

West Des Moines, IA

PROJECT: BV County, FY25 Env Comp, IA 27223146.25 DATE: 1/14/2025

SUBJECT: Buena Vista County Sanitary Landfill - 11-SDP-01-74C - 2024 Leachate Control System Performance Evaluation Report and 2024 Landfill Gas Annual Report TRANSMITTAL ID: 00003

PURPOSE: For your approval VIA: Info Exchange

FROM

NAME	COMPANY	EMAIL	PHONE
Sean Marczewski West Des Moines, IA	SCS Engineers	SMarczewski@scsengineers.com	+1-515-631-6152

TO

NAME	COMPANY	EMAIL	PHONE
Mike Smith 502 East 9th Street Des Moines IA 50319-0034 United States	Iowa, State of	mike.smith@dnr.iowa.gov	515-725-8200

REMARKS: Mike -

Please find for your download the Buena Vista County Sanitary Landfill 2024 Leachate Control System Performance Evaluation Report and 2024 Landfill Gas Annual Report. Let us know if you have any questions or comments.

Thanks,

Sean A. Marczewski
Project Professional
SCS Engineers
1690 All-State Court, Suite 100
West Des Moines, Iowa 50265
712-661-9682 (C)
515-631-6152 (O)
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Transmittal

DATE: 1/14/2025
TRANSMITTAL ID: 00003

DESCRIPTION OF CONTENTS

QTY	DATED	TITLE	NOTES
1	1/14/2025	Buena Vista County Sanitary Landfill - 11-SDP-01-74C - 2024 Leachate Control System Performance Evaluation Report and 2024 Landfill Gas Annual Report 01.14.2025.pdf	

COPIES:

Becky Jolly
Lori Dicks (Buena Vista County Solid Waste Commission)
Sean Marczewski (SCS Engineers)
Nathan Ohrt (SCS Engineers)

January 14, 2025
File No. 27223146.25

Mr. Mike Smith, P.E.
Iowa Department of Natural Resources
Land Quality Bureau
6200 Park Avenue
Des Moines, Iowa 50321

Subject: 2024 Leachate Control System Performance Evaluation Report and Landfill Gas
Annual Report
Buena Vista County Sanitary Landfill
Permit No. 11-SDP-01-74C

Dear Mike:

SCS Engineers, on behalf of the Buena Vista County Solid Waste Commission, has completed an evaluation of the leachate control system and gas monitoring results for the Buena Vista County Sanitary Landfill in accordance with the requirements of the closure permit and applicable amendments. The 2024 Leachate Control System Performance Evaluation Report and the 2024 Landfill Gas Annual Report for the site are included as Appendix A and Appendix B, respectively. If you have any questions regarding these reports, please contact Sean Marczewski at (712) 661-9682.

Sincerely,



Sean Marczewski
Project Professional
SCS Engineers



Nathan Ohrt
Senior Project Professional
SCS Engineers

SAM/NPO

Copies: Addressee
Ms. Lori Dicks, Buena Vista County Solid Waste Commission



Appendix A

2024 Leachate Control System Performance Evaluation Report

2024 Leachate Control System Performance Evaluation Report

Buena Vista County Sanitary Landfill
1263 630th Street
Storm Lake, Iowa 50588

Permit No. 11-SDP-01-74C

Prepared for:

Buena Vista County Solid Waste Commission
Storm Lake, Iowa

SCS ENGINEERS

27223146.25 | January 14, 2025

1690 All-State Court, Suite 100
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Table of Contents

Section	Page
1.0 Description of Existing Leachate Control System	1
1.1 Location of Control System	1
1.2 Approved Changes to System	1
1.3 Proposed Changes to System	1
2.0 Maintenance	3
2.1 Last Date of Cleaning and Inspection	3
2.2 Date for Next Cleaning and Inspection	3
2.3 Maintenance Performed on Pumps, Valves, Tanks, Lagoons, Controls, etc.	3
3.0 Performance	3
3.1 Head Level Measurements and Leachate Elevations	3
3.2 Effectiveness of Leachate System in Attaining Minimum Achievable Levels	3
3.3 Volume of Leachate Recirculated	4
3.4 Volume of Leachate Treated On-Site	4
3.5 Volume of Leachate Treated Off-Site	4
3.6 Storage Capacity	4
3.7 Leachate Quality Testing Results	4
4.0 General Comments	5

Tables

Table 3-1. Reporting Period and Historical Column Thicknesses	4
Table 3-2. Leachate Analytical Results Comparison	5

Figures

Figure 1-1 Leachate Control System	2
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Attachments

- Attachment A Historical Leachate Column Thicknesses
- Attachment B Analytical Leachate Test Results

1.0 DESCRIPTION OF EXISTING LEACHATE CONTROL SYSTEM

SCS Engineers (SCS), on behalf of the Buena Vista County Solid Waste Commission, has prepared this Leachate Control System Performance Evaluation Report (LCSPER) for the closed Buena Vista County Sanitary Landfill (Landfill). This LCSPER was prepared in general accordance with the requirements specified in the facility's closure permit issued on July 2, 2008 (Doc #25643) and applicable amendments. This LCSPER describes the leachate control system, discusses maintenance activities, provides an evaluation of the effectiveness of the system, and if necessary makes recommendations for additional control measures. The reporting period for this report is January through December 2024.

1.1 LOCATION OF CONTROL SYSTEM

The Landfill property is depicted in **Figure 1**. The Landfill property consists of approximately 50 acres generally within the NW $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Section 19, T90N, R36W, Buena Vista County, Iowa.

The components of the leachate control system for the Landfill are described below and are shown in **Figure 1**. A leachate control system was constructed in 1996 in the easternmost cell consisting of a leachate gravity pipe collection system along with a leachate storage lagoon. In addition, a cutoff drain tile was installed across the north end of this area to intercept and divert and/or lower existing groundwater.

- Extraction Drains. The extraction drains flow to manholes MH-1, MH-2, and Meter MH.
- Leachate Monitoring Wells. This system includes six leachate monitoring wells: LW-1, LW-2, LW-3, LW-4, LW-5, and LW-6. In correspondence dated April 4, 2022 (Doc # 102680) the DNR approved removal of measuring point LW-3 due to damage.

1.2 APPROVED CHANGES TO SYSTEM

The DNR approved the request to temporarily suspend the collection of leachate from the easternmost cell on September 3, 2019 (Doc #95828). However, a small flow of liquid was subsequently observed in MH-1 indicating flow may be circumventing the plugged lines and still entering the manhole. A sample was collected from the leachate lagoon on September 22, 2022 and analyzed for chloride, ammonia as nitrogen, total suspended solids (TSS), biochemical oxygen demand (BOD), chemical oxygen demand (COD), and pH. It is unclear from the analytical results whether the liquid in the lagoon is leachate or not. No changes were made during this reporting period.

