Hartland Landfill – Landfill Gas Monitoring 2023 Report

Capital Regional District | Parks, Recreation & Environmental Services, Environmental Protection

Hartland Biogas Upgrading Facility under construction (July 2024)

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HARTLAND LANDFILL – LANDFILL GAS MONITORING
2023 REPORT

EXECUTIVE SUMMARY

Hartland Landfill provides solid waste disposal services for the Capital Regional District (CRD). The landfill is a multi-purpose facility providing collection services for recyclable materials, household hazardous waste, items covered by product stewardship, as well as disposal of municipal solid waste (MSW) and controlled waste. The site operates pursuant to an operational certificate under the *Environmental Management Act*, issued by the BC Ministry of Environment and Climate Change Strategy (ENV); and follows a Design, Operations and Closure Plan required under the operational certificate.

The landfill footprint (Phase 1 + Phase 2) occupies 42.9 Ha with an estimated 8.2 M tonnes of municipal solid waste in place in 2023. When the landfill reaches planned final filling elevations in Phase 2, it is estimated to contain approximately 18 M tonnes of municipal solid waste. This report fulfills annual reporting requirements set out in the BC *Operational Certificate 12659* and the BC *Landfill Gas Management Regulation*. Landfill gas (LFG) collection/management at Hartland (described below) includes collection and utilization infrastructure, generation modelling and monitoring (utilization, perimeter gas probes, and hotspot monitoring.

LFG collection and/or management at Hartland in 2023 included the following components:

- **Gas collection infrastructure** including cover systems, collection pipes, wells, and blowers to facilitate gas collection and utilization.
- **LFG utilization facility** that generates electricity for the BC Hydro grid.
- **LFG monitoring system** including collection system, hotspot and subsurface monitoring programs.
- **Methane production and gas generation modelling** rates given landfill waste volumes and decomposition rates.

GAS GENERATION, COLLECTION AND UTILIZATION

In 2023, the gas collection system consisted of 58 vertical wells and 94 horizontal wells, for a total of 152 wells. Four non-productive wells were removed from service, and two horizontal wells were connected to the system and activated in completed lifts in Phase 2, Cell 3. The well field was balanced monthly in 2023, as recommended by the BC *Landfill Gas Management Facilities Design Guidelines*.

A fugitive emissions monitoring project was completed in 2020. The data were used to complete a comprehensive landfill gas mass balance for the site using three different landfill gas generation models. Report findings confirm that the current ENV model overestimates landfill gas generation and fugitive emissions at Hartland, while an alternative model (UBCi) more accurately estimates gas generation. Therefore, this model was used again in 2023, alongside the ENV model. Results of the UBCi model demonstrate a collection efficiency of 74%, whereas the ENV model reports 64% for the same period. According to the UBCi model (which is supported by empirical mass balance data), Hartland Landfill is just under the 75% collection efficiency requirement set out in the *Landfill Gas Management Regulation*.

Table ES1 Modelled Methane Generation and Collection Efficiency 2023

Year	Modelled Annual Methane Generated ENV (tonnes/year)	Modelled Annual Methane Generated UBCi (tonnes/year)	Measured Annual Gas Capture (tonnes/year)	Collection Efficiency (%) ENV Model	Collection Efficiency (%) UBCi Model
2023	8,418	7,307	5,408	64%	74%

MONITORING

Hartland Landfill has several monitoring programs to assess the effectiveness of the LFG collection infrastructure. The following summarizes the components of the program:

1. **Collection and utilization system monitoring** to evaluate changes in gas quality over time and to document data for gas collection and gas utilization to assess collection efficiency and total emissions from the landfill.

2. **Monitoring of subsurface perimeter and building foundation probes** to assess the potential for subsurface LFG migration at the eastern landfill boundary and at on-site buildings for compliance with BC *Landfill Criteria*, and for worker and public health and safety.

3. **Surface emissions and hotspot monitoring** to verify the effectiveness of cover and the LFG collection system in order to identify health and safety risks associated with fugitive LFG emissions.

COMPLIANCE SUMMARY

Table ES2 has been prepared to summarize the results of LFG monitoring programs, whether the results comply with requirements, actions taken to address non-compliance, and recommendations.

Table ES2 LFG Compliance Summary 2023

Program	Compliance Location	Criteria	Findings	Mitigation/Actions	Recommendations
Perimeter Probe Monitoring	Probes GP-1A, 1B, 2A, 2B, 3A, 3B, 11A, 11B, 12A and 12B	Methane must not exceed 5% in subsurface soils (BC *Landfill Criteria for Municipal Solid Waste* & BC *Landfill Gas Management Facilities Design Guidelines*)	No exceedances Low risk of sub-surface gas migration to adjacent properties	None	Continue quarterly monitoring.
Building Foundation Probe Monitoring	Probes GP-4A, 5A, 6A, 6B, 7A, 7B, 8A, 9A, 13A, 17A, 18A	Maximum 1% methane in any on-site facility (BC *Landfill Criteria for Municipal Solid Waste* & BC *Landfill Gas Management Facilities Design Guidelines*)	No exceedances Low risk of subsurface gas migration to adjacent building	None	Continue quarterly monitoring.
Ambient Grid Monitoring	N/A	100 ppm total hydrocarbon (THC), as methane (CRD internal guideline)	11 grid locations >100 ppm No cover system failures suspected in the closed area of Phase 1	Investigated hotspots and mitigated, where possible.	Continue annual monitoring.
Hotspot Monitoring	N/A	1,000 ppm THC (CRD internal guideline)	No new hotspots (Z-points) >1,000 ppm were identified. Currently 23 locations for hotspot investigation	Added new locations of hotspots to the monitoring program.	Continue annual monitoring. Investigate mitigation options.
Well Field Monitoring and Balancing	N/A	Monitor monthly. Oxygen 2.5% - gas optimization and reduction of fire potential *(BC Landfill Gas Management Facilities Design Guidelines)*	Monitoring completed monthly; Oxygen did not exceed 2.5%	None	Continue monthly monitoring at minimum.
Gas Collection	N/A	75% gas collection efficiency target by the end of 2016, as per *Landfill Gas Management Plan*	Site specific model (UBCi) estimated collection efficiency at 74%. ENV model estimated collection efficiency at 64%.	*Landfill Gas Management Plan* submitted to ENV.	Continue to implement the gas management plan and optimize methane and nitrogen, oxygen levels in the well field.

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1.0 INTRODUCTION

Hartland Landfill provides solid waste disposal services for the Capital Regional District (CRD). The landfill is a multi-purpose facility providing collection services for recyclable materials, household hazardous waste, extended producer responsibility products, salvageable items, as well as disposal services for municipal solid waste and controlled waste. Landfill operations are guided by the *Hartland Landfill Design, Operations and Closure Plan (updated 2023),* the BC *Operational Certificate 12659* issued by the BC Ministry of Environment and Climate Change Strategy (ENV), and the CRD's *Solid Waste Management Plan (approved in 2022)*.

Landfill gas (LFG) is primarily composed of methane, carbon dioxide and nitrogen, with small amounts of water vapour, oxygen and trace gases. Trace gases include hydrogen sulphide, ammonia, nitrous oxide, volatile organic compounds and chlorofluorocarbons. Risks associated with LFG include asphyxiation, flammability (between 5% and 15% methane by volume), toxicity, odour, and greenhouse gas (GHG) emissions.

The objective of an LFG collection system is to reduce GHGs through the destruction of collected methane, mitigate fugitive emissions, and reduce the potential for subsurface, lateral gas migration. Ongoing monitoring is conducted at the landfill to assess the effectiveness of these controls, and includes gas generation modelling, gas capture assessment, and ambient and subsurface monitoring.

This report is prepared to assess operational needs and performance, meet regulatory reporting requirements and to inform the public regarding LFG management at Hartland. This report meets the reporting requirements specified in the BC *Operational Certificate 12659* and the BC *Landfill Gas Management Regulation* for annual reporting of gas collection and management.

2.0 SITE DESCRIPTION

The Hartland Landfill is situated on 320 hectares within the District of Saanich. Mount Work Regional Park is located to the west, parkland and the Heal's Rifle Range lies to the north, residential properties lie to the east, and undeveloped CRD property is located to the south.

The climate in the area is classified as "cool mediterranean" due to warm, dry summers and cool, wet winters. Annual precipitation is around 800-1,000 mm per year. The site is surrounded by bedrock; discontinuous bedrock fractures have been identified.

The CRD took over operation of the landfill site in 1985. Prior to that, it was privately owned and operated. The landfill footprint (Phase 1 + Phase 2) occupies 42.9 Ha with an estimated 8.2 M tonnes of MSW in place. The average annual disposal rate for the last five years is approximately 184,913 tonnes which comprises residential, commercial and industrial wastes.

The landfill has two operational areas: Phase 1 was operational between the 1950s and 1997 and has final cover. Phase 2 comprises the current active area of the landfill, which began in 1997. Phase 1 is unlined and covered with a combination geomembrane/clay cap. Phase 2 was constructed within a former lake basin (now referred to as the Phase 2 basin); it is partially lined and relies on hydraulic gradients to contain leachate. Development of the Hartland Landfill is guided conceptually by the cell development and filling plan, updated in 2022.

3.0 REGULATORY FRAMEWORK

There are a number of provincial and federal regulations that apply to LFG management, emissions management and reporting. Key regulations are listed below.

3.1 LFG Management Regulation

The BC *Landfill Gas Management Regulation* requires landfills that produce 1,000 tonnes of methane per year have a qualified professional prepare an LFG management plan. According to the regulation, the *Landfill Gas Management Plan* must be prepared in accordance with the BC *Landfill Gas Management Facilities Design Guidelines*, 2010 ('*the Guidelines*') and include:

- a description of existing or planned methods or maintenance practices and processes for LFG management on the site;
- a plan for installation, operation and maintenance of LFG management facilities (including contingencies for planned or emergency shutdowns); and
- recommendations for optimizing LFG collection to meet a 75% collection efficiency target four years after implementation.

The Guidelines specify a set of design and performance objectives/standards regarding LFG management and operations, including gas collection and composition; extraction and destruction infrastructure; and gas migration and assessment.

3.2 WorkSafeBC

Many of the compounds in LFG, particularly methane, hydrogen sulphide and individual volatile organic compounds, have worker exposure limits set out within WorkSafeBC regulations. The Hartland Landfill must comply with these limits.

3.3 BC Landfill Criteria for Municipal Solid Waste

The BC *Landfill Criteria for Municipal Solid Waste* (2016) stipulates compliance with the *Landfill Gas Management Regulation* and the Guidelines described above. As well, the landfill must be managed to ensure there is no public threat or nuisance/odour. Annual reporting and compliance review is a requirement under Hartland Landfill's *Operational Certificate 12659.* A full compliance report for all Operational Certificate requirements is provided in the 2022 Hartland Landfill Annual Operations Report.

4.0 HEALTH AND SAFETY

LFG is flammable, toxic and poses an asphyxiation risk to landfill employees and contractors on site. Specifically:

- LFG can accumulate in confined spaces or low-lying areas with poor air circulation, which can pose an asphyxiation risk due to the displacement of oxygen.
- Both trace gases and major gas constituents can result in acute toxicity if exposure occurs at high enough concentrations.
- Trace gases, usually associated with sulphur compounds, can create odours.
- Methane is explosive at concentrations between 5 and 15%. It is also a GHG with 25 times the global warming potential of carbon dioxide.

There is also potential for gas to laterally migrate off-site. When gas pressure builds up in a landfill, gas migrates via cracks, soil pores, and/or fractures to equalize with the surrounding atmosphere. This includes migrating through permeable cover systems or subsurface migration toward adjacent properties. The main objective of an LFG collection system is to mitigate the above risks and reduce the potential for subsurface, lateral gas migration. However, while lateral movement can be mitigated with LFG collection and control, there will still be fugitive LFG emissions on site. A number of factors influence this, such as atmospheric

pressure, groundwater level, gas pressure in the refuse mass, and permeability of cover systems. Gas collection system operation and utilization is discussed in Sections 6.0 and 7.0, and monitoring programs are discussed in Section 9.0.

5.0 LFG GENERATION

Decomposition of refuse creates LFG; the composition and amount of gas generated varies based on factors, such as amount, type and age of waste, as well as environmental conditions, such as temperature and moisture content. LFG composition and generation rates are discussed in Sections 7.0 and 9.0.

Peak gas generation occurs during the first one to three years after disposal. Initially, decomposition of waste is an aerobic process and produces mainly carbon dioxide. As oxygen is depleted, the decomposition occurs under anaerobic conditions. The total waste input and waste composition affects overall gas generation rates. For clarity, it is important to note that gas production is the total amount of gas predicted to be produced by the landfill given waste composition, volume of existing waste in place and site-specific, meteorological conditions.

5.1 Waste Quantity

The quantity of LFG production is dependent on the amount and type of waste received. In 2023, the Hartland Landfill received 208,647 tonnes of waste, which included 184,566 tonnes of general refuse (including biosolids mixed with sand), 21,124 tonnes of controlled waste and 2,957 tonnes of asbestos.

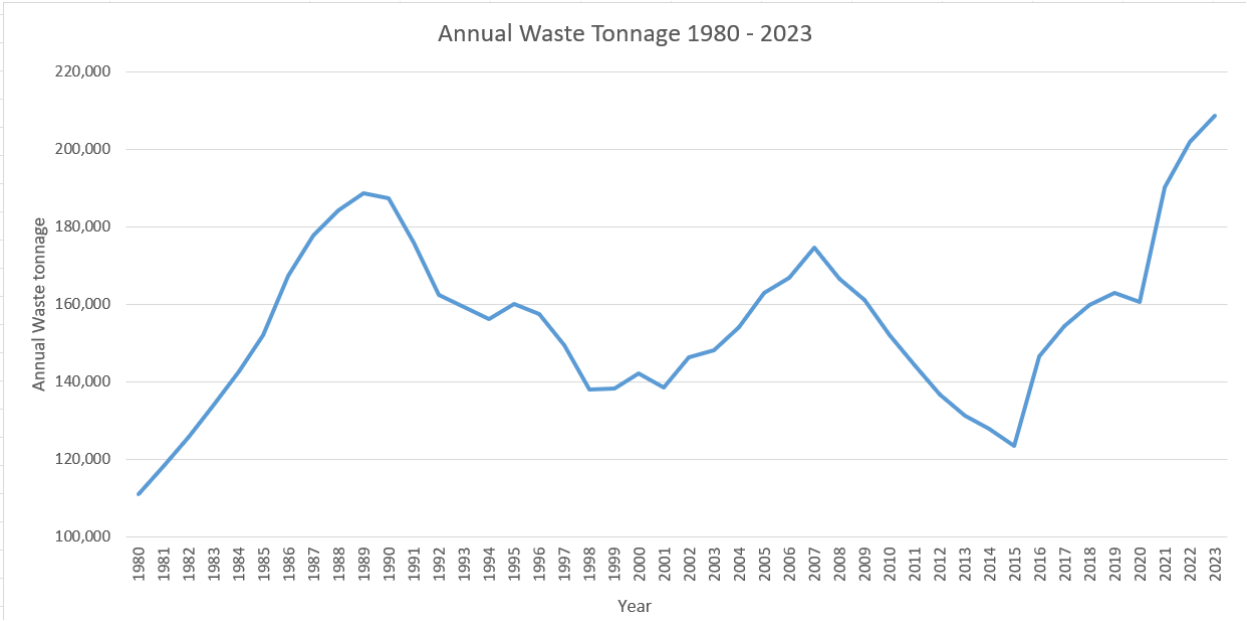


Figure 1 Annual Waste Tonnages Received or Estimated for Hartland Landfill from 1980-2023

5.2 Waste Composition

Waste composition is used to calculate methane generation rates in order to estimate overall LFG generation. Waste composition study results are included in Table 1 and with the gas generation data in Appendix A, including methane generation potential and a summary of waste sources and diversion, as required under the BC *Landfill Gas Management Regulation*.

The Waste Composition Study conducted by Tetratech (2022) does not quantify controlled waste. Controlled waste is classified by the CRD as wastes that, due to environmental or health and safety considerations, require special handling. Controlled waste deposited at the site is measured by scale and

classified by type. In this report, controlled waste data is categorized as described below for three consecutive years (2021 through 2023).

In 2023, the general refuse total tonnage (184,566) was inclusive of approximately 2,200 tonnes of biosolids. Based on consultant feedback, this volume of landfilled biosolids is not expected to have any appreciable impact on the reported collection efficiency. Staff will continue to review this and make adjustments to the methodologies as necessary.

For the purpose of this report, and based on the consultant's recommendation, the following assumptions were applied to categorize controlled waste decomposability:

- All asbestos and demolition wastes are relatively inert.
- Anything with a rock/sand nature or contaminated soil is relatively inert.
- Anything with unknown composition is categorized as Miscellaneous (50% moderately decomposable and 50% relatively inert).
- Waste sludge and pumping from sewage treatment are decomposable.

Controlled waste composition is attributed to each of the waste composition categories (relatively inert, moderately decomposable and decomposable waste) in the models. Table 1 indicates the waste composition used since 1980.

Table 1 Waste Composition 1980 to Present; and Projection to 2027

Date Range	Relatively Inert	Moderately Decomposable	Decomposable
1980 to 1995	33.7%	24.9%	41.4%
1996 to 2000	33.9%	40.5%	25.6%
2001 to 2004	26.6%	39.6%	33.8%
2005 to 2009	33.2%	37.0%	29.9%
2010 to 2013	31.5%	39.1%	29.4%
2014 to 2019	36.5%	41.3%	22.2%
2020 to2021	36.8%	42.1%	21.1%
2022 to 2027	40.9%	42.4%	16.7%

5.3 Gas Generation Modelling

LFG generation rates are estimated using the ENV model stipulated by the BC *Landfill Gas Management Regulation*. Additional modelling was completed in 2020 after a comprehensive landfill gas quantification project supported the use of the UBCi model as a more accurate representation of gas generation for Hartland Landfill details on modelling inputs and methodology for the ENV model and UBCi model and the landfill gas quantification project are included in Appendix A1 through A6.

Table 2 Estimated Methane Generation by Year at Hartland Landfill

Year	Annual Methane Generation (tonnes/yr) UBCi model	Annual Methane Generation (tonnes/yr) ENV model
2021	7,167	8,192
2022	7,283	8,325
2023	7,307	8,418

6.0 LFG COLLECTION AND MONITORING INFRASTRUCTURE

Systems to control and monitor fugitive LFG emissions have been implemented at Hartland Landfill. The objective of these controls is to:

- protect employee and public health and safety
- prevent migration of gas off-property or into on-site buildings
- reduce GHG
- capture gas for energy recovery
- control odour

The original LFG management system was installed in 1990 and upgraded in 1996. Under this early LFG system, collected methane was destroyed via candlestick flare. Since 2004, LFG has been used to generate electricity. The current LFG management system consists of:

- An extraction well network, including vertical and horizontal wells.
- A collection system incorporating branch, lateral and header pipes to convey the collected LFG from the extraction network to the LFG utilization facility or flares.
- An LFG destruction facility with moisture separators, centrifugal blowers, flares, piping and electrical service.
- A 1.6-MW generator for LFG utilization.
- An LFG monitoring program.
- A subsurface gas migration monitoring network that includes gas monitoring probes located adjacent to the eastern property boundary and the perimeter of on-site building foundations.

6.1 Gas Extraction Wells

Table 3 shows the number and type of gas wells installed and operating over the last six years. A complete summary of all gas wells, including installation and deactivation dates, is included in Appendix B.

Table 3 Number and Type of Gas Wells Installed or Operating (2018-2023)

Type of Gas Well	2018	2019	2020	2021	2022	2023
Vertical gas wells operating	63	60	60	58	58	58
Horizontal gas wells operating	69	78	78	84	86	94
Leachate horizontal gas wells operating	9	8	6	6	1	1
Leachate gas trench operating	0	0	0	0	0	0
Wells installed, but not connected[1]	15	7	15	7	25	33
Totals	**141**	**146**	**144**	**148**	**145**	**152**

[1] The total number of wells (does count wells currently installed, but not connected the gas collection system yet)

See Figure 2 for the general location and layout of the LFG infrastructure.

Since 2011, the density of horizontal wells has increased from 45-50 m to 20 m on center. Wells are placed on each vertical lift, approximately every 4 m, with each offset from the lower trench alignment. All new horizontal wells over 150 m in length are connected to laterals at both ends (where feasible).

Current vertical well design includes dual zone shallow and deep wells extending approximately 16 m and 30 m into the waste, respectively. Vertical well saturation with leachate has complicated gas extraction and, as a result, no further vertical wells have been installed since the 2012 implementation of the *Landfill Gas Management Plan*.

Figure 2 Hartland LFG Collection Infrastructure

Hartland Landfill

Gas Collection Infrastructure July 2023

CRD

Making a difference...together

Gas Collection Facility
- Gas Plant
- Power Plant

Gas Collection Well
- Buried Well
- Well
- Well Head Assembly

Gas Collection Node
- Cleanout
- Condensate Drain
- Condensate Drain Cleanout
- Condensate Trap
- Header Cleanout
- Inline Valve
- Sampling Port
- Trench Riser

Gas Collection Pipe
- Header
- Lateral
- Trench Riser

Horizontal Gas Wells
- 171, 175 & 179 Lifts
- 163, 165 & 167 Lifts
- 151, 155 & 159 Lifts
- 139, 143 & 147 Lifts
- Other Wells
- Landfill Designated Areas

N W E S

Metres
0 20 40 60 80 100

Projection: UTM Zone 10 North, NAD 1983
This map is for general information only and may contain inaccuracies.

Metres
0 10 20 30 40 50

Projection: UTM Zone 10 North, NAD 1983
This map is for general information only and may contain inaccuracies.

North Park Road
Residual Way
North Hydro Road
North Haul Rd
Upper Lagoon Access
Lagoon Road
High Level Road
Toutle Valley Road
Toutle Slope Rd
North Toe Road
East Perimeter Road
140 Bench Road
150 Bench Road
160 Bench Road
170 Bench Road
160 to 170 Bench Connector Road
North Main Haul Road
East Hydro Road
Main Access Road
Recycle & Public Road
Berm Road
South Diversion Road
South Park Road

PHASE 2 CELL 2 CLOSURE (2016)
PHASE 2 CELL 1 NORTH FACE CLOSURE (2011)
PHASE 2 CELL 3 CURRENT EXTENT
PHASE 1 CLOSURE (1997)
SOUTH WEST PROGRESSIVE CLOSURE (2008)

6.2 Gas Well Field Operation and Monitoring

CRD staff monitor gas wells for methane, carbon dioxide, carbon monoxide, oxygen, balance gas, static pressure, differential pressure, temperature and flow on a monthly basis. The well field must be measured and balanced at least once per month and more often if there are changes in gas composition, or if there are fluctuations in the system vacuum. There are many factors that impact gas generation, so frequent well adjustments are critical to minimize oxygen, and optimize flow and methane content. Ideally, constant vacuum is applied at a well so that gas is drawn at approximately the same rate that it is being generated (a target of >50% methane and <3% oxygen is desirable). A comprehensive summary of gas concentration by well is provided in Appendix C. For 2023, on average, the LFG at the gas plant was comprised of 53% methane and 0.4% oxygen.

Data from the well field, including individual well gas flows, is provided in Appendices B2 and B3. The well field was balanced 12 times in 2023 on a monthly basis (specific wells are checked more often to optimize gas extraction), as recommended by the BC *Landfill Gas Management Facilities Design Guidelines.*

Table 4 shows that the ten most productive wells contribute approximately 49% of the total gas volume. Figure 3 depicts gas collection by well as it contributes to the total gas collected.

Table 4 Gas Wells with the Highest Collection 2023

Name	Refuse Lift (mASL)	Year Activated	Average Methane (% by vol)	Average Flow (scfm)	Months in Operation	Methane Annual Flow (scfm)	Methane Flow (m^3)	Energy (GJ)	Well Production (% of Total)	Cumulative Total (%)
HLGW016B	163	2012	52.23	109.72	12	30,104,933	852,481	30,604	16%	16%
HLGW028A	171	2017	53.48	34.64	12	9,731,211	275,559	9,893	5%	21%
HLGW073A	163	2019	53.08	32.69	12	9,114,742	258,102	9,266	5%	26%
HLGW081A	167	2019	53.27	28.02	12	7,839,517	221,992	7,969	4%	31%
HLGW0018	165	2013	53.05	26.58	12	7,408,191	209,778	7,531	4%	35%
HLGW067A	159	2018	52.95	21.83	12	6,070,683	171,904	6,171	3%	38%
HLGW079A	167	2019	54.75	20.08	12	5,773,737	163,495	5,869	3%	41%
HLGW070A	163	2019	55.14	18.95	12	5,489,167	155,437	5,580	3%	44%
HLGW072A	163	2019	52.21	20.83	11	5,236,092	148,270	5,323	3%	47%
HLGW080A	167	2019	55.98	17.13	12	5,038,693	142,681	5,122	3%	49%

If a gas well does not produce enough methane, the valve is often turned down or off. Well production is reviewed monthly during well field balancing events. Wells with poor quality or low/no gas may be monitored over time for improvements before being removed from the program. It is recommended that older, non-producing wells be removed from the monitoring program and labelled as ‘inactive’ after 18 months.

Figure 3 Gas Collection in 2023 by Individual Well

HARTLAND LANDFILL

GAS COLLECTION IN 2023 BY INDIVIDUAL WELL

PHASE 2
CELL 2 CLOSURE (2016)

PHASE 2 CELL 3 (ACTIVE)

PHASE 2, CELL 1 NORTH
FACE CLOSURE (2011)

PHASE 1 CLOSURE (1997)

SOUTH WEST PROGRESSIVE
CLOSURE (2008)

HLGW0009 (0%) 139
HLGW0010 (0%) 139
HLGW0011 (0%) 139
HLGW0001 (0%) 139
VLGW0057 (0%)
HLGW0012 (0%) 141
LHGW0003 (0%) 147
HLGW0013 (0%) 147
HLGW0004 (0%) 147
VLGW0060 (0.1%) 147
HLGW0015 (0%) 155
HLGW0003 (0%) 139
LHGW0013 (0.1%) 147
VLGW0056 (0%)
LHGW002A (0%) 147
VLGW0059 (0.6%)
HLGW0014 (0%) 155
LHGW0004 (0%) 147
HLGW0088 (0.3%) 155
LHGW0023 (0%) 159
LHGW0022 (0%) 159
HLGW0005 (0%) 147
HLGW0059 (0.9%) 155
LHGW0021 (0%) 159
VLGW0058 (0%) 159
VLGW0055 (0.2%) 159
HLGW0052 (0.1%) 151
HLGW0057 (1.9%) 155
LHGW0020 (0%) 159
VLGW0054 (0%)
HLGW0053 (1.1%) 151
HLGW016B (16.2%) 159
LHGW0019 (0%) 159
HLGW0061 (2.1%) 155
HLGW0064 (0%) 159
HLGW017B (0%) 163
HLGW006B (0%) 159
HLGW0054 (0.3%) 151
HLGW0024 (0%) 171
LHGW0017 (0%) 163
HLGW0055 (0.6%) 151
HLGW065B (0.6%) 159
HLGW021B (0.9%) 165
HLGW0060 (0%) 155
HLGW0018 (4%) 165
HLGW0063 (0.4%) 155
HLGW066B (0%) 159
HLGW0025 (0%) 171
HLGW019B (0%) 165
HLGW0062 (0.6%) 155
HLGW067B (0%) 159
HLGW020B (0%) 165
HLGW0068 (0%) 159
HLGW0023 (0%) 165
HLGW027B (0.1%) 171
HLGW0056 (0%) 167
HLGW0036 (0%) 171
HLGW022B (0%) 165
HLGW0075 (0%) 163
HLGW0026 (0%) 171
HLGW0037 (0%) 175
RWHGW01B (0%) 165
HLGW038B (2%) 175
HLGW0045 (0%) 179
HLGW028B (1.6%) 171
HLGW0046 (0%) 179
HLGW039B (0.1%) 175
HLGW047B (0%) 179
HLGW040B (0.6%) 175
HLGW048B (0.1%) 179
HLGW041B (0.6%) 175
HLGW049B (1.3%) 179
HLGW042B (2.1%) 175
HLGW050B (0.4%) 179
HLGW051B (0.4%) 179
HLGW043B (0.1%) 175
HLGW044B (0.1%) 175
HLGW034B (0%) 171
HLGW033B (0%) 171
HLGW032B (1.9%) 171
HLGW008B (1.8%) 167
HLGW031B (1.1%) 171
HLGW030B (1.3%) 171
VLGW0052 (0.1%)
HLGW029B (0.1%) 171
VLGW0049 (0%)
VLGW0053 (0%)
HLGW006A (0%) 159
VLGW0050 (0.1%)
VLGW0051 (1.4%)
VLGW030S (0.4%)
VLGW032S (0.8%)
VLGW047S (0%)
VLGW034S (0%)
VLGW033S (0%)
VLGW031S (0%)
VLGW028S (0.7%)
VLGW029D (0.5%) 159
VLGW027D (0.9%)
VLGW022D (0.1%)
VLGW027S (0.4%)
VLGW022S (0.1%)
VLGW014S (0%)
VLGW029S (0.1%)
VLGW014D (0%)
VLGW026S (0.5%)
VLGW021D (0.3%)
VLGW021S (0.2%)
VLGW013S (0.2%)
VLGW026D (0%)
VLGW020D (0%)
VLGW013D (0%)
VLGW025D (0%)
VLGW020S (0.1%)
VLGW025S (0%)
VLGW043S (0%)
VLGW008S (0.6%)
VLGW019D (0.1%)
VLGW008D (0%)
VLGW019S (0.3%)
VLGW012S (0.7%)
VLGW018D (0.3%)
VLGW007D (0.3%)
VLGW007S (0.1%)
VLGW018S (0.1%)
VLGW011S (0.1%)
HLGW073A (4.9%) 163
HLGW051A (0.1%) 179
HLGW082A (2.1%) 167
HLGW050A (0.1%) 179
HLGW043A (0.6%) 175
VLGW006D (0.1%)
HLGW072A (2.8%) 163
HLGW042A (0.1%) 175
HLGW044A (0.5%) 175
VLGW017D (0.2%)
HLGW083A (0%) 167
HLGW081A (4.2%) 167
HLGW049A (0%) 179
HLGW034A (0.6%) 171
VLGW017S (0.2%)
VLGW006S (0.1%)
HLGW071A (0.8%) 163
HLGW041A (0.2%) 175
HLGW074A (0.3%) 163
HLGW080A (2.7%) 167
HLGW048A (0.5%) 179
VLGW005D (0%)
VLGW010S (0%)
HLGW066A (0%) 169
HLGW017A (0%) 163
HLGW040A (0.4%) 175
HLGW033A (1.3%) 171
VLGW016S (0.1%)
VLGW005S (0%)
HLGW067A (3.3%) 159
HLGW079A (3.1%) 167
HLGW047A (0.8%) 179
HLGW032A (0.3%) 171
VLGW016D (0.3%)
VLGW024D (0.7%)
VLGW009D (0%)
HLGW065A (0%) 159
HLGW039A (0.5%) 175
VLGW024S (0%)
VLGW042S (0%)
VLGW009S (0%)
RWHGW01A (0.1%) 155
HLGW031A (0.1%) 171
HLGW030A (0%) 171
VLGW015D (0.3%)
VLGW004D (0%)
VLGW004S (0.2%)
HLGW019C (0%) 165
VLGW023D (0%)
VLGW015S (0.3%)
HLGW016A (0%) 159
HLGW070A (3%) 163
HLGW027A (0.2%) 171
HLGW029A (0.1%) 171
HLGW028A (5.2%) 171
HLGW008A (0.2%) 167
VLGW001D (0.2%)
VLGW023S (0.2%)
VLGW002D (0%)
VLGW001S (0%)
VLGW003S (0.3%)
VLGW003D (0.7%)
VLGW002S (0%)

Gas Well Production 2021

- 0.00%-049%
- 0.5%-1.49%
- 1.5%-3.99%
- >4.00%
- Decomissioned Well or Well with No Production
- Active Gas Lines
- Abandoned or Inactive Gas Lines; HorizontalWell, Inactive

HLGW0012 (4.8%) - Well ID - % of Total Production

VLGW024S (0%) Wells With no Gas Production (Not Read or Turned Off)

LHGW0009 (0%) Decomissioned Wells (no Gas Production)

147 Lift Number

Making a difference...together

Metres
0 10 20 40 60 80 100

Projection: UTM ZONE 10N NAD 83

CRD - Facilities Management & Engineering Services - Jul 24, 2024 - Technologist: sruljancich - Map Document: HartlandGasProduction2023.mxd

N W E S

7.0 LFG UTILIZATION AND COLLECTION EFFICIENCY

The volume of collected LFG is measured by flow meters at the LFG plant and recorded on the CRD SCADA system. The data is compiled to determine collection and utilization rates, and then compared to the generation model to estimate the collection efficiency of the system. LFG collection refers to all gas drawn into the gas plant, while LFG utilization refers only to the gas used to generate electricity. Table 5 shows a summary of gas collection, utilization and overall collection efficiency. Figures in the following section illustrate the collection efficiency for the last several years (2010-2023) and the full set of data is provided in Appendix C1.

