2024 Annual Report

Landfill Gas Performance Monitoring
Go East Landfill/Alpine Estates Development

Prepared for
Century Communities®

Prepared by
Herrera Environmental Consultants, Inc.

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2024 Annual Report

Landfill Gas Performance Monitoring
Go East Landfill/Alpine Estates Development

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Certificate of Professional Engineer

This document has been prepared under the supervision of a professional engineer.

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Introduction

Herrera Environmental Consultants, Inc. (Herrera) is contracted by Century Communities of Washington, LLC (Century Communities®) to support in the operations and maintenance of the landfill gas (LFG) system at the Go East Landfill/Alpine Estates. This Annual Report presents LFG monitoring techniques, data, and results at and around the Go East Landfill/Alpine Estates for the year 2024. This document satisfies the Gas Pathway reporting requirements of the Landfill Gas Monitoring and Contingency Plan (LFGMCP) and the Go East Solid Waste Facility Permit.

Summary

This Annual Report provides relevant information pertaining to the LFG control and collection system at the Go East Landfill/Alpine Estates and results of the 2024 LFG compliance monitoring as set forth in the LFGMCP and the Go East Solid Waste Facility Permit. Annual LFG compliance monitoring for 2024 included methane monitoring at LFG probes and methane surface monitoring. Data presented in this report was collected by Herrera staff.

In 2024 Herrera continued routine LFG monitoring at the Go East Landfill/Alpine Estates property and saw exceedances of the Washington Administrative Code (WAC) 173-350-400 lower explosive limit (LEL) of 5 percent by volume methane at most of the perimeter soil gas probes. This has been typical since monitoring began at the landfill in November 2022. At the end of 2024, four of the 12 perimeter probes were still reading above 5 percent by volume methane; however, this number is down from 10 perimeter probes in exceedance in June 2024. Monitoring of surface emissions and house ventilation trench monitoring stations has shown that the methane observed in the probes is not migrating to the surface or underneath homes. Herrera believes the environmental controls, monitoring, and contingency response measures installed and performed for the Alpines Estates homes provide safeguards against the potential threat of persistent methane outside the landfill. The network of house ventilation trench monitoring stations below each of the 96 houses planned for the Alpine Estates development provides a large footprint for monitoring and evaluating LFG migration while additional investigations and contingency measures are done to mitigate the presence of LFG in the deep soils of the property.

Background

The project site is located at 4330 108th Street Southeast, Everett, Washington. It was operated as an excavation and sand reclamation site from 1969 through 1971. Between 1972 and 1977, the landfill operator, Rekoway, Inc. (Rekoway), accepted wood waste debris and concrete solid material that was compacted and placed in sealed cells—before the site was initially closed in 1978. With Go East Corporation (Go East) as the Owner/Operator, the site reopened in 1979 and accepted wood waste placed in enclosed cells from 1979 to 1983. After this period, the landfill ceased all operations. In 2009, the property was purchased by P&GE, LLC (P&GE). In July 2022, P&GE completed landfill closure in accordance with the Go East Landfill Closure Plan that was approved by Snohomish County Health Department (SCHD) under its Solid Waste Facility Permit #PT0004938 (SW-027).

Closure involved reducing the landfill size, from approximately 10 acres to approximately 6 acres, by excavating the landfill edges and relocating the landfill material found there to the remaining landfill area. The excavated portion was designated as the "Wedge" area, where the excavation would be refilled with onsite and imported material. The remaining landfill area was closed in accordance with current standards and codes, in compliance with the various permits and approvals. Specific capping materials and environmental controls installed as part of the closure are discussed in the following section. P&GE also assembled the plans and permits associated with placing a housing community on the parcel around the closed landfill. In May 2022, Century Communities of Washington, LLC purchased the redevelopment project from P&GE and began installation of the utilities for the planned housing community. Snohomish County Planning and Development Services approved the final plat for the Alpine Estates, A Plat Community, on September 27, 2023. This plat map establishes residential property boundaries in close proximity to the final landfill boundary.

The closed landfill itself, each individual enclosed Alpine Estates home, and the sewer lift station electrical building (electrical building) were constructed with an LFG control system designed to collect any LFG and convey it to vent pipes that will release the gas a safe distance away from any receptor. The LFG control system acts as the primary line of defense against LFG migration beyond the landfill boundary. The individual LFG control systems for each Alpine Estates home and the electrical building are designed as a protective measure should any LFG migrate from the closed landfill. Figure 1 depicts the LFG monitoring locations and the reduced and capped landfill area.

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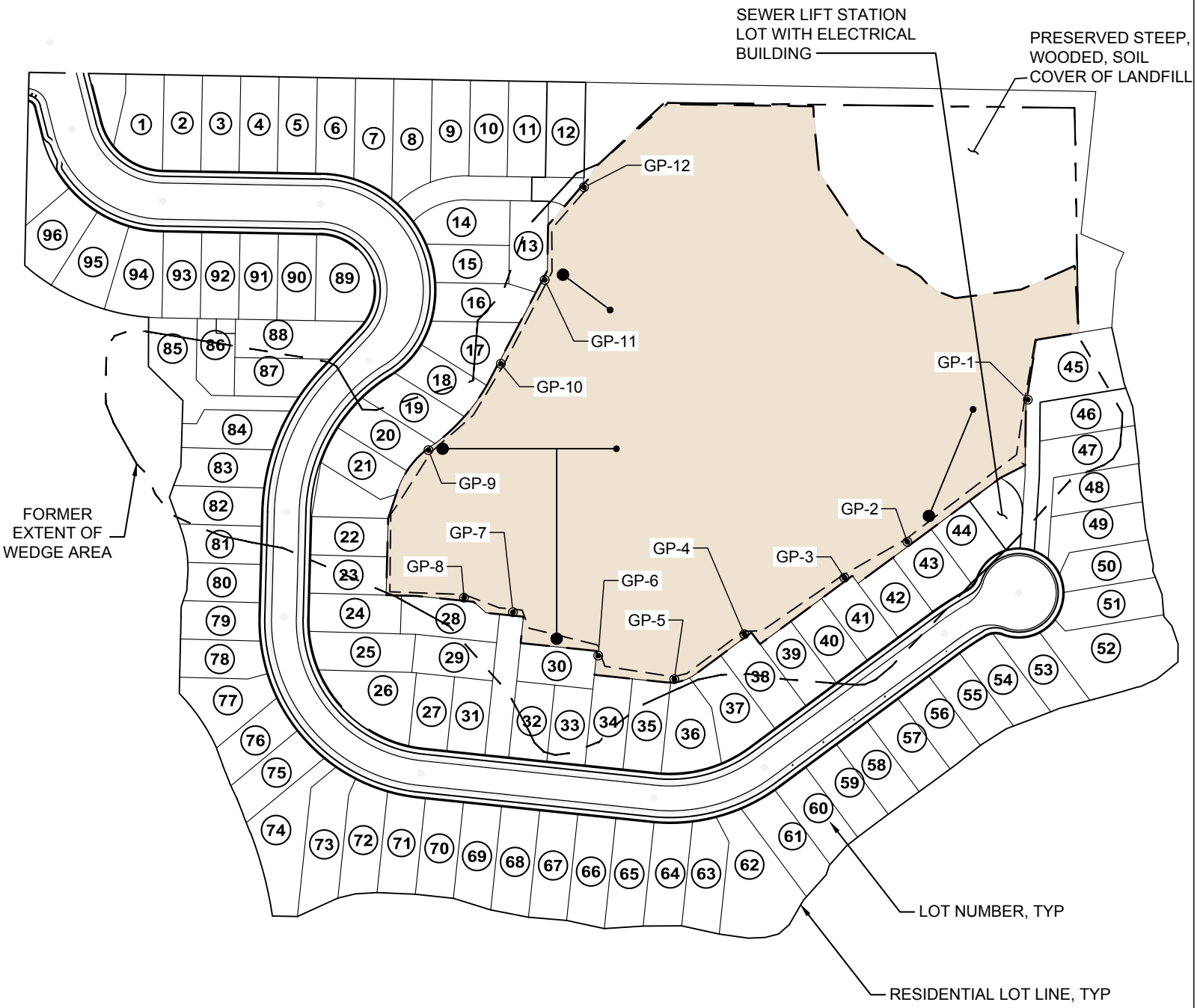
Figure 1.
Landfill Gas Monitoring Locations.



LEGEND

◉ GP-#	LANDFILL PERIMETER SOIL GAS PROBE	— — — —	GRAVEL TRENCH WITH 2 IN PERF PIPE
●	LANDFILL GAS SUMP	———	GRAVEL TRENCH WITH 2 IN PIPE
•	LANDFILL GAS VENT	▭	CAPPED AND CLOSED LANDFILL AREA

Go East Landfill

The closed landfill has an engineered final cover constructed of the following layers (from top to bottom):

- A minimum of 12 inches of topsoil
- A minimum of 12 inches of onsite sand
- Geocomposite (200-mil [200 thousandths of 1 inch] GSE® Fabrinet double-sided composite, with 6-ounce nonwoven geotextile)
- Geomembrane (40-mil GSE® UltraFlex, linear low-density polyethylene, double-sided, textured)
- A minimum 6-inch bottom layer of onsite sand

As the gas rises, it encounters the impenetrable surface and travels horizontally to the gravel-filled methane vent trench system located at the perimeter of the closed landfill. The trench was excavated to native soil with variable dimensions to match site conditions and filled with gravel. A geomembrane liner was placed on the outside of the methane vent trench and welded to the geomembrane liner of the landfill cover. The trench contains a 2-inch-diameter, perforated collection pipe that conveys the gas to one of four sump-like structures for continuous gas monitoring. Gas is conveyed from these four sumps to one of three horizontal pipes that extend to vertical vent pipes that discharge the gas 10 feet above grade. The vent pipes are located more than 100 feet from any buildable lot. Twelve gas perimeter monitoring probes were installed between the landfill containment system and the property boundary, and these probes extend into native soils (Vikek Environmental Engineers, 2022).

In 2022, in response to monitoring data (discussed in later sections), Herrera installed wind-driven turbine exhaust ventilators on top of each vent pipe to create pull and encourage increased LFG collection. In 2023, when that was observed to not sufficiently draw LFG away from the perimeter, Herrera installed a portable soil vapor extraction unit (blower) near GP-7 to provide vacuum on the perimeter trench through the sump near GP-7. Discharge was routed through the LFG Vent connected to sumps by GP-7 and GP-9. Other contingency measures were implemented in 2023 to try to bring methane levels down. These included leaving the probe valves open to vent, converting the collection system from passive to active with installation of a blower, and connecting the blower to several probes for individual vacuum extraction. In 2024, caps were added to vent pipe connections at the sumps by GP-11 and GP-2 to prevent atmospheric air from being pulled into the trench and to increase vacuum influence on the landfill perimeter trench. The vent pipe connection at the sump near GP-9 was also capped to prevent recirculation of LFG through the collection system.

Table 1 summarizes the relevant historical landfill operations and closure activities.

Table 1. Summary of Go East Landfill Operation and Closure Activities.	
Date	**Description**
1969–1971	• Operated as excavation and sand reclamation site
1972	• Accepted wood debris and concrete solid material that was compacted and placed in sealed cells
1978	• Initial closure
1979–1983	• Reopened with Go East Corporation as Owner/Operator; accepted wood waste placed in enclosed cells until 1983
1983	• All landfill operations ceased.
2009	• Purchased by P&GE
2021–2022	• Landfill closure was conducted by P&GE, with a minimum 12 inches of topsoil, 12 inches of onsite sand, geocomposite, geomembrane, and a 6-inch bottom layer of onsite sand. • Passive LFG system was built. Gravel-filled trenches at the landfill perimeter were excavated to native soil and laid with 2-inch diameter perforated pipes to direct gas to sump-like structures for continuous monitoring. The geomembrane liner on the outside of the trench is welded to the geomembrane liner of the landfill cover. Gas is conveyed from sumps to discharge pipes and vented 10 feet above grade. Gas is vented more than 100 feet from any buildable lot. • Twelve gas perimeter monitoring probes were installed between the landfill containment system and the property boundary, extending into native soils.
2022	• Century Communities of Washington, LLC purchased the redevelopment project. • Herrera repaired the perimeter soil gas probe casings to prepare them for routine monitoring. • Herrera began investigative LFG monitoring. • Herrera installed wind-driven turbine exhaust ventilators on top of each vent pipe to create pull and encourage increased LFG collection.
2023	• Herrera placed a blower on the landfill to turn passive collection into active collection and improve LFG extraction. The blower was installed near GP-7 to provide vacuum on the perimeter trench through the sump near GP-7. Discharge was routed through the LFG Vent connected to sumps by GP-7 and GP-9. • Herrera began LFG investigation and implemented contingency measures to reduce methane levels, including leaving the probe valves open to vent, turning the blower on and off to see if perimeter probe methane levels correlated, and connecting the blower to several probes for individual vacuum extraction.
2024	• Herrera began LFG compliance monitoring. • Caps were added to vent pipe connections at the sumps near GP-11 and GP-2, to prevent atmospheric air from being pulled into the trench and to increase vacuum influence on the landfill perimeter trench. The vent pipe connection at the sump near GP-9 was also capped to prevent recirculation of LFG through the collection system. • LFG sample was collected from the landfill collection trench for analysis, to begin the process of upsizing the blower unit and ensuring compliance with air emissions.

Alpine Estates Development

As shown in Figure 1, Alpine Estates homes are situated within 1,000 feet of the Go East Landfill. The Landfill Closure Plan and the Plat Map for the Alpine Estates Community require that the homes be constructed with gas barrier and ventilation systems that are protective against methane produced from the biodegradation of organic waste from the landfill. Methane is an odorless and colorless gas that is non-toxic and creates no hazard to human health when inhaled at the low levels observed in the Alpine

Estates community. Methane is combustible and capable of igniting at concentrations between 5 and 15 percent by volume (i.e., 50,000 and 150,000 parts per million by volume, or ppmV).

Each individual Alpine Estates home, as well as the electrical building, has a gas barrier and ventilation system designed to seal the foundation and collect and convey soil gas to a vent pipe that discharges above the structure. Soil gas can be monitored beneath each structure. The gas barrier and ventilation systems for the Alpine Estates homes and the electrical building provide a protective barrier for any explosive gases that might migrate from the closed landfill.

The electrical building was constructed with a gas mitigation system that includes a gas vapor impervious membrane and underlying passive ventilation system. The electrical building is uninhabited and only accessed occasionally for utility or maintenance purposes. The gas mitigation system design for the electrical building is included in Appendix A of the LFGMCP and is consistent with the Landfill Closure Plan.

For the safety of Alpine Estates homes' residents, in accordance with the nationally recognized Los Angeles Department of Building and Safety Methane Mitigation Standards, a gas barrier, ventilation, monitoring, and detection system will be installed for all Alpine Estates homes, including the 55 homes constructed in 2024. Figure 2 shows the typical details of the gas control system for Alpine Estates homes, and Table 2 summarizes the gas control system feature and the construction quality assurance (CQA) measure implemented.

Figure 2. Typical Gas Control System Details for Alpine Estates Homes.

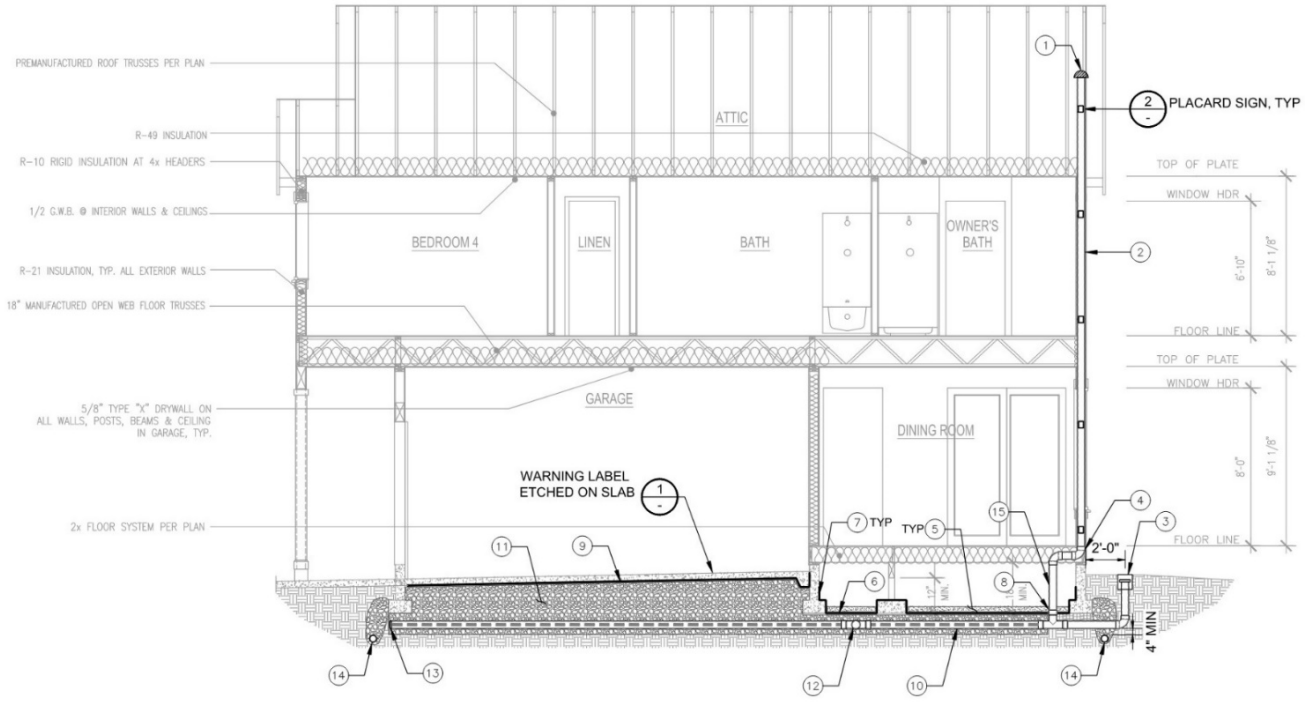


Table 2. Alpine Estates Gas Control Systems and Construction Quality Assurance Measures Implemented.			
Gas Control System Feature	**Callout on Figure 2**	**Description**	**CQA Measure**
Methane ventilation trench	Item 10	Beneath the house footprint and impervious geomembrane are perforated horizontal pipes surrounded by a gravel trench. These trenches provide a preferential pathway for any migrating LFG to be routed through the pipes, into the vents, and exhausted above the house.	Visual confirmation
Impervious geomembrane	Items 6 and 9	An impervious geomembrane is installed above the methane ventilation trench beneath the footprint of each home to provide a barrier to any potential migrating LFG and prevent it from entering the home.	Laboratory test to ensure performance and smoke test(s) using a high volume-low pressure pump and liquid smoke to verify no leaks after installation
Vent riser pipes	Item 2	Two vent riser pipes are attached to the ventilation trench pipe to convey any collected soil gas to be exhausted above the house. Methane gas warning labels are placed on vent riser pipes every five feet.	Air pressure leak test to ensure pipe is capable of holding 4 pounds per square inch for at least 1 hour without losing pressure. Visual confirmation for labels.
Garage stamp	"WARNING LABEL ETCHED ON SLAB"	A stamp is made in the garage to remind occupants of the installed methane gas control barrier below the slab.	Visual confirmation
House ventilation trench monitoring station	Item 3	An additional section of pipe is connected to the ventilation trench and terminates at a monitoring station in the backyard of the house to monitor the composition of gas in the ventilation trench.	Visual confirmation
Continuous gas detection and alarm system	Not called out	Three combustible gas detectors are installed inside the house to provide continuous monitoring of the indoor air of the house. The gas detectors are connected to a central control panel that will alarm if methane is detected at concentrations above 1.25% methane (12,500 ppmV, 25% of the way to becoming potentially explosive) within the house. The combustible gas detectors are placed near the ceiling because methane is lighter than air.	Activation tested to ensure functional
Electrical junction box in crawl space	Not called out	An electrical junction box is installed in the crawl space to provide power for an intrinsically safe fan, such as the Plastec P15 XP, rated for Class 1, Division 1, and Division 2 standards (functions similarly to radon fan). A fan will be installed if methane is detected and confirmed above 0.1% (1,000 ppmV) at the house ventilation trench monitoring station and/or 0.01% (100 ppmV) inside the house, to create an active collection system. The fan should be installed in the crawl space on the above ground segment of PVC pipe before the transition to the cast iron vent riser pipe. The pipe is pressure testing and installed with warning labels to prevent the pipe from leaking soil gas in the event a fan needs to be installed.	Visual

Herrera personnel were present during every stage of construction of the gas barrier, ventilation, and detection system, to ensure all components were installed as designed. Table 3 summarizes the relevant development associated with Alpine Estates.

Table 3. Summary of Alpine Estates Development.

Date	Description
2022	• Century Communities of Washington, LLC purchased the redevelopment Project from P&GE and began installation of the utilities for the planned housing community.
2023	• The electrical building was constructed with a gas mitigation system, including a gas vapor impervious membrane and underlying passive ventilation system consisting of perforated horizontal pipes, gravel blankets, and a vent riser. • The first two Alpine Estates homes were constructed with gas mitigation systems, including gas vapor impervious membranes and underlying passive ventilation systems. • Methane surface emissions monitoring inside Alpine Estates homes while they are being constructed begins.
2024	• 55 Alpine Estates homes were constructed with gas mitigation systems, including gas vapor impervious membranes and underlying passive ventilation systems. • Methane surface emissions monitoring inside Alpine Estates homes while they are being constructed continues.

Landfill Gas Collection System Status

In 2024, the four components of gas monitoring at the Go East Landfill and Alpine Estates Development were as follows:

- LFG Sumps – continuous monitoring within the landfill containment system
- Perimeter Soil Gas Probes – monitoring beyond the landfill containment system
- House Ventilation Trench Monitoring Stations – monitoring beneath Alpine Estates homes
- Indoor Air – monitoring the first-floor interior of Alpine Estates homes and electrical building

Each of these components were monitored, either manually by Herrera personnel or automatically through installed monitors. Table 4 summarizes the LFG monitoring components, their locations, and the frequency of monitoring, as well as the monitoring process and equipment used.