1.3 PROPOSED CHANGES TO SYSTEM

As noted during a previous site visit, a small volume of liquid was observed flowing through the final manhole prior to discharge into the leachate lagoon, indicating that the collection of leachate from the municipal solid waste landfill (MSWLF) unit may not have entirely ceased. A construction effort to create a complete physical disconnect of the leachate collection piping from the manholes on the southwest and southeast sides of the MSWLF unit was being pursued; however, that effort was recently halted in anticipation of a developing requirement to perform a contaminant transport modeling evaluation to further assess the appropriateness of ceasing leachate collection from the MSWLF unit. Documentation of this evaluation will be provided under separate cover.

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Leachate Control System

Legend		
<ul style="list-style-type: none"> ▲ Approximate Leachate Monitoring Location ▲ Approximate Leachate Monitoring Location ▲ Leachate Manholes ▲ Approximate Cleanout Location 	<ul style="list-style-type: none"> ▲ Damaged Leachate Monitoring Location ▲ Approximate Methane Monitoring Location ▲ Approximate Monitoring Well Location 	<ul style="list-style-type: none"> — Located Waste Boundary (2018) — Approximate Waste Boundary — Interpolated Waste Boundary — Approximate Property Boundary
<ul style="list-style-type: none"> — Leachate Line 		

Buena Vista County Sanitary
 Landfill
 Storm Lake, Iowa
 Project No: 27223146.25
 Drawing Date: January
 2025

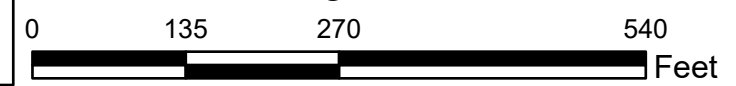
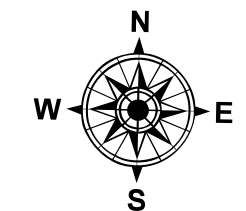


Figure 1

GEOGRAPHIC INFORMATION SYSTEMS, HERE, GARMIN, FOUR SQUARE, FICO, METROPCS, USGS, ENR, CIGAR, USGS

2.0 MAINTENANCE

2.1 LAST DATE OF CLEANING AND INSPECTION

The last cleaning and inspection of the leachate control system occurred in the fall of 2018 by Rehab Systems, Inc.

2.2 DATE FOR NEXT CLEANING AND INSPECTION

Cleaning of the leachate collection lines is not scheduled at this time as the lines are closed and leachate is not intentionally being collected.

2.3 MAINTENANCE PERFORMED ON PUMPS, VALVES, TANKS, LAGOONS, CONTROLS, ETC.

There was no maintenance performed on the leachate system during this reporting period.

3.0 PERFORMANCE

3.1 HEAD LEVEL MEASUREMENTS AND LEACHATE ELEVATIONS

Monthly leachate head level measurements were required by Amendment No. 9 dated May 1, 2019 (Doc #95050) to the Landfill's closure permit. The request to suspend the collection of leachate was approved in Amendment No. 10 dated September 3, 2019 (Doc #95828). A provision of the approval included monthly head measurements of the six leachate monitoring wells and the two newly installed head monitoring points in the manholes for twelve months. In conjunction with the 2021 Leachate Control System Performance Evaluation Report (Doc #102680), a request was made to change the frequency of head measurements from monthly to quarterly and to remove measurement point LW-3; these requests were granted in DNR correspondence dated April 4, 2022 (Doc #102718). Graphs showing the historical leachate level trends are included in **Attachment A**.

The representativeness of the collection pipe pressure measurements taken quarterly in 2022 by Evora Consulting was suspect and was investigated further during the January 2023 site visit. The gauges were removed, and manual measurements were obtained; the manual measurements indicated that less than 2 inches of fluid was observed in each collection pipe.

3.2 EFFECTIVENESS OF LEACHATE SYSTEM IN ATTAINING MINIMUM ACHIEVABLE LEVELS

During this reporting period, the leachate wells had thicknesses ranging from 0.01 feet in LW-4 to 4.80 feet in LW-5. The minimum and maximum column thickness values were within historical ranges measured in the last five years for LW-1, LW-2, LW-4, LW-5, and LW-6.

The minimum and maximum for the reporting period and historical column thickness values for each leachate well are provided in **Table 3-1**.

Table 3-1. Reporting Period and Historical Column Thicknesses

Leachate Well	Reporting Period		Historical	
	Minimum (ft)	Maximum (ft)	Minimum (ft)	Maximum (ft)
LW-1	0.03	1.15	0.00	3.85
LW-2	1.91	1.99	0.14	4.24
LW-4	0.01	0.37	0.00	2.43
LW-5	4.72	4.80	1.35	7.85
LW-6	1.03	1.43	0.00	3.98

3.3 VOLUME OF LEACHATE RECIRCULATED

Leachate is not recirculated at the facility.

3.4 VOLUME OF LEACHATE TREATED ON-SITE

Leachate is not treated on-site.

3.5 VOLUME OF LEACHATE TREATED OFF-SITE

Leachate extracted from the Landfill is transported to and treated by the Storm Lake Wastewater Treatment Plant (WWTP). A total of 138,600 gallons of leachate were hauled during the 2024 reporting period.

3.6 STORAGE CAPACITY

On-site leachate storage capacity is approximately 350,000 gallons.

3.7 LEACHATE QUALITY TESTING RESULTS

The leachate treatment agreement issued by the Storm Lake WWTP requires testing of the leachate to be treated. **Attachment B** (Analytical Leachate Test Results) contains the available leachate sample results obtained from the City of Storm Lake WWTP. Previous leachate analytical results are included in **Table 3-2**.

Table 3-2. Leachate Analytical Results Comparison

Sample Location	Date Sampled	Chloride (mg/L)	Ammonia, N (mg/L)	BOD (mg/L)	COD (mg/L)
Leachate Lagoon	3/20/2024		13.5	<11.5	
Leachate Lagoon	9/22/2022	557	2.06	21	220
L5-L6	9/30/2021		515	41	1460
L1-L2	9/30/2021		186	60	1970
Leachate Grab Sample	9/23/2020			29	
Leachate Grab Sample	9/22/2020			80	
Leachate Grab Sample	9/21/2020			75	
Leachate Grab Sample	6/30/2020			21	
Leachate Grab Sample	6/24/2020			>740	
Leachate Grab Sample	6/23/2020			11	
Leachate Grab Sample	6/16/2020			17	
Leachate Grab Sample	6/15/2020			29	
Leachate Grab Sample	6/12/2020			<7	
Leachate Lagoon	6/8/2020		12	5	
Leachate Grab Sample	1/10/2020			23	
Leachate Grab Sample	1/9/2020			22	
Comp Leachate N	10/7/2019		99.9	196	773
Comp Leachate S	10/7/2019		314	52.7	807
Leachate	4/15/2015		20	65	
Leachate	4/14/2015		35	65	
LW-4	9/22/2015	659			
LW-6	9/22/2015	974			
LW-5	9/22/2015	4830			
Landfill Leachate	8/14/2015			60	
Landfill Leachate	8/12/2015			<35	
Landfill Leachate	8/11/2015			70	
Landfill Leachate	8/5/2015			500	

Notes:

BOD – Biological Oxygen Demand

COD – Chemical Oxygen Demand

4.0 GENERAL COMMENTS

The analysis and opinions expressed in this report are based upon data obtained from the field measurements at the indicated locations and from any other information discussed in this report. This report does not reflect any variations in fluid levels that may occur between measurement locations or across the site. Actual subsurface conditions may vary and may not become evident without further exploration.

