Horn Rapids Landfill
Environmental Monitoring Report
Calendar Year 2021

Prepared for

Richland Washington

March 2022

Prepared by

Parametrix

Horn Rapids Landfill
Environmental Monitoring Report
Calendar Year 2021

Prepared for

City of Richland
Public Works Department
840 Northgate
Richland, WA 99352

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CITATION

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Seattle, Washington.
March 2022.

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.

Lisa A. Gilbert

Prepared by Lisa A. Gilbert, LHG

Approved by Ian Sutton, P.E.

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.

RCW 18.220 requires that groundwater reports are stamped by a licensed geologist or by a professional engineer with the appropriate background in groundwater.

1st ☐ 2nd ☐ 3rd ☐ 4th ☒ YEAR: 2021	Reference (section, subsection)	Included in this report	Location – page # or appendix #
***Quarterly Groundwater Reports**: 173-351-415 (2) plus the referenced section*			
Groundwater monitoring data		☒	Appendix A
Statistical results and/or trends		☒	Page 4-4 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 GWQSs		☒	Tables 3-1 and 3-2
Static water level readings		☒	Appendix G
Potentiometric surface elevation maps depicting flow direction		☒	Appendix G
Flow rate – calculated		☒	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
Trilinear diagrams	430, (5b)	☒	Appendix F
Leachate analyses (if applicable)		☒	Page 6-1
Data submitted in electronic format for Environmental Information Management System		☒	Submitted
Also, the Department of Ecology requests that you include a complete copy of the lab report with each quarterly report.		☒	Appendix B
***Annual Groundwater Reports**: 173-351-415 (1)* **YEAR:2021**			
Summary of statistical results and/or trends		☒	Page 4-4 to 4-6
Summary of groundwater flow rate and direction for the year		☒	Page 5-1
Copy of all potentiometric maps for the year		☒	Appendix G
Summary geochemical evaluation		☒	Page 4-7

Lisa A. Lint	March 2022	Horn Rapids
Signature of Report Author	Date	Landfill

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ACRONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
µmhos/cm	micromhos per centimeter
BFHD	Benton-Franklin Health District
bgs	below ground surface
City	City of Richland
City Facility	275-acre permitted waste facility, including Landfill
City Property	Contiguous property owned by the City of Richland, including the City Facility (approximately 1,820 total acres)
DCA	dichloroethane
DCE	dichloroethene
DO	dissolved oxygen
Ecology	Washington Department of Ecology
EPA	U.S. Environmental Protection Agency
Expansion	104-acre permitted expansion of the Horn Rapids Landfill located within the City Facility east of the Landfill
ft	feet
FS	Feasibility Study
GWQSs	Water Quality Standards for Groundwaters of the State of Washington
IHS	Indicator Hazardous Substances
Landfill	46-acre permitted area where municipal solid waste (MSW) has been placed within the City Facility
LFG	landfill gas
MCLs	Maximum Contaminant Levels
mg/L	milligrams per liter
MSW	municipal solid waste
MTCA	Model Toxics Control Act
ORP	Oxidation-reduction potential
Permit	Solid Waste Permit
PCE	tetrachloroethene
QAPP	Quality Assurance Project Plan
RI	Remedial Investigation
TCE	trichloroethene

ACRONYMS AND ABBREVIATIONS (CONTINUED)

TDS	total dissolved solids
TOC	total organic carbon
UTLs	upper tolerance limits
VC	vinyl chloride
VOC	volatile organic compound
WAC	Washington Administrative Code

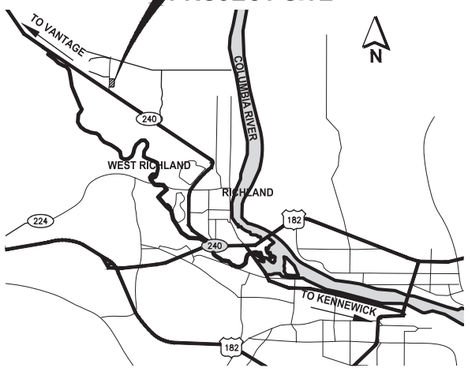
1. INTRODUCTION

This report presents the 2021 results of environmental sampling and analysis for groundwater, vadose zone, and landfill gas (LFG) at the Horn Rapids Landfill. The quarterly groundwater sampling events were conducted on March, June, September, and December 2021. The most recent vadose zone inspection was conducted in September 2021. The LFG collection system was monitored monthly and the probes were monitored quarterly. Groundwater sampling was conducted by Parametrix personnel and gas probe monitoring was conducted by City of Richland Public Works Department (City) personnel in accordance with Operating Permit No. BFHD 19-17 MSWLF issued by the Benton-Franklin Health District (BFHD). Environmental monitoring locations are presented on the Facility Plan (Figure 1-1) and monitoring well locations are shown on Figure 1-2.

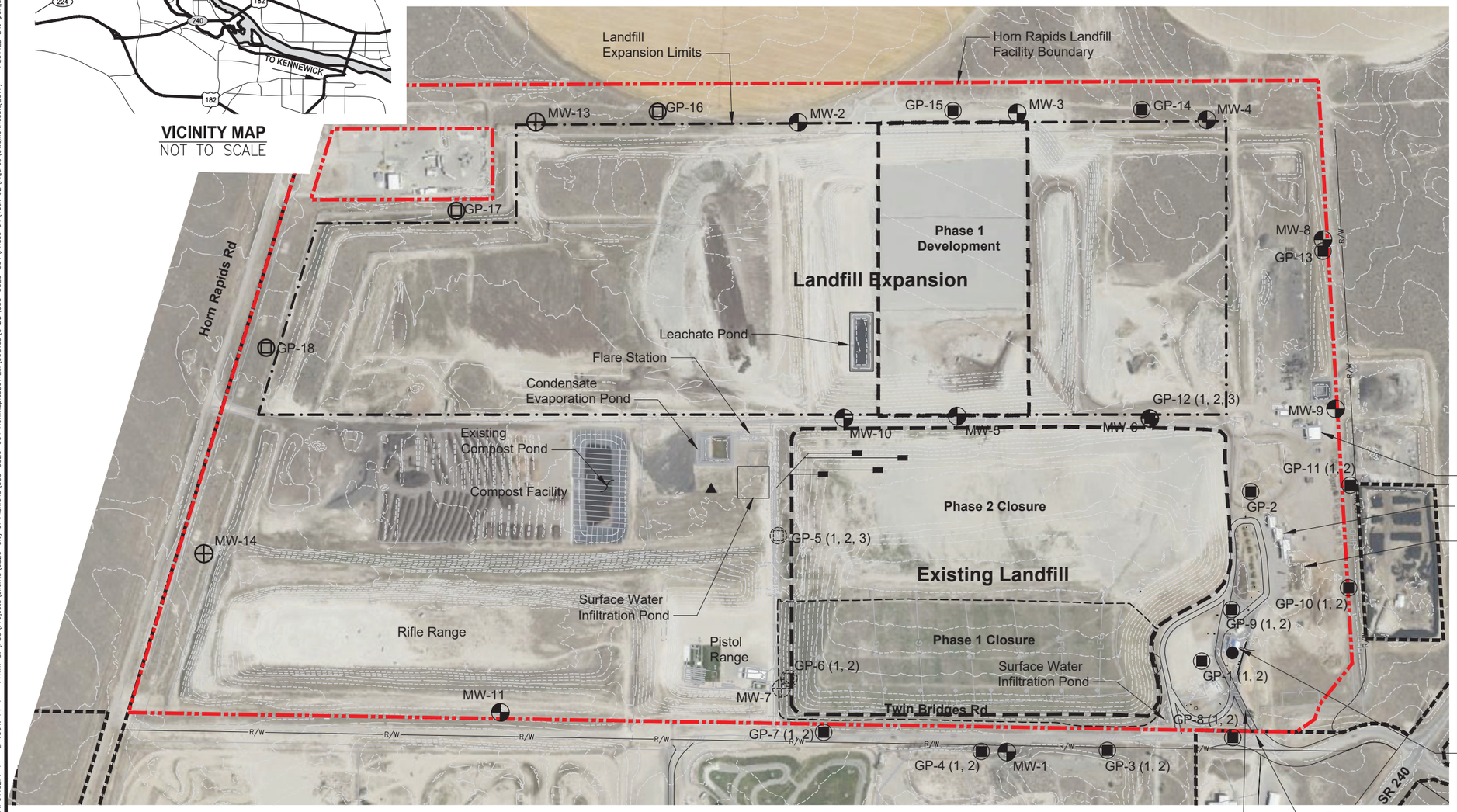
The following terminology related to the Horn Rapids Landfill has been developed, as further described in Section 2:

- City Facility: 275-acre permitted waste site, including landfill, customer transfer station, and compost facility on a parcel dedicated to these uses
- Landfill: 46-acre permitted area where municipal solid waste (MSW) has been placed since the 1970's within the City Facility
- City Property: Contiguous property owned by the City of Richland, including the City Facility (approximately 1,820 total acres), most of which is being marketed for various forms of development
- Expansion: 104-acre lined expansion of the Horn Rapids Landfill located within the City Facility east of the Landfill

PROJECT SITE



VICINITY MAP
NOT TO SCALE



LEGEND:

- FACILITY BOUNDARY
- LANDFILL EXPANSION BOUNDARY
- REFUSE BOUNDARY
- PHASE 1 CLOSURE BOUNDARY
- CITY OF RICHLAND PROPERTY LINE
- DECOMMISSIONED WATER SUPPLY WELL
- EXISTING GROUNDWATER MONITORING WELL
- PROPOSED MONITORING WELL (APPROXIMATE LOCATION)
- DECOMMISSIONED GROUNDWATER MONITORING WELL
- EXISTING GAS PROBE (1,2,3) WITH VARIABLE–DEPTH
- PROPOSED GAS PROBE (APPROXIMATE LOCATION)
- DECOMMISSIONED GAS PROBE
- LYSIMETER PORT
- LYSIMETER

Parametrix DATE: February 28, 2022 FILE: PS3820004P04T02F1-1

N
0 500
SCALE IN FEET

Figure 1-1
Horn Rapids Landfill
Facility Plan

Horn Rapids
Landfill Facility Boundary

OP

MW-2
GP-15
MW-3
GP-14
MW-4
MW-12
MW-8
GP-13
R/W
MW-10
MW-5
GP-12 (1, 2, 3)
MW-6
MW-9
GP-11 (1, 2)
GP-2 (1,2)
GP-5
GP-10 (1, 2)
GP-9 (1, 2)
GP-1 (1,2)
GP-6
MW-7
MW-11
GP-8 (1, 2)
TWIN BRIDGES RD
GP-7 (1, 2)
MW-1
GP-4 (1, 2)
GP-3 (1, 2)
SR 240

Parametrix DATE: February 25, 2022 FILE: BL3820007P01T01F1-2

N
0 500
SCALE IN FEET

Legend:

- Decommissioned Water Supply Well
- Existing Groundwater Monitoring Well
- Decommissioned Groundwater Monitoring Well
- Existing Gas Probe
- Decommissioned Gas Probe
- Facility Boundary
- City of Richland Property Line
- Refuse Boundary
- Phase 1 Closure Boundary

Figure 1-2
Groundwater Monitoring Well and Gas Probe Locations
Horn Rapids Landfill

2. BACKGROUND

2.1 Horn Rapids Landfill Setting

The Horn Rapids Landfill is owned and operated by the City. It is located northwest of and within the city limits of Richland, Washington in an area bounded by Twin Bridges Road on the west, Horn Rapids Road on the north, and State Route 240 on the south.

The Horn Rapids Landfill is located within the southwest quadrant of a larger 275-acre parcel of City-owned property (City Facility) that includes the 46-acre existing landfill (Landfill) permitted for disposal of MSW, a support facility, a 9-acre composting facility, a customer service transfer station that includes a small household hazardous waste receiving area, and the 104-acre landfill Expansion, which 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. 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, which includes a road-racing track and a motocross track facility. The remaining City Property south and southeast of the Landfill is undeveloped. Figure 1-2 shows the portion of the City Property that includes the groundwater monitoring wells.

The Facility Plan (Figure 1-1) shows the City Facility boundary, the Landfill and other City Facility features, and monitoring locations including gas probes, groundwater monitoring wells, and lysimeters. The area within the City Facility east of the currently permitted 46 acres is the Horn Rapids Landfill Expansion (Expansion). A new scale house/office building has recently been constructed near the City Facility entrance and began operation in November 2020.

2.2 Landfill Description

The Landfill began receiving MSW in 1974. The Landfill historically accepted only municipal wastes and was initially developed by placing waste into a series of north-south oriented trenches in the Phase 1 western portion of the Landfill. The waste depths in the trenches ranged from 12 to 30 feet (ft).

The Landfill (refuse) boundary is shown on Figure 1-1. Phase 1 (the western portion) of the Landfill was closed in 2011, including installation of a LFG collection system. From 2005 to 2010, Phase 1 of the Landfill was filled and graded to the closure grading plan. During the 2011 construction season, Phase 1 closure was installed over the western portion of the Landfill, which included the installation of the active LFG system.

MSW was accepted in Phase 2 of the Landfill through September 2020 and is now being placed in lined Phase 1E of the Expansion area. The 104-acre, Horn Rapids Landfill Expansion is located east of the Landfill. Closure of Phase 2 at the Landfill began with LFG well installations in 2021 and is expected to have closure cover installed in 2022.

2.3 Regulatory History

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

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). By letter dated February 18, 2000, the City notified BFHD and Washington Department of Ecology (Ecology) that statistically significant increases in groundwater contaminants were confirmed during monitoring activities and that the increase in concentration would be addressed through a formal corrective action process under the Model Toxics Control Act (MTCA). 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).

In order to comply with MTCA requirements, the City chose to conduct a MTCA independent cleanup of the groundwater by performing a Remedial Investigation (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 extraction system was designed (Parametrix 2005) based on pilot study results that showed LFG extraction would effectively remove VOCs from the subsurface. The closure, includinga LFG extraction system, is being implemented in two phases.

Between 2005 and 2010, Phase 1 (the western portion of the 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 Phase 1 closure included a final cover and gas collection system consisting of in-refuse wells, collection manifold and laterals, a condensate manhole, and a flare station. The gas collection system was activated in September 2011 to prevent subsurface LFG migration beyond the landfill perimeter and to remove VOCs from groundwater beneath the landfill. The collection system has operated 24 hours a day since startup. Phase 2 (the eastern portion of the Landfill) was filled to grade in September 2020 and closure began in 2021 and is expected to be completed in 2022.

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, 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 Appendix I. The following activities were completed:

- During the first quarter of 2014, in addition to the landfill 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 Appendix III parameters has been conducted annually in phases beginning in 2014. 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 is being 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-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, and MW-8 in 2021.

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 2017c) 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). 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 feet from the City Facility boundary and was relatively stable, and that nearby groundwater sources 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, bromodichloromethane, chloroform, cis-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride. The draft RI Report also indicated the likely cleanup remedy to be the planned Phase 2 closure and LFG removal combined with monitored natural attenuation of the groundwater contamination. A FS report is currently being developed as Phase 2 closure plans are being finalized.

3. COMPLIANCE STATUS SUMMARY

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

3.1 Groundwater

As summarized in Table 3-1, parameters in groundwater wells were detected during 2021 at concentrations above *Water Quality Standards for Groundwaters of the State of Washington* (GWQSs, WAC 173-200), and *State Drinking Water Regulations* (Maximum Contaminant Levels [MCLs], WAC 246-290). Summaries of the 2021 groundwater monitoring data are provided in Table A-1 (WAC 173-351 Appendix I and II parameters and Table A-2 (WAC 173-351 Appendix III parameters) located in Appendix A.

Table 3-2 summarizes the highest 2021 concentration exceeding criteria in upgradient (MW-1, MW-11) or cross gradient (MW-2) wells, and downgradient wells along the edge of the 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 Vadose Zone

A permit modification was granted by BFHD (2017) and beginning in 2017, the vadose zone ports have been checked annually during the third quarter. During the Third Quarter 2021, a small amount of leachate was found in Port-4 that was sufficient to collect a sample to be tested for VOCs. The data are presented in Table A-1 of Appendix A.

3.3 Landfill Gas

No methane was detected above the regulatory limit of 5 percent except at GP-2 during the First Quarter 2021, and GP-12 during all four quarters. The extent of LFG migration has remained in close proximity to the perimeter of the Landfill and concentrations have not exceeded the 5 percent by volume regulatory action limit at the City Facility boundary.

Table 3-1. Wells with Parameters above Groundwater Quality Criteria, 2021

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		
Iron	MW-1	MW-5, MW-8, MW-10	MW-1	MW-5, MW-8, MW-10
Manganese		MW-5, MW-10		MW-5, MW-10
Chloride		MW-8		MW-8
Nitrate	MW-1, MW-2, MW-11	MW-8	MW-1, MW-2, MW-11	MW-8
Sulfate	MW-11		MW-11	
Chromium	MW-2		MW-2	
Total Dissolved Solids (TDS)	MW-1, MW-11	MW-5, MW-6, MW-8, MW-9, MW-10	MW-1, MW-11	MW-5, MW-6, MW-8, 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 (1,2-DCA)		MW-5		
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-10		MW-5, MW-6, MW-9
Vinyl Chloride (VC)		MW-4, MW-5, MW-6, MW-10		MW-5, MW-6

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).

Table 3-2. Highest Concentrations of Parameters above Groundwater Quality Criteria, 2021

Parameter	Units	GWQS	MCL	Highest 2021 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	1,714	MW-11	1,359	MW-10	1,572	MW-8	
INORGANICS										
Arsenic	mg/l	0.00005	0.01	0.0051	MW-2	0.0026	MW-5	0.0088	MW-3	0.0087
Iron	mg/L			0.37	MW-1	0.40	MW-10	0.35	MW-8	
Manganese	mg/L	0.05	0.05			0.32	MW-5			
Chloride	mg/L	250	250					290	MW-8	
Nitrate	mg/L	10	10	45	MW-11			50	MW-8	
Sulfate	mg/L	250	250	330	MW-11					
Chromium	mg/L			0.33	MW-2					
Total Dissolved Solids (TDS)	mg/L	500	500	1,700	MW-11	900	MW-10	1300	MW-8	
VOCS										
1,1-Dichloroethane (1,1-DCA)	µg/L	1	NA			6.5	MW-10	6.1	MW-4	1.7
1,2-Dichloroethane (1,2-DCA)	µg/L	0.5	5			0.59	MW-5			
Bromodichloromethane	µg/L	0.3	80					0.79	MW-8	
Chloroform	µg/L	7	80					12	MW-8	
Tetrachloroethene (PCE)	µg/L	0.8	5	4.9	MW-1	26	MW-6	13	MW-9	
Trichloroethene (TCE)	µg/L	3	5			13	MW-6	5.4	MW-9	
Vinyl Chloride (VC)	µg/L	0.02	2			3.1	MW-6	0.032	MW-4	

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).

MCL = Maximum Contaminant Level (WAC 246-290)

4. GROUNDWATER MONITORING

This report includes the following information for the 2021 groundwater monitoring, per the Permit and the quarterly and annual reporting requirements delineated in WAC 173-351-415 (1) and (2):

- Laboratory report for the Fourth Quarter 2021 (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 diagram, and stiff diagram (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 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).

Groundwater samples were collected with dedicated sampling pumps using a low-flow purging technique. Water purged from each well was placed in the evaporation ponds. Samples to be tested for dissolved metals were filtered in the field through 0.45-micron filters. A duplicate sample (MW-21) was collected 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 Eurofins TestAmerica in Tacoma, Washington.

Samples were collected at well MW-8 during the Second Quarter 2021 and analyzed for the additional Appendix III parameters of WAC 173-351-990.

4.2 Groundwater Quality Results and Comparison to Criteria

Laboratory reports for the First, Second, and Third Quarter 2021 were presented in previous reports (Parametrix 2021b, c, e). The laboratory report for the Fourth Quarter 2021 is 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.

Table A-1 (Appendix I and II parameters) in Appendix A provide a summary of the 2021 groundwater monitoring results. The groundwater results are compared to the *Water Quality Standards for*

Groundwaters of the State of Washington (GWQSs; WAC 173-200) and *State Drinking Water Regulations* (Maximum Contaminant Levels [MCLs], WAC 246-290).

None of the additional WAC 173-351 Appendix III parameters (Table A-2) were detected in the samples collected form MW-8.

4.3 Groundwater Data Evaluation Approach

Statistical analysis procedures for evaluation of groundwater monitoring data collected at the Horn Rapids Landfill 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 have been identified in the monitoring wells downgradient of the Landfill. As described in Section 2.2, a remedy is in progress and data are now being collected to assess the effectiveness of closure activities on mitigating the existing groundwater contamination. Therefore, the statistical approach has been modified to reflect assessment monitoring approaches outlined in the QAPP and described in the following paragraphs.

Corrective action in the form of final Landfill closure construction is not anticipated to be completed until 2022, and it is not expected that the VOC source will be fully controlled until that time. Data will continue to be collected from groundwater wells to assess trends during implementation of closure construction. Monitoring wells in close proximity to the eastern edge of the Landfill (MW-5, MW-6, and MW-10) that have shown significant impacts will continue to be monitored for evidence that the LFG system is affecting VOCs that are impacting groundwater. Wells at the City Facility boundary (MW-3, MW-4, MW-8, and MW-9) will continue to be monitored to assess the degree of attenuation of VOCs.

During the period prior to final closure, the statistical evaluation approach for these wells will consist of evaluating trends qualitatively using time-series plots and quantitatively using Sen's slope and Mann-Kendall tests. Once closure is complete, statistical evaluation procedures appropriate for corrective action monitoring will be conducted at wells along the City Facility boundary that are currently impacted (wells MW-3, MW-4, MW-8, and MW-9) and well MW-12 further downgradient on City Property.

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. 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 as one-half of the detection limit and a hollow symbol is shown. The data are separated into two groups, one group with wells along the edge of the active Landfill (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.

4.4.1 Volatile Organic Compounds

VOCs are an unambiguous indicator of landfill impacts since the typical landfill indicator parameters have been impacted by upgradient sources. The greatest number and highest concentrations of VOCs were detected in the monitoring wells immediately downgradient of the Landfill (MW-5, MW-6, and MW-10), with the highest concentrations of many VOCs detected in well MW-6. Detected VOCs in these wells included 1,1-DCA, cis-1,2-DCE, trans-1,2-DCE, PCE, TCE, and VC. Overall decreasing trends have occurred in all three wells for 1,1-DCA, and in wells MW-5 and MW-6 for PCE, TCE, and VC. A similar suite of VOCs was also detected in well MW-9 and concentrations of some VOCs have shown increases including cis-1,2-DCE, PCE and TCE.

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. VOCs were not detected in upgradient well MW-11.

Along the eastern City Facility boundary, concentrations of 1,1-DCA have shown an overall increase in MW-4 but have decreased in MW-3 and MW-8. Chloroform and bromodichloromethane in wells MW-3 and MW-8 have increased over the past few years. In well MW-12, located further downgradient on City Property, 1,1-DCA and cis-1,2-DCE were consistently detected. Slightly higher concentrations were measured in the Fourth Quarter 2021 and the Fourth Quarter concentration of 1,1-DCA was above the GWQS.

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 TDS, chloride, nitrate, and cations. Data spikes observed in these wells suggest that more than one source may have contributed 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 at the crop circles, and septic systems in the adjacent Off-Road Vehicle (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 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).

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) increased beginning in 2000, but stabilized over the past approximately 12 years.

In upgradient well MW-11, increasing trends in conductivity and TDS, and in concentrations of some inorganic parameters (including calcium, chloride, magnesium, nitrate, and sulfate) have been observed since its installation in 2010, although concentrations have stabilized during the past approximately 5 years.

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 (nitrate, calcium, sodium, chloride, magnesium, potassium, and sulfate) were higher than observed historically beginning in the Third Quarter of 2008, although concentrations began decreasing again in 2012.

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 a number of inorganic parameters have shown increasing trends in wells MW-8 and MW-9 over the past few years, including calcium, chloride, magnesium, nitrate, and sulfate.

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, nitrate, potassium, sulfate, and TDS) have been observed; concentrations increased between 2011 and 2016, and then decreased again until 2019. 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, increasing DO and decreasing TSS and concentrations of manganese, dissolved methane, and sodium have been observed since installation.

4.5 Sen's Slope Plots and Mann-Kendall Tests

Potential 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 2020). 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 or not 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 2012 through Fourth Quarter 2021) and 5 years (First Quarter 2017 through Fourth Quarter 2021). 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 are 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 (1Q2012-4Q2021 and 1Q2017-4Q2021)

Parameter	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-8	MW-9	MW-10	MW-11
Past 10 Years 1Q2012-4Q2021										
1,1-DCA			↓	↑	↓	↓		↓	↓	
1,2-DCA						↓				
1,2-Dichloropropane					↓	↓				
Benzene					↓	↓			↓	
Chloroform			↑	↓				↓		
cis-1,2-DCE			↓	↑				↑	↑	
Methylene Chloride									↓	
PCE						↓		↑		
trans-1,2-DCE						↓				
TCE	↓				↓	↓			↓	
Trichlorofluoromethane			↓	↑						
Vinyl Chloride (VC)					↓	↓			↓	
Past 5 Years 1Q2017-4Q2021										
1,1-DCA				↑	↓	↓		↓	↓	
1,2-DCA					↓	↓				
1,2-Dichloropropane						↓				
Chloroform			↑	↓						
cis-1,2-DCE				↑						
trans-1,2-DCE						↓				
TCE				↑						
Trichlorofluoromethane				↑						
Vinyl Chloride (VC)									↓	

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

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

4.5.1 Volatile Organic Compounds (Past 5 and 10 Years)

As shown in Table 4-1, over the past 5 and 10 years statistically significant downward trends were observed for chloroform in MW-4; 1,1-DCA in MW-5, MW-6, MW-9, and MW-10; and 1,2-DCA and 1,2-dichloropropane in MW-6. Statistically significant upward trends were observed in MW-3 for chloroform and in MW-4 for 1,1-DCA and trichlorofluoromethane. For the chlorinated ethenes, statistically significant downward trends were observed for VC in MW-10; and trans-1,2-DCE in MW-6. A statistically significant upward trend was observed for cis-1,2-DCE in MW-4.

Additional statistically significant downward trends that have emerged over the past 5 years include 1,2-DCA in MW-5. Additional statistically significant upward trends that have emerged over the past 5 years include TCE in MW-4.

4.5.2 Trend Summary

A summary of statistically significant trends that were observed in VOC concentrations during both the past 5 and 10 years is presented below:

- Well MW-3 showed an upward trend in chloroform. MW-3 is along the eastern City Facility boundary.
- Well MW-4 showed a downward trend in chloroform and upward trends in 1,1-DCA, cis-1,2-DCE, and trichlorofluoromethane. MW-4 is along the eastern City Facility boundary.
- Well MW-5 showed a downward trend in 1,1-DCA. MW-5 is between the Landfill and the currently active Expansion cell.
- Well MW-6 showed downward trends in 1,1-DCA, 1,2-DCA, 1,2-dichloropropane, and trans-1,2-DCE. MW-6 is between the Landfill and the currently active Expansion cell.
- Well MW-9 showed downward trends in 1,1-DCA and chloroform. MW-9 is along the southern City Facility boundary.
- Well MW-10 showed downward trends in 1,1-DCA and VC. MW-10 is between the Landfill and the currently active Expansion cell.

Additional statistically significant trends present over the past 5 years include:

- Well MW-4 showed an upward trend in TCE.
- Well MW-5 showed a downward trend in 1,2-DCA.

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).

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.

Some of the 2021 data (Table A-1) indicate that natural attenuation may be occurring. DO measurements were lower in downgradient wells MW-5, MW-6, and MW-10 (generally about 2 mg/L or less) and in MW-4 and MW-9 (about 3 to 5 mg/L) than in the remaining wells (generally between about 4 and 9 mg/L). Decreased levels of DO are consistent with the breakdown of contaminants in groundwater (EPA 1998). The ORP measurements generally followed this pattern with more negative values observed in wells with lower DO.

Dissolved methane continued to be detected in downgradient wells along the edge of the Landfill: MW-5 (up to 1.1 mg/L), MW-6 (up to 4.6 mg/L), and MW-10 (up to 2.2 mg/L). Methane was also detected at lower concentrations in further downgradient wells MW-8, MW-9, MW-12 and in upgradient well MW-11, which during the Fourth Quarter had a concentration of 0.051 mg/L. The occurrence 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 Landfill is the source and transport mechanism for the VOCs impacting groundwater (Shaw Environmental, Inc. 2003).

Evaluation of indicator and natural attenuation parameters indicates biodegradation of chlorinated hydrocarbons is likely occurring in groundwater near the Landfill source. The positive evidence that biodegradation is occurring includes reduced DO and ORP. However, quantitative analysis of other evidence is inconclusive. Trends in other parameters that might indicate that degradation is occurring (EPA 1998, Jurgens et al 2009), such as increases in chloride, alkalinity, and dissolved methane, or decreases in nitrate and sulfate, are somewhat ambiguous because concentrations of these parameters have been affected by contributions from upgradient sources, and methane is also contributed directly by LFG.

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 2021. The trilinear and Stiff diagrams indicate that in most of the wells the dominant anion was bicarbonate, and the dominant cation was calcium. However, the proportions of sulfate and chloride with respect to bicarbonate were higher in upgradient well MW-11 and downgradient well MW-8, and to a lesser extent in wells MW-2 and MW-3. Well MW-12 had slightly higher proportions of sodium and potassium with respect to magnesium and calcium than in the other downgradient wells.

4.8.2 Cation/Anion Balance Calculations

Cation/anion balance calculations for 2021 are presented in Appendix F. All groundwater charge balance differences were less than 10 percent for all quarters. 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 millequivalents per liter) could indicate laboratory error, poor well conditions, or other ions not accounted for in natural or impacted groundwater conditions. Charge balance differences of 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

5.1 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 water table beneath the City Facility occurs at depths of approximately 75 to 110 ft below ground surface (bgs) and elevations of approximately 385 to 388 ft NAVD88, and typically fluctuates less than a foot throughout the year.

Regionally, groundwater flow has been documented to be eastward toward the Columbia River (Shaw 2003). However, historical groundwater measurements have indicated the flow direction at the City Facility to be locally influenced by groundwater mounding from irrigated crop circles on the City Facility's eastern boundary, deflecting the flow in the eastern portion of the City Facility seasonally toward the southeast. Crop circles have been used to grow alfalfa hay, corn and potatoes since 1987. The source of the irrigation water is reported to be from the Columbia River.

Historical influences at the ORV park west of the City Facility may have also temporarily altered local flow directions by periodically flooding shallow unlined waterways for boat racing and allowing the water to seep out after each race. The ponds were constructed in 1999 and racing was discontinued in the mid 2000's. Additional sources of artificial recharge include the four septic systems at the ORV park, including a bathroom/shower facility designed for 4,000 uses per day.

Irrigation is conducted seasonally at the Tri City Kart Club, located on the ORV park property immediately west of the Landfill, and this facility also includes a bathroom/shower facility and septic system. Beginning in 2019, groundwater monitoring indicates groundwater mounding is occurring beneath the northern portion of the Landfill immediately downgradient of the Tri City Kart Club likely related to groundwater recharge from that facility. The mounding appears to steepen the groundwater gradient on the northwest portion of the landfill and shifting the flow slightly more toward the south-southeast.

Although groundwater flow across the City Facility is generally toward the southeast, the mounding effects of intermittent crop circle irrigation on the eastern boundary and artificial recharge to the west have caused minor fluctuations in the groundwater flow direction both temporally and seasonally.

5.2 Groundwater Flow

Groundwater elevations and potentiometric surface maps for 2021 are presented in Appendix G. The groundwater flow direction continued to be toward the southeast.

The calculated rate of flow ranged from 0.003 to 0.05 ft/day or 1 to 16 ft/year, based on the measured groundwater gradient in the vicinity of well MW-6 (0.0004 to 0.0006 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).

6. VADOSE ZONE MONITORING

During the Third Quarter 2021, a small amount of leachate was found in Port 4 that was sufficient to collect a sample to be tested for VOCs. Limited quantities of liquid were detected at Port 3 during three previous events between 2014 and 2016. The data are presented in Table A-1 of Appendix A and are shown on time-series plots in Appendix C. The data are comparable to previous results from Port 3. Although reporting limits were elevated compared to groundwater samples, 4-methyl-2-pentanone and toluene were detected in the leachate and are not typically measured in groundwater samples. Cis-1,2-DCE and vinyl chloride were detected in the leachate at concentrations similar to those measured in groundwater samples from wells immediately downgradient of the Landfill.

Leachate is collected from four lysimeters that monitor the vadose zone directly beneath the MSW located in the northeast corner of the 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 1-1. 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.

7. LANDFILL GAS MONITORING

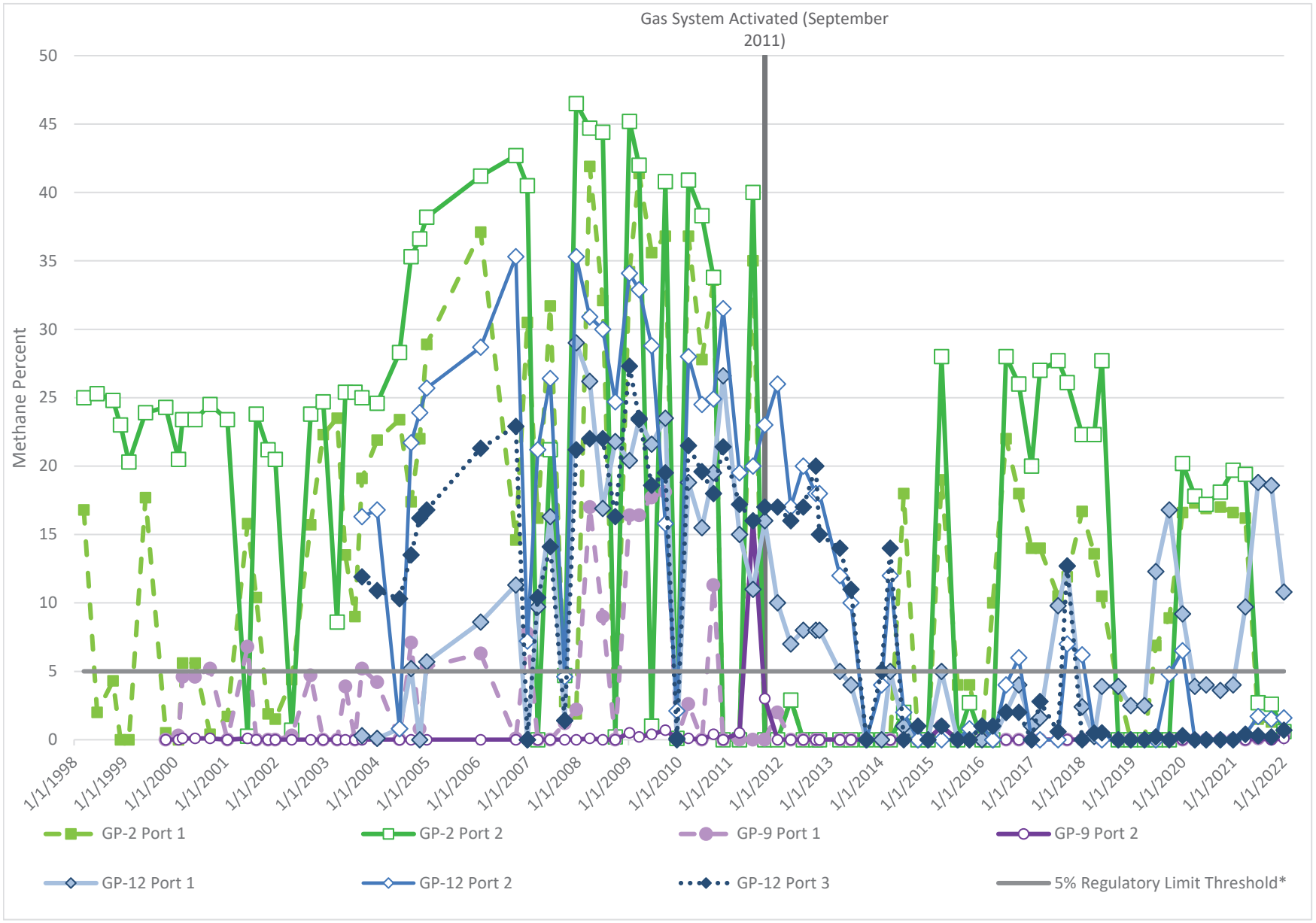
LFG measurements collected from thirteen LFG monitoring probes (Figure 1-1) are presented in Appendix H. Gas probes GP-1 through GP-4 and GP-7 through GP-11 are screened at two subsurface intervals, and GP-12 is screened at three separate intervals, including one deep probe just above groundwater. The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

7.1 Landfill Gas Data

In 2021, methane above background concentrations was detected in gas probes GP-2 and GP-12. All the concentrations were less than 5 percent by volume, except GP-2-1, GP-2-2, and GP-12-1. The extent of LFG migration remains in close proximity to the perimeter of the Landfill and concentrations have not exceeded the 5 percent by volume regulatory action limit at the City Facility boundary. Note the fourth quarter event occurred on January 3, 2022.

7.2 Historical Landfill Gas Data Trends

Trends in probes where methane has historically been observed (GP-2, GP-9, and GP-12) are shown on the time-series plot 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. For example, methane concentrations in GP-12 have decreased from over 30 percent by volume prior to the 2011 Phase 1 Closure to less than 20 percent in 2021, and methane concentrations in GP-2 have decreased from over 45 percent by volume to less than 20 percent in 2021.



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

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

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

Since 2011, the Phase 1 LFG collection system and cover are effectively removing much of the gas within close proximity of the Landfill as demonstrated by the decreases in methane concentrations observed at multilevel gas probes GP-2 and GP-12, including GP-12-3, screened immediately above the water table. It is expected that removing or greatly reducing the LFG source has been effective in reducing impacts to groundwater beneath the Landfill. The source of VOCs to groundwater are expected to be further reduced upon full closure of the Landfill that is anticipated in 2022, which will include an expanded LFG system (Phase 2).

Evaluation of natural attenuation parameters such as DO and ORP measurements indicate that conditions in groundwater near the Landfill source are consistent with attenuation of chlorinated hydrocarbons. However, quantitative analysis of other evidence is inconclusive. Trends in other parameters that might indicate that biodegradation is occurring, such as increases in chloride, alkalinity, and dissolved methane, or decreases in nitrate and sulfate, are somewhat ambiguous because concentrations of these parameters have been affected by influences from upgradient sources, and methane is also contributed directly by LFG.

Since area wide background concentrations of inorganic indicator parameters are present, VOCs are the only unambiguous compounds of concern reflecting landfill impacts. VOCs continued to be detected in groundwater at concentrations above groundwater quality criteria. The groundwater monitoring wells located in close proximity to the waste along the eastern edge of the Landfill (MW-5, MW-6, and MW-10) show the highest number and concentrations of VOCs. Further downgradient well MW-9, located along the southern City Facility boundary approximately 800 feet from the Landfill, also has been impacted by a similar suite of VOCs in lower concentrations. The other three further downgradient monitoring wells along the City Facility boundary, MW-3, MW-4, and MW-8, contain a slightly different distribution of VOCs and in lower concentrations. Low levels of VOCs have also been detected in well MW-12 further downgradient on City Property. Overall VOC concentrations appear consistent with the findings of the 2021 draft RI with exceedances of groundwater quality criteria generally limited to within 500 feet of the City Facility boundary.

Trend analyses indicate that the concentrations of some VOCs have shown significant decreases in some groundwater wells during the past 10 years since completion of the Phase 1 Landfill closure. These include 1,1-DCA in wells MW-3, MW-5, MW-6, MW-9, and MW-10; 1,2-DCA in well MW-6, 1,2-dichloropropane in wells MW-5 and MW-6; benzene in wells MW-5, MW-6, and MW-10; chloroform in wells MW-4 and MW-9; methylene chloride in well MW-10; trichlorofluoromethane in MW-3; chlorinated ethenes in upgradient well MW-1 (TCE); well MW-3 (cis-1,2-DCE), well MW-5 (TCE and VC), well MW-6 (PCE, trans-1,2-DCE, TCE, and VC), and well MW-10 (TCE and VC). Upward trends are present for chloroform in well MW-3; 1,1-DCA, cis-1,2-DCE, and trichlorofluoromethane in well MW-4; cis-1,2-DCE and PCE in well MW-9; and cis-1,2-DCE in well MW-10. Note that cis-1,2-DCE in wells MW-9 and MW-10 and PCE concentrations in MW-9 have stabilized during the past 5 years.

No Appendix III parameters other than VOCs have been detected in groundwater wells, and leachate generation has been shown to be minimal by insignificant quantities of liquids present in lysimeters.

8.2 Recommendations

Ongoing quarterly groundwater and LFG monitoring will continue to evaluate whether the Phase 1 Closure is mitigating the LFG source that has impacted groundwater. The groundwater monitoring will assess whether downward trends in VOCs are continuing to occur in downgradient wells, reflecting attenuation of existing contamination. To this end, the statistical evaluation for groundwater data will consist of evaluating groundwater time series plots, updating groundwater trend analyses, and updating plots of methane measurements in the LFG probes. The draft RI report has been submitted to Ecology and a FS report is being prepared in accordance with the MTCA Agreed Order that focuses on the Phase 2 closure and LFG control as the likely cleanup remedy.

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Appendix A

Groundwater Quality Data Summary Tables

Table A-1. Groundwater Quality Monitoring Results, Horn Rapids Landfill, 2021

	Analyte	Units	GWQS	MCL	MW-1 3/16/2021	MW-1 6/16/2021	MW-1 9/22/2021	MW-1 12/9/2021	MW-2 3/16/2021	MW-2 6/16/2021	MW-2 9/22/2021	MW-2 12/10/2021	MW-3 3/16/2021	MW-3 6/17/2021	MW-3 9/22/2021	MW-3 12/10/2021
FIELD DATA	Conductivity	µmhos/cm		700 **	**799**	**907**	**814**	595	518.5	524	509.3	379.1	368.1	376.1	383.9	290.1
	pH	units	6.5-8.5		7.01	7.14	7.07	7.36	7.47	7.73	7.45	7.87	7.58	7.93	7.46	8.02
	Temperature	C°			21.2	21.6	22.3	20.2	19.9	21.6	21.9	19.9	21.4	21.5	21.5	20.1
	Redox	mv			212.4	123.8	97.1	133.9	237.0	83.8	81.6	166.7	230.8	149.5	93.8	151.3
	Dissolved Oxygen	mg/L			6.30	4.90	4.76	5.22	8.44	6.73	6.65	6.69	11.21	8.91	8.22	8.76
WATER QUALITY PARAMETERS	Nitrate-Nitrogen	mg/L as N	10 *	10 *	**11**	**11**	9.6	9.1 H	**12**	**11**	**11**	**11 H**	9.0	6.4	6.1	6.1 H
	Calcium, Dissolved	mg/L			120	130	100	110	70	68	58	64	47	48	40	47
	Sodium, Dissolved	mg/L			22	24	20	21	14	14	12	14	13	13	11	13
	Bicarbonate Alkalinity	mg/L as CaCO3			300	340	290	280	130	110	110	110	95	110	91	95
	Chloride	mg/L	250 **	250 **	27	28	28	26	29	30	27	26	18	21	20	19
	Magnesium, Dissolved	mg/L			24	26	21	22	15	14	13	14	9.2	9.3	8.0	9.3
	Potassium, Dissolved	mg/L			8.2	8.5	7.6	7.7	6.4	6.0	5.5	6.0	6.3	6.0	5.1	6.0
	Sulfate	mg/L	250 **	250 **	55	57	54	54	63	68	61	59	39	42	42	43
	Total Alkalinity	mg/L as CaCO3			300	340	290	280	130	110	110	110	95	110	91	95
	Iron, Dissolved	mg/L	0.30 **	0.30 **	0.11	**0.37**	<0.10	0.11	<0.10	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
	Manganese, Dissolved	mg/L	0.05 **	0.05 **	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
	Ammonia-Nitrogen	mg/L as N			0.89 J	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	Total Organic Carbon	mg/L			2.2	2.0	1.3	1.4	1.5	<1.5	<1.0	<1.0	<1.5	<1.5	<1.0	1.1
	Total Dissolved Solids	mg/L	500 **	500 **	**510**	440	480	400	340	210	340	370	210	170	250	190
	Total Suspended Solids	mg/L			<2.0	<2.0	<2.0	<2.0	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
METALS	Antimony, Total	mg/L		6 *	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080
	Arsenic, Total	mg/L	0.00005 ***	0.01 *	**0.0042**	**0.0038**	**0.0041**	**0.0037**	**0.0045**	**0.0039**	**0.0041**	**0.0051**	**0.0082**	**0.0079**	**0.0088**	**0.0074**
	Barium, Total	mg/L	1 *	2 *	0.058	0.062	0.057	0.051	0.037	0.033	0.033	0.034	0.021	0.020	0.021	0.020
	Beryllium, Total	mg/L		0.004 *	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
	Cadmium, Total	mg/L	0.01 *	0.005 *	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
	Chromium, Total	mg/L	0.05 *	0.1 *	0.0031	0.0030	0.0029	0.0022	**0.10**	0.050	0.031	**0.33**	0.0066	0.0048	0.0032	0.0030
	Cobalt, Total	mg/L			0.017	0.018	0.021	0.014	<0.00040	0.00056	0.00071	0.00077	<0.00040	0.00051	0.00073	0.00058
	Copper, Total	mg/L	1 **		<0.0020	<0.0020	<0.0020	<0.0020	0.0043	0.0022	<0.0020	0.019	<0.0020	<0.0020	<0.0020	<0.0020
	Lead, Total	mg/L	0.05 *		<0.00040	0.00046	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
	Nickel, Total	mg/L		0.1 *	<0.0030	<0.0030	<0.0030	<0.0030	0.0075	0.020	0.028	0.056	<0.0030	<0.0030	<0.0030	<0.0030
	Selenium, Total	mg/L	0.01 *	0.05 *	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080
	Silver, Total	mg/L	0.05 *	0.1 **	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
	Thallium, Total	mg/L		0.002 *	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Vanadium, Total	mg/L			0.0099	0.0090	0.0093	0.0088	0.013	0.011	0.011	0.018	0.015	0.015	0.015	0.014
	Zinc, Total	mg/L	5 **	5 **	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070
VOLATILE ORGANIC COMPOUNDS	1,1,1,2-Tetrachloroethane	µg/L			<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
	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	0.21	<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
	1,2,3-Trichloropropane	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
	1,2-Dibromo-3-Chloropropane	µg/L		0.2 *	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
	1,2-Dibromoethane	µg/L	0.001 ***	0.05 *	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
	1,2-Dichlorobenzene	µg/L		600 *	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
	1,2-Dichloroethane	µg/L	0.5 ***	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	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
	1,4-Dichlorobenzene	µg/L	4 ***	75 *	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
	2-Butanone	µg/L			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	2-Hexanone	µg/L			<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
	4-Methyl-2-pentanone	µg/L			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	Acetone	µg/L			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10

Table A-1. Groundwater Quality Monitoring Results, Horn Rapids Landfill, 2021

	Analyte	Units	GWQS	MCL	MW-4 3/16/2021	MW-4 6/17/2021	MW-4 9/22/2021	MW-4 12/10/2021	MW-5 3/17/2021	MW-5 6/16/2021	MW-5 9/23/2021	MW-5 12/9/2021	MW-6 3/17/2021	MW-6 6/16/2021	MW-6 9/22/2021	MW-6 12/9/2021
FIELD DATA	Conductivity	µmhos/cm		700 **	568	583	585	454.0	**1300**	**1230**	**1229**	**946**	**1037**	**1078**	**1117**	**829**
	pH	units	6.5-8.5		7.37	7.79	7.42	7.76	6.59	6.83	6.66	6.86	6.51	6.74	6.55	6.77
	Temperature	C°			20.7	21.4	21.5	19.5	22.5	23.0	24.1	22.8	27.1	27.3	27.7	25.4
	Redox	mv			180.2	120.7	80.3	182.1	-26.7	-138.5	-97.3	79.4	42.2	58.5	79.8	27.5
	Dissolved Oxygen	mg/L			4.58	3.83	5.09	4.29	0.99	0.34	0.58	0.54	0.51	0.53	0.48	0.44
WATER QUALITY PARAMETERS	Nitrate-Nitrogen	mg/L as N	10 *	10 *	5.2	5.2	4.5	5.1 H	2.4	1.5	1.5	1.2 H	4.1 J	2.7	2.9	2.7 H
	Calcium, Dissolved	mg/L			85	85	77	88	210	190	170	180	170	170	150	170
	Sodium, Dissolved	mg/L			15	15	14	15	33	26	23	26	24	22	20	22
	Bicarbonate Alkalinity	mg/L as CaCO3			240	240	250	230	570	510	460	480	490	500	460	470
	Chloride	mg/L	250 **	250 **	14	28	14	14	52	50	50	48	21	22	24	21
	Magnesium, Dissolved	mg/L			18	18	17	19	52	45	40	45	41	41	37	41
	Potassium, Dissolved	mg/L			7.2	7.0	6.6	7.2	13	12	11	12	13	12	11	12
	Sulfate	mg/L	250 **	250 **	29	33	31	32	110	84	81	84 J	50 J	49	53	53
	Total Alkalinity	mg/L as CaCO3			240	240	250	230	570	510	460	480	490	500	460	470
	Iron, Dissolved	mg/L	0.30 **	0.30 **	<0.10	0.12	<0.10	<0.10	0.16	0.28	0.11	0.18	0.12	**0.31**	<0.10	0.24
	Manganese, Dissolved	mg/L	0.05 **	0.05 **	<0.020	<0.020	<0.020	<0.020	**0.28**	**0.22**	**0.21**	**0.32**	0.043	0.049	0.037	0.040
	Ammonia-Nitrogen	mg/L as N			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	Total Organic Carbon	mg/L			1.6	<1.5	1.4	<1.0	7.6	4.7	2.2	2.5	4.9	4.9	1.1	1.0
	Total Dissolved Solids	mg/L	500 **	500 **	360	220	260	300	**850**	**780**	**800**	**770**	**640**	**550**	**690**	**690**
	Total Suspended Solids	mg/L			<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
METALS	Antimony, Total	mg/L		6 *	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080
	Arsenic, Total	mg/L	0.00005 ***	0.01 *	**0.0042**	**0.0036**	**0.0042**	**0.0038**	**0.0026**	**0.0021**	**0.0026**	**0.0026**	**0.0017**	**0.0016**	**0.0016**	**0.0015**
	Barium, Total	mg/L	1 *	2 *	0.049	0.047	0.048	0.046	0.12	0.094	0.11	0.10	0.11	0.10	0.11	0.097
	Beryllium, Total	mg/L		0.004 *	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
	Cadmium, Total	mg/L	0.01 *	0.005 *	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
	Chromium, Total	mg/L	0.05 *	0.1 *	0.0021	0.0019	0.0017	0.0017	0.0026	<0.00080	<0.00080	<0.00080	0.0010	0.0020	0.00088	0.010
	Cobalt, Total	mg/L			0.0025	0.0029	0.0022	0.0018	0.0016	0.00060	0.00049	0.00055	<0.00040	0.0014	0.00043	0.0091
	Copper, Total	mg/L	1 **		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0023	<0.0020	0.0028	0.0031	0.0025	0.0020	<0.0020
	Lead, Total	mg/L	0.05 *		<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
	Nickel, Total	mg/L		0.1 *	<0.0030	<0.0030	<0.0030	<0.0030	0.0041	<0.0030	0.0033	0.0031	<0.0030	<0.0030	<0.0030	0.010
	Selenium, Total	mg/L	0.01 *	0.05 *	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080
	Silver, Total	mg/L	0.05 *	0.1 **	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
	Thallium, Total	mg/L		0.002 *	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Vanadium, Total	mg/L			0.012	0.010	0.011	0.011	0.0077	0.0063	0.0075	0.0074	0.0070	0.0064	0.0069	0.0064
	Zinc, Total	mg/L	5 **	5 **	<0.0070	<0.0070	<0.0070	<0.0070	0.015	0.017	0.014	0.012	0.011	<0.0070	<0.0070	<0.0070
VOLATILE ORGANIC COMPOUNDS	1,1,1,2-Tetrachloroethane	µg/L			<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
	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 ***		**5.5**	**4.7**	**4.7**	**6.1**	**4.8**	**4.6**	**4.6**	**5.3**	**3.3**	**2.7**	**2.7**	**1.5**
	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
	1,2,3-Trichloropropane	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
	1,2-Dibromo-3-Chloropropane	µg/L		0.2 *	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
	1,2-Dibromoethane	µg/L	0.001 ***	0.05 *	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
	1,2-Dichlorobenzene	µg/L		600 *	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
	1,2-Dichloroethane	µg/L	0.5 ***	5 *	<0.20	<0.20	<0.20	<0.20	**0.59**	**0.55**	**0.54**	**0.56**	0.38	0.35	0.32	0.26
	1,2-Dichloropropane	µg/L	0.6 ***	5 *	<0.20	<0.20	<0.20	<0.20	0.34	0.31	0.35	0.40	0.30	0.27	0.30	0.39
	1,4-Dichlorobenzene	µg/L	4 ***	75 *	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
	2-Butanone	µg/L			<10	<10	<10	<10	<10	<10	<10	<10	12	<10	<40	<10
	2-Hexanone	µg/L			<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<12	<3.0
	4-Methyl-2-pentanone	µg/L			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	Acetone	µg/L			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10

Table A-1. Groundwater Quality Monitoring Results, Horn Rapids Landfill, 2021

	Analyte	Units	GWQS	MCL	MW-8 3/17/2021	MW-8 6/17/2021	MW-8 9/22/2021	MW-8 12/10/2021	MW-9 3/16/2021	MW-21 (MW-9 Dup) 3/16/2021	MW-9 6/17/2021	MW-9 9/22/2021	MW-9 12/10/2021	MW-10 3/17/2021	MW-10 6/16/2021	MW-10 9/22/2021	MW-21 (MW-10 Dup) 9/22/2021	MW-10 12/9/2021
FIELD DATA	Conductivity	µmhos/cm		700 **	**1181**	**1572**	**1339**	453.0	**950**	NA	**1136**	**1110**	**781**	**1283**	**1359**	**1299**	NA	**966**
	pH	units	6.5-8.5		7.54	7.75	7.55	7.96	6.76	NA	7.15	6.91	7.15	6.65	6.63	6.60	NA	6.81
	Temperature	C°			22.5	23.3	23.2	21.3	23.7	NA	22.4	24.4	22.0	25.7	24.8	27.0	NA	23.8
	Redox	mv			210.0	102.4	85.2	131.1	121.5	NA	81.1	119.8	104.9	110.1	86.5	71.4	NA	119.3
	Dissolved Oxygen	mg/L			10.76	8.63	7.98	7.68	3.09	NA	3.93	2.89	2.94	0.58	0.30	0.41	NA	0.42
WATER QUALITY PARAMETERS	Nitrate-Nitrogen	mg/L as N	10 *	10 *	**37**	**50**	**42 H**	**14 H**	7.2 J	9.6	7.7	7.2 H	7.0 H	4.0	4.0	4.2	4.2 H	4.0 H
	Calcium, Dissolved	mg/L			150	200	160	73	150	140	160	140	150	230	230	190	200	200
	Sodium, Dissolved	mg/L			35	38	32	21	25	24	33	25	23	24	24	21	22	21
	Bicarbonate Alkalinity	mg/L as CaCO3			120	120	110	120	360	350	400	370	330	650	610	540	530	490
	Chloride	mg/L	250 **	250 **	190	**290**	210	66	61	57	71	67	63	32	35	33	33	30
	Magnesium, Dissolved	mg/L			31	41	33	15	33	32	37	32	33	48	49	42	43	43
	Potassium, Dissolved	mg/L			11	12	10	7.3	9.8	9.4	10	9.0	9.1	13	13	12	12	12
	Sulfate	mg/L	250 **	250 **	87	92	83	47	73	71	85	81	86	90	91	88 J	88	85
	Total Alkalinity	mg/L as CaCO3			120	120	110	120	360	350	400	370	330	650	610	540	530	490
	Iron, Dissolved	mg/L	0.30 **	0.30 **	0.11	**0.35**	<0.10	<0.10	0.10	0.11	0.18	<0.10	0.13	0.18	**0.40**	0.12	0.11	0.17
	Manganese, Dissolved	mg/L	0.05 **	0.05 **	<0.020	<0.020	<0.020	<0.020	<0.020	0.027	<0.020	<0.020	<0.020	**0.053**	**0.051**	0.038	0.040	0.038
	Ammonia-Nitrogen	mg/L as N			<0.50	<0.50	<0.50	<0.50	0.56	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	Total Organic Carbon	mg/L			2.2	2.5	2.0	1.2	3.4	3.3	3.7	1.7	1.6	9.5	6.2	1.9	1.9	3.1
	Total Dissolved Solids	mg/L	500 **	500 **	**760**	**860**	**1300**	370	**560**	**620**	**580**	**680**	**650**	**860**	**750**	**900**	**890**	**890**
	Total Suspended Solids	mg/L			<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<2.0	<2.0
METALS	Antimony, Total	mg/L		6 *	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080
	Arsenic, Total	mg/L	0.00005 ***	0.01 *	**0.0077**	**0.0059**	**0.0078**	**0.0087**	**0.0019**	**0.0020**	**0.0017**	**0.0019**	**0.0016**	**0.0016**	**0.0013**	**0.0014**	**0.0015**	**0.0013**
	Barium, Total	mg/L	1 *	2 *	0.11	0.15	0.13	0.048	0.081	0.072	0.097	0.096	0.076	0.14	0.12	0.13	0.12	0.11
	Beryllium, Total	mg/L		0.004 *	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
	Cadmium, Total	mg/L	0.01 *	0.005 *	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
	Chromium, Total	mg/L	0.05 *	0.1 *	0.0091	0.0034	0.0085	0.0049	0.0027	0.0022	0.0073	0.0025	0.0030	0.0031	<0.00080	0.00091	0.0010	<0.00080
	Cobalt, Total	mg/L			<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.0010	<0.00040	<0.00040	<0.00040	<0.00040
	Copper, Total	mg/L	1 **		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0023	<0.0020	<0.0020	<0.0020	<0.0020
	Lead, Total	mg/L	0.05 *		<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
	Nickel, Total	mg/L		0.1 *	0.0048	<0.0030	0.0049	<0.0030	<0.0030	<0.0030	0.0040	<0.0030	<0.0030	0.0038	<0.0030	<0.0030	<0.0030	<0.0030
	Selenium, Total	mg/L	0.01 *	0.05 *	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080
	Silver, Total	mg/L	0.05 *	0.1 **	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
	Thallium, Total	mg/L		0.002 *	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Vanadium, Total	mg/L			0.014	0.011	0.014	0.016	0.0071	0.0072	0.0064	0.0069	0.0065	0.0074	0.0067	0.0070	0.0069	0.0065
	Zinc, Total	mg/L	5 **	5 **	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	0.0083	<0.0070	<0.0070	<0.0070	<0.0070
VOLATILE ORGANIC COMPOUNDS	1,1,1,2-Tetrachloroethane	µg/L			<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30 J	<0.30	<0.30
	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 J	<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 J	<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 J	<0.20	<0.20
	1,1-Dichloroethane	µg/L	1 ***		<0.20	<0.20	<0.20	0.22	**2.5**	**2.5**	**1.3**	**1.9**	**2.6**	**6.5**	**5.8**	**5.7 J**	**5.6**	**6.3**
	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 J	<0.20	<0.20
	1,2,3-Trichloropropane	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 J	<0.20	<0.20
	1,2-Dibromo-3-Chloropropane	µg/L		0.2 *	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0 J	<2.0	<2.0
	1,2-Dibromoethane	µg/L	0.001 ***	0.05 *	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
	1,2-Dichlorobenzene	µg/L		600 *	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30 J	<0.30	<0.30
	1,2-Dichloroethane	µg/L	0.5 ***	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.49	0.44	0.48 J	0.43	<0.20
	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 J	<0.20	0.20
	1,4-Dichlorobenzene	µg/L	4 ***	75 *	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30 J	<0.30	<0.30
	2-Butanone	µg/L			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	2-Hexanone	µg/L			<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
	4-Methyl-2-pentanone	µg/L			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10 J	<10	<10
	Acetone	µg/L			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10

Table A-1. Groundwater Quality Monitoring Results, Horn Rapids Landfill, 2021

	Analyte	Units	GWQS	MCL	MW-11 3/17/2021	MW-11 6/17/2021	MW-21 (MW-11 Dup) 6/17/2021	MW-11 9/22/2021	MW-11 12/9/2021	MW-12 3/16/2021	MW-12 6/17/2021	MW-12 9/23/2021	MW-12 12/10/2021	MW-21 (MW-12 Dup) 12/9/2021	Leachate Port 4 9/22/2021	Trip Blank 3/17/2021	Trip Blank 6/16/2021	Trip Blank 9/22/2021	Trip Blank 12/9/2021
FIELD DATA	Conductivity	µmhos/cm		700 **	**1660**	**1714**	NA	**1705**	**1284**	403.1	420.0	415.1	368.7	NA	NA	NA	NA	NA	NA
	pH	units	6.5-8.5		7.27	7.54	NA	7.34	7.48	7.42	7.92	7.77	7.83	NA	NA	NA	NA	NA	NA
	Temperature	C°			21.7	21.7	NA	22.0	19.8	24.7	23.7	23.4	20.5	NA	NA	NA	NA	NA	NA
	Redox	mv			181.1	120.9	NA	91.2	176.1	243.6	168.5	115.5	165.4	NA	NA	NA	NA	NA	NA
	Dissolved Oxygen	mg/L			10.55	8.53	NA	8.20	8.30	7.02	7.83	6.76	5.29	NA	NA	NA	NA	NA	NA
WATER QUALITY PARAMETERS	Nitrate-Nitrogen	mg/L as N	10 *	10 *	**45**	**40**	**49**	**37**	**40 H**	5.5	5.2	4.6	5.2 H	5.2 H	NA	NA	NA	NA	NA
	Calcium, Dissolved	mg/L			260	260	260	240	260	48	51	46	63	64	NA	NA	NA	NA	NA
	Sodium, Dissolved	mg/L			21	20	20	19	20	21	21	20	20	21	NA	NA	NA	NA	NA
	Bicarbonate Alkalinity	mg/L as CaCO3			170	170	170	170	160	140	140	140	180	170	NA	NA	NA	NA	NA
	Chloride	mg/L	250 **	250 **	210	210	220	200	210	13	16	13	14	14	NA	NA	NA	NA	NA
	Magnesium, Dissolved	mg/L			52	53	52	49	52	10	11	9.7	12	12	NA	NA	NA	NA	NA
	Potassium, Dissolved	mg/L			12	12	12	11	12	7.6	7.7	7.3	7.7	8.0	NA	NA	NA	NA	NA
	Sulfate	mg/L	250 **	250 **	**330**	**330**	**300**	**310**	**320**	34	39	35	35	35	NA	NA	NA	NA	NA
	Total Alkalinity	mg/L as CaCO3			170	170	170	170	160	140	140	140	180	170	NA	NA	NA	NA	NA
	Iron, Dissolved	mg/L	0.30 **	0.30 **	0.17	0.30	0.29	0.14	0.23	<0.10	<0.10	<0.10	<0.10	<0.10	NA	NA	NA	NA	NA
	Manganese, Dissolved	mg/L	0.05 **	0.05 **	<0.020	<0.020	<0.020	<0.020	<0.020	0.027	<0.020	<0.020	<0.020	<0.020	NA	NA	NA	NA	NA
	Ammonia-Nitrogen	mg/L as N			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA
	Total Organic Carbon	mg/L			4.7	4.5	4.4	3.9	4.4	<1.5	<1.5	<1.0	<1.0	<1.0	NA	NA	NA	NA	NA
	Total Dissolved Solids	mg/L	500 **	500 **	**1200**	**1100**	**900**	**1700**	**1300**	270	<10	230	340 J	250 J	NA	NA	NA	NA	NA
	Total Suspended Solids	mg/L			4.2	<2.0	2	<2.0	<2.0	160	10	11	13	11	NA	NA	NA	NA	NA
METALS	Antimony, Total	mg/L		6 *	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	NA	NA	NA	NA	NA
	Arsenic, Total	mg/L	0.00005 ***	0.01 *	**0.0047**	**0.0039**	**0.0039**	**0.0045**	**0.0039**	0.0083 R	**0.0081**	**0.0087**	**0.0060**	**0.0057**	NA	NA	NA	NA	NA
	Barium, Total	mg/L	1 *	2 *	0.11	0.098	0.098	0.10	0.092	0.078 R	0.061	0.046	0.056	0.051	NA	NA	NA	NA	NA
	Beryllium, Total	mg/L		0.004 *	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	NA	NA	NA	NA	NA
	Cadmium, Total	mg/L	0.01 *	0.005 *	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	NA	NA	NA	NA	NA
	Chromium, Total	mg/L	0.05 *	0.1 *	0.0071	0.0034	0.0033	0.0039	0.0030	0.077 R	0.0078	0.013	0.0070	0.0068	NA	NA	NA	NA	NA
	Cobalt, Total	mg/L			0.0012	0.00047	0.00044	0.00054	<0.00040	0.0046 R	0.00082	0.00040	<0.00040	<0.00040	NA	NA	NA	NA	NA
	Copper, Total	mg/L	1 **		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.029 R	0.0081	0.011	0.0047	0.0048	NA	NA	NA	NA	NA
	Lead, Total	mg/L	0.05 *		<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.0014 R	0.00069	<0.00040	<0.00040	<0.00040	NA	NA	NA	NA	NA
	Nickel, Total	mg/L		0.1 *	0.0043	<0.0030	<0.0030	<0.0030	<0.0030	0.048 R	0.0036	0.0062	0.0040	0.0043	NA	NA	NA	NA	NA
	Selenium, Total	mg/L	0.01 *	0.05 *	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	NA	NA	NA	NA	NA
	Silver, Total	mg/L	0.05 *	0.1 **	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.00062 R	<0.00040	<0.00040	<0.00040	<0.00040	NA	NA	NA	NA	NA
	Thallium, Total	mg/L		0.002 *	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	NA	NA	NA	NA	NA
	Vanadium, Total	mg/L			0.011	0.0092	0.0093	0.0098	0.0092	0.022 R	0.017	0.016	0.013	0.012	NA	NA	NA	NA	NA
	Zinc, Total	mg/L	5 **	5 **	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070	0.014 R	0.0076	<0.0070	<0.0070	<0.0070	NA	NA	NA	NA	NA
VOLATILE ORGANIC COMPOUNDS	1,1,1,2-Tetrachloroethane	µg/L			<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<15	<0.30	<0.30	<0.30	<0.30
	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	<10	<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	<10	<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	<10	<0.20	<0.20	<0.20	<0.20
	1,1-Dichloroethane	µg/L	1 ***		<0.20	<0.20	<0.20	<0.20	<0.20	0.43	0.43	0.38	**1.7**	**1.6**	<10	<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	<10	<0.20	<0.20	<0.20	<0.20
	1,2,3-Trichloropropane	µg/L			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<10	<0.20	<0.20	<0.20	<0.20
	1,2-Dibromo-3-Chloropropane	µg/L		0.2 *	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<100	<2.0	<2.0	<2.0	<2.0
	1,2-Dibromoethane	µg/L	0.001 ***	0.05 *	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<5.0	<0.10	<0.10	<0.10	<0.10
	1,2-Dichlorobenzene	µg/L		600 *	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<15	<0.30	<0.30	<0.30	<0.30
	1,2-Dichloroethane	µg/L	0.5 ***	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<10	<0.20	<0.20	<0.20	<0.20
	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	<10	<0.20	<0.20	<0.20	<0.20
	1,4-Dichlorobenzene	µg/L	4 ***	75 *	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<15	<0.30	<0.30	<0.30	<0.30
	2-Butanone	µg/L			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<500	<10	<10	<10	<10
	2-Hexanone	µg/L			<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<150	<3.0	<3.0	<3.0	<3.0
	4-Methyl-2-pentanone	µg/L			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	1800	<10	<10	<10	<10
	Acetone	µg/L			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<500	<10	<10	<10	<10

Table A-1. Groundwater Quality Monitoring Results, Horn Rapids Landfill, 2021

	Analyte	Units	GWQS	MCL	MW-1 3/16/2021	MW-1 6/16/2021	MW-1 9/22/2021	MW-1 12/9/2021	MW-2 3/16/2021	MW-2 6/16/2021	MW-2 9/22/2021	MW-2 12/10/2021	MW-3 3/16/2021	MW-3 6/17/2021	MW-3 9/22/2021	MW-3 12/10/2021
VOLATILE ORGANIC COMPOUNDS (Cont.)	Acrylonitrile	µg/L	0.07 ***		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	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
	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 ***	80 * THM	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	0.23
	Bromoform	µg/L	5 ***	80 * THM	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	Bromomethane	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
	Carbon Disulfide	µg/L			<0.30	<0.30	<0.30	2.1	<0.30	<0.30	<0.30	0.91	<0.30	<0.30	<0.30	0.66
	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
	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			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	Chloroform	µg/L	7 ***	80 * THM	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	5.5	5.2	5.8	5.7
	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
	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			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	Methylene Chloride	µg/L	5 ***	5 *	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	m,p-Xylene	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
	o-Xylene	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
	Styrene	µg/L		100 *	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Tetrachloroethene	µg/L	0.8 ***	5 *	**3.9**	**4.9**	**3.5**	**4.0**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	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			<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
	Trichloroethene	µg/L	3 ***	5 *	0.20	0.32	0.21	0.26	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Trichlorofluoromethane	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
	Vinyl Acetate	µg/L			<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
	Vinyl Chloride	µg/L	0.02 ***	2 *	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
	Total Xylenes	µg/L		10000 * XYL	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
NATURAL ATTENUATION	Ethane	µg/L			<1.1	<5.0	<1.1	<1.1	<1.1	<5.0	<1.1	<1.1	<1.1	<5.0	<1.1	<1.1
	Ethene	µg/L			<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0
	Methane	µg/L			<0.58	<5.0	<0.58	<0.58	<0.58	<5.0	<0.58	<0.58	<0.58	<5.0	<0.58	<0.58

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
*XYL = Primary MCL for the sum of all xylenes
J = Estimated value
R = Rejected value
H = Estimated value; analyzed beyond specified holding time
Bold = Does not meet GWQS or MCL
NA = Not analyzed

Table A-1. Groundwater Quality Monitoring Results, Horn Rapids Landfill, 2021

	Analyte	Units	GWQS	MCL	MW-4 3/16/2021	MW-4 6/17/2021	MW-4 9/22/2021	MW-4 12/10/2021	MW-5 3/17/2021	MW-5 6/16/2021	MW-5 9/23/2021	MW-5 12/9/2021	MW-6 3/17/2021	MW-6 6/16/2021	MW-6 9/22/2021	MW-6 12/9/2021
VOLATILE ORGANIC COMPOUNDS (Cont.)	Acrylonitrile	µg/L	0.07 ***		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	Benzene	µg/L	1 ***	5 *	<0.20	<0.20	<0.20	<0.20	0.31	0.28	0.22	0.28	0.38	0.31	0.28	0.32
	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 ***	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
	Bromoform	µg/L	5 ***	80 * THM	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	Bromomethane	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
	Carbon Disulfide	µg/L			<0.30	<0.30	<0.30	0.46	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
	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
	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			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	Chloroform	µg/L	7 ***	80 * THM	0.30	0.28	0.26	0.34	<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
	cis-1,2-Dichloroethene	µg/L		70 *	3.8	4.2	3.9	4.8	25	28	29	30	49	47	57	41
	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			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	Methylene Chloride	µg/L	5 ***	5 *	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	m,p-Xylene	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
	o-Xylene	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
	Styrene	µg/L		100 *	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Tetrachloroethene	µg/L	0.8 ***	5 *	<0.50	<0.50	<0.50	<0.50	**9.1**	**14**	**14**	**15**	**21**	**20**	**24**	**26**
	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	0.40	0.48	0.47	<0.20	1.5	1.4	1.3	0.74
	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			<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
	Trichloroethene	µg/L	3 ***	5 *	0.29	0.34	0.32	0.48	**4.2**	**5.6**	**5.6**	**5.5**	**11**	**11**	**13**	**12**
	Trichlorofluoromethane	µg/L			1.4	1.1	1.0	1.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	Vinyl Acetate	µg/L			<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<8	<2.0
	Vinyl Chloride	µg/L	0.02 ***	2 *	<0.020	**0.032**	<0.020	<0.020	**1.6**	**1.6**	**1.7**	**2.0**	**2.8**	**2.1**	**2.3**	**3.1**
	Total Xylenes	µg/L		10000 * XYL	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
NATURAL ATTENUATION	Ethane	µg/L			<1.1	<5.0	<1.1	<1.1	<1.1	<5.0	<1.1	<1.1	<1.1	<5.0	<1.1	<1.1
	Ethene	µg/L			<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0
	Methane	µg/L			<0.58	<5.0	<0.58	<0.58	1100	420	720	370	3300	2100	4600	4100

Notes:

GWQS = Water Quality Standards for Ground Waters of the State of Washington (WAC
MCL = Maximum Contaminant Level, State Drinking Water Regulations (WAC 246-2
* = Primary
** = Secondary
*** = Carcinogen
*THM = Primary MCL for the sum of all trihalomethanes
*XYL = Primary MCL for the sum of all xylenes
J = Estimated value
R = Rejected value
H = Estimated value; analyzed beyond specified holding time
Bold = Does not meet GWQS or MCL
NA = Not analyzed

Table A-1. Groundwater Quality Monitoring Results, Horn Rapids Landfill, 2021

	Analyte	Units	GWQS	MCL	MW-8 3/17/2021	MW-8 6/17/2021	MW-8 9/22/2021	MW-8 12/10/2021	MW-9 3/16/2021	MW-21 (MW-9 Dup) 3/16/2021	MW-9 6/17/2021	MW-9 9/22/2021	MW-9 12/10/2021	MW-10 3/17/2021	MW-10 6/16/2021	MW-10 9/22/2021	MW-21 (MW-10 Dup) 9/22/2021	MW-10 12/9/2021
VOLATILE ORGANIC COMPOUNDS (Cont.)	Acrylonitrile	µg/L	0.07 ***		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	Benzene	µg/L	1 ***	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.22	<0.20	<0.20 J	<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 J	<0.20	<0.20
	Bromodichloromethane	µg/L	0.3 ***	80 * THM	0.27	0.28	**0.42**	**0.79**	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20 J	<0.20	<0.20
	Bromoform	µg/L	5 ***	80 * THM	<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	<0.50
	Bromomethane	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 J	<0.50	<0.50
	Carbon Disulfide	µg/L			<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
	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 J	<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 J	<0.20	<0.20
	Chloroethane	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 J	<0.50	<0.50
	Chloroform	µg/L	7 ***	80 * THM	4.7	4.1	6.3	**12**	0.23	0.26	<0.20	0.23	0.29	0.63	0.64	0.67 J	0.66	0.57
	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 J	<0.50	<0.50
	cis-1,2-Dichloroethene	µg/L		70 *	<0.20	<0.20	<0.20	<0.20	12	12	6.9	11	14	14	16	17 J	17	18
	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 J	<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 J	<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 J	<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 J	<0.20	<0.20
	Iodomethane	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	<0.50
	Methylene Chloride	µg/L	5 ***	5 *	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	m,p-Xylene	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 J	<0.50	<0.50
	o-Xylene	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 J	<0.50	<0.50
	Styrene	µg/L		100 *	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0 J	<1.0	<1.0
	Tetrachloroethene	µg/L	0.8 ***	5 *	<0.50	<0.50	<0.50	<0.50	**12**	**12**	**11**	**11**	**13**	**4.2**	**5.9**	**6.0 J**	**5.8**	**6.3**
	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 J	<0.20	<0.20
	trans-1,2-Dichloroethene	µg/L		100 *	<0.20	<0.20	<0.20	<0.20	0.42	0.38	0.23	0.33	0.49	0.22	0.23	0.23 J	<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 J	<0.20	<0.20
	trans-1,4-Dichloro-2-butene	µg/L			<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
	Trichloroethene	µg/L	3 ***	5 *	<0.20	<0.20	<0.20	<0.20	**4.6**	**4.8**	2.9	**4.5**	**5.4**	2.5	**3.3**	**3.6 J**	**3.3**	**3.3**
	Trichlorofluoromethane	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 J	<0.50	<0.50
	Vinyl Acetate	µg/L			<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
	Vinyl Chloride	µg/L	0.02 ***	2 *	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	**0.45**	**0.35**	**0.29 J**	**0.31**	**0.34**
	Total Xylenes	µg/L		10000 * XYL	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50 J	<0.50	<0.50
NATURAL ATTENUATION	Ethane	µg/L			<1.1	<5.0	<1.1	<1.1	<1.1	<1.1	<5.0	<1.1	<1.1	<1.1	<5.0	<1.1	<1.1	<1.1
	Ethene	µg/L			<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0
	Methane	µg/L			<0.58	<5.0	0.75	1.4	<0.58	<0.58	<5.0	1.4	3.1	1700	1300	2200	2000	1700

Notes:

GWQS = Water Quality Standards for Ground Waters of the State of Washington (WAC
MCL = Maximum Contaminant Level, State Drinking Water Regulations (WAC 246-2
* = Primary
** = Secondary
*** = Carcinogen
*THM = Primary MCL for the sum of all trihalomethanes
*XYL = Primary MCL for the sum of all xylenes
J = Estimated value
R = Rejected value
H = Estimated value; analyzed beyond specified holding time
Bold = Does not meet GWQS or MCL
NA = Not analyzed

Table A-1. Groundwater Quality Monitoring Results, Horn Rapids Landfill, 2021

	Analyte	Units	GWQS	MCL	MW-11 3/17/2021	MW-11 6/17/2021	MW-21 (MW-11 Dup) 6/17/2021	MW-11 9/22/2021	MW-11 12/9/2021	MW-12 3/16/2021	MW-12 6/17/2021	MW-12 9/23/2021	MW-12 12/10/2021	MW-21 (MW-12 Dup) 12/9/2021	Leachate Port 4 9/22/2021	Trip Blank 3/17/2021	Trip Blank 6/16/2021	Trip Blank 9/22/2021	Trip Blank 12/9/2021
VOLATILE ORGANIC COMPOUNDS (Cont.)	Acrylonitrile	µg/L	0.07 ***		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<500	<10	<10	<10	<10
	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	<10	<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	<10	<0.20	<0.20	<0.20	<0.20
	Bromodichloromethane	µg/L	0.3 ***	80 * THM	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<10	<0.20	<0.20	<0.20	<0.20
	Bromoform	µg/L	5 ***	80 * THM	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<0.50	<0.50	<0.50	<0.50
	Bromomethane	µg/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<0.50	<0.50	<0.50	<0.50
	Carbon Disulfide	µg/L			<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.81 J	<0.30 J	<15	<0.30	<0.30	<0.30	<0.30
	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	<10	<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	<10	<0.20	<0.20	<0.20	<0.20
	Chloroethane	µg/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<0.50	<0.50	<0.50	<0.50
	Chloroform	µg/L	7 ***	80 * THM	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.32	0.33	<10	<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	<25	<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	0.33	0.33	0.26	1.2	1.1	15	<0.20	<0.20	<0.20	<0.20
	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	<10	<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	<10	<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	<10	<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	<10	<0.20	<0.20	<0.20	<0.20
	Iodomethane	µg/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<0.50	<0.50	<0.50	<0.50
	Methylene Chloride	µg/L	5 ***	5 *	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0
	m,p-Xylene	µg/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<0.50	<0.50	<0.50	<0.50
	o-Xylene	µg/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<0.50	<0.50	<0.50	<0.50
	Styrene	µg/L		100 *	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<50	<1.0	<1.0	<1.0	<1.0
	Tetrachloroethene	µg/L	0.8 ***	5 *	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<0.50	<0.50	<0.50	<0.50
	Toluene	µg/L		1000 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	11	<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	<10	<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	<10	<0.20	<0.20	<0.20	<0.20
	trans-1,4-Dichloro-2-butene	µg/L			<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<100	<2.0	<2.0	<2.0	<2.0
	Trichloroethene	µg/L	3 ***	5 *	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<10	<0.20	<0.20	<0.20	<0.20
	Trichlorofluoromethane	µg/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<0.50	<0.50	<0.50	<0.50
	Vinyl Acetate	µg/L			<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<100	<2.0	<2.0	<2.0	<2.0
	Vinyl Chloride	µg/L	0.02 ***	2 *	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	**3.3**	<0.020	<0.020	<0.020	<0.020
	Total Xylenes	µg/L		10000 * XYL	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<0.50	<0.50	<0.50	<0.50
NATURAL ATTENUATION	Ethane	µg/L			<1.1	<5.0	<5.0	<1.1	<1.1	<1.1	<5.0	<1.1	<1.1	<1.1	NA	<1.1	<5.0	<1.1	<1.1
	Ethene	µg/L			<1.0	<5.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	NA	<1.0	<5.0	<1.0	<1.0
	Methane	µg/L			<0.58	<5.0	<5.0	<0.58	51	<0.58	<5.0	<0.58	0.69	<0.58	NA	<0.58	<5.0	<0.58	0.67

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*XYL = Primary MCL for the sum of all xylenes
J = Estimated value
R = Rejected value
H = Estimated value; analyzed beyond specified holding time
Bold = Does not meet GWQS or MCL
NA = Not analyzed

Table A-2. Groundwater Quality Results, Appendix III[1] Parameters, Horn Rapids Landfill, Second Quarter 2021

	Analyte	Units	GWQS	MCL	MW-8 6/17/2021
VOLATILE ORGANIC COMPOUNDS	1,1,1,2-Tetrachloroethane	µg/L			<1.0
	1,1,1-Trichloroethane	µg/L	200 *	200 *	<1.0
	1,1,2,2-Tetrachloroethane	µg/L			<1.0
	1,1,2-Trichloroethane	µg/L		5 *	<1.0
	1,1-Dichloroethane	µg/L	1 ***		<1.0
	1,1-Dichloroethene	µg/L		7 *	<1.0
	1,1-Dichloropropene	µg/L			<1.0
	1,2,3-Trichloropropane	µg/L			<2.5
	1,2-Dibromo-3-Chloropropane	µg/L		0.2 *	<5.0
	Ethylene dibromide	µg/L	0.001 ***	0.05 *	<1.0
	1,2-Dichlorobenzene	µg/L		600 *	<1.0
	1,2-Dichloroethane	µg/L	0.5 ***	5 *	<1.0
	1,2-Dichloropropane	µg/L	0.6 ***	5 *	<1.0
	1,3-Dichlorobenzene	µg/L			<1.0
	1,3-Dichloropropane	µg/L			<1.0
	1,4-Dichlorobenzene	µg/L	4 ***	75 *	<1.0
	2,2-Dichloropropane	µg/L			<1.0
	Methyl ethyl ketone	µg/L			<6.0
	2-Hexanone	µg/L			<5.0
	4-Methyl-2-pentanone	µg/L			<5.0
	Acetone	µg/L			<10
	Acetonitrile	µg/L			<30
	Acrolein	µg/L			<20
	Acrylonitrile	µg/L	0.07 ***		<20
	Allyl Chloride	µg/L			<2.0
	Benzene	µg/L	1 ***	5 *	<1.0
	Bromoform	µg/L	5 ***	80 * THM	<1.0
	Bromomethane	µg/L			<2.0 J
	Carbon Disulfide	µg/L			<2.0
	Carbon Tetrachloride	µg/L	0.3 ***	5 *	<1.0
	Chlorobenzene	µg/L		100 *	<1.0
	Bromochloromethane	µg/L			<1.0
	Chlorodibromomethane	µg/L		80 * THM	<1.0
	Chloroethane	µg/L			<2.0
	Chloroform	µg/L	7 ***	80 * THM	4.0
	Chloromethane	µg/L			<2.0
	Chloroprene	µg/L			<1.0
	Cis-1,2-Dichloroethene	µg/L		70 *	<1.0
	Cis-1,3-Dichloropropene	µg/L			<1.0
	Dibromomethane	µg/L			<1.0
	Dichlorobromomethane	µg/L	0.3 ***	80 * THM	<1.0
	Dichlorodifluoromethane	µg/L			<2.0
	Ethylmethacrylate	µg/L			<3.0
	Ethylbenzene	µg/L		700 *	<1.0
	Methyl Iodide	µg/L			<1.0 J
	Isobutyl Alcohol	µg/L			<110
	Methacrylonitrile	µg/L			<10
	Methyl Methacrylate	µg/L			<4.0
	Methylene Chloride	µg/L	5 ***	5 *	<2.0
	Propionitrile	µg/L			<20
	Styrene	µg/L		100 *	<1.0
	Tetrachloroethene	µg/L	0.8 ***	5 *	<1.0
	Toluene	µg/L		1000 *	<1.0
	Trans-1,2-Dichloroethene	µg/L		100 *	<1.0
	Trans-1,3-Dichloropropene	µg/L			<3.0
	Trans-1,4-Dichloro-2-butene	µg/L			<3.0
	Trichloroethene	µg/L	3 ***	5 *	<1.0
	Trichlorofluoromethane	µg/L			<2.0
	Vinyl Acetate	µg/L			<3.0
	Vinyl Chloride	µg/L	0.02 ***	2 *	<1.0
	Total Xylenes	µg/L		10000 * XYL	<2.0
SEMIVOLATILE ORGANIC COMPOUNDS	1,2,4,5-Tetrachlorobenzene	µg/L			<9.7
	1,2,4-Trichlorobenzene	µg/L			<3.9
	1,2-Dichlorobenzene	µg/L		60 *	<3.9
	1,3,5-Trinitrobenzene	µg/L			<49
	1,3-Dichlorobenzene	µg/L			<9.7
	1,3-Dinitrobenzene	µg/L			<9.7
	1,4-Dichlorobenzene	µg/L	4 ***	75 *	<3.9
	1-Naphthylamine	µg/L			<9.7
	2,2'-oxybis[1-chloropropane]	µg/L			<9.7
	2,3,4,6-Tetrachlorophenol	µg/L			<49
	2,4,5-Trichlorophenol	µg/L			<9.7
	2,4,6-Trichlorophenol	µg/L	4 ***		<9.7
	2,4-Dichlorophenol	µg/L			<9.7
	2,4-Dimethylphenol	µg/L			<9.7
	2,4-Dinitrophenol	µg/L			<29
	2,4-Dinitrotoluene	µg/L	0.1 ***		<9.7
	2,6-Dichlorophenol	µg/L			<9.7
	2,6-Dinitrotoluene	µg/L	0.1 ***		<9.7
	2-Acetylaminofluorene	µg/L			<97
	2-Chloronaphthalene	µg/L			<3.9
	2-Chlorophenol	µg/L			<9.7
	2-Methylnaphthalene	µg/L			<3.9
	2-Methylphenol	µg/L			<9.7
	2-Nitroaniline	µg/L			<9.7
	2-Nitrophenol	µg/L			<9.7
	2-Toluidine	µg/L			<9.7
	3 & 4 Methylphenol	µg/L			<9.7
	3,3'-Dichlorobenzidine	µg/L			<49
	3-Methylcholanthrene	µg/L			<19
	4,6-Dinitro-2-Methylphenol	µg/L			<49

Table A-2. Groundwater Quality Results, Appendix III[1] Parameters, Horn Rapids Landfill, Second Quarter 2021

	Analyte	Units	GWQS	MCL	MW-8 6/17/2021
SEMIVOLATILE ORGANIC COMPOUNDS (Cont.)	4-Aminobiphenyl	µg/L			<49
	4-Bromophenyl phenyl ether	µg/L			<9.7
	4-Chloro-3-Methylphenol	µg/L			<9.7
	4-Chloroaniline	µg/L			<9.7
	4-Chlorophenyl-Phenylether	µg/L			<9.7
	4-Nitroaniline	µg/L			<9.7
	4-Nitrophenol	µg/L			<9.7
	7,12-Dimethylbenz(a)anthracene	µg/L			<19
	a,a-Dimethylphenethylamine	µg/L			<49
	Acenaphthene	µg/L			<3.9
	Acenaphthylene	µg/L			<3.9
	Anthracene	µg/L			<3.9
	Benzidine, 3,3-Dimethyl-	µg/L	0.007 ***		<19
	Benzo[a]anthracene	µg/L			<3.9
	Benzo[a]pyrene	µg/L	0.008 ***	0.2 *	<3.9
	Benzo[b]fluoranthene	µg/L			<3.9
	Benzo[g,h,i]perylene	µg/L			<3.9
	Benzo[k]fluoranthene	µg/L			<3.9
	Benzyl Alcohol	µg/L			<9.7
	Bis(2-Chloroethoxy)Methane	µg/L			<9.7
	Bis(2-Chloroethyl)Ether	µg/L			<9.7
	Bis(2-Ethylhexyl) Phthalate	µg/L	6 ***		<9.7
	Butyl benzyl phthalate	µg/L			<3.9
	Chlorobenzilate	µg/L			<9.7
	Chrysene	µg/L			<3.9
	Di-allate (Avadex)	µg/L	1 ***		<5.5
	Dibenzo(a,h)anthracene	µg/L			<3.9
	Dibenzofuran	µg/L			<3.9
	Di-n-butyl phthalate	µg/L			<3.9
	Diethyl phthalate	µg/L			<3.9
	Dimethoate	µg/L			<19
	Dimethyl phthalate	µg/L			<3.9
	Di-N-Octyl Phthalate	µg/L			<3.9
	Diphenylamine	µg/L			<9.7
	Disulfoton (Di-Syston)	µg/L			<49
	Acetophenone	µg/L			<9.7
	Ethyl Methanesulfonate	µg/L			<9.7
	Famphur	µg/L			<97
	Fluoranthene	µg/L			<3.9
	Fluorene	µg/L			<3.9
	Hexachlorobenzene	µg/L	0.05 ***	1 *	<9.7
	Hexachlorobutadiene	µg/L			<9.7
	Hexachlorocyclopentadiene	µg/L		50 *	<49
	Hexachloroethane	µg/L			<9.7
	Hexachloropropene	µg/L			<97
	Indeno(1,2,3-cd)pyrene	µg/L			<3.9
	Isophorone	µg/L			<9.7
	Isosafrole	µg/L			<3.4
	Methapyrilene	µg/L			<49
	Methyl Methanesulfonate	µg/L			<9.7
	Methyl Parathion	µg/L			<49
	m-Nitroaniline	µg/L			<9.7
	Naphthalene	µg/L			<3.9
	Naphthoquinone, 1,4-	µg/L			<49
	Naphthylamine, 2-	µg/L			<9.7
	Nitrobenzene	µg/L			<9.7
	N-Nitrosodiethylamine	µg/L	0.0005 ***		<9.7
	N-Nitrosodimethylamine	µg/L	0.002 ***		<9.7
	N-Nitrosodi-N-Butylamine	µg/L	0.02 ***		<9.7
	N-Nitrosodi-n-propylamine	µg/L	0.01 ***		<9.7
	n-Nitrosodiphenylamine(as diphenylamine)	µg/L	17 ***		<9.7
	N-Nitrosomethylethylamine	µg/L	0.004 ***		<9.7
	N-Nitrosopiperidine	µg/L			<9.7
	N-Nitrosopyrrolidine	µg/L	0.04 ***		<9.7
	O,O,O-Triethyl phosphorothioate	µg/L			<49
	Ethyl Parathion	µg/L			<49
	p-Dimethylamino azobenzene	µg/L			<19
	Pentachlorobenzene	µg/L			<9.7
	Pentachloronitrobenzene	µg/L			<49
	Pentachlorophenol	µg/L		1 *	<49
	Phenacetin	µg/L			<19
	Phenanthrene	µg/L			<3.9
	Phenol	µg/L			<9.7
	Phorate	µg/L			<49
	p-Phenylene diamine	µg/L			<97
	Pronamide (Kerb)	µg/L			<19
	Pyrene	µg/L			<9.7
	Safrole	µg/L			<19
	Thionazin	µg/L			<49
	Toluidine, 5-Nitro-O-	µg/L			<19

Table A-2. Groundwater Quality Results, Appendix III[1] Parameters, Horn Rapids Landfill, Second Quarter 2021

	Analyte	Units	GWQS	MCL	MW-8 6/17/2021
ORGANOCHLORINE PESTICIDES	4,4'-DDD	µg/L	0.3 ***		<0.049
	4,4'-DDE	µg/L	0.3 ***		<0.049
	4,4'-DDT	µg/L	0.3 ***		<0.049
	Aldrin	µg/L	0.005 ***		<0.049
	alpha-BHC	µg/L			<0.049
	beta-BHC	µg/L			<0.049
	delta-BHC	µg/L			<0.049
	Dieldrin	µg/L	0.005 ***		<0.049
	Endosulfan I	µg/L			<0.049
	Endosulfan II	µg/L			<0.049
	Endosulfan Sulfate	µg/L			<0.049
	Endrin	µg/L	0.2 *	2 *	<0.049
	Endrin Aldehyde	µg/L			<0.049
	Lindane	µg/L	0.06 ***	0.2 *	<0.049
	Heptachlor	µg/L	0.02 ***	0.4 *	<0.049
	Heptachlor Epoxide	µg/L	0.009 ***	0.2 *	<0.049
	Isodrin	µg/L			<0.098
	Kepone	µg/L			<0.98
	Methoxychlor	µg/L	100 *	40 *	<0.098
	Chlordane, technical	µg/L	0.06 ***	2 *	<0.49
	Toxaphene	µg/L	0.08 ***	3 *	<2.0
POLYCHLORINATED BIPHENYLS (PCBs)	PCB-aroclor 1016	µg/L	0.01 ***	0.5 *	<0.98
	PCB-aroclor 1221	µg/L	0.01 ***	0.5 *	<0.98
	PCB-aroclor 1232	µg/L	0.01 ***	0.5 *	<0.98
	PCB-aroclor 1242	µg/L	0.01 ***	0.5 *	<0.98
	PCB-aroclor 1248	µg/L	0.01 ***	0.5 *	<0.98
	PCB-aroclor 1254	µg/L	0.01 ***	0.5 *	<0.98
	PCB-aroclor 1260	µg/L	0.01 ***	0.5 *	<0.98
	PCB-aroclor 1262	µg/L	0.01 ***	0.5 *	<0.98
	PCB-aroclor 1268	µg/L	0.01 ***	0.5 *	<0.98
	PCB, Sum of Aroclors	µg/L	0.01 ***	0.5 *	<0.98
HERBICIDES	2,4-D	µg/L	100 *	70 *	<3.8
	Dinoseb	µg/L		7 *	<0.96
	2,4,5-T	µg/L			<0.96
	Silvex	µg/L	10 *	50 *	<0.96
	Mercury	µg/L	0.002 *	0.002 *	<0.20
	Cyanide	mg/L		0.2 *	<0.010
	Sulfide	mg/L			<4.0
	2,3,7,8-TCDD	pg/L		0.6	<9.8

Notes:
[1] = Chapter 173-351 WAC
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
*XYL = Primary MCL for the sum of all xylenes
J = Estimated value

Appendix B

Laboratory Data Report and Data Review Memorandum

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

Laboratory Job ID: 580-108302-1
Client Project/Site: Horn Rapids Landfill
Revision: 1

For:
Parametrix, Inc.
719 2nd Avenue
Suite 200
Seattle, Washington 98104

Attn: Lisa Gilbert

Kristine D. Allen

Authorized for release by:
1/19/2022 5:01:06 PM
Kristine Allen, Client Service Manager
(253)248-4970
Kristine.Allen@Eurofinset.com

Designee for

Nathan Lewis, Project Manager I
(253)922-2310
Nathan.Lewis@Eurofinset.com

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Job ID: 580-108302-1

Laboratory: Eurofins Seattle

Narrative

Job Narrative
580-108302-1

Comments
Report was revised 1/19/2022 to report iron that was inadvertantly left off of the log in.

No additional comments.

Receipt
The samples were received on 12/11/2021 11:15 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 1.8º C, 2.8º C and 4.8º C.

GC/MS VOA
Method 8260D: The continuing calibration verification (CCV) associated with batch 580-376188 recovered above the upper control limit for 1,2,4-Trimethylbenzene, 2-Chlorotoluene, 4-Chlorotoluene, 4-Isopropyltoluene, Isopropylbenzene, m-Xylene & p-Xylene, N-Propylbenzene, tert-Butylbenzene, . The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated samples are impacted: MW-12 (580-108302-11), MW-12 (580-108302-11[MS]) and MW-12 (580-108302-11[MSD]).

