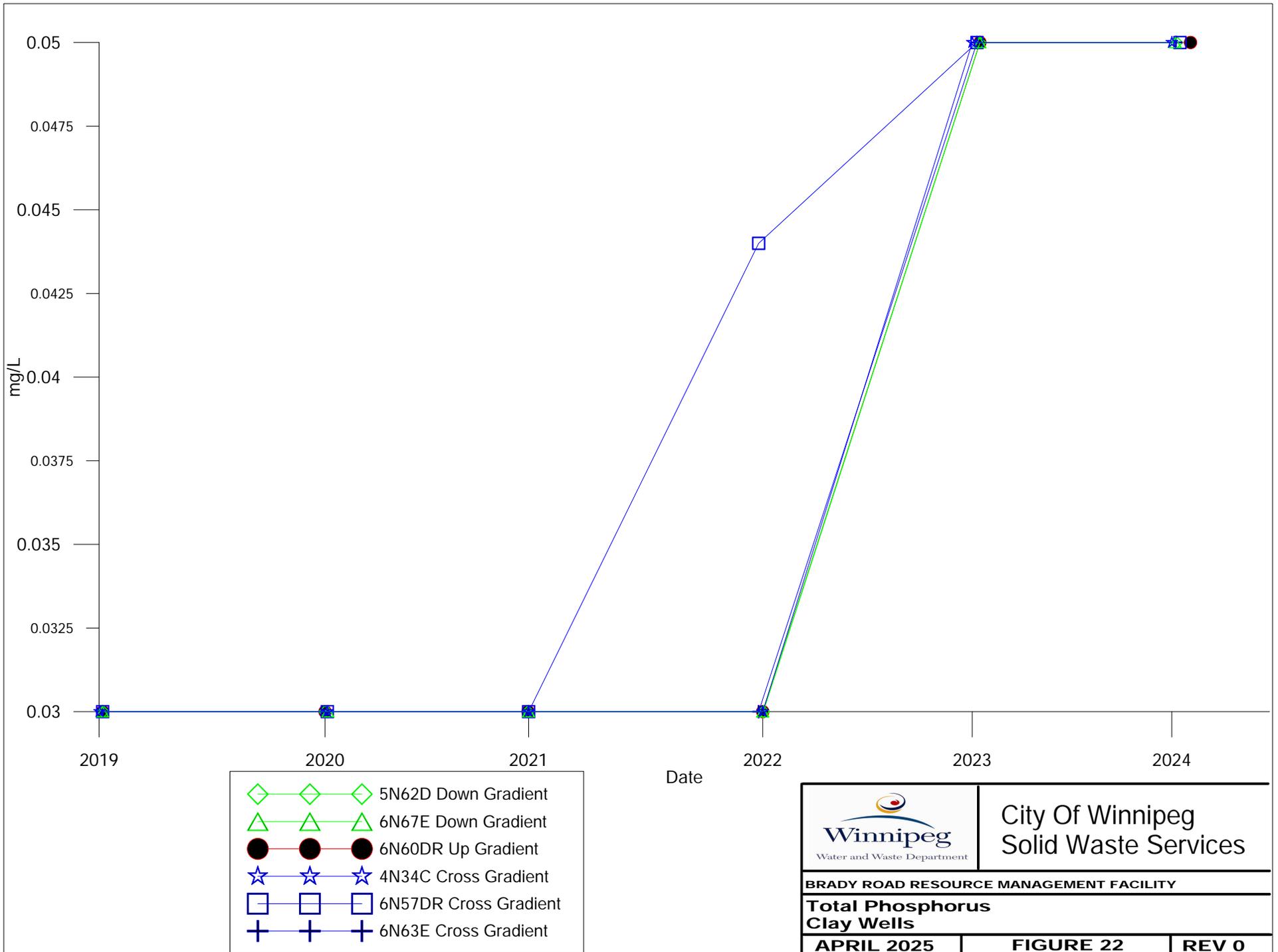
City of Winnipeg  
Solid Waste Services



Date



	City Of Winnipeg Solid Waste Services	
	BRADY ROAD RESOURCE MANAGEMENT FACILITY	
Dissolved Iron Clay Wells		
APRIL 2025	FIGURE 19	REV 0



City Of Winnipeg  
Solid Waste Services

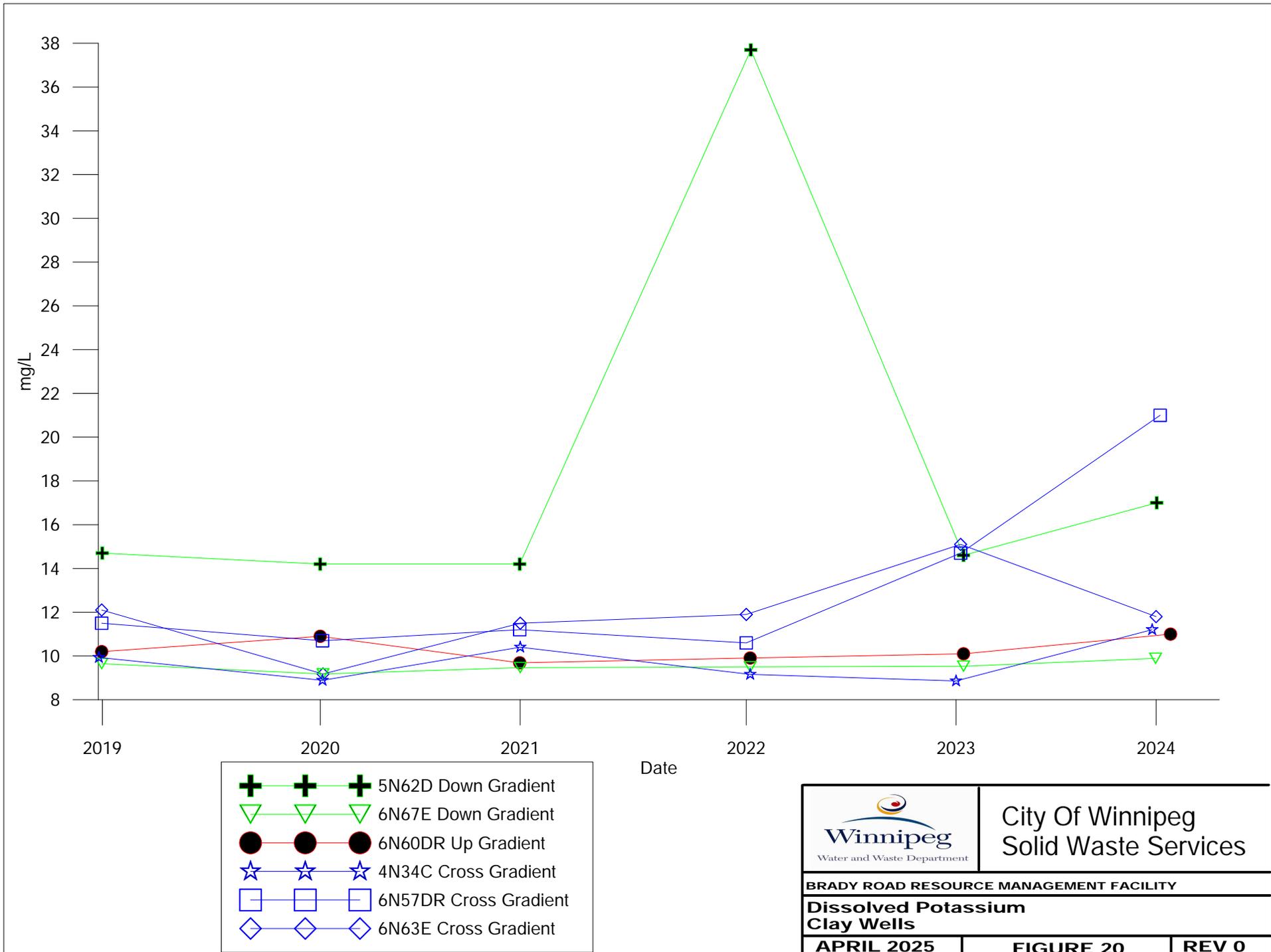
BRADY ROAD RESOURCE MANAGEMENT FACILITY

**Total Phosphorus  
Clay Wells**

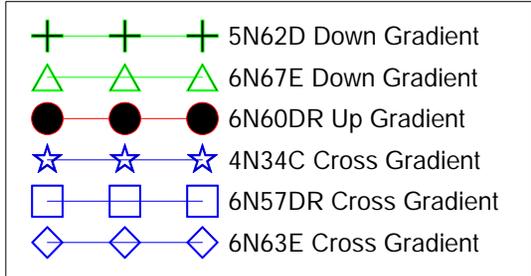
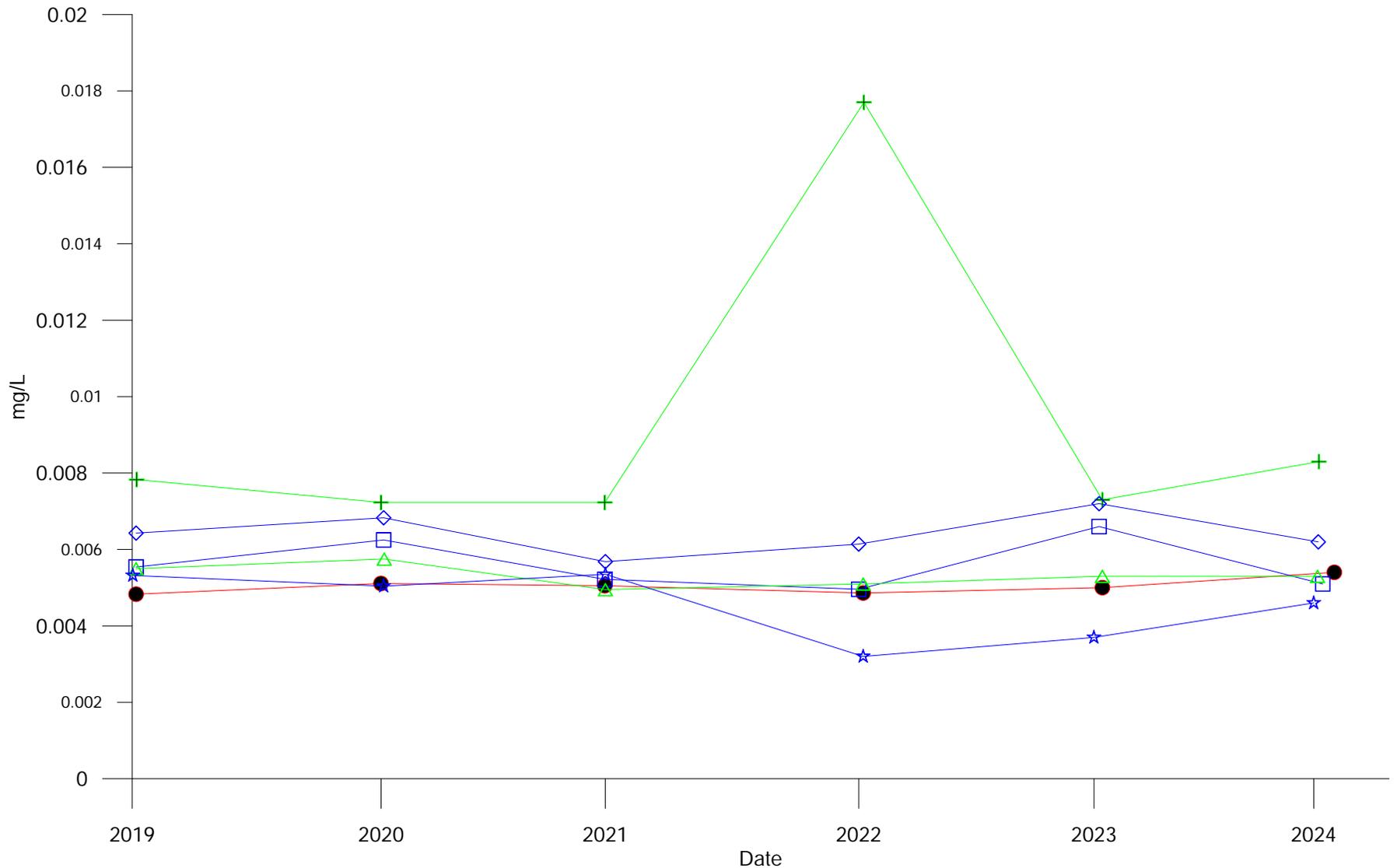
APRIL 2025

FIGURE 22

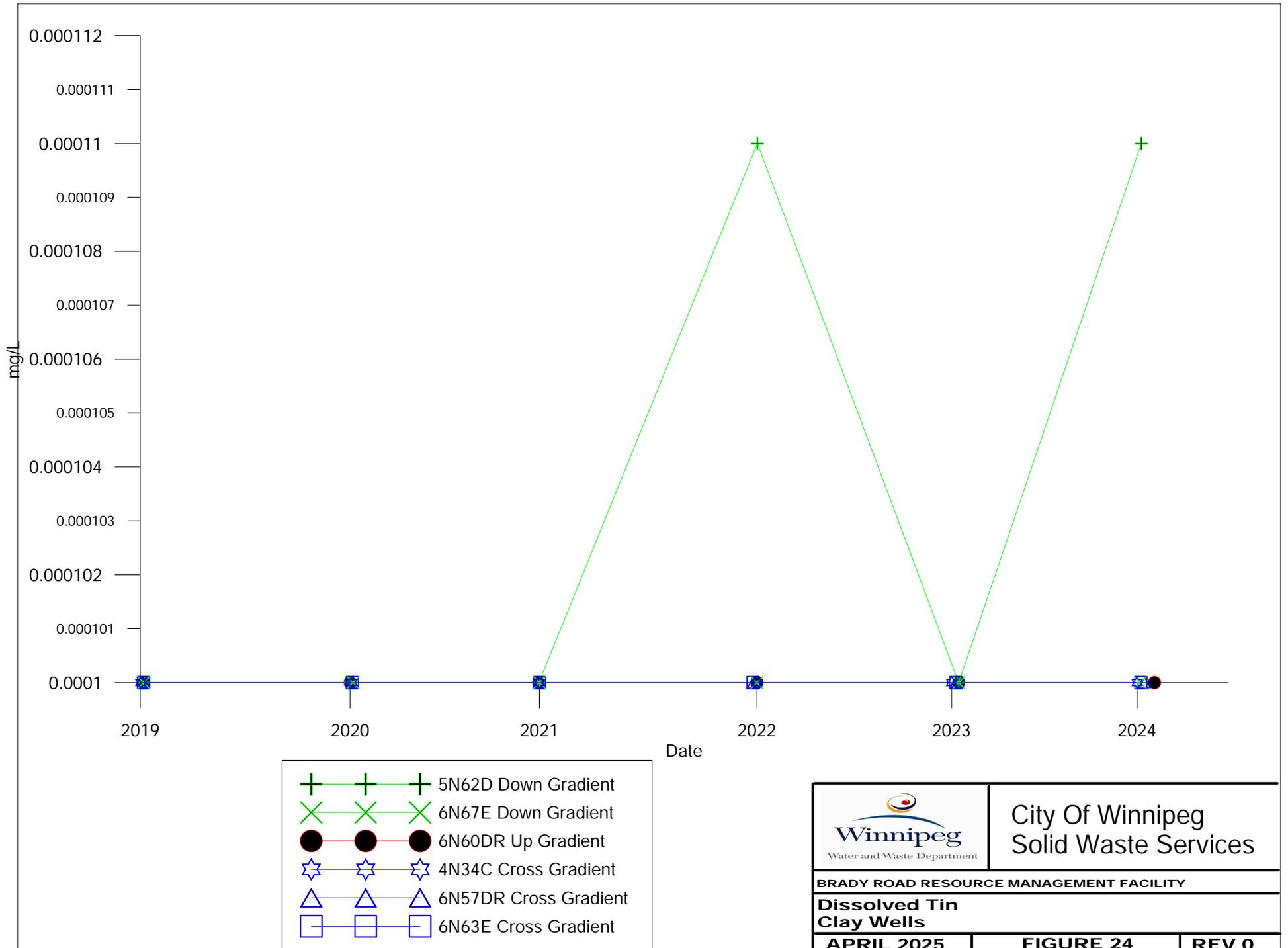
REV 0



City Of Winnipeg  
Solid Waste Services



	City Of Winnipeg Solid Waste Services	
	BRADY ROAD RESOURCE MANAGEMENT FACILITY	
Dissolved Rubidium Clay Wells		
APRIL 2025	FIGURE 23	REV 0



City Of Winnipeg  
Solid Waste Services

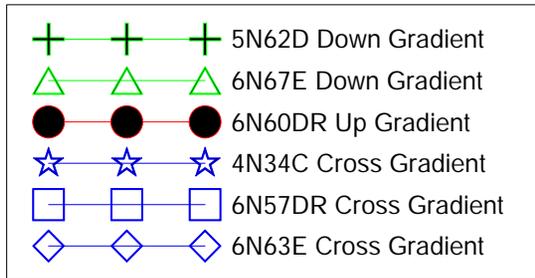
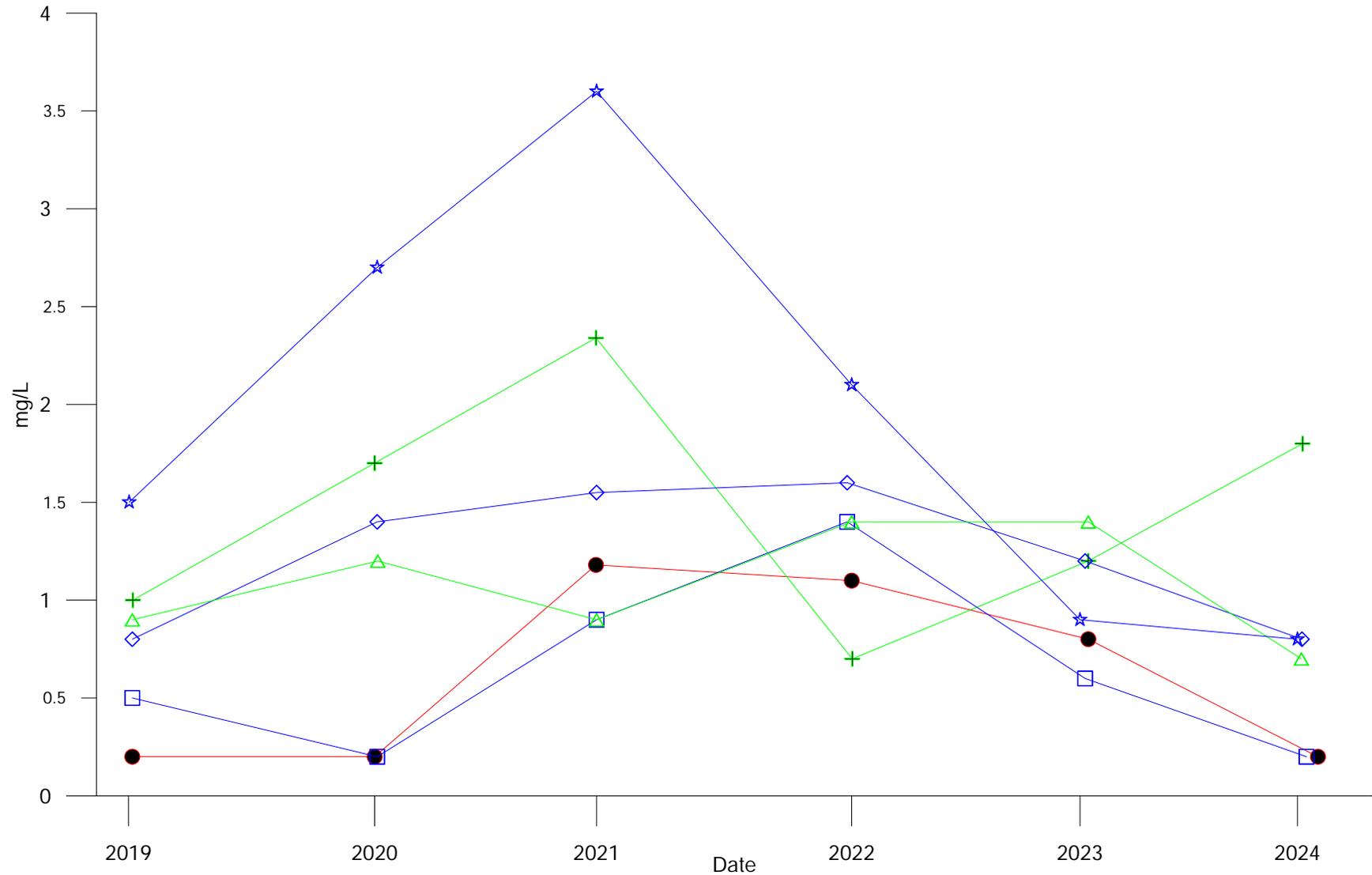
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Tin  
Clay Wells

APRIL 2025

FIGURE 24

REV 0



City Of Winnipeg  
Solid Waste Services

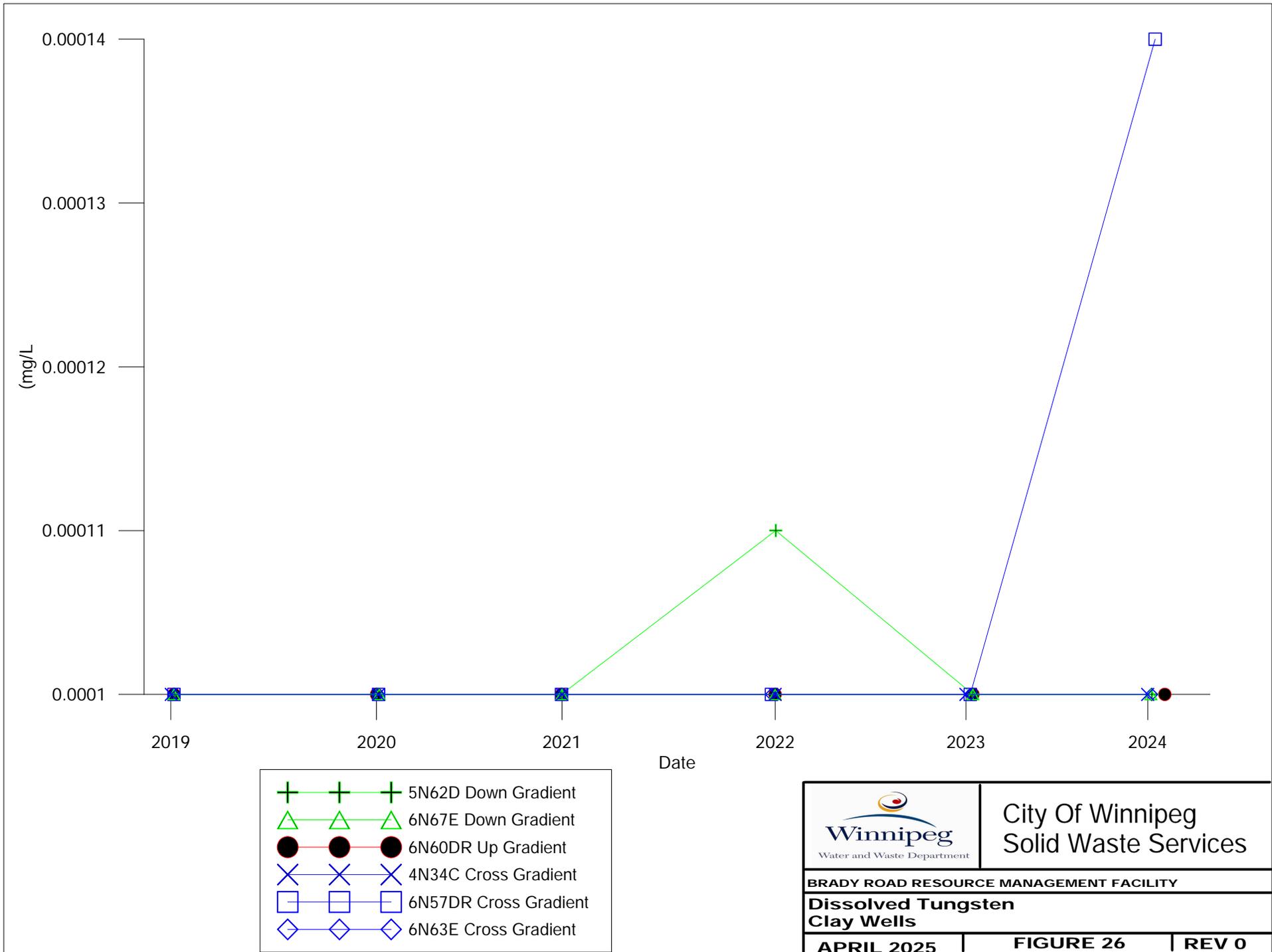
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Total Kjeldahl Nitrogen  
Clay Wells

APRIL 2025

FIGURE 25

REV 0

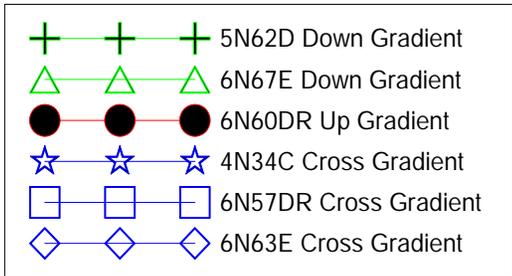
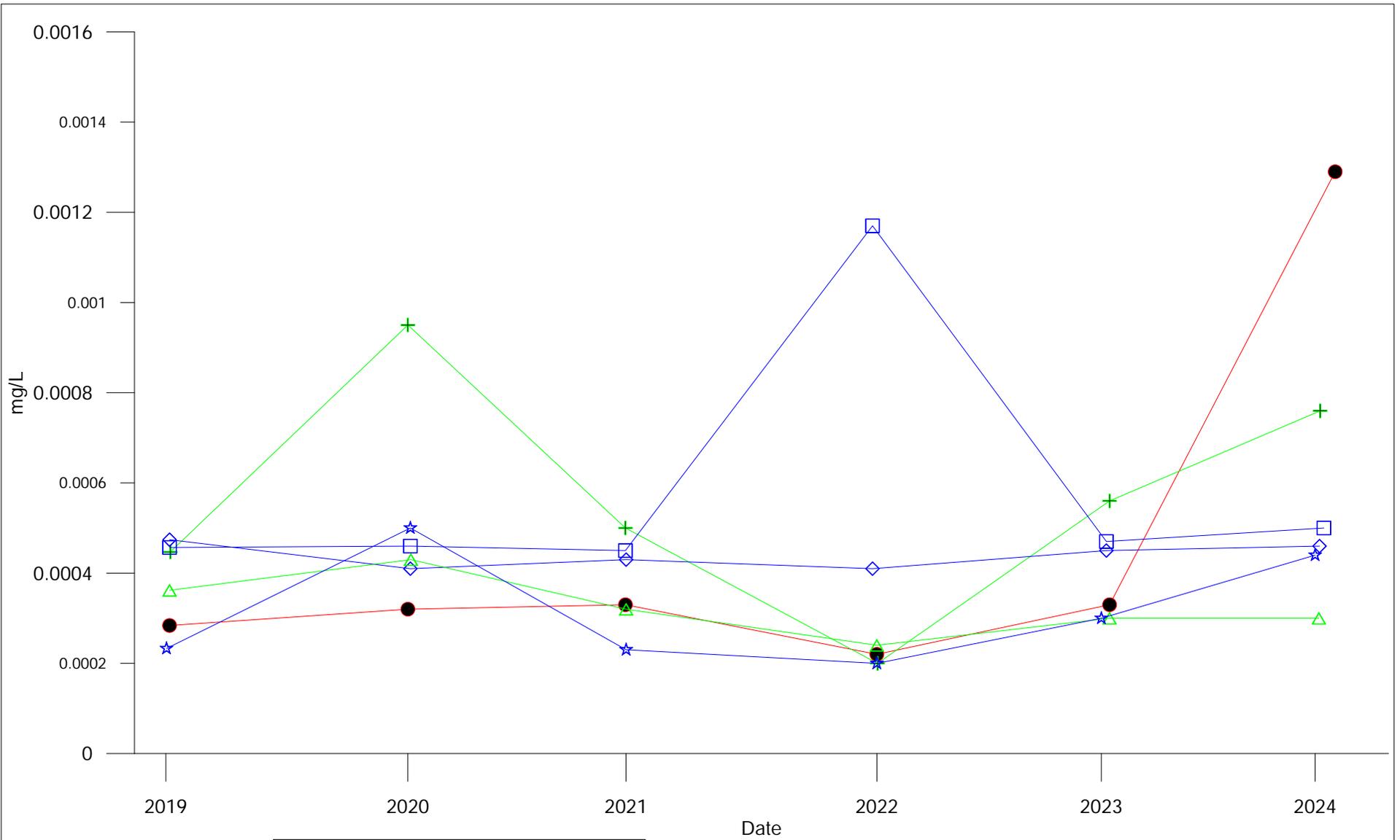


City Of Winnipeg  
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

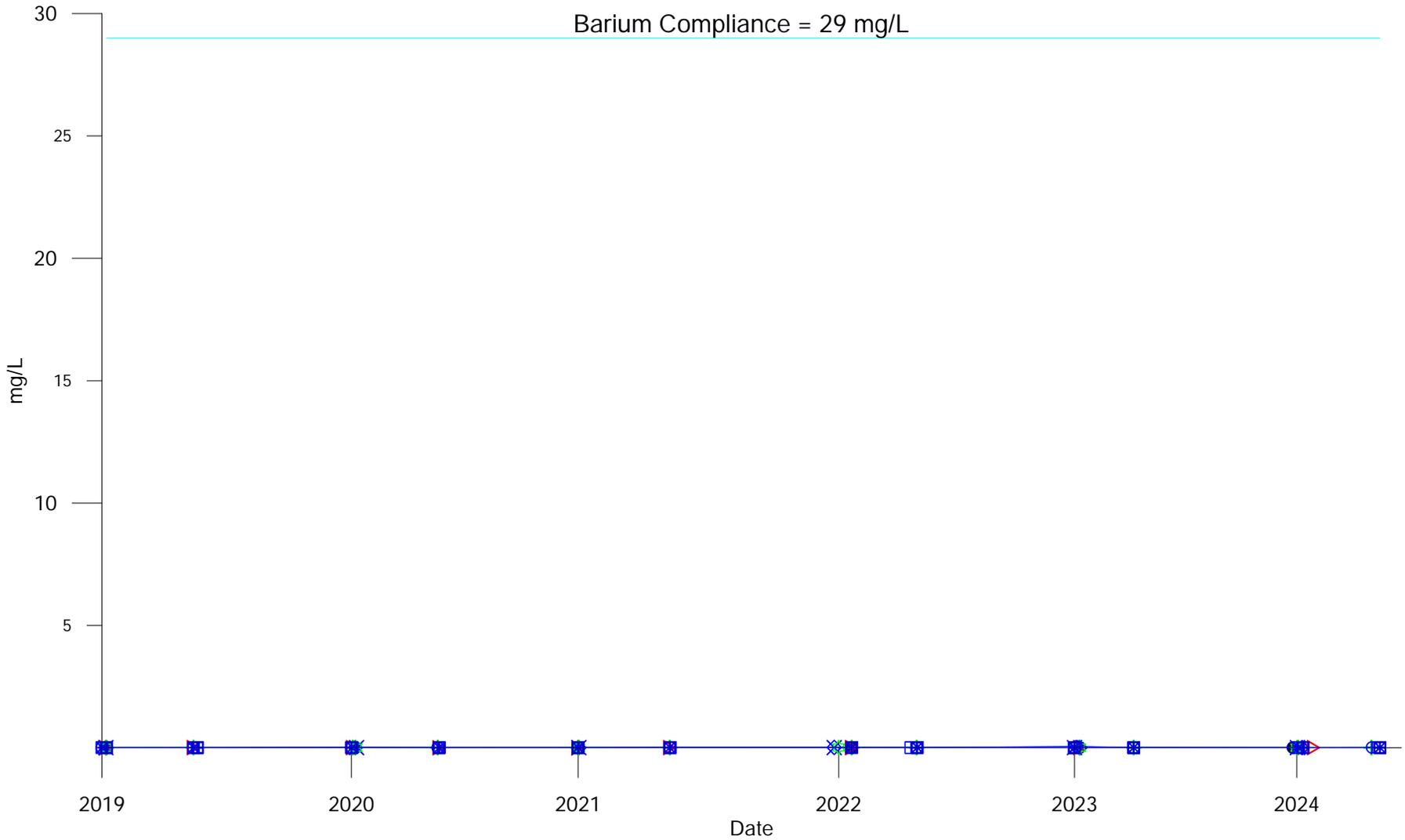
Dissolved Tungsten  
Clay Wells

APRIL 2025 | FIGURE 26 | REV 0



	City Of Winnipeg Solid Waste Services	
	BRADY ROAD RESOURCE MANAGEMENT FACILITY	
Dissolved Zirconium Clay Wells		
APRIL 2025	FIGURE 27	REV 0

Barium Compliance = 29 mg/L



Up gradient

6N60EER

Down gradient

5N62E

6N67F

Cross gradient

13A

14A

Cross gradient

15A

16A

4N34DDR

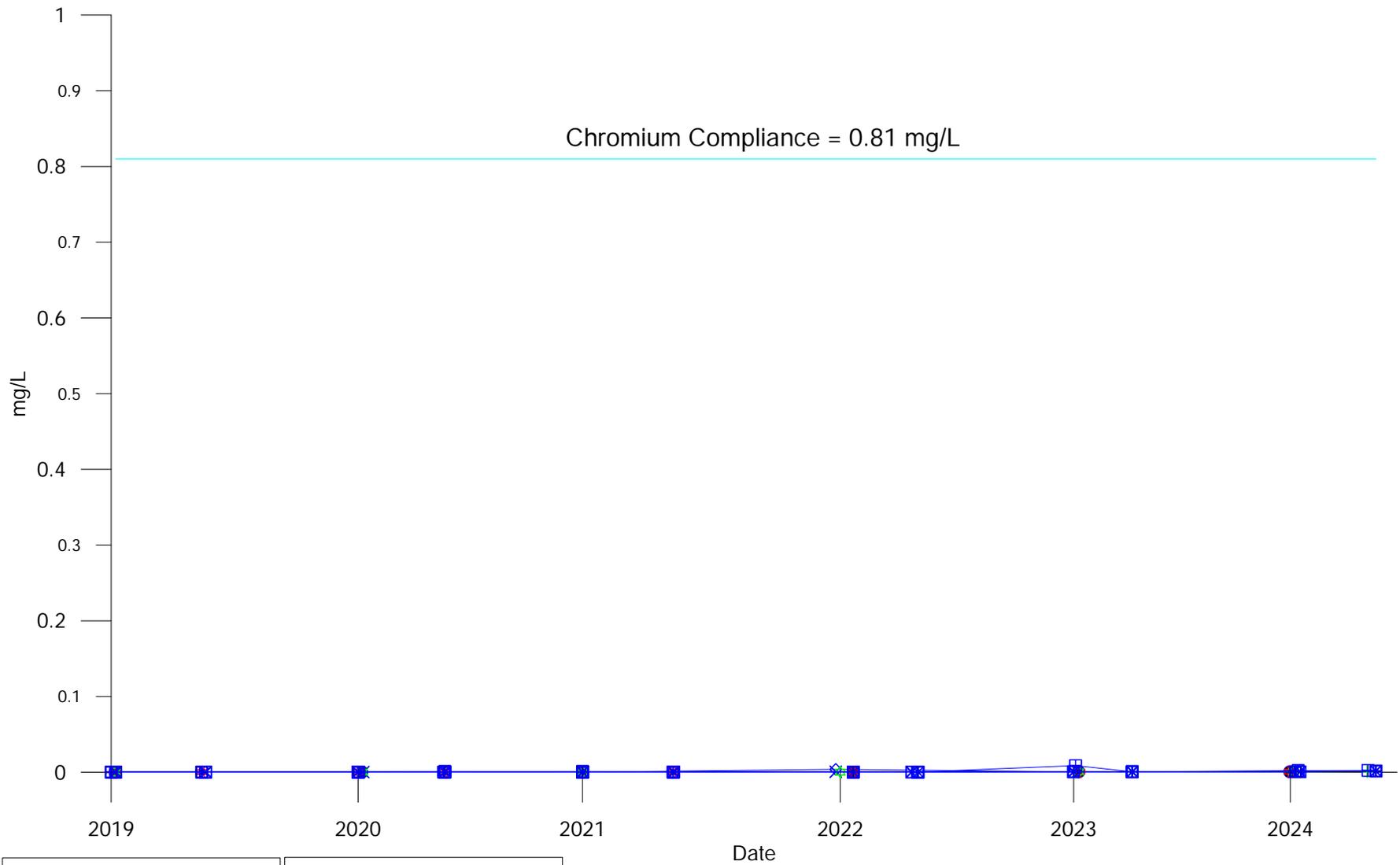
6N57F

6N63F

Barium MOE Criteria = 29 mg/L

	City Of Winnipeg Solid Waste Services	
	BRADY ROAD RESOURCE MANAGEMENT FACILITY	
Dissolved Barium Till Wells		
APRIL 2025	FIGURE 30	REV 0

Chromium Compliance = 0.81 mg/L



Up gradient

6N60E

Down gradient

5N62E  
6N67F

Cross gradient

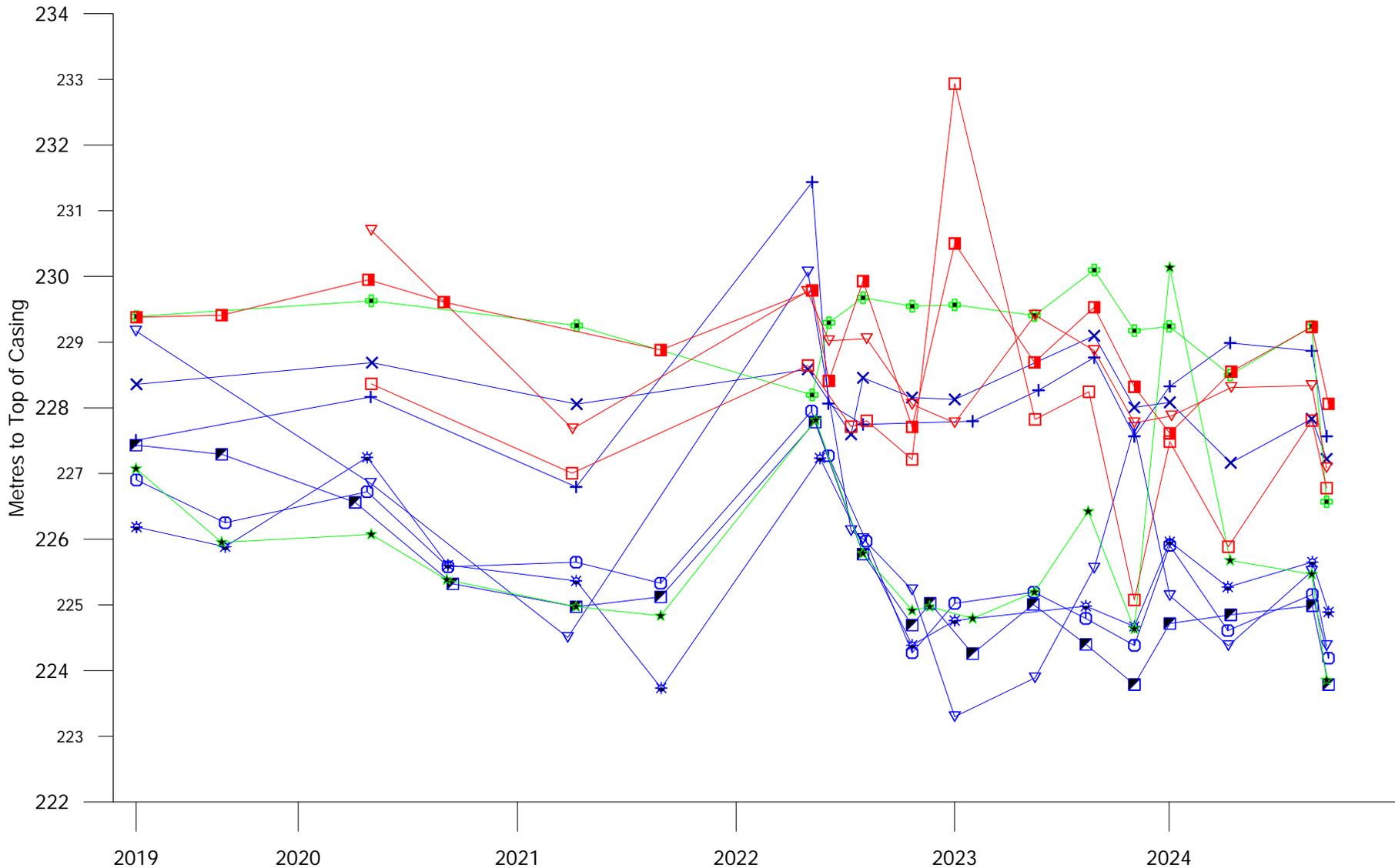
13A  
14A

Cross gradient

15A  
16A  
4N34DDR  
6N57F  
6N63F

**Chromium MOE Criteria = 0.81 mg/L**

	City Of Winnipeg Solid Waste Services	
	BRADY ROAD RESOURCE MANAGEMENT FACILITY	
Dissolved Chromium Till Wells		
APRIL 2025	FIGURE 32	REV 0

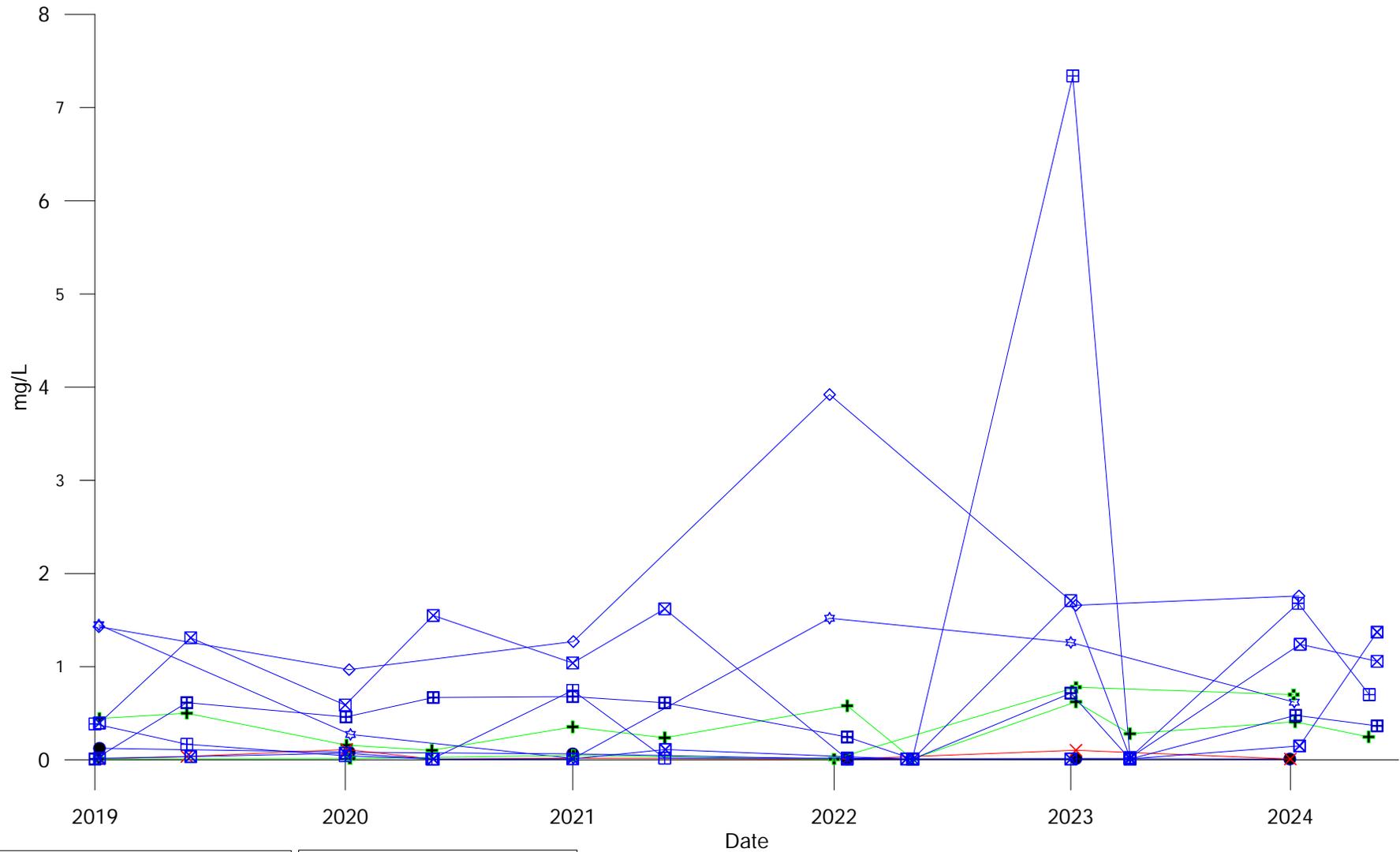


Cross gradient		
		13A
		15A
		6N57FR
		16A
		4N34DR
		6N63F

Up gradient		
		6N58FR
		6N59FR
		6N60ER

Down gradient		
		5N62E
		6N67F

	City of Winnipeg Solid Waste Services	
	BRADY ROAD RESOURCE MANAGEMENT FACILITY	
GROUNDWATER ELEVATION TILL WELLS		
APRIL 2025	FIGURE GW-1-1	REV 0



Up gradient  
 X—X—X 6N60EER

Down gradient  
 +—+—+ 5N62E  
 +—+—+ 6N67F

Cross gradient  
 □—□—□ 13A  
 □—□—□ 14A

Cross gradient  
 □—□—□ 15A  
 □—□—□ 16A  
 ●—●—● 4N34DDR  
 ◇—◇—◇ 6N57F  
 ☆—☆—☆ 6N63F

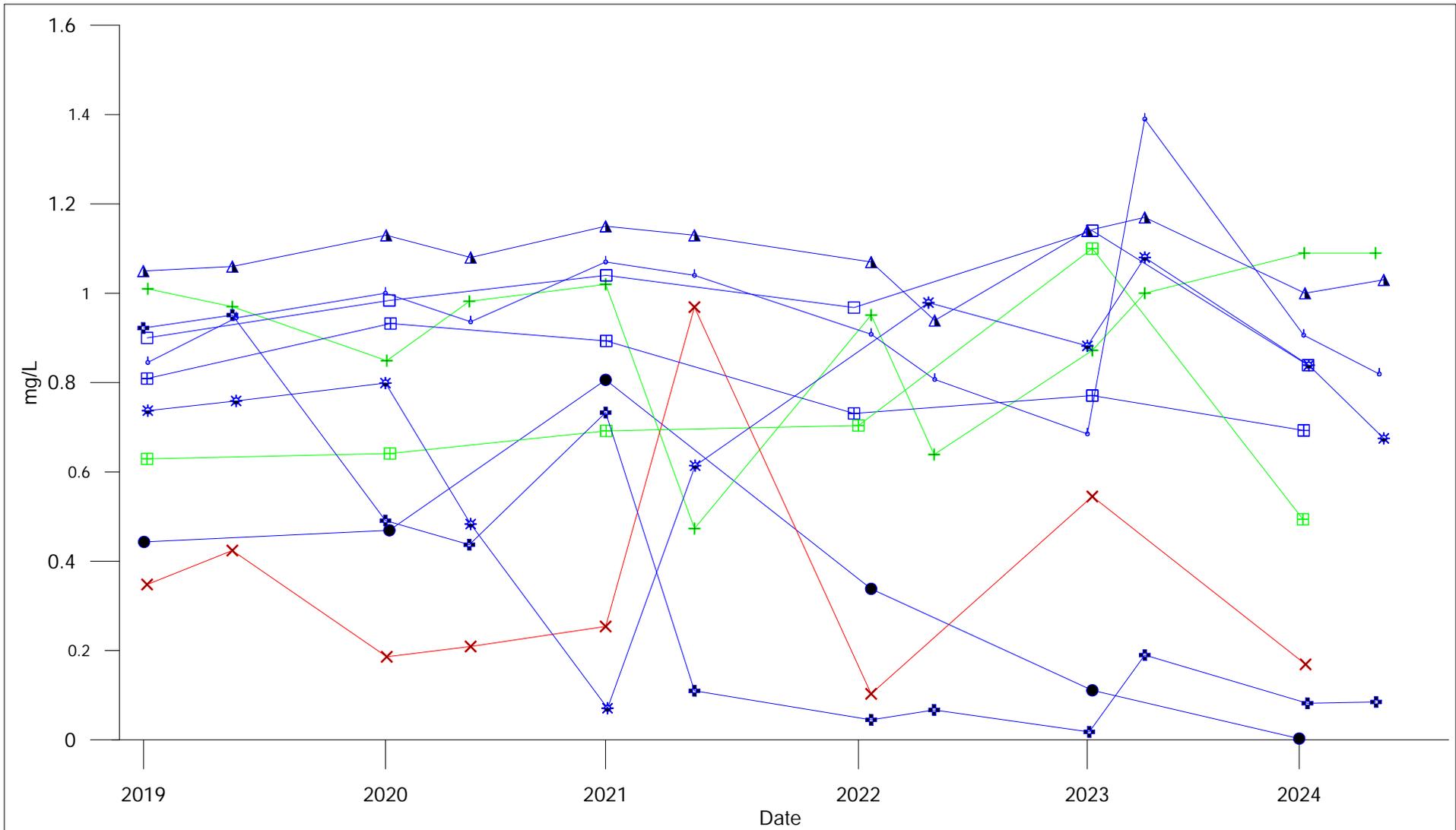


City Of Winnipeg  
 Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Iron  
 Till Wells

APRIL 2025 | FIGURE 33 | REV 0



Up gradient  
 6N60EER

Cross gradient  
 13A  
 14A

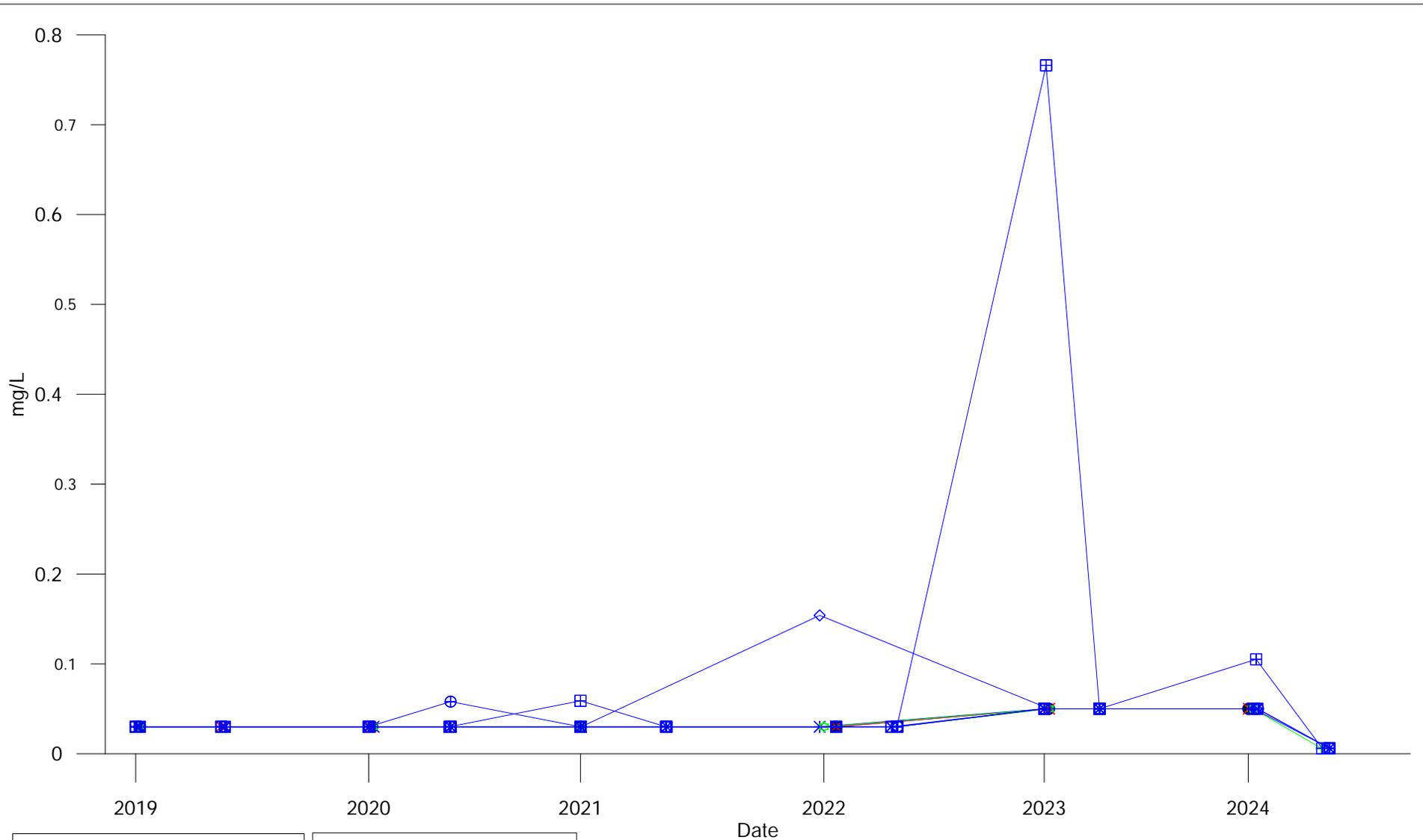
Down gradient  
 5N62E  
 6N67F

Cross gradient  
 15A  
 16A  
 4N34DDR  
 6N57F  
 6N63F



City Of Winnipeg  
 Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY  
**Total Ammonia  
 Till Wells**  
**APRIL 2025** | **FIGURE 37** | **REV 0**



Up gradient  
 X—X—X 6N60EER

Down gradient  
 +—+—+ 5N62E  
 ☆—☆—☆ 6N67F

Cross gradient  
 □—□—□ 13A  
 ▣—▣—▣ 14A

Cross gradient  
 ⊠—⊠—⊠ 16A  
 ●—●—● 4N34DDR  
 ◇—◇—◇ 6N57F  
 ✱—✱—✱ 6N63F  
 ⊕—⊕—⊕ 15A



City Of Winnipeg  
 Solid Waste Services

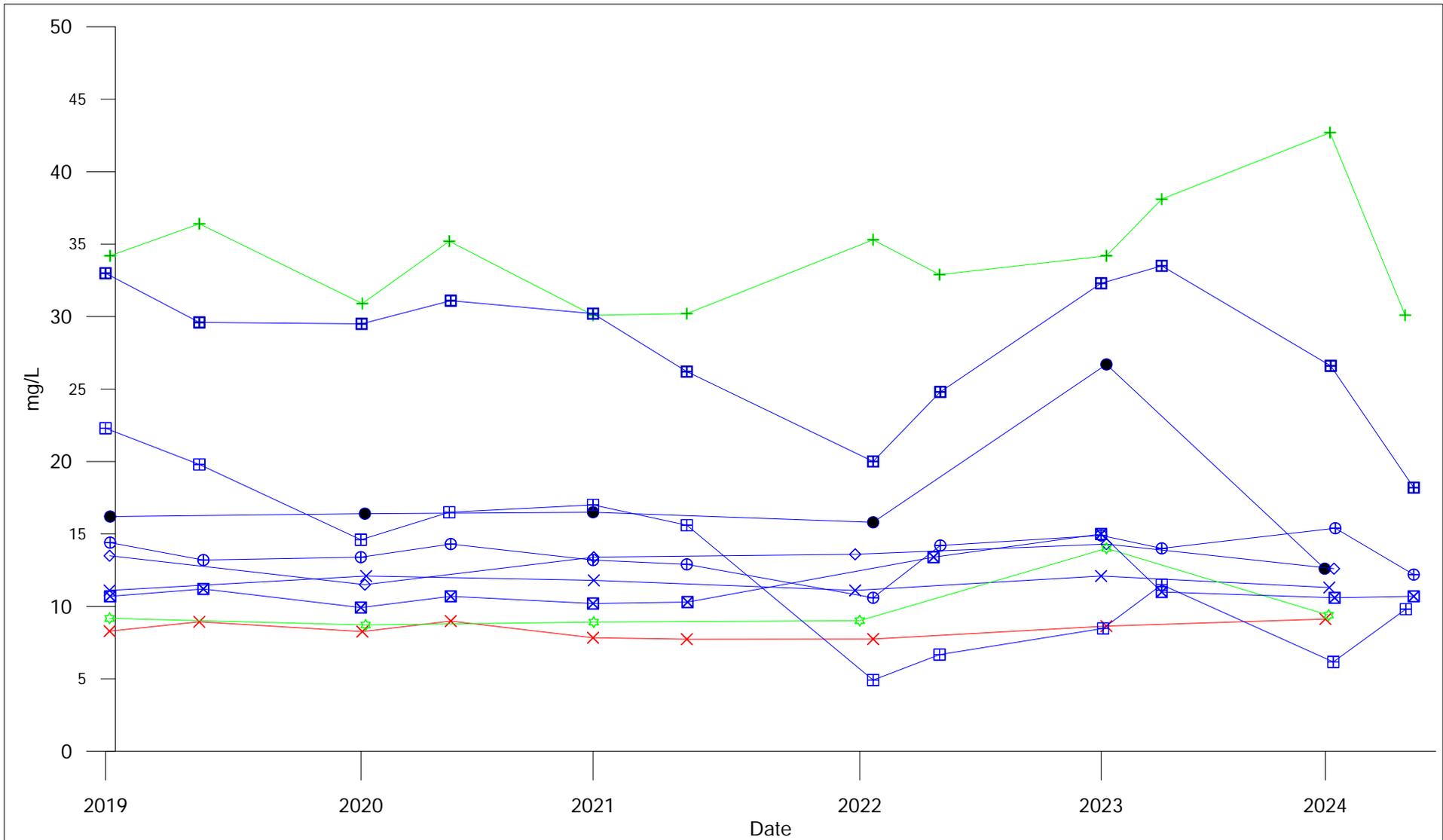
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Phosphorus  
 Till Wells