SCS has prepared this report for the exclusive use of our client for the specific application to the project discussed, and the report has been prepared in accordance with generally accepted environmental engineering practices. No warranties, either express stated or implied, are intended or made. In the event any changes in the nature or location of leachate accumulations or other subsurface conditions as outlined in this report are observed, the conclusions contained herein cannot be considered valid unless changes are reviewed and the opinions of this report are modified or verified in writing by SCS.

Attachment A
Historical Leachate Column Thicknesses

Table A.1
Historical Leachate Column Thickness
Buena Vista County Landfill
Permit No. 11-SDP-1-74P

Date	LW-1	LW-2	LW-3	LW-4	LW-5	LW-6
Well Depth (ft)	33.35	25.24	52.03	27.23	28.95	22.48
Jan-11	0.25	0.54	17.83	D	5.17	0.88
Feb-11	0.17	0.66	17.78	D	5.22	0.96
Mar-11	0.21	0.64	17.85	D	5.27	1.08
Apr-11	0.23	0.94	17.95	D	5.34	0.88
May-11	0.85	1.24	18.63	D	5.92	0.48
Jun-11	0.25	1.74	19.53	1.23	6.42	3.08
Jul-11	0.85	1.44	19.73	1.33	6.12	3.98
Aug-11	0.05	0.74	18.53	D	5.42	2.98
Sep-11	0.05	1.74	18.53	0.23	5.72	2.48
Oct-11	0.05	1.64	18.43	0.23	5.72	2.48
Nov-11	0.05	1.34	18.13	0.23	5.52	2.28
Dec-11	0.05	1.84	18.13	0.23	5.52	2.28
Jan-12	0.25	0.59	18.13	0.13	5.72	1.18
Feb-12	0.25	0.69	20.63	0.13	4.82	0.98
Mar-12	0.14	0.88	17.23	0.11	5.37	0.66
Apr-12	0.00	0.54	17.43	0.33	5.52	0.58
May-12	0.00	0.14	18.13	0.53	5.32	0.18
Jun-12	0.00	0.44	17.83	0.13	5.02	0.08
Jul-12	0.00	0.59	18.18	D	5.02	0.00
Aug-12	0.00	0.54	18.33	D	4.92	0.00
Sep-12	0.09	0.54	18.13	D	5.22	0.32
Oct-12	0.00	0.44	17.08	D	5.30	0.38
Nov-12	0.00	0.54	17.83	D	5.12	0.38
Dec-12	0.00	0.44	17.93	D	5.22	0.28
Jan-13	0.00	0.64	19.33	D	5.02	0.00
Feb-13	0.00	0.34	17.53	D	5.52	0.88
Mar-13	0.00	0.44	17.63	D	5.62	0.98
Apr-13	0.00	0.54	17.73	1.53	5.02	0.00
May-13	0.00	0.54	17.73	1.53	5.02	0.00
Jun-13	0.00	0.44	17.73	1.53	4.92	0.00
Jul-13	0.00	0.74	17.53	1.63	4.92	0.00
Aug-13	0.00	0.74	17.63	0.63	4.52	0.00
Sep-13	0.05	0.44	17.43	D	5.52	0.98
Oct-13	0.15	0.34	17.53	D	5.62	0.98
Nov-13	0.05	0.44	17.03	D	5.22	0.78
Dec-13	0.05	0.14	17.23	D	5.32	0.88

Table A.1
Historic Leachate Column Thickness
Buena Vista County Landfill
Permit No. 11-SDP-1-74P

Date	LW-1	LW-2	LW-3	LW-4	LW-5	LW-6
Well Depth (ft)	33.35	25.24	52.03	27.23	28.95	22.48
Jan-14	0.05	0.14	17.23	D	5.32	0.88
Feb-14	0.05	0.14	17.23	D	5.32	0.88
Mar-14	0.05	0.14	17.23	D	5.22	0.88
Apr-14	0.05	0.14	17.33	D	4.96	0.88
May-14	0.05	0.14	17.33	D	5.32	0.88
Jun-14	0.05	0.14	17.33	1.43	5.12	0.88
Jul-14	0.05	0.54	17.33	1.53	5.02	0.88
Aug-14	0.05	0.54	17.33	1.53	5.02	0.78
Sep-14	0.05	0.39	17.38	1.38	5.22	1.16
Oct-14	0.05	0.34	17.33	0.93	5.37	1.43
Nov-14	0.05	0.44	17.03	D	5.42	0.08
Dec-14	0.05	0.44	16.63	2.43	5.42	0.00
Jan-15	0.35	0.64	18.03	D	5.42	0.88
Feb-15	0.15	0.36	17.13	D	5.67	0.74
Mar-15	0.15	0.44	17.13	D	5.72	0.88
Apr-15	0.15	0.40	17.23	0.13	5.62	0.66
May-15	0.15	0.40	16.73	0.43	4.72	0.63
Jun-15	0.15	0.38	17.28	D	4.82	0.58
Jul-15	0.15	0.34	17.43	D	4.87	0.63
Aug-15	0.15	0.44	17.47	D	4.68	1.08
Sep-15	0.25	0.59	17.13	0.63	5.02	1.58
Oct-15	0.15	0.54	17.28	0.43	4.80	1.43
Nov-15	0.25	0.19	17.13	D	5.37	1.18
Dec-15	0.15	0.84	17.63	0.43	5.62	1.08
Jan-16	0.05	0.94	16.63	0.33	7.52	0.08
Feb-16	0.45	0.84	17.33	0.83	5.92	0.08
Mar-16	0.85	0.84	17.23	0.73	5.92	0.08
Apr-16	0.55	1.04	17.13	1.13	4.72	0.08
May-16	0.05	0.84	15.73	1.83	4.92	0.98
Jun-16	0.15	0.64	17.43	0.83	4.52	0.88
Jul-16	0.05	0.44	17.33	0.53	4.32	0.68
Aug-16	0.45	0.84	17.33	0.73	5.12	1.08
Sep-16	0.55	0.84	17.33	0.83	5.12	1.08
Oct-16	0.75	0.84	17.43	1.83	5.82	1.18
Nov-16	0.65	0.84	17.23	1.73	5.62	0.98
Dec-16	0.75	0.84	17.23	1.23	5.62	1.18

Table A.1
Historic Leachate Column Thickness
Buena Vista County Landfill
Permit No. 11-SDP-1-74P

