Horn Rapids Landfill
2024 Annual
Environmental Monitoring Report

Prepared for
City of Richland

March 2025

Parametrix

Horn Rapids Landfill
2024 Annual
Environmental Monitoring Report

Prepared for

City of Richland
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Certification

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned, whose seal, as a professional hydrogeologist licensed to practice as such, is affixed below.

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CHECKLIST FOR GROUNDWATER REPORTING
Municipal Solid Waste Landfills
WAC 173-351-415

Include a signed, completed copy of this checklist with each quarterly and annual report.

Quarterly groundwater reports shall be submitted to the jurisdictional health department and Ecology within 60 days of receipt of analytical data. Annual groundwater reports shall be submitted to the jurisdictional health department and Ecology by April 1 of each year.

1st ☐ 2nd ☐ 3rd ☐ 4th ☒ YEAR: 2024	Reference (section, subsection)	Included in this report	Location – page # or appendix #
***Quarterly Groundwater Reports**: 173-351-415 (2) plus the referenced section*			
Statistical calculations and summaries		☒	Page 4-2 to 4-6
Descriptive statistics	420, (1)	☒	Appendix E
Statistical tests	420, (2)	☒	Appendix D
Notification of statistical increase (if applicable)	420, (4)	☒	Page 3-1
Notification of concentrations above Chapter 173-200 WAC criteria (if any)	430, (4)	☒	Tables 3-1 and 3-2
Static water level readings	415, (2)	☒	Appendix G
Potentiometric surface elevation maps depicting flow direction	415, (2)	☒	Appendix G
Flow rate – calculated	415, (2)	☒	Page 5-1
Cation-anion balances	430, (5a)	☒	Appendix F
Explanation of greater than 5% (or 10%) difference if needed	430, (5a)	☒	Page 4-7 to 4-8
Trilinear diagrams	430, (5b)	☒	Appendix F
Leachate analyses (if sampled and tested)	415, (2)	☒	Page 8-1
Data entered into EIM database	415, (3)	☐	Submitted
Complete copy of the lab report with chain of custody record		☒	Appendix B
***Annual Groundwater Reports**: 173-351-415 (1)* **YEAR: 2024**			
Summary of statistical results and trends	415, (1)	☒	Page 4-2 to 4-7
Summary of groundwater flow rate and direction for the year	415, (1)	☒	Page 5-1
Copy of all potentiometric maps for the year	415, (1)	☒	Appendix G
Summary geochemical evaluation	415, (1)	☒	Page 5-3
For Quarterly and Annual Reports			
Stamped by a licensed professional	RCW 18.220	☒	

Signature of Report Author	Date	Landfill
Lisa A. Lint	March 2025	Horn Rapids

Acronyms and Abbreviations

BFHD	Benton-Franklin Health District
bgs	below ground surface
City Facility	275-acre parcel of City-owned property
City	City of Richland Public Works Department
CULs	Cleanup Levels
DO	dissolved oxygen
DCA	Dichloroethane
DCE	Dichloroethene
Ecology	Washington Department of Ecology
EDC	1,2-dichloroethane
EPA's	U.S. Environmental Protection Agency
FS	Feasibility Study
ft	feet
GWQSs	Water Quality Standards for Groundwaters of the State of Washington (WAC 173-200-040)
IHS	Indicator Hazardous Substances
LFG	landfill gas
MCLs	Maximum Contaminant Levels (WAC 246-290-310)
mg/L	milligrams per liter
MSW	municipal solid waste
MTCA	Model Toxics Control Act (Chapter 173-340 WAC)
New Landfill	104-acre landfill expansion
Old Landfill	46-acre historical landfill
ORP	oxidation-reduction potential
ORV	off-road vehicle
PCE	tetrachloroethene
Permit	Solid Waste Permit
QAPP	Quality Assurance Project Plan
RI	Remedial Investigation
RNG	renewable natural gas
TCE	trichloroethene
TDS	total dissolved solids
TOC	total organic carbon
UTLs	Upper Tolerance Limits
VC	vinyl chloride
VOCs	volatile organic compounds

1. Introduction

This report presents the 2024 environmental monitoring results of groundwater, landfill gas (LFG), and leachate for the City of Richland's Horn Rapids Landfill. Groundwater sampling was conducted by Parametrix personnel and LFG probe monitoring was conducted by City of Richland (City) Public Works Department personnel in accordance with an operating permit issued by the Benton-Franklin Health District (BFHD). The City Facility layout is presented on Figure 1-1 and monitoring well and LFG probe locations are shown on Figures 1-2 and 1-3. Leachate and lysimeter sampling points are shown on Figure 1-4.

The following terminology related to the Horn Rapids Landfill has been developed, as further described in Section 2:

- City Facility: 275-acre permitted waste site, including landfill, customer transfer station, and compost facility (Figure 1-1).
- Old Landfill: 46-acre permitted area within the City Facility where municipal solid waste (MSW) was placed between the 1970's and 2020. The western older portion is referred to as Old Landfill Phase I and the newer eastern portion is referred to as Old Landfill Phase 2. The Old Landfill does not have a bottom liner.
- City Property: Contiguous property (approximately 1,820 total acres) owned by the City of Richland, includes the City Facility.
- New Landfill, also referred to as Expansion: 104-acre lined expansion of the City Facility located east of the Old Landfill. The City began placing MSW into Phase 1 of the New Landfill in 2020. The New Landfill has a bottom liner and a double lined leachate storage and evaporation pond (referred to as the New Landfill Phase I Leachate Pond).

2. Background

2.1 City Facility Setting

The City Facility is owned and operated by the City. It is located within the city limits of Richland, Washington in a rural area bounded by Twin Bridges Road on the west, Horn Rapids Road on the north, and State Route 240 on the south. The City Facility (Figure 1-1) is a 275-acre parcel that includes the 46-acre historical landfill (Old Landfill), a support facility, an approximately 20-acre composting facility, a City-operated shooting/pistol range, a private renewable natural gas (RNG) plant operated by Pine Creek, a flare facility and condensate pond, a customer service transfer station that includes a small household hazardous waste receiving area, and the 104-acre landfill expansion (New Landfill) permitted for disposal of MSW and its associated leachate pond. The New Landfill began operation in the fall of 2020.

The City also owns contiguous property (City Property) to the west, south and east of the City Facility (a total of approximately 1,820 total acres), with the exception of several small privately-owned parcels, two located along the southwest corner of the City Facility, and one in the northeast corner of the City Facility. Immediately east of the City Facility are circle-irrigated agricultural fields used to grow alfalfa hay, corn, and potatoes. The City Property immediately west of the City Facility has been developed as an off-road vehicle (ORV) park that includes a road-racing track and a motocross track facility. Additional agricultural fields are located further west and northwest. The remaining City Property south and southeast of the City Facility is undeveloped.

2.2 Landfill Description

The Old Landfill began receiving MSW into the western portion referred to as Old Landfill Phase 1 in 1974. The Old Landfill was initially developed by placing MSW into a series of north-south oriented trenches. The waste depths in the trenches ranged from 12 to 30 feet (ft) below ground surface (bgs). From 2005 to 2010, Old Landfill Phase 1 was filled and graded in accordance with the closure grading plan and officially closed in 2011. Closure of this section of the Old Landfill included capping and installation of an active LFG collection system.

MSW was accepted in the eastern portion of the Old Landfill referred to as Old Landfill Phase 2 through September 2020. Closure of Old Landfill Phase 2 began with installation of LFG extraction wells in 2021; closure cover was completed and LFG extraction was initiated in July 2023. Placement of MSW began in Phase 1 of the New Landfill on the eastern portion of the City Facility in 2020. The City is currently in the design phase for Phase 2 of the New Landfill that will be located south of the New Landfill Phase 1.

Leachate generated from Phase 1 of the New Landfill is collected via a network of perforated pipes installed above the liner. The leachate is conveyed to a leachate storage and evaporation pond (Leachate Pond) north of Phase 1. The Leachate Pond is constructed with a double liner and a leak detection sump to check for the presence of liquids. The Leachate Pond, management and collection details are shown on Figure 1-4. Four lysimeters installed in the vadose zone beneath the MSW in the northeastern portion of the Old Landfill are monitored annually for the presence of leachate (Parametrix 2021a).

2.3 Hydrogeologic Setting

Groundwater in the uppermost aquifer occurs under water table conditions in the sand, silt and gravel sediments of the middle Ringold Formation, and the aquifer thickness is approximately 80 to 110 ft (Parametrix 2017b). The uppermost aquifer beneath the City Facility occurs at depths of approximately 75 to 110 ft bgs at the normal grade of the Facility but at a depth of approximately 17 ft bgs near the Leachate Pond. The pond is approximately 8 feet deep, placing the lowest point of the primary pond liner approximately 9 ft above the water table. Water levels are at elevations of approximately 385 to 388 ft NAVD88 and typically fluctuate less than a foot throughout the year. The overall groundwater gradient across the City Facility is relatively flat, approximately 0.0005 ft/ft.

Regionally, groundwater flow has been documented to be eastward toward the Columbia River (Shaw 2003). However, historical groundwater measurements at the City Facility have shown effects of artificial groundwater recharge from intermittent crop circle irrigation both immediately to the east and further west and northwest, activities at the local ORV Park to the west, and the on-site stormwater infiltration pond located south of the condensate pond. These sources of artificial groundwater recharge cause fluctuations in the groundwater flow direction both temporally and seasonally at the City Facility.

Crop circle irrigation has been used to grow alfalfa hay, corn and potatoes proximate to the City Facility since 1987. The source of the irrigation water is reported to be from the Columbia River. Historical groundwater measurements have indicated the irrigated crop circles on the City Facility's eastern boundary have historically deflected the flow in the eastern portion of the City Facility seasonally toward the southeast.

Activities at the ORV park located west of the City Facility including boat racing, septic system operation, and irrigation may periodically alter local groundwater flow directions at the City Facility. From 1999 to the mid-2000s the ORV park periodically flooded shallow unlined waterways for boat racing then allowed the water to seep into the ground after race events. The ORV park seasonally irrigates the Tri City Kart Club that operates on the ORV park and the ORV park has four septic systems, including a bathroom/shower facility designed for 4,000 uses per day.

The northern on-site stormwater infiltration pond has been active since approximately 2010 and receives drainage from the majority of the Old Landfill Phase I. The infiltration pond was recently improved in 2023, expanding the capture area of the infiltration pond to also receive drainage from the Old Landfill Phase 2. During the improvements, it was discovered that several low areas of the conveyance ditch were allowing water to infiltrate locally rather than reaching the pond. The low areas north of the Old Landfill Phase 2 were fixed, however, some additional low areas near the Old Landfill Phase I may be contributing additional local recharge.

All of these activities contribute to artificial groundwater recharge that may affect groundwater flow direction, steepening the groundwater gradient on the northwest portion of the City Facility and shifting flow slightly toward the south-southeast.

2.4 Monitoring Well History

The initial groundwater monitoring network consisted of one upgradient well (MW-1) located on the western boundary of the City Facility and three downgradient monitoring wells (MW-2, MW-3, and MW-4) located along the eastern boundary of the City Facility. In 1998, two additional wells (MW-5 and MW-6) were installed along the eastern edge of the Old Landfill. Additional downgradient wells

MW-7 through MW-10 were installed in 2001 (Shaw Environmental, Inc. 2003, 2004). Well MW-7 was decommissioned in 2010 because it was located within the construction footprint of the closure of the Old Landfill Phase 1. Additional upgradient well MW-11 was installed in 2010 as part of permitting for the New Landfill. Additional downgradient groundwater well MW-12 was installed on City Property southeast of the City Facility in 2018 as part of the remedial investigation (RI; Parametrix 2021a), described further in Section 2.5 below.

2.5 Regulatory History

The Horn Rapids Landfill was originally permitted under Chapter 173-301 Washington Administrative Code (WAC) and currently operates under the Criteria for Municipal Solid Waste Landfills, Chapter 173-351 WAC and the current Solid Waste Permit (Permit) issued by the BFHD. Groundwater monitoring has been performed since 1987 and is currently documented in quarterly and annual groundwater monitoring reports in accordance with Chapter 173-351 WAC.

Concentrations of volatile organic compounds (VOCs) were detected above the WAC 173-200-040 Groundwater Quality Criteria, including tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride (VC), in groundwater monitoring wells MW-5 and MW-6 installed in 1998 (Shannon & Wilson 1998)., The City notified BFHD and Washington Department of Ecology (Ecology) in a letter dated February 18, 2000 that statistically significant increases in groundwater contaminants were confirmed during monitoring activities and that the increases in concentration would be addressed through a formal corrective action process under the Model Toxics Control Act (MTCA; Chapter 173-340 WAC). Ecology sent the City a MTCA Early Notice letter on March 6, 2000, and the Horn Rapids Landfill was placed on Ecology's Confirmed or Suspected Contaminated Sites list for groundwater contamination (Facility/Site No. 308).

To comply with MTCA requirements, the City chose to conduct a MTCA independent cleanup of the groundwater by performing a RI and Feasibility Study (FS). From 2001 through 2004, the City performed an independent, two-phased RI (Shaw Environmental Inc. 2003, 2004), and in 2004, they performed a LFG pilot study/FS (Shaw EMCON/OWT, Inc. 2005). The RI determined that LFG is the likely source of the VOCs impacting groundwater. A LFG pilot study (Parametrix 2005) showed LFG extraction would effectively remove VOCs from the subsurface, and supported installation of the LFG extraction system during closure as a remedy.

Between 2005 and 2010, the western portion of the Old Landfill was filled and graded to approved closure grading plans (EMCON 1999; Parametrix 2006, 2008, 2011) and was closed in 2011 (Parametrix 2011, 2012a, 2012b) as an independent remedial action in accordance with WAC 173-340. The closure included a final cover and gas collection system consisting of in-refuse LFG wells, collection manifold and laterals, a condensate manhole, and a flare station. The LFG collection system was activated in September 2011 to prevent subsurface LFG migration beyond the Old Landfill perimeter and to remove VOCs from groundwater. The collection system has operated 24-hours a day since startup. The eastern portion of the Old Landfill was filled to grade in September 2020. Closure began with the installation of LFG wells in 2021 and 2022. The cover installation and activation of LFG extraction was completed in late July 2023.

In 2013, Ecology requested that additional activities be conducted to comply with the assessment monitoring requirements of WAC 173-351-440. Assessment monitoring is required whenever statistical increases and concentrations above the criteria in WAC 173-200-040, Water Quality

Standards for Groundwaters of the State of Washington, have been detected for one or more of the constituents listed in WAC 173-351-990 Appendix I. The following activities were completed:

- During the second quarter of 2014, in addition to the groundwater monitoring wells, samples were collected from an additional monitoring well (W-1) located on the east side of the Weidle neighborhood, south of and more than a mile from the Landfill (Parametrix 2014). Although well W-1 is located in a direction that is not downgradient of the Landfill, the sample was collected to confirm that the Landfill was not impacting drinking water wells in the Weidle neighborhood. The groundwater quality data did not indicate any impacts from the Landfill.
- Testing for WAC 173-351-990 Appendix III parameters was conducted annually in phases between 2014 and 2022. Initially, testing included one well near the active cell and one well at the City Facility boundary in the second quarter of each year. The tested wells were MW-6 and MW-9 (2014), MW-5 and MW-8 (2015), and MW-4 and MW-10 (2016). The results of the testing did not detect any Appendix III compounds other than the VOCs identified during the RI. Therefore, beginning in 2017, annual testing for the additional Appendix III parameters was conducted on a rotating schedule at one of the three wells located closest to the Landfill (MW-5, MW-6, and MW-10), or at wells MW-4, MW-8, and MW-9 located at the City Facility boundary. Testing was conducted at well MW-6 in 2017, MW-10 in 2018, MW-5 in 2019, MW-9 in 2020, MW-8 in 2021, and MW-4 in 2022.

As discussed in a letter submitted to BFCHD (Parametrix 2022) testing for the WAC 173-351-990 Appendix III assessment monitoring parameters was discontinued in 2023 since none of the additional parameters have been detected other than VOCs which are listed as detection monitoring constituents in WAC 173-351 Appendix I. Therefore, the Site has met the criteria "concentrations of all Appendix III constituents are at or below background values for two consecutive events" per WAC 173 351-440(5).

In July 2017, the City entered into an Agreed Order (No. DE 13717) with Ecology in accordance with MTCA to complete a RI/FS. A Remedial Investigation Work Plan (Parametrix 2017d) was approved by Ecology (Ecology 2017) and Phases 1 and 2 of the Work Plan were completed in November 2017 (Parametrix 2018) and November 2018 (Parametrix 2019), respectively. Phase 1 consisted of a push probe investigation to evaluate the furthest extent of the contamination directly downgradient from the central portion of the contaminant plume, and Phase 2 consisted of installing permanent groundwater monitoring well MW-12 at a location beyond the area of impact to be used as a sentinel well for the assessment monitoring program.

The draft RI Report was submitted to Ecology in January 2021 (Parametrix 2021a) and included quarterly groundwater and LFG monitoring data collected through second quarter 2020. The 2021 draft RI Report expanded upon the findings of the previous RI that showed groundwater impacts were primarily related to LFG migration. The updated RI showed the areal extent of groundwater contamination did not extend beyond 500 ft from the City Facility boundary and that nearby groundwater resources had not been impacted. The draft RI Report developed a preliminary list of Indicator Hazardous Substances (IHS) to be further evaluated in the FS under WAC 173-340-703 that consist of total arsenic, 1,1-dichloroethane (1,1-DCA), bromodichloromethane, chloroform, cis-1,2-dichloroethene (cis-1,2-DCE), PCE, TCE, and VC. The draft RI Report also indicated the likely cleanup remedy to be the planned Old Landfill Phase 2 closure and LFG removal combined with monitored natural attenuation of the groundwater contamination.

Ecology's comments on the draft RI Report (Ecology 2022) included the opinion that the extent of VOCs in groundwater is not fully delineated. This conclusion was based in part on the increasing trends in some VOCs observed over the past 5 years in wells MW-3 and MW-4 located along the eastern City Facility boundary, particularly in consideration of the more easterly flow direction observed over the past few years. The presumptive remedy for the City Facility has remained closure of the Old Landfill, LFG control, and natural attenuation through biodegradation. The City developed an approach and timeframe (Parametrix 2024a) for evaluating 2 years of additional monitoring data through 2025 to assess the effects of the interim remedial measures completed since the closure of the Old Landfill in late July 2023 with installation of the landfill cover and activation of the LFG extraction system. Ecology has agreed with this approach for the timing of the FS. The Old Landfill Phase 2 closure is expected to further reduce the source of VOCs to groundwater and address the increasing trends observed in wells near the City Facility boundary. Following the period of evaluation, the RI will be completed and a FS report will be prepared in accordance with the MTCA Agreed Order. It is anticipated that the FS will focus on the Old Landfill closure, LFG control, and biodegradation as the likely cleanup remedy.

3. Compliance Status Summary

The compliance status with respect to the requirements of Chapter 173-351 WAC and the Permit is described below for groundwater, LFG, and leachate.

3.1 Groundwater

Groundwater monitoring is being conducted to evaluate contaminant trends related to the known release from the Old Landfill being investigated as part of the MTCA RI/FS in accordance with Chapter 173-340 WAC, and to confirm that contaminants are not being contributed from the New Landfill in accordance with Chapter 173-351 WAC. Concentrations of groundwater contaminants in this report are compared to *Water Quality Standards for Groundwaters of the State of Washington* (GWQSs) published in WAC 173-200-040, and *State Drinking Water Regulations*/Maximum Contaminant Levels (MCLs published in WAC 246-290-310). MTCA Cleanup levels (CULs) will be developed as part of the FS in accordance with Chapter 173-340 WAC. The earliest period the CULs will be finalized is following the 2025 monitoring period after evaluating if additional downgradient wells are necessary for the RI.

As summarized in Table 3-1, parameters in groundwater wells were detected during 2024 at concentrations above GWQSs and MCLs. Summaries of the 2024 groundwater monitoring data are provided in Table A-1 (WAC 173-351-990 Appendix I and II parameters) located in Appendix A.

Table 3-2 summarizes the highest 2024 concentrations exceeding criteria in upgradient (MW-1, MW-11) or cross gradient (MW-2) wells, and downgradient wells along the edge of the Old Landfill (MW-5, M-6, and MW-10), along the City Facility boundary (MW-3, MW-4, MW-8, and MW-9), and on City Property (MW-12).

3.2 Landfill Gas

Methane concentrations are monitored in LFG probes at thirteen locations (see Figure 1-3). The LFG probes were not monitored in the fourth quarter due to field equipment being out of service. No methane was detected above the regulatory limit of 5 percent in 2024.

The extent of LFG migration has remained in close proximity to the perimeter of the Old Landfill and concentrations have not exceeded the 5 percent by volume regulatory action limit at the City Facility boundary.

3.3 Leachate

3.3.1 Old Landfill

Four lysimeters monitor the vadose zone directly beneath the MSW located in the northeast corner of the Old Landfill (see Figure 1-4). A permit modification was granted by BFHD (2017) and beginning in 2017, the vadose zone ports have been checked annually during the third quarter. The ports were checked during the third quarter of 2024, and a small amount of leachate was found in one of the ports; however, the volume was not sufficient to collect a sample to be tested for VOCs.

3.3.2 New Landfill

Samples from the New Landfill Leachate Pond have been collected annually beginning in 2022. During the first quarter 2024 event, Leachate Pond samples were analyzed for WAC 173-351-990 Appendix I and II parameters. Table A-2 summarizes the results of the leachate sampling. Liquid was also observed in the Leachate Pond leak detection sump (Leachate Underdrain) and samples were collected and analyzed for a subset of parameters. Table A-3 summarizes the results of the Leachate Underdrain sampling.

The leak detection sump was subsequently evacuated by the City but liquid continued to accumulate at levels comparable to the height of the Leachate Pond but below the inlet piping, suggesting a potential leak in the primary pond liner. The City is actively controlling the level of leachate to ensure the levels do not reach the designed free board. The City is also periodically removing liquid from the Leachate Underdrain on a regular basis and returning the liquid to the Leachate Pond. These actions will continue until the New Landfill Phase 2 Leachate Pond is constructed later in 2025 at which time repairs will be made to the New Landfill Phase 1 Leachate Pond liner.

Table 3-1. Wells with Detected Concentrations above Groundwater Quality Criteria, 2024

Parameter	GWQS		MCL	
	Upgradient or Cross Gradient	Downgradient	Upgradient or Cross Gradient	Downgradient
FIELD PARAMETERS				
Conductivity			MW-1, MW-11	MW-5, MW-6, MW-8, MW-9, MW-10
INORGANICS				
Arsenic	MW-1, MW-2, MW-11	MW-3 through MW-6, MW-8 through MW-10, MW-12		
Manganese		MW-5, MW-6, MW-10		MW-5, MW-6, MW-10
Nitrate	MW-2, MW-11	MW-4, MW-6, MW-8, MW-10	MW-2, MW-11	MW-4, MW-6, MW-8, MW-10
Sulfate	MW-11	MW-10	MW-11	MW-10
Total Dissolved Solids (TDS)	MW-11	MW-5, MW-6, MW-9, MW-10	MW-11	MW-5, MW-6, MW-9, MW-10
VOCS				
1,1-Dichloroethane (1,1-DCA)		MW-4, MW-5, MW-6, MW-9, MW-10, MW-12		
1,2-Dichloroethane (EDC)		MW-10		
Benzene	MW-11			
Bromodichloromethane		MW-8		
Chloroform		MW-8		
Tetrachloroethene (PCE)	MW-1	MW-5, MW-6, MW-9, MW-10		MW-5, MW-6, MW-9, MW-10
Trichloroethene (TCE)		MW-5, MW-6, MW-9		MW-6
Vinyl Chloride (VC)		MW-5, MW-10		

MW-1 and MW-11 are upgradient from the Landfill; MW-2 is cross-gradient from the Landfill

GWQS = Water quality standards for groundwaters of the State of Washington (WAC 173-200-040).

MCL = Maximum Contaminant Level (WAC 246-290-310)

Table 3-2. Highest Reported Concentrations of Parameters above Groundwater Quality Criteria, 2024

Parameter	Units	GWQS	MCL	Highest Observed Concentration Above Criteria						City Property (MW-12)
				Upgradient or Cross Gradient (MW-1, -2, -11)		Downgradient				
						Adjacent to Landfill (MW-5, -6, -10)		City Facility Boundary (MW -3, -4, -8, -9)		
				Concentration	Well	Concentration	Well	Concentration	Well	
FIELD PARAMETERS										
Conductivity	µmhos/cm	NA	700	1,819	MW-11	2,292	MW-10	1,110	MW-9	
INORGANICS										
Arsenic	mg/L	0.00005	0.01	0.00505	MW-11	0.00414	MW-5	0.00936	MW-3	0.00826
Manganese	mg/L	0.05	0.05			2.24	MW-5			
Nitrate	mg/L	10	10	47	MW-11	69	MW-10	29	MW-8	
Sulfate	mg/L	250	250	370	MW-11	291	MW-10			
Total Dissolved Solids (TDS)	mg/L	500	500	1,290	MW-11	1,680	MW-10	715	MW-8	
VOCS										
1,1-Dichloroethane (1,1-DCA)	µg/L	1	NA			4.33	MW-10	4.81	MW-4	1.83
1,2-Dichloroethane (EDC)	µg/L	0.5	5			0.56	MW-10			
Benzene	µg/L	1	5	3.74	MW-11					
Bromodichloromethane	µg/L	0.3	80					0.75	MW-8	
Chloroform	µg/L	7	80					12.0	MW-8	
Tetrachloroethene (PCE)	µg/L	0.8	5	5.24	MW-1	18.6	MW-6	10.7	MW-9	
Trichloroethene (TCE)	µg/L	3	5			8.41	MW-6	4.24	MW-9	
Vinyl Chloride (VC)	µg/L	0.02	2			1.02	MW-5			

MW-1 and MW-11 are upgradient from the Landfill; MW-2 is cross-gradient from the Landfill

GWQS = Water quality standards for groundwaters of the State of Washington (WAC 173-200-040).

MCL = Maximum Contaminant Level (WAC 246-290-310)

4. Groundwater Monitoring

This report includes the following information for the 2024 groundwater monitoring, per the Permit and the quarterly reporting requirements delineated in WAC 173-351-415 (1) and (2):

- Laboratory reports for the fourth quarter 2024 (Appendix B).
- Field measurements and analytical laboratory results for the sampling period (Appendix A).
- Statistical calculations and summaries, including Sen's slope/Mann Kendall tests for trend, (Appendix D); and background groundwater quality statistical summary (Appendix E).
- Notification of results that exceed concentrations above GWQSs (Tables 3-1 and 3-2).
- Cation-anion balances, trilinear diagrams, and stiff diagrams (Appendix F).
- Static water level measurements for each monitoring well and potentiometric surface elevation map depicting groundwater flow rate and direction (Appendix G).

In addition, the report contains the following information required by the Permit and BFHD correspondence:

- Time-series plots for all constituents tested (Appendix C).
- LFG data (Appendix H).

4.1 Sampling and Analysis

Groundwater samples were collected quarterly in 2024 from eleven monitoring wells (MW-1 through MW-6, MW-8 through MW-12) in accordance with the Quality Assurance Project Plan (QAPP; Parametrix 2017a). Due to pump issues, monitoring well MW-11 was not sampled during the fourth quarter 2024 event.

Groundwater samples were collected with dedicated sampling pumps using a low-flow purging technique. Samples to be tested for dissolved metals were filtered in the field through 0.45-micron filters. A duplicate sample (MW-21) was collected from a different well during each quarterly event.

The groundwater samples were analyzed for the constituents identified in Appendix I and Appendix II of WAC 173-351-990, and for additional natural attenuation parameters added as part of the RI (Shaw Environmental, Inc. 2003). Laboratory analyses were conducted by Analytical Resources, Inc. in Seattle, Washington, with the exception of the nitrate analyses that were conducted by Energy Northwest in Richland, Washington due to holding time considerations.

4.2 Groundwater Quality Results and Comparison to Criteria

The laboratory reports for the fourth quarter 2024 are provided in Appendix B. The data were evaluated with respect to the data validation criteria described in the QAPP, and a memorandum is provided in Appendix B. The laboratory reports and data validation memoranda for the first, second, and third quarters of 2024 were presented in previous reports (Parametrix 2024b,c,d).

Table A-1 (WAC 173-351-990 Appendix I and II parameters) in Appendix A provides a summary of the 2024 groundwater monitoring results. The groundwater results are compared to the GWQSs (WAC 173-200-040) and MCLs (WAC 246-290-310).

4.3 Groundwater Data Evaluation Approach

Statistical analysis procedures for evaluation of groundwater monitoring data are outlined in the QAPP (Parametrix 2017a) and are summarized in the following paragraphs. The procedures were developed in accordance with U.S. Environmental Protection Agency (EPA's) *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities -Unified Guidance* (Unified Guidance; EPA 2009) as recommended in Ecology guidance documents (Ecology 2012).

Prior to 2016, quarterly reports included comparison of the downgradient well data to Upper Tolerance Limits (UTLs) calculated based on background data for upgradient well MW-1 (Parametrix 2016). Statistically significant increases over background were identified in the monitoring wells downgradient of the Old Landfill and confirmed a release. As described in Section 2.2, a remedy was partially completed in 2011 with the Old Landfill Phase 1 closure and fully completed in 2023 with the Old Landfill Phase 2 closure. As part of the MTCA RI, data have been evaluated to assess the effectiveness of closure activities on mitigating the existing groundwater contamination. The current statistical approach follows assessment monitoring approaches outlined in the QAPP and WAC-173-351-440 and consists of evaluating trends qualitatively using time-series plots and quantitatively using Sen's slope and Mann-Kendall tests.

Corrective action in the form of final closure construction was completed at the Old Landfill in July 2023. Monitoring wells near the eastern edge of the Old Landfill (MW-5, MW-6, and MW-10) that have shown significant impacts are being monitored for evidence that VOC concentrations in the wells are continuing to decrease indicating that the LFG system is preventing VOC migration to groundwater.

Wells at the City Facility boundary (MW-3, MW-4, MW-8, and MW-9) and on further downgradient City Property (MW-12) are being monitored to assess the degree of attenuation of VOCs. The City has developed an approach and timeframe for evaluating additional monitoring data to assess the effects of the interim remedial measures completed (Parametrix 2024a).

4.4 Time-Series Plots

Time-series plots are presented in Appendix C for constituents with concentrations exceeding groundwater quality criteria or that historically exceeded UTLs and regularly detected VOCs. The observed trends are discussed separately in the following sections for VOCs and inorganic parameters. In the case where a parameter is tested for but not detected, the "concentration" of that parameter is plotted at the reporting limit and a hollow symbol is shown. The groundwater data are separated into two groups, one group with wells along the edge of the Old Landfill Phase 2 Closure (MW-5, MW-6, former well MW-7 (historical data), and MW-10), and a second group with wells along the City Facility boundary (MW-2, MW-3, MW-4, MW-8 and MW-9) and well MW-12 on further downgradient City Property. Upgradient wells MW-1 and MW-11 are included on both sets of plots. VOC data for leachate port samples are included with the wells along the edge of the Old Landfill Phase 2 Closure.

4.4.1 Volatile Organic Compounds

VOCs provide an unambiguous indicator of landfill impacts since other typical landfill indicator parameters have been impacted by upgradient sources. The greatest number and highest concentrations of VOCs are detected in the monitoring wells immediately downgradient of the Old Landfill (MW-5, MW-6, and MW-10) and are primarily chlorinated solvents including 1,1-dichloroethane (DCA), 1,2-dichloroethene (EDC), cis-1,2-dichloroethene (DCE), trans-1,2-DCE,

tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride (VC). Decreasing trends in VOC concentrations have been observed in these wells over the past approximately 20 years. A similar suite of VOCs have been detected in MW-9, located near the southern City Facility boundary, including cis-1,2-DCE, PCE, and TCE, although concentrations of these VOCs have fluctuated within a stable range over the past approximately 10 years, and concentrations of 1,1-DCA have decreased.

Along the eastern City Facility boundary, concentrations of VOCs are being evaluated as part of the RI (Parametrix 2024a) to determine if additional investigation is necessary. Concentrations of cis-1,2-DCE and TCE in well MW-4 have shown increases over the past 5 years but have stabilized over the past 2 years. In well MW-3, chloroform concentrations increased beginning in approximately 2018 but have recently stabilized. Increases in chloroform concentrations have also been observed in wells MW-8 and MW-9, located near the southern City Facility boundary, but have also stabilized.

PCE in concentrations above the GWQS have consistently been detected in upgradient well MW-1, and its presence is likely related to transport by LFG from the Old Landfill. In upgradient well MW-11 further north of the Old Landfill, benzene has been detected since the third quarter of 2023 and has shown an increasing trend with the second and third quarter 2024 concentrations above the GWQS of 1 µg/L. No sample could be collected in the fourth quarter of 2024. Toluene was also detected in the third quarter of 2024 at a low concentration. The presence of benzene and toluene may indicate groundwater impacts from a source upgradient of the Landfill.

In well MW-12, located downgradient south-southeast of the City Facility on City Property, 1,1-DCA and cis-1,2-DCE were detected in all quarters of 2024 at concentrations below the GWQS except for 1,1-DCA (1.83 µg/L) in the fourth quarter. Additionally, chloroform and trichlorofluoromethane were detected in the fourth quarter of 2024. These detections will be confirmed in future monitoring events.

4.4.2 Inorganic Parameters

Groundwater quality data collected from wells in the northern portion of the City Facility, in particular upgradient wells MW-1 and MW-11, former upgradient well MW-7, cross gradient well MW-2, and to some extent downgradient well MW-3, indicate that upgradient sources are contributing to area-wide background concentrations of inorganic compounds, including total dissolved solids (TDS), chloride, nitrate, and cations. Data spikes observed in these wells suggest that more than one source may have contributed to pulses of contaminants over time.

Likely potential upgradient sources are those that involve application of water that could drive contaminants to the water table, such as agricultural irrigation and potential fertilizer application at the crop circles, and septic systems in the adjacent ORV park. Biosolids applications in the northern portion of the City Facility have also been considered as a source but are not presently believed to have had substantial impacts since the biosolids are dry and applied in thin layers and have largely already been scraped off for other City Facility uses.

Ongoing groundwater monitoring related to the Hanford Reservation has documented occurrences of nitrate plumes in the Richland area with concentrations of greater than 10 milligrams per liter (mg/L) nitrate as N (45 mg/L Nitrate as NO3). The sources of nitrate have been attributed to agricultural applications of fertilizer to irrigated fields (CH2M 2015). Similarly, chloride can also be leached from fertilizer applications.

In upgradient well MW-1, concentrations of some parameters (including alkalinity, calcium, chloride, magnesium, nitrate, potassium, sodium, sulfate, total organic carbon (TOC), TDS, and conductivity)

began increasing in 2000 but have stabilized over the past approximately 20 years and appear to have slightly decreased over the few years.

In upgradient well MW-11, concentrations of conductivity and TDS and some inorganic parameters (including calcium, chloride, magnesium, and sulfate) began increasing in 2013 but stabilized over the past approximately 8 years. Nitrate concentrations have continued to slowly increase.

In cross-gradient well MW-2, located in the northeastern corner of the City Facility, conductivity and TDS and the concentrations of some inorganic parameters (calcium, chloride, magnesium, potassium, nitrate, sodium, and sulfate) were higher than observed historically beginning in the third quarter of 2008, although concentrations began decreasing again in 2013. Some recent increases in calcium, conductivity, nitrate, magnesium, and sodium have been observed; however, these concentrations are within historical ranges.

Concentrations of inorganic parameters in wells located immediately downgradient of the Landfill (MW-5, MW-6, and MW-10) were generally higher than in wells located along the southern City Facility boundary (MW-8 and MW-9). However, concentrations of some inorganic parameters in wells MW-8 and MW-9 have shown increasing trends, including calcium, chloride, magnesium, potassium, nitrate, sodium, sulfate, and TDS, although most have stabilized over the past few years.

In well MW-10, increased specific conductivity/TDS and concentrations of some parameters (including dissolved calcium, chloride, dissolved magnesium, nitrate, sulfate, and TOC) were observed beginning in the second quarter of 2024. MW-10 is located directly upgradient of the New Landfill Phase 1 Leachate Pond, and it is possible the well is being affected by a leak in the primary pond liner. Concentrations for many of these parameters decreased in the fourth quarter of 2024 and will continue to be observed in future monitoring events. Further discussion of possible impacts of a leak in the Leachate Pond are further discussed in Section 7.2.

Concentrations of inorganic parameters in downgradient wells along the eastern City Facility boundary (MW-3 and MW-4) were comparatively low. In well MW-3, fluctuating trends in some parameters (including chloride, calcium, magnesium, potassium, nitrate, sodium, sulfate, and TDS) have been observed; concentrations increased between 2011 and 2016, decreased again until 2019, and have since stabilized. Concentrations of these parameters in MW-4 increased between 2008 and 2013, decreased until 2019 and then stabilized, although slight increases have been observed over the past few years. It is not possible to determine if these trends represent natural changes in local groundwater or landfill impacts, since the upgradient wells have shown area-wide impacts by outside sources.

In well MW-12, located further downgradient on City Property, concentrations of inorganic parameters were generally between the range of wells MW-3 and MW-4. Slight increases in some parameters (calcium, magnesium, nitrate, and TDS) have been observed since the well was installed in 2018.

4.5 Sen's Slope Plots and Mann-Kendall Tests

Trends in the groundwater data were evaluated using the Mann-Kendall test for trend and Sen's nonparametric estimator of slope (EPA 2009) with the Sanitas™ software (Sanitas Technologies 2024). These tests are well suited to environmental data because there are no distributional assumptions, and missing data (non-detects) or irregularly spaced measurement periods are permitted. The Mann-Kendall test was used to identify whether a trend exists, and then the Sen's slope test was used to determine how steeply the concentration levels are changing.

The nonparametric Mann-Kendall test evaluates the significance of temporal trends at the 95 percent confidence level. A negative value for the Mann Kendall S statistic implies that a majority of the differences between earlier and later values are negative, suggestive of a decreasing trend. An S value near zero indicates a roughly equal number of positive and negative differences. This would be expected if the measurements were randomly fluctuating about a constant mean with no apparent trend.

The Sen's slope test is a nonparametric procedure used to estimate the true slope of the data. The advantage of the Sen's slope test over linear regression methods is that it is not greatly affected by gross data errors or outliers and can be computed when data are missing.

Sen's slope and Mann Kendall tests were analyzed for VOCs (Appendix D) using data for the past 10 years (first quarter 2015 through fourth quarter 2024) and 5 years (fourth quarter 2019 through third quarter 2024). In addition, 2-year trends were analyzed for wells and parameters that had increasing 5-year trends. A summary of statistically significant trends in parameter concentrations for VOCs are presented in Table 4-1. Only well/parameter cases with greater than 50 percent non-detected values were included in the trend evaluations.

Table 4-1. Statistically Significant Trends in Volatile Organic Compounds Calculated Using the Sen's Slope and Mann-Kendall Test

Parameter	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-8	MW-9	MW-10	MW-11	MW-12[1]
Past 10 Years 1Q2015-4Q2024											
1,1-DCA				↑	↓	↓		↓	↓		
EDC					↓	↓			↓		
1,2-Dichloropropane					↓	↓					
Benzene						↓			↓		
Chloroform			↑	↓				↑	↓		
cis-1,2-DCE				↑	↓	↓					
PCE					↓	↓			↓		
trans-1,2-DCE					↓	↓					
TCE				↑	↓	↓					
Vinyl Chloride (VC)					↓	↓			↓		
Past 5 Years 1Q2020-4Q2024											
1,1-DCA				↓	↓	↓		↓	↓		
EDC					↓	↓					
1,2-Dichloropropane					↓	↓					
Benzene					↓	↓					
Chloroform								↑	↓		
cis-1,2-DCE				↑	↓	↓					
PCE					↓				↓		
trans-1,2-DCE						↓					
TCE				↑	↓	↓					
Trichlorofluoromethane				↓							
Vinyl Chloride (VC)					↓	↓					
Past 2 Years 1Q2023-4Q2024*											
Chloroform											
cis-1,2-DCE											
TCE											

↑ = Statistically significant increasing trend (positive Mann-Kendall and Sen's slope)

↓ = Statistically significant decreasing trend (negative Mann-Kendall and Sen's slope)

↑ or ↓ = Significant trend observed consistently for both past 5 years and past 10 years

*2-year trends were analyzed for well/parameter cases with statistically significant increasing trends over the past 5 years

[1] Data for MW-12 available beginning in 2018; 10-year trends were not calculated

4.5.1 Volatile Organic Compounds

As shown in Table 4-1, a number of VOCs in wells located adjacent to the Old Landfill (MW-5, MW-6, and MW-10) showed statistically significant decreasing trends over both the past 5 and 10 years, suggesting that the 2011 Old Landfill Phase I closure, 2023 Old Landfill Phase 2 closure, and LFG extraction system operations are having an overall positive effect by removing the source of contaminants to groundwater. These include 1,1-DCA in wells MW-5, MW-6, and MW-10; 1,2-dichloropropane in wells MW-5 and MW-6; benzene in well MW-6; chloroform in well MW-10; chlorinated ethenes in well MW-5 and well MW-6 (cis-1,2-DCE, EDC, PCE, TCE, and VC), and well MW-10 (PCE). Additional decreasing trends are anticipated due to the 2023 Old Landfill Phase 2 closure.

Wells along the City Facility boundary (MW-4 and MW-9) showed statistically significant increasing trends in some VOCs for both the past 5 and 10 years (cis-1,2-DCE and TCE in well MW-4; chloroform in well MW-9). Although these wells are downgradient of the current fill area (Figure 1-2), the increasing trends are believed to be related to the Old Landfill. However, the data indicate that concentrations of some VOCs in wells located along the City Facility boundary may be stabilizing. As noted in Section 4.4.1 above, concentrations of cis-1,2-DCE and TCE in MW-4 were slightly lower during the past few quarters, and some of the 10-year increasing trends were no longer present over the past 5 years (chloroform in well MW-3 and 1,1-DCA in well MW-4). In addition, there were no 2-year increasing trends in the wells and parameters that had increasing 5-year trends (cis,1,2-dichloroethene and TCE in MW-4 and chloroform in MW-9). These may be signs of success of contaminant source removal related to the Old Landfill LFG collection system. Trends will continue to be evaluated through 2025 in accordance with the RI Work Plan Addendum (Parametrix 2024a).

The statistically significant increasing 5-year trend for cis-1,2-DCE in well MW-12 located on City Property beyond the City Facility boundary through the second quarter of 2024 was no longer observed indicating the concentrations may be stabilizing. Due to the low groundwater flow rates (see Section 5), VOC detections in well MW-12 likely reflect LFG impacts occurring prior to remediation efforts had begun. Future monitoring and statistical analysis will be used to observe if the increasing trend in MW-12 persists.

4.6 Background Statistics

Background statistics (i.e., mean, variance, standard deviation, coefficient of variation, and standard error) for upgradient wells MW-1 and MW-11 are presented in Appendix E in accordance with WAC 173-351-420(1). Variations in concentrations within the upgradient wells are presented in the time-series plots discussed in Section 4.4.

4.7 Natural Attenuation Parameters

Analysis and measurement of additional parameters (dissolved methane, ethane, ethene, dissolved oxygen [DO], and oxidation-reduction potential [ORP]) are being performed to evaluate whether VOCs are degrading through either biological or chemical processes (Shaw Environmental, Inc. 2003). Natural attenuation of VOCs would be indicated by elevated concentrations of ethene or ethane and decreases in DO and ORP (EPA 1998).

Some of the 2024 data (Table A-1) indicate that natural attenuation is likely occurring. DO measurements were lower in downgradient wells MW-5, MW-6, and MW-10 adjacent to the Old Landfill Phase 2 closure (about 1 mg/L or less) and some ORP measurements were also lower. The

lower DO and ORP observed in these wells indicate more anaerobic conditions that would be favorable for reductive dechlorination of more highly chlorinated compounds (PCE and TCE) which have shown significant decreases in concentrations over the past 10 years (see Table 4-1).

Quantitative analysis of other evidence for reductive dechlorination is inconclusive. The high nitrate concentrations contributed by an upgradient source as demonstrated at well MW-11 would tend to inhibit reductive dechlorination reactions for more highly chlorinated compounds (PCE and TCE), and the high sulfate concentrations would inhibit reductive dechlorination of lower chlorinated compounds (DCE and VC). The low concentrations of iron and TOC throughout the Site are also unfavorable for reductive dechlorination. Methane is contributed directly by LFG and no ethane or ethene were detected in any of the wells.

Higher DO was measured in further downgradient wells (between 3 and 9 mg/L), and ORP measurements generally followed this pattern with more positive values observed in wells with higher DO. The relatively higher DO and ORP in wells along the City Facility boundary compared to the wells along the edge of the Old Landfill Phase 2 closure indicates a more aerobic environment which could support degradation of cis-1,2-DCE and VC, and the significantly lower concentrations in VC in wells at the City Facility boundary provide evidence that degradation of VC is occurring.

Trends in other parameters that might indicate that biodegradation is occurring (EPA 1998, Jurgens et al 2009), such as increases in chloride and alkalinity, or decreases in nitrate and sulfate, are somewhat ambiguous because concentrations of these parameters have been affected by contributions from upgradient sources. However, nitrate and sulfate concentrations are lower and alkalinity concentrations are higher in wells MW-5, MW-6, and MW-10 than in upgradient well MW-11, suggesting that biodegradation may be occurring.

Dissolved methane continued to be detected in downgradient wells adjacent to the Old Landfill Phase 2 closure: MW-5 (0.083 to 0.493 mg/L), MW-6 (0.355 to 1.18 mg/L), and MW-10 (0.988 to 1.97 mg/L). Methane was also detected at lower concentrations in upgradient well MW-11 and downgradient well MW-9. The occurrence of higher concentrations of dissolved methane in the wells with the highest concentrations of VOCs continues to support the hypothesis that LFG generated by the decomposition of solid waste within the Old Landfill is the source and transport mechanism for the VOCs impacting groundwater (Shaw Environmental, Inc. 2003).

4.8 Geochemical Evaluation

The geochemical evaluation (Appendix F) included preparing trilinear and Stiff diagrams to illustrate major ion geochemistry and calculating cation/anion balances.

4.8.1 Trilinear and Stiff Diagrams

Trilinear and Stiff diagrams are presented for each individual quarter of 2024 and for the combined 2024 data including the Leachate Pond and Leachate Pond Underdrain. The trilinear and Stiff diagrams indicate that in most of the wells the dominant anion was bicarbonate, and the dominant cation was calcium, followed by magnesium. However, the proportions of sulfate and chloride with respect to bicarbonate were higher in upgradient well MW-11 and to a lesser extent in downgradient wells MW-2, MW-8 and MW-10. Compared to the groundwater samples, the Leachate Pond and Leachate Pond Underdrain samples had higher proportions of chloride, sodium and potassium.

4.8.2 Cation/Anion Balance Calculations

Cation/anion balance calculations for 2024 are presented in Appendix F. All monitoring wells were within the acceptable range. As stated in WAC 173-351-430-5(a), charge balance differences of greater than 5 to 10 percent (5 percent for cation/anion sums of greater than 5 milliequivalents per liter) could indicate laboratory error, poor well conditions, or other ions not accounted for in natural or impacted groundwater conditions. Charge balance differences between 5 and 10 percent have periodically been observed in the monitoring wells. Actions taken to improve charge balance differences beginning in 2007 consisted of changing analytical laboratories and reviewing quality assurance records provided by the laboratory to monitor data quality.

5. Groundwater Flow Direction and Rate

Groundwater elevations and potentiometric surface maps for 2024 are presented in Appendix G. The groundwater flow direction continued to be toward the southeast in the northern and southern portions of the City Facility but was easterly in the central portion of the City Facility. Although the overall historical flow direction has ranged from easterly to southeasterly, flow in the central portion of the City Facility has been more easterly over the past few years. Some influences from upgradient and/or on-site sources of recharge have affected the groundwater gradient across the City Facility (see Section 2.3).

The average rate of groundwater flow is calculated to be low, ranging from 0.003 to 0.04 ft/day or 1 to 15 ft/year, based on the measured groundwater gradient in the vicinity of well MW-6 (0.0005 ft/ft), hydraulic conductivity values of 2 to 15 ft/day (Shaw Environmental, Inc. 2003; Shannon & Wilson 1998), and estimated porosities between 20 and 35 percent (Walton 1985). However, nearby evaluations of flow within the Ringold Formation at the Hanford site have shown higher average hydraulic conductivities (U.S. DOE 2009) indicating average horizontal flow velocities at the City Facility may be underestimated.

Beginning in 2014, groundwater monitoring has indicated groundwater mounding is occurring beneath the western portion of the City Facility immediately downgradient of the ORV park and is believed to be related to groundwater recharge from the Old Landfill, the neighboring facility, or crop circle irrigation further to the west and northwest. The mounding appears to steepen the groundwater gradient on the northwest portion of the City Facility and shift flow slightly toward the south-southeast.

Potentiometric surface maps since the Leachate Pond was constructed in 2021 show that the water elevations in MW-10 and MW-11 have typically been slightly higher in MW-11 compared to MW-10 in the third quarter, whereas water elevations have been higher in MW-10 compared to MW-11 in the first, second, and fourth quarters. Due to the slow rate of calculated groundwater flow due (less than 20 ft/year), it is difficult to trace the path and timing of specific contributions of recharge containing contaminants added from upgradient sources, but it is known that the ORV park to the west of the facility has irrigation and septic systems, and there are irrigated crop circles further to the northwest that could contribute seasonal pulses of water.

6. Landfill Gas Monitoring

LFG was measured by City personnel at thirteen LFG monitoring probes (Figure 1-3) and the data are presented in Appendix H. Gas probes GP-1 through GP-4 and GP-7 through GP-11 are screened at two subsurface intervals, and GP-12 is screened at three separate intervals, including one deep probe just above groundwater. The data include measurements collected from three single-completion LFG probes (GP-13, GP-14, and GP-15) that were installed in June 2021 (Parametrix 2021b) to monitor Phase 1 of the New Landfill. These gas probes are completed in alluvium outside the New Landfill.

6.1 Landfill Gas Data

In 2024, the first through third quarterly methane concentrations were less than 5 percent by volume. The LFG probes were not monitored in the fourth quarter due to field equipment being out of service. The extent of LFG migration remains in close proximity to the perimeter of the Old Landfill and concentrations have not exceeded the 5 percent by volume regulatory action limit at the City Facility boundary.

6.2 Historical Landfill Gas Data Trends

Methane trends in the probes where methane has historically been observed (GP-2, GP-9, and GP-12) are shown in Figure 7-1. The data indicate that despite limited spikes, overall substantial decreases have been observed since the closure activities started in 2011 that included installation and operation of an active LFG control system. Methane concentrations in GP-2 and GP-12 have decreased from 35 to 45 percent by volume prior to the 2011 Old Landfill Phase 1 to 0.0 percent in 2024.

Methane concentrations in GP-12-1 showed a temporary increase beginning in the second quarter of 2023 but have since decreased. GP-12-1 is the shallowest probe at that location, with its screen extending to a depth of 2.5 ft below the bottom of waste (approximately 62 ft above the water table). The temporary increases observed at GP-12-1 were likely related to the placement of the cover in Phase 2 of the Old Landfill and ensuing LFG buildup prior to the beginning of gas extraction that was initiated in late July.

Methane concentrations in GP-12-3 have been significantly reduced since the Old Landfill Phase 1 closure, from typical concentrations of 15 to 25 percent, to generally less than 1 percent. This probe is notable because its screened interval extends to approximately 8 ft above the water table (56.5 ft below the top of waste). All 2024 methane concentrations measured at GP-12-3 in were 0.0 percent.

New gas probes GP-13, GP-14, and GP-15 that monitor Phase 1 of the New Landfill have not detected methane above background concentrations since installation in 2021.

6.3 Landfill Gas System Changes

Figure 1-3 shows the LFG controls on the Old Landfill. As discussed above, the Old Landfill Phase 2 LFG controls were activated in July 2023. The first LFG controls on the New Landfill were recently installed in the first quarter of 2024 and consist of three horizontal (east-west oriented) perforated pipe trenches installed into the waste. These trenches are connected to the gas control system but have not been activated at this time due to the lack of gas present. Upon presence of landfill gas in the

trenches this portion of the gas control system will be activated. A renewable natural gas (RNG) plant has been constructed west of the flare station near the center of the City Facility (see Figure 1-1). The RNG plant was activated in December 2023 (Pine Creek 2023). Typical gas control system operation routes all LFG to the RNG plant with the City's flare as a backup control measure. In the event of a shutdown of the RNG plant an automated control valve routes gas to the flare until normal operation of the RNG is restored. Future gas generation is expected to exceed the capacity of the RNG plant, and upon reaching this threshold the automatic control valve will modulate flow to both the RNG plant and the City flare to create sufficient capacity to maintain control of the LFG.

Gas probe GP-12 is located within or near the future waste footprint of the New Landfill Phase 2. The City is preparing to decommission the gas probe and replace it with a gas probe GP-12R located adjacent to MW-6. Parametrix has assisted the City with a variance for the replacement probe to allow nested construction similar to the existing GP-12, and the work will be completed in 2025.

7. Leachate Monitoring

7.1 Old Landfill Vadose Zone Monitoring

Leachate is collected annually during the third quarter from four lysimeters that monitor the vadose zone directly beneath the MSW located in the northeast corner of the Old Landfill. Drains from each lysimeter are connected to a common sampling vault where discrete samples of leachate are collected from four sampling ports. The approximate location of the lysimeters and sampling vault are identified in Figure 1-4. Samples from the four vadose monitoring ports are to be analyzed for leachate parameters listed in Appendix I and II of WAC 173-351-990.

The leachate ports of the Old Landfill were checked in the third quarter 2024, and a small amount of leachate was found in one of the ports; however, the volume was not sufficient to collect a sample to be tested for VOCs.

7.2 New Landfill Leachate Pond

Leachate from the New Landfill Phase 1 is gravity drained from the lined cell into the double lined leachate storage and evaporation pond (referred to as the New Landfill Phase I Leachate Pond). The lowest point of the primary pond liner is approximately 9 ft above the water table at that location.

The ground surface elevation at the Leachate Pond is 404 ft NAVD88. The inlet pipe from the New Landfill to the Leachate Pond is at an elevation of 402 ft NAVD88 and the primary liner bottom elevation is at an elevation of 396 ft NAVD88. The pond was designed to have 18 inches of free board for a maximum water pond water level of 402.5 ft NAVD88. The secondary liner of the pond is approximately 8 ft above the water table which occurs at approximately 387 ft NAVD88 (see Appendix G).

7.2.1 Pond Level Monitoring and Actions Taken

The leak detection sump (leachate underdrain) between the liners is checked quarterly for the presence of liquid and the water level of the pond is recorded on the field data sheet. In the case that liquid is detected in the leak detection sump, samples may be collected to compare the results with those of the leachate in the pond. The liquid level and leak detection sump for the Condensate Evaporation Pond near the flare facility are similarly checked quarterly and recorded on field sheets.

The Landfill experienced a very moist period in February 2024 and pond levels were observed up into the designed free board (18 inches) of the pond. In April 2024, liquid was detected in the Leachate Pond leak detection sump at a level comparable to the Leachate Pond.

The leak detection sump was subsequently evacuated by the City but liquid continues to accumulate in the leak detection sump at levels comparable to the height of the Leachate Pond but below the inlet piping, suggesting a potential leak in the primary pond liner. The City is actively monitoring the level of the Leachate Pond to ensure the leachate remains in containment of the primary liner. The City is also actively removing liquid from the Leachate Sump to mitigate risk of any additional leachate from collecting in annular space between the primary and secondary liner until the secondary liner has been evaluated for potential leaks. Since beginning regular evacuation of the underdrain, the volume of liquid in the underdrain has decreased. These actions will continue until

the New Landfill Phase 2 Leachate Pond is constructed later in 2025 at which time repairs will be made to the New Landfill Phase 1 Leachate Pond liner.

7.2.2 Leachate Pond and Underdrain Sampling

The annual sampling of the New Landfill Phase 1 Leachate Pond was conducted during the first quarter of 2024 and the results were presented in the first quarter 2024 report (Parametrix 2024b). Samples were collected with a peristaltic pump and analyzed for Chapter 173-351 WAC Appendix I and II parameters. Samples of the liquid in the Leachate Pond Underdrain were also collected during the first quarter of 2024 and analyzed for VOCs, metals, and selected inorganic parameters.
Leachate Quality Comparison to Groundwater

Data for the Leachate Pond and Leachate Underdrain samples are summarized in Tables A-2 and A-3 of Appendix A and presented on time-series plots in Appendix C. The VOCs acetone, carbon disulfide, and 2-butanone were detected in the Leachate Pond sample, and acetone was also detected in the Leachate Pond Underdrain at a slightly lower concentration. The Leachate Pond samples have shown apparent increases in concentrations of some parameters since sampling was initiated in 2022, likely reflecting the increasing contributions of leachate compared to storm water runoff. Concentrations of indicator parameters in the Leachate Pond Underdrain sample were slightly lower than in the Leachate Pond.

In well MW-10 located adjacent to and upgradient of the Leachate Pond, some leachate indicator parameters including specific conductivity/TDS and concentrations of dissolved calcium, chloride, dissolved magnesium, nitrate, sulfate, and TOC showed increases beginning in the second quarter of 2024, and acetone was detected in the third quarter of 2024. MW-10 is located directly upgradient of the New Landfill Phase 1 Leachate Pond, it was suspected that the well may have been affected by a leak in the primary pond liner (Parametrix 2025).

Time-series plots for selected leachate indicator parameters showing data for MW-10, the Leachate Pond, and the Leachate Pond Underdrain were updated with fourth quarter data, and are presented in Appendix C. The fourth quarter concentrations of some parameters in MW-10 were slightly lower than in the third quarter. Compared to MW-10, specific conductivity and TDS and concentrations of chloride, dissolved magnesium, and TOC were higher in the Leachate Pond, and dissolved calcium and sulfate were lower. Nitrate was not detected in the Leachate Pond, although ammonia was higher than in groundwater. In the fourth quarter, acetone was not detected in MW-10 but was detected in nearby wells MW-4 and MW-5. MW-4 and MW-5 did not show increases in other indicator parameters, and the evaluation of a potential release related to the Leachate Pond remains ongoing.

8. Conclusions and Recommendations

8.1 Conclusions

Environmental monitoring at the Facility was completed in accordance with Chapter 173-351 WAC related to active MSW landfill operations at the New Landfill and in accordance with MTCA related to historical releases related to the Old Landfill. The original RI determined that LFG is the likely source of the VOCs impacting groundwater (Shaw Environmental Inc. 2003, 2004) due to historical LFG releases from the unlined portions of the Old Landfill. The findings of the subsequent 2021 draft RI Report (Parametrix 2021) showed that exceedances of groundwater quality criteria are generally limited to within 500 ft of the City Facility boundary.

Although the overall historical flow direction has ranged from easterly to southeasterly, flow in the central portion of the City Facility has been more easterly over the past few years, potentially due to mounding effects of on-site stormwater infiltration, intermittent crop circle irrigation, and activities at a local ORV Park.

Ecology's comments on the draft RI Report (Ecology 2022) included the opinion that the extent of VOCs in groundwater is not fully delineated. This conclusion was based in part on the increasing trends in some VOCs observed over the past 5 years in wells MW-3 and MW-4 located along the eastern City Facility boundary, particularly in consideration of the more easterly flow direction observed over the past few years. The City developed an approach and 2-year timeframe for evaluating additional monitoring data to assess the effects of the interim remedial measures completed (Parametrix 2024a).

Since 2011, the Old Landfill Phase 1 LFG collection system has been effective in removing much of the LFG within close proximity of the Old Landfill as demonstrated by the overall decreases in methane concentrations observed at multilevel gas probes GP-2 and GP-12, including GP-12-3, screened immediately above the water table. With completion of the Old Landfill Phase 2 closure in July 2023, the source of VOCs to groundwater has been further reduced as evidenced by the absence of methane at GP-12-3 during 2024.

Trend analyses indicate that the concentrations of VOCs in groundwater wells located near the Old Landfill have shown significant decreases over both the past 5 and 10 years. In addition, the previously increasing trends observed for some VOCs in wells located along the City Facility boundary and in well MW-12 further downgradient on City Property are no longer significant, suggesting VOC concentrations are stabilizing.

The trends in VOC concentrations suggest the LFG extraction system is reducing the concentration of contaminants reaching the water table and indicate progress at the mid-point of the 2-year period of evaluation (Parametrix 2024a) that will enable completion of the FS. These findings are especially promising because the groundwater data reflect LFG impacts occurring prior to remediation efforts and it is expected to take time to observe the effects of remediation due to the low groundwater flow rates (see Section 5). Evaluation of natural attenuation parameters such as DO and ORP measurements indicate that conditions in groundwater near the Old Landfill source may be consistent with attenuation of PCE and TCE, and more aerobic conditions further downgradient may be consistent with degradation of cis-1,2-DCE and VC.

Methane has not been detected above background in new gas probes GP-13, GP-14, and GP-15 that monitor Phase 1 of the New Landfill. GP-12 is being replaced in 2025 with a new gas probe GP-12R located adjacent to MW-6, slightly closer to the Old Landfill, and will continue to be monitored.

The presence of liquid in the Leachate Pond leak detection sump and analytical results indicate there is likely a leak in the Leachate Pond primary liner. The City is actively monitoring the level of the Leachate Pond to ensure the leachate remains within the containment of the primary liner. The City is also actively removing liquid from the Leachate Underdrain sump to mitigate risk of any additional leachate from collecting in annular space between the primary and secondary liner until the secondary liner has been evaluated for potential leaks. The City has been approved by BFHD to remove leachate from the pond and apply it to the working face to expedite drawdown of the leachate by surface evaporation. Surface evaporation on the working face requires temperatures at minimum above freezing and preferentially well above freezing to create conditions that encourage evaporation rather than recirculation through the cell. Evaporation rather than recirculation through the cell is preferred since recirculation hydrates the refuse and creates an environment that would lead to increased gas production caused by an increased rate of refuse decomposition. As temperatures warm in the spring this will allow the City to implement the surface evaporation methodology. The City will maintain these preventative measures until leachate can be directed into the new Phase 2 Leachate Pond so that repairs can be made to the Phase 1 Leachate Pond later in 2025.

Leachate indicator parameter increases were observed beginning in the second quarter of 2024 in well MW-10 located adjacent to and upgradient of the Leachate Pond indicating that leachate may have migrated past the containment liner and may be causing impacts to groundwater. Although the well is upgradient of the Leachate Pond, it is only separated by a distance of approximately 200 ft, there is less than 10 ft of vertical separation from the Leachate Pond to groundwater and the groundwater gradient is very flat.

As requested by Ecology, this relationship was further evaluated in an addendum to the third quarter 2024 report (Parametrix 2025). Although the observed leachate indicator parameter concentration increases in MW-10 could potentially be attributed to leachate from the Leachate Pond, these parameters are also elevated in upgradient well MW-11 and cross gradient well MW-2 and may also reflect contributions from other upgradient sources. Fourth quarter concentrations of parameters in MW-10 were slightly lower and the data will continue to be evaluated.

8.2 Recommendations

Ongoing groundwater monitoring will assess whether decreasing trends in VOCs are continuing to occur in downgradient wells, reflecting attenuation of existing contamination related to historical releases from the Old Landfill. To this end, the statistical evaluation for groundwater data will continue to consist of evaluating groundwater time series plots, updating groundwater trend analyses, and updating plots of methane measurements in the LFG probes. Trends in VOC concentrations will continue to be evaluated through 2025 in accordance with the RI Work Plan Addendum (Parametrix 2024a).

The City should continue leachate management control measures to mitigate the source of the leachate found in the leak detection sump at the New Landfill Phase 1 Leachate Pond due to the suspected leak in the primary liner. Liquid in the annular space between the primary and secondary Leachate Pond liners should continue to be regularly evacuated until repairs can be made. Since the groundwater data from the nearest monitoring well suggests potential impacts from leachate, the City should continue evaluating quarterly monitoring data to confirm that the interim actions have been successful in removing the contaminant source. The City has also agreed to prepare a

technical memorandum providing further detail documenting the interim actions already taken and the planned schedule of additional actions.

Following the completion of the final RI Report, a FS report will be prepared in accordance with the MTCA Agreed Order that focuses on the Old Landfill Phase 2 closure including installation of the landfill cover and activation of the LFG extraction system completed in July 2023 as the likely cleanup remedy. The closure is expected to continue reducing the source of VOCs to groundwater and address the previously increasing trends observed in wells near the City Facility boundary.

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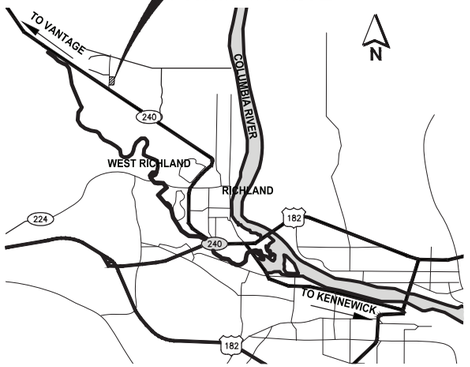
Figures

FILE: HRL OPSPLANF1-1 FACILITY LAYOUT: F1-1 PATH: \\parametrix.com\pmx\P50\Projects\Clients\3820-City of Richland\555-3820-004 HornRapids2011EM\99Svcs\2-ADD\555-3820-004\Phase 13 2023\Horn Rapids Ops Plan PLOTTED BY: NeierTif DATE: Friday, July 21, 2023 7:27:14 AM

PROJECT SITE



VICINITY MAP
NOT TO SCALE

LEGEND:

- Facility Boundary
- City of Richland Property Line
- Active Phase
- Old Landfill Boundary
- New Landfill Boundary

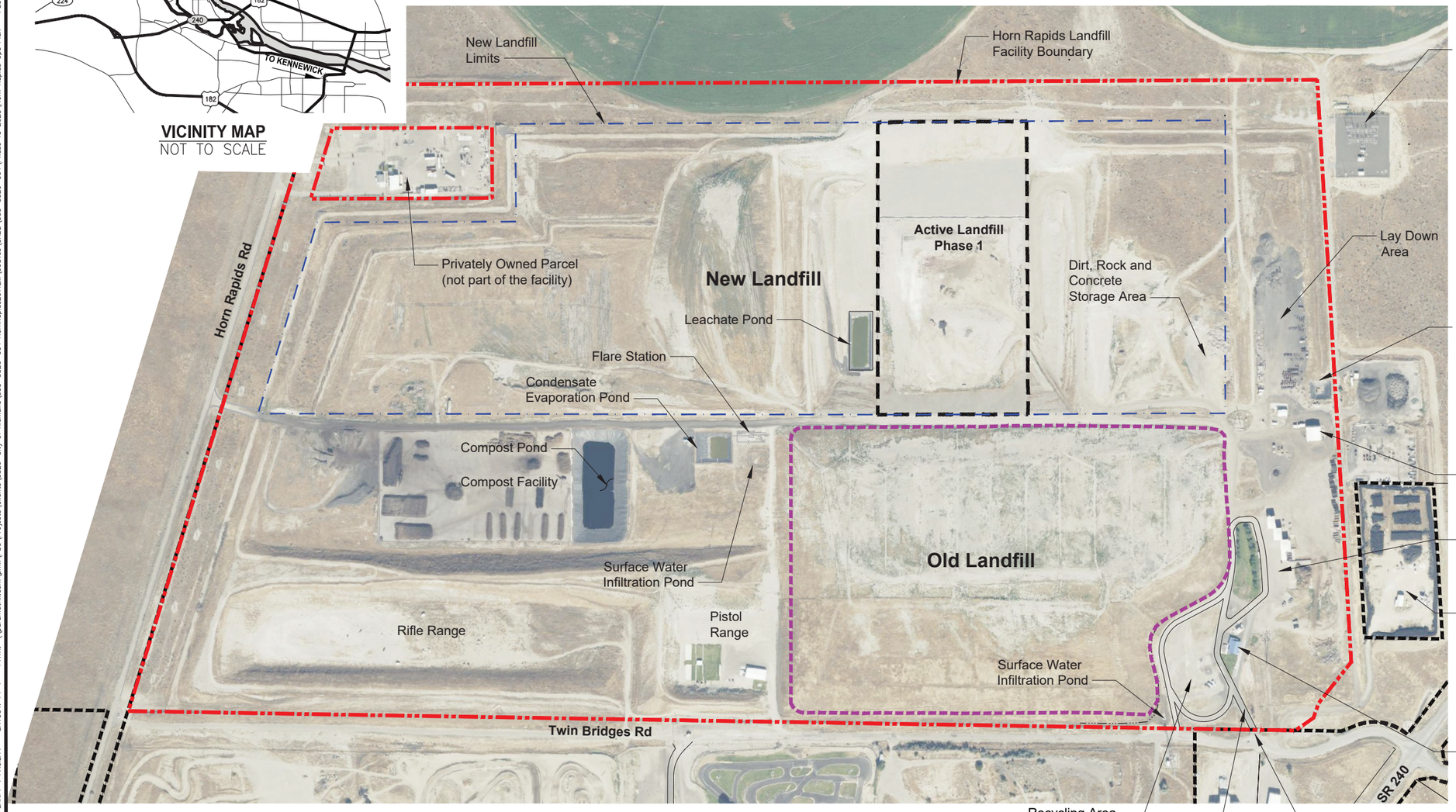


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Figure 1-1
Horn Rapids Landfill
Facility Plan

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Privately Owned Parcel (not part of the facility)

MW-2
MW-3
MW-4
MW-12
MW-8
MW-10
MW-5
MW-6
MW-9
MW-7
MW-11
MW-1

Active Landfill Phase 1

New Landfill

Old Landfill

Compost Facility

Rifle Range

Pistol Range

Transfer Station

Recycle Area

Privately Owned Parcel

SR 240

TWIN BRIDGES RD

TWIN BRIDGES RD

Parametrix DATE: July 21, 2023 FILE: HRL OPSPLANF1-3 GW WELLS

0 N 400
SCALE IN FEET

Legend:

- Existing Groundwater Monitoring Well
- Decommissioned Groundwater Monitoring Well
- Facility Boundary
- City of Richland Property Line
- Active Phase
- Old Landfill Boundary
- New Landfill Boundary

Figure 1-2
Groundwater Monitoring Well Locations
Horn Rapids Landfill

FILE: HRL OPSPLANF1-3.LFG LAYOUT: F1-3 PATH: U:\PSO\Projects\Clients\3820-City of Richland\555-3820-004 HornRapids2011EM\99Svcs\CADD\555-3820-004\Phase 13 2023\Horn Rapids Ops Plan PLOTTED BY: purgabut DATE: Thursday, December 12, 2024 12:10:08 PM

Privately Owned Parcel (not part of the facility)

GP-15

GP-14

GP-13

Active Landfill Phase 1

New Landfill

GP-12 (1, 2, 3)

GP-12R

Old Landfill

Compost Facility

GP-5

GP-11 (1, 2)

Privately Owned Parcel

GP-2 (1,2)

Transfer Station

GP-10 (1, 2)

GP-9 (1, 2)

Rifle Range

Pistol Range

GP-6

GP-1 (1,2)

GP-8 (1, 2)

Recycle Area

TWIN BRIDGES RD

GP-7 (1, 2)

GP-4 (1, 2)

GP-3 (1, 2)

Parametrix DATE: December 12, 2024 FILE: HRL OPSPLANF1-3 LFG

N

0 400

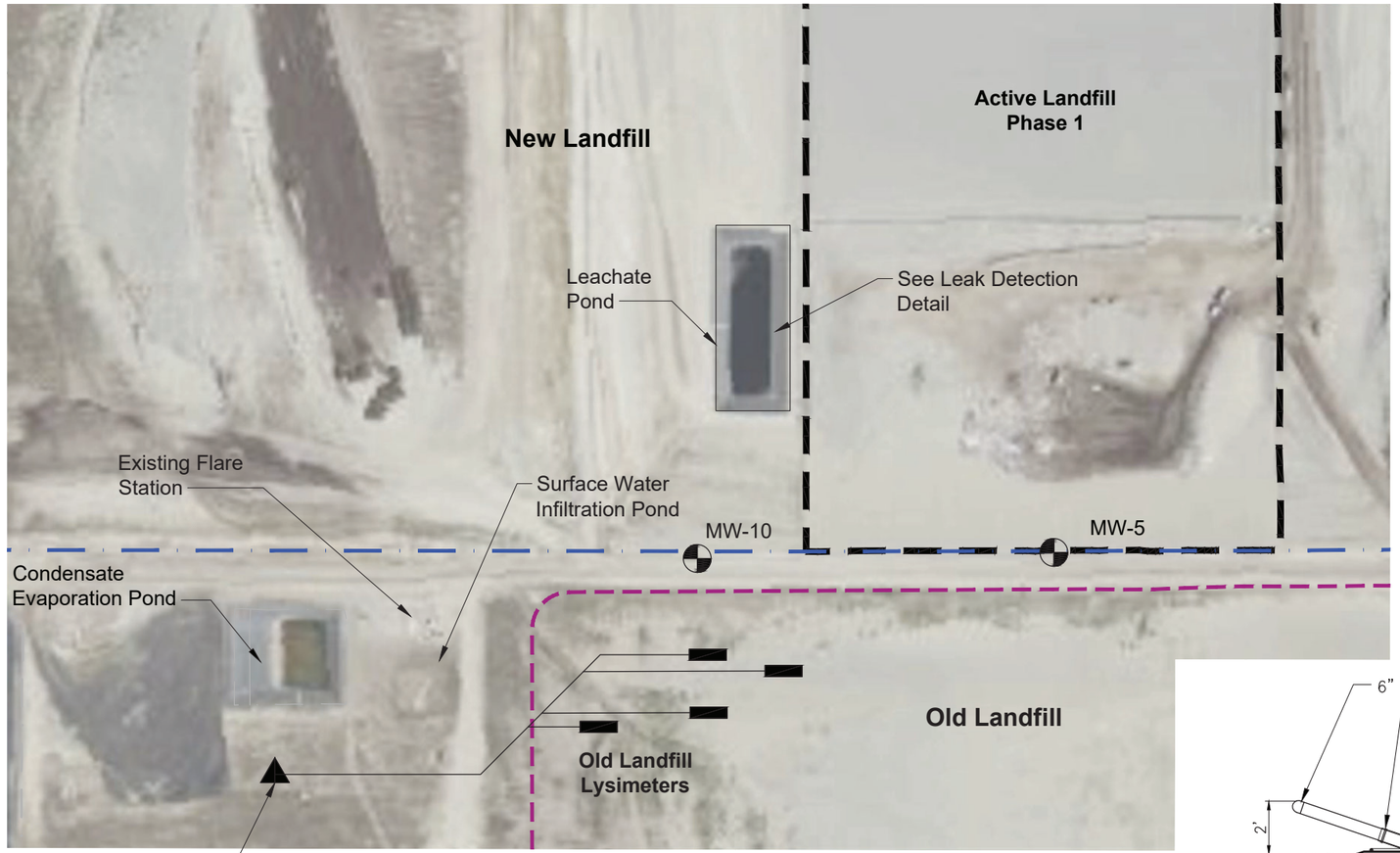
SCALE IN FEET

LEGEND:

- Proposed Gas Probe
- Existing Gas Probe
- Decommissioned Gas Probe
- LFG Gas Extraction Wells
- LFG Control System
- Facility Boundary
- City of Richland Property Line
- Active Phase
- Old Landfill Boundary
- New Landfill Boundary

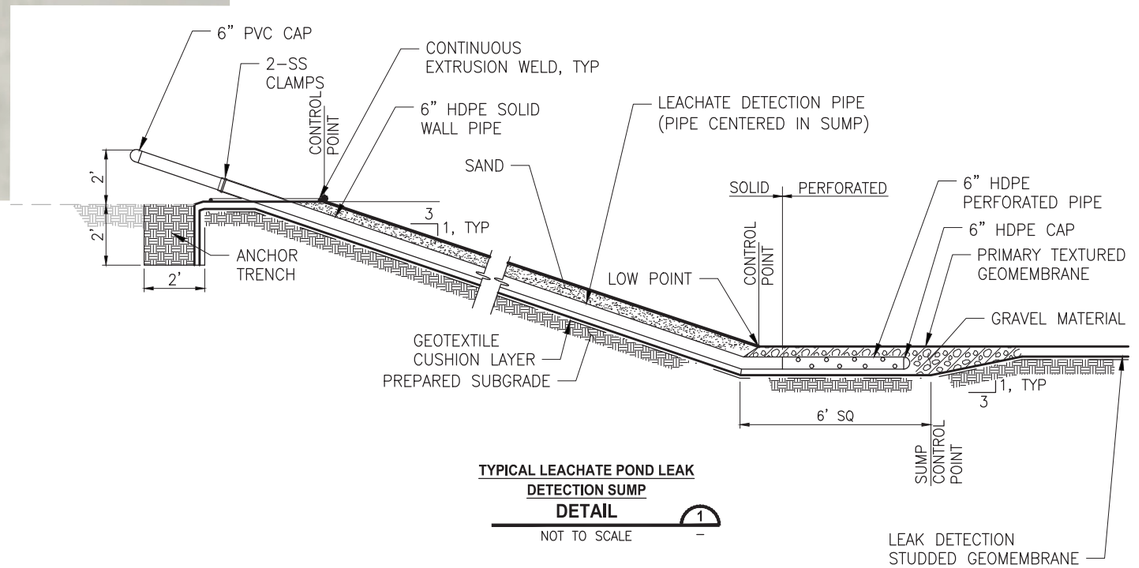
Figure 1-3
Gas Probe and Extraction Well Locations
Horn Rapids Landfill

FILE: HRL OPSPLANF1-6 LEACHATE LAYOUT: F1-6 PATH: \\parametrix.com\pmx\PSO\Projects\Clients\3820-City of Richland\555-3820-004 HornRapids2011EM\99Svcs\CADD\555-3820-004\Phase 13 2023\Horn Rapids Ops Plan PLOTTED BY: NeierTif DATE: Thursday, July 20, 2023



LEGEND:

- Existing Groundwater Monitoring Well
- Lysimeter Port
- Lysimeter
- Active Phase
- Old Landfill Boundary
- New Landfill Boundary



TYPICAL LEACHATE POND LEAK DETECTION SUMP DETAIL 1

NOT TO SCALE

Parametrix DATE: July 20, 2023 FILE: HRL OPSPLANF1-6 LEACHATE

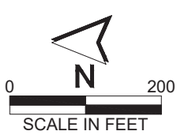
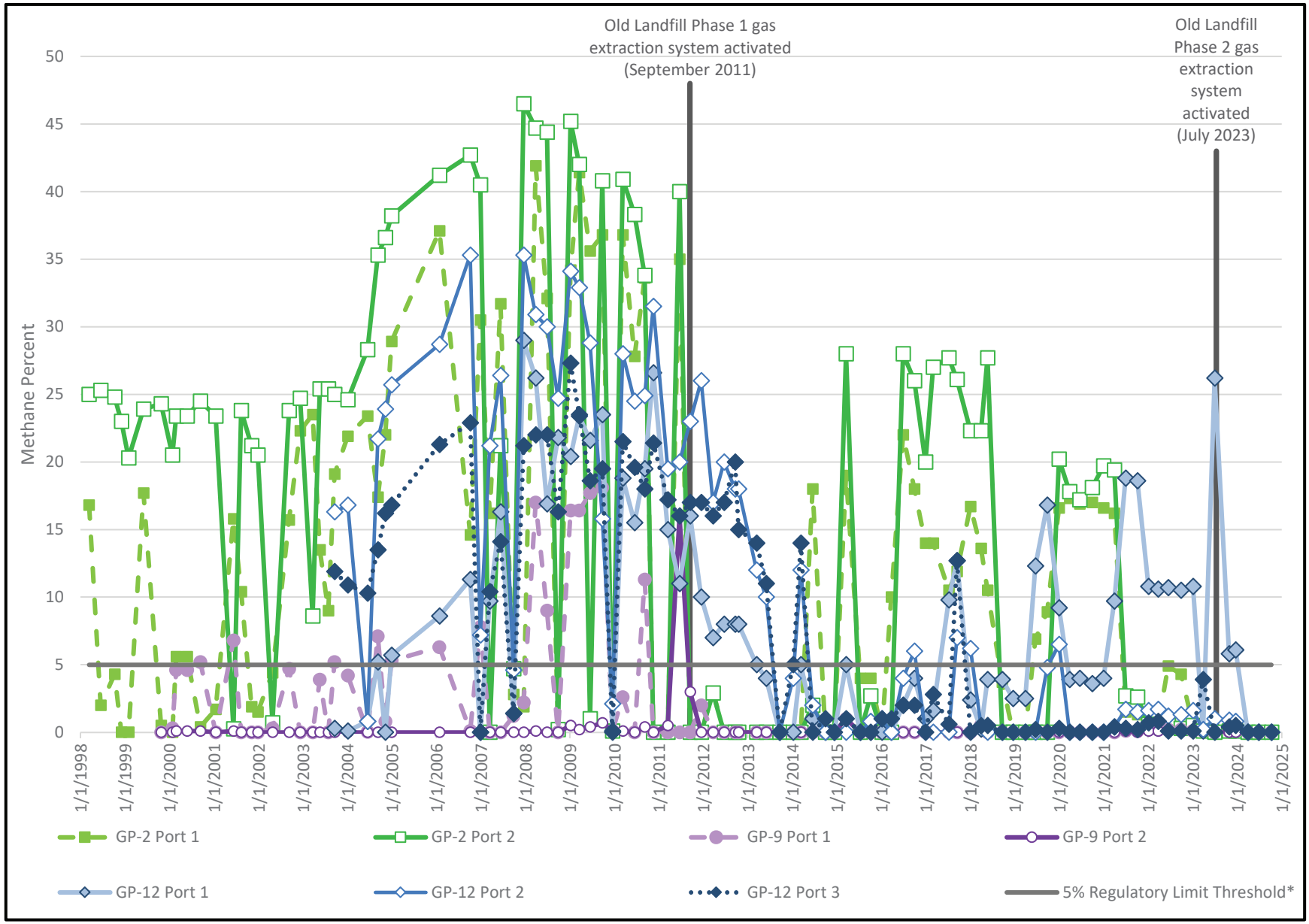


Figure 1-4
Leachate Management Details
Horn Rapids Landfill



Parametrix

*WAC 173-351 (Threshold for reference only, applies at City Facility Boundary)

Figure 7-1
Methane in Landfill Gas Probes, Horn Rapids Landfill

Appendix A

Groundwater Quality Data Summary Tables

Table A-1. Groundwater Quality Monitoring Results, 2024

Analyte		Units	GWQS	MCL	MW-1 4/9/2024	MW-1 6/18/2024	MW-1 9/24/2024	MW-1 12/3/2024	MW-2 4/10/2024	MW-2 6/19/2024	MW-2 9/25/2024	MW-2 12/3/2024	MW-3 4/10/2024	MW-3 6/18/2024	MW-3 9/26/2024	MW-3 12/4/2024
FIELD DATA	pH	units	6.5-8.5		7.21	7.23	8.24	7.43	7.63	7.65	8.16	7.75	7.89	7.95	8.10	7.98
	Conductivity	µmhos/cm		700 **	680	**709**	693	599	560	592	600	565	312	326.7	324.3	285.9
	Temperature	C°			21.6	21.9	21.9	21.0	20.9	21.4	22.1	20.3	20.4	21.8	19.6	18.9
	Redox	mv			70.7	-23.0	-119.2	-150.6	69.3	5.4	-107.1	-182.6	86.5	-66.5	-52.3	-181.6
	Dissolved Oxygen	mg/L			5.01	5.34	5.06	5.79	8.56	5.95	5.47	6.46	8.69	7.49	7.53	8.28
	Turbidity	NTU			0.35	0.00	0.00	0.00	1.55	0.00	0.06	0.00	0.0	0.00	0.00	0.00
WATER QUALITY PARAMETERS	Nitrate-Nitrogen	mg/L	10 *	10 *	6.6	6.1	6.4	6.6	**15**	**16**	**18**	**18**	2.9	3.0	3.1	2.7
	Calcium, Dissolved	mg/L			98.1	106	103	93.2	72.7	78.2	79.5	83.2	37.6	41.2	40.7	39.8
	Sodium, Dissolved	mg/L			21.8	22.7	22.6	21.7	14.4	14.8	14.7	15.7	11.5	12.0	11.9	12.3
	Bicarbonate Alkalinity	mg/L as CaCO3			290	290	284	260	125	119	124	122	102	101	105	103
	Chloride	mg/L	250 **	250 **	20.5	22.9	20.4	18.9	26.5	30.4	26.7	26.4	13.5	15.2	13.3	11.8
	Magnesium, Dissolved	mg/L			20.0	21.1	20.4	18.3	15.8	16.9	17.0	17.6	7.58	8.19	7.88	7.74
	Potassium, Dissolved	mg/L			7.72	8.12	7.68	7.50	6.48	6.78	6.38	6.86	5.50	5.81	5.67	5.68
	Sulfate	mg/L	250 **	250 **	46.6	45.1	43.0	40.9	68.0	70.6	66.5	71.2	28.4	29.9	27.4	27.6
	Total Alkalinity	mg/L as CaCO3			290	290	284	260	125	119	124	122	102	101	105	103
	Iron, Dissolved	mg/L	0.30 **	0.30 **	<0.0500	<0.0500	<0.250	<0.0500	<0.0500	<0.0500	<0.250	<0.0500	<0.0500	<0.0500	<0.100	<0.0500
	Manganese, Dissolved	mg/L	0.05 **	0.05 **	<0.0040	<0.0040	<0.0200	<0.0040	<0.0040	<0.0040	<0.0200	<0.0040	<0.0040	<0.0040	<0.0080	<0.0040
	Ammonia-Nitrogen	mg/L as N			<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
	Total Organic Carbon	mg/L			1.34	1.26	9.39	1.37	1.01	1.00	4.90	1.26	0.74	0.71	3.46	0.87
	Total Dissolved Solids	mg/L	500 **	500 **	437	467	435	420	351	385	410	416	211	231	212	196
	Total Suspended Solids	mg/L			<1	<1	<1	10	<1	<1	<1	<1	<1	<1	<1	<1
METALS	Antimony, Total	mg/L		6 *	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	Arsenic, Total	mg/L	0.00005 **,1	0.01 *	**0.00406**	**0.00397**	**0.00412**	**0.00390**	**0.00353**	**0.00352**	**0.00333**	**0.00332**	**0.00876**	**0.00936**	**0.00911**	**0.00904**
	Barium, Total	mg/L	1 *	2 *	0.0465	0.0468	0.0445	0.0403	0.0361	0.0385	0.0382	0.0390	0.0162	0.0166	0.0173	0.0176
	Beryllium, Total	mg/L		0.004 *	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	Cadmium, Total	mg/L	0.01 *	0.005 *	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Chromium, Total	mg/L	0.05 *	0.1 *	<0.00250	<0.00250	<0.00250	<0.00500	0.0145	0.0187	0.00462	0.00544	<0.00250	<0.00250	<0.00250	<0.00250
	Cobalt, Total	mg/L			0.00437	0.0113	0.00839	0.0102	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	Copper, Total	mg/L	1 **		<0.00250	0.00498	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250
	Lead, Total	mg/L	0.05 *		<0.000500	<0.000500	<0.000500	<0.00100	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Nickel, Total	mg/L		0.1 *	<0.00250	<0.00250	<0.00250	<0.00250	0.00404	0.00522	0.00341	0.00422	<0.00250	<0.00250	<0.00250	<0.00250
	Selenium, Total	mg/L	0.01 *	0.05 *	<0.00250	<0.00250	<0.00250	<0.00500	0.00259	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250
	Silver, Total	mg/L	0.05 *	0.1 **	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	Thallium, Total	mg/L		0.002 *	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	Vanadium, Total	mg/L			0.00772	0.00845	0.00676	0.00710	0.00901	0.0100	0.00772	0.00769	0.0144	0.0155	0.0128	0.0132
	Zinc, Total	mg/L	5 **	5 **	<0.0300	0.0311	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300
VOLATILE ORGANIC COMPOUNDS	1,1,1,2-Tetrachloroethane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,1,1-Trichloroethane	µg/L	200 *	200 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,1,2,2-Tetrachloroethane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,1,2-Trichloroethane	µg/L		5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,1-Dichloroethane	µg/L	1 ***		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Vinyl Acetate	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,1-Dichloroethene	µg/L		7 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	2-Butanone	µg/L			<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
	1,2,3-Trichloropropane	µg/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	1,2-Dibromo-3-Chloropropane	µg/L		0.2 *	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	1,2-Dibromoethane	µg/L	0.001 **,1	0.05 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,2-Dichlorobenzene	µg/L		600 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,2-Dichloroethane	µg/L	0.5 **,1	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,2-Dichloropropane	µg/L	0.6 **,1	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,4-Dichlorobenzene	µg/L	4 **,1	75 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	2-Hexanone	µg/L			<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
	4-Methyl-2-pentanone	µg/L			<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
	Acetone	µg/L			<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
	Benzene	µg/L	1 **,1	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Bromochloromethane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Bromodichloromethane	µg/L	0.3 **,1	80 * THM	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.23	<0.20	<0.20
	Bromoform	µg/L	5 **,1	80 * THM	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Bromomethane	µg/L			<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
	Carbon Disulfide	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Carbon Tetrachloride	µg/L	0.3 **,1	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Chlorobenzene	µg/L		100 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Chloroethane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Chloroform	µg/L	7 **,1	80 * THM	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	5.94	6.77	5.92	6.82
	Chloromethane	µg/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	cis-1,2-Dichloroethene	µg/L		70 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table A-1. Groundwater Quality Monitoring Results, 2024

Analyte		Units	GWQS	MCL	MW-1 4/9/2024	MW-1 6/18/2024	MW-1 9/24/2024	MW-1 12/3/2024	MW-2 4/10/2024	MW-2 6/19/2024	MW-2 9/25/2024	MW-2 12/3/2024	MW-3 4/10/2024	MW-3 6/18/2024	MW-3 9/26/2024	MW-3 12/4/2024
VOLATILE ORGANIC COMPOUNDS (Cont.)	cis-1,3-Dichloropropene	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Dibromochloromethane	µg/L		80 * THM	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Dibromomethane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Ethylbenzene	µg/L		700 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Iodomethane	µg/L			<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
	Methylene Chloride	µg/L	5 **,	5 *	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
	m,p-Xylene	µg/L			<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
	o-Xylene	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Styrene	µg/L		100 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Tetrachloroethene	µg/L	0.8 **,	5 *	**5.23**	**5.24**	**4.03**	**4.07**	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Toluene	µg/L		1000 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	trans-1,2-Dichloroethene	µg/L		100 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	trans-1,3-Dichloropropene	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	trans-1,4-Dichloro-2-butene	µg/L			<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
	Trichloroethene	µg/L	3 **,	5 *	0.30	0.33	0.25	0.21	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Trichlorofluoromethane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Vinyl Chloride	µg/L	0.02 **,	2 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Acrylonitrile	µg/L	0.07 ***		<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
NATURAL ATTENUATION PARAMETERS	Ethane	µg/L			<1.23	<1.23	<1.12	<1.12	<1.23	<1.23	<1.12	<1.12	<1.23	<1.23	<1.12	<1.12
	Ethene	µg/L			<1.14	<1.14	<1.14	<1.14	<1.14	<1.14	<1.14	<1.14	<1.14	<1.14	<1.14	<1.14
	Methane	µg/L			<0.65	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65
	Acetylene	µg/L			<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06

Notes:

GWQS = Water Quality Standards for Ground Waters of the State of Washington (WAC 173-200)
MCL = Maximum Contaminant Level, State Drinking Water Regulations (WAC 246-290)
* = Primary
** = Secondary
*** = Carcinogen
*THM = Primary MCL for the sum of all trihalomethanes
H = Estimated value; analyzed beyond specified holding time
B = Detected in reagent blank or trip blank
Bold = Does not meet GWQS or MCL
NA = Not analyzed

Table A-1. Groundwater Quality Monitoring Results, 2024

Analyte		Units	GWQS	MCL	MW-4 4/10/2024	MW-4 6/18/2024	MW-4 9/26/2024	MW-4 12/3/2024	MW-5 4/9/2024	MW-5 6/18/2024	MW-5 9/24/2024	MW-5 12/3/2024	MW-6 4/9/2024	MW-6 6/18/2024	MW-6 9/25/2024	MW-6 12/4/2024	MW-21 (MW-6 Dup) 12/4/2024
FIELD DATA	pH	units	6.5-8.5		7.59	7.69	7.80	7.75	6.65	6.59	7.42	6.93	6.64	6.61	7.16	6.68	NA
	Conductivity	µmhos/cm		700 **	630	658	664	609	**1430**	**1934**	**1690**	**1429**	**1070**	**1243**	**1440**	**1324**	NA
	Temperature	C°			20.4	21.7	20.7	20.0	24.3	26.3	25.9	22.6	23.5	26.7	27.6	24.7	NA
	Redox	mv			91.0	-92.0	-58.8	-195.1	-25.3	-221.1	-241.5	-208.9	-72.5	-229.6	-247.6	-217.2	NA
	Dissolved Oxygen	mg/L			3.51	3.56	3.51	3.96	0.33	0.49	0.26	0.42	0.44	0.29	0.21	0.13	NA
	Turbidity	NTU			0.42	0.00	0.00	0.00	0.37	0.00	0.00	0.00	0.07	0.00	0.13	0.00	NA
WATER QUALITY PARAMETERS	Nitrate-Nitrogen	mg/L	10 *	10 *	9.5	9.4	**11**	**11**	1.4	0.89	1.3	1.5	<0.05	<0.050	6.8	**10**	**10**
	Calcium, Dissolved	mg/L			90.9	97.4	96.0	97.6	200	305	251	229	157	189	220	220	222
	Sodium, Dissolved	mg/L			15.1	15.8	15.7	16.3	26.0	42.7	39.8	38.9	21.3	26.2	27.7	27.9	28.3
	Bicarbonate Alkalinity	mg/L as CaCO3			264	260	262	258	588	641	609	584	549	602	627	598	598
	Chloride	mg/L	250 **	250 **	15.3	17.3	15.8	14.6	65.3	120	89.9	77.0	22.8	30.2	40.7	41.5	41.6
	Magnesium, Dissolved	mg/L			20.0	21.2	20.9	20.7	49.4	77.0	66.5	62.1	39.6	48.6	54.8	54.0	54.5
	Potassium, Dissolved	mg/L			7.36	7.71	7.38	7.60	12.6	15.9	13.8	14.1	11.8	13.5	13.1	13.6	13.8
	Sulfate	mg/L	250 **	250 **	36.2	35.8	35.3	34.7	104	308	212	165	50.1	72.2	122	132	122
	Total Alkalinity	mg/L as CaCO3			264	260	262	258	588	641	609	584	549	602	627	598	598
	Iron, Dissolved	mg/L	0.30 **	0.30 **	<0.0500	<0.0500	<0.250	<0.0500	<0.0500	0.115	<0.500	0.0634	**0.343**	0.232	<0.500	<0.0500	<0.0500
	Manganese, Dissolved	mg/L	0.05 **	0.05 **	<0.0040	<0.0040	<0.0200	<0.0040	**0.579**	**1.23**	**2.05**	**2.24**	**0.218**	**0.402**	**0.551**	**0.782**	**0.783**
	Ammonia-Nitrogen	mg/L as N			<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.341	0.299	0.156	0.100	0.107
	Total Organic Carbon	mg/L			0.51	0.63	7.13	0.91	4.54	12.38	17.90	7.65	1.38	1.57	10.79	3.90	3.79
	Total Dissolved Solids	mg/L	500 **	500 **	384	417	416	397	**909**	**1250**	**1100**	**1060**	**665**	**780**	**893**	**940**	**957**
	Total Suspended Solids	mg/L			<1	<1	<0.9	<1	<1	<1	<0.9	<1	<1	<1	<1	<1	<1
METALS	Antimony, Total	mg/L		6 *	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	Arsenic, Total	mg/L	0.00005 **ʃ	0.01 *	**0.00404**	**0.00391**	**0.00396**	**0.00371**	**0.00312**	**0.00414**	**0.00389**	**0.00413**	**0.00103**	**0.00138**	**0.00166**	**0.00182**	**0.00178**
	Barium, Total	mg/L	1 *	2 *	0.0499	0.0539	0.0529	0.0544	0.116	0.117	0.0912	0.1010	0.0921	0.125	0.141	0.132	0.1240
	Beryllium, Total	mg/L		0.004 *	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	Cadmium, Total	mg/L	0.01 *	0.005 *	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Chromium, Total	mg/L	0.05 *	0.1 *	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.0100	<0.00500	<0.00500	<0.00250	<0.00250	<0.00500	<0.00500	<0.00500
	Cobalt, Total	mg/L			0.0110	0.0112	0.00958	0.0116	<0.00100	0.00246	0.00227	0.00348	<0.00100	<0.00100	0.00223	0.00272	0.00248
	Copper, Total	mg/L	1 **		<0.00250	<0.00250	<0.00250	<0.00250	0.00304	0.00296	0.00313	0.00836	0.00315	0.00355	0.00314	<0.00250	<0.00250
	Lead, Total	mg/L	0.05 *		<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Nickel, Total	mg/L		0.1 *	<0.00250	<0.00250	<0.00250	<0.00250	0.00533	0.0122	0.0106	0.0125	<0.00250	<0.00250	0.00269	0.00286	0.00270
	Selenium, Total	mg/L	0.01 *	0.05 *	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250
	Silver, Total	mg/L	0.05 *	0.1 **	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	Thallium, Total	mg/L		0.002 *	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	Vanadium, Total	mg/L			0.00933	0.0110	0.00859	0.00908	0.00601	0.00590	0.00469	0.00587	0.00379	0.00529	0.00776	0.00546	0.00529
	Zinc, Total	mg/L	5 **	5 **	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	0.0327	<0.0300	0.0425	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300
VOLATILE ORGANIC COMPOUNDS	1,1,1,2-Tetrachloroethane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,1,1-Trichloroethane	µg/L	200 *	200 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,1,2,2-Tetrachloroethane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,1,2-Trichloroethane	µg/L		5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,1-Dichloroethane	µg/L	1 ***		**3.93**	**4.81**	**3.46**	**4.37**	**2.61**	**2.90**	**1.71**	**2.63**	**1.79**	**2.56**	**1.48**	**2.23**	**2.19**
	Vinyl Acetate	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,1-Dichloroethene	µg/L		7 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	2-Butanone	µg/L			<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
	1,2,3-Trichloropropane	µg/L			<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
	1,2-Dibromo-3-Chloropropane	µg/L		0.2 *	<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
	1,2-Dibromoethane	µg/L	0.001 **ʃ	0.05 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,2-Dichlorobenzene	µg/L		600 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,2-Dichloroethane	µg/L	0.5 **ʃ	5 *	<0.20	<0.20	<0.20	<0.20	0.34	0.40	0.20	0.32	0.24	0.29	<0.20	0.22	0.22
	1,2-Dichloropropane	µg/L	0.6 **ʃ	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,4-Dichlorobenzene	µg/L	4 **ʃ	75 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	2-Hexanone	µg/L			<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
	4-Methyl-2-pentanone	µg/L			<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
	Acetone	µg/L			<5.00	<5.00	<5.00	6.12	<5.00	<5.00	<5.00	6.04	<5.00	<5.00	<5.00	<5.00	<5.00
	Benzene	µg/L	1 **ʃ	5 *	<0.20	<0.20	<0.20	<0.20	0.23	0.28	<0.20	0.23	0.25	0.24	<0.20	0.24	0.25
	Bromochloromethane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Bromodichloromethane	µg/L	0.3 **ʃ	80 * THM	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Bromoform	µg/L	5 **ʃ	80 * THM	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Bromomethane	µg/L			<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
	Carbon Disulfide	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Carbon Tetrachloride	µg/L	0.3 **ʃ	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Chlorobenzene	µg/L		100 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Chloroethane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Chloroform	µg/L	7 **ʃ	80 * THM	0.27	<0.34	0.24	0.36	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Chloromethane	µg/L			<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
	cis-1,2-Dichloroethene	µg/L		70 *	4.46	5.05	4.27	5.43	16.8	17.4	11.1	16.8	30.1	30.6	17.5	31.3	30.8

Table A-1. Groundwater Quality Monitoring Results, 2024

Analyte		Units	GWQS	MCL	MW-4 4/10/2024	MW-4 6/18/2024	MW-4 9/26/2024	MW-4 12/3/2024	MW-5 4/9/2024	MW-5 6/18/2024	MW-5 9/24/2024	MW-5 12/3/2024	MW-6 4/9/2024	MW-6 6/18/2024	MW-6 9/25/2024	MW-6 12/4/2024	MW-21 (MW-6 Dup) 12/4/2024
VOLATILE ORGANIC COMPOUNDS (Cont.)	cis-1,3-Dichloropropene	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Dibromochloromethane	µg/L		80 * THM	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Dibromomethane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Ethylbenzene	µg/L		700 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Iodomethane	µg/L			<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
	Methylene Chloride	µg/L	5 ***J	5 *	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
	m,p-Xylene	µg/L			<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
	o-Xylene	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Styrene	µg/L		100 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Tetrachloroethene	µg/L	0.8 ***	5 *	0.51	0.62	0.60	0.64	**9.49**	**8.59**	**6.38**	**8.43**	**17.5**	**16.9**	**12.4**	**18.6**	**19.3**
	Toluene	µg/L		1000 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	trans-1,2-Dichloroethene	µg/L		100 *	<0.20	<0.20	<0.20	<0.20	0.29	0.31	0.26	0.30	0.80	0.81	0.44	0.62	0.60
	trans-1,3-Dichloropropene	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	trans-1,4-Dichloro-2-butene	µg/L			<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
	Trichloroethene	µg/L	3 ***J	5 *	0.59	0.70	0.65	0.75	**3.65**	**3.54**	2.50	**3.43**	**8.41**	**8.32**	**5.51**	**8.53**	**8.74**
	Trichlorofluoromethane	µg/L			0.69	0.74	0.70	0.83	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Vinyl Chloride	µg/L	0.02 ***J	2 *	<0.20	<0.20	<0.20	<0.20	**0.81**	**1.02**	**0.71**	**0.58**	<0.20	<0.20	<0.20	<0.20	<0.20
	Acrylonitrile	µg/L	0.07 ***		<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
NATURAL ATTENUATION PARAMETERS	Ethane	µg/L			<1.23	<1.23	<1.12	<1.12	<1.23	<1.23	<1.12	<1.12	<1.23	<1.23	<1.12	<1.12	<1.12
	Ethene	µg/L			<1.14	<1.14	<1.14	<1.14	<1.14	<1.14	<1.14	<1.14	<1.14	<1.14	<1.14	<1.14	<1.14
	Methane	µg/L			<0.65	<0.65	<0.65	<0.65	282	493	134	83.8	1180	1070	355	359	368
	Acetylene	µg/L			<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06

Notes:

GWQS = Water Quality Standards for Ground Waters of the State of Washington (WAC 173-200)
MCL = Maximum Contaminant Level, State Drinking Water Regulations (WAC 246-290)
* = Primary
** = Secondary
*** = Carcinogen
*THM = Primary MCL for the sum of all trihalomethanes
H = Estimated value; analyzed beyond specified holding time
B = Detected in reagent blank or trip blank
Bold = Does not meet GWQS or MCL
NA = Not analyzed

Table A-1. Groundwater Quality Monitoring Results, 2024

Analyte		Units	GWQS	MCL	MW-8 4/10/2024	MW-8 6/19/2024	MW-8 9/26/2024	MW-8 12/3/2024	MW-9 4/10/2024	MW-9 6/19/2024	MW-9 9/24/2024	MW-9 12/3/2024	MW-10 4/9/2024	MW-10 6/18/2024	MW-21 (MW-10 Dup) 6/18/2024	MW-10 9/24/2024	MW-10 12/3/2024
FIELD DATA	pH	units	6.5-8.5		7.62	7.64	8.01	7.73	6.98	6.96	7.47	7.41	6.61	6.56	NA	7.30	7.31
	Conductivity	µmhos/cm		700 **	**990**	**1079**	639	528	**970**	**1110**	**977**	**873**	**1500**	**1857**	NA	**2292**	**1938**
	Temperature	C°			22.6	23.5	22.8	21.4	22.3	24.0	23.9	18.9	25.3	24.5	NA	26.5	17.8
	Redox	mv			88.0	26.0	-63.8	-181.9	85.3	40.0	-152.6	-192.2	7.0	-216.5	NA	-246.7	-203.3
	Dissolved Oxygen	mg/L			6.69	6.67	5.85	5.48	3.62	3.43	2.31	2.80	0.48	0.16	NA	0.18	0.45
	Turbidity	NTU			0.37	0.00	0.00	0.00	0.0	0.00	0.09	0.00	0.83	0.00	NA	0.00	0.00
WATER QUALITY PARAMETERS	Nitrate-Nitrogen	mg/L	10 *	10 *	**25**	**29**	**14**	**12**	7.6	9.5	7.8	7.9	7.6	**18**	**18**	**69**	**55**
	Calcium, Dissolved	mg/L			121	139	82.7	75.2	140	162	148	144	240	307	307	404	362
	Sodium, Dissolved	mg/L			29.8	31.9	22.4	20.8	24.5	31.8	24.8	25.1	24.7	28.3	28.3	30.5	30.4
	Bicarbonate Alkalinity	mg/L as CaCO3			146	142	148	160	381	408	373	364	720	744	752	616	632
	Chloride	mg/L	250 **	250 **	113	129	47.4	29.3	49.9	55.8	48.2	45.1	37.8	58.5	57.9	115	89.2
	Magnesium, Dissolved	mg/L			26.2	29.6	17.2	15.4	31.9	37.1	33.0	32.0	53.1	65.8	65.6	88.5	80.1
	Potassium, Dissolved	mg/L			9.91	10.7	7.77	7.63	9.35	10.4	9.43	9.61	13.5	15.4	15.4	14.9	16.5
	Sulfate	mg/L	250 **	250 **	88.2	93.8	52.4	48.0	73.7	89.7	70.0	68.2	104	155	155	**291**	**268**
	Total Alkalinity	mg/L as CaCO3			146	142	148	160	381	408	373	364	720	744	752	616	632
	Iron, Dissolved	mg/L	0.30 **	0.30 **	<0.0500	<0.0500	<0.250	<0.0500	<0.0500	<0.0500	<0.250	<0.0500	0.168	<0.0500	<0.0500	<1.00	0.277
	Manganese, Dissolved	mg/L	0.05 **	0.05 **	<0.0040	<0.0040	<0.0200	<0.0040	<0.0040	<0.0040	<0.0200	<0.0040	**0.0879**	**0.0920**	**0.0914**	**0.118**	**0.127**
	Ammonia-Nitrogen	mg/L as N			<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.167	<0.040	0.049	0.046	<0.040
	Total Organic Carbon	mg/L			1.28	1.71	2.98	0.93	1.44	1.32	13.91	1.89	4.23	8.03	8.03	44.17	19.45
	Total Dissolved Solids	mg/L	500 **	500 **	**635**	**715**	405	386	**608**	**675**	**594**	**621**	**937**	**1180**	**1170**	**1680**	**1380**
	Total Suspended Solids	mg/L			<1	1	<0.9	<1	<1	<1	<0.9	1	1	<1	<1	<0.9	10
METALS	Antimony, Total	mg/L		6 *	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	Arsenic, Total	mg/L	0.00005 **, ‡	0.01 *	**0.00687**	**0.00687**	**0.00826**	**0.00823**	**0.00188**	**0.00189**	**0.00178**	**0.00169**	**0.00198**	**0.00158**	**0.00142**	**0.00150**	**0.00300**
	Barium, Total	mg/L	1 *	2 *	0.0831	0.0946	0.0501	0.0459	0.0729	0.0924	0.0737	0.07	0.129	0.164	0.167	0.219	0.189
	Beryllium, Total	mg/L		0.004 *	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	Cadmium, Total	mg/L	0.01 *	0.005 *	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Chromium, Total	mg/L	0.05 *	0.1 *	<0.00250	0.00277	<0.00250	<0.00250	<0.00250	0.00323	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00500
	Cobalt, Total	mg/L			<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	0.00125
	Copper, Total	mg/L	1 **		<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	0.00267	0.00512	0.00484
	Lead, Total	mg/L	0.05 *		<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Nickel, Total	mg/L		0.1 *	0.00411	0.00379	<0.00250	<0.00250	<0.00250	<0.00250	0.00372	<0.00250	<0.00250	0.00301	0.00342	0.00601	0.00595
	Selenium, Total	mg/L	0.01 *	0.05 *	0.00513	0.00579	0.00270	<0.00250	0.00410	0.00630	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250
	Silver, Total	mg/L	0.05 *	0.1 **	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	Thallium, Total	mg/L		0.002 *	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	Vanadium, Total	mg/L			0.0117	0.0134	0.0120	0.0129	0.00585	0.00683	0.00496	0.00545	0.00608	0.00707	0.00706	0.00472	0.00617
	Zinc, Total	mg/L	5 **	5 **	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300
VOLATILE ORGANIC COMPOUNDS	1,1,1,2-Tetrachloroethane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,1,1-Trichloroethane	µg/L	200 *	200 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,1,2,2-Tetrachloroethane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,1,2-Trichloroethane	µg/L		5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,1-Dichloroethane	µg/L	1 ***		<0.20	<0.20	0.39	0.85	**1.20**	**1.04**	**1.32**	**1.70**	**4.26**	**4.33**	**4.51**	**2.13**	**3.27**
	Vinyl Acetate	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,1-Dichloroethene	µg/L		7 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.23	0.23	0.25	<0.20	<0.20
	2-Butanone	µg/L			<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
	1,2,3-Trichloropropane	µg/L			<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
	1,2-Dibromo-3-Chloropropane	µg/L		0.2 *	<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
	1,2-Dibromoethane	µg/L	0.001 **, ‡	0.05 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,2-Dichlorobenzene	µg/L		600 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,2-Dichloroethane	µg/L	0.5 **, ‡	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.40	**0.54**	**0.56**	0.22	0.32
	1,2-Dichloropropane	µg/L	0.6 **, ‡	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	1,4-Dichlorobenzene	µg/L	4 **, ‡	75 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	2-Hexanone	µg/L			<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
	4-Methyl-2-pentanone	µg/L			<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
	Acetone	µg/L			<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	11.9	<5.00
	Benzene	µg/L	1 **, ‡	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Bromochloromethane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Bromodichloromethane	µg/L	0.3 **, ‡	80 * THM	0.21	0.26	**0.55**	**0.75**	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Bromoform	µg/L	5 **, ‡	80 * THM	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Bromomethane	µg/L			<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
	Carbon Disulfide	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Carbon Tetrachloride	µg/L	0.3 **, ‡	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Chlorobenzene	µg/L		100 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Chloroethane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Chloroform	µg/L	7 **, ‡	80 * THM	3.57	4.37	**8.26**	**12.0**	1.73	<1.01	1.07	1.22	0.52	<0.42	<0.42	0.23	0.29
	Chloromethane	µg/L			<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
	cis-1,2-Dichloroethene	µg/L		70 *	<0.20	<0.20	0.25	0.65	6.11	4.81	7.55	10.4	10.8	14.6	14.9	8.24	12.8

Table A-1. Groundwater Quality Monitoring Results, 2024

Analyte		Units	GWQS	MCL	MW-8 4/10/2024	MW-8 6/19/2024	MW-8 9/26/2024	MW-8 12/3/2024	MW-9 4/10/2024	MW-9 6/19/2024	MW-9 9/24/2024	MW-9 12/3/2024	MW-10 4/9/2024	MW-10 6/18/2024	MW-21 (MW-10 Dup) 6/18/2024	MW-10 9/24/2024	MW-10 12/3/2024
VOLATILE ORGANIC COMPOUNDS (Cont.)	cis-1,3-Dichloropropene	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Dibromochloromethane	µg/L		80 * THM	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Dibromomethane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Ethylbenzene	µg/L		700 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Iodomethane	µg/L			<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
	Methylene Chloride	µg/L	5 **,	5 *	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
	m,p-Xylene	µg/L			<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
	o-Xylene	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Styrene	µg/L		100 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Tetrachloroethene	µg/L	0.8 **,	5 *	<0.20	<0.20	<0.20	<0.20	**9.16**	**9.45**	**8.94**	**10.7**	**3.54**	**5.91**	**5.85**	**4.17**	**4.97**
	Toluene	µg/L		1000 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	trans-1,2-Dichloroethene	µg/L		100 *	<0.20	<0.20	<0.20	<0.20	0.20	0.21	0.32	0.35	<0.20	0.22	0.25	<0.20	<0.20
	trans-1,3-Dichloropropene	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	trans-1,4-Dichloro-2-butene	µg/L			<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
	Trichloroethene	µg/L	3 **,	5 *	<0.20	<0.20	<0.20	<0.20	2.98	2.09	**3.57**	**4.24**	1.98	**3.17**	**3.25**	2.02	2.56
	Trichlorofluoromethane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Vinyl Chloride	µg/L	0.02 **,	2 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	**0.63**	**0.59**	**0.64**	**0.25**	<0.20
	Acrylonitrile	µg/L	0.07 ***		<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
NATURAL ATTENUATION PARAMETERS	Ethane	µg/L			<1.23	<1.23	<1.12	<1.12	<1.23	<1.23	<1.12	<1.12	<1.23	<1.23	<1.23	<1.12	<1.12
	Ethene	µg/L			<1.14	<1.14	<1.14	<1.14	<1.14	<1.14	<1.14	<1.14	<1.14	<1.14	<1.14	<1.14	<1.14
	Methane	µg/L			<0.65	<0.65	<0.65	<0.65	4.84	1.08	<0.65	<0.65	1430	1970	2030	1120	998
	Acetylene	µg/L			<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06

Notes:

GWQS = Water Quality Standards for Ground Waters of the State of Washington (WAC 173-200)
MCL = Maximum Contaminant Level, State Drinking Water Regulations (WAC 246-290)
* = Primary
** = Secondary
*** = Carcinogen
*THM = Primary MCL for the sum of all trihalomethanes
H = Estimated value; analyzed beyond specified holding time
B = Detected in reagent blank or trip blank
Bold = Does not meet GWQS or MCL
NA = Not analyzed

Table A-1. Groundwater Quality Monitoring Results, 2024

Analyte		Units	GWQS	MCL	MW-11 4/9/2024	(MW-11 Dup) 4/9/2024	MW-11 6/18/2024	MW-11 9/25/2024	MW-11 NA	MW-12 4/10/2024	MW-12 6/18/2024	MW-12 9/25/2024	MW-21 (MW-12 Dup) 9/25/2024	MW-12 12/4/2024
FIELD DATA	pH	units	6.5-8.5		7.35	NA	7.39	7.93	NA	7.80	7.84	8.00	NA	7.64
	Conductivity	µmhos/cm		700 **	**1790**	NA	**1819**	**1464**	NA	421	421.5	464	NA	487.6
	Temperature	C°			20.9	NA	21.2	21.8	NA	22.0	23.1	23.5	NA	22.0
	Redox	mv			46.8	NA	-14.6	-106.4	NA	136.1	-36.1	-61.5	NA	-154.3
	Dissolved Oxygen	mg/L			7.83	NA	7.72	5.86	NA	6.25	7.46	4.87	NA	5.39
	Turbidity	NTU			0.87	NA	0.00	11.8	NA	7.72	1.22	23.2	NA	24.5
WATER QUALITY PARAMETERS	Nitrate-Nitrogen	mg/L	10 *	10 *	**40**	**41**	**43**	**47**	NA	6.0	5.9	6.3	6.5	6.6
	Calcium, Dissolved	mg/L			262	263	287	227	NA	51.9	51.3	57.5	57.3	73.0
	Sodium, Dissolved	mg/L			20.2	20.2	21.1	20.2	NA	19.5	20.4	21.0	21.0	21.4
	Bicarbonate Alkalinity	mg/L as CaCO3			163	163	164	193	NA	155	142	168	165	200
	Chloride	mg/L	250 **	250 **	200	200	206	132	NA	11.9	12.7	12.5	12.3	14.2
	Magnesium, Dissolved	mg/L			57.6	57.5	60.8	44.1	NA	10.5	10.5	11.6	11.4	13.1
	Potassium, Dissolved	mg/L			12.2	12.2	12.9	10.7	NA	7.42	7.65	7.71	7.97	7.93
	Sulfate	mg/L	250 **	250 **	**370**	**374**	**328**	193	NA	35.1	33.9	33.4	32.7	34.4
	Total Alkalinity	mg/L as CaCO3			163	163	164	193	NA	155	142	168	165	200
	Iron, Dissolved	mg/L	0.30 **	0.30 **	<0.0500	<0.0500	<0.0500	<0.500	NA	<0.0500	<0.0500	<0.250	<0.250	<0.0500
	Manganese, Dissolved	mg/L	0.05 **	0.05 **	<0.0040	<0.0040	<0.0040	<0.0400	NA	<0.0040	<0.0040	<0.0200	<0.0200	<0.0040
	Ammonia-Nitrogen	mg/L as N			<0.040	<0.040	<0.040	<0.040	NA	<0.040	<0.040	<0.040	<0.040	<0.040
	Total Organic Carbon	mg/L			7.69	7.45	6.89	10.44	NA	0.51	0.64	6.91	8.24	0.98
	Total Dissolved Solids	mg/L	500 **	500 **	**1270**	**1270**	**1290**	**1040**	NA	259	277	291	272	338
	Total Suspended Solids	mg/L			<1	<1	<1	4	NA	12	2	126 J	35 J	24
METALS	Antimony, Total	mg/L		6 *	<0.00100	<0.00100	<0.00100	<0.00100	NA	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	Arsenic, Total	mg/L	0.00005 **[1]	0.01 *	**0.00405**	**0.00391**	**0.00421**	**0.00505**	NA	**0.00731**	**0.00826**	**0.00755**	**0.00726**	**0.00603**
	Barium, Total	mg/L	1 *	2 *	0.0847 J	0.0845 J	0.0898	0.0834	NA	0.0471	0.0437	0.0543	0.0527	0.0568
	Beryllium, Total	mg/L		0.004 *	<0.00100	<0.00100	<0.00100	<0.00100	NA	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	Cadmium, Total	mg/L	0.01 *	0.005 *	<0.000500	<0.000500	<0.000500	<0.000500	NA	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Chromium, Total	mg/L	0.05 *	0.1 *	0.00325	0.00346	0.00348	0.00511	NA	0.00916	0.00893	0.00860	0.00826	0.00527
	Cobalt, Total	mg/L			<0.00100	<0.00100	<0.00100	0.00273	NA	0.00109	0.00118	<0.00100	<0.00100	<0.00100
	Copper, Total	mg/L	1 **		<0.00250	<0.00250	<0.00250	<0.00250	NA	0.00354	<0.00250	0.00374	0.00366	0.00503
	Lead, Total	mg/L	0.05 *		<0.000500	<0.000500	<0.000500	<0.000500	NA	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Nickel, Total	mg/L		0.1 *	<0.00250	<0.00250	<0.00250	0.00465	NA	0.00658	0.00680	0.00814	0.00769	0.00584
	Selenium, Total	mg/L	0.01 *	0.05 *	0.00575	0.00472	0.00500	0.00380	NA	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250
	Silver, Total	mg/L	0.05 *	0.1 **	<0.00100	<0.00100	<0.00100	<0.00100	NA	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	Thallium, Total	mg/L		0.002 *	<0.00100	<0.00100	<0.00100	<0.00100	NA	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	Vanadium, Total	mg/L			0.00838	0.00814	0.00957	0.00858	NA	0.0121	0.0148	0.0120	0.0116	0.0110
	Zinc, Total	mg/L	5 **	5 **	<0.0300	<0.0300	0.0548	<0.0300	NA	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300
VOLATILE ORGANIC COMPOUNDS	1,1,1,2-Tetrachloroethane	µg/L			<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	1,1,1-Trichloroethane	µg/L	200 *	200 *	<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	1,1,2,2-Tetrachloroethane	µg/L			<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	1,1,2-Trichloroethane	µg/L		5 *	<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	1,1-Dichloroethane	µg/L	1 ***		<0.20	<0.20	<0.20	<0.20	NA	0.52	0.46	0.85	0.75	**1.83**
	Vinyl Acetate	µg/L			<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	1,1-Dichloroethene	µg/L		7 *	<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	2-Butanone	µg/L			<5.00	<5.00	<5.00	<5.00	NA	<5.00	<5.00	<5.00	<5.00	<5.00
	1,2,3-Trichloropropane	µg/L			<0.50	<0.50	<0.50	<0.50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	1,2-Dibromo-3-Chloropropane	µg/L		0.2 *	<0.50	<0.50	<0.50	<0.50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	1,2-Dibromoethane	µg/L	0.001 **[1]	0.05 *	<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	1,2-Dichlorobenzene	µg/L		600 *	<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	1,2-Dichloroethane	µg/L	0.5 **[1]	5 *	<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	1,2-Dichloropropane	µg/L	0.6 **[1]	5 *	<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	1,4-Dichlorobenzene	µg/L	4 **[1]	75 *	<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	2-Hexanone	µg/L			<5.00	<5.00	<5.00	<5.00	NA	<5.00	<5.00	<5.00	<5.00	<5.00
	4-Methyl-2-pentanone	µg/L			<5.00	<5.00	<5.00	<5.00	NA	<5.00	<5.00	<5.00	<5.00	<5.00
	Acetone	µg/L			<5.00	<5.00	<5.00	<5.00	NA	<5.00	<5.00	<5.00	<5.00	<5.00
	Benzene	µg/L	1 **[1]	5 *	0.94	0.86	**1.05**	**3.74**	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	Bromochloromethane	µg/L			<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	Bromodichloromethane	µg/L	0.3 **[1]	80 * THM	<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	Bromoform	µg/L	5 **[1]	80 * THM	<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	Bromomethane	µg/L			<1.00	<1.00	<1.00	<1.00	NA	<1.00	<1.00	<1.00	<1.00	<1.00
	Carbon Disulfide	µg/L			<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	Carbon Tetrachloride	µg/L	0.3 **[1]	5 *	<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	Chlorobenzene	µg/L		100 *	<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	Chloroethane	µg/L			<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	Chloroform	µg/L	7 **[1]	80 * THM	<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	0.46
	Chloromethane	µg/L			<0.50	<0.50	<0.50	<0.50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	cis-1,2-Dichloroethene	µg/L		70 *	<0.20	<0.20	<0.20	<0.20	NA	0.43	0.35	0.61	0.69	1.83

Table A-1. Groundwater Quality Monitoring Results, 2024

Analyte		Units	GWQS	MCL	MW-11 4/9/2024	(MW-11 Dup) 4/9/2024	MW-11 6/18/2024	MW-11 9/25/2024	MW-11 NA	MW-12 4/10/2024	MW-12 6/18/2024	MW-12 9/25/2024	MW-21 (MW-12 Dup) 9/25/2024	MW-12 12/4/2024
VOLATILE ORGANIC COMPOUNDS (Cont.)	cis-1,3-Dichloropropene	µg/L			<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	Dibromochloromethane	µg/L		80 * THM	<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	Dibromomethane	µg/L			<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	Ethylbenzene	µg/L		700 *	<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	Iodomethane	µg/L			<1.00	<1.00	<1.00	<1.00	NA	<1.00	<1.00	<1.00	<1.00	<1.00
	Methylene Chloride	µg/L	5 **[1]	5 *	<1.00	<1.00	<1.00	<1.00	NA	<1.00	<1.00	<1.00	<1.00	<1.00
	m,p-Xylene	µg/L			<0.40	<0.40	<0.40	<0.40	NA	<0.40	<0.40	<0.40	<0.40	<0.40
	o-Xylene	µg/L			<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	Styrene	µg/L		100 *	<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	Tetrachloroethene	µg/L	0.8 **[1]	5 *	<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	Toluene	µg/L		1000 *	<0.20	<0.20	<0.20	0.24	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	trans-1,2-Dichloroethene	µg/L		100 *	<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	trans-1,3-Dichloropropene	µg/L			<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	trans-1,4-Dichloro-2-butene	µg/L			<1.00	<1.00	<1.00	<1.00	NA	<1.00	<1.00	<1.00	<1.00	<1.00
	Trichloroethene	µg/L	3 **[1]	5 *	<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	Trichlorofluoromethane	µg/L			<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	0.23
	Vinyl Chloride	µg/L	0.02 **[1]	2 *	<0.20	<0.20	<0.20	<0.20	NA	<0.20	<0.20	<0.20	<0.20	<0.20
	Acrylonitrile	µg/L	0.07 ***		<1.00	<1.00	<1.00	<1.00	NA	<1.00	<1.00	<1.00	<1.00	<1.00
NATURAL ATTENUATION PARAMETERS	Ethane	µg/L			<1.23	<1.23	<1.23	2.04	NA	<1.23	<1.23	<1.12	<1.12	<1.12
	Ethene	µg/L			<1.14	<1.14	<1.14	10.8	NA	<1.14	<1.14	<1.14	<1.14	<1.14
	Methane	µg/L			<0.65	<0.65	<0.65	8.16	NA	<0.65	<0.65	<0.65	<0.65	<0.65
	Acetylene	µg/L			<1.06	<1.06	<1.06	<1.06	NA	<1.06	<1.06	<1.06	<1.06	<1.06

Notes:

GWQS = Water Quality Standards for Ground Waters of the State of Washington (WAC 173-200)
MCL = Maximum Contaminant Level, State Drinking Water Regulations (WAC 246-290)
* = Primary
** = Secondary
*** = Carcinogen
*THM = Primary MCL for the sum of all trihalomethanes
H = Estimated value; analyzed beyond specified holding time
B = Detected in reagent blank or trip blank
Bold = Does not meet GWQS or MCL
NA = Not analyzed

Table A-1. Groundwater Quality Monitoring Results, 2024

Analyte		Units	GWQS	MCL	Trip Blank 4/9/2024	Trip Blank 6/18/2024	Trip Blank 9/26/2024	Trip Blank 12/4/2024
FIELD DATA	pH	units	6.5-8.5		NA	NA	NA	NA
	Conductivity	µmhos/cm		700 **	NA	NA	NA	NA
	Temperature	C°			NA	NA	NA	NA
	Redox	mv			NA	NA	NA	NA
	Dissolved Oxygen	mg/L			NA	NA	NA	NA
	Turbidity	NTU			NA	NA	NA	NA
WATER QUALITY PARAMETERS	Nitrate-Nitrogen	mg/L	10 *	10 *	NA	NA	NA	NA
	Calcium, Dissolved	mg/L			NA	NA	NA	NA
	Sodium, Dissolved	mg/L			NA	NA	NA	NA
	Bicarbonate Alkalinity	mg/L as CaCO3			NA	NA	NA	NA
	Chloride	mg/L	250 **	250 **	NA	NA	NA	NA
	Magnesium, Dissolved	mg/L			NA	NA	NA	NA
	Potassium, Dissolved	mg/L			NA	NA	NA	NA
	Sulfate	mg/L	250 **	250 **	NA	NA	NA	NA
	Total Alkalinity	mg/L as CaCO3			NA	NA	NA	NA
	Iron, Dissolved	mg/L	0.30 **	0.30 **	NA	NA	NA	NA
	Manganese, Dissolved	mg/L	0.05 **	0.05 **	NA	NA	NA	NA
	Ammonia-Nitrogen	mg/L as N			NA	NA	NA	NA
	Total Organic Carbon	mg/L			NA	NA	NA	NA
	Total Dissolved Solids	mg/L	500 **	500 **	NA	NA	NA	NA
	Total Suspended Solids	mg/L			NA	NA	NA	NA
METALS	Antimony, Total	mg/L		6 *	NA	NA	NA	NA
	Arsenic, Total	mg/L	0.00005 ***†	0.01 *	NA	NA	NA	NA
	Barium, Total	mg/L	1 *	2 *	NA	NA	NA	NA
	Beryllium, Total	mg/L		0.004 *	NA	NA	NA	NA
	Cadmium, Total	mg/L	0.01 *	0.005 *	NA	NA	NA	NA
	Chromium, Total	mg/L	0.05 *	0.1 *	NA	NA	NA	NA
	Cobalt, Total	mg/L			NA	NA	NA	NA
	Copper, Total	mg/L	1 **		NA	NA	NA	NA
	Lead, Total	mg/L	0.05 *		NA	NA	NA	NA
	Nickel, Total	mg/L		0.1 *	NA	NA	NA	NA
	Selenium, Total	mg/L	0.01 *	0.05 *	NA	NA	NA	NA
	Silver, Total	mg/L	0.05 *	0.1 **	NA	NA	NA	NA
	Thallium, Total	mg/L		0.002 *	NA	NA	NA	NA
	Vanadium, Total	mg/L			NA	NA	NA	NA
	Zinc, Total	mg/L	5 **	5 **	NA	NA	NA	NA
VOLATILE ORGANIC COMPOUNDS	1,1,1,2-Tetrachloroethane	µg/L			<0.20	<0.20	<0.20	<0.20
	1,1,1-Trichloroethane	µg/L	200 *	200 *	<0.20	<0.20	<0.20	<0.20
	1,1,2,2-Tetrachloroethane	µg/L			<0.20	<0.20	<0.20	<0.20
	1,1,2-Trichloroethane	µg/L		5 *	<0.20	<0.20	<0.20	<0.20
	1,1-Dichloroethane	µg/L	1 ***		<0.20	<0.20	<0.20	<0.20
	Vinyl Acetate	µg/L			<0.20	<0.20	<0.20	<0.20
	1,1-Dichloroethene	µg/L		7 *	<0.20	<0.20	<0.20	<0.20
	2-Butanone	µg/L			<5.00	<5.00	<5.00	<5.00
	1,2,3-Trichloropropane	µg/L			<0.50	<0.50	<0.50	<0.50
	1,2-Dibromo-3-Chloropropane	µg/L		0.2 *	<0.50	<0.50	<0.50	<0.50
	1,2-Dibromoethane	µg/L	0.001 ***†	0.05 *	<0.20	<0.20	<0.20	<0.20
	1,2-Dichlorobenzene	µg/L		600 *	<0.20	<0.20	<0.20	<0.20
	1,2-Dichloroethane	µg/L	0.5 ***†	5 *	<0.20	<0.20	<0.20	<0.20
	1,2-Dichloropropane	µg/L	0.6 ***†	5 *	<0.20	<0.20	<0.20	<0.20
	1,4-Dichlorobenzene	µg/L	4 ***†	75 *	<0.20	<0.20	<0.20	<0.20
	2-Hexanone	µg/L			<5.00	<5.00	<5.00	<5.00
	4-Methyl-2-pentanone	µg/L			<5.00	<5.00	<5.00	<5.00
	Acetone	µg/L			<5.00	<5.00	<5.00	<5.00
	Benzene	µg/L	1 ***†	5 *	<0.20	<0.20	<0.20	<0.20
	Bromochloromethane	µg/L			<0.20	<0.20	<0.20	<0.20
	Bromodichloromethane	µg/L	0.3 ***†	80 * THM	<0.20	<0.20	<0.20	<0.20
	Bromoform	µg/L	5 ***†	80 * THM	<0.20	<0.20	<0.20	<0.20
	Bromomethane	µg/L			<1.00	<1.00	<1.00	<1.00
	Carbon Disulfide	µg/L			<0.20	<0.20	<0.20	<0.20
	Carbon Tetrachloride	µg/L	0.3 ***†	5 *	<0.20	<0.20	<0.20	<0.20
	Chlorobenzene	µg/L		100 *	<0.20	<0.20	<0.20	<0.20
	Chloroethane	µg/L			<0.20	<0.20	<0.20	<0.20
	Chloroform	µg/L	7 ***†	80 * THM	<0.20	2.17	<0.20	<0.20
	Chloromethane	µg/L			<0.50	<0.50	<0.50	<0.50
	cis-1,2-Dichloroethene	µg/L		70 *	<0.20	<0.20	<0.20	<0.20

Table A-1. Groundwater Quality Monitoring Results, 2024

Analyte		Units	GWQS	MCL	Trip Blank 4/9/2024	Trip Blank 6/18/2024	Trip Blank 9/26/2024	Trip Blank 12/4/2024
VOLATILE ORGANIC COMPOUNDS (Cont.)	cis-1,3-Dichloropropene	µg/L			<0.20	<0.20	<0.20	<0.20
	Dibromochloromethane	µg/L		80 * THM	<0.20	<0.20	<0.20	<0.20
	Dibromomethane	µg/L			<0.20	<0.20	<0.20	<0.20
	Ethylbenzene	µg/L		700 *	<0.20	<0.20	<0.20	<0.20
	Iodomethane	µg/L			<1.00	<1.00	<1.00	<1.00
	Methylene Chloride	µg/L	5 ***	5 *	<1.00	<1.00	<1.00	<1.00
	m,p-Xylene	µg/L			<0.40	<0.40	<0.40	<0.40
	o-Xylene	µg/L			<0.20	<0.20	<0.20	<0.20
	Styrene	µg/L		100 *	<0.20	<0.20	<0.20	<0.20
	Tetrachloroethene	µg/L	0.8 ***	5 *	<0.20	<0.20	<0.20	<0.20
	Toluene	µg/L		1000 *	<0.20	<0.20	<0.20	<0.20
	trans-1,2-Dichloroethene	µg/L		100 *	<0.20	<0.20	<0.20	<0.20
	trans-1,3-Dichloropropene	µg/L			<0.20	<0.20	<0.20	<0.20
	trans-1,4-Dichloro-2-butene	µg/L			<1.00	<1.00	<1.00	<1.00
	Trichloroethene	µg/L	3 ***	5 *	<0.20	<0.20	<0.20	<0.20
	Trichlorofluoromethane	µg/L			<0.20	<0.20	<0.20	<0.20
	Vinyl Chloride	µg/L	0.02 ***	2 *	<0.20	<0.20	<0.20	<0.20
	Acrylonitrile	µg/L	0.07 ***		<1.00	<1.00	<1.00	<1.00
NATURAL ATTENUATION PARAMETERS	Ethane	µg/L			NA	NA	<1.12	<1.12
	Ethene	µg/L			NA	NA	<1.14	<1.14
	Methane	µg/L			NA	NA	<0.65	<0.65
	Acetylene	µg/L			NA	NA	<1.06	<1.06

Notes:

GWQS = Water Quality Standards for Ground Waters of the State of Washington (WAC 173-200)
MCL = Maximum Contaminant Level, State Drinking Water Regulations (WAC 246-290)
* = Primary
** = Secondary
*** = Carcinogen
*THM = Primary MCL for the sum of all trihalomethanes
H = Estimated value; analyzed beyond specified holding time
B = Detected in reagent blank or trip blank
Bold = Does not meet GWQS or MCL
NA = Not analyzed

Table A-2. Leachate Pond Results, Horn Rapids Landfill, 2024

Analyte		Units	Leachate Pond 4/10/2024
FIELD DATA	pH	units	8.28
	Conductivity	µmhos/cm	4470
	Temperature	C°	16.9
	Redox	mv	-160.2
	Dissolved Oxygen	mg/L	0.15
	Turbidity	NTU	7.55
WATER QUALITY PARAMETERS	Ammonia-Nitrogen	mg/L as N	83.3
	Bicarbonate Alkalinity	mg/L as CaCO3	1390
	Total Alkalinity	mg/L as CaCO3	NA
	Total Dissolved Solids	mg/L	2740
	Total Suspended Solids	mg/L	10
	Total Organic Carbon	mg/L	148.6
	Chloride	mg/L	871
	Sulfate	mg/L	28.8
	Calcium, Total	mg/L	119
	Iron, Total	mg/L	0.862
	Magnesium, Total	mg/L	178
	Manganese, Total	mg/L	0.482
	Potassium, Total	mg/L	246
	Sodium, Total	mg/L	575
	Nitrate-Nitrogen	mg/L	<0.05
METALS	Arsenic, Total	mg/L	0.0192
	Cadmium, Total	mg/L	<0.000500
	Cobalt, Total	mg/L	0.00627
	Copper, Total	mg/L	<0.00250
	Nickel, Total	mg/L	0.0541
	Selenium, Total	mg/L	<0.00250
	Zinc, Total	mg/L	<0.0300
	Antimony, Total	mg/L	0.00136
	Barium, Total	mg/L	0.228
	Beryllium, Total	mg/L	<0.00100
	Chromium, Total	mg/L	0.00585
	Lead, Total	mg/L	<0.000500
	Silver, Total	mg/L	<0.00100
	Thallium, Total	mg/L	<0.00100
	Vanadium, Total	mg/L	0.00746
VOLATILE ORGANIC COMPOUNDS	Chloromethane	µg/L	<0.50
	Vinyl Chloride	µg/L	<0.20
	Bromomethane	µg/L	<1.00
	Chloroethane	µg/L	<0.20
	Trichlorofluoromethane	µg/L	<0.20
	Acetone	µg/L	42.8
	1,1-Dichloroethene	µg/L	<0.20
	Iodomethane	µg/L	<1.00
	Methylene Chloride	µg/L	<1.00
	Acrylonitrile	µg/L	<1.00
	Carbon Disulfide	µg/L	1.76
	trans-1,2-Dichloroethene	µg/L	<0.20
	Vinyl Acetate	µg/L	<0.20
	1,1-Dichloroethane	µg/L	<0.20
	2-Butanone	µg/L	18.8
	cis-1,2-Dichloroethene	µg/L	<0.20
	Chloroform	µg/L	<0.20
	Bromochloromethane	µg/L	<0.20

Table A-2. Leachate Pond Results, Horn Rapids Landfill, 2024

Analyte		Units	Leachate Pond 4/10/2024
VOLATILE ORGANIC COMPOUNDS (CONT.)	1,1,1-Trichloroethane	µg/L	<0.20
	Carbon Tetrachloride	µg/L	<0.20
	1,2-Dichloroethane	µg/L	<0.20
	Benzene	µg/L	<0.20
	Trichloroethene	µg/L	<0.20
	1,2-Dichloropropane	µg/L	<0.20
	Bromodichloromethane	µg/L	<0.20
	Dibromomethane	µg/L	<0.20
	4-Methyl-2-pentanone	µg/L	<5.00
	cis-1,3-Dichloropropene	µg/L	<0.20
	Toluene	µg/L	<0.20
	trans-1,3-Dichloropropene	µg/L	<0.20
	2-Hexanone	µg/L	<5.00
	1,1,2-Trichloroethane	µg/L	<0.20
	Tetrachloroethene	µg/L	<0.20
	Dibromochloromethane	µg/L	<0.20
	1,2-Dibromoethane	µg/L	<0.20
	Chlorobenzene	µg/L	<0.20
	Ethylbenzene	µg/L	<0.20
	1,1,1,2-Tetrachloroethane	µg/L	<0.20
	m,p-Xylene	µg/L	<0.40
	o-Xylene	µg/L	<0.20
	Styrene	µg/L	<0.20
	Bromoform	µg/L	<0.20
	1,1,2,2-Tetrachloroethane	µg/L	<0.20
	1,2,3-Trichloropropane	µg/L	<0.50
	trans-1,4-Dichloro-2-butene	µg/L	<1.00
	1,4-Dichlorobenzene	µg/L	<0.20
	1,2-Dichlorobenzene	µg/L	<0.20
	1,2-Dibromo-3-Chloropropane	µg/L	<0.50
	Total Xylenes	µg/L	- -
NATURAL ATTENUATION PA	Methane	µg/L	463
	Ethane	µg/L	<1.23
	Ethene	µg/L	<1.14
	Acetylene	µg/L	<1.06

Table A-3. Leachate Underdrain Results, Horn Rapids Landfill, 2024

Analyte		Units	Leachate Underdrain 4/10/2024
FIELD DATA	pH	units	NA
	Conductivity	µmhos/cm	NA
	Temperature	C°	NA
	Redox	mv	NA
	Dissolved Oxygen	mg/L	NA
WATER QUALITY PARAMETERS	Ammonia-Nitrogen	mg/L as N	NA
	Bicarbonate Alkalinity	mg/L as CaCO3	634
	Total Alkalinity	mg/L as CaCO3	NA
	Total Dissolved Solids	mg/L	1890
	Total Suspended Solids	mg/L	NA
	Total Organic Carbon	mg/L	NA
	Chloride	mg/L	715
	Sulfate	mg/L	20.5
	Calcium, Total	mg/L	67.5
	Iron, Total	mg/L	0.120
	Magnesium, Total	mg/L	98.5
	Manganese, Total	mg/L	0.0240
	Potassium, Total	mg/L	153
	Sodium, Total	mg/L	404
	Nitrate-Nitrogen	mg/L	NA
METALS	Arsenic, Total	mg/L	0.00471
	Cadmium, Total	mg/L	<0.000500
	Cobalt, Total	mg/L	0.00192
	Copper, Total	mg/L	0.00293
	Nickel, Total	mg/L	0.0360
	Selenium, Total	mg/L	0.00130
	Zinc, Total	mg/L	<0.0300
	Antimony, Total	mg/L	<0.00100
	Barium, Total	mg/L	0.143
	Beryllium, Total	mg/L	<0.00100
	Chromium, Total	mg/L	<0.00250
	Lead, Total	mg/L	<0.000500
	Silver, Total	mg/L	<0.00100
	Thallium, Total	mg/L	<0.00100
	Vanadium, Total	mg/L	0.00120
VOLATILE ORGANIC COMPOUNDS	Chloromethane	µg/L	<0.50
	Vinyl Chloride	µg/L	<0.20
	Bromomethane	µg/L	<1.00
	Chloroethane	µg/L	<0.20
	Trichlorofluoromethane	µg/L	<0.20
	Acetone	µg/L	6.23
	1,1-Dichloroethene	µg/L	<0.20
	Iodomethane	µg/L	<1.00
	Methylene Chloride	µg/L	<1.00
	Acrylonitrile	µg/L	<1.00
	Carbon Disulfide	µg/L	<0.20
	trans-1,2-Dichloroethene	µg/L	<0.20
	Vinyl Acetate	µg/L	<0.20
	1,1-Dichloroethane	µg/L	<0.20
	2-Butanone	µg/L	<5.00
	cis-1,2-Dichloroethene	µg/L	<0.20
	Chloroform	µg/L	<0.20
	Bromochloromethane	µg/L	<0.20
	1,1,1-Trichloroethane	µg/L	<0.20

Table A-3. Leachate Underdrain Results, Horn Rapids Landfill, 2024

Analyte		Units	Leachate Underdrain 4/10/2024
VOLATILE ORGANIC COMPOUNDS (CONT.)	Carbon Tetrachloride	µg/L	<0.20
	1,2-Dichloroethane	µg/L	<0.20
	Benzene	µg/L	<0.20
	Trichloroethene	µg/L	<0.20
	1,2-Dichloropropane	µg/L	<0.20
	Bromodichloromethane	µg/L	<0.20
	Dibromomethane	µg/L	<0.20
	4-Methyl-2-pentanone	µg/L	<5.00
	cis-1,3-Dichloropropene	µg/L	<0.20
	Toluene	µg/L	<0.20
	trans-1,3-Dichloropropene	µg/L	<0.20
	2-Hexanone	µg/L	<5.00
	1,1,2-Trichloroethane	µg/L	<0.20
	Tetrachloroethene	µg/L	<0.20
	Dibromochloromethane	µg/L	<0.20
	1,2-Dibromoethane	µg/L	<0.20
	Chlorobenzene	µg/L	<0.20
	Ethylbenzene	µg/L	<0.20
	1,1,1,2-Tetrachloroethane	µg/L	<0.20
	m,p-Xylene	µg/L	<0.40
	o-Xylene	µg/L	<0.20
	Styrene	µg/L	<0.20
	Bromoform	µg/L	<0.20
	1,1,2,2-Tetrachloroethane	µg/L	<0.20
	1,2,3-Trichloropropane	µg/L	<0.50
	trans-1,4-Dichloro-2-butene	µg/L	<1.00
	1,4-Dichlorobenzene	µg/L	<0.20
	1,2-Dichlorobenzene	µg/L	<0.20
	1,2-Dibromo-3-Chloropropane	µg/L	<0.50
NATURAL ATTENUATION PARAMETERS	Methane	µg/L	NA
	Ethane	µg/L	NA
	Ethene	µg/L	NA
	Acetylene	µg/L	NA

Appendix B

Fourth Quarter 2024 Laboratory Data Reports and Data Review Memorandum

Analytical Resources, LLC
Analytical Chemists and Consultants
Tukwila, WA

15 January 2025

Lisa Gilbert
Parametrix, Inc.
719 2nd Avenue, Suite 200
Seattle, WA 98104

RE: City of Richland Horn Rapids Landfill (555-3820-004)

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
24L0086	N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC

Phillip Bates, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006-012

Chain of Custody Record & Laboratory Analysis Request

AR Assigned Number: 24L0036	Turn-around Requested: 2 weeks	Date: 12/5/24	
AR Client Company: Parametrix	Phone: 206.394.3667	Page: 1 of 2	
Client Contact: Lisa Gilbert		No. of Coolers: 5	Cooler Temps: -2.0, -1.6, -2.4, -0.6, -1.2
Client Project Name: City of Richland Horn Rapids Landfill			
Client Project #: 555-3820-004	Samplers: Sally Nguyen		

Analytical Resources, LLC
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6202 (fax)

Sample ID	Date	Time	Matrix	No. Containers	VOCs (173-351 App1)	Alk/Bicarb	TDS/TSS	TOC, NH3	Chloride, SO4	Dissolved Metals	Total Metals	RSK 175	Notes/Comments
					Analysis Requested								D Metals=Fe,Mn,Ca,Na,K,Mg
MW-1	12/3	855	GW	18	✔	✔	✔	✔	✔	✔	✔	✔	MS/MSD VOC
MW-2	12/3	1615	GW	12	✔	✔	✔	✔	✔	✔	✔	✔	
MW-3	12/4	1105	GW	12	✔	✔	✔	✔	✔	✔	✔	✔	
MW-4	12/3	1508	GW	12	✔	✔	✔	✔	✔	✔	✔	✔	
MW-5	12/3	1230	GW	12	✔	✔	✔	✔	✔	✔	✔	✔	
MW-6	12/4	1010	GW	12	✔	✔	✔	✔	✔	✔	✔	✔	
MW-8	12/3	1420	GW	12	✔	✔	✔	✔	✔	✔	✔	✔	
MW-9	"	1325	GW	12	✔	✔	✔	✔	✔	✔	✔	✔	
MW-10	"	1130	GW	12	✔	✔	✔	✔	✔	✔	✔	✔	
~~MW-11~~ SN	—	—	GW	12	✔	✔	✔	✔	✔	✔	✔	✔	

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
TMetals=Sb,As,Ba,Be,Cd,Cr,Co,Cu,Pb,Ni,Se,Ag,Th,V,Zn	Printed Name: Sally Nguyen	Printed Name: Sydni Acevedo	Printed Name:	Printed Name:
	Company: Parametrix	Company: ARI	Company:	Company:
	Date & Time: 12/5/24 @ 0927	Date & Time: 12/05/24 0927	Date & Time:	Date & Time:

Limits of Liability: *Analytical Resources, LLC (AR) will perform all requested services in accordance with appropriate methodology following AR Standard Operating Procedures and the AR Quality Assurance Program. This program meets standards for the industry. The total liability of AR, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by AR release AR from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between AR and the Client.*

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to AR will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hard copy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Chain of Custody Record & Laboratory Analysis Request

AR Assigned Number: 24L0086	Turn-around Requested: 2 weeks	Date: 12/5/24	
AR Client Company:	Phone: 206.394.3667	Page: 2 of 2	
Client Contact: Lisa Gilbert		No. of Coolers:	Cooler Temps:
Client Project Name: City of Richland Horn Rapids Landfill			
Client Project #: 555-3820-004	Samplers: Sally Nguyen		

Analytical Resources, LLC
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6202 (fax)

Sample ID	Date	Time	Matrix	No. Containers	VOCs (173-351 App1)	Alk/Bicarb	TDS/TSS	TOC, NH3	Chloride, SO4	Dissolved Metals	Total Metals	RSK 175	Notes/Comments
					Analysis Requested								
MW-12	12/4	0855	GW	12	✓	✓	✓	✓	✓	✓	✓	✓	D Metals=Fe,Mn,Ca,Na,K,Mg
MW-21	↓	1040	GW	12	✓	✓	✓	✓	✓	✓	✓	✓	

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
TMetals=Sb,As,Ba,Be,Cd,Cr,Co,Cu,Pb,Ni,Se,Ag,Th,V,Zn	Printed Name: Sally Nguyen	Printed Name: Sydni Acevedo	Printed Name:	Printed Name:
	Company: Parametrix	Company: ARI	Company:	Company:
	Date & Time: 12/5/24 @0927	Date & Time: 12/05/24 0927	Date & Time:	Date & Time:

Limits of Liability: *Analytical Resources, LLC (AR) will perform all requested services in accordance with appropriate methodology following AR Standard Operating Procedures and the AR Quality Assurance Program. This program meets standards for the industry. The total liability of AR, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by AR release AR from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between AR and the Client.*

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to AR will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hard copy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	24L0086-01	Water	03-Dec-2024 08:55	05-Dec-2024 09:27
MW-1	24L0086-02	Water	03-Dec-2024 08:55	05-Dec-2024 09:27
MW-2	24L0086-03	Water	03-Dec-2024 16:15	05-Dec-2024 09:27
MW-2	24L0086-04	Water	03-Dec-2024 16:15	05-Dec-2024 09:27
MW-3	24L0086-05	Water	04-Dec-2024 11:05	05-Dec-2024 09:27
MW-3	24L0086-06	Water	04-Dec-2024 11:05	05-Dec-2024 09:27
MW-4	24L0086-07	Water	03-Dec-2024 15:08	05-Dec-2024 09:27
MW-4	24L0086-08	Water	03-Dec-2024 15:08	05-Dec-2024 09:27
MW-5	24L0086-09	Water	03-Dec-2024 12:30	05-Dec-2024 09:27
MW-5	24L0086-10	Water	03-Dec-2024 12:30	05-Dec-2024 09:27
MW-6	24L0086-11	Water	04-Dec-2024 10:10	05-Dec-2024 09:27
MW-6	24L0086-12	Water	04-Dec-2024 10:10	05-Dec-2024 09:27
MW-8	24L0086-13	Water	03-Dec-2024 14:20	05-Dec-2024 09:27
MW-8	24L0086-14	Water	03-Dec-2024 14:20	05-Dec-2024 09:27
MW-9	24L0086-15	Water	03-Dec-2024 13:25	05-Dec-2024 09:27
MW-9	24L0086-16	Water	03-Dec-2024 13:25	05-Dec-2024 09:27
MW-10	24L0086-17	Water	03-Dec-2024 11:30	05-Dec-2024 09:27
MW-10	24L0086-18	Water	03-Dec-2024 11:30	05-Dec-2024 09:27
MW-12	24L0086-19	Water	04-Dec-2024 08:55	05-Dec-2024 09:27
MW-12	24L0086-20	Water	04-Dec-2024 08:55	05-Dec-2024 09:27
MW-21	24L0086-21	Water	04-Dec-2024 10:40	05-Dec-2024 09:27
MW-21	24L0086-22	Water	04-Dec-2024 10:40	05-Dec-2024 09:27
Trip Blank	24L0086-23	Water	03-Dec-2024 08:55	05-Dec-2024 09:27

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Work Order Case Narrative

Client: Parametrix, Inc.
Project: City of Richland Horn Rapids Landfill
Project Number: 555-3820-004
Work Order: 24L0086

Sample receipt

Sample(s) as listed on the preceding page were received 05-Dec-2024 09:27 under ARI work order 24L0086. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Volatiles - EPA Method SW8260D

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements with allowed exceedances. The "Q"-flagged analytes on the summary forms all had high recoveries in the ICV.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and relative percent difference (RPD) were within advisory control limits.