APRIL 2025

FIGURE 35

REV 0



Up gradient  
 6N60EER

Down gradient  
 5N62E  
 6N67F

Cross gradient  
 13A  
 14A

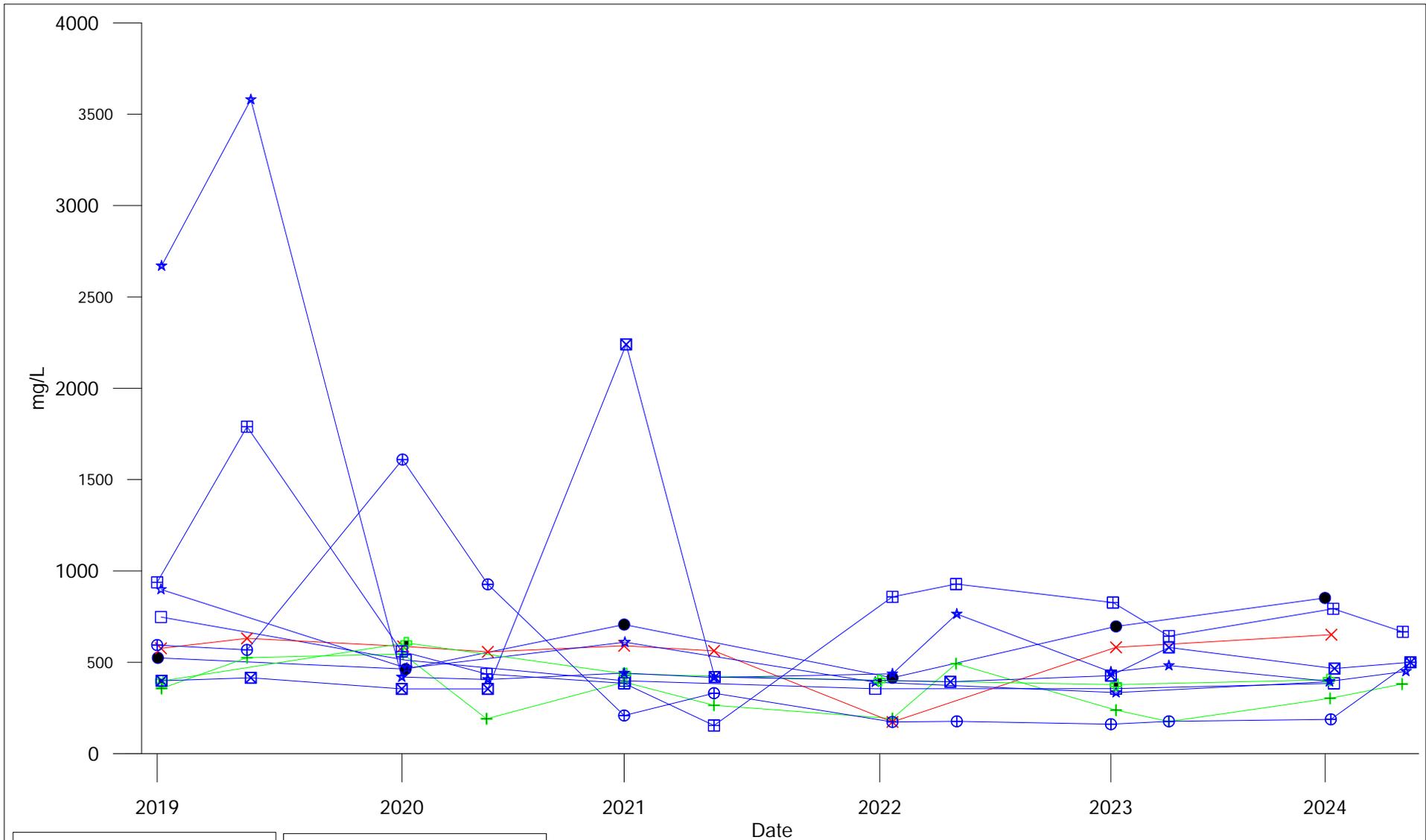
Cross gradient  
 15A  
 16A  
 4N34DDR  
 6N57F  
 6N63F



City Of Winnipeg  
 Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY  
**Dissolved Potassium**  
**Till Wells**  
 APRIL 2025 | FIGURE 34 | REV 0





Up gradient  
 × × × 6N60E

Down gradient  
 + + + 5N62E  
 ⊕ ⊕ ⊕ 6N67F

Cross gradient  
 ⊞ ⊞ ⊞ 13A  
 ⊕ ⊕ ⊕ 14A

Cross gradient  
 ☆ ☆ ☆ 15A  
 ⊠ ⊠ ⊠ 16A  
 ● ● ● 4N34DDR  
 □ □ □ 6N57F  
 ☆ ☆ ☆ 6N63F



City Of Winnipeg  
 Solid Waste Services

**APPENDIX E**  
**2024 WEEKLY WEIR DATA**



Water and Waste  
Eaux et déchets

### 2024 Weekly Weir Data

Date	Flow	pH (units)	Conductivity (m/s)	DO (mg/L)	Temp (°C)
9-May-24	No Flow	8.23	1.36	7.5	23.0
15-May-24	No Flow	7.74	1.48	0.5	11.7
21-May-24	No Flow	7.70	1.27	1.04	16.1
28-May-24	Slow Flow	7.75	1.31	9.13	14.2
5-Jun-24	Slow Flow	7.94	1.26	8.13	13.3
12-Jun-24	No Flow	7.75	1.72	8.23	16.4
18-Jun-24	Slow Flow	7.68	1.43	7.68	15.3
27-Jun-24	No Flow	7.83	1.73	5.19	23.3
4-Jul-24	No Flow	7.83	1.42	4.68	22.5
12-Jul-24	No Flow	7.36	0.67	4.90	25.4
19-Jul-24	Low flow	7.38	2.10	1.33	20.2
23-Jul-24	No Flow	7.54	1.11	4.38	23.1
2-Aug-24	No Flow	7.56	1.75	2.39	28.2
7-Aug-24	No Flow	7.45	2.23	1.58	17.1
16-Aug-24	No Flow	7.42	2.30	2.41	18.2
23-Aug-24	No Flow	7.58	2.79	6.14	26.0
30-Aug-24	No Flow	7.58	2.39	3.11	18.4
5-Sep-24	No Flow	7.66	2.52	7.99	15.2
12-Sep-24	No Flow	7.69	2.51	6.36	19.4
19-Sep-24	No Flow	7.67	2.49	6.29	19.7
28-Sep-24	No Flow	7.69	2.64	0.71	16.3
10-Oct-24	No Flow	7.99	2.85	5.92	16.2
18-Oct-24	No Flow	8.03	2.95	5.65	18.0
23-Oct-24	No Flow	8.13	3.06	6.30	16.8
30-Oct-24	No Flow	8.09	3.01	7.48	14.8
6-Nov-24	No Flow	7.87	2.69	5.22	12.8
15-Nov-24	No Flow	7.95	4.75	4.38	18.1
22-Nov-24	Frozen	7.66	2.86	6.08	15.2
27-Nov-24	Frozen	7.50	3.44	6.70	15.8

**APPENDIX F**  
**2024 SURFACE WATER DATA**



## 2024 Surface Water Monitoring

		Ponds													
		SWQ25-6	SWQ25-7	SWQ25-8	SWQ25-9A		SW25-9B		SWQ25-11A		SWQ25-11B		SWQ25-11C		
		652092/652404	652093/652405	652094/652406	652095/652407	671754/675957	652096/652408	671755/675958	652097/652409	689814/692007	652098/652410	689815/692008	652099/652411	689816/692009	
Sample Number	Criteria*	11-Apr-24	11-Apr-24	12-Apr-24	11-Apr-24	11-Jul-24	11-Apr-24	11-Jul-24	12-Apr-24	12-Sep-24	12-Apr-24	12-Sep-24	12-Apr-24	12-Sep-24	
<b>Inorganic Parameters</b>															
Alkalinity - Bicarbonate	mg/L	209	48	254	124	182	132	146	280	710	229	548	264	805	
Alkalinity - Carbonate	mg/L	<3.0	18.6	<3.0	<3.0	<3.0	<3.0	18.8	<3.0	83	<3.0	132	<3.0	115	
Alkalinity - Hydroxide	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	
Alkalinity - Total	mg/L	209	66	254	124	182	132	165	280	793	229	680	266	920	
Dissolved Hardness (CaCO3)	mg/L	177	142	230	148	178	157	210	359	972	211	888	359	1,063	
pH	units	6.5-9.0	8.50	9.56	7.78	7.85	7.95	8.34	9.17	8.27	8.72	7.92	8.88	8.93	
Specific Conductivity	(µS/cm)	789	476	911	420	441	417	473	1,170	3,180	654	2,920	1,210	3,030	
Turbidity	(ntu)	24.9	9.45	50.7	24.7	5.37	17.8	3.81	15.9	1,888	16.6	246	22.5	394	
Total Dissolved Solids	mg/L	412	270	624	234	295	230	315	743	3,020	478	2,640	771	2,610	
Total Suspended Solids	mg/L	54	42	132	52	<3.0	38	27	55	1,256	138	212	81	463	
Total Solids	mg/L	466	312	756	286	286	268	342	798	4,270	616	2,850	852	3,070	
Dissolved Chloride (Cl)	mg/L	640*	83.5	90.5	91.0	41.1	26.6	33.1	34.8	118	572	44.4	521	158	
Dissolved Sulphate (SO4)	mg/L		31.3	65.2	45.7	0.8	0.5	2.1	<0.4	48.0	375	20.6	259	136	
<b>Nutrients</b>															
Ammonia - Dissolved	mg/L N		12.8	<0.003	5.25	0.220	<0.003	0.972	<0.003	3.70	1.66	1.06	0.036	2.04	
Nitrate - Dissolved	mg/L N	13	1.030	0.007	<0.004	0.200	0.008	0.144	0.156	0.027	0.063	<0.004	0.032	0.128	
Total Kjeldahl Nitrogen	mg/L N		19.1	1.9	17.3	1.4	1.7	3.1	1.6	12.3	30.4	8.3	28.5	10.0	
Phosphorus - Dissolved	mg/L P		0.208	<0.013	1.92	0.035	0.180	<0.013	0.172	<0.013	0.229	4.56	0.291	0.198	
<b>Other</b>															
Cyanide - Total (CN)	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
<b>Organic Indicators</b>															
Carbonaceous Oxygen Demand	mg/L		101	76	303	56	59	68	60	195	1380	312	830	212	
Biochemical Oxygen Demand	mg/L		<3	15	18	7	<3	15	3	19	99	26	65	24	
<b>Metals</b>															
Arsenic (As)- Dissolved	mg/L	0.0050*	0.0041	0.0015	0.0066	0.0022	0.0048	0.0021	0.0049	0.0044	0.0236	0.0027	0.0274	0.0062	
Barium (Ba)- Dissolved	mg/L		0.0269	0.0142	0.0397	0.0298	0.0437	0.0345	0.0413	0.0509	0.2910	0.0177	0.1641	0.0405	
Beryllium (Be)- Dissolved	mg/L		<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.0007	<0.00002	0.0005	<0.00002	
Cadmium (Cd)- Dissolved	mg/L	0.00009*	0.000031	<0.000005	0.000017	0.000007	<0.000007	0.000006	0.000010	0.000021	0.000201	0.000037	0.000093	0.000014	
Calcium (Ca)- Dissolved	mg/L		17.9	19.3	37.0	30.4	40.3	31.2	38.2	47.4	80.9	32.3	62.2	39.7	
Chromium (Cr)- Dissolved	mg/L		0.00833	<0.00050	0.00123	<0.00050	0.00304	<0.00050	0.00065	0.00135	0.02215	<0.00050	0.00636	0.00093	
Copper (Cu)- Dissolved	mg/L	0.0040*	0.00613	0.00188	0.00655	0.00167	0.00186	0.00188	0.00187	0.00500	0.02126	0.00450	0.01183	0.00405	
Iron (Fe)- Dissolved	mg/L	0.30*	0.119	0.028	0.617	0.041	0.372	0.022	0.194	0.160	9.142	0.036	2.171	0.083	
Lead (Pb)- Dissolved	mg/L	0.0070*	0.000342	<0.000050	0.000864	<0.000050	0.000170	<0.000050	0.000160	0.000196	0.008500	0.000212	0.002960	0.000126	
Magnesium (Mg)- Dissolved	mg/L		32.0	22.8	33.3	17.5	22.2	19.3	24.0	58.4	187.0	31.6	177.9	63.2	
Manganese (Mn)- Dissolved	mg/L		0.0225	0.0184	0.1690	0.0706	0.1016	0.0415	0.0176	0.0642	0.3671	0.0532	0.2067	0.0395	
Mercury (Hg)- Dissolved	mg/L	0.000026*	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000071	<0.0000050	<0.0000050	<0.0000050	
Nickel (Ni)- Dissolved	mg/L	0.150*	0.0236	0.0025	0.0113	0.0029	0.0725	0.0032	0.0156	0.0161	0.0818	0.0045	0.0711	0.0150	
Potassium (K)- Dissolved	mg/L		25.7	17.9	123.0	9.49	11.6	10.4	12.4	71.8	208.2	54.1	192.5	70.2	
Selenium (Se)- Dissolved	mg/L	0.0010*	0.000261	0.000142	0.000243	0.000128	<0.0002	0.000119	<0.0002	0.000186	0.00740	0.000058	0.00870	0.000204	
Sodium (Na)- Dissolved	mg/L		113.0	24.9	19.4	20.0	15.1	18.9	18.2	74.1	329.9	21.2	311.6	81.3	
Zinc (Zn)- Dissolved	mg/L	0.030*	0.0072	<0.0010	0.0110	0.0076	0.0100	0.0038	0.0121	0.0135	0.0559	0.0090	0.0186	0.0043	
<b>Bacteria</b>															
Total Coliforms (MTF)	MPN/100mL		2,420	161	>2,420	>2,420	>2,420	961	>2,420	>2,420	>2,420	>2,420	>2,420	411	
Fecal Coliforms (MTF)	MPN/100mL		308	6	172	91	579	236	830	6	1,010	93	1,010	1	
E. coli (MTF)	MPN/100mL		133	5	88	112	687	285	>2420	2	>2,420	68	1,010	5	
<b>Field Parameters</b>															
pH	units	6.5-9.0	8.67	9.47	9.13	8.02	7.74	8.44	9.20	8.45	8.94	7.35	9.07	9.19	
Specific Conductivity	(µS/cm)		693	412	807	361	423	370	430	1,006	3,450	615	3,195	1,055	
Temperature	°C		10.6	10.8	9.8	10.4	26.0	9.1	26.7	9.5	16.7	8.4	19.8	9.0	

Note: Criteria from Canadian Council of Ministers of the Environment, Canadian Environmental Quality Guidelines Summary Table, Water Quality Guidelines for the Protection of Freshwater Aquatic Life. (CCME, 2019)  
\* Criteria for total chloride and total metals



## 2024 Surface Water Monitoring

			Upstream		Downstream				
			SW25-1		SW25-2		SW25-16		
Sample Number			652088/652400	671751/675955	652090/652402	671763/676290	689361/692002	652091/652403	671753/676284
Units			11-Apr-24	11-Jul-24	12-Apr-24	12-Jul-24	12-Sep-24	12-Apr-24	12-Jul-24
Criteria*									
<b>Inorganic Parameters</b>									
Alkalinity - Bicarbonate	mg/L		96	224	157	270	837	160	216
Alkalinity - Carbonate	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Hydroxide	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Total	mg/L		96	224	157	270	837	160	216
Dissolved Hardness (CaCO3)	mg/L		93	209	182	250	802	179	204
pH	units	6.5-9.0	7.23	7.49	8.05	7.41	7.72	7.61	7.45
Specific Conductivity	(µS/cm)		222	450	536	726	2,310	646	581
Turbidity	(ntu)		20.4	5.95	11.0	26.5	42.4	7.38	3.02
Total Dissolved Solids	mg/L		106	306	308	499	1,620	372	332
Total Suspended Solids	mg/L		78	52	48	1,029	351	40	92.0
Total Solids	mg/L		184	358	356	1,530	1,970	412	424
Dissolved Chloride (Cl)	mg/L	640*	7.1	11.5	49.1	59.6	360	93.0	34.5
Dissolved Sulphate (SO4)	mg/L		<0.4	1.6	30.3	1.2	<0.4	4.4	<0.4
<b>Nutrients</b>									
Ammonia - Dissolved	mg/L N		<0.003	<0.003	0.622	0.375	<0.003	<0.003	<0.003
Nitrate - Dissolved	mg/L N	13	0.010	0.068	0.254	0.022	<0.004	0.011	<0.004
Total Kjeldahl Nitrogen	mg/L N		0.70	1.9	2.6	46.4	9.6	1.7	1.9
Phosphorus - Dissolved	mg/L P		0.179	0.166	0.069	0.353	0.672	0.128	0.190
<b>Other</b>									
Cyanide - Total (CN)	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic Indicators</b>									
Carbonaceous Oxygen Demand	mg/L		33	75	69	345	330	88	74
Biochemical Oxygen Demand	mg/L		<3	4	9	28	8	5	<3
<b>Metals</b>									
Arsenic (As)- Dissolved	mg/L	0.0050*	0.0023	0.0041	0.0032	0.0080	0.0212	0.0033	0.0049
Barium (Ba)- Dissolved	mg/L		0.0194	0.0361	0.0377	0.0686	0.1948	0.0454	0.0460
Beryllium (Be)- Dissolved	mg/L		<0.00002	<0.0002	<0.00002	<0.0002	0.0007	<0.00002	<0.0002
Cadmium (Cd)- Dissolved	mg/L	0.00009*	0.000011	0.000013	0.000007	0.000009	0.000113	0.000007	0.000029
Calcium (Ca)- Dissolved	mg/L		22.1	40.2	31.3	45.5	91.9	33.5	44.7
Chromium (Cr)- Dissolved	mg/L		<0.00050	0.00092	<0.00050	0.00130	0.00355	<0.00050	0.00064
Copper (Cu)- Dissolved	mg/L	0.0040*	0.00138	0.00124	0.00148	0.00118	0.00810	0.00232	0.00124
Iron (Fe)- Dissolved	mg/L	0.30*	0.197	0.591	0.048	0.448	0.566	0.073	0.133
Lead (Pb)- Dissolved	mg/L	0.0070*	0.000314	0.000210	<0.000050	0.000240	0.001230	0.000070	0.000100
Magnesium (Mg)- Dissolved	mg/L		9.28	28.0	25.1	36.8	139	23.1	25.2
Manganese (Mn)- Dissolved	mg/L		0.0208	0.1694	0.1050	0.3148	0.5868	0.0329	0.0559
Mercury (Hg)- Dissolved	mg/L	0.000026*	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Nickel (Ni)- Dissolved	mg/L	0.150*	0.00180	0.02000	0.00475	0.02178	0.03557	0.00236	0.01549
Potassium (K)- Dissolved	mg/L		5.24	8.46	19.4	27.4	107.8	13.4	10.5
Selenium (Se)- Dissolved	mg/L	0.0010*	0.000061	<0.0002	<0.000050	<0.0002	0.01030	0.000132	<0.0002
Sodium (Na)- Dissolved	mg/L		4.18	14.3	28.0	40.5	213.2	50.2	25.0
Zinc (Zn)- Dissolved	mg/L	0.030*	0.0030	0.0066	0.0016	0.0032	0.0041	0.0027	0.0038
<b>Bacteria</b>									
Total Coliforms (MTF)	MPN/100mL		365	>2,420	1,990	>2,420	>2,420	>2,420	>2,420
Fecal Coliforms (MTF)	MPN/100mL		1	108	42	156	308	5	81
E. coli (MTF)	MPN/100mL		<1	62	28	144	461	1	82
<b>Field Parameters</b>									
pH	units	6.5-9.0	7.40	7.19	8.36	7.36	7.69	7.59	7.31
Specific Conductivity	(µS/cm)		407	901	495	669	2,507	599	1,103
Temperature	°C		7.8	24.6	10.7	25.1	19.4	11.5	25.4



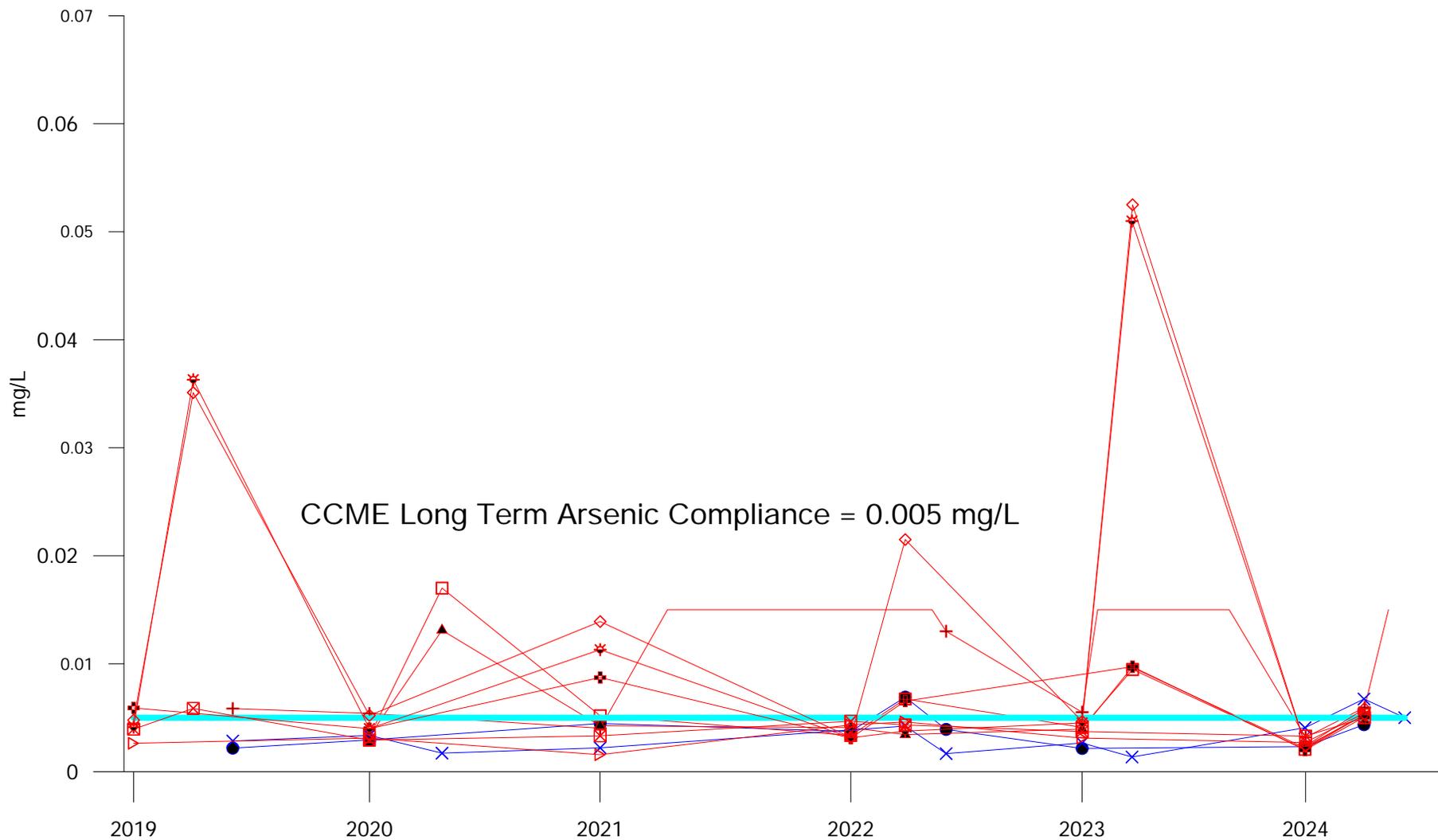
## 2024 Surface Water Monitoring

### Interior

Sample Number	Criteria*	SW25-12			SW25-14A		SW25-14B		SW25-15A		SW25-15B	
		652089/652401	671752/675956	689362/692003	652100/652412	675959	652101/652413	671757/675960	652102/652414	671758/676285	652103/652415	671759/676286
Units		11-Apr-24	11-Jul-24	12-Sep-24	11-Apr-24	11-Jul-24	11-Apr-24	11-Jul-24	12-Apr-24	12-Jul-24	12-Apr-24	12-Jul-24
<b>Inorganic Parameters</b>												
Alkalinity - Bicarbonate	mg/L	124	183	811	139	210	134	na	173	201	177	226
Alkalinity - Carbonate	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	na	<3.0	<3.0	<3.0	<3.0
Alkalinity - Hydroxide	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	na	<3.0	<3.0	<3.0	<3.0
Alkalinity - Total	mg/L	124	183	811	139	210	134	na	173	201	177	226
Dissolved Hardness (CaCO3)	mg/L	139	177	1,018	154	185	154	221	189	215	200	242
pH	units	6.5-9.0	7.45	9.44	7.60	7.57	7.58	8.21	8.09	8.01	7.48	8.00
Specific Conductivity	(µS/cm)	346	447	2,010	446	448	428	473	532	560	533	673
Turbidity	(ntu)	53.3	6.48	1,084	29.9	5.66	28.9	8.68	10.4	2.08	16.7	3.08
Total Dissolved Solids	mg/L	218	275	1,470	262	304	226	301	278	365	286	427
Total Suspended Solids	mg/L	76.0	45	3,720	36	68	86	87	48	87	84	105
Total Solids	mg/L	294	320	5,190	298	372	312	388	326	452	370	532
Dissolved Chloride (Cl)	mg/L	640*	26.9	17.2	196	43.2	26.2	34.6	34.7	40.9	43.3	44.0
Dissolved Sulphate (SO4)	mg/L		3.8	-0.4	194	1.3	0.6	1.2	<0.4	7.5	2.3	19.7
<b>Nutrients</b>												
Ammonia - Dissolved	mg/L N		<0.003	0.066	0.122	0.248	<0.003	1.150	0.073	2.090	<0.003	1.940
Nitrate - Dissolved	mg/L N	13	0.012	0.026	<0.004	0.116	<0.004	0.156	0.140	0.192	0.005	0.192
Total Kjeldahl Nitrogen	mg/L N		1.1	1.7	9.4	1.4	1.9	2.9	0.9	4.0	1.5	4.0
Phosphorus - Dissolved	mg/L P		0.275	0.240	0.138	0.104	0.173	<0.013	0.209	<0.013	0.191	<0.013
<b>Other</b>												
Cyanide - Total (CN)	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic Indicators</b>												
Carbonaceous Oxygen Demand	mg/L		76	76	780	55	65	81	65	57	63	74
Biochemical Oxygen Demand	mg/L		5	7	70	5	4	14	5	12	<3	7
<b>Metals</b>												
Arsenic (As)- Dissolved	mg/L	0.0050*	0.0043	0.0063	0.0050	0.0027	0.0051	0.0020	0.0051	0.0024	0.0048	0.0024
Barium (Ba)- Dissolved	mg/L		0.0332	0.0331	0.1253	0.0347	0.0446	0.0325	0.0392	0.0433	0.0419	0.0454
Beryllium (Be)- Dissolved	mg/L		<0.00002	<0.0002	0.0003	<0.00002	<0.0002	<0.00002	0.0004	<0.00002	<0.0002	<0.0002
Cadmium (Cd)- Dissolved	mg/L	0.00009*	0.000010	<0.000007	0.000023	<0.000005	<0.000007	0.000009	0.000061	0.000007	0.000015	<0.000006
Calcium (Ca)- Dissolved	mg/L		31.8	37.7	134.4	33.0	41.1	30.8	37.9	36.4	41.7	37.4
Chromium (Cr)- Dissolved	mg/L		<0.00050	0.00077	0.00075	<0.00050	0.00078	<0.00050	0.00086	<0.00050	0.00067	<0.00050
Copper (Cu)- Dissolved	mg/L	0.0040*	0.00256	0.00125	0.00065	0.00180	0.00103	0.00262	0.00174	0.00162	0.00324	0.00167
Iron (Fe)- Dissolved	mg/L	0.30*	0.374	0.673	0.525	0.073	0.743	0.023	0.199	0.016	0.122	0.021
Lead (Pb)- Dissolved	mg/L	0.0070*	0.000386	0.000130	0.000440	0.000066	0.000180	<0.000050	0.000260	<0.000050	0.000090	<0.000050
Magnesium (Mg)- Dissolved	mg/L		14.4	20.2	166	17.3	22.1	18.7	23.2	23.7	27.3	25.9
Manganese (Mn)- Dissolved	mg/L		0.0426	0.2005	1.039	0.0873	0.240	0.0546	0.1028	0.0338	0.0419	0.0502
Mercury (Hg)- Dissolved	mg/L	0.000026*	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Nickel (Ni)- Dissolved	mg/L	0.150*	0.00300	0.01520	0.00566	0.00297	0.01560	0.00307	0.01702	0.00356	0.01704	0.00400
Potassium (K)- Dissolved	mg/L		11.4	11.0	5.25	11.0	11.6	9.9	11.7	12.8	12.5	14.0
Selenium (Se)- Dissolved	mg/L	0.0010*	0.000151	<0.0002	0.00410	0.000097	<0.0002	0.000104	<0.0002	0.000062	0.000200	0.000092
Sodium (Na)- Dissolved	mg/L		11.9	11.6	169.5	23.2	14.9	18.2	19.0	21.9	23.7	24.6
Zinc (Zn)- Dissolved	mg/L	0.030*	0.0221	0.0121	0.0064	0.0080	0.0094	0.0045	0.0055	0.0021	0.0029	0.0022
<b>Bacteria</b>												
Total Coliforms (MTF)	MPN/100mL		2,420	>2,420	>2,420	1,010	>2,420	>2,420	>2,420	1,730	1,010	1,990
Fecal Coliforms (MTF)	MPN/100mL		31	73	722	50	121	291	1,550	291	76	276
E. coli (MTF)	MPN/100mL		29	56	1,300	47	68	150	1,990	238	81	249
<b>Field Parameters</b>												
pH	units	6.5-9.0	7.85	7.16	7.87	7.63	7.26	8.49	8.08	7.23	7.68	7.02
Specific Conductivity	(µS/cm)		324	375	2,186	415	425	376	467	546	922	483
Temperature	°C		5.7	23.3	19.7	7.0	23.5	9.5	25.2	5.7	25.2	7.2

Note: Criteria from Canadian Council of Ministers of the Environment, Canadian Environmental Quality Guidelines Summary Table, Water Quality Guidelines for the Protection of Freshwater Aquatic Life. (CCME, 2019)  
\* Criteria for total chloride and total metals na - not analysed; lab error

**APPENDIX G**  
**2024 SURFACE WATER**  
**TVC GRAPHS**



**Up Stream**

- SW25-1
- × SW25-12

**Down Stream**

- ⊠ SW25-16
- + SW25-2
- SW25-9B
- ▲ SW25-9A

**Down Stream**

- CCME
- ⊕ SW25-14A
- ⊕ SW25-14B
- ⊕ SW25-15A
- ◇ SW25-15B



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Solid Waste Services

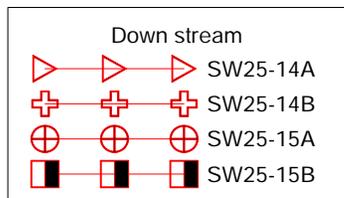
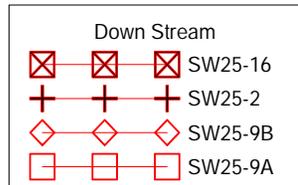
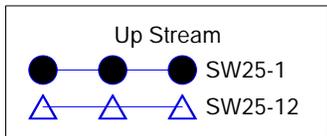
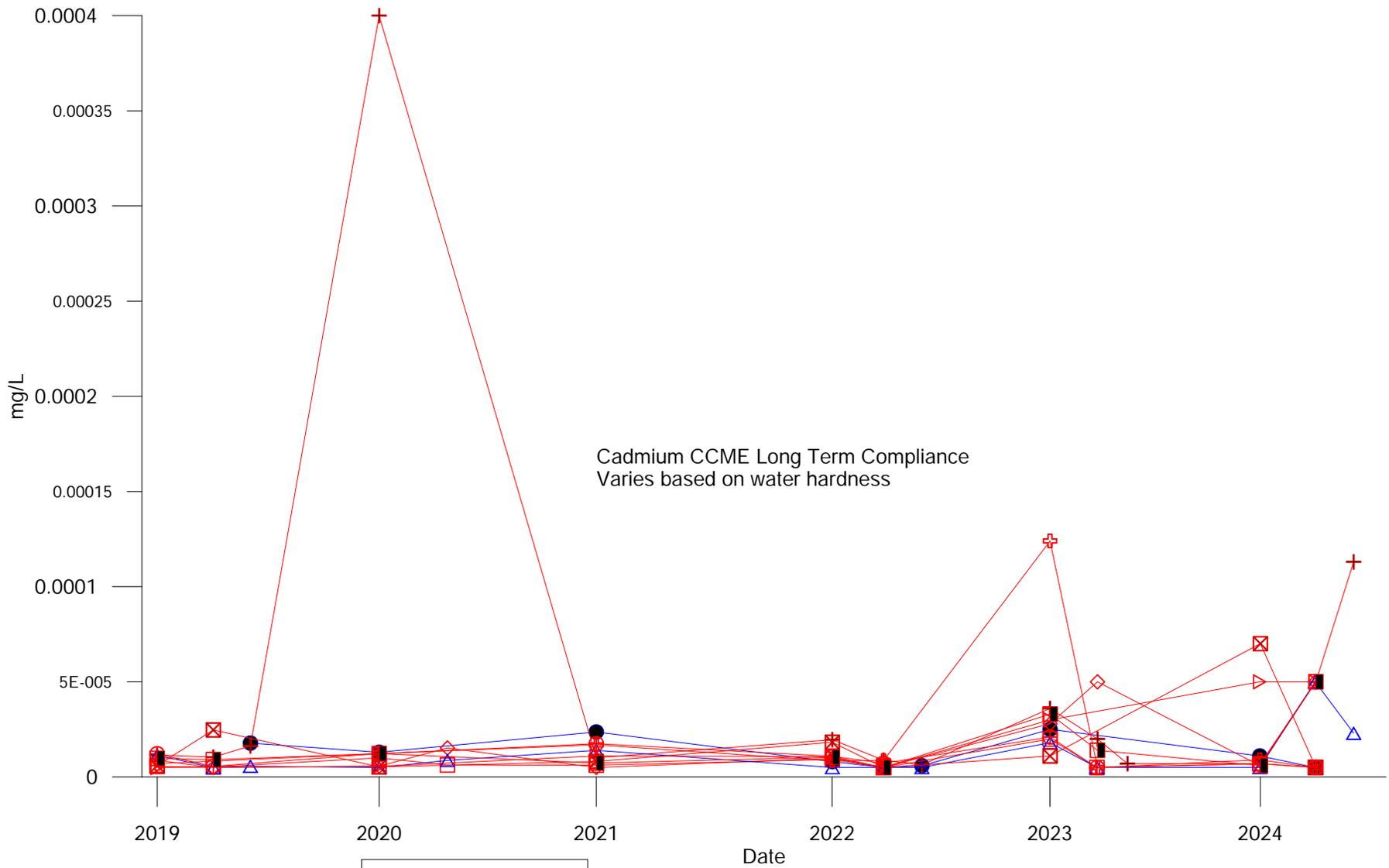
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Arsenic  
Surface Water

APRIL 2025

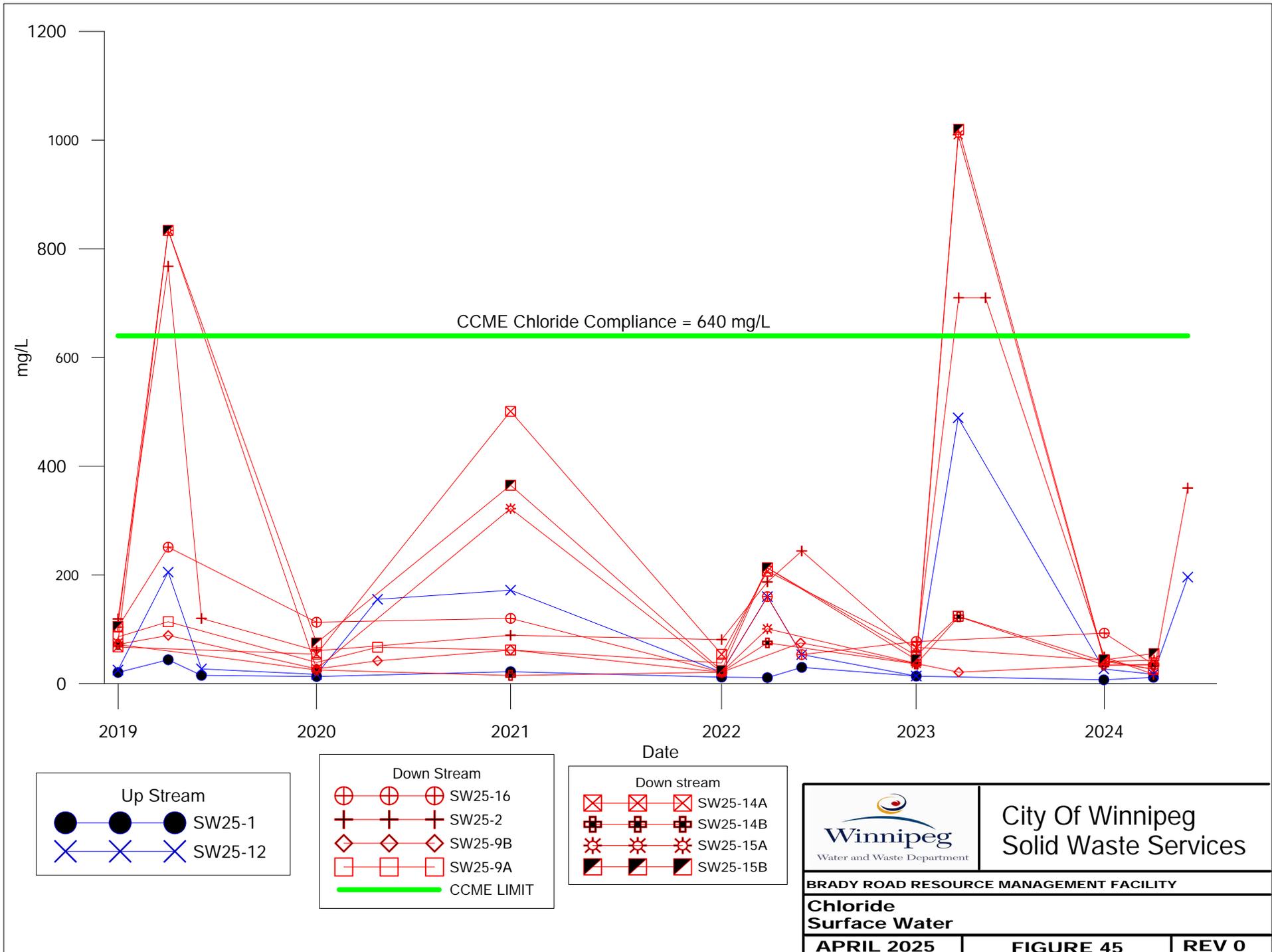
FIGURE 43

REV 0



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BRADY ROAD RESOURCE MANAGEMENT FACILITY		
Dissolved Cadmium Surface Water		
APRIL 2025	FIGURE 44	REV 0



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Solid Waste Services

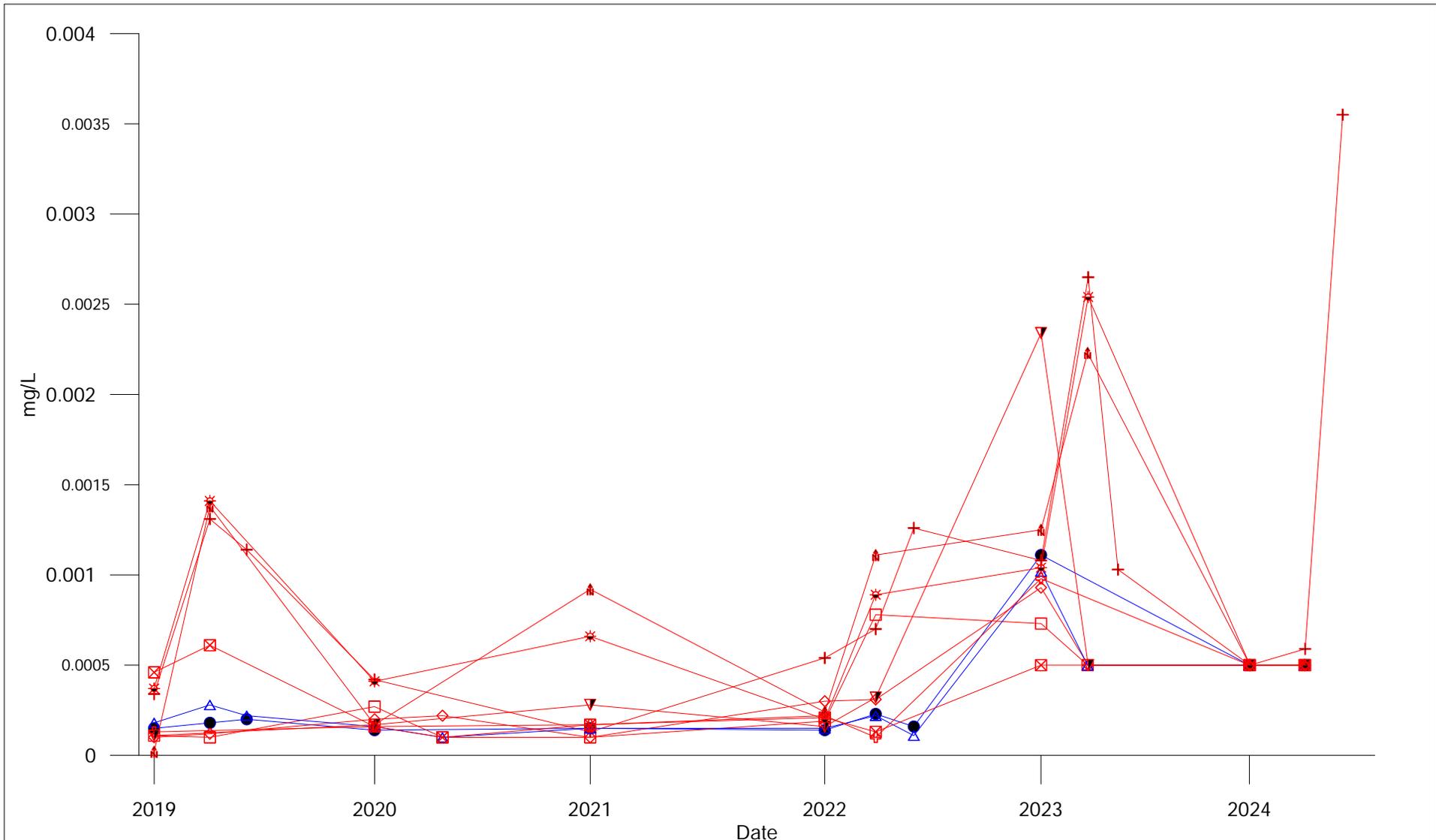
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Chloride  
Surface Water

APRIL 2025

FIGURE 45

REV 0



**Up Stream**

- SW25-1
- ▲ SW25-12

**Down Stream**

- ⊠ SW25-16
- ⊕ SW25-2
- ◇ SW25-9B
- SW25-9A

**Down stream**

- ⊕ SW25-14A
- ▼ SW25-14B
- ⬆ SW25-15A
- ☀ SW25-15B



City Of Winnipeg  
Solid Waste Services

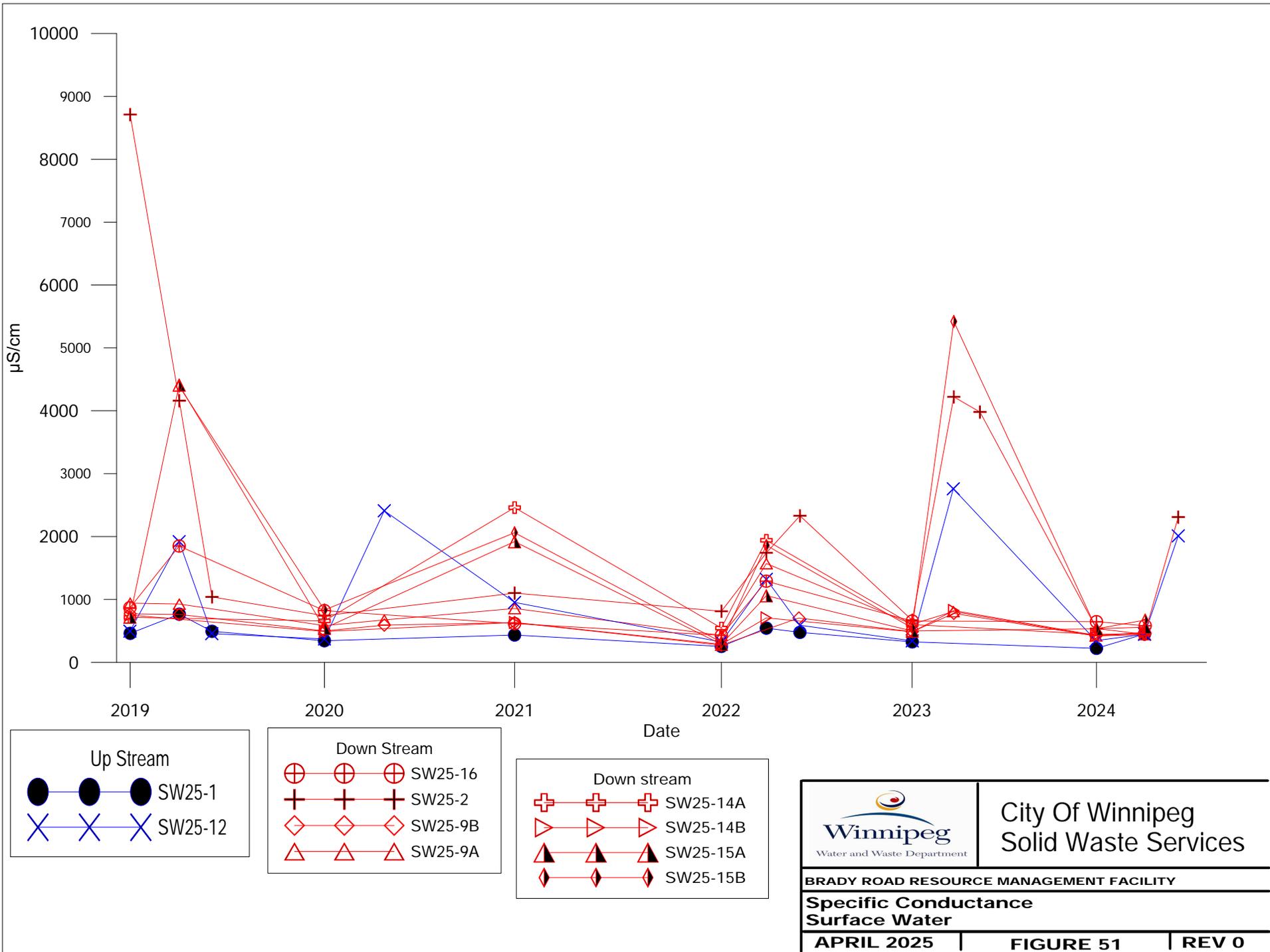
BRADY ROAD RESOURCE MANAGEMENT FACILITY

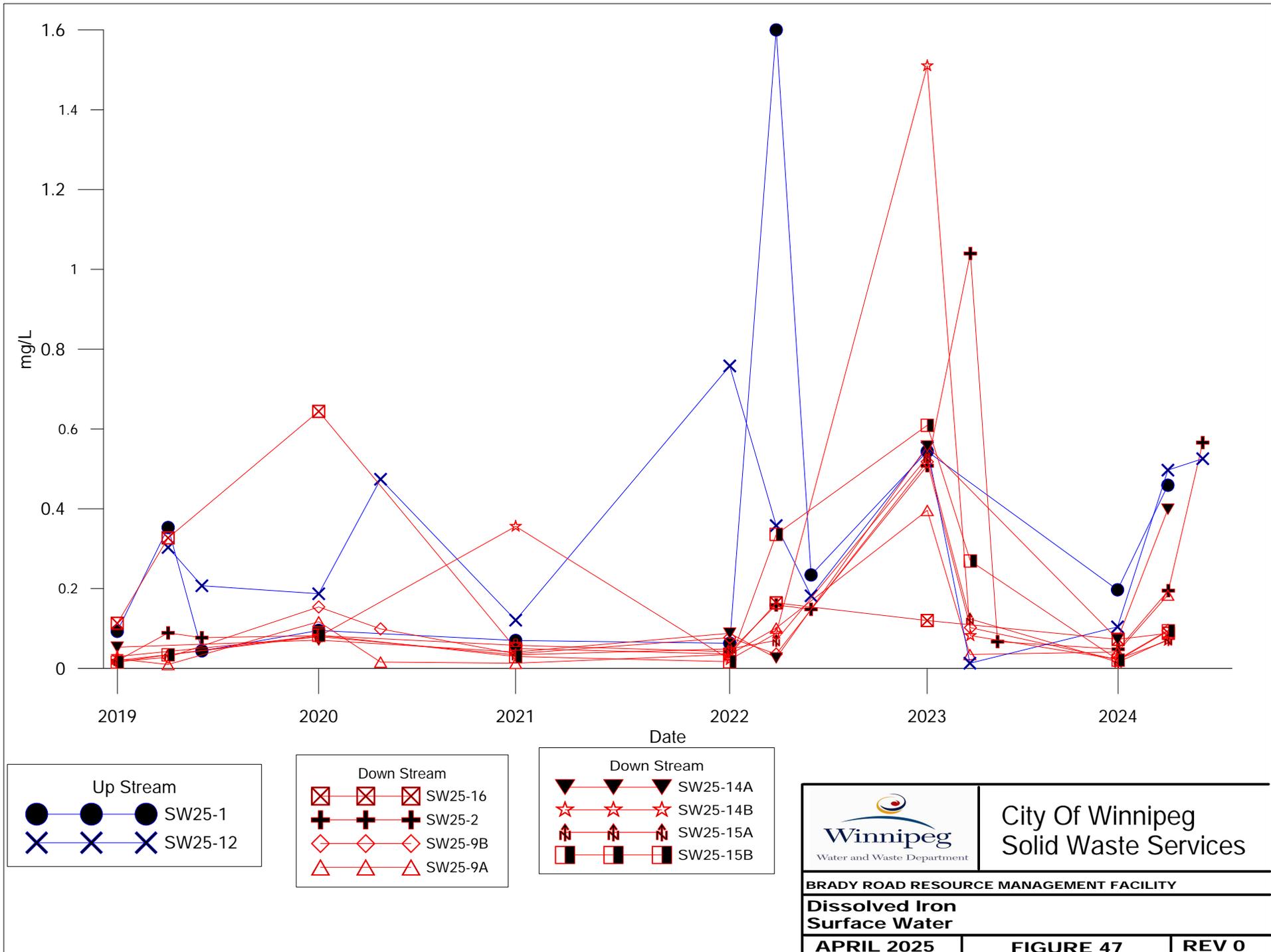
Dissolved Chromium  
Surface Water

APRIL 2025

FIGURE 46

REV 0





City Of Winnipeg  
Solid Waste Services

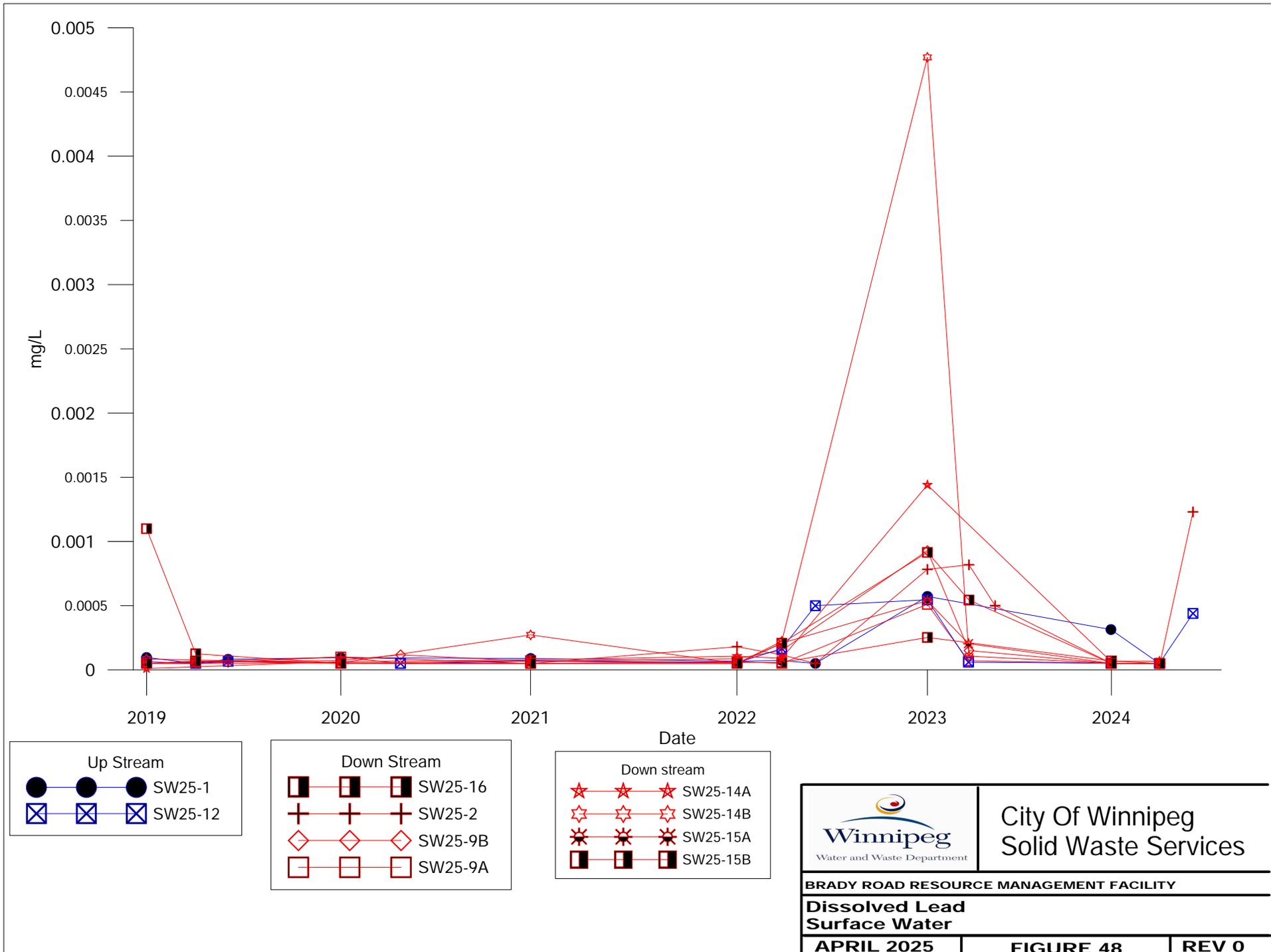
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Iron  
Surface Water

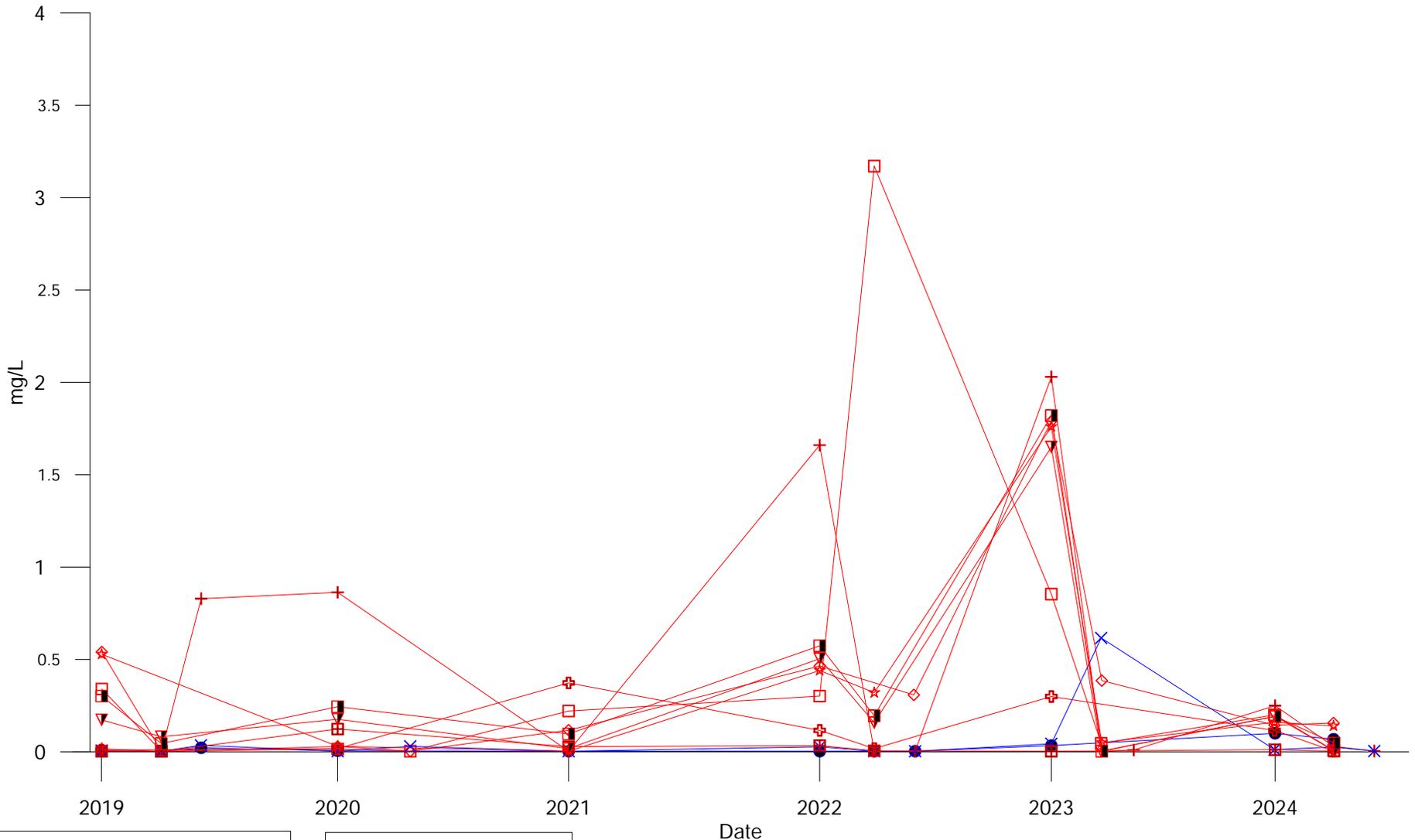
APRIL 2025

FIGURE 47

REV 0



City Of Winnipeg  
Solid Waste Services



**Up Stream**

- SW25-1
- SW25-1
- SW25-1
- × SW25-12
- × SW25-12
- × SW25-12

**Down Stream**

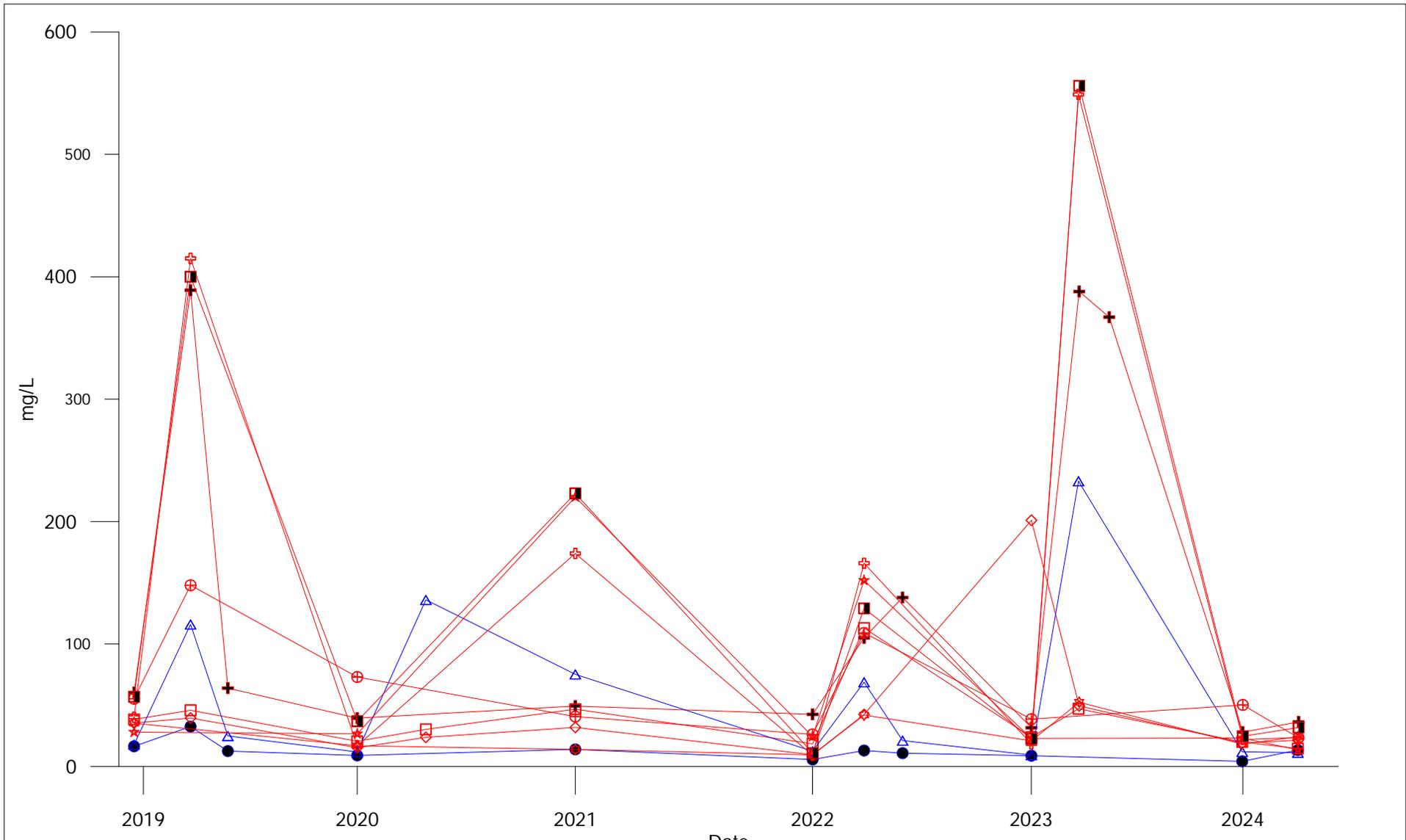
- ▣ SW25-16
- ▣ SW25-16
- ▣ SW25-16
- ⊕ SW25-2
- ⊕ SW25-2
- ⊕ SW25-2
- ◇ SW25-9B
- ◇ SW25-9B
- ◇ SW25-9B
- ▢ SW25-9A
- ▢ SW25-9A
- ▢ SW25-9A