Date	LW-1	LW-2	LW-3	LW-4	LW-5	LW-6
Well Depth (ft)	33.35	25.24	52.03	27.23	28.95	22.48
Jan-17	0.55	0.84	17.13	0.13	5.62	1.28
Feb-17	0.55	0.94	17.13	0.03	5.72	1.18
Mar-17	0.75	1.04	17.33	0.23	5.92	1.38
Apr-17	0.85	1.04	17.08	1.63	4.72	0.98
May-17	0.45	1.14	16.53	0.33	4.32	1.18
Jun-17	0.45	0.94	16.53	0.03	4.32	0.88
Jul-17	0.25	1.04	16.33	0.03	4.22	0.98
Aug-17	0.65	1.14	16.68	2.03	5.12	1.38
Sep-17	0.75	1.14	16.68	D	5.02	1.28
Oct-17	0.95	1.14	16.53	D	5.42	0.68
Nov-17	1.05	3.44	26.53	0.43	5.35	1.38
Dec-17	1.15	4.04	25.83	D	4.75	1.08
Jan-18	0.85	1.24	16.43	0.33	4.85	1.28
Feb-18	0.45	1.04	14.53	0.33	4.75	1.08
Mar-18	0.25	0.84	14.53	0.33	4.55	0.88
Apr-18	0.05	1.24	14.43	0.33	4.65	1.08
May-18	0.45	1.24	14.43	0.83	5.05	1.18
Jun-18	0.25	1.04	23.53	0.73	5.15	1.28
Jul-18	1.15	0.74	24.23	1.03	5.75	1.28
Aug-18	0.65	0.64	24.33	0.93	5.25	0.78
Sep-18	0.85	1.34	D	D	5.03	1.28
Oct-18	0.85	1.44	D	D	6.05	1.28
Nov-18	0.95	1.34	D	D	5.45	1.38
Dec-18	1.05	1.54	D	D	5.45	1.38
Jan-19	1.15	1.74	F	F	5.45	1.38
Mar-19	1.35	1.74	F	F	5.85	0.38
Apr-19	0.95	1.54	28.23	0.03	5.95	1.48
Jul-19	3.85	2.24	28.33	0.23	5.95	1.48
Sep-19	1.45	2.74	28.33	0.33	5.85	0.38
Oct-19	1.15	1.94	14.03	1.73	5.65	1.88
Nov-19	0.55	0.84	29.13	0.03	5.75	1.38
Dec-19	1.25	0.94	29.23	0.03	6.75	1.28

Table A.1
Historic Leachate Column Thickness
Buena Vista County Landfill
Permit No. 11-SDP-1-74P

Date	LW-1	LW-2	LW-3	LW-4	LW-5	LW-6
Well Depth (ft)	33.35	25.24	52.03	27.23	28.95	22.48
Feb-20	0.75	1.44	14.03	D	1.35	0.98
Mar-20	-	-	-	-	-	-
Apr-20	-	-	-	-	-	-
May-20	0.85	1.74	14.03	D	4.45	0.98
Jun-20	-	-	-	-	-	-
Jul-20	D	1.34	14.03	D	5.05	D
Sep-20	-	-	-	-	-	-
Oct-20	0.85	1.04	14.03	D	3.95	1.28
Jan-21	1.35	4.24	14.03	D	D	D
Feb-21	1.35	D	14.03	D	4.92	D
Mar-21	1.10	1.85	14.03	D	4.63	1.10
Apr-21	0.85	D	14.03	D	D	0.38
May-21	1.35	D	14.03	D	D	0.18
Jun-21	0.98	1.79	14.03	D	4.68	1.34
Jul-21	1.35	0.74	14.03	D	D	0.18
Aug-21	1.35	0.64	14.03	D	D	0.18
Sep-21	0.95	1.74	14.03	D	4.92	1.48
Oct-21	0.25	0.54	14.03	D	1.42	D
Dec-21	0.61	2.13	14.03	D	4.78	1.39
Mar-22	0.27	F	D	F	4.77	1.14
Jun-22	0.20	1.95	D	0.89	4.86	2.42
Sep-22	0.43	1.70	D	D	4.83	3.25
Nov-22	0.39	1.84	D	D	4.71	1.46
Jan-23	0.37	1.68	R	D	4.80	3.21
Jun-23	NM	NM	R	NM	NM	NM
Sep-23	0.05	1.93	R	D	4.52	1.33
Dec-23	0.18	1.92	R	D	5.00	1.24
Mar-24	0.03	1.93	R	D	4.81	1.00
May-24	0.15	1.99	R	0.70	4.83	1.43
Jul-24	0.39	1.90	R	D	4.75	1.14
Oct-24	0.20	1.91	R	D	4.77	1.03

Notes:

NM - Not measured.

R - Removed measurement point.

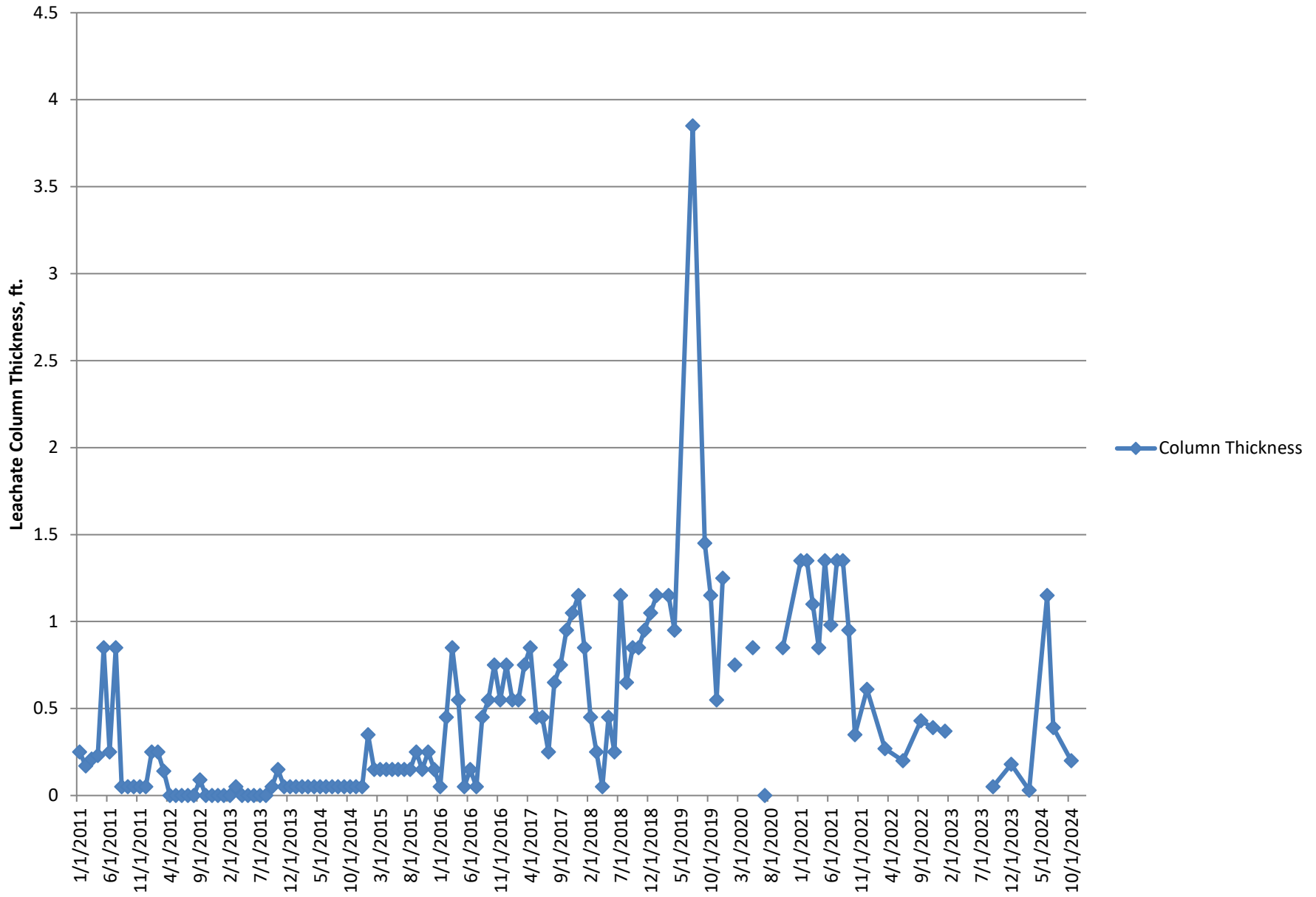
D - Dry.