Table 4. Summary of Monitoring Components.

Monitoring Component	Location	Frequency of Routine/Initial Monitoring	Monitoring Process and Equipment Used
LFG Sump	Along gas collection trench within the landfill containment system	Continuous	Automatic with RKI Instruments M2A Transmitter Units
Perimeter Soil Gas Probe	Beyond the landfill containment system adjacent to landfill property boundary	Quarterly	Manual with GEM™ 5000
House Ventilation Trench Monitoring Station	Adjacent to each Alpine Estates home. Connected to perforated collection pipe trenches positioned beneath house footprint	Monthly for first 6 months of home being built (each home)	Manual with GEM™ 5000
Indoor Air	Interior of each Alpine Estates home and electrical building	One time after structure is built (each structure)	Manual with SEM™ 5000
		Continuous[a]	Automatic with Macurco™ GD-2A Model

[a] Only the Alpine Estates homes (not the electrical building) are continuously monitored with installed gas detectors.

Monitoring LFG collection systems serves two purposes: (1) performance monitoring within the system to guide its operation and (2) post-construction compliance monitoring to confirm that the system is mitigating LFG emissions as intended by the Landfill Closure Plan. The LFG conditions were evaluated for operational, supplemental, or regulatory purposes in 2024. Table 5 outlines the regulatory and/or supplemental level at which each of the four monitoring components are evaluated to inform how well the LFG collection and mitigation system is operating and the contingency monitoring action that is triggered when these levels are reached per the LFGMCP. Regulatory compliance criteria for methane are established at the property boundary of the landfill (i.e., the perimeter probes) and indoor air within the structures. Supplemental monitoring levels were established to trigger monitoring at other monitoring components. Supplemental monitoring trigger levels help to ensure methane levels across the Alpine Estates Development remain below regulatory levels.

Table 5. Summary of Monitoring Types and Levels.			
Monitoring Component	**Monitoring Type**	**Methane Level (% by volume)**	**Monitoring Action and Frequency**
LFG Sump	Supplemental	None	N/A
	Regulatory	None	N/A
Perimeter Soil Gas Probe	Supplemental	1%	For home lots, one-time monitoring of house ventilation trench monitoring stations after methane of greater than 1% is detected at the perimeter probe. For electrical building, one-time monitoring of indoor air. Refer to the table in Figure C-1 in Appendix C of the LFGMCP.
	Regulatory	5%	Weekly monitoring of the perimeter probe for 4 weeks until control is established, and then monthly monitoring until methane levels are confirmed to drop below 5%.
House Ventilation Trench Monitoring Station	Supplemental	0.1%	One-time monitoring of indoor air of the home after methane of greater than 0.1% is detected at the associated house ventilation monitoring station.
	Regulatory	None	N/A
Indoor Air	Supplemental	None	N/A
	Regulatory	0.01%	Daily indoor monitoring of the offsite structure until methane levels are confirmed to drop below 0.01%.

Landfill Gas Perimeter Probe Monitoring

Background

A network of soil gas probes is established around the perimeter of the landfill site. The locations of these probes are shown in Figure 1. These probes are used to evaluate whether LFG control systems are effective at controlling methane migration. The primary goal of monitoring is to keep methane levels below regulatory limits. Methane concentrations in soil at the landfill boundary should not exceed the LEL of 5 percent by volume (50,000 ppmV). The LEL represents the lowest concentration of a gas or vapor in air that is capable of producing a flash of fire in the presence of an ignition source.

Methods

Herrera utilized a Landtec GEM™ 5000 unit to measure gas concentrations at probes surrounding the perimeter of the landfill site. The GEM™ 5000 is a handheld portable gas analyzer that measures the concentrations of methane, carbon dioxide, and oxygen. The GEM™ 5000 measures methane and carbon dioxide by dual wavelength infrared cell and oxygen by internal electrochemical cell. The GEM™ 5000 was used in accordance with the LFGMCP.

Twelve probes were monitored in 2024. GP-1 was only monitored once in 2024, before being unintentionally buried under asphalt during construction of the Lot 45 driveway. GP-1 will be uncovered

prior to completion of the Alpine Estates Development in 2025, so it can continue being monitored in the future.

Per Table 4 and the LFGMCP, perimeter soil gas probe should be monitored on a quarterly basis. Since the methane concentrations routinely exceeded the 5 percent regulatory level, Herrera personnel increased the monitoring frequency to weekly in 2024. In accordance with Table 5 and the LFGMCP, when the regulatory threshold of 5 percent is exceeded at the perimeter soil gas probes, weekly monitoring is to take place until control is established and methane levels are confirmed to drop below 5 percent. Levels above 5 percent continued to be observed at certain probes through the end of 2024 so weekly monitoring was continued. LFG monitoring was furthermore conducted during times when LFG is most likely to migrate. Barometric pressure and precipitation influence LFG migration. As a result, LFG monitoring was conducted under the following conditions to the extent possible:

- Barometric pressure was low following at least 2 hours of falling barometric pressure, with a drop of least 0.25 inches of mercury.
- Soils were saturated.
- During the winter, the snow cover was just beginning to melt, or the ground surface was frozen, snow-covered, and/or ice-covered.

Results

Soil gas concentrations collected at the probes along the landfill perimeter are presented per gas probe in Tables 6 to 18. Data since monitoring first began in 2022 is included. LFG composition data was also collected at the blower, to compare the composition of LFG inside the trench to the soil gas beyond the landfill. The blower reads represent the content of LFG collected from the perimeter collection trench with the dilution valve at the blower closed. The dilution valve is operated so that emissions from the LFG Vent connected to sumps by GP-7 and GP-9 are kept below the methane LEL of 5 percent. Figures 3 to 15 show the measured methane values for the gas probes and blower, respectively, plotted against the 5 percent regulatory limit. The figures also show when the blower was in operation and when it was turned off.

GP-1

Table 6. Monitoring Results for Landfill Perimeter Soil Gas Probe Number 1.					
Date	**% Methane**	**% Carbon Dioxide**	**% Oxygen**	**% Balance**	**Actions/Key Dates**
11/2/2022	3.9	27.0	0.0	69.2	
11/23/2022	**8.5**	30.5	0.0	61	
1/13/2023	**10.9**	24.1	0.1	64.9	- Turbine vents installed on LFG vent (12/12/2022–present)
2/23/2023	**6.3**	21.8	0.1	71.8	- Vacuum extraction from methane trench (2/10/2023–6/16/2023) - Probe valve left open to vent (2/23/2023–3/22/2023)
3/3/2023	0.4	3.5	11.8	84.3	
3/10/2023	0.0	0.3	21.2	78.4	
3/22/2023	0.0	0.8	19.6	79.6	- Probe valve closed (3/22/2023–present)
4/1/2023	1.1	15.6	1.3	82	
5/9/2023	0.0	0	19.9	80.1	
6/15/2023	0.0	0.2	19.6	80.1	
6/27/2023	0.5	13.4	0.1	86	- Blower shut off (6/16/2023–6/17/2023) - Vacuum extraction from methane trench (6/17/2023–6/26/2023) - Blower shut off (6/26/2023–7/24/2023)
7/5/2023	0.6	14.4	0.1	84.9	
8/21/2023	0.0	8.3	9.8	81.9	- Vacuum extraction from methane trench (7/24/2023–8/18/2023) - Blower shut off (8/18/2023–8/23/2023)
9/5/2023	0.0	7.3	11.6	81.1	- Vacuum extraction from methane trench (8/23/2023–11/10/2023)
9/22/2023	0.0	1.2	17.5	81.3	
10/21/2023	0.9	20.5	0.1	78.5	
11/1/2023	1.1	20.1	0.1	78.7	
11/10/2023	1.3	12.1	0.1	86.5	- Blower shut off (11/10/2023–6/19/2024)
11/17/2023	1.4	16.9	0.1	81.6	
11/30/2023	1.7	11.8	0.2	86.3	
12/8/2023	1.8	11.1	0.1	87.0	
1/3/2024	1.9	18.7	0.0	79.4	
3/15/2024	Not read due to construction blockage				
4/3/2024	Not read due to construction blockage				
5/1/2024	Not read due to construction blockage				
5/7/2024	Not read due to construction blockage				
5/15/2024	Not read due to construction blockage				
5/21/2024	Not read due to construction blockage				
5/31/2024	Not read due to construction blockage				
6/7/2024	Not read due to construction blockage				
6/25/2024	Not read due to construction blockage				- Vacuum extraction from methane trench (6/19/2024–present)
7/5/2024	Not read due to construction blockage				
7/12/2024	Not read due to construction blockage				
7/16/2024	Not read due to construction blockage				
7/26/2024	Not read due to construction blockage				
8/8/2024	Not read due to construction blockage				- Caps added to the other two vent pipe connections at sumps
8/20/2024	Not read due to construction blockage				
8/24/2024	Not read due to construction blockage				
8/29/2024	Not read due to construction blockage				
9/4/2024	Not read due to construction blockage				
9/19/2024	Not read due to construction blockage				
9/26/2024	Not read due to construction blockage				
10/3/2024	Not read due to construction blockage				
10/8/2024	Not read due to construction blockage				
10/20/2024	Not read due to construction blockage				
10/30/2024	Not read due to construction blockage				
11/8/2024	Not read due to construction blockage				
11/12/2024	Not read due to construction blockage				
11/19/2024	Not read due to construction blockage				- Blower shut off (11/15/2024–present)
11/27/2024	Not read due to construction blockage				
12/2/2024	Not read due to construction blockage				
12/12/2024	Not read due to construction blockage				
12/20/2024	Not read due to construction blockage				

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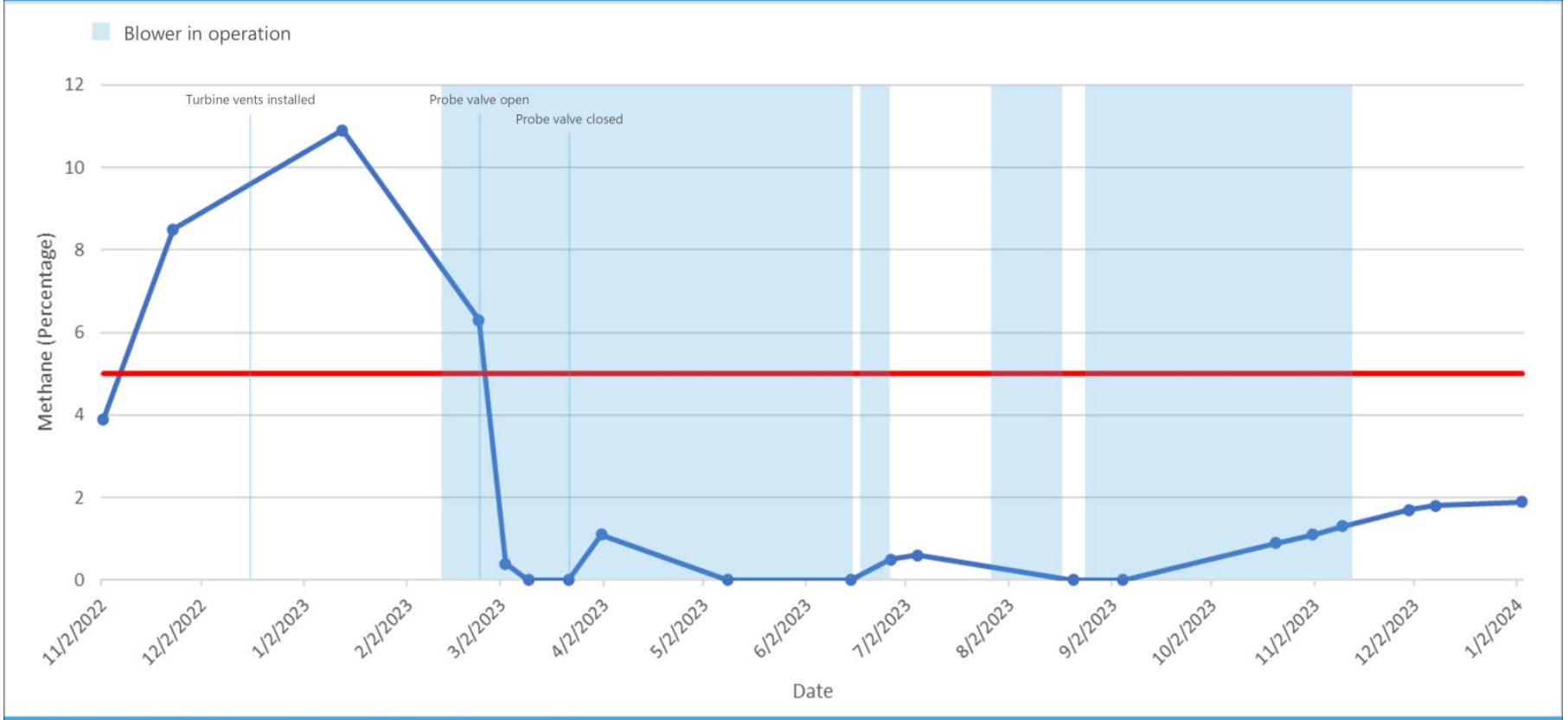
Figure 3. Methane Content of Landfill Perimeter Soil Gas Probe #1.



Produced by Herrera Environmental Consultants (herrerainc.com)

GP-2

Table 7. Monitoring Results for Landfill Perimeter Soil Gas Probe Number 2.					
Date	**% Methane**	**% Carbon Dioxide**	**% Oxygen**	**% Balance**	**Actions/Key Dates**
11/2/2022	**12.3**	29.2	0.0	58.4	
11/23/2022	**14.1**	26.9	0.0	39.1	
1/13/2023	**15.7**	25.2	0.1	59.1	- Turbine vents installed on LFG vent (12/12/2022–present)
2/23/2023	**16.4**	24	0.1	59.6	- Vacuum extraction from methane trench (2/10/2023–6/16/2023) - Probe valve left open to vent (2/23/2023–3/22/2023)
3/3/2023	0.0	1.8	17.7	80.5	
3/10/2023	0.0	0.2	21.3	78.4	
3/22/2023	0.0	0.2	20	79.9	- Probe valve closed (3/22/2023–present)
4/1/2023	0.6	9.9	1.5	87.9	
5/9/2023	0.0	0	20.1	79.8	
6/15/2023	0.0	0.5	19.7	79.8	
6/27/2023	0.0	13.5	0.4	86.1	- Blower shut off (6/16/2023–6/17/2023) - Vacuum extraction from methane trench (6/17/2023–6/26/2023) - Blower shut off (6/26/2023–7/24/2023)
7/5/2023	0.2	15.6	0.1	84.2	
8/21/2023	0.1	22.7	0.1	77.1	- Vacuum extraction from methane trench (7/24/2023–8/18/2023) - Blower shut off (8/18/2023–8/23/2023)
9/5/2023	0.1	22.8	0.1	76.9	- Vacuum extraction from methane trench (8/23/2023–11/10/2023)
9/22/2023	0.0	21.4	0.1	78.4	
10/21/2023	0.9	22.2	0.1	76.9	
11/1/2023	0.9	21.6	0.1	77.4	
11/10/2023	1.3	21.2	0.1	77.4	- Blower shut off (11/10/2023–6/19/2024)
11/17/2023	1.5	20.1	0.1	78.3	
11/30/2023	1.6	20.3	0.1	78.1	
12/8/2023	1.5	19.8	0.0	78.6	
1/3/2024	0.3	18.3	0.0	81.4	
3/15/2024	Not read due to construction blockage				
4/3/2024	2.8	16.2	0.0	81	
5/1/2024	4.7	16.9	0.0	78.5	
5/7/2024	**5.4**	17.8	0.1	76.7	
5/15/2024	**6.0**	17.8	0.1	76.1	
5/21/2024	**6.4**	18	0.1	75.6	
5/31/2024	**6.8**	17.9	0.1	75.2	
6/7/2024	**7.4**	17.5	0.1	75.1	
6/25/2024	**7.7**	18	0.1	74.2	- Vacuum extraction from methane trench (6/19/2024–present)
7/5/2024	**5.2**	18	0.1	76.6	
7/12/2024	2.2	17.9	0.1	79.8	
7/16/2024	1.5	17.5	0.2	80.9	
7/26/2024	1.4	19.5	0.0	79.1	
8/8/2024	0	17.8	0.1	82.1	- Caps added to the other two vent pipe connections at sumps
8/20/2024	0.1	17.7	0.2	82	
8/24/2024	0	17.8	0.2	82.1	
8/29/2024	0	17	0.1	82.9	
9/4/2024	0	16.2	0.3	83.4	
9/19/2024	0.2	15.8	1.5	82.6	
9/26/2024	0	16.1	1.9	82	
10/3/2024	0	15.5	3.1	81.4	
10/8/2024	0	15.3	3.4	81.3	
10/20/2024	0	13.9	6	80.1	
10/30/2024	0	14	5.9	80.2	
11/8/2024	0	14.8	3.9	81.3	
11/12/2024	0	14.6	3	82.3	
11/19/2024	0	14.5	3.4	82.1	- Blower shut off (11/15/2024–present)
11/27/2024	0	14.2	3.6	82.2	
12/2/2024	0	13.9	4.8	81.3	
12/12/2024	0	13.8	5.5	80.7	
12/20/2024	0	13.5	5.9	80.6	

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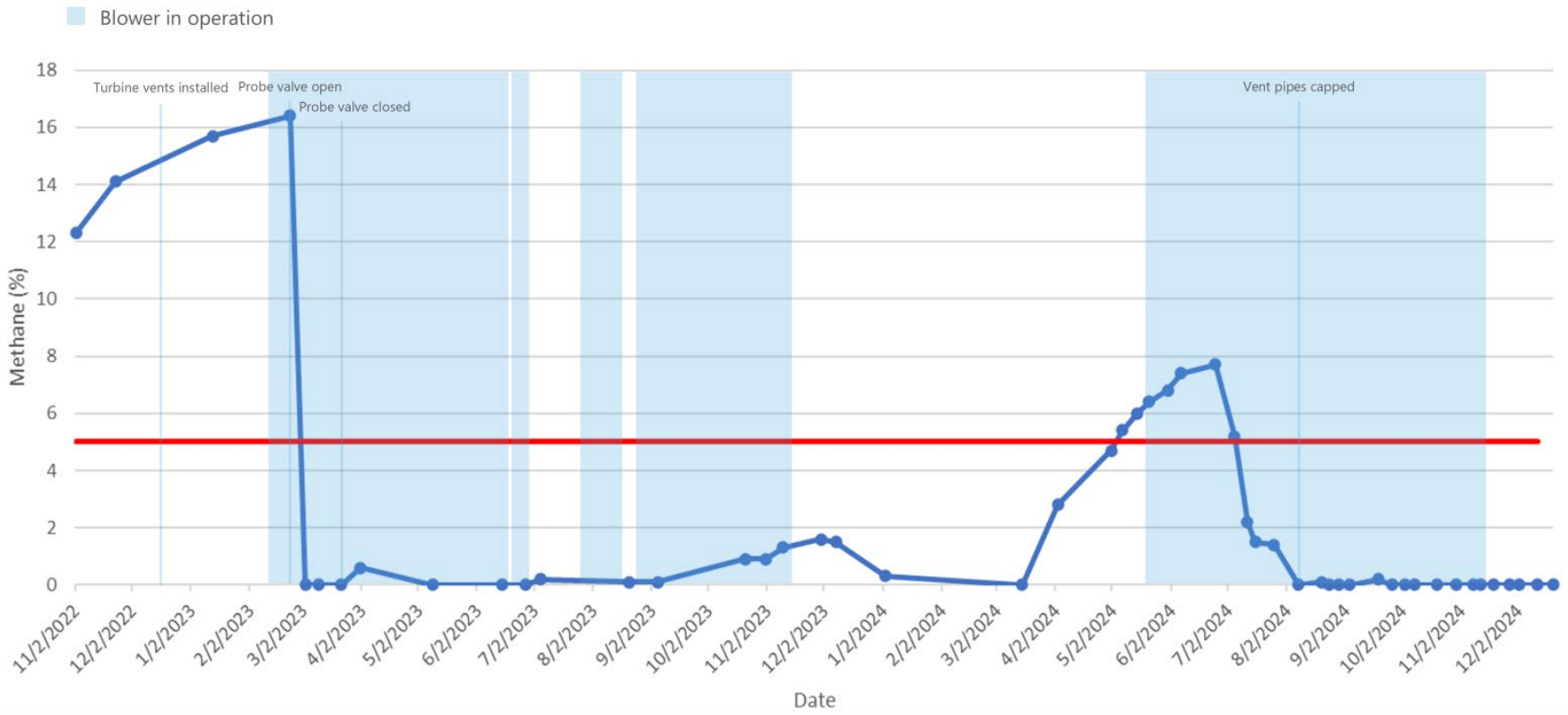
Figure 4. Methane Content of Landfill Perimeter Soil Gas Probe #2.