**Down stream**

- ⊕ SW25-14A
- ⊕ SW25-14A
- ⊕ SW25-14A
- ☆ SW25-14B
- ☆ SW25-14B
- ☆ SW25-14B
- ▼ SW2-15A
- ▼ SW2-15A
- ▼ SW2-15A
- ▣ SW25-15B
- ▣ SW25-15B
- ▣ SW25-15B



**City Of Winnipeg  
Solid Waste Services**



**Up Stream**

- SW25-1
- ▲ SW25-12

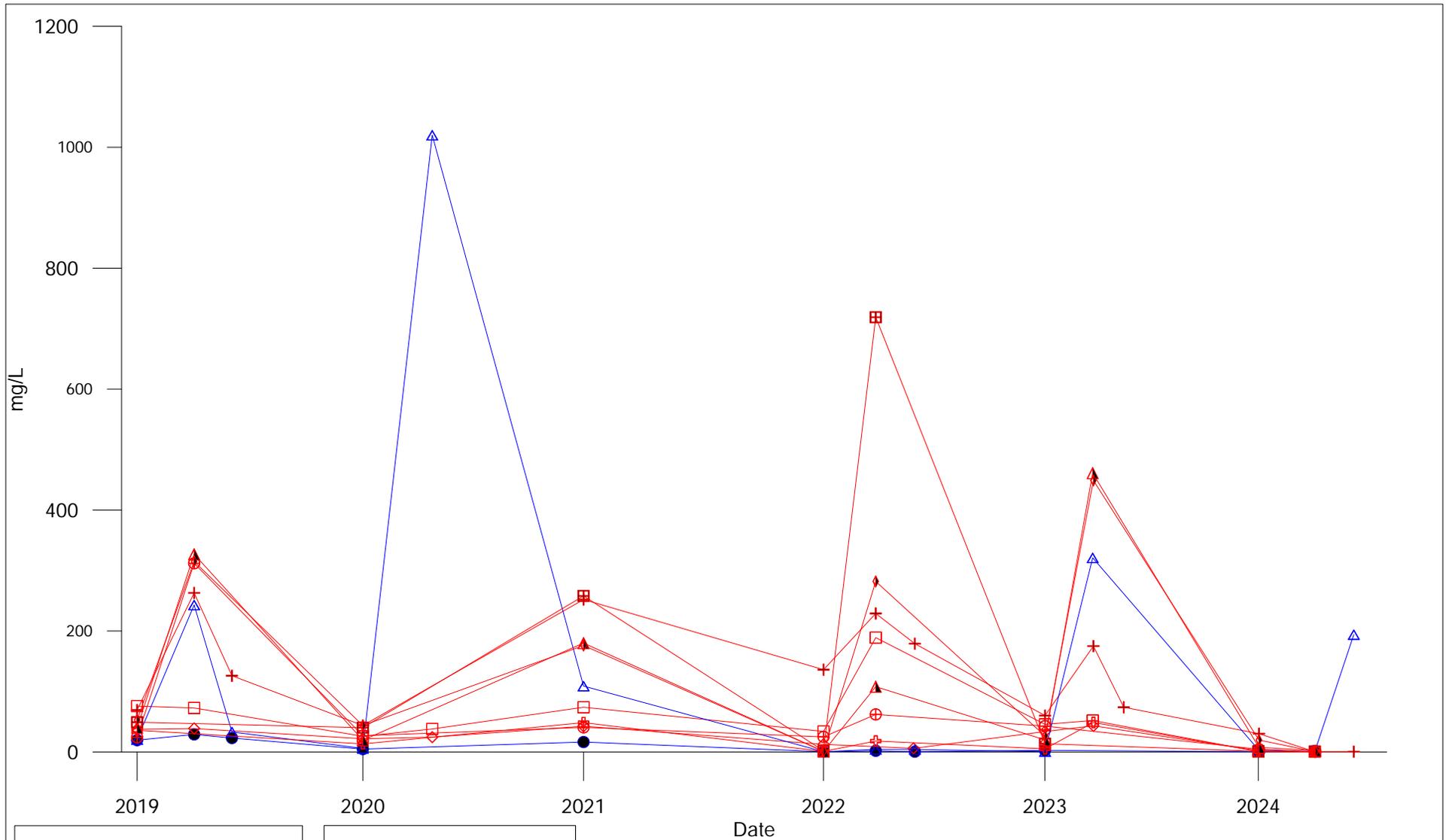
**Down Stream**

- ⊕ SW25-16
- ⊕ SW25-2
- ◇ SW25-9B
- SW25-9A

**Down stream**

- ★ SW25-14A
- ☆ SW25-14B
- ⊕ SW25-15A
- SW25-15B

	<b>City Of Winnipeg Solid Waste Services</b>	
	<b>BRADY ROAD RESOURCE MANAGEMENT FACILITY</b>	
<b>Dissolved Sodium Surface Water</b>		
<b>APRIL 2025</b>	<b>FIGURE 50</b>	<b>REV 0</b>



**Up Stream**

- SW25-1
- ▲ SW25-12

**Down Stream**

- ⊕ SW25-16
- ⊕ SW25-2
- ◇ SW25-9B
- SW25-9A

**Down stream**

- ⊞ SW25-14A
- ⊞ SW25-14B
- ▲ SW25-15A
- ◆ SW25-15B



City Of Winnipeg  
Solid Waste Services

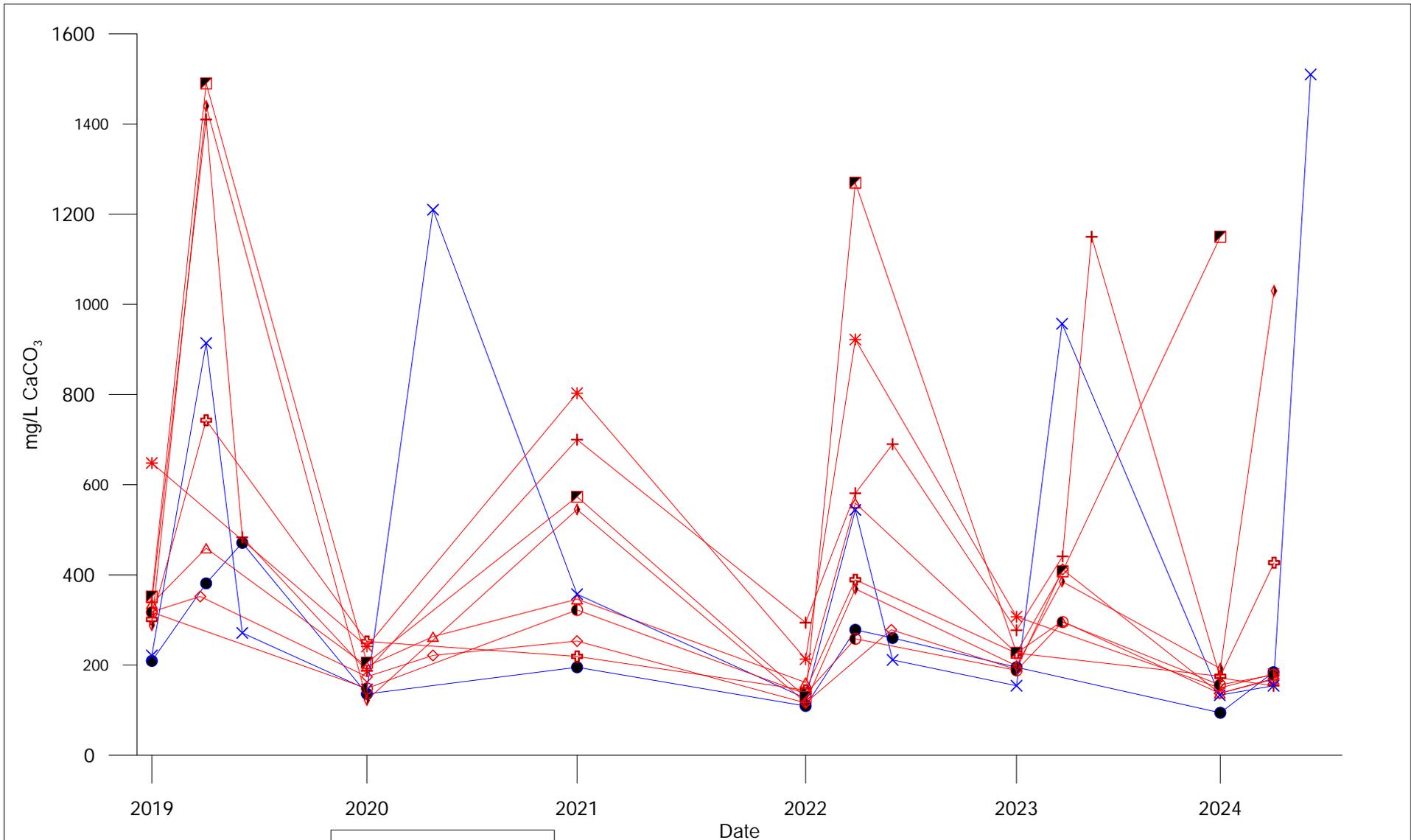
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Sulfate  
Surface Water

APRIL 2025

FIGURE 52

REV 0



**Up Stream**

- SW25-1
- × SW25-12

**Down Stream**

- ⊕ SW25-16
- ⊕ SW25-2
- ◇ SW25-9B
- △ SW25-9A

**Down stream**

- ⊗ SW25-14A
- ◐ SW25-14B
- ◑ SW25-15A
- ◓ SW25-15B



**City Of Winnipeg  
Solid Waste Services**

**APPENDIX H**  
**2024 LEACHATE LEVELS**



## 2024 Leachate Levels

	Date	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24
Manhole 3	Top of Manhole Elevation (m)	233.66	233.66	233.66	233.66	233.66	233.66	233.66	233.66	233.66	233.66	233.66	233.66
	Depth to Leachate (m)	2.84	2.36	3.08	1.82	7.79	4.64	6.06	8.43	4.91	2.82	6.92	2.35
	Manhole Leachate Elevation (m)	230.82	231.30	230.58	231.84	225.87	229.02	227.60	225.23	228.75	230.84	226.74	231.31
Manhole 8	Top of Manhole Elevation (m)	236.61	236.61	236.61	236.61	236.61	236.61	236.61	236.61	236.61	236.61	236.61	236.61
	Depth to Leachate (m)	9.45	9.65	9.60	6.21	9.72	9.69	9.81	9.91	9.56	9.83	9.74	9.78
	Manhole Leachate Elevation (m)	227.16	226.96	227.01	230.40	226.89	226.92	226.80	226.70	227.05	226.78	226.87	226.83
Manhole 13	Top of Manhole Elevation (m)	234.89	234.89	234.89	234.89	234.89	234.89	234.89	234.89	234.89	234.89	234.89	234.89
	Depth to Leachate (m)	9.75	9.47	10.06	6.64	5.37	4.96	4.17	3.65	6.57	9.58	10.04	9.01
	Manhole Leachate Elevation (m)	225.14	225.42	224.83	228.25	229.52	229.93	230.72	231.24	228.32	225.31	224.85	225.88
Manhole 24	Top of Manhole Elevation (m)	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00
	Depth to Leachate (m)	8.84	8.86	7.04	5.94	3.67	8.78	8.80	8.59	6.62	8.84	8.94	8.93
	Manhole Leachate Elevation (m)	226.16	226.14	227.96	229.06	231.33	226.22	226.20	226.41	228.38	226.16	226.06	226.07
Manhole 27	Top of Manhole Elevation (m)	235.71	235.71	235.71	235.71	235.71	235.71	235.71	235.71	235.71	235.71	235.71	235.71
	Depth to Leachate (m)	1.98	2.08	1.95	1.98	2.22	2.06	2.22	2.08	2.41	2.29	1.98	2.10
	Manhole Leachate Elevation (m)	233.73	233.63	233.76	233.73	233.49	233.65	233.49	233.63	233.30	233.42	233.73	233.61
Manhole 31	Top of Manhole Elevation (m)	234.74	234.74	234.74	234.74	234.74	234.74	234.74	234.74	234.74	234.74	234.74	234.74
	Depth to Leachate (m)	7.92	4.67	0.98	0.83	1.87	1.91	0.65	1.52	5.04	1.14	0.88	1.56
	Manhole Leachate Elevation (m)	226.82	230.07	233.76	233.91	232.87	232.83	234.09	233.22	229.70	233.60	233.86	233.18
Manhole 34	Top of Manhole Elevation (m)	235.42	235.42	235.42	235.42	235.42	235.42	235.42	235.42	235.42	235.42	235.42	235.42
	Depth to Leachate (m)	1.32	1.69	1.74	1.69	1.67	1.28	1.06	1.17	1.14	1.38	1.33	1.78
	Manhole Leachate Elevation (m)	234.10	233.73	233.68	233.73	233.75	234.14	234.36	234.25	234.28	234.04	234.09	233.64
Manhole 46	Top of Manhole Elevation (m)	235.04	235.04	235.04	235.04	235.04	235.04	235.04	235.04	235.04	235.04	235.04	235.04
	Depth to Leachate (m)	6.22	CNM*	6.10	6.06	5.97	5.85	5.64	5.76	5.81	6.02	6.06	6.19
	Manhole Leachate Elevation (m)	228.82	CNM*	228.94	228.98	229.07	229.19	229.40	229.28	229.23	229.02	228.98	228.85
Manhole 47	Top of Manhole Elevation (m)	234.54	234.54	234.54	234.54	234.54	234.54	234.54	234.54	234.54	234.54	234.54	234.54
	Depth to Leachate (m)	4.44	4.05	4.02	3.98	4.09	3.96	4.01	4.19	4.20	4.16	4.12	3.99
	Manhole Leachate Elevation (m)	230.10	230.49	230.52	230.56	230.45	230.58	230.53	230.35	230.34	230.38	230.42	230.55
Manhole 48	Top of Manhole Elevation (m)	234.48	234.48	234.48	234.48	234.48	234.48	234.48	234.48	234.48	234.48	234.48	234.48
	Depth to Leachate (m)	3.53	3.70	3.63	3.86	3.64	3.66	3.39	3.66	3.70	3.69	3.53	3.71
	Manhole Leachate Elevation (m)	230.95	230.78	230.85	230.62	230.84	230.82	231.09	230.82	230.78	230.79	230.95	230.77
Bio	Top of Manhole Elevation (m)	234.18	234.18	234.18	234.18	234.18	234.18	234.18	234.18	234.18	234.18	234.18	234.18
	Depth to Leachate (m)	4.27	3.54	4.24	3.88	1.42	2.74	1.72	1.16	5.04	4.53	4.33	3.87
	Manhole Leachate Elevation (m)	229.91	230.64	229.94	230.30	232.76	231.44	232.46	233.02	229.14	229.65	229.85	230.31
Riser 1	Top of Riser Elevation (m)	234.97	234.97	234.97	234.97	234.97	234.97	234.97	234.97	234.97	234.97	234.97	234.97
	Depth to Leachate (m)	21.64	15.95	4.36	16.30	15.12	16.10	18.48	22.86	20.65	17.34	16.00	17.80
	Riser Leachate Elevation (m)	213.33	219.02	230.61	218.67	219.85	218.87	216.49	212.11	214.32	217.63	218.97	217.17

\*could not measure, dangerous gas concentrations

**APPENDIX I**  
**2024 LEACHATE DATA**



2024 Leachate Monitoring

	Sample Numbers	Criteria*	Q25-MH3	Q25-MH8	Q25-MH13	Q25-MH24	Q25-MH27	Q25-MH31	Q25-MH34	Q25-MH46	Q25-MH47	Q25-MH48	Leachate Tank	BIO 1	RISER 1
			673928/681128	673929/680786	673930/680787	673931/681447	673932/681129	673933/681130	673934/681131	673935/680788	673936/680789	673937/680790	673927/681446	673925/681444	673926/681445
			Units	Criteria*	Jul-24	Jul-24	Jul-24	Aug-24	Jul-24	Jul-24	Jul-24	Jul-24	Jul-24	Jul-24	Aug-24
<b>Field Parameters</b>															
pH	units		6.94	7.02	6.25	7.68	7.85	7.13	6.71	7.38	6.34	7.83	8.12	6.38	7.97
Turbidity	ntu		>1000	131	35.2	>1000	4.11	81.6	15.1	>1000	623	114	>1000	4.80	348
Specific Conductivity	uS/cm		14,690	12,410	2,447	11,720	1,034	14,350	14,030	21,700	35,890	26,100	18,960	2,429	19,180
Temperature	°C		15.1	16.7	18.0	15.8	20.9	18.0	18.5	19.3	13.5	15.2	20.4	21.0	17.3
<b>Inorganic Parameters</b>															
Alkalinity - Bicarbonate	mg/L		5,280	4,490	674	3,120	470	4,690	3,090	8,880	14,500	9,840	7,970	94	7,780
Alkalinity - Carbonate	mg/L		<-3.0	<-3.0	<-3.0	<-3.0	<-3.0	<-3.0	<-3.0	<-3.0	<-3.0	<-3.0	<-3.0	<-3.0	<-3.0
Alkalinity - Hydroxide	mg/L		<-3.0	<-3.0	<-3.0	<-3.0	<-3.0	<-3.0	<-3.0	<-3.0	<-3.0	<-3.0	<-3.0	<-3.0	<-3.0
Alkalinity - Total	mg/L		5,280	4,490	674	3,120	470	4,690	3,090	8,880	14,500	9,840	7,970	94	7,780
Hardness (as CaCO3)	mg/L		463	578	500	599	215	471	365	388	10,700	249	958	57	293
pH	units		7.03	7.09	6.38	6.85	7.76	7.25	6.94	7.34	6.29	8.00	7.50	7.30	7.29
Specific Conductivity	uS/cm		12,400	10,200	1,890	6,250	770	11,800	10,200	17,900	32,700	22,700	15,700	419	17,000
Turbidity	ntu		106	173	14.1	392	1.89	79.8	212	82.2	617	102	215	3.01	256
Total Dissolved Solids	mg/L		7,030	5,870	1,710	4,220	619	6,580	6,190	8,990	65,300	14,200	10,200	356	8,740
Total Suspended Solids	mg/L		185	212	26	11390	3	21	37	205	1057	73	877	<-3.0	168
Total Solids	mg/L		7,210	6,080	1,740	15,600	622	6,600	6,230	9,190	66,400	14,300	11,100	358	8,900
Chloride (dissolved)	mg/L	2,300*	1,680	1,210	107	585	11.0	1,540	2,170	1,870	2,800	2,170	1,720	22.2	1,730
Sulphate (dissolved)	mg/L		20.0	249	434	660	50.5	36.0	1.0	<-0.4	988	4.0	<-0.4	1.8	19.0
<b>Other</b>															
Cyanide (CN)	mg/L	0.066	0.0180	0.0050	<0.0050	<0.0100	<0.0050	0.0174	<0.0100	<0.0050	<0.0200	<0.0200	0.0227	<0.0050	0.0169
<b>Nutrients</b>															
Dissolved Ammonia	mg/L		551	591	4.17	337	0.397	520	280	1180	2,170	1,200	1,080	2.59	892
Nitrate Nitrite Nitrogen	mg/L		0.195	0.164	0.014	0.123	0.710	2.89	0.471	0.260	0.056	0.268	0.258	4.24	0.699
Total Kjeldahl Nitrogen	mg/L		808	670	9.5	390	1.3	827	400	1,770	3,290	43,100	1,240	6.9	930
Phosphorus (Total)	mg/L		2.4391	2.4463	0.2133	2.3018	0.2577	2.4851	1.0562	7.4855	30.4060	5.8353	10.5940	1.2937	7.5244
<b>Organic Indicators</b>															
Biological Oxygen Demand	mg/L		63	46	<24	54	<3	59	55	<285	26,300	5,320	1,250	<3	137
Chemical Oxygen Demand	mg/L		1,400	1,030	216	608	84	1,300	756	1,310	76,800	9,320	6,400	94	1,900
<b>Metals - Total</b>															
Total Arsenic (As)	mg/L	1.9	ns												
Total Barium (Ba)	mg/L	29	ns												
Total Beryllium (Be)	mg/L	0.067	ns												
Total Cadmium (Cd)	mg/L	0.0027	ns												
Total Calcium (Ca)	mg/L		185.56	231.57	200.25	223.54	86.20	188.65	146.01	155.26	4325.3	383.72	99.70	22.66	115.67
Total Chromium (Cr)	mg/L	0.81	ns												
Total Chromium (Hexavalent)	mg/L	0.14	<-0.00250	<-0.00250	<-0.00050	<-0.00250	<-0.00250	<-0.00250	<-0.00250	<-0.00250	<-0.010	<-0.00250	<-0.00250	<-0.00050	<-0.00250
Total Copper (Cu)	mg/L	0.087	ns												
Total Iron (Fe)	mg/L		ns												
Total Lead (Pb)	mg/L	0.025	ns												
Total Magnesium (Mg)	mg/L		398.45	374.60	114.04	240.01	43.777	377.51	409.01	408.85	733.48	312.15	281.64	10.435	476.08
Total Manganese (Mn)	mg/L		ns												
Total Mercury (Hg)	mg/L	0.0028	0.0000166	0.0000055	0.0000116	<-0.00010	0.0000078	0.0000176	0.0000123	<-0.0000050	0.0001220	<-0.0000500	0.0000112	<-0.0000050	0.000033
Total Nickel (Ni)	mg/L	0.49	ns												
Total Potassium (K)	mg/L		361.93	221.95	8.52	175.33	14.65	331.01	164.68	617.45	1446.20	467.23	1051.60	38.98	402.96
Total Silver (Ag)	mg/L	0.0015	ns												
Total Sodium (Na)	mg/L	2,300	1,250.5	874.7	68.9	538.9	21.1	1,161.8	1,116.4	1,651.9	3,139.5	1,464.7	2,022.8	13.8	1,690.6
Total Zinc (Zn)	mg/L	1.1	ns												
<b>Metals - Dissolved</b>															
Dissolved Arsenic (As)	mg/L	1.9	0.0147	0.0103	0.0097	0.0226	0.0022	0.0139	0.0071	0.0488	0.0473	0.0547	0.0427	0.0036	0.0462
Dissolved Barium (Ba)	mg/L	29	0.4970	0.4582	0.1557	0.2457	0.1244	0.4384	0.7025	0.2685	0.1426	0.0242	0.4742	0.0225	0.2793
Dissolved Beryllium (Be)	mg/L	0.067	<-0.0002	<-0.0002	0.0007	0.0011	<-0.0002	<-0.0002	<-0.0002	<-0.0002	<-0.0002	<-0.0002	<-0.0002	0.0004	<-0.0002
Dissolved Cadmium (Cd)	mg/L	0.0027	0.000255	0.000359	0.000180	0.000061	0.000064	0.000496	0.000119	0.000378	0.001028	0.000273	0.000305	0.000042	0.000239
Dissolved Calcium (Ca)	mg/L		194.00	248.10	204.20	233.40	93.99	199.80	148.80	164.70	4615.00	108.40	406.50	24.52	115.30
Dissolved Chromium (Cr)	mg/L	0.81	0.11609	0.05315	0.01248	0.02991	0.00953	0.12979	0.03494	0.16416	0.41569	0.2843	0.22300	0.01129	0.16395
Dissolved Copper (Cu)	mg/L	0.087	0.01729	0.01220	0.01521	0.00536	0.01218	0.00670	0.03113	0.00982	0.01998	0.01256	0.01212	0.01220	0.01843
Dissolved Iron (Fe)	mg/L		11.020	2.832	4.978	4.060	0.126	9.974	17.420	3.813	298.300	2.392	32.560	0.473	5.255
Dissolved Lead (Pb)	mg/L	0.025	0.00552	0.00210	0.00397	0.00184	0.00006	0.01344	0.00464	0.00184	0.00274	0.00086	0.01187	0.00060	0.00773
Dissolved Magnesium (Mg)	mg/L		428.40	427.20	122.60	242.20	50.320	393.60	466.30	440.50	835.30	312.8	318.20	11.310	392.50
Dissolved Manganese (Mn)	mg/L		0.360	0.415	0.495	0.624	0.069	0.375	0.212	0.362	17.619	0.3393	3.090	0.083	0.246
Dissolved Nickel (Ni)	mg/L	0.49	0.35282	0.39913	0.26241	0.38426	0.28124	0.61238	0.28181	0.56028	1.55440	0.55774	0.58449	0.30881	0.75011
Dissolved Potassium (K)	mg/L		404.90	261.30	10.75	189.30	16.63	375.00	202.70	611.40	1648.00	1129.00	509.20	46.43	328.10
Dissolved Selenium (Se)	mg/L	0.063*	0.0113	0.0100	0.0010	0.0042	0.0003	0.0096	0.0091	0.0080	0.0080	0.0103	0.0138	0.0006	0.0091
Dissolved Silver (Ag)	mg/L	0.0015	<-0.0050	<-0.0050	<-0.0050	<-0.0050	<-0.0050	<-0.0050	<-0.0050	<-0.0050	0.008700	<-0.0050	<-0.0050	<-0.0050	<-0.0050
Dissolved Sodium (Na)	mg/L	2,300	1,389.0	1,024.0	74.1	569.6	23.9	1,233.0	1,214.0	1,853.0	3,634.0	1,464.7	2,022.8	14.4	1,810.0
Dissolved Zinc (Zn)	mg/L	1.1	0.1186	0.0435	0.0222	0.0216	0.0161	0.0916	0.0317	0.1465	1.1520	0.1262	0.1687	0.0741	0.1075
<b>Extractables</b>															
Benzo (a) Pyrene (PAH)	ug/L	0.81	0.0056	1.36	7.15	2.88	0.067	0.0194	0.199	<-4.0	<-4.0	<-4.0	0.0511	<-0.125	<-2.0
Anthracene	ug/L	2.4	<-1.0	1.83	4.74	26.5	<-0.20	<-4.0	4.5	<-4.0	<-10.0	<-4.0	0.51	<-0.20	<-2.0
4'4' Methylenebis 2 Chloroaniline	ug/L		<-1.65	<-0.50	<-0.50	<-0.50	<-0.50	<-1.60	<-0.95	<-1.15	<-0.95	<-1.15	<-0.50	<-0.50	<-6.0
Benzo (a) anthracene (PAH)	ug/L	4.7	<-1.0	2.95	2.44	9.64	<-0.20	<-4.0	1.27	<-4.0	<-10.0	<-4.0	<-0.40	<-0.20	<-2.0
Benzo (b,j) fluoranthene (PAH)	ug/L		<-1.0	1.18	5.91	3.63	0.130	0.028	0.037	<-4.0	<-4.0	<-4.0	0.064	<-0.12	<-2.0
Benzo (g,h,i) Perylene (PAH)	ug/L	0.2	<-1.0	0.076	0.187	1.79	0.024	<-4.0	0.393	<-4.0	<-10.0	<-4.0	0.016	<-0.010	<-0.010
Hexachlorobenzene	ug/L	3.1	<-0.0080	<-0.040	<-0.040	<-0.0080	<-0.0080	<-0.0080	<-0.0080	<-0.040	<-0.040	<-0.040	<-0.0080	<-0.0080	<-0.0080
Phenanthrene	ug/L	580													



2024 Leachate Monitoring

	Sample Numbers	Criteria*	LQ25-MH3	LQ25-MH8	LQ25-MH13	LQ25-MH24	LQ25-MH27	LQ25-MH31	LQ25-MH34	LQ25-MH46	LQ25-MH47	LQ25-MH48	Leachate Tank	BIO 1	RISER 1
			673928/681128	673929/680786	673930/680787	673931/681447	673932/681129	673933/681130	673934/681131	673935/680788	673936/680789	673937/680790	673927/681446	673925/681444	673926/681445
	Units		Jul-24	Jul-24	Jul-24	Aug-24	Jul-24	Jul-24	Jul-24	Jul-24	Jul-24	Jul-24	Aug-24	Aug-24	Aug-24
<b>Petroleum Hydrocarbons</b>															
CCME Petroleum Hydrocarbon Fraction F1	mg/L	0.75	0.38	0.16	0.55	0.31	<0.10	0.12	0.39	0.28	2.54	0.2	0.28	<0.10	0.14
CCME Petroleum Hydrocarbon Fraction F2	mg/L	0.15	1.30	1.82	0.51	4.08	<0.10	0.69	1.23	1.47	nr	2.37	1.12	<0.10	1.40
CCME Petroleum Hydrocarbon Fraction F3	mg/L	0.50	<0.25	1.30	0.57	21.4	<0.25	<0.25	0.26	0.61	nr	1.05	0.41	<0.25	0.65
CCME Petroleum Hydrocarbon Fraction F4	mg/L	0.50	<0.25	<0.25	<0.25	2.71	<0.25	<0.25	<0.25	<0.25	nr	<0.25	<0.25	<0.25	<0.25
<b>Volatile Organic Carbons</b>															
Vinyl Chloride	ug/L	1.7	<0.50	<0.50	<0.50	0.65	<0.50	<0.50	<0.50	1.12	<0.50	<0.50	0.59	<0.50	<0.50
1,4 Dichlorobenzene	ug/L	67	12.1	6.98	18.7	4.16	<0.50	4.21	2.16	2.21	<0.50	<0.50	0.72	<0.50	0.73
Chloroform	ug/L	22	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene	ug/L	17	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene	ug/L	17	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
<b>Dioxins and Furans</b>															
2378 TeCDD	ng/L	14											<0.67		
12378 PeCDD	ng/L	14											<1.80		
123478 HxCDD	ng/L	14											<1.50		
123678 HxCDD	ng/L	14											12.0		
123789 HxCDD	ng/L	14											4.4		
1234678 HpCDD	ng/L	14											425		
OCDD	ng/L	14											3,460		
Total TCDDs	ng/L	14											2.76		
Total PeCDD	ng/L	14											14.9		
Total HxCDD	ng/L	14											158		
Total HpCDD	ng/L	14											950		
2378 TeCDF	ng/L	14											<0.63		
12378 PeCDF	ng/L	14											<1.10		
23478 PeCDF	ng/L	14											<0.84		
123478 HxCDF	ng/L	14											2.41		
123678 HxCDF	ng/L	14											1.77		
123789 HxCDF	ng/L	14											<0.71		
234678 HxCDF	ng/L	14											1.20		
1234678 HpCDF	ng/L	14											34.2		
1234789 HpCDF	ng/L	14											2.30		
OCDF	ng/L	14											45.1		
Total TCDF	ng/L	14											6.66		
Total PeCDF	ng/L	14											3.60		
Total HxCDF	ng/L	14											36.4		
Total HpCDF	ng/L	14											88.9		
<b>Polychlorinated Biphenyls</b>															
Aroclor 1016	ug/L		<0.020	<1.39	<0.050	<0.055	<0.020	<0.020	<0.020	<0.090	<0.20	<0.050	<0.051	<0.020	<0.050
Aroclor 1221	ug/L		<0.020	<1.39	<0.050	<0.055	<0.020	<0.020	<0.020	<0.090	<0.20	<0.050	<0.051	<0.020	<0.050
Aroclor 1232	ug/L		<0.020	<1.39	<0.050	<0.055	<0.020	<0.020	<0.020	<0.090	<0.20	<0.050	<0.051	<0.020	<0.050
Aroclor 1242	ug/L		0.463	<1.39	<0.050	<0.055	<0.020	0.527	<0.020	<0.090	<0.20	<0.050	<0.051	<0.020	<0.050
Aroclor 1248	ug/L		<0.020	<1.39	<0.050	<0.055	<0.020	<0.020	<0.020	<0.090	<0.20	<0.050	<0.051	<0.020	<0.050
Aroclor 1254	ug/L		<0.026	<0.074	<0.050	<0.020	<0.020	<0.046	<0.020	<0.090	<0.20	<0.050	<0.020	<0.020	<0.050
Aroclor 1260	ug/L		<0.040	<0.060	<0.070	<0.020	<0.020	<0.040	<0.040	<0.100	<0.20	<0.100	<0.080	<0.020	<0.080
Total PCBs	ug/L	15	0.463	<3.11	<0.172	<0.129	<0.060	0.527	<0.085	<0.280	<0.60	<0.212	<0.180	<0.060	<0.185
<b>Pesticides and Herbicides</b>															
Diazinon	ug/L		<0.025	nr	nr	nr	<0.025	<0.025	<0.025	nr	nr	nr	nr	nr	nr
2, 4-D	ug/L		<10.0	<10.0	<2.50	<10.0	<2.50	<10.0	<10.0	<10.0	36.1	<25.0	<25.0	<0.50	<50.0
Aldrin	ug/L	8.5	<0.008	<0.040	<0.040	<0.008	<0.008	<0.008	<0.008	<0.040	<0.040	<0.040	<0.008	<0.008	<0.008
gamma-Hexachlorocyclohexane (Lindane)	ug/L	1.2	<0.008	<0.040	<0.040	<0.008	<0.008	<0.008	<0.008	<0.040	<0.040	<0.040	<0.008	<0.008	<0.008
MCPA	ug/L		<10.0	<10.0	<2.50	<10.0	<2.50	<10.0	<10.0	<10.0	<25.0	<25.0	<25.0	<0.50	<50.0
Methoxychlor	ug/L	6.5	<0.008	<0.040	<0.040	<0.008	<0.008	<0.008	<0.008	<0.040	<0.040	<0.040	<0.008	<0.008	0.157
Mirex	ug/L		<0.008	<0.040	<0.040	<0.008	<0.008	<0.008	<0.008	<0.040	<0.040	<0.040	<0.008	<0.008	<0.008
<b>Bacteria</b>															
Total Coliforms	MPN/100mL		7,270	2,480	>24,200	10,500	1,920	9,210	2,610	1,300	>24,200	20	24,200	3,580	4,880
Fecal Coliforms	MPN/100mL		20	30	100	990	<10	40	100	30	>24,200	<10	>24,200	860	70
E. coli	MPN/100mL		30	40	20	820	20	170	100	10	>24,200	10	24,200	520	50

Note: Criteria from Ontario Ministry of the Environment. (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.I of the Environmental Protection Act Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition  
nr - no result, QC Failure

**APPENDIX J**  
**2024 LEACHATE**  
**PIPER DIAGRAMS**

# Site: Brady Location: MH3

Dates:

- 11-Sep-19
- 8-Sep-20
- 10-Aug-21
- 9-Sep-22
- 29-May-23
- 31-Jul-24

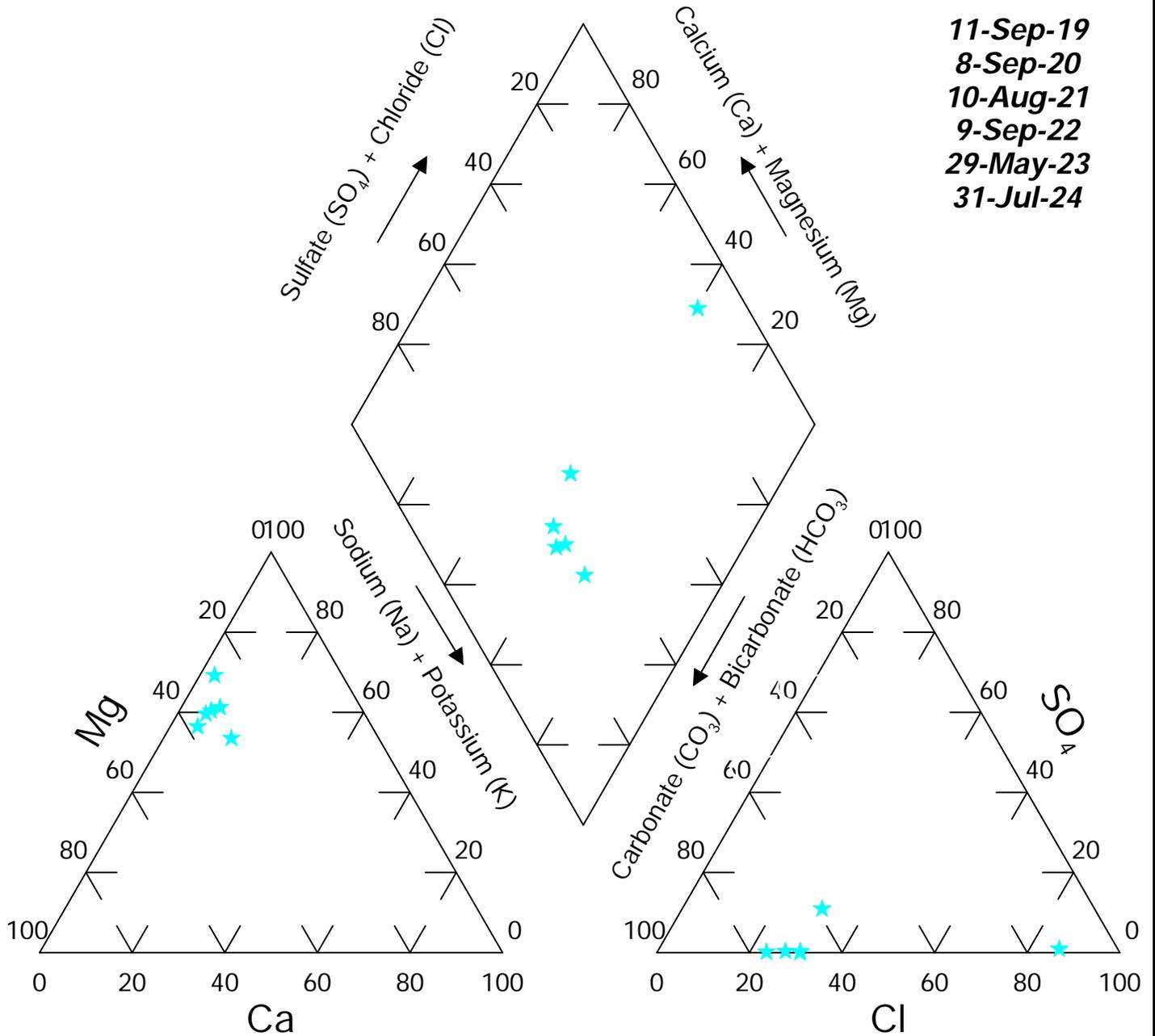


FIGURE: 18P

# Site: Brady Location: MH8

Dates:

- 11-Sep-19
- 9-Sep-20
- 10-Aug-21
- 8-Sep-22
- 25-May-23
- 30-Jul-24

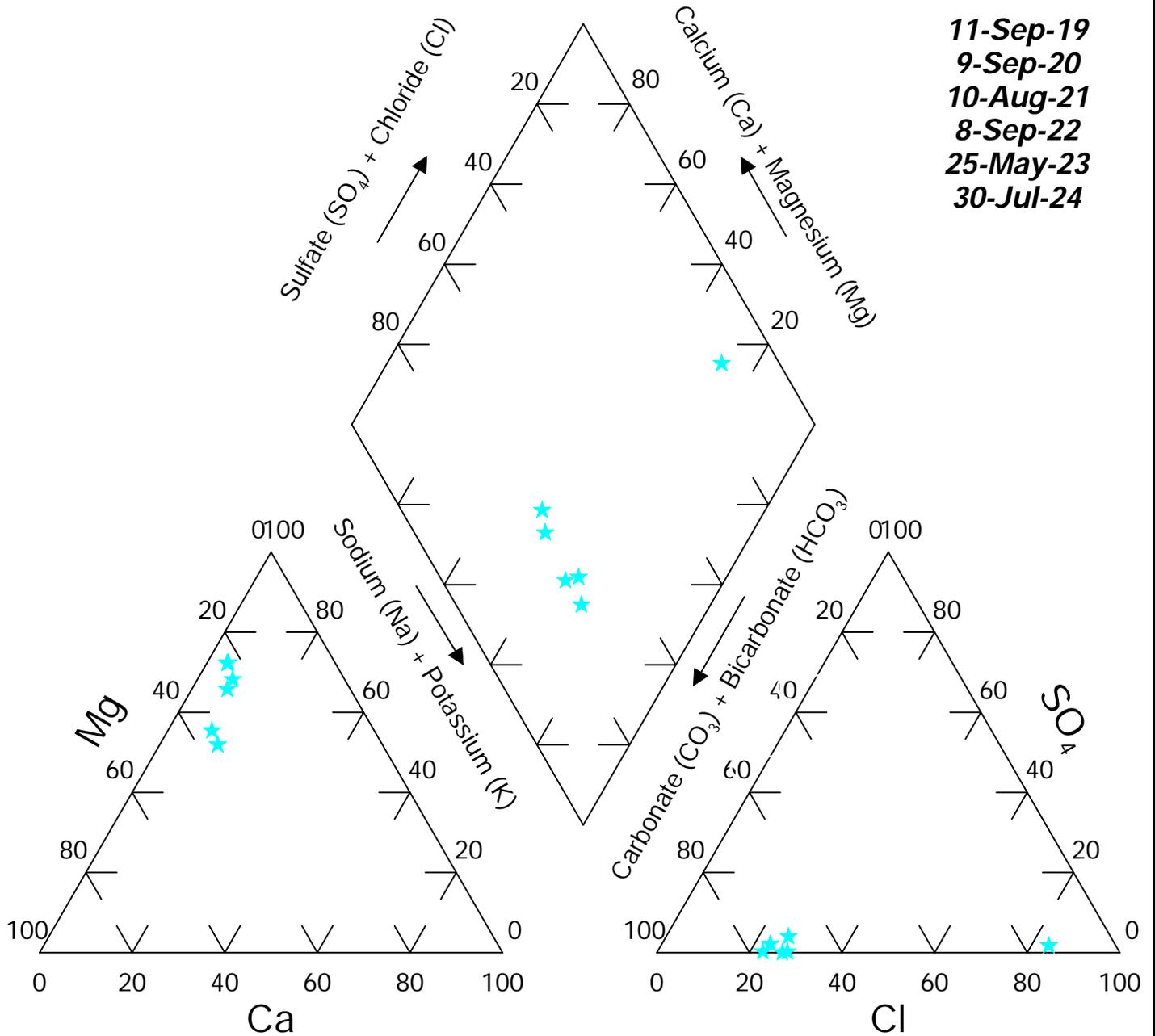


FIGURE: 19P

# Site: Brady Location: MH13

Dates:

- 12-Sep-19
- 8-Sep-20
- 10-Aug-21
- 8-Sep-22
- 25-May-23
- 30-Jul-24

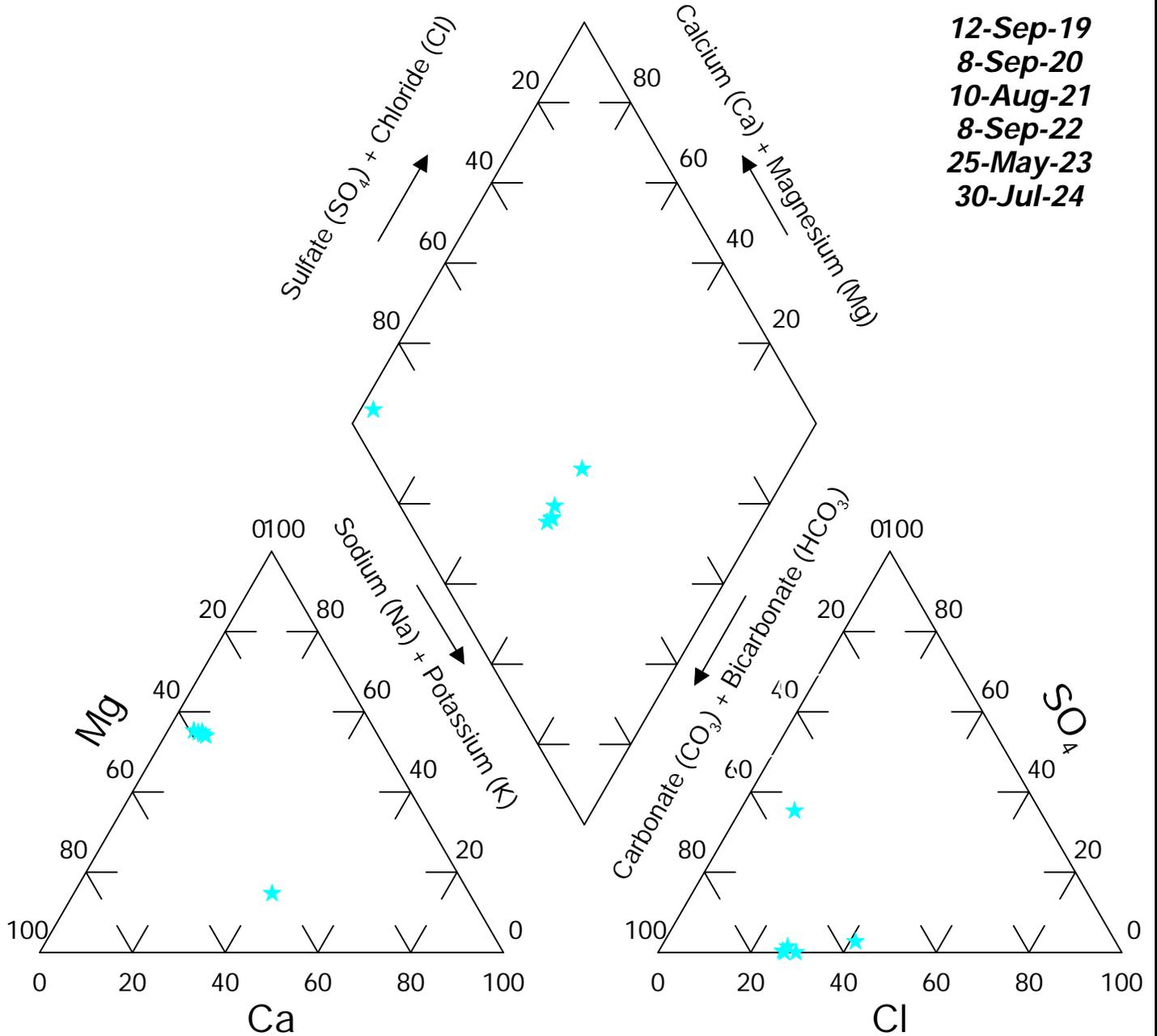
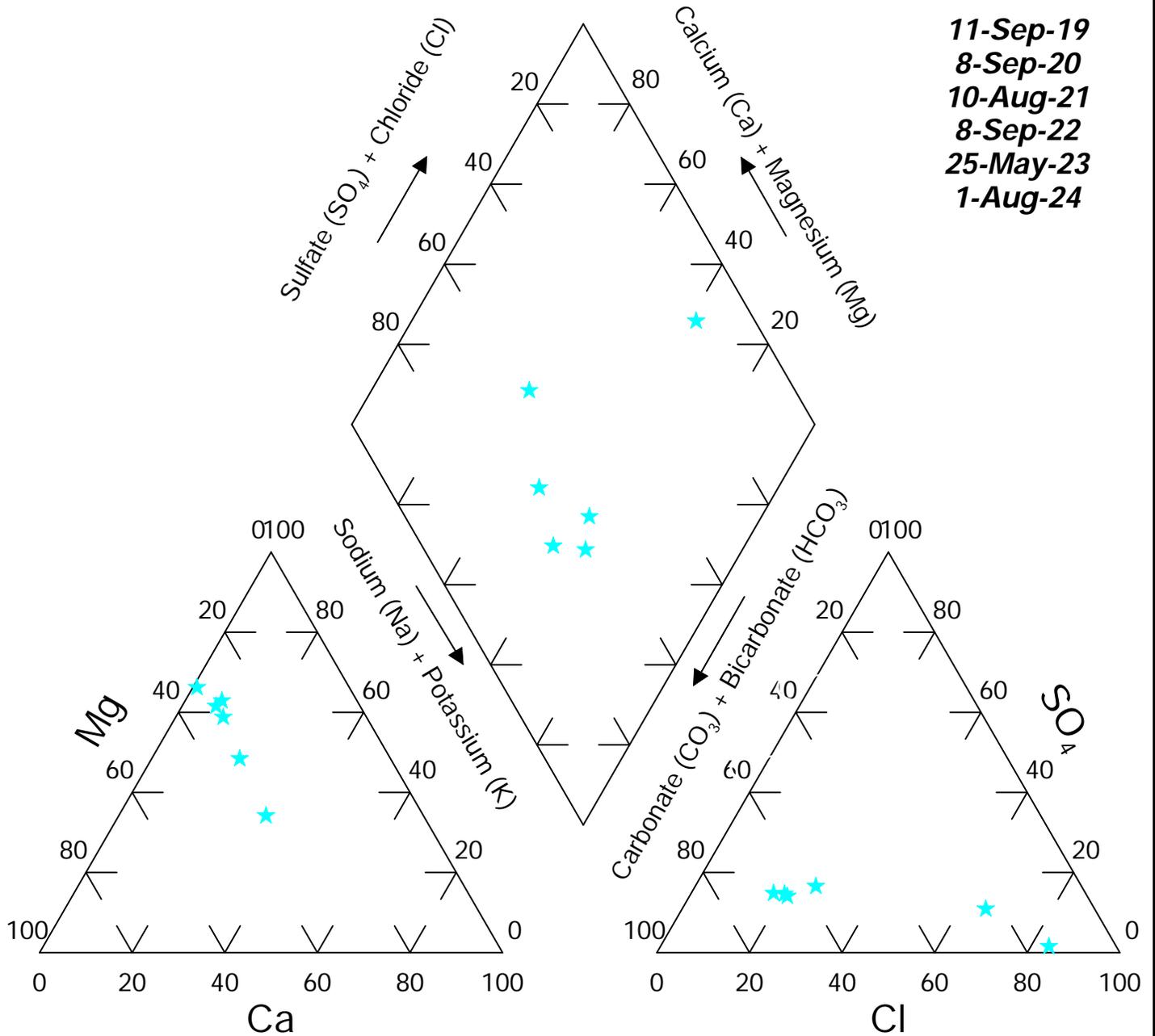


FIGURE: 20P

**Site: Brady**  
**Location: MH24**

**Dates:**

- 11-Sep-19**
- 8-Sep-20**
- 10-Aug-21**
- 8-Sep-22**
- 25-May-23**
- 1-Aug-24**



**FIGURE: 21P**

# Site: Brady Location: MH27

Dates:

- 11-Sep-19
- 8-Sep-20
- 10-Aug-21
- 8-Sep-22
- 30-May-23
- 31-Jul-24

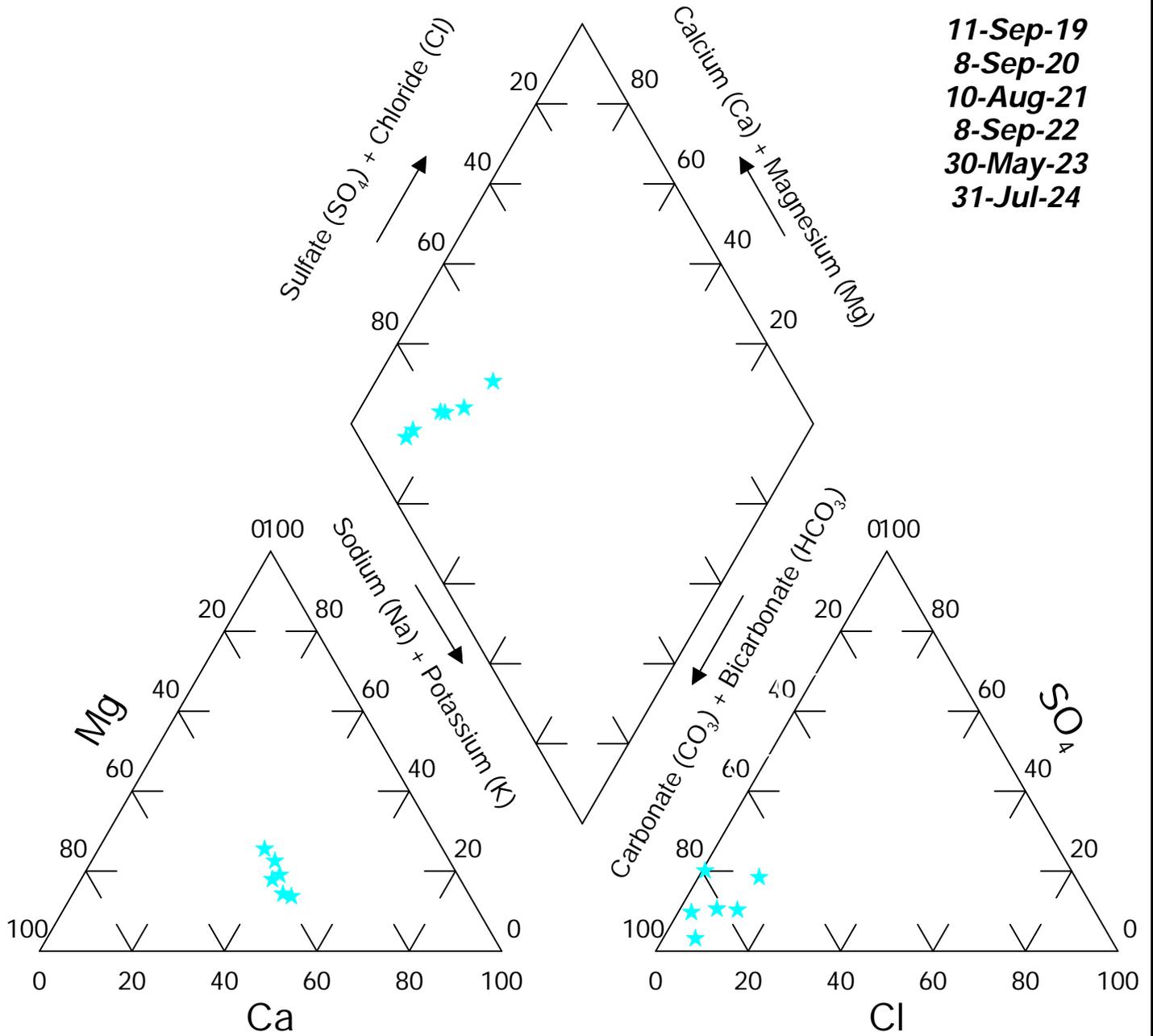


FIGURE: 22P

# Site: Brady Location: MH31

Dates:

- 11-Sep-19
- 8-Sep-20
- 10-Aug-21
- 8-Sep-22
- 1-Jun-23
- 31-Jul-24

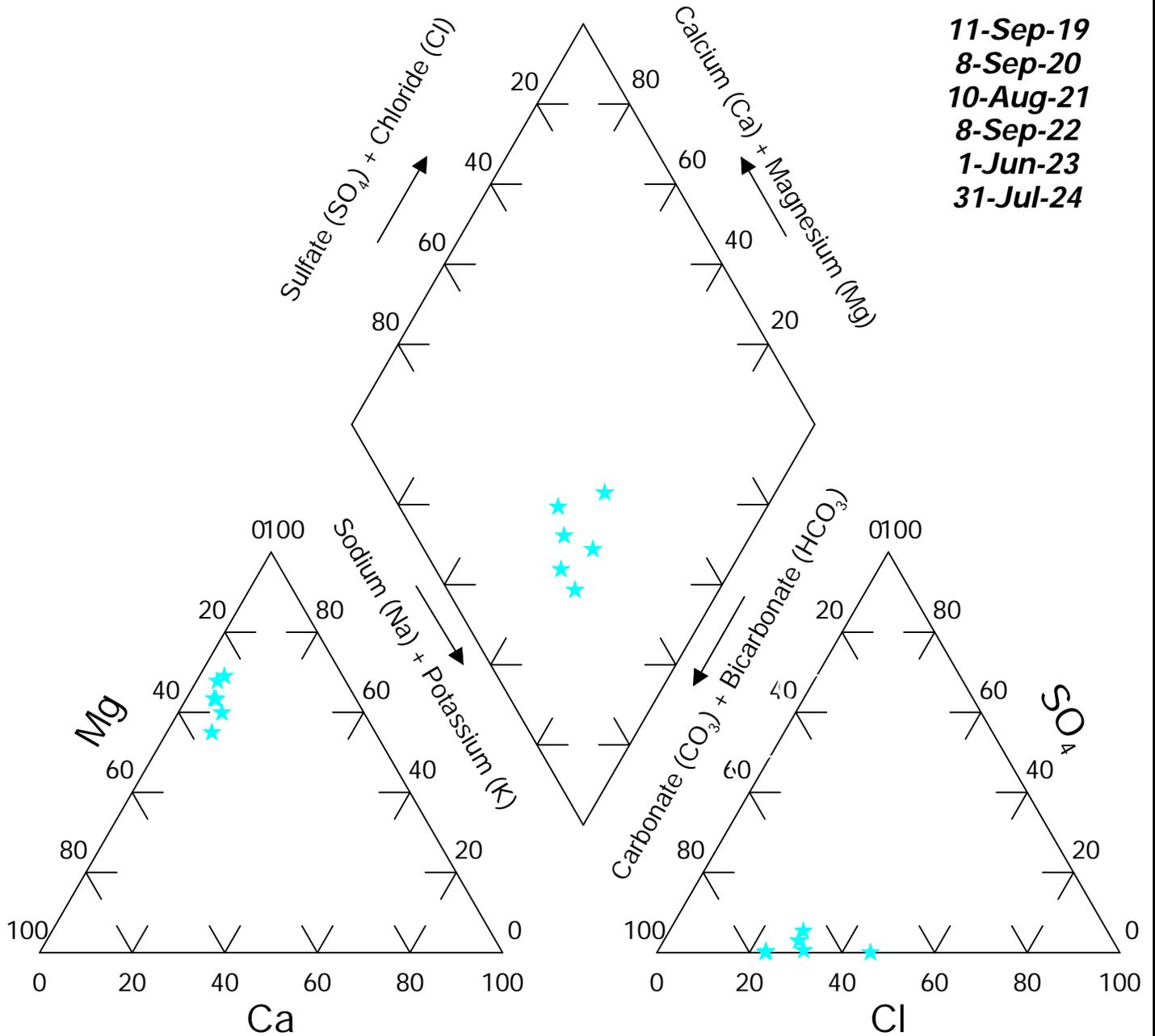
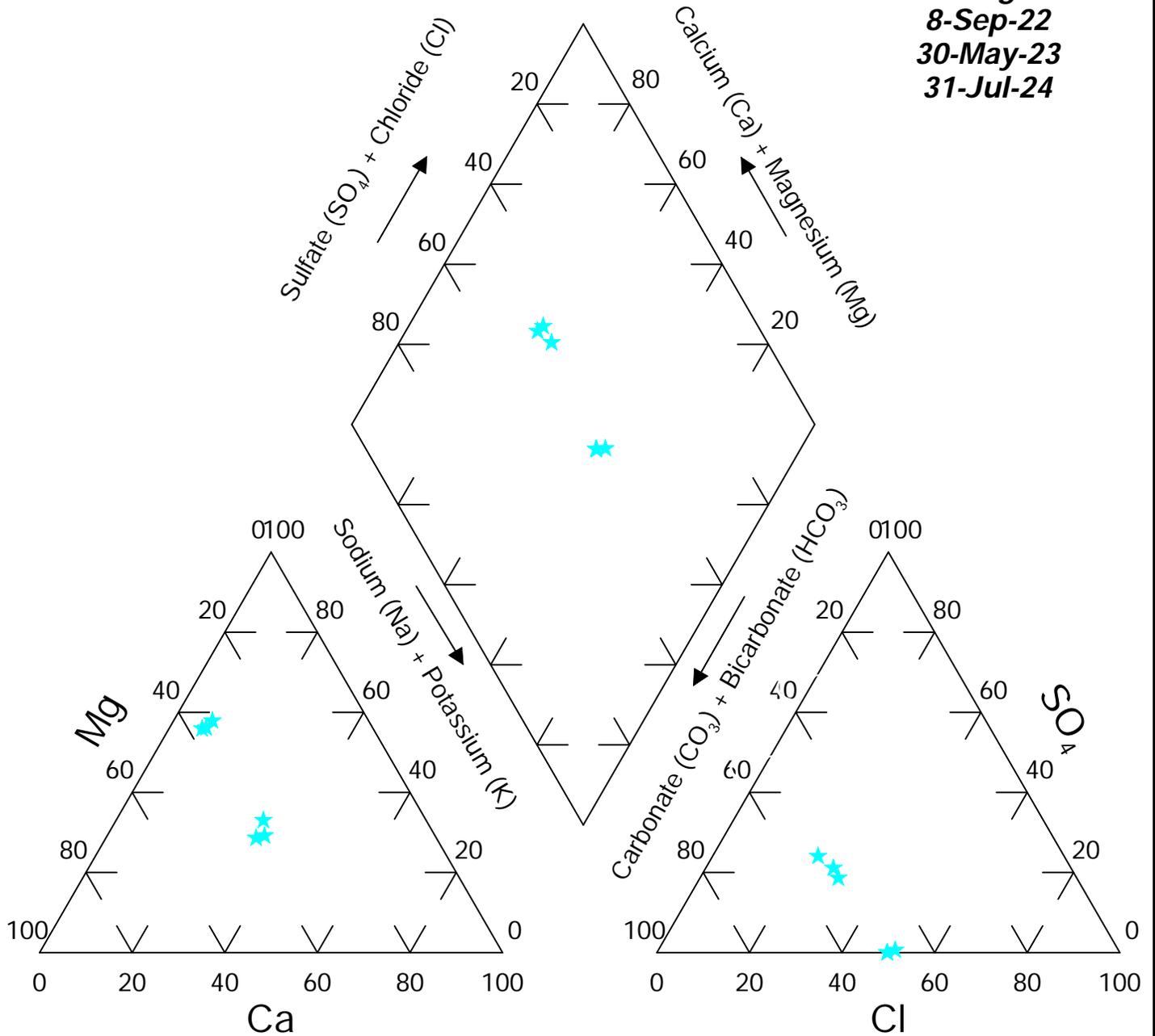