The LFG utilization facility shown in Figure 4 consists of six major components:

1. **Conditioning Skid:** Receives the LFG from the CRD collection/blower system. The conditioning skid cools the gas and reduces moisture, which drains into the condensate collection system. It also reduces the amount of siloxane, which increases wear and tear on generator components.
2. **Refrigeration Plant:** Provides coolant to the conditioning skid by circulating it, as required, to maintain the LFG at 2°C.
3. **Engine:** 20-cylinder, 2,200-HP Caterpillar. The engine runs a direct drive 1,200-rpm, 1.6-MW generator. Electricity produced is fed into the BC Hydro grid.
4. **Transformer:** The unit converts 600 V to 25 kV.
5. **Switch Gear:** Monitors stability of the line input to the BC Hydro grid.
6. **Master Control Building:** Houses the controls that interconnect the utilization facility with the collection system. It also provides system operation controls, such as continuous quality, flow rate and pressure monitoring. The CRD has upgraded its system controls to communicate with the utilization facility.

Gas is drawn into the facility by the blowers and passed through the conditioning skid. An automated valve maintains the required gas pressure for the generator, while excess gas is fed back to the candlestick flare. Gas is only directed to the ground flare during extended periods of generator downtime, during times of generator maintenance or BC Hydro power outages.

Figure 4 Hartland LFG Plant

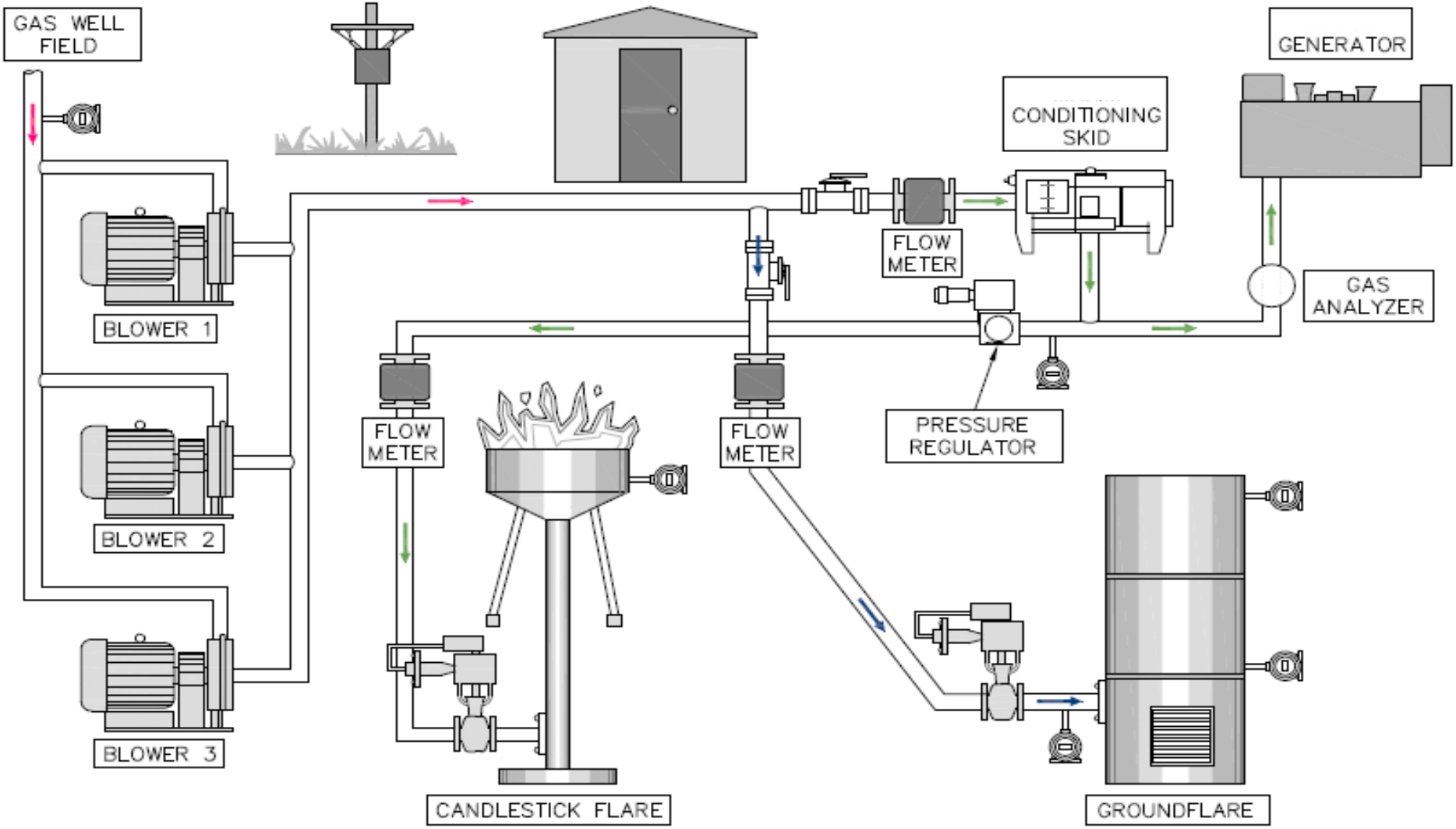


Table 5 LFG System Collection Efficiency 2010-2023 ENV Model

Year	Modelled Methane generation (tonnes/year)	Measured Methane (tonnes/year)	Collection Efficiency (%) ENV Model	GHG Emission (tonnes/year CO_2e)	GHG Emission (tonnes/year CO_2e)[1] with biological oxidation
2010	8,054	2,664	32.4	155,829	116,872
2011	8,125	2,835	34.3	152,379	114,284
2012	8,163	4,045	48.8	118,945	89,208
2013	8,170	4,817	58.2	97,019	72,764
2014	8,158	4,596	56.4	100,211	75158
2015	8,103	5,294	65.6	77,722	58,292
2016	8,038	4,923	61.8	85,064	63,798
2017	8,032	5,377	67.7	71,868	53,901
2018	8,056	5,060	64.0	79,780	59,835
2019	8,101	5,182	65.5	76,532	57,399
2020	8,157	5,289	66.7	74,060	55,545
2021	8,192	5,611	68.5	72,268	54,201
2022	8,325	5,865	70.5	68,880	51,660
2023	8,418	5,422	64	83,888	62,916

[1] Assuming 25% biological oxidation. Appendix A6 includes US EPA Oxidation Table Reference for Cover System Capture

Table 6 LFG Collection System Efficiency 2015-2023 UBCi Model

Year	Modelled Methane generation (tonnes/year)	Measured Methane (tonnes/year)	Collection Efficiency (%) UBCi Model	GHG Emission (tonnes/year CO_2e)	GHG Emission (tonnes/year CO_2e)[1] with biological oxidation
2015	7,239	5,294	73	54,440	40,830
2016	7,135	4,923	69	61,919	46,439
2017	7,100	5,377	76	48,250	36,187
2018	7,101	5,060	71	57,139	42,855
2019	7,123	5,182	73	54,337	40,753
2020	7,151	5,289	74	52,135	39,102
2021	7,167	5,611	78	43,545	32,659
2022	7,283	5,865	81	39,699	29,774
2023	7,307	5,422	74	52,780	39,585

[1] Assuming 25% biological oxidation. Appendix A6 includes US EPA Oxidation Table Reference for Cover System Capture

The data above present collection efficiency using the ENV gas generation model (Table 5), as stipulated in the *Landfill Gas Management Facilities Design Guidelines*, and the UBCi model (Table 6). In 2020, landfill gas emissions were measured across the site and a methane mass balance was completed. Data was compared to three landfill gas generation models (including the required ENV model) and collection efficiency was calculated. Gas generation results from the UBCi model correlate closely with the methane mass balance and result in a higher collection efficiency. The UBCi model was used to retroactively calculate collection efficiency back to 2014. More detail on this project is provided in the next section (7.1.1).

In 2023, collection efficiency using the ENV model and UBCi model was calculated at 64% and 74%, with total uncollected (fugitive) GHG emissions after biological oxidation estimated at 62,916 and 39,585 tonnes CO_2e, respectively (Figure 5 and Figure 6). Gas collection varies as a result of refuse age, well installation/operation, and well balancing activity.

Overall, the following observations can be made regarding gas production and collection at Hartland:

- Phase 1 gas production is depleting. Waste in this area of the landfill has been in place for more than 30 years and a decline in gas production is expected.
- There is decreased gas production in some high producing wells in Phase 2, which is expected due to age of refuse and advanced methanogenic processes.
- Gas collection could be improved with final connection of wells in the 171, 175, 179 and 183 lifts in Cell 3. Some of these wells have temporary connection at the north end. Connection of these wells is expected to improve collection efficiency. Delays in well connections can be attributed to design challenges, and construction of Cell 4.

Figure 5 Fugitive GHG Emission After Biological Oxidation at Hartland Landfill 2015-2023 (UBCi model)

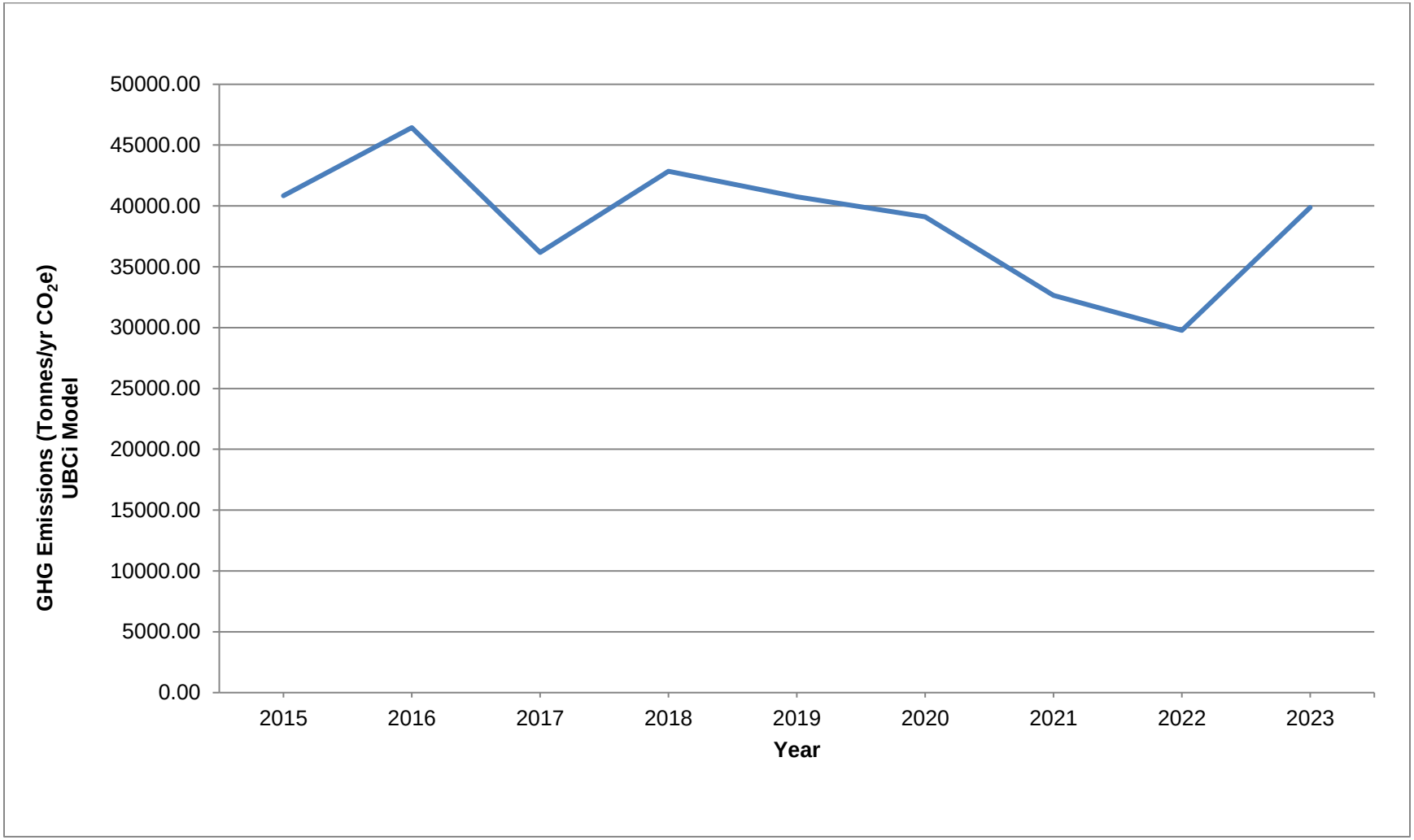
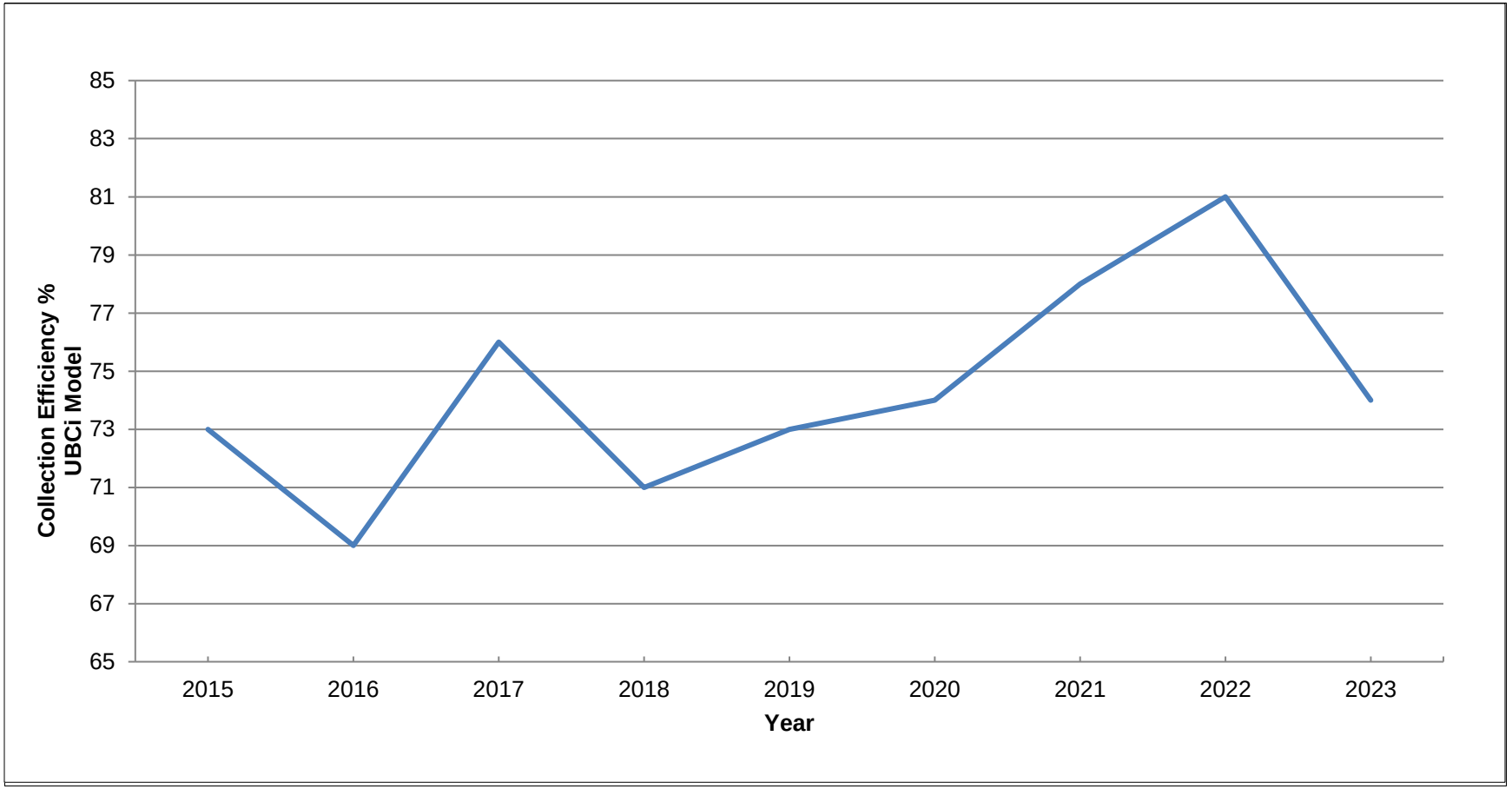


Figure 6 Collection Efficiency Estimates 2015-2023 (UBCi model)



7.1.1 Gas Generation, Quantification and Modelling Study

Fugitive emissions at Hartland were empirically measured during two field events in 2020 (June and October). The data were used to complete a comprehensive landfill gas mass balance for the site across three different landfill gas generation models. Report findings confirm that the current ENV model overestimates landfill gas generation and fugitive emissions at Hartland, while the UBCi model more accurately estimates gas generation. Consequently, the calculated gas collection efficiency is higher for the UBCi model. In 2023, according to the UBCi model, supported by empirical, mass balance data, Hartland Landfill is slightly under the 75% collection efficiency requirement set out in the *BC Landfill Gas Management Regulation*. The analysis also found that current landfill cover systems were estimated to biologically oxidize 29% of the total fugitive emissions in 2020. For the 2023 report, based on the advice of our consultant, we are assuming 25% biological oxidation through the landfill cover based on the US EPA Oxidation Table (Appendix A6).

The report also identified additional strategies that can be taken by the CRD to increase collection efficiency and biological oxidization, including enhancements to the existing landfill gas collection system and application of an engineered biocover system on both closed and operational phases of the landfill. In July 2023, approximately 2 hectares of fabricated biocover were installed on both the south and north slopes of the Cell 3 disposal area. The biocover blend was designed by consultants using biosolids mixed with additional feedstocks (wood and sand) to create biosolids growing medium (BGM). Following the land application, consultants were retained to:

- establish baseline data for methane emission rates from the targeted areas,
- gauge the levels of methane emissions from the biocover system immediately following its installation (understanding that methanotrophic activities might not yet be fully developed), and
- perform a technical inspection and provide commentary on the design and construction of the biocover test pads.

The methane emission rates from final surface and the biocover areas at the Hartland Landfill were quantified using field measurements. The results of this initial study indicated potential for additional fugitive methane reduction through biocover; however, since this investigation was completed closely following the biocover installation, it was recommended by the consultant to repeat the investigation after approximately one year. This would allow sufficient time for the methanotrophic bacteria responsible for methane biological oxidation to be established within the medium. In addition, a modification in the installation design and configurations was recommended to minimize the upward migration of gas through the underlying aggregate drainage layer. Implementation of the recommendations associated with the installations would potentially considerably reduce the observed hotspots at the edges of the biocover area and it would result in higher efficacy rates for reducing methane emissions through biocover in the future. Hartland staff are planning to implement these changes and schedule a follow up assessment on the biocover areas in 2024.

In 2024, CRD staff and consultant(s) will be working on improving or designing alternative ways to address fugitive emissions across the landfill.

7.1.2 Destruction Devices and Usage

Table 7 shows the average gas collected from 2014-2023 and flows through destruction devices (generator, candlestick or groundflare). Flaring of gas occurs when gas collection exceeds generator capacity or during generator downtime.

The BC *Landfill Gas Management Facilities Design Guidelines* specify that a candlestick flare should not be used as a primary combustion device but can be utilized as a backup combustion device when flows exceed the capacity of other approved devices. As a result, 50% or more of the total LFG collected should be directed through high efficiency destruction devices (groundflare or generator). Since 2009, the generator and groundflare have been the primary destruction devices. In 2023, a total of 61% of the gas was directed through approved destruction devices.

Table 7 LFG Flows to Destruction Devices (2015-2023)

Annual Average	Year							
	2016	2017	2018	2019	2020	2021	2022	2023
Gas Collected (scfm)*	1,003.3	1,101.8	1,037.1	1,062.2	1,084.0	1,150.1	1,201.7	1,108.3
Gas Burned by Generator (scfm)*	263.9	467.2	534.6	439.3	439.3	443.4	384.7	369.6
Gas Burned by Candlestick Flare (scfm)*	313.6	461.1	469.5	394.6	394.6	520.2	480.1	426.8
Gas Burned by Groundflare (scfm)*	430.0	176.6	33.0	228.3	228.3	127.6	200.5	252.6
Total Gas Flared	74.1%	57.9%	48.5%	58.6%	57.5%	56.3%	56.6%	61.3%
% through candlestick	**31.26%**	**41.85%**	**45.27%**	**37.15%**	**37.15%**	**45.23%**	**39.95%**	**38.51%**

*Normalized to 50% methane

7.1.3 LFG Management Plan Implementation Status

The CRD has implemented the conceptual design in the *Landfill Gas Management Plan*. However, since the plan was prepared, some operational changes have occurred, which are summarized below:

2012	Per the *Landfill Gas Management Plan*, alignment of horizontal wells changed from east-west to north-south due to the master fill plan cell phasing and progression.
2012/2013	Relocation and reconfiguration of controlled waste disposal areas. Controlled waste, initially landfilled in clay-lined cells, is now trenched into refuse. Landfilling was conducted over the controlled waste area expanding the available footprint for Cell 2. This benefits overall collection in that it allows gas wells to be installed in controlled waste areas that would otherwise be inappropriate due to clay.
2014	Installation of vertical gas wells has been delayed pending further review of efficacy due to leachate inundation or minimal gas production. Vertical gas wells installed in recent closed areas (2012) were not productive due to density of horizontal wells and overlapping areas-of-influence.
2014	Since implementation of the *Landfill Gas Management Plan*, horizontal well installation depths have been reduced (made shallower). The proposed deeper wells were intended to accelerate activation; however, this was not actualized, and the deeper wells triggered odour and safety issues during installation. As a result, this part of the *Landfill Gas Management Plan* was revised to allow for shallow wells. The shallow wells have fewer health and safety considerations, are less expensive to install, and can be activated in the same timeframe, as deeper wells specified in the plan.
2015/2016	Filling plan sequencing has changed since the plan was prepared. These changes represent schedule variations rather than whole scale deviations from *the Landfill Gas Management Plan*. Changes include: • Phase 2, Cell 2 vertical extension by two lifts to allow time for completion of the cliff quarry and construction of Cell 3.
2017	A bypass line valve was opened at the gas plant to reduce backpressure on the well field and increase gas flows to the plant. As a result, flows increased by 50-100 scfm.
2018	No significant changes to the system were made in 2018.

2019	No significant changes to the system were made, but additional Cell 3 wells are now coming online, which is consistent with the *Landfill Gas Management Plan* prediction that Cell 3 well activation may take up to five years.
2020	No significant changes to the system were made. LFG generation and emissions study was completed to confirm the effectiveness of the current collection infrastructure and well field balancing programs. Additional well field optimization projects are planned for 2021.
2021	CRD staff continue the well balancing efforts several times a month to optimize the methane generation in each well and subsequently improve the well field gas production (i.e., reducing nitrogen and oxygen content and increasing the methane production).
2022	No significant changes to the system were made. Additional well field optimization and biocover projects are planned for 2023. CRD staff will continue the well balancing efforts several times a month to optimize the methane generation in each well and subsequently improve the well field gas production (i.e., reducing nitrogen and oxygen content and increasing the methane production). Due to the current design and development of Cells 4, 5 and 6 in Phase 2, connection has been delayed for a number of collection wells already installed on the north slope of Cell 3.
2023	Approximately 2 hectares of fabricated biocover was installed on both the south and north slopes of the Cell 3 disposal area and a follow-up field measurement on the biocover areas is planned for 2024. While the biocover is not an approved LFG mitigation/destruction method under the regulation, it is expected to reduce localized fugitive methane emissions in areas without tarps or permanent closures. Results of the follow-up monitoring will be presented in a future annual report. In 2023, the construction of Cell 4 in Phase 2 was initiated, resulting in delayed connection of 33 collection wells already installed in the upper lifts of Cell 3. These wells will be connected to a collection system at both ends (north and south) but south connections require the extension of a main gas header on top of Cell 3, which is scheduled for construction in the third and fourth quarters (Q3/Q4) of 2024. The final north connection will not be completed until Cell 4 construction and subsequent LFG collection design is completed (2025). Gas collection is expected to decline in 2024 until the wells are connected. CRD staff will continue wellfield balancing each month to optimize LFG collection in each well and improve the quality of collected gas (i.e., reduce nitrogen and oxygen content and increase methane production). To reduce staff workload and improve data collection and wellfield balancing efforts, the CRD plans to install and pilot automated gas well tuning devices in 2024 at key collection wells. The existing gas-to-energy facility (generator) was formally decommissioned to enable construction of the Biogas Upgrading Facility on December 31, 2023. More detail in Section 7.1.4

7.1.4 Future Projects

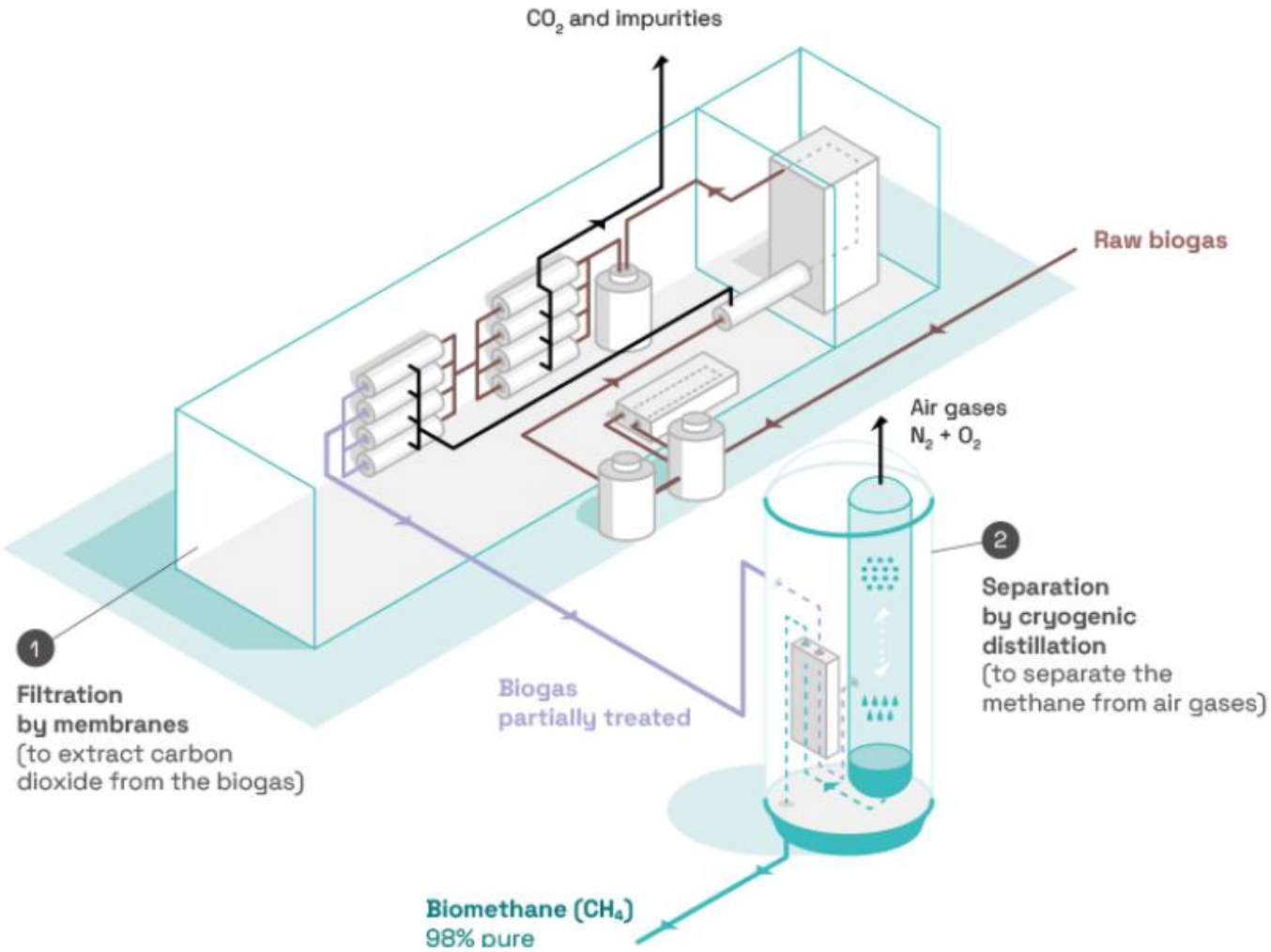
Renewable Natural Gas Project

Work is continuing on the Biogas Upgrading Facility (BUF) at Hartland Landfill. Construction to replace the existing landfill gas-to-energy facility began in Q3 of 2023 and will take approximately one year to complete. A phasing plan has been developed and will be followed during decommissioning and construction to ensure ongoing gas destruction in accordance with the Landfill Gas Management Regulation. The electricity generation function of the existing gas plant ceased December 31, 2023. A new enclosed flare and blowers are planned for installation in 2024. Until this new equipment is commissioned, the existing ground flare will operate continuously. The new flare system consists of two blowers, an enclosed flare, flame arrestor, condensate knock-out, analyzers, valves, controls, interconnected piping and electrical system.

The BUF is anticipated to start producing Renewable Natural Gas (RNG) for sale to FortisBC by December 2024. The BUF uses cutting edge, proprietary technologies and has a complex design. A high-level process is indicated in Figure 7. As the raw biogas enters the system, the carbon dioxide and other impurities are filtered out by the membranes. The partially treated biogas then goes through a secondary treatment where the methane is separated from other gasses like oxygen and nitrogen through cryogenic distillation. The BUF expected design capacity is maximum 2,000 scfm, and the output is delivered to the Fortis Injection Station for distribution as RNG into the Fortis Intermediate Pressure piping network. The facility is designed to meet or exceed the CRD Biomethane Specifications under the range of LFG characteristics outlined in Appendix F1.

General layout and isometric view of the BUF in addition to some high-level information associated with enclosed flare, candlestick flare, blower, and high level process design are provided in Appendix F2 through F9.

Figure 7 Overview of process design for the Biogas Upgrading Facility



Note: The complete details of this technology are proprietary information and can be provided to the regulator upon request.
Figure Source: Renewable natural gas for all - Waga Energy (waga-energy.com)

Landfill Gas Management in Cells 3 to 6

The construction of Cell 4 began in September 2023 with completion scheduled for October 2024. This construction has delayed design and installation of a final Cell 3 gas header. The final Cell 3 header in the CRD's 2011 LFG Management Plan was designed in a split configuration; however, loop configurations typically result in improved vacuum and collection efficiency and have historically been the norm at Hartland. As a result, he CRD has altered the Cell 3 header, in consultation with a consultant (Sperling Hansen Associates), to a loop configuration. Installation is expected in Q4 of 2024. The updated Cell 3 header design, and the implementation timelines are included in Appendix G. The Cell 4 landfill gas collection system design is expected in early 2025.