Method 8260D: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 580-376188 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method 8260D: The following sample was diluted to bring the concentration of target analytes within the calibration range: MW-6 (580-108302-6). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC Semi VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
Method 300.0: The following sample(s) was received with less than 2 days remaining on the holding time or less than one shift (8 hours) remaining on a test with a holding time of 48 hours or less. As such, the laboratory had insufficient time remaining to perform the analysis within holding time: MW-1 (580-108302-1), MW-2 (580-108302-2), MW-3 (580-108302-3), MW-4 (580-108302-4), MW-5 (580-108302-5), MW-6 (580-108302-6), MW-8 (580-108302-7), MW-9 (580-108302-8), MW-10 (580-108302-9), MW-11 (580-108302-10), MW-12 (580-108302-11), MW-12 (580-108302-11[MS]), MW-12 (580-108302-11[MSD]) and MW-21 (580-108302-12).No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

General Chemistry

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
H	Sample was prepped or analyzed beyond the specified holding time

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Client Sample ID: MW-1

Date Collected: 12/09/21 16:20
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-1

Matrix: Water

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/17/21 13:14	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/17/21 13:14	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/17/21 13:14	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/17/21 13:14	1
1,1-Dichloroethane	ND		0.20		ug/L			12/17/21 13:14	1
1,1-Dichloroethene	ND		0.20		ug/L			12/17/21 13:14	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/17/21 13:14	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/17/21 13:14	1
1,2-Dibromoethane	ND		0.10		ug/L			12/17/21 13:14	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/17/21 13:14	1
1,2-Dichloroethane	ND		0.20		ug/L			12/17/21 13:14	1
1,2-Dichloropropane	ND		0.20		ug/L			12/17/21 13:14	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/17/21 13:14	1
2-Butanone	ND		10		ug/L			12/17/21 13:14	1
2-Hexanone	ND		3.0		ug/L			12/17/21 13:14	1
4-Methyl-2-pentanone	ND		10		ug/L			12/17/21 13:14	1
Acetone	ND		10		ug/L			12/17/21 13:14	1
Acrylonitrile	ND		10		ug/L			12/17/21 13:14	1
Benzene	ND		0.20		ug/L			12/17/21 13:14	1
Bromochloromethane	ND		0.20		ug/L			12/17/21 13:14	1
Bromodichloromethane	ND		0.20		ug/L			12/17/21 13:14	1
Bromoform	ND		0.50		ug/L			12/17/21 13:14	1
Bromomethane	ND		0.50		ug/L			12/17/21 13:14	1
Carbon disulfide	**2.1**		0.30		ug/L			12/17/21 13:14	1
Carbon tetrachloride	ND		0.20		ug/L			12/17/21 13:14	1
Chlorobenzene	ND		0.20		ug/L			12/17/21 13:14	1
Chloroethane	ND		0.50		ug/L			12/17/21 13:14	1
Chloroform	ND		0.20		ug/L			12/17/21 13:14	1
Chloromethane	ND		0.50		ug/L			12/17/21 13:14	1
cis-1,2-Dichloroethene	ND		0.20		ug/L			12/17/21 13:14	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 13:14	1
Dibromochloromethane	ND		0.20		ug/L			12/17/21 13:14	1
Dibromomethane	ND		0.20		ug/L			12/17/21 13:14	1
Ethylbenzene	ND		0.20		ug/L			12/17/21 13:14	1
Iodomethane	ND		0.50		ug/L			12/17/21 13:14	1
Methylene Chloride	ND		5.0		ug/L			12/17/21 13:14	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/17/21 13:14	1
o-Xylene	ND		0.50		ug/L			12/17/21 13:14	1
Styrene	ND		1.0		ug/L			12/17/21 13:14	1
Tetrachloroethene	**4.0**		0.50		ug/L			12/17/21 13:14	1
Toluene	ND		0.20		ug/L			12/17/21 13:14	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/17/21 13:14	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 13:14	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/17/21 13:14	1
Trichloroethene	**0.26**		0.20		ug/L			12/17/21 13:14	1
Trichlorofluoromethane	ND		0.50		ug/L			12/17/21 13:14	1
Vinyl acetate	ND		2.0		ug/L			12/17/21 13:14	1
Vinyl chloride	ND		0.020		ug/L			12/17/21 13:14	1
Xylenes, Total	ND		0.50		ug/L			12/17/21 13:14	1

Client Sample ID: MW-1

Date Collected: 12/09/21 16:20
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-1

Matrix: Water

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*80 - 120*		*12/17/21 13:14*	*1*
4-Bromofluorobenzene (Surr)	*93*		*80 - 120*		*12/17/21 13:14*	*1*
Dibromofluoromethane (Surr)	*103*		*80 - 120*		*12/17/21 13:14*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*12/17/21 13:14*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/22/21 13:42	1
Ethylene	ND		1.0		ug/L			12/22/21 13:42	1
Methane	**0.59**		0.58		ug/L			12/22/21 13:42	1

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	**110**		0.50		mg/L		12/16/21 21:10	12/17/21 19:57	1
Magnesium	**22**		0.50		mg/L		12/16/21 21:10	12/17/21 19:57	1
Manganese	ND		0.020		mg/L		12/16/21 21:10	12/17/21 19:57	1
Potassium	**7.7**		3.3		mg/L		12/16/21 21:10	12/17/21 19:57	1
Sodium	**21**		0.50		mg/L		12/16/21 21:10	12/17/21 19:57	1

Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.0037**		0.0010		mg/L		12/16/21 21:07	12/17/21 18:38	1
Antimony	ND		0.00080		mg/L		12/16/21 21:07	12/17/21 18:38	1
Barium	**0.051**		0.0012		mg/L		12/16/21 21:07	12/17/21 18:38	1
Beryllium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 18:38	1
Cadmium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 18:38	1
Chromium	**0.0022**		0.00080		mg/L		12/16/21 21:07	12/17/21 18:38	1
Cobalt	**0.014**		0.00040		mg/L		12/16/21 21:07	12/17/21 18:38	1
Copper	ND		0.0020		mg/L		12/16/21 21:07	12/17/21 18:38	1
Lead	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 18:38	1
Nickel	ND		0.0030		mg/L		12/16/21 21:07	12/17/21 18:38	1
Selenium	ND		0.0080		mg/L		12/16/21 21:07	12/17/21 18:38	1
Silver	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 18:38	1
Thallium	ND		0.0010		mg/L		12/16/21 21:07	12/17/21 18:38	1
Vanadium	**0.0088**		0.0040		mg/L		12/16/21 21:07	12/17/21 18:38	1
Zinc	ND		0.0070		mg/L		12/16/21 21:07	12/17/21 18:38	1

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**0.11**		0.10		mg/L		12/16/21 21:10	01/12/22 11:15	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**26**		1.5		mg/L			12/20/21 15:25	1
Nitrate as N	**9.1**	**H**	0.20		mg/L			12/12/21 15:39	1
Sulfate	**54**		1.5		mg/L			12/20/21 15:25	1
TOC Result 1	**1.4**		1.0		mg/L			12/30/21 07:36	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.50		mg/L		12/17/21 16:25	12/21/21 22:02	1
Alkalinity	**280**		7.0		mg/L			12/17/21 17:21	1
Bicarbonate Alkalinity as CaCO3	**280**		7.0		mg/L			12/17/21 17:21	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-1
Date Collected: 12/09/21 16:20
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-1
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**400**		50		mg/L			12/15/21 07:02	1
Total Suspended Solids	ND		2.0		mg/L			12/15/21 19:09	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-2

Date Collected: 12/10/21 14:40
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-2

Matrix: Water

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/17/21 13:39	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/17/21 13:39	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/17/21 13:39	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/17/21 13:39	1
1,1-Dichloroethane	**0.21**		0.20		ug/L			12/17/21 13:39	1
1,1-Dichloroethene	ND		0.20		ug/L			12/17/21 13:39	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/17/21 13:39	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/17/21 13:39	1
1,2-Dibromoethane	ND		0.10		ug/L			12/17/21 13:39	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/17/21 13:39	1
1,2-Dichloroethane	ND		0.20		ug/L			12/17/21 13:39	1
1,2-Dichloropropane	ND		0.20		ug/L			12/17/21 13:39	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/17/21 13:39	1
2-Butanone	ND		10		ug/L			12/17/21 13:39	1
2-Hexanone	ND		3.0		ug/L			12/17/21 13:39	1
4-Methyl-2-pentanone	ND		10		ug/L			12/17/21 13:39	1
Acetone	ND		10		ug/L			12/17/21 13:39	1
Acrylonitrile	ND		10		ug/L			12/17/21 13:39	1
Benzene	ND		0.20		ug/L			12/17/21 13:39	1
Bromochloromethane	ND		0.20		ug/L			12/17/21 13:39	1
Bromodichloromethane	ND		0.20		ug/L			12/17/21 13:39	1
Bromoform	ND		0.50		ug/L			12/17/21 13:39	1
Bromomethane	ND		0.50		ug/L			12/17/21 13:39	1
Carbon disulfide	**0.91**		0.30		ug/L			12/17/21 13:39	1
Carbon tetrachloride	ND		0.20		ug/L			12/17/21 13:39	1
Chlorobenzene	ND		0.20		ug/L			12/17/21 13:39	1
Chloroethane	ND		0.50		ug/L			12/17/21 13:39	1
Chloroform	ND		0.20		ug/L			12/17/21 13:39	1
Chloromethane	ND		0.50		ug/L			12/17/21 13:39	1
cis-1,2-Dichloroethene	ND		0.20		ug/L			12/17/21 13:39	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 13:39	1
Dibromochloromethane	ND		0.20		ug/L			12/17/21 13:39	1
Dibromomethane	ND		0.20		ug/L			12/17/21 13:39	1
Ethylbenzene	ND		0.20		ug/L			12/17/21 13:39	1
Iodomethane	ND		0.50		ug/L			12/17/21 13:39	1
Methylene Chloride	ND		5.0		ug/L			12/17/21 13:39	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/17/21 13:39	1
o-Xylene	ND		0.50		ug/L			12/17/21 13:39	1
Styrene	ND		1.0		ug/L			12/17/21 13:39	1
Tetrachloroethene	ND		0.50		ug/L			12/17/21 13:39	1
Toluene	ND		0.20		ug/L			12/17/21 13:39	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/17/21 13:39	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 13:39	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/17/21 13:39	1
Trichloroethene	ND		0.20		ug/L			12/17/21 13:39	1
Trichlorofluoromethane	ND		0.50		ug/L			12/17/21 13:39	1
Vinyl acetate	ND		2.0		ug/L			12/17/21 13:39	1
Vinyl chloride	ND		0.020		ug/L			12/17/21 13:39	1
Xylenes, Total	ND		0.50		ug/L			12/17/21 13:39	1

Client Sample ID: MW-2

Date Collected: 12/10/21 14:40
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-2

Matrix: Water

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*80 - 120*		*12/17/21 13:39*	*1*
4-Bromofluorobenzene (Surr)	*90*		*80 - 120*		*12/17/21 13:39*	*1*
Dibromofluoromethane (Surr)	*96*		*80 - 120*		*12/17/21 13:39*	*1*
Toluene-d8 (Surr)	*101*		*80 - 120*		*12/17/21 13:39*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/22/21 13:55	1
Ethylene	ND		1.0		ug/L			12/22/21 13:55	1
Methane	**0.62**		0.58		ug/L			12/22/21 13:55	1

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	**64**		0.50		mg/L		12/16/21 21:10	12/17/21 20:13	1
Magnesium	**14**		0.50		mg/L		12/16/21 21:10	12/17/21 20:13	1
Manganese	ND		0.020		mg/L		12/16/21 21:10	12/17/21 20:13	1
Potassium	**6.0**		3.3		mg/L		12/16/21 21:10	12/17/21 20:13	1
Sodium	**14**		0.50		mg/L		12/16/21 21:10	12/17/21 20:13	1

Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.0051**		0.0010		mg/L		12/16/21 21:07	12/17/21 19:32	1
Antimony	ND		0.00080		mg/L		12/16/21 21:07	12/17/21 19:32	1
Barium	**0.034**		0.0012		mg/L		12/16/21 21:07	12/17/21 19:32	1
Beryllium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:32	1
Cadmium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:32	1
Chromium	**0.33**		0.00080		mg/L		12/16/21 21:07	12/17/21 19:32	1
Cobalt	**0.00077**		0.00040		mg/L		12/16/21 21:07	12/17/21 19:32	1
Copper	**0.019**		0.0020		mg/L		12/16/21 21:07	12/17/21 19:32	1
Lead	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:32	1
Nickel	**0.056**		0.0030		mg/L		12/16/21 21:07	12/17/21 19:32	1
Selenium	ND		0.0080		mg/L		12/16/21 21:07	12/17/21 19:32	1
Silver	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:32	1
Thallium	ND		0.0010		mg/L		12/16/21 21:07	12/17/21 19:32	1
Vanadium	**0.018**		0.0040		mg/L		12/16/21 21:07	12/17/21 19:32	1
Zinc	ND		0.0070		mg/L		12/16/21 21:07	12/17/21 19:32	1

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.10		mg/L		12/16/21 21:10	01/12/22 11:57	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**26**		1.5		mg/L			12/20/21 15:37	1
Nitrate as N	**11**	**H**	0.40		mg/L			12/12/21 17:13	2
Sulfate	**59**		1.5		mg/L			12/20/21 15:37	1
TOC Result 1	ND		1.0		mg/L			12/30/21 07:54	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.50		mg/L		12/17/21 16:25	12/21/21 22:02	1
Alkalinity	**110**		7.0		mg/L			12/17/21 17:21	1
Bicarbonate Alkalinity as CaCO3	**110**		7.0		mg/L			12/17/21 17:21	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-2
Date Collected: 12/10/21 14:40
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-2
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**370**		50		mg/L			12/15/21 07:02	1
Total Suspended Solids	ND		2.0		mg/L			12/15/21 19:09	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-3

Date Collected: 12/10/21 10:35
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-3

Matrix: Water

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/17/21 14:03	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/17/21 14:03	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/17/21 14:03	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/17/21 14:03	1
1,1-Dichloroethane	ND		0.20		ug/L			12/17/21 14:03	1
1,1-Dichloroethene	ND		0.20		ug/L			12/17/21 14:03	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/17/21 14:03	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/17/21 14:03	1
1,2-Dibromoethane	ND		0.10		ug/L			12/17/21 14:03	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/17/21 14:03	1
1,2-Dichloroethane	ND		0.20		ug/L			12/17/21 14:03	1
1,2-Dichloropropane	ND		0.20		ug/L			12/17/21 14:03	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/17/21 14:03	1
2-Butanone	ND		10		ug/L			12/17/21 14:03	1
2-Hexanone	ND		3.0		ug/L			12/17/21 14:03	1
4-Methyl-2-pentanone	ND		10		ug/L			12/17/21 14:03	1
Acetone	ND		10		ug/L			12/17/21 14:03	1
Acrylonitrile	ND		10		ug/L			12/17/21 14:03	1
Benzene	ND		0.20		ug/L			12/17/21 14:03	1
Bromochloromethane	ND		0.20		ug/L			12/17/21 14:03	1
Bromodichloromethane	**0.23**		0.20		ug/L			12/17/21 14:03	1
Bromoform	ND		0.50		ug/L			12/17/21 14:03	1
Bromomethane	ND		0.50		ug/L			12/17/21 14:03	1
Carbon disulfide	**0.66**		0.30		ug/L			12/17/21 14:03	1
Carbon tetrachloride	ND		0.20		ug/L			12/17/21 14:03	1
Chlorobenzene	ND		0.20		ug/L			12/17/21 14:03	1
Chloroethane	ND		0.50		ug/L			12/17/21 14:03	1
Chloroform	**5.7**		0.20		ug/L			12/17/21 14:03	1
Chloromethane	ND		0.50		ug/L			12/17/21 14:03	1
cis-1,2-Dichloroethene	ND		0.20		ug/L			12/17/21 14:03	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 14:03	1
Dibromochloromethane	ND		0.20		ug/L			12/17/21 14:03	1
Dibromomethane	ND		0.20		ug/L			12/17/21 14:03	1
Ethylbenzene	ND		0.20		ug/L			12/17/21 14:03	1
Iodomethane	ND		0.50		ug/L			12/17/21 14:03	1
Methylene Chloride	ND		5.0		ug/L			12/17/21 14:03	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/17/21 14:03	1
o-Xylene	ND		0.50		ug/L			12/17/21 14:03	1
Styrene	ND		1.0		ug/L			12/17/21 14:03	1
Tetrachloroethene	ND		0.50		ug/L			12/17/21 14:03	1
Toluene	ND		0.20		ug/L			12/17/21 14:03	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/17/21 14:03	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 14:03	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/17/21 14:03	1
Trichloroethene	ND		0.20		ug/L			12/17/21 14:03	1
Trichlorofluoromethane	ND		0.50		ug/L			12/17/21 14:03	1
Vinyl acetate	ND		2.0		ug/L			12/17/21 14:03	1
Vinyl chloride	ND		0.020		ug/L			12/17/21 14:03	1
Xylenes, Total	ND		0.50		ug/L			12/17/21 14:03	1

Client Sample ID: MW-3

Date Collected: 12/10/21 10:35
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-3

Matrix: Water

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*80 - 120*		*12/17/21 14:03*	*1*
4-Bromofluorobenzene (Surr)	*89*		*80 - 120*		*12/17/21 14:03*	*1*
Dibromofluoromethane (Surr)	*102*		*80 - 120*		*12/17/21 14:03*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*		*12/17/21 14:03*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/22/21 14:08	1
Ethylene	ND		1.0		ug/L			12/22/21 14:08	1
Methane	**0.63**		0.58		ug/L			12/22/21 14:08	1

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	**47**		0.50		mg/L		12/16/21 21:10	12/17/21 20:33	1
Magnesium	**9.3**		0.50		mg/L		12/16/21 21:10	12/17/21 20:33	1
Manganese	ND		0.020		mg/L		12/16/21 21:10	12/17/21 20:33	1
Potassium	**6.0**		3.3		mg/L		12/16/21 21:10	12/17/21 20:33	1
Sodium	**13**		0.50		mg/L		12/16/21 21:10	12/17/21 20:33	1

Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.0074**		0.0010		mg/L		12/16/21 21:07	12/17/21 19:36	1
Antimony	ND		0.00080		mg/L		12/16/21 21:07	12/17/21 19:36	1
Barium	**0.020**		0.0012		mg/L		12/16/21 21:07	12/17/21 19:36	1
Beryllium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:36	1
Cadmium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:36	1
Chromium	**0.0030**		0.00080		mg/L		12/16/21 21:07	12/17/21 19:36	1
Cobalt	**0.00058**		0.00040		mg/L		12/16/21 21:07	12/17/21 19:36	1
Copper	ND		0.0020		mg/L		12/16/21 21:07	12/17/21 19:36	1
Lead	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:36	1
Nickel	ND		0.0030		mg/L		12/16/21 21:07	12/17/21 19:36	1
Selenium	ND		0.0080		mg/L		12/16/21 21:07	12/17/21 19:36	1
Silver	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:36	1
Thallium	ND		0.0010		mg/L		12/16/21 21:07	12/17/21 19:36	1
Vanadium	**0.014**		0.0040		mg/L		12/16/21 21:07	12/17/21 19:36	1
Zinc	ND		0.0070		mg/L		12/16/21 21:07	12/17/21 19:36	1

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.10		mg/L		12/16/21 21:10	01/12/22 12:09	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**19**		1.5		mg/L			12/20/21 15:48	1
Nitrate as N	**6.1**	**H**	0.20		mg/L			12/12/21 15:04	1
Sulfate	**43**		1.5		mg/L			12/20/21 15:48	1
TOC Result 1	**1.1**		1.0		mg/L			12/30/21 08:15	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.50		mg/L		12/17/21 16:25	12/21/21 22:02	1
Alkalinity	**95**		7.0		mg/L			12/17/21 17:21	1
Bicarbonate Alkalinity as CaCO3	**95**		7.0		mg/L			12/17/21 17:21	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-3
Date Collected: 12/10/21 10:35
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-3
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	190		50		mg/L			12/15/21 07:02	1
Total Suspended Solids	ND		2.0		mg/L			12/15/21 19:09	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-4
Date Collected: 12/10/21 11:30
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-4
Matrix: Water

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/17/21 14:28	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/17/21 14:28	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/17/21 14:28	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/17/21 14:28	1
1,1-Dichloroethane	**6.1**		0.20		ug/L			12/17/21 14:28	1
1,1-Dichloroethene	ND		0.20		ug/L			12/17/21 14:28	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/17/21 14:28	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/17/21 14:28	1
1,2-Dibromoethane	ND		0.10		ug/L			12/17/21 14:28	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/17/21 14:28	1
1,2-Dichloroethane	ND		0.20		ug/L			12/17/21 14:28	1
1,2-Dichloropropane	ND		0.20		ug/L			12/17/21 14:28	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/17/21 14:28	1
2-Butanone	ND		10		ug/L			12/17/21 14:28	1
2-Hexanone	ND		3.0		ug/L			12/17/21 14:28	1
4-Methyl-2-pentanone	ND		10		ug/L			12/17/21 14:28	1
Acetone	ND		10		ug/L			12/17/21 14:28	1
Acrylonitrile	ND		10		ug/L			12/17/21 14:28	1
Benzene	ND		0.20		ug/L			12/17/21 14:28	1
Bromochloromethane	ND		0.20		ug/L			12/17/21 14:28	1
Bromodichloromethane	ND		0.20		ug/L			12/17/21 14:28	1
Bromoform	ND		0.50		ug/L			12/17/21 14:28	1
Bromomethane	ND		0.50		ug/L			12/17/21 14:28	1
Carbon disulfide	**0.46**		0.30		ug/L			12/17/21 14:28	1
Carbon tetrachloride	ND		0.20		ug/L			12/17/21 14:28	1
Chlorobenzene	ND		0.20		ug/L			12/17/21 14:28	1
Chloroethane	ND		0.50		ug/L			12/17/21 14:28	1
Chloroform	**0.34**		0.20		ug/L			12/17/21 14:28	1
Chloromethane	ND		0.50		ug/L			12/17/21 14:28	1
cis-1,2-Dichloroethene	**4.8**		0.20		ug/L			12/17/21 14:28	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 14:28	1
Dibromochloromethane	ND		0.20		ug/L			12/17/21 14:28	1
Dibromomethane	ND		0.20		ug/L			12/17/21 14:28	1
Ethylbenzene	ND		0.20		ug/L			12/17/21 14:28	1
Iodomethane	ND		0.50		ug/L			12/17/21 14:28	1
Methylene Chloride	ND		5.0		ug/L			12/17/21 14:28	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/17/21 14:28	1
o-Xylene	ND		0.50		ug/L			12/17/21 14:28	1
Styrene	ND		1.0		ug/L			12/17/21 14:28	1
Tetrachloroethene	ND		0.50		ug/L			12/17/21 14:28	1
Toluene	ND		0.20		ug/L			12/17/21 14:28	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/17/21 14:28	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 14:28	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/17/21 14:28	1
Trichloroethene	**0.48**		0.20		ug/L			12/17/21 14:28	1
Trichlorofluoromethane	**1.3**		0.50		ug/L			12/17/21 14:28	1
Vinyl acetate	ND		2.0		ug/L			12/17/21 14:28	1
Vinyl chloride	ND		0.020		ug/L			12/17/21 14:28	1
Xylenes, Total	ND		0.50		ug/L			12/17/21 14:28	1

Client Sample ID: MW-4

Date Collected: 12/10/21 11:30
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-4

Matrix: Water

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*103*		*80 - 120*		*12/17/21 14:28*	*1*
4-Bromofluorobenzene (Surr)	*88*		*80 - 120*		*12/17/21 14:28*	*1*
Dibromofluoromethane (Surr)	*100*		*80 - 120*		*12/17/21 14:28*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*		*12/17/21 14:28*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/22/21 14:20	1
Ethylene	ND		1.0		ug/L			12/22/21 14:20	1
Methane	**0.65**		0.58		ug/L			12/22/21 14:20	1

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	**88**		0.50		mg/L		12/16/21 21:10	12/17/21 20:36	1
Magnesium	**19**		0.50		mg/L		12/16/21 21:10	12/17/21 20:36	1
Manganese	ND		0.020		mg/L		12/16/21 21:10	12/17/21 20:36	1
Potassium	**7.2**		3.3		mg/L		12/16/21 21:10	12/17/21 20:36	1
Sodium	**15**		0.50		mg/L		12/16/21 21:10	12/17/21 20:36	1

Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.0038**		0.0010		mg/L		12/16/21 21:07	12/17/21 19:40	1
Antimony	ND		0.00080		mg/L		12/16/21 21:07	12/17/21 19:40	1
Barium	**0.046**		0.0012		mg/L		12/16/21 21:07	12/17/21 19:40	1
Beryllium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:40	1
Cadmium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:40	1
Chromium	**0.0017**		0.00080		mg/L		12/16/21 21:07	12/17/21 19:40	1
Cobalt	**0.0018**		0.00040		mg/L		12/16/21 21:07	12/17/21 19:40	1
Copper	ND		0.0020		mg/L		12/16/21 21:07	12/17/21 19:40	1
Lead	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:40	1
Nickel	ND		0.0030		mg/L		12/16/21 21:07	12/17/21 19:40	1
Selenium	ND		0.0080		mg/L		12/16/21 21:07	12/17/21 19:40	1
Silver	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:40	1
Thallium	ND		0.0010		mg/L		12/16/21 21:07	12/17/21 19:40	1
Vanadium	**0.011**		0.0040		mg/L		12/16/21 21:07	12/17/21 19:40	1
Zinc	ND		0.0070		mg/L		12/16/21 21:07	12/17/21 19:40	1

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.10		mg/L		12/16/21 21:10	01/12/22 12:13	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**14**		1.5		mg/L			12/20/21 16:00	1
Nitrate as N	**5.1**	**H**	0.20		mg/L			12/12/21 14:52	1
Sulfate	**32**		1.5		mg/L			12/20/21 16:00	1
TOC Result 1	ND		1.0		mg/L			12/30/21 08:32	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.50		mg/L		12/17/21 16:25	12/21/21 22:02	1
Alkalinity	**230**		7.0		mg/L			12/17/21 17:21	1
Bicarbonate Alkalinity as CaCO3	**230**		7.0		mg/L			12/17/21 17:21	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-4
Date Collected: 12/10/21 11:30
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-4
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**300**		50		mg/L			12/15/21 07:02	1
Total Suspended Solids	ND		2.0		mg/L			12/15/21 19:09	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-5

Date Collected: 12/09/21 14:20
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-5

Matrix: Water

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/17/21 17:26	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/17/21 17:26	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/17/21 17:26	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/17/21 17:26	1
1,1-Dichloroethane	**5.3**		0.20		ug/L			12/17/21 17:26	1
1,1-Dichloroethene	ND		0.20		ug/L			12/17/21 17:26	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/17/21 17:26	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/17/21 17:26	1
1,2-Dibromoethane	ND		0.10		ug/L			12/17/21 17:26	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/17/21 17:26	1
1,2-Dichloroethane	**0.56**		0.20		ug/L			12/17/21 17:26	1
1,2-Dichloropropane	**0.40**		0.20		ug/L			12/17/21 17:26	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/17/21 17:26	1
2-Butanone	ND		10		ug/L			12/17/21 17:26	1
2-Hexanone	ND		3.0		ug/L			12/17/21 17:26	1
4-Methyl-2-pentanone	ND		10		ug/L			12/17/21 17:26	1
Acetone	ND		10		ug/L			12/17/21 17:26	1
Acrylonitrile	ND		10		ug/L			12/17/21 17:26	1
Benzene	**0.28**		0.20		ug/L			12/17/21 17:26	1
Bromochloromethane	ND		0.20		ug/L			12/17/21 17:26	1
Bromodichloromethane	ND		0.20		ug/L			12/17/21 17:26	1
Bromoform	ND		0.50		ug/L			12/17/21 17:26	1
Bromomethane	ND		0.50		ug/L			12/17/21 17:26	1
Carbon disulfide	ND		0.30		ug/L			12/17/21 17:26	1
Carbon tetrachloride	ND		0.20		ug/L			12/17/21 17:26	1
Chlorobenzene	ND		0.20		ug/L			12/17/21 17:26	1
Chloroethane	ND		0.50		ug/L			12/17/21 17:26	1
Chloroform	ND		0.20		ug/L			12/17/21 17:26	1
Chloromethane	ND		0.50		ug/L			12/17/21 17:26	1
cis-1,2-Dichloroethene	**30**		0.20		ug/L			12/17/21 17:26	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 17:26	1
Dibromochloromethane	ND		0.20		ug/L			12/17/21 17:26	1
Dibromomethane	ND		0.20		ug/L			12/17/21 17:26	1
Ethylbenzene	ND		0.20		ug/L			12/17/21 17:26	1
Iodomethane	ND		0.50		ug/L			12/17/21 17:26	1
Methylene Chloride	ND		5.0		ug/L			12/17/21 17:26	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/17/21 17:26	1
o-Xylene	ND		0.50		ug/L			12/17/21 17:26	1
Styrene	ND		1.0		ug/L			12/17/21 17:26	1
Tetrachloroethene	**15**		0.50		ug/L			12/17/21 17:26	1
Toluene	ND		0.20		ug/L			12/17/21 17:26	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/17/21 17:26	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 17:26	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/17/21 17:26	1
Trichloroethene	**5.5**		0.20		ug/L			12/17/21 17:26	1
Trichlorofluoromethane	ND		0.50		ug/L			12/17/21 17:26	1
Vinyl acetate	ND		2.0		ug/L			12/17/21 17:26	1
Vinyl chloride	**2.0**		0.020		ug/L			12/17/21 17:26	1
Xylenes, Total	ND		0.50		ug/L			12/17/21 17:26	1

Client Sample ID: MW-5

Date Collected: 12/09/21 14:20
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-5

Matrix: Water

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*80 - 120*		*12/17/21 17:26*	*1*
4-Bromofluorobenzene (Surr)	*92*		*80 - 120*		*12/17/21 17:26*	*1*
Dibromofluoromethane (Surr)	*97*		*80 - 120*		*12/17/21 17:26*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*12/17/21 17:26*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/22/21 14:33	1
Ethylene	ND		1.0		ug/L			12/22/21 14:33	1
Methane	**370**		0.58		ug/L			12/22/21 14:33	1

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	**180**		0.50		mg/L		12/16/21 21:10	12/17/21 20:39	1
Magnesium	**45**		0.50		mg/L		12/16/21 21:10	12/17/21 20:39	1
Manganese	**0.32**		0.020		mg/L		12/16/21 21:10	12/17/21 20:39	1
Potassium	**12**		3.3		mg/L		12/16/21 21:10	12/17/21 20:39	1
Sodium	**26**		0.50		mg/L		12/16/21 21:10	12/17/21 20:39	1

Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.0026**		0.0010		mg/L		12/16/21 21:07	12/17/21 19:44	1
Antimony	ND		0.00080		mg/L		12/16/21 21:07	12/17/21 19:44	1
Barium	**0.10**		0.0012		mg/L		12/16/21 21:07	12/17/21 19:44	1
Beryllium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:44	1
Cadmium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:44	1
Chromium	ND		0.00080		mg/L		12/16/21 21:07	12/17/21 19:44	1
Cobalt	**0.00055**		0.00040		mg/L		12/16/21 21:07	12/17/21 19:44	1
Copper	**0.0028**		0.0020		mg/L		12/16/21 21:07	12/17/21 19:44	1
Lead	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:44	1
Nickel	**0.0031**		0.0030		mg/L		12/16/21 21:07	12/17/21 19:44	1
Selenium	ND		0.0080		mg/L		12/16/21 21:07	12/17/21 19:44	1
Silver	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:44	1
Thallium	ND		0.0010		mg/L		12/16/21 21:07	12/17/21 19:44	1
Vanadium	**0.0074**		0.0040		mg/L		12/16/21 21:07	12/17/21 19:44	1
Zinc	**0.012**		0.0070		mg/L		12/16/21 21:07	12/17/21 19:44	1

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**0.18**		0.10		mg/L		12/16/21 21:10	01/12/22 12:16	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**48**		1.5		mg/L			12/20/21 16:35	1
Nitrate as N	**1.2**	**H**	0.20		mg/L			12/12/21 16:15	1
Sulfate	**84**	**F1**	1.5		mg/L			12/20/21 16:35	1
TOC Result 1	**2.5**		1.0		mg/L			12/30/21 08:50	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.50		mg/L		12/17/21 16:25	12/21/21 22:02	1
Alkalinity	**480**		7.0		mg/L			12/17/21 17:21	1
Bicarbonate Alkalinity as CaCO3	**480**		7.0		mg/L			12/17/21 17:21	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-5
Date Collected: 12/09/21 14:20
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-5
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**770**		50		mg/L			12/15/21 07:02	1
Total Suspended Solids	ND		2.0		mg/L			12/15/21 19:09	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-6

Date Collected: 12/09/21 15:25
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-6

Matrix: Water

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/17/21 17:50	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/17/21 17:50	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/17/21 17:50	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/17/21 17:50	1
1,1-Dichloroethane	**1.5**		0.20		ug/L			12/17/21 17:50	1
1,1-Dichloroethene	ND		0.20		ug/L			12/17/21 17:50	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/17/21 17:50	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/17/21 17:50	1
1,2-Dibromoethane	ND		0.10		ug/L			12/17/21 17:50	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/17/21 17:50	1
1,2-Dichloroethane	**0.26**		0.20		ug/L			12/17/21 17:50	1
1,2-Dichloropropane	**0.39**		0.20		ug/L			12/17/21 17:50	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/17/21 17:50	1
2-Butanone	ND		10		ug/L			12/17/21 17:50	1
2-Hexanone	ND		3.0		ug/L			12/17/21 17:50	1
4-Methyl-2-pentanone	ND		10		ug/L			12/17/21 17:50	1
Acetone	ND		10		ug/L			12/17/21 17:50	1
Acrylonitrile	ND		10		ug/L			12/17/21 17:50	1
Benzene	**0.32**		0.20		ug/L			12/17/21 17:50	1
Bromochloromethane	ND		0.20		ug/L			12/17/21 17:50	1
Bromodichloromethane	ND		0.20		ug/L			12/17/21 17:50	1
Bromoform	ND		0.50		ug/L			12/17/21 17:50	1
Bromomethane	ND		0.50		ug/L			12/17/21 17:50	1
Carbon disulfide	ND		0.30		ug/L			12/17/21 17:50	1
Carbon tetrachloride	ND		0.20		ug/L			12/17/21 17:50	1
Chlorobenzene	ND		0.20		ug/L			12/17/21 17:50	1
Chloroethane	ND		0.50		ug/L			12/17/21 17:50	1
Chloroform	ND		0.20		ug/L			12/17/21 17:50	1
Chloromethane	ND		0.50		ug/L			12/17/21 17:50	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 17:50	1
Dibromochloromethane	ND		0.20		ug/L			12/17/21 17:50	1
Dibromomethane	ND		0.20		ug/L			12/17/21 17:50	1
Ethylbenzene	ND		0.20		ug/L			12/17/21 17:50	1
Iodomethane	ND		0.50		ug/L			12/17/21 17:50	1
Methylene Chloride	ND		5.0		ug/L			12/17/21 17:50	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/17/21 17:50	1
o-Xylene	ND		0.50		ug/L			12/17/21 17:50	1
Styrene	ND		1.0		ug/L			12/17/21 17:50	1
Tetrachloroethene	**26**		0.50		ug/L			12/17/21 17:50	1
Toluene	ND		0.20		ug/L			12/17/21 17:50	1
trans-1,2-Dichloroethene	**0.74**		0.20		ug/L			12/17/21 17:50	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 17:50	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/17/21 17:50	1
Trichloroethene	**12**		0.20		ug/L			12/17/21 17:50	1
Trichlorofluoromethane	ND		0.50		ug/L			12/17/21 17:50	1
Vinyl acetate	ND		2.0		ug/L			12/17/21 17:50	1
Vinyl chloride	**3.1**		0.020		ug/L			12/17/21 17:50	1
Xylenes, Total	ND		0.50		ug/L			12/17/21 17:50	1

Client Sample ID: MW-6

Date Collected: 12/09/21 15:25
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-6

Matrix: Water

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*80 - 120*		*12/17/21 17:50*	*1*
4-Bromofluorobenzene (Surr)	*91*		*80 - 120*		*12/17/21 17:50*	*1*
Dibromofluoromethane (Surr)	*97*		*80 - 120*		*12/17/21 17:50*	*1*
Toluene-d8 (Surr)	*101*		*80 - 120*		*12/17/21 17:50*	*1*

Method: 8260D - Volatile Organic Compounds by GC/MS - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**41**		2.0		ug/L			12/20/21 15:07	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*80 - 120*		*12/20/21 15:07*	*10*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*12/20/21 15:07*	*10*
Dibromofluoromethane (Surr)	*96*		*80 - 120*		*12/20/21 15:07*	*10*
Toluene-d8 (Surr)	*102*		*80 - 120*		*12/20/21 15:07*	*10*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/22/21 14:46	1
Ethylene	ND		1.0		ug/L			12/22/21 14:46	1
Methane (TCD)	**4100**		390		ug/L			12/22/21 14:46	1

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	**170**		0.50		mg/L		12/16/21 21:10	12/17/21 20:43	1
Magnesium	**41**		0.50		mg/L		12/16/21 21:10	12/17/21 20:43	1
Manganese	**0.040**		0.020		mg/L		12/16/21 21:10	12/17/21 20:43	1
Potassium	**12**		3.3		mg/L		12/16/21 21:10	12/17/21 20:43	1
Sodium	**22**		0.50		mg/L		12/16/21 21:10	12/17/21 20:43	1

Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.0015**		0.0010		mg/L		12/16/21 21:07	12/17/21 19:48	1
Antimony	ND		0.00080		mg/L		12/16/21 21:07	12/17/21 19:48	1
Barium	**0.097**		0.0012		mg/L		12/16/21 21:07	12/17/21 19:48	1
Beryllium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:48	1
Cadmium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:48	1
Chromium	**0.010**		0.00080		mg/L		12/16/21 21:07	12/17/21 19:48	1
Cobalt	**0.0091**		0.00040		mg/L		12/16/21 21:07	12/17/21 19:48	1
Copper	ND		0.0020		mg/L		12/16/21 21:07	12/17/21 19:48	1
Lead	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:48	1
Nickel	**0.010**		0.0030		mg/L		12/16/21 21:07	12/17/21 19:48	1
Selenium	ND		0.0080		mg/L		12/16/21 21:07	12/17/21 19:48	1
Silver	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:48	1
Thallium	ND		0.0010		mg/L		12/16/21 21:07	12/17/21 19:48	1
Vanadium	**0.0064**		0.0040		mg/L		12/16/21 21:07	12/17/21 19:48	1
Zinc	ND		0.0070		mg/L		12/16/21 21:07	12/17/21 19:48	1

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**0.24**		0.10		mg/L		12/16/21 21:10	01/12/22 12:20	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-6
Date Collected: 12/09/21 15:25
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-6
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**21**		1.5		mg/L			12/20/21 17:10	1
Nitrate as N	**2.7**	**H**	0.20		mg/L			12/12/21 16:26	1
Sulfate	**53**		1.5		mg/L			12/20/21 17:10	1
TOC Result 1	**1.0**		1.0		mg/L			12/30/21 09:40	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.50		mg/L		12/17/21 16:25	12/21/21 22:02	1
Alkalinity	**470**		7.0		mg/L			12/17/21 17:21	1
Bicarbonate Alkalinity as CaCO3	**470**		7.0		mg/L			12/17/21 17:21	1
Total Dissolved Solids	**690**		50		mg/L			12/15/21 07:02	1
Total Suspended Solids	ND		2.0		mg/L			12/15/21 19:09	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-8

Date Collected: 12/10/21 12:30
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-7

Matrix: Water

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/17/21 18:15	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/17/21 18:15	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/17/21 18:15	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/17/21 18:15	1
1,1-Dichloroethane	**0.22**		0.20		ug/L			12/17/21 18:15	1
1,1-Dichloroethene	ND		0.20		ug/L			12/17/21 18:15	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/17/21 18:15	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/17/21 18:15	1
1,2-Dibromoethane	ND		0.10		ug/L			12/17/21 18:15	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/17/21 18:15	1
1,2-Dichloroethane	ND		0.20		ug/L			12/17/21 18:15	1
1,2-Dichloropropane	ND		0.20		ug/L			12/17/21 18:15	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/17/21 18:15	1
2-Butanone	ND		10		ug/L			12/17/21 18:15	1
2-Hexanone	ND		3.0		ug/L			12/17/21 18:15	1
4-Methyl-2-pentanone	ND		10		ug/L			12/17/21 18:15	1
Acetone	ND		10		ug/L			12/17/21 18:15	1
Acrylonitrile	ND		10		ug/L			12/17/21 18:15	1
Benzene	ND		0.20		ug/L			12/17/21 18:15	1
Bromochloromethane	ND		0.20		ug/L			12/17/21 18:15	1
Bromodichloromethane	**0.79**		0.20		ug/L			12/17/21 18:15	1
Bromoform	ND		0.50		ug/L			12/17/21 18:15	1
Bromomethane	ND		0.50		ug/L			12/17/21 18:15	1
Carbon disulfide	ND		0.30		ug/L			12/17/21 18:15	1
Carbon tetrachloride	ND		0.20		ug/L			12/17/21 18:15	1
Chlorobenzene	ND		0.20		ug/L			12/17/21 18:15	1
Chloroethane	ND		0.50		ug/L			12/17/21 18:15	1
Chloroform	**12**		0.20		ug/L			12/17/21 18:15	1
Chloromethane	ND		0.50		ug/L			12/17/21 18:15	1
cis-1,2-Dichloroethene	ND		0.20		ug/L			12/17/21 18:15	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 18:15	1
Dibromochloromethane	ND		0.20		ug/L			12/17/21 18:15	1
Dibromomethane	ND		0.20		ug/L			12/17/21 18:15	1
Ethylbenzene	ND		0.20		ug/L			12/17/21 18:15	1
Iodomethane	ND		0.50		ug/L			12/17/21 18:15	1
Methylene Chloride	ND		5.0		ug/L			12/17/21 18:15	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/17/21 18:15	1
o-Xylene	ND		0.50		ug/L			12/17/21 18:15	1
Styrene	ND		1.0		ug/L			12/17/21 18:15	1
Tetrachloroethene	ND		0.50		ug/L			12/17/21 18:15	1
Toluene	ND		0.20		ug/L			12/17/21 18:15	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/17/21 18:15	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 18:15	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/17/21 18:15	1
Trichloroethene	ND		0.20		ug/L			12/17/21 18:15	1
Trichlorofluoromethane	ND		0.50		ug/L			12/17/21 18:15	1
Vinyl acetate	ND		2.0		ug/L			12/17/21 18:15	1
Vinyl chloride	ND		0.020		ug/L			12/17/21 18:15	1
Xylenes, Total	ND		0.50		ug/L			12/17/21 18:15	1

Client Sample ID: MW-8

Date Collected: 12/10/21 12:30
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-7

Matrix: Water

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*103*		*80 - 120*		*12/17/21 18:15*	*1*
4-Bromofluorobenzene (Surr)	*91*		*80 - 120*		*12/17/21 18:15*	*1*
Dibromofluoromethane (Surr)	*101*		*80 - 120*		*12/17/21 18:15*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*12/17/21 18:15*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/22/21 14:59	1
Ethylene	ND		1.0		ug/L			12/22/21 14:59	1
Methane	**1.4**		0.58		ug/L			12/22/21 14:59	1

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	**73**		0.50		mg/L		12/16/21 21:10	12/17/21 20:46	1
Magnesium	**15**		0.50		mg/L		12/16/21 21:10	12/17/21 20:46	1
Manganese	ND		0.020		mg/L		12/16/21 21:10	12/17/21 20:46	1
Potassium	**7.3**		3.3		mg/L		12/16/21 21:10	12/17/21 20:46	1
Sodium	**21**		0.50		mg/L		12/16/21 21:10	12/17/21 20:46	1

Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.0087**		0.0010		mg/L		12/16/21 21:07	12/17/21 19:51	1
Antimony	ND		0.00080		mg/L		12/16/21 21:07	12/17/21 19:51	1
Barium	**0.048**		0.0012		mg/L		12/16/21 21:07	12/17/21 19:51	1
Beryllium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:51	1
Cadmium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:51	1
Chromium	**0.0049**		0.00080		mg/L		12/16/21 21:07	12/17/21 19:51	1
Cobalt	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:51	1
Copper	ND		0.0020		mg/L		12/16/21 21:07	12/17/21 19:51	1
Lead	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:51	1
Nickel	ND		0.0030		mg/L		12/16/21 21:07	12/17/21 19:51	1
Selenium	ND		0.0080		mg/L		12/16/21 21:07	12/17/21 19:51	1
Silver	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:51	1
Thallium	ND		0.0010		mg/L		12/16/21 21:07	12/17/21 19:51	1
Vanadium	**0.016**		0.0040		mg/L		12/16/21 21:07	12/17/21 19:51	1
Zinc	ND		0.0070		mg/L		12/16/21 21:07	12/17/21 19:51	1

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.10		mg/L		12/16/21 21:10	01/12/22 12:24	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**66**		1.5		mg/L			12/20/21 17:22	1
Nitrate as N	**14**	**H**	0.40		mg/L			12/12/21 17:25	2
Sulfate	**47**		1.5		mg/L			12/20/21 17:22	1
TOC Result 1	**1.2**		1.0		mg/L			12/30/21 10:03	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.50		mg/L		12/17/21 16:25	12/21/21 22:02	1
Alkalinity	**120**		7.0		mg/L			12/17/21 17:21	1
Bicarbonate Alkalinity as CaCO3	**120**		7.0		mg/L			12/17/21 17:21	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-8
Date Collected: 12/10/21 12:30
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-7
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**370**		50		mg/L			12/15/21 07:02	1
Total Suspended Solids	ND		2.0		mg/L			12/15/21 19:09	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-9
Date Collected: 12/10/21 09:30
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-8
Matrix: Water

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/17/21 18:39	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/17/21 18:39	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/17/21 18:39	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/17/21 18:39	1
1,1-Dichloroethane	**2.6**		0.20		ug/L			12/17/21 18:39	1
1,1-Dichloroethene	ND		0.20		ug/L			12/17/21 18:39	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/17/21 18:39	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/17/21 18:39	1
1,2-Dibromoethane	ND		0.10		ug/L			12/17/21 18:39	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/17/21 18:39	1
1,2-Dichloroethane	ND		0.20		ug/L			12/17/21 18:39	1
1,2-Dichloropropane	ND		0.20		ug/L			12/17/21 18:39	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/17/21 18:39	1
2-Butanone	ND		10		ug/L			12/17/21 18:39	1
2-Hexanone	ND		3.0		ug/L			12/17/21 18:39	1
4-Methyl-2-pentanone	ND		10		ug/L			12/17/21 18:39	1
Acetone	ND		10		ug/L			12/17/21 18:39	1
Acrylonitrile	ND		10		ug/L			12/17/21 18:39	1
Benzene	ND		0.20		ug/L			12/17/21 18:39	1
Bromochloromethane	ND		0.20		ug/L			12/17/21 18:39	1
Bromodichloromethane	ND		0.20		ug/L			12/17/21 18:39	1
Bromoform	ND		0.50		ug/L			12/17/21 18:39	1
Bromomethane	ND		0.50		ug/L			12/17/21 18:39	1
Carbon disulfide	ND		0.30		ug/L			12/17/21 18:39	1
Carbon tetrachloride	ND		0.20		ug/L			12/17/21 18:39	1
Chlorobenzene	ND		0.20		ug/L			12/17/21 18:39	1
Chloroethane	ND		0.50		ug/L			12/17/21 18:39	1
Chloroform	**0.29**		0.20		ug/L			12/17/21 18:39	1
Chloromethane	ND		0.50		ug/L			12/17/21 18:39	1
cis-1,2-Dichloroethene	**14**		0.20		ug/L			12/17/21 18:39	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 18:39	1
Dibromochloromethane	ND		0.20		ug/L			12/17/21 18:39	1
Dibromomethane	ND		0.20		ug/L			12/17/21 18:39	1
Ethylbenzene	ND		0.20		ug/L			12/17/21 18:39	1
Iodomethane	ND		0.50		ug/L			12/17/21 18:39	1
Methylene Chloride	ND		5.0		ug/L			12/17/21 18:39	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/17/21 18:39	1
o-Xylene	ND		0.50		ug/L			12/17/21 18:39	1
Styrene	ND		1.0		ug/L			12/17/21 18:39	1
Tetrachloroethene	**13**		0.50		ug/L			12/17/21 18:39	1
Toluene	ND		0.20		ug/L			12/17/21 18:39	1
trans-1,2-Dichloroethene	**0.49**		0.20		ug/L			12/17/21 18:39	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 18:39	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/17/21 18:39	1
Trichloroethene	**5.4**		0.20		ug/L			12/17/21 18:39	1
Trichlorofluoromethane	ND		0.50		ug/L			12/17/21 18:39	1
Vinyl acetate	ND		2.0		ug/L			12/17/21 18:39	1
Vinyl chloride	ND		0.020		ug/L			12/17/21 18:39	1
Xylenes, Total	ND		0.50		ug/L			12/17/21 18:39	1

Client Sample ID: MW-9

Date Collected: 12/10/21 09:30
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-8

Matrix: Water

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*80 - 120*		*12/17/21 18:39*	*1*
4-Bromofluorobenzene (Surr)	*89*		*80 - 120*		*12/17/21 18:39*	*1*
Dibromofluoromethane (Surr)	*99*		*80 - 120*		*12/17/21 18:39*	*1*
Toluene-d8 (Surr)	*101*		*80 - 120*		*12/17/21 18:39*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/22/21 15:12	1
Ethylene	ND		1.0		ug/L			12/22/21 15:12	1
Methane	**3.1**		0.58		ug/L			12/22/21 15:12	1

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	**150**		0.50		mg/L		12/16/21 21:10	12/17/21 20:49	1
Magnesium	**33**		0.50		mg/L		12/16/21 21:10	12/17/21 20:49	1
Manganese	ND		0.020		mg/L		12/16/21 21:10	12/17/21 20:49	1
Potassium	**9.1**		3.3		mg/L		12/16/21 21:10	12/17/21 20:49	1
Sodium	**23**		0.50		mg/L		12/16/21 21:10	12/17/21 20:49	1

Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.0016**		0.0010		mg/L		12/16/21 21:07	12/17/21 19:55	1
Antimony	ND		0.00080		mg/L		12/16/21 21:07	12/17/21 19:55	1
Barium	**0.076**		0.0012		mg/L		12/16/21 21:07	12/17/21 19:55	1
Beryllium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:55	1
Cadmium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:55	1
Chromium	**0.0030**		0.00080		mg/L		12/16/21 21:07	12/17/21 19:55	1
Cobalt	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:55	1
Copper	ND		0.0020		mg/L		12/16/21 21:07	12/17/21 19:55	1
Lead	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:55	1
Nickel	ND		0.0030		mg/L		12/16/21 21:07	12/17/21 19:55	1
Selenium	ND		0.0080		mg/L		12/16/21 21:07	12/17/21 19:55	1
Silver	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 19:55	1
Thallium	ND		0.0010		mg/L		12/16/21 21:07	12/17/21 19:55	1
Vanadium	**0.0065**		0.0040		mg/L		12/16/21 21:07	12/17/21 19:55	1
Zinc	ND		0.0070		mg/L		12/16/21 21:07	12/17/21 19:55	1

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**0.13**		0.10		mg/L		12/16/21 21:10	01/12/22 12:28	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**63**		1.5		mg/L			12/20/21 17:34	1
Nitrate as N	**7.0**	**H**	0.20		mg/L			12/12/21 15:16	1
Sulfate	**86**		1.5		mg/L			12/20/21 17:34	1
TOC Result 1	**1.6**		1.0		mg/L			12/30/21 10:18	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.50		mg/L		12/17/21 16:25	12/21/21 22:02	1
Alkalinity	**330**		7.0		mg/L			12/17/21 17:21	1
Bicarbonate Alkalinity as CaCO3	**330**		7.0		mg/L			12/17/21 17:21	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-9
Date Collected: 12/10/21 09:30
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-8
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**650**		50		mg/L			12/15/21 07:02	1
Total Suspended Solids	ND		2.0		mg/L			12/15/21 19:09	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-10
Date Collected: 12/09/21 13:35
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-9
Matrix: Water

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/17/21 19:04	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/17/21 19:04	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/17/21 19:04	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/17/21 19:04	1
1,1-Dichloroethane	**6.3**		0.20		ug/L			12/17/21 19:04	1
1,1-Dichloroethene	ND		0.20		ug/L			12/17/21 19:04	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/17/21 19:04	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/17/21 19:04	1
1,2-Dibromoethane	ND		0.10		ug/L			12/17/21 19:04	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/17/21 19:04	1
1,2-Dichloroethane	ND		0.20		ug/L			12/17/21 19:04	1
1,2-Dichloropropane	**0.20**		0.20		ug/L			12/17/21 19:04	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/17/21 19:04	1
2-Butanone	ND		10		ug/L			12/17/21 19:04	1
2-Hexanone	ND		3.0		ug/L			12/17/21 19:04	1
4-Methyl-2-pentanone	ND		10		ug/L			12/17/21 19:04	1
Acetone	ND		10		ug/L			12/17/21 19:04	1
Acrylonitrile	ND		10		ug/L			12/17/21 19:04	1
Benzene	ND		0.20		ug/L			12/17/21 19:04	1
Bromochloromethane	ND		0.20		ug/L			12/17/21 19:04	1
Bromodichloromethane	ND		0.20		ug/L			12/17/21 19:04	1
Bromoform	ND		0.50		ug/L			12/17/21 19:04	1
Bromomethane	ND		0.50		ug/L			12/17/21 19:04	1
Carbon disulfide	ND		0.30		ug/L			12/17/21 19:04	1
Carbon tetrachloride	ND		0.20		ug/L			12/17/21 19:04	1
Chlorobenzene	ND		0.20		ug/L			12/17/21 19:04	1
Chloroethane	ND		0.50		ug/L			12/17/21 19:04	1
Chloroform	**0.57**		0.20		ug/L			12/17/21 19:04	1
Chloromethane	ND		0.50		ug/L			12/17/21 19:04	1
cis-1,2-Dichloroethene	**18**		0.20		ug/L			12/17/21 19:04	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 19:04	1
Dibromochloromethane	ND		0.20		ug/L			12/17/21 19:04	1
Dibromomethane	ND		0.20		ug/L			12/17/21 19:04	1
Ethylbenzene	ND		0.20		ug/L			12/17/21 19:04	1
Iodomethane	ND		0.50		ug/L			12/17/21 19:04	1
Methylene Chloride	ND		5.0		ug/L			12/17/21 19:04	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/17/21 19:04	1
o-Xylene	ND		0.50		ug/L			12/17/21 19:04	1
Styrene	ND		1.0		ug/L			12/17/21 19:04	1
Tetrachloroethene	**6.3**		0.50		ug/L			12/17/21 19:04	1
Toluene	ND		0.20		ug/L			12/17/21 19:04	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/17/21 19:04	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 19:04	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/17/21 19:04	1
Trichloroethene	**3.3**		0.20		ug/L			12/17/21 19:04	1
Trichlorofluoromethane	ND		0.50		ug/L			12/17/21 19:04	1
Vinyl acetate	ND		2.0		ug/L			12/17/21 19:04	1
Vinyl chloride	**0.34**		0.020		ug/L			12/17/21 19:04	1
Xylenes, Total	ND		0.50		ug/L			12/17/21 19:04	1

Client Sample ID: MW-10

Date Collected: 12/09/21 13:35
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-9

Matrix: Water

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*80 - 120*		*12/17/21 19:04*	*1*
4-Bromofluorobenzene (Surr)	*90*		*80 - 120*		*12/17/21 19:04*	*1*
Dibromofluoromethane (Surr)	*97*		*80 - 120*		*12/17/21 19:04*	*1*
Toluene-d8 (Surr)	*104*		*80 - 120*		*12/17/21 19:04*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/22/21 15:25	1
Ethylene	ND		1.0		ug/L			12/22/21 15:25	1
Methane (TCD)	**1700**		390		ug/L			12/22/21 15:25	1

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	**200**		0.50		mg/L		12/16/21 21:10	12/17/21 20:53	1
Magnesium	**43**		0.50		mg/L		12/16/21 21:10	12/17/21 20:53	1
Manganese	**0.038**		0.020		mg/L		12/16/21 21:10	12/17/21 20:53	1
Potassium	**12**		3.3		mg/L		12/16/21 21:10	12/17/21 20:53	1
Sodium	**21**		0.50		mg/L		12/16/21 21:10	12/17/21 20:53	1

Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.0013**		0.0010		mg/L		12/16/21 21:07	12/17/21 20:15	1
Antimony	ND		0.00080		mg/L		12/16/21 21:07	12/17/21 20:15	1
Barium	**0.11**		0.0012		mg/L		12/16/21 21:07	12/17/21 20:15	1
Beryllium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 20:15	1
Cadmium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 20:15	1
Chromium	ND		0.00080		mg/L		12/16/21 21:07	12/17/21 20:15	1
Cobalt	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 20:15	1
Copper	ND		0.0020		mg/L		12/16/21 21:07	12/17/21 20:15	1
Lead	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 20:15	1
Nickel	ND		0.0030		mg/L		12/16/21 21:07	12/17/21 20:15	1
Selenium	ND		0.0080		mg/L		12/16/21 21:07	12/17/21 20:15	1
Silver	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 20:15	1
Thallium	ND		0.0010		mg/L		12/16/21 21:07	12/17/21 20:15	1
Vanadium	**0.0065**		0.0040		mg/L		12/16/21 21:07	12/17/21 20:15	1
Zinc	ND		0.0070		mg/L		12/16/21 21:07	12/17/21 20:15	1

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**0.17**		0.10		mg/L		12/16/21 21:10	01/12/22 12:47	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**30**		1.5		mg/L			12/20/21 17:45	1
Nitrate as N	**4.0**	**H**	0.20		mg/L			12/12/21 16:38	1
Sulfate	**85**		1.5		mg/L			12/20/21 17:45	1
TOC Result 1	**3.1**		1.0		mg/L			12/30/21 10:41	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.50		mg/L		12/17/21 16:25	12/21/21 22:02	1
Alkalinity	**490**		7.0		mg/L			12/17/21 17:21	1
Bicarbonate Alkalinity as CaCO3	**490**		7.0		mg/L			12/17/21 17:21	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-10
Date Collected: 12/09/21 13:35
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-9
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**890**		50		mg/L			12/15/21 07:02	1
Total Suspended Solids	ND		2.0		mg/L			12/14/21 23:04	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-11
Date Collected: 12/09/21 12:40
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-10
Matrix: Water

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/17/21 19:28	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/17/21 19:28	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/17/21 19:28	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/17/21 19:28	1
1,1-Dichloroethane	ND		0.20		ug/L			12/17/21 19:28	1
1,1-Dichloroethene	ND		0.20		ug/L			12/17/21 19:28	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/17/21 19:28	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/17/21 19:28	1
1,2-Dibromoethane	ND		0.10		ug/L			12/17/21 19:28	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/17/21 19:28	1
1,2-Dichloroethane	ND		0.20		ug/L			12/17/21 19:28	1
1,2-Dichloropropane	ND		0.20		ug/L			12/17/21 19:28	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/17/21 19:28	1
2-Butanone	ND		10		ug/L			12/17/21 19:28	1
2-Hexanone	ND		3.0		ug/L			12/17/21 19:28	1
4-Methyl-2-pentanone	ND		10		ug/L			12/17/21 19:28	1
Acetone	ND		10		ug/L			12/17/21 19:28	1
Acrylonitrile	ND		10		ug/L			12/17/21 19:28	1
Benzene	ND		0.20		ug/L			12/17/21 19:28	1
Bromochloromethane	ND		0.20		ug/L			12/17/21 19:28	1
Bromodichloromethane	ND		0.20		ug/L			12/17/21 19:28	1
Bromoform	ND		0.50		ug/L			12/17/21 19:28	1
Bromomethane	ND		0.50		ug/L			12/17/21 19:28	1
Carbon disulfide	ND		0.30		ug/L			12/17/21 19:28	1
Carbon tetrachloride	ND		0.20		ug/L			12/17/21 19:28	1
Chlorobenzene	ND		0.20		ug/L			12/17/21 19:28	1
Chloroethane	ND		0.50		ug/L			12/17/21 19:28	1
Chloroform	ND		0.20		ug/L			12/17/21 19:28	1
Chloromethane	ND		0.50		ug/L			12/17/21 19:28	1
cis-1,2-Dichloroethene	ND		0.20		ug/L			12/17/21 19:28	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 19:28	1
Dibromochloromethane	ND		0.20		ug/L			12/17/21 19:28	1
Dibromomethane	ND		0.20		ug/L			12/17/21 19:28	1
Ethylbenzene	ND		0.20		ug/L			12/17/21 19:28	1
Iodomethane	ND		0.50		ug/L			12/17/21 19:28	1
Methylene Chloride	ND		5.0		ug/L			12/17/21 19:28	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/17/21 19:28	1
o-Xylene	ND		0.50		ug/L			12/17/21 19:28	1
Styrene	ND		1.0		ug/L			12/17/21 19:28	1
Tetrachloroethene	ND		0.50		ug/L			12/17/21 19:28	1
Toluene	ND		0.20		ug/L			12/17/21 19:28	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/17/21 19:28	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 19:28	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/17/21 19:28	1
Trichloroethene	ND		0.20		ug/L			12/17/21 19:28	1
Trichlorofluoromethane	ND		0.50		ug/L			12/17/21 19:28	1
Vinyl acetate	ND		2.0		ug/L			12/17/21 19:28	1
Vinyl chloride	ND		0.020		ug/L			12/17/21 19:28	1
Xylenes, Total	ND		0.50		ug/L			12/17/21 19:28	1

Client Sample ID: MW-11

Date Collected: 12/09/21 12:40
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-10

Matrix: Water

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*106*		*80 - 120*		*12/17/21 19:28*	*1*
4-Bromofluorobenzene (Surr)	*89*		*80 - 120*		*12/17/21 19:28*	*1*
Dibromofluoromethane (Surr)	*102*		*80 - 120*		*12/17/21 19:28*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*12/17/21 19:28*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/22/21 15:38	1
Ethylene	ND		1.0		ug/L			12/22/21 15:38	1
Methane	**51**		0.58		ug/L			12/22/21 15:38	1

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	**260**		0.50		mg/L		12/16/21 21:10	12/17/21 20:56	1
Magnesium	**52**		0.50		mg/L		12/16/21 21:10	12/17/21 20:56	1
Manganese	ND		0.020		mg/L		12/16/21 21:10	12/17/21 20:56	1
Potassium	**12**		3.3		mg/L		12/16/21 21:10	12/17/21 20:56	1
Sodium	**20**		0.50		mg/L		12/16/21 21:10	12/17/21 20:56	1

Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.0039**		0.0010		mg/L		12/16/21 21:07	12/17/21 20:18	1
Antimony	ND		0.00080		mg/L		12/16/21 21:07	12/17/21 20:18	1
Barium	**0.092**		0.0012		mg/L		12/16/21 21:07	12/17/21 20:18	1
Beryllium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 20:18	1
Cadmium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 20:18	1
Chromium	**0.0030**		0.00080		mg/L		12/16/21 21:07	12/17/21 20:18	1
Cobalt	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 20:18	1
Copper	ND		0.0020		mg/L		12/16/21 21:07	12/17/21 20:18	1
Lead	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 20:18	1
Nickel	ND		0.0030		mg/L		12/16/21 21:07	12/17/21 20:18	1
Selenium	ND		0.0080		mg/L		12/16/21 21:07	12/17/21 20:18	1
Silver	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 20:18	1
Thallium	ND		0.0010		mg/L		12/16/21 21:07	12/17/21 20:18	1
Vanadium	**0.0092**		0.0040		mg/L		12/16/21 21:07	12/17/21 20:18	1
Zinc	ND		0.0070		mg/L		12/16/21 21:07	12/17/21 20:18	1

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**0.23**		0.10		mg/L		12/16/21 21:10	01/12/22 12:51	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**210**		7.5		mg/L			12/22/21 11:03	5
Nitrate as N	**40**	**H**	1.0		mg/L			12/12/21 16:50	5
Sulfate	**320**		7.5		mg/L			12/22/21 11:03	5
TOC Result 1	**4.4**		1.0		mg/L			12/30/21 10:57	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.50		mg/L		12/17/21 16:25	12/21/21 22:02	1
Alkalinity	**160**		7.0		mg/L			12/17/21 17:21	1
Bicarbonate Alkalinity as CaCO3	**160**		7.0		mg/L			12/17/21 17:21	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-11
Date Collected: 12/09/21 12:40
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-10
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**1300**		50		mg/L			12/15/21 07:02	1
Total Suspended Solids	ND		2.0		mg/L			12/14/21 23:04	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-12
Date Collected: 12/10/21 13:40
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-11
Matrix: Water

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/17/21 15:49	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/17/21 15:49	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/17/21 15:49	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/17/21 15:49	1
1,1-Dichloroethane	**1.7**		0.20		ug/L			12/17/21 15:49	1
1,1-Dichloroethene	ND		0.20		ug/L			12/17/21 15:49	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/17/21 15:49	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/17/21 15:49	1
1,2-Dibromoethane	ND		0.10		ug/L			12/17/21 15:49	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/17/21 15:49	1
1,2-Dichloroethane	ND		0.20		ug/L			12/17/21 15:49	1
1,2-Dichloropropane	ND		0.20		ug/L			12/17/21 15:49	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/17/21 15:49	1
2-Butanone	ND		10		ug/L			12/17/21 15:49	1
2-Hexanone	ND		3.0		ug/L			12/17/21 15:49	1
4-Methyl-2-pentanone	ND		10		ug/L			12/17/21 15:49	1
Acetone	ND		10		ug/L			12/17/21 15:49	1
Acrylonitrile	ND		10		ug/L			12/17/21 15:49	1
Benzene	ND		0.20		ug/L			12/17/21 15:49	1
Bromochloromethane	ND		0.20		ug/L			12/17/21 15:49	1
Bromodichloromethane	ND		0.20		ug/L			12/17/21 15:49	1
Bromoform	ND		0.50		ug/L			12/17/21 15:49	1
Bromomethane	ND		0.50		ug/L			12/17/21 15:49	1
Carbon disulfide	**0.81**		0.30		ug/L			12/17/21 15:49	1
Carbon tetrachloride	ND		0.20		ug/L			12/17/21 15:49	1
Chlorobenzene	ND		0.20		ug/L			12/17/21 15:49	1
Chloroethane	ND		0.50		ug/L			12/17/21 15:49	1
Chloroform	**0.32**		0.20		ug/L			12/17/21 15:49	1
Chloromethane	ND		0.50		ug/L			12/17/21 15:49	1
cis-1,2-Dichloroethene	**1.2**		0.20		ug/L			12/17/21 15:49	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 15:49	1
Dibromochloromethane	ND		0.20		ug/L			12/17/21 15:49	1
Dibromomethane	ND		0.20		ug/L			12/17/21 15:49	1
Ethylbenzene	ND		0.20		ug/L			12/17/21 15:49	1
Iodomethane	ND		0.50		ug/L			12/17/21 15:49	1
Methylene Chloride	ND		5.0		ug/L			12/17/21 15:49	1
m-Xylene & p-Xylene	ND	F1	0.50		ug/L			12/17/21 15:49	1
o-Xylene	ND		0.50		ug/L			12/17/21 15:49	1
Styrene	ND		1.0		ug/L			12/17/21 15:49	1
Tetrachloroethene	ND		0.50		ug/L			12/17/21 15:49	1
Toluene	ND		0.20		ug/L			12/17/21 15:49	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/17/21 15:49	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 15:49	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/17/21 15:49	1
Trichloroethene	ND		0.20		ug/L			12/17/21 15:49	1
Trichlorofluoromethane	ND		0.50		ug/L			12/17/21 15:49	1
Vinyl acetate	ND		2.0		ug/L			12/17/21 15:49	1
Vinyl chloride	ND		0.020		ug/L			12/17/21 15:49	1
Xylenes, Total	ND	F1	0.50		ug/L			12/17/21 15:49	1

Client Sample ID: MW-12

Date Collected: 12/10/21 13:40
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-11

Matrix: Water

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*94*		*80 - 120*		*12/17/21 15:49*	*1*
4-Bromofluorobenzene (Surr)	*92*		*80 - 120*		*12/17/21 15:49*	*1*
Dibromofluoromethane (Surr)	*97*		*80 - 120*		*12/17/21 15:49*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*12/17/21 15:49*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/22/21 16:24	1
Ethylene	ND		1.0		ug/L			12/22/21 16:24	1
Methane	**0.69**		0.58		ug/L			12/22/21 16:24	1

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	**63**		0.50		mg/L		12/16/21 21:10	12/17/21 21:07	1
Magnesium	**12**		0.50		mg/L		12/16/21 21:10	12/17/21 21:07	1
Manganese	ND		0.020		mg/L		12/16/21 21:10	12/17/21 21:07	1
Potassium	**7.7**		3.3		mg/L		12/16/21 21:10	12/17/21 21:07	1
Sodium	**20**		0.50		mg/L		12/16/21 21:10	12/17/21 21:07	1

Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.0060**		0.0010		mg/L		12/16/21 21:07	12/17/21 20:22	1
Antimony	ND		0.00080		mg/L		12/16/21 21:07	12/17/21 20:22	1
Barium	**0.056**		0.0012		mg/L		12/16/21 21:07	12/17/21 20:22	1
Beryllium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 20:22	1
Cadmium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 20:22	1
Chromium	**0.0070**		0.00080		mg/L		12/16/21 21:07	12/17/21 20:22	1
Cobalt	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 20:22	1
Copper	**0.0047**		0.0020		mg/L		12/16/21 21:07	12/17/21 20:22	1
Lead	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 20:22	1
Nickel	**0.0040**		0.0030		mg/L		12/16/21 21:07	12/17/21 20:22	1
Selenium	ND		0.0080		mg/L		12/16/21 21:07	12/17/21 20:22	1
Silver	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 20:22	1
Thallium	ND		0.0010		mg/L		12/16/21 21:07	12/17/21 20:22	1
Vanadium	**0.013**		0.0040		mg/L		12/16/21 21:07	12/17/21 20:22	1
Zinc	ND		0.0070		mg/L		12/16/21 21:07	12/17/21 20:22	1

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.10		mg/L		12/16/21 21:10	01/12/22 12:55	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**14**		1.5		mg/L			12/20/21 18:09	1
Nitrate as N	**5.2**	**H**	0.20		mg/L			12/12/21 13:54	1
Sulfate	**35**		1.5		mg/L			12/20/21 18:09	1
TOC Result 1	ND		1.0		mg/L			12/31/21 09:39	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.50		mg/L		12/17/21 16:25	12/21/21 22:02	1
Alkalinity	**180**		7.0		mg/L			12/17/21 17:21	1
Bicarbonate Alkalinity as CaCO3	**180**		7.0		mg/L			12/17/21 17:21	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-12
Date Collected: 12/10/21 13:40
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-11
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	340		50		mg/L			12/15/21 07:02	1
Total Suspended Solids	13		2.0		mg/L			12/15/21 19:09	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-21
Date Collected: 12/10/21 07:00
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-12
Matrix: Water

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/18/21 19:31	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/18/21 19:31	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/18/21 19:31	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/18/21 19:31	1
1,1-Dichloroethane	**1.6**		0.20		ug/L			12/18/21 19:31	1
1,1-Dichloroethene	ND		0.20		ug/L			12/18/21 19:31	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/18/21 19:31	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/18/21 19:31	1
1,2-Dibromoethane	ND		0.10		ug/L			12/18/21 19:31	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/18/21 19:31	1
1,2-Dichloroethane	ND		0.20		ug/L			12/18/21 19:31	1
1,2-Dichloropropane	ND		0.20		ug/L			12/18/21 19:31	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/18/21 19:31	1
2-Butanone	ND		10		ug/L			12/18/21 19:31	1
2-Hexanone	ND		3.0		ug/L			12/18/21 19:31	1
4-Methyl-2-pentanone	ND		10		ug/L			12/18/21 19:31	1
Acetone	ND		10		ug/L			12/18/21 19:31	1
Acrylonitrile	ND		10		ug/L			12/18/21 19:31	1
Benzene	ND		0.20		ug/L			12/18/21 19:31	1
Bromochloromethane	ND		0.20		ug/L			12/18/21 19:31	1
Bromodichloromethane	ND		0.20		ug/L			12/18/21 19:31	1
Bromoform	ND		0.50		ug/L			12/18/21 19:31	1
Bromomethane	ND		0.50		ug/L			12/18/21 19:31	1
Carbon disulfide	ND		0.30		ug/L			12/18/21 19:31	1
Carbon tetrachloride	ND		0.20		ug/L			12/18/21 19:31	1
Chlorobenzene	ND		0.20		ug/L			12/18/21 19:31	1
Chloroethane	ND		0.50		ug/L			12/18/21 19:31	1
Chloroform	**0.33**		0.20		ug/L			12/18/21 19:31	1
Chloromethane	ND		0.50		ug/L			12/18/21 19:31	1
cis-1,2-Dichloroethene	**1.1**		0.20		ug/L			12/18/21 19:31	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/18/21 19:31	1
Dibromochloromethane	ND		0.20		ug/L			12/18/21 19:31	1
Dibromomethane	ND		0.20		ug/L			12/18/21 19:31	1
Ethylbenzene	ND		0.20		ug/L			12/18/21 19:31	1
Iodomethane	ND		0.50		ug/L			12/18/21 19:31	1
Methylene Chloride	ND		5.0		ug/L			12/18/21 19:31	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/18/21 19:31	1
o-Xylene	ND		0.50		ug/L			12/18/21 19:31	1
Styrene	ND		1.0		ug/L			12/18/21 19:31	1
Tetrachloroethene	ND		0.50		ug/L			12/18/21 19:31	1
Toluene	ND		0.20		ug/L			12/18/21 19:31	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/18/21 19:31	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/18/21 19:31	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/18/21 19:31	1
Trichloroethene	ND		0.20		ug/L			12/18/21 19:31	1
Trichlorofluoromethane	ND		0.50		ug/L			12/18/21 19:31	1
Vinyl acetate	ND		2.0		ug/L			12/18/21 19:31	1
Vinyl chloride	ND		0.020		ug/L			12/18/21 19:31	1
Xylenes, Total	ND		0.50		ug/L			12/18/21 19:31	1

Client Sample ID: MW-21

Date Collected: 12/10/21 07:00
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-12

Matrix: Water

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*103*		*80 - 120*		*12/18/21 19:31*	*1*
4-Bromofluorobenzene (Surr)	*93*		*80 - 120*		*12/18/21 19:31*	*1*
Dibromofluoromethane (Surr)	*98*		*80 - 120*		*12/18/21 19:31*	*1*
Toluene-d8 (Surr)	*105*		*80 - 120*		*12/18/21 19:31*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/22/21 16:37	1
Ethylene	ND		1.0		ug/L			12/22/21 16:37	1
Methane	ND		0.58		ug/L			12/22/21 16:37	1

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	**64**		0.50		mg/L		12/16/21 21:10	12/17/21 21:10	1
Magnesium	**12**		0.50		mg/L		12/16/21 21:10	12/17/21 21:10	1
Manganese	ND		0.020		mg/L		12/16/21 21:10	12/17/21 21:10	1
Potassium	**8.0**		3.3		mg/L		12/16/21 21:10	12/17/21 21:10	1
Sodium	**21**		0.50		mg/L		12/16/21 21:10	12/17/21 21:10	1

Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.0057**		0.0010		mg/L		12/16/21 21:07	12/17/21 20:26	1
Antimony	ND		0.00080		mg/L		12/16/21 21:07	12/17/21 20:26	1
Barium	**0.051**		0.0012		mg/L		12/16/21 21:07	12/17/21 20:26	1
Beryllium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 20:26	1
Cadmium	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 20:26	1
Chromium	**0.0068**		0.00080		mg/L		12/16/21 21:07	12/17/21 20:26	1
Cobalt	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 20:26	1
Copper	**0.0048**		0.0020		mg/L		12/16/21 21:07	12/17/21 20:26	1
Lead	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 20:26	1
Nickel	**0.0043**		0.0030		mg/L		12/16/21 21:07	12/17/21 20:26	1
Selenium	ND		0.0080		mg/L		12/16/21 21:07	12/17/21 20:26	1
Silver	ND		0.00040		mg/L		12/16/21 21:07	12/17/21 20:26	1
Thallium	ND		0.0010		mg/L		12/16/21 21:07	12/17/21 20:26	1
Vanadium	**0.012**		0.0040		mg/L		12/16/21 21:07	12/17/21 20:26	1
Zinc	ND		0.0070		mg/L		12/16/21 21:07	12/17/21 20:26	1

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.10		mg/L		12/16/21 21:10	01/12/22 12:59	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**14**		1.5		mg/L			12/20/21 18:20	1
Nitrate as N	**5.2**	**H**	0.20		mg/L			12/12/21 15:28	1
Sulfate	**35**		1.5		mg/L			12/20/21 18:20	1
TOC Result 1	ND		1.0		mg/L			12/31/21 10:27	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.50		mg/L		12/17/21 16:25	12/21/21 22:02	1
Alkalinity	**170**		7.0		mg/L			12/17/21 17:21	1
Bicarbonate Alkalinity as CaCO3	**170**		7.0		mg/L			12/17/21 17:21	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-21
Date Collected: 12/10/21 07:00
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-12
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	250		50		mg/L			12/15/21 07:02	1
Total Suspended Solids	11		2.0		mg/L			12/15/21 19:09	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: TRIP BLANK
Date Collected: 12/09/21 00:01
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-13
Matrix: Water

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/18/21 17:02	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/18/21 17:02	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/18/21 17:02	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/18/21 17:02	1
1,1-Dichloroethane	ND		0.20		ug/L			12/18/21 17:02	1
1,1-Dichloroethene	ND		0.20		ug/L			12/18/21 17:02	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/18/21 17:02	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/18/21 17:02	1
1,2-Dibromoethane	ND		0.10		ug/L			12/18/21 17:02	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/18/21 17:02	1
1,2-Dichloroethane	ND		0.20		ug/L			12/18/21 17:02	1
1,2-Dichloropropane	ND		0.20		ug/L			12/18/21 17:02	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/18/21 17:02	1
2-Butanone	ND		10		ug/L			12/18/21 17:02	1
2-Hexanone	ND		3.0		ug/L			12/18/21 17:02	1
4-Methyl-2-pentanone	ND		10		ug/L			12/18/21 17:02	1
Acetone	ND		10		ug/L			12/18/21 17:02	1
Acrylonitrile	ND		10		ug/L			12/18/21 17:02	1
Benzene	ND		0.20		ug/L			12/18/21 17:02	1
Bromochloromethane	ND		0.20		ug/L			12/18/21 17:02	1
Bromodichloromethane	ND		0.20		ug/L			12/18/21 17:02	1
Bromoform	ND		0.50		ug/L			12/18/21 17:02	1
Bromomethane	ND		0.50		ug/L			12/18/21 17:02	1
Carbon disulfide	ND		0.30		ug/L			12/18/21 17:02	1
Carbon tetrachloride	ND		0.20		ug/L			12/18/21 17:02	1
Chlorobenzene	ND		0.20		ug/L			12/18/21 17:02	1
Chloroethane	ND		0.50		ug/L			12/18/21 17:02	1
Chloroform	ND		0.20		ug/L			12/18/21 17:02	1
Chloromethane	ND		0.50		ug/L			12/18/21 17:02	1
cis-1,2-Dichloroethene	ND		0.20		ug/L			12/18/21 17:02	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/18/21 17:02	1
Dibromochloromethane	ND		0.20		ug/L			12/18/21 17:02	1
Dibromomethane	ND		0.20		ug/L			12/18/21 17:02	1
Ethylbenzene	ND		0.20		ug/L			12/18/21 17:02	1
Iodomethane	ND		0.50		ug/L			12/18/21 17:02	1
Methylene Chloride	ND		5.0		ug/L			12/18/21 17:02	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/18/21 17:02	1
o-Xylene	ND		0.50		ug/L			12/18/21 17:02	1
Styrene	ND		1.0		ug/L			12/18/21 17:02	1
Tetrachloroethene	ND		0.50		ug/L			12/18/21 17:02	1
Toluene	ND		0.20		ug/L			12/18/21 17:02	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/18/21 17:02	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/18/21 17:02	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/18/21 17:02	1
Trichloroethene	ND		0.20		ug/L			12/18/21 17:02	1
Trichlorofluoromethane	ND		0.50		ug/L			12/18/21 17:02	1
Vinyl acetate	ND		2.0		ug/L			12/18/21 17:02	1
Vinyl chloride	ND		0.020		ug/L			12/18/21 17:02	1
Xylenes, Total	ND		0.50		ug/L			12/18/21 17:02	1

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: TRIP BLANK

Date Collected: 12/09/21 00:01
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-13

Matrix: Water

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*105*		*80 - 120*		*12/18/21 17:02*	*1*
4-Bromofluorobenzene (Surr)	*91*		*80 - 120*		*12/18/21 17:02*	*1*
Dibromofluoromethane (Surr)	*97*		*80 - 120*		*12/18/21 17:02*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*12/18/21 17:02*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/22/21 16:50	1
Ethylene	ND		1.0		ug/L			12/22/21 16:50	1
Methane	**0.67**		0.58		ug/L			12/22/21 16:50	1

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 580-376188/6
Matrix: Water
Analysis Batch: 376188

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/17/21 11:36	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/17/21 11:36	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/17/21 11:36	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/17/21 11:36	1
1,1-Dichloroethane	ND		0.20		ug/L			12/17/21 11:36	1
1,1-Dichloroethene	ND		0.20		ug/L			12/17/21 11:36	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/17/21 11:36	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/17/21 11:36	1
1,2-Dibromoethane	ND		0.10		ug/L			12/17/21 11:36	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/17/21 11:36	1
1,2-Dichloroethane	ND		0.20		ug/L			12/17/21 11:36	1
1,2-Dichloropropane	ND		0.20		ug/L			12/17/21 11:36	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/17/21 11:36	1
2-Butanone	ND		10		ug/L			12/17/21 11:36	1
2-Hexanone	ND		3.0		ug/L			12/17/21 11:36	1
4-Methyl-2-pentanone	ND		10		ug/L			12/17/21 11:36	1
Acetone	ND		10		ug/L			12/17/21 11:36	1
Acrylonitrile	ND		10		ug/L			12/17/21 11:36	1
Benzene	ND		0.20		ug/L			12/17/21 11:36	1
Bromochloromethane	ND		0.20		ug/L			12/17/21 11:36	1
Bromodichloromethane	ND		0.20		ug/L			12/17/21 11:36	1
Bromoform	ND		0.50		ug/L			12/17/21 11:36	1
Bromomethane	ND		0.50		ug/L			12/17/21 11:36	1
Carbon disulfide	ND		0.30		ug/L			12/17/21 11:36	1
Carbon tetrachloride	ND		0.20		ug/L			12/17/21 11:36	1
Chlorobenzene	ND		0.20		ug/L			12/17/21 11:36	1
Chloroethane	ND		0.50		ug/L			12/17/21 11:36	1
Chloroform	ND		0.20		ug/L			12/17/21 11:36	1
Chloromethane	ND		0.50		ug/L			12/17/21 11:36	1
cis-1,2-Dichloroethene	ND		0.20		ug/L			12/17/21 11:36	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 11:36	1
Dibromochloromethane	ND		0.20		ug/L			12/17/21 11:36	1
Dibromomethane	ND		0.20		ug/L			12/17/21 11:36	1
Ethylbenzene	ND		0.20		ug/L			12/17/21 11:36	1
Iodomethane	ND		0.50		ug/L			12/17/21 11:36	1
Methylene Chloride	ND		5.0		ug/L			12/17/21 11:36	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/17/21 11:36	1
o-Xylene	ND		0.50		ug/L			12/17/21 11:36	1
Styrene	ND		1.0		ug/L			12/17/21 11:36	1
Tetrachloroethene	ND		0.50		ug/L			12/17/21 11:36	1
Toluene	ND		0.20		ug/L			12/17/21 11:36	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/17/21 11:36	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/17/21 11:36	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/17/21 11:36	1
Trichloroethene	ND		0.20		ug/L			12/17/21 11:36	1
Trichlorofluoromethane	ND		0.50		ug/L			12/17/21 11:36	1
Vinyl acetate	ND		2.0		ug/L			12/17/21 11:36	1
Vinyl chloride	ND		0.020		ug/L			12/17/21 11:36	1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 580-376188/6
Matrix: Water
Analysis Batch: 376188

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	ND		0.50		ug/L			12/17/21 11:36	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*80 - 120*		*12/17/21 11:36*	*1*
4-Bromofluorobenzene (Surr)	*91*		*80 - 120*		*12/17/21 11:36*	*1*
Dibromofluoromethane (Surr)	*95*		*80 - 120*		*12/17/21 11:36*	*1*
Toluene-d8 (Surr)	*100*		*80 - 120*		*12/17/21 11:36*	*1*

Lab Sample ID: LCS 580-376188/3
Matrix: Water
Analysis Batch: 376188

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1,2-Tetrachloroethane	5.00	5.93		ug/L		119	69 - 127
1,1,1-Trichloroethane	5.00	5.18		ug/L		104	70 - 121
1,1,2,2-Tetrachloroethane	5.00	5.66		ug/L		113	67 - 136
1,1,2-Trichloroethane	5.00	5.83		ug/L		117	73 - 127
1,1-Dichloroethane	5.00	5.63		ug/L		113	74 - 120
1,1-Dichloroethene	5.00	5.41		ug/L		108	60 - 129
1,2,3-Trichloropropane	5.00	5.77		ug/L		115	67 - 135
1,2-Dibromo-3-Chloropropane	5.00	5.41		ug/L		108	55 - 135
1,2-Dibromoethane	5.00	5.45		ug/L		109	61 - 143
1,2-Dichlorobenzene	5.00	6.06		ug/L		121	72 - 129
1,2-Dichloroethane	5.00	5.19		ug/L		104	74 - 127
1,2-Dichloropropane	5.00	5.26		ug/L		105	69 - 130
1,4-Dichlorobenzene	5.00	5.68		ug/L		114	71 - 129
2-Butanone	25.0	26.2		ug/L		105	37 - 150
2-Hexanone	25.0	26.2		ug/L		105	56 - 150
4-Methyl-2-pentanone	25.0	26.8		ug/L		107	63 - 137
Acetone	25.0	28.8		ug/L		115	49 - 150
Acrylonitrile	50.0	45.0		ug/L		90	50 - 145
Benzene	5.00	5.61		ug/L		112	80 - 120
Bromochloromethane	5.00	5.49		ug/L		110	79 - 121
Bromodichloromethane	5.00	5.39		ug/L		108	74 - 131
Bromoform	5.00	5.38		ug/L		108	48 - 127
Bromomethane	5.00	5.36		ug/L		107	51 - 148
Carbon disulfide	5.00	5.06		ug/L		101	54 - 142
Carbon tetrachloride	5.00	5.15		ug/L		103	66 - 130
Chlorobenzene	5.00	5.84		ug/L		117	74 - 123
Chloroethane	5.00	5.54		ug/L		111	54 - 140
Chloroform	5.00	5.60		ug/L		112	75 - 120
Chloromethane	5.00	5.08		ug/L		102	32 - 150
cis-1,2-Dichloroethene	5.00	5.63		ug/L		113	72 - 120
cis-1,3-Dichloropropene	5.00	5.39		ug/L		108	77 - 131
Dibromochloromethane	5.00	5.53		ug/L		111	62 - 141
Dibromomethane	5.00	5.41		ug/L		108	65 - 141
Ethylbenzene	5.00	5.66		ug/L		113	80 - 124
Iodomethane	5.00	5.18		ug/L		104	60 - 128

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 580-376188/3
Matrix: Water
Analysis Batch: 376188

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methylene Chloride	5.00	5.59		ug/L		112	40 - 142
m-Xylene & p-Xylene	5.00	6.13		ug/L		123	75 - 124
o-Xylene	5.00	6.11		ug/L		122	71 - 124
Styrene	5.00	5.70		ug/L		114	74 - 127
Tetrachloroethene	5.00	5.66		ug/L		113	75 - 124
Toluene	5.00	5.91		ug/L		118	80 - 126
trans-1,2-Dichloroethene	5.00	5.11		ug/L		102	69 - 121
trans-1,3-Dichloropropene	5.00	5.71		ug/L		114	71 - 138
trans-1,4-Dichloro-2-butene	5.00	5.11		ug/L		102	20 - 150
Trichloroethene	5.00	5.10		ug/L		102	72 - 120
Trichlorofluoromethane	5.00	5.29		ug/L		106	60 - 132
Vinyl acetate	12.5	13.7		ug/L		110	38 - 150
Vinyl chloride	5.00	5.45		ug/L		109	41 - 150
Xylenes, Total	10.0	12.2		ug/L		122	73 - 123

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 120*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*
Dibromofluoromethane (Surr)	*98*		*80 - 120*
Toluene-d8 (Surr)	*101*		*80 - 120*

Lab Sample ID: LCSD 580-376188/4
Matrix: Water
Analysis Batch: 376188

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1,2-Tetrachloroethane	5.00	5.27		ug/L		105	69 - 127	12	22
1,1,1-Trichloroethane	5.00	4.59		ug/L		92	70 - 121	12	24
1,1,2,2-Tetrachloroethane	5.00	4.95		ug/L		99	67 - 136	13	24
1,1,2-Trichloroethane	5.00	5.26		ug/L		105	73 - 127	10	22
1,1-Dichloroethane	5.00	5.03		ug/L		101	74 - 120	11	26
1,1-Dichloroethene	5.00	4.73		ug/L		95	60 - 129	13	29
1,2,3-Trichloropropane	5.00	5.09		ug/L		102	67 - 135	12	25
1,2-Dibromo-3-Chloropropane	5.00	4.81		ug/L		96	55 - 135	12	29
1,2-Dibromoethane	5.00	4.71		ug/L		94	61 - 143	15	22
1,2-Dichlorobenzene	5.00	5.34		ug/L		107	72 - 129	13	22
1,2-Dichloroethane	5.00	4.78		ug/L		96	74 - 127	8	21
1,2-Dichloropropane	5.00	4.82		ug/L		96	69 - 130	9	22
1,4-Dichlorobenzene	5.00	5.11		ug/L		102	71 - 129	11	22
2-Butanone	25.0	23.2		ug/L		93	37 - 150	12	35
2-Hexanone	25.0	23.6		ug/L		94	56 - 150	10	29
4-Methyl-2-pentanone	25.0	23.9		ug/L		96	63 - 137	11	26
Acetone	25.0	24.7		ug/L		99	49 - 150	16	24
Acrylonitrile	50.0	38.8		ug/L		78	50 - 145	15	33
Benzene	5.00	5.04		ug/L		101	80 - 120	11	22
Bromochloromethane	5.00	4.61		ug/L		92	79 - 121	17	20
Bromodichloromethane	5.00	4.79		ug/L		96	74 - 131	12	21
Bromoform	5.00	4.81		ug/L		96	48 - 127	11	23

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 580-376188/4
Matrix: Water
Analysis Batch: 376188

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bromomethane			5.00	4.51		ug/L		90	51 - 148	17	35
Carbon disulfide			5.00	4.31		ug/L		86	54 - 142	16	34
Carbon tetrachloride			5.00	4.62		ug/L		92	66 - 130	11	24
Chlorobenzene			5.00	5.18		ug/L		104	74 - 123	12	21
Chloroethane			5.00	4.76		ug/L		95	54 - 140	15	33
Chloroform			5.00	4.99		ug/L		100	75 - 120	11	21
Chloromethane			5.00	4.31		ug/L		86	32 - 150	16	33
cis-1,2-Dichloroethene			5.00	4.84		ug/L		97	72 - 120	15	22
cis-1,3-Dichloropropene			5.00	4.83		ug/L		97	77 - 131	11	24
Dibromochloromethane			5.00	5.07		ug/L		101	62 - 141	9	22
Dibromomethane			5.00	4.78		ug/L		96	65 - 141	12	22
Ethylbenzene			5.00	5.05		ug/L		101	80 - 124	11	22
Iodomethane			5.00	4.53		ug/L		91	60 - 128	14	39
Methylene Chloride			5.00	4.89	J	ug/L		98	40 - 142	13	25
m-Xylene & p-Xylene			5.00	5.59		ug/L		112	75 - 124	9	22
o-Xylene			5.00	5.49		ug/L		110	71 - 124	11	23
Styrene			5.00	5.11		ug/L		102	74 - 127	11	22
Tetrachloroethene			5.00	5.18		ug/L		104	75 - 124	9	20
Toluene			5.00	5.21		ug/L		104	80 - 126	13	20
trans-1,2-Dichloroethene			5.00	4.65		ug/L		93	69 - 121	9	27
trans-1,3-Dichloropropene			5.00	5.01		ug/L		100	71 - 138	13	26
trans-1,4-Dichloro-2-butene			5.00	4.68		ug/L		94	20 - 150	9	35
Trichloroethene			5.00	4.76		ug/L		95	72 - 120	7	22
Trichlorofluoromethane			5.00	4.69		ug/L		94	60 - 132	12	32
Vinyl acetate			12.5	11.5		ug/L		92	38 - 150	17	35
Vinyl chloride			5.00	4.65		ug/L		93	41 - 150	16	32
Xylenes, Total			10.0	11.1		ug/L		111	73 - 123	10	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*80 - 120*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*
Dibromofluoromethane (Surr)	*97*		*80 - 120*
Toluene-d8 (Surr)	*103*		*80 - 120*

Lab Sample ID: 580-108302-11 MS
Matrix: Water
Analysis Batch: 376188

Client Sample ID: MW-12
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1,2-Tetrachloroethane	ND		5.00	5.44		ug/L		109	69 - 127
1,1,1-Trichloroethane	ND		5.00	5.26		ug/L		104	70 - 121
1,1,2,2-Tetrachloroethane	ND		5.00	5.09		ug/L		102	67 - 136
1,1,2-Trichloroethane	ND		5.00	5.40		ug/L		108	73 - 127
1,1-Dichloroethane	1.7		5.00	7.10		ug/L		109	74 - 120
1,1-Dichloroethene	ND		5.00	5.44		ug/L		109	60 - 129
1,2,3-Trichloropropane	ND		5.00	4.84		ug/L		97	67 - 135
1,2-Dibromo-3-Chloropropane	ND		5.00	4.54		ug/L		91	55 - 135
1,2-Dibromoethane	ND		5.00	4.89		ug/L		96	61 - 143

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 580-108302-11 MS
Matrix: Water
Analysis Batch: 376188

Client Sample ID: MW-12
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichlorobenzene	ND		5.00	5.41		ug/L		108	72 - 129
1,2-Dichloroethane	ND		5.00	4.98		ug/L		98	74 - 127
1,2-Dichloropropane	ND		5.00	5.19		ug/L		102	69 - 130
1,4-Dichlorobenzene	ND		5.00	5.24		ug/L		105	71 - 129
2-Butanone	ND		25.0	23.7		ug/L		95	37 - 150
2-Hexanone	ND		25.0	20.7		ug/L		83	56 - 150
4-Methyl-2-pentanone	ND		25.0	22.9		ug/L		91	63 - 137
Acetone	ND		25.0	23.0		ug/L		92	49 - 150
Acrylonitrile	ND		50.0	41.2		ug/L		73	50 - 145
Benzene	ND		5.00	5.61		ug/L		112	80 - 120
Bromochloromethane	ND		5.00	4.92		ug/L		98	79 - 121
Bromodichloromethane	ND		5.00	5.11		ug/L		102	74 - 131
Bromoform	ND		5.00	4.79		ug/L		96	48 - 127
Bromomethane	ND		5.00	4.77		ug/L		95	51 - 148
Carbon disulfide	0.81		5.00	5.32		ug/L		90	54 - 142
Carbon tetrachloride	ND		5.00	5.31		ug/L		105	66 - 130
Chlorobenzene	ND		5.00	5.54		ug/L		111	74 - 123
Chloroethane	ND		5.00	5.06		ug/L		101	54 - 140
Chloroform	0.32		5.00	5.67		ug/L		107	75 - 120
Chloromethane	ND		5.00	4.73		ug/L		85	32 - 150
cis-1,2-Dichloroethene	1.2		5.00	6.62		ug/L		109	72 - 120
cis-1,3-Dichloropropene	ND		5.00	4.81		ug/L		94	77 - 131
Dibromochloromethane	ND		5.00	5.06		ug/L		101	62 - 141
Dibromomethane	ND		5.00	4.72		ug/L		93	65 - 141
Ethylbenzene	ND		5.00	5.72		ug/L		113	80 - 124
Iodomethane	ND		5.00	4.88		ug/L		98	60 - 128
Methylene Chloride	ND		5.00	5.45		ug/L		109	40 - 142
m-Xylene & p-Xylene	ND	F1	5.00	6.36	F1	ug/L		127	75 - 124
o-Xylene	ND		5.00	5.96		ug/L		119	71 - 124
Styrene	ND		5.00	5.52		ug/L		110	74 - 127
Tetrachloroethene	ND		5.00	5.71		ug/L		114	75 - 124
Toluene	ND		5.00	5.84		ug/L		117	80 - 126
trans-1,2-Dichloroethene	ND		5.00	5.16		ug/L		102	69 - 121
trans-1,3-Dichloropropene	ND		5.00	5.15		ug/L		103	71 - 138
trans-1,4-Dichloro-2-butene	ND		5.00	4.46		ug/L		89	20 - 150
Trichloroethene	ND		5.00	5.12		ug/L		101	72 - 120
Trichlorofluoromethane	ND		5.00	5.41		ug/L		103	60 - 132
Vinyl acetate	ND		12.5	12.7		ug/L		94	38 - 150
Vinyl chloride	ND		5.00	5.07		ug/L		101	41 - 150
Xylenes, Total	ND	F1	10.0	12.3		ug/L		123	73 - 123

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 120*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*
Dibromofluoromethane (Surr)	*97*		*80 - 120*
Toluene-d8 (Surr)	*105*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 580-108302-11 MSD
Matrix: Water
Analysis Batch: 376188

Client Sample ID: MW-12
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1,2-Tetrachloroethane	ND		5.00	5.63		ug/L		113	69 - 127	3	22
1,1,1-Trichloroethane	ND		5.00	5.65		ug/L		112	70 - 121	7	24
1,1,2,2-Tetrachloroethane	ND		5.00	5.10		ug/L		102	67 - 136	0	24
1,1,2-Trichloroethane	ND		5.00	5.58		ug/L		112	73 - 127	3	22
1,1-Dichloroethane	1.7		5.00	7.53		ug/L		117	74 - 120	6	26
1,1-Dichloroethene	ND		5.00	5.66		ug/L		113	60 - 129	4	29
1,2,3-Trichloropropane	ND		5.00	5.09		ug/L		102	67 - 135	5	25
1,2-Dibromo-3-Chloropropane	ND		5.00	4.70		ug/L		94	55 - 135	4	29
1,2-Dibromoethane	ND		5.00	4.89		ug/L		96	61 - 143	0	22
1,2-Dichlorobenzene	ND		5.00	5.78		ug/L		116	72 - 129	7	22
1,2-Dichloroethane	ND		5.00	5.07		ug/L		99	74 - 127	2	21
1,2-Dichloropropane	ND		5.00	5.44		ug/L		107	69 - 130	5	22
1,4-Dichlorobenzene	ND		5.00	5.40		ug/L		108	71 - 129	3	22
2-Butanone	ND		25.0	22.2		ug/L		89	37 - 150	6	35
2-Hexanone	ND		25.0	20.6		ug/L		82	56 - 150	1	29
4-Methyl-2-pentanone	ND		25.0	22.9		ug/L		92	63 - 137	0	26
Acetone	ND		25.0	22.6		ug/L		91	49 - 150	1	24
Acrylonitrile	ND		50.0	44.4		ug/L		79	50 - 145	8	33
Benzene	ND		5.00	5.89		ug/L		118	80 - 120	5	22
Bromochloromethane	ND		5.00	5.02		ug/L		100	79 - 121	2	20
Bromodichloromethane	ND		5.00	5.31		ug/L		106	74 - 131	4	21
Bromoform	ND		5.00	4.92		ug/L		98	48 - 127	3	23
Bromomethane	ND		5.00	5.20		ug/L		104	51 - 148	9	35
Carbon disulfide	0.81		5.00	5.55		ug/L		95	54 - 142	4	34
Carbon tetrachloride	ND		5.00	5.62		ug/L		111	66 - 130	6	24
Chlorobenzene	ND		5.00	5.68		ug/L		114	74 - 123	2	21
Chloroethane	ND		5.00	5.47		ug/L		109	54 - 140	8	33
Chloroform	0.32		5.00	5.98		ug/L		113	75 - 120	5	21
Chloromethane	ND		5.00	5.01		ug/L		90	32 - 150	6	33
cis-1,2-Dichloroethene	1.2		5.00	7.02		ug/L		117	72 - 120	6	22
cis-1,3-Dichloropropene	ND		5.00	5.11		ug/L		100	77 - 131	6	24
Dibromochloromethane	ND		5.00	5.02		ug/L		100	62 - 141	1	22
Dibromomethane	ND		5.00	4.77		ug/L		94	65 - 141	1	22
Ethylbenzene	ND		5.00	5.84		ug/L		116	80 - 124	2	22
Iodomethane	ND		5.00	5.16		ug/L		103	60 - 128	6	39
Methylene Chloride	ND		5.00	5.64		ug/L		113	40 - 142	3	25
m-Xylene & p-Xylene	ND	F1	5.00	6.43	F1	ug/L		129	75 - 124	1	22
o-Xylene	ND		5.00	6.05		ug/L		121	71 - 124	1	23
Styrene	ND		5.00	5.55		ug/L		111	74 - 127	0	22
Tetrachloroethene	ND		5.00	5.99		ug/L		120	75 - 124	5	20
Toluene	ND		5.00	6.07		ug/L		121	80 - 126	4	20
trans-1,2-Dichloroethene	ND		5.00	5.49		ug/L		108	69 - 121	6	27
trans-1,3-Dichloropropene	ND		5.00	5.31		ug/L		106	71 - 138	3	26
trans-1,4-Dichloro-2-butene	ND		5.00	4.83		ug/L		97	20 - 150	8	35
Trichloroethene	ND		5.00	5.43		ug/L		107	72 - 120	6	22
Trichlorofluoromethane	ND		5.00	5.80		ug/L		111	60 - 132	7	32
Vinyl acetate	ND		12.5	12.7		ug/L		94	38 - 150	0	35
Vinyl chloride	ND		5.00	5.38		ug/L		108	41 - 150	6	32

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 580-108302-11 MSD
Matrix: Water
Analysis Batch: 376188

Client Sample ID: MW-12
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Xylenes, Total	ND	F1	10.0	12.5	F1	ug/L		125	73 - 123	1	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 120*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*
Dibromofluoromethane (Surr)	*96*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Lab Sample ID: MB 580-376295/6
Matrix: Water
Analysis Batch: 376295

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.30		ug/L			12/18/21 16:38	1
1,1,1-Trichloroethane	ND		0.20		ug/L			12/18/21 16:38	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			12/18/21 16:38	1
1,1,2-Trichloroethane	ND		0.20		ug/L			12/18/21 16:38	1
1,1-Dichloroethane	ND		0.20		ug/L			12/18/21 16:38	1
1,1-Dichloroethene	ND		0.20		ug/L			12/18/21 16:38	1
1,2,3-Trichloropropane	ND		0.20		ug/L			12/18/21 16:38	1
1,2-Dibromo-3-Chloropropane	ND		2.0		ug/L			12/18/21 16:38	1
1,2-Dibromoethane	ND		0.10		ug/L			12/18/21 16:38	1
1,2-Dichlorobenzene	ND		0.30		ug/L			12/18/21 16:38	1
1,2-Dichloroethane	ND		0.20		ug/L			12/18/21 16:38	1
1,2-Dichloropropane	ND		0.20		ug/L			12/18/21 16:38	1
1,4-Dichlorobenzene	ND		0.30		ug/L			12/18/21 16:38	1
2-Butanone	ND		10		ug/L			12/18/21 16:38	1
2-Hexanone	ND		3.0		ug/L			12/18/21 16:38	1
4-Methyl-2-pentanone	ND		10		ug/L			12/18/21 16:38	1
Acetone	ND		10		ug/L			12/18/21 16:38	1
Acrylonitrile	ND		10		ug/L			12/18/21 16:38	1
Benzene	ND		0.20		ug/L			12/18/21 16:38	1
Bromochloromethane	ND		0.20		ug/L			12/18/21 16:38	1
Bromodichloromethane	ND		0.20		ug/L			12/18/21 16:38	1
Bromoform	ND		0.50		ug/L			12/18/21 16:38	1
Bromomethane	ND		0.50		ug/L			12/18/21 16:38	1
Carbon disulfide	ND		0.30		ug/L			12/18/21 16:38	1
Carbon tetrachloride	ND		0.20		ug/L			12/18/21 16:38	1
Chlorobenzene	ND		0.20		ug/L			12/18/21 16:38	1
Chloroethane	ND		0.50		ug/L			12/18/21 16:38	1
Chloroform	ND		0.20		ug/L			12/18/21 16:38	1
Chloromethane	ND		0.50		ug/L			12/18/21 16:38	1
cis-1,2-Dichloroethene	ND		0.20		ug/L			12/18/21 16:38	1
cis-1,3-Dichloropropene	ND		0.20		ug/L			12/18/21 16:38	1
Dibromochloromethane	ND		0.20		ug/L			12/18/21 16:38	1
Dibromomethane	ND		0.20		ug/L			12/18/21 16:38	1
Ethylbenzene	ND		0.20		ug/L			12/18/21 16:38	1
Iodomethane	ND		0.50		ug/L			12/18/21 16:38	1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 580-376295/6
Matrix: Water
Analysis Batch: 376295

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methylene Chloride	ND		5.0		ug/L			12/18/21 16:38	1
m-Xylene & p-Xylene	ND		0.50		ug/L			12/18/21 16:38	1
o-Xylene	ND		0.50		ug/L			12/18/21 16:38	1
Styrene	ND		1.0		ug/L			12/18/21 16:38	1
Tetrachloroethene	ND		0.50		ug/L			12/18/21 16:38	1
Toluene	ND		0.20		ug/L			12/18/21 16:38	1
trans-1,2-Dichloroethene	ND		0.20		ug/L			12/18/21 16:38	1
trans-1,3-Dichloropropene	ND		0.20		ug/L			12/18/21 16:38	1
trans-1,4-Dichloro-2-butene	ND		2.0		ug/L			12/18/21 16:38	1
Trichloroethene	ND		0.20		ug/L			12/18/21 16:38	1
Trichlorofluoromethane	ND		0.50		ug/L			12/18/21 16:38	1
Vinyl acetate	ND		2.0		ug/L			12/18/21 16:38	1
Vinyl chloride	ND		0.020		ug/L			12/18/21 16:38	1
Xylenes, Total	ND		0.50		ug/L			12/18/21 16:38	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*80 - 120*		*12/18/21 16:38*	*1*
4-Bromofluorobenzene (Surr)	*91*		*80 - 120*		*12/18/21 16:38*	*1*
Dibromofluoromethane (Surr)	*97*		*80 - 120*		*12/18/21 16:38*	*1*
Toluene-d8 (Surr)	*101*		*80 - 120*		*12/18/21 16:38*	*1*

Lab Sample ID: LCS 580-376295/3
Matrix: Water
Analysis Batch: 376295

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1,2-Tetrachloroethane	5.00	5.23		ug/L		105	69 - 127
1,1,1-Trichloroethane	5.00	4.80		ug/L		96	70 - 121
1,1,2,2-Tetrachloroethane	5.00	5.20		ug/L		104	67 - 136
1,1,2-Trichloroethane	5.00	5.04		ug/L		101	73 - 127
1,1-Dichloroethane	5.00	5.26		ug/L		105	74 - 120
1,1-Dichloroethene	5.00	4.83		ug/L		97	60 - 129
1,2,3-Trichloropropane	5.00	4.93		ug/L		99	67 - 135
1,2-Dibromo-3-Chloropropane	5.00	4.89		ug/L		98	55 - 135
1,2-Dibromoethane	5.00	4.68		ug/L		94	61 - 143
1,2-Dichlorobenzene	5.00	5.38		ug/L		108	72 - 129
1,2-Dichloroethane	5.00	4.84		ug/L		97	74 - 127
1,2-Dichloropropane	5.00	4.89		ug/L		98	69 - 130
1,4-Dichlorobenzene	5.00	5.21		ug/L		104	71 - 129
2-Butanone	25.0	22.0		ug/L		88	37 - 150
2-Hexanone	25.0	25.1		ug/L		101	56 - 150
4-Methyl-2-pentanone	25.0	23.8		ug/L		95	63 - 137
Acetone	25.0	25.5		ug/L		102	49 - 150
Acrylonitrile	50.0	44.7		ug/L		89	50 - 145
Benzene	5.00	5.21		ug/L		104	80 - 120
Bromochloromethane	5.00	4.74		ug/L		95	79 - 121
Bromodichloromethane	5.00	4.86		ug/L		97	74 - 131
Bromoform	5.00	4.82		ug/L		96	48 - 127

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 580-376295/3
Matrix: Water
Analysis Batch: 376295

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Bromomethane	5.00	4.65		ug/L		93	51 - 148
Carbon disulfide	5.00	4.70		ug/L		94	54 - 142
Carbon tetrachloride	5.00	4.65		ug/L		93	66 - 130
Chlorobenzene	5.00	5.15		ug/L		103	74 - 123
Chloroethane	5.00	4.79		ug/L		96	54 - 140
Chloroform	5.00	5.04		ug/L		101	75 - 120
Chloromethane	5.00	4.40		ug/L		88	32 - 150
cis-1,2-Dichloroethene	5.00	5.03		ug/L		101	72 - 120
cis-1,3-Dichloropropene	5.00	4.88		ug/L		98	77 - 131
Dibromochloromethane	5.00	4.80		ug/L		96	62 - 141
Dibromomethane	5.00	4.61		ug/L		92	65 - 141
Ethylbenzene	5.00	5.18		ug/L		104	80 - 124
Iodomethane	5.00	4.67		ug/L		93	60 - 128
Methylene Chloride	5.00	5.30		ug/L		106	40 - 142
m-Xylene & p-Xylene	5.00	5.54		ug/L		111	75 - 124
o-Xylene	5.00	5.53		ug/L		111	71 - 124
Styrene	5.00	5.04		ug/L		101	74 - 127
Tetrachloroethene	5.00	5.09		ug/L		102	75 - 124
Toluene	5.00	5.30		ug/L		106	80 - 126
trans-1,2-Dichloroethene	5.00	4.70		ug/L		94	69 - 121
trans-1,3-Dichloropropene	5.00	5.03		ug/L		101	71 - 138
trans-1,4-Dichloro-2-butene	5.00	5.11		ug/L		102	20 - 150
Trichloroethene	5.00	4.86		ug/L		97	72 - 120
Trichlorofluoromethane	5.00	4.36		ug/L		87	60 - 132
Vinyl acetate	12.5	12.6		ug/L		101	38 - 150
Vinyl chloride	5.00	4.62		ug/L		92	41 - 150
Xylenes, Total	10.0	11.1		ug/L		111	73 - 123

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*100*		*80 - 120*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*
Dibromofluoromethane (Surr)	*100*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Lab Sample ID: LCSD 580-376295/4
Matrix: Water
Analysis Batch: 376295

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1,2-Tetrachloroethane	5.00	5.11		ug/L		102	69 - 127	2	22
1,1,1-Trichloroethane	5.00	4.61		ug/L		92	70 - 121	4	24
1,1,2,2-Tetrachloroethane	5.00	5.06		ug/L		101	67 - 136	3	24
1,1,2-Trichloroethane	5.00	5.10		ug/L		102	73 - 127	1	22
1,1-Dichloroethane	5.00	5.17		ug/L		103	74 - 120	2	26
1,1-Dichloroethene	5.00	4.66		ug/L		93	60 - 129	4	29
1,2,3-Trichloropropane	5.00	4.98		ug/L		100	67 - 135	1	25
1,2-Dibromo-3-Chloropropane	5.00	4.70		ug/L		94	55 - 135	4	29
1,2-Dibromoethane	5.00	4.71		ug/L		94	61 - 143	1	22

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 580-376295/4
Matrix: Water
Analysis Batch: 376295

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dichlorobenzene			5.00	5.15		ug/L		103	72 - 129	4	22
1,2-Dichloroethane			5.00	4.73		ug/L		95	74 - 127	2	21
1,2-Dichloropropane			5.00	4.69		ug/L		94	69 - 130	4	22
1,4-Dichlorobenzene			5.00	4.95		ug/L		99	71 - 129	5	22
2-Butanone			25.0	20.7		ug/L		83	37 - 150	6	35
2-Hexanone			25.0	22.8		ug/L		91	56 - 150	10	29
4-Methyl-2-pentanone			25.0	23.4		ug/L		94	63 - 137	2	26
Acetone			25.0	26.3		ug/L		105	49 - 150	3	24
Acrylonitrile			50.0	40.8		ug/L		82	50 - 145	9	33
Benzene			5.00	5.01		ug/L		100	80 - 120	4	22
Bromochloromethane			5.00	4.71		ug/L		94	79 - 121	1	20
Bromodichloromethane			5.00	4.67		ug/L		93	74 - 131	4	21
Bromoform			5.00	4.87		ug/L		97	48 - 127	1	23
Bromomethane			5.00	4.34		ug/L		87	51 - 148	7	35
Carbon disulfide			5.00	4.55		ug/L		91	54 - 142	3	34
Carbon tetrachloride			5.00	4.51		ug/L		90	66 - 130	3	24
Chlorobenzene			5.00	5.16		ug/L		103	74 - 123	0	21
Chloroethane			5.00	4.49		ug/L		90	54 - 140	6	33
Chloroform			5.00	4.92		ug/L		98	75 - 120	2	21
Chloromethane			5.00	4.31		ug/L		86	32 - 150	2	33
cis-1,2-Dichloroethene			5.00	5.00		ug/L		100	72 - 120	0	22
cis-1,3-Dichloropropene			5.00	4.71		ug/L		94	77 - 131	4	24
Dibromochloromethane			5.00	4.82		ug/L		96	62 - 141	0	22
Dibromomethane			5.00	4.55		ug/L		91	65 - 141	1	22
Ethylbenzene			5.00	5.15		ug/L		103	80 - 124	1	22
Iodomethane			5.00	4.58		ug/L		92	60 - 128	2	39
Methylene Chloride			5.00	5.28		ug/L		106	40 - 142	0	25
m-Xylene & p-Xylene			5.00	5.59		ug/L		112	75 - 124	1	22
o-Xylene			5.00	5.44		ug/L		109	71 - 124	2	23
Styrene			5.00	4.97		ug/L		99	74 - 127	1	22
Tetrachloroethene			5.00	5.01		ug/L		100	75 - 124	2	20
Toluene			5.00	5.20		ug/L		104	80 - 126	2	20
trans-1,2-Dichloroethene			5.00	4.76		ug/L		95	69 - 121	1	27
trans-1,3-Dichloropropene			5.00	4.94		ug/L		99	71 - 138	2	26
trans-1,4-Dichloro-2-butene			5.00	5.18		ug/L		104	20 - 150	1	35
Trichloroethene			5.00	4.64		ug/L		93	72 - 120	5	22
Trichlorofluoromethane			5.00	4.21		ug/L		84	60 - 132	3	32
Vinyl acetate			12.5	12.7		ug/L		102	38 - 150	1	35
Vinyl chloride			5.00	4.51		ug/L		90	41 - 150	2	32
Xylenes, Total			10.0	11.0		ug/L		110	73 - 123	0	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*99*		*80 - 120*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*
Dibromofluoromethane (Surr)	*97*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 580-376446/6
Matrix: Water
Analysis Batch: 376446