FIGURE: 23P

**Site: Brady**  
**Location: MH34**

**Dates:**

- 11-Sep-19**
- 8-Sep-20**
- 10-Aug-21**
- 8-Sep-22**
- 30-May-23**
- 31-Jul-24**

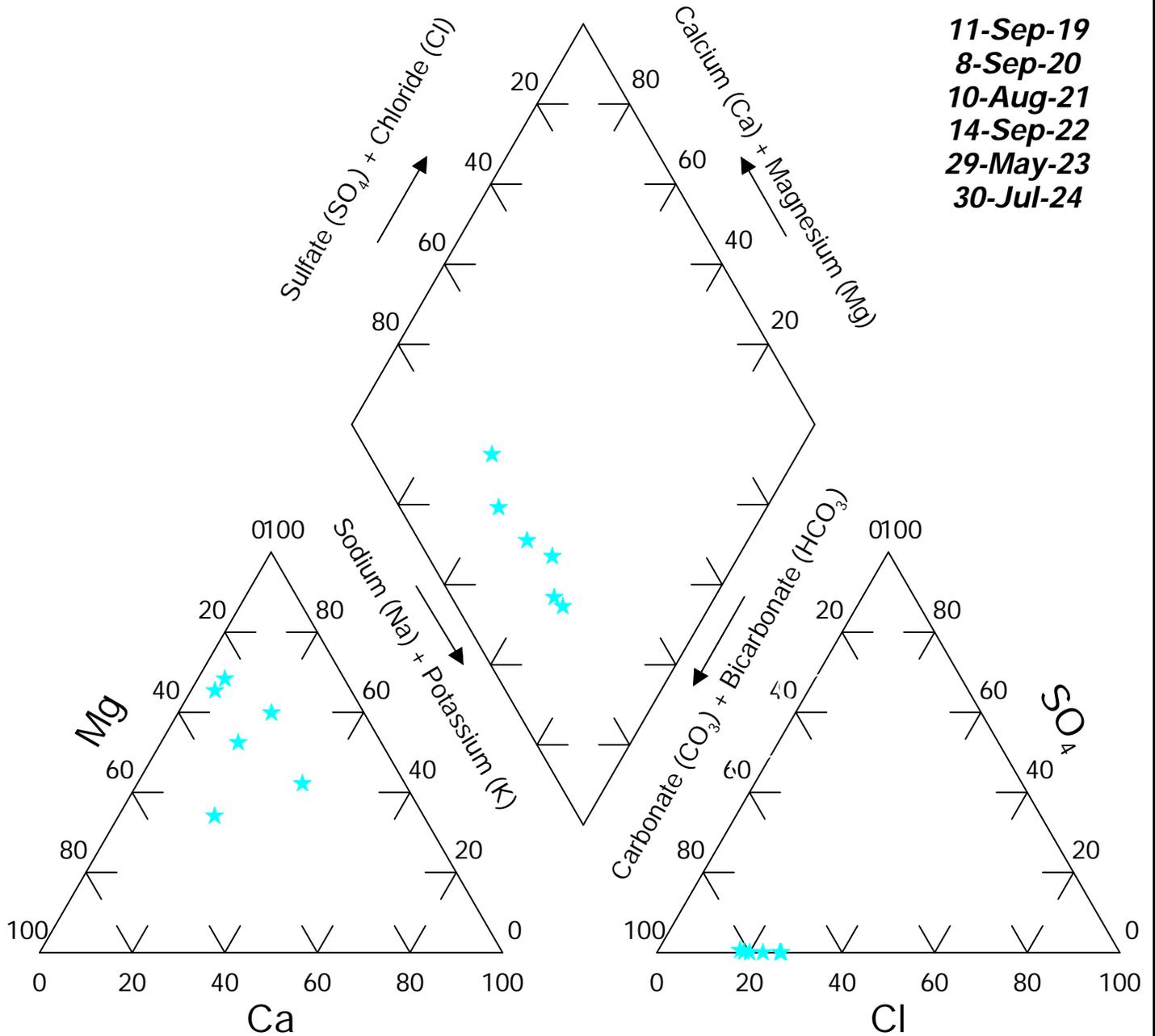


**FIGURE: 24P**

**Site: Brady**  
**Location: MH46**

**Date:**

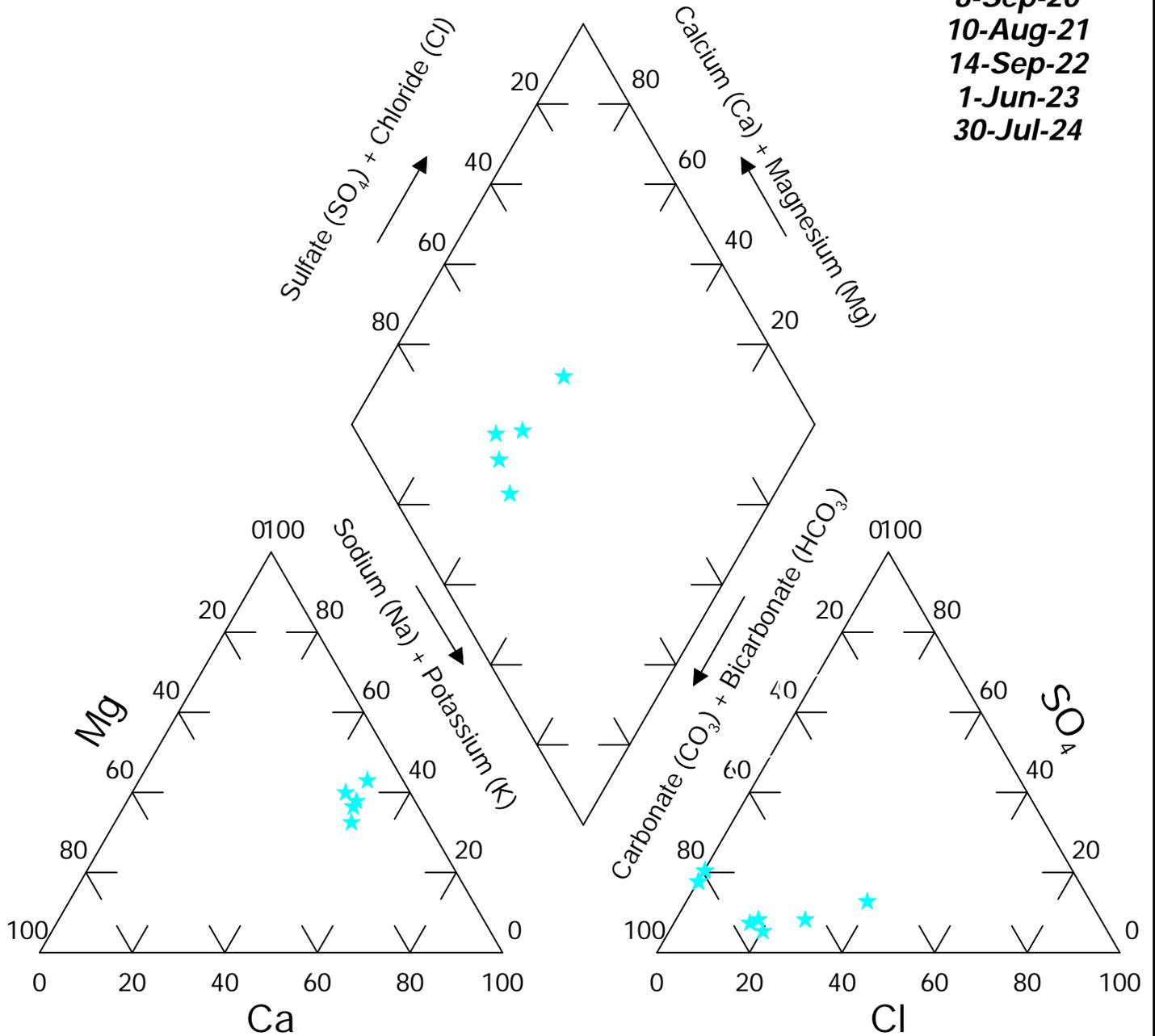
- 11-Sep-19**
- 8-Sep-20**
- 10-Aug-21**
- 14-Sep-22**
- 29-May-23**
- 30-Jul-24**



**FIGURE: 21P**

**Site: Brady**  
**Location: MH47**

**Date:**  
**8-Sep-20**  
**10-Aug-21**  
**14-Sep-22**  
**1-Jun-23**  
**30-Jul-24**



**FIGURE: 21P**

**Site: Brady**  
**Location: MH48**

Date:

1-Jun-23  
 30-Jul-24

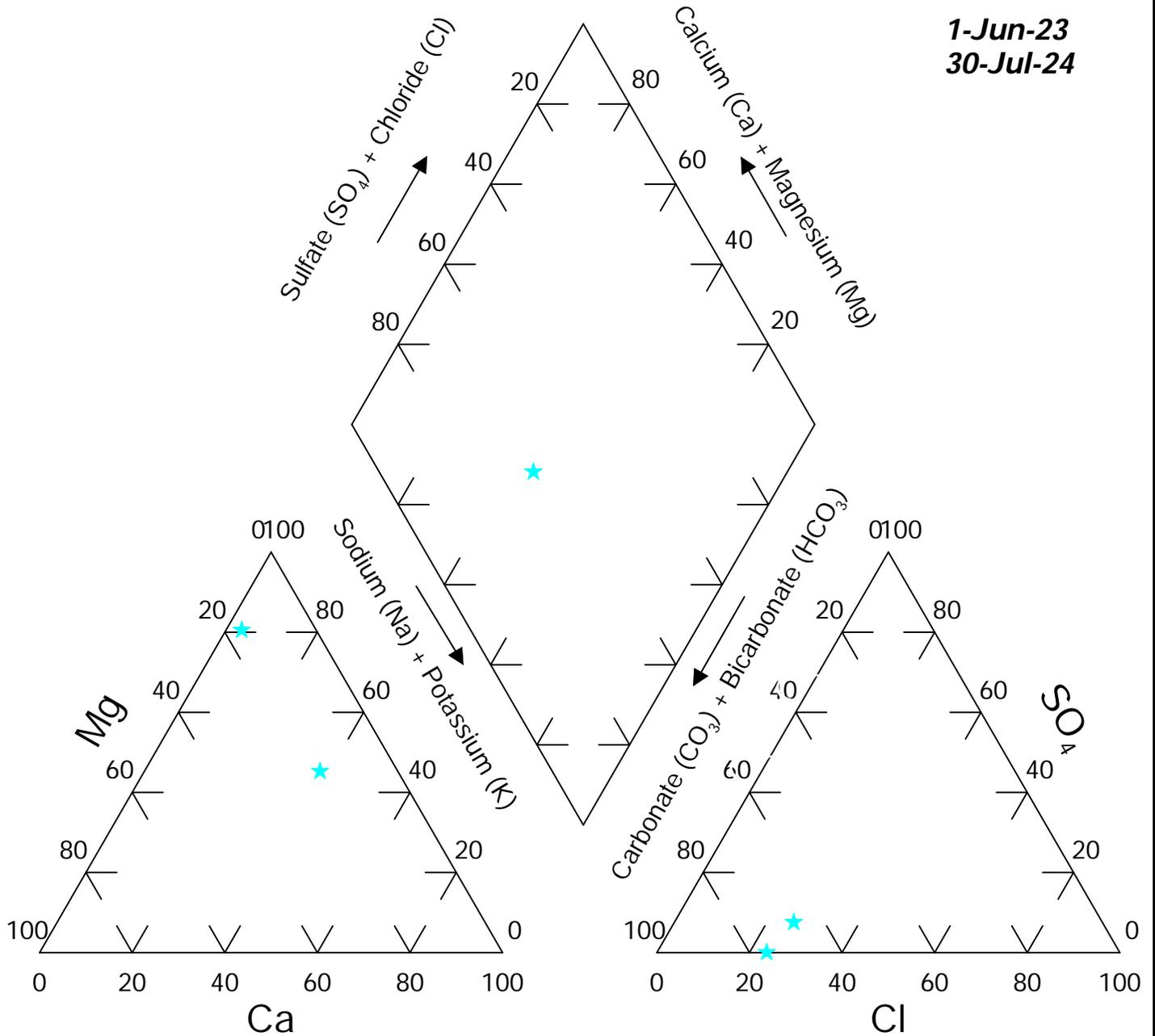


FIGURE: 21P

# Site: Brady Location: MH BIO

Dates:

- 10-Sep-19
- 8-Sep-20
- 10-Aug-21
- 8-Sep-22
- 26-May-23
- 1-Aug-24

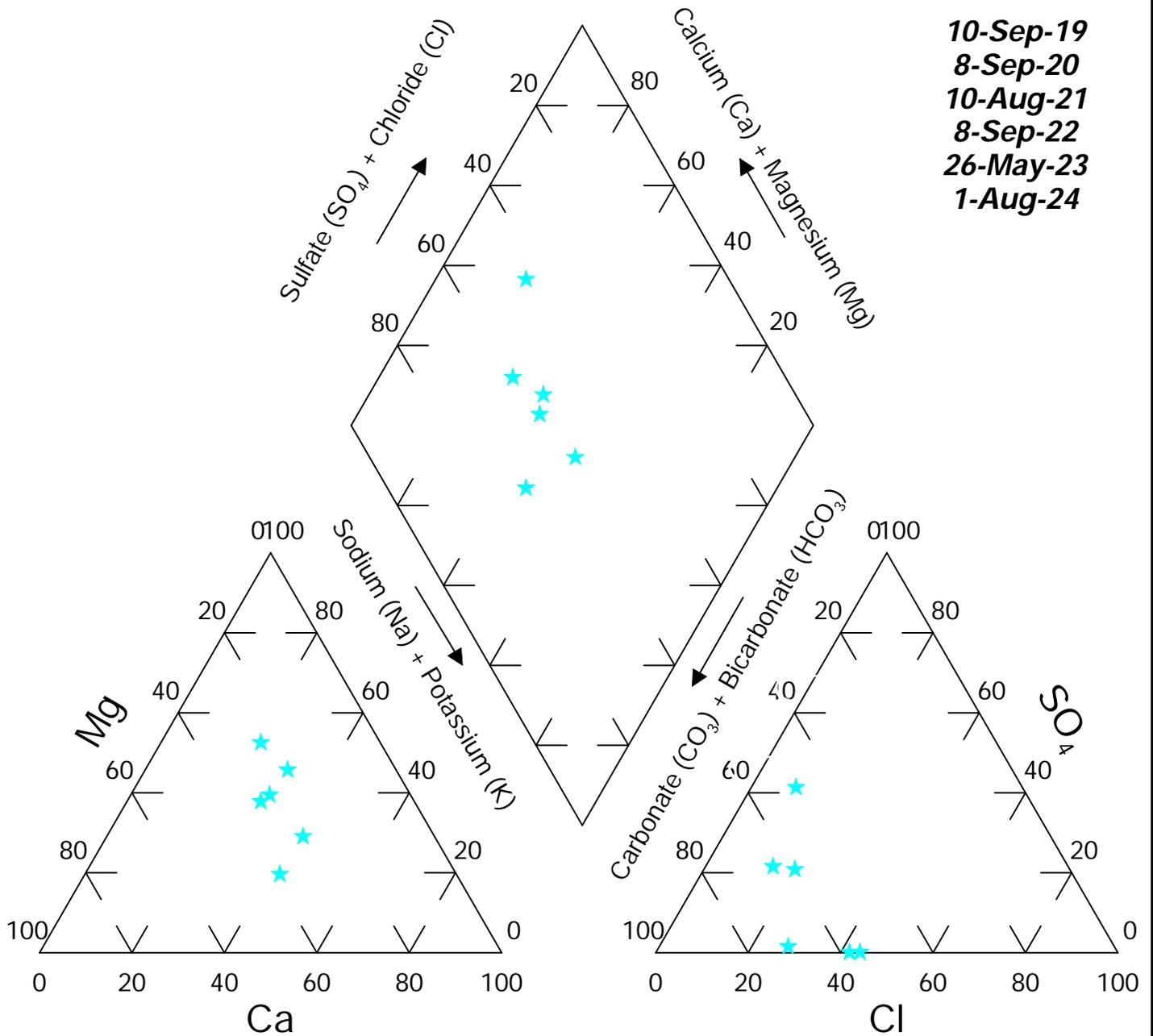


FIGURE: 18P

# Site: Brady Location: *Riser 1*

Dates:

- 10-Sep-19
- 8-Sep-20
- 10-Aug-21
- 14-Sep-22
- 26-May-23
- 1-Aug-24

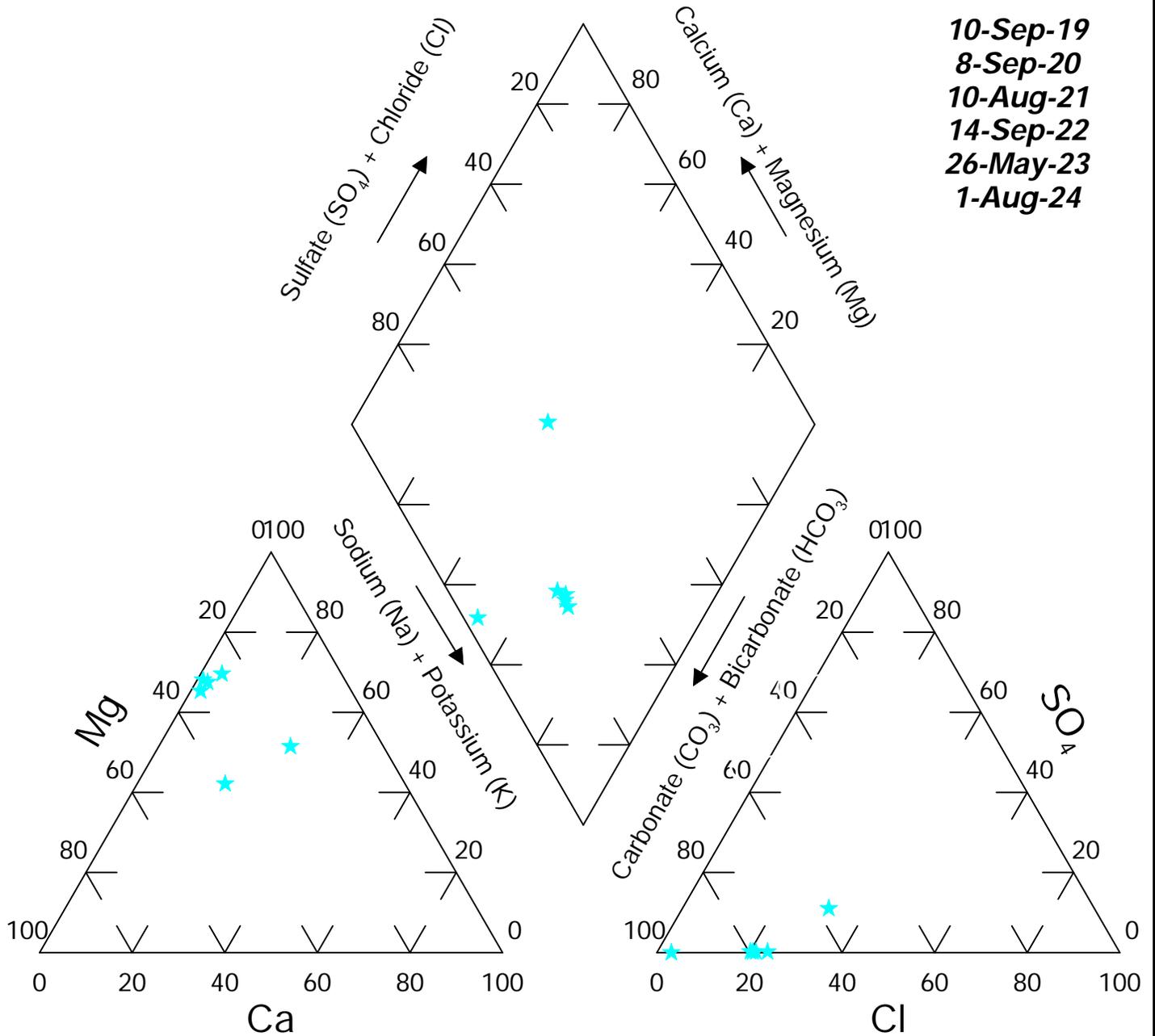


FIGURE: 18P

**APPENDIX K  
2024 LANDFILL GAS  
COLLECTION AND FLARING  
REPORT**



# 2024 ANNUAL MONITORING REPORT BRADY ROAD RESOURCE MANAGEMENT FACILITY LANDFILL GAS COLLECTION AND FLARING SYSTEM

CITY OF WINNIPEG

February 20, 2025

Project No. 468



A Landfill Gas Utilization Company

**2024 ANNUAL MONITORING REPORT  
LANDFILL GAS COLLECTION AND FLARING SYSTEM  
CITY OF WINNIPEG**

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## 1.0 INTRODUCTION

The City of Winnipeg operates the Landfill Gas Collection and Flaring System (LGCFS) at the Brady Road Resource Management Facility in Winnipeg, Manitoba, which operates under Manitoba Conservation Licence 3081. After a commissioning phase, the system became operational full time in August 2013 after approval to operate was received by the Office of the Fire Commissioner.

Operation of the system, including maintenance and monitoring in 2024, was completed by Comcor Environmental Limited (Comcor) on behalf of its partner Integrated Gas Recovery Services (IGRS).

This report outlines work performed and data collected during the operation of the Landfill Gas Collection and Flaring System in 2024.

## 2.0 LANDFILL GAS COLLECTION SYSTEM

There are two main components of the LGCFS that require monitoring. These include:

- Landfill Gas Collection Wellfield
- Mechanical System

The purpose and procedures associated with the monitoring of each of these components are discussed separately below. The recommended monitoring frequency is presented in Table 1.

**Table 1: Summary of Monitoring Frequency**

System Component	Monitoring Frequency
Wellfield Monitoring	Monthly
Remote Mechanical System Monitoring	Weekly
Mechanical System Monitoring	Weekly

### 2.1 Wellfield System Expansions and Repairs

In the fall of 2023 poor gas quality was noted on Lateral 5. Since that time, this lateral has been closed off and isolated from the active collection system, as it is suspected there is a break in the conveyance piping below ground. This has resulted in 10 wells being off line during 2024. In 2024, Comcor worked with the City to prepare a proposal for repair of this lateral, however due to high cost estimates received from contractors, this work will be put to public tender in 2025.

### 2.2 Wellfield System Monitoring

The wellfield system monitoring consists of measuring vacuum/pressure at each well and lateral pipe, the percentage of methane, oxygen and carbon dioxide in the landfill gas, and parts per million of carbon monoxide and hydrogen sulphide at each location. These measurements were



taken using a portable gas meter/analyzer such as a Landtec GEM-5000, or equivalent. Vacuum fluctuations were noted, as it can be an indication of water within the piping system.

Each wellhead was monitored for the velocity of gas using an anemometer. The measured velocities were used to calculate landfill gas flow rates by multiplying the velocity by the pipe cross-sectional area.

The monitoring data collected during the monthly round is beneficial to determine if the wellfield is operating as intended. Changes to the wellhead valve position were made to ensure maximum gas collection from the landfill. The system was monitored and field balanced by a technician experienced in the operation of this type of system.

During 2024, there were no elevated levels of Carbon Monoxide (CO) (>500 ppm). Elevated carbon monoxide within landfill gas can be an indicator of a subsurface fire within the waste. There was no indication of a subsurface fire in 2024.

The wellfield monitoring data and valve positions can be found in Table 2.

Pump counter measurements were recorded on a monthly basis at all active dual-purpose gas/leachate collection wells. During the monthly pump counter measurements, the following items were noted:

- A large number of the pumps were frozen due to the extreme cold and were not functional during most of the winter.
- Various counters were replaced as needed.
- The pump counters at PDT4, PDT5, PDT7 and PDT9 were not functioning throughout the 2024 reporting year due to flooding in the chamber, thus readings were not able to be recorded.

In instances when there was a lack of a functioning pump counter, the pumps were checked on a monthly basis to confirm operation, and most were found to be operating as intended at inspections. Table 3 presents the pump counter measurements recorded at both the pump drain traps and active dual-purpose wells in 2024.

Water level monitoring requirements are for water levels to be measured on a semi-annual basis. In 2024, two additional rounds were completed to total four events in April, July, October and December. Table 4 presents the water levels measured in 2024. The percent of open screen available for gas collection at each well is estimated based on water levels.

Based on pump counters and water levels recorded throughout 2024, dual purpose well pumps continue to remove leachate consistently. In 2024, the average open screen percentage of the monitored dual-purpose wells was 46.7%.

Throughout the year, pumps were inspected and tested for proper operation. While most were in generally good condition, an increasing number of issues were identified. When problems were detected, faulty pumps were replaced with fully functional units where possible. Currently, six wells have pumps that are stuck and cannot be retrieved. To determine why the pumps were stuck, Comcor staff used a camera to visually inspect the wells. Unfortunately, during inspections there was no obvious issue before the camera reached the water table and the camera was no longer sending a clear picture. Comcor also explored adding compressed air to the well to see if the pump was silted in and could be freed up, but unfortunately the wells are too deep for this to be effective.

Throughout the year, gaskets on the air line flanges connecting to the dual-purpose wells have been a recurring issue, frequently failing and resulting in compressed air leaks. These failures have

led to operational inefficiencies and increased maintenance efforts. In response, Comcor has been actively exploring alternative gasket materials and designs to improve durability and performance. Several replacement options are currently undergoing testing to identify the most effective solution for this application, with the goal of enhancing system reliability and reducing future failures.

As the gas collection system ages, winter operations have become increasingly difficult. During the cold winter months, many collection wells freeze, which lowers collection efficiency, and results in lower gas quality and higher vacuum in the collection system. In the fall of 2024, Comcor installed permanent insulation on two wells as a test, to determine if this would be an effective way of preventing freezing. Initial results were good, but Comcor will continue to monitor these wells over the course of the winter.

Starting in the summer of 2024, the gas collection system began experiencing a significant and unexpected shift in both vacuum pressure and methane concentration. Prior to this period, system conditions had remained relatively stable. However, on July 18th, a sudden and substantial influx of water entered the mechanical system, leading to severe operational disruptions.

The excessive water overwhelmed critical components, particularly the blowers, which became flooded. As a direct result, the flaring system was forced to shut down, halting normal gas management operations. This incident marked a turning point in system performance, leading to cascading effects on vacuum levels, methane quality, and overall gas extraction efficiency.

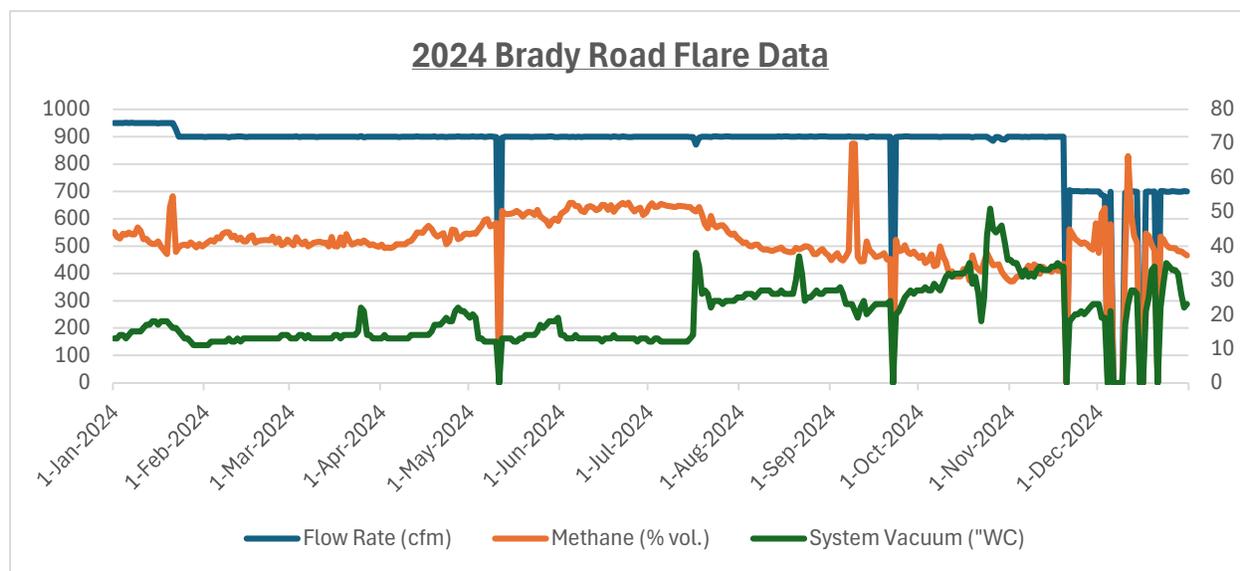


Figure 1: 2024 Brady Road Flare Data

As illustrated in the graph above, methane concentrations were stable prior to the July 18th event, consistently measuring above 40% by volume. However, a dramatic shift occurred following the incident. The system vacuum experienced a sharp and sudden increase, nearly doubling in July. This spike in vacuum pressure indicates a significant change in wellfield conditions, which may have led to the influx of water into the mechanical system.

In the weeks and months following this event, methane concentrations exhibited a gradual yet steady decline. This downward trend persisted as the elevated vacuum continued to impact the system's gas composition and overall performance. By late November, in an effort to stabilize methane levels and ensure consistent flare operation, it became necessary to reduce the system's flow rate set-point. This adjustment was critical in maintaining a sufficient methane concentration for proper combustion and regulatory compliance.

Following the July event, extensive testing was done to attempt to determine the root cause. These steps are outlined below:

- All PDTs were checked and confirmed to be operating correctly.
- All wells were checked to ensure they were intact and not allowing bad gas into the system.
- All laterals were isolated.
- All redundancies were isolated.
- Methane concentrations were monitored at flow controls

Following these tests, no definitive conclusions have been reached, as the results have not shown any significant or lasting improvement in methane quality or system vacuum. Additionally, the source of the large volume of water that entered the system remains unexplained.

Further testing is currently underway to investigate whether the issue may be occurring along the header, where testing is considerably more challenging. Comcor / IGRS will prepare costing and plans for the installation of isolation valves on the gas header, which would allow for further isolation of portions of the system to determine the root cause of the current issues.

### 2.3 Surface Emission Monitoring

As required by the City, surface emission monitoring is requested to be carried out on a quarterly basis, weather conditions permitting, by Comcor. In 2024, the surface emissions monitoring was completed two times due to restrictions with weather conditions. This monitoring is performed using an Elkins Earthworks IRwin or similar with integral GPS, marking locations where concentrations of hydrocarbons were greater than 500 ppm. The surface emission monitoring was completed in May and October for the 2024 reporting year. Several areas were noted where there were significant volumes of gas detected, including areas where the cap was weak and pipe penetrated the landfill cap. The reports from the two surface emission monitoring events in 2024 have been included in Appendix B.

### 2.4 Mechanical System Monitoring

The main operational control of the mechanical system is carried out by the Programmable Logic Controller (PLC). The PLC also provides information on the operating status of the system and records all data electronically which can be downloaded when required. Specific details on these items are included in the Flare Operation and Maintenance Manual. At a minimum the PLC records:

- Landfill gas composition and temperature;
- Flare operating times;
- Blower operating times;
- Landfill gas flow rate;
- Volume of landfill gas collected and flared; and
- Greenhouse Gas Emission Reduction in CO<sub>2</sub> equivalents.

These items were also monitored remotely and were reviewed at minimum on a weekly basis to ensure that all parameters outlined above are being recorded and that all system data indicates that the overall system is operating properly. The system review was carried out by a technician experienced in the operation of such systems.

Comcor staff also carried out the maintenance of the system as outlined by the Operations and Maintenance Manual. There were two other notable maintenance items in 2024.

In September of 2024, the thermal safety valve at the flare developed a large crack. This was an immediate safety concern, as gas could potentially escape, so the flare was shut down. The City assisted Comcor with removing the thermal valve, and welding a temporary repair. A new thermal valve was then ordered and installed in November. No issues have been reported since then.

In late November, early December, the flare began to experience operational issues, with frequent shut-downs. The cause of this was traced back to the UV flame scanner. A new scanner was purchased and installed in December.

Data for 2024 has been compiled, and is found in Appendix A.

### 2.4.1 System Pressure Measurements

Monitoring ports at the inlet and outlet to the blower were measured and recorded on a monthly frequency, using a suitably scaled pressure gauge. Gauge fluctuations were noted, as it can be an indication of water within the system.

Data for 2024 has been compiled and is found in Table 2.

### 2.4.2 System Gas Measurements

The purpose of the main blower skid gas analyzer system is to monitor the oxygen and methane concentrations of the landfill gas being transferred by the LGCFS to the flare. As a safety precaution, if either the oxygen concentration becomes too high, or the methane concentration becomes too low, an alarm is sent to the main computer control panel PLC to shut the system down. Having records of the gas concentrations also allows for better analysis of the system and aids in troubleshooting when problems arise.

A pump, located within the gas analyzer system cabinet in the control room, is used to draw a continuous sample of process gas from the header pipe on the blower discharge side. After entering the analyzer, the sample is drawn through a de-mister and a series of filters to remove any particulate or moisture that may affect the monitoring equipment. The methane and oxygen concentrations of the sample are then measured by an infra-red methane analyzer and oxygen analyzer. The methane and oxygen concentrations are displayed on separate LED display screens mounted on the front face of the gas analyzer panel. The gas analyzer system will send signals to the PLC that will trigger a number of system alarms/warnings including low methane and high oxygen.

All system failures and/or alarms are displayed on the main control circuit panel. Any alarms that shut down the system are relayed by the auto messaging to the system operator.

During 2024, the system operated as intended, with the analyzer data recorded at an interval of five minutes or better and any system alarms were sent to the operator. This data was recorded and summarized into a daily value and can be found in Appendix A.

In addition to the main system analyser, concentrations of methane (CH<sub>4</sub>), carbon dioxide (CO<sub>2</sub>) and oxygen (O<sub>2</sub>) were measured manually, recorded monthly at the blower inlet and blower

outlet, and compared to the in-situ monitoring devices to ensure accuracy. These measurements were taken using a gas meter/analyzer such as a Landtec GEM-5000+, or equivalent.

### 2.4.3 System Flow Rate Measurements

Landfill gas velocities and temperatures at each landfill gas extraction well in the wellfield were measured and recorded on a monthly basis using an anemometer, if possible. These velocities were used to calculate landfill gas flow rates by multiplying by the pipe's cross-sectional area.

A thermal mass flow meter continuously calculates flows to the flare and this data was recorded on an interval of 5 minutes or less.

The monitoring completed in 2024 is found in Table 2 and a summary of daily plant data can be found in Appendix A.

## 3.0 FLARE AND GREENHOUSE GAS EMISSIONS

### 3.1 Flare Emissions

The flare stack is equipped with four thermocouples that measure the temperature in the flare stack. These thermocouples are monitored by the system control panel PLC at intervals of 5 minutes or better. The control system is continuously monitoring the flame conditions and will shut down the LGCFS system immediately if flame is lost.

If the system shuts down for any reason, the fail-safe valve will close and prevent any non-combusted landfill gas from being released to the atmosphere, thereby controlling the emissions from the flare.

### 3.2 Greenhouse Gas Emissions

The landfill gas is comprised of primarily methane and carbon dioxide in approximately equal amounts. In addition, there are other trace amounts of a large number of compounds. Methane and carbon dioxide are greenhouse gases but methane has a global warming potential 25 times that of carbon dioxide. By combusting the methane in the flare, the resultant products are carbon dioxide and water vapour which reduces its global warming potential by approximately 95 percent.

The control panel records both flow and methane gas concentration being collected from the system and being sent to be combusted in the flare. These quantities are measured and recorded at intervals of 5 minutes or less. The data collected can be readily processed to calculate the greenhouse gas emission reduction expressed as carbon dioxide equivalents.

For the Brady Road Landfill, greenhouse gas emissions have been calculated based on operational data and can be found in Appendix A.

## 4.0 CONDENSATE COLLECTION SYSTEM

The purpose of the Condensate Collection System component of the LGCFS is to remove moisture from the landfill gas and to collect condensate from the collection laterals/header pipes. Collection and removal of the condensate increases the efficiency of the landfill gas collection in the wellfield and minimizes the moisture being passed through the mechanical system.

Condensate and moisture are removed from the system at three main locations. First, relative low points have been provided in the gas collection header to allow any free moisture to drain by gravity out of the underground gas collection system. In the wellfield, this moisture drains into condensate gravity style and pump style drain traps which have pneumatic pumps installed inside the sump. Next, prior to the gas entering the blowers, a condensate moisture separator removes most of the residual water droplets remaining in the gas. At this stage, the residual water drains by gravity into the main condensate chamber.

The condensate chamber stores the water until the pump at the bottom of the chamber is activated either manually or automatically through a series of floats. The water is then pumped through a 75 mm diameter HDPE forcemain and is discharged into the leachate collection system.

Condensate/leachate collected from the dual-purpose wells, pump drain traps, and the condensate chamber can either be sent directly to the storage tank or to MH32. Under normal operating conditions, condensate/leachate will be sent directly to the storage tank. If the storage tank is offline, leachate/condensate can be sent to MH32 by opening the isolation valve located on the condensate line to MH32.

## 5.0 CONCLUSIONS AND RECOMMENDATIONS

1. Operational issues began in July 2024. Further investigations should continue, prioritizing the repair of Lateral 5. If no additional issues are identified in the wellfield, installing isolation valves on the main gas header may be necessary to further segment the system and pinpoint any problem areas.
2. During surface emission monitoring, some areas were noted where gas was escaping. These were identified in areas where surface cap was weak and pipe emanated from the landfill surface. In order to get maximum efficiency from the LGCFS, these issues should be looked at in the future.
3. Continue to develop a consistent maintenance program for the dual purpose wells.
4. Add additional insulation or means to protect the dual purpose wells from freezing.
5. The system should continue to operate on a full-time basis and be monitored according to the Operation and Maintenance Manual for the site.

All of which is Respectfully Submitted,

**INTEGRATED GAS RECOVERY SERVICES**



Jordan Demerchant  
Environmental Technician



Lux Burgess, CET, LET  
Wellfield Operations Supervisor



Shannan McGarr, B.Sc.  
Director of Operations



Table 2: 2024 Wellfield Monitoring Data

			January	February	March	April	May	June	July	August	September	October	November	December	
<b>Control Panel</b>	<i>Flow Rate</i>	<i>CFM</i>	900.0	900.0	900.0	900.0	900.0	900.0	900.0	900.0	900.0	900.0	700.0	700.0	
	<i>CH<sub>4</sub></i>	<i>%</i>	40.8	42.2	40.5	46.8	48.3	51.7	45.6	39.0	40.7	35.0	40.3	39.5	
	<i>O<sub>2</sub></i>	<i>%</i>	4.8	4.7	5.7	2.8	2.4	1.6	1.7	3.2	4.3	3.5	3.9	4.5	
	<i>Wellfield Vac</i>	<i>"H<sub>2</sub>O</i>	-14.5	-13.2	-14.7	-20.7	-17.7	-12.5	-24.2	-27.3	-24.4	-42.6	-21.3	-29.0	
	<i>Outlet Press.</i>	<i>"H<sub>2</sub>O</i>	3.4	3.4	3.5	3.3	3.5	3.4	3.5	3.4	3.6	3.6	3.3	3.5	
<b>LOCATIONS</b>															
<b>H-1</b> well bore seal	<i>CH<sub>4</sub></i>	<i>%</i>	49.60	-	37.50	38.40	41.20	42.50	41.50	56.90	24.20	37.40	35.60	39.60	
	<i>CO<sub>2</sub></i>	<i>%</i>	28.40	-	25.60	22.50	24.60	25.40	26.40	30.60	27.70	28.60	29.60	30.20	
	<i>O<sub>2</sub></i>	<i>%</i>	13.80	-	6.20	7.30	6.80	5.40	4.20	2.40	0.90	0.90	1.50	1.80	
	<i>BAL (N<sub>2</sub>)</i>	<i>%</i>		-						1.03	43.80	29.70			
	<i>CO</i>	<i>PPM</i>	1.00	-	3.00	4.00	5.00	4.00	5.00	7.00	6.00	2.00	3.00	2.00	
	<i>H<sub>2</sub>S</i>	<i>PPM</i>	3.00	-	5.00	6.00	5.00	4.00	5.00	22.00	20.00	10.00	11.00	15.00	
	<i>Initial pressure</i>	<i>"H<sub>2</sub>O</i>		-								-3.77	-0.58	-0.22	
	<i>Adjusted pressure</i>	<i>"H<sub>2</sub>O</i>		-								-3.85	-0.58	-0.21	
	<i>Lateral</i>	<i>"H<sub>2</sub>O</i>		-	-9.57	-10.53	-11.24	-10.57	-15.48	-15.47	-23.10	-26.57	-27.17	-28.15	
	<i>Flow</i>	<i>CFM</i>	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33.40	0.00	0.00	
	<i>Energy</i>		0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.20	0.00	0.00	
	<i>Comments</i>		closed	closed	closed	closed	1/2T	1/2T	1/2T	1/2T	1/2T	closed	closed	closed	
	<b>H-2</b>	<i>CH<sub>4</sub></i>	<i>%</i>	50.80	14.60	15.40	20.10	26.90	28.90	30.20	54.60	46.90	33.80	31.70	33.60
		<i>CO<sub>2</sub></i>	<i>%</i>	33.60	15.60	16.20	15.30	19.00	18.60	22.10	35.50	34.60	27.50	28.60	25.80
<i>O<sub>2</sub></i>		<i>%</i>	5.10	9.60	10.20	11.50	13.20	11.20	10.20	1.60	1.30	5.20	6.80	7.30	
<i>BAL (N<sub>2</sub>)</i>		<i>%</i>								2.25	12.29	13.84			
<i>CO</i>		<i>PPM</i>	1.00	5.00	5.00	1.00	2.00	5.00	8.00	4.00	3.00	1.00	3.00	1.00	
<i>H<sub>2</sub>S</i>		<i>PPM</i>	1.00	5.00	3.00	4.00	5.00	3.00	4.00	29.00	7.00	8.00	1.00	2.00	
<i>Initial pressure</i>		<i>"H<sub>2</sub>O</i>										-10.07	-0.21	-0.21	
<i>Adjusted pressure</i>		<i>"H<sub>2</sub>O</i>										-8.90	-0.21	-0.11	
<i>Lateral</i>		<i>"H<sub>2</sub>O</i>			-9.12	-10.08	-11.19	-10.62	-15.96	-14.68	-23.38	-26.00	-26.48	-28.74	
<i>Flow</i>		<i>CFM</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.40	0.00	0.00	
<i>Energy</i>			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.51	0.00	0.00	
<i>Comments</i>			cracked	closed	closed	closed	closed	closed	closed	cracked	cracked	closed	closed	closed	

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
H-3	CH <sub>4</sub>	%	22.50	44.50	43.60	45.70	44.00	43.20	41.80	49.20	47.70	44.20	42.10	40.10
	CO <sub>2</sub>	%	30.10	30.20	31.50	33.70	32.10	31.20	30.60	33.60	33.50	32.70	33.70	30.40
	O <sub>2</sub>	%	3.60	5.10	4.20	3.40	4.50	5.10	6.10	3.50	3.80	6.90	7.00	6.90
	BAL (N <sub>2</sub> )	%								0.47	0.64	0.00		
	CO	PPM	2.00	12.00	11.00	16.00	14.00	10.00	11.00	11.00	14.00	8.00	5.00	4.00
	H <sub>2</sub> S	PPM	15.00	8.00	10.00	6.00	7.00	10.00	11.00	22.00	9.00	8.00	7.00	5.00
	Initial pressure	"H <sub>2</sub> O										-16.34	-5.10	-3.54
	Adjusted pressure	"H <sub>2</sub> O										-16.38	-4.21	-3.68
	Lateral	"H <sub>2</sub> O			-12.67	-14.97	-10.27	-10.27	-16.40	-14.90	-23.66	-27.89	-27.84	-27.85
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	54.90	41.40	10.60
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37.31	26.80	6.54
	Comments		closed	closed	closed	cracked	cracked	cracked	cracked	cracked	cracked	closed	closed	closed
	H-4 DP	CH <sub>4</sub>	%	45.80	41.60	42.90	43.70	45.80	42.10	40.20	47.00	27.80	27.30	29.40
CO <sub>2</sub>		%	32.50	29.60	30.60	31.40	32.60	33.60	31.50	33.40	19.10	22.00	21.50	23.10
O <sub>2</sub>		%	4.80	2.60	4.50	4.20	4.00	3.60	3.20	3.90	11.30	6.10	8.40	6.40
BAL (N <sub>2</sub> )		%								0.96	0.00	21.54		
CO		PPM	2.00	2.00	1.00	0.00	1.00	2.00	5.00	5.00	0.00	3.00	1.00	2.00
H <sub>2</sub> S		PPM	24.00	24.00	31.00	27.00	19.00	16.00	12.00	35.00	27.00	15.00	14.00	12.00
Initial pressure		"H <sub>2</sub> O										-0.97	-0.26	-0.21
Adjusted pressure		"H <sub>2</sub> O										-0.77	-0.25	-0.20
Lateral		"H <sub>2</sub> O			-12.95	-14.36	-11.69	-10.69	-16.57	-15.20	-23.95	-26.86	-27.26	-28.26
Flow		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Comments			cracked	cracked	cracked	cracked	cracked	cracked	closed	cracked	closed	closed	closed	closed
1-5 well bore seal		CH <sub>4</sub>	%	48.60	40.10	39.60	38.40	40.30	42.50	41.50	21.50	56.90	23.00	24.80
	CO <sub>2</sub>	%	35.40	30.10	29.40	30.80	29.50	30.20	31.50	15.30	37.90	16.60	18.90	19.60
	O <sub>2</sub>	%	4.20	5.10	4.60	3.80	3.90	3.40	3.20	12.70	1.30	12.80	11.40	10.20
	BAL (N <sub>2</sub> )	%								2.49	0.00	0.00		
	CO	PPM	4.00	1.00	4.00	5.00	6.00	4.00	2.00	3.00	5.00	2.00	4.00	3.00
	H <sub>2</sub> S	PPM	174.00	15.00	12.00	16.00	14.00	15.00	14.00	2.00	7.00	5.00	52.00	29.00
	Initial pressure	"H <sub>2</sub> O										-0.28	-0.04	-0.04
	Adjusted pressure	"H <sub>2</sub> O										-0.15	-0.03	-0.04
	Lateral	"H <sub>2</sub> O			-10.25	-9.18	-10.24	-10.28	-16.50	-19.82	-23.71	-28.08	-27.18	-28.32
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.70	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.14	0.00	0.00
	Comments		cracked	closed	cracked	closed	closed	closed						

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
1-6 DP	CH <sub>4</sub>	%	50.20	18.60	15.20	12.40	15.60	20.30	25.60	29.70	28.40	27.20	28.40	29.50
	CO <sub>2</sub>	%	39.40	13.50	12.80	11.10	10.40	14.70	15.70	23.50	16.90	19.70	22.10	24.60
	O <sub>2</sub>	%	1.90	10.50	12.40	13.00	14.20	12.50	10.50	6.30	11.30	7.30	6.80	4.80
	BAL (N <sub>2</sub> )	%								16.69	0.69	18.21		
	CO	PPM	1.00	0.00	2.00	4.00	4.00	3.00	4.00	8.00	2.00	0.00	1.00	3.00
	H <sub>2</sub> S	PPM	35.00	12.00	10.00	9.00	10.00	11.00	15.00	25.00	84.00	7.00	8.00	7.00
	Initial pressure	"H <sub>2</sub> O										-0.45	0.03	-0.02
	Adjusted pressure	"H <sub>2</sub> O										1.00	-0.02	-0.02
	Lateral	"H <sub>2</sub> O			-9.68	-8.89	-9.62	-10.57	-14.80	-16.11	-24.03	-27.00	-27.18	-28.32
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed
1-7	CH <sub>4</sub>	%	41.20	41.60	42.50	40.50	42.90	45.80	40.20	51.60	45.40	42.40	44.40	42.20
	CO <sub>2</sub>	%	18.40	30.90	31.60	32.60	31.20	30.90	29.50	35.00	35.20	31.50	32.80	30.60
	O <sub>2</sub>	%	14.20	4.60	4.00	3.90	3.50	2.90	2.40	2.90	7.40	8.00	7.40	7.50
	BAL (N <sub>2</sub> )	%								0.00	0.00	0.00		
	CO	PPM	24.00	24.00	28.00	35.00	29.00	29.00	15.00	23.00	18.00	20.00	14.00	10.00
	H <sub>2</sub> S	PPM	2.00	26.00	48.00	56.00	37.00	48.00	54.00	167.00	157.00	35.00	25.00	26.00
	Initial pressure	"H <sub>2</sub> O										-0.39	-1.04	-4.21
	Adjusted pressure	"H <sub>2</sub> O										-0.44	-1.24	-4.18
	Lateral	"H <sub>2</sub> O			-10.68	-9.50	-10.57	-10.69	-16.32	-15.85	-23.63	-28.64	-29.57	-27.15
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	66.40	41.20	20.80
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.28	28.12	13.49
	Comments		cracked	cracked	cracked	cracked	cracked	cracked	cracked	cracked	cracked	closed	closed	closed
1-8	CH <sub>4</sub>	%	53.20	48.50	48.60	50.70	52.00	50.30	48.50	19.20	9.40	34.20	33.20	35.60
	CO <sub>2</sub>	%	29.60	32.60	34.90	37.30	35.60	33.80	32.60	14.10	6.30	25.30	26.80	25.10
	O <sub>2</sub>	%	9.20	2.30	2.20	2.10	2.00	2.30	2.60	13.60	18.40	3.20	4.50	3.60
	BAL (N <sub>2</sub> )	%								1.69	0.00	25.20		
	CO	PPM	3.00	5.00	2.00	1.00	2.00	2.00	2.00	2.00	6.00	5.00	4.00	3.00
	H <sub>2</sub> S	PPM	14.00	51.00	63.00	61.00	58.00	42.00	32.00	20.00	15.00	11.00	9.00	5.00
	Initial pressure	"H <sub>2</sub> O										-0.54	-0.32	-0.32
	Adjusted pressure	"H <sub>2</sub> O										-0.44	-0.32	-0.35
	Lateral	"H <sub>2</sub> O			-11.57	-10.53	-11.34	-11.02	-16.84	-16.48	-23.74	-27.24	-27.61	-28.17
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.30	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.74	0.00	0.00
	Comments		1/2T	1/2T	1/2T	1/2T	1/2T	1/2T	1/2T	closed	closed	closed	closed	closed

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December		
1-9 DP	CH <sub>4</sub>	%	21.50	33.60	35.40	37.70	40.20	42.80	45.80	33.00	14.80	48.40	47.10	45.20	
	CO <sub>2</sub>	%	22.50	32.60	33.60	29.50	28.50	29.40	30.20	26.60	21.40	30.70	31.20	30.10	
	O <sub>2</sub>	%	12.30	2.10	1.90	1.50	1.90	1.50	1.80	3.50	4.90	0.30	0.90	1.20	
	BAL (N <sub>2</sub> )	%								23.67	40.38	19.47			
	CO	PPM	1.00	7.00	15.00	11.00	15.00	14.00	15.00	9.00	2.00	0.00	1.00	2.00	
	H <sub>2</sub> S	PPM	10.00	10.00	8.00	11.00	14.00	18.00	24.00	8.00	0.00	11.00	10.00	11.00	
	Initial pressure	"H <sub>2</sub> O										-3.37	-3.59	-0.06	
	Adjusted pressure	"H <sub>2</sub> O										-3.47	-3.68	-0.05	
	Lateral	"H <sub>2</sub> O			-11.62	-10.96	-11.48	-11.35	-16.95	-15.73	-24.38	-26.25	-27.26	-28.24	
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	40.20	10.20	5.40	
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29.91	7.39	3.75	
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	cracked	cracked	cracked	
	1-10 DP	CH <sub>4</sub>	%	51.80	44.50	45.70	47.20	46.80	45.90	49.60	34.10	0.20	11.50	18.00	21.50
CO <sub>2</sub>		%	30.10	26.90	25.40	24.00	22.50	25.40	26.70	25.70	0.10	7.60	7.10	10.20	
O <sub>2</sub>		%	15.90	5.10	4.00	4.10	3.80	4.50	3.90	4.30	20.90	18.30	10.20	8.40	
BAL (N <sub>2</sub> )		%								19.65	0.00	0.00			
CO		PPM	2.00	4.00	8.00	9.00	10.00	18.00	17.00	8.00	6.00	7.00	8.00	5.00	
H <sub>2</sub> S		PPM	31.00	2.00	1.00	6.00	8.00	10.00	12.00	7.00	1.00	2.00	2.00	4.00	
Initial pressure		"H <sub>2</sub> O										-0.23	-0.15	0.10	
Adjusted pressure		"H <sub>2</sub> O										-0.24	-0.11	-0.05	
Lateral		"H <sub>2</sub> O			-10.57	-11.17	-11.95	-11.96	-16.50	-14.80	-23.88	-27.30	-27.51	-28.68	
Flow		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Energy			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Comments			cracked	cracked	cracked	cracked	cracked	cracked	cracked	cracked	closed	closed	closed	closed	
H-11 DP		CH <sub>4</sub>	%	33.60	43.20	44.10	45.60	49.60	50.10	51.40	45.10	54.40	28.70	29.80	21.40
	CO <sub>2</sub>	%	35.40	28.50	30.90	33.70	31.00	32.40	31.50	29.10	38.80	22.00	25.40	24.10	
	O <sub>2</sub>	%	1.60	3.80	3.60	3.50	3.40	3.60	3.50	5.40	2.10	7.70	7.60	6.80	
	BAL (N <sub>2</sub> )	%								0.00	0.00	12.49			
	CO	PPM	7.00	2.00	4.00	3.00	5.00	4.00	3.00	2.00	3.00	3.00	2.00	6.00	
	H <sub>2</sub> S	PPM	32.00	145.00	101.00	88.00	68.00	71.00	75.00	89.00	121.00	55.00	54.00	65.00	
	Initial pressure	"H <sub>2</sub> O										-28.03	-10.22	-0.01	
	Adjusted pressure	"H <sub>2</sub> O										-0.03	-0.03	0.01	
	Lateral	"H <sub>2</sub> O			-10.69	-9.93	-10.24	-11.42	-17.40	-15.60	-22.12	-28.20	-29.51	-28.63	
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.90	0.00	0.00	
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.37	0.00	0.00	
	Comments		closed	cracked	1/2T	1/2T	closed	closed	closed						

Table 2: 2024 Wellfield Monitoring Data

			January	February	March	April	May	June	July	August	September	October	November	December	
<b>H-12</b> well bore seal	<i>CH<sub>4</sub></i>	%	52.30	43.60	42.90	44.20	45.80	44.70	42.70	50.60	42.70	26.90	25.10	20.40	
	<i>CO<sub>2</sub></i>	%	38.60	29.60	28.40	31.90	32.50	31.50	30.90	31.40	31.90	19.70	18.90	19.50	
	<i>O<sub>2</sub></i>	%	1.50	4.20	4.10	4.50	4.40	4.80	4.20	2.60	2.80	10.10	9.90	8.70	
	<i>BAL (N<sub>2</sub>)</i>	%								5.57	12.02	5.12			
	<i>CO</i>	PPM	0.00	15.00	10.00	6.00	7.00	5.00	4.00	3.00	6.00	7.00	4.00	2.00	
	<i>H<sub>2</sub>S</i>	PPM	168.00	19.00	57.00	70.00	74.00	69.00	24.00	148.00	61.00	51.00	44.00	48.00	
	<i>Initial pressure</i>	"H <sub>2</sub> O											-7.13	-0.62	0.01
	<i>Adjusted pressure</i>	"H <sub>2</sub> O											-2.92	-0.54	0.04
	<i>Lateral</i>	"H <sub>2</sub> O			-10.68	-10.31	-10.69	-10.62	-17.50	-15.45	-24.13	-29.18	-30.15	-28.10	
	<i>Flow</i>	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	52.30	0.00	0.00	
	<i>Energy</i>		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.63	0.00	0.00	
	<i>Comments</i>		2T	2T	2T	2T	1T	1T	1T	1T	1T	closed	closed	closed	
	<b>2-13</b>	<i>CH<sub>4</sub></i>	%	41.20	51.80	50.80	52.80	54.10	53.80	52.30	53.20	57.30	55.30	54.60	53.60
		<i>CO<sub>2</sub></i>	%	21.80	34.20	35.60	36.10	35.80	34.90	32.40	34.10	36.60	37.10	36.40	34.10
<i>O<sub>2</sub></i>		%	4.30	3.20	2.10	1.70	1.40	1.50	1.80	3.20	2.10	7.40	4.10	4.80	
<i>BAL (N<sub>2</sub>)</i>		%								0.00	0.00	0.00			
<i>CO</i>		PPM	2.00	28.00	47.00	63.00	54.00	63.00	48.00	41.00	35.00	4.00	1.00	4.00	
<i>H<sub>2</sub>S</i>		PPM	61.00	168.00	219.00	246.00	216.00	200.00	157.00	384.00	351.00	299.00	189.00	174.00	
<i>Initial pressure</i>		"H <sub>2</sub> O											-27.65	-24.15	-23.18
<i>Adjusted pressure</i>		"H <sub>2</sub> O											-27.80	-20.14	-23.68
<i>Lateral</i>		"H <sub>2</sub> O			-11.03	-12.11	-11.84	-11.14	-15.84	-14.84	-24.52	-28.80	-29.74	-28.57	
<i>Flow</i>		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	40.40	40.10	31.20	
<i>Energy</i>			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.35	33.66	25.71	
<i>Comments</i>			2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	
<b>2-14</b> well bore seal		<i>CH<sub>4</sub></i>	%	52.80	32.60	31.60	33.20	32.50	35.80	39.60	25.10	41.90	32.70	31.20	30.40
		<i>CO<sub>2</sub></i>	%	35.80	25.80	24.80	25.10	26.90	27.50	25.40	23.00	33.90	23.70	22.40	21.40
	<i>O<sub>2</sub></i>	%	1.40	7.20	6.50	7.00	9.60	10.40	9.90	7.50	6.10	6.10	7.20	8.60	
	<i>BAL (N<sub>2</sub>)</i>	%								16.05	0.00	14.44			
	<i>CO</i>	PPM	1.00	2.00	1.00	0.00	2.00	3.00	4.00	19.00	13.00	8.00	7.00	6.00	
	<i>H<sub>2</sub>S</i>	PPM	47.00	35.00	65.00	71.00	56.00	48.00	36.00	7.00	152.00	22.00	15.00	16.00	
	<i>Initial pressure</i>	"H <sub>2</sub> O											-0.53	-0.14	-0.21
	<i>Adjusted pressure</i>	"H <sub>2</sub> O											-0.49	-0.14	-0.21
	<i>Lateral</i>	"H <sub>2</sub> O			-10.57	-10.21	-11.32	-11.63	-16.77	-17.11	-24.48	-27.27	-27.19	-28.24	
	<i>Flow</i>	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	<i>Energy</i>		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	<i>Comments</i>		cracked	cracked	closed	closed	closed	closed							