Volatile Gases - AMEE by RSK175

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and relative percent difference (RPD) were within advisory control limits.

Total Metals - EPA Method 200.8

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits except for the barium blank. As all sample results were more than 10x the concentration of the contamination, no further action was taken. The associated data has been "B"-flagged.

The blank spike (BS/LCS) percent recoveries were within control limits.

The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and the duplicate relative percent difference (RPD) were within advisory control limits.

Dissolved Metals - EPA Method 6010D

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations including interference checks were within method requirements for reported elements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Wet Chemistry

The sample(s) were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The reference material (SRM) percent recoveries were within control limits.

The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and the duplicate relative percent difference (RPD) were within advisory control limits except for chloride and sulfate. Due to the high natural concentration of the spiked analytes, an accurate recovery of the analytes was not possible.

WORK ORDER

24L0086

Samples will be discarded 90 days after submission of a final report unless other instructions are received

Client: Parametrix, Inc. **Project Manager:** Phillip Bates

Project: City of Richland Horn Rapids Landfill **Project Number:** 555-3820-004

Preservation Confirmation

Container ID	Container Type	pH	
24L0086-01 A	HDPE NM, 1000 mL		
24L0086-01 B	HDPE NM, 1000 mL		
24L0086-01 C	HDPE NM, 500 mL		
24L0086-01 D	HDPE NM, 500 mL		
24L0086-01 E	HDPE NM, 500 mL, 1:1 HNO3	<2	P
24L0086-01 F	Glass NM, Amber, 500 mL, 9N H2SO4	<2	P
24L0086-01 G	VOA Vial, Clear, 40 mL, HCL		
24L0086-01 H	VOA Vial, Clear, 40 mL, HCL		
24L0086-01 I	VOA Vial, Clear, 40 mL, HCL		
24L0086-01 J	VOA Vial, Clear, 40 mL, HCL		
24L0086-01 K	VOA Vial, Clear, 40 mL, HCL		
24L0086-01 L	VOA Vial, Clear, 40 mL, HCL		
24L0086-01 M	VOA Vial, Clear, 40 mL, HCL		
24L0086-01 N	VOA Vial, Clear, 40 mL, HCL		
24L0086-01 O	VOA Vial, Clear, 40 mL, HCL		
24L0086-01 P	VOA Vial, Clear, 40 mL, HCL		
24L0086-01 Q	VOA Vial, Clear, 40 mL, HCL		
24L0086-02 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	P
24L0086-03 A	HDPE NM, 1000 mL		
24L0086-03 B	HDPE NM, 1000 mL		
24L0086-03 C	HDPE NM, 500 mL		
24L0086-03 D	HDPE NM, 500 mL		
24L0086-03 E	HDPE NM, 500 mL, 1:1 HNO3	<2	P
24L0086-03 F	Glass NM, Amber, 500 mL, 9N H2SO4	<2	P
24L0086-03 G	VOA Vial, Clear, 40 mL, HCL		
24L0086-03 H	VOA Vial, Clear, 40 mL, HCL		
24L0086-03 I	VOA Vial, Clear, 40 mL, HCL		
24L0086-03 J	VOA Vial, Clear, 40 mL, HCL		
24L0086-03 K	VOA Vial, Clear, 40 mL, HCL		
24L0086-04 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	P
24L0086-05 A	HDPE NM, 1000 mL		
24L0086-05 B	HDPE NM, 1000 mL		
24L0086-05 C	HDPE NM, 500 mL		
24L0086-05 D	HDPE NM, 500 mL		

Reviewed By Date

WORK ORDER

24L0086

Samples will be discarded 90 days after submission of a final report unless other instructions are received

Client: Parametrix, Inc. **Project Manager: Phillip Bates**

Project: City of Richland Horn Rapids Landfill **Project Number: 555-3820-004**

24L0086-05 E	HDPE NM, 500 mL, 1:1 HNO3	L2	P
24L0086-05 F	Glass NM, Amber, 500 mL, 9N H2SO4	L2	P
24L0086-05 G	VOA Vial, Clear, 40 mL, HCL		
24L0086-05 H	VOA Vial, Clear, 40 mL, HCL		
24L0086-05 I	VOA Vial, Clear, 40 mL, HCL		
24L0086-05 J	VOA Vial, Clear, 40 mL, HCL		
24L0086-05 K	VOA Vial, Clear, 40 mL, HCL		
24L0086-06 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	L2	P
24L0086-07 A	HDPE NM, 1000 mL		
24L0086-07 B	HDPE NM, 1000 mL		
24L0086-07 C	HDPE NM, 500 mL		
24L0086-07 D	HDPE NM, 500 mL		
24L0086-07 E	HDPE NM, 500 mL, 1:1 HNO3	L2	P
24L0086-07 F	Glass NM, Amber, 500 mL, 9N H2SO4	L2	P
24L0086-07 G	VOA Vial, Clear, 40 mL, HCL		
24L0086-07 H	VOA Vial, Clear, 40 mL, HCL		
24L0086-07 I	VOA Vial, Clear, 40 mL, HCL		
24L0086-07 J	VOA Vial, Clear, 40 mL, HCL		
24L0086-07 K	VOA Vial, Clear, 40 mL, HCL		
24L0086-08 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	L2	P
24L0086-09 A	HDPE NM, 1000 mL		
24L0086-09 B	HDPE NM, 1000 mL		
24L0086-09 C	HDPE NM, 500 mL		
24L0086-09 D	HDPE NM, 500 mL		
24L0086-09 E	HDPE NM, 500 mL, 1:1 HNO3	L2	P
24L0086-09 F	Glass NM, Amber, 500 mL, 9N H2SO4	L2	P
24L0086-09 G	VOA Vial, Clear, 40 mL, HCL		
24L0086-09 H	VOA Vial, Clear, 40 mL, HCL		
24L0086-09 I	VOA Vial, Clear, 40 mL, HCL		
24L0086-09 J	VOA Vial, Clear, 40 mL, HCL		
24L0086-09 K	VOA Vial, Clear, 40 mL, HCL		
24L0086-10 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	L2	P
24L0086-11 A	HDPE NM, 1000 mL		
24L0086-11 B	HDPE NM, 1000 mL		
24L0086-11 C	HDPE NM, 500 mL		
24L0086-11 D	HDPE NM, 500 mL		

Reviewed By Date

WORK ORDER

24L0086

Samples will be discarded 90 days after submission of a final report unless other instructions are received

Client: Parametrix, Inc. **Project Manager: Phillip Bates**

Project: City of Richland Horn Rapids Landfill **Project Number: 555-3820-004**

24L0086-11 E	HDPE NM, 500 mL, 1:1 HNO3	C2P
24L0086-11 F	Glass NM, Amber, 500 mL, 9N H2SO4	C2 P
24L0086-11 G	VOA Vial, Clear, 40 mL, HCL	
24L0086-11 H	VOA Vial, Clear, 40 mL, HCL	
24L0086-11 I	VOA Vial, Clear, 40 mL, HCL	
24L0086-11 J	VOA Vial, Clear, 40 mL, HCL	
24L0086-11 K	VOA Vial, Clear, 40 mL, HCL	
24L0086-12 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	C2 P
24L0086-13 A	HDPE NM, 1000 mL	
24L0086-13 B	HDPE NM, 1000 mL	
24L0086-13 C	HDPE NM, 500 mL	
24L0086-13 D	HDPE NM, 500 mL	
24L0086-13 E	HDPE NM, 500 mL, 1:1 HNO3	C2 P
24L0086-13 F	Glass NM, Amber, 500 mL, 9N H2SO4	C2 P
24L0086-13 G	VOA Vial, Clear, 40 mL, HCL	
24L0086-13 H	VOA Vial, Clear, 40 mL, HCL	
24L0086-13 I	VOA Vial, Clear, 40 mL, HCL	
24L0086-13 J	VOA Vial, Clear, 40 mL, HCL	
24L0086-13 K	VOA Vial, Clear, 40 mL, HCL	
24L0086-14 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	C2 P
24L0086-15 A	HDPE NM, 1000 mL	
24L0086-15 B	HDPE NM, 1000 mL	
24L0086-15 C	HDPE NM, 500 mL	
24L0086-15 D	HDPE NM, 500 mL	
24L0086-15 E	HDPE NM, 500 mL, 1:1 HNO3	C2 P
24L0086-15 F	Glass NM, Amber, 500 mL, 9N H2SO4	C2 P
24L0086-15 G	VOA Vial, Clear, 40 mL, HCL	
24L0086-15 H	VOA Vial, Clear, 40 mL, HCL	
24L0086-15 I	VOA Vial, Clear, 40 mL, HCL	
24L0086-15 J	VOA Vial, Clear, 40 mL, HCL	
24L0086-15 K	VOA Vial, Clear, 40 mL, HCL	
24L0086-16 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	C2 P
24L0086-17 A	HDPE NM, 1000 mL	
24L0086-17 B	HDPE NM, 1000 mL	
24L0086-17 C	HDPE NM, 500 mL	
24L0086-17 D	HDPE NM, 500 mL	

Reviewed By Date

WORK ORDER

24L0086

Samples will be discarded 90 days after submission of a final report unless other instructions are received

Client: Parametrix, Inc. **Project Manager: Phillip Bates**

Project: City of Richland Horn Rapids Landfill **Project Number: 555-3820-004**

24L0086-17 E	HDPE NM, 500 mL, 1:1 HNO3	C2 P
24L0086-17 F	Glass NM, Amber, 500 mL, 9N H2SO4	C2 P
24L0086-17 G	VOA Vial, Clear, 40 mL, HCL	
24L0086-17 H	VOA Vial, Clear, 40 mL, HCL	
24L0086-17 I	VOA Vial, Clear, 40 mL, HCL	
24L0086-17 J	VOA Vial, Clear, 40 mL, HCL	
24L0086-17 K	VOA Vial, Clear, 40 mL, HCL	
24L0086-18 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	C2 P
24L0086-19 A	HDPE NM, 1000 mL	
24L0086-19 B	HDPE NM, 1000 mL	
24L0086-19 C	HDPE NM, 500 mL	
24L0086-19 D	HDPE NM, 500 mL	
24L0086-19 E	HDPE NM, 500 mL, 1:1 HNO3	C2 P
24L0086-19 F	Glass NM, Amber, 500 mL, 9N H2SO4	C2 P
24L0086-19 G	VOA Vial, Clear, 40 mL, HCL	
24L0086-19 H	VOA Vial, Clear, 40 mL, HCL	
24L0086-19 I	VOA Vial, Clear, 40 mL, HCL	
24L0086-19 J	VOA Vial, Clear, 40 mL, HCL	
24L0086-19 K	VOA Vial, Clear, 40 mL, HCL	
24L0086-20 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	C2 P
24L0086-21 A	HDPE NM, 1000 mL	
24L0086-21 B	HDPE NM, 1000 mL	
24L0086-21 C	HDPE NM, 500 mL	
24L0086-21 D	HDPE NM, 500 mL	
24L0086-21 E	HDPE NM, 500 mL, 1:1 HNO3	C2 P
24L0086-21 F	Glass NM, Amber, 500 mL, 9N H2SO4	C2 P
24L0086-21 G	VOA Vial, Clear, 40 mL, HCL	
24L0086-21 H	VOA Vial, Clear, 40 mL, HCL	
24L0086-21 I	VOA Vial, Clear, 40 mL, HCL	
24L0086-21 J	VOA Vial, Clear, 40 mL, HCL	
24L0086-21 K	VOA Vial, Clear, 40 mL, HCL	
24L0086-22 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	C2 P
24L0086-23 A	VOA Vial, Clear, 40 mL, HCL	
24L0086-23 B	VOA Vial, Clear, 40 mL, HCL	
24L0086-23 C	VOA Vial, Clear, 40 mL, HCL	
24L0086-23 D	VOA Vial, Clear, 40 mL, HCL	

Reviewed By _____ Date _____

WORK ORDER

24L0086

Samples will be discarded 90 days after submission of a final report unless other instructions are received

Client: Parametrix, Inc. **Project Manager: Phillip Bates**

Project: City of Richland Horn Rapids Landfill **Project Number: 555-3820-004**

Preservation Confirmed By

12/5/24
Date

Reviewed By

Date

Analytical Resources, LLC
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Parametrix Project Name: Richland Horn Rapids

COC No(s): NA Delivered by: Fed-Ex UPS Courier Hand Delivered Other:

Assigned ARI Job No: 24L0086 Tracking No: NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? YES NO

Were custody papers included with the cooler? YES NO

Were custody papers properly filled out (ink, signed, etc.) YES NO

Temperature of Cooler(s) (°C) Time 0927 -2.0 -1.6 -2.4 -0.6 -1.2 Temp Gun ID#: 8117

Was a temperature blank included in the cooler? YES NO

Were coolers received between 0°- 6° (°C) YES NO

Was sufficient ice used (if appropriate)? NA YES NO

Cooler Accepted by: SA Date: 12/05/24 Time: 0927

Complete custody forms and attach all shipping documents

Log-In Phase:

What kind of packing material was used? Bubble Wrap Wet Ice Gel Packs Baggies Foam Block N/A Other:

Are any samples that were out of temperature compliance documented in LIMS? YES NO

How were bottles sealed in plastic bags? Individually Grouped Not

Did all bottles arrive in good condition (unbroken)? YES NO

Were all bottle labels complete and legible? YES NO

Did the number of containers listed on COC match with the number of containers received? YES NO

Did all bottle labels and tags agree with custody papers? YES NO

Were all bottles used correct for the requested analyses? YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) NA YES NO

Were all VOC vials free of air bubbles? NA YES NO 12/5/24

Was sufficient amount of sample sent in each bottle? YES NO

Date VOC Trip Blank was made at ARI NA 11/25/24

Were the sample(s) split by ARI? NA YES Date/Time: Equipment: Split by:

Samples Logged by: Date: 12/5/24 Time: 1446 Labels checked by:

** *Notify Project Manager of discrepancies or concerns* **

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-1

24L0086-01 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/03/2024 08:55
Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 13:26

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-01 G
Preparation Batch: BML0140 — Sample Size: 10 mL
Prepared: 12/06/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	0.21	ug/L	
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U

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MW-1

24L0086-01 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/03/2024 08:55

Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 13:26

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Tetrachloroethene	127-18-4	1	0.20	4.07	ug/L	
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*114*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*98.9*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*94.3*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*97.7*	*%*	

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MW-1

24L0086-01 (Water)

Dissolved Gases

Method: EPA RSK-175 — Sampled: 12/03/2024 08:55
Instrument: FID6 Analyst: PKC — Analyzed: 12/09/2024 12:14

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-01 J
Preparation Batch: BML0194 — Sample Size: 10 mL
Prepared: 12/09/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Acetylene	74-86-2	1	1.06	ND	ug/L	U
Methane	74-82-8	1	0.65	ND	ug/L	U
Ethane	74-84-0	1	1.12	ND	ug/L	U
Ethene	74-85-1	1	1.14	ND	ug/L	U
Surrogate: Propane			*62-122 %*	*110*	*%*	

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MW-1

24L0086-01 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/03/2024 08:55
Instrument: ICPMS1 Analyst: HAL — Analyzed: 01/06/2025 20:19

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-01 E 01
Preparation Batch: BML0179 — Sample Size: 25 mL
Prepared: 12/08/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic UCT	7440-38-2	5	0.00100	0.00390	mg/L	D
Barium	7440-39-3	5	0.00250	0.0403	mg/L	D, B
Beryllium	7440-41-7	5	0.00100	ND	mg/L	U
Cadmium UCT	7440-43-9	5	0.000500	ND	mg/L	U
Cobalt UCT	7440-48-4	5	0.00100	0.0102	mg/L	D
Copper UCT	7440-50-8	5	0.00250	ND	mg/L	U
Lead	7439-92-1	5	0.00100	ND	mg/L	U
Nickel UCT	7440-02-0	5	0.00250	ND	mg/L	U
Selenium UCT	7782-49-2	5	0.00500	ND	mg/L	U
Silver	7440-22-4	5	0.00100	ND	mg/L	U
Thallium	7440-28-0	5	0.00100	ND	mg/L	U
Zinc UCT	7440-66-6	5	0.0300	ND	mg/L	U

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Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-1

24L0086-01 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 12/03/2024 08:55
Instrument: LACHAT1 Analyst: CB — Analyzed: 12/10/2024 16:18

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-01 F
Preparation Batch: BML0217 — Sample Size: 10 mL
Prepared: 12/10/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-1

24L0086-01 (Water)

Wet Chemistry

Method: SM 2320 B-11 — Sampled: 12/03/2024 08:55

Instrument: Accumet AB150 Analyst: UW — Analyzed: 12/11/2024 13:00

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-01 D

Preparation Batch: BML0243 — Sample Size: 100 mL

Prepared: 12/11/2024 — Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	260	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	260	mg/L CaCO3	

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MW-1

24L0086-01 (Water)

Wet Chemistry

Method: SM 2540 C-11 — Sampled: 12/03/2024 08:55

Instrument: BAL2 Analyst: VD — Analyzed: 12/10/2024 15:54

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-01

Preparation Batch: BML0211 — Sample Size: 100 mL

Prepared: 12/10/2024 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	420	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-1

24L0086-01 (Water)

Wet Chemistry

Method: SM 2540 D-11 — Sampled: 12/03/2024 08:55
Instrument: BAL2 Analyst: LM — Analyzed: 12/06/2024 11:26

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-01
Preparation Batch: BML0150 — Sample Size: 300 mL
Prepared: 12/06/2024 — Final Volume: 1000 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Suspended Solids		1	3	3	10	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-1

24L0086-01 (Water)

Wet Chemistry

Method: SM 5310 B-11 — Sampled: 12/03/2024 08:55
Instrument: TOC-LCSH Analyst: RMS — Analyzed: 12/30/2024 09:18

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-01 F
Preparation Batch: BML0576 — Sample Size: 20 mL
Prepared: 12/30/2024 — Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	1.37	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-1

24L0086-01RE1 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/03/2024 08:55

Instrument: ICPMS2 Analyst: MCB — Analyzed: 01/09/2025 17:13

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-01RE1 E 02

Preparation Batch: BNA0112 — Sample Size: 25 mL

Prepared: 01/08/2025 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	5	0.00100	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-1

24L0086-01RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 12/03/2024 08:55
Instrument: IC930 Analyst: LERB — Analyzed: 12/11/2024 10:40

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-01RE1 C
Preparation Batch: BML0223 — Sample Size: 10 mL
Prepared: 12/10/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	10	1.00	1.00	18.9	mg/L	D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	10	1.00	1.00	40.9	mg/L	D

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-1

24L0086-01RE2 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/03/2024 08:55
Instrument: ICPMS2 Analyst: MCB — Analyzed: 01/08/2025 22:05

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-01RE2 E 01
Preparation Batch: BML0179 — Sample Size: 25 mL
Prepared: 12/08/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chromium	7440-47-3	10	0.00500	ND	mg/L	U
Vanadium	7440-62-2	10	0.00200	0.00710	mg/L	D

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Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-1

24L0086-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010D — Sampled: 12/03/2024 08:55
Instrument: ICP3 Analyst: SH — Analyzed: 12/24/2024 01:56

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 24L0086-02 A 01
Preparation Batch: BML0176 — Sample Size: 25 mL
Prepared: 12/07/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0500	93.2	mg/L	
Iron, Dissolved	7439-89-6	1	0.0500	ND	mg/L	U
Magnesium, Dissolved	7439-95-4	1	0.0500	18.3	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0040	ND	mg/L	U
Potassium, Dissolved	7440-09-7	1	0.500	7.50	mg/L	
Sodium, Dissolved	7440-23-5	1	0.500	21.7	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-2

24L0086-03 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/03/2024 16:15
Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 13:49

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-03 G
Preparation Batch: BML0140 — Sample Size: 10 mL
Prepared: 12/06/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-2

24L0086-03 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/03/2024 16:15

Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 13:49

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*112*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*98.4*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*91.4*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*99.9*	*%*	

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Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-2

24L0086-03 (Water)

Dissolved Gases

Method: EPA RSK-175 — Sampled: 12/03/2024 16:15
Instrument: FID6 Analyst: MN — Analyzed: 12/06/2024 19:34

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-03 J
Preparation Batch: BML0155 — Sample Size: 10 mL
Prepared: 12/06/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Acetylene	74-86-2	1	1.06	ND	ug/L	U
Methane	74-82-8	1	0.65	ND	ug/L	U
Ethane	74-84-0	1	1.12	ND	ug/L	U
Ethene	74-85-1	1	1.14	ND	ug/L	U
Surrogate: Propane			*62-122 %*	*107*	*%*	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-2

24L0086-03 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/03/2024 16:15
Instrument: ICPMS1 Analyst: HAL — Analyzed: 01/06/2025 21:10

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-03 E 02
Preparation Batch: BML0179 — Sample Size: 25 mL
Prepared: 12/08/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic UCT	7440-38-2	5	0.00100	0.00332	mg/L	D
Barium	7440-39-3	5	0.00250	0.0390	mg/L	D, B
Beryllium	7440-41-7	5	0.00100	ND	mg/L	U
Cadmium UCT	7440-43-9	5	0.000500	ND	mg/L	U
Chromium	7440-47-3	5	0.00250	0.00544	mg/L	D
Cobalt UCT	7440-48-4	5	0.00100	ND	mg/L	U
Copper UCT	7440-50-8	5	0.00250	ND	mg/L	U
Lead	7439-92-1	5	0.000500	ND	mg/L	U
Nickel UCT	7440-02-0	5	0.00250	0.00422	mg/L	D
Selenium UCT	7782-49-2	5	0.00250	ND	mg/L	U
Silver	7440-22-4	5	0.00100	ND	mg/L	U
Thallium	7440-28-0	5	0.00100	ND	mg/L	U
Vanadium	7440-62-2	5	0.00100	0.00769	mg/L	D
Zinc UCT	7440-66-6	5	0.0300	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-2

24L0086-03 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 12/03/2024 16:15
Instrument: LACHAT1 Analyst: CB — Analyzed: 12/10/2024 16:45

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-03 F
Preparation Batch: BML0217 — Sample Size: 10 mL
Prepared: 12/10/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-2

24L0086-03 (Water)

Wet Chemistry

Method: SM 2320 B-11 — Sampled: 12/03/2024 16:15

Instrument: Accumet AB150 Analyst: UW — Analyzed: 12/11/2024 13:00

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-03 D

Preparation Batch: BML0243 — Sample Size: 100 mL

Prepared: 12/11/2024 — Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	122	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	122	mg/L CaCO3	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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MW-2

24L0086-03 (Water)

Wet Chemistry

Method: SM 2540 C-11 — Sampled: 12/03/2024 16:15
Instrument: BAL2 Analyst: VD — Analyzed: 12/10/2024 15:54

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-03
Preparation Batch: BML0211 — Sample Size: 100 mL
Prepared: 12/10/2024 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	416	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
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MW-2

24L0086-03 (Water)

Wet Chemistry

Method: SM 2540 D-11 — Sampled: 12/03/2024 16:15

Instrument: BAL2 Analyst: LM — Analyzed: 12/06/2024 11:26

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-03

Preparation Batch: BML0150 — Sample Size: 1010 mL

Prepared: 12/06/2024 — Final Volume: 1000 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Suspended Solids		1	1	1	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-2

24L0086-03 (Water)

Wet Chemistry

Method: SM 5310 B-11 — Sampled: 12/03/2024 16:15
Instrument: TOC-LCSH Analyst: RMS — Analyzed: 12/30/2024 10:43

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-03 F
Preparation Batch: BML0576 — Sample Size: 20 mL
Prepared: 12/30/2024 — Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	1.26	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-2

24L0086-03RE1 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/03/2024 16:15

Instrument: ICPMS2 Analyst: MCB — Analyzed: 01/09/2025 17:12

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-03RE1 E 02

Preparation Batch: BNA0112 — Sample Size: 25 mL

Prepared: 01/08/2025 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	5	0.00100	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-2

24L0086-03RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 12/03/2024 16:15
Instrument: IC930 Analyst: LERB — Analyzed: 12/11/2024 11:59

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-03RE1 C
Preparation Batch: BML0223 — Sample Size: 10 mL
Prepared: 12/10/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	18	1.80	1.80	26.4	mg/L	D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	18	1.80	1.80	71.2	mg/L	D

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-2

24L0086-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010D — Sampled: 12/03/2024 16:15

Instrument: ICP3 Analyst: SH — Analyzed: 12/24/2024 02:22

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 24L0086-04 A 01

Preparation Batch: BML0176 — Sample Size: 25 mL

Prepared: 12/07/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0500	83.2	mg/L	
Iron, Dissolved	7439-89-6	1	0.0500	ND	mg/L	U
Magnesium, Dissolved	7439-95-4	1	0.0500	17.6	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0040	ND	mg/L	U
Potassium, Dissolved	7440-09-7	1	0.500	6.86	mg/L	
Sodium, Dissolved	7440-23-5	1	0.500	15.7	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-3

24L0086-05 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/04/2024 11:05
Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 14:12

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-05 G
Preparation Batch: BML0140 — Sample Size: 10 mL
Prepared: 12/06/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	6.82	ug/L	
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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MW-3

24L0086-05 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/04/2024 11:05

Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 14:12

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*113*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*98.9*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*94.1*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*99.2*	*%*	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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MW-3

24L0086-05 (Water)

Dissolved Gases

Method: EPA RSK-175 — Sampled: 12/04/2024 11:05
Instrument: FID6 Analyst: MN — Analyzed: 12/06/2024 19:47

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-05 I
Preparation Batch: BML0155 — Sample Size: 10 mL
Prepared: 12/06/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Acetylene	74-86-2	1	1.06	ND	ug/L	U
Methane	74-82-8	1	0.65	ND	ug/L	U
Ethane	74-84-0	1	1.12	ND	ug/L	U
Ethene	74-85-1	1	1.14	ND	ug/L	U
Surrogate: Propane			*62-122 %*	*102*	*%*	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-3

24L0086-05 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/04/2024 11:05
Instrument: ICPMS1 Analyst: HAL — Analyzed: 01/06/2025 21:15

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-05 E 02
Preparation Batch: BML0179 — Sample Size: 25 mL
Prepared: 12/08/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic UCT	7440-38-2	5	0.00100	0.00904	mg/L	D
Barium	7440-39-3	5	0.00250	0.0176	mg/L	D, B
Beryllium	7440-41-7	5	0.00100	ND	mg/L	U
Cadmium UCT	7440-43-9	5	0.000500	ND	mg/L	U
Chromium	7440-47-3	5	0.00250	ND	mg/L	U
Cobalt UCT	7440-48-4	5	0.00100	ND	mg/L	U
Copper UCT	7440-50-8	5	0.00250	ND	mg/L	U
Lead	7439-92-1	5	0.000500	ND	mg/L	U
Nickel UCT	7440-02-0	5	0.00250	ND	mg/L	U
Selenium UCT	7782-49-2	5	0.00250	ND	mg/L	U
Silver	7440-22-4	5	0.00100	ND	mg/L	U
Thallium	7440-28-0	5	0.00100	ND	mg/L	U
Vanadium	7440-62-2	5	0.00100	0.0132	mg/L	D
Zinc UCT	7440-66-6	5	0.0300	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-3

24L0086-05 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 12/04/2024 11:05
Instrument: LACHAT1 Analyst: CB — Analyzed: 12/10/2024 16:46

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-05 F
Preparation Batch: BML0217 — Sample Size: 10 mL
Prepared: 12/10/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-3

24L0086-05 (Water)

Wet Chemistry

Method: SM 2320 B-11 — Sampled: 12/04/2024 11:05
Instrument: Accumet AB150 Analyst: UW — Analyzed: 12/11/2024 13:00

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-05 C
Preparation Batch: BML0243 — Sample Size: 100 mL
Prepared: 12/11/2024 — Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	103	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	103	mg/L CaCO3	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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MW-3

24L0086-05 (Water)

Wet Chemistry

Method: SM 2540 C-11 — Sampled: 12/04/2024 11:05

Instrument: BAL2 Analyst: VD — Analyzed: 12/10/2024 15:54

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-05

Preparation Batch: BML0211 — Sample Size: 200 mL

Prepared: 12/10/2024 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	196	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
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MW-3

24L0086-05 (Water)

Wet Chemistry

Method: SM 2540 D-11 — Sampled: 12/04/2024 11:05

Instrument: BAL2 Analyst: LM — Analyzed: 12/06/2024 11:26

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-05

Preparation Batch: BML0150 — Sample Size: 990 mL

Prepared: 12/06/2024 — Final Volume: 1000 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Suspended Solids		1	1	1	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-3

24L0086-05 (Water)

Wet Chemistry

Method: SM 5310 B-11 — Sampled: 12/04/2024 11:05
Instrument: TOC-LCSH Analyst: RMS — Analyzed: 12/30/2024 11:00

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-05 F
Preparation Batch: BML0576 — Sample Size: 20 mL
Prepared: 12/30/2024 — Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	0.87	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
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MW-3

24L0086-05RE1 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/04/2024 11:05

Instrument: ICPMS2 Analyst: MCB — Analyzed: 01/09/2025 17:54

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-05RE1 E 02

Preparation Batch: BNA0112 — Sample Size: 25 mL

Prepared: 01/08/2025 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	5	0.00100	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-3

24L0086-05RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 12/04/2024 11:05
Instrument: IC930 Analyst: LERB — Analyzed: 12/11/2024 12:18

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-05RE1 D
Preparation Batch: BML0223 — Sample Size: 10 mL
Prepared: 12/10/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	6	0.600	0.600	11.8	mg/L	D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	6	0.600	0.600	27.6	mg/L	D

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-3

24L0086-06 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010D — Sampled: 12/04/2024 11:05
Instrument: ICP3 Analyst: SH — Analyzed: 12/24/2024 02:25

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 24L0086-06 A 01
Preparation Batch: BML0176 — Sample Size: 25 mL
Prepared: 12/07/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0500	39.8	mg/L	
Iron, Dissolved	7439-89-6	1	0.0500	ND	mg/L	U
Magnesium, Dissolved	7439-95-4	1	0.0500	7.74	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0040	ND	mg/L	U
Potassium, Dissolved	7440-09-7	1	0.500	5.68	mg/L	
Sodium, Dissolved	7440-23-5	1	0.500	12.3	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-4

24L0086-07 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/03/2024 15:08
Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 14:35

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-07 G
Preparation Batch: BML0140 — Sample Size: 10 mL
Prepared: 12/06/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	0.83	ug/L	
Acetone	67-64-1	1	5.00	6.12	ug/L	
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	4.37	ug/L	
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	5.43	ug/L	
Chloroform	67-66-3	1	0.20	0.36	ug/L	
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	0.75	ug/L	
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	0.64	ug/L	
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-4

24L0086-07 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/03/2024 15:08
Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 14:35

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*115*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*98.9*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*93.0*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*98.7*	*%*	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-4

24L0086-07 (Water)

Dissolved Gases

Method: EPA RSK-175 — Sampled: 12/03/2024 15:08
Instrument: FID6 Analyst: PKC — Analyzed: 12/09/2024 12:27

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-07 I
Preparation Batch: BML0194 — Sample Size: 10 mL
Prepared: 12/09/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Acetylene	74-86-2	1	1.06	ND	ug/L	U
Methane	74-82-8	1	0.65	ND	ug/L	U
Ethane	74-84-0	1	1.12	ND	ug/L	U
Ethene	74-85-1	1	1.14	ND	ug/L	U
Surrogate: Propane			*62-122 %*	*107*	*%*	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-4

24L0086-07 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/03/2024 15:08
Instrument: ICPMS1 Analyst: HAL — Analyzed: 01/06/2025 21:20

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-07 E 02
Preparation Batch: BML0179 — Sample Size: 25 mL
Prepared: 12/08/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic UCT	7440-38-2	5	0.00100	0.00371	mg/L	D
Barium	7440-39-3	5	0.00250	0.0544	mg/L	D, B
Beryllium	7440-41-7	5	0.00100	ND	mg/L	U
Cadmium UCT	7440-43-9	5	0.000500	ND	mg/L	U
Chromium	7440-47-3	5	0.00250	ND	mg/L	U
Cobalt UCT	7440-48-4	5	0.00100	0.0116	mg/L	D
Copper UCT	7440-50-8	5	0.00250	ND	mg/L	U
Lead	7439-92-1	5	0.000500	ND	mg/L	U
Nickel UCT	7440-02-0	5	0.00250	ND	mg/L	U
Selenium UCT	7782-49-2	5	0.00250	ND	mg/L	U
Silver	7440-22-4	5	0.00100	ND	mg/L	U
Thallium	7440-28-0	5	0.00100	ND	mg/L	U
Vanadium	7440-62-2	5	0.00100	0.00908	mg/L	D
Zinc UCT	7440-66-6	5	0.0300	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-4

24L0086-07 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 12/03/2024 15:08
Instrument: LACHAT1 Analyst: CB — Analyzed: 12/10/2024 16:47

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-07 F
Preparation Batch: BML0217 — Sample Size: 10 mL
Prepared: 12/10/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-4

24L0086-07 (Water)

Wet Chemistry

Method: SM 2320 B-11 — Sampled: 12/03/2024 15:08
Instrument: Accumet AB150 Analyst: UW — Analyzed: 12/11/2024 13:00

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-07 C
Preparation Batch: BML0243 — Sample Size: 100 mL
Prepared: 12/11/2024 — Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	258	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	258	mg/L CaCO3	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
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MW-4

24L0086-07 (Water)

Wet Chemistry

Method: SM 2540 C-11 — Sampled: 12/03/2024 15:08
Instrument: BAL2 Analyst: VD — Analyzed: 12/10/2024 15:54

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-07
Preparation Batch: BML0211 — Sample Size: 100 mL
Prepared: 12/10/2024 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	397	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-4

24L0086-07 (Water)

Wet Chemistry

Method: SM 2540 D-11 — Sampled: 12/03/2024 15:08
Instrument: BAL2 Analyst: LM — Analyzed: 12/06/2024 11:26

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-07
Preparation Batch: BML0150 — Sample Size: 1010 mL
Prepared: 12/06/2024 — Final Volume: 1000 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Suspended Solids		1	1	1	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-4

24L0086-07 (Water)

Wet Chemistry

Method: SM 5310 B-11 — Sampled: 12/03/2024 15:08
Instrument: TOC-LCSH Analyst: RMS — Analyzed: 12/30/2024 12:09

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-07 F
Preparation Batch: BML0576 — Sample Size: 20 mL
Prepared: 12/30/2024 — Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	0.91	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-4

24L0086-07RE1 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/03/2024 15:08
Instrument: ICPMS2 Analyst: MCB — Analyzed: 01/09/2025 17:55

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-07RE1 E 02
Preparation Batch: BNA0112 — Sample Size: 25 mL
Prepared: 01/08/2025 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	5	0.00100	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-4

24L0086-07RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 12/03/2024 15:08
Instrument: IC930 Analyst: LERB — Analyzed: 12/11/2024 12:38

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-07RE1 D
Preparation Batch: BML0223 — Sample Size: 10 mL
Prepared: 12/10/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	9	0.900	0.900	14.6	mg/L	D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	9	0.900	0.900	34.7	mg/L	D

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-4

24L0086-08 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010D — Sampled: 12/03/2024 15:08
Instrument: ICP3 Analyst: SH — Analyzed: 12/24/2024 02:27

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 24L0086-08 A 01
Preparation Batch: BML0176 — Sample Size: 25 mL
Prepared: 12/07/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0500	97.6	mg/L	
Iron, Dissolved	7439-89-6	1	0.0500	ND	mg/L	U
Magnesium, Dissolved	7439-95-4	1	0.0500	20.7	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0040	ND	mg/L	U
Potassium, Dissolved	7440-09-7	1	0.500	7.60	mg/L	
Sodium, Dissolved	7440-23-5	1	0.500	16.3	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-5

24L0086-09 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/03/2024 12:30
Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 14:58

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-09 G
Preparation Batch: BML0140 — Sample Size: 10 mL
Prepared: 12/06/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	0.58	ug/L	
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	6.04	ug/L	
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	0.30	ug/L	
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	2.63	ug/L	
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	16.8	ug/L	
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	0.32	ug/L	
Benzene	71-43-2	1	0.20	0.23	ug/L	
Trichloroethene	79-01-6	1	0.20	3.43	ug/L	
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	8.43	ug/L	
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-5

24L0086-09 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/03/2024 12:30

Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 14:58

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*112*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*99.3*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*92.6*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*99.2*	*%*	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-5

24L0086-09 (Water)

Dissolved Gases

Method: EPA RSK-175 — Sampled: 12/03/2024 12:30
Instrument: FID6 Analyst: PKC — Analyzed: 12/09/2024 12:40

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-09 I
Preparation Batch: BML0194 — Sample Size: 10 mL
Prepared: 12/09/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Acetylene	74-86-2	1	1.06	ND	ug/L	U
Methane	74-82-8	1	0.65	83.8	ug/L	
Ethane	74-84-0	1	1.12	ND	ug/L	U
Ethene	74-85-1	1	1.14	ND	ug/L	U
Surrogate: Propane			*62-122 %*	*103*	*%*	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-5

24L0086-09 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/03/2024 12:30
Instrument: ICPMS1 Analyst: HAL — Analyzed: 01/06/2025 22:16

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-09 E 01
Preparation Batch: BML0179 — Sample Size: 25 mL
Prepared: 12/08/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic UCT	7440-38-2	5	0.00100	0.00413	mg/L	D
Barium	7440-39-3	5	0.00250	0.101	mg/L	D, B
Beryllium	7440-41-7	5	0.00100	ND	mg/L	U
Cadmium UCT	7440-43-9	5	0.000500	ND	mg/L	U
Cobalt UCT	7440-48-4	5	0.00100	0.00348	mg/L	D
Copper UCT	7440-50-8	5	0.00250	0.00836	mg/L	D
Lead	7439-92-1	5	0.000500	ND	mg/L	U
Nickel UCT	7440-02-0	5	0.00250	0.0125	mg/L	D
Selenium UCT	7782-49-2	5	0.00250	ND	mg/L	U
Silver	7440-22-4	5	0.00100	ND	mg/L	U
Thallium	7440-28-0	5	0.00100	ND	mg/L	U
Zinc UCT	7440-66-6	5	0.0300	0.0425	mg/L	D

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
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MW-5

24L0086-09 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 12/03/2024 12:30
Instrument: LACHAT1 Analyst: CB — Analyzed: 12/10/2024 16:56

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-09 F
Preparation Batch: BML0217 — Sample Size: 10 mL
Prepared: 12/10/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-5

24L0086-09 (Water)

Wet Chemistry

Method: SM 2320 B-11 — Sampled: 12/03/2024 12:30
Instrument: Accumet AB150 Analyst: UW — Analyzed: 12/11/2024 13:00

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-09 C
Preparation Batch: BML0243 — Sample Size: 100 mL
Prepared: 12/11/2024 — Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	584	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	584	mg/L CaCO3	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-5

24L0086-09 (Water)

Wet Chemistry

Method: SM 2540 C-11 — Sampled: 12/03/2024 12:30
Instrument: BAL2 Analyst: VD — Analyzed: 12/10/2024 15:54

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-09
Preparation Batch: BML0211 — Sample Size: 75 mL
Prepared: 12/10/2024 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	13	13	1060	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-5

24L0086-09 (Water)

Wet Chemistry

Method: SM 2540 D-11 — Sampled: 12/03/2024 12:30
Instrument: BAL2 Analyst: LM — Analyzed: 12/06/2024 11:26

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-09
Preparation Batch: BML0150 — Sample Size: 1030 mL
Prepared: 12/06/2024 — Final Volume: 1000 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Suspended Solids		1	1	1	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-5

24L0086-09 (Water)

Wet Chemistry

Method: SM 5310 B-11 — Sampled: 12/03/2024 12:30
Instrument: TOC-LCSH Analyst: RMS — Analyzed: 12/30/2024 12:31

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-09 F
Preparation Batch: BML0576 — Sample Size: 20 mL
Prepared: 12/30/2024 — Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	7.65	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-5

24L0086-09RE1 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/03/2024 12:30
Instrument: ICPMS2 Analyst: MCB — Analyzed: 01/09/2025 17:57

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-09RE1 E 02
Preparation Batch: BNA0112 — Sample Size: 25 mL
Prepared: 01/08/2025 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	5	0.00100	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-5

24L0086-09RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 12/03/2024 12:30
Instrument: IC930 Analyst: LERB — Analyzed: 12/11/2024 12:58

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-09RE1 D
Preparation Batch: BML0223 — Sample Size: 10 mL
Prepared: 12/10/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	45	4.50	4.50	77.0	mg/L	D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	45	4.50	4.50	165	mg/L	D

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-5

24L0086-09RE2 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/03/2024 12:30
Instrument: ICPMS2 Analyst: MCB — Analyzed: 01/08/2025 23:09

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-09RE2 E 01
Preparation Batch: BML0179 — Sample Size: 25 mL
Prepared: 12/08/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chromium	7440-47-3	10	0.00500	ND	mg/L	U
Vanadium	7440-62-2	10	0.00200	0.00587	mg/L	D

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-5

24L0086-10 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010D — Sampled: 12/03/2024 12:30
Instrument: ICP3 Analyst: SH — Analyzed: 12/24/2024 02:30

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 24L0086-10 A 01
Preparation Batch: BML0176 — Sample Size: 25 mL
Prepared: 12/07/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0500	229	mg/L	
Iron, Dissolved	7439-89-6	1	0.0500	0.0634	mg/L	
Magnesium, Dissolved	7439-95-4	1	0.0500	62.1	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0040	2.24	mg/L	
Potassium, Dissolved	7440-09-7	1	0.500	14.1	mg/L	
Sodium, Dissolved	7440-23-5	1	0.500	38.9	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-6

24L0086-11 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/04/2024 10:10
Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 15:21

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-11 G
Preparation Batch: BML0140 — Sample Size: 10 mL
Prepared: 12/06/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	0.62	ug/L	
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	2.23	ug/L	
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	31.3	ug/L	
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	0.22	ug/L	
Benzene	71-43-2	1	0.20	0.24	ug/L	
Trichloroethene	79-01-6	1	0.20	8.53	ug/L	
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	18.6	ug/L	
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
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MW-6

24L0086-11 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/04/2024 10:10

Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 15:21

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*113*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*97.9*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*93.3*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*100*	*%*	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-6

24L0086-11 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/04/2024 10:10
Instrument: ICPMS1 Analyst: HAL — Analyzed: 01/06/2025 22:21

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-11 E 01
Preparation Batch: BML0179 — Sample Size: 25 mL
Prepared: 12/08/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic UCT	7440-38-2	5	0.00100	0.00182	mg/L	D
Barium	7440-39-3	5	0.00250	0.132	mg/L	D, B
Beryllium	7440-41-7	5	0.00100	ND	mg/L	U
Cadmium UCT	7440-43-9	5	0.000500	ND	mg/L	U
Cobalt UCT	7440-48-4	5	0.00100	0.00272	mg/L	D
Copper UCT	7440-50-8	5	0.00250	ND	mg/L	U
Lead	7439-92-1	5	0.000500	ND	mg/L	U
Nickel UCT	7440-02-0	5	0.00250	0.00286	mg/L	D
Selenium UCT	7782-49-2	5	0.00250	ND	mg/L	U
Silver	7440-22-4	5	0.00100	ND	mg/L	U
Thallium	7440-28-0	5	0.00100	ND	mg/L	U
Zinc UCT	7440-66-6	5	0.0300	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-6

24L0086-11 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 12/04/2024 10:10
Instrument: LACHAT1 Analyst: CB — Analyzed: 12/10/2024 16:57

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-11 F
Preparation Batch: BML0217 — Sample Size: 10 mL
Prepared: 12/10/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	0.100	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-6

24L0086-11 (Water)

Wet Chemistry

Method: SM 2320 B-11 — Sampled: 12/04/2024 10:10

Instrument: Accumet AB150 Analyst: UW — Analyzed: 12/11/2024 13:00

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-11 D

Preparation Batch: BML0243 — Sample Size: 100 mL

Prepared: 12/11/2024 — Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	598	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	598	mg/L CaCO3	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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MW-6

24L0086-11 (Water)

Wet Chemistry

Method: SM 2540 C-11 — Sampled: 12/04/2024 10:10

Instrument: BAL2 Analyst: VD — Analyzed: 12/10/2024 15:54

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-11

Preparation Batch: BML0211 — Sample Size: 75 mL

Prepared: 12/10/2024 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	13	13	940	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
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MW-6

24L0086-11 (Water)

Wet Chemistry

Method: SM 2540 D-11 — Sampled: 12/04/2024 10:10

Instrument: BAL2 Analyst: LM — Analyzed: 12/06/2024 11:26

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-11

Preparation Batch: BML0150 — Sample Size: 1010 mL

Prepared: 12/06/2024 — Final Volume: 1000 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Suspended Solids		1	1	1	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
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MW-6

24L0086-11 (Water)

Wet Chemistry

Method: SM 5310 B-11 — Sampled: 12/04/2024 10:10

Instrument: TOC-LCSH Analyst: RMS — Analyzed: 12/30/2024 12:53

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-11 F

Preparation Batch: BML0576 — Sample Size: 20 mL

Prepared: 12/30/2024 — Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	3.90	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
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MW-6

24L0086-11RE1 (Water)

Dissolved Gases

Method: EPA RSK-175 — Sampled: 12/04/2024 10:10

Instrument: FID6 Analyst: PKC — Analyzed: 12/09/2024 12:53

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-11RE1 J

Preparation Batch: BML0194 — Sample Size: 10 mL

Prepared: 12/09/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Acetylene	74-86-2	1	1.06	ND	ug/L	U
Methane	74-82-8	1	0.65	359	ug/L	
Ethane	74-84-0	1	1.12	ND	ug/L	U
Ethene	74-85-1	1	1.14	ND	ug/L	U
Surrogate: Propane			*62-122 %*	*104*	*%*	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-6

24L0086-11RE1 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/04/2024 10:10
Instrument: ICPMS2 Analyst: MCB — Analyzed: 01/09/2025 17:58

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-11RE1 E 02
Preparation Batch: BNA0112 — Sample Size: 25 mL
Prepared: 01/08/2025 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	5	0.00100	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-6

24L0086-11RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 12/04/2024 10:10

Instrument: IC930 Analyst: LERB — Analyzed: 12/11/2024 13:18

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-11RE1 C

Preparation Batch: BML0223 — Sample Size: 10 mL

Prepared: 12/10/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	32	3.20	3.20	41.5	mg/L	D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	32	3.20	3.20	132	mg/L	D

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-6

24L0086-11RE2 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/04/2024 10:10
Instrument: ICPMS2 Analyst: MCB — Analyzed: 01/08/2025 23:14

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-11RE2 E 01
Preparation Batch: BML0179 — Sample Size: 25 mL
Prepared: 12/08/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chromium	7440-47-3	10	0.00500	ND	mg/L	U
Vanadium	7440-62-2	10	0.00200	0.00546	mg/L	D

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-6

24L0086-12 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010D — Sampled: 12/04/2024 10:10

Instrument: ICP3 Analyst: SH — Analyzed: 12/24/2024 02:34

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 24L0086-12 A 01

Preparation Batch: BML0176 — Sample Size: 25 mL

Prepared: 12/07/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0500	220	mg/L	
Iron, Dissolved	7439-89-6	1	0.0500	ND	mg/L	U
Magnesium, Dissolved	7439-95-4	1	0.0500	54.0	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0040	0.782	mg/L	
Potassium, Dissolved	7440-09-7	1	0.500	13.6	mg/L	
Sodium, Dissolved	7440-23-5	1	0.500	27.9	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-8

24L0086-13 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/03/2024 14:20
Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 15:44

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-13 G
Preparation Batch: BML0140 — Sample Size: 10 mL
Prepared: 12/06/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	0.85	ug/L	
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	0.65	ug/L	
Chloroform	67-66-3	1	0.20	12.0	ug/L	
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	0.75	ug/L	
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-8

24L0086-13 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/03/2024 14:20

Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 15:44

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*114*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*98.6*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*91.7*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*99.2*	*%*	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-8

24L0086-13 (Water)

Dissolved Gases

Method: EPA RSK-175 — Sampled: 12/03/2024 14:20
Instrument: FID6 Analyst: MN — Analyzed: 12/06/2024 16:14

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-13 H
Preparation Batch: BML0155 — Sample Size: 10 mL
Prepared: 12/06/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Acetylene	74-86-2	1	1.06	ND	ug/L	U
Methane	74-82-8	1	0.65	ND	ug/L	U
Ethane	74-84-0	1	1.12	ND	ug/L	U
Ethene	74-85-1	1	1.14	ND	ug/L	U
Surrogate: Propane			*62-122 %*	*112*	*%*	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-8

24L0086-13 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/03/2024 14:20
Instrument: ICPMS1 Analyst: HAL — Analyzed: 01/06/2025 22:26

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-13 E 01
Preparation Batch: BML0179 — Sample Size: 25 mL
Prepared: 12/08/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic UCT	7440-38-2	5	0.00100	0.00823	mg/L	D
Barium	7440-39-3	5	0.00250	0.0459	mg/L	D, B
Beryllium	7440-41-7	5	0.00100	ND	mg/L	U
Cadmium UCT	7440-43-9	5	0.000500	ND	mg/L	U
Chromium	7440-47-3	5	0.00250	ND	mg/L	U
Cobalt UCT	7440-48-4	5	0.00100	ND	mg/L	U
Copper UCT	7440-50-8	5	0.00250	ND	mg/L	U
Lead	7439-92-1	5	0.000500	ND	mg/L	U
Nickel UCT	7440-02-0	5	0.00250	ND	mg/L	U
Selenium UCT	7782-49-2	5	0.00250	ND	mg/L	U
Silver	7440-22-4	5	0.00100	ND	mg/L	U
Thallium	7440-28-0	5	0.00100	ND	mg/L	U
Vanadium	7440-62-2	5	0.00100	0.0129	mg/L	D
Zinc UCT	7440-66-6	5	0.0300	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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MW-8

24L0086-13 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 12/03/2024 14:20
Instrument: LACHAT1 Analyst: CB — Analyzed: 12/10/2024 16:58

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-13 F
Preparation Batch: BML0217 — Sample Size: 10 mL
Prepared: 12/10/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
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MW-8

24L0086-13 (Water)

Wet Chemistry

Method: SM 2320 B-11 — Sampled: 12/03/2024 14:20

Instrument: Accumet AB150 Analyst: UW — Analyzed: 12/11/2024 13:00

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-13 D

Preparation Batch: BML0243 — Sample Size: 100 mL

Prepared: 12/11/2024 — Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	160	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	160	mg/L CaCO3	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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24L0086-13 (Water)

Wet Chemistry

Method: SM 2540 C-11 — Sampled: 12/03/2024 14:20
Instrument: BAL2 Analyst: VD — Analyzed: 12/10/2024 15:54

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-13
Preparation Batch: BML0211 — Sample Size: 100 mL
Prepared: 12/10/2024 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	386	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
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MW-8

24L0086-13 (Water)

Wet Chemistry

Method: SM 2540 D-11 — Sampled: 12/03/2024 14:20

Instrument: BAL2 Analyst: LM — Analyzed: 12/06/2024 11:26

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-13

Preparation Batch: BML0150 — Sample Size: 1030 mL

Prepared: 12/06/2024 — Final Volume: 1000 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Suspended Solids		1	1	1	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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MW-8

24L0086-13 (Water)

Wet Chemistry

Method: SM 5310 B-11 — Sampled: 12/03/2024 14:20
Instrument: TOC-LCSH Analyst: RMS — Analyzed: 12/30/2024 13:18

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-13 F
Preparation Batch: BML0576 — Sample Size: 20 mL
Prepared: 12/30/2024 — Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	0.93	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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MW-8

24L0086-13RE1 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/03/2024 14:20
Instrument: ICPMS2 Analyst: MCB — Analyzed: 01/09/2025 17:59

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-13RE1 E 02
Preparation Batch: BNA0112 — Sample Size: 25 mL
Prepared: 01/08/2025 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	5	0.00100	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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MW-8

24L0086-13RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 12/03/2024 14:20
Instrument: IC930 Analyst: LERB — Analyzed: 12/11/2024 14:38

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-13RE1 C
Preparation Batch: BML0223 — Sample Size: 10 mL
Prepared: 12/10/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	11	1.10	1.10	29.3	mg/L	D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	11	1.10	1.10	48.0	mg/L	D

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
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MW-8

24L0086-14 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010D — Sampled: 12/03/2024 14:20
Instrument: ICP3 Analyst: SH — Analyzed: 12/24/2024 02:57

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 24L0086-14 A 01
Preparation Batch: BML0176 — Sample Size: 25 mL
Prepared: 12/07/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0500	75.2	mg/L	
Iron, Dissolved	7439-89-6	1	0.0500	ND	mg/L	U
Magnesium, Dissolved	7439-95-4	1	0.0500	15.4	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0040	ND	mg/L	U
Potassium, Dissolved	7440-09-7	1	0.500	7.63	mg/L	
Sodium, Dissolved	7440-23-5	1	0.500	20.8	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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24L0086-15 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/03/2024 13:25
Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 16:07

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-15 G
Preparation Batch: BML0140 — Sample Size: 10 mL
Prepared: 12/06/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	0.35	ug/L	
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	1.70	ug/L	
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	10.4	ug/L	
Chloroform	67-66-3	1	0.20	1.22	ug/L	
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	4.24	ug/L	
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	10.7	ug/L	
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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24L0086-15 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/03/2024 13:25

Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 16:07

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*116*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*98.6*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*91.8*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*100*	*%*	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-9

24L0086-15 (Water)

Dissolved Gases

Method: EPA RSK-175 — Sampled: 12/03/2024 13:25

Instrument: FID6 Analyst: MN — Analyzed: 12/06/2024 16:28

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-15 H

Preparation Batch: BML0155 — Sample Size: 10 mL

Prepared: 12/06/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Acetylene	74-86-2	1	1.06	ND	ug/L	U
Methane	74-82-8	1	0.65	ND	ug/L	U
Ethane	74-84-0	1	1.12	ND	ug/L	U
Ethene	74-85-1	1	1.14	ND	ug/L	U
Surrogate: Propane			*62-122 %*	*112*	*%*	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-9

24L0086-15 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/03/2024 13:25
Instrument: ICPMS1 Analyst: HAL — Analyzed: 01/03/2025 22:37

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-15 E
Preparation Batch: BML0179 — Sample Size: 25 mL
Prepared: 12/08/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic UCT	7440-38-2	5	0.00100	0.00169	mg/L	D
Barium	7440-39-3	5	0.00250	0.0700	mg/L	D, B
Beryllium	7440-41-7	5	0.00100	ND	mg/L	U
Cadmium UCT	7440-43-9	5	0.000500	ND	mg/L	U
Cobalt UCT	7440-48-4	5	0.00100	ND	mg/L	U
Copper UCT	7440-50-8	5	0.00250	ND	mg/L	U
Lead	7439-92-1	5	0.000500	ND	mg/L	U
Nickel UCT	7440-02-0	5	0.00250	ND	mg/L	U
Selenium UCT	7782-49-2	5	0.00250	ND	mg/L	U
Zinc UCT	7440-66-6	5	0.0300	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-9

24L0086-15 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 12/03/2024 13:25

Instrument: LACHAT1 Analyst: CB — Analyzed: 12/10/2024 16:59

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-15 F

Preparation Batch: BML0217 — Sample Size: 10 mL

Prepared: 12/10/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-9

24L0086-15 (Water)

Wet Chemistry

Method: SM 2320 B-11 — Sampled: 12/03/2024 13:25
Instrument: Accumet AB150 Analyst: UW — Analyzed: 12/11/2024 13:00

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-15 D
Preparation Batch: BML0243 — Sample Size: 100 mL
Prepared: 12/11/2024 — Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	364	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	364	mg/L CaCO3	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-9

24L0086-15 (Water)

Wet Chemistry

Method: SM 2540 C-11 — Sampled: 12/03/2024 13:25
Instrument: BAL2 Analyst: VD — Analyzed: 12/10/2024 15:54

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-15
Preparation Batch: BML0211 — Sample Size: 100 mL
Prepared: 12/10/2024 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	621	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-9

24L0086-15 (Water)

Wet Chemistry

Method: SM 2540 D-11 — Sampled: 12/03/2024 13:25
Instrument: BAL2 Analyst: LM — Analyzed: 12/06/2024 11:26

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-15
Preparation Batch: BML0150 — Sample Size: 1000 mL
Prepared: 12/06/2024 — Final Volume: 1000 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Suspended Solids		1	1	1	1	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-9

24L0086-15 (Water)

Wet Chemistry

Method: SM 5310 B-11 — Sampled: 12/03/2024 13:25

Instrument: TOC-LCSH Analyst: RMS — Analyzed: 12/30/2024 13:40

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-15 F

Preparation Batch: BML0576 — Sample Size: 20 mL

Prepared: 12/30/2024 — Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	1.89	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-9

24L0086-15RE1 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/03/2024 13:25
Instrument: ICPMS2 Analyst: MCB — Analyzed: 01/09/2025 18:01

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-15RE1 E 02
Preparation Batch: BNA0112 — Sample Size: 25 mL
Prepared: 01/08/2025 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	5	0.00100	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-9

24L0086-15RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 12/03/2024 13:25
Instrument: IC930 Analyst: LERB — Analyzed: 12/11/2024 14:58

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-15RE1 C
Preparation Batch: BML0223 — Sample Size: 10 mL
Prepared: 12/10/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	18	1.80	1.80	45.1	mg/L	D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	18	1.80	1.80	68.2	mg/L	D

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-9

24L0086-15RE2 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/03/2024 13:25

Instrument: ICPMS1 Analyst: HAL — Analyzed: 01/06/2025 23:30

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-15RE2 E 01

Preparation Batch: BML0179 — Sample Size: 25 mL

Prepared: 12/08/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chromium	7440-47-3	5	0.00250	ND	mg/L	U
Silver	7440-22-4	5	0.00100	ND	mg/L	U
Thallium	7440-28-0	5	0.00100	ND	mg/L	U
Vanadium	7440-62-2	5	0.00100	0.00545	mg/L	D

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-9

24L0086-16 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010D — Sampled: 12/03/2024 13:25

Instrument: ICP3 Analyst: SH — Analyzed: 12/24/2024 02:59

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 24L0086-16 A 01

Preparation Batch: BML0176 — Sample Size: 25 mL

Prepared: 12/07/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0500	144	mg/L	
Iron, Dissolved	7439-89-6	1	0.0500	ND	mg/L	U
Magnesium, Dissolved	7439-95-4	1	0.0500	32.0	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0040	ND	mg/L	U
Potassium, Dissolved	7440-09-7	1	0.500	9.61	mg/L	
Sodium, Dissolved	7440-23-5	1	0.500	25.1	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-10

24L0086-17 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/03/2024 11:30
Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 16:30

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-17 G
Preparation Batch: BML0140 — Sample Size: 10 mL
Prepared: 12/06/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	3.27	ug/L	
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	12.8	ug/L	
Chloroform	67-66-3	1	0.20	0.29	ug/L	
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	0.32	ug/L	
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	2.56	ug/L	
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	4.97	ug/L	
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-10

24L0086-17 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/03/2024 11:30

Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 16:30

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*113*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*98.4*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*92.4*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*101*	*%*	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-10

24L0086-17 (Water)

Dissolved Gases

Method: EPA RSK-175 — Sampled: 12/03/2024 11:30

Instrument: FID6 Analyst: MN — Analyzed: 12/06/2024 16:55

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-17 H

Preparation Batch: BML0155 — Sample Size: 10 mL

Prepared: 12/06/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Acetylene	74-86-2	1	1.06	ND	ug/L	U
Ethane	74-84-0	1	1.12	ND	ug/L	U
Ethene	74-85-1	1	1.14	ND	ug/L	U
Surrogate: Propane			*62-122 %*	*103*	*%*	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-10

24L0086-17 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/03/2024 11:30

Instrument: ICPMS1 Analyst: HAL — Analyzed: 01/03/2025 22:42

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-17 E

Preparation Batch: BML0179 — Sample Size: 25 mL

Prepared: 12/08/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic UCT	7440-38-2	5	0.00100	0.00300	mg/L	D
Barium	7440-39-3	5	0.00250	0.189	mg/L	D, B
Beryllium	7440-41-7	5	0.00100	ND	mg/L	U
Cadmium UCT	7440-43-9	5	0.000500	ND	mg/L	U
Cobalt UCT	7440-48-4	5	0.00100	0.00125	mg/L	D
Copper UCT	7440-50-8	5	0.00250	0.00484	mg/L	D
Lead	7439-92-1	5	0.000500	ND	mg/L	U
Nickel UCT	7440-02-0	5	0.00250	0.00595	mg/L	D
Selenium UCT	7782-49-2	5	0.00250	ND	mg/L	U
Zinc UCT	7440-66-6	5	0.0300	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-10

24L0086-17 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 12/03/2024 11:30

Instrument: LACHAT1 Analyst: CB — Analyzed: 12/10/2024 17:00

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-17 F

Preparation Batch: BML0217 — Sample Size: 10 mL

Prepared: 12/10/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-10

24L0086-17 (Water)

Wet Chemistry

Method: SM 2320 B-11 — Sampled: 12/03/2024 11:30
Instrument: Accumet AB150 Analyst: UW — Analyzed: 12/11/2024 13:00

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-17 D
Preparation Batch: BML0243 — Sample Size: 100 mL
Prepared: 12/11/2024 — Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	632	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	632	mg/L CaCO3	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-10

24L0086-17 (Water)

Wet Chemistry

Method: SM 2540 C-11 — Sampled: 12/03/2024 11:30

Instrument: BAL2 Analyst: VD — Analyzed: 12/10/2024 15:54

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-17

Preparation Batch: BML0211 — Sample Size: 75 mL

Prepared: 12/10/2024 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	13	13	1380	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-10

24L0086-17 (Water)

Wet Chemistry

Method: SM 2540 D-11 — Sampled: 12/03/2024 11:30

Instrument: BAL2 Analyst: LM — Analyzed: 12/06/2024 11:26

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-17

Preparation Batch: BML0150 — Sample Size: 500 mL

Prepared: 12/06/2024 — Final Volume: 1000 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Suspended Solids		1	2	2	10	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-10

24L0086-17 (Water)

Wet Chemistry

Method: SM 5310 B-11 — Sampled: 12/03/2024 11:30
Instrument: TOC-LCSH Analyst: RMS — Analyzed: 12/30/2024 14:03

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-17 F
Preparation Batch: BML0576 — Sample Size: 20 mL
Prepared: 12/30/2024 — Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	19.45	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-10

24L0086-17RE1 (Water)

Dissolved Gases

Method: EPA RSK-175 — Sampled: 12/03/2024 11:30

Instrument: FID6 Analyst: MN — Analyzed: 12/06/2024 17:08

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-17RE1 H

Preparation Batch: BML0155 — Sample Size: 1 mL

Prepared: 12/06/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Methane	74-82-8	1	6.54	998	ug/L	
Surrogate: Propane			*62-122 %*	*118*	*%*	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-10

24L0086-17RE1 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/03/2024 11:30

Instrument: ICPMS2 Analyst: MCB — Analyzed: 01/09/2025 18:09

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-17RE1 E 02

Preparation Batch: BNA0112 — Sample Size: 25 mL

Prepared: 01/08/2025 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	5	0.00100	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-10

24L0086-17RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 12/03/2024 11:30
Instrument: IC930 Analyst: LERB — Analyzed: 12/11/2024 15:17

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-17RE1 C
Preparation Batch: BML0223 — Sample Size: 10 mL
Prepared: 12/10/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	67	6.70	6.70	89.2	mg/L	D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	67	6.70	6.70	268	mg/L	D

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-10

24L0086-17RE2 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/03/2024 11:30

Instrument: ICPMS1 Analyst: HAL — Analyzed: 01/06/2025 23:41

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-17RE2 E 01

Preparation Batch: BML0179 — Sample Size: 25 mL

Prepared: 12/08/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chromium	7440-47-3	10	0.00500	ND	mg/L	U
Vanadium	7440-62-2	10	0.00200	0.00617	mg/L	D

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-10

24L0086-17RE3 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/03/2024 11:30

Instrument: ICPMS1 Analyst: HAL — Analyzed: 01/06/2025 23:36

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-17RE3 E 01

Preparation Batch: BML0179 — Sample Size: 25 mL

Prepared: 12/08/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Silver	7440-22-4	5	0.00100	ND	mg/L	U
Thallium	7440-28-0	5	0.00100	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-10

24L0086-18 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010D — Sampled: 12/03/2024 11:30

Instrument: ICP3 Analyst: SH — Analyzed: 12/24/2024 03:02

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 24L0086-18 A 01

Preparation Batch: BML0176 — Sample Size: 25 mL

Prepared: 12/07/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0500	362	mg/L	
Iron, Dissolved	7439-89-6	1	0.0500	0.277	mg/L	
Magnesium, Dissolved	7439-95-4	1	0.0500	80.1	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0040	0.127	mg/L	
Potassium, Dissolved	7440-09-7	1	0.500	16.5	mg/L	
Sodium, Dissolved	7440-23-5	1	0.500	30.4	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-12

24L0086-19 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/04/2024 08:55
Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 16:53

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-19 G
Preparation Batch: BML0140 — Sample Size: 10 mL
Prepared: 12/06/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	0.23	ug/L	
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	1.83	ug/L	
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	1.83	ug/L	
Chloroform	67-66-3	1	0.20	0.46	ug/L	
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-12

24L0086-19 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/04/2024 08:55

Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 16:53

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*114*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*100*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*91.5*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*98.6*	*%*	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-12

24L0086-19 (Water)

Dissolved Gases

Method: EPA RSK-175 — Sampled: 12/04/2024 08:55

Instrument: FID6 Analyst: MN — Analyzed: 12/06/2024 17:22

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-19 I

Preparation Batch: BML0155 — Sample Size: 10 mL

Prepared: 12/06/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Acetylene	74-86-2	1	1.06	ND	ug/L	U
Methane	74-82-8	1	0.65	ND	ug/L	U
Ethane	74-84-0	1	1.12	ND	ug/L	U
Ethene	74-85-1	1	1.14	ND	ug/L	U
Surrogate: Propane			*62-122 %*	*115*	*%*	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-12

24L0086-19 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/04/2024 08:55

Instrument: ICPMS1 Analyst: HAL — Analyzed: 01/03/2025 22:47

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-19 E

Preparation Batch: BML0179 — Sample Size: 25 mL

Prepared: 12/08/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic UCT	7440-38-2	5	0.00100	0.00603	mg/L	D
Barium	7440-39-3	5	0.00250	0.0568	mg/L	D, B
Beryllium	7440-41-7	5	0.00100	ND	mg/L	U
Cadmium UCT	7440-43-9	5	0.000500	ND	mg/L	U
Cobalt UCT	7440-48-4	5	0.00100	ND	mg/L	U
Copper UCT	7440-50-8	5	0.00250	0.00503	mg/L	D
Lead	7439-92-1	5	0.000500	ND	mg/L	U
Nickel UCT	7440-02-0	5	0.00250	0.00584	mg/L	D
Selenium UCT	7782-49-2	5	0.00250	ND	mg/L	U
Zinc UCT	7440-66-6	5	0.0300	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-12

24L0086-19 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 12/04/2024 08:55
Instrument: LACHAT1 Analyst: CB — Analyzed: 12/10/2024 17:02

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-19 F
Preparation Batch: BML0217 — Sample Size: 10 mL
Prepared: 12/10/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-12

24L0086-19 (Water)

Wet Chemistry

Method: SM 2320 B-11 — Sampled: 12/04/2024 08:55

Instrument: Accumet AB150 Analyst: UW — Analyzed: 12/11/2024 13:00

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-19 C

Preparation Batch: BML0243 — Sample Size: 100 mL

Prepared: 12/11/2024 — Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	200	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	200	mg/L CaCO3	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
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MW-12

24L0086-19 (Water)

Wet Chemistry

Method: SM 2540 C-11 — Sampled: 12/04/2024 08:55

Instrument: BAL2 Analyst: VD — Analyzed: 12/10/2024 15:54

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-19

Preparation Batch: BML0211 — Sample Size: 100 mL

Prepared: 12/10/2024 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	338	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
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MW-12

24L0086-19 (Water)

Wet Chemistry

Method: SM 2540 D-11 — Sampled: 12/04/2024 08:55

Instrument: BAL2 Analyst: LM — Analyzed: 12/06/2024 11:26

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-19

Preparation Batch: BML0150 — Sample Size: 480 mL

Prepared: 12/06/2024 — Final Volume: 1000 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Suspended Solids		1	2	2	24	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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MW-12

24L0086-19 (Water)

Wet Chemistry

Method: SM 5310 B-11 — Sampled: 12/04/2024 08:55

Instrument: TOC-LCSH Analyst: RMS — Analyzed: 12/30/2024 14:25

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-19 F

Preparation Batch: BML0576 — Sample Size: 20 mL

Prepared: 12/30/2024 — Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	0.98	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-12

24L0086-19RE1 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/04/2024 08:55

Instrument: ICPMS2 Analyst: MCB — Analyzed: 01/09/2025 18:10

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-19RE1 E 02

Preparation Batch: BNA0112 — Sample Size: 25 mL

Prepared: 01/08/2025 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	5	0.00100	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
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MW-12

24L0086-19RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 12/04/2024 08:55

Instrument: IC930 Analyst: LERB — Analyzed: 12/11/2024 15:37

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-19RE1 D

Preparation Batch: BML0223 — Sample Size: 10 mL

Prepared: 12/10/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	8	0.800	0.800	14.2	mg/L	D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	8	0.800	0.800	34.4	mg/L	D

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-12

24L0086-19RE2 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/04/2024 08:55

Instrument: ICPMS1 Analyst: HAL — Analyzed: 01/06/2025 22:06

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-19RE2 E 01

Preparation Batch: BML0179 — Sample Size: 25 mL

Prepared: 12/08/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chromium	7440-47-3	5	0.00250	0.00527	mg/L	D
Silver	7440-22-4	5	0.00100	ND	mg/L	U
Thallium	7440-28-0	5	0.00100	ND	mg/L	U
Vanadium	7440-62-2	5	0.00100	0.0110	mg/L	D

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-12

24L0086-20 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010D — Sampled: 12/04/2024 08:55

Instrument: ICP3 Analyst: SH — Analyzed: 12/24/2024 03:06

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 24L0086-20 A 01

Preparation Batch: BML0176 — Sample Size: 25 mL

Prepared: 12/07/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0500	73.0	mg/L	
Iron, Dissolved	7439-89-6	1	0.0500	ND	mg/L	U
Magnesium, Dissolved	7439-95-4	1	0.0500	13.1	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0040	ND	mg/L	U
Potassium, Dissolved	7440-09-7	1	0.500	7.93	mg/L	
Sodium, Dissolved	7440-23-5	1	0.500	21.4	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-21

24L0086-21 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/04/2024 10:40
Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 17:16

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-21 G
Preparation Batch: BML0140 — Sample Size: 10 mL
Prepared: 12/06/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	0.60	ug/L	
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	2.19	ug/L	
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	30.8	ug/L	
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	0.22	ug/L	
Benzene	71-43-2	1	0.20	0.25	ug/L	
Trichloroethene	79-01-6	1	0.20	8.74	ug/L	
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	19.3	ug/L	
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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MW-21

24L0086-21 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/04/2024 10:40

Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 17:16

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*114*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*98.4*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*90.7*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*101*	*%*	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
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MW-21

24L0086-21 (Water)

Dissolved Gases

Method: EPA RSK-175 — Sampled: 12/04/2024 10:40

Instrument: FID6 Analyst: MN — Analyzed: 12/06/2024 17:35

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-21 H

Preparation Batch: BML0155 — Sample Size: 10 mL

Prepared: 12/06/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Acetylene	74-86-2	1	1.06	ND	ug/L	U
Methane	74-82-8	1	0.65	368	ug/L	
Ethane	74-84-0	1	1.12	ND	ug/L	U
Ethene	74-85-1	1	1.14	ND	ug/L	U
Surrogate: Propane			*62-122 %*	*109*	*%*	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-21

24L0086-21 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/04/2024 10:40

Instrument: ICPMS1 Analyst: HAL — Analyzed: 01/03/2025 22:53

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-21 E

Preparation Batch: BML0179 — Sample Size: 25 mL

Prepared: 12/08/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic UCT	7440-38-2	5	0.00100	0.00178	mg/L	D
Barium	7440-39-3	5	0.00250	0.124	mg/L	D, B
Beryllium	7440-41-7	5	0.00100	ND	mg/L	U
Cadmium UCT	7440-43-9	5	0.000500	ND	mg/L	U
Cobalt UCT	7440-48-4	5	0.00100	0.00248	mg/L	D
Copper UCT	7440-50-8	5	0.00250	ND	mg/L	U
Lead	7439-92-1	5	0.000500	ND	mg/L	U
Nickel UCT	7440-02-0	5	0.00250	0.00270	mg/L	D
Selenium UCT	7782-49-2	5	0.00250	ND	mg/L	U
Zinc UCT	7440-66-6	5	0.0300	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
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MW-21

24L0086-21 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 12/04/2024 10:40
Instrument: LACHAT1 Analyst: CB — Analyzed: 12/10/2024 17:03

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-21 F
Preparation Batch: BML0217 — Sample Size: 10 mL
Prepared: 12/10/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	0.107	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-21

24L0086-21 (Water)

Wet Chemistry

Method: SM 2320 B-11 — Sampled: 12/04/2024 10:40

Instrument: Accumet AB150 Analyst: UW — Analyzed: 12/11/2024 13:00

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-21 C

Preparation Batch: BML0243 — Sample Size: 100 mL

Prepared: 12/11/2024 — Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	598	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	598	mg/L CaCO3	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-21

24L0086-21 (Water)

Wet Chemistry

Method: SM 2540 C-11 — Sampled: 12/04/2024 10:40
Instrument: BAL2 Analyst: VD — Analyzed: 12/10/2024 15:54

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-21
Preparation Batch: BML0211 — Sample Size: 75 mL
Prepared: 12/10/2024 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	13	13	957	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-21

24L0086-21 (Water)

Wet Chemistry

Method: SM 2540 D-11 — Sampled: 12/04/2024 10:40
Instrument: BAL2 Analyst: LM — Analyzed: 12/06/2024 11:26

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-21
Preparation Batch: BML0150 — Sample Size: 1010 mL
Prepared: 12/06/2024 — Final Volume: 1000 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Suspended Solids		1	1	1	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-21

24L0086-21 (Water)

Wet Chemistry

Method: SM 5310 B-11 — Sampled: 12/04/2024 10:40

Instrument: TOC-LCSH Analyst: RMS — Analyzed: 12/30/2024 14:47

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-21 F

Preparation Batch: BML0576 — Sample Size: 20 mL

Prepared: 12/30/2024 — Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	3.79	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-21

24L0086-21RE1 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/04/2024 10:40

Instrument: ICPMS2 Analyst: MCB — Analyzed: 01/09/2025 18:12

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-21RE1 E 02

Preparation Batch: BNA0112 — Sample Size: 25 mL

Prepared: 01/08/2025 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	5	0.00100	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-21

24L0086-21RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 12/04/2024 10:40
Instrument: IC930 Analyst: LERB — Analyzed: 12/11/2024 15:57

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 24L0086-21RE1 D
Preparation Batch: BML0223 — Sample Size: 10 mL
Prepared: 12/10/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	32	3.20	3.20	41.6	mg/L	D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	32	3.20	3.20	122	mg/L	D

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-21

24L0086-21RE2 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/04/2024 10:40

Instrument: ICPMS1 Analyst: HAL — Analyzed: 01/06/2025 22:11

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-21RE2 E 01

Preparation Batch: BML0179 — Sample Size: 25 mL

Prepared: 12/08/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Silver	7440-22-4	5	0.00100	ND	mg/L	U
Thallium	7440-28-0	5	0.00100	ND	mg/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-21

24L0086-21RE3 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 12/04/2024 10:40

Instrument: ICPMS2 Analyst: MCB — Analyzed: 01/08/2025 23:05

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 24L0086-21RE3 E 01

Preparation Batch: BML0179 — Sample Size: 25 mL

Prepared: 12/08/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chromium	7440-47-3	10	0.00500	ND	mg/L	U
Vanadium	7440-62-2	10	0.00200	0.00529	mg/L	D

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

MW-21

24L0086-22 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010D — Sampled: 12/04/2024 10:40

Instrument: ICP3 Analyst: SH — Analyzed: 12/24/2024 03:09

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 24L0086-22 A 01

Preparation Batch: BML0176 — Sample Size: 25 mL

Prepared: 12/07/2024 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0500	222	mg/L	
Iron, Dissolved	7439-89-6	1	0.0500	ND	mg/L	U
Magnesium, Dissolved	7439-95-4	1	0.0500	54.5	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0040	0.783	mg/L	
Potassium, Dissolved	7440-09-7	1	0.500	13.8	mg/L	
Sodium, Dissolved	7440-23-5	1	0.500	28.3	mg/L	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Trip Blank

24L0086-23 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/03/2024 08:55

Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 10:13

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-23 A

Preparation Batch: BML0140 — Sample Size: 10 mL

Prepared: 12/06/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Trip Blank

24L0086-23 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 12/03/2024 08:55

Instrument: NT20 Analyst: LN — Analyzed: 12/06/2024 10:13

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*110*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*99.1*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*92.9*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*96.2*	*%*	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Trip Blank

24L0086-23 (Water)

Dissolved Gases

Method: EPA RSK-175 — Sampled: 12/03/2024 08:55

Instrument: FID6 Analyst: PKC — Analyzed: 12/09/2024 13:07

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 24L0086-23 D

Preparation Batch: BML0194 — Sample Size: 10 mL

Prepared: 12/09/2024 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Acetylene	74-86-2	1	1.06	ND	ug/L	U
Methane	74-82-8	1	0.65	ND	ug/L	U
Ethane	74-84-0	1	1.12	ND	ug/L	U
Ethene	74-85-1	1	1.14	ND	ug/L	U
Surrogate: Propane			*62-122 %*	*107*	*%*	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BML0140 - EPA 8260D

Instrument: NT20 Analyst: LN

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BML0140-BLK1)			Prepared: 06-Dec-2024 Analyzed: 06-Dec-2024 09:35							
Chloromethane	ND	0.50	ug/L							U
Vinyl Chloride	ND	0.20	ug/L							U
Bromomethane	ND	1.00	ug/L							U
Chloroethane	ND	0.20	ug/L							U
Trichlorofluoromethane	ND	0.20	ug/L							U
Acetone	ND	5.00	ug/L							U
1,1-Dichloroethene	ND	0.20	ug/L							U
Iodomethane	ND	1.00	ug/L							U
Methylene Chloride	ND	1.00	ug/L							U
Acrylonitrile	ND	1.00	ug/L							U
Carbon Disulfide	ND	0.20	ug/L							U
trans-1,2-Dichloroethene	ND	0.20	ug/L							U
Vinyl Acetate	ND	0.20	ug/L							U
1,1-Dichloroethane	ND	0.20	ug/L							U
2-Butanone	ND	5.00	ug/L							U
cis-1,2-Dichloroethene	ND	0.20	ug/L							U
Chloroform	ND	0.20	ug/L							U
Bromochloromethane	ND	0.20	ug/L							U
1,1,1-Trichloroethane	ND	0.20	ug/L							U
Carbon tetrachloride	ND	0.20	ug/L							U
1,2-Dichloroethane	ND	0.20	ug/L							U
Benzene	ND	0.20	ug/L							U
Trichloroethene	ND	0.20	ug/L							U
1,2-Dichloropropane	ND	0.20	ug/L							U
Bromodichloromethane	ND	0.20	ug/L							U
Dibromomethane	ND	0.20	ug/L							U
4-Methyl-2-Pentanone	ND	5.00	ug/L							U
cis-1,3-Dichloropropene	ND	0.20	ug/L							U
Toluene	ND	0.20	ug/L							U
trans-1,3-Dichloropropene	ND	0.20	ug/L							U
2-Hexanone	ND	5.00	ug/L							U
1,1,2-Trichloroethane	ND	0.20	ug/L							U
Tetrachloroethene	ND	0.20	ug/L							U
Dibromochloromethane	ND	0.20	ug/L							U
1,2-Dibromoethane	ND	0.20	ug/L							U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BML0140 - EPA 8260D

Instrument: NT20 Analyst: LN

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BML0140-BLK1)			Prepared: 06-Dec-2024 Analyzed: 06-Dec-2024 09:35							
Chlorobenzene	ND	0.20	ug/L							U
Ethylbenzene	ND	0.20	ug/L							U
1,1,1,2-Tetrachloroethane	ND	0.20	ug/L							U
m,p-Xylene	ND	0.40	ug/L							U
o-Xylene	ND	0.20	ug/L							U
Styrene	ND	0.20	ug/L							U
Bromoform	ND	0.20	ug/L							U
1,1,2,2-Tetrachloroethane	ND	0.20	ug/L							U
1,2,3-Trichloropropane	ND	0.50	ug/L							U
trans-1,4-Dichloro 2-Butene	ND	1.00	ug/L							U
1,4-Dichlorobenzene	ND	0.20	ug/L							U
1,2-Dichlorobenzene	ND	0.20	ug/L							U
1,2-Dibromo-3-chloropropane	ND	0.50	ug/L							U
Surrogate: 1,2-Dichloroethane-d4	5.77		ug/L	*5.00*		*115*	*80-129*			
Surrogate: Toluene-d8	4.92		ug/L	*5.00*		*98.5*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.80		ug/L	*5.00*		*95.9*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	5.02		ug/L	*5.00*		*100*	*80-120*			

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BML0140 - EPA 8260D

Instrument: NT20 Analyst: LN

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BML0140-BS1)				Prepared: 06-Dec-2024 Analyzed: 06-Dec-2024 08:27						
Chloromethane	12.5	0.50	ug/L	10.0		125	60-138			Q
Vinyl Chloride	11.7	0.20	ug/L	10.0		117	66-133			
Bromomethane	11.1	1.00	ug/L	10.0		111	72-131			
Chloroethane	11.8	0.20	ug/L	10.0		118	60-155			
Trichlorofluoromethane	11.7	0.20	ug/L	10.0		117	62-141			
Acetone	59.3	5.00	ug/L	50.0		119	58-142			
1,1-Dichloroethene	11.7	0.20	ug/L	10.0		117	69-135			
Iodomethane	9.88	1.00	ug/L	10.0		98.8	56-147			
Methylene Chloride	11.9	1.00	ug/L	10.0		119	65-135			
Acrylonitrile	12.1	1.00	ug/L	10.0		121	64-134			Q
Carbon Disulfide	9.97	0.20	ug/L	10.0		99.7	78-125			
trans-1,2-Dichloroethene	10.7	0.20	ug/L	10.0		107	78-128			
Vinyl Acetate	11.2	0.20	ug/L	10.0		112	55-138			
1,1-Dichloroethane	11.5	0.20	ug/L	10.0		115	76-124			
2-Butanone	58.7	5.00	ug/L	50.0		117	61-140			
cis-1,2-Dichloroethene	10.8	0.20	ug/L	10.0		108	80-121			
Chloroform	11.3	0.20	ug/L	10.0		113	80-122			
Bromochloromethane	10.2	0.20	ug/L	10.0		102	80-121			
1,1,1-Trichloroethane	9.60	0.20	ug/L	10.0		96.0	79-123			
Carbon tetrachloride	9.51	0.20	ug/L	10.0		95.1	53-137			
1,2-Dichloroethane	10.3	0.20	ug/L	10.0		103	75-123			
Benzene	10.5	0.20	ug/L	10.0		105	80-120			
Trichloroethene	10.2	0.20	ug/L	10.0		102	80-120			
1,2-Dichloropropane	10.8	0.20	ug/L	10.0		108	80-120			
Bromodichloromethane	10.0	0.20	ug/L	10.0		100	80-121			
Dibromomethane	9.55	0.20	ug/L	10.0		95.5	80-120			
4-Methyl-2-Pentanone	51.0	5.00	ug/L	50.0		102	67-133			
cis-1,3-Dichloropropene	9.89	0.20	ug/L	10.0		98.9	80-124			
Toluene	10.2	0.20	ug/L	10.0		102	80-120			
trans-1,3-Dichloropropene	9.62	0.20	ug/L	10.0		96.2	71-127			
2-Hexanone	52.4	5.00	ug/L	50.0		105	69-133			
1,1,2-Trichloroethane	9.65	0.20	ug/L	10.0		96.5	80-121			
Tetrachloroethene	9.95	0.20	ug/L	10.0		99.5	80-120			
Dibromochloromethane	9.15	0.20	ug/L	10.0		91.5	65-135			
1,2-Dibromoethane	9.45	0.20	ug/L	10.0		94.5	80-121			

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BML0140 - EPA 8260D

Instrument: NT20 Analyst: LN

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BML0140-BS1)				Prepared: 06-Dec-2024 Analyzed: 06-Dec-2024 08:27						
Chlorobenzene	9.99	0.20	ug/L	10.0		99.9	80-120			
Ethylbenzene	10.2	0.20	ug/L	10.0		102	80-120			
1,1,1,2-Tetrachloroethane	9.31	0.20	ug/L	10.0		93.1	80-120			
m,p-Xylene	20.5	0.40	ug/L	20.0		103	80-121			
o-Xylene	9.98	0.20	ug/L	10.0		99.8	80-121			
Styrene	10.3	0.20	ug/L	10.0		103	80-124			
Bromoform	9.00	0.20	ug/L	10.0		90.0	51-134			
1,1,2,2-Tetrachloroethane	9.40	0.20	ug/L	10.0		94.0	77-123			
1,2,3-Trichloropropane	9.42	0.50	ug/L	10.0		94.2	76-125			
trans-1,4-Dichloro 2-Butene	10.3	1.00	ug/L	10.0		103	55-129			
1,4-Dichlorobenzene	10.2	0.20	ug/L	10.0		102	80-120			
1,2-Dichlorobenzene	9.95	0.20	ug/L	10.0		99.5	80-120			
1,2-Dibromo-3-chloropropane	9.03	0.50	ug/L	10.0		90.3	62-123			
Surrogate: 1,2-Dichloroethane-d4	5.58		ug/L	*5.00*		*112*	*80-129*			
Surrogate: Toluene-d8	5.00		ug/L	*5.00*		*100*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.82		ug/L	*5.00*		*96.4*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	4.98		ug/L	*5.00*		*99.7*	*80-120*			

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BML0140 - EPA 8260D

Instrument: NT20 Analyst: LN

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BML0140-BSD1)				Prepared: 06-Dec-2024 Analyzed: 06-Dec-2024 08:50						
Chloromethane	12.7	0.50	ug/L	10.0		127	60-138	1.49	30	Q
Vinyl Chloride	11.9	0.20	ug/L	10.0		119	66-133	1.52	30	
Bromomethane	11.0	1.00	ug/L	10.0		110	72-131	0.55	30	
Chloroethane	11.8	0.20	ug/L	10.0		118	60-155	0.13	30	
Trichlorofluoromethane	11.7	0.20	ug/L	10.0		117	62-141	0.06	30	
Acetone	59.0	5.00	ug/L	50.0		118	58-142	0.51	30	
1,1-Dichloroethene	11.8	0.20	ug/L	10.0		118	69-135	0.96	30	
Iodomethane	10.2	1.00	ug/L	10.0		102	56-147	2.67	30	
Methylene Chloride	12.2	1.00	ug/L	10.0		122	65-135	2.14	30	
Acrylonitrile	12.3	1.00	ug/L	10.0		123	64-134	1.72	30	Q
Carbon Disulfide	10.1	0.20	ug/L	10.0		101	78-125	1.23	30	
trans-1,2-Dichloroethene	10.9	0.20	ug/L	10.0		109	78-128	1.61	30	
Vinyl Acetate	11.6	0.20	ug/L	10.0		116	55-138	2.90	30	
1,1-Dichloroethane	11.8	0.20	ug/L	10.0		118	76-124	2.26	30	
2-Butanone	59.8	5.00	ug/L	50.0		120	61-140	1.88	30	
cis-1,2-Dichloroethene	10.9	0.20	ug/L	10.0		109	80-121	1.67	30	
Chloroform	11.3	0.20	ug/L	10.0		113	80-122	0.28	30	
Bromochloromethane	10.5	0.20	ug/L	10.0		105	80-121	3.02	30	
1,1,1-Trichloroethane	9.79	0.20	ug/L	10.0		97.9	79-123	1.96	30	
Carbon tetrachloride	9.85	0.20	ug/L	10.0		98.5	53-137	3.53	30	
1,2-Dichloroethane	10.6	0.20	ug/L	10.0		106	75-123	2.49	30	
Benzene	10.6	0.20	ug/L	10.0		106	80-120	1.47	30	
Trichloroethene	10.1	0.20	ug/L	10.0		101	80-120	0.36	30	
1,2-Dichloropropane	11.1	0.20	ug/L	10.0		111	80-120	2.55	30	
Bromodichloromethane	10.2	0.20	ug/L	10.0		102	80-121	2.08	30	
Dibromomethane	9.96	0.20	ug/L	10.0		99.6	80-120	4.27	30	
4-Methyl-2-Pentanone	52.6	5.00	ug/L	50.0		105	67-133	3.13	30	
cis-1,3-Dichloropropene	10.2	0.20	ug/L	10.0		102	80-124	2.65	30	
Toluene	10.4	0.20	ug/L	10.0		104	80-120	1.57	30	
trans-1,3-Dichloropropene	9.95	0.20	ug/L	10.0		99.5	71-127	3.40	30	
2-Hexanone	54.5	5.00	ug/L	50.0		109	69-133	3.78	30	
1,1,2-Trichloroethane	9.77	0.20	ug/L	10.0		97.7	80-121	1.25	30	
Tetrachloroethene	10.2	0.20	ug/L	10.0		102	80-120	2.07	30	
Dibromochloromethane	9.55	0.20	ug/L	10.0		95.5	65-135	4.29	30	
1,2-Dibromoethane	9.92	0.20	ug/L	10.0		99.2	80-121	4.82	30	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BML0140 - EPA 8260D

Instrument: NT20 Analyst: LN

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BML0140-BSD1)				Prepared: 06-Dec-2024 Analyzed: 06-Dec-2024 08:50						
Chlorobenzene	10.3	0.20	ug/L	10.0		103	80-120	3.18	30	
Ethylbenzene	10.4	0.20	ug/L	10.0		104	80-120	1.79	30	
1,1,1,2-Tetrachloroethane	9.72	0.20	ug/L	10.0		97.2	80-120	4.36	30	
m,p-Xylene	21.1	0.40	ug/L	20.0		106	80-121	2.80	30	
o-Xylene	10.2	0.20	ug/L	10.0		102	80-121	2.39	30	
Styrene	10.7	0.20	ug/L	10.0		107	80-124	3.60	30	
Bromoform	9.38	0.20	ug/L	10.0		93.8	51-134	4.10	30	
1,1,2,2-Tetrachloroethane	9.77	0.20	ug/L	10.0		97.7	77-123	3.86	30	
1,2,3-Trichloropropane	10.2	0.50	ug/L	10.0		102	76-125	8.30	30	
trans-1,4-Dichloro 2-Butene	10.2	1.00	ug/L	10.0		102	55-129	1.52	30	
1,4-Dichlorobenzene	10.4	0.20	ug/L	10.0		104	80-120	2.25	30	
1,2-Dichlorobenzene	10.2	0.20	ug/L	10.0		102	80-120	2.18	30	
1,2-Dibromo-3-chloropropane	9.19	0.50	ug/L	10.0		91.9	62-123	1.71	30	
Surrogate: 1,2-Dichloroethane-d4	5.72		ug/L	*5.00*		*114*	*80-129*			
Surrogate: Toluene-d8	5.00		ug/L	*5.00*		*100*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.85		ug/L	*5.00*		*97.1*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	4.97		ug/L	*5.00*		*99.4*	*80-120*			

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BML0140 - EPA 8260D

Instrument: NT20 Analyst: LN

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BML0140-MS1)	**Source: 24L0086-01**		Prepared: 06-Dec-2024 Analyzed: 06-Dec-2024 18:48							
Chloromethane	12.5	0.50	ug/L	10.0	ND	125	60-138			
Vinyl Chloride	11.6	0.20	ug/L	10.0	ND	116	66-133			
Bromomethane	10.8	1.00	ug/L	10.0	ND	108	72-131			
Chloroethane	11.7	0.20	ug/L	10.0	ND	117	60-155			
Trichlorofluoromethane	11.5	0.20	ug/L	10.0	ND	115	62-141			
Acetone	58.6	5.00	ug/L	50.0	ND	117	58-142			
1,1-Dichloroethene	11.8	0.20	ug/L	10.0	ND	118	69-135			
Iodomethane	9.87	1.00	ug/L	10.0	ND	98.7	56-147			
Methylene Chloride	11.3	1.00	ug/L	10.0	ND	113	65-135			
Acrylonitrile	11.2	1.00	ug/L	10.0	ND	112	64-134			
Carbon Disulfide	9.88	0.20	ug/L	10.0	ND	98.8	78-125			
trans-1,2-Dichloroethene	11.0	0.20	ug/L	10.0	ND	110	78-128			
Vinyl Acetate	8.99	0.20	ug/L	10.0	ND	89.9	55-138			
1,1-Dichloroethane	11.9	0.20	ug/L	10.0	ND	119	76-124			
2-Butanone	56.8	5.00	ug/L	50.0	ND	114	61-140			
cis-1,2-Dichloroethene	10.8	0.20	ug/L	10.0	ND	108	80-121			
Chloroform	11.6	0.20	ug/L	10.0	ND	116	80-122			
Bromochloromethane	10.5	0.20	ug/L	10.0	ND	105	80-121			
1,1,1-Trichloroethane	9.62	0.20	ug/L	10.0	ND	96.2	79-123			
Carbon tetrachloride	9.74	0.20	ug/L	10.0	ND	97.4	53-137			
1,2-Dichloroethane	10.5	0.20	ug/L	10.0	ND	105	75-123			
Benzene	10.6	0.20	ug/L	10.0	ND	106	80-120			
Trichloroethene	10.4	0.20	ug/L	10.0	0.21	102	80-120			
1,2-Dichloropropane	11.0	0.20	ug/L	10.0	ND	110	80-120			
Bromodichloromethane	9.98	0.20	ug/L	10.0	ND	99.8	80-121			
Dibromomethane	9.51	0.20	ug/L	10.0	ND	95.1	80-120			
4-Methyl-2-Pentanone	49.1	5.00	ug/L	50.0	ND	98.1	67-133			
cis-1,3-Dichloropropene	9.43	0.20	ug/L	10.0	ND	94.3	80-124			
Toluene	10.5	0.20	ug/L	10.0	ND	105	80-120			
trans-1,3-Dichloropropene	9.24	0.20	ug/L	10.0	ND	92.4	71-127			
2-Hexanone	50.3	5.00	ug/L	50.0	ND	101	69-133			
1,1,2-Trichloroethane	9.66	0.20	ug/L	10.0	ND	96.6	80-121			
Tetrachloroethene	14.1	0.20	ug/L	10.0	4.07	100	80-120			
Dibromochloromethane	9.17	0.20	ug/L	10.0	ND	91.7	65-135			
1,2-Dibromoethane	9.48	0.20	ug/L	10.0	ND	94.8	80-121			

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BML0140 - EPA 8260D

Instrument: NT20 Analyst: LN

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BML0140-MS1)	**Source: 24L0086-01**		Prepared: 06-Dec-2024 Analyzed: 06-Dec-2024 18:48							
Chlorobenzene	10.3	0.20	ug/L	10.0	ND	103	80-120			
Ethylbenzene	10.5	0.20	ug/L	10.0	ND	105	80-120			
1,1,1,2-Tetrachloroethane	9.44	0.20	ug/L	10.0	ND	94.4	80-120			
m,p-Xylene	21.1	0.40	ug/L	20.0	ND	105	80-121			
o-Xylene	10.2	0.20	ug/L	10.0	ND	102	80-121			
Styrene	10.6	0.20	ug/L	10.0	ND	106	80-124			
Bromoform	8.85	0.20	ug/L	10.0	ND	88.5	51-134			
1,1,2,2-Tetrachloroethane	9.55	0.20	ug/L	10.0	ND	95.5	77-123			
1,2,3-Trichloropropane	9.50	0.50	ug/L	10.0	ND	95.0	76-125			
trans-1,4-Dichloro 2-Butene	9.52	1.00	ug/L	10.0	ND	95.2	55-129			
1,4-Dichlorobenzene	10.6	0.20	ug/L	10.0	ND	106	80-120			
1,2-Dichlorobenzene	10.4	0.20	ug/L	10.0	ND	104	80-120			
1,2-Dibromo-3-chloropropane	8.57	0.50	ug/L	10.0	ND	85.7	62-123			
Surrogate: 1,2-Dichloroethane-d4	5.53		ug/L	*5.00*	*5.68*	*111*	*80-129*			
Surrogate: Toluene-d8	5.02		ug/L	*5.00*	*4.94*	*100*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.73		ug/L	*5.00*	*4.71*	*94.6*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	4.99		ug/L	*5.00*	*4.88*	*99.8*	*80-120*			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BML0140 - EPA 8260D

Instrument: NT20 Analyst: LN

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BML0140-MSD1)	**Source: 24L0086-01**		Prepared: 06-Dec-2024 Analyzed: 06-Dec-2024 19:11							
Chloromethane	12.4	0.50	ug/L	10.0	ND	124	60-138	1.24	30	
Vinyl Chloride	11.5	0.20	ug/L	10.0	ND	115	66-133	0.93	30	
Bromomethane	11.0	1.00	ug/L	10.0	ND	110	72-131	2.33	30	
Chloroethane	11.7	0.20	ug/L	10.0	ND	117	60-155	0.50	30	
Trichlorofluoromethane	11.3	0.20	ug/L	10.0	ND	113	62-141	1.40	30	
Acetone	59.4	5.00	ug/L	50.0	ND	119	58-142	1.37	30	
1,1-Dichloroethene	11.6	0.20	ug/L	10.0	ND	116	69-135	1.80	30	
Iodomethane	9.81	1.00	ug/L	10.0	ND	98.1	56-147	0.64	30	
Methylene Chloride	11.1	1.00	ug/L	10.0	ND	111	65-135	1.90	30	
Acrylonitrile	12.2	1.00	ug/L	10.0	ND	122	64-134	8.04	30	
Carbon Disulfide	9.86	0.20	ug/L	10.0	ND	98.6	78-125	0.20	30	
trans-1,2-Dichloroethene	10.8	0.20	ug/L	10.0	ND	108	78-128	2.20	30	
Vinyl Acetate	8.97	0.20	ug/L	10.0	ND	89.7	55-138	0.22	30	
1,1-Dichloroethane	11.7	0.20	ug/L	10.0	ND	117	76-124	1.93	30	
2-Butanone	56.7	5.00	ug/L	50.0	ND	113	61-140	0.23	30	
cis-1,2-Dichloroethene	10.8	0.20	ug/L	10.0	ND	108	80-121	0.54	30	
Chloroform	11.3	0.20	ug/L	10.0	ND	113	80-122	2.35	30	
Bromochloromethane	10.2	0.20	ug/L	10.0	ND	102	80-121	2.98	30	
1,1,1-Trichloroethane	9.61	0.20	ug/L	10.0	ND	96.1	79-123	0.04	30	
Carbon tetrachloride	9.65	0.20	ug/L	10.0	ND	96.5	53-137	0.98	30	
1,2-Dichloroethane	10.2	0.20	ug/L	10.0	ND	102	75-123	2.58	30	
Benzene	10.4	0.20	ug/L	10.0	ND	104	80-120	2.08	30	
Trichloroethene	10.2	0.20	ug/L	10.0	0.21	99.6	80-120	2.65	30	
1,2-Dichloropropane	10.9	0.20	ug/L	10.0	ND	109	80-120	1.10	30	
Bromodichloromethane	9.85	0.20	ug/L	10.0	ND	98.5	80-121	1.33	30	
Dibromomethane	9.50	0.20	ug/L	10.0	ND	95.0	80-120	0.14	30	
4-Methyl-2-Pentanone	48.9	5.00	ug/L	50.0	ND	97.8	67-133	0.33	30	
cis-1,3-Dichloropropene	9.34	0.20	ug/L	10.0	ND	93.4	80-124	0.96	30	
Toluene	10.2	0.20	ug/L	10.0	ND	102	80-120	3.25	30	
trans-1,3-Dichloropropene	9.11	0.20	ug/L	10.0	ND	91.1	71-127	1.39	30	
2-Hexanone	50.0	5.00	ug/L	50.0	ND	100	69-133	0.68	30	
1,1,2-Trichloroethane	9.37	0.20	ug/L	10.0	ND	93.7	80-121	3.04	30	
Tetrachloroethene	13.7	0.20	ug/L	10.0	4.07	96.4	80-120	2.89	30	
Dibromochloromethane	9.07	0.20	ug/L	10.0	ND	90.7	65-135	1.09	30	
1,2-Dibromoethane	9.33	0.20	ug/L	10.0	ND	93.3	80-121	1.59	30	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BML0140 - EPA 8260D

Instrument: NT20 Analyst: LN

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BML0140-MSD1)	**Source: 24L0086-01**		Prepared: 06-Dec-2024 Analyzed: 06-Dec-2024 19:11							
Chlorobenzene	9.96	0.20	ug/L	10.0	ND	99.6	80-120	3.60	30	
Ethylbenzene	9.98	0.20	ug/L	10.0	ND	99.8	80-120	4.92	30	
1,1,1,2-Tetrachloroethane	9.15	0.20	ug/L	10.0	ND	91.5	80-120	3.16	30	
m,p-Xylene	20.5	0.40	ug/L	20.0	ND	103	80-121	2.60	30	
o-Xylene	9.86	0.20	ug/L	10.0	ND	98.6	80-121	3.47	30	
Styrene	10.2	0.20	ug/L	10.0	ND	102	80-124	3.73	30	
Bromoform	8.37	0.20	ug/L	10.0	ND	83.7	51-134	5.60	30	
1,1,2,2-Tetrachloroethane	8.99	0.20	ug/L	10.0	ND	89.9	77-123	6.02	30	
1,2,3-Trichloropropane	8.86	0.50	ug/L	10.0	ND	88.6	76-125	6.99	30	
trans-1,4-Dichloro 2-Butene	9.47	1.00	ug/L	10.0	ND	94.7	55-129	0.57	30	
1,4-Dichlorobenzene	9.72	0.20	ug/L	10.0	ND	97.2	80-120	8.21	30	
1,2-Dichlorobenzene	9.62	0.20	ug/L	10.0	ND	96.2	80-120	7.62	30	
1,2-Dibromo-3-chloropropane	8.28	0.50	ug/L	10.0	ND	82.8	62-123	3.43	30	
Surrogate: 1,2-Dichloroethane-d4	5.63		ug/L	*5.00*	*5.68*	*113*	*80-129*			
Surrogate: Toluene-d8	5.05		ug/L	*5.00*	*4.94*	*101*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.80		ug/L	*5.00*	*4.71*	*96.0*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	4.90		ug/L	*5.00*	*4.88*	*97.9*	*80-120*			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Dissolved Gases - Quality Control

Batch BML0155 - EPA RSK-175

Instrument: FID6 Analyst: MN

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BML0155-BLK1)			Prepared: 06-Dec-2024 Analyzed: 06-Dec-2024 12:10							
Acetylene	ND	1.06	ug/L							U
Methane	ND	0.65	ug/L							U
Ethane	ND	1.12	ug/L							U
Ethene	ND	1.14	ug/L							U
Surrogate: Propane	2060		ug/L	*1800*		*114*	*62-122*			

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Dissolved Gases - Quality Control

Batch BML0155 - EPA RSK-175

Instrument: FID6 Analyst: MN

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BML0155-BS1)				Prepared: 06-Dec-2024 Analyzed: 06-Dec-2024 11:43						
Acetylene	566	1.06	ug/L	530		107	0-200			
Methane	358	0.65	ug/L	328		109	80-120			
Ethane	668	1.12	ug/L	615		109	80-120			
Ethene	616	1.14	ug/L	575		107	80-120			
Surrogate: Propane	2080		ug/L	*1800*		*115*	*62-122*			

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Dissolved Gases - Quality Control

Batch BML0155 - EPA RSK-175

Instrument: FID6 Analyst: MN

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BML0155-BSD1)				Prepared: 06-Dec-2024 Analyzed: 06-Dec-2024 11:57						
Acetylene	538	1.06	ug/L	530		101	0-200	5.08	200	
Methane	357	0.65	ug/L	328		109	80-120	0.41	30	
Ethane	660	1.12	ug/L	615		107	80-120	1.18	30	
Ethene	607	1.14	ug/L	575		106	80-120	1.44	30	
Surrogate: Propane	2060		ug/L	*1800*		*115*	*62-122*			

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Dissolved Gases - Quality Control

Batch BML0194 - EPA RSK-175

Instrument: FID6 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BML0194-BLK1)				Prepared: 09-Dec-2024 Analyzed: 09-Dec-2024 09:30						
Acetylene	ND	1.06	ug/L							U
Methane	ND	0.65	ug/L							U
Ethane	ND	1.12	ug/L							U
Ethene	ND	1.14	ug/L							U
Surrogate: Propane	2010		ug/L	*1800*		*112*	*62-122*			

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Dissolved Gases - Quality Control

Batch BML0194 - EPA RSK-175

Instrument: FID6 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BML0194-BS1)				Prepared: 09-Dec-2024 Analyzed: 09-Dec-2024 09:04						
Acetylene	579	1.06	ug/L	530		109	0-200			
Methane	369	0.65	ug/L	328		113	80-120			
Ethane	685	1.12	ug/L	615		111	80-120			
Ethene	631	1.14	ug/L	575		110	80-120			
Surrogate: Propane	2010		ug/L	*1800*		*111*	*62-122*			

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Dissolved Gases - Quality Control

Batch BML0194 - EPA RSK-175

Instrument: FID6 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BML0194-BSD1)				Prepared: 09-Dec-2024 Analyzed: 09-Dec-2024 09:17						
Acetylene	578	1.06	ug/L	530		109	0-200	0.21	200	
Methane	369	0.65	ug/L	328		112	80-120	0.10	30	
Ethane	689	1.12	ug/L	615		112	80-120	0.52	30	
Ethene	633	1.14	ug/L	575		110	80-120	0.23	30	
Surrogate: Propane	2020		ug/L	*1800*		*112*	*62-122*			

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Dissolved Gases - Quality Control

Batch BML0194 - EPA RSK-175

Instrument: FID6 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BML0194-MS1)	**Source: 24L0086-01**		Prepared: 09-Dec-2024 Analyzed: 09-Dec-2024 14:24							
Acetylene	567	1.06	ug/L	530	ND	107	0-200			
Methane	360	0.65	ug/L	328	ND	110	80-120			
Ethane	683	1.12	ug/L	615	ND	111	80-120			
Ethene	622	1.14	ug/L	575	ND	108	80-120			
Surrogate: Propane	2040		ug/L	*1800*	*1980*	*113*	*62-122*			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Dissolved Gases - Quality Control

Batch BML0194 - EPA RSK-175

Instrument: FID6 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BML0194-MSD1)	**Source: 24L0086-01**		Prepared: 09-Dec-2024 Analyzed: 09-Dec-2024 14:38							
Acetylene	547	1.06	ug/L	530	ND	103	0-200	3.57	200	
Methane	353	0.65	ug/L	328	ND	107	80-120	2.02	30	
Ethane	668	1.12	ug/L	615	ND	109	80-120	2.20	30	
Ethene	611	1.14	ug/L	575	ND	106	80-120	1.90	30	
Surrogate: Propane	1940		ug/L	*1800*	*1980*	*108*	*62-122*			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BML0179 - EPA 200.8

Instrument: ICPMS1 Analyst: HAL

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BML0179-BLK1)				Prepared: 08-Dec-2024 Analyzed: 18-Dec-2024 01:43							
Chromium	52	ND	0.000500	mg/L							U
Copper UCT	63 UCT	ND	0.000500	mg/L							U
Lead	208	ND	0.000100	mg/L							U
Nickel UCT	60 UCT	ND	0.000500	mg/L							U
Silver	107	ND	0.000200	mg/L							U
Thallium	205	ND	0.000200	mg/L							U
Zinc UCT	66 UCT	ND	0.00600	mg/L							U
Blank (BML0179-BLK2)				Prepared: 08-Dec-2024 Analyzed: 23-Dec-2024 16:30							
Arsenic UCT	75a UCT	ND	0.000200	mg/L							U
Cadmium UCT	111 UCT	ND	0.000100	mg/L							U
Chromium	52	ND	0.000500	mg/L							U
Copper UCT	63 UCT	ND	0.000500	mg/L							U
Lead	208	ND	0.000100	mg/L							U
Nickel UCT	60 UCT	ND	0.000500	mg/L							U
Silver	107	ND	0.000200	mg/L							U
Zinc UCT	66 UCT	ND	0.00600	mg/L							U
Blank (BML0179-BLK3)				Prepared: 08-Dec-2024 Analyzed: 06-Jan-2025 19:53							
Arsenic UCT	75a UCT	ND	0.000200	mg/L							U
Barium	135	0.000963	0.000500	mg/L							
Beryllium	9	ND	0.000200	mg/L							U
Cadmium UCT	111 UCT	ND	0.000100	mg/L							U
Chromium	52	ND	0.000500	mg/L							U
Cobalt UCT	59 UCT	ND	0.000200	mg/L							U
Copper UCT	63 UCT	ND	0.000500	mg/L							U
Lead	208	ND	0.000100	mg/L							U
Nickel UCT	60 UCT	ND	0.000500	mg/L							U
Selenium UCT	78 UCT	ND	0.000500	mg/L							U
Silver	107	ND	0.000200	mg/L							U
Thallium	205	ND	0.000200	mg/L							U
Vanadium	51a	ND	0.000200	mg/L							U
Zinc UCT	66 UCT	ND	0.00600	mg/L							U
LCS (BML0179-BS1)				Prepared: 08-Dec-2024 Analyzed: 18-Dec-2024 01:48							
Chromium	52	0.0227	0.000500	mg/L	0.0250		91.0	80-120			

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BML0179 - EPA 200.8

Instrument: ICPMS1 Analyst: HAL

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BML0179-BS1)					Prepared: 08-Dec-2024 Analyzed: 18-Dec-2024 01:48						
Copper UCT	63 UCT	0.0252	0.000500	mg/L	0.0250		101	80-120			
Lead	208	0.0245	0.000200	mg/L	0.0250		98.0	80-120			
Nickel UCT	60 UCT	0.0255	0.000500	mg/L	0.0250		102	80-120			
Silver	107	0.0240	0.000200	mg/L	0.0250		95.9	85-115			
Zinc UCT	66 UCT	0.0821	0.00600	mg/L	0.0800		103	80-120			
LCS (BML0179-BS2)					Prepared: 08-Dec-2024 Analyzed: 23-Dec-2024 16:34						
Arsenic UCT	75a UCT	0.0251	0.000200	mg/L	0.0250		100	80-120			
Cadmium UCT	111 UCT	0.0254	0.000100	mg/L	0.0250		102	80-120			
Chromium	52	0.0271	0.000500	mg/L	0.0250		108	80-120			
Copper UCT	63 UCT	0.0258	0.000500	mg/L	0.0250		103	80-120			
Lead	208	0.0265	0.000200	mg/L	0.0250		106	80-120			
Nickel UCT	60 UCT	0.0263	0.000500	mg/L	0.0250		105	80-120			
Silver	107	0.0275	0.000200	mg/L	0.0250		110	80-120			
Zinc UCT	66 UCT	0.0839	0.00600	mg/L	0.0800		105	80-120			
LCS (BML0179-BS3)					Prepared: 08-Dec-2024 Analyzed: 06-Jan-2025 19:58						
Arsenic UCT	75a UCT	0.0250	0.000200	mg/L	0.0250		99.9	85-115			
Barium	135	0.0256	0.000500	mg/L	0.0250		102	85-115			B
Beryllium	9	0.0256	0.000200	mg/L	0.0250		102	85-115			
Cadmium UCT	111 UCT	0.0258	0.000100	mg/L	0.0250		103	85-115			
Chromium	52	0.0242	0.000500	mg/L	0.0250		96.9	85-115			
Cobalt UCT	59 UCT	0.0256	0.000200	mg/L	0.0250		102	85-115			
Copper UCT	63 UCT	0.0253	0.000500	mg/L	0.0250		101	85-115			
Lead	208	0.0250	0.000200	mg/L	0.0250		100	85-115			
Nickel UCT	60 UCT	0.0254	0.000500	mg/L	0.0250		101	85-115			
Selenium UCT	78 UCT	0.0811	0.00100	mg/L	0.0800		101	85-115			
Silver	107	0.0251	0.000200	mg/L	0.0250		100	85-115			
Thallium	205	0.0249	0.000200	mg/L	0.0250		99.8	85-115			
Vanadium	51a	0.0239	0.000200	mg/L	0.0250		95.5	85-115			
Zinc UCT	66 UCT	0.0807	0.00600	mg/L	0.0800		101	85-115			
Duplicate (BML0179-DUP1)			**Source: 24L0086-01**		Prepared: 08-Dec-2024 Analyzed: 06-Jan-2025 20:24						
Arsenic UCT	75a UCT	0.00378	0.00100	mg/L		0.00390			3.13	20	D
Barium	135	0.0425	0.00250	mg/L		0.0403			5.32	20	D, B
Beryllium	9	ND	0.00100	mg/L		ND				20	U

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BML0179 - EPA 200.8

Instrument: ICPMS1 Analyst: HAL

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (BML0179-DUP1)		**Source: 24L0086-01**		Prepared: 08-Dec-2024 Analyzed: 06-Jan-2025 20:24							
Cadmium UCT	111 UCT	ND	0.000500	mg/L		ND				20	U
Cobalt UCT	59 UCT	0.0105	0.00100	mg/L		0.0102			2.81	20	D
Copper UCT	63 UCT	ND	0.00250	mg/L		ND				20	U, D
Lead	208	ND	0.000500	mg/L		ND				20	U
Nickel UCT	60 UCT	ND	0.00250	mg/L		ND				20	U, D
Selenium UCT	78 UCT	ND	0.00250	mg/L		ND				20	U
Silver	107	ND	0.00100	mg/L		ND				20	U
Thallium	205	ND	0.00100	mg/L		ND				20	U
Zinc UCT	66 UCT	ND	0.0300	mg/L		ND				20	U
Matrix Spike (BML0179-MS1)		**Source: 24L0086-01**		Prepared: 08-Dec-2024 Analyzed: 06-Jan-2025 20:29							
Arsenic UCT	75a UCT	0.0286	0.00100	mg/L	0.0250	0.00390	98.9	75-125			D
Barium	135	0.0678	0.00250	mg/L	0.0250	0.0403	110	75-125			D, B
Beryllium	9	0.0257	0.00100	mg/L	0.0250	ND	103	75-125			D
Cadmium UCT	111 UCT	0.0261	0.000500	mg/L	0.0250	ND	104	75-125			D
Cobalt UCT	59 UCT	0.0361	0.00100	mg/L	0.0250	0.0102	104	75-125			D
Copper UCT	63 UCT	0.0271	0.00250	mg/L	0.0250	ND	101	75-125			D
Lead	208	0.0248	0.00100	mg/L	0.0250	ND	99.2	75-125			D
Nickel UCT	60 UCT	0.0272	0.00250	mg/L	0.0250	ND	103	75-125			D
Selenium UCT	78 UCT	0.0792	0.00500	mg/L	0.0800	ND	97.4	75-125			D
Silver	107	0.0240	0.00100	mg/L	0.0250	ND	95.8	75-125			D
Thallium	205	0.0246	0.00100	mg/L	0.0250	ND	98.2	75-125			D
Zinc UCT	66 UCT	0.0868	0.0300	mg/L	0.0800	ND	109	75-125			D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BML0179-MSD1)		**Source: 24L0086-01**		Prepared: 08-Dec-2024 Analyzed: 06-Jan-2025 20:34							
Arsenic UCT	75a UCT	0.0294	0.00100	mg/L	0.0250	0.00390	102	75-125	2.71	20	D
Barium	135	0.0688	0.00250	mg/L	0.0250	0.0403	114	75-125	1.44	20	D, B
Beryllium	9	0.0257	0.00100	mg/L	0.0250	ND	103	75-125	0.02	20	D
Cadmium UCT	111 UCT	0.0258	0.000500	mg/L	0.0250	ND	103	75-125	1.16	20	D
Cobalt UCT	59 UCT	0.0360	0.00100	mg/L	0.0250	0.0102	103	75-125	0.35	20	D
Copper UCT	63 UCT	0.0275	0.00250	mg/L	0.0250	ND	103	75-125	1.52	20	D
Lead	208	0.0263	0.000500	mg/L	0.0250	ND	105	75-125	6.02	20	D
Nickel UCT	60 UCT	0.0273	0.00250	mg/L	0.0250	ND	103	75-125	0.42	20	D
Selenium UCT	78 UCT	0.0805	0.00250	mg/L	0.0800	ND	101	75-125	1.54	20	D

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BML0179 - EPA 200.8

Instrument: ICPMS1 Analyst: HAL

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BML0179-MSD1)		**Source: 24L0086-01**			Prepared: 08-Dec-2024	Analyzed: 06-Jan-2025 20:34					
Silver	107	0.0250	0.00100	mg/L	0.0250	ND	99.9	75-125	4.17	20	D
Thallium	205	0.0253	0.00100	mg/L	0.0250	ND	101	75-125	2.85	20	D
Zinc UCT	66 UCT	0.0858	0.0300	mg/L	0.0800	ND	107	75-125	1.18	20	D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (BML0179-DUP2)		**Source: 24L0086-01RE2**			Prepared: 08-Dec-2024	Analyzed: 08-Jan-2025 22:09					
Chromium	52	ND	0.00500	mg/L		ND				20	U
Vanadium	51a	0.00791	0.00200	mg/L		0.00710			10.80	20	D
Matrix Spike (BML0179-MS2)		**Source: 24L0086-01RE2**			Prepared: 08-Dec-2024	Analyzed: 08-Jan-2025 22:14					
Chromium	52	0.0261	0.00500	mg/L	0.0250	ND	105	75-125			D
Vanadium	51a	0.0294	0.00200	mg/L	0.0250	0.00710	89.0	75-125			D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BML0179-MSD2)		**Source: 24L0086-01RE2**			Prepared: 08-Dec-2024	Analyzed: 08-Jan-2025 22:19					
Chromium	52	0.0264	0.00500	mg/L	0.0250	ND	106	75-125	1.07	20	D
Vanadium	51a	0.0304	0.00200	mg/L	0.0250	0.00710	93.1	75-125	3.45	20	D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BNA0112 - EPA 200.8

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BNA0112-BLK1)					Prepared: 08-Jan-2025 Analyzed: 08-Jan-2025 20:03						
Antimony	121	ND	0.000200	mg/L							U
Blank (BNA0112-BLK2)					Prepared: 08-Jan-2025 Analyzed: 09-Jan-2025 17:29						
Antimony	121	ND	0.000200	mg/L							U
LCS (BNA0112-BS1)					Prepared: 08-Jan-2025 Analyzed: 08-Jan-2025 20:08						
Antimony	121	0.0255	0.000200	mg/L	0.0250		102	85-115			
LCS (BNA0112-BS2)					Prepared: 08-Jan-2025 Analyzed: 09-Jan-2025 17:30						
Antimony	121	0.0253	0.000200	mg/L	0.0250		101	85-115			
Duplicate (BNA0112-DUP1)			**Source: 24L0086-01RE1**		Prepared: 08-Jan-2025 Analyzed: 09-Jan-2025 17:15						
Antimony	121	ND	0.00100	mg/L		ND				20	U
Matrix Spike (BNA0112-MS1)			**Source: 24L0086-01RE1**		Prepared: 08-Jan-2025 Analyzed: 09-Jan-2025 17:16						
Antimony	121	0.0258	0.00100	mg/L	0.0250	ND	103	75-125			D
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BNA0112-MSD1)			**Source: 24L0086-01RE1**		Prepared: 08-Jan-2025 Analyzed: 09-Jan-2025 17:17						
Antimony	121	0.0255	0.00100	mg/L	0.0250	ND	102	75-125	0.92	20	D
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BML0176 - EPA 6010D

Instrument: ICP3 Analyst: SH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BML0176-BLK1)				Prepared: 07-Dec-2024 Analyzed: 24-Dec-2024 00:39						
Calcium, Dissolved	ND	0.0500	mg/L							U
Iron, Dissolved	ND	0.0500	mg/L							U
Magnesium, Dissolved	ND	0.0500	mg/L							U
Manganese, Dissolved	ND	0.0040	mg/L							U
Potassium, Dissolved	ND	0.500	mg/L							U
Sodium, Dissolved	ND	0.500	mg/L							U
LCS (BML0176-BS1)				Prepared: 07-Dec-2024 Analyzed: 24-Dec-2024 00:42						
Calcium, Dissolved	10.0	0.0505	mg/L	10.0		100	80-120			
Iron, Dissolved	2.10	0.0505	mg/L	2.00		105	80-120			
Magnesium, Dissolved	9.95	0.0505	mg/L	10.0		99.5	80-120			
Manganese, Dissolved	0.492	0.0040	mg/L	0.500		98.4	80-120			
Potassium, Dissolved	9.92	0.505	mg/L	10.0		99.2	80-120			
Sodium, Dissolved	10.0	0.505	mg/L	10.0		100	80-120			

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BML0150 - SM 2540 D-11

Instrument: BAL2 Analyst: LM

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BML0150-BLK1)					Prepared: 06-Dec-2024 Analyzed: 06-Dec-2024 11:26						
Suspended Solids	ND	1	1	mg/L							U
LCS (BML0150-BS1)					Prepared: 06-Dec-2024 Analyzed: 06-Dec-2024 11:26						
Suspended Solids	50	1	1	mg/L	52.80		94.5	90-110			
Duplicate (BML0150-DUP2)		**Source: 24L0086-01**			Prepared: 06-Dec-2024 Analyzed: 06-Dec-2024 11:26						
Suspended Solids	11	3	3	mg/L		10			9.52	20	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BML0211 - SM 2540 C-11

Instrument: BAL2 Analyst: VD

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BML0211-BLK1)				Prepared: 10-Dec-2024 Analyzed: 10-Dec-2024 15:54							
Dissolved Solids	ND	5	5	mg/L							U
LCS (BML0211-BS1)				Prepared: 10-Dec-2024 Analyzed: 10-Dec-2024 15:54							
Dissolved Solids	484	10	10	mg/L	500		96.8	90-110			
Duplicate (BML0211-DUP1)		**Source: 24L0086-01**		Prepared: 10-Dec-2024 Analyzed: 10-Dec-2024 15:54							
Dissolved Solids	439	10	10	mg/L		420			4.42	20	

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BML0217 - EPA 350.1 M

Instrument: LACHAT1 Analyst: CB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BML0217-BLK1)					Prepared: 10-Dec-2024 Analyzed: 10-Dec-2024 16:15						
Ammonia-N	ND	0.040	0.040	mg/L							U
LCS (BML0217-BS1)					Prepared: 10-Dec-2024 Analyzed: 10-Dec-2024 16:17						
Ammonia-N	0.455	0.040	0.040	mg/L	0.500		91.0	90-110			
Duplicate (BML0217-DUP1)		**Source: 24L0086-01**			Prepared: 10-Dec-2024 Analyzed: 10-Dec-2024 16:19						
Ammonia-N	ND	0.040	0.040	mg/L		ND				20	U
Matrix Spike (BML0217-MS1)		**Source: 24L0086-01**			Prepared: 10-Dec-2024 Analyzed: 10-Dec-2024 16:20						
Ammonia-N	0.451	0.040	0.040	mg/L	0.501	ND	90.1	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BML0223 - EPA 300.0

Instrument: IC930 Analyst: LERB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BML0223-BLK1)					Prepared: 10-Dec-2024 Analyzed: 10-Dec-2024 17:58						
Chloride	ND	0.100	0.100	mg/L							U
Sulfate	ND	0.100	0.100	mg/L							U
LCS (BML0223-BS1)					Prepared: 10-Dec-2024 Analyzed: 10-Dec-2024 18:18						
Chloride	4.80	0.100	0.100	mg/L	5.00		95.9	90-110			
LCS (BML0223-BS2)					Prepared: 10-Dec-2024 Analyzed: 17-Dec-2024 14:45						
Sulfate	4.80	0.100	0.100	mg/L	5.00		96.0	90-110			
Duplicate (BML0223-DUP2)		**Source: 24L0086-01RE1**			Prepared: 10-Dec-2024 Analyzed: 11-Dec-2024 10:59						
Chloride	18.8	1.00	1.00	mg/L		18.9			0.70	20	D
Sulfate	40.5	1.00	1.00	mg/L		40.9			0.90	20	D
Matrix Spike (BML0223-MS2)		**Source: 24L0086-01RE1**			Prepared: 10-Dec-2024 Analyzed: 11-Dec-2024 11:19						
Chloride	20.3	1.10	1.10	mg/L	2.00	18.9	69.7	80-120			HC, D
Sulfate	44.9	1.10	1.10	mg/L	2.00	40.9	201	80-120			HC, D
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BML0223-MSD2)		**Source: 24L0086-01RE1**			Prepared: 10-Dec-2024 Analyzed: 11-Dec-2024 11:39						
Chloride	20.4	1.10	1.10	mg/L	2.00	18.9	74.9	80-120	0.51	20	HC, D
Sulfate	42.0	1.10	1.10	mg/L	2.00	40.9	56.6	80-120	6.65	20	HC, D
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BML0243 - SM 2320 B-11

Instrument: Accumet AB150 Analyst: UW

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BML0243-BLK1)				Prepared: 11-Dec-2024 Analyzed: 11-Dec-2024 11:11							
Alkalinity, Bicarbonate	ND	1.00	1.00	mg/L CaCO3							U
Alkalinity, Total	ND	1.00	1.00	mg/L CaCO3							U
Duplicate (BML0243-DUP2)		**Source: 24L0086-01**		Prepared: 11-Dec-2024 Analyzed: 11-Dec-2024 13:00							
Alkalinity, Bicarbonate	259	1.00	1.00	mg/L CaCO3		260			0.38	20	
Alkalinity, Total	259	1.00	1.00	mg/L CaCO3		260			0.38	20	
Reference (BML0243-SRM1)				Prepared: 11-Dec-2024 Analyzed: 11-Dec-2024 13:00							
Alkalinity, Total	155	1.00	1.00	mg/L CaCO3	153		101	84.97-115.03			

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
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Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BML0576 - SM 5310 B-11

Instrument: TOC-LCSH Analyst: RMS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BML0576-BLK1)					Prepared: 30-Dec-2024 Analyzed: 30-Dec-2024 08:34						
Total Organic Carbon	ND	0.50	0.50	mg/L							U
LCS (BML0576-BS1)					Prepared: 30-Dec-2024 Analyzed: 30-Dec-2024 08:52						
Total Organic Carbon	21.35	0.50	0.50	mg/L	20.00		107	90-110			
Duplicate (BML0576-DUP1)		**Source: 24L0086-01**			Prepared: 30-Dec-2024 Analyzed: 30-Dec-2024 09:35						
Total Organic Carbon	1.37	0.50	0.50	mg/L		1.37			0.66	20	
Matrix Spike (BML0576-MS1)		**Source: 24L0086-01**			Prepared: 30-Dec-2024 Analyzed: 30-Dec-2024 09:58						
Total Organic Carbon	21.34	0.50	0.50	mg/L	20.00	1.37	99.9	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BML0576-MSD1)		**Source: 24L0086-01**			Prepared: 30-Dec-2024 Analyzed: 30-Dec-2024 10:17						
Total Organic Carbon	23.83	0.50	0.50	mg/L	20.00	1.37	112	75-125	11.00	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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Certified Analyses included in this Report

Analyte	Certifications
EPA 200.8 in Water	
Antimony-121	NELAP,DoD-ELAP,WADOE,WA-DW
Arsenic-75a UCT	NELAP,DoD-ELAP,WADOE,WA-DW
Barium-135	NELAP,DoD-ELAP,WADOE,WA-DW
Beryllium-9	NELAP,DoD-ELAP,WADOE,WA-DW
Cadmium-111 UCT	NELAP,DoD-ELAP,WADOE,WA-DW
Chromium-52	NELAP,DoD-ELAP,WADOE,WA-DW
Cobalt-59 UCT	NELAP,DoD-ELAP,WADOE
Copper-63 UCT	NELAP,DoD-ELAP,WADOE,WA-DW
Lead-208	NELAP,DoD-ELAP,WADOE,WA-DW
Nickel-60 UCT	NELAP,DoD-ELAP,WADOE,WA-DW
Selenium-78 UCT	NELAP,DoD-ELAP,WADOE,WA-DW
Silver-107	NELAP,DoD-ELAP,WADOE,WA-DW
Thallium-205	NELAP,DoD-ELAP,WADOE,WA-DW
Vanadium-51a	NELAP,DoD-ELAP,WADOE
Zinc-66 UCT	NELAP,DoD-ELAP,WADOE,WA-DW
EPA 300.0 in Water	
Chloride	DoD-ELAP,WADOE,NELAP
Sulfate	DoD-ELAP,WADOE,NELAP
EPA 6010D in Water	
Calcium	DoD-ELAP,NELAP,WADOE
Iron	DoD-ELAP,NELAP,WADOE
Magnesium	DoD-ELAP,NELAP,WADOE
Manganese	DoD-ELAP,NELAP,WADOE
Potassium	DoD-ELAP,NELAP,WADOE
Sodium	DoD-ELAP,NELAP,WADOE
EPA 8260D in Water	
Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Acrylonitrile	DoD-ELAP,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
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Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE

1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE

EPA RSK-175 in Water

Methane	NELAP
Methane	NELAP
Methane	NELAP
Methane	NELAP
Ethane	NELAP
Ethane	NELAP
Ethane	NELAP
Ethane	NELAP

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Ethene	NELAP
Ethene	NELAP
Ethene	NELAP
Ethene	NELAP
SM 2320 B-11 in Water	
Alkalinity, Bicarbonate	NELAP,WADOE,DoD-ELAP
Alkalinity, Total	DoD-ELAP,WADOE,NELAP
SM 2540 C-11 in Water	
Dissolved Solids	DoD-ELAP,WADOE,NELAP
SM 2540 D-11 in Water	
Suspended Solids	DoD-ELAP,WADOE,NELAP
SM 5310 B-11 in Water	
Total Organic Carbon	WADOE,NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2025
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program, PJLA Testing	66169	02/28/2025
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2025
WADOE	WA Dept of Ecology	C558	06/30/2025
WA-DW	Ecology - Drinking Water	C558	06/30/2025

Parametrix, Inc.	Project: City of Richland Horn Rapids Landfill	
719 2nd Avenue, Suite 200	Project Number: 555-3820-004	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	15-Jan-2025 15:22

Notes and Definitions

*	Flagged value is not within established control limits.
B	This analyte was detected in the method blank.
D	The reported value is from a dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
HC	The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
J	Estimated concentration value detected below the reporting limit.
L	Analyte concentration is <=5 times the reporting limit and the replicate control limit defaults to +/- RL instead of 20% RPD
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

ENERGY NORTHWEST
PRECISION LABS
350 Hills St, Suite 107, Richland, WA 99354 Website: enprecisionlabs.com
Phone: 509-377-8058 Fax: 509-377-8464 Envirolab@energy-northwest.com

ANALYTICAL RESULTS REPORT

Order Number: 250466 Date Reported: 23-Dec-24

Send Report To: Lisa Gilbert
Parametrix
719 2nd Ave. Suite 200
Seattle, WA 98104

Bill To: Lisa Gilbert
Parametrix
719 2nd Ave. Suite 200
Seattle, WA 98104

Sample Number: 250466-01 Date Collected: 12/3/2024 8:55:00 AM
Sample Location: Horn Rapids Landfill
Date Received: 12/4/2024 7:11:40 AM
Customer Sample ID: MW-1

Sample No: 250466-01

ANALYTE	RESULT	UNITS	PQL	Analyzed	Method	Analyst	Qualifier
Nitrate (as N)	6.6	mg/L	0.050	12/4/2024	EPA 300.0	jhill	

Sample Number: 250466-02 Date Collected: 12/3/2024 4:15:00 PM
Sample Location: Horn Rapids Landfill
Date Received: 12/4/2024 7:11:40 AM
Customer Sample ID: MW-2

Sample No: 250466-02

ANALYTE	RESULT	UNITS	PQL	Analyzed	Method	Analyst	Qualifier
Nitrate (as N)	18	mg/L	0.050	12/4/2024	EPA 300.0	jhill	

Sample Number: 250466-03 Date Collected: 12/3/2024 3:08:00 PM
Sample Location: Horn Rapids Landfill
Date Received: 12/4/2024 7:11:40 AM
Customer Sample ID: MW-4

Sample No: 250466-03

ANALYTE	RESULT	UNITS	PQL	Analyzed	Method	Analyst	Qualifier
Nitrate (as N)	11	mg/L	0.050	12/4/2024	EPA 300.0	jhill	

Sample Number: 250466-04 Date Collected: 12/3/2024 12:30:00 PM
Sample Location: Horn Rapids Landfill
Date Received: 12/4/2024 7:11:40 AM
Customer Sample ID: MW-5

Sample No: 250466-04

ANALYTE	RESULT	UNITS	PQL	Analyzed	Method	Analyst	Qualifier
Nitrate (as N)	1.5	mg/L	0.050	12/4/2024	EPA 300.0	jhill	

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Phone: 509-377-8058 Fax: 509-377-8464 Envirolab@energy-northwest.com

ANALYTICAL RESULTS REPORT

ANALYTE	RESULT	UNITS	PQL	Analyzed	Method	Analyst	Qualifier

Sample Number: 250466-05 Date Collected: 12/3/2024 2:20:00 PM

Sample Location: Horn Rapids Landfill

Date Received: 12/4/2024 7:11:40 AM

Customer Sample ID: MW-8

Sample No: 250466-05

ANALYTE	RESULT	UNITS	PQL	Analyzed	Method	Analyst	Qualifier
Nitrate (as N)	12	mg/L	0.050	12/4/2024	EPA 300.0	jhill	

Sample Number: 250466-06 Date Collected: 12/3/2024 1:25:00 PM

Sample Location: Horn Rapids Landfill

Date Received: 12/4/2024 7:11:40 AM

Customer Sample ID: MW-9

Sample No: 250466-06

ANALYTE	RESULT	UNITS	PQL	Analyzed	Method	Analyst	Qualifier
Nitrate (as N)	7.9	mg/L	0.050	12/4/2024	EPA 300.0	jhill	

Sample Number: 250466-07 Date Collected: 12/3/2024 11:30:00 AM

Sample Location: Horn Rapids Landfill

Date Received: 12/4/2024 7:11:40 AM

Customer Sample ID: MW-10

Sample No: 250466-07

ANALYTE	RESULT	UNITS	PQL	Analyzed	Method	Analyst	Qualifier
Nitrate (as N)	55	mg/L	0.050	12/4/2024	EPA 300.0	jhill	

Notes:

PQL Practical Quantitation Limit

NA (Not Analyzed) in the results column indicates this compound was not included in the current analysis.

ND (Not Detected) in the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.

Comments: Due Date: 12/23/2024

ENERGY NORTHWEST

Authorized Signature:

Traci Williams
Environmental Services Manager

ENERGY NORTHWEST

Chain of Custody
Services Sales Order

Environmental Services
350 Hills Street Suite 107, Richland, WA 99354
Phone: 509-377-8058 **Fax:** 509-377-8464

Account Information	**Project ID**	**Order ID**
Company Name: Parametrix Customer Contact: Lisa Gilbert	555-3820-004 (14.01)	250466

Mailing Address: 719 2nd Avenue, Suite 200, Seattle, WA 98104

Billing Address (*if different*): *City of Richland, Accounts Payable, PO Box 190, MS11, Richland, WA 99352*

Email: lgilbert@parametrix.com Phone: (206) 394-3667

Receive Invoice: ☐ Hard Copy ☐ Email Receive Report: Hard Copy ☐ Email

Requested Tests

Matrix

S - Soil
WW - Waste Water
DW - Drinking Water
O - Oil
N - NPDES
Ot - Other

Rush TAT

☐ Yes ☐ No

# of working days: ____

Date Requested: _____

Lab Use Only	Sample Identification (Location, Name, Code, etc)	Collection Date	Collection Time	Matrix	Number of Bottles	Nitrate (EPA 300.0)	Comments
01	MW-1	12/3/24	8:55	WW	1	X	
02	MW-2	12/3/24	1615	WW	1	X	
~~0~~	~~MW-3~~ SN			WW	1	X	
03	MW-4	12/3/24	1508	WW	1	X	
04	MW-5	12/3/24	1230	WW	1	X	
	~~MW-6~~ SN		SN	WW	1	X	
05	MW-8	12/3/24	1420	WW	1	X	
06	MW-9	12/3/24	1325	WW	1	X	
07	MW-10	12/3/24	1130	WW	1	X	
	~~MW-11~~ SN			WW	1	X	
	~~MW-12~~ SN			WW	1	X	
	~~MW-21~~ SN			WW	1	X	
				WW	1	X	

Being duly authorized and empowered by Customer, by signing below, Customer agrees to having reviewed, understood, and is fully accepting of the terms on the reverse side of this form.

Print / Signature	Date / Time	Print / Signature	Date / Time
Relinquished by: Sally Nguyen	12/3/24 @ 1701	Received by:	
Relinquished by:		Received by:	
Accepted by lab:	12/4/24 0711		

Payment Type (*circle*) ☐ Paid CC Check

Amount $

Please make all checks payable to Energy Northwest

Sample Condition at Receipt
Temperature (*circle*): *Ambient Cold Frozen*
☐ Containers intact/ Lids tight
☐ VOC Vials w/o Headspace
☐ Labels Match Custody

ENERGY NORTHWEST
PRECISION LABS
350 Hills St, Suite 107, Richland, WA 99354 Website: enprecisionlabs.com
Phone: 509-377-8058 Fax: 509-377-8464 Envirolab@energy-northwest.com

ANALYTICAL RESULTS REPORT

Order Number: 250477 Date Reported: 23-Dec-24

Send Report To: Lisa Gilbert
Parametrix
719 2nd Ave. Suite 200
Seattle, WA 98104

Bill To: Lisa Gilbert
Parametrix
719 2nd Ave. Suite 200
Seattle, WA 98104

Sample Number: 250477-01 Date Collected: 12/4/2024 11:05:00 AM
Sample Location: Horn Rapids Landfill
Date Received: 12/4/2024 1:05:14 PM
Customer Sample ID: MW-3

Sample No: 250477-01

ANALYTE	RESULT	UNITS	PQL	Analyzed	Method	Analyst	Qualifier
Nitrate (as N)	2.7	mg/L	0.050	12/4/2024	EPA 300.0	jhill	

Sample Number: 250477-02 Date Collected: 12/4/2024 10:10:00 AM
Sample Location: Horn Rapids Landfill
Date Received: 12/4/2024 1:05:14 PM
Customer Sample ID: MW-6

Sample No: 250477-02

ANALYTE	RESULT	UNITS	PQL	Analyzed	Method	Analyst	Qualifier
Nitrate (as N)	10	mg/L	0.050	12/4/2024	EPA 300.0	jhill	

Sample Number: 250477-03 Date Collected: 12/4/2024 8:55:00 AM
Sample Location: Horn Rapids Landfill
Date Received: 12/4/2024 1:05:14 PM
Customer Sample ID: MW-12

Sample No: 250477-03

ANALYTE	RESULT	UNITS	PQL	Analyzed	Method	Analyst	Qualifier
Nitrate (as N)	6.6	mg/L	0.050	12/4/2024	EPA 300.0	jhill	

Sample Number: 250477-04 Date Collected: 12/4/2024 10:40:00 AM
Sample Location: Horn Rapids Landfill
Date Received: 12/4/2024 1:05:14 PM
Customer Sample ID: MW-21

Sample No: 250477-04

ANALYTE	RESULT	UNITS	PQL	Analyzed	Method	Analyst	Qualifier
Nitrate (as N)	10	mg/L	0.050	12/4/2024	EPA 300.0	jhill	

ENERGY NORTHWEST
PRECISION LABS
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Phone: 509-377-8058 Fax: 509-377-8464 Envirolab@energy-northwest.com

ANALYTICAL RESULTS REPORT

ANALYTE	RESULT	UNITS	PQL	Analyzed	Method	Analyst	Qualifier

Notes:

PQL Practical Quantitation Limit

NA (Not Analyzed) in the results column indicates this compound was not included in the current analysis.