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20		ug/L			12/20/21 14:42	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*80 - 120*		*12/20/21 14:42*	*1*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*		*12/20/21 14:42*	*1*
Dibromofluoromethane (Surr)	*98*		*80 - 120*		*12/20/21 14:42*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*12/20/21 14:42*	*1*

Lab Sample ID: LCS 580-376446/3
Matrix: Water
Analysis Batch: 376446

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
cis-1,2-Dichloroethene			5.00	5.44		ug/L		109	72 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*80 - 120*
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*
Dibromofluoromethane (Surr)	*98*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Lab Sample ID: LCSD 580-376446/4
Matrix: Water
Analysis Batch: 376446

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
cis-1,2-Dichloroethene			5.00	4.68		ug/L		94	72 - 120	15	22

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 120*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*
Dibromofluoromethane (Surr)	*97*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 680-700297/8
Matrix: Water
Analysis Batch: 700297

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		1.1		ug/L			12/22/21 13:21	1
Ethylene	ND		1.0		ug/L			12/22/21 13:21	1
Methane	ND		0.58		ug/L			12/22/21 13:21	1

Method: RSK-175 - Dissolved Gases (GC) (Continued)

Lab Sample ID: LCS 680-700297/3
Matrix: Water
Analysis Batch: 700297

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane (TCD)	1920	2020		ug/L		105	75 - 125

Lab Sample ID: LCS 680-700297/6
Matrix: Water
Analysis Batch: 700297

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ethane	361	322		ug/L		89	75 - 125
Ethylene	337	291		ug/L		86	75 - 125
Methane	192	174		ug/L		91	75 - 125

Lab Sample ID: LCSD 680-700297/4
Matrix: Water
Analysis Batch: 700297

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methane (TCD)	1920	2030		ug/L		106	75 - 125	1	30

Lab Sample ID: LCSD 680-700297/7
Matrix: Water
Analysis Batch: 700297

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ethane	361	318		ug/L		88	75 - 125	1	30
Ethylene	337	288		ug/L		85	75 - 125	1	30
Methane	192	172		ug/L		89	75 - 125	1	30

Lab Sample ID: 580-108302-11 MS
Matrix: Water
Analysis Batch: 700297

Client Sample ID: MW-12
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Ethane	ND		361	327		ug/L		91	75 - 125
Ethylene	ND		337	295		ug/L		88	75 - 125
Methane	0.69		192	175		ug/L		91	75 - 125

Lab Sample ID: 580-108302-11 MSD
Matrix: Water
Analysis Batch: 700297

Client Sample ID: MW-12
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ethane	ND		361	321		ug/L		89	75 - 125	2	30
Ethylene	ND		337	289		ug/L		86	75 - 125	2	30
Methane	0.69		192	173		ug/L		90	75 - 125	1	30

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 580-376146/26-A
Matrix: Water
Analysis Batch: 376404

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 376146

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	ND		0.50		mg/L		12/16/21 21:10	12/17/21 19:48	1
Magnesium	ND		0.50		mg/L		12/16/21 21:10	12/17/21 19:48	1
Manganese	ND		0.020		mg/L		12/16/21 21:10	12/17/21 19:48	1
Potassium	ND		3.3		mg/L		12/16/21 21:10	12/17/21 19:48	1
Sodium	ND		0.50		mg/L		12/16/21 21:10	12/17/21 19:48	1

Lab Sample ID: LCS 580-376146/27-A
Matrix: Water
Analysis Batch: 376404

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 376146

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Calcium			20.0	21.3		mg/L		106	85 - 115		
Magnesium			20.0	21.4		mg/L		107	85 - 115		
Manganese			1.00	1.00		mg/L		100	85 - 115		
Potassium			20.0	20.5		mg/L		102	85 - 115		
Sodium			20.0	20.4		mg/L		102	85 - 115		

Lab Sample ID: LCSD 580-376146/28-A
Matrix: Water
Analysis Batch: 376404

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 376146

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Calcium			20.0	21.4		mg/L		107	85 - 115	1	20
Magnesium			20.0	21.8		mg/L		109	85 - 115	2	20
Manganese			1.00	1.00		mg/L		100	85 - 115	0	20
Potassium			20.0	20.7		mg/L		104	85 - 115	1	20
Sodium			20.0	20.1		mg/L		100	85 - 115	2	20

Lab Sample ID: 580-108302-1 MS
Matrix: Water
Analysis Batch: 376404

Client Sample ID: MW-1
Prep Type: Dissolved
Prep Batch: 376146

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Calcium	110		20.0	127	4	mg/L		98	70 - 130		
Magnesium	22		20.0	42.4		mg/L		102	70 - 130		
Manganese	ND		1.00	0.995		mg/L		100	70 - 130		
Potassium	7.7		20.0	28.0		mg/L		102	70 - 130		
Sodium	21		20.0	41.2		mg/L		103	70 - 130		

Lab Sample ID: 580-108302-1 MSD
Matrix: Water
Analysis Batch: 376404

Client Sample ID: MW-1
Prep Type: Dissolved
Prep Batch: 376146

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Calcium	110		20.0	132	4	mg/L		121	70 - 130	3	20
Magnesium	22		20.0	44.0		mg/L		110	70 - 130	4	20
Manganese	ND		1.00	1.03		mg/L		103	70 - 130	3	20
Potassium	7.7		20.0	29.1		mg/L		107	70 - 130	4	20
Sodium	21		20.0	42.7		mg/L		110	70 - 130	3	20

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: 580-108302-2 MS
Matrix: Water
Analysis Batch: 376404

Client Sample ID: MW-2
Prep Type: Dissolved
Prep Batch: 376146

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Calcium	64		20.0	83.8		mg/L		97	70 - 130
Magnesium	14		20.0	34.0		mg/L		101	70 - 130
Manganese	ND		1.00	1.01		mg/L		101	70 - 130
Potassium	6.0		20.0	25.9		mg/L		100	70 - 130
Sodium	14		20.0	33.3		mg/L		98	70 - 130

Lab Sample ID: 580-108302-2 MSD
Matrix: Water
Analysis Batch: 376404

Client Sample ID: MW-2
Prep Type: Dissolved
Prep Batch: 376146

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Calcium	64		20.0	83.1		mg/L		94	70 - 130	1	20
Magnesium	14		20.0	34.2		mg/L		102	70 - 130	1	20
Manganese	ND		1.00	0.991		mg/L		99	70 - 130	2	20
Potassium	6.0		20.0	26.0		mg/L		100	70 - 130	1	20
Sodium	14		20.0	33.2		mg/L		98	70 - 130	0	20

Lab Sample ID: 580-108302-1 DU
Matrix: Water
Analysis Batch: 376404

Client Sample ID: MW-1
Prep Type: Dissolved
Prep Batch: 376146

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Calcium	110		107		mg/L		0.5	20
Magnesium	22		21.9		mg/L		0.5	20
Manganese	ND		ND		mg/L		NC	20
Potassium	7.7		7.64		mg/L		0.5	20
Sodium	21		20.8		mg/L		1	20

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 580-376145/26-A
Matrix: Water
Analysis Batch: 376340

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 376145

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		12/16/21 21:08	12/17/21 18:30	1
Antimony	ND		0.00080		mg/L		12/16/21 21:08	12/17/21 18:30	1
Barium	ND		0.0012		mg/L		12/16/21 21:08	12/17/21 18:30	1
Beryllium	ND		0.00040		mg/L		12/16/21 21:08	12/17/21 18:30	1
Cadmium	ND		0.00040		mg/L		12/16/21 21:08	12/17/21 18:30	1
Chromium	ND		0.00080		mg/L		12/16/21 21:08	12/17/21 18:30	1
Cobalt	ND		0.00040		mg/L		12/16/21 21:08	12/17/21 18:30	1
Copper	ND		0.0020		mg/L		12/16/21 21:08	12/17/21 18:30	1
Lead	ND		0.00040		mg/L		12/16/21 21:08	12/17/21 18:30	1
Nickel	ND		0.0030		mg/L		12/16/21 21:08	12/17/21 18:30	1
Selenium	ND		0.0080		mg/L		12/16/21 21:08	12/17/21 18:30	1
Silver	ND		0.00040		mg/L		12/16/21 21:08	12/17/21 18:30	1
Thallium	ND		0.0010		mg/L		12/16/21 21:08	12/17/21 18:30	1
Vanadium	ND		0.0040		mg/L		12/16/21 21:08	12/17/21 18:30	1

Method: 200.8 - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 580-376145/26-A
Matrix: Water
Analysis Batch: 376340

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 376145

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Zinc	ND		0.0070		mg/L		12/16/21 21:08	12/17/21 18:30	1

Lab Sample ID: LCS 580-376145/27-A
Matrix: Water
Analysis Batch: 376340

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 376145

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	1.00	0.979		mg/L		98	85 - 115
Antimony	1.00	0.998		mg/L		100	85 - 115
Barium	1.00	1.02		mg/L		102	85 - 115
Beryllium	1.00	0.949		mg/L		95	85 - 115
Cadmium	1.00	0.997		mg/L		100	85 - 115
Chromium	1.00	0.981		mg/L		98	85 - 115
Cobalt	1.00	0.983		mg/L		98	85 - 115
Copper	1.00	1.01		mg/L		101	85 - 115
Lead	1.00	1.01		mg/L		101	85 - 115
Nickel	1.00	1.01		mg/L		101	85 - 115
Selenium	1.00	0.958		mg/L		96	85 - 115
Silver	1.00	1.01		mg/L		101	85 - 115
Thallium	1.00	0.976		mg/L		98	85 - 115
Vanadium	1.00	0.981		mg/L		98	85 - 115
Zinc	1.00	0.997		mg/L		100	85 - 115

Lab Sample ID: LCSD 580-376145/28-A
Matrix: Water
Analysis Batch: 376340

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 376145

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	1.00	0.968		mg/L		97	85 - 115	1	20
Antimony	1.00	0.969		mg/L		97	85 - 115	3	20
Barium	1.00	0.987		mg/L		99	85 - 115	3	20
Beryllium	1.00	0.954		mg/L		95	85 - 115	1	20
Cadmium	1.00	0.967		mg/L		97	85 - 115	3	20
Chromium	1.00	0.997		mg/L		100	85 - 115	2	20
Cobalt	1.00	0.969		mg/L		97	85 - 115	1	20
Copper	1.00	1.02		mg/L		102	85 - 115	1	20
Lead	1.00	1.01		mg/L		101	85 - 115	0	20
Nickel	1.00	1.01		mg/L		101	85 - 115	1	20
Selenium	1.00	0.990		mg/L		99	85 - 115	3	20
Silver	1.00	0.986		mg/L		99	85 - 115	3	20
Thallium	1.00	0.982		mg/L		98	85 - 115	1	20
Vanadium	1.00	0.998		mg/L		100	85 - 115	2	20
Zinc	1.00	1.01		mg/L		101	85 - 115	1	20

Method: 200.8 - Metals (ICP/MS) (Continued)

Lab Sample ID: 580-108302-1 MS
Matrix: Water
Analysis Batch: 376340

Client Sample ID: MW-1
Prep Type: Total/NA
Prep Batch: 376145

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.0037		1.00	0.927		mg/L		92	70 - 130
Antimony	ND		1.00	0.883		mg/L		88	70 - 130
Barium	0.051		1.00	1.01		mg/L		96	70 - 130
Beryllium	ND		1.00	0.951		mg/L		95	70 - 130
Cadmium	ND		1.00	0.936		mg/L		94	70 - 130
Chromium	0.0022		1.00	0.954		mg/L		95	70 - 130
Cobalt	0.014		1.00	0.943		mg/L		93	70 - 130
Copper	ND		1.00	0.983		mg/L		98	70 - 130
Lead	ND		1.00	0.992		mg/L		99	70 - 130
Nickel	ND		1.00	0.951		mg/L		95	70 - 130
Selenium	ND		1.00	0.982		mg/L		98	70 - 130
Silver	ND		1.00	0.944		mg/L		94	70 - 130
Thallium	ND		1.00	0.965		mg/L		97	70 - 130
Vanadium	0.0088		1.00	0.959		mg/L		95	70 - 130
Zinc	ND		1.00	0.943		mg/L		94	70 - 130

Lab Sample ID: 580-108302-1 MSD
Matrix: Water
Analysis Batch: 376340

Client Sample ID: MW-1
Prep Type: Total/NA
Prep Batch: 376145

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.0037		1.00	0.950		mg/L		95	70 - 130	2	20
Antimony	ND		1.00	0.913		mg/L		91	70 - 130	3	20
Barium	0.051		1.00	1.04		mg/L		99	70 - 130	3	20
Beryllium	ND		1.00	0.931		mg/L		93	70 - 130	2	20
Cadmium	ND		1.00	0.969		mg/L		97	70 - 130	4	20
Chromium	0.0022		1.00	0.948		mg/L		95	70 - 130	1	20
Cobalt	0.014		1.00	0.963		mg/L		95	70 - 130	2	20
Copper	ND		1.00	0.982		mg/L		98	70 - 130	0	20
Lead	ND		1.00	0.969		mg/L		97	70 - 130	2	20
Nickel	ND		1.00	0.948		mg/L		95	70 - 130	0	20
Selenium	ND		1.00	0.962		mg/L		96	70 - 130	2	20
Silver	ND		1.00	0.971		mg/L		97	70 - 130	3	20
Thallium	ND		1.00	0.941		mg/L		94	70 - 130	3	20
Vanadium	0.0088		1.00	0.954		mg/L		95	70 - 130	0	20
Zinc	ND		1.00	0.953		mg/L		95	70 - 130	1	20

Lab Sample ID: 580-108302-1 DU
Matrix: Water
Analysis Batch: 376340

Client Sample ID: MW-1
Prep Type: Total/NA
Prep Batch: 376145

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Arsenic	0.0037		0.00392		mg/L		6	20
Antimony	ND		ND		mg/L		NC	20
Barium	0.051		0.0546		mg/L		7	20
Beryllium	ND		ND		mg/L		NC	20
Cadmium	ND		ND		mg/L		NC	20
Chromium	0.0022		0.00232		mg/L		5	20
Cobalt	0.014		0.0153		mg/L		7	20

Method: 200.8 - Metals (ICP/MS) (Continued)

Lab Sample ID: 580-108302-1 DU
Matrix: Water
Analysis Batch: 376340

Client Sample ID: MW-1
Prep Type: Total/NA
Prep Batch: 376145

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Copper	ND		ND		mg/L		NC	20
Lead	ND		ND		mg/L		NC	20
Nickel	ND		ND		mg/L		NC	20
Selenium	ND		ND		mg/L		NC	20
Silver	ND		ND		mg/L		NC	20
Thallium	ND		ND		mg/L		NC	20
Vanadium	0.0088		0.00942		mg/L		6	20
Zinc	ND		ND		mg/L		NC	20

Lab Sample ID: MB 580-376146/26-A
Matrix: Water
Analysis Batch: 378148

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 376146

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.10		mg/L		12/16/21 21:10	01/12/22 11:11	1

Lab Sample ID: LCS 580-376146/27-A
Matrix: Water
Analysis Batch: 378148

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 376146

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	20.0	22.0		mg/L		110	85 - 115

Lab Sample ID: LCSD 580-376146/28-A
Matrix: Water
Analysis Batch: 378148

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 376146

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	20.0	22.5		mg/L		112	85 - 115	2	20

Lab Sample ID: 580-108302-1 MS
Matrix: Water
Analysis Batch: 378148

Client Sample ID: MW-1
Prep Type: Dissolved
Prep Batch: 376146

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	0.11		20.0	21.9		mg/L		109	70 - 130

Lab Sample ID: 580-108302-1 MSD
Matrix: Water
Analysis Batch: 378148

Client Sample ID: MW-1
Prep Type: Dissolved
Prep Batch: 376146

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	0.11		20.0	22.1		mg/L		110	70 - 130	1	20

Lab Sample ID: 580-108302-2 MS
Matrix: Water
Analysis Batch: 378148

Client Sample ID: MW-2
Prep Type: Dissolved
Prep Batch: 376146

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	ND		20.0	20.8		mg/L		104	70 - 130

Method: 200.8 - Metals (ICP/MS) (Continued)

Lab Sample ID: 580-108302-2 MSD
Matrix: Water
Analysis Batch: 378148

Client Sample ID: MW-2
Prep Type: Dissolved
Prep Batch: 376146

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	ND		20.0	22.1		mg/L		110	70 - 130	6	20

Lab Sample ID: 580-108302-1 DU
Matrix: Water
Analysis Batch: 378148

Client Sample ID: MW-1
Prep Type: Dissolved
Prep Batch: 376146

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Iron	0.11		0.105		mg/L		4	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 580-375662/9
Matrix: Water
Analysis Batch: 375662

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND		0.20		mg/L			12/12/21 17:36	1

Lab Sample ID: LCS 580-375662/10
Matrix: Water
Analysis Batch: 375662

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	5.00	5.34		mg/L		107	90 - 110

Lab Sample ID: LCSD 580-375662/24
Matrix: Water
Analysis Batch: 375662

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate as N	5.00	5.34		mg/L		107	90 - 110	0	15

Lab Sample ID: MB 580-376642/3
Matrix: Water
Analysis Batch: 376642

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.5		mg/L			12/20/21 14:14	1
Sulfate	ND		1.5		mg/L			12/20/21 14:14	1

Lab Sample ID: LCS 580-376642/4
Matrix: Water
Analysis Batch: 376642

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	51.2		mg/L		102	90 - 110
Sulfate	50.0	50.7		mg/L		101	90 - 110

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCSD 580-376642/5
Matrix: Water
Analysis Batch: 376642

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride			50.0	51.3		mg/L		103	90 - 110	0	15
Sulfate			50.0	50.7		mg/L		101	90 - 110	0	15

Lab Sample ID: 580-108302-5 MS
Matrix: Water
Analysis Batch: 376642

Client Sample ID: MW-5
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	48		50.0	94.9		mg/L		93	90 - 110
Sulfate	84	F1	50.0	126	F1	mg/L		83	90 - 110

Lab Sample ID: 580-108302-5 MSD
Matrix: Water
Analysis Batch: 376642

Client Sample ID: MW-5
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	48		50.0	95.0		mg/L		93	90 - 110	0	15
Sulfate	84	F1	50.0	126	F1	mg/L		83	90 - 110	0	15

Lab Sample ID: MB 580-376650/10
Matrix: Water
Analysis Batch: 376650

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.5		mg/L			12/22/21 12:25	1
Sulfate	ND		1.5		mg/L			12/22/21 12:25	1

Lab Sample ID: LCS 580-376650/11
Matrix: Water
Analysis Batch: 376650

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride			50.0	51.0		mg/L		102	90 - 110
Sulfate			50.0	51.1		mg/L		102	90 - 110

Lab Sample ID: LCSD 580-376650/12
Matrix: Water
Analysis Batch: 376650

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride			50.0	51.0		mg/L		102	90 - 110	0	15
Sulfate			50.0	51.2		mg/L		102	90 - 110	0	15

Method: 350.1 - Nitrogen, Ammonia

Lab Sample ID: MB 580-376254/1-A
Matrix: Water
Analysis Batch: 376579

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 376254

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.50		mg/L		12/17/21 16:25	12/21/21 22:02	1

Lab Sample ID: LCS 580-376254/2-A
Matrix: Water
Analysis Batch: 376579

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 376254

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Ammonia			2.00	2.00		mg/L		100	90 - 110		

Lab Sample ID: 580-108302-3 MS
Matrix: Water
Analysis Batch: 376579

Client Sample ID: MW-3
Prep Type: Total/NA
Prep Batch: 376254

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Ammonia	ND		2.00	2.15		mg/L		108	90 - 110		

Lab Sample ID: 580-108302-3 MSD
Matrix: Water
Analysis Batch: 376579

Client Sample ID: MW-3
Prep Type: Total/NA
Prep Batch: 376254

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ammonia	ND		2.00	2.00		mg/L		100	90 - 110	7	20

Lab Sample ID: 580-108302-3 DU
Matrix: Water
Analysis Batch: 376579

Client Sample ID: MW-3
Prep Type: Total/NA
Prep Batch: 376254

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Ammonia	ND			ND		mg/L				NC	20

Method: SM 2320B - Alkalinity

Lab Sample ID: LCS 580-376260/2
Matrix: Water
Analysis Batch: 376260

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Alkalinity			100	93.5		mg/L		93	85 - 115		

Lab Sample ID: 580-108302-1 DU
Matrix: Water
Analysis Batch: 376260

Client Sample ID: MW-1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Alkalinity	280			282		mg/L				0.9	17
Bicarbonate Alkalinity as CaCO3	280			282		mg/L				0.9	20

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 580-375892/1
Matrix: Water
Analysis Batch: 375892

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		50		mg/L			12/15/21 07:02	1

Lab Sample ID: LCS 580-375892/2
Matrix: Water
Analysis Batch: 375892

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	1000	1070		mg/L		107	80 - 120

Lab Sample ID: 580-108302-1 DU
Matrix: Water
Analysis Batch: 375892

Client Sample ID: MW-1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	400		490		mg/L		20	20

Lab Sample ID: 580-108302-2 DU
Matrix: Water
Analysis Batch: 375892

Client Sample ID: MW-2
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	370		320		mg/L		15	20

Method: SM 2540D - Solids, Total Suspended (TSS)

Lab Sample ID: MB 580-375894/1
Matrix: Water
Analysis Batch: 375894

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	ND		2.0		mg/L			12/14/21 23:04	1

Lab Sample ID: LCS 580-375894/2
Matrix: Water
Analysis Batch: 375894

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Suspended Solids	500	428		mg/L		86	80 - 120

Lab Sample ID: MB 580-376017/1
Matrix: Water
Analysis Batch: 376017

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	ND		2.0		mg/L			12/15/21 19:09	1

Method: SM 2540D - Solids, Total Suspended (TSS) (Continued)

Lab Sample ID: LCS 580-376017/2
Matrix: Water
Analysis Batch: 376017

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Suspended Solids	500	410		mg/L		82	80 - 120

Method: SM 5310B - Organic Carbon, Total (TOC)

Lab Sample ID: MB 280-562190/38
Matrix: Water
Analysis Batch: 562190

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	ND		1.0		mg/L			12/30/21 02:05	1

Lab Sample ID: MB 280-562190/4
Matrix: Water
Analysis Batch: 562190

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	ND		1.0		mg/L			12/29/21 16:32	1

Lab Sample ID: LCS 280-562190/36
Matrix: Water
Analysis Batch: 562190

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
TOC Result 1	25.0	25.9		mg/L		104	88 - 112

Lab Sample ID: LCSD 280-562190/37
Matrix: Water
Analysis Batch: 562190

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
TOC Result 1	25.0	25.7		mg/L		103	88 - 112	1	15

Lab Sample ID: 580-108302-10 MS
Matrix: Water
Analysis Batch: 562190

Client Sample ID: MW-11
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
TOC Result 1	4.4		25.0	29.5		mg/L		100	88 - 112

Lab Sample ID: 580-108302-10 MSD
Matrix: Water
Analysis Batch: 562190

Client Sample ID: MW-11
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
TOC Result 1	4.4		25.0	29.6		mg/L		101	88 - 112	0	15

Method: SM 5310B - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: MB 280-562328/35
Matrix: Water
Analysis Batch: 562328

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	ND		1.0		mg/L			12/31/21 01:55	1

Lab Sample ID: MB 280-562328/4
Matrix: Water
Analysis Batch: 562328

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	ND		1.0		mg/L			12/30/21 17:19	1

Lab Sample ID: LCS 280-562328/34
Matrix: Water
Analysis Batch: 562328

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
TOC Result 1			25.0	24.8		mg/L		99	88 - 112		

Lab Chronicle

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-1

Lab Sample ID: 580-108302-1

Date Collected: 12/09/21 16:20
Date Received: 12/11/21 11:15

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	376188	12/17/21 13:14	JBT	FGS SEA
Total/NA	Analysis	RSK-175		1	700297	12/22/21 13:42	JCK	TAL SAV
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.7 Rev 4.4		1	376404	12/17/21 19:57	TMH	FGS SEA
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.8		1	378148	01/12/22 11:15	FCW	FGS SEA
Total/NA	Prep	200.8			376145	12/16/21 21:07	TMH	FGS SEA
Total/NA	Analysis	200.8		1	376340	12/17/21 18:38	FCW	FGS SEA
Total/NA	Analysis	300.0		1	375662	12/12/21 15:39	E1S	FGS SEA
Total/NA	Analysis	300.0		1	376642	12/20/21 15:25	E1S	FGS SEA
Total/NA	Prep	Distill/Ammonia			376254	12/17/21 16:25	MLT	FGS SEA
Total/NA	Analysis	350.1		1	376579	12/21/21 22:02	MLT	FGS SEA
Total/NA	Analysis	SM 2320B		1	376260	12/17/21 17:21	MLT	FGS SEA
Total/NA	Analysis	SM 2540C		1	375892	12/15/21 07:02	FCG	FGS SEA
Total/NA	Analysis	SM 2540D		1	376017	12/15/21 19:09	MLT	FGS SEA
Total/NA	Analysis	SM 5310B		1	562190	12/30/21 07:36	RAF	TAL DEN

Client Sample ID: MW-2

Lab Sample ID: 580-108302-2

Date Collected: 12/10/21 14:40
Date Received: 12/11/21 11:15

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	376188	12/17/21 13:39	JBT	FGS SEA
Total/NA	Analysis	RSK-175		1	700297	12/22/21 13:55	JCK	TAL SAV
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.7 Rev 4.4		1	376404	12/17/21 20:13	TMH	FGS SEA
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.8		1	378148	01/12/22 11:57	FCW	FGS SEA
Total/NA	Prep	200.8			376145	12/16/21 21:07	TMH	FGS SEA
Total/NA	Analysis	200.8		1	376340	12/17/21 19:32	FCW	FGS SEA
Total/NA	Analysis	300.0		2	375662	12/12/21 17:13	E1S	FGS SEA
Total/NA	Analysis	300.0		1	376642	12/20/21 15:37	E1S	FGS SEA
Total/NA	Prep	Distill/Ammonia			376254	12/17/21 16:25	MLT	FGS SEA
Total/NA	Analysis	350.1		1	376579	12/21/21 22:02	MLT	FGS SEA
Total/NA	Analysis	SM 2320B		1	376260	12/17/21 17:21	MLT	FGS SEA
Total/NA	Analysis	SM 2540C		1	375892	12/15/21 07:02	FCG	FGS SEA
Total/NA	Analysis	SM 2540D		1	376017	12/15/21 19:09	MLT	FGS SEA
Total/NA	Analysis	SM 5310B		1	562190	12/30/21 07:54	RAF	TAL DEN

Lab Chronicle

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-3

Lab Sample ID: 580-108302-3

Date Collected: 12/10/21 10:35
Date Received: 12/11/21 11:15

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	376188	12/17/21 14:03	JBT	FGS SEA
Total/NA	Analysis	RSK-175		1	700297	12/22/21 14:08	JCK	TAL SAV
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.7 Rev 4.4		1	376404	12/17/21 20:33	TMH	FGS SEA
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.8		1	378148	01/12/22 12:09	FCW	FGS SEA
Total/NA	Prep	200.8			376145	12/16/21 21:07	TMH	FGS SEA
Total/NA	Analysis	200.8		1	376340	12/17/21 19:36	FCW	FGS SEA
Total/NA	Analysis	300.0		1	375662	12/12/21 15:04	E1S	FGS SEA
Total/NA	Analysis	300.0		1	376642	12/20/21 15:48	E1S	FGS SEA
Total/NA	Prep	Distill/Ammonia			376254	12/17/21 16:25	MLT	FGS SEA
Total/NA	Analysis	350.1		1	376579	12/21/21 22:02	MLT	FGS SEA
Total/NA	Analysis	SM 2320B		1	376260	12/17/21 17:21	MLT	FGS SEA
Total/NA	Analysis	SM 2540C		1	375892	12/15/21 07:02	FCG	FGS SEA
Total/NA	Analysis	SM 2540D		1	376017	12/15/21 19:09	MLT	FGS SEA
Total/NA	Analysis	SM 5310B		1	562190	12/30/21 08:15	RAF	TAL DEN

Client Sample ID: MW-4

Lab Sample ID: 580-108302-4

Date Collected: 12/10/21 11:30
Date Received: 12/11/21 11:15

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	376188	12/17/21 14:28	JBT	FGS SEA
Total/NA	Analysis	RSK-175		1	700297	12/22/21 14:20	JCK	TAL SAV
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.7 Rev 4.4		1	376404	12/17/21 20:36	TMH	FGS SEA
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.8		1	378148	01/12/22 12:13	FCW	FGS SEA
Total/NA	Prep	200.8			376145	12/16/21 21:07	TMH	FGS SEA
Total/NA	Analysis	200.8		1	376340	12/17/21 19:40	FCW	FGS SEA
Total/NA	Analysis	300.0		1	375662	12/12/21 14:52	E1S	FGS SEA
Total/NA	Analysis	300.0		1	376642	12/20/21 16:00	E1S	FGS SEA
Total/NA	Prep	Distill/Ammonia			376254	12/17/21 16:25	MLT	FGS SEA
Total/NA	Analysis	350.1		1	376579	12/21/21 22:02	MLT	FGS SEA
Total/NA	Analysis	SM 2320B		1	376260	12/17/21 17:21	MLT	FGS SEA
Total/NA	Analysis	SM 2540C		1	375892	12/15/21 07:02	FCG	FGS SEA
Total/NA	Analysis	SM 2540D		1	376017	12/15/21 19:09	MLT	FGS SEA
Total/NA	Analysis	SM 5310B		1	562190	12/30/21 08:32	RAF	TAL DEN

Lab Chronicle

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-5

Lab Sample ID: 580-108302-5

Date Collected: 12/09/21 14:20

Matrix: Water

Date Received: 12/11/21 11:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	376188	12/17/21 17:26	JBT	FGS SEA
Total/NA	Analysis	RSK-175		1	700297	12/22/21 14:33	JCK	TAL SAV
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.7 Rev 4.4		1	376404	12/17/21 20:39	TMH	FGS SEA
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.8		1	378148	01/12/22 12:16	FCW	FGS SEA
Total/NA	Prep	200.8			376145	12/16/21 21:07	TMH	FGS SEA
Total/NA	Analysis	200.8		1	376340	12/17/21 19:44	FCW	FGS SEA
Total/NA	Analysis	300.0		1	375662	12/12/21 16:15	E1S	FGS SEA
Total/NA	Analysis	300.0		1	376642	12/20/21 16:35	E1S	FGS SEA
Total/NA	Prep	Distill/Ammonia			376254	12/17/21 16:25	MLT	FGS SEA
Total/NA	Analysis	350.1		1	376579	12/21/21 22:02	MLT	FGS SEA
Total/NA	Analysis	SM 2320B		1	376260	12/17/21 17:21	MLT	FGS SEA
Total/NA	Analysis	SM 2540C		1	375892	12/15/21 07:02	FCG	FGS SEA
Total/NA	Analysis	SM 2540D		1	376017	12/15/21 19:09	MLT	FGS SEA
Total/NA	Analysis	SM 5310B		1	562190	12/30/21 08:50	RAF	TAL DEN

Client Sample ID: MW-6

Lab Sample ID: 580-108302-6

Date Collected: 12/09/21 15:25

Matrix: Water

Date Received: 12/11/21 11:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	376188	12/17/21 17:50	JBT	FGS SEA
Total/NA	Analysis	8260D	DL	10	376446	12/20/21 15:07	JSM	FGS SEA
Total/NA	Analysis	RSK-175		1	700297	12/22/21 14:46	JCK	TAL SAV
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.7 Rev 4.4		1	376404	12/17/21 20:43	TMH	FGS SEA
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.8		1	378148	01/12/22 12:20	FCW	FGS SEA
Total/NA	Prep	200.8			376145	12/16/21 21:07	TMH	FGS SEA
Total/NA	Analysis	200.8		1	376340	12/17/21 19:48	FCW	FGS SEA
Total/NA	Analysis	300.0		1	375662	12/12/21 16:26	E1S	FGS SEA
Total/NA	Analysis	300.0		1	376642	12/20/21 17:10	E1S	FGS SEA
Total/NA	Prep	Distill/Ammonia			376254	12/17/21 16:25	MLT	FGS SEA
Total/NA	Analysis	350.1		1	376579	12/21/21 22:02	MLT	FGS SEA
Total/NA	Analysis	SM 2320B		1	376260	12/17/21 17:21	MLT	FGS SEA
Total/NA	Analysis	SM 2540C		1	375892	12/15/21 07:02	FCG	FGS SEA
Total/NA	Analysis	SM 2540D		1	376017	12/15/21 19:09	MLT	FGS SEA
Total/NA	Analysis	SM 5310B		1	562190	12/30/21 09:40	RAF	TAL DEN

Client Sample ID: MW-8

Lab Sample ID: 580-108302-7

Date Collected: 12/10/21 12:30

Matrix: Water

Date Received: 12/11/21 11:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	376188	12/17/21 18:15	JBT	FGS SEA
Total/NA	Analysis	RSK-175		1	700297	12/22/21 14:59	JCK	TAL SAV
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.7 Rev 4.4		1	376404	12/17/21 20:46	TMH	FGS SEA
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.8		1	378148	01/12/22 12:24	FCW	FGS SEA
Total/NA	Prep	200.8			376145	12/16/21 21:07	TMH	FGS SEA
Total/NA	Analysis	200.8		1	376340	12/17/21 19:51	FCW	FGS SEA
Total/NA	Analysis	300.0		2	375662	12/12/21 17:25	E1S	FGS SEA
Total/NA	Analysis	300.0		1	376642	12/20/21 17:22	E1S	FGS SEA
Total/NA	Prep	Distill/Ammonia			376254	12/17/21 16:25	MLT	FGS SEA
Total/NA	Analysis	350.1		1	376579	12/21/21 22:02	MLT	FGS SEA
Total/NA	Analysis	SM 2320B		1	376260	12/17/21 17:21	MLT	FGS SEA
Total/NA	Analysis	SM 2540C		1	375892	12/15/21 07:02	FCG	FGS SEA
Total/NA	Analysis	SM 2540D		1	376017	12/15/21 19:09	MLT	FGS SEA
Total/NA	Analysis	SM 5310B		1	562190	12/30/21 10:03	RAF	TAL DEN

Client Sample ID: MW-9

Lab Sample ID: 580-108302-8

Date Collected: 12/10/21 09:30

Matrix: Water

Date Received: 12/11/21 11:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	376188	12/17/21 18:39	JBT	FGS SEA
Total/NA	Analysis	RSK-175		1	700297	12/22/21 15:12	JCK	TAL SAV
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.7 Rev 4.4		1	376404	12/17/21 20:49	TMH	FGS SEA
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.8		1	378148	01/12/22 12:28	FCW	FGS SEA
Total/NA	Prep	200.8			376145	12/16/21 21:07	TMH	FGS SEA
Total/NA	Analysis	200.8		1	376340	12/17/21 19:55	FCW	FGS SEA
Total/NA	Analysis	300.0		1	375662	12/12/21 15:16	E1S	FGS SEA
Total/NA	Analysis	300.0		1	376642	12/20/21 17:34	E1S	FGS SEA
Total/NA	Prep	Distill/Ammonia			376254	12/17/21 16:25	MLT	FGS SEA
Total/NA	Analysis	350.1		1	376579	12/21/21 22:02	MLT	FGS SEA
Total/NA	Analysis	SM 2320B		1	376260	12/17/21 17:21	MLT	FGS SEA
Total/NA	Analysis	SM 2540C		1	375892	12/15/21 07:02	FCG	FGS SEA
Total/NA	Analysis	SM 2540D		1	376017	12/15/21 19:09	MLT	FGS SEA
Total/NA	Analysis	SM 5310B		1	562190	12/30/21 10:18	RAF	TAL DEN

Client Sample ID: MW-10

Lab Sample ID: 580-108302-9

Date Collected: 12/09/21 13:35

Matrix: Water

Date Received: 12/11/21 11:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	376188	12/17/21 19:04	JBT	FGS SEA
Total/NA	Analysis	RSK-175		1	700297	12/22/21 15:25	JCK	TAL SAV
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.7 Rev 4.4		1	376404	12/17/21 20:53	TMH	FGS SEA
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.8		1	378148	01/12/22 12:47	FCW	FGS SEA
Total/NA	Prep	200.8			376145	12/16/21 21:07	TMH	FGS SEA
Total/NA	Analysis	200.8		1	376340	12/17/21 20:15	FCW	FGS SEA
Total/NA	Analysis	300.0		1	375662	12/12/21 16:38	E1S	FGS SEA
Total/NA	Analysis	300.0		1	376642	12/20/21 17:45	E1S	FGS SEA
Total/NA	Prep	Distill/Ammonia			376254	12/17/21 16:25	MLT	FGS SEA
Total/NA	Analysis	350.1		1	376579	12/21/21 22:02	MLT	FGS SEA
Total/NA	Analysis	SM 2320B		1	376260	12/17/21 17:21	MLT	FGS SEA
Total/NA	Analysis	SM 2540C		1	375892	12/15/21 07:02	FCG	FGS SEA
Total/NA	Analysis	SM 2540D		1	375894	12/14/21 23:04	FCG	FGS SEA
Total/NA	Analysis	SM 5310B		1	562190	12/30/21 10:41	RAF	TAL DEN

Client Sample ID: MW-11

Lab Sample ID: 580-108302-10

Date Collected: 12/09/21 12:40

Matrix: Water

Date Received: 12/11/21 11:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	376188	12/17/21 19:28	JBT	FGS SEA
Total/NA	Analysis	RSK-175		1	700297	12/22/21 15:38	JCK	TAL SAV
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.7 Rev 4.4		1	376404	12/17/21 20:56	TMH	FGS SEA
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.8		1	378148	01/12/22 12:51	FCW	FGS SEA
Total/NA	Prep	200.8			376145	12/16/21 21:07	TMH	FGS SEA
Total/NA	Analysis	200.8		1	376340	12/17/21 20:18	FCW	FGS SEA
Total/NA	Analysis	300.0		5	375662	12/12/21 16:50	E1S	FGS SEA
Total/NA	Analysis	300.0		5	376650	12/22/21 11:03	E1S	FGS SEA
Total/NA	Prep	Distill/Ammonia			376254	12/17/21 16:25	MLT	FGS SEA
Total/NA	Analysis	350.1		1	376579	12/21/21 22:02	MLT	FGS SEA
Total/NA	Analysis	SM 2320B		1	376260	12/17/21 17:21	MLT	FGS SEA
Total/NA	Analysis	SM 2540C		1	375892	12/15/21 07:02	FCG	FGS SEA
Total/NA	Analysis	SM 2540D		1	375894	12/14/21 23:04	FCG	FGS SEA
Total/NA	Analysis	SM 5310B		1	562190	12/30/21 10:57	RAF	TAL DEN

Lab Chronicle

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: MW-12

Lab Sample ID: 580-108302-11

Date Collected: 12/10/21 13:40
Date Received: 12/11/21 11:15

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	376188	12/17/21 15:49	JBT	FGS SEA
Total/NA	Analysis	RSK-175		1	700297	12/22/21 16:24	JCK	TAL SAV
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.7 Rev 4.4		1	376404	12/17/21 21:07	TMH	FGS SEA
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.8		1	378148	01/12/22 12:55	FCW	FGS SEA
Total/NA	Prep	200.8			376145	12/16/21 21:07	TMH	FGS SEA
Total/NA	Analysis	200.8		1	376340	12/17/21 20:22	FCW	FGS SEA
Total/NA	Analysis	300.0		1	375662	12/12/21 13:54	E1S	FGS SEA
Total/NA	Analysis	300.0		1	376642	12/20/21 18:09	E1S	FGS SEA
Total/NA	Prep	Distill/Ammonia			376254	12/17/21 16:25	MLT	FGS SEA
Total/NA	Analysis	350.1		1	376579	12/21/21 22:02	MLT	FGS SEA
Total/NA	Analysis	SM 2320B		1	376260	12/17/21 17:21	MLT	FGS SEA
Total/NA	Analysis	SM 2540C		1	375892	12/15/21 07:02	FCG	FGS SEA
Total/NA	Analysis	SM 2540D		1	376017	12/15/21 19:09	MLT	FGS SEA
Total/NA	Analysis	SM 5310B		1	562328	12/31/21 09:39	RAF	TAL DEN

Client Sample ID: MW-21

Lab Sample ID: 580-108302-12

Date Collected: 12/10/21 07:00
Date Received: 12/11/21 11:15

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	376295	12/18/21 19:31	JBT	FGS SEA
Total/NA	Analysis	RSK-175		1	700297	12/22/21 16:37	JCK	TAL SAV
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.7 Rev 4.4		1	376404	12/17/21 21:10	TMH	FGS SEA
Dissolved	Prep	200.8			376146	12/16/21 21:10	TMH	FGS SEA
Dissolved	Analysis	200.8		1	378148	01/12/22 12:59	FCW	FGS SEA
Total/NA	Prep	200.8			376145	12/16/21 21:07	TMH	FGS SEA
Total/NA	Analysis	200.8		1	376340	12/17/21 20:26	FCW	FGS SEA
Total/NA	Analysis	300.0		1	375662	12/12/21 15:28	E1S	FGS SEA
Total/NA	Analysis	300.0		1	376642	12/20/21 18:20	E1S	FGS SEA
Total/NA	Prep	Distill/Ammonia			376254	12/17/21 16:25	MLT	FGS SEA
Total/NA	Analysis	350.1		1	376579	12/21/21 22:02	MLT	FGS SEA
Total/NA	Analysis	SM 2320B		1	376260	12/17/21 17:21	MLT	FGS SEA
Total/NA	Analysis	SM 2540C		1	375892	12/15/21 07:02	FCG	FGS SEA
Total/NA	Analysis	SM 2540D		1	376017	12/15/21 19:09	MLT	FGS SEA
Total/NA	Analysis	SM 5310B		1	562328	12/31/21 10:27	RAF	TAL DEN

Lab Chronicle

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Client Sample ID: TRIP BLANK

Date Collected: 12/09/21 00:01
Date Received: 12/11/21 11:15

Lab Sample ID: 580-108302-13

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	376295	12/18/21 17:02	JBT	FGS SEA
Total/NA	Analysis	RSK-175		1	700297	12/22/21 16:50	JCK	TAL SAV

Laboratory References:

FGS SEA = Eurofins Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

TAL DEN = Eurofins Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

TAL SAV = Eurofins Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Accreditation/Certification Summary

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Laboratory: Eurofins Seattle

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Oregon	NELAP	4167	07-07-22

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
SM 2320B		Water	Bicarbonate Alkalinity as CaCO3

Washington	State	C788	07-13-22

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
SM 2320B		Water	Bicarbonate Alkalinity as CaCO3

Laboratory: Eurofins Denver

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Washington	State	C583-19	08-03-22

Laboratory: Eurofins Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
	AFCEE	SAVLAB	
Alabama	State	41450	06-30-22
Alaska (UST)	State	17-016	09-22-22
ANAB	Dept. of Defense ELAP	L2463	09-18-22
ANAB	ISO/IEC 17025	L2463.01	09-22-22
Arkansas DEQ	State	19-015-0	02-01-22
California	State	2939	06-30-22
Connecticut	State	PH-0161	01-10-22
Florida	NELAP	E87052	06-30-22
Georgia	State	E87052	06-30-22
Georgia (DW)	State	803	06-30-22
Guam	State	19-007R	04-17-22
Hawaii	State	<cert No.>	06-30-22
Illinois	NELAP	200022	11-30-22
Indiana	State	C-GA-02	06-30-22
Iowa	State	353	07-01-23
Kentucky (UST)	State	NA	06-30-22
Louisiana	NELAP	02011	06-30-22
Louisiana (DW)	State	LA009	12-31-21
Maine	State	GA00006	09-25-22
Maryland	State	250	12-31-22
Massachusetts	State	M-GA006	06-30-22
Michigan	State	9925	03-05-22
Mississippi	State	<cert No.>	06-30-22
Nebraska	State	NE-OS-7-04	06-30-22
New Jersey	NELAP	GA769	06-30-22
New Mexico	State	GA00006	06-30-22
New York	NELAP	10842	04-01-22
North Carolina (DW)	State	13701	07-01-22

Accreditation/Certification Summary

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Laboratory: Eurofins Savannah (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
North Carolina (WW/SW)	State	269	12-31-21
Pennsylvania	NELAP	68-00474	06-30-22
Puerto Rico	State	GA00006	01-01-23
South Carolina	State	98001	01-11-22
Tennessee	State	02961	06-30-22
Texas	NELAP	T1047004185-19-14	11-30-22
Texas	TCEQ Water Supply	T104704185	06-30-22
USDA	US Federal Programs	P330-18-00313	09-03-24
Virginia	NELAP	10509	01-12-22
Washington	State	C805	06-10-22
Wisconsin	State	999819810	08-31-22
Wyoming	State	8TMS-L	06-30-22

Sample Summary

Client: Parametrix, Inc.
Project/Site: Horn Rapids Landfill

Job ID: 580-108302-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-108302-1	MW-1	Water	12/09/21 16:20	12/11/21 11:15
580-108302-2	MW-2	Water	12/10/21 14:40	12/11/21 11:15
580-108302-3	MW-3	Water	12/10/21 10:35	12/11/21 11:15
580-108302-4	MW-4	Water	12/10/21 11:30	12/11/21 11:15
580-108302-5	MW-5	Water	12/09/21 14:20	12/11/21 11:15
580-108302-6	MW-6	Water	12/09/21 15:25	12/11/21 11:15
580-108302-7	MW-8	Water	12/10/21 12:30	12/11/21 11:15
580-108302-8	MW-9	Water	12/10/21 09:30	12/11/21 11:15
580-108302-9	MW-10	Water	12/09/21 13:35	12/11/21 11:15
580-108302-10	MW-11	Water	12/09/21 12:40	12/11/21 11:15
580-108302-11	MW-12	Water	12/10/21 13:40	12/11/21 11:15
580-108302-12	MW-21	Water	12/10/21 07:00	12/11/21 11:15
580-108302-13	TRIP BLANK	Water	12/09/21 00:01	12/11/21 11:15

TestAmerica Seattle
5755 8th Street East

Tacoma, WA 98424
phone 253.922.2310 fax 253.922.5047

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☑ Other: **WAC 173-351**

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Lisa Gilbert	Date:	COC No:
Parametrix, Inc.	Tel/Fax: (206) 394-3667	Carrier:	____ of ____ COCs
719 Second Avenue, Suite 200	Analysis Turnaround Time		Sampler:
Seattle, WA 98104	☐ CALENDAR DAYS ☑ WORKING DAYS		For Lab Use Only:
(206) 394-3700	TAT if different from Below ____		Walk-in Client:
	☑ 2 weeks		Lab Sampling:
Project Name: Horn Rapids Landfill	☐ 1 week		
Site: Richland, WA	☐ 2 days		Job / SDG No.:
P O #	☐ 1 day		

Sample Identification	Sample Date	Sample Time	Sample Type (C/Comp-G/Grab)	Matrix	# of Cont.	Perform MS / MSD (Y / N)	VOCs (8260C) WAC 173-351 App I	Alk, Bicarb, Cl, Sulfate, Nitrate	TDS, TSS	Ammonia	TOC	D Metals (Fe, Mn, Ca, Mg, K, Na)	Total Metals (WAC173-351Appl)	Methane, Ethane, Ethene	Sample Specific Notes:
MW-1	12/9/21	1620	G	water	12		x	x	x	x	x	x	x	x	Dissolved metals are field filtered
MW-2	12/10/21	1440		water	12		x	x	x	x	x	x	x	x	
MW-3	12/10/21	1035		water	12		x	x	x	x	x	x	x	x	
MW-4	12/10/21	1130		water	12		x	x	x	x	x	x	x	x	
MW-5	12/9/21	1420		water	12		x	x	x	x	x	x	x	x	
MW-6	12/9/21	1525		water	12		x	x	x	x	x	x	x	x	
MW-8	12/10/21	1230		water	12		x	x	x	x	x	x	x	x	
MW-9	12/16/21	0930		water	12		x	x	x	x	x	x	x	x	
MW-10	12/9/21	1335		water	12		x	x	x	x	x	x	x	x	
MW-11	12/9/21	1240		water	12		x	x	x	x	x	x	x	x	
MW-12	12/10/21	1340		water	18	Y	x	x	x	x	x	x	x	x	MS/MSD VOCs only
MW-21	12/10/21	0700		water	12		x	x	x	x	x	x	x	x	
Trip Blank	—	—	—	water			x							x	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for ____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: ____ Corr'd: ____ Therm ID No.: ____

Relinquished by:	Parametrix, Inc	Date/Time: 12/11/21 1115	Received by: DIANA VALLELIANA	Company: EFGS	Date/Time: 12/11/21 1115
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:		

580-108302 Chain of Custody

Therm. ID: IR9 Cor: 2.8 ° Unc: 2.6 °
Cooler Dsc: LB
Packing: Bub
Cust. Seal: Yes ___ No ✓
Blue Ice, Wet, Dry, None
FedEx:
UPS:
Lab Cour:
Other: CD

Therm. ID: IR9 Cor: 1.8 ° Unc: 1.6 °
Cooler Dsc: LB
Packing: Bub
Cust. Seal: Yes ___ No ✓
Blue Ice, Wet, Dry, None
FedEx:
UPS:
Lab Cour:
Other: CD

Therm. ID: IR9 Cor: 4.4 ° Unc: 4.6 °
Cooler Dsc: LB
Packing: Bub
Cust. Seal: Yes ___ No ✓
Blue Ice, Wet, Dry, None
FedEx:
UPS:
Lab Cour:
Other: CD

Parametrix
rcd. 12/11/21
@ 1115

Eurofins FGS, Seattle
5755 8th Street East
Tacoma, WA 98424
Phone: 253-922-2310 Fax: 425-420-9210

Chain of Custody Record

eurofins | Environment Testing America

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lewis, Nathan A	Carrier Tracking No(s):	COC No: 580-98243.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Nathan.Lewis@Eurofinset.com	State of Origin: Washington	Page: Page 1 of 2
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): NELAP - Oregon; State - Washington; State Program - Was ...		Job #: 580-108302-1
Address: 4955 Yarrow Street, ,	Due Date Requested: 1/2/2022			
City: Arvada	TAT Requested (days):			
State, Zip: CO, 80002				
Phone: 303-736-0100(Tel) 303-431-7171(Fax)	PO #:			
Email:	WO #:			
Project Name: Horn Rapids Landfill	Project #: 58013566			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SM5310B/ (MOD) Local Method	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
MW-1 (580-108302-1)	12/9/21	16:20 Pacific		Water			X	1	
MW-2 (580-108302-2)	12/10/21	14:40 Pacific		Water			X	1	
MW-3 (580-108302-3)	12/10/21	10:35 Pacific		Water			X	1	
MW-4 (580-108302-4)	12/10/21	11:30 Pacific		Water			X	1	
MW-5 (580-108302-5)	12/9/21	14:20 Pacific		Water			X	1	
MW-6 (580-108302-6)	12/9/21	15:25 Pacific		Water			X	1	
MW-8 (580-108302-7)	12/10/21	12:30 Pacific		Water			X	1	
MW-9 (580-108302-8)	12/10/21	09:30 Pacific		Water			X	1	
MW-10 (580-108302-9)	12/9/21	13:35 Pacific		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins Frontier Global Sciences LLC places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Frontier Global Sciences LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Frontier Global Sciences LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Frontier Global Sciences LLC.

Possible Hazard Identification	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)***
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Tom Blume	12 13 21			12/14/2021 1040	ETA DEN
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact:	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:
		29.1/29.0.1

Eurofins FGS, Seattle
5755 8th Street East
Tacoma, WA 98424
Phone: 253-922-2310 Fax: 425-420-9210

Chain of Custody Record

eurofins | Environment Testing America

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lewis, Nathan A	Carrier Tracking No(s):	COC No: 580-98243.2
Client Contact: Shipping/Receiving	Phone:	E-Mail: Nathan.Lewis@Eurofinset.com	State of Origin: Washington	Page: Page 2 of 2
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): NELAP - Oregon; State - Washington; State Program - Was ...		Job #: 580-108302-1
Address: 4955 Yarrow Street, ,	Due Date Requested: 1/2/2022			
City: Arvada	TAT Requested (days):			
State, Zip: CO, 80002				
Phone: 303-736-0100(Tel) 303-431-7171(Fax)	PO #:			
Email:	WO #:			
Project Name: Horn Rapids Landfill	Project #: 58013566			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SM5310B/ (MOD) Local Method	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
MW-11 (580-108302-10)	12/9/21	12:40 Pacific		Water			X	1	
MW-12 (580-108302-11)	12/10/21	13:40 Pacific		Water			X	1	
MW-21 (580-108302-12)	12/10/21	07:00 Pacific		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins Frontier Global Sciences LLC places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Frontier Global Sciences LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Frontier Global Sciences LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Frontier Global Sciences LLC.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	Tom B	12 13 21			12/14/2021 1040	ETA DEN
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Eurofins FGS, Seattle
5755 8th Street East
Tacoma WA 98424
Phone 253-922-2310 Fax: 425-420-9210

Chain of Custody Record

eurofins Environment Testing America

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Lewis, Nathan A	Carrier Tracking No(s):	COC No: 580-98237 1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Nathan Lewis@Eurofinset.com	State of Origin: Washington	Page: Page 1 of 2
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): NELAP - Oregon, State - Washington, State Program - Was		Job #: 580-108302-1
Address: 5102 LaRoche Avenue	Due Date Requested 1/2/2022			
City: Savannah	TAT Requested (days)			
State, Zip: GA, 31404				
Phone: 912-354-7858(Tel) 912-352-0165(Fax)	PO #:			
Email:	WO #:			
Project Name: Horn Rapids Landfill	Project #: 58013566			
Site:	SSOW#:			

Analysis Requested

Preservation Codes.

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	RSK_175/ (MOD) Methane, Ethane, & Ethene	Total Number of containers	Special Instructions/Note.
			Preservation Code:						
MW-1 (580-108302-1)	12/9/21	16.20 Pacific		Water			X	3	
MW-2 (580-108302-2)	12/10/21	14.40 Pacific		Water			X	3	
MW-3 (580-108302-3)	12/10/21	10 35 Pacific		Water			X	3	
MW-4 (580-108302-4)	12/10/21	11 30 Pacific		Water			X	3	
MW-5 (580-108302-5)	12/9/21	14.20 Pacific		Water			X	3	
MW-6 (580-108302-6)	12/9/21	15.25 Pacific		Water			X	3	
MW-8 (580-108302-7)	12/10/21	12.30 Pacific		Water			X	3	
MW-9 (580-108302-8)	12/10/21	09 30 Pacific		Water			X	3	
MW-10 (580-108302-9)	12/9/21	13:35 Pacific		Water			X	3	

Note: Since laboratory accreditations are subject to change, Eurofins Frontier Global Sciences LLC places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Frontier Global Sciences LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Frontier Global Sciences LLC attention immediately If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Frontier Global Sciences LLC.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested I II III, IV Other (specify) Primary Deliverable Rank. 2	Special Instructions/QC Requirements

Empty Kit Relinquished by:	Date	Time	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	Tom Blount	12 13 21			12/15 1050	
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No	Cooler Temperature(s) °C and Other Remarks:	4.0/4.1

Ver: 06/08/2021

Eurofins FGS, Seattle
5755 8th Street East
Tacoma WA 98424
Phone 253-922-2310 Fax: 425-420-9210

Chain of Custody Record

eurofins Environment Testing America

Client Information (Sub Contract Lab)	Sampler	Lab PM: Lewis, Nathan A	Carrier Tracking No(s):	COC No: 580-98237.2
Client Contact: Shipping/Receiving	Phone:	E-Mail: Nathan.Lewis@Eurofinset.com	State of Origin: Washington	Page: Page 2 of 2
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): NELAP - Oregon State - Washington State Program - Was		Job #: 580-108302-1
Address: 5102 LaRoche Avenue,	Due Date Requested: 1/2/2022			
City: Savannah	TAT Requested (days)			
State, Zip: GA, 31404				
Phone: 912-354-7858(Tel) 912-352-0165(Fax)	PO #:			
Email:	WO #:			
Project Name: Horn Rapids Landfill	Project #: 58013566			
Site:	SSOW#:			

Analysis Requested

Preservation Codes.

A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	RSK_176/ (MOD) Methane, Ethane, & Ethene	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
MW-11 (580-108302-10)	12/9/21	12:40 Pacific		Water			X	3	
MW-12 (580-108302-11)	12/10/21	13.40 Pacific		Water			X	2	
MW-21 (580-108302-12)	12/10/21	07:00 Pacific		Water			X	3	
TRIP BLANK (580-108302-13)	12/9/21	00 01 Pacific		Water			X	4	

Note: Since laboratory accreditations are subject to change. Eurofins Frontier Global Sciences LLC places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Frontier Global Sciences LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Frontier Global Sciences LLC attention immediately If all requested accreditations are current to date return the signed Chain of Custody attesting to said complicance to Eurofins Frontier Global Sciences LLC.

Possible Hazard Identification *Unconfirmed*	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*** ☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested I II III IV Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements

Empty Kit Relinquished by:	Date	Time	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Tom Blank	12 13 21				
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 12/15 1050	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No	Cooler Temperature(s) °C and Other Remarks. 4.0/4.1

Ver: 06/08/2021

Login Sample Receipt Checklist

Client: Parametrix, Inc.

Job Number: 580-108302-1

Login Number: 108302
List Number: 1
Creator: Vallelunga, Diana L

List Source: Eurofins Seattle

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	False	Refer to Job Narrative for details.
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Parametrix, Inc.

Job Number: 580-108302-1

Login Number: 108302
List Number: 2
Creator: O'Hara, Jake F

List Source: Eurofins Denver
List Creation: 12/14/21 02:08 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Parametrix, Inc.

Job Number: 580-108302-1

Login Number: 108302
List Number: 3
Creator: Hartley, Tyler

List Source: Eurofins Savannah
List Creation: 12/15/21 12:07 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Project:	**Horn Rapids Landfill Fourth Quarter 2021: 555-3820-004**
Date Completed:	**1.13.22**
Sample Numbers:	MW-1 through MW-6, MW-8 through MW-12, MW-21, and TB Test America 580-108302 MS/MSD and duplicate samples collected at MW-12
QA/QC Completed By:	Erika Beyer
Holding Times:	All within limits except Nitrate
Chain vs Data:	All compounds indicated on COC were analyzed except Iron
Blanks:	(List any compounds detected) MB None Trip Methane detected, 0.67 ug/L.
Lab Comments:	The samples were received on 12/11/2021 11:15 AM. The samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 1.8º C, 2.8º C and 4.8º C.

VOCs (8260B and 8260D)

Method 8260D:Batch 580-376188 recovered above the upper control limit for 1,2,4-Trimethylbenzene, 2-Chlorotoluene, 4-Chlorotoluene, 4-Isopropyltoluene, Isopropylbenzene, m-Xylene & p-Xylene, N-Propylbenzene, tert-Butylbenzene, . The samples associated with this were non-detects for the affected analytes; therefore, the data have been reported. The associated samples impacted: MW-12 (580-108302-11), MW-12 (580-108302-11[MS]) and MW-12 (580-108302-11[MSD]). In MS MW-12 m-Xylene & p-Xylene were at 127 %Rec, Xylene at 123 %Rec for MS. MSD MW-12 m-Xylene and p-Xylene were 129 %Rec and Xylenes 125 % Rec.

Method 8260D: The following sample was diluted to bring the concentration of target analytes within the calibration range: MW-6 (580-108302-6).

RSK-175

Method RSK-175: Trip Blank had a detection of Methane at 0.67 ug/L. All samples greater than 0.67 ug/L will be recorded. Samples less than 0.67 ug/L Methane will be recorded as Non detect.

Metals (200.8)

No issues.

Project: **Horn Rapids Landfill Fourth Quarter 2021: 555-3820-004**
Date Completed: **1.13.22**
Sample Numbers: MW-1 through MW-6, MW-8 through MW-12, MW-21, and TB
Test America 580-108302
MS/MSD and duplicate samples collected at MW-12
QA/QC Completed By: Erika Beyer

General Chemistry

Method 300.0: The following sample(s) was received with less than 2 days remaining on the holding time or less than one shift (8 hours) remaining on a test with a holding time of 48 hours or less. As such, the laboratory had insufficient time remaining to perform the analysis for Nitrate within holding time: MW-1 (580-108302-1), MW-2 (580-108302-2), MW-3 (580-108302-3), MW-4 (580-108302-4), MW-5 (580-108302-5), MW-6 (580-108302-6), MW-8 (580-108302-7), MW-9 (580-108302-8), MW-10 (580-108302-9), MW-11 (580-108302-10), MW-12 (580-108302-11), MW-12 (580-108302-11[MS]), MW-12 (580-108302-11[MSD]) and MW-21 (580-108302-12).

Method 300. The matrix spike / matrix spike duplicate (MS/MSD) recoveries for Sulfate in MW-5 were outside control limits LOW at 83 %Rec. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Parametrix Qualifiers
J Qualify sulfate in MW-5, currently flagged F1 due to low %Rec, 83%, in MS/MSD

Retain H qualifiers for nitrate in MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-8, MW-9, MW-10, MW-11, and MW-12 due to analysis past the holding time.

Remove F1 qualifier for m-Xylenes, p-Xylenes, and Xylenes due to high %Rec and Non detects in samples for MW-12.
U qualifier placed for Methane samples below 0.67 ug/L for samples MW-1, MW-2, MW-3, and MW-4.
J Qualify MW-12 and MW-21 Duplicate for Total Dissolved Solids. Duplicate result not within RL. Result is 31% RPD.
J Qualify MW-12 and MW-21 Duplicate for Carbon Disulfide. Duplicate result not within RL. Result is 95% RPD.

Data Validation Horn Rapids 555-3820-004

QA/QC completed by: Erika Beyer 1/13/2022

Sample number: MW-1, -2, -3, -4, -5, -6, -8. -9, -10, -11,-12, -21
Test America 580-108302-1 thru 580-108302-13

Sample Date: December 09 and December 10

Parameter	sample	duplicate	avg	diff	rpd	=/<25%	RL	w/in RL?
	MW-12	MW-21						
Metals total (ug/L)								
Arsenic	0.006	0.0057	0.00585	0.0003	5	y	0.001	
Antimony	<0.0008	<0.0008	#DIV/0!	#VALUE!	#VALUE!		0.0008	y
Barium	0.056	0.051	0.0535	0.005	9	y	0.0012	
Beryllium	<0.0004	<0.0004	#DIV/0!	#VALUE!	#VALUE!		0.0004	y
Cadmium	<0.0004	<0.0004	#DIV/0!	#VALUE!	#VALUE!		0.0004	y
Chromium	0.007	0.0068	0.0069	0.0002	3	y	0.0008	
Cobalt	<0.0004	<0.0004	#DIV/0!	#VALUE!	#VALUE!		0.0004	y
Copper	0.0047	0.0048	0.00475	-1E-04	2	y	0.002	
Lead	<0.0004	<0.0004	#DIV/0!	#VALUE!	#VALUE!		0.0004	y
Nickel	0.004	0.0043	0.00415	-0.0003	7	y	0.003	
Selenium	<0.0008	<0.0008	#DIV/0!	#VALUE!	#VALUE!		0.008	y
Silver	<0.0004	<0.0004	#DIV/0!	#VALUE!	#VALUE!		0.0004	y
Thallium	<0.001	<0.001	#DIV/0!	#VALUE!	#VALUE!		0.001	y
Vanadium	0.013	0.012	0.0125	0.001	8	y	0.004	
Zinc	<0.007	<0.007	#DIV/0!	#VALUE!	#VALUE!		0.007	y
Metals dissolved (ug/L)								
Calcium	63	64	63.5	-1	2	y	0.5	
Magnesium	12	12	12	0	0	y	0.5	
Manganese	<0.020	<0.020	#DIV/0!	#VALUE!	#VALUE!		0.02	y
Potassium	7.7	8	7.85	-0.3	4	y	3.3	
Sodium	20	21	20.5	-1	5	y	0.5	
Iron	<0.10	<0.10	#DIV/0!	#VALUE!	#VALUE!		0.1	y
RSK (ug/L)								
ethane	<1.1	<1.1	#DIV/0!	#VALUE!	#VALUE!		1.1	y
ethene	<1.0	<1.0	#DIV/0!	#VALUE!	#VALUE!		1	y
methane	0.69	<0.58	0.69	#VALUE!	#VALUE!		0.58	y

Data Validation Horn Rapids 555-3820-004

QA/QC completed by: Erika Beyer 1/13/2022

Sample number: MW-1, -2, -3, -4, -5, -6, -8. -9, -10, -11,-12, -21
Test America 580-108302-1 thru 580-108302-13

Sample Date: December 09 and December 10

Parameter	sample	duplicate	avg	diff	rpd	=/<25%	RL	w/in RL?
	MW-12	MW-21						
Conventionals (mg/L)								
chloride	14	14	14	0	0	y	1.5	
nitrate	5.2	5.2	5.2	0	0	y	0.2	
sulfate	35	35	35	0	0	y	1.5	
TOC	<1.0	<1.0	#DIV/0!	#VALUE!	#VALUE!		1	y
Ammonia	<0.5	<0.5	#DIV/0!	#VALUE!	#VALUE!		0.5	y
Alkalinity	180	170	175	10	6	y	7	
Bicarbonate	180	170	175	10	6	y	7	
TDS	**340**	**250**	**295**	**90**	**31**	**n**	**50**	**y**
TSS	13	11	12	2	17	y	2	
VOCs (ug/L)								
1,1-dichloroethane	1.7	1.6	1.65	0.1	6	y	0.2	
1,2-dichloroethane	<0.10	<0.10	#DIV/0!	#VALUE!	#VALUE!		0.2	y
1,2-dichloropropane	<0.2	<0.20	#DIV/0!	#VALUE!	#VALUE!		0.2	y
acetone	<10	<10	#DIV/0!	#VALUE!	#VALUE!		10	y
benzene	<0.2	<0.2	#DIV/0!	#VALUE!	#VALUE!		0.2	y
bromodichloromethane	<0.2	<0.2	#DIV/0!	#VALUE!	#VALUE!		0.02	y
Carbon disulfide	**0.81**	**<0.3**	**0.81**	**#VALUE!**	**#VALUE!**	**n**	**0.3**	**n**
chloroform	0.32	0.33	0.325	-0.01	3	y	0.2	
cis-1,2-dichloroethene	1.2	1.1	1.15	0.1	9	y	0.2	
tetrachloroethene	<0.50	<0.50	#DIV/0!	#VALUE!	#VALUE!		0.5	y
trans-1,2-dichloroethene	<0.20	<0.20	#DIV/0!	#VALUE!	#VALUE!		0.2	y
trichloroethene	<0.20	<0.20	#DIV/0!	#VALUE!	#VALUE!		0.2	y
vinyl chloride	<0.020	<0.020	#DIV/0!	#VALUE!	#VALUE!		0.02	y

Horn Rapids Data Validation Checklist
Holding Times

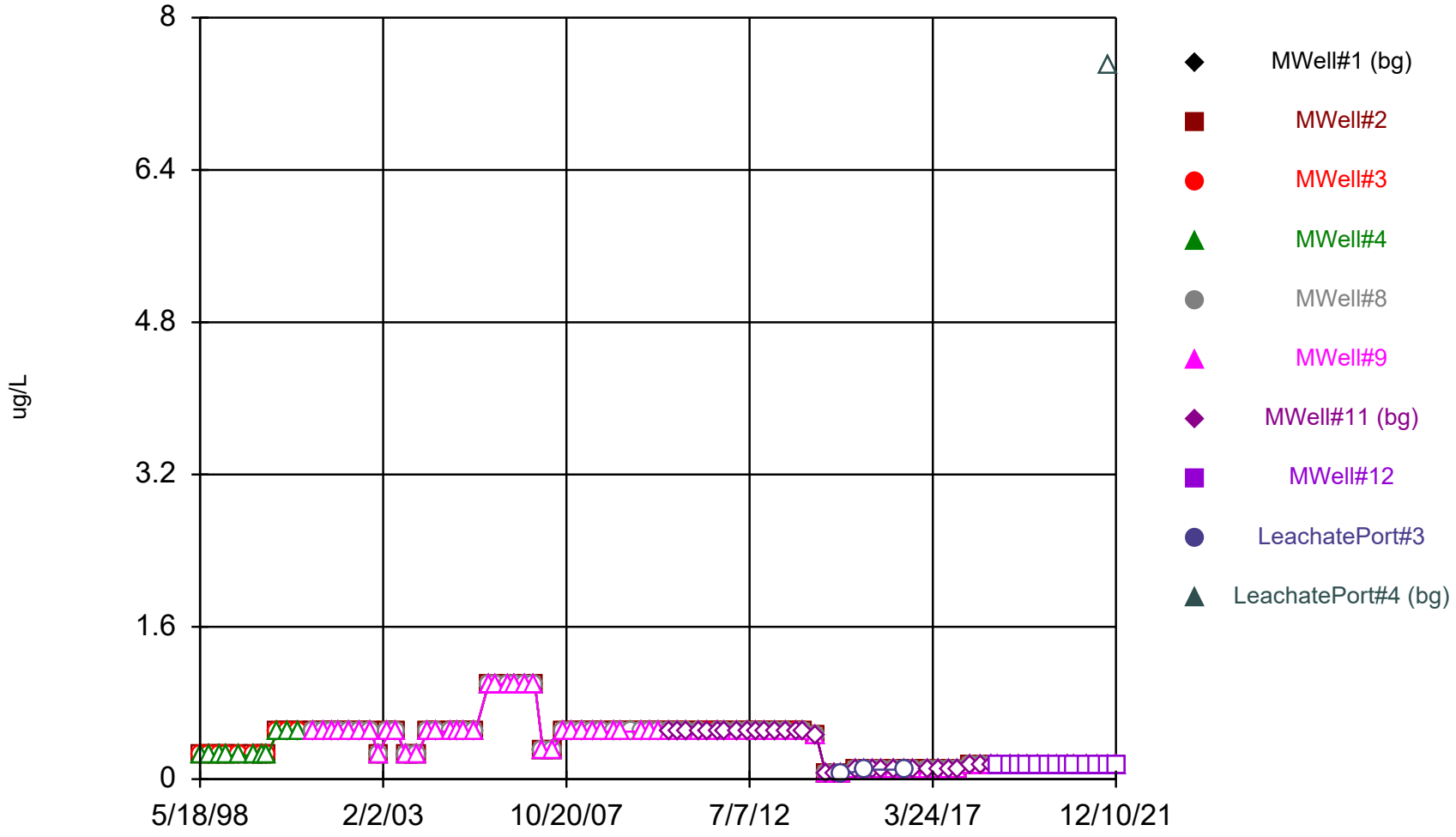
Analyte	Holding Time	Analysis	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-8	MW-9	MW-10	MW-11	MW-12	MW-21	TB
date sampled			12/9/2021	12/10/2021	12/10/2021	12/10/2021	12/9/2021	12/9/2021	12/10/2021	12/10/2021	12/9/2021	12/9/2021	12/10/2021	12/10/2021	12/9/2021
time sampled			1620	1440	1035	1130	1420	1525	1230	930	1335	1240	1340	1340	
VOCs	14 days (pres)	17-Dec	√	√	√	√	√	√	√	√	√	√	√	√	√
MEE	14 days (pres)	22-Dec	√	√	√	√	√	√	√	√	√	√	√	√	√
Metals 200.7 D	6 months	17-Dec	√	√	√	√	√	√	√	√	√	√	√	√	
Metals 200.8 T	6 months	17-Dec	√	√	√	√	√	√	√	√	√	√	√	√	
Iron 200.8 D	6 months	12-Jan	√	√	√	√	√	√	√	√	√	√	√	√	
Chloride	28 days	20-Dec	√	√	√	√	√	√	√	√	√	√	√	√	
Nitrate as N	48 hr	12-Dec	n	n	n	n	n	n	n	n	n	n	n	n	
time			1539	1713	1504	1452	1615	1626	1725	1516	1638	1650	1354	1528	
Sulfate	28 days	20-Dec	√	√	√	√	√	√	√	√	√	√	√	√	
TOC	28 days	30-Dec	√	√	√	√	√	√	√	√	√	√	√	√	
Ammonia	28 days	21-Dec	√	√	√	√	√	√	√	√	√	√	√	√	
Alkalinity	14 days	17-Dec	√	√	√	√	√	√	√	√	√	√	√	√	
Bicarbonate	14 days	17-Dec	√	√	√	√	√	√	√	√	√	√	√	√	
TDS	7 days	15-Dec	√	√	√	√	√	√	√	√	√	√	√	√	
TSS	7 days	14-Dec	√	√	√	√	√	√	√	√	√	√	√	√	

Appendix C

Time-Series Plots

Sanitas™ v.9.6.32 Software licensed to Parametrix. UG
Hollow symbols indicate censored values.

Time Series

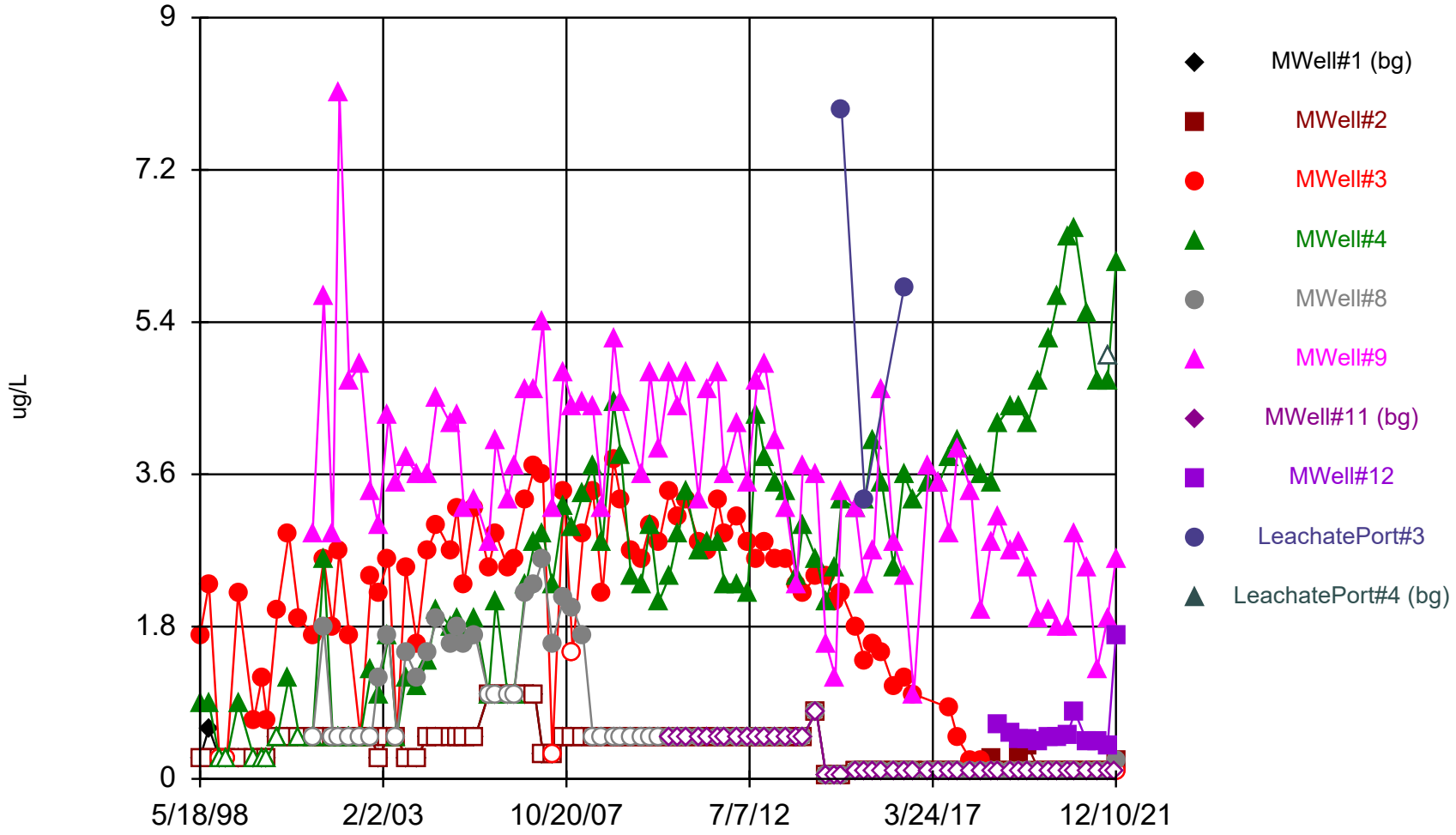


Constituent: 1,1,1,2-Tetrachloroethane Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.9.6.32 Software licensed to Parametrix. UG
Hollow symbols indicate censored values.

Time Series

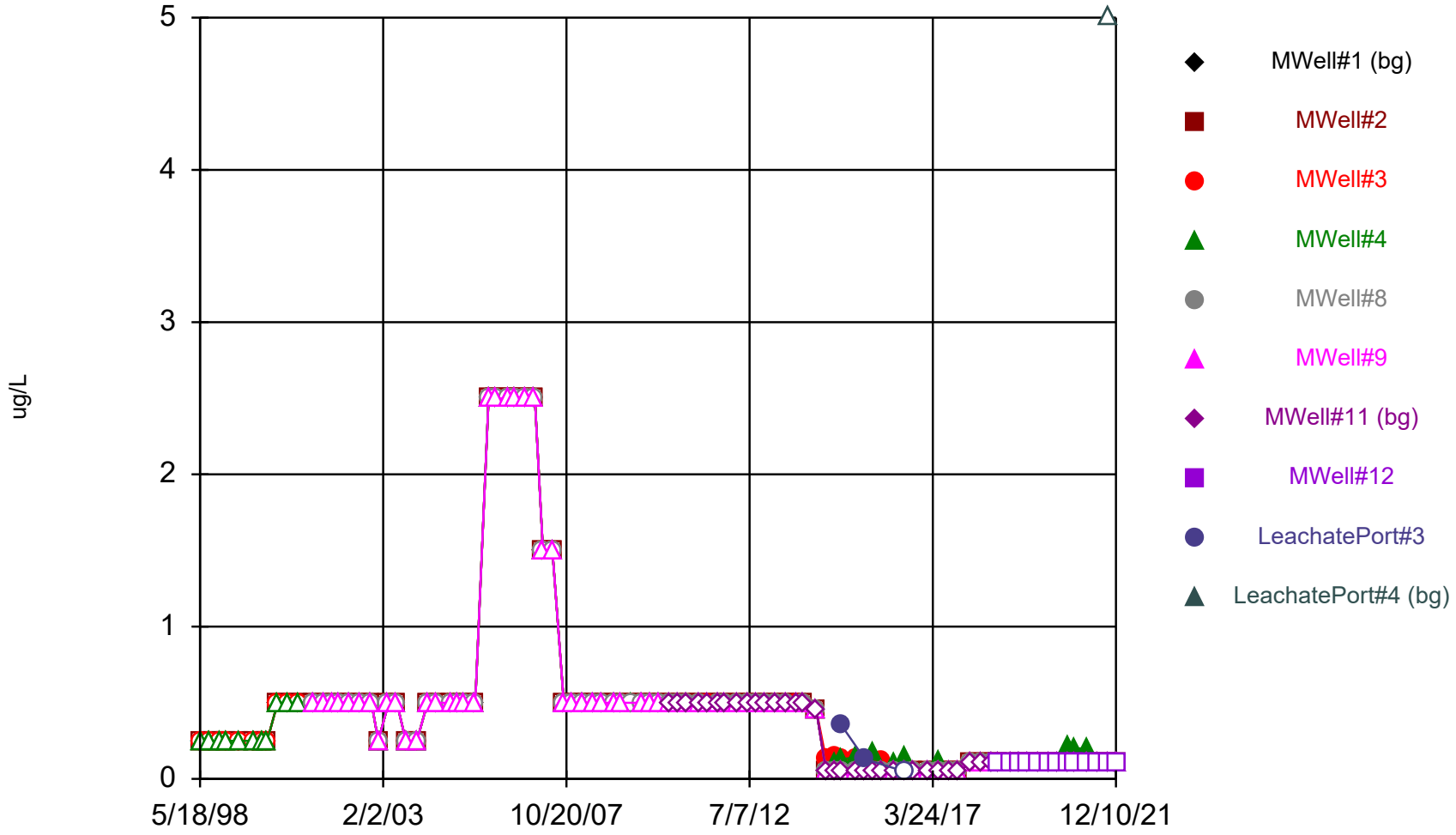


Constituent: 1,1-Dichloroethane Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.9.6.32 Software licensed to Parametrix. UG
Hollow symbols indicate censored values.

Time Series

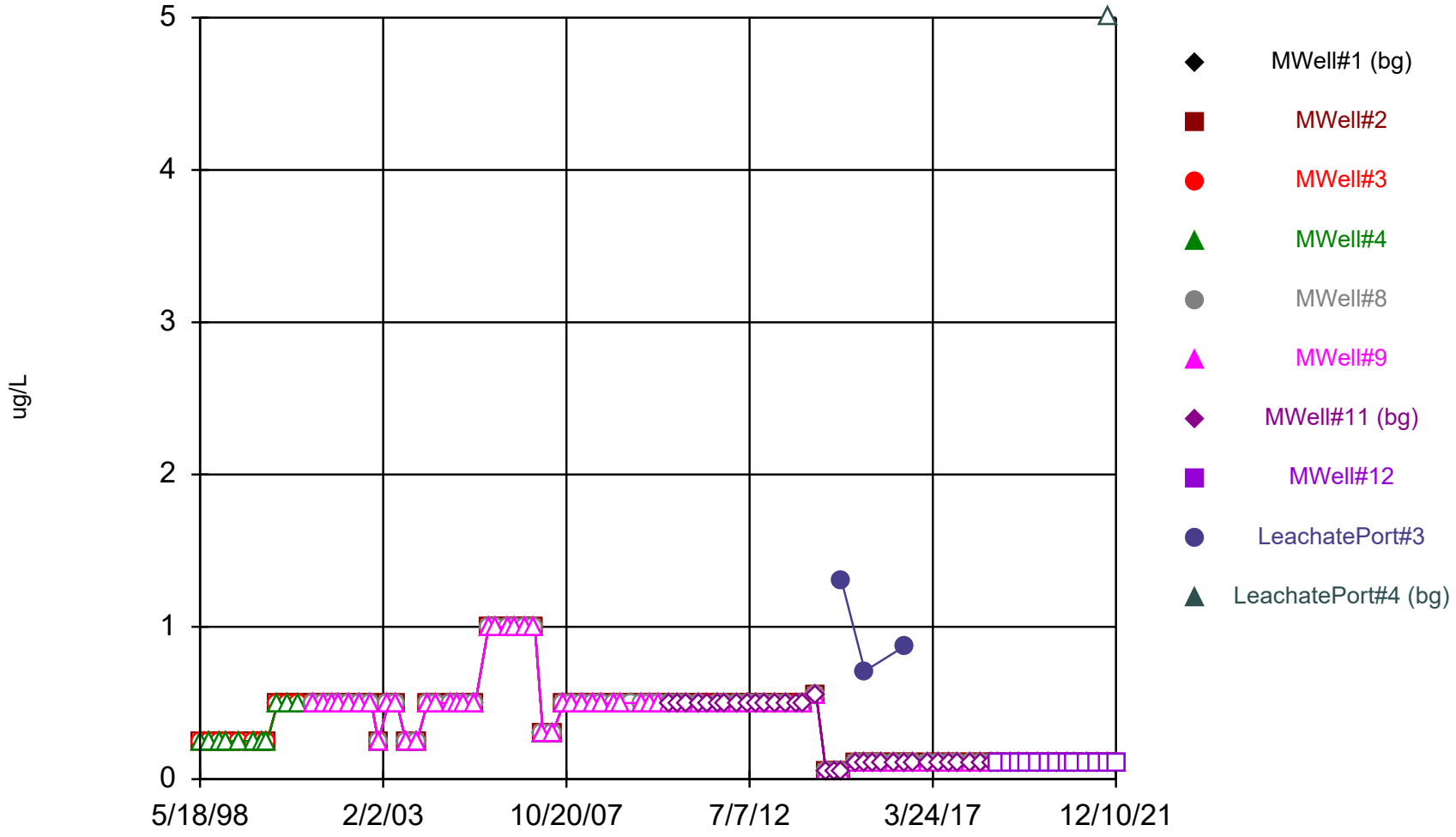


Constituent: 1,1-Dichloroethene Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.9.6.32 Software licensed to Parametrix. UG
Hollow symbols indicate censored values.

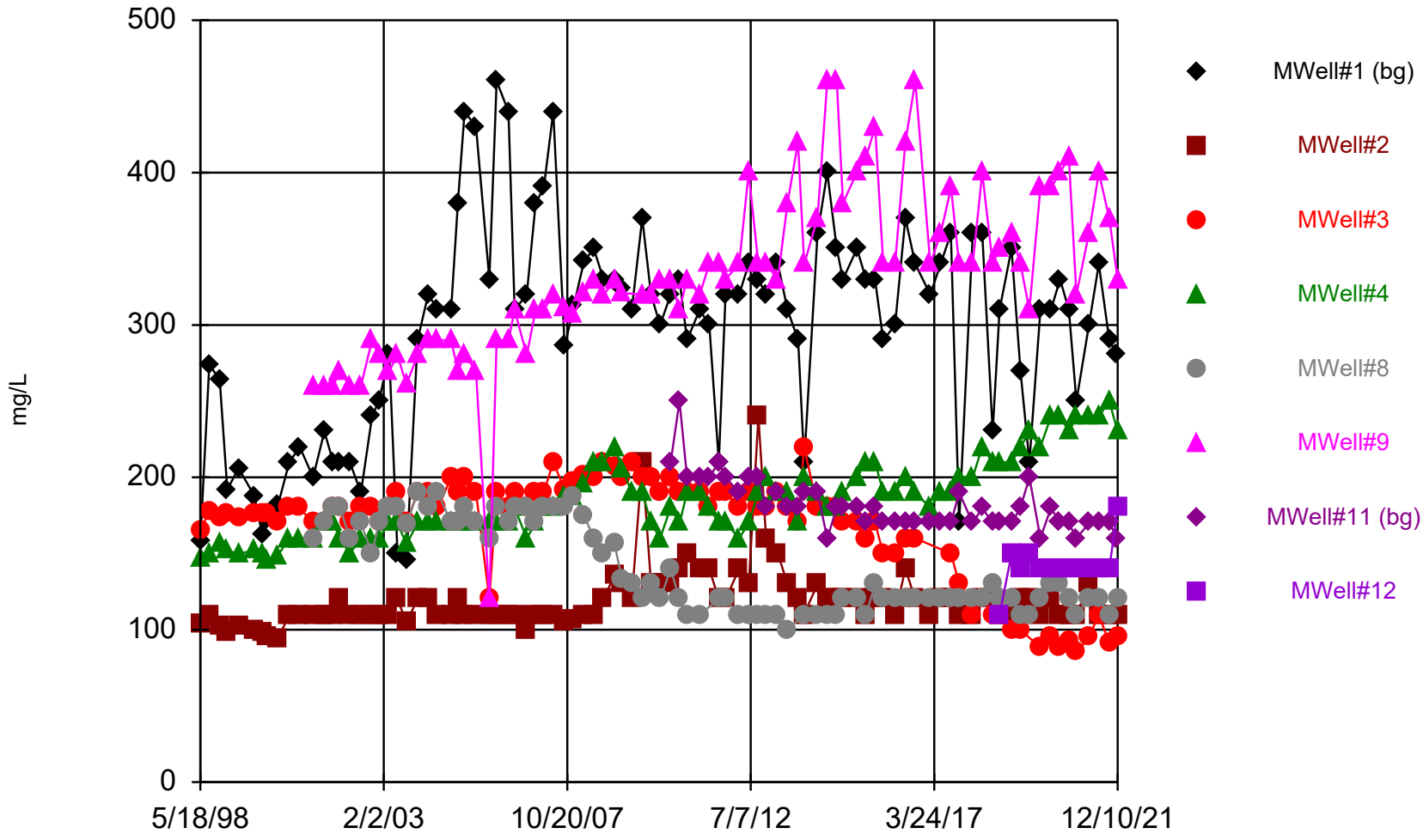
Time Series



Constituent: 1,2-Dichloroethane Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series

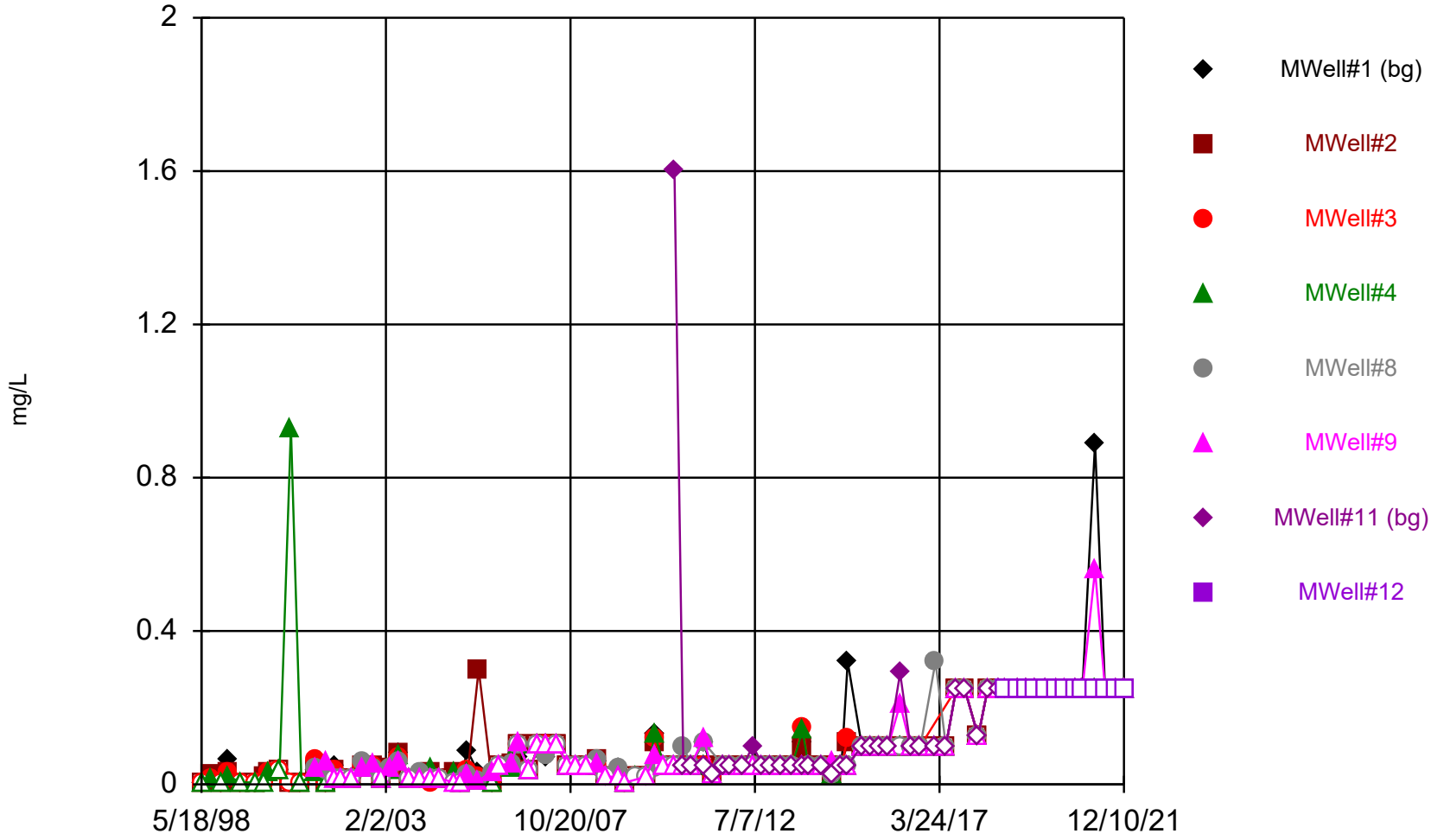


Constituent: Alkalinity Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

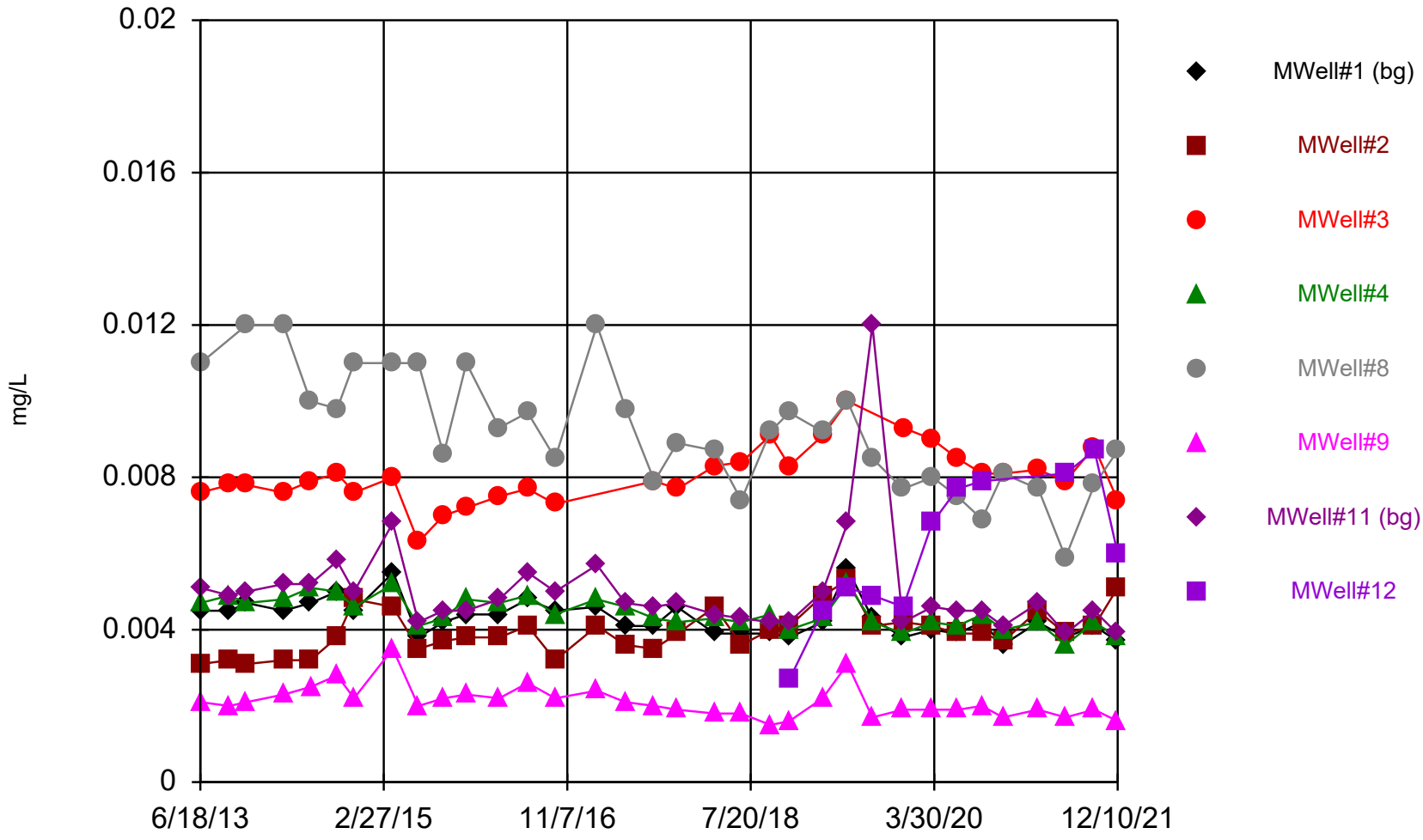
Time Series



Constituent: Ammonia Nitrogen Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

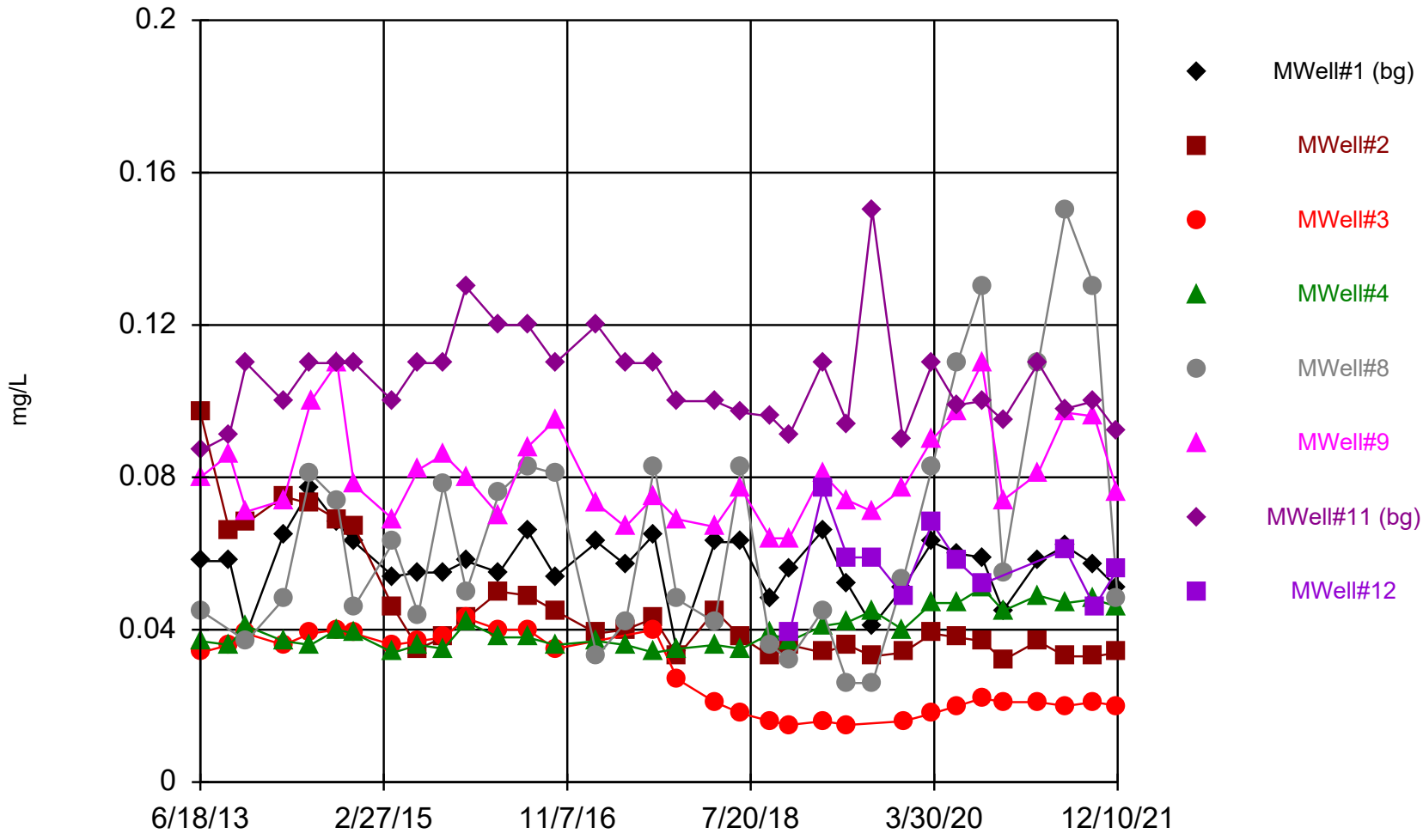
Time Series



Constituent: Arsenic, Total Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Barium, Total Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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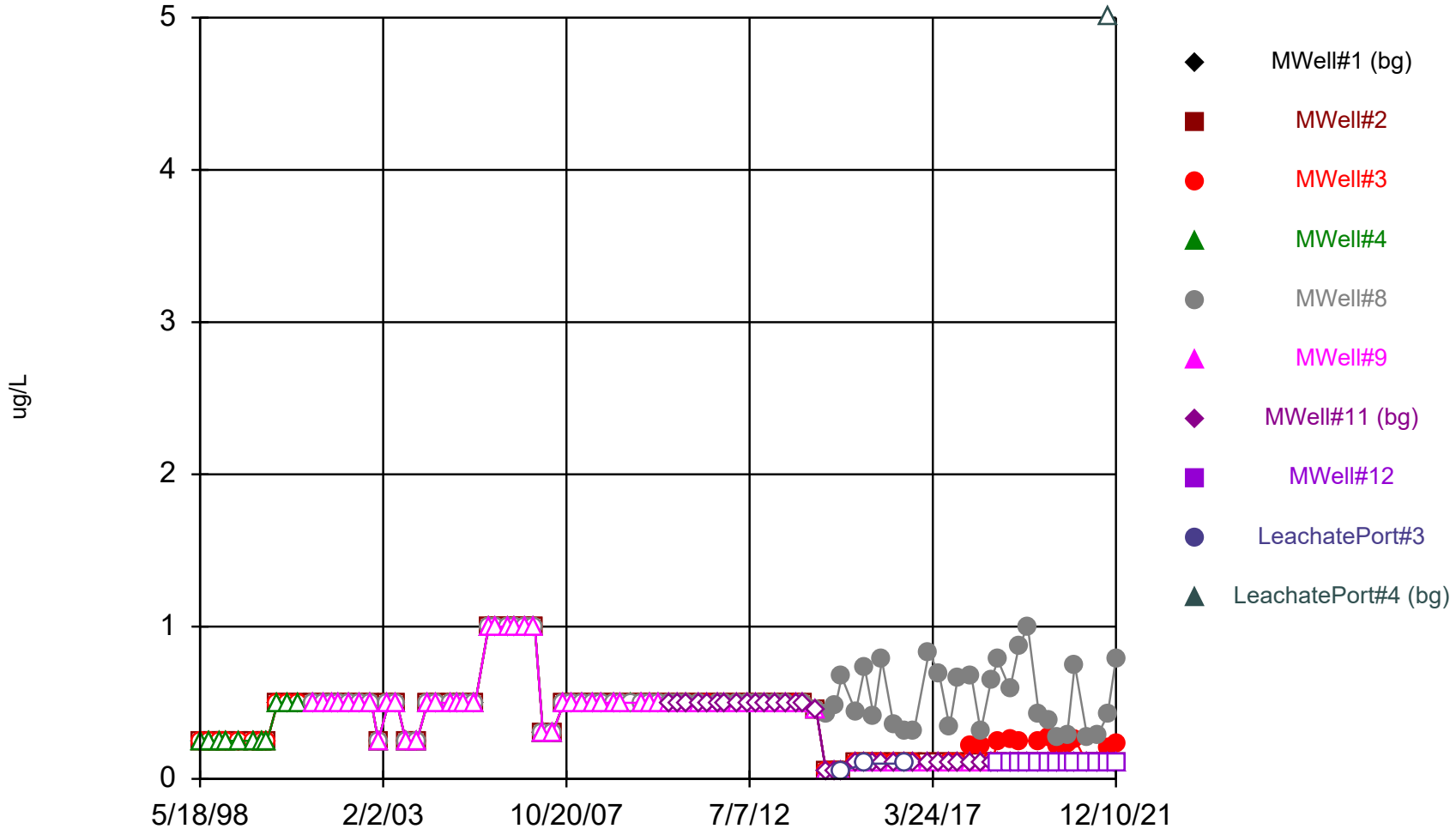
Hollow symbols indicate censored values.