Installation of Well Auto Tuning Devices

In 2024, the CRD intends to initiate a pilot project testing the feasibility of automated well head tuning devices at Hartland. Automated well tuning devices monitor and adjust gas well extraction rate at a higher frequency than a field technician (e.g., multiple times a day – depending on the device and the design). These devices measure vacuum, gas concentrations, and flow rate at each well, and then adjust the extraction rate of each well to achieve optimal performance. When deployed at multiple locations the devices are anticipated to improve LFG collection efficiency and reduced overall fugitive emissions. The deployment of these devices is expected in late 2024.

Installation of Continuous Surface Emission Monitoring Devices

The CRD is currently partnering with a potential vendor to install continuous methane surface emission measurement devices at different locations of Hartland Landfill. This will be a pilot project to apply an alternative method for surface emissions monitoring and leak detection on the site. Each device will be equipped with methane sensors and the default ability to monitor meteorological data using anemometer, temperature, pressure and humidity sensors. It's a partnership partially funded by a federal grant through the vendor (Qube Technologies), and as part of this partnership, the CRD will provide in-kind contributions such as access to the site and will evaluate this new technology as a tool to fulfill new obligations under the impending Environment Climate Change Canada landfill methane regulations.

8.0 OPERATIONAL PERFORMANCE

Detailed landfill operational updates and changes are outlined in the Hartland Landfill 2023 Operations Report. There were no significant changes to the operation of the LFG system in 2023. The gas collection system operated continuously, except when there was a power failure or alarms that resulted in system shutdown.

Table 8 summarizes collection system downtime (i.e., no vacuum applied on the collection system), approximately nine days. All downtime can be attributed to power outages and planned/unplanned maintenance.

Table 9 summarizes the 2023 generator performance, including electricity production, which compares actual operating hours to available operating hours for each month.

Table 8 Summary of 2023 Blower Downtime by Month

Month	Downtime (hours)
January	74.87
February	0.00
March	24.30
April	0.00
May	0.75
June	2.21
July	7.34
August	27.76
September	0.00
October	74.45
November	0.00
December	1.97
Total	**213.66 (8.90 days)**

Table 9 Generator Performance 2023

Month	Engine Run Hours	Electricity Generated (MW-hour)[1]	Production (%)
January	292	1,038	87%
February	354	840	78%
March	691	984	83%
April	153	0	0%
May	640	389	33%
June	475	668	58%
July	277	911	77%
August	652	205	17%
September	687	1,003	87%
October	589	472	40%
November	697	433	38%
December[2]	677	996	84%
Average	**515**	**662**	**57%**

[1] Reported by BC Hydro

[2] The Generator was shut down as of December 31, 2023, to facilitate the transition to the BUF facility. The gas is being flared during the transition period.

9.0 MONITORING PROGRAMS

Annual monitoring is conducted to evaluate LFG collection and control system performance. Monitoring includes both operational monitoring, generator performance monitoring and environmental monitoring (e.g., gas quality in surface probes). This section and Table 10 summarize the LFG monitoring activities.

Table 10 Summary of LFG Monitoring Programs

Task & Objectives	Frequency	Primary Parameters	Criteria	Action if Criteria Exceeded	Monitoring By
1. Perimeter subsurface probe monitoring					
To detect potential subsurface LFG migrating off-site	Quarterly at perimeter probes	CH_4, CO_2, O_2, pressure and/or vacuum	LEL for methane (5.0%)	Increase sampling frequency. Initiate off-site sampling (see Task 7 below). Evaluate effectiveness of remedial measures.	EPro staff
2. Building foundation probes					
To detect potential subsurface LFG migration into on-site building foundations	Quarterly at foundation probes	CH_4, CO_2, O_2, pressure and/or vacuum	20% of LEL 10% of LEL – CRD internal standard	Initiate appropriate remedial action.	EPro staff
3. On-site ambient grid sampling					
To assess on-site LFG concentrations at known grid locations across the landfill surface	Once per year	THC as methane and H_2S	100 ppm as THC (methane)	Initiate investigation of remedial measures. Identify locations >100 ppm THC for Task 4.	EPro staff
4. On-site ambient hotspot monitoring					
To identify localized sources of LFG, or releases that could create potential health, safety, environmental or operational problems	Once per year	THC as methane and H_2S	12,500 ppm/1.25% THC (25% of the LEL) 5 ppm H_2S	Initiate investigation of remedial measures. Identify locations with THC >1,000 ppm or H_2S >5 ppm as Z points (hotspots). Personal gas detectors required in high-risk areas.	EPro staff

Task & Objectives	Frequency	Primary Parameters	Criteria	Action if Criteria Exceeded	Monitoring By
5. Gas well field monitoring					
Monitor the concentrations and gas flows from all the wells connected to the gas collection system	Minimum of monthly	Temperature, vacuum, flow rate, CH_4, CO_2, O_2	Maintain gas flow and methane content, control oxygen intake	Adjust wellhead vacuum.	Hartland staff
6. Blower, flare and generator station monitoring					
Monitor the performance of the moisture separators, blowers and flare and/or generation station	Continuous	Temperature, pressure, gas flow rate, CH_4, O_2	Operational	Adjust well field if outside operational criteria.	Hartland staff
7. Off-site properties					
To measure concentrations of gases in the event of LFG migrating off-site	Task 1 exceedance	THC and H_2S	Detectable above air quality guidelines and WorkSafeBC criteria	Initiate appropriate remedial action.	Hartland staff
8. On-site building gas monitoring					
To monitor methane and H_2S levels to protect workers in on-site buildings	Task 2 exceedance	Methane and H_2S	20% of the LEL (1% CH_4) – the Guidelines 10 ppm H_2S – WorkSafeBC	Initiate appropriate remedial action.	Hartland staff
9. LFG speciation					
To measure concentrations of compounds in the LFG at the inlet to the gas conditioning skid and power generation station	Once every two years	VOC and H_2S	WorkSafeBC criteria for individual compounds in ambient air	Initiate Task 10 if calculated ambient concentrations exceed WorkSafeBC limits.	EPro staff
10. On-site ambient air quality measurement					
Measure ambient VOC	Task 9 exceedance	VOC and H_2S	WorkSafeBC criteria for individual compounds in ambient air	Initiate remedial action.	EPro staff

Notes:
EPro staff = Environmental Protection staff
LEL = lower explosive limit
THC = total hydrocarbons
VOC = volatile organic content

9.1 Subsurface Gas Monitoring – Perimeter and Foundation Probes

Perimeter probes and foundation/trench probes have been used at Hartland Landfill to monitor for subsurface gas migration since 1996. Perimeter and foundation probes are required in the BC *Landfill Criteria for Municipal Solid Waste* (2016). Quarterly monitoring is conducted in five eastern perimeter monitoring probes and 12 foundation monitoring probes (Figure 8). Through long-term improvements to the LFG collection system, LFG migration potential has been mitigated and there is no indication of gas migration off-site. Although the risk is minimal, ongoing monitoring is required to meet regulatory requirements and to confirm worker and public health and safety. A complete monitoring methodology, probe locations, details, and data from the perimeter and building foundation probes are provided in Appendix D.

9.1.1 Perimeter Probes

All probes were monitored according to the standard operating procedures four times in 2023; data is presented in Table 11 and Table 13, maximum values are shown in Table 12. There was no detectable methane recorded in 2023. Consistent with historical data, CO_2 levels are slightly higher in the shallower 'B' probes than the deeper 'A' probes. Elevated CO_2 levels may give an early indication of the presence of LFG; however, no unusually high CO_2 levels were observed. Ongoing monitoring will continue to determine if any trends develop.

9.1.2 Foundation Probes

Foundation probes were monitored four times in 2023, which is in compliance with ENV requirements (see Table 13 and 14). Carbon dioxide levels were similar to previous years. There were no recorded exceedances of the ENV limit of 1.0% methane during the reporting period. Monitoring will continue to satisfy regulatory requirements and to determine if any trends develop.

Perimeter and foundation probe monitoring results for 2023 were in compliance with the ENV requirements. Methane was not detected. The data indicates minimal risk of subsurface methane migration to adjacent properties or buildings. Quarterly monitoring should continue, to meet regulatory requirements and to evaluate health and safety risks.

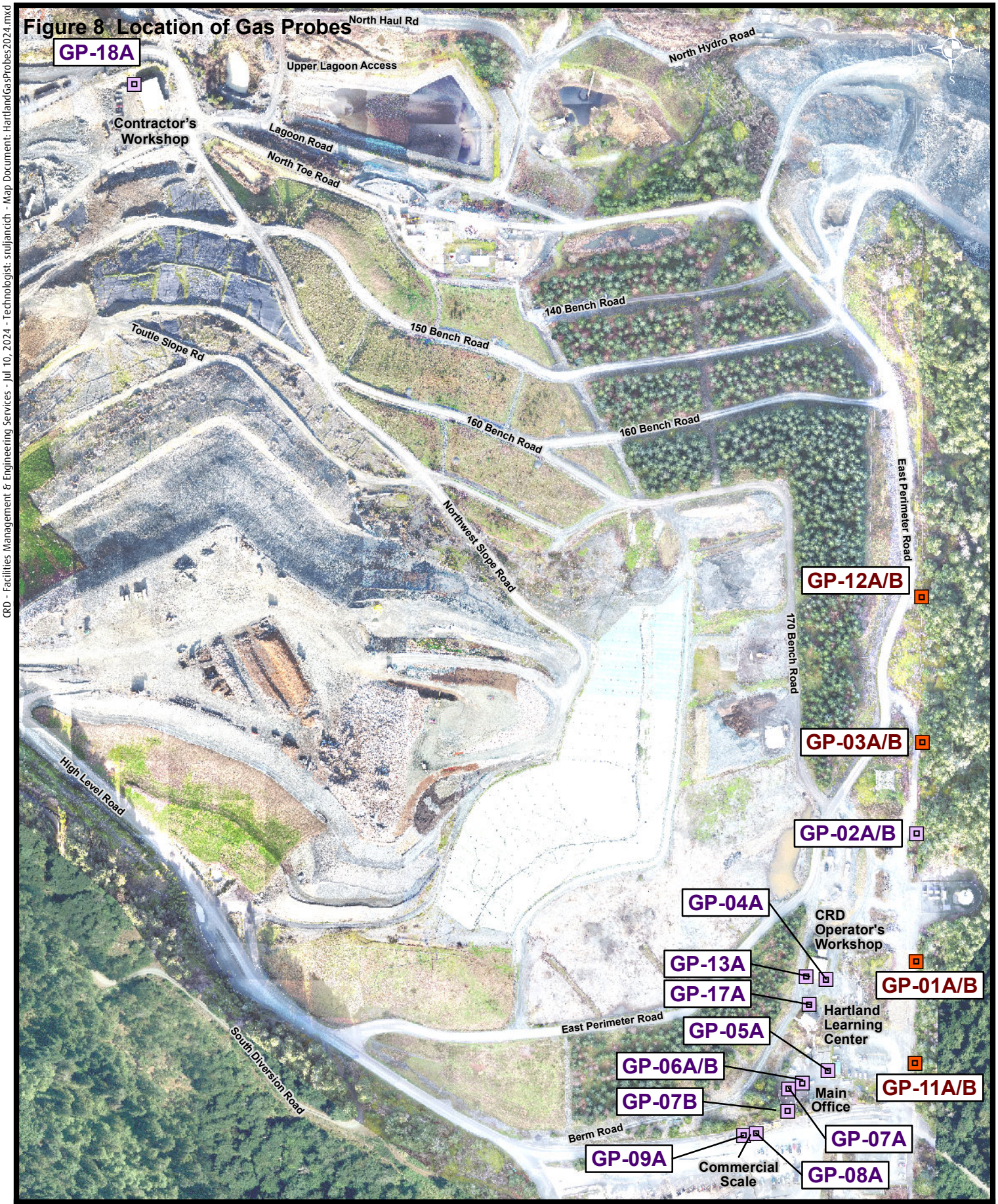
Table 11 Average Gas Concentrations in Subsurface Perimeter Probes 2017-2023

Probe	CH_4 (%)							Probe	CO_2 (%)							Probe	O_2 (%)						
	2017	2018	2019	2020	2021	2022	2023		2017	2018	2019	2020	2021	2022	2023		2017	2018	2019	2020	2021	2022	2023
GP-01A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	GP-01A	0.03	0.00	0.00	0.03	0.05	0.20	0.10	GP-01A	20.3	20.3	20.8	20.8	21.5	20.2	21.1
GP-01B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	GP-01B	0.88	0.80	1.53	2.48	2.98	3.05	1.90	GP-01B	19.3	19.4	19.1	19.1	16.1	15.4	17.7
GP-02A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	GP-02A	0.00	0.00	0.00	0.03	0.05	0.20	0.13	GP-02A	20.4	20.2	20.6	20.8	21.6	20.1	21.2
GP-02B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	GP-02B	1.60	3.05	3.78	4.33	2.23	4.70	2.73	GP-02B	15.6	13.9	12.5	15.7	16.8	9.7	16.6
GP-03A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	GP-03A	1.80	1.38	1.88	1.45	1.88	1.75	0.70	GP-03A	12.8	14.7	13.8	15.5	18.5	13.0	18.5
GP-03B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	GP-03B	3.93	3.93	5.85	6.08	4.98	3.75	0.77	GP-03B	16.2	15.4	15.5	15.3	14.9	15.4	20.5
GP-11A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	GP-11A	0.08	0.00	0.00	0.03	0.13	0.20	0.13	GP-11A	20.3	20.3	20.8	20.9	21.5	20.4	21.2
GP-11B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	GP-11B	1.38	1.05	1.37	2.10	1.98	11.00	1.83	GP-11B	19.2	19.5	19.8	18.6	19.5	18.4	19.3
GP-12A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	GP-12A	2.03	1.95	1.25	2.33	1.80	11.70	1.63	GP-12A	13.4	13.6	16.4	13.5	15.3	14.2	16.6
GP-12B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	GP-12B	4.75	4.93	7.25	7.03	5.23	8.25	4.63	GP-12B	12.9	12.9	9.0	10.5	12.9	8.2	14.6

Table 12 Maximum Gas Concentrations in Perimeter Probes

Probe	CH_4 (%)	CO_2 (%)
GP-1A	0.00	0.10
GP-1B	0.00	1.45
GP-2A	0.00	0.15
GP-2B	0.00	2.70
GP-3A	0.00	0.95
GP-3B	0.00	1.05
GP-11A	0.00	0.15
GP-11B	0.00	1.85
GP-12A	0.00	2.25
GP-12B	0.00	4.25

Figure 8 Location of Gas Probes



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Metres

0 10 20 40 60 80 100

Projection: UTM ZONE 10N NAD 83

Perimeter Gas Probe

Foundation Gas Probe

LOCATION OF GAS PROBES

Table 13 Average Gas Concentrations in Subsurface Foundation Probes 2017-2023

Probe	CH_4 (%)							Probe	CO_2 (%)							Probe	O_2 (%)						
	2017	2018	2019	2020	2021	2022	2023		2017	2018	2019	2020	2021	2022	2023		2017	2018	2019	2020	2021	2022	2023
GP-04A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	GP-04A	2.07	0.05	0.00	2.90	1.08	2.10	1.50	GP-04A	19.4	20.8	21.0	18.3	20.8	18.4	18.8
GP-05A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	GP-05A	0.73	0.65	0.58	0.83	0.80	0.60	0.87	GP-05A	19.8	19.7	20.2	19.9	21.0	20.0	20.2
GP-06A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	GP-06A	1.03	1.00	0.78	0.75	1.33	0.40	1.17	GP-06A	19.1	19.4	20.0	20.0	20.3	20.1	19.6
GP-06B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	GP-06B	0.68	0.68	0.53	0.85	1.50	0.75	1.07	GP-06B	19.6	19.6	20.3	19.8	20.2	19.8	19.9
GP-07A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	GP-07A	0.18	0.30	0.25	0.23	0.53	0.25	0.37	GP-07A	20.1	20.1	20.6	20.6	16.8	20.6	20.8
GP-07B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	GP-07B	0.08	0.13	0.15	0.15	0.33	0.15	0.23	GP-07B	20.3	20.3	20.7	20.7	21.6	20.7	20.9
GP-08A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	GP-08A	0.15	0.13	0.20	0.15	0.25	0.20	0.20	GP-08A	20.3	20.4	20.6	20.7	21.7	20.7	21.1
GP-09A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	GP-09A	0.20	0.10	0.18	0.15	0.20	0.20	0.27	GP-09A	20.1	20.3	20.7	20.7	21.7	20.6	21.0
GP-13A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	GP-13A	3.30	2.77	2.43	2.78	2.35	11.80	2.63	GP-13A	16.8	17.3	18.5	17.6	19.0	16.0	18.3
GP-17A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	GP-17A	0.73	0.20	0.05	0.15	0.15	10.90	0.13	GP-17A	19.6	20.0	20.6	20.7	21.7	20.0	21.1
GP-18A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	GP-18A	0.28	0.33	0.25	0.18	0.18	10.65	0.20	GP-18A	19.4	19.2	20.0	20.2	21.0	20.5	20.8

Notes:
GP-17A: probe for Hartland Learning Centre (constructed in 2011)
GP-18A: probe for new contractors workshop (constructed in 2011)

Table 14 Maximum Gas Concentrations in Foundation Probes

Probe	CH_4 (%)	CO_2 (%)
GP-04A	0.0	0.75
GP-05A	0.0	0.90
GP-06A	0.0	0.95
GP-06B	0.0	0.55
GP-07A	0.0	0.35
GP-07B	0.0	0.25
GP-08A	0.0	0.25
GP-09A	0.0	0.35
GP-13A	0.0	2.65
GP-17A	0.0	0.15
GP-18A	0.0	0.10

9.2 Surface Emissions and Hotspot Sampling

Fugitive emissions can occur from advection and/or diffusion via soil pores, gaps and defective cover materials and are monitored routinely through surface monitoring. This monitoring assesses landfill closure integrity, supports worker health and safety, informs operational or capital planning, and supports optimal LFG collection. This monitoring is a simple and low cost means to assess methane and non-methane emissions. Although hotspot locations (also known as Z-points) change over time, they are usually located at breaks or seams of cover systems and near side slopes in Phase 2, where gas collection is a challenge. The locations of all grid points and hotspots as of August 2023 are shown in Figure 10. A summary of the results are shown in Table 15 and Table 16.

A historical summary of all Z-points is provided in Appendix E. In 2023, there was a total of 23 Z-points identified. There were no elevated hydrogen sulphide concentrations. The absence of hotspots in Phase 1 indicates that the cover and gas collection system in the permanent closure is functioning. Annual monitoring should continue. Hotspots have decreased significantly since the implementation of the *Landfill Gas Management Plan* in 2012.

Table 15 Summary of Grid Sampling Results 2023

Survey date	August
Grid points monitored	195
# Grid points >100 ppm THC	11

Note: Does not include discontinued and grid points in Active Face and Controlled Waste areas, where the waypoints could not be accessed at the time of the survey

Table 16 Summary of Hotspot Results 2023

Survey date	August
Total # hotspots[1]	21
New hotspots at end of survey	0
Hotspots discontinued[2]	2
Maximum CH_4 (ppm)	15,000

[1] Total number of hotspots at the end of the survey date

[2] Hotspots discontinued at the end of the survey date

Figure 9 Hartland Landfill Ambient Air Monitoring Results, August 2023

PHASE 2 CELL 2 CLOSURE (2016)

PHASE 2, CELL 1 NORTH FACE CLOSURE (2011)

PHASE 2, CELL 3 (ACTIVE FACE)

PHASE 1 CLOSURE (1997)

SOUTH WEST PROGRESSIVE CLOSURE (2008)

	3-9 August, 2023	
WAYPOINT	Methane	H2S
	ppm	ppm
Z88	12200	0.000
Z94	3.1	0.000
Z100	12900	0.000
Z106	8000	0.007
Z122	1015	0.003
Z123	0.0	0.000
Z125	5034	0.000
Z126	14000	0.000
Z127	7100	0.000
Z128	15000	0.243
Z130	3300	0.000
Z131	3300	0.000
Z133	0.0	0.000
Z134	4.8	0.000
Z136	2800	0.000

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0 20 40 60 80 100 Metres

Projection: UTM ZONE 10N NAD 83

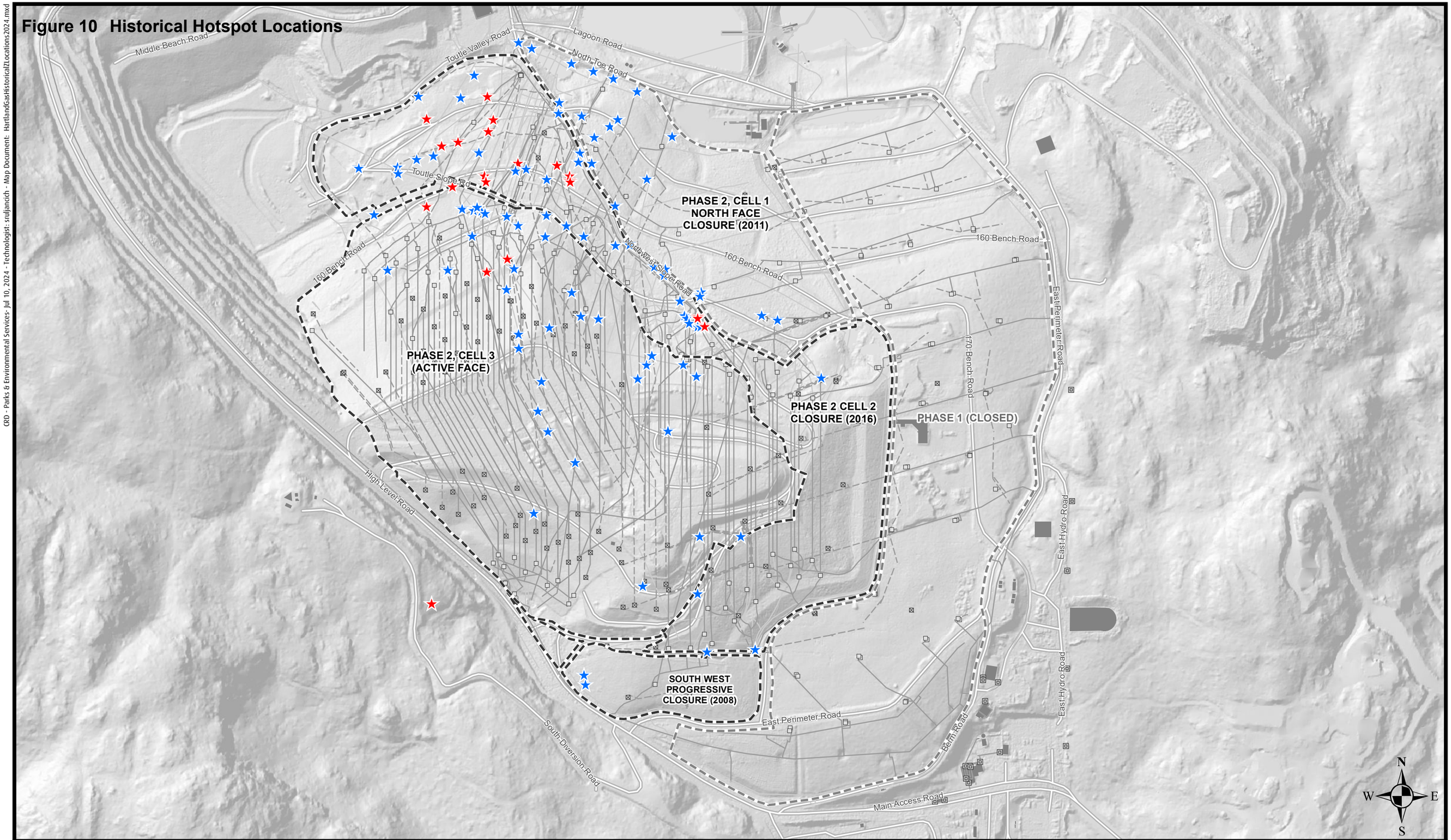
Combustible Gas Result
(parts per million)
- 0-99 ppm
- 100-999 ppm
- 1,000-12,499 ppm
- >12,500 ppm

- Gas Probes
- Active Gas Wells
- Abandoned or Inactive Gas Wells
- Active Gas Lines
- Abandoned or Inactive Gas Lines
- Leachate Collection Lines
- Roads
- Final Closure Areas
- Progressive Closure Areas
- Structures

HARTLAND LANDFILL AMBIENT AIR MONITORING RESULTS - AUGUST 2023

CRD - Parks & Environmental Services - Jul 10, 2024 - Technologist: sruljancich - Map Document: HartlandGasHistoricalZLocations2024.mxd

Figure 10 Historical Hotspot Locations



Making a difference...together

Metres

0 20 40 60 80 100

Projection: UTM ZONE 10N NAD 83

- Historical Z-Spot Locations (Active)
- Historical Z-Spot Locations (Inactive)
- Gas Probes
- Active Gas Wells
- Abandoned or Inactive Gas Wells
- Active Gas Lines
- Abandoned or Inactive Gas Lines
- Leachate Collection Lines
- Roads
- Final Closure Areas
- Progressive Closure Areas
- Structures
- Water Bodies

HISTORICAL Z-POINT LOCATIONS

The following table summarizes LFG monitoring results, compliance, mitigation actions and recommendations.

Table 17 LFG Compliance Summary

Program	Compliance Location	Criteria	Findings	Mitigation/Actions	Recommendations
Perimeter Probe Monitoring	Probes GP-1A, 1B, 2A, 2B, 3A, 3B, 11A, 11B, 12A and 12B	Methane must not exceed 5% in subsurface soils (BC *Landfill Criteria for Municipal Solid Waste* & BC *Landfill Gas Management Facilities Design Guidelines*)	No exceedances Low risk of sub-surface gas migration to adjacent properties	None	Continue quarterly monitoring.
Building Foundation Probe Monitoring	Probes GP-4A, 5A, 6A, 6B, 7A, 7B, 8A, 9A, 13A, 17A, 18A	Maximum 1% methane in any on-site facility (BC *Landfill Criteria for Municipal Solid Waste* & BC *Landfill Gas Management Facilities Design Guidelines*)	No exceedances Low risk of subsurface gas migration to adjacent building	None	Continue quarterly monitoring.
Ambient Grid Monitoring	N/A	100 ppm total hydrocarbon (THC), as methane (CRD internal guideline)	11 grid locations >100 ppm No cover system failures suspected in the closed area of Phase 1	Investigated hotspots and mitigated, where possible.	Continue annual monitoring.
Hotspot Monitoring	N/A	1,000 ppm THC (CRD internal guideline)	No new hotspots (Z-points) >1,000 ppm were identified. Currently 23 locations for hotspot investigation	Added new locations of hotspots to the monitoring program.	Continue annual monitoring. Investigate mitigation options.
Well Field Monitoring and Balancing	N/A	Monitor monthly. Oxygen 2.5% - gas optimization and reduction of fire potential *(BC Landfill Gas Management Facilities Design Guidelines)*	Monitoring completed monthly; Oxygen did not exceed 2.5%	None	Continue monthly monitoring at minimum.
Gas Collection	N/A	75% gas collection efficiency target by the end of 2016, as per *Landfill Gas Management Plan*	Site specific model (UBCi) estimated collection efficiency at 74%. ENV model estimated collection efficiency at 64%.	*Landfill Gas Management Plan* submitted to ENV.	Continue to implement the gas management plan and optimize methane and nitrogen, oxygen levels in the well field

10.0 CONCLUSIONS AND RECOMMENDATIONS

The following section presents the key findings and recommendations developed from the 2023 LFG monitoring programs at the Hartland Landfill.

GAS GENERATION

Hartland Landfill generates greater than 1,000 tonnes of methane per year and is subject to the BC *Landfill Gas Management Regulation*. In 2023, according to the ENV model, the Hartland Landfill is estimated to have generated 8,418 of methane tonnes/year or the equivalent of approximately 235,704 tonnes CO_2e. Of this total, 62,916 tonnes of CO_2e were uncaptured (fugitive emissions). Though not recognized under the regulation, alternative gas modeling using the UBCi model, shows CO_2e emissions (39,585 tonnes CO_2e) to be substantially less than the ENV model.

GAS GENERATION, COLLECTION AND UTILIZATION

In 2023, the gas extraction network consisted of 152 wells that captured an average of 1,108 scfm of LFG. Well field balancing was completed at least monthly to optimize collection. Well field monitoring and balancing should continue at least monthly, as recommended by the BC *Landfill Gas Management Facilities Design Guidelines*.

At the end of 2023, the efficiency was 64% according to the ENV model. Empirical data and methane mass balance indicates that an alternative gas generation (UBCi) more accurately estimates overall gas production for Hartland. Using this model, collection efficiency in 2023 is estimated to be 74%. In 2023, the construction of Cell 4 in Phase 2 was initiated, resulting in delayed connection of 33 collection wells already installed in the upper lifts of Cell 3, and this was reflected in the lower collection efficiency in 2023. Collection efficiency is expected to continue declining until gas header construction, and well connection is complete (expected Q4 2024). The CRD continues to follow the *Landfill Gas Management Plan* design specifications for reaching 75% collection efficiency. Staff continue to monitor and adjust the well field to maximize collection and optimize key gas constituents (methane and nitrogen) in accordance with the Guidelines.

OPERATIONAL PERFORMANCE

The gas plant experienced seven days worth of downtime (i.e., no vacuum applied to the well field) due to power outages and unforeseen events. A back-up generator was installed in August 2020 as back-up power to minimize blower downtime and ensure continuous destruction of landfill gas.

MONITORING

No methane concentrations were observed during foundation and perimeter probe monitoring and, as a result, there is little risk of lateral LFG migration. This monitoring is a regulatory requirement and should continue on a quarterly schedule.

During the 2023 surface emissions grid monitoring, 11 grid locations with methane concentrations >100 ppm were identified. Currently there are 22 locations monitored for hotspot investigation.

UPCOMING PROJECTS IN 2024

Work on the Biogas Upgrading Facility (BUF) facility at Hartland Landfill is ongoing, with construction to replace the existing gas-to-energy facility expected to be complete by Q3 of 2024. The new facility aims to produce RNG for FortisBC by December 2024, with a design capacity of 2,000 scfm. Concurrently, construction of landfill gas management systems in Cell 4 is underway, with completion expected by October 2024, and an updated Cell 3 header installation planned for Q4 of 2024. Additionally, pilot projects for automated well head tuning devices and continuous methane surface emission monitoring devices are set to begin in 2024, aiming to improve gas collection efficiency and reduce emissions.