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
2-15	CH <sub>4</sub>	%	51.60	42.10	44.80	45.80	49.80	50.90	52.40	15.30	0.20	20.10	24.80	22.90
	CO <sub>2</sub>	%	41.80	31.40	32.60	34.20	33.70	31.50	29.60	10.40	0.20	14.00	15.60	16.90
	O <sub>2</sub>	%	5.80	2.10	1.90	1.60	1.40	2.40	2.10	15.10	21.40	15.10	14.80	12.40
	BAL (N <sub>2</sub> )	%								2.12	0.00	0.00		
	CO	PPM	1.00	1.00	2.00	41.00	29.00	31.00	21.00	5.00	2.00	3.00	2.00	3.00
	H <sub>2</sub> S	PPM	65.00	19.00	15.00	21.00	23.00	27.00	26.00	10.00	3.00	4.00	5.00	6.00
	Initial pressure	"H <sub>2</sub> O										-0.33	0.01	-0.32
	Adjusted pressure	"H <sub>2</sub> O										-0.35	-0.02	-0.58
	Lateral	"H <sub>2</sub> O			-10.69	-11.95	-12.48	-12.07	-16.85	-14.38	-24.92	-28.16	-27.15	-28.17
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00
	Energy		14.00	17.60	18.90	20.10	-	-	25.70	28.10	26.90	-	-	-
	Comments		cracked	cracked	cracked	cracked	cracked	1/2T	1/2T	closed	closed	closed	closed	closed
	2-16	CH <sub>4</sub>	%	54.20	40.10	39.60	36.30	38.60	39.50	42.50	32.80	57.00	34.60	33.60
CO <sub>2</sub>		%	34.50	29.50	30.20	28.80	29.30	30.10	31.60	26.30	38.00	26.10	24.80	21.40
O <sub>2</sub>		%	7.60	3.90	4.80	4.10	6.30	4.80	3.90	7.70	1.40	5.90	6.20	7.00
BAL (N <sub>2</sub> )		%								4.09	0.00	11.10		
CO		PPM	14.00	14.00	26.00	21.00	31.00	35.00	31.00	7.00	10.00	1.00	2.00	2.00
H <sub>2</sub> S		PPM	21.00	25.00	20.00	29.00	25.00	27.00	19.00	34.00	66.00	7.00	7.00	4.00
Initial pressure		"H <sub>2</sub> O										-2.58	-0.58	0.02
Adjusted pressure		"H <sub>2</sub> O										-1.38	-0.68	-0.05
Lateral		"H <sub>2</sub> O			-10.30	-11.07	-12.03	-11.03	-16.95	-16.73	-23.81	-26.84	-27.18	-28.36
Flow		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Comments			1T	1T	1/2T	closed	closed	closed	closed	closed	closed	closed	closed	closed
2-17		CH <sub>4</sub>	%	0.00	49.50	50.10	51.90	53.20	54.00	50.10	45.80	48.80	37.50	38.90
	CO <sub>2</sub>	%	2.30	35.90	36.80	37.00	36.40	34.60	29.40	31.50	32.50	27.10	28.60	29.40
	O <sub>2</sub>	%	18.90	2.20	2.40	1.40	1.20	2.40	2.50	4.30	11.80	6.90	5.40	5.10
	BAL (N <sub>2</sub> )	%								2.15	0.00	2.42		
	CO	PPM	1.00	16.00	15.00	7.00	1.00	2.00	5.00	3.00	9.00	3.00	5.00	5.00
	H <sub>2</sub> S	PPM	31.00	26.00	5.00	9.00	11.00	15.00	5.00	10.00	9.00	9.00	11.00	15.00
	Initial pressure	"H <sub>2</sub> O										-1.31	-0.65	-0.14
	Adjusted pressure	"H <sub>2</sub> O										-1.02	-0.05	-0.05
	Lateral	"H <sub>2</sub> O			-11.92	-12.07	-12.27	-11.57	-17.21	-15.19	-24.70	-28.10	-29.75	-27.19
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	40.20	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.18	0.00	0.00
	Comments		closed	cracked	1/2T	1T	2T	2T	2T	1T	1T	cracked	cracked	cracked

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
2-18	CH <sub>4</sub>	%	41.50	53.60	55.90	56.00	55.40	53.80	51.80	33.00	46.10	38.50	42.10	41.60
	CO <sub>2</sub>	%	30.50	36.70	37.50	39.00	38.50	36.70	35.10	28.40	33.70	33.90	31.50	31.40
	O <sub>2</sub>	%	20.60	1.50	1.30	0.60	0.90	1.10	1.50	3.70	1.50	0.90	0.80	1.20
	BAL (N <sub>2</sub> )	%								20.91	13.03	23.30		
	CO	PPM	0.00	8.00	12.00	10.00	11.00	15.00	25.00	17.00	14.00	10.00	11.00	11.00
	H <sub>2</sub> S	PPM	15.00	34.00	34.00	27.00	19.00	22.00	14.00	18.00	28.00	33.00	33.00	31.00
	Initial pressure	"H <sub>2</sub> O										-0.33	-2.24	-0.03
	Adjusted pressure	"H <sub>2</sub> O										-2.58	-1.02	-0.17
	Lateral	"H <sub>2</sub> O			-11.62	-12.83	-12.68	-11.89	-17.02	-14.18	-24.39	-27.74	-29.31	-27.68
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.90	12.40	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.47	8.03	0.00
	Comments		1/2T	1/2T	1/2T	1/2T	1/2T	1/2T	1/2T	cracked	cracked	cracked	cracked	cracked
	3-19	CH <sub>4</sub>	%	15.60	55.40	54.80	55.50	54.80	53.90	52.70	58.20	43.80	42.70	41.70
CO <sub>2</sub>		%	10.40	37.50	36.90	37.80	38.40	37.60	34.80	38.20	30.30	31.30	30.60	29.80
O <sub>2</sub>		%	12.40	6.00	5.90	3.70	3.50	5.80	5.70	1.30	4.90	4.20	5.70	6.00
BAL (N <sub>2</sub> )		%								0.00	2.48	5.92		
CO		PPM	11.00	9.00	5.00	2.00	4.00	4.00	5.00	3.00	2.00	2.00	4.00	5.00
H <sub>2</sub> S		PPM	2.00	21.00	32.00	29.00	37.00	48.00	26.00	92.00	18.00	35.00	34.00	39.00
Initial pressure		"H <sub>2</sub> O										-8.88	-5.24	-3.84
Adjusted pressure		"H <sub>2</sub> O										-9.44	-5.62	-4.89
Lateral		"H <sub>2</sub> O			-3.55	-2.78	-5.62	-5.69	-8.62	-13.72	-23.77	-29.04	-29.15	-28.69
Flow		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	20.40	10.40
Energy			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.39	13.08	6.76
Comments			closed	cracked	1T	1T	1T	1T	1T	1T	1/2T	1/2T	1/2T	cracked
3-20		CH <sub>4</sub>	%	41.20	51.80	52.70	53.70	54.00	54.20	51.20	55.50	56.10	53.80	52.40
	CO <sub>2</sub>	%	30.20	38.50	39.50	40.30	41.20	38.90	37.60	39.30	39.30	40.80	36.70	34.60
	O <sub>2</sub>	%	3.50	2.40	1.30	0.80	1.00	1.20	1.50	1.20	1.60	0.80	1.20	1.80
	BAL (N <sub>2</sub> )	%								0.00	0.00	1.58		
	CO	PPM	11.00	5.00	9.00	8.00	7.00	8.00	4.00	14.00	4.00	8.00	5.00	3.00
	H <sub>2</sub> S	PPM	11.00	16.00	15.00	7.00	4.00	5.00	12.00	15.00	11.00	14.00	15.00	21.00
	Initial pressure	"H <sub>2</sub> O										-27.65	-24.11	-19.62
	Adjusted pressure	"H <sub>2</sub> O										-27.70	-20.24	-18.54
	Lateral	"H <sub>2</sub> O			-6.24	-4.95	-6.94	-7.62	-16.24	-11.51	-24.41	-28.93	-30.62	-28.62
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	65.20	52.10	43.80
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	53.93	41.97	34.48
	Comments		1/2T	1/2T	1T	1T	2T	2T	2T	2T	2T	2T	2T	2T

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
3-21	CH <sub>4</sub>	%	0.00	15.30	12.80	16.40	23.00	25.60	29.60	9.10	0.80	49.60	50.70	48.60
	CO <sub>2</sub>	%	3.60	22.50	19.40	13.80	15.80	19.50	22.40	6.90	0.50	39.30	36.90	35.90
	O <sub>2</sub>	%	18.40	13.20	13.00	14.30	13.40	10.60	11.80	17.30	20.30	1.80	1.30	2.10
	BAL (N <sub>2</sub> )	%								1.31	1.67	2.50		
	CO	PPM	1.00	3.00	2.00	1.00	7.00	8.00	7.00	0.00	0.00	6.00	4.00	5.00
	H <sub>2</sub> S	PPM	15.00	5.00	3.00	1.00	5.00	8.00	14.00	3.00	0.00	40.00	46.00	38.00
	Initial pressure	"H <sub>2</sub> O										-1.43	-2.25	-0.18
	Adjusted pressure	"H <sub>2</sub> O										-0.88	-3.21	-0.05
	Lateral	"H <sub>2</sub> O			-3.69	-2.96	-4.95	-5.21	-8.62	-14.73	-24.68	-29.08	-30.24	-27.57
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.80
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.08
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed
	3-22 well bore seal	CH <sub>4</sub>	%	9.60	55.60	57.20	58.40	57.40	56.80	54.10	58.00	56.90	49.70	47.50
CO <sub>2</sub>		%	3.60	37.80	38.60	40.30	41.20	40.20	39.60	38.30	27.60	37.10	35.80	33.70
O <sub>2</sub>		%	4.10	2.60	1.40	1.10	1.00	1.70	2.10	2.20	2.00	6.00	4.60	5.00
BAL (N <sub>2</sub> )		%								0.00	0.00	0.00		
CO		PPM	1.00	8.00	18.00	31.00	26.00	28.00	31.00	26.00	15.00	0.00	3.00	1.00
H <sub>2</sub> S		PPM	5.00	69.00	35.00	48.00	51.00	59.00	26.00	49.00	53.00	28.00	22.00	15.00
Initial pressure		"H <sub>2</sub> O										-15.81	-14.26	-15.57
Adjusted pressure		"H <sub>2</sub> O										-18.46	-15.24	-14.98
Lateral		"H <sub>2</sub> O			3.68	-0.91	-5.62	-6.32	-14.74	-13.85	-22.58	-28.24	-29.74	-28.47
Flow		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.50	22.60	24.50
Energy			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.02	16.50	18.27
Comments			closed	2T	2T	2T	2T	2T	1T	1T	1T	1T	1T	1T
3-23		CH <sub>4</sub>	%	53.00	51.70	52.60	54.50	55.90	54.20	53.60	61.00	59.40	53.80	52.80
	CO <sub>2</sub>	%	39.50	38.60	39.50	38.30	39.60	36.50	33.20	38.60	35.40	37.00	36.70	34.20
	O <sub>2</sub>	%	5.30	2.40	2.60	1.30	1.20	3.20	3.50	0.40	0.80	3.70	4.60	4.80
	BAL (N <sub>2</sub> )	%								0.00	0.00	0.00		
	CO	PPM	20.00	4.00	4.00	3.00	3.00	3.00	1.00	7.00	4.00	5.00	5.00	4.00
	H <sub>2</sub> S	PPM	134.00	61.00	58.00	91.00	101.00	132.00	117.00	205.00	157.00	241.00	198.00	156.00
	Initial pressure	"H <sub>2</sub> O										-15.45	-14.35	-16.95
	Adjusted pressure	"H <sub>2</sub> O										-13.13	-14.36	-15.69
	Lateral	"H <sub>2</sub> O			-6.92	-7.07	-8.62	-7.18	-10.24	-13.48	-24.15	-29.03	-30.15	-28.63
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	35.50	33.20	30.90
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29.36	26.95	23.80
	Comments		cracked	1T	1T	2T	2T	2T	2T	2T	2T	2T	2T	2T

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
3-24	CH <sub>4</sub>	%	43.60	1.50	0.00	0.00	0.00	0.00	0.00	17.10	7.80	4.00	10.10	15.20
	CO <sub>2</sub>	%	33.20	0.40	0.50	0.20	0.50	1.00	1.40	11.90	4.80	3.20	5.40	8.50
	O <sub>2</sub>	%	3.60	17.40	19.80	20.00	20.10	18.40	15.40	14.10	18.40	2.20	1.80	1.70
	BAL (N <sub>2</sub> )	%								3.60	0.00	82.28		
	CO	PPM	5.00	1.00	0.00	0.00	1.00	1.00	7.00	3.00	2.00	6.00	8.00	4.00
	H <sub>2</sub> S	PPM	6.00	4.00	5.00	3.00	5.00	8.00	10.00	43.00	34.00	24.00	20.00	23.00
	Initial pressure	"H <sub>2</sub> O										-0.09	-0.09	-0.06
	Adjusted pressure	"H <sub>2</sub> O										-0.07	-0.08	-0.02
	Lateral	"H <sub>2</sub> O			-4.96	-2.85	-5.96	-5.48	-14.29	-19.63	-24.46	-28.88	-29.55	-28.62
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed
	3-25	CH <sub>4</sub>	%	55.80	33.60	29.40	22.60	26.90	29.50	31.60	4.80	12.50	26.20	27.50
CO <sub>2</sub>		%	38.60	20.50	19.40	16.20	19.60	21.80	24.50	2.80	3.60	27.80	26.70	25.80
O <sub>2</sub>		%	4.20	12.80	11.90	10.70	9.90	7.40	6.50	3.70	3.60	20.80	19.40	15.40
BAL (N <sub>2</sub> )		%								74.71	72.15	0.00		
CO		PPM	12.00	1.00	0.00	0.00	1.00	5.00	5.00	0.00	1.00	4.00	6.00	2.00
H <sub>2</sub> S		PPM	41.00	15.00	17.00	22.00	19.00	30.00	45.00	78.00	84.00	1.00	2.00	5.00
Initial pressure		"H <sub>2</sub> O										-0.18	-0.14	-0.14
Adjusted pressure		"H <sub>2</sub> O										-0.13	-0.12	-0.12
Lateral		"H <sub>2</sub> O			4.95	-2.87	-4.95	-5.55	-14.30	-14.06	-23.65	-28.47	-29.31	-28.47
Flow		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Comments			closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed
3-26		CH <sub>4</sub>	%	25.80	54.80	55.80	54.00	53.60	55.80	54.90	58.30	56.90	52.30	50.40
	CO <sub>2</sub>	%	26.90	32.70	33.80	34.40	32.70	31.50	32.80	36.60	35.90	33.90	35.60	31.50
	O <sub>2</sub>	%	5.20	6.20	5.60	7.80	6.20	4.10	5.80	2.20	2.80	2.70	3.10	3.20
	BAL (N <sub>2</sub> )	%								0.00	0.00	3.95		
	CO	PPM	4.00	5.00	5.00	3.00	1.00	3.00	8.00	4.00	2.00	2.00	6.00	5.00
	H <sub>2</sub> S	PPM	41.00	33.00	24.00	17.00	14.00	17.00	15.00	43.00	51.00	7.00	2.00	7.00
	Initial pressure	"H <sub>2</sub> O										-15.80	-15.10	-15.24
	Adjusted pressure	"H <sub>2</sub> O										-15.90	-14.68	-15.62
	Lateral	"H <sub>2</sub> O			-6.92	-7.29	-7.28	-8.55	-11.24	-19.68	-21.58	-27.77	-27.58	-27.68
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	55.40	11.70	22.10
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	44.55	9.07	16.82
	Comments		cracked	1T	1T	1T	1T	1T						

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
<b>3-27 DP</b>	CH <sub>4</sub>	%	48.70	45.60	44.90	45.90	46.70	47.00	49.50	41.90	42.80	33.40	36.90	32.40
	CO <sub>2</sub>	%	40.10	31.20	32.40	31.90	32.00	33.50	31.60	28.80	29.70	24.00	25.10	26.80
	O <sub>2</sub>	%	7.50	2.90	4.60	3.80	2.50	3.90	3.40	5.10	6.20	16.50	14.20	12.60
	BAL (N <sub>2</sub> )	%								4.92	5.21	0.00		
	CO	PPM	15.00	5.00	9.00	3.00	5.00	5.00	5.00	6.00	8.00	4.00	4.00	6.00
	H <sub>2</sub> S	PPM	25.00	48.00	64.00	81.00	84.00	96.00	100.00	86.00	95.00	29.00	52.00	49.00
	Initial pressure	"H <sub>2</sub> O										-5.57	-1.32	-0.05
	Adjusted pressure	"H <sub>2</sub> O										-3.22	-1.24	-0.06
	Lateral	"H <sub>2</sub> O			-5.27	-6.35	-6.92	-6.35	-8.62	-14.05	-23.57	-29.94	-30.38	-29.01
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments		1/2T	1/2T	cracked	cracked	cracked	cracked	cracked	cracked	cracked	closed	closed	closed
	<b>3-28</b>	CH <sub>4</sub>	%	21.60	41.10	39.60	36.60	40.90	42.60	40.70	19.70	21.20	24.40	22.90
CO <sub>2</sub>		%	22.80	28.60	29.40	26.20	28.50	30.60	31.50	13.00	12.40	26.00	27.80	24.80
O <sub>2</sub>		%	18.20	6.60	7.60	6.60	5.90	8.40	6.20	14.10	12.60	9.10	8.40	6.80
BAL (N <sub>2</sub> )		%								0.00	0.00	6.10		
CO		PPM	7.00	3.00	6.00	3.00	1.00	2.00	7.00	3.00	2.00	5.00	2.00	5.00
H <sub>2</sub> S		PPM	6.00	36.00	28.00	38.00	29.00	25.00	19.00	33.00	14.00	21.00	22.00	19.00
Initial pressure		"H <sub>2</sub> O										0.09	-0.11	0.05
Adjusted pressure		"H <sub>2</sub> O										0.10	0.10	0.05
Lateral		"H <sub>2</sub> O			-5.27	-6.82	-6.94	-6.29	-7.62	-16.65	-23.65	-28.67	-29.57	-28.32
Flow		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Comments			cracked	cracked	cracked	cracked	closed	closed	closed	closed	closed	closed	closed	closed
<b>3-29 DP</b>		CH <sub>4</sub>	%	39.80	50.80	51.40	53.30	52.50	53.40	52.60	23.50	25.90	30.00	27.40
	CO <sub>2</sub>	%	26.80	32.60	34.10	35.30	33.60	34.80	35.60	16.60	18.40	31.40	32.60	31.60
	O <sub>2</sub>	%	3.50	2.80	1.80	1.30	1.10	1.60	2.30	12.90	13.80	9.60	8.30	7.40
	BAL (N <sub>2</sub> )	%								0.00	0.00	0.00		
	CO	PPM	10.00	1.00	1.00	4.00	8.00	4.00	4.00	2.00	4.00	10.00	7.00	1.00
	H <sub>2</sub> S	PPM	42.00	26.00	45.00	58.00	63.00	56.00	47.00	2.00	3.00	1.00	2.00	4.00
	Initial pressure	"H <sub>2</sub> O										-0.03	-0.02	-0.21
	Adjusted pressure	"H <sub>2</sub> O										0.02	0.02	-0.22
	Lateral	"H <sub>2</sub> O			-5.18	-6.82	-7.19	-7.26	-10.99	-20.59	-23.98	-28.85	-29.17	-28.71
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.40	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.87	0.00	0.00
	Comments		1T	2T	2T	2T	2T	2T	2T	closed	closed	closed	closed	closed

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
3-30 DP	CH <sub>4</sub>	%	18.20	29.60	25.90	21.30	26.50	29.90	32.20	20.50	26.80	23.50	26.90	24.10
	CO <sub>2</sub>	%	12.70	19.50	20.20	17.50	18.70	15.80	19.70	13.60	14.20	27.40	28.40	29.60
	O <sub>2</sub>	%	1.70	11.60	10.80	13.50	12.50	10.50	11.40	13.80	14.70	6.60	5.60	6.20
	BAL (N <sub>2</sub> )	%								0.00	0.00	17.55		
	CO	PPM	1.00	5.00	2.00	2.00	4.00	2.00	2.00	1.00	2.00	3.00	1.00	3.00
	H <sub>2</sub> S	PPM	9.00	8.00	5.00	4.00	5.00	8.00	10.00	5.00	4.00	1.00	3.00	8.00
	Initial pressure	"H <sub>2</sub> O										-0.19	-0.32	-0.31
	Adjusted pressure	"H <sub>2</sub> O										-0.15	-0.15	-0.34
	Lateral	"H <sub>2</sub> O			-5.48	-6.68	-7.68	-6.31	-7.24	-20.71	-24.26	-28.89	-29.67	-28.68
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed
	4-31	CH <sub>4</sub>	%	54.60	50.20	51.60	52.70	54.00	52.60	52.30	51.00	35.60	40.80	39.50
CO <sub>2</sub>		%	31.50	37.40	38.00	38.20	32.50	31.00	32.50	35.80	27.60	31.30	32.10	31.90
O <sub>2</sub>		%	1.30	2.60	2.30	1.70	0.90	1.30	1.40	1.20	4.70	10.40	8.70	8.90
BAL (N <sub>2</sub> )		%								7.46	14.33	0.00		
CO		PPM	3.00	6.00	5.00	3.00	5.00	4.00	8.00	5.00	4.00	2.00	5.00	8.00
H <sub>2</sub> S		PPM	120.00	122.00	101.00	123.00	105.00	100.00	75.00	102.00	49.00	58.00	68.00	75.00
Initial pressure		"H <sub>2</sub> O										-16.75	-1.35	-2.95
Adjusted pressure		"H <sub>2</sub> O										-16.75	-1.24	-2.36
Lateral		"H <sub>2</sub> O			-2.22	-1.89	-2.34	-4.96	-8.62	-13.64	-23.74	-29.07	-29.64	-27.02
Flow		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Comments			1T	1T	1T	1T	1T	1T	1T	1T	cracked	cracked	cracked	cracked
4-32		CH <sub>4</sub>	%	55.80	51.90	52.60	54.90	55.90	51.80	52.70	58.20	50.20	49.80	50.10
	CO <sub>2</sub>	%	36.90	39.60	40.20	41.20	38.00	35.40	34.20	41.10	36.60	38.10	36.90	34.20
	O <sub>2</sub>	%	1.60	2.10	2.20	1.90	1.60	1.90	2.10	0.10	10.80	4.00	5.30	5.80
	BAL (N <sub>2</sub> )	%								0.22	0.00	0.00		
	CO	PPM	1.00	4.00	4.00	2.00	3.00	2.00	5.00	4.00	3.00	2.00	2.00	6.00
	H <sub>2</sub> S	PPM	169.00	136.00	130.00	127.00	154.00	148.00	134.00	27.00	94.00	133.00	102.00	98.00
	Initial pressure	"H <sub>2</sub> O										-2.20	-4.52	-5.24
	Adjusted pressure	"H <sub>2</sub> O										-3.22	-6.48	-5.18
	Lateral	"H <sub>2</sub> O			-3.62	-3.20	-2.95	-5.20	-7.62	1.53	-23.60	-27.84	-28.10	-27.64
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.70	15.40	21.80
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.68	11.86	16.69
	Comments		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
4-33	CH <sub>4</sub>	%	47.20	55.80	56.90	58.70	57.80	55.20	53.60	57.00	56.80	55.90	51.40	50.60
	CO <sub>2</sub>	%	30.60	35.60	37.60	38.30	40.10	39.60	38.60	34.50	35.60	35.80	34.50	33.90
	O <sub>2</sub>	%	3.20	2.60	2.40	2.70	2.50	3.60	4.20	2.40	2.50	7.10	8.40	7.80
	BAL (N <sub>2</sub> )	%								0.00	0.00	0.00		
	CO	PPM	2.00	5.00	0.00	4.00	5.00	4.00	4.00	8.00	5.00	3.00	4.00	8.00
	H <sub>2</sub> S	PPM	36.00	157.00	203.00	242.00	218.00	198.00	164.00	368.00	321.00	303.00	185.00	176.00
	Initial pressure	"H <sub>2</sub> O										-18.44	-18.47	-17.25
	Adjusted pressure	"H <sub>2</sub> O										-18.18	-18.24	-19.68
	Lateral	"H <sub>2</sub> O			-3.68	-2.34	-5.21	-6.33	-11.20	-13.75	-23.65	-29.55	-30.26	-28.47
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.70	0.00	13.40
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.04	0.00	10.42
	Comments		cracked	1T	1T	2T	2T	2T	2T	2T	2T	2T	2T	2T
4-34	CH <sub>4</sub>	%	1.20	54.20	56.20	55.80	54.20	55.90	54.80	19.10	21.50	0.30	0.30	10.20
	CO <sub>2</sub>	%	1.20	34.70	36.50	35.90	36.90	34.00	32.50	12.00	12.40	0.10	0.60	5.40
	O <sub>2</sub>	%	16.40	3.20	2.60	2.80	2.40	3.80	3.60	15.40	14.90	20.90	18.60	17.50
	BAL (N <sub>2</sub> )	%								0.00	0.00	0.00		
	CO	PPM	1.00	2.00	2.00	2.00	3.00	2.00	2.00	2.00	5.00	3.00	5.00	2.00
	H <sub>2</sub> S	PPM	51.00	16.00	12.00	17.00	24.00	26.00	20.00	197.00	158.00	8.00	4.00	5.00
	Initial pressure	"H <sub>2</sub> O										-0.46	-0.25	-0.03
	Adjusted pressure	"H <sub>2</sub> O										-0.53	-0.48	-0.02
	Lateral	"H <sub>2</sub> O			0.25	0.02	0.01	0.05	0.12	-5.58	-23.97	-3.94	-2.58	-28.41
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.90	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
	Comments		cracked	2T	2T	2T	2T	2T	2T	closed	closed	closed	closed	closed
4-35 well bore seal	CH <sub>4</sub>	%	51.20	30.50	26.80	20.40	23.60	29.80	30.10	9.10	10.20	15.30	19.40	21.60
	CO <sub>2</sub>	%	37.60	16.10	15.80	14.90	15.70	12.40	15.80	6.30	8.50	10.30	12.40	19.70
	O <sub>2</sub>	%	2.80	12.50	11.90	12.30	15.70	12.60	11.50	16.70	17.50	16.30	15.60	14.20
	BAL (N <sub>2</sub> )	%								4.77	7.40	0.00		
	CO	PPM	0.00	2.00	5.00	2.00	6.00	4.00	4.00	1.00	1.00	4.00	2.00	7.00
	H <sub>2</sub> S	PPM	82.00	111.00	103.00	120.00	128.00	126.00	102.00	82.00	95.00	90.00	100.00	95.00
	Initial pressure	"H <sub>2</sub> O										-0.43	-0.58	0.10
	Adjusted pressure	"H <sub>2</sub> O										-0.31	-0.62	0.12
	Lateral	"H <sub>2</sub> O			-5.62	-4.19	-5.29	-5.99	-10.40	-19.46	-24.65	-27.79	-28.47	-28.15
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments		2T	closed	closed	closed	closed	closed						

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
4-36	CH <sub>4</sub>	%	43.50	43.70	42.60	46.30	45.20	44.30	45.70	51.00	50.20	50.40	51.80	50.10
	CO <sub>2</sub>	%	31.70	30.00	30.40	31.30	32.80	34.80	32.60	32.30	31.20	30.60	31.20	30.60
	O <sub>2</sub>	%	1.90	2.50	4.20	3.40	2.90	4.80	3.60	5.10	5.50	4.80	5.10	6.20
	BAL (N <sub>2</sub> )	%								0.00	0.00	0.00		
	CO	PPM	1.00	1.00	7.00	3.00	2.00	6.00	4.00	6.00	6.00	4.00	1.00	9.00
	H <sub>2</sub> S	PPM	244.00	91.00	88.00	117.00	165.00	157.00	127.00	232.00	157.00	107.00	105.00	124.00
	Initial pressure	"H <sub>2</sub> O										-0.23	-15.14	-0.04
	Adjusted pressure	"H <sub>2</sub> O										-13.48	-15.48	-0.05
	Lateral	"H <sub>2</sub> O			-5.84	-4.85	-5.84	-6.11	-11.57	-10.58	-24.58	-27.85	-28.64	-28.62
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments		cracked	cracked	cracked	cracked	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV
4-37	CH <sub>4</sub>	%	0.00	18.40	18.50	18.10	21.00	25.10	24.70	17.40	15.90	10.30	12.40	18.40
	CO <sub>2</sub>	%	1.00	21.40	18.60	17.00	19.50	23.50	25.80	12.50	16.90	6.60	8.40	12.80
	O <sub>2</sub>	%	14.20	10.40	9.40	9.70	8.80	7.40	8.50	17.40	15.60	19.00	15.60	12.40
	BAL (N <sub>2</sub> )	%								0.00	0.00	0.00		
	CO	PPM	3.00	2.00	4.00	5.00	6.00	1.00	9.00	2.00	6.00	3.00	4.00	5.00
	H <sub>2</sub> S	PPM	8.00	27.00	35.00	29.00	15.00	21.00	28.00	5.00	2.00	78.00	84.00	75.00
	Initial pressure	"H <sub>2</sub> O										-0.09	-0.02	-0.12
	Adjusted pressure	"H <sub>2</sub> O										-0.06	-0.06	-0.18
	Lateral	"H <sub>2</sub> O			-6.22	-6.96	-5.62	-6.59	-10.65	-21.30	-24.02	-28.53	-29.31	-27.95
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed
5-38	CH <sub>4</sub>	%	54.20	53.60	52.80	56.00	55.30	54.00	52.90	50.80	58.50	55.20	54.80	55.20
	CO <sub>2</sub>	%	37.40	35.90	36.40	37.40	35.90	34.00	31.20	35.60	41.00	31.60	30.10	29.50
	O <sub>2</sub>	%	1.00	1.50	1.90	1.20	1.50	0.80	1.30	2.30	0.50	6.80	8.50	7.60
	BAL (N <sub>2</sub> )	%								2.61	0.00	0.56		
	CO	PPM	0.00	5.00	4.00	4.00	9.00	4.00	4.00	9.00	3.00	3.00	4.00	1.00
	H <sub>2</sub> S	PPM	24.00	148.00	155.00	132.00	102.00	127.00	101.00	3.00	234.00	330.00	268.00	213.00
	Initial pressure	"H <sub>2</sub> O										-0.04	-0.03	-0.06
	Adjusted pressure	"H <sub>2</sub> O										-0.04	-0.04	-0.03
	Lateral	"H <sub>2</sub> O			0.66	0.51	0.21	0.25	0.30	-0.06	1.29	0.62	-0.03	0.00
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.40	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.19	0.00	0.00
	Comments		cracked	cracked	cracked	1T	1T	2T	2T	2T	2T	2T	2T	2T

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
5-39 well bore seal	CH <sub>4</sub>	%	54.80	1.00	0.00	0.00	0.00	0.00	59.00	20.80	47.20	48.70	49.40	
	CO <sub>2</sub>	%	40.50	1.00	0.50	0.30	0.30	1.20	37.70	16.10	32.00	34.10	33.40	
	O <sub>2</sub>	%	5.50	14.20	15.80	17.40	18.60	17.20	15.40	3.40	8.30	17.40	18.40	
	BAL (N <sub>2</sub> )	%							0.00	23.43	0.00			
	CO	PPM	20.00	8.00	1.00	0.00	2.00	5.00	2.00	2.00	3.00	5.00	5.00	
	H <sub>2</sub> S	PPM	102.00	10.00	9.00	5.00	9.00	12.00	24.00	369.00	64.00	11.00	15.00	19.00
	Initial pressure	"H <sub>2</sub> O										-0.09	-0.04	-0.02
	Adjusted pressure	"H <sub>2</sub> O										-0.07	-0.07	0.02
	Lateral	"H <sub>2</sub> O			0.02	-0.03	0.25	0.68	-0.24	-0.06	-0.14	-0.06	-0.08	-0.04
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed
	5-40	CH <sub>4</sub>	%	55.60	49.60	48.40	45.60	49.30	53.70	52.50	54.60	48.50	47.20	46.20
		CO <sub>2</sub>	%	36.50	35.60	37.40	38.80	36.40	31.40	32.60	32.80	33.60	33.10	32.80
O <sub>2</sub>		%	1.40	12.80	14.70	15.60	16.40	14.20	12.50	4.80	5.10	1.80	3.50	
BAL (N <sub>2</sub> )		%							0.00	0.00	9.80			
CO		PPM	2.00	4.00	3.00	3.00	9.00	10.00	9.00	3.00	1.00	7.00	4.00	
H <sub>2</sub> S		PPM	168.00	124.00	111.00	126.00	139.00	127.00	123.00	15.00	10.00	17.00	12.00	14.00
Initial pressure		"H <sub>2</sub> O										0.02	-0.08	-0.09
Adjusted pressure		"H <sub>2</sub> O										0.01	0.01	-0.11
Lateral		"H <sub>2</sub> O			0.03	0.10	0.26	0.65	1.00	-0.02	-0.03	0.01	0.02	-0.06
Flow		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Comments			2T	1T	1T	1/2T	1/2T	1/2T						
5-41 well bore seal		CH <sub>4</sub>	%	40.90	55.60	56.90	58.30	55.00	59.60	57.80	3.10	5.60	17.70	19.40
		CO <sub>2</sub>	%	19.60	34.70	35.80	38.40	39.60	36.90	34.90	3.50	6.50	13.00	15.40
	O <sub>2</sub>	%	16.80	3.20	2.90	3.10	2.60	3.40	3.60	11.40	10.40	2.40	1.80	
	BAL (N <sub>2</sub> )	%							38.91	40.20	57.83			
	CO	PPM	2.00	4.00	6.00	4.00	2.00	8.00	10.00	2.00	4.00	7.00	3.00	
	H <sub>2</sub> S	PPM	9.00	122.00	215.00	268.00	245.00	268.00	294.00	6.00	1.00	9.00	10.00	
	Initial pressure	"H <sub>2</sub> O										-0.04	-0.01	-0.04
	Adjusted pressure	"H <sub>2</sub> O										-0.03	-0.03	-0.03
	Lateral	"H <sub>2</sub> O			0.28	0.05	0.12	0.63	0.58	-0.09	-0.08	-0.04	0.06	-0.01
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments		1/2T	1T	1T	2T	2T	2T	2T	closed	closed	closed	closed	closed

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
5-42	CH <sub>4</sub>	%	19.80	52.70	54.70	55.20	54.80	53.40	51.60	0.30	6.70	47.80	46.80	48.50
	CO <sub>2</sub>	%	5.90	37.60	38.70	39.40	40.00	39.60	40.10	0.30	0.90	32.90	33.60	31.80
	O <sub>2</sub>	%	12.70	4.20	4.00	5.40	4.10	5.80	4.70	19.10	15.80	1.70	1.90	3.60
	BAL (N <sub>2</sub> )	%								8.10	5.80	11.17		
	CO	PPM	5.00	4.00	2.00	3.00	2.00	5.00	4.00	2.00	5.00	6.00	5.00	7.00
	H <sub>2</sub> S	PPM	5.00	218.00	311.00	295.00	266.00	275.00	199.00	1.00	2.00	44.00	35.00	27.00
	Initial pressure	"H <sub>2</sub> O										-0.18	-0.03	-0.03
	Adjusted pressure	"H <sub>2</sub> O										-0.11	-0.11	0.02
	Lateral	"H <sub>2</sub> O			0.28	0.48	0.22	0.62	0.25	0.40	0.02	-0.09	0.18	0.22
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments		cracked	1T	1T	2T	2T	2T	2T	closed	closed	closed	closed	closed
	5-43	CH <sub>4</sub>	%	1.90	53.50	536.00	56.90	54.40	52.60	53.60	60.50	0.40	0.50	1.50
CO <sub>2</sub>		%	0.50	36.70	37.70	37.70	36.10	35.90	33.80	37.90	0.40	0.30	0.80	5.40
O <sub>2</sub>		%	18.50	1.20	0.80	0.40	0.30	0.60	1.80	0.70	1.30	16.20	15.60	12.80
BAL (N <sub>2</sub> )		%								0.00	92.99	21.76		
CO		PPM	1.00	1.00	3.00	3.00	2.00	2.00	6.00	5.00	3.00	4.00	6.00	6.00
H <sub>2</sub> S		PPM	27.00	62.00	57.00	72.00	58.00	65.00	82.00	262.00	214.00	8.00	8.00	9.00
Initial pressure		"H <sub>2</sub> O										-0.07	0.02	-0.01
Adjusted pressure		"H <sub>2</sub> O										-0.04	-0.04	-0.03
Lateral		"H <sub>2</sub> O			0.05	-0.04	0.02	0.18	0.14	0.24	-0.18	0.07	-0.02	-0.01
Flow		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Comments			closed	2T	closed	closed	closed	closed						
5-44		CH <sub>4</sub>	%	51.60	51.60	52.80	53.70	54.10	55.30	56.30	39.00	40.10	47.90	45.80
	CO <sub>2</sub>	%	38.50	35.60	36.70	38.40	37.40	35.20	33.60	31.50	32.70	32.60	33.60	31.50
	O <sub>2</sub>	%	3.20	8.60	8.40	7.80	6.50	8.50	7.40	18.50	14.70	19.50	18.60	15.40
	BAL (N <sub>2</sub> )	%								0.00	0.00	0.00		
	CO	PPM	0.00	2.00	1.00	2.00	1.00	3.00	5.00	2.00	8.00	3.00	8.00	5.00
	H <sub>2</sub> S	PPM	41.00	0.00						20.00	15.00	10.00	13.00	16.00
	Initial pressure	"H <sub>2</sub> O										-0.01	0.54	-0.03
	Adjusted pressure	"H <sub>2</sub> O										0.03	0.03	-0.02
	Lateral	"H <sub>2</sub> O			0.06	0.18	0.29	0.34	0.42	0.00	-15.00	1.03	1.00	0.81
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments		2T	2T	2T	2T	2T	2T	2T	1/2T	1/2T	1/2T	1/2T	1/2T

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
5-45	CH <sub>4</sub>	%	45.80	54.80	55.70	58.20	56.40	55.80	54.80	36.20	39.60	31.90	33.60	32.60
	CO <sub>2</sub>	%	39.60	38.30	37.40	39.40	35.60	33.00	31.40	30.10	29.60	22.20	25.60	24.80
	O <sub>2</sub>	%	17.40	0.80	0.20	0.60	1.00	1.80	2.40	2.90	3.60	16.00	14.80	13.90
	BAL (N <sub>2</sub> )	%								19.84	21.50	0.00		
	CO	PPM	2.00	3.00	1.00	5.00	10.00	20.00	5.00	3.00	3.00	3.00	2.00	7.00
	H <sub>2</sub> S	PPM	21.00	258.00	268.00	277.00	254.00	242.00	218.00	53.00	63.00	203.00	145.00	135.00
	Initial pressure	"H <sub>2</sub> O										-0.04	-0.01	-0.05
	Adjusted pressure	"H <sub>2</sub> O										-0.01	-0.01	-0.04
	Lateral	"H <sub>2</sub> O			0.68	0.43	0.32	0.75	0.96	-0.18	-0.22	-0.01	0.02	0.03
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.20	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.49	0.00	0.00
	Comments		1T	1T	1T	2T	2T	2T	2T	1T	closed	closed	closed	closed
	5-46	CH <sub>4</sub>	%	47.20	0.00	0.00	0.00	0.00	0.00	0.00	3.00	9.70	40.90	43.60
CO <sub>2</sub>		%	42.80	1.50	0.90	0.40	1.50	1.80	2.20	2.50	2.40	24.80	27.40	26.80
O <sub>2</sub>		%	3.60	1.50	1.60	1.50	1.80	2.70	2.90	3.60	3.70	3.10	2.60	3.60
BAL (N <sub>2</sub> )		%								77.29	75.40	19.48		
CO		PPM	1.00	5.00	2.00	2.00	5.00	4.00	14.00	4.00	6.00	5.00	5.00	2.00
H <sub>2</sub> S		PPM	126.00	132.00	132.00	158.00	186.00	145.00	136.00	49.00	52.00	19.00	22.00	23.00
Initial pressure		"H <sub>2</sub> O										0.02	0.02	0.01
Adjusted pressure		"H <sub>2</sub> O										0.02	0.02	0.05
Lateral		"H <sub>2</sub> O			0.24	0.68	0.41	0.24	0.58	-0.09	-0.35	0.02	0.03	-0.02
Flow		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Comments			closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed
6-47		CH <sub>4</sub>	%	19.40	51.20	52.90	53.00	52.10	51.30	50.70	60.90	49.80	45.80	42.10
	CO <sub>2</sub>	%	12.70	32.60	33.60	35.40	36.80	35.60	34.20	37.10	37.50	28.50	29.60	30.20
	O <sub>2</sub>	%	13.40	1.20	1.40	1.70	1.60	1.80	2.10	0.60	12.70	7.60	8.10	7.60
	BAL (N <sub>2</sub> )	%								0.00	0.00	8.92		
	CO	PPM	2.00	1.00	3.00	2.00	4.00	6.00	7.00	4.00	3.00	3.00	5.00	2.00
	H <sub>2</sub> S	PPM	20.00	36.00	42.00	36.00	42.00	45.00	32.00	83.00	62.00	47.00	36.00	32.00
	Initial pressure	"H <sub>2</sub> O										-7.47	-2.51	-4.21
	Adjusted pressure	"H <sub>2</sub> O										-7.96	-3.18	-4.25
	Lateral	"H <sub>2</sub> O			-11.25	-10.61	-11.24	-10.98	-15.81	-10.66	-14.61	-15.15	-16.24	-15.32
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	95.10	41.90	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	66.96	27.12	0.00
	Comments		cracked	2T	1T	1T	1T	cracked						

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
6-48	CH <sub>4</sub>	%	35.80	47.50	46.90	45.30	49.60	50.90	51.20	1.00	0.30	0.50	5.50	15.80
	CO <sub>2</sub>	%	16.90	30.50	29.40	27.50	28.40	29.40	30.20	2.50	0.20	0.30	0.60	2.50
	O <sub>2</sub>	%	9.70	2.20	2.60	4.20	3.90	4.80	3.20	18.50	14.20	19.20	18.90	14.80
	BAL (N <sub>2</sub> )	%								8.07	31.62	7.42		
	CO	PPM	0.00	10.00	11.00	9.00	17.00	19.00	24.00	3.00	2.00	3.00	5.00	4.00
	H <sub>2</sub> S	PPM	21.00	4.00	5.00	6.00	5.00	8.00	10.00	1.00	15.00	3.00	5.00	4.00
	Initial pressure	"H <sub>2</sub> O										-0.24	-0.09	0.02
	Adjusted pressure	"H <sub>2</sub> O										-0.20	-0.20	-0.07
	Lateral	"H <sub>2</sub> O			-10.05	-10.11	-11.36	-10.26	-16.02	-6.42	-14.77	-22.26	-22.62	-17.85
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments			1/2T	1/2T	1/2T	1/2T	1/2T	1/2T	closed	closed	closed	closed	closed
	6-49	CH <sub>4</sub>	%	42.80	56.90	58.40	57.40	55.20	54.20	52.40	35.50	38.60	22.00	26.70
CO <sub>2</sub>		%	32.80	36.20	36.20	37.00	36.80	37.50	36.40	31.70	35.70	16.70	18.40	19.40
O <sub>2</sub>		%	1.80	0.50	0.30	0.10	0.30	1.70	1.50	2.20	2.90	12.80	13.50	12.40
BAL (N <sub>2</sub> )		%								22.28	21.50	0.12		
CO		PPM	1.00	1.00	2.00	4.00	6.00	6.00	4.00	5.00	9.00	3.00	1.00	8.00
H <sub>2</sub> S		PPM	109.00	148.00	268.00	290.00	312.00	284.00	215.00	35.00	22.00	50.00	47.00	74.00
Initial pressure		"H <sub>2</sub> O										-2.38	-0.03	-0.03
Adjusted pressure		"H <sub>2</sub> O										-0.03	-0.03	-0.03
Lateral		"H <sub>2</sub> O			-4.57	-3.39	-5.14	-6.25	-10.65	-12.94	-14.21	-15.63	-16.80	-15.17
Flow		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.50	0.00	0.00
Energy			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.29	0.00	0.00
Comments			closed	1T	2T	2T	2T	2T	2T	1/2T	1/2T	closed	closed	closed
6-50		CH <sub>4</sub>	%	12.40	21.40	20.60	21.40	25.10	24.80	28.60	23.60	23.10	20.80	21.60
	CO <sub>2</sub>	%	5.80	23.40	19.40	16.80	19.40	22.40	25.80	18.90	19.60	19.10	21.70	20.70
	O <sub>2</sub>	%	14.80	9.90	10.30	11.80	12.40	10.20	5.40	10.20	11.50	12.50	11.50	12.30
	BAL (N <sub>2</sub> )	%								8.74	9.60	0.35		
	CO	PPM	1.00	3.00	8.00	3.00	3.00	4.00	6.00	3.00	4.00	3.00	6.00	8.00
	H <sub>2</sub> S	PPM	14.00	5.00	4.00	8.00	10.00	12.00	10.00	42.00	24.00	27.00	34.00	44.00
	Initial pressure	"H <sub>2</sub> O										-0.22	-0.22	-0.02
	Adjusted pressure	"H <sub>2</sub> O										-0.17	-0.17	-0.02
	Lateral	"H <sub>2</sub> O			-5.92	-4.26	-5.99	-6.12	-10.63	-11.45	-13.69	-19.69	-20.15	-17.32
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
6-51	CH <sub>4</sub>	%	50.00	49.80	48.10	46.40	48.50	51.80	52.30	35.40	39.40	29.30	32.60	33.80
	CO <sub>2</sub>	%	32.60	32.60	33.90	34.80	35.80	36.80	35.90	30.70	31.70	25.60	27.40	28.40
	O <sub>2</sub>	%	1.20	3.60	2.90	1.40	1.50	1.40	1.00	18.70	17.50	8.60	7.40	6.40
	BAL (N <sub>2</sub> )	%								0.00	0.00	3.99		
	CO	PPM	5.00	6.00	3.00	6.00	0.00	2.00	5.00	2.00	5.00	3.00	4.00	4.00
	H <sub>2</sub> S	PPM	0.00	29.00	58.00	70.00	76.00	81.00	65.00	9.00	15.00	29.00	33.00	10.00
	Initial pressure	"H <sub>2</sub> O										-0.22	-0.03	-0.03
	Adjusted pressure	"H <sub>2</sub> O										-0.14	-0.14	-0.03
	Lateral	"H <sub>2</sub> O			-6.21	-3.79	-5.48	-6.97	-10.24	-13.10	-14.58	-16.92	-16.58	-15.62
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments			1/2T	1/2T	1/2T	1/2T	1T	1T	closed	closed	closed	closed	closed
	6-52	CH <sub>4</sub>	%	45.80	51.60	50.10	46.20	49.60	50.20	49.50	37.80	39.60	46.70	47.80
CO <sub>2</sub>		%	31.60	30.50	31.60	30.30	31.20	30.40	31.50	31.10	30.20	36.40	31.80	32.60
O <sub>2</sub>		%	10.70	4.20	4.30	4.40	3.60	3.50	3.30	2.50	2.20	16.90	10.50	8.60
BAL (N <sub>2</sub> )		%								19.15	16.30	0.00		
CO		PPM	1.00	2.00	5.00	3.00	1.00	1.00	8.00	5.00	5.00	3.00	2.00	4.00
H <sub>2</sub> S		PPM	255.00	31.00	65.00	81.00	70.00	75.00	84.00	72.00	88.00	57.00	48.00	56.00
Initial pressure		"H <sub>2</sub> O										-0.06	-10.26	-11.23
Adjusted pressure		"H <sub>2</sub> O										-14.63	-10.24	-11.24
Lateral		"H <sub>2</sub> O			-4.26	-4.55	-6.29	-5.22	-8.62	-11.00	-14.85	-18.47	-19.25	-18.27
Flow		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.80	15.80	12.60
Energy			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.06	11.61	9.45
Comments			1/2T	1T	1T	1/2T	1/2T	1/2T	1/2T	cracked	cracked	cracked	cracked	cracked
6-53		CH <sub>4</sub>	%	45.60	48.00	47.10	49.60	50.20	51.80	50.80	41.90	42.80	41.50	42.80
	CO <sub>2</sub>	%	34.60	35.20	35.90	34.30	32.40	35.60	33.80	33.00	29.80	26.90	29.40	27.60
	O <sub>2</sub>	%	9.60	0.60	0.50	0.20	0.40	1.20	1.90	0.40	0.60	5.80	5.60	5.20
	BAL (N <sub>2</sub> )	%								23.19	21.80	23.58		
	CO	PPM	1.00	3.00	4.00	5.00	3.00	5.00	2.00	6.00	5.00	3.00	7.00	3.00
	H <sub>2</sub> S	PPM	174.00	255.00	257.00	316.00	328.00	269.00	258.00	412.00	144.00	48.00	26.00	19.00
	Initial pressure	"H <sub>2</sub> O										-1.02	-0.57	-5.86
	Adjusted pressure	"H <sub>2</sub> O										-1.10	-1.10	-5.68
	Lateral	"H <sub>2</sub> O			-3.49	-2.54	-3.94	-4.15	-8.62	-10.02	-14.62	-21.51	-21.54	-15.70
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.30	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.04	0.00	0.00
	Comments		cracked	cracked	1T	1T	2T	2T	2T	1T	cracked	cracked	cracked	cracked

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
6-54	CH <sub>4</sub>	%	45.80	30.50	29.60	33.60	31.60	30.60	35.70	23.70	24.10	20.50	25.60	24.10
	CO <sub>2</sub>	%	35.20	25.80	25.80	22.50	23.50	26.90	27.60	18.60	12.80	19.20	21.50	20.60
	O <sub>2</sub>	%	0.90	14.20	15.40	18.20	17.50	15.80	14.80	20.10	19.30	4.80	5.80	6.20
	BAL (N <sub>2</sub> )	%								0.00	0.00	37.36		
	CO	PPM	2.00	2.00	4.00	1.00	6.00	2.00	2.00	2.00	8.00	5.00	8.00	4.00
	H <sub>2</sub> S	PPM	238.00	9.00	4.00	5.00	12.00	14.00	17.00	8.00	10.00	39.00	29.00	31.00
	Initial pressure	"H <sub>2</sub> O										-0.17	-0.17	0.15
	Adjusted pressure	"H <sub>2</sub> O										-0.15	-0.15	-0.01
	Lateral	"H <sub>2</sub> O			-8.22	-9.24	-8.63	-7.06	-11.57	-11.90	-14.58	-19.37	-21.52	-18.62
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed
	6-55	CH <sub>4</sub>	%	52.80	53.80	52.90	53.60	52.70	51.00	52.10	0.20	15.80	19.90	23.50
CO <sub>2</sub>		%	33.00	31.00	32.70	33.70	35.60	33.60	32.40	0.30	0.90	18.90	20.60	21.80
O <sub>2</sub>		%	4.50	4.60	3.60	2.20	1.80	2.60	3.60	19.20	18.50	4.90	4.70	5.10
BAL (N <sub>2</sub> )		%								7.72	8.40	37.78		
CO		PPM	4.00	1.00	2.00	1.00	2.00	3.00	1.00	2.00	2.00	10.00	2.00	2.00
H <sub>2</sub> S		PPM	101.00	128.00	140.00	124.00	99.00	101.00	85.00	2.00	21.00	39.00	21.00	28.00
Initial pressure		"H <sub>2</sub> O										0.01	0.02	0.02
Adjusted pressure		"H <sub>2</sub> O										-0.07	-0.07	-0.02
Lateral		"H <sub>2</sub> O			-5.61	-6.25	-6.28	-6.30	-10.95	-9.78	-15.24	-18.98	-19.34	-17.91
Flow		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Comments			2T	2T	2T	2T	2T	2T	2T	closed	closed	closed	closed	closed
6-56		CH <sub>4</sub>	%	50.00	30.10	29.40	25.10	24.50	26.90	30.10	35.40	39.60	36.50	33.40
	CO <sub>2</sub>	%	34.80	28.60	27.80	24.80	24.10	25.70	26.90	25.80	24.80	24.70	21.70	23.60
	O <sub>2</sub>	%	1.00	13.50	12.50	15.40	14.80	10.20	11.70	2.70	2.90	5.00	5.20	4.60
	BAL (N <sub>2</sub> )	%								25.89	24.50	38.10		
	CO	PPM	0.00	2.00	5.00	0.00	8.00	6.00	24.00	3.00	7.00	8.00	1.00	1.00
	H <sub>2</sub> S	PPM	115.00	30.00	15.00	19.00	24.00	21.00	33.00	28.00	17.00	41.00	35.00	26.00
	Initial pressure	"H <sub>2</sub> O										0.02	-0.01	-0.01
	Adjusted pressure	"H <sub>2</sub> O										0.02	0.02	-0.01
	Lateral	"H <sub>2</sub> O			-7.62	-8.14	-7.16	-6.28	-11.62	-16.60	-13.91	-17.80	-18.47	-18.62
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
6-57	CH <sub>4</sub>	%	41.70	26.90	22.30	18.40	22.50	29.60	32.50	35.10	40.20	40.80	41.80	42.80
	CO <sub>2</sub>	%	33.60	18.00	15.90	12.80	16.80	15.70	18.40	24.80	21.70	31.50	28.90	27.40
	O <sub>2</sub>	%	0.60	3.60	3.50	3.00	4.10	3.80	3.90	19.90	20.00	4.80	5.60	5.00
	BAL (N <sub>2</sub> )	%								0.00	0.00	39.30		
	CO	PPM	5.00	2.00	3.00	3.00	1.00	5.00	8.00	2.00	5.00	6.00	2.00	2.00
	H <sub>2</sub> S	PPM	26.00	36.00	26.00	32.00	29.00	31.00	28.00	1.00	2.00	32.00	26.00	13.00
	Initial pressure	"H <sub>2</sub> O										-0.04	-0.02	-0.02
	Adjusted pressure	"H <sub>2</sub> O										-0.02	-0.02	-0.03
	Lateral	"H <sub>2</sub> O			-8.67	-9.95	-9.85	-10.27	-11.57	-17.09	-14.58	-16.87	-15.95	-17.54
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed
	6-58	CH <sub>4</sub>	%	51.80	25.80	24.80	24.80	29.60	32.70	31.80	0.10	5.50	17.40	19.20
CO <sub>2</sub>		%	36.90	30.70	31.60	30.20	31.20	30.50	31.70	0.20	0.60	17.40	19.60	20.50
O <sub>2</sub>		%	1.40	5.20	4.90	3.10	5.90	4.80	4.20	17.10	16.90	5.60	5.70	5.20
BAL (N <sub>2</sub> )		%								17.96	15.90	38.43		
CO		PPM	1.00	3.00	1.00	4.00	4.00	5.00	3.00	2.00	6.00	7.00	4.00	5.00
H <sub>2</sub> S		PPM	162.00	16.00	14.00	24.00	36.00	40.00	51.00	4.00	5.00	28.00	30.00	33.00
Initial pressure		"H <sub>2</sub> O										-0.02	-0.01	-0.01
Adjusted pressure		"H <sub>2</sub> O										0.01	0.01	-0.02
Lateral		"H <sub>2</sub> O			-8.47	-9.24	-8.62	-7.67	-12.45	-16.80	-14.65	-18.31	-19.62	-19.62
Flow		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Comments			1/2T	closed	closed	closed	closed	closed						
6-59		CH <sub>4</sub>	%	47.10	17.50	14.50	10.50	8.80	15.80	19.70	34.80	35.80	32.60	19.40
	CO <sub>2</sub>	%	34.10	18.50	18.40	11.80	15.40	16.80	19.60	27.10	25.80	25.10	26.70	25.90
	O <sub>2</sub>	%	1.60	4.20	3.60	3.10	6.40	2.60	3.00	12.20	12.50	5.70	6.10	5.70
	BAL (N <sub>2</sub> )	%								0.00	0.00	37.55		
	CO	PPM	2.00	1.00	2.00	2.00	5.00	4.00	4.00	3.00	4.00	7.00	5.00	6.00
	H <sub>2</sub> S	PPM	112.00	28.00	39.00	45.00	28.00	26.00	17.00	47.00	33.00	33.00	28.00	24.00
	Initial pressure	"H <sub>2</sub> O										0.00	-0.02	-0.02
	Adjusted pressure	"H <sub>2</sub> O										0.01	0.01	-0.06
	Lateral	"H <sub>2</sub> O			-10.25	-9.32	-10.26	-9.15	-16.24	-17.82	-12.69	-18.73	-19.62	-17.24
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
7-60	CH <sub>4</sub>	%	0.00	52.40	51.70	52.60	53.70	55.70	54.70	28.00	0.20	10.80	15.40	21.50
	CO <sub>2</sub>	%	0.00	34.50	33.60	31.70	32.50	33.60	32.40	23.30	0.50	9.50	10.20	15.40
	O <sub>2</sub>	%	19.70	0.50	0.10	0.20	0.40	0.40	0.30	2.40	21.10	10.90	11.80	10.40
	BAL (N <sub>2</sub> )	%								37.23	0.00	27.60		
	CO	PPM	1.00	2.00	5.00	3.00	1.00	1.00	2.00	3.00	3.00	2.00	2.00	6.00
	H <sub>2</sub> S	PPM	1.00	14.00	32.00	26.00	36.00	35.00	23.00	1.00	1.00	26.00	28.00	49.00
	Initial pressure	"H <sub>2</sub> O										0.01	0.05	0.01
	Adjusted pressure	"H <sub>2</sub> O										0.02	0.02	0.04
	Lateral	"H <sub>2</sub> O			-2.95	-2.80	-4.29	-5.98	-8.69	-10.23	-14.37	-10.96	-8.61	-8.15
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments		closed	2T	2T	2T	2T	2T	2T	closed	closed	closed	closed	closed
	7-61	CH <sub>4</sub>	%	1.50	51.20	50.60	51.40	53.60	51.00	51.40	54.50	52.40	54.60	53.40
CO <sub>2</sub>		%	2.50	31.90	32.50	33.60	30.00	31.50	32.50	36.80	35.40	36.60	37.50	31.60
O <sub>2</sub>		%	1.80	2.90	2.40	1.50	1.60	2.40	3.40	4.20	3.60	1.10	0.80	1.10
BAL (N <sub>2</sub> )		%								0.00	0.00	3.54		
CO		PPM	0.00	5.00	5.00	5.00	6.00	8.00	6.00	9.00	5.00	3.00	4.00	5.00
H <sub>2</sub> S		PPM	209.00	134.00	108.00	124.00	148.00	157.00	154.00					
Initial pressure		"H <sub>2</sub> O										-6.33	-8.24	-7.15
Adjusted pressure		"H <sub>2</sub> O										-10.64	-8.64	-7.68
Lateral		"H <sub>2</sub> O			-6.73	-5.82	-6.58	-8.60	-12.40	-9.95	-14.57	-13.58	-10.52	-8.69
Flow		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.50	10.20	11.50
Energy			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.46	8.37	9.25
Comments			2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T
7-62		CH <sub>4</sub>	%	45.50	52.70	53.60	52.90	54.00	48.40	47.60	55.30	56.90	58.90	56.70
	CO <sub>2</sub>	%	33.90	31.50	29.60	28.40	29.40	28.50	29.40	39.30	38.90	38.60	38.70	37.50
	O <sub>2</sub>	%	10.20	5.10	4.60	4.80	4.20	3.60	3.50	2.80	2.10	0.50	1.20	1.50
	BAL (N <sub>2</sub> )	%								0.00	0.00	0.11		
	CO	PPM	0.00	2.00	3.00	4.00	7.00	1.00	2.00	4.00	1.00	6.00	8.00	4.00
	H <sub>2</sub> S	PPM	137.00	155.00	163.00	157.00	196.00	201.00	196.00					
	Initial pressure	"H <sub>2</sub> O										-10.29	-18.36	-7.62
	Adjusted pressure	"H <sub>2</sub> O										-12.00	-19.47	-7.54
	Lateral	"H <sub>2</sub> O			-6.14	-5.18	-6.03	-7.08	-11.50	-12.32	-13.68	-13.08	-10.15	-8.62
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00	13.60
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.72	0.00	11.46
	Comments		closed	2T	2T	2T	2T	2T						