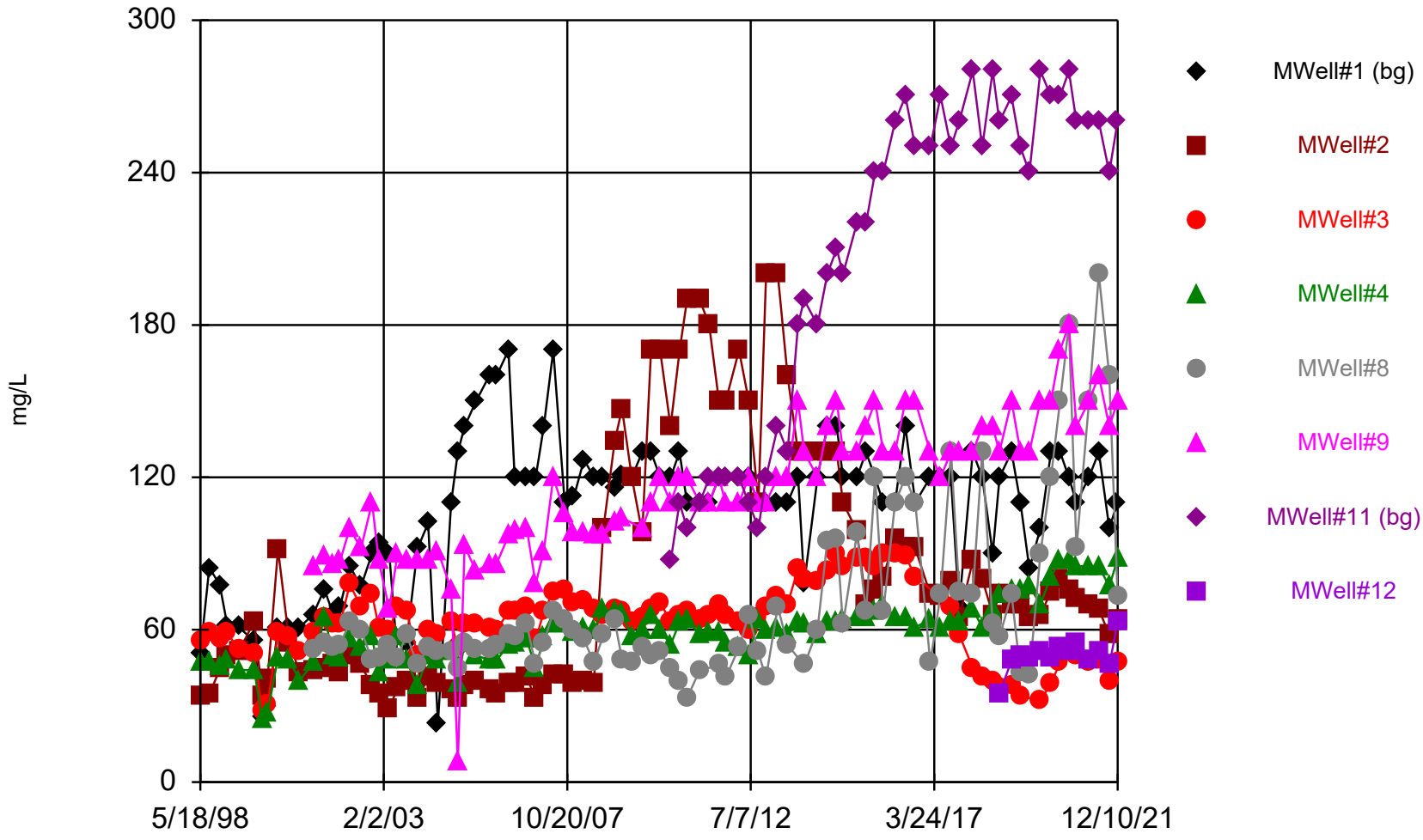
Time Series



Constituent: Bromodichloromethane Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

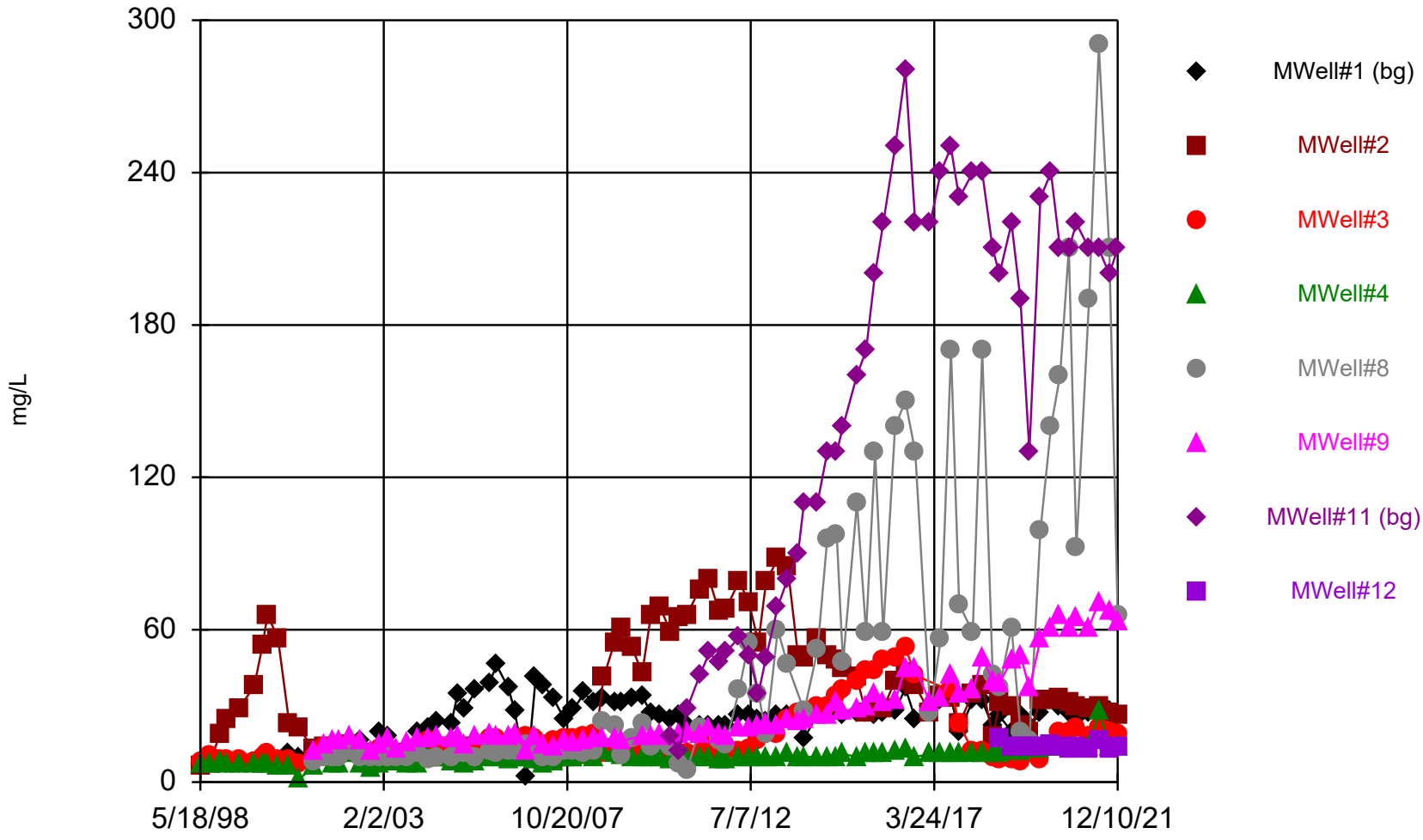
Time Series



Constituent: Calcium, Dissolved Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series

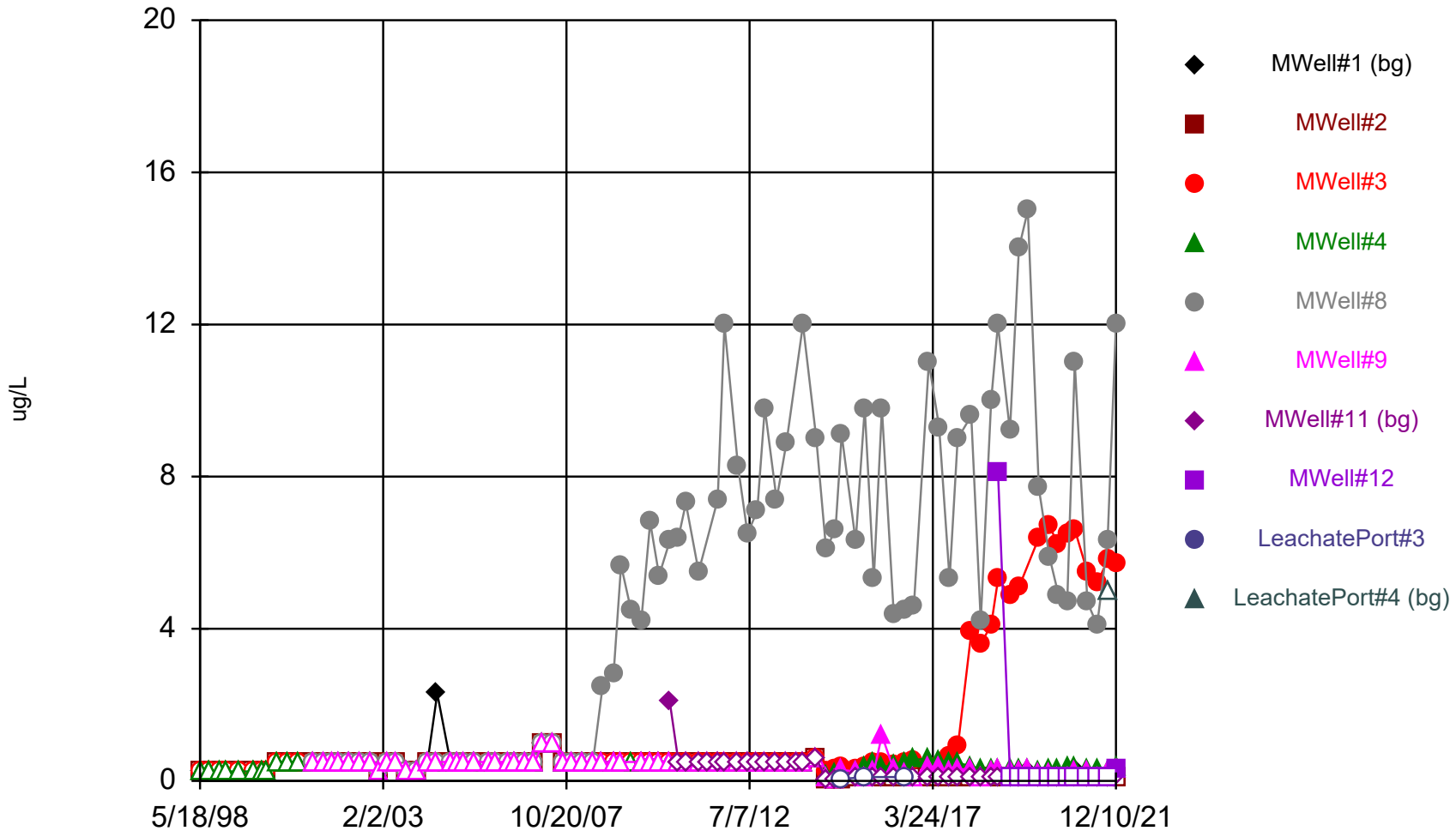


Constituent: Chloride Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

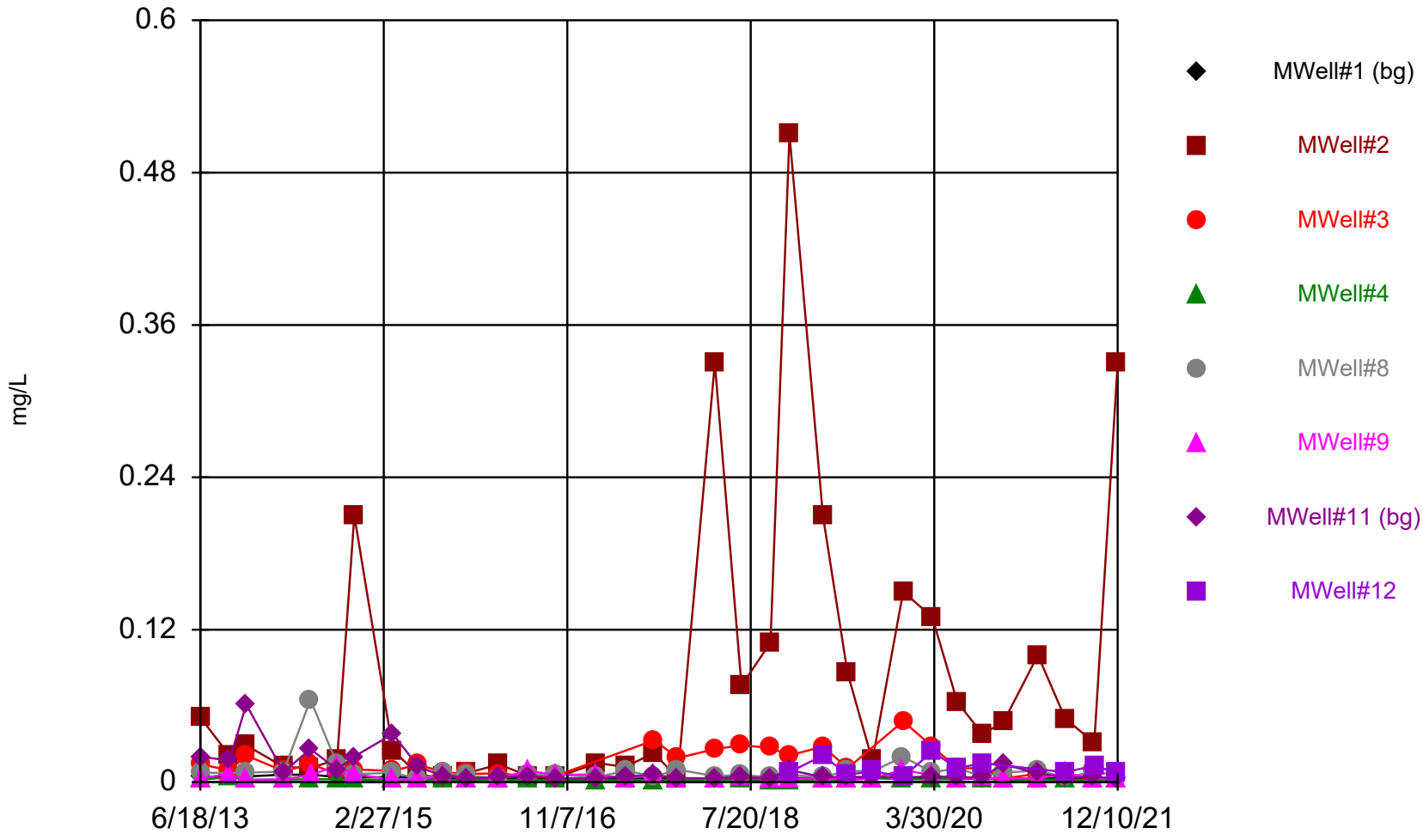
Time Series



Constituent: Chloroform Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Chromium, Total Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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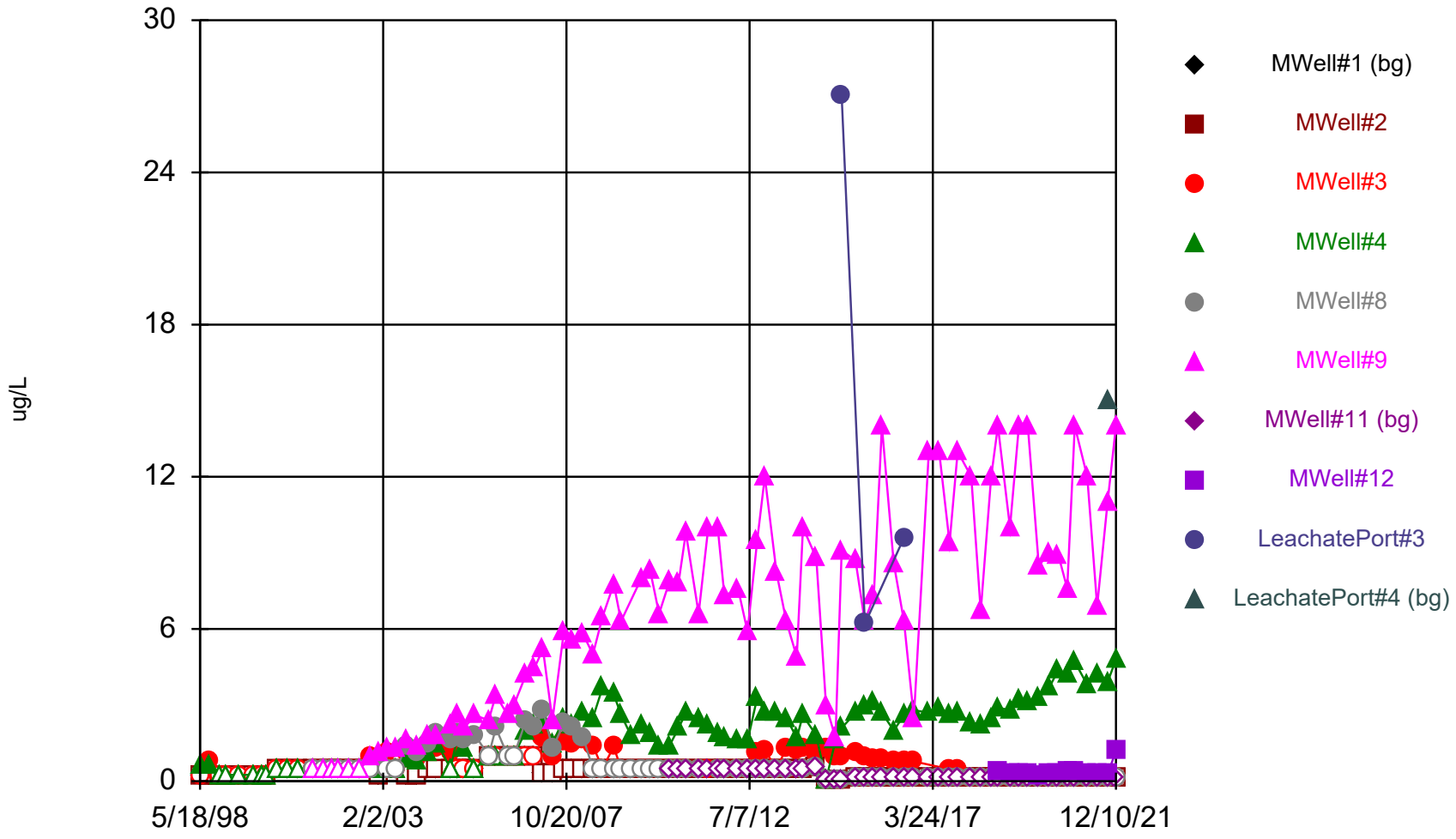
Hollow symbols indicate censored values.

Time Series

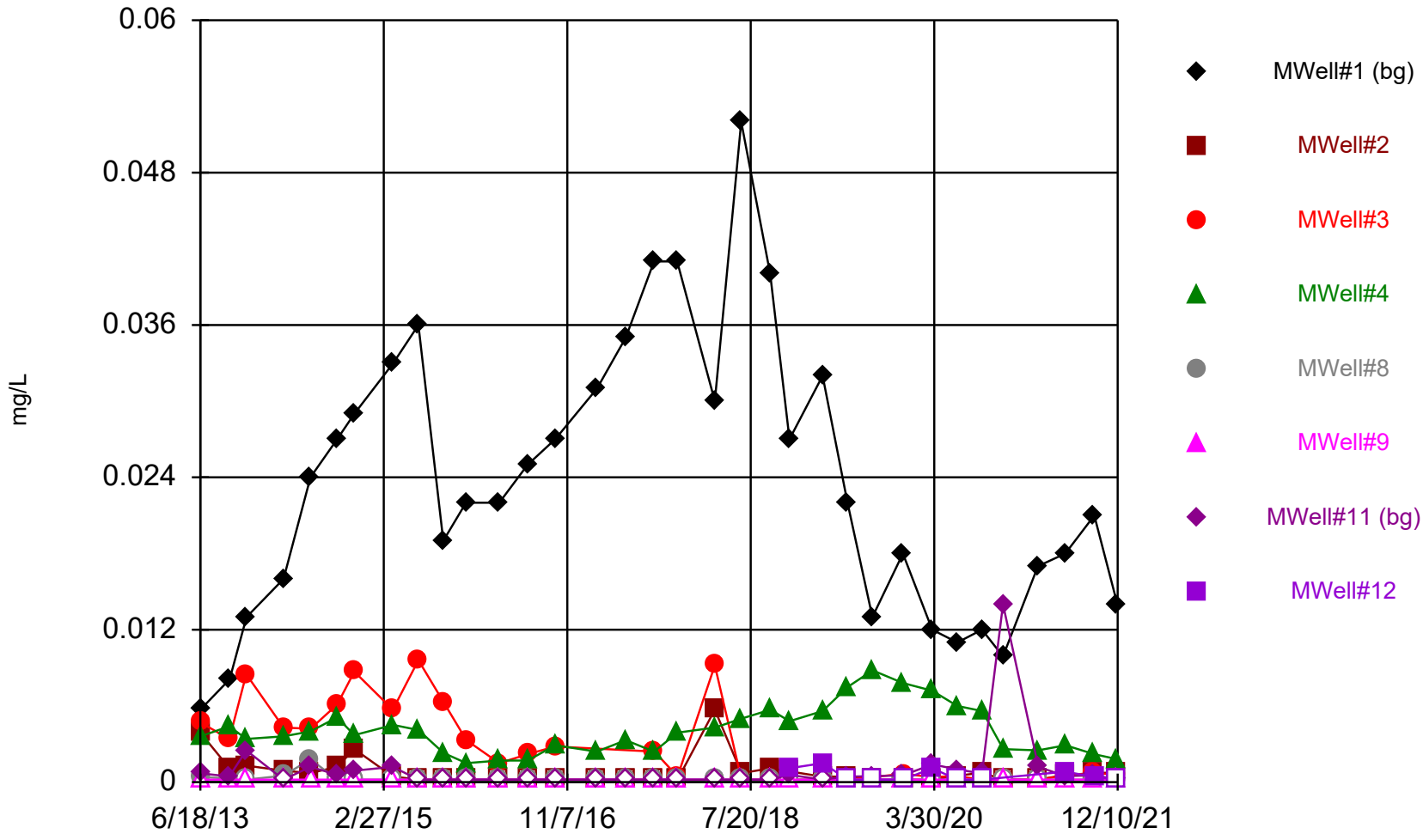


Constituent: cis-1,2-Dichloroethene Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

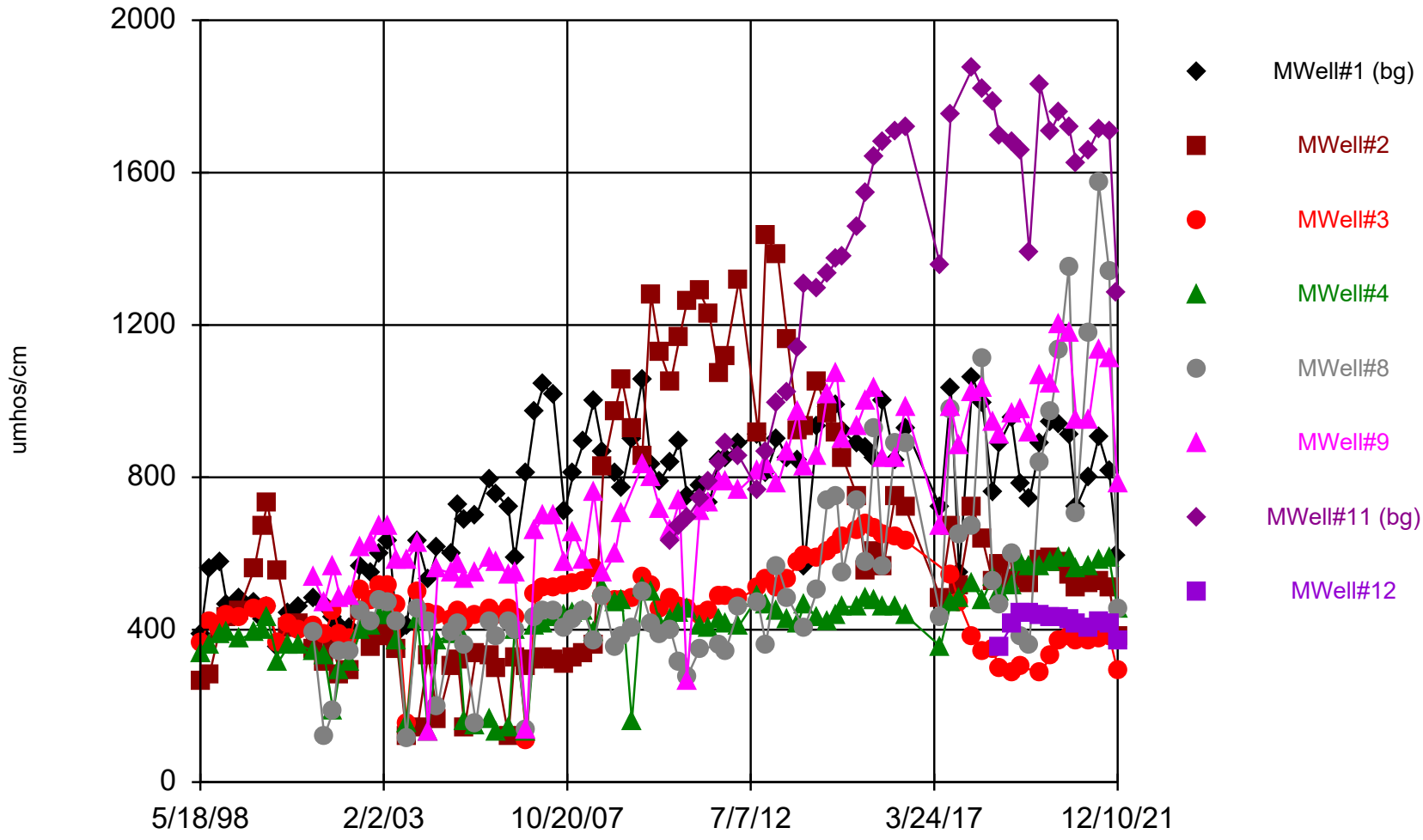
Time Series



Constituent: Cobalt, Total Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

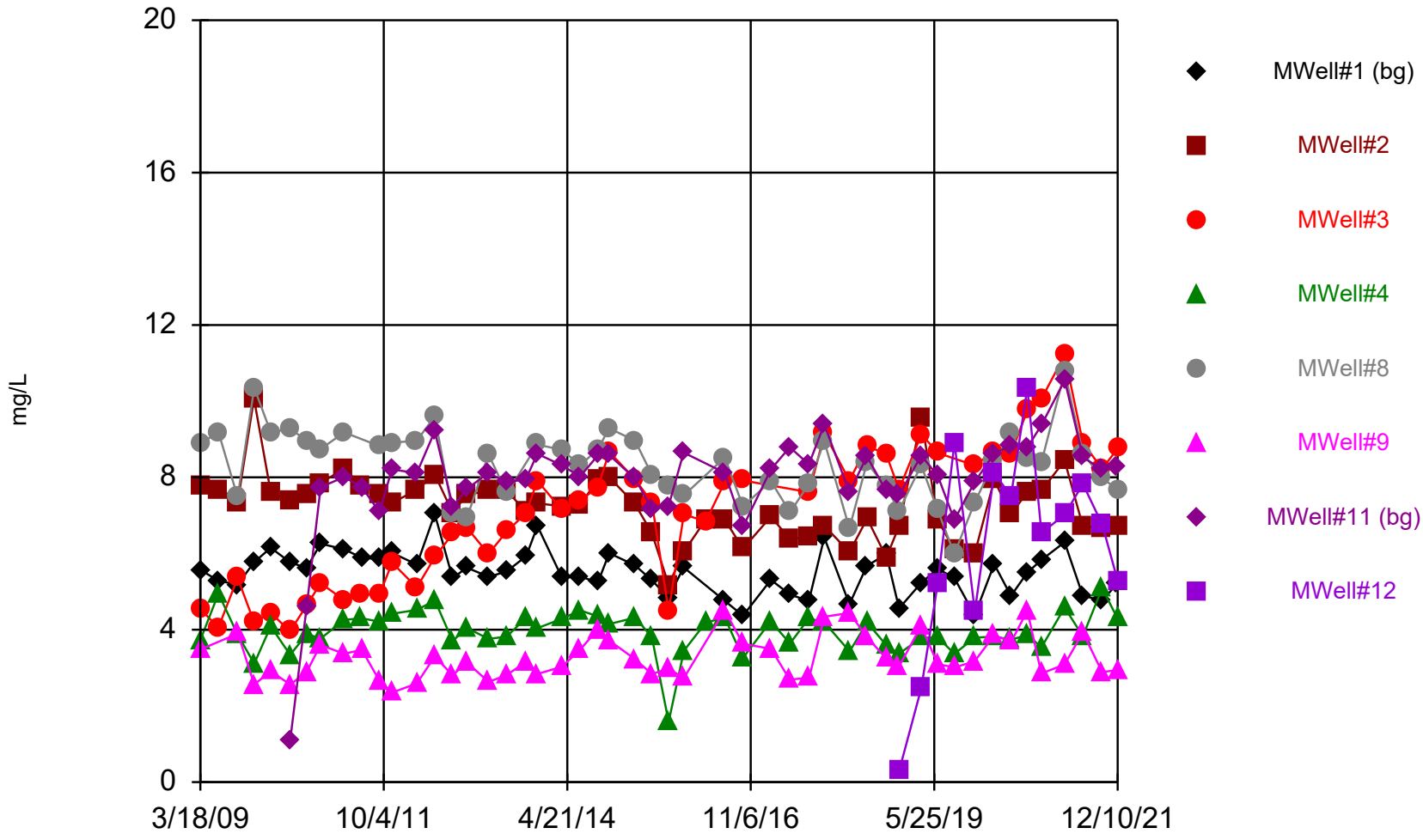
Time Series



Constituent: Conductivity Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series

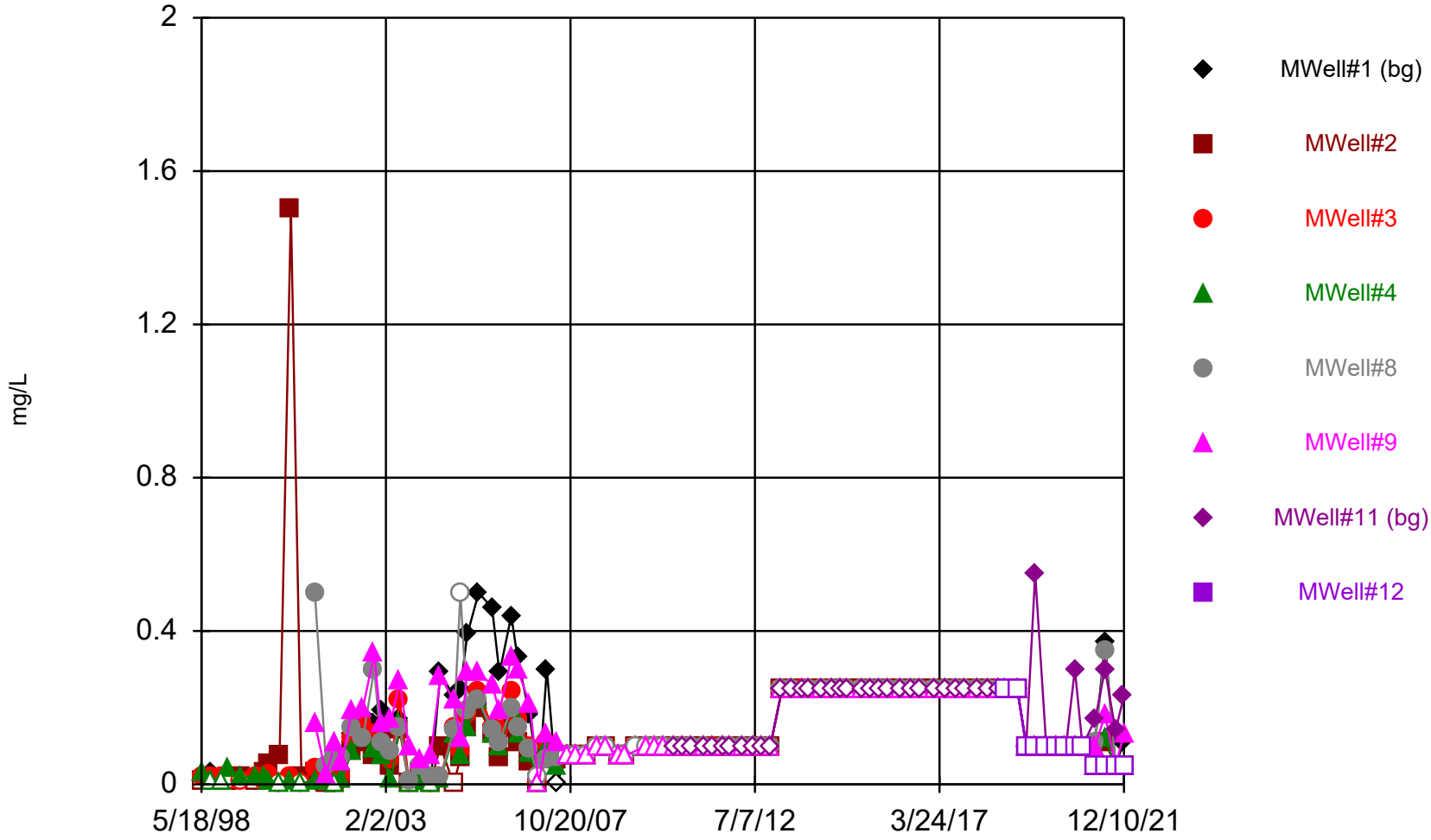


Constituent: Dissolved Oxygen Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

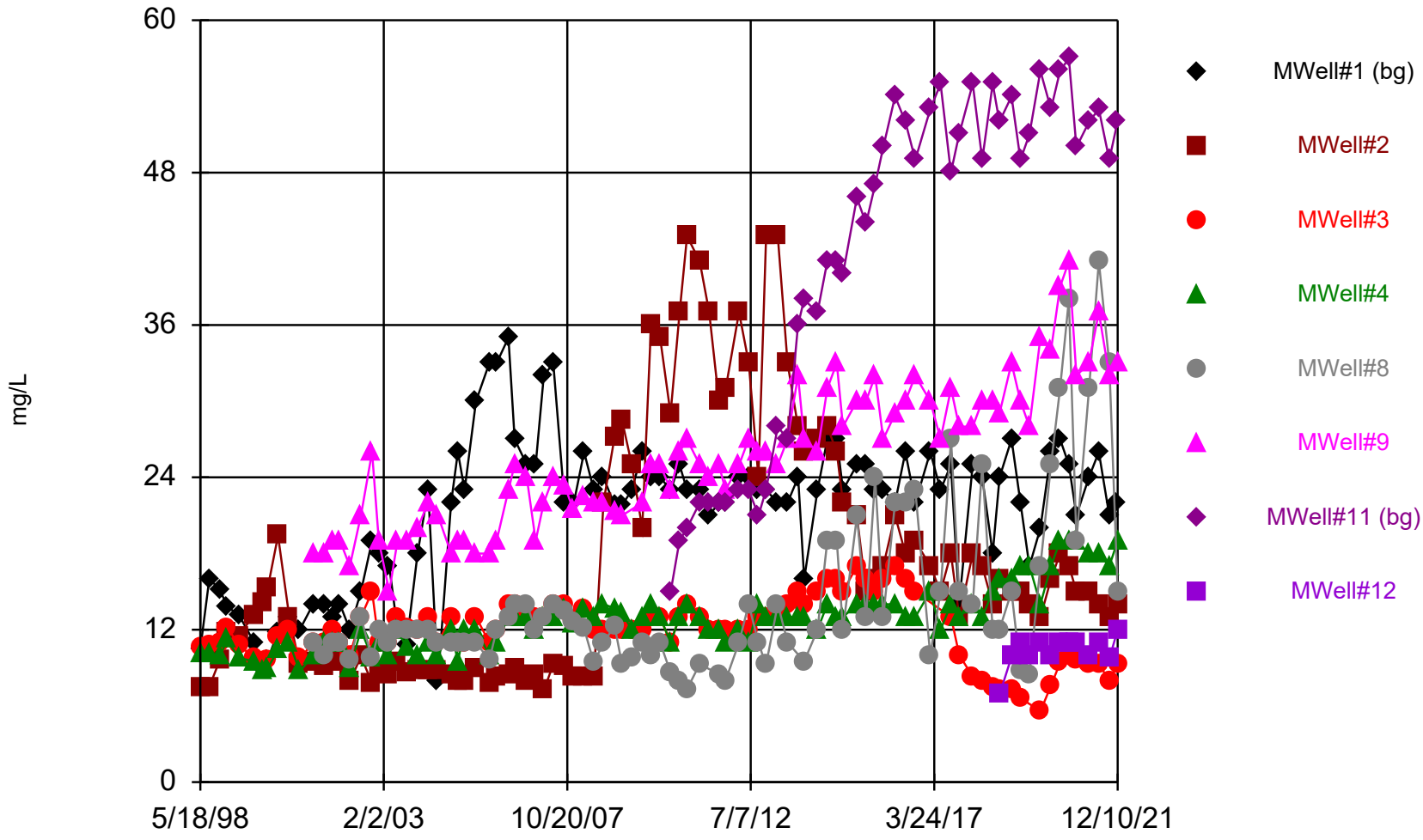
Time Series



Constituent: Iron, Dissolved Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Magnesium, Dissolved Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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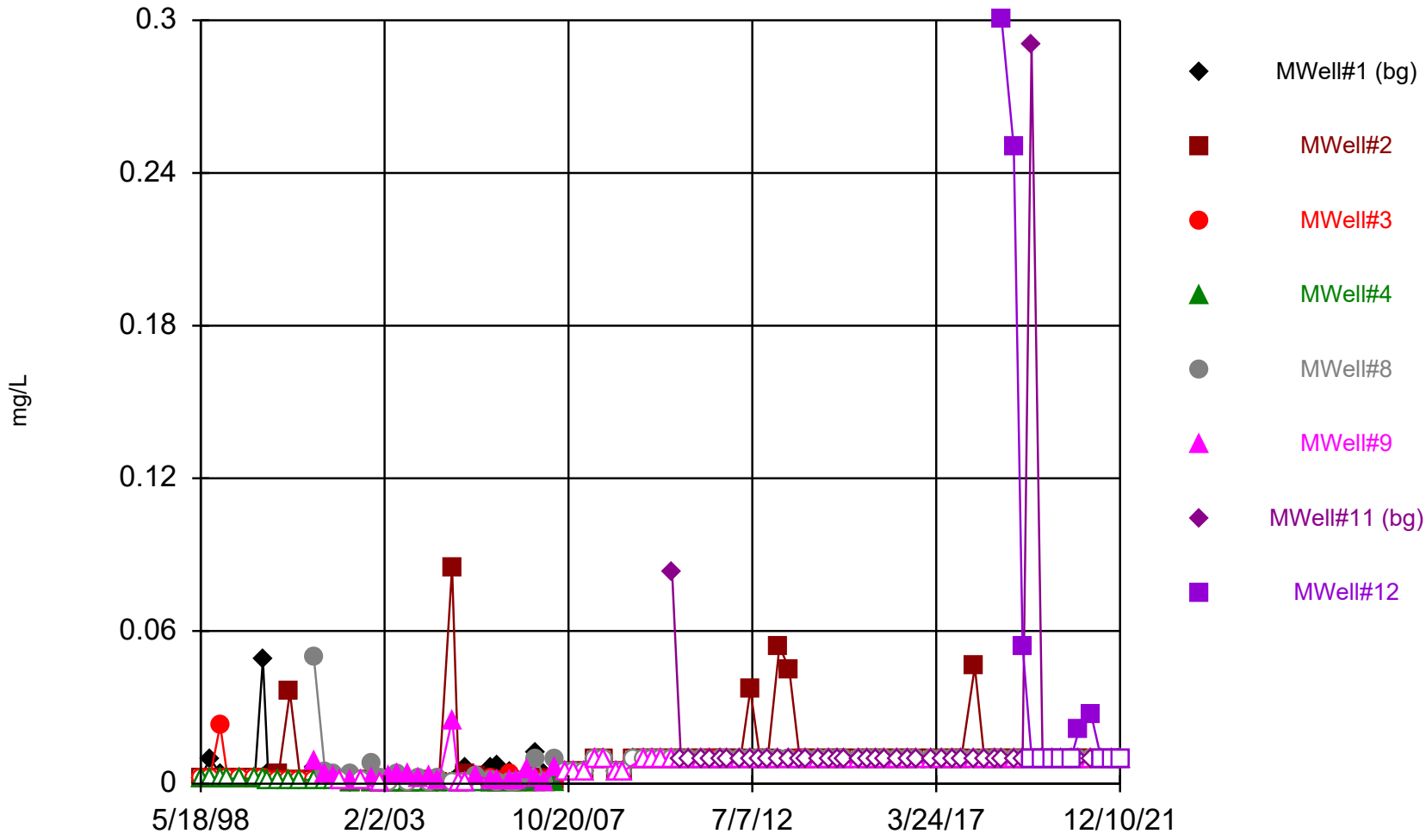
Hollow symbols indicate censored values.

Time Series

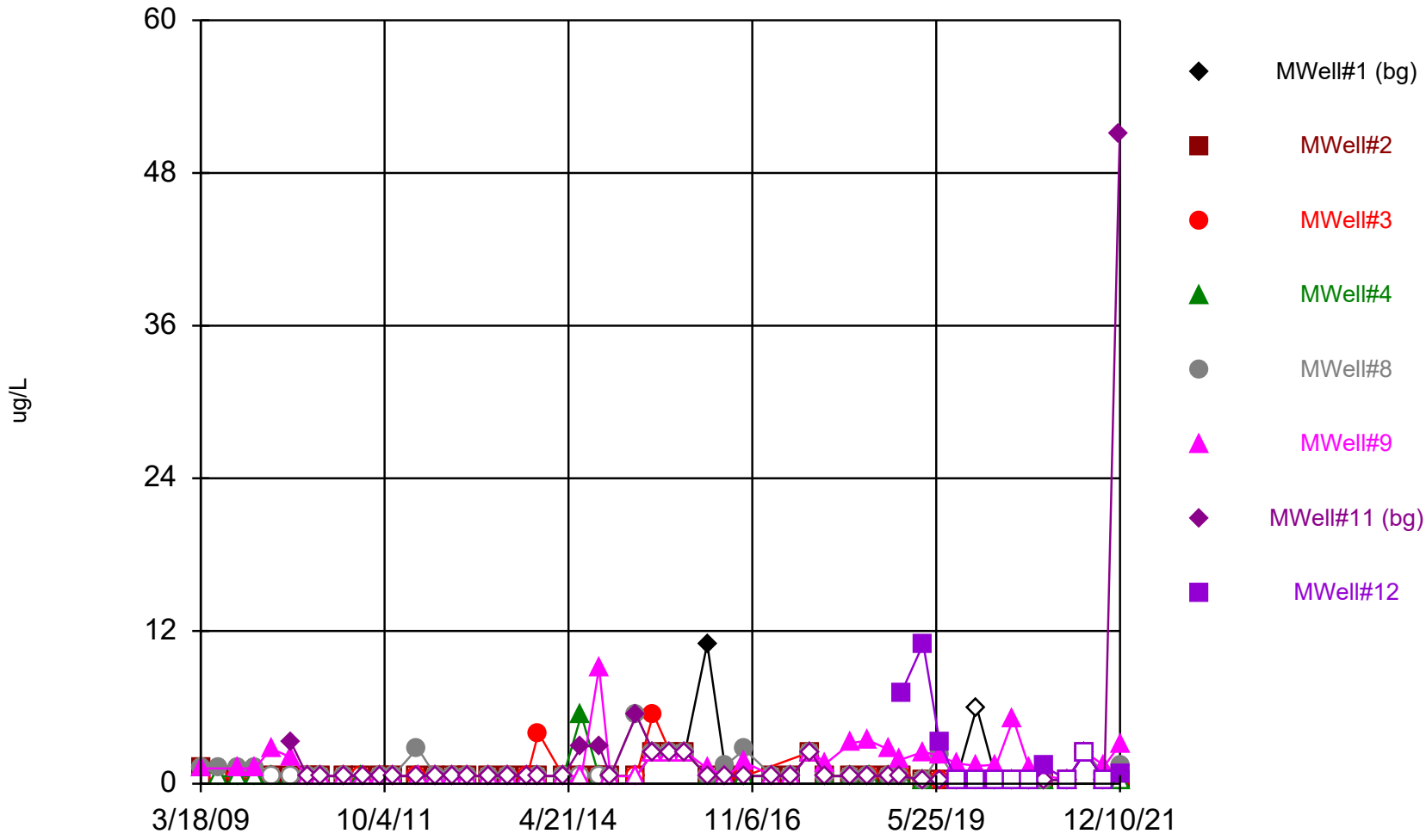


Constituent: Manganese, Dissolved Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Time Series



Constituent: Methane Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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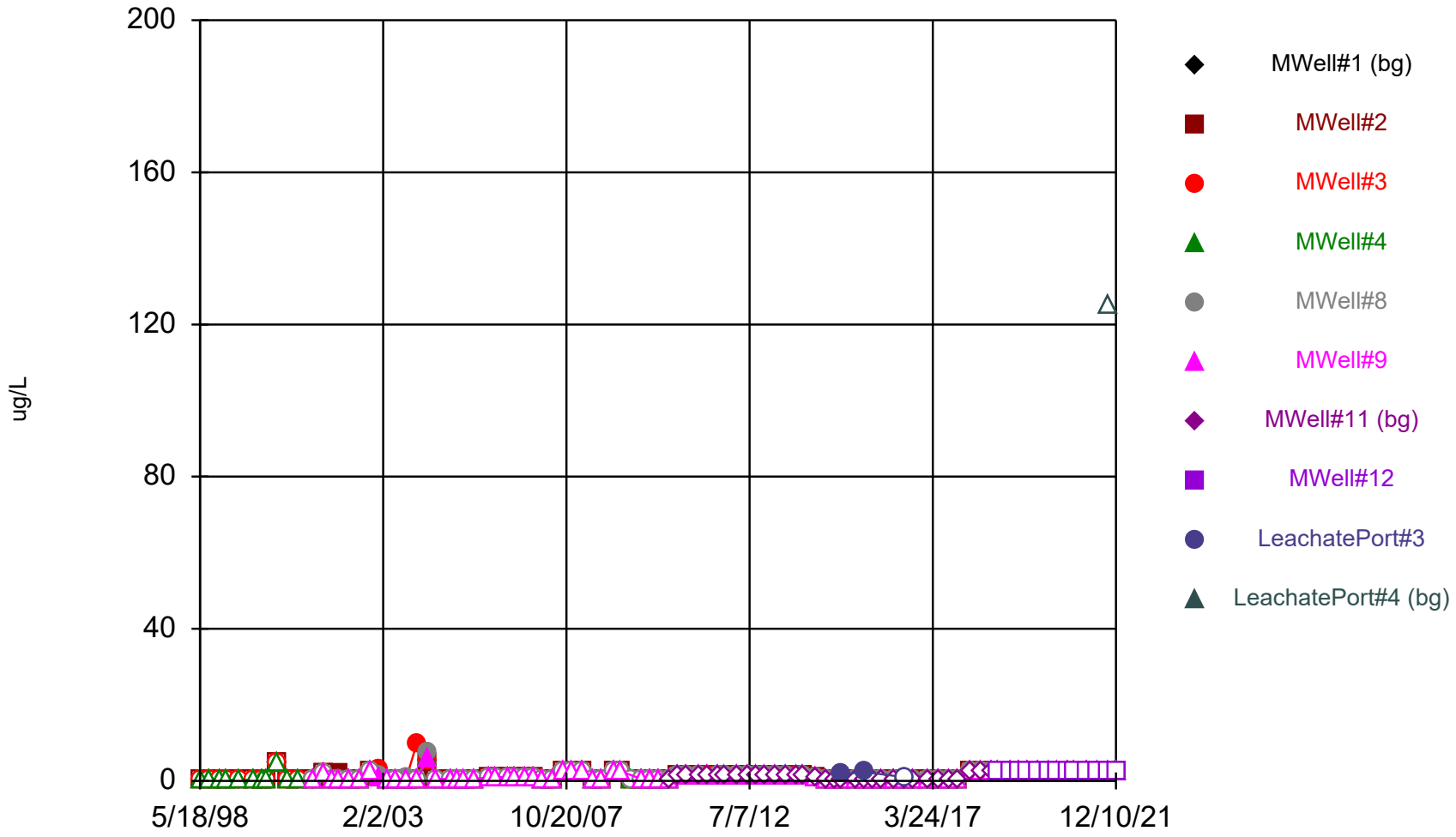
Hollow symbols indicate censored values.

Time Series

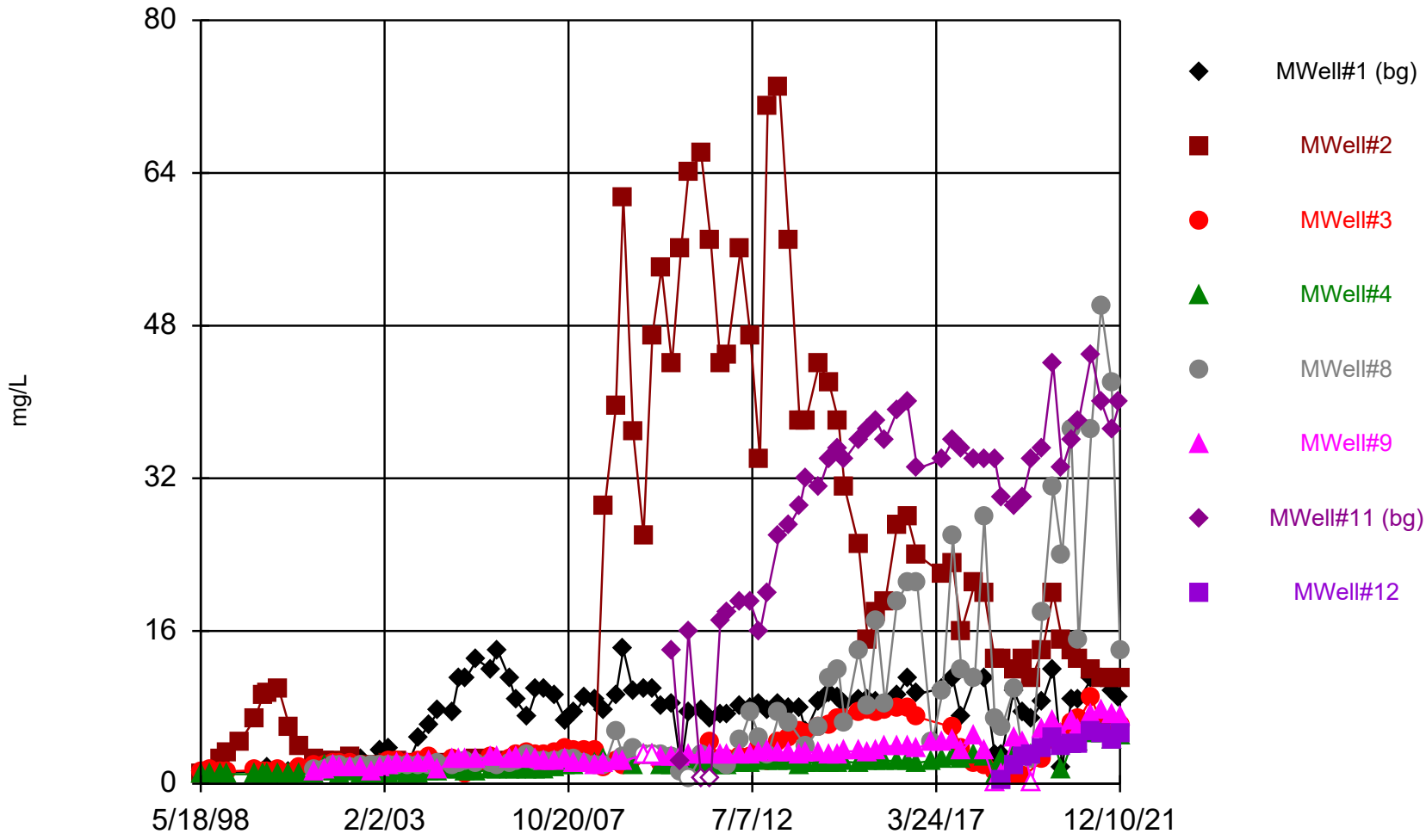


Constituent: Methylene Chloride Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

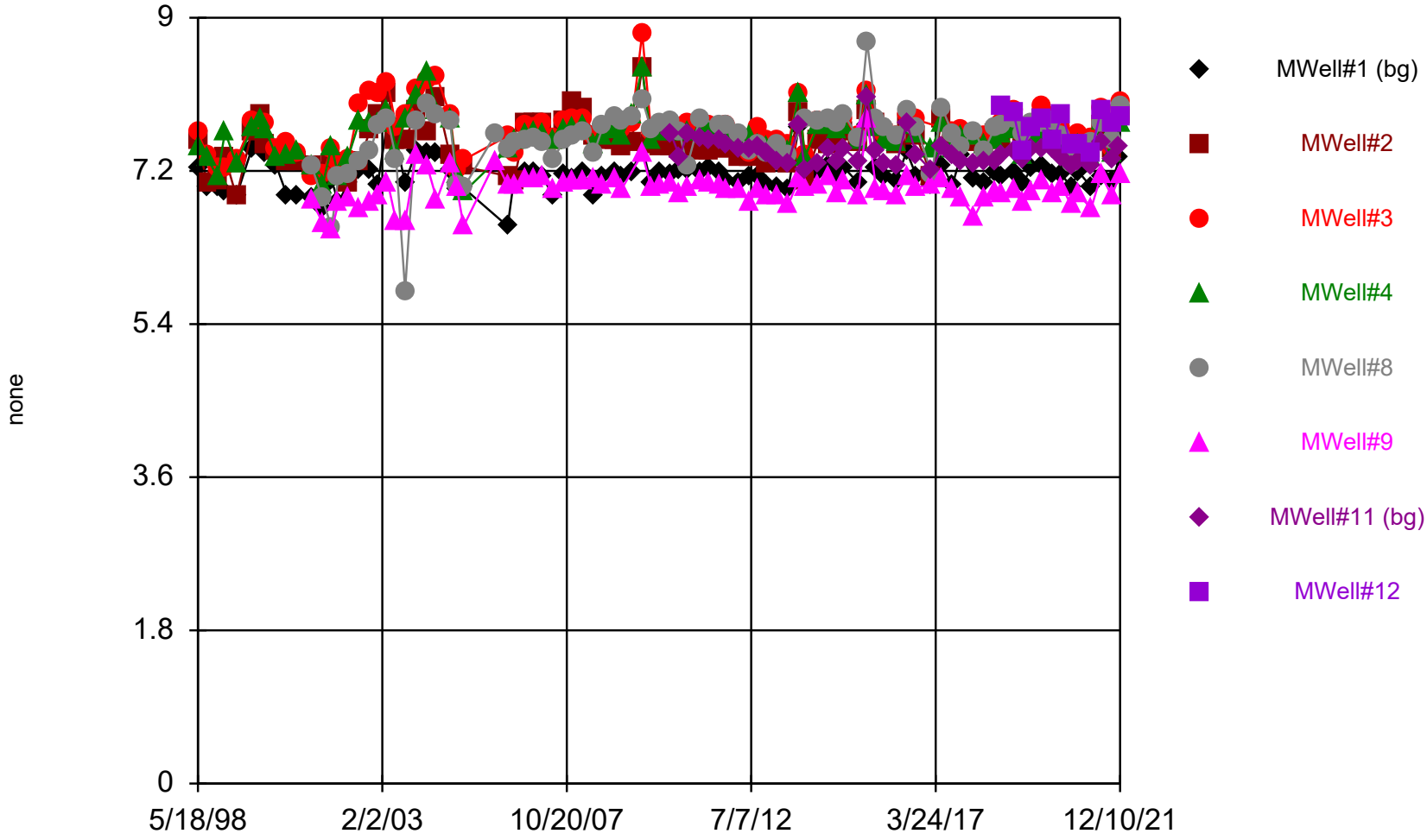
Time Series



Constituent: Nitrate Nitrogen Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

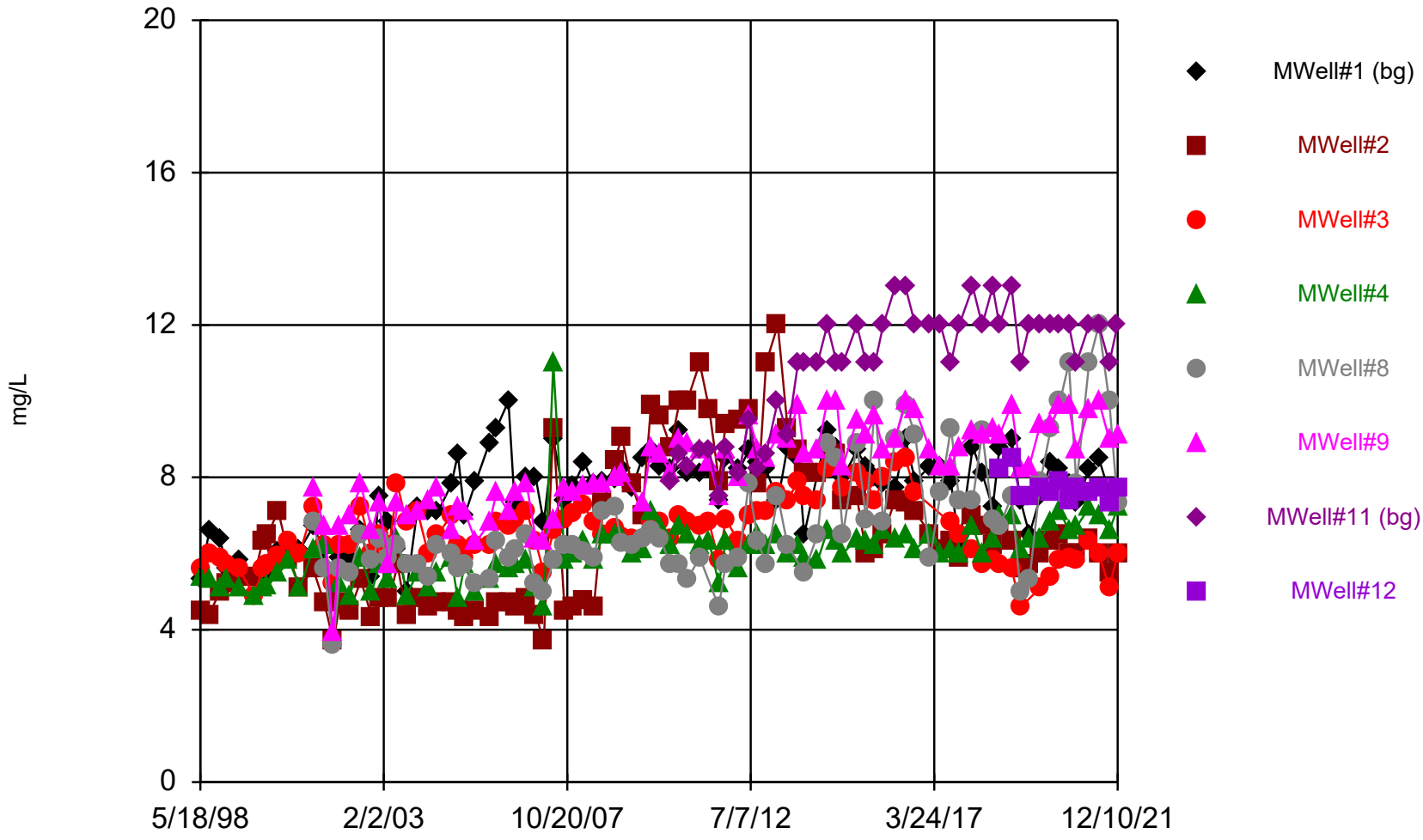
Time Series



Constituent: pH Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series

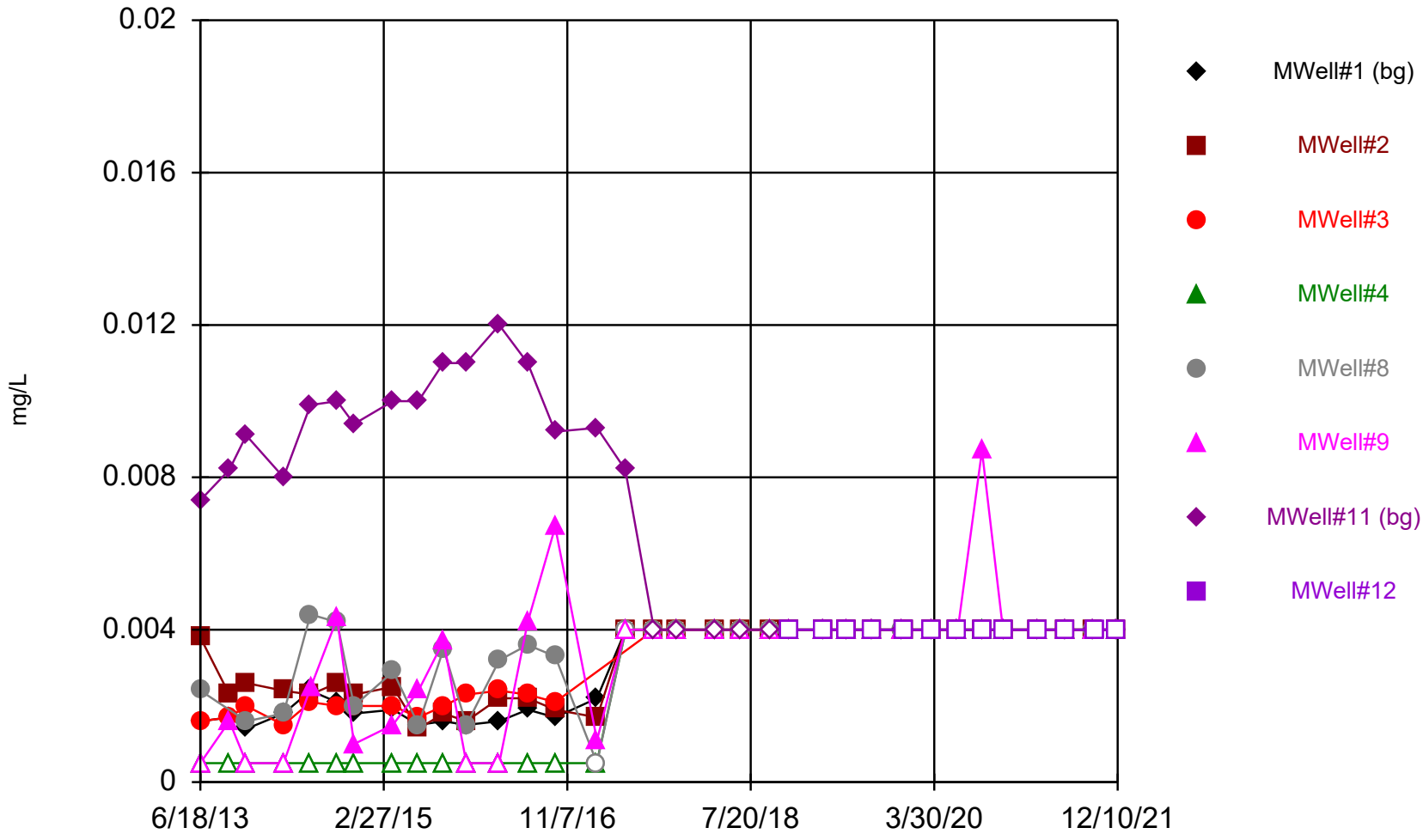


Constituent: Potassium, Dissolved Analysis Run 1/24/2022 11:15 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

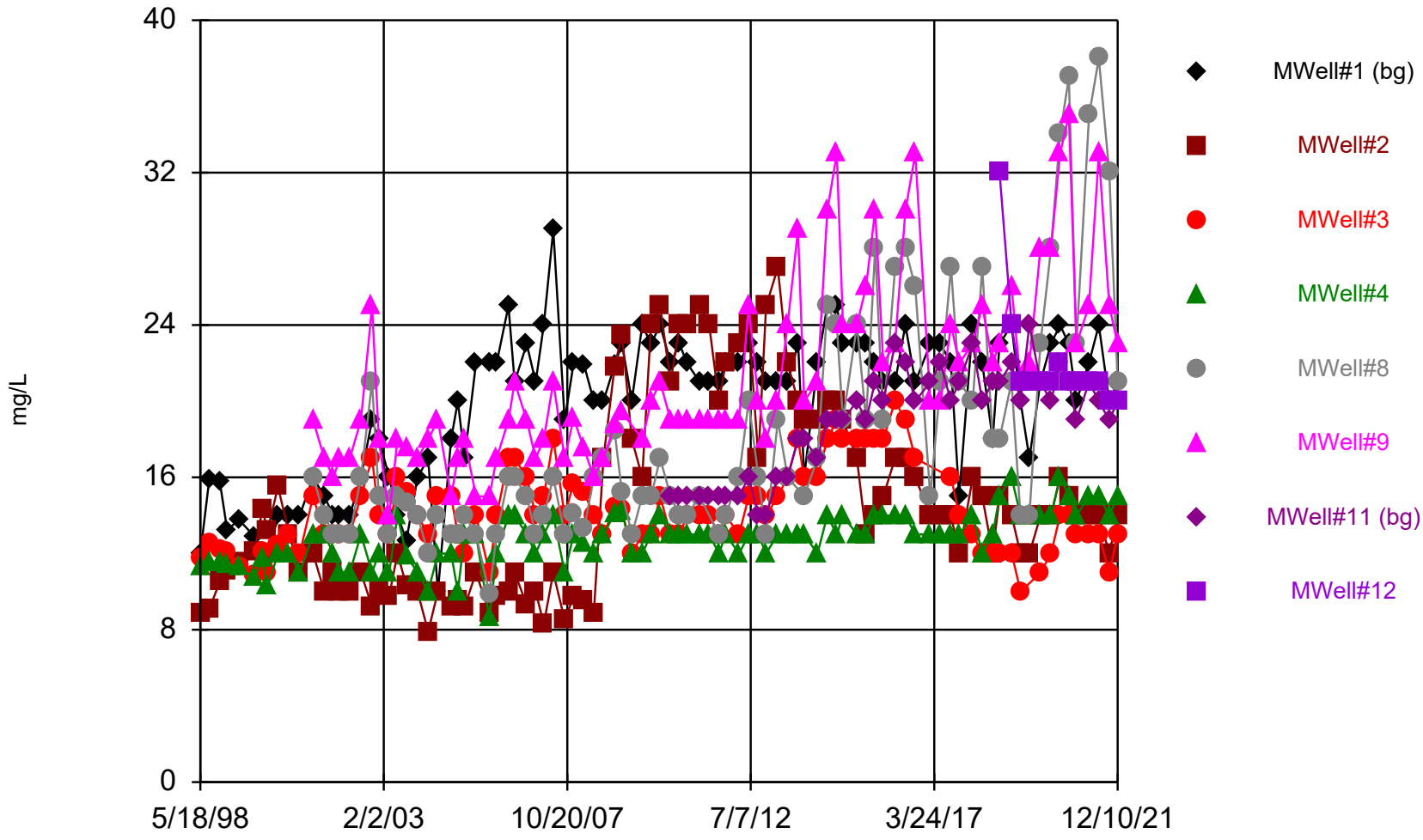
Time Series



Constituent: Selenium, Total Analysis Run 1/24/2022 11:16 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

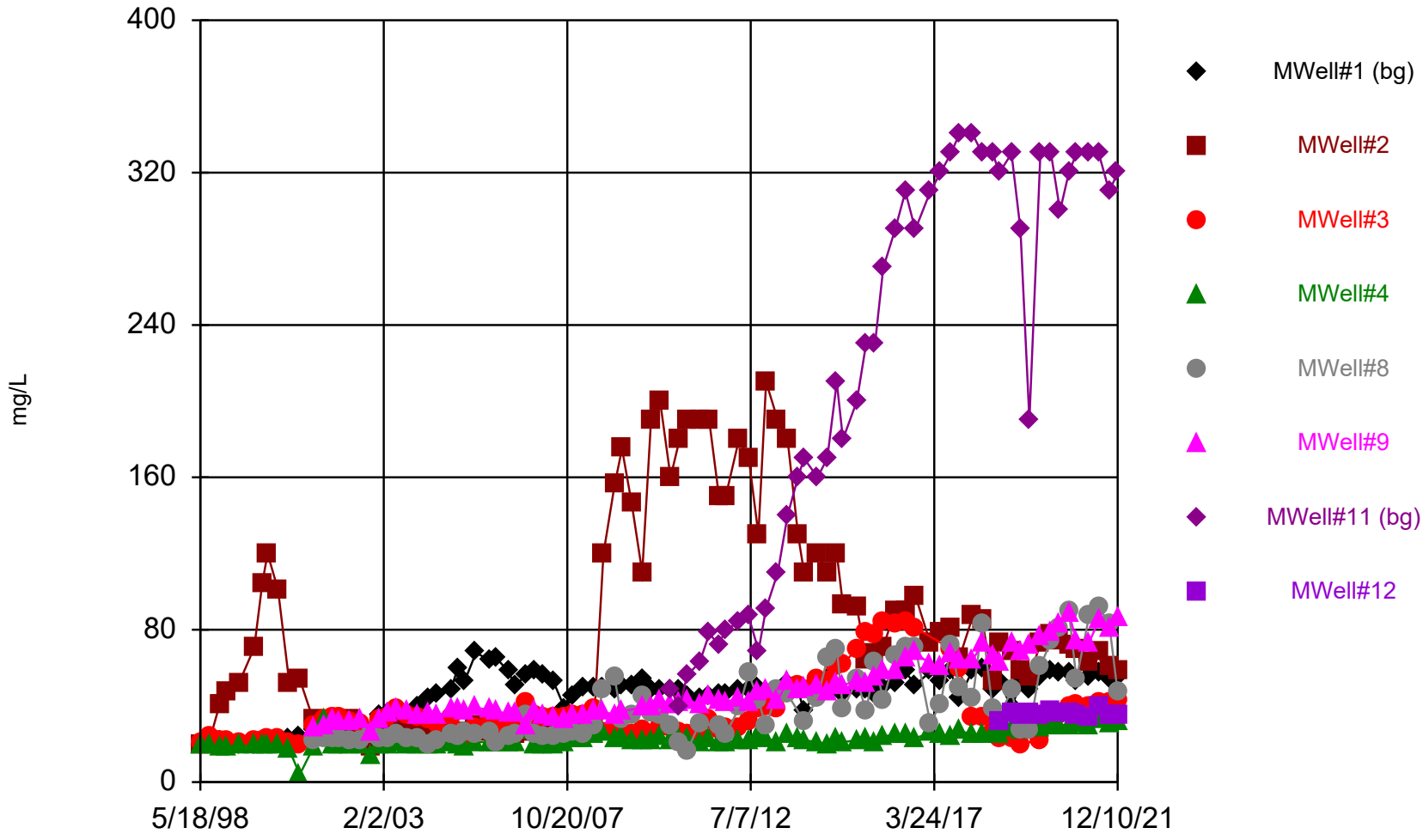
Time Series



Constituent: Sodium, Dissolved Analysis Run 1/24/2022 11:16 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series

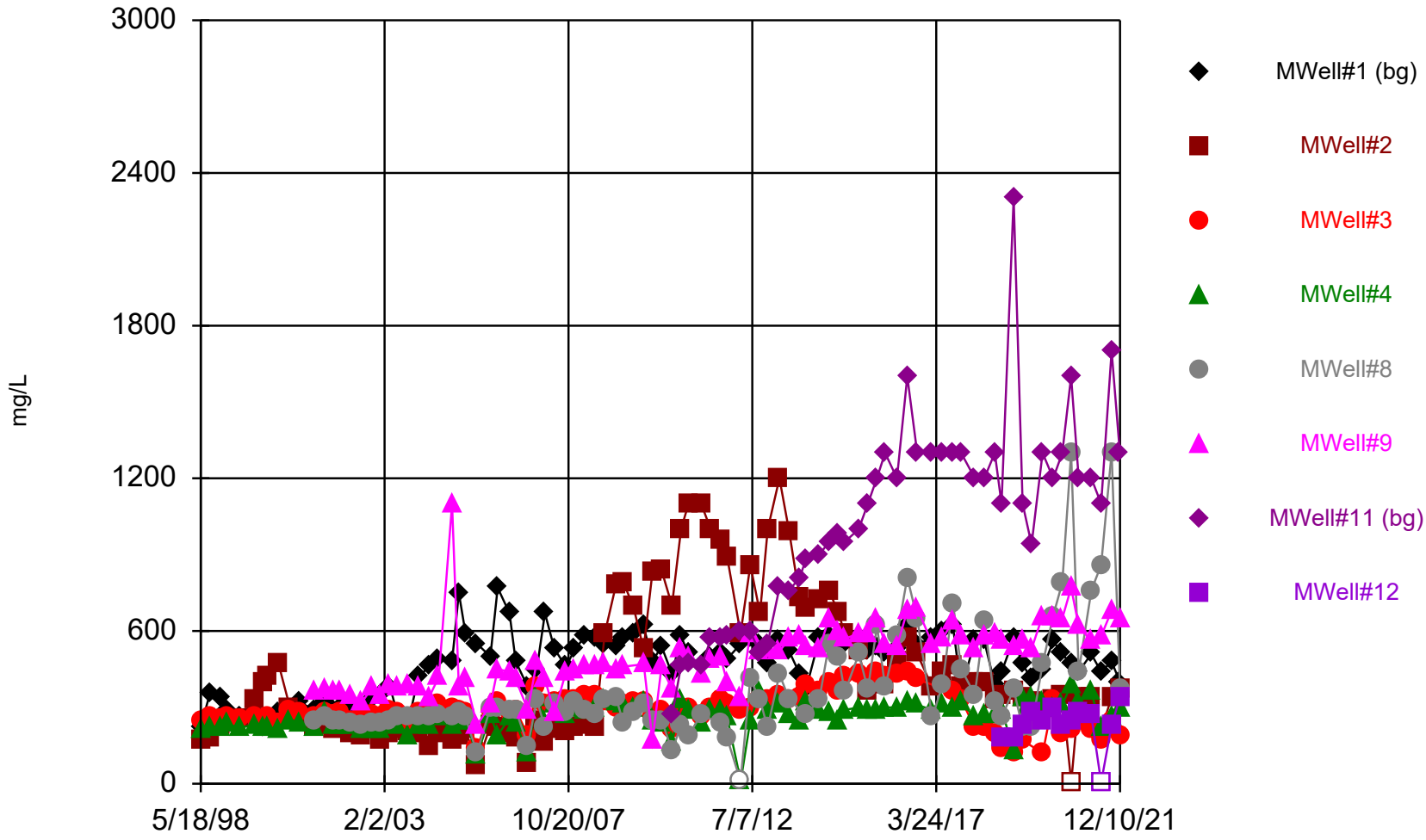


Constituent: Sulfate Analysis Run 1/24/2022 11:16 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Time Series



Constituent: TDS Analysis Run 1/24/2022 11:16 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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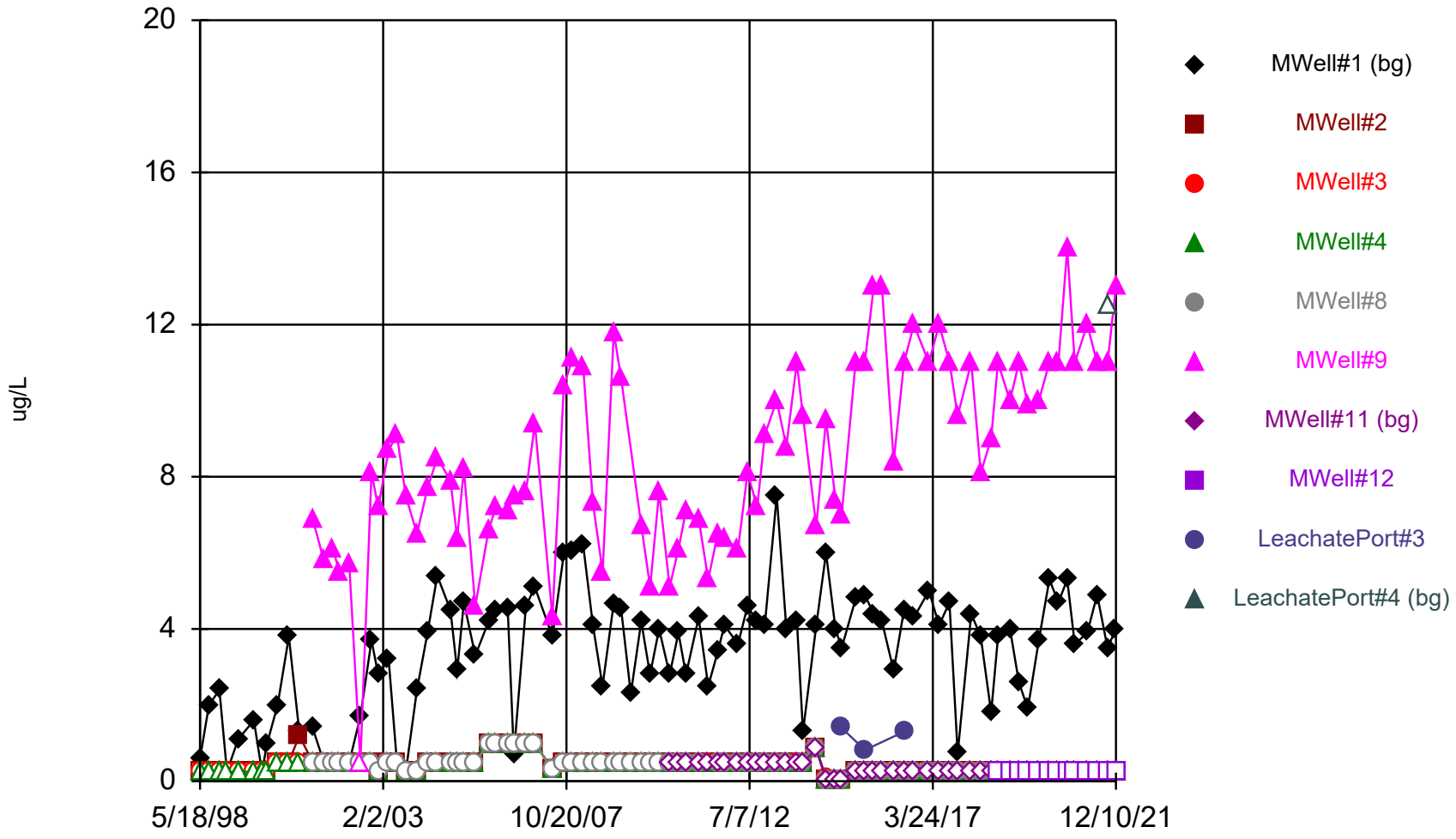
Hollow symbols indicate censored values.

Time Series

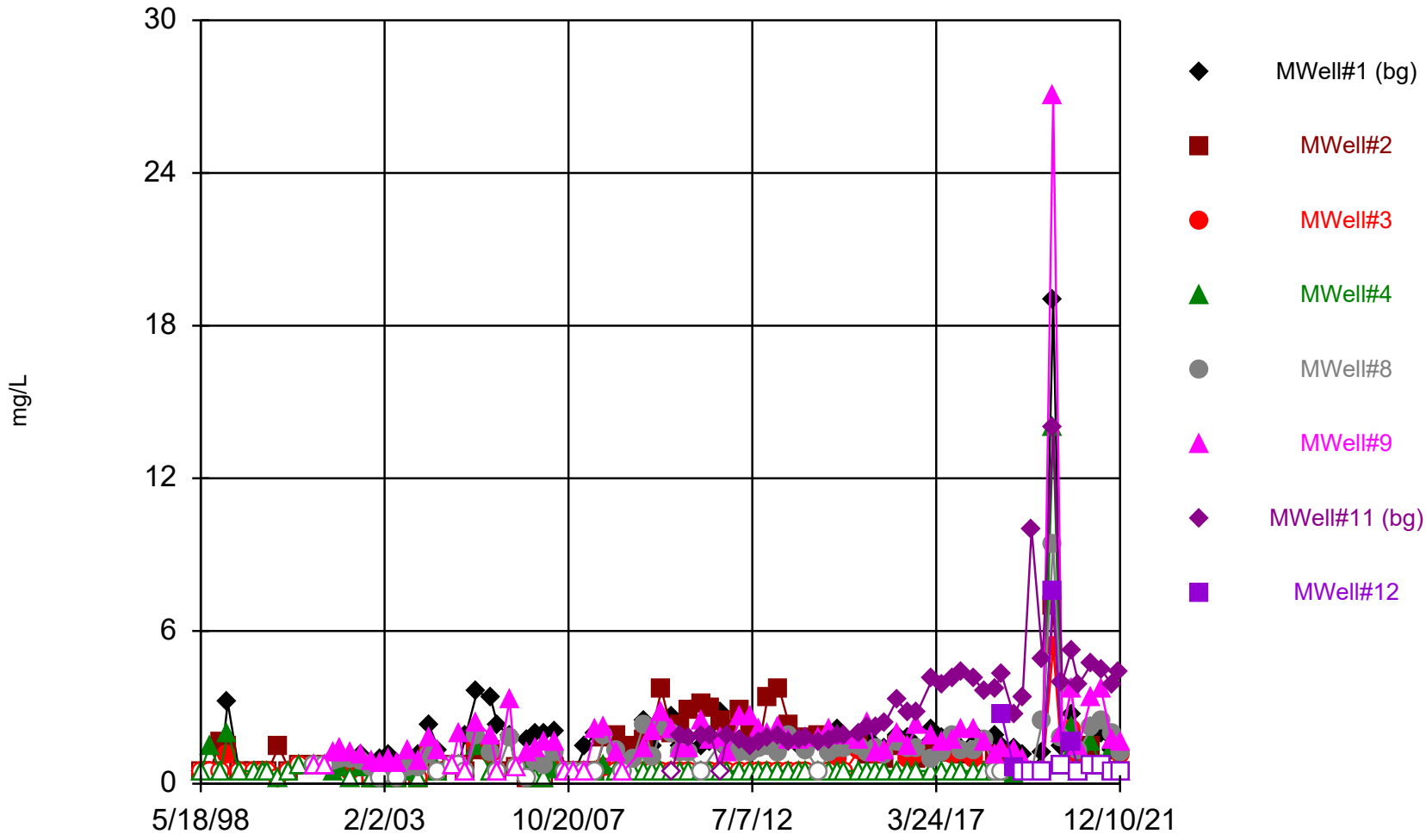


Constituent: Tetrachloroethene Analysis Run 1/24/2022 11:16 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Time Series



Constituent: TOC Analysis Run 1/24/2022 11:16 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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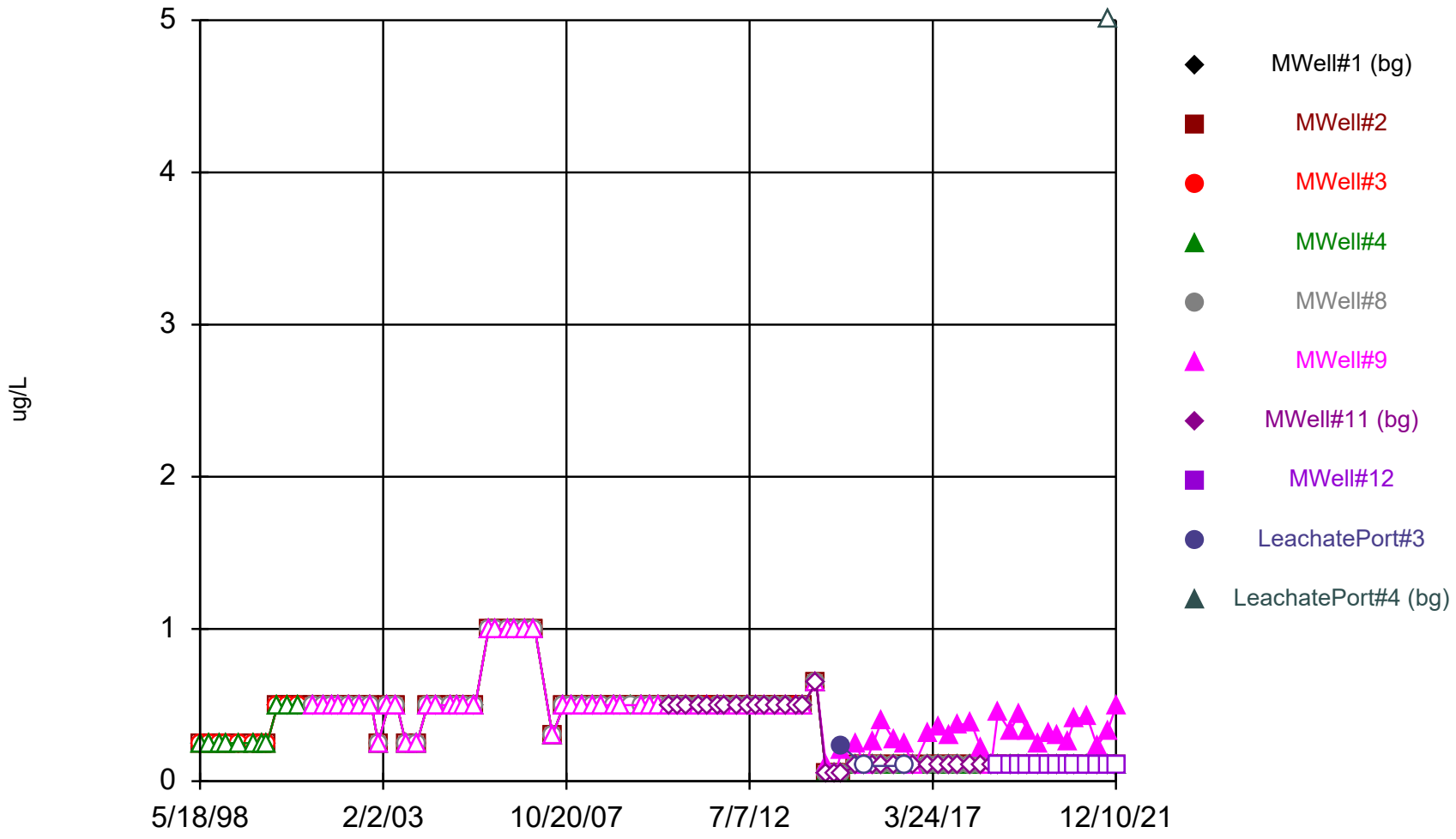
Hollow symbols indicate censored values.

Time Series

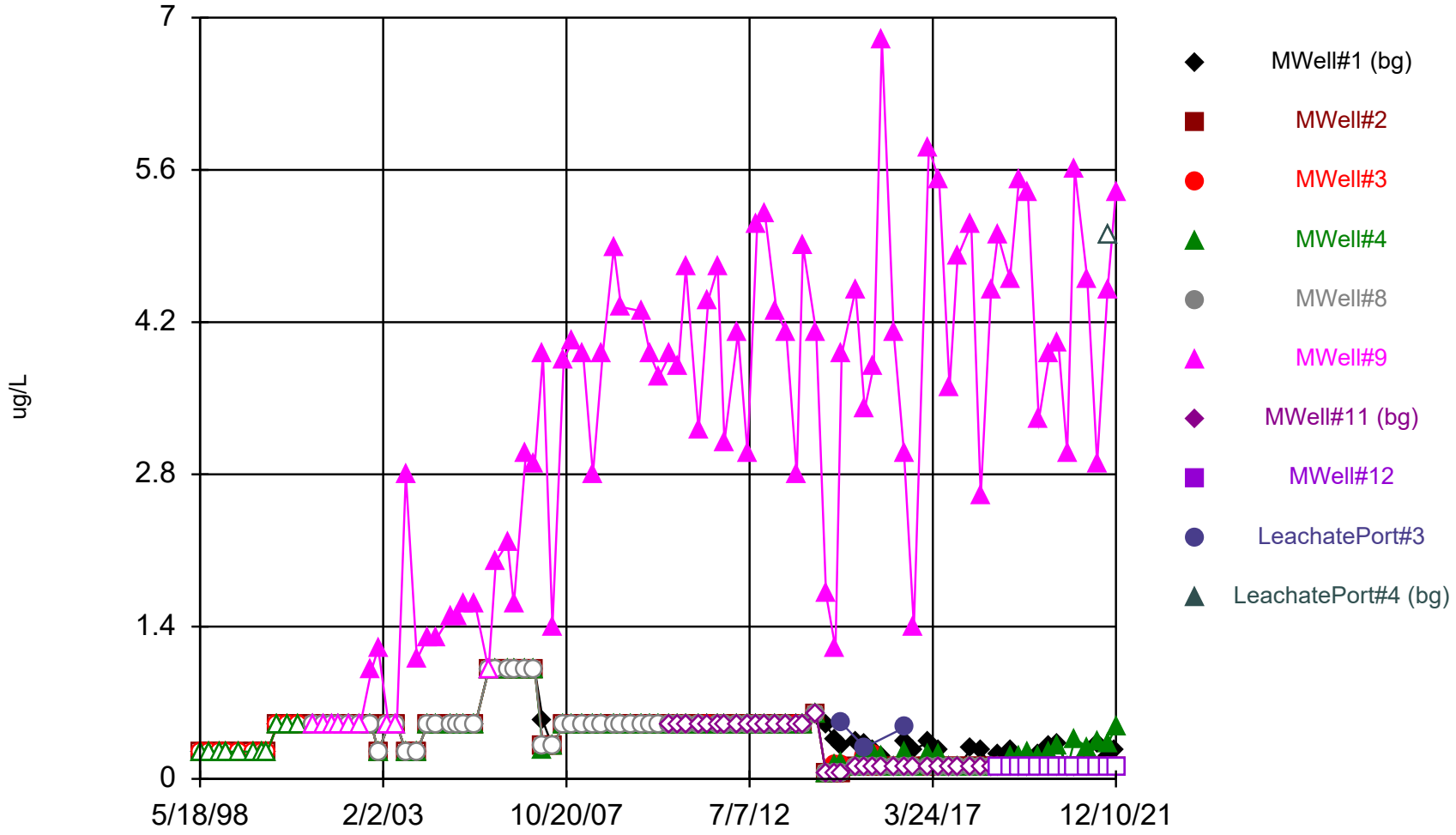


Constituent: trans-1,2-Dichloroethene Analysis Run 1/24/2022 11:16 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.9.6.32 Software licensed to Parametrix. UG
Hollow symbols indicate censored values.

Time Series

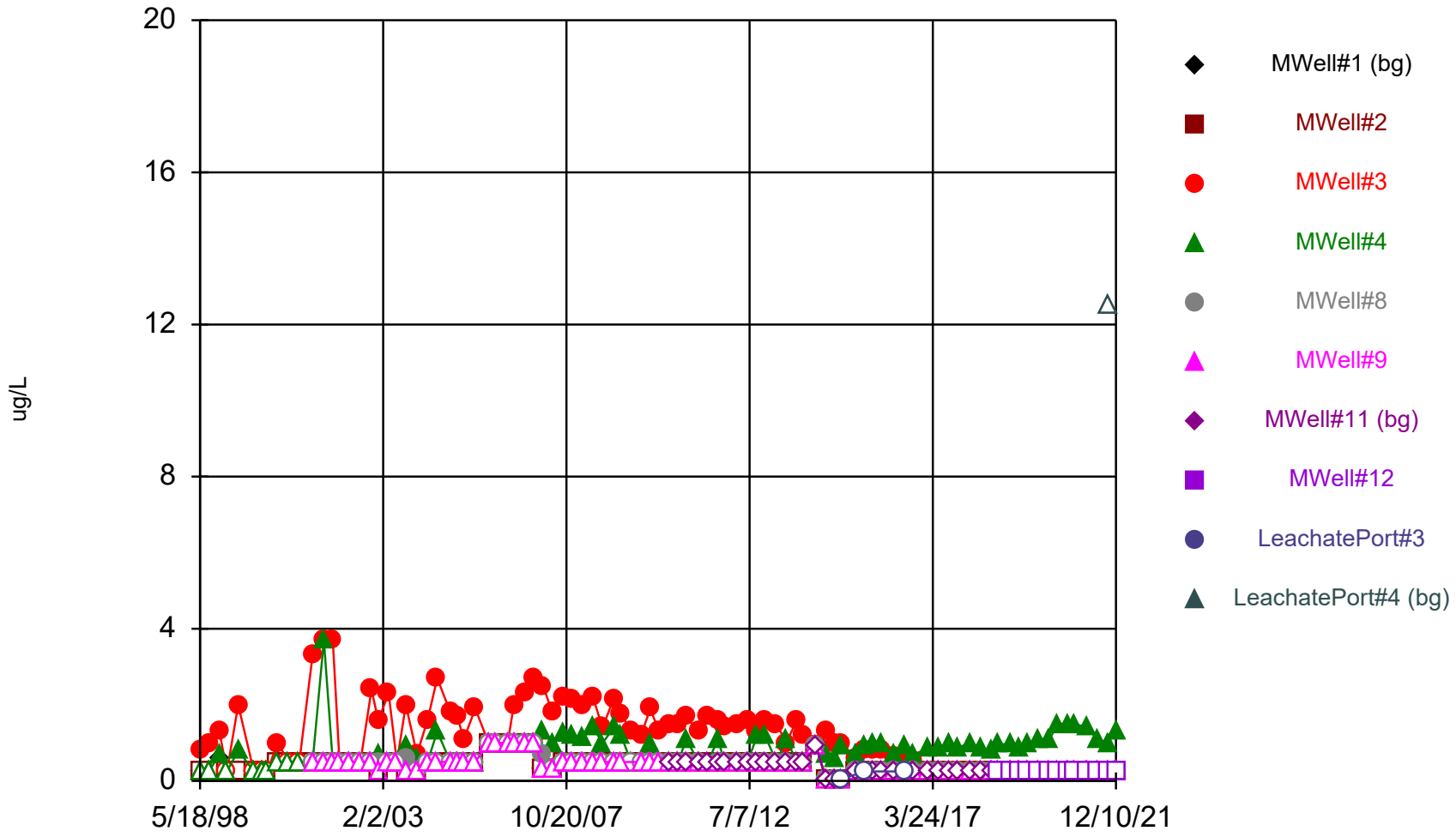


Constituent: Trichloroethene Analysis Run 1/24/2022 11:16 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sanitas™ v.9.6.32 Software licensed to Parametrix. UG
Hollow symbols indicate censored values.