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12.0 REPORT SIGNOFF

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APPENDIX A

Hartland Landfill Gas Generation Model Inputs

A1	**Inputs for Generating Methane Capture Efficiency Models**
A2-a	**All 2020 Controlled Waste Data**
A2-b	**Summary of 2020 Controlled Waste Data**
A2-c	**All 2021 Controlled Waste Data**
A2-d	**Summary of 2021 Controlled Waste Data**
A2-e	**All 2022 Controlled Waste Data**
A2-f	**Summary of 2022 Controlled Waste Data**
A2-g	**Controlled Waste Composition Used in 2023 Modelling**
A2-h	**Summary of 2023 Controlled Waste Data**
A2-i	**Controlled Waste Composition Summary**
A3-a	**Waste Composition Input to ENV Model**
A3-b	**Waste Composition Input to UBCi Model**
A4-a	**Summary of the Inputs to ENV model**
A4-b	**Results of the ENV Model**
A5	**Results of the UBCi Model**
A6	**US EPA Oxidation Table Reference for Cover System Capture**

Appendix A Hartland Landfill Gas Generation Model Inputs

A1 Inputs for Generating Methane Capture Efficiency Models

Variables		Relatively Inert	Moderately Decomposable	Decomposable
Gas Production potential (m^3 CH4/tonne), Lo =		20	120	160
Waste Composition, 1980 to	1995	0.336	0.248	0.414
Waste Composition, 1996 to	2000	0.338	0.405	0.256
Waste Composition, 2001 to	2004	0.266	0.396	0.337
Waste Composition, 2005 to	2009	0.331	0.369	0.298
Waste Composition, 2010 to	2013	0.314	0.391	0.294
Waste Composition, 2014 to	future	0.327	0.427	0.201
Lag time before start of gas production, lag =	1	Year		
Historical Data Used (years)	38			
1st Year of Historical Data Used	1980			
4 Years after reporting year	2024			
methane (by volume)	0.5			
carbon dioxide (by volume)	0.5			
methane (density)	0.6557	kg/m^3	(25°C,1ATM)	
carbon dioxide (density)	1.7988	kg/m^3	(25°C,1ATM)	

Appendix A2-a All 2020 Controlled Waste Data

Type	Tonnes	Classification	Misc	Liquid Waste	Screenings	Soil	Asbestos
Sewage screenings	7.710	moderately decomposable	7.710				
Out of region asbestos	30.860	inert					30.860
Spoiled food	43.340	decomposable	43.340				
Contaminated drywall	0.140	inert	0.140				
Contaminated soils	27.310	inert				27.310	
Dead animals	52.240	decomposable	52.240				
Fibre optic cable	17.640	inert	17.640				
Food processing waste	65.360	decomposable	65.360				
Health hazard waste	87.660	miscellaneous	87.660				
Miscellaneous controlled waste	496.850	miscellaneous	496.850				
Pumpings (sewage)	285.400	moderately decomposable		285.400			
Pumpings residual sludge		moderately decomposable		0.000			
Pumpings (drainage sumps)	735.380	moderately decomposable		735.380			
Sewage screenings	1,033.100	moderately decomposable			1,033.100		
Spent charcoal	27.070	decomposable	27.070				
Waste asbestos	3,061.690	inert					3,061.690
Sewage sludge	10,199.640	moderately decomposable			10,199.640		
Animal fecal waste	30.710	decomposable	30.710				
Surface coating waste	67.290	inert	67.290				
Knotweed	11.860	decomposable	11.860				
Vermiculite	0.260	decomposable	0.260				
International waste	17.910	miscellaneous	17.910				
Totals	**16,299.420**		**926.040**	**1,020.780**	**11,232.740**	**27.310**	**3,092.550**

Appendix A2-b Summary of 2020 Controlled Waste Data

Type	Sum of Tonnes
Decomposable	**230.84**
animal fecal waste	30.71
dead animals	52.24
food processing waste	65.36
knotweed	11.86
vermiculite	0.26
spent charcoal	27.07
spoiled food	43.34
Inert	**3,204.93**
contaminated drywall	0.14
contaminated soils	27.31
fibre optic cable	17.64
out of region asbestos	30.86
surface coating waste	67.29
waste asbestos	3,061.69
Miscellaneous	**602.42**
health hazard waste	87.66
international waste	17.91
miscellaneous controlled waste	496.85
Moderately decomposable	**12,261.23**
pumpings (drainage sumps)	735.38
pumpings (sewage)	285.4
pumpings residual sludge	
sewage screenings	1,040.81
sewage sludge	10,199.64
Grand Total	**16,299.42**

Appendix A2-c All 2021 Controlled Waste Data

Type	Tonnes	Classification	Misc	Liquid Waste	Screenings	Soil	Asbestos
Out of region asbestos	64.320	Inert					64.320
Film plastic out		Inert					
Mattress recycle		Inert					
Spoiled food	72.570	Decomposable	72.570				
Contaminated drywall	0.540	Inert	0.540				
Contaminated soils	27.620	Inert				27.620	
Dead animals	76.850	Decomposable	76.850				
Fibre optic cable	44.900	Inert	44.900				
Food processing waste	25.590	Decomposable	25.590				
Health hazard waste	67.660	Miscellaneous	67.660				
Miscellaneous controlled waste	127.540	Miscellaneous	127.540				
Pumpings	40.660	Moderate Decomposable		40.660			
Pumpings (sewage)	3,040.190	Moderate Decomposable		3,040.190			
Pumpings residual sludge		Moderate Decomposable		0.000			
Pumpings (drainage sumps)	830.750	Moderate Decomposable		830.750			
Vehicle washing facility waste		Inert		0.000			
Sewage screenings	1,913.300	Moderate Decomposable			1,913.300		
Sharps	-	Inert	0.000				
Soot	1.640	Decomposable	1.640				
Spent charcoal	31.190	Decomposable	31.190				
Waste asbestos	4,069.300	Inert					4,069.300
Sewage sludge	13,414.890	Moderate Decomposable		13,414.890			
Animal fecal waste	39.360	Decomposable	39.360				
Surface coating waste	116.750	Inert	116.750				
Knotweed	25.920	Decomposable	25.920				
Vermiculite	0.210	Inert	0.210				
International waste	22.010	Miscellaneous	22.010				
Totals	**24,053.760**		**652.730**	**17,326.490**	**1,913.300**	**27.620**	**4,133.620**

Appendix A2-d Summary of 2021 Controlled Waste Data

Type	Sum of Tonnes
Decomposable	**273.12**
animal fecal waste	39.36
dead animals	76.85
food processing waste	25.59
knotweed	25.92
soot	1.64
spent charcoal	31.19
spoiled food	72.57
Inert	**4,323.64**
contaminated drywall	0.54
contaminated soils	27.62
fibre optic cable	44.9
film plastic out	
mattress recycle	
vermiculite	0.21
out of region asbestos	64.32
sharps	0
surface coating waste	116.75
Vehicle washing facility waste	
waste asbestos	4069.3
Miscellaneous	**217.21**
health hazard waste	67.66
international waste	22.01
miscellaneous controlled waste	127.54
Moderate Decomposable	**19,239.79**
pumpings	40.66
pumpings (drainage sumps)	830.75
pumpings (sewage)	3,040.19
pumpings residual sludge	
sewage screenings	1,913.3
sewage sludge	13,414.89
Grand Total	**24,053.76**

Appendix A2-e All 2022 Controlled Waste Data

Type	Tonnes	Classification	Misc	Liquid Waste	Screenings	Soil	Asbestos
Spoiled food	122.110	Decomposable	122.110				
Contaminated drywall		Inert	0.000				
Contaminated soils	58.480	Inert	58.480				
Dead animals	52.580	Decomposable	52.580				
Fibre optic cable	16.920	Inert	16.920				
Food processing waste	30.350	Decomposable	30.350				
Health hazard waste	47.880	Miscellaneous	47.880				
Miscellaneous controlled waste	637.880	Miscellaneous	637.880				
Non-hazardous solids, soil, sand	260.850	Miscellaneous	260.850				
Pumpings (sewage)	517.970	Moderate Decomposable		517.97			
Out of region asbestos	575.37	Inert					575.37
Waste asbestos	3569.65	Inert					3,569.65
Pumpings residual sludge	6.350	Moderate Decomposable		6.35			
Pumpings (drainage sumps)	709.090	Moderate Decomposable		709.09			
Vehicle washing facility waste	4.580	Inert		4.58			
Sewage screenings	1,906.670	Moderate Decomposable			1,906.670		
Sharps	-	Inert	0.000				
Soot	0.040	Decomposable	0.040				
Spent charcoal	62.850	Decomposable	62.850				
Sewage sludge	10,409.880	Moderate Decomposable			10,409.880		
Animal fecal waste	43.160	Decomposable	43.160				
Surface coating waste	57.880	Inert	57.880				
Knotweed	23.300	Decomposable	23.300				
International waste	2,863.470	Miscellaneous	2,863.470				
Totals	**21,977.31**		**4,277.75**	**1,237.99**	**12,316.55**	**0.00**	**4,145.02**

Appendix A2-f Summary of 2022 Controlled Waste Data

Type	Sum of Tonnes
Decomposable	**334.39**
animal fecal waste	43.16
dead animals	52.58
food processing waste	30.35
knotweed	23.30
soot	0.04
spent charcoal	62.85
spoiled food	122.11
Inert	**4,220.42**
contaminated drywall	0
contaminated soils	58.48
fibre optic cable	16.92
out of region asbestos	575.37
waste asbestos	3,569.65
Inert	**62.46**
sharps	0.00
surface coating waste	57.88
vehicle washing facility waste	4.58
Miscellaneous	**3,810.08**
health hazard waste	47.88
international waste	2,863.47
miscellaneous controlled waste	637.88
non-hazardous solids, soil, sand	260.85
Moderate Decomposable	**13,549.96**
pumpings (drainage sumps)	709.09
pumpings (sewage)	517.97
pumpings residual sludge	6.35
sewage screenings	1,906.67
sewage sludge	10,409.88
Grand Total	**21,977.31**

Appendix A2-g Controlled Waste Composition Used in 2023 Modelling

Year	Controlled Waste Composition		
	Relatively Inert	Moderately Decomposable	Decomposable
2014 to 2019	27.4%	56.9%	15.7%
2020	21.5%	77.1%	1.4%
2021	18.43%	80.43%	1.14%
2022	28%	70%	2%
2023	23%	75%	1%

Appendix A2-h Summary of 2023 Controlled Waste Data

Type	Sum of Tonnes
Decomposable	**280.15**
animal fecal waste	42.68
dead animals	55.31
food processing waste	26.15
knotweed	0.00
soot	2.21
spent charcoal	87.43
spoiled food	66.37
Inert	**74.03**
contaminated drywall	1.24
contaminated soils	44.20
fibre optic cable	12.02
out of region asbestos	16.57
waste asbestos	**3,118.58**
Inert	0.00
sharps	177.89
surface coating waste	0.00
vehicle washing facility waste	2,940.69
Miscellaneous	**4,886.21**
health hazard waste	10.87
international waste	4,402.85
miscellaneous controlled waste	328.43
non-hazardous solids, soil, sand	144.06
Moderate Decomposable	**15,722.32**
pumpings (drainage sumps)	1,967.82
pumpings (sewage)	1,032.81
pumpings residual sludge	1,505.81
sewage screenings	1,585.30
sewage sludge	9,630.58
Grand Total	**24,081.29**

Appendix A2-i Controlled Waste Composition Summary

Year	Decomposable (tonne)	Decomposable %	Moderately Decomp-osable (tonne)	Moderately Decomp-osable %	Inert (tonne)	Inert %	Miscellaneous (tonne)	Miscellaneous %	Total (tonne)
2019	2,405.71	15.7%	8,591.29	56.1%	4,070.92	27%	257.34	2%	15,326.24
2020	230.84	1.4%	12,261.23	75.2%	3,204.93	20%	602.42	4%	16,300.38
2021	273.12	1.1%	19,239.79	80.0%	4,323.64	18%	217.21	1%	24,054.75
2022	334.39	2%	13,549.96	62%	4,282.88	19%	3,810.08	17%	21,978.14
2023	280.15	1%	15,722.32	65%	3,192.61	13%	4,886.21	20%	24,082.09*

* includes 2,957 tonnes of asbestos

Appendix A3-a Waste Composition Input to ENV Model

The ENV model waste composition for MSW is as follow, however, the overall waste composition depends on tonnages of MSW and Controlled waste.

	Relatively Inert	Moderately Decomposable	Decomposable
1981 - 2013	35.1%	37.2%	27.7%
2014 - 2015	35.8%	39.8%	24.4%
2016 - 2021	36.8%	42.1%	21.1%
2022 - 2027	40.9%	42.4%	16.7%

Waste Characterization Summary: For "current condition" scenario, using the 2010 and 2016 waste compositions report by Tetra Tech in their 2016 report, three different compositions were developed grouping the waste components into the categories required by the ENV Model. In calculation of each category's percentages we made the following assumptions based on the details provided in Tetra Tech's report.

- Moderately Decomposable: Including wood waste, paper, textile, 20% of "composite products", and 50% of "other" (to account for diapers),
- Decomposable: Including food waste and yard waste.

Appendix A3-b Waste Composition Input to UBCi Model

UBCi Model waste composition (categories) for MSW are as follows:

		UBCiModel - Input DOC used for Hartland Advanced LFG Modeling							
		Food	Garden	Paper	Wood	Textile	Nappies	Inerts	Total
MSW	Up to 2013	21.7%	6.0%	15.5%	12.5%	5.6%	3.9%	34.9%	100.00%
	2014 & 2015	20.6%	3.8%	15.5%	14.9%	5.9%	3.8%	35.5%	100.00%
	2016 to 2021	19.5%	1.6%	15.4%	17.4%	6.3%	3.7%	36.1%	100.00%
	2022 to Future	13.6%	3.1%	14.2%	19.3%	5.5%	3.7%	40.5%	100.00%

Appendix A4-a Summary of the Inputs to ENV Model

Year of Report	2023	
Annual Tonnage in Preceding Year	208,646	(tonnes/year)
Total waste in Place in the Preceding Year	6,850,393	(tonnes/year)
Methane generation in the Preceding Year	8,418	(tonnes CH4/year)
Next Five Years	**Waste Tonnage (tonnes)**	**Methane Generation (tonnes CH4/year)**
2024	210,941	8,532
2025	213,262	8,650
2026	215,608	8,772
2027	217,979	8,899
2028	220,377	9,029

Appendix A4-b Results of the ENV Model

				Waste Tonnage			Methane Generation Rate, k			Annual	Annual
		Annual	Cumulative		Moderately			Moderately		Methane	Landfill Gas
Year	Year	Tonnage	Waste-in-place	Relatively Inert	Decomposable	Decomposable	Relatively Inert	Decomposable	Decomposable	Production	Production
	Number	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	($year^{-1}$)	($year^{-1}$)	($year^{-1}$)	(tonnes/yr)	(m^3/hr)
1980	1	111,037	111,037	38,974	41,306	30,757	0.02	0.04	0.09	0	-
1981	2	118,254	229,291	41,507	43,990	32,756	0.02	0.04	0.09	431	150
1982	3	125,941	355,232	44,205	46,850	34,886	0.02	0.04	0.09	859	299
1983	4	134,127	489,359	47,079	49,895	37,153	0.02	0.04	0.09	1,287	448
1984	5	142,845	632,204	50,139	53,138	39,568	0.02	0.04	0.09	1,718	598
1985	6	152,130	784,334	53,398	56,592	42,140	0.02	0.04	0.09	2,152	749
1986	7	167,472	951,806	58,783	62,300	46,390	0.02	0.04	0.09	2,593	903
1987	8	177,686	1,129,492	62,368	66,099	49,219	0.02	0.04	0.09	3,063	1,067
1988	9	184,193	1,313,685	64,652	68,520	51,021	0.02	0.04	0.09	3,541	1,233
1989	10	188,750	1,502,435	66,251	70,215	52,284	0.02	0.04	0.09	4,012	1,397
1990	11	187,476	1,689,911	65,804	69,741	51,931	0.02	0.04	0.09	4,469	1,556
1991	12	175,956	1,865,867	61,761	65,456	48,740	0.02	0.04	0.09	4,891	1,703
1992	13	162,329	2,028,196	56,977	60,386	44,965	0.02	0.04	0.09	5,240	1,824
1993	14	159,431	2,187,627	55,960	59,308	44,162	0.02	0.04	0.09	5,513	1,920
1994	15	156,285	2,343,912	54,856	58,138	43,291	0.02	0.04	0.09	5,759	2,005
1995	16	159,993	2,503,905	56,158	59,517	44,318	0.02	0.04	0.09	5,977	2,081
1996	17	157,528	2,661,433	55,292	58,600	43,635	0.02	0.04	0.09	6,196	2,157
1997	18	149,429	2,810,862	52,450	55,588	41,392	0.02	0.04	0.09	6,392	2,226
1998	19	138,081	2,948,943	48,466	51,366	38,248	0.02	0.04	0.09	6,545	2,279
1999	20	138,174	3,087,117	48,499	51,401	38,274	0.02	0.04	0.09	6,646	2,314
2000	21	142,239	3,229,356	49,926	52,913	39,400	0.02	0.04	0.09	6,742	2,347
2001	22	138,533	3,367,889	48,625	51,534	38,374	0.02	0.04	0.09	6,849	2,385
2002	23	146,324	3,514,213	51,360	54,433	40,532	0.02	0.04	0.09	6,936	2,415
2003	24	148,225	3,662,438	52,027	55,140	41,058	0.02	0.04	0.09	7,049	2,454

Appendix A, continued

				Waste Tonnage			Methane Generation Rate, k			Annual	Annual
		Annual	Cumulative		Moderately			Moderately		Methane	Landfill Gas
Year	Year	Tonnage	Waste-in-place	Relatively Inert	Decomposable	Decomposable	Relatively Inert	Decomposable	Decomposable	Production	Production
	Number	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	($year^{-1}$)	($year^{-1}$)	($year^{-1}$)	(tonnes/yr)	(m^3/hr)
2004	25	154,113	3,816,551	54,094	57,330	42,689	0.02	0.04	0.09	7,163	2,494
2005	26	163,040	3,979,591	57,227	60,651	45,162	0.02	0.04	0.09	7,294	2,540
2006	27	166,820	4,146,411	58,554	62,057	46,209	0.02	0.04	0.09	7,452	2,595
2007	28	174,537	4,320,948	61,262	64,928	48,347	0.02	0.04	0.09	7,616	2,652
2008	29	166,722	4,487,670	58,519	62,021	46,182	0.02	0.04	0.09	7,799	2,716
2009	30	161,194	4,648,864	56,579	59,964	44,651	0.02	0.04	0.09	7,942	2,765
2010	31	152,062	4,800,926	53,374	56,567	42,121	0.02	0.04	0.09	8,054	2,804
2011	32	144,179	4,945,105	50,607	53,635	39,938	0.02	0.04	0.09	8,125	2,829
2012	33	136,763	5,081,868	48,004	50,876	37,883	0.02	0.04	0.09	8,163	2,842
2013	34	131,418	5,213,286	46,128	48,887	36,403	0.02	0.04	0.09	8,170	2,845
2014	35	128,045	5,341,331	45,177	52,311	30,557	0.02	0.04	0.09	8,158	2,841
2015	36	123,381	5,464,712	43,252	50,976	29,153	0.02	0.04	0.09	8,103	2,822
2016	37	146,704	5,611,416	52,809	63,618	30,278	0.02	0.04	0.09	8,038	2,799
2017	38	154,472	5,765,888	55,592	67,007	31,873	0.02	0.04	0.09	8,032	2,797
2018	39	159,942	5,925,830	57,589	69,335	33,018	0.02	0.04	0.09	8,056	2,805
2019	40	163,001	6,088,831	58,544	70,892	33,566	0.02	0.04	0.09	8,101	2,821
2020	41	160,727	6,249,558	56,654	73,371	30,702	0.02	0.04	0.09	8,157	2,840
2021	42	190,209	6,439,767	65,578	89,299	35,332	0.02	0.04	0.09	8,192	2,852
2022	43	201,980	6,641,747	79,887	91,698	30,395	0.02	0.04	0.09	8,325	2,899
2023	44	208,646	6,850,393	81,203	96,341	31,103	0.02	0.04	0.09	8,418	2,931
2024	45	210,941	7,061,335	82,143	97,313	31,486	0.02	0.04	0.09	8,532	2,971
2025	46	213,262	7,274,596	83,093	98,296	31,873	0.02	0.04	0.09	8,650	3,012
2026	47	215,608	7,490,204	84,053	99,289	32,265	0.02	0.04	0.09	8,772	3,054
2027	48	217,979	7,708,183	85,024	100,294	32,661	0.02	0.04	0.09	8,899	3,098
2028	49	220,377	7,928,560	86,006	101,309	33,062	0.02	0.04	0.09	9,029	3,144

Appendix A4-b Results of the ENV Model (continued)

Waste Type	Methane Generation Potential L_0 (m^3 methane/tonne)	Methane Generation Rate (k) Values
Relatively Inert	20	0.02
Moderately Decomposable	120	0.04
Decomposable	160	0.09

Appendix A5 Results of the UBCi Model

Year	Captured LFG, CH_4			Generation Estimate (tonnes/year)		Methane Capture Efficiency	
	SCFM, LFG (at 50% CH_4)	m^3/hr (CH_4)	tonnes/yr (CH_4)	UBCiModel	ENV AR Tool	UBCiModel	ENV AR Tool
2021	1,150.1	977.0	5,611.8	7,166.6	8,192.0	78%	69%
2022	1,201.7	1,020.9	5,863.7	7,283.0	8,325.1	81%	70%
2023	1,108.3	941.5	5,408.0	7,307.7	8,418.0	74%	64%

Appendix A6 US EPA Oxidation Table Reference for Cover System Capture

Conditions (C1 to C7)	CH_4 Oxidation Fraction
I. For all reporting years prior to 2013 reporting year	
C1. For all landfills regardless of cover type or methane flux	0.10
II. For 2013 reporting year and all subsequent years	
C2. For landfills that have a geomembrane (synthetic) cover or other non-soil barrier meeting the definition of final cover with less than 300 mm of cover soil for greater than 50% of the landfill area containing waste	0.0
C3. For landfills that do not meet the conditions in C2 above and for which you elect not to determine CH_4 flux	0.10
C4. For landfills that do not meet the conditions in C2 or C3 above and that do not have final cover, or intermediate or interim cover[a] for greater than 50% of the landfill area containing waste	0.10
C5. For landfills that do not meet the conditions in C2 or C3 above and that have final cover, or intermediate or interim cover[a] for greater than 50% of the landfill area containing waste and for which the CH_4 flux rate[b] is less than 10 grams per square meter per day ($g/m^2/d$)	0.35
C6. For landfills that do not meet the conditions in C2 or C3 above and that have final cover or intermediate or interim cover[a] for greater than 50% of the landfill area containing waste and for which the CH_4 flux rate[b] is 10 to 70 $g/m^2/d$	0.25
C7: For landfills that do not meet the conditions in C2 or C3 above and that have final cover or intermediate or interim cover[a] for greater than 50% of the landfill area containing waste and for which the CH_4 flux rate[b] is greater than 70 $g/m^2/d$	0.1
[a] Where a landfill is located in a state that does not have an intermediate or interim cover requirement, the landfill must have soil cover of 12 inches (300 mm) or greater in order to use an oxidation fraction of 0.25 or 0.35.	

[b] Methane flux rate (in grams per square meter per day; g/m^2/d) is the mass flow rate of methane per unit area at the bottom of the surface soil prior to any oxidation and is calculated as follows:

For Equation HH-5 of this subpart, or for Equation TT-6 of subpart TT of this part,

$$\mathrm{MF} = K \times G_{\mathrm{CH\,4}} / \mathrm{SArea}$$

For Equation HH-6 of this subpart,

$$\mathrm{MF} = K \times \left(G_{\mathrm{CH\,4}} - \sum_{n-1}^{N} R_n\right) / \mathrm{SArea}$$

For Equations HH-7 pf this subpart,

$$\mathrm{MF} = K \times \left(\frac{1}{\mathrm{CE}} \sum_{n-1}^{N} \left[\frac{R_n}{f_{\mathrm{Rec},n}}\right]\right) / \mathrm{SArea}$$

For Equation HH-8 of this subpart,

$$\mathrm{MF} = K \times \left(\frac{1}{\mathrm{CE}} \left\{\sum_{n-1}^{N} \left[\frac{R_n}{f_{\mathrm{Rec},n}}\right]\right\} - \sum_{n-1}^{N} R_n\right) / \mathrm{SArea}$$

Where:

MF = Methane flux rate from the landfill in the reporting year (g/m^2/d).

K = unit conversion factor = 10^6/365 (g/metric ton per days/year) or 10^6/366 for a leap year.

SArea = The surface area of the landfill containing waste at the beginning of the reporting year (m^2).

G_{CH4} = Modeled methane generation rate in reporting year from Equation HH-1 of this subpart or Equation TT-1 of subpart TT of this part, as applicable, except for application with Equation HH-6 of this subpart (metric tons CH_4). For application with Equation HH-6 of this subpart, the greater of the modeled methane generation rate in reporting year from Equation HH-1 of this subpart or Equation TT-1 of this part, as applicable, and the quantity of recovered CH_4 from Equation HH-4 of this subpart (metric tons CH4).

CE = Collection efficiency estimated at landfill, taking into account system coverage, operation, and cover system materials from Table HH-3 of this subpart. If area by soil cover type information is not available, use default value of 0.75 (CE4 in table HH-3 of this subpart) for all areas under active influence of the collection system.

N = Number of landfill gas measurement locations (associated with a destruction device or gas sent off-site). If a single monitoring location is used to monitor volumetric flow and CH_4 concentration of the recovered gas sent to one or multiple destruction devices, then N = 1.

R^n = Quantity of recovered CH_4 from Equation HH-4 of this subpart for the nth measurement location (metric tons).

$f^{Rec,n}$ = Fraction of hours the recovery system associated with the nth measurement location was operating (annual operating hours/8760 hours per year or annual operating hours/8784 hours per year for a leap year).

APPENDIX B

Hartland Landfill Well Field Data

B1 Hartland Landfill Gas Well Operation

B2 Hartland Landfill Gas Well Field Data

B3 Hartland Landfill Gas Well Field Data Summary

Appendix B1 Hartland Landfill Gas Well Operation

Operating Year(s) for Gas Wells Hartland Landfill Capital Regional District																																
Well Information						Gas Well Readings																										
Old Well Name	New Well Name	Lift (mASL)	Installation Date	Activation Date	Deactivation Date	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Comments
BLGW0001			2002	2003	2005						x	x	x	IA																	*Deactivated 2005*
BLGW0002			2002	2003	2005						x	x	x	IA																	*Deactivated 2005*
BLGW0003			2002	2003	2007						x	x	x	x	x	IA															*Deactivated 2007*
BLGW0004			2002	2003	2007						x	x	x	x	x	IA															*Deactivated 2007*
BLGW0005			2002	2003	2007						x	x	x	x	x	IA															*Deactivated 2007*
BLGW0006			2002	2003	2007						x	x	x	x	x	IA															*Deactivated 2007*
BLGW0007			2002	2003	2007						x	x	x	x	x	IA															*Deactivated 2007*
BLGW0008			2002	2003	2004						x	x	IA																		*Deactivated 2004*
BLGW0009			2002	2003	2004						x	x	IA																		*Deactivated 2004*
BLGW0010			2002	2003	2004						x	x	IA																		*Deactivated 2004*
BLGW0011			2002	2003	2004						x	x	IA																		*Deactivated 2004*
BLGW0012			2002	2003	2004						x	x	IA																		*Deactivated 2004*
BLGW0013			2002	2003	2004						x	x	IA																		*Deactivated 2004*
BLGW0014			2002	2003	2004						x	x	IA																		*Deactivated 2004*
BLGW0015			2002	2003	2004						x	x	IA																		*Deactivated 2004*
BLGW0016			2002	2003	2008						x	x	x	x	x	x	IA														*Deactivated 2008*
BLGW0017			2002	2003	2008						x	x	x	x	x	x	IA														*Deactivated 2008*
BLGW0018			2002	2003	2008						x	x	x	x	x	x	IA														*Deactivated 2008*
BLGW0019			2002	2003	2006						x	x	x	x	IA																*Deactivated 2006*
BLGW0020			2002	2003	2006						x	x	x	x	IA																*Deactivated 2006*
BLGW0021			2002	2003	2006						x	x	x	x	IA																*Converted to vertical well OLGW0048s*
LHGW0001	**LHGW0001**		1999	2003	2011						x	x	x	x	x	x	x	x	x	IA											*Abandoned May 2011*
LHGW002A	**LHGW002A**	**147**	1999	2007	2012										x	x	x	x	x	x	x	x	x	x	x	IA	IA				*Disconnected for Cell 1 closure - reconnected in Dec2012*
LHGW002B	**LHGW002B**		1999	2007	2011								x	x	x	x	x	x	x	IA											*Abandoned in May 2011*
LHGW0003	**LHGW0003**	**147**	1999	2003	2013						x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	IA	IA			*Disconnected for Cell 1 closure reconnected Jan2013*
LHGW0004	**LHGW0004**	**147**	1999	2003	2023						x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
LHGW0005																															
LHGW0006	**LHGW0006**	**143**	2008	2009	2014												x	x	x	x	x	x	IA								*Abandoned May 2014*
LHGW0007	**LHGW0007**	**143**	2008	2009	2017												x	x	x	x	x	x	x	x	x	IA					*no readings 2017-2018 - no production*
LHGW0008	**LHGW0008**	**143**	2008	2009	2017												x	x	x	x	x	x	x	x	x	IA					*no readings 2017-2018 - no production*
LHGW0009	**LHGW0009**	**143**	2012	2012	2014															x	x	x	IA								*Start Feb 2012 - abandoned May 2014*
LHGW0010	**LHGW0010**	**143**	2011	2012	2014															x	x	x	IA								*Start Feb 2012, was 11 - abandoned May 2014*
LHGW0010	**LHGW0010**	**147**	2010	2010																											*Active*

Appendix B1, continued

Operating Year(s) for Gas Wells Hartland Landfill Capital Regional District																															
Well Information						Gas Well Readings																									
Old Well Name	New Well Name	Lift (mASL)	Installation Date	Activation Date	Deactivation Date	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Comments
LHGW0017	LHGW0017	163	2014	2012	2018															x	x	x	x	x	x	IA						*start January 2012 / no readings 2017-2018 - no production*
LHGW0019	LHGW0019	---	2014	2014	2021																	x	x	x	x	x	x	x	x			*Started May 2014*
LHGW0020	LHGW0020	159	2014	2014	2021																	x	x	x	x	x	x	x	x			*Started May 2014*
LHGW0021	LHGW0021	159	2014	2014	2021																	x	x	x	x	x	IA					*Started May 2014*
LHGW0022	LHGW0022	159	2014	2014	2021																	x	x	x	x	x	x	x	x			*Started May 2014*
LHGW0023	LHGW0023	159	2011	2011	2021														x	x	x	x	x	x	x	x	x	x	x			*start September 2011, was 21*
OHGW0001	HLGW0001	139	1999	2001					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	*Disconnected for Cell 1 closure - reconnected Jan2013*
OHGW0002	HLGW0002		1999	2001	2011				x	x	x	x	x	x	x	x	x	x	x	IA												*Abandoned May 2011*
OHGW0003	HLGW0003	139	1999	2003							x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	*Disconnected for Cell 1 closure - reconnected Jan2013*
OHGW0004	HLGW0004	147	1999	2003							x	x	x	x	x	x	x	x	x	x	x	x	x	x	IA						*Disconnected for Cell 1 closure - reconnected Jan2013 / no readings 2017-2018 - no production*
OHGW0005	HLGW0005	147	1999	2003							x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	*Disconnected for Cell 1 closure - reconnected Jan2013*
OHGW006A	HLGW006A	159	1999	2005									x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OHGW006B	HLGW006B	159	1999	2005									x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	*Disconnected for Cell 1 closure - reconnected Jan2013*
OHGW0007	HLGW0007		1999	2005	2011								x	x	x	x	x	x	x	IA											*Abandoned in May 2011*
OHGW008A	HLGW008A	143	1999	2006										x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	*Disconnected for Cell 1 closure - reconnected Jan2013*
OHGW008B	HLGW008B	143	1999	2006										x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	*Disconnected for Cell 1 closure - reconnected Jan2013*
OHGW0009	HLGW0009	139	2007	2008	2014										x	x	x	x	x	x	x	x	IA									*Disconnected for Cell 1 closure - reconnected Jan2013 - abandoned May 2014*
OHGW0010	HLGW0010	139	2007	2008	2024										x	x	x	x	x	x	x	x	x	x	x	IA						*Disconnected for Cell 1 closure - reconnected Jan2013 / no readings 2017-2018 - no production*
OHGW0011	HLGW0011		2007	2008	2024										x	x	x	x	x	x	x	x	x	x	x	IA						*Disconnected for Cell 1 closure - reconnected Jan2013 / no readings 2017-2018 - no production*
OHGW0012	HLGW0012	147		2010	2024													x	x	x	x	x	x	x	x	x	x	x	x	x	x	*Decommissioned 2024*
OHGW0013	HLGW0013	147		2010	2024													x	x	x	x	x	x	x	x	x	x	x	x	x	x	*Decommissioned 2024*
OHGW0014	HLGW0014	155		2011															x	x	x	x	x	x	x	x	x	x	x	x	x	
OHGW0015	HLGW0015	155		2011	2014														x	x	x	x	IA									*abandoned May 2014*
	HLGW016A	159	2012	2012																x	x	x	x	x	x	IA						*Started Dec 2012 / no readings 2017-2018 - no production*
OHGW0016 /HLGW0016	HLGW016B	163	2012	2012																x	x	x	x	x	x	x	x	x	x	x	x	*Started Jan 2012*
	HLGW017A	163	2012	2013																x	x	x	x	x	x	x	x	IA	IA	IA	IA	*Started Dec 2012*
OHGW0017/HLGW0017	HLGW017B	163	2012	2012	2023															x	x	x	x	x	x	x	x	x	x	x	x	*Started Jan 2012, decommissioned 2023*
	HLGW0018	165	2012	2013																	x	x	x	x	x	x	x	x	x	x	x	*Started Jan2013*
	HLGW019B	165	2013	2013	2022																x	x	x	x	x	IA						*Started Jan 2013 / no readings 2017-2018 - no production - Decommissioned*
	HLGW019C	165	2012	2012	2020															x	x	x	x	x	x	x	x	IA	IA	IA	IA	*Started Dec 2012 - decommissioned July 2020*
	HLGW020B	165	2013	2013																	x	x	x	x	x	IA						*Started Jan 2013 / no readings 2017-2018 - no production*
	HLGW021B	165	2013	2013																	x	x	x	x	x	x	x	x	x	x	x	*Started Jan 2013*