ND (Not Detected) in the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.

Comments: Due date 12/23/2024

ENERGY NORTHWEST Authorized Signature:

Traci Williams
Environmental Services Manager

ENERGY NORTHWEST

Chain of Custody
Services Sales Order

Environmental Services
350 Hills Street Suite 107, Richland, WA 99354
Phone: 509-377-8058 **Fax:** 509-377-8464

Account Information	Project ID	Order ID
Company Name: Parametrix	555-3820-004 (14.01)	25077 RCH 12/4/24
Customer Contact: Lisa Gilbert		250477
Mailing Address: 719 2nd Avenue, Suite 200, Seattle, WA 98104		
Billing Address (*if different*): *City of Richland, Accounts Payable, PO Box 190, MS11, Richland, WA 99352*		
Email:lgilbert@parametrix.com Phone: (206) 394-3667		
Receive Invoice: ☐ Hard Copy ☐ Email Receive Report: Hard Copy ☐ Email		

Requested Tests

Matrix

S - Soil
WW - Waste Water
DW - Drinking Water
O - Oil
N - NPDES
Ot - Other

Rush TAT

☐ Yes ☐ No

# of working days: ____

Date Requested: _____

Lab Use Only	Sample Identification (Location, Name, Code, etc)	Collection Date	Collection Time	Matrix	Number of Bottles	Nitrate (EPA 300.0)	Comments
	~~MW-1~~ SN	~~12/4/24~~		WW	1	X	
	~~MW-2~~ SN			WW	1	X	
01	MW-3	12/4/24	1105	WW	1	X	
	~~MW-4~~ SN			WW	1	X	
	~~MW-5~~ SN			WW	1	X	
02	MW-6	12/4/24	1010	WW	1	X	
	~~MW-7~~ SN			WW	1	X	
	~~MW-8~~ SN			WW	1	X	
	~~MW-9~~ SN			WW	1	X	
	~~MW-11~~ SN			WW	1	X	
03	MW-12	12/4/24	0855	WW	1	X	
04	MW-21	12/4/24	1040	WW	1	X	
				WW	1	X	

Being duly authorized and empowered by Customer, by signing below, Customer agrees to having reviewed, understood, and is fully accepting of the terms on the reverse side of this form.

Print / Signature	Date / Time	Print / Signature	Date / Time
Relinquished by: Sally Nguyen	12/4/24 @ 1408	Received by:	
Relinquished by:		Received by:	
Accepted by lab:	12/4/24 1305		

Payment Type (*circle*) ☐ Paid
CC Check

Amount
$

Please make all checks payable to Energy Northwest

Sample Condition at Receipt
Temperature (*circle*):
Ambient *Cold* *Frozen*
☐ Containers intact/ Lids tight
☐ VOC Vials w/o Headspace
☐ Labels Match Custody

Project:	**Horn Rapids Landfill Fourth Quarter 2024: 555-3820-004**
Date Completed:	**2/3/2025**
QA/QC Completed By:	Katie Burke
Sample Dates:	12/3/24 and 12/4/24 ARI 24L0086: MW-1 through MW-6, MW-8 through MW-12, MW-21, and TB ENW 250466 (Nitrate): MW-1, -2, -4, -5, -8, -9, -10 ENW 250477 (Nitrate): MW-3, -6, -12, -21 MS/MSD collected at MW-1, duplicate at MW-6
All VOAs bubble free	
Holding Times:	All within limits
Chain vs Data:	All compounds analyzed.
Blanks:	(List any compounds detected) MB Barium at 0.000936 mg/L. All samples were flagged "B" by the lab. RL is 0.000500 Trip None
Lab Comments:	**Sample Receipt** Sample(s) as listed on the preceding page were received 05-Dec-2024 09:27 under ARI work order 24L0086. Cooler temperatures were recorded at -2.0C, -1.6C, -2.4C, -0.6C, -1.2C. **VOCs (8260D)** Initial and continuing calibrations were within method requirements with allowed exceedances. **The "Q"-flagged analytes on the summary forms all had high recoveries in the ICV.** Internal standard areas were within limits. The surrogate percent recoveries were within control limits. The method blank(s) were clean at the reporting limits. The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and relative percent difference (RPD) were within advisory control limits.

Project: **Horn Rapids Landfill Fourth Quarter 2024: 555-3820-004**
Date Completed: **2/3/2025**
QA/QC Completed By: Katie Burke
Sample Dates: 12/3/24 and 12/4/24
ARI 24L0086: MW-1 through MW-6, MW-8 through MW-12, MW-21, and TB
ENW 250466 (Nitrate): MW-1, -2, -4, -5, -8, -9, -10
ENW 250477 (Nitrate): MW-3, -6, -12, -21
MS/MSD collected at MW-1, duplicate at MW-6

RSK-175

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Metals (200.8 and 6010D)

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits except for the **barium** blank. As all sample results were more than 10x the concentration of the contamination, no further action was taken. The associated data has been "B"-flagged. The "B" qualified data will be removed from the associated data since the sample results are greater than 10x the concentration of the contamination in the method blank.

The blank spike (BS/LCS) percent recoveries were within control limits.

The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and the duplicate relative percent difference (RPD) were within advisory control limits.

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations including interference checks were within method requirements for reported elements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits

Project: **Horn Rapids Landfill Fourth Quarter 2024: 555-3820-004**
Date Completed: **2/3/2025**
QA/QC Completed By: Katie Burke
Sample Dates: 12/3/24 and 12/4/24
ARI 24L0086: MW-1 through MW-6, MW-8 through MW-12, MW-21, and TB
ENW 250466 (Nitrate): MW-1, -2, -4, -5, -8, -9, -10
ENW 250477 (Nitrate): MW-3, -6, -12, -21
MS/MSD collected at MW-1, duplicate at MW-6

Anions (Method 300.0)

The sample(s) were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The reference material (SRM) percent recoveries were within control limits.

The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and the duplicate relative percent difference (RPD) were within advisory control limits except for **chloride (69.7%) and sulfate (201%)**. Due to the high natural concentration of the spiked analytes, an accurate recovery of the analytes was not possible. These analytes were flagged "HC" by the lab.

General Chemistry

Analytes qualified "D" are for dilution.

Parametrix Qualifiers
No qualifiers

Field Duplicate — Horn Rapids Landfill Fourth Quarter: 555-3820-004

Completed by: Katie Burke — 2/2/2025

Sample Dates: December 3 and 4, 2024
ARI 24L0086: MW-1 through MW-6, MW-8 through MW-12, MW-21, and TB
ENW 250466 (Nitrate): MW-1, -2, -4, -5, -8, -9, -10,
ENW 250477 (Nitrate): MW-3, -6, -8, -12, -21
MS/MSD collected at MW-1, duplicate at MW-6

Parameter	Sample	Duplicate	Average	Difference	RPD	=/<25%	RL	w/in RL?
	MW-6	MW-21						
Metals, total (mg/L)								
Arsenic	0.00182	0.00178	0.0018	0.000040	2	y	0.00100	
Cadmium	<0.000500	<0.000500	n/a	n/a	n/a		0.000500	y
Cobalt	0.00272	0.00248	0.0026	0.00024	9	y	0.00100	
Copper	<0.00250	<0.00250	n/a	n/a	n/a		0.00250	y
Nickel	0.00286	0.00270	0.00278	0.00016	6	y	0.00250	
Selenium	<0.00250	<0.00250	n/a	n/a	n/a		0.00250	y
Zinc	<0.0300	<0.0300	n/a	n/a	n/a		0.0300	y
Antimony	<0.00100	<0.00100	n/a	n/a	n/a		0.00100	y
Barium	0.132	0.124	0.128	0.008	6	y	0.00250	
Beryllium	<0.00100	<0.00100	n/a	n/a	n/a		0.00100	y
Chromium	<0.00500	<0.00500	n/a	n/a	n/a		0.00250	y
Lead	<0.000500	<0.000500	n/a	n/a	n/a		0.000500	y
Silver	<0.00100	<0.00100	n/a	n/a	n/a		1.00	y
Thallium	<0.00100	<0.00100	n/a	n/a	n/a		0.00100	y
Vanadium	0.00546	0.00529	0.005375	0.00017	3	y	0.00100	
Metals, dissolved (mg/L)								
Calcium	220	222	221	-2	1	y	0.0500	
Iron	<0.0500	<0.0500	n/a	n/a	n/a		0.0400	y
Magnesium	54.0	54.5	54.25	-0.5	1	y	0.0500	
Manganese	0.782	0.783	0.7825	-0.001	0	y	0.0400	
Potassium	13.6	13.8	13.7	-0.2	1	y	0.500	
Sodium	27.9	28.3	28.1	-0.4	1	y	0.500	
RSK (ug/L)								
Acetylene	<1.06	<1.06	n/a	n/a	n/a		1.06	y
Methane	359	368	363.5	-9	2	y	0.65	
Ethane	<1.12	<1.12	n/a	n/a	n/a		1.12	y
Ethene	<1.14	<1.14	n/a	n/a	n/a		1.14	y
Conventionals (mg/L)								
Chloride	41.5	41.6	41.55	-0.1	0	y	0.800	
Sulfate	132	122	127	10	8	y	0.800	
Ammonia	0.100	0.107	0.1035	-0.007	7		0.040	y
TOC	3.9	3.79	3.845	0.11	3	y	0.50	
Alkalinity	598	598	598	0	0	y	1.00	
Bicarbonate	598	598	598	0	0	y	1.00	
TDS	940	957	948.5	-17	2	y	10	
TSS	<1	<1	n/a	n/a	n/a		1	y
Nitrate	10	10	10	0	0	y	0.050	

Field Duplicate — Horn Rapids Landfill Fourth Quarter: 555-3820-004

Completed by: Katie Burke — 2/2/2025

Sample Dates: December 3 and 4, 2024
ARI 24L0086: MW-1 through MW-6, MW-8 through MW-12, MW-21, and TB
ENW 250466 (Nitrate): MW-1, -2, -4, -5, -8, -9, -10,
ENW 250477 (Nitrate): MW-3, -6, -8, -12, -21
MS/MSD collected at MW-1, duplicate at MW-6

Parameter	Sample	Duplicate	Average	Difference	RPD	=/<25%	RL	w/in RL?
	MW-6	MW-21						
VOCs (ug/L)								
1,1-Dichloroethene	<0.20	<0.20	n/a	n/a	n/a		0.20	y
cis-1,2-Dichloroethene	31.3	30.8	31.05	0.5	2	y	0.20	
trans-1,2-Dichloroethene	0.62	0.60	0.61	0.02	3	y	0.20	

Appendix C

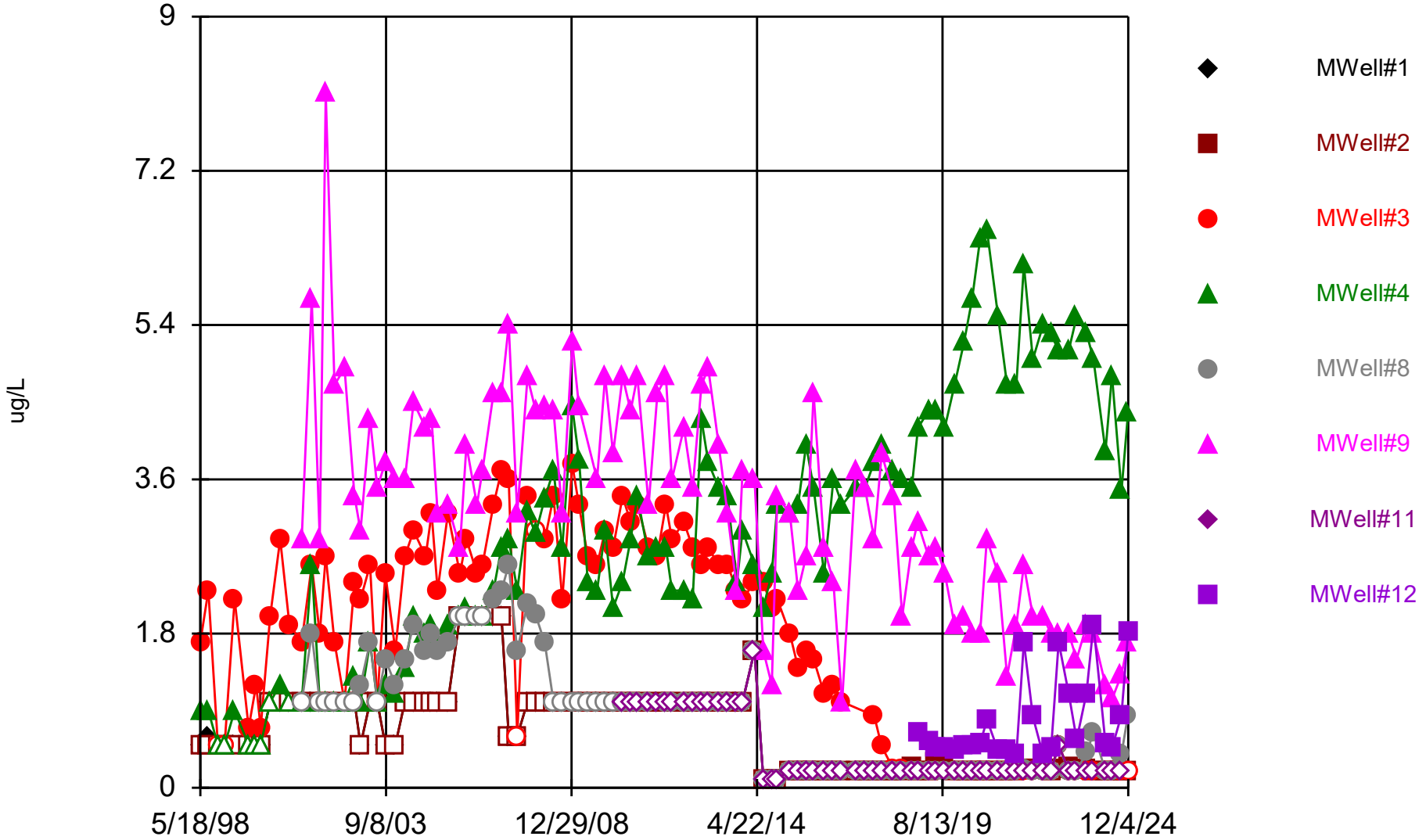
Time-Series Plots

C-1

Groundwater and Leachate Ports

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

Time Series

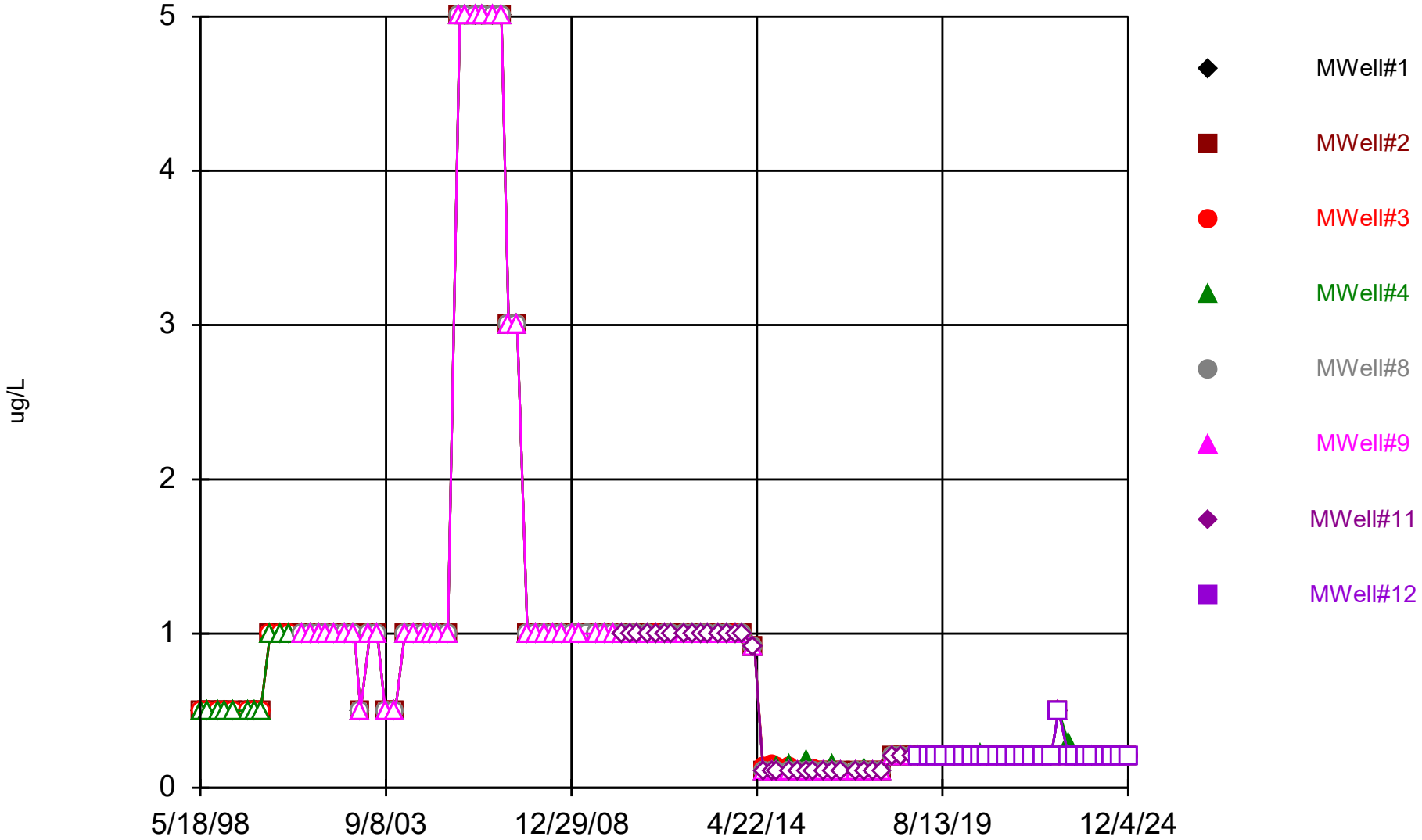


Constituent: 1,1-Dichloroethane Analysis Run 3/12/2025 12:43 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

Time Series

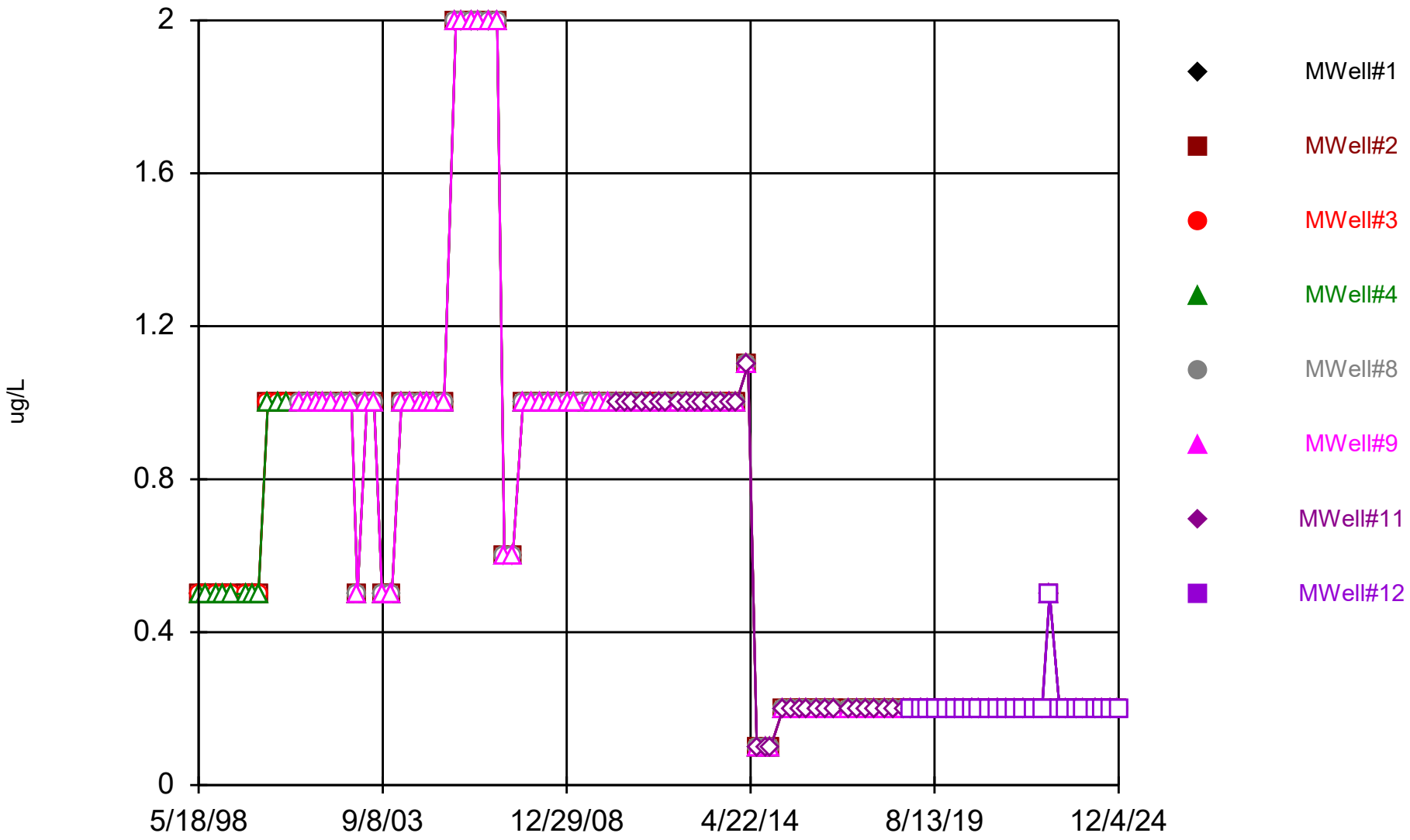


Constituent: 1,1-Dichloroethene Analysis Run 3/12/2025 12:43 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

Time Series

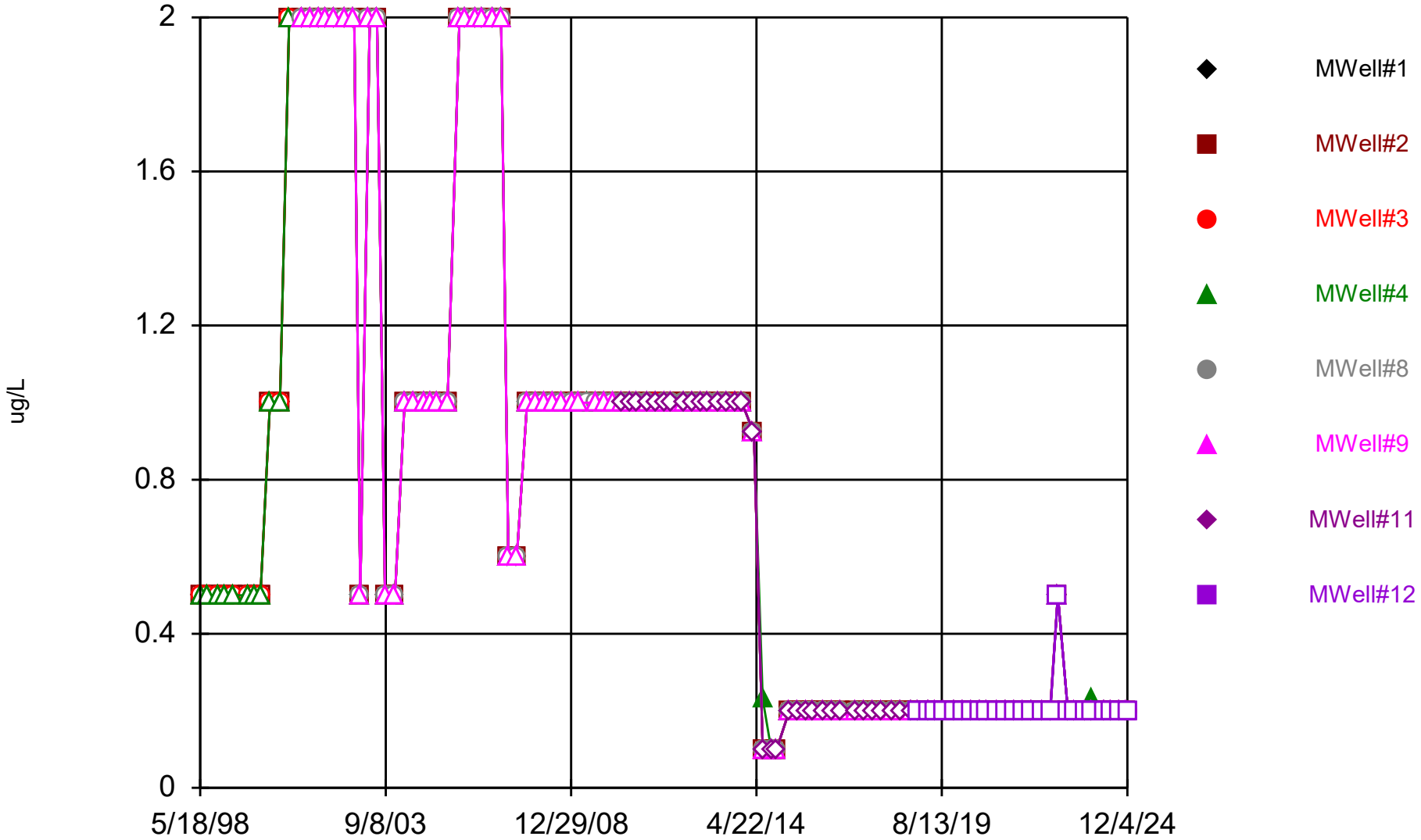


Constituent: 1,2-Dichloroethane Analysis Run 3/12/2025 12:43 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

Time Series

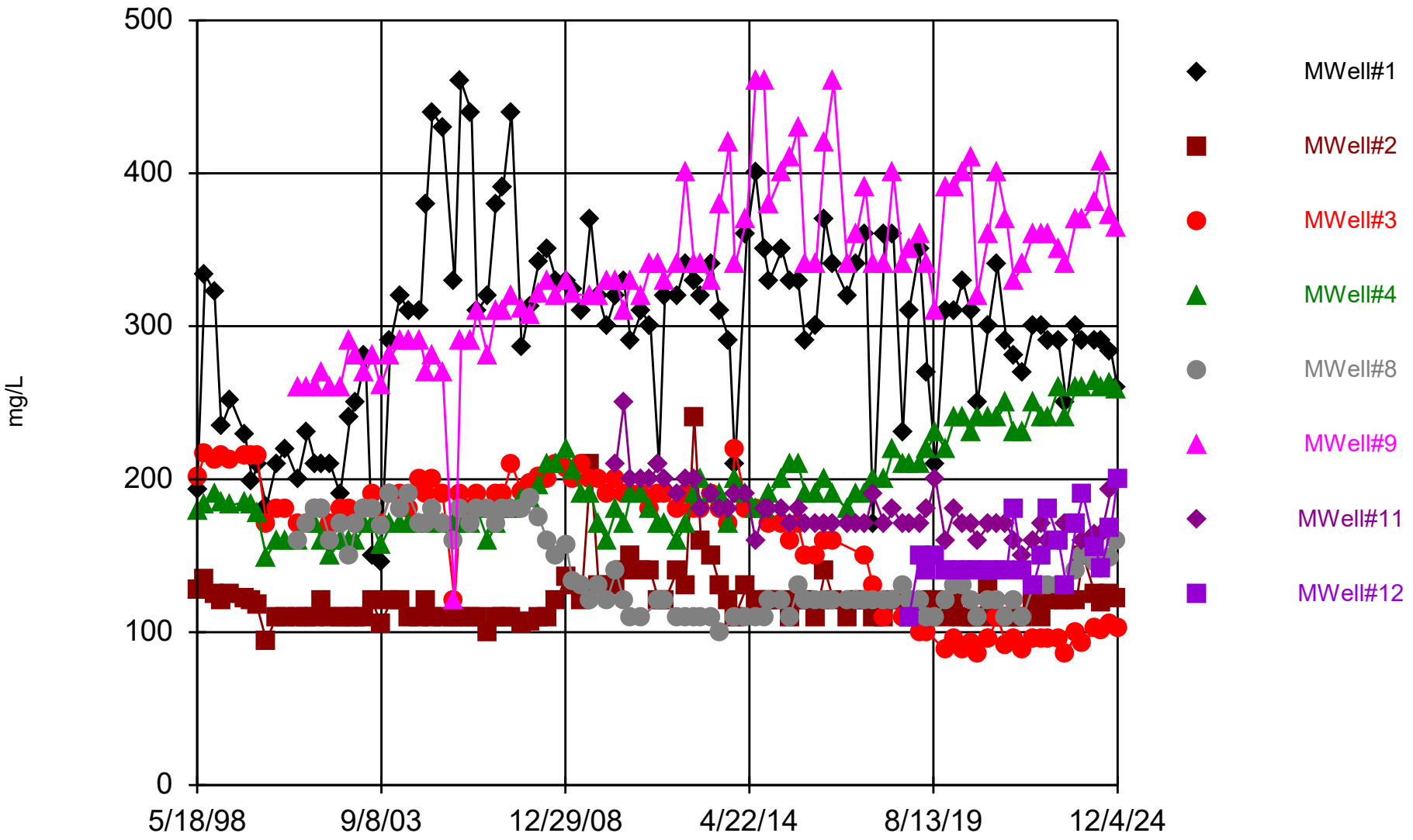


Constituent: 1,2-Dichloropropane Analysis Run 3/12/2025 12:43 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.

Time Series



Constituent: Alkalinity, Bicarbonate Analysis Run 3/12/2025 12:43 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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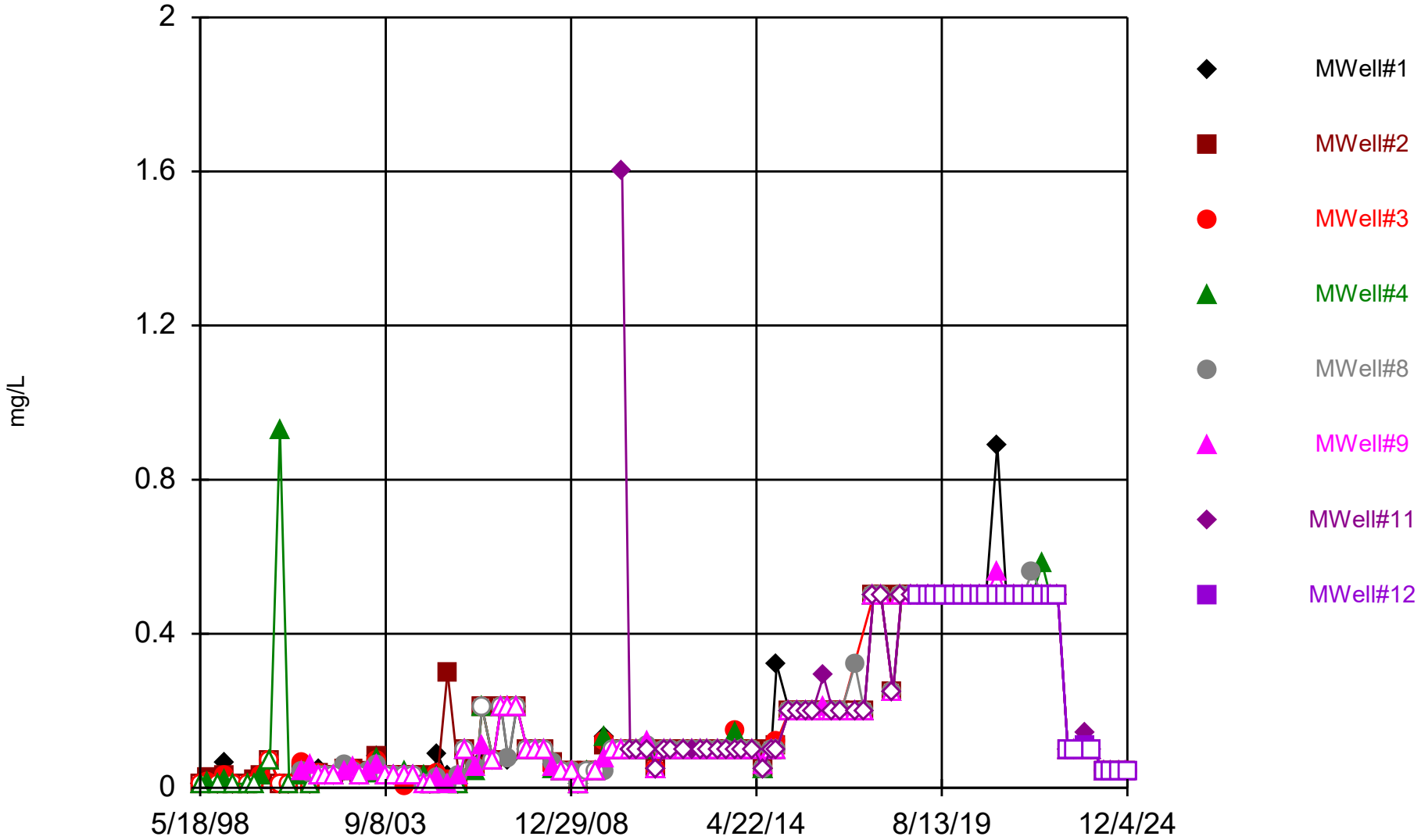
Hollow symbols indicate censored values.

Time Series

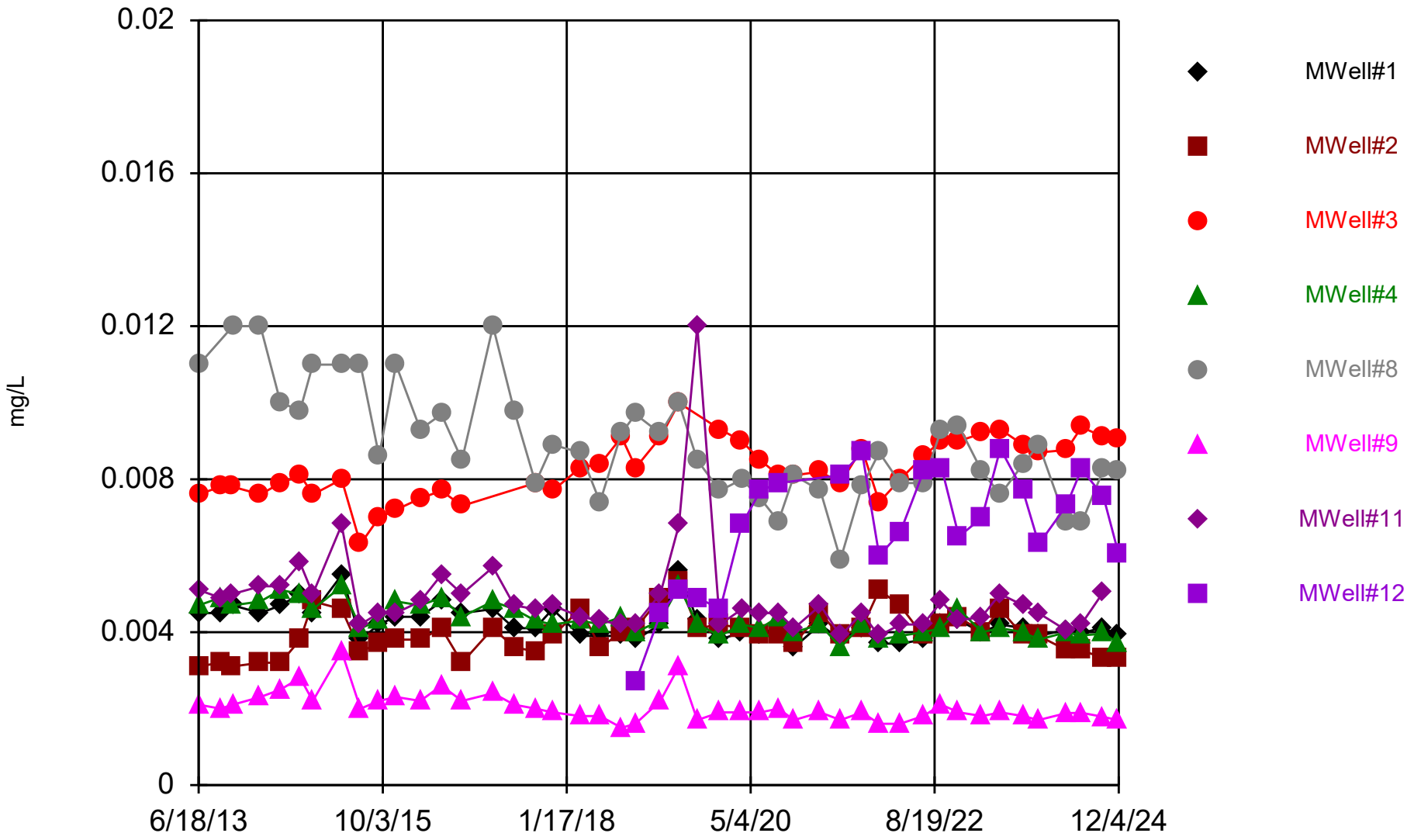


Constituent: Ammonia Nitrogen Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.

Time Series



Constituent: Arsenic, Total Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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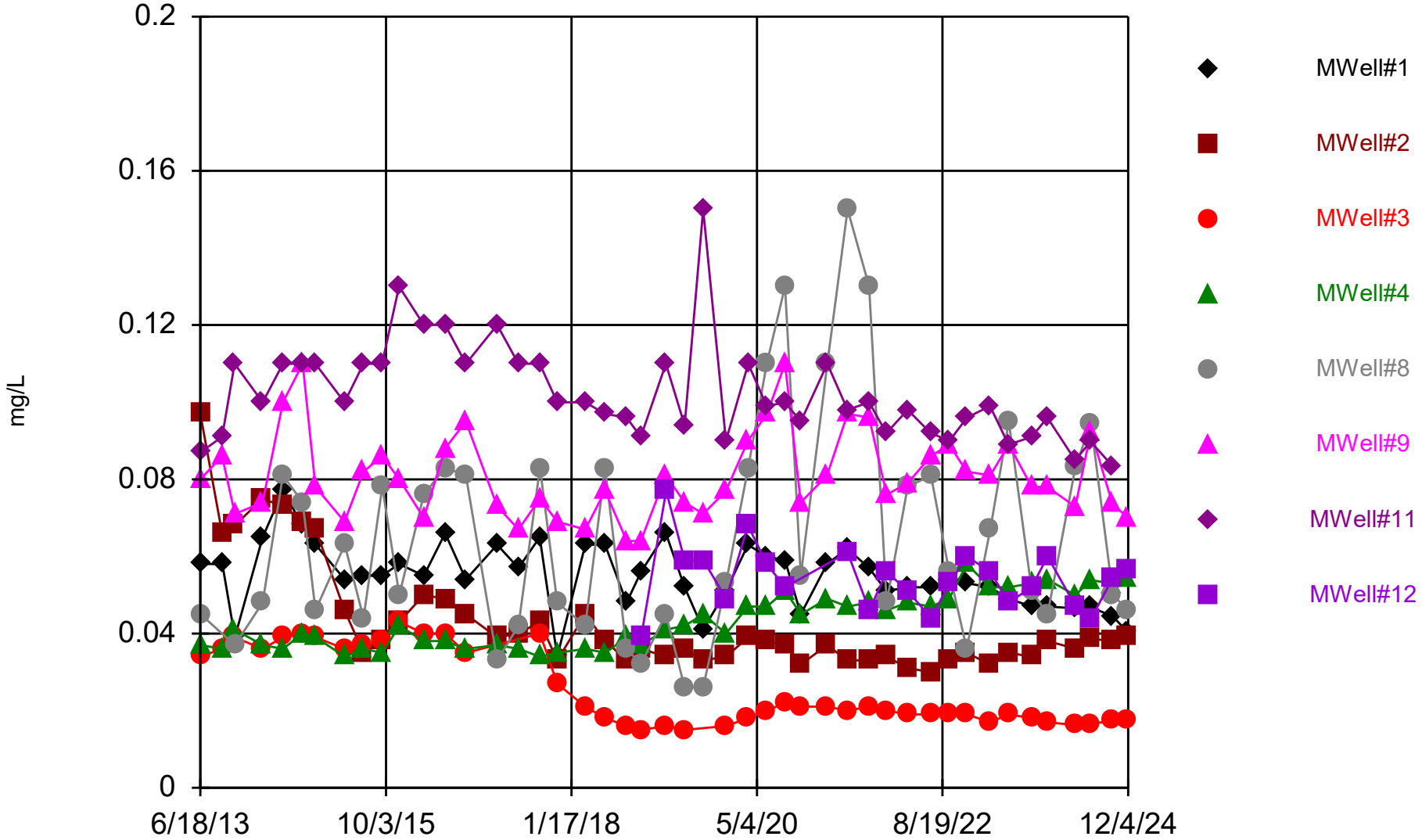
Time Series



Constituent: Barium, Total Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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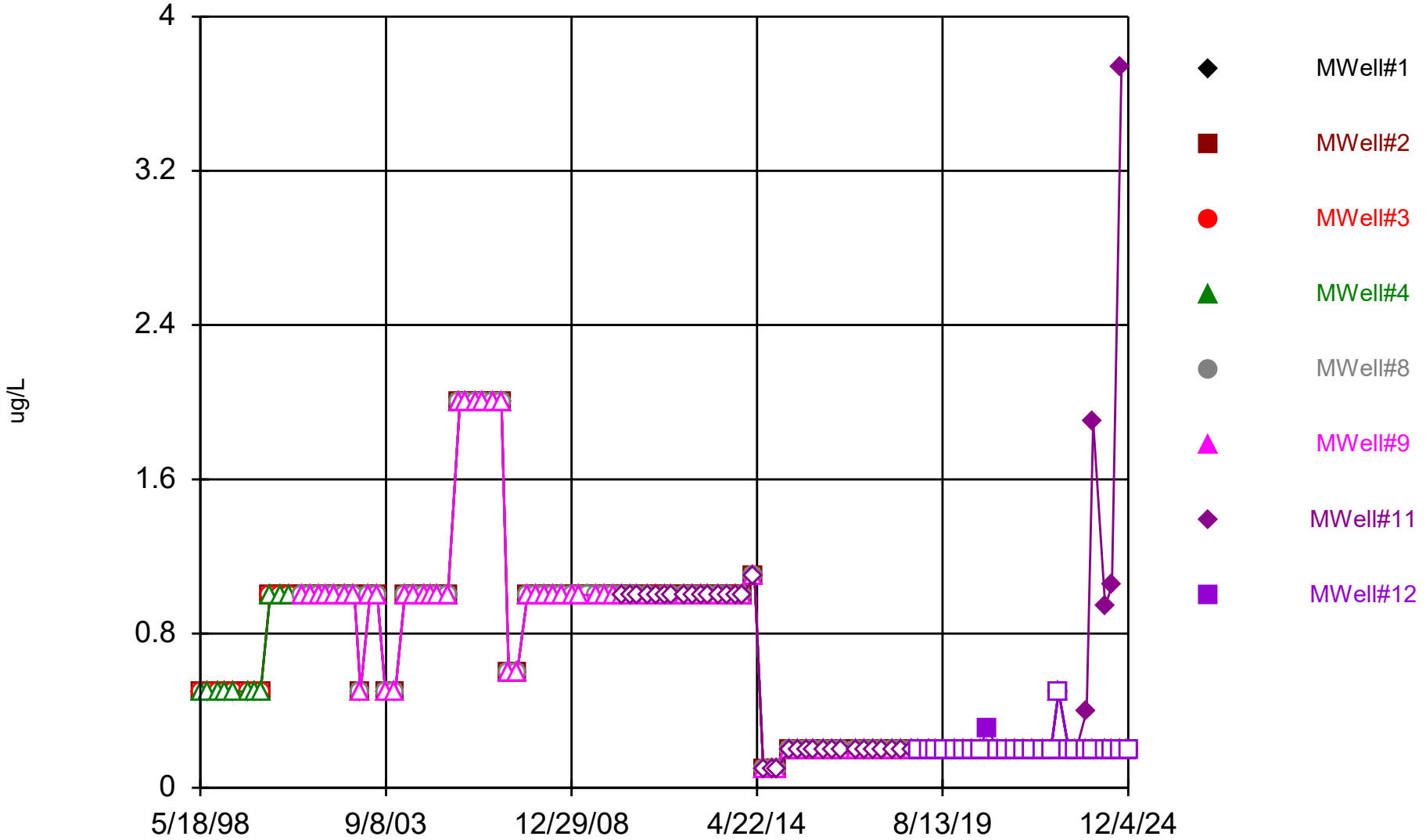
Time Series

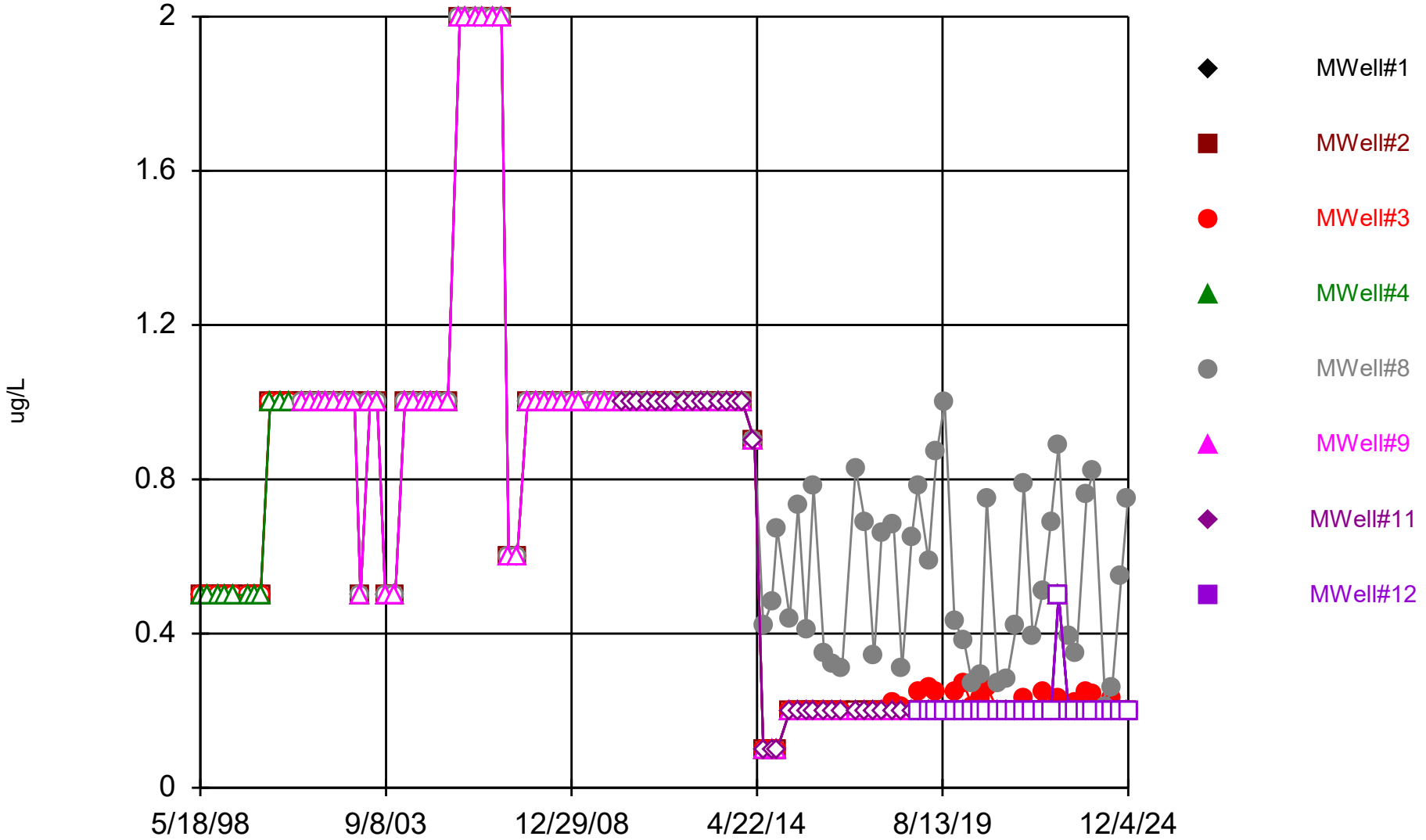


Constituent: Benzene Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

Time Series

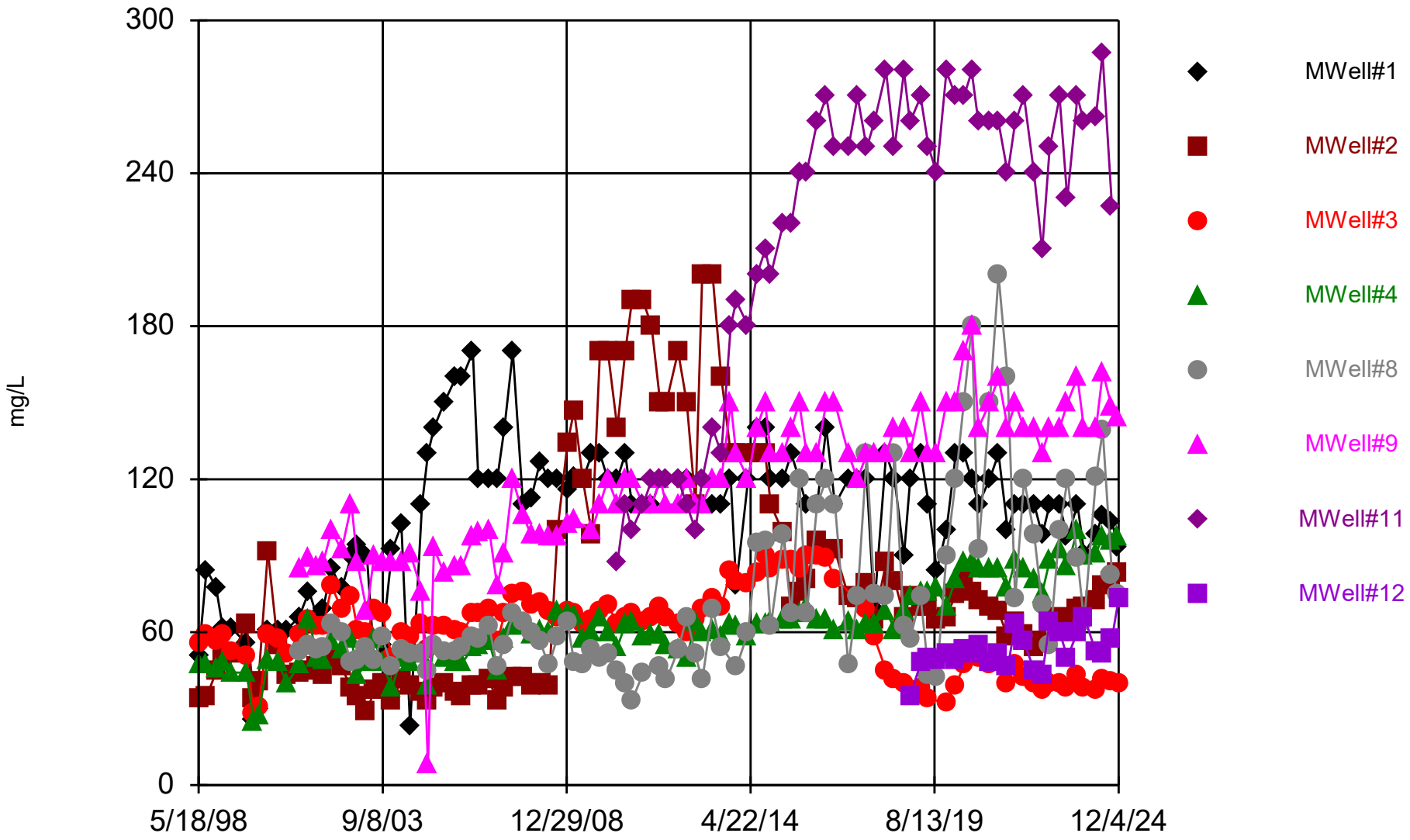


Constituent: Bromodichloromethane Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.

Time Series



Constituent: Calcium, Dissolved Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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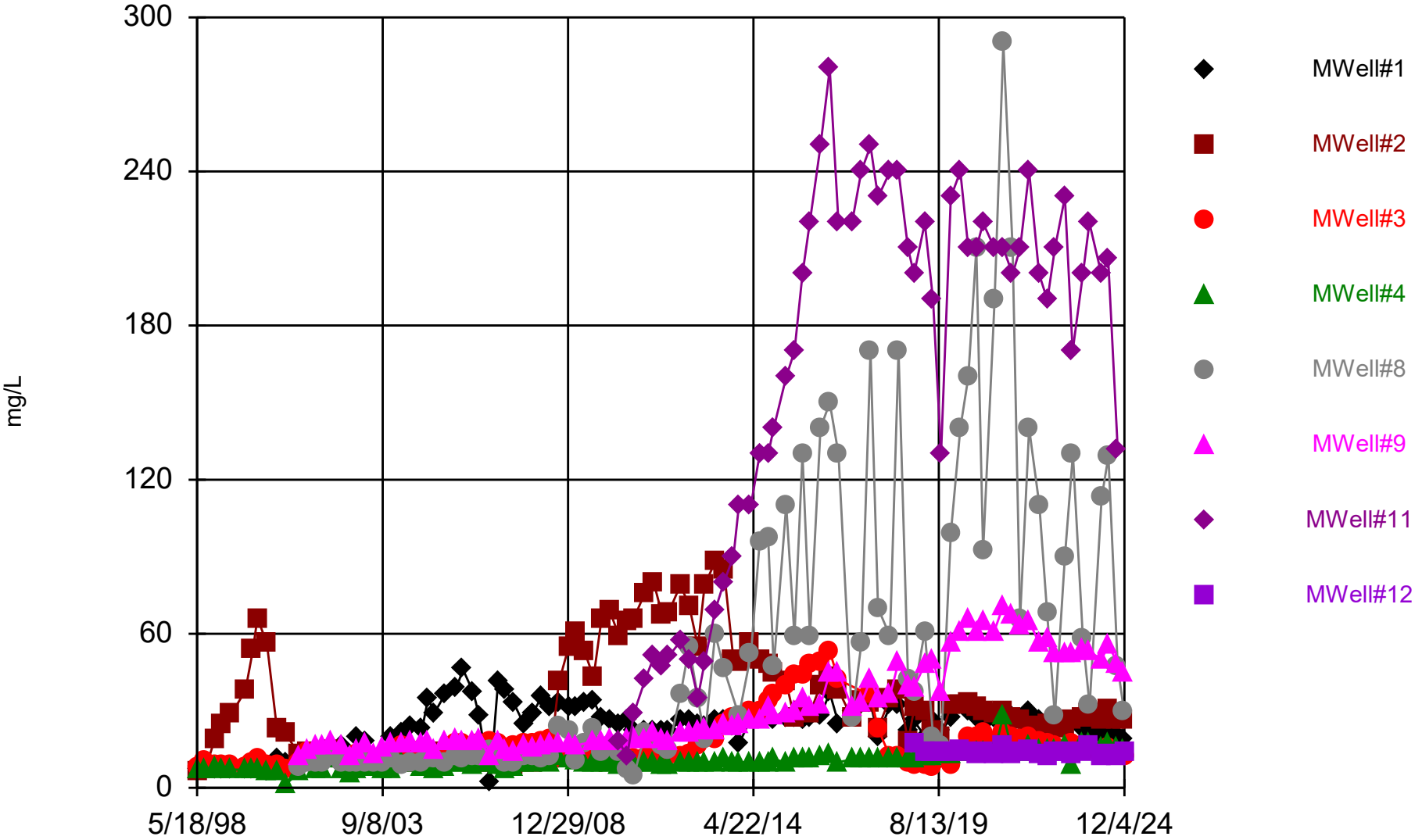

Constituent: Chloride Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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Hollow symbols indicate censored values.

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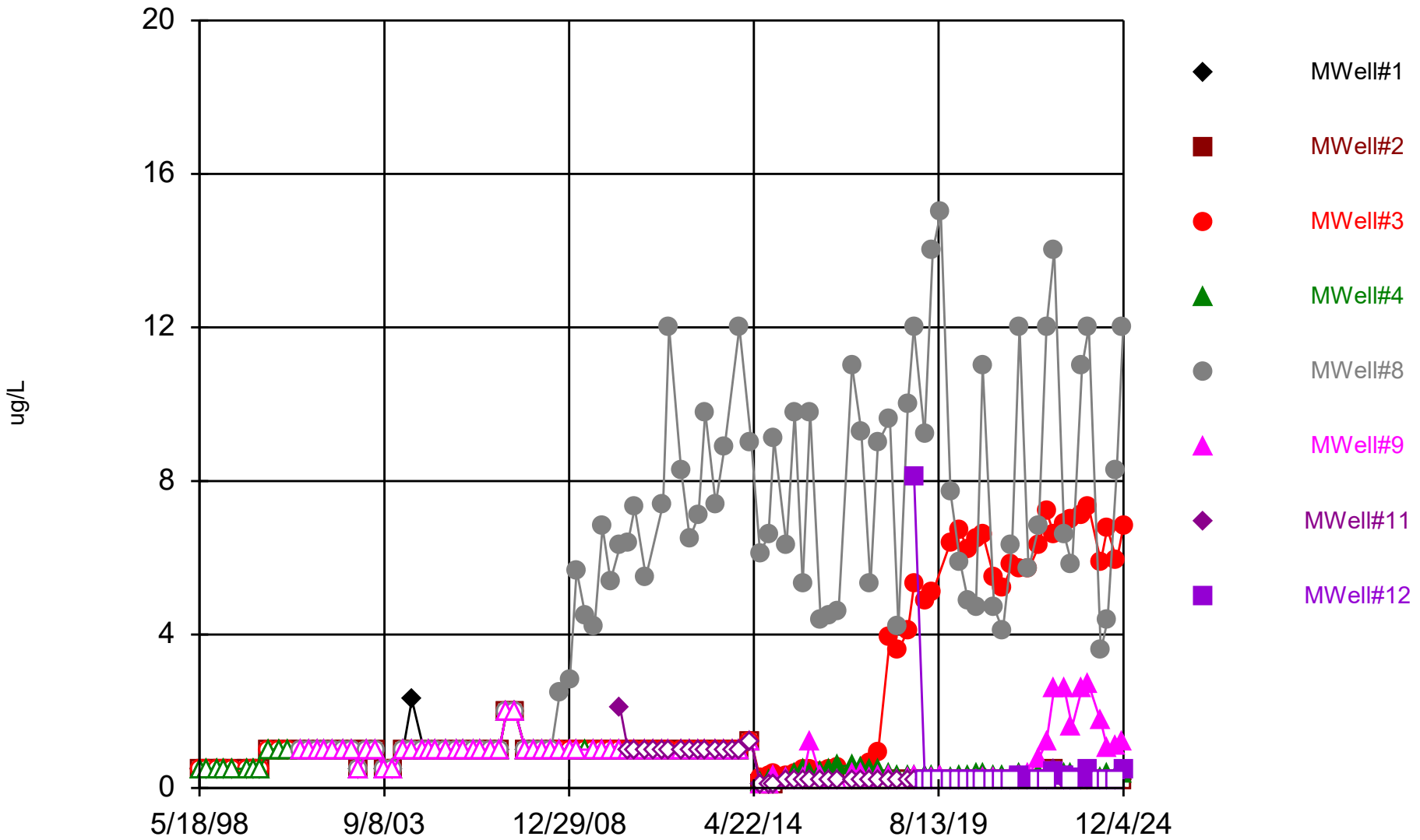

Constituent: Chloroform Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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Hollow symbols indicate censored values.

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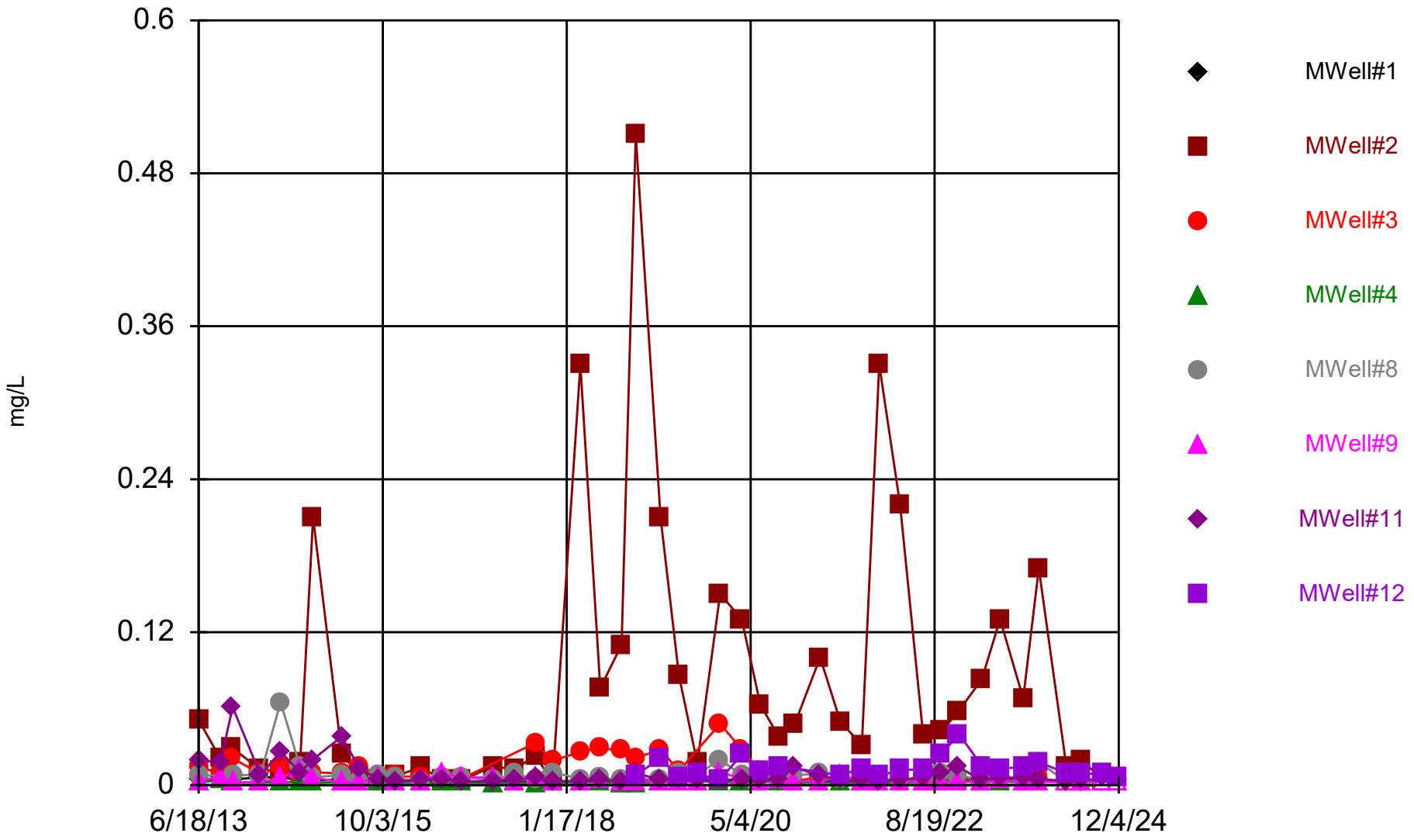

Constituent: Chromium, Total Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

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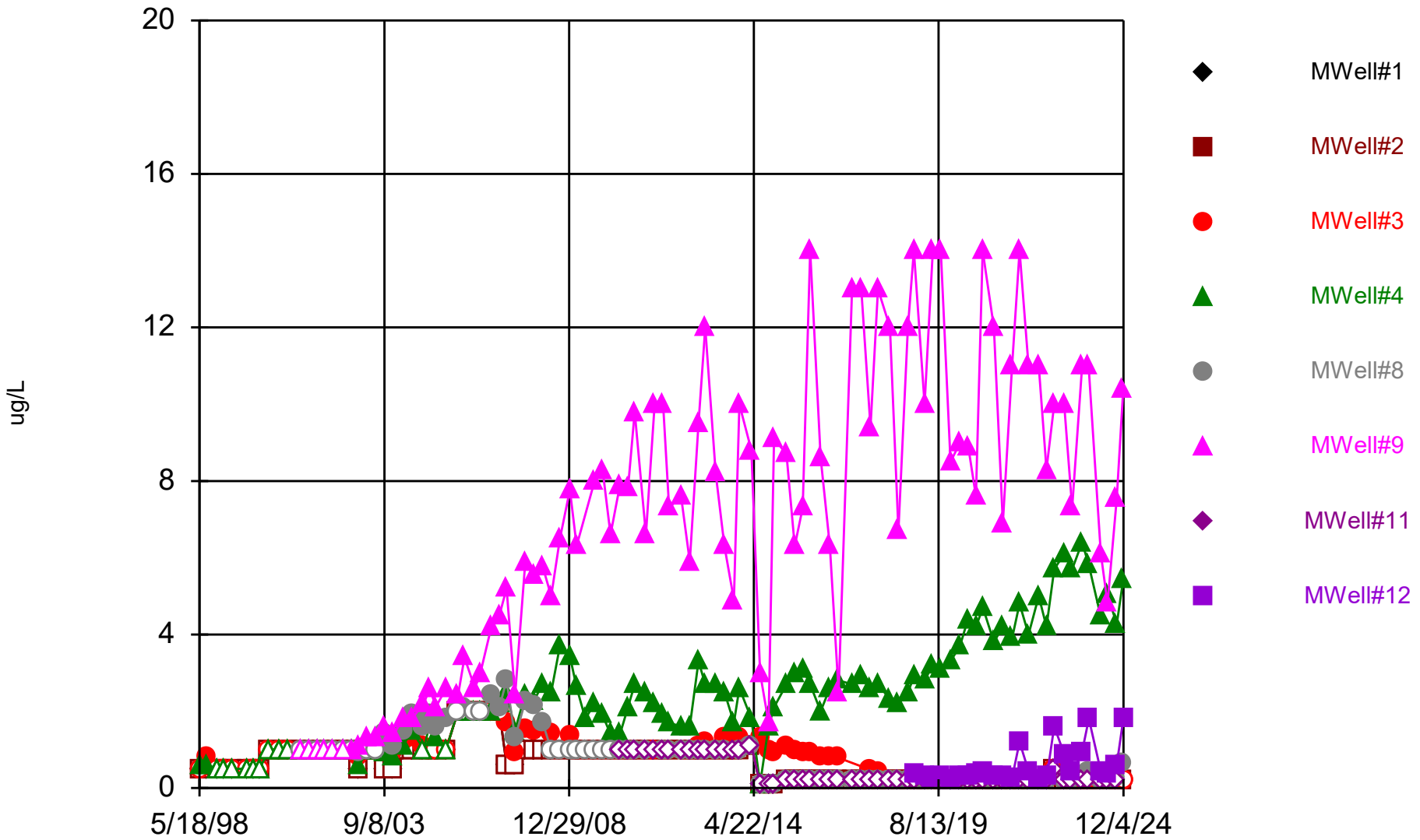

Constituent: cis-1,2-Dichloroethene Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

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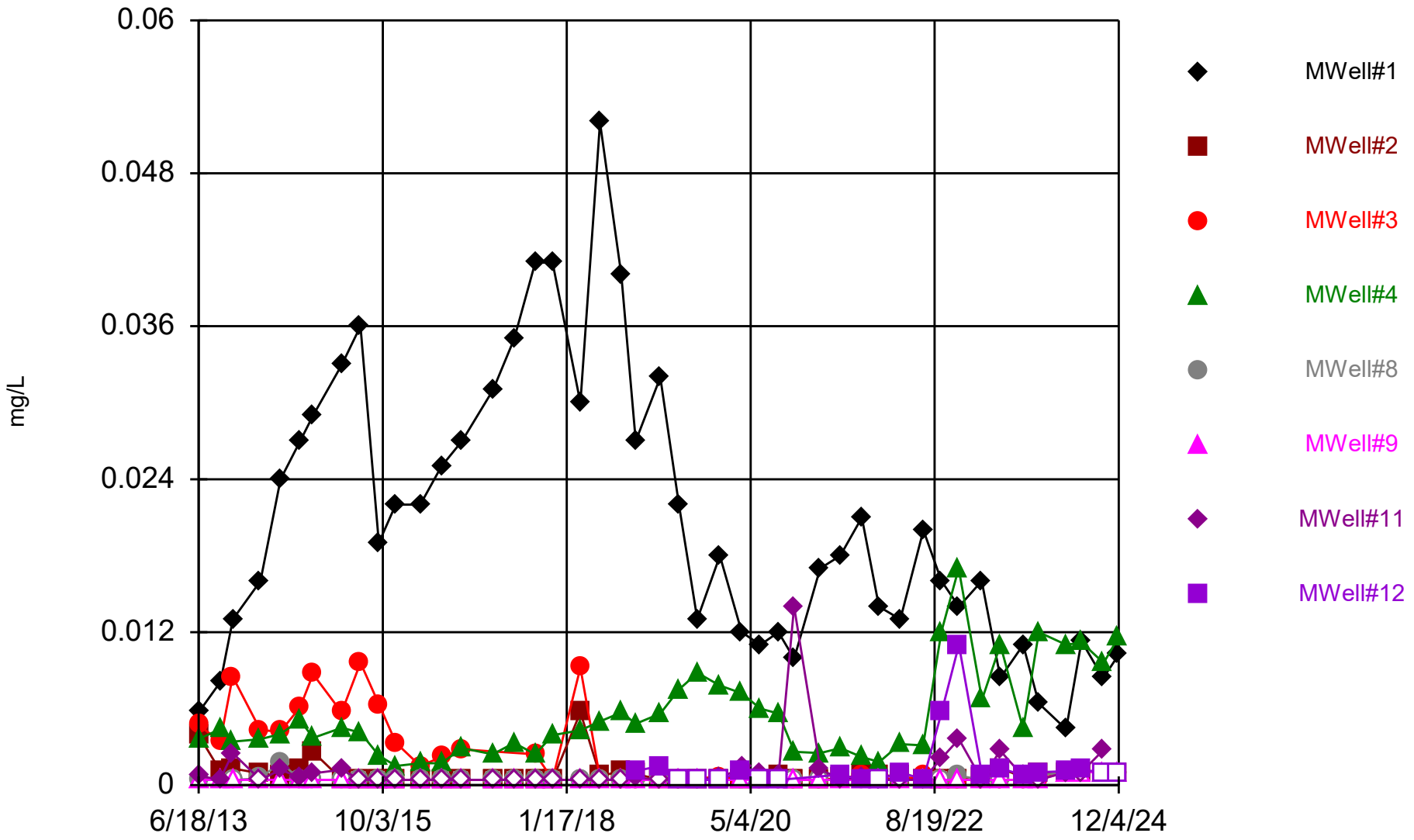

Constituent: Cobalt, Total Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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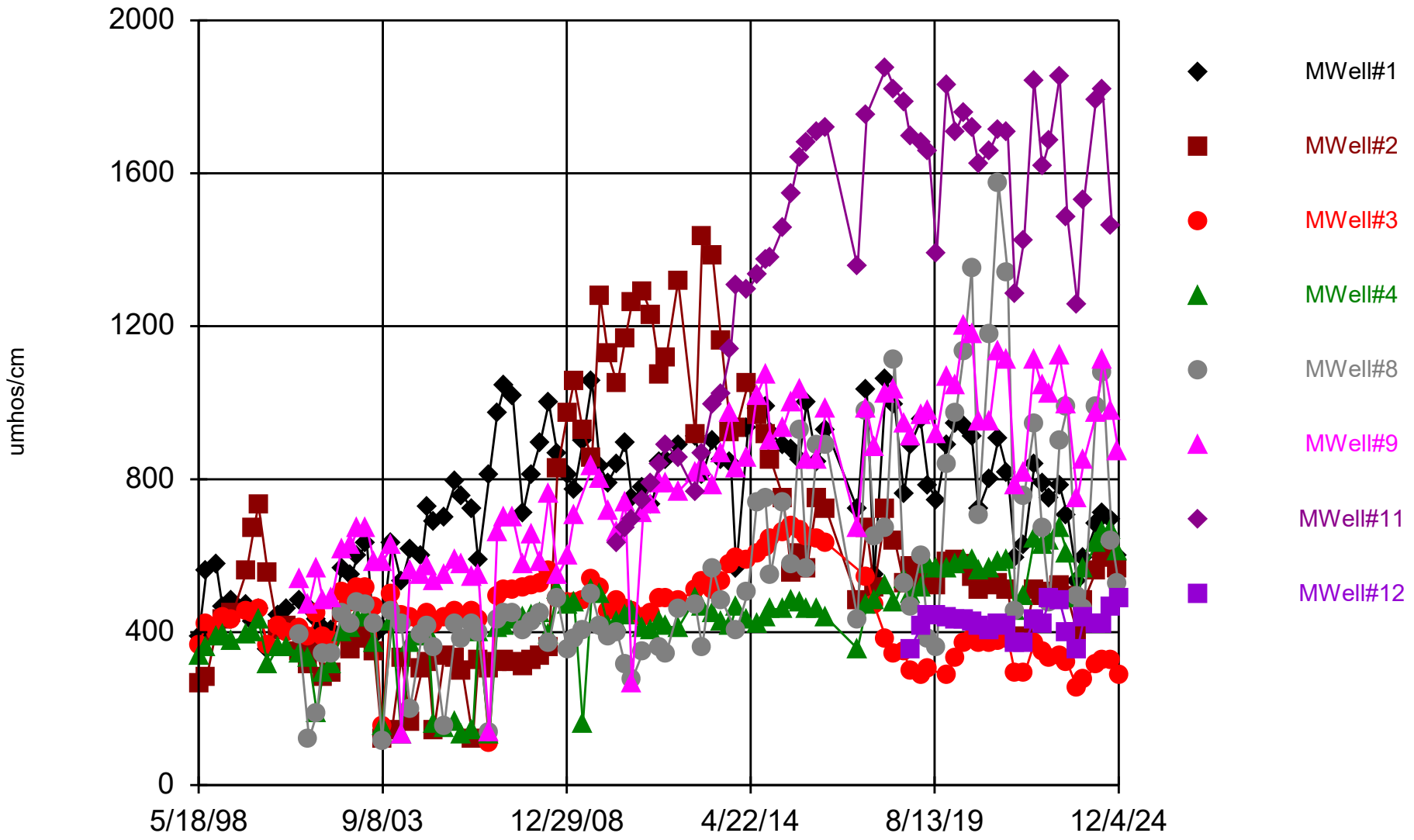

Constituent: Conductivity Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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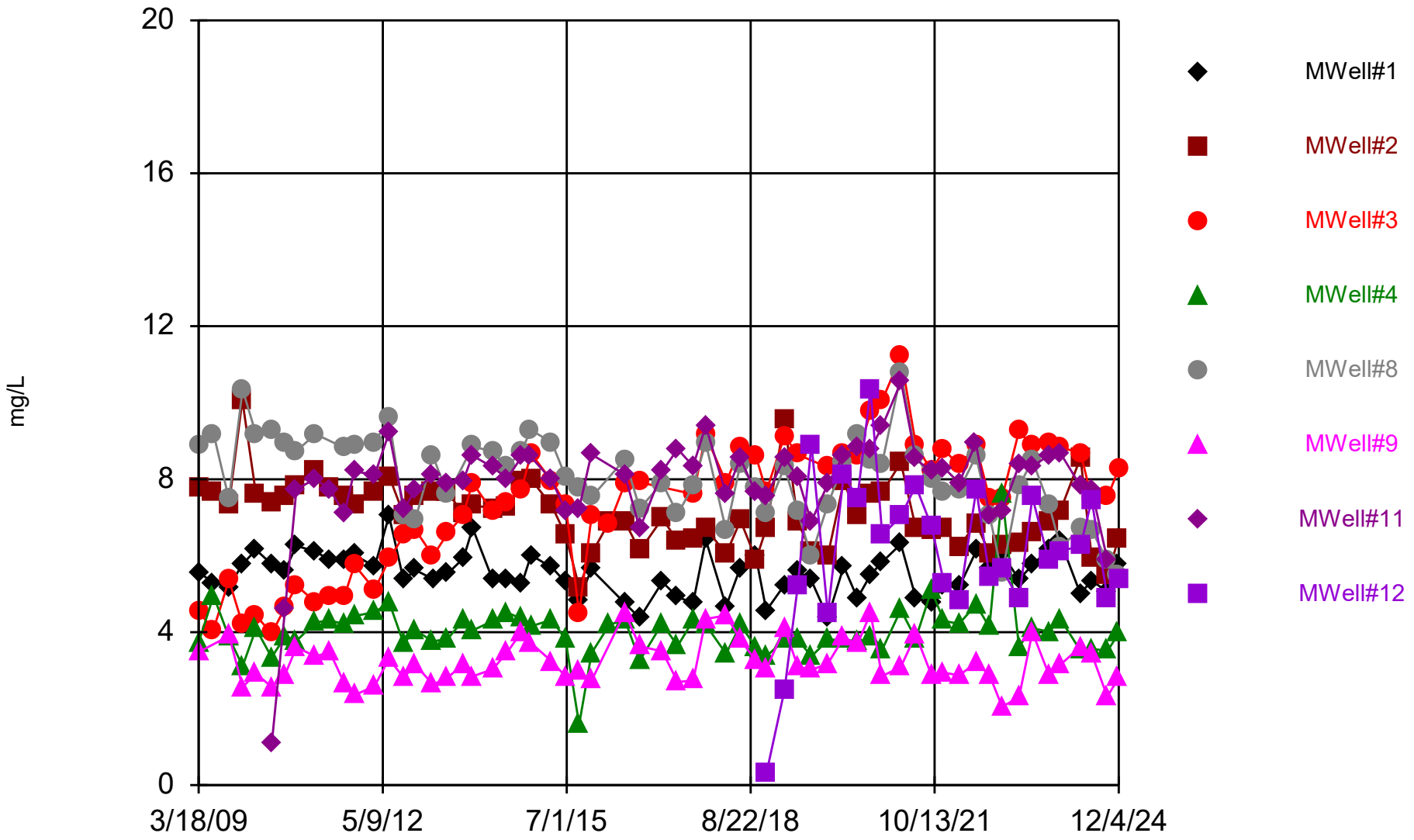
Time Series



Constituent: Dissolved Oxygen Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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Hollow symbols indicate censored values.

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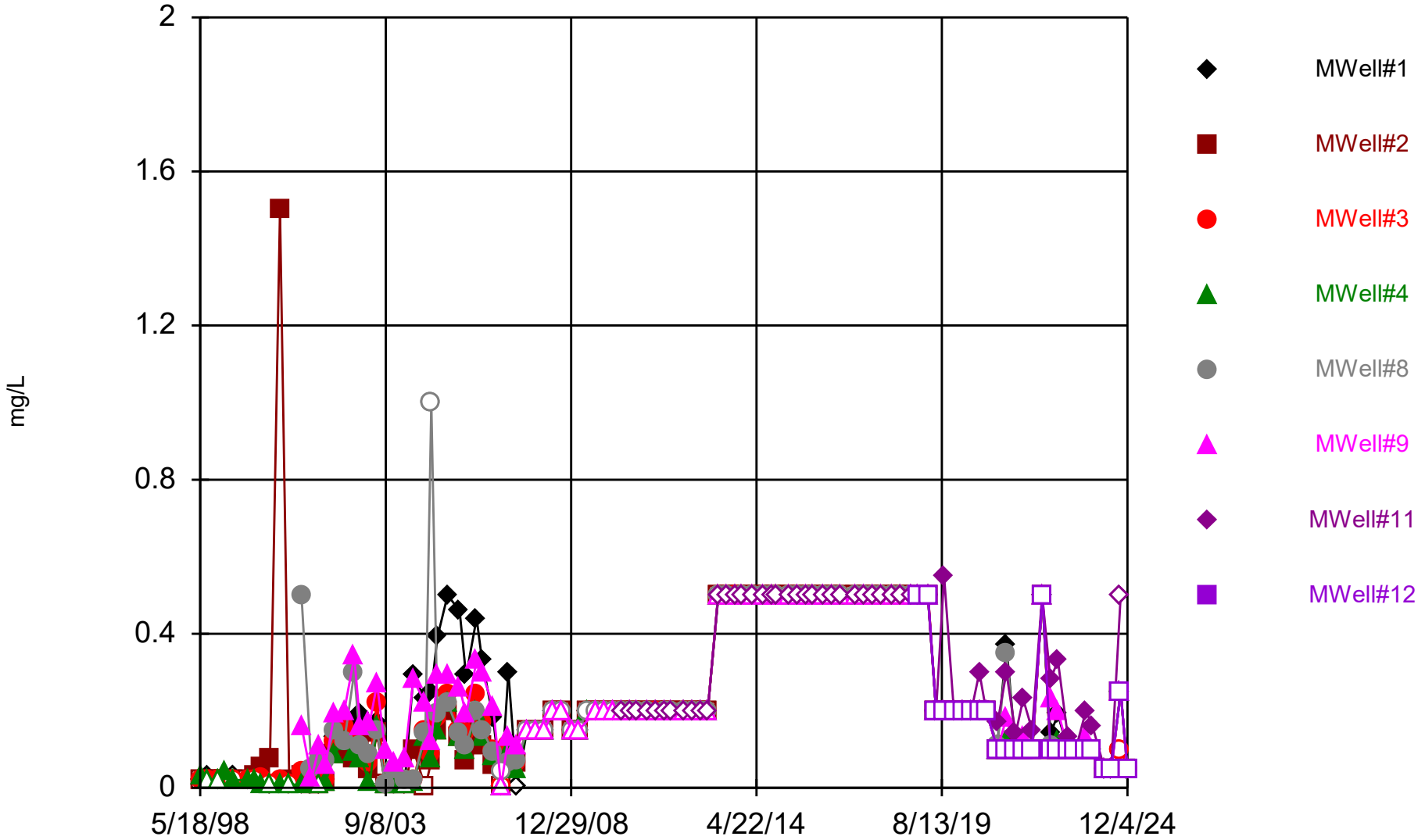
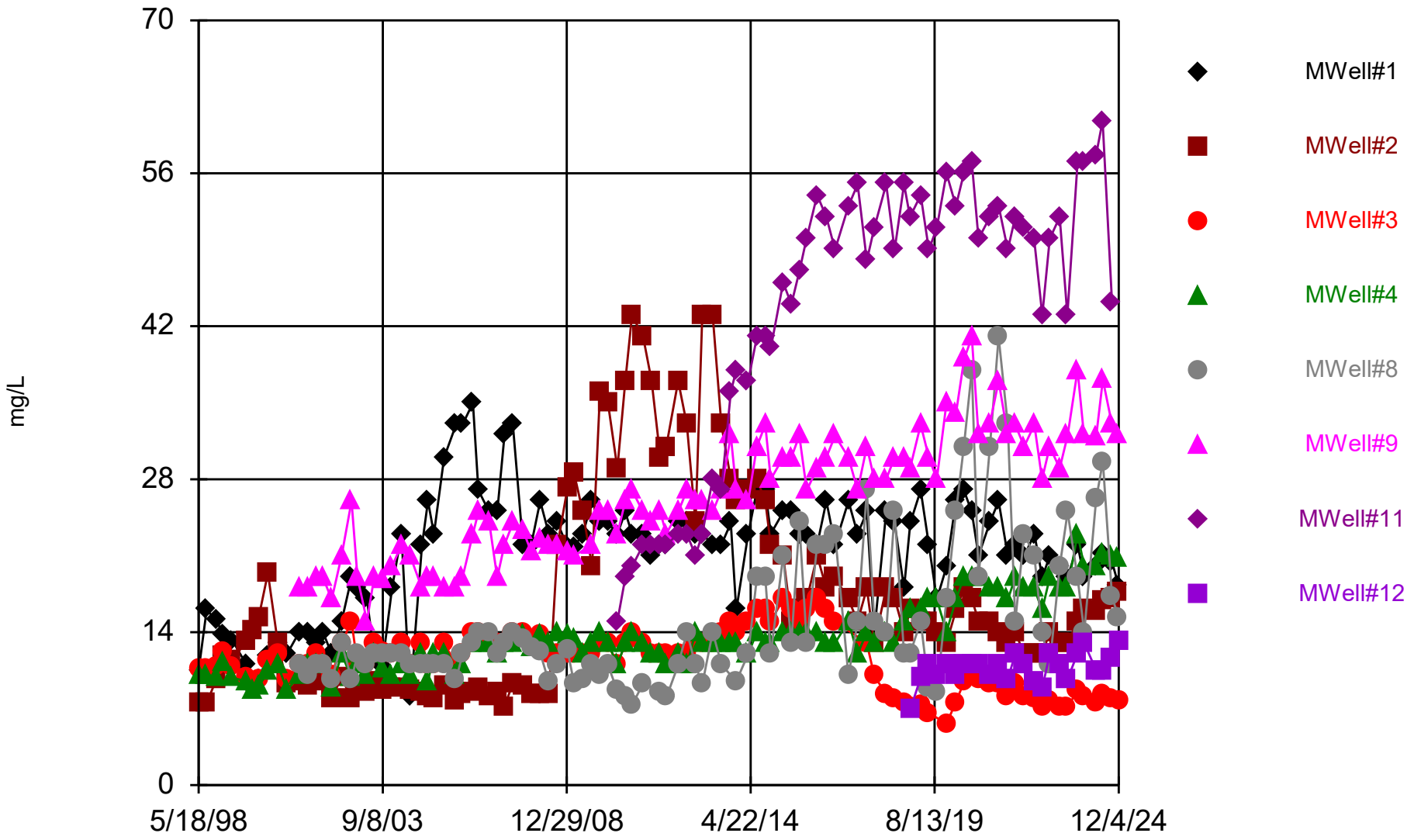


Constituent: Iron, Dissolved Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.

Time Series

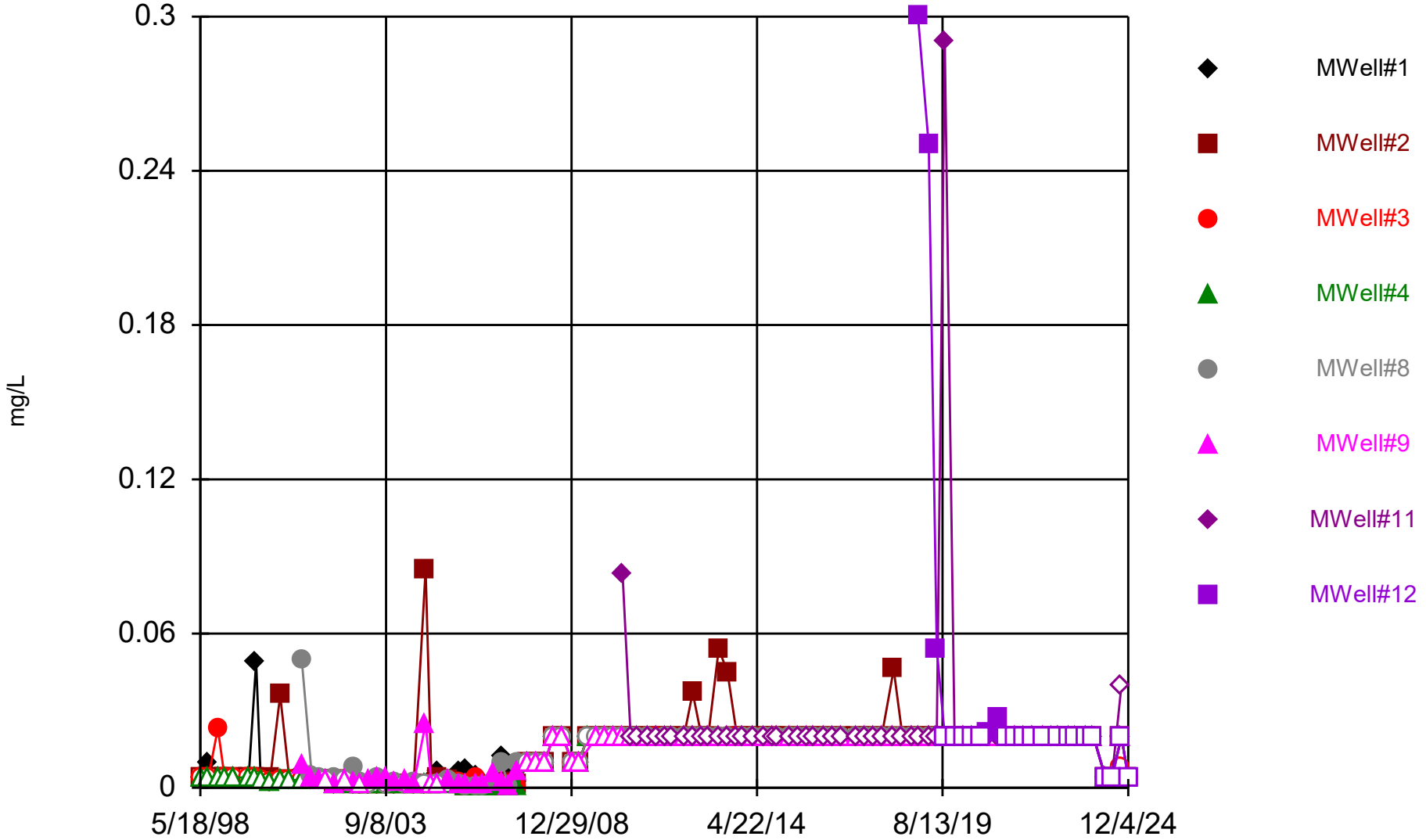


Constituent: Magnesium, Dissolved Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

Time Series

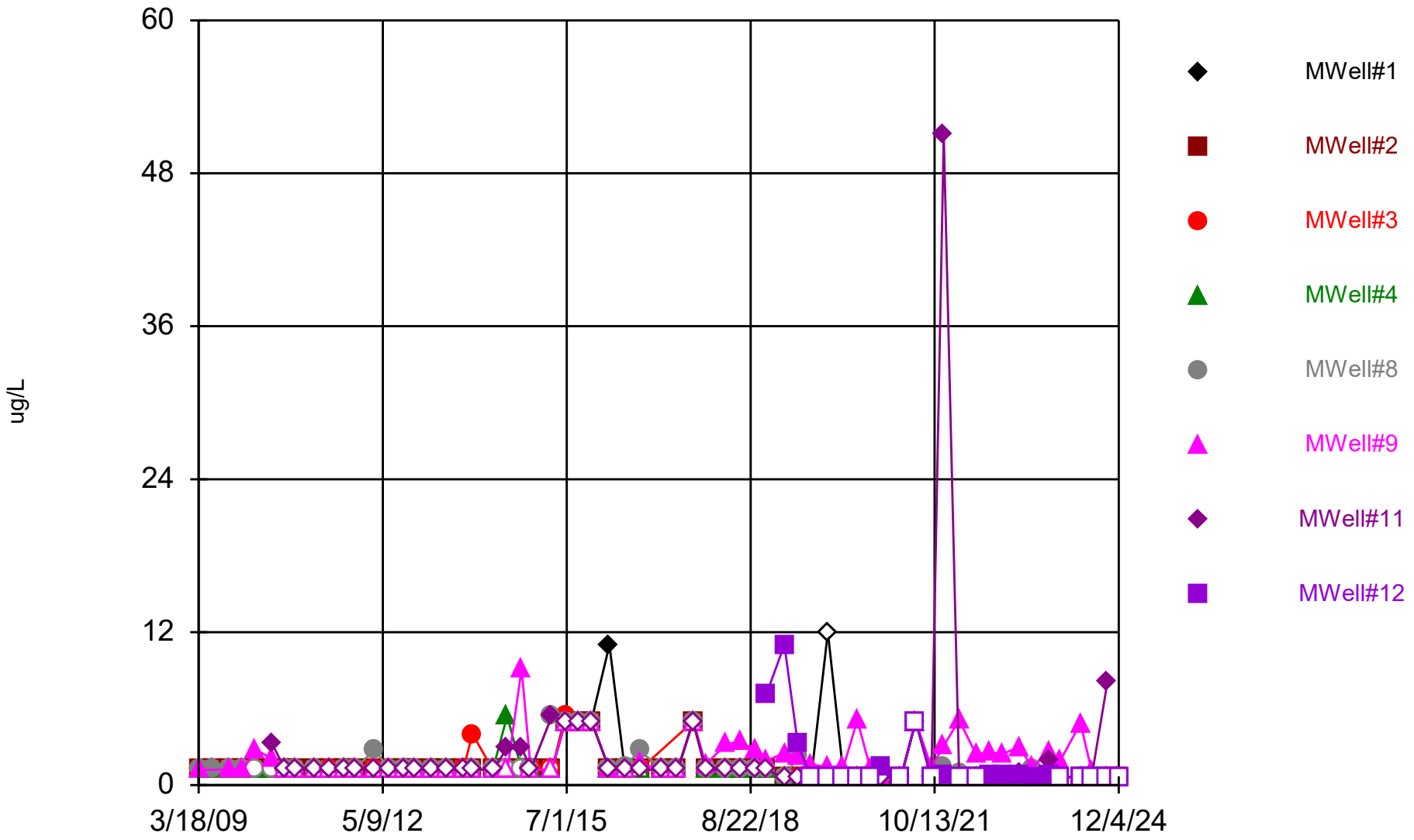


Constituent: Manganese, Dissolved Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

Time Series



Constituent: Methane Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

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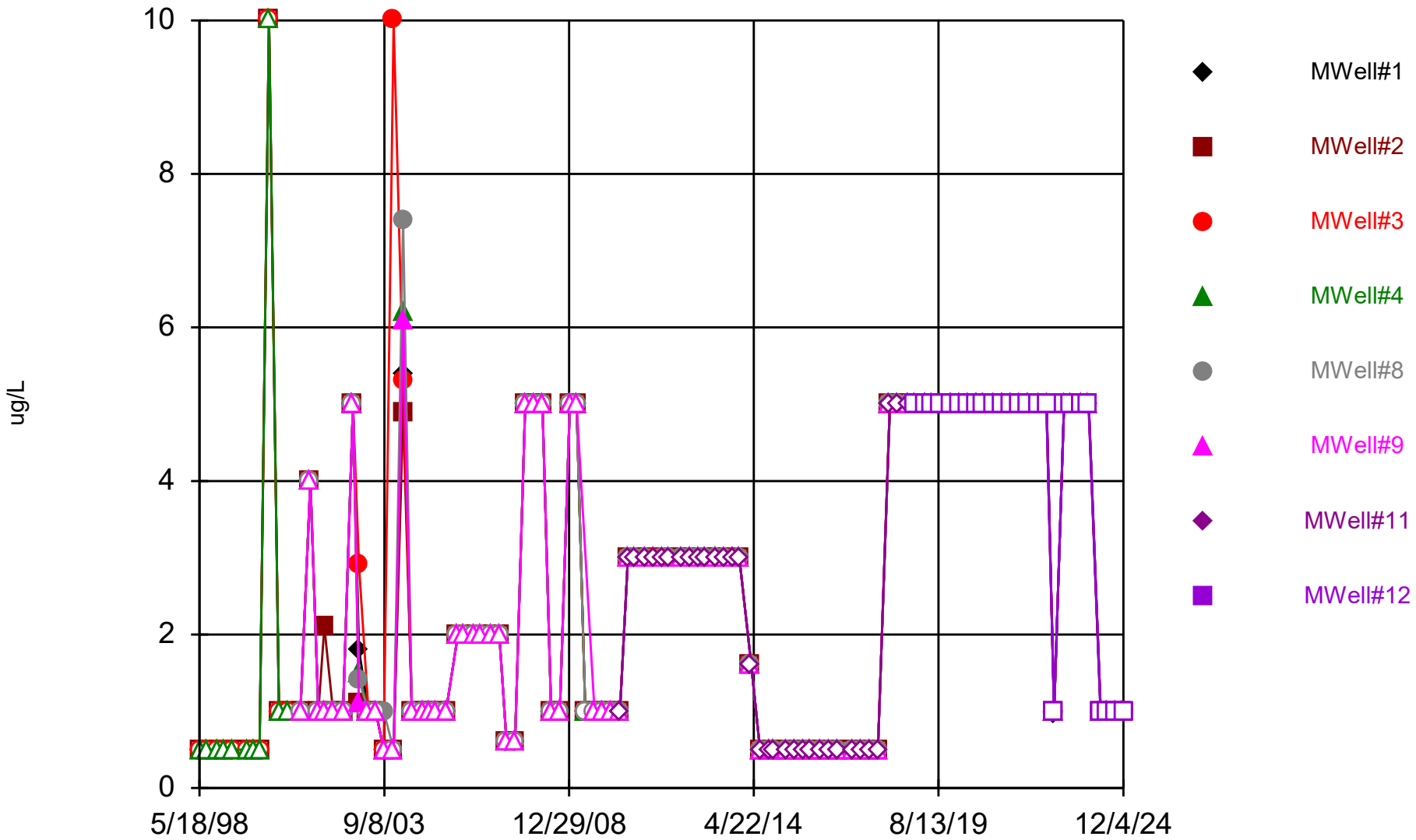

Constituent: Methylene Chloride Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

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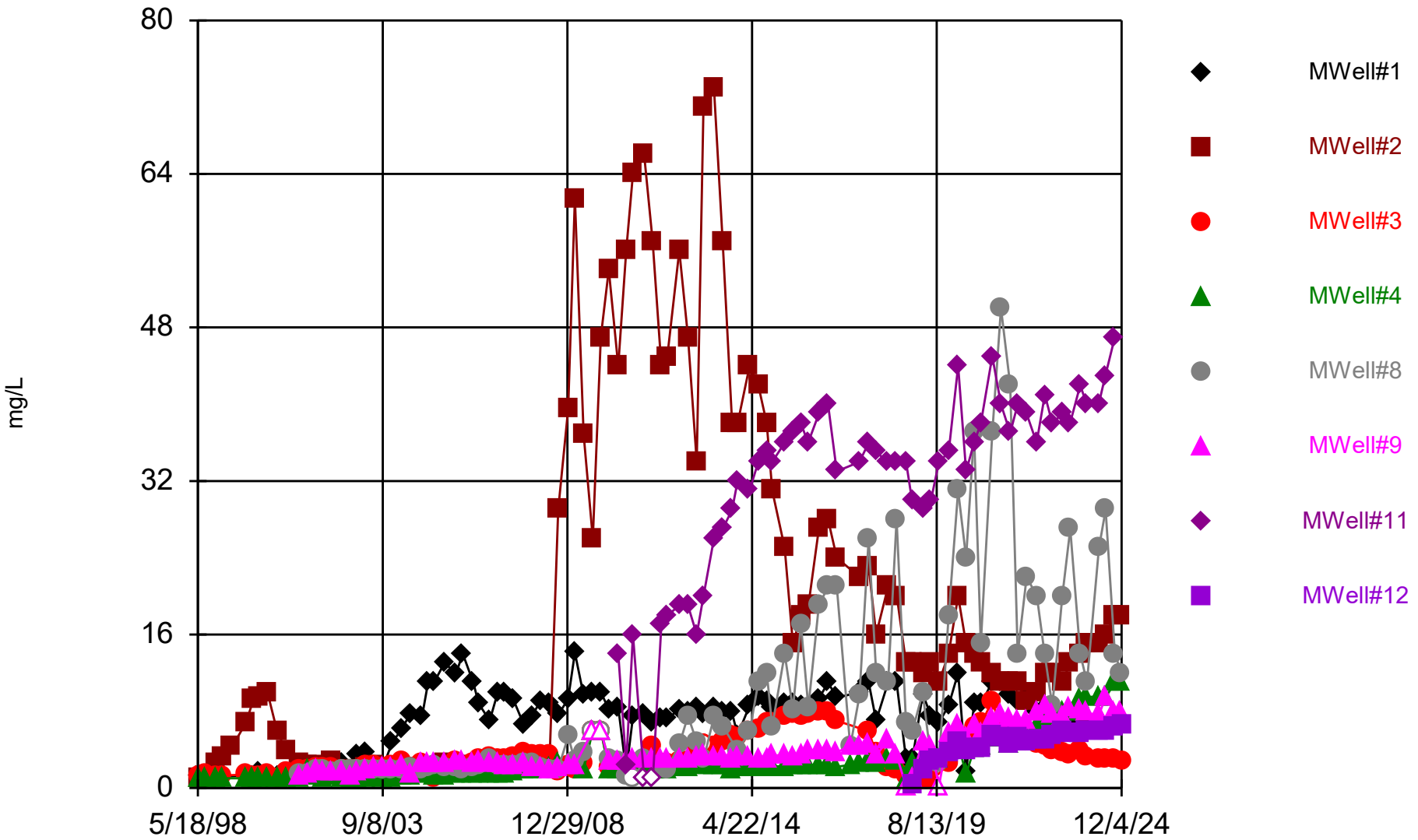
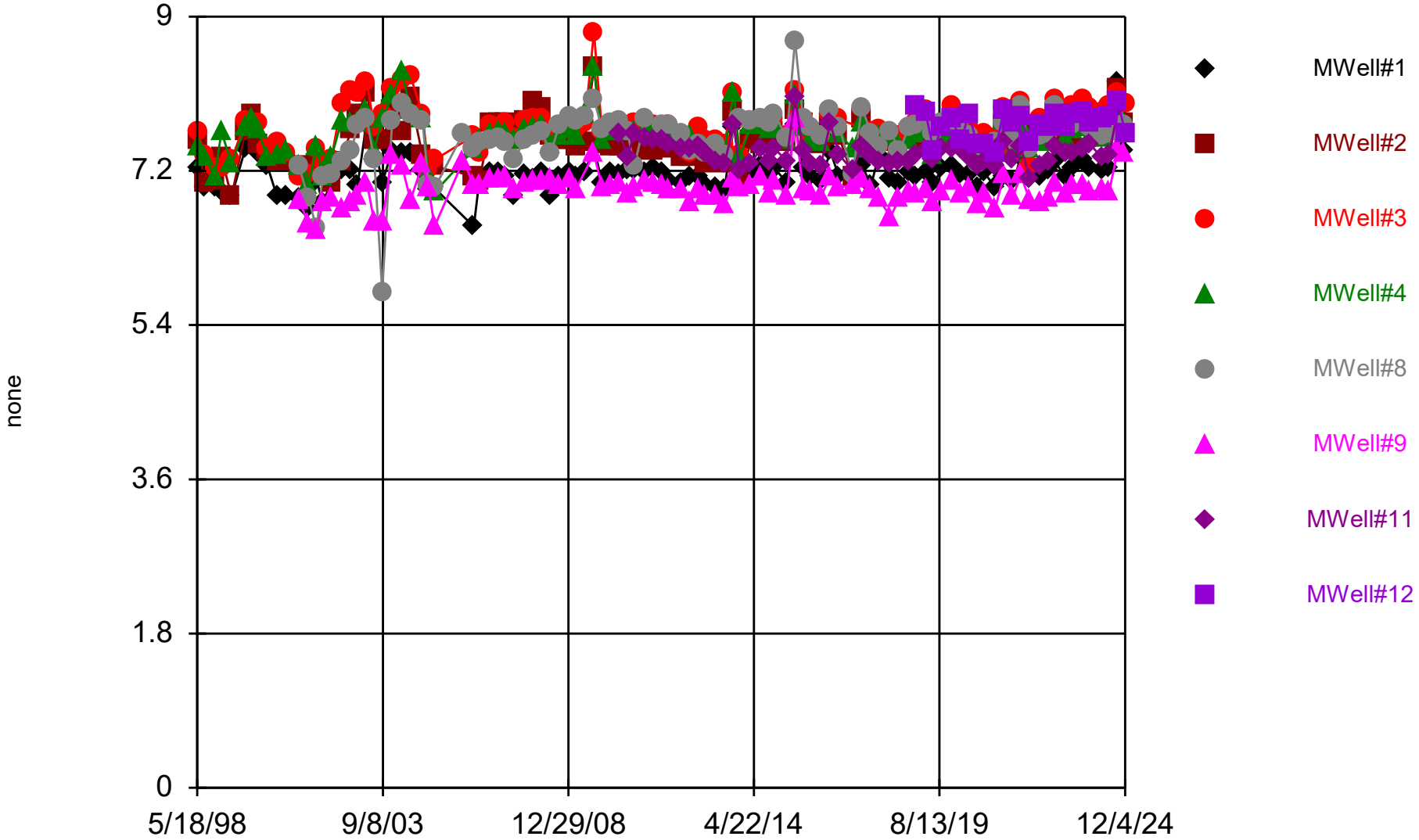


Constituent: Nitrate Nitrogen Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.

Time Series

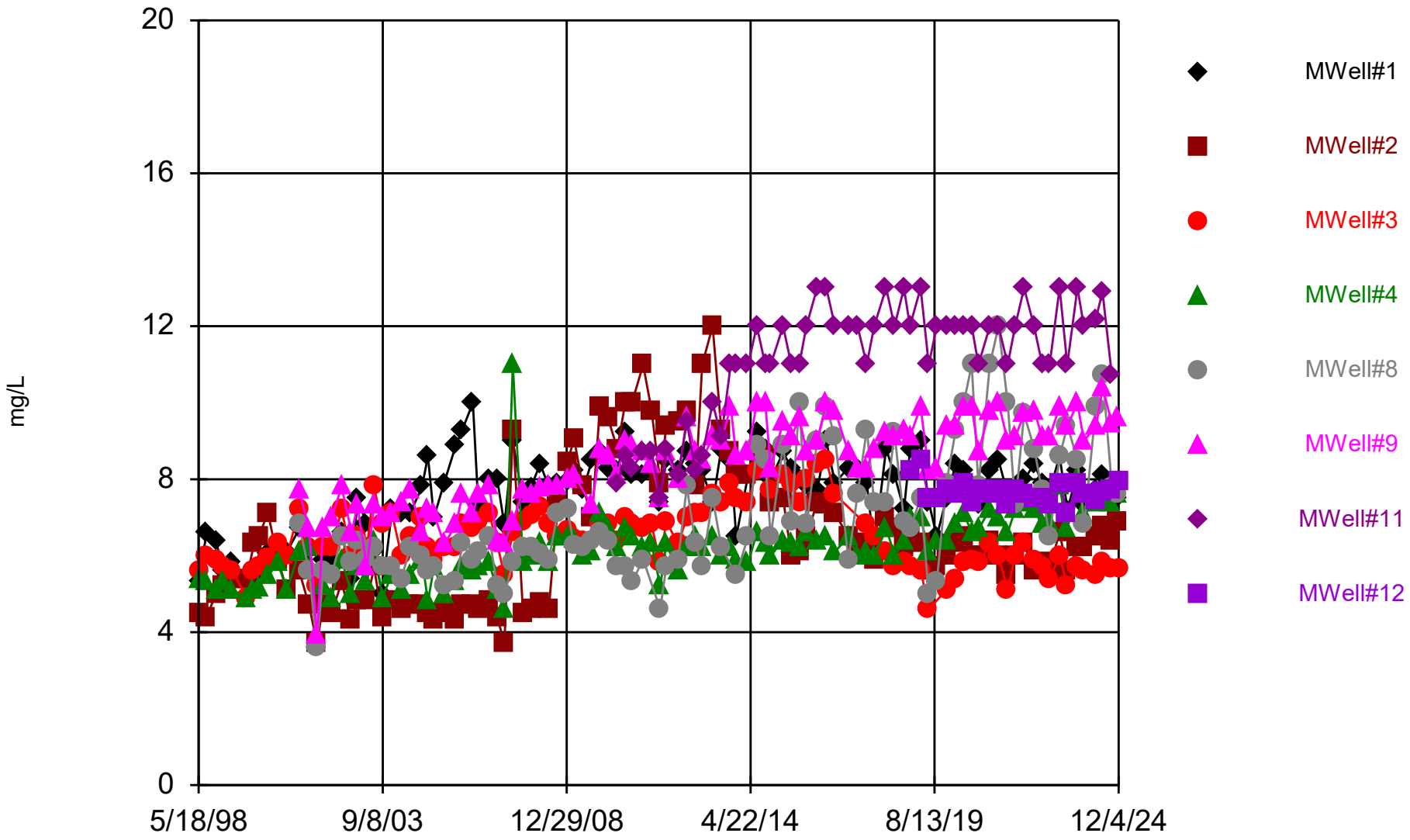


Constituent: pH Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.

Time Series

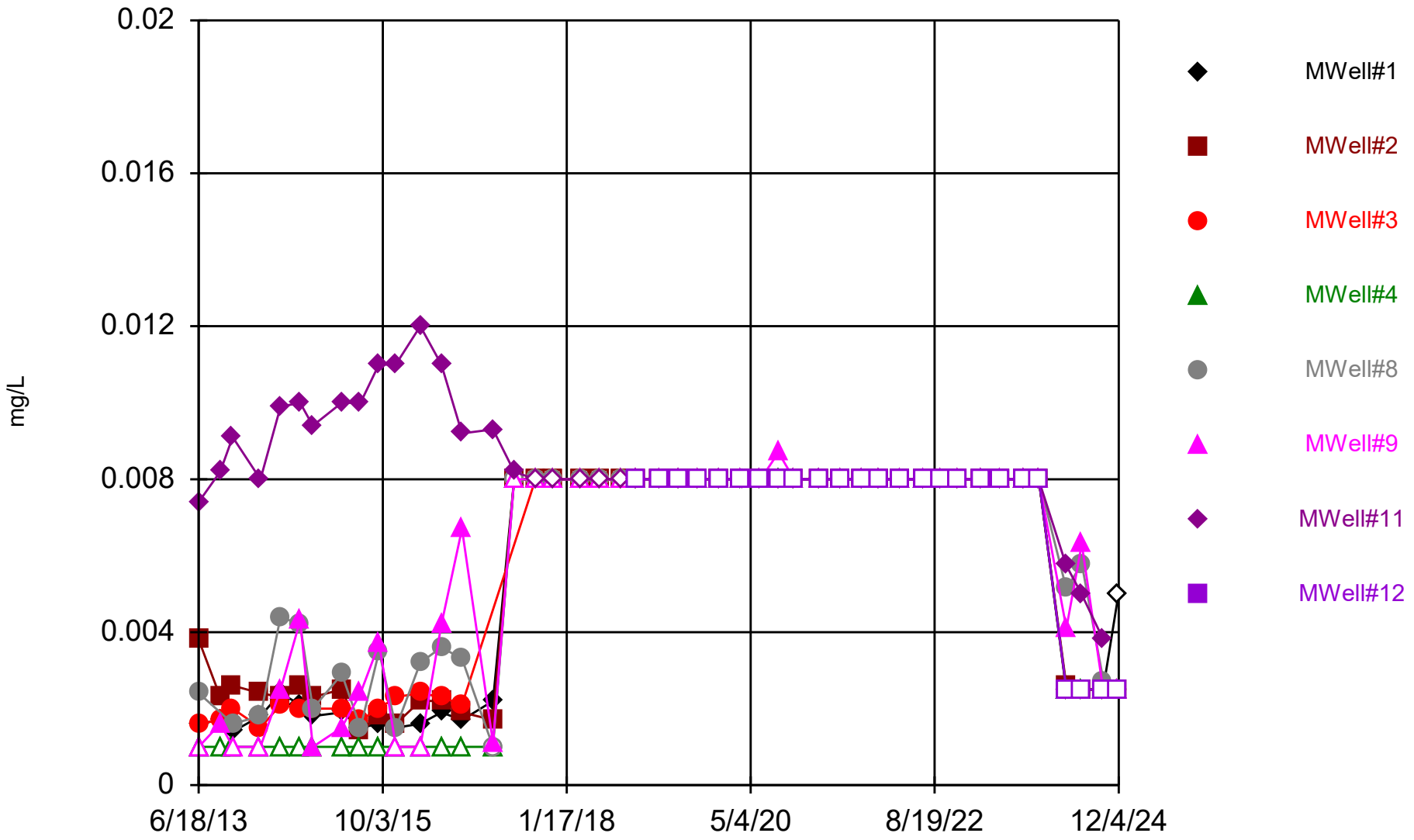


Constituent: Potassium, Dissolved Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

Time Series

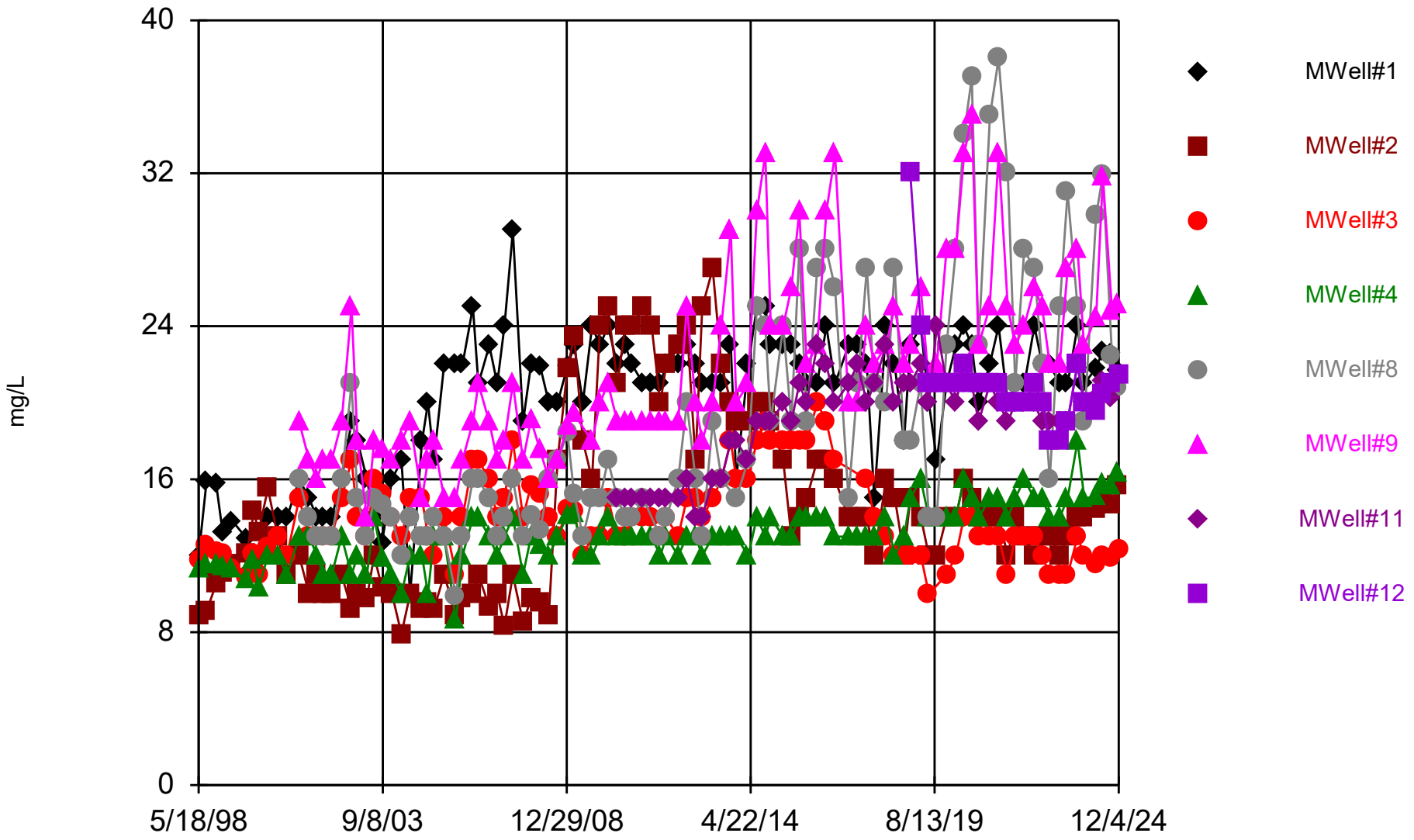


Constituent: Selenium, Total Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.

Time Series

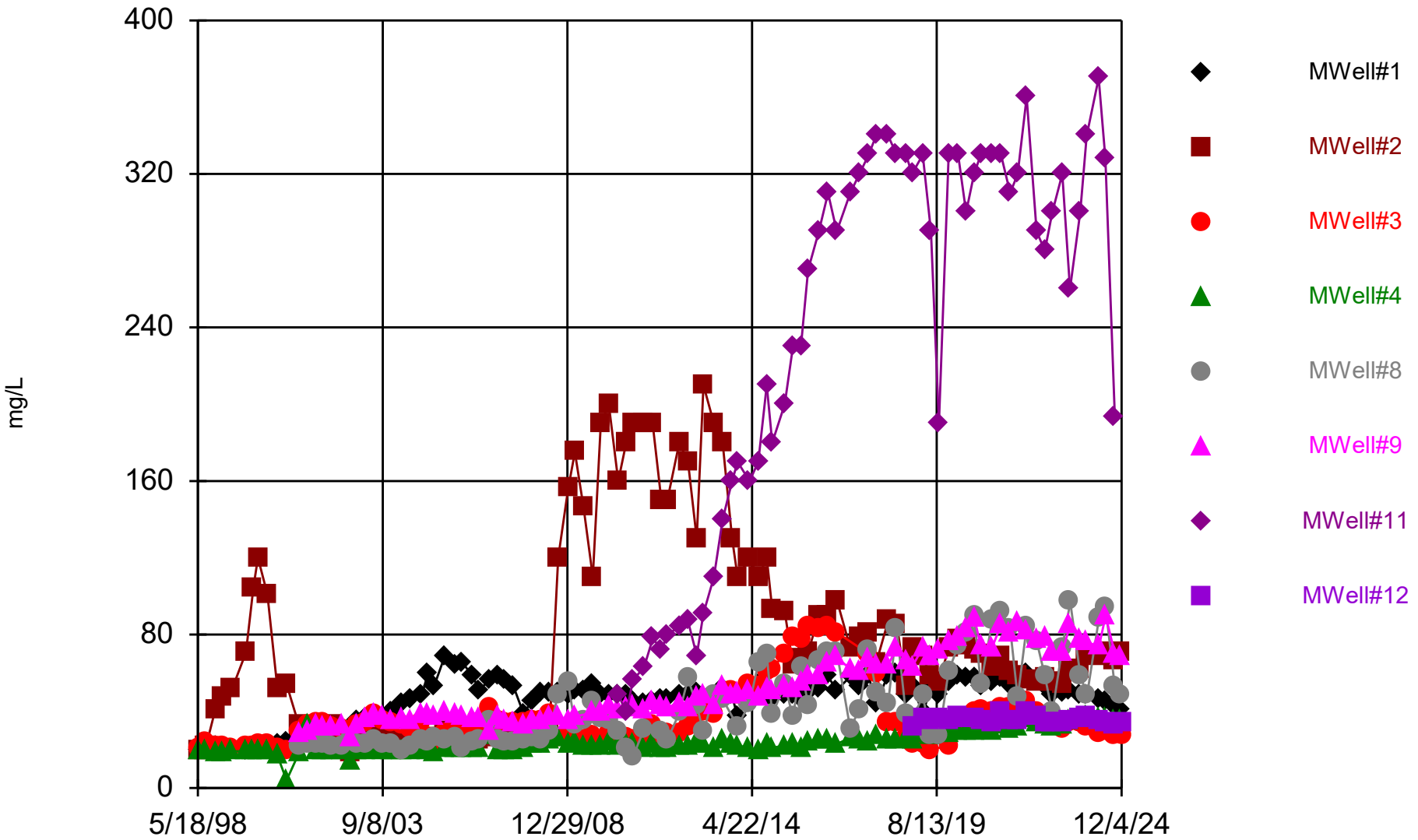


Constituent: Sodium, Dissolved Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.

Time Series

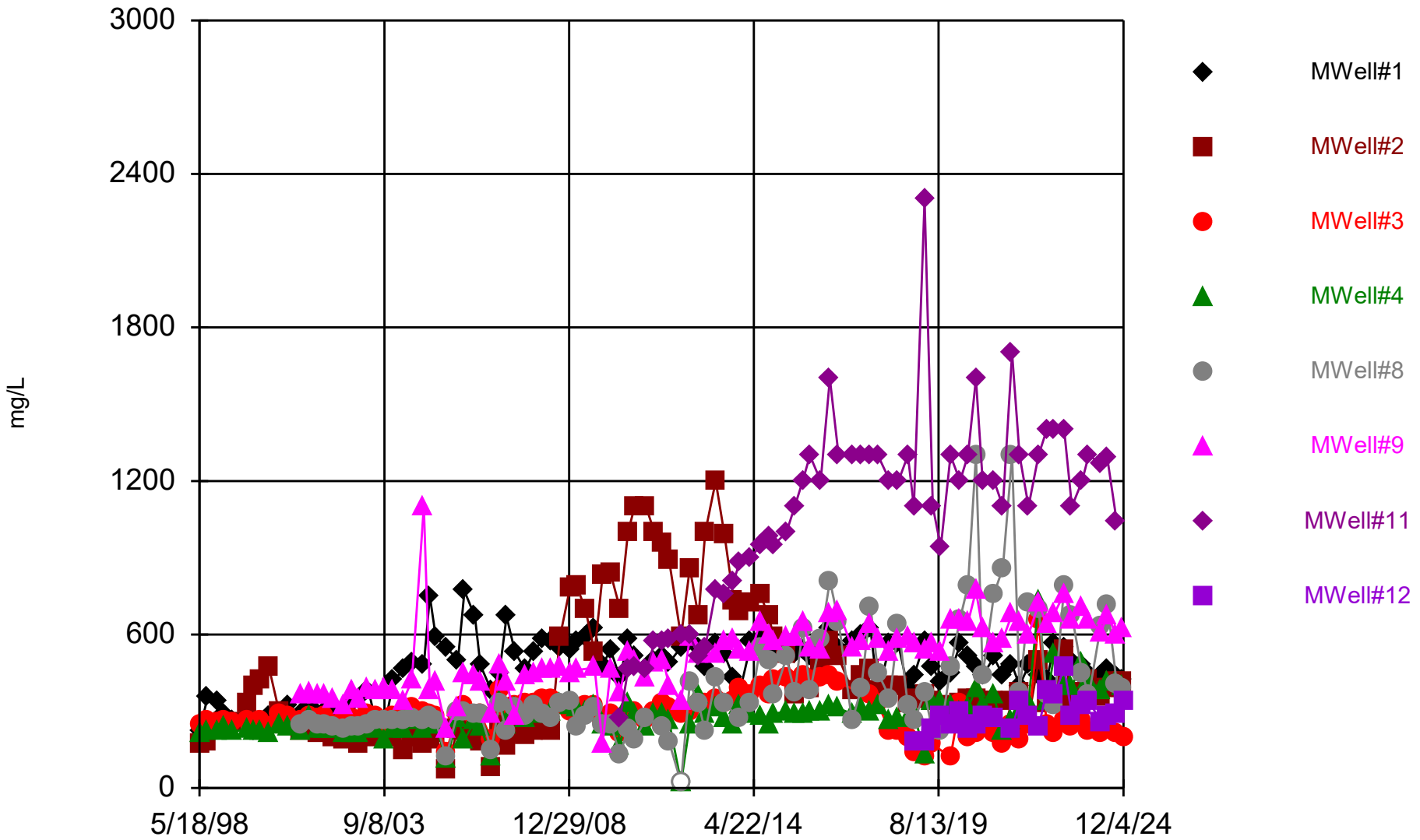


Constituent: Sulfate Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

Time Series

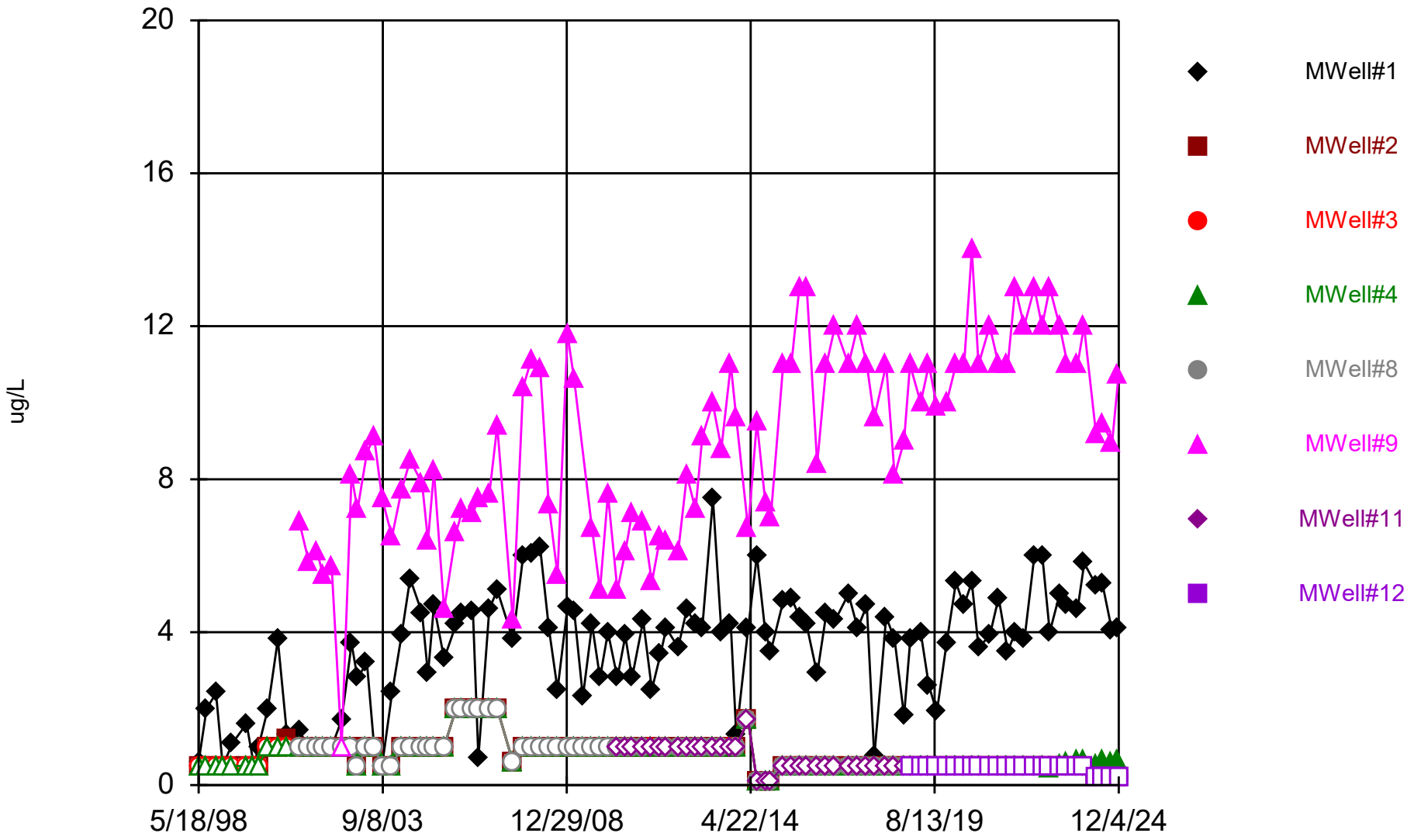


Constituent: TDS Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

Time Series

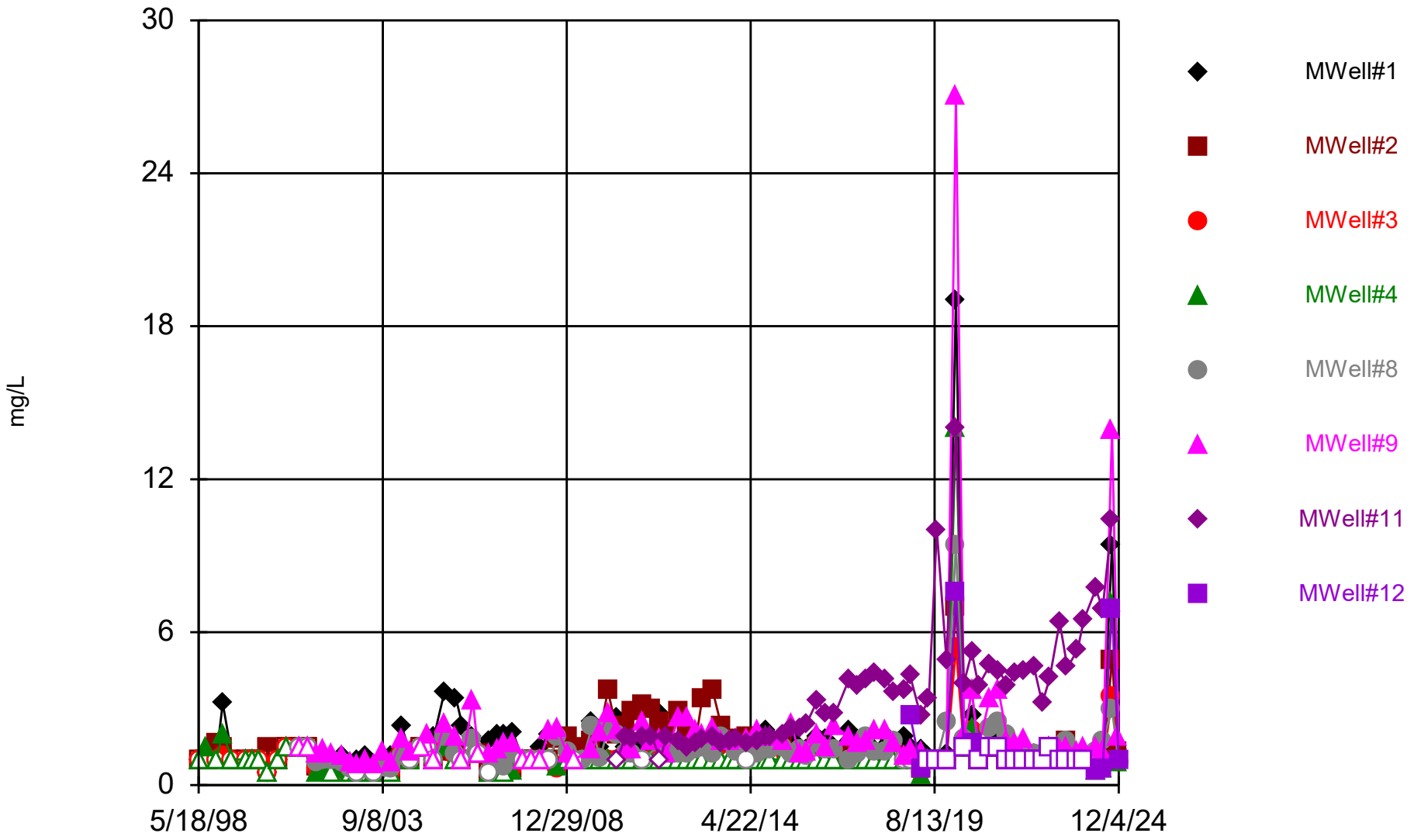


Constituent: Tetrachloroethene Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

Time Series

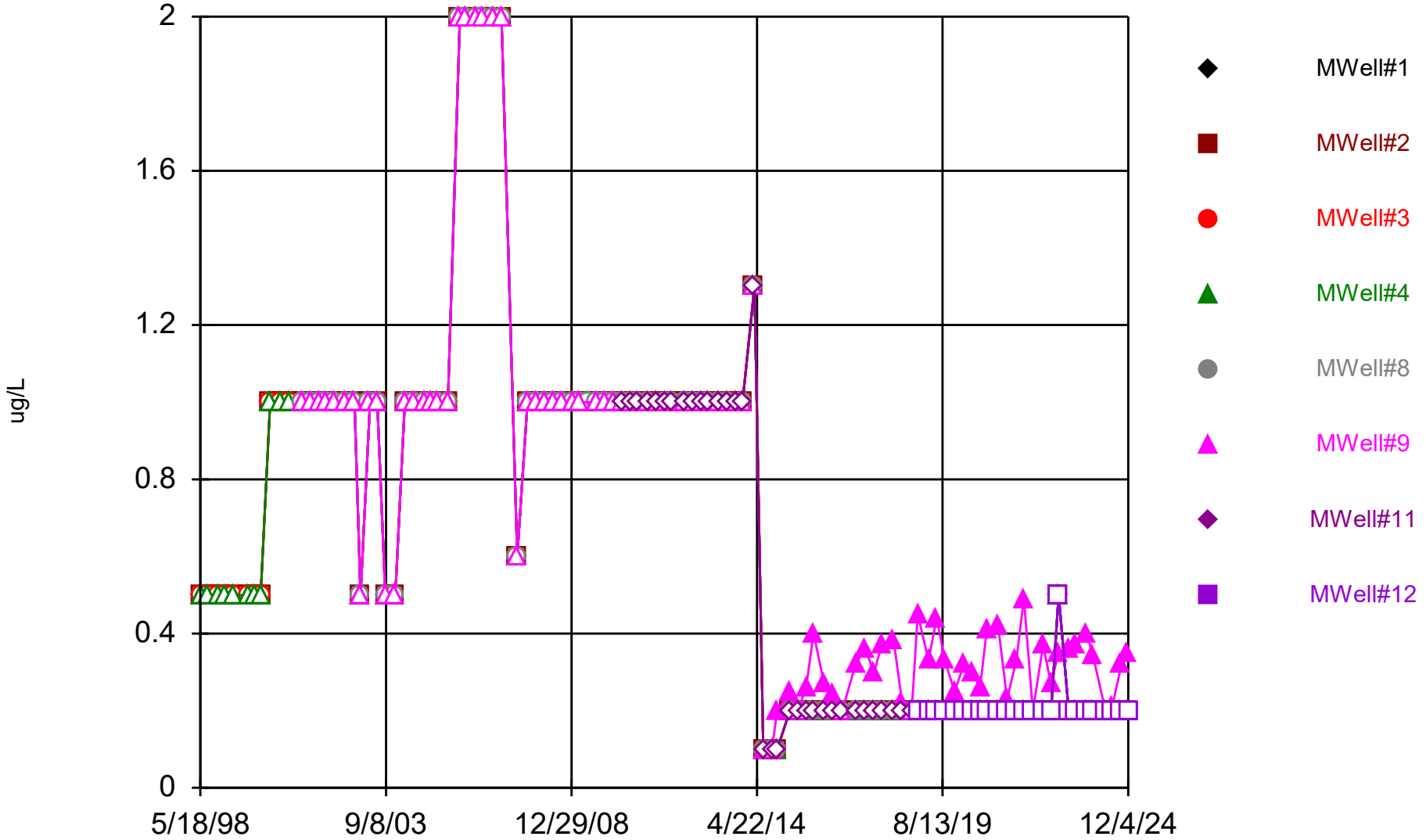


Constituent: TOC Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

Time Series

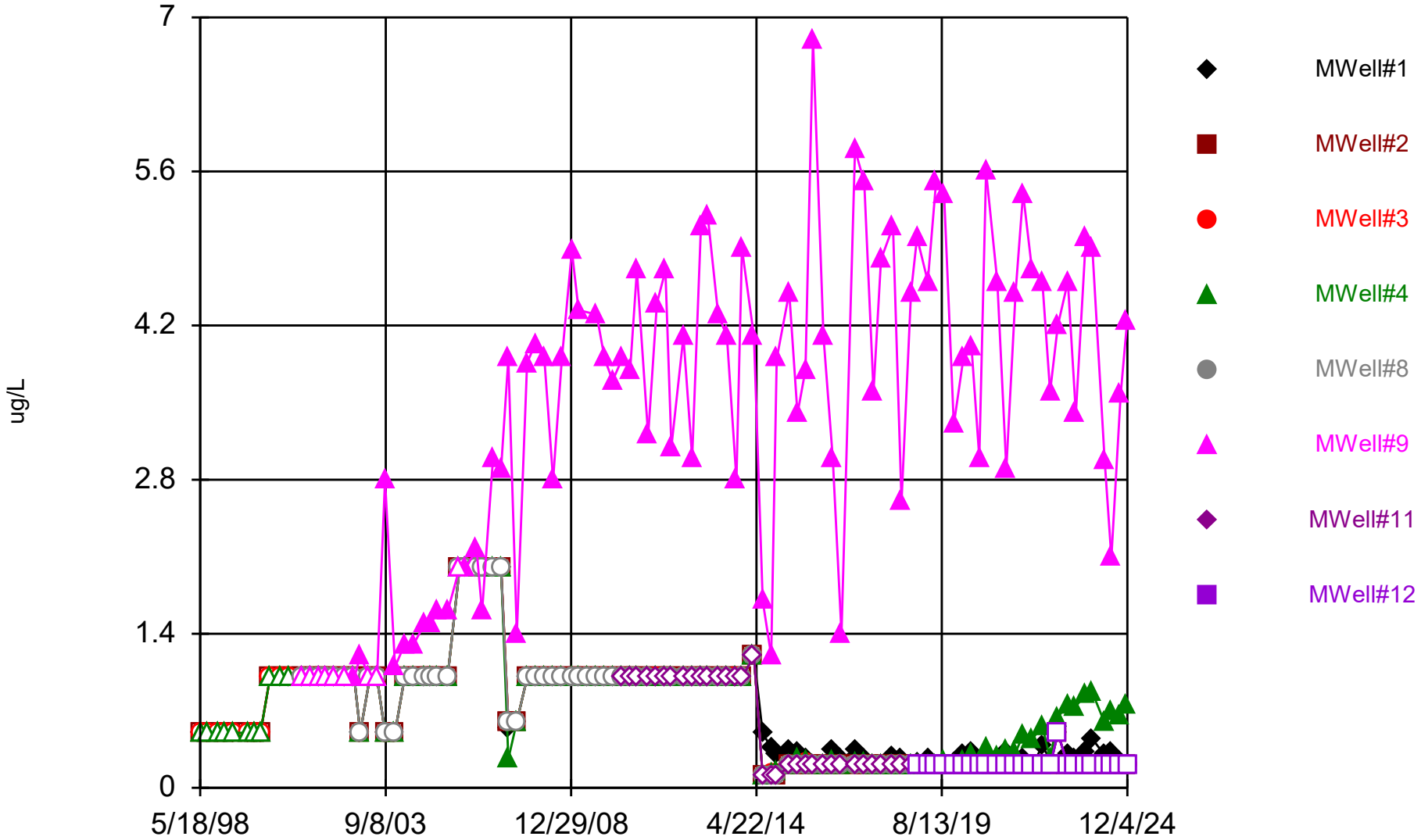


Constituent: trans-1,2-Dichloroethene Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

Time Series



Constituent: Trichloroethene Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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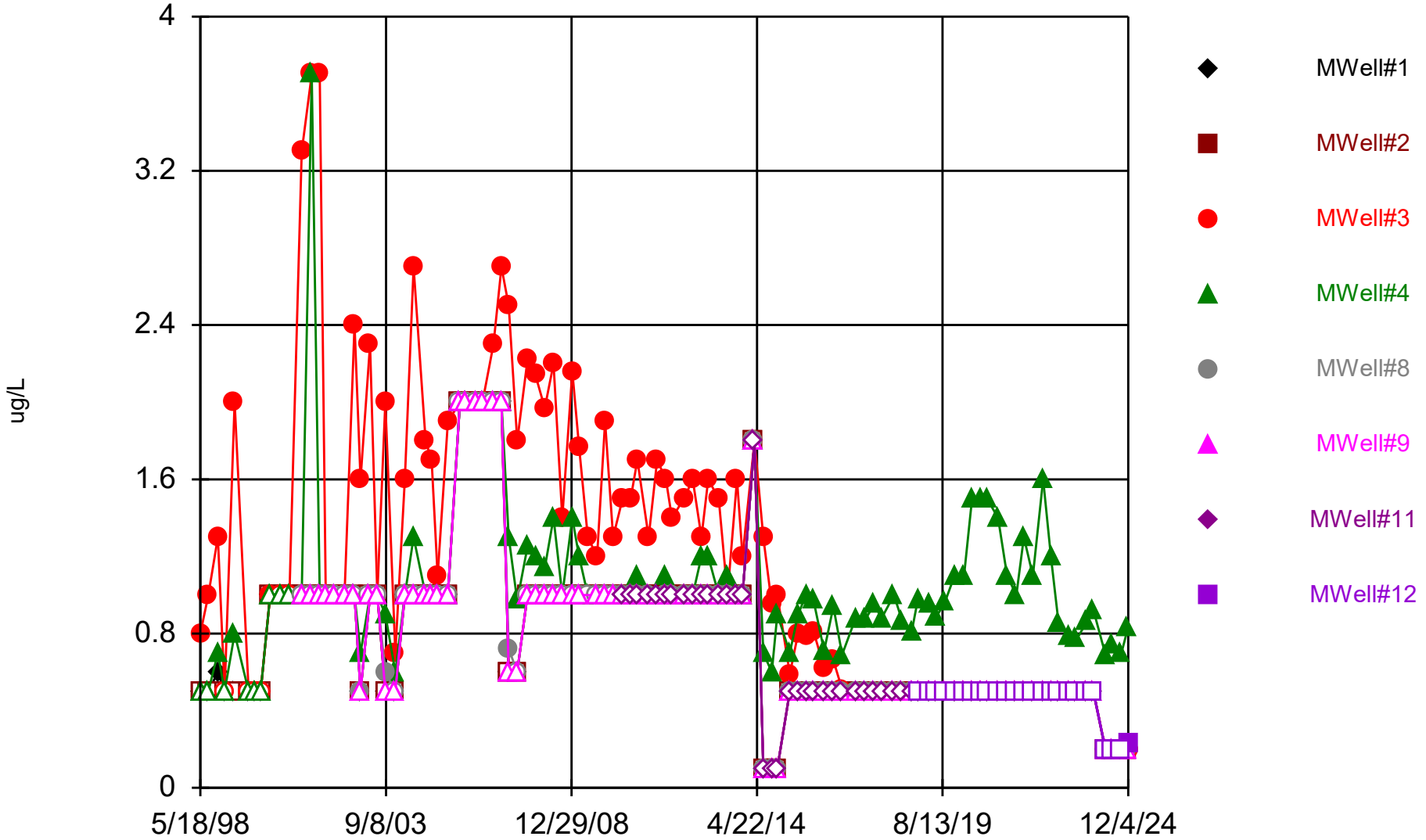
Time Series

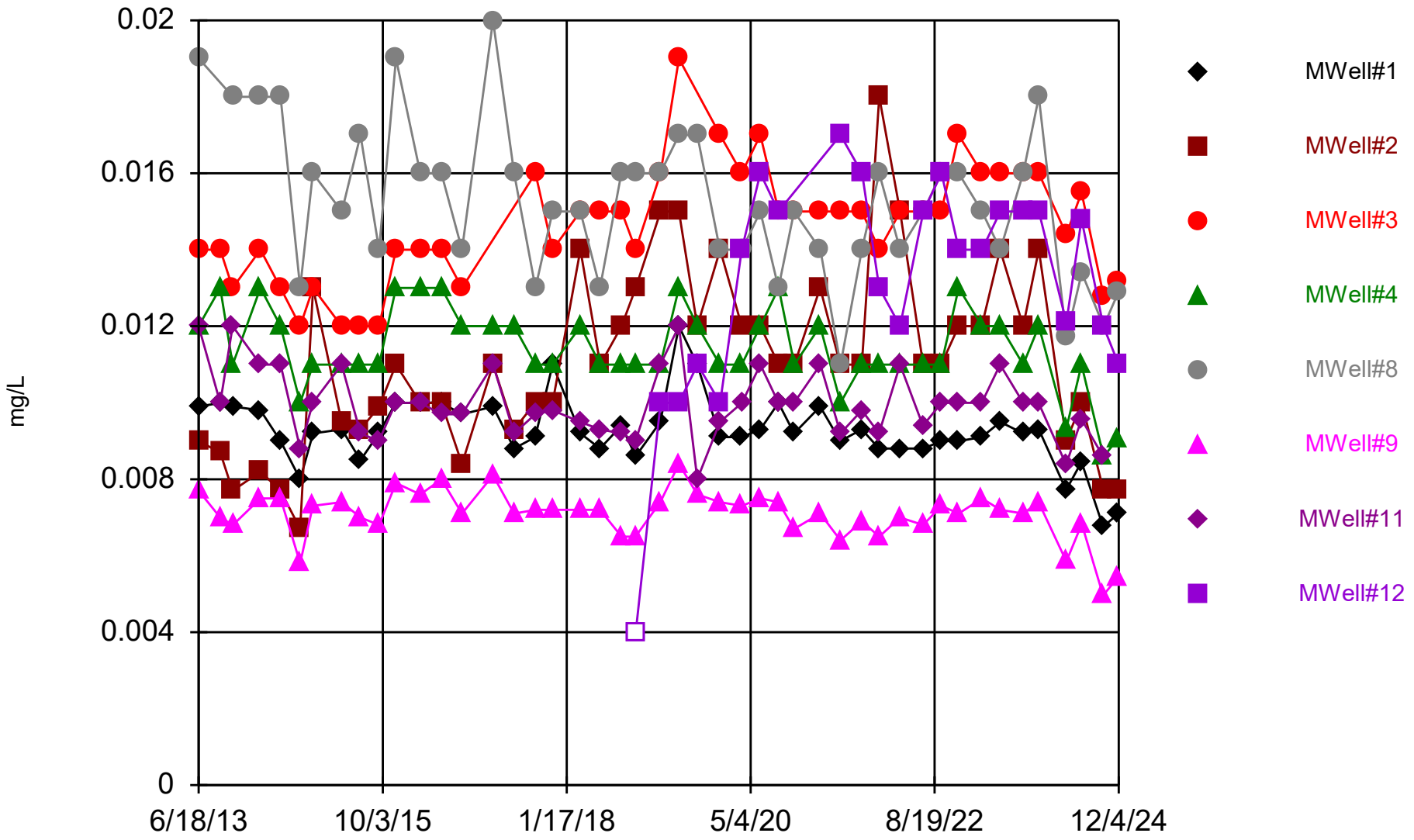


Constituent: Trichlorofluoromethane Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

Time Series



Constituent: Vanadium, Total Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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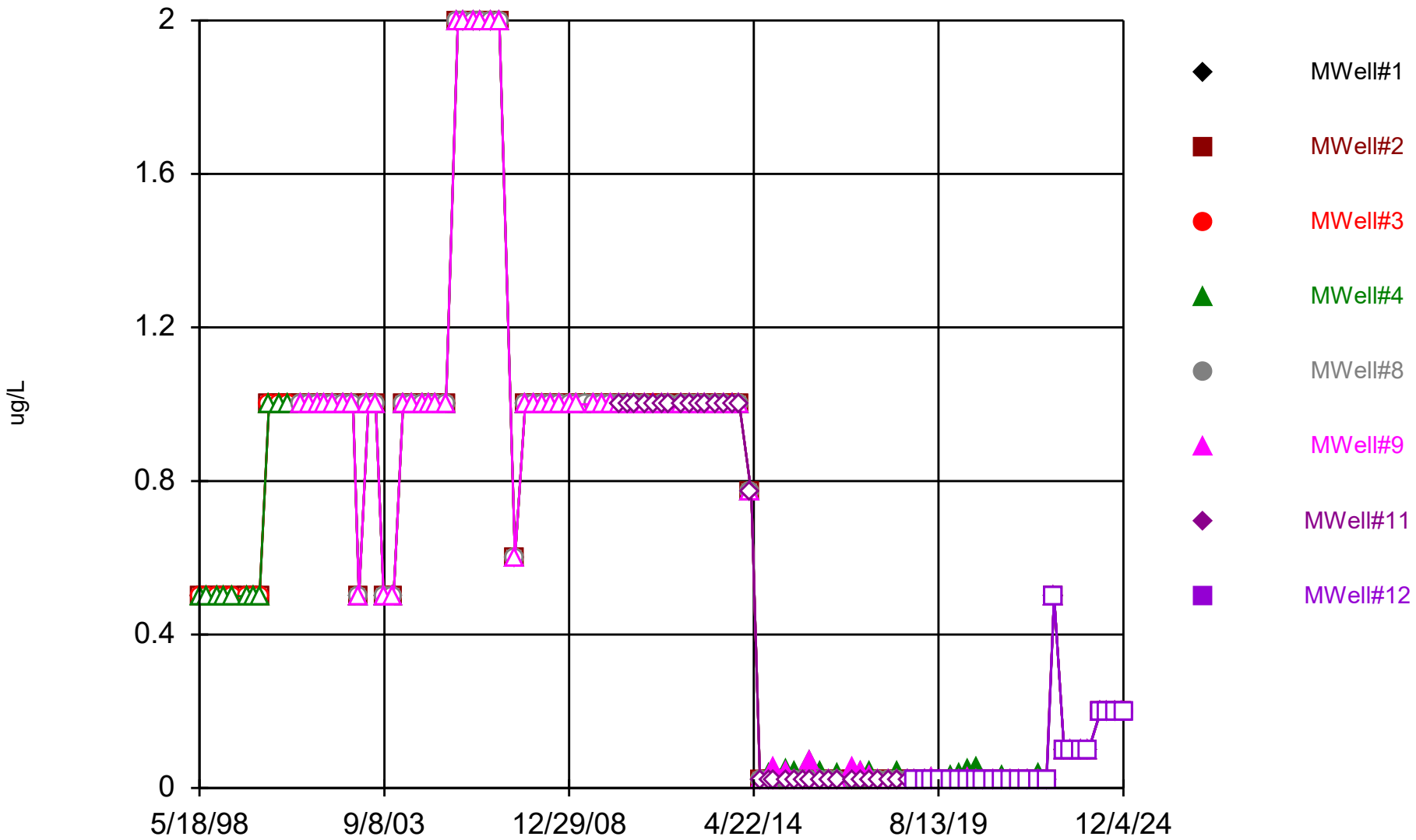
Hollow symbols indicate censored values.