Time Series

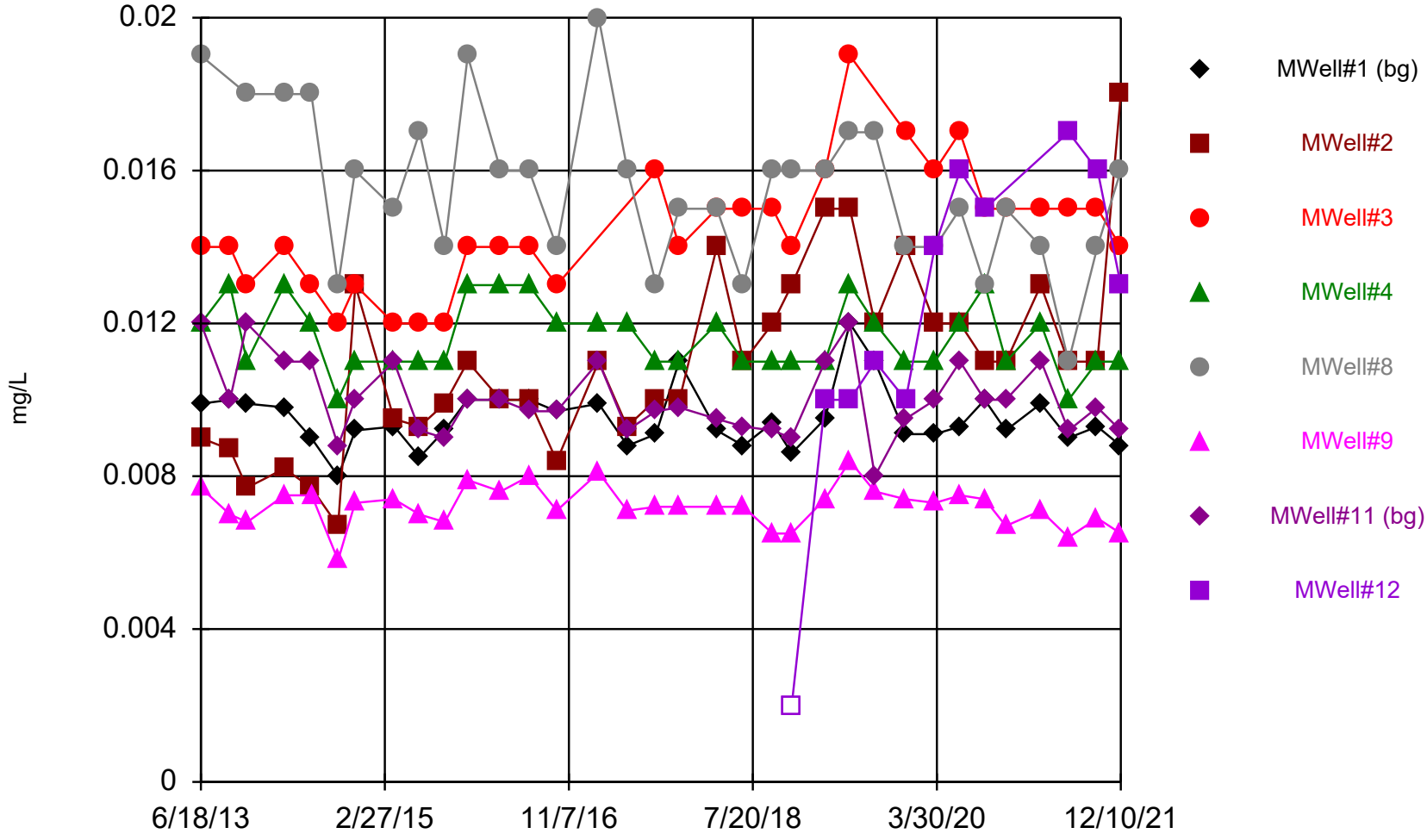


Constituent: Trichlorofluoromethane Analysis Run 1/24/2022 11:16 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Time Series

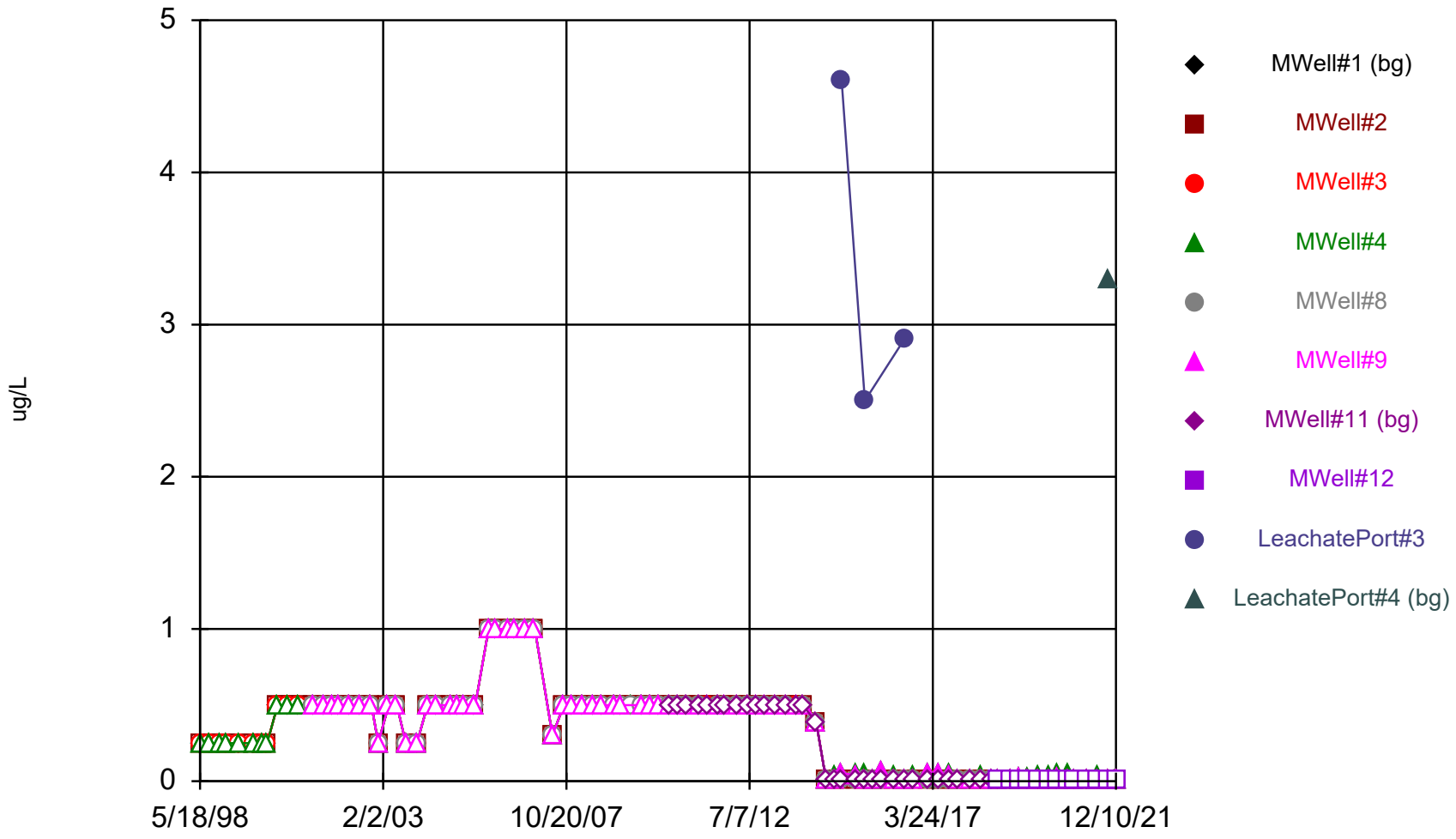


Constituent: Vanadium, Total Analysis Run 1/24/2022 11:16 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Time Series

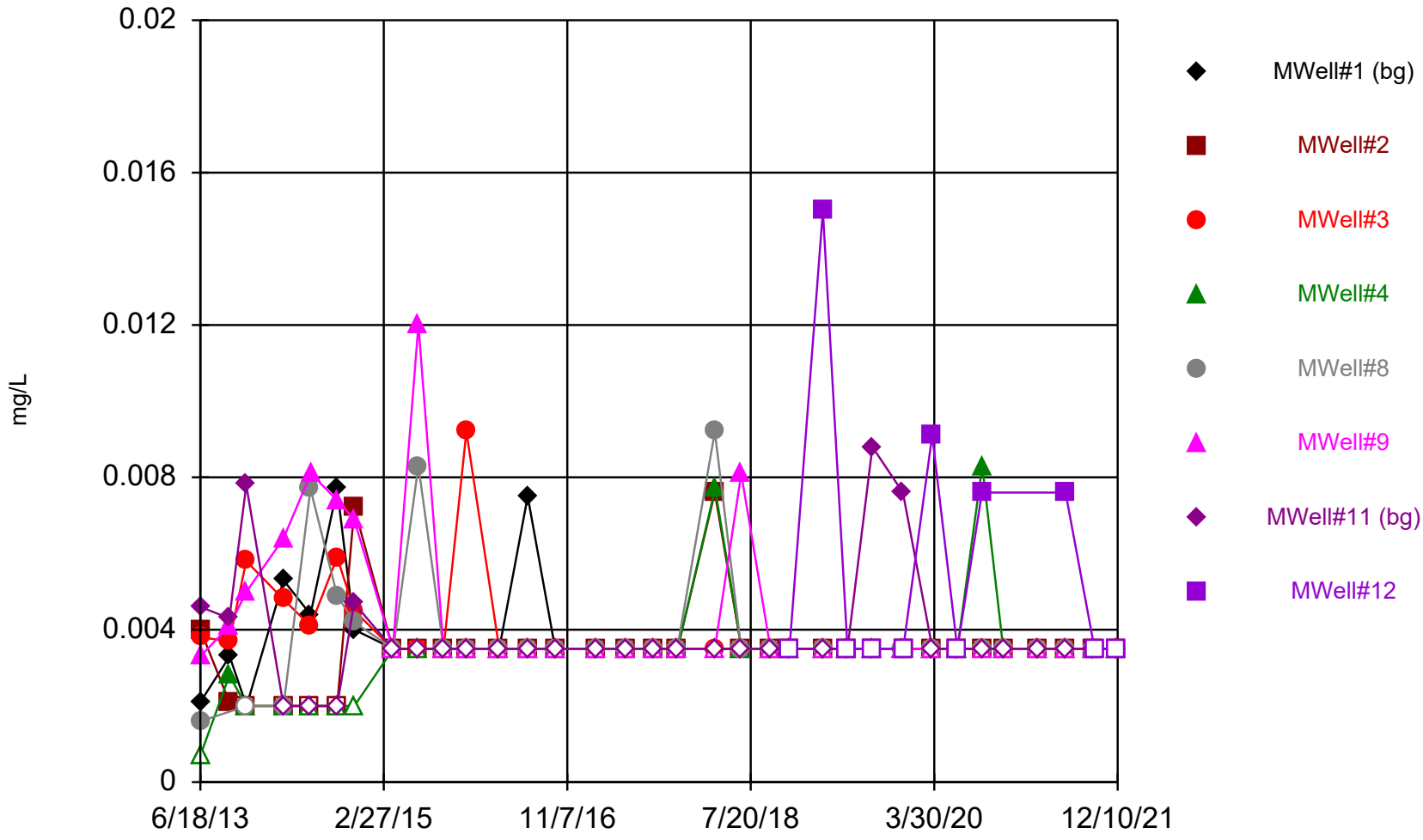


Constituent: Vinyl Chloride Analysis Run 1/24/2022 11:16 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Time Series

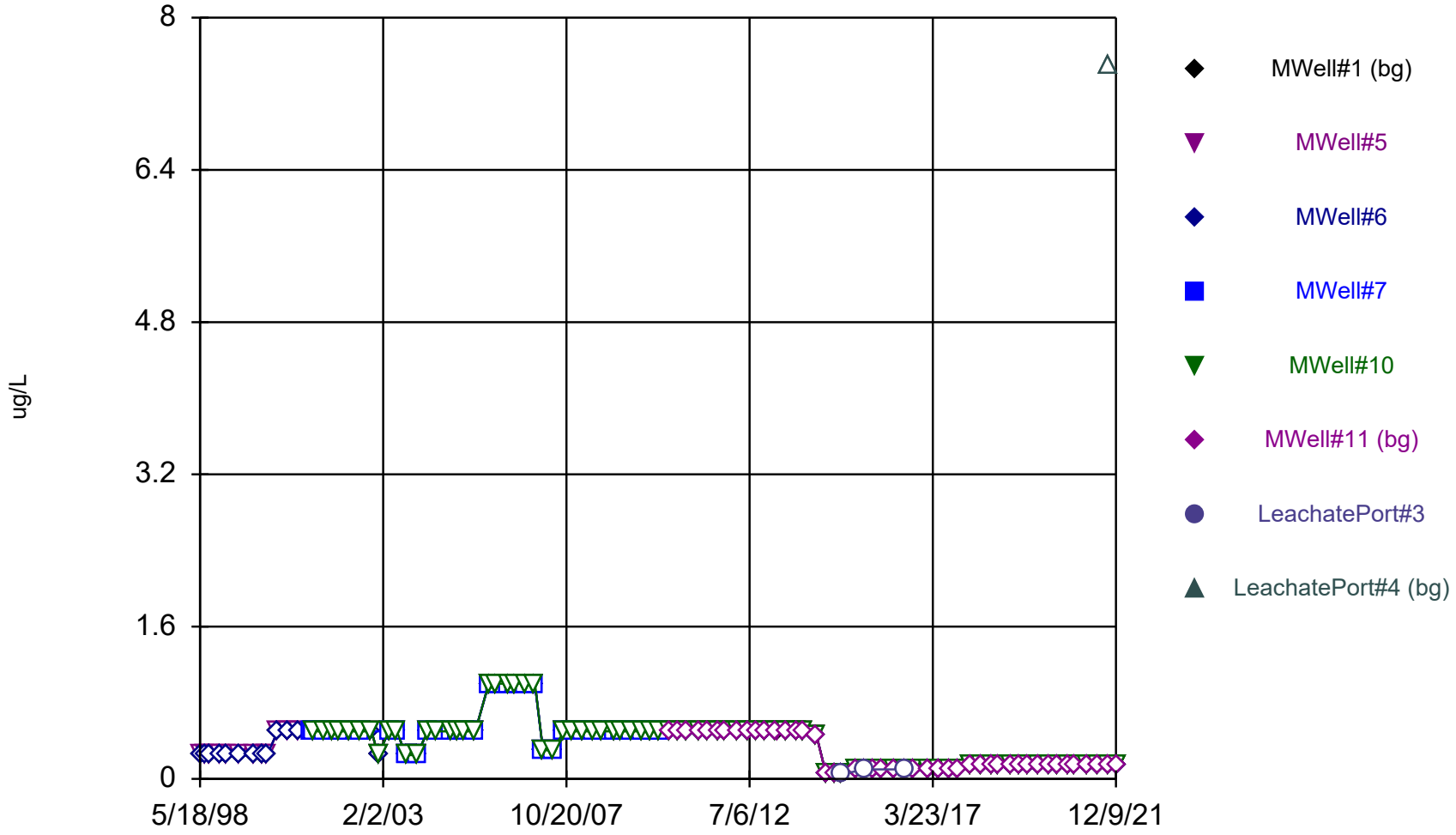


Constituent: Zinc, Total Analysis Run 1/24/2022 11:16 AM View: HRLF_TSP Set1

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Time Series

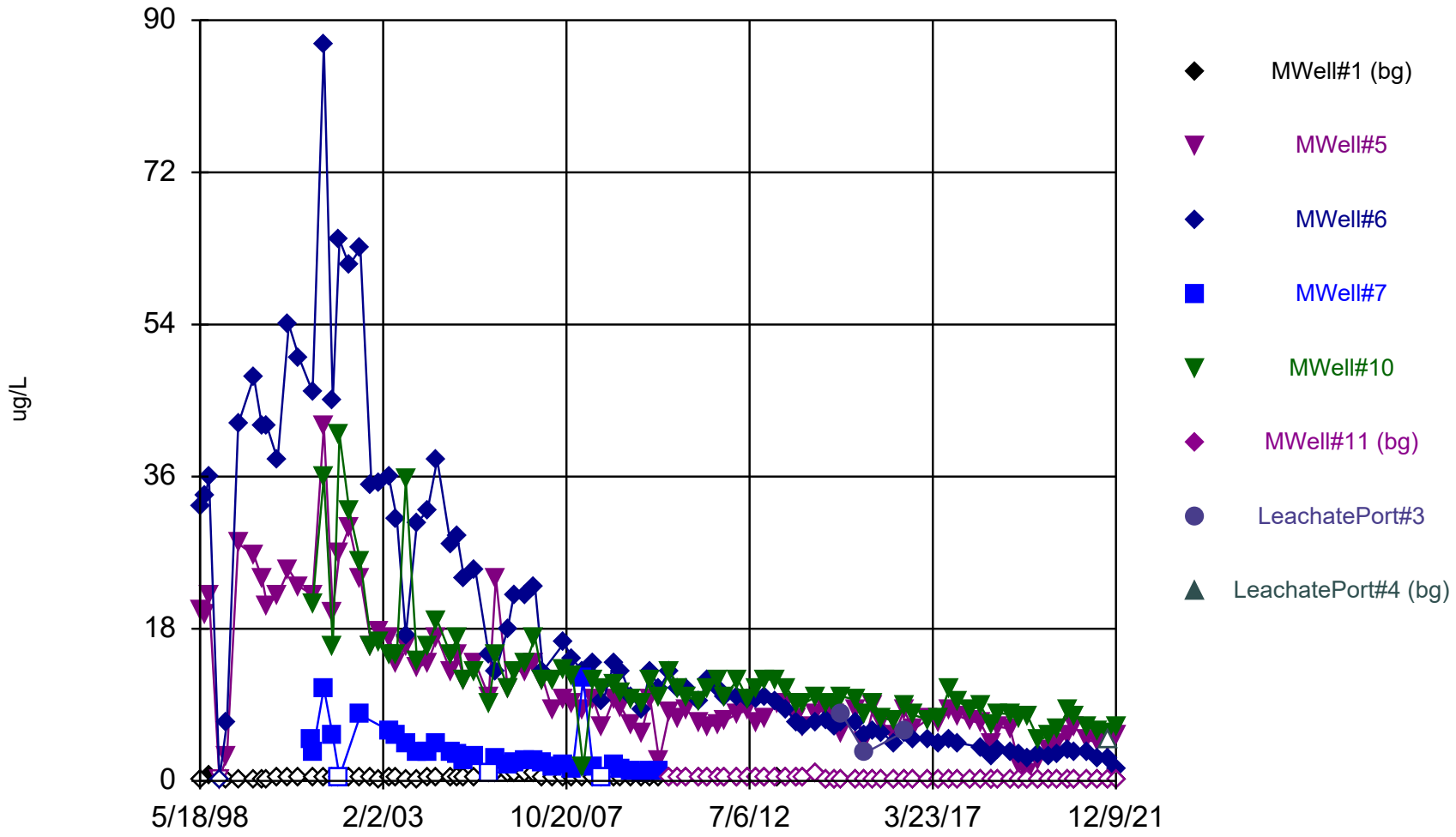


Constituent: 1,1,1,2-Tetrachloroethane Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Time Series

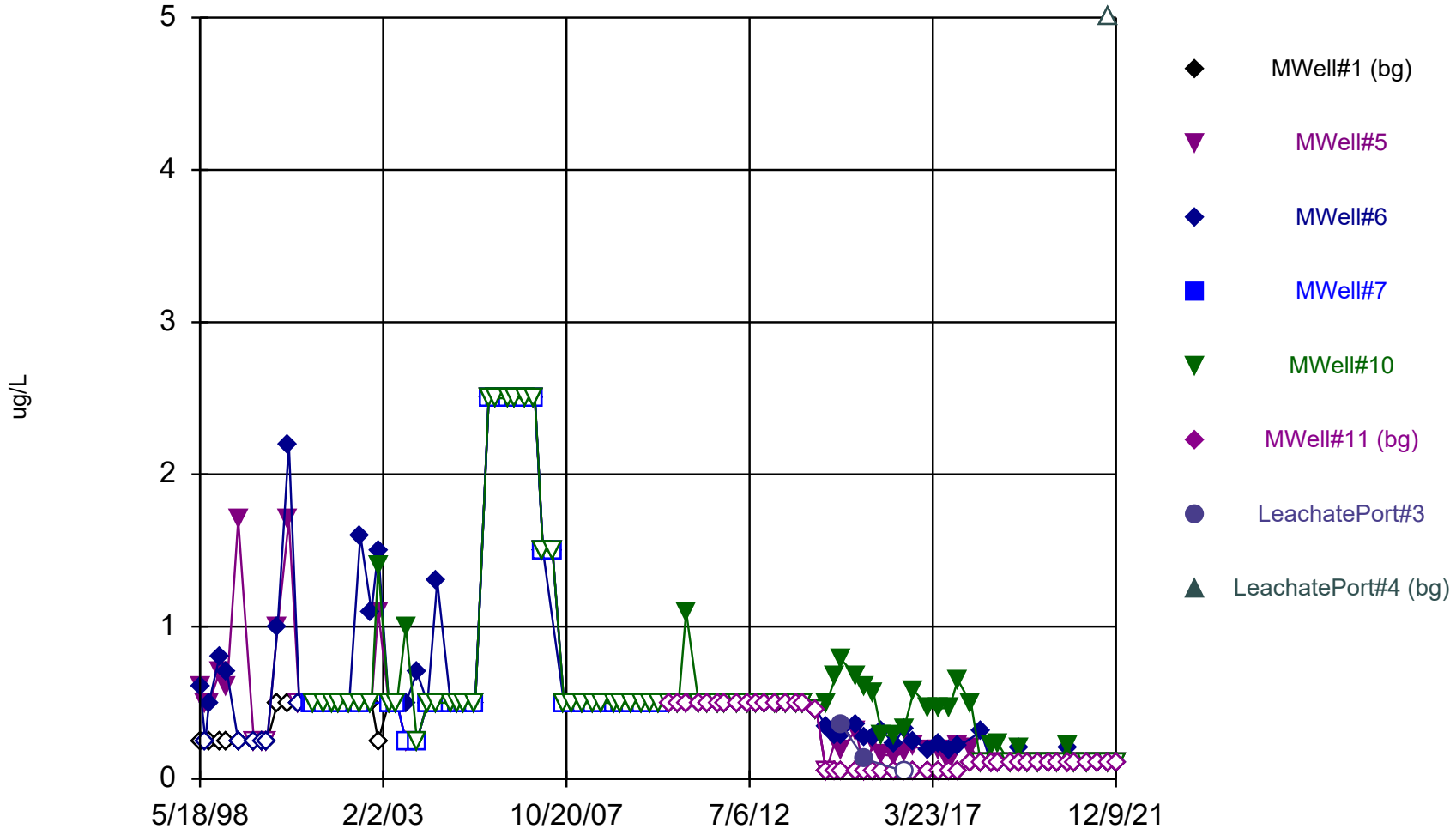


Constituent: 1,1-Dichloroethane Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Time Series

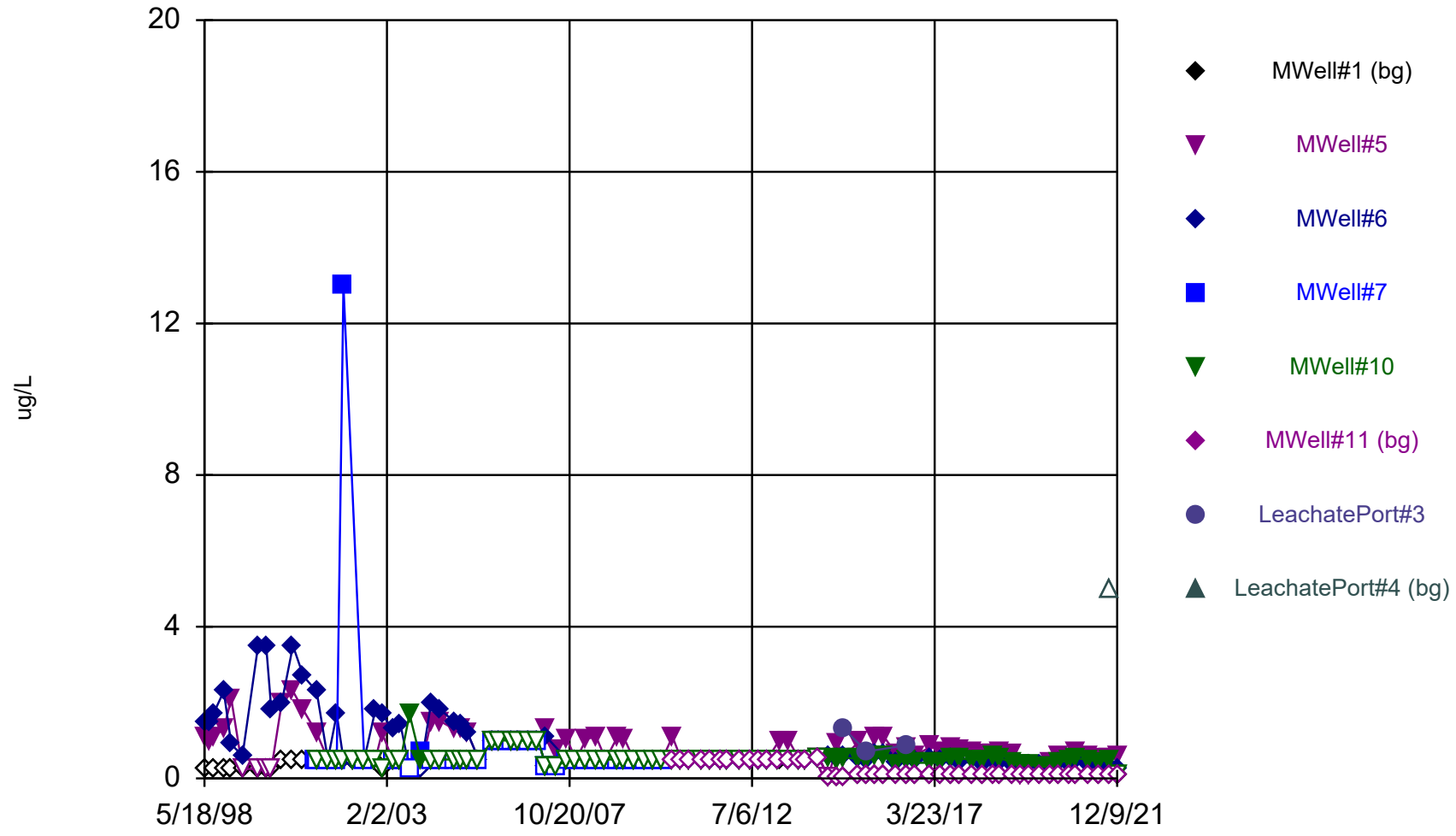


Constituent: 1,1-Dichloroethene Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

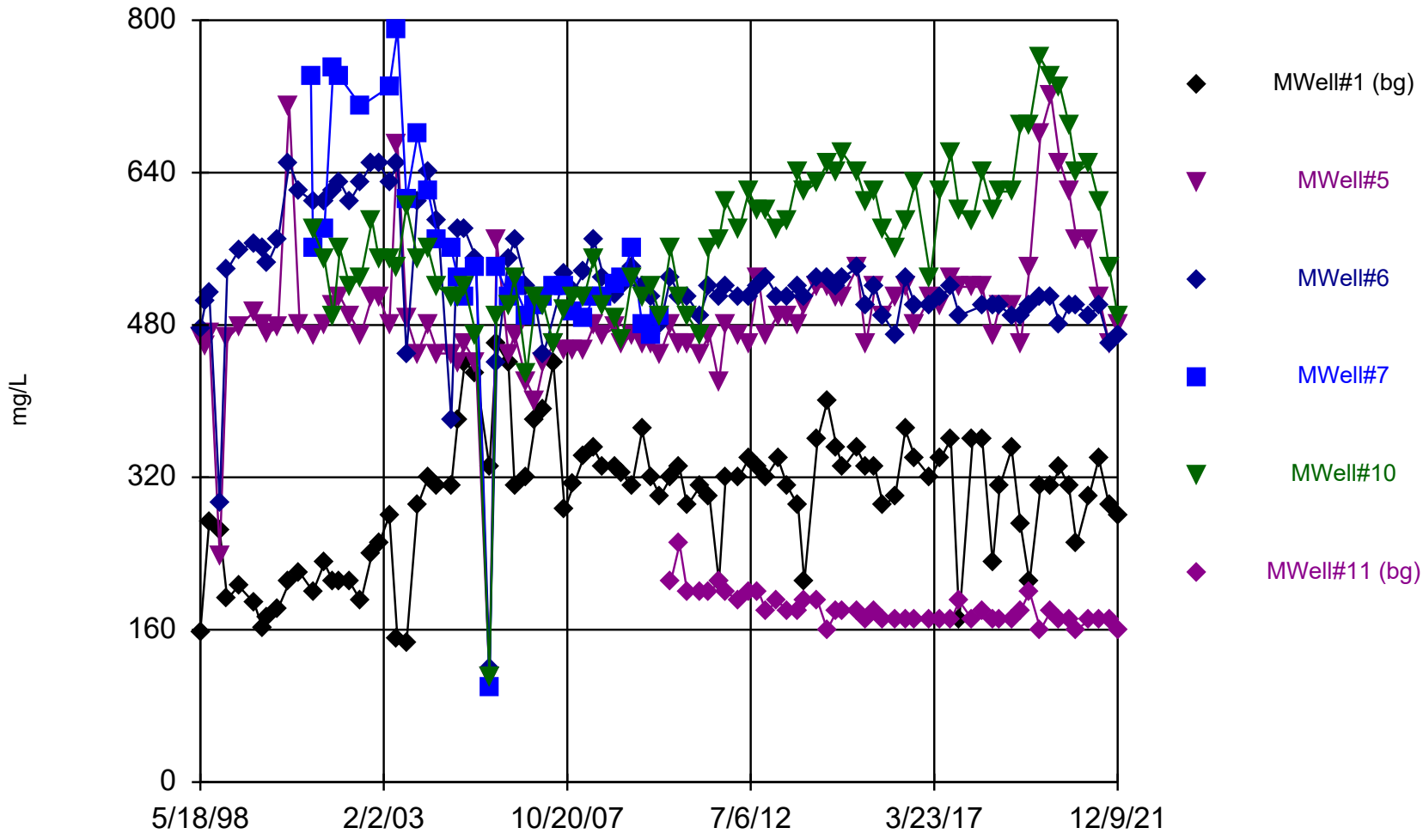
Time Series



Constituent: 1,2-Dichloroethane Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series

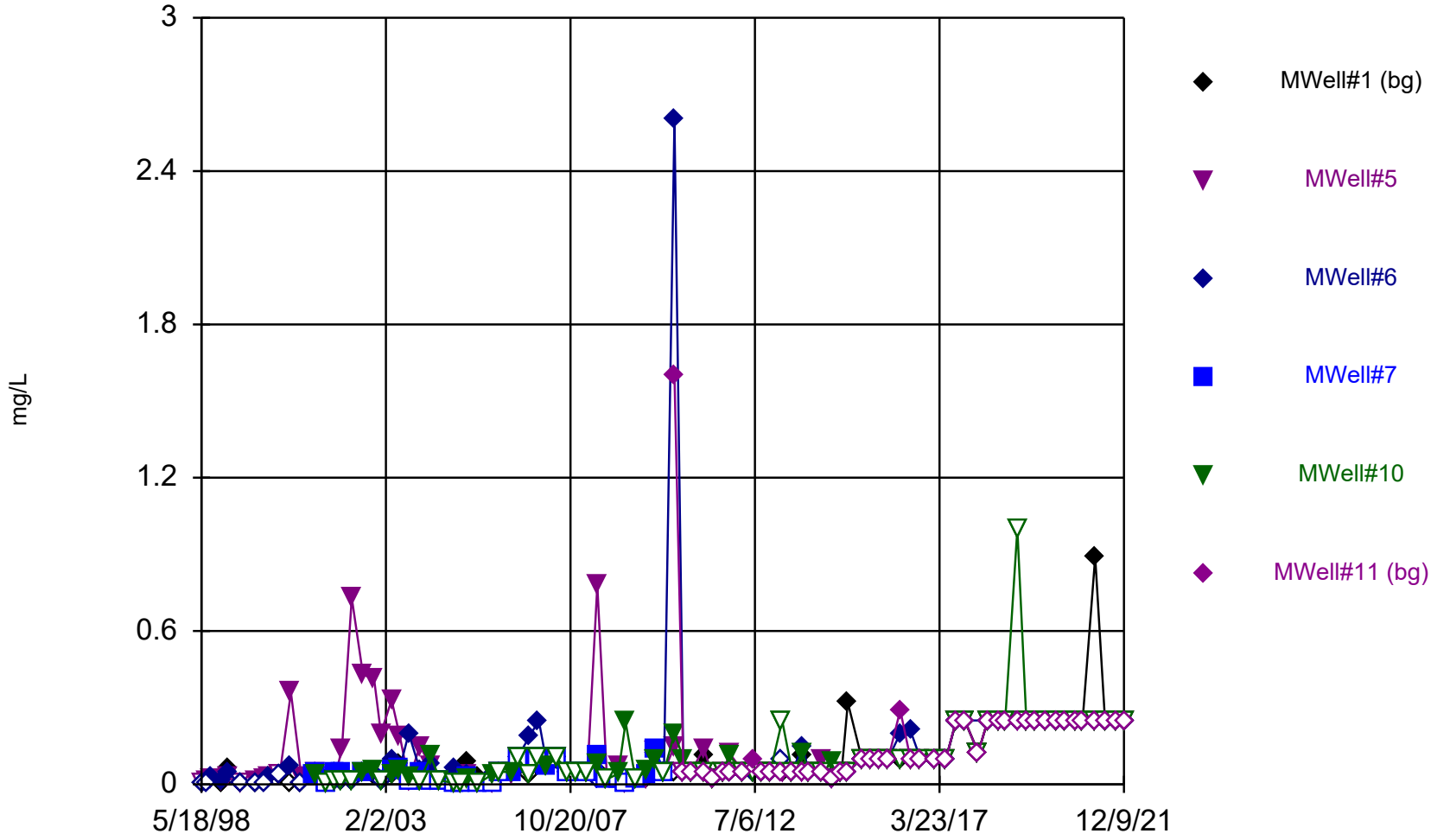


Constituent: Alkalinity Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

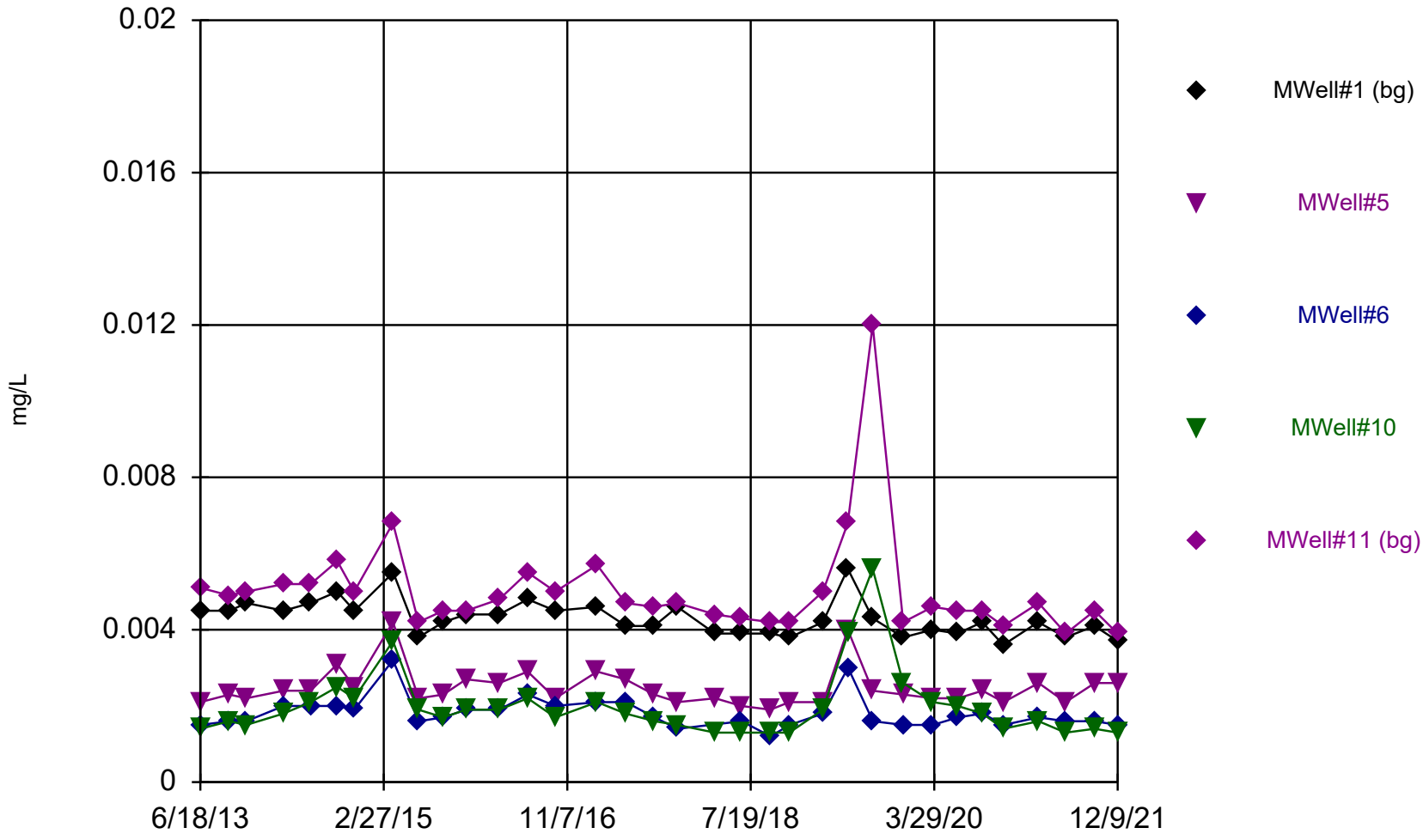
Time Series



Constituent: Ammonia Nitrogen Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

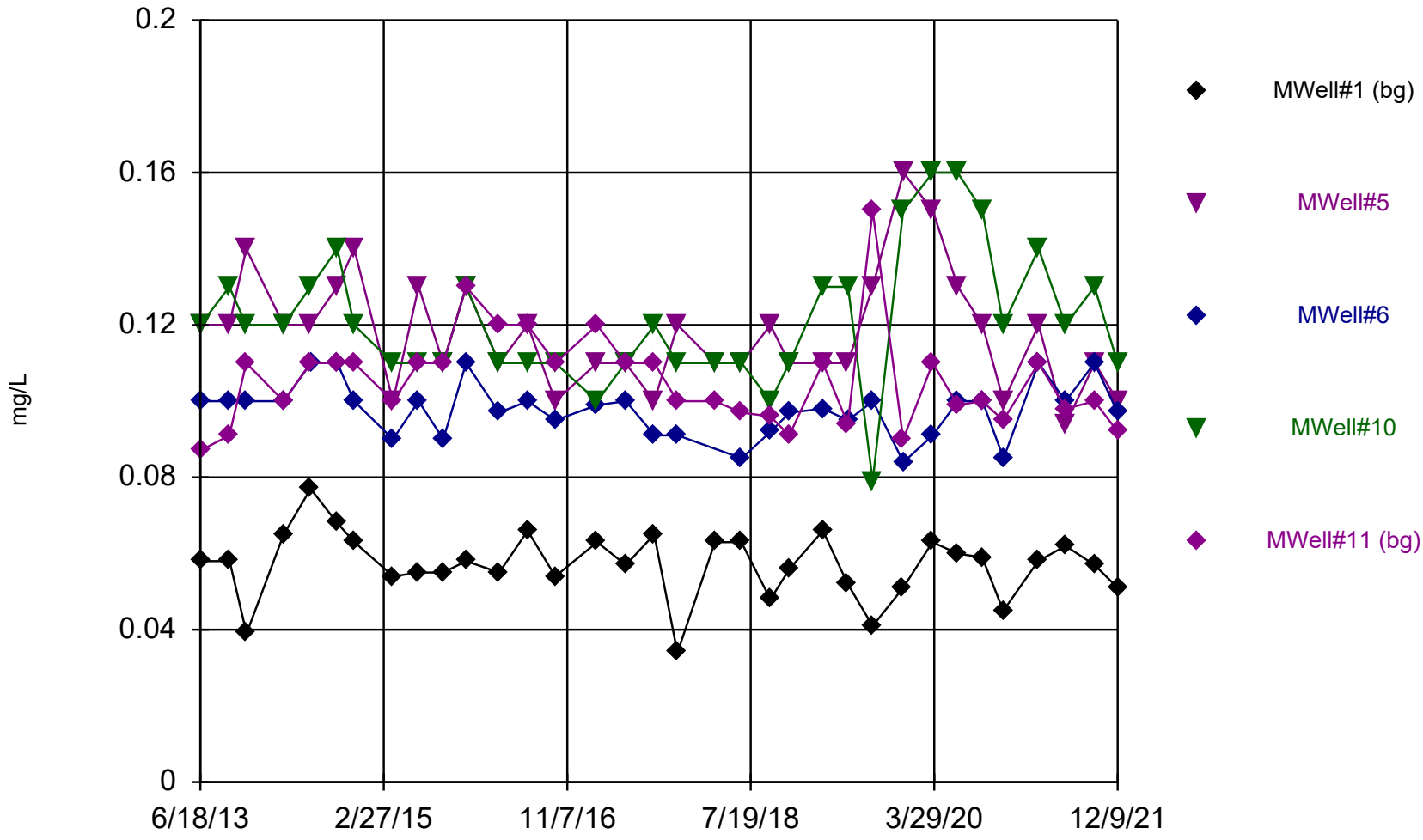
Time Series



Constituent: Arsenic, Total Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series

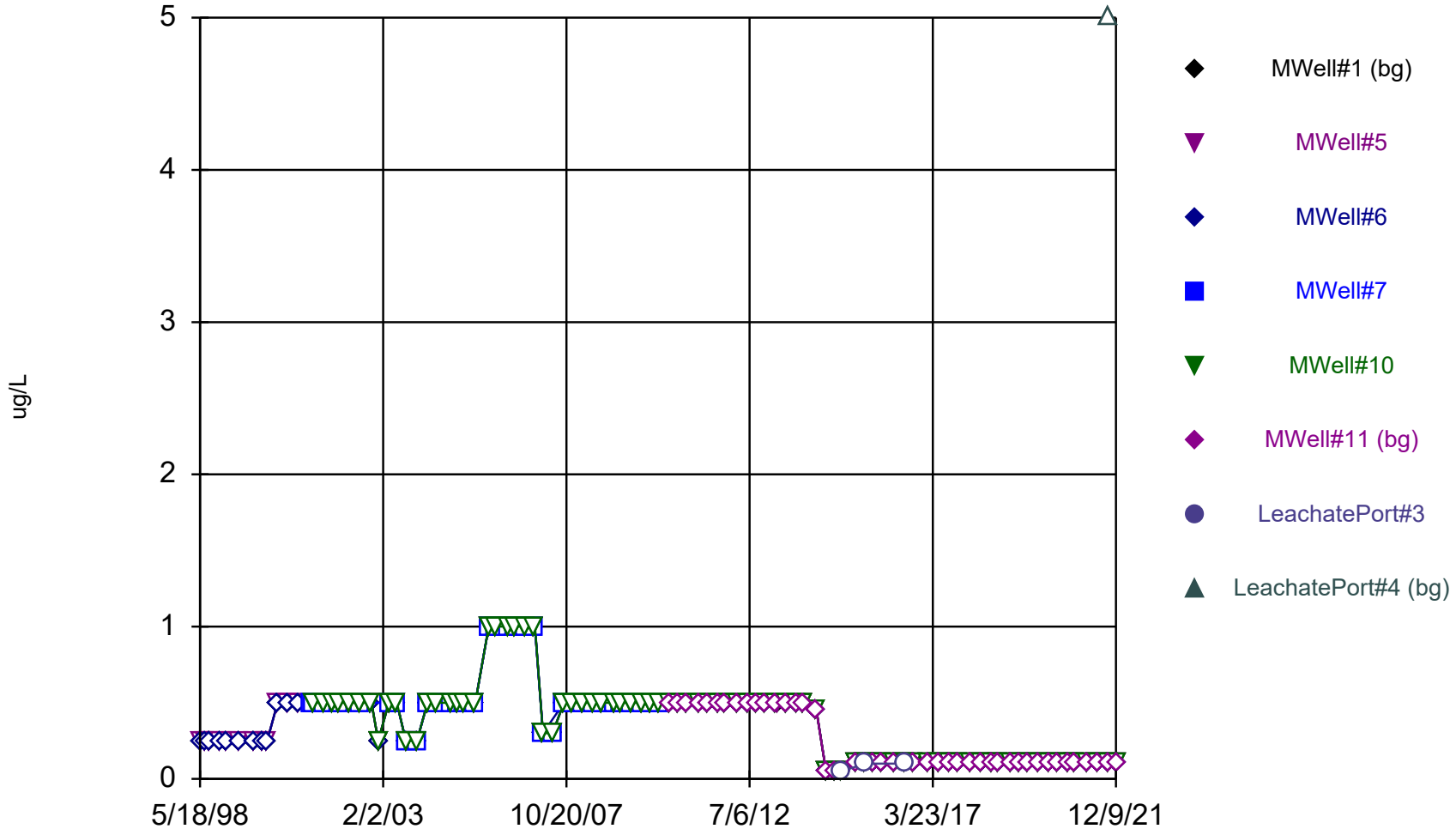


Constituent: Barium, Total Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

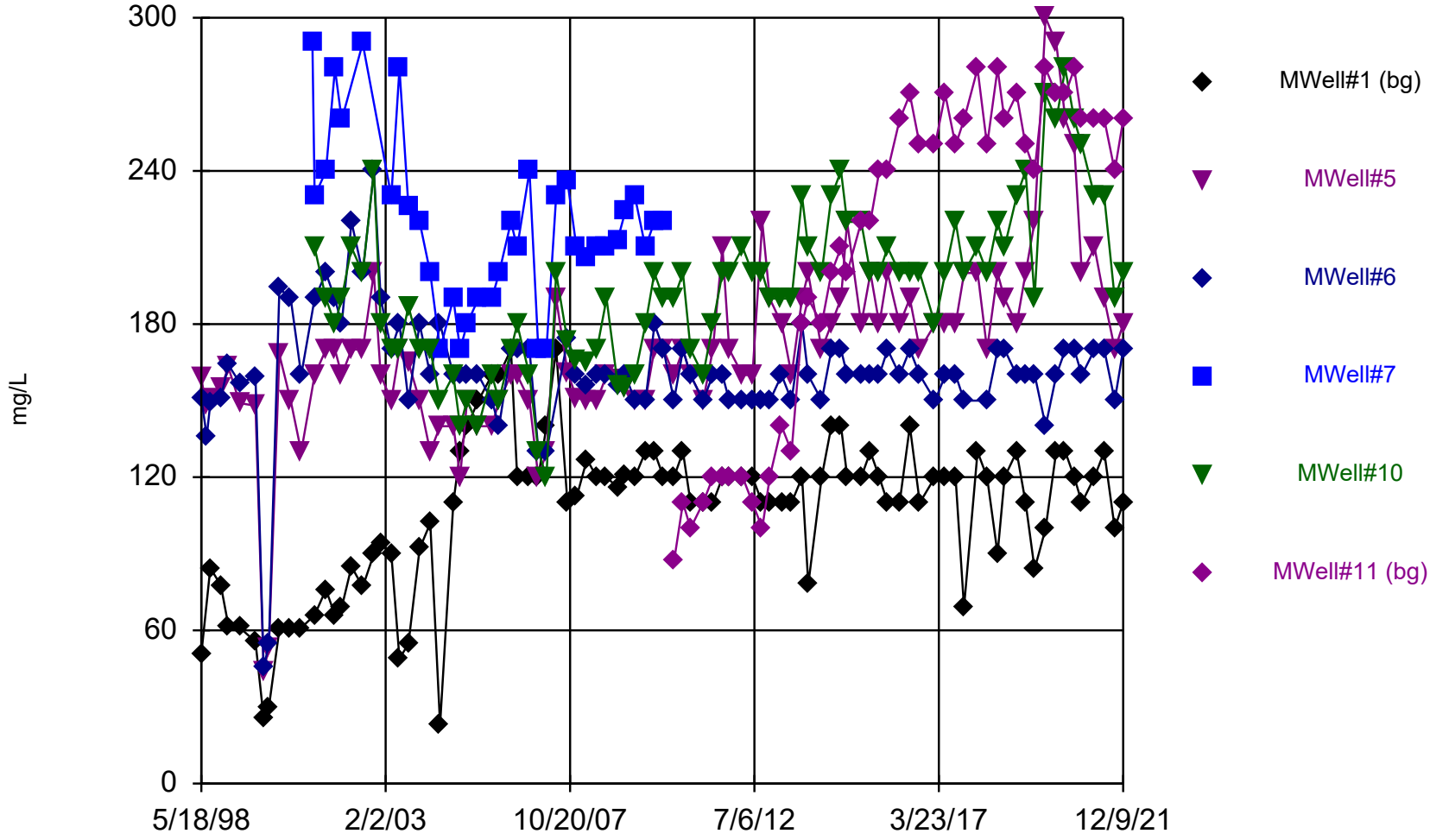
Time Series



Constituent: Bromodichloromethane Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

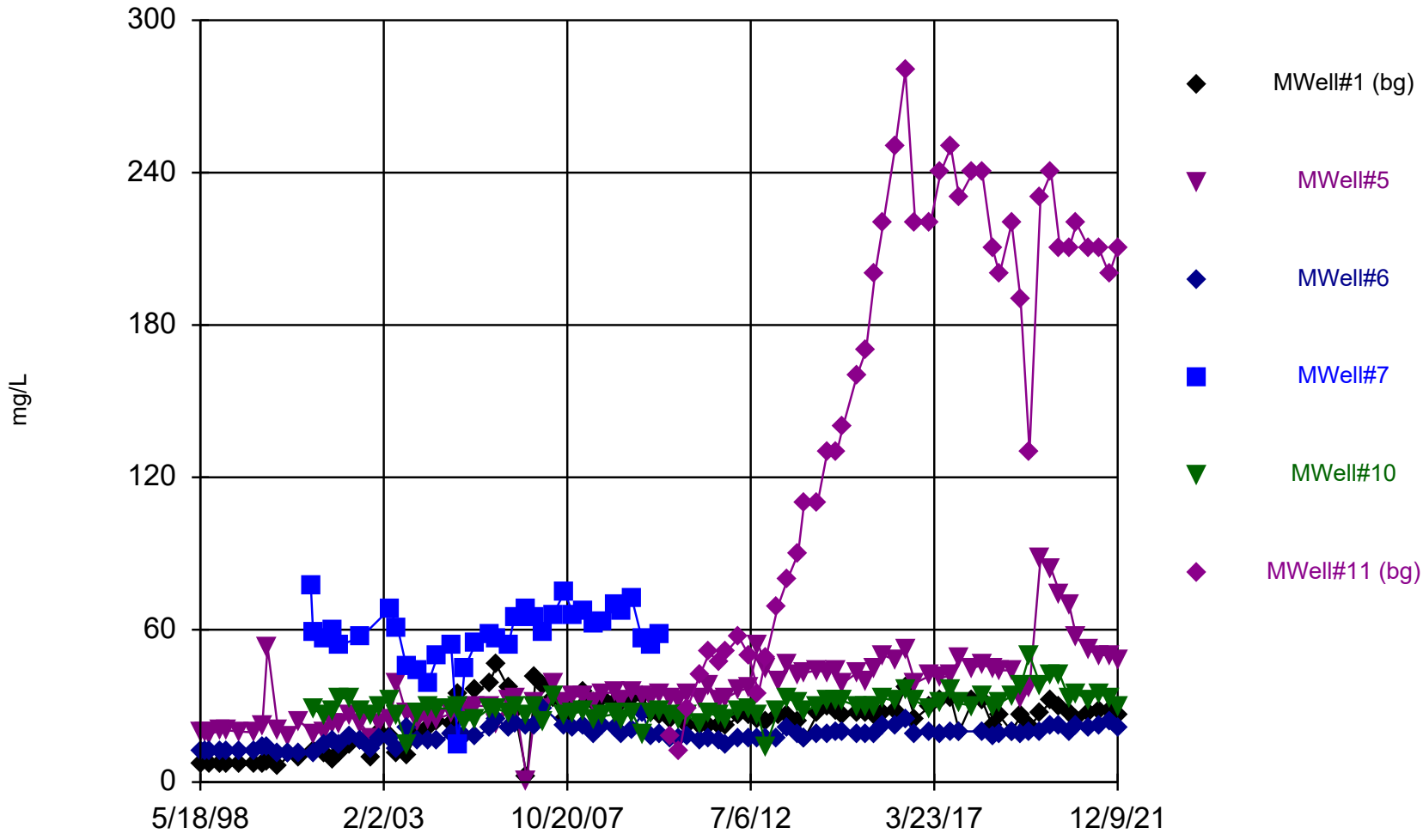
Time Series



Constituent: Calcium, Dissolved Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series

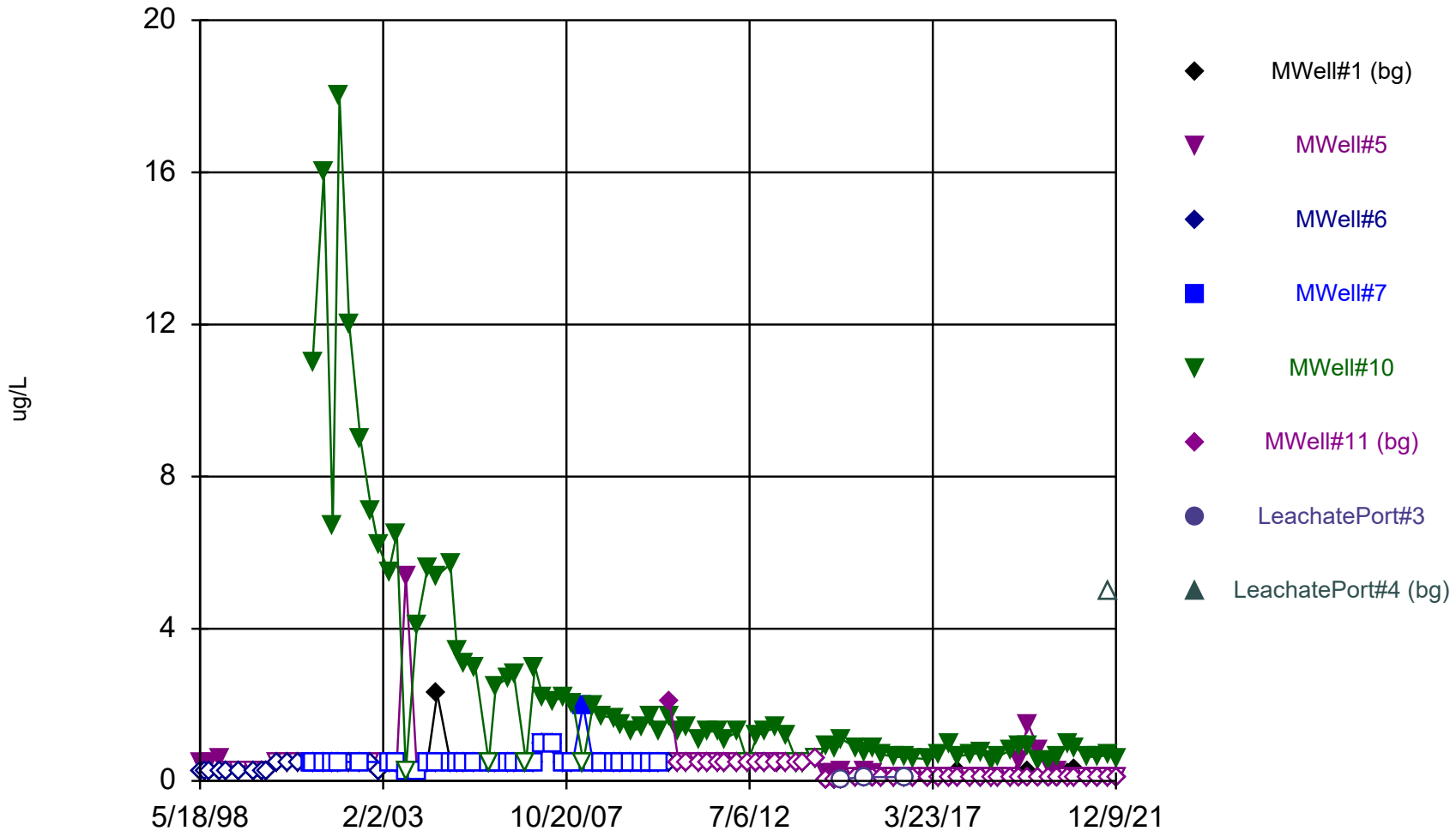


Constituent: Chloride Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Time Series

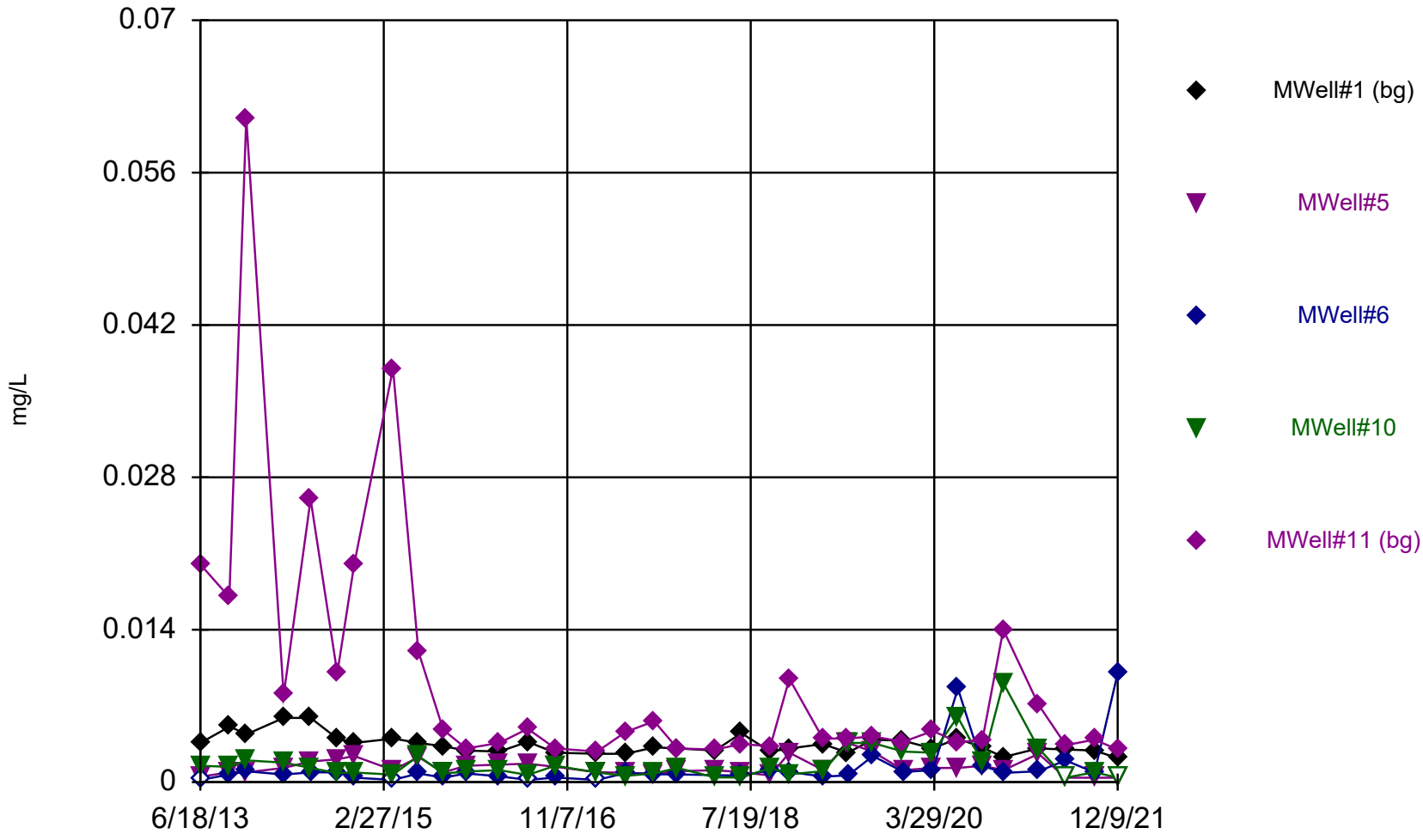


Constituent: Chloroform Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Time Series

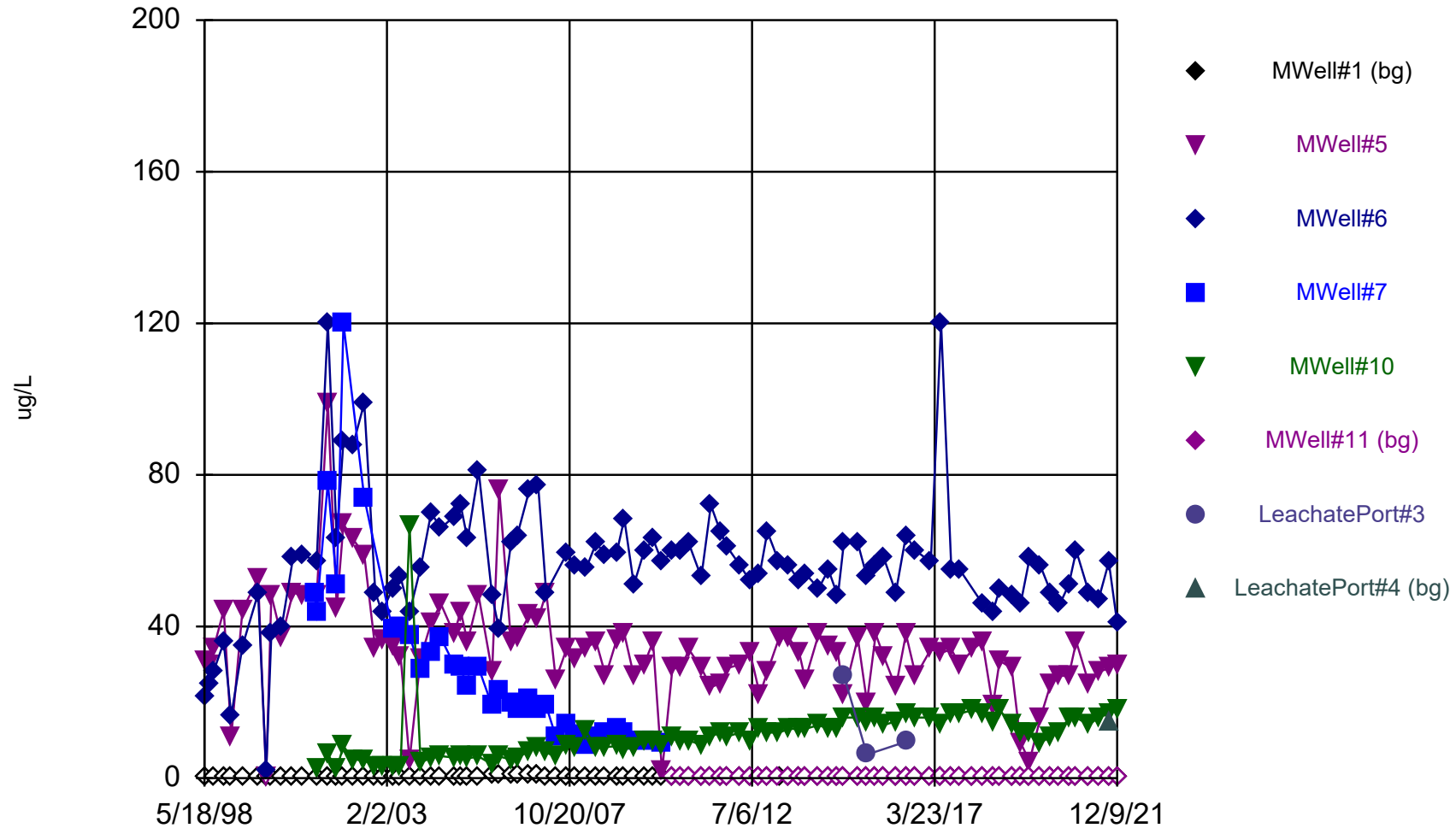


Constituent: Chromium, Total Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Time Series

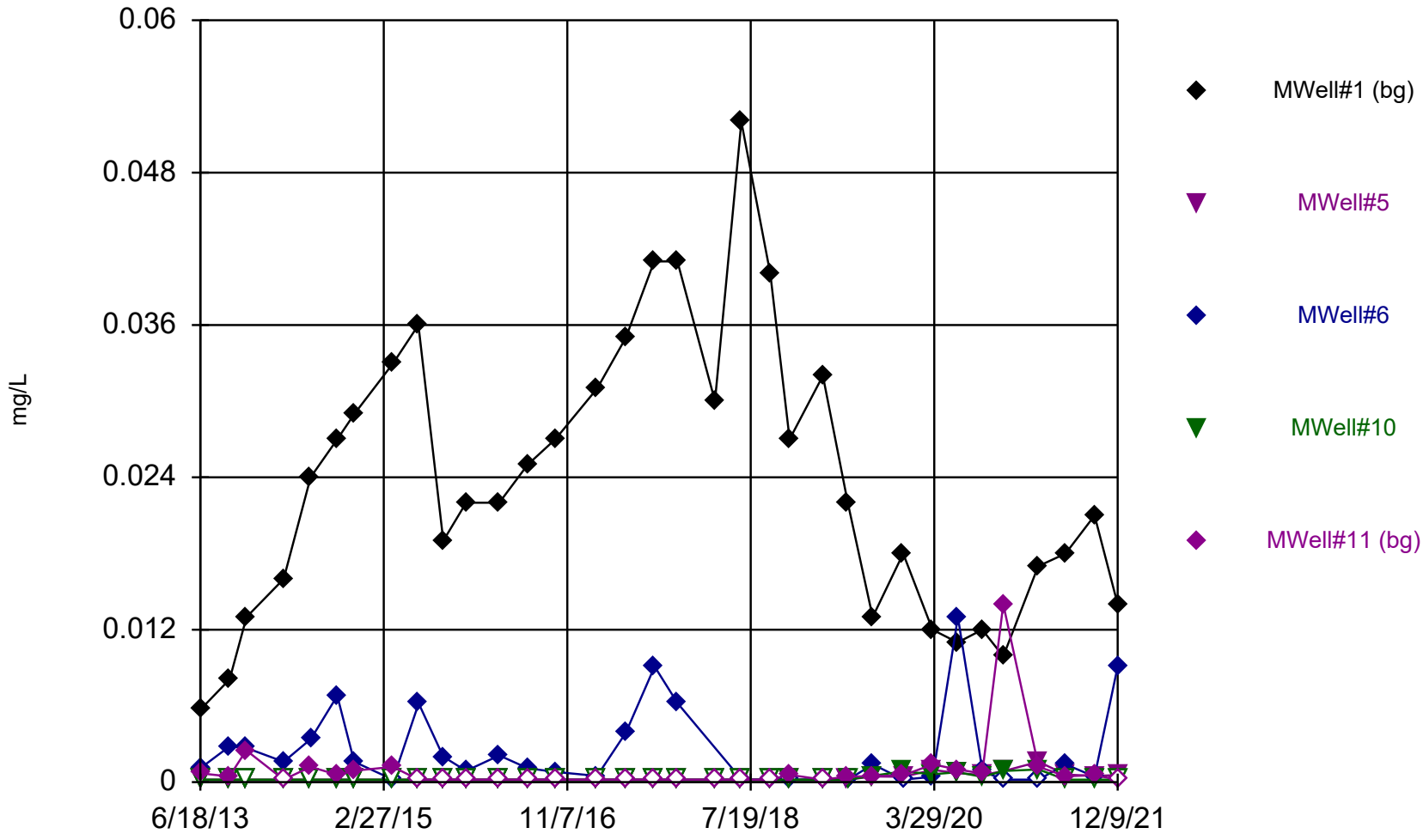


Constituent: cis-1,2-Dichloroethene Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

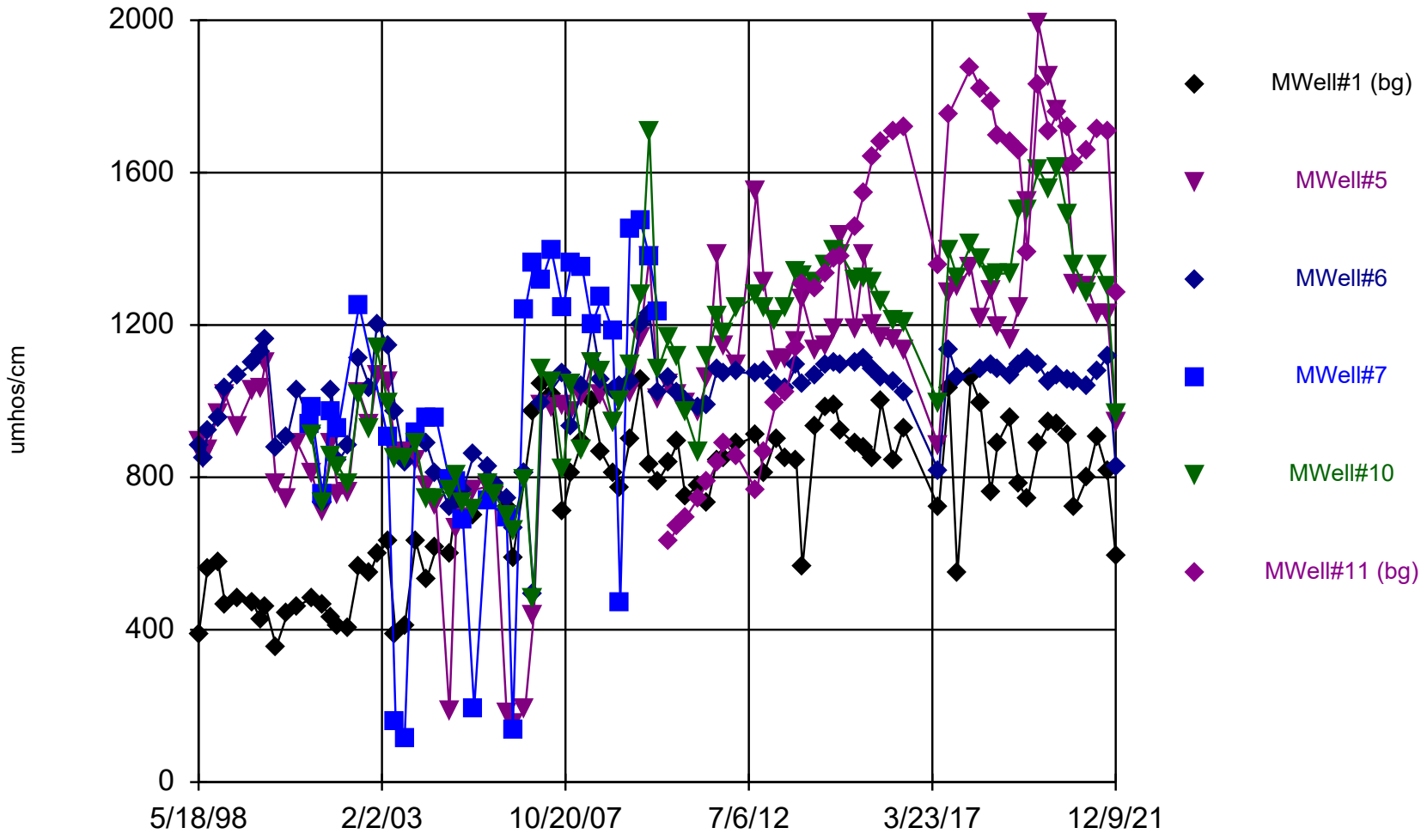
Time Series



Constituent: Cobalt, Total Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

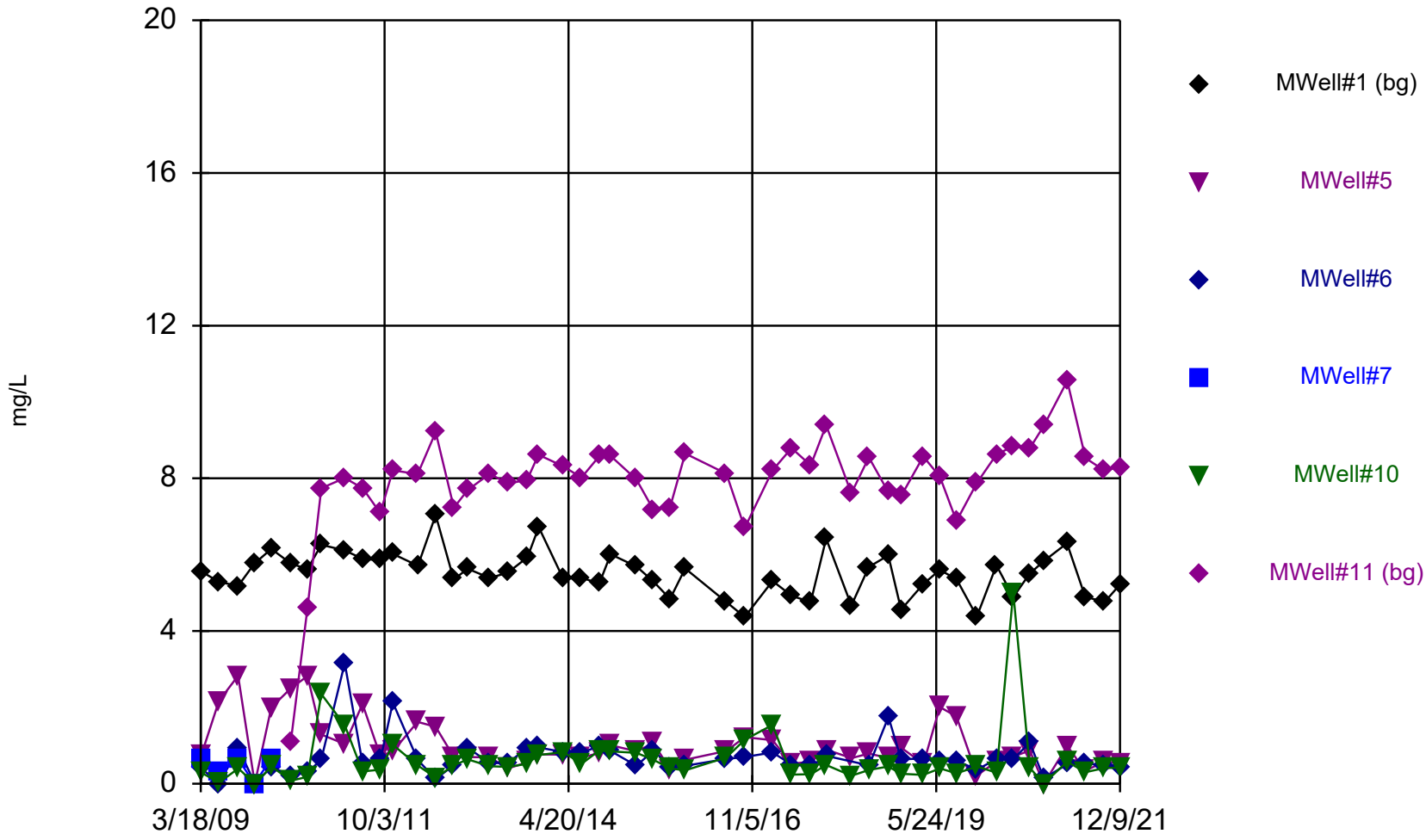
Time Series



Constituent: Conductivity Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series

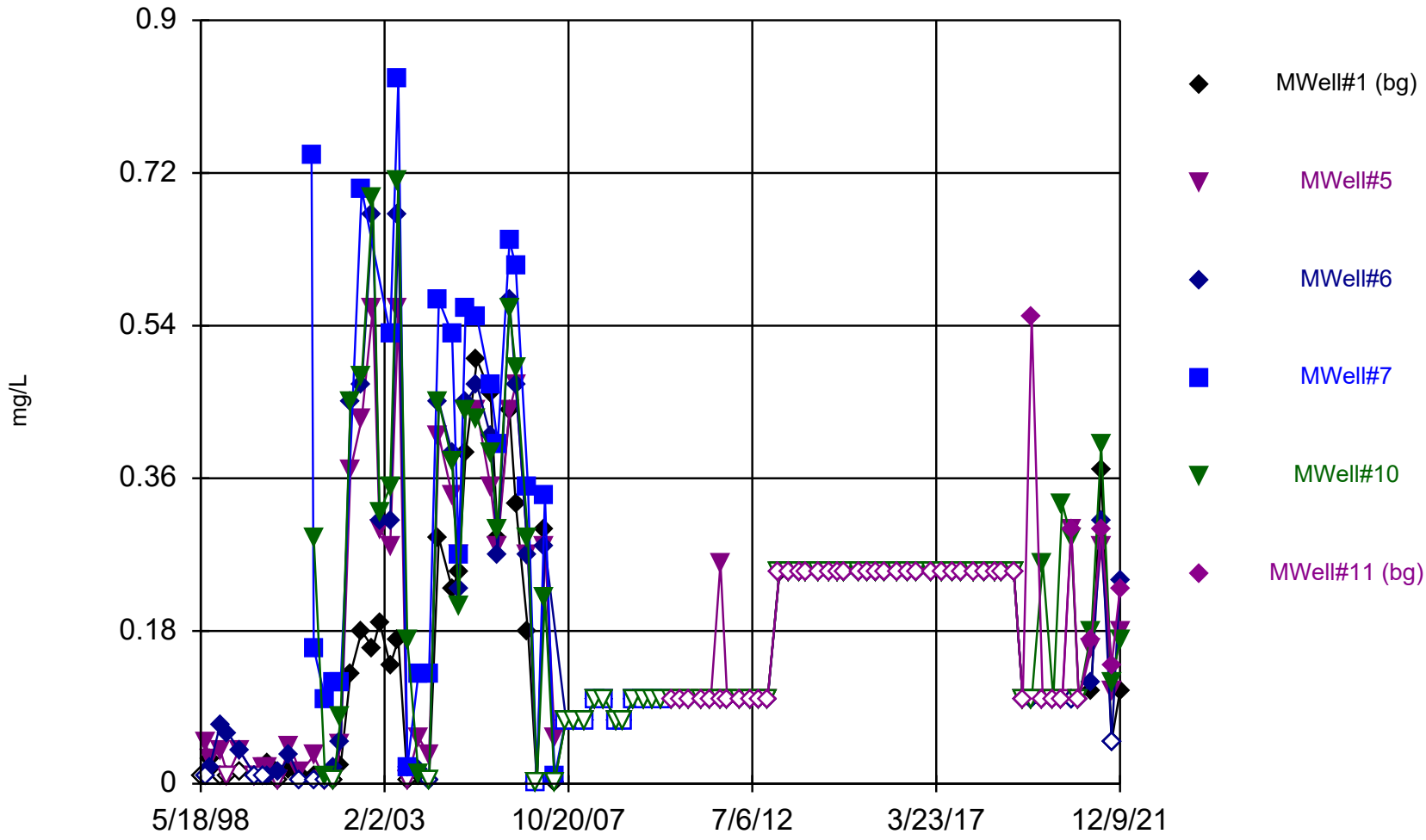


Constituent: Dissolved Oxygen Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

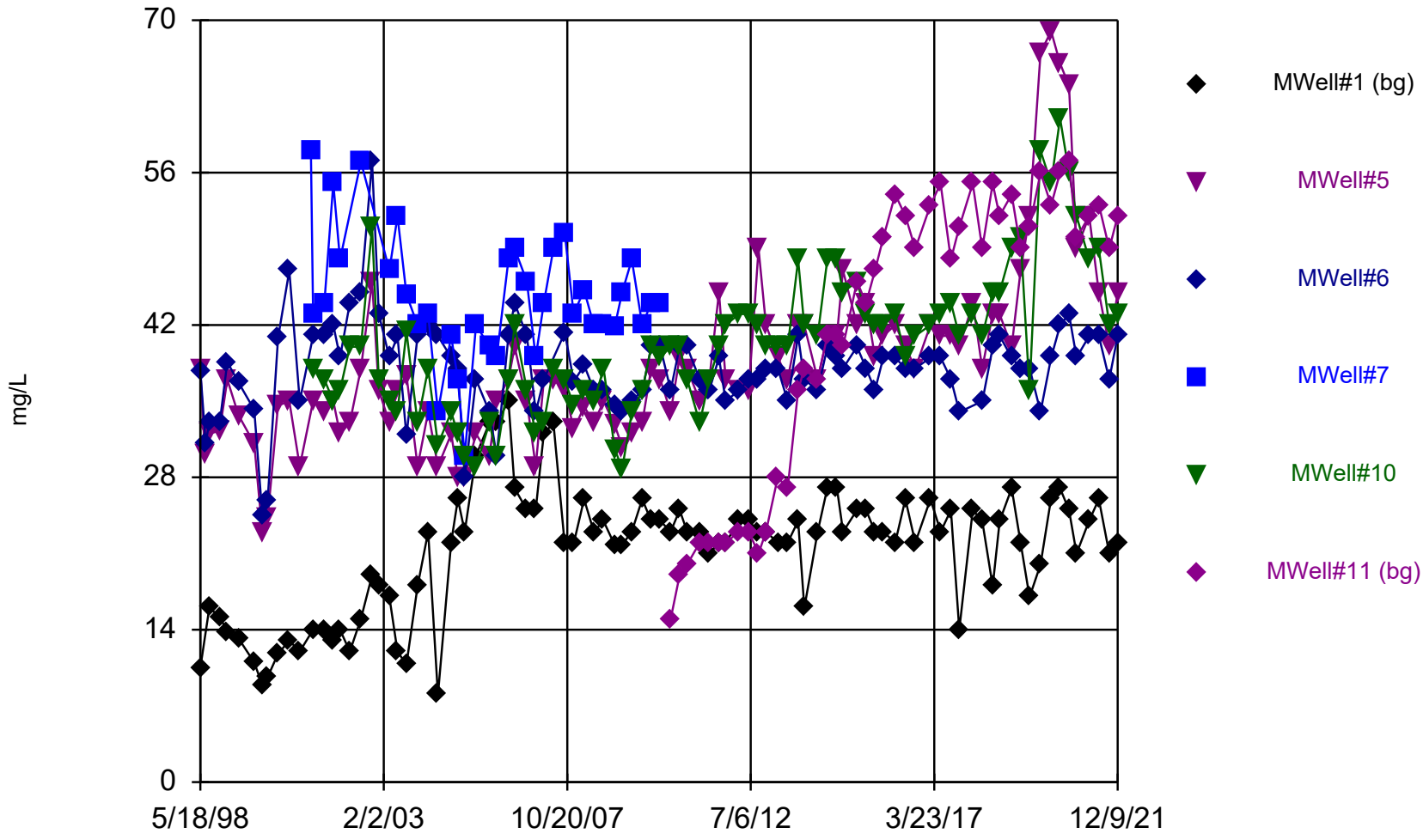
Time Series



Constituent: Iron, Dissolved Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series

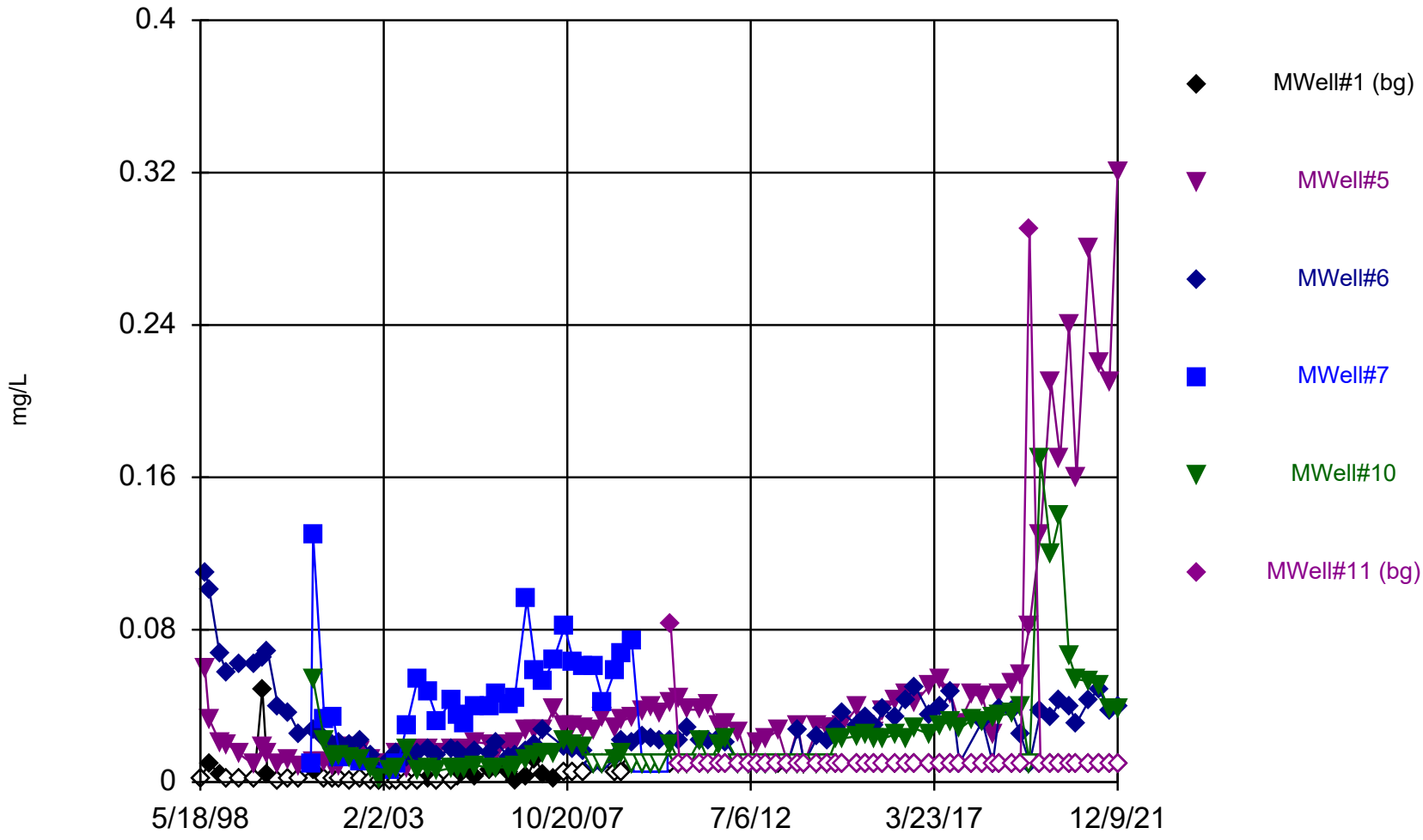


Constituent: Magnesium, Dissolved Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Time Series

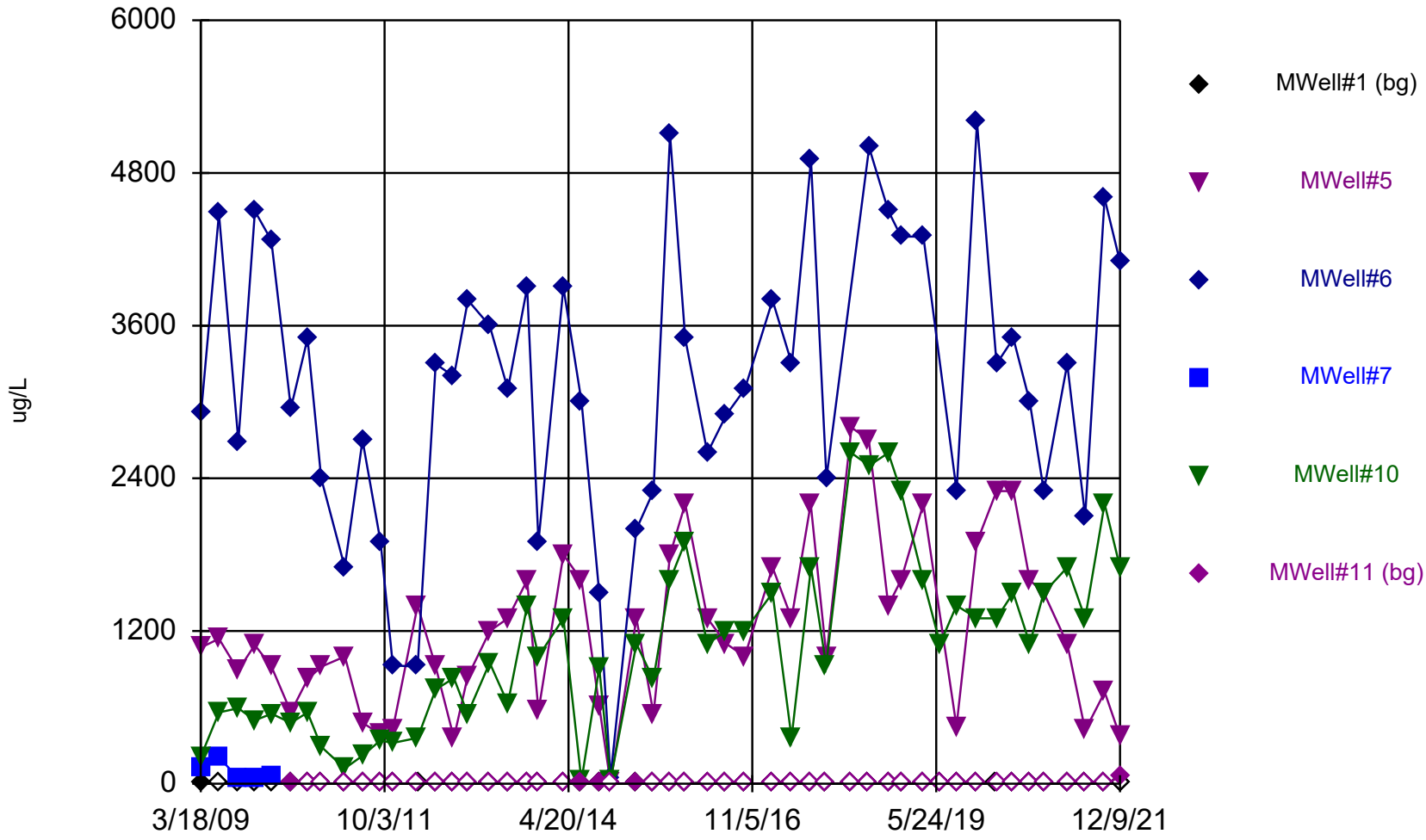


Constituent: Manganese, Dissolved Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Time Series

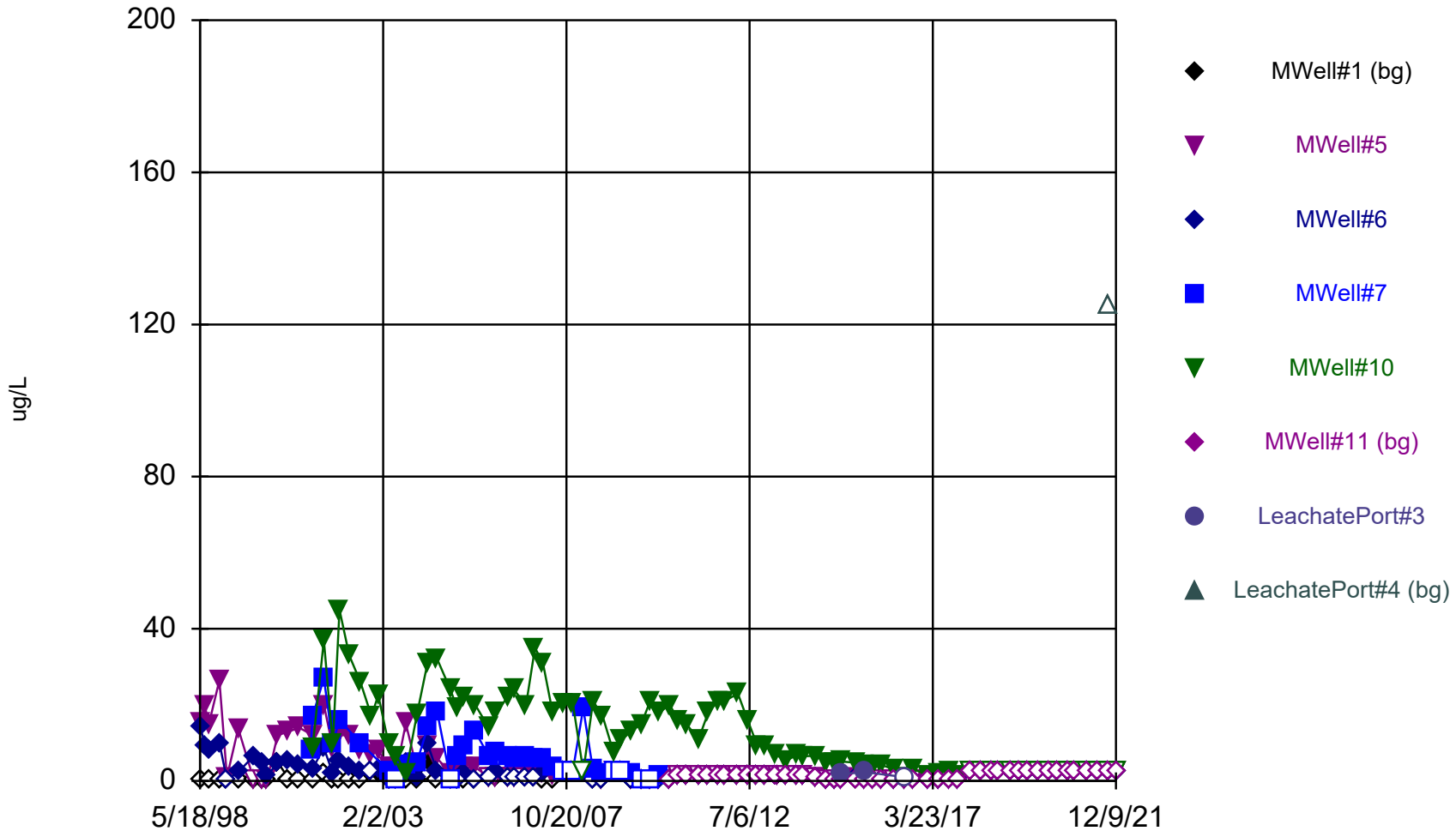


Constituent: Methane Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Time Series

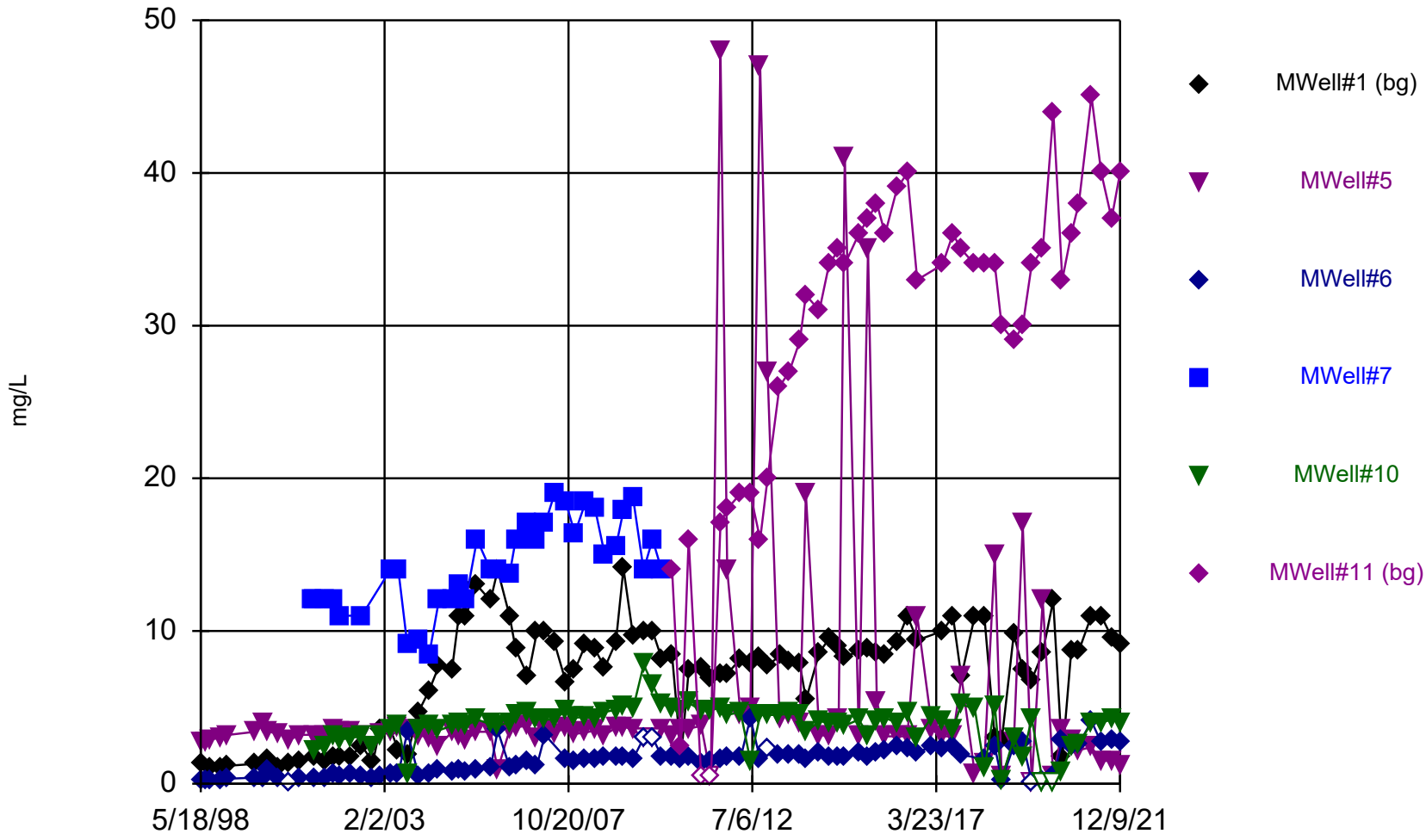


Constituent: Methylene Chloride Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

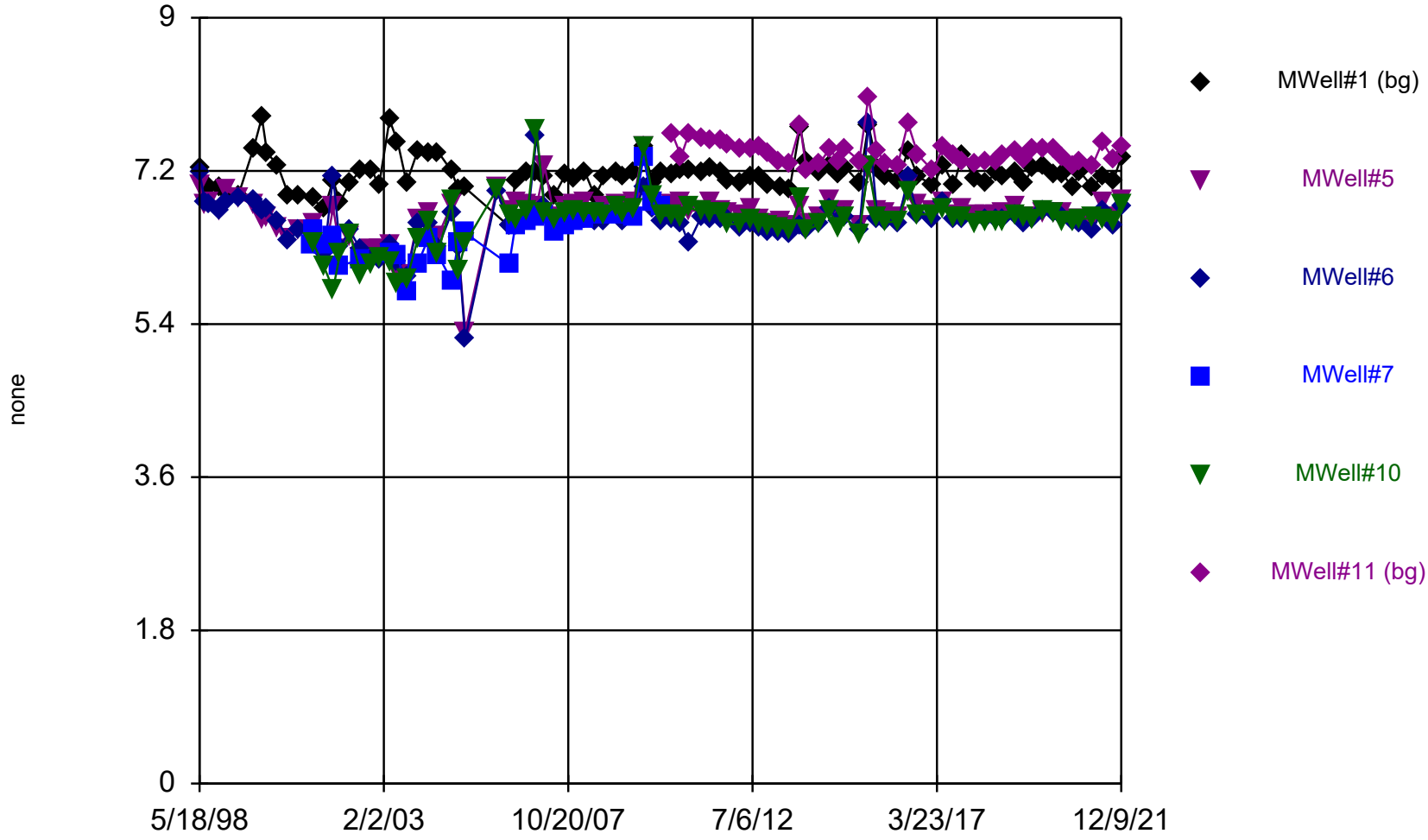
Time Series



Constituent: Nitrate Nitrogen Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

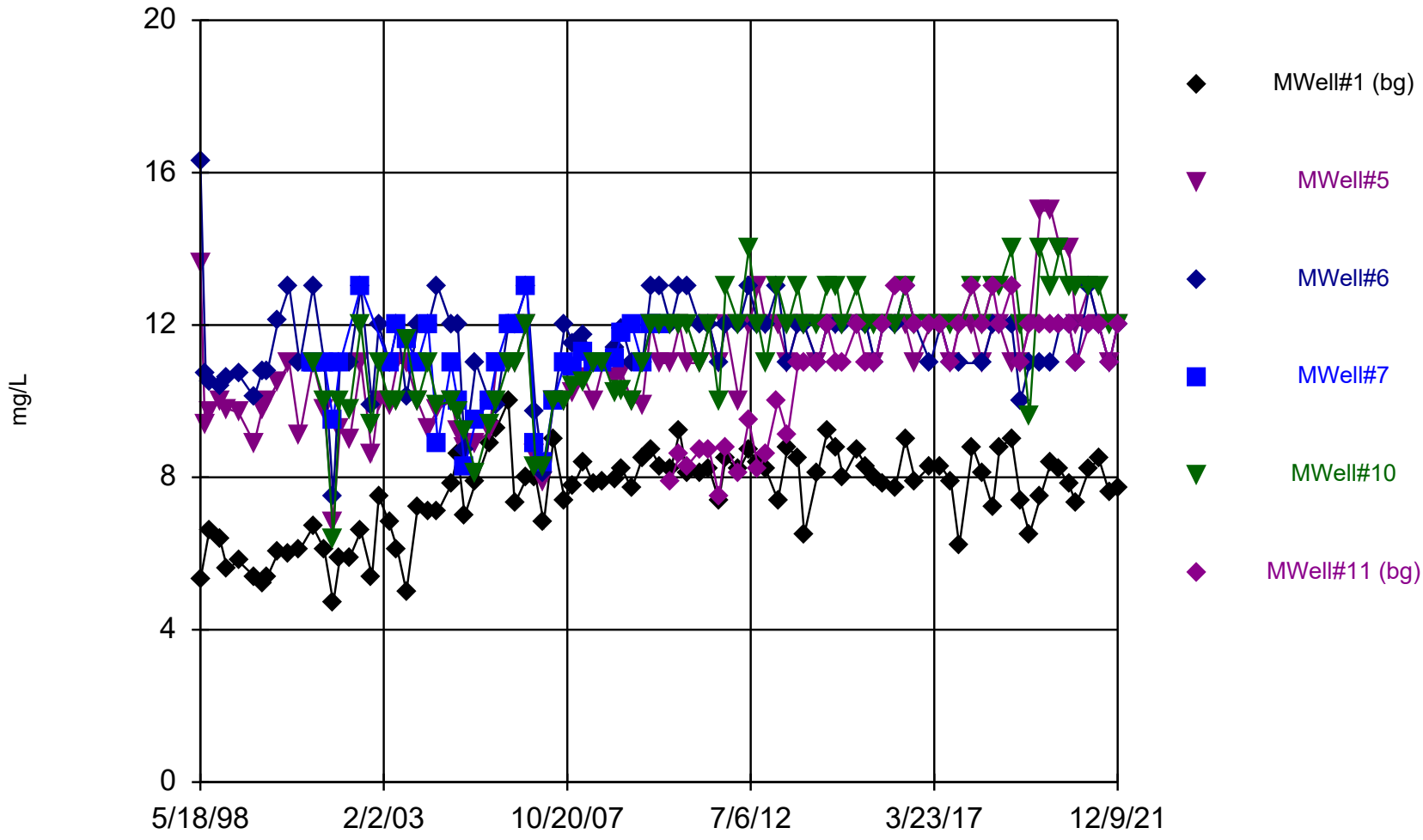
Time Series



Constituent: pH Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series



Constituent: Potassium, Dissolved Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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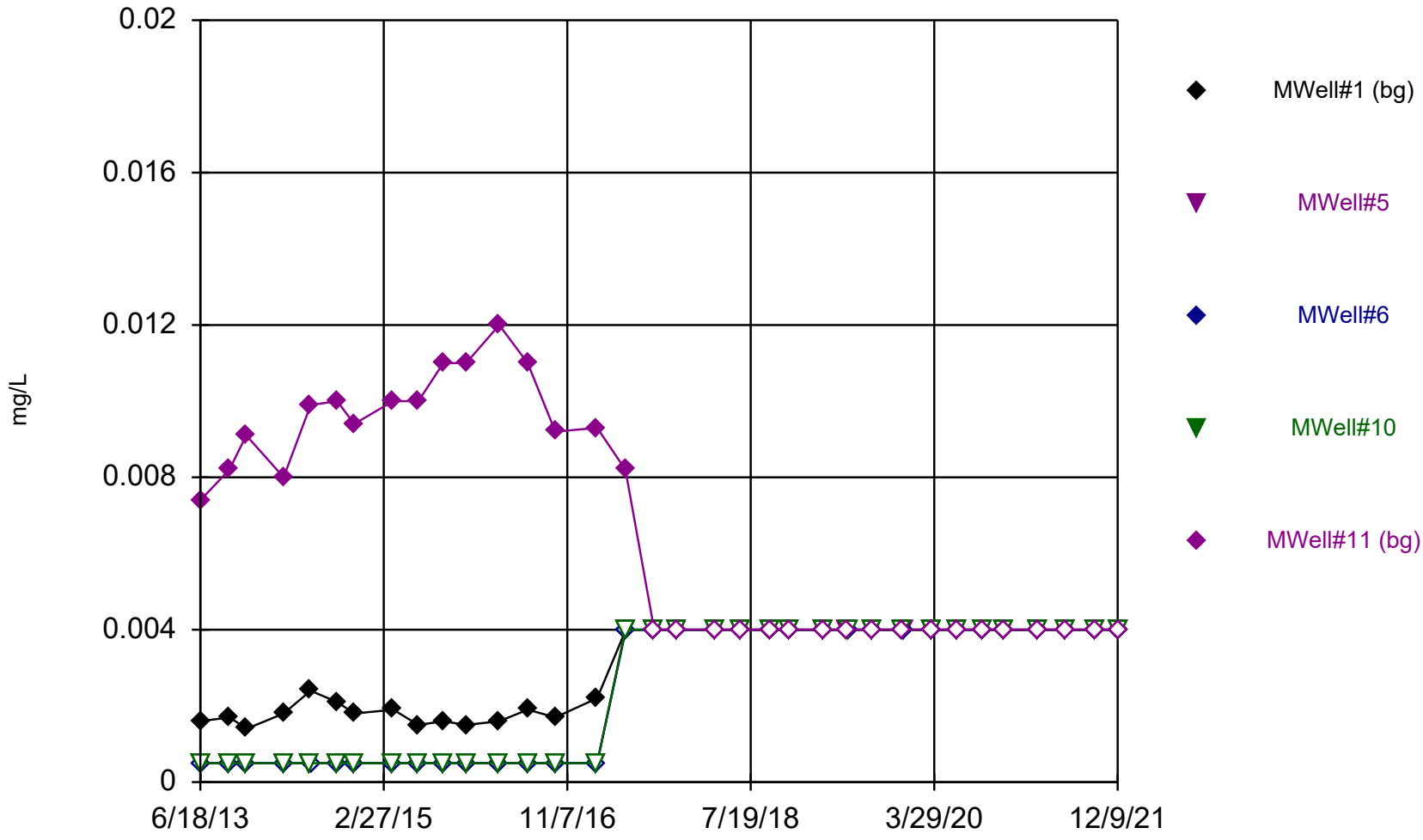
Hollow symbols indicate censored values.