Appendix B1, continued

Operating Year(s) for Gas Wells Hartland Landfill Capital Regional District																														
Well Information						Gas Well Readings																								
Old Well Name	New Well Name	Lift (mASL)	Installation Date	Activation Date	Deactivation Date	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Comments
	HLGW022B	**165**	2013	2013																	x	x	x	x	x	x	x	x	x	x	*Started Jan 2013*
Previously HLGW0023	**HLGW023B**	**165**	2013	2013																	x	x	x	x	x	x	x	x	x	x	*Started Jan 2013*
	HLGW024B	171	2014	2016																				x	x	x	x	x	x	x	*Activated 2016*
	HLGW025B	171	2014	2016																				x	x	x	x	x	x	x	*Activated 2016*
	HLGW026B	171	2014	2015																			x	x	x	x	x	x	x	x	*Started Jan 2015*
	HLGW027A	171	2014	2017																					x	x	x	x	x	x	*activated 2017*
	HLGW027B	171	2014	2015																			x	x	x	x	x	x	x	x	*Started Jan 2015*
	HLGW028B	171	2014	2015																			x	x	x	x	x	x	x	x	*Activated Jan 2015*
	HLGW028A	171	2014	2017																					x	x	x	x	x	x	
	HLGW029B	171	2014	2015																			x	x	x	x	x	x	x	x	*Activated Jan 2015*
	HLGW029A	171	2014	2017																					x	x	x	x	x	x	
	HLGW030A	171	2013	2014																		x	x	x	x	x	x	x	x	x	x	*Activated Jan 2014 temp disconnected Jun2016 for cell 3/ reactivated Oct 2017*
	HLGW030B	171	2013	2014																		x	x	x	x	x	x	x	x	x	x	*Activated Jan 2014*
	HLGW031A	171	2013	2014																		x	x	x	x	x	x	x	x	x	x	*Activated Jan 2014 temp disconnected Jun2016 for cell 3 / reactivated Oct 2017*
	HLGW031B	171	2013	2014																		x	x	x	x	x	x	x	x	x	x	*Activated Jan 2014*
	HLGW032A	171	2013	2014																		x	x	x	x	x	x	x	x	x	x	*Activated Jan 2014 temp disconnected Jun2016 for cell 3/ reactivated Oct 2017*
	HLGW032B	171	2013	2014																		x	x	x	x	x	x	x	x	x	x	*Activated Jan 2014*
	HLGW033A	171	2013	2014																		x	x	x	x	x	x	x	x	x	x	*Activated Jan 2014 temp disconnected Jun2016 for cell 3 / reactivated Oct 2017*
	HLGW033B	171	2013	2014																		x	x	x	x	x	x	x	x	x	x	*Activated Jan 2014*
	HLGW034A	171	2013	2014																		x	x	x	x	x	x	x	x	x	x	*Activated Jan 2014 temp disconnected Jun2016 for cell 3 / reactivated Oct 2017*
	HLGW034B	171	2013	2014																		x	x	x	x	x	x	x	x	x	x	*Activated Jan 2014*
	HLGW035A	---	---	---	---	---	---	---	---	---	--	---	---	---	---	--	---	---	---	---	---	---	---	---	---	---	---					*Wells not installed*
	HLGW035B	---	---	---	---	---	---	---	---	---	--	---	---	---	---	--	---	---	---	---	---	---	---	---	---	---	---					*Wells not installed*
	HLGW036B	175	2015	2017																					x	x	x					*Installed 2015 - Temp connection Jan2017*
	HLGW037B	175	2015	2017																					x	x	x	x	x	x	x	
	HLGW038B	175	2015	2017																					x	x	x	x	x	x	x	*Installed 2015 - Temp connection Jan2017*
	HLGW039A	175	2015	2017																					x	x	x	x	x	x	x	
	HLGW039B	175	2015	2017																					x	x	x	x	x	x	x	*Installed 2015 - Temp connection Jan2017*
	HLGW040A	175	2015	2017																					x	x	x	x	x	x	x	
	HLGW040B	175	2015	2018																						x	x	x	x	x	x	*Activated Jan 2018*
	HLGW041A	175	2015	2017																					x	x	x	x	x	x	x	
	HLGW041B	175	2015	2017																					x	x	x	x	x	x	x	
	HLGW042A	175	2015	2017																					x	x	x	x	x	x	x	

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Operating Year(s) for Gas Wells Hartland Landfill Capital Regional District																														
Well Information						Gas Well Readings																								
Old Well Name	New Well Name	Lift (mASL)	Installation Date	Activation Date	Deactivation Date	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Comments
	HLGW042B	175	2015	2017																					x	x	x	x	x	x	x	*Installed 2015 - Temp Activated Jan2017*
	HLGW043A	175	2015	2017																					x	x	x	x	x	x	x	
	HLGW043B	175	2015	2017																					x	x	x	x	x	x	x	*Installed 2015 - Temp Activated Jan2017*
	HLGW044A	179	2015	2017																					x	x	x	x	x	x	x	
	HLGW044B	179	2015	2017																					x	x	x	x	x	x	x	*Installed 2015 - Temp Activated Jan2017*
	HLGW045A	179	2016	2019																				I			x	IA	IA	IA	IA	*Activated April 2019*
	HLGW045B	179	2016	2018																				I		x	x	x	x	x	x	*Activated Jan 2018*
	HLGW046A	179	2016	2019																				I			x	IA	IA	IA	IA	*Activated April 2019*
	HLGW046B	179	2016	2018																				I		x	x	x	x	x	x	*Activated Jan 2018*
	HLGW047A	179	2016	2017																					x	x	x	x	x	x	x	
	HLGW047B	179	2016	2018																				I		x	x	x	x	x	x	*Activated Jan 2018*
	HLGW048A	179	2016	2017																					x	x	x	x	x	x	x	
	HLGW048B	179	2016	2018																				I		x	x	x	x	x	x	*Activated Jan 2018*
	HLGW049A	179	2016	2017																					x	x	x	IA	IA	IA	IA	
	HLGW049B	179	2016	2018																				I		x	x	x	x	x	x	*Activated Jan 2018*
	HLGW050A	179	2016	2017																					x	x	x	x	x	x	x	
	HLGW050B	179	2016	2018																				I		x	x	x	x	x	x	*Activated Jan 2018*
	HLGW051A	179	2016	2017																					x	x	x	x	x	x	x	
	HLGW051B	179	2016	2017																				I	x	x	x	x	x	x	x	
	HLGW0052	151	2017	2018																						x	x	x	x	x	x	*Activated July 2018*
	HLGW0053	151(3)	2017	2018																						x	x	x	x	x	x	*Activated July 2018*
	HLGW0054	151(3)	2017	2018																						x	x	x	x	x	x	*Activated July 2018*
	HLGW0055	151(3)	2017	2018																						x	x	x	x	x	x	*Activated July 2018*
	HLGW0056	151(3)	2017	2018																						x	x	IA	IA	IA	IA	*Activated August 2018, abandoned 2023 - no readings*
	HLGW0057	155(3)	2018	2019																							x	x	x	x	x	*Activated April 2019*
	HLGW0058	155(3)	2018	2019																							x	x	x	x	x	*Activated April 2019*
	HLGW0059	155(3)	2018	2019																							x	x	x	x	x	*Activated April 2019*
	HLGW0060	155(3)	2018	2019																							x	x	x	x	x	*Activated April 2019*
	HLGW0061	155(3)	2018	2019																							x	x	x	x	x	*Activated April 2019*
	HLGW0062	155(3)	2018	2019																							x	x	x	x	x	*Activated April 2019*
	HLGW0063	155(3)	2018	2019																							x	x	x	x	x	*Activated April 2019*
	HLGW0064	155(3)	2018	2020																							---	---	---	---	---	*Active May/June 2020*
	HLGW0065	159 (3)	2018	2020																								x	x	x	x	*Active May/June 2020*
	HLGW0066	159 (3)	2018	2020																								x	x	x	x	*Active May/June 2020*
	HLGW0067B	159 (3)	2018	2020																								x	x	x	x	*Active May/June 2020*

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Operating Year(s) for Gas Wells Hartland Landfill Capital Regional District																																
Well Information						Gas Well Readings																										
Old Well Name	New Well Name	Lift (mASL)	Installation Date	Activation Date	Deactivation Date	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Comments
	HLGW0068B	159 (3)	2018	2020																								x	x	x	x	*Active May/June 2020*
	HLGW0069	159 (3)	2018	2020																								x	x	x	x	*Active June 2020*
	HLGW0070A	163	2019	2021																									x	x	x	
	HLGW0070B	163	2019																													*Awaiting wellhead tie in.*
	HLGW0071A	163	2019	2021																									x	x	x	
	HLGW0071B	163	2019																													*Awaiting wellhead tie in.*
	HLGW0072A	163	2019	2021																									x	x	x	
	HLGW0072B	163	2019																													*Awaiting wellhead tie in.*
	HLGW0073A	163	2019	2021																									x	x	x	
	HLGW0073B	163	2019																													*Awaiting wellhead tie in.*
	HLGW0074A	163	2019	2021																									x	x	x	
	HLGW0074B	163	2019																													*Awaiting wellhead tie in.*
	HLGW0075	163	2019	2021																									x	x	x	*Activated July 2021*
	HLGW0076	167	2019	2023																											x	*Activated in 2023*
	HLGW0077	167	2019	2023																											x	*Activated in 2023*
	HLGW0078	167	2019	2022																										x	x	*Activated in 2022*
	HLGW0079A	167	2019	2021																												
	HLGW0079B	167	2019																													*Awaiting wellhead tie in.*
	HLGW0080A	167	2019	2021																												
	HLGW0080B	167	2019																													*Awaiting wellhead tie in.*
	HLGW0081A	167	2019	2021																												
	HLGW0081B	167	2019																													*Awaiting wellhead tie in.*
	HLGW0082A	167	2019	2021																												
	HLGW0082B	167	2019																													*Awaiting wellhead tie in.*
	HLGW0083	167	2019	2021																												
	RWHGW01A	155	2017	2020																								x	x	x	x	*Rock Wall gas collectors - activated Nov 2020*
	RWHGW01B	155	2017	2020																								x	x	x	x	*Rock Wall gas collectors - activated Nov 2020*
	HLGW0084	167	2019	2022																										x	x	*Activated in 2022*
	HLGW0085	171	2020	2023																											x	*Activated in 2023*
	HLGW0086	171	2020	2023																											x	*Activated in 2023*
	HLGW0087	171	2020	2023																											x	*Activated in 2023*
	HLGW0088A	171	2020	2023																											x	*Activated in 2023*
	HLGW0088B	171	2020																													*Awaiting wellhead tie in.*
	HLGW0089A	171	2020	2023																											x	*Activated in 2023*
	HLGW0089B	171	2020																													*Awaiting wellhead tie in.*

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Operating Year(s) for Gas Wells Hartland Landfill Capital Regional District																															
Well Information						Gas Well Readings																									
Old Well Name	New Well Name	Lift (mASL)	Installation Date	Activation Date	Deactivation Date	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Comments
	HLGW0090A	171	2020																												*Awaiting wellhead tie in.*
	HLGW0090B	171	2020																												*Awaiting wellhead tie in.*
	HLGW0091A	171	2020																												*Awaiting wellhead tie in.*
	HLGW0091B	171	2020																												*Awaiting wellhead tie in.*
	HLGW0092A	171	2020																												*Awaiting wellhead tie in.*
	HLGW0092B	171	2020																												*Awaiting wellhead tie in.*
	HLGW0093A	171	2020	2023																										x	*Activated in 2023*
	HLGW0093B	171	2020																												*Awaiting wellhead tie in.*
	HLGW0094	171	2020																												*Awaiting wellhead tie in.*
	HLGW0095	171	2020																												*Awaiting wellhead tie in.*
	HLGW0096	175	2021																												*Flange only - Awaiting wellhead tie in.*
	HLGW0097	175	2021																												*Flange only - Awaiting wellhead tie in.*
	HLGW0098	175	2021																												*Flange only - Awaiting wellhead tie in.*
	HLGW0099	175	2021																												*Flange only - Awaiting wellhead tie in.*
	HLGW0100A	175	2021																												*Flange only - Awaiting wellhead tie in.*
	HLGW0100B	175	2021																												*Flange only - Awaiting wellhead tie in.*
	HLGW0101A	175	2021																												*Flange only - Awaiting wellhead tie in.*
	HLGW0101B	175	2021																												*Flange only - Awaiting wellhead tie in.*
	HLGW0102A	175	2021																												*Flange only - Awaiting wellhead tie in.*
	HLGW0102B	175	2022																												*Flange only - Awaiting wellhead tie in.*
	HLGW0103A	175	2022																												*Flange only - Awaiting wellhead tie in.*
	HLGW0103B	175	2022																												*Flange only - Awaiting wellhead tie in.*
	HLGW0104A	175	2022																												*Flange only - Awaiting wellhead tie in.*
	HLGW0104B	175	2022																												*Flange only - Awaiting wellhead tie in.*
	HLGW0105A	175	2022																												*Flange only - Awaiting wellhead tie in.*
	HLGW0105B	175	2022																												*Flange only - Awaiting wellhead tie in.*
	HLGW0106A	175	2022																												*Flange only - Awaiting wellhead tie in.*
	HLGW0106B	175	2022																												*Flange only - Awaiting wellhead tie in.*
	HLGW0107A	179	2023																												*Flange only - Awaiting wellhead tie in.*
	HLGW0107B	179	2023																												*Flange only - Awaiting wellhead tie in.*
	HLGW0108A	179	2023																												*Flange only - Awaiting wellhead tie in.*
	HLGW0108B	179	2023																												*Flange only - Awaiting wellhead tie in.*
	HLGW0109A	179	2023																												*Flange only - Awaiting wellhead tie in.*
	HLGW0109B	179	2023																												*Flange only - Awaiting wellhead tie in.*
	HLGW0110A	179	2023																												*Flange only - Awaiting wellhead tie in.*

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Operating Year(s) for Gas Wells Hartland Landfill Capital Regional District																															
Well Information						Gas Well Readings																									
Old Well Name	New Well Name	Lift (mASL)	Installation Date	Activation Date	Deactivation Date	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Comments
	HLGW0110B	179	2023																												*Flange only - Awaiting wellhead tie in.*
	HLGW0111A	179	2023																												*Flange only - Awaiting wellhead tie in.*
	HLGW0111B	179	2023																												*Flange only - Awaiting wellhead tie in.*
	HLGW0112A	179	2023																												*Flange only - Awaiting wellhead tie in.*
	HLGW0112B	179	2023																												*Flange only - Awaiting wellhead tie in.*
	HLGW0113A	179	2023																												*Flange only - Awaiting wellhead tie in.*
	HLGW0113B	179	2023																												*Flange only - Awaiting wellhead tie in.*
	HLGW0114A	179	2023																												*Flange only - Awaiting wellhead tie in.*
	HLGW0114B	179	2023																												*Flange only - Awaiting wellhead tie in.*
	HLGW115A	183	2023																												
	HLGW115B	183	2023																												
	HLGW116A	183	2023																												
	HLGW116B	183	2023																												
	HLGW117A	183	2023																												
	HLGW117B	183	2023																												
	HLGW118A	183	2023																												
	HLGW118B	183	2023																												
	HLGW119A	183	2023																												
	HLGW119B	183	2023																												
	HLGW120A	183	2024																												
	HLGW120B	183	2024																												
	HLGW121A	183	2024																												
	HLGW121B	183	2024																												
	HLGW122A	183	2024																												
	HLGW122B	183	2024																												
OLGT001A	**TLGW001A**		1996		2024	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	IA							*Abandoned and decommissioned in 2024*
OLGT001B	**TLGW001B**		1996		2024	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	IA							*Abandoned and decommissioned in 2024*
OLGT002A	**TLGW002A**		1996		2024	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	IA							*Abandoned and decommissioned in 2024*
OLGT002B	**TLGW002B**		1996		2024	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	IA							*Abandoned and decommissioned in 2024*
OLGT002C	**TLGW002C**		1996		2024	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	IA							*Abandoned and decommissioned in 2024*
OLGT0003					2002	x	x	x	x	x	IA																					*Deactivated 2002, decommissioned in 2024*
OLGT0004					2002	x	x	x	x	x	IA																					*Deactivated 2002, decommissioned in 2024*
OLGT0005					2002	x	x	x	x	x	IA																					*Deactivated 2002, decommissioned in 2024*
OLGT0006					2002	x	x	x	x	x	IA																					*Deactivated 2002, decommissioned in 2024*

Appendix B1, continued

Operating Year(s) for Gas Wells Hartland Landfill Capital Regional District																													
Well Information						Gas Well Readings																							
Old Well Name	New Well Name	Lift (mASL)	Installation Date	Activation Date	Deactivation Date	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Comments
OLGT0007					2002	x	x	x	x	x	IA																				*Deactivated 2002, decommissioned in 2024*
OLGT0008					2002	x	x	x	x	x	IA																				*Deactivated 2002, decommissioned in 2024*
OLGT0009					2002	x	x	x	x	x	IA																				*Deactivated 2002, decommissioned in 2024*
OLGT0010					2002	x	x	x	x	x	IA																				*Deactivated 2002, decommissioned in 2024*
OLGT0011					2002	x	x	x	x	x	IA																				*Deactivated 2002, decommissioned in 2024*
OLGT0012					2002	x	x	x	x	x	IA																				*Deactivated 2002, decommissioned in 2024*
OLGT0013					2002	x	x	x	x	x	IA																				*Deactivated 2002, decommissioned in 2024*
OLGT0014					2002	x	x	x	x	x	IA																				*Deactivated 2002, decommissioned in 2024*
OLGT0015					2002	x	x	x	x	x	IA																				*Deactivated 2002, decommissioned in 2024*
OLGT0016					2002	x	x	x	x	x	IA																				*Deactivated 2002, decommissioned in 2024*
OLGT0017					2002	x	x	x	x	x	IA																				*Deactivated 2002, decommissioned in 2024*
OLGT0018					2002	x	x	x	x	x	IA																				*Deactivated 2002, decommissioned in 2024*
OLGT0019					2002	x	x	x	x	x	IA																				*Deactivated 2002, decommissioned in 2024*
OLGW001D	VLGW001D	---	1996	1996		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	IA						*no readings 2017-2018 - no production*
OLGW001S	VLGW001S	---	1996	1996		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	IA						*no readings 2017-2018 - no production*
OLGW002D	VLGW002D	---	1996	1996		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	IA						*no readings 2017-2018 - no production*
OLGW002S	VLGW002S	---	1996	1996		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	IA						*no readings 2017-2018 - no production*
OLGW003D	VLGW003D	---	1996	1996		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW003S	VLGW003S	---	1996	1996		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW004D	VLGW004D	---	1996	1996		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	IA						
OLGW004S	VLGW004S	---	1996	1996		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x					*Decommissioned 2023*
OLGW005D	VLGW005D	---	1996	1996	2023	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	IA						*Decommissioned 2023*
OLGW005S	VLGW005S	---	1996	1996	2023	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW006D	VLGW006D	---	1996	1996		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW006S	VLGW006S	---	1996	1996		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW007D	VLGW007D	---	1996	1996		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW007S	VLGW007S	---	1996	1996		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW008D	VLGW008D	---	1996	1996		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW008S	VLGW008S	---	1996	1996		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW009D	VLGW009D	---	1996	1996		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW009S	VLGW009S	---	1996	1996		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW010S	VLGW010S	---	1996	1996	2023	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	*Decommissioned 2023*
OLGW011S	VLGW011S	---	1996	1996		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW012S	VLGW012S	---	1996	1996		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW013D	VLGW013D	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	

Appendix B1, continued

Operating Year(s) for Gas Wells Hartland Landfill Capital Regional District																														
Well Information						Gas Well Readings																								
Old Well Name	New Well Name	Lift (mASL)	Installation Date	Activation Date	Deactivation Date	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Comments
OLGW013S	VLGW013S	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW014D	VLGW014D	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	IA							
OLGW014S	VLGW014S	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	IA							
OLGW015D	VLGW015D	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW015S	VLGW015S	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW016D	VLGW016D	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW016S	VLGW016S	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW017D	VLGW017D	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW017S	VLGW017S	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW018D	VLGW018D	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW018S	VLGW018S	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW019D	VLGW019D	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW019S	VLGW019S	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW020D	VLGW020D	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW020S	VLGW020S	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW021D	VLGW021D	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW021S	VLGW021S	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW022D	VLGW022D	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW022S	VLGW022S	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW023D	VLGW023D	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW023S	VLGW023S	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW024D	VLGW024D	---	1997	1997	2024	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	*Decommissioned 2023*
OLGW024S	VLGW024S	---	1997	1997	2024	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	IA							*Decommissioned 2023*
OLGW025D	VLGW025D	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	IA							
OLGW025S	VLGW025S	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		IA	IA	IA	IA	
OLGW026D	VLGW026D	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW026S	VLGW026S	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW027D	VLGW027D	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW027S	VLGW027S	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW028S	VLGW028S	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW029D	VLGW029D	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW029S	VLGW029S	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW030S	VLGW030S	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW031S	VLGW031S	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW032S	VLGW032S	---	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	

Appendix B1, continued

Operating Year(s) for Gas Wells Hartland Landfill Capital Regional District																														
Well Information						Gas Well Readings																								
Old Well Name	New Well Name	Lift (mASL)	Installation Date	Activation Date	Deactivation Date	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Comments
OLGW033S	**VLGW033S**	**---**	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW034S	**VLGW034S**	**---**	1997	1997		x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW035S		**---**	1997	1998	2004	x	x	x	x	x	x	x	IA																			*Deactivated 2004*
OLGW035D		**---**	1997	1998	2004	x	x	x	x	x	x	x	IA																			*Deactivated 2004*
OLGW036S		**---**	1997	1998	2004	x	x	x	x	x	x	x	IA																			*Deactivated 2004*
OLGW036D		**---**	1997	1998	2004	x	x	x	x	x	x	x	IA																			*Deactivated 2004*
OLGW037S		**---**	1997	1998	2005	x	x	x	x	x	x	x	x	IA																		*Deactivated 2005*
OLGW037D		**---**	1997	1998	2005	x	x	x	x	x	x	x	x	IA																		*Deactivated 2005*
OLGW038S		**---**	1997	1998	2004	x	x	x	x	x	x	x	IA																			*Deactivated 2004*
OLGW038D		**---**	1997	1998	2004	x	x	x	x	x	x	x	IA																			*Deactivated 2004*
OLGW039S		**---**	1997	1998	2004	x	x	x	x	x	x	x	IA																			*Deactivated 2004*
OLGW039D		**---**	1997	1998	2004	x	x	x	x	x	x	x	IA																			*Deactivated 2004*
OLGW040S		**---**	1997	1998	2004	x	x	x	x	x	x	x	IA																			*Deactivated 2004*
OLGW040D		**---**	1997	1998	2004	x	x	x	x	x	x	x	IA																			*Deactivated 2004*
OLGW041D		**---**	1997	1998	2008	x	x	x	x	x	x	x	x	x	x	x																*Deactivated 2008*
OLGW041S		**---**	1997	1998	2008	x	x	x	x	x	x	x	x	x	x	x																*Deactivated 2008*
OLGW042S	**VLGW042S**	**---**	2002	2003	2021						x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x					*Decommissioned 2021*
OLGW043S	**VLGW043S**	**---**	2002	2003	2021						x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x					*Decommissioned 2021*
OLGW044S	**VLGW044S**	**---**	2002	2003	2011						x	x	x	x	x	x	x	x	x	IA												*Abandoned in May 2011*
OLGW045S	**VLGW045S**	**---**	2002	2003	2011						x	x	x	x	x	x	x	x	x	IA												*Abandoned in May 2011*
OLGW046S	**VLGW046S**	**---**	2002	2003	2011						x	x	x	x	x	x	x	x	x	IA												*Abandoned in May 2011*
OLGW047S	**VLGW047S**	**---**	2002	2003	2021						x	x	x	x	x	x	x	x	x			x	x	x	x	x	IA					*Decommissioned 2021*
OLGW048S	**VLGW048S**	**---**	2002	2002	2011										x	x	x	x	x	**IA**												*Abandoned in May 2011*
OLGW049	**VLGW0049**	**---**	2011	2011															x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW050	**VLGW0050**	**---**	2011	2011															x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW051	**VLGW0051**	**---**	2011	2011															x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW052	**VLGW0052**	**---**	2011	2011															x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW053	**VLGW0053**	**---**	2011	2011															x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW054	**VLGW0054**	**---**	2011	2011															x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW055	**VLGW0055**	**---**	2011	2011															x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW056	**VLGW0056**	**---**	2011	2011															x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW057	**VLGW0057**	**---**	2011	2011															x	x	x	x	x	x	IA							*Decommissioned 2021*
OLGW058	**VLGW0058**	**---**	2011	2011															x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW059	**VLGW0059**	**---**	2011	2011															x	x	x	x	x	x	x	x	x	x	x	x	x	
OLGW060	**VLGW0060**	**---**	2011	2011	2024														x	x	x	x	x	x	x	x	x	x	x	x	x	*Decommissioned 2024 during oad upgrade*

Appendix B1, continued

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Number of Active Wells	95	95	95	97	97	113	113	99	97	99	94	92	92	109	107	114	129	128	130	141	140	145	143	147	144	152
Number of Inactive Wells	0	0	0	0	0	17	0	18	4	3	5	3	0	0	8	0	0	5	0	12	13	2	9	9	25*	25

Notes:
The total number of the inactive wells is an approximate number as the design of the cells 4, 5 and 6 is currently being completed.

Appendix B2 2023 Hartland Landfill Gas Well Field Data

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
HLGW0001							
January							
February							
March							
April							
May	2023-05-30	36.90	28.70	0.00	34.40	0.00	0.00
June	2023-06-29	27.50	27.00	0.20	45.30	0.00	0.00
July							
August							
September							
October							
November							
December							
Average		**32.2**	**27.9**	**0.1**	**39.9**	**0.0**	**0.0**
HLGW0003							
January							
February	2023-03-31	43.60	32.30	2.00	22.10	0.00	0.00
March							
April							
May	2023-05-30	33.30	28.50	1.40	36.80	0.00	0.00
June	2023-06-29	34.70	28.90	1.60	34.80	0.00	0.00
July							
August							
September							
October							
November							
December							
Average		**37.2**	**29.9**	**1.7**	**31.2**	**0.0**	**0.0**
HLGW0004							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
December							
Average							
HLGW0005							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
HLGW006A							
January							
February							
March							
April							
May	2023-05-29	39.20	31.40	0.00	29.40	0.00	0.70
June	2023-06-28	36.10	30.60	0.00	33.30	0.00	0.00
July	2023-07-20	39.50	32.30	0.00	28.20	0.00	1.40
August	2023-09-26	35.10	31.70	0.00	33.20	0.00	0.00
September	2023-09-26	35.10	31.70	0.00	33.20	0.00	0.00
October	2023-11-27	27.60	28.80	0.00	43.60	0.00	0.00
November	2023-11-27	27.60	28.80	0.00	43.60	0.00	0.00
December	2023-12-20	31.90	30.80	0.10	37.20	0.00	0.00
Average		**34.0**	**30.8**	**0.0**	**35.2**	**0.0**	**0.3**
HLGW006B							
January							
February							
March							
April							
May							
June							
July							
August							
September							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
October							
November							
December							
Average							
HLGW008A							
January	2023-01-19	35.40	31.50	0.00	33.10	0.00	0.00
February	2023-03-08	38.50	32.20	0.00	29.30	0.90	1.50
March	2023-03-08	35.00	31.10	0.00	33.90	0.00	0.00
April	2023-04-19	36.50	31.70	0.00	31.80	0.00	0.00
May	2023-05-18	40.80	32.00	0.00	27.20	0.00	0.00
June	2023-06-21	39.30	32.30	0.00	28.40	0.00	1.90
July	2023-07-17	43.30	33.60	0.20	22.90	2.60	4.10
August	2023-09-18	41.00	32.90	0.10	26.00	7.30	0.00
September	2023-09-18	41.00	32.90	0.10	26.00	7.30	0.00
October	2023-11-15	38.20	32.10	0.10	29.60	0.00	2.20
November	2023-11-15	38.20	32.10	0.10	29.60	0.00	2.20
December	2023-12-12	30.80	30.20	0.00	39.00	0.00	0.00
Average		**38.2**	**32.1**	**0.1**	**29.7**	**1.5**	**1.0**
HLGW008B							
January	2023-01-31	35.30	30.90	0.10	33.70	0.00	0.00
February	2023-03-14	52.50	38.30	0.00	9.20	152.60	140.60
March	2023-03-14	34.50	30.70	0.00	34.80	1.50	0.00
April	2023-04-25	35.30	30.80	0.00	33.90	0.00	0.00
May	2023-05-26	44.30	33.70	0.00	22.00	9.20	9.30
June	2023-06-27	39.60	32.10	0.00	28.30	8.40	8.50
July	2023-07-20	40.50	32.40	0.00	27.10	7.50	7.60
August	2023-09-18	38.70	32.30	0.00	29.00	8.90	2.60
September	2023-09-18	38.70	32.30	0.00	29.00	8.90	2.60
October	2023-11-27	34.50	30.60	0.00	34.90	0.00	0.00
November	2023-11-27	34.50	30.60	0.00	34.90	0.00	0.00
December							
Average		**38.9**	**32.2**	**0.0**	**28.8**	**17.9**	**15.6**
HLGW0009							
January	---	---	---	---	---	---	---
February	---	---	---	---	---	---	---
March	---	---	---	---	---	---	---
April	Decommissioned May 2014						
May	---	---	---	---	---	---	---
June	---	---	---	---	---	---	---
July	---	---	---	---	---	---	---