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
7-63	CH <sub>4</sub>	%	33.20	19.60	18.40	10.70	13.50	19.40	20.10	5.10	6.40	32.20	31.60	33.60
	CO <sub>2</sub>	%	15.80	11.50	10.50	6.50	7.50	12.50	18.40	2.60	2.40	29.00	29.40	26.80
	O <sub>2</sub>	%	19.80	7.50	6.90	9.20	10.50	4.80	3.70	20.20	20.20	1.20	0.90	1.50
	BAL (N <sub>2</sub> )	%								0.00	0.00	33.06		
	CO	PPM	5.00	3.00	4.00	2.00	3.00	5.00	1.00	2.00	5.00	4.00	5.00	7.00
	H <sub>2</sub> S	PPM	2.00	25.00	19.00	14.00	11.00	17.00	15.00	1.00	1.00	81.00	66.00	72.00
	Initial pressure	"H <sub>2</sub> O										-0.25	0.04	-0.01
	Adjusted pressure	"H <sub>2</sub> O										0.03	0.03	-0.02
	Lateral	"H <sub>2</sub> O			-3.64	-2.10	-4.27	-5.72	-10.15	-11.49	-12.58	-11.70	-8.62	-7.26
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed
	7-64	CH <sub>4</sub>	%	47.60	60.20	64.90	55.90	56.80	50.60	49.80	44.00	42.80	48.30	49.70
CO <sub>2</sub>		%	32.60	32.80	33.40	35.20	36.20	34.60	31.50	32.10	31.60	35.10	33.40	31.40
O <sub>2</sub>		%	1.30	2.90	2.40	1.00	1.50	5.80	6.70	1.90	1.50	16.60	10.10	9.80
BAL (N <sub>2</sub> )		%								14.82	16.90	0.00		
CO		PPM	3.00	4.00	2.00	3.00	5.00	2.00	1.00	4.00	1.00	2.00	5.00	5.00
H <sub>2</sub> S		PPM	128.00	140.00	129.00	157.00	102.00	127.00	105.00	79.00	81.00	24.00	36.00	37.00
Initial pressure		"H <sub>2</sub> O										-3.32	-5.14	-10.24
Adjusted pressure		"H <sub>2</sub> O										-3.82	-5.68	-12.58
Lateral		"H <sub>2</sub> O			-5.84	-6.27	-7.39	-6.25	-11.43	-15.76	-14.57	-13.50	-11.51	-14.28
Flow		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.80	33.60	31.50
Energy			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.87	25.67	24.26
Comments			2T	2T	2T	2T	2T	1T	1T	2T	2T	2T	2T	2T
7-65		CH <sub>4</sub>	%	50.80	33.60	32.50	31.50	33.50	39.40	41.20	45.50	48.50	52.20	53.60
	CO <sub>2</sub>	%	35.20	26.30	25.80	24.80	22.70	23.10	25.80	33.00	32.60	36.90	35.80	33.60
	O <sub>2</sub>	%	1.90	2.50	2.10	2.60	3.90	4.00	3.40	1.90	2.10	6.30	4.80	5.60
	BAL (N <sub>2</sub> )	%								12.42	15.60	0.00		
	CO	PPM	0.00	3.00	4.00	1.00	3.00	4.00	4.00	4.00	7.00	2.00	4.00	1.00
	H <sub>2</sub> S	PPM	172.00	20.00	22.00	32.00	48.00	36.00	32.00	46.00	42.00	80.00	74.00	62.00
	Initial pressure	"H <sub>2</sub> O										-11.40	-1.24	-11.24
	Adjusted pressure	"H <sub>2</sub> O										-0.07	-1.25	-10.25
	Lateral	"H <sub>2</sub> O			9.24	-10.10	-9.18	-8.46	-12.68	-10.02	-14.58	-16.29	-15.24	-14.62
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	142.30	48.40	47.10
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	114.20	39.88	38.09
	Comments		1T	closed	closed	closed	closed	closed	closed	1T	1T	1T	1T	1T

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
7-66	CH <sub>4</sub>	%	63.40	50.20	51.80	53.60	54.80	52.80	51.70	39.10	38.40	42.80	42.80	45.80
	CO <sub>2</sub>	%	33.70	31.80	32.60	33.90	34.60	35.00	34.70	31.10	31.60	41.00	40.20	41.50
	O <sub>2</sub>	%	2.50	1.50	1.10	0.80	1.00	2.10	2.80	1.20	1.80	16.20	12.80	10.60
	BAL (N <sub>2</sub> )	%								24.06	27.10	0.00		
	CO	PPM	2.00	1.00	1.00	2.00	6.00	5.00	2.00	4.00	4.00	1.00	8.00	8.00
	H <sub>2</sub> S	PPM	99.00	100.00	145.00	157.00	436.00	326.00	258.00	42.00	12.00	483.00	265.00	198.00
	Initial pressure	"H <sub>2</sub> O										0.00	0.15	0.15
	Adjusted pressure	"H <sub>2</sub> O										-0.01	-0.01	-0.06
	Lateral	"H <sub>2</sub> O			0.66	0.09	0.15	0.15	0.36	-7.42	-12.58	-0.02	0.01	0.02
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments		2T	2T	2T	2T	2T	2T	2T	cracked	cracked	cracked	cracked	cracked
	7-67	CH <sub>4</sub>	%	1.90	51.20	52.70	51.70	52.60	51.60	50.40	16.90	22.50	31.50	34.80
CO <sub>2</sub>		%	1.00	31.20	32.70	31.40	32.80	34.60	31.60	19.70	20.10	28.50	28.40	29.80
O <sub>2</sub>		%	19.60	2.40	1.90	1.30	1.50	3.00	2.60	7.40	6.20	19.20	17.40	15.40
BAL (N <sub>2</sub> )		%								28.03	19.60	0.00		
CO		PPM	3.00	1.00	5.00	2.00	1.00	8.00	5.00	5.00	6.00	1.00	6.00	2.00
H <sub>2</sub> S		PPM	21.00	102.00	163.00	121.00	148.00	184.00	203.00	46.00	27.00	28.00	32.00	36.00
Initial pressure		"H <sub>2</sub> O										-0.19	0.02	0.01
Adjusted pressure		"H <sub>2</sub> O										-0.18	-0.18	0.00
Lateral		"H <sub>2</sub> O			-4.95	-5.14	-6.95	-7.58	-12.84	-11.51	-13.68	-12.13	-10.57	-9.14
Flow		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Comments			cracked	1T	1T	2T	2T	2T	2T	closed	closed	closed	closed	closed
7-68		CH <sub>4</sub>	%	52.70	52.60	54.90	53.90	55.80	53.80	51.30	56.90	53.80	51.30	52.10
	CO <sub>2</sub>	%	36.00	34.50	35.20	33.60	35.60	33.10	30.80	37.60	26.80	38.30	36.90	33.40
	O <sub>2</sub>	%	1.20	2.10	2.40	1.40	1.10	2.50	2.90	0.80	1.20	10.30	8.70	5.80
	BAL (N <sub>2</sub> )	%								1.68	2.50	0.00		
	CO	PPM	1.00	2.00	6.00	3.00	5.00	6.00	1.00	4.00	8.00	2.00	5.00	1.00
	H <sub>2</sub> S	PPM	222.00	57.00	87.00	105.00	87.00	85.00	111.00					
	Initial pressure	"H <sub>2</sub> O										-11.67	-8.14	-8.15
	Adjusted pressure	"H <sub>2</sub> O										-8.45	-8.15	-8.21
	Lateral	"H <sub>2</sub> O			-5.95	-5.62	-6.48	-7.96	-12.18	-9.07	-14.26	-12.12	-10.39	-9.37
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.50
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.23
	Comments		2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
8-69	CH <sub>4</sub>	%	52.30	51.70	50.80	49.50	50.90	51.20	52.70	54.50	51.70	50.80	51.60	49.90
	CO <sub>2</sub>	%	38.20	32.60	33.90	34.80	35.20	34.50	30.50	31.50	33.60	31.40	30.10	31.80
	O <sub>2</sub>	%	1.40	2.10	2.30	1.90	1.60	1.40	3.60	2.40	2.60	3.10	2.90	3.60
	BAL (N <sub>2</sub> )	%								0.00	0.00	0.00		
	CO	PPM	1.00	2.00	1.00	2.00	6.00	3.00	4.00	5.00	2.00	3.00	5.00	4.00
	H <sub>2</sub> S	PPM	215.00	66.00	96.00	127.00	106.00	108.00	75.00	52.00	25.00	41.00	29.00	16.00
	Initial pressure	"H <sub>2</sub> O										-7.35	-8.34	-6.25
	Adjusted pressure	"H <sub>2</sub> O										-8.45	-8.11	-6.14
	Lateral	"H <sub>2</sub> O			-6.92	-5.28	-7.25	-7.15	-11.50	-10.21	-14.27	-10.52	-9.14	-7.32
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.80	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.06	0.00	0.00
	Comments		2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T
8-70	CH <sub>4</sub>	%	31.50	44.80	46.30	41.20	40.20	45.70	46.90	5.70	10.50	31.50	33.80	30.40
	CO <sub>2</sub>	%	16.80	34.80	33.20	32.60	36.80	32.50	31.80	2.90	2.90	28.10	28.40	25.70
	O <sub>2</sub>	%	18.50	15.60	14.70	15.20	19.70	18.40	14.70	19.00	19.20	0.00	1.50	1.80
	BAL (N <sub>2</sub> )	%								0.58	1.20	40.40		
	CO	PPM	0.00	3.00	1.00	1.00	7.00	5.00	6.00	2.00	2.00	3.00	1.00	4.00
	H <sub>2</sub> S	PPM	4.00	24.00	15.00	19.00	26.00	30.00	32.00	1.00	1.00	73.00	73.00	61.00
	Initial pressure	"H <sub>2</sub> O										0.04	0.01	0.04
	Adjusted pressure	"H <sub>2</sub> O										0.04	0.04	0.03
	Lateral	"H <sub>2</sub> O			2.22	1.35	-1.24	-2.22	-5.47	-11.10	-12.64	-11.58	-9.62	-8.16
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments		closed	cracked	cracked	cracked	cracked	cracked	cracked	closed	closed	closed	closed	closed
8-71	CH <sub>4</sub>	%	50.20	51.60	53.40	56.90	54.90	51.80	52.70	52.10	52.80	47.40	48.50	47.40
	CO <sub>2</sub>	%	32.70	29.80	28.40	27.10	24.70	26.80	29.60	31.60	32.70	35.50	34.80	35.60
	O <sub>2</sub>	%	1.90	2.90	2.30	1.20	1.40	2.10	2.80	1.80	1.90	0.00	0.10	1.50
	BAL (N <sub>2</sub> )	%								1.50	2.50	17.10		
	CO	PPM	0.00	4.00	2.00	1.00	2.00	2.00	8.00	5.00	3.00	5.00	2.00	2.00
	H <sub>2</sub> S	PPM	144.00	108.00	127.00	128.00	154.00	124.00	129.00	15.00	16.00	133.00	165.00	155.00
	Initial pressure	"H <sub>2</sub> O										-5.21	-3.84	-5.52
	Adjusted pressure	"H <sub>2</sub> O										-3.20	-3.22	-5.62
	Lateral	"H <sub>2</sub> O			-3.64	-2.51	-3.16	-3.06	-6.24	-9.62	-12.69	-9.56	-7.14	-6.84
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.40	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.95	0.00	0.00
	Comments		2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
8-72	CH <sub>4</sub>	%	55.80	47.50	51.70	54.70	52.60	50.60	52.60	50.90	51.90	48.30	49.60	46.80
	CO <sub>2</sub>	%	35.20	30.20	31.80	32.90	31.60	32.50	31.70	30.60	31.80	36.10	35.60	34.20
	O <sub>2</sub>	%	2.20	1.40	0.40	0.80	0.90	0.50	1.20	1.50	2.00	0.00	0.50	1.60
	BAL (N <sub>2</sub> )	%								0.00	0.00	15.60		
	CO	PPM	1.00	1.00	2.00	2.00	4.00	1.00	5.00	8.00	3.00	4.00	8.00	5.00
	H <sub>2</sub> S	PPM	102.00	184.00	195.00	148.00	186.00	168.00	138.00	29.00	33.00	138.00	148.00	124.00
	Initial pressure	"H <sub>2</sub> O										-3.31	-3.24	-4.68
	Adjusted pressure	"H <sub>2</sub> O										-3.79	-3.21	-4.57
	Lateral	"H <sub>2</sub> O			-3.02	-2.69	-4.58	-5.48	-7.32	-10.01	-13.48	-9.19	-7.62	-6.28
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.50	6.50	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.83	4.96	0.00
	Comments		2T	1T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T
	8-73	CH <sub>4</sub>	%	32.80	50.20	53.60	54.20	55.10	53.80	55.70	54.80	53.70	43.30	45.80
CO <sub>2</sub>		%	30.60	29.80	28.60	34.50	33.80	32.60	29.20	28.60	26.80	37.10	35.60	33.10
O <sub>2</sub>		%	2.50	0.60	0.50	0.90	1.10	1.10	1.80	2.00	1.50	19.60	14.70	12.40
BAL (N <sub>2</sub> )		%								21.80	20.80	0.00		
CO		PPM	2.00	2.00	1.00	1.00	3.00	5.00	7.00	10.00	9.00	2.00	1.00	1.00
H <sub>2</sub> S		PPM	108.00	235.00	201.00	222.00	217.00	235.00	185.00	65.00	18.00	23.00	35.00	34.00
Initial pressure		"H <sub>2</sub> O										-3.48	-3.15	-4.65
Adjusted pressure		"H <sub>2</sub> O										-5.04	-3.18	-4.84
Lateral		"H <sub>2</sub> O			-3.68	-3.01	-4.11	-4.27	-7.12	-10.57	-11.62	-10.20	-8.63	-6.30
Flow		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.50	0.00	0.00
Energy			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.98	0.00	0.00
Comments			1T	2T	2T	1T	1T	1T						
8-74		CH <sub>4</sub>	%	39.60	51.80	52.80	53.60	55.60	54.70	53.20	56.10	54.80	51.80	50.40
	CO <sub>2</sub>	%	30.80	37.40	39.40	28.90	25.40	24.10	25.80	40.00	38.70	39.00	40.10	39.60
	O <sub>2</sub>	%	4.90	1.30	1.60	1.20	0.90	1.30	2.10	3.40	2.80	9.20	8.40	7.40
	BAL (N <sub>2</sub> )	%								0.00	0.00	0.00		
	CO	PPM	3.00	4.00	3.00	3.00	1.00	4.00	2.00	7.00	4.00	4.00	5.00	8.00
	H <sub>2</sub> S	PPM	168.00	221.00	257.00	201.00	187.00	174.00	154.00	474.00	365.00	314.00	268.00	246.00
	Initial pressure	"H <sub>2</sub> O										-9.97	-5.24	-6.12
	Adjusted pressure	"H <sub>2</sub> O										-10.03	-6.22	-6.01
	Lateral	"H <sub>2</sub> O			-3.84	-2.95	-3.96	-5.68	-8.62	-9.92	-13.58	-9.25	-7.62	-6.24
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.20	22.20	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.68	17.20	0.00
	Comments		1T	2T	2T	2T	2T	2T						

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
WH-75	CH <sub>4</sub>	%	55.10	50.90	51.20	50.20	51.80	52.60	51.00	50.60	51.80	50.90	48.70	48.10
	CO <sub>2</sub>	%	41.80	33.60	34.70	38.60	36.90	30.50	31.70	32.60	32.40	31.50	32.60	33.60
	O <sub>2</sub>	%	1.80	2.80	2.80	1.30	1.50	0.80	0.60	2.90	2.60	2.10	2.50	2.70
	BAL (N <sub>2</sub> )	%								0.00	0.00	0.00		
	CO	PPM	2.00	3.00	3.00	2.00	4.00	2.00	9.00	5.00	7.00	4.00	8.00	8.00
	H <sub>2</sub> S	PPM	269.00	169.00	125.00	146.00	120.00	130.00	102.00	27.00	24.00	32.00	36.00	48.00
	Initial pressure	"H <sub>2</sub> O										-3.45	-2.35	-7.18
	Adjusted pressure	"H <sub>2</sub> O										-3.47	-2.35	-7.25
	Lateral	"H <sub>2</sub> O			-4.25	-5.62	-6.18	-7.62	-9.62	-9.95	-13.68	-10.57	-8.68	-8.21
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments		2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T
	WH-76	CH <sub>4</sub>	%	41.20	47.20	50.70	51.60	52.70	51.40	52.30	51.90	50.90	51.80	47.10
CO <sub>2</sub>		%	40.80	35.00	36.20	37.40	34.50	32.90	30.60	33.60	31.60	32.60	33.70	31.40
O <sub>2</sub>		%	2.50	2.40	2.40	2.00	2.40	1.50	1.80	1.50	1.80	1.10	1.40	2.10
BAL (N <sub>2</sub> )		%								8.11	9.40	0.00		
CO		PPM	7.00	5.00	2.00	5.00	9.00	5.00	5.00	4.00	5.00	4.00	2.00	5.00
H <sub>2</sub> S		PPM	201.00	127.00	187.00	194.00	163.00	152.00	133.00	120.00	133.00	108.00	122.00	103.00
Initial pressure		"H <sub>2</sub> O										-3.87	-2.15	-5.32
Adjusted pressure		"H <sub>2</sub> O										-3.85	-2.18	-5.40
Lateral		"H <sub>2</sub> O			-6.35	-5.27	-6.29	-6.57	-10.47	-9.58	-11.48	-10.51	-9.35	-6.56
Flow		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Comments			1T	1T	2T	2T	2T	2T	2T	2T	2T	1T	1T	1T
WH-77		CH <sub>4</sub>	%	45.20	45.20	47.80	48.40	50.20	51.30	50.10	49.50	48.70	52.30	51.60
	CO <sub>2</sub>	%	31.20	34.20	35.90	36.90	35.00	36.80	37.80	34.10	35.20	33.80	35.10	35.20
	O <sub>2</sub>	%	3.30	14.80	13.60	14.50	10.70	8.60	9.60	1.20	1.40	3.20	2.90	2.40
	BAL (N <sub>2</sub> )	%								0.00	0.00	0.00		
	CO	PPM	0.00	1.00	1.00	2.00	3.00	7.00	4.00	5.00	1.00	1.00	4.00	6.00
	H <sub>2</sub> S	PPM	127.00	24.00	36.00	54.00	62.00	84.00	58.00	15.00	18.00	10.00	12.00	16.00
	Initial pressure	"H <sub>2</sub> O										-9.87	-8.31	-6.15
	Adjusted pressure	"H <sub>2</sub> O										-9.98	-8.33	-6.21
	Lateral	"H <sub>2</sub> O			-6.90	-5.32	-6.84	-6.28	-10.33	-9.51	-11.95	-10.26	-8.47	-7.62
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments		1/2T	1/2T	1/2T	1/2T	1T	1T	1T	1T	1T	1T	1T	1T

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
WH-78	CH <sub>4</sub>	%	55.80	51.80	50.90	51.90	52.90	55.70	52.80	51.00	51.60	53.10	51.60	51.60
	CO <sub>2</sub>	%	33.10	33.80	35.70	38.50	40.10	39.50	36.70	35.20	3.60	35.60	33.80	32.60
	O <sub>2</sub>	%	3.00	4.60	3.80	2.10	2.00	1.50	2.70	0.90	1.00	10.40	10.10	8.50
	BAL (N <sub>2</sub> )	%								21.00	15.80	0.00		
	CO	PPM	0.00	3.00	4.00	3.00	3.00	1.00	3.00	7.00	4.00	2.00	4.00	2.00
	H <sub>2</sub> S	PPM	134.00	147.00	128.00	130.00	122.00	103.00	99.00	35.00	24.00	182.00	165.00	127.00
	Initial pressure	"H <sub>2</sub> O										-8.15	-8.15	-6.32
	Adjusted pressure	"H <sub>2</sub> O										-9.15	-8.24	-6.12
	Lateral	"H <sub>2</sub> O			-6.32	-5.66	-6.82	-6.97	-8.59	-9.60	-11.68	-10.39	-8.62	-6.15
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.20	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.14	0.00	0.00
	Comments		2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T
	WH-79	CH <sub>4</sub>	%	52.60	47.50	53.00	54.80	55.40	52.40	51.60	48.60	49.80	50.70	48.60
CO <sub>2</sub>		%	35.60	31.60	33.20	34.80	32.70	35.40	24.70	33.50	34.80	34.90	32.90	31.90
O <sub>2</sub>		%	1.40	2.50	1.90	1.50	1.40	2.60	3.60	2.10	1.90	3.60	2.60	2.00
BAL (N <sub>2</sub> )		%								15.70	16.90	0.00		
CO		PPM	0.00	2.00	5.00	3.00	2.00	2.00	8.00	8.00	3.00	5.00	2.00	4.00
H <sub>2</sub> S		PPM	201.00	248.00	216.00	205.00	215.00	168.00	147.00	24.00	62.00	100.00	107.00	111.00
Initial pressure		"H <sub>2</sub> O										-3.41	-3.26	-8.35
Adjusted pressure		"H <sub>2</sub> O										-3.37	-3.27	-8.40
Lateral		"H <sub>2</sub> O			-4.28	-4.21	-5.51	-6.02	-9.47	-9.24	-11.20	-10.38	-8.62	-8.94
Flow		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Comments			1T	1T	2T	2T	2T	2T	2T	1T	1T	1T	1T	1T
WH-80		CH <sub>4</sub>	%	52.70	45.30	52.00	52.90	53.90	50.90	51.70	51.90	50.60	51.00	49.60
	CO <sub>2</sub>	%	35.40	35.70	36.00	38.20	39.60	38.20	39.50	33.60	32.00	34.70	30.10	31.80
	O <sub>2</sub>	%	2.10	2.90	2.80	1.10	1.10	3.40	2.70	1.50	1.70	2.80	3.10	2.60
	BAL (N <sub>2</sub> )	%								8.11	7.80	0.00		
	CO	PPM	1.00	3.00	1.00	2.00	1.00	4.00	1.00	4.00	8.00	2.00	5.00	6.00
	H <sub>2</sub> S	PPM	57.00	135.00	157.00	257.00	263.00	214.00	215.00	120.00	157.00	182.00	168.00	143.00
	Initial pressure	"H <sub>2</sub> O										-3.78	-3.17	-5.12
	Adjusted pressure	"H <sub>2</sub> O										-3.77	-3.17	-5.50
	Lateral	"H <sub>2</sub> O			-3.48	-4.95	-5.33	-6.17	-7.15	-9.58	-11.08	-10.49	-7.99	-6.22
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments		1T	1T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T

Table 2: 2024 Wellfield Monitoring Data

	Units	January	February	March	April	May	June	July	August	September	October	November	December	
5-81	CH <sub>4</sub>	%	59.60	54.80	55.70	57.20	56.20	54.80	53.60	53.20	61.20	50.60	51.20	50.90
	CO <sub>2</sub>	%	30.60	39.60	40.60	41.70	39.60	38.20	38.60	35.90	38.40	34.50	32.50	31.70
	O <sub>2</sub>	%	1.40	1.00	0.60	0.10	0.20	0.50	0.90	9.80	0.40	1.40	1.50	2.10
	BAL (N <sub>2</sub> )	%								0.00	0.00	8.21	4.00	5.00
	CO	PPM	2.00	2.00	9.00	8.00	9.00	10.00	11.00	11.00	4.00	5.00	4.00	5.00
	H <sub>2</sub> S	PPM	101.00	34.00	26.00	32.00	65.00	76.00	95.00	3.00	317.00	24.00	24.00	29.00
	Initial pressure	"H <sub>2</sub> O										0.02	0.35	0.11
	Adjusted pressure	"H <sub>2</sub> O										0.04	0.04	0.10
	Lateral	"H <sub>2</sub> O			1.24	2.59	2.14	1.24	0.68	7.95	-0.15	0.88	0.58	0.17
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments		2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T
	7-82	CH <sub>4</sub>	%	51.60	45.20	46.30	47.10	50.20	51.80	50.90	52.30	51.50	32.90	35.70
CO <sub>2</sub>		%	30.20	32.60	34.60	33.80	35.90	33.50	31.60	35.60	34.20	30.00	29.10	28.60
O <sub>2</sub>		%	8.60	4.80	3.50	2.90	2.50	3.60	3.10	2.30	2.00	1.80	1.10	1.30
BAL (N <sub>2</sub> )		%								1.11	5.64	28.50	3.00	6.00
CO		PPM	0.00	15.00	24.00	27.00	19.00	24.00	23.00	30.00	22.00	2.00	3.00	6.00
H <sub>2</sub> S		PPM	66.00	57.00	101.00	93.00	101.00	102.00	71.00	180.00	165.00	71.00	65.00	55.00
Initial pressure		"H <sub>2</sub> O										-0.01	0.01	-0.02
Adjusted pressure		"H <sub>2</sub> O										0.00	0.00	-0.05
Lateral		"H <sub>2</sub> O			-8.66	-8.66	-7.51	-8.24	-16.27	-10.23	-13.62	-12.09	-10.24	-9.34
Flow		CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Comments			1/2T	1/2T	1/2T	1/2T	1T	1T	1T	1T	1T	1/2T	closed	closed
7-83		CH <sub>4</sub>	%	47.50	1.80	1.10	0.00	1.20	1.80	1.90	0.20	8.80	3.60	5.80
	CO <sub>2</sub>	%	31.80	1.20	0.60	0.10	1.20	1.90	1.50	0.20	0.40	3.00	6.60	10.20
	O <sub>2</sub>	%	11.60	16.90	15.40	17.20	16.40	13.50	12.40	19.90	20.10	1.20	1.50	1.80
	BAL (N <sub>2</sub> )	%								4.48	5.80	87.66	4.00	2.00
	CO	PPM	1.00	2.00	2.00	0.00	2.00	4.00	5.00	1.00	6.00	2.00	4.00	2.00
	H <sub>2</sub> S	PPM	4.00	8.00	6.00	9.00	8.00	9.00	11.00	1.00	2.00	59.00	48.00	34.00
	Initial pressure	"H <sub>2</sub> O										-0.03	0.03	-0.03
	Adjusted pressure	"H <sub>2</sub> O										-0.01	-0.01	-0.01
	Lateral	"H <sub>2</sub> O			-4.58	-3.07	-5.69	-6.04	-8.47	-11.10	-12.95	-12.41	-10.27	-9.25
	Flow	CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Energy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed

Notes:

NLV No Lateral Vacuum  
 - No reading

Table 3: Pump Counters

	January 28, 2024				February 28, 2024			March 28, 2024			April 28, 2024			May 28, 2024			June 28, 2024		
Location	Prev. Counter	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo
PDT 1	2289	2289	0	0	2289	0	0	2289	0	0	2299	10	26	2305	6	15.6	2357	52	135.2
PDT 2	68127	68127	0	0	68127	0	0	68127	0	0	68127	0	0	68127	0	0	68127	0	0
PDT 3	18101	18101	0	0	18101	0	0	18101	0	0	18101	0	0	18101	0	0	18101	0	0
PDT 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PDT 5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PDT 6	11485	11485	0	0	11485	0	0	11485	0	0	16266	4781	12430.6	17458	1192	3099.2	18442	984	2558.4
PDT 7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PDT 8	38247	38247	0	0	38247	0	0	38247	0	0	38247	0	0	38247	0	0	38247	0	0
PDT 9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PDT 10	10435	10487	52	135.2	10521	34	88.4	10854	333	865.8	11274	420	1092	11965	691	1796.6	12157	192	499.2
PDT 11	55629	55987	358	930.8	57415	1428	3712.8	59328	1913	4973.8	60218	890	2314	69584	9366	24351.6	75187	5603	14567.8
PDT 12	160495	160495	0	0	160495	0	0	160495	0	0	160495	0	0	160495	0	0	160495	0	0
H-1	35218	36584	1366	3551.6	38954	2370	6162	39557	603	1567.8	55055	15498	40294.8	59618	4563	11863.8	65278	5660	14716
H-2	3528	3528	0	0	3528	0	0	3528	0	0	3536	8	20.8	3537	1	2.6	3540	3	7.8
H-3	184229	186278	2049	5327.4	191430	5152	13395.2	203628	12198	31714.8	223282	19654	51100.4	223282	0	0	223301	19	49.4
H-4	60320	60584	264	686.4	60984	400	1040	61358	374	972.4	62155	797	2072.2	70215	8060	20956	77518	7303	18987.8
H-5	334851	336158	1307	3398.2	339847	3689	9591.4	344962	5115	13299	360691	15729	40895.4	370218	9527	24770.2	386218	16000	41600
H-6	924118	926154	2036	5293.6	927536	1382	3593.2	929688	2152	5595.2	932364	2676	6957.6	932364	0	0	932364	0	0
1-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-8	315998	318268	2270	5902	320169	1901	4942.6	325889	5720	14872	332668	6779	17625.4	345862	13194	34304.4	362184	16322	42437.2
1-9	373520	374592	1072	2787.2	379628	5036	13093.6	380248	620	1612	383224	843	2191.8	383224	2133	5545.8	386211	2987	7766.2
1-10	707368	711268	3900	10140	720157	8889	23111.4	742614	22457	58388.2	770440	27826	72347.6	789551	19111	49688.6	799628	10077	26200.2
H-11	189523	195678	6155	16003	199257	3579	9305.4	201574	2317	6024.2	215567	13993	36381.8	215574	7	18.2	215574	0	0
H-12	715218	721365	6147	15982.2	731544	10179	26465.4	748517	16973	44129.8	759242	10725	27885	779218	19976	51937.6	786200	6982	18152.8
2-13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-15	87899	91277	3378	8782.8	91657	380	988	93224	1567	4074.2	109726	16502	42905.2	112487	2761	7178.6	119548	7061	18358.6
2-16	10682	10933	251	652.6	11245	312	811.2	11614	369	959.4	11989	375	975	12184	195	507	12458	274	712.4
2-17	662230	662230	0	0	662230	0	0	662230	0	0	662230	0	0	662230	0	0	662230	0	0
2-18	679558	702135	22577	58700.2	745112	42977	111740.2	796558	51446	133759.6	908967	112409	292263.4	65984	156980	408148	154873	88889	231111.4
3-19	182571	186227	3656	9505.6	191548	5321	13834.6	194299	2751	7152.6	212157	17858	46430.8	216847	4690	12194	219667	2820	7332
3-20	226801	237158	10357	26928.2	241548	4390	11414	264889	23341	60686.6	278338	13449	34967.4	284510	6172	16047.2	296511	12001	31202.6
3-21	303953	314558	10605	27573	318459	3901	10142.6	318555	96	249.6	389842	71287	185346.2	395127	5285	13741	399627	4500	11700
3-22	59142	61505	2363	0	65998	4493	0	13533	5205	13533	74265	3062	7961.2	75209	944	2454.4	78143	2934	7628.4
3-23	259120	263557	4437	11536.2	269014	5457	14188.2	274503	5489	14271.4	282507	8004	20810.4	282507	0	0	282507	0	0
3-24	367112	367112	0	0	367112	0	0	367112	0	0	367112	0	0	367112	0	0	367112	0	0
3-25	524888	526447	1559	4053.4	529637	3190	8294	534812	5175	13455	541606	6794	17664.4	566299	24693	64201.8	578412	12113	31493.8
3-26	13168	13168	0	0	13168	0	0	13168	0	0	13168	0	0	13168	0	0	13168	0	0
3-27	877119	877119	0	0	877119	0	0	877119	0	0	877121	2	5.2	877121	0	0	877121	0	0
3-28	126896	126896	0	0	126896	0	0	126896	0	0	126896	0	0	126896	0	0	126896	0	0
3-29	13	13	0	0	13	0	0	13	0	0	15	2	5.2	15	0	0	15	0	0
3-30	69472	69472	0	0	69472	0	0	69472	0	0	69475	3	7.8	69475	0	0	69475	0	0
4-31	635	635	0	0	635	0	0	635	0	0	635	0	0	635	0	0	635	0	0
4-32	362557	391574	29017	75444.2	436210	44636	116053.6	462904	26694	69404.4	482645	19741	51326.6	521558	38913	101173.8	556308	34750	90350
4-33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-34	51278	62157	10879	28285.4	95217	33060	85956	102158	6941	18046.6	124867	22709	59043.4	136874	12007	31218.2	154824	17950	46670
4-35	237111	237111	0	0	237111	0	0	237111	0	0	237111	0	0	237111	0	0	237111	0	0
4-36	29	29	0	0	29	0	0	29	0	0	29	0	0	29	0	0	29	0	0
4-37	368214	368214	0	0	368214	0	0	368214	0	0	435168	66954	174080.4	437518	2350	6110	439684	2166	5631.6
5-38	919284	919968	684	1778.4	923421	3453	8977.8	926308	2887	7506.2	947851	21543	56011.8	962157	14306	37195.6	976238	14081	36610.6
5-39	162886	162886	0	0	162886	0	0	162886	1	2.6	162887	0	0	162887	0	0	162887	0	0
5-40	19	19	0	0	19	0	0	19	0	0	19	0	0	19	0	0	19	0	0
5-41	24	24	0	0	24	0	0	24	0	0	24	0	0	24	0	0	24	0	0
5-42	280210	285447	5237	13616.2	298617	13170	34242	302157	3540	9204	306528	4371	11364.6	312557	6029	15675.4	318547	5990	15574
5-43	284550	285421	871	2264.6	285968	547	1422.2	286715	747	1942.2	287490	775	2015	333247	45757	118968.2	348579	15332	39863.2
5-44	17	17	0	0	17	0	0	17	0	0	17	0	0	17	0	0	17	0	0
5-45	265949	296570	30621	79614.6	326582	30012	78031.2	365917	39335	102271	396572	30655	79703	421053	24481	63650.6	465903	44850	116610
5-46	1732	1732	0	0	1732	0	0	1732	0	0	1732	0	0	1732	0	0	1732	0	0
6-47	621438	626805	41367	107554.2	712638	49833	129565.8	736662	24024	62462.4	766953	30291	78756.6	895124	128171	333244.6	968215	73091	190036.6
6-48	624513	624515	2	5.2	624862	347	902.2	624912	50	109.2	624954	42	114.4	624998	44	114.4	625028	30	78
6-49	32558	32954	396	1029.6	45888	12934	33628.4	56308	10420	27092	88392	32084	83418.4	102154	13762	35781.2	120154	18000	46800
6-50	57781	57781	0	0	57781	0	0	57781	0	0	62976	5195	13507	63215	239	621.4	64215	1000	2600
6-51	21	21	0	0	21	0	0	21	0	0	21	0	0	21	0	0	21	0	0
6-52	85012	85012	0	0	85012	0	0	85012	0	0	96211	11199	29117.4	96211	0	0	96211	0	0
6-53	102	102	0	0	102	0	0	102	0	0	102	0	0	102	0	0	102	0	0

Table 3: Pump Counters

Location	January 28, 2024			February 28, 2024			March 28, 2024			April 28, 2024			May 28, 2024			June 28, 2024			
	Prev. Counter	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo
6-54	717980	717980	0	0	717980	0	0	717980	0	0	717980	0	0	717980	0	0	717980	0	0
6-55	-	-	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-
6-56	350470	350470	0	0	350470	0	0	350470	0	0	350470	0	0	350470	0	0	350470	0	0
6-57	87028	87028	0	0	87028	0	0	87028	0	0	87028	0	0	87028	0	0	87028	0	0
6-58	49632	49921	289	751.4	50017	96	249.6	50124	107	278.2	50218	94	244.4	50369	151	392.6	50485	116	301.6
6-59	325	325	0	0	325	0	0	325	0	0	325	0	0	325	0	0	325	0	0
7-60	666921	667125	204	530.4	669215	2090	5434	671267	2052	5335.2	673605	2338	6078.8	675298	1693	4401.8	678201	2903	7547.8
7-61	29658	30215	557	1448.2	31257	1042	2709.2	32695	1438	3738.8	33622	927	2410.2	35628	2006	5215.6	38627	2999	7797.4
7-62	N/C	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-
7-63	21000	29657	8657	22508.2	58471	28814	74916.4	86257	27786	72243.6	90217	3960	10296	99257	9040	23504	112477	13220	34372
7-64	193255	194587	1332	3463.2	196237	1650	4290	198247	2010	5226	200154	1907	4958.2	203268	3114	8096.4	206517	3249	8447.4
7-65	675986	676251	265	689	676524	273	709.8	676935	411	1068.6	677215	280	728	677524	309	803.4	677723	199	517.4
7-66	158222	159487	1265	3289	161257	1770	4602	163629	2372	6167.2	166547	2918	7586.8	169302	2755	7163	171254	1952	5075.2
7-67	43	43	0	0	43	0	0	43	0	0	43	0	0	43	0	0	43	0	0
7-68	5	5	0	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0	0
8-69	260487	260487	0	0	260487	0	0	260487	0	0	260487	0	0	260487	0	0	260487	0	0
8-70	589621	599624	10003	26007.8	612547	12923	33599.8	623594	11047	28722.2	637154	13560	35256	642517	5363	13943.8	649211	6694	17404.4
8-71	35330	35399	69	179.4	35458	59	153.4	35521	63	163.8	35698	177	460.2	35862	164	426.4	35924	62	161.2
8-72	N/C	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-
8-73	416855	416957	102	265.2	417035	78	202.8	417122	87	226.2	417169	47	122.2	417215	46	119.6	417322	107	278.2
8-74	811	811	0	0	811	0	0	811	0	0	811	0	0	811	0	0	811	0	0
WH-75	11	11	0	0	11	0	0	11	0	0	11	0	0	11	0	0	11	0	0
WH-76	1254	1527	273	709.8	1698	171	444.6	1785	87	226.2	1965	180	468	1965	0	0	1965	0	0
WH-77	120255	121574	1319	3429.4	122684	1110	2886	124695	2011	5228.6	126584	1889	4911.4	130218	3634	9448.4	133574	3356	8725.6
WH-78	153629	154268	639	1661.4	155208	940	2444	156398	1190	3094	157487	1089	2831.4	158025	538	1398.8	160348	2323	6039.8
WH-79	16	16	0	0	16	0	0	16	0	0	16	0	0	16	0	0	16	0	0
WH-80	18	18	0	0	18	0	0	18	0	0	18	0	0	18	0	0	18	0	0
5-81	100004	100254	250	650	100684	430	1118	100998	314	816.4	101248	250	650	102514	1266	3291.6	102698	184	478.4
7-82	401248	425968	24720	64272	432689	6721	17474.6	485712	53023	137859.8	495178	9466	24611.6	503268	8090	21034	524857	21589	56131.4
7-83	46	46	0	0	46	0	0	46	0	0	46	0	0	46	0	0	46	0	0

Notes:

- New Counter
- Pump counter permanently removed, contain non-functioning pump stuck in well.
- Counter rolled over to 0
- No reading

Table 3: Pump Counters

Location	July 28, 2024				August 28, 2024			September 28, 2024			October 28, 2024			November 28, 2024			December 28, 2024		
	Prev. Counter	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo
PDT 1	2289	2358	1	2.6	2658	300	780	2681	23	59.8	2714	33	85.8	2960	246	639.6	3158	198	514.8
PDT 2	68127	68127	0	0	68127	0	0	45781	-22346	-58099.6	45847	66	171.6	45911	64	166.4	46218	307	798.2
PDT 3	18101	18101	0	0	-	-	-	18101	-	-	18101	0	0	18101	0	0	18101	0	0
PDT 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PDT 5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PDT 6	11485	19847	1405	3653	21589	1742	4529.2	23623	2034	5288.4	24309	686	1783.6	26587	2278	5922.8	27149	562	1461.2
PDT 7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PDT 8	38247	38247	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PDT 9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PDT 10	10435	12957	800	2080	13027	70	182	13380	353	917.8	13524	144	374.4	13958	434	1128.4	14021	63	163.8
PDT 11	55629	86294	11107	28878.2	88517	2223	5779.8	93892	5375	13975	95624	1732	4503.2	96247	623	1619.8	97268	1021	2654.6
PDT 12	160495	4981	-155514	-404336.4	4981	0	0	4981	0	0	4981	0	0	4981	0	0	4981	0	0
H-1	35218	69218	3940	10244	79248	10030	26078	92608	13360	34736	101689	9081	23610.6	105974	4285	11141	106587	613	1593.8
H-2	3528	3551	11	28.6	3559	8	20.8	3671	7	18.2	3671	105	273	3676	5	13	3676	0	0
H-3	184229	223301	0	0	223301	0	0	223301	0	0	223302	1	2.6	223320	18	46.8	223329	9	23.4
H-4	60320	86117	8599	22357.4	98215	12098	31454.8	98215	8406	21855.6	116863	10242	26629.2	126224	9361	24338.6	127548	1324	3442.4
H-5	334851	395140	8922	23197.2	402158	7018	18246.8	403472	1314	3416.4	411380	7908	20560.8	422697	11317	29424.2	425697	3000	7800
H-6	924118	932364	0	0	932364	0	0	932366	2	5.2	932366	0	0	932459	93	241.8	932459	0	0
1-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-8	315998	371558	9374	24372.4	384192	12634	32848.4	397383	13191	34296.6	397397	14	36.4	397408	11	28.6	397436	28	72.8
1-9	373520	387555	1344	3494.4	388106	551	1432.6	388183	77	200.2	392704	4521	11754.6	394604	1900	4940	398514	3910	10166
1-10	707368	812057	12429	32315.4	815268	3211	8348.6	817269	2001	5202.6	819310	2041	5306.6	820217	907	2358.2	821547	1330	3458
H-11	189523	215574	0	0	215574	0	0	215579	5	13	215579	0	0	222428	6849	17807.4	256184	33756	87765.6
H-12	715218	798458	12258	31870.8	815468	17010	44226	824375	8907	23158.2	856122	31747	82542.2	883883	27761	72178.6	902157	18274	47512.4
2-13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-15	87899	121470	1922	4997.2	121857	387	1006.2	121913	56	145.6	124450	2537	6596.2	135478	11028	28672.8	143225	7747	20142.2
2-16	10682	12966	508	1320.8	13208	242	629.2	13472	264	686.4	13684	212	551.2	14182	498	1294.8	14599	417	1084.2
2-17	662230	963338	14767	38394.2	987514	24176	62857.6	3914	16399	42637.4	6781	2867	7454.2	85187	78406	203855.6	179325	94138	244759.8
2-18	679558	326951	172078	447402.8	684557	357606	929775.6	720274	35717	92864.2	720345	71	184.6	735447	15102	39265.2	737002	1555	4043
3-19	182571	222557	2890	7514	229548	6991	18176.6	230634	1086	2823.6	253123	22489	58471.4	274106	20983	54555.8	302157	28051	72932.6
3-20	226801	301549	5038	13098.8	309684	8135	31464.9	314649	4965	12909	358219	43570	113282	396217	37998	98794.8	421017	24800	64480
3-21	303953	408517	8890	23114	410203	1686	4383.6	413522	3319	8629.4	468832	55310	143806	496217	27385	71201	532687	36470	94822
3-22	59142	79258	1115	2899	80100	842	2189.2	80712	612	1591.2	83267	2555	6643	96532	34489	117248	20716	53861.6	
3-23	259120	282507	0	0	282507	0	0	282525	18	46.8	283157	632	1643.2	285617	2460	6396	286157	540	1404
3-24	367112	367112	0	0	367112	0	0	367112	0	0	367112	0	0	367112	0	0	367112	0	0
3-25	524888	584228	5816	15121.6	595311	7019	18249.4	601257	4064	10566.4	602157	6846	17799.6	625779	23622	61417.2	642030	16251	42252.6
3-26	13168	13168	0	0	13168	0	0	13168	0	0	13168	0	0	13168	0	0	13168	0	0
3-27	877119	877121	0	0	877121	0	0	877130	9	23.4	877130	0	0	877130	0	0	877130	0	0
3-28	126896	126896	0	0	126896	0	0	126896	0	0	126896	0	0	128457	1561	4058.6	132584	4127	10730.2
3-29	13	15	0	0	15	0	0	15	0	0	15	0	0	15	0	0	15	0	0
3-30	69472	69475	0	0	69475	0	0	69480	5	13	70215	735	1911	70958	743	1931.8	71021	63	163.8
4-31	635	635	0	0	635	0	0	9765	9130	23738	18347	8582	22313.2	21147	2800	7280	22685	1538	3998.8
4-32	362557	573629	17321	45034.6	584219	10590	27534	593901	9682	25173.2	650600	56699	147417.4	684517	33917	88184.2	698475	13958	36290.8
4-33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-34	51278	175268	20444	53154.4	199853	24585	63921	214556	14703	38227.8	236594	22038	57298.8	254785	18191	47296.6	261247	6462	16801.2
4-35	237111	237111	0	0	237111	0	0	237112	1	2.6	237112	0	0	237112	0	0	237112	0	0
4-36	29	29	0	0	29	0	0	29	0	0	29	0	0	29	0	0	29	0	0
4-37	368214	442157	2473	6429.8	443699	1542	4009.2	445457	1758	4570.8	446587	1130	2938	448210	1623	4219.8	449305	1095	2847
5-38	919284	985200	8962	23301.2	989621	4421	11494.6	994771	5150	13390	6075	11303	29387.8	10298	4223	10979.8	12478	2180	5668
5-39	162886	162887	0	0	162887	0	0	162887	0	0	162887	0	0	162887	0	0	162887	0	0
5-40	19	19	0	0	19	0	0	19	0	0	19	0	0	19	0	0	19	0	0
5-41	24	24	0	0	24	0	0	24	0	0	24	0	0	24	0	0	24	0	0
5-42	280210	326527	7980	20748	331227	4700	12220	347247	16020	41652	354810	7563	19663.8	362187	7377	19180.2	365210	3023	7859.8
5-43	284550	375127	26548	69024.8	385201	10074	26192.4	401156	15955	41483	412485	11329	29455.4	421056	8571	22284.6	425148	4092	10639.2
5-44	17	17	0	0	17	0	0	17	0	0	17	0	0	17	0	0	17	0	0
5-45	265949	524968	59065	153569	572156	47188	122688.8	628138	55982	145553.2	659874	31736	82513.6	695147	35273	91709.8	721602	26455	68783
5-46	1732	1732	0	0	1732	0	0	1732	0	0	1732	0	0	1732	0	0	1732	0	0
6-47	621438	120547	-847668	-2203936.8	265917	145370	377962	343945	78028	202872.8	351485	7540	19604	365985	14500	37700	371205	5220	13572
6-48	624513	625058	30	78	625098	40	104	625106	8	20.8	625127	21	54.6	625158	31	80.6	625187	29	75.4
6-49	32558	136297	16143	41971.8	142057	5760	14976	145287	3230	8398	149305	4018	10446.8	156824	7519	19549.4	159632	2808	7300.8
6-50	57781	64857	642	1669.2	65329	472	1227.2	65814	485	1261	66205	391	1016.6	66523	318	826.8	66903	380	988
6-51	21	21	0	0	21	0	0	21	0	0	21	0	0	21	0	0	21	0	0
6-52	85012	96211	0	0	96211	0	0	96211	0	0	96211	0	0	121325	25114	65296.4	132045	10720	27872
6-53	102	102	0	0	102	0	0	102	0	0	102	0	0	102	0	0	102	0	0

Table 3: Pump Counters

Location	July 28, 2024			August 28, 2024			September 28, 2024			October 28, 2024			November 28, 2024			December 28, 2024			
	Prev. Counter	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo
6-54	717980	717980	0	0	717980	0	0	717980	0	0	717980	0	0	717980	0	0	717980	0	0
6-55	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-
6-56	350470	350470	0	0	350470	0	0	350470	0	0	350470	0	0	350470	0	0	350470	0	0
6-57	87028	87028	0	0	87028	0	0	87028	0	0	87028	0	0	87028	0	0	87028	0	0
6-58	49632	50695	210	546	50841	146	379.6	50961	120	312	51105	144	374.4	51195	90	234	51265	70	182
6-59	325	325	0	0	325	0	0	325	0	0	325	0	0	325	0	0	325	0	0
7-60	666921	681368	3167	8234.2	683207	1839	4781.4	685927	2720	7072	689333	3406	8855.6	691214	1881	4890.6	692257	1043	2711.8
7-61	29658	41268	2641	6866.6	42395	1127	2930.2	43628	1233	3205.8	44917	1289	3351.4	45294	377	980.2	46958	1664	4326.4
7-62	N/C	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-
7-63	21000	118574	6097	15852.2	126540	7966	20711.6	134774	8234	21408.4	138457	3683	9575.8	142360	3903	10147.8	143258	898	2334.8
7-64	193255	206999	482	1253.2	208157	1158	3010.8	213698	5541	14406.6	218547	4849	12607.4	221598	3051	7932.6	225698	4100	10660
7-65	675986	677931	208	540.8	678524	593	1541.8	678901	377	980.2	679235	334	868.4	679457	222	577.2	679514	57	148.2
7-66	158222	173205	1951	5072.6	174285	1080	2808	175309	1024	2662.4	177295	1986	5163.6	178245	950	2470	180214	1969	5119.4
7-67	43	43	0	0	43	0	0	43	0	0	43	0	0	43	0	0	43	0	0
7-68	5	5	0	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0	0
8-69	260487	260487	0	0	260487	0	0	260487	0	0	260487	0	0	260487	0	0	260487	0	0
8-70	589621	653485	4274	11112.4	658147	4662	12121.2	659302	1155	3003	661284	1982	5153.2	663548	2264	5886.4	666934	3386	8803.6
8-71	35330	36214	290	754	36348	134	348.4	36597	249	647.4	36621	24	62.4	36695	74	192.4	36721	26	67.6
8-72	N/C	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-
8-73	416855	417403	81	210.6	417522	119	309.4	417699	177	460.2	417768	69	179.4	417826	58	150.8	417902	76	197.6
8-74	811	811	0	0	811	0	0	811	0	0	811	0	0	811	0	0	811	0	0
WH-75	11	11	0	0	11	0	0	11	0	0	11	0	0	11	0	0	11	0	0
WH-76	1254	1965	0	0	1965	0	0	1965	0	0	1965	0	0	1965	0	0	1965	0	0
WH-77	120255	136208	2634	6848.4	139220	3012	7831.2	141018	1798	4674.8	146841	5823	15139.8	150157	3316	8621.6	151306	1149	2987.4
WH-78	153629	162574	2226	5787.6	165284	2710	7046	166302	1018	2646.8	167245	943	2451.8	168547	1302	3385.2	169254	707	1838.2
WH-79	16	16	0	0	16	0	0	16	0	0	16	0	0	16	0	0	16	0	0
WH-80	18	18	0	0	18	0	0	18	0	0	18	0	0	18	0	0	18	0	0
5-81	100004	103214	516	1341.6	103685	471	1224.6	103904	219	569.4	104268	364	946.4	104497	229	595.4	104963	466	1211.6
7-82	401248	548752	23895	62127	559517	10765	27989	577213	17696	46009.6	584621	7408	19260.8	589305	4684	12178.4	598154	8849	23007.4
7-83	46	46	0	0	46	0	0	46	0	0	46	0	0	46	0	0	46	0	0

Notes:

- No Counter
- Pump counter permanently removed, contain non-functioning pump stuck in well.
- Incorrect Reading at Counter
- No reading

Table 4: Water Levels

Units	meters	meters	April 2024				July 2024				October 2024				December 2024			
			meters	meters	°C	%												
Locations	Screen Length	Installed Well Depth	Depth to Water	Depth to Bottom	Temperature	Open Screen	Depth to Water	Depth to Bottom	Temperature	Open Screen	Depth to Water	Depth to Bottom	Temperature	Open Screen	Depth to Water	Depth to Bottom	Temperature	Open Screen
H-1	12	14.63	11.20	14.20	41.2	59.87	10.50	14.20	35.6	55.08	10.50	14.20	39.4	55.08	11.10	14.40	31.5	59.18
H-2	14	16.77	9.60	15.80	33.6	39.07	9.60	15.90	31.2	39.07	9.80	15.50	33.4	40.26	10.20	15.70	32.6	42.65
H-3	12	15.24	8.20	14.50	32.5	33.79	8.30	15.00	25.6	34.45	8.60	14.70	26.9	36.42	7.80	15.10	30.4	31.17
H-4	11	14.02	7.50	8.80	25.4	31.74	7.60	9.30	20.4	32.45	7.40	8.70	31.5	31.03	7.40	9.40	24.8	31.03
1-5	11	13.72	8.10	14.00	23.6	36.82	7.90	14.10	25.7	35.36	8.20	14.10	25.6	37.55	7.70	14.00	22.5	33.90
1-6	12	15.55	9.90	15.00	25.9	42.10	10.10	15.10	29.6	43.39	10.20	15.00	23.7	44.03	9.80	15.00	26.7	41.46
1-7	18	21.34	11.50	15.10	27.4	39.60	11.20	14.40	31.5	38.19	11.40	15.00	29.5	39.13	10.40	14.30	28.4	34.45
1-8	21	24.39	9.20	24.00	35.6	25.22	9.90	23.40	32.6	28.09	9.30	24.00	33.4	25.63	9.90	23.60	29.4	28.09
1-9	12	14.63	10.30	14.40	36.7	53.72	10.20	14.30	36.7	53.03	10.70	14.40	33.5	56.45	9.90	14.40	31.4	50.98
1-10	9	12.20	10.70	11.40	30.2	62.74	10.50	11.20	26.7	61.10	10.40	11.60	30.7	60.28	10.10	11.10	31.5	57.82
H-11	9	12.80	Foam	12.10	31.5	-	Foam	12.20	31.5	-	8.40	12.10	30.9	37.03	8.60	12.30	30.5	38.59
H-12	13	16.16	11.50	16.10	31.5	52.30	12.00	15.50	26.7	55.40	11.90	16.10	29.8	54.78	11.50	15.60	25.7	52.30
2-13	21	25.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-14	20	22.56	11.50	13.60	42.5	38.81	12.50	20.10	39.5	4.30	11.80	21.00	39.8	40.14	12.80	21.00	35.4	44.57
2-15	18	21.65	11.10	17.50	39.6	35.79	12.30	17.50	32.7	41.33	12.00	17.90	36.4	39.94	12.00	17.40	36.1	39.94
2-16	26	28.35	15.80	20.40	30.4	47.12	16.80	26.60	37.6	50.65	15.40	20.40	30.1	45.71	16.40	19.50	28.5	49.24
2-17	15	18.29	13.10	16.80	25.4	54.95	12.80	16.30	29.6	53.31	13.20	16.30	25.4	55.49	12.70	16.30	26.8	52.76
2-18	15	18.29	13.90	15.70	41.6	59.32	14.20	16.70	31.5	60.96	14.10	15.70	45.8	60.41	14.80	15.60	35.6	64.24
3-19	12	14.94	10.40	14.20	35.6	51.25	10.50	15.40	31.7	51.92	10.20	14.30	36.1	49.91	10.00	14.40	33.9	48.57
3-20	11	13.26	10.60	13.90	22.5	60.39	11.20	14.10	26.9	64.91	10.70	13.80	25.4	61.14	11.00	14.00	25.7	63.40
3-21	5	7.62	6.10	7.20	26.8	40.03	5.90	7.70	25.7	37.41	6.50	7.60	22.9	45.28	5.50	7.80	26.8	32.16
3-22	24	26.68	11.20	20.40	31.4	32.27	11.50	19.40	29.4	33.39	11.40	20.30	31.5	33.02	11.20	19.70	27.8	32.27
3-23	23	25.91	11.90	18.20	29.5	34.16	12.10	18.30	36.4	34.93	11.50	18.30	32.6	32.61	11.80	18.00	28.1	33.77
3-24	21	23.48	12.50	20.40	32.4	44.16	13.60	20.10	41.5	48.84	12.60	20.40	33.7	44.58	12.90	20.10	31.6	45.86
3-25	18	21.34	10.10	18.50	39.5	33.04	10.20	18.60	37.4	33.51	9.40	18.50	31.4	29.76	10.50	18.40	36.8	34.91
3-26	9	12.20	8.80	12.40	34.8	47.16	9.10	13.50	36.9	49.62	9.20	12.60	35.9	50.44	9.20	13.60	35.6	50.44
3-27	21	24.09	10.50	20.00	41.5	32.20	11.40	19.30	34.7	35.94	12.40	19.50	41.8	40.09	11.40	19.20	34.7	35.94
3-28	12	15.24	8.70	15.00	29.4	37.07	8.50	15.20	40.5	35.76	9.20	15.20	32.6	40.35	8.80	15.20	30.6	37.73
3-29	12	14.63	11.40	14.60	33.8	61.23	11.50	15.40	39.8	61.92	12.10	14.90	31.9	66.02	11.10	15.30	32.8	59.18
3-30	7	9.76	6.60	8.30	36.7	42.65	6.80	8.10	35.7	44.70	5.40	8.00	35.6	30.35	6.60	8.10	35.0	42.65
4-31	16	18.75	13.90	18.30	37.6	59.50	14.20	18.10	32.4	61.10	12.90	18.10	39.7	54.17	14.00	18.20	34.9	60.03
4-32	10	12.50	9.80	11.70	38.4	56.45	9.50	11.70	35.8	54.05	8.50	11.50	31.4	46.05	9.80	11.50	36.9	56.45
4-33	24	26.68	13.40	21.10	35.1	41.66	13.60	20.70	35.7	42.41	12.50	19.60	32.6	38.29	14.00	20.80	36.2	43.91
4-34	20	22.56	13.80	19.50	24.8	49.01	13.50	18.60	31.7	47.68	12.40	19.60	32.8	42.80	13.60	18.40	23.4	48.12
4-35	15	17.38	13.60	18.30	26.8	65.98	13.80	18.50	32.0	67.13	14.20	18.30	21.4	69.43	13.20	18.30	25.8	63.68
4-36	15	18.29	11.00	17.50	36.7	43.47	11.10	17.50	31.7	44.01	12.30	17.40	25.6	50.57	11.40	18.10	36.8	45.65
4-37	12	14.94	11.50	15.20	31.4	58.61	12.10	15.20	32.9	62.63	11.60	15.00	31.8	59.28	12.20	15.50	30.4	63.30
5-38	8	10.67	7.90	12.00	26.8	45.46	8.50	12.30	29.7	51.09	8.10	12.30	23.6	47.34	8.80	12.60	27.8	53.90
5-39	8	10.67	10.50	11.70	22.8	69.83	10.50	12.30	32.5	69.83	10.60	11.70	20.4	70.77	10.20	12.10	24.1	67.02