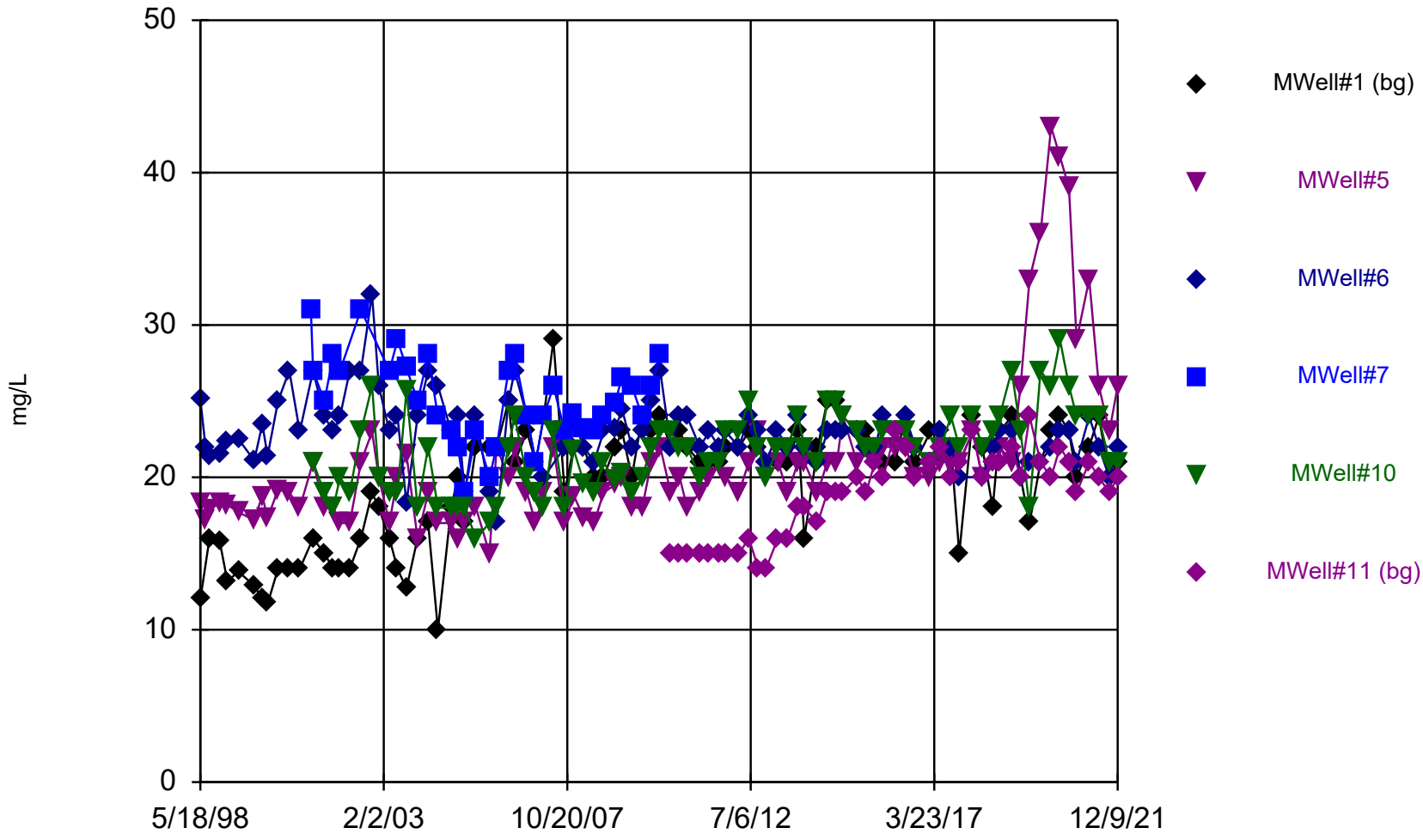
Time Series



Constituent: Selenium, Total Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

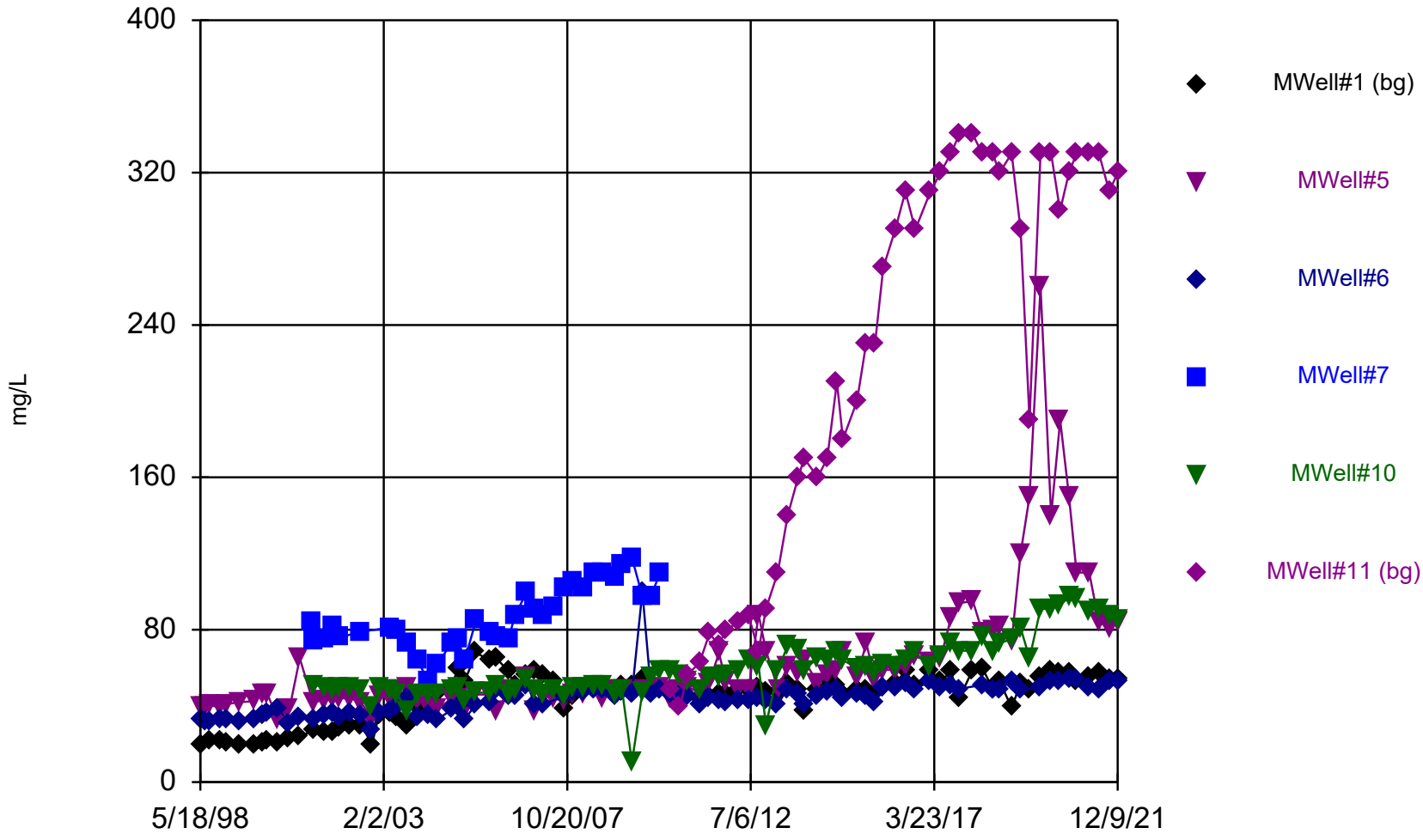
Time Series



Constituent: Sodium, Dissolved Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

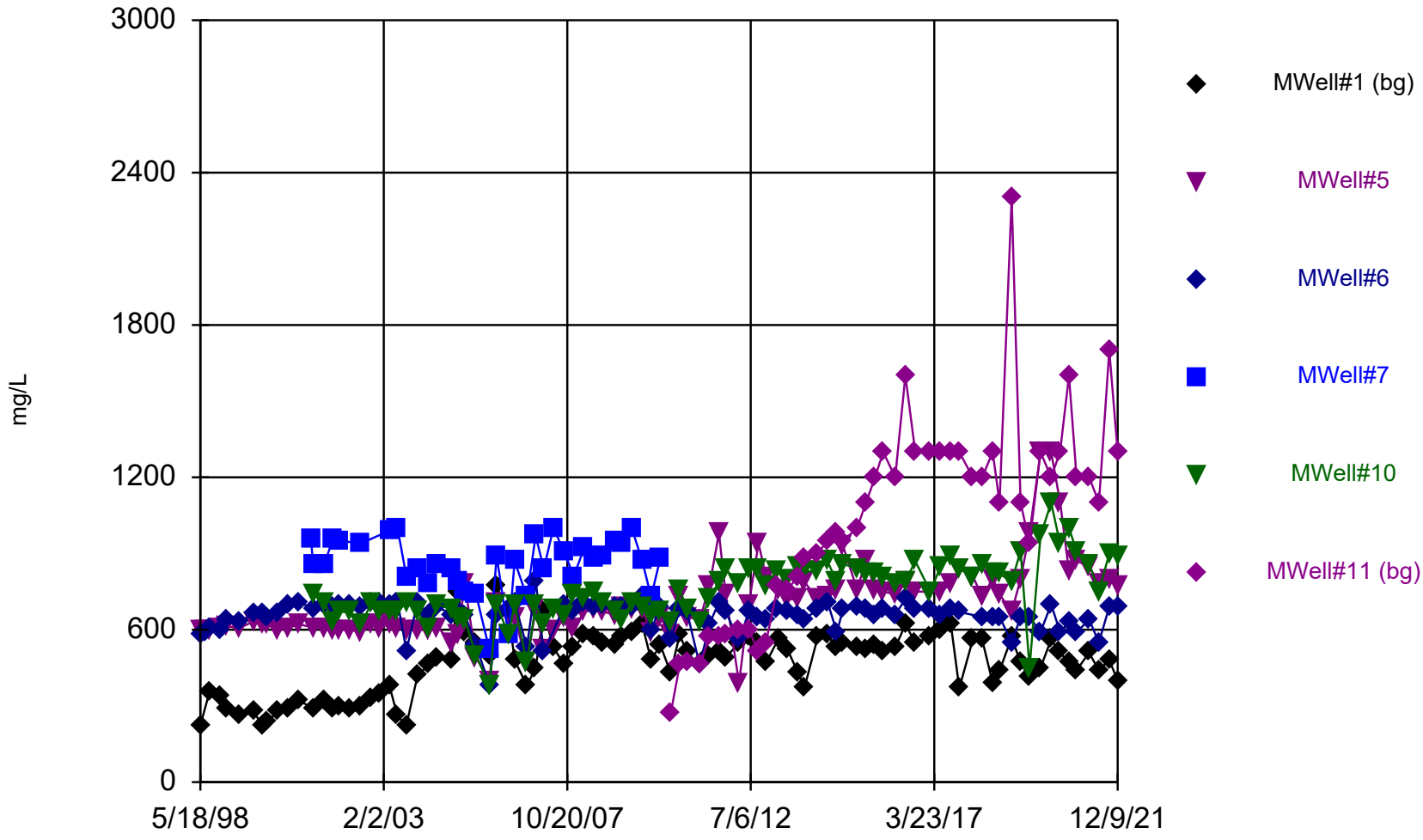
Time Series



Constituent: Sulfate Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series

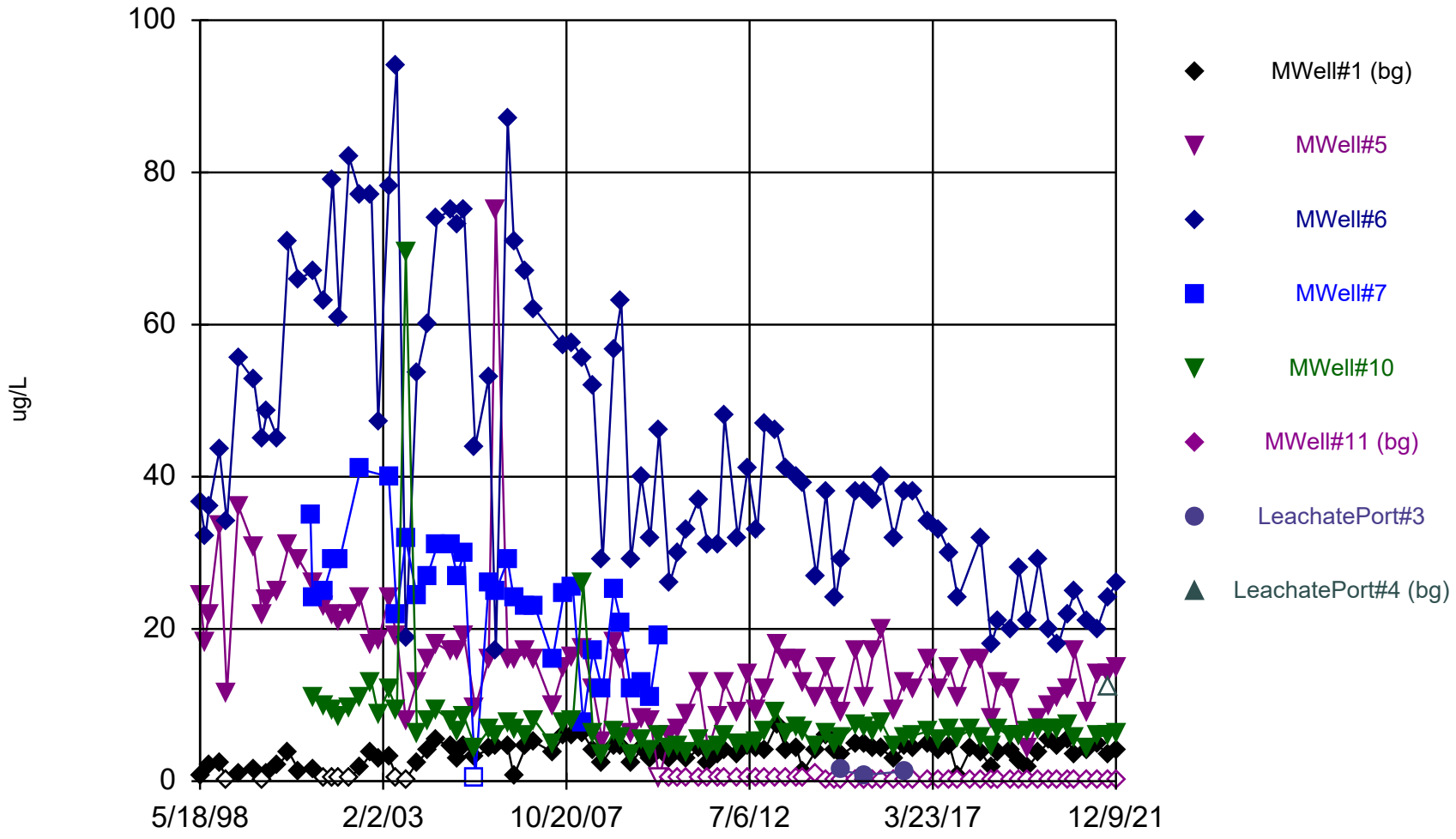


Constituent: TDS Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Time Series

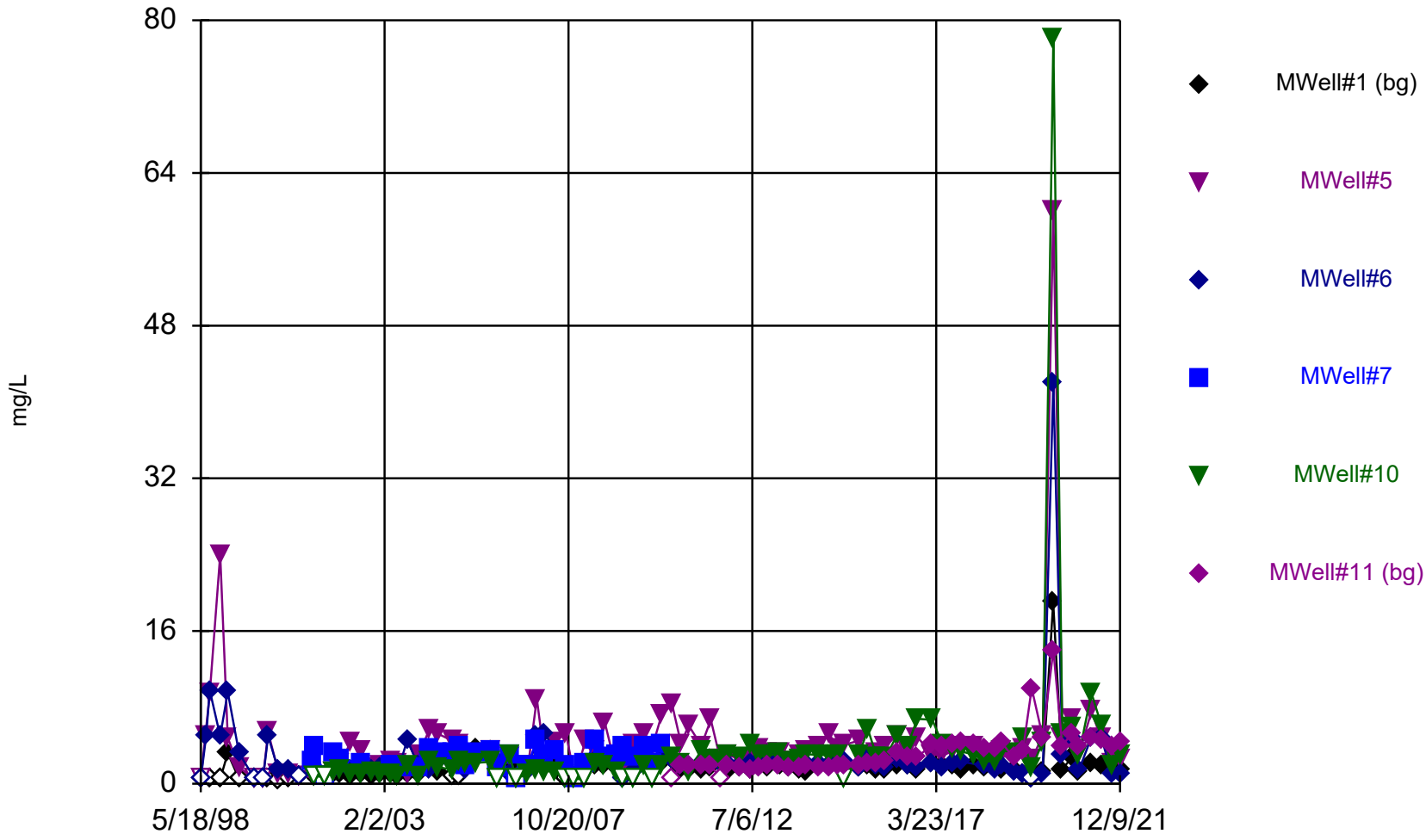


Constituent: Tetrachloroethene Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Time Series

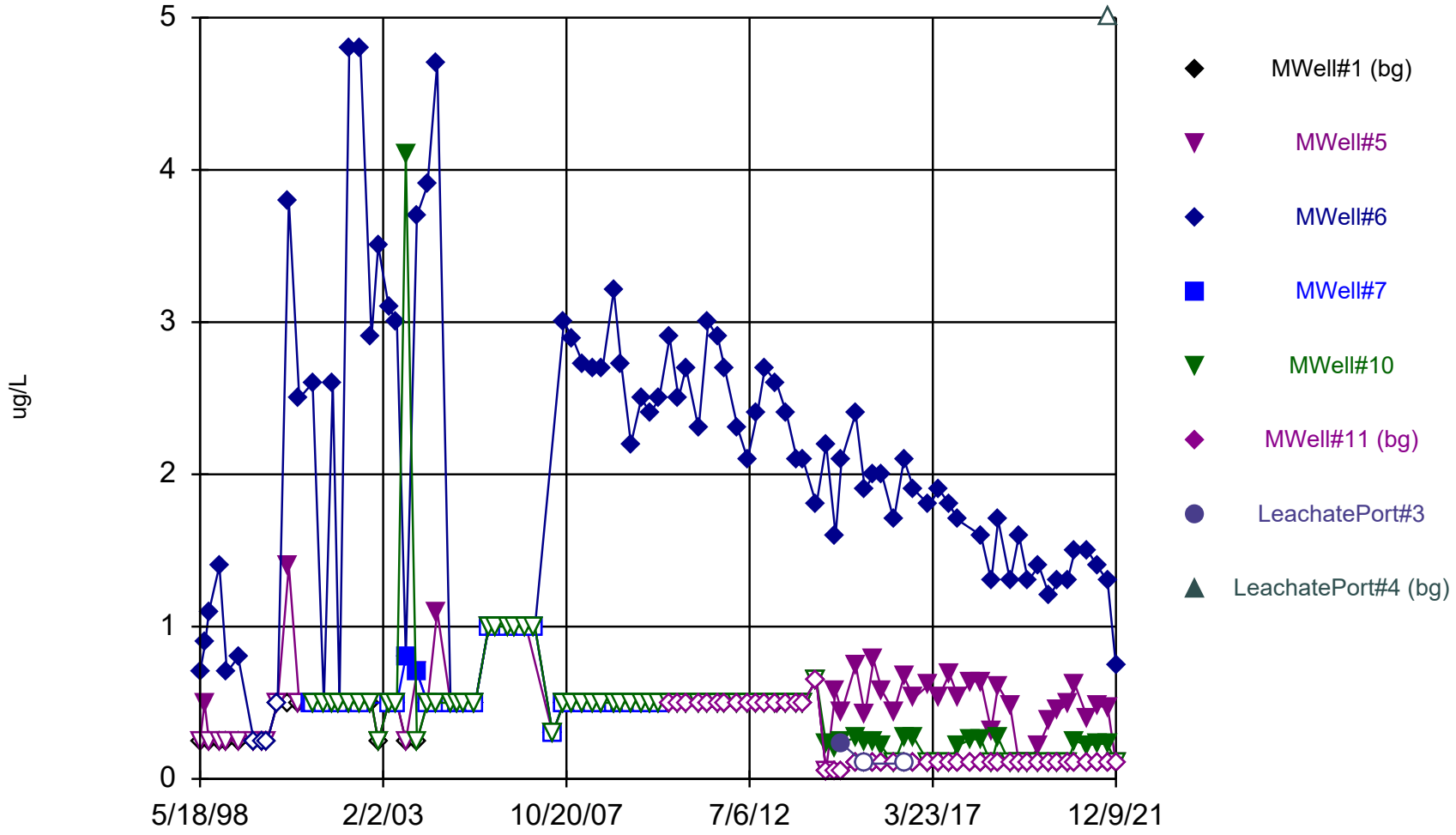


Constituent: TOC Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Time Series



Constituent: trans-1,2-Dichloroethene Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

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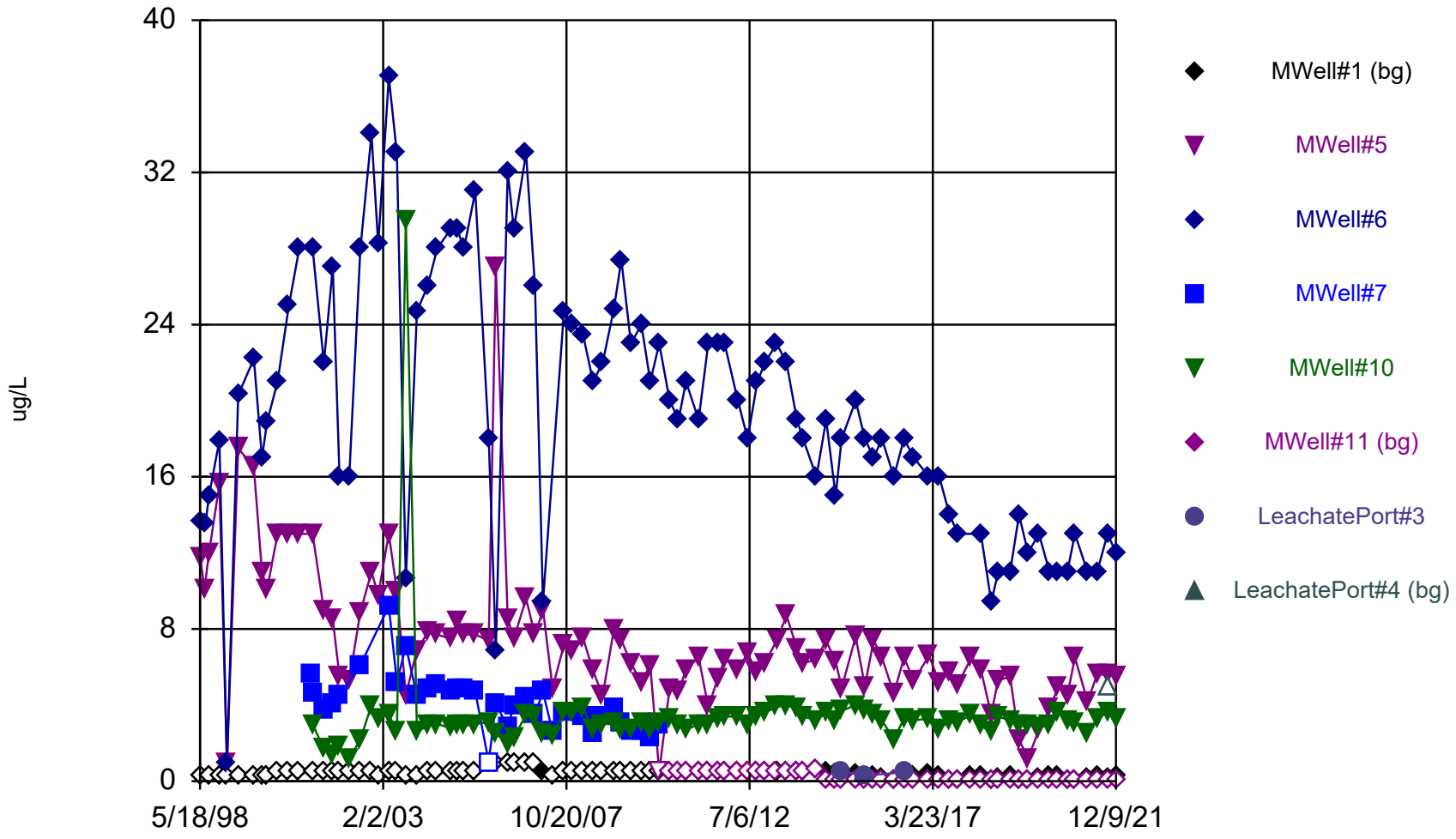
Hollow symbols indicate censored values.

Time Series

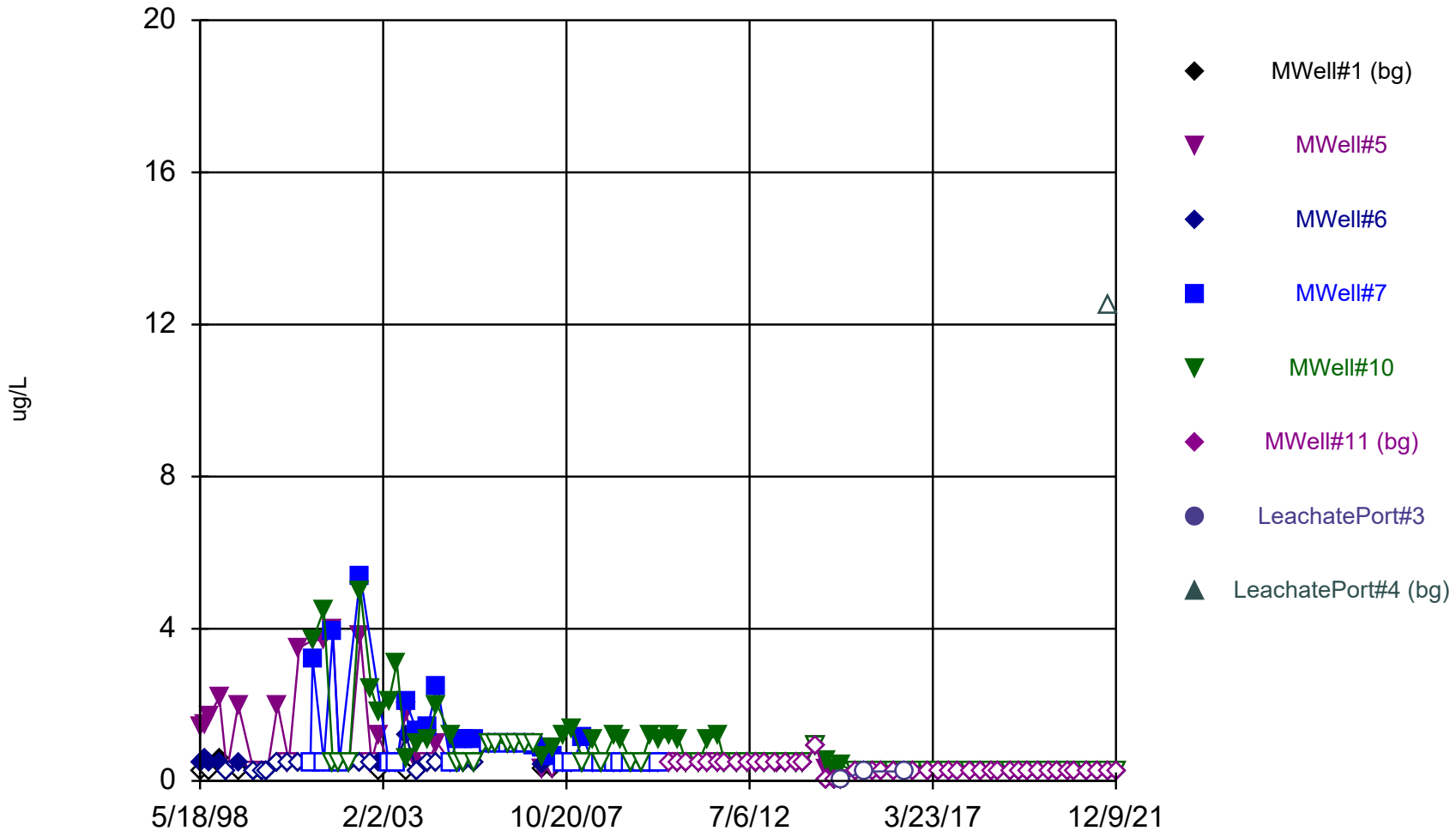


Constituent: Trichloroethene Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

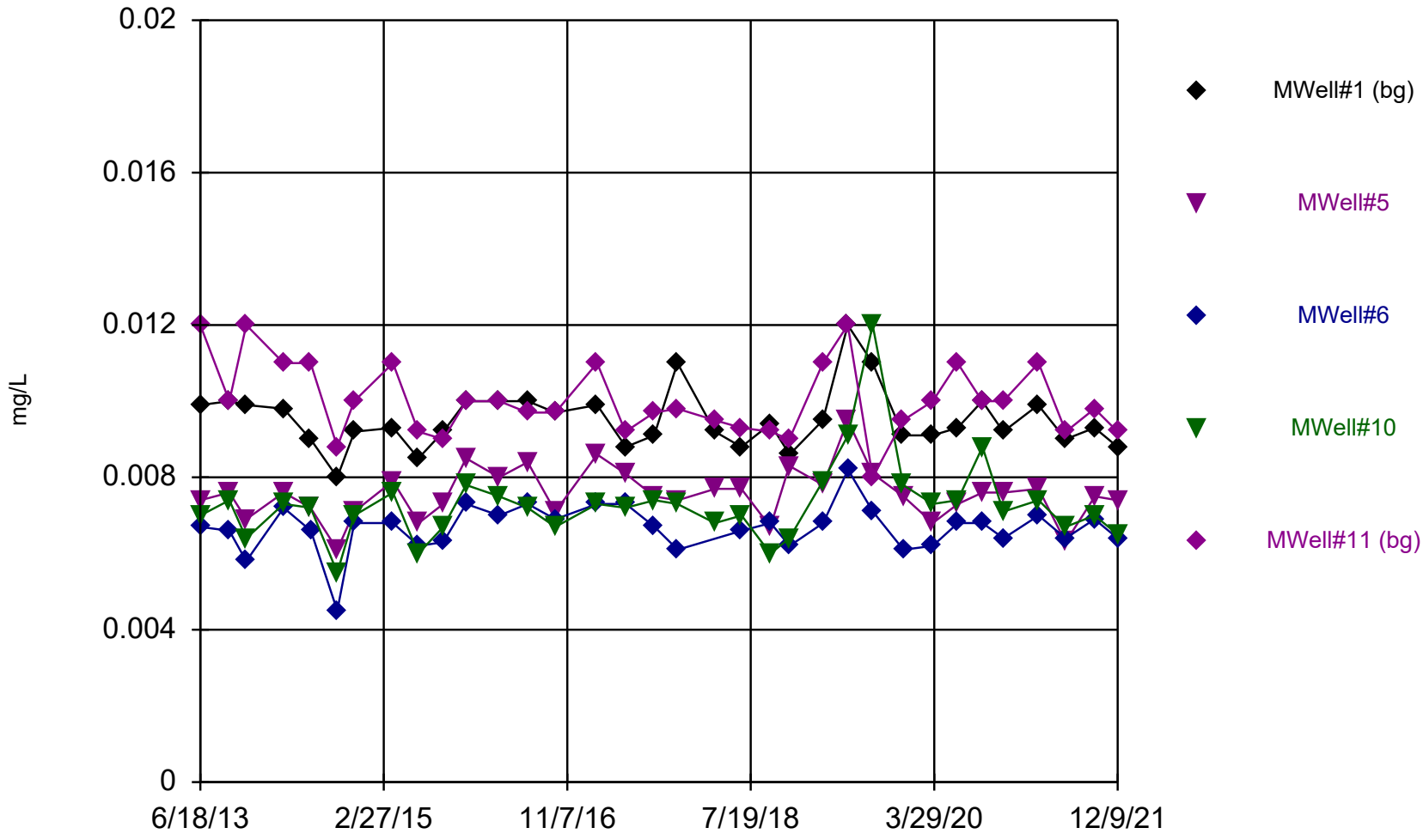
Time Series



Constituent: Trichlorofluoromethane Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Time Series

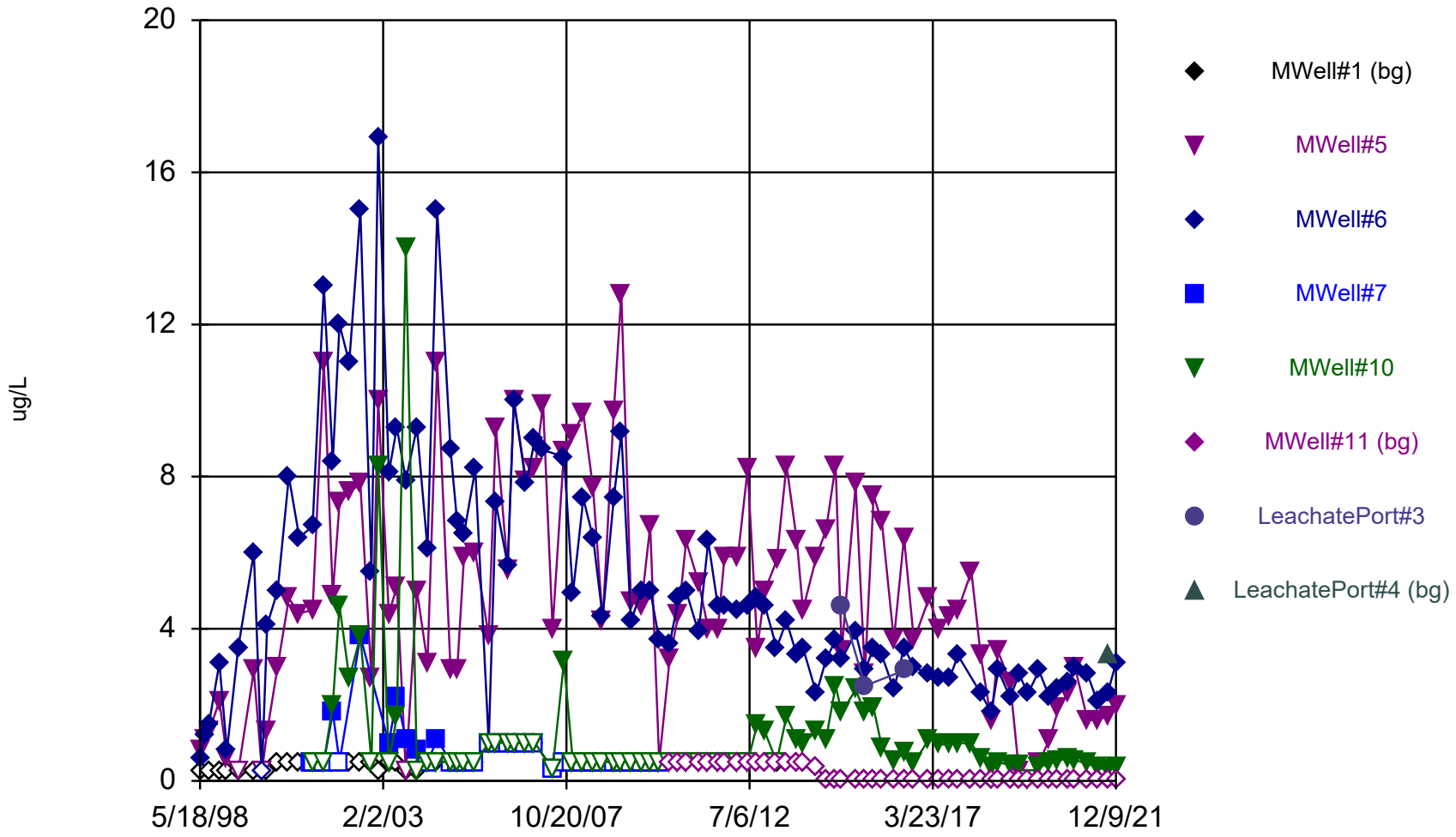


Constituent: Vanadium, Total Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Time Series

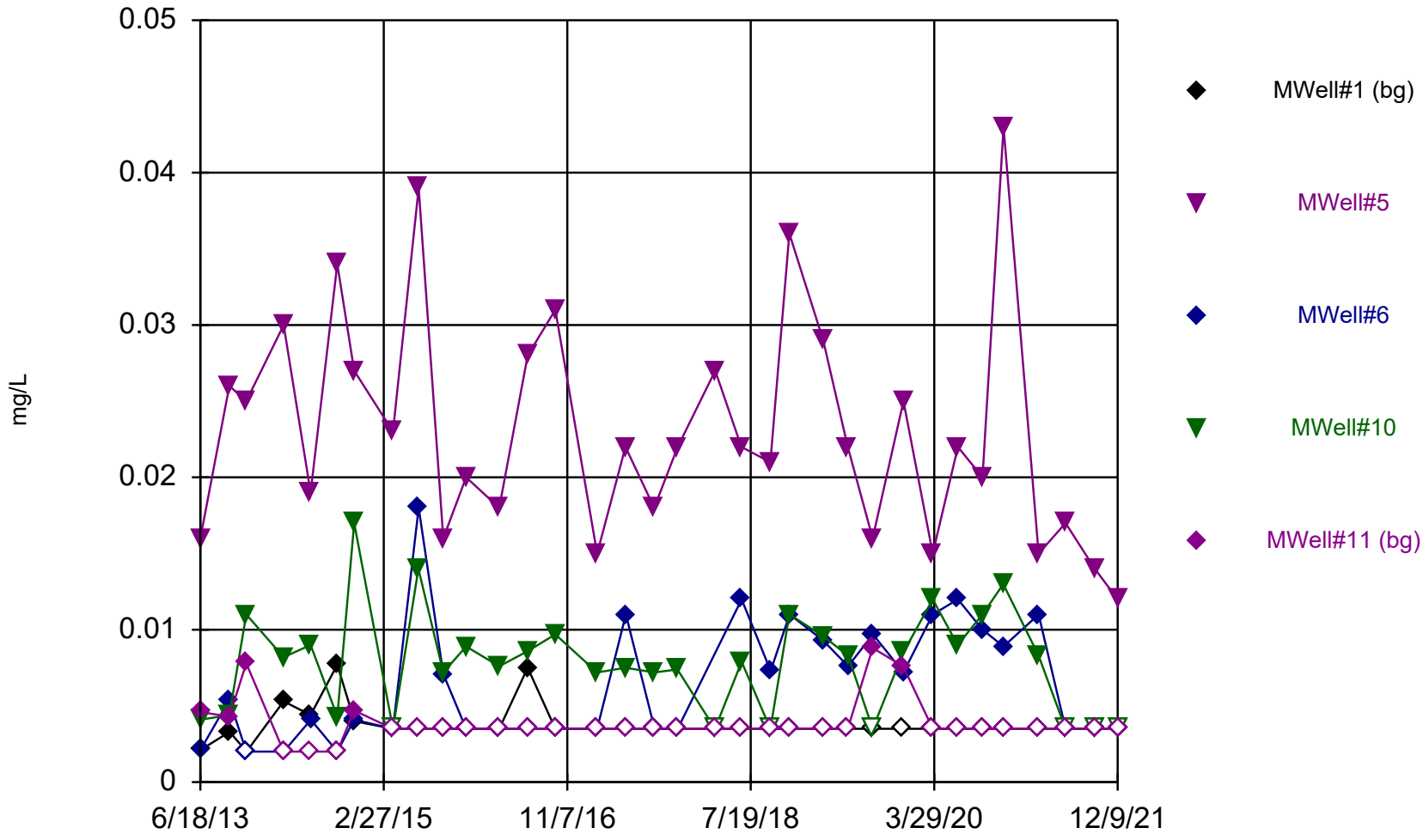


Constituent: Vinyl Chloride Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Time Series



Constituent: Zinc, Total Analysis Run 1/24/2022 11:20 AM View: HRLF_TSP Set2

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Appendix D

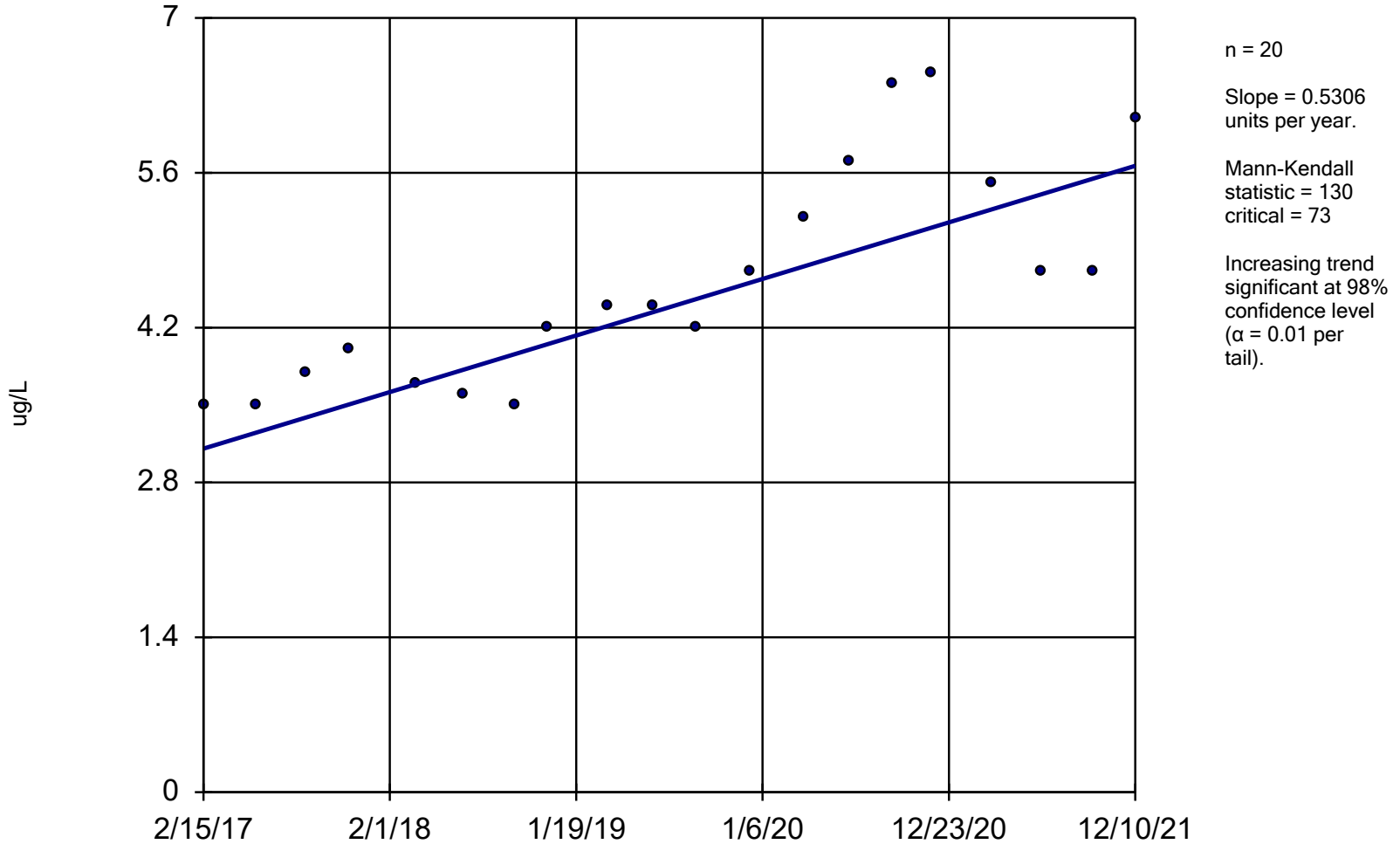
Sen’s Slope/Mann Kendall Tests

Horn Rapids Landfill Trends for Volatile Organic Compounds, First Quarter 2017 through Fourth Quarter 2021

Constituent Name	Well	Slope	Calculated Statistic	Critical Value	Trend	N	% Non-detects	Normality	Transformation	Alpha	Method
1,1-Dichloroethane (ug/L)	MWell#4	0.5306	130	73	Yes	20	0	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#5	-0.6434	-74	-73	Yes	20	0	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#6	-0.4668	-99	-68	Yes	19	0	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#9	-0.3898	-106	-73	Yes	20	0	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#10	-0.6096	-79	-73	Yes	20	0	n/a	n/a	0.02	NP
1,2-Dichloroethane (ug/L)	MWell#5	-0.04714	-87	-73	Yes	20	10	n/a	n/a	0.02	NP
1,2-Dichloroethane (ug/L)	MWell#6	-0.03596	-100	-68	Yes	19	0	n/a	n/a	0.02	NP
1,2-Dichloropropane (ug/L)	MWell#6	-0.02959	-82	-68	Yes	19	0	n/a	n/a	0.02	NP
Alkalinity (mg/L)	MWell#3	-8.939	-78	-58	Yes	17	0	n/a	n/a	0.02	NP
Alkalinity (mg/L)	MWell#4	13.17	145	73	Yes	20	0	n/a	n/a	0.02	NP
Chloroform (ug/L)	MWell#3	1.022	76	58	Yes	17	0	n/a	n/a	0.02	NP
Chloroform (ug/L)	MWell#4	-0.03687	-81	-73	Yes	20	0	n/a	n/a	0.02	NP
cis-1,2-Dichloroethene (ug/L)	MWell#4	0.4993	129	73	Yes	20	0	n/a	n/a	0.02	NP
trans-1,2-Dichloroethene (ug/L)	MWell#6	-0.132	-89	-68	Yes	19	0	n/a	n/a	0.02	NP
Trichloroethene (ug/L)	MWell#4	0.05735	103	73	Yes	20	35	n/a	n/a	0.02	NP
Trichlorofluoromethane (ug/L)	MWell#4	0.08787	101	73	Yes	20	0	n/a	n/a	0.02	NP
Vinyl Chloride (ug/L)	MWell#10	-0.1432	-97	-73	Yes	20	5	n/a	n/a	0.02	NP

Sen's Slope Estimator

MWell#4

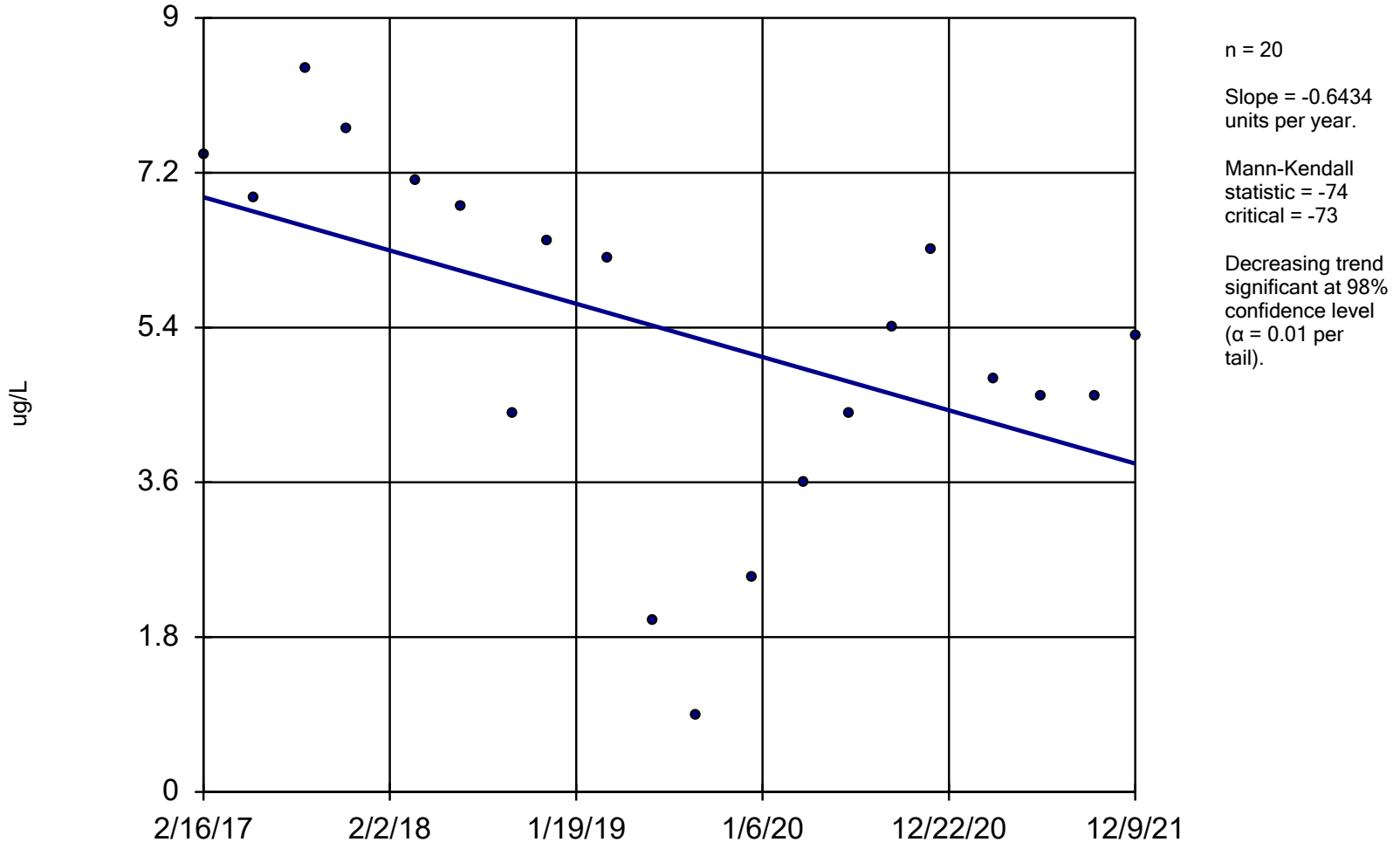


Constituent: 1,1-Dichloroethane Analysis Run 1/14/2022 2:34 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#5

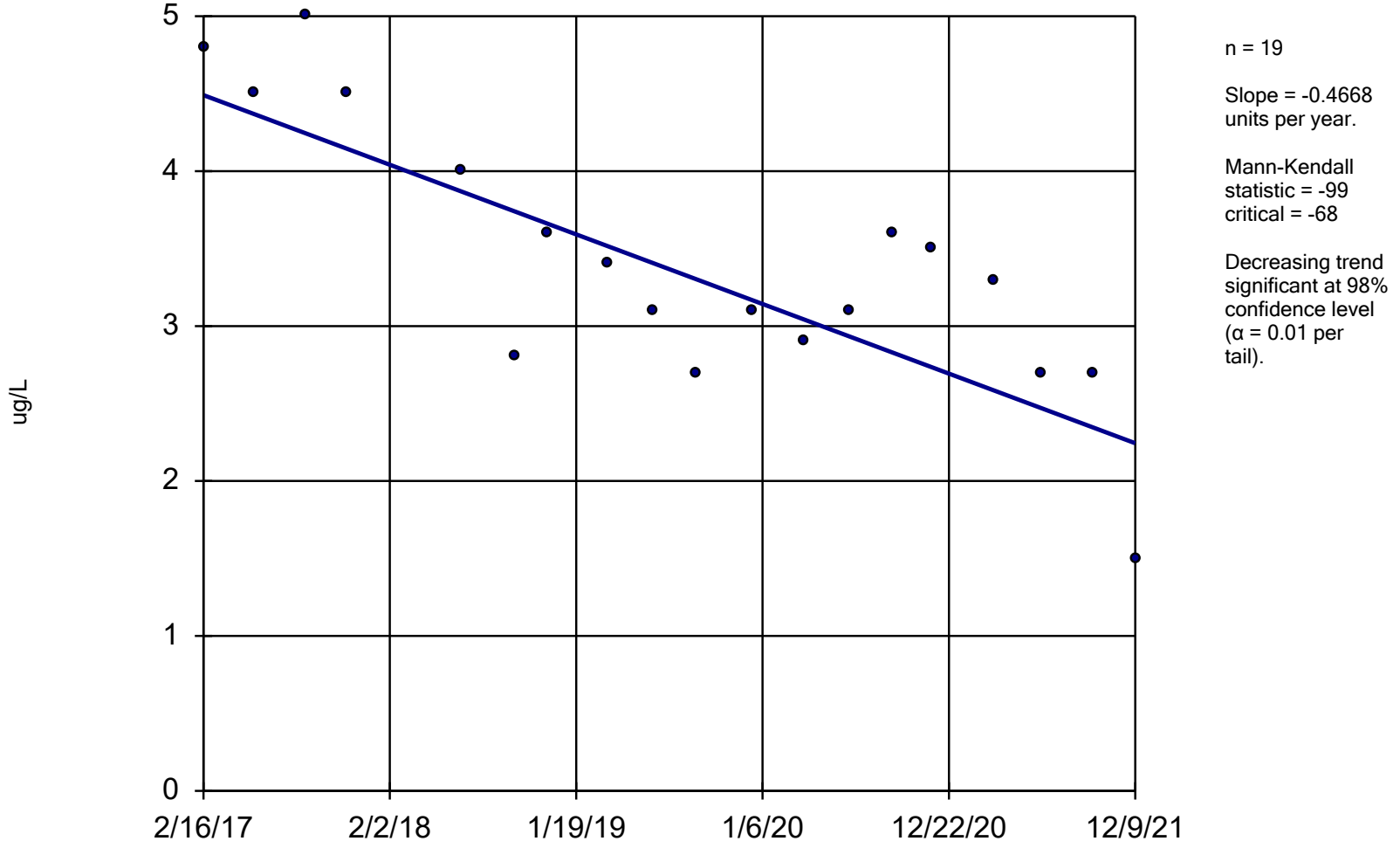


Constituent: 1,1-Dichloroethane Analysis Run 1/14/2022 2:34 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#6



n = 19

Slope = -0.4668 units per year.

Mann-Kendall statistic = -99
critical = -68

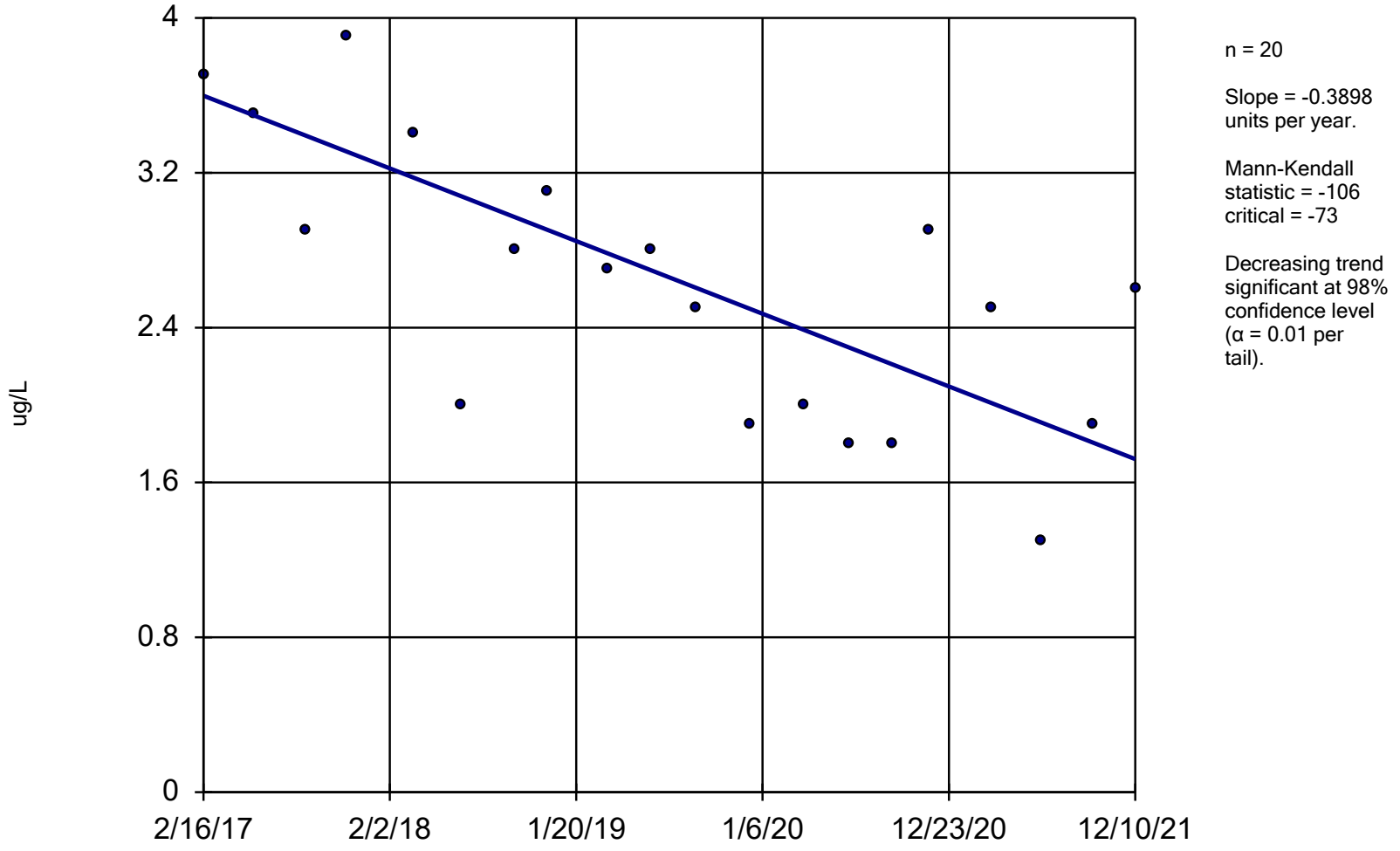
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: 1,1-Dichloroethane Analysis Run 1/14/2022 2:34 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#9



n = 20

Slope = -0.3898 units per year.

Mann-Kendall statistic = -106
critical = -73

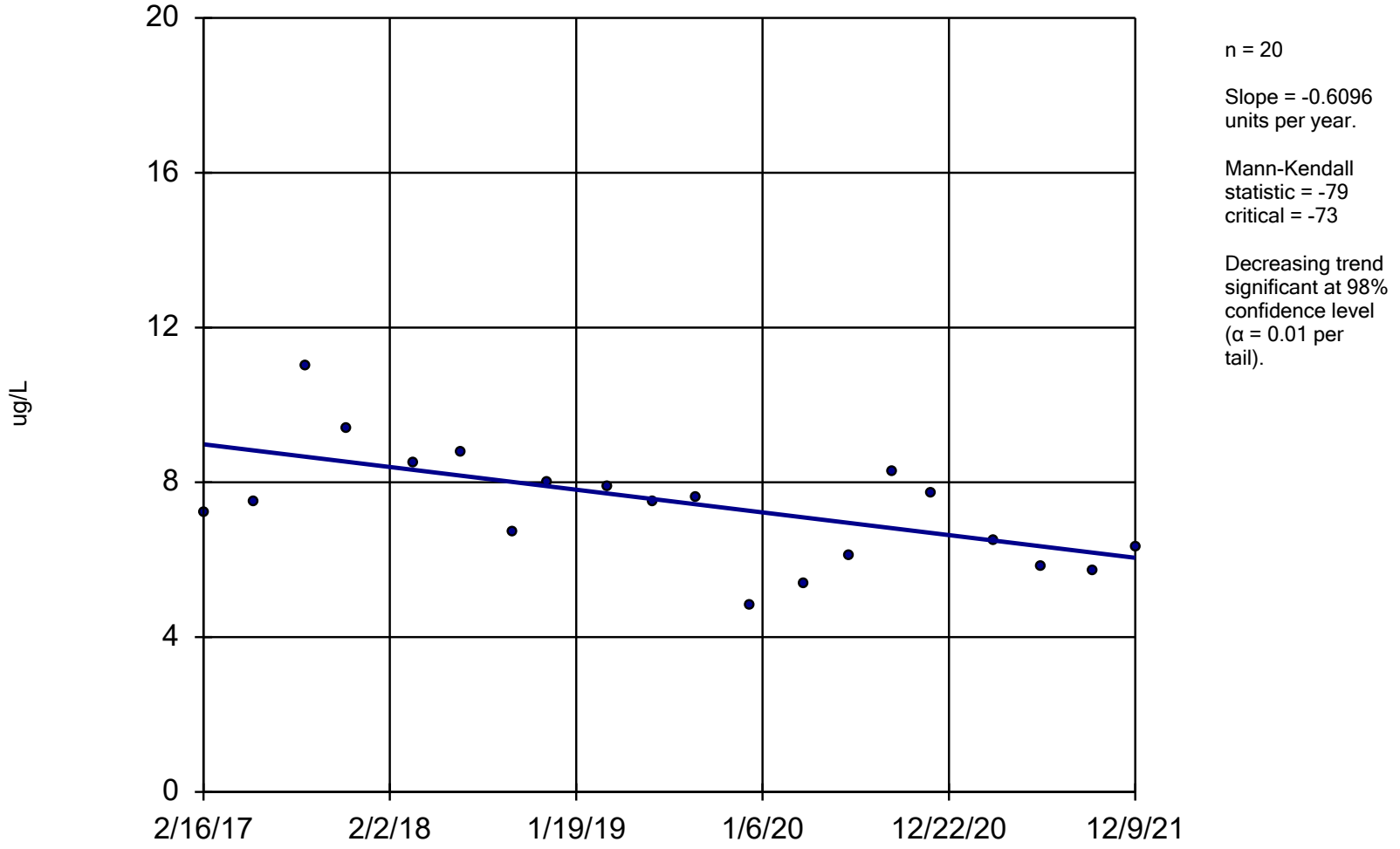
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: 1,1-Dichloroethane Analysis Run 1/14/2022 2:34 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#10



n = 20

Slope = -0.6096 units per year.

Mann-Kendall statistic = -79
critical = -73

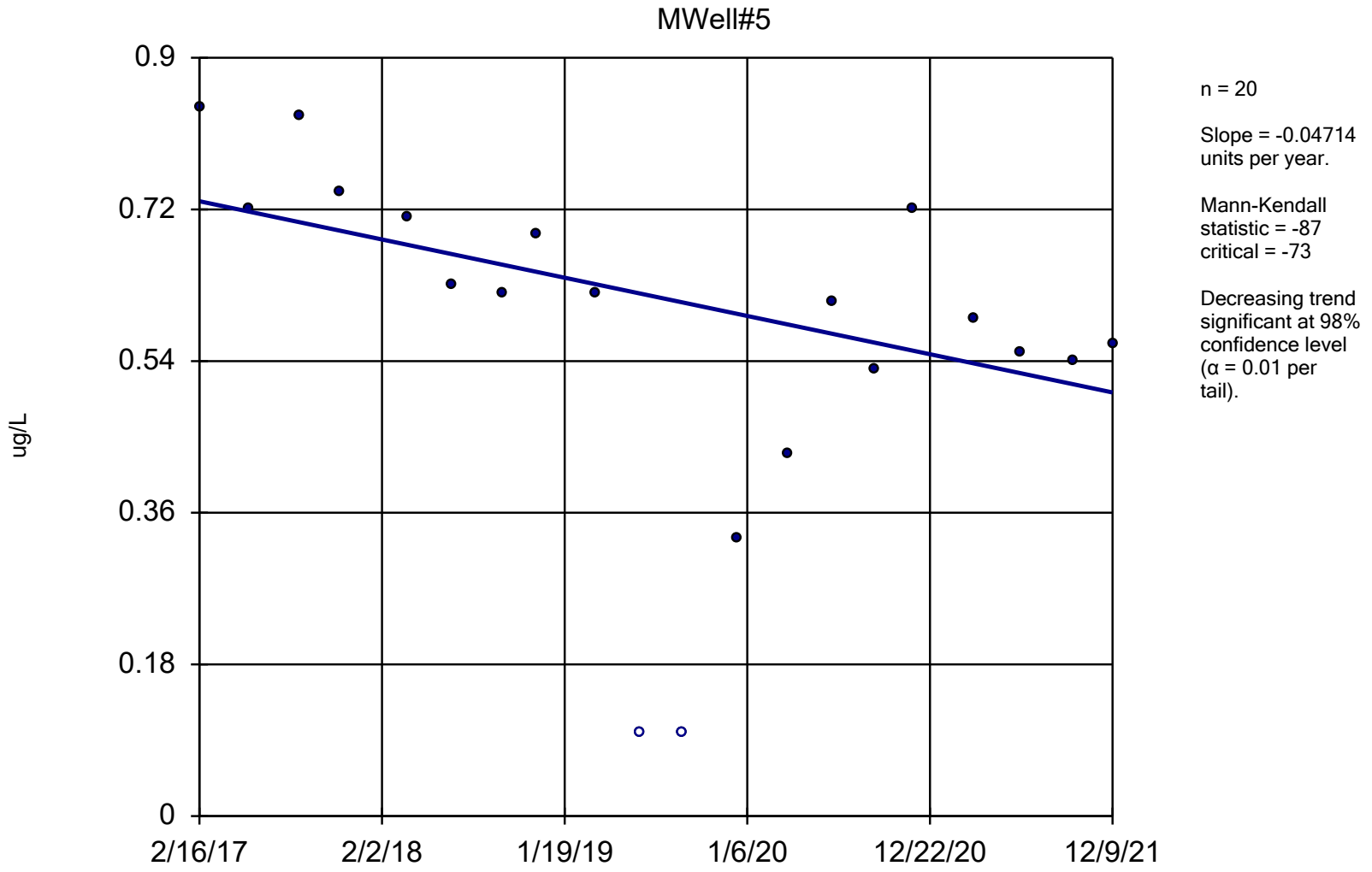
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: 1,1-Dichloroethane Analysis Run 1/14/2022 2:34 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Sen's Slope Estimator

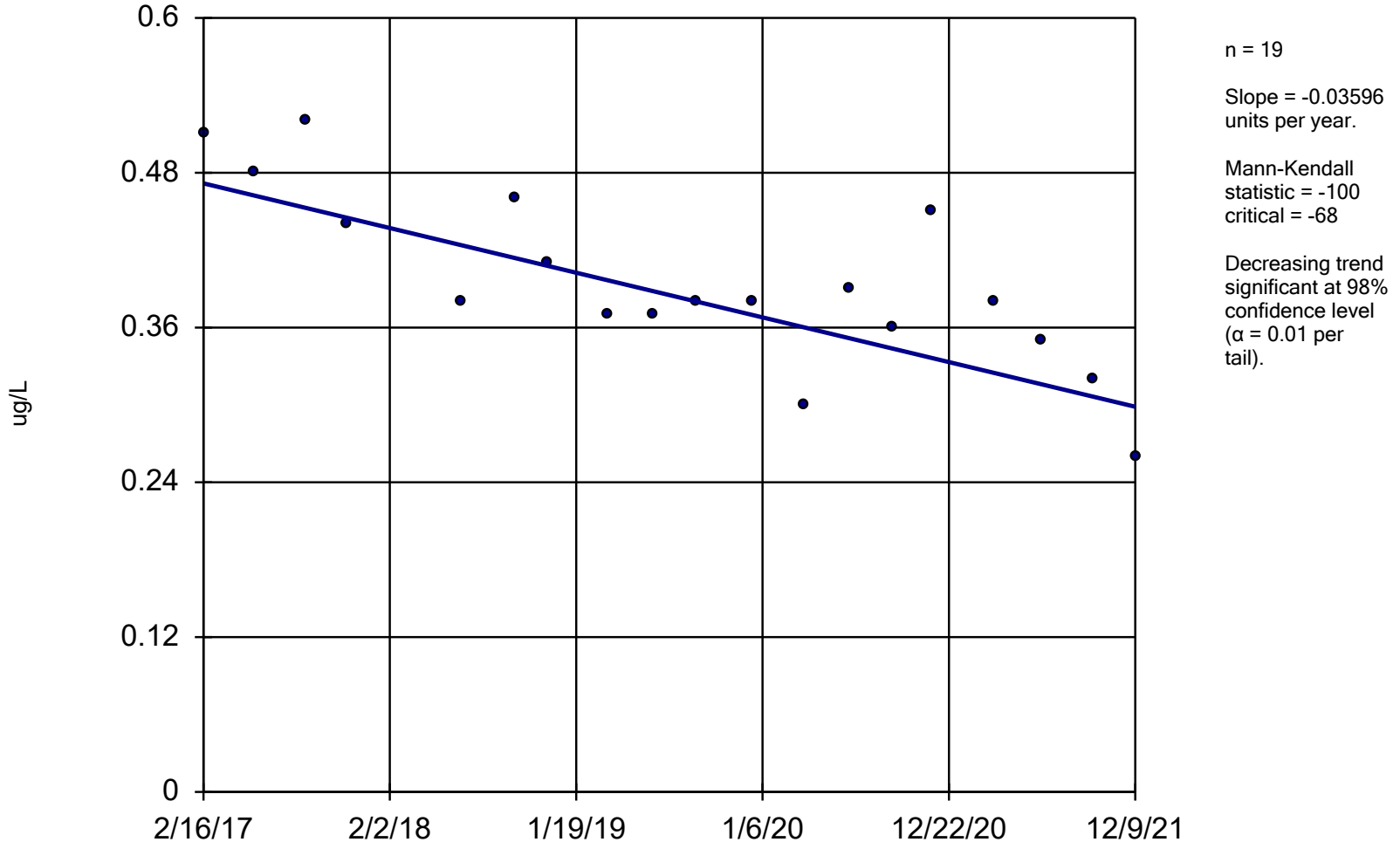


Constituent: 1,2-Dichloroethane Analysis Run 1/14/2022 2:34 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#6



n = 19

Slope = -0.03596 units per year.

Mann-Kendall statistic = -100
critical = -68

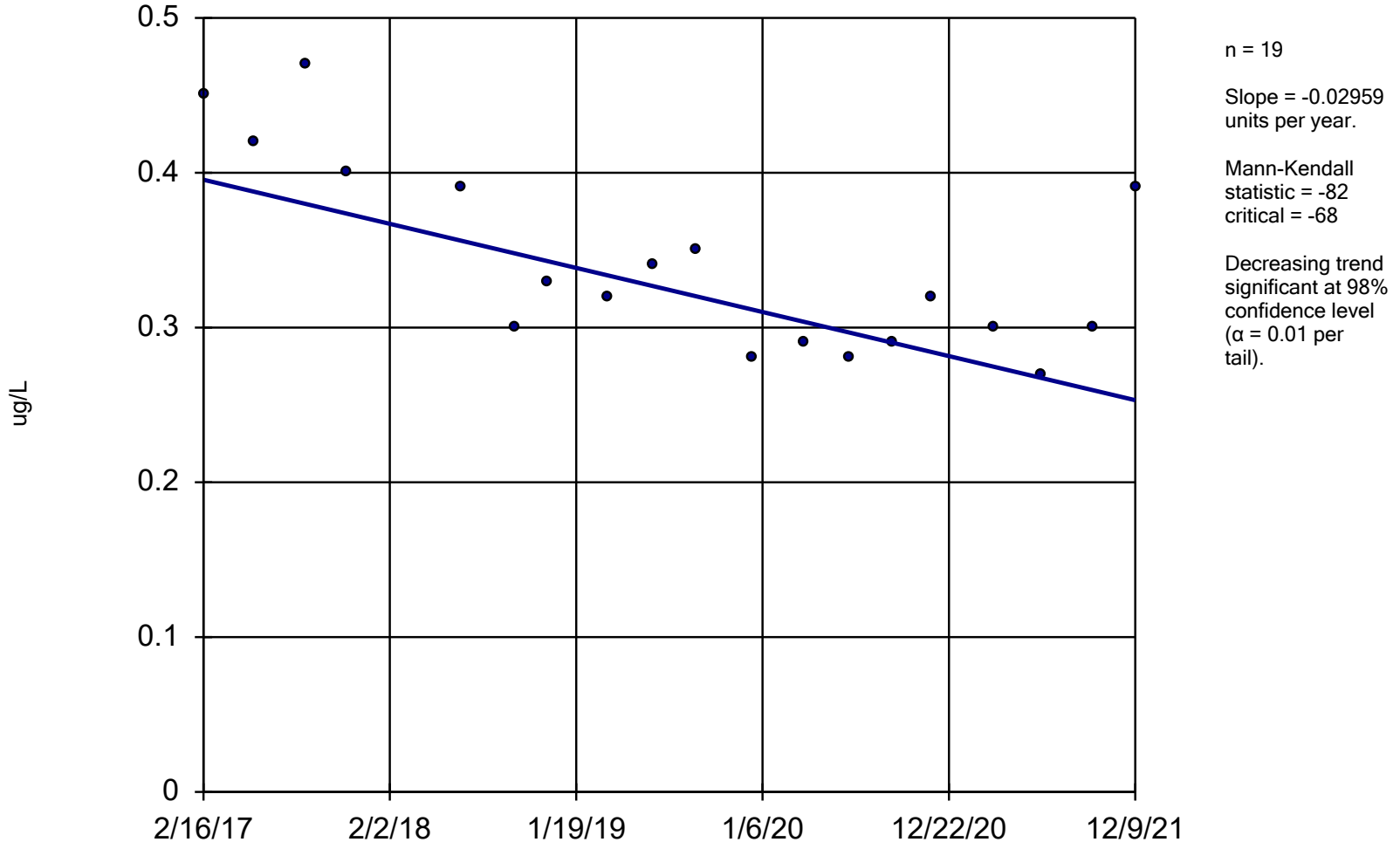
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: 1,2-Dichloroethane Analysis Run 1/14/2022 2:34 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#6



n = 19

Slope = -0.02959 units per year.

Mann-Kendall statistic = -82
critical = -68

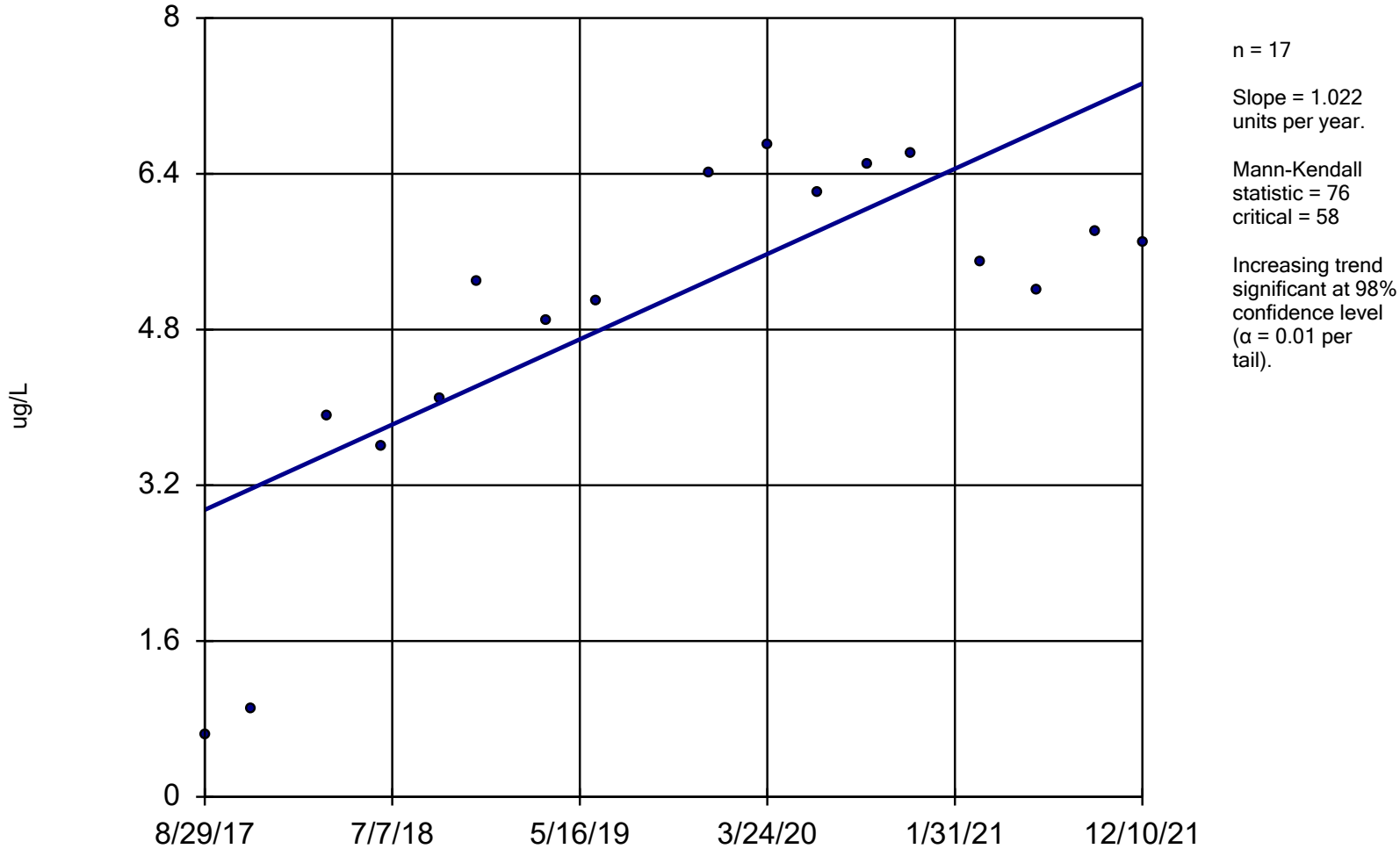
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: 1,2-Dichloropropane Analysis Run 1/14/2022 2:34 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#3



n = 17

Slope = 1.022 units per year.

Mann-Kendall statistic = 76
critical = 58

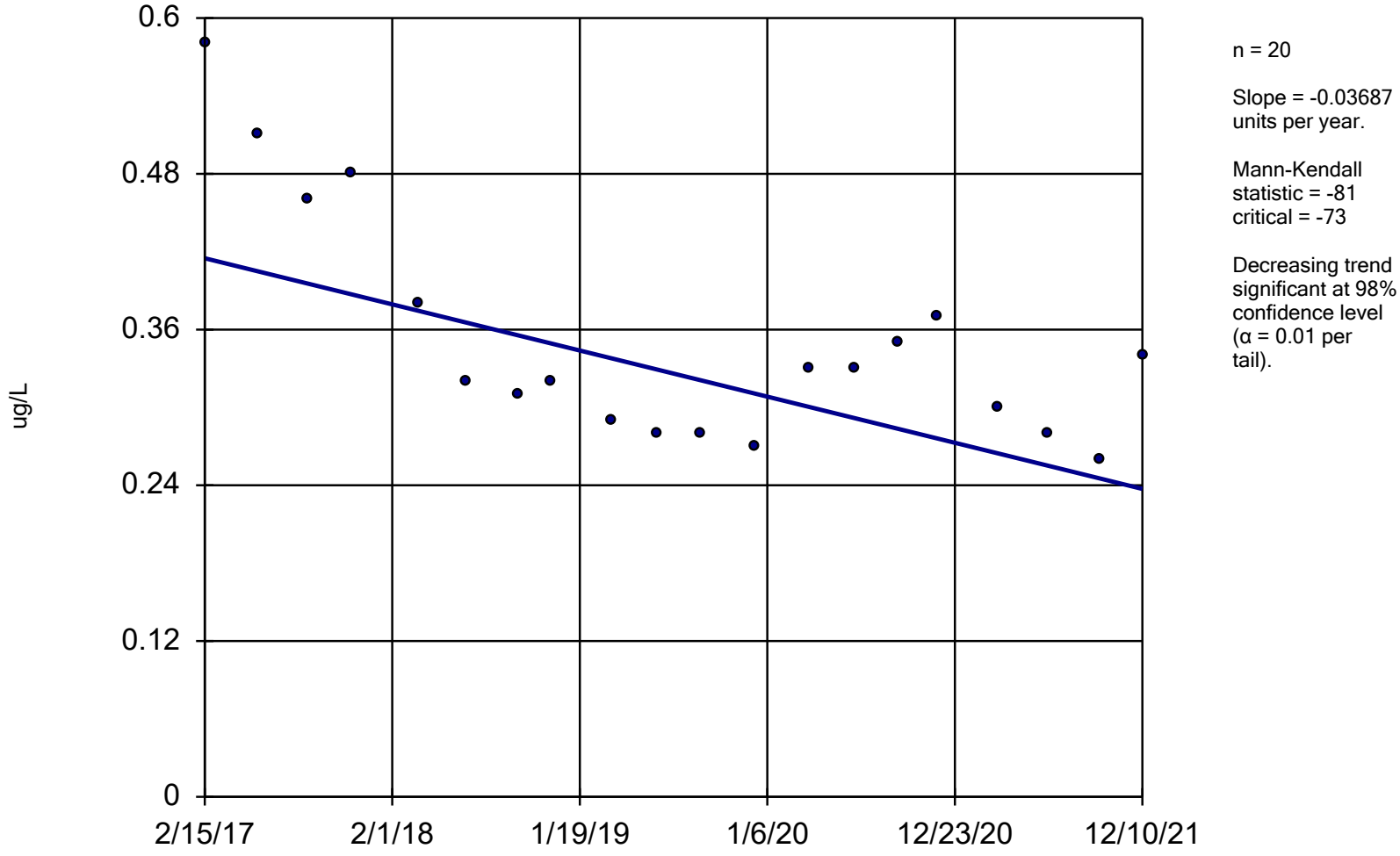
Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Chloroform Analysis Run 1/14/2022 2:34 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#4



n = 20

Slope = -0.03687 units per year.

Mann-Kendall statistic = -81
critical = -73

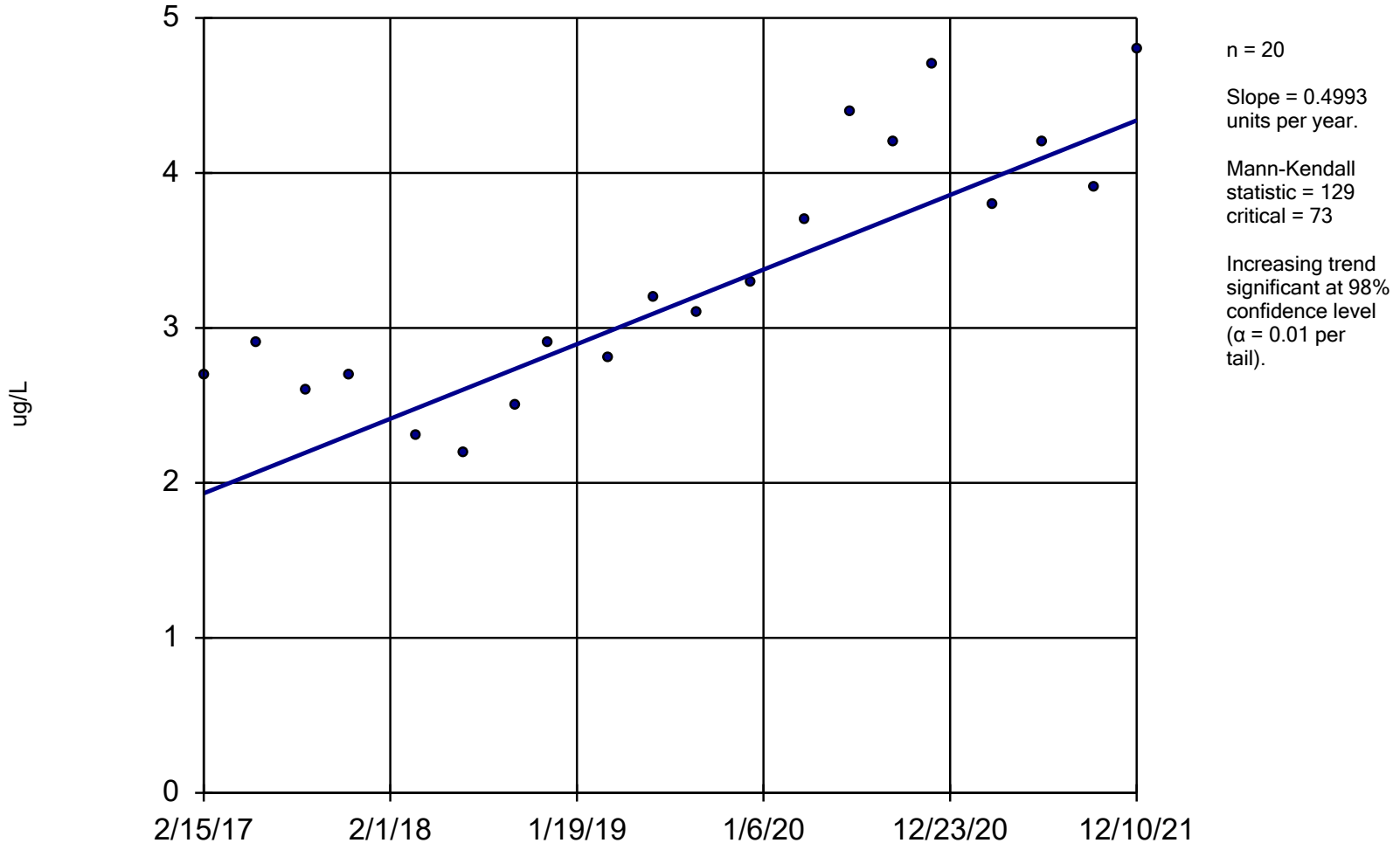
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Chloroform Analysis Run 1/14/2022 2:34 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#4



n = 20

Slope = 0.4993 units per year.

Mann-Kendall statistic = 129
critical = 73

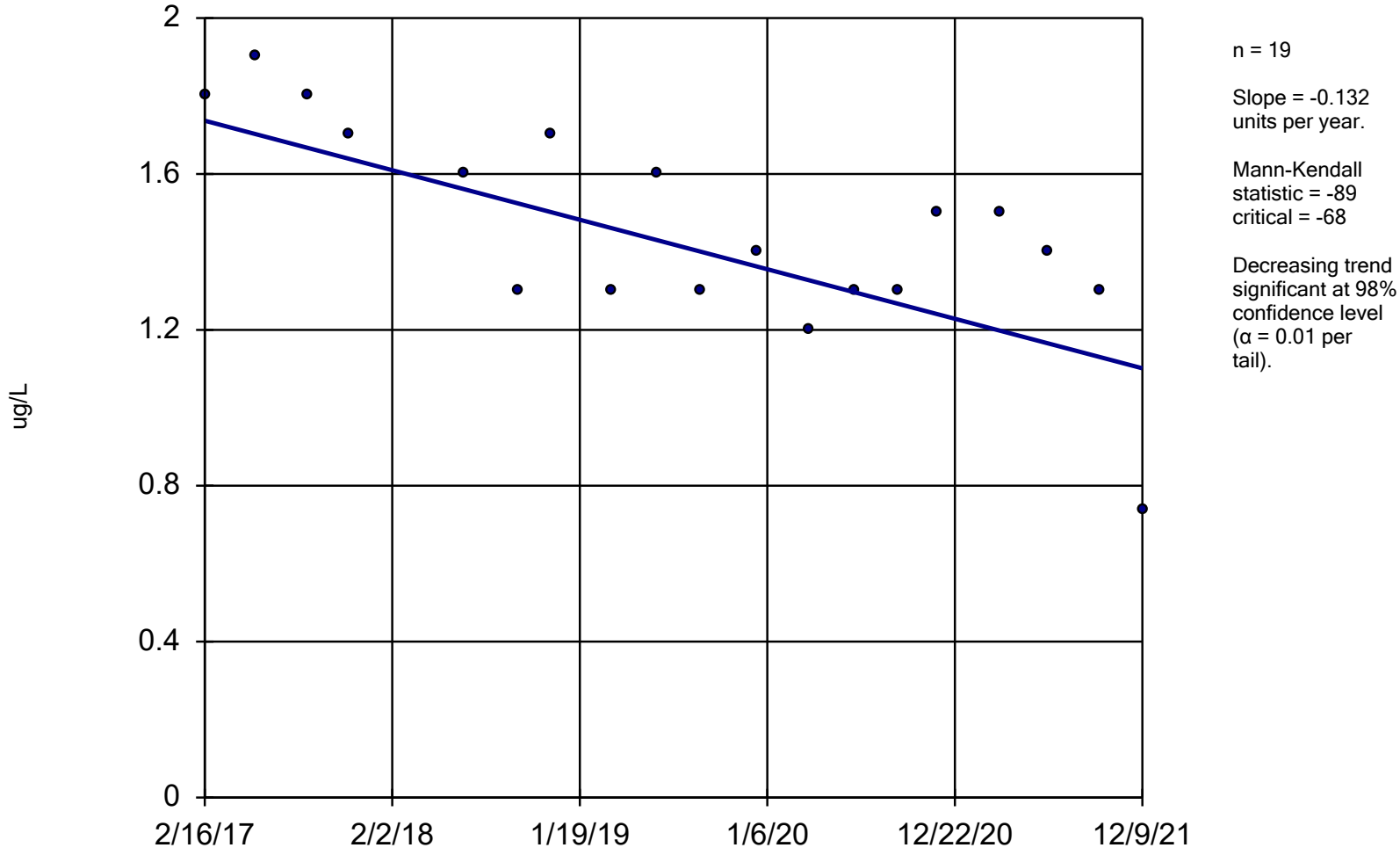
Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: cis-1,2-Dichloroethene Analysis Run 1/14/2022 2:34 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#6



n = 19

Slope = -0.132 units per year.

Mann-Kendall statistic = -89
critical = -68

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

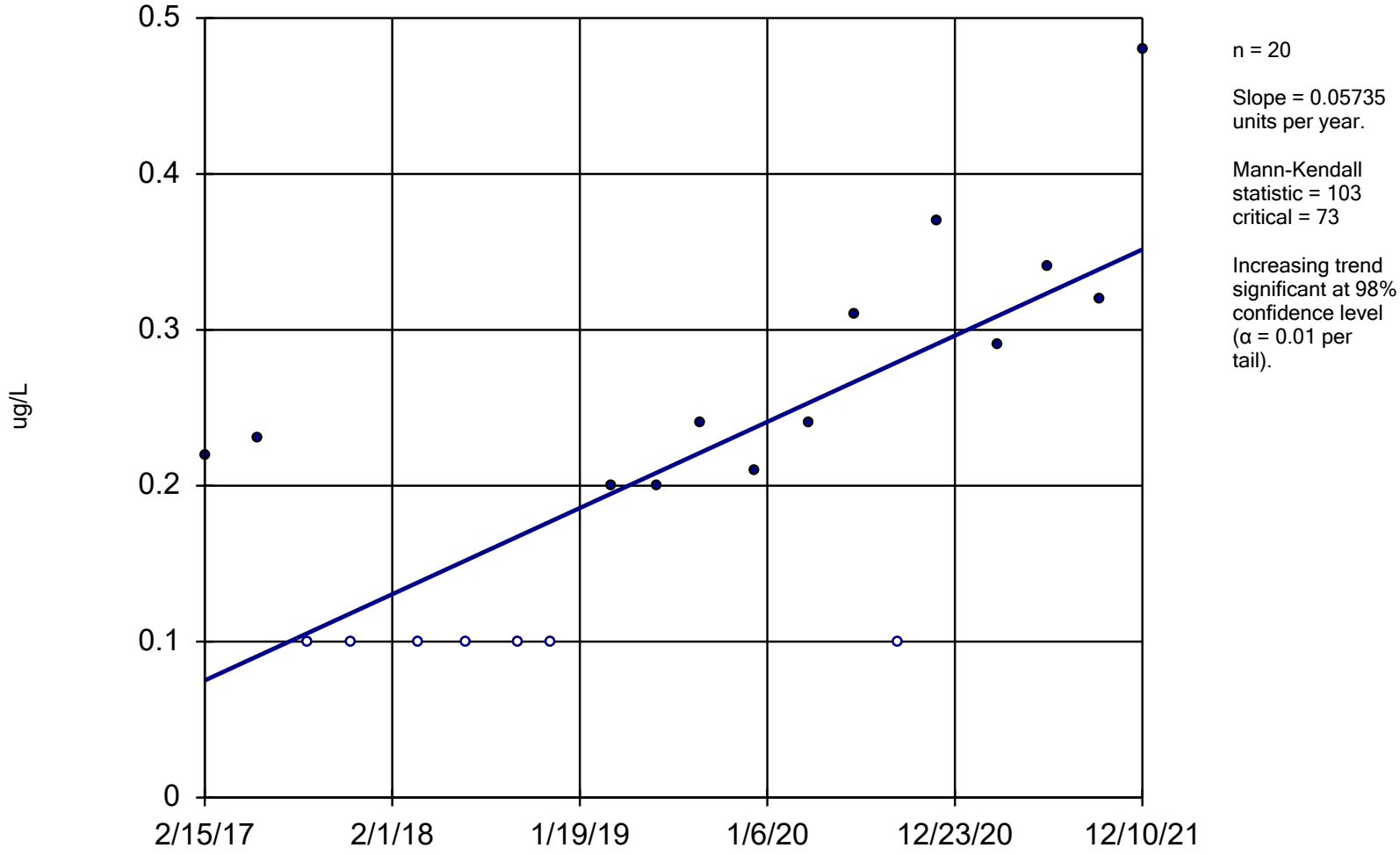
Constituent: trans-1,2-Dichloroethene Analysis Run 1/14/2022 2:34 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Sen's Slope Estimator

MWell#4



n = 20

Slope = 0.05735 units per year.

Mann-Kendall statistic = 103
critical = 73

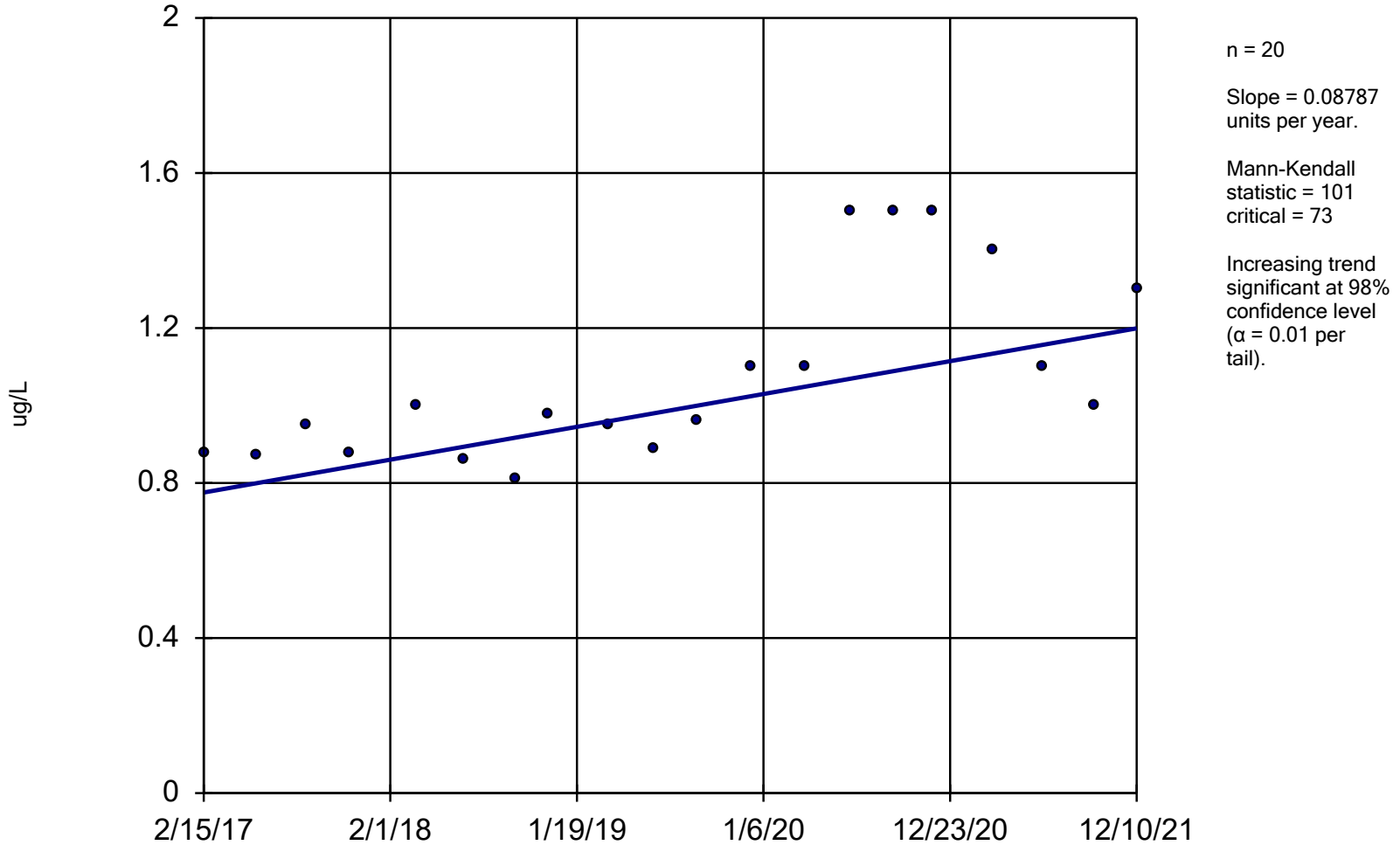
Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Trichloroethene Analysis Run 1/14/2022 2:34 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#4



n = 20

Slope = 0.08787 units per year.

Mann-Kendall statistic = 101
critical = 73

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

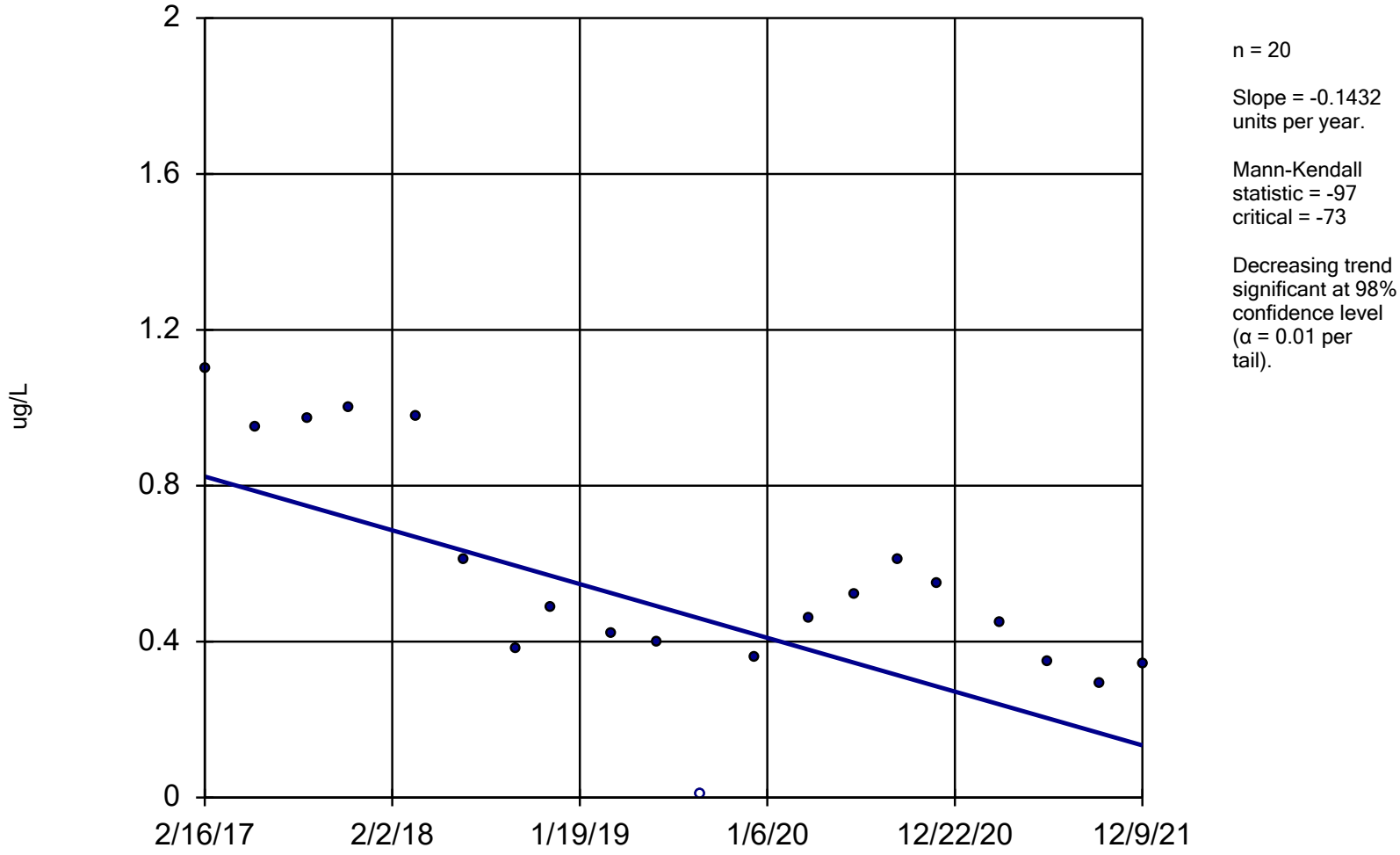
Constituent: Trichlorofluoromethane Analysis Run 1/14/2022 2:34 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Sen's Slope Estimator

MWell#10



n = 20

Slope = -0.1432 units per year.

Mann-Kendall statistic = -97
critical = -73

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Vinyl Chloride Analysis Run 1/14/2022 2:34 PM View: HRLF_SensSlope 5-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Horn Rapids Landfill Trends for Volatile Organic Compounds, First Quarter 2012 through Fourth Quarter 2021

Constituent Name	Well	Slope	Calculated Statistic	Critical Value	Trend	N	% Non-detects	Normality	Transformation	Alpha	Method
1,1-Dichloroethane (ug/L)	MWell#3	-0.3447	-526	-171	Yes	36	36.11	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#4	0.297	475	194	Yes	39	0	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#5	-0.4193	-353	-194	Yes	39	0	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#6	-0.73	-584	-186	Yes	38	0	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#9	-0.1936	-295	-194	Yes	39	0	n/a	n/a	0.02	NP
1,1-Dichloroethane (ug/L)	MWell#10	-0.5116	-464	-194	Yes	39	0	n/a	n/a	0.02	NP
1,2-Dichloroethane (ug/L)	MWell#6	-0.01992	-375	-186	Yes	38	23.68	n/a	n/a	0.02	NP
1,2-Dichloropropane (ug/L)	MWell#5	-0.02	-319	-194	Yes	39	25.64	n/a	n/a	0.02	NP
1,2-Dichloropropane (ug/L)	MWell#6	-0.02499	-432	-186	Yes	38	21.05	n/a	n/a	0.02	NP
Benzene (ug/L)	MWell#5	-0.02294	-290	-194	Yes	39	33.33	n/a	n/a	0.02	NP
Benzene (ug/L)	MWell#6	-0.01652	-335	-186	Yes	38	23.68	n/a	n/a	0.02	NP
Benzene (ug/L)	MWell#10	-0.06906	-528	-194	Yes	39	20.51	n/a	n/a	0.02	NP
Chloroform (ug/L)	MWell#3	0.6558	371	171	Yes	36	25	n/a	n/a	0.02	NP
Chloroform (ug/L)	MWell#4	-0.02149	-248	-194	Yes	39	23.08	n/a	n/a	0.02	NP
Chloroform (ug/L)	MWell#9	-0.03011	-270	-194	Yes	39	41.03	n/a	n/a	0.02	NP
cis-1,2-Dichloroethene (ug/L)	MWell#3	-0.1355	-393	-171	Yes	36	50	n/a	n/a	0.02	NP
cis-1,2-Dichloroethene (ug/L)	MWell#4	0.232	410	194	Yes	39	2.564	n/a	n/a	0.02	NP
cis-1,2-Dichloroethene (ug/L)	MWell#9	0.4244	204	194	Yes	39	0	n/a	n/a	0.02	NP
cis-1,2-Dichloroethene (ug/L)	MWell#10	0.388	225	194	Yes	39	0	n/a	n/a	0.02	NP
Methylene Chloride (ug/L)	MWell#10	-0.5312	-457	-194	Yes	39	43.59	n/a	n/a	0.02	NP
Tetrachloroethene (ug/L)	MWell#6	-2.119	-392	-186	Yes	38	0	n/a	n/a	0.02	NP
Tetrachloroethene (ug/L)	MWell#9	0.3278	279	194	Yes	39	0	n/a	n/a	0.02	NP
trans-1,2-Dichloroethene (ug/L)	MWell#6	-0.1259	-496	-186	Yes	38	0	n/a	n/a	0.02	NP
Trichloroethene (ug/L)	MWell#1 (bg	-0.03615	-398	-194	Yes	39	43.59	n/a	n/a	0.02	NP

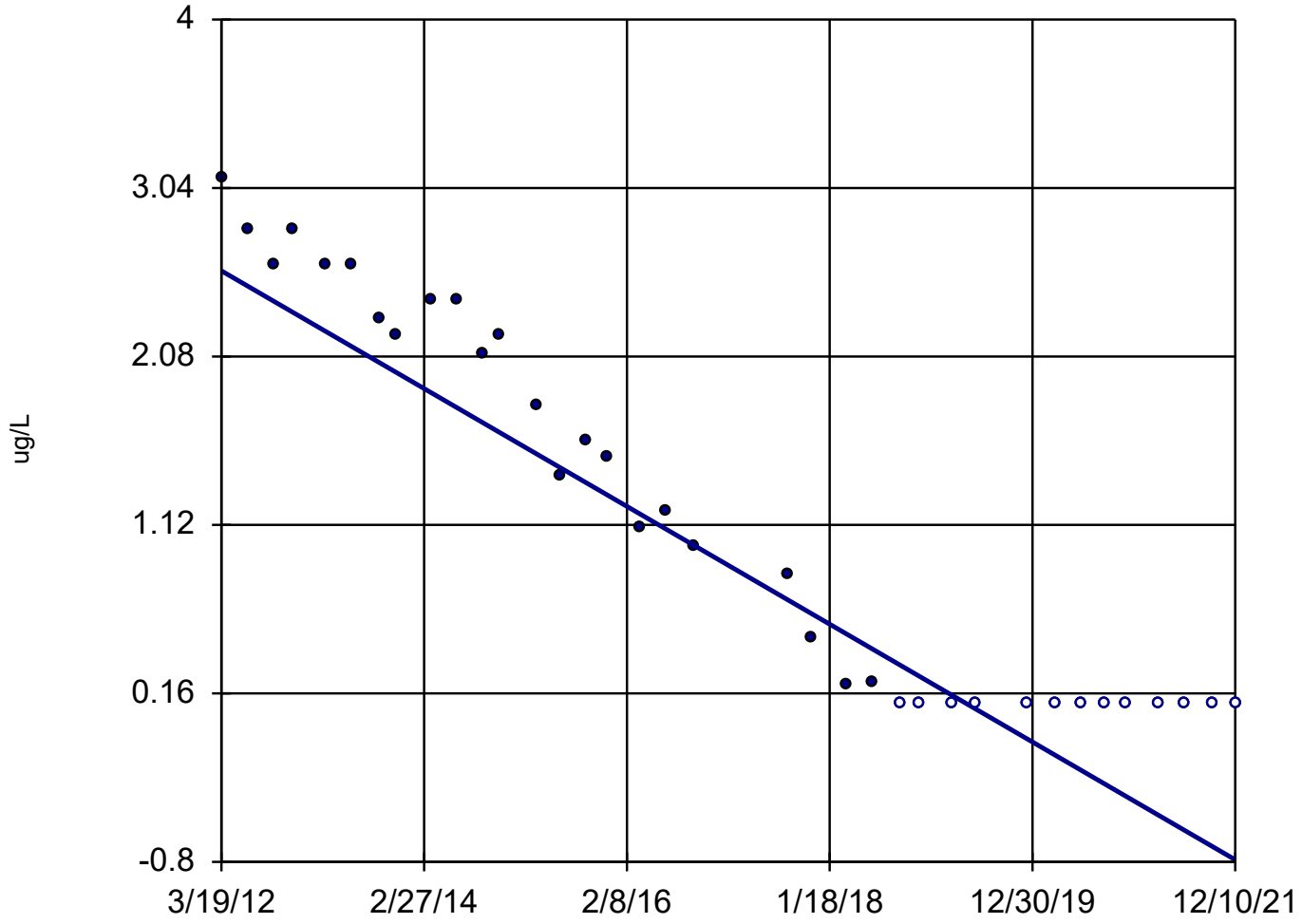
Horn Rapids Landfill Trends for Volatile Organic Compounds, First Quarter 2012 through Fourth Quarter 2021

Constituent Name	Well	Slope	Calculated Statistic	Critical Value	Trend	N	% Non-detects	Normality	Transformation	Alpha	Method
Trichloroethene (ug/L)	MWell#5	-0.2345	-273	-194	Yes	39	0	n/a	n/a	0.02	NP
Trichloroethene (ug/L)	MWell#6	-1.101	-475	-186	Yes	38	0	n/a	n/a	0.02	NP
Trichloroethene (ug/L)	MWell#10	-0.05319	-206	-194	Yes	39	0	n/a	n/a	0.02	NP
Trichlorofluoromethane (ug/L)	MWell#3	-0.1385	-442	-171	Yes	36	50	n/a	n/a	0.02	NP
Trichlorofluoromethane (ug/L)	MWell#4	0.06345	332	194	Yes	39	15.38	n/a	n/a	0.02	NP
Vinyl Chloride (ug/L)	MWell#5	-0.6079	-397	-194	Yes	39	2.564	n/a	n/a	0.02	NP
Vinyl Chloride (ug/L)	MWell#6	-0.1854	-374	-186	Yes	38	0	n/a	n/a	0.02	NP
Vinyl Chloride (ug/L)	MWell#10	-0.1099	-353	-194	Yes	39	10.26	n/a	n/a	0.02	NP

Hollow symbols indicate censored values.

Sen's Slope Estimator

MWell#3



n = 36

Slope = -0.3447 units per year.

Mann-Kendall statistic = -526
critical = -171

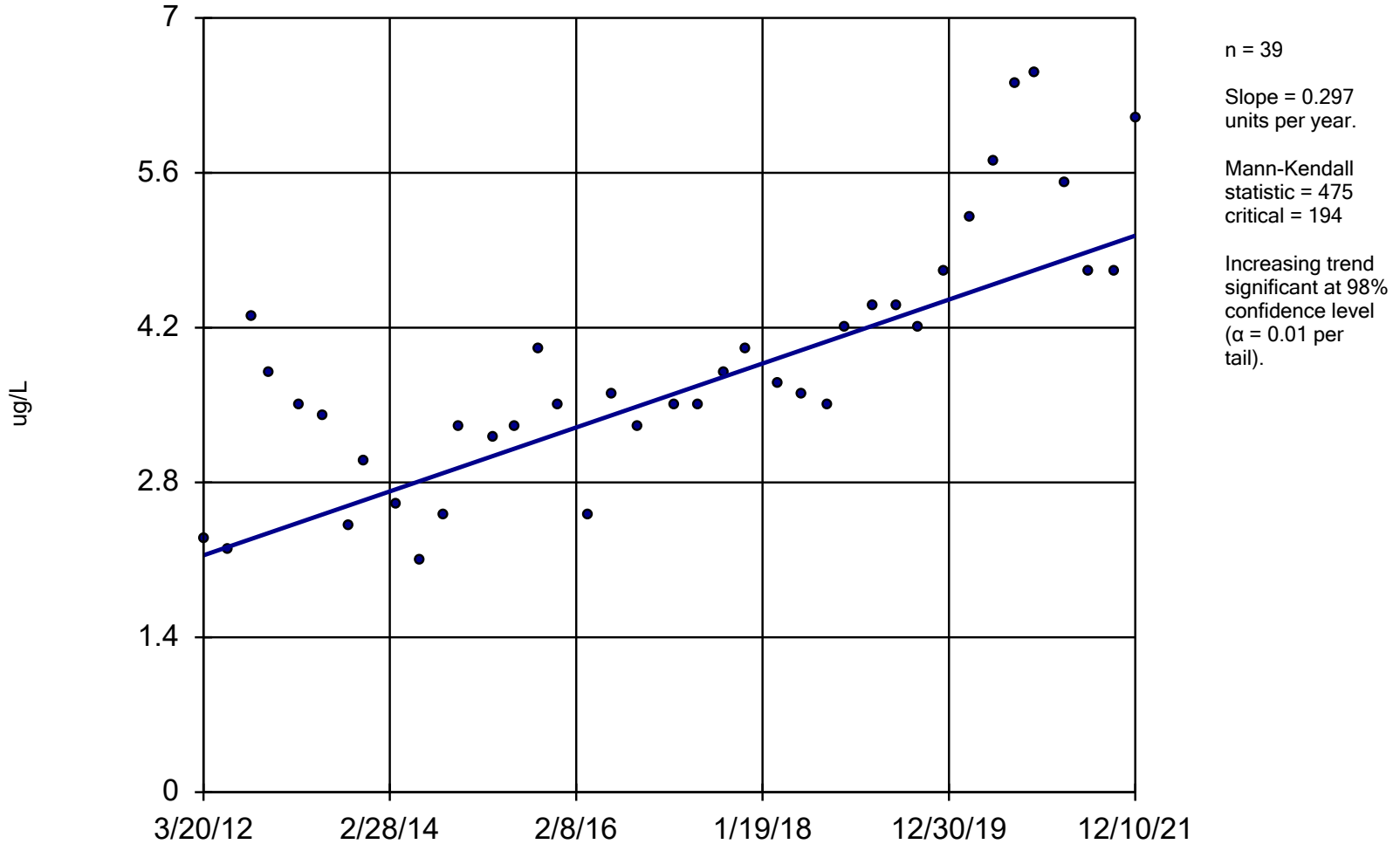
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: 1,1-Dichloroethane Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#4



n = 39

Slope = 0.297 units per year.