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
August	---	---	---	---	---	---	---
September	---	---	---	---	---	---	---
October	---	---	---	---	---	---	---
November	---	---	---	---	---	---	---
December	---	---	---	---	---	---	---
Average	---	---	---	---	---	---	---
HLGW0010							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
HLGW0011							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
HLGW0012							
January							
February							
March							
April							
May							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
June							
July							
August							
September							
October							
November							
December							
Average							
HLGW0013							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
HLGW0014							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
HLGW0015							
January							
February							
March							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average		0.0	0.0	0.0	0.0	0.0	0.0
HLGW016A							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
HLGW016B							
January	2023-01-10	56.00	39.80	0.10	4.10	146.50	154.40
February	2023-03-02	58.10	41.90	0.00	0.00	2.50	8.40
March	2023-03-02	55.70	39.10	0.00	5.20	132.30	132.30
April	2023-04-04	52.50	37.80	0.10	9.60	137.10	120.50
May	2023-05-17	52.70	38.10	0.00	9.20	135.30	127.20
June	2023-06-20	47.50	36.40	0.40	15.70	140.80	125.40
July	2023-07-11	48.60	36.70	0.30	14.40	125.50	127.30
August	2023-09-13	46.70	35.70	0.70	16.90	110.40	102.00
September	2023-09-13	46.70	35.70	0.70	16.90	110.40	102.00
October	2023-11-14	55.70	39.60	0.00	4.70	89.00	97.50
November	2023-11-14	55.70	39.60	0.00	4.70	89.00	97.50
December	2023-12-05	50.90	38.50	0.00	10.60	97.80	103.60
Average		**52.2**	**38.2**	**0.2**	**9.3**	**109.7**	**108.2**
HLGW017A							
January							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
HLGW017B							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
HLGW0018							
January	2023-01-18	59.20	40.80	0.00	0.00	15.10	16.70
February	2023-03-02	58.10	41.90	0.00	0.00	118.70	118.80
March	2023-03-02	59.40	40.60	0.00	0.00	15.30	17.30
April	2023-04-04	55.40	38.90	0.00	5.70	17.20	17.10
May	2023-05-17	53.40	38.70	0.00	7.90	17.40	15.10
June	2023-06-20	53.40	38.90	0.00	7.70	14.10	16.50
July	2023-07-11	50.80	38.10	0.00	11.10	15.70	15.70
August	2023-09-13	48.40	37.70	0.00	13.90	16.00	13.80
September	2023-09-13	48.40	37.70	0.00	13.90	16.00	13.80
October	2023-11-14	49.80	38.50	0.00	11.70	27.90	28.00
November	2023-11-14	49.80	38.50	0.00	11.70	27.90	28.00
December	2023-12-05	50.50	39.10	0.00	10.40	17.70	15.80
Average		**53.1**	**39.1**	**0.0**	**7.8**	**26.6**	**26.4**

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
HLGW019B							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
HLGW019C							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
HLGW020B							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
December							
Average							
HLGW021B							
January	2023-01-18	58.40	41.40	0.20	0.00	4.30	7.70
February							
March	2023-03-02	48.70	37.20	1.00	13.10	7.20	7.10
April	2023-04-18	54.90	39.40	0.30		6.10	6.10
May	2023-05-17	58.50	40.30	0.20		5.40	7.70
June	2023-06-20	49.60	38.00	0.40	12.00	8.60	8.30
July	2023-07-13	56.90	40.20	0.10	2.80	7.50	12.90
August	2023-09-12	53.40	39.30	0.10	7.20	9.00	8.90
September	2023-09-12	53.40	39.30	0.10	7.20	9.00	8.90
October	2023-11-14	58.50	41.30	0.20	0.00	4.00	8.20
November	2023-11-14	58.50	41.30	0.20		4.00	8.20
December	2023-12-14	47.90	38.50	0.20	13.40	5.00	4.60
Average		**54.4**	**39.7**	**0.3**	**7.0**	**6.4**	**8.1**
HLGW022B							
January							
February							
March							
April	2023-04-18	43.20	36.00	0.00	20.80	1.80	0.00
May	2023-05-17	51.20	36.70	0.70	11.40	1.00	1.50
June	2023-06-20	29.40	31.00	0.10	39.50	1.00	0.00
July							
August							
September							
October							
November							
December	2023-12-28	29.30	30.80	0.00	39.90	1.50	0.00
Average		**38.3**	**33.6**	**0.2**	**27.9**	**1.3**	**0.4**
HLGW023B							
January							
February							
March							
April							
May							
June							
July							
August							
September							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
October							
November							
December							
Average							
HLGW024B							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
HLGW025B							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
HLGW026B							
January							
February							
March							
April							
May							
June							
July							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
August							
September							
October							
November							
December							
Average							
HLGW027A							
January	2023-01-19	47.30	38.40	0.00	14.30	0.00	0.00
February	2023-03-08	46.40	37.10	0.00	16.50	0.00	1.90
March	2023-03-08	44.60	35.60	0.00	19.80	1.90	1.10
April	2023-04-19	42.60	34.60	0.00	22.80	2.20	0.00
May	2023-05-18	47.10	35.60	0.00	17.30	0.00	1.00
June	2023-06-21	48.50	36.50	0.00	15.00	1.80	2.10
July	2023-07-17	50.90	37.60	0.00	11.50	1.50	1.80
August	2023-09-18	47.60	36.50	0.00	15.90	1.50	1.80
September	2023-09-18	47.60	36.50	0.00	15.90	1.50	1.80
October	2023-11-15	46.80	36.00	0.00	17.20	1.10	1.90
November	2023-11-15	46.80	36.00	0.00	17.20	1.10	1.90
December	2023-12-12	39.50	34.20	0.00	26.30	1.90	0.00
Average		**46.3**	**36.2**	**0.0**	**17.5**	**1.2**	**1.3**
HLGW027B							
January	2023-01-18	58.10	38.30	0.00	3.60	0.00	2.50
February	2023-03-09	41.50	34.30	0.00	24.20	6.20	0.00
March	2023-03-09	48.90	35.70	0.00	15.40	0.00	1.10
April	2023-04-18	28.30	29.00	1.00	41.70	1.80	0.00
May	2023-05-17	57.20	38.30	0.10	4.40	0.00	1.50
June	2023-06-20	36.60	32.00	0.80	30.60	1.00	0.00
July	2023-07-13	4.70	12.60	15.70	67.00	0.00	0.00
August	2023-09-20	35.40	32.10	0.70	31.80	0.00	0.00
September	2023-09-20	35.40	32.10	0.70	31.80	0.00	0.00
October	2023-11-27	26.60	25.50	3.70	44.20	1.90	0.00
November	2023-11-27	26.60	25.50	3.70	44.20	1.90	0.00
December	2023-12-14	43.30	34.70	0.10	21.90	0.00	0.00
Average		**36.9**	**30.8**	**2.2**	**30.1**	**1.1**	**0.4**
HLGW028A							
January	2023-01-19	54.60	39.40	0.00	6.00	30.50	30.90
February	2023-03-08	54.50	38.50	0.00	7.00	33.60	33.70
March	2023-03-08	54.60	38.80	0.00	6.60	33.20	33.50
April	2023-04-20	52.50	47.30	0.20	0.00	31.40	37.80
May	2023-05-18	58.10	39.30	0.00	2.60	22.90	27.60

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
June	2023-06-21	54.60	38.90	0.00	6.50	28.50	33.10
July	2023-07-17	54.60	39.60	0.00	5.80	29.50	33.90
August	2023-09-18	51.60	38.00	0.00	10.40	43.60	43.10
September	2023-09-18	51.60	38.00	0.00	10.40	43.60	43.10
October	2023-11-15	53.70	38.90	0.00	7.40	39.10	52.20
November	2023-11-15	53.70	38.90	0.00	7.40	39.10	52.20
December	2023-12-12	47.60	37.80	0.00	14.60	40.70	39.70
Average		**53.5**	**39.5**	**0.0**	**7.1**	**34.6**	**38.4**
HLGW028B							
January	2023-01-17	56.90	39.70	0.00	3.40	24.60	26.30
February	2023-03-09	50.70	37.50	0.00	11.80	4.40	4.10
March							
April	2023-04-18	48.30	37.40	0.00	14.30	5.50	2.10
May	2023-05-17	58.30	40.10	0.00	1.60	5.10	6.40
June	2023-06-20	58.20	40.00	0.00	1.80	5.10	7.00
July	2023-07-13	48.90	37.60	0.00	13.50	5.90	5.90
August	2023-09-20	49.10	37.60	0.00	13.30	17.40	9.60
September	2023-09-20	49.10	37.60	0.00	13.30	17.40	9.60
October	2023-11-27	57.00	39.30	0.00	3.70	12.70	20.30
November	2023-11-27	57.00	39.30	0.00	3.70	12.70	20.30
December	2023-12-14	48.80	37.90	0.00	13.30	15.70	8.30
Average		**52.9**	**38.5**	**0.0**	**8.5**	**11.5**	**10.9**
HLGW029A							
January	2023-01-19	51.50	38.80	0.00	9.70	0.00	3.70
February	2023-03-08	53.00	38.60	0.00	8.40	7.20	7.10
March	2023-03-08	53.00	39.20	0.00	7.80	8.50	8.60
April	2023-04-21	36.70	33.30	0.10	29.90	5.80	0.00
May	2023-05-18	1.80	1.70	19.40	77.10	0.00	0.00
June	2023-06-21	22.00	30.00	8.30	39.70	0.00	0.00
July	2023-07-17	19.90	28.80	8.70	42.60	0.00	0.00
August	2023-09-18	18.90	26.10	8.70	46.30	0.00	0.00
September	2023-09-18	18.90	26.10	8.70	46.30	0.00	0.00
October	2023-11-15	20.70	23.70	8.20	47.40	0.00	0.00
November	2023-11-15	20.70	23.70	8.20	47.40	0.00	0.00
December	2023-12-12	2.10	2.10	20.10	75.70	0.00	0.00
Average		**26.6**	**26.0**	**7.5**	**39.9**	**1.8**	**1.6**
HLGW029B							
January	2023-01-31	60.10	39.90	0.00	0.00	0.00	1.90
February							
March							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
April	2023-04-18	61.10	38.90	0.00	0.00	0.00	1.10
May							
June							
July							
August	2023-09-20	60.40	39.40	0.00	0.20	1.90	4.60
September	2023-09-20	60.40	39.40	0.00	0.20	1.90	4.60
October	2023-11-27	42.70	35.60	0.00	21.70	1.10	0.00
November	2023-11-27	42.70	35.60	0.00	21.70	1.10	0.00
December	2023-12-14	18.50	26.20	1.10	54.20	1.50	0.00
Average		**49.4**	**36.4**	**0.2**	**14.0**	**1.1**	**1.7**
HLGW030A							
January							
February	2023-03-08	21.20	24.70	2.00	52.10	2.60	0.00
March							
April	2023-04-21	40.70	33.70	0.00	25.60	0.00	0.00
May	2023-05-18	59.80	40.10	0.10	0.00	0.00	1.20
June	2023-06-21	46.10	36.40	0.00	17.50	1.90	1.70
July	2023-07-17	32.40	32.00	0.00	35.60	1.50	0.00
August	2023-09-19	20.80	23.40	1.90	53.90	0.00	0.00
September	2023-09-19	20.80	23.40	1.90	53.90	0.00	0.00
October	2023-11-15	23.70	24.60	2.70	49.00	0.00	0.00
November	2023-11-15	23.70	24.60	2.70	49.00	0.00	0.00
December	2023-12-12		28.80	0.10		0.00	0.00
Average		**32.1**	**29.2**	**1.1**	**37.4**	**0.6**	**0.3**
HLGW030B							
January	2023-01-17	56.00	39.80	0.00	4.20	9.40	9.30
February	2023-03-09	35.00	31.20	0.30	33.50	0.00	0.00
March	2023-03-09	55.60	38.00	0.00	6.40	10.70	10.50
April	2023-04-05	53.60	37.70	0.00	8.70	13.50	13.20
May	2023-05-18	56.60	39.20	0.00	4.20	12.20	12.20
June	2023-06-20	54.10	38.90	0.00	7.00	12.20	13.50
July	2023-07-12	54.60	38.50	0.00	6.90	9.40	10.70
August	2023-09-12	53.40	38.70	0.00	7.90	17.40	18.20
September	2023-09-12	53.40	38.70	0.00	7.90	17.40	18.20
October							
November							
December	2023-12-14	49.90	38.20	0.10	11.80	1.80	1.80
Average		**52.2**	**37.9**	**0.0**	**9.9**	**10.4**	**10.8**
HLGW031A							
January							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
February	2023-03-08	50.20	36.70	0.00	13.10	10.30	7.20
March							
April	2023-04-21	45.00	35.50	0.10	19.40	0.00	0.00
May	2023-05-18	60.40	39.50	0.10	0.00	0.00	1.60
June	2023-06-21	42.50	33.10	0.00	24.40	1.20	0.00
July	2023-07-17	37.10	30.90	0.50	31.50	0.00	0.00
August	2023-09-19	19.70	23.90	2.20	54.20	0.00	0.00
September	2023-09-19	19.70	23.90	2.20	54.20	0.00	0.00
October	2023-11-15	22.20	26.10	1.20	50.50	0.00	0.00
November	2023-11-15	22.20	26.10	1.20	50.50	0.00	0.00
December	2023-12-12	57.60	40.50	0.00	1.90	0.00	1.60
Average		**37.7**	**31.6**	**0.8**	**30.0**	**1.2**	**1.0**
HLGW031B							
January	2023-01-18	59.00	40.80	0.10	0.10	5.00	7.20
February	2023-03-09	61.10	38.90	0.00	0.00	0.00	3.20
March	2023-03-09	59.60	40.40	0.00	0.00	6.00	9.10
April	2023-04-05	50.10	36.80	0.00	13.10	11.00	6.70
May	2023-05-18	59.90	39.80	0.00	0.30	6.50	7.90
June	2023-06-20	56.50	39.30	0.00	4.20	11.90	14.30
July	2023-07-12	59.60	40.00	0.00	0.40	10.60	13.80
August	2023-09-12	51.00	37.40	0.10	11.50	9.50	9.60
September	2023-09-12	51.00	37.40	0.10	11.50	9.50	9.60
October							
November							
December	2023-12-18	53.70	40.60	0.10	5.60	9.40	11.30
Average		**56.2**	**39.1**	**0.0**	**4.7**	**7.9**	**9.3**
HLGW032A							
January							
February	2023-03-08	42.20	33.70	0.50	23.60	20.00	13.60
March	2023-03-08	51.50	37.00	0.00	11.50	2.00	1.90
April	2023-04-21	46.90	36.10	0.00	17.00	2.80	1.10
May	2023-05-18	48.50	35.90	0.00	15.60	0.00	0.00
June	2023-06-21	53.60	36.20	0.00	10.20	0.00	1.70
July	2023-07-17	40.60	35.50	0.00	23.90	0.00	0.00
August	2023-09-19	32.80	31.80	1.90	33.50	0.00	0.00
September	2023-09-19	32.80	31.80	1.90	33.50	0.00	0.00
October	2023-11-15	23.70	29.90	3.10	43.30	0.00	0.00
November	2023-11-15	23.70	29.90	3.10	43.30	0.00	0.00
December	2023-12-12	49.50	37.70	0.10	12.70	9.90	9.80
Average		**40.5**	**34.1**	**1.0**	**24.4**	**3.2**	**2.6**

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
HLGW032B							
January	2023-01-18	58.90	40.90	0.20	0.00	7.20	8.70
February	2023-03-09	60.60	39.40	0.00	0.00	0.00	2.90
March	2023-03-09	59.90	40.10	0.00	0.00	6.90	11.80
April	2023-04-05	60.10	39.70	0.10	0.10	10.50	13.00
May	2023-05-18	58.30	39.10	0.00	2.60	12.20	16.10
June	2023-06-20	42.80	34.10	0.30	22.80	24.10	14.20
July	2023-07-12	59.80	40.20	0.00	0.00	4.70	10.50
August	2023-09-12	60.10	39.80	0.10	0.00	36.20	36.10
September	2023-09-12	60.10	39.80	0.10	0.00	36.20	36.10
October							
November							
December	2023-12-18	52.40	38.10	1.60	7.90	0.00	0.00
Average		**57.3**	**39.1**	**0.2**	**3.3**	**13.8**	**14.9**
HLGW033A							
January	2023-01-19	52.10	36.90	0.30	10.70	9.30	9.40
February	2023-03-08	50.30	36.60	0.00	13.10	17.40	16.40
March	2023-03-08	46.00	33.60	1.70	18.70	13.50	10.80
April	2023-04-21	49.20	35.70	0.50	14.60	9.80	7.10
May	2023-05-18	60.70	39.30	0.00	0.00	6.70	9.10
June	2023-06-21	55.20	38.20	0.00	6.60	7.10	10.10
July	2023-07-17	44.80	34.60	0.70	19.90	10.00	6.20
August	2023-09-19	53.90	37.70	0.00	8.40	8.70	8.70
September	2023-09-19	53.90	37.70	0.00	8.40	8.70	8.70
October	2023-11-15	56.80	38.30	0.50	4.40	5.20	9.90
November	2023-11-15	56.80	38.30	0.50	4.40	5.20	9.90
December	2023-12-12	51.00	37.60	0.00	11.40	4.80	4.80
Average		**52.6**	**37.0**	**0.4**	**10.1**	**8.9**	**9.3**
HLGW033B							
January							
February	2023-03-09	58.90	38.60	0.00	2.50	9.40	12.20
March	2023-03-09	1.40	2.90	19.00	76.70	0.00	0.00
April	2023-04-21	3.20	4.70	17.20		0.00	0.00
May	2023-05-18	33.40	28.30	1.70	36.60	0.00	0.00
June	2023-06-20	4.40	4.40	18.30	72.90	0.00	0.00
July	2023-07-12	0.10	0.60	19.60	79.70	0.00	0.00
August	2023-09-19	3.40	4.50	16.70	75.40	0.00	0.00
September	2023-09-19	3.40	4.50	16.70	75.40	0.00	0.00
October	2023-11-15	19.00	25.20	0.50	55.30		
November	2023-11-15	19.00	25.20	0.50	55.30	0.00	0.00

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
December	2023-12-14	6.30	16.60	5.80	71.30	0.00	0.00
Average		**13.9**	**14.1**	**10.5**	**60.1**	**0.9**	**1.2**
HLGW034A							
January							
February	2023-03-08	15.70	23.00	1.90	59.40	0.00	0.00
March	2023-03-08	54.20	37.10	0.10	8.60	6.00	6.10
April	2023-04-21	53.40	36.50	0.00	10.10	7.50	6.00
May	2023-05-18	60.90	39.00	0.10	0.00	3.90	7.80
June	2023-06-21	55.60	37.70	0.00	6.70	5.00	7.00
July	2023-07-17	44.20	34.60	0.00	21.20	6.20	3.20
August	2023-09-19	60.40	39.60	0.00	0.00	3.20	8.50
September	2023-09-19	60.40	39.60	0.00	0.00	3.20	8.50
October	2023-11-15	56.10	37.40	0.60	5.90	5.10	9.90
November	2023-11-15	56.10	37.40	0.60	5.90	5.10	9.90
December	2023-12-28	54.20	38.20	0.10	7.50	4.40	10.70
Average		**51.9**	**36.4**	**0.3**	**11.4**	**4.5**	**7.1**
HLGW034B							
January	2023-01-18	50.50	35.50	0.00	14.00	0.00	0.00
February	2023-03-09	59.80	40.20	0.00	0.00	1.70	7.60
March	2023-03-09	33.00	28.50	0.20	38.30	0.00	0.00
April	2023-04-21	43.40	32.90	0.20	23.50	0.00	0.00
May	2023-05-18	60.40	37.40	0.00	2.20	2.20	3.10
June	2023-06-20	38.60	31.30	0.40	29.70	0.00	0.00
July	2023-07-19	33.80	26.20	0.00	40.00	0.00	0.00
August	2023-09-19	58.30	37.50	0.50	3.70	0.00	1.90
September	2023-09-19	58.30	37.50	0.50	3.70	0.00	1.90
October	2023-11-15	40.10	31.70	0.00	28.20		
November	2023-11-15	40.10	31.70	0.00	28.20	0.00	0.00
December	2023-12-14	32.20	29.50	0.00	38.30	0.00	0.00
Average		**45.7**	**33.3**	**0.2**	**20.8**	**0.4**	**1.3**
HLGW036B							
January							
February							
March							
April							
May							
June							
July							
August							
September							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
October							
November							
December							
Average							
HLGW037B							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
HLGW038B							
January	2023-01-17	52.00	37.70	0.50	9.80	8.50	8.40
February	2023-03-31	60.40	39.60	0.00	0.00	0.00	1.90
March	2023-03-31	55.70	38.80	0.00	5.50	6.70	5.20
April	2023-04-18	54.00	38.60	0.00	7.40	5.80	6.50
May	2023-05-17	49.10	36.90	0.20	13.80	9.10	8.20
June	2023-06-20	45.90	35.20	0.90	18.00	3.80	0.00
July	2023-07-13	57.50	40.00	0.00	2.50	0.00	1.50
August	2023-09-12	47.90	38.20	0.00	13.90	58.50	46.40
September	2023-09-12	47.90	38.20	0.00	13.90	58.50	46.40
October	2023-11-27	60.80	38.90	0.30	0.00	1.10	3.00
November	2023-11-27	60.80	38.90	0.30	0.00	1.10	3.00
December	2023-12-14	56.40	41.10	0.00	2.50	3.90	3.90
Average		**54.0**	**38.5**	**0.2**	**7.3**	**13.1**	**11.2**
HLGW039A							
January	2023-01-19	47.20	35.40	0.70	16.70	4.70	0.00
February	2023-03-08	59.10	39.70	0.00	1.20	10.90	12.30
March	2023-03-08	59.80	40.20	0.00	0.00	4.80	6.80
April	2023-04-21	53.10	36.60	0.70	9.60	6.80	3.50
May	2023-05-24	60.20	39.80	0.00	0.00	3.50	8.70
June	2023-06-21	50.70	35.50	1.20	12.60	7.90	7.90
July	2023-07-17	43.30	33.20	1.70	21.80	9.30	3.90

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
August	2023-09-18	32.70	28.20	3.20	35.90	1.80	0.00
September	2023-09-18	32.70	28.20	3.20	35.90	1.80	0.00
October	2023-11-15	2.70	4.40	18.40	74.50	0.00	0.00
November	2023-11-15	2.70	4.40	18.40	74.50	0.00	0.00
December	2023-12-28	1.10	1.80	20.30	76.80	0.00	0.00
Average		**37.1**	**27.3**	**5.7**	**30.0**	**4.3**	**3.6**
HLGW039B							
January	2023-01-17	39.80	32.80	0.10	27.30	3.20	2.60
February	2023-03-09	60.10	39.90	0.00	0.00	2.50	4.70
March	2023-03-09	61.00	39.00	0.00	0.00	1.00	2.70
April							
May							
June							
July							
August							
September							
October							
November							
December	2023-12-14	57.50	39.80	0.00	2.70	2.10	4.50
Average		**54.6**	**37.9**	**0.0**	**7.5**	**2.2**	**3.6**
HLGW040A							
January	2023-01-19	47.70	37.60	0.00	14.70	0.00	0.00
February	2023-03-08	35.70	33.90	0.00	30.40	4.80	0.00
March	2023-03-08	59.20	40.80	0.00	0.00	1.10	3.50
April	2023-04-21	44.00	35.80	0.10	20.10	3.30	1.00
May	2023-05-24	60.00	40.00	0.00	0.00	1.10	4.60
June	2023-06-21	58.80	40.70	0.00	0.50	3.30	6.00
July	2023-07-17	38.50	33.50	0.70	27.30	8.10	4.00
August	2023-09-19	47.00	37.50	0.00	15.50	3.70	2.60
September	2023-09-19	47.00	37.50	0.00	15.50	3.70	2.60
October	2023-11-15	58.60	40.90	0.50	0.00	1.10	1.10
November	2023-11-15	58.60	40.90	0.50	0.00	1.10	1.10
December	2023-12-28	43.80	36.50	0.40	19.30	5.90	2.40
Average		**49.9**	**38.0**	**0.2**	**11.9**	**3.1**	**2.4**
HLGW040B							
January	2023-01-17	28.30	28.70	0.70	42.30	1.00	0.00
February	2023-03-09	61.40	38.10	0.20	0.30	0.00	1.60
March	2023-03-09	60.30	39.70	0.00	0.00	1.50	3.60
April	2023-04-18	54.20	38.40	0.00	7.40	8.20	6.90
May	2023-05-17	47.20	35.80	0.50	16.50	1.00	2.10

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
June	2023-06-20	46.60	36.10	0.00	17.30	3.80	1.80
July	2023-07-19	57.30	38.90	0.20	3.60	2.70	4.10
August	2023-09-20	51.90	38.10	0.00	10.00	4.70	4.40
September	2023-09-20	51.90	38.10	0.00	10.00	4.70	4.40
October	2023-11-27	62.00	37.80	0.00	0.20	4.00	6.60
November	2023-11-27	62.00	37.80	0.00	0.20	4.00	6.60
December	2023-12-14	51.70	37.90	0.00	10.40	9.00	8.70
Average		**52.9**	**37.1**	**0.1**	**9.9**	**3.7**	**4.2**
HLGW041A							
January							
February	2023-03-08	42.20	34.90	0.00	22.90	9.00	4.90
March	2023-03-08	59.50	40.50	0.00	0.00	1.90	3.20
April	2023-04-21	9.50	16.60	8.80	65.10	1.80	0.00
May							
June	2023-06-21	37.00	32.90	0.30	29.80	0.00	0.00
July							
August	2023-09-19	26.70	28.60	0.10	44.60	0.00	0.00
September	2023-09-19	26.70	28.60	0.10	44.60	0.00	0.00
October	2023-11-15	59.20	40.80	0.00	0.00	1.60	3.00
November	2023-11-15	59.20	40.80	0.00	0.00	1.60	3.00
December	2023-12-28	43.00	36.80	0.40	19.80	6.20	2.40
Average		**40.3**	**33.4**	**1.1**	**25.2**	**2.5**	**1.8**
HLGW041B							
January	2023-01-31	44.00	34.60	0.40	21.00	9.10	8.30
February	2023-03-09	59.90	39.00	0.00	1.10	0.00	1.10
March	2023-03-09	59.90	39.60	0.50	0.00	1.00	4.10
April	2023-04-18	58.60	40.30	0.00	1.10	5.80	6.40
May	2023-05-31	39.30	33.60	0.60	26.50	11.50	2.40
June	2023-06-20	58.70	40.40	0.00	0.90	3.50	6.10
July	2023-07-19	43.70	35.30	0.10	20.90	4.00	2.30
August	2023-09-20	55.50	39.50	0.00	5.00	4.80	4.10
September	2023-09-20	55.50	39.50	0.00	5.00	4.80	4.10
October	2023-11-27	22.70	18.90	10.50	47.90	7.20	0.00
November	2023-11-27	22.70	18.90	10.50	47.90	7.20	0.00
December	2023-12-14	32.50	29.30	4.30	33.90	0.00	0.00
Average		**46.1**	**34.1**	**2.2**	**17.6**	**4.9**	**3.2**
HLGW042A							
January	2023-01-19	52.50	37.60	0.30	9.60	0.00	0.00
February	2023-03-08	40.70	34.40	0.30	24.60	6.80	3.80
March	2023-03-08	52.60	36.60	0.00	10.80	0.00	0.00

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
April	2023-04-21	47.50	35.20	0.00	17.30	0.00	0.00
May							
June	2023-06-21	43.90	30.20	0.00	25.90	0.00	1.80
July							
August	2023-09-19	47.60	36.10	0.50	15.80	1.50	1.00
September	2023-09-19	47.60	36.10	0.50	15.80	1.50	1.00
October	2023-11-15	59.60	39.70	0.00	0.70	0.00	1.60
November	2023-11-15	59.60	39.70	0.00	0.70	0.00	1.60
December	2023-12-28	45.60	37.20	0.00	17.20	0.00	0.00
Average		**49.7**	**36.3**	**0.2**	**13.8**	**1.0**	**1.1**
HLGW042B							
January	2023-01-18	59.80	40.10	0.00	0.10	15.70	17.30
February	2023-03-09	50.70	36.40	0.00	12.90	0.00	0.00
March	2023-03-09	55.00	38.60	0.00	6.40	20.80	22.90
April	2023-04-05	50.40	36.90	0.00	12.70	17.10	15.20
May	2023-05-24	52.80	37.50	0.00	9.70	14.80	14.50
June	2023-06-20	53.90	38.20	0.10	7.80	18.30	22.20
July	2023-07-19	49.00	37.10	0.00	13.90	20.30	19.60
August	2023-09-19	50.00	37.20	0.00	12.80	13.90	13.30
September	2023-09-19	50.00	37.20	0.00	12.80	13.90	13.30
October	2023-11-15	58.80	40.10	0.00	1.10	10.10	19.00
November	2023-11-15	58.80	40.10	0.00	1.10	10.10	19.00
December	2023-12-14	51.20	39.00	0.00	9.80	14.80	14.80
Average		**53.4**	**38.2**	**0.0**	**8.4**	**14.2**	**15.9**
HLGW043A							
January							
February	2023-03-08	53.50	37.50	0.00	9.00	19.20	18.80
March	2023-03-08	47.70	34.90	0.20	17.20	5.40	1.90
April	2023-04-21	58.10	37.20	0.00	4.70	0.00	1.10
May	2023-05-24	59.50	38.00	0.00	2.50	3.50	6.10
June	2023-06-21	54.20	35.20	0.00	10.60	7.30	7.20
July	2023-07-17	39.70	34.00	0.00	26.30	4.50	2.60
August	2023-09-19	53.30	38.30	0.00	8.40	1.90	1.00
September	2023-09-19	53.30	38.30	0.00	8.40	1.90	1.00
October	2023-11-15	54.80	37.70	0.00	7.50	2.50	2.20
November	2023-11-15	54.80	37.70	0.00	7.50	2.50	2.20
December	2023-12-28	49.40	37.00	0.00	13.60	3.30	3.50
Average		**52.6**	**36.9**	**0.0**	**10.5**	**4.7**	**4.3**
HLGW043B							
January	2023-01-18	46.10	34.00	0.40	19.50	1.50	0.00

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
February	2023-03-09	53.20	36.50	0.00	10.30	5.70	4.10
March	2023-03-09	42.70	32.60	0.30	24.40	0.00	0.00
April	2023-04-05	40.80	32.60	0.20	26.40	0.00	0.00
May	2023-05-24	41.70	32.20	0.10	26.00	0.00	0.00
June							
July	2023-07-19	29.30	27.40	1.10	42.20	0.00	0.00
August	2023-09-19	31.20	28.10	1.90	38.80	0.00	0.00
September	2023-09-19	31.20	28.10	1.90	38.80	0.00	0.00
October	2023-11-15	1.70	7.70	14.10	76.50		
November	2023-11-15	1.70	7.70	14.10	76.50	0.00	0.00
December	2023-12-14	36.00	30.80	0.80	32.40	0.00	0.00
Average		**32.3**	**27.1**	**3.2**	**37.4**	**0.7**	**0.4**
HLGW044A							
January	2023-01-19	52.90	37.10	0.00	10.00	1.50	1.10
February	2023-03-08	36.10	30.90	0.20	32.80	0.00	1.00
March	2023-03-08	45.80	35.00	0.00	19.20	5.20	1.90
April	2023-04-21	59.30	37.80	0.00	2.90	1.50	2.70
May	2023-05-24	55.70	37.50	0.00	6.80	4.00	5.00
June	2023-06-21	48.00	35.30	0.00	16.70	7.60	7.40
July	2023-07-17	39.30	32.50	0.00	28.20	3.00	1.00
August	2023-09-19	56.50	37.90	0.00	5.60	2.70	4.00
September	2023-09-19	56.50	37.90	0.00	5.60	2.70	4.00
October	2023-11-15	56.20	38.10	0.10	5.60	3.60	6.50
November	2023-11-15	56.20	38.10	0.10	5.60	3.60	6.50
December	2023-12-28	45.30	35.80	0.10	18.80	4.30	3.10
Average		**50.7**	**36.2**	**0.0**	**13.2**	**3.3**	**3.7**
HLGW044B							
January							
February	2023-03-09	57.20	37.50	0.00	5.30	5.40	5.10
March	2023-03-09	43.20	31.60	0.00	25.20	0.00	0.00
April	2023-04-21	46.10	32.80	0.00	21.10	1.50	0.00
May	2023-05-24	34.80	31.00	0.00	34.20	0.00	0.00
June	2023-06-20	37.60	27.30	1.00	34.10	0.00	0.00
July							
August	2023-09-19	42.40	27.10	0.60	29.90	0.00	0.00
September	2023-09-19	42.40	27.10	0.60	29.90	0.00	0.00
October	2023-11-15	33.30	18.30	0.60	47.80		
November	2023-11-15	33.30	18.30	0.60	47.80	0.00	0.00
December	2023-12-14	28.70	16.10	0.20	55.00	0.00	0.00
Average		**39.9**	**26.7**	**0.4**	**33.0**	**0.8**	**0.6**