F - Frozen.

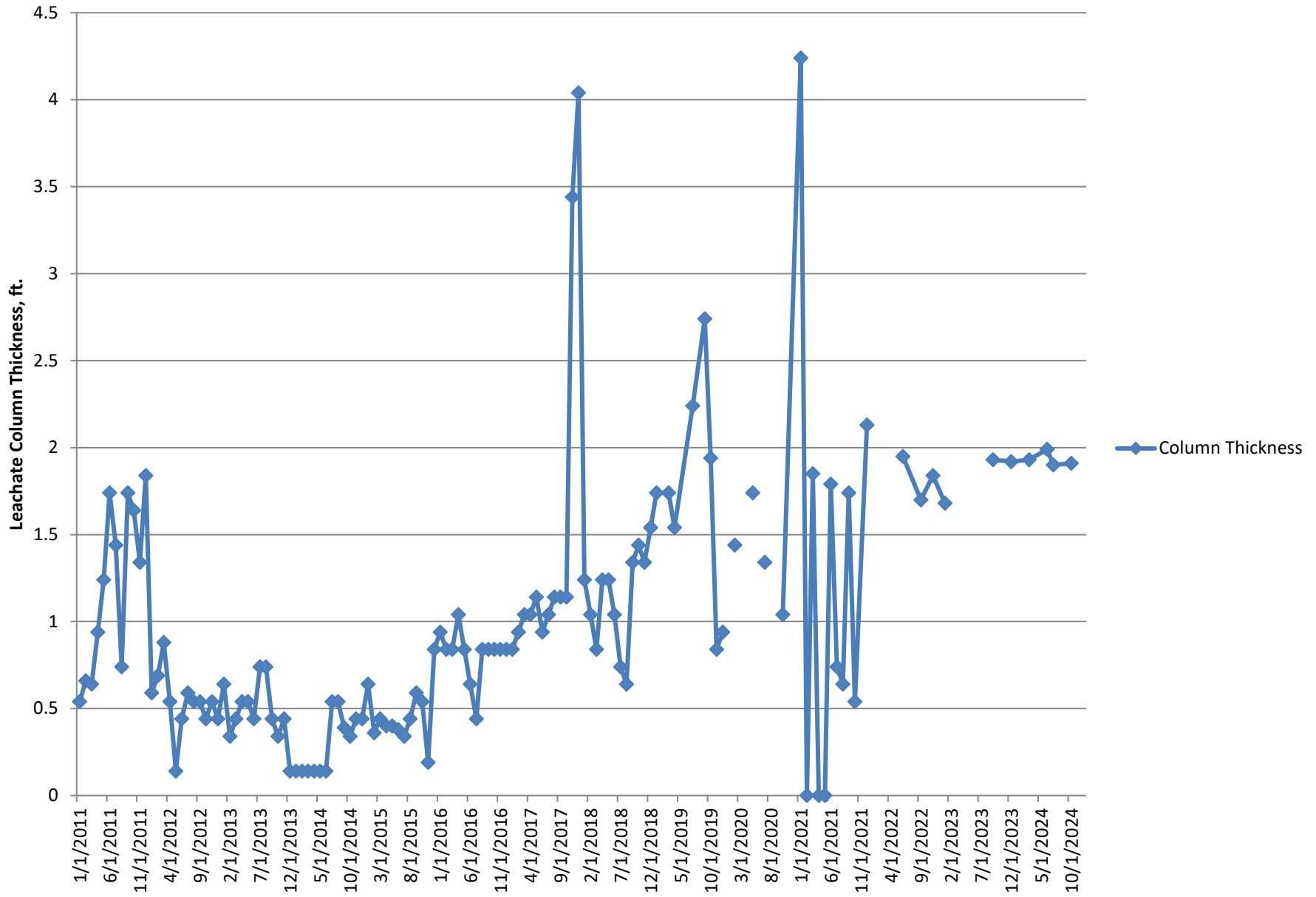
1) It should be noted that the 2023 Q2 measurements were inadvertently missed.

2) Measurements recorded in March, April, June, and September 2020 appeared erroneous and were removed from the dataset.