Mann-Kendall statistic = 475
critical = 194

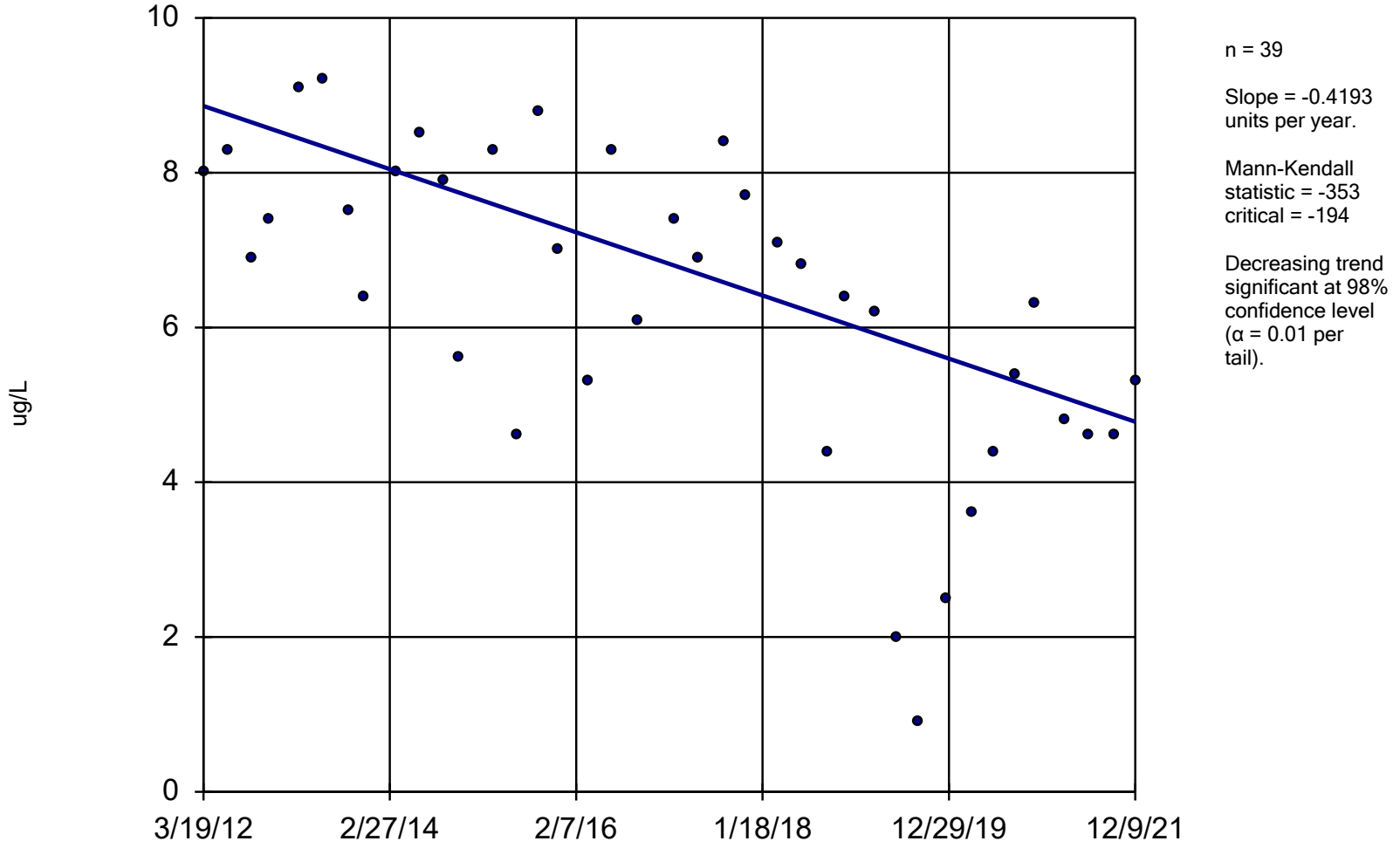
Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: 1,1-Dichloroethane Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#5



n = 39

Slope = -0.4193 units per year.

Mann-Kendall statistic = -353
critical = -194

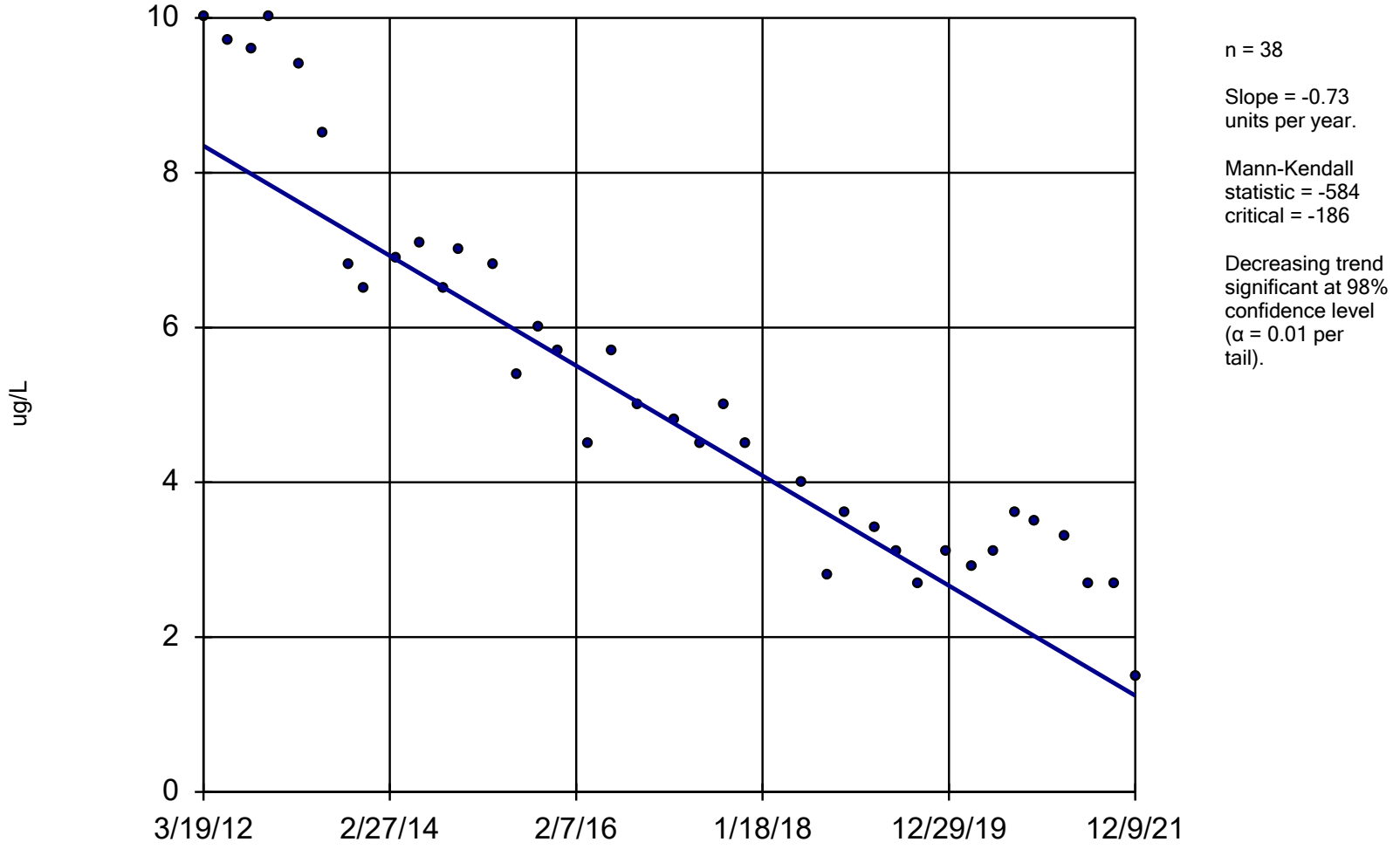
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: 1,1-Dichloroethane Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#6



n = 38

Slope = -0.73 units per year.

Mann-Kendall statistic = -584
critical = -186

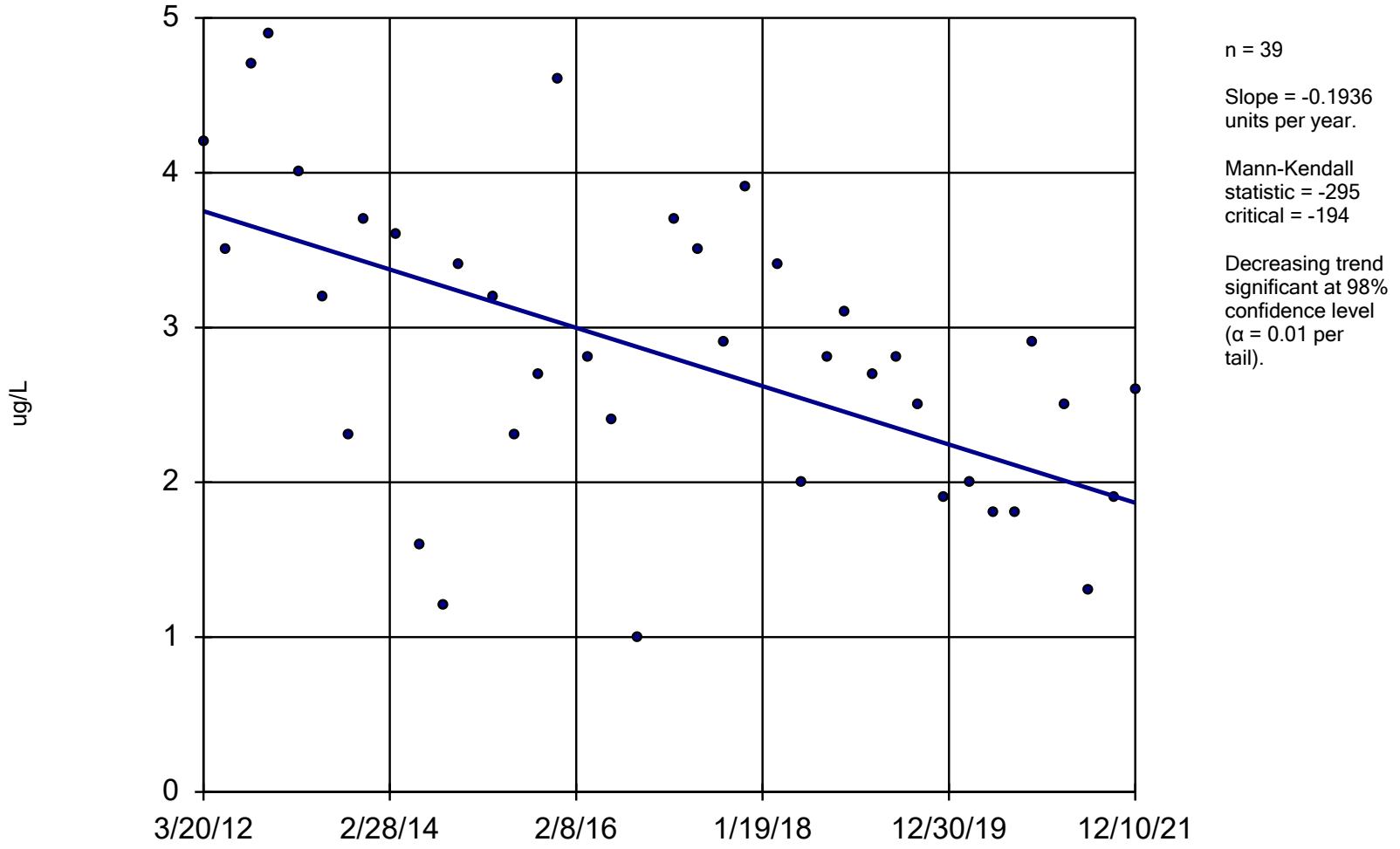
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: 1,1-Dichloroethane Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#9



n = 39

Slope = -0.1936 units per year.

Mann-Kendall statistic = -295
critical = -194

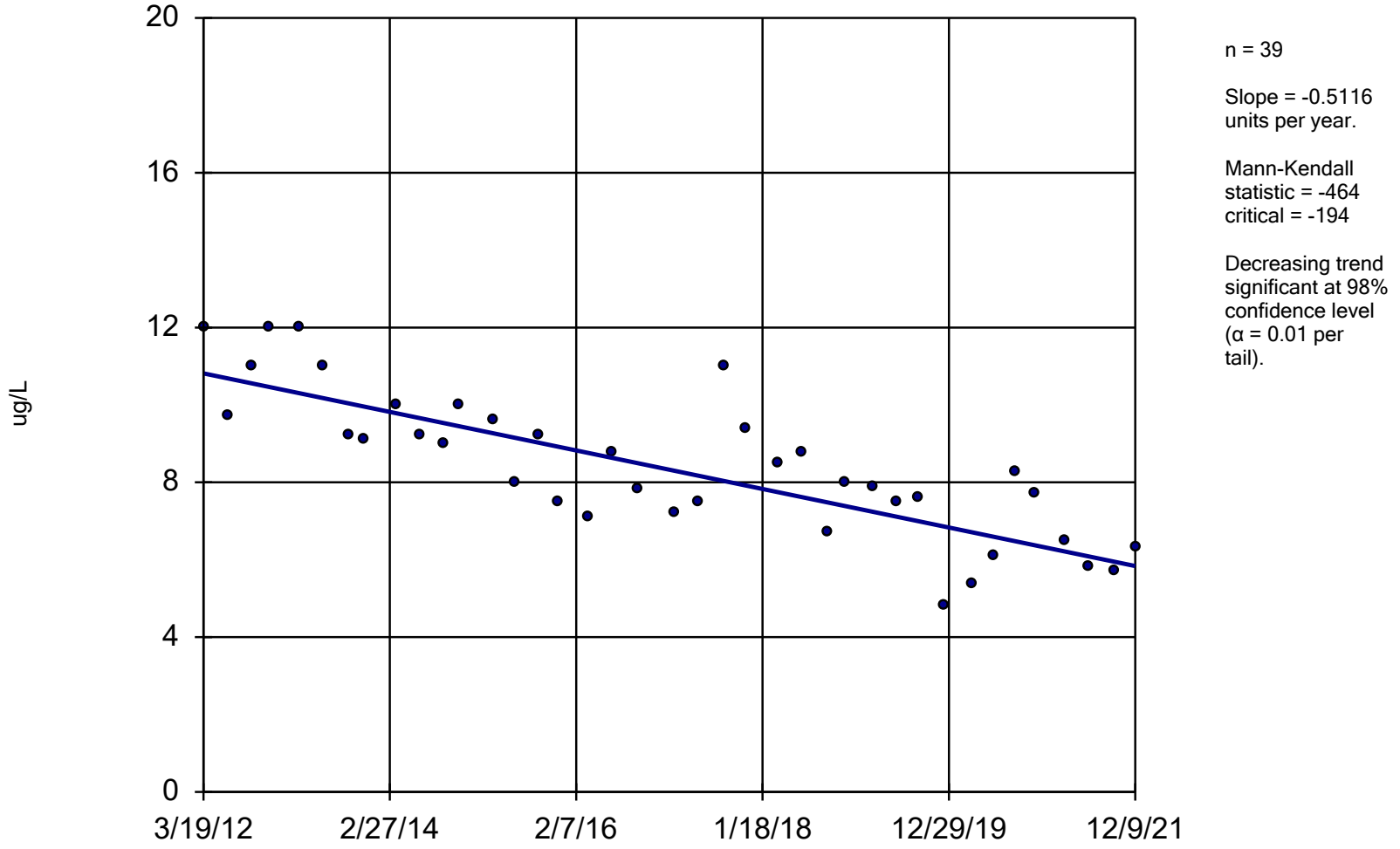
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: 1,1-Dichloroethane Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#10



n = 39

Slope = -0.5116 units per year.

Mann-Kendall statistic = -464
critical = -194

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

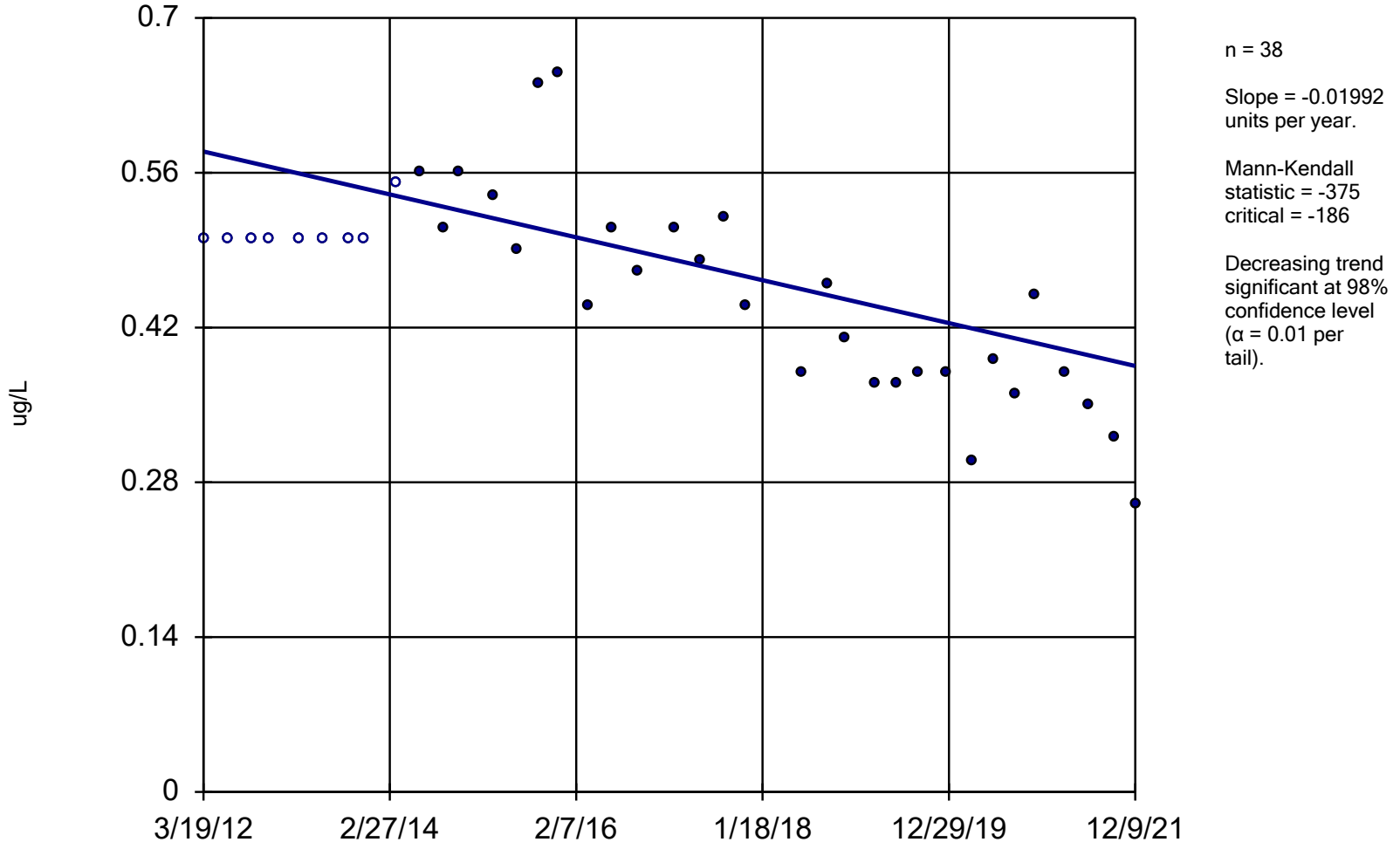
Constituent: 1,1-Dichloroethane Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Sen's Slope Estimator

MWell#6



n = 38

Slope = -0.01992 units per year.

Mann-Kendall statistic = -375
critical = -186

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

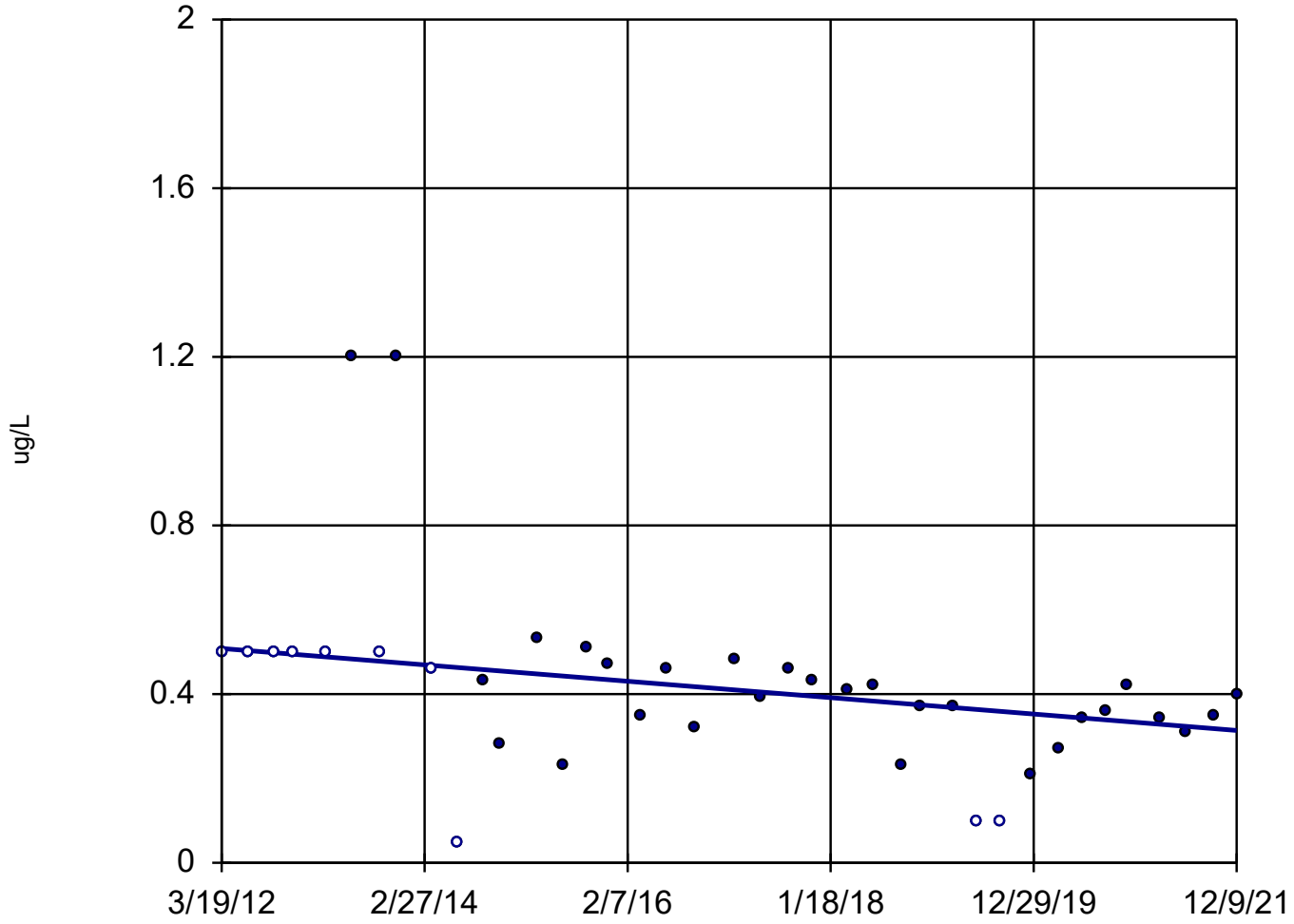
Constituent: 1,2-Dichloroethane Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Sen's Slope Estimator

MWell#5



n = 39

Slope = -0.02 units per year.

Mann-Kendall statistic = -319
critical = -194

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

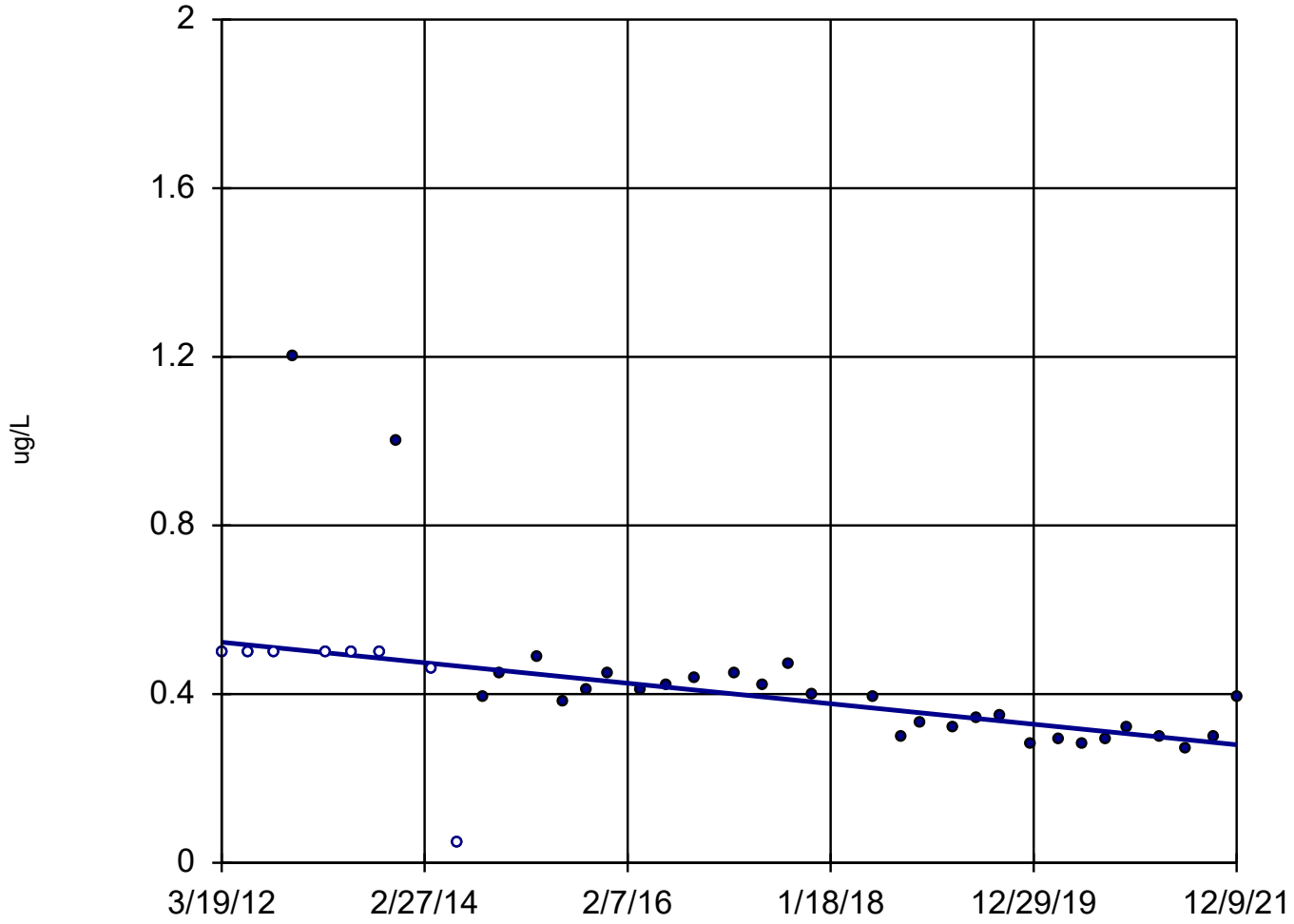
Constituent: 1,2-Dichloropropane Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Sen's Slope Estimator

MWell#6



n = 38

Slope = -0.02499 units per year.

Mann-Kendall statistic = -432
critical = -186

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

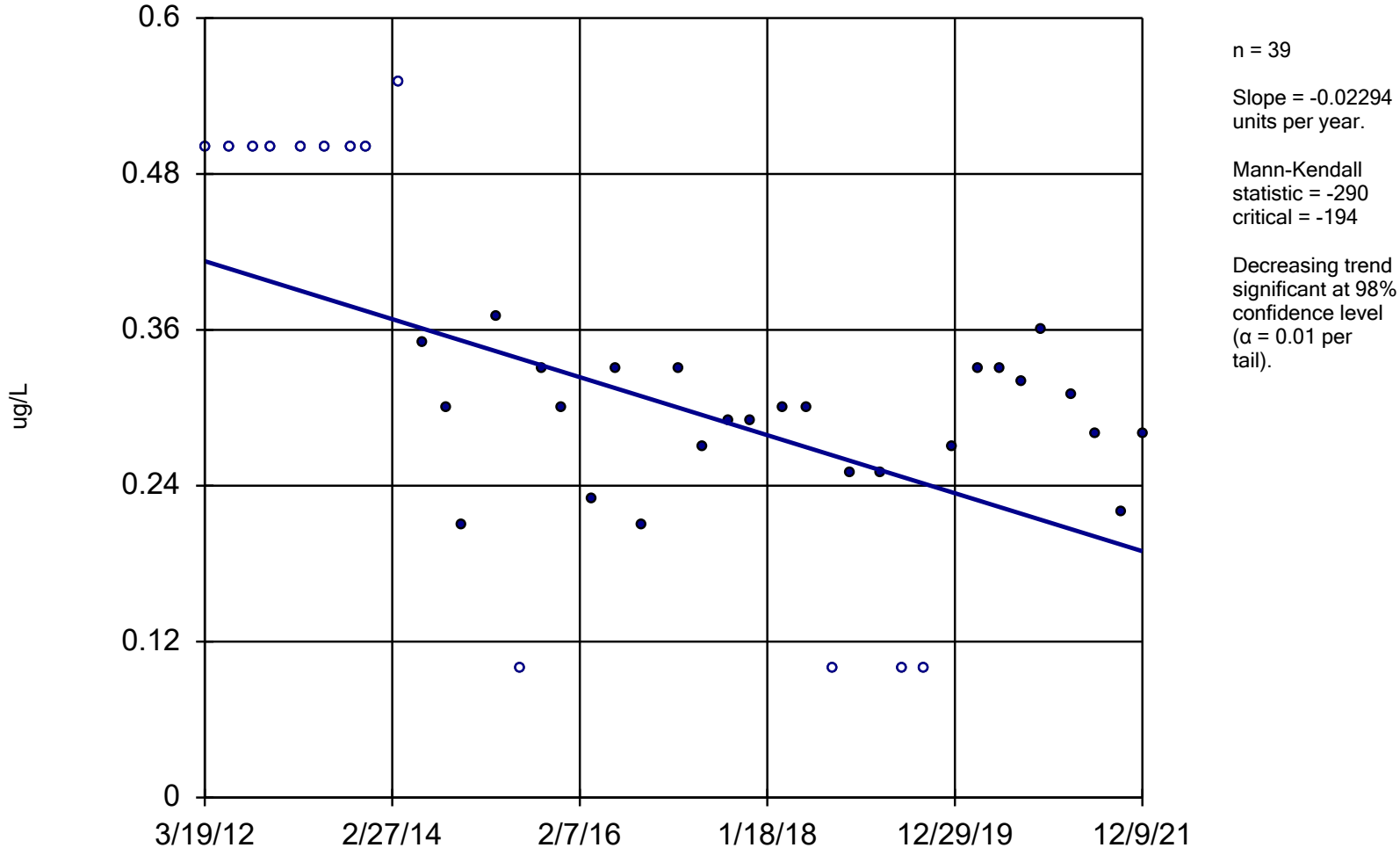
Constituent: 1,2-Dichloropropane Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Sen's Slope Estimator

MWell#5



n = 39

Slope = -0.02294 units per year.

Mann-Kendall statistic = -290
critical = -194

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

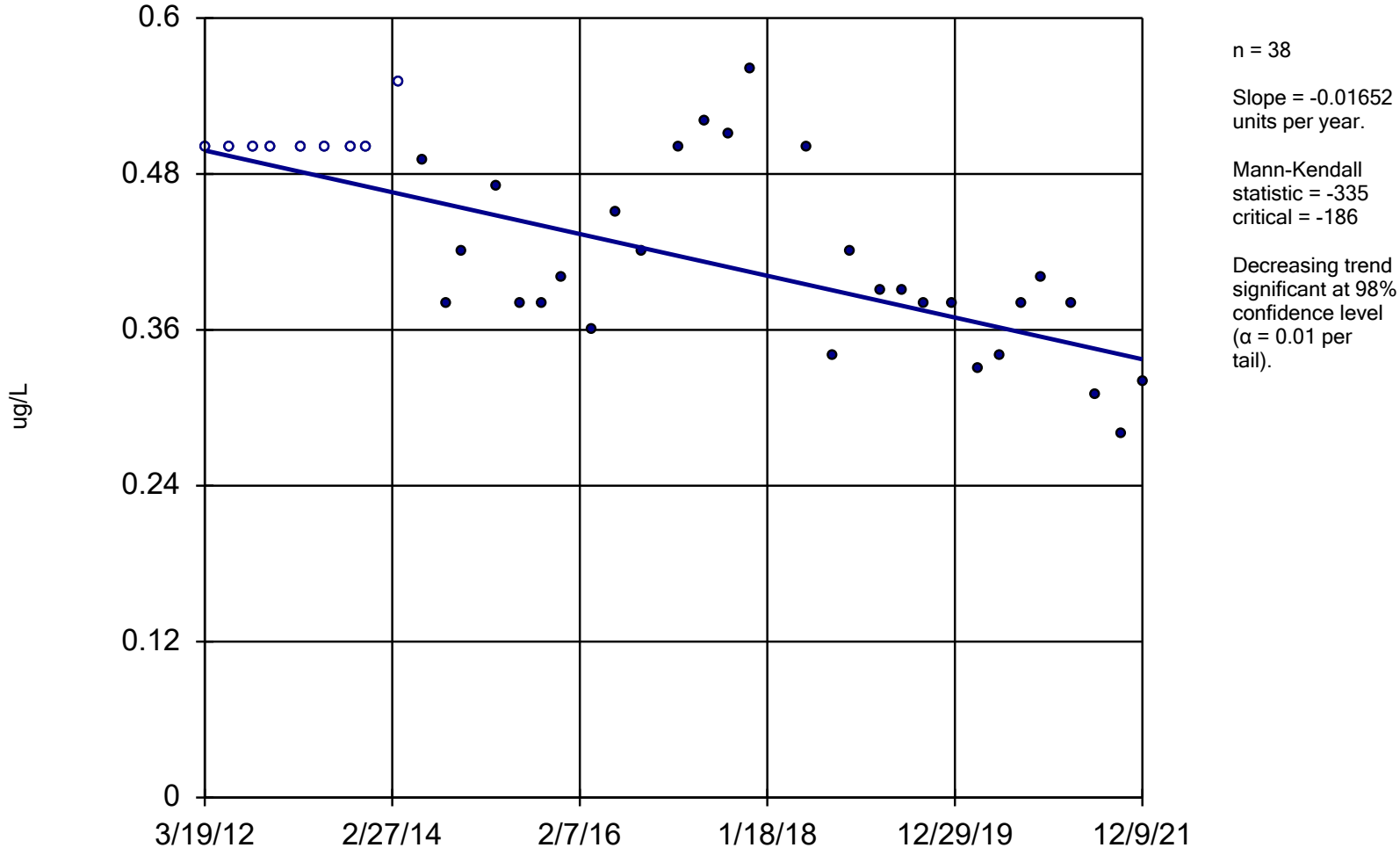
Constituent: Benzene Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Sen's Slope Estimator

MWell#6



n = 38

Slope = -0.01652 units per year.

Mann-Kendall statistic = -335
critical = -186

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

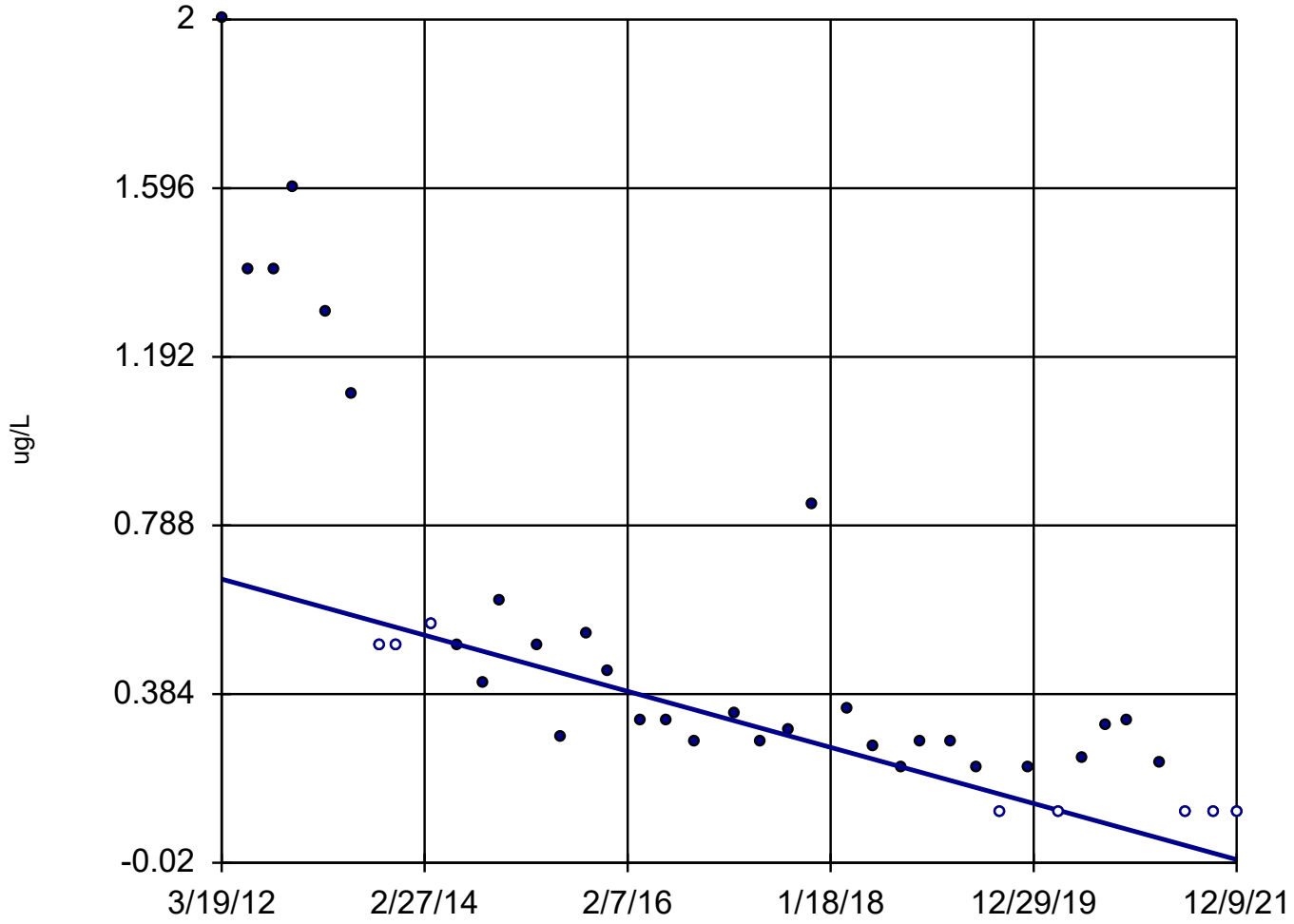
Constituent: Benzene Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Sen's Slope Estimator

MWell#10



n = 39

Slope = -0.06906 units per year.

Mann-Kendall statistic = -528
critical = -194

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

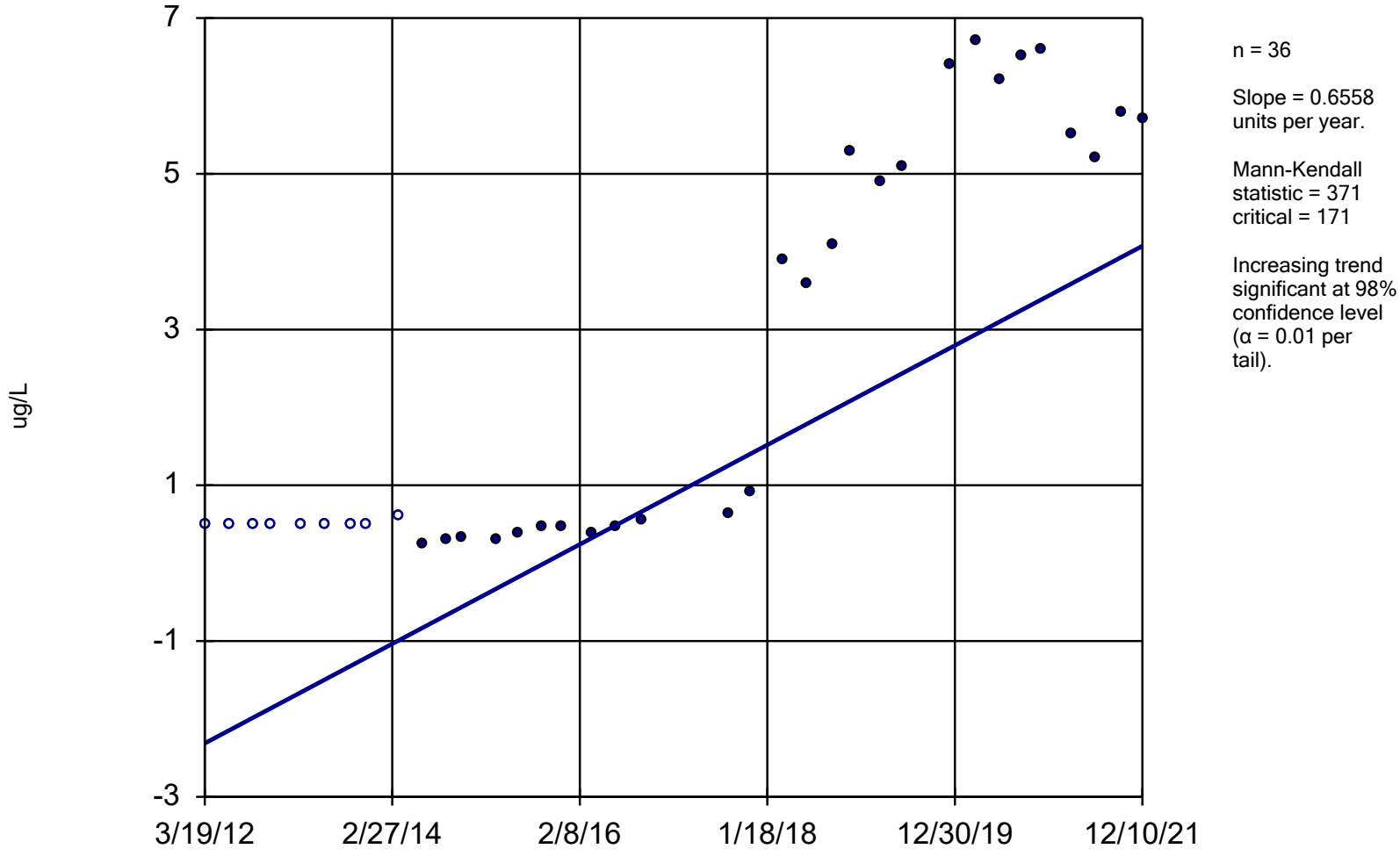
Constituent: Benzene Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Sen's Slope Estimator

MWell#3



n = 36

Slope = 0.6558 units per year.

Mann-Kendall statistic = 371
critical = 171

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

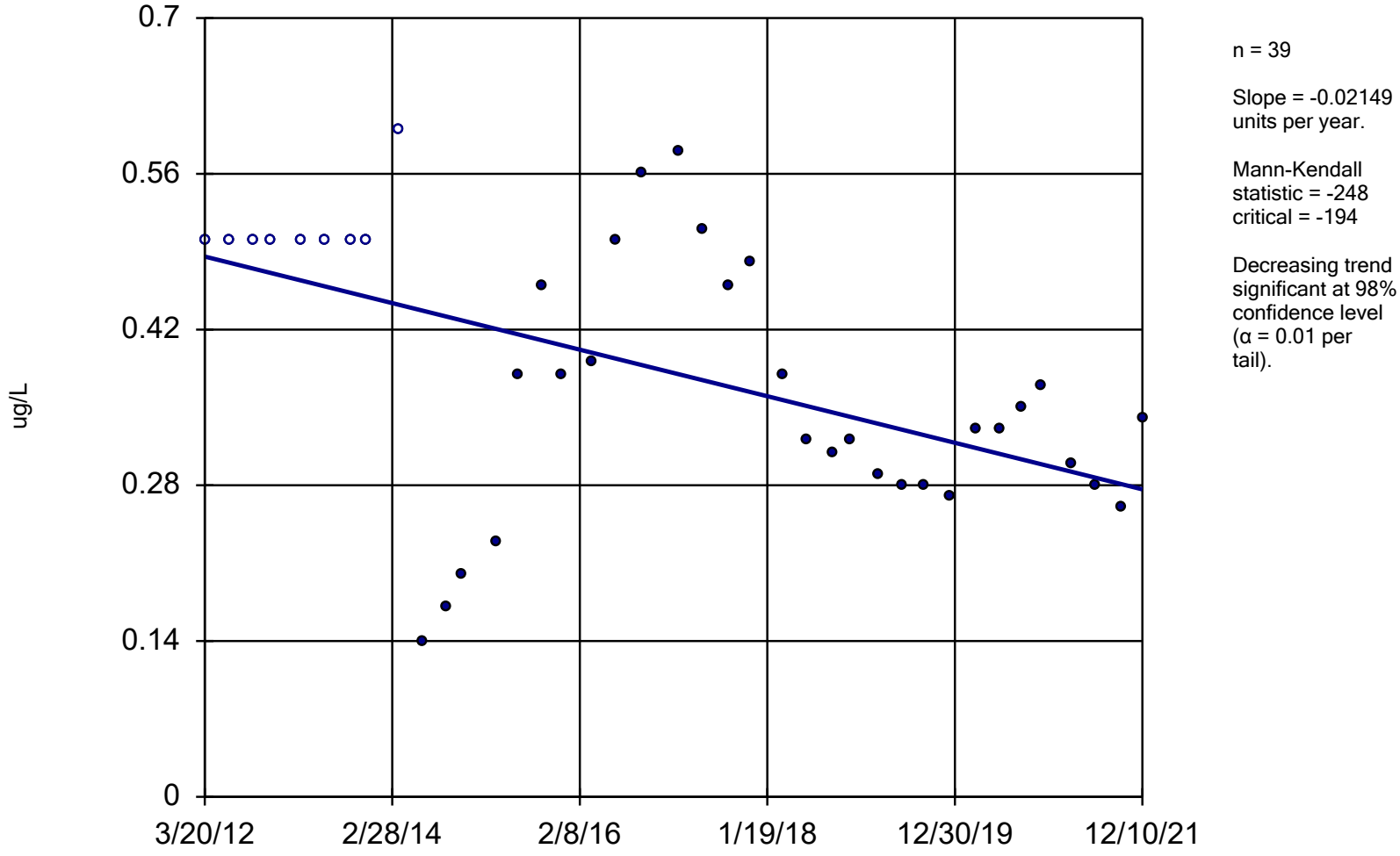
Constituent: Chloroform Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Sen's Slope Estimator

MWell#4



n = 39

Slope = -0.02149 units per year.

Mann-Kendall statistic = -248
critical = -194

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

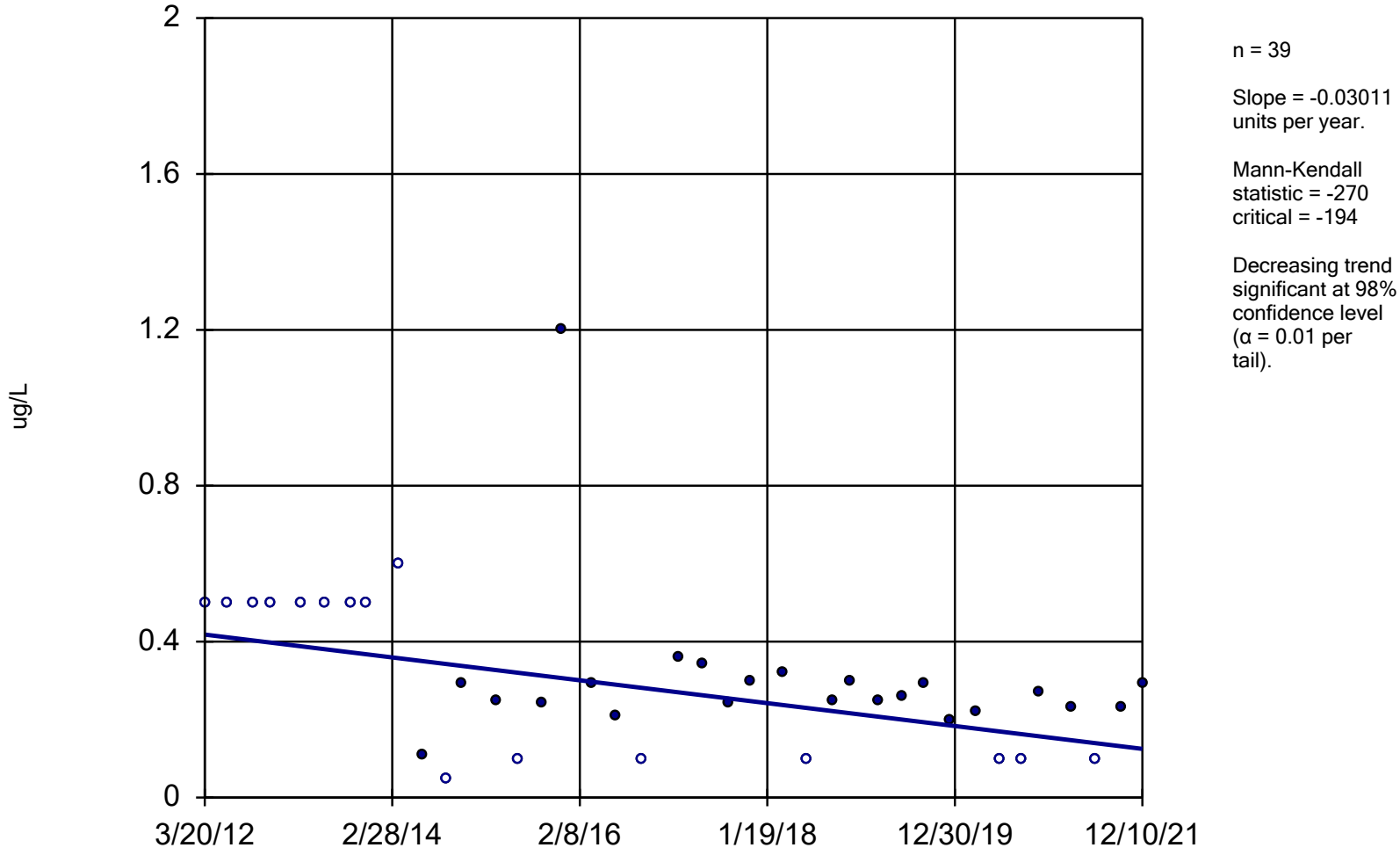
Constituent: Chloroform Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Sen's Slope Estimator

MWell#9



n = 39

Slope = -0.03011 units per year.

Mann-Kendall statistic = -270
critical = -194

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

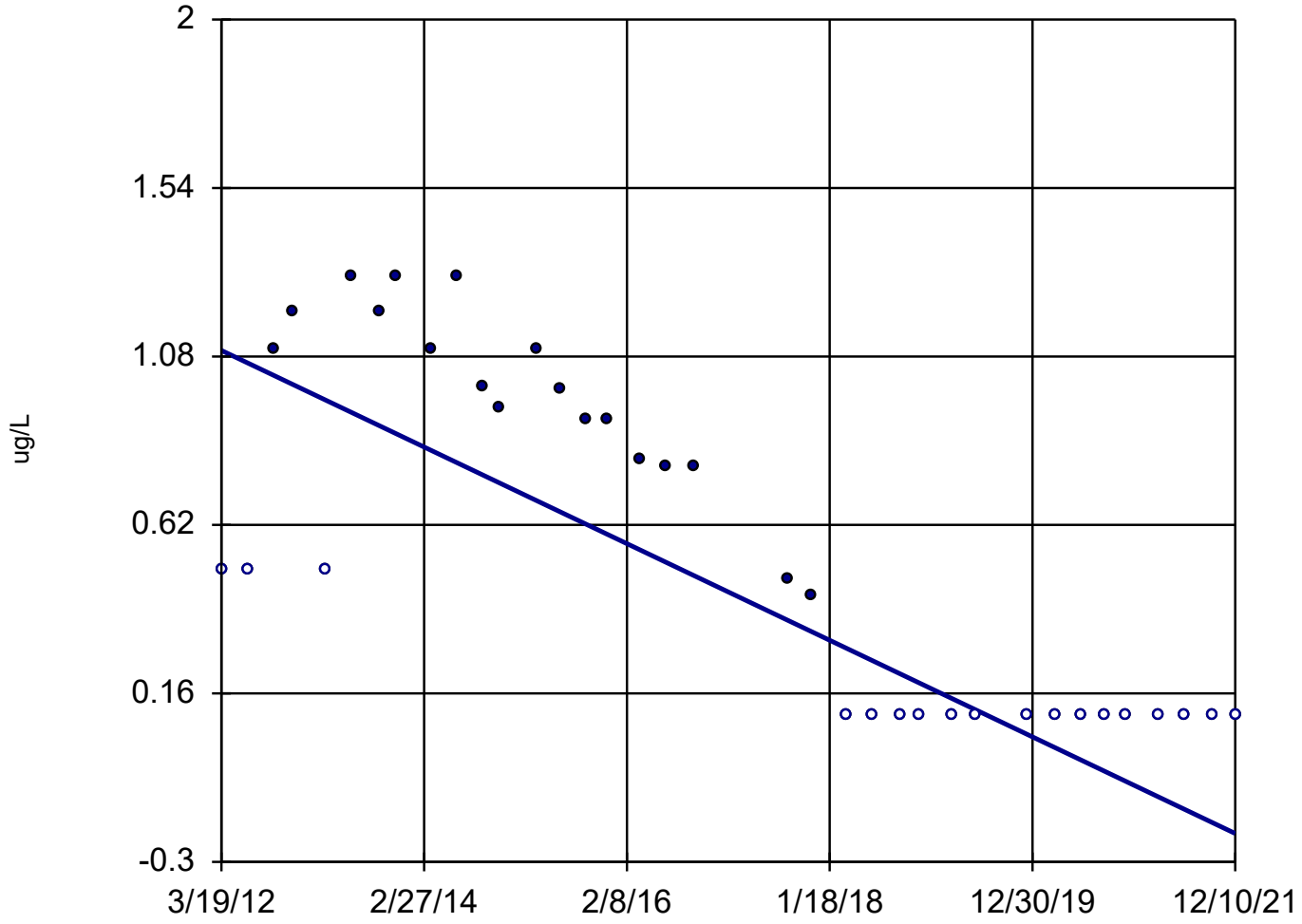
Constituent: Chloroform Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Sen's Slope Estimator

MWell#3



n = 36

Slope = -0.1355 units per year.

Mann-Kendall statistic = -393
critical = -171

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

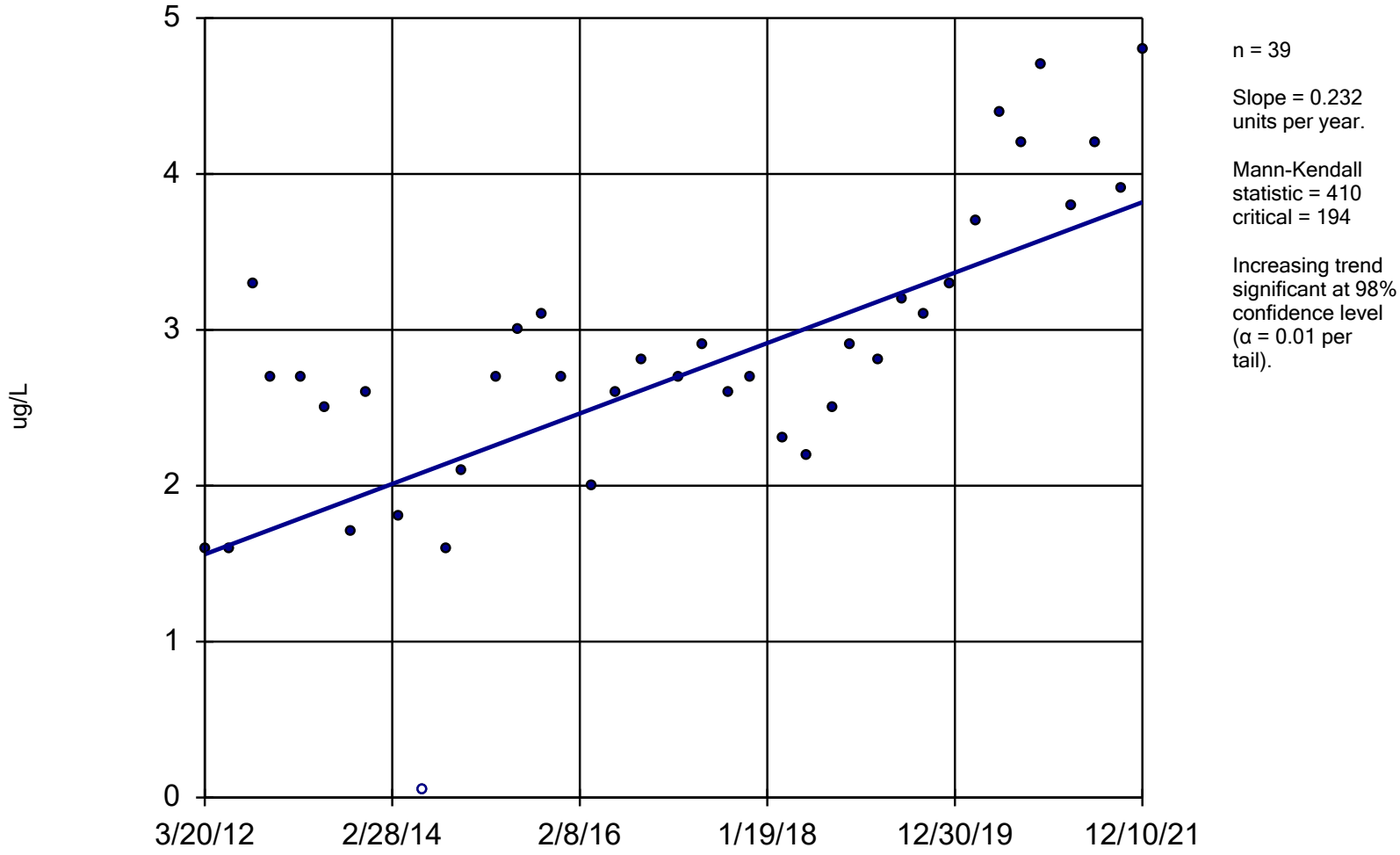
Constituent: cis-1,2-Dichloroethene Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Sen's Slope Estimator

MWell#4



n = 39

Slope = 0.232 units per year.

Mann-Kendall statistic = 410
critical = 194

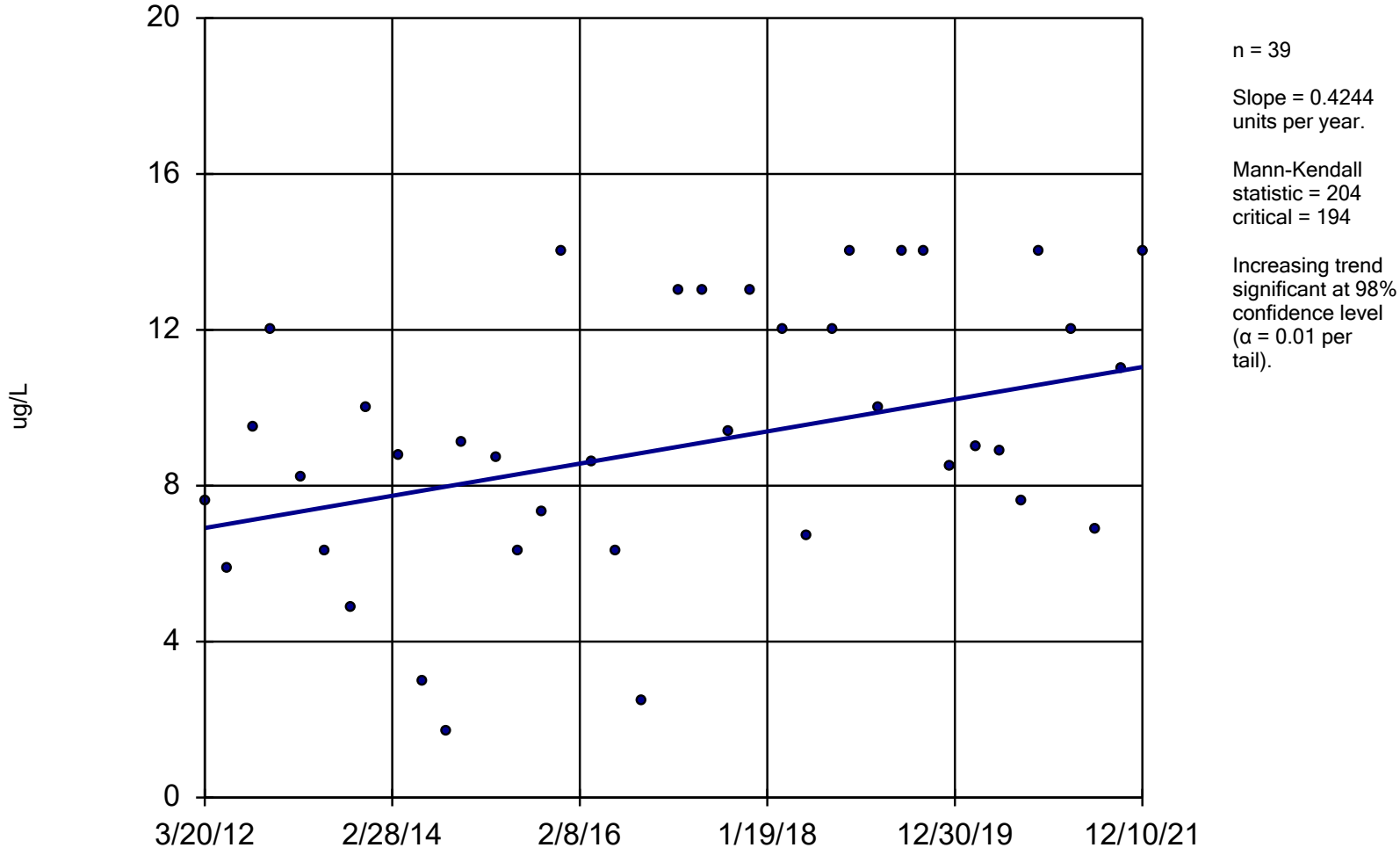
Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: cis-1,2-Dichloroethene Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#9



n = 39

Slope = 0.4244 units per year.

Mann-Kendall statistic = 204
critical = 194

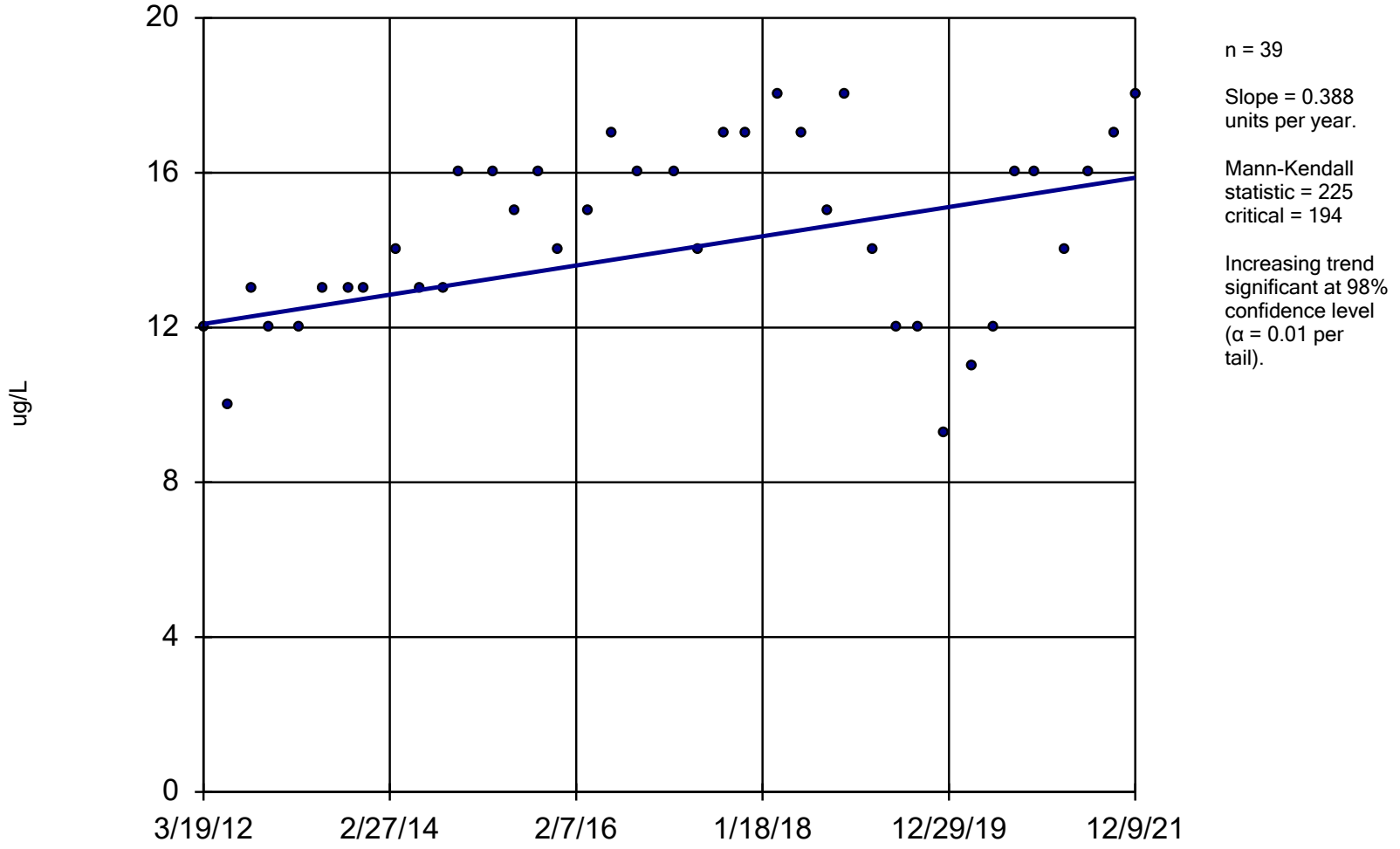
Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: cis-1,2-Dichloroethene Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#10



n = 39

Slope = 0.388 units per year.

Mann-Kendall statistic = 225
critical = 194

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

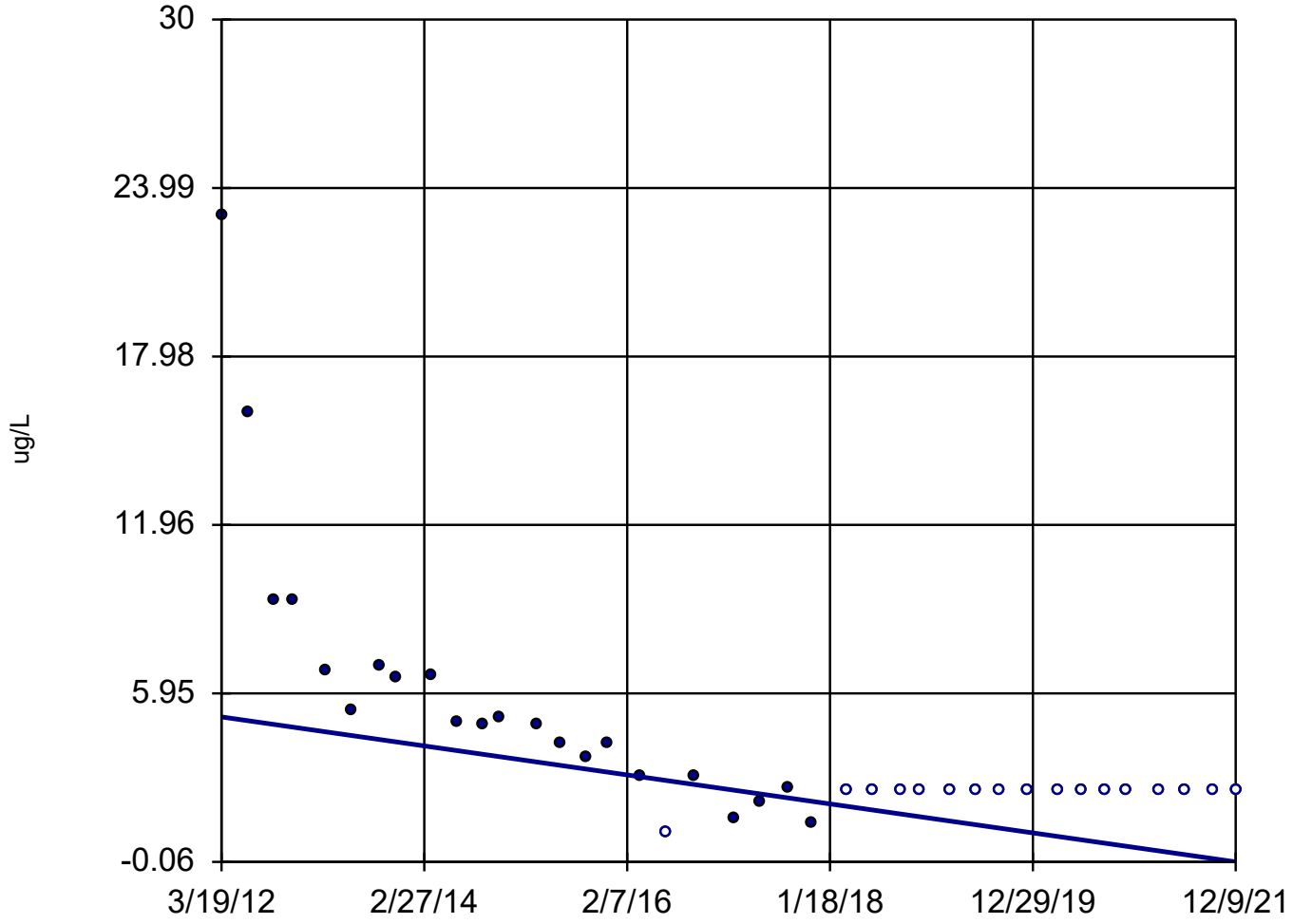
Constituent: cis-1,2-Dichloroethene Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Sen's Slope Estimator

MWell#10



n = 39

Slope = -0.5312 units per year.

Mann-Kendall statistic = -457
critical = -194

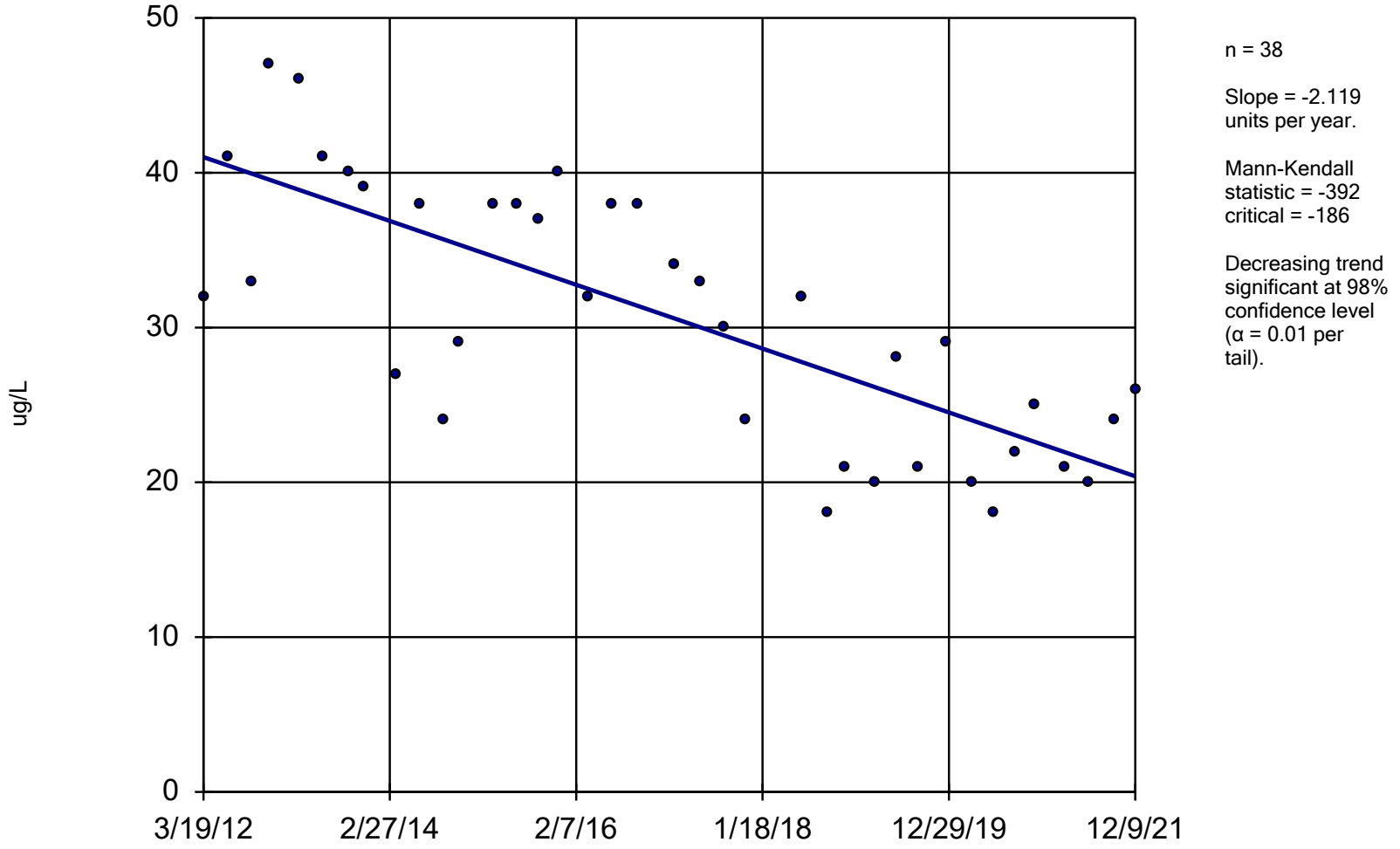
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Methylene Chloride Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#6



n = 38

Slope = -2.119 units per year.

Mann-Kendall statistic = -392
critical = -186

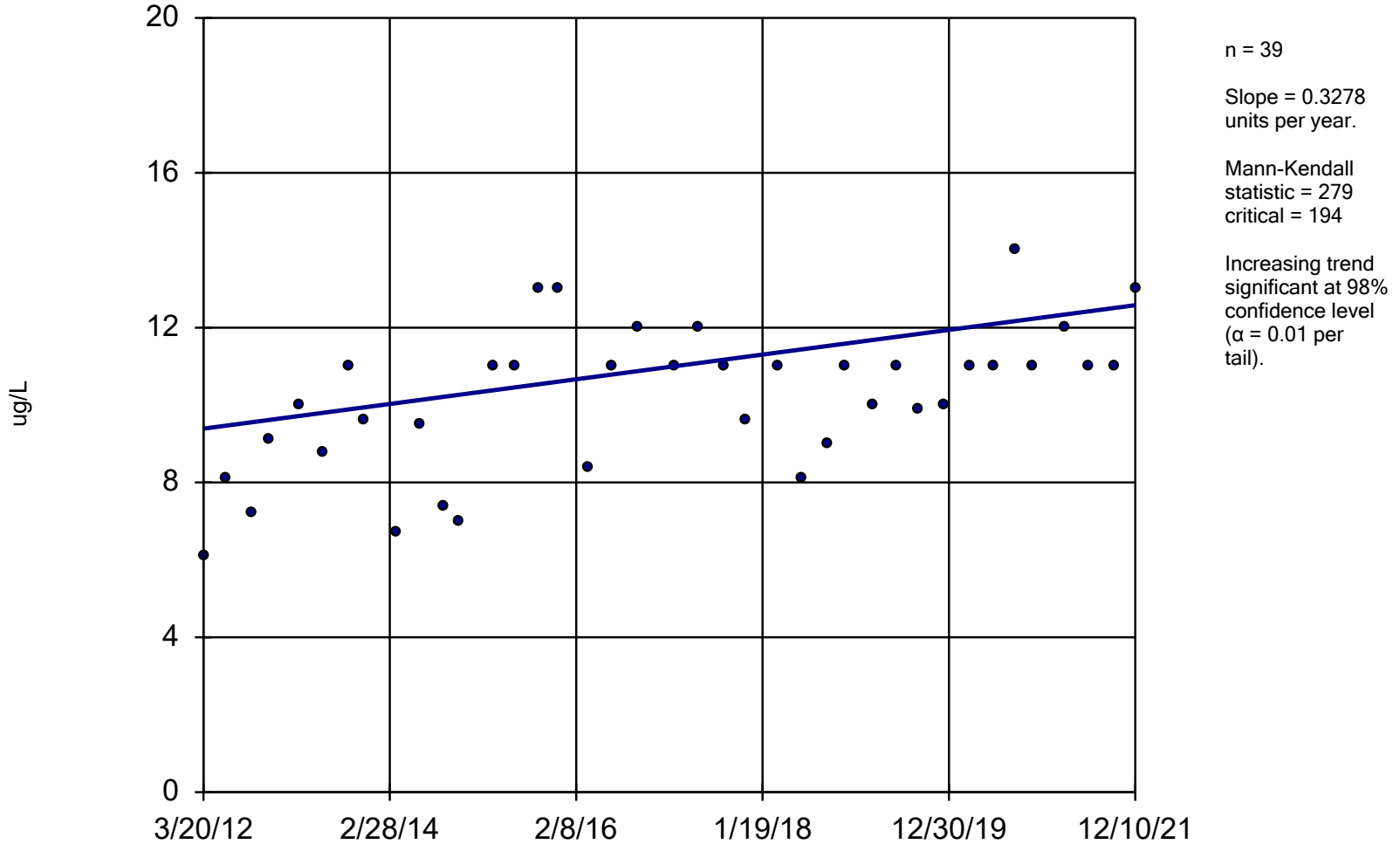
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Tetrachloroethene Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#9



n = 39

Slope = 0.3278 units per year.

Mann-Kendall statistic = 279
critical = 194

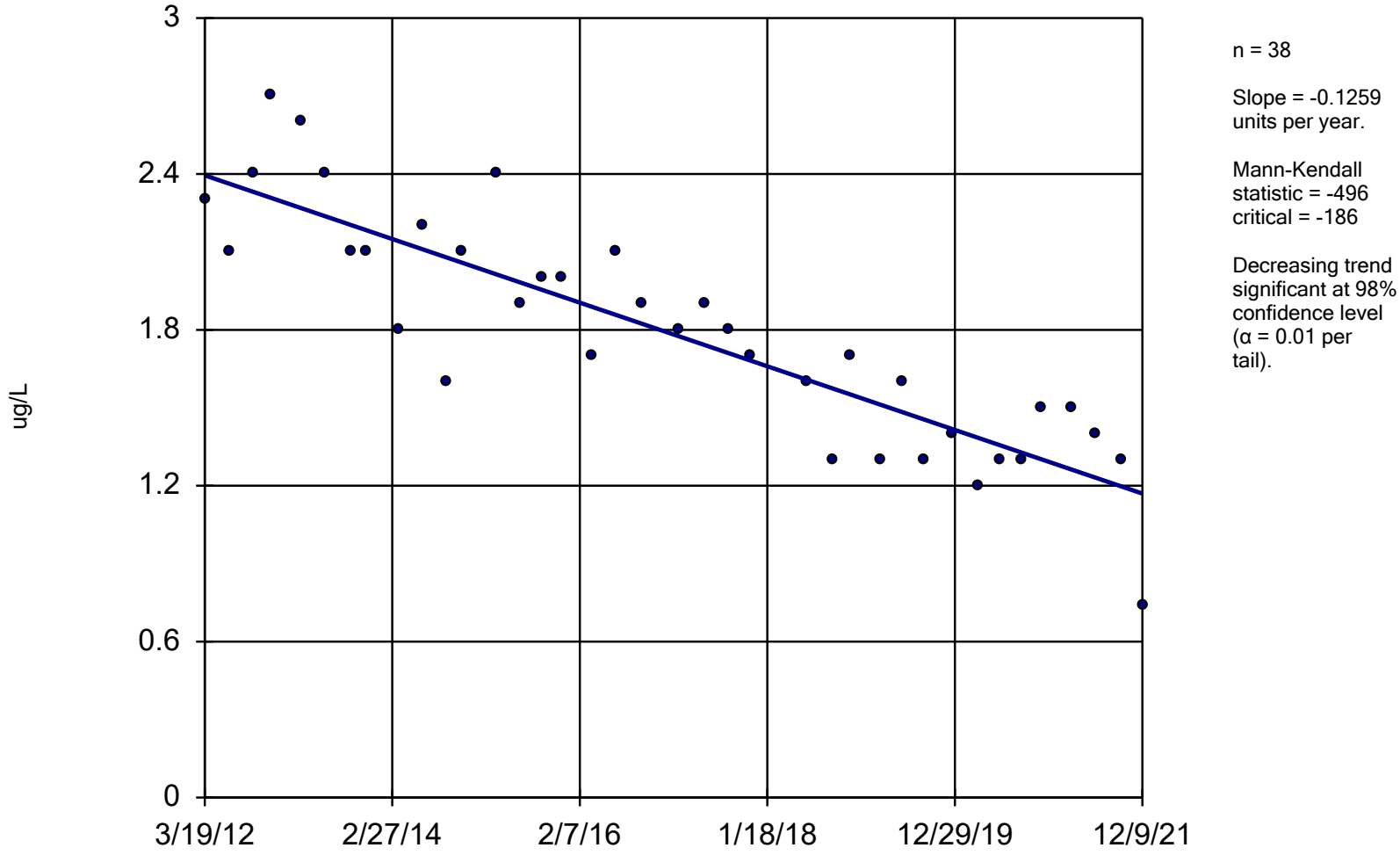
Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Tetrachloroethene Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#6



n = 38

Slope = -0.1259 units per year.

Mann-Kendall statistic = -496
critical = -186

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

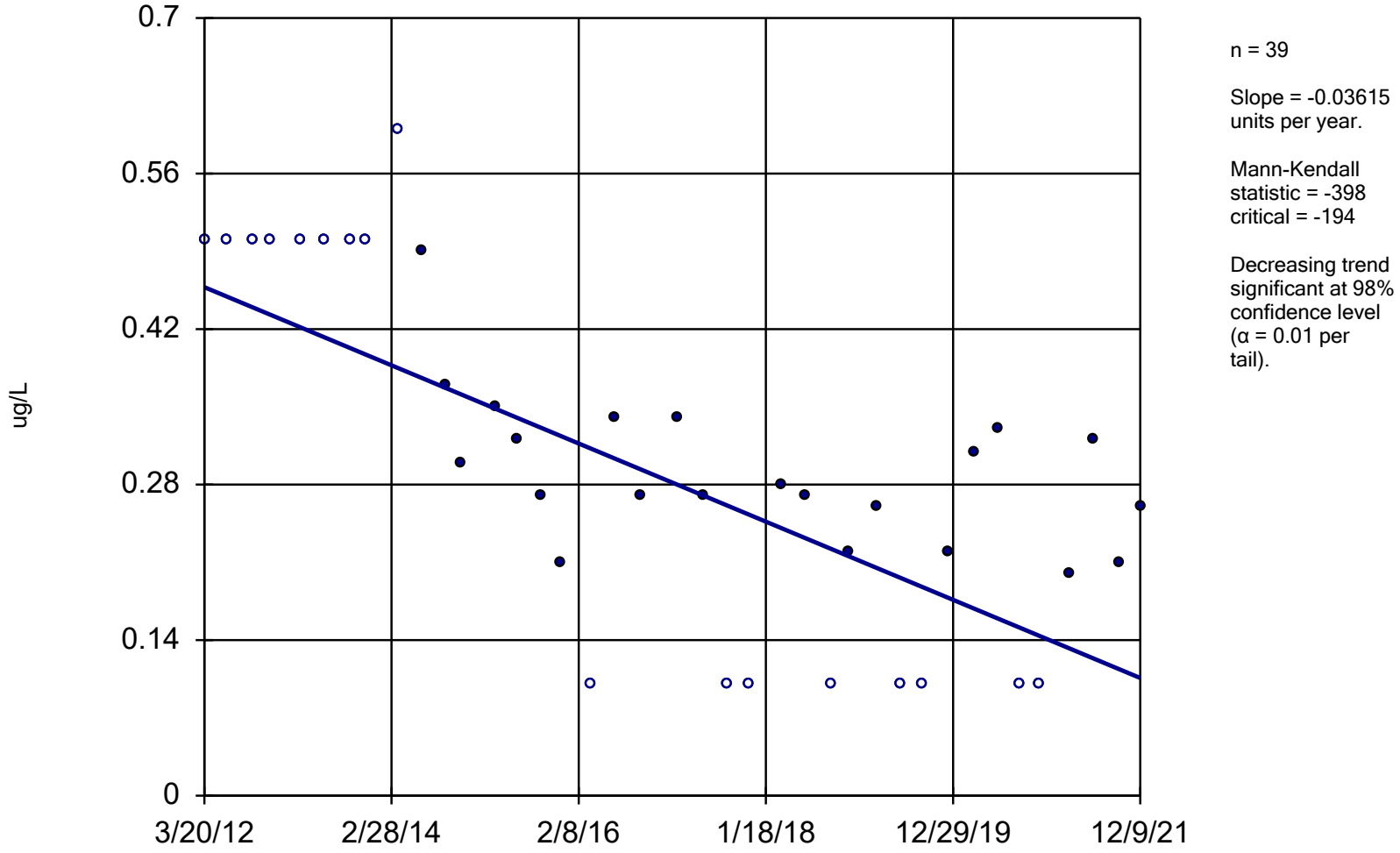
Constituent: trans-1,2-Dichloroethene Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Sen's Slope Estimator

MWell#1 (bg)



n = 39

Slope = -0.03615 units per year.

Mann-Kendall statistic = -398
critical = -194

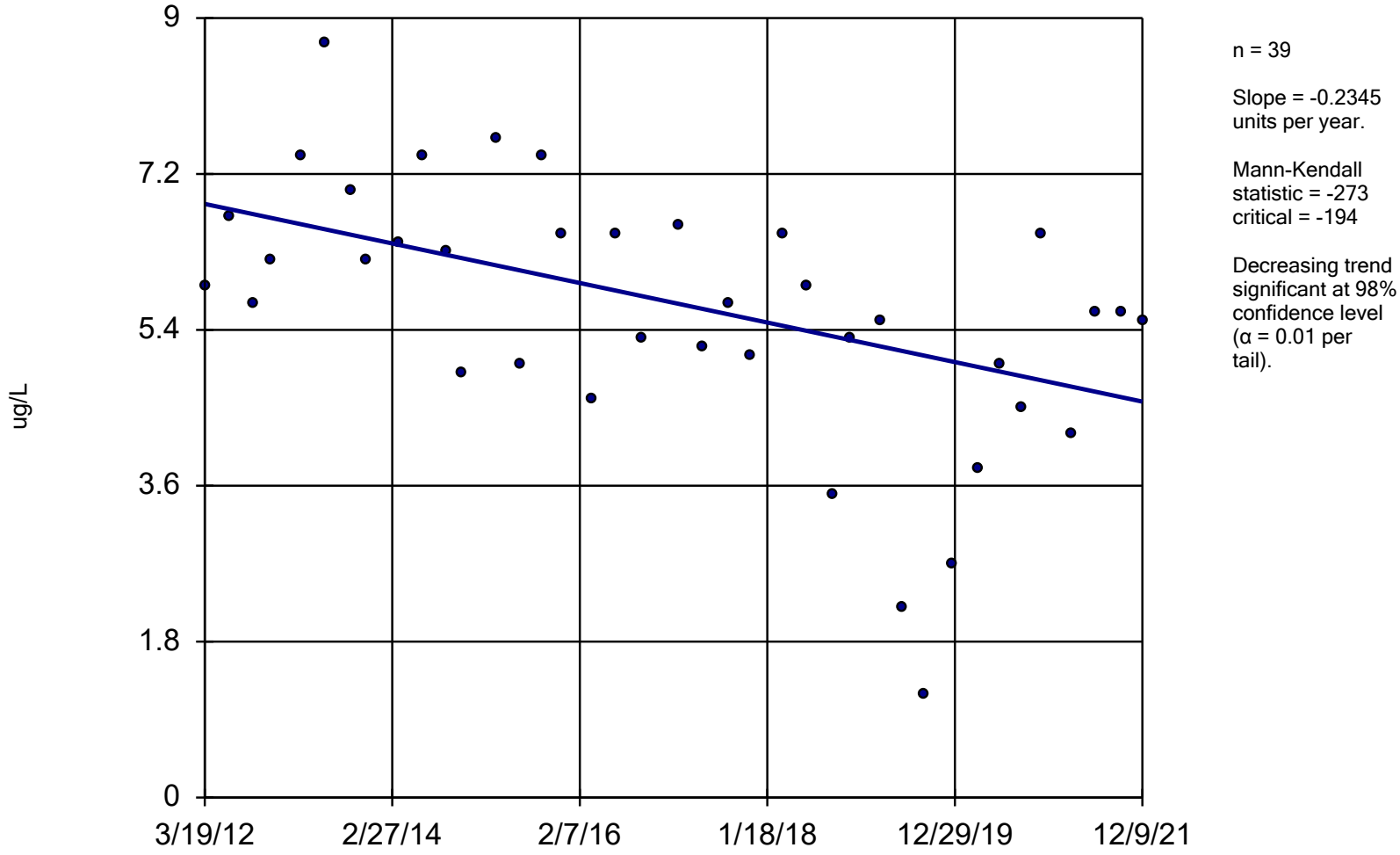
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Trichloroethene Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#5



n = 39

Slope = -0.2345 units per year.

Mann-Kendall statistic = -273
critical = -194

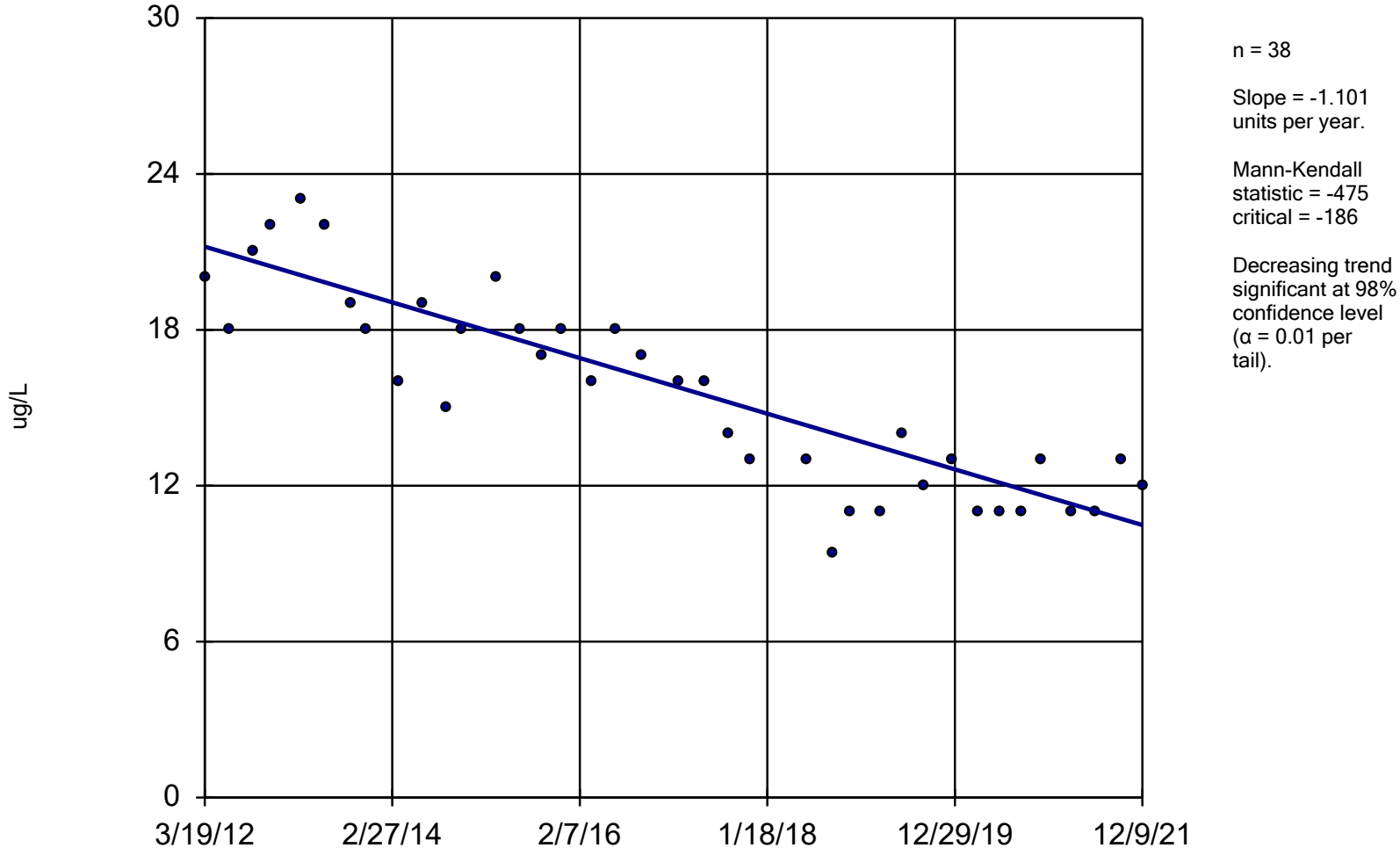
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Trichloroethene Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#6



n = 38

Slope = -1.101 units per year.

Mann-Kendall statistic = -475
critical = -186

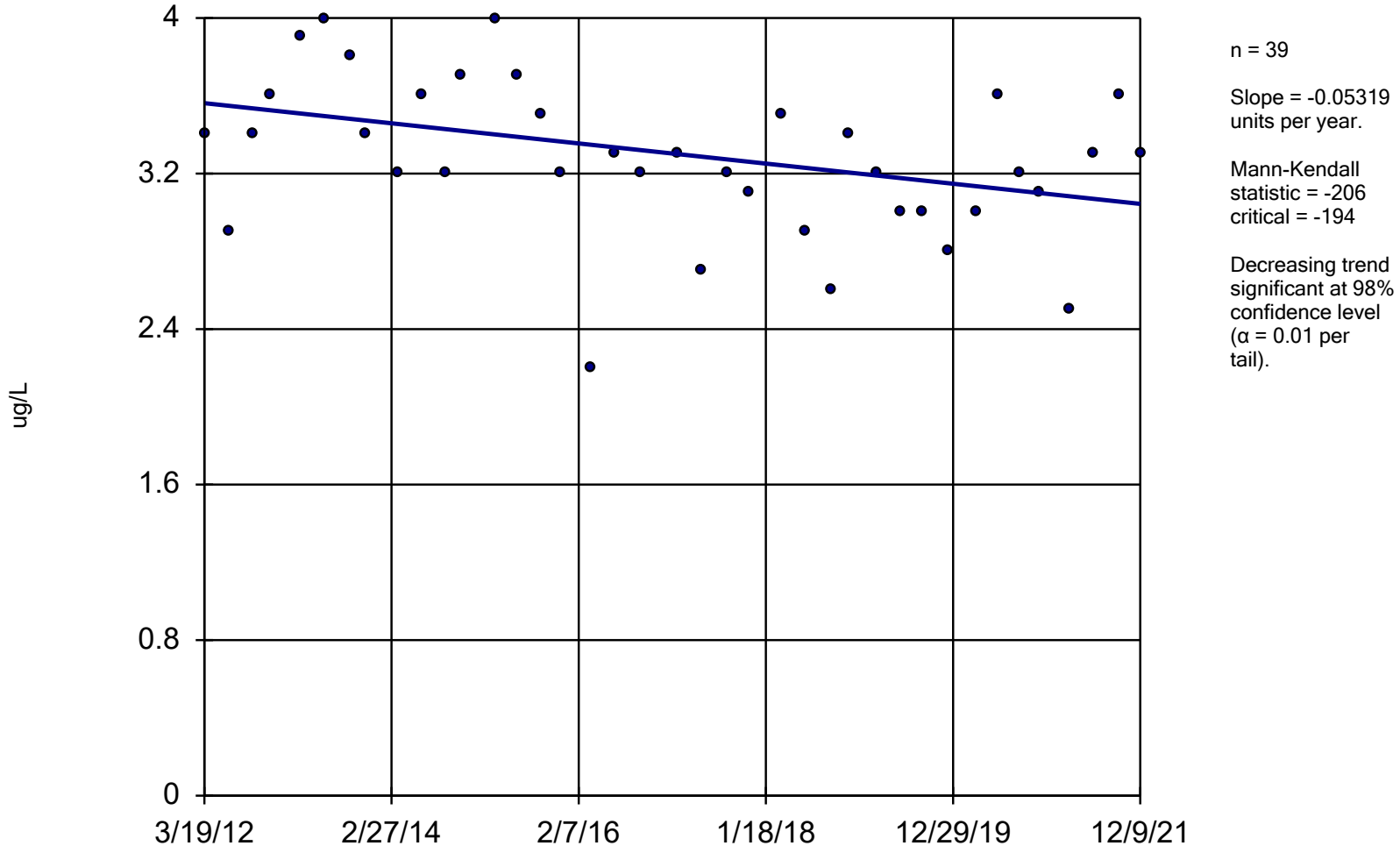
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Trichloroethene Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#10



n = 39

Slope = -0.05319 units per year.

Mann-Kendall statistic = -206
critical = -194

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

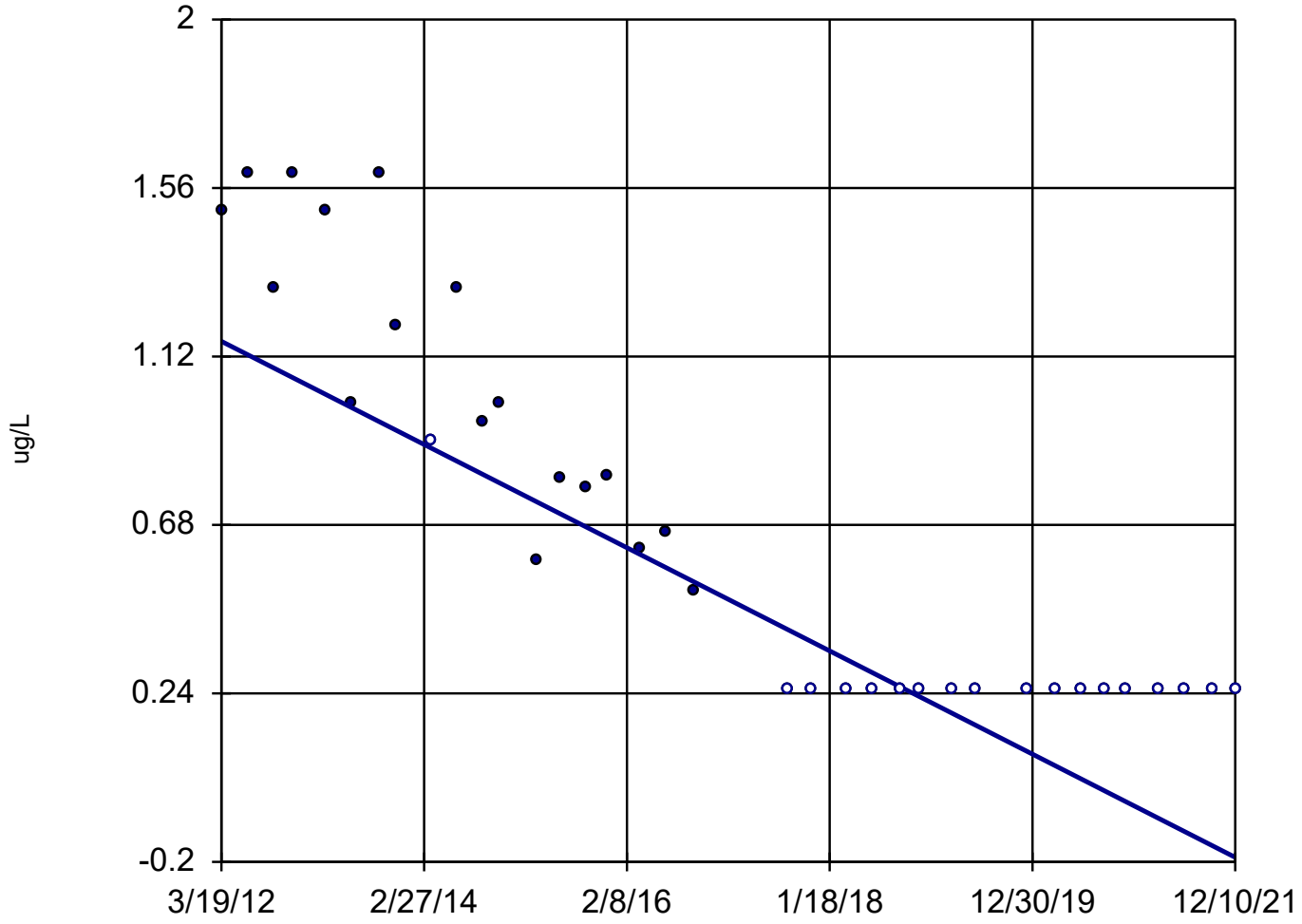
Constituent: Trichloroethene Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Sen's Slope Estimator

MWell#3



n = 36

Slope = -0.1385 units per year.

Mann-Kendall statistic = -442
critical = -171

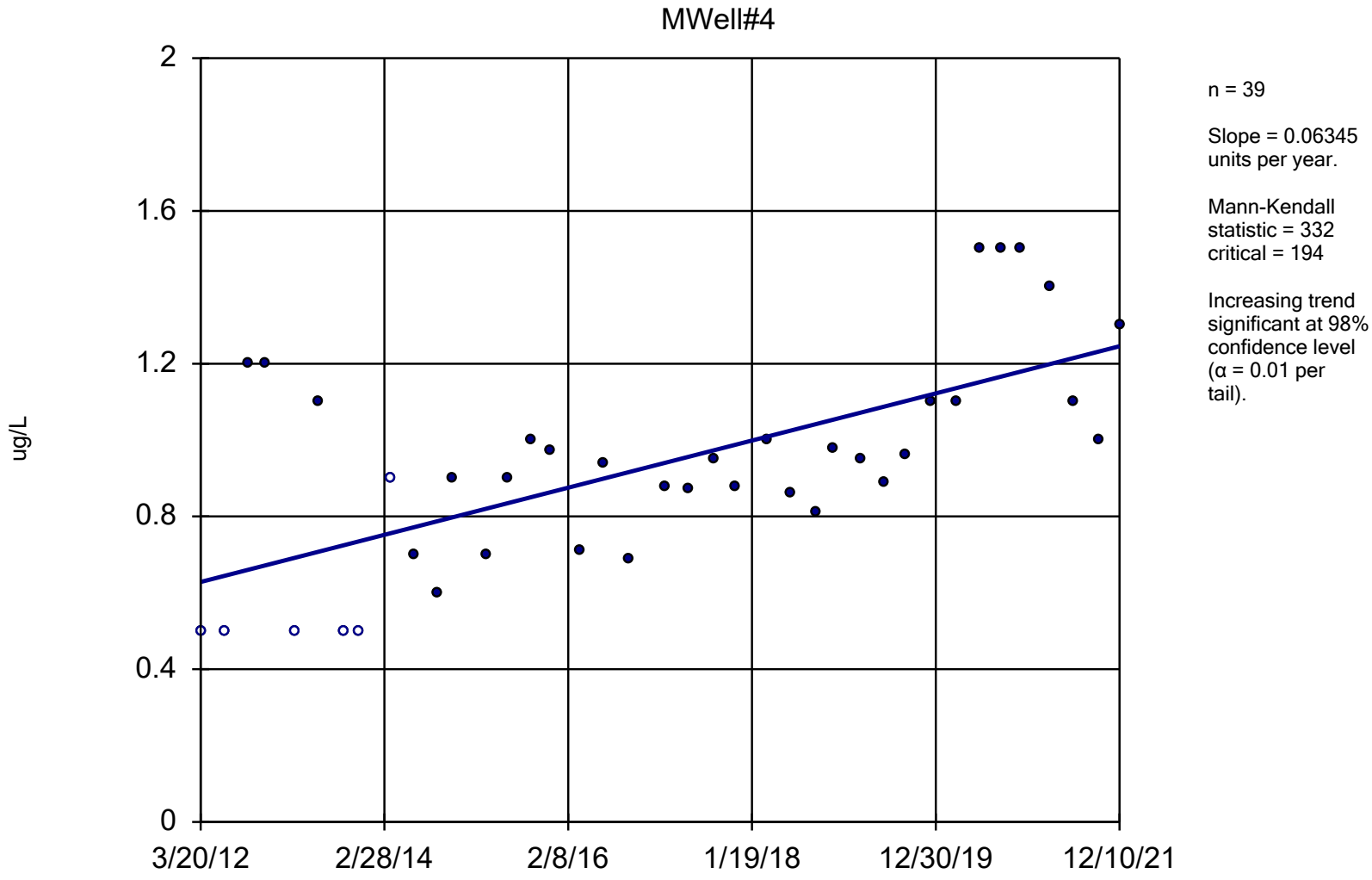
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Trichlorofluoromethane Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Sen's Slope Estimator



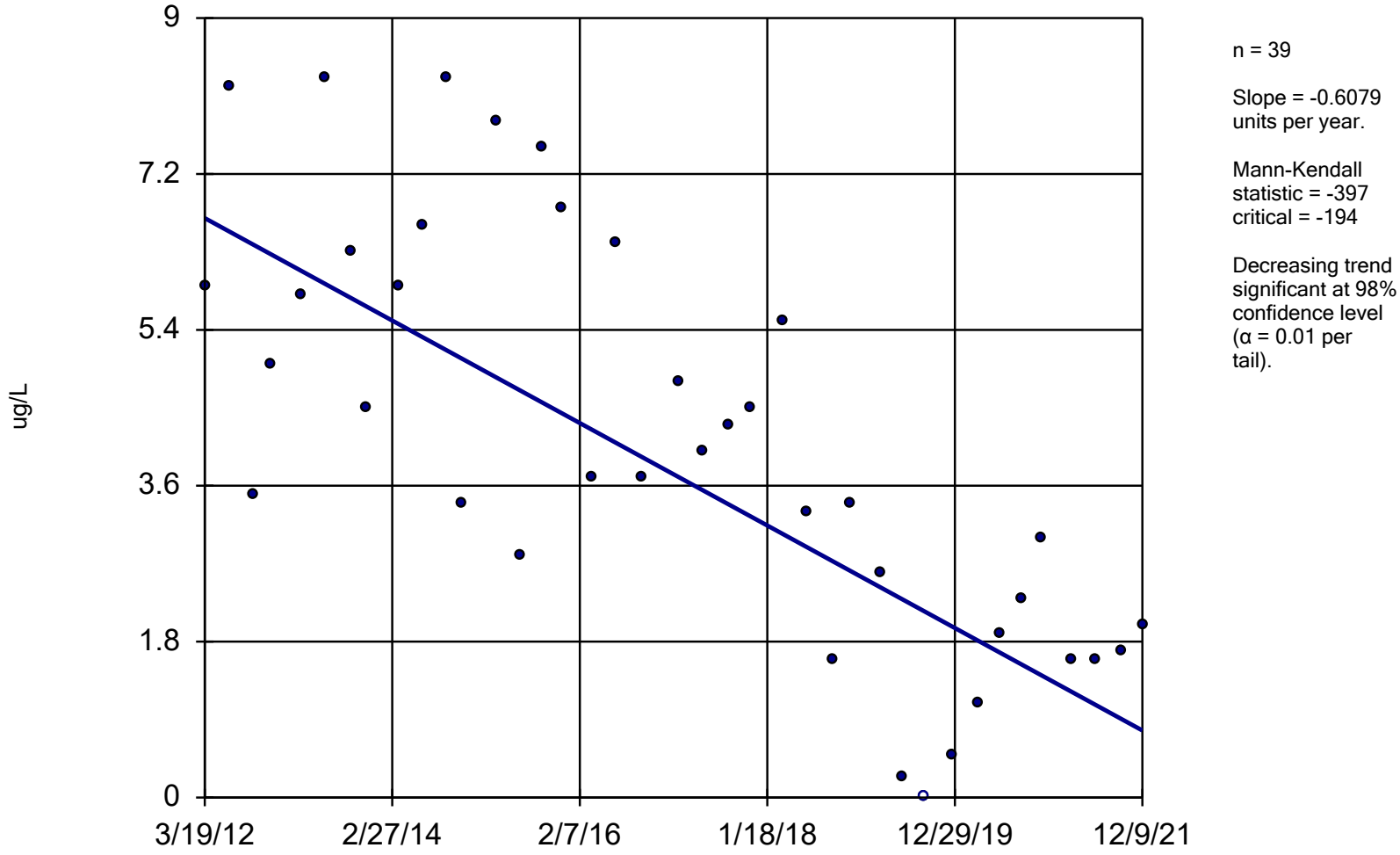
Constituent: Trichlorofluoromethane Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Sen's Slope Estimator

MWell#5



n = 39

Slope = -0.6079 units per year.