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GP-3

Table 8. Monitoring Results for Landfill Perimeter Soil Gas Probe Number 3.					
Date	**% Methane**	**% Carbon Dioxide**	**% Oxygen**	**% Balance**	**Actions/Key Dates**
11/2/2022	**27.5**	29.2	0.0	43.3	
11/23/2022	**24.0**	24.7	0.0	51.4	
1/13/2023	**23.0**	22.9	0.1	54	- Turbine vents installed on LFG vent (12/12/2022–present)
2/23/2023	**16.2**	19.9	1.1	62.8	- Vacuum extraction from methane trench (2/10/2023–6/16/2023) - Probe valves left open to vent (2/23/2023–3/22/2023)
3/3/2023	0.2	1.6	18.2	79.9	
3/10/2023	0.0	0.1	21.6	78.4	
3/22/2023	0.0	0.0	20.2	79.8	- Probe valves closed (3/22/2023–present)
4/1/2023	0.0	11.7	7.5	80.8	
5/9/2023	0.0	0.0	20.3	79.7	
6/15/2023	0.0	0.0	20.4	79.6	
6/27/2023	0.0	13.1	4.7	82.3	- Blower shut off (6/16/2023–6/17/2023) - Vacuum extraction from methane trench (6/17/2023–6/26/2023) - Blower shut off (6/26/2023–7/24/2023)
7/5/2023	0.1	15.8	0.1	84.1	
8/21/2023	1.7	24	0.1	74.2	- Vacuum extraction from methane trench (7/24/2023–8/18/2023) - Blower shut off (8/18/2023–8/23/2023)
9/5/2023	2.7	25.2	0.1	72	- Vacuum extraction from methane trench (8/23/2023–11/10/2023)
9/22/2023	0.2	21.3	0.1	78.4	
10/21/2023	0.0	18	0.2	81.8	
11/1/2023	0.0	17.3	0.1	82.6	
11/10/2023	0.0	17.5	0.2	82.3	- Blower shut off (11/10/2023–6/19/2024)
11/17/2023	0.0	17.0	0.1	82.9	
11/30/2023	0.4	17.4	0.1	82.1	
12/8/2023	0.0	17.9	1.7	80.5	
1/3/2024	5.7	20.2	0.0	74.1	
3/15/2024	Not read due to construction blockage				
4/3/2024	**6.2**	17.7	0.0	76.1	
5/1/2024	**9.3**	18.5	0.0	72.1	
5/7/2024	**10.1**	19.6	0.1	70.2	
5/15/2024	**10.9**	20.2	0.1	68.8	
5/21/2024	**11.4**	20.9	0.1	67.6	
5/31/2024	**12.5**	21.1	0.1	66.3	
6/7/2024	**12.3**	20.9	0.1	66.7	
6/25/2024	**5.0**	21	0.1	73.9	- Vacuum extraction from methane trench (6/19/2024–11/15/2024)
7/5/2024	1.8	20.3	0.1	77.8	
7/12/2024	0.6	19.3	0.1	80	
7/16/2024	0.1	19.1	0.1	80.7	
7/26/2024	0.3	21.5	0.0	78.2	
8/8/2024	0	19.5	0.1	80.5	- Caps added to the other two vent pipe connections at sumps
8/20/2024	0.1	18.3	0.1	81.5	
8/24/2024	0	17.4	1	81.7	
8/29/2024	0	13.1	5.1	81.8	
9/4/2024	0	12.3	4.1	83.5	
9/19/2024	0.2	12.4	5.3	82.1	
9/26/2024	0.1	12.3	5.5	82.1	
10/3/2024	0.1	12.3	6.2	81.4	
10/8/2024	0	13.2	4.8	82	
10/20/2024	0	9.9	9.8	80.3	
10/30/2024	0	9.6	10.8	79.6	
11/8/2024	0	10	8.4	81.7	
11/12/2024	0	10	6.8	83.2	
11/19/2024	0	10.2	6.9	82.9	- Blower shut off (11/15/2024–present)
11/27/2024	0	10.4	6.8	82.8	
12/2/2024	0	9.8	7.1	83.1	
12/12/2024	0	9.6	7.4	83	
12/20/2024	0	9.4	7.7	82.9	

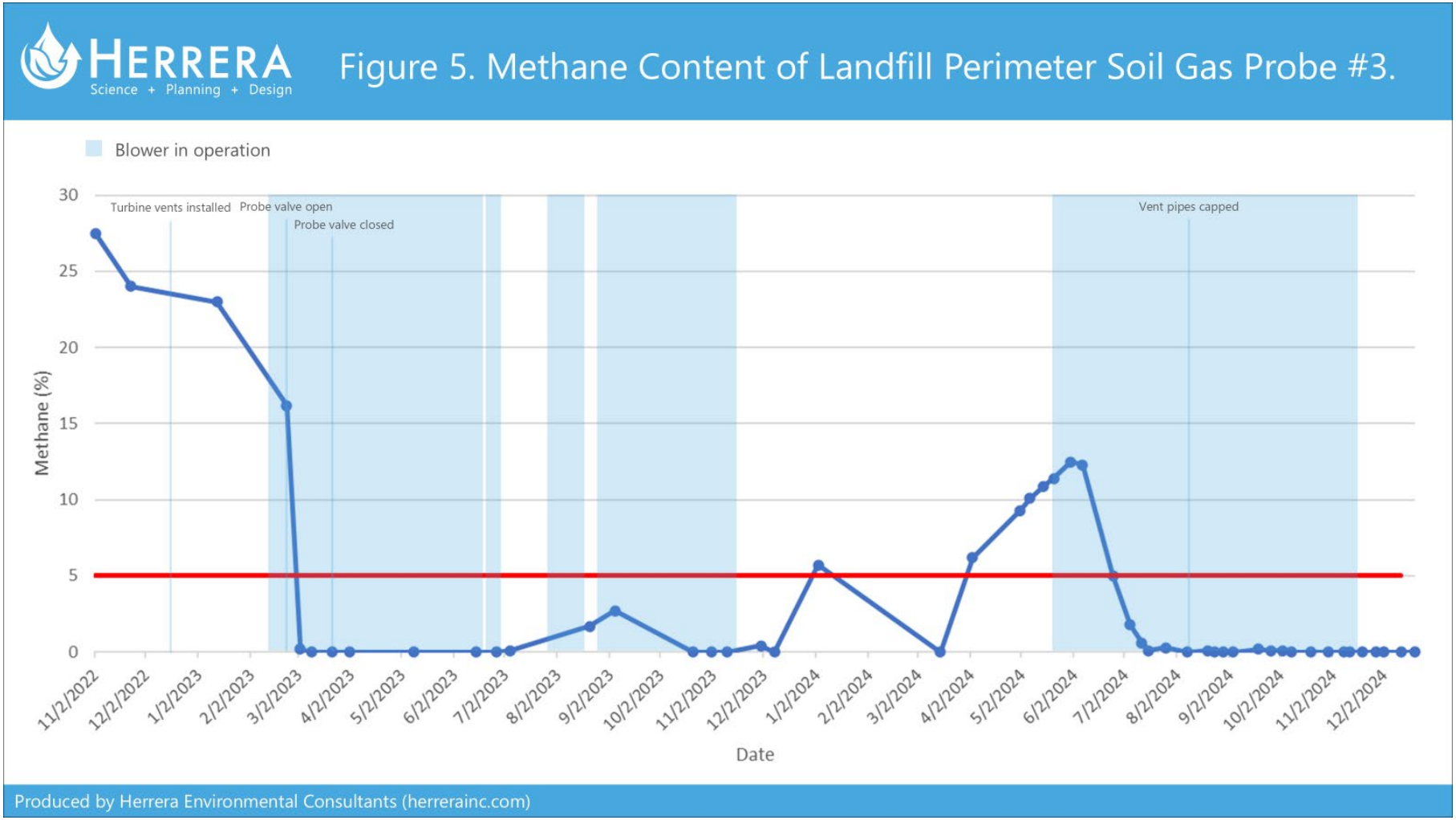
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Figure 5. Methane Content of Landfill Perimeter Soil Gas Probe #3.
Blower in operation
Turbine vents installed
Probe valve open
Probe valve closed
Vent pipes capped
Methane (%)
30
25
20
15
10
5
0
11/2/2022
12/2/2022
1/2/2023
2/2/2023
3/2/2023
4/2/2023
5/2/2023
6/2/2023
7/2/2023
8/2/2023
9/2/2023
10/2/2023
11/2/2023
12/2/2023
1/2/2024
2/2/2024
3/2/2024
4/2/2024
5/2/2024
6/2/2024
7/2/2024
8/2/2024
9/2/2024
10/2/2024
11/2/2024
12/2/2024
Date
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GP-4

Table 9. Monitoring Results for Landfill Perimeter Soil Gas Probe Number 4.					
Date	**% Methane**	**% Carbon Dioxide**	**% Oxygen**	**% Balance**	**Actions/Key Dates**
11/2/2022	**28.4**	31.7	0.1	39.8	
11/23/2022	**32.9**	27.7	0.0	39.3	
1/13/2023	**32.5**	26.5	0.0	41	- Turbine vents installed on LFG vent (12/12/2022–present)
2/23/2023	**31.6**	25.6	0.1	42.7	- Vacuum extraction from methane trench (2/10/2023–6/16/2023) - Perimeter probe valves left open to vent (2/23/2023–3/22/2023)
3/3/2023	0.0	0.2	20.9	79	
3/10/2023	0.0	0.1	21.6	78.3	
3/22/2023	0.0	0.0	20.4	79.6	- Perimeter probe valves closed (3/22/2023–present)
4/1/2023	**11.1**	10.5	0.0	78.3	
5/9/2023	0.6	14.3	3.2	81.9	- Vacuum extraction from soil gas probes (4/17/2023–6/16/2023)
6/15/2023	3.6	21.1	0.2	75.1	
6/27/2023	4.0	23.4	0.0	72.6	- Blower shut off (6/16/2023–6/17/2023) - Perimeter probe valve closed (6/16/2023 -6/17/2023) - Vacuum extraction from methane trench (6/17/2023–6/26/2023) - Vacuum extraction from soil gas probes (6/17/2023–6/26/2023) - Blower shut off (6/26/2023–7/24/2023) - Perimeter probe valve closed (6/26/2023 -7/24/2023)
7/5/2023	4.6	23.2	0.1	72.2	
8/21/2023	4.6	21.9	0.1	73.4	- Vacuum extraction from soil gas probes (7/21/2023–8/18/2023) - Vacuum extraction from methane trench (7/24/2023–8/18/2023) - Blower shut off (8/18/2023–8/23/2023) - Perimeter probe valve closed (8/18/2023 -8/23/2023)
9/5/2023	4.2	21.1	0.4	74.4	- Vacuum extraction from methane trench (8/23/2023–11/10/2023) - Vacuum extraction from soil gas probes (8/23/2023–11/10/2023)
9/22/2023	3.8	20.3	0.5	75.3	
10/21/2023	2.4	19.8	0.1	77.8	
11/1/2023	2.1	19.3	0.1	78.5	
11/10/2023	2.7	19.9	0.1	77.4	- Blower shut off (11/10/2023–6/19/2024) - Perimeter probe valve closed (11/10/2023–present)
11/17/2023	3.0	19.6	0.1	77.4	
11/30/2023	3.7	20.5	0.1	75.7	
12/8/2023	4.0	20.7	0.0	75.2	
1/3/2024	1.8	15.7	0.0	82.5	
3/15/2024	**10.6**	24.0	0.0	65.4	
4/3/2024	**11.6**	17.4	0.0	71	
5/1/2024	**14.1**	17.9	0.0	68	
5/7/2024	**15.4**	19.2	0.1	65.3	
5/15/2024	**15.0**	19.1	0.1	65.9	
5/21/2024	**15.4**	19.3	0.0	65.2	
5/31/2024	**15.4**	19.2	0.1	65.3	
6/7/2024	**15.1**	18.6	0.1	66.2	
6/25/2024	**14.4**	18.6	0.1	66.8	- Vacuum extraction from methane trench (6/19/2024–11/15/2024)
7/5/2024	**11.4**	18.1	0.1	70.3	
7/12/2024	**7.4**	18.4	0.1	74.1	
7/16/2024	**6.0**	19.9	0.1	76	
7/26/2024	**5.7**	21.0	0.0	73.4	
8/8/2024	2.7	19.4	0.1	77.8	- Caps added to the other two vent pipe connections at sumps
8/20/2024	3.2	20	0.1	76.8	
8/24/2024	2.7	20.4	0.1	76.9	
8/29/2024	2.5	19.9	0.1	77.5	
9/4/2024	2.4	19.5	0.1	78	
9/21/2024	2.3	21.5	0	76.2	
9/26/2024	2.6	21.3	0	76.1	
10/2/2024	2.4	21.6	0	76	
10/8/2024	2.3	21.7	0	76	
10/20/2024	2.6	21.2	0.1	76.1	
10/30/2024	2.4	21.6	0.1	76	
11/8/2024	2.4	21.1	0.1	76.4	
11/12/2024	2.7	20.6	0.1	76.6	
11/19/2024	3.2	21	0.1	75.7	- Blower shut off (11/15/2024–present)
11/27/2024	3.8	21.1	0.1	75	
12/2/2024	4.5	21.1	0.1	74.3	
12/12/2024	**5.3**	20.4	0.1	74.2	
12/20/2024	**5.8**	19.8	0.1	74.3	

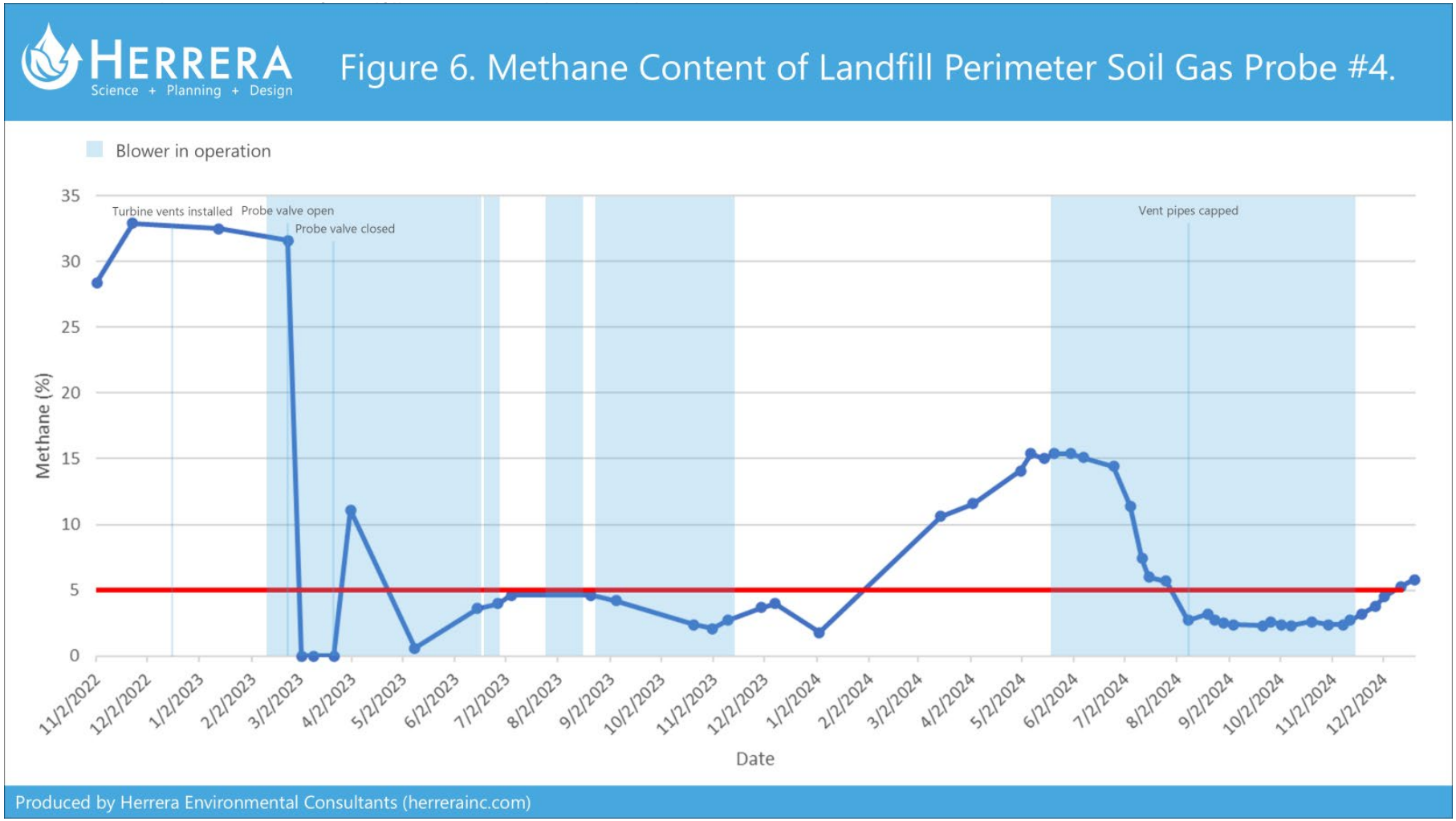
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Figure 6. Methane Content of Landfill Perimeter Soil Gas Probe #4.
Blower in operation
Turbine vents installed
Probe valve open
Probe valve closed
Vent pipes capped
Methane (%)
35
30
25
20
15
10
5
0
11/2/2022
12/2/2022
1/2/2023
2/2/2023
3/2/2023
4/2/2023
5/2/2023
6/2/2023
7/2/2023
8/2/2023
9/2/2023
10/2/2023
11/2/2023
12/2/2023
1/2/2024
2/2/2024
3/2/2024
4/2/2024
5/2/2024
6/2/2024
7/2/2024
8/2/2024
9/2/2024
10/2/2024
11/2/2024
12/2/2024
Date
Produced by Herrera Environmental Consultants (herrerainc.com)

GP-5

Table 10. Monitoring Results for Landfill Perimeter Soil Gas Probe Number 5.					
Date	**% Methane**	**% Carbon Dioxide**	**% Oxygen**	**% Balance**	**Actions/Key Dates**
11/2/2022	0.0	0.7	21.7	77.6	
11/23/2022	**28.8**	18.3	0.0	52.9	
1/13/2023	**29.0**	18.2	0.1	52.7	- Turbine vents installed on LFG vent (12/12/2022–present)
2/23/2023	**25.4**	14.8	1.5	58.3	- Vacuum extraction from methane trench (2/10/2023–6/16/2023) - Perimeter probe valves left open to vent (2/23/2023–3/22/2023)
3/3/2023	0.9	0.6	18.8	79.8	
3/10/2023	0.0	0.1	21.7	78.2	
3/22/2023	0.0	0.0	20.5	79.4	- Perimeter probe valves closed (3/22/2023–present)
4/1/2023	**9.2**	11.8	0.0	79	
5/9/2023	0.4	3.0	15.4	81.2	- Vacuum extraction from soil gas probes (4/17/2023–6/16/2023)
6/15/2023	1.7	13.2	3.2	81.9	
6/27/2023	0.0	13.9	0.5	85.6	- Blower shut off (6/16/2023–6/17/2023) - Perimeter probe valve closed (6/16/2023 -6/17/2023) - Vacuum extraction from methane trench (6/17/2023–6/26/2023) - Vacuum extraction from soil gas probes (6/17/2023–6/26/2023) - Blower shut off (6/26/2023–7/24/2023) - Perimeter probe valve closed (6/26/2023 -7/24/2023)
7/5/2023	0.4	14	0.0	85.5	
8/21/2023	2.6	17.6	0.1	79.7	- Vacuum extraction from soil gas probes (7/21/2023–8/18/2023) - Vacuum extraction from methane trench (7/24/2023–8/18/2023) - Blower shut off (8/18/2023–8/23/2023) - Perimeter probe valve closed (8/18/2023 -8/23/2023)
9/5/2023	3.0	17.3	0.4	79.4	- Vacuum extraction from methane trench (8/23/2023–11/10/2023) - Vacuum extraction from soil gas probes (8/23/2023–11/10/2023)
9/22/2023	2.0	15.8	1.6	80.6	
10/21/2023	1.3	15.6	2.8	80.3	
11/1/2023	0.3	11.5	5.8	82.4	
11/10/2023	0.3	13.3	3.7	82.7	- Blower shut off (11/10/2023–6/19/2024) - Perimeter probe valve closed (11/10/2023–present)
11/17/2023	0.0	10.3	4.9	84.8	
11/30/2023	0.0	12.9	2.1	85.0	
12/8/2023	0.2	15.4	0.0	84.3	
1/3/2024	**9.1**	17.4	0.0	73.5	
3/15/2024	**8.4**	22	0.0	69.6	
4/3/2024	**10.4**	15.4	0.0	74.2	
5/1/2024	**12.8**	16	0.0	71.2	
5/7/2024	**14.7**	17.3	0.1	67.9	
5/15/2024	**13.5**	16.5	0.0	70	
5/21/2024	**13.6**	16.5	0.0	69.9	
5/31/2024	**14**	16.1	0.1	69.9	
6/7/2024	**13.3**	15.3	0.1	71.4	
6/25/2024	**9.6**	13.8	0.1	76.5	- Vacuum extraction from methane trench (6/19/2024–11/15/2024)
7/5/2024	**5.7**	12.8	0.1	81.4	
7/12/2024	2.9	12.8	0.1	84.3	
7/16/2024	0.0	9.6	0.1	90.3	
7/26/2024	1.7	13.3	0.0	85	
8/8/2024	0.0	12.2	0.1	87.7	- Caps added to the other two vent pipe connections at sumps
8/20/2024	0.2	13	0.1	86.7	
8/24/2024	0.0	13.1	0.4	86.5	
8/29/2024	0.0	12.2	1.3	86.4	
9/4/2024	0.0	11.7	1.6	86.8	
9/21/2024	0.1	11.9	3.1	84.9	
9/26/2024	0.1	11.2	3.7	85	
10/3/2024	0	10.9	5.1	84	
10/8/2024	0	10.8	4.8	84.4	
10/20/2024	0	9.6	6.7	83.7	
10/30/2024	0	9.8	7.6	82.6	
11/8/2024	0	9.6	7.7	82.8	
11/12/2024	0	9	7.5	83.5	
11/19/2024	0	11.8	3	85.1	- Blower shut off (11/15/2024–present)
11/27/2024	0	10.2	6.5	83.3	
12/2/2024	0	10.8	5.6	83.6	
12/12/2024	0	10.7	5.3	84	
12/20/2024	0	11.3	5.2	83.5	