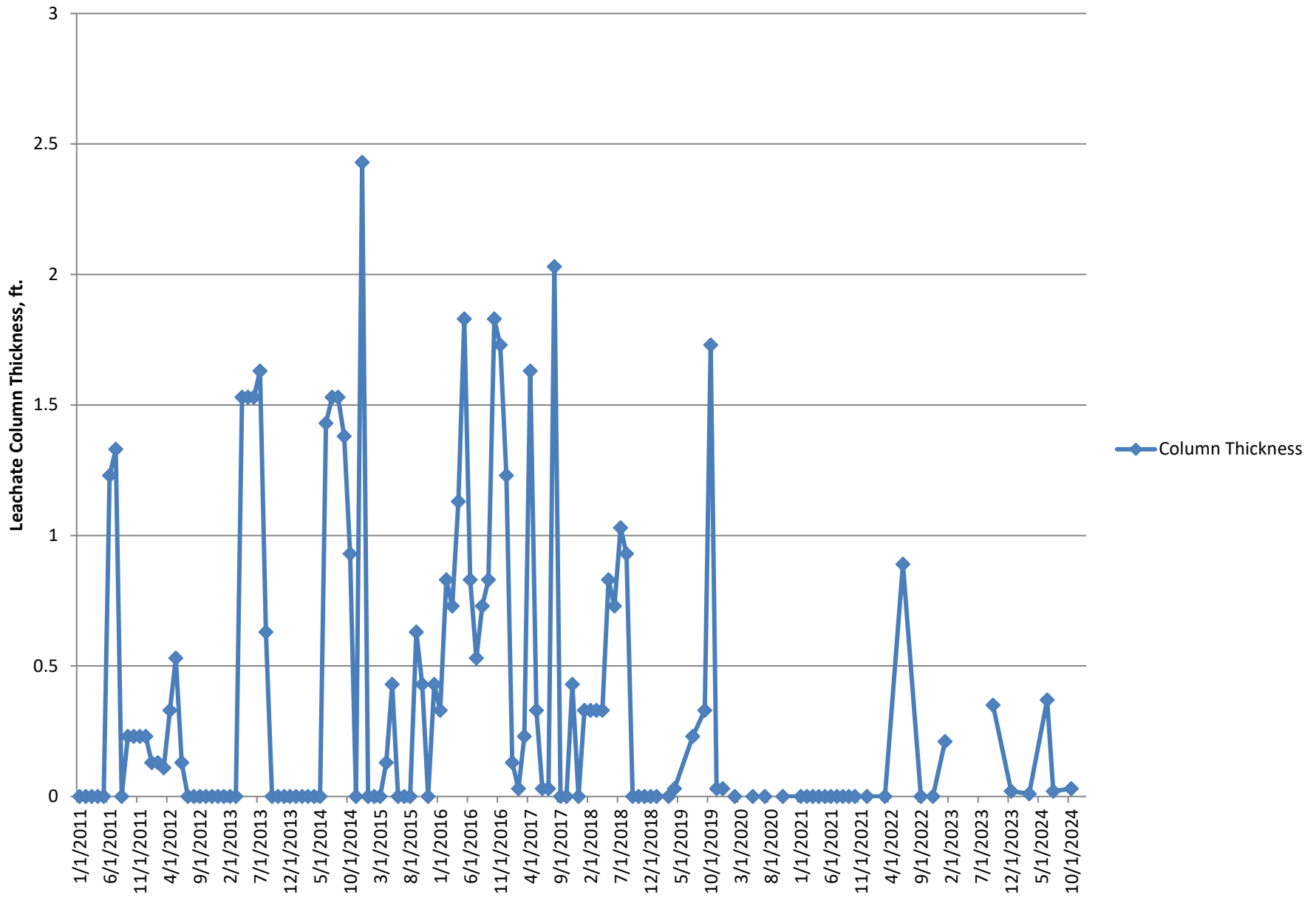
LW-1



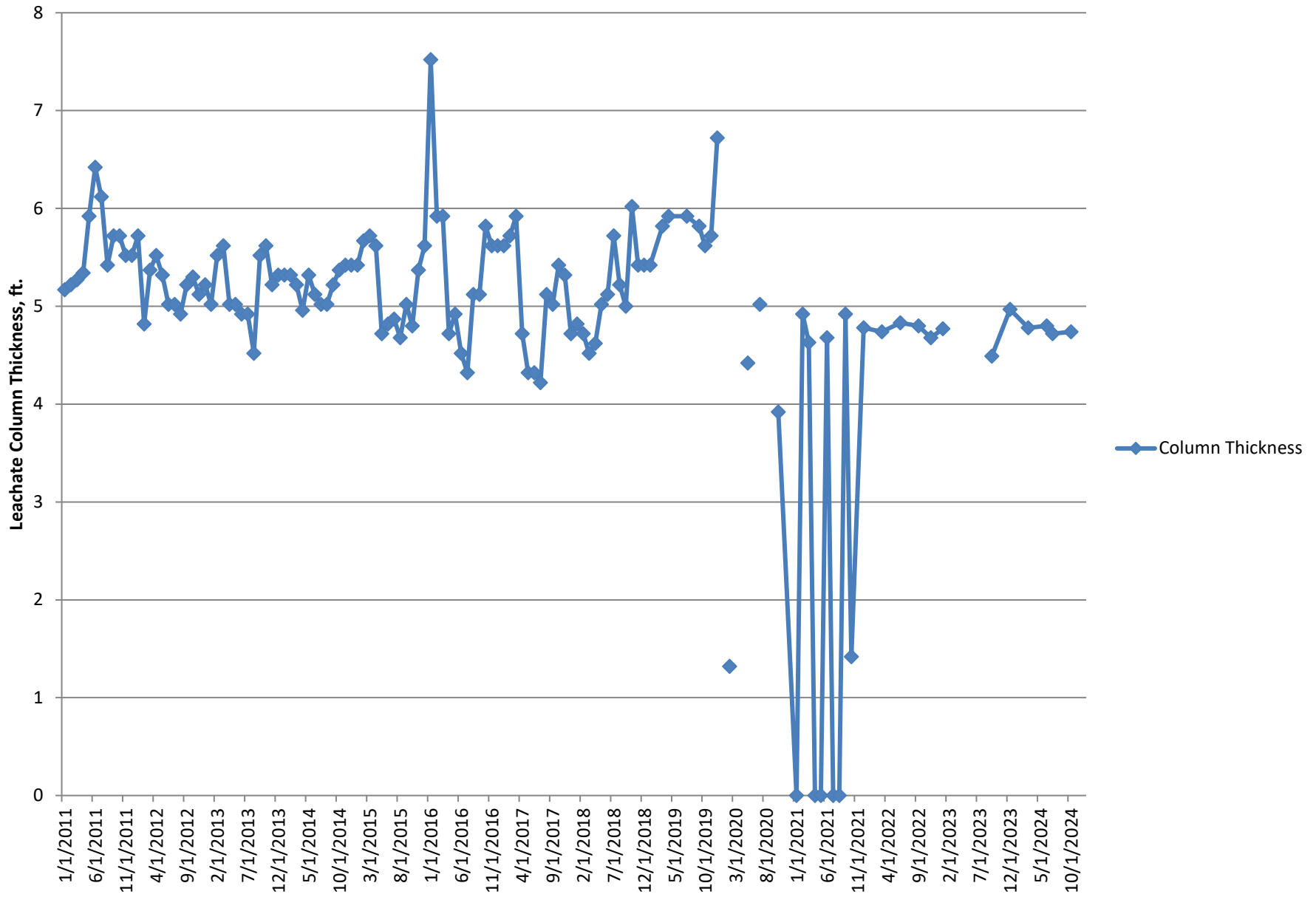
LW-2



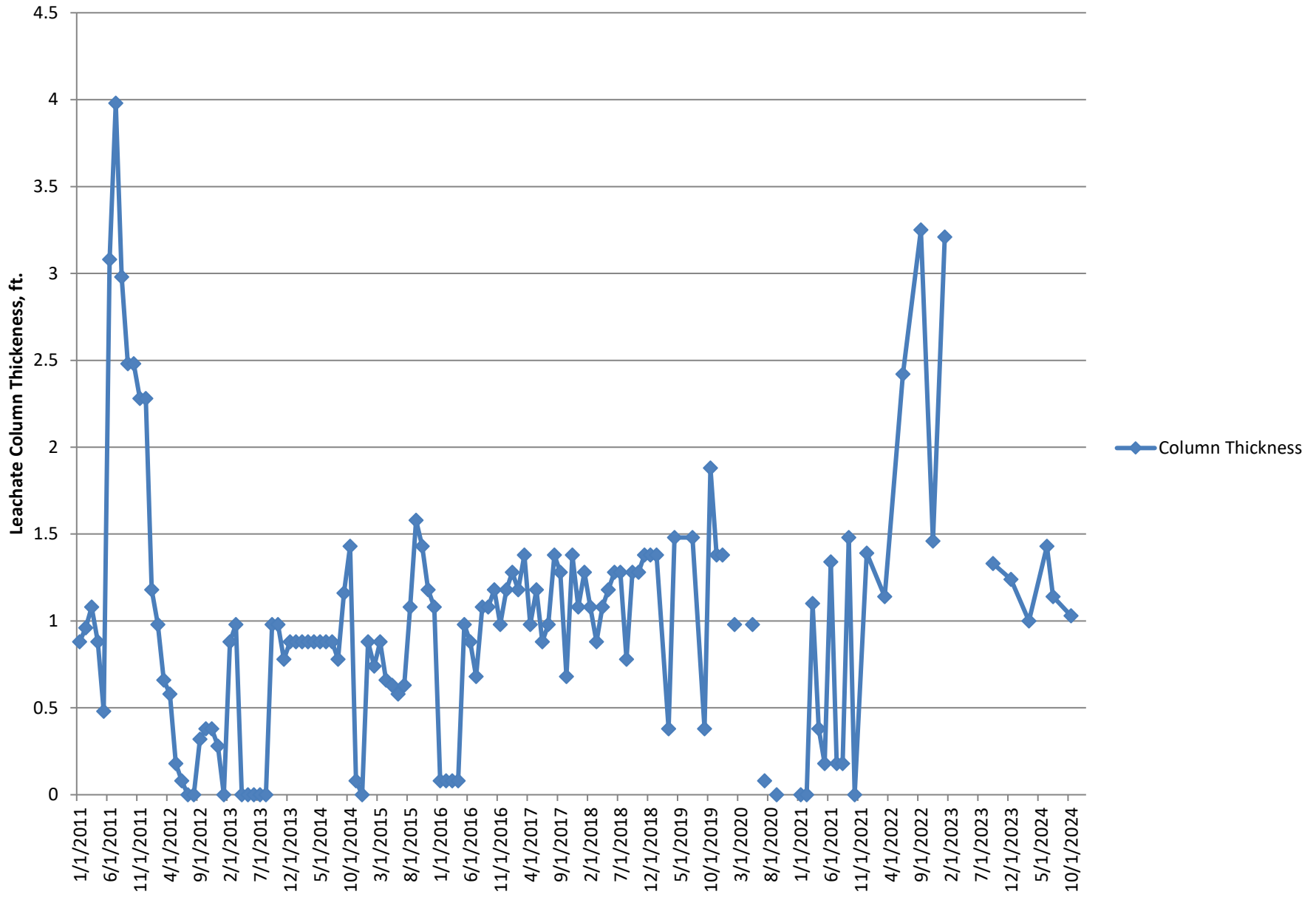
LW-4



LW-5



LW-6



Attachment B
Analytical Leachate Test Results



Certificate of Analysis

Report Date: 3-26-2024
Report Number: 24-086-0020
Lab ID Number: 24009688

Buena Vista County Solid Waste Commission
PO Box 1051
Storm Lake, IA 50588

Date Submitted: 3-20-2024
Date Received: 3-20-2024
Contact: Lori Dicks

Sample Description: Landfill Leachate Lagoon
Sampled: 3-20-2024 @ 8:00 by LD
Received: 3-20-2024 @ 11:21 by BR (8.8°C)

Test Requested	Result	Analysis Date / Time	Analyst	Method
BOD (mg/L)	< 11.5	3-20-2024 14:34	EW	SM 5210B - 2011
Total Kjeldahl Nitrogen (mg/L)	18.3	3-22-2024 8:41	HS	CFR PAI-DK03
Total Suspended Solids (mg/L)	29.5	3-21-2024 12:47	AH	SM 2540 D - 2011
Ammonia as N (mg/L)	13.5	3-25-2024 9:22	HS	SM 4500 NH3C - 2011
Arsenic (ppm)	< 0.02	3-22-2024 14:38	EB	EPA 200.8 (mod)
Barium (ppm)	0.296	3-22-2024 14:38	EB	EPA 200.8 (mod)
Cadmium (ppm)	< 0.0004	3-22-2024 14:38	EB	EPA 200.8 (mod)
Chromium (ppm)	< 0.002	3-22-2024 14:38	EB	EPA 200.8 (mod)
Copper (ppm)	< 0.002	3-22-2024 14:38	EB	EPA 200.8 (mod)
Iron (ppm)	6.78	3-22-2024 12:08	EB	SM 3120 B - 2011
Lead (ppm)	< 0.001	3-22-2024 14:38	EB	EPA 200.8 (mod)