Time Series



Constituent: Vinyl Chloride Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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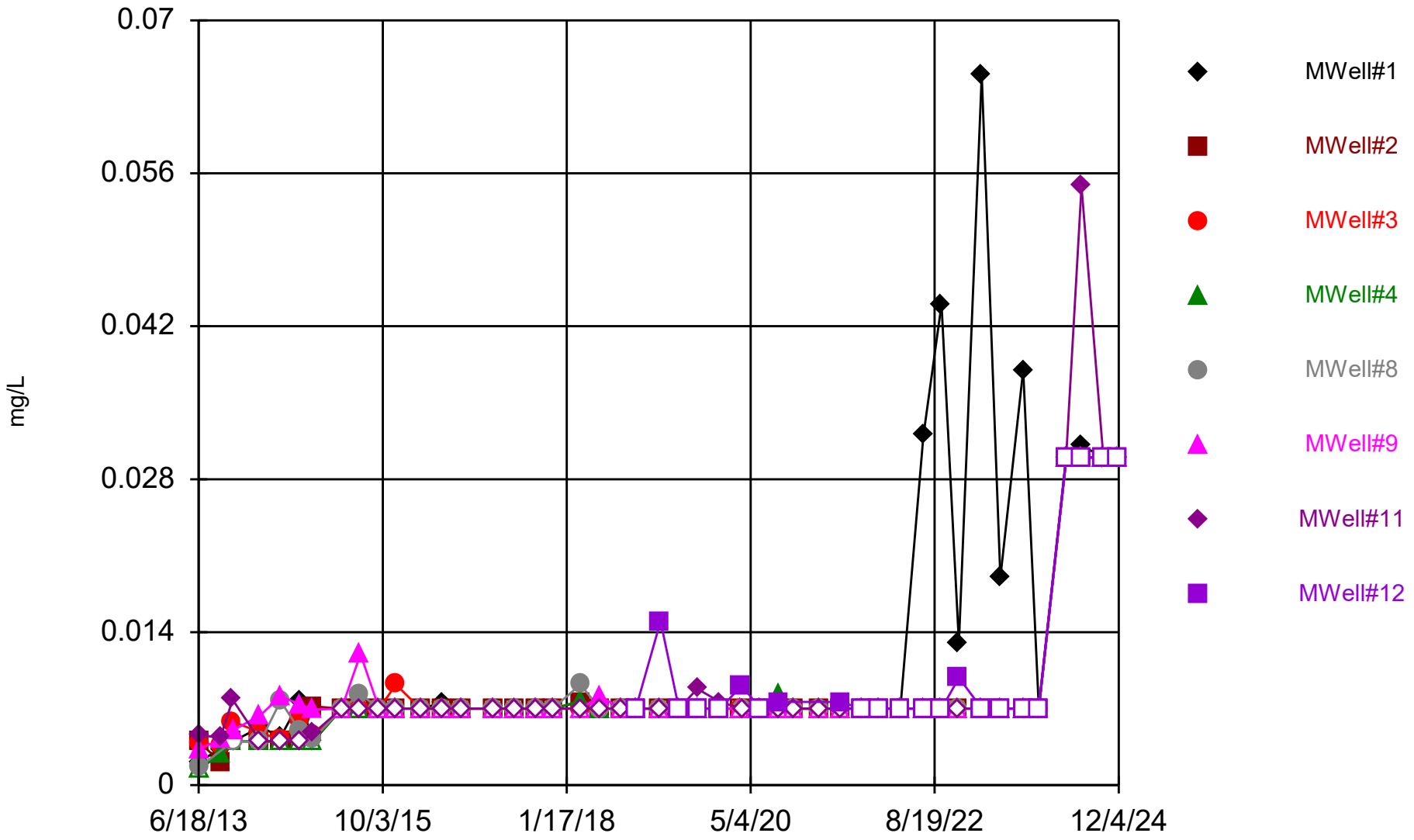
Hollow symbols indicate censored values.

Time Series



Constituent: Zinc, Total Analysis Run 3/12/2025 12:44 PM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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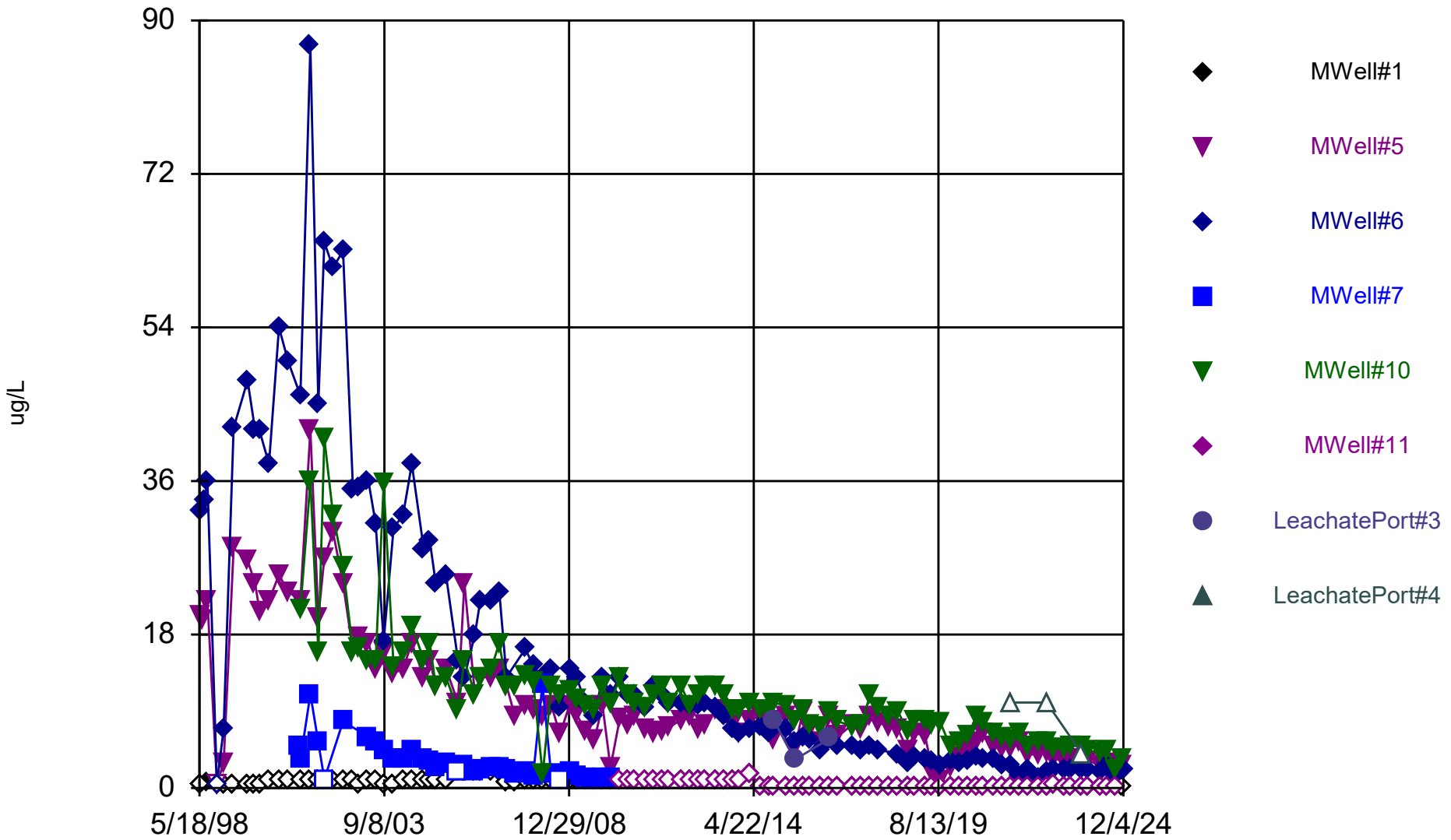
Hollow symbols indicate censored values.

Time Series



Constituent: 1,1-Dichloroethane Analysis Run 3/12/2025 12:39 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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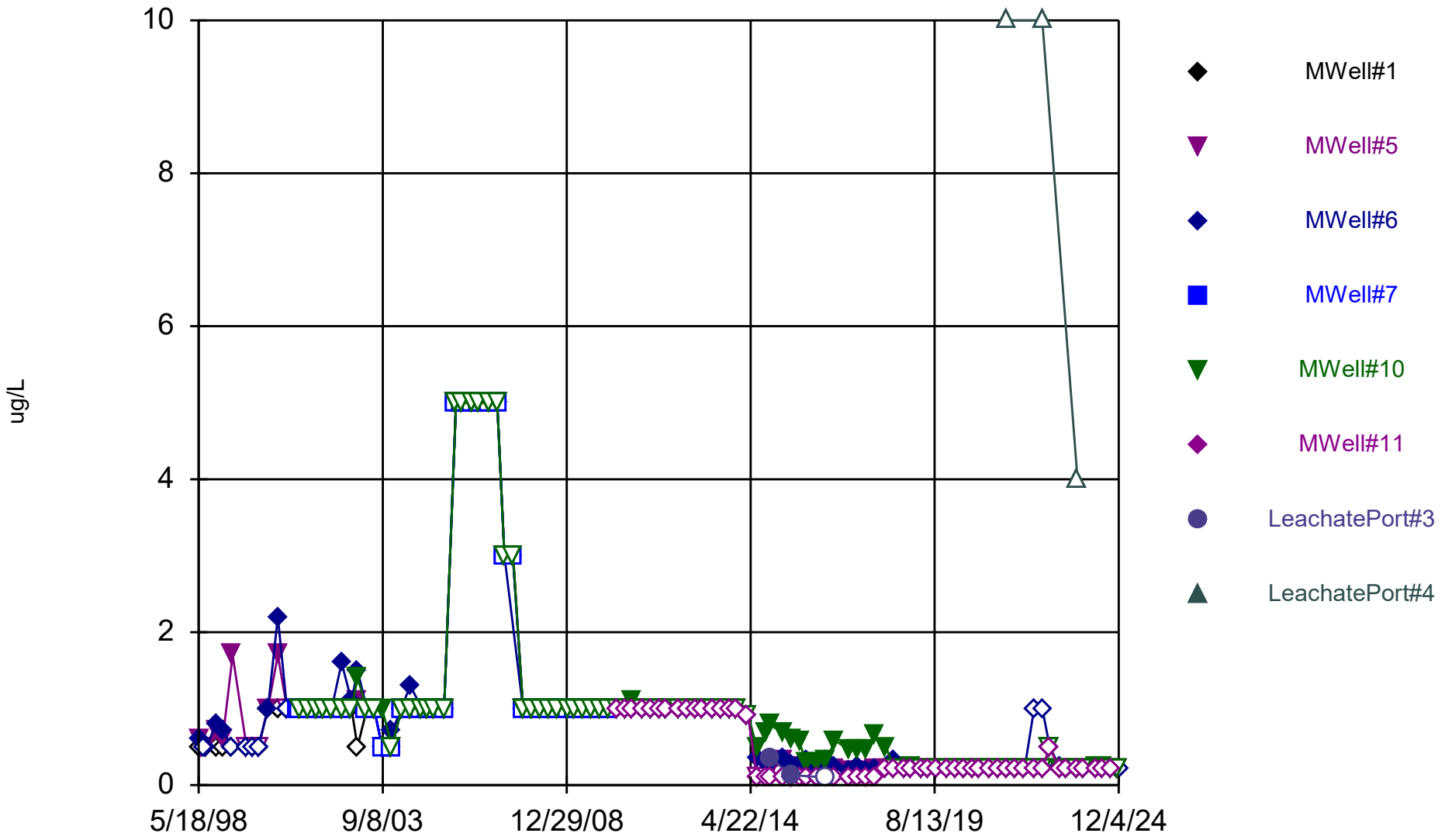
Hollow symbols indicate censored values.

Time Series

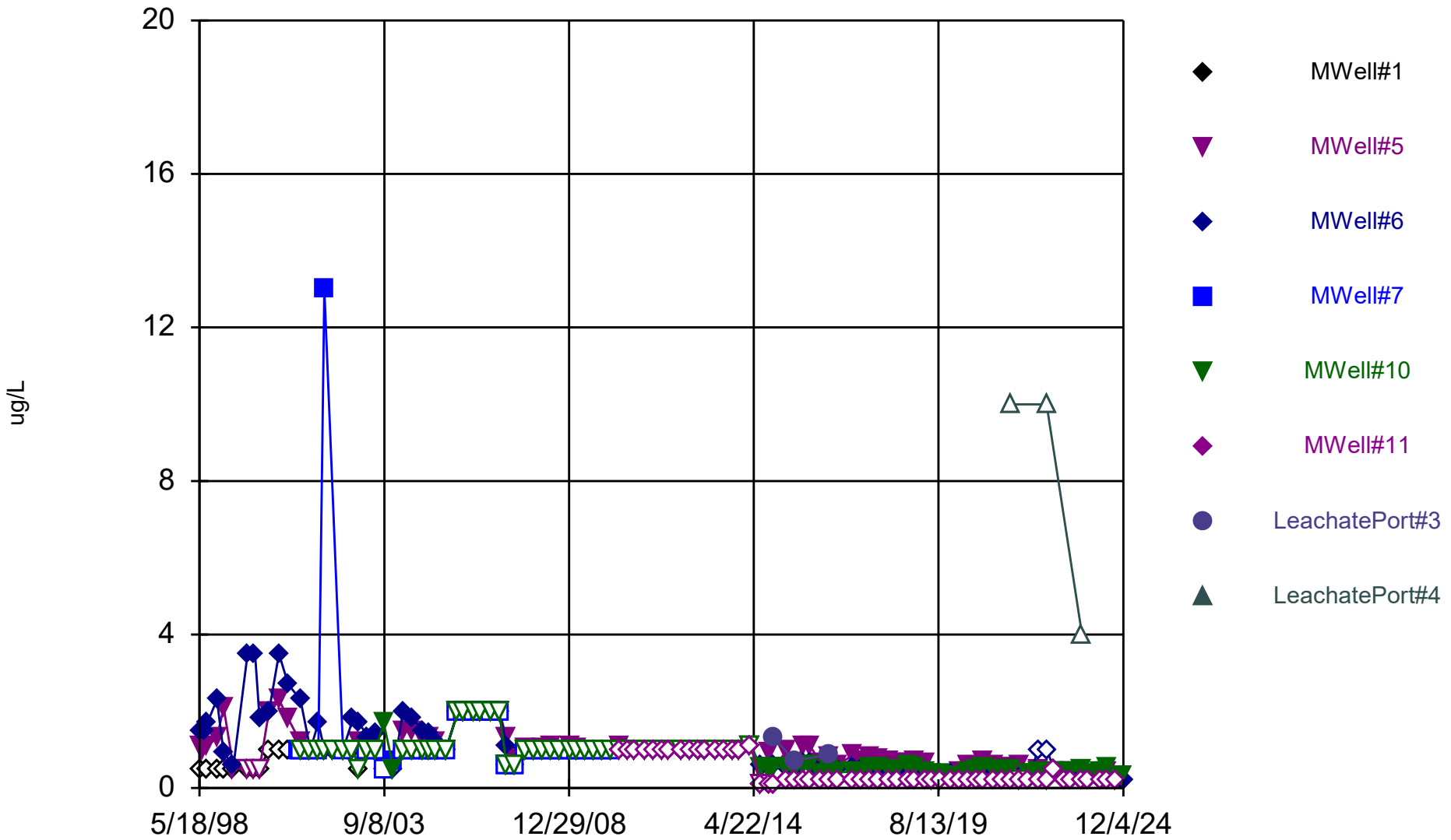


Constituent: 1,1-Dichloroethene Analysis Run 3/12/2025 12:39 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

Time Series

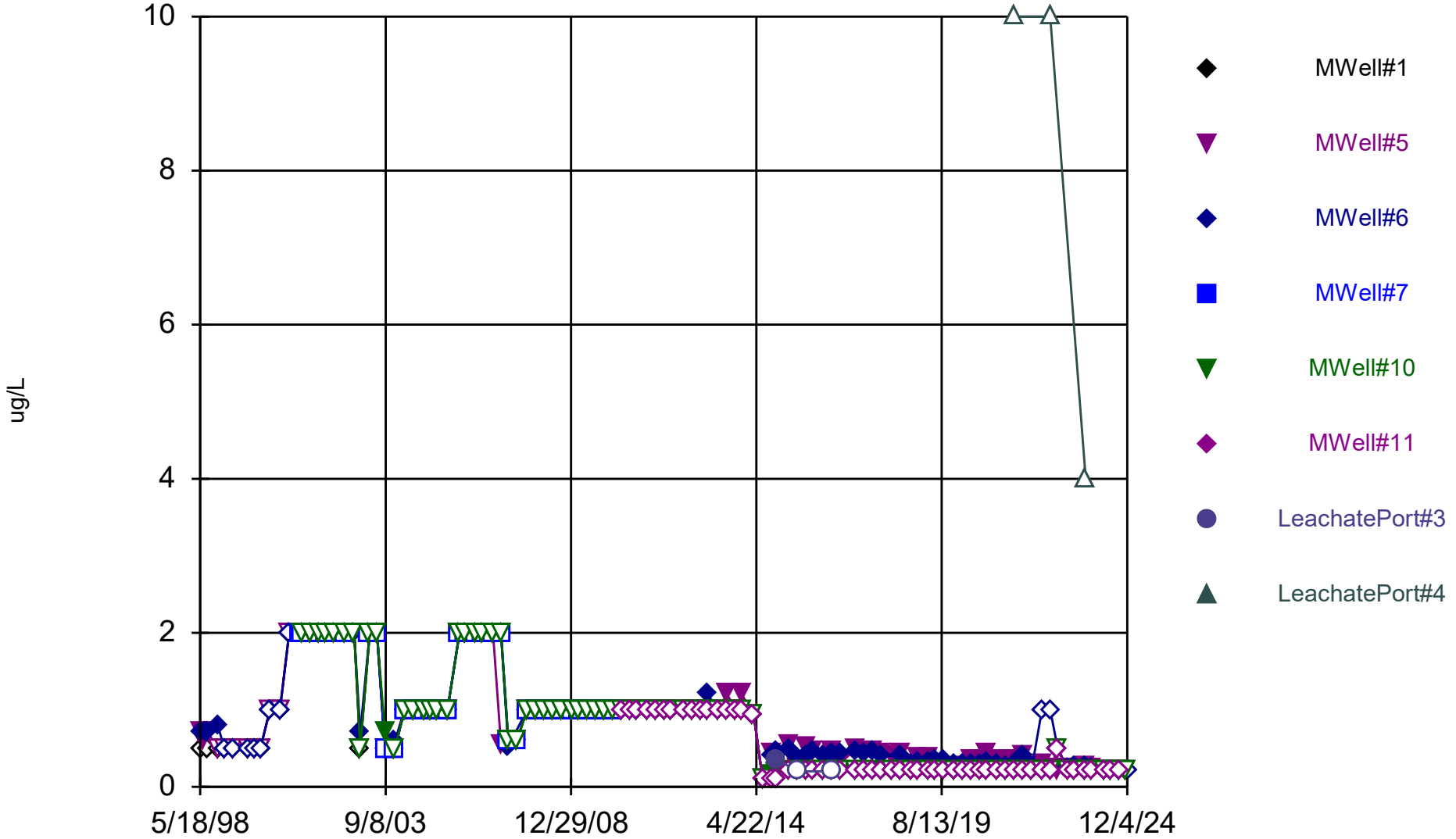


Constituent: 1,2-Dichloroethane Analysis Run 3/12/2025 12:39 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

Time Series

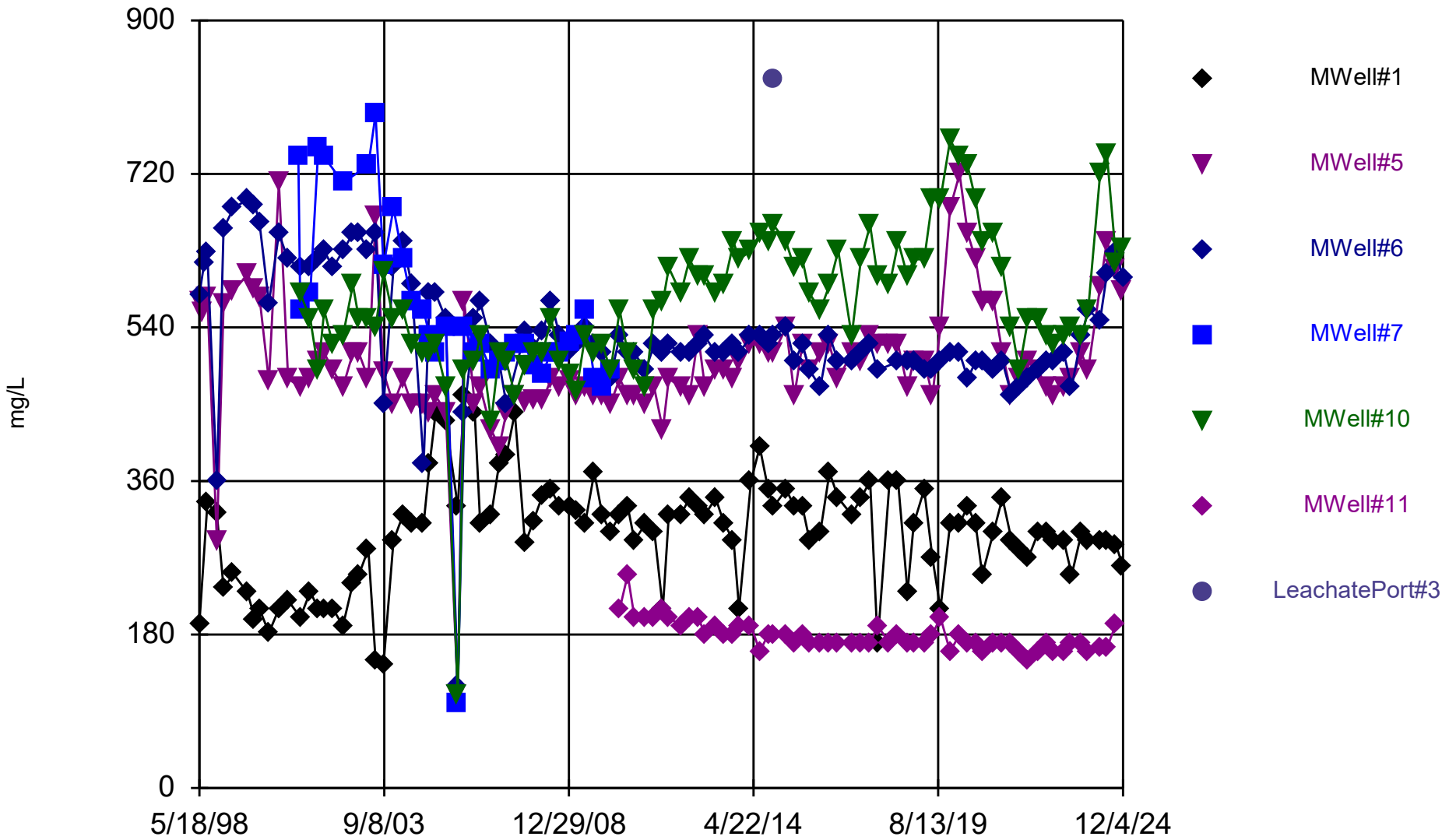


Constituent: 1,2-Dichloropropane Analysis Run 3/12/2025 12:39 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.

Time Series



Constituent: Alkalinity, Bicarbonate Analysis Run 3/12/2025 12:39 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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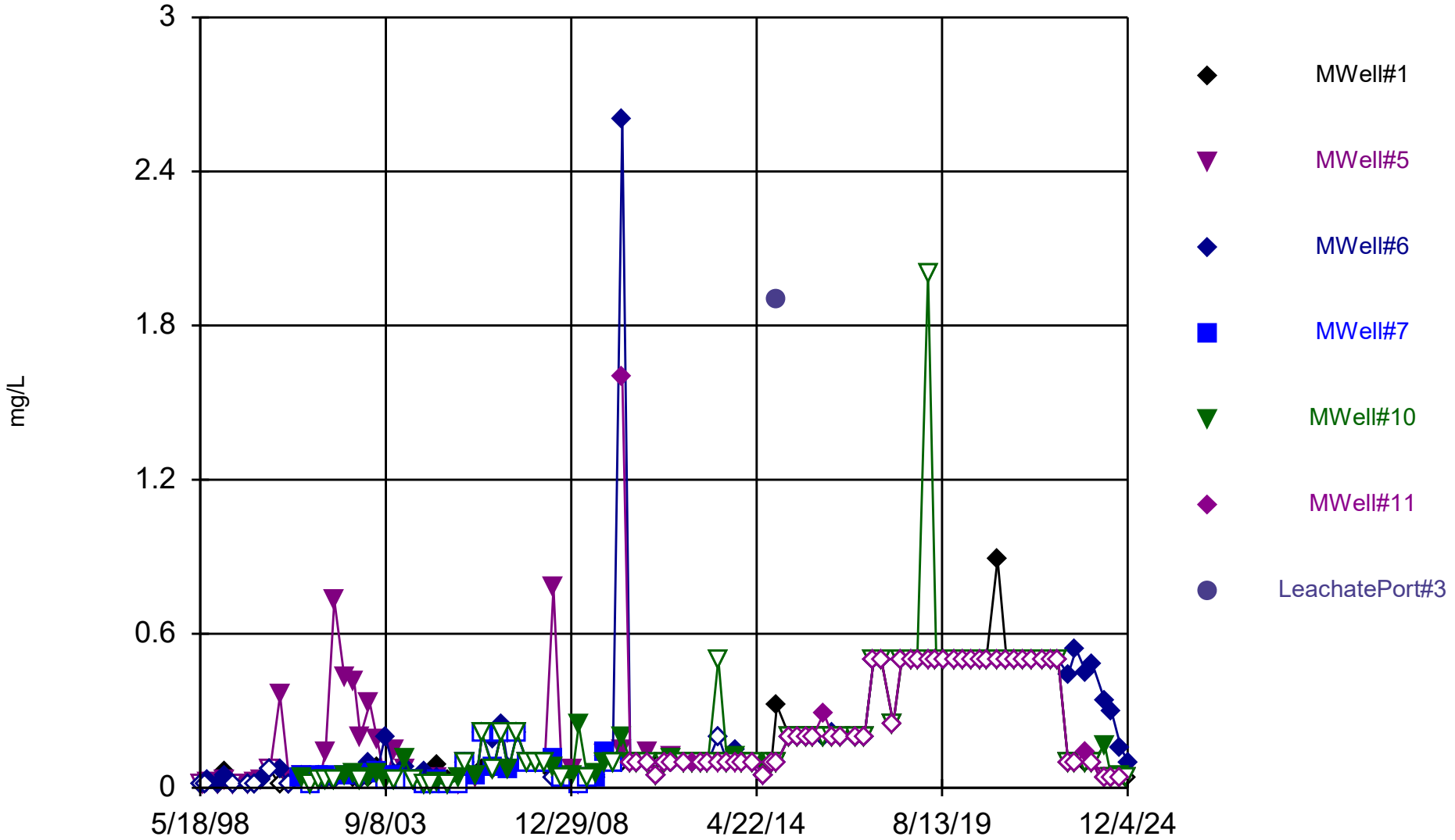
Hollow symbols indicate censored values.

Time Series



Constituent: Ammonia Nitrogen Analysis Run 3/12/2025 12:39 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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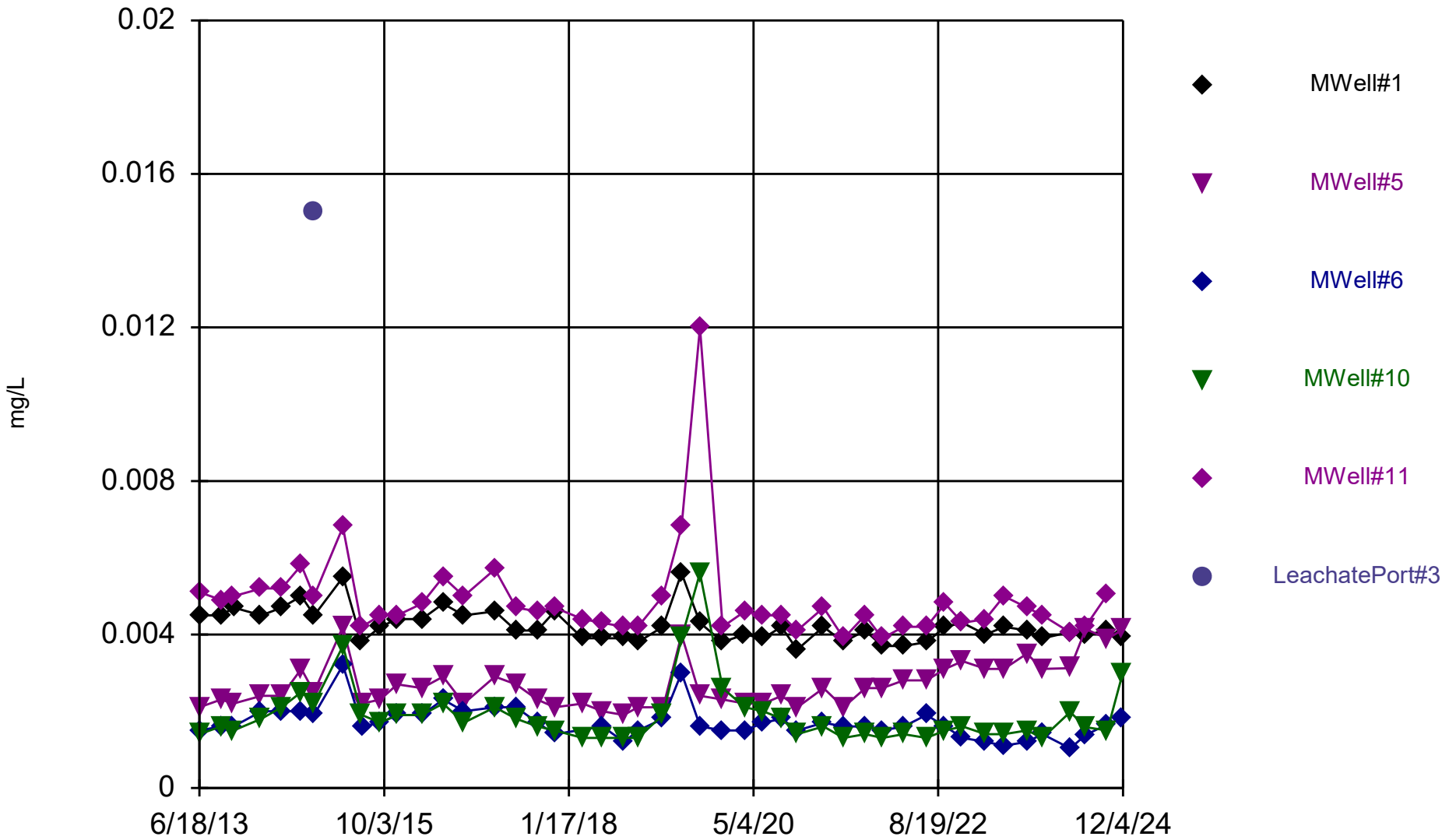
Time Series



Constituent: Arsenic, Total Analysis Run 3/12/2025 12:39 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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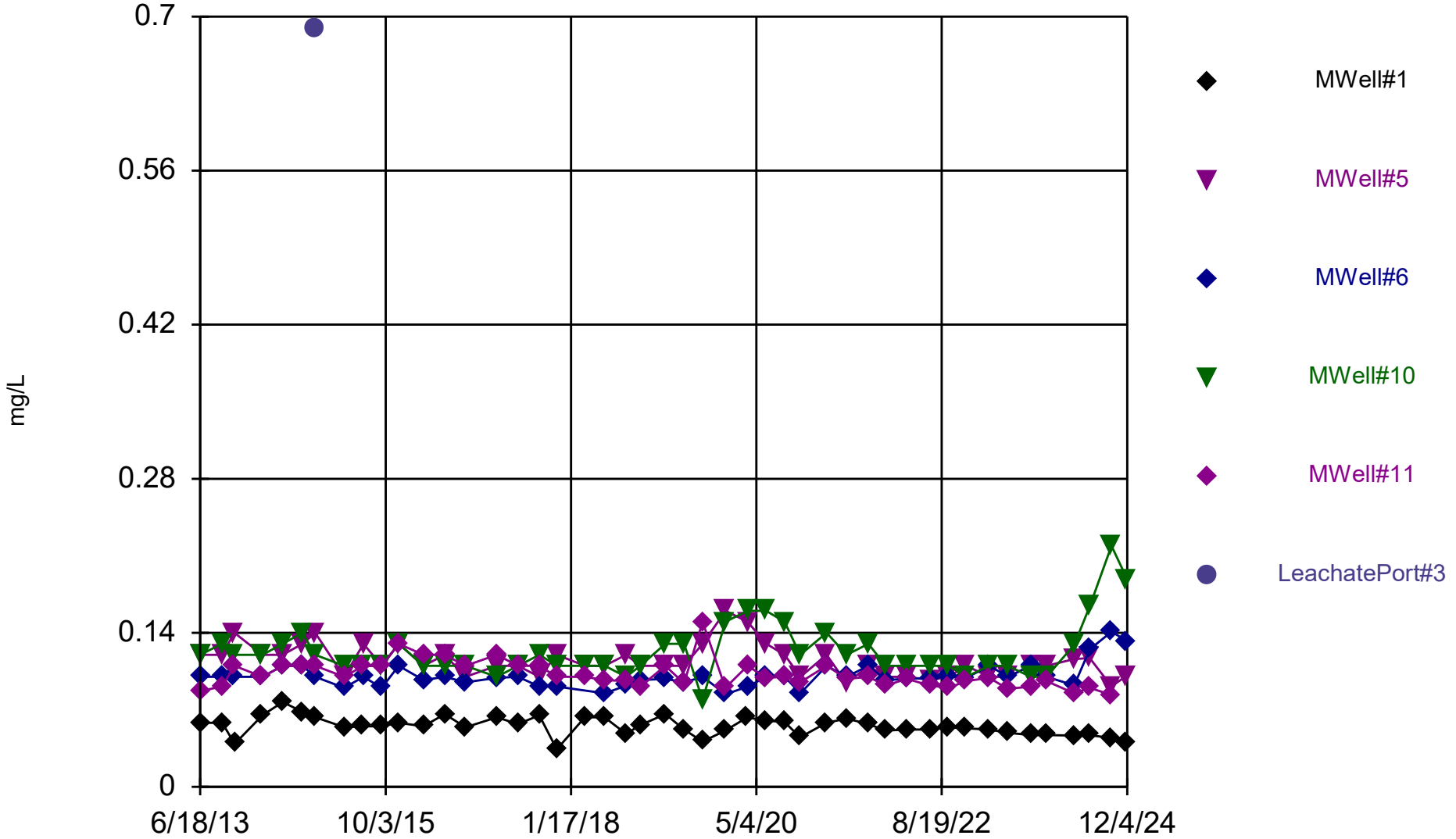
Time Series



Constituent: Barium, Total Analysis Run 3/12/2025 12:39 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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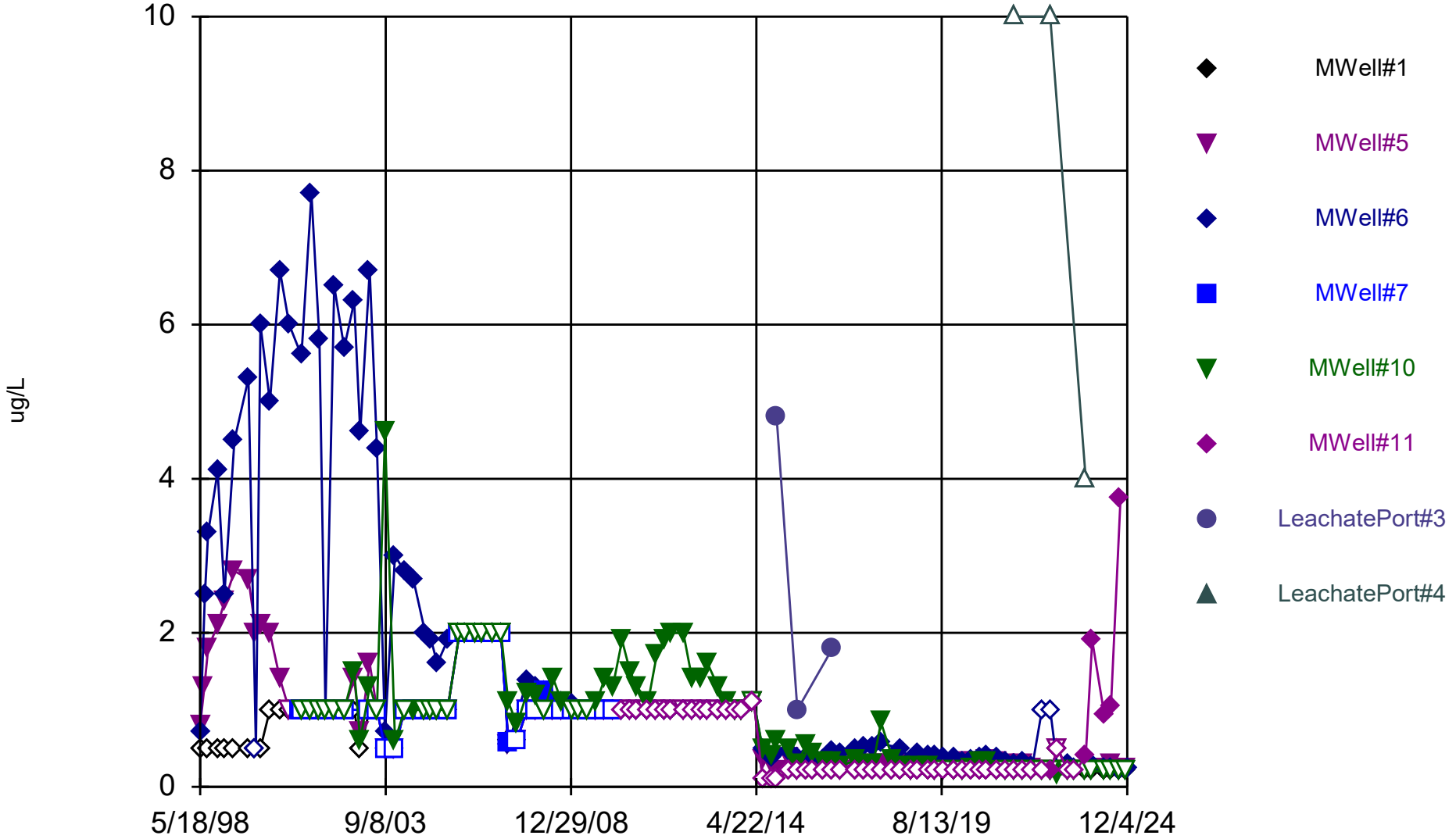
Hollow symbols indicate censored values.

Time Series



Constituent: Benzene Analysis Run 3/12/2025 12:39 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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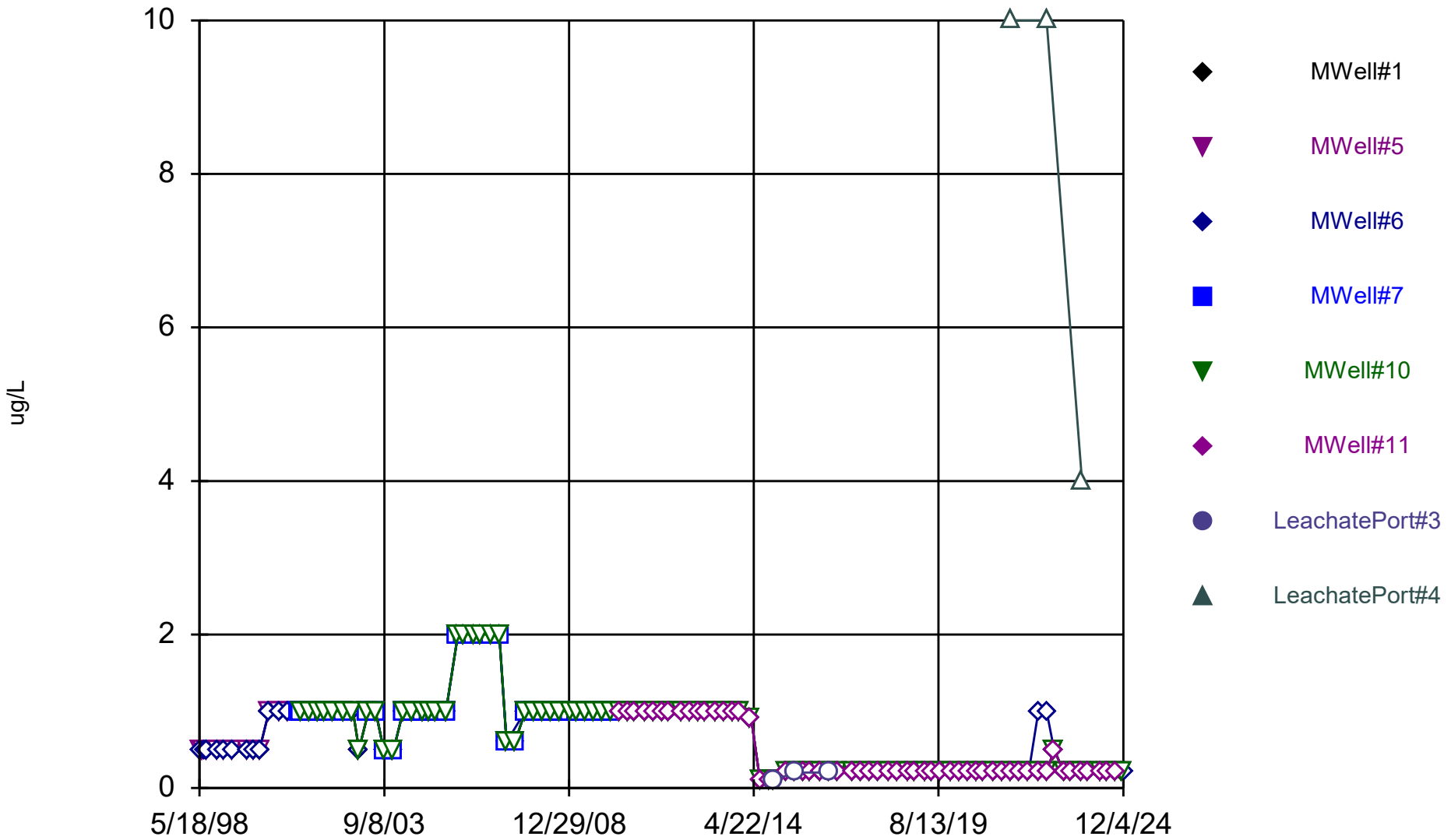
Hollow symbols indicate censored values.

Time Series



Constituent: Bromodichloromethane Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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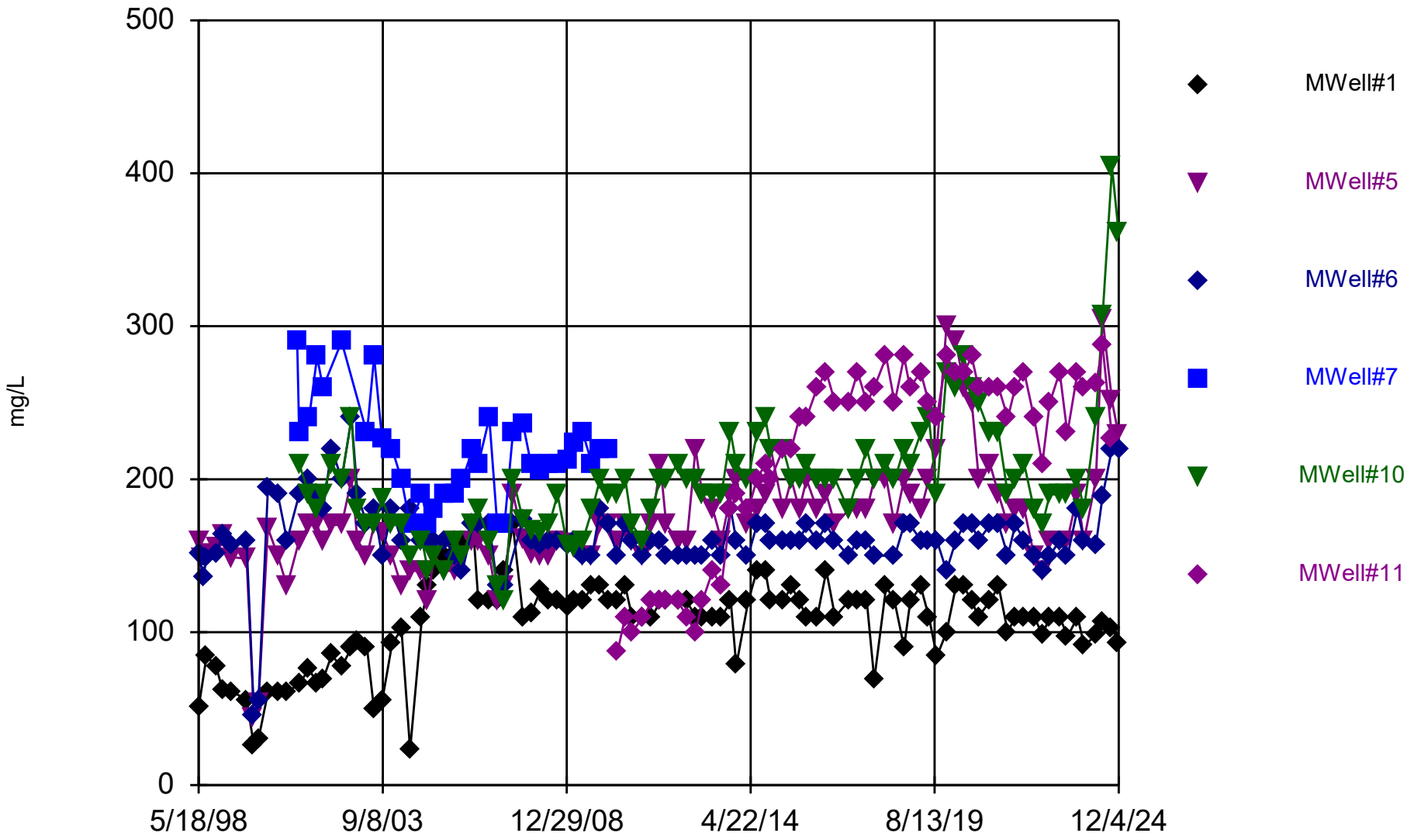
Time Series



Constituent: Calcium, Dissolved Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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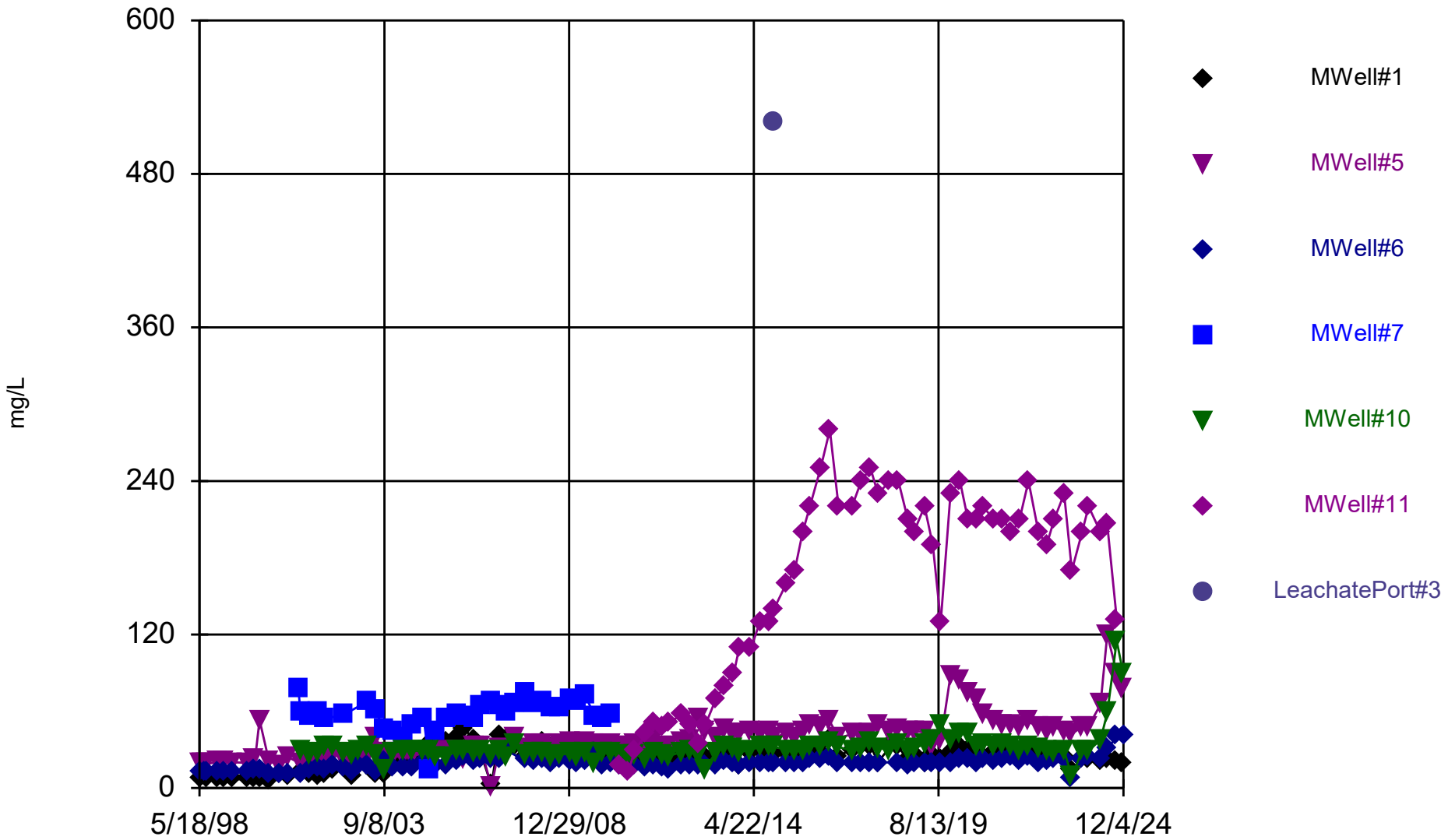
Time Series



Constituent: Chloride Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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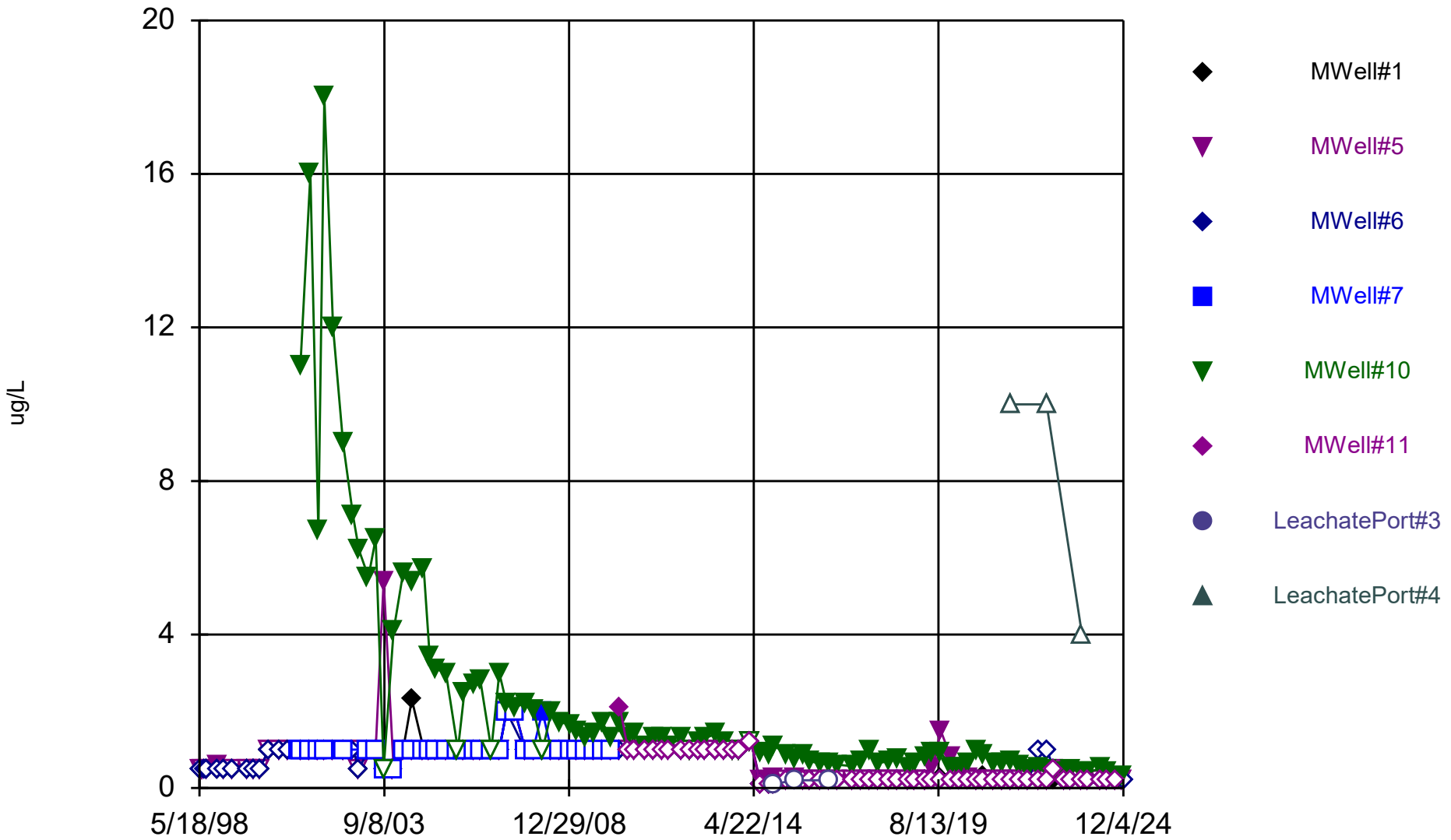
Hollow symbols indicate censored values.

Time Series



Constituent: Chloroform Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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Hollow symbols indicate censored values.

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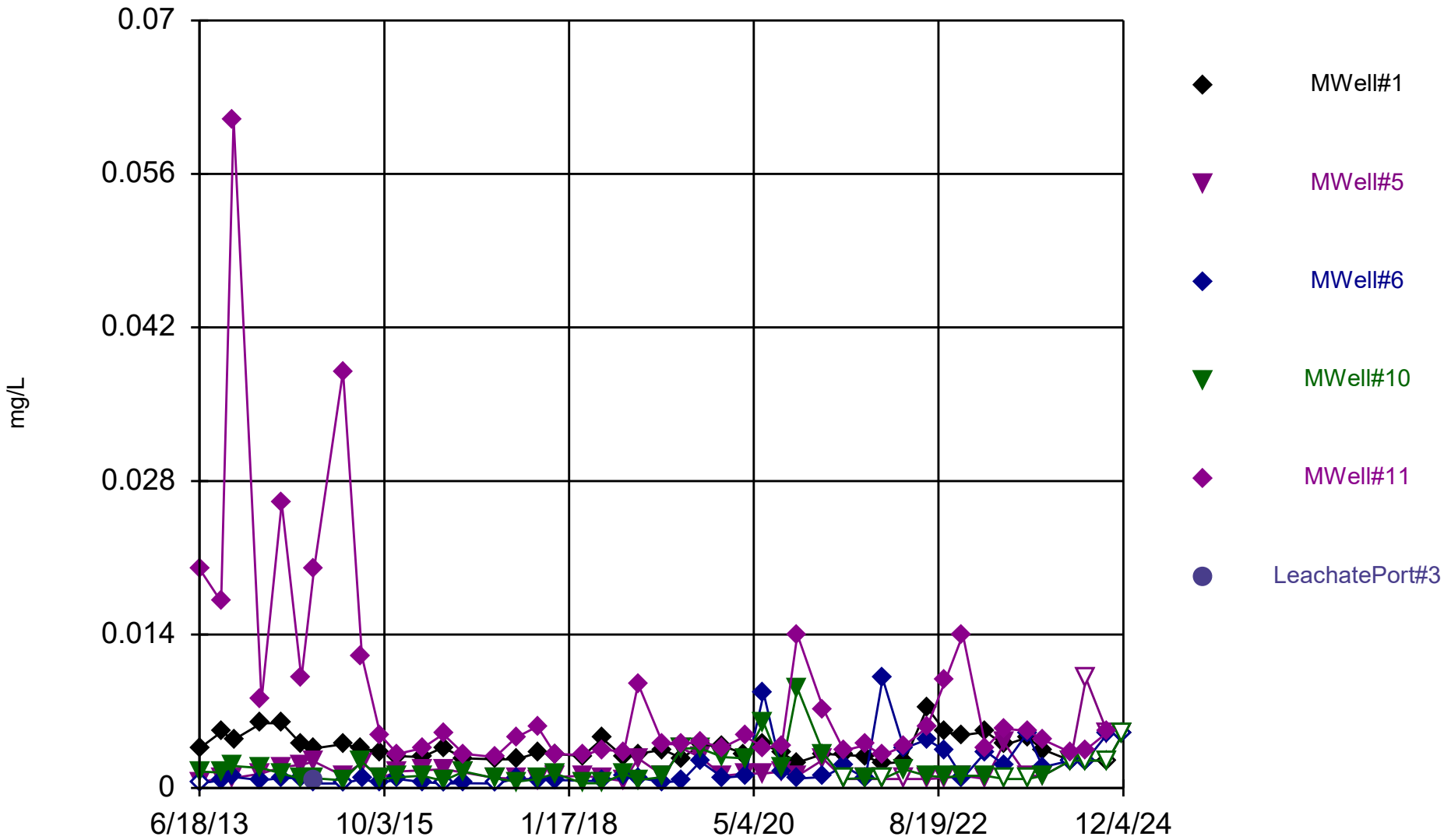

Constituent: Chromium, Total Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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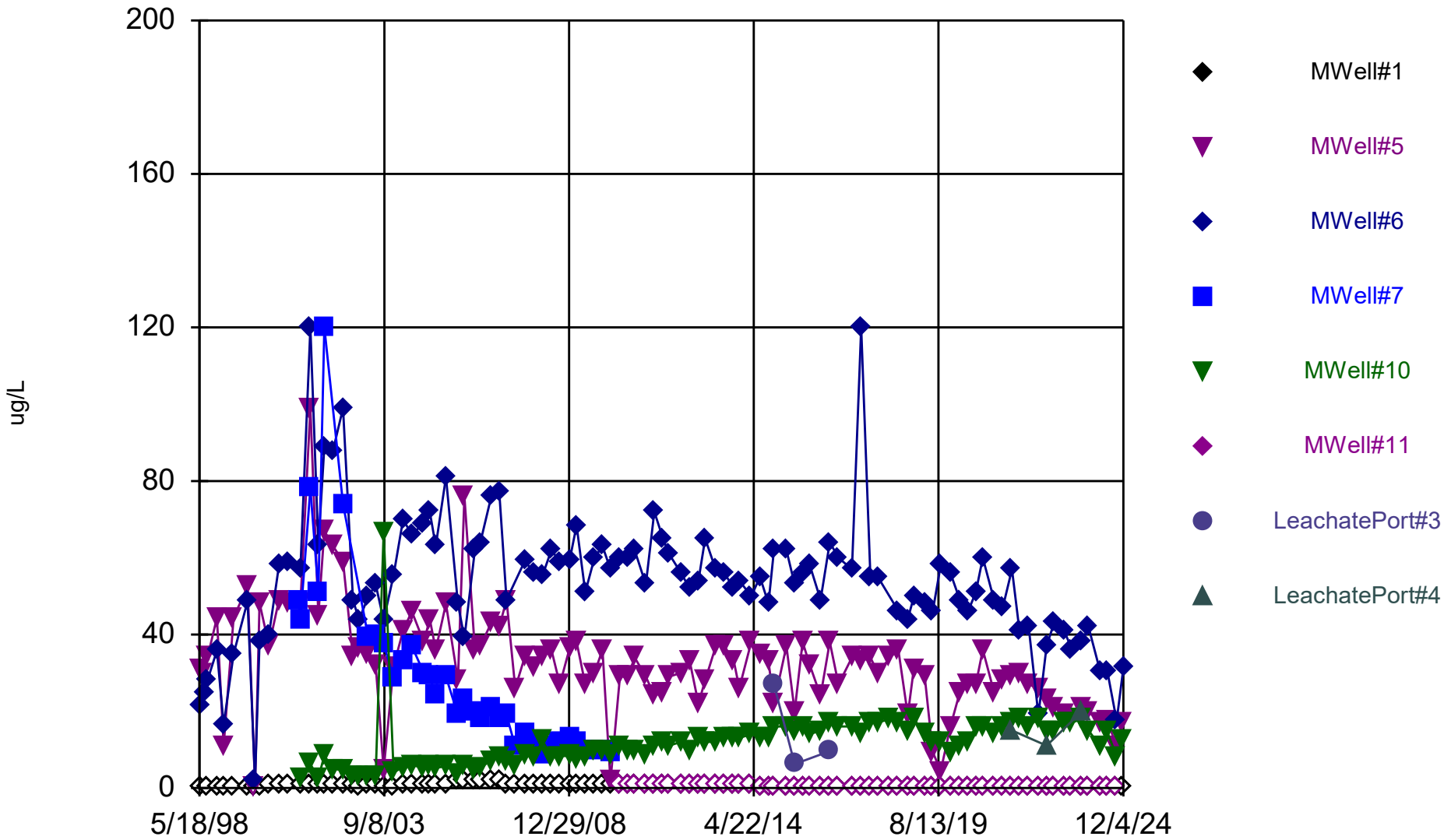
Hollow symbols indicate censored values.

Time Series



Constituent: cis-1,2-Dichloroethene Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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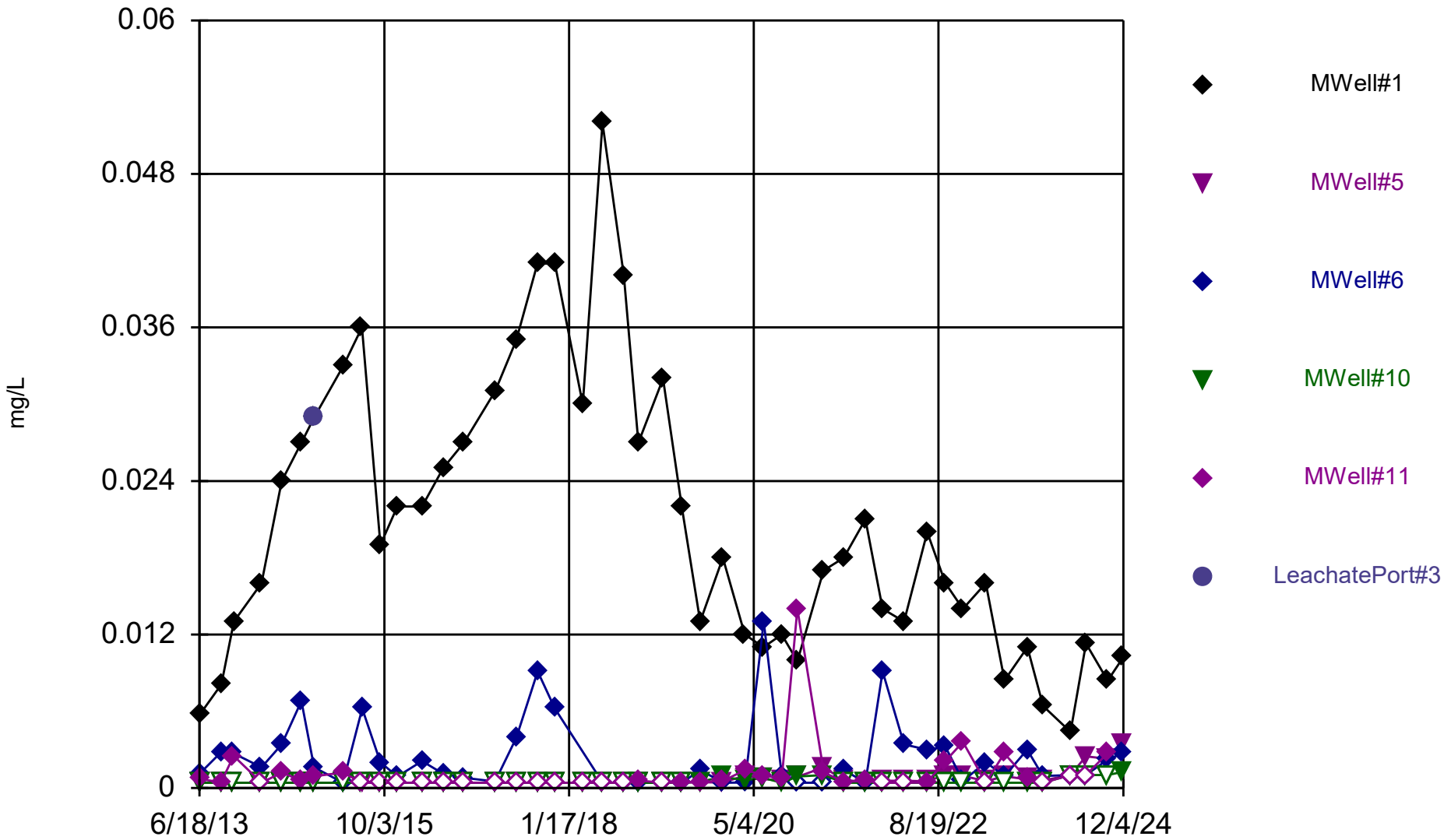
Hollow symbols indicate censored values.

Time Series



Constituent: Cobalt, Total Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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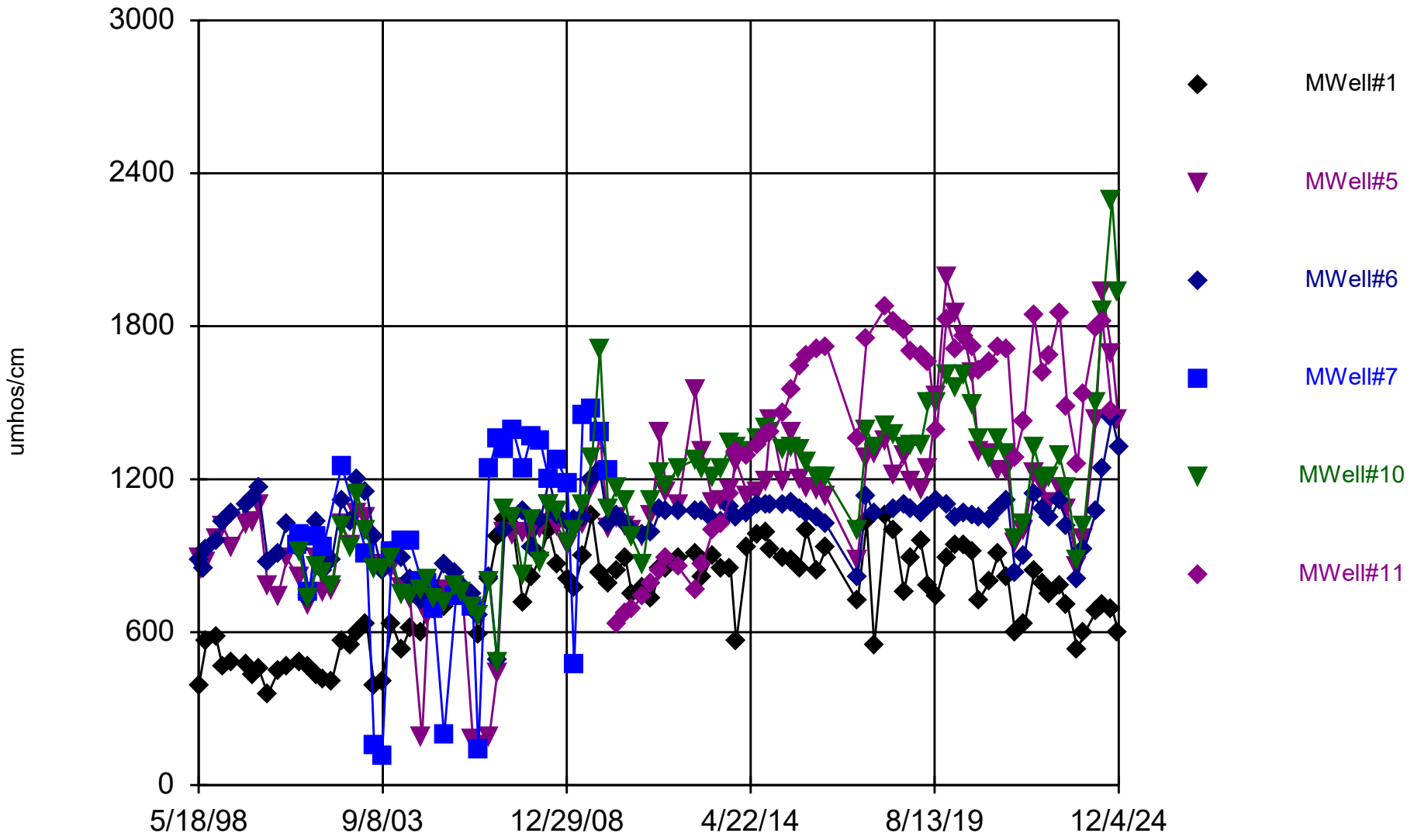
Time Series



Constituent: Conductivity Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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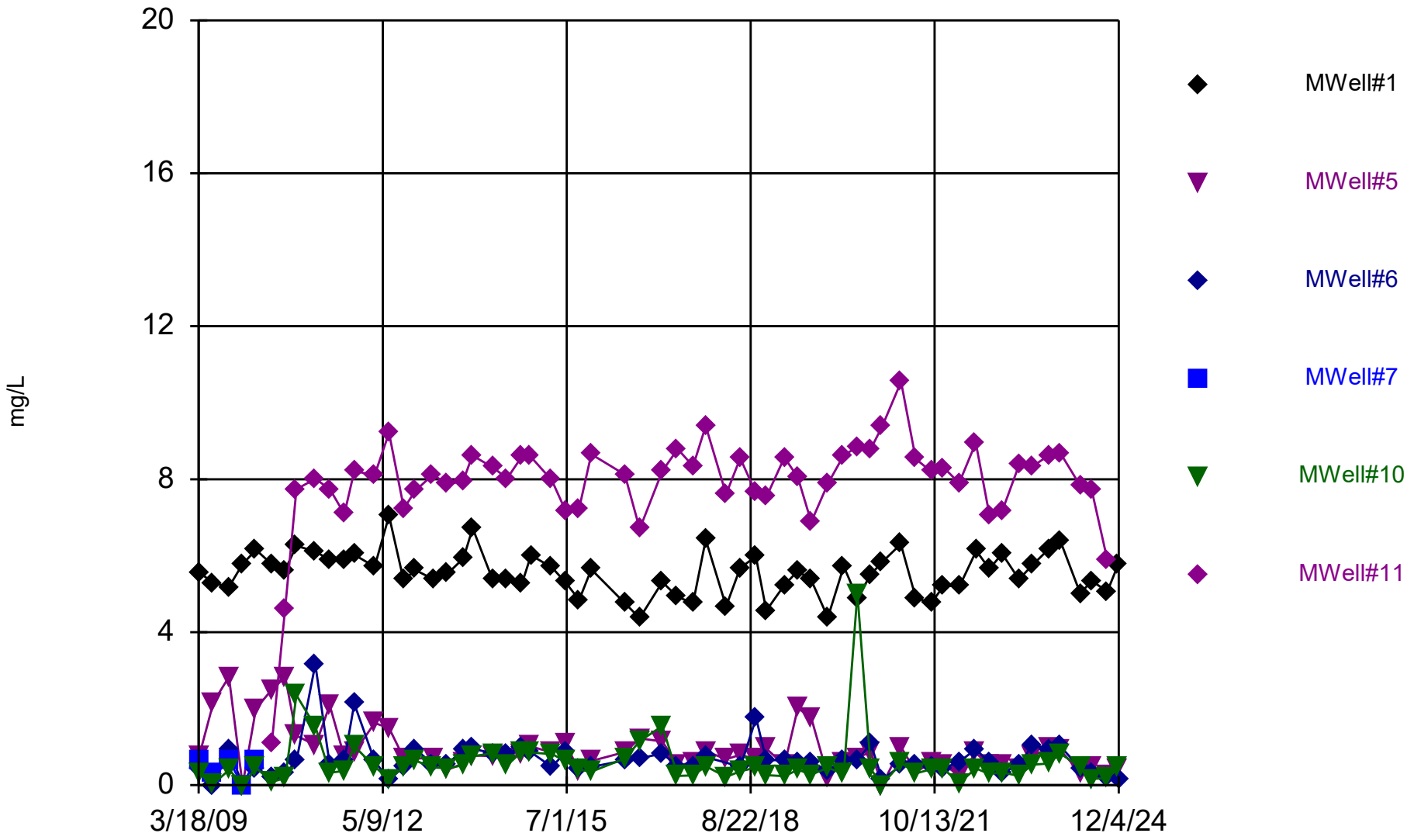
Time Series



Constituent: Dissolved Oxygen Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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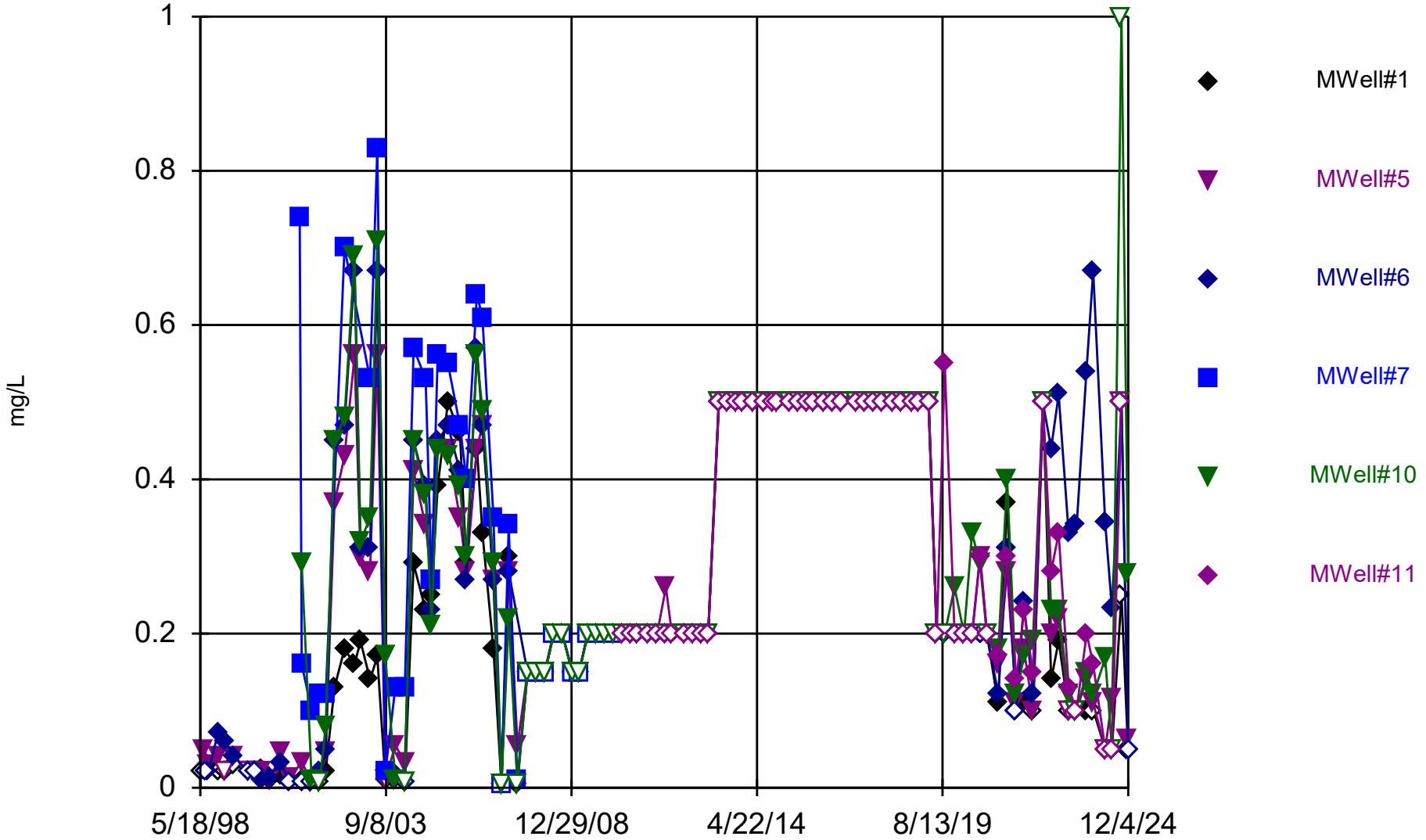
Hollow symbols indicate censored values.

Time Series



Constituent: Iron, Dissolved Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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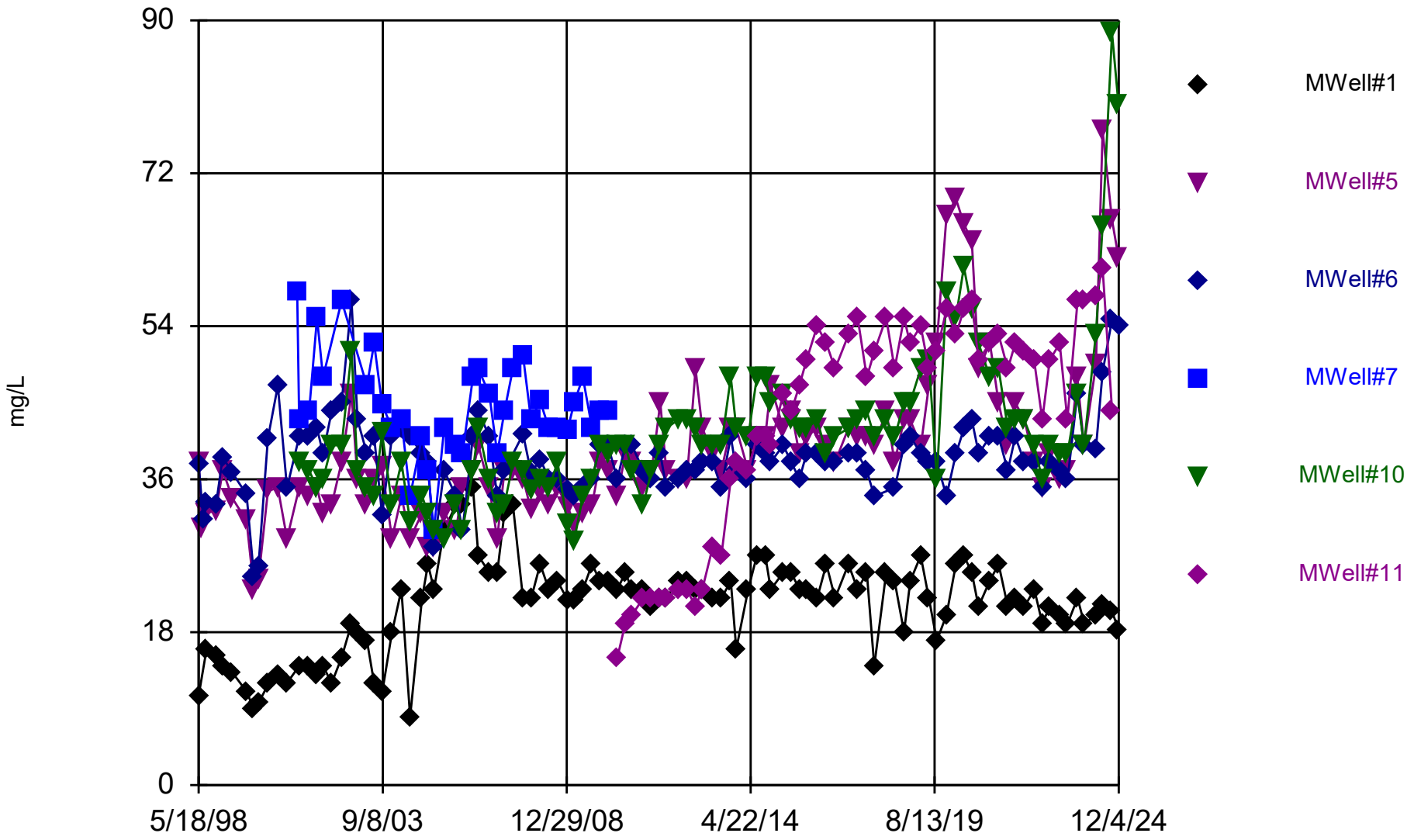
Time Series



Constituent: Magnesium, Dissolved Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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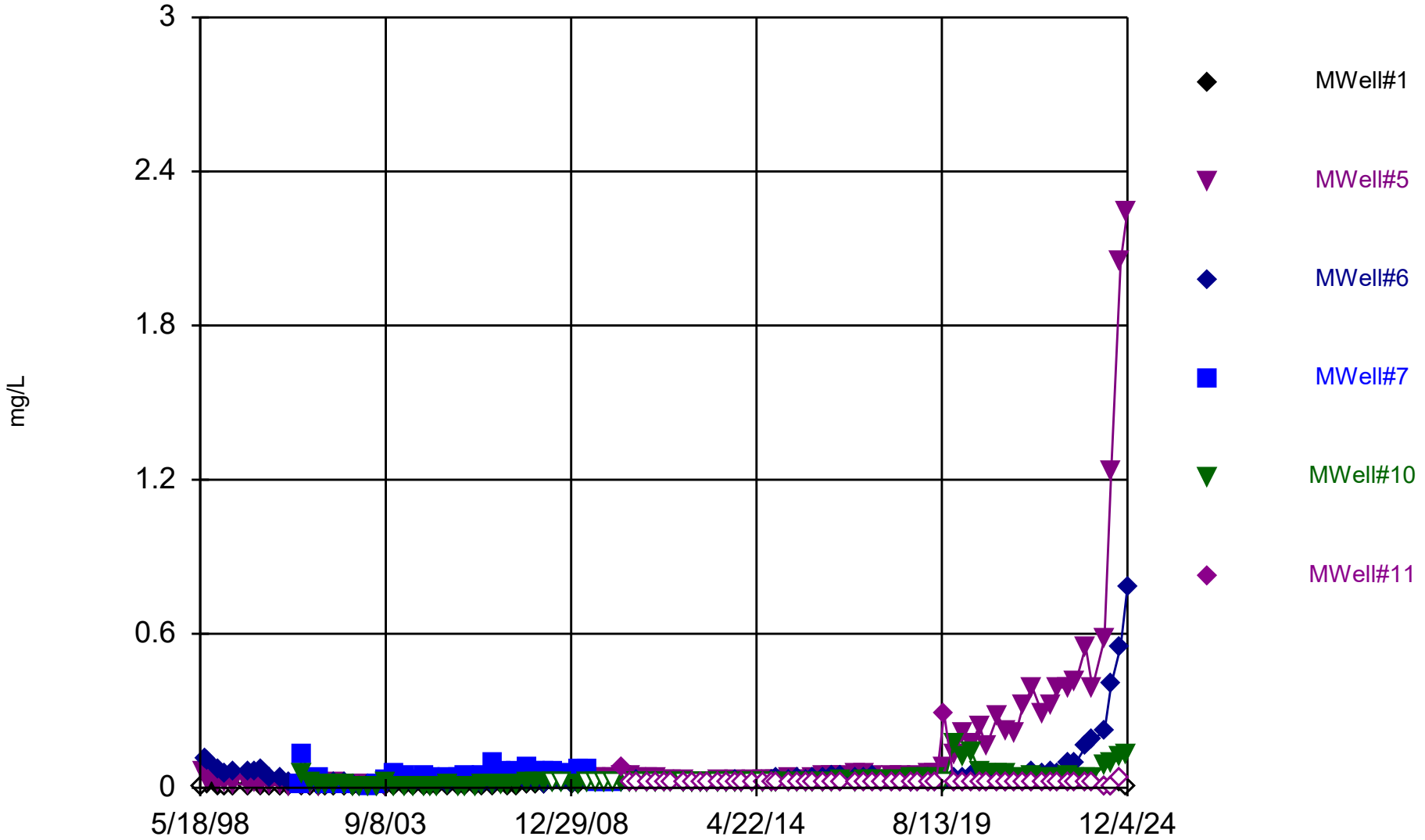
Time Series



Constituent: Manganese, Dissolved Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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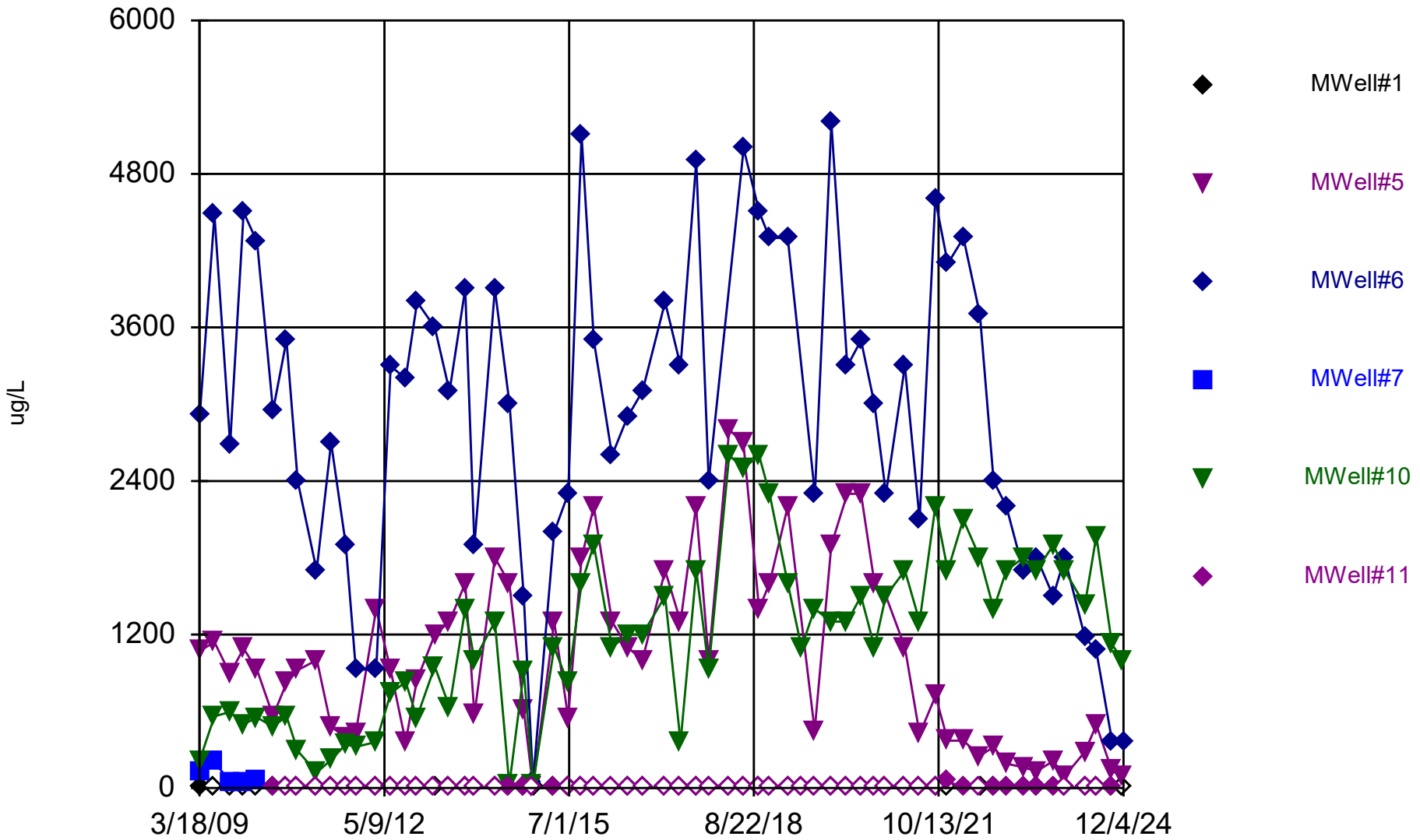
Time Series



Constituent: Methane Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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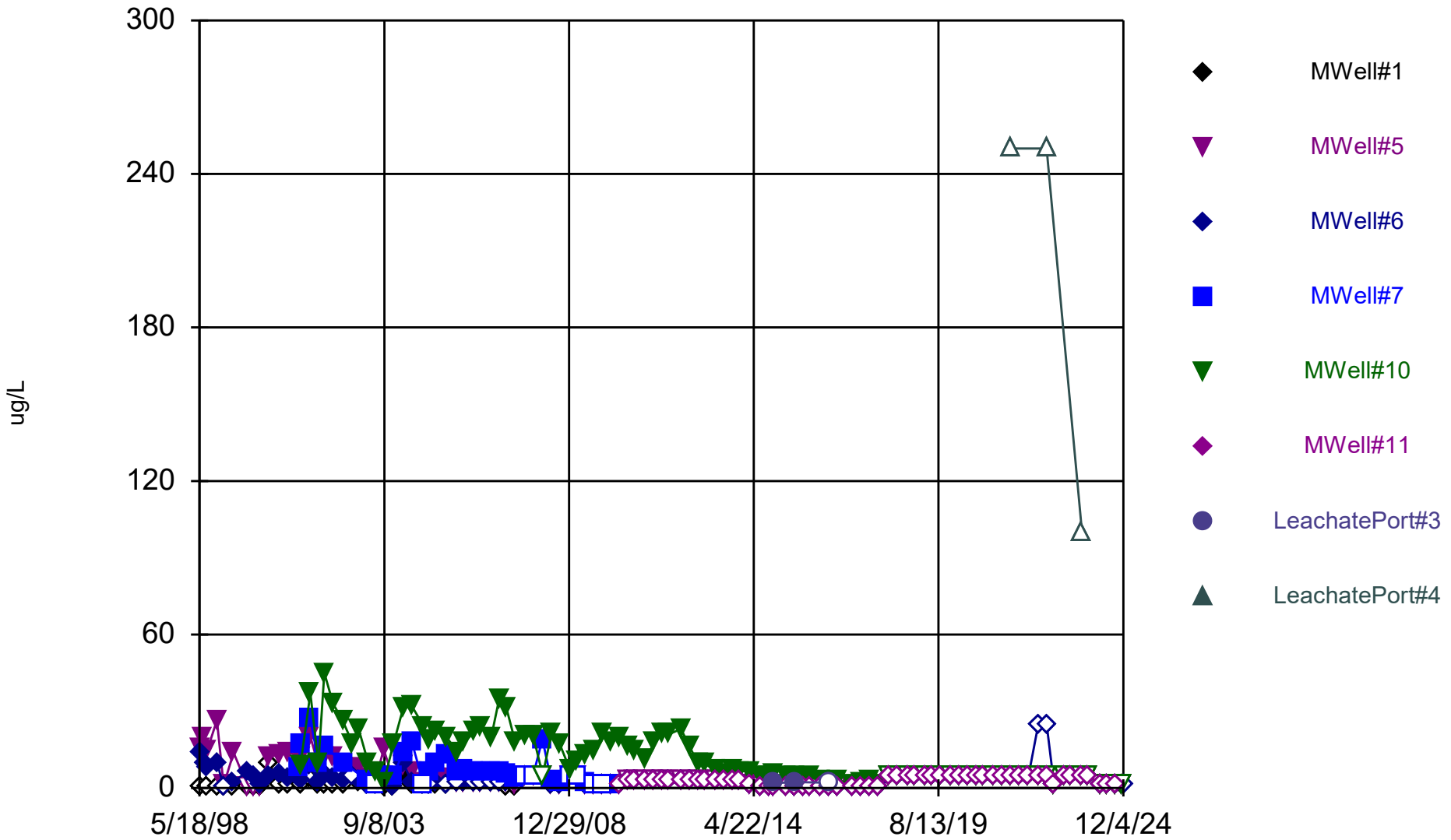
Hollow symbols indicate censored values.

Time Series



Constituent: Methylene Chloride Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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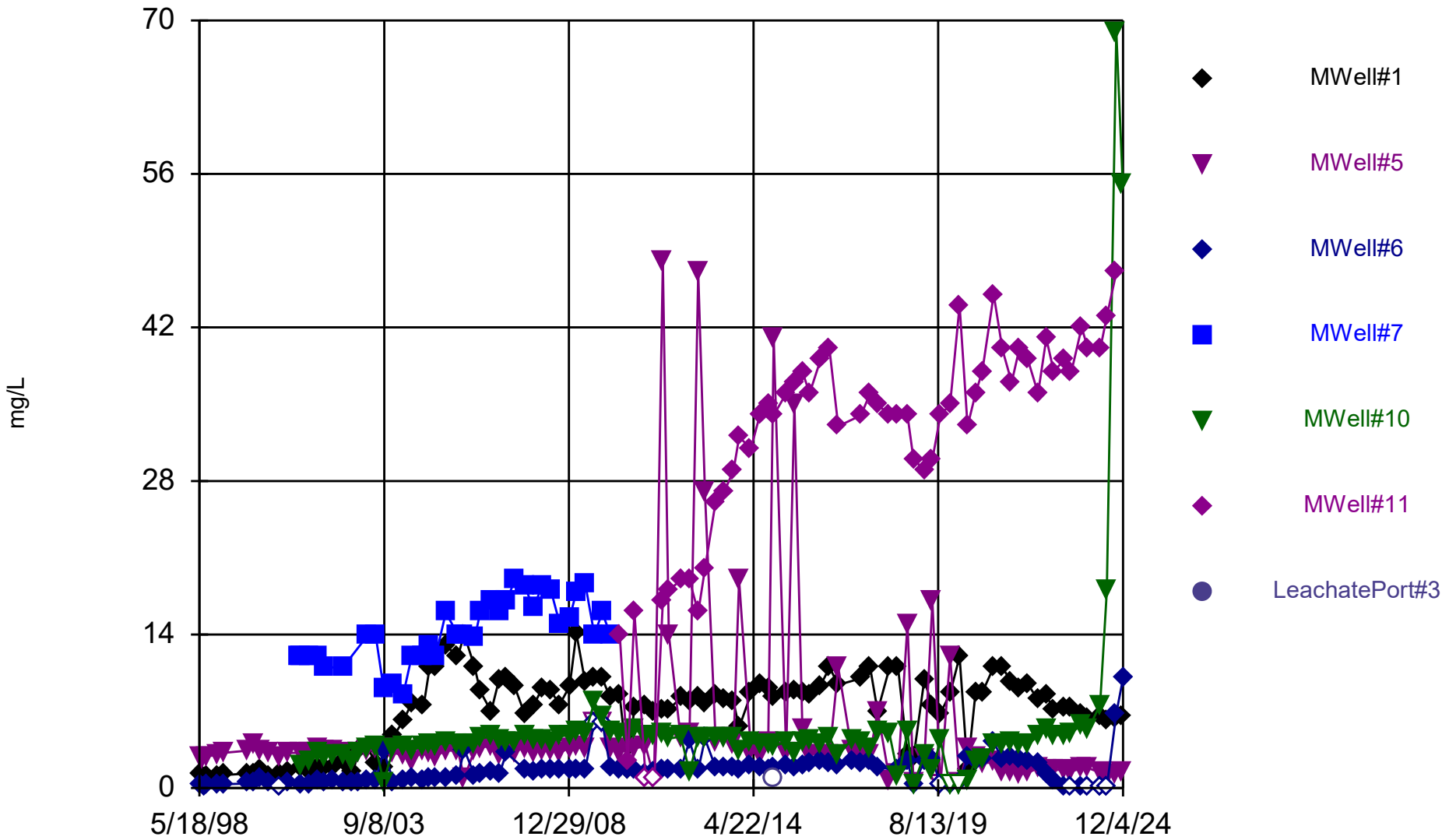
Hollow symbols indicate censored values.

Time Series



Constituent: Nitrate Nitrogen Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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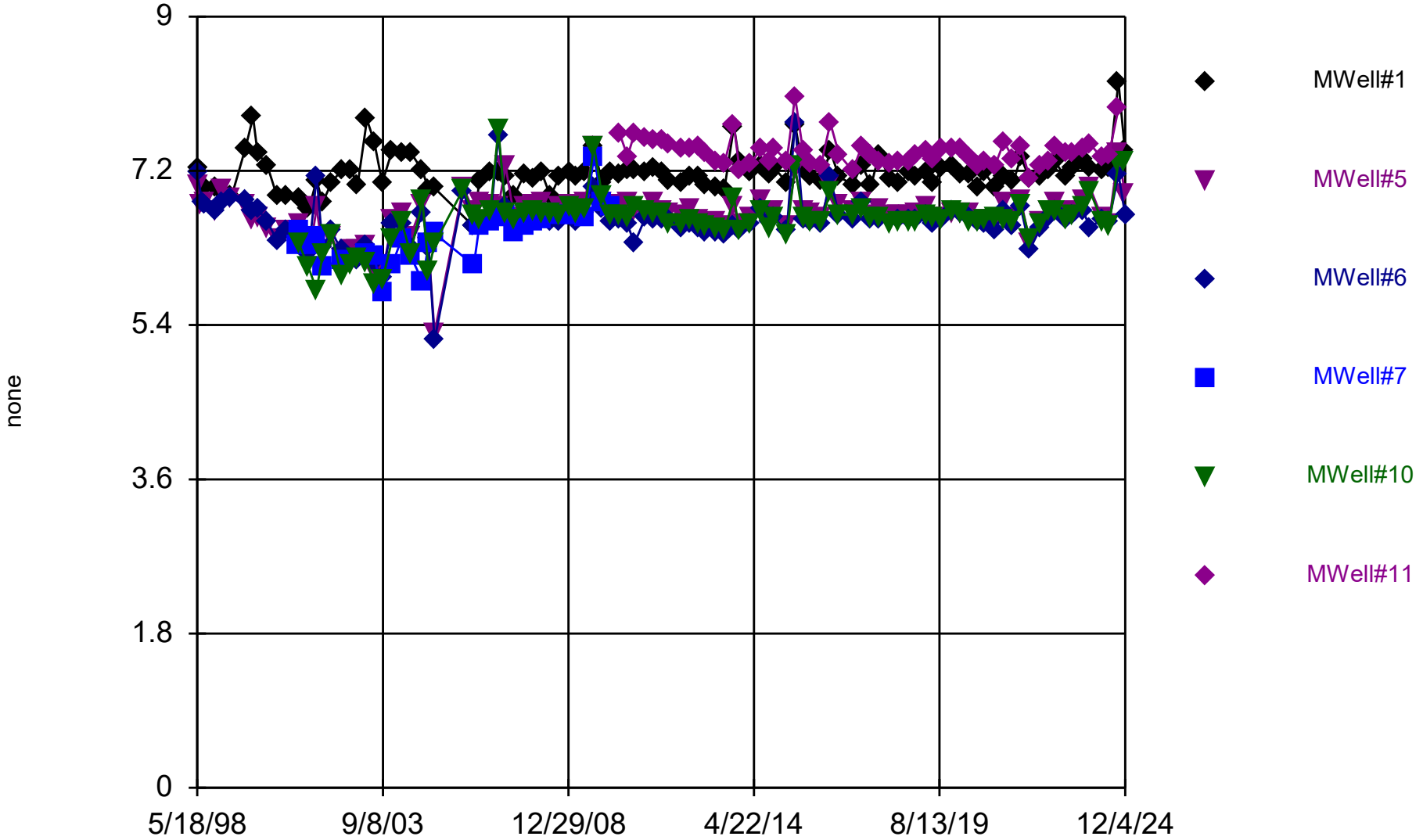
Time Series



Constituent: pH Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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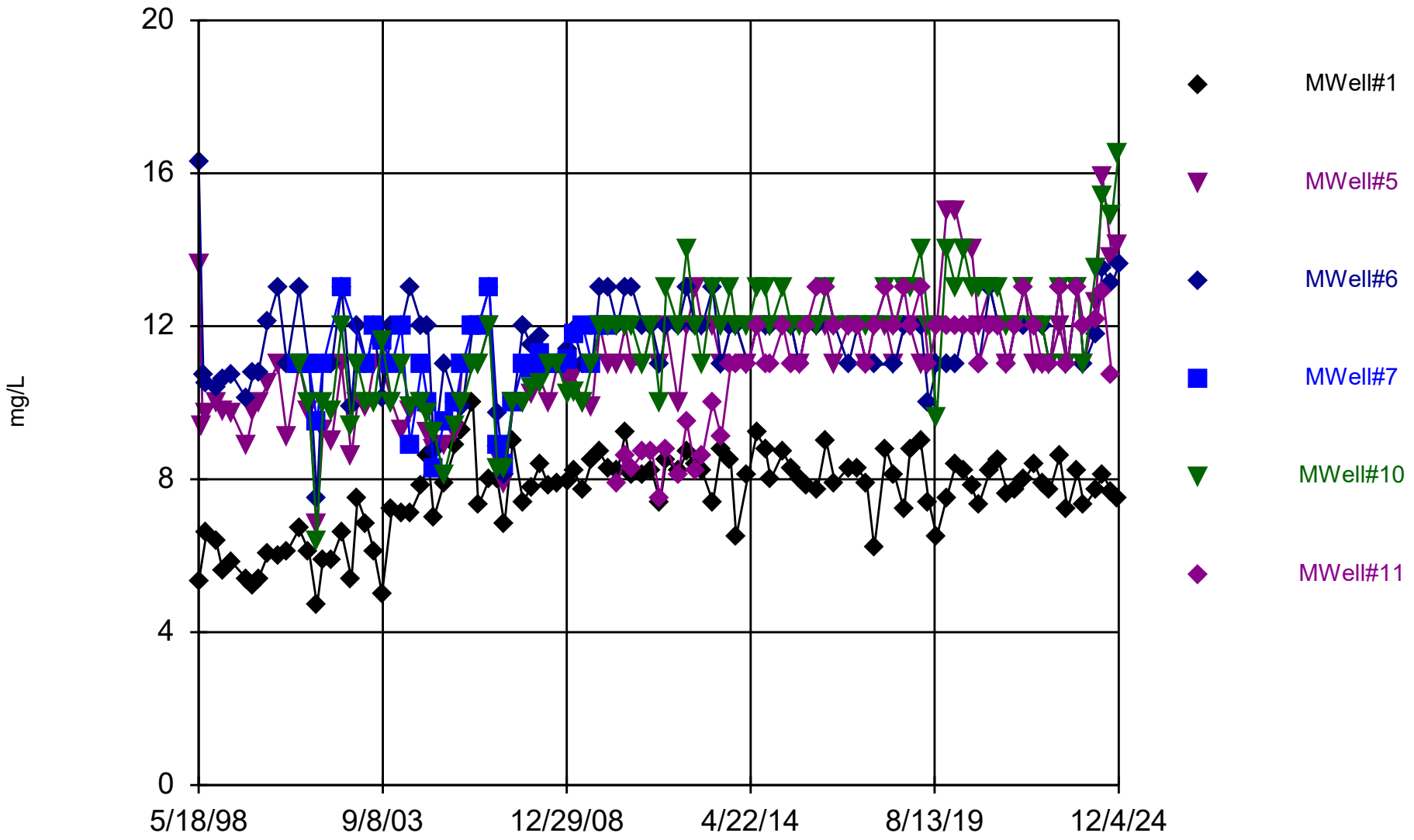
Time Series



Constituent: Potassium, Dissolved Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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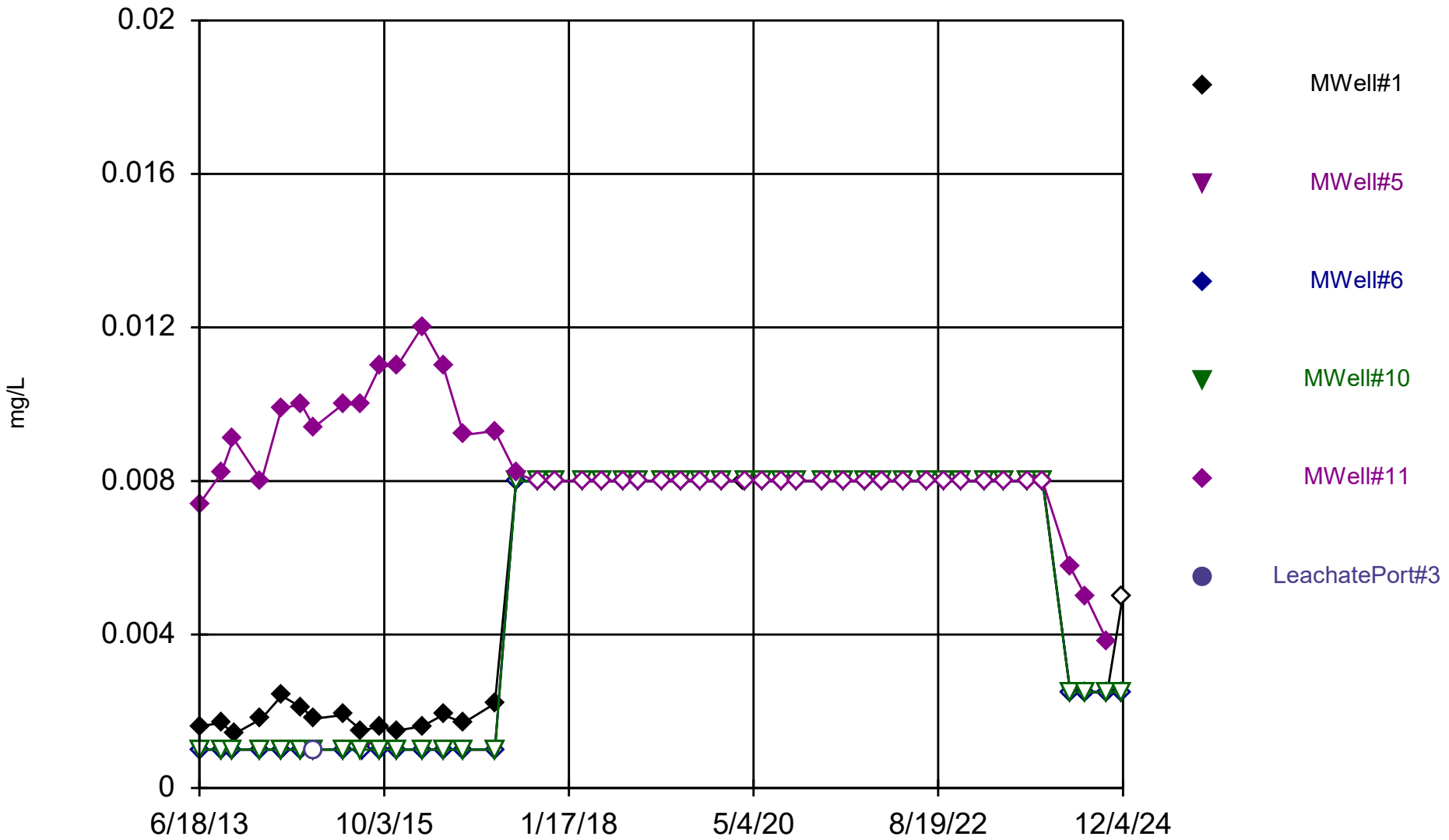
Time Series



Constituent: Selenium, Total Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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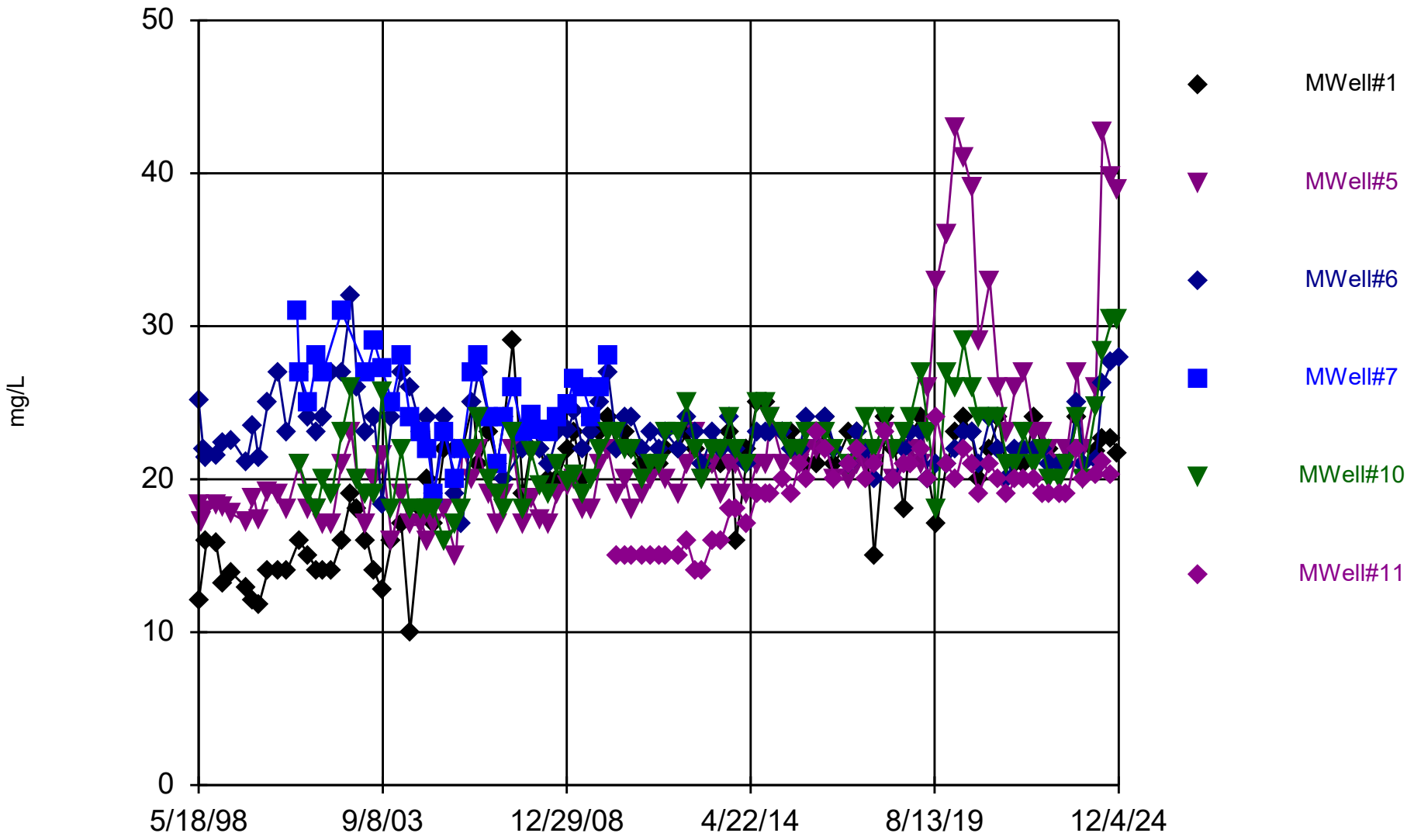
Time Series



Constituent: Sodium, Dissolved Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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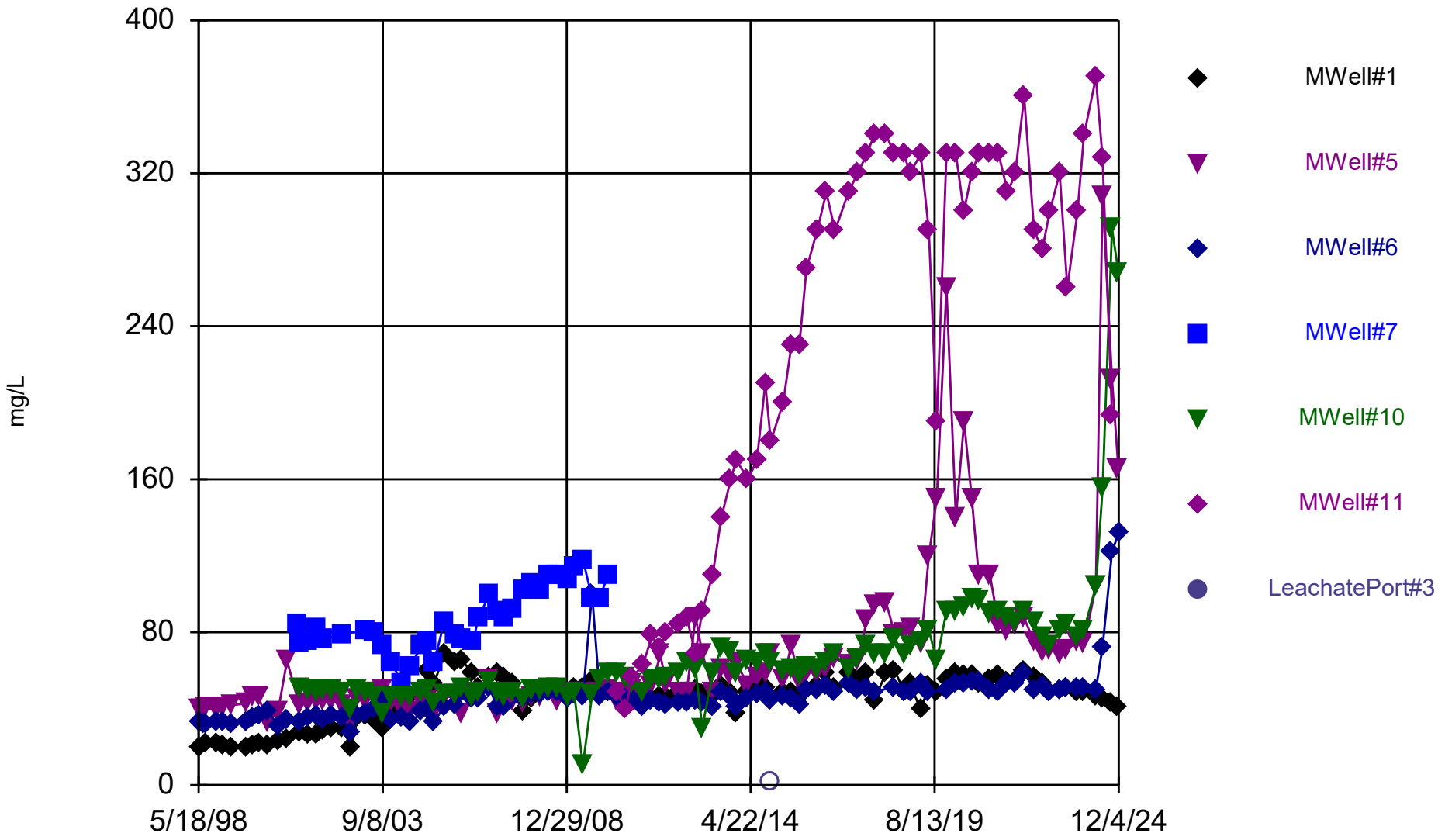
Hollow symbols indicate censored values.

Time Series



Constituent: Sulfate Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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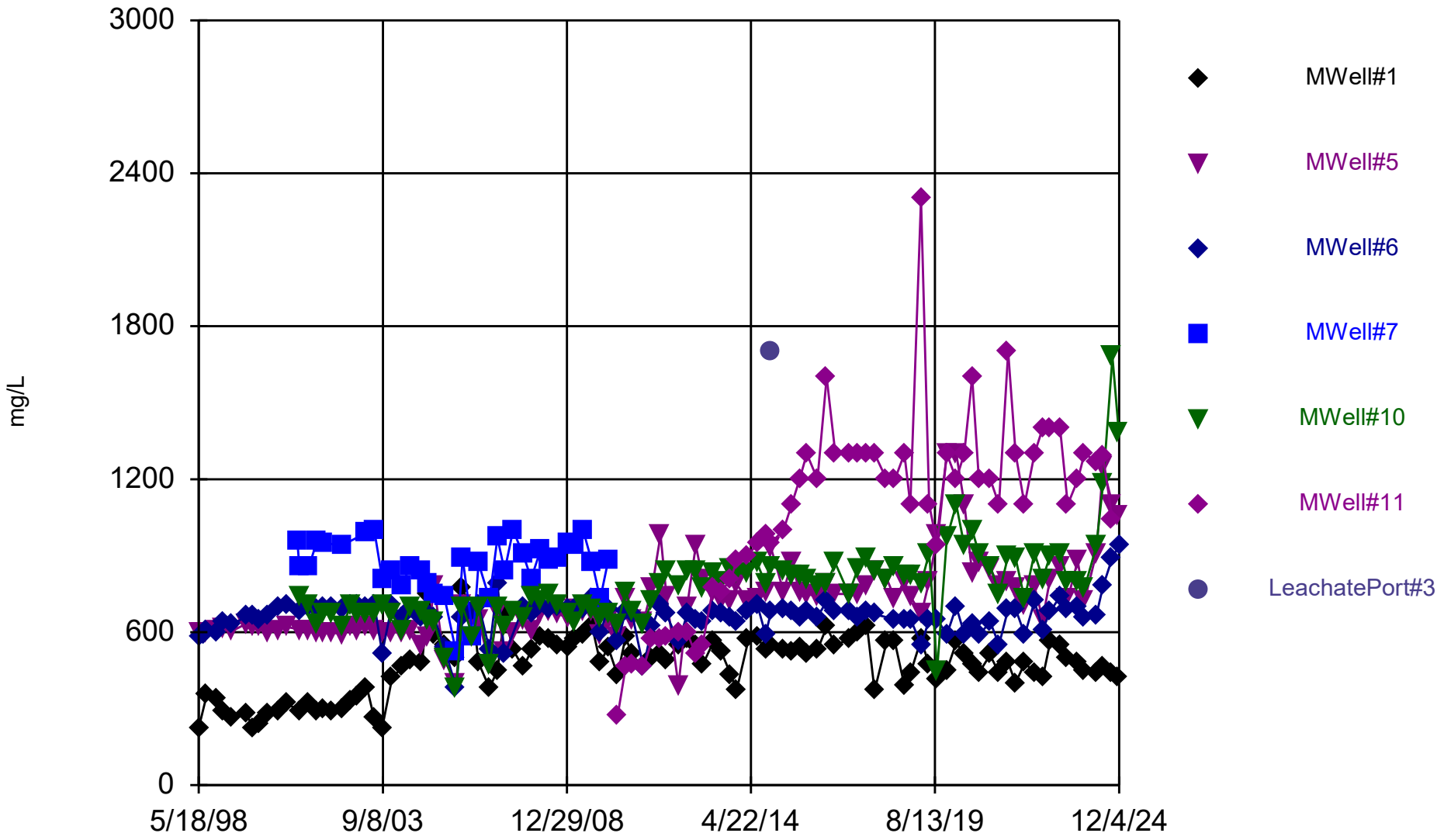
Time Series



Constituent: TDS Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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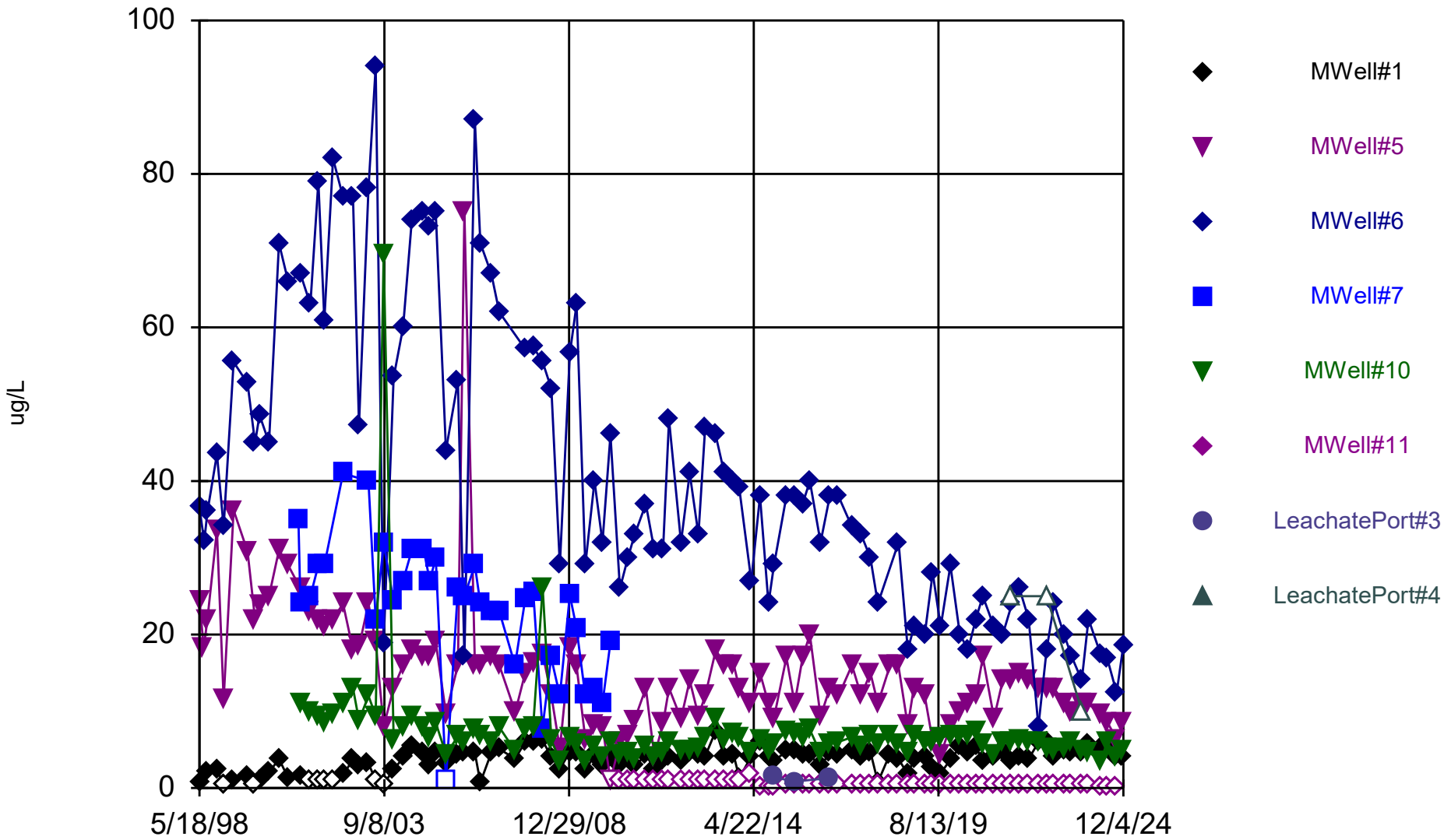
Hollow symbols indicate censored values.

Time Series



Constituent: Tetrachloroethene Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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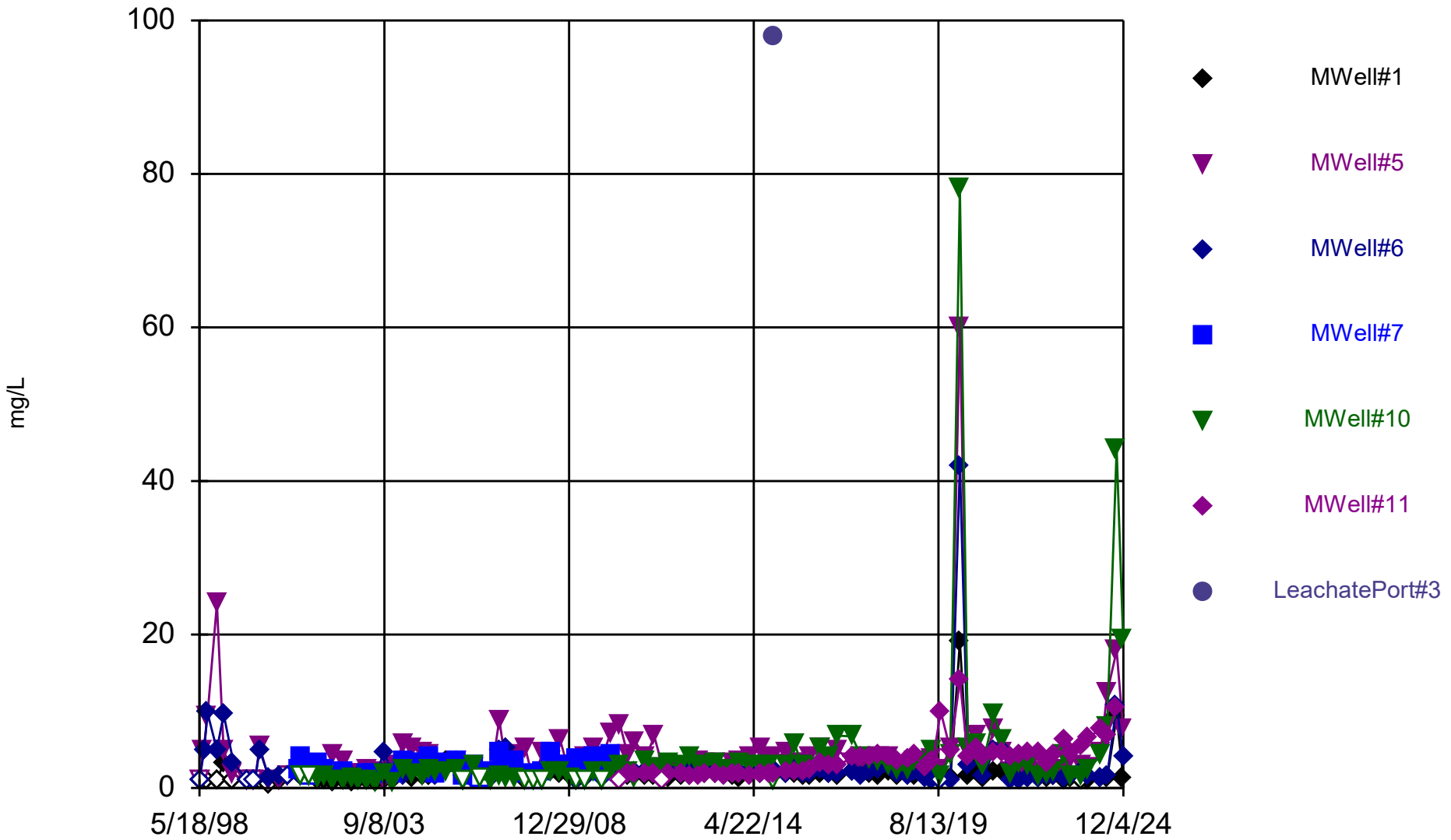
Hollow symbols indicate censored values.

Time Series



Constituent: TOC Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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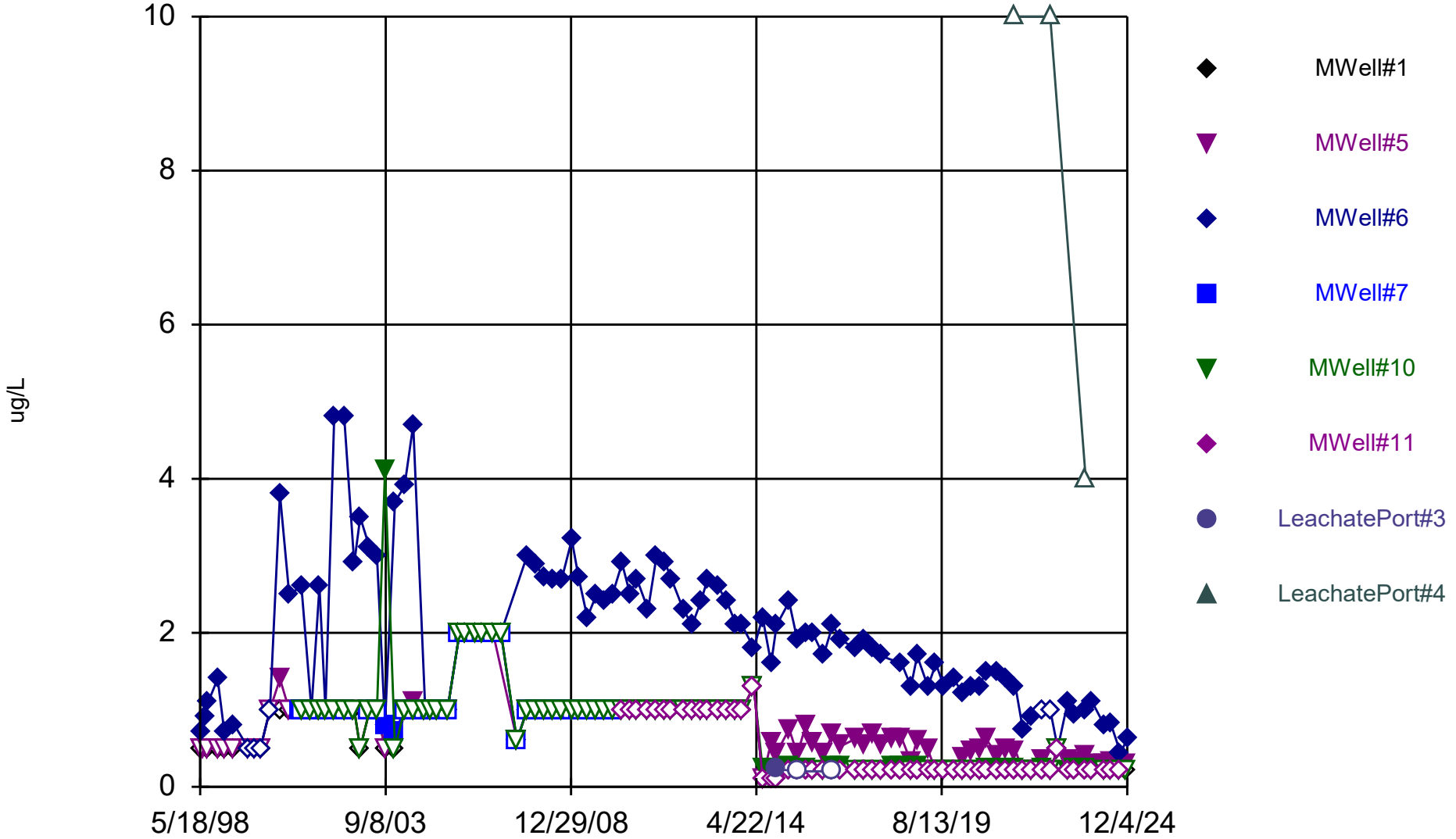
Hollow symbols indicate censored values.

Time Series

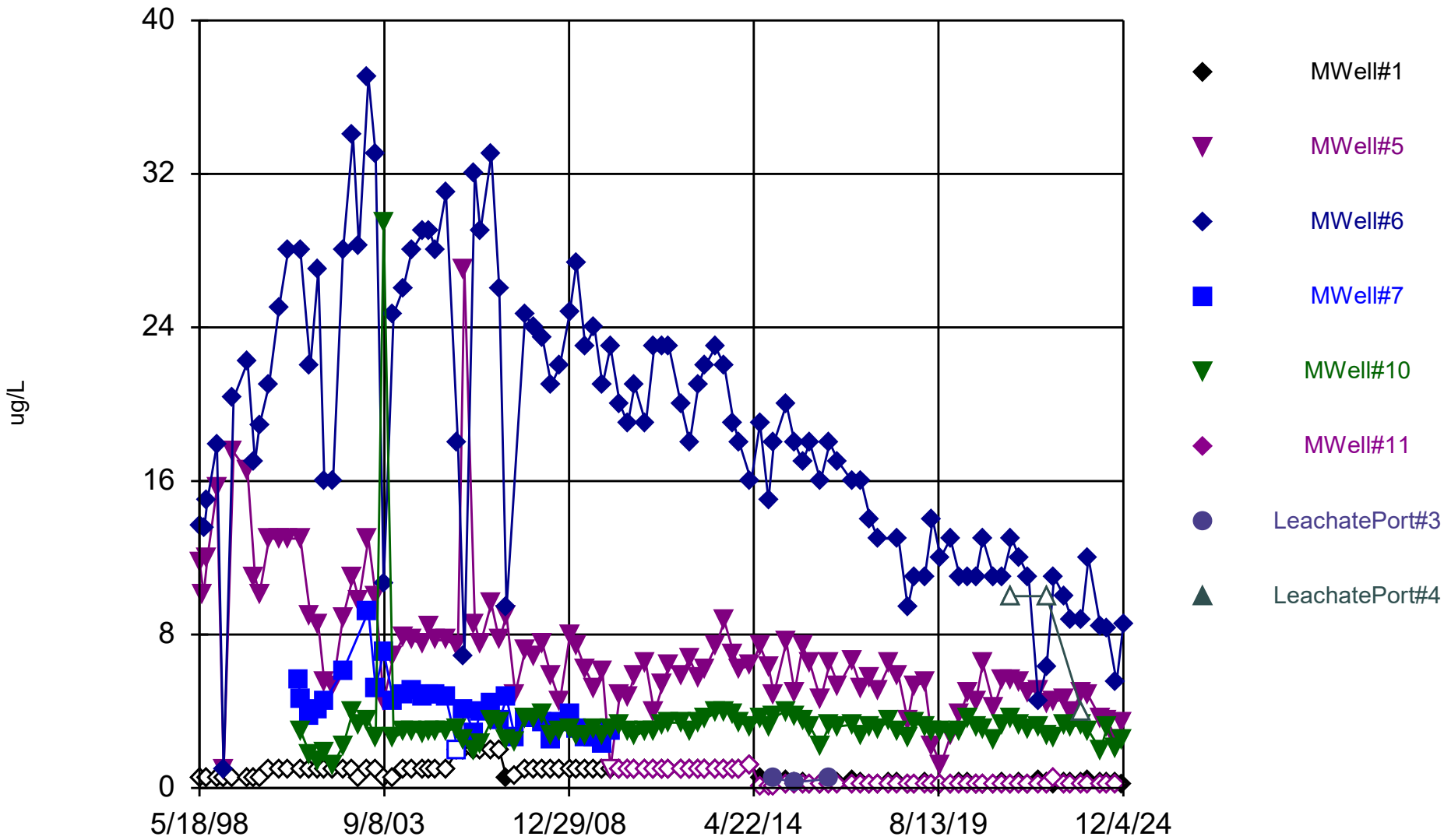


Constituent: trans-1,2-Dichloroethene Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

Time Series



Constituent: Trichloroethene Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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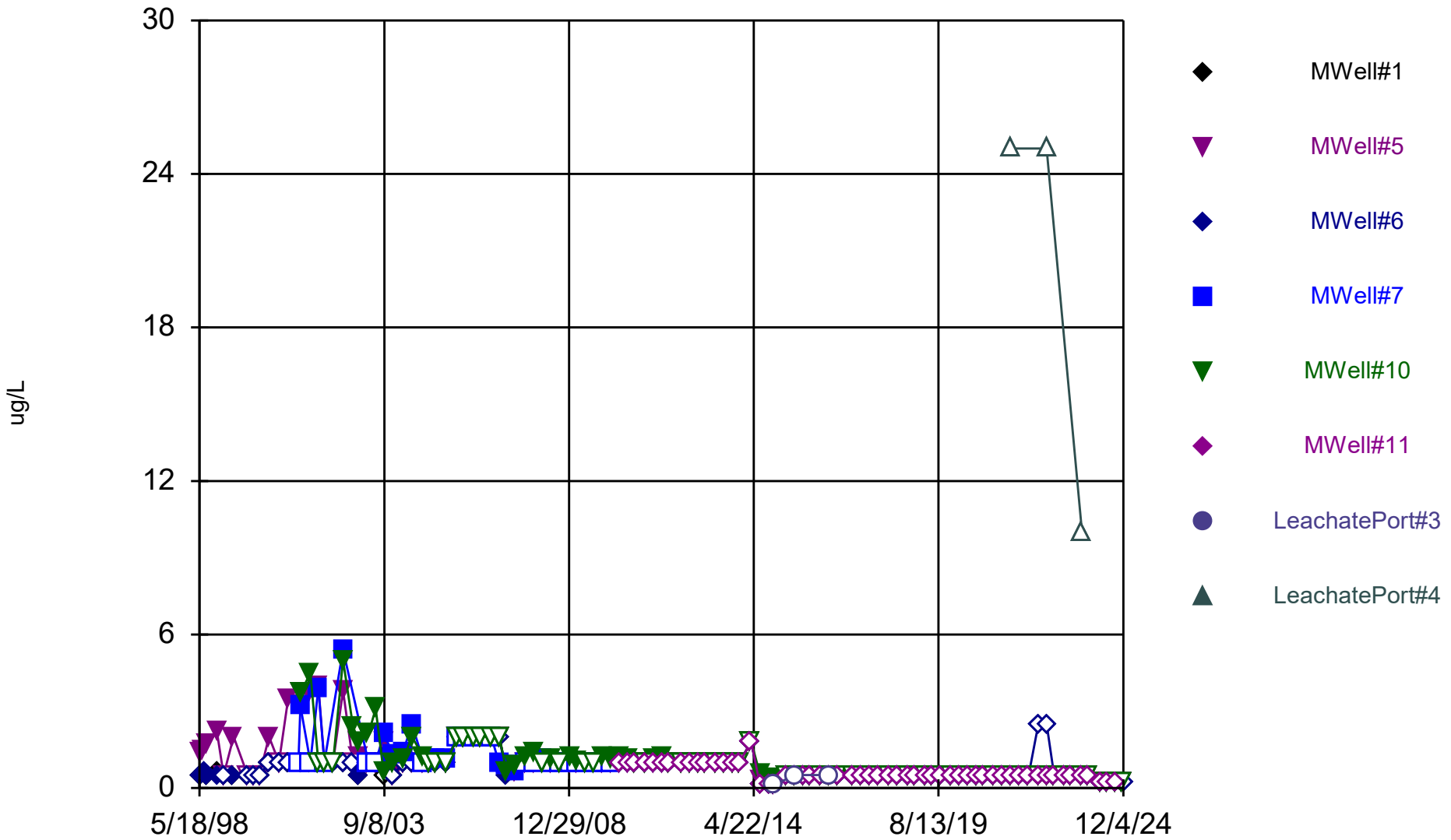
Hollow symbols indicate censored values.