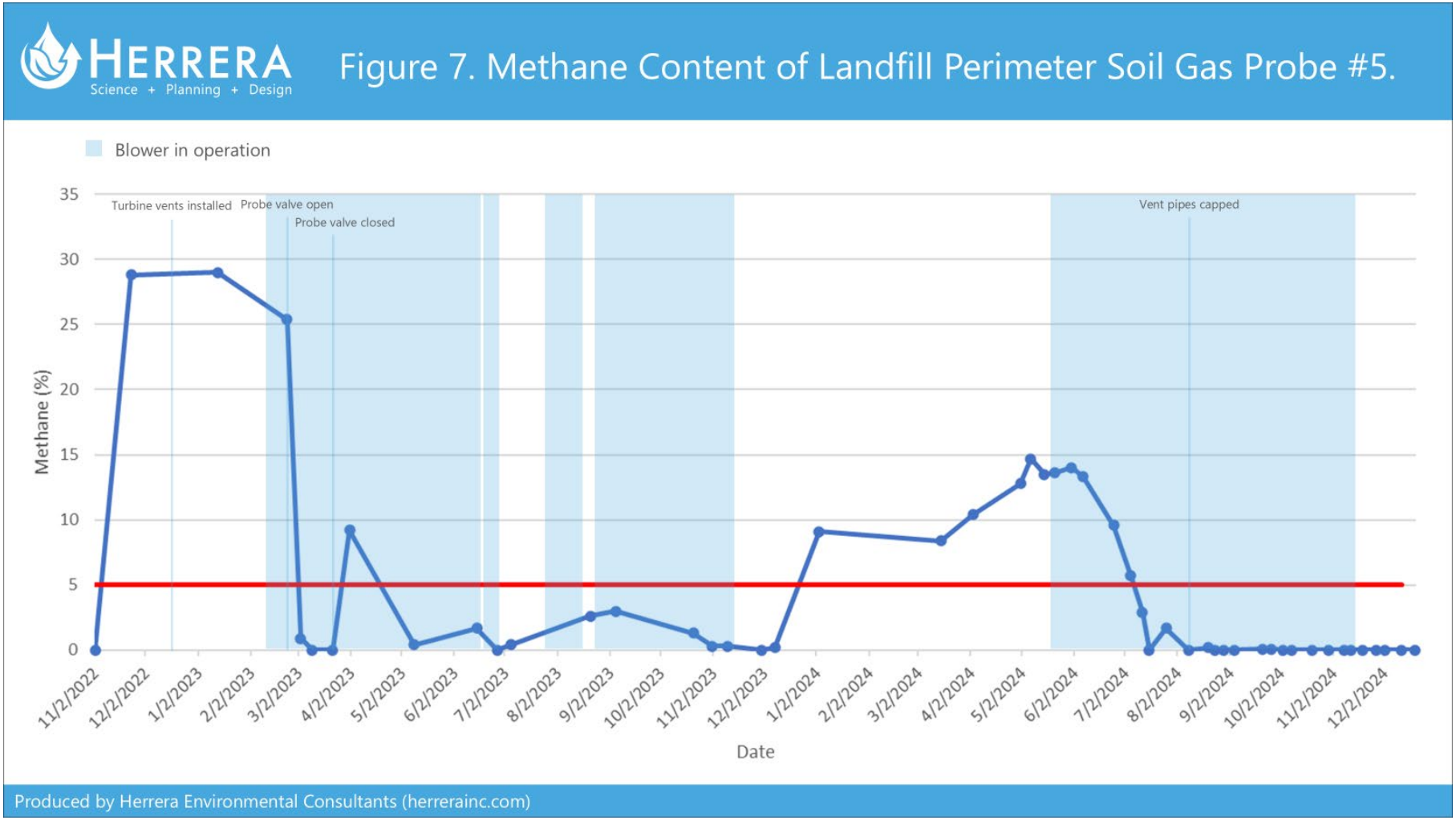
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Figure 7. Methane Content of Landfill Perimeter Soil Gas Probe #5.
Blower in operation
Turbine vents installed
Probe valve open
Probe valve closed
Vent pipes capped
Methane (%)
35
30
25
20
15
10
5
0
11/2/2022
12/2/2022
1/2/2023
2/2/2023
3/2/2023
4/2/2023
5/2/2023
6/2/2023
7/2/2023
8/2/2023
9/2/2023
10/2/2023
11/2/2023
12/2/2023
1/2/2024
2/2/2024
3/2/2024
4/2/2024
5/2/2024
6/2/2024
7/2/2024
8/2/2024
9/2/2024
10/2/2024
11/2/2024
12/2/2024
Date
Produced by Herrera Environmental Consultants (herrerainc.com)

GP-6

Table 11. Monitoring Results for Landfill Perimeter Soil Gas Probe Number 6.

Date	% Methane	% Carbon Dioxide	% Oxygen	% Balance	Actions/Key Dates
11/2/2022	0.0	0.3	21.8	77.8	
11/23/2022	**82.0**	18	0.0	0.0	
1/13/2023	**35.0**	18.5	0.0	46.5	- Turbine vents installed on LFG vent (12/12/2022–present)
2/23/2023	**35.4**	15.4	0.2	49	- Vacuum extraction from methane trench (2/10/2023–6/16/2023) - Perimeter probe valves left open to vent (2/23/2023–3/22/2023)
3/3/2023	**17.6**	13.4	3.3	65.8	
3/10/2023	**22.2**	22.2	0.2	55.5	- Vacuum extraction from soil gas probes (3/10/2023–6/16/2023)
3/22/2023	**11.6**	21.8	0.1	66.5	
4/1/2023	**8.7**	22.3	0.1	68.9	
5/9/2023	0.0	0.0	21	79	
6/15/2023	1.0	3.2	16	79.8	
6/27/2023	**5.5**	16.7	0.0	77.8	- Blower shut off (6/16/2023–6/17/2023) - Perimeter probe valve closed (6/16/2023 -6/17/2023) - Vacuum extraction from methane trench (6/17/2023–6/26/2023) - Vacuum extraction from soil gas probes (6/17/2023–6/26/2023) - Blower shut off (6/26/2023–7/24/2023) - Perimeter probe valve closed (6/26/2023 -7/24/2023)
7/5/2023	4.8	14.4	0.0	80.8	
8/21/2023	**7.1**	15.8	0.6	76.6	- Vacuum extraction from soil gas probes (7/21/2023–8/18/2023) - Vacuum extraction from methane trench (7/24/2023–8/18/2023) - Blower shut off (8/18/2023–8/23/2023) - Perimeter probe valve closed (8/18/2023 -8/23/2023)
9/5/2023	**8.1**	16.5	0.9	74.5	- Vacuum extraction from methane trench (8/23/2023–11/10/2023) - Vacuum extraction from soil gas probes (8/23/2023–11/10/2023)
9/22/2023	**6.8**	17.5	0.8	74.9	
10/21/2023	**5.0**	19.5	0.1	75.5	
11/1/2023	4.3	19.2	0.1	76.4	
11/10/2023	0.0	0.1	20.9	79	- Blower shut off (11/10/2023–6/19/2024) - Perimeter probe valve closed (11/10/2023–present)
11/17/2023	3.7	17.7	0.1	78.5	
11/30/2023	2.9	17.1	0.0	80.0	
12/8/2023	3.2	14.6	0.0	82.2	
1/3/2024	3.5	15.6	0.0	80.9	
3/15/2024	**13.8**	22.7	0.0	63.5	
4/3/2024	**17.9**	16.5	0.0	65.6	
5/1/2024	**19.7**	16.7	0.0	63.6	
5/7/2024	**21.7**	17.6	0.1	60.7	
5/15/2024	**20.3**	17	0.0	62.8	
5/21/2024	**18.1**	16.4	0.0	65.5	
5/31/2024	**18.8**	15.9	0.0	65.3	
6/7/2024	**17.9**	14.9	0.0	67.2	
6/25/2024	**18.3**	14.7	0.0	67	- Vacuum extraction from methane trench (6/19/2024–present)
7/5/2024	**15.6**	15.6	0.1	68.7	
7/12/2024	**10.7**	16.7	0.1	72.5	
7/16/2024	**9.4**	15.4	0.1	75.1	
7/26/2024	**10.4**	16.7	0.0	72.9	
8/8/2024	**6**	15.6	0.1	78.3	- Caps added to the other two vent pipe connections at sumps
8/20/2024	**7.6**	17.6	0.1	74.8	
8/24/2024	**6.8**	18.1	0.1	75	
8/29/2024	**6.2**	15.7	0.1	78.1	
9/4/2024	**6.2**	17	0.1	76.7	
9/21/2024	**5**	16.9	0	78.1	
9/26/2024	4.5	16.1	0	79.4	
10/3/2024	3.9	16	0	80.1	
10/8/2024	4.7	18.1	0.1	77.1	
10/20/2024	3.5	15.4	0.1	81	
10/30/2024	3.4	16.1	0	80.4	
11/8/2024	4.2	17.1	0	78.7	
11/12/2024	**5.2**	17.1	0	77.6	
11/19/2024	4.4	16.1	0.1	79.5	- Blower shut off (11/15/2024–present)
11/27/2024	4.9	17.2	0.1	77.8	
12/2/2024	**8.3**	17.8	0	73.8	
12/12/2024	**6.5**	16.5	0	77	
12/20/2024	**7.3**	17	0.1	75.6	

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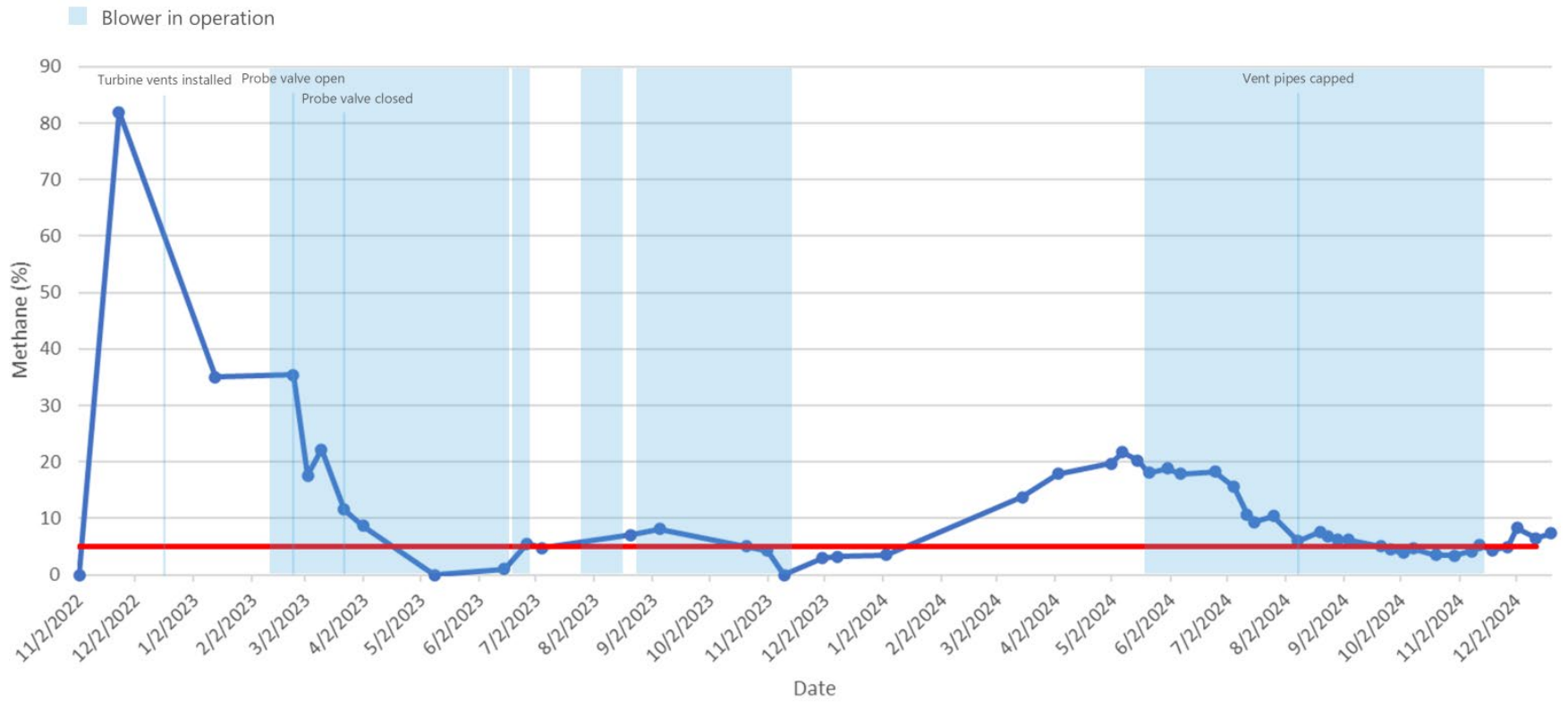
Figure 8. Methane Content of Landfill Perimeter Soil Gas Probe #6.



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GP-7

Table 12. Monitoring Results for Landfill Perimeter Soil Gas Probe Number 7.

Date	% Methane	% Carbon Dioxide	% Oxygen	% Balance	Actions/Key Dates
11/2/2022	**35.5**	20.7	0.0	43.4	
11/23/2022	**38**	20.0	0.0	42.6	
1/13/2023	**36.4**	20.6	0.1	43	- Turbine vents installed on LFG vent (12/12/2022–present)
2/23/2023	**37.9**	19.6	0.1	42.4	- Vacuum extraction from methane trench (2/10/2023–6/16/2023) - Perimeter probe valves left open to vent (2/23/2023–3/22/2023)
3/3/2023	**13.1**	6.1	12.7	68.2	
3/10/2023	**26.7**	18.3	3.1	51.9	- Vacuum extraction from soil gas probes (3/10/2023–6/16/2023)
3/22/2023	**17.2**	18.4	1.4	63	
4/1/2023	**12.8**	20.5	1.2	65.5	
5/9/2023	4.6	15.8	4.0	75.6	
6/15/2023	4.2	18.6	0.2	77	
6/27/2023	0.2	18.8	0.2	80.7	- Blower shut off (6/16/2023–6/17/2023) - Perimeter probe valve closed (6/16/2023–6/17/2023) - Vacuum extraction from methane trench (6/17/2023–6/26/2023) - Vacuum extraction from soil gas probes (6/17/2023–6/26/2023) - Blower shut off (6/26/2023–7/24/2023) - Perimeter probe valve closed (6/26/2023 -7/24/2023)
7/5/2023	2.3	16.2	0.0	81.5	
8/21/2023	0.7	14.9	0.3	84	- Vacuum extraction from soil gas probes (7/21/2023–8/18/2023) - Vacuum extraction from methane trench (7/24/2023–8/18/2023) - Blower shut off (8/18/2023–8/23/2023) - Perimeter probe valve closed (8/18/2023 -8/23/2023)
9/5/2023	**8.1**	17.9	0.1	73.9	- Vacuum extraction from methane trench (8/23/2023–11/10/2023) - Vacuum extraction from soil gas probes (8/23/2023–8/25/2023) - Perimeter probe valve closed and removed from vacuum extraction system (8/25/2023–present)
9/22/2023	**8.5**	17.9	0.1	73.5	
10/21/2023	**7.4**	19.1	0.1	73.4	
11/1/2023	**6.6**	19.2	0.0	74.1	
11/10/2023	**7.3**	20.3	0.1	72.4	- Blower shut off (11/10/2023–6/19/2024)
11/17/2023	**6.8**	18.7	0.1	74.5	
11/30/2023	**6.7**	20.5	0.0	72.7	
12/8/2023	**6.8**	19.2	0.0	74.0	
1/3/2024	**8.5**	18.2	0.0	73.3	
3/15/2024	**14.5**	21.7	0.0	63.8	
4/3/2024	**16.5**	14.3	0.0	69.2	
5/1/2024	**18.6**	16.7	0.0	64.7	
5/7/2024	**16.8**	17.5	0.1	65.5	
5/15/2024	**18.3**	18.7	0.0	63	
5/21/2024	**20**	19.5	0.1	60.4	
5/31/2024	**19.8**	20.7	0.1	59.5	
6/7/2024	**20.2**	19.9	0.1	59.8	
6/25/2024	**22.5**	17.7	0.3	59.5	- Vacuum extraction from methane trench (6/19/2024–11/15/2024)
7/5/2024	**19.6**	17.1	0.2	63.1	
7/12/2024	**13.2**	16.2	0.1	70.4	
7/16/2024	**11.0**	15.5	0.1	73.4	
7/26/2024	**11.7**	17.2	0.0	71.1	
8/8/2024	**5.6**	15.8	0.1	78.5	- Caps added to the other two vent pipe connections at sumps
8/20/2024	4.4	16.1	0.3	79.3	
8/24/2024	**7.5**	17.2	0	75.3	
8/29/2024	**7**	17	0.1	75.9	
9/4/2024	**5.6**	16.5	0.1	77.8	
9/21/2024	**5**	17.2	0	77.8	
9/26/2024	4.8	16.8	0	78.4	
10/3/2024	4.9	17.3	0	77.8	
10/8/2024	3.6	17.1	0.3	79	
10/20/2024	**5.1**	16.8	0.1	78	
10/30/2024	**6.3**	17.6	0.1	76	
11/8/2024	4.7	15.8	0	79.3	
11/12/2024	4.5	16.3	0.1	79.1	
11/19/2024	2.5	13.2	0.1	84.2	- Blower shut off (11/15/2024–present)
11/27/2024	3.8	13.6	0.1	82.5	
12/2/2024	4.4	14	0.1	81.5	
12/12/2024	4.8	14.5	0.1	80.6	
12/20/2024	**5.3**	14.1	0.2	80.4	

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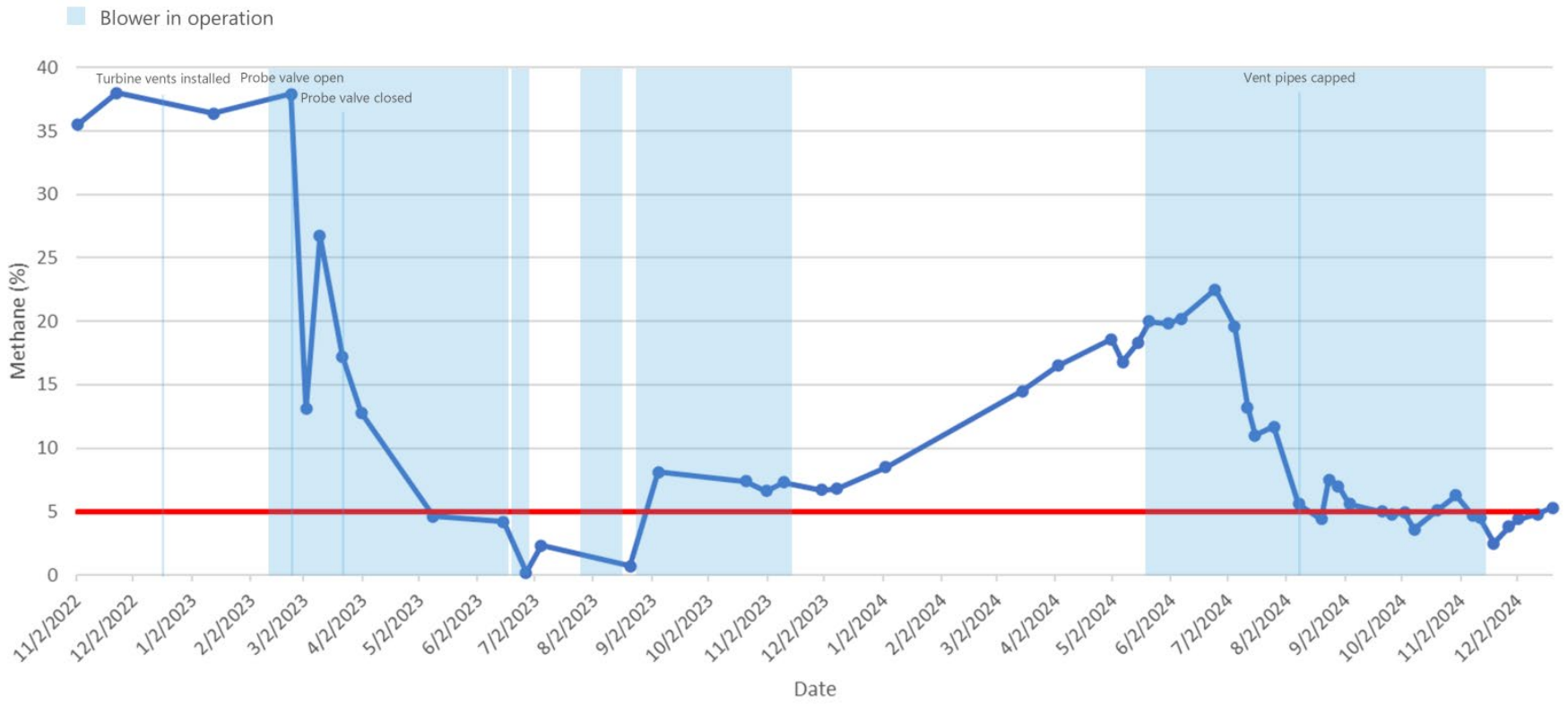
Figure 9. Methane Content of Landfill Perimeter Soil Gas Probe #7.



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GP-8

Table 13. Monitoring Results for Landfill Perimeter Soil Gas Probe Number 8.