Nickel (ppm)	0.0254	3-22-2024 14:38	EB	EPA 200.8 (mod)
pH	7.88	3-20-2024 14:24	RT	SM 4500-H B - 2011
Selenium (ppm)	0.0099	3-22-2024 14:38	EB	EPA 200.8 (mod)
Silver (ppm)	< 0.002	3-22-2024 14:38	EB	EPA 200.8 (mod)
Total Dissolved Solids (mg/L)	1394	3-21-2024 7:58	JRS	SM 2540C - 2011
Zinc (ppm)	0.00917	3-22-2024 14:38	EB	EPA 200.8 (mod)

Comments

Foundation Analytical Lab (IDNR Lab #396, USEPA Lab #IA01138) is certified by the Iowa Department of Natural Resources for the testing of wastewater and drinking water.


Upon receipt sample met requirements for analysis EXCEPT pH guidelines not met and maximum hold time exceeded (pH).

Respectfully submitted by

Molly Lundsgaard
Laboratory Administrator

**** End Certificate of Analysis ****

Samples were received in acceptable condition unless denoted in the comments section of this report. Any temperature(s) recorded at receipt are + / - 1°C. All data for this report has been approved by Foundation Analytical Laboratory Management. The results depicted in this report apply to samples as submitted. It is not possible for Foundation Analytical Laboratory to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by Foundation Analytical Laboratory. As a mutual protection to clients, the public, and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.