Table 4: Water Levels

Units	meters	meters	April 2024				July 2024				October 2024				December 2024			
			meters	meters	°C	%												
Locations	Screen Length	Installed Well Depth	Depth to Water	Depth to Bottom	Temperature	Open Screen	Depth to Water	Depth to Bottom	Temperature	Open Screen	Depth to Water	Depth to Bottom	Temperature	Open Screen	Depth to Water	Depth to Bottom	Temperature	Open Screen
5-40	18	21.95	8.40	19.60	34.7	21.60	8.80	20.20	29.8	23.42	9.10	13.80	31.6	24.79	8.40	13.50	32.8	21.60
5-41	17	18.90	11.30	16.20	36.9	48.49	11.60	16.10	27.4	50.08	11.50	16.10	30.7	49.55	11.40	15.80	30.5	49.02
5-42	12	16.16	8.60	14.60	25.4	28.69	9.00	14.80	31.5	31.17	9.30	14.50	25.8	33.03	9.10	14.80	26.9	31.79
5-43	14	16.16	8.1	12.8	31.5	35.03	8.3	12.3	28.7	36.27	8.2	12.8	40.7	35.65	8.4	12.1	28.5	36.89
5-44	19	21.95	10.4	13.7	39.5	33.49	10.7	13.7	36.7	34.86	12.4	13.8	35.8	42.60	10.5	14.1	37	33.94
5-45	15	16.77	9.2	15.5	35.2	45.77	9.6	15.4	24.5	48.16	9.1	15.4	32.5	45.18	9.5	15.5	34.5	47.56
5-46	16	18.90	10	16.5	30.4	36.77	11.5	16.4	26.7	44.71	10.3	16.4	33.6	38.36	11.6	16.8	31.8	45.24
6-47	14	15.85	8.8	13.2	26.8	42.05	8.9	13.9	32.6	42.68	8.4	13.6	26.8	39.52	9.1	14.6	28.6	43.94
6-48	15	17.68	10.2	15.6	30.5	40.44	10.5	14.7	28.4	42.14	10.6	15.4	30.6	42.70	10.8	15.1	31.7	43.83
6-49	20	23.48	18.5	22.7	32.8	65.82	18.7	23.1	31.9	66.67	17.8	22.9	33.8	62.84	18.5	22.4	29.8	65.82
6-50	14	17.38	13.2	16.4	35.7	58.41	12.4	16.8	41.5	53.81	12.8	16.6	34.7	56.11	12.6	16.5	33.5	54.96
6-51	12	14.94	8.6	8.8	33.4	39.20	7.9	10.8	28.4	34.51	8.1	8.9	30.4	35.85	8.2	11.1	31.7	36.52
6-52	6	9.15	5.5	7.4	31.5	26.80	5.4	7.7	31.6	25.71	6.1	7.8	29.7	33.36	5.6	7.7	30.8	27.89
6-53	22	23.63	16.4	20	30.8	62.96	16.8	21.2	31.7	64.65	15.8	20	31.7	60.42	16.8	21.2	31.5	64.65
6-54	13	15.85	7.2	15.2	32.6	28.11	7	15	26.8	26.85	7.6	15.3	33.6	30.63	7.2	15.2	28.7	28.11
6-55	18	21.34	11.3	2.3	31.9	38.66	11.4	12.5	31.6	39.13	11.2	2.2	30.8	38.19	11.6	21.4	31	40.07
6-56	10	12.80	9.2	12.4	28.4	50.42	9.5	12.5	32.7	52.76	9.5	12.4	36.8	52.76	9.4	12.5	37.5	51.98
6-57	0	0.00	11.1	13.6	31.6	-	11.6	14.5	31.8	-	11.5	13.6	31.7	-	11.5	14.5	30.8	-
6-58	0	0.00	10.6	21.1	31.5	-	11	21.4	26.8	-	10.4	21	25.4	-	11.2	21.4	30.6	-
6-59	17	20.12	14.8	21	32.6	58.40	15.6	21.2	27.1	62.38	15	21.4	30.7	59.39	15.7	21.3	28.7	62.87
7-60	13	15.55	12.8	13.9	36.9	62.71	12.3	13.9	25.8	59.50	13.5	13.7	33.6	67.22	12.5	14.2	27.6	60.78
7-61	13	15.24	9.1	12.5	30.4	43.70	9.5	12	36.4	46.32	9	12.3	32.7	43.04	9.8	12.1	26.8	48.29
7-62	17	18.29	14.5	17	28.4	70.93	15.1	16.4	38.4	74.21	13.4	16.7	31.5	64.92	14.8	16.4	31.5	72.57
7-63	11	13.41	9.4	12.5	36.5	51.89	8.6	11.9	43.5	45.93	8.5	12.4	36.9	45.18	8.5	12.1	34.7	45.18
7-64	22	24.09	17.5	25.4	31.7	63.80	18.4	25.2	25.8	67.53	16.5	25.5	32.5	59.65	17.5	25.4	32.6	63.80
7-65	24	26.22	21.5	26.2	33.9	72.70	21.3	27.1	31.7	71.93	22	26.4	34.8	74.60	22.1	27.3	34.8	74.99
7-66	19	21.95	19.6	22.2	32.5	75.40	19.4	22.2	26.9	74.49	19	22.1	32.6	72.67	18.4	22.4	30.8	69.93
7-67	6	9.45	6.3	8.6	31.6	34.40	5.9	8.4	29.8	30.17	6.5	8.9	31.7	36.52	6.2	8.4	29.8	33.34
7-68	14	19.51	13.4	17	36.9	38.99	13.8	17.1	35.4	41.04	12.9	17.1	33.6	36.43	14.5	17.1	35.7	44.63
8-69	15	17.68	9.6	15	36.7	40.50	10	14.8	26.4	42.76	9.9	14.8	25.8	42.19	11.2	14.9	34.6	49.54
8-70	8	10.67	10	14.2	31.5	65.14	10.2	13.9	32.5	67.02	10.2	14.1	27.4	67.02	10.3	14.2	30.8	67.95
8-71	13	15.85	9.6	14.6	20.8	41.32	9.8	14.1	31	42.58	8.9	14.1	39.5	36.91	9.9	14	25.4	43.22
8-72	23	25.91	20.1	26.3	26.8	65.80	20.3	27	29.8	66.57	21.2	26.4	33.4	70.04	20.4	26.8	23.7	66.96
8-73	21	24.39	14.5	18.4	35.6	46.95	15.6	16.8	31.8	51.46	14.6	18.7	31.8	47.36	15.7	18.4	31.4	51.87
8-74	24	27.44	15.3	18.1	31.7	44.65	15.7	19.4	29.3	46.11	15.7	18.1	35.6	46.11	15.4	19.3	32.8	45.01
WH-75	16	18.60	11.4	14.2	35.6	44.90	11.3	13.9	42.7	44.37	11.4	14.2	34.8	44.90	11.2	13.6	34	43.83
WH-76	12	15.24	9.5	11.1	32.8	42.32	9.2	11.1	33.7	40.35	9.6	11.3	30.9	42.98	9.3	11.2	31.6	41.01
WH-77	11	14.33	10.2	13.2	29.8	49.91	10.2	1.31	36.1	49.91	10	13	29.8	48.51	10.4	13.1	30.8	51.30
WH-78	23	25.61	14.7	19.7	34.7	45.50	15.1	19.7	34.5	47.06	13.8	19.5	28.5	41.98	15.3	20	32.6	47.84

Table 4: Water Levels

			April 2024				July 2024				October 2024				December 2024			
Units	meters	meters	meters	meters	°C	%												
Locations	Screen Length	Installed Well Depth	Depth to Water	Depth to Bottom	Temperature	Open Screen	Depth to Water	Depth to Bottom	Temperature	Open Screen	Depth to Water	Depth to Bottom	Temperature	Open Screen	Depth to Water	Depth to Bottom	Temperature	Open Screen
WH-79	9	12.50	11.5	16.5	35.1	67.61	11.8	17.1	32.6	70.01	11.5	16.9	28.6	67.61	11.4	16.8	33.8	66.81
WH-80	15	17.99	12.4	16.2	18.5	53.68	12.2	16.6	25.8	52.57	12.3	16.3	19.7	53.13	12.3	16.5	19.5	53.13
5-81	6	8.84	3.2	5.5	22.4	5.16	2.9	5.2	24.7	1.77	3.6	5.6	26.7	9.68	3.2	5.1	25.4	5.16
7-82	7	7.01	4.3	6.2	29.6	56.97	4.1	5.9	33.6	54.12	4.5	6.2	25.7	59.83	3.2	6.2	23.6	41.29
7-83	2	3.96	3.3	5.4	24.7	44.80	2.8	5.5	31.8	32.18	3.6	5.6	24.7	52.37	3.6	5.5	27.4	52.37
<b>Notes:</b>																		
- Could Not Measure																		



## **APPENDIX A**

### Flare Data



10-Mar-2024	95.28	13	17454	2266	245	9E+07	1.2E+07	1293307	36637	899	539	41.2	5.1	24	1	0	899	913	23.4	46538	0	39509.8
11-Mar-2024	100	13	17700	2512	246	9.2E+07	1.3E+07	1296402	36724	900	542	41.3	5.1	24	0	876	900	918	21.5	46559.6	0	39509.8
12-Mar-2024	99.44	13	17944	2756	244	9.3E+07	1.5E+07	1295508	36699	900	537	41	5.2	24	0	883	900	924	25.8	46585.3	0	39509.8
13-Mar-2024	100	13	18188	3000	244	9.4E+07	1.6E+07	1296446	36726	900	538	41	5.1	24	0	878	900	924	24.3	46609.6	0	39509.8
14-Mar-2024	100	13	18426	3238	239	9.6E+07	1.7E+07	1295915	36711	900	523	39.9	5.5	24	0	884	900	917	23.4	46633	0	39509.8
15-Mar-2024	100	13	18680	3492	254	9.7E+07	1.9E+07	1296261	36720	900	559	42.7	4.8	24	0	883	900	921	24.4	46657.4	0	39509.8
16-Mar-2024	100	14	18918	3730	238	9.8E+07	2E+07	1296140	36717	900	524	40	5.6	24	0	869	900	937	24.4	46681.7	0	39509.8
17-Mar-2024	100	14	19156	3968	238	1E+08	2.1E+07	1296103	36716	900	523	39.9	5.5	24	0	869	900	929	24.4	46706.1	0	39509.8
18-Mar-2024	100	13	19410	4222	254	1E+08	2.2E+07	1296151	36717	900	558	42.6	4.8	24	0	882	900	912	24.4	46730.5	0	39509.8
19-Mar-2024	99.86	14	19514	4326	104	1E+08	2.3E+07	564202	15983	900	230	40.2	5.6	10.4	0	869	900	926	13.4	46743.9	0	39509.8
20-Mar-2024	100	14	19672	4484	158	1E+08	2.4E+07	791757	22429	900	348	43.5	4.8	14.7	1	854	900	960	13.4	46757.3	0	39509.8
21-Mar-2024	100	14	19920	4732	248	1E+08	2.5E+07	1295707	36705	900	546	41.6	5.4	24	0	881	900	920	23.3	46780.6	0	39509.8
22-Mar-2024	100	14	20161	4973	241	1E+08	2.6E+07	1295837	36708	900	530	40.4	5.6	24	0	873	900	920	24.4	46805	0	39509.8
23-Mar-2024	100	14	20405	5217	244	1.1E+08	2.8E+07	1295478	36698	900	536	40.9	5.4	24	0	880	900	920	24.4	46829.4	0	39509.8
24-Mar-2024	100	15	20651	5463	246	1.1E+08	2.9E+07	1294229	36663	899	541	41.3	5.4	24	0	879	900	926	24.4	46853.8	0	39509.8
25-Mar-2024	100	22	20896	5708	245	1.1E+08	3E+07	1299030	36799	902	538	40.9	5.5	24	0	865	900	933	24.4	46878.1	0	39509.8
26-Mar-2024	100	21	21143	5955	247	1.1E+08	3.2E+07	1292266	36607	897	544	41.6	5.2	24	0	861	900	947	24.4	46902.5	0	39509.8
27-Mar-2024	100	14	21387	6199	244	1.1E+08	3.3E+07	1295860	36709	900	537	41	5.5	24	0	872	900	922	24.4	46926.9	0	39509.8
28-Mar-2024	100	14	21627	6439	240	1.1E+08	3.4E+07	1296221	36719	900	527	40.2	5.7	24	0	872	900	928	24.4	46951.3	0	39509.8
29-Mar-2024	100	13	21868	6680	241	1.1E+08	3.5E+07	1296048	36714	900	531	40.5	5.6	24	0	871	900	922	24.4	46975.6	0	39509.8
30-Mar-2024	100	13	22107	6919	239	1.2E+08	3.7E+07	1295898	36710	900	526	40.1	5.8	24	0	870	900	922	24.4	47000	0	39509.8
31-Mar-2024	100	13	22344	7156	237	1.2E+08	3.8E+07	1295794	36707	900	521	39.8	5.9	24	0	876	900	921	24.4	47024.4	0	39509.8
1-Apr-2024	100	13	22585	7411	241	1.2E+08	1296683	1296683	36732	900	530	40.4	5.6	24	0	882	900	922	24.4	47048.8	0	39509.8
2-Apr-2024	100	14	22820	7672	235	1.2E+08	2593062	1296379	36724	900	517	39.4	6	24	0	880	900	918	24.4	47073.1	0	39509.8
3-Apr-2024	100	13	23056	7917	236	1.2E+08	3888883	1295821	36708	900	519	39.6	6	24	0	880	900	924	24.4	47097.5	0	39509.8
4-Apr-2024	100	13	23291	8162	235	1.2E+08	5184872	1295989	36713	900	516	39.4	6.1	24	0	881	900	924	24.4	47121.9	0	39509.8
5-Apr-2024	100	13	23528	8407	237	1.2E+08	6480908	1296036	36714	900	520	39.7	5.9	24	0	850	900	939	24.4	47146.3	0	39509.8
6-Apr-2024	100	13	23769	8652	241	1.2E+08	7776290	1295382	36696	900	531	40.5	5.7	24	0	838	900	961	24.4	47170.6	0	39509.8
7-Apr-2024	100	13	24010	8897	241	1.3E+08	9071413	1295123	36688	899	531	40.5	5.7	24	0	879	900	921	24.4	47195	0	39509.8
8-Apr-2024	100	13	24251	9142	241	1.3E+08	1E+07	1295584	36701	900	531	40.5	5.7	24	0	883	900	920	24.4	47219.4	0	39509.8
9-Apr-2024	100	13	24492	9387	241	1.3E+08	1.2E+07	1296456	36726	900	531	40.5	5.8	24	0	876	900	925	24.4	47243.8	0	39509.8
10-Apr-2024	99.31	13	24701	9632	209	1.3E+08	1.3E+07	1098667	31123	900	459	41.3	5.5	20.2	1	415	899	957	21.5	47265.2	0	39509.8
11-Apr-2024	100	14	24948	9877	247	1.3E+08	1.4E+07	1295483	36698	900	544	41.5	5.3	24	0	855	900	928	24.4	47289.6	0	39509.8
12-Apr-2024	100	14	25202	10122	254	1.3E+08	1.5E+07	1296408	36725	900	558	42.5	4.8	24	0	881	900	922	23.3	47312.9	0	39509.8
13-Apr-2024	100	14	25465	10367	263	1.3E+08	1.7E+07	1296777	36735	901	578	44	4.5	24	0	868	900	928	24.4	47337.3	0	39509.8
14-Apr-2024	100	14	25727	10612	262	1.3E+08	1.8E+07	1296070	36715	900	577	44	4.4	24	0	840	900	940	24.4	47361.7	0	39509.8
15-Apr-2024	100	14	25989	10857	262	1.4E+08	1.9E+07	1296305	36722	900	576	43.9	4.2	24	0	874	900	930	24.4	47386.1	0	39509.8
16-Apr-2024	100	14	26258	11102	269	1.4E+08	2.1E+07	1295978	36712	900	591	45.1	3.9	24	0	875	900	922	24.4	47410.4	0	39509.8
17-Apr-2024	100	14	26531	11347	273	1.4E+08	2.2E+07	1296067	36715	900	601	45.9	3.7	24	0	886	900	915	24.4	47434.8	0	39509.8
18-Apr-2024	100	15	26799	11592	268	1.4E+08	2.3E+07	1296148	36717	900	590	45	3.9	24	0	853	900	936	24.4	47459.2	0	39509.8
19-Apr-2024	100	17	27058	11837	259	1.4E+08	2.4E+07	1296763	36735	901	570	43.5	4.2	24	0	860	900	926	24.4	47483.6	0	39509.8
20-Apr-2024	100	17	27313	12082	255	1.4E+08	2.6E+07	1294980	36684	899	561	42.8	4.2	24	0	855	900	930	24.4	47507.9	0	39509.8
21-Apr-2024	100	17	27570	12327	257	1.4E+08	2.7E+07	1295306	36693	900	566	43.2	4.2	24	0	856	900	935	24.4	47532.3	0	39509.8
22-Apr-2024	100	18	27831	12572	261	1.4E+08	2.8E+07	1295751	36706	900	574	43.8	4.1	24	0	867	900	929	24.4	47556.7	0	39509.8
23-Apr-2024	100	19	28072	12817	241	1.5E+08	3E+07	1294687	36676	899	531	40.5	4.7	24	0	882	901	918	25.1	47581.8	0	39509.8
24-Apr-2024	100	18	28319	13062	247	1.5E+08	3.1E+07	1295526	36700	900	543	41.4	4.2	24	0	854	900	922	24.4	47606.1	0	39509.8
25-Apr-2024	100	18	28586	13307	267	1.5E+08	3.2E+07	1295916	36711	900	588	44.8	3.2	24	0	822	900	953	24.4	47630.5	0	39509.8
26-Apr-2024	100	21	28852	13552	266	1.5E+08	3.3E+07	1295327	36694	900	585	44.6	3.2	24	0	875	900	919	24.4	47654.9	0	39509.8
27-Apr-2024	100	22	29103	13797	251	1.5E+08	3.5E+07	1296864	36738	901	552	42	3.8	24	0	871	900	931	24.4	47679.3	0	39509.8
28-Apr-2024	100	21	29356	14042	253	1.5E+08	3.6E+07	1296581	36730	900	556	42.4	3.7	24	0	881	900	920	24.4	47703.6	0	39509.8
29-Apr-2024	100	21	29614	14287	258	1.5E+08	3.7E+07	1295419	36697	900	569	43.4	3.6	24	0	882	900	913	24.4	47728	0	39509.8
30-Apr-2024	100	20	29875	14532	261	1.6E+08	3.9E+07	1296269	36721	900	574	43.7	3.5	24	0	865	900	930	24.4	47752.4	0	39509.8
1-May-2024	100	19	30134	14777	259	1.6E+08	1295342	1295342	36694	900	569	43.4	3.5	24	0	879	900	920	24.4	47776.8	0	39509.8
2-May-2024	82.36	20	30395	15022	261	1.6E+08	2595033	1299691	366818	901	574	43.8	3.2	24	0	869	900	926	24	47800.7	0	39509.8
3-May-2024	100	19	30655	15267	260	1.6E+08	3890484	1295451	36698	900	571	43.6	3.4	24	0	875	900	933	24.4	47825.1	0	39509.8
4-May-2024	100	13	30922	15512	267	1.6E+08	5187170	1296686	36733	900	588	44.8	3.5	24	0	857	900	939	24.4	47849.5	0	39509.8
5-May-2024	100	13	31197	15757	275	1.6E+08	6483848	1296678	36732	901	604	46	3.4	24	0	855	900	935	24.4	47873.9	0	39509.8
6-May-2024	100	12	31479	16002	282	1.6E+08	7771700	1287852	36482	899	620	47.6</										

22-May-2024	100	14	35564	5689	297	1.8E+08	2.6E+07	1295276	36693	899	653	49.8	2.2	24	0	848	900	937	24.4	48239.7	0	39509.8
23-May-2024	100	14	35857	5982	293	1.8E+08	2.7E+07	1296205	36719	900	644	49.1	2.4	24	0	852	900	941	24.4	48264.1	0	39509.8
24-May-2024	100	15	36158	6283	301	1.8E+08	2.9E+07	1295777	36707	900	663	50.6	1.9	24	0	872	900	919	24.4	48288.5	0	39509.8
25-May-2024	100	17	36449	6574	291	1.8E+08	3E+07	1296466	36726	900	639	48.7	2.4	24	0	873	900	922	24.4	48312.8	0	39509.8
26-May-2024	100	16	36736	6861	287	1.9E+08	3.1E+07	1296048	36714	900	630	48.1	2.6	24	0	859	900	929	24.4	48337.2	0	39509.8
27-May-2024	100	17	37018	7143	282	1.9E+08	3.2E+07	1296505	36727	900	621	47.4	2.7	24	0	860	900	935	24.4	48361.6	0	39509.8
28-May-2024	100	18	37291	7416	273	1.9E+08	3.4E+07	1289522	36530	901	599	45.9	3	23.9	1	29	899	936	15.2	48376.8	9.1	39518.9
29-May-2024	100	18	37573	7698	282	1.9E+08	3.5E+07	1297035	36742	901	621	47.3	2.6	24	0	848	900	948	0	48376.8	24.4	39543.3
30-May-2024	100	18	37860	7985	287	1.9E+08	3.6E+07	1294960	36684	899	631	48.1	2.4	24	0	871	900	928	0	48376.8	24.4	39567.7
31-May-2024	100	19	38142	8267	282	1.9E+08	3.8E+07	1294355	36666	899	620	47.3	2.5	24	0	878	900	923	0	48376.8	24.4	39592
1-Jun-2024	100	14	38437	295	295	1.9E+08	1296366	1296366	36723	900	649	49.5	2.2	24	0	879	900	917	0	48376.8	24.4	39616.4
2-Jun-2024	100	14	38735	593	298	2E+08	2591806	1295440	36697	900	655	50	2.2	24	0	858	900	934	0	48376.8	24.4	39640.8
3-Jun-2024	100	13	39037	895	302	2E+08	3887671	1295865	36709	900	664	50.7	2	24	0	849	900	942	0	48376.8	24.4	39665.2
4-Jun-2024	100	13	39331	1189	294	2E+08	5102859	1215188	34424	899	647	52.6	1.4	22.5	3	20	896	981	9.8	48386.5	13.1	39678.3
5-Jun-2024	100	13	39645	1503	314	2E+08	6398687	1295828	36708	900	690	52.6	1.3	24	0	861	900	938	24.4	48410.9	0	39678.3
6-Jun-2024	100	14	39953	1811	308	2E+08	7693062	1294375	36667	899	677	51.7	1.4	24	0	839	900	969	24.4	48435.3	0	39678.3
7-Jun-2024	100	13	40261	2119	308	2E+08	8988841	1295779	36707	900	678	51.7	1.4	24	0	858	900	949	24.4	48459.7	0	39678.3
8-Jun-2024	100	13	40561	2419	300	2E+08	1E+07	1294627	36674	899	659	50.3	2	24	0	843	900	960	24.4	48484	0	39678.3
9-Jun-2024	100	13	40859	2717	298	2E+08	1.2E+07	1295308	36693	900	655	49.9	2	24	0	846	900	948	24.4	48508.4	0	39678.3
10-Jun-2024	100	13	41166	3024	307	2.1E+08	1.3E+07	1296060	36715	900	674	51.4	1.6	24	0	874	900	924	24.4	48532.8	0	39678.3
11-Jun-2024	100	13	41474	3332	308	2.1E+08	1.4E+07	1295620	36702	900	678	51.7	1.6	24	0	851	900	945	24.4	48557.2	0	39678.3
12-Jun-2024	100	13	41780	3638	306	2.1E+08	1.5E+07	1295642	36703	900	672	51.3	1.7	24	0	848	900	944	24.4	48581.5	0	39678.3
13-Jun-2024	100	13	42081	3939	301	2.1E+08	1.7E+07	1295771	36707	900	663	50.5	1.9	24	0	852	900	952	24.4	48605.9	0	39678.3
14-Jun-2024	98.61	13	42384	4242	303	2.1E+08	1.8E+07	1295761	36706	900	667	50.9	1.8	24	0	870	900	925	24.8	48630.7	0	39678.3
15-Jun-2024	100	12	42695	4553	311	2.1E+08	1.9E+07	1296014	36713	900	683	52.1	1.5	24	0	859	900	938	24.4	48655.1	0	39678.3
16-Jun-2024	100	13	43005	4863	310	2.1E+08	2.1E+07	1296318	36722	900	682	52	1.5	24	0	873	900	928	24.4	48679.5	0	39678.3
17-Jun-2024	100	13	43307	5165	302	2.1E+08	2.2E+07	1296330	36722	900	664	50.6	1.8	24	0	844	900	950	24.4	48703.8	0	39678.3
18-Jun-2024	100	13	43617	5475	310	2.2E+08	2.3E+07	1295118	36688	899	682	52	1.4	24	0	856	900	956	24.4	48728.2	0	39678.3
19-Jun-2024	100	14	43915	5773	298	2.2E+08	2.5E+07	1296756	36735	901	656	50	1.9	24	0	861	900	930	24.4	48752.6	0	39678.3
20-Jun-2024	100	13	44221	6079	306	2.2E+08	2.6E+07	1296698	36733	900	672	51.2	1.6	24	0	871	900	931	24.4	48777	0	39678.3
21-Jun-2024	100	13	44531	6389	310	2.2E+08	2.7E+07	1295065	36687	899	681	52	1.5	24	0	855	900	936	24.4	48801.3	0	39678.3
22-Jun-2024	100	13	44845	6703	314	2.2E+08	2.8E+07	1296875	36738	901	690	52.6	1.3	24	0	862	900	931	24.4	48825.7	0	39678.3
23-Jun-2024	100	13	45155	7013	310	2.2E+08	3E+07	1296095	36716	900	683	52.1	1.4	24	0	847	900	939	24.4	48850.1	0	39678.3
24-Jun-2024	100	13	45469	7327	314	2.2E+08	3.1E+07	1295219	36691	899	691	52.7	1.3	24	0	873	900	928	24.4	48874.5	0	39678.3
25-Jun-2024	100	13	45774	7632	305	2.3E+08	3.2E+07	1294936	36683	899	671	51.2	1.7	24	0	847	900	961	24.4	48898.8	0	39678.3
26-Jun-2024	100	13	46072	7930	298	2.3E+08	3.4E+07	1295700	36705	900	656	50.1	1.9	24	0	850	900	948	24.4	48923.2	0	39678.3
27-Jun-2024	100	12	46375	8233	303	2.3E+08	3.5E+07	1295837	36708	900	667	50.9	1.8	24	0	871	900	923	24.4	48947.6	0	39678.3
28-Jun-2024	100	13	46681	8539	306	2.3E+08	3.6E+07	1296466	36726	900	672	51.2	1.6	24	0	874	900	936	24.4	48972	0	39678.3
29-Jun-2024	100	13	46974	8832	293	2.3E+08	3.7E+07	1296178	36718	900	645	49.1	2.2	24	0	848	900	947	24.4	48996.3	0	39678.3
30-Jun-2024	100	13	47271	9129	297	2.3E+08	3.9E+07	1296519	36728	900	653	49.8	2	24	0	862	900	929	24.4	49020.7	0	39678.3
1-Jul-2024	100	12	47579	308	308	2.3E+08	1296207	1296207	36719	900	677	51.6	1.5	24	0	848	900	949	24.4	49045.1	0	39678.3
2-Jul-2024	100	12	47892	621	313	2.3E+08	2591957	1295750	36706	900	689	52.5	1.4	24	0	860	900	946	24.4	49069.5	0	39678.3
3-Jul-2024	100	13	48199	928	307	2.4E+08	3887748	1295791	36707	900	674	51.4	1.7	24	0	865	900	930	24.4	49093.8	0	39678.3
4-Jul-2024	100	13	48506	1235	307	2.4E+08	5183050	1295302	36693	900	674	51.5	1.7	24	0	845	900	947	24.4	49118.2	0	39678.3
5-Jul-2024	100	12	48818	1547	312	2.4E+08	6479217	1296167	36718	900	686	52.3	1.5	24	0	855	900	941	24.4	49142.6	0	39678.3
6-Jul-2024	100	12	49129	1858	311	2.4E+08	7775293	1296076	36715	900	684	52.1	1.6	24	0	878	900	922	24.4	49167	0	39678.3
7-Jul-2024	100	12	49438	2167	309	2.4E+08	9070738	1295445	36697	900	679	51.8	1.6	24	0	858	900	940	24.4	49191.3	0	39678.3
8-Jul-2024	100	12	49746	2475	308	2.4E+08	1E+07	1296559	36729	900	678	51.7	1.6	24	0	864	900	932	24.4	49215.7	0	39678.3
9-Jul-2024	99.31	12	50053	2782	307	2.4E+08	1.2E+07	1296046	36714	900	675	51.5	1.7	24	0	875	900	925	24.7	49240.4	0	39678.3
10-Jul-2024	100	12	50359	3088	306	2.4E+08	1.3E+07	1295673	36704	900	674	51.4	1.7	24	0	874	900	923	24.4	49264.8	0	39678.3
11-Jul-2024	100	12	50668	3397	309	2.5E+08	1.4E+07	1295804	36708	900	680	51.8	1.6	24	0	876	900	916	24.4	49289.2	0	39678.3
12-Jul-2024	100	12	50976	3705	308	2.5E+08	1.6E+07	1295489	36699	900	677	51.7	1.7	24	0	871	900	922	24.4	49313.5	0	39678.3
13-Jul-2024	100	12	51283	4012	307	2.5E+08	1.7E+07	1295466	36698	900	676	51.6	1.6	24	0	839	900	940	24.4	49337.9	0	39678.3
14-Jul-2024	100	12	51589	4318	306	2.5E+08	1.8E+07	1296411	36725	900	674	51.4	1.7	24	0	870	900	924	24.4	49362.3	0	39678.3
15-Jul-2024	100	13	51894	4623	305	2.5E+08	1.9E+07	1289427	36527	899	670	51.4	1.6	23.9	1	50	899	970	14.8	49377.1	9.5	39687.7
16-Jul-2024	100	14	52195	4924	301	2.5E+08	2.1E+07	1294522	36671	899	663	50.6	1.8	24	0	841	900	951	0	49377.1	24.3	39712
17-Jul-2024	100	18	52475	5204	280	2.5E+08	2.2E+07	1217659	34494	871	617	50.1	2.1	23.3	17	813	900	974	0	49377.1	24.4	39736.4
18-Jul-2024	100	34	52728	5457	253	2.5E+08	2.3E+07	1070939	30338	896	557	51.4	1.8	19.9	13	2						

3-Aug-2024	100	26	56850	738	245	2.7E+08	3887517	1296095	36716	900	540	41.1	1.8	24	0	840	900	963	24.4	49678.7	0	39833.2
4-Aug-2024	100	26	57089	977	239	2.8E+08	5183900	1296383	36724	900	527	40.1	1.9	24	0	867	900	943	24.4	49703.1	0	39833.2
5-Aug-2024	100	26	57327	1215	238	2.8E+08	6480113	1296213	36719	900	523	39.9	2	24	0	868	900	929	24.4	49727.5	0	39833.2
6-Aug-2024	100	25	57568	1456	241	2.8E+08	7776423	1296310	36722	900	530	40.4	1.9	24	0	878	900	921	24.4	49751.9	0	39833.2
7-Aug-2024	100	26	57809	1697	241	2.8E+08	9072482	1296059	36715	900	529	40.4	2	24	0	852	900	963	24.4	49776.2	0	39833.2
8-Aug-2024	100	27	58044	1932	235	2.8E+08	1E+07	1295545	36700	900	516	39.4	2.1	24	0	835	900	962	24.4	49800.6	0	39833.2
9-Aug-2024	100	27	58276	2164	232	2.8E+08	1.2E+07	1296193	36719	900	510	38.9	2.2	24	0	855	900	948	24.4	49825	0	39833.2
10-Aug-2024	100	27	58508	2396	232	2.8E+08	1.3E+07	1296098	36716	900	511	39	2.3	24	0	857	900	954	24.4	49849.4	0	39833.2
11-Aug-2024	100	27	58739	2627	231	2.9E+08	1.4E+07	1295458	36698	900	508	38.8	2.4	24	0	859	900	938	24.4	49873.7	0	39833.2
12-Aug-2024	100	26	58969	2857	230	2.9E+08	1.6E+07	1295582	36701	900	506	38.6	2.4	24	0	876	900	919	24.4	49898.1	0	39833.2
13-Aug-2024	100	26	59201	3089	232	2.9E+08	1.7E+07	1296526	36728	900	510	38.9	2.5	24	0	882	900	924	24.4	49922.5	0	39833.2
14-Aug-2024	98.89	26	59435	3323	234	2.9E+08	1.8E+07	1297060	36743	901	515	39.2	2.4	24	0	880	900	930	25.5	49948	0	39833.2
15-Aug-2024	100	27	59671	3559	236	2.9E+08	1.9E+07	1296331	36722	900	520	39.6	2.3	24	0	872	900	928	24.4	49972.4	0	39833.2
16-Aug-2024	100	26	59902	3790	231	2.9E+08	2.1E+07	1296891	36738	901	508	38.7	2.5	24	0	857	900	948	23.4	49995.7	0	39833.2
17-Aug-2024	100	26	60131	4019	229	2.9E+08	2.2E+07	1296834	36737	901	504	38.4	2.6	24	0	858	900	948	24.4	50020.1	0	39833.2
18-Aug-2024	100	26	60359	4247	228	2.9E+08	2.3E+07	1295939	36711	900	502	38.2	2.6	24	0	851	900	933	24.4	50044.5	0	39833.2
19-Aug-2024	100	26	60588	4476	229	3E+08	2.5E+07	1296328	36722	900	503	38.3	2.7	24	0	879	900	921	24.4	50068.8	0	39833.2
20-Aug-2024	100	30	60824	4712	236	3E+08	2.6E+07	1296375	36724	900	518	39.5	2.5	24	0	873	900	921	24.4	50093.2	0	39833.2
21-Aug-2024	100	37	61057	4945	233	3E+08	2.7E+07	1297230	36748	901	512	39	2.5	24	0	886	900	914	24.4	50117.6	0	39833.2
22-Aug-2024	100	32	61292	5180	235	3E+08	2.9E+07	1295831	36708	900	516	39.4	2.6	24	0	863	900	959	24.4	50142	0	39833.2
23-Aug-2024	100	24	61531	5419	239	3E+08	3E+07	1296520	36728	900	525	40	2.8	24	0	873	900	926	24.4	50166.3	0	39833.2
24-Aug-2024	100	25	61769	5657	238	3E+08	3.1E+07	1296333	36723	900	523	39.9	2.8	24	0	879	900	927	24.4	50190.7	0	39833.2
25-Aug-2024	100	25	62004	5892	235	3E+08	3.2E+07	1297094	36744	901	517	39.4	2.8	24	0	873	900	923	24.4	50215.1	0	39833.2
26-Aug-2024	100	26	62228	6116	224	3E+08	3.4E+07	1296337	36723	900	494	37.6	3.1	24	0	860	900	941	24.4	50239.5	0	39833.2
27-Aug-2024	100	27	62452	6340	224	3.1E+08	3.5E+07	1295903	36710	900	492	37.6	3	24	0	861	900	931	24.4	50263.8	0	39833.2
28-Aug-2024	100	26	62682	6570	230	3.1E+08	3.6E+07	1296840	36737	901	506	38.6	3.1	24	0	873	900	930	24.4	50288.2	0	39833.2
29-Aug-2024	100	26	62915	6803	233	3.1E+08	3.8E+07	1296778	36735	901	513	39.1	3.1	24	0	875	900	937	24.4	50312.6	0	39833.2
30-Aug-2024	100	27	63141	7029	226	3.1E+08	3.9E+07	1297125	36745	901	498	37.9	3.3	24	0	865	900	927	24.4	50337	0	39833.2
31-Aug-2024	100	27	63363	7251	222	3.1E+08	4E+07	1295835	36708	900	489	37.3	3.4	24	0	847	900	964	24.4	50361.3	0	39833.2
1-Sep-2024	100	27	63577	7415	214	3.1E+08	1296429	1296429	36725	900	471	35.9	3.5	24	0	855	900	932	24.4	50385.7	0	39833.2
2-Sep-2024	100	27	63798	7624	221	3.1E+08	2592883	1296454	36726	900	486	37	3.4	24	0	880	900	917	24.4	50410.1	0	39833.2
3-Sep-2024	100	27	64024	7871	226	3.1E+08	3888926	1296043	36714	900	496	37.9	3.4	24	0	881	900	918	24.4	50434.5	0	39833.2
4-Sep-2024	100	28	64240	8177	216	3.2E+08	5185586	1296660	36732	900	475	36.2	3.7	24	0	856	900	945	24.4	50458.8	0	39833.2
5-Sep-2024	100	26	64453	1090	213	3.2E+08	6481481	1295895	36710	900	469	35.8	3.6	24	0	848	900	946	24.4	50483.2	0	39833.2
6-Sep-2024	100	23	64674	1311	221	3.2E+08	7778042	1296561	36729	900	485	37	3.7	24	0	851	900	932	24.4	50507.6	0	39833.2
7-Sep-2024	100	23	64905	1542	231	3.2E+08	9075050	1297008	36742	901	507	38.6	3.6	24	0	874	900	919	24.4	50532	0	39833.2
8-Sep-2024	100	23	65322	1959	417	3.2E+08	1E+07	1296289	36721	900	918	70	3.8	24	0	877	900	920	24.4	50556.3	0	39833.2
9-Sep-2024	100	21	65739	2376	417	3.2E+08	1.2E+07	1296465	36726	900	918	69.9	4.1	24	0	841	900	981	24.4	50580.7	0	39833.2
10-Sep-2024	100	19	65959	2596	220	3.2E+08	1.3E+07	1296654	36732	900	484	36.9	4.8	24	0	872	900	930	24.4	50605.1	0	39833.2
11-Sep-2024	99.31	22	66170	2807	211	3.3E+08	1.4E+07	1296127	36717	900	465	35.5	5.1	24	0	846	900	937	25.1	50630.2	0	39833.2
12-Sep-2024	100	24	66258	2895	88	3.3E+08	1.5E+07	539122	15272	900	194	35.6	5.1	10	0	43	898	923	11.4	50641.6	0	39833.2
13-Sep-2024	100	20	66335	2972	77	3.3E+08	1.5E+07	402702	11408	897	169	41.4	5.1	7.5	2	817	900	1063	5.4	50646.9	0	39833.2
14-Sep-2024	100	21	66566	3203	231	3.3E+08	1.6E+07	1296680	36732	900	509	38.8	5.4	24	0	879	900	919	24.4	50671.3	0	39833.2
15-Sep-2024	100	22	66793	3430	227	3.3E+08	1.8E+07	1296758	36735	901	498	38	5.1	24	0	871	900	925	24.4	50695.7	0	39833.2
16-Sep-2024	100	23	67013	3650	220	3.3E+08	1.9E+07	1295543	36700	900	483	36.8	5.1	24	0	873	900	924	24.4	50720	0	39833.2
17-Sep-2024	100	23	67234	3871	221	3.3E+08	2E+07	1295789	36707	900	486	37	5	24	0	866	900	922	24.4	50744.4	0	39833.2
18-Sep-2024	100	23	67457	4094	223	3.3E+08	2.2E+07	1296098	36716	900	490	37.4	4.9	24	0	867	900	928	24.4	50768.8	0	39833.2
19-Sep-2024	100	23	67683	4320	226	3.3E+08	2.3E+07	1296300	36722	900	497	37.9	4.8	24	0	879	900	914	24.4	50793.2	0	39833.2
20-Sep-2024	100	23	67898	4535	215	3.4E+08	2.4E+07	1296149	36717	900	474	36.1	5.2	24	0	879	900	917	24.4	50817.5	0	39833.2
21-Sep-2024	99.31	24	67968	4605	70	3.4E+08	2.5E+07	418175	11846	900	153	36.2	5.1	7.6	0	883	900	915	10.3	50827.8	0	39833.2
22-Sep-2024	100	0	67968	4605	0	3.4E+08	2.5E+07	0	0	0	0	0	0	0	0	0	0	0	0	50827.8	0	39833.2
23-Sep-2024	100	20	68123	4760	155	3.4E+08	2.5E+07	803129	22751	899	340	41.8	5	14.9	1	859	900	1065	13	50840.8	0	39833.2
24-Sep-2024	100	21	68353	4990	230	3.4E+08	2.7E+07	1296026	36714	900	505	38.5	5.7	24	0	870	900	936	24.4	50865.2	0	39833.2
25-Sep-2024	100	23	68584	5221	231	3.4E+08	2.8E+07	1296032	36714	900	509	38.8	5.2	24	0	875	900	920	24.4	50889.6	0	39833.2
26-Sep-2024	100	25	68824	5461	240	3.4E+08	2.9E+07	1297189	36747	901	528	40.2	4.1	24	0	874	900	927	24.4	50913.9	0	39833.2
27-Sep-2024	100	26	69052	5689	228	3.4E+08	3.1E+07	1296728	36734	901	502	38.2	4.3	24	0	861	900	920	24.4	50938.3	0	39833.2
28-Sep-2024	100	27	69276	5913	224	3.4E+08	3.2E+07	1295918	36711	900	493	37.6	4.4	24	0	863	900	939	24.4	50962.7	0	39833.2
29-Sep-2024	100	26	69505	6142	229	3.4E+08	3.3E+07	1295890	36710	900	504	38.4	4.2	24	0	833	900	976	24.4	50987.1	0	39

15-Oct-2024	100	32	72674	2946	184	3.6E+08	1.9E+07	1283143	36349	900	404	31.1	6.3	23.8	1	46	899	960	0	51177.4	24.2	40015
16-Oct-2024	100	32	72873	3145	199	3.7E+08	2E+07	1295698	36705	900	437	33.3	5.9	24	0	874	900	916	0	51177.4	24.4	40039.3
17-Oct-2024	100	33	73072	3344	199	3.7E+08	2.1E+07	1296068	36715	900	438	33.4	6	24	0	876	900	922	0	51177.4	24.4	40063.7
18-Oct-2024	100	35	73170	3442	98	3.7E+08	2.2E+07	714521	20241	900	216	29.9	6.8	13.2	0	40	898	921	0	51177.4	16.1	40079.8
19-Oct-2024	100	29	73300	3572	130	3.7E+08	2.3E+07	754958	21386	898	285	37.3	5.8	14	1	862	900	1102	0	51177.4	11.6	40091.3
20-Oct-2024	100	31	73505	3777	205	3.7E+08	2.4E+07	1296202	36719	900	450	34.3	6.3	24	0	882	900	916	0	51177.4	24.4	40115.7
21-Oct-2024	100	26	73703	3975	198	3.7E+08	2.5E+07	1296055	36715	900	435	33.2	6.6	24	0	884	900	916	0	51177.4	25.4	40141.1
22-Oct-2024	100	18	73897	4169	194	3.7E+08	2.6E+07	1295567	36701	900	426	32.5	6.6	24	0	848	900	944	0	51177.4	24.4	40165.5
23-Oct-2024	100	25	74108	4380	211	3.7E+08	2.8E+07	1296319	36722	900	465	35.4	5	24	0	880	900	918	0	51177.4	24.4	40189.9
24-Oct-2024	100	43	74334	4606	226	3.7E+08	2.9E+07	1295890	36710	900	497	37.9	3.3	24	0	861	900	945	0	51177.4	24.4	40214.2
25-Oct-2024	100	51	74499	4771	165	3.8E+08	3E+07	995929	28213	892	363	36.1	3.1	18.6	1	28	898	955	0	51177.4	18.9	40233.1
26-Oct-2024	100	45	74701	4973	202	3.8E+08	3.1E+07	1274848	36114	885	444	34.4	3.5	24	0	859	900	924	0	51177.4	24.4	40257.5
27-Oct-2024	100	44	74907	5179	206	3.8E+08	3.3E+07	1294555	36672	899	452	34.5	3.4	24	0	874	900	926	0	51177.4	24.4	40281.9
28-Oct-2024	100	45	75113	5385	206	3.8E+08	3.4E+07	1293900	36654	899	454	34.7	3.4	24	0	862	900	939	0	51177.4	24.4	40306.2
29-Oct-2024	100	46	75305	5577	192	3.8E+08	3.5E+07	1282421	36328	891	421	32.5	3.7	24	0	880	900	922	0	51177.4	24.4	40330.6
30-Oct-2024	100	41	75489	5761	184	3.8E+08	3.6E+07	1279471	36245	889	404	31.2	4.1	24	0	846	900	942	0	51177.4	24.4	40355
31-Oct-2024	100	36	75669	5941	180	3.8E+08	3.8E+07	1295622	36702	900	397	30.3	4.7	24	0	887	900	914	0	51177.4	24.4	40379.4
1-Nov-2024	100	36	75846	177	177	3.8E+08	1296184	1296184	36718	900	389	29.6	5	24	0	884	900	915	0	51177.4	24.4	40403.7
2-Nov-2024	100	35	76023	354	177	3.9E+08	2592116	1295932	36711	900	390	29.7	5.2	24	0	870	900	930	0	51177.4	24.4	40428.1
3-Nov-2024	100	35	76207	538	184	3.9E+08	3888114	1295998	36713	900	406	30.9	5.1	24	0	867	900	936	0	51177.4	25.4	40453.5
4-Nov-2024	100	33	76389	720	182	3.9E+08	5154750	1266636	35881	900	401	31.3	5.2	23.5	1	24	899	975	7.7	51185.1	16.1	40469.7
5-Nov-2024	100	31	76571	902	182	3.9E+08	6427602	1272852	36057	899	401	31.1	5.4	23.6	1	35	898	976	24	51209.1	0	40469.7
6-Nov-2024	100	33	76765	1096	194	3.9E+08	7723793	1296191	36719	900	426	32.5	4.6	24	0	862	900	937	24.4	51233.5	0	40469.7
7-Nov-2024	100	31	76968	1299	203	3.9E+08	9011618	1287825	36482	899	447	34.3	5.2	23.9	1	22	898	952	24.3	51257.7	0	40469.7
8-Nov-2024	100	32	77165	1496	197	3.9E+08	1E+07	1295411	36696	900	433	33	4.3	24	0	879	900	914	24.4	51282.1	0	40469.7
9-Nov-2024	100	31	77372	1703	207	3.9E+08	1.2E+07	1295962	36712	900	455	34.7	4.1	24	0	884	900	917	24.4	51306.5	0	40469.7
10-Nov-2024	100	33	77575	1906	203	4E+08	1.3E+07	1295761	36706	900	448	34.1	4.3	24	0	832	900	951	24.4	51330.9	0	40469.7
11-Nov-2024	100	34	77765	2096	190	4E+08	1.4E+07	1295984	36713	900	419	31.9	4.5	24	0	870	900	939	24.4	51355.2	0	40469.7
12-Nov-2024	100	33	77967	2298	202	4E+08	1.5E+07	1296095	36716	900	445	33.9	4.2	24	0	878	900	919	24.4	51379.6	0	40469.7
13-Nov-2024	99.31	33	78164	2495	197	4E+08	1.7E+07	1295095	36687	899	433	33	4.4	24	0	871	900	926	24.7	51404.3	0	40469.7
14-Nov-2024	100	33	78360	2691	196	4E+08	1.8E+07	1296224	36719	900	432	32.9	4.4	24	0	876	900	924	24.4	51428.7	0	40469.7
15-Nov-2024	100	34	78553	2884	193	4E+08	1.9E+07	1296100	36716	900	425	32.4	4.6	24	0	886	900	917	24.4	51453	0	40469.7
16-Nov-2024	100	34	78756	3087	203	4E+08	2.1E+07	1296294	36721	900	447	34.1	4.4	24	0	882	900	916	23.4	51476.4	0	40469.7
17-Nov-2024	100	35	78952	3283	196	4.1E+08	2.2E+07	1295810	36708	900	431	32.8	4.8	24	0	886	900	916	24.4	51500.8	0	40469.7
18-Nov-2024	100	34	79147	3478	195	4.1E+08	2.3E+07	1295786	36707	900	428	32.7	4.8	24	0	874	900	923	24.4	51525.2	0	40469.7
19-Nov-2024	100	34	79287	3618	140	4.1E+08	2.4E+07	874997	24787	900	308	34.8	4.4	16.2	0	25	898	923	18.7	51543.8	0	40469.7
20-Nov-2024	100	0	79287	3618	0	4.1E+08	2.4E+07	0	0	0	0	0	0	0	0	0	0	0	0	51543.8	0	40469.7
21-Nov-2024	100	18	79387	3718	100	4.1E+08	2.5E+07	481405	13637	704	219	44.9	3.6	11.4	2	8	897	1062	9.3	51553.2	0	40469.7
22-Nov-2024	100	19	79589	3920	202	4.1E+08	2.6E+07	1009990	28611	701	445	43.6	3.5	24	0	885	900	920	24.4	51577.6	0	40469.7
23-Nov-2024	100	20	79784	4115	195	4.1E+08	2.7E+07	1009439	28595	701	430	42.1	3.6	24	0	878	900	928	24.4	51601.9	0	40469.7
24-Nov-2024	100	20	79977	4308	193	4.1E+08	2.8E+07	1010016	28612	701	424	41.5	3.8	24	0	881	900	918	24.4	51626.3	0	40469.7
25-Nov-2024	100	21	80165	4496	188	4.1E+08	2.9E+07	1007643	28545	700	414	40.6	3.9	24	0	872	900	926	24.4	51650.7	0	40469.7
26-Nov-2024	100	20	80324	4655	159	4.1E+08	2.9E+07	840064	23797	700	350	41.1	3.9	20	1	12	899	973	20.3	51671	0	40469.7
27-Nov-2024	100	21	80512	4843	188	4.1E+08	3.1E+07	1009266	28590	701	415	40.6	4	24	0	880	900	918	24.4	51695.4	0	40469.7
28-Nov-2024	100	22	80696	5027	184	4.1E+08	3.2E+07	1007599	28543	700	404	39.6	4.1	24	0	864	900	937	24.4	51719.7	0	40469.7
29-Nov-2024	100	23	80876	5207	180	4.2E+08	3.3E+07	1007817	28549	700	397	38.9	4.1	24	0	875	900	928	24.4	51744.1	0	40469.7
30-Nov-2024	100	23	81092	5423	216	4.2E+08	3.4E+07	1007951	28553	700	476	46.7	5.1	24	0	871	900	930	24.4	51768.5	0	40469.7
1-Dec-2024	100	23	81096	4	4	4.2E+08	22448	22448	636	700	9	38	4.3	0.5	0	7	843	909	2.7	51771.2	0	40469.7
2-Dec-2024	100	19	81114	22	18	4.2E+08	99367	76919	2179	687	39	49.5	2.4	1.9	2	6	875	1022	0	51771.2	1.9	40471.6
3-Dec-2024	100	19	81124	32	10	4.2E+08	141637	42270	1197	682	22	51.1	1.7	1	1	3	885	1031	0	51771.2	1	40472.6
4-Dec-2024	100	0	81124	32	0	4.2E+08	141637	0	0	0	0	0	0	0	0	0	0	0	0	51771.2	0	40472.6
5-Dec-2024	100	21	81204	112	80	4.2E+08	515809	374172	10600	698	176	46.4	3.8	8.9	1	2	896	930	0	51771.2	9.1	40481.7
6-Dec-2024	100	0	81204	112	0	4.2E+08	515809	0	0	0	0	0	0	0	0	0	0	0	0	51771.2	0	40481.7
7-Dec-2024	100	0	81204	112	0	4.2E+08	515809	0	0	0	0	0	0	0	0	0	0	0	0	51771.2	0	40481.7
8-Dec-2024	100	0	81204	112	0	4.2E+08	515809	0	0	0	0	0	0	0	0	0	0	0	0	51771.2	0	40481.7
9-Dec-2024	100	0	81204	112	0	4.2E+08	515809	0	0	0	0	0	0	0	0	0	0	0	0	51771.2	0	40481.7
10-Dec-2024	100	17	81277	185	73	4.2E+08	958891	443082	12552	695	161	35.8	7.9	10.6	3	-13	892	1023	0	51771.2	8.5	40490.3
11-Dec-2024	100	23	81463	371	186	4.2E+08	1567595	608704	17243	700	409	66.3	5.9	14.5	3	-15	894	992	0	51771.2	14.8	40505.1
12-Dec-2024	100	27	81692	600	229	4.2E+08	2577124	1009529	28598	701	503	49.3	3.5	24	0	885	900	917	0	51771.2		

27-Dec-2024	100	33	83600	2508	183	4.3E+08	1.3E+07	1007411	28538	700	402	39.4	4.3	24	0	850	900	935	0	51771.2	24.4	40773.7
28-Dec-2024	100	32	83778	2686	178	4.3E+08	1.4E+07	1006803	28521	699	392	38.5	4.6	24	0	877	900	926	0	51771.2	24.4	40798.1
29-Dec-2024	100	26	83956	2864	178	4.3E+08	1.5E+07	1007100	28529	699	392	38.5	4.5	24	0	883	900	920	0	51771.2	24.4	40822.5
30-Dec-2024	100	22	84131	3039	175	4.3E+08	1.6E+07	1009952	28610	701	386	37.8	4.7	24	0	874	900	928	0	51771.2	24.4	40846.9
31-Dec-2024	100	23	84304	3212	173	4.3E+08	1.7E+07	1008473	28568	700	380	37.3	4.7	24	0	866	900	927	0	51771.2	24.4	40871.2

**APPENDIX B**

Surface Emission Reports

June 28<sup>th</sup>, 2024

Mr. Chris Kozak  
City of Winnipeg  
1120 Waverly Street  
Winnipeg, MB R3T 0P4

Project No. 9-468

Dear Mr. Kozak:

RE: Surface Emission Survey – May 2024  
Area 1 - Landfill Gas Collection and Flaring System  
Brady Road Resource Management Facility, Winnipeg, MB

## 1.0 Introduction and Background

As part of the Operations contract with the City of Winnipeg (City), Integrated Gas Recovery Services (IGRS) is required to perform surface emission surveys during each calendar year to assess the effectiveness of the landfill gas (LFG) collection wellfield at the Brady Road Resource Management Facility (Site). On May 22<sup>nd</sup> and 23<sup>rd</sup>, 2024, IGRS performed the first surface emission survey (SES) of 2024. The results of the SES provide information on the performance of the LFG collection system. The results identify any areas on the landfill surface that may require additional attention to limit amounts of LFG being released into the atmosphere. The results of the May 2024 SES can be compared to previous SESs completed at the Site and any future SESs to determine areas that may consistently have high surface emissions of LFG.

The flaring system at the Site was commissioned in July of 2013, the same month the first SES was completed. Since then, the system has been running on a consistent basis, with flow rates ranging between 800 to 1000 cfm. This report discusses the results of the May 2024 SES, evaluates the emission and odour sources, and provides recommended remedial measures.

## 2.0 Methodology

The May 2024 SES was completed using Comcor's Surface Emissions Survey Protocol (Protocol), which is based on the United States Environmental Protection Agency's (USEPA) New Source Performance Standards (NSPS) for surface emissions monitoring at municipal solid waste landfills. The Protocol's methodology generally involves walking in a 30-meter grid to detect fugitive LFG emissions across the waste mound. Comcor's SES Protocol is provided as Attachment A.



An IRwin SX Portable Methane Leak Detector (Detector) was used to perform the SES. The Detector uses IR detection technology to detect methane emissions with a detection limit of 1 part per million (ppm), and is able to continuously sample and store readings at a frequency as high as once per second. The Detector is equipped with a global positioning system (GPS) sensor, which tracks the survey grid and location of all methane readings. The Detector was calibrated according to the manufacturers' specifications prior to being used for the SES.

A serpentine pattern was used to cover the entirety of the landfill site survey area. This path was tracked by the GPS and is displayed in Figure 1. At times, there were deviations from the path in an effort to identify major surface emissions where areas of potentially higher concern were noted.

The results of a SES are a good initial indicator of the effectiveness of the landfill cap and the overall LFG collection system. SESs have been used to identify high levels of surface emissions from the waste and identify areas that may require further investigation or remediation.

### **3.0 Operational and Site Conditions**

On May 22<sup>nd</sup> and 23<sup>rd</sup>, 2024, Comcor staff carried out an SES of the entire capped waste disposal fill area. The SES was conducted both where LFG collection wells are installed, as well as on the newly capped area where there is no LFG collection system. It is noted that there is currently a large active area with on-going filling operations, and without cover that was not able to be effectively monitored, due to the work in the area. Focus was placed on wells and infrastructure that penetrates the clay cap, as these points can often be a pathway for emissions. Comcor also inspected the area for evidence of LFG build-up, stressed vegetation, and/or areas of obvious odour.

Figure 1 provides a site plan reflective of the existing LFG wellfield. All wells had been previously balanced, and the LFG collection and flaring system had been running consistently prior to performing the SES. With these operating conditions, the results of the SES are a better representation of surface emissions under optimal operations.

Weather conditions during the May 2024 SES were average for the season and did fall within the required guidelines outlined in Attachment A.

### **4.0 Results**

#### **Background Emissions**

Background methane concentration readings are taken before a SES is conducted in order to identify which surface emissions are the result of the landfill, and which are from alternative



sources offsite. Background readings are taken upwind from the landfill site to ensure that emissions from the landfill do not influence the background concentrations. Each day, prior to commencing the SES, Comcor took background concentration readings both upwind and downwind at a distance of 30 meters or more from the limit of waste. In all cases, readings were between 0 to 2 ppm. These readings were considered negligible, and no further action was required to correct readings taken during the SES.

### Measured Emissions and Remedial Measures

In accordance with the Protocol, a minimum concentration of 1,000 ppm is commonly used as the emission exceedance threshold. However, as a conservative measure, Comcor reports all readings with concentrations above 500 ppm that were measured during the SES.

Figure 1 presents the locations of the emission exceedances, and is categorized into a gas concentration range as indicated by the colour coding on the figure.

Special attention was given to areas associated with the 2020 construction project, which involved the installation of compressed air and forcemain lines to various collection system infrastructure. Overall, these areas did not provide an indication of excessive methane escape.

An extensive investigation of Cell 30 and 31 was also completed, due to the odors that had been identified in previous sweeps. The odors had generally dissipated and were not identified during the May 2024 SES. It is likely that the capping activities have effectively reduced the odors identified in previous years. The largest area of concern is the cap located on the north side of cell 30 following the installed header; this area is indicated by large zone with no vegetation that follows a portion of the north header. Previous sweeps, in addition to the May 2024 sweep, have shown a number of hits in this portion of the site.

It is noted that capping activities have also been completed over the older parts of the landfill. While exceedances are not typically located in these areas, additional cap only serves to further prevent/reduce methane escape and oxygen intrusion through the landfill surface. It is recommended that additional capping activities in older parts of the landfill continue.

### Vegetation and Clay Cap Condition

Special attention and observation were also given to the condition of the clay cap and vegetation. Large cracks and ruts in the clay cap can allow gas to escape the landfill mound, and stressed or missing vegetation indicate that gas is escaping through the clay cap and is affecting plant/vegetation health.

While conducting the May 2024 SES, Comcor observed many areas of stressed vegetation in addition to those which were previously noted above. While these locations did not exceed the



methane threshold of the SES Protocol, they are still the best indicator of methane escape and will require continued monitoring to ensure potential gas emissions are remediated effectively.