Date	% Methane	% Carbon Dioxide	% Oxygen	% Balance	Actions/Key Dates
11/2/2022	**35.6**	23.7	0.0	40.7	
11/23/2022	**37.4**	21	0.0	41.6	
1/13/2023	**37.1**	21.3	0.0	41.6	- Turbine vents installed on LFG vent (12/12/2022–present)
2/23/2023	**30.7**	22.7	0.2	46.4	- Vacuum extraction from methane trench (2/10/2023–6/16/2023) - Perimeter probe valves left open to vent (2/23/2023–3/22/2023)
3/3/2023	**9.8**	2.5	16	71.8	
3/10/2023	0.3	0.2	16.2	83.3	- Vacuum extraction from soil gas probes (3/10/2023–6/16/2023)
3/22/2023	3.0	6.3	13.9	76.8	
4/1/2023	1.4	5.3	16.2	77.2	
5/9/2023	0.0	5.4	14.6	80	
6/15/2023	0.0	2.5	17.4	80.1	
6/27/2023	0.0	4.1	13.6	82.3	- Blower shut off (6/16/2023–6/17/2023) - Perimeter probe valve closed (6/16/2023 -6/17/2023) - Vacuum extraction from methane trench (6/17/2023–6/26/2023) - Vacuum extraction from soil gas probes (6/17/2023–6/26/2023) - Blower shut off (6/26/2023–7/24/2023) - Perimeter probe valve closed (6/26/2023 -7/24/2023)
7/5/2023	0.0	8.1	4.0	87.9	
8/21/2023	0.0	6.3	8.4	85.3	- Vacuum extraction from soil gas probes (7/21/2023–8/18/2023) - Vacuum extraction from methane trench (7/24/2023–8/18/2023) - Blower shut off (8/18/2023–8/23/2023) - Perimeter probe valve closed (8/18/2023 -8/23/2023)
9/5/2023	0.0	4.1	14.8	81.1	- Vacuum extraction from methane trench (8/23/2023–11/10/2023) - Vacuum extraction from soil gas probes (8/23/2023–8/25/2023) - Perimeter probe valve closed and removed from vacuum extraction system (8/25/2023–present)
9/22/2023	0.0	5.5	13.7	80.8	
10/21/2023	0.0	5.5	15.1	79.4	
11/1/2023	0.0	4.5	16.6	78.9	
11/10/2023	3.1	12.9	2.9	81	- Blower shut off (11/10/2023–6/19/2024)
11/17/2023	0.0	10.6	8.1	81.3	
11/30/2023	2.4	14.0	0.0	83.5	
12/8/2023	0.0	11.2	3.0	85.8	
1/3/2024	3	11.1	0.0	85.9	
3/15/2024	**8.2**	14.9	0.0	76.9	
4/3/2024	**9.3**	9.9	0.0	80.8	
5/1/2024	**16.2**	13.6	0.0	70.2	
5/7/2024	**14.8**	14.0	0.1	71.2	
5/15/2024	**13.9**	14.5	0.0	71.5	
5/21/2024	**18**	16.0	0.1	66	
5/31/2024	**16**	16.6	0.1	67.3	
6/7/2024	**16.3**	16.4	0.1	67.1	
6/25/2024	0.0	5.1	15.8	79.1	- Vacuum extraction from methane trench (6/19/2024–11/15/2024)
7/5/2024	0.0	3.6	17.4	79	
7/12/2024	0.0	2.4	18.1	66.5	
7/16/2024	0.0	2.0	16.5	70.5	
7/26/2024	0.1	1.6	16.7	81.7	
8/8/2024	0	1.8	18.8	72.1	- Caps added to the other two vent pipe connections at sumps
8/20/2024	0.1	1.9	19.2	78.8	
8/24/2024	0	2.3	18.8	78.9	
8/29/2024	0	2.6	18.6	78.8	
9/4/2024	0	2.5	17.1	80.5	
9/21/2024	0	2.1	18	79.9	
9/26/2024	0	1.9	18	80.1	
10/3/2024	0	1.9	20	78.1	
10/8/2024	0	1.7	18.9	79.4	
10/20/2024	0	1.9	19.6	78.5	
10/30/2024	0	1.8	19.5	78.7	
11/8/2024	0	2	20.9	77.1	
11/12/2024	0	1.9	20.3	77.8	
11/19/2024	0	2.2	20.1	77.7	- Blower shut off (11/15/2024–present)
11/27/2024	0	2.5	19.9	77.6	
12/2/2024	0	1.8	20.9	77.3	
12/12/2024	0	1.7	20.3	78	
12/20/2024	0	2.1	20.6	77.3	

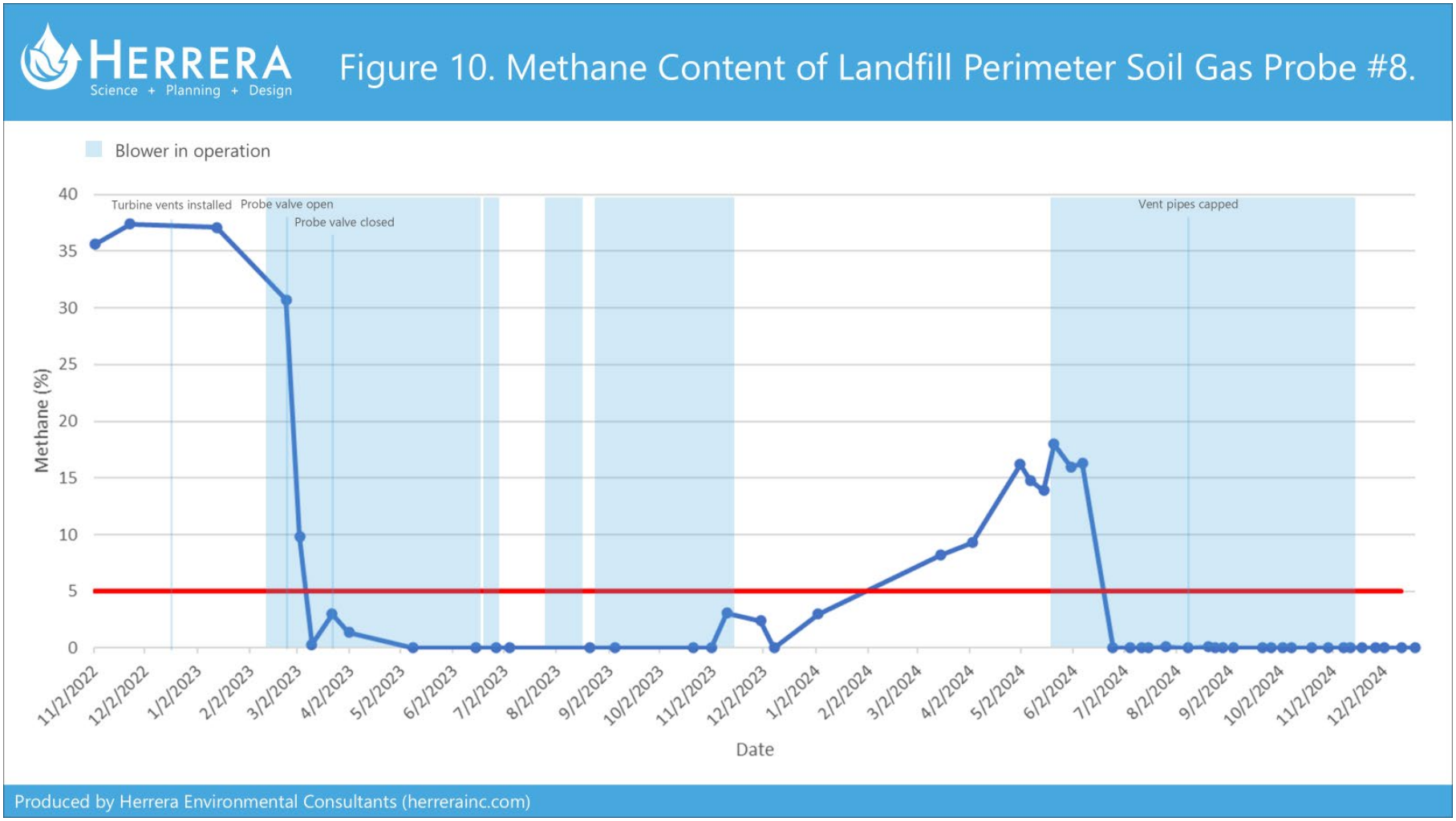
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Figure 10. Methane Content of Landfill Perimeter Soil Gas Probe #8.
Blower in operation
Turbine vents installed
Probe valve open
Probe valve closed
Vent pipes capped
Methane (%)
40
35
30
25
20
15
10
5
0
11/2/2022
12/2/2022
1/2/2023
2/2/2023
3/2/2023
4/2/2023
5/2/2023
6/2/2023
7/2/2023
8/2/2023
9/2/2023
10/2/2023
11/2/2023
12/2/2023
1/2/2024
2/2/2024
3/2/2024
4/2/2024
5/2/2024
6/2/2024
7/2/2024
8/2/2024
9/2/2024
10/2/2024
11/2/2024
12/2/2024
Date
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GP-9

Table 14. Monitoring Results for Landfill Perimeter Soil Gas Probe Number 9.

Date	% Methane	% Carbon Dioxide	% Oxygen	% Balance	Actions/Key Dates
11/2/2022	Not Read				
11/23/2022	4.2	0.1	14	81.7	
1/13/2023	**5.8**	0.1	3.2	90.9	- Turbine vents installed on LFG vent (12/12/2022–present)
2/23/2023	Not Read				- Vacuum extraction from methane trench (2/10/2023–6/16/2023)
3/3/2023	Not Read				
3/10/2023	0.1	0.1	21.4	78.5	
3/22/2023	0.1	0.0	21.2	78.7	
4/1/2023	2.4	0.1	2.2	95.3	
5/9/2023	3.1	0.1	0.2	96.6	
6/15/2023	0.0	3.1	13.6	83.3	
6/27/2023	0.0	6.2	5	88.8	- Blower shut off (6/16/2023–6/17/2023) - Vacuum extraction from methane trench (6/17/2023–6/26/2023) - Blower shut off (6/26/2023–7/24/2023)
7/5/2023	0.1	8.8	4.7	86.4	
8/21/2023	Not Read				- Vacuum extraction from methane trench (7/24/2023–8/18/2023) - Blower shut off (8/18/2023–8/23/2023)
9/5/2023	Not Read				- Vacuum extraction from methane trench (8/23/2023–11/10/2023)
9/22/2023	Not Read				
10/21/2023	Not Read				
11/1/2023	Not Read				
11/10/2023	0.0	6.5	4.9	88.6	- Blower shut off (11/10/2023–6/19/2024)
11/17/2023	0.0	6.5	4.9	88.6	
11/30/2023	0.0	6.5	4.9	88.6	
12/8/2023	0.0	6.5	4.9	88.6	
1/3/2024	0.0	4.7	8.4	86.9	
3/15/2024	0.0	5.5	5.9	88.6	
4/3/2024	0.2	7.8	6.1	86.1	
5/1/2024	0.1	5.6	6.7	87.7	
5/7/2024	0.0	7.2	6.3	86.5	
5/15/2024	0.4	6.3	7.6	86.1	
5/21/2024	0.2	7.9	6.8	85.3	
5/31/2024	0.1	8.6	5.3	86.1	
6/7/2024	0.2	8.2	6.5	85.3	
6/25/2024	0.0	8.5	5.2	86.3	- Vacuum extraction from methane trench (6/19/2024–11/15/2024)
7/5/2024	0.0	7.9	6.7	85.4	
7/12/2024	0.0	8.1	6.2	85.7	
7/16/2024	0.1	7.6	6.6	85.8	
7/26/2024	0.1	7.7	6.5	85.8	
8/8/2024	0	7.6	6.6	85.8	- Caps added to the other two vent pipe connections at sumps
8/20/2024	0.1	7.6	6.7	85.7	
8/24/2024	0	7.7	6.5	85.8	
8/29/2024	0	8	6.5	85.5	
9/4/2024	0	7.9	6.6	85.5	
9/21/2024	0.1	7.7	6.5	85.8	
9/26/2024	0.0	7.2	6.3	86.5	
10/3/2024	0.0	7.9	3.2	88.9	
10/8/2024	0.0	8.5	5.2	86.3	
10/20/2024	0.1	7.6	6.6	85.8	
10/30/2024	0	8.2	6.1	85.7	
11/8/2024	0	8.1	5.6	86.3	
11/12/2024	0	7.7	5.1	87.2	
11/19/2024	0	7.4	6.9	85.7	- Blower shut off (11/15/2024–present)
11/27/2024	0	8.1	5.9	86	
12/2/2024	0	8	5.4	86.6	
12/12/2024	0	7.6	6.2	86.2	
12/20/2024	0	7.3	6.7	86	

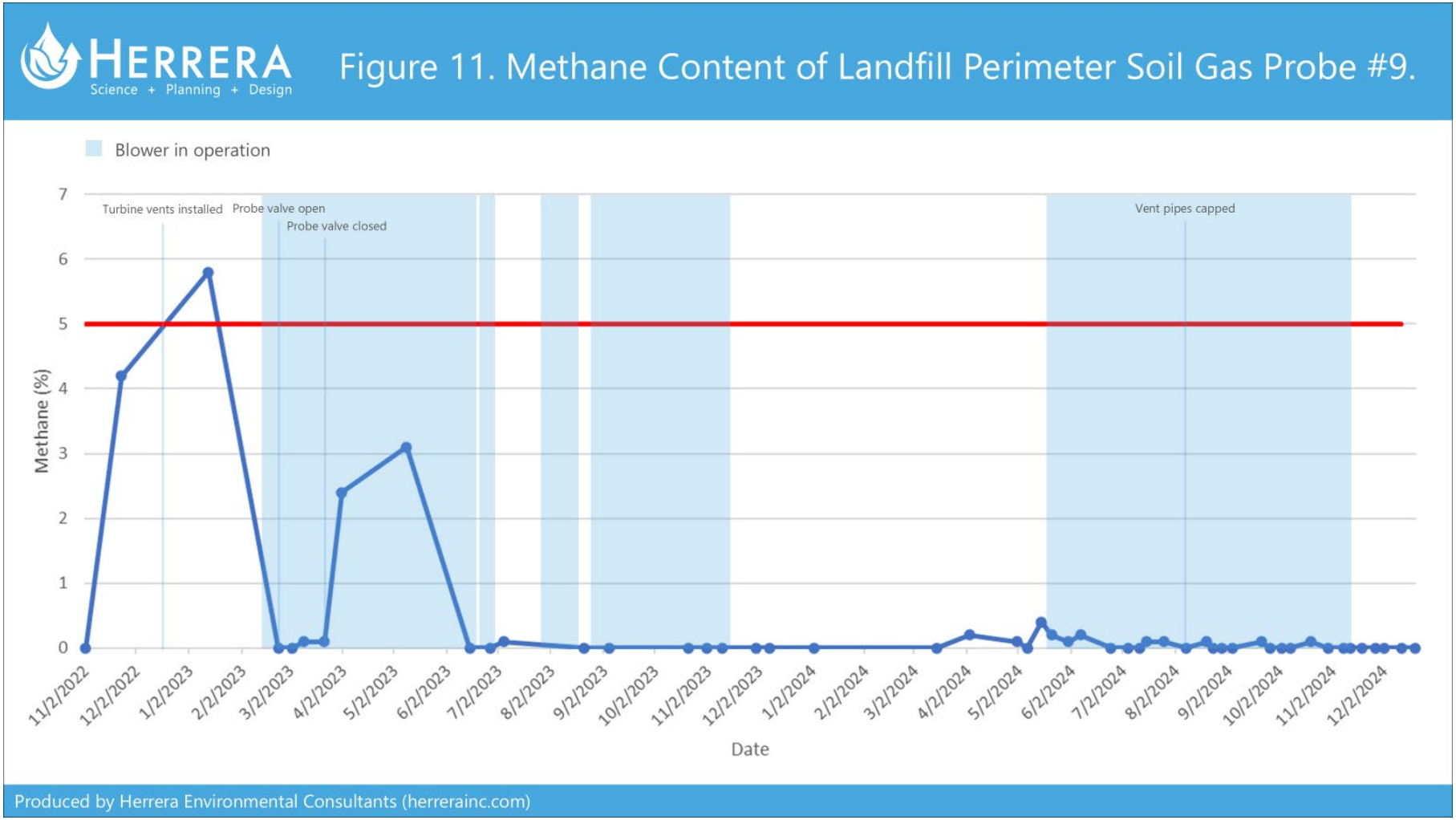
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Figure 11. Methane Content of Landfill Perimeter Soil Gas Probe #9.
Blower in operation
Turbine vents installed
Probe valve open
Probe valve closed
Vent pipes capped
Methane (%)
0
1
2
3
4
5
6
7
11/2/2022
12/2/2022
1/2/2023
2/2/2023
3/2/2023
4/2/2023
5/2/2023
6/2/2023
7/2/2023
8/2/2023
9/2/2023
10/2/2023
11/2/2023
12/2/2023
1/2/2024
2/2/2024
3/2/2024
4/2/2024
5/2/2024
6/2/2024
7/2/2024
8/2/2024
9/2/2024
10/2/2024
11/2/2024
12/2/2024
Date
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Table 15. Monitoring Results for Landfill Perimeter Soil Gas Probe Number 10.					
Date	**% Methane**	**% Carbon Dioxide**	**% Oxygen**	**% Balance**	**Actions/Key Dates**
11/2/2022	**35.9**	56.4	0.0	7.7	
11/23/2022	**39.3**	53.6	0.0	6.9	
1/13/2023	**41.9**	55.3	0.1	2.7	- Turbine vents installed on LFG vent (12/12/2022–present)
2/23/2023	**30.4**	40.5	0.0	29	- Blower installed and turned on (2/10/2023–6/16/2023) - Perimeter probe valves left open to vent (2/23/2023–3/22/2023)
3/3/2023	**32.5**	31.1	0.1	36.3	
3/10/2023	0.0	0.1	21.9	78	
3/22/2023	0.0	0.1	21.1	78.8	- Perimeter probe valves closed (3/22/2023–7/21/2023)
4/1/2023	**12.6**	15.1	0.0	72.3	
5/9/2023	0.0	0.1	20.4	79.5	
6/15/2023	0.0	0.0	21.1	78.9	
6/27/2023	3.3	15.3	0.0	81.4	- Blower shut off (6/16/2023–6/17/2023) - Vacuum extraction from methane trench (6/17/2023–6/26/2023) - Blower shut off (6/26/2023–7/24/2023)
7/5/2023	**6.4**	19.1	0.0	74.5	
8/21/2023	**9.4**	31.3	0.1	59.2	- Vacuum extraction from soil gas probes (7/21/2023–8/18/2023) - Vacuum extraction from methane trench (7/24/2023–8/18/2023) - Blower shut off (8/18/2023–8/23/2023) - Perimeter probe valve closed (8/18/2023 -8/23/2023)
9/5/2023	**10.1**	30.6	0.1	59.2	- Vacuum extraction from methane trench (8/23/2023–11/10/2023) - Vacuum extraction from soil gas probes (8/23/2023–11/10/2023)
9/22/2023	**9.3**	28.8	0.1	61.8	
10/21/2023	**9.7**	28.3	0.1	61.9	
11/1/2023	**10.3**	27.7	0.0	62	
11/10/2023	**10.0**	27.5	0.1	62.4	- Blower shut off (11/10/2023–6/19/2024) - Perimeter probe valve closed (11/10/2023–present)
11/17/2023	**10.7**	27.6	0.0	61.7	
11/30/2023	**15.5**	31.3	0.0	53.1	
12/8/2023	**16.3**	32.2	0.0	51.5	
1/3/2024	**21.4**	35.3	0.0	43.3	
3/15/2024	**27.5**	37.3	0.0	35.2	
4/3/2024	**30.7**	38.5	0.0	30.7	
5/1/2024	**30.6**	35	0.0	34.4	
5/7/2024	**31.8**	38.9	0.1	29.2	
5/15/2024	**30.4**	38.5	0.0	31.1	
5/21/2024	**31.8**	39	0.1	29.1	
5/31/2024	**30.9**	38.6	0.0	30.5	
6/7/2024	**31.4**	38.5	0.1	30.0	
6/25/2024	**29.1**	37.8	0.2	32.9	- Vacuum extraction from methane trench (6/19/2024–11/15/2024)
7/5/2024	**25.4**	36	0.1	38.4	
7/12/2024	**19.2**	32.9	0.1	47.9	
7/16/2024	**17.4**	32.1	0.1	50.4	
7/26/2024	**18.8**	35	0.0	46.2	
8/8/2024	**11.5**	30.8	0.1	57.6	- Caps added to the other two vent pipe connections at sumps
8/20/2024	**13**	30.4	0.1	56.5	
8/24/2024	**Not Read**				
8/29/2024	**10.5**	29.2	0.1	60.3	
9/4/2024	**10.1**	28.9	0.1	60.9	
9/19/2024	**9.7**	29.4	0.1	60.8	- Blower shut off (11/15/2023–present)
9/26/2024	**8.2**	31.1	0	60.7	
10/3/2024	**7.9**	31.1	0	61	
10/8/2024	**7.8**	31.2	0	61	
10/20/2024	**9.8**	30.7	0.1	59.4	
10/30/2024	**10**	30.7	0.1	59.1	
11/8/2024	**10.2**	30.5	0.1	59.3	
11/12/2024	**11.1**	30.1	0.2	58.7	
11/19/2024	**13.3**	31.1	0.1	55.5	- Blower shut off (11/15/2024–present)
11/27/2024	**14.1**	31.8	0.1	54	
12/2/2024	**16.6**	32.7	0.1	50.7	
12/12/2024	**17.1**	30.7	0.1	52.1	
12/20/2024	**16.9**	31.5	0.1	51.5	