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
HLGW047A							
January	2023-01-19	51.20	48.80	0.00	0.00	8.20	11.50
February	2023-03-08	31.10	30.10	0.00	38.80	0.00	0.00
March	2023-03-08	51.60	41.80	0.00	6.60	9.70	10.00
April	2023-04-19	48.10	38.60	0.00	13.30	10.40	6.50
May	2023-05-24	58.20	41.30	0.00	0.50	3.10	6.20
June	2023-06-21	45.70	36.90	0.00	17.40	5.80	3.00
July	2023-07-17	54.10	39.30	0.00	6.60	2.90	4.50
August							
September							
October	2023-11-15	58.40	41.60	0.00	0.00	7.70	10.30
November	2023-11-15	58.40	41.60	0.00	0.00	7.70	10.30
December	2023-12-28	55.60	40.40	0.20	3.80	11.10	11.80
Average		**51.2**	**40.0**	**0.0**	**8.7**	**6.7**	**7.4**
HLGW048A							
January	2023-01-19	58.40	41.60	0.00	0.00	0.00	3.00
February	2023-03-08	40.90	36.60	0.30	22.20	0.00	0.00
March	2023-03-08	53.50	39.00	0.00	7.50	5.70	5.70
April	2023-04-19	48.20	37.40	0.00	14.40	7.00	4.40
May	2023-05-24	59.90	40.00	0.00	0.10	1.90	4.30
June	2023-06-21	45.00	35.50	0.10	19.40	3.00	3.40
July	2023-07-17	38.70	33.80	0.00	27.50	8.30	3.30
August	2023-09-19	56.00	39.70	0.00	4.30	3.50	3.40
September	2023-09-19	56.00	39.70	0.00	4.30	3.50	3.40
October	2023-11-15	54.70	37.70	0.00	7.60	1.60	1.10
November	2023-11-15	54.70	37.70	0.00	7.60	1.60	1.10
December	2023-12-28	55.70	40.60	0.20	3.50	4.90	4.10
Average		**51.8**	**38.3**	**0.1**	**9.9**	**3.4**	**3.1**
HLGW049A							
January							
February	2023-03-08	21.40	25.00	0.10	53.50	0.00	0.00
March	2023-03-08	59.10	40.90	0.00	0.00	1.90	4.10
April	2023-04-19	33.70	31.80	0.30	34.20	2.60	0.00
May	2023-05-24	53.40	36.70	0.00	9.90	0.00	1.00
June	2023-06-21	27.20	28.80	0.10	43.90	0.00	0.00
July	2023-07-17	48.40	36.00	0.00	15.60	0.00	1.00
August	2023-09-19	20.70	25.70	0.80	52.80	0.00	0.00
September	2023-09-19	20.70	25.70	0.80	52.80	0.00	0.00
October	2023-11-15	27.30	27.80	0.10	44.80		
November	2023-11-15	27.30	27.80	0.10	44.80	0.00	0.00

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
December	2023-12-28	22.50	26.20	0.30	51.00	0.00	0.00
Average		**32.9**	**30.2**	**0.2**	**36.7**	**0.5**	**0.6**
HLGW050A							
January							
February	2023-03-08	47.10	35.60	0.60	16.70	6.00	2.60
March	2023-03-08	41.40	34.40	0.00	24.20	1.50	0.00
April	2023-04-19	57.10	37.20	0.00	5.70	0.00	1.10
May	2023-05-24	40.10	34.00	0.00	25.90	0.00	0.00
June	2023-06-21	36.80	32.00	0.10	31.10	0.00	0.00
July	2023-07-17	33.20	31.40	0.00	35.40	0.00	0.00
August	2023-09-19	35.60	31.30	0.00	33.10	0.00	0.00
September	2023-09-19	35.60	31.30	0.00	33.10	0.00	0.00
October	2023-11-15	60.90	39.10	0.10	N/A		1.10
November	2023-11-15	60.90	39.10	0.10	N/A	0.00	1.10
December	2023-12-28	44.80	35.70	0.00	19.50	1.90	0.00
Average		**44.9**	**34.6**	**0.1**	**25.0**	**0.9**	**0.5**
HLGW051A							
January							
February	2023-03-08	60.30	39.60	0.00	0.10	1.60	3.40
March	2023-03-08	17.80	24.30	0.00	57.90	3.60	0.00
April	2023-04-19	38.90	32.40	0.20	28.50	0.00	0.00
May	2023-05-24	28.10	28.90	0.10	42.90	0.00	0.00
June	2023-06-21	44.90	33.10	0.70	21.30	0.00	0.00
July	2023-07-17	27.50	24.30	0.10	48.10	0.00	0.00
August	2023-09-19	54.10	28.00	0.10	17.80	0.00	1.60
September	2023-09-19	54.10	28.00	0.10	17.80	0.00	1.60
October	2023-11-15	59.60	40.00	0.30	0.10		
November							
December	2023-12-28	50.20	37.20	0.20	12.40	1.90	1.50
Average		**43.6**	**31.6**	**0.2**	**24.7**	**0.8**	**0.9**
LHGW002A							
January							
February							
March							
April							
May							
June							
July							
August							
September							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
October							
November							
December							
Average							
LHGW0003							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
LHGW0004							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
LHGW0006							
January	---	---	---	---	---	---	---
February	---	---	---	---	---	---	---
March	---	---	---	---	---	---	---
April	Decommissioned May 2014						
May	---	---	---	---	---	---	---
June	---	---	---	---	---	---	---

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
July	---	---	---	---	---	---	---
August	---	---	---	---	---	---	---
September	---	---	---	---	---	---	---
October	---	---	---	---	---	---	---
November	---	---	---	---	---	---	---
December	---	---	---	---	---	---	---
Average		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
LHGW0007							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
LHGW0008							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
LHGW0009							
January	---	---	---	---	---	---	---
February	---	---	---	---	---	---	---
March	---	---	---	---	---	---	---

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
April	Decommissioned May 2014						
May	---	---	---	---	---	---	---
June	---	---	---	---	---	---	---
July	---	---	---	---	---	---	---
August	---	---	---	---	---	---	---
September	---	---	---	---	---	---	---
October	---	---	---	---	---	---	---
November	---	---	---	---	---	---	---
December	---	---	---	---	---	---	---
Average		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
LHGW0010							
January	---	---	---	---	---	---	---
February	---	---	---	---	---	---	---
March	---	---	---	---	---	---	---
April	Decommissioned May 2014						
May	---	---	---	---	---	---	---
June	---	---	---	---	---	---	---
July	---	---	---	---	---	---	---
August	---	---	---	---	---	---	---
September	---	---	---	---	---	---	---
October	---	---	---	---	---	---	---
November	---	---	---	---	---	---	---
December	---	---	---	---	---	---	---
Average		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
LHGW0013							
January	2023-01-20	42.00	34.70	1.50	21.80	1.70	0.00
February	2023-03-30	54.10	39.70	0.30	5.90	10.90	11.00
March	2023-03-30	52.70	35.60	1.80	9.90	0.00	1.80
April	2023-04-25	9.10	8.60	16.70	65.60	0.00	0.00
May	2023-05-29	42.00	31.20	3.30	23.50	0.00	0.00
June	2023-06-28	0.00	2.90	17.10	80.00	0.00	0.00
July	2023-07-20	0.70	4.90	15.50	78.90	0.00	0.00
August	2023-09-26	21.00	23.40	2.40	53.20	0.00	0.00
September	2023-09-26	21.00	23.40	2.40	53.20	0.00	0.00
October							
November							
December							
Average		**27.0**	**22.7**	**6.8**	**43.6**	**1.4**	**1.4**
LHGW0017							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
LHGW0019							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
LHGW0020							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
Average							
LHGW0021							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
LHGW0022							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
LHGW0023							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
November							
December							
Average							
TLGW001A							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
TLGW001B							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
TLGW002A							
January							
February							
March							
April							
May							
June							
July							
August							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
September							
October							
November							
December							
Average		---	---	---	---	---	**0.0**
TLGW002B							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average		---	---	---	---	---	**0.0**
TLGW002C							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average		---	---	---	---	---	**0.0**
VLGW001D							
January	2023-01-20	56.80	13.50	0.00	29.70	2.40	0.00
February	2023-03-10	87.00	8.80	0.00	4.20	0.00	2.30
March	2023-03-10	57.50	14.10	0.00	28.40	2.10	1.20
April	2023-04-24	47.00	14.90	0.00	38.10	2.30	0.00
May	2023-05-12	71.50	8.60	1.10	18.80	0.00	1.70
June	2023-06-28	42.40	12.60	1.10	43.90	2.20	0.00

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
July	2023-07-19	75.50	8.60	0.00	15.90	0.00	1.70
August	2023-09-25	89.60	7.80	0.00	2.60	0.00	1.30
September	2023-09-25	89.60	7.80	0.00	2.60	0.00	1.30
October	2023-11-23	66.00	11.70	0.20	22.10	1.20	
November	2023-11-23	66.00	11.70	0.20	22.10	1.20	1.70
December	2023-12-12	61.90	11.90	0.10	26.10	1.70	2.80
Average		**67.6**	**11.0**	**0.2**	**21.2**	**1.1**	**1.3**
VLGW001S							
January							
February							
March							
April	2023-04-24	27.90	25.80	0.00	46.30	0.00	0.00
May	2023-05-12	30.00	25.40	0.50	44.10	0.00	0.00
June	2023-06-28	37.00	25.30	1.50	36.20	0.00	0.00
July	2023-07-19	48.90	27.70	0.80	22.60	0.00	0.00
August	2023-09-25	58.30	29.30	0.00	12.40	0.00	0.00
September	2023-09-25	58.30	29.30	0.00	12.40	0.00	0.00
October							
November							
December	2023-12-12	49.80	30.10	0.00	20.10	0.00	0.00
Average		**44.3**	**27.6**	**0.4**	**27.7**	**0.0**	**0.0**
VLGW002D							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average		**---**	**---**	**---**	**---**	**---**	**0.0**
VLGW002S							
January							
February							
March							
April							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
May							
June							
July							
August							
September							
October							
November							
December							
Average		---	---	---	---	---	**0.0**
VLGW003D							
January	2023-01-19	71.40	21.60	0.30	6.70	6.70	7.50
February	2023-03-10	63.20	22.50	0.10	14.20	5.00	4.40
March	2023-03-10	59.70	21.70	0.00	18.60	3.40	3.10
April	2023-04-24	47.00	19.20	0.00	33.80	3.30	0.00
May	2023-05-12	65.60	18.20	0.00	16.20	0.00	3.20
June	2023-06-22	58.20	16.70	0.40	24.70	2.60	2.30
July	2023-07-19	72.20	16.20	0.00	11.60	5.20	6.20
August	2023-09-25	53.20	17.70	0.30	28.80	6.20	4.40
September	2023-09-25	53.20	17.70	0.30	28.80	6.20	4.40
October	2023-11-15	64.10	19.30	0.00	16.60	3.30	4.80
November	2023-11-15	64.10	19.30	0.00	16.60	3.30	4.80
December	2023-12-12	60.50	20.20	0.00	19.30	4.00	4.30
Average		**61.0**	**19.2**	**0.1**	**19.7**	**4.1**	**4.1**
VLGW003S							
January	2023-01-19	64.10	32.50	0.00	3.40	0.00	2.00
February	2023-03-10	55.10	26.30	0.00	18.60	2.30	2.00
March	2023-03-10	59.70	27.30	0.10	12.90	0.00	1.10
April	2023-04-24	46.10	30.00	0.00	23.90	2.70	2.20
May	2023-05-12	68.00	22.70	0.00	9.30	0.00	1.60
June	2023-06-22	65.30	22.60	0.00	12.10	1.10	2.90
July	2023-07-19	54.00	22.40	0.00	23.60	4.80	2.50
August	2023-09-25	70.00	21.60	0.00	8.40	0.00	1.70
September	2023-09-25	70.00	21.60	0.00	8.40	0.00	1.70
October	2023-11-15	66.70	24.10	0.00	9.20	2.70	
November	2023-11-15	66.70	24.10	0.00	9.20	2.70	1.70
December	2023-12-12	58.00	26.40	0.20	15.40	3.10	2.00
Average		**62.0**	**25.1**	**0.0**	**12.9**	**1.6**	**1.9**
VLGW004D							
January							
February							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
VLGW004S							
January							
February							
March							
April							
May	2023-05-12	50.30	17.30	2.10		3.40	3.60
June	2023-06-28	53.20	18.20	0.60	28.00	2.20	1.60
July	2023-07-19	66.10	16.30	0.00	17.60	1.10	0.00
August	2023-09-25	87.30	11.80	0.10	0.80	0.00	1.30
September	2023-09-25	87.30	11.80	0.10	0.80	0.00	1.30
October	2023-11-23	60.60	17.50	1.80	20.10	1.70	1.20
November	2023-11-23	60.60	17.50	1.80	20.10	1.70	1.20
December	2023-12-20	57.80	18.30	1.10	22.80	1.60	2.40
Average		**65.4**	**16.1**	**1.0**	**15.7**	**1.5**	**1.6**
VLGW005D							
January							
February	2023-03-10	56.60	39.40	0.00	4.00	4.80	6.30
March	2023-03-10	89.90	10.10	0.00	0.00	0.00	1.90
April	2023-04-24	25.80	3.70	14.30	56.20	0.00	0.00
May	2023-05-25	89.70	10.30	0.00	0.00	0.00	2.60
June	2023-06-28	90.50	9.40	0.20	N/A	0.00	
July	2023-07-19	88.90	8.70	0.00	2.40	0.00	0.00
August	2023-09-25	90.30	9.70	0.00	0.00	0.00	1.30
September	2023-09-25	90.30	9.70	0.00	0.00	0.00	1.30
October	2023-11-16	83.20	16.80	0.10			
November	2023-11-16	83.20	16.80	0.10	N/A	1.80	1.80
December							
Average		**78.8**	**13.5**	**1.5**	**8.9**	**0.7**	**1.9**
VLGW005S							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
January							
February	2023-03-13	17.20	2.30	17.70	62.80	0.00	0.00
March	2023-03-13	79.50	17.10	0.00	3.40	0.00	0.00
April	2023-04-24	80.00	16.50	0.30	3.20	0.00	0.00
May	2023-05-25	81.40	15.30	0.00	3.30	0.00	2.50
June	2023-06-28	42.30	21.20	0.30	36.20	1.00	0.00
July	2023-07-19	76.30	14.80	0.00	8.90	0.00	1.70
August							
September	2023-09-25	82.70	14.40	0.00	2.90	0.00	0.00
October	2023-11-16	89.70	10.20	0.00	0.10		
November							
December							
Average		**68.6**	**14.0**	**2.3**	**15.1**	**0.1**	**0.6**
VLGW006D							
January	2023-01-27	57.10	18.10	0.00	24.80	2.70	2.00
February							
March	2023-03-13	50.00	18.80	0.00	31.20	1.60	1.60
April	2023-04-25	55.00	18.80	0.00	26.20	1.10	1.60
May	2023-05-26	65.50	18.40	0.00	16.10	1.60	1.10
June	2023-06-28	32.30	18.00	0.10	49.60	1.00	0.00
July	2023-07-25	80.50	18.60	0.90	0.00	0.00	2.40
August	2023-09-25	77.90	16.80	0.00	5.30	0.00	2.50
September	2023-09-25	77.90	16.80	0.00	5.30	0.00	2.50
October	2023-11-28	69.10	12.40	0.90	17.60		
November							
December	2023-12-20	53.90	17.10	0.00	29.00	1.10	0.00
Average		**61.9**	**17.4**	**0.2**	**20.5**	**1.0**	**1.5**
VLGW006S							
January	2023-01-27	77.70	12.80	0.10	9.40	0.00	1.20
February							
March	2023-03-13	42.30	15.20	3.20	39.30	1.10	0.00
April	2023-04-25	64.30	12.30	0.70	22.70	0.00	1.20
May	2023-05-26	75.60	13.70	0.00	10.70	0.00	1.20
June	2023-06-28	22.40	17.40	1.00	59.20	5.10	0.00
July	2023-07-19	47.30	14.80	0.00	37.90	0.00	0.00
August	2023-09-25	77.90	13.90	0.00	8.20	0.00	1.70
September	2023-09-25	77.90	13.90	0.00	8.20	0.00	1.70
October	2023-11-28	53.70	17.40	0.00	28.90		0.00
November	2023-11-28	53.70	17.40	0.00	28.90	0.00	0.00
December							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
Average		**59.3**	**14.9**	**0.5**	**25.3**	**0.7**	**0.7**
VLGW007D							
January	2023-01-27	80.60	19.40	0.00	0.00	0.00	1.70
February	2023-03-30	47.60	17.80	0.00	34.60	1.10	0.00
March	2023-03-30	79.80	20.20	0.00	0.00	0.00	1.20
April	2023-04-25	79.90	20.10	0.00	0.00	0.00	1.20
May	2023-05-25	74.30	18.00	0.00	7.70	2.40	3.60
June	2023-06-22	54.20	17.50	0.10	28.20	1.60	1.90
July	2023-07-17	57.40	17.50	0.10	25.00	1.90	1.60
August	2023-09-26	66.10	21.10	0.20	12.60	2.00	2.00
September	2023-09-26	66.10	21.10	0.20	12.60	2.00	2.00
October	2023-11-28	61.00	24.80	0.00	14.20		
November	2023-11-28	61.00	24.80	0.00	14.20	3.40	4.60
December	2023-12-20	53.70	19.70	0.20	26.40	3.10	1.60
Average		**65.1**	**20.2**	**0.1**	**14.6**	**1.6**	**1.9**
VLGW007S							
January	2023-01-27	70.30	18.40	0.20	11.10	1.70	1.20
February	2023-03-30	71.20	19.70	0.00	9.10	0.00	0.00
March	2023-03-30	70.20	18.40	0.20	11.20	0.00	1.20
April	2023-04-25	57.70	17.70	0.30	24.30	2.00	1.60
May	2023-05-25	65.60	17.20	0.00	17.20	1.60	2.60
June	2023-06-22	41.00	16.40	0.20	42.40	1.90	0.00
July	2023-07-17	16.60	5.30	12.40	65.70	0.00	0.00
August	2023-09-26	68.60	12.00	1.00	18.40	0.00	0.00
September	2023-09-26	68.60	12.00	1.00	18.40	0.00	0.00
October	2023-11-28	35.70	11.60	6.70	46.00		0.00
November	2023-11-28	35.70	11.60	6.70	46.00	0.00	0.00
December	2023-12-20	68.60	12.90	0.30	18.20	0.00	0.00
Average		**55.8**	**14.4**	**2.4**	**27.3**	**0.7**	**0.6**
VLGW008D							
January							
February	2023-03-17	65.80	19.40	0.00	14.80	2.70	2.10
March	2023-03-17	67.30	18.20	1.50	13.00	0.00	0.00
April	2023-04-24	72.30	17.80	0.90	9.00	0.00	0.00
May	2023-05-25	76.30	17.60	0.00	6.10	0.00	0.00
June	2023-06-22	51.70	16.00	2.40	29.90	0.00	0.00
July	2023-07-17	29.80	9.80	9.30	51.10	0.00	0.00
August	2023-09-26	79.30	19.50	0.00	1.20	0.00	3.10
September	2023-09-26	79.30	19.50	0.00	1.20	0.00	3.10
October							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
November							
December	2023-12-18	57.80	20.00	0.70	21.50	0.00	0.00
Average		**64.4**	**17.5**	**1.6**	**16.4**	**0.3**	**0.9**
VLGW008S							
January	2023-01-17	74.40	20.30	0.00	5.30	1.70	3.30
February	2023-03-17	90.60	9.30	0.00	0.10	0.00	1.90
March	2023-03-17	68.70	19.20	0.10	12.00	3.00	2.40
April	2023-04-24	68.00	18.90	0.00	13.10	2.70	2.10
May	2023-05-25	70.60	18.70	0.10	10.60	3.60	4.70
June	2023-06-22	51.60	17.30	0.00	31.10	4.70	4.70
July	2023-07-17	49.70	17.50	0.00	32.80	6.30	5.80
August	2023-09-26	64.40	19.30	0.00	16.30	1.50	1.50
September	2023-09-26	64.40	19.30	0.00	16.30	1.50	1.50
October	2023-11-16	60.00	18.60	0.10	21.30	5.00	2.40
November	2023-11-16	60.00	18.60	0.10	21.30	5.00	2.40
December	2023-12-18	47.30	19.00	0.00	33.70	3.80	1.20
Average		**64.1**	**18.0**	**0.0**	**17.8**	**3.2**	**2.8**
VLGW009D							
January							
February	2023-03-10	50.40	12.70	6.90	30.00	N/A	N/A
March	2023-03-10	68.90	24.50	0.00	6.60	0.00	1.20
April	2023-04-24	46.90	21.30	2.00	29.80	0.00	0.00
May	2023-05-29	87.00	12.90	0.10	0.00	0.00	1.80
June	2023-06-28	26.00	19.70	0.30	54.00	1.80	2.10
July							
August	2023-09-25	85.10	10.70	0.00	4.20	0.00	1.20
September	2023-09-25	85.10	10.70	0.00	4.20	0.00	1.20
October							
November							
December	2023-12-19	27.80	20.80	0.20	51.20	1.10	0.00
Average		**59.7**	**16.7**	**1.2**	**22.5**	**0.4**	**1.1**
VLGW009S							
January							
February	2023-03-10	49.70	26.10	0.60	23.60	0.00	0.00
March	2023-03-10	>>>>	25.10	0.00	N/A	0.00	1.70
April	2023-04-24	53.80	14.70	5.90	25.60	0.00	0.00
May	2023-05-29	74.70	25.10	0.20	0.00	0.00	0.00
June	2023-06-28	18.50	4.50	14.40	62.60	0.00	0.00
July							
August	2023-09-25	75.50	14.80	1.30	8.40	0.00	0.00

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
September	2023-09-25	75.50	14.80	1.30	8.40	0.00	0.00
October	2023-11-16	74.90	15.90	0.10	9.10		
November	2023-11-16	74.90	15.90	0.10	9.10	1.70	2.80
December	2023-12-19	69.80	19.30	0.10	10.80	0.00	1.20
Average		**63.0**	**17.6**	**2.4**	**17.5**	**0.2**	**0.6**
VLGW010S							
January							
February							
March							
April							
May	2023-05-25	52.90	23.50	0.40	23.20	0.00	0.00
June	2023-06-28	8.00	18.30	0.60	73.10	0.00	0.00
July							
August	2023-09-25	62.70	22.10	0.00	15.20	0.00	0.00
September							
October							
November							
December							
Average		**41.2**	**21.3**	**0.3**	**37.2**	**0.0**	**0.0**
VLGW011S							
January	2023-01-17	37.90	26.30	0.00	35.80	0.00	0.00
February	2023-03-13	75.10	24.80	0.10	0.00	0.00	2.10
March	2023-03-13	35.80	22.50	0.60	41.10	0.00	0.00
April	2023-04-24	43.60	22.30	0.20	33.90	0.00	0.00
May	2023-05-25	42.60	22.20	0.00	35.20	0.00	0.00
June	2023-06-22	27.90	22.60	0.00	49.50	1.80	0.00
July	2023-07-17	52.10	27.20	0.00	20.70	0.00	1.90
August	2023-09-25	61.00	32.80	0.00	6.20	1.90	1.60
September	2023-09-25	61.00	32.80	0.00	6.20	1.90	1.60
October	2023-11-16	36.60	27.80	0.20	35.40	2.50	0.00
November	2023-11-16	36.60	27.80	0.20	35.40	2.50	0.00
December	2023-12-18	43.60	28.30	0.00	28.10	0.00	0.00
Average		**46.2**	**26.5**	**0.1**	**27.3**	**0.9**	**0.6**
VLGW012S							
January	2023-01-17	40.60	22.30	0.00	37.10	1.10	0.00
February							
March	2023-03-17	38.90	21.80	0.10	39.20	3.80	0.00
April							
May	2023-05-25	71.30	24.00	0.00	4.70	4.40	5.20
June	2023-06-22	54.50	24.30	0.00	21.20	5.60	5.10

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
July	2023-07-17	56.80	25.00	0.00	18.20	6.60	6.10
August	2023-09-26	47.80	25.60	0.00	26.60	14.80	1.90
September	2023-09-26	47.80	25.60	0.00	26.60	14.80	1.90
October	2023-11-16	56.20	26.80	0.00	17.00	4.10	4.30
November	2023-11-16	56.20	26.80	0.00	17.00	4.10	4.30
December	2023-12-18	42.50	24.30	0.00	33.20	1.90	2.20
Average		**51.3**	**24.7**	**0.0**	**24.1**	**6.1**	**3.1**
VLGW013D							
January							
February							
March	2023-03-09	73.90	19.20	0.00	6.90	0.00	0.00
April	2023-04-11	73.60	20.30	0.00	6.10	0.00	0.00
May	2023-05-10	72.10	20.10	0.00	7.80	0.00	0.00
June	2023-06-22	52.80	19.90	0.60	26.70	0.00	0.00
July							
August	2023-09-26	57.20	19.70	0.00	23.10	0.00	0.00
September	2023-09-26	57.20	19.70	0.00	23.10	0.00	0.00
October							
November							
December	2023-12-05	57.10	21.50	0.00	21.40	0.00	0.00
Average		**63.4**	**20.1**	**0.1**	**16.4**	**0.0**	**0.0**
VLGW013S							
January							
February							
March	2023-03-09	73.90	18.70	0.10	7.30	0.00	1.20
April	2023-04-03	73.80	20.20	0.00	6.00	1.20	2.50
May	2023-05-10	71.90	19.40	0.00	8.70	0.00	1.20
June	2023-06-22	54.50	19.00	0.00	26.50	4.40	4.20
July	2023-07-13	46.40	19.60	0.20	33.80	4.90	0.00
August	2023-09-26	57.90	19.60	0.00	22.50	1.60	0.00
September	2023-09-26	57.90	19.60	0.00	22.50	1.60	0.00
October	2023-11-16	64.50	19.90	0.00	15.60	0.00	1.70
November	2023-11-16	64.50	19.90	0.00	15.60	0.00	1.70
December	2023-12-05	53.60	22.20	0.00	24.20	1.60	0.00
Average		**61.9**	**19.8**	**0.0**	**18.3**	**1.5**	**1.3**
VLGW014D							
January							
February							
March							
April							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
May							
June							
July							
August							
September							
October							
November							
December							
Average		**---**	**---**	**---**	**---**	**---**	**0.0**
VLGW014S							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average		**---**	**---**	**---**	**---**	**---**	**0.0**
VLGW015D							
January	2023-01-20	82.80	17.00	0.10	0.10	0.00	1.80
February	2023-03-10	60.40	25.10	0.00	14.50	3.80	3.80
March	2023-03-10	73.70	10.90	0.80	14.60	2.80	2.50
April	2023-04-24	50.60	11.40	1.10	36.90	2.60	0.00
May	2023-05-12	88.00	9.70	0.00	2.30	0.00	2.60
June	2023-06-28	53.00	11.30	0.60	35.10	2.30	1.10
July	2023-07-19	69.00	15.30	0.00	15.70	2.70	1.10
August	2023-09-25	79.30	13.70	0.00	7.00	1.20	2.80
September	2023-09-25	79.30	13.70	0.00	7.00	1.20	2.80
October							
November							
December	2023-12-18	76.90	16.80	0.00	6.30	3.40	3.60
Average		**71.3**	**14.5**	**0.3**	**14.0**	**2.0**	**2.2**
VLGW015S							
January	2023-01-20	71.40	23.70	0.30	4.60	3.90	6.30
February	2023-03-10	65.20	21.60	0.00	13.20	1.20	1.70

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
March	2023-03-10	55.90	24.70	0.00	19.40	3.50	2.30
April	2023-04-24	52.20	25.10	0.30	22.40	3.00	3.00
May	2023-05-12	51.00	22.10	0.10	26.80	3.00	2.80
June	2023-06-28	51.80	23.30	0.50	24.40	2.20	1.50
July	2023-07-19	65.70	27.20	0.30	6.80	0.00	1.60
August	2023-09-25	72.00	23.30	0.00	4.70	1.70	1.70
September	2023-09-25	72.00	23.30	0.00	4.70	1.70	1.70
October							
November							
December							
Average		**61.9**	**23.8**	**0.2**	**14.1**	**2.2**	**2.5**
VLGW016D							
January							
February	2023-03-10	48.20	30.80	0.00	21.00	0.00	0.00
March	2023-03-10	76.10	20.90	0.00	3.00	1.20	3.10
April	2023-04-21	49.50	20.40	0.00	30.10	4.80	1.10
May	2023-05-12	49.60	18.40	0.00	32.00	2.80	2.30
June	2023-06-28	67.60	18.40	0.00	14.00	2.40	2.60
July	2023-07-19	69.30	19.00	0.00	11.70	5.10	5.30
August	2023-09-25	83.60	16.30	0.00	0.10	0.00	1.70
September	2023-09-25	83.60	16.30	0.00	0.10	0.00	1.70
October	2023-11-16	38.30	19.70	0.00	42.00	2.60	1.40
November	2023-11-16	38.30	19.70	0.00	42.00	2.60	1.40
December							
Average		**60.4**	**20.0**	**0.0**	**19.6**	**2.2**	**2.1**
VLGW016S							
January							
February	2023-03-10	72.50	27.50	0.00	0.00	0.00	0.00
March	2023-03-10	55.50	28.50	0.00	16.00	1.60	1.10
April	2023-04-21	38.50	27.40	0.00	34.10	1.10	0.00
May	2023-05-12	68.90	27.70	0.10	3.30	0.00	1.10
June	2023-06-28	37.10	27.70	0.10	35.10	1.00	0.00
July	2023-07-19	76.50	21.60	0.00	1.90	0.00	1.70
August	2023-09-25	73.30	26.70	0.00	0.00	1.60	1.60
September	2023-09-25	73.30	26.70	0.00	0.00	1.60	1.60
October	2023-11-16	50.80	32.20	0.10	16.90		0.00
November	2023-11-16	50.80	32.20	0.10	16.90	0.00	0.00
December							
Average		**59.7**	**27.8**	**0.0**	**12.4**	**0.8**	**0.7**
VLGW017D							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
January							
February							
March	2023-03-13	54.10	24.60	0.40	20.90	2.60	0.00
April	2023-04-21	73.00	26.90	0.00	0.10	0.00	0.00
May	2023-05-26	73.80	26.20	0.00	0.00	0.00	2.60
June	2023-06-28	31.70	20.10	1.00	47.20	3.30	0.00
July	2023-07-19	73.30	24.00	0.00	2.70	0.00	1.10
August	2023-09-25	73.70	26.30	0.00	0.00	2.00	4.70
September	2023-09-25	73.70	26.30	0.00	0.00	2.00	4.70
October	2023-11-28	73.90	26.10	0.00	0.00		2.10
November	2023-11-28	73.90	26.10	0.00	0.00	1.20	2.10
December							
Average		**66.8**	**25.2**	**0.2**	**7.9**	**1.4**	**1.9**
VLGW017S							
January							
February	2023-03-13	57.60	29.80	0.00	12.60	3.70	2.60
March	2023-03-13	73.40	26.60	0.00	0.00	1.10	2.90
April	2023-04-21	73.10	26.90	0.00	0.00	2.30	4.50
May	2023-05-26	73.60	26.30	0.00	0.10	3.60	2.80
June	2023-06-28	61.60	24.50	0.20	13.70	0.00	0.00
July	2023-07-19	63.30	24.00	0.00	12.70	2.70	4.20
August							
September							
October	2023-11-28	72.80	25.60	1.60	0.00		2.40
November	2023-11-28	72.80	25.60	1.60	0.00	0.00	2.40
December							
Average		**68.5**	**26.2**	**0.4**	**4.9**	**1.9**	**2.7**
VLGW018D							
January							
February	2023-03-10	53.40	29.20	0.00	17.40	0.00	0.00
March	2023-03-10	46.70	28.40	0.00	24.90	2.70	1.50
April	2023-04-21	53.40	28.60	0.00	18.00	2.80	2.80
May	2023-05-29	55.30	28.00	0.00	16.70	1.60	4.20
June	2023-06-27	34.00	25.20	0.00	40.80	5.10	1.00
July	2023-07-19	65.90	30.70	0.00	3.40	0.00	1.60
August	2023-09-26	62.00	30.40	0.00	7.60	2.80	2.30
September	2023-09-26	62.00	30.40	0.00	7.60	2.80	2.30
October	2023-11-28	65.80	31.80	0.10	2.30		2.00
November	2023-11-28	65.80	31.80	0.10	2.30	0.00	2.00
December							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
Average		**56.4**	**29.5**	**0.0**	**14.1**	**2.0**	**2.0**
VLGW018S							
January							
February	2023-03-10	51.10	32.70	0.10	16.10	1.90	1.60
March	2023-03-10	45.70	27.50	2.00	24.80	0.00	0.00
April	2023-04-21	52.90	28.40	0.00	18.70	0.00	0.00
May	2023-05-29	53.90	27.40	0.20	18.50	0.00	0.00
June	2023-06-27	35.10	25.70	0.20	39.00	0.00	0.00
July	2023-07-19	55.90	26.20	0.00	17.90	0.00	1.10
August	2023-09-26	54.30	28.20	0.00	17.50	2.50	1.90
September	2023-09-26	54.30	28.20	0.00	17.50	2.50	1.90
October	2023-11-28	43.50	28.00	0.20	28.30	1.10	0.00
November	2023-11-28	43.50	28.00	0.20	28.30	1.10	0.00
December							
Average		**49.0**	**28.0**	**0.3**	**22.7**	**0.9**	**0.7**
VLGW019D							
January							
February	2023-03-10	52.10	33.70	0.00	14.20	2.80	2.20
March	2023-03-10	47.00	32.50	0.00	20.50	2.20	1.10
April	2023-04-21	40.70	29.70	0.00	29.60	1.00	0.00
May	2023-05-26	64.10	35.90	0.00	0.00	0.00	1.50
June	2023-06-27	43.30	29.70	0.00	27.00	3.30	2.60
July	2023-07-19	41.70	28.80	0.00	29.50	0.00	0.00
August	2023-09-26	61.60	33.50	0.10	4.80	0.00	0.00
September	2023-09-26	61.60	33.50	0.10	4.80	0.00	0.00
October	2023-11-28	45.50	31.80	0.10	22.60	0.00	
November	2023-11-28	45.50	31.80	0.10	22.60	0.00	0.00
December							
Average		**50.3**	**32.1**	**0.0**	**17.6**	**0.9**	**0.8**
VLGW019S							
January							
February	2023-03-10	63.50	36.10	0.40	0.00	0.00	0.00
March	2023-03-10	49.30	33.50	0.00	17.20	1.50	1.90
April	2023-04-21	44.30	31.10	0.00	24.60	2.90	1.10
May	2023-05-26	65.40	34.60	0.00	0.00	2.50	6.10
June	2023-06-27	45.40	30.30	0.00	24.30	4.40	4.00
July	2023-07-19	43.50	29.70	0.00	26.80	6.00	1.80
August	2023-09-26	60.60	33.80	0.00	5.60	1.60	1.90
September	2023-09-26	60.60	33.80	0.00	5.60	1.60	1.90
October	2023-11-28	49.30	33.00	0.20	17.50	2.50	2.50