## 5.0 Recommended Remedial Measures

The most evident indicator of methane escape on Site is the presence of stressed and/or lacking vegetation. It is recommended that capping activities be prioritized for areas where a lack of vegetation is clearly visible. Since the majority of the exceedances in previous SES were found in Cells 30 and 31, it is recommended that capping should be completed in these areas first. This capping is expected to help reduce methane escape as well as oxygen intrusion, and reduce odor complaints.

Following any repair/capping work, a follow-up SES should be conducted to ensure the final cap is adequate in controlling emissions. Future surveys should continue to evaluate previous areas of concern to ensure they did not go unnoticed in the May 2024 SES, and to identify any further areas that may require remediation.

## 6.0 Conclusions

The results of the May 2024 SES indicate that some progress has been made in reducing the amount of fugitive emissions through the landfill cap. Visual inspections of the surface cap during this round of monitoring show less stressed vegetation than in previous emission sweeps. Routine surface sweeps should continue in the future to document any changes in landfill gas emissions.

If you have any questions or concerns, please contact the undersigned.

Yours truly,

### COMCOR ENVIRONMENTAL LIMITED

Luxon Burgess, CET, LET  
Supervisor – Wellfield Operations

Jordan DeMerchant  
Environmental Technician

Brady Road Landfill CH4 ppm 2024-05-22



**COMCOR**  
ENVIRONMENTAL LIMITED  
Consulting Engineers and Landfill Gas Specialists

May 2024 Surface Emissions Sweep  
Brady Road Resource Management Facility  
Winnipeg, Manitoba

Figure 1  
PATH WALKED AND METHANE  
EXCEEDANCES



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**ATTACHMENT A**  
Surface Emissions Survey Protocol

<b>COMCOR / IGRS</b>		Standard Operating Procedure for <b>Surface Emissions Sweep Methodology</b>		
<b>Issue Date:</b> June 2020	<b>Written by:</b> L. Burgess	<b>Approved by:</b> S. McGarr	<b>Procedure:</b> COM-WF8	<b>Rev:</b> May 2024
<b>Distribution:</b> All Field Technicians		Field Operations		<b>Previous Rev:</b>

### **Purpose**

The objective of a Surface Emission Monitoring Plan is to complete an assessment of fugitive methane emissions within a landfill footprint.

The landfill gas emissions survey is based on the United States Environmental Protection Agency’s (USEPA) New Source Performance Standards (NSPS) for surface emissions monitoring at municipal solid waste landfills. Background methane concentration should be taken before each emissions survey and will be determined by monitoring upwind and downwind outside the boundary of the landfill at a distance of at least 30 metres from the limit of waste. The on-site emission survey is to be conducted as described within this document.

### **Tools and Equipment**

- IRwin Methane Leak Detector
- QED GEM or Elkins Earthworks Envision
- Camera / Cellphone for documenting exceedances

### **Required PPE**

- Personal Gas Monitor
- CSA approved foot wear with sole puncture protection and Grade 1 protective toe
- High visibility clothing (CSA Class 2)

### **Monitoring map**

- The path followed by the individual(s) who perform surface monitoring will be a serpentine pattern with 30m spacing.
- The maps will show the location of all gas monitors, each of which is shown with a unique identifier.
- The monitoring grid map may also indicate each area that is excluded from surface monitoring. Each excluded area is labeled and an attachment to the map has been prepared to explain the basis for each area’s exclusion from monitoring. The following areas are excluded from required monitoring:
  1. Slopes that are determined by the individual(s) performing the monitoring to be too steep to be safely traversed while carrying the monitor.
  2. Areas containing only waste other than Municipal Solid Waste (for example, “construction and demolition” debris, kiln ash, etc.).
  3. Areas of known asbestos disposal.

### **Instrument and Calibration Gas Specifications**

- All instruments will be field calibrated and have certification from the manufacturer or rental supplier.

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### Monitoring Schedule

- Under the NSPS, quarterly monitoring is required for all landfills that require a gas collection system (GCS). A landfill that can demonstrate that surface concentrations are below 500 parts per million by volume (ppmv) measured as methane in four consecutive quarters do not require a GCS.
- Any closed landfills that has surface concentrations not to exceed 500 parts per million by volume (ppmv) measured as methane in four consecutive quarterly monitoring periods may conduct annual monitoring.
- Monitoring will only occur if conditions are appropriate. Below is an outline of reasons that monitoring may not be able to be completed.
  1. Weather that is determined by the individual(s) who perform the surface monitoring to be unsafe in which to conduct outdoor activities or which may be damaging to health (i.e. , extremes of temperature, high winds, rain-snow-ice or thunder storms, snow and ice accumulation, darkness, ozone alerts, other air pollution alerts).
  2. Occurrence of meteorological conditions considered to be other than “typical”.
  3. For Tier 4 Landfills, average wind speed (on a 5-minute interval) must not exceed 40 km/h (25 mph).
  4. Ambient temperatures which do not rise above the minimum required ambient operational temperature of the monitoring instrument.
  5. Ambient temperatures which do not fall below the maximum allowable ambient operational temperature of the monitoring instrument.
  6. Accumulation of snow/ice to a depth in excess of the maximum allowable monitoring height-above-surface (i.e., 10 cm. = 4 inches).
  7. Wet surface conditions such that traversing the landfill would either present a hazard to the individual(s) performing the monitoring, or would damage the cover and potentially result in the creation of methane leaks.
- Where a delay in the monitoring schedule has been caused by one or more of the above conditions, monitoring will resume as soon as the condition(s) which precluded meeting the monitoring schedule subside. Documentation will be entered into the report detailing the regular monitoring schedule and conditions in which they were completed.

### Monitoring Procedure

- Conduct monitoring only if ambient temperatures are within acceptable operating limits for the monitoring instrument; there is no snow/ice cover greater than four inches deep, weather conditions are “typical” for the area, and weather and site conditions are such that it is not dangerous to conduct monitoring.
- For Tier 4 Landfills, conduct monitoring only if average wind speeds are below 40 km/h (25 mph). Utilize a wind barrier if average wind speeds exceed 1.8 km/h (4 mph) or gusts exceed 4.5 km/h (10 mph). Average wind speed to be determined every 5-minutes in an open area using an on-site anemometer with a continuous recorder and data logger for the entire monitoring event.
- Warm up the instrument per the manufacturer’s recommendations.

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- Perform an instrument calibration prior to each monitoring day.
- At a distance of 30 meters (98 feet) from the perimeter wells on the upwind side of the landfill, face into the wind and move the probe in the air for at least 30 seconds.
- Note the meter reading and record it as “upwind reading”.
- Perform the same procedure at a distance of 30 meters (98 feet) from the perimeter wells on the downwind side of the landfill and record the meter reading as “downwind reading”.
- Average the upwind and downwind readings and record the average in “background concentration”.
- Using the surface monitoring map, begin walking the sampling path at the starting point on the map holding the monitor probe no more than four inches above the landfill surface. Walk at a steady pace of approximately 1.5 mph (approximately 1 step per second).
- When the instrument gives a meter reading of > 500 ppm, stop walking and note the maximum meter reading. Record the time of detection and a unique location identifier from the GPS unit. It may be necessary to create a location identifier on the sampling grid map.
- Continue walking the sampling path until the entire route has been traversed.
- While traversing the path, if any areas are seen off of the path that appear to have a high potential for methane leaks (i.e., stressed vegetation, noticeable surface cracks, sunken areas, etc.), deviate from the path and monitor these areas as if they were on the path. Cover penetrations such as wellheads, vents and posts that pass through the cover of the landfill must also be monitored. Document these areas only if a leak is recorded.
- If the portable gas monitor gives a reading above its detectable limits use another instrument suitable to this range to determine methane levels.
- All areas of stressed vegetation, noticeable surface cracks, sunken areas, etc. should also be noted and the location recorded. If possible, take digital pictures to record any extreme conditions.

### Measured Exceedances

- If methane is detected at a concentration greater than 1000 ppm above background, the following steps may be taken until the exceedance is remedied:
  1. The location and concentration of the exceedance will be recorded.
  2. Adjustments to adjacent extraction wells will be made to increase gas collection in the vicinity of the exceedance. The location will be re-monitored within ten (10) calendar days of detecting the exceedance.
  3. If re-monitoring the location shows a second exceedance, cover maintenance will be performed. The location will be re-monitored within ten (10) calendar days of maintenance.
  4. If re-monitoring shows a third exceedance, consideration will be given to installing additional landfill gas extraction wells.



November 28<sup>th</sup>, 2024

Mr. Chris Kozak  
City of Winnipeg  
1120 Waverly Street  
Winnipeg, MB R3T 0P4

Project No. 9-468

Dear Mr. Kozak:

RE: Surface Emission Survey – October 2024  
Area 1 - Landfill Gas Collection and Flaring System  
Brady Road Resource Management Facility, Winnipeg, MB

**Integrated Gas  
Recovery Services**  
A Landfill Gas Utilization Company

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## 1.0 Introduction and Background

As part of the Operations contract with the City of Winnipeg (City), Integrated Gas Recovery Services (IGRS) is required to perform surface emission surveys during each calendar year to assess the effectiveness of the landfill gas (LFG) collection wellfield at the Brady Road Resource Management Facility (Site). On October 8<sup>th</sup> and 9<sup>th</sup>, 2024, IGRS performed the second surface emission survey (SES) of 2024. The results of the SES provide information on the performance of the LFG collection system. The results identify any areas on the landfill surface that may require additional attention to limit amounts of LFG being released into the atmosphere. The results of the October 2024 SES can be compared to previous SESs completed at the Site and any future SESs to determine areas that may consistently have high surface emissions of LFG.

The flaring system at the Site was commissioned in July of 2013, the same month the first SES was completed. Since then, the system has been running on a consistent basis, with flow rates ranging between 800 to 1000 cfm. This report discusses the results of the October 2024 SES, evaluates the emission and odour sources, and provides recommended remedial measures.

## 2.0 Methodology

The October 2024 SES was completed using IGRS's Surface Emissions Survey Protocol (Protocol), which is based on the United States Environmental Protection Agency's (USEPA) New Source Performance Standards (NSPS) for surface emissions monitoring at municipal solid waste landfills. The Protocol's methodology generally involves walking in a 30-meter grid to detect fugitive LFG emissions across the waste mound. IGRS's SES Protocol is provided as Attachment A.

An IRwin SX Portable Methane Leak Detector (Detector) was used to perform the SES. The Detector uses IR detection technology to detect methane emissions with a detection limit of 1 part per million (ppm), and is able to continuously sample and store readings at a frequency as high as once per second. The Detector is equipped with a global positioning system (GPS) sensor, which tracks the survey grid and location of all methane readings. The Detector was calibrated according to the manufacturers' specifications prior to being used for the SES.

A serpentine pattern was used to cover the entirety of the landfill site survey area. This path was tracked by the GPS and is displayed in Figure 1. At times, there were deviations from the path in an effort to identify major surface emissions where areas of potentially higher concern were noted.

The results of a SES are a good initial indicator of the effectiveness of the landfill cap and the overall LFG collection system. SESs have been used to identify high levels of surface emissions from the waste and identify areas that may require further investigation or remediation.





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**Integrated Gas Recovery Services**  
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### 3.0 Operational and Site Conditions

On October 8<sup>th</sup> and 9<sup>th</sup>, 2024, IGRS staff carried out an SES of the capped waste disposal fill area. The SES was conducted both where LFG collection wells are installed, as well as on the newly capped area where there is no LFG collection system. It is noted that there is currently a large active area with on-going filling operations, and without cover that was not able to be effectively monitored, due to the work in the area. Focus was placed on wells and infrastructure that penetrates the clay cap, as these points can often be a pathway for emissions. IGRS also inspected the area for evidence of LFG build-up, stressed vegetation, and/or areas of obvious odour.

Figure 1 provides a site plan reflective of the existing LFG wellfield. All wells had been previously balanced, and the LFG collection and flaring system had been running consistently prior to performing the SES. With these operating conditions, the results of the SES are a better representation of surface emissions under optimal operations.

It was also noted that excessive vegetative growth on site made this SES more difficult to complete than previous sweeps. The vegetation restricted access to some areas or caused variations in the typical route taken during SES. These restrictions while small could impact the overall quality of the SES as any emissions from those areas could not be noted.

Weather conditions during the October 2024 SES were average for the season and fell within the required guidelines outlined in Attachment A.

**Table 1: Summary of Weather Conditions**

	High Temp °C	Low Temp °C	Max Wind Speed (km/hr)	Wind Direction	Pressure (kPa)
<b>October 8, 2024</b>	20	3	26	SSE	99.07
<b>October 9, 2024</b>	22	9	39	SE	98.6

### 4.0 Results

#### Background Emissions

Background methane concentration readings are taken before a SES is conducted in order to identify which surface emissions are the result of the landfill, and which are from alternative sources offsite. Background readings are taken upwind from the landfill site to ensure that emissions from the landfill do not influence the background concentrations. Each day, prior to commencing the SES, IGRS took background concentration readings both upwind and downwind at a distance of 30 meters or more from the limit of waste. In all cases, readings were between 0 to 2 ppm. These readings were considered negligible, and no further action was required to correct readings taken during the SES.

#### Measured Emissions and Remedial Measures

In accordance with the Protocol, a minimum concentration of 1,000 ppm is commonly used as the emission exceedance threshold. However, as a conservative measure, IGRS reports all readings with concentrations above 500 ppm that were measured during the SES.

Figure 1 presents the locations of the emission exceedances and is categorized into a gas concentration range as indicated by the colour coding on the figure.





Special attention was given to areas associated with the 2020 construction project, which involved the installation of compressed air and forcemain lines to various collection system infrastructure. Overall, these areas did not provide an indication of excessive methane escape.

Typically, an investigation of Cell 30 and 31 is also completed, due to the odors that had been identified in previous sweeps. During this SES due to the large amount of vegetation as well as ongoing fill operations in the area, this area was not able to be monitored as thoroughly as previous sweeps. In areas where it was completed, odors had generally dissipated and were not identified during the October SES. It is likely that the capping activities have effectively reduced the odors identified in previous years. The largest area of concern is the cap located on the north side of cell 30 following the installed header; this area is indicated by large zone with no vegetation that follows a portion of the north header. Previous sweeps have shown a number of hits in this portion of the site.

It is noted that capping activities have also been completed over the older parts of the landfill. While exceedances are not typically located in these areas, additional cap only serves to further prevent/reduce methane escape and oxygen intrusion through the landfill surface. It is recommended that additional capping activities in older parts of the landfill continue.

### Vegetation and Clay Cap Condition

Special attention and observation were also given to the condition of the clay cap and vegetation. Large cracks and ruts in the clay cap can allow gas to escape the landfill mound, and stressed or missing vegetation indicate that gas is escaping through the clay cap and is affecting plant/vegetation health.

While conducting the October 2024 SES, IGRS observed many areas of stressed vegetation in addition to those which were previously noted above. While these locations did not exceed the methane threshold of the SES Protocol, they are still the best indicator of methane escape and will require continued monitoring to ensure potential gas emissions are remediated effectively.

## **5.0 Recommended Remedial Measures**

The most evident indicator of methane escape on Site, is the presence of stressed and/or lacking vegetation. It is recommended that capping activities be prioritized for areas where a lack of vegetation is clearly visible. Typically, many of the exceedances in previous SES were found in Cells 30 and 31, it is recommended that capping should be completed in these areas first. This capping is expected to help reduce methane escape as well as oxygen intrusion and reduce odor complaints especially as there are on LFG wells in the area.

While no manholes produced exceedances during this round of the SES, it was noted that many manholes have openings in their lids which could allow fugitive emissions, and IGRS would recommend that all manholes be fully sealed. Undertaking this work could also increase landfill gas collection efficiency.

Following any repair/capping work, a follow-up SES should be conducted to ensure the final cap is adequate in controlling emissions. Future surveys should continue to evaluate previous areas of concern to ensure they did not go unnoticed in the October 2024 SES, and to identify any further areas that may require remediation.

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A Landfill Gas Utilization Company

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## 6.0 Conclusions

The results of the October 2024 SES indicate that progress has been made in reducing the amount of fugitive emissions through the landfill cap. Visual inspections of the surface cap during this round of monitoring show less stressed vegetation than in previous emission sweeps. Routine surface sweeps should continue in the future to document any changes in landfill gas emissions.

If you have any questions or concerns, please contact the undersigned.

Yours very truly,

**INTERGRATED GAS RECOVERY SERVICES**

**Integrated Gas  
Recovery Services**  
A Landfill Gas Utilization Company

Luxon Burgess, CET, LET  
Supervisor, Wellfield Operations

Jordan DeMerchant  
Environmental Technician

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Brady Road Landfill CH4 ppm 2024-10-08

0 500 1000

10000



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ENVIRONMENTAL LIMITED  
Consulting Engineers and Landfill Gas Specialists

October 2024 Surface Emissions Sweep  
Brady Road Resource Management Facility  
Winnipeg, Manitoba

Figure 1  
PATH WALKED AND METHANE  
EXCEEDANCES



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## ATTACHMENT A

### Surface Emission Survey Protocol

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<b>Distribution:</b> All Field Technicians		Field Operations		<b>Previous Rev:</b>

### **Purpose**

The objective of a Surface Emission Monitoring Plan is to complete an assessment of fugitive methane emissions within a landfill footprint.

The landfill gas emissions survey is based on the United States Environmental Protection Agency’s (USEPA) New Source Performance Standards (NSPS) for surface emissions monitoring at municipal solid waste landfills. Background methane concentration should be taken before each emissions survey and will be determined by monitoring upwind and downwind outside the boundary of the landfill at a distance of at least 30 metres from the limit of waste. The on-site emission survey is to be conducted as described within this document.

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  7. Wet surface conditions such that traversing the landfill would either present a hazard to the individual(s) performing the monitoring, or would damage the cover and potentially result in the creation of methane leaks.
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### Monitoring Procedure

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- Warm up the instrument per the manufacturer’s recommendations.

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- Perform an instrument calibration prior to each monitoring day.
- At a distance of 30 meters (98 feet) from the perimeter wells on the upwind side of the landfill, face into the wind and move the probe in the air for at least 30 seconds.
- Note the meter reading and record it as “upwind reading”.
- Perform the same procedure at a distance of 30 meters (98 feet) from the perimeter wells on the downwind side of the landfill and record the meter reading as “downwind reading”.
- Average the upwind and downwind readings and record the average in “background concentration”.
- Using the surface monitoring map, begin walking the sampling path at the starting point on the map holding the monitor probe no more than four inches above the landfill surface. Walk at a steady pace of approximately 1.5 mph (approximately 1 step per second).
- When the instrument gives a meter reading of > 500 ppm, stop walking and note the maximum meter reading. Record the time of detection and a unique location identifier from the GPS unit. It may be necessary to create a location identifier on the sampling grid map.
- Continue walking the sampling path until the entire route has been traversed.
- While traversing the path, if any areas are seen off of the path that appear to have a high potential for methane leaks (i.e., stressed vegetation, noticeable surface cracks, sunken areas, etc.), deviate from the path and monitor these areas as if they were on the path. Cover penetrations such as wellheads, vents and posts that pass through the cover of the landfill must also be monitored. Document these areas only if a leak is recorded.
- If the portable gas monitor gives a reading above its detectable limits use another instrument suitable to this range to determine methane levels.
- All areas of stressed vegetation, noticeable surface cracks, sunken areas, etc. should also be noted and the location recorded. If possible, take digital pictures to record any extreme conditions.

### Measured Exceedances

- If methane is detected at a concentration greater than 1000 ppm above background, the following steps may be taken until the exceedance is remedied:
  1. The location and concentration of the exceedance will be recorded.
  2. Adjustments to adjacent extraction wells will be made to increase gas collection in the vicinity of the exceedance. The location will be re-monitored within ten (10) calendar days of detecting the exceedance.
  3. If re-monitoring the location shows a second exceedance, cover maintenance will be performed. The location will be re-monitored within ten (10) calendar days of maintenance.
  4. If re-monitoring shows a third exceedance, consideration will be given to installing additional landfill gas extraction wells.

**APPENDIX L**  
**2024 EXTERNAL GAS PROBE**  
**MONITORING**



### 2024 External Gas Probe Monitoring

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
1	23-Jan-24	0.0	21.9	0.0	0.0
1	12-Feb-24	0.0	21.2	0.0	0.0
1	11-Mar-24	0.0	21.5	0.0	0.0
1	3-Apr-24	0.1	22.3	0.0	0.0
1	7-May-24	0.0	18.2	0.0	0.0
1	7-Jun-24	0.1*	20.8	0.0	0.0
1	8-Jul-24	0.0	21.1	1.0	0.0
1	7-Aug-24	0.1	21.6	1.0	0.0
1	5-Sep-24	0.0	21.9	0.0	0.0
1	7-Oct-24	0.0	20.9	0.0	0.0
1	7-Nov-24	0.0	20.5	0.0	0.0
1	17-Dec-24	0.0	21.7	0.0	0.0

\*Reading 0.1 CH4 in open air

2	23-Jan-24	0.0	22.3	0.0	0.0
2	12-Feb-24	0.0	20.9	0.0	0.0
2	11-Mar-24	0.0	20.4	0.0	0.0
2	3-Apr-24	0.0	18.6	0.0	0.0
2	7-May-24	0.0	21.1	0.0	0.0
2	7-Jun-24	0.1*	20.8	0.0	0.0
2	8-Jul-24	0.0	20.9	1.0	0.0
2	7-Aug-24	0.0	19.9	1.0	0.0
2	5-Sep-24	0.0	20.1	0.0	0.0
2	7-Oct-24	0.0	19.6	0.0	0.0
2	7-Nov-24	0.0	20.8	0.0	0.0
2	17-Dec-24	0.0	21.7	0.0	0.0

\*Reading 0.1 CH4 in open air

3	23-Jan-24	0.0	21.4	0.0	0.0
3	12-Feb-24	0.0	21.0	1.0	0.0
3	11-Mar-24	0.0	20.9	0.0	0.0
3	3-Apr-24	0.0	21.2	0.0	0.0
3	6-May-24	0.1	20.7	0.0	0.0
3	7-Jun-24	0.1	20.9	0.0	0.0
3	8-Jul-24	0.1	20.2	0.0	0.0
3	7-Aug-24	0.0	19.5	0.0	0.0
3	5-Sep-24	0.0	21.3	0.0	0.0
3	7-Oct-24	0.0	20.9	0.0	0.0
3	8-Nov-24	0.0	21.5	0.0	0.0
3	30-Dec-24	0.0	20.8	0.0	0.0



### 2024 External Gas Probe Monitoring

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
4	24-Jan-24	0.0	20.9	0.0	0.0
4	12-Feb-24	0.0	21.5	0.0	0.0
4	11-Mar-24	0.0	21.5	0.0	0.0
4	3-Apr-24	0.0	21.2	0.0	0.0
4	6-May-24	0.2	20.1	0.0	0.0
4	7-Jun-24	0.0	20.9	0.0	0.0
4	8-Jul-24	0.0	19.9	0.0	0.0
4	7-Aug-24	0.0	21.6	0.0	0.0
4	5-Sep-24	0.0	21.9	0.0	0.0
4	7-Oct-24	0.0	21.0	0.0	0.0
4	8-Nov-24	0.0	21.6	0.0	0.0
4	30-Dec-24	0.0	21.8	0.0	0.0
5	24-Jan-24	0.0	21.5	0.0	0.0
5	12-Feb-24	0.0	21.1	0.0	0.0
5	11-Mar-24	0.0	20.4	0.0	0.0
5	3-Apr-24	0.0	21.2	0.0	0.0
5	6-May-24	0.0	20.0	0.0	0.0
5	7-Jun-24	0.0	19.6	0.0	0.0
5	8-Jul-24	0.0	17.9	0.0	0.0
5	7-Aug-24	0.0	20.3	1.0	0.0
5	5-Sep-24	0.0	21.7	0.0	0.0
5	7-Oct-24	0.0	20.9	0.0	0.0
5	8-Nov-24	0.0	21.5	1.0	0.0
5	30-Dec-24	0.0	22.2	0.0	0.0
6	22-Jan-24	0.0	21.4	0.0	0.0
6	6-Feb-24	0.0	21.5	0.0	0.0
6	11-Mar-24	0.0	21.5	0.0	0.0
6	3-Apr-24	0.0	21.6	0.0	0.0
6	6-May-24	0.0	20.6	0.0	0.0
6	7-Jun-24	0.0	20.7	0.0	0.0
6	8-Jul-24	0.0	20.3	0.0	0.0
6	6-Aug-24	0.1	21.9	1.0	0.0
6	5-Sep-24	0.0	22.5	1.0	0.0
6	7-Oct-24	0.0	21.2	0.0	0.0
6	7-Nov-24	0.0	21.1	0.0	0.0
6	17-Dec-24	0.0	21.8	0.0	0.0



### 2024 External Gas Probe Monitoring

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
7	22-Jan-24	0.0	22.9	0.0	0.0
7	6-Feb-24	0.0	20.8	0.0	0.0
7	12-Mar-24	0.0	20.9	0.0	0.0
7	4-Apr-24	0.0	18.2	0.0	0.0
7	7-May-24	0.0	19.6	0.0	0.0
7	7-Jun-24	0.0	18.1	0.0	0.0
7	8-Jul-24	0.0	19.0	0.0	0.0
7	6-Aug-24	0.1	20.1	0.0	0.0
7	5-Sep-24	0.0	21.0	0.0	0.0
7	7-Oct-24	0.1	20.8	0.0	0.0
7	8-Nov-24	0.0	21.4	1.0	0.0
7	16-Dec-24	0.0	21.0	0.0	0.0
8	22-Jan-24	0.0	23.2	0.0	0.0
8	6-Feb-24	0.0	21.3	0.0	0.0
8	12-Mar-24	0.0	21.6	0.0	0.0
8	4-Apr-24	0.0	20.3	0.0	0.0
8	7-May-24	0.0	16.6	0.0	0.0
8	7-Jun-24	0.0	20.6	0.0	0.0
8	8-Jul-24	0.0	20.9	0.0	0.0
8	6-Aug-24	0.1	21.6	0.0	0.0
8	5-Sep-24	0.0	21.8	0.0	0.0
8	7-Oct-24	0.1	20.9	0.0	0.0
8	8-Nov-24	0.0	21.5	1.0	0.0
8	16-Dec-24	0.0	21.7	0.0	0.0
9	22-Jan-24	0.0	22.9	0.0	0.0
9	6-Feb-24	0.0	20.5	0.0	0.0
9	12-Mar-24	0.0	18.7	0.0	0.0
9	4-Apr-24	0.0	16.2	0.0	0.0
9	7-May-24	0.0	19.2	0.0	0.0
9	7-Jun-24	0.1*	21.5	0.0	0.0
9	8-Jul-24	0.0	20.9	1.0	0.0
9	6-Aug-24	0.1	20.8	1.0	0.0
9	5-Sep-24	0.0	20.1	0.0	0.0
9	7-Oct-24	0.1	19.5	0.0	0.0
9	8-Nov-24	0.0	20.5	0.0	0.0
9	16-Dec-24	0.0	20.8	0.0	0.0

\*Reading 0.1 CH4 in open air



### 2024 External Gas Probe Monitoring

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
10	22-Jan-24	0.0	23.0	0.0	0.0
10	6-Feb-24	0.0	20.8	0.0	0.0
10	12-Mar-24	0.0	20.3	0.0	0.0
10	4-Apr-24	0.0	18.1	0.0	0.0
10	7-May-24	0.0	21.4	0.0	0.0
10	7-Jun-24	0.1*	21.5	0.0	0.0
10	8-Jul-24	0.0	20.8	0.0	0.0
10	6-Aug-24	0.1	21.7	1.0	0.0
10	5-Sep-24	0.0	21.4	0.0	0.0
10	7-Oct-24	0.1	20.2	0.0	0.0
10	8-Nov-24	0.0	21.3	1.0	0.0
10	16-Dec-24	0.0	21.2	0.0	0.0

\*Reading 0.1 CH4 in open air

P26E	22-Jan-24	0.0	22.1	0.0	0.0
P26E	12-Feb-24	0.0	20.5	1.0	0.0
P26E	11-Mar-23	0.0	15.0	0.0	0.0
P26E	3-Apr-24	0.0	14.6	0.0	0.0
P26E	7-May-24	0.0	11.6	0.0	0.0
P26E	7-Jun-24	0.0	20.6	0.0	0.0
P26E	9-Jul-24	0.1	20.4	0.0	0.0
P26E	7-Aug-24	0.0	15.4	1.0	0.0
P26E	5-Sep-24	0.0	20.9	0.0	0.0
P26E	7-Oct-24	0.0	20.5	0.0	0.0
P26E	8-Nov-24	0.0	21.2	0.0	0.0
P26E	17-Dec-24	0.0	20.9	0.0	0.0
P28E	22-Jan-24	0.0	22.1	0.0	0.0
P28E	12-Feb-24	0.0	22.3	0.0	0.0
P28E	11-Mar-24	0.0	21.3	0.0	0.0
P28E	4-Apr-24	0.0	21.4	0.0	0.0
P28E	7-May-24	0.0	21.0	0.0	0.0
P28E	7-Jun-24	0.0	20.7	0.0	0.0
P28E	9-Jul-24	0.0	20.2	0.0	0.0
P28E	7-Aug-24	0.0	21.8	1.0	0.0
P28E	5-Sep-24	0.0	22.0	0.0	0.0
P28E	7-Oct-24	0.0	21.0	0.0	0.0
P28E	8-Nov-24	0.0	21.7	1.0	0.0
P28E	17-Dec-24	0.0	20.3	0.0	0.0



### 2024 External Gas Probe Monitoring

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
P30E	24-Jan-24	0.0	22.3	0.0	0.0
P30E	12-Feb-24	0.0	20.1	0.0	0.0
P30E	11-Mar-24	0.0	19.6	0.0	0.0
P30E	4-Apr-24	0.0	21.4	0.0	0.0
P30E	7-May-24	0.0	21.2	0.0	0.0
P30E	7-Jun-24	0.0	20.7	0.0	0.0
P30E	8-Jul-24	0.0	21.0	0.0	0.0
P30E	7-Aug-24	0.0	21.8	1.0	0.0
P30E	5-Sep-24	0.0	20.6	0.0	0.0
P30E	7-Oct-24	0.0	20.3	0.0	0.0
P30E	8-Nov-24	0.0	21.4	1.0	0.0
P30E	17-Dec-24	0.0	20.3	0.0	0.0
P34E	24-Jan-24	0.0	21.7	0.0	0.0
P34E	6-Feb-24	0.0	21.1	0.0	0.0
P34E	11-Mar-24	0.0	17.3	0.0	0.0
P34E	3-Apr-24	0.0	17.2	0.0	0.0
P34E	7-May-24	0.0	20.9	0.0	0.0
P34E	12-Jun-14	0.0	20.4	0.0	0.0
P34E	9-Jul-24	0.0	20.2	0.0	0.0
P34E	7-Aug-24	0.1	22.0	1.0	0.0
P34E	5-Sep-24	0.0	22.1	0.0	0.0
P34E	7-Oct-24	0.0	20.8	0.0	0.0
P34E	7-Nov-24	0.0	20.9	0.0	0.0
P34E	17-Dec-24	0.0	20.7	0.0	0.0
P106E	24-Jan-24	0.0	20.6	0.0	0.0
P106E	6-Feb-24	0.0	21.4	0.0	0.0
P106E	12-Mar-24	0.0	22.4	0.0	0.0
P106E	4-Apr-24	0.0	21.0	0.0	0.0
P106E	7-May-24	0.0	20.5	0.0	0.0
P106E	5-Jun-24	0.0	20.2	0.0	0.0
P106E	8-Jul-24	0.0	20.7	0.0	0.0
P106E	6-Aug-24	0.0	21.3	1.0	0.0
P106E	5-Sep-24	0.0	21.8	0.0	0.0
P106E	7-Oct-24	0.1	20.9	0.0	0.0
P106E	7-Nov-24	0.0	21.1	0.0	0.0
P106E	30-Dec-24	0.0	21.7	0.0	0.0



### 2024 External Gas Probe Monitoring

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
P107E	24-Jan-24	0.0	22.1	0.0	0.0
P107E	6-Feb-24	0.0	21.4	1.0	0.0
P107E	12-Mar-24	0.0	21.5	0.0	0.0
P107E	4-Apr-24	0.0	12.2	1.0	0.0
P107E	7-May-24	0.0	21.1	0.0	0.0
P107E	5-Jun-24	0.0	20.6	0.0	0.0
P107E	8-Jul-24	0.0	20.7	0.0	0.0
P107E	6-Aug-24	0.0	21.3	0.0	0.0
P107E	5-Sep-24	0.0	21.8	0.0	0.0
P107E	7-Oct-24	0.1	21.1	0.0	0.0
P107E	7-Nov-24	0.0	19.9	0.0	0.0
P107E	30-Dec-24	0.0	21.3	0.0	0.0
P108E	24-Jan-24	0.0	20.9	0.0	0.0
P108E	6-Feb-24	0.0	21.5	0.0	0.0
P108E	12-Mar-24	0.0	21.8	0.0	0.0
P108E	4-Apr-24	0.0	21.7	0.0	0.0
P108E	7-May-24	0.0	21.1	0.0	0.0
P108E	5-Jun-24	0.0	20.5	0.0	0.0
P108E	8-Jul-24	0.0	20.6	0.0	0.0
P108E	6-Aug-24	0.0	21.4	1.0	0.0
P108E	5-Sep-24	0.0	21.9	0.0	0.0
P108E	7-Oct-24	0.1	21.2	0.0	0.0
P108E	7-Nov-24	0.0	20.3	0.0	0.0
P108E	30-Dec-24	0.0	21.1	0.0	0.0
P109E	24-Jan-24	0.0	21.3	0.0	0.0
P109E	6-Feb-24	0.0	19.8	0.0	0.0
P109E	12-Mar-24	0.0	17.1	0.0	0.0
P109E	4-Apr-24	0.0	14.7	1.0	0.0
P109E	7-May-24	0.0	20.9	0.0	0.0
P109E	7-Jun-24	0.1*	21.4	0.0	0.0
P109E	8-Jul-24	0.0	20.6	0.0	0.0
P109E	6-Aug-24	0.1	16.2	0.0	0.0
P109E	5-Sep-24	0.0	15.9	0.0	0.0
P109E	7-Oct-24	0.0	20.1	0.0	0.0
P109E	7-Nov-24	0.0	20.7	0.0	0.0
P109E	16-Dec-24	0.0	18.2	0.0	0.0

\*Reading 0.1 CH4 in open air



### 2024 External Gas Probe Monitoring

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
P110E	24-Jan-24	0.0	12.7	16.0	0.0
P110E	6-Feb-24	0.0	0.3	16.0	1.0
P110E	12-Mar-24	0.0	0.6	29.0	2.0
P110E	4-Apr-24	0.0	0.5	36.0	2.0
P110E	7-May-24	0.0	21.1	0.0	0.0
P110E	5-Jun-24	0.0	0.3	1.0	0.0
P110E*	5-Jun-24	0.0	7.6	0.0	0.0
P110E	8-Jul-24	0.0	0.2	1.0	0.0
P110E*	8-Jul-24	0.0	12.3	0.0	0.0
P110E	6-Aug-24	0.0	17.8	0.0	0.0
P110E	5-Sep-24	0.0	17.7	0.0	0.0
P110E	7-Oct-24	0.0	13.8	0.0	0.0
P110E	7-Nov-24	0.0	6.2	0.0	1.0
P110E	30-Dec-24	0.0	14.9	0.0	0.0

\*Abnormal Reading - Took an additional sample after a purge cycle

P111E	24-Jan-24	0.0	14.8	0.0	0.0
P111E	6-Feb-24	0.0	21.8	0.0	0.0
P111E	12-Mar-24	0.0	21.7	0.0	0.0
P111E	4-Apr-24	0.0	19.9	0.0	0.0
P111E	7-May-24	0.0	18.7	4.0	0.0
P111E	7-Jun-24	0.0	20.7	0.0	0.0
P111E	8-Jul-24	0.0	21.1	1.0	0.0
P111E	7-Aug-24	0.1	22.0	1.0	0.0
P111E	5-Sep-24	0.0	21.8	0.0	0.0
P111E	7-Oct-24	0.0	20.9	0.0	0.0
P111E	7-Nov-24	0.0	20.4	0.0	0.0
P111E	30-Dec-24	0.0	21.8	0.0	0.0
P112E	22-Jan-24	0.0	20.1	0.0	0.0
P112E	6-Feb-24	0.0	21.6	0.0	0.0
P112E	12-Mar-24	0.0	19.5	0.0	0.0
P112E	4-Apr-24	0.0	21.8	0.0	0.0
P112E	7-May-24	0.0	21.1	0.0	0.0
P112E	5-Jun-24	0.0	20.3	0.0	0.0
P112E	8-Jul-24	0.0	19.9	0.0	0.0
P112E	7-Aug-24	0.0	18.0	1.0	0.0
P112E	5-Sep-24	0.0	19.7	0.0	0.0
P112E	7-Oct-24	0.0	20.2	0.0	0.0
P112E	7-Nov-24	0.0	20.3	0.0	0.0
P112E	30-Dec-24	0.0	21.3	0.0	0.0

**APPENDIX M**  
**BRRMF PROPOSED SAMPLING**  
**AND ANALYSIS PLANS**



# Brady Road Resource Management Facility Proposed Sampling and Analysis Plan Updates

**April 14, 2025**

# Brady Road Resource Management Facility

## Proposed Sampling and Analysis Plan Updates

### Introduction

With the issuance of the Brady Road Resource Management Facility (BRRMF) Environment Act License No.3081 R, on April 23, 2014, the City of Winnipeg (the City) developed Sampling and Analysis Plans (SAPs) for Groundwater, Surface Water, and Leachate. The SAPs were developed with the objectives of tracking trends, monitoring key indicator parameters, and identifying potential sources of contamination. Since 2014, the BRRMF has expanded, its infrastructure has become more complex, and on-site activities have evolved.

In 2024, the City of Winnipeg completed a comprehensive review of its SAPs and is proposing updated SAPs that reflect current on-site activities and infrastructure while ensuring continued monitoring of essential environmental parameters. For Groundwater, Surface Water, and Leachate samples we propose to continue monitoring for the required parameters but reduce or eliminate some parameters that are not required under EAL No. 3081 R. We are also proposing a reduction to the frequency and number of sampling locations for the BRRMF site.

### Groundwater

The 2014 SAP for groundwater includes 13 bedrock wells, which are required under EAL No. 3081 R (compliance locations) and 21 overburden wells completed in clay or till, which are not required under EAL No. 3081 R (non-compliance locations). Bedrock wells are sampled twice per year (spring and fall), till wells are sampled at varying frequencies based on location, and clay wells are sampled once per year (except GWQ 25-6N59DR, which is sampled every second year). The parameters analyzed vary by sample location and date, and are summarized in Table 1.

The City is proposing continued sampling of the 13 bedrock wells twice per year for the parameters listed in Appendix F of EAL No. 3081 R. For till wells, we

propose sampling every 2 years for the parameters listed in Appendix F of EAL No. 3081 R, with the exception of total and fecal coliforms and *E. coli*. For clay layer wells we propose continuing with our current parameter list (which is a reduced indicator parameter list) but reducing the sampling frequency to once every five years.

A Summary of the current and proposed Groundwater SAPs are presented in Table 1. The addition or removal of future sampling locations and/or parameters analyzed will be detailed in the respective reporting year.

## Surface Water

The 2014 Surface Water SAP was designed to provide an overall parameter profile across the BRRMF site, covering both impacted and non-impacted waterways. Since 2014, this plan has been refined, with indicator parameters tracked and reported annually. The surface water management approach at BRRMF has evolved over the years and will continue to adapt as new cells are constructed, particularly in areas such as Area B.

The primary objective of the surface water management plan is to maintain clear separation between impacted and non-impacted water sources, while assessing any potential effects on water quality as it moves onto and off the site. The City is not proposing any changes to sampling frequency for upstream (SQW25-1 and SQW25-12) and downstream (SWQ25-2 and SWQ25-16) locations and impacted water ponds (SWQ 25-6, SWQ 25-7, and SWQ 25-8).

Due to the annual fluctuation in precipitation and water runoff, the Drying Ponds (SWQ 25-11a, b, and c) have been steadily retaining water. The City has extended Drying Pond B to provide additional contingency against overflow. Each pond was surveyed in 2024 and the berms were regraded to their original elevation. Drying Pond C is the only pond that connects to the non-impacted water system; it will remain closed and will not be discharged without consent from Manitoba Environment and Climate Change. We will continue sampling these locations prior to discharge and sampling data will be submitted to Manitoba Environment and Climate Change prior to any discharge event. The

CRCC Pond (SWQ25-10) no longer exists, as such, SWQ25-10, SWQ25-13a and SWQ25-13B are not included in the proposed Surface Water SAP.

We propose reducing the frequency of sampling at the clean water ponds (SWQ 25-9a and b) and intermediate points on the South Perimeter Ditch (SWQ 25-14a and b and SWQ 25-15a and b) to an as-needed basis going forward, which includes prior to discharge for ponds and for investigative purposes at ponds and other on-site locations, if required.

No changes are proposed to the parameters analyzed; all samples will be analyzed for the parameters listed in Appendix G of EAL No. 3081 R.

A Summary of the current and proposed Surface Water SAPs are presented in Table 2. The addition or removal of future sampling locations and/or parameters analyzed will be detailed in the respective reporting year.

## Leachate

Over the past three decades, the leachate management system has evolved, primarily through the installation of sub-drains in the base of newer landfill cells during construction. The Environmental Impact Assessment (EIA) submitted with the Environmental Act Proposal for the BRRMF (December 2012) confirmed that organic contaminants from the leachate have not been detected in the underlying groundwater system. The current leachate management system is a pneumatic system designed to maintain leachate levels on-site below the required threshold of 0.3 meters above the landfill cell liner. The system includes a network of drains, sumps, pumping stations, and pneumatic pumps. Routine maintenance and periodic inspections of the collection system and leachate manholes are conducted by City staff, under the direction of the Supervisor of Environmental Monitoring and Reporting.

In 2018, the collection system was upgraded to a centralized system, with the holding tank on-site serving as the primary collection vessel. The system currently includes collection manholes, landfill gas and leachate extraction wells, and pumping manholes. The three pumping manholes (MH-27, MH-BIO, and MH-34) are excluded from the centralized system as they are situated outside the main waste footprint and have their own independent collection system(s).

The current Leachate SAP includes sampling at 12 individual manholes and the centralized collection tank location on an annual basis. Because ten of the manholes are part of the same centralized system, where all drainage is collected at the Leachate tank before being hauled offsite to the North End Pollution Control Centre (NEWPCC) for treatment, we are proposing reducing to four sampling locations (the centralized leachate collection tank, MH-27, MH-BIO, and MH-34).

To facilitate comparison with Surface Water and Groundwater samples, we propose to analyze leachate samples for the parameters listed in EAL No. 3081R Appendices F and G. We proposed to discontinue testing for the parameters listed in Schedule A of EAL 2684 RRR, because these parameters are tested and reported by NEWPCC.

A Summary of the current and proposed Leachate SAPs are presented in Table 3. The addition or removal of future sampling locations and/or parameters analyzed will be detailed in the respective reporting year.

**Table 1: Groundwater Sampling and Analysis Plan**

**Bedrock (Compliance)**

Current Sampling and Analysis Plan				Proposed Sampling and Analysis Plan					
Sample ID	Unit Monitored	Frequency	Parameters	Sample ID	Unit Monitored	Frequency	Parameters		
<b>Upgradient Background Brady Road</b>				<b>Upgradient Background Brady Road</b>					
GWQ-25-W7	Bedrock	Semi-Annual (Spring/Fall)	All parameters listed under <b>Appendix F</b> of Environment Act Licence No. 3081 "Comprehensive Water Quality Chemical and Microbiological Parameters" During Fall sampling a reduced indicator parameter set was submitted for W5, W7, W10R, and W12.	GWQ-25-W6	Bedrock	Semi-Annual (Spring/Fall)	All parameters listed under <b>Appendix F</b> of Environment Act Licence No. 3081 "Comprehensive Water Quality Chemical and Microbiological Parameters"		
<b>Downgradient Site Perimeter East</b>				<b>Downgradient Site Perimeter East</b>					
GWQ-25-W8	Bedrock	Semi-Annual (Spring/Fall)		GWQ-25-W8	Bedrock	Semi-Annual (Spring/Fall)			
GWQ-25-W11	Bedrock	Semi-Annual (Spring/Fall)		GWQ-25-W11	Bedrock	Semi-Annual (Spring/Fall)			
<b>Cross Gradient Site Perimeter North</b>				<b>Cross Gradient Site Perimeter North</b>					
GWQ-25-W10	Bedrock	Semi-Annual (Spring/Fall)		GWQ-25-W9	Bedrock	Semi-Annual (Spring/Fall)			
GWQ-25-W10R	Bedrock	Semi-Annual (Spring/Fall)		GWQ-25-W10R	Bedrock	Semi-Annual (Spring/Fall)			
<b>Downgradient Former Disposal Cells in west of site</b>				<b>Downgradient Former Disposal Cells in west of site</b>					
GWQ-25-W8	Bedrock	Semi-Annual (Spring/Fall)		GWQ-25-W7	Bedrock	Semi-Annual (Spring/Fall)			
<b>Downgradient (East)</b>				<b>Downgradient (East)</b>					
GWQ-25-W12	Bedrock	Semi-Annual (Spring/Fall)		GWQ-25-W12	Bedrock	Semi-Annual (Spring/Fall)			
GWQ-25-W13	Bedrock*	Semi-Annual (Spring/Fall)		GWQ-25-W13	Bedrock*	Semi-Annual (Spring/Fall)			
GWQ-25-W14	Bedrock*	Semi-Annual (Spring/Fall)		GWQ-25-W14	Bedrock*	Semi-Annual (Spring/Fall)			
GWQ-25-W15	Bedrock*	Semi-Annual (Spring/Fall)		GWQ-25-W15	Bedrock*	Semi-Annual (Spring/Fall)			
GWQ-25-W16	Bedrock*	Semi-Annual (Spring/Fall)		GWQ-25-W16	Bedrock*	Semi-Annual (Spring/Fall)			
<b>Cross Gradient Site Perimeter South</b>				<b>Cross Gradient Site Perimeter South</b>					
GWQ-25-W4	Bedrock	Semi-Annual (Spring/Fall)		GWQ-25-W4	Bedrock	Semi-Annual (Spring/Fall)			
GWQ-25-W5	Bedrock	Semi-Annual (Spring/Fall)		GWQ-25-W5	Bedrock	Semi-Annual (Spring/Fall)			

\* wells that have been added since the development of the current SAP

**Till (Non-compliance)**

Current Sampling and Analysis Plan				Proposed Sampling and Analysis Plan					
Sample ID	Unit Monitored	Frequency	Parameters	Sample ID	Unit Monitored	Frequency	Parameters		
<b>Upgradient Background Brady Road</b>				<b>Upgradient Background Brady Road</b>					
GWQ-25-6N60E	Top Of Till	Spring Annually	All parameters with the exception of <i>Total and Fecal Coliforms</i> listed under <b>Appendix F</b> of Environment Act Licence No. 3081 "Comprehensive Water Quality Chemical and Microbiological Parameters". During Fall sampling a reduced indicator parameter set was submitted for Semi-Annual locations.	GWQ-25-6N60E	Top Of Till	Every 2 years	All parameters with the exception of <i>Total and Fecal Coliforms</i> listed under <b>Appendix F</b> of Environment Act Licence No. 3081 "Comprehensive Water Quality Chemical and Microbiological Parameters"		
<b>Downgradient Site Perimeter East</b>				<b>Downgradient Site Perimeter East</b>					
GWQ-25-5N62E	Till	Semi-Annual (Spring/Fall)		GWQ-25-5N62E	Till	Every 2 years			
<b>Cross Gradient Site Perimeter North</b>				<b>Cross Gradient Site Perimeter North</b>					
GWQ-25-6N63F	Till	Spring Annually		GWQ-25-6N63F	Till	Every 2 years			
GWQ-25-6N57F	Till	Spring Annually		GWQ-25-6N57F	Till	Every 2 years			
<b>Downgradient (East)</b>				<b>Downgradient (East)</b>					
GWQ-25-6N67F	Till	Spring Annually		GWQ-25-6N67F	Till	Every 2 years			
GWQ-25-W13A	Till*	Semi-Annual (Spring/Fall)		GWQ-25-W13A	Till*	Every 2 years			
GWQ-25-W14A	Till*	Semi-Annual (Spring/Fall)		GWQ-25-W14A	Till*	Every 2 years			
GWQ-25-W15A	Till*	Semi-Annual (Spring/Fall)		GWQ-25-W15A	Till*	Every 2 years			
GWQ-25-W16A	Till*	Semi-Annual (Spring/Fall)		GWQ-25-W16A	Till*	Every 2 years			
<b>Cross Gradient (South)</b>				<b>Cross Gradient (South)</b>					
GWQ-25-4N34DR	Till	Spring Annually		GWQ-25-4N34DR	Till	Every 2 years			
<b>Cross Gradient Site Perimeter South</b>				<b>Cross Gradient Site Perimeter South</b>					
GWQ-25-6N58DR	Top Of Till	Spring every 2 years		GWQ-25-6N58DR	Top Of Till	Every 2 years			
GWQ-25-6N58F	Till	Spring every 2 years		GWQ-25-6N58F	Till	Every 2 years			
GWQ-25-6N59F	Till	Spring every 2 years		GWQ-25-6N59F	Till	Every 2 years			

\* wells that have been added since the development of the current SAP

**Clay (non-compliance)**

Current Sampling and Analysis Plan				Proposed Sampling and Analysis Plan					
Sample ID	Unit Monitored	Frequency	Parameters	Sample ID	Unit Monitored	Frequency	Parameters		
<b>Upgradient Background Brady Road</b>				<b>Upgradient Background Brady Road</b>					
GWQ-25-6N60DR	Clay	Spring Annually	GWQ-25-6N60DR was sampled all parameters with the exception of <i>Total and Fecal Coliforms</i> and <i>Cyanide</i> as listed under <b>Appendix F</b> of Environment Act Licence No. 3081 "Comprehensive Water Quality Chemical and Microbiological Parameters". A reduced parameter list that includes the following <i>indicator parameters</i> : <ul style="list-style-type: none"> <li>Alkalinity and Hardness</li> <li>pH</li> <li>Conductivity</li> <li>Turbidity</li> <li>TS/TSS/TDS Solids</li> <li>Chloride</li> <li>Sulphate</li> <li>Dissolved Ammonia</li> <li>Nitrate-Nitrite-Nitrogen</li> <li>Total Kjeldhal Nitrogen</li> <li>Dissolved Phosphorus</li> <li>Dissolved metals</li> <li>Total Mercury</li> </ul>	GWQ-25-6N60DR	Clay	Every 5 years	A reduced parameter list that includes the following <i>indicator parameters</i> : <ul style="list-style-type: none"> <li>Alkalinity and Hardness</li> <li>pH</li> <li>Conductivity</li> <li>Turbidity</li> <li>TS/TSS/TDS Solids</li> <li>Chloride</li> <li>Sulphate</li> <li>Dissolved Ammonia</li> <li>Nitrate-Nitrite-Nitrogen</li> <li>Total Kjeldhal Nitrogen</li> <li>Dissolved Phosphorus</li> <li>Dissolved metals</li> <li>Total Mercury</li> </ul>		
<b>Downgradient Site Perimeter East</b>				<b>Downgradient Site Perimeter East</b>					
GWQ-25-5N62D	Clay	Spring Annually		GWQ-25-5N62D	Clay	Every 5 years			
<b>Cross Gradient Site Perimeter North</b>				<b>Cross Gradient Site Perimeter North</b>					
GWQ-25-6N63E	Clay	Spring Annually		GWQ-25-6N63E	Clay	Every 5 years			
GWQ-25-6N57DR	Clay	Spring Annually		GWQ-25-6N57DR	Clay	Every 5 years			
<b>Downgradient (East)</b>				<b>Downgradient (East)</b>					
GWQ-25-6N67E	Clay	Spring Annually		GWQ-25-6N67E	Clay	Every 5 years			
<b>Cross Gradient (South)</b>				<b>Cross Gradient (South)</b>					
GWQ-25-4N34B	Clay	Spring Annually		GWQ-25-4N34B	Clay	Every 5 years			
GWQ-25-4N34-C	Clay	Spring Annually		GWQ-25-4N34-C	Clay	Every 5 years			
<b>Cross Gradient Site Perimeter South</b>				<b>Cross Gradient Site Perimeter South</b>					
GWQ-25-6N59DR	Clay	Spring every 2 years		GWQ-25-6N59DR	Clay	Every 5 years			

**Table 2: Surface Water Sampling and Analysis Plan**

Current Sampling and Analysis Plan			Proposed Sampling and Analysis Plan				
Sample ID	Locations	Frequency	Parameters	Sample ID	Locations	Frequency	Parameters
<b>Upstream (Off-Site Monitoring)</b>			All parameters listed under <b>Appendix G</b> of Environment Act Licence No. 3081 "Surface Water Quality Chemical and Microbiological Parameters"	<b>Upstream (Off-Site Monitoring)</b>			All parameters listed under <b>Appendix G</b> of Environment Act Licence No. 3081 "Surface Water Quality Chemical and Microbiological Parameters"
SWQ-25-1	Brady Road (drainage from west)	Spring Runoff Summer Runoff Fall Runoff		SWQ-25-1	Brady Road (drainage from west)	Spring Runoff Summer Runoff Fall Runoff	
SWQ-25-12	Charette Road Ditch (drainage from north and west)	Spring Runoff Summer Runoff Fall Runoff		SWQ-25-12	Charette Road Ditch (drainage from north and west)	Spring Runoff Summer Runoff Fall Runoff	
<b>Downstream Compliance Point</b>				<b>Downstream Compliance Point</b>			
SWQ-25-2	Downstream Weir*	Spring Runoff Summer Runoff Fall Runoff		SWQ-25-2	Downstream Weir*	Spring Runoff Summer Runoff Fall Runoff	
<b>Other Downstream</b>				<b>Other Downstream</b>			
SWQ-25-16	North Branch of Westerndoft Coulee north of access Road	Spring Runoff Summer Runoff		SWQ-25-16	North Branch of Westerndoft Coulee north of access Road	Spring Runoff Summer Runoff	
<b>Impacted Water Ponds</b>				<b>Impacted Water Ponds</b>			
SWQ-25-6	Active Area Collection Pond	Prior to discharge		SWQ-25-6	Active Area Collection Pond	As needed or prior to approved discharge	
SWQ-25-7	Biosolids Storm water Pond	After treatment and prior to discharge		SWQ-25-7	Biosolids Storm water Pond	As needed or prior to approved discharge	
SWQ-25-8	Leaf and Yard Waste Storm Water Pond	Prior to discharge		SWQ-25-8	Leaf and Yard Waste Storm Water Pond	As needed or prior to approved discharge	
<b>Clean Water Pond</b>				<b>Clean Water Pond</b>			
SWQ-9a	Clean Water Pond 1	Spring Runoff Summer Runoff		SWQ-9a	Clean Water Pond 1	As needed	
SWQ-9b	Clean Water Pond 2	Spring Runoff Summer Runoff		SWQ-9b	Clean Water Pond 2	As needed	
<b>Dry Ponds</b>				<b>Dry Ponds</b>			
SWQ-25-10	CRCC Pond	Prior to discharge		<del>SWQ-25-10</del>	<del>CRCC Pond</del>	<del>Pond no longer exists</del>	
SWQ-25-11a	Southeast Dry Pond 1	Prior to discharge		SWQ-25-11a	Southeast Dry Pond 1	Prior to approved discharge	
SWQ-25-11b	Southeast Dry Pond 2	Prior to discharge		SWQ-25-11b	Southeast Dry Pond 2	Prior to approved discharge	
SWQ-25-11c	Southeast Dry Pond 3	Prior to discharge		SWQ-25-11c	Southeast Dry Pond 3	Prior to approved discharge	
<b>Intermediate Points on South Perimeter Ditch</b>				<b>Intermediate Points on South Perimeter Ditch</b>			
SWQ-25-13a	Upstream of CRCC Pond	Spring Runoff Summer Runoff		<del>SWQ-25-13a</del>	<del>Upstream of CRCC Pond</del>	<del>Location no longer exists</del>	
SWQ-25-13b	Downstream of CRCC Pond	Spring Runoff Summer Runoff		<del>SWQ-25-13b</del>	<del>Downstream of CRCC Pond</del>	<del>Location no longer exists</del>	
SWQ-25-14a	Upstream of Clean Water Ponds 1 and 2	Spring Runoff Summer Runoff		SWQ-25-14a	Upstream of Clean Water Ponds 1 and 2	As needed	
SWQ-25-14b	Downstream of Clean Water Ponds 1 and 2	Spring Runoff Summer Runoff		SWQ-25-14b	Downstream of Clean Water Ponds 1 and 2	As needed	
SWQ-25-15a	Upstream of Dry Pond 3	Spring Runoff Summer Runoff	SWQ-25-15a	Upstream of Dry Pond 3	As needed		
SWQ-25-15b	Downstream of Dry Pond 3	Spring Runoff Summer Runoff	SWQ-25-15b	Downstream of Dry Pond 3	As needed		

\*additional weekly sampling for flow, pH, and conductivity

**Table 3: Leachate Sampling and Analysis Plan**

Current Sampling and Analysis Plan				Proposed Sampling and Analysis Plan			
Sample ID	Locations	Frequency	Parameters	Sample ID	Locations	Frequency	Parameters
LQ25 - MH3	End of Charette Road (1988 Cell)	Annually	All parameters listed under <b>Appendices "F" and "G"</b> from Environment Act Licence No. 3081R and Schedule "A" from Environment Act Licence 2684 RRR	LQ25 - MH3	End of Charette Road (1988 Cell)	As needed	All parameters listed under <b>Appendices "F" and "G"</b> from Environment Act Licence No. 3081R
LQ 25 - MH8	East of Bucksway Service Road (1989 Cell)	Annually		LQ 25 - MH8	East of Bucksway Service Road (1989 Cell)	As needed	
LQ 25 - MH13	Northeast corner of landfill, South of North Service Road (1990/1991 Cell)	Annually		LQ 25 - MH13	Northeast corner of landfill, South of North Service Road (1990/1991 Cell)	As needed	
LQ 25 - MH24	Northwest corner of landfill, South of North Service Road (1997 Cell)	Annually		LQ 25 - MH24	Northwest corner of landfill, South of North Service Road (1997 Cell)	As needed	
LQ 25 - MH27	South of Charette Road, Southwest corner of landfill (1977/1978 Cell)	Annually		LQ 25 - MH27	South of Charette Road, Southwest corner of landfill (1977/1978 Cell)	Annually	
LQ25 - MH34	Immediately South of Charette Road, Southwest corner of landfill (1975/1976 Cell)	Annually		LQ25 - MH34	Immediately South of Charette Road, Southwest corner of landfill (1975/1976 Cell)	Annually	
LQ25 - MHBIO1	Biosolids Manhole, South of compost pad	Annually		LQ25 - MHBIO1	Biosolids Manhole, South of compost pad	Annually	
LQ25- RISER 1	Northwest side of Cell 31 (2015), Northwest corner of landfill	Annually		LQ25- RISER 1	Northwest side of Cell 31 (2015), Northwest corner of landfill	As needed	
LQ25- TANK	Corner of Charette Rd and Payette	Annually		LQ25- TANK	Corner of Charette Rd and Payette	Annually	
LQ25- MH46	Northwest side of Cell 31 (2015), South of Riser	Annually		LQ25- MH46	Northwest side of Cell 31 (2015), South of Riser	As needed	
LQ25- MH47	Northwest side of Cell 32, West side of Payette Rd	Annually		LQ25- MH47	Northwest side of Cell 32, West side of Payette Rd	As needed	
LQ25- MH48	Northwest side of Cell 33, West side of Payette Rd	Annually		LQ25- MH48	Northwest side of Cell 33, West side of Payette Rd	As needed	
LQ25- MH31	East side of legacy cells	Annually		LQ25- MH31	East side of legacy cells	As needed	