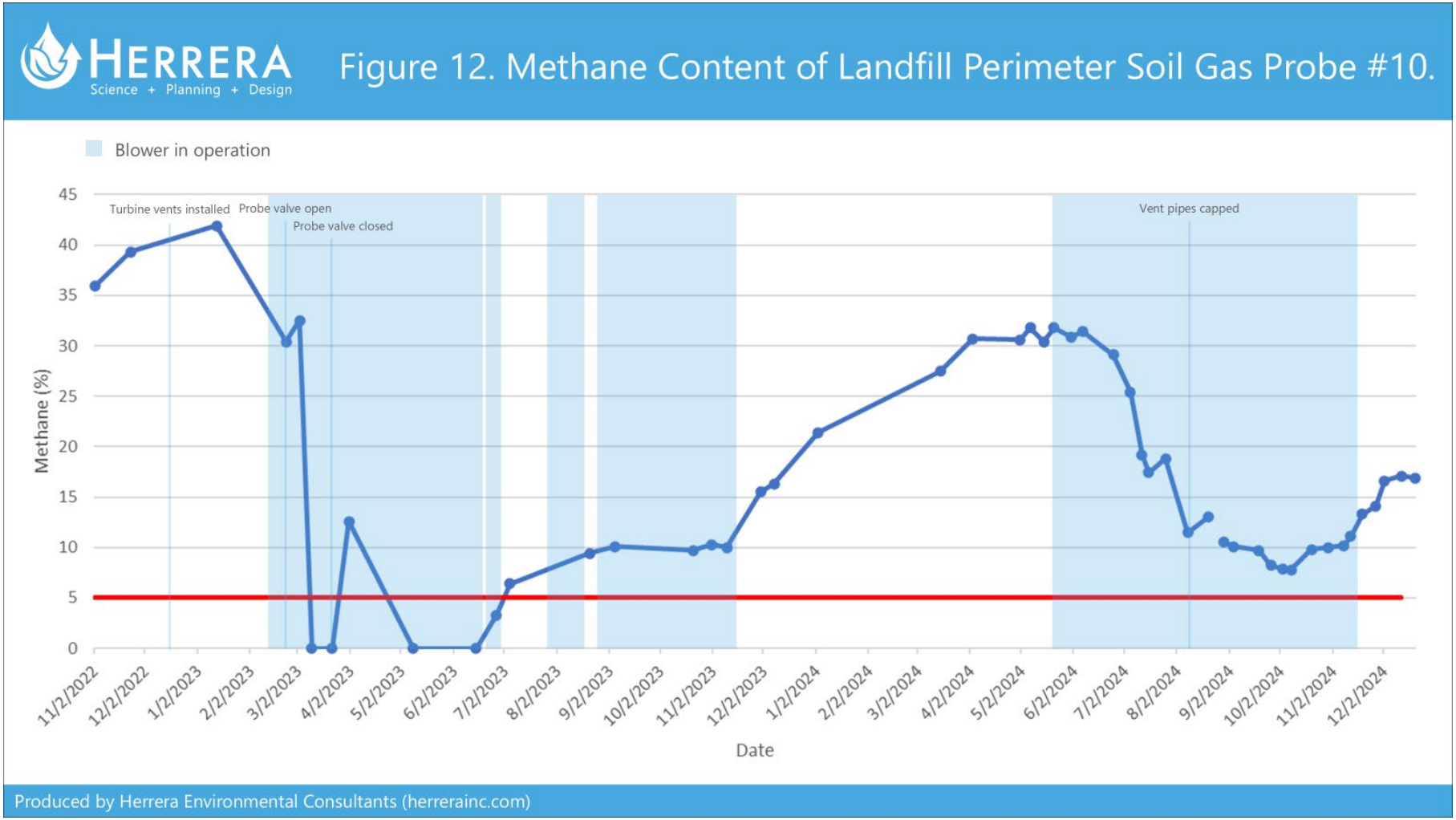
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Figure 12. Methane Content of Landfill Perimeter Soil Gas Probe #10.
Blower in operation
Turbine vents installed
Probe valve open
Probe valve closed
Vent pipes capped
Methane (%)
45
40
35
30
25
20
15
10
5
0
11/2/2022
12/2/2022
1/2/2023
2/2/2023
3/2/2023
4/2/2023
5/2/2023
6/2/2023
7/2/2023
8/2/2023
9/2/2023
10/2/2023
11/2/2023
12/2/2023
1/2/2024
2/2/2024
3/2/2024
4/2/2024
5/2/2024
6/2/2024
7/2/2024
8/2/2024
9/2/2024
10/2/2024
11/2/2024
12/2/2024
Date
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GP-11

Table 16. Monitoring Results for Landfill Perimeter Soil Gas Probe Number 11.					
Date	**% Methane**	**% Carbon Dioxide**	**% Oxygen**	**% Balance**	**Actions/Key Dates**
11/2/2022	0.0	16.2	8.2	75.7	
11/23/2022	0.6	22.9	2.8	73.7	
1/13/2023	**38.4**	48	0.1	13.5	- Turbine vents installed on LFG vent (12/12/2022–present)
2/23/2023	**33.3**	36.3	0.0	30.4	- Vacuum extraction from methane trench (2/10/2023–6/16/2023) - Perimeter probe valves left open to vent (2/23/2023–3/22/2023)
3/3/2023	**30.9**	27	0.1	42	
3/10/2023	0.0	0.3	21.8	77.9	
3/22/2023	0.0	0.2	21.3	78.5	- Perimeter probe valves closed (3/22/2023–7/21/2023)
4/1/2023	**19.1**	25	0.5	55.4	
5/9/2023	0.0	0.7	20	79.3	
6/15/2023	1.5	20.8	0.9	76.8	
6/27/2023	**9.9**	27.2	0.4	62.5	- Blower shut off (6/16/2023–6/17/2023) - Vacuum extraction from methane trench (6/17/2023–6/26/2023) - Blower shut off (6/26/2023–7/24/2023)
7/5/2023	**17.2**	33.6	0.1	49	
8/21/2023	**7.6**	26.3	0.4	65.7	- Vacuum extraction from soil gas probes (7/21/2023–8/18/2023) - Vacuum extraction from methane trench (7/24/2023–8/18/2023) - Blower shut off (8/18/2023–8/23/2023) - Perimeter probe valve closed (8/18/2023–8/23/2023)
9/5/2023	3.1	24	0.5	72.5	- Vacuum extraction from methane trench (8/23/2023–11/10/2023) - Vacuum extraction from soil gas probes (8/23/2023–11/10/2023)
9/22/2023	1.6	21.9	1.8	74.7	
10/21/2023	3.0	25.2	1.6	70.2	
11/1/2023	4.2	27	0.6	68.2	
11/10/2023	3.9	26.1	1.2	68.8	- Blower shut off (11/10/2023–6/19/2024) - Perimeter probe valve closed (11/10/2023–present)
11/17/2023	2.6	21.4	0.1	75.9	
11/30/2023	**17.3**	33.4	0.1	49.2	
12/8/2023	**21.7**	25.8	0.0	52.4	
1/3/2024	**18.0**	29.8	0.4	51.7	
3/15/2024	**18.2**	32.5	0.0	49.3	
4/3/2024	**20.5**	30.3	0.0	49.2	
5/1/2024	**17.7**	28	0.1	54.2	
5/7/2024	**10.2**	27.4	0.6	61.7	
5/15/2024	**19.5**	30.6	0.4	49.5	
5/21/2024	**22.1**	32.6	0.2	45.1	
5/31/2024	**20.9**	32.2	0.2	46.7	
6/7/2024	**18.1**	31	0.2	50.7	
6/25/2024	**6.7**	26.3	0.9	66.1	- Vacuum extraction from methane trench (6/19/2024–11/15/2024)
7/5/2024	3.0	22.7	1.0	73.3	
7/12/2024	1.9	22.2	1.0	74.9	
7/16/2024	4.1	22.8	1.0	72.1	
7/26/2024	**7.7**	27.3	0.6	64.5	
8/8/2024	**6.3**	25.4	0.9	67.4	- Caps added to the other two vent pipe connections at sumps
8/20/2024	**8.7**	25.5	1	64.9	
8/24/2024	**10**	26.3	1.1	62.6	
8/29/2024	**8**	25.5	0.3	66.2	
9/4/2024	**10.2**	26.5	0.5	62.8	
9/19/2024	**12.1**	28.2	0.6	59.1	
9/26/2024	**10.7**	30.4	0.4	58.5	
10/3/2024	**11.3**	31	0.4	57.3	
10/8/2024	**11.6**	30.9	0.6	56.9	
10/20/2024	**14.8**	30.9	0.7	53.6	
10/30/2024	**10.5**	29.6	0.5	59.4	
11/8/2024	**8.2**	26.8	0.5	64.5	
11/12/2024	**17.1**	30.5	0.1	52.3	
11/19/2024	**22.9**	32.9	0.1	44.1	- Blower shut off (11/15/2024–present)
11/27/2024	**22.6**	32.1	0.3	45	
12/2/2024	**22.1**	31.5	0.5	45.9	
12/12/2024	**22**	30.6	0.4	47	
12/20/2024	**22.4**	31.4	0.3	45.9	

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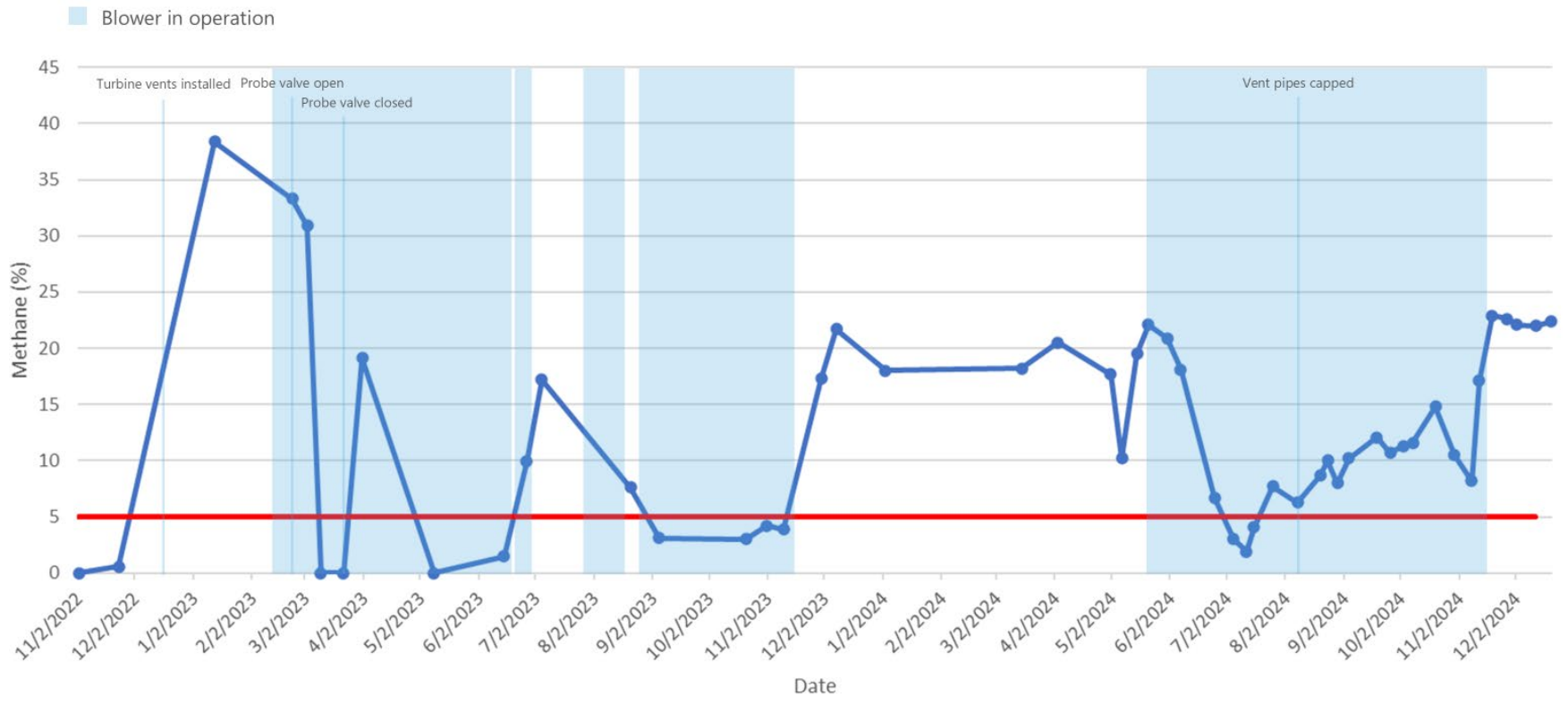
Figure 13. Methane Content of Landfill Perimeter Soil Gas Probe #11.



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GP-12

Table 17. Monitoring Results for Landfill Perimeter Soil Gas Probe Number 12.					
Date	**% Methane**	**% Carbon Dioxide**	**% Oxygen**	**% Balance**	**Actions/Key Dates**
11/2/2022	**22.8**	40.6	0.8	35.1	
11/23/2022	0.0	0.2	21.4	78.4	
1/13/2023	**27.9**	42.9	0.3	29	- Turbine vents installed on LFG vent (12/12/2022–present)
2/23/2023	**27**	42.2	0.0	30.8	- Vacuum extraction from methane trench (2/10/2023–6/16/2023) - Probe valves left open to vent (2/23/2023–3/22/2023)
3/3/2023	**12.8**	24.9	0.1	62.2	
3/10/2023	0.0	0.1	22	77.9	
3/22/2023	0.0	0.8	20.1	79.1	- Probe valves closed (3/22/2023–present)
4/1/2023	**17.7**	36.1	0.0	46.2	
5/9/2023	0.0	0.0	20.4	79.6	
6/15/2023	0.0	2.0	16.7	81.3	
6/27/2023	2.6	26.3	0.4	70.7	- Blower shut off (6/16/2023–6/17/2023) - Vacuum extraction from methane trench (6/17/2023–6/26/2023) - Blower shut off (6/26/2023–7/24/2023)
7/5/2023	3.1	27.9	0.2	68.7	
8/21/2023	4.3	30.4	0.3	65.1	- Vacuum extraction from methane trench (7/24/2023–8/18/2023) - Blower shut off (8/18/2023–8/23/2023)
9/5/2023	4.3	31.1	0	64.5	- Vacuum extraction from methane trench (8/23/2023–11/10/2023)
9/22/2023	4.1	30.4	0.8	64.6	
10/21/2023	3.2	31.6	0.1	65	
11/1/2023	2.8	27.9	1.8	67.5	
11/10/2023	3.4	30.3	0.1	66.2	- Blower shut off (11/10/2023–6/19/2024)
11/17/2023	3.4	30.4	0.0	66.2	
11/30/2023	**7.2**	32.4	0.0	60.4	
12/8/2023	**7.2**	32.5	0.0	60.4	
1/3/2024	**8.5**	32.8	0.0	58.7	
3/15/2024	**10.7**	34.1	0.0	55.2	
4/3/2024	**11.7**	31.5	0.0	56.8	
5/1/2024	**12.4**	29.4	0.0	58.2	
5/7/2024	**13.6**	32	0.1	54.4	
5/15/2024	**11.9**	30.7	0.0	57.4	
5/21/2024	**12.3**	31.3	0.0	56.4	
5/31/2024	**11.7**	30.6	0.1	57.6	
6/7/2024	**11.9**	30.1	0.1	58	
6/25/2024	**9.2**	28.5	0.1	62.3	- Vacuum extraction from methane trench (6/19/2024–11/15/2024)
7/5/2024	**6.8**	27	0.1	66.1	
7/12/2024	**5.0**	25.5	0.1	69.4	
7/16/2024	4.0	24.2	0.2	71.5	
7/26/2024	4.8	26.5	0.0	68.7	
8/8/2024	2.8	24.1	0.3	72.8	- Caps added to the other two vent pipe connections at sumps
8/20/2024	4.9	24.8	0.1	70.2	
8/24/2024	4.8	25.4	0	69.8	
8/29/2024	Not Read				
9/4/2024	4.4	24.6	0.1	70.9	
9/19/2024	4.8	26.1	0	69.1	
9/26/2024	4.3	27.8	0	67.9	
10/3/2024	3.7	27.1	0	69.2	
10/8/2024	4.1	28	0	67.9	
10/20/2024	4.6	27.5	0	67.9	
10/30/2024	**5**	28.1	0	66.9	
11/8/2024	4.5	27.8	0	67.7	
11/12/2024	**5.5**	27.4	0.1	67	
11/19/2024	**6.7**	27.8	0.1	65.4	- Blower shut off (11/15/2024–present)
11/27/2024	**7**	28.2	0	64.8	
12/2/2024	**7.7**	28.6	0	63.6	
12/12/2024	**8.3**	31.4	0	60.3	
12/20/2024	**8.5**	32.5	0	59	

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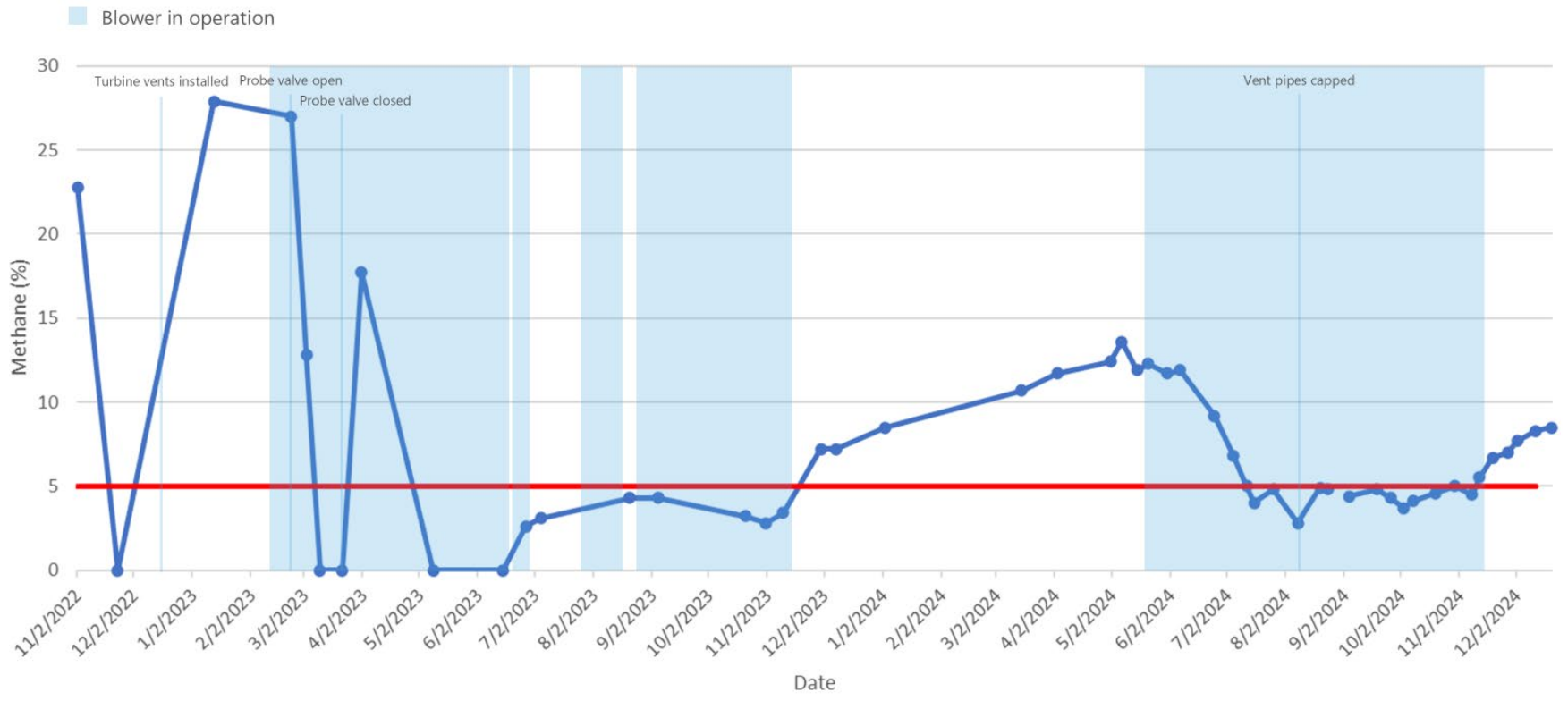
Figure 14. Methane Content of Landfill Perimeter Soil Gas Probe #12.



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Soil Vapor Extraction Unit

Table 18. Monitoring Results for Soil Vapor Extraction Unit.