Time Series



Constituent: Trichlorofluoromethane Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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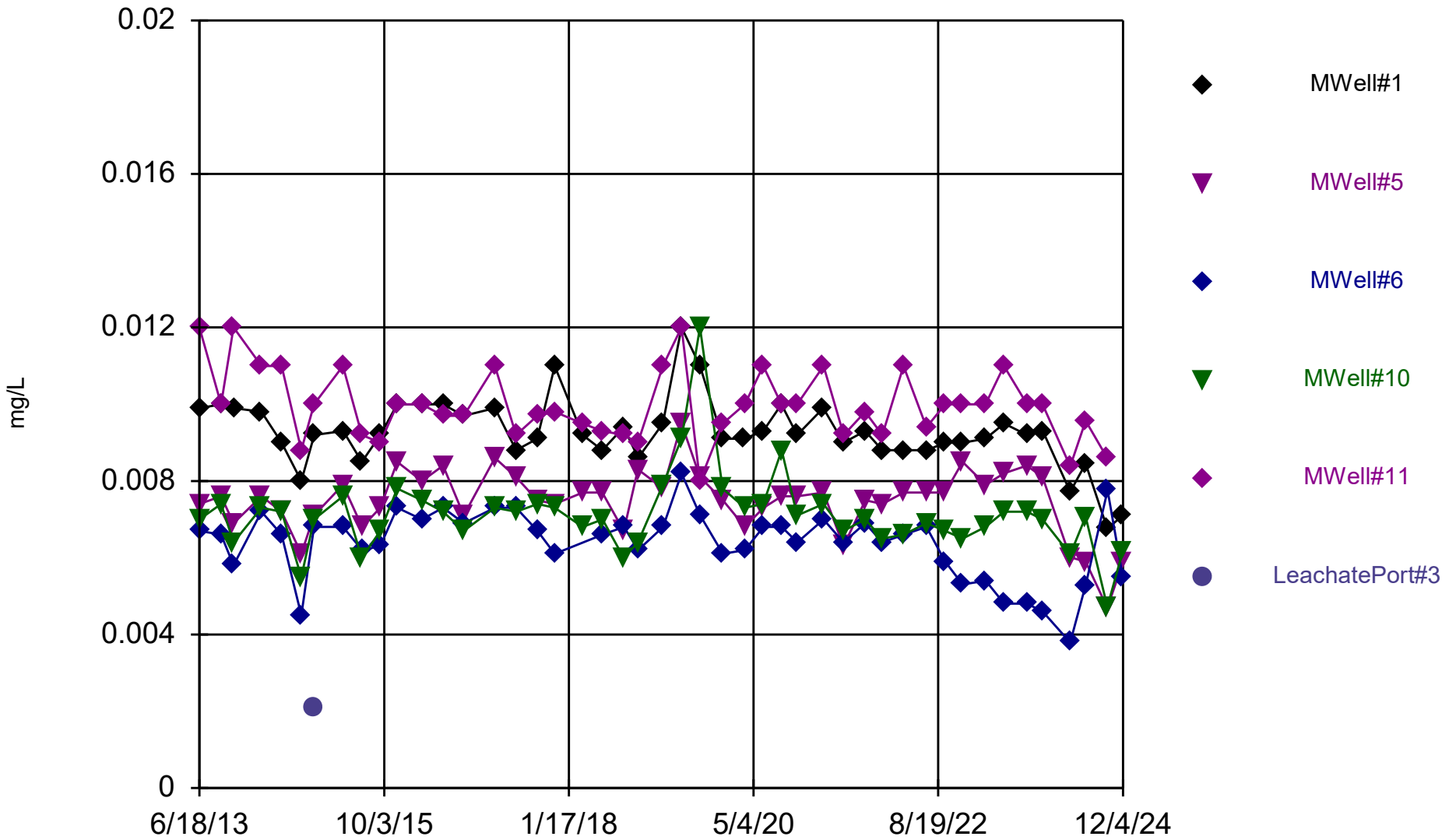
Time Series



Constituent: Vanadium, Total Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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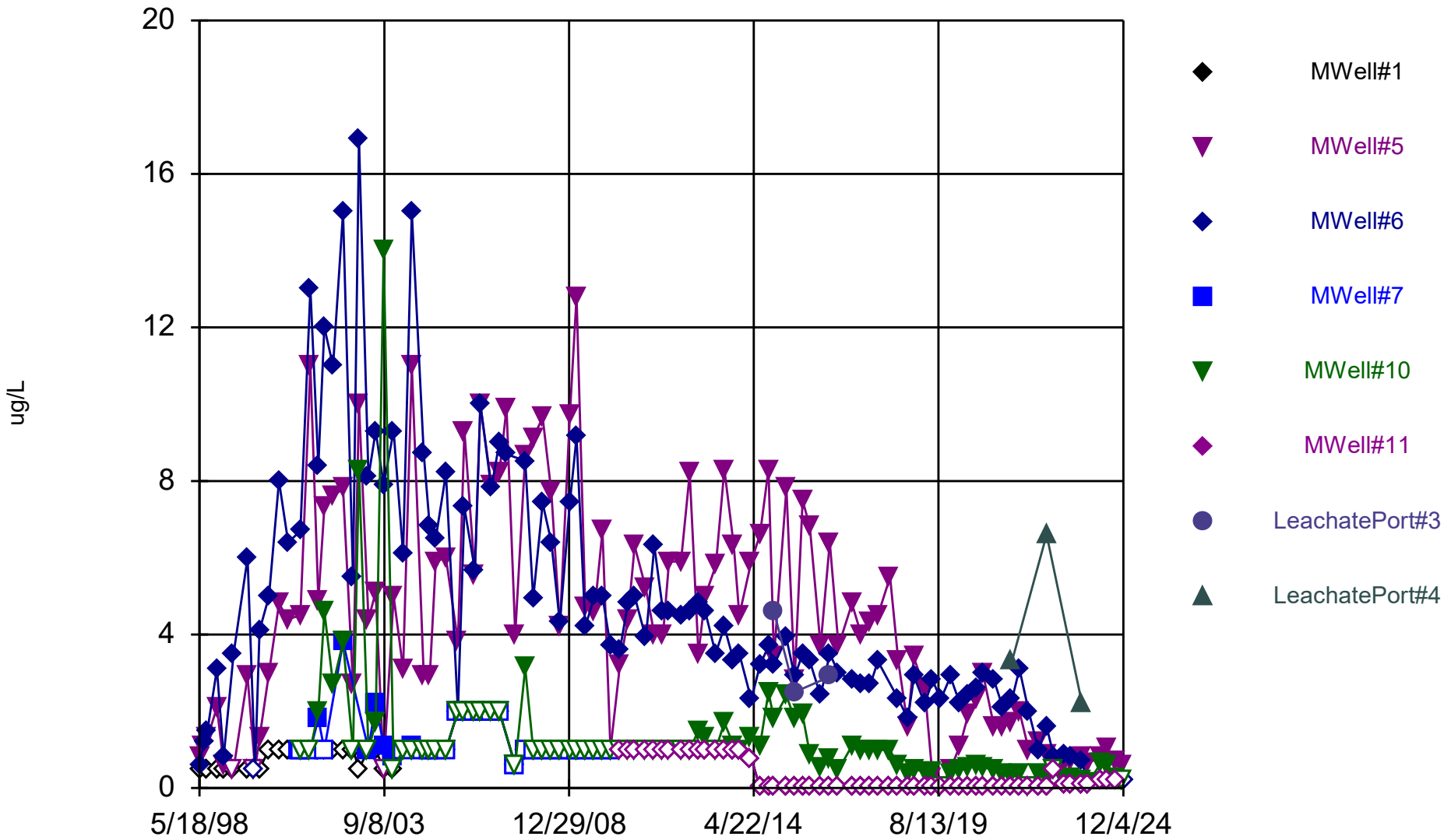
Hollow symbols indicate censored values.

Time Series



Constituent: Vinyl Chloride Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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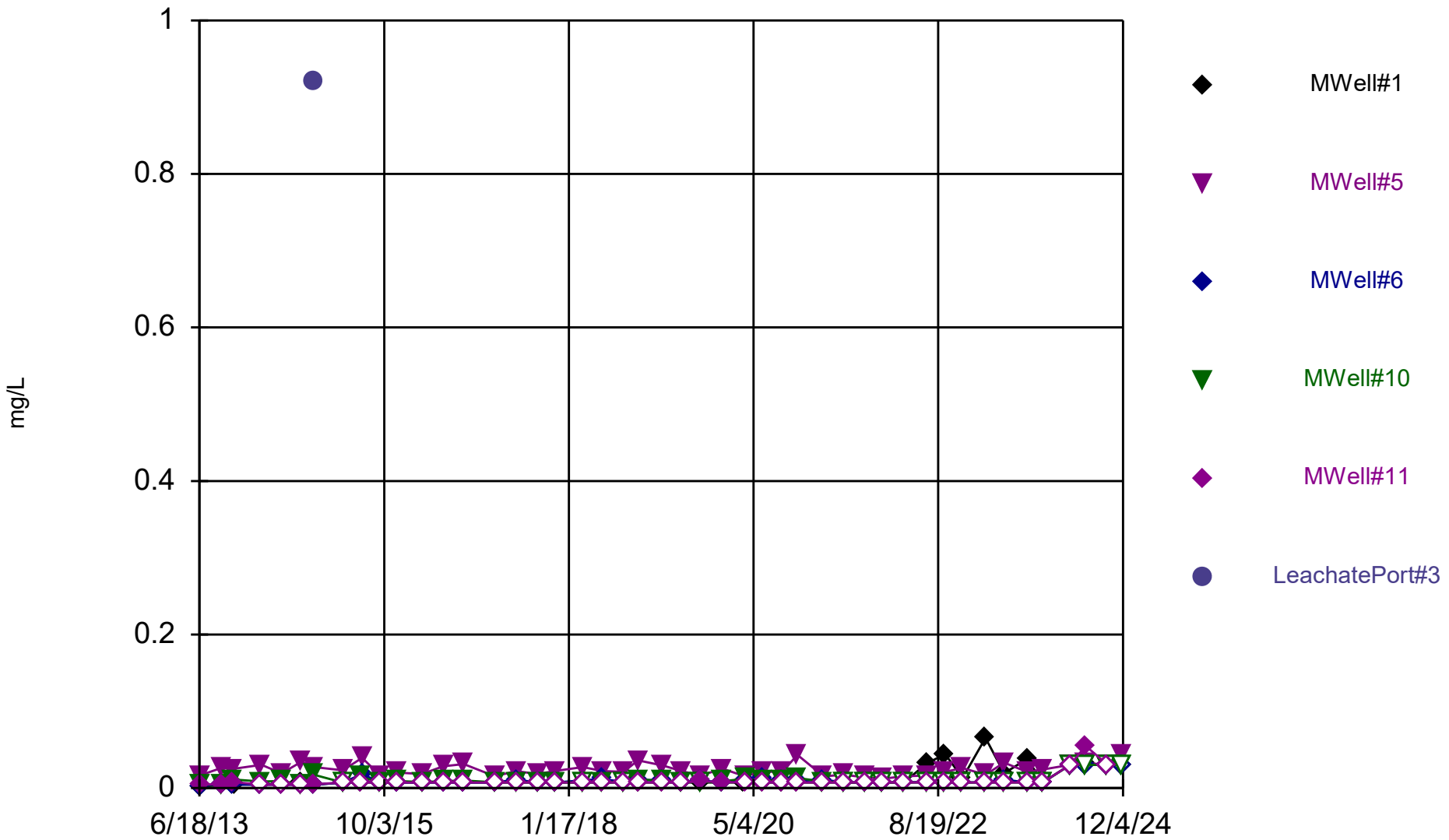
Hollow symbols indicate censored values.

Time Series



Constituent: Zinc, Total Analysis Run 3/12/2025 12:40 PM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

C-2

Leachate Pond and Pond Underdrain

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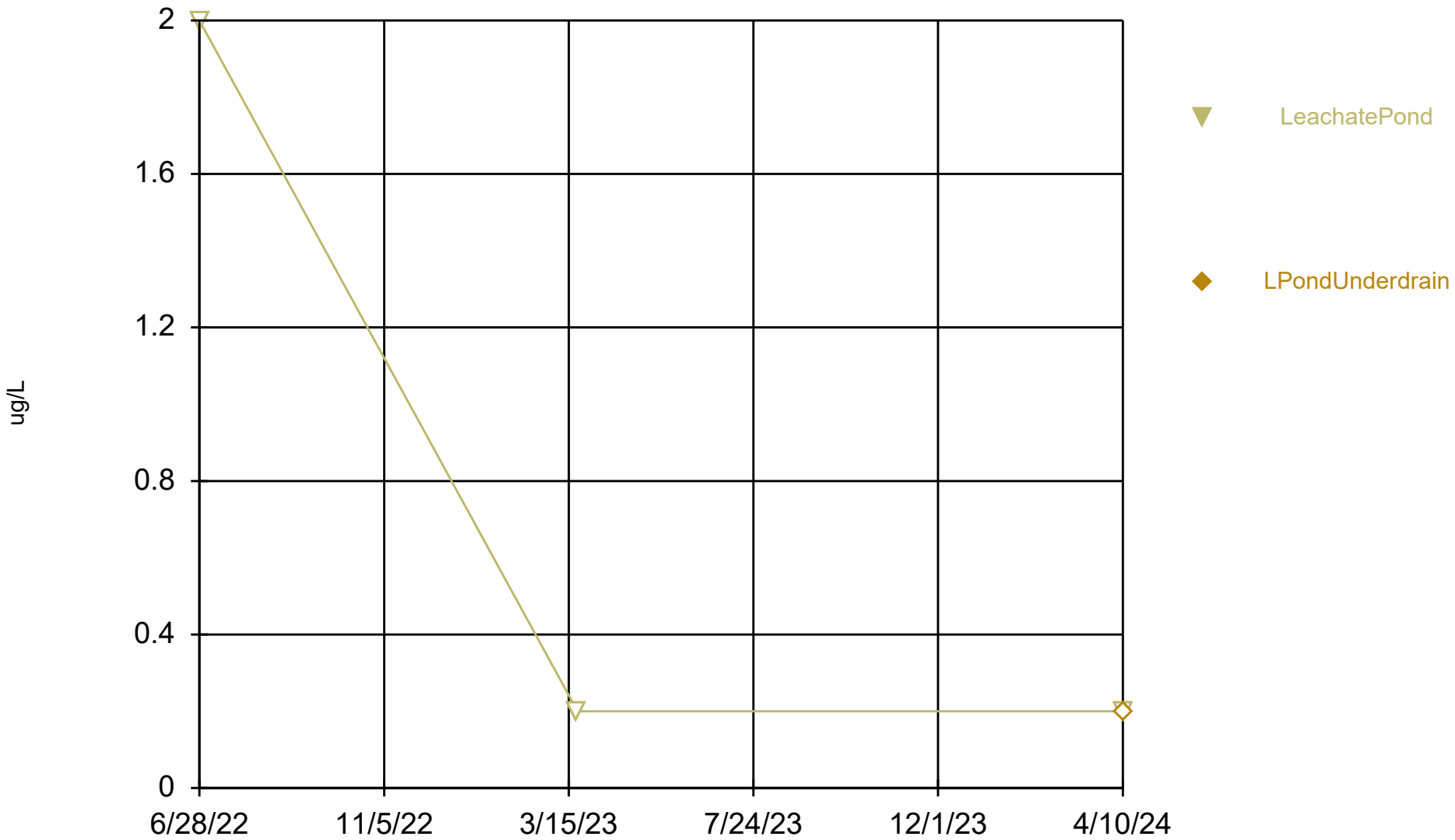
Time Series



Constituent: 1,1-Dichloroethane Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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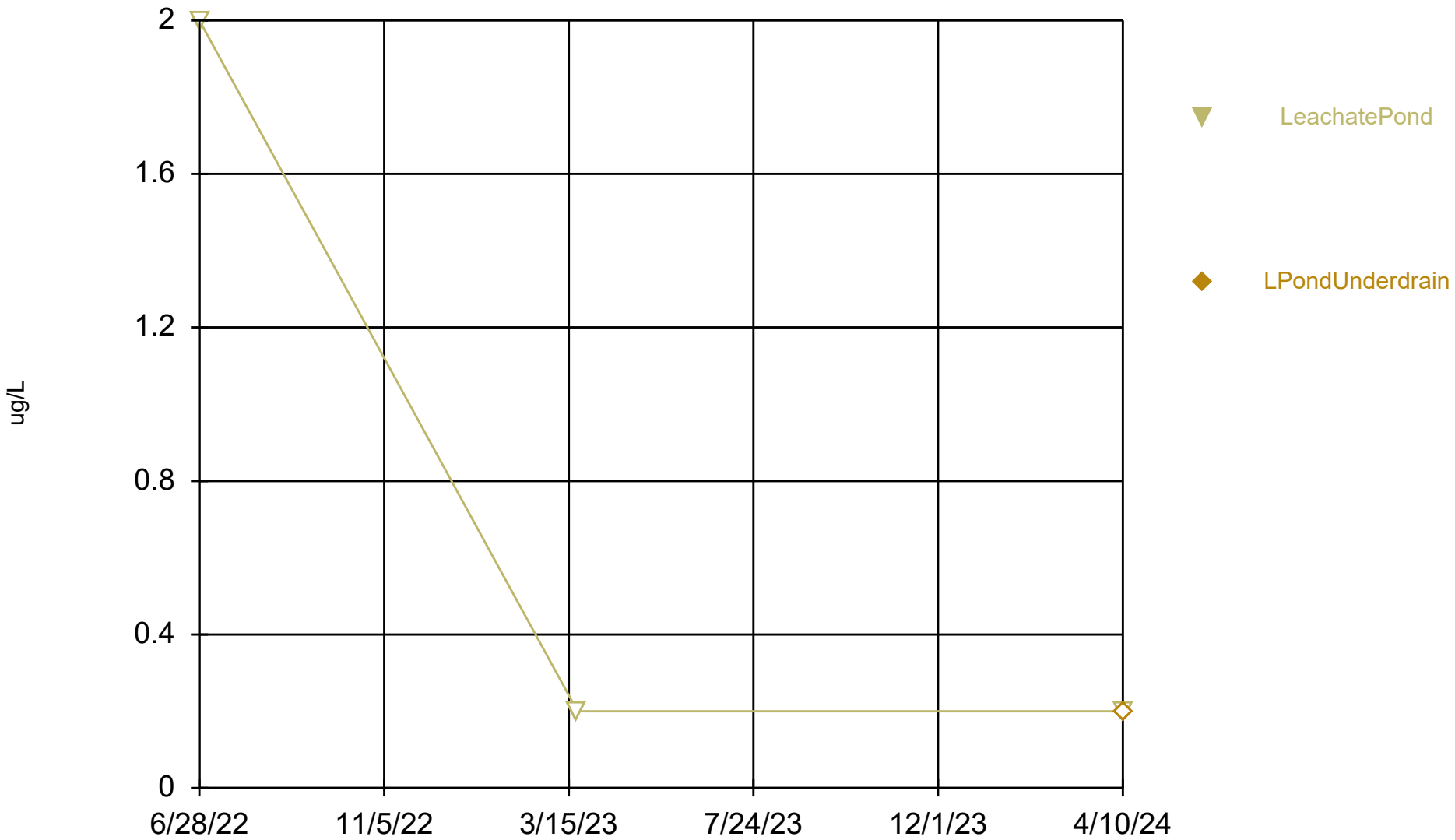
Hollow symbols indicate censored values.

Time Series



Constituent: 1,1-Dichloroethene Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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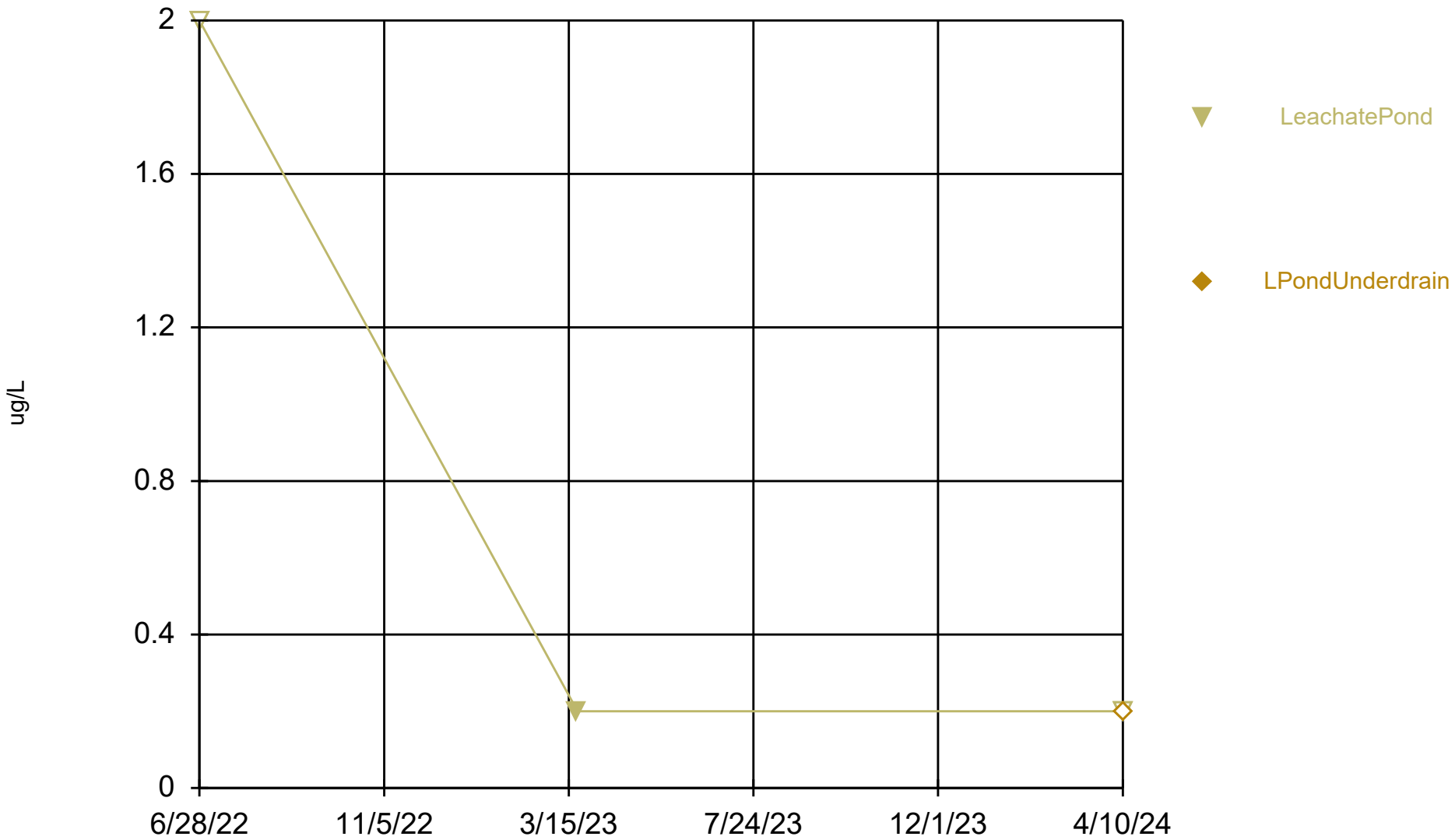
Hollow symbols indicate censored values.

Time Series



Constituent: 1,2-Dichloroethane Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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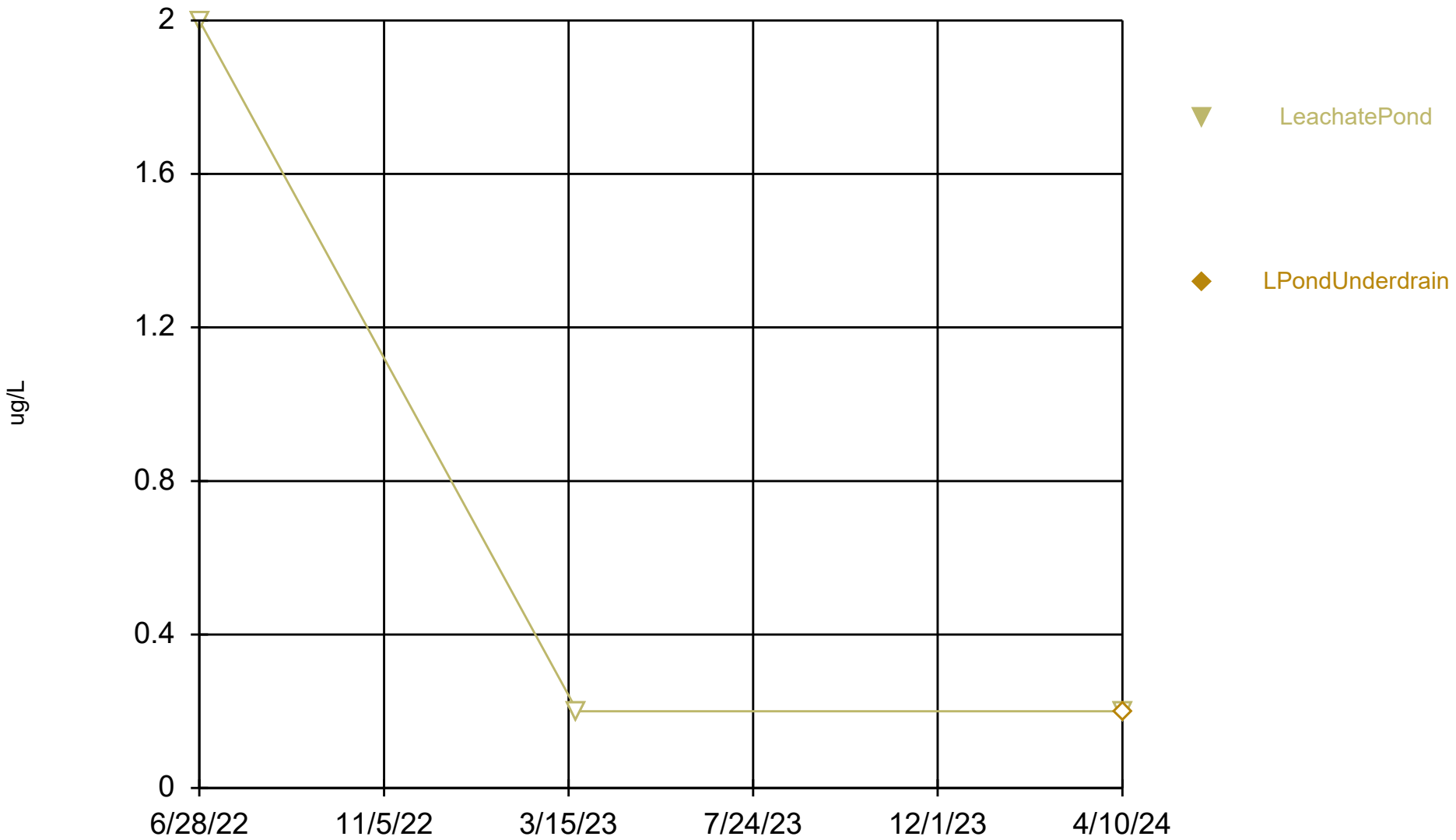
Hollow symbols indicate censored values.

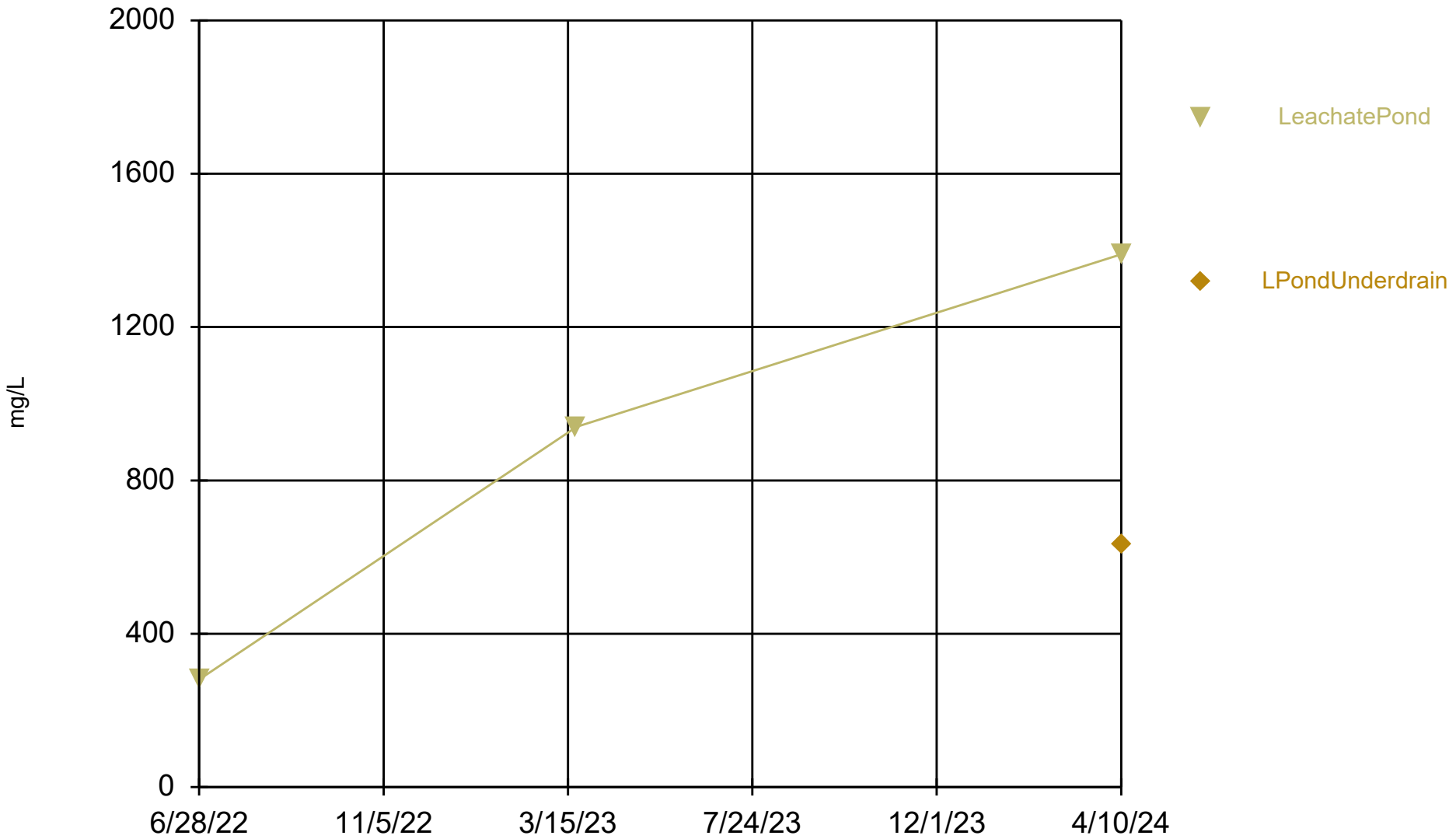
Time Series



Constituent: 1,2-Dichloropropane Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Alkalinity, Bicarbonate Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Onl

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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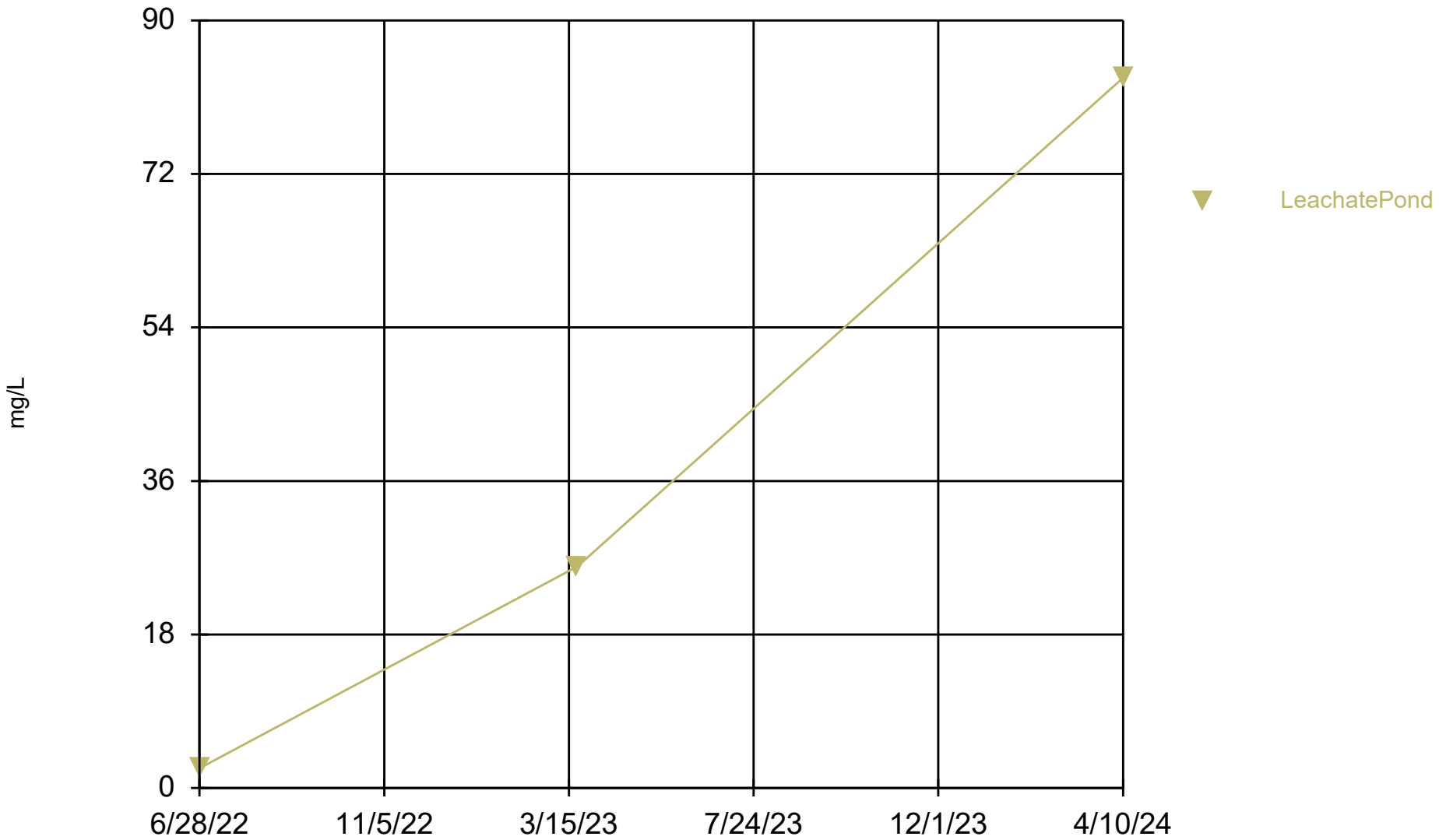
Time Series



Constituent: Ammonia Nitrogen Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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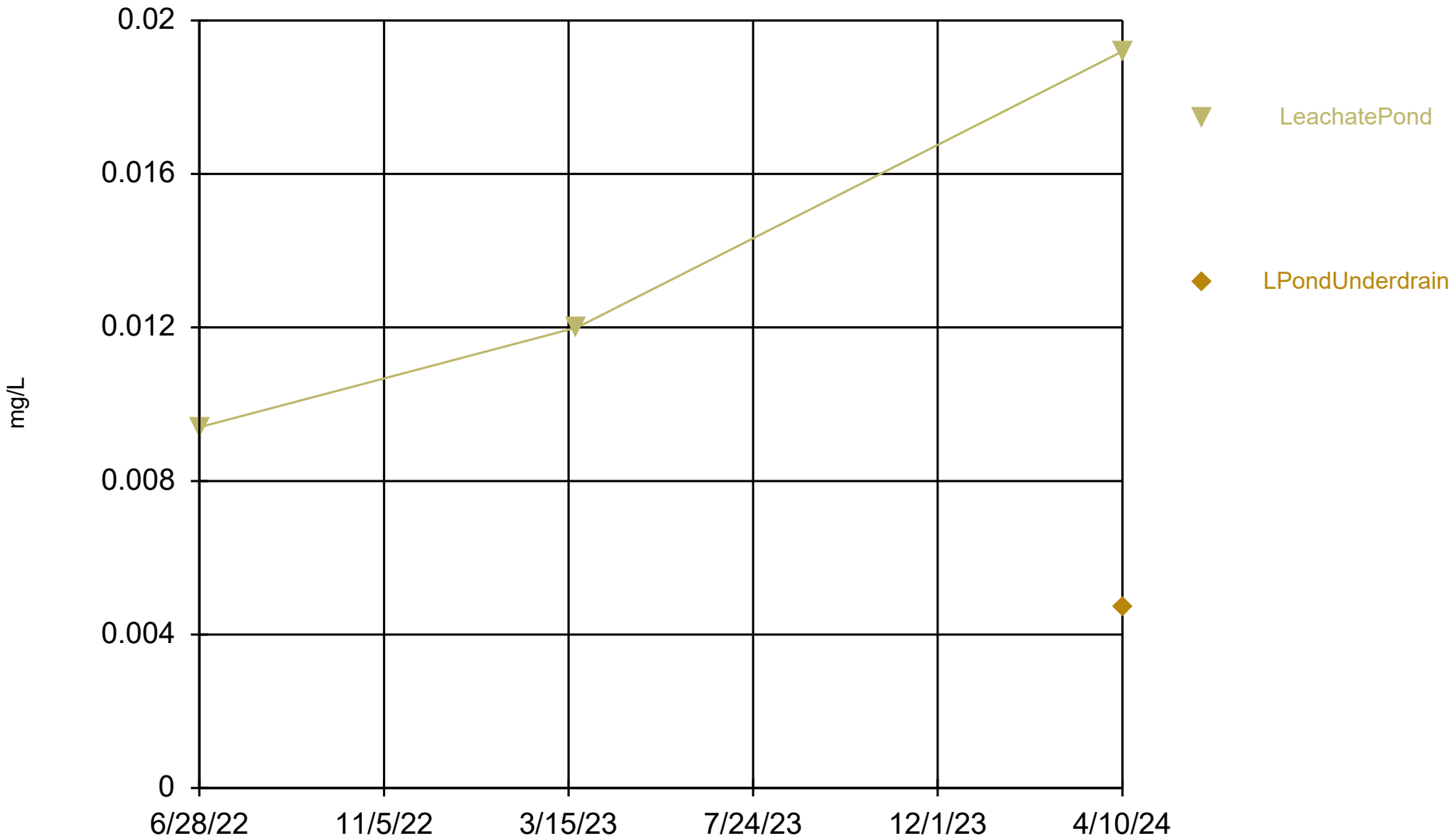
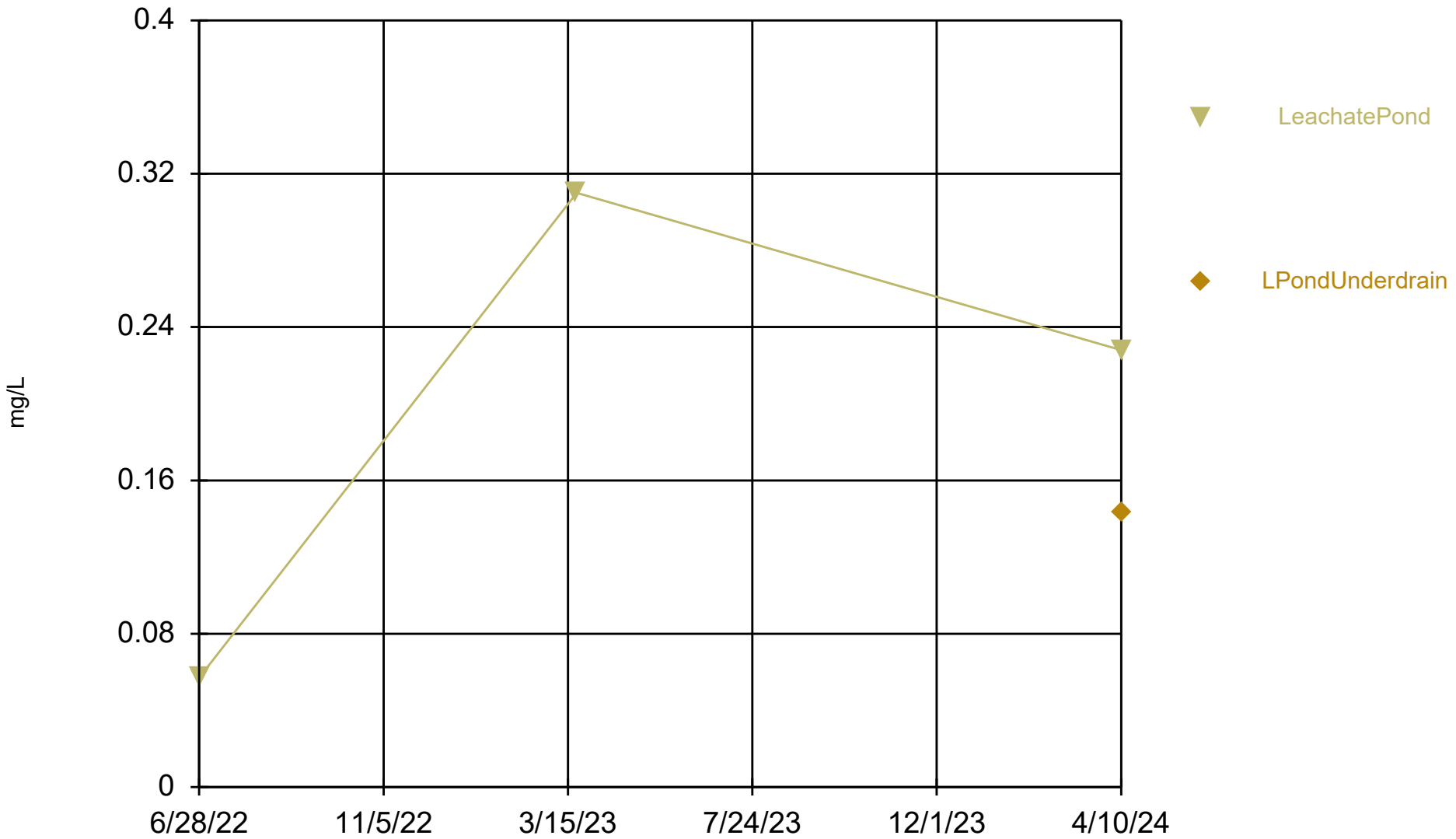
Time Series



Constituent: Arsenic, Total Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Barium, Total Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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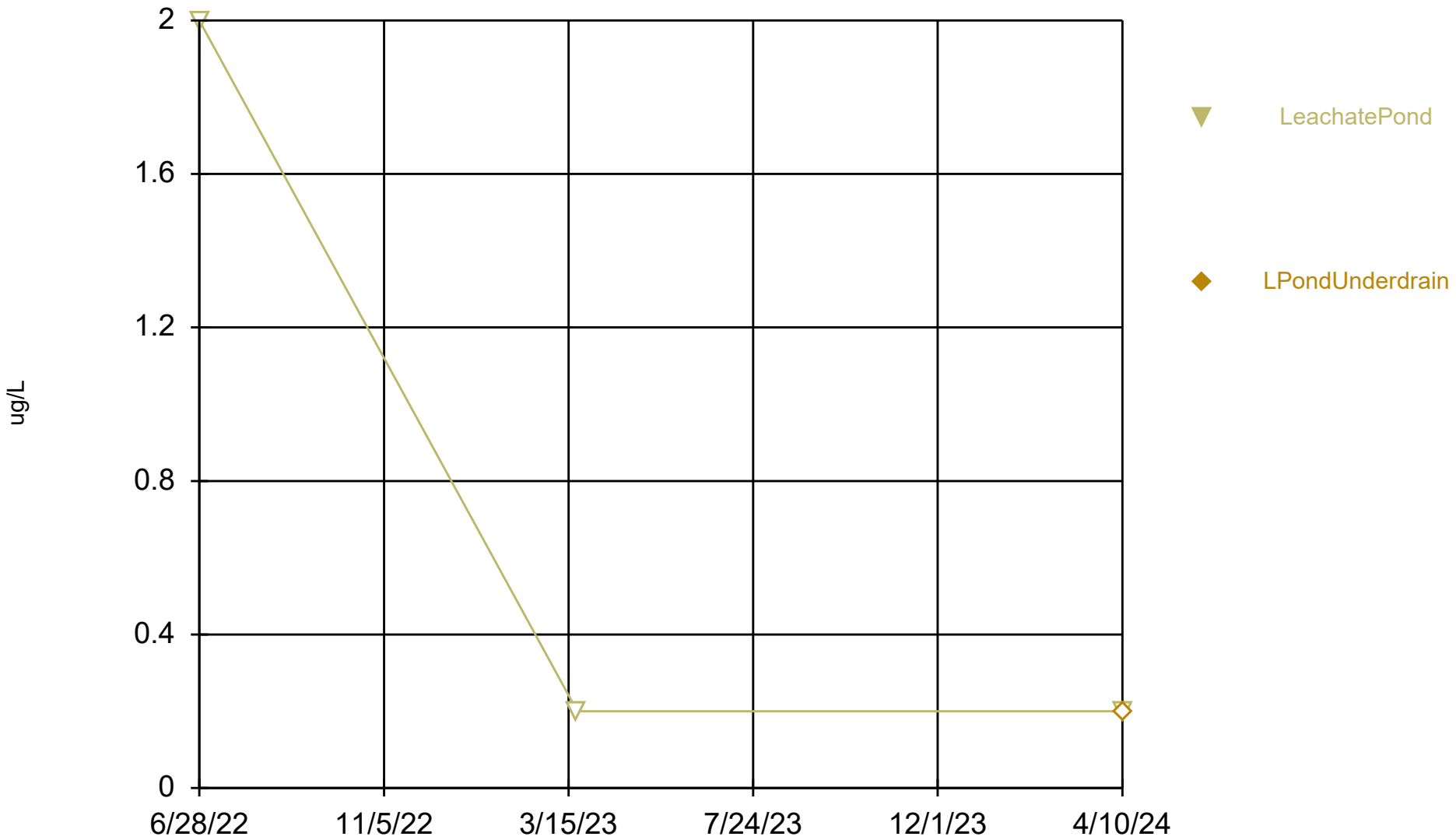
Hollow symbols indicate censored values.

Time Series



Constituent: Benzene Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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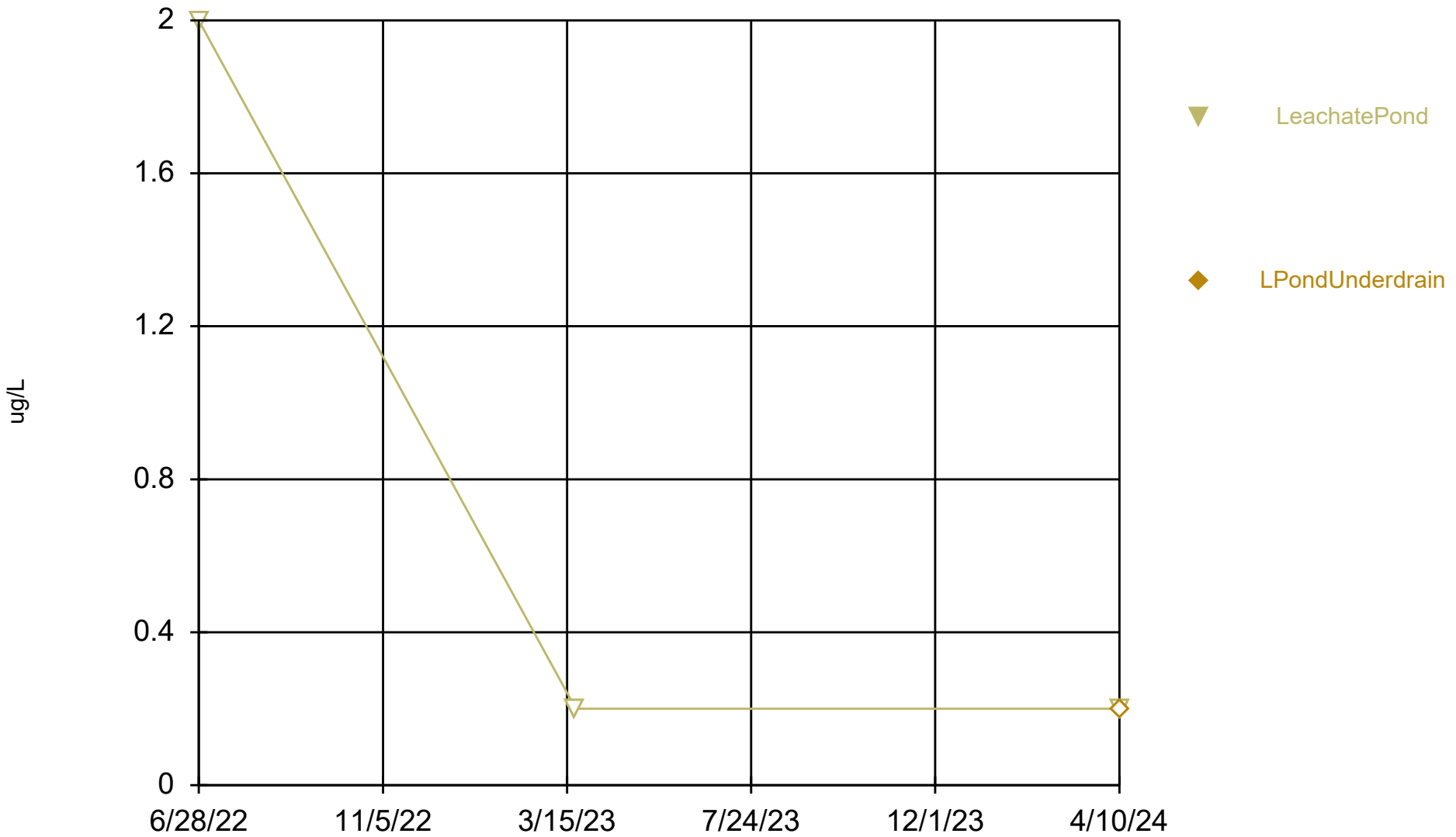
Hollow symbols indicate censored values.

Time Series



Constituent: Bromodichloromethane Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate O

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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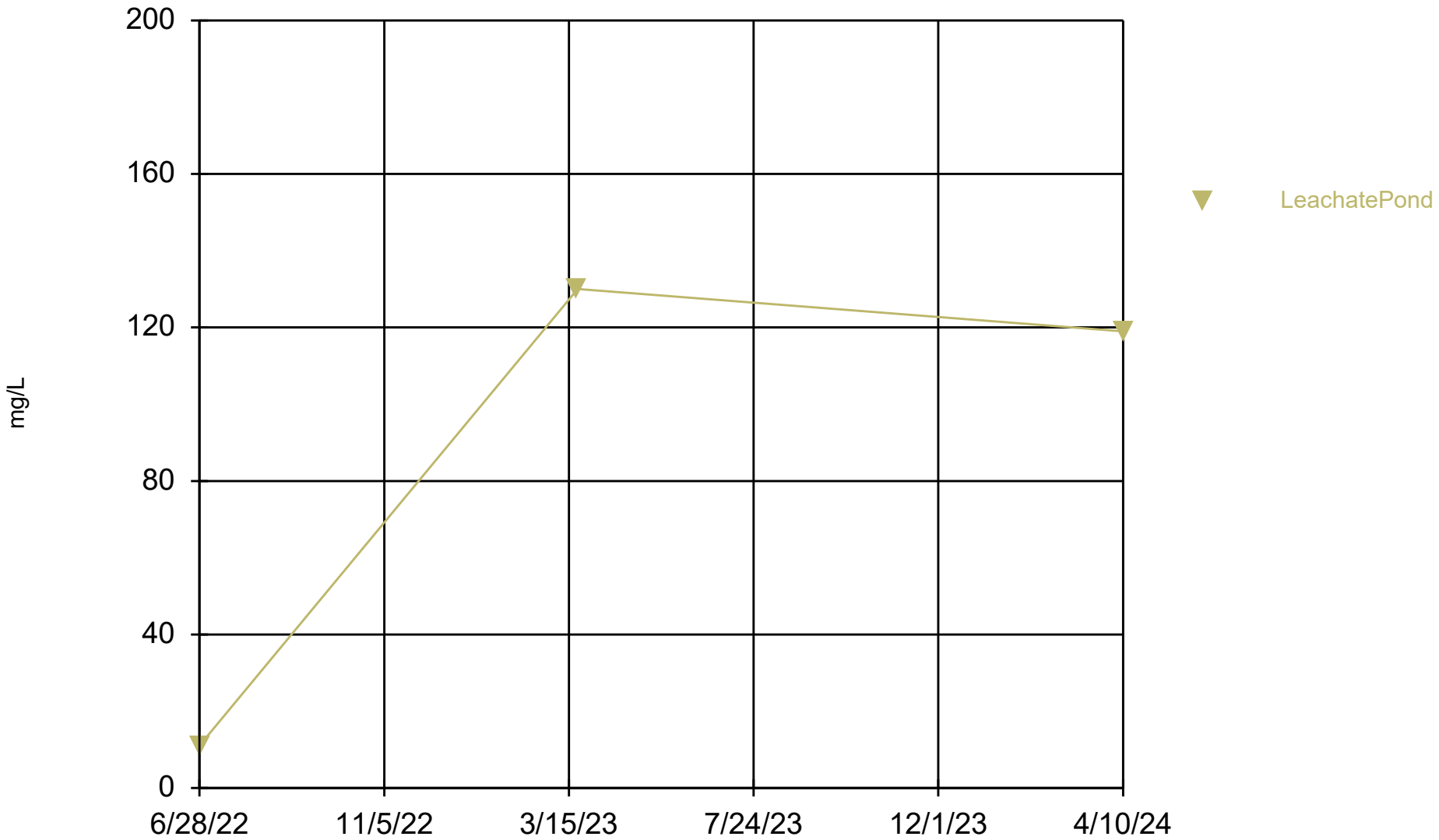
Time Series



Constituent: Calcium, Total Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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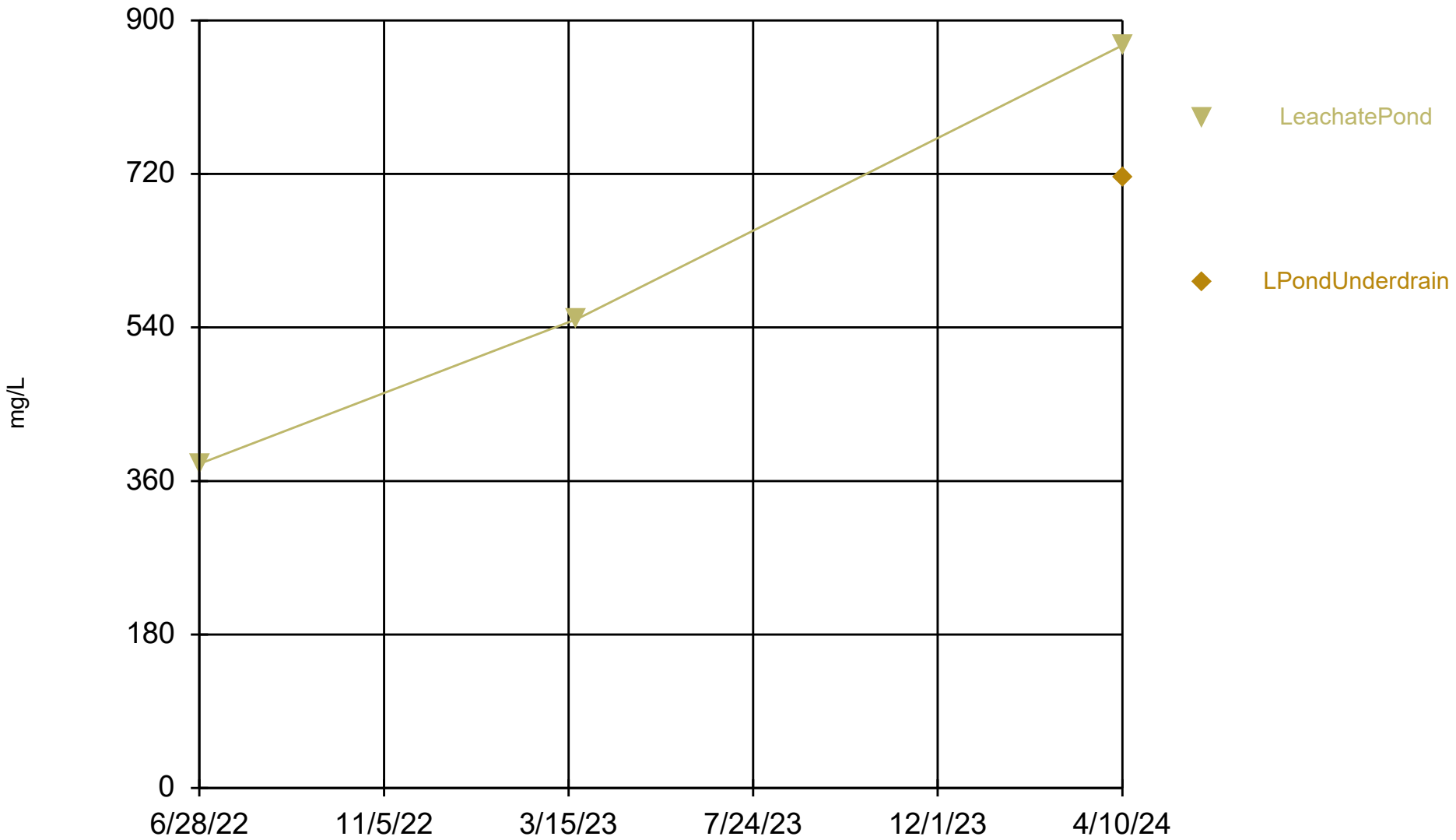
Time Series



Constituent: Chloride Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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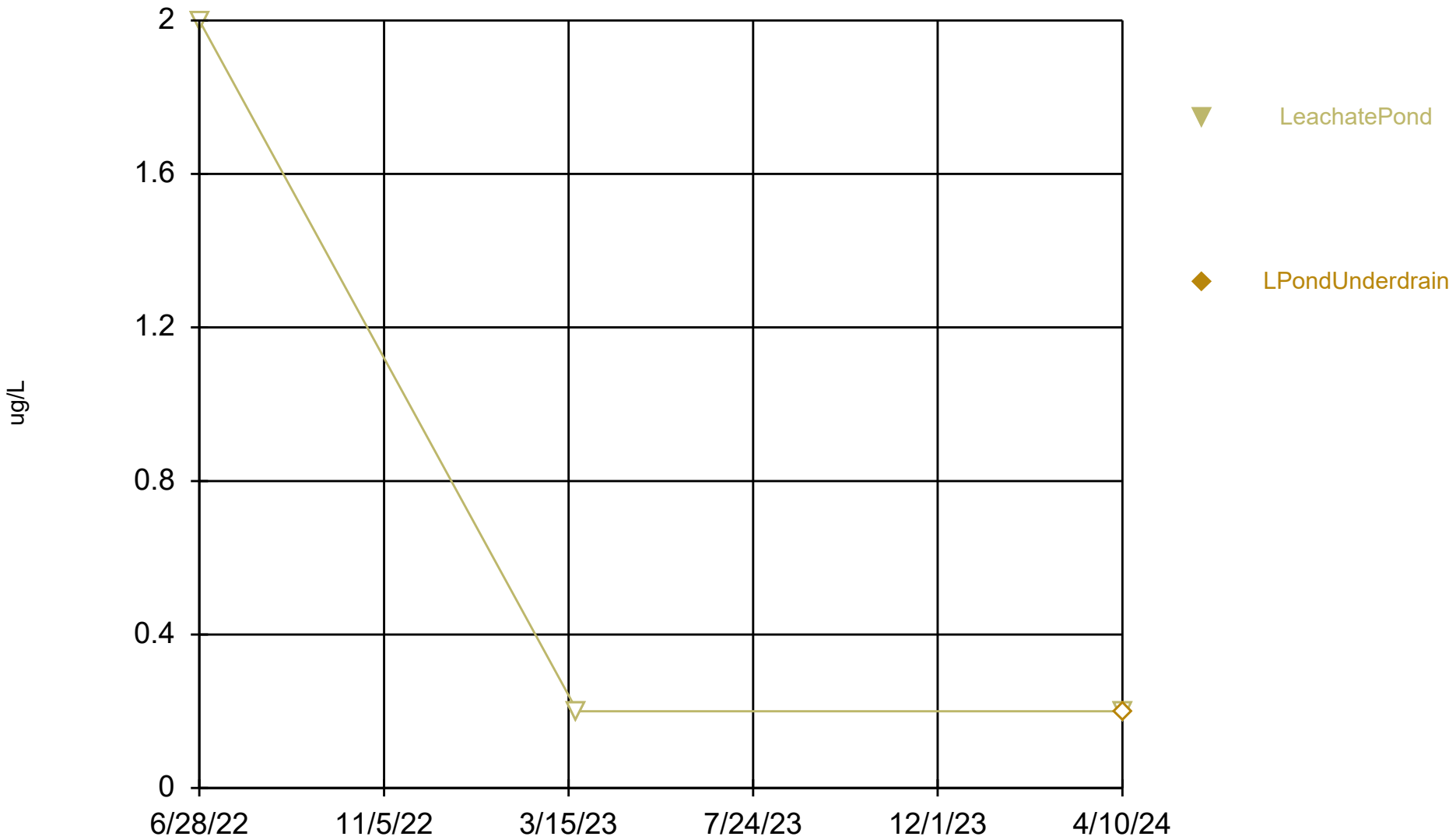
Hollow symbols indicate censored values.

Time Series



Constituent: Chloroform Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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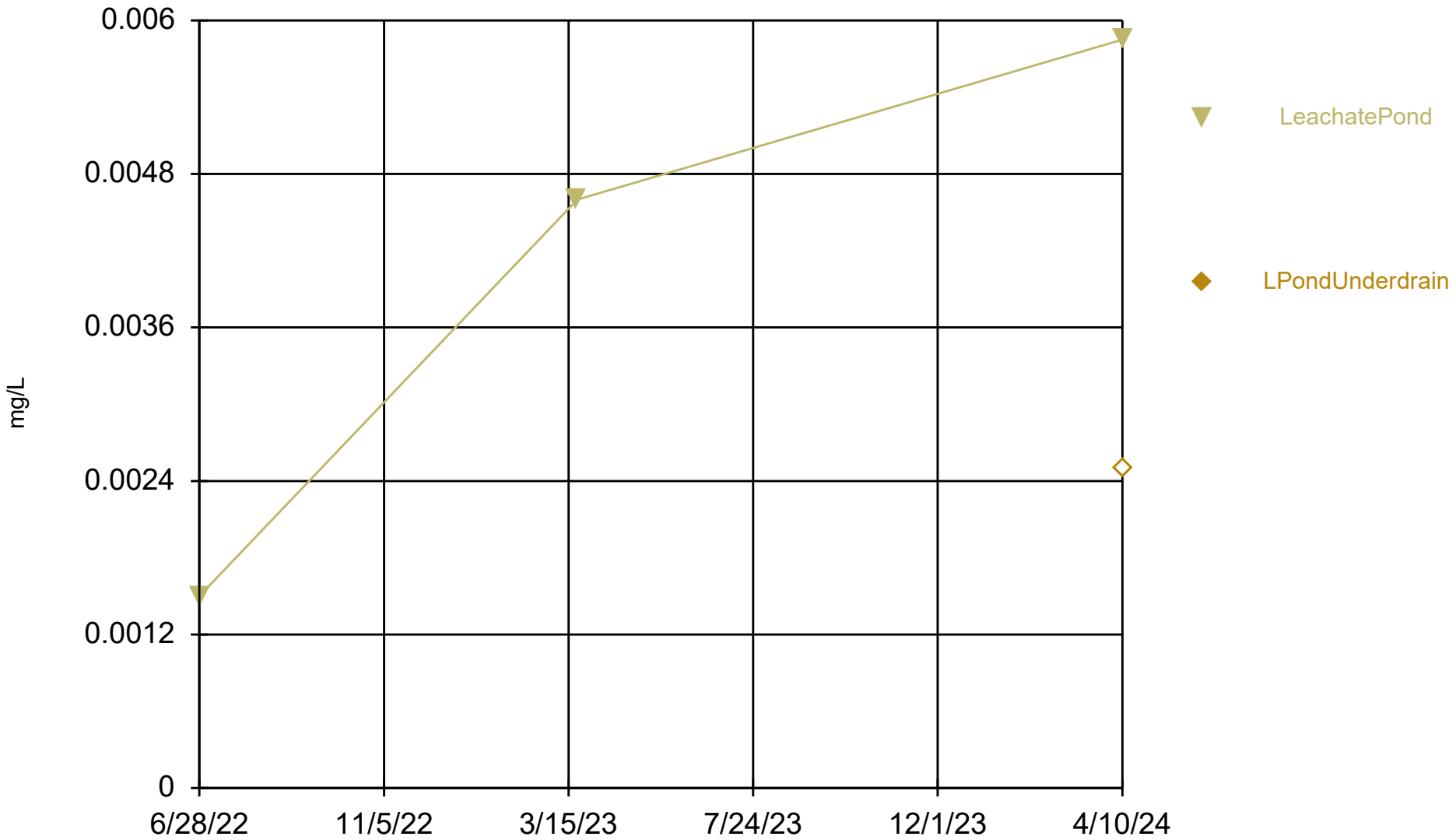
Hollow symbols indicate censored values.

Time Series



Constituent: Chromium, Total Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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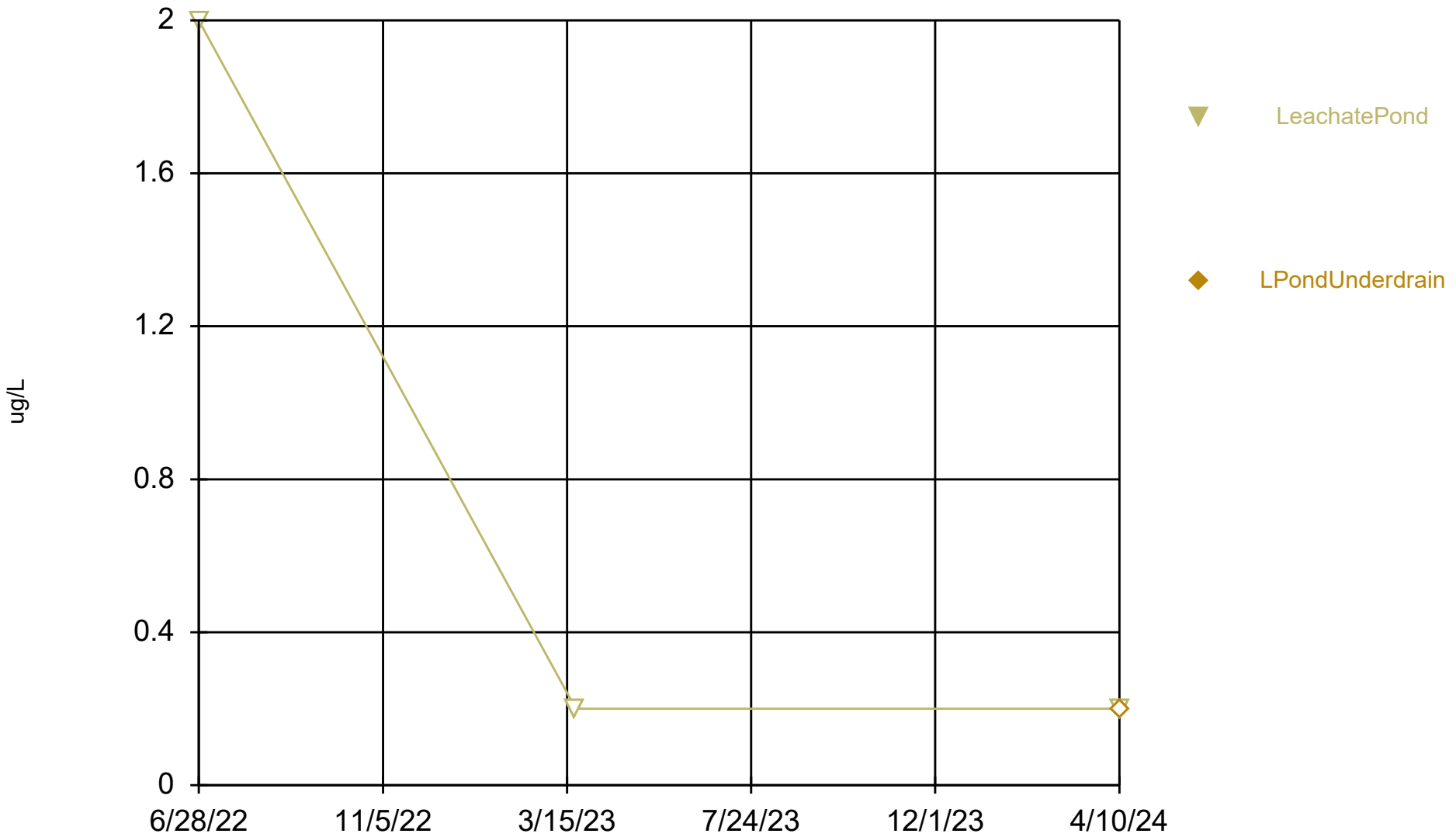
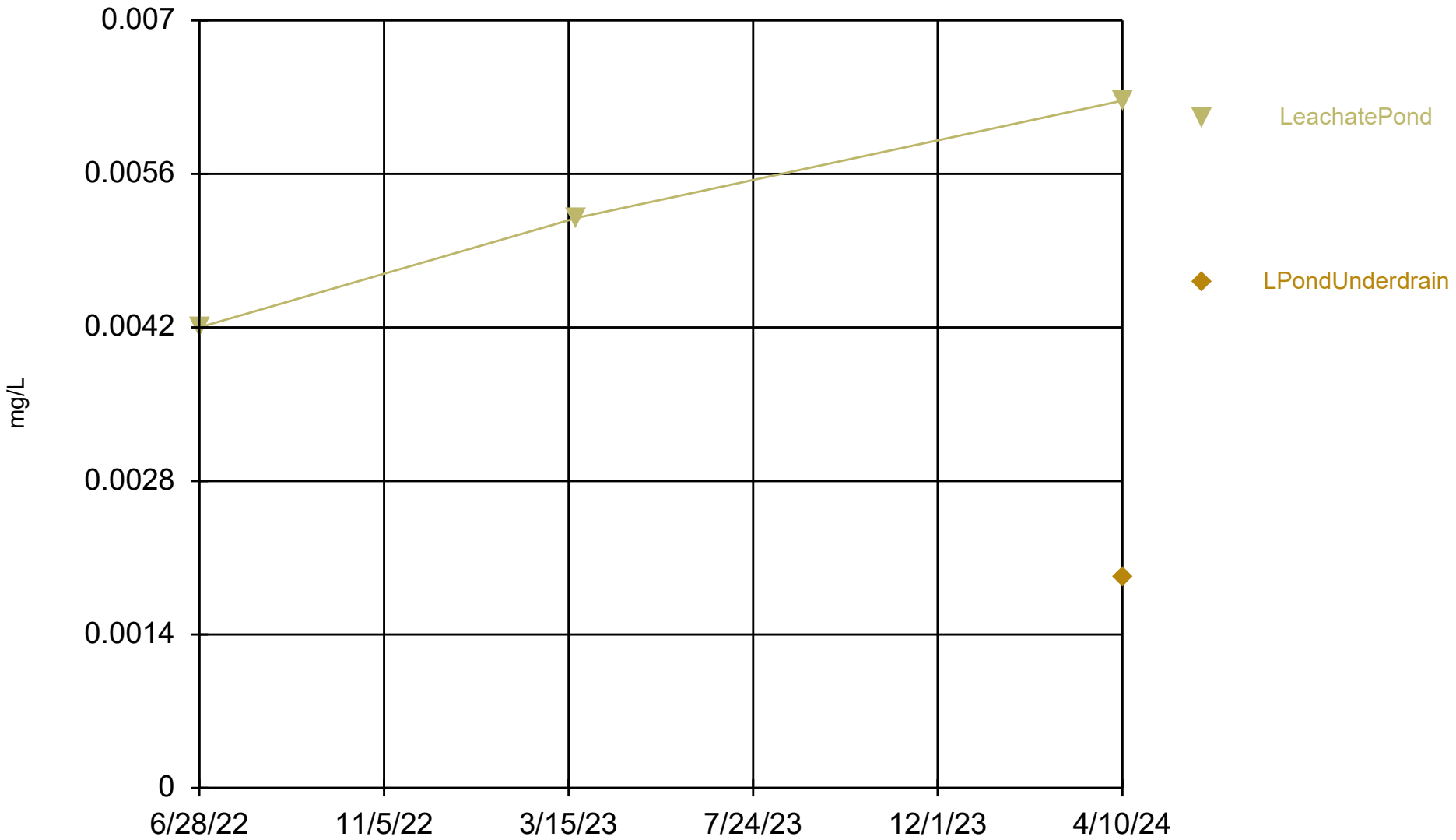
Hollow symbols indicate censored values.

Time Series



Constituent: cis-1,2-Dichloroethene Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate On Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

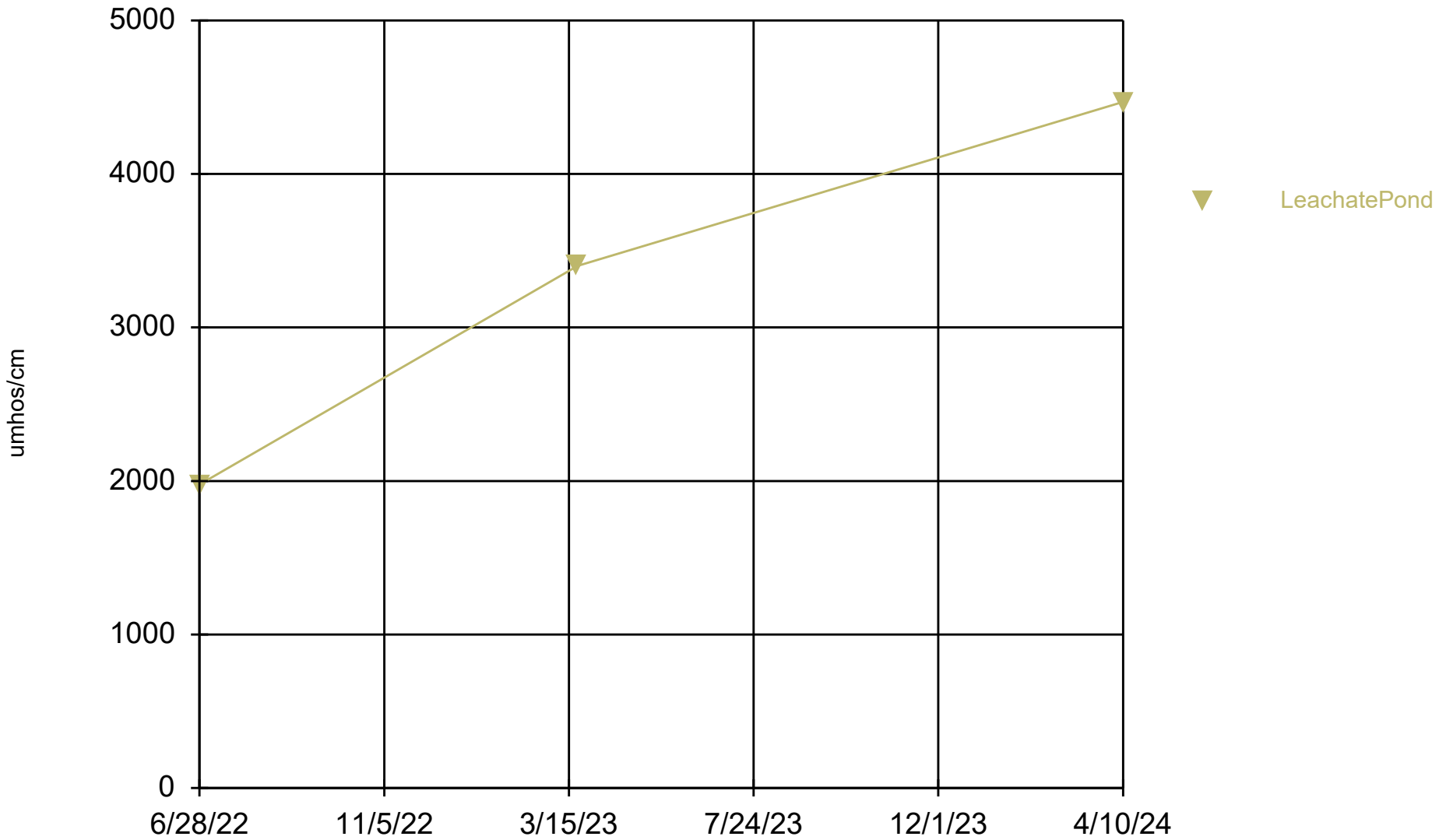
Time Series



Constituent: Cobalt, Total Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

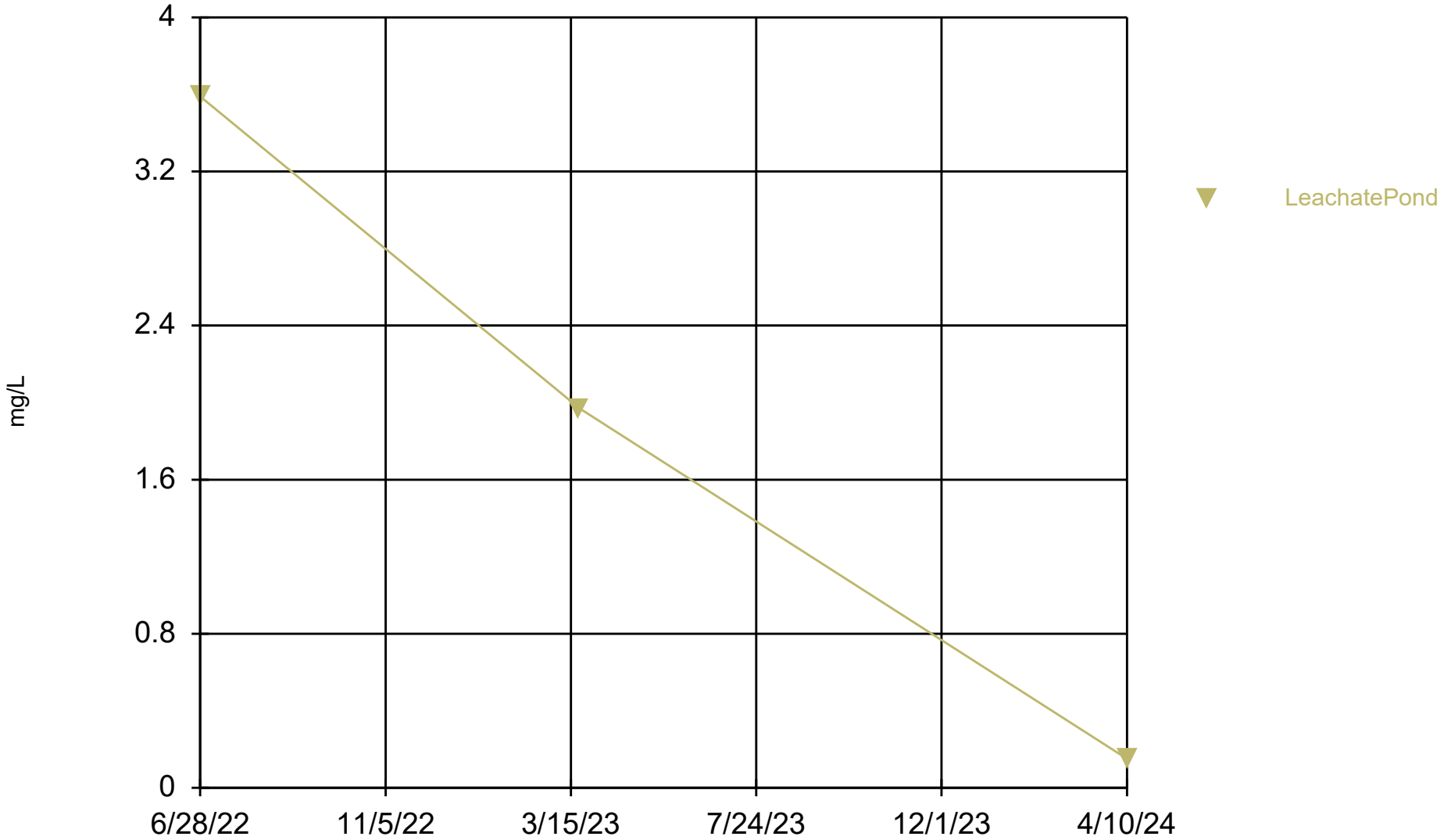
Time Series



Constituent: Conductivity Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Dissolved Oxygen Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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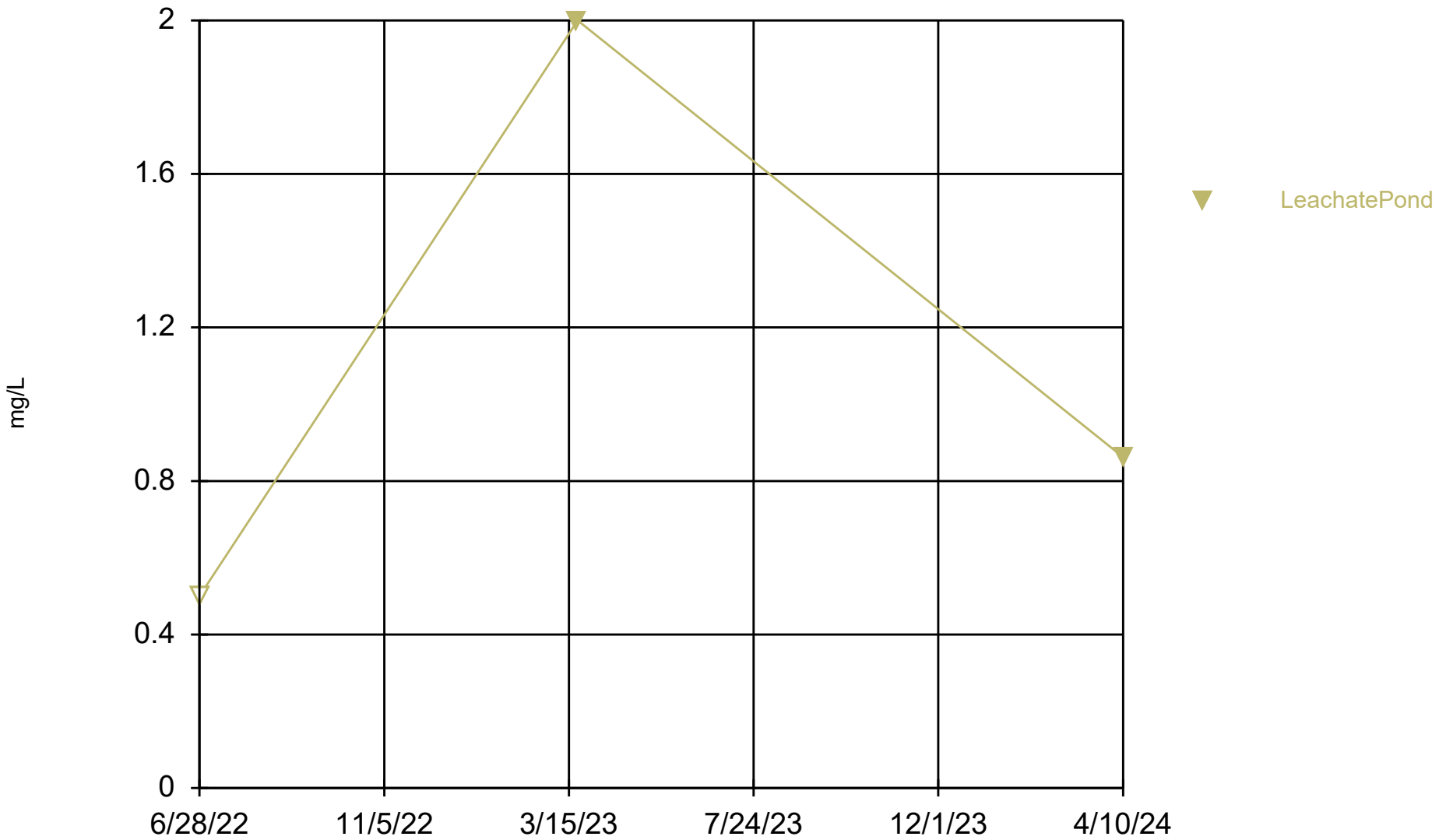
Time Series



Constituent: Iron, Total Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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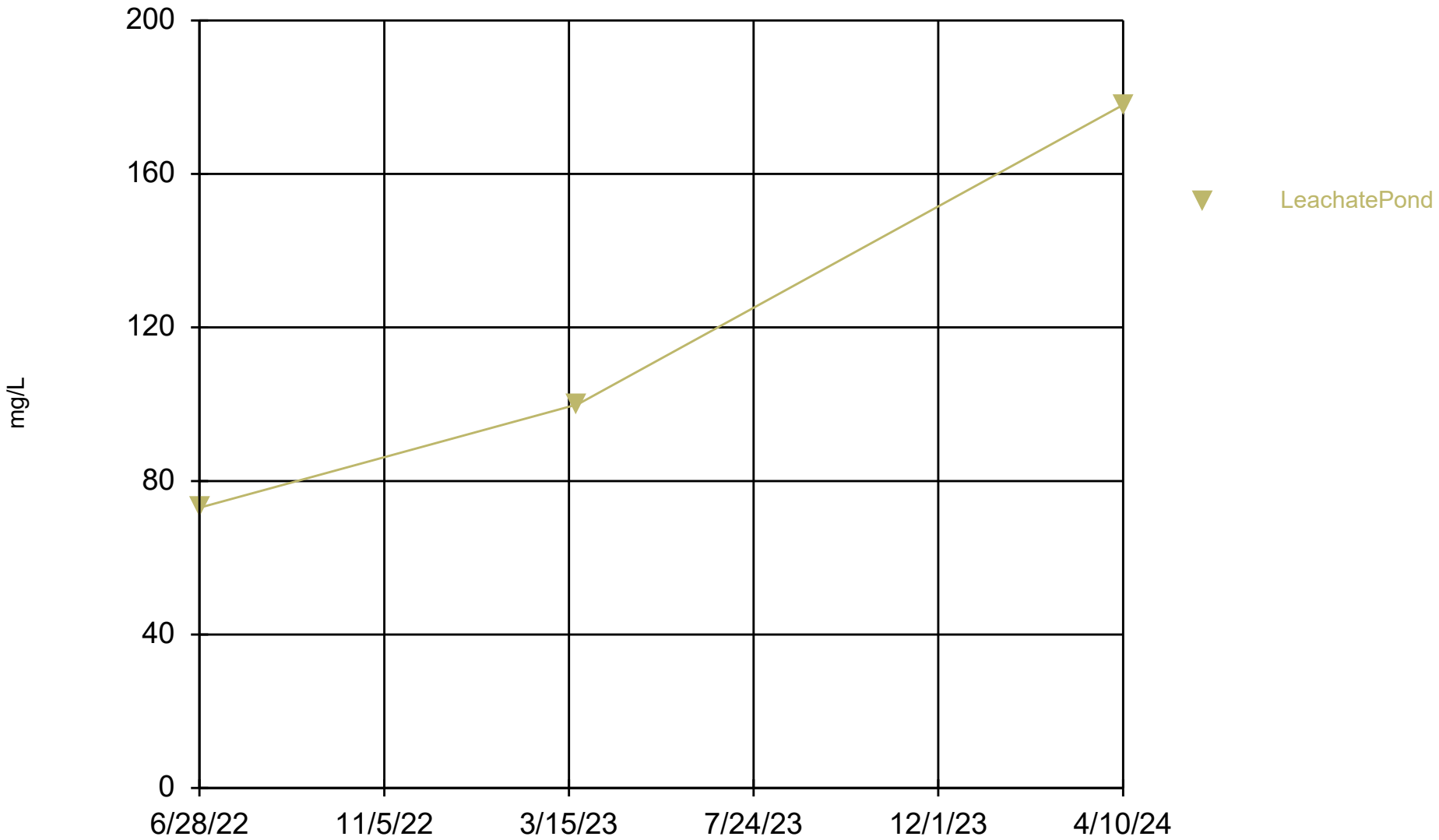
Time Series



Constituent: Magnesium, Total Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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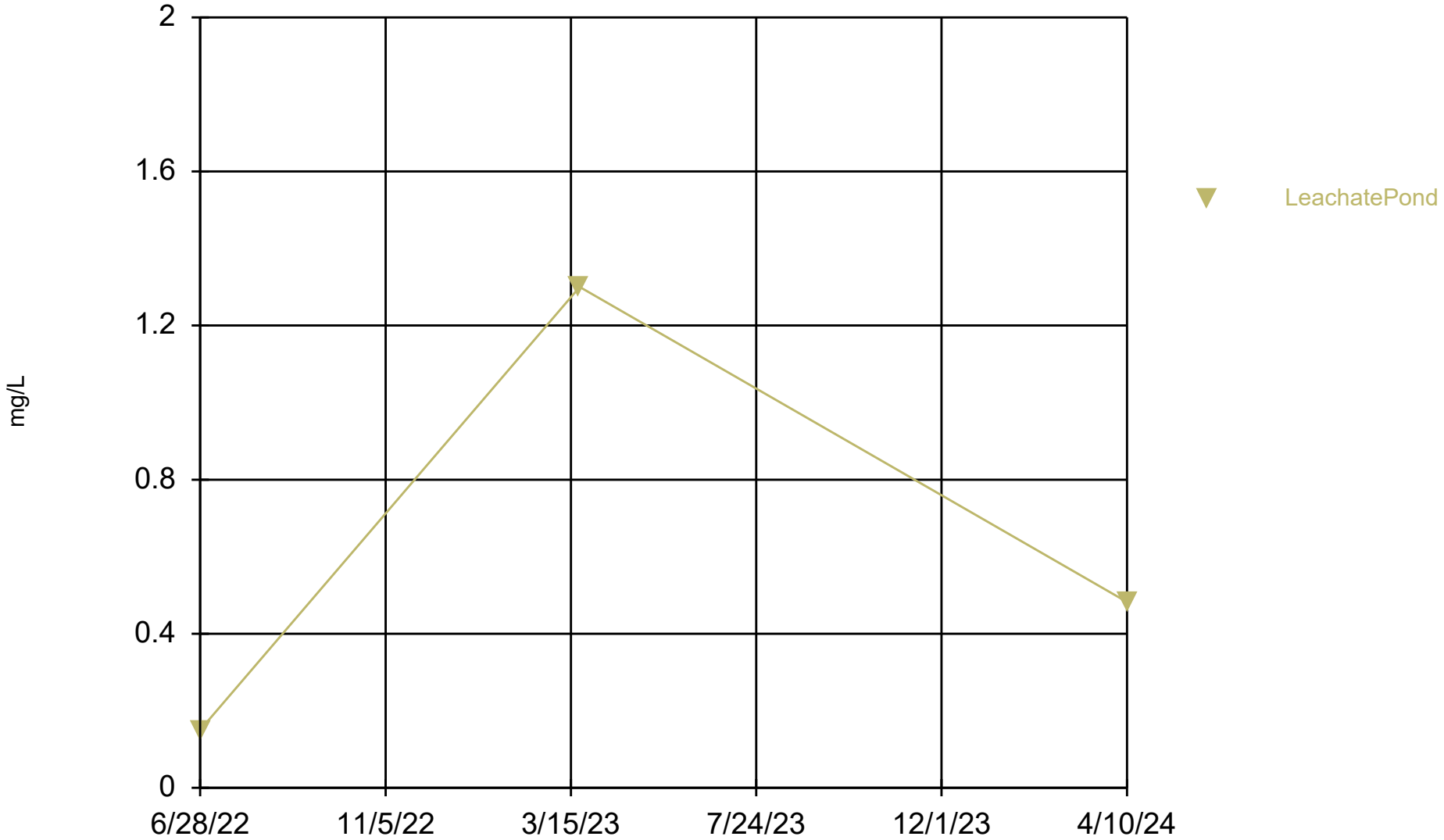
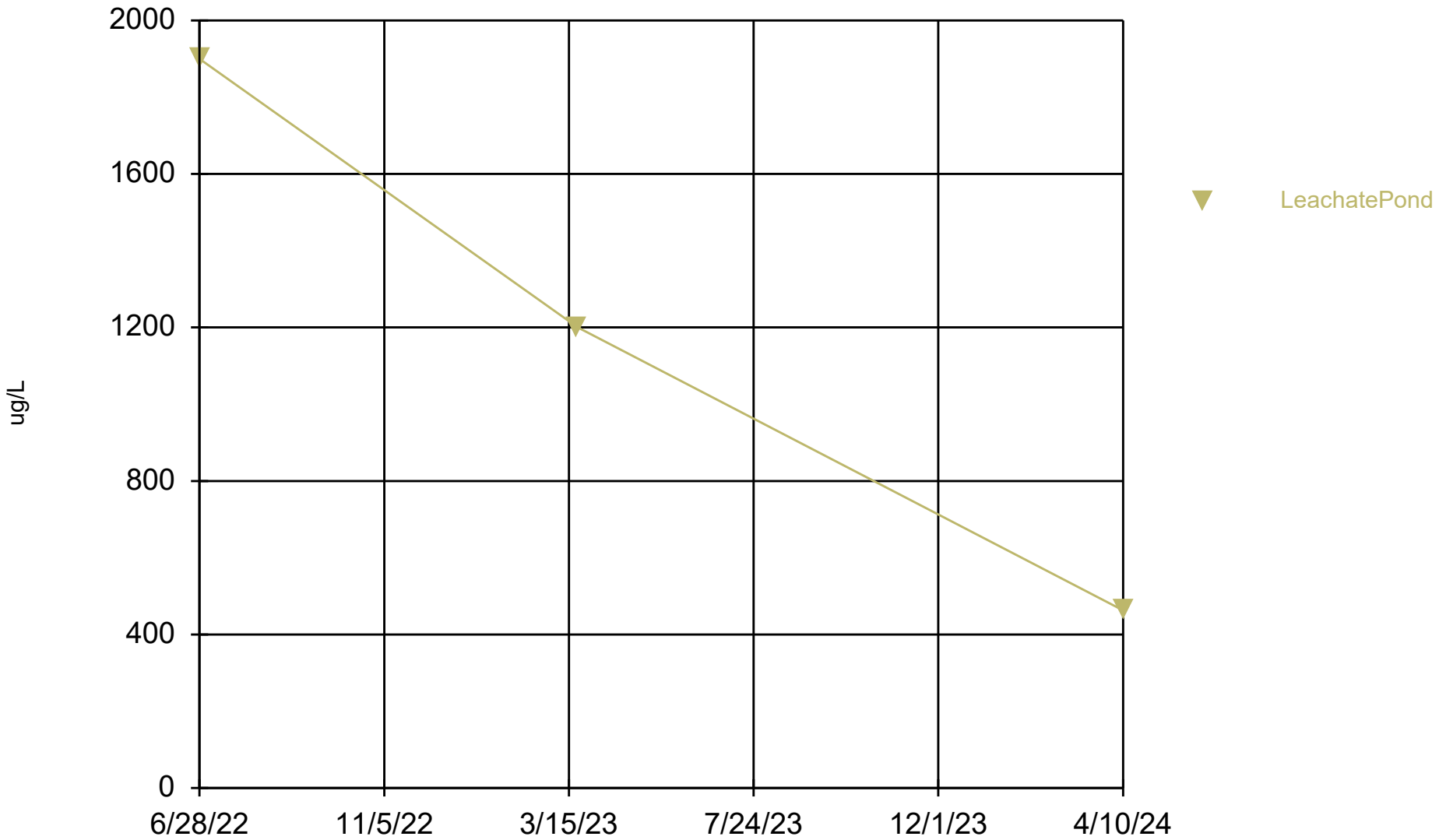
Time Series



Constituent: Manganese, Total Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Methane Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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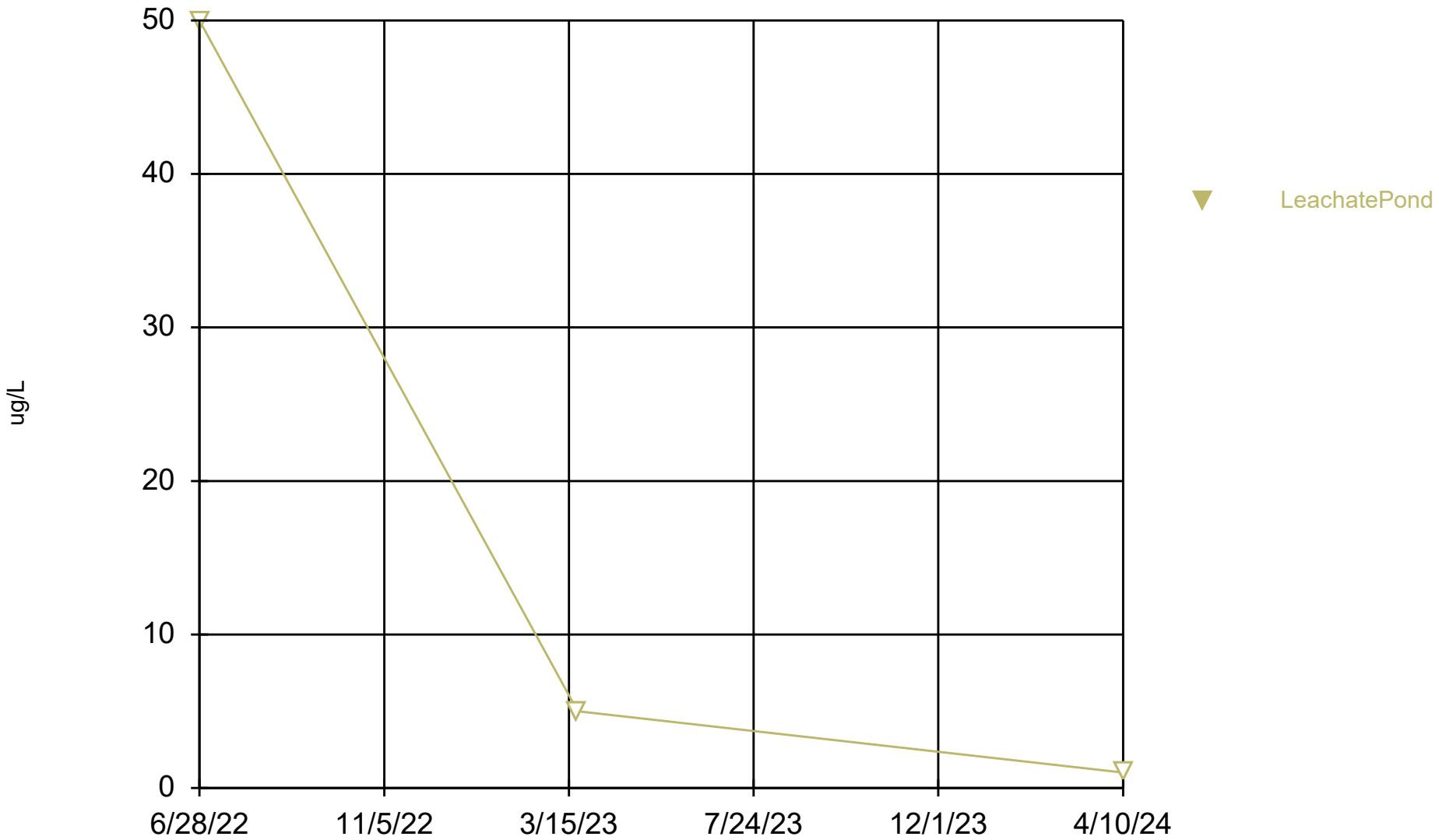
Hollow symbols indicate censored values.

Time Series



Constituent: Methylene Chloride Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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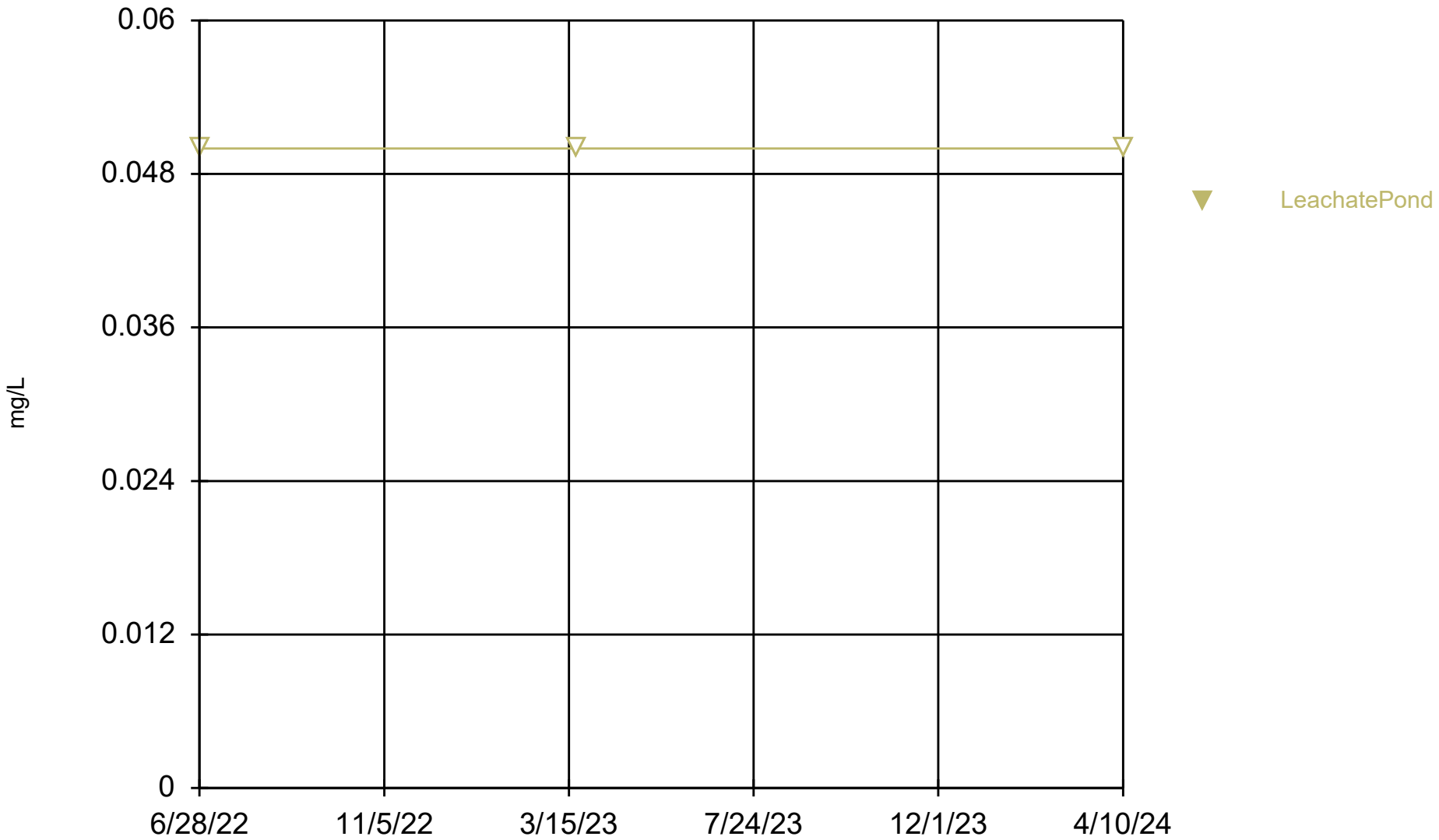
Hollow symbols indicate censored values.

Time Series

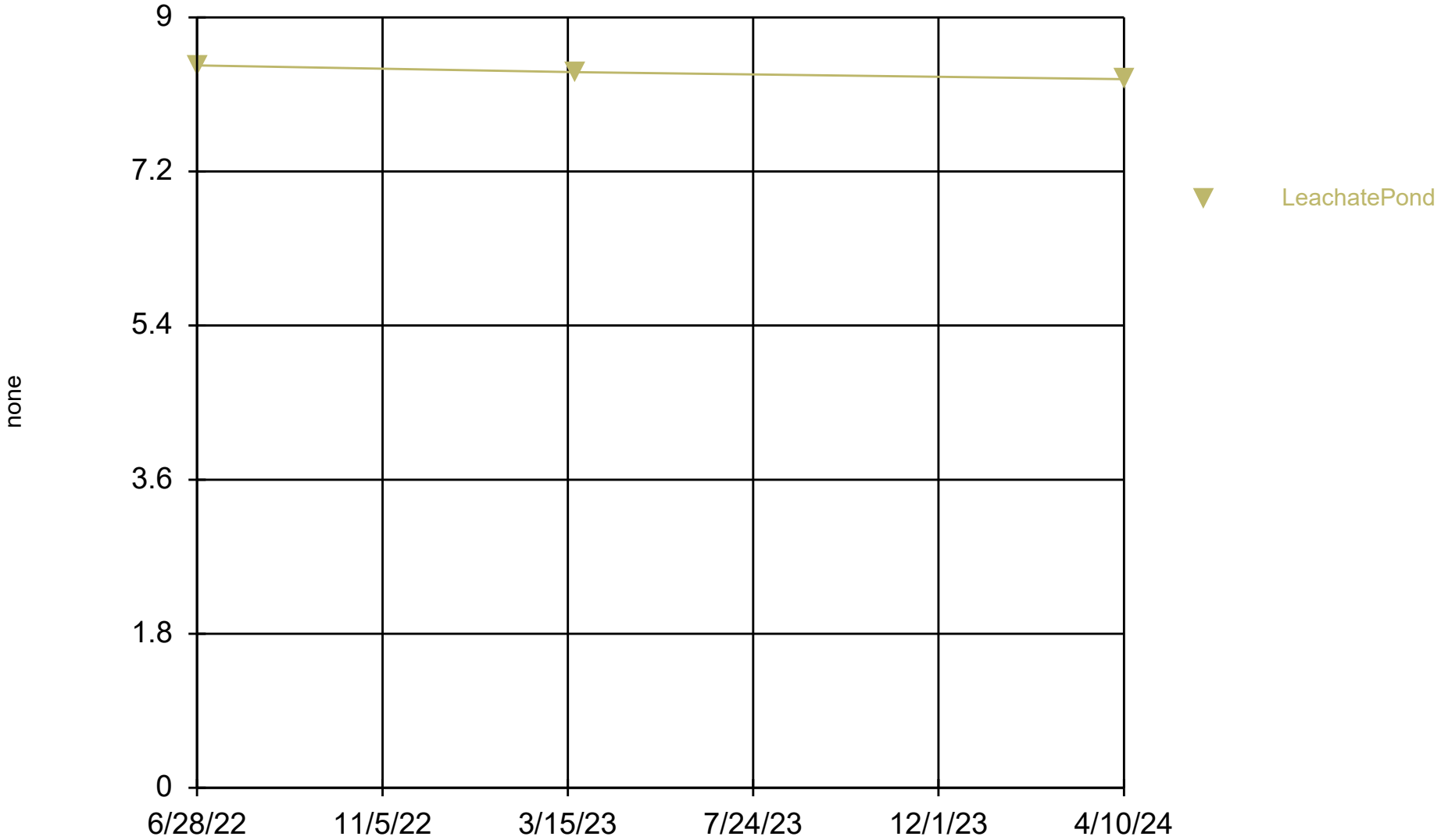


Constituent: Nitrate Nitrogen Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.

Time Series



Constituent: pH Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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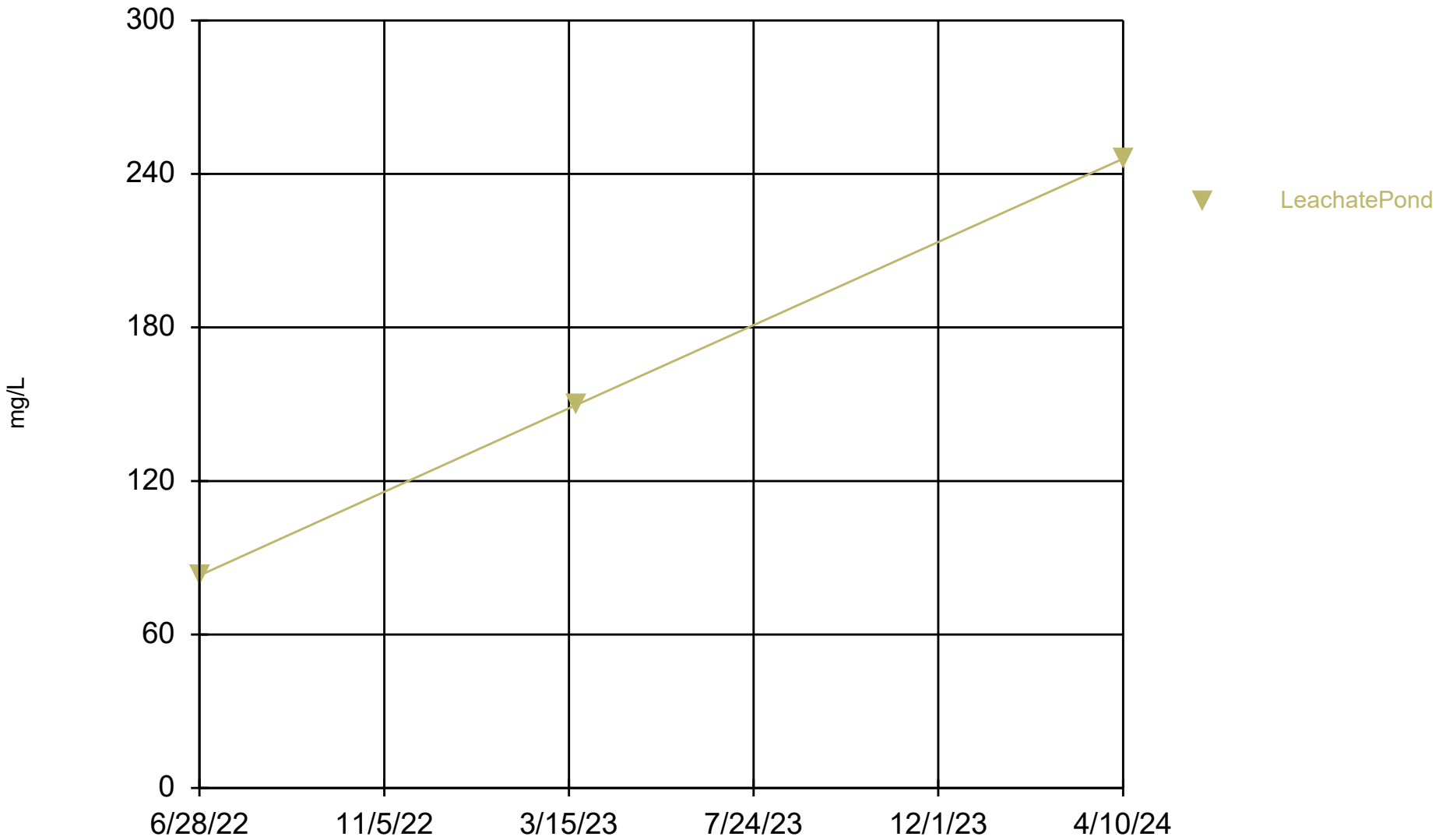
Time Series



Constituent: Potassium, Total Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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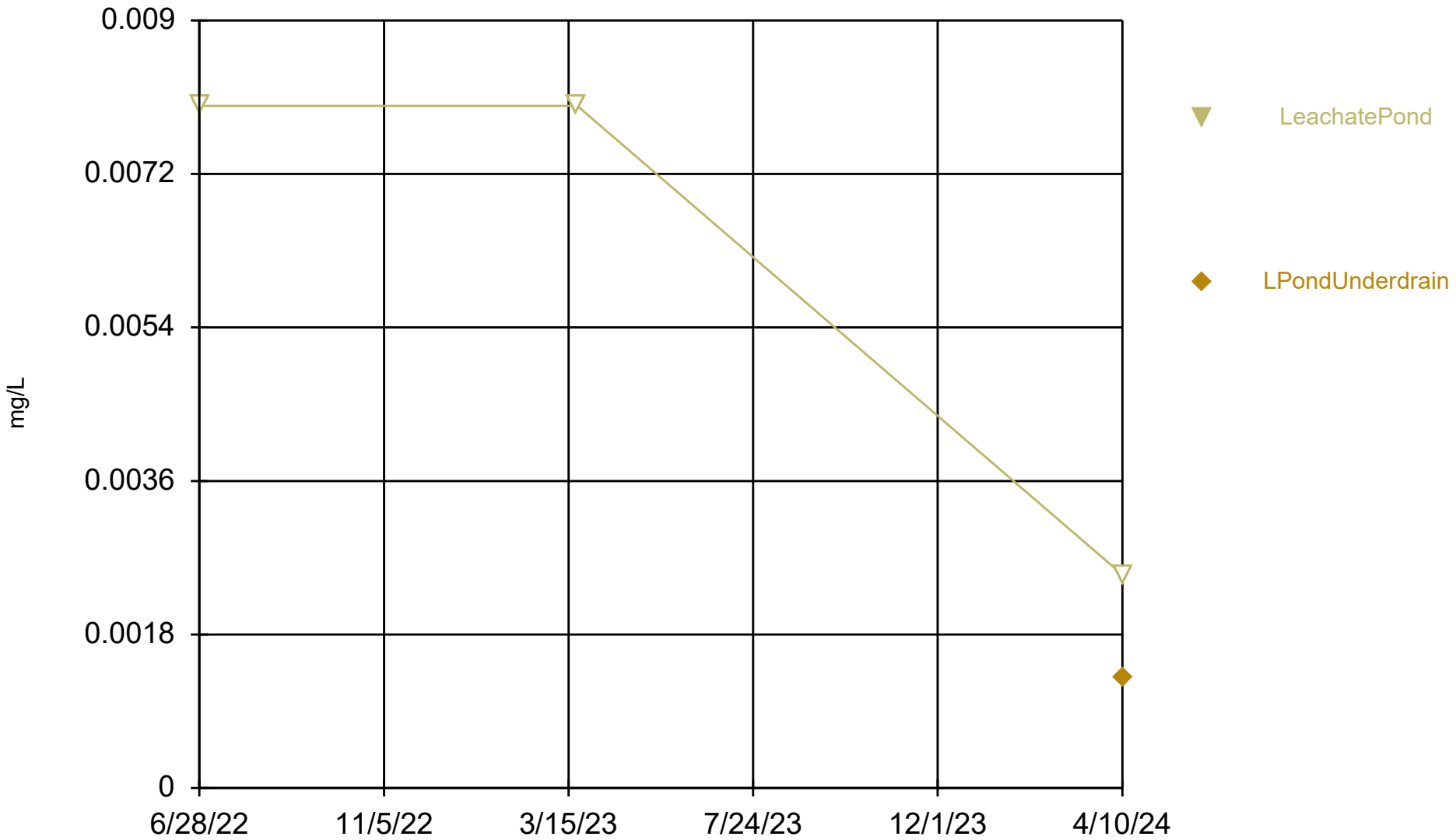
Hollow symbols indicate censored values.

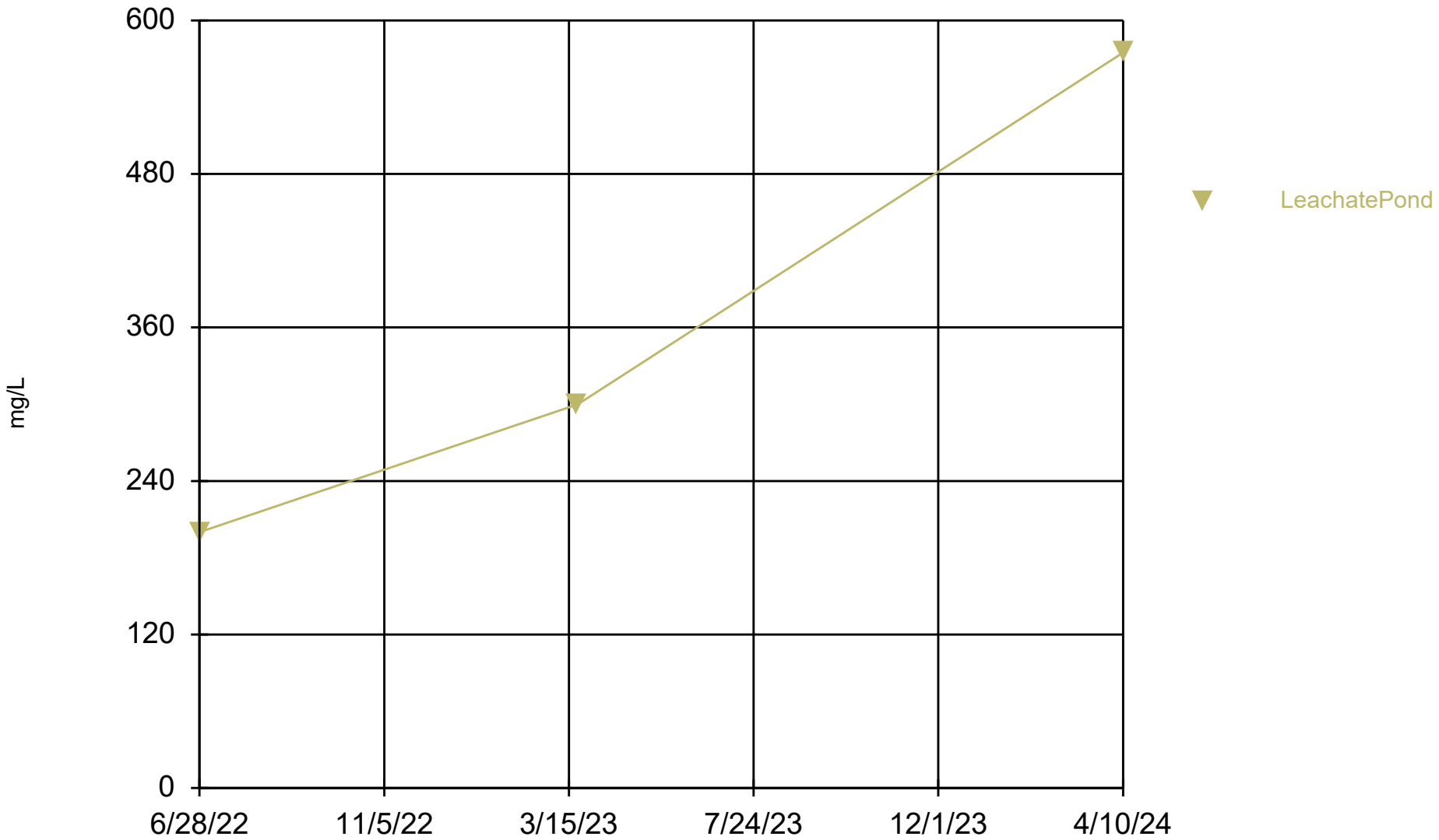
Time Series



Constituent: Selenium, Total Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Sodium, Total Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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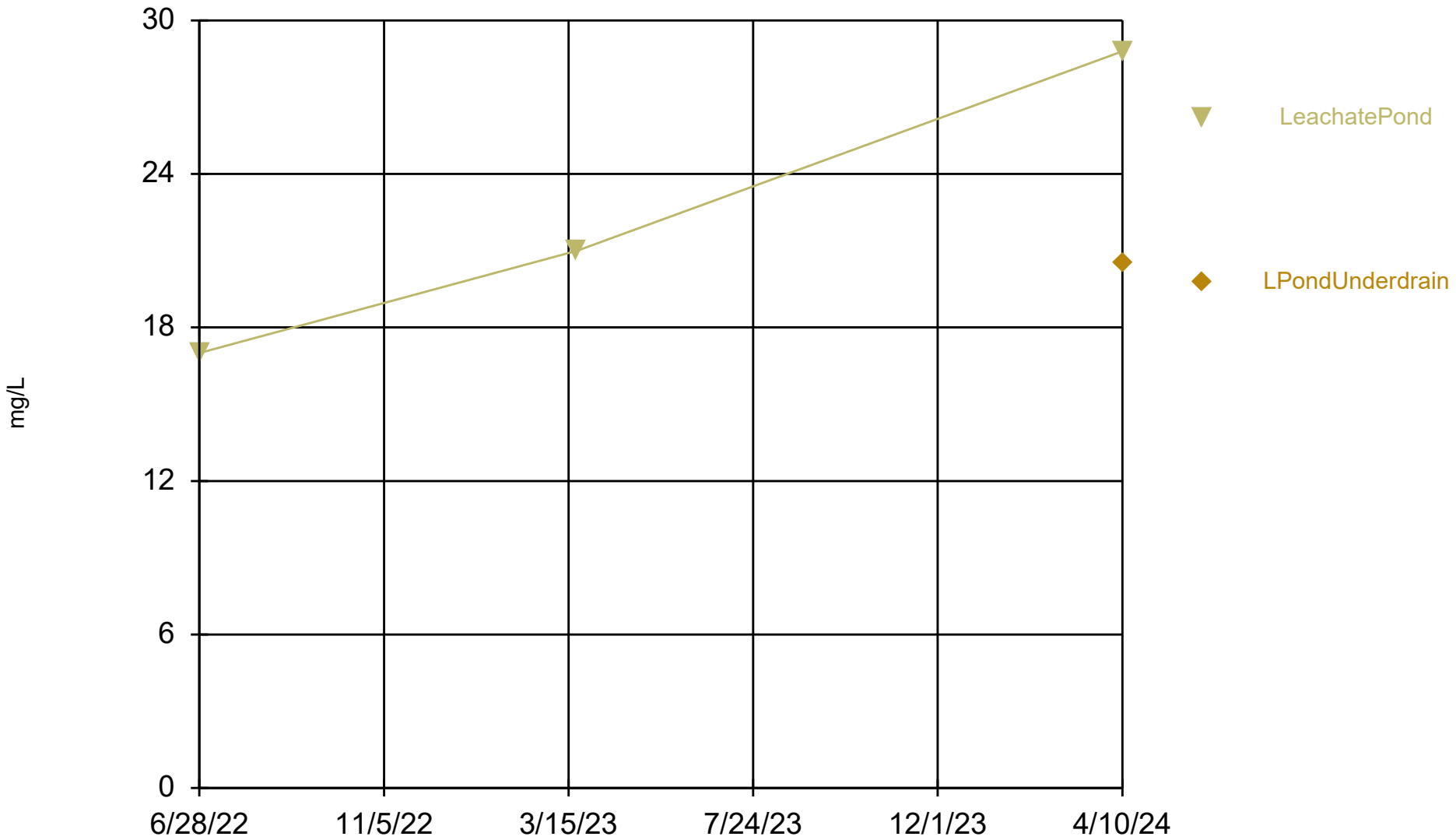
Time Series



Constituent: Sulfate Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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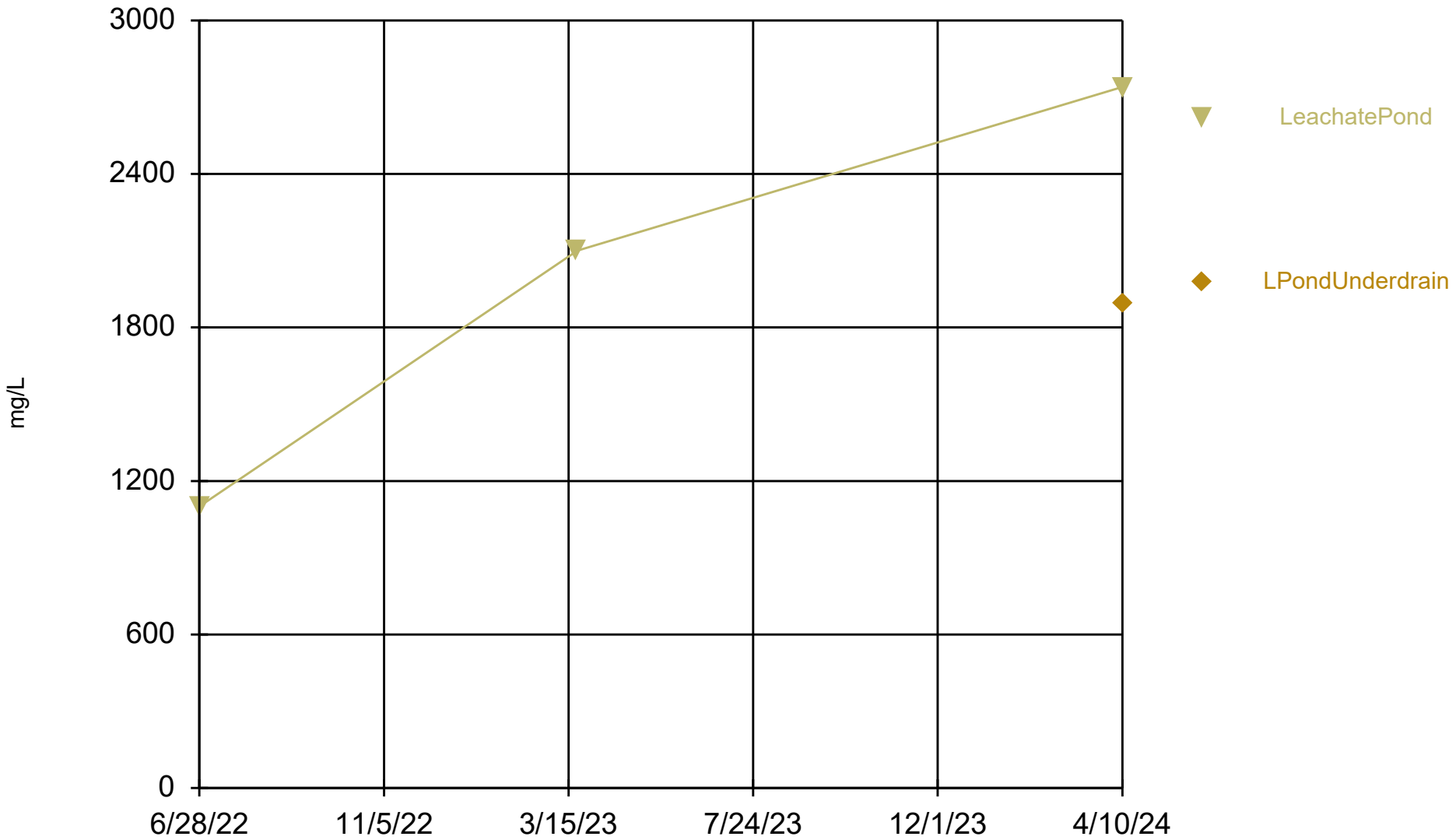
Time Series

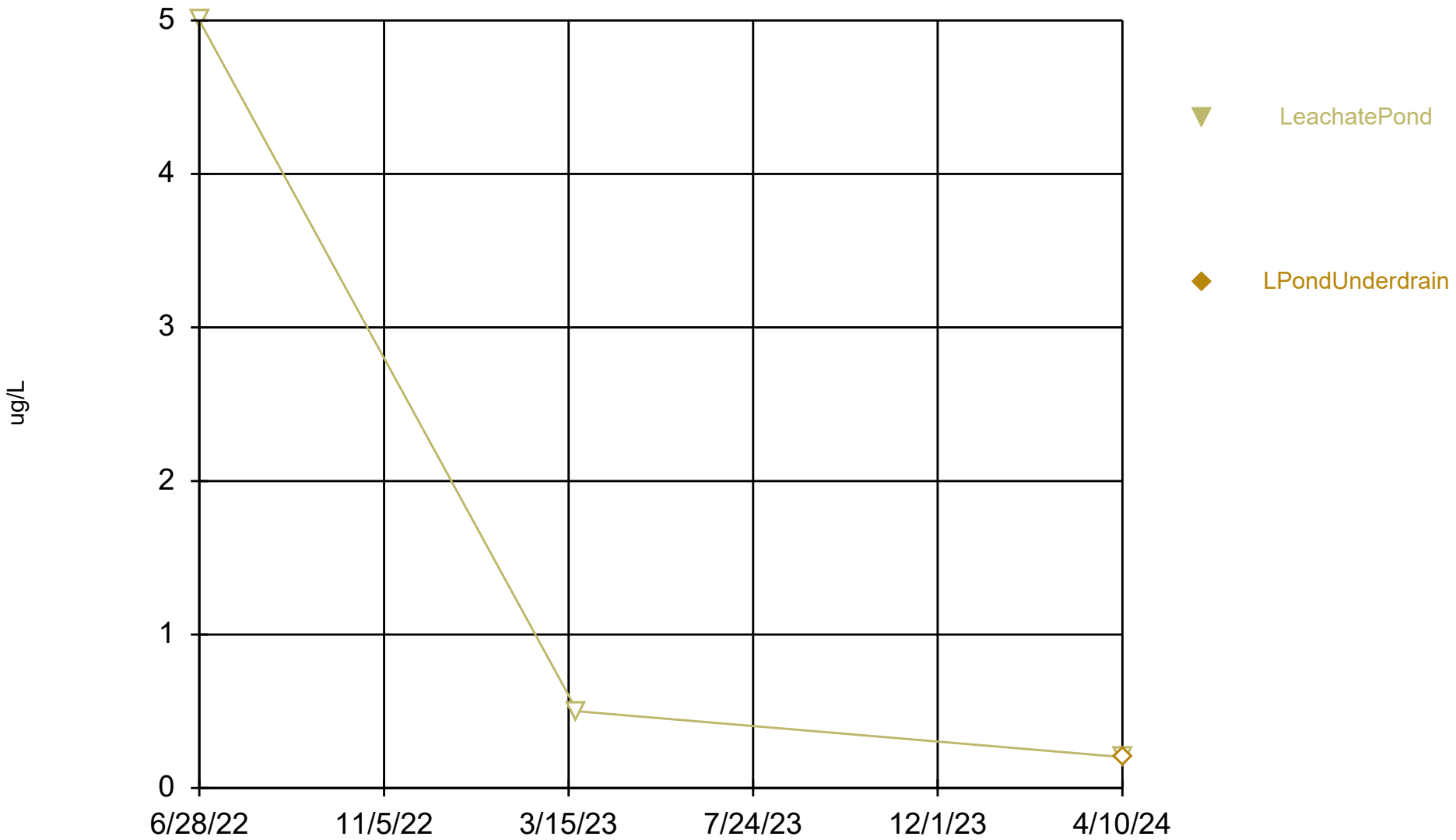


Constituent: TDS Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

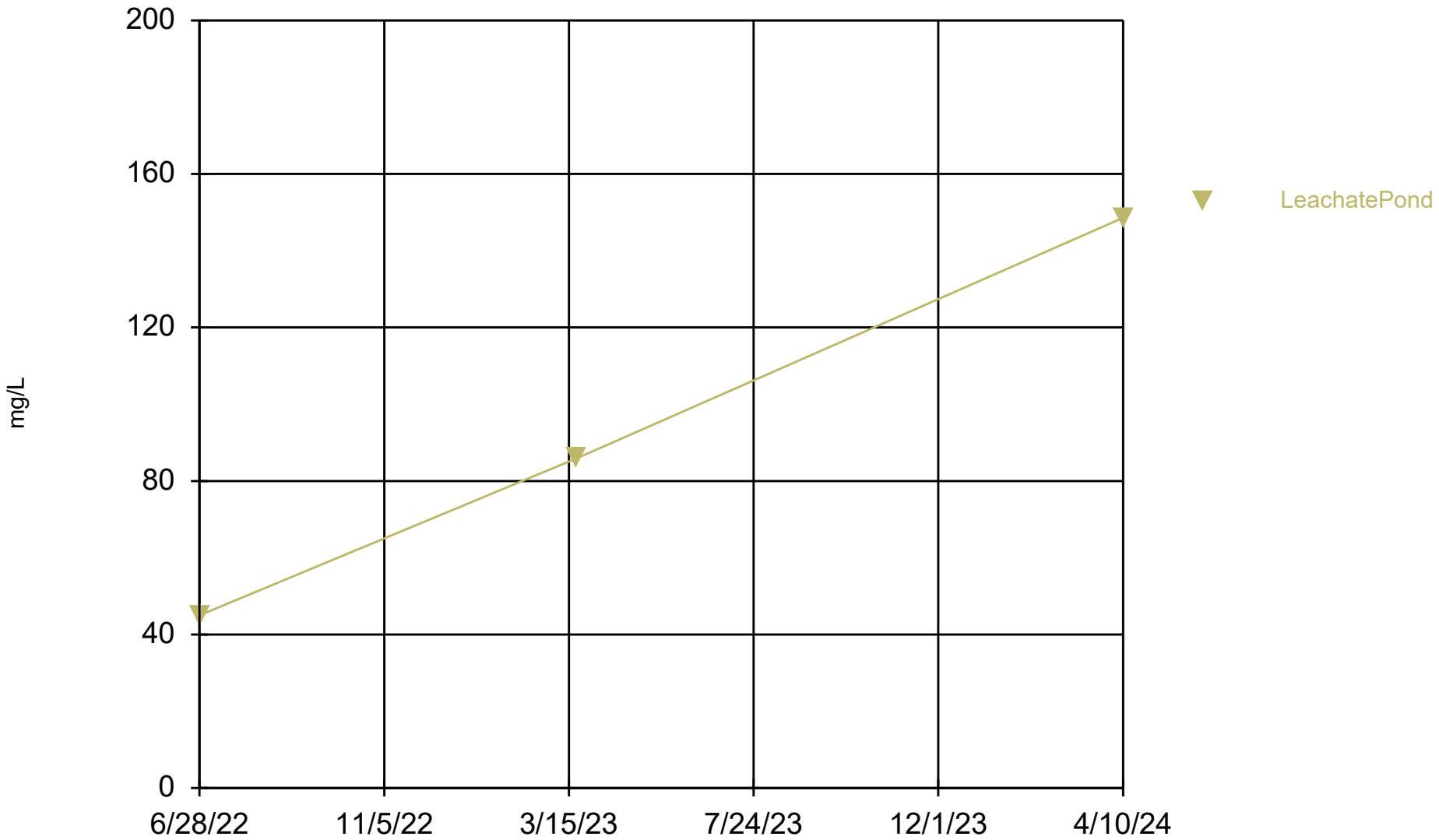
Time Series



Constituent: Tetrachloroethene Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: TOC Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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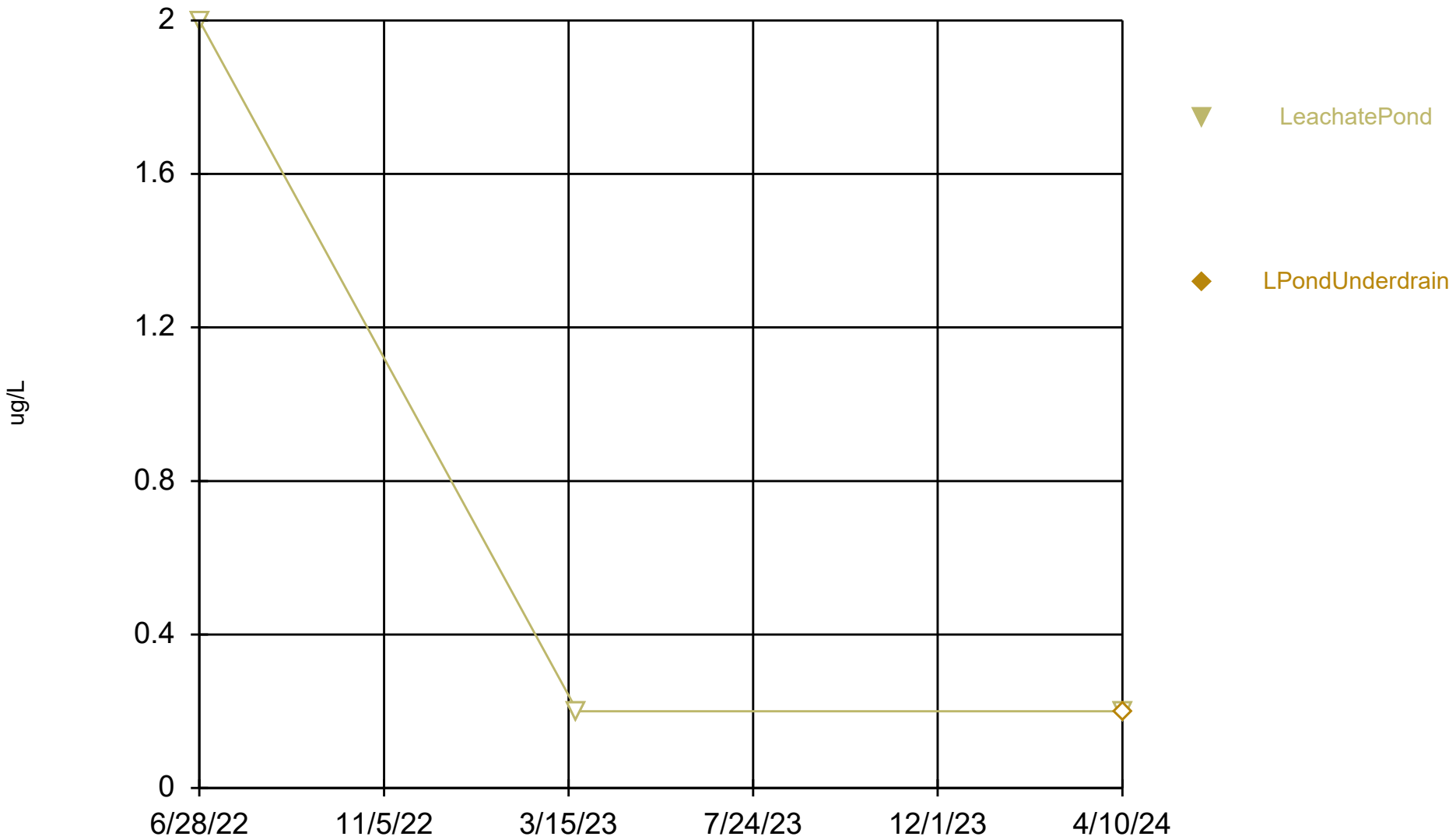
Hollow symbols indicate censored values.

Time Series



Constituent: trans-1,2-Dichloroethene Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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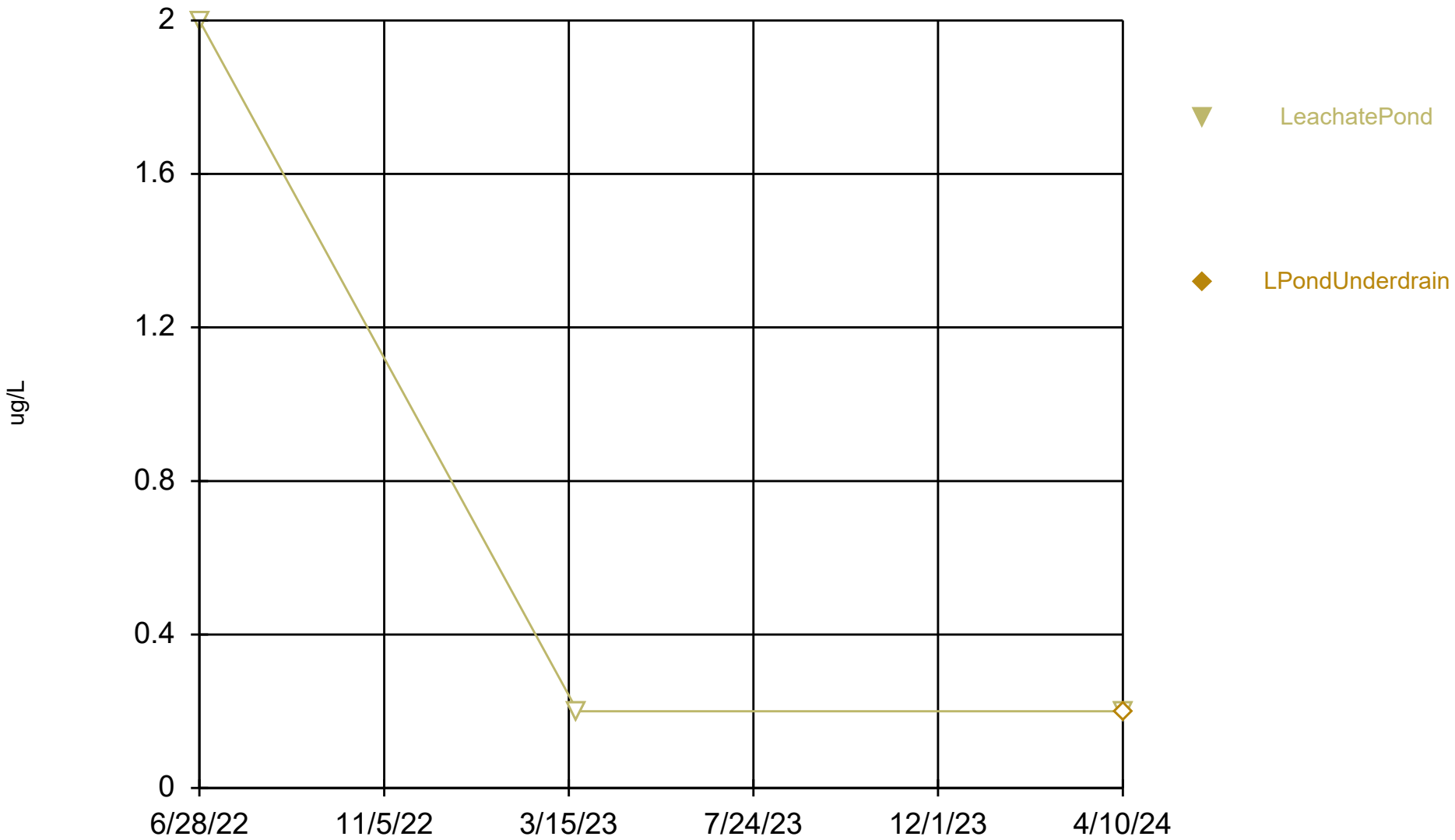
Hollow symbols indicate censored values.

Time Series

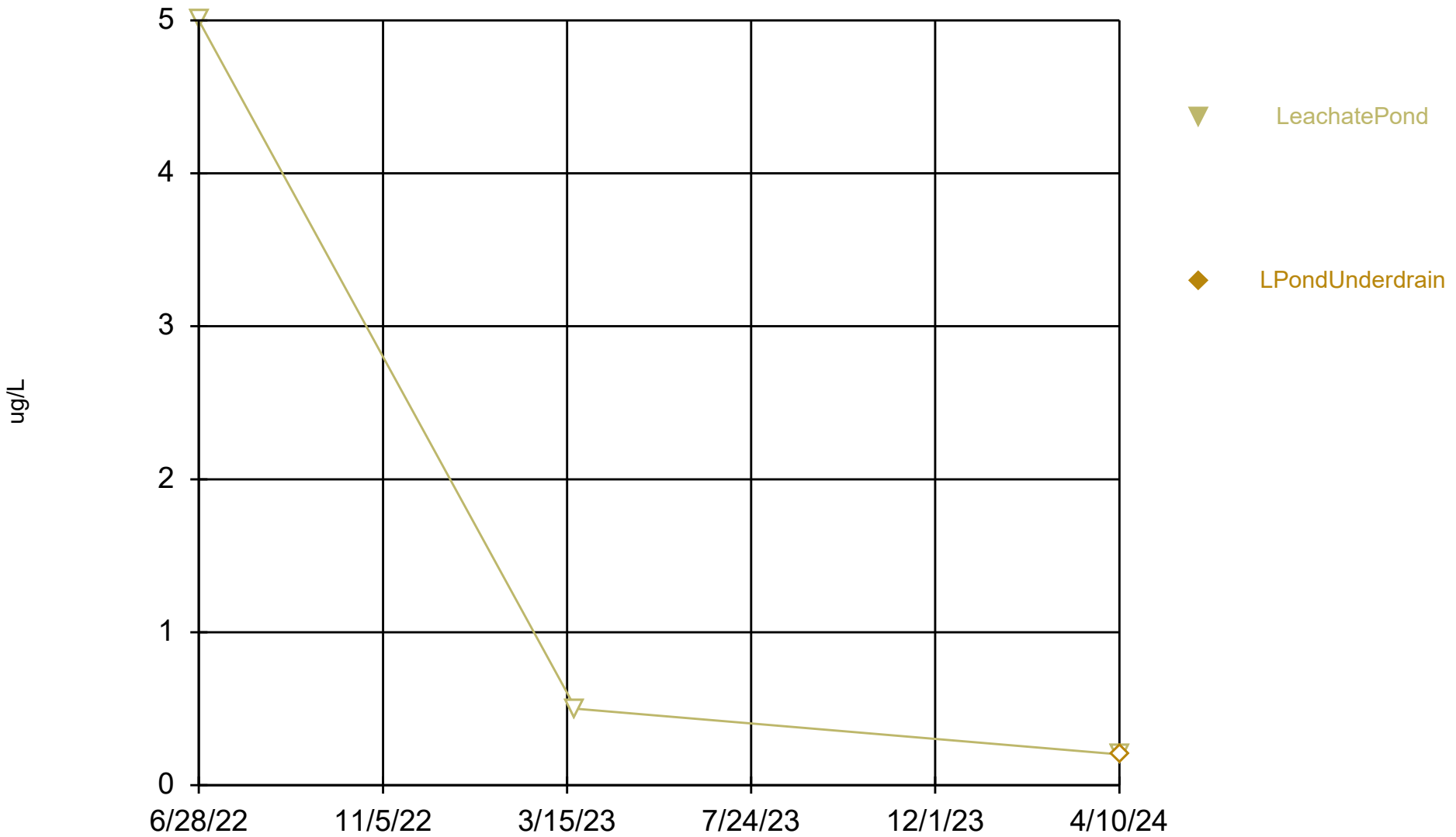


Constituent: Trichloroethene Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

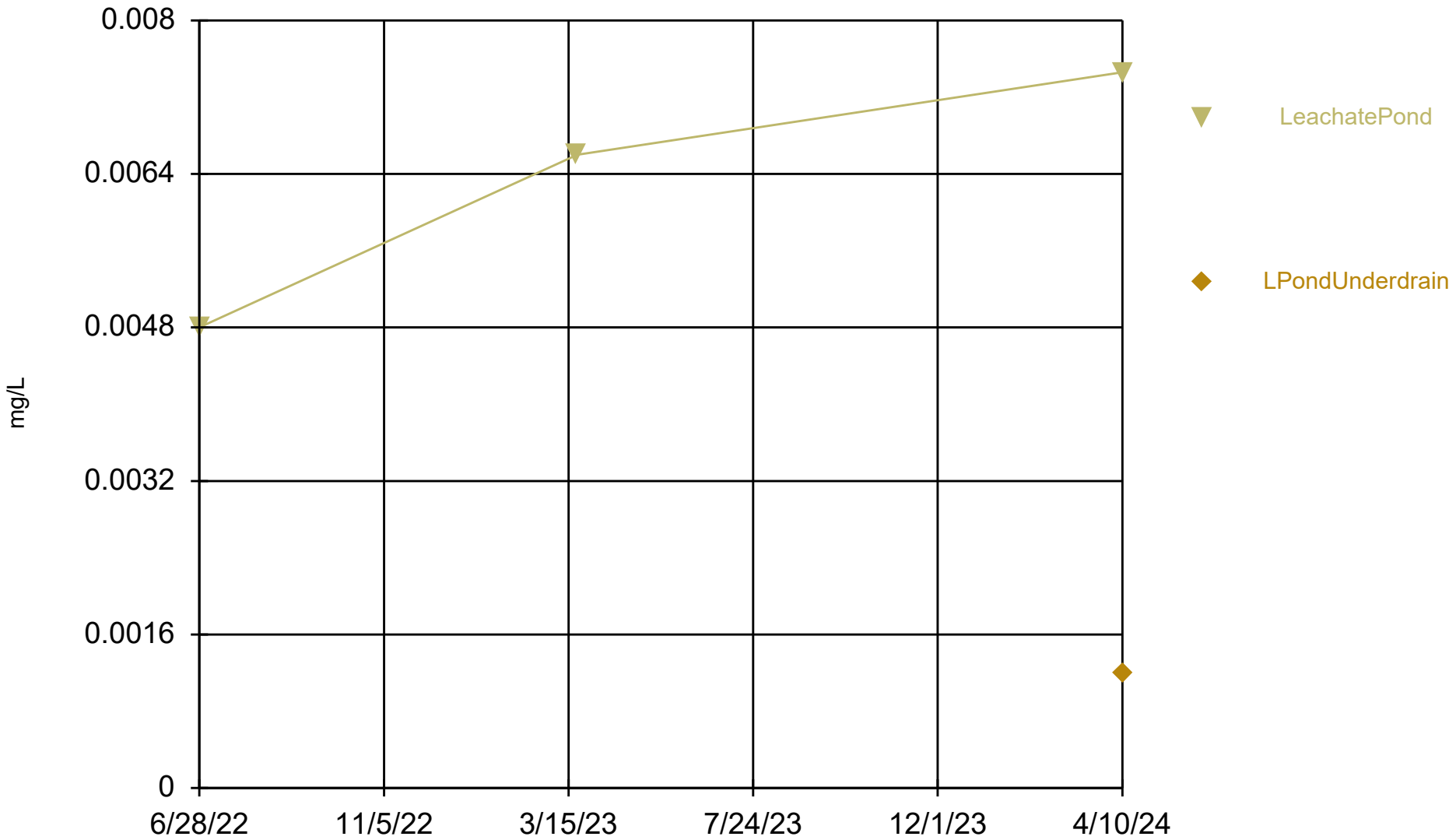
Time Series



Constituent: Trichlorofluoromethane Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate O

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Vanadium, Total Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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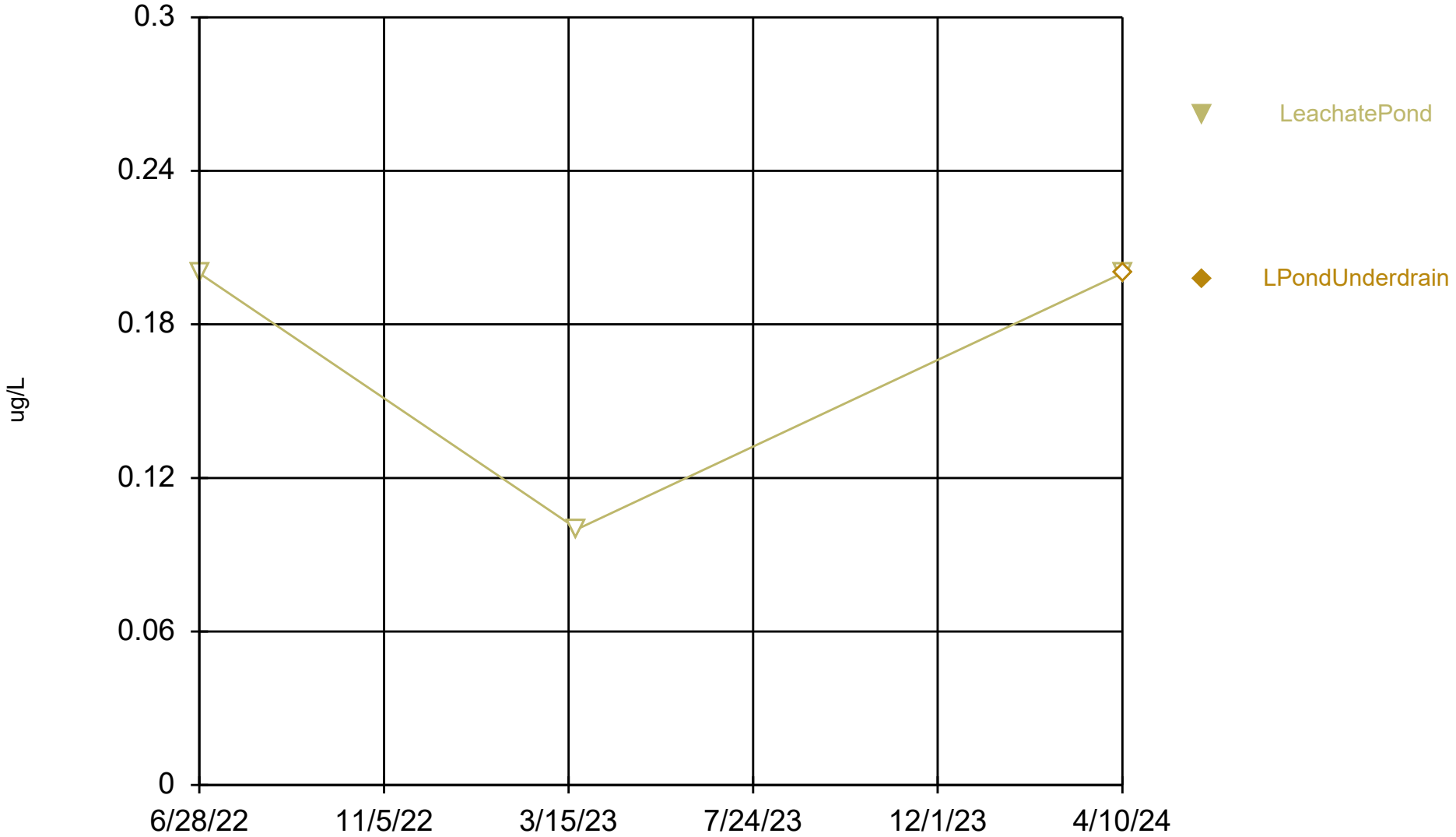
Hollow symbols indicate censored values.