Mann-Kendall statistic = -397
critical = -194

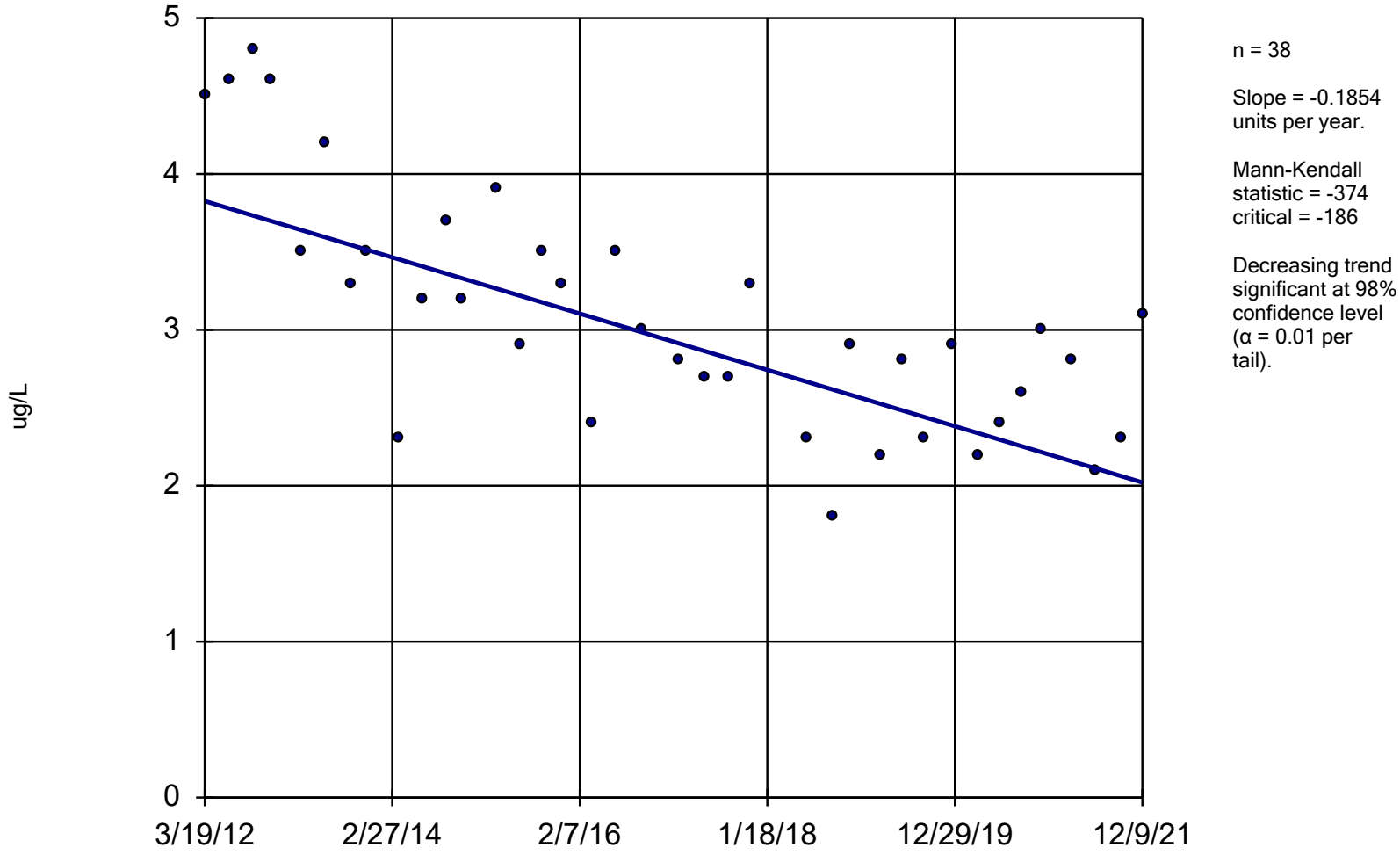
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Vinyl Chloride Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Sen's Slope Estimator

MWell#6



n = 38

Slope = -0.1854 units per year.

Mann-Kendall statistic = -374
critical = -186

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

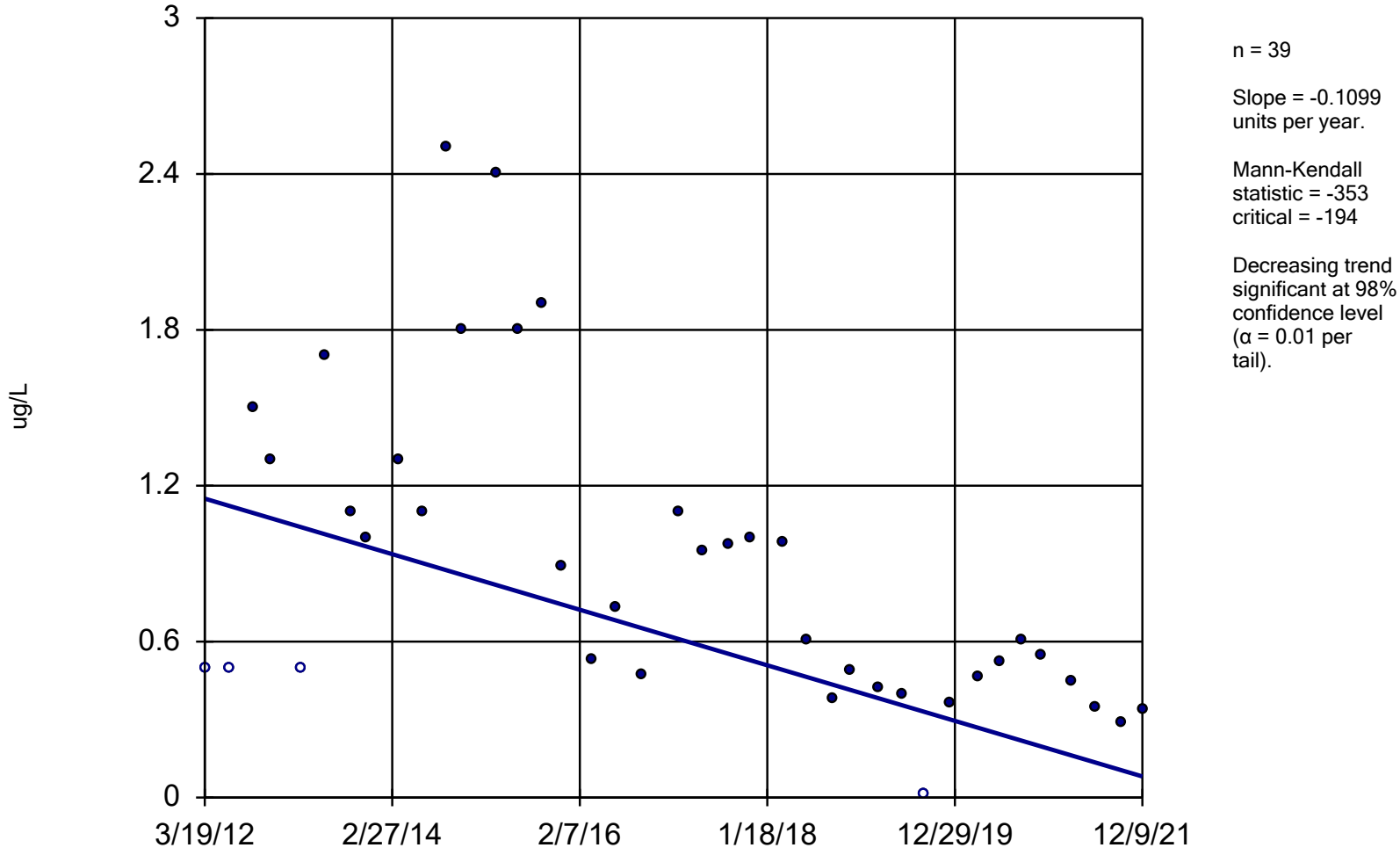
Constituent: Vinyl Chloride Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Hollow symbols indicate censored values.

Sen's Slope Estimator

MWell#10



n = 39

Slope = -0.1099 units per year.

Mann-Kendall statistic = -353
critical = -194

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Vinyl Chloride Analysis Run 1/14/2022 2:25 PM View: HRLF_SensSlope 10-year

Horn Rapids Landfill Client: City of Richland Data: HRLF_alldata

Appendix E

Background Statistical Summary

HORN RAPIDS LANDFILL - FOURTH QUARTER 2021
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]	119	0.485	0.26378496	0.5136	0.04709	1.058969072	0.5	100
1,1,1,2-Tetrachloroethane (ug/L)	MWell#11 (bg)	46	0.2524	0.03352561	0.1831	0.027	0.725435816	0.15	100
1,1,1-Trichloroethane (ug/L)	MWell#1 (bg)	119	0.4753	0.26915344	0.5188	0.04756	1.091521145	0.5	100
1,1,1-Trichloroethane (ug/L)	MWell#11 (bg)	46	0.2329	0.03697929	0.1923	0.02836	0.825676256	0.1	100
1,1,2,2-Tetrachloroethane (ug/L)	MWell#1 (bg)	119	0.4779	0.26873856	0.5184	0.04752	1.084745763	0.5	100
1,1,2,2-Tetrachloroethane (ug/L)	MWell#11 (bg)	46	0.2341	0.03740356	0.1934	0.02851	0.826142674	0.1	100
1,1,2-Trichloroethane (ug/L)	MWell#1 (bg)	119	0.481	0.27123264	0.5208	0.04775	1.082744283	0.5	100
1,1,2-Trichloroethane (ug/L)	MWell#11 (bg)	46	0.2312	0.03667225	0.1915	0.02823	0.828287197	0.1	100
1,1-Dichloroethane (ug/L)	MWell#1 (bg)	119	0.4983	0.26842761	0.5181	0.04749	1.039735099	0.5	95.8
1,1-Dichloroethane (ug/L)	MWell#11 (bg)	46	0.2424	0.043681	0.209	0.03081	0.862211221	0.1	100
1,1-Dichloroethene (ug/L)	MWell#1 (bg)	119	0.5883	0.61042969	0.7813	0.07162	1.328063913	0.5	100
1,1-Dichloroethene (ug/L)	MWell#11 (bg)	46	0.2229	0.04145296	0.2036	0.03002	0.913414087	0.1	100
1,2,3-Trichloropropane (ug/L)	MWell#1 (bg)	119	0.5166	0.439569	0.663	0.06077	1.283391405	0.5	100
1,2,3-Trichloropropane (ug/L)	MWell#11 (bg)	46	0.2365	0.03602404	0.1898	0.02798	0.802536998	0.1	100
1,2-Dibromo-3-chloropropane (ug/L)	MWell#1 (bg)	117	1.473	1.6384	1.28	0.1183	0.868974881	1	100
1,2-Dibromo-3-chloropropane (ug/L)	MWell#11 (bg)	46	0.9345	0.04669921	0.2161	0.03186	0.231246656	1	100
1,2-Dibromoethane (ug/L)	MWell#1 (bg)	118	0.5022	0.45535504	0.6748	0.06212	1.343687774	0.5	100
1,2-Dibromoethane (ug/L)	MWell#11 (bg)	46	0.199	0.04502884	0.2122	0.03129	1.066331658	0.05	100
1,2-Dichlorobenzene (ug/L)	MWell#1 (bg)	118	0.5832	0.60481729	0.7777	0.07159	1.333504801	0.5	99.15
1,2-Dichlorobenzene (ug/L)	MWell#11 (bg)	46	0.2783	0.038416	0.196	0.02889	0.704275961	0.15	100
1,2-Dichloroethane (ug/L)	MWell#1 (bg)	118	0.4958	0.27994681	0.5291	0.04871	1.067164179	0.5	100
1,2-Dichloroethane (ug/L)	MWell#11 (bg)	46	0.237	0.038809	0.197	0.02905	0.831223629	0.1	100
1,2-Dichloropropane (ug/L)	MWell#1 (bg)	115	0.521	0.30008484	0.5478	0.05108	1.051439539	0.5	100
1,2-Dichloropropane (ug/L)	MWell#11 (bg)	46	0.235	0.03775249	0.1943	0.02865	0.826808511	0.1	100
1,4-Dichlorobenzene (ug/L)	MWell#1 (bg)	118	0.5831	0.60466176	0.7776	0.07158	1.333561996	0.5	99.15
1,4-Dichlorobenzene (ug/L)	MWell#11 (bg)	46	0.2793	0.03996001	0.1999	0.02947	0.715717866	0.15	100
2-Butanone (ug/L)	MWell#1 (bg)	113	4.982	24.631369	4.963	0.4669	0.996186271	5	98.23
2-Butanone (ug/L)	MWell#11 (bg)	46	5.272	2.719201	1.649	0.2431	0.312784522	5	100
2-Hexanone (ug/L)	MWell#1 (bg)	113	2.592	6.702921	2.589	0.2436	0.998842593	2.5	99.12
2-Hexanone (ug/L)	MWell#11 (bg)	46	1.647	0.44049769	0.6637	0.09786	0.402975106	1.5	100
4-Methyl-2-pentanone (ug/L)	MWell#1 (bg)	112	2.599	2.396304	1.548	0.1462	0.595613698	2.5	100
4-Methyl-2-pentanone (ug/L)	MWell#11 (bg)	46	2.777	1.375929	1.173	0.1729	0.422398272	2.5	100

[1] All statistics based on Non-Detects = 1/2 MDL [2] (bg) indicates a background well.

HORN RAPIDS LANDFILL - FOURTH QUARTER 2021
Summary of Descriptive Statistics

Constituent Name	Well	N	Mean[1]	Variance	Standard Deviation	Standard Error	Coeffient of Variation	Median	% Non-Detects
Acetone (ug/L)	MWell#1 (bg)	115	11.72	5267.8564	72.58	6.769	6.192832765	3	94.78
Acetone (ug/L)	MWell#11 (bg)	46	3.307	3.154176	1.776	0.2618	0.537042637	3	100
Acrylonitrile (ug/L)	MWell#1 (bg)	113	2.785	5.410276	2.326	0.2188	0.83518851	2.5	100
Acrylonitrile (ug/L)	MWell#11 (bg)	46	3.317	1.787569	1.337	0.1971	0.403075068	2.5	100
Alkalinity (mg/L)	MWell#1 (bg)	109	286.2	5444.9641	73.79	7.067	0.257826695	300	0
Alkalinity (mg/L)	MWell#11 (bg)	46	181.5	293.0944	17.12	2.525	0.094325069	180	0
Ammonia Nitrogen (mg/L)	MWell#1 (bg)	118	0.08608	0.01194649	0.1093	0.01006	1.269749071	0.05	77.97
Ammonia Nitrogen (mg/L)	MWell#11 (bg)	46	0.1732	0.05494336	0.2344	0.03456	1.35334873	0.1	93.48
Antimony, Dissolved (mg/L)	MWell#1 (bg)	84	0.008953	0.000357966	0.01892	0.002064	2.113258126	0.0005	95.24
Antimony, Dissolved (mg/L)	MWell#11 (bg)	21	0.0002	0	0	0	0	0.0002	100
Antimony, Total (mg/L)	MWell#1 (bg)	34	0.0002471	7.41493E-09	0.00008611	0.00001477	0.348482396	0.0002	100
Antimony, Total (mg/L)	MWell#11 (bg)	34	0.0002471	7.41493E-09	0.00008611	0.00001477	0.348482396	0.0002	100
Arsenic, Dissolved (mg/L)	MWell#1 (bg)	85	0.00717	3.72344E-05	0.006102	0.0006619	0.851046025	0.005	15.29
Arsenic, Dissolved (mg/L)	MWell#11 (bg)	21	0.004729	7.58118E-07	0.0008707	0.00019	0.184119264	0.0049	0
Arsenic, Total (mg/L)	MWell#1 (bg)	34	0.004303	2.22124E-07	0.0004713	0.00008083	0.109528236	0.0042	0
Arsenic, Total (mg/L)	MWell#11 (bg)	34	0.005029	1.98246E-06	0.001408	0.0002415	0.279976138	0.0047	0
Barium, Dissolved (mg/L)	MWell#1 (bg)	85	0.04488	0.00032364	0.01799	0.001951	0.400846702	0.05	9.412
Barium, Dissolved (mg/L)	MWell#11 (bg)	21	0.08352	0.000259854	0.01612	0.003518	0.193007663	0.08	0
Barium, Total (mg/L)	MWell#1 (bg)	34	0.05703	7.5603E-05	0.008695	0.001491	0.152463616	0.058	0
Barium, Total (mg/L)	MWell#11 (bg)	34	0.1056	0.00016129	0.0127	0.002178	0.120265152	0.105	0
Benzene (ug/L)	MWell#1 (bg)	119	0.4937	0.27815076	0.5274	0.04834	1.068260077	0.5	100
Benzene (ug/L)	MWell#11 (bg)	46	0.237	0.038809	0.197	0.02905	0.831223629	0.1	100
Beryllium, Dissolved (mg/L)	MWell#1 (bg)	85	0.0006315	3.92878E-07	0.0006268	0.00006799	0.992557403	0.0005	100
Beryllium, Dissolved (mg/L)	MWell#11 (bg)	21	0.0002	0	0	0	0	0.0002	100
Beryllium, Total (mg/L)	MWell#1 (bg)	34	0.0002	0	0	0	0	0.0002	100
Beryllium, Total (mg/L)	MWell#11 (bg)	34	0.0002	0	0	0	0	0.0002	100
Bicarbonate (mg/L)	MWell#1 (bg)	109	296	4569.76	67.6	6.475	0.228378378	310	0
Bicarbonate (mg/L)	MWell#11 (bg)	46	181.5	293.0944	17.12	2.525	0.094325069	180	0
Bromochloromethane (ug/L)	MWell#1 (bg)	118	0.4809	0.27050401	0.5201	0.04788	1.081513828	0.5	99.15
Bromochloromethane (ug/L)	MWell#11 (bg)	46	0.237	0.038809	0.197	0.02905	0.831223629	0.1	100
Bromodichloromethane (ug/L)	MWell#1 (bg)	119	0.4782	0.26863489	0.5183	0.04752	1.083856127	0.5	100
Bromodichloromethane (ug/L)	MWell#11 (bg)	46	0.2348	0.037636	0.194	0.02861	0.826235094	0.1	100

[1] All statistics based on Non-Detects = 1/2 MDL [2] (bg) indicates a background well.

HORN RAPIDS LANDFILL - FOURTH QUARTER 2021
Summary of Descriptive Statistics

Constituent Name	Well	N	Mean[1]	Variance	Standard Deviation	Standard Error	Coeffient of Variation	Median	% Non-Detects
Bromoform (ug/L)	MWell#1 (bg)	119	0.5151	0.24730729	0.4973	0.04559	0.965443603	0.5	100
Bromoform (ug/L)	MWell#11 (bg)	46	0.3304	0.02362369	0.1537	0.02265	0.465193705	0.25	100
Bromomethane (ug/L)	MWell#1 (bg)	117	1.092	1.565001	1.251	0.1157	1.145604396	0.5	99.15
Bromomethane (ug/L)	MWell#11 (bg)	46	1.039	1.073296	1.036	0.1527	0.997112608	0.5	100
Cadmium, Dissolved (mg/L)	MWell#1 (bg)	85	0.001073	1.49084E-06	0.001221	0.0001324	1.137931034	0.0005	98.82
Cadmium, Dissolved (mg/L)	MWell#11 (bg)	21	0.0002	0	0	0	0	0.0002	100
Cadmium, Total (mg/L)	MWell#1 (bg)	34	0.0002235	4.27847E-09	0.00006541	0.00001122	0.292662192	0.0002	100
Cadmium, Total (mg/L)	MWell#11 (bg)	34	0.0002235	4.27847E-09	0.00006541	0.00001122	0.292662192	0.0002	100
Calcium, Dissolved (mg/L)	MWell#1 (bg)	108	101.1	1036.1961	32.19	3.098	0.318397626	110	0
Calcium, Dissolved (mg/L)	MWell#11 (bg)	46	208.4	4228.9009	65.03	9.588	0.312044146	240	0
Calcium, Total (mg/L)	MWell#1 (bg)	8	118.3	430.1476	20.74	7.333	0.175316991	120	0
Calcium, Total (mg/L)	MWell#11 (bg)	8	182.5	1164.1744	34.12	12.06	0.186958904	200	0
Carbon Disulfide (ug/L)	MWell#1 (bg)	113	2.105	45.050944	6.712	0.6314	3.188598575	0.5	98.23
Carbon Disulfide (ug/L)	MWell#11 (bg)	46	0.2554	0.03523129	0.1877	0.02768	0.734925607	0.15	100
Carbon Tetrachloride (ug/L)	MWell#1 (bg)	118	0.503	0.28494244	0.5338	0.04914	1.061232604	0.5	100
Carbon Tetrachloride (ug/L)	MWell#11 (bg)	46	0.2391	0.04044121	0.2011	0.02965	0.841070682	0.1	100
Carbonate (mg/L)	MWell#1 (bg)	56	2.634	0.322624	0.568	0.0759	0.21564161	2.5	100
Carbonate (mg/L)	MWell#11 (bg)	45	2.5	0	0	0	0	2.5	100
Chloride (mg/L)	MWell#1 (bg)	120	20.1	114.9184	10.72	0.9783	0.533333333	22	0
Chloride (mg/L)	MWell#11 (bg)	46	154.6	6477.0304	80.48	11.87	0.520569211	195	0
Chlorobenzene (ug/L)	MWell#1 (bg)	119	0.4786	0.26863489	0.5183	0.04752	1.082950272	0.5	100
Chlorobenzene (ug/L)	MWell#11 (bg)	46	0.2359	0.03818116	0.1954	0.02881	0.828317084	0.1	100
Chloroethane (ug/L)	MWell#1 (bg)	119	0.9695	1.498176	1.224	0.1122	1.262506447	0.5	100
Chloroethane (ug/L)	MWell#11 (bg)	46	0.9842	1.140624	1.068	0.1575	1.085145296	0.25	100
Chloroform (ug/L)	MWell#1 (bg)	119	0.5082	0.3364	0.58	0.05317	1.141282959	0.5	94.12
Chloroform (ug/L)	MWell#11 (bg)	46	0.2728	0.11383876	0.3374	0.04975	1.236803519	0.1	97.83
Chloromethane (ug/L)	MWell#1 (bg)	117	1.067	1.643524	1.282	0.1185	1.201499531	0.5	99.15
Chloromethane (ug/L)	MWell#11 (bg)	46	0.9576	1.185921	1.089	0.1606	1.137218045	0.25	100
Chromium, Dissolved (mg/L)	MWell#1 (bg)	85	0.004736	4.72794E-05	0.006876	0.0007458	1.451858108	0.0029	30.59
Chromium, Dissolved (mg/L)	MWell#11 (bg)	21	0.004514	2.2801E-06	0.00151	0.0003295	0.334514843	0.0042	0
Chromium, Total (mg/L)	MWell#1 (bg)	34	0.003471	7.91922E-07	0.0008899	0.0001526	0.256381446	0.0032	0
Chromium, Total (mg/L)	MWell#11 (bg)	34	0.0096	0.000144721	0.01203	0.002062	1.253125	0.0044	0

[1] All statistics based on Non-Detects = 1/2 MDL [2] (bg) indicates a background well.

HORN RAPIDS LANDFILL - FOURTH QUARTER 2021
Summary of Descriptive Statistics

Constituent Name	Well	N	Mean[1]	Variance	Standard Deviation	Standard Error	Coeffient of Variation	Median	% Non-Detects
cis-1,2-Dichloroethene (ug/L)	MWell#1 (bg)	119	0.5252	0.52490025	0.7245	0.06641	1.379474486	0.5	99.16
cis-1,2-Dichloroethene (ug/L)	MWell#11 (bg)	46	0.237	0.038809	0.197	0.02905	0.831223629	0.1	100
cis-1,3-Dichloropropene (ug/L)	MWell#1 (bg)	117	0.4736	0.22963264	0.4792	0.0443	1.011824324	0.5	100
cis-1,3-Dichloropropene (ug/L)	MWell#11 (bg)	46	0.2676	0.03125824	0.1768	0.02607	0.660687593	0.25	100
Cobalt, Dissolved (mg/L)	MWell#1 (bg)	85	0.006439	5.32754E-05	0.007299	0.0007917	1.133561112	0.005	55.29
Cobalt, Dissolved (mg/L)	MWell#11 (bg)	21	0.0002833	2.11121E-08	0.0001453	0.00003172	0.512883869	0.0002	71.43
Cobalt, Total (mg/L)	MWell#1 (bg)	34	0.02364	0.00012056	0.01098	0.001883	0.464467005	0.022	0
Cobalt, Total (mg/L)	MWell#11 (bg)	34	0.0009412	5.5696E-06	0.00236	0.0004048	2.507437314	0.00044	47.06
Conductivity (umhos/cm)	MWell#1 (bg)	105	703.2	44732.25	211.5	20.64	0.300767918	742	0
Conductivity (umhos/cm)	MWell#11 (bg)	42	1366	157609	397	61.26	0.290629575	1426	0
Copper, Dissolved (mg/L)	MWell#1 (bg)	85	0.003993	4.10368E-05	0.006406	0.0006948	1.604307538	0.0014	68.24
Copper, Dissolved (mg/L)	MWell#11 (bg)	21	0.003633	1.18405E-05	0.003441	0.000751	0.947151115	0.0024	14.29
Copper, Total (mg/L)	MWell#1 (bg)	34	0.001241	8.71049E-07	0.0009333	0.0001601	0.752054795	0.001	76.47
Copper, Total (mg/L)	MWell#11 (bg)	34	0.002479	4.47746E-06	0.002116	0.0003629	0.853569988	0.001	50
Dibromochloromethane (ug/L)	MWell#1 (bg)	118	0.4805	0.27154521	0.5211	0.04797	1.084495317	0.5	100
Dibromochloromethane (ug/L)	MWell#11 (bg)	46	0.2413	0.04247721	0.2061	0.03039	0.854123498	0.1	100
Dibromomethane (ug/L)	MWell#1 (bg)	115	0.4992	0.286225	0.535	0.04989	1.071714744	0.5	100
Dibromomethane (ug/L)	MWell#11 (bg)	46	0.235	0.03775249	0.1943	0.02865	0.826808511	0.1	100
Dissolved Oxygen (mg/L)	MWell#1 (bg)	50	5.508	0.33051001	0.5749	0.0813	0.104375454	5.55	0
Dissolved Oxygen (mg/L)	MWell#11 (bg)	45	7.94	1.871424	1.368	0.2039	0.172292191	8.12	0
Ethane (ug/L)	MWell#1 (bg)	51	4	4.2849	2.07	0.2899	0.5175	5	100
Ethane (ug/L)	MWell#11 (bg)	46	3.664	3.709476	1.926	0.284	0.525655022	5	100
Ethene (ug/L)	MWell#1 (bg)	51	3.971	4.092529	2.023	0.2833	0.509443465	5	100
Ethene (ug/L)	MWell#11 (bg)	46	3.652	3.786916	1.946	0.2869	0.532858708	5	100
Ethylbenzene (ug/L)	MWell#1 (bg)	118	0.4796	0.27071209	0.5203	0.0479	1.084862385	0.5	100
Ethylbenzene (ug/L)	MWell#11 (bg)	46	0.2347	0.03759721	0.1939	0.02859	0.826161057	0.1	100
Iodomethane (ug/L)	MWell#1 (bg)	111	1.49	1.630729	1.277	0.1212	0.85704698	1	100
Iodomethane (ug/L)	MWell#11 (bg)	46	0.9913	1.127844	1.062	0.1566	1.071320488	0.25	100
Iron, Dissolved (mg/L)	MWell#1 (bg)	120	0.1444	0.02152089	0.1467	0.01339	1.015927978	0.1	70.83
Iron, Dissolved (mg/L)	MWell#11 (bg)	46	0.202	0.00817216	0.0904	0.01333	0.447524752	0.25	86.96
Iron, Total (mg/L)	MWell#1 (bg)	8	0.25	0	0	0	0	0.25	100
Iron, Total (mg/L)	MWell#11 (bg)	8	0.3813	0.13778944	0.3712	0.1313	0.973511671	0.25	87.5

[1] All statistics based on Non-Detects = 1/2 MDL [2] (bg) indicates a background well.

HORN RAPIDS LANDFILL - FOURTH QUARTER 2021
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#1 (bg)	84	0.003381	5.8967E-05	0.007679	0.0008378	2.271221532	0.0005	90.48
Lead, Dissolved (mg/L)	MWell#11 (bg)	21	0.0002	0	0	0	0	0.0002	100
Lead, Total (mg/L)	MWell#1 (bg)	34	0.0003215	1.9572E-08	0.0001399	0.00002399	0.435147745	0.0004	91.18
Lead, Total (mg/L)	MWell#11 (bg)	34	0.0003156	2.50906E-08	0.0001584	0.00002717	0.501901141	0.0002	94.12
Magnesium, Dissolved (mg/L)	MWell#1 (bg)	108	20.28	38.1924	6.18	0.5947	0.304733728	22	0
Magnesium, Dissolved (mg/L)	MWell#11 (bg)	46	41.57	180.0964	13.42	1.979	0.322828963	48.5	0
Magnesium, Total (mg/L)	MWell#1 (bg)	8	24	16	4	1.414	0.166666667	24	0
Magnesium, Total (mg/L)	MWell#11 (bg)	8	37.5	47.997184	6.928	2.449	0.184746667	40.5	0
Manganese, Dissolved (mg/L)	MWell#1 (bg)	120	0.01078	0.000337457	0.01837	0.001677	1.704081633	0.01	79.17
Manganese, Dissolved (mg/L)	MWell#11 (bg)	46	0.01767	0.001800305	0.04243	0.006256	2.401245048	0.01	95.65
Manganese, Total (mg/L)	MWell#1 (bg)	8	0.01	0	0	0	0	0.01	100
Manganese, Total (mg/L)	MWell#11 (bg)	8	0.01262	5.51306E-05	0.007425	0.002625	0.588351823	0.01	87.5
Methane (ug/L)	MWell#1 (bg)	51	1.047	2.930944	1.712	0.2397	1.635148042	0.6	96.08
Methane (ug/L)	MWell#11 (bg)	46	2.1	55.487601	7.449	1.098	3.547142857	0.6	89.13
Methylene Chloride (ug/L)	MWell#1 (bg)	119	1.301	1.270129	1.127	0.1033	0.866256726	1	98.32
Methylene Chloride (ug/L)	MWell#11 (bg)	46	1.43	0.86974276	0.9326	0.1375	0.652167832	1.5	100
Nickel, Dissolved (mg/L)	MWell#1 (bg)	85	0.006874	0.000119246	0.01092	0.001184	1.588594705	0.0018	69.41
Nickel, Dissolved (mg/L)	MWell#11 (bg)	21	0.005238	6.38068E-06	0.002526	0.0005513	0.482245132	0.0052	14.29
Nickel, Total (mg/L)	MWell#1 (bg)	34	0.001553	9.52957E-08	0.0003087	0.00005294	0.198776561	0.0015	97.06
Nickel, Total (mg/L)	MWell#11 (bg)	34	0.004753	4.46358E-05	0.006681	0.001146	1.405638544	0.0015	61.76
Nitrate Nitrogen (mg/L)	MWell#1 (bg)	118	5.81	15.468489	3.933	0.3621	0.676936317	7.1	0
Nitrate Nitrogen (mg/L)	MWell#11 (bg)	45	29.5	118.3744	10.88	1.622	0.368813559	34	4.444
pH (none)	MWell#1 (bg)	109	7.234	0.06754801	0.2599	0.02489	0.035927564	7.17	0
pH (none)	MWell#11 (bg)	46	7.427	0.026244	0.162	0.02388	0.021812306	7.405	0
Potassium, Dissolved (mg/L)	MWell#1 (bg)	108	7.356	1.570009	1.253	0.1206	0.17033714	7.7	0
Potassium, Dissolved (mg/L)	MWell#11 (bg)	46	10.91	2.576025	1.605	0.2366	0.147112741	11	0
Potassium, Total (mg/L)	MWell#1 (bg)	8	8.713	1.800964	1.342	0.4745	0.154022725	8.55	0
Potassium, Total (mg/L)	MWell#11 (bg)	8	10.56	1.7424	1.32	0.4667	0.125	11	0
Redox (mv)	MWell#1 (bg)	51	120.6	6622.7044	81.38	11.39	0.674792703	110	0
Redox (mv)	MWell#11 (bg)	46	133.5	9407.0601	96.99	14.3	0.726516854	125.6	0
Selenium, Dissolved (mg/L)	MWell#1 (bg)	85	0.007247	0.000205062	0.01432	0.001554	1.975990065	0.002	31.76
Selenium, Dissolved (mg/L)	MWell#11 (bg)	21	0.005469	1.2996E-05	0.003605	0.0007867	0.659169867	0.0048	4.762

[1] All statistics based on Non-Detects = 1/2 MDL [2] (bg) indicates a background well.

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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 (bg)	34	0.003021	1.28596E-06	0.001134	0.0001944	0.375372393	0.004	55.88
Selenium, Total (mg/L)	MWell#11 (bg)	34	0.006638	8.79716E-06	0.002966	0.0005087	0.446821332	0.004	52.94
Silver, Dissolved (mg/L)	MWell#1 (bg)	85	0.003239	4.45556E-05	0.006675	0.000724	2.060821241	0.0005	97.65
Silver, Dissolved (mg/L)	MWell#11 (bg)	21	0.0002	0	0	0	0	0.0002	100
Silver, Total (mg/L)	MWell#1 (bg)	34	0.0002	0	0	0	0	0.0002	100
Silver, Total (mg/L)	MWell#11 (bg)	34	0.0002	0	0	0	0	0.0002	100
Sodium, Dissolved (mg/L)	MWell#1 (bg)	108	19.08	17.867529	4.227	0.4067	0.221540881	21	0
Sodium, Dissolved (mg/L)	MWell#11 (bg)	46	18.89	7.656289	2.767	0.4079	0.146479619	20	0
Sodium, Total (mg/L)	MWell#1 (bg)	8	22.38	9.696996	3.114	1.101	0.139142091	23	0
Sodium, Total (mg/L)	MWell#11 (bg)	8	18.5	1.999396	1.414	0.5	0.076432432	19	0
Styrene (ug/L)	MWell#1 (bg)	118	0.5303	0.24354225	0.4935	0.04543	0.930605318	0.5	100
Styrene (ug/L)	MWell#11 (bg)	46	0.3646	0.02152089	0.1467	0.02163	0.402358749	0.435	100
Sulfate (mg/L)	MWell#1 (bg)	120	40.1	216.6784	14.72	1.344	0.367082294	46	0
Sulfate (mg/L)	MWell#11 (bg)	46	222.1	11342.25	106.5	15.7	0.479513733	250	0
TDS (mg/L)	MWell#1 (bg)	109	446.3	16281.76	127.6	12.22	0.285906341	470	0
TDS (mg/L)	MWell#11 (bg)	46	1034	154449	393	57.95	0.380077369	1100	0
Temperature (C)	MWell#1 (bg)	120	20.23	5.76	2.4	0.219	0.11863569	20.34	0
Temperature (C)	MWell#11 (bg)	46	20.68	4.778596	2.186	0.3223	0.105705996	20.77	0
Tetrachloroethene (ug/L)	MWell#1 (bg)	118	2.922	2.954961	1.719	0.1583	0.588295688	3.05	19.49
Tetrachloroethene (ug/L)	MWell#11 (bg)	46	0.3315	0.02471184	0.1572	0.02318	0.474208145	0.25	100
Thallium, Dissolved (mg/L)	MWell#1 (bg)	85	0.003379	5.45087E-05	0.007383	0.0008008	2.184965966	0.0005	98.82
Thallium, Dissolved (mg/L)	MWell#11 (bg)	21	0.000481	1.61926E-09	0.00004024	0.000008781	0.083659044	0.0005	100
Thallium, Total (mg/L)	MWell#1 (bg)	34	0.0005	0	0	0	0	0.0005	100
Thallium, Total (mg/L)	MWell#11 (bg)	34	0.0005	0	0	0	0	0.0005	100
TOC (mg/L)	MWell#1 (bg)	119	1.48	3.396649	1.843	0.1689	1.24527027	1.3	29.41
TOC (mg/L)	MWell#11 (bg)	46	3.187	5.267025	2.295	0.3384	0.720112959	2.55	4.348
Toluene (ug/L)	MWell#1 (bg)	119	0.4844	0.27793984	0.5272	0.04833	1.08835673	0.5	99.16
Toluene (ug/L)	MWell#11 (bg)	46	0.2347	0.03759721	0.1939	0.02859	0.826161057	0.1	100
Total Suspended Solids (mg/L)	MWell#1 (bg)	29	1.105	0.10131489	0.3183	0.05911	0.288054299	1	100
Total Suspended Solids (mg/L)	MWell#11 (bg)	29	2.791	25.553025	5.055	0.9387	1.811178789	1	72.41
trans-1,2-Dichloroethene (ug/L)	MWell#1 (bg)	118	0.4814	0.27092025	0.5205	0.04792	1.081221437	0.5	100
trans-1,2-Dichloroethene (ug/L)	MWell#11 (bg)	46	0.2391	0.04044121	0.2011	0.02965	0.841070682	0.1	100

[1] All statistics based on Non-Detects = 1/2 MDL [2] (bg) indicates a background well.

HORN RAPIDS LANDFILL - FOURTH QUARTER 2021
Summary of Descriptive Statistics

Constituent Name	Well	N	Mean[1]	Variance	Standard Deviation	Standard Error	Coeffient of Variation	Median	% Non-Detects
trans-1,3-Dichloropropene (ug/L)	MWell#1 (bg)	117	0.4592	0.23804641	0.4879	0.04511	1.0625	0.5	100
trans-1,3-Dichloropropene (ug/L)	MWell#11 (bg)	46	0.231	0.03663396	0.1914	0.02822	0.828571429	0.1	100
trans-1,4-Dichloro-2-butene (ug/L)	MWell#1 (bg)	108	1.465	1.151329	1.073	0.1032	0.732423208	1	100
trans-1,4-Dichloro-2-butene (ug/L)	MWell#11 (bg)	46	1.607	0.93528241	0.9671	0.1426	0.601804605	1	100
Trichloroethene (ug/L)	MWell#1 (bg)	119	0.5159	0.24710841	0.4971	0.04557	0.963558829	0.5	80.67
Trichloroethene (ug/L)	MWell#11 (bg)	46	0.238	0.03956121	0.1989	0.02933	0.835714286	0.1	100
Trichlorofluoromethane (ug/L)	MWell#1 (bg)	119	0.6311	0.91738084	0.9578	0.08781	1.517667565	0.5	96.64
Trichlorofluoromethane (ug/L)	MWell#11 (bg)	46	0.3326	0.025921	0.161	0.02373	0.484064943	0.25	100
Vanadium, Dissolved (mg/L)	MWell#1 (bg)	85	0.01154	4.56976E-05	0.00676	0.0007332	0.585788562	0.0107	16.47
Vanadium, Dissolved (mg/L)	MWell#11 (bg)	21	0.0098	2.41181E-06	0.001553	0.000339	0.158469388	0.0098	0
Vanadium, Total (mg/L)	MWell#1 (bg)	34	0.009515	5.98921E-07	0.0007739	0.0001327	0.081334735	0.0093	0
Vanadium, Total (mg/L)	MWell#11 (bg)	34	0.01002	9.38186E-07	0.0009686	0.0001661	0.096666667	0.0099	0
Vinyl Acetate (ug/L)	MWell#1 (bg)	113	2.206	8.282884	2.878	0.2707	1.304623753	1	100
Vinyl Acetate (ug/L)	MWell#11 (bg)	46	1.245	0.82355625	0.9075	0.1338	0.728915663	1	100
Vinyl Chloride (ug/L)	MWell#1 (bg)	118	0.5812	1.119364	1.058	0.09737	1.820371645	0.5	100
Vinyl Chloride (ug/L)	MWell#11 (bg)	46	0.1779	0.05433561	0.2331	0.03437	1.310286678	0.01	100
Xylenes (ug/L)	MWell#1 (bg)	80	0.7139	0.20802721	0.4561	0.05099	0.638884998	1	100
Xylenes (ug/L)	MWell#11 (bg)	46	0.5285	0.20034576	0.4476	0.066	0.84692526	0.25	100
Zinc, Dissolved (mg/L)	MWell#1 (bg)	96	0.007066	7.98878E-05	0.008938	0.0009123	1.264930654	0.00405	53.13
Zinc, Dissolved (mg/L)	MWell#11 (bg)	21	0.006033	4.29811E-05	0.006556	0.001431	1.086689872	0.0035	28.57
Zinc, Total (mg/L)	MWell#1 (bg)	38	0.004929	2.14462E-05	0.004631	0.0007513	0.939541489	0.0035	78.95
Zinc, Total (mg/L)	MWell#11 (bg)	34	0.003862	2.09092E-06	0.001446	0.000248	0.3744174	0.0035	82.35

[1] All statistics based on Non-Detects = 1/2 MDL [2] (bg) indicates a background well.

Appendix F

Geochemical Evaluation

Summary of Cation/Anion Charge Balance Differences, 2021 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	6.10	5.03	-0.54	5.05
Well #2	5.55	6.76	2.43	8.16
Well #3	6.48	1.46	-1.38	5.54
Well #4	5.46	1.53	-0.76	8.38
Well #5	4.24	4.48	2.94	5.28
Well #6	7.03	5.84	2.89	8.21
Well #8	7.61	7.07	7.95	4.48
Well #9	4.46	3.37	-0.70	5.33
Well #10	2.97	5.48	1.92	8.32
Well #11	4.41	4.76	3.10	5.76
Well #12	4.41	4.77	2.25	3.92

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).

$$RPD = \frac{2(C-A)}{C+A} \times 100$$

☐ Difference is greater than 10% [see WAC 173-351-430(5)(a)].

NA= Not available

Cation/Anion Balance Calculations (Dissolved Metals), Horn Rapids Landfill, First Quarter 2021

	Conversion Factor[1] (mg/L to meq/L)	Well #1			Well #2			Well #3			Well #4			Well #5			Well #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	0.96	10.48	14	0.61	11.07	13	0.57	14.76	15	0.65	9.94	33	1.44	8.68	24	1.04	7.89
Ca	0.0499	120	5.99	65.56	70	3.49	63.48	47	2.35	61.22	85	4.24	64.64	210	10.48	63.35	170	8.48	64.07
Mg	0.08229	24	1.97	21.62	15	1.23	22.43	9.2	0.76	19.76	18	1.48	22.57	52	4.28	25.87	41	3.37	25.48
Fe(+2)	0.03581	0.11	0.00	0.04	0.05	0.00	0.03	0.05	0.00	0.05	0.05	0.00	0.03	0.16	0.01	0.03	0.12	0.00	0.03
K	0.02558	8.2	0.21	2.30	6.4	0.16	2.98	6.3	0.16	4.21	7.2	0.18	2.81	13	0.33	2.01	13	0.33	2.51
Mn	0.0364	0.01	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.28	0.01	0.06	0.043	0.00	0.01
		TOTAL	9.13	100.00	TOTAL	5.50	100.00	TOTAL	3.83	100.00	TOTAL	6.56	100.00	TOTAL	16.54	100.00	TOTAL	13.24	100.00
ANIONS																			
HCO_3[2]	0.02	300	6.00	74.22	130	2.60	52.81	95	1.90	56.46	240	4.80	81.60	570	11.40	75.02	490	9.80	85.22
SO_4	0.02082	55	1.15	14.16	63	1.31	26.64	39	0.81	24.13	29	0.60	10.26	110	2.29	15.07	50	1.04	9.05
Cl	0.02821	27	0.76	9.42	29	0.82	16.62	18	0.51	15.09	14	0.39	6.71	52	1.47	9.65	21	0.59	5.15
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	0.01613	11	0.18	2.19	12	0.19	3.93	9	0.15	4.31	5.2	0.08	1.43	2.4	0.04	0.25	4.1	0.07	0.58
		TOTAL	8.08	100.00	TOTAL	4.92	100.00	TOTAL	3.36	100.00	TOTAL	5.88	100.00	TOTAL	15.20	100.00	TOTAL	11.50	100.00
(meq/L cations-anions)/(meq/L cations+anions)*100				6.10			5.55			6.48			5.46			4.24			7.03

Cation/Anion Balance Calculations (Dissolved Metals), Horn Rapids Landfill, First Quarter 2021

	Conversion Factor[1] (mg/L to meq/L)	Well #8			Well #9			Well #10			Well #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	35	1.52	12.85	25	1.09	9.42	24	1.04	6.21	21	0.91	4.94	21	0.91	21.10
Ca	0.0499	150	7.49	63.20	150	7.49	64.85	230	11.48	68.27	260	12.97	70.21	48	2.40	55.33
Mg	0.08229	31	2.55	21.54	33	2.72	23.53	48	3.95	23.49	52	4.28	23.16	10	0.82	19.01
Fe(+2)	0.03581	0.11	0.00	0.03	0.1	0.00	0.03	0.18	0.01	0.04	0.17	0.01	0.03	0.05	0.00	0.04
K	0.02558	11	0.28	2.38	9.8	0.25	2.17	13	0.33	1.98	12	0.31	1.66	7.6	0.19	4.49
Mn	0.0364	0.01	0.00	0.00	0.01	0.00	0.00	0.053	0.00	0.01	0.01	0.00	0.00	0.027	0.00	0.02
		TOTAL	11.84	100.00	TOTAL	11.54	100.00	TOTAL	16.81	100.00	TOTAL	18.48	100.00	TOTAL	4.33	100.00
ANIONS																
HCO_3[2]	0.02	120	2.40	23.60	360	7.20	68.20	650	13.00	82.07	170	3.40	20.09	140	2.80	70.65
SO_4	0.02082	87	1.81	17.81	73	1.52	14.40	90	1.87	11.83	330	6.87	40.61	34	0.71	17.86
Cl	0.02821	190	5.36	52.71	61	1.72	16.30	32	0.90	5.70	210	5.92	35.01	13	0.37	9.25
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	0.01613	37	0.60	5.87	7.2	0.12	1.10	4	0.06	0.41	45	0.73	4.29	5.5	0.09	2.24
		TOTAL	10.17	100.00	TOTAL	10.56	100.00	TOTAL	15.84	100.00	TOTAL	16.92	100.00	TOTAL	3.96	100.00
(meq/L cations-anions)/(meq/L cations+anions)*100				7.61			4.46			2.97			4.41			4.41

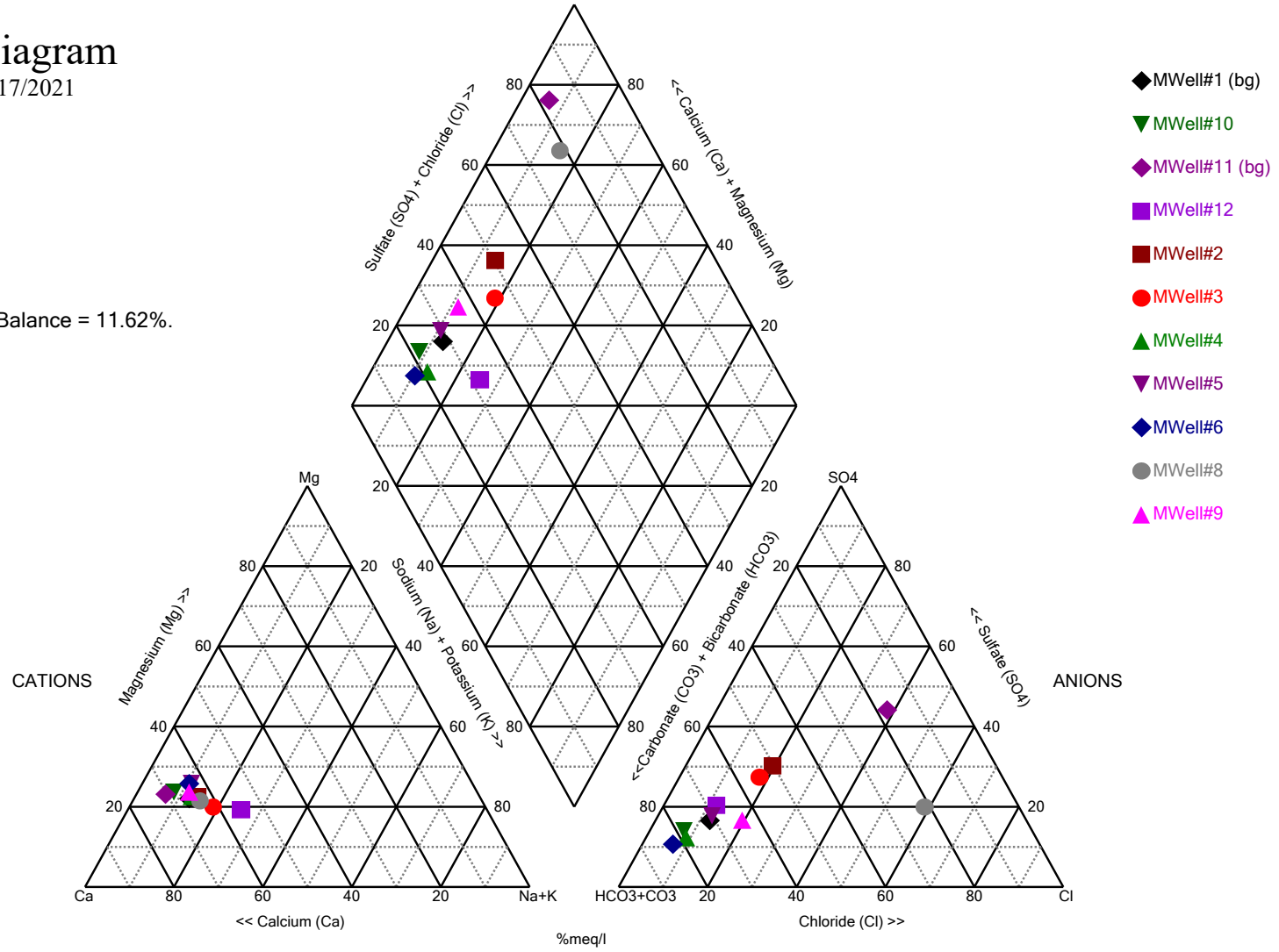
[1]Reference: Hem 1985.

[2]HCO_3 and CO_3 reported as $CaCO_3$, conversion factor adjusted accordingly.

Piper Diagram

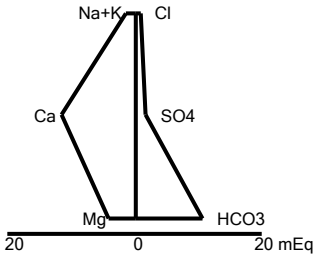
3/16/2021, 3/17/2021

Cation-Anion Balance = 11.62%.



Analysis Run 5/3/2021 2:12 PM

Horn Rapids Landfill Client: City of Richland Data: 1Q_21_PIPER



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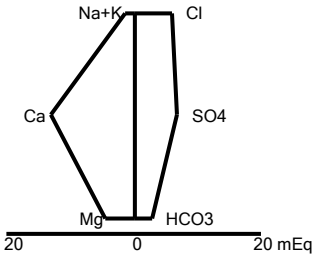

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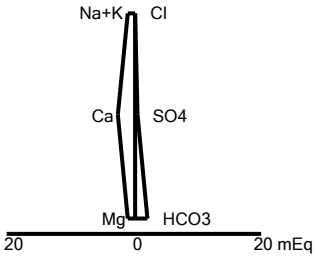

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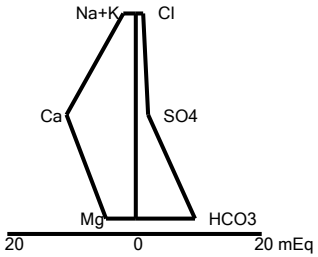

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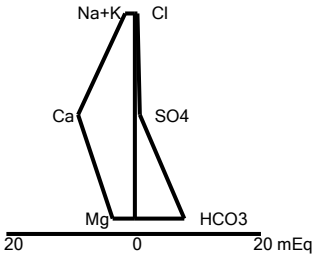

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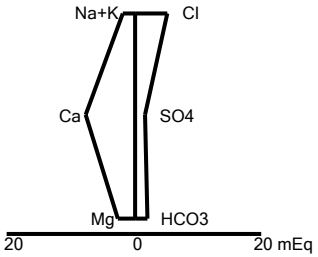

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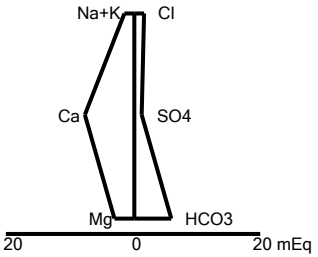

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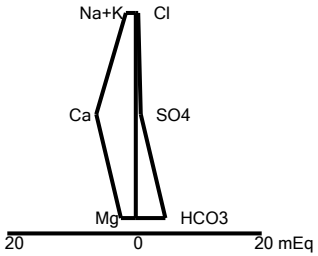

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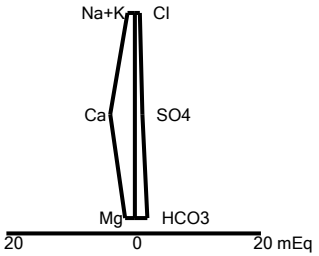

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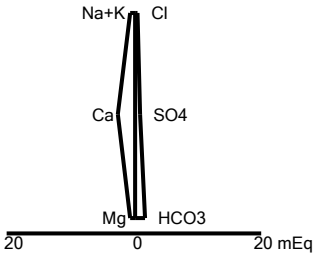

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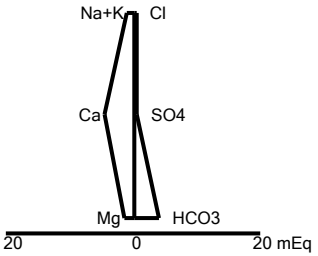


MWell#4

Stiff Diagram - 3/16/2021, 3/17/2021 Analysis Run 5/3/2021 2:15 PM

Horn Rapids Landfill Client: City of Richland Data: 1Q_21_PIPER

Cation/Anion Balance Calculations, Horn Rapids Landfill, Second Quarter 2021

	Conversion Factor[1] (mg/L to meq/L)	Well #1			Well #2			Well #3			Well #4			Well #5			Well #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	24	1.04	10.54	14	0.61	11.46	13	0.57	14.57	15	0.65	9.95	26	1.13	7.73	22	0.96	7.29
Ca	0.0499	130	6.49	65.51	68	3.39	63.88	48	2.40	61.71	85	4.24	64.67	190	9.48	64.76	170	8.48	64.59
Mg	0.08229	26	2.14	21.61	14	1.15	21.69	9.3	0.77	19.72	18	1.48	22.58	45	3.70	25.29	41	3.37	25.69
Fe(+2)	0.03581	0.37	0.01	0.13	0.11	0.00	0.07	0.05	0.00	0.05	0.12	0.00	0.07	0.28	0.01	0.07	0.31	0.01	0.08
K	0.02558	8.5	0.22	2.20	6	0.15	2.89	6	0.15	3.95	7	0.18	2.73	12	0.31	2.10	12	0.31	2.34
Mn	0.0364	0.01	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.22	0.01	0.05	0.049	0.00	0.01
		TOTAL	9.90	100.00	TOTAL	5.31	100.00	TOTAL	3.88	100.00	TOTAL	6.56	100.00	TOTAL	14.64	100.00	TOTAL	13.13	100.00
ANIONS																			
HCO_3^2	0.02	340	6.80	75.94	110	2.20	47.42	110	2.20	58.35	240	4.80	75.46	510	10.20	76.21	500	10.00	85.58
SO_4	0.02082	57	1.19	13.25	68	1.42	30.52	42	0.87	23.19	33	0.69	10.80	84	1.75	13.07	49	1.02	8.73
Cl	0.02821	28	0.79	8.82	30	0.85	18.24	21	0.59	15.71	28	0.79	12.42	50	1.41	10.54	22	0.62	5.31
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	0.01613	11	0.18	1.98	11	0.18	3.82	6.4	0.10	2.74	5.2	0.08	1.32	1.5	0.02	0.18	2.7	0.04	0.37
		TOTAL	8.95	100.00	TOTAL	4.64	100.00	TOTAL	3.77	100.00	TOTAL	6.36	100.00	TOTAL	13.38	100.00	TOTAL	11.68	100.00
(meq/L cations-anions)/(meq/L cations+anions)*100				5.03			6.76			1.46			1.53			4.48			5.84

Cation/Anion Balance Calculations, Horn Rapids Landfill, Second Quarter 2021

	Conversion Factor[1] (mg/L to meq/L)	Well #8			Well #9			Well #10			Well #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	38	1.65	10.79	33	1.44	11.28	24	1.04	6.18	20	0.87	4.70	21	0.91	20.02
Ca	0.0499	200	9.98	65.11	160	7.98	62.73	230	11.48	67.90	260	12.97	70.04	51	2.54	55.78
Mg	0.08229	41	3.37	22.01	37	3.04	23.92	49	4.03	23.86	53	4.36	23.55	11	0.91	19.84
Fe(+2)	0.03581	0.35	0.01	0.08	0.18	0.01	0.05	0.4	0.01	0.08	0.3	0.01	0.06	0.05	0.00	0.04
K	0.02558	12	0.31	2.00	10	0.26	2.01	13	0.33	1.97	12	0.31	1.66	7.7	0.20	4.32
Mn	0.0364	0.01	0.00	0.00	0.01	0.00	0.00	0.051	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.01
		TOTAL	15.33	100.00	TOTAL	12.73	100.00	TOTAL	16.90	100.00	TOTAL	18.52	100.00	TOTAL	4.56	100.00
ANIONS																
HCO_3[2]	0.02	120	2.40	18.04	400	8.00	67.24	610	12.20	80.55	170	3.40	20.19	140	2.80	67.52
SO_4	0.02082	92	1.92	14.40	85	1.77	14.88	91	1.89	12.51	330	6.87	40.80	39	0.81	19.58
Cl	0.02821	290	8.18	61.50	71	2.00	16.84	35	0.99	6.52	210	5.92	35.18	16	0.45	10.88
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	0.01613	50	0.81	6.06	7.7	0.12	1.04	4	0.06	0.43	40	0.65	3.83	5.2	0.08	2.02
		TOTAL	13.30	100.00	TOTAL	11.90	100.00	TOTAL	15.15	100.00	TOTAL	16.84	100.00	TOTAL	4.15	100.00
(meq/L cations-anions)/(meq/L cations+anions)*100				7.07			3.37			5.48			4.76			4.77

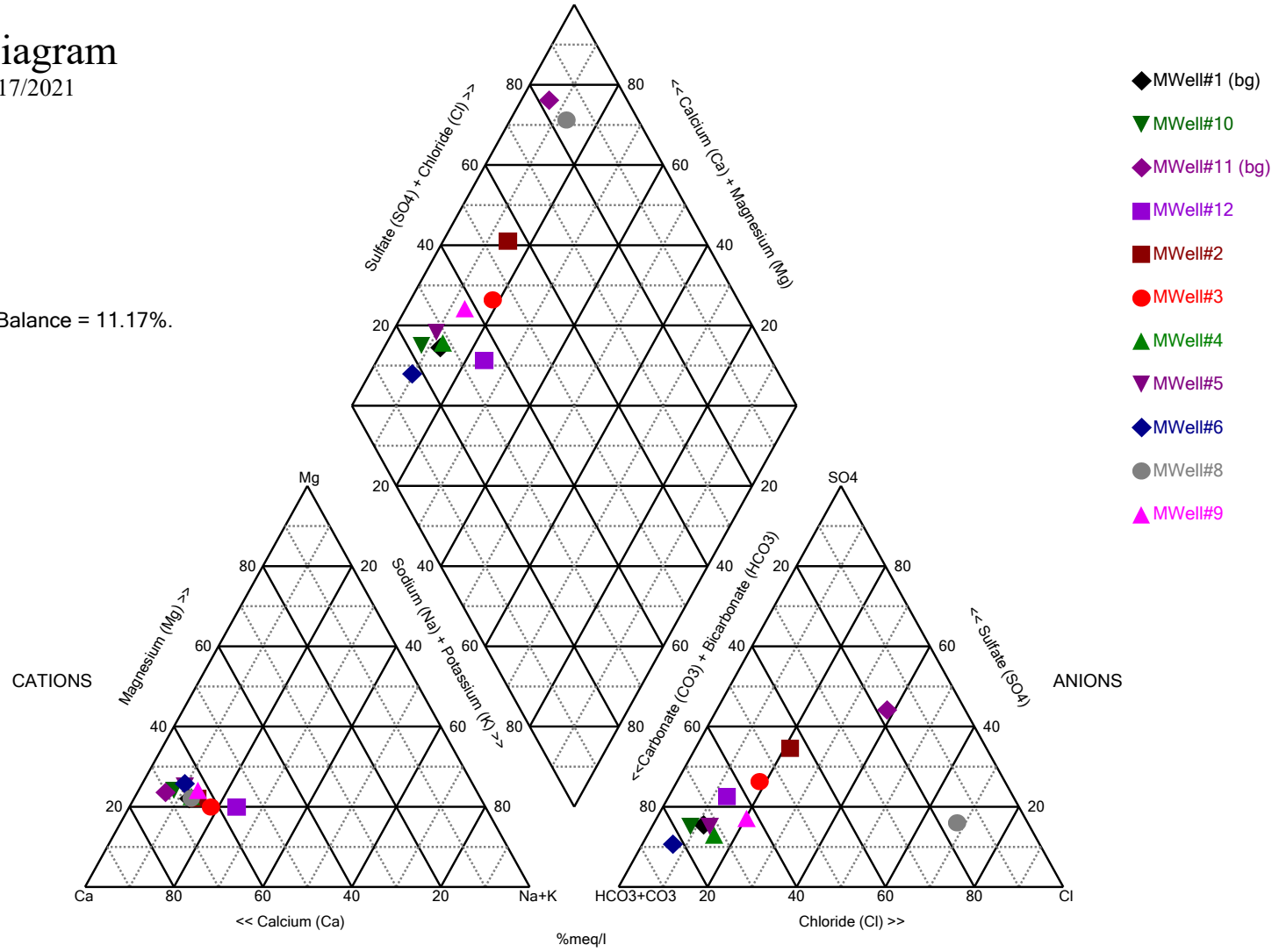
[1]Reference: Hem 1985.

[2]HCO_3 and CO_3 reported as $CaCO_3$, conversion factor adjusted accordingly.

Piper Diagram

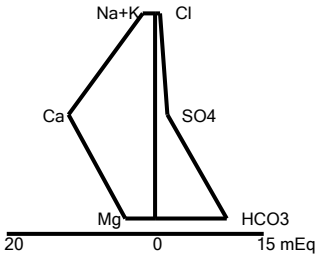
6/16/2021, 6/17/2021

Cation-Anion Balance = 11.17%.



Analysis Run 8/3/2021 10:38 PM

Horn Rapids Landfill Client: City of Richland Data: 2Q_21_PIPER



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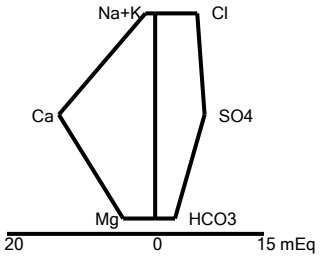

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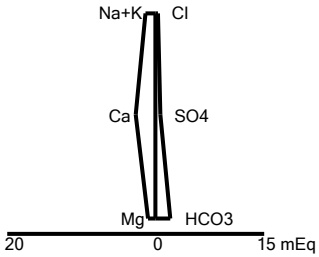

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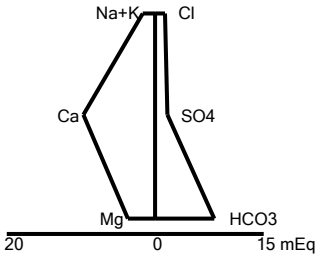

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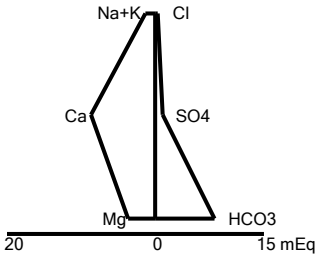
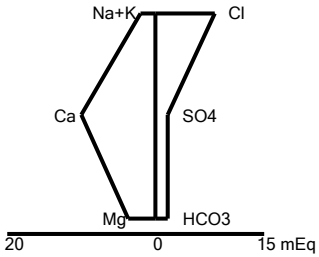
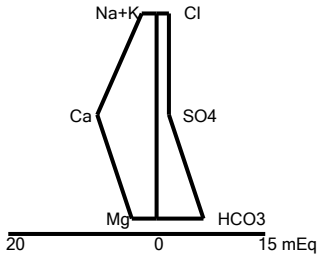


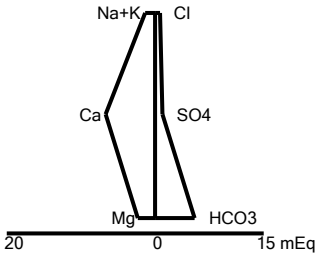
MWell#6



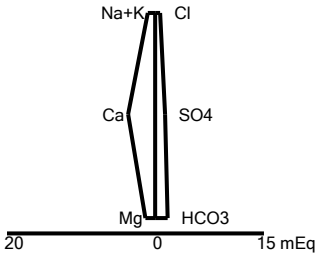
MWell#8



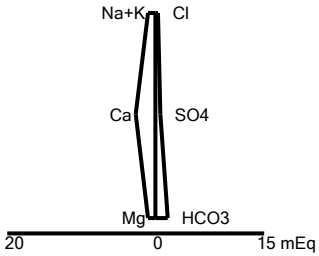
MWell#9



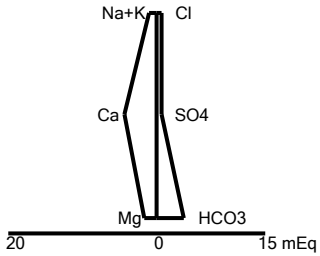
MWell#1 (bg)



MWell#2



MWell#3



MWell#4

Stiff Diagram - 6/16/2021, 6/17/2021 Analysis Run 8/3/2021 10:43 PM

Horn Rapids Landfill Client: City of Richland Data: 2Q_21_PIPER

Cation/Anion Balance Calculations (Dissolved Metals), Horn Rapids Landfill, Third Quarter 2021

	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	20	0.87	11.18	12	0.52	11.28	11	0.48	14.65	14	0.61	10.11	23	1.00	7.66	20	0.87	7.45
Ca	0.0499	100	4.99	64.10	58	2.89	62.53	40	2.00	61.13	77	3.84	63.81	170	8.48	64.91	150	7.49	64.06
Mg	0.08229	21	1.73	22.20	13	1.07	23.11	8	0.66	20.16	17	1.40	23.23	40	3.29	25.19	37	3.04	26.06
Fe(+2)	0.03581	0.05	0.00	0.02	0.05	0.00	0.04	0.05	0.00	0.05	0.05	0.00	0.03	0.11	0.00	0.03	0.05	0.00	0.02
K	0.02558	7.6	0.19	2.50	5.5	0.14	3.04	5.1	0.13	4.00	6.6	0.17	2.80	11	0.28	2.15	11	0.28	2.41
Mn	0.0364	0.010	0.00	0.00	0.010	0.00	0.01	0.010	0.00	0.01	0.010	0.00	0.01	0.21	0.008	0.06	0.037	0.00	0.01
		TOTAL	7.78	100.00	TOTAL	4.63	100.00	TOTAL	3.27	100.00	TOTAL	6.02	100.00	TOTAL	13.07	100.00	TOTAL	11.68	100.00
ANIONS																			
HCO_3^2	0.02	290	5.80	73.71	110	2.20	49.90	91	1.82	54.21	250	5.00	81.79	460	9.20	74.67	460	9.20	83.43
SO_4	0.02082	54	1.12	14.29	61	1.27	28.80	42	0.87	26.05	31	0.65	10.56	81	1.69	13.69	53	1.10	10.01
Cl	0.02821	28	0.79	10.04	27	0.76	17.27	20	0.56	16.81	14	0.39	6.46	50	1.41	11.45	24	0.68	6.14
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	0.01613	9.6	0.15	1.97	11	0.18	4.02	6.1	0.10	2.93	4.5	0.07	1.19	1.5	0.02	0.20	2.9	0.05	0.42
		TOTAL	7.87	100.00	TOTAL	4.41	100.00	TOTAL	3.36	100.00	TOTAL	6.11	100.00	TOTAL	12.32	100.00	TOTAL	11.03	100.00
(meq/L cations-anions)/(meq/L cations+anions)*100				-0.54			2.43			-1.38			-0.76			2.94			2.89

Cation/Anion Balance Calculations (Dissolved Metals), Horn Rapids Landfill, Third Quarter 2021

	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	32	1.39	11.27	25	1.09	9.94	21	0.91	6.45	19	0.83	4.83	20	0.87	20.95
Ca	0.0499	160	7.98	64.65	140	6.99	63.86	190	9.48	66.94	240	11.98	69.95	46	2.30	55.28
Mg	0.08229	33	2.72	21.99	32	2.63	24.07	42	3.46	24.40	49	4.03	23.55	9.7	0.80	19.22
Fe(+2)	0.03581	0.05	0.00	0.01	0.05	0.00	0.02	0.12	0.00	0.03	0.14	0.01	0.03	0.05	0.00	0.04
K	0.02558	10	0.26	2.07	9	0.23	2.10	12	0.31	2.17	11	0.28	1.64	7.3	0.19	4.50
Mn	0.0364	0.010	0.00	0.00	0.010	0.00	0.00	0.038	0.00	0.01	0.010	0.00	0.00	0.010	0.00	0.01
		TOTAL	12.35	100.00	TOTAL	10.94	100.00	TOTAL	14.16	100.00	TOTAL	17.12	100.00	TOTAL	4.15	100.00
ANIONS																
HCO_3[2]	0.02	110	2.20	20.89	370	7.40	66.71	540	10.80	79.23	170	3.40	21.13	140	2.80	70.54
SO_4	0.02082	83	1.73	16.41	81	1.69	15.20	88	1.83	13.44	310	6.45	40.11	35	0.73	18.36
Cl	0.02821	210	5.92	56.26	67	1.89	17.04	33	0.93	6.83	200	5.64	35.06	13	0.37	9.24
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	0.01613	42	0.68	6.43	7.2	0.12	1.05	4.2	0.07	0.50	37	0.60	3.71	4.6	0.07	1.87
		TOTAL	10.53	100.00	TOTAL	11.09	100.00	TOTAL	13.63	100.00	TOTAL	16.09	100.00	TOTAL	3.97	100.00
(meq/L cations-anions)/(meq/L cations+anions)*100				7.95			-0.70			1.92			3.10			2.25

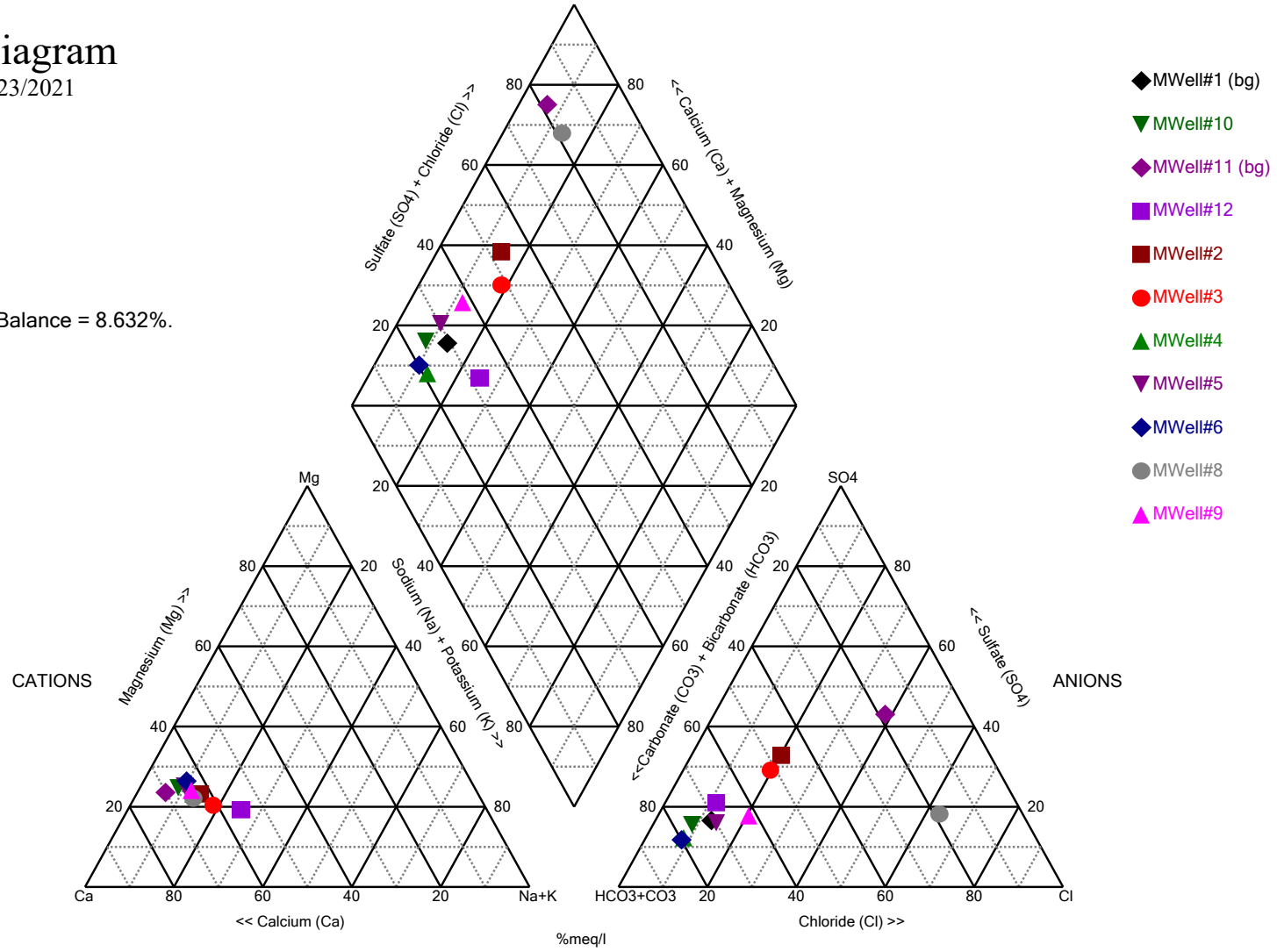
[1]Reference: Hem 1985.

[2]HCO_3 and CO_3 reported as $CaCO_3$, conversion factor adjusted accordingly.

Piper Diagram

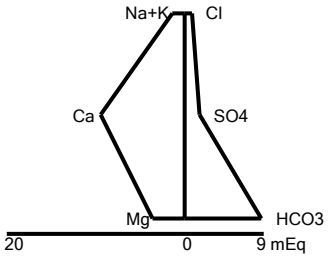
9/22/2021, 9/23/2021

Cation-Anion Balance = 8.632%.



Analysis Run 11/11/2021 9:38 AM

Horn Rapids Landfill Client: City of Richland Data: 3Q_21_PIPER



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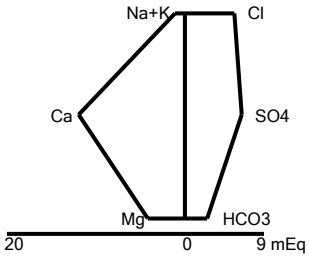
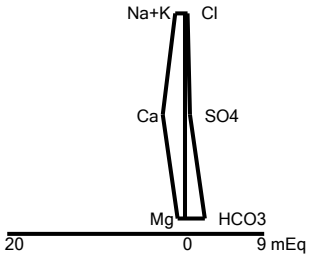


MWell#11 (bg)



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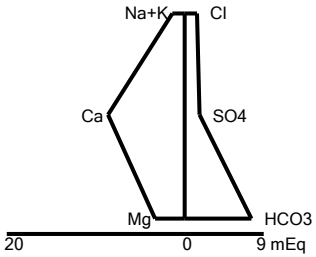
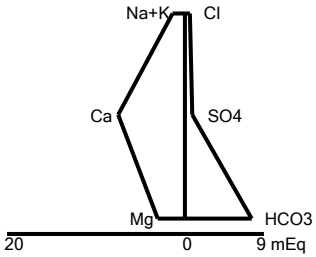
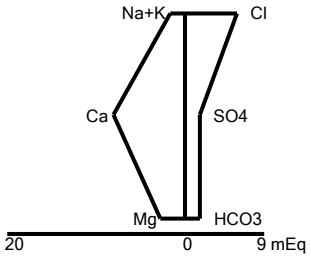


MWell#5



MWell#6



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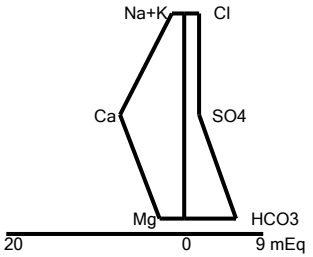

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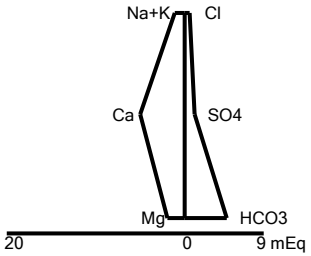

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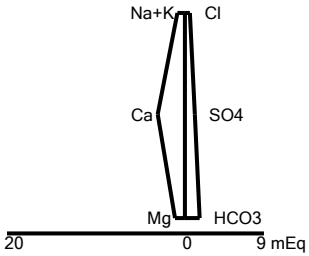
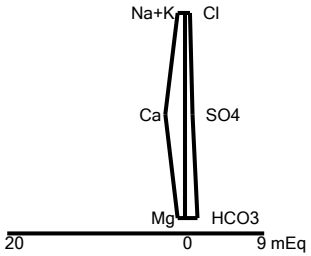
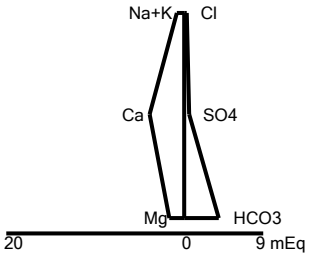


MWell#2



MWell#3



MWell#4

Stiff Diagram - 9/22/2021, 9/23/2021 Analysis Run 11/11/2021 9:42 AM

Horn Rapids Landfill Client: City of Richland Data: 3Q_21_PIPER

Cation/Anion Balance Calculations (Dissolved Metals), Horn Rapids Landfill, Fourth Quarter 2021

	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	0.91	10.86	14	0.61	11.92	13	0.57	14.76	15	0.65	9.60	26	1.13	8.00	22	0.96	7.29
Ca	0.0499	110	5.49	65.24	64	3.19	62.49	47	2.35	61.21	88	4.39	64.64	180	8.98	63.52	170	8.48	64.60
Mg	0.08229	22	1.81	21.52	14	1.15	22.54	9.3	0.77	19.97	19	1.56	23.01	45	3.70	26.19	41	3.37	25.69
Fe(+2)	0.03581	0.11	0.00	0.05	0.05	0.00	0.04	0.05	0.00	0.05	0.05	0.00	0.03	0.18	0.01	0.05	0.24	0.01	0.07
K	0.02558	7.7	0.20	2.34	6	0.15	3.00	6	0.15	4.01	7.2	0.18	2.71	12	0.31	2.17	12	0.31	2.34
Mn	0.0364	0.01	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.32	0.01	0.08	0.04	0.00	0.01
		TOTAL	8.41	100.00	TOTAL	5.11	100.00	TOTAL	3.83	100.00	TOTAL	6.79	100.00	TOTAL	14.14	100.00	TOTAL	13.13	100.00
ANIONS																			
HCO_3^2	0.02	280	5.60	73.64	110	2.20	50.70	95	1.90	55.40	230	4.60	80.09	480	9.60	75.46	470	9.40	84.38
SO_4	0.02082	54	1.12	14.78	59	1.23	28.31	43	0.90	26.10	32	0.67	11.60	84	1.75	13.75	53	1.10	9.91
Cl	0.02821	26	0.73	9.65	26	0.73	16.90	19	0.54	15.63	14	0.39	6.88	48	1.35	10.64	21	0.59	5.32
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	0.01613	9.1	0.15	1.93	11	0.18	4.09	6.1	0.10	2.87	5.1	0.08	1.43	1.2	0.02	0.15	2.7	0.04	0.39
		TOTAL	7.60	100.00	TOTAL	4.34	100.00	TOTAL	3.43	100.00	TOTAL	5.74	100.00	TOTAL	12.72	100.00	TOTAL	11.14	100.00
(meq/L cations-anions)/(meq/L cations+anions)*100				5.05			8.16			5.54			8.38			5.28			8.21

Cation/Anion Balance Calculations (Dissolved Metals), Horn Rapids Landfill, Fourth Quarter 2021

	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	21	0.91	15.28	23	1.00	8.75	21	0.91	6.19	20	0.87	4.72	20	0.87	16.73
Ca	0.0499	73	3.64	60.92	150	7.49	65.43	200	9.98	67.68	260	12.97	70.36	63	3.14	60.45
Mg	0.08229	15	1.23	20.64	33	2.72	23.74	43	3.54	24.00	52	4.28	23.21	12	0.99	18.99
Fe(+2)	0.03581	0.05	0.00	0.03	0.13	0.00	0.04	0.17	0.01	0.04	0.23	0.01	0.04	0.05	0.00	0.03
K	0.02558	7.3	0.19	3.12	9.1	0.23	2.03	12	0.31	2.08	12	0.31	1.66	7.7	0.20	3.79
Mn	0.0364	0.01	0.00	0.01	0.01	0.00	0.00	0.038	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.01
		TOTAL	5.98	100.00	TOTAL	11.44	100.00	TOTAL	14.75	100.00	TOTAL	18.44	100.00	TOTAL	5.20	100.00
ANIONS																
HCO_3[2]	0.02	120	2.40	43.91	330	6.60	64.20	490	9.80	78.52	160	3.20	19.47	180	3.60	74.88
SO_4	0.02082	47	0.98	17.90	86	1.79	17.42	85	1.77	14.18	320	6.66	40.55	35	0.73	15.16
Cl	0.02821	66	1.86	34.06	63	1.78	17.29	30	0.85	6.78	210	5.92	36.05	14	0.39	8.22
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	0.01613	14	0.23	4.13	7	0.11	1.10	4	0.06	0.52	40	0.65	3.93	5.2	0.08	1.74
		TOTAL	5.47	100.00	TOTAL	10.28	100.00	TOTAL	12.48	100.00	TOTAL	16.43	100.00	TOTAL	4.81	100.00
(meq/L cations-anions)/(meq/L cations+anions)*100				4.48			5.33			8.32			5.76			3.92

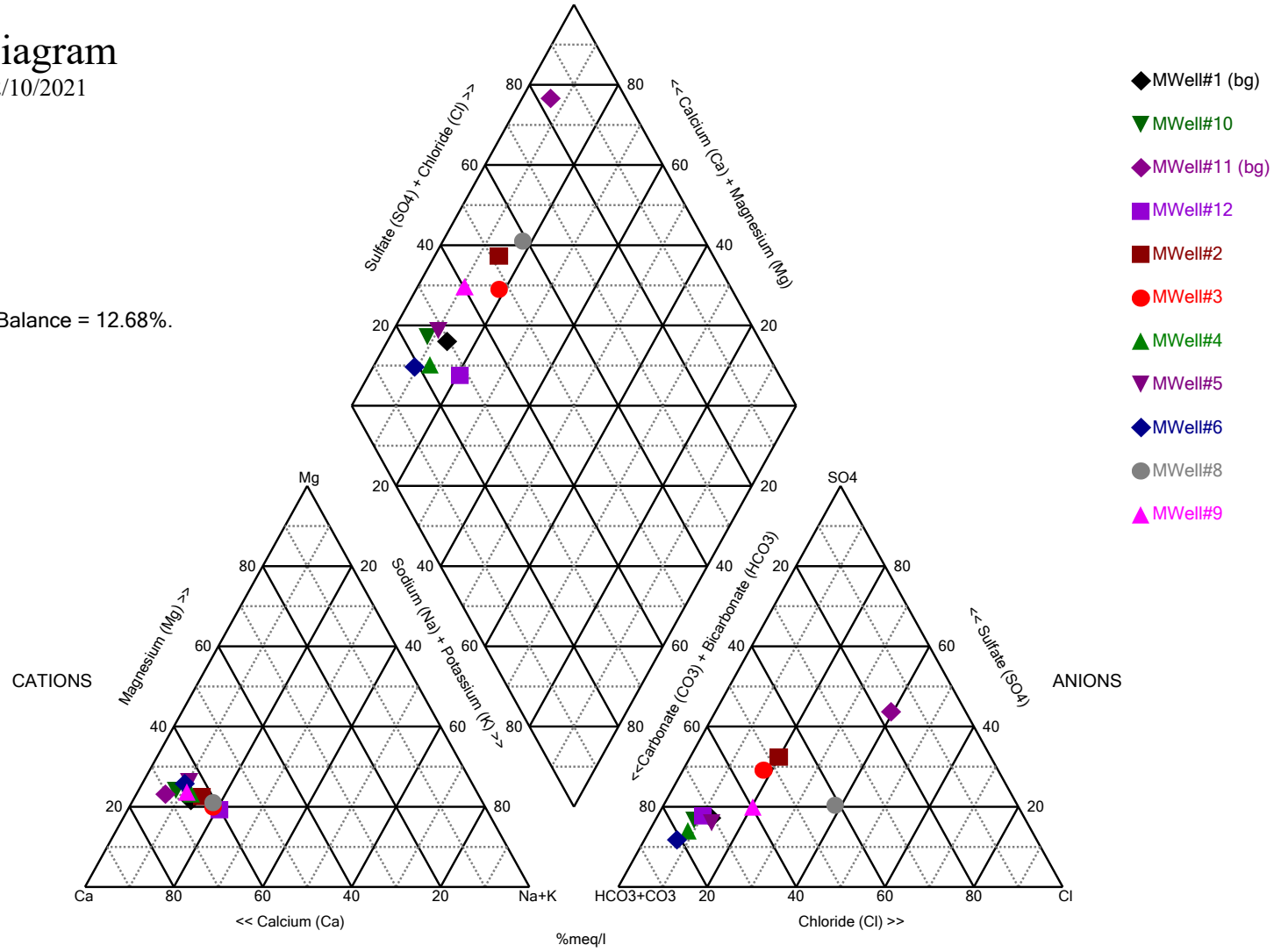
[1]Reference: Hem 1985.

[2]HCO_3 and CO_3 reported as $CaCO_3$, conversion factor adjusted accordingly.

Piper Diagram

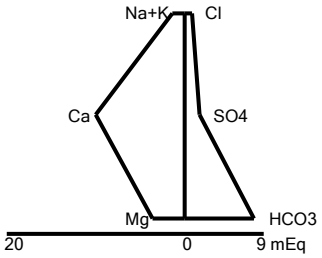
12/9/2021, 12/10/2021

Cation-Anion Balance = 12.68%.

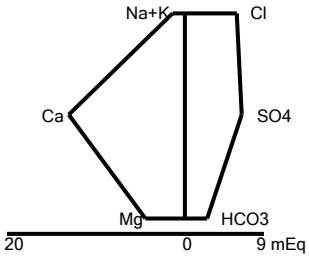


Analysis Run 1/24/2022 12:53 PM

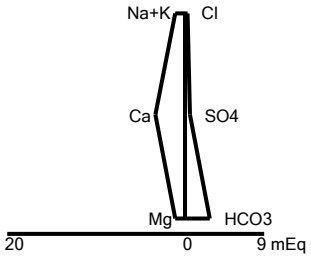
Horn Rapids Landfill Client: City of Richland Data: 4Q_21_PIPER



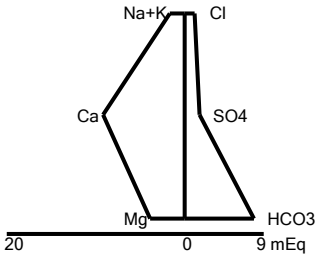
MWell#10



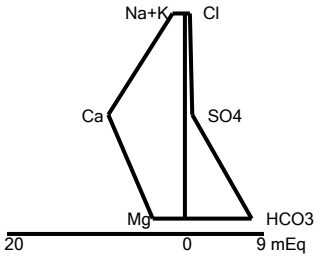
MWell#11 (bg)



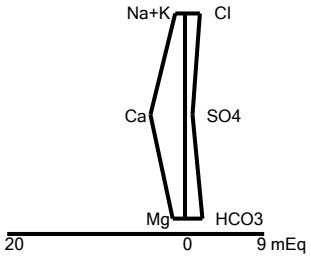
MWell#12



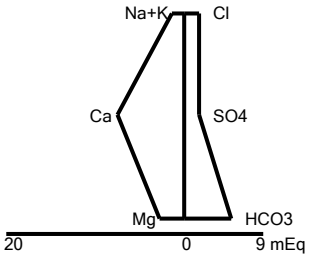
MWell#5



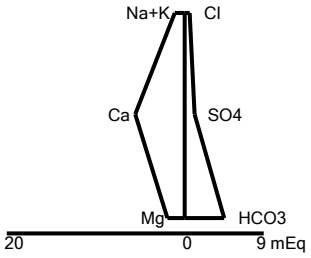
MWell#6



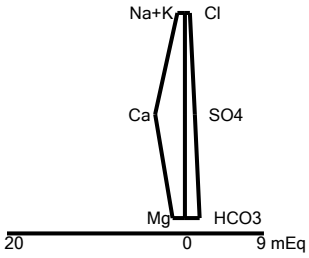
MWell#8



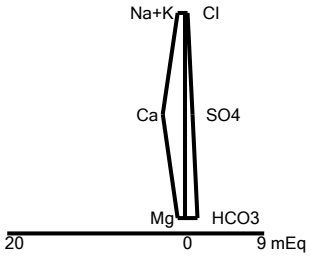
MWell#9



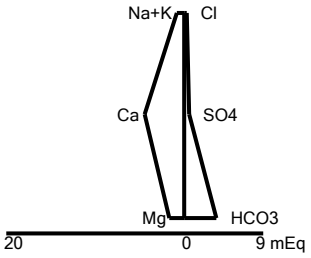
MWell#1 (bg)



MWell#2



MWell#3



MWell#4

Stiff Diagram - 12/9/2021, 12/10/2021 Analysis Run 1/24/2022 12:54 PM

Horn Rapids Landfill Client: City of Richland Data: 4Q_21_PIPER

Appendix G

Groundwater Data and Potentiometric Surface Map

Table G-1. Groundwater Elevation Data, First Quarter 2021, 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	102.67	387.01
MW-2	372,460.09	2,294,368.28	469.73	83.81	385.92
MW-3	371,529.10	2,294,408.23	481.28	95.38	385.90
MW-4	370,722.92	2,294,379.43	462.52	76.74	385.78
MW-5	371,784.64	2,293,120.19	469.94	83.73	386.21
MW-6	370,965.00	2,293,109.43	484.54	98.22	386.32
MW-8	370,228.88	2,293,869.87	476.47	90.58	385.89
MW-9	370,175.53	2,293,150.76	490.75	104.66	386.09
MW-10[3]	372,265.23	2,293,111.61	464.08	77.05	387.03
MW-11	373,725.48	2,291,860.98	481.16	94.28	386.88
MW-12	368,946.27	1,934,322.73	477.63	91.99	385.64

Groundwater levels measured on March 16 and 17, 2021

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

MW-2
385.92

MW-3
385.90

MW-4
385.78

385.75

MW-12
385.64

386.00

MW-8
385.89

MW-10
387.03

MW-5
386.21

386.25

GP-12 (1, 2, 3)

MW-6
386.32

MW-9
386.09

GP-2 (1,2)

GP-11 (1, 2)

386.50

GP-10 (1, 2)

386.75

387.00

GP-9 (1, 2)

GP-1 (1,2)

MW-11
386.88

GP-7 (1, 2)

GP-8 (1, 2)

GP-4 (1, 2)

MW-1
387.01

GP-3 (1, 2)

Topographic Contour Interval: 10 ft

Elevation Datum: NAVD88

Parametrix DATE: May 13, 2021 FILE: BL3820004P04T02-F-G1-1stQ2021

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 March 16 and 17, 2021
- ● Gas Probe (1, 2, 3) with variable-depth screens

Figure G1
Potentiometric Surface Map
First Quarter 2021
Horn Rapids Landfill

Table G-2. Groundwater Elevation Data, Second Quarter 2021, 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	102.77	386.91
MW-2	372,460.09	2,294,368.28	469.73	84.04	385.69
MW-3	371,529.10	2,294,408.23	481.28	95.50	385.78
MW-4	370,722.92	2,294,379.43	462.52	76.98	385.54
MW-5	371,784.64	2,293,120.19	469.94	83.99	385.95
MW-6	370,965.00	2,293,109.43	484.54	98.56	385.98
MW-8	370,228.88	2,293,869.87	476.47	90.84	385.63
MW-9	370,175.53	2,293,150.76	490.75	104.90	385.85
MW-10[3]	372,265.23	2,293,111.61	464.08	77.09	386.99
MW-11	373,725.48	2,291,860.98	481.16	94.36	386.80
MW-12	368,946.27	1,934,322.73	477.63	92.28	385.35

Groundwater levels measured on June 16 and 17, 2021

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

MW-2
385.69

MW-3
385.78

MW-4
385.54

MW-12
385.35

MW-8
385.63

MW-9
385.85

MW-10
386.99

MW-5
385.95

GP-12 (1, 2, 3)
MW-6
385.98

GP-2 (1,2)

GP-11 (1, 2)

GP-10 (1, 2)

GP-9 (1, 2)

GP-1 (1,2)

GP-8 (1, 2)

MW-11
386.80

GP-7 (1, 2)

GP-4 (1, 2)

MW-1
386.91

GP-3 (1, 2)

385.75

385.50

385.75

386.00

386.25

386.50

386.75

387.00

Topographic Contour Interval: 10 ft

Elevation Datum: NAVD88

Parametrix DATE: Aug 06, 2021 FILE: BL3820004P04T02-F-G1-2ndQ2021

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 June 16 and 17, 2021
- ● Gas Probe (1, 2, 3) with variable-depth screens

Figure G2
Potentiometric Surface Map
Second Quarter 2021
Horn Rapids Landfill

Table G-3. Groundwater Elevation Data, Third Quarter 2021, 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	102.93	386.75
MW-2	372,460.09	2,294,368.28	469.73	84.15	385.58
MW-3	371,529.10	2,294,408.23	481.28	95.76	385.52
MW-4	370,722.92	2,294,379.43	462.52	77.13	385.39
MW-5	371,784.64	2,293,120.19	469.94	84.04	385.90
MW-6	370,965.00	2,293,109.43	484.54	98.68	385.86
MW-8	370,228.88	2,293,869.87	476.47	90.99	385.48
MW-9	370,175.53	2,293,150.76	490.75	105.04	385.71
MW-10[3]	372,265.23	2,293,111.61	464.08	77.31	386.77
MW-11	373,725.48	2,291,860.98	481.16	94.21	386.95
MW-12	368,946.27	1,934,322.73	477.63	92.39	385.24

Groundwater levels measured on September 23 and 23, 2021

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

MW-2
385.58

MW-3
385.52

MW-4
385.39

385.25

MW-12
385.24

385.50

MW-8
385.48

385.75

MW-10
386.77

MW-5
385.90

GP-12 (1, 2, 3)
MW-6
385.86

MW-9
385.71

386.00

GP-2 (1,2)

GP-11 (1, 2)

386.25

GP-10 (1, 2)

386.75

386.50

GP-9 (1, 2)

GP-1 (1,2)

MW-11
386.95

GP-7 (1, 2)

GP-4 (1, 2)

MW-1
386.75

GP-3 (1, 2)

GP-8 (1, 2)

Topographic Contour Interval: 10 ft

Elevation Datum: NAVD88

Parametrix DATE: Nov 29, 2021 FILE: BL3820004P04T02-F-G1-3rdQ2021

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 22 and 23, 2021
- ● Gas Probe (1, 2, 3) with variable-depth screens

Figure G3
Potentiometric Surface Map
Third Quarter 2021
Horn Rapids Landfill

Table G-4. Groundwater Elevation Data, Fourth Quarter 2021, 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	102.80	386.88
MW-2	372,460.09	2,294,368.28	469.73	84.10	385.63
MW-3	371,529.10	2,294,408.23	481.28	95.80	385.48
MW-4	370,722.92	2,294,379.43	462.52	77.05	385.47
MW-5	371,784.64	2,293,120.19	469.94	83.91	386.03
MW-6	370,965.00	2,293,109.43	484.54	98.43	386.11
MW-8	370,228.88	2,293,869.87	476.47	90.72	385.75
MW-9	370,175.53	2,293,150.76	490.75	104.88	385.87
MW-10[3]	372,265.23	2,293,111.61	464.08	77.23	386.85
MW-11	373,725.48	2,291,860.98	481.16	94.24	386.92
MW-12	368,946.27	1,934,322.73	477.63	91.95	385.68

Groundwater levels measured on December 9 and 10, 2021

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

MW-2
385.63

MW-3
385.48

MW-4
385.47

MW-12
385.68

MW-8
385.75

MW-10
386.85

MW-5
386.03

MW-6
386.11

MW-9
385.87

MW-11
386.92

MW-1
386.88

385.50

385.75

386.00

386.25

386.50

386.75

GP-12 (1, 2, 3)

GP-11 (1, 2)

GP-2 (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)

Topographic Contour Interval: 10 ft

Elevation Datum: NAVD88

Parametrix DATE: Feb 16, 2022 FILE: BL3820004P04T02-F-G1-4thQ2021

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 December 9 and 10, 2021
- ● Gas Probe (1, 2, 3) with variable-depth screens

Figure G4
Potentiometric Surface Map
Fourth Quarter 2021
Horn Rapids Landfill

Appendix H

Landfill Gas Data

HORN RAPIDS LANDFILL
PERIMETER GAS PROBES

MONITORED DATA				
PROBE	PRESSURE INCHES W.C.	CH4 (% VOL)	O2 (% VOL)	CO2 (% VOL)
DATE: 3/30/21				
GP-1-1	-0.20	0	20.1	0.9
GP-1-2	-0.19	0	20.7	0.8
GP-2-1	-0.26	16.2	1	25.1
GP-2-2	-0.39	19.4	1.3	22.2
GP-3-1	-0.53	0	20.3	1
GP-3-2	-0.50	0	19.9	1
GP-4-1	-0.87	0	20	1
GP-4-2	-0.82	0	19.6	0.9
GP-7-1	-0.78	0	20.8	0.1
GP-7-2	-0.62	0	21.2	0.1
GP-8-1	-0.46	0.1	20.2	0.5
GP-8-2	-0.43	0.1	20.2	0.5
GP-9-1	-0.48	0	21.2	0.1
GP-9-2	-0.27	0	19.9	0.5
GP-10-1	-0.39	0	19.3	1.6
GP-10-2	-0.34	0	19.7	1
GP-11-1	-0.31	0	20.4	0.1
GP-11-2	-0.30	0	19.6	0.5
GP-12-1	-0.43	9.7	5.5	20.2
GP-12-2	-0.62	0.4	18.9	1.2
GP-12-3	-0.61	0.4	19	0.4
GP-13	NA	NA	NA	NA
GP-14	NA	NA	NA	NA
GP-15	NA	NA	NA	NA

COMMENTS:

Weather: 37 to 40° F, clear and calm

Barometer: 29.79 in. of mercury steady

MONITORED DATA					
PROBE	PRESSURE INCHES W.C.	CH4 (% VOL)	O2 (% VOL)	CO2 (% VOL)	
DATE: 6/30/21					
GP-1-1	-0.21	0	20.3	0.7	
GP-1-2	-0.20	0	20.5	0.9	
GP-2-1	-0.15	1.5	18.9	3.2	
GP-2-2	-0.29	2.7	18.6	2.4	
GP-3-1	-0.42	0	20.2	1.1	
GP-3-2	-0.44	0	19.9	1	
GP-4-1	-0.85	0	20	1	
GP-4-2	-0.81	0	19.7	0.8	
GP-7-1	-0.72	0	20.8	0.1	
GP-7-2	-0.64	0	21.1	0.1	
GP-8-1	-0.47	0.1	20.1	0.6	
GP-8-2	-0.43	0.1	20.1	0.5	
GP-9-1	-0.15	0.1	21.4	0	
GP-9-2	0.06	0.1	19.9	0.9	
GP-10-1	-0.36	0	19.6	1.4	
GP-10-2	-0.37	0	19.8	0.9	
GP-11-1	-0.33	0	20.3	0.1	
GP-11-2	-0.31	0	19.7	0.3	
GP-12-1	-0.29	18.8	1.7	26.6	
GP-12-2	-0.28	1.7	16.8	4.6	
GP-12-3	-0.24	0.3	19.8	1.1	
GP-13	-0.16	0.3	20.9	0.1	Newly installed, sampled 7/16/2021
GP-14	-0.04	0.2	20.8	0.1	Newly installed, sampled 7/16/2021
GP-15	-0.20	0.2	20.5	0.2	Newly installed, sampled 7/16/2021

COMMENTS:

Weather: 70 to 85° F, clear

Barometer: 29.37 in. of mercury steady

HORN RAPIDS LANDFILL
PERIMETER GAS PROBES

MONITORED DATA				
PROBE	PRESSURE INCHES W.C.	CH4 (% VOL)	O2 (% VOL)	CO2 (% VOL)
DATE: 10/4/21				
GP-1-1	-0.18	0	20.2	0.6
GP-1-2	-0.21	0	20.4	0.8
GP-2-1	-0.16	1.3	18.9	3.4
GP-2-2	-0.28	2.6	18.7	2.5
GP-3-1	-0.40	0	20.3	1.2
GP-3-2	-0.43	0	19.8	1
GP-4-1	-0.82	0	20.1	1.1
GP-4-2	-0.82	0	19.8	0.6
GP-7-1	-0.71	0	20.9	0.1
GP-7-2	-0.62	0	21	0.1
GP-8-1	-0.45	0	20	0.4
GP-8-2	-0.41	0.1	20.2	0.4
GP-9-1	-0.13	0.1	21.2	0.1
GP-9-2	0.04	0	20	0.9
GP-10-1	-0.35	0	19.5	1.5
GP-10-2	-0.35	0	19.9	0.8
GP-11-1	-0.32	0.1	20.2	0.1
GP-11-2	-0.30	0	19.7	0.3
GP-12-1	-0.30	18.6	1.9	26.7
GP-12-2	-0.29	1.5	16.9	4.3
GP-12-3	-0.22	0.2	19.7	1.2
GP-13	-0.14	0.2	20.8	0
GP-14	-0.02	0.3	20.8	0.1
GP-15	-0.02	0.2	20.6	0.1
COMMENTS:				
Weather: 47 to 60° F, clear				
Barometer:	29.60	in. of mercury		steady

MONITORED DATA				
PROBE	PRESSURE INCHES W.C.	CH4 (% VOL)	O2 (% VOL)	CO2 (% VOL)
DATE: 1/3/22				
GP-1-1	-0.67	0.4	15.9	2
GP-1-2	-0.66	0.4	15.8	1.7
GP-2-1	-0.69	0.7	17.7	0.2
GP-2-2	-0.89	0.6	17.8	1.9
GP-3-1	-0.42	0.2	20.1	0.9
GP-3-2	-0.45	0.1	19.6	0.9
GP-4-1	-0.84	0	20.2	1.2
GP-4-2	-0.82	0	19.8	0.4
GP-7-1	-0.72	0	20.4	0.1
GP-7-2	-0.65	0	20.1	0.1
GP-8-1	-0.42	0	19.8	0.4
GP-8-2	-0.43	0.1	19.8	0.3
GP-9-1	-0.03	0.4	13.4	9.2
GP-9-2	-0.05	0.1	13.8	2.9
GP-10-1	-0.38	0	18.9	1.2
GP-10-2	-0.35	0	18.9	0.6
GP-11-1	-0.35	0	18.4	0.1
GP-11-2	-0.31	0	18.1	0.2
GP-12-1	-0.28	10.8	5.5	19.6
GP-12-2	-0.71	1.6	17.3	4.5
GP-12-3	-0.82	0.7	18.3	0.1
GP-13	-0.26	0.5	18.1	0.1
GP-14	-0.19	0.6	18.2	0.1
GP-15	-0.17	0.7	18.2	0.1
COMMENTS:				
Weather: 43 to 45° F,				
Barometer:	29.57	in. of mercury		steady