Date	% Methane	% Carbon Dioxide	% Oxygen	% Balance	Actions/Key Dates
11/2/2022	-	-	-	-	- Blower not installed (11/2/2022–2/10/2023)
11/23/2022	-	-	-	-	
1/13/2023	-	-	-	-	
2/23/2023	Not Read				- Blower installed, vacuum extraction from methane trench (2/10/2023–6/16/2023)
3/3/2023	**23.8**	19.7	1.6	54.9	
3/10/2023	**20.7**	19.8	4.2	55.3	
3/22/2023	**11.1**	17.8	4.7	66.5	
4/1/2023	**8.7**	19	4.5	67.8	
5/9/2023	3.3	13.8	4.9	78	
6/15/2023	3.2	11.5	7.9	77.3	
6/27/2023	-	-	-	-	- Blower shut off (6/16/2023–6/17/2023) - Vacuum extraction from methane trench (6/17/2023–6/26/2023) - Blower shut off (6/26/2023–7/24/2023)
7/5/2023	-	-	-	-	
8/21/2023	-	-	-	-	- Vacuum extraction from methane trench (7/24/2023–8/18/2023) - Blower shut off (8/18/2023–8/23/2023)
9/5/2023	**6.0**	14.6	6	73.4	- Vacuum extraction from methane trench (8/23/2023–11/10/2023)
9/22/2023	Not Read				
10/21/2023	4.8	15.7	6.6	72.9	
11/1/2023	4.6	16.5	5.1	73.8	
11/10/2023	3.8	13.6	8.3	74.3	- Blower shut off (11/10/2023–6/19/2024)
11/17/2023	-	-	-	-	
11/30/2023	-	-	-	-	
12/8/2023	-	-	-	-	
1/3/2024	-	-	-	-	
3/15/2024	-	-	-	-	
4/3/2024	-	-	-	-	
5/1/2024	-	-	-	-	
5/7/2024	-	-	-	-	
5/15/2024	-	-	-	-	
5/21/2024	-	-	-	-	
5/31/2024	-	-	-	-	
6/7/2024	-	-	-	-	
6/25/2024	**15.4**	14.3	5.2	65.1	- Vacuum extraction from methane trench (6/19/2024–11/15/2024)
7/5/2024	**11**	13.8	5.8	69.4	
7/12/2024	**7.0**	13.4	7.1	72.4	
7/16/2024	**6.0**	12.7	6.6	74.8	
7/26/2024	**7.1**	14.8	6.7	71.4	
8/8/2024	**3.9**	12.4	7.7	76	- Caps added to the other two vent pipe connections at sumps
8/20/2024	**6**	13.9	6.9	73.2	
8/24/2024	**6**	15.4	5.6	73	
8/29/2024	4.2	15	5.9	73.4	- Dilution valve on blower opened halfway (8/24/24–11/15/2024)
9/4/2024	**4.0**	14.3	6	74.3	
9/21/2024	4.6	14.5	6.4	74.5	
9/26/2024	4.8	14.8	5.8	74.6	
10/3/2024	4.6	15	6.3	74.1	
10/8/2024	3.9	14.5	6.1	75.5	
10/20/2024	4.4	12.8	8	74.7	
10/30/2024	4.6	12.8	9.4	73.3	
11/8/2024	4.4	13.3	8.3	74.1	
11/12/2024	4.9	11.7	10.2	73.2	- Blower shut off (11/15/2024–present)
11/19/2024	-	-	-	-	
11/27/2024	-	-	-	-	
12/2/2024	-	-	-	-	
12/12/2024	-	-	-	-	
12/20/2024	-	-	-	-	

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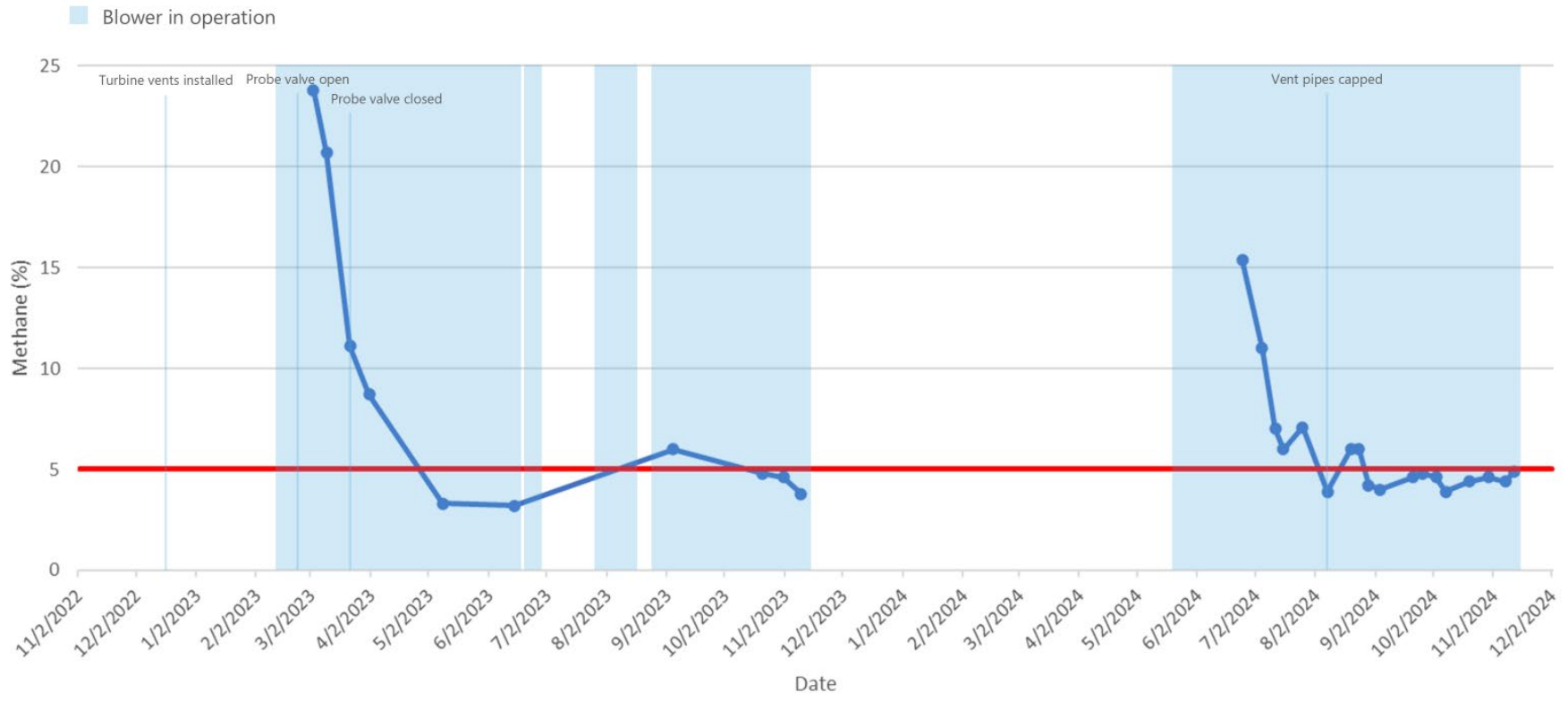
Figure 15. Methane Content at Portable Soil Vapor Extraction Unit.



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Notable Areas/Probes

Methane was detected above 5 percent at all probes at some point in 2024. Methane hot spots above 5 percent continue to exist around GP-6, GP-7, GP-10, GP-11, and GP-12. GP-1, GP-2, GP-4, and GP-8 have typically observed methane levels above 1 percent.

Methane concentrations above 5 percent have been observed since the landfill was closed and monitoring began in November 2022. Per the LFG Monitoring Readiness Report (Herrera 2024), Herrera personnel performed a number of investigations, implemented contingency measures, and saw fluctuations of methane levels in the probes since the start of monitoring. In February 2023, a blower unit was installed that reduced methane levels at all probes. Some probes were directly connected to the blower to help facilitate quicker soil gas cleanup. In November 2023, the blower was turned off to evaluate the rebound of methane levels. Methane concentrations rebounded to similar concentrations observed when monitoring was initiated in November 2022. The trend upward in spring and early summer of 2024 led to Herrera taking additional action to better control methane presence.

The blower was reinstalled in June 2024 (as it was in 2023) near GP-7, to provide vacuum on the perimeter trench through the sump near GP-7. Discharge was routed through the LFG Vent connected to sumps near GP-7 and GP-9. In August 2024, caps were added to the other two vent pipe connections at the sumps near GP-11 and GP-2 to prevent atmospheric air from being pulled into the trench and to increase vacuum influence on the landfill perimeter trench. The vent pipe connection at the sump near GP-9 was also capped to prevent recirculation of LFG through the collection system. Reduced methane concentrations were observed at the probes after the caps were added to the vent pipe connections; however, upward trends in methane levels began again during the rainy season. Saturated soils are believed to trap soil vapor and result in increased methane levels at the perimeter probes. These upward trends also coincide with the shutdown of the blower in November 2024 due to groundwater flooding of the landfill perimeter collection trench.

Top of Hill/West Side

The top of the hill around GP-10 and GP-11 have typically shown the highest soil vapor methane presence since monitoring began. In July 2024, methane levels were below 5 percent at GP-11 when the soil was dry and the blower was on. GP-10 has essentially maintained levels above 5 percent since monitoring began in 2022. Methane levels at GP-12 consistently dropped below 5 percent during periods of blower operation, but rose again above 5 percent in periods of blower inactivity. During November 2024 monitoring, methane reads trended upward again in GP-10, GP-11, and GP-12, likely due to the start of the rainy season and pockets of methane gas being trapped beneath saturated soils. Additionally, the blower temporarily shut off on November 15, 2024, because heavy rains caused the sumps to fill with water and the blower to pull in large amounts of water rather than LFG. The temporary inactive blower likely also contributed to the upward trend in methane levels. GP-9 has remained consistently below the 5 percent benchmark throughout all of 2024.

Side of Hill/South Side

GP-4, GP-5, GP-6, GP-7, and GP-8 had methane levels above 5 percent when monitoring first began at the landfill in 2022. All probes' methane levels dropped with implementation of the blower unit and direct vacuum extraction in February 2023. All probes' methane levels rose again when the blower was shut off in November 2023. GP-4, GP-5, GP-6, GP-7, and GP-8 were mostly above the 5 percent limit between the months of January and August 2024, with a peak concentration of 22.5 percent methane. Methane levels at these gas probes peaked in June, before the blower was reinstalled, and dropped to acceptable levels for most of the rest of 2024. Levels at GP4, GP-6, and GP-7 again rose above 5 percent at the end of the year, when the blower was off due to collection trench flooding.

Bottom of Hill/East Side

GP-1, GP-2, and GP-3 had methane levels above 5 percent when monitoring first began at the landfill in 2022. In February 2023, GP-2 and GP-3 both reached levels below 5 percent when the blower was first installed and turned on. When the blower was shut off again in November 2023, methane levels slowly rose again and surpassed 5 percent. GP-2 peaked at 7.7 percent methane on June 25, 2024, and GP-3 peaked at 12.5 percent methane on May 31, 2024, when the blower was off. Since the blower resumed operation in June 2024, GP-2 and GP-3 have maintained methane levels around 0 percent. GP-1 also maintained levels below the 5 percent benchmark for the beginning of 2024, but GP-1 was covered with asphalt during construction activities and remains inaccessible despite repeated efforts to reestablish accessibility.

Landfill Gas Surface Monitoring

Background

Methane surface emissions monitoring was conducted around the Go East Landfill, beneath the vapor barriers at the house ventilation trench monitoring stations and within Alpine Estates homes on 10 occasions in 2024. Per the LFGMCP, the interior of the electrical building and Alpine Estates homes were air monitored to ensure that methane levels are safe prior to occupancy. The concentrations of methane must not exceed 0.01 percent (100 ppmV) in indoor air of the Alpine Estates homes, per WAC 173-350-400(4)(b).

The continuous methane detectors installed within the homes cannot detect levels below 0.5 percent (5,000 ppmV) methane, and the electrical building is not equipped with such devices. To ensure that methane concentrations inside the offsite structures were below the 0.01 percent (100 ppmV) regulatory threshold, indoor methane levels were monitored using a surface emissions monitor that can detect methane as low as 1 ppmV (0.0001 percent). Naturally occurring methane levels in atmosphere are approximately 2 ppmV (0.0002 percent) (Helmenstine, 2024). Each home completed in 2024 had the interior air monitored at least once before occupancy, often more than once.

Surface monitoring was conducted as part of an initial assessment either following completion of home construction or during home construction. Surface monitoring was conducted as part of a supplemental

assessment when supplemental monitoring trigger level exceedances were either (1) observed both at a perimeter probe and at the house ventilation trench monitoring station (in the case of Alpine Estates homes) or (2) just observed at a perimeter probe (in the case of the electrical building).

Supplemental monitoring measures are taken when methane levels above 1 percent are observed at the perimeter probes. Perimeter probes have a regulatory assessment level of 5 percent methane, and, while not regulatory, a supplemental monitoring trigger level of 1 percent methane that initiates monitoring at the house monitoring stations of specific Alpine Estates development lots. Figure C-1 of the LFGMCP defines the lots that are to be monitored when there is an exceedance of 1 percent methane observed at a given probe.

Positioned outside of the house, the house monitoring stations connect to the collection system pipe installed beneath the house footprint. In 2024, 55 Alpine Estates houses were constructed. The house monitoring stations have been installed for these homes, and the contingency monitoring of the lots has begun (see LFGMCP, Figure C-1). Indoor home air monitoring with a surface emissions monitor is required if there is a detection of methane at or above 0.1 percent at the house monitoring station; this detection has not occurred.

Method

Herrera personnel used a Landtec SEM 5000 Tunable Diode Laser Absorption Spectroscopy (TDLAS) detector to measure methane concentrations across the surface of the Go East landfill and within and around uninhabited Alpine Estates homes. The SEM 5000 unit is calibrated to the landfill site location and adjusts measurements based on the background methane concentrations measured upwind and downwind. In accordance with WAC 173-408, monitoring was conducted with the Landtec SEM 5000 unit's probe (1) within 3 inches of the landfill or ground surface while traversing the monitored areas, (2) when barometric pressure was stable or dropping, and (3) when wind was less than 5 miles per hour (mph) and gusts did not exceed 10 mph. The monitored areas included the perimeter of the landfill and the lots of homes under development.

Results

Figures 16 to 20 show the results of methane surface monitoring around the Go East Landfill, beneath the vapor barriers at the house ventilation trench monitoring stations, and within Alpine Estates homes. One yellow dot represents one recorded methane concentration in ppmV. During 2024 surface monitoring, the highest observed concentration of methane was 20.4 ppmV, near the LFG continuous monitoring sump closest to Lot 19, but off the property of any home. The highest methane observances were typically near the continuous monitoring sumps, because these locations are where the collection trench is not buried and is accessible at ground level. The highest methane level observed within or beneath a home at the house ventilation trench monitoring station was 5.2 ppmV. Surface monitoring took place at least one time within each house before construction was completed. Results of surface monitoring across the site and within each home indicate that methane conditions at Alpine Estates are safe and well below the 0.01 percent(100 ppmV) regulatory threshold.

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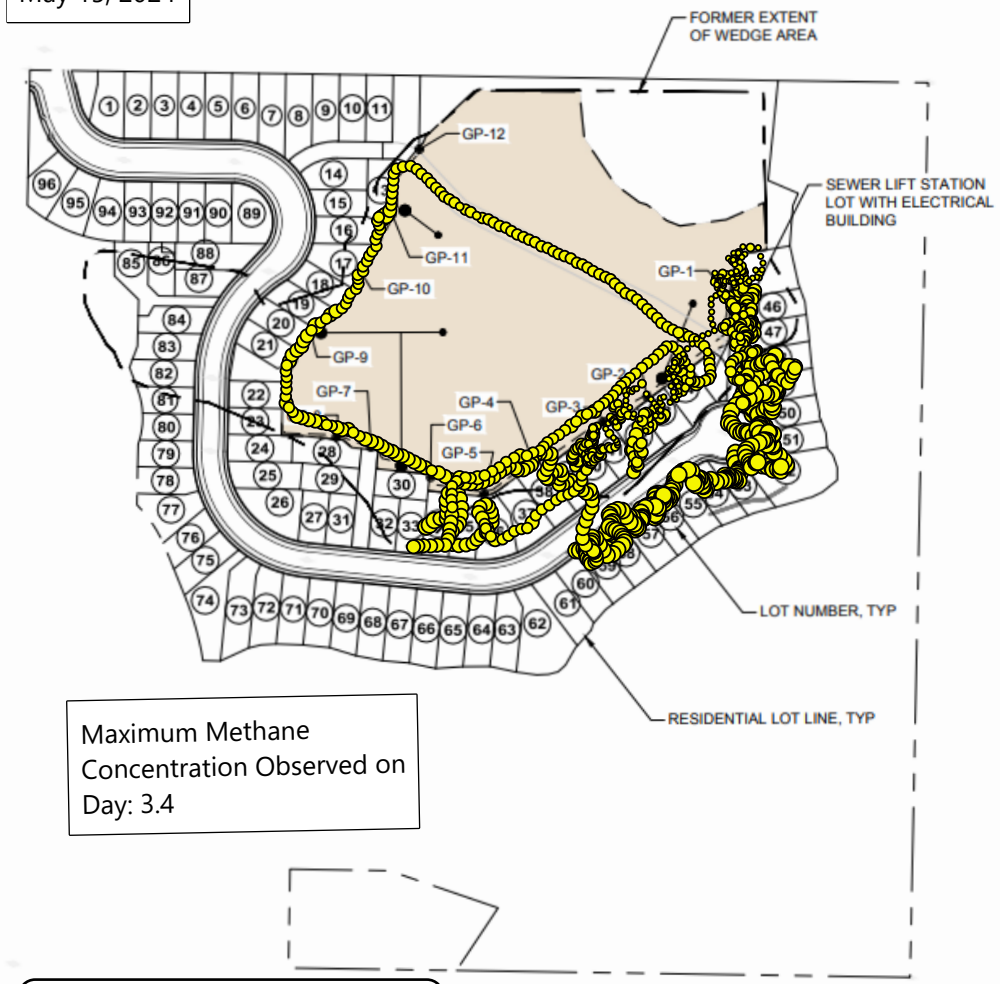
Figure 16.
Surface Monitoring Results.

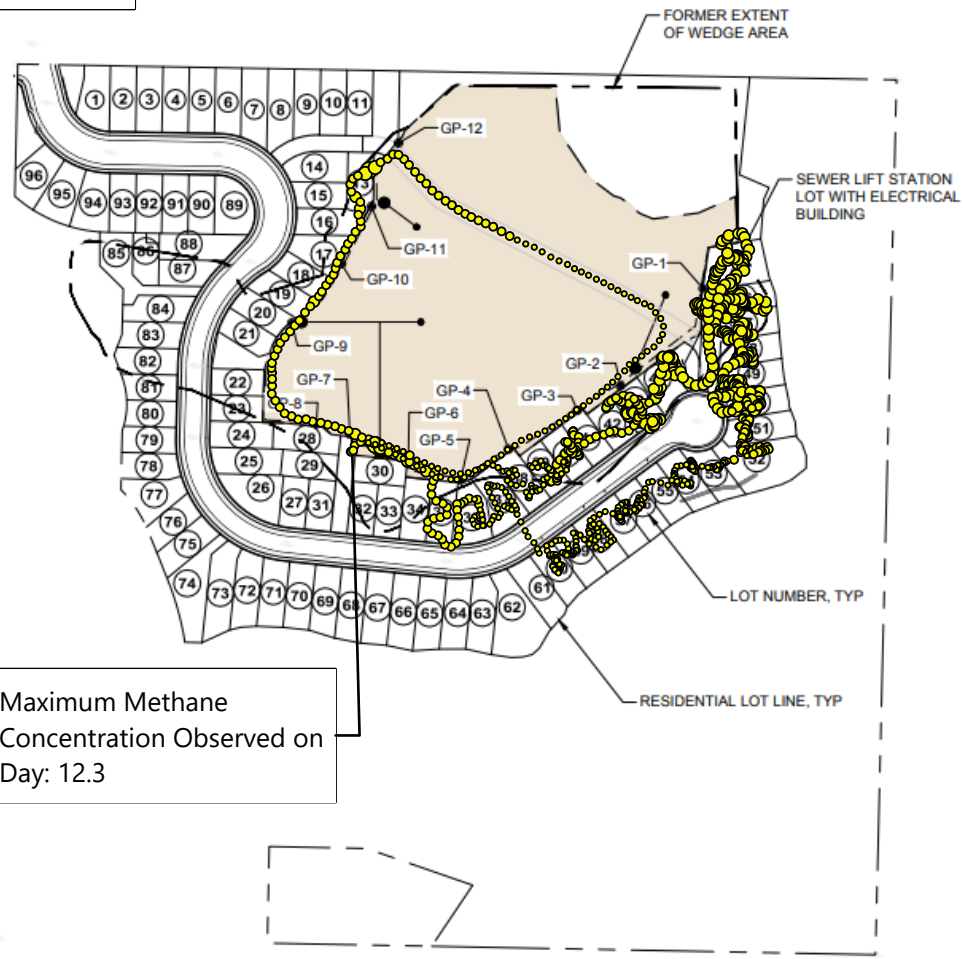
May 15, 2024



Maximum Methane Concentration Observed on Day: 3.4

Methane Concentration (ppm)
- 2.90
- 2.91 - 3.00
- 3.01 - 3.10
- 3.11 - 3.20
- 3.21 - 3.40

May 21, 2024



Maximum Methane Concentration Observed on Day: 12.3

Methane Concentration (ppm)
- 2.70 - 2.90
- 2.91 - 3.10
- 3.11 - 3.70
- 3.71 - 4.30
- 4.31 - 12.30

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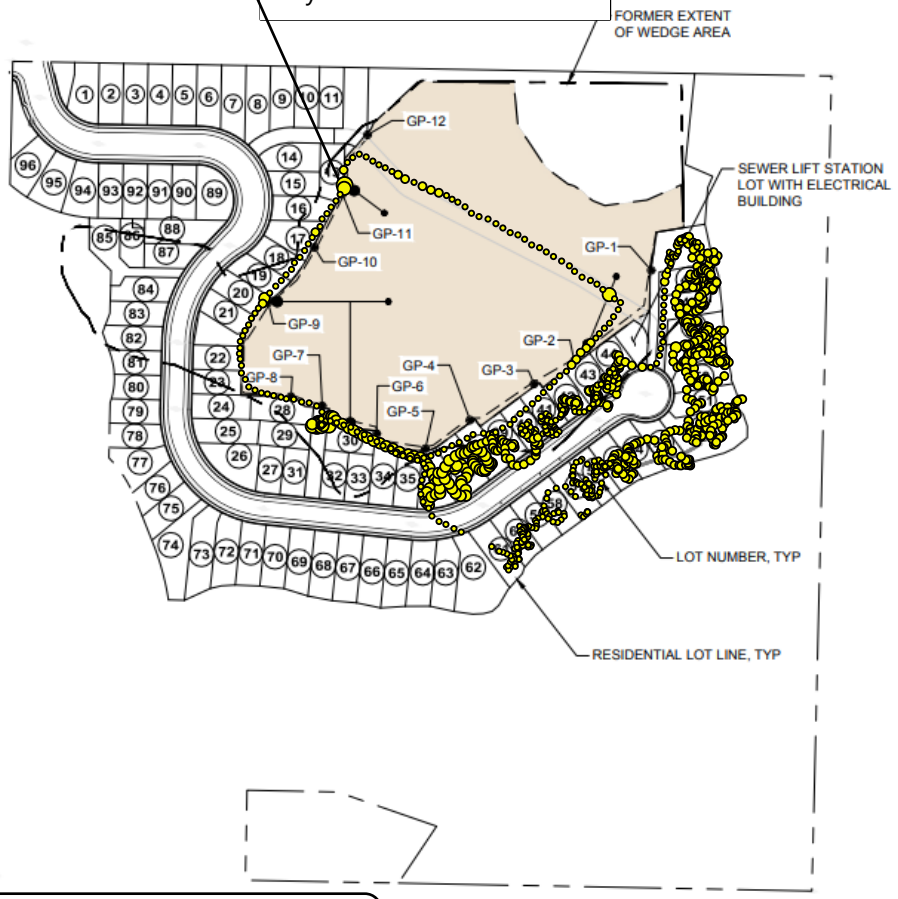
Figure 17.
Surface Monitoring Results.