Time Series



Constituent: Vinyl Chloride Analysis Run 2/2/2025 2:36 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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Hollow symbols indicate censored values.

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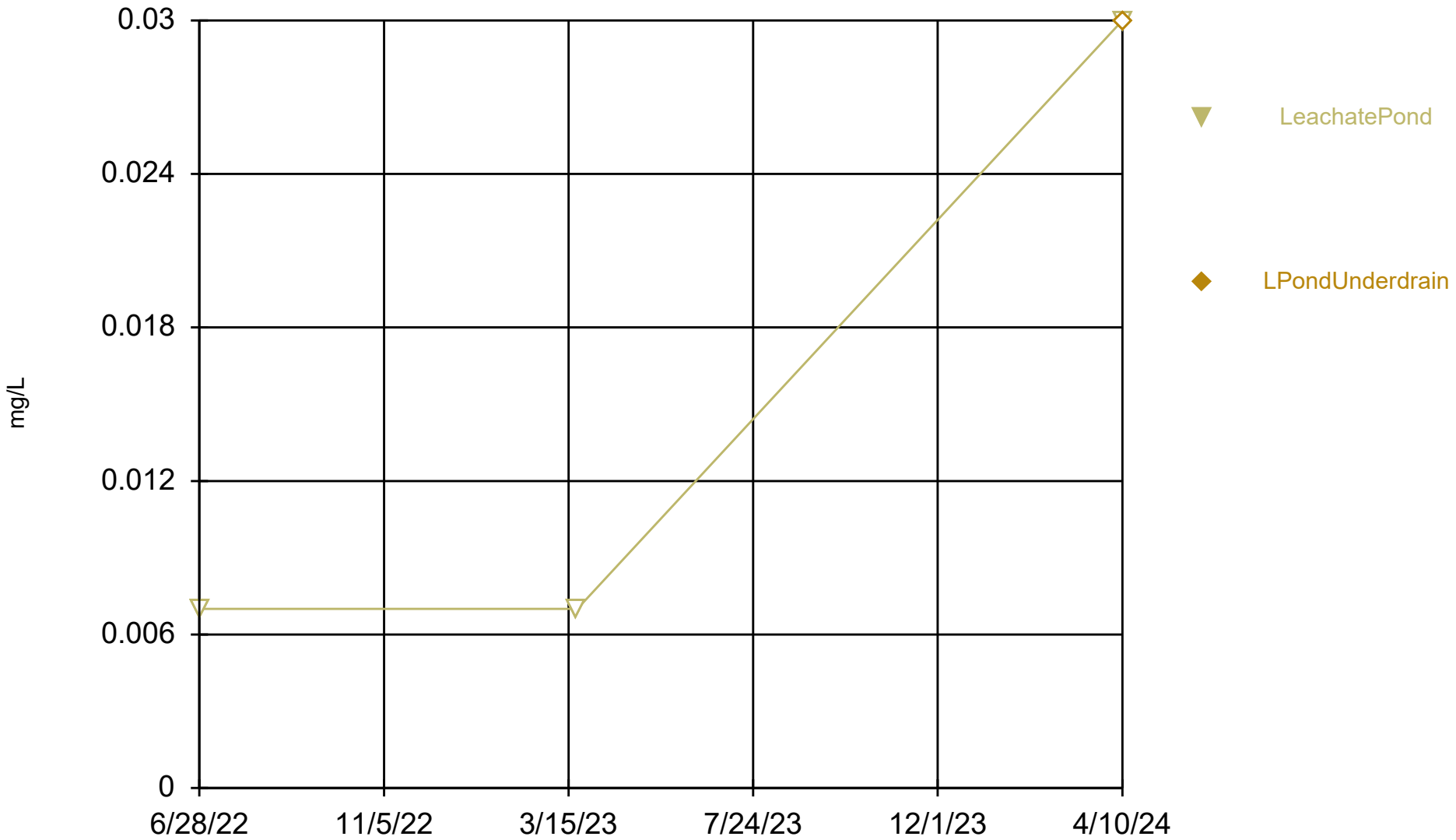

Constituent: Zinc, Total Analysis Run 2/2/2025 2:37 PM View: HRLF_TSP Set 1_Leachate Only

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

C-3

MW-10, Leachate Pond, and Pond Underdrain

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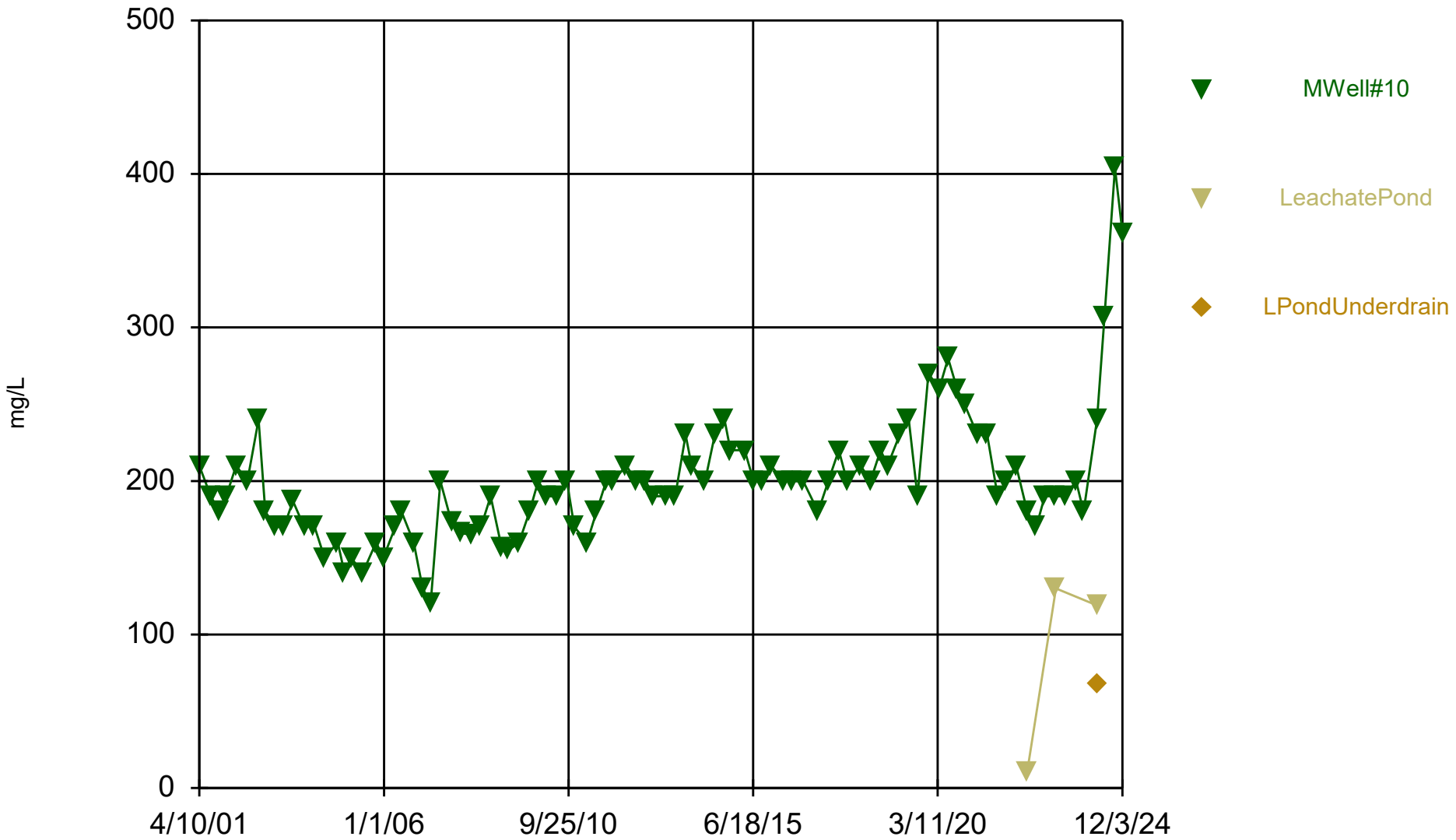
Time Series



Constituent: Calcium, Dissolved Analysis Run 2/5/2025 11:33 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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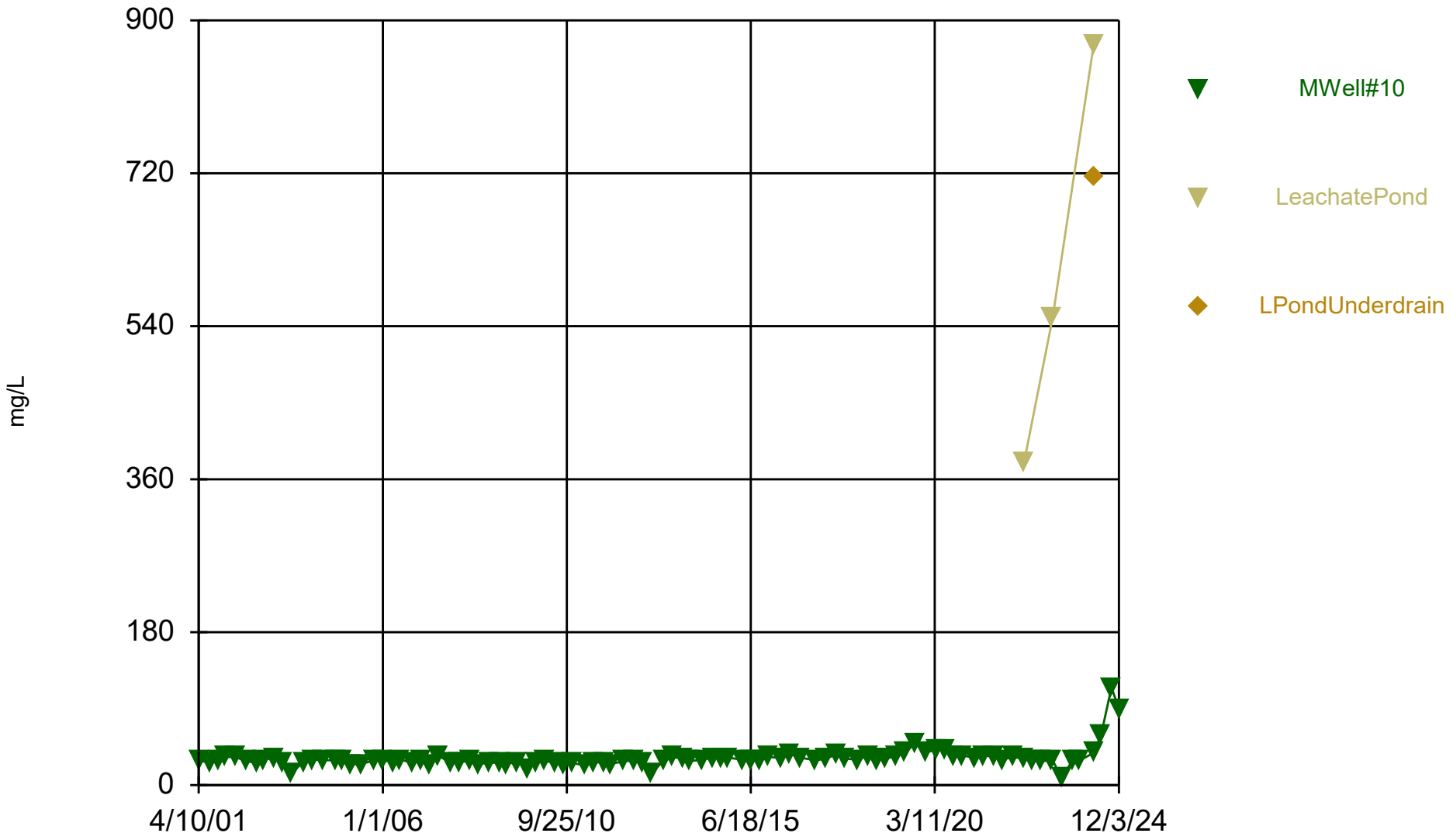
Time Series

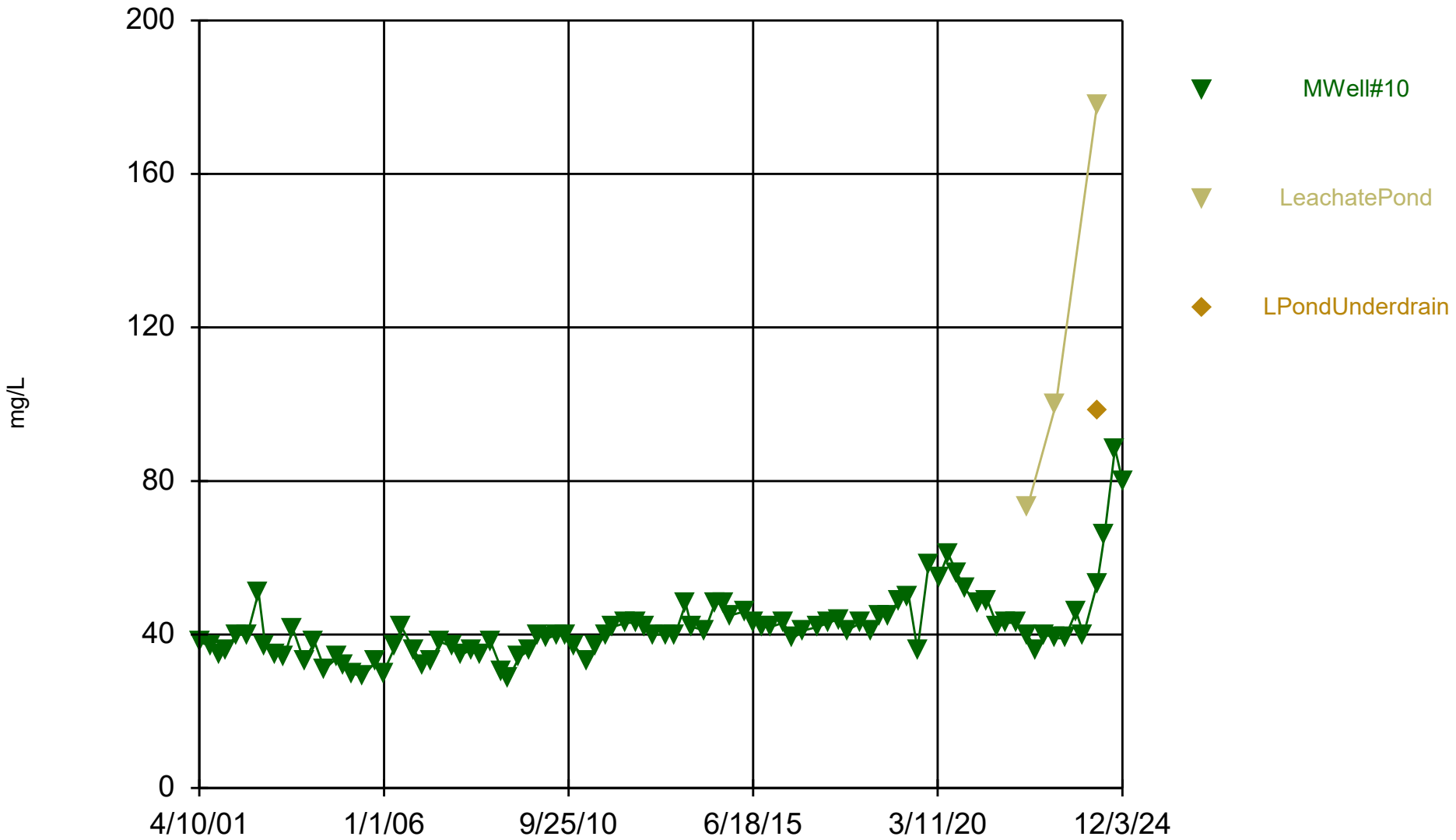


Constituent: Chloride Analysis Run 2/5/2025 11:33 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.

Time Series



Constituent: Magnesium, Dissolved Analysis Run 2/5/2025 11:33 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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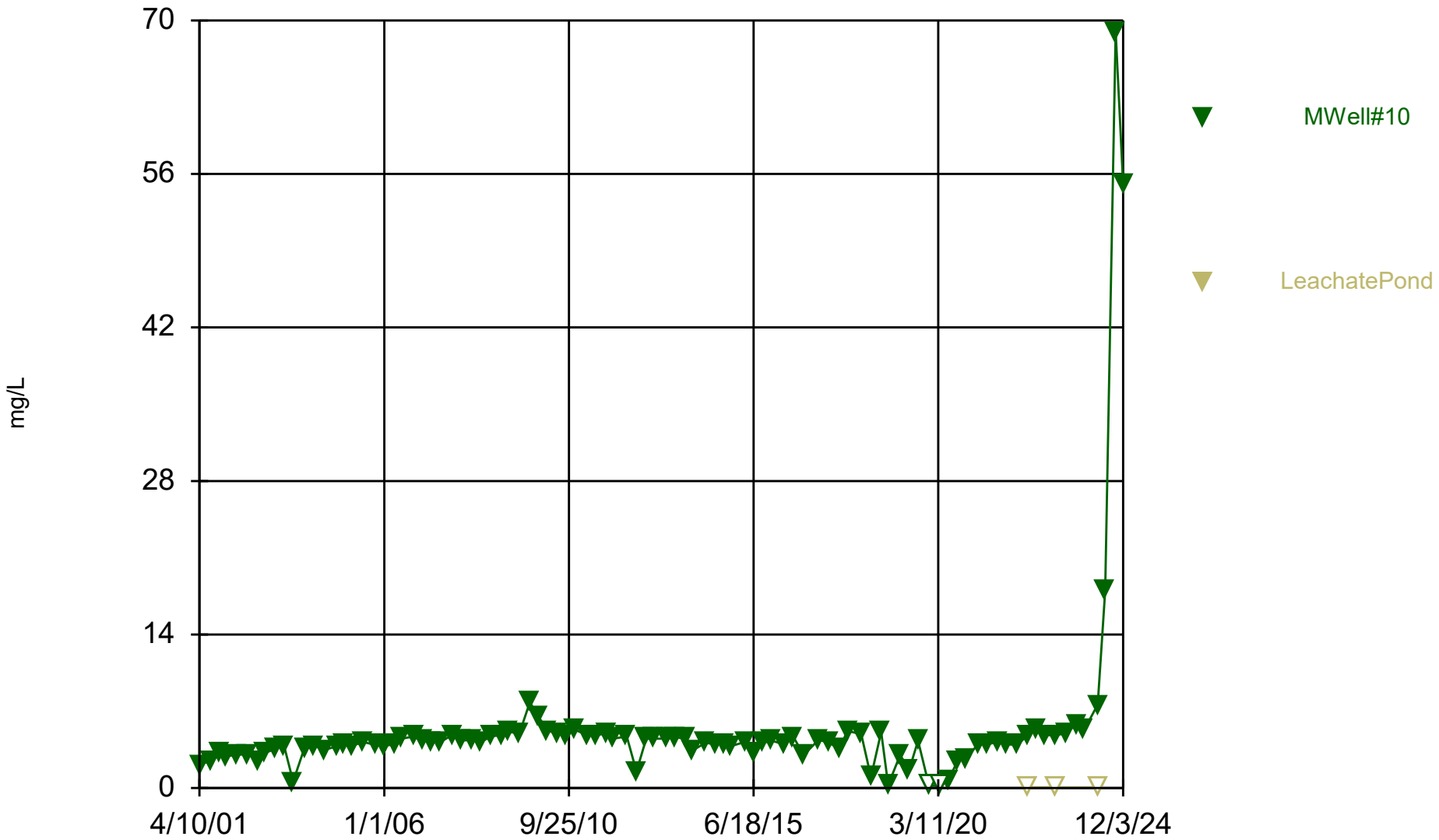
Hollow symbols indicate censored values.

Time Series



Constituent: Nitrate Nitrogen Analysis Run 2/5/2025 11:33 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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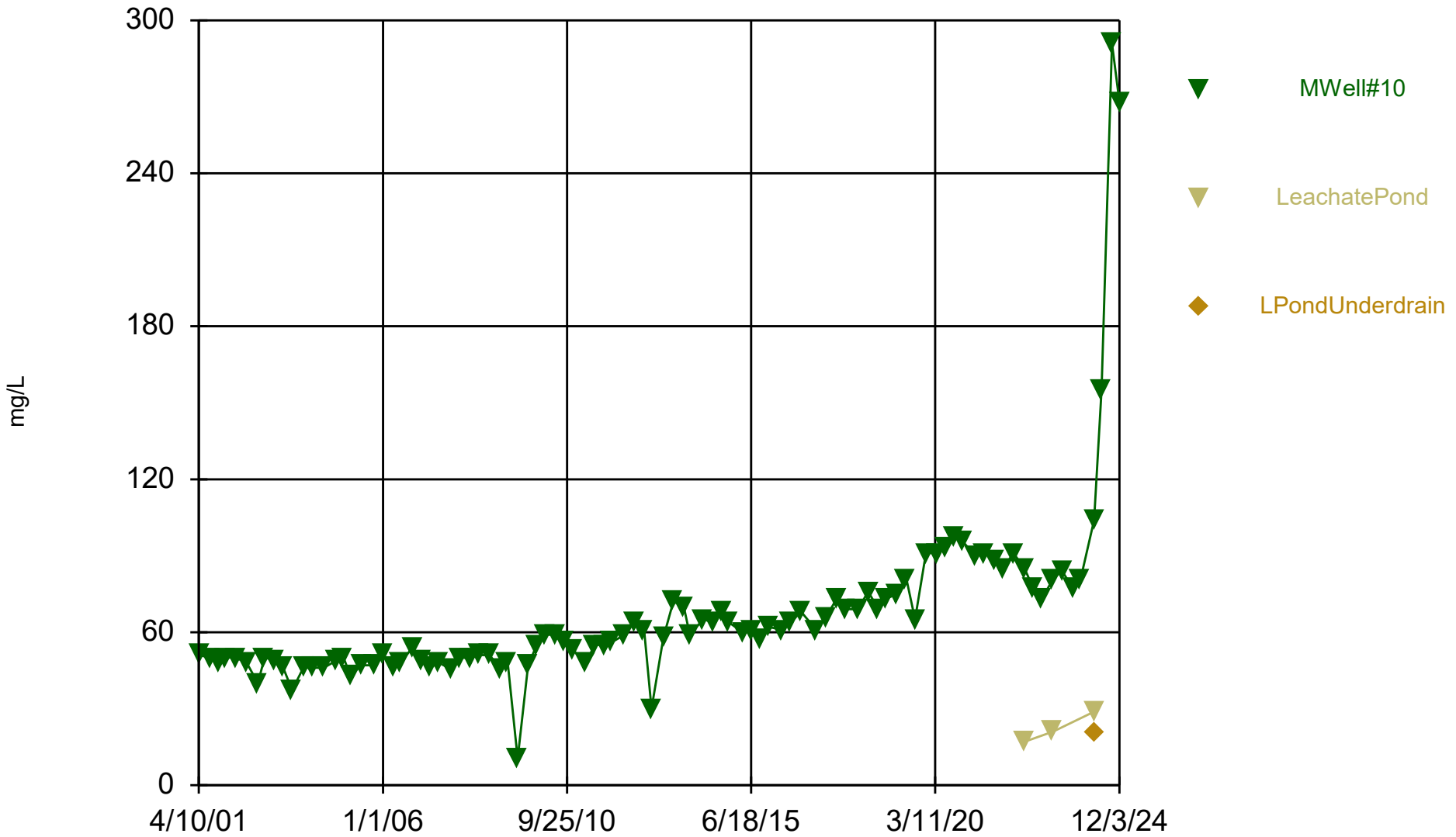
Time Series



Constituent: Sulfate Analysis Run 2/5/2025 11:33 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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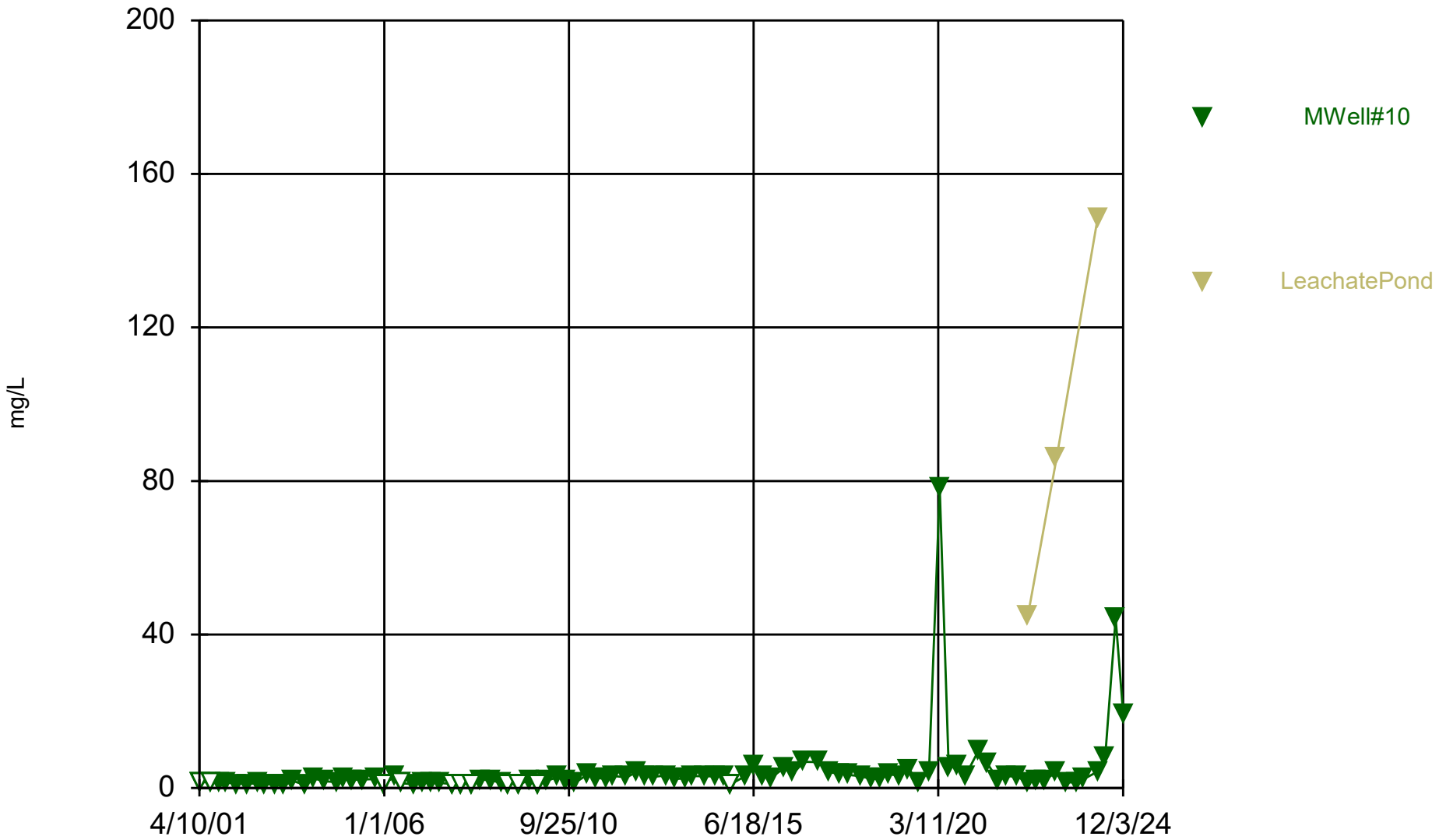
Hollow symbols indicate censored values.

Time Series



Constituent: TOC Analysis Run 2/5/2025 11:33 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Appendix D

Sen's Slope/ Mann Kendall Tests

D-1

10-Year Trends

Horn Rapids Landfill Trends for Volatile Organic Compounds, First Quarter 2020 through Fourth Quarter 2024

Constituent Name	Well	Slope	Calculated Statistic	Critical Value	Trend	N	% Non-detects	Normality	Transformation	Alpha	Method
1,1-Dichloroethane (ug/L)	MWell#4	0.2322	343	194	Yes	39	0	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#5	-0.6027	-434	-194	Yes	39	0	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#6	-0.4261	-517	-186	Yes	38	0	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#9	-0.1977	-401	-194	Yes	39	0	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#10	-0.5711	-507	-194	Yes	39	0	n/a	n/a	0.02	NP
1,2-Dichloroethane (ug/L)	MWell#5	-0.05906	-436	-194	Yes	39	7.692	n/a	n/a	0.02	NP
1,2-Dichloroethane (ug/L)	MWell#6	-0.03045	-405	-186	Yes	38	10.53	n/a	n/a	0.02	NP
1,2-Dichloroethane (ug/L)	MWell#10	-0.01377	-213	-194	Yes	39	2.564	n/a	n/a	0.02	NP
1,2-Dichloropropane (ug/L)	MWell#5	-0.02963	-386	-194	Yes	39	15.38	n/a	n/a	0.02	NP
1,2-Dichloropropane (ug/L)	MWell#6	-0.02388	-378	-186	Yes	38	18.42	n/a	n/a	0.02	NP
Benzene (ug/L)	MWell#6	-0.02347	-361	-186	Yes	38	7.895	n/a	n/a	0.02	NP
Benzene (ug/L)	MWell#10	-0.01541	-451	-194	Yes	39	41.03	n/a	n/a	0.02	NP
Chloroform (ug/L)	MWell#3	0.6869	463	171	Yes	36	0	n/a	n/a	0.02	NP
Chloroform (ug/L)	MWell#4	-0.01121	-199	-194	Yes	39	0	n/a	n/a	0.02	NP
Chloroform (ug/L)	MWell#9	0.06353	267	194	Yes	39	15.38	n/a	n/a	0.02	NP
Chloroform (ug/L)	MWell#10	-0.03989	-382	-194	Yes	39	0	n/a	n/a	0.02	NP
cis-1,2-Dichloroethene (ug/L)	MWell#4	0.3499	493	194	Yes	39	0	n/a	n/a	0.02	NP
cis-1,2-Dichloroethene (ug/L)	MWell#5	-1.952	-341	-194	Yes	39	0	n/a	n/a	0.02	NP
cis-1,2-Dichloroethene (ug/L)	MWell#6	-2.955	-424	-186	Yes	38	0	n/a	n/a	0.02	NP
Tetrachloroethene (ug/L)	MWell#5	-0.4991	-212	-194	Yes	39	0	n/a	n/a	0.02	NP
Tetrachloroethene (ug/L)	MWell#6	-2.287	-434	-186	Yes	38	0	n/a	n/a	0.02	NP
Tetrachloroethene (ug/L)	MWell#10	-0.1827	-258	-194	Yes	39	0	n/a	n/a	0.02	NP
trans-1,2-Dichloroethene (ug/L)	MWell#5	-0.03823	-340	-194	Yes	39	15.38	n/a	n/a	0.02	NP
trans-1,2-Dichloroethene (ug/L)	MWell#6	-0.1451	-531	-186	Yes	38	7.895	n/a	n/a	0.02	NP
Trichloroethene (ug/L)	MWell#4	0.05196	445	194	Yes	39	25.64	n/a	n/a	0.02	NP
Trichloroethene (ug/L)	MWell#5	-0.2622	-305	-194	Yes	39	0	n/a	n/a	0.02	NP
Trichloroethene (ug/L)	MWell#6	-1.039	-476	-186	Yes	38	0	n/a	n/a	0.02	NP
Vinyl Chloride (ug/L)	MWell#5	-0.5199	-452	-194	Yes	39	2.564	n/a	n/a	0.02	NP
Vinyl Chloride (ug/L)	MWell#6	-0.3324	-460	-186	Yes	38	13.16	n/a	n/a	0.02	NP
Vinyl Chloride (ug/L)	MWell#10	-0.08432	-408	-194	Yes	39	10.26	n/a	n/a	0.02	NP

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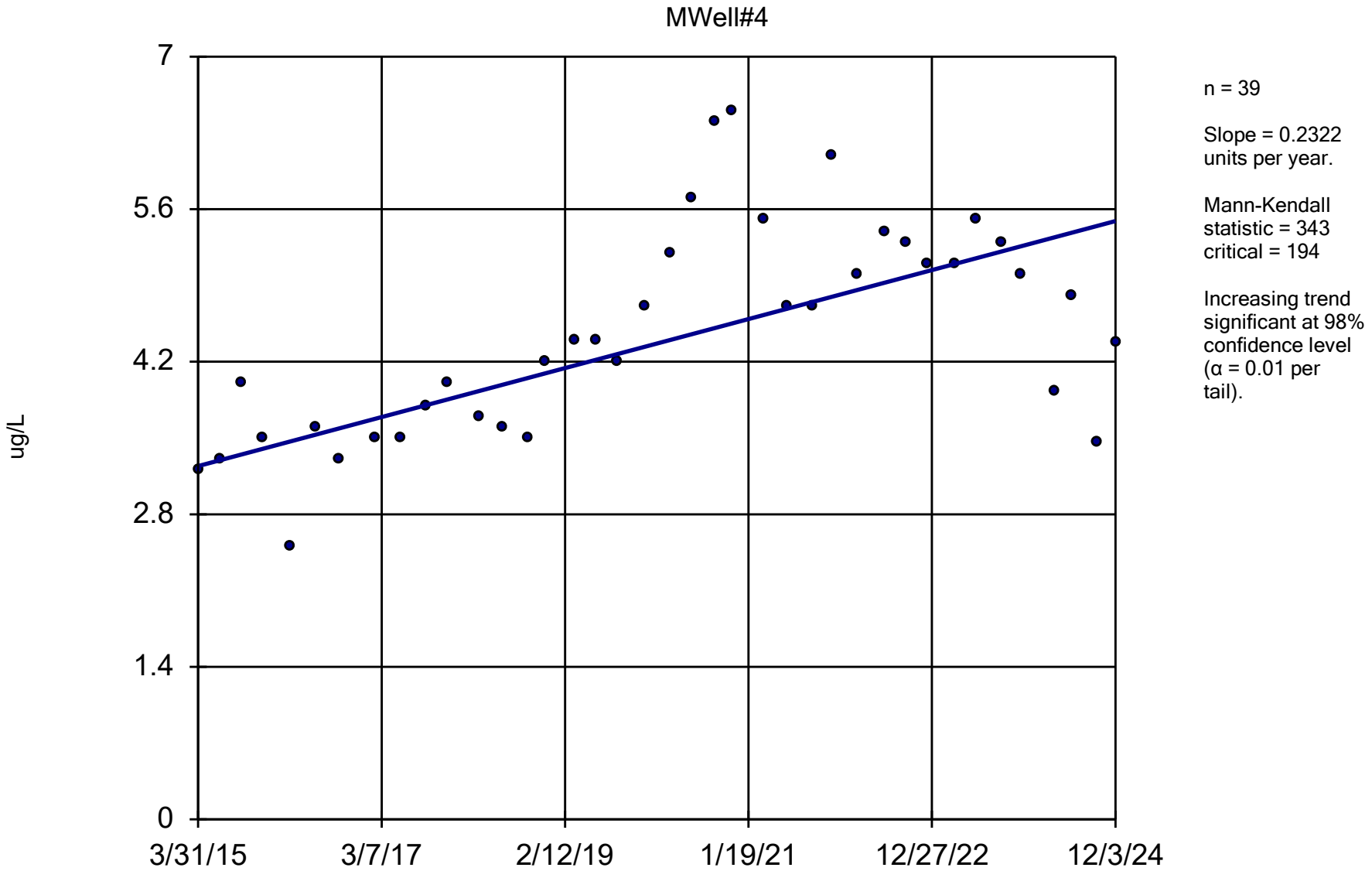
Sen's Slope Estimator

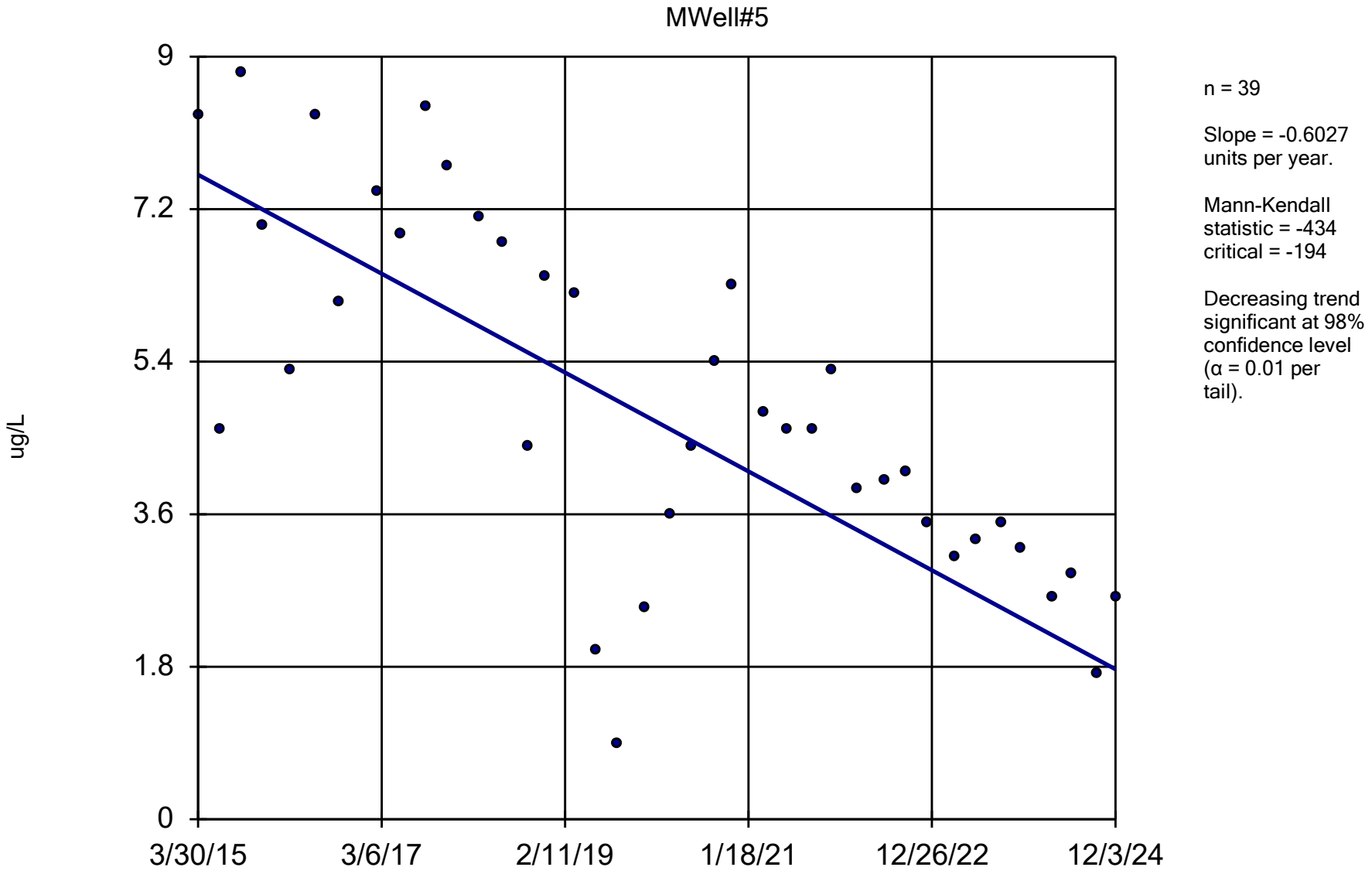


Constituent: 1,1-Dichloroethane Analysis Run 2/2/2025 4:30 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.

Sen's Slope Estimator



Constituent: 1,1-Dichloroethane Analysis Run 2/2/2025 4:30 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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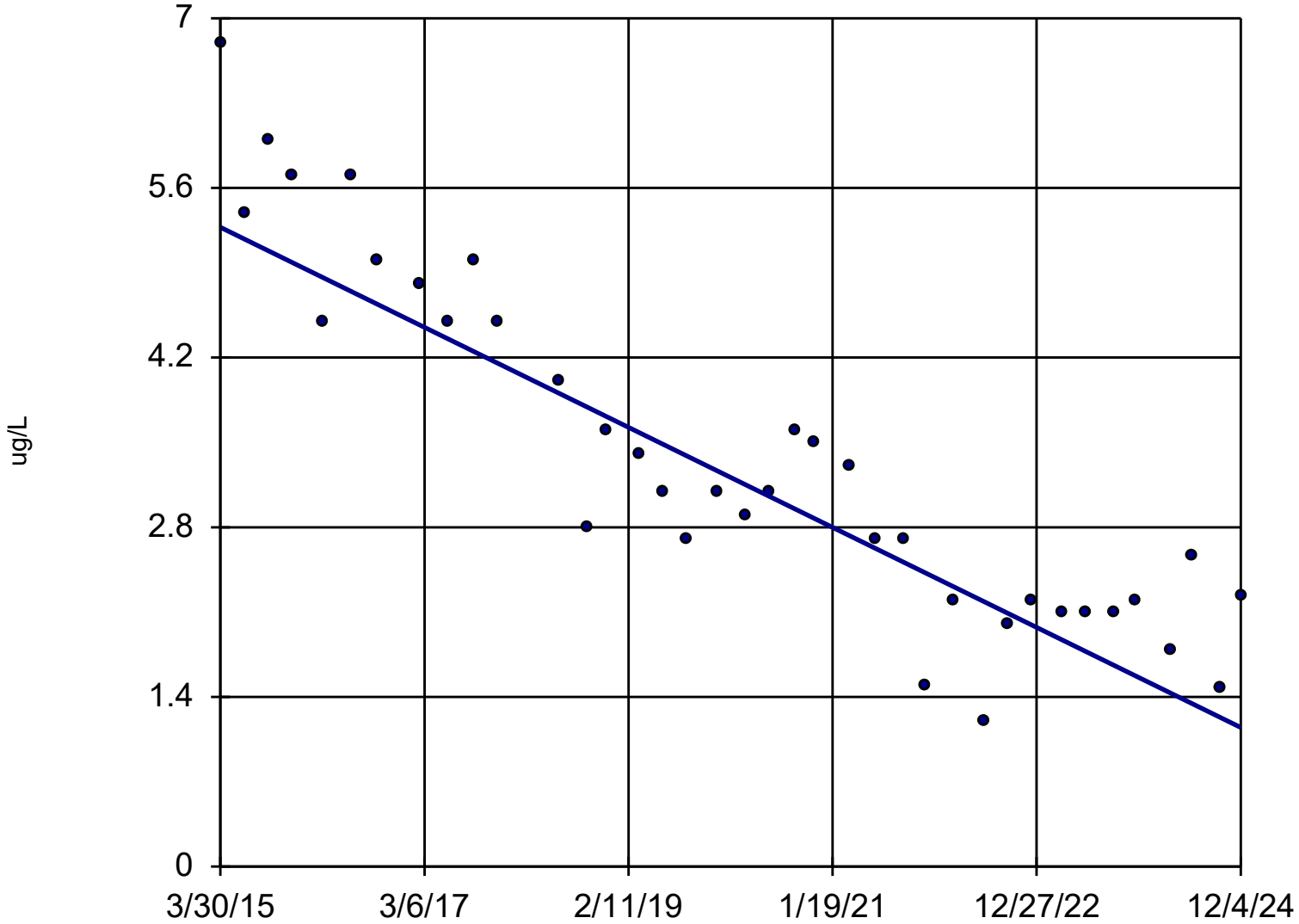
Sen's Slope Estimator

MWell#6



n = 38

Slope = -0.4261 units per year.

Mann-Kendall statistic = -517
critical = -186

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: 1,1-Dichloroethane Analysis Run 2/2/2025 4:30 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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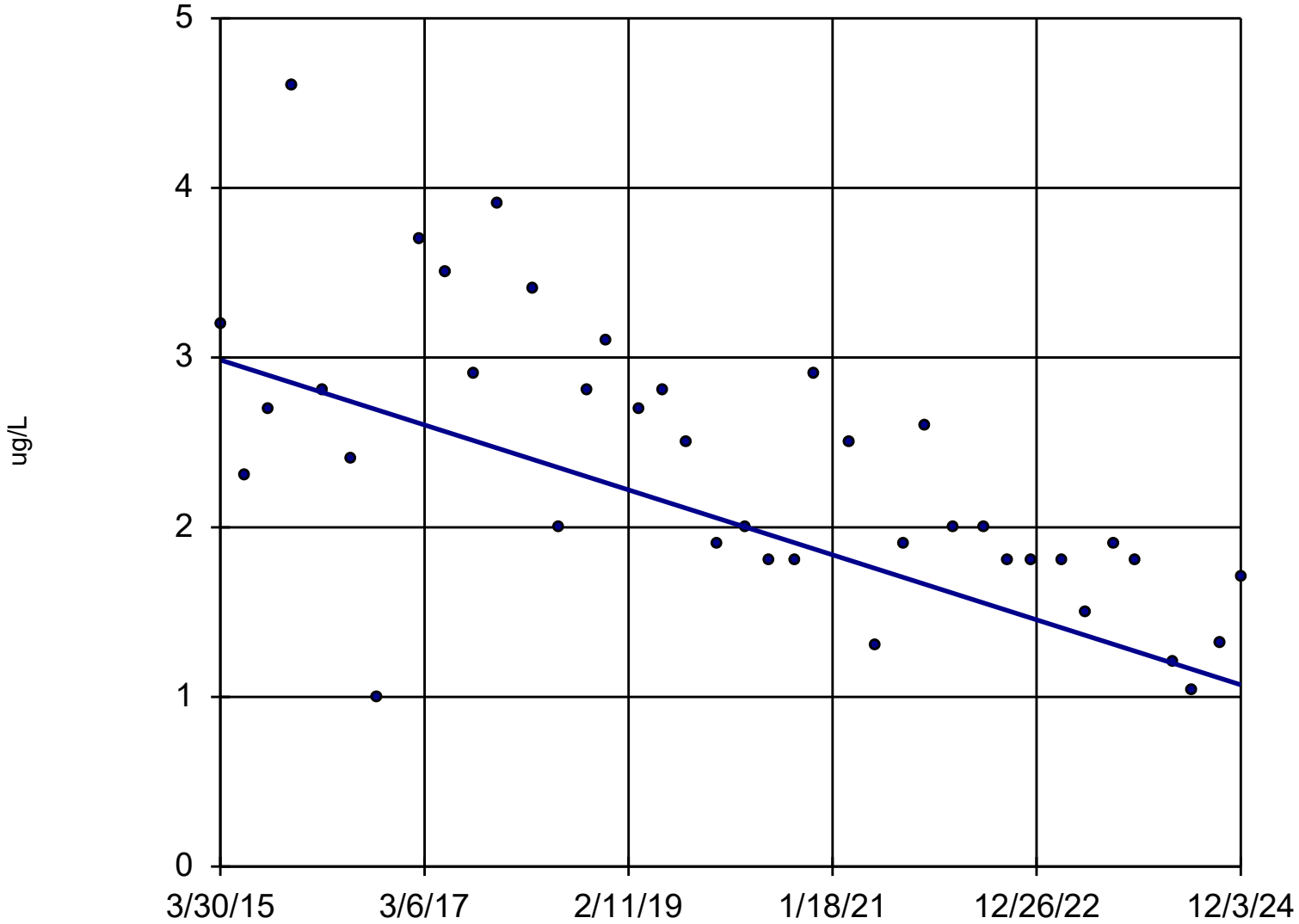
Sen's Slope Estimator

MWell#9



n = 39

Slope = -0.1977 units per year.

Mann-Kendall statistic = -401
critical = -194

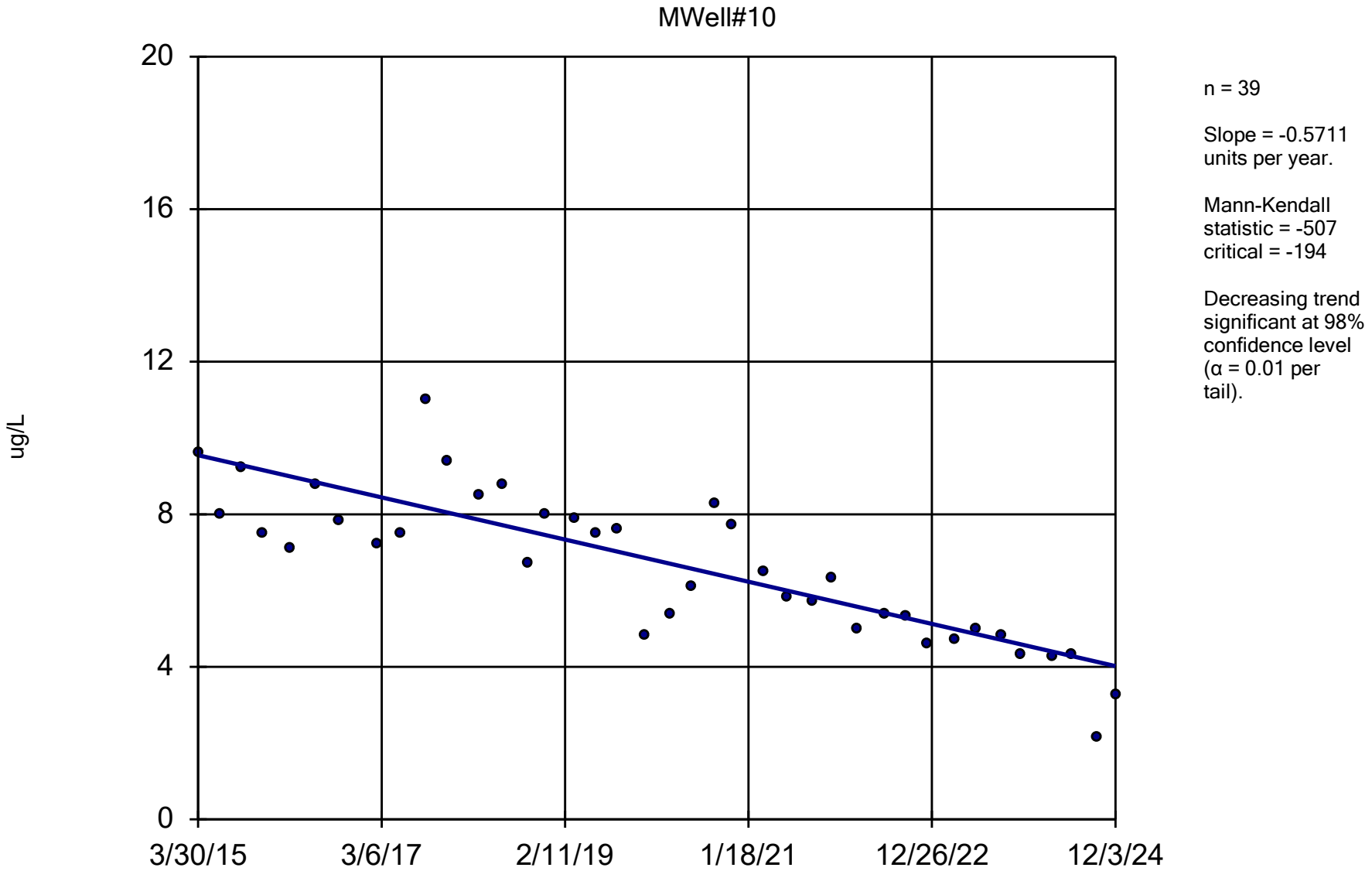
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: 1,1-Dichloroethane Analysis Run 2/2/2025 4:30 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.

Sen's Slope Estimator



Constituent: 1,1-Dichloroethane Analysis Run 2/2/2025 4:30 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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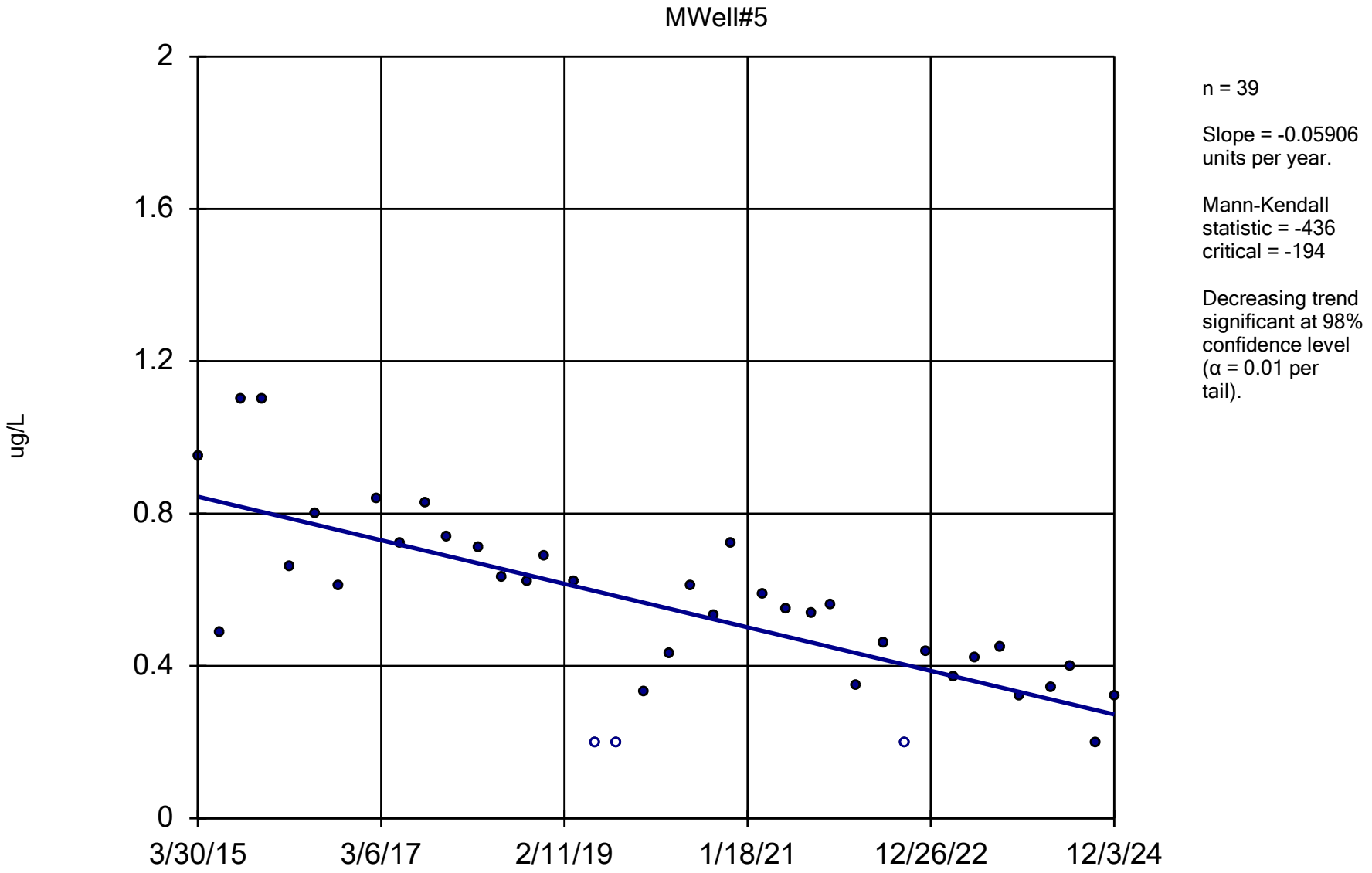
Hollow symbols indicate censored values.

Sen's Slope Estimator



Constituent: 1,2-Dichloroethane Analysis Run 2/2/2025 4:30 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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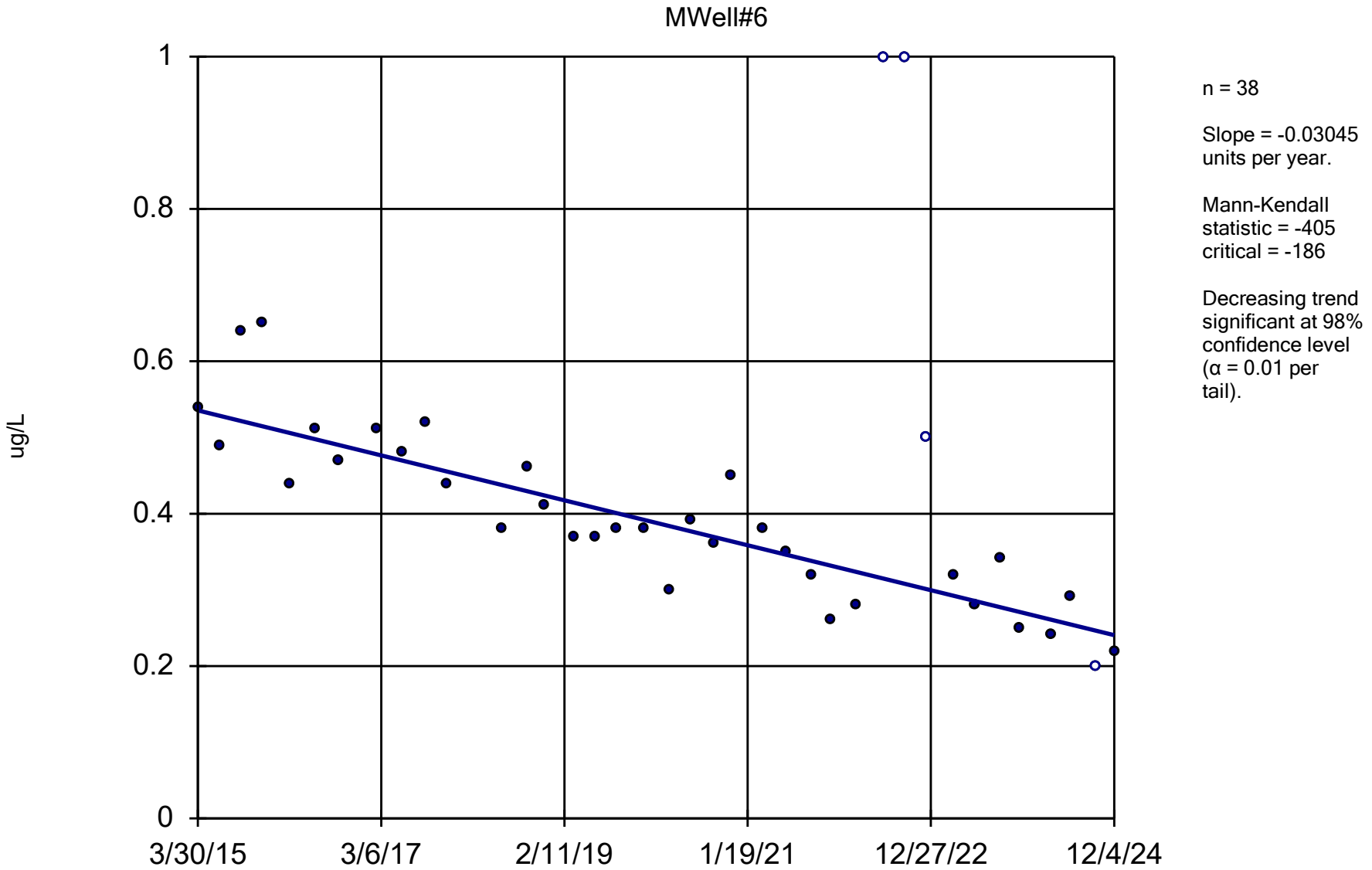
Hollow symbols indicate censored values.

Sen's Slope Estimator



Constituent: 1,2-Dichloroethane Analysis Run 2/2/2025 4:30 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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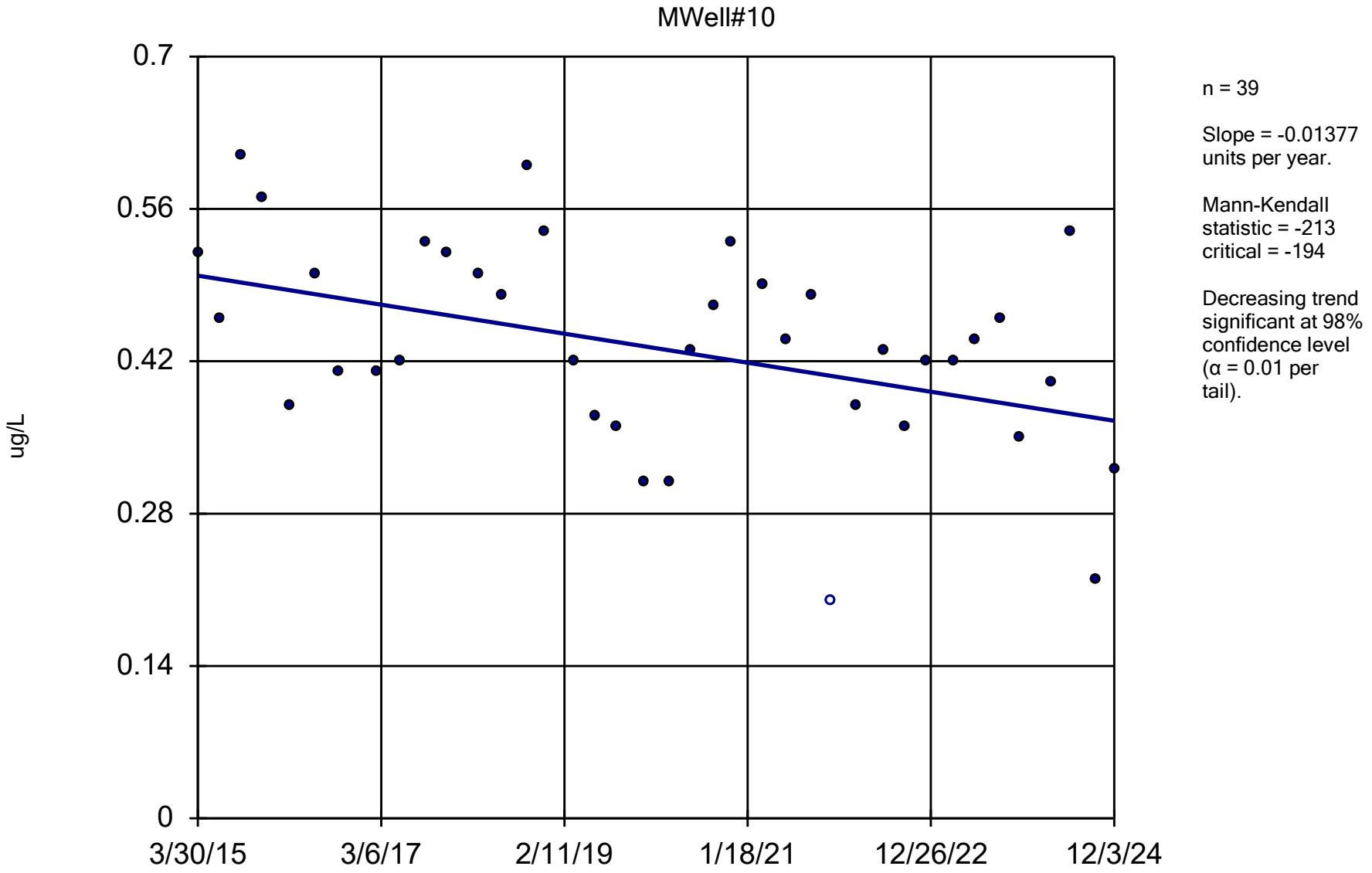
Hollow symbols indicate censored values.

Sen's Slope Estimator



Constituent: 1,2-Dichloroethane Analysis Run 2/2/2025 4:30 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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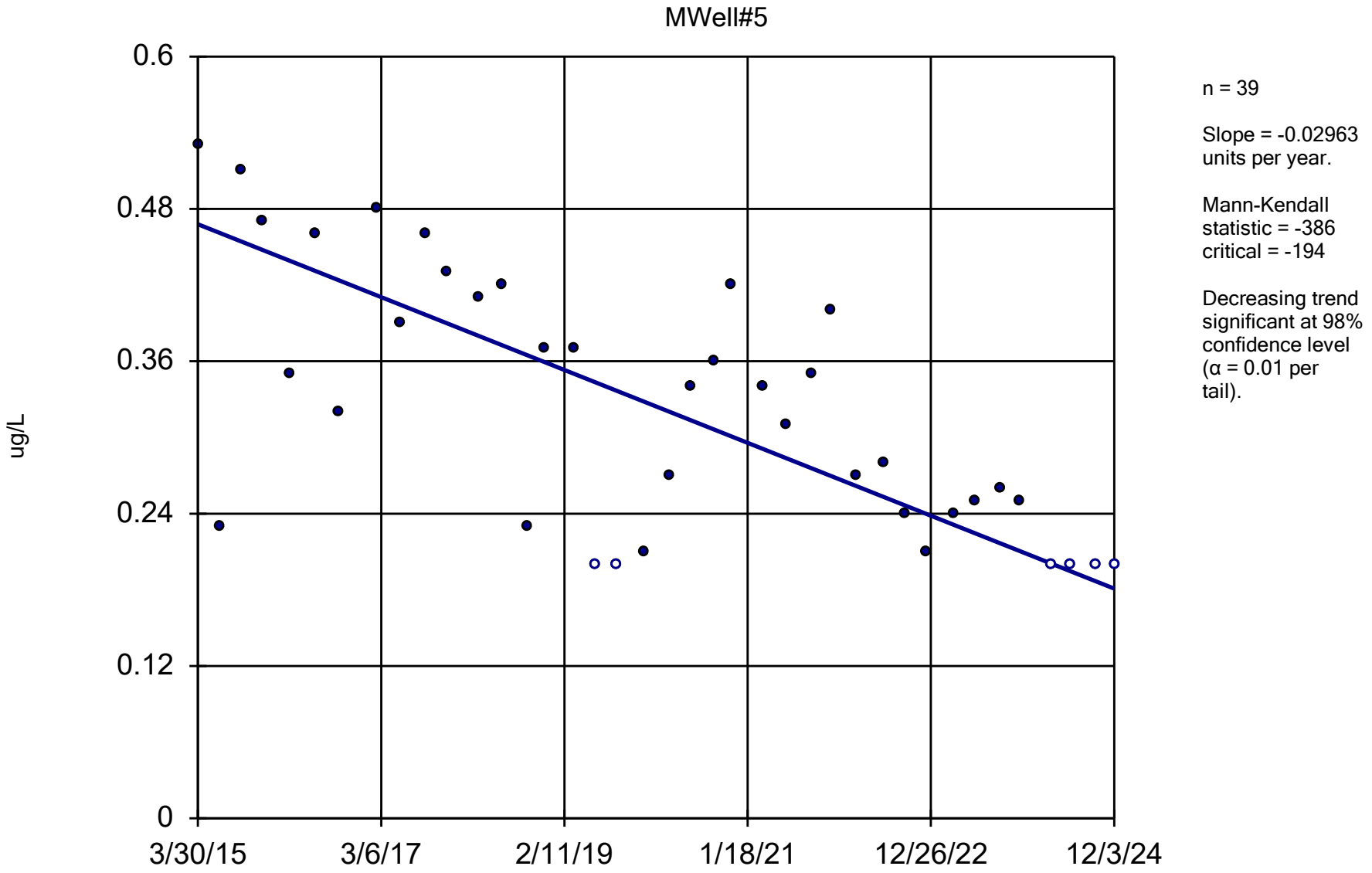
Hollow symbols indicate censored values.

Sen's Slope Estimator



Constituent: 1,2-Dichloropropane Analysis Run 2/2/2025 4:30 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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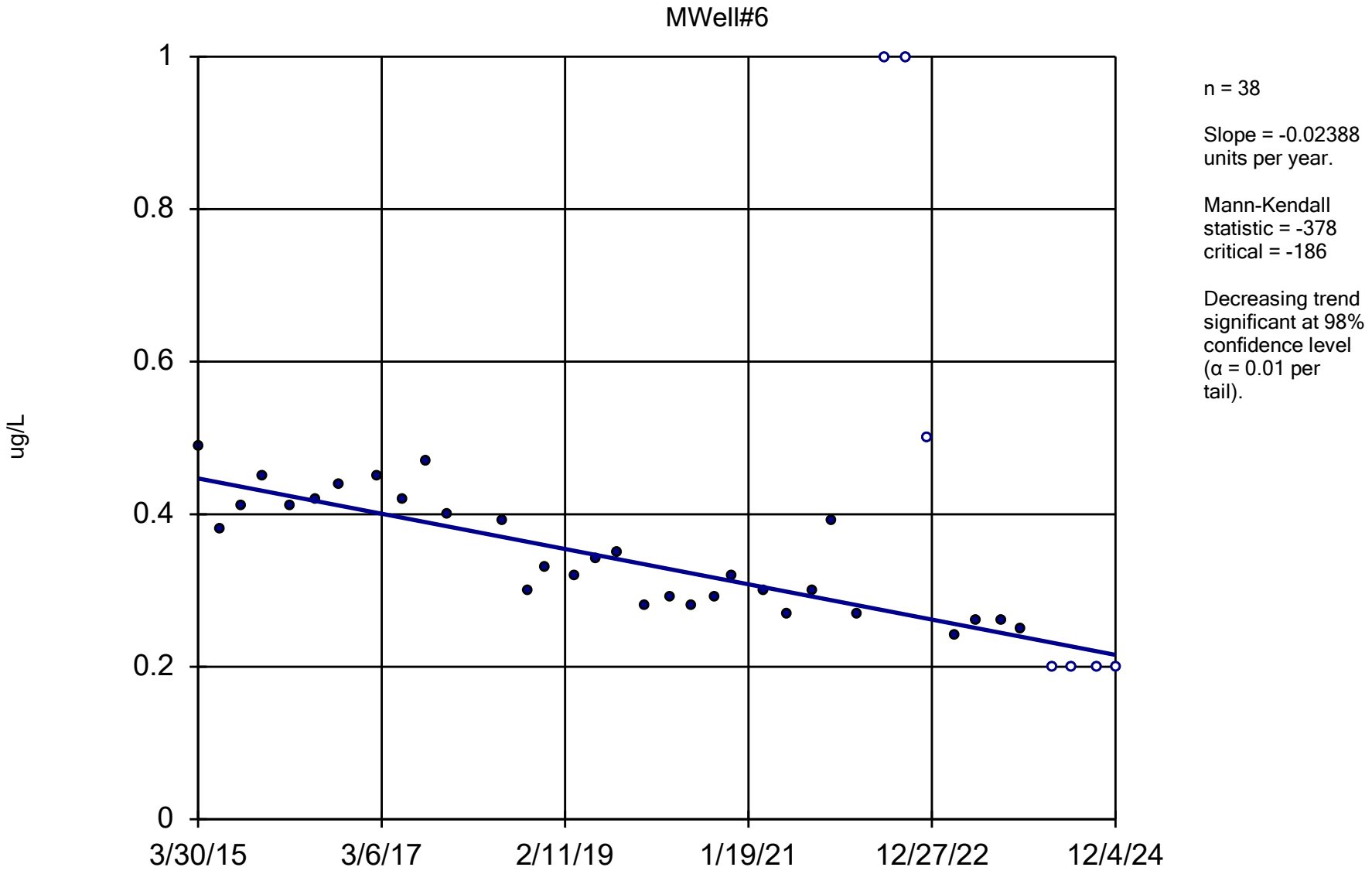
Hollow symbols indicate censored values.

Sen's Slope Estimator



Constituent: 1,2-Dichloropropane Analysis Run 2/2/2025 4:30 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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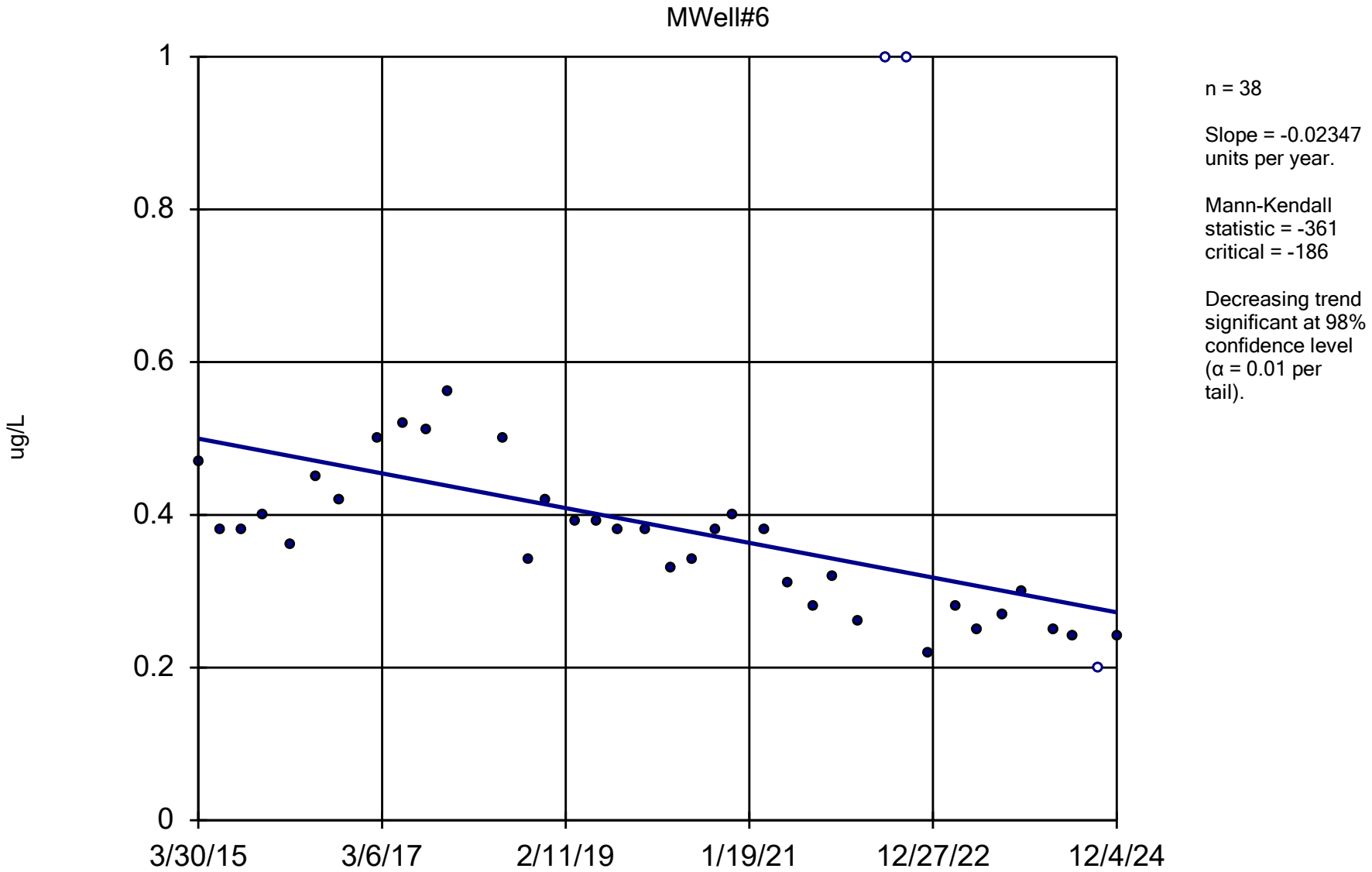
Hollow symbols indicate censored values.

Sen's Slope Estimator



Constituent: Benzene Analysis Run 2/2/2025 4:30 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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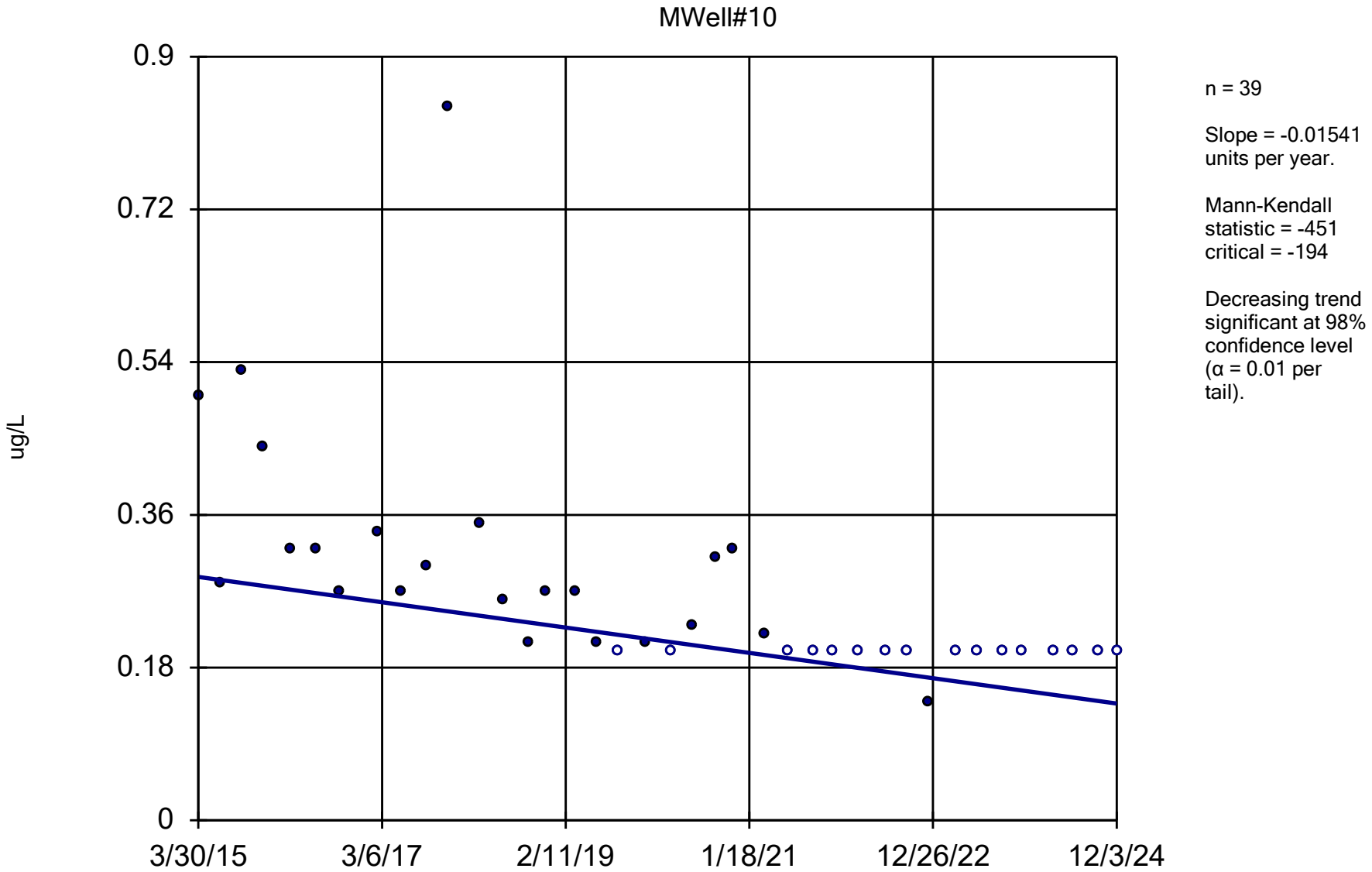
Hollow symbols indicate censored values.

Sen's Slope Estimator



Constituent: Benzene Analysis Run 2/2/2025 4:30 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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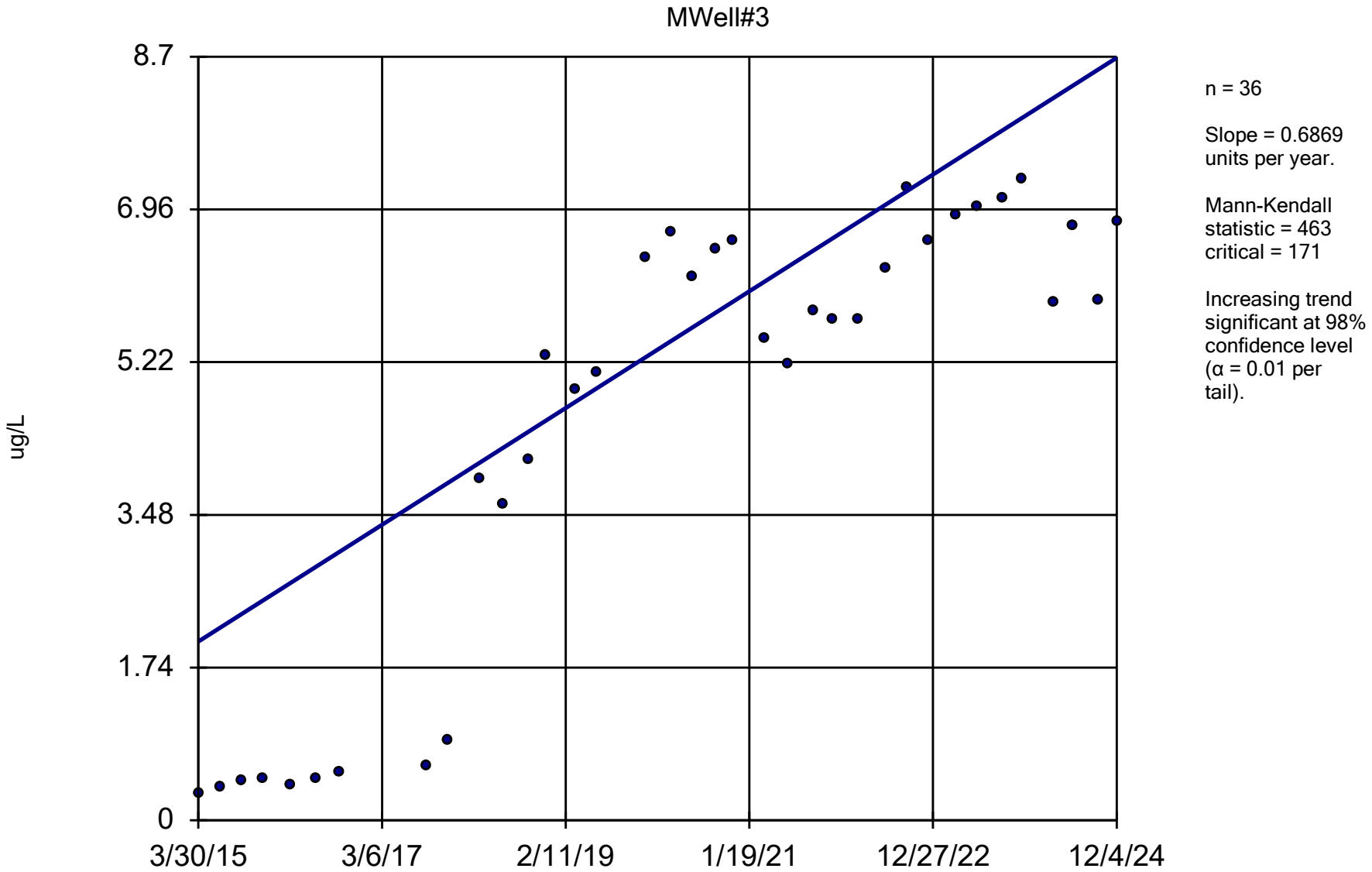
Sen's Slope Estimator



Constituent: Chloroform Analysis Run 2/2/2025 4:30 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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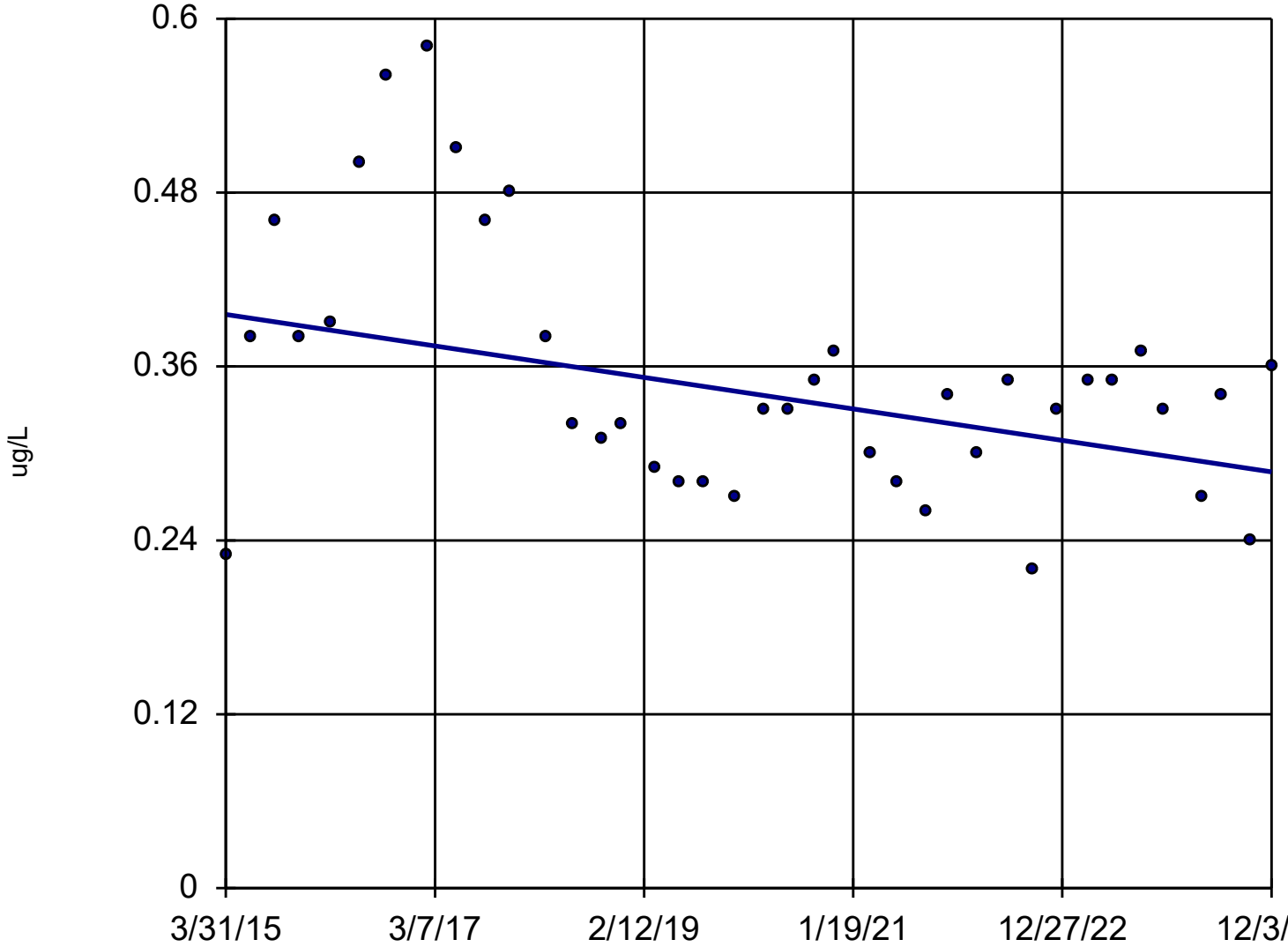
Sen's Slope Estimator

MWell#4



n = 39

Slope = -0.01121 units per year.

Mann-Kendall statistic = -199
critical = -194

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Chloroform Analysis Run 2/2/2025 4:31 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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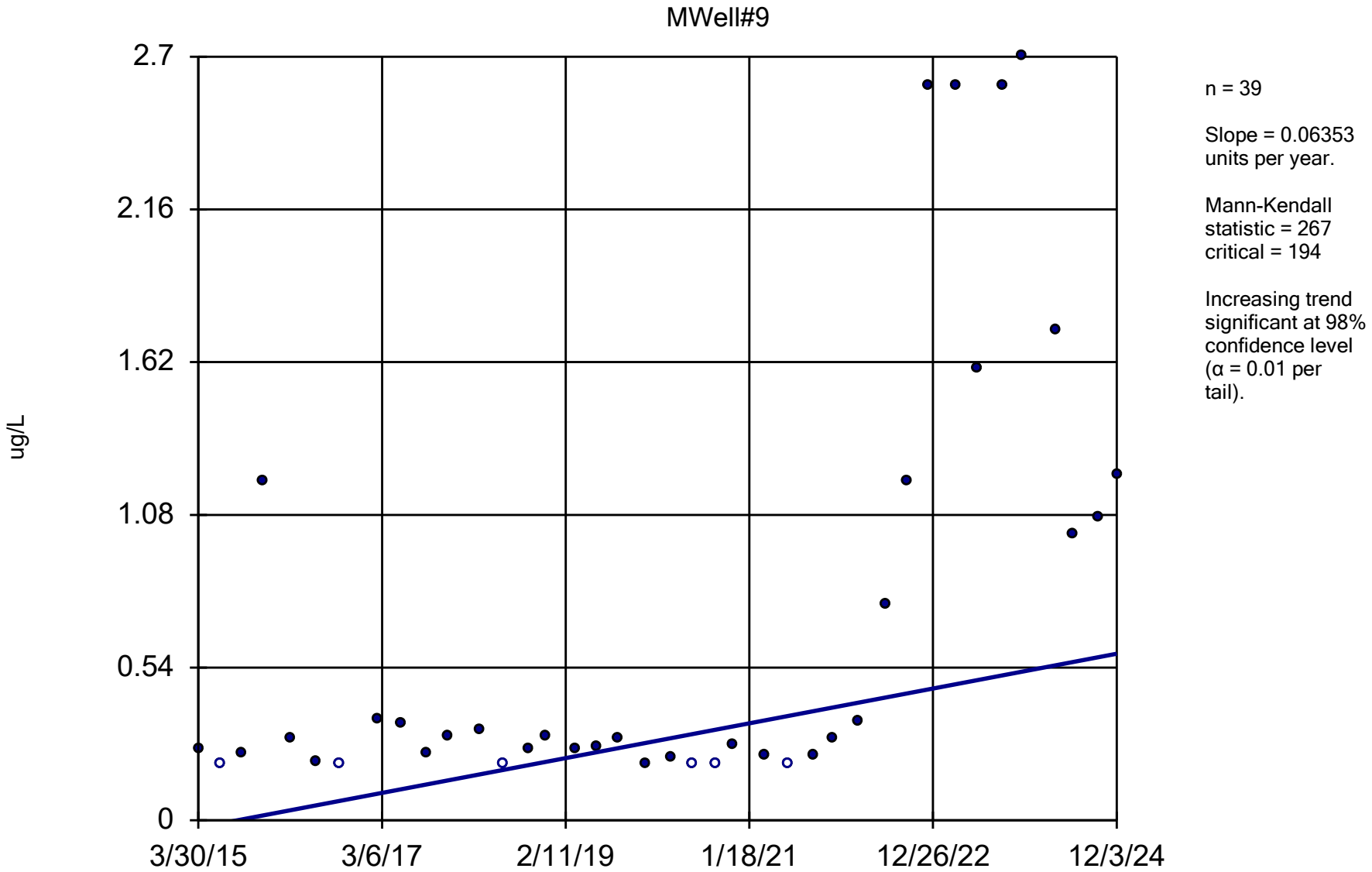
Hollow symbols indicate censored values.

Sen's Slope Estimator

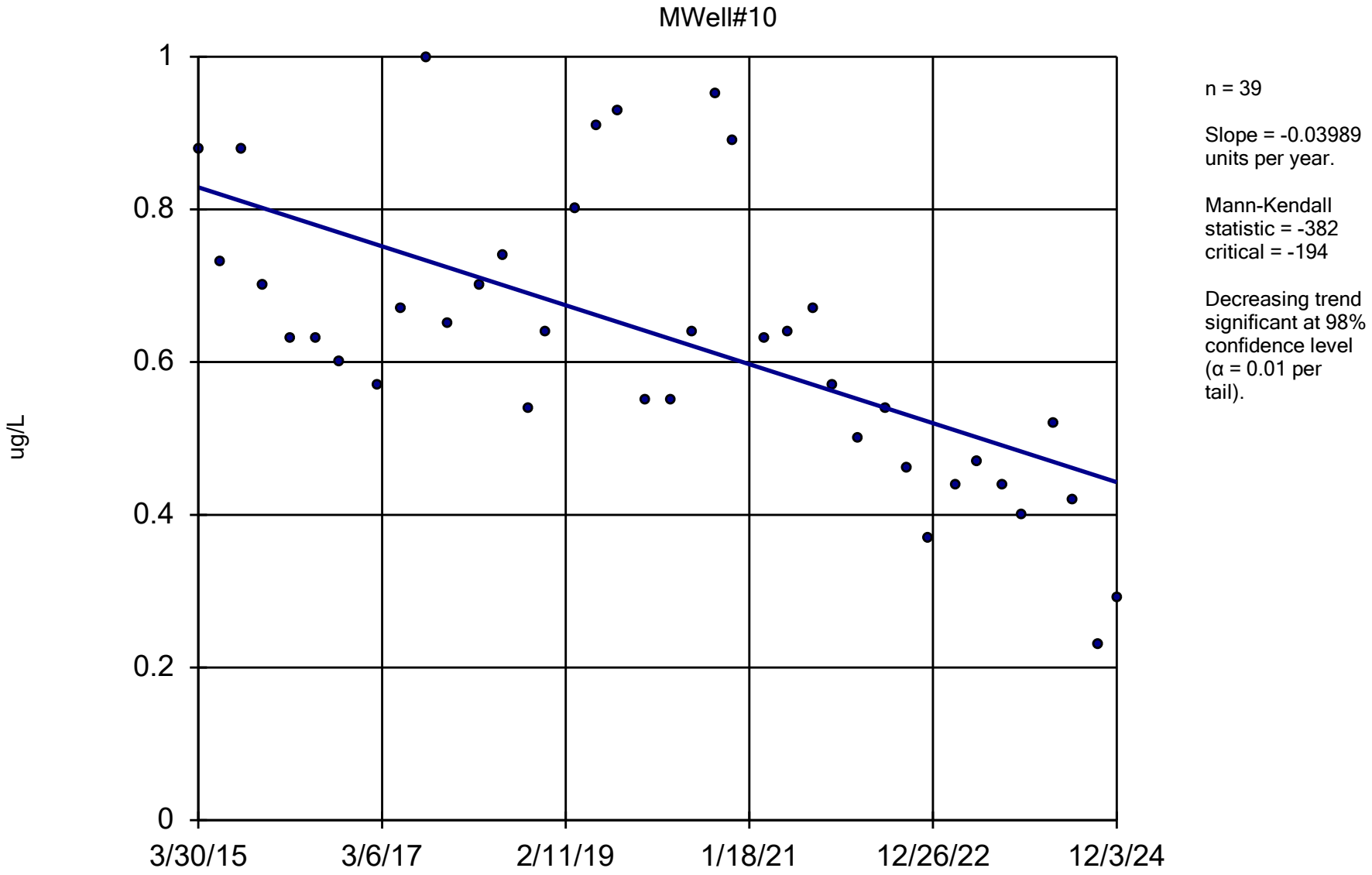


Constituent: Chloroform Analysis Run 2/2/2025 4:31 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.

Sen's Slope Estimator



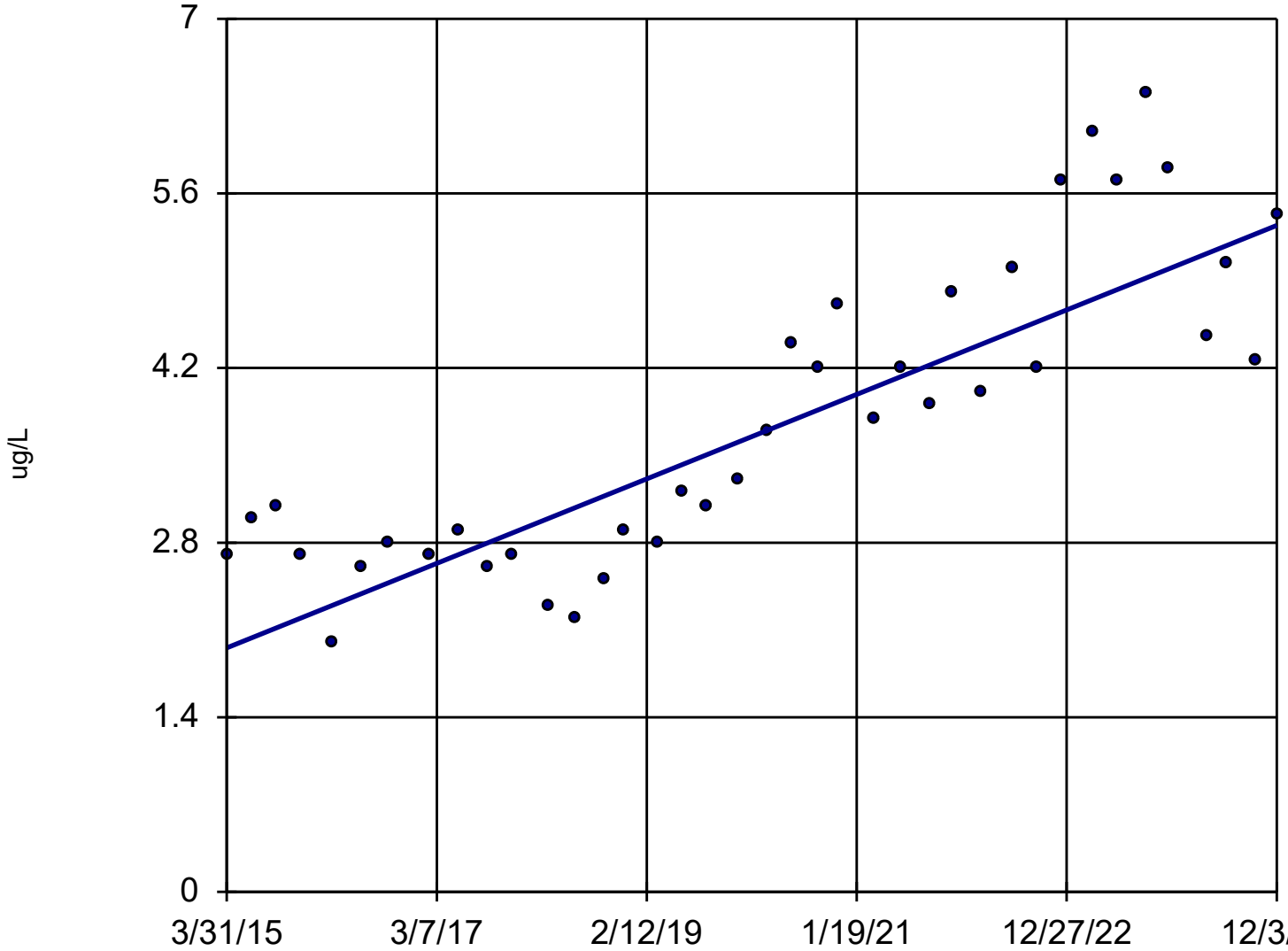
Constituent: Chloroform Analysis Run 2/2/2025 4:31 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.

Sen's Slope Estimator

MWell#4



n = 39

Slope = 0.3499 units per year.

Mann-Kendall statistic = 493
critical = 194

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: cis-1,2-Dichloroethene Analysis Run 2/2/2025 4:31 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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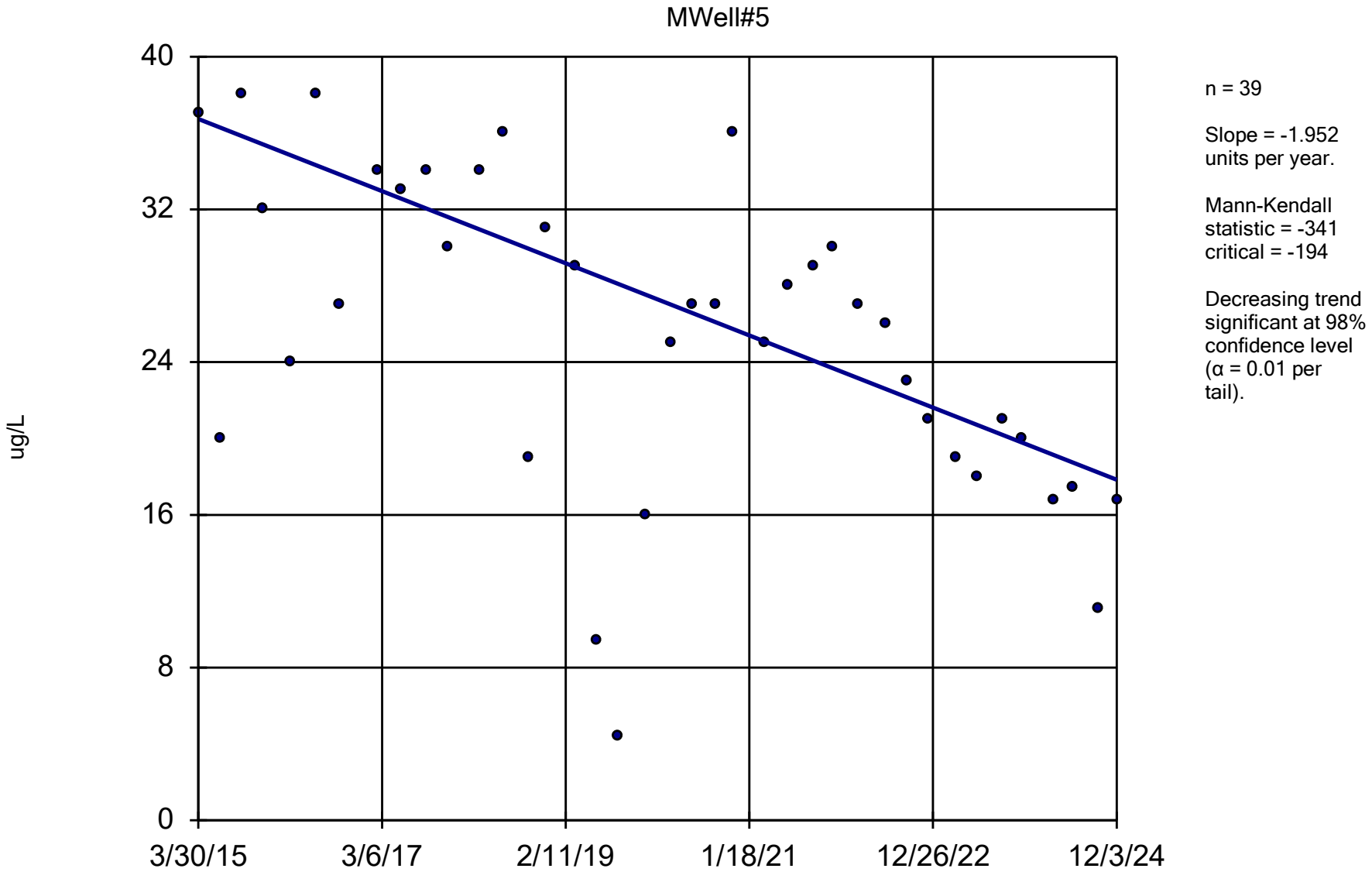
Sen's Slope Estimator



Constituent: cis-1,2-Dichloroethene Analysis Run 2/2/2025 4:31 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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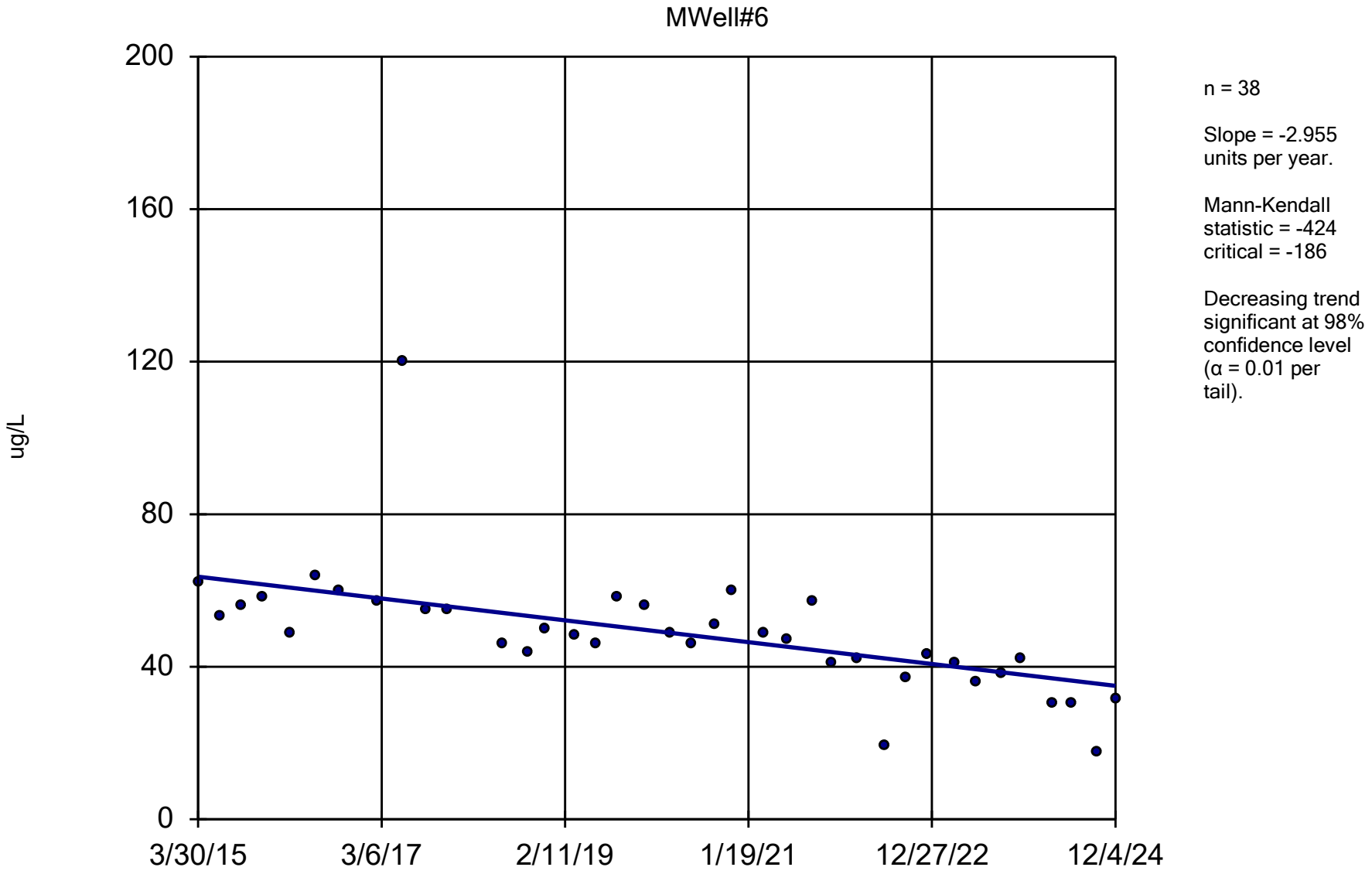
Sen's Slope Estimator



Constituent: cis-1,2-Dichloroethene Analysis Run 2/2/2025 4:31 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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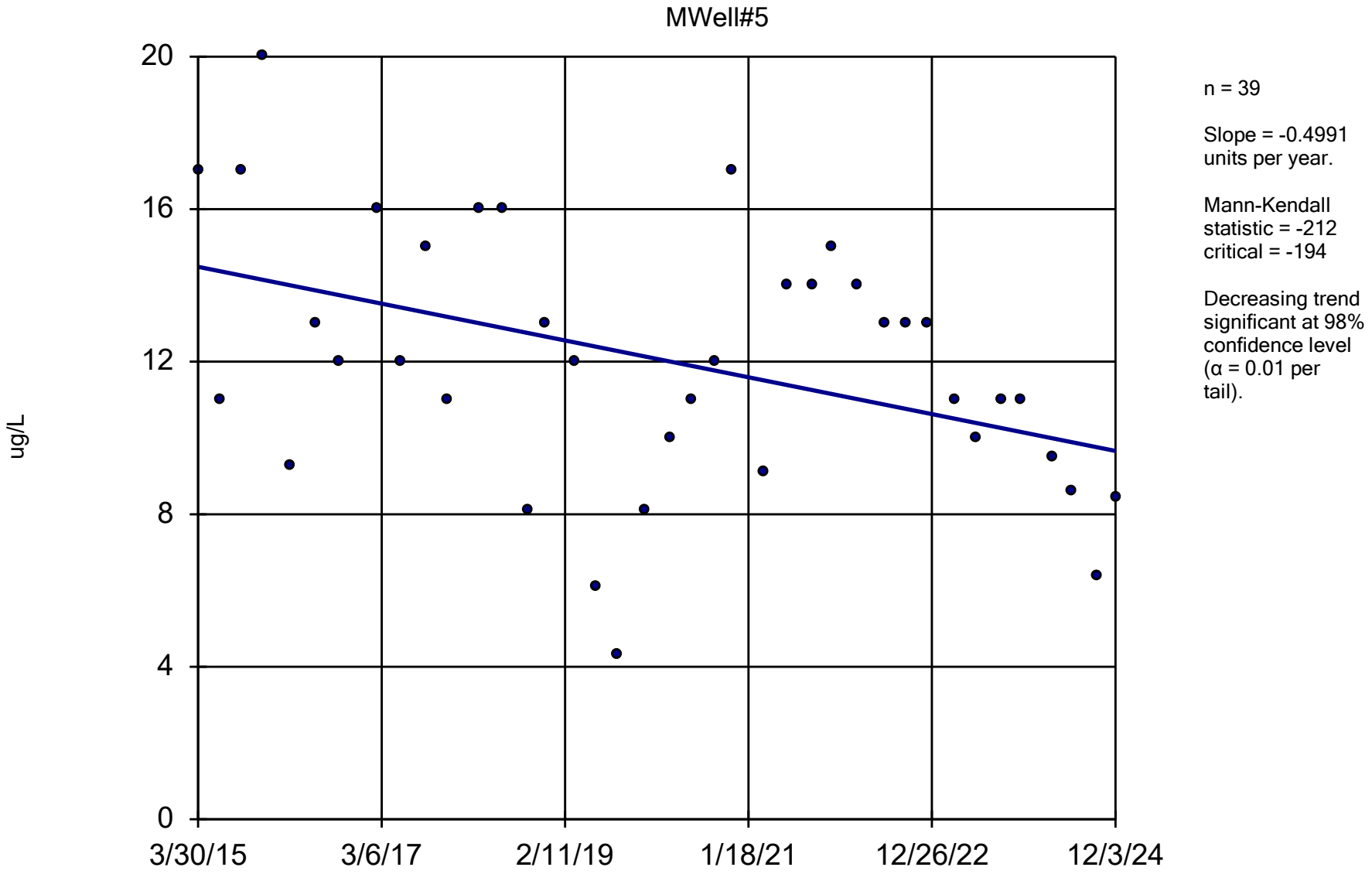
Sen's Slope Estimator

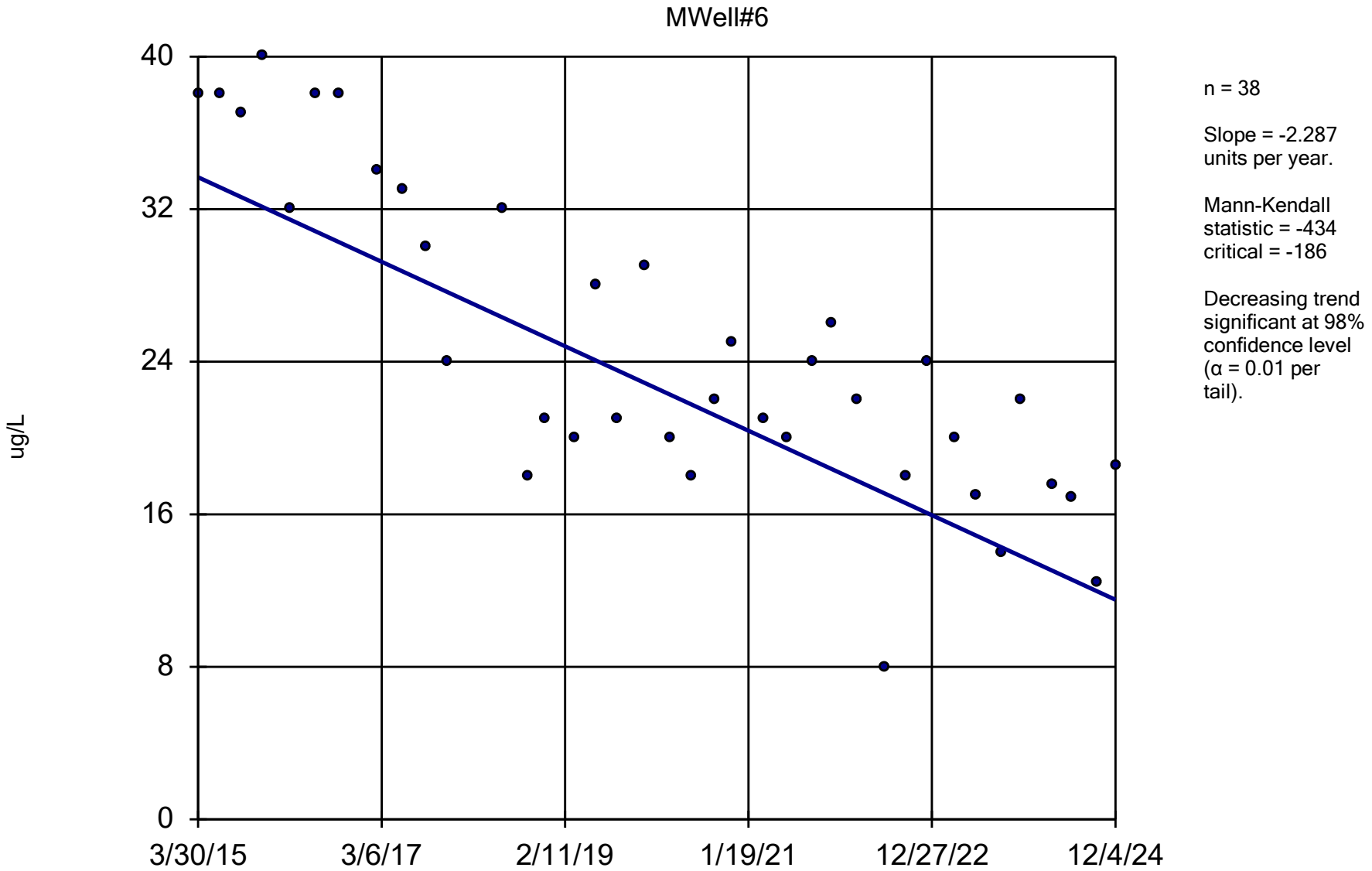


Constituent: Tetrachloroethene Analysis Run 2/2/2025 4:31 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.

Sen's Slope Estimator

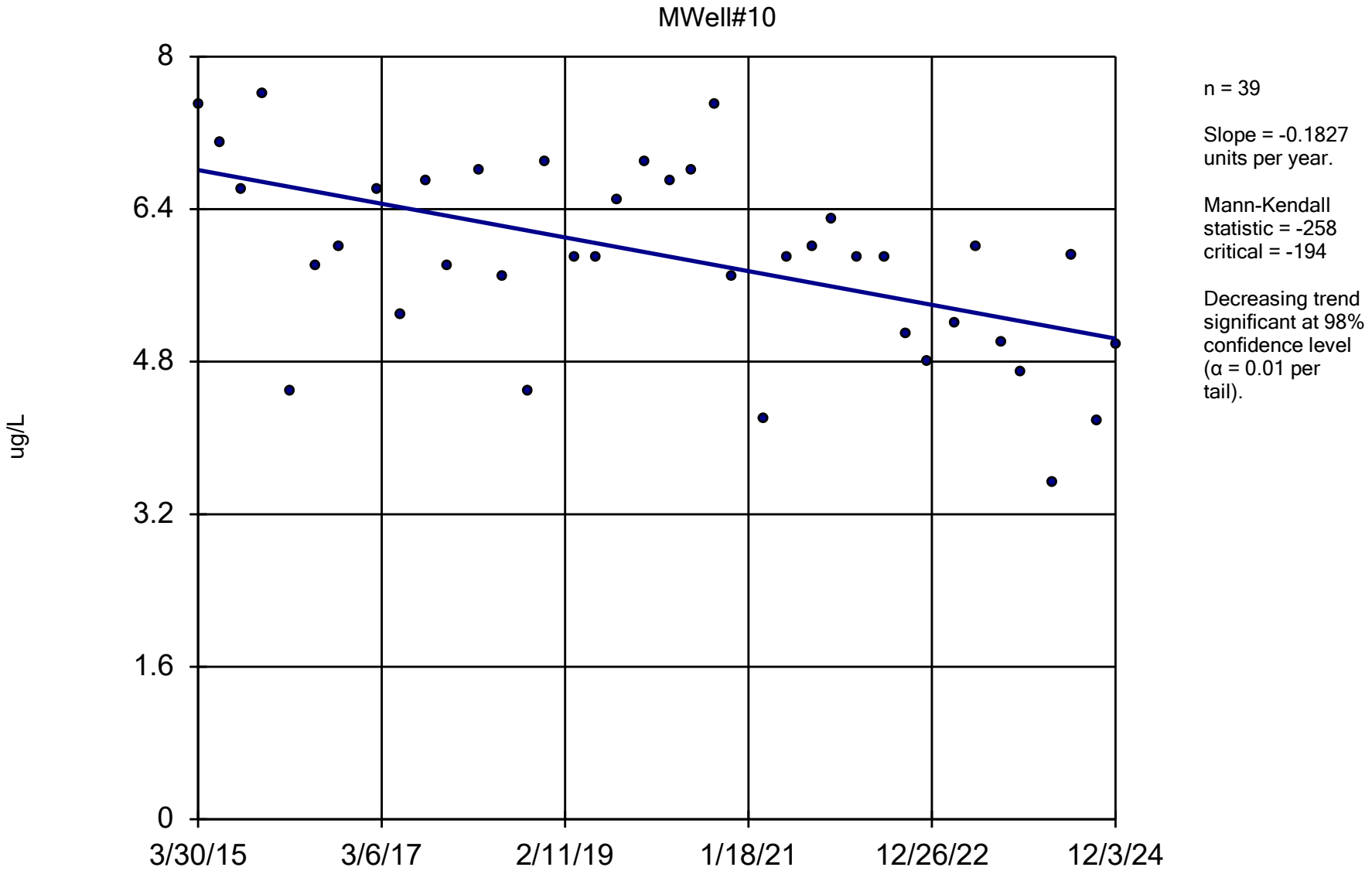


Constituent: Tetrachloroethene Analysis Run 2/2/2025 4:31 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.

Sen's Slope Estimator



Constituent: Tetrachloroethene Analysis Run 2/2/2025 4:31 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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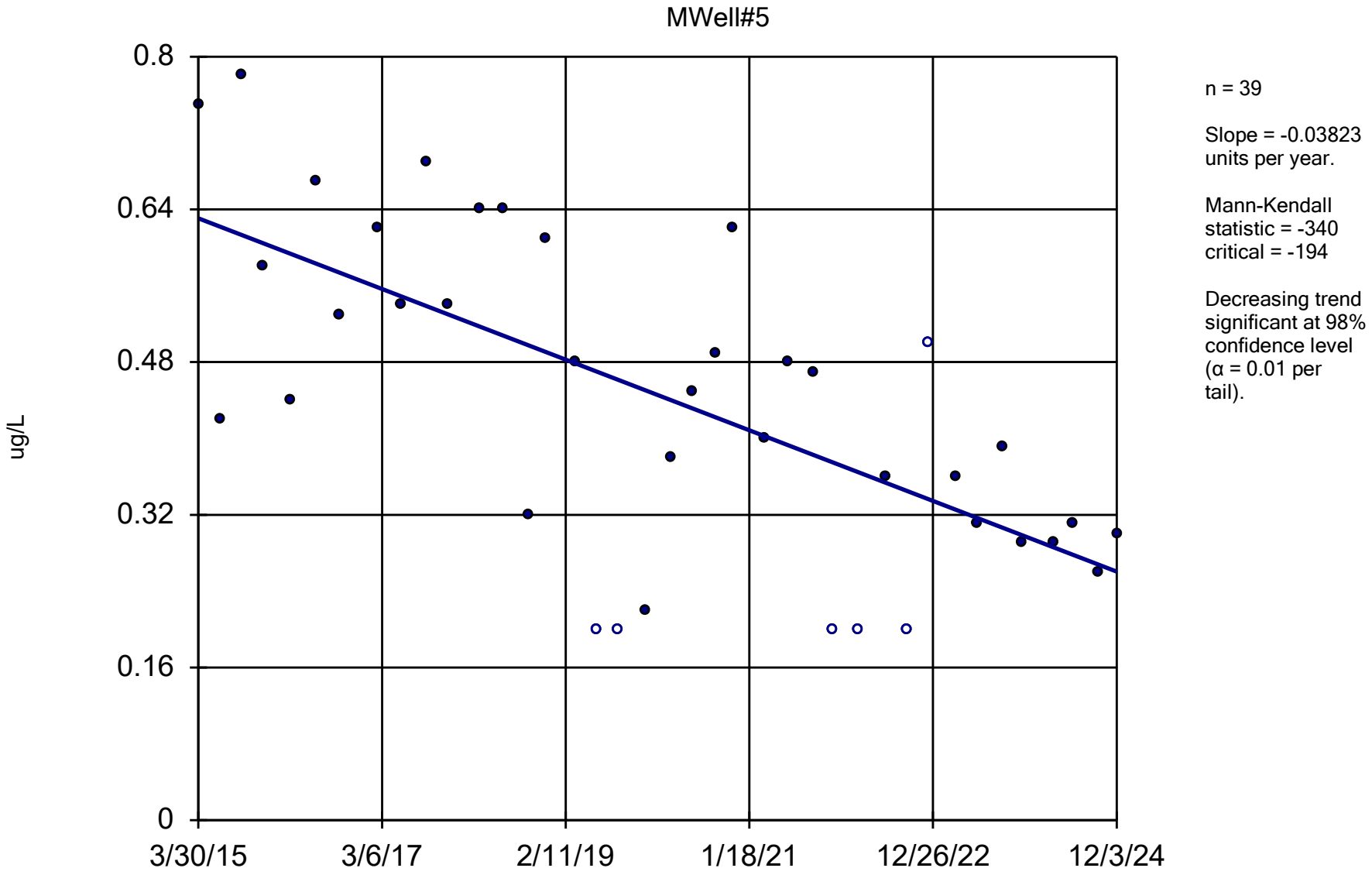
Hollow symbols indicate censored values.

Sen's Slope Estimator



Constituent: trans-1,2-Dichloroethene Analysis Run 2/2/2025 4:31 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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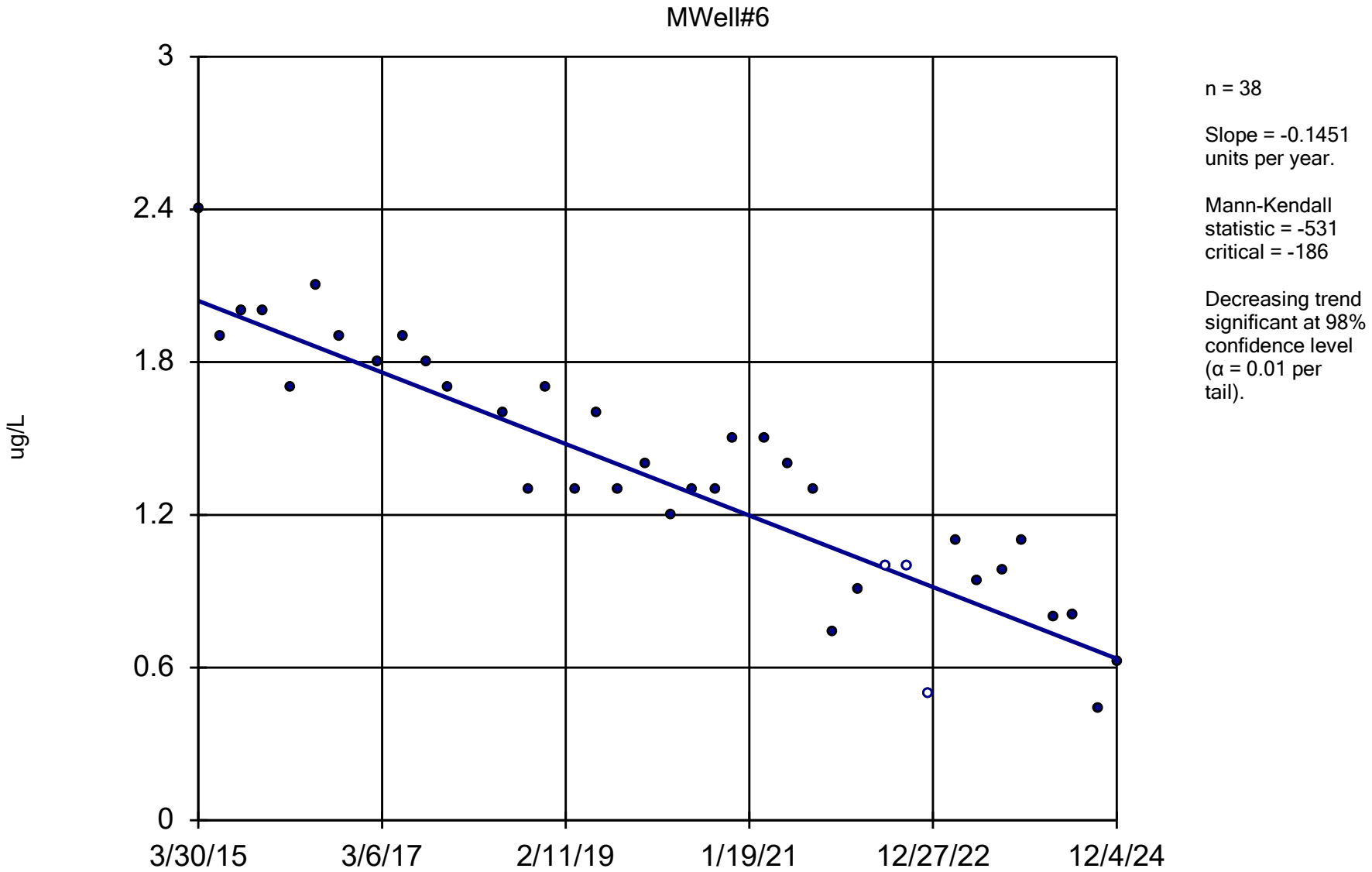
Hollow symbols indicate censored values.

Sen's Slope Estimator



Constituent: trans-1,2-Dichloroethene Analysis Run 2/2/2025 4:31 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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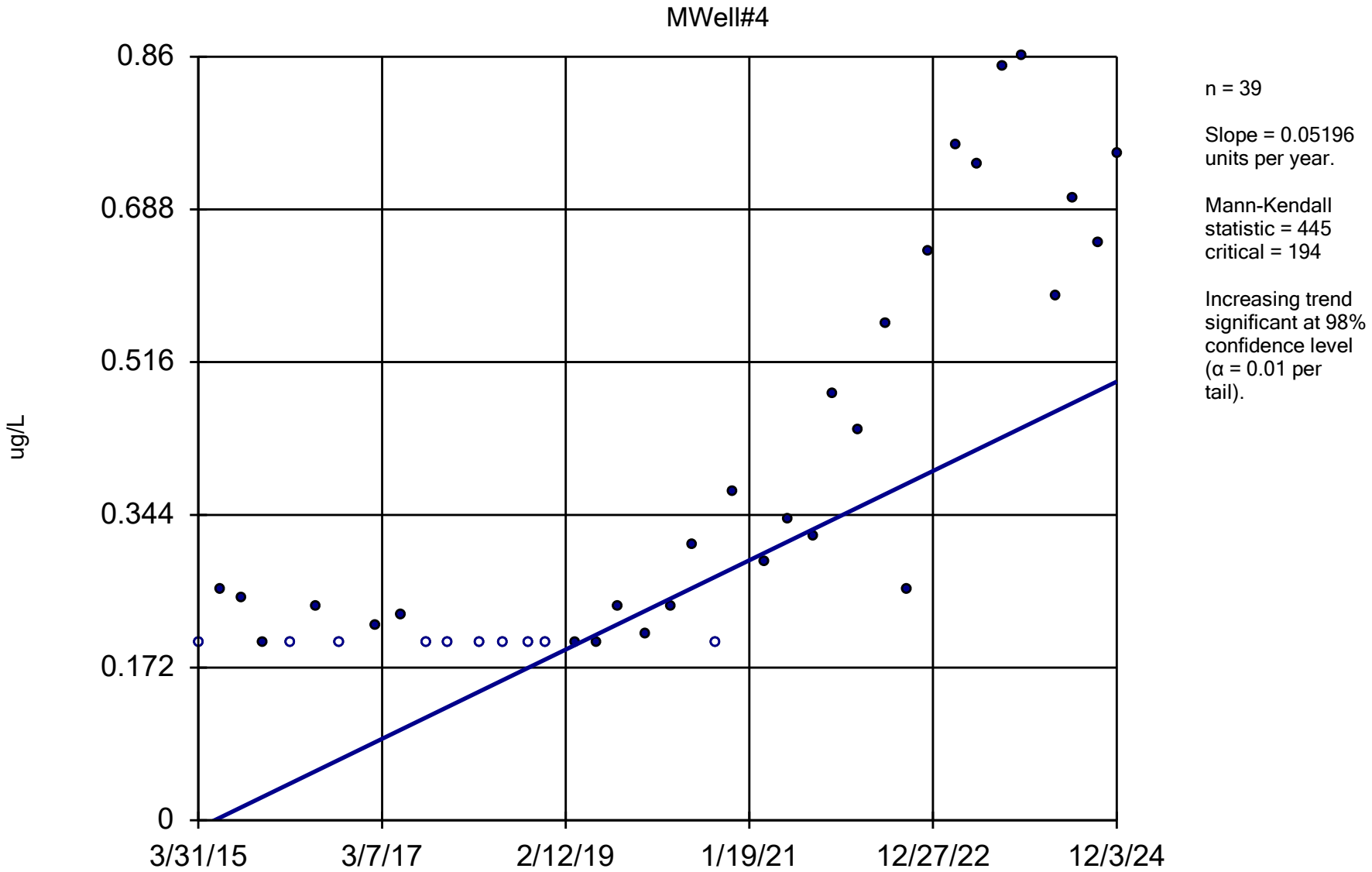
Hollow symbols indicate censored values.

Sen's Slope Estimator



Constituent: Trichloroethene Analysis Run 2/2/2025 4:31 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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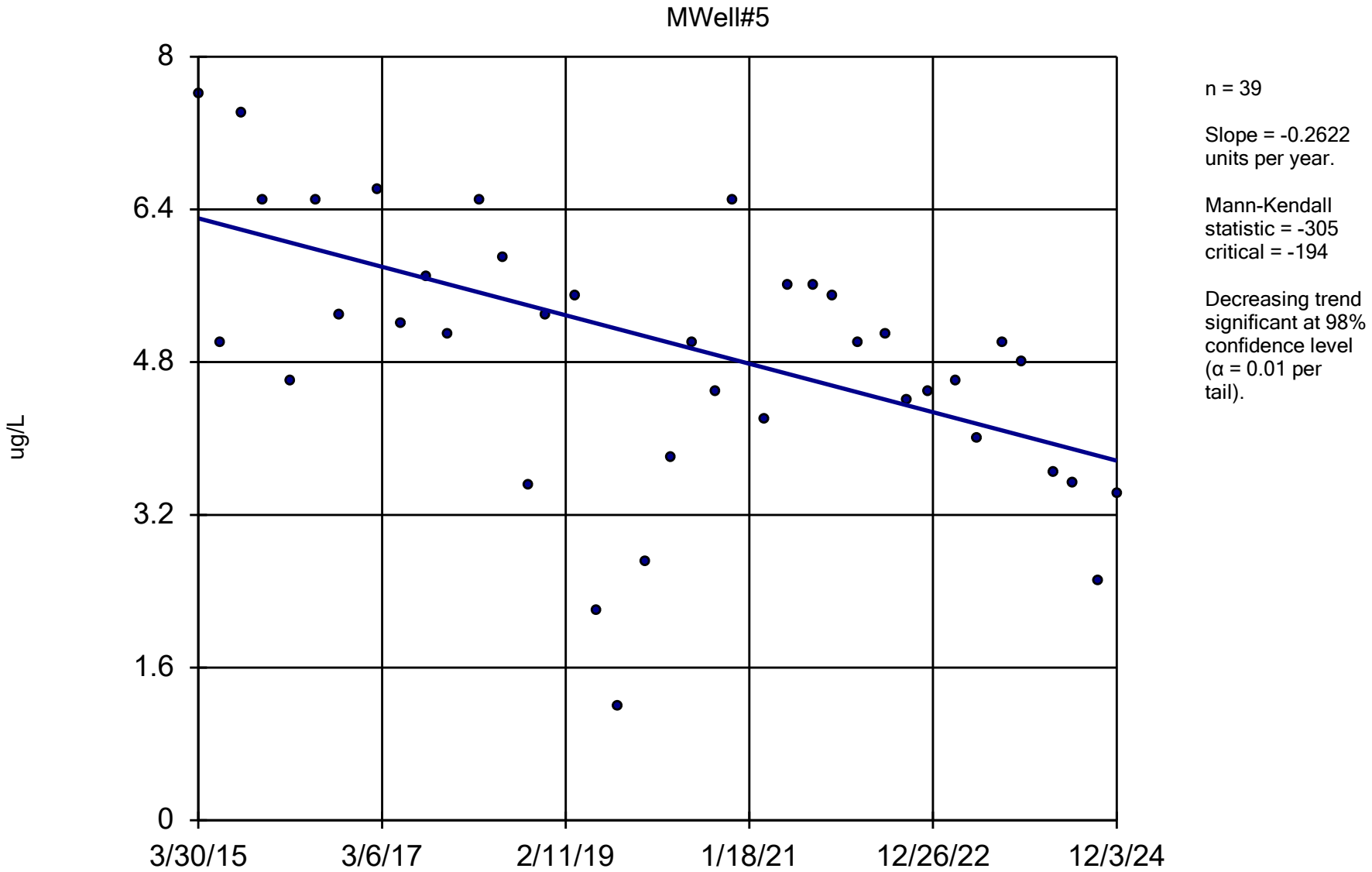
Sen's Slope Estimator



Constituent: Trichloroethene Analysis Run 2/2/2025 4:31 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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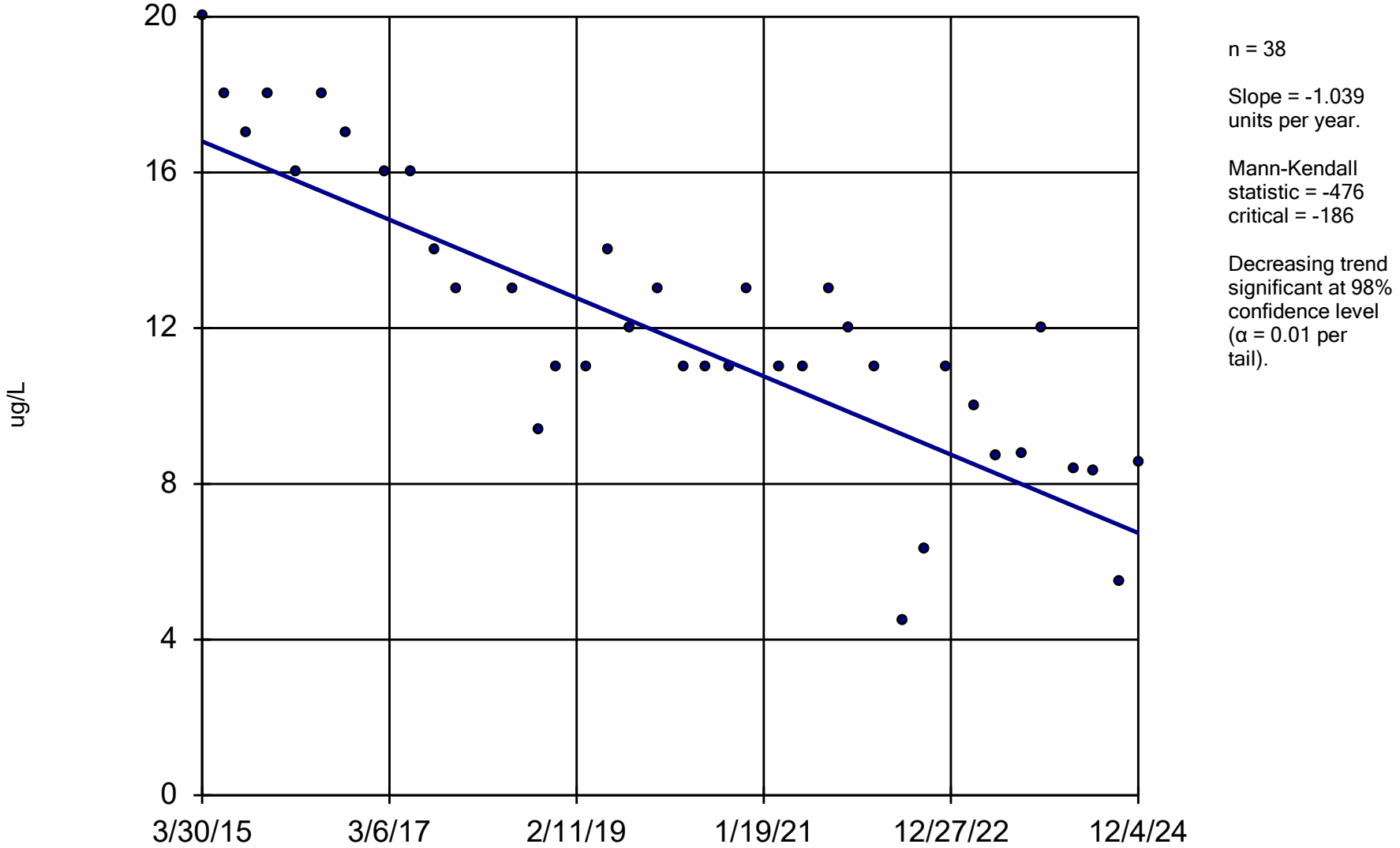
Sen's Slope Estimator

MWell#6



n = 38

Slope = -1.039 units per year.

Mann-Kendall statistic = -476
critical = -186

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Trichloroethene Analysis Run 2/2/2025 4:31 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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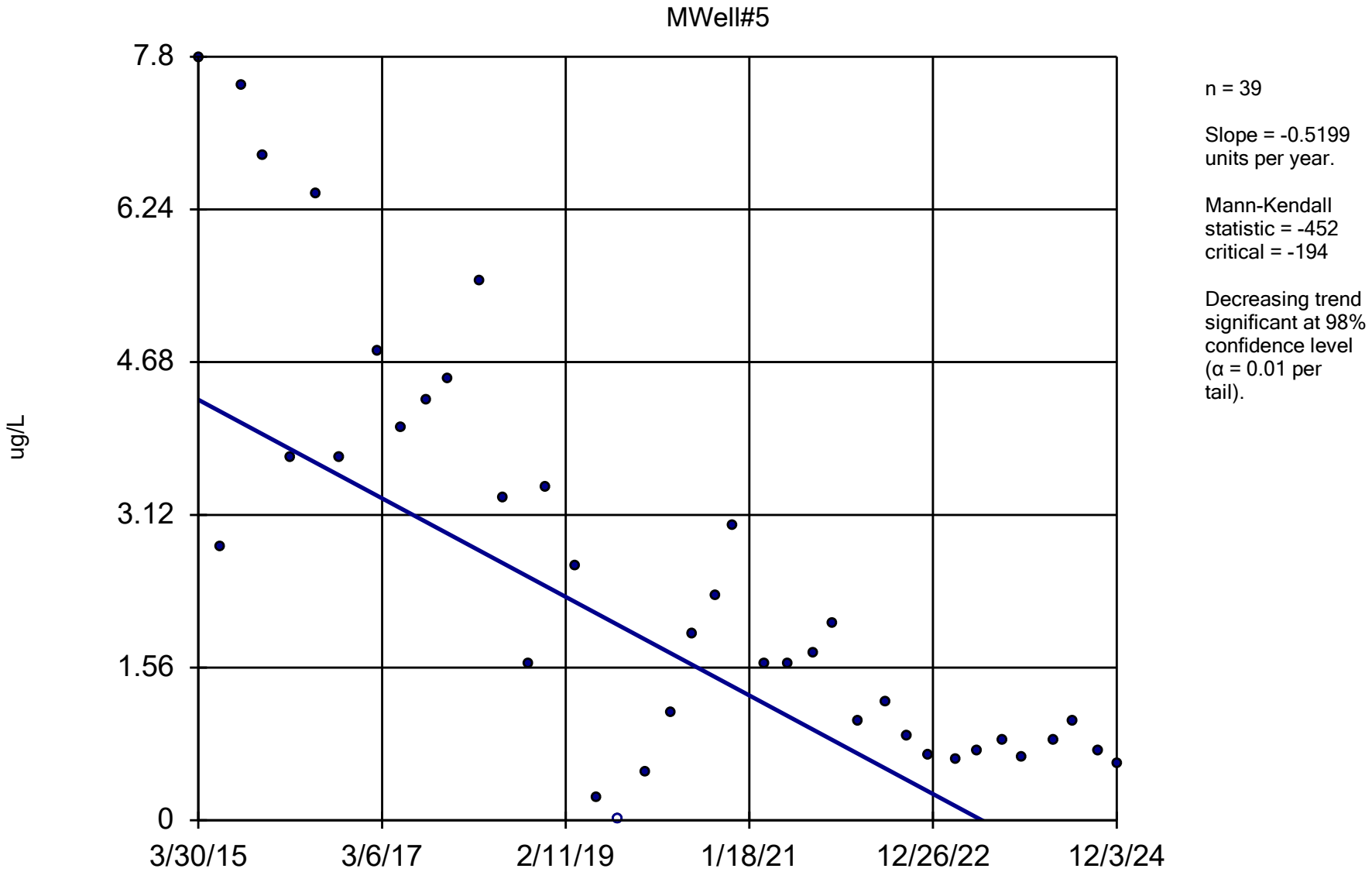
Hollow symbols indicate censored values.