Appendix B
2024 Landfill Gas Annual Report

Landfill Gas Monitoring - Field Measurement Recording Sheet
2024 Methane Monitoring Event - Q1
January - March 2024

Name of Facility: Buena Vista County Solid Waste Commission

Monitoring Equipment Used: RAE

Date of Measurement: 3/5/2024

Equipment Calibration Date: 3/5/2024

Equipment Calibration Time: 3:30 PM

Weather Conditions:

Name of Sampler: Konner Roth

Temperature: 55°F

Barometric Pressure: 30.70" Hg

Other: Wind 5-10 mph, Sunny

Compliance Sample Points	Measured Well Depth (ft)	Static Water Level (ft)	Groundwater Elevation	Top of Screen Elevation	Screen Exposed	Methane Concentration % of LEL	Comments
LFGW-2	28.00	27.25	1354.50	1374.22	yes	52%	
LFGW-3	18.35	9.09	1346.30	1349.97	yes	0%	
LFGW-4	12.76	4.95	1378.22	1379.95	yes	0%	
PZ-4C	13.87	8.57	1360.24	1360.76	yes	0%	
Additional Sample Points							
GV-1	30.15	29.45	1347.38	1366.72	yes	1%	
GV-2	29.39	28.83	1353.38	1372.17	yes	0%	
GV-3	29.29	29.20	1356.03	1376.25	yes	0%	
GV-5	25.50	25.30	1359.15	1374.29	yes	99%	Communication with the DNR on 12/6/2023 determined that because methane was not measured in GV-6, no further action was required with regard to this measurement.
GV-6	25.42	25.40	1355.14	1369.83	yes	0%	

Landfill Gas Monitoring - Field Measurement Recording Sheet
2024 Methane Monitoring Event - Q2
April - June 2024

Name of Facility: Buena Vista County Solid Waste Commission

Monitoring Equipment Used: RAE

Date of Measurement: 6/4/2024

Equipment Calibration Date: 6/4/2024

Equipment Calibration Time: 11:00 AM

Weather Conditions:

Name of Sampler: Cole Tesar

Temperature: 70°F

Barometric Pressure: NM

Other: None

Compliance Sample Points	Measured Well Depth (ft)	Static Water Level (ft)	Groundwater Elevation	Top of Screen Elevation	Screen Exposed	Methane Concentration % of LEL	Comments
LFGW-2	28.00	26.73	1355.18	1374.22	yes	37%	
LFGW-3	18.26	6.36	1351.61	1349.97	no	0%	
LFGW-4	12.74	3.76	1383.77	1379.95	no	0%	
PZ-4C	13.45	7.21	1361.66	1360.76	no	0%	
Additional Sample Points							
GV-1	NM	NM	NA	1366.72	NA	0%	Vent broken at base.
GV-2	30.18	27.50	1354.71	1372.17	yes	0%	
GV-3	29.20	28.82	1356.50	1376.25	yes	0%	
GV-5	25.30	21.97	1362.48	1374.29	yes	53%	
GV-6	25.40	25.35	1354.78	1369.83	yes	2%	

Landfill Gas Monitoring - Field Measurement Recording Sheet
2024 Methane Monitoring Event - Q3
July - September 2024

Name of Facility: Buena Vista County Solid Waste Commission

Monitoring Equipment Used: RAE

Date of Measurement: 7/9/2024

Equipment Calibration Date: 7/9/2024

Equipment Calibration Time: 11:45 AM

Weather Conditions:

Name of Sampler: Michael Morgan

Temperature: 81°F

Barometric Pressure: 29.90" Hg

Other: Partly Cloudy

Compliance Sample Points	Measured Well Depth (ft)	Static Water Level (ft)	Groundwater Elevation	Top of Screen Elevation	Screen Exposed	Methane Concentration % of LEL	Comments
LFGW-2	28.03	27.08	1354.83	1374.22	yes	21%	
LFGW-3	18.26	8.97	1349.00	1349.97	yes	5%	
LFGW-4	12.75	4.92	1382.61	1379.95	no	7%	
PZ-4C	13.48	7.58	1361.29	1360.76	no	0%	
Additional Sample Points							
GV-1	25.24	23.44	1353.39	1366.72	yes	0%	Vent broken at base.
GV-2	30.15	27.93	1354.28	1372.17	yes	0%	
GV-3	29.22	28.82	1356.50	1376.25	yes	0%	
GV-5	25.30	23.47	1360.98	1374.29	yes	23%	
GV-6	25.41	25.02	1355.11	1369.83	yes	3%	

Landfill Gas Monitoring - Field Measurement Recording Sheet
2024 Methane Monitoring Event - Q4
October - December 2024

Name of Facility: Buena Vista County Solid Waste Commission

Monitoring Equipment Used: RAE

Date of Measurement: 10/3/2024

Equipment Calibration Date: 10/3/2024

Equipment Calibration Time: 1:00 PM

Weather Conditions:

Name of Sampler: Sean Marczewski

Temperature: 76°F

Barometric Pressure: 28.96" Hg

Other: Partly Cloudy,

Compliance Sample Points	Measured Well Depth (ft)	Static Water Level (ft)	Groundwater Elevation	Top of Screen Elevation	Screen Exposed	Methane Concentration % of LEL	Comments
LFGW-2	28.04	27.60	1354.31	1374.22	yes	>100%	
LFGW-3	18.25	9.89	1348.08	1349.97	yes	0%	
LFGW-4	12.76	5.01	1382.52	1379.95	no	0%	
PZ-4C	13.49	8.78	1360.09	1360.76	yes	0%	
Additional Sample Points							
GV-1	30.18	29.43	1347.40	1366.72	yes	0%	Vent broken at base.
GV-2	30.13	28.50	1353.71	1372.17	yes	0%	
GV-3	29.22	29.10	1356.22	1376.25	yes	0%	
GV-5	25.29	24.75	1359.70	1374.29	yes	>100%	Communication with the DNR on 12/6/2023 determined that because methane was not measured in GV-6, no further action was required with regard to this measurement.
GV-6	25.44	25.33	1354.80	1369.83	yes	0%	

Date Saved: 12/20/2023 2:37 PM
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Methane Monitoring Network

Legend		Buena Vista County Sanitary Landfill Storm Lake, Iowa Project No: 27223146.25 Drawing Date: January 2025
<ul style="list-style-type: none"> ▲ Approximate Methane Monitoring Location ▲ Approximate Leachate Monitoring Location ▲ Leachate Manholes 	<ul style="list-style-type: none"> Damaged Leachate Monitoring Location ▲ Approximate Monitoring Well Location - - - Located Waste Boundary (2018) 	

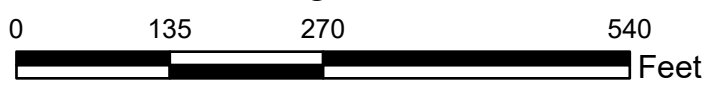
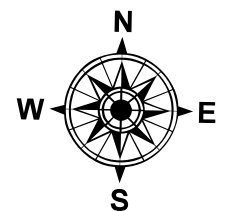


Figure 1