May 31, 2024

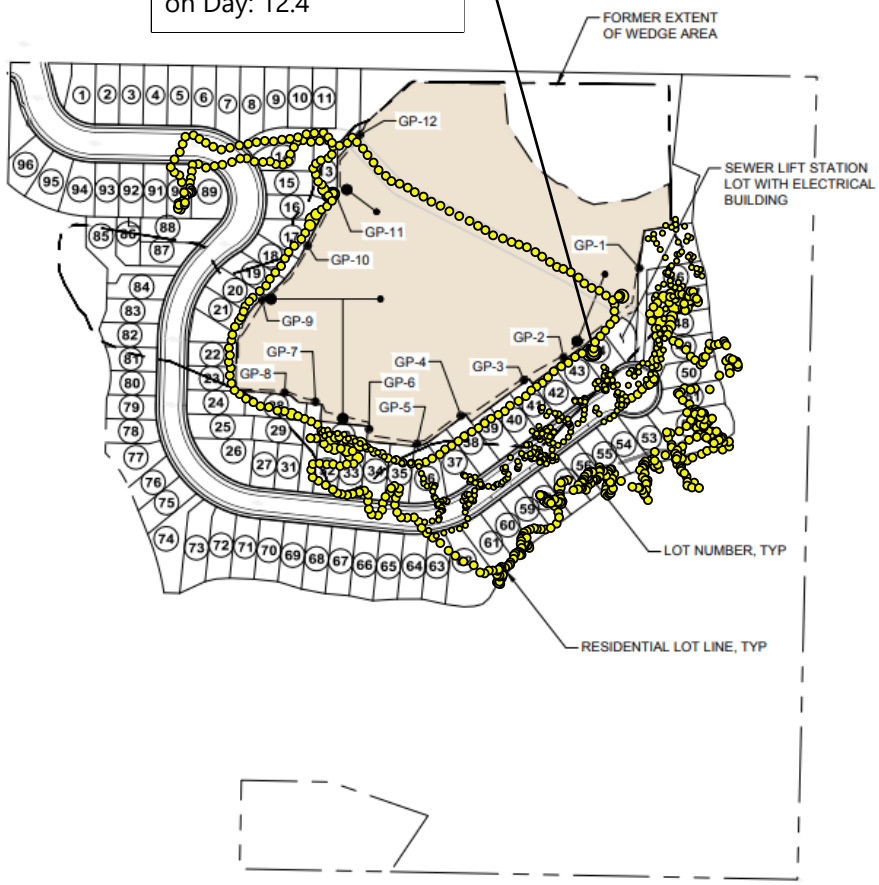
Maximum Methane Concentration Observed on Day: 12.4



Methane Concentration (ppm)
- 2.00 - 2.20
- 2.21 - 2.50
- 2.51 - 3.00
- 3.01 - 3.90
- 3.91 - 12.40

June 7, 2024

Maximum Methane Concentration Observed on Day: 12.4



Methane Concentrations (ppm)
- 2.10 - 2.70
- 2.71 - 3.40
- 3.41 - 4.20
- 4.21 - 5.70
- 5.71 - 7.20

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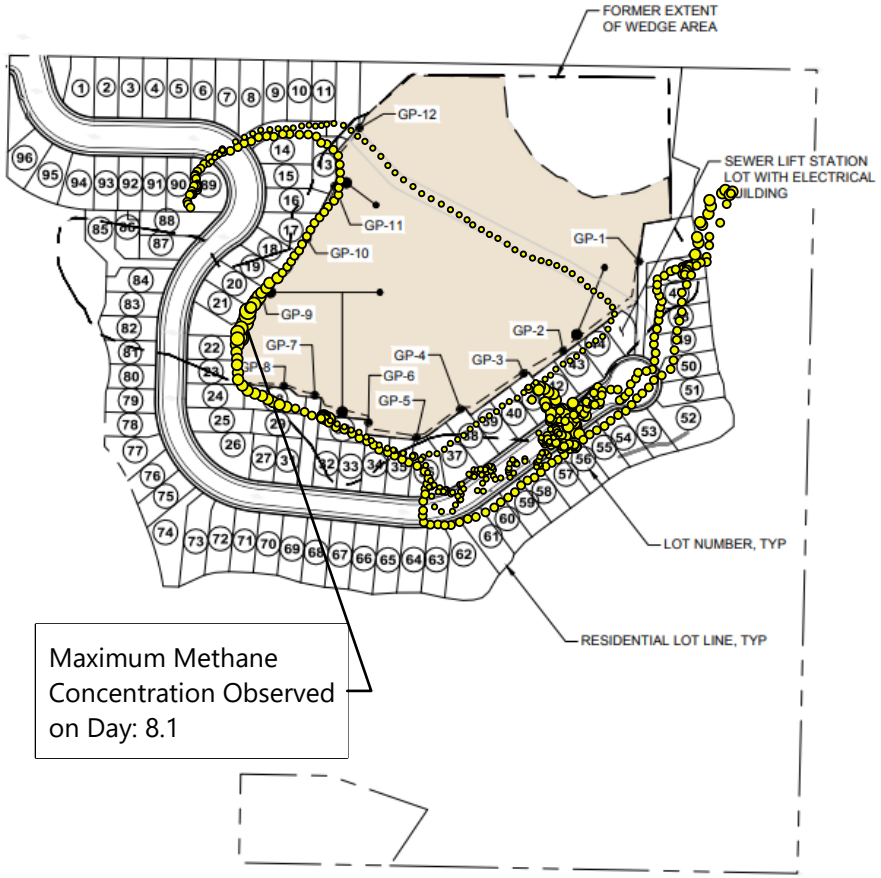
Figure 18.
Surface Monitoring Results.

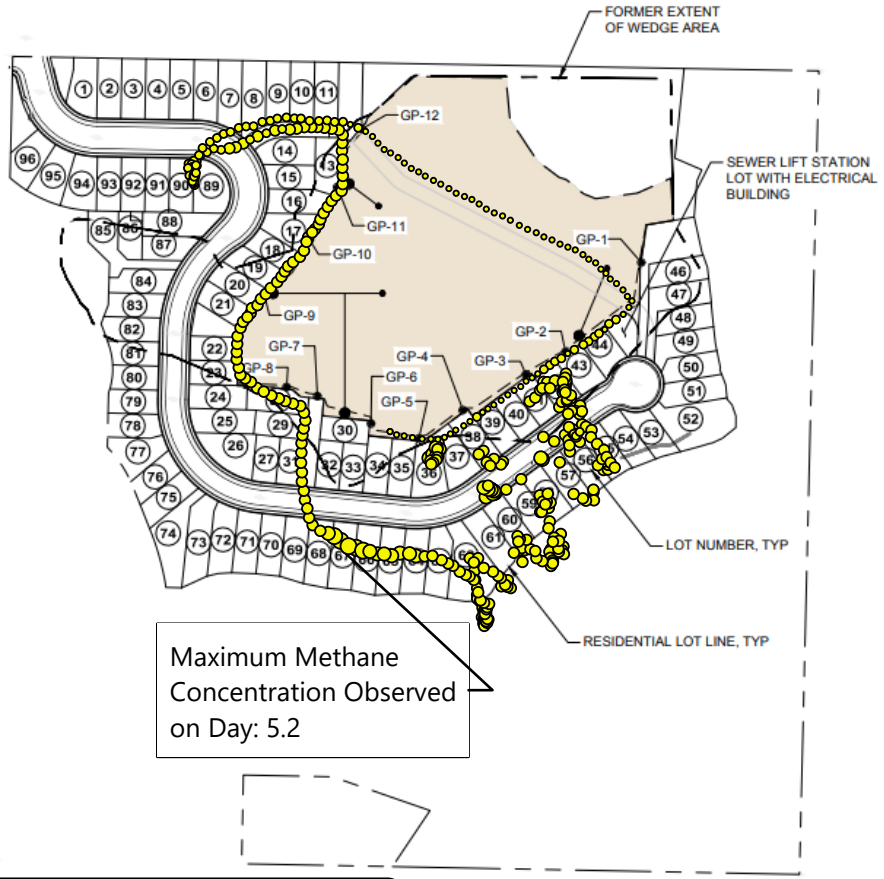
June 25, 2024



Methane Concentrations (ppm)

- 2.70 - 3.00
- 3.01 - 3.30
- 3.31 - 4.10
- 4.11 - 5.20
- 5.21 - 8.10

July 5, 2024



Methane Concentrations (ppm)

- 1.90 - 2.50
- 2.51 - 3.00
- 3.01 - 3.60
- 3.61 - 4.30
- 4.31 - 5.20

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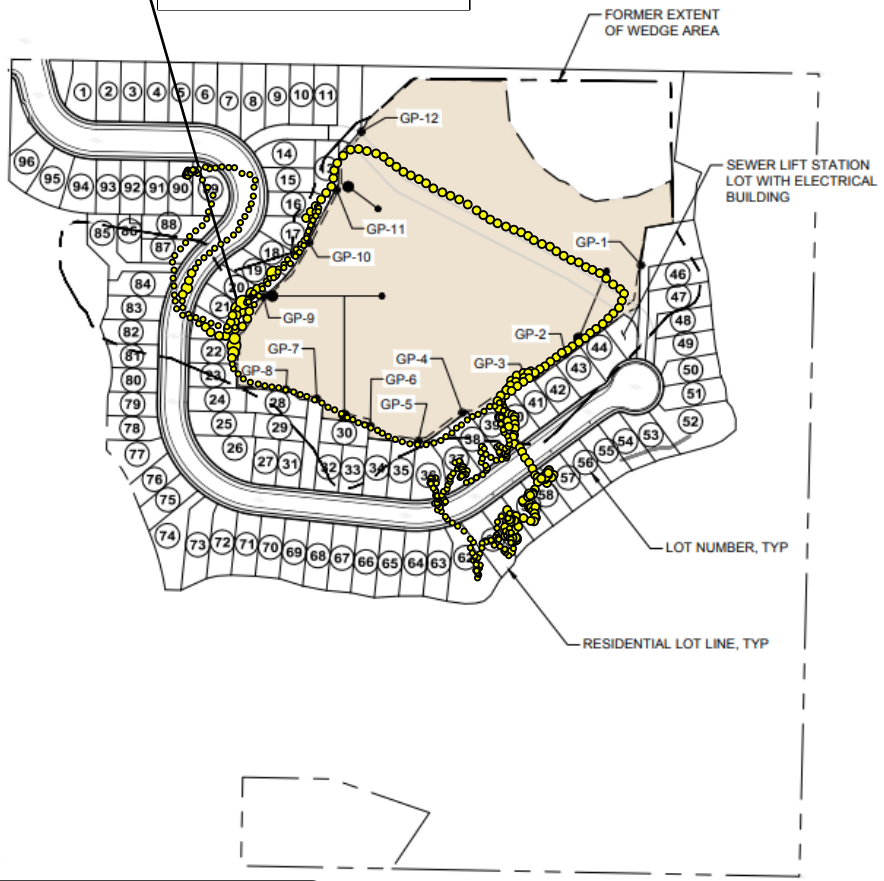
Figure 19.
Surface Monitoring Results.

July 12, 2024

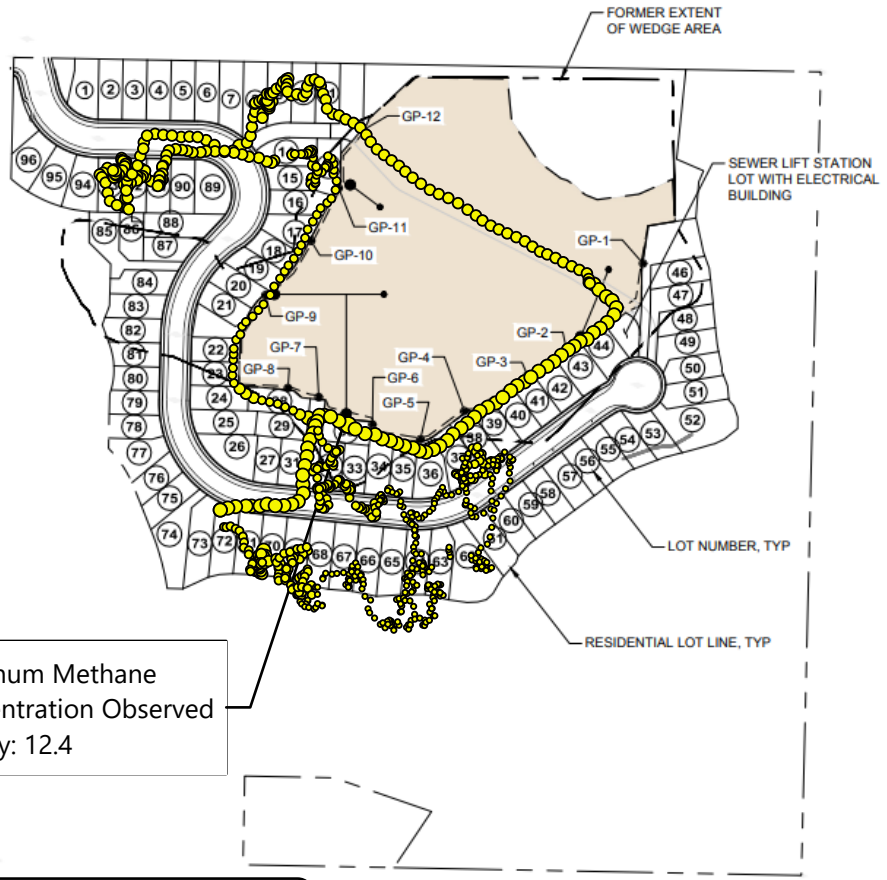
Maximum Methane Concentration Observed on Day: 9.7



Methane Concentrations (ppm)

- 3.00 - 3.10
- 3.11 - 3.70
- 3.71 - 4.70
- 4.71 - 6.10
- 6.11 - 9.70

August 29, 2024



Maximum Methane Concentration Observed on Day: 12.4

Methane Concentrations (ppm)

- 2.10 - 2.30
- 2.31 - 2.50
- 2.51 - 2.80
- 2.81 - 4.30
- 4.31 - 13.80

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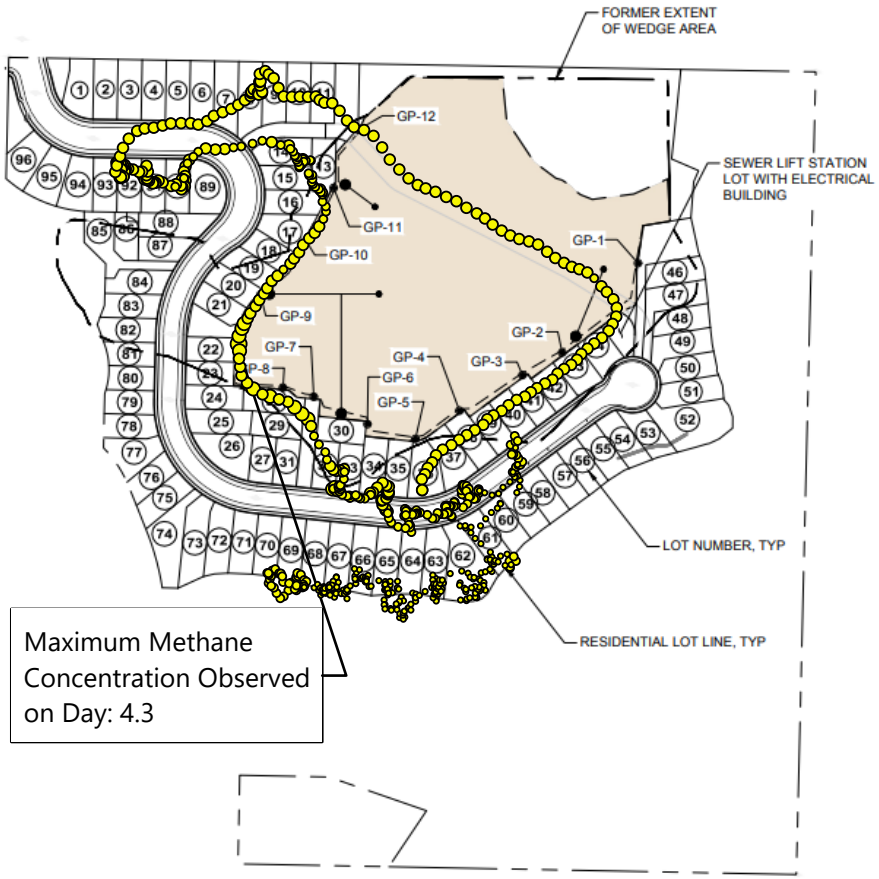
Figure 20.
Surface Monitoring Results.

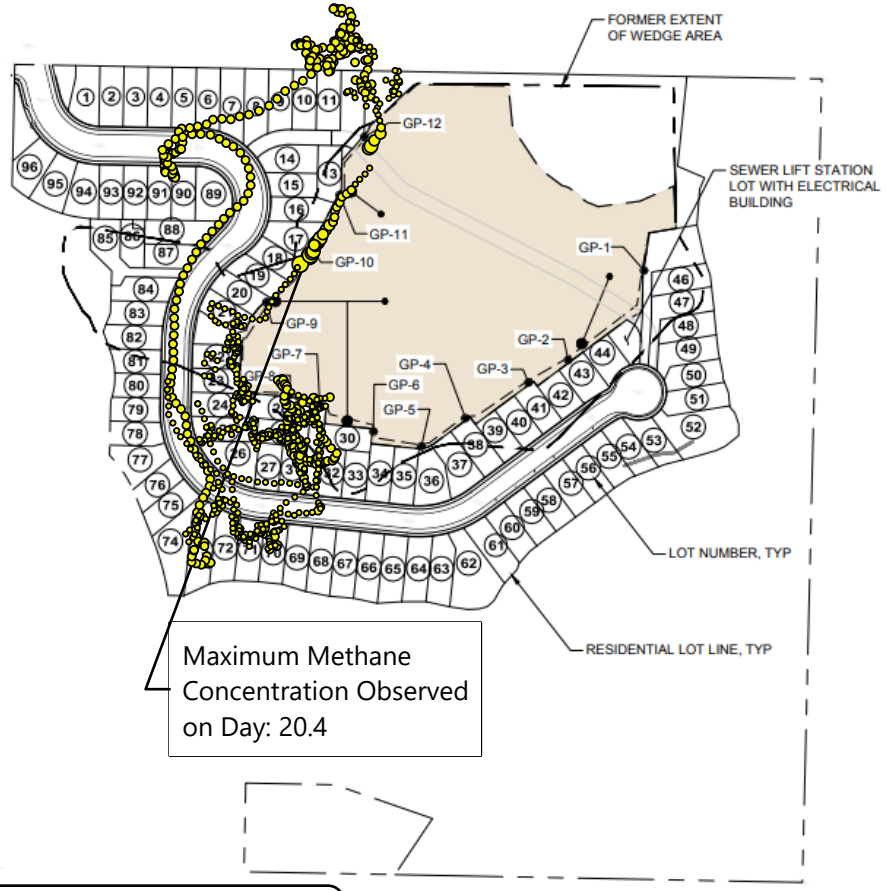
N

September 4, 2024



Methane Concentrations (ppm)
- 3.00
- 3.01 - 3.20
- 3.21 - 3.40
- 3.41 - 3.80
- 3.81 - 4.30

December 4, 2024



Methane Concentrations (ppm)
- 2.60 - 3.00
- 3.01 - 4.60
- 4.61 - 7.80
- 7.81 - 13.90
- 13.91 - 20.40

0 100 200 400 Feet

Other Work Performed

In November 2024, the process for installing a larger, permanent blower unit to increase vacuum influence on the collection trench was initiated with collection of an LFG sample representative of LFG collected from the landfill perimeter collection trench. Although methane concentrations stayed mostly consistent after the blower was installed, methane reads at four of the 10 probes have consistently read above the LEL of 5 percent and upward trends were observed in October through December. Therefore, upsize of the blower was deemed necessary.

The LFG sample was analyzed for the U.S. Environmental Protection Agency (EPA) Toxic Organics – 15 (TO-15) constituents by Fremont Analytical in Seattle, Washington. Concentration results of TO-15 analytes from the laboratory were multiplied by the flow rate observed at the blower at the time of sample collection (80 standard cubic feet per minute (scfm)) to develop loading rates for each analyte. The analyte loading rates were then compared to the regulated limits for Small Quantity Emission Rates (SQERs). SQERs are the level of emissions below which dispersion modeling is not required to demonstrate compliance with Acceptable Source Impact Levels (ASILs). An ASIL is the screening concentration of a toxic air pollutant (TAP) in the ambient air. TAPs are pollutants that are known or suspected to cause cancer or other serious health effects, or adverse environmental effects. The associated SQER emission thresholds were taken from the current WAC 173-460 (Controls for New Sources of TAPs). All analytes had loading rates lower than the corresponding SQER threshold, indicating the analytes and total emissions meet compliance and do not require further dispersion modeling to determine compliance. In 2025, a Go East Landfill Emissions Technical Memorandum will be prepared and submitted to provide more description of this sample collection and the emissions compliance. Additionally, once the permanent soil vapor extraction unit is up and running, another sample will be collected to confirm emissions remain in compliance with increased LFG extraction.

Planned Work for 2025

During 2025, the following onsite work is planned for the Go East Landfill:

- Perform weekly perimeter probe monitoring until control is established and methane levels are confirmed to drop below 5 percent.
- House ventilation trench monitoring station and indoor air monitoring of Alpine Estates homes if supplemental monitoring action is triggered.
- Uncover GP-1 for future migration monitoring before Alpine Estates development is completed.
- Prepare and submit the Go East Landfill Emissions Technical Memorandum to Ecology and SCHD.
- Install a new upsized blower unit.
- Collect LFG samples and analyze emissions with a new upsized blower; prepare another Go East Landfill Emissions Technical Memorandum for Ecology and SCHD.

During 2025, the following onsite work is planned for the Alpine Estates Development:

- Oversee construction of remaining 39 Alpine Estates homes with gas mitigation systems, including gas vapor impervious membranes and underlying passive ventilation systems.
- Perform methane surface emissions monitoring inside Alpine Estates homes while they are being constructed.
- For each completed home, prepare Environmental Construction Confirmation Reports for Ecology and SCHD to review.

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