Sen's Slope Estimator



Constituent: Vinyl Chloride Analysis Run 2/2/2025 4:31 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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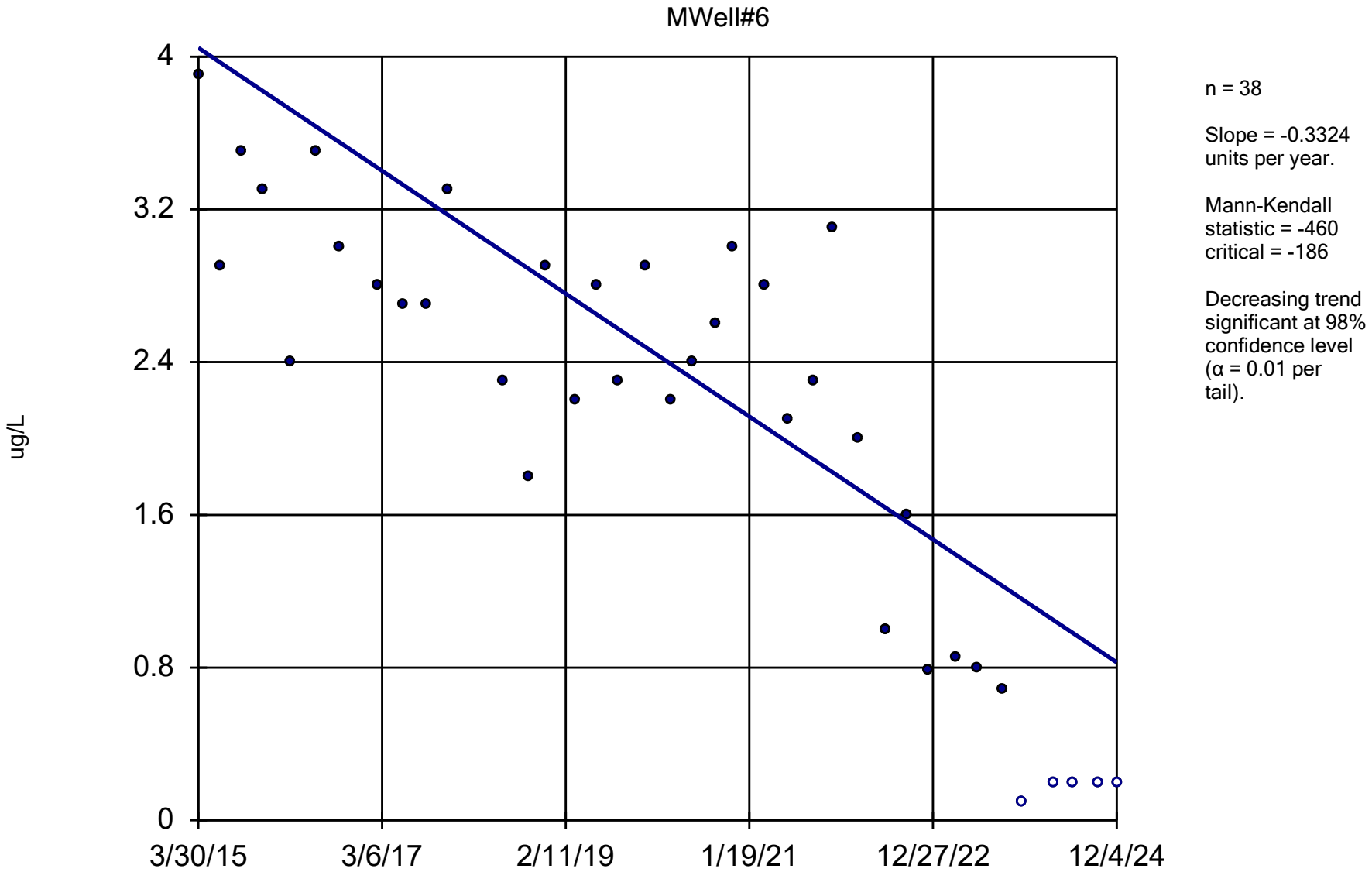
Hollow symbols indicate censored values.

Sen's Slope Estimator



n = 38

Slope = -0.3324 units per year.

Mann-Kendall statistic = -460
critical = -186

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Vinyl Chloride Analysis Run 2/2/2025 4:31 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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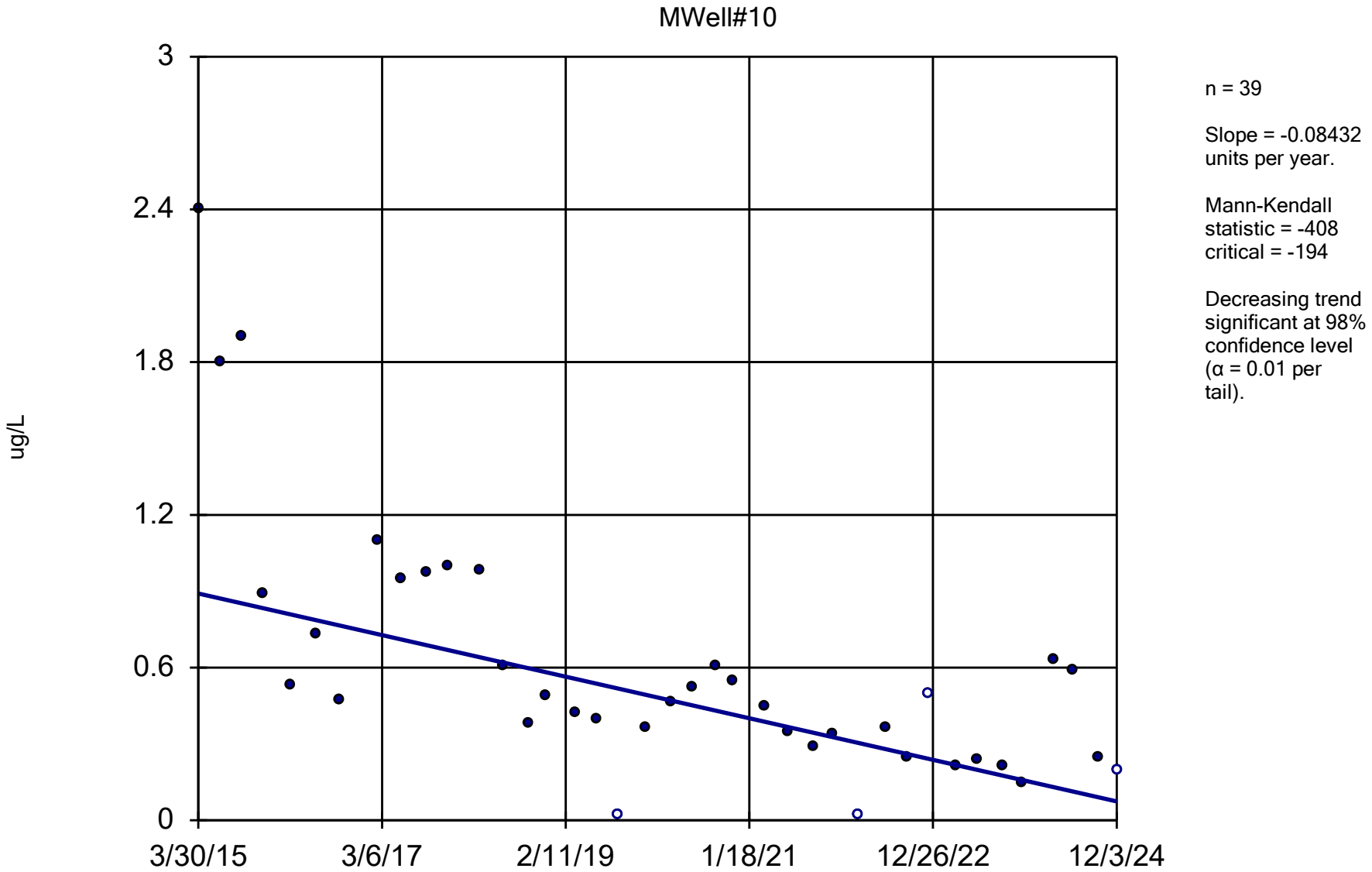
Hollow symbols indicate censored values.

Sen's Slope Estimator



Constituent: Vinyl Chloride Analysis Run 2/2/2025 4:31 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

D-2

5-Year Trends

Horn Rapids Landfill Trends for Volatile Organic Compounds, First Quarter 2020 through Fourth Quarter 2024

Constituent Name	Well	Slope	Calculated Statistic	Critical Value	Trend	N	% Non-detects	Normality	Transformation	Alpha	Method
1,1-Dichloroethane (ug/L)	MWell#4	-0.3198	-87	-73	Yes	20	0	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#5	-0.6247	-128	-73	Yes	20	0	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#6	-0.2998	-79	-73	Yes	20	0	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#9	-0.153	-83	-73	Yes	20	0	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#10	-0.6838	-142	-73	Yes	20	0	n/a	n/a	0.02	NP
1,2-Dichloroethane (ug/L)	MWell#5	-0.06579	-106	-73	Yes	20	5	n/a	n/a	0.02	NP
1,2-Dichloroethane (ug/L)	MWell#6	-0.03169	-81	-73	Yes	20	20	n/a	n/a	0.02	NP
1,2-Dichloropropane (ug/L)	MWell#5	-0.03529	-118	-73	Yes	20	20	n/a	n/a	0.02	NP
1,2-Dichloropropane (ug/L)	MWell#6	-0.02102	-83	-73	Yes	20	35	n/a	n/a	0.02	NP
Benzene (ug/L)	MWell#5	-0.0256	-90	-73	Yes	20	25	n/a	n/a	0.02	NP
Benzene (ug/L)	MWell#6	-0.02913	-97	-73	Yes	20	15	n/a	n/a	0.02	NP
Chloroform (ug/L)	MWell#9	0.2847	117	73	Yes	20	15	n/a	n/a	0.02	NP
Chloroform (ug/L)	MWell#10	-0.0866	-128	-73	Yes	20	0	n/a	n/a	0.02	NP
cis-1,2-Dichloroethene (ug/L)	MWell#4	0.299	84	73	Yes	20	0	n/a	n/a	0.02	NP
cis-1,2-Dichloroethene (ug/L)	MWell#5	-3.233	-124	-73	Yes	20	0	n/a	n/a	0.02	NP
cis-1,2-Dichloroethene (ug/L)	MWell#6	-4.816	-113	-73	Yes	20	0	n/a	n/a	0.02	NP
Tetrachloroethene (ug/L)	MWell#5	-1.389	-83	-73	Yes	20	0	n/a	n/a	0.02	NP
Tetrachloroethene (ug/L)	MWell#10	-0.4536	-88	-73	Yes	20	0	n/a	n/a	0.02	NP
trans-1,2-Dichloroethene (ug/L)	MWell#6	-0.154	-98	-73	Yes	20	15	n/a	n/a	0.02	NP
Trichloroethene (ug/L)	MWell#4	0.1321	122	73	Yes	20	5	n/a	n/a	0.02	NP
Trichloroethene (ug/L)	MWell#5	-0.4633	-81	-73	Yes	20	0	n/a	n/a	0.02	NP
Trichloroethene (ug/L)	MWell#6	-0.7182	-77	-73	Yes	20	0	n/a	n/a	0.02	NP
Trichlorofluoromethane (ug/L)	MWell#4	-0.1579	-114	-73	Yes	20	0	n/a	n/a	0.02	NP
Vinyl Chloride (ug/L)	MWell#5	-0.2987	-108	-73	Yes	20	0	n/a	n/a	0.02	NP
Vinyl Chloride (ug/L)	MWell#6	-0.6328	-134	-73	Yes	20	25	n/a	n/a	0.02	NP

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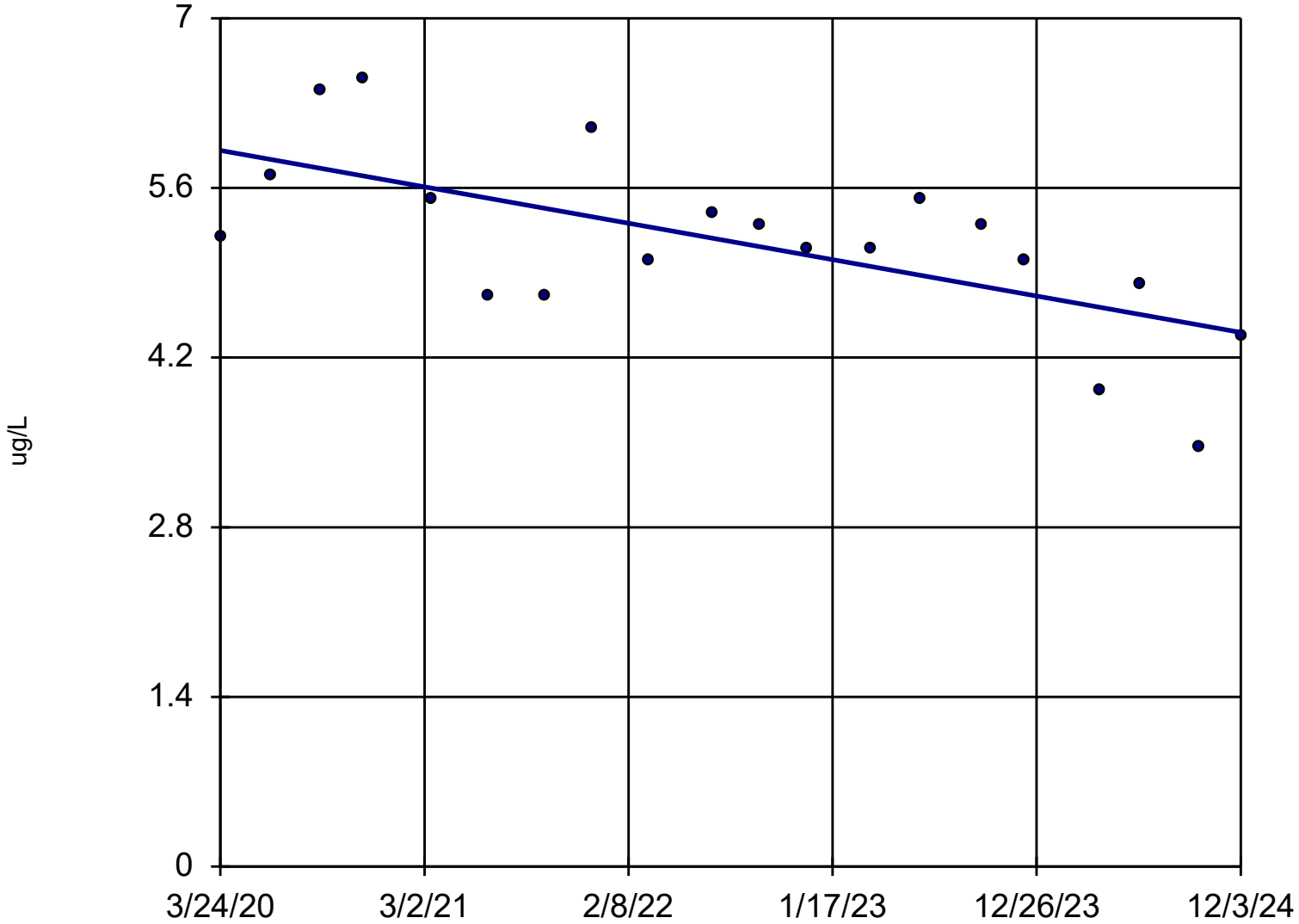
Sen's Slope Estimator

MWell#4



n = 20

Slope = -0.3198 units per year.

Mann-Kendall statistic = -87
critical = -73

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: 1,1-Dichloroethane Analysis Run 2/2/2025 4:35 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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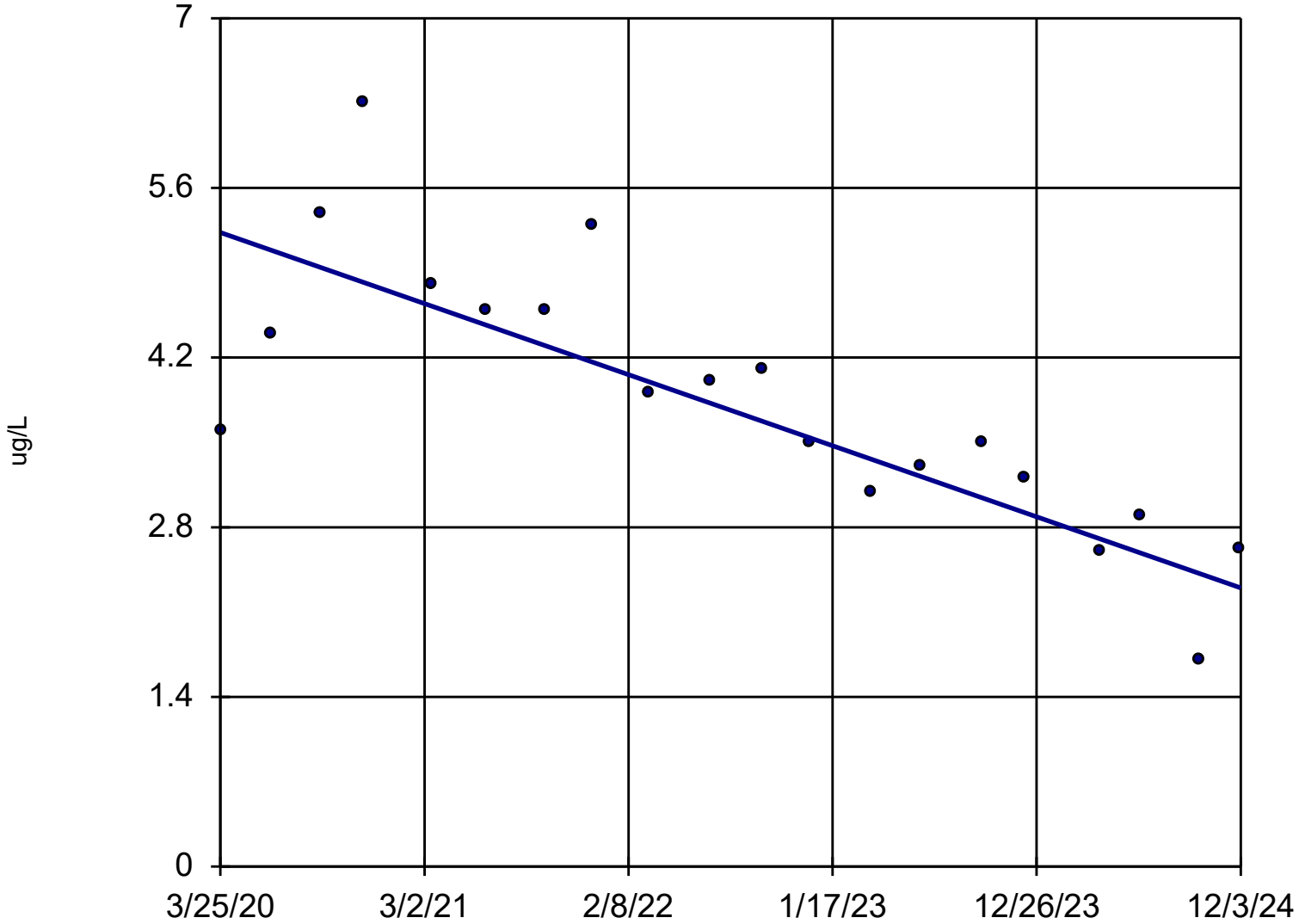
Sen's Slope Estimator

MWell#5



n = 20

Slope = -0.6247 units per year.

Mann-Kendall statistic = -128
critical = -73

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: 1,1-Dichloroethane Analysis Run 2/2/2025 4:35 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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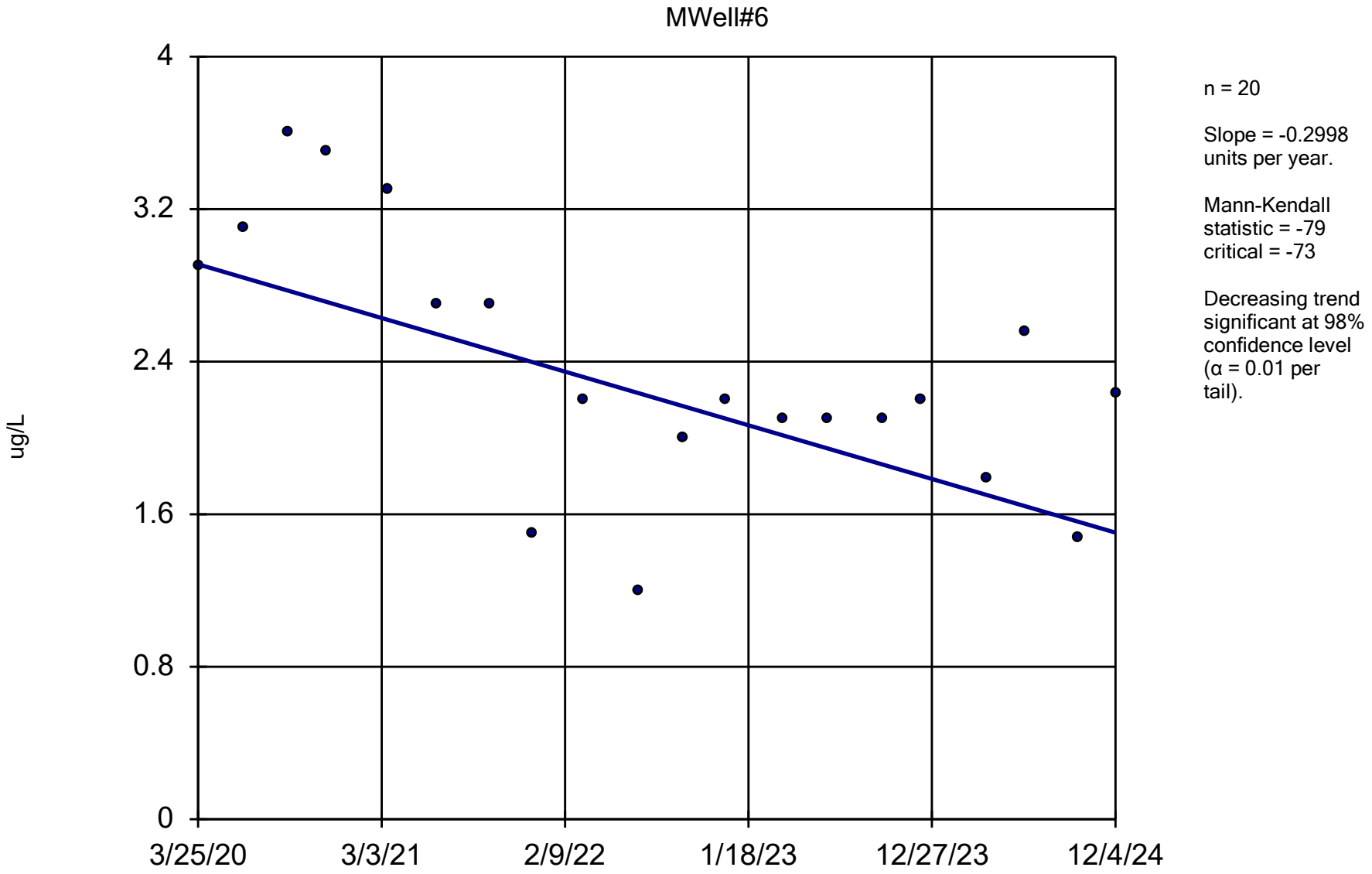
Sen's Slope Estimator



Constituent: 1,1-Dichloroethane Analysis Run 2/2/2025 4:35 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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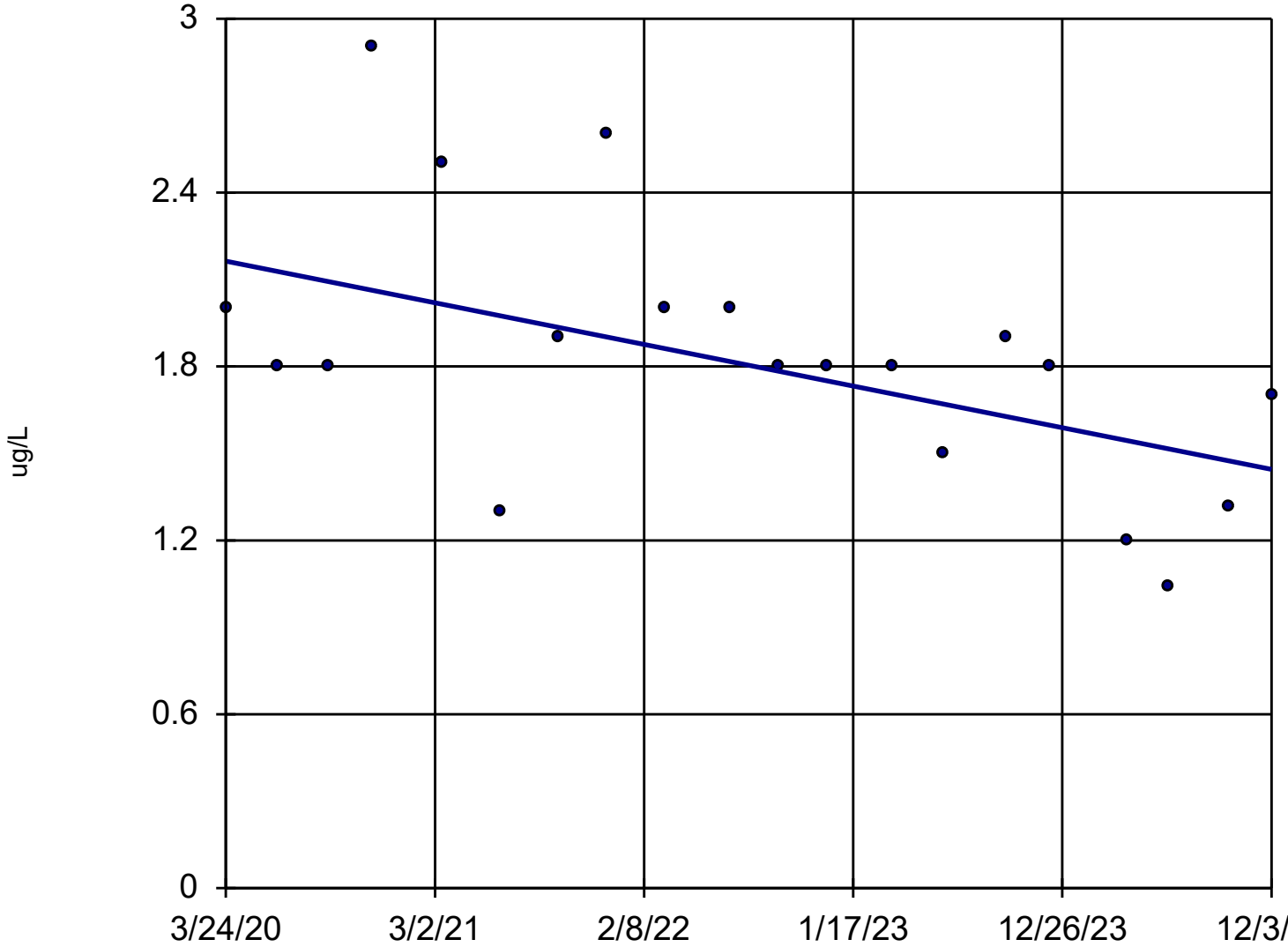
Sen's Slope Estimator

MWell#9



n = 20

Slope = -0.153 units per year.

Mann-Kendall statistic = -83
critical = -73

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: 1,1-Dichloroethane Analysis Run 2/2/2025 4:35 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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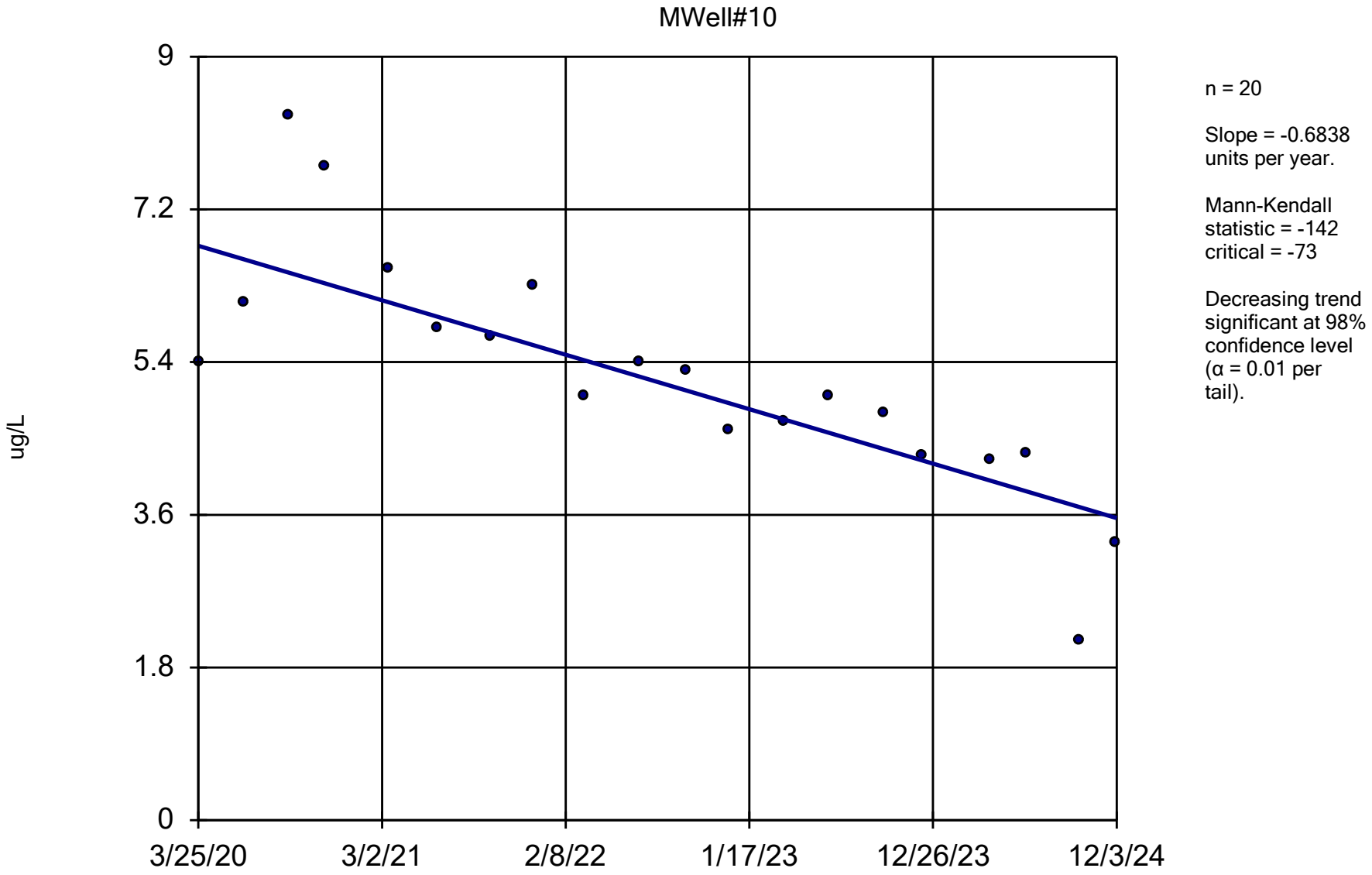
Sen's Slope Estimator



Constituent: 1,1-Dichloroethane Analysis Run 2/2/2025 4:35 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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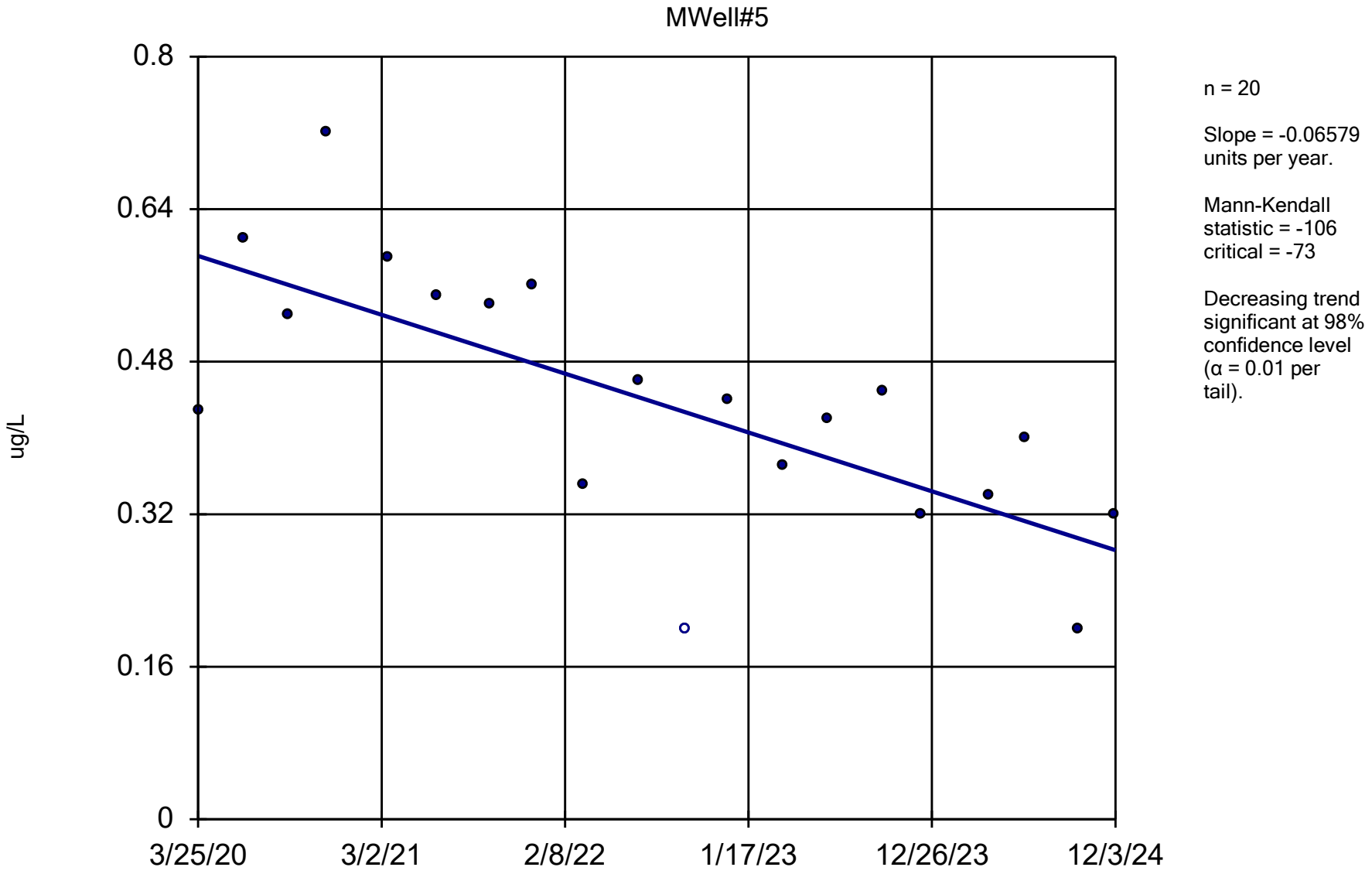
Hollow symbols indicate censored values.

Sen's Slope Estimator



Constituent: 1,2-Dichloroethane Analysis Run 2/2/2025 4:36 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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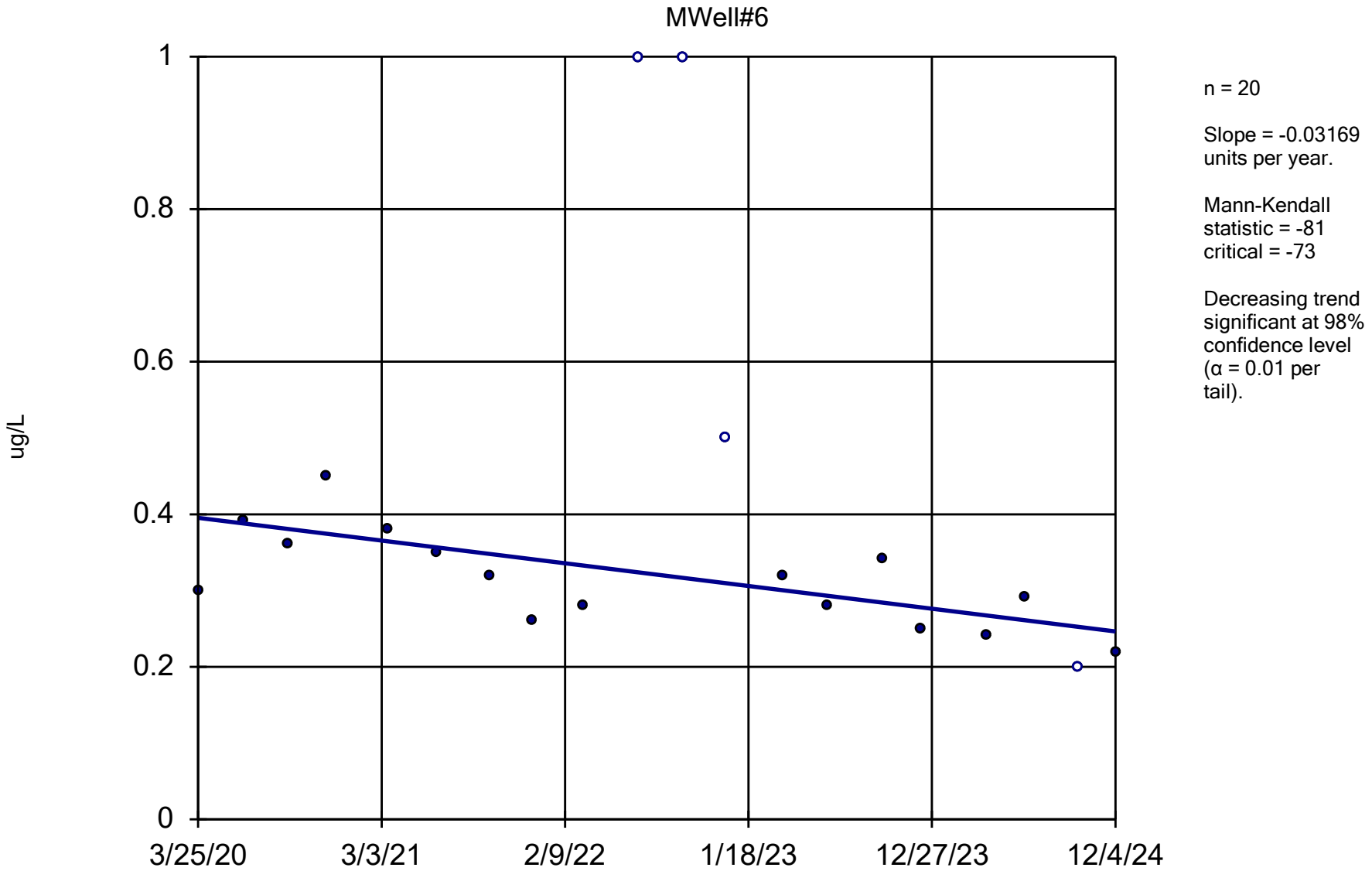
Hollow symbols indicate censored values.

Sen's Slope Estimator



Constituent: 1,2-Dichloroethane Analysis Run 2/2/2025 4:36 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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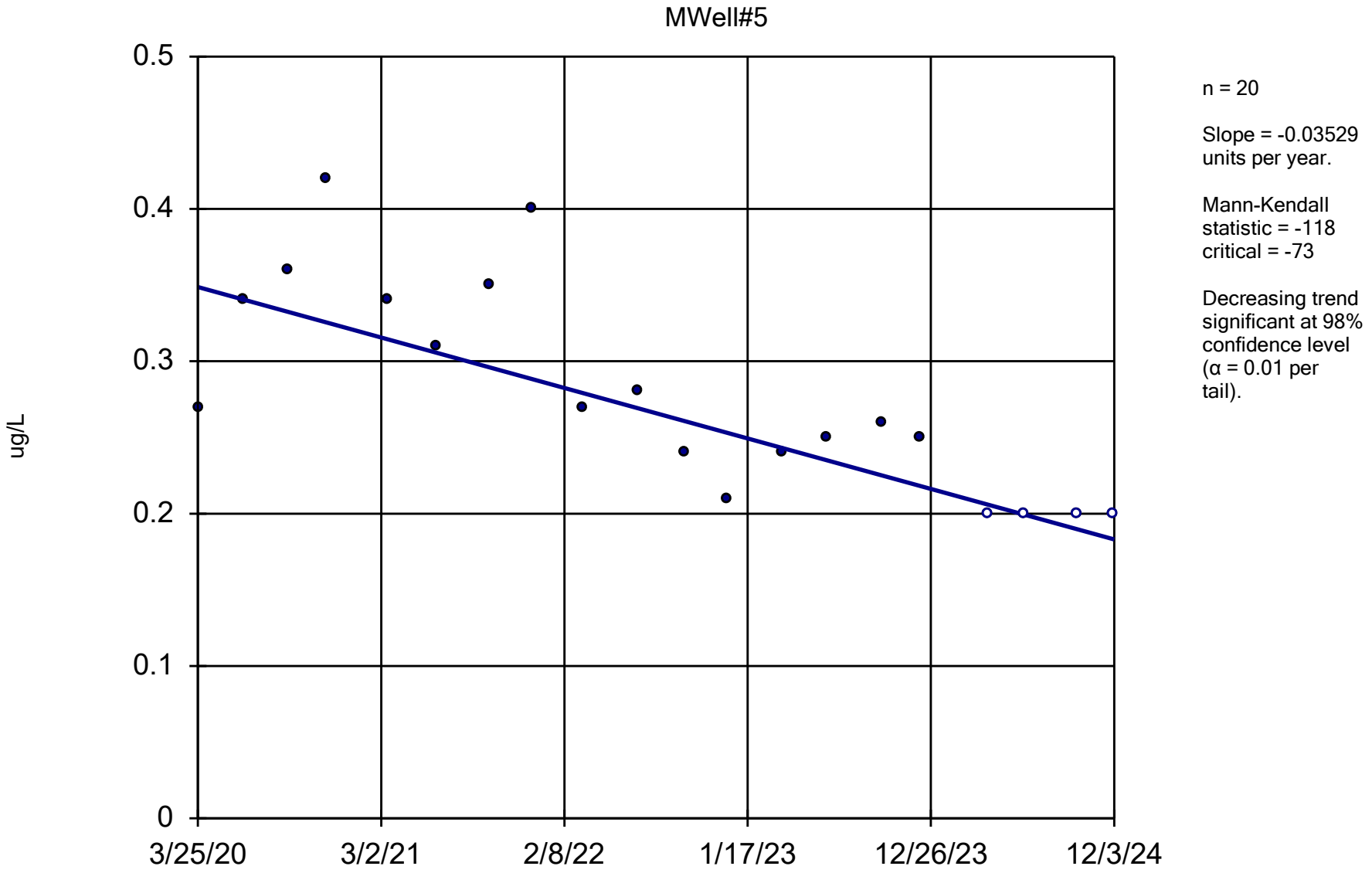
Hollow symbols indicate censored values.

Sen's Slope Estimator

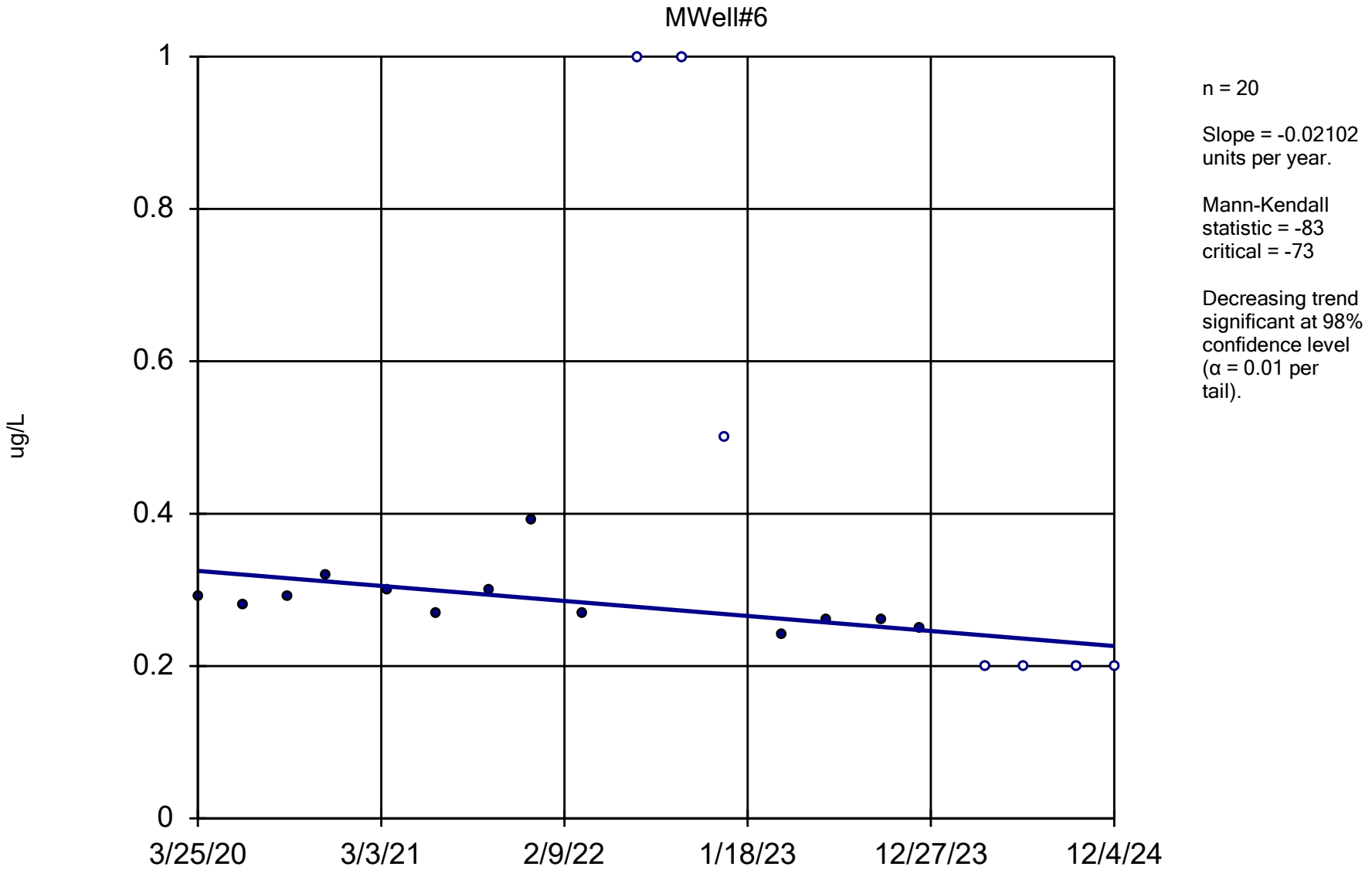


Constituent: 1,2-Dichloropropane Analysis Run 2/2/2025 4:36 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

Sen's Slope Estimator



Constituent: 1,2-Dichloropropane Analysis Run 2/2/2025 4:36 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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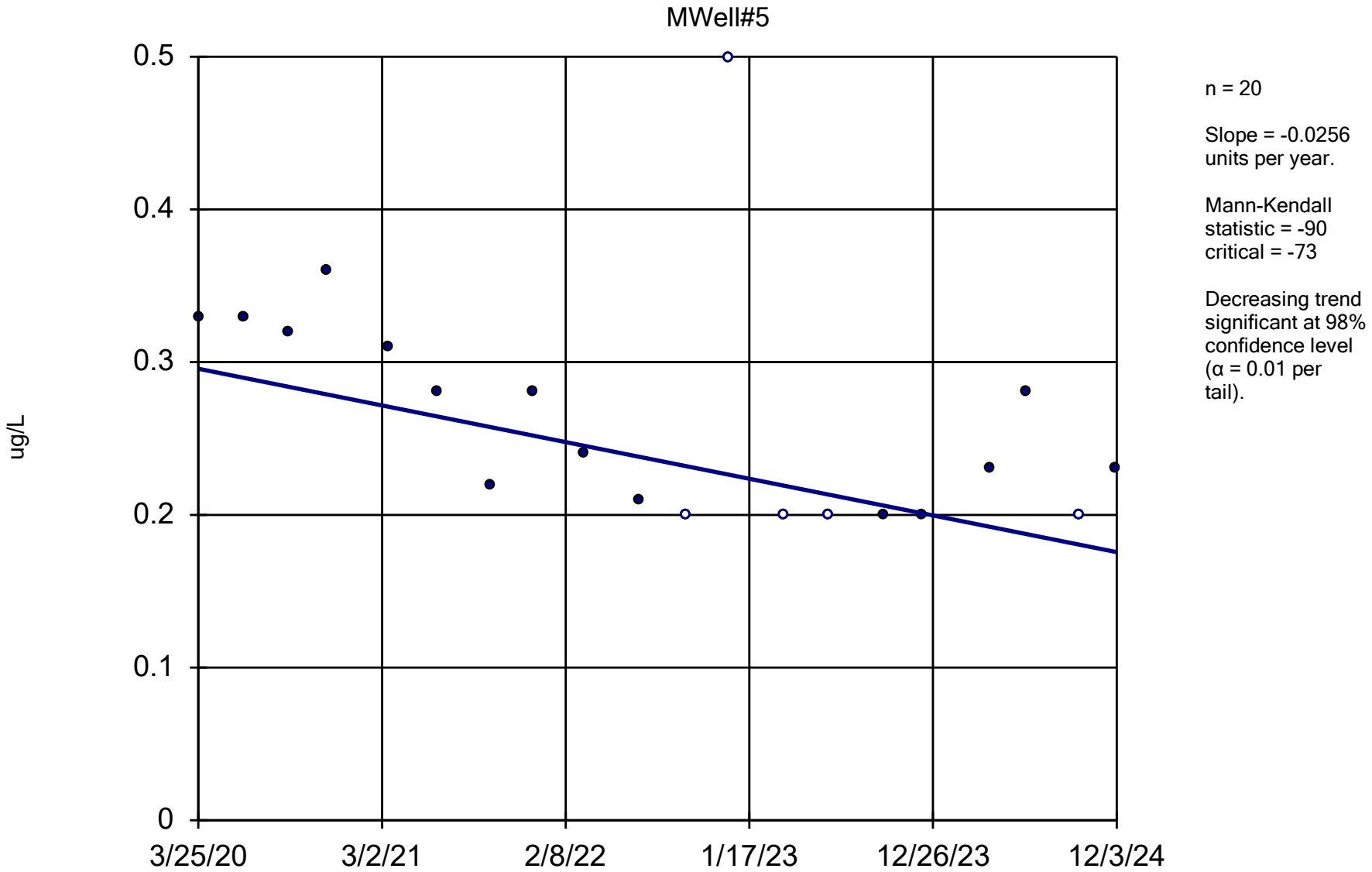
Hollow symbols indicate censored values.

Sen's Slope Estimator



Constituent: Benzene Analysis Run 2/2/2025 4:36 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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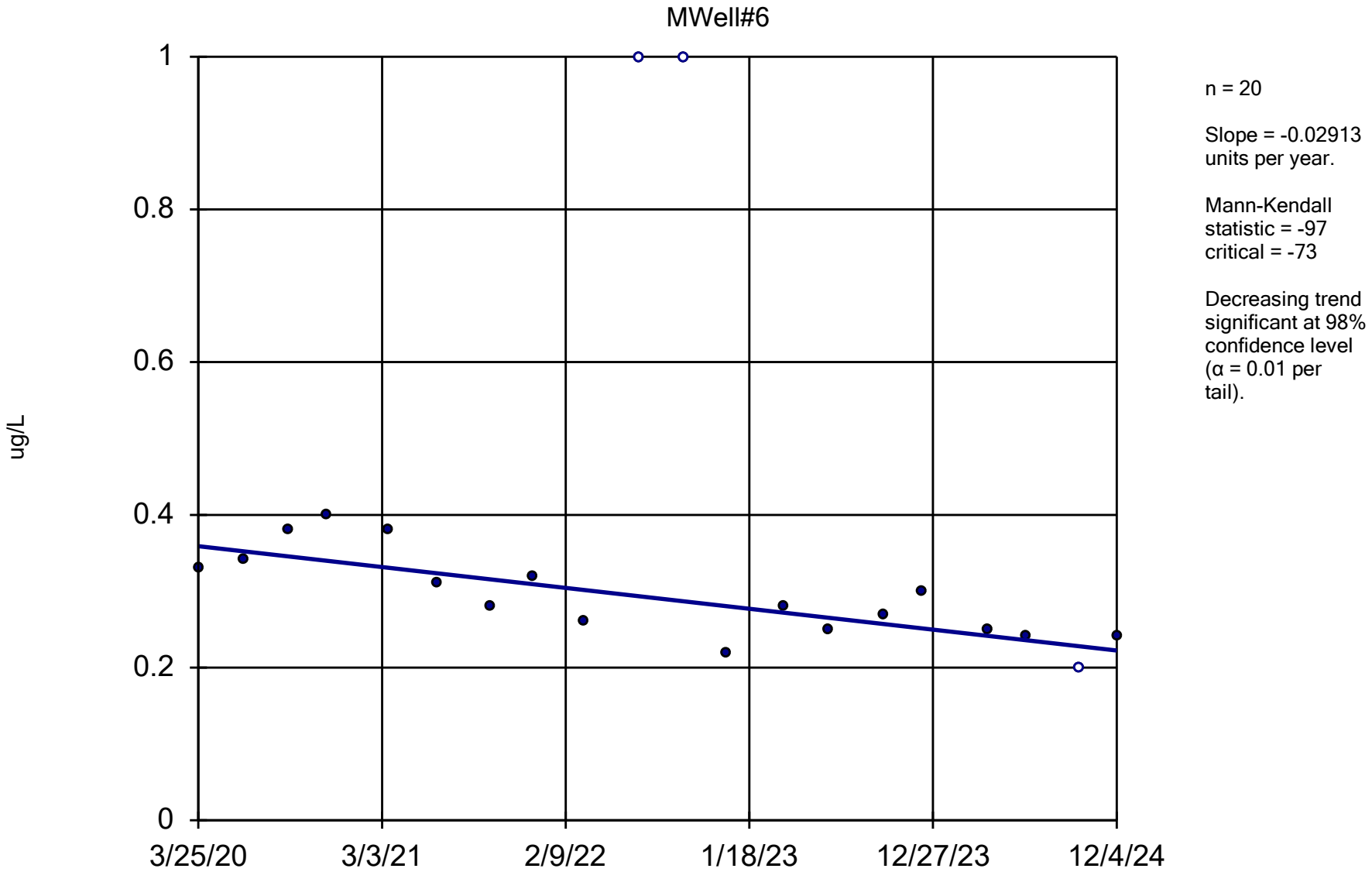
Hollow symbols indicate censored values.

Sen's Slope Estimator

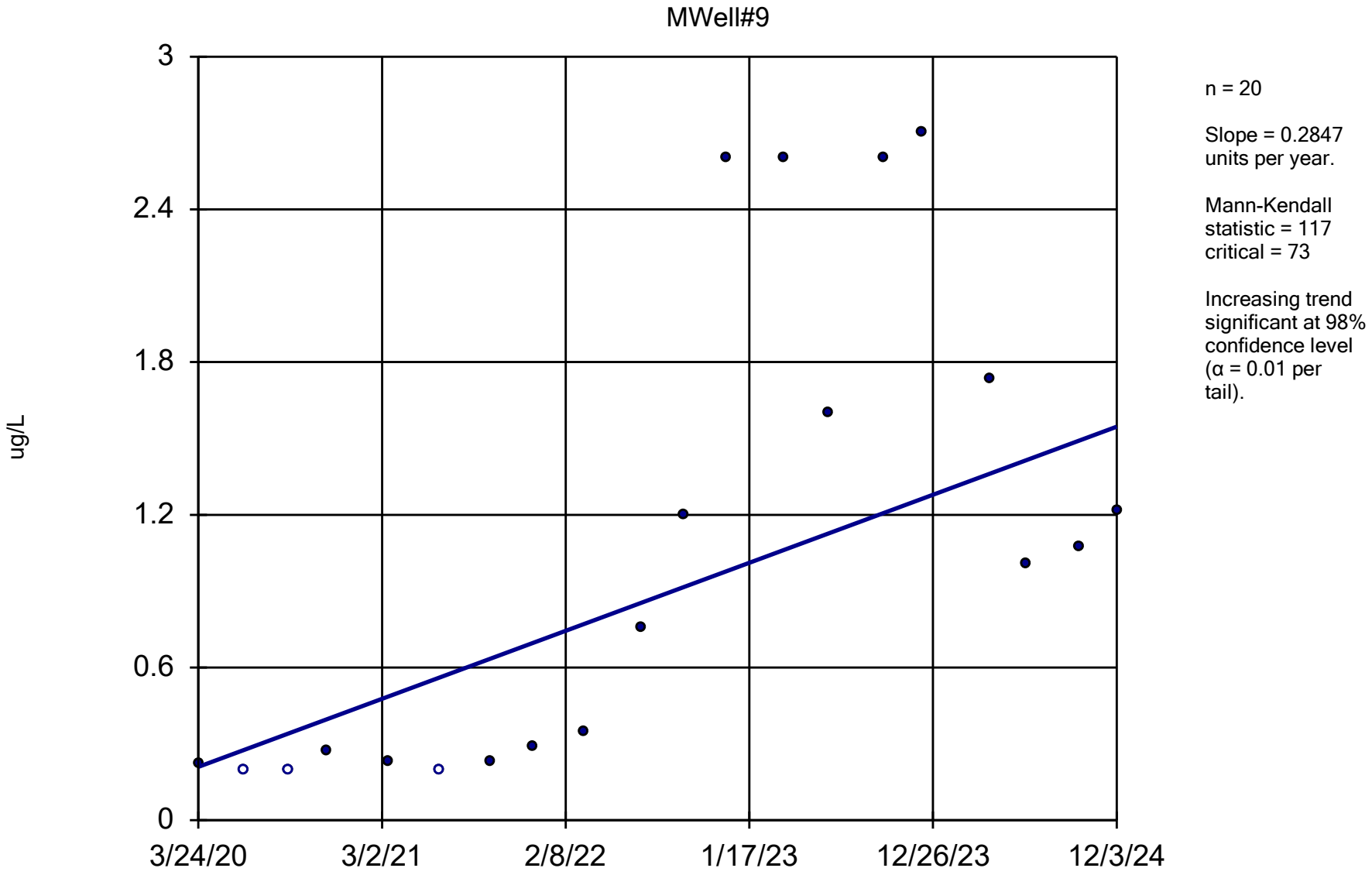


Constituent: Benzene Analysis Run 2/2/2025 4:36 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.
Hollow symbols indicate censored values.

Sen's Slope Estimator



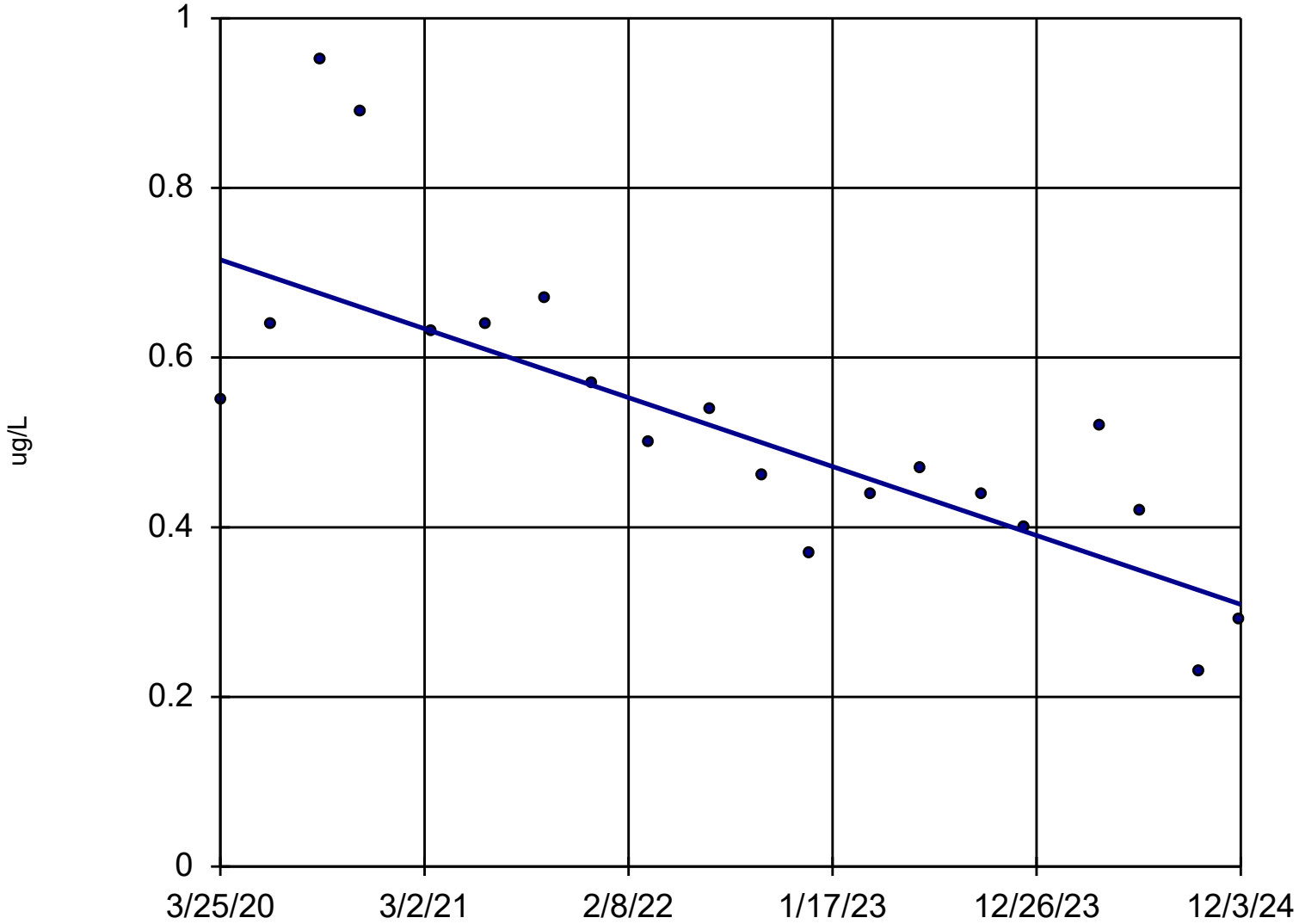
Constituent: Chloroform Analysis Run 2/2/2025 4:36 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.

Sen's Slope Estimator

MWell#10



n = 20

Slope = -0.0866 units per year.

Mann-Kendall statistic = -128
critical = -73

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Chloroform Analysis Run 2/2/2025 4:36 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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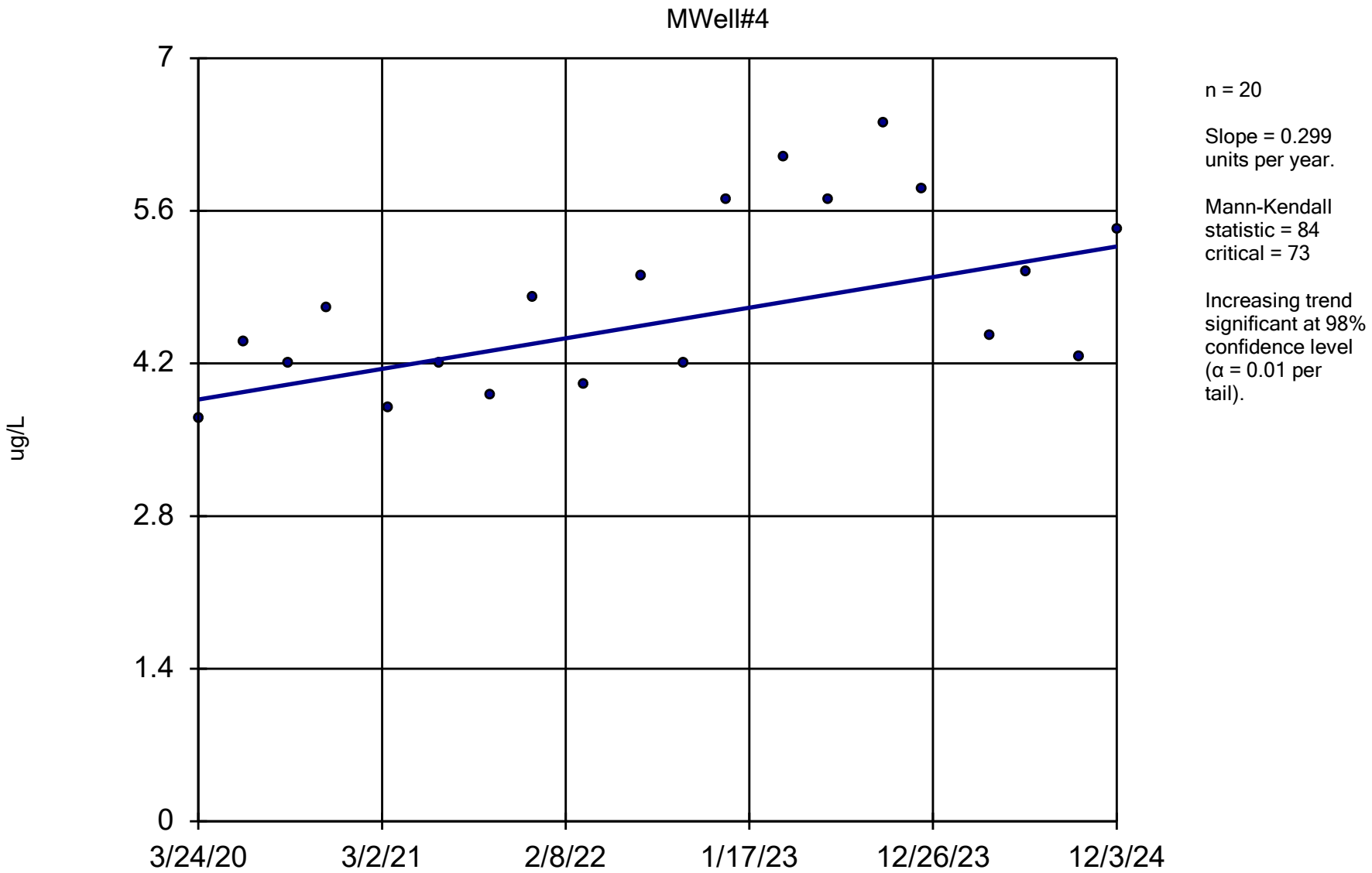
Sen's Slope Estimator



Constituent: cis-1,2-Dichloroethene Analysis Run 2/2/2025 4:36 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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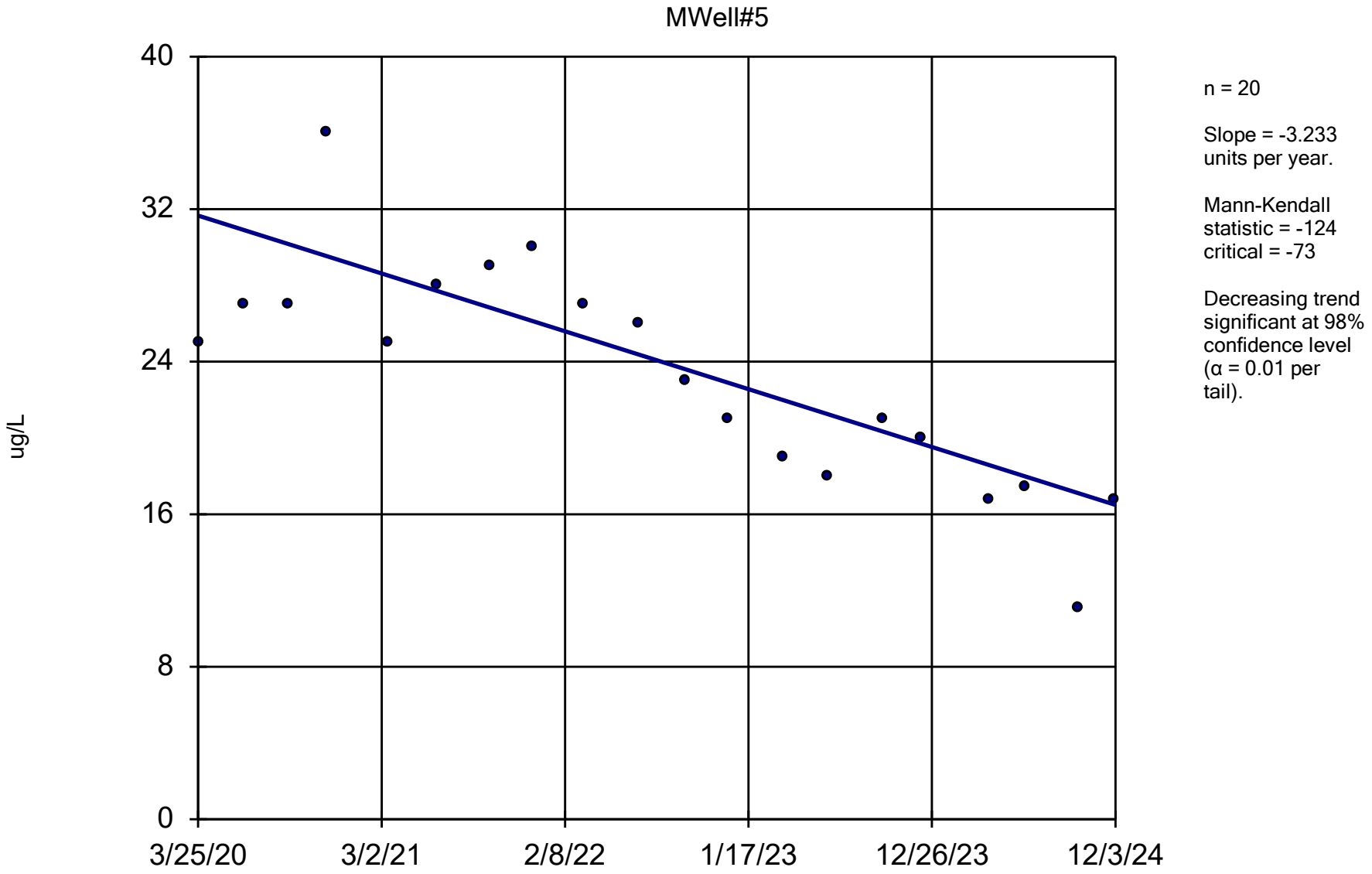
Sen's Slope Estimator



Constituent: cis-1,2-Dichloroethene Analysis Run 2/2/2025 4:36 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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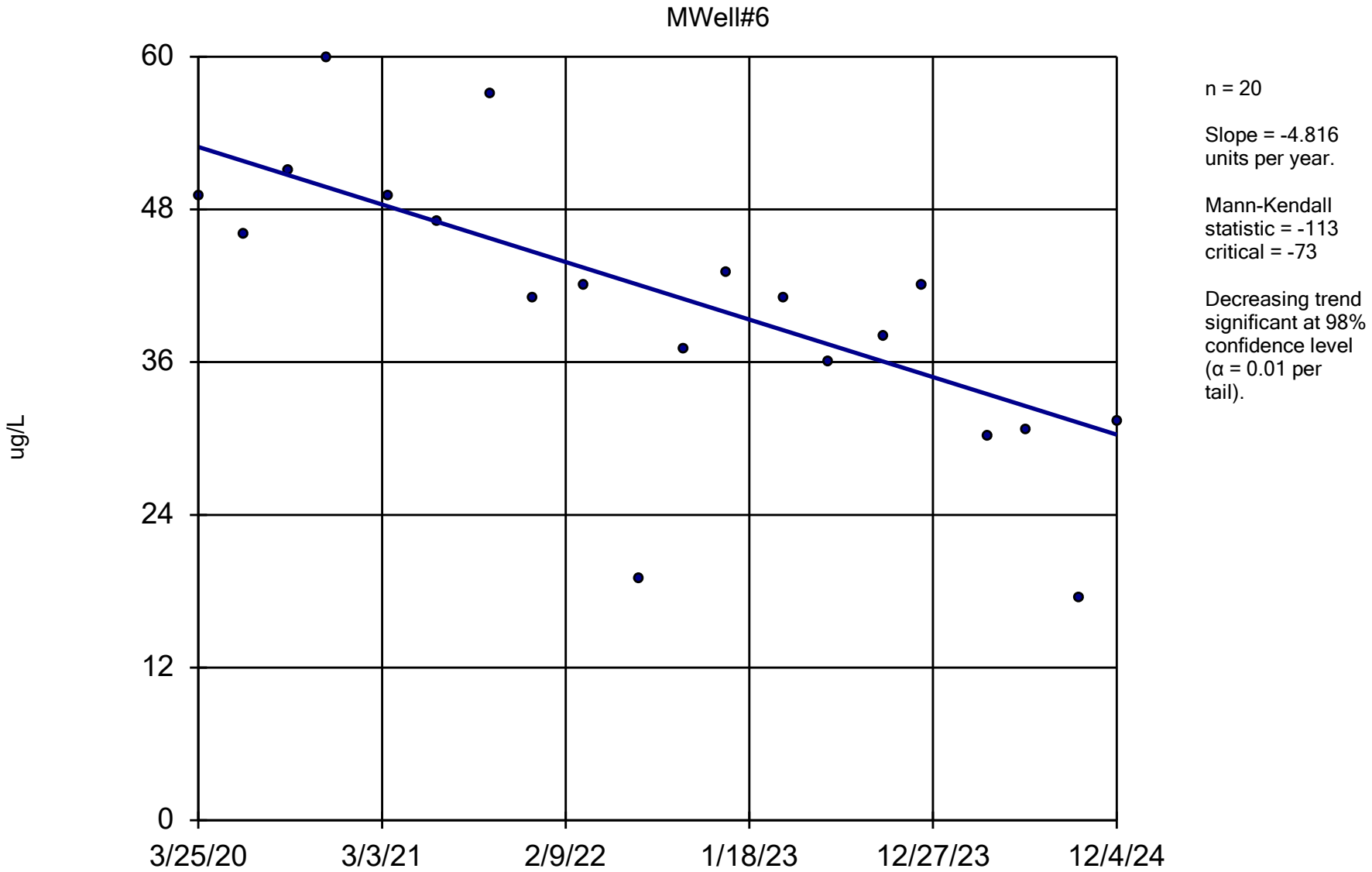
Sen's Slope Estimator



Constituent: cis-1,2-Dichloroethene Analysis Run 2/2/2025 4:36 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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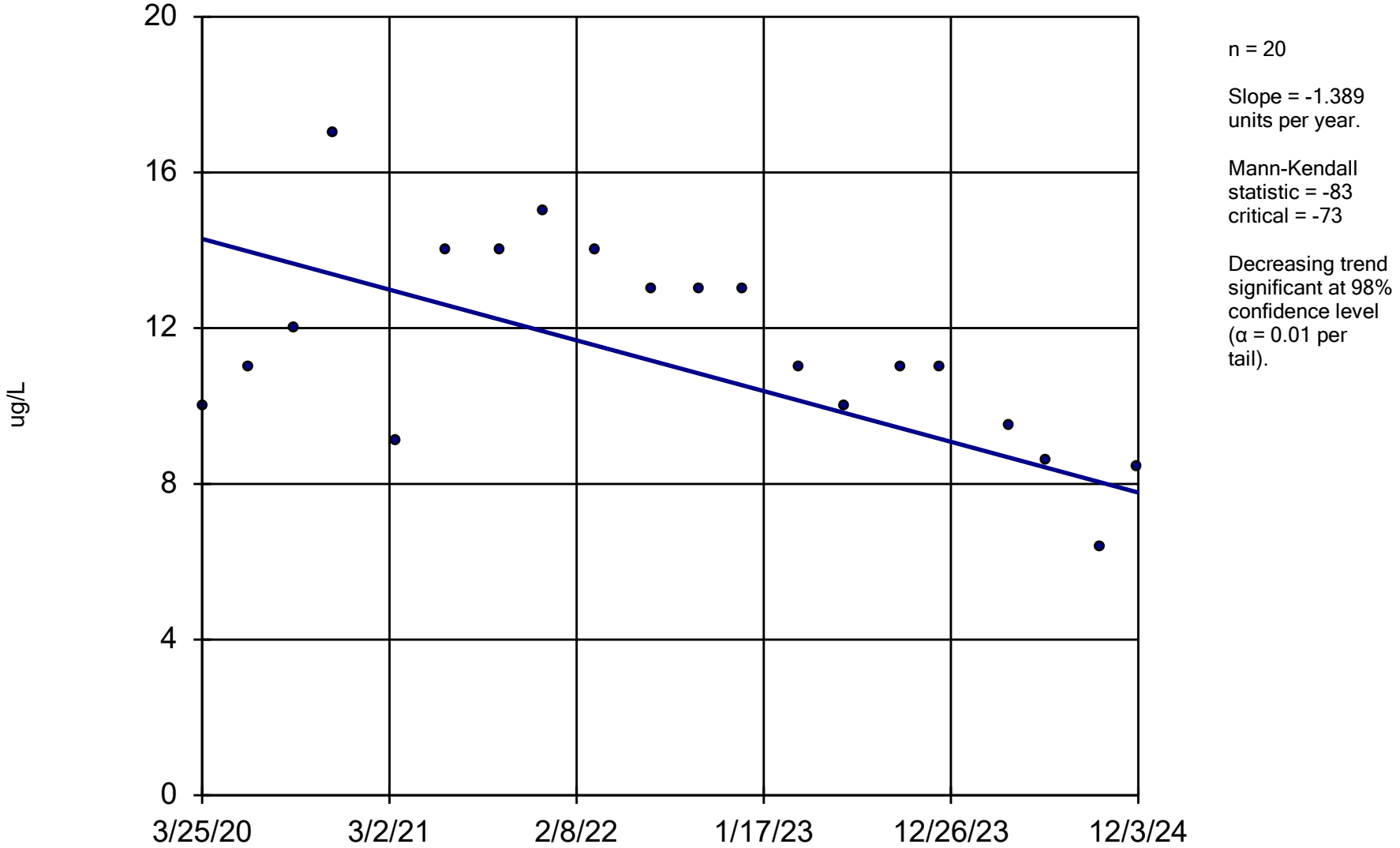
Sen's Slope Estimator

MWell#5



n = 20

Slope = -1.389 units per year.

Mann-Kendall statistic = -83
critical = -73

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Tetrachloroethene Analysis Run 2/2/2025 4:36 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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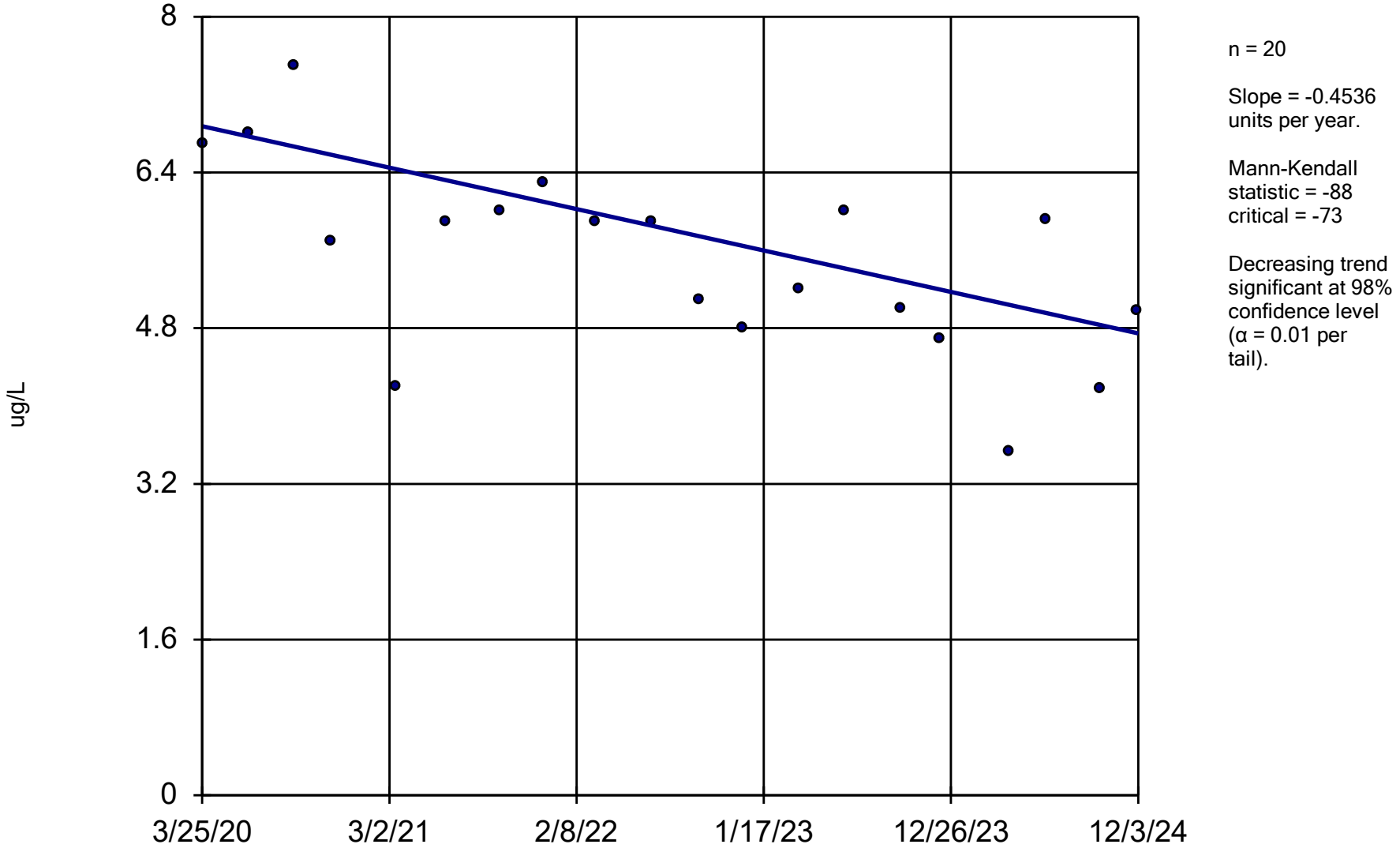
Sen's Slope Estimator

MWell#10



n = 20

Slope = -0.4536 units per year.

Mann-Kendall statistic = -88
critical = -73

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Tetrachloroethene Analysis Run 2/2/2025 4:36 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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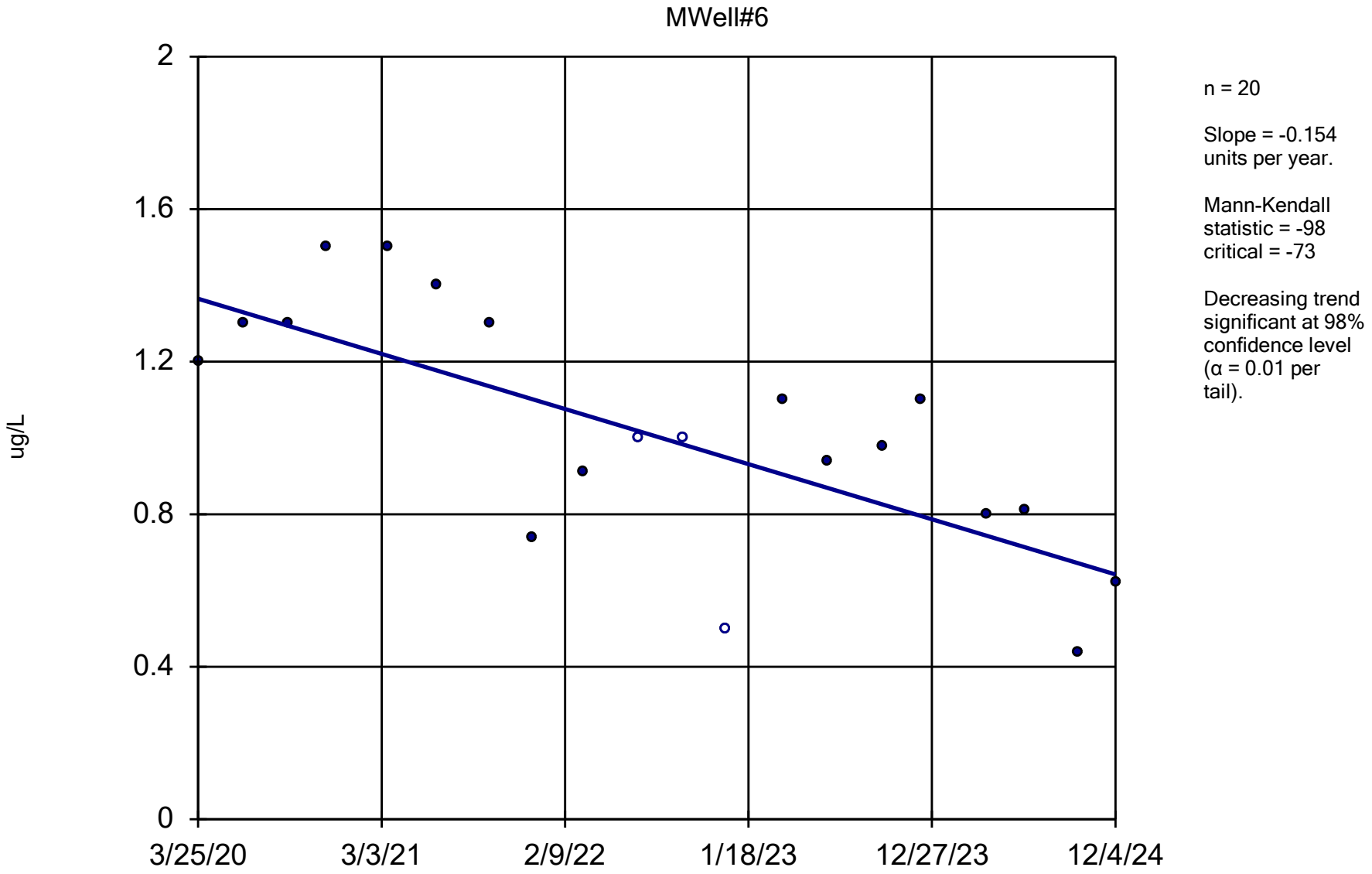
Hollow symbols indicate censored values.

Sen's Slope Estimator



Constituent: trans-1,2-Dichloroethene Analysis Run 2/2/2025 4:36 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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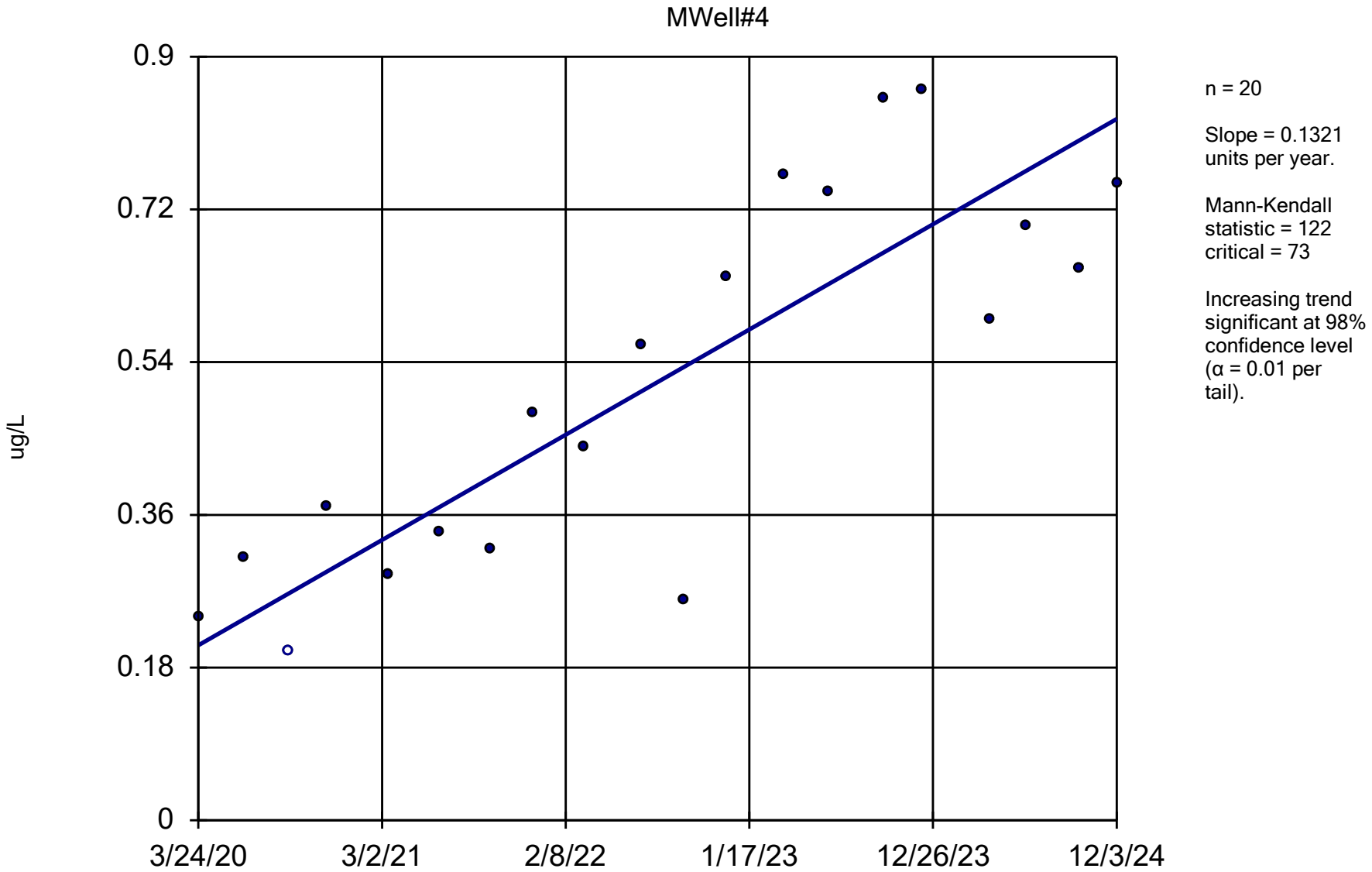
Hollow symbols indicate censored values.

Sen's Slope Estimator



Constituent: Trichloroethene Analysis Run 2/2/2025 4:36 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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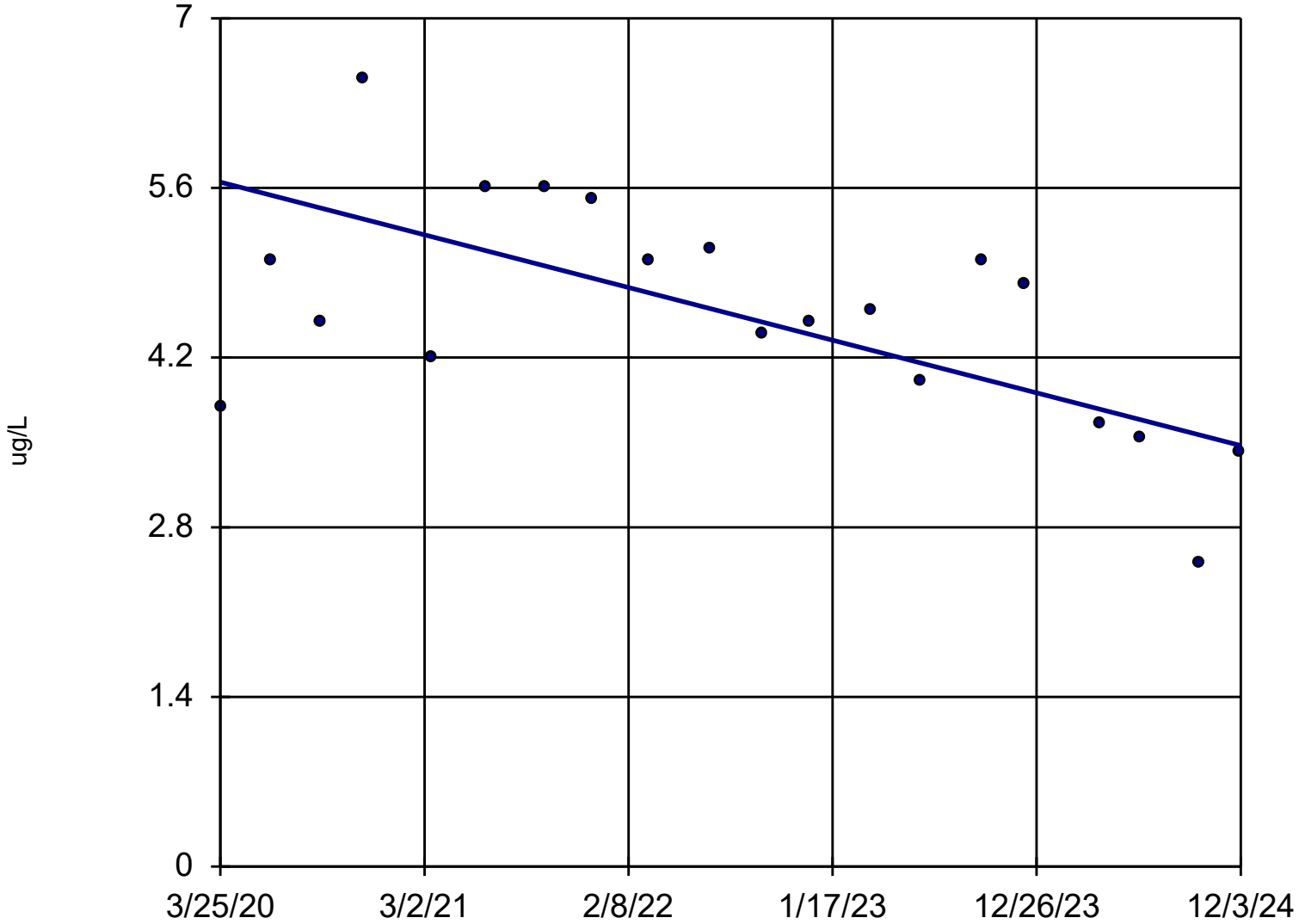
Sen's Slope Estimator

MWell#5



n = 20

Slope = -0.4633 units per year.

Mann-Kendall statistic = -81
critical = -73

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Trichloroethene Analysis Run 2/2/2025 4:36 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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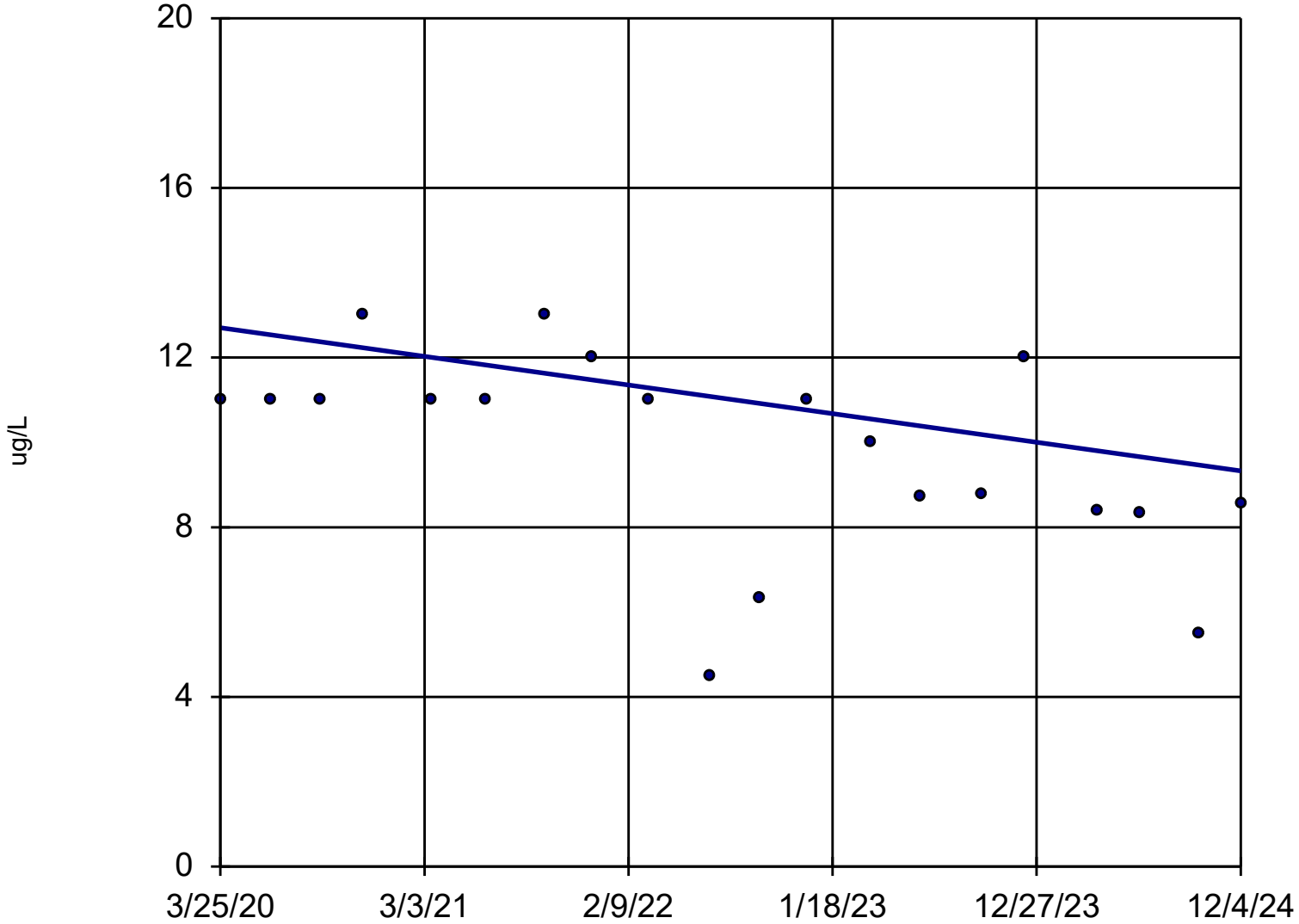
Sen's Slope Estimator

MWell#6



n = 20

Slope = -0.7182 units per year.

Mann-Kendall statistic = -77
critical = -73

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Trichloroethene Analysis Run 2/2/2025 4:36 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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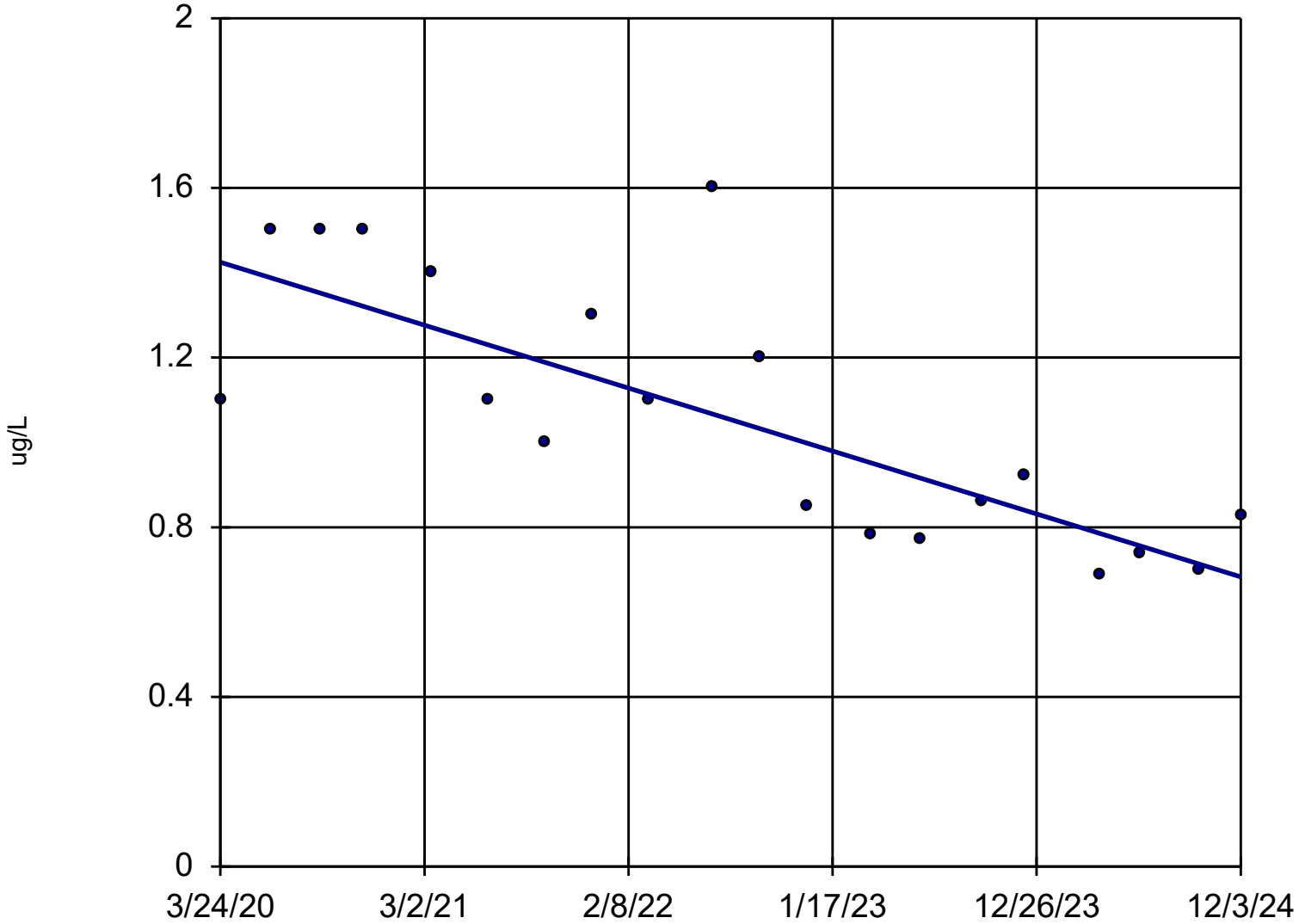
Sen's Slope Estimator

MWell#4



n = 20

Slope = -0.1579 units per year.

Mann-Kendall statistic = -114
critical = -73

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Trichlorofluoromethane Analysis Run 2/2/2025 4:36 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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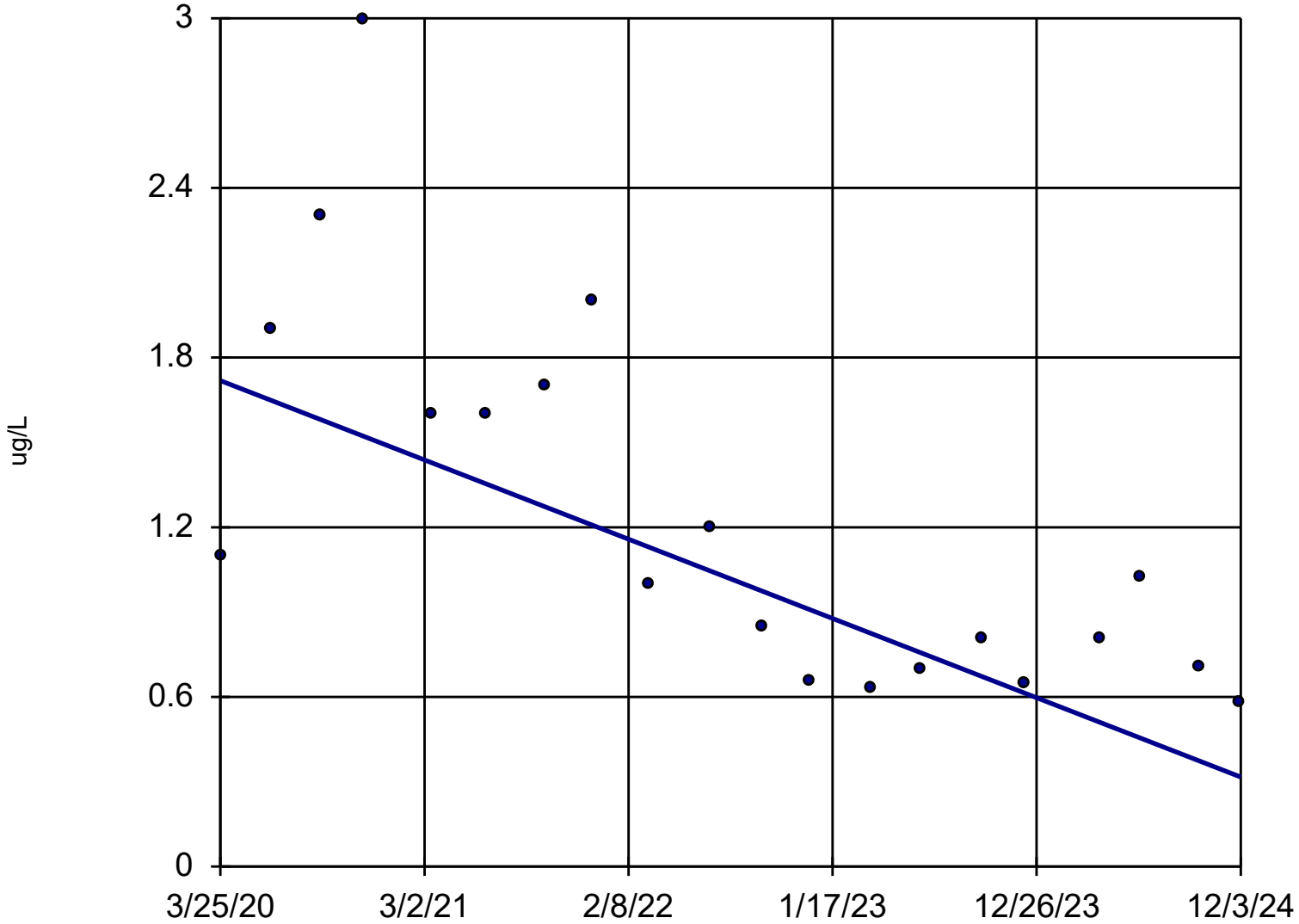
Sen's Slope Estimator

MWell#5



n = 20

Slope = -0.2987 units per year.

Mann-Kendall statistic = -108
critical = -73

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Vinyl Chloride Analysis Run 2/2/2025 4:36 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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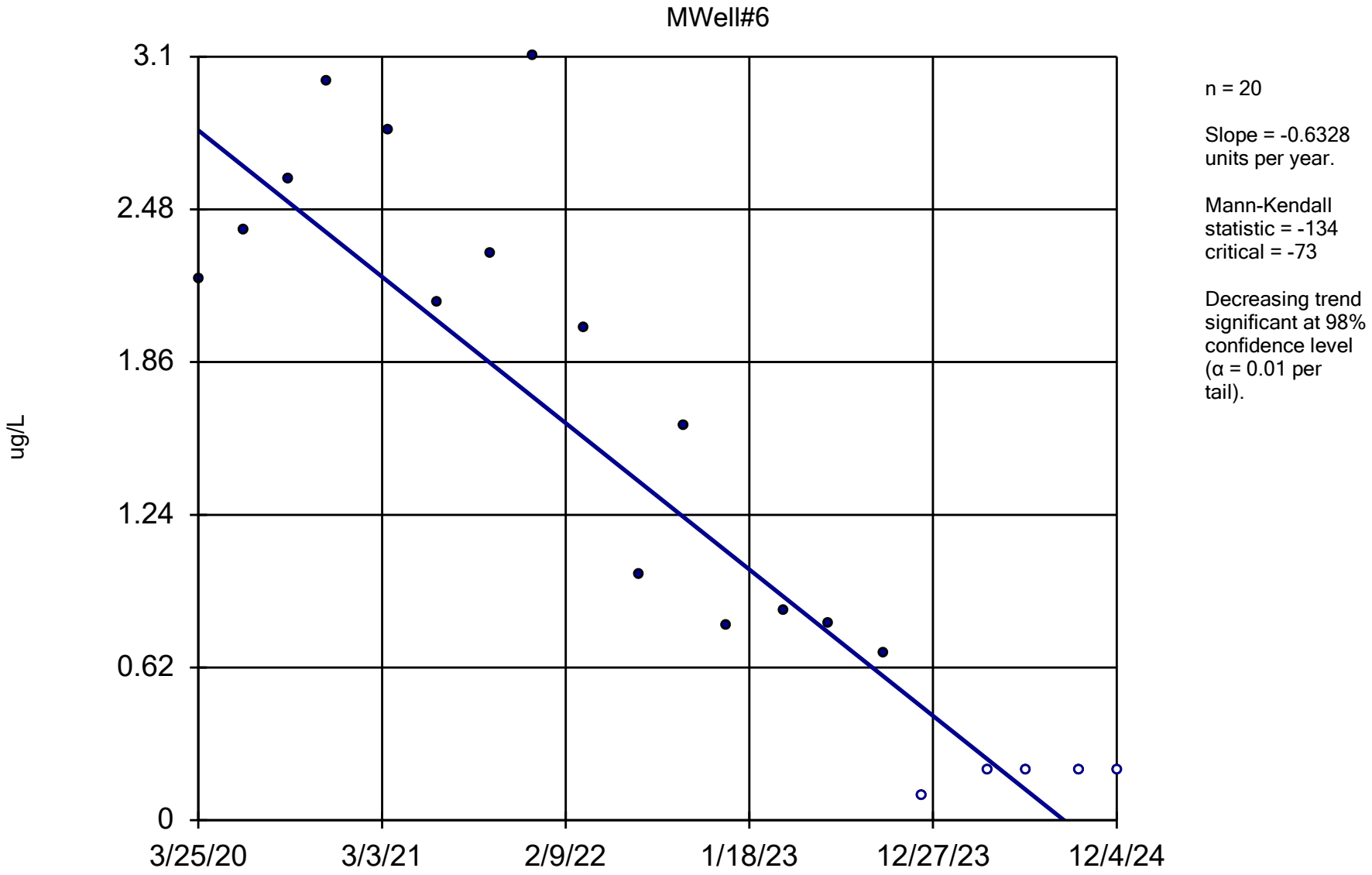
Hollow symbols indicate censored values.

Sen's Slope Estimator



Constituent: Vinyl Chloride Analysis Run 2/2/2025 4:36 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

D-3

2-Year Trends

Horn Rapids Landfill Trends for Volatile Organic Compounds, First Quarter 2023 through Fourth Quarter 2024

Constituent Name	Well	Slope	Calculated Statistic	Critical Value	Trend	N	% Non-detects	Normality	Transformation	Alpha	Method
Chloroform (ug/L)	MWell#9	-0.819	-11	-20	No	8	0	n/a	n/a	0.02	NP
cis-1,2-Dichloroethene (ug/L)	MWell#4	-0.8309	-14	-20	No	8	0	n/a	n/a	0.02	NP
Trichloroethene (ug/L)	MWell#4	-0.05912	-6	-20	No	8	0	n/a	n/a	0.02	NP

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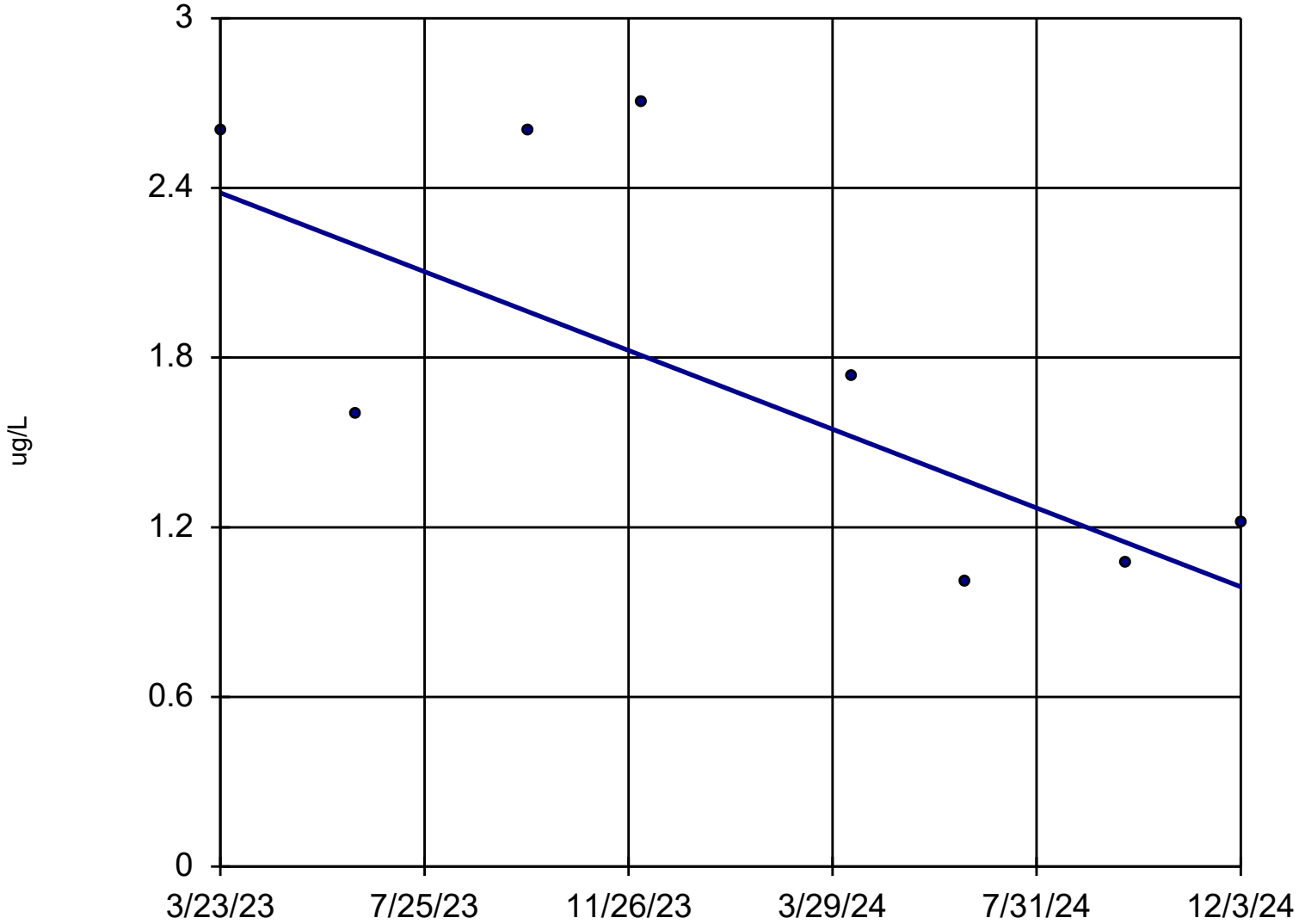
Sen's Slope Estimator

MWell#9



n = 8

Slope = -0.819 units per year.

Mann-Kendall statistic = -11
critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Chloroform Analysis Run 2/2/2025 4:12 PM View: 2-year trend

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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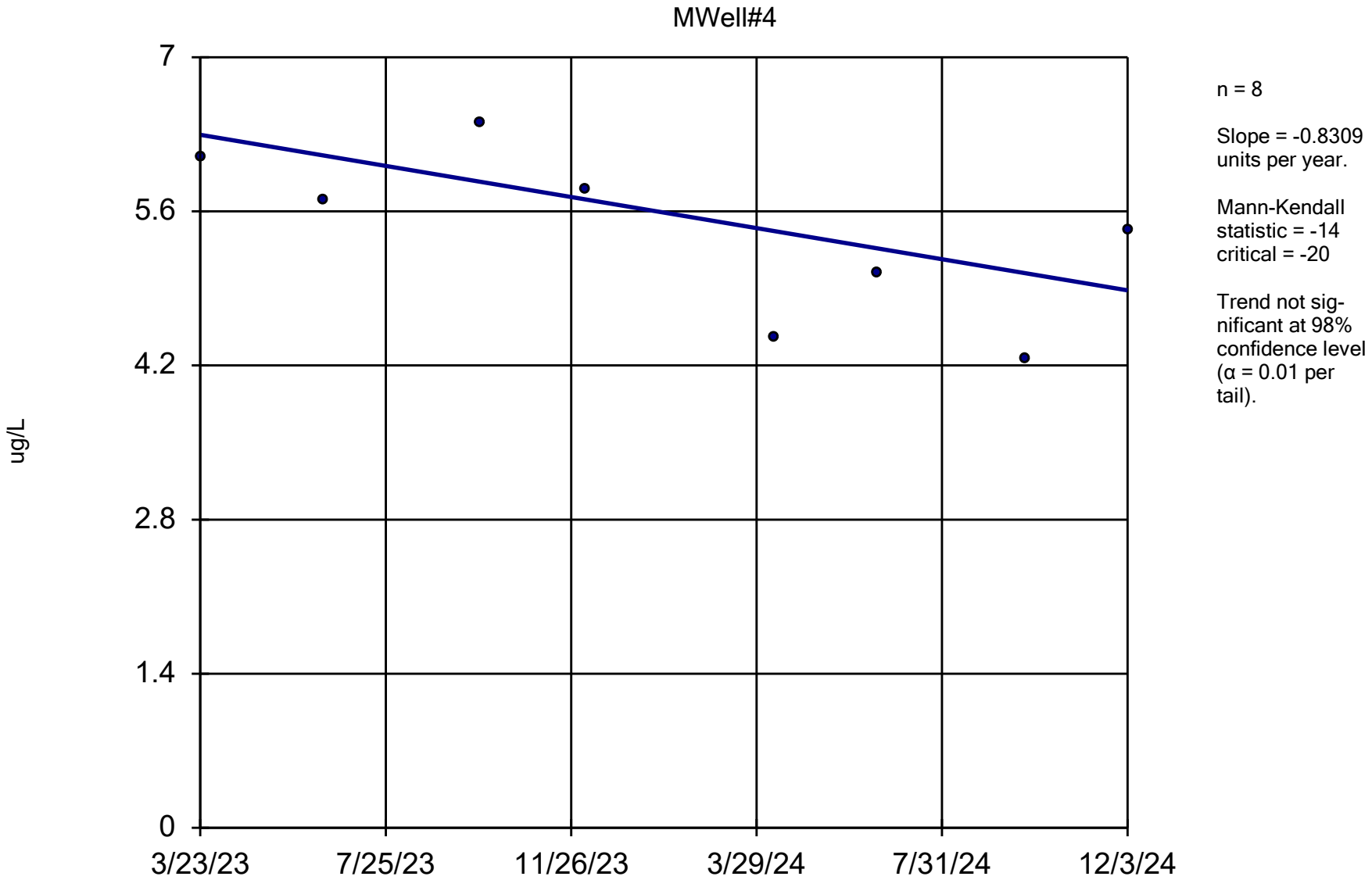
Sen's Slope Estimator

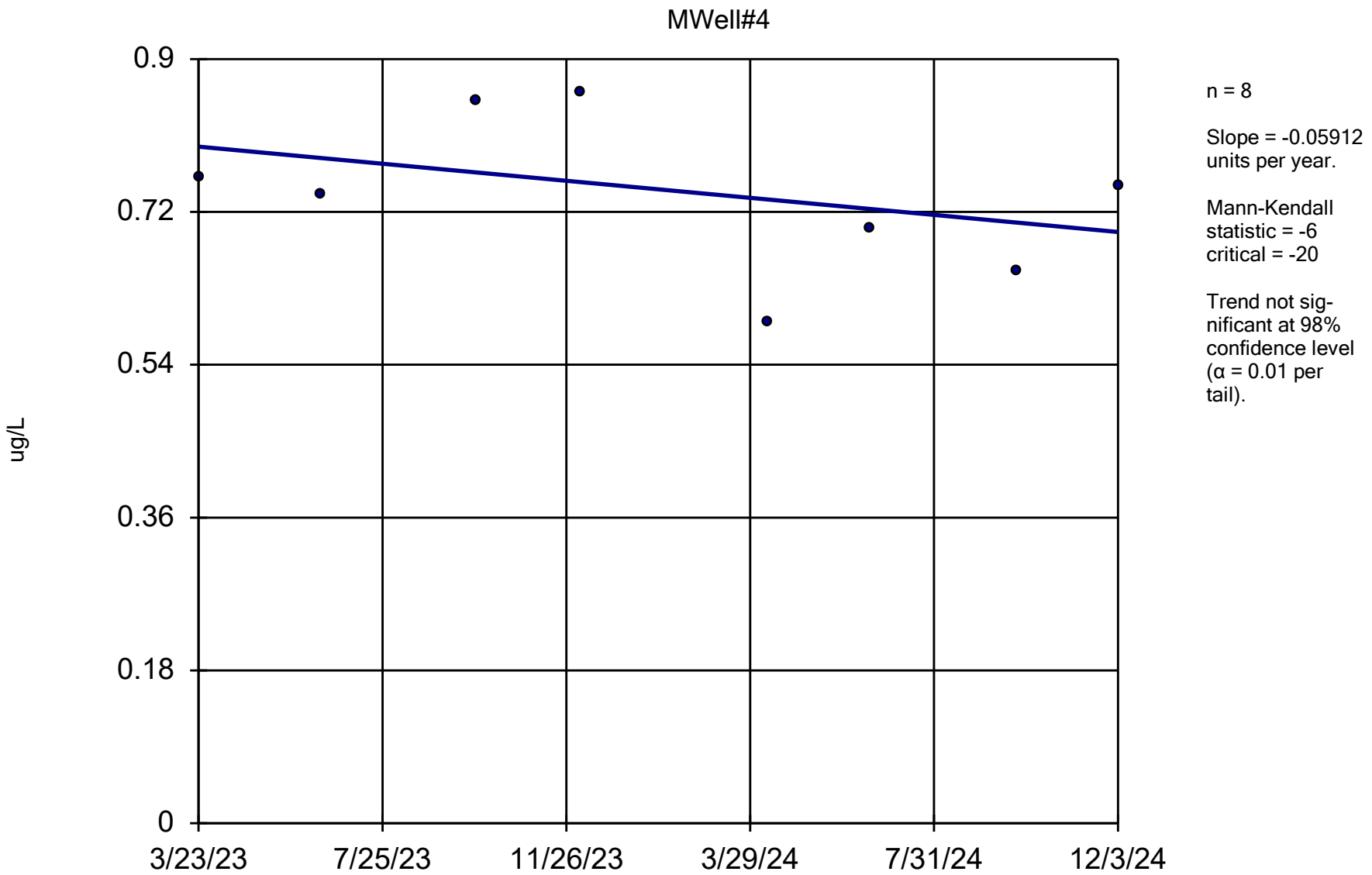


Constituent: cis-1,2-Dichloroethene Analysis Run 2/2/2025 4:12 PM View: 2-year trend

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.10.0.24 Software licensed to Parametrix.

Sen's Slope Estimator



Constituent: Trichloroethene Analysis Run 2/2/2025 4:12 PM View: 2-year trend

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Appendix E

Background Statistical Summary

HORN RAPIDS LANDFILL - FOURTH QUARTER 2024
Summary of Descriptive Statistics

Constituent Name	Well	N	Mean[1]	Variance	Standard Deviation	Standard Error	Coeffient of Variation	Median	% Non-Detects
1,1,1,2-Tetrachloroethane (ug/L)	MWell#1 (bg)[2]	131	0.907	0.998001	0.999	0.08728	1.1014333	1	100
1,1,1,2-Tetrachloroethane (ug/L)	MWell#11	57	0.4635	0.116281	0.341	0.04516	0.73570658	0.3	100
1,1,1-Trichloroethane (ug/L)	MWell#1	131	0.8842	1.022121	1.011	0.08833	1.14340647	0.73	100
1,1,1-Trichloroethane (ug/L)	MWell#11	57	0.4198	0.12938409	0.3597	0.04765	0.85683659	0.2	100
1,1,2,2-Tetrachloroethane (ug/L)	MWell#1	131	0.8889	1.0201	1.01	0.08828	1.1362358	1	100
1,1,2,2-Tetrachloroethane (ug/L)	MWell#11	57	0.4218	0.13082689	0.3617	0.04791	0.85751541	0.2	100
1,1,2-Trichloroethane (ug/L)	MWell#1	131	0.8944	1.030225	1.015	0.08872	1.134839	1	100
1,1,2-Trichloroethane (ug/L)	MWell#11	57	0.417	0.12809241	0.3579	0.0474	0.85827338	0.2	100
1,1-Dichloroethane (ug/L)	MWell#1	131	0.9008	1.0201	1.01	0.08828	1.12122558	1	96.18
1,1-Dichloroethane (ug/L)	MWell#11	57	0.4351	0.15233409	0.3903	0.05169	0.89703516	0.2	100
1,1-Dichloroethene (ug/L)	MWell#1	131	1.089	2.292196	1.514	0.1323	1.3902663	1	100
1,1-Dichloroethene (ug/L)	MWell#11	57	0.4037	0.14227984	0.3772	0.04997	0.9343572	0.2	100
1,2,3-Trichloropropane (ug/L)	MWell#1	131	0.9684	1.640961	1.281	0.1119	1.3228005	1	100
1,2,3-Trichloropropane (ug/L)	MWell#11	57	0.4414	0.12411529	0.3523	0.04667	0.79814227	0.2	100
1,2-Dibromo-3-chloropropane (ug/L)	MWell#1	129	2.803	6.185169	2.487	0.2189	0.88726365	2	100
1,2-Dibromo-3-chloropropane (ug/L)	MWell#11	57	1.798	0.26091664	0.5108	0.06766	0.28409344	2	100
1,2-Dibromoethane (ug/L)	MWell#1	130	0.927	1.713481	1.309	0.1148	1.41208198	0.8	100
1,2-Dibromoethane (ug/L)	MWell#11	57	0.3528	0.15610401	0.3951	0.05233	1.11989796	0.1	100
1,2-Dichlorobenzene (ug/L)	MWell#1	130	1.076	2.247001	1.499	0.1315	1.39312268	1	99.23
1,2-Dichlorobenzene (ug/L)	MWell#11	57	0.5053	0.13586596	0.3686	0.04882	0.72946764	0.3	100
1,2-Dichloroethane (ug/L)	MWell#1	130	0.9208	1.065024	1.032	0.09055	1.12076455	1	100
1,2-Dichloroethane (ug/L)	MWell#11	57	0.4263	0.13586596	0.3686	0.04883	0.86464931	0.2	100
1,2-Dichloropropane (ug/L)	MWell#1	127	0.9647	1.1449	1.07	0.09492	1.1091531	0.6	100
1,2-Dichloropropane (ug/L)	MWell#11	57	0.4232	0.13213225	0.3635	0.04815	0.85893195	0.2	100
1,4-Dichlorobenzene (ug/L)	MWell#1	130	1.076	2.25	1.5	0.1316	1.39405204	1	99.23
1,4-Dichlorobenzene (ug/L)	MWell#11	57	0.507	0.14100025	0.3755	0.04974	0.74063116	0.3	100
2-Butanone (ug/L)	MWell#1	125	9.428	64.176121	8.011	0.7165	0.84970301	10	97.6
2-Butanone (ug/L)	MWell#11	57	10.18	11.182336	3.344	0.4429	0.32848723	10	100
2-Hexanone (ug/L)	MWell#1	125	4.891	15.124321	3.889	0.3478	0.79513392	5	99.2
2-Hexanone (ug/L)	MWell#11	57	3.395	1.703025	1.305	0.1729	0.38438881	3	100
4-Methyl-2-pentanone (ug/L)	MWell#1	124	5.462	9.891025	3.145	0.2824	0.57579641	5	100

[1] All statistics based on Non-Detects = 1/2 MDL [2] (bg) indicates a background well.

HORN RAPIDS LANDFILL - FOURTH QUARTER 2024
Summary of Descriptive Statistics

Constituent Name	Well	N	Mean[1]	Variance	Standard Deviation	Standard Error	Coeffient of Variation	Median	% Non-Detects
4-Methyl-2-pentanone (ug/L)	MWell#11	57	6.061	6.651241	2.579	0.3416	0.42550734	5	100
Acetone (ug/L)	MWell#1	127	14.97	4745.8321	68.89	6.113	4.60187041	6	95.28
Acetone (ug/L)	MWell#11	57	6.968	11.614464	3.408	0.4514	0.489093	10	100
Acrylonitrile (ug/L)	MWell#1	125	5.706	21.864976	4.676	0.4182	0.81948826	5	100
Acrylonitrile (ug/L)	MWell#11	57	6.811	9.9225	3.15	0.4173	0.46248715	5	100
Ammonia Nitrogen (mg/L)	MWell#1	130	0.1548	0.030625	0.175	0.01534	1.13049096	0.1	80
Ammonia Nitrogen (mg/L)	MWell#11	57	0.2895	0.06640929	0.2577	0.03414	0.89015544	0.2	92.98
Antimony, Dissolved (mg/L)	MWell#1	84	0.01785	0.00143338	0.03786	0.004131	2.1210084	0.001	95.24
Antimony, Dissolved (mg/L)	MWell#11	21	0.0004	0	0	0	0	0.0004	100
Antimony, Total (mg/L)	MWell#1	46	0.000591	5.1484E-08	0.0002269	3.345E-05	0.38373076	0.0004	100
Antimony, Total (mg/L)	MWell#11	45	0.000582	4.8753E-08	0.0002208	3.292E-05	0.37925112	0.0004	100
Arsenic, Dissolved (mg/L)	MWell#1	85	0.01001	0.00018442	0.01358	0.001473	1.35664336	0.005	15.29
Arsenic, Dissolved (mg/L)	MWell#11	21	0.004729	7.5812E-07	0.0008707	0.00019	0.18411926	0.0049	0
Arsenic, Total (mg/L)	MWell#1	46	0.004229	1.8619E-07	0.0004315	6.362E-05	0.10203358	0.00416	0
Arsenic, Total (mg/L)	MWell#11	45	0.004898	1.57E-06	0.001253	0.0001867	0.2558187	0.0046	0
Barium, Dissolved (mg/L)	MWell#1	85	0.04711	0.00030485	0.01746	0.001894	0.37062195	0.05	9.412
Barium, Dissolved (mg/L)	MWell#11	21	0.08352	0.00025985	0.01612	0.003518	0.19300766	0.08	0
Barium, Total (mg/L)	MWell#1	46	0.05485	7.3239E-05	0.008558	0.001262	0.15602552	0.055	0
Barium, Total (mg/L)	MWell#11	45	0.1022	0.00016307	0.01277	0.001904	0.12495108	0.1	0
Benzene (ug/L)	MWell#1	131	0.9176	1.058841	1.029	0.08992	1.12140366	1	100
Benzene (ug/L)	MWell#11	57	0.5496	0.362404	0.602	0.07973	1.09534207	0.2	89.47
Beryllium, Dissolved (mg/L)	MWell#1	85	0.001263	1.5725E-06	0.001254	0.000136	0.99287411	0.001	100
Beryllium, Dissolved (mg/L)	MWell#11	21	0.0004	0	0	0	0	0.0004	100
Beryllium, Total (mg/L)	MWell#1	46	0.000452	2.9207E-08	0.0001709	0.0000252	0.37793012	0.0004	100
Beryllium, Total (mg/L)	MWell#11	45	0.00044	2.2922E-08	0.0001514	2.256E-05	0.34409091	0.0004	100
Bromochloromethane (ug/L)	MWell#1	130	0.8938	1.028196	1.014	0.08893	1.13448199	1	99.23
Bromochloromethane (ug/L)	MWell#11	57	0.4351	0.14160169	0.3763	0.04984	0.86485865	0.2	100
Bromodichloromethane (ug/L)	MWell#1	131	0.8893	1.0201	1.01	0.08828	1.13572473	1	100
Bromodichloromethane (ug/L)	MWell#11	57	0.4228	0.131769	0.363	0.04808	0.85856197	0.2	100
Bromoform (ug/L)	MWell#1	131	0.9725	0.933156	0.966	0.0844	0.9933162	1	100
Bromoform (ug/L)	MWell#11	57	0.614	0.08874441	0.2979	0.03945	0.48517915	0.5	100

[1] All statistics based on Non-Detects = 1/2 MDL [2] (bg) indicates a background well.

HORN RAPIDS LANDFILL - FOURTH QUARTER 2024
Summary of Descriptive Statistics

Constituent Name	Well	N	Mean[1]	Variance	Standard Deviation	Standard Error	Coeffient of Variation	Median	% Non-Detects
Bromomethane (ug/L)	MWell#1	129	2.022	5.574321	2.361	0.2079	1.16765579	1	99.22
Bromomethane (ug/L)	MWell#11	57	1.826	3.755844	1.938	0.2567	1.06133625	1	100
Cadmium, Dissolved (mg/L)	MWell#1	85	0.002135	5.978E-06	0.002445	0.0002652	1.14519906	0.001	98.82
Cadmium, Dissolved (mg/L)	MWell#11	21	0.0004	0	0	0	0	0.0004	100
Cadmium, Total (mg/L)	MWell#1	46	0.000444	1.3179E-08	0.0001148	1.693E-05	0.25885006	0.0004	100
Cadmium, Total (mg/L)	MWell#11	45	0.000442	1.341E-08	0.0001158	1.726E-05	0.26187246	0.0004	100
Calcium, Dissolved (mg/L)	MWell#1	120	101.3	936.9721	30.61	2.795	0.30217177	110	0
Calcium, Dissolved (mg/L)	MWell#11	57	216.9	3800.7225	61.65	8.166	0.28423237	240	0
Calcium, Total (mg/L)	MWell#1	8	118.3	430.1476	20.74	7.333	0.17531699	120	0
Calcium, Total (mg/L)	MWell#11	8	182.5	1164.1744	34.12	12.06	0.1869589	200	0
Carbon Disulfide (ug/L)	MWell#1	125	3.81	164.0961	12.81	1.146	3.36220472	1	98.4
Carbon Disulfide (ug/L)	MWell#11	57	0.4772	0.12716356	0.3566	0.04723	0.74727578	0.3	100
Carbon Tetrachloride (ug/L)	MWell#1	130	0.9338	1.085764	1.042	0.0914	1.11587064	0.8	100
Carbon Tetrachloride (ug/L)	MWell#11	57	0.4298	0.14145121	0.3761	0.04981	0.87505817	0.2	100
Carbonate (mg/L)	MWell#1	8	6.875	6.697744	2.588	0.9149	0.37643636	5	100
Chloride (mg/L)	MWell#1	132	20.33	106.2961	10.31	0.8971	0.50713232	22.45	0
Chloride (mg/L)	MWell#11	57	163.3	5683.6521	75.39	9.986	0.46166565	200	0
Chlorobenzene (ug/L)	MWell#1	131	0.8901	1.0201	1.01	0.08829	1.13470397	1	100
Chlorobenzene (ug/L)	MWell#11	57	0.4246	0.13366336	0.3656	0.04843	0.86104569	0.2	100
Chloroethane (ug/L)	MWell#1	131	1.798	5.635876	2.374	0.2075	1.32035595	1	100
Chloroethane (ug/L)	MWell#11	57	1.669	4.052169	2.013	0.2666	1.20611144	0.5	100
Chloroform (ug/L)	MWell#1	131	0.8921	1.032256	1.016	0.08877	1.13888578	1	93.89
Chloroform (ug/L)	MWell#11	57	0.4474	0.18215824	0.4268	0.05653	0.95395619	0.2	98.25
Chloromethane (ug/L)	MWell#1	129	1.964	6.081156	2.466	0.2172	1.25560081	1	99.22
Chloromethane (ug/L)	MWell#11	57	1.651	4.112784	2.028	0.2687	1.22834646	0.5	100
Chromium, Dissolved (mg/L)	MWell#1	85	0.006041	5.5667E-05	0.007461	0.0008093	1.23506042	0.0036	30.59
Chromium, Dissolved (mg/L)	MWell#11	21	0.004514	2.2801E-06	0.00151	0.0003295	0.33451484	0.0042	0
Chromium, Total (mg/L)	MWell#1	46	0.003635	0.00000121	0.0011	0.0001621	0.30261348	0.0034	8.696
Chromium, Total (mg/L)	MWell#11	45	0.008668	0.00011364	0.01066	0.001589	1.2298108	0.0046	0
cis-1,2-Dichloroethene (ug/L)	MWell#1	131	0.929	1.221025	1.105	0.09652	1.18945102	1	99.24
cis-1,2-Dichloroethene (ug/L)	MWell#11	57	0.4263	0.13586596	0.3686	0.04883	0.86464931	0.2	100

[1] All statistics based on Non-Detects = 1/2 MDL [2] (bg) indicates a background well.

HORN RAPIDS LANDFILL - FOURTH QUARTER 2024
Summary of Descriptive Statistics

Constituent Name	Well	N	Mean[1]	Variance	Standard Deviation	Standard Error	Coeffient of Variation	Median	% Non-Detects
cis-1,3-Dichloropropene (ug/L)	MWell#1	129	0.88	0.87740689	0.9367	0.08248	1.06443182	0.62	100
cis-1,3-Dichloropropene (ug/L)	MWell#11	57	0.4758	0.116964	0.342	0.0453	0.71878941	0.2	100
Cobalt, Dissolved (mg/L)	MWell#1	85	0.009528	0.00015901	0.01261	0.001368	1.32346767	0.006	55.29
Cobalt, Dissolved (mg/L)	MWell#11	21	0.000426	4.695E-09	6.852E-05	1.495E-05	0.16076959	0.0004	71.43
Cobalt, Total (mg/L)	MWell#1	46	0.02049	0.00012188	0.01104	0.001628	0.53879941	0.018	0
Cobalt, Total (mg/L)	MWell#11	45	0.001125	4.4142E-06	0.002101	0.0003131	1.86755556	0.00047	46.67
Conductivity (umhos/cm)	MWell#1	117	702	40925.29	202.3	18.7	0.28817664	729	0
Conductivity (umhos/cm)	MWell#11	53	1417	142355.29	377.3	51.83	0.26626676	1530	0
Copper, Dissolved (mg/L)	MWell#1	85	0.006729	8.3613E-05	0.009144	0.0009918	1.35889434	0.002	68.24
Copper, Dissolved (mg/L)	MWell#11	21	0.003705	1.1404E-05	0.003377	0.000737	0.91147099	0.0024	14.29
Copper, Total (mg/L)	MWell#1	46	0.002306	1.3619E-06	0.001167	0.0001721	0.50607112	0.002	71.74
Copper, Total (mg/L)	MWell#11	45	0.002762	2.5664E-06	0.001602	0.0002389	0.58001448	0.002	62.22
Dibromochloromethane (ug/L)	MWell#1	130	0.8931	1.032256	1.016	0.08908	1.13761057	1	100
Dibromochloromethane (ug/L)	MWell#11	57	0.4333	0.14830201	0.3851	0.05101	0.88876067	0.2	100
Dibromomethane (ug/L)	MWell#1	127	0.9254	1.087849	1.043	0.09257	1.12708018	1	100
Dibromomethane (ug/L)	MWell#11	57	0.4232	0.13213225	0.3635	0.04815	0.85893195	0.2	100
Dissolved Oxygen (mg/L)	MWell#1	62	5.537	0.308025	0.555	0.07048	0.10023478	5.585	0
Dissolved Oxygen (mg/L)	MWell#11	56	7.925	1.643524	1.282	0.1714	0.16176656	8.115	0
Ethane (ug/L)	MWell#1	63	6.69	21.233664	4.608	0.5805	0.68878924	10	100
Ethane (ug/L)	MWell#11	57	6.147	17.884441	4.229	0.5601	0.68797788	10	98.25
Ethene (ug/L)	MWell#1	63	6.628	20.657025	4.545	0.5726	0.68572722	10	100
Ethene (ug/L)	MWell#11	57	6.286	18.122049	4.257	0.5639	0.67721922	10	96.49
Ethylbenzene (ug/L)	MWell#1	130	0.8915	1.028196	1.014	0.08893	1.13740886	1	100
Ethylbenzene (ug/L)	MWell#11	57	0.4226	0.13162384	0.3628	0.04805	0.85849503	0.2	100
Iodomethane (ug/L)	MWell#1	123	2.953	10.336225	3.215	0.2899	1.08872333	2	100
Iodomethane (ug/L)	MWell#11	57	2.153	13.388281	3.659	0.4846	1.69948908	0.5	100
Iron, Dissolved (mg/L)	MWell#1	132	0.2155	0.03598609	0.1897	0.01651	0.88027842	0.185	71.21
Iron, Dissolved (mg/L)	MWell#11	57	0.3393	0.026244	0.162	0.02145	0.47745358	0.3	78.95
Iron, Total (mg/L)	MWell#1	8	0.5	0	0	0	0	0.5	100
Iron, Total (mg/L)	MWell#11	8	0.6	0.07997584	0.2828	0.1	0.47133333	0.5	87.5
Lead, Dissolved (mg/L)	MWell#1	84	0.00669	0.00023654	0.01538	0.001678	2.29895366	0.001	90.48

[1] All statistics based on Non-Detects = 1/2 MDL [2] (bg) indicates a background well.

HORN RAPIDS LANDFILL - FOURTH QUARTER 2024
Summary of Descriptive Statistics

Constituent Name	Well	N	Mean[1]	Variance	Standard Deviation	Standard Error	Coeffient of Variation	Median	% Non-Detects
Lead, Dissolved (mg/L)	MWell#11	21	0.0004	0	0	0	0	0.0004	100
Lead, Total (mg/L)	MWell#1	46	0.000562	4.012E-08	0.0002003	2.953E-05	0.35672306	0.0004	93.48
Lead, Total (mg/L)	MWell#11	45	0.000547	3.7365E-08	0.0001933	2.881E-05	0.35318838	0.0004	95.56
Magnesium, Dissolved (mg/L)	MWell#1	120	20.28	34.515625	5.875	0.5363	0.28969428	21.95	0
Magnesium, Dissolved (mg/L)	MWell#11	57	43.46	166.9264	12.92	1.712	0.29728486	49	0
Magnesium, Total (mg/L)	MWell#1	8	24	16	4	1.414	0.16666667	24	0
Magnesium, Total (mg/L)	MWell#11	8	37.5	47.997184	6.928	2.449	0.18474667	40.5	0
Manganese, Dissolved (mg/L)	MWell#1	132	0.01641	0.000314	0.01772	0.001542	1.07982937	0.02	81.06
Manganese, Dissolved (mg/L)	MWell#11	57	0.02563	0.00135645	0.03683	0.004879	1.4369879	0.02	96.49
Manganese, Total (mg/L)	MWell#1	8	0.02	0	0	0	0	0.02	100
Manganese, Total (mg/L)	MWell#11	8	0.02137	1.5124E-05	0.003889	0.001375	0.18198409	0.02	87.5
Methane (ug/L)	MWell#1	63	1.626	4.532641	2.129	0.2682	1.30934809	1.2	90.48
Methane (ug/L)	MWell#11	57	2.521	45.2929	6.73	0.8914	2.66957557	1.2	78.95
Methylene Chloride (ug/L)	MWell#1	131	2.614	4.558225	2.135	0.1865	0.81675593	2	97.71
Methylene Chloride (ug/L)	MWell#11	57	2.993	3.598609	1.897	0.2512	0.63381223	3	100
Nickel, Dissolved (mg/L)	MWell#1	85	0.01268	0.00045882	0.02142	0.002324	1.68927445	0.003	69.41
Nickel, Dissolved (mg/L)	MWell#11	21	0.005452	4.9908E-06	0.002234	0.0004874	0.40975789	0.0052	14.29
Nickel, Total (mg/L)	MWell#1	46	0.002991	6.1703E-08	0.0002484	3.662E-05	0.08304915	0.003	95.65
Nickel, Total (mg/L)	MWell#11	45	0.005221	3.0459E-05	0.005519	0.0008227	1.05707719	0.003	60
Nitrate Nitrogen (mg/L)	MWell#1	130	5.94	14.280841	3.779	0.3314	0.63619529	7.1	0
Nitrate Nitrogen (mg/L)	MWell#11	56	31.63	114.0624	10.68	1.427	0.33765413	34.5	3.571
pH (none)	MWell#1	121	7.242	0.06996025	0.2645	0.02404	0.03652306	7.18	0
pH (none)	MWell#11	57	7.426	0.02859481	0.1691	0.0224	0.02277134	7.41	0
Potassium, Dissolved (mg/L)	MWell#1	120	7.406	1.452025	1.205	0.11	0.16270591	7.71	0
Potassium, Dissolved (mg/L)	MWell#11	57	11.12	2.4025	1.55	0.2053	0.13938849	12	0
Potassium, Total (mg/L)	MWell#1	8	8.713	1.800964	1.342	0.4745	0.15402272	8.55	0
Potassium, Total (mg/L)	MWell#11	8	10.56	1.7424	1.32	0.4667	0.125	11	0
Redox (mv)	MWell#1	63	107.6	7869.4641	88.71	11.18	0.82444238	100.4	0
Redox (mv)	MWell#11	57	119.4	9658.9584	98.28	13.02	0.82311558	118	0
Selenium, Dissolved (mg/L)	MWell#1	85	0.01254	0.00083059	0.02882	0.003126	2.29824561	0.002	31.76
Selenium, Dissolved (mg/L)	MWell#11	21	0.005478	1.2895E-05	0.003591	0.0007835	0.65553122	0.0048	4.762

[1] All statistics based on Non-Detects = 1/2 MDL [2] (bg) indicates a background well.

HORN RAPIDS LANDFILL - FOURTH QUARTER 2024
Summary of Descriptive Statistics

Constituent Name	Well	N	Mean[1]	Variance	Standard Deviation	Standard Error	Coeffient of Variation	Median	% Non-Detects
Selenium, Total (mg/L)	MWell#1	46	0.005548	8.988E-06	0.002998	0.0004421	0.54037491	0.008	67.39
Selenium, Total (mg/L)	MWell#11	45	0.008361	2.0736E-06	0.00144	0.0002146	0.1722282	0.008	57.78
Silver, Dissolved (mg/L)	MWell#1	85	0.0061	0.0001508	0.01228	0.001332	2.01311475	0.001	97.65
Silver, Dissolved (mg/L)	MWell#11	21	0.0004	0	0	0	0	0.0004	100
Silver, Total (mg/L)	MWell#1	46	0.000452	2.9207E-08	0.0001709	0.0000252	0.37793012	0.0004	100
Silver, Total (mg/L)	MWell#11	45	0.00044	2.2922E-08	0.0001514	2.256E-05	0.34409091	0.0004	100
Sodium, Dissolved (mg/L)	MWell#1	120	19.38	16.982641	4.121	0.3762	0.2126419	21	0
Sodium, Dissolved (mg/L)	MWell#11	57	19.1	6.497401	2.549	0.3376	0.1334555	20	0
Sodium, Total (mg/L)	MWell#1	8	22.38	9.696996	3.114	1.101	0.13914209	23	0
Sodium, Total (mg/L)	MWell#11	8	18.5	1.999396	1.414	0.5	0.07643243	19	0
Styrene (ug/L)	MWell#1	130	1.026	0.90801841	0.9529	0.08357	0.92875244	1	100
Styrene (ug/L)	MWell#11	57	0.7305	0.094249	0.307	0.04067	0.4202601	1	100
Sulfate (mg/L)	MWell#1	132	40.92	206.2096	14.36	1.25	0.35092864	46.3	0
Sulfate (mg/L)	MWell#11	57	237.9	10609	103	13.64	0.43295502	290	0
TDS (mg/L)	MWell#1	121	448.7	14908.41	122.1	11.1	0.27211946	467	0
TDS (mg/L)	MWell#11	57	1077	134762.41	367.1	48.63	0.34085422	1200	0
Temperature (C)	MWell#1	132	20.28	5.354596	2.314	0.2014	0.11410256	20.4	0
Temperature (C)	MWell#11	57	20.76	4.280761	2.069	0.2741	0.09966281	20.93	0
Tetrachloroethene (ug/L)	MWell#1	130	3.273	2.907025	1.705	0.1495	0.52092881	3.8	17.69
Tetrachloroethene (ug/L)	MWell#11	57	0.6158	0.092416	0.304	0.04027	0.49366677	0.5	100
Thallium, Dissolved (mg/L)	MWell#1	85	0.006758	0.00021815	0.01477	0.001602	2.18555786	0.001	98.82
Thallium, Dissolved (mg/L)	MWell#11	21	0.000962	6.4754E-09	8.047E-05	1.756E-05	0.08365734	0.001	100
Thallium, Total (mg/L)	MWell#1	46	0.001	0	0	0	0	0.001	100
Thallium, Total (mg/L)	MWell#11	45	0.001	0	0	0	0	0.001	100
TOC (mg/L)	MWell#1	131	1.66	3.352561	1.831	0.16	1.10301205	1.4	28.24
TOC (mg/L)	MWell#11	57	3.718	5.987809	2.447	0.3241	0.65814954	3.4	3.509
Toluene (ug/L)	MWell#1	131	0.8931	1.046529	1.023	0.08939	1.14544844	0.89	99.24
Toluene (ug/L)	MWell#11	57	0.4233	0.13133376	0.3624	0.048	0.8561304	0.2	98.25
Total Suspended Solids (mg/L)	MWell#1	41	2.193	2.079364	1.442	0.2253	0.65754674	2	97.56
Total Suspended Solids (mg/L)	MWell#11	40	3.075	17.372224	4.168	0.6591	1.35544715	2	77.5
trans-1,2-Dichloroethene (ug/L)	MWell#1	130	0.8946	1.030225	1.015	0.08899	1.13458529	1	100

[1] All statistics based on Non-Detects = 1/2 MDL [2] (bg) indicates a background well.

HORN RAPIDS LANDFILL - FOURTH QUARTER 2024
Summary of Descriptive Statistics

Constituent Name	Well	N	Mean[1]	Variance	Standard Deviation	Standard Error	Coeffient of Variation	Median	% Non-Detects
trans-1,2-Dichloroethene (ug/L)	MWell#11	57	0.4298	0.14145121	0.3761	0.04981	0.87505817	0.2	100
trans-1,3-Dichloropropene (ug/L)	MWell#1	129	0.8539	0.904401	0.951	0.08373	1.11371355	0.6	100
trans-1,3-Dichloropropene (ug/L)	MWell#11	57	0.4167	0.12794929	0.3577	0.04738	0.85841133	0.2	100
trans-1,4-Dichloro-2-butene (ug/L)	MWell#1	120	2.804	4.305625	2.075	0.1895	0.74001427	2	100
trans-1,4-Dichloro-2-butene (ug/L)	MWell#11	57	2.926	3.396649	1.843	0.2441	0.62987013	2	100
Trichloroethene (ug/L)	MWell#1	131	0.9107	0.99241444	0.9962	0.08704	1.09388383	1	74.05
Trichloroethene (ug/L)	MWell#11	57	0.4281	0.13845841	0.3721	0.04929	0.86918944	0.2	100
Trichlorofluoromethane (ug/L)	MWell#1	131	1.166	3.407716	1.846	0.1613	1.58319039	1	96.95
Trichlorofluoromethane (ug/L)	MWell#11	57	0.6175	0.09647236	0.3106	0.04114	0.50299595	0.5	100
Vanadium, Dissolved (mg/L)	MWell#1	85	0.0137	0.00019238	0.01387	0.001504	1.01240876	0.0107	16.47
Vanadium, Dissolved (mg/L)	MWell#11	21	0.0098	2.4118E-06	0.001553	0.000339	0.15846939	0.0098	0
Vanadium, Total (mg/L)	MWell#1	46	0.009266	8.1234E-07	0.0009013	0.0001329	0.09726959	0.0092	0
Vanadium, Total (mg/L)	MWell#11	45	0.009972	8.6657E-07	0.0009309	0.0001388	0.09335138	0.01	0
Vinyl Acetate (ug/L)	MWell#1	125	4.155	30.724849	5.543	0.4958	1.33405535	2	100
Vinyl Acetate (ug/L)	MWell#11	57	2.37	3.055504	1.748	0.2316	0.73755274	2	100
Vinyl Chloride (ug/L)	MWell#1	130	1.069	4.145296	2.036	0.1786	1.90458372	0.885	100
Vinyl Chloride (ug/L)	MWell#11	57	0.3146	0.18524416	0.4304	0.05701	1.36808646	0.02	100
Xylenes (ug/L)	MWell#1	89	1.341	0.81685444	0.9038	0.0958	0.67397465	1	100
Xylenes (ug/L)	MWell#11	55	0.9776	0.70476025	0.8395	0.1132	0.85873568	0.5	100
Zinc, Dissolved (mg/L)	MWell#1	96	0.009889	0.00010221	0.01011	0.001032	1.02234806	0.00545	53.13
Zinc, Dissolved (mg/L)	MWell#11	21	0.006676	3.9238E-05	0.006264	0.001367	0.9382864	0.0041	28.57
Zinc, Total (mg/L)	MWell#1	50	0.01313	0.00016104	0.01269	0.001795	0.96648896	0.007	70
Zinc, Total (mg/L)	MWell#11	45	0.008791	7.3822E-05	0.008592	0.001281	0.97736321	0.007	84.44

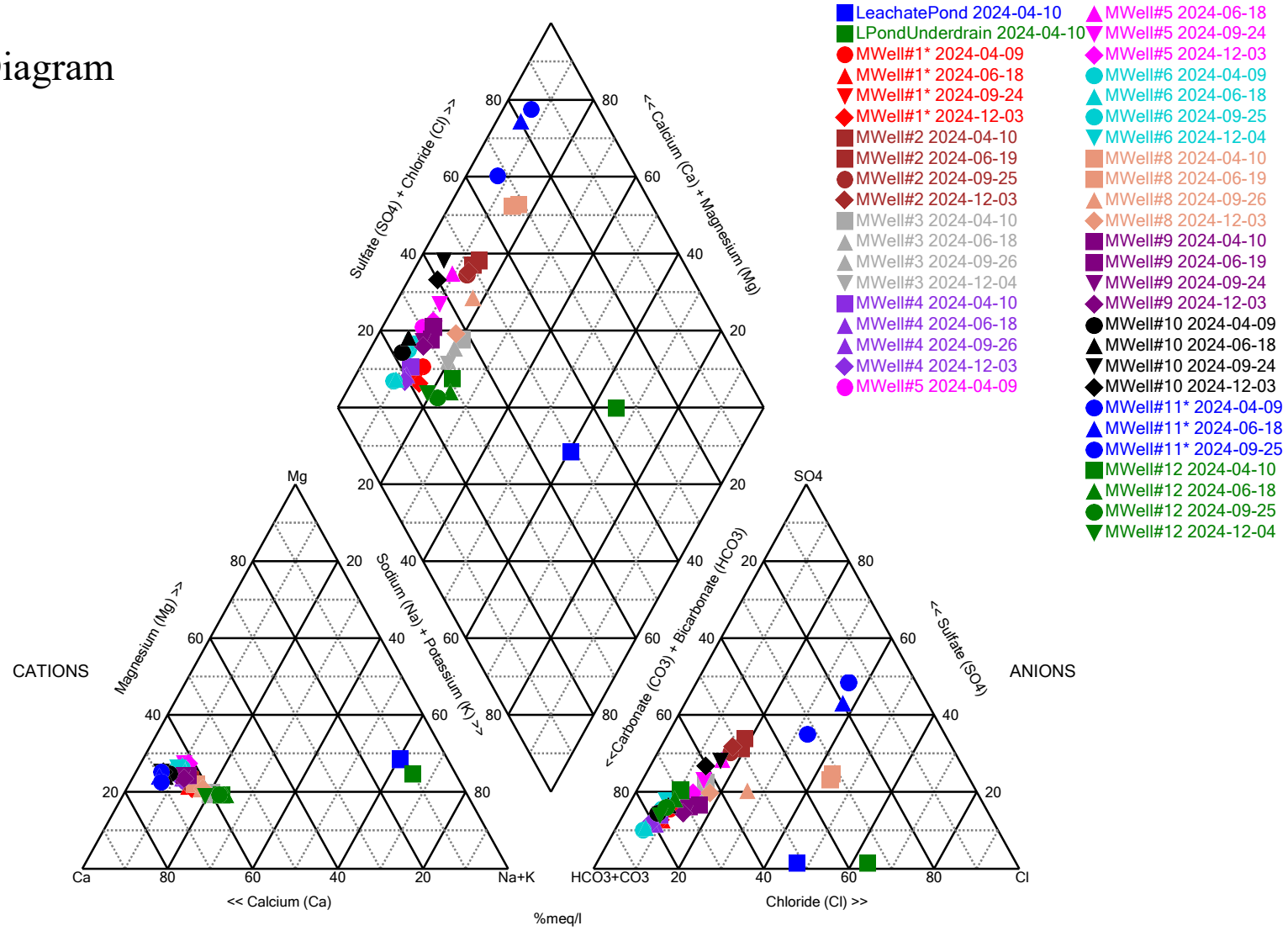
[1] All statistics based on Non-Detects = 1/2 MDL [2] (bg) indicates a background well.

Appendix F

Geochemical Evaluation

Sanitas™ v.10.0.24 Software licensed to Parametrix.

Piper Diagram



Analysis Run 3/11/2025 4:52 PM

Horn Rapids Landfill Client: City of Richland Data: 2024_PIPER_final

Summary of Cation/Anion Charge Balance Differences, 2024 Groundwater Data, Horn Rapids Landfill

Monitoring Well	First Quarter RPD[1]	Second Quarter RPD[1]	Third Quarter RPD[1]	Fourth Quarter RPD[1]
Well #1	-0.85	1.46	2.53	1.65
Well #2	-0.12	-0.29	2.24	4.09
Well #3	-1.21	0.11	1.16	2.23
Well #4	-0.82	1.69	1.24	2.74
Well #5	-1.11	-0.42	2.39	3.55
Well #6	-1.31	0.78	1.02	1.25
Well #8	0.08	3.72	2.54	1.98
Well #9	-0.85	1.01	2.66	2.86
Well #10	-1.11	1.38	4.71	3.43
Well #11	-1.19	4.00	3.73	NA
Well #12	-1.12	0.29	0.83	2.34
Leachate Pond	-0.98	NA	NA	NA
Leachate Underdrain	-0.47	NA	NA	NA

Note:

[1] Reported in relative percent difference (RPD). For each sample the analytical results were converted into milliequivalents per liter (meq/L) and the cation meq/L summed (C) and the anion meq/L summed (A).

$$RPD = \frac{2(C-A)}{C+A} \times 100$$

[ ] = Outside WAC 173-351-420(5)(a) acceptable range

NA= Not available

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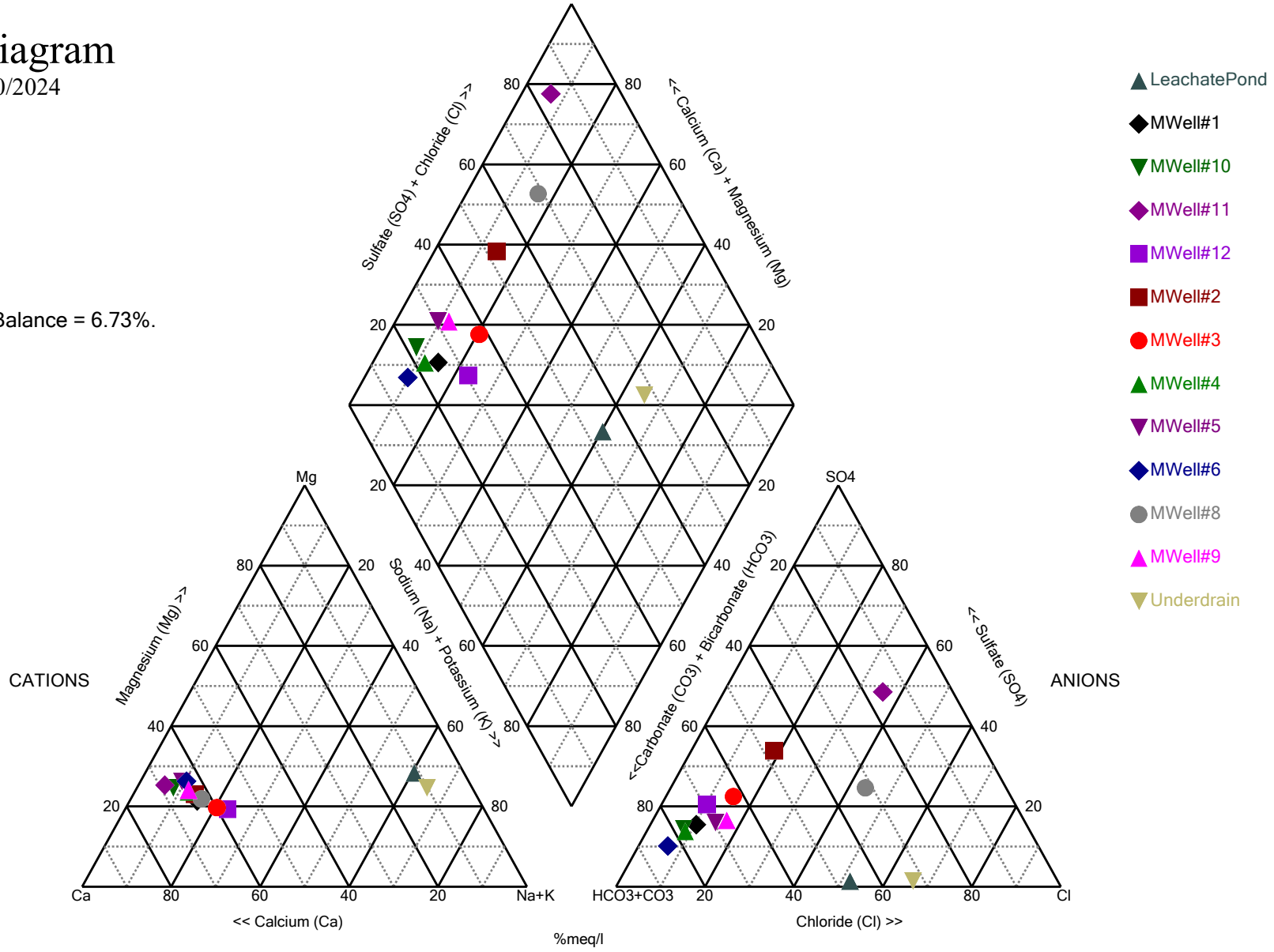
Piper Diagram

4/9/2024, 4/10/2024

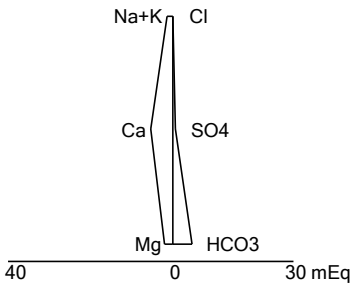
Cation-Anion Balance = 6.73%.



Analysis Run 6/20/2024 1:43 PM

Horn Rapids Landfill Client: City of Richland Data: 1Q_24_PIPER_final

Sanitas™ v.10.0.15 Software licensed to Parametrix.



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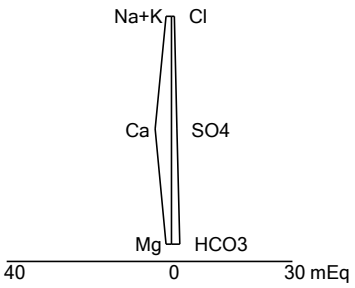

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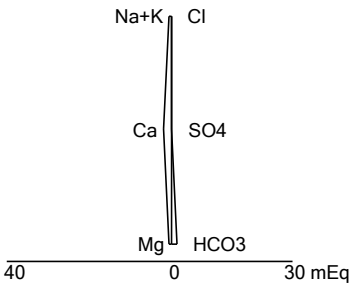

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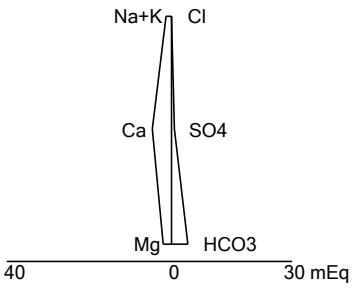

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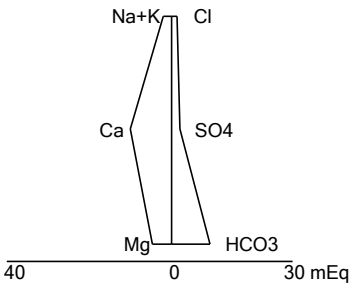

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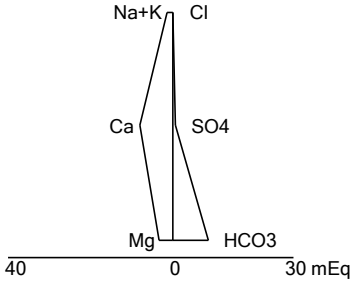

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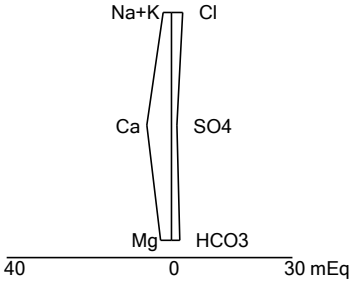

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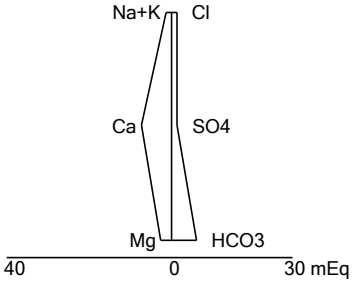

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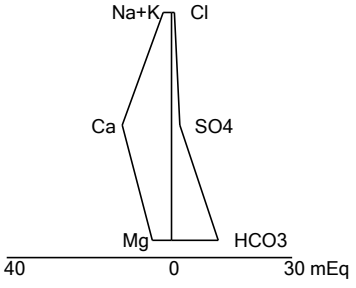

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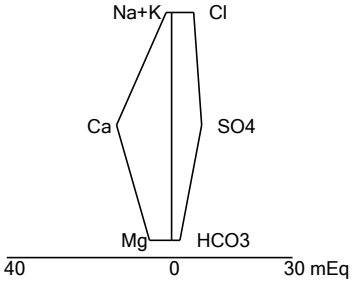

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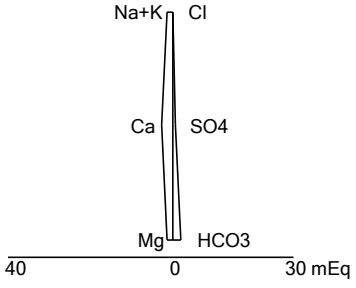

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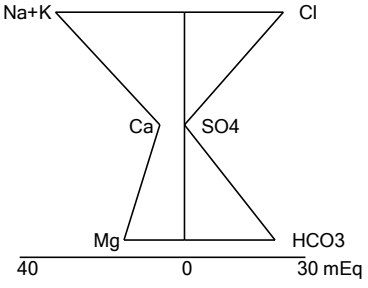
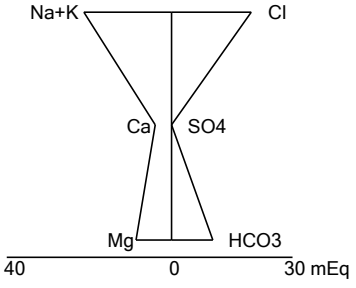


LeachatePond



Underdrain

Stiff Diagram - 4/9/2024, 4/10/2024 Analysis Run 6/20/2024 1:43 PM

Horn Rapids Landfill Client: City of Richland Data: 1Q_24_PIPER_final

Cation/Anion Balance Calculations (Dissolved Metals), Horn Rapids Landfill, First Quarter 2024

	Conversion Factor[1] (mg/L to meq/L)	MW-1			MW-2			MW-3			MW-4			MW-5			MW-6			MW-8			MW-9			MW-10			MW-11			MW-12			Leachate Pond			Leachate Underdrain		
		Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)
CATIONS																																						
Na	0.0435	21.8	0.95	12.34	14.4	0.63	10.95	11.5	0.50	15.92	15.1	0.66	9.35	26.0	1.13	7.29	21.3	0.93	7.51	29.8	1.30	13.30	24.5	1.07	9.76	24.7	1.07	6.04	20.2	0.88	4.62	19.5	0.85	18.88	575	25.01	48.16	404	17.57	53.31
Ca	0.0499	98.1	4.90	63.68	72.7	3.63	63.41	37.6	1.88	59.72	90.9	4.54	64.54	200	9.98	64.30	157	7.83	63.48	121	6.04	61.96	140	6.99	63.99	240	11.98	67.38	262	13.07	68.79	51.9	2.59	57.64	119	5.94	11.43	67.5	3.37	10.22
Mg	0.08229	20.0	1.65	21.41	15.8	1.30	22.73	7.58	0.62	19.85	20.0	1.65	23.42	49.4	4.07	26.19	39.6	3.26	26.40	26.2	2.16	22.12	31.9	2.63	24.05	53.1	4.37	24.58	57.6	4.74	24.94	10.5	0.86	19.23	178	14.65	28.20	98.5	8.11	24.59
Fe(+2)	0.03581	0.025	0.00	0.01	0.025	0.00	0.02	0.025	0.00	0.03	0.025	0.00	0.01	0.025	0.00	0.01	0.343	0.01	0.10	0.025	0.00	0.01	0.025	0.00	0.01	0.168	0.01	0.03	0.025	0.00	0.00	0.025	0.00	0.02	0.862	0.03	0.06	0.120	0.00	0.01
K	0.02558	7.72	0.20	2.57	6.48	0.17	2.90	5.50	0.14	4.48	7.36	0.19	2.68	12.6	0.32	2.08	11.8	0.30	2.45	9.91	0.25	2.60	9.35	0.24	2.19	13.5	0.35	1.94	12.2	0.31	1.64	7.42	0.19	4.22	246	6.29	12.12	153	3.91	11.87
Mn	0.0364	0.002	0.00	0.00	0.002	0.00	0.00	0.002	0.00	0.00	0.002	0.00	0.00	0.579	0.02	0.14	0.218	0.01	0.06	0.002	0.00	0.00	0.002	0.00	0.00	0.0879	0.00	0.02	0.002	0.00	0.00	0.002	0.00	0.00	0.482	0.02	0.03	0.0240	0.00	0.00
		TOTAL	7.69	100.00	TOTAL	5.72	100.00	TOTAL	3.14	100.00	TOTAL	7.03	100.00	TOTAL	15.52	100.00	TOTAL	12.34	100.00	TOTAL	9.74	100.00	TOTAL	10.92	100.00	TOTAL	17.77	100.00	TOTAL	19.01	100.00	TOTAL	4.49	100.00	TOTAL	51.94	100.00	TOTAL	32.97	100.00
ANIONS																																						
HCO_3[2]	0.02	290	5.80	74.17	125	2.50	43.60	102	2.04	63.37	264	5.28	73.91	588	11.76	74.11	549	10.98	86.67	146	2.92	30.01	381	7.62	68.62	720	14.40	79.23	163	3.26	16.75	155	3.10	67.47	1390	27.80	52.48	634	12.68	38.10
SO_4	0.02082	46.6	0.97	12.41	68.0	1.42	24.69	28.4	0.59	18.37	36.2	0.75	10.55	104	2.17	13.65	50.1	1.04	8.23	88.2	1.84	18.87	73.7	1.53	13.82	104	2.17	11.91	370	7.70	39.58	35.1	0.73	15.90	28.8	0.60	1.13	20.5	0.43	1.28
Cl	0.02821	20.5	0.58	7.40	26.5	0.75	13.04	13.5	0.38	11.83	15.3	0.43	6.04	65.3	1.84	11.61	22.8	0.64	5.08	113	3.19	32.77	49.9	1.41	12.68	37.8	1.07	5.87	200	5.64	28.99	11.9	0.34	7.31	871	24.57	46.38	715	20.17	60.61
CO_3[2]	0.02	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
NO_3	0.0714	6.6	0.47	6.03	15	1.07	18.68	2.9	0.21	6.43	9.5	0.68	9.50	1.4	0.10	0.63	0.025	0.00	0.01	25	1.79	18.35	7.6	0.54	4.89	7.6	0.54	2.99	40	2.86	14.68	6	0.43	9.32	0.025	0.00	0.00	0	0.00	0.00
		TOTAL	7.82	100.00	TOTAL	5.73	100.00	TOTAL	3.22	100.00	TOTAL	7.14	100.00	TOTAL	15.87	100.00	TOTAL	12.67	100.00	TOTAL	9.73	100.00	TOTAL	11.10	100.00	TOTAL	18.17	100.00	TOTAL	19.46	100.00	TOTAL	4.59	100.00	TOTAL	52.97	100.00	TOTAL	33.28	100.00
anion + cation Sum (meq/L)			15.51			11.46			6.36			14.17			31.39			25.01			19.47			22.02			35.95			38.47			9.09			104.91			66.24	
(meq/L cations-anions)/(meq/L cations+anions)*100				-0.85			-0.12			-1.21			-0.82			-1.11			-1.31			0.08			-0.85			-1.11			-1.19			-1.12			-0.98			-0.47

[1]Reference: Hem 1985.
[2]HCO_3 and CO_3 reported as $CaCO_3$, conversion factor adjusted accordingly.
= Outside WAC 173-351-420(5)(a) acceptable range
5 percent if anion plus cation sum greater than 5 meq/L;
10 percent if anion plus cation sum less than 5 meq/L

Note: Values for cations in groundwater samples are measured as dissolved (field-filtered).

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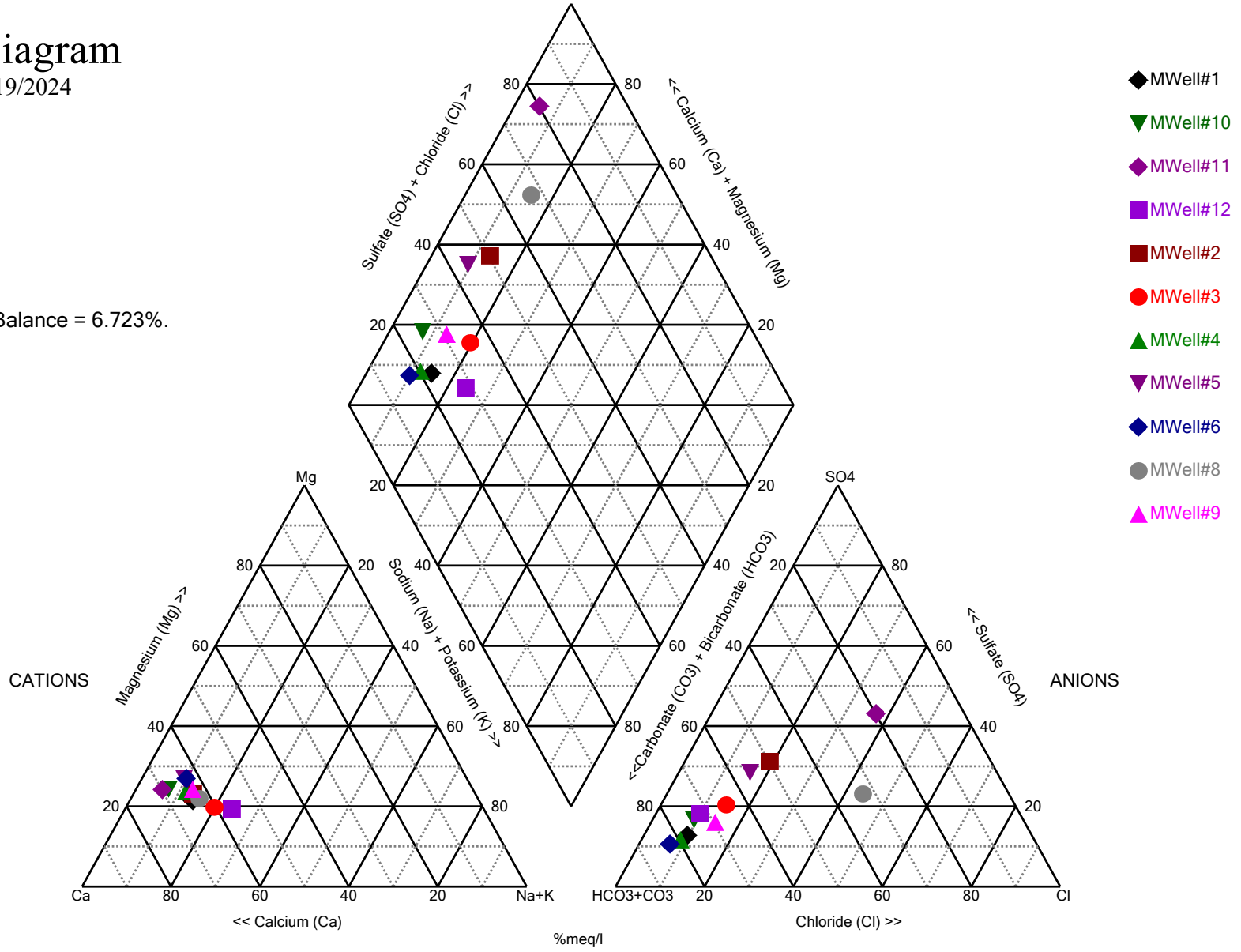
Piper Diagram

6/18/2024, 6/19/2024

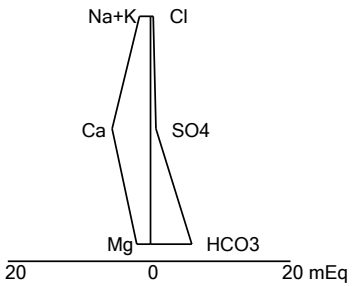
Cation-Anion Balance = 6.723%.



Analysis Run 8/16/2024 1:40 PM

Horn Rapids Landfill Client: City of Richland Data: 2Q_24_PIPER_FINAL

Sanitas™ v.10.0.15 Software licensed to Parametrix.



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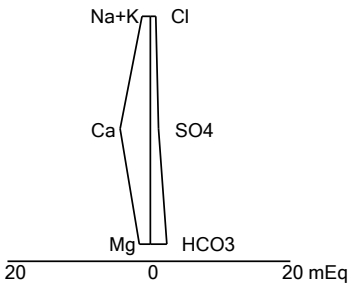

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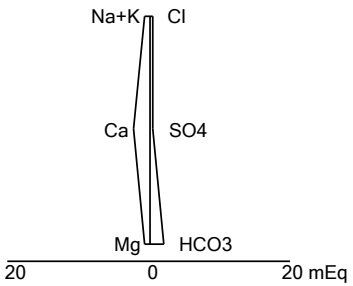

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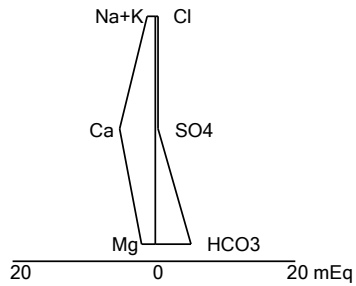

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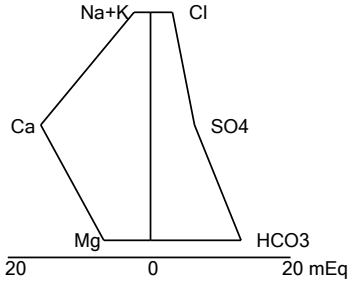

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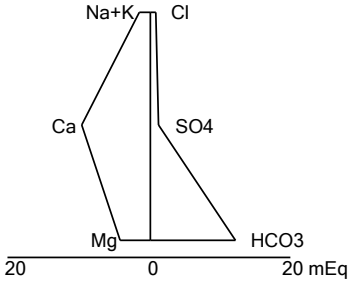

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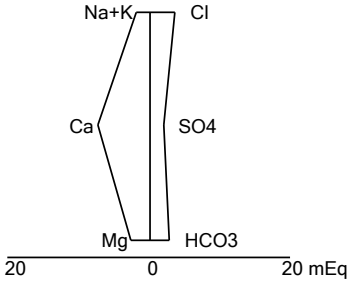

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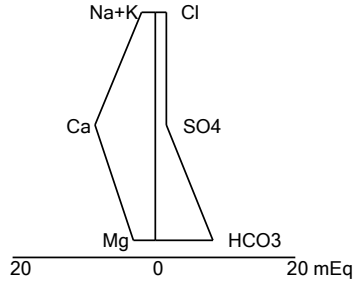

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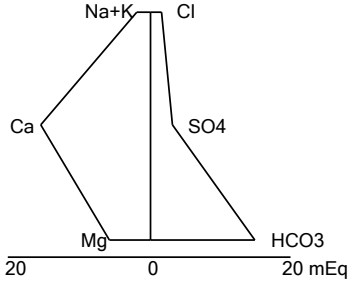

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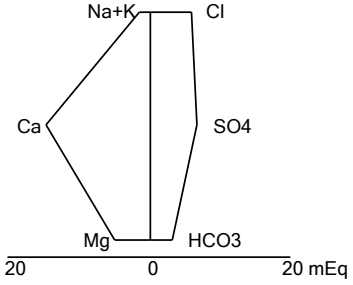
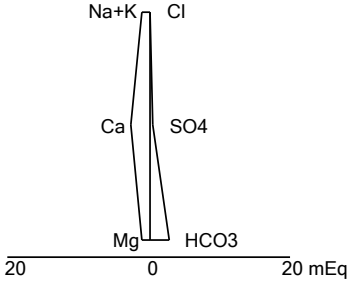


MWell#11



MWell#12

Stiff Diagram - 6/18/2024, 6/19/2024 Analysis Run 8/16/2024 1:42 PM

Horn Rapids Landfill Client: City of Richland Data: 2Q_24_PIPER_FINAL

Cation/Anion Balance Calculations (Dissolved Metals), Horn Rapids Landfill, Second Quarter 2024

	Conversion Factor[1] (mg/L to meq/L)	MW-1			MW-2			MW-3			MW-4			MW-5			MW-6		
		Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)
CATIONS																			
Na	0.0435	22.7	0.99	12.01	14.8	0.64	10.53	12.0	0.52	15.35	15.8	0.69	9.18	42.7	1.86	7.78	26.2	1.14	7.63
Ca	0.0499	106	5.29	64.33	78.2	3.90	63.85	41.2	2.06	60.44	97.4	4.86	64.89	305	15.22	63.76	189	9.43	63.13
Mg	0.08229	21.1	1.74	21.12	16.9	1.39	22.76	8.19	0.67	19.81	21.2	1.74	23.29	77.0	6.34	26.55	48.6	4.00	26.77
Fe(+2)	0.03581	0.025	0.00	0.01	0.025	0.00	0.01	0.025	0.00	0.03	0.025	0.00	0.01	0.115	0.00	0.02	0.232	0.01	0.06
K	0.02558	8.12	0.21	2.53	6.78	0.17	2.84	5.81	0.15	4.37	7.71	0.20	2.63	15.9	0.41	1.70	13.5	0.35	2.31
Mn	0.0364	0.002	0.00	0.00	0.002	0.00	0.00	0.002	0.00	0.00	0.002	0.00	0.00	1.23	0.04	0.19	0.402	0.01	0.10
		TOTAL	8.22	100.00	TOTAL	6.11	100.00	TOTAL	3.40	100.00	TOTAL	7.49	100.00	TOTAL	23.87	100.00	TOTAL	14.94	100.00
ANIONS																			
HCO_3^2	0.02	290	5.80	72.64	119	2.38	38.72	101	2.02	59.51	260	5.20	71.81	641	12.82	53.26	602	12.04	81.86
SO_4	0.02082	22.9	0.48	5.97	30.4	0.63	10.30	15.2	0.32	9.32	17.3	0.36	4.97	120	2.50	10.38	30.2	0.63	4.28
Cl	0.02821	45.1	1.27	15.93	70.6	1.99	32.40	29.9	0.84	24.85	35.8	1.01	13.95	308	8.69	36.10	72.2	2.04	13.85
CO_3^2	0.02	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
NO_3	0.0714	6.1	0.44	5.45	16	1.14	18.58	3	0.21	6.31	9.4	0.67	9.27	0.89	0.06	0.26	0.025	0.00	0.01
		TOTAL	7.98	100.00	TOTAL	6.15	100.00	TOTAL	3.39	100.00	TOTAL	7.24	100.00	TOTAL	24.07	100.00	TOTAL	14.71	100.00
anion + cation Sum (meq/L)			16.21			12.26			6.80			14.73			47.94			29.65	
(meq/L cations-anions)/(meq/L cations+anions)*100				1.46			-0.29			0.11			1.69			-0.42			0.78

Cation/Anion Balance Calculations (Dissolved Metals), Horn Rapids Landfill, Second Quarter 2024

	Conversion Factor[1] (mg/L to meq/L)	MW-8			MW-9			MW-10			MW-11			MW-12		
		Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)
CATIONS																
Na	0.0435	31.9	1.39	12.58	31.8	1.38	10.82	28.3	1.23	5.50	21.1	0.92	4.46	20.4	0.89	19.69
Ca	0.0499	139	6.94	62.86	162	8.08	63.22	307	15.32	68.50	287	14.32	69.61	51.3	2.56	56.79
Mg	0.08229	29.6	2.44	22.07	37.1	3.05	23.88	65.8	5.41	24.21	60.8	5.00	24.32	10.5	0.86	19.17
Fe(+2)	0.03581	0.025	0.00	0.01	0.025	0.00	0.01	0.025	0.00	0.00	0.025	0.00	0.00	0.025	0.00	0.02
K	0.02558	10.7	0.27	2.48	10.4	0.27	2.08	15.4	0.39	1.76	12.9	0.33	1.60	7.65	0.20	4.34
Mn	0.0364	0.002	0.00	0.00	0.002	0.00	0.00	0.0920	0.00	0.01	0.002	0.00	0.00	0.002	0.00	0.00
		TOTAL	11.03	100.00	TOTAL	12.79	100.00	TOTAL	22.36	100.00	TOTAL	20.57	100.00	TOTAL	4.51	100.00
ANIONS																
HCO_3[2]	0.02	142	2.84	27.73	408	8.16	65.12	744	14.88	68.40	164	3.28	17.27	142	2.84	63.36
SO_4	0.02082	129	2.69	26.22	55.8	1.16	9.27	58.5	1.22	5.60	328	6.83	35.96	12.7	0.26	5.90
Cl	0.02821	93.8	2.65	25.83	89.7	2.53	20.19	155	4.37	20.10	206	5.81	30.60	33.9	0.96	21.34
CO_3[2]	0.02	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
NO_3	0.0714	29	2.07	20.22	9.5	0.68	5.41	18.0	1.29	5.91	43	3.07	16.17	5.9	0.42	9.40
		TOTAL	10.24	100.00	TOTAL	12.53	100.00	TOTAL	21.76	100.00	TOTAL	18.99	100.00	TOTAL	4.48	100.00
anion + cation Sum (meq/L)			21.28			25.32			44.12			39.56			8.99	
(meq/L cations-anions)/(meq/L cations+anions)*100				3.72			1.01			1.38			4.00			0.29

[1]Reference: Hem 1985.

[2]HCO_3 and CO_3 reported as $CaCO_3$, conversion factor adjusted accordingly.

☐ = Outside WAC 173-351-420(5)(a) acceptable range

Note: Values for cations in groundwater samples are measured as dissolved (field-filtered).
5 percent if anion plus cation sum greater than 5 meq/L; 10 percent if anion plus cation sum less than 5 meq/L

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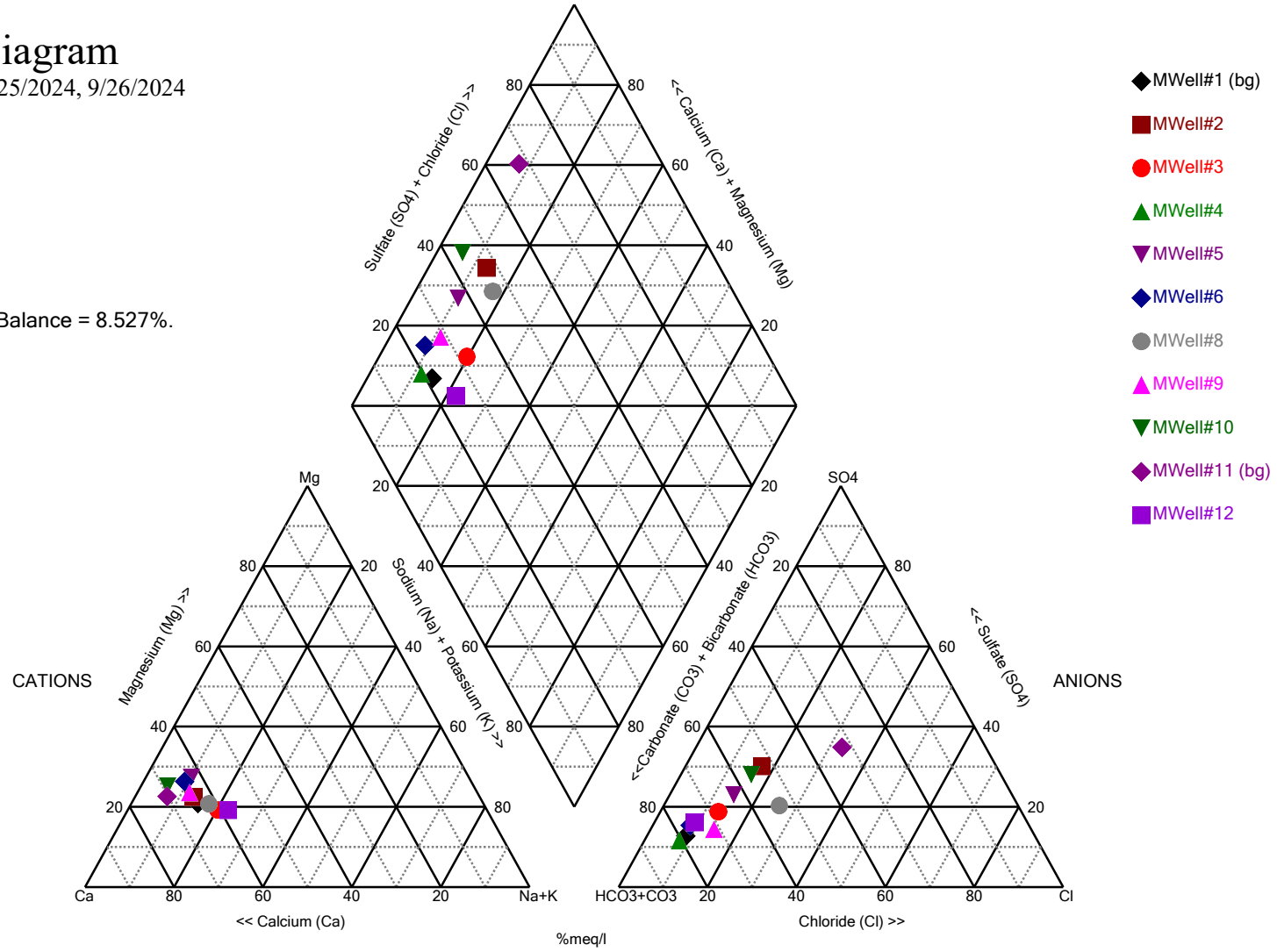
Piper Diagram

9/24/2024, 9/25/2024, 9/26/2024

Cation-Anion Balance = 8.527%.



Analysis Run 11/19/2024 4:29 PM

Horn Rapids Landfill Client: City of Richland Data: 3Q_24_PIPER_final2

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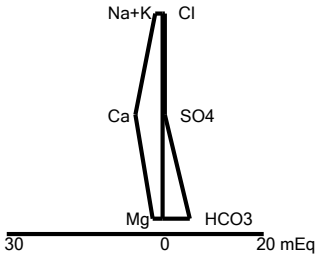

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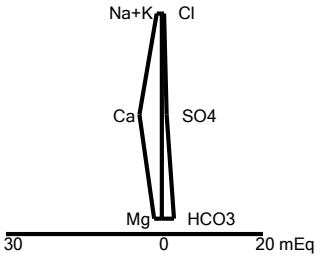

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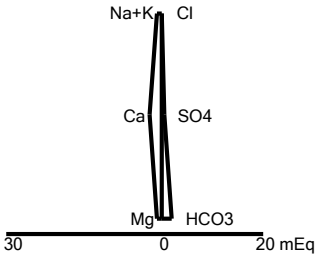

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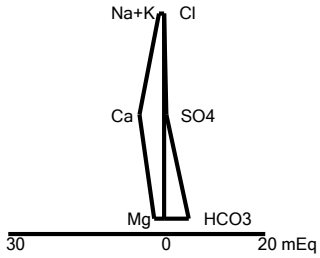

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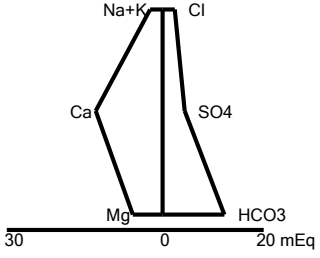

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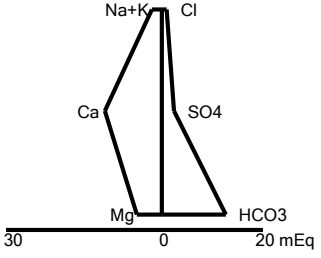

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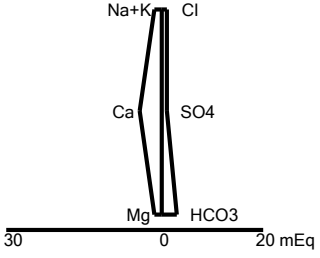

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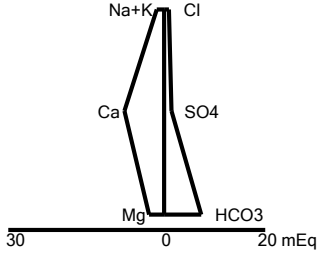

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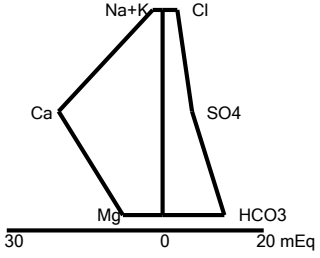

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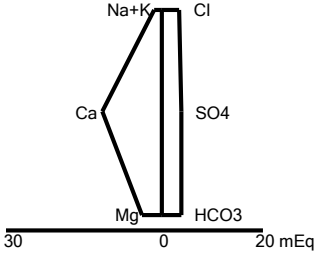

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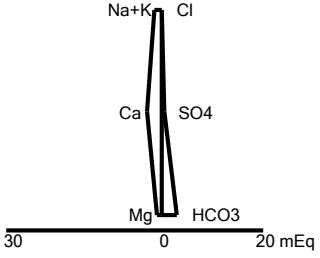

MWell#12

Stiff Diagram - 9/24/2024, 9/25/2024, 9/26/2024 Analysis Run 11/19/2024 9:50 AM

Horn Rapids Landfill Client: City of Richland Data: 3Q_24_PIPER_final

Cation/Anion Balance Calculations (Dissolved Metals), Horn Rapids Landfill, Third Quarter 2024

	Conversion Factor[1] (mg/L to meq/L)	MW-1			MW-2			MW-3			MW-4			MW-5			MW-6		
		Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)
CATIONS																			
Na	0.0435	22.6	0.98	12.28	14.7	0.64	10.36	11.9	0.52	15.48	15.7	0.68	9.25	39.8	1.73	8.59	27.7	1.20	7.06
Ca	0.0499	103	5.14	64.22	79.5	3.97	64.26	40.7	2.03	60.73	96	4.79	64.85	251	12.52	62.11	220	10.98	64.36
Mg	0.08229	20.4	1.68	20.98	17	1.40	22.66	7.88	0.65	19.39	20.9	1.72	23.28	66.5	5.47	27.14	54.8	4.51	26.44
Fe(+2)	0.03581	0.125	0.00	0.06	0.125	0.00	0.07	0.05	0.00	0.05	0.125	0.00	0.06	0.25	0.01	0.04	0.25	0.01	0.05
K	0.02558	7.68	0.20	2.45	6.38	0.16	2.64	5.67	0.15	4.34	7.38	0.19	2.56	13.8	0.35	1.75	13.1	0.34	1.96
Mn	0.0364	0.010	0.00	0.00	0.010	0.00	0.01	0.004	0.00	0.00	0.010	0.00	0.00	2.05	0.075	0.37	0.551	0.02	0.12
		TOTAL	8.00	100.00	TOTAL	6.17	100.00	TOTAL	3.34	100.00	TOTAL	7.39	100.00	TOTAL	20.17	100.00	TOTAL	17.06	100.00
ANIONS																			
HCO_3^2	0.02	284	5.68	74.66	124	2.48	42.01	105	2.10	64.28	262	5.24	72.72	609	12.18	63.36	627	12.54	75.03
SO_4	0.02082	43	0.90	11.77	66.5	1.38	23.45	27.4	0.57	17.46	35.3	0.73	10.20	212	4.41	22.96	122	2.54	15.20
Cl	0.02821	20.4	0.58	7.56	26.7	0.75	12.76	13.3	0.38	11.48	15.8	0.45	6.19	89.9	2.54	13.19	40.7	1.15	6.87
CO_3^2	0.02	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
NO_3	0.0714	6.4	0.46	6.01	18	1.29	21.77	3.1	0.22	6.78	11	0.79	10.90	1.3	0.09	0.48	6.8	0.49	2.90
		TOTAL	7.61	100.00	TOTAL	5.90	100.00	TOTAL	3.27	100.00	TOTAL	7.21	100.00	TOTAL	19.22	100.00	TOTAL	16.71	100.00
anion + cation Sum (meq/L)			15.61			12.08			6.61			14.59			39.39			33.77	
(meq/L cations-anions)/(meq/L cations+anions)*100				2.53			2.24			1.16			1.24			2.39			1.02

Cation/Anion Balance Calculations (Dissolved Metals), Horn Rapids Landfill, Third Quarter 2024

	Conversion Factor[1] (mg/L to meq/L)	MW-8			MW-9			MW-10			MW-11			MW-12		
		Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)
CATIONS																
Na	0.0435	22.4	0.97	14.50	24.8	1.08	9.44	30.5	1.33	4.55	20.2	0.88	5.45	21	0.91	18.49
Ca	0.0499	82.7	4.13	61.41	148	7.39	64.64	404	20.16	69.11	227	11.33	70.28	57.5	2.87	58.09
Mg	0.08229	17.2	1.42	21.06	33	2.72	23.77	88.5	7.28	24.96	44.1	3.63	22.51	11.6	0.95	19.33
Fe(+2)	0.03581	0.125	0.00	0.07	0.125	0.00	0.04	0.5	0.02	0.06	0.25	0.01	0.06	0.125	0.00	0.09
K	0.02558	7.77	0.20	2.96	9.43	0.24	2.11	14.9	0.38	1.31	10.7	0.27	1.70	7.71	0.20	3.99
Mn	0.0364	0.010	0.00	0.01	0.010	0.00	0.00	0.118	0.00	0.01	0.020	0.00	0.00	0.010	0.00	0.01
		TOTAL	6.72	100.00	TOTAL	11.43	100.00	TOTAL	29.17	100.00	TOTAL	16.12	100.00	TOTAL	4.94	100.00
ANIONS																
HCO_3[2]	0.02	148	2.96	46.34	373	7.46	68.86	616	12.32	46.40	193	3.86	25.81	168	3.36	69.17
SO_4	0.02082	52.4	1.09	17.08	70	1.46	13.45	291	6.06	22.82	193	4.02	26.86	33.4	0.70	14.31
Cl	0.02821	47.4	1.34	20.93	48.2	1.36	12.55	115	3.24	12.22	132	3.72	24.89	12.5	0.35	7.26
CO_3[2]	0.02	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
NO_3	0.0714	14	1.00	15.65	7.8	0.56	5.14	69	4.93	18.56	47	3.36	22.44	6.3	0.45	9.26
		TOTAL	6.39	100.00	TOTAL	10.83	100.00	TOTAL	26.55	100.00	TOTAL	14.96	100.00	TOTAL	4.86	100.00
anion + cation Sum (meq/L)			13.11			22.26			55.72			31.08			9.80	
(meq/L cations-anions)/(meq/L cations+anions)*100				2.54			2.66			4.71			3.73			0.83

[1]Reference: Hem 1985.

[2]HCO_3 and CO_3 reported as $CaCO_3$, conversion factor adjusted accordingly.

Note: Values for cations in groundwater samples are measured as dissolved (field-filtered).
5 percent if anion plus cation sum greater than 5 meq/L; 10 percent if anion plus cation sum less than 5 meq/L

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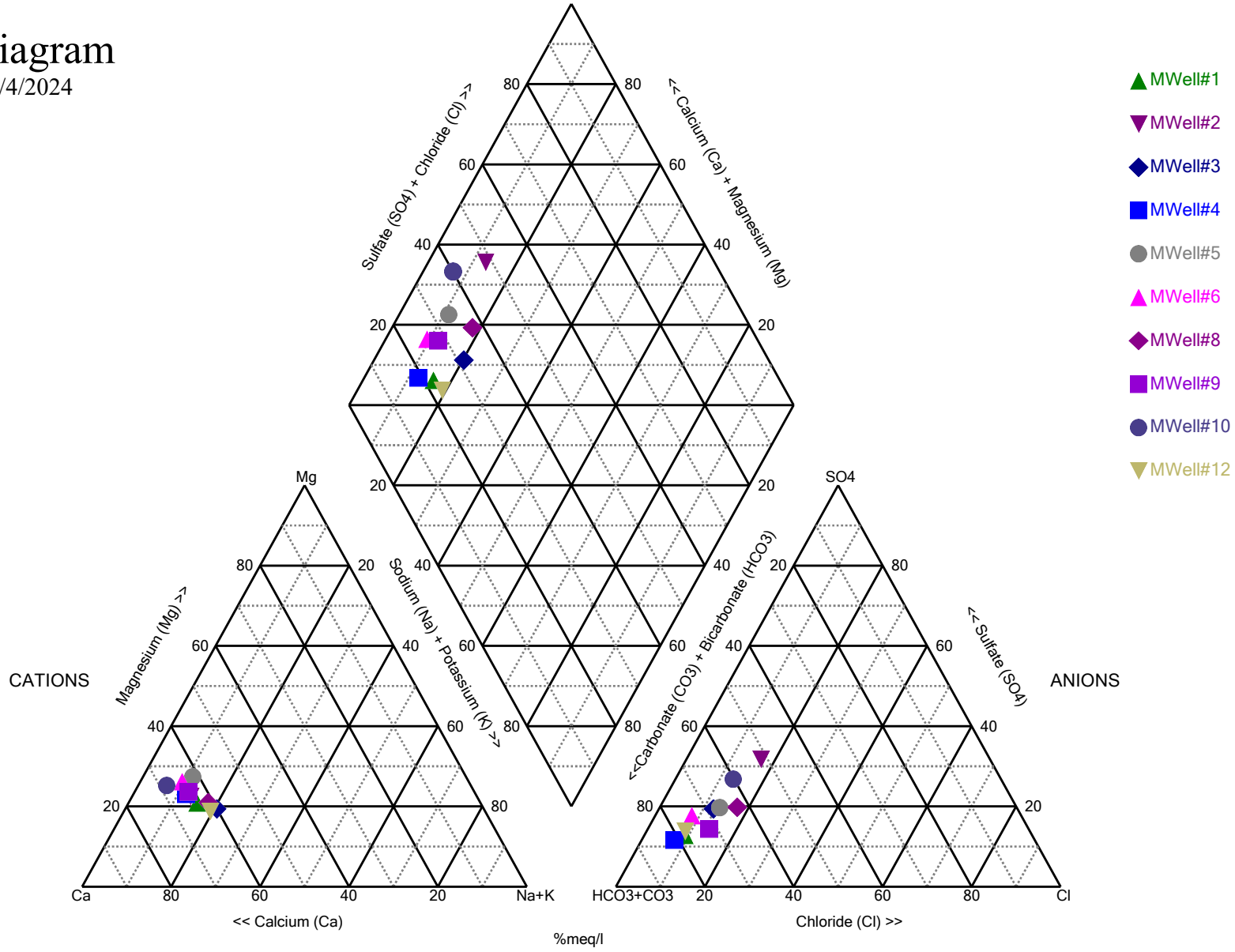
Piper Diagram

12/3/2024, 12/4/2024



Analysis Run 2/2/2025 1:50 PM

Horn Rapids Landfill Client: City of Richland Data: 4Q_24_PIPER_final

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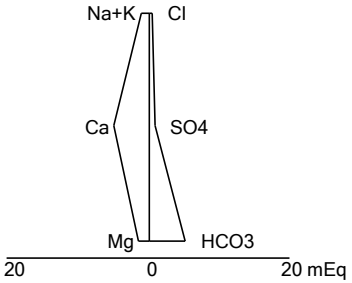

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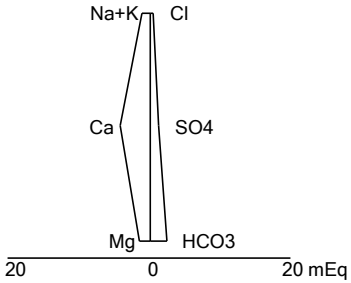

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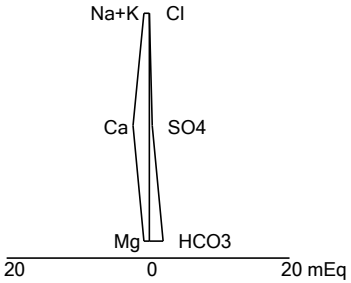

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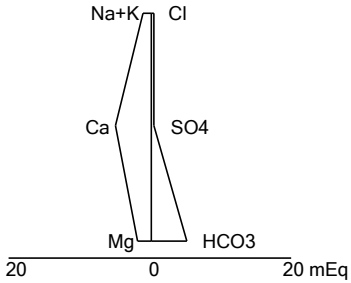

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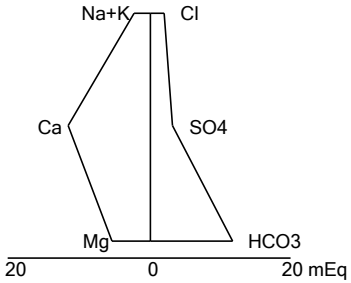

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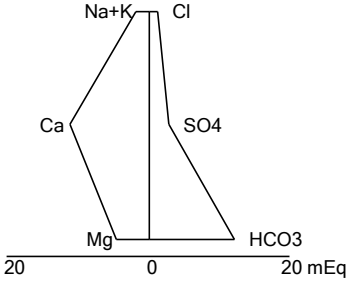
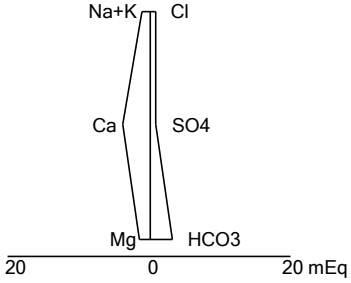
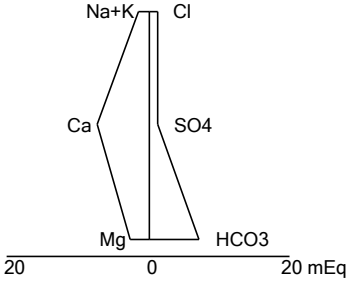


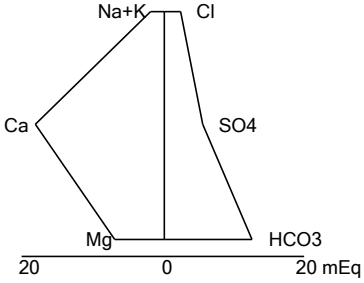
MWell#6



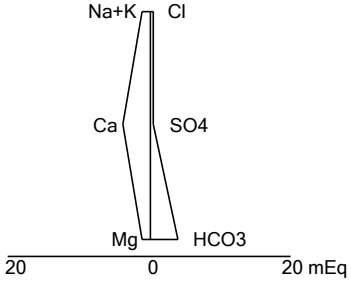
MWell#8



MWell#9



MWell#10



MWell#12

Stiff Diagram - 12/3/2024, 12/4/2024 Analysis Run 2/2/2025 1:51 PM

Horn Rapids Landfill Client: City of Richland Data: 4Q_24_PIPER_final

Cation/Anion Balance Calculations (Dissolved Metals), Horn Rapids Landfill, Fourth Quarter 2024

	Conversion Factor[1] (mg/L to meq/L)	MW-1			MW-2			MW-3			MW-4			MW-5			MW-6		
		Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)
CATIONS																			
Na	0.0435	21.7	0.94	12.94	15.7	0.68	10.57	12.3	0.54	16.19	16.3	0.71	9.48	38.9	1.69	9.06	27.9	1.21	7.13
Ca	0.0499	93.2	4.65	63.77	83.2	4.15	64.27	39.8	1.99	60.10	97.6	4.87	65.13	229	11.43	61.19	220	10.98	64.53
Mg	0.08229	18.3	1.51	20.65	17.6	1.45	22.42	7.74	0.64	19.28	20.7	1.70	22.78	62.1	5.11	27.37	54.0	4.44	26.12
Fe(+2)	0.03581	0.025	0.00	0.01	0.025	0.00	0.01	0.025	0.00	0.03	0.025	0.00	0.01	0.0634	0.00	0.01	0.025	0.00	0.01
K	0.02558	7.50	0.19	2.63	6.86	0.18	2.72	5.68	0.15	4.40	7.60	0.19	2.60	14.1	0.36	1.93	13.6	0.35	2.04
Mn	0.0364	0.002	0.00	0.00	0.002	0.00	0.00	0.002	0.00	0.00	0.002	0.00	0.00	2.24	0.08	0.44	0.782	0.03	0.17
		TOTAL	7.29	100.00	TOTAL	6.46	100.00	TOTAL	3.30	100.00	TOTAL	7.48	100.00	TOTAL	18.67	100.00	TOTAL	17.01	100.00
ANIONS																			
HCO_3[2]	0.02	260	5.20	73.70	122	2.44	40.99	103	2.06	65.18	258	5.16	72.88	584	11.68	67.15	598	11.96	72.08
SO_4	0.02082	40.9	0.85	12.07	71.2	1.48	24.90	27.6	0.57	18.18	34.7	0.72	10.20	165	3.44	19.75	132	2.75	16.56
Cl	0.02821	18.9	0.53	7.56	26.4	0.74	12.51	11.8	0.33	10.53	14.6	0.41	5.82	77.0	2.17	12.49	41.5	1.17	7.06
CO_3[2]	0.02	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
NO_3	0.0714	6.6	0.47	6.68	18	1.29	21.59	2.7	0.19	6.10	11	0.79	11.09	1.5	0.11	0.62	10	0.71	4.30
		TOTAL	7.06	100.00	TOTAL	5.95	100.00	TOTAL	3.16	100.00	TOTAL	7.08	100.00	TOTAL	17.39	100.00	TOTAL	16.59	100.00
anion + cation Sum (meq/L)			14.35			12.41			6.46			14.56			36.07			33.61	
(meq/L cations-anions)/(meq/L cations+anions)*100				1.65			4.09			2.23			2.74			3.55			1.25

Cation/Anion Balance Calculations (Dissolved Metals), Horn Rapids Landfill, Fourth Quarter 2024

	Conversion Factor[1] (mg/L to meq/L)	MW-8			MW-9			MW-10			MW-11			MW-12		
		Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)	Value (mg/L)	Value (meq/L)	Percent of Total (meq/L)
CATIONS																
Na	0.0435	20.8	0.90	14.78	25.1	1.09	9.79	30.4	1.32	5.01	0	0.00	NA	21.4	0.93	15.90
Ca	0.0499	75.2	3.75	61.31	144	7.19	64.40	362	18.06	68.39	0	0.00	NA	73.0	3.64	62.21
Mg	0.08229	15.4	1.27	20.70	32.0	2.63	23.60	80.1	6.59	24.95	0	0.00	NA	13.1	1.08	18.41
Fe(+2)	0.03581	0.025	0.00	0.01	0.025	0.00	0.01	0.277	0.01	0.04	0	0.00	NA	0.025	0.00	0.02
K	0.02558	7.63	0.20	3.19	9.61	0.25	2.20	16.5	0.42	1.60	0	0.00	NA	7.93	0.20	3.46
Mn	0.0364	0.002	0.00	0.00	0.002	0.00	0.00	0.127	0.00	0.02	0	0.00	NA	0.002	0.00	0.00
		TOTAL	6.12	100.00	TOTAL	11.16	100.00	TOTAL	26.41	100.00	TOTAL	0.00	0.00	TOTAL	5.86	100.00
ANIONS																
HCO_3[2]	0.02	160	3.20	54.40	364	7.28	69.09	632	12.64	51.25	0	0.00	NA	200	4.00	71.58
SO_4	0.02082	48.0	1.00	16.99	68.2	1.42	13.48	268	5.58	22.62	0	0.00	NA	34.4	0.72	12.82
Cl	0.02821	29.3	0.83	14.05	45.1	1.27	12.08	89.2	2.52	10.20	0	0.00	NA	14.2	0.40	7.17
CO_3[2]	0.02	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	NA	0	0.00	0.00
NO_3	0.0714	12	0.86	14.56	7.9	0.56	5.35	55	3.93	15.92	0	0.00	NA	6.6	0.47	8.43
		TOTAL	5.88	100.00	TOTAL	10.54	100.00	TOTAL	24.66	100.00	TOTAL	0.00	0.00	TOTAL	5.59	100.00
anion + cation Sum (meq/L)			12.00			21.69			51.08			0.00			11.44	
(meq/L cations-anions)/(meq/L cations+anions)*100				1.98			2.86			3.43			NA			2.34

[1]Reference: Hem 1985.

[2]HCO_3 and CO_3 reported as $CaCO_3$, conversion factor adjusted accordingly.

= Outside WAC 173-351-420(5)(a) acceptable range

Note: Values for cations in groundwater samples are measured as dissolved (field-filtered).
5 percent if anion plus cation sum greater than 5 meq/L; 10 percent if anion plus cation sum less than 5 meq/L
NA= Not available

Appendix G

Groundwater Data and Potentiometric Surface Maps

Table G-1. Groundwater Elevation Data, First Quarter 2024, Horn Rapids Landfill

Well	Northing[1]	Easting	Reference Elevation (NAVD88)[2]	Depth to water (ft)	Groundwater Elevation (NAVD88)
MW-1	371,572.00	2,291,691.97	489.68	102.34	387.34
MW-2	372,460.09	2,294,368.28	469.73	83.58	386.15
MW-3	371,529.10	2,294,408.23	481.28	95.09	386.19
MW-4	370,722.92	2,294,379.43	462.52	76.38	386.14
MW-5	371,784.64	2,293,120.19	469.94	83.33	386.61
MW-6	370,965.00	2,293,109.43	484.54	97.93	386.61
MW-8	370,228.88	2,293,869.87	476.47	90.06	386.41
MW-9	370,175.53	2,293,150.76	490.75	104.23	386.52
MW-10	372,265.23	2,293,111.61	464.08	76.65	387.43
MW-11	373,725.48	2,291,860.98	481.16	94.07	387.09
MW-12	368,946.27	1,934,322.73	477.63	91.50	386.13

Groundwater levels measured on April 9 and 10, 2024

Notes:

[1]Northing and Easting will be updated with new survey data

[2]Updated to NAVD88 in accordance with Ecology guidance

[3]Resurveyed in December 2019 to reflect monument adjustment during construction at expansion area

FILE: BL3820004P04T02-F-G1-1STQ2024 LAYOUT: G1 PATH: U:\PS0\Projects\Clients\3820-City of Richland\555--3820--004 HornRapids2011EM\99Svcs\CADD\555--3820--004\Phase 04\Task 02\Figures\ PLOTTED BY: ChrisNoa DATE: Thursday, June 27, 2024 9:25:24 AM

MW-2
386.15

MW-3
386.19

MW-4
386.14

MW-12
386.13

MW-8
386.41

MW-9
386.52

MW-10
387.43

MW-5
386.61

MW-6
386.61

GP-12 (1, 2, 3)

MW-11
387.09

MW-1
387.34

GP-1 (1,2)

GP-2 (1,2)

GP-3 (1, 2)

GP-4 (1, 2)

GP-7 (1, 2)

GP-8 (1, 2)

GP-9 (1, 2)

GP-10 (1, 2)

GP-11 (1, 2)

386.25

386.50

386.75

387.00

387.25

475.00

450.00

425.00

400.00

500.00

525.00

Topographic Contour Interval: 10 ft

Elevation Datum: NAVD88

Parametrix DATE: Jun 27, 2024 FILE: BL3820004P04T02-F-G1-1stQ2024

N

0 400

SCALE IN FEET

LEGEND:

- Approximate extent of refuse
- Approximate site boundary
- Groundwater elevation contour
- Approximate groundwater flow direction

Monitoring Stations

- ■ Monitoring well, with groundwater elevation in ft NAVD88 measured April 9 and 10, 2024
- ● Gas Probe (1, 2, 3) with variable-depth screens

Figure G1
Potentiometric Surface Map
First Quarter 2024
Horn Rapids Landfill

Table G-2. Groundwater Elevation Data, Second Quarter 2024, Horn Rapids Landfill

Well	Northing[1]	Easting	Reference Elevation (NAVD88)[2]	Depth to water (ft)	Groundwater Elevation (NAVD88)
MW-1	371,572.00	2,291,691.97	489.68	102.13	387.55
MW-2	372,460.09	2,294,368.28	469.73	83.66	386.07
MW-3	371,529.10	2,294,408.23	481.28	95.02	386.26
MW-4	370,722.92	2,294,379.43	462.52	76.44	386.08
MW-5	371,784.64	2,293,120.19	469.94	89.96*	379.98*
MW-6	370,965.00	2,293,109.43	484.54	98.01	386.53
MW-8	370,228.88	2,293,869.87	476.47	90.38	386.09
MW-9	370,175.53	2,293,150.76	490.75	104.34	386.41
MW-10	372,265.23	2,293,111.61	464.08	76.76	387.32
MW-11	373,725.48	2,291,860.98	481.16	94.15	387.01
MW-12	368,946.27	1,934,322.73	477.63	91.61	386.02

Groundwater levels measured on June 18 and 19, 2024

* Possible measurement error, data not used in contouring

Notes:

[1]Northing and Easting will be updated with new survey data

[2]Updated to NAVD88 in accordance with Ecology guidance

[3]Resurveyed in December 2019 to reflect monument adjustment during construction at expansion area

FILE: BL3820004P04T02-F-G2-2NDQ2024 LAYOUT: G2 PATH: U:\PSG\Projects\Clients\3820-City of Richland\555-3820-004 HornRapids2011EM 995vcs\CADD\555-3820-004\Phase 04\Task 02\Figures\ PLOTTED BY: purgabut DATE: Thursday, March 13, 2025 12:23:41 PM

MW-2
386.07

MW-3
386.26

MW-4
386.08

MW-12
386.02

MW-8
386.09

MW-9
386.41

MW-10
387.32

MW-5*
379.98

MW-6
386.53

GP-12 (1, 2, 3)

MW-11
387.01

MW-1
387.55

GP-1 (1,2)
GP-2 (1,2)
GP-3 (1, 2)
GP-4 (1, 2)
GP-7 (1, 2)
GP-8 (1, 2)
GP-9 (1, 2)
GP-10 (1, 2)
GP-11 (1, 2)

386.25
386.50
386.75
387.00
387.25
387.50
475.00
500.00
525.00

Topographic Contour Interval: 10 ft

Elevation Datum: NAVD88

Parametrix DATE: Mar 13, 2025 FILE: BL3820004P04T02-F-G2-2ndQ2024

0 N 400
SCALE IN FEET

LEGEND:

- Approximate extent of refuse
- Approximate site boundary
- Groundwater elevation contour
- Approximate groundwater flow direction

Monitoring Stations

- ■ Monitoring well, with groundwater elevation in ft NAVD88 measured June 18 and 19, 2024
- ● Gas Probe (1, 2, 3) with variable-depth screens
- * Possible measurement error, data not used in contouring

Figure G2
Potentiometric Surface Map
Second Quarter 2024
Horn Rapids Landfill

Table G-3. Groundwater Elevation Data, Third Quarter 2024, Horn Rapids Landfill

Well	Northing[1]	Easting	Reference Elevation (NAVD88)[2]	Depth to water (ft)	Groundwater Elevation (NAVD88)
MW-1	371,572.00	2,291,691.97	489.68	102.23	387.45
MW-2	372,460.09	2,294,368.28	469.73	83.45	386.28
MW-3	371,529.10	2,294,408.23	481.28	95.06	386.22
MW-4	370,722.92	2,294,379.43	462.52	76.41	386.11
MW-5	371,784.64	2,293,120.19	469.94	83.33	386.61
MW-6	370,965.00	2,293,109.43	484.54	97.94	386.60
MW-8	370,228.88	2,293,869.87	476.47	90.24	386.23
MW-9	370,175.53	2,293,150.76	490.75	104.27	386.48
MW-10	372,265.23	2,293,111.61	464.08	76.65	387.43
MW-11	373,725.48	2,291,860.98	481.16	93.70	387.46
MW-12	368,946.27	1,934,322.73	477.63	91.76	385.87

Groundwater levels measured on September 24, 25, and 26, 2024

Notes:

[1]Northing and Easting will be updated with new survey data

[2]Updated to NAVD88 in accordance with Ecology guidance

[3]Resurveyed in December 2019 to reflect monument adjustment during construction at expansion area

FILE: BL3820004P04T02-F-G1-3RDQ2024 LAYOUT: G1 PATH: U:\PSO\Projects\Clients\3820-City of Richland\555-3820-004 HornRapids2011EM\395vcs\CADD\555-3820-004\Phase 04\Task 02\Figures\ PLOTTED BY: purgabut DATE: Tuesday, December 10, 2024 9:27:49 PM

MW-2
386.28

MW-3
386.22

MW-4
386.11

MW-12
385.87

MW-8
386.23

MW-10
387.32

MW-5
386.61

MW-6
386.60

MW-9
386.48

MW-11
387.46

MW-1
387.45

GP-12 (1, 2, 3)

GP-2 (1,2)

GP-11 (1, 2)

GP-10 (1, 2)

GP-9 (1, 2)

GP-1 (1,2)

GP-7 (1, 2)

GP-4 (1, 2)

GP-3 (1, 2)

GP-8 (1, 2)

386.00

386.25

386.50

386.75

387.00

387.25

475.00

450.00

425.00

500.00

525.00

Topographic Contour Interval: 10 ft

Elevation Datum: NAVD88

Parametrix DATE: Dec 10, 2024 FILE: BL3820004P04T02-F-G1-3rdQ2024

0 N 400
SCALE IN FEET

LEGEND:

- Approximate extent of refuse
- Approximate site boundary
- Groundwater elevation contour
- Approximate groundwater flow direction

Monitoring Stations

- ■ Monitoring well, with groundwater elevation in ft NAVD88 measured September 24, 25 and 26, 2024
- ● Gas Probe (1, 2, 3) with variable-depth screens

Figure G3
Potentiometric Surface Map
Third Quarter 2024
Horn Rapids Landfill

Table G-4. Groundwater Elevation Data, Fourth Quarter 2024, Horn Rapids Landfill

Well	Northing[1]	Easting	Reference Elevation (NAVD88)[2]	Depth to water (ft)	Groundwater Elevation (NAVD88)
MW-1	371,572.00	2,291,691.97	489.68	102.26	387.42
MW-2	372,460.09	2,294,368.28	469.73	83.36	386.37
MW-3	371,529.10	2,294,408.23	481.28	94.83	386.45
MW-4	370,722.92	2,294,379.43	462.52	76.27	386.25
MW-5	371,784.64	2,293,120.19	469.94	83.44	386.50
MW-6	370,965.00	2,293,109.43	484.54	97.91	386.63
MW-8	370,228.88	2,293,869.87	476.47	90.06	386.41
MW-9	370,175.53	2,293,150.76	490.75	104.15	386.60
MW-10	372,265.23	2,293,111.61	464.08	76.70	387.38
MW-11	373,725.48	2,291,860.98	481.16	93.78	387.38
MW-12	368,946.27	1,934,322.73	477.63	91.22	386.41

Groundwater levels measured on December 3 and 4, 2024

Notes:

[1]Northing and Easting will be updated with new survey data

[2]Updated to NAVD88 in accordance with Ecology guidance

[3]Resurveyed in December 2019 to reflect monument adjustment during construction at expansion area

FILE: BL3820004P04T02-F-G1-4thQ2024 LAYOUT: G1 PATH: U:\PS0\Projects\Clients\3820-City of Richland\555-3820-004 HornRapids2011EM\99Svcs\CADD\555-3820-004\Phase 04\Task 02\Figures\ PLOTTED BY: purgabut DATE: Thursday, March 13, 2025 12:25:39 PM

MW-2
386.37

MW-3
386.45

MW-4
386.25

MW-12
386.41

MW-8
386.41

MW-9
386.60

MW-10
387.38

MW-5
386.50

MW-6
386.63

MW-11
387.38

MW-1
387.42

GP-12 (1, 2, 3)

GP-2 (1,2)

GP-11 (1, 2)

GP-10 (1, 2)

GP-9 (1, 2)

GP-1 (1,2)

GP-8 (1, 2)

GP-7 (1, 2)

GP-4 (1, 2)

GP-3 (1, 2)

475.00

450.00

425.00

400.00

500.00

525.00

386.50

386.75

387.00

387.25

Topographic Contour Interval: 10 ft

Elevation Datum: NAVD88

Parametrix DATE: Mar 13, 2025 FILE: BL3820004P04T02-F-G1-4thQ2024

0 N 400
SCALE IN FEET

Legend:

- Approximate extent of refuse
- Approximate site boundary
- Groundwater elevation contour
- Approximate groundwater flow direction

Monitoring Stations

- ■ Monitoring well, with groundwater elevation in ft NAVD88 measured December 3 and 4, 2024
- ● Gas Probe (1, 2, 3) with variable-depth screens

Figure G4
Potentiometric Surface Map
Fourth Quarter 2024
Horn Rapids Landfill

Appendix H

Landfill Gas Data

HORN RAPIDS LANDFILL PERIMETER GAS MONITORING DATA

NAME Heather Zanin **EMPL. #** 4836 **DATE:** 3/29/2024

	WEATHER	**TEMP**	**BAROMOETER**
START	Clear	58	
FINISH	Clear	62	

Comments:

Well Location/Port	Pressure ("wc)	Methane (CH_4 %)	Carbon Dioxide (CO_2 &)	Oxygen (O_2 %)	Bal	Comments: Barometer
GP - 1-1	0.04	0.0	0.2	20.7	79.1	29.42
GP - 1-2	-0.01	0.0	0.1	20.9	79.0	29.43
GP - 2-1	-0.03	0.0	0.1	21.1	78.8	29.44
GP - 2-2	-0.25	0.0	0.1	21.1	79.1	29.43
GP - 3-1	-0.26	0.1	0.0	20.8	79.4	29.41
GP - 3-2	-0.19	0.0	0.0	20.8	79.4	29.40
GP - 4-1	-0.30	0.1	0.1	20.8	79.3	29.40
GP - 4-2	-0.27	0.1	0.1	20.7	79.4	29.39
GP - 5-1						
GP - 5-2						
GP - 6-1						
GP - 6-2						
GP - 7-1	-0.15	0.2	0.1	21.0	78.9	29.36
GP - 7-2	0.00	0.1	0.1	20.9	78.9	29.40
GP - 8-1	-0.04	0.0	0.0	20.6	79.4	29.40
GP - 8-2	-0.04	0.0	0.2	20.4	79.4	29.43
GP - 9-1	-0.46	0.0	0.0	21.0	79.5	29.44
GP - 9-2	-0.04	0.0	0.0	21.1	78.9	29.43
GP - 10-1	-0.13	0.0	0.2	20.4	79.5	29.44
GP - 10-2	-0.03	0.0	1.1	19.1	79.8	29.42
GP - 11-1	-0.06	0.0	0.0	20.6	79.5	29.44
GP - 11-2	0.01	0.0	0.1	20.6	79.3	29.43
GP - 11-3						
GP - 12-1	-0.18	0.0	2.0	19.1	78.4	29.45
GP - 12-2	-0.06	0.0	0.3	20.7	78.1	29.44
GP - 12-3	-0.01	0.0	4.1	16.0	72.5	29.43
GP - 13-1	0.1	0.0	0.0	21.0	78.9	29.43
GP - 14-1	0.22	0.0	0.0	21.0	78.8	29.45
GP - 15-1	0.17	0.0	0.2	20.6	79.0	29.45

HORN RAPIDS LANDFILL PERIMETER GAS MONITORING DATA

NAME Heather Zanin **EMPL. #** 4836 **DATE:** 6/27/2024

	WEATHER	**TEMP**	**BAROMOETER**
START	Windy & Partly Sunny	70	
FINISH	Windy & Partly Sunny	73	

Comments:

Well Location/Port	Pressure ("wc)	Methane (CH_4 %)	Carbon Dioxide (CO_2 &)	Oxygen (O_2 %)	Bal	Comments: Barometer
GP - 1-1	-0.08	0.0	0.5	20.6	78.9	29.37
GP - 1-2	-0.06	0.0	0.5	20.7	78.8	29.39
GP - 2-1	0.01	0.0	0.2	20.5	79.2	29.39
GP - 2-2	-0.11	0.0	0.1	20.5	79.3	29.4
GP - 3-1	-0.24	0.1	0.0	20.8	79.3	29.4
GP - 3-2	-0.18	0.0	0.0	20.8	79.4	29.39
GP - 4-1	-0.28	0.1	0.1	19.9	80.1	29.40
GP - 4-2	-0.29	0.0	0.1	19.7	80.2	29.39
GP - 5-1						
GP - 5-2						
GP - 6-1						
GP - 6-2						
GP - 7-1	-0.17	0.1	0.1	21.0	79.0	29.39
GP - 7-2	0.01	0.1	0.1	20.9	78.9	29.40
GP - 8-1	-0.60	0.0	0.0	20.6	80.0	29.40
GP - 8-2	-0.05	0.0	0.2	20.4	79.5	29.4
GP - 9-1	-0.39	0.0	0.1	20.8	79.1	29.39
GP - 9-2	-0.08	0.0	0.1	20.6	79.3	29.38
GP - 10-1	0.24	0.0	1.1	18.8	80.1	29.44
GP - 10-2	0.28	0.0	1.2	18.7	80.1	29.44
GP - 11-1	0.27	0.0	0.1	19.7	80.2	29.44
GP - 11-2	0.29	0.0	0.2	19.6	80.2	29.43
GP - 11-3						
GP - 12-1	0.21	0.0	3.7	16.4	79.9	29.43
GP - 12-2	0.19	0.0	0.1	19.9	80.0	29.43
GP - 12-3	0.16	0.0	0.7	19.3	80.0	29.43
GP - 13-1	0.21	0.0	0.1	20.2	79.7	29.39
GP - 14-1	0.19	0.0	0.2	19.9	79.9	29.42
GP - 15-1	0.36	0.0	0.3	19.7	80.1	29.42

HORN RAPIDS LANDFILL **PERIMETER GAS MONITORING DATA**

NAME Heather Zanin **EMPL. #** 4836 **DATE:** 10/8/2024

	WEATHER	**TEMP**	**BAROMOETER**
START	Sunny	72	
FINISH	Sunny	76	

Comments:

Well Location/Port	Pressure ("wc)	Methane (CH_4 %)	Carbon Dioxide (CO_2 &)	Oxygen (O_2 %)	Balance	Comments - Barometer
GP - 1-1	-0.05	0.0	0.4	20.7	78.9	29.39
GP - 1-2	-0.07	0.0	0.5	20.7	78.9	29.38
GP - 2-1	-0.09	0.0	0.1	20.5	79.3	29.4
GP - 2-2	-0.12	0.0	0.0	20.7	78.9	29.39
GP - 3-1	-0.21	0.0	0.0	20.8	79.4	29.39
GP - 3-2	-0.18	0.0	0.0	20.8	79.4	29.4
GP - 4-1	-0.26	0.1	0.0	20.1	80.0	29.4
GP - 4-2	-0.31	0.0	0.1	19.9	80.1	29.39
GP - 7-1	-0.16	0.0	0.1	20.9	78.9	29.39
GP - 7-2	-0.12	0.1	0.1	20.6	80.0	29.4
GP - 8-1	-0.59	0.0	0.0	21.0	79.0	29.39
GP - 8-2	-0.02	0.0	0.1	20.4	79.6	29.41
GP - 9-1	-0.29	0.0	0.0	20.7	79.1	29.41
GP - 9-2	-0.1	0.0	0.0	20.8	79.2	29.44
GP - 10-1	0.19	0.1	1.0	18.6	80.0	29.42
GP - 10-2	0.23	0.0	1.1	18.8	80.1	29.43
GP - 11-1	0.26	0.0	0.0	19.8	80.1	29.43
GP - 11-2	0.27	0.0	0.1	19.7	80.0	29.43
GP - 12-1	0.19	0.0	3.2	16.7	79.8	29.42
GP - 12-2	0.19	0.0	0.2	19.7	79.9	29.42
GP - 12-3	0.13	0.0	0.8	19.3	80.0	29.43
GP - 13-1	0.2	0.0	0	20.2	79.8	29.42
GP - 14-1	0.18	0.0	0.2	20	79.9	29.39
GP - 15-1	0.3	0.0	0.2	19.8	80.1	29.43
GP - 5-1						
GP - 5-2						
GP - 6-1						
GP - 6-2						
GP - 11-3						

Appendix I

Field Data Sheets

PARAMETRIX

Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-01**

Project Number:	555-3820-004	**Date:**	4/9/2024
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	M Brady
	Richland, WA 99354	**Purged By:**	M Brady

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	102.34 1546	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	139	**Date Purged:**	4/9/24
Top of Screen (feet)	114	**Purge Time (from/to):**	1548 – 1608
Reference Point (surveyor's notch, etc.):	TOC	**Time Sampled:**	1610

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial t	102.34					6.15	NTU	
1553 5	101.84	7.22	0.66	18.7	64.8	5.72	0.67	3.6 440ml/min
1558 10	—	7.22	0.67	20.7	68.9	5.25	0.67	3.6
1603 15	—	7.21	0.68	21.6	72.2	5.10	0.07	3.6
1608 20	—	7.21	0.68	21.6	70.7	5.01	0.35	3.6

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	440ml/min	**Sampling Flow Rate:**	"
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	4/11/24
	Energy Northwest (nitrate)		4/10/24
Shipment Method:	Hand	**Field QC Sample Number:**	

Well Integrity:

Remarks: Tough to measure WL, pump needs to be fixed

Signature: M Brady

PARAMETRIX

Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-02**

Project Number:	555-3820-004	**Date:**	4/10/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	MBrady
	Richland, WA 99354	**Purged By:**	MBrady

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	83.58 1042	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	123	**Date Purged:**	4/10/24
Top of Screen (feet)	98	**Purge Time (from/to):**	1043 - 1103
Reference Point (surveyor's notch, etc.):	TOC	**Time Sampled:**	1105

TIME (2400 hr)		DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L(± 10%)	TURBIDITY (visual) NTU	PUMP SETTING
Initial	t	83.58							
1048	5	83.62	7.65	0.56	20.2	62.1	8.84	1.67	4.3 3.7 500mL/min
1053	10	83.64	7.64	0.56	19.9	72.5	8.77	1.04	3.7
1058	15	83.64	7.63	0.56	20.1	69.0	8.72	1.58	3.7
1103	20	83.64	7.63	0.56	20.9	69.3	8.56	1.55	

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	500ml/min	**Sampling Flow Rate:**	"
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	4/11/24
	Energy Northwest (nitrate)		4/10/24
Shipment Method:	Hand	**Field QC Sample Number:**	

Well Integrity:

Remarks:

Signature: MBrady

PARAMETRIX

Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-03**

Project Number:	555-3820-004	**Date:**	4/10/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	M Brady
	Richland, WA 99354	**Purged By:**	M Brady

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	95.09 906	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	136	**Date Purged:**	4/10/24
Top of Screen (feet)	111	**Purge Time (from/to):**	909-934
Reference Point (surveyor's notch, etc.):	TOC	**Time Sampled:**	935

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L(± 10%)	TURBIDITY (visual)	PUMP SETTING
	t						NTU	3.7
Initial	_____							500 ml/min
914	5 95.02	7.88	0.309	17.2	103.1	9.72	1.30	
919	10 95.1	7.90	0.309	18.1	97.9	9.44		
924	15 95.24	7.90	0312	19.2	90.4	9.03	0.0	
929	20 95.16	7.89	0.309	20.1	87.9	8.85	0.0	
934	25 95.17	7.89	0312	20.4	86.5	8.69	0.0	

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	500ml/min	**Sampling Flow Rate:**	"
Field Parameter Instrument			
Laboratory:	ARI	**Date Sent to Lab:**	4/11/24
	Energy Northwest (nitrate)		4/10/24
Shipment Method:	Hand	**Field QC Sample Number:**	

Well Integrity:

Remarks: Sounder gives false positive shorting on wiring

Signature: M Brady

PARAMETRIX

Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-04**

Project Number:	555-3820-004	**Date:**	4/10/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	M Brady
	Richland, WA 99354	**Purged By:**	M Brady

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	76.38 954	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	115	**Date Purged:**	4/10/24
Top of Screen (feet)	90	**Purge Time (from/to):**	957 – 1017
Reference Point (surveyor's notch, etc.):	TOC	**Time Sampled:**	1018

TIME (2400 hr)	±	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual) NTU	PUMP SETTING
Initial									520 ml/min
1002	5	76.40	7.56	0.59	17.5	102.8	9.69 3.68	0.79	3.5
1007	10	76.41	7.60	0.61	19.4	95.8	3.68	0.00	—
1012	15	76.41	7.60	0.64	20.2	96.7	3.57	0.06	—
1017	20	76.41	7.59	0.63	20.4	91.0	3.51	0.42	

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	520 ml/min	**Sampling Flow Rate:**	520 ml/min
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	4/11/24
	Energy Northwest (nitrate)		4/10/24
Shipment Method:	Hand	**Field QC Sample Number:**	

Well Integrity:

Remarks:

Signature: M Brady

PARAMETRIX

Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-05**

Project Number:	555-3820-004	**Date:**	4/9/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	M. Brady
	Richland, WA 99354	**Purged By:**	M Brady

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	83.33 1231	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	101	**Date Purged:**	4/9/24
Top of Screen (feet)	91	**Purge Time (from/to):**	1234 - 1259
Reference Point (surveyor's notch, etc.):	TOC	**Time Sampled:**	1300

TIME (2400 hr)		DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual) NTU	PUMP SETTING
Initial	±	83.37							
1239	5	83.50	6.63	1.61	20.0	-44.1	0.72	0	3.6 380ml/min
1244	10	83.50	6.65	1.55	22.0	-32.7	0.55	0	3.6
1249	15	83.50	6.64	1.48	23.8	-27.4	0.44	0.04	3.6
1254	20	83.50	6.64	1.44	24.2	-27.2	0.35	0.51	3.6
1259	25	83.50	6.65	1.43	24.3	-25.3	6.33	0.37	3.6

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	380 ml/min	**Sampling Flow Rate:**	"
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	4/11/24
	Energy Northwest (nitrate)		4/10/24
Shipment Method:	Hand	**Field QC Sample Number:**	

Well Integrity:

Remarks:

Signature: Mark Brady

PARAMETRIX

Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-06**

Project Number:	555-3820-004	**Date:**	4/9/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	M Brady
	Richland, WA 99354	**Purged By:**	M Brady

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	97.93 1328	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	116	**Date Purged:**	4/9/24
Top of Screen (feet)	106	**Purge Time (from/to):**	1330–1350
Reference Point (surveyor's notch, etc.):	TOC	**Time Sampled:**	1355

TIME (2400 hr)		DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual) NTU	PUMP SETTING	
Initial	±	97.93								
1335	5	98.10	6.64	1.07	21.8	-62.3	0.53	0.17	3.7	400ml/min
1340	10	98.10	6.65	1.07	22.1	-64.2	0.51	0.39	3.7	
1345	15	98.10	6.65	1.07	22.7	-69.2	0.46	0.21	3.7	
1350	20	98.10	6.64	1.07	23.5	-72.5	0.44	0.07	3.7	

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	400ml/min	**Sampling Flow Rate:**	"
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	4/11/24
	Energy Northwest (nitrate)		4/10/24
Shipment Method:	Hand	**Field QC Sample Number:**	

Well Integrity:

Remarks: Slight odor H_2S at start

Signature: M Brady

PARAMETRIX

Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-08**

Project Number:	555-3820-004	**Date:**	4/10/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	MBrady
	Richland, WA 99354	**Purged By:**	MBrady

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	90.06 1132	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	102.5	**Date Purged:**	4/10/24
Top of Screen (feet)	87.5	**Purge Time (from/to):**	1135-1155
Reference Point (surveyor's notch, etc.):	TOC	**Time Sampled:**	1156

TIME (2400 hr)		DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual) NTU	PUMP SETTING
Initial	t	90.06							
1140	5	90.21	7.59	0.97	17.9	89.1	7.39	8.07	3.6 500 ml/min
1145	10	90.21	7.62	1.00	21.9	86.7	6.87	0.0	3.6
1150	15	90.21	7.61	1.00	22.3	87.4	6.77	0.34	3.6
1155	20	90.21	7.62	0.99	22.4	88.0	6.69	0.37	3.6

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	500 ml/min	**Sampling Flow Rate:**	"
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	4/11/24
	Energy Northwest (nitrate)		4/10/24
Shipment Method:	Hand	**Field QC Sample Number:**	

Well Integrity:

Remarks:

Signature: MBrady

PARAMETRIX

Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-09**

Project Number:	555-3820-004	**Date:**	4/10/2024
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	MBrady
	Richland, WA 99354	**Purged By:**	MBrady

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	104.23 1223	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	115.5	**Date Purged:**	4/10/2024
Top of Screen (feet)	100.5	**Purge Time (from/to):**	1228 - 1258
Reference Point (surveyor's notch, etc.):	TOC	**Time Sampled:**	1300

TIME (2400 hr)		DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	t	104.23							
1233	5	104.28	6.98	0.98	17.8	21.6	7.14	0.32	3.8 400ml/min
1238	10	104.28	6.98	0.95	18.0	62.3	4.69	0.08	3.8
1243	15	104.28	7.00	0.95	19.2	71.8	4.38	0.08	3.8
1248	20	104.28	6.98	0.97	21.0	80.2	3.81	0.0	3.8
1253	25	104.28	6.99	0.96	21.9	83.8	3.75	0.0	3.8
1258	30	104.28	6.98	0.97	22.3	85.3	3.62	0.0	3.8

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	400ml/min	**Sampling Flow Rate:**	"
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	4/11/24
	Energy Northwest (nitrate)		4/10/24
Shipment Method:	Hand	**Field QC Sample Number:**	

Well Integrity:

Remarks: Rotten Egg Smell H_2S at start

Signature: MBrady

PARAMETRIX

Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-10**

Project Number:	555-3820-004	**Date:**	4/9/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	MBrady
	Richland, WA 99354	**Purged By:**	MBrady

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	76.65 11:06	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	87.5	**Date Purged:**	4/9/24
Top of Screen (feet)	72.5	**Purge Time (from/to):**	1109 - 1142
Reference Point (surveyor's notch, etc.):		**Time Sampled:**	1143

TIME (2400 hr)		DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual) NTU	PUMP SETTING
Initial	±	76.65							300ml/min
1114	5	76.69	6.64	1.47	20.9	93.1	0.87	2.20	3.6
1122	13	76.71	6.63	1.50	21.7	98.4	0.76	1.10	Flow issues 3.8
1127	18	76.70	6.63	1.52	27.0	90.2	0.75	1.59	3.6
1132	23	76.71	6.62	1.49	27.6	8.3	0.49	0.65	3.6
1137	28	76.71	6.61	1.51	26.6	5.3	0.53	0.83	3.6
1142	33	76.71	6.61	1.50	25.3	7.0	0.48	0.83	

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	300ml/min	**Sampling Flow Rate:**	"
Field Parameter Instrument			
Laboratory:	ARI	**Date Sent to Lab:**	4/11/24
	Energy Northwest (nitrate)		4/10/24
Shipment Method:	Hand	**Field QC Sample Number:**	

Well Integrity:

Remarks:

Signature: MBrady

PARAMETRIX

Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-11**

Project Number:	555-3820-004	**Date:**	4/9/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	MBrady
	Richland, WA 99354	**Purged By:**	MBrady

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	94.07 1430	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	105	**Date Purged:**	4/9/24
Top of Screen (feet)	90	**Purge Time (from/to):**	1434 - 1504
Reference Point (surveyor's notch, etc.):	TOC	**Time Sampled:**	1505

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual) NTU	PUMP SETTING	
Initial	± 94.07								
1439	5 94.12	7.34	1.79	17.4	+3.8	7.12	3.35	3.6	400ml/min.
1444	10 94.12	7.35	1.79	18.4	+8.7	6.65	1.46	3.6	Flow ISSV
1449	15 94.21	7.35	1.78	20.1	+21.7	7.25	0.79	3.6	↑
1454	20 94.23	7.34	1.79	27.9	+47.2	7.94	0.87	3.6	
1459	25 94.25	7.34	1.78	21.4	+51.0	7.92	0.98	3.6	
1504	30 94.27	7.35	1.79	20.7	+46.8	7.83	0.87	3.6	

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	400 ml/min	**Sampling Flow Rate:**	"
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	4/11/24
	Energy Northwest (nitrate)		4/10/24
Shipment Method:	Hand	**Field QC Sample Number:**	MW-21

Well Integrity:

Remarks: MS/MSD & Duplicate

Signature: MBrady

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Groundwater Sampling Field Data Sheet

Well #: **MW-12**

Project Number:	555-3820-004	**Date:**	4/10/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Rod	**Sampled By:**	M Brady
	Richland, WA 99354	**Purged By:**	M Brady

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	91.50 743	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	104	**Date Purged:**	4/10/24
Top of Screen (feet)	89	**Purge Time (from/to):**	748 - 818
Reference Point (surveyor's notch, etc.):	TOC	**Time Sampled:**	820

TIME (2400 hr)		DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING	
								NTU		
Initial	t	91.50								
753	5	91.50	7.83	0.417	16.5	136.2	6.37	3.91	3.8/320 mL/min	
758	10		7.81	0.421	16.4	126.4	6.15	4.50	↑4.0 flow drop	
803	15		7.80	0.422	17.3	127.6	5.68	—	4.1	PUMP ISSUE
808	20		7.81	0.420	21.0	1443	6.65	8.27		
813	25	91.50	7.80	0.421	22.	139.1	6.31		3.9	
818	30	91.50	7.80	0.421	22	136.1	6.25	7.72		

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	320 mL/min	**Sampling Flow Rate:**	"
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	4/10/24
	Energy Northwest (nitrate)		4/10/24
Shipment Method:	Hand	**Field QC Sample Number:**	

Well Integrity:

Remarks: Pump has issues reset twice. Appears to be overheating. Higher flow rate is better to cool off

Signature: M Brady

Groundwater Sampling Field Data Sheet

Well #: **Leachate Pond**

Project Number:	555-3820-004	**Date:**	4/10/2024
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	M Brady
	Richland, WA 99354		

TIME (2400 hr)	pH (units)	Ec (µmhos/cm 25°C)	TEMPERATURE °C	Redox (mv)	Dissolved Oxygen (mg/L)	TURBIDITY (visual)
1401	8.28	4.47	16.9	-160.2	0.15	7.55 NTU

Laboratory:	ARI 4/11/24	**Date Sent to Lab:**	
	Energy Northwest (nitrate) 4/10/24		
Chain-of-Custody (yes/no):	yes	**Field QC Sample Number:**	None
Shipment Method:	Hand		None

Remarks: Sampled 1405, Water is cloudy strong odor of gas

Depth level 10.82 Feet Sump/Underdrain

Underdrain WL about even w/ pond called Drew
Need to sample. Pickup VOAs from ENW. Return to Site
1600 sampled Leachate Underdrain/Sump

Temp 15.6
DO 6.94
Cond 3.22
pH 7.86
ORP 79.7
Water is clear, slight odor

Took Photo of WL in pond

Signature: M Brady

Field Data Sheet

Well #: **Condensate Pond**

Project Number:	555-3820-004	**Date:**	4/10/2024
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road Richland, WA 99354	**Measured By:**	M Brady

TIME (2400 hr)	Depth to Water from top of Pipe (ft)	Estimated Depth of Water in Pond (ft)
1425	24.63	2'

Remarks:

Top 456 ft, bottom 448 ft; approximate length of pipe 25 ft (3:1)

Took Photo WL is @ 2ft mark

Signature: MBrady

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Groundwater Sampling Field Data Sheet

Well #: **MW-01**

Project Number:	555-3820-004	**Date:**	6/18/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	Nguyen
	Richland, WA 99354	**Purged By:**	Nguyen

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	102.13 @ 1049	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	139	**Date Purged:**	6/18
Top of Screen (feet)	114	**Purge Time (from/to):**	1054 - 1123
Reference Point (surveyor's notch, etc.):	TOC	**Time Sampled:**	1110

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	102.13							
1055	102.18	7.25	691	19.9	-10.9	5.78	0.00	3.6
1100	"	7.23	699	20.2	-20.4	5.63	"	
1105		7.24	701	20.9	-21.8	5.50	"	
1110		7.23	709	21.9	-23.0	5.34	"	

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	450 mL/min	**Sampling Flow Rate:**	
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	
	Energy Northwest (nitrate)		
Shipment Method:		**Field QC Sample Number:**	

Well Integrity:

Remarks: Hard to take WL. Pump needs repair.

Signature: _____

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Groundwater Sampling Field Data Sheet

Well #: **MW-02**

Project Number:	555-3820-004	**Date:**	6/19/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	Nguyen
	Richland, WA 99354	**Purged By:**	Nguyen

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	83.66' @ 817	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	123	**Date Purged:**	6/19
Top of Screen (feet)	98	**Purge Time (from/to):**	819 - 856
Reference Point (surveyor's notch, etc.):		**Time Sampled:**	840

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L(± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	83.66							
820	83.69	7.77	590	17.9	8.4	*7.63	1.76	3.6
825	"	7.71	589	18.1	10.3	6.63	1.81	
830	"	7.69	592	19.9	10.9	5.98	0.38	
835	83.70	7.66	591	21.2	8.4	5.86	0.00	
840	"	7.65	592	21.4	5.4	5.95	"	

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	450 mL/min	**Sampling Flow Rate:**	
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	
	Energy Northwest (nitrate)		
Shipment Method:		**Field QC Sample Number:**	

Well Integrity:

Remarks:

Signature: _____

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Groundwater Sampling Field Data Sheet

Well #: **MW-03**

Project Number:	555-3820-004	**Date:**	6/18/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	Nguyen
	Richland, WA 99354	**Purged By:**	Nguyen

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	95.02' @ 1535	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	136	**Date Purged:**	6/18
Top of Screen (feet)	111	**Purge Time (from/to):**	1535 – 1608
Reference Point (surveyor's notch, etc.):		**Time Sampled:**	1555

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L(± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	95.02							
1540	95.06	7.96	322.7	19.2	-73.5	8.35	0.00	3.7
1545	"	7.97	324.9	19.4	-73.0	7.88	"	
1550	95.02	7.98	322.2	20.0	-73.6	7.65	"	
1555	"	7.95	326.7	21.8	-66.5	7.49	"	

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	500 mL/min	**Sampling Flow Rate:**	
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	
	Energy Northwest (nitrate)		
Shipment Method:		**Field QC Sample Number:**	

Well Integrity:

Remarks: WL indicator finicky/super sensitive. Readings may not be accurate.

Signature: _____

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Groundwater Sampling Field Data Sheet

Well #: **MW-04**

Project Number:	555-3820-004	**Date:**	6/18/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	Nguyen
	Richland, WA 99354	**Purged By:**	Nguyen

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	76.44 @ 1691	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	115	**Date Purged:**	6/18
Top of Screen (feet)	90	**Purge Time (from/to):**	1626 - 1700
Reference Point (surveyor's notch, etc.):		**Time Sampled:**	1650

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	76.44							
1630	76.50	7.75	622	19.0	-103.0	4.10	0.00	3.5
1635	"	7.72	647	20.7	-97.4	3.70	"	
1640	"	7.70	649	21.4	-89.6	3.55	"	
1645	"	7.70	648	21.6	-89.8	3.48	"	
1650	76.43	7.69	658	21.7	-92.0	3.56	"	

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	450 ml/min	**Sampling Flow Rate:**	
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	
	Energy Northwest (nitrate)		
Shipment Method:		**Field QC Sample Number:**	

Well Integrity:

Remarks: WL finnicky/sensitive, [illegible]

Signature: _____

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Groundwater Sampling Field Data Sheet

Well #: **MW-05**

Project Number:	555-3820-004	**Date:**	6/18/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	Nguyen
	Richland, WA 99354	**Purged By:**	Nguyen

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	89.96' @ 1300	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	101	**Date Purged:**	6/18
Top of Screen (feet)	91	**Purge Time (from/to):**	1301 - 1349
Reference Point (surveyor's notch, etc.):		**Time Sampled:**	1338

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	89.96'							
1303	90.06	6.62	2368	21.4	-223.3	2.31	0.00	3.5
1308	89.95	6.59	2450	21.4	-214.0	1.02	"	
1313	"	6.60	2325	22.3	-204.9	0.81	"	
1318	"	6.60	2271	23.7	-208.9	0.68	"	
1323	"	6.59	2096	25.2	-208.5	0.62	"	
1328	"	6.59	2094	25.8	-211.4	0.54	"	
1332	"	6.58	1961	26.1	-217.4	0.52	"	
1338	90.21	6.59	1934	26.3	-221.1	0.49	"	

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	450mL/min	**Sampling Flow Rate:**	
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	
	Energy Northwest (nitrate)		
Shipment Method:		**Field QC Sample Number:**	

Well Integrity:

Remarks:

Signature: _____

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Groundwater Sampling Field Data Sheet

Well #: **MW-06**

Project Number:	555-3820-004	**Date:**	6/18/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	Nguyen
	Richland, WA 99354	**Purged By:**	Nguyen

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	98.01 @ 1150	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	116	**Date Purged:**	6/18
Top of Screen (feet)	106	**Purge Time (from/to):**	1151 - 1238
Reference Point (surveyor's notch, etc.):		**Time Sampled:**	1221

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial								
1155	96.92	6.67	1297	22.2	-183.2	1.21	0.00	3.7
1200	89.79	6.66	1291	22.3	-191.4	0.67	"	
1205	89.78	6.64	1275	23.8	-208.4	0.38	"	
1210	"	6.64	1265	25.1	-219.7	0.35	"	
1215	"	6.61	1253	26.3	-223.3	0.30	"	
1220	"	6.61	1243	26.7	-229.6	0.29	"	

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	600 mL/min (would not flow if lower)	**Sampling Flow Rate:**	
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	
	Energy Northwest (nitrate)		
Shipment Method:		**Field QC Sample Number:**	

Well Integrity:

Remarks: Water level indicator being finicky. Readings may be innaccurate. 97.99' after purging & turning off pump.

Signature: _____

Dirt accumulating around fence. Fence hard to open & close. Lock on gate finnicky; couldn't close. Well is locked.

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Groundwater Sampling Field Data Sheet

Well #: **MW-08**

Project Number:	555-3820-004	**Date:**	6/19/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	Nguyen
	Richland, WA 99354	**Purged By:**	Nguyen

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	89.81' @ 1019	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	102.5	**Date Purged:**	6/19
Top of Screen (feet)	87.5	**Purge Time (from/to):**	1020 – 1055
Reference Point (surveyor's notch, etc.):		**Time Sampled:**	1045

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	89.81							
1025	90.38	7.69	1080	18.4	13.3	8.27	0.00	3.5
1030	"	7.70	1071	19.7	9.3	7.35	"	
1035	90.37	7.66	1081	22.7	17.9	6.96	"	
1040	"	7.64	1076	23.2	23.7	6.76	"	
1045	90.35	7.64	1079	23.5	26.0	6.67	"	

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	450 ml/min	**Sampling Flow Rate:**	
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	
	Energy Northwest (nitrate)		
Shipment Method:		**Field QC Sample Number:**	

Well Integrity:

Remarks:

Signature: _____

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Groundwater Sampling Field Data Sheet

Well #: **MW-09**

Project Number:	555-3820-004	**Date:**	6/19/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	Nguyen
	Richland, WA 99354	**Purged By:**	Nguyen

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	104.34' @ 923	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	115.5	**Date Purged:**	6/19
Top of Screen (feet)	100.5	**Purge Time (from/to):**	924 – 1006
Reference Point (surveyor's notch, etc.):		**Time Sampled:**	950

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	104.34							
925	104.49	7.04	1134	18.4	-13.0	5.05	0.00	3.8
930	"	7.02	1116	18.4	-7.0	4.64	"	
935	"	7.01	1120	20.6	29.4	4.11	"	
940	"	7.00	1121	22.1	33.7	3.78	"	
945	104.48	6.97	1116	23.5	39.0	3.56	"	
950	104.49	6.96	1110	24.0	40.0	3.43	"	

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	500 mL/min	**Sampling Flow Rate:**	
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	
	Energy Northwest (nitrate)		
Shipment Method:		**Field QC Sample Number:**	

Well Integrity:

Remarks:

Signature: _____

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Groundwater Sampling Field Data Sheet

Well #: **MW-10**

Project Number:	555-3820-004	**Date:**	6/18/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	Nguyen
	Richland, WA 99354	**Purged By:**	Nguyen

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	76.76' @ 1408	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	87.5	**Date Purged:**	6/18
Top of Screen (feet)	72.5	**Purge Time (from/to):**	1408 – 1455
Reference Point (surveyor's notch, etc.):		**Time Sampled:**	1435 ~~1455~~

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	76.76							
1410	76.43	6.66	1763	22.7	-160.9	1.89	3.20	3.5
1415	76.45	6.64	1755	23.0	-221.3	0.86	3.08	"
1420	"	6.62	1774	23.3	-211.8	0.64	0.00	3.6
1425	~~76.46~~	6.58	1784	27.4	-210.6	0.27	"	
1430	76.47	6.56	1778	23.3	-219.9	0.16	"	
1435	76.51	6.56	~~1957~~	24.5	-216.5	0.16	"	

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	475 mL/min	**Sampling Flow Rate:**	
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	
	Energy Northwest (nitrate)		
Shipment Method:		**Field QC Sample Number:**	MW-21

Well Integrity:

Remarks: DUP (MW-21) & MS/MSD taken.

Signature: _____

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Groundwater Sampling Field Data Sheet

Well #: **MW-11**

Project Number:	555-3820-004	**Date:**	6/18/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	
	Richland, WA 99354	**Purged By:**	

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	94.15' @ 0936	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	105	**Date Purged:**	
Top of Screen (feet)	90	**Purge Time (from/to):**	939 - 1019
Reference Point (surveyor's notch, etc.):		**Time Sampled:**	1007

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	94.15							
940	"	7.46	1823	18.2	-20.9	8.34	0.00	3.5
945	94.22	7.43	1824	19.2	-25.7	8.00	"	
950		–	–	–	–	–	–	–
955	94.22	7.43	1817	20.4	-21.7	7.95	"	3.5
1000	"	7.41	1819	20.4	-19.0	7.98	"	
1005	"	7.39	1819	21.2	-14.6	7.72	"	

restarted generator →

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	500 mL/min	**Sampling Flow Rate:**	
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	
	Energy Northwest (nitrate)		
Shipment Method:		**Field QC Sample Number:**	

Well Integrity:

Remarks:

Signature: _____

PARAMETRIX

Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-12**

Project Number:	555-3820-004	**Date:**	6/18/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Rod	**Sampled By:**	Nguyen
	Richland, WA 99354	**Purged By:**	Nguyen

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	91.61 @ 1738	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	104	**Date Purged:**	6/18
Top of Screen (feet)	89	**Purge Time (from/to):**	1740 – 1816
Reference Point (surveyor's notch, etc.):		**Time Sampled:**	1800

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING	
Initial	91.61								
1743	91.71	7.91	406.5	18.6	-49.3	7.71	0.00	3.9	
1748	"	7.91	413.0	18.7	-46.0	7.57	0.51	4.1	4.1
1750	–	–	–	–	–	–	0.36		reset pump →
1758	91.73	7.87	421.7	22.8	-39.0	7.35	1.50	3.9	
1800		7.84	427.5	23.1	-36.1	7.46	1.22		

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	450 mL/min	**Sampling Flow Rate:**	
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	
	Energy Northwest (nitrate)		
Shipment Method:	450 mL/min	**Field QC Sample Number:**	

Well Integrity:

Remarks:

Signature: _____

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Field Data Sheet

Well #: **Leachate Pond**

Project Number:	555-3820-004	**Date:**	6/19/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road Richland, WA 99354	**Measured By:**	Nguyen

TIME (2400 hr)	Depth to Water from top of Pipe (ft)	Estimated Depth of Water in Pond (ft)
1125	~ 14.20	7.5

Remarks:

Top 404 ft, bottom 396 ft; approximate length of pipe 25 ft (3:1)

Can't tell what tick marks are. See pic. Took best visual guess.

Signature: _____

Field Data Sheet

Well #: **Condensate Pond**

Project Number:	555-3820-004	**Date:**	6/19/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road Richland, WA 99354	**Measured By:**	Nguyen

TIME (2400 hr)	Depth to Water from top of Pipe (ft)	Estimated Depth of Water in Pond (ft)
1140	~24.60	1

Remarks:

Top 456 ft, bottom 448 ft; approximate length of pipe 25 ft (3:1)

Signature: _____

PARAMETRIX

Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-01**

Project Number:	555-3820-004	**Date:**	9/24/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	C. Bourgeois
	Richland, WA 99354	**Purged By:**	CB " "

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	102.23	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	139	**Date Purged:**	1726 - 1750
Top of Screen (feet)	114	**Purge Time (from/to):**	9/24/24
Reference Point (surveyor's notch, etc.):	PVC (N)	**Time Sampled:**	1800

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	(NTU) TURBIDITY (~~visual~~)	(Hz) PUMP SETTING
Initial	102.23							
1730	No measurement	8.57	663	19.3	-137.2	5.74	0.66	224
1735	↓	8.36	671	21.3	-130.4	5.32	0.09	" "
1740		8.29	687	21.7	-125.4	5.25	0.00	" "
1745		8.27	694	21.8	-123.2	5.06	0.00	" "
1750		8.24	693	21.9	-119.2	5.06	0.00	" "

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	550 mL/min	**Sampling Flow Rate:**	550 mL/min
Field Parameter Instrument	YSI Quattro & grey pump controller		

Laboratory:	ARI	**Date Sent to Lab:**	9/26/24
	Energy Northwest (nitrate)		9/25/24
Shipment Method:	in person (both)	**Field QC Sample Number:**	NA

Well Integrity:

Remarks: ~~tubing~~ - GWL meter probe caught in many places in well

- around 267 Hz to initiate flow

Signature: CB

PARAMETRIX

Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-02**

Project Number:	555-3820-004	**Date:**	9/25/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	C. Bourgeois
	Richland, WA 99354	**Purged By:**	" "

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	83.45	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	123	**Date Purged:**	9/25/24
Top of Screen (feet)	98	**Purge Time (from/to):**	1512 - 1535
Reference Point (surveyor's notch, etc.):	PVC (N)	**Time Sampled:**	1545

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L(± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	83.45	8.52						
1515	83.50	[illegible]	614	18.5	-130.7	6.56	1.60	198
1520	83.50	8.36	616	20.0	-123.3	6.00	1.72	" "
1525	83.50	8.26	615	21.5	-116.2	5.50	1.29	" "
1530	83.50	8.20	604	21.9	-110.7	5.61	0.70	" "
1535	83.50	8.16	600	22.1	-107.1	5.47	0.06	" "

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	575 ml/min	**Sampling Flow Rate:**	575 ml/min
Field Parameter Instrument	YSI Quatro & black pump controller		

Laboratory:	ARI	**Date Sent to Lab:**	9/26/24
	Energy Northwest (nitrate)		9/26/24
Shipment Method:	in person (both)	**Field QC Sample Number:**	NA

Well Integrity: good

Remarks:

Signature: [signature]

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Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-03**

Project Number:	555-3820-004	**Date:**	9/26/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	C. Bourgeois
	Richland, WA 99354	**Purged By:**	" "

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	95.06	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	136	**Date Purged:**	9/26/24
Top of Screen (feet)	111	**Purge Time (from/to):**	646 - 700
Reference Point (surveyor's notch, etc.):	PVC (NT)	**Time Sampled:**	700

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L(± 10%)	(NTU) TURBIDITY (~~visual~~)	(Hz) PUMP SETTING
Initial	95.06							213
650	94.6	8.14	320.7	17.3	-52.5	7.99	0.00	~~215~~
655	94.34	8.13	323.7	18.0	-53.3	7.87	0.00	" "
700	94.35	8.10	324.3	19.6	-52.3	7.53	0.00	" "

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	500 ~~max~~ ml/min	**Sampling Flow Rate:**	500 ml/min
Field Parameter Instrument	YSI Quatro & Black pump controller.		

Laboratory:	ARI	**Date Sent to Lab:**	9/26/24
	Energy Northwest (nitrate)		9/26/24
Shipment Method:	Hand Inperson (both)	**Field QC Sample Number:**	NA

Well Integrity: Monument being undermined. Rest is good.

Remarks:

- Monument being undermined. & concrete 60% exposed and cracked. Photos @ 645.
- 261 Hz to initiate flow
- water became warm halfway through sampling

Signature: CL

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Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-04**

Project Number:	555-3820-004	**Date:**	9/26/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	C. Bourgeois
	Richland, WA 99354	**Purged By:**	" "

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	76.41	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	115	**Date Purged:**	9/26/24
Top of Screen (feet)	90	**Purge Time (from/to):**	754 - 815
Reference Point (surveyor's notch, etc.):	PVC (N)	**Time Sampled:**	820

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	(NTU) TURBIDITY (~~visual~~)	(Hz) PUMP SETTING
Initial	76.41							
755	~~75.76~~	7.89	640	17.5	-42.8	5.45	0.45	188
800	~~74.79~~	7.85	661	18.8	-50.8	4.06	0.12	" "
805	~~74.74~~	7.81	663	20.2	-54.9	3.66	0.00	" "
810	~~74.97~~	7.80	661	20.6	-56.1	3.58	0.00	" "
815	76.44	7.80	664	20.7	-58.8	3.51	0.00	" "

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	500 mL/min	**Sampling Flow Rate:**	500 mL/min
Field Parameter Instrument	YSI Quatro & Black pump controller		

Laboratory:	ARI	**Date Sent to Lab:**	9/26/24
	Energy Northwest (nitrate)		9/26/24
Shipment Method:	in person (both)	**Field QC Sample Number:**	NA

Well Integrity: good.

Remarks: - WL measurements from 800-10 were reporting wet tubing in well.

Signature: CB

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Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-05**

Project Number:	555-3820-004	**Date:**	9/24/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	C. Bourgeois
	Richland, WA 99354	**Purged By:**	" "

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	83.33	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	101	**Date Purged:**	9/24/24
Top of Screen (feet)	91	**Purge Time (from/to):**	1437 - 1525
Reference Point (surveyor's notch, etc.):	PVC (N)	**Time Sampled:**	1530

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	(NTU) TURBIDITY ~~(visual)~~	(Hz) PUMP SETTING
Initial	83.33							
1445	83.44	7.60	1922	23.8	-244.0	0.98	0.18	210
1450	83.44	7.51	1894	25.0	-246.8	0.68	0.00	" "
1455	83.44	7.43	1858	25.8	-243.0	0.45	0.00	" "
1500	83.44	7.44	1828	25.7	-245.0	0.41	0.02	" "
1505	~~83.44~~ 83.44	7.42	1793	25.9	-243.8	0.31	0.00	" "
1510	83.44	7.43	1762	25.7	-243.8	0.28	0.00	" "
1515	83.44	7.40	1728	25.9	-237.6	0.31	0.00	" "
1520	83.44	7.40	1703	26.1	-241.8	0.25	0.00	" "
1525	83.44	7.42	1690	25.9	-241.5	0.26	0.00	210

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	550 mL/min	**Sampling Flow Rate:**	550 mL/min
Field Parameter Instrument	YSI Quattro		

Laboratory:	ARI	**Date Sent to Lab:**	9/26/24
	Energy Northwest (nitrate)		9/25/24
Shipment Method:	In person (both)	**Field QC Sample Number:**	NA

Well Integrity: Good. Has it's own pump controller cable

Remarks:
- High confidence initial GWL measurement
- ~~Lots~~ GWL meter probe got hung up a lot on the way down.
- 222 Hz to initiate flow, 210
- WL measurements more difficult while pumping

Signature: CW

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Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-06**

Project Number:	555-3820-004	**Date:**	9/25/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	C. Bivens
	Richland, WA 99354	**Purged By:**	" "

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	97.94	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	116	**Date Purged:**	1327 - 1405
Top of Screen (feet)	106	**Purge Time (from/to):**	9/25/24
Reference Point (surveyor's notch, etc.):	PVC (N)	**Time Sampled:**	1415

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	97.94							
1330	97.95	7.43	1610	23.0	-252.0	0.46	0.00	22
1335	97.95	7.51	1588	23.4	-275.4	0.34	0.00	" "
1340	97.95	7.42	1572	24.9	-280.9	0.29	6.43	" "
1345	97.95	7.26	1540	26.6	-274.9	0.25	0.00	" "
1350	97.95	7.17	1513	27.0	-265.0	0.23	0.00	" "
1355	97.95	7.15	1489	27.3	-256.5	0.22	0.00	" "
1400	97.95	7.16	1467	27.5	-252.3	0.22	0.00	" "
1405	97.95	7.16	1440	27.6	-247.6	0.24	0.13	" "

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	625 mL/min	**Sampling Flow Rate:**	625 mL/min
Field Parameter Instrument	YSI Quattro } Black pump controller		

Laboratory:	ARI	**Date Sent to Lab:**	9/26/24
	Energy Northwest (nitrate)		9/26/24
Shipment Method:	in person (both	**Field QC Sample Number:**	✓ A0

Well Integrity: good, door difficult to get through (sand)

Remarks:
- Purged water is bubbly - WL measurements difficult
- 267 ltz needed to initiate flow.
- WL meter ~~lead~~ probe and last ~10' of line came back up with orange-brown clay/silt on it

Signature: CW

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Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-08**

Project Number:	555-3820-004	**Date:**	9/26/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	C. Bourgeois
	Richland, WA 99354	**Purged By:**	" "

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	90.24	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	102.5	**Date Purged:**	C. Bourgeois
Top of Screen (feet)	87.5	**Purge Time (from/to):**	917 - 940
Reference Point (surveyor's notch, etc.):	PVC (NT)	**Time Sampled:**	940

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	(NTU) TURBIDITY ~~(visual)~~	(Hz) PUMP SETTING
Initial	90.24							
920	~~90.18~~	8.26	641	18.1	-74.6	6.72	2.02	209
925	~~90.24~~	8.14	640	20.5	-65.4	~~6.60~~ 5.98	0.41	" "
930	90.30	8.05	642	22.3	-61.5	5.89	0.31	" "
935	90.31	8.03	642	22.6	-61.2	5.85	0.00	" "
940	90.31	8.01	639	22.8	-63.8	5.85	0.00	" "

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	550 ml/min	**Sampling Flow Rate:**	550 ml/min
Field Parameter Instrument	YSI Quattro & Black pump controller ✓		

Laboratory:	ARI	**Date Sent to Lab:**	9/26/24
	Energy Northwest (nitrate)		9/26/24
Shipment Method:	in person (both)	**Field QC Sample Number:**	N/A

Well Integrity: good

Remarks:
- Initial WL measurement confirmed. Lowered tubing to 96' and cable was wet from ~90-96'.
- Used paper clip to temporarily seal the soft tubing / well head connection. - 250 Hz needed to initiate flow

Signature: [signature]

- WL's from 920-925 incorrect.

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Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-09**

Project Number:	555-3820-004	**Date:**	9/24/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	C. Bourgeois
	Richland, WA 99354	**Purged By:**	" "

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	104.27	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	115.5	**Date Purged:**	9/24/24
Top of Screen (feet)	100.5	**Purge Time (from/to):**	1120-1150
Reference Point (surveyor's notch, etc.):	TOC (N)	**Time Sampled:**	1200

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	(NTU) TURBIDITY ~~(visual)~~	(Hz) PUMP SETTING
Initial	104.27							
1125	104.20	7.71	957	19.1	-190.3	2.82	0.08	226
1130	104.20	7.69	968	20.2	-178.3	2.47	0.29	" "
1135	104.20	7.56	972	22.3	-168.2	2.34	0.52	" "
1140	104.20	7.49	975	23.4	-160.2	2.19	0.11	" "
1145	104.20	7.48	978	23.8	-154.9	2.27	0.20	" "
1150	104.20	7.47	977	23.9	-152.6	2.31	0.09	" "

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	600 mL/min.	**Sampling Flow Rate:**	600 mL/min
Field Parameter Instrument	YSI Quattro	& grundfos pump controller	

Laboratory:	ARI	**Date Sent to Lab:**	9/26/24
	Energy Northwest (nitrate)		9/25/24
Shipment Method:	in person (both)	**Field QC Sample Number:**	NA

Well Integrity: good. has it's own pump controller cable in monument

Remarks:
- Tried 224 Hz → 450 mL/min but generator groaned so I returned to 226 Hz → 600 mL/min
- Water at beginning of purge had a rotten egg smell
- Had to raise Hz to 235 to flow through filter.

Signature:

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Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-10**

Project Number:	555-3820-004	**Date:**	9/24/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	C. Bourgeois
	Richland, WA 99354	**Purged By:**	" "

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	76.65'	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	87.5	**Date Purged:**	9/24/24
Top of Screen (feet)	72.5	**Purge Time (from/to):**	1300 - 1330
Reference Point (surveyor's notch, etc.):	PVC (N)	**Time Sampled:**	1330

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	(NTU) TURBIDITY (~~visual~~)	(Hz) PUMP SETTING
Initial	76.65							
1305	76.29	7.89	2253	22.8	-234.6	0.74	0.00	197
1310	76.32	7.58	2262	24.4	-259.4	0.52	0.40	" "
1315	76.27	7.35	2240	25.9	-248.1	0.50	0.30	* 196
1320	76.28	7.27	2249	26.2	-244.1	0.48	0.40	" "
1325	76.30	7.27	2266	26.4	-245.1	0.46	0.09	" "
1330	76.30	7.30	2292	26.5	-246.7	0.18	0.00	" "

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	550 mL/min	**Sampling Flow Rate:**	550 mL/min
Field Parameter Instrument	YSI Quattro & Cetray pump controller		

Laboratory:	ARI	**Date Sent to Lab:**	9/26/24
	Energy Northwest (nitrate)		9/25/24
Shipment Method:	in person (both)	**Field QC Sample Number:**	NA

Well Integrity: good. requires female-to-male pump controller cable

Remarks:

- 225 Hz needed to initiate flow, 197 Hz to maintain 550 mL/min.
- very difficult to get clear signal/response from WL meter. - water generates bubbles

Signature: CMV

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Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-11**

Project Number:	555-3820-004	**Date:**	9/25/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	C. Bourgeois
	Richland, WA 99354	**Purged By:**	" "

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	93.70	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	105	**Date Purged:**	9/25/24
Top of Screen (feet)	90	**Purge Time (from/to):**	937
Reference Point (surveyor's notch, etc.):	PVC (N)	**Time Sampled:**	1015

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	93.70							
940	93.78	8.20	1454	20.0	-118.4	6.96	2.37	299
945	93.81	8.16	1452	20.0	-110.8	6.84	10.7	" "
955	93.71	7.94	1464	22.0	-106.9	7.21	11.8	216
1000	not measured	7.93	not recorded	21.8	-104.4	5.86	not measured	" "

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	658 mL/min	**Sampling Flow Rate:**	~500 mL/min
Field Parameter Instrument	YSI Quattro. Blank pump controller.		

Laboratory:	ARI	**Date Sent to Lab:**	9/26/24
	Energy Northwest (nitrate)		9/25/24
Shipment Method:	in person (both)	**Field QC Sample Number:**	NA

Well Integrity: good, pump runs very high amperage.

Remarks:
- Bus undervoltage error code trying to initiate flow. Unusually high amperage > 10 A
- switched to black case pump controller.
→ Flow initiated ~250 Hz
- Flow rate depleted, turned Hz way up to maintain flow.
- Flow stopped (pump didn't just flow) @ 950
- Flow stopped again at 1000, Sampling.

Signature: [signature]

PARAMETRIX

Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-12**

Project Number:	555-3820-004	**Date:**	9/25/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Rod	**Sampled By:**	C. Bourgeois
	Richland, WA 99354	**Purged By:**	" "

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	91.76	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	104	**Date Purged:**	9/25/24
Top of Screen (feet)	89	**Purge Time (from/to):**	641-730
Reference Point (surveyor's notch, etc.):	PVC N	**Time Sampled:**	730

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	(NTU) TURBIDITY (visual)	(Hz) PUMP SETTING
Initial	91.46							
645	91.42	8.19	489	17.9	-44.0	5.29	4.59	215
650	not measured	8.17	484	18.1	-47.3	4.50	not measured	" "
700	91.49	8.01	481	21.8	-47.3	4.87	13.1	217
705	91.42	7.99	482.4	22.4	-49.2	4.84	8.80	" "
710	91.42	7.97	479.2	23.4	-50.1	4.68	6.82	" "
715	91.42	7.98	473	23.4	-53.6	4.70	10.18	" "
720	91.42	7.99	469	23.4	-55.6	4.67	23.4	" "
725	91.42	7.99	469	23.5	-58.4	4.94	25.2	" "

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	700 mL/min	**Sampling Flow Rate:**	700 mL/min
Field Parameter Instrument	YSI dvatto		

Laboratory:	ARI	**Date Sent to Lab:**	9/24/24
	Energy Northwest (nitrate)		9/25/24
Shipment Method:	in person (both)	**Field QC Sample Number:**	MW-21 & MW-12 (MS/MSD)

Well Integrity: good, removed some bent LDPE tubing. → collected @ 815

Remarks:
- 246 Hz needed to initiate flow
- Pump shutoff at 652... Flow stopped, not the controller.
- Raised Hz & flowrate for pump stability.

Signature: CW

730	91.42	8.00	464	23.5	-61.5	4.87	23.2	* 217

* Pump shutoff between total metals & dissolved metals sampling (both MW-12 and -21)

Field Data Sheet

Well #: **Condensate Pond**

Project Number:	555-3820-004	**Date:**	9/24/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road Richland, WA 99354	**Measured By:**	C. Bourgeois

TIME (2400 hr)	Depth to Water from top of Pipe (ft)	Estimated Depth of Water in Pond (ft)
0940 - 0947	27.92	~0 (see below)

Remarks:

Top 456 ft, bottom 448 ft; approximate length of pipe 25 ft (3:1)

- Photos timestamped: 938 m
- ~90% pond surface is dry. South end has some fluid.
- The staff gague is completely dry.

Signature: CB

Field Data Sheet

Well #: **Leachate Pond**

Project Number:	555-3820-004	**Date:**	9/24/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road Richland, WA 99354	**Measured By:**	C. Bourgeois

TIME (2400 hr)	Depth to Water from top of Pipe (ft)	Estimated Depth of Water in Pond (ft)
1005-1027	24.99	5.5

Remarks:

Top 404 ft, bottom 396 ft; approximate length of pipe 25 ft (3:1)

- When I arrived at pond, a pump was attached to sump port. Tracy Reed came and removed. Measurement shortly after.

- Photos timestamped 1001 -

25.43 - 0.44 = 24.99'

- Pump intake tube left in port, difference between pump intake tube and 'top of pipe' = 0.44'

Signature: CB

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Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **Leachate Port**

Project Number:	555-3820-004	**Date:**	9/25/12
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	Tracy Reed
	Richland, WA 99354		& Barrgen's

TIME (2400 hr)	pH (units)	Ec (µmhos/cm 25°C)	TEMPERATURE °C	Redox (mv)	Dissolved Oxygen (mg/L)	TURBIDITY (visual)
—	—	—	—	—	—	—

Laboratory:	Eurofins Seattle	**Date Sent to Lab:**	—
Chain-of-Custody (yes/no):	yes	**Field QC Sample Number:**	None
Shipment Method:	—		None

Remarks:

Depth level _____ Feet

- Tracy Reed of the City of Richland reported that ports 2-4 were completely dry, and he was only able to collect ~3 mL of fluid from port 1
- The sample was collected at 829 but later discarded

Signature: Clary

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Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-01**

Project Number:	555-3820-004	**Date:**	12/3/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	Nguyen
	Richland, WA 99354	**Purged By:**	Nguyen

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	102.26	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	139	**Date Purged:**	
Top of Screen (feet)	114	**Purge Time (from/to):**	830-920
Reference Point (surveyor's notch, etc.):		**Time Sampled:**	855

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	102.26							
835	–	7.65	585	16.0	-118.6	6.65	0.00	3.6A
840	102.27	7.64	595	19.7	-136.7	6.43	"	
845	"	7.50	607	20.3	-142.7	6.10	"	
850	102.26	7.47	605	20.7	-149.7	5.97	"	
855	"	7.43	599	21.0	-150.6	5.79		

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	450 ml/min	**Sampling Flow Rate:**	
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	
	Energy Northwest (nitrate)		
Shipment Method:		**Field QC Sample Number:**	

Well Integrity:

Remarks: Tricky getting WL probe down well.

Signature:

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Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-02**

Project Number:	555-3820-004	**Date:**	12/3/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	Nguyen
	Richland, WA 99354	**Purged By:**	Nguyen

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	83.36	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	123	**Date Purged:**	12/3/24
Top of Screen (feet)	98	**Purge Time (from/to):**	1558 -
Reference Point (surveyor's notch, etc.):		**Time Sampled:**	1615

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L(± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	83.36							
1600	83.34	8.05	564	16.5	-174.9	6.79	0.00	3.6A
1605	83.45	7.78	569	20.2	-176.1	6.45	—	
1610	83.50	7.75	571	20.2	-179.5	6.46	—	
1615	"	7.75	565	20.3	-182.6	6.46	—	

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	500 mL/min	**Sampling Flow Rate:**	
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	
	Energy Northwest (nitrate)		12/3
Shipment Method:		**Field QC Sample Number:**	

Well Integrity:

Remarks: Difficult to read water levels.

Signature:

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Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-03**

Project Number:	555-3820-004	**Date:**	12/4/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	Nguyen
	Richland, WA 99354	**Purged By:**	Nguyen

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	94.83	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	136	**Date Purged:**	
Top of Screen (feet)	111	**Purge Time (from/to):**	1052 - 1126
Reference Point (surveyor's notch, etc.):		**Time Sampled:**	1105

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L(± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	94.83							
1055	94.97	8.28	284.4	16.3	-182.2	8.58	0.00	3.7A
1100	94.89	8.11	285.5	17.0	-183.2	8.37	"	
1105	"	7.98	285.9	18.9	-181.6	8.28	"	

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:		**Sampling Flow Rate:**	
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	
	Energy Northwest (nitrate)		
Shipment Method:		**Field QC Sample Number:**	

Well Integrity:

Remarks:

Signature:

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Groundwater Sampling Field Data Sheet

Well #: **MW-04**

Project Number:	555-3820-004	**Date:**	12/3/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	Nguyen
	Richland, WA 99354	**Purged By:**	Nguyen

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	76.27	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	115	**Date Purged:**	
Top of Screen (feet)	90	**Purge Time (from/to):**	1451 - 1535
Reference Point (surveyor's notch, etc.):		**Time Sampled:**	1508

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	76.27							
1453	—	7.99	589	17.1	-184.8	4.66	0.00	3.5/3.6A
1458	76.32	7.86	605	18.9	-191.6	4.20	—	
1503	76.31	7.78	600	19.7	-194.7	4.04	—	
1508	"	7.75	609	20.0	-195.1	3.96	—	

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	500 mL/min	**Sampling Flow Rate:**	
Field Parameter Instrument	-		
Laboratory:	ARI	**Date Sent to Lab:**	
	Energy Northwest (nitrate)		
Shipment Method:		**Field QC Sample Number:**	

Well Integrity:

Remarks:

Signature: _____

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Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-05**

Project Number:	555-3820-004	**Date:**	12/3/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	Nguyen
	Richland, WA 99354	**Purged By:**	Nguyen

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):		**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	101	**Date Purged:**	
Top of Screen (feet)	91	**Purge Time (from/to):**	1207 - 1250
Reference Point (surveyor's notch, etc.):		**Time Sampled:**	1230

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial								
1210	83.44	7.25	1498	19.3	-213.6	1.94	0.00	3.64
1215	83.37	7.01	1458	21.7	-205.7	0.79	"	
1220	83.36	7.02	1458	21.4	-205.4	0.44	—	
1225	"	7.02	1445	21.5	-207.8	0.44	—	
1230	83.40	6.93	1429	22.6	-208.9	0.42		

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	400 mL/min	**Sampling Flow Rate:**	
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	
	Energy Northwest (nitrate)		
Shipment Method:		**Field QC Sample Number:**	

Well Integrity:

Remarks: Difficult to tell water level.

Signature: _____

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Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-06**

Project Number:	555-3820-004	**Date:**	12/4/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	N Nguyen
	Richland, WA 99354	**Purged By:**	N Nguyen

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	97.91	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	116	**Date Purged:**	
Top of Screen (feet)	106	**Purge Time (from/to):**	935 - 1030
Reference Point (surveyor's notch, etc.):		**Time Sampled:**	1010

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	97.91							
935	98.00	7.11	1582	19.3	-245.0	4.33	0.00	3.84
940	–	7.07	1649	18.9	-197.6	2.19	"	
945	98.08	6.69	1562	25.1	-218.7	0.43	–	
950	98.10	6.65	1466	25.0	-214.8	0.28	–	
955	"	6.67	1405	24.6	-215.3	0.19	–	
1000	"	6.68	1375	24.6	-215.2	0.15		
1005		6.69	1342	24.7	-216.3	0.14		
1010		6.68	1324	24.7	-217.2	0.13		

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	300 mL/min	**Sampling Flow Rate:**	
Field Parameter Instrument			
Laboratory:	ARI	**Date Sent to Lab:**	
	Energy Northwest (nitrate)		
Shipment Method:		**Field QC Sample Number:**	MW-21

Well Integrity:

Remarks: Difficult to read WL.

DUP MW-21 taken (time 1040).

Signature: _____

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Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-08**

Project Number:	555-3820-004	**Date:**	12/3/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	Nguyen
	Richland, WA 99354	**Purged By:**	Nguyen

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	90.06	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	102.5	**Date Purged:**	
Top of Screen (feet)	87.5	**Purge Time (from/to):**	1403 - 1435
Reference Point (surveyor's notch, etc.):		**Time Sampled:**	1420

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	90.06							
1405	90.13	8.05	533	17.7	-183.3	5.84	0.00	3.6A
1410	90.12	7.85	527	19.9	-180.9	5.60	—	
1415	-	7.77	532	21.0	-181.3	5.33	—	
1420	90.12	7.73	528	21.4	-181.9	5.48	—	

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	500 mL/min	**Sampling Flow Rate:**	
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	
	Energy Northwest (nitrate)		
Shipment Method:		**Field QC Sample Number:**	

Well Integrity:

Remarks:

Signature:

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Groundwater Sampling Field Data Sheet

Well #: **MW-09**

Project Number:	555-3820-004	**Date:**	12/3/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	Nguyen
	Richland, WA 99354	**Purged By:**	Nguyen

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	104.15	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	115.5	**Date Purged:**	
Top of Screen (feet)	100.5	**Purge Time (from/to):**	1313 - 1345
Reference Point (surveyor's notch, etc.):		**Time Sampled:**	1325

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	104.15							
1315	~	7.45	872	17.1	-197.8	2.82	0.00	
1320	"	7.56	875	17.3	-194.7	2.84	—	
1325	"	7.41	873	18.9	-192.2	2.80	—	

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	500 mL/min	**Sampling Flow Rate:**	
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	
	Energy Northwest (nitrate)		
Shipment Method:	~	**Field QC Sample Number:**	

Well Integrity:

Remarks:

Signature:

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Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-10**

Project Number:	555-3820-004	**Date:**	12/3/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	Nguyen
	Richland, WA 99354	**Purged By:**	Nguyen

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	76.70'	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	87.5	**Date Purged:**	
Top of Screen (feet)	72.5	**Purge Time (from/to):**	1113 - 1154
Reference Point (surveyor's notch, etc.):		**Time Sampled:**	1130

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial	76.70							
1115	—	7.17	2049	19.4	-215.0	0.86	0.00	3.6A
1120	76.66	7.15	1910	19.5	-199.7	0.46	—	
1125	76.64	7.18	1930	19.0	-200.4	0.45	—	
1130	"	7.31	1938	17.8	-203.3	0.45	—	

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	375 ml/min	**Sampling Flow Rate:**	
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	
	Energy Northwest (nitrate)		
Shipment Method:		**Field QC Sample Number:**	

Well Integrity:

Remarks: Generator stopped mid-sampling. Restarted.

Signature: _____

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Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-11**

Project Number:	555-3820-004	**Date:**	12/4/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road	**Sampled By:**	Nguyen (see notes)
	Richland, WA 99354	**Purged By:**	Nguyen

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	93.78	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	105	**Date Purged:**	N/A
Top of Screen (feet)	90	**Purge Time (from/to):**	
Reference Point (surveyor's notch, etc.):		**Time Sampled:**	

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING
Initial								

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	N/A	**Sampling Flow Rate:**	N/A
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	N/A
	Energy Northwest (nitrate)		
Shipment Method:	N/A	**Field QC Sample Number:**	N/A

Well Integrity:

Remarks: Couldn't get water to flow. Controller would max out at 125 - 135 Hz then short circuit.

F0009 error code

Signature: _____

PARAMETRIX

Form 02-EN-100/Rev. 10/02

Groundwater Sampling Field Data Sheet

Well #: **MW-12**

Project Number:	555-3820-004	**Date:**	12/4/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Rod	**Sampled By:**	Nguyen
	Richland, WA 99354	**Purged By:**	Nguyen

Casing Diameter: 2" x 4" _ 6" _____ Other _____

Initial Depth to Water (feet):	91.22	**Purge Flow Rate Measurement Method:**	Graduated Cylinder
Depth of Well (feet):	104	**Date Purged:**	
Top of Screen (feet)	89	**Purge Time (from/to):**	828 - 920
Reference Point (surveyor's notch, etc.):		**Time Sampled:**	855

TIME (2400 hr)	DEPTH TO WATER (ft)	pH (units) (± 0.1)	Ec (µmhos/cm 25°C) (± 3%)	TEMP °C	Redox (mv) (± 10)	Dissolved Oxygen mg/L (± 10%)	TURBIDITY (visual)	PUMP SETTING	
Initial	91.22								
830	91.18	7.95	476.2	15.9	-141.2	6.47	18.5	40 A	
835	—	—	—	—	—	—	—	—	pump stopped
840	—	7.80	483	19.6	-150.9	6.07	18.5	3.9/4.0 A	
845	—	7.78	485	19.8	-156.3	5.66	23.1		
850	—	7.64	486.7	22.4	-150.4	5.81	24.1		pump shut off 848
855	—	7.64	4876	22.0	-154.3	5.39	24.5		

Purge Equipment:	Dedicated Submersible	**Sampling Equipment:**	Dedicated Submersible
Purge Flow Rate:	400 ml/min	**Sampling Flow Rate:**	
Field Parameter Instrument			

Laboratory:	ARI	**Date Sent to Lab:**	
	Energy Northwest (nitrate)		
Shipment Method:		**Field QC Sample Number:**	

Well Integrity:

Remarks: Difficult to read WL when pump on. Probe gets stuck when trying to descend.

Pump/controller stopped @ 825. Had to disconnect & reset.

Signature: _____

→ removed WL probe – kept getting stuck.

Pump off again @ 848.

Field Data Sheet

Well #: **Leachate Pond**

Project Number:	555-3820-004	**Date:**	12/4/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road Richland, WA 99354	**Measured By:**	Nguyen

TIME (2400 hr)	Depth to Water from top of Pipe (ft)	Estimated Depth of Water in Pond (ft)
1150	25.80	6

Remarks:

Top 404 ft, bottom 396 ft; approximate length of pipe 25 ft (3:1)

Signature: _____

PARAMETRIX

Form 02-EN-100/Rev. 10/02

Field Data Sheet

Well #: **Condensate Pond**

Project Number:	555-3820-004	**Date:**	12/4/24
Project Name:	Horn Rapids Landfill	**Client Name**	City of Richland
Project Address:	3102 Twin Bridges Road Richland, WA 99354	**Measured By:**	Nguyen

TIME (2400 hr)	Depth to Water from top of Pipe (ft)	Estimated Depth of Water in Pond (ft)
1203	25.00	1.25

Remarks:

Top 456 ft, bottom 448 ft; approximate length of pipe 25 ft (3:1)

Signature: _____