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
November	2023-11-28	49.30	33.00	0.20	17.50	2.50	2.50
December							
Average		**53.1**	**32.9**	**0.1**	**13.9**	**2.6**	**2.4**
VLGW020D							
January							
February	2023-03-10	64.50	35.40	0.10	0.00	0.00	1.10
March	2023-03-10	57.00	34.50	0.00	8.50	0.00	1.60
April							
May	2023-05-10	45.60	29.90	0.00	24.50	0.00	0.00
June	2023-06-28	41.00	30.30	0.00	28.70	0.00	0.00
July	2023-07-20	61.60	35.30	0.00	3.10	0.00	0.00
August	2023-09-26	54.10	34.00	0.10	11.80	0.00	0.00
September	2023-09-26	54.10	34.00	0.10	11.80	0.00	0.00
October	2023-10-26	32.80	27.60	0.10	39.50		
November							
December							
Average		**51.3**	**32.6**	**0.1**	**16.0**	**0.0**	**0.4**
VLGW020S							
January							
February							
March	2023-03-10	42.80	31.70	0.00	25.50	1.90	0.00
April							
May	2023-05-10	38.60	27.70	0.00	33.70	0.00	0.00
June	2023-06-28	34.10	27.30	0.70	37.90	1.50	0.00
July	2023-07-20	62.50	34.50	0.10	2.90	0.00	1.50
August	2023-09-26	53.10	32.30	0.00	14.60	1.50	1.10
September	2023-09-26	53.10	32.30	0.00	14.60	1.50	1.10
October	2023-10-26	27.70	28.60	0.00	43.70	1.90	
November							
December							
Average		**44.6**	**30.6**	**0.1**	**24.7**	**1.2**	**0.6**
VLGW021D							
January							
February							
March	2023-03-10	63.50	18.80	0.60	17.10	2.70	1.20
April	2023-04-25	48.80	20.60	0.00	30.60	1.60	0.00
May	2023-05-10	71.00	18.80	0.00	10.20	1.20	1.70
June	2023-06-22	66.20	18.60	0.00	15.20	2.60	2.40
July	2023-07-20	53.60	18.30	0.00	28.10	6.10	4.20
August	2023-09-26	59.10	19.50	0.00	21.40	2.00	1.60

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
September	2023-09-26	59.10	19.50	0.00	21.40	2.00	1.60
October	2023-11-23	62.90	19.50	0.00	17.60	2.40	2.40
November	2023-11-23	62.90	19.50	0.00	17.60	2.40	2.40
December							
Average		**60.8**	**19.2**	**0.1**	**19.9**	**2.6**	**1.9**
VLGW021S							
January							
February							
March	2023-03-10	63.30	21.80	0.00	14.90	1.70	2.00
April	2023-04-25	67.00	18.60	0.00	14.40	2.70	1.70
May	2023-05-10	80.10	19.90	0.00	0.00	0.00	1.20
June	2023-06-22	54.80	19.50	0.00	25.70	0.00	1.10
July	2023-07-20	46.30	17.60	3.10	33.00	0.00	0.00
August	2023-09-26	74.40	20.10	0.00	5.50	0.00	2.40
September	2023-09-26	74.40	20.10	0.00	5.50	0.00	2.40
October	2023-11-27	58.80	19.90	0.00	21.30	4.00	4.20
November	2023-11-27	58.80	19.90	0.00	21.30	4.00	4.20
December							
Average		**64.2**	**19.7**	**0.3**	**15.7**	**1.4**	**2.1**
VLGW022D							
January							
February							
March							
April							
May	2023-05-26	74.30	24.70	0.90	0.10	0.00	0.00
June	2023-06-27	58.30	23.80	3.20	14.70	0.00	0.00
July	2023-07-20	67.60	27.10	0.00	5.30	0.00	1.90
August	2023-09-26	70.80	25.40	0.00	3.80	2.40	1.60
September	2023-09-26	70.80	25.40	0.00	3.80	2.40	1.60
October	2023-10-26	71.50	25.80	0.40	2.30	2.70	3.00
November							
December							
Average		**68.9**	**25.4**	**0.8**	**5.0**	**1.3**	**1.4**
VLGW022S							
January							
February							
March	2023-03-13	42.10	19.80	0.00	38.10	0.00	0.00
April							
May	2023-05-26	58.50	22.20	0.00	19.30	0.00	0.00
June	2023-06-27	28.10	19.00	0.60	52.30	6.20	0.00

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
July	2023-07-20	16.30	16.80	0.00	66.90	0.00	0.00
August	2023-09-26	31.60	18.30	0.00	50.10	0.00	0.00
September	2023-09-26	31.60	18.30	0.00	50.10	0.00	0.00
October	2023-10-26	28.00	18.10	1.10	52.80		
November							
December							
Average		**33.7**	**18.9**	**0.2**	**47.1**	**1.0**	**0.0**
VLGW023D							
January							
February							
March							
April	2023-04-24	54.80	16.90	0.10	28.20	1.90	0.00
May	2023-05-25	90.70	9.30	0.00	0.00	0.00	1.80
June							
July	2023-07-19	52.50	14.80	0.00	32.70	0.00	0.00
August	2023-09-25	88.10	9.60	0.10	2.20	0.00	0.00
September	2023-09-25	88.10	9.60	0.10	2.20	0.00	0.00
October	2023-11-15	80.70	11.80	0.00	7.50		1.80
November	2023-11-15	80.70	11.80	0.00	7.50	0.00	1.80
December							
Average		**76.5**	**12.0**	**0.0**	**11.5**	**0.3**	**0.8**
VLGW023S							
January							
February							
March	2023-03-09	68.50	28.60	0.00	2.90	0.00	2.00
April	2023-04-24	36.20	25.70	0.20	37.90	2.40	0.00
May	2023-05-25	66.60	26.40	0.00	7.00	0.00	1.10
June	2023-06-22	66.20	29.20	0.00	4.60	0.00	2.00
July	2023-07-19	48.30	30.00	0.10	21.60	4.20	3.80
August	2023-09-25	62.30	32.70	0.00	5.00	3.00	3.00
September	2023-09-25	62.30	32.70	0.00	5.00	3.00	3.00
October	2023-11-15	62.00	32.40	0.00	5.60	1.10	2.00
November	2023-11-15	62.00	32.40	0.00	5.60	1.10	2.00
December							
Average		**59.4**	**30.0**	**0.0**	**10.6**	**1.6**	**2.1**
VLGW024D							
January							
February							
March	2023-03-10	72.90	24.60	0.00	2.50	1.70	2.40
April	2023-04-21	53.00	26.00	0.00	21.00	3.20	1.60

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
May	2023-05-25	79.80	20.00	0.10	0.10	0.00	2.50
June							
July							
August							
September							
October							
November							
December							
Average		**68.6**	**23.5**	**0.0**	**7.9**	**1.6**	**2.2**
VLGW024S							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
VLGW025D							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
VLGW025S							
January							
February							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
VLGW026D							
January							
February							
March	2023-03-10	49.50	29.30	0.00	21.20	1.10	0.00
April	2023-04-25	66.40	33.60	0.00	0.00	0.00	1.60
May	2023-05-10	65.40	34.60	0.00	0.00	0.00	1.90
June	2023-06-22	65.00	33.30	0.00	1.70	0.00	1.50
July	2023-07-20	45.30	27.90	1.10	25.70	0.00	0.00
August	2023-09-26	66.00	34.00	0.00	0.00	0.00	0.00
September	2023-09-26	66.00	34.00	0.00	0.00	0.00	0.00
October	2023-11-27	66.30	33.70	0.00	0.00	0.00	1.60
November	2023-11-27	66.30	33.70	0.00	0.00	0.00	1.60
December							
Average		**61.8**	**32.7**	**0.1**	**5.4**	**0.1**	**0.9**
VLGW026S							
January							
February							
March	2023-03-10	43.20	26.70	0.00	30.10	2.50	1.10
April	2023-04-25	69.20	29.30	0.00	1.50	1.60	2.30
May	2023-05-10	69.90	29.80	0.00	0.30	3.90	5.30
June	2023-06-22	52.40	28.50	0.00	19.10	6.90	6.60
July	2023-07-20	42.10	27.30	0.40	30.20	6.00	2.10
August	2023-09-26	56.20	29.80	0.00	14.00	5.90	5.50
September	2023-09-26	56.20	29.80	0.00	14.00	5.90	5.50
October	2023-11-27	68.80	31.20	0.00	0.00	1.60	2.60
November	2023-11-27	68.80	31.20	0.00	0.00	1.60	2.60
December							
Average		**58.5**	**29.3**	**0.0**	**12.1**	**4.0**	**3.7**
VLGW027D							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
January							
February							
March	2023-03-13	68.10	23.70	0.00	8.20	1.10	1.60
April	2023-04-25	68.80	23.20	0.00	8.00	1.60	1.10
May	2023-05-26	75.10	24.90	0.00	0.00	1.60	4.00
June	2023-06-27	66.30	23.80	0.00	9.90	1.60	3.50
July	2023-07-20	61.00	22.80	0.10	16.10	3.20	4.10
August	2023-09-26	65.30	25.20	0.00	9.50	3.30	4.30
September	2023-09-26	65.30	25.20	0.00	9.50	3.30	4.30
October	2023-10-30	67.90	25.40	0.10	6.60	0.00	0.00
November	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
December							
Average		**67.2**	**24.3**	**0.0**	**8.5**	**2.0**	**2.9**
VLGW027S							
January							
February							
March							
April	2023-04-25	9.20	18.40	0.00	72.40	1.80	0.00
May	2023-05-26	81.70	18.20	0.00	0.10	0.00	0.00
June							
July	2023-07-20	55.60	15.30	0.60	28.50	0.00	0.00
August	2023-09-26	28.20	20.60	0.50	50.70	0.00	0.00
September	2023-09-26	28.20	20.60	0.50	50.70	0.00	0.00
October	2023-10-30	59.80	19.90	0.10	20.20	0.00	
November	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
December							
Average		**43.8**	**18.8**	**0.3**	**37.1**	**0.3**	**0.0**
VLGW028S							
January							
February							
March	2023-03-29	59.90	30.00	0.00	10.10	0.00	1.10
April	2023-04-25	37.90	26.30	0.00	35.80	1.90	0.00
May	2023-05-29	55.50	25.00	0.50	19.00	0.00	0.00
June	2023-06-27	19.80	20.70	0.00	59.50	10.10	0.00
July	2023-07-19	33.20	19.40	0.80	46.60	0.00	0.00
August	2023-09-26	56.30	24.70	0.30	18.70	0.00	0.00
September	2023-09-26	56.30	24.70	0.30	18.70	0.00	0.00
October	2023-10-24	64.90	26.80	0.00	8.30		
November	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
December							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
Average		**48.0**	**24.7**	**0.2**	**27.1**	**1.7**	**0.2**
VLGW029D							
January							
February							
March	2023-03-29	69.70	30.20	0.10	0.00	2.80	3.90
April	2023-04-25	62.80	24.40	0.00	12.80	4.10	3.90
May	2023-05-26	71.40	25.20	0.20	3.20	3.30	6.00
June	2023-06-27	55.30	25.20	0.10	19.40	9.20	6.80
July	2023-07-20	53.20	24.00	0.10	22.70	4.00	4.40
August	2023-09-26	58.80	26.00	0.00	15.20	2.50	6.00
September	2023-09-26	58.80	26.00	0.00	15.20	2.50	6.00
October	2023-11-28	61.60	25.80	0.00	12.60	2.00	2.30
November	2023-11-28	61.60	25.80	0.00	12.60	2.00	2.30
December							
Average		**61.5**	**25.8**	**0.1**	**12.6**	**3.6**	**4.6**
VLGW029S							
January							
February							
March	2023-03-29	65.50	34.50	0.00	0.00	0.00	1.10
April	2023-04-25	38.40	21.80	0.00	39.80	0.00	0.00
May	2023-05-26	63.70	23.80	0.00	12.50	0.00	0.00
June	2023-06-27	68.10	29.90	0.00	2.00	0.00	1.10
July	2023-07-20	65.90	27.50	0.00	6.60	2.50	3.40
August	2023-09-26	39.00	22.80	0.00	38.20	2.20	0.00
September	2023-09-26	39.00	22.80	0.00	38.20	2.20	0.00
October							
November	2023-11-28	21.40	20.00	0.20	58.40	5.10	2.50
December							
Average		**50.1**	**25.4**	**0.0**	**24.5**	**1.5**	**1.0**
VLGW030S							
January							
February							
March	2023-03-29	43.90	28.70	0.10	27.30	0.00	0.00
April	2023-04-25	31.80	26.70	0.00	41.50	0.00	0.00
May	2023-05-29	42.20	27.20	0.00	30.60	0.00	0.00
June	2023-06-27	23.30	23.40	0.10	53.20	0.00	0.00
July							
August	2023-09-26	33.70	23.50	3.40	39.40	0.00	0.00
September	2023-09-26	33.70	23.50	3.40	39.40	0.00	0.00
October	2023-10-24	44.20	28.30	0.00	27.50	0.00	

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
November	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
December							
Average		**36.1**	**25.9**	**1.0**	**37.0**	**0.0**	**0.0**
VLGW031S							
January							
February							
March	2023-03-13	66.30	24.20	0.10	9.40	0.00	1.10
April							
May	2023-05-24	62.40	23.70	0.20	13.70	0.00	0.00
June	2023-06-26	30.50	20.60	0.10	48.80	0.00	0.00
July	2023-07-19	47.20	20.70	0.40	31.70	0.00	0.00
August	2023-09-25	65.70	24.20	0.00	10.10	0.00	2.30
September	2023-09-25	65.70	24.20	0.00	10.10	0.00	2.30
October	2023-11-22	65.10	25.60	0.50	8.80		
November	2023-11-22	65.10	25.60	0.50	8.80	0.00	1.20
December							
Average		**58.5**	**23.6**	**0.2**	**17.7**	**0.0**	**1.0**
VLGW032S							
January							
February							
March	2023-03-29	57.70	27.80	0.00	14.50	3.90	3.50
April	2023-04-25	>>>>	27.60	0.00	N/A	2.50	2.50
May	2023-05-29	54.00	26.70	0.10	19.20	1.60	1.60
June	2023-06-27	53.70	27.30	0.00	19.00	1.10	1.10
July	2023-07-19	54.40	26.50	0.00	19.10	1.90	2.20
August	2023-09-26	44.60	26.70	0.00	28.70	4.10	1.50
September	2023-09-26	44.60	26.70	0.00	28.70	4.10	1.50
October							
November	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
December							
Average		**51.5**	**27.0**	**0.0**	**21.5**	**2.7**	**2.0**
VLGW033S							
January							
February							
March							
April							
May	2023-05-24	46.00	33.70	0.10	20.20	0.00	0.00
June	2023-06-26	39.40	32.00	0.10	28.50	0.00	0.00
July	2023-07-19	46.10	32.10	0.00	21.80	0.00	0.00
August							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
September							
October	2023-11-22	48.90	30.60	0.00	20.50		
November	2023-11-22	48.90	30.60	0.00	20.50	0.00	0.00
December							
Average		**45.9**	**31.8**	**0.0**	**22.3**	**0.0**	**0.0**
VLGW034S							
January							
February							
March							
April							
May	2023-05-24	37.60	30.00	0.00	32.40	0.00	0.00
June	2023-06-26	45.70	34.00	0.00	20.30	0.00	1.80
July	2023-07-19	39.40	29.40	0.20	31.00	0.00	0.00
August							
September							
October	2023-11-22	43.00	33.80	0.00	23.20		
November	2023-11-22	43.00	33.80	0.00	23.20	0.00	0.00
December							
Average		**41.7**	**32.2**	**0.0**	**26.0**	**0.0**	**0.5**
VLGW042S							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
VLGW043S							
January							
February							
March							
April							
May							
June							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
July							
August							
September							
October							
November							
December							
Average							
VLGW047S							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
VLGW0049							
January	2023-01-31	68.40	31.60	0.10	N/A	0.00	2.40
February	2023-03-14	67.60	32.00	0.40	0.00	1.10	1.10
March	2023-03-14	65.00	29.00	1.60		0.00	0.00
April	2023-04-25	70.20	29.80	0.00	0.00	0.00	N/A
May	2023-05-25	70.60	29.40	0.00	0.00	0.00	0.00
June	2023-06-27	70.50	29.40	0.10	0.00	0.00	0.00
July	2023-07-20	69.50	29.70	0.00		0.00	0.00
August	2023-09-26	70.50	29.40	0.00	0.10	0.60	0.60
September	2023-09-26	70.50	29.40	0.00	0.10	0.60	0.60
October	2023-11-27	71.50	28.10	0.40	0.00		
November	2023-11-27	71.50	28.10	0.40	0.00	0.30	0.30
December							
Average		**69.6**	**29.6**	**0.3**	**0.0**	**0.3**	**0.6**
VLGW0050							
January	2023-01-31	38.30	27.60	0.30	33.80	1.10	0.00
February	2023-03-16	66.40	18.50	1.00	14.10	1.70	1.20
March	2023-03-16	74.60	25.20	0.20	0.00	0.00	1.20
April	2023-04-25	40.10	27.50	0.00	32.40	1.10	0.00

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
May	2023-05-30	75.20	24.80	0.00	0.00	0.00	1.20
June	2023-06-27	48.10	27.90	0.00	24.00	0.00	0.00
July	2023-07-20	59.90	26.30	0.10	13.70	0.00	1.10
August	2023-09-26	42.80	28.00	0.00	29.20	1.50	0.00
September	2023-09-26	42.80	28.00	0.00	29.20	1.50	0.00
October	2023-11-27	57.20	25.80	0.10	16.90	0.00	1.10
November	2023-11-27	57.20	25.80	0.10	16.90	0.00	1.10
December	2023-12-20	35.50	28.10	0.00	36.40	1.50	0.00
Average		**53.2**	**26.1**	**0.2**	**20.6**	**0.7**	**0.6**
VLGW0051							
January	2023-01-31	57.30	32.30	0.10	10.30	7.70	8.00
February	2023-03-16	52.30	32.10	0.20	15.40	0.00	1.10
March	2023-03-16	56.90	32.60	0.00	10.50	8.50	8.60
April	2023-04-25	58.60	31.80	0.00	9.60	6.00	6.60
May							
June	2023-06-27	55.60	31.60	0.00	12.80	7.70	7.70
July	2023-07-20	57.30	31.40	0.00	11.30	8.50	8.50
August	2023-09-26	47.80	31.80	0.00	20.40	18.30	11.70
September	2023-09-26	47.80	31.80	0.00	20.40	18.30	11.70
October	2023-11-27	50.50	31.90	0.00	17.60	13.10	13.10
November	2023-11-27	50.50	31.90	0.00	17.60	13.10	13.10
December	2023-12-20	46.70	32.10	0.00	21.20	14.30	13.70
Average		**52.8**	**31.9**	**0.0**	**15.2**	**10.5**	**9.4**
VLGW0052							
January	2023-01-31	38.50	31.30	0.00	30.20	1.50	0.00
February	2023-03-14	50.60	33.60	0.10	15.70	0.00	0.00
March	2023-03-14	42.00	31.20	0.00	26.80	0.00	0.00
April	2023-04-25	47.30	30.30	0.00	22.40	0.00	0.00
May	2023-05-25	59.60	34.60	0.00	5.80	0.00	1.10
June	2023-06-27	57.30	34.70	0.00	8.00	0.00	1.10
July	2023-07-20	51.10	34.10	0.00	14.80	1.50	1.00
August	2023-09-26	51.10	35.20	0.00	13.70	3.50	2.90
September	2023-09-26	51.10	35.20	0.00	13.70	3.50	2.90
October	2023-11-27	45.10	33.20	0.00	21.70		1.10
November	2023-11-27	45.10	33.20	0.00	21.70	1.10	1.10
December							
Average		**49.0**	**33.3**	**0.0**	**17.7**	**1.1**	**1.0**
VLGW0053							
January	2023-01-31	47.20	32.50	0.00	20.30	0.00	0.00
February	2023-03-14	38.00	28.70	0.00	33.30	0.00	0.00

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
March	2023-03-14	46.10	32.10	0.00	21.80	0.00	0.00
April	2023-04-25	42.20	30.90	0.00	26.90	0.00	0.00
May	2023-05-25	46.40	32.00	0.00	21.60	0.00	0.00
June	2023-06-27	45.80	31.40	0.00	22.80	0.00	0.00
July	2023-07-20	44.70	30.90	0.00	24.40	0.00	0.00
August	2023-09-26	47.50	32.30	0.00	20.20	0.00	0.00
September	2023-09-26	47.50	32.30	0.00	20.20	0.00	0.00
October	2023-11-27	44.00	31.10	0.00	24.90	0.00	
November	2023-11-27	44.00	31.10	0.00	24.90	0.00	0.00
December							
Average		**44.9**	**31.4**	**0.0**	**23.8**	**0.0**	**0.0**
VLGW0054							
January	2023-01-31	41.60	29.30	0.20	28.90	1.10	0.00
February							
March							
April	2023-04-25	40.20	28.70	0.00	31.10	0.00	0.00
May	2023-05-29	48.40	29.80	0.00	21.80	0.00	0.00
June	2023-06-26	43.70	29.10	0.00	27.20	1.00	1.50
July	2023-07-20	44.80	29.50	0.00	25.70	1.50	0.00
August	2023-09-26	45.40	30.00	0.00	24.60	0.00	0.00
September	2023-09-26	45.40	30.00	0.00	24.60	0.00	0.00
October	2023-11-27	37.40	28.40	0.00	34.20	0.00	
November	2023-11-27	37.40	28.40	0.00	34.20	0.00	0.00
December	2023-12-20	37.90	29.70	0.10	32.30	0.00	0.00
Average		**42.2**	**29.3**	**0.0**	**28.5**	**0.4**	**0.2**
VLGW0055							
January	2023-01-31	62.40	35.10	0.00	2.50	2.00	1.10
February	2023-03-16	50.00	33.00	0.00	17.00	1.60	0.00
March	2023-03-16	62.20	34.50	0.10	3.20	0.00	1.60
April	2023-04-25	57.30	34.20	0.00	8.50	0.00	1.50
May	2023-05-29	56.40	34.10	0.00	9.50	1.10	1.10
June	2023-06-26	52.60	32.40	0.00	15.00	3.30	3.30
July	2023-07-20	51.50	31.90	0.00	16.60	2.40	1.90
August	2023-09-26	55.30	33.20	0.00	11.50	2.50	1.10
September	2023-09-26	55.30	33.20	0.00	11.50	2.50	1.10
October	2023-11-27	57.10	34.00	0.00	8.90	0.00	1.10
November	2023-11-27	57.10	34.00	0.00	8.90	0.00	1.10
December	2023-12-20	48.70	33.50	0.00	17.80	2.50	1.90
Average		**55.5**	**33.6**	**0.0**	**10.9**	**1.5**	**1.4**
VLGW0056							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
January	2023-01-31	60.30	33.50	0.00	6.20	0.00	1.60
February							
March							
April	2023-04-25	53.90	31.40	0.10	14.60	0.00	1.10
May	2023-05-29	40.90	27.30	0.00	31.80	1.90	0.00
June	2023-06-26	54.00	30.70	0.00	15.30	0.00	1.50
July	2023-07-20	44.70	28.80	0.00	26.50	1.80	0.00
August	2023-09-26	56.10	31.80	0.00	12.10	0.00	0.00
September	2023-09-26	56.10	31.80	0.00	12.10	0.00	0.00
October	2023-11-27	35.70	27.90	0.00	36.40		0.00
November	2023-11-27	35.70	27.90	0.00	36.40	0.00	0.00
December							
Average		**48.6**	**30.1**	**0.0**	**21.3**	**0.5**	**0.5**
VLGW0057							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
VLGW0058							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
Average							
VLGW0059							
January							
February							
March	2023-03-31	60.00	40.00	0.00	0.00	6.50	8.40
April	2023-04-25	37.30	31.60	2.70	28.40	10.20	2.40
May	2023-05-17	59.90	40.10	0.00	0.00	1.50	4.10
June	2023-06-26	48.80	36.40	0.80	14.00	5.00	4.60
July	2023-07-20	49.70	36.70	0.80	12.80	3.90	4.10
August	2023-09-26	56.10	39.60	0.10	4.20	2.20	4.00
September	2023-09-26	56.10	39.60	0.10	4.20	2.20	4.00
October	2023-11-14	50.80	39.10	0.10	10.00	5.80	5.70
November	2023-11-14	50.80	39.10	0.10	10.00	5.80	5.70
December	2023-12-12	49.10	38.70	0.10	12.10	6.70	6.10
Average		**51.9**	**38.1**	**0.5**	**9.6**	**5.0**	**4.9**
VLGW0060							
January							
February							
March							
April							
May	2023-05-31	65.10	34.90	0.00	0.00	0.00	1.10
June	2023-06-28	53.20	33.10	0.10	13.60	0.00	1.00
July							
August	2023-09-26	49.80	34.40	0.00	15.80	2.90	2.20
September	2023-09-26	49.80	34.40	0.00	15.80	2.90	2.20
October							
November							
December							
Average		**54.5**	**34.2**	**0.0**	**11.3**	**1.5**	**1.6**
HLGW049B							
January	2023-01-18	56.40	39.10	0.00	4.50	6.20	7.50
February	2023-03-09	59.80	39.00	0.00	1.20	0.00	1.10
March	2023-03-09	57.70	39.40	0.00	2.90	0.00	4.20
April	2023-04-18	57.90	40.10	0.00	2.00	4.50	5.90
May	2023-05-31	58.00	39.80	0.00	2.20	4.90	7.60
June	2023-06-20	52.30	38.30	0.00	9.40	4.70	6.30
July	2023-07-19	53.50	39.20	0.00	7.30	6.00	8.00
August	2023-09-20	46.30	36.30	0.30	17.10	25.00	8.60
September	2023-09-20	46.30	36.30	0.30	17.10	25.00	8.60
October	2023-11-27	48.90	36.70	0.10	14.30	9.40	7.90

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
November	2023-11-27	48.90	36.70	0.10	14.30	9.40	7.90
December	2023-12-14	48.40	37.50	0.00	14.10	12.60	10.20
Average		**52.9**	**38.2**	**0.1**	**8.9**	**9.0**	**7.0**
HLGW040B							
January	2023-01-17	28.30	28.70	0.70	42.30	1.00	0.00
February	2023-03-09	61.40	38.10	0.20	0.30	0.00	1.60
March	2023-03-09	60.30	39.70	0.00	0.00	1.50	3.60
April	2023-04-18	54.20	38.40	0.00	7.40	8.20	6.90
May	2023-05-17	47.20	35.80	0.50	16.50	1.00	2.10
June	2023-06-20	46.60	36.10	0.00	17.30	3.80	1.80
July	2023-07-19	57.30	38.90	0.20	3.60	2.70	4.10
August	2023-09-20	51.90	38.10	0.00	10.00	4.70	4.40
September	2023-09-20	51.90	38.10	0.00	10.00	4.70	4.40
October	2023-11-27	62.00	37.80	0.00	0.20	4.00	6.60
November	2023-11-27	62.00	37.80	0.00	0.20	4.00	6.60
December	2023-12-14	51.70	37.90	0.00	10.40	9.00	8.70
Average		**52.9**	**37.1**	**0.1**	**9.9**	**3.7**	**4.2**
HLGW045B							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
HLGW046B							
January							
February							
March							
April							
May							
June							
July							
August							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
September							
October							
November							
December							
Average							
HLGW047B							
January							
February							
March	2023-03-09	40.50	36.90	0.00	22.60	0.00	0.00
April	2023-04-18	38.20	33.10	0.00	28.70	0.00	0.00
May	2023-05-17	27.40	29.40	0.00	43.20	0.00	0.00
June	2023-06-20	32.90	30.70	0.00	36.40	0.00	0.00
July	2023-07-19	51.60	39.00	0.00	9.40	0.00	1.00
August	2023-09-20	48.20	38.70	0.00	13.10	2.10	0.00
September							
October	2023-11-27	47.00	21.50	3.30	28.20	0.00	
November							
December	2023-12-14	54.40	36.70	0.00	8.90	2.70	5.80
Average		**42.5**	**33.3**	**0.4**	**23.8**	**0.6**	**1.0**
HLGW048B							
January							
February							
March	2023-03-09	21.40	24.30	0.00	54.30	0.00	0.00
April	2023-04-18	20.60	24.80	0.00	54.60	0.00	0.00
May	2023-05-31	20.00	26.90	0.00	53.10	0.00	0.00
June	2023-06-20	24.60	28.40	0.00	47.00	0.00	0.00
July	2023-07-19	43.30	34.50	0.00	22.20	0.00	0.00
August	2023-09-20	44.70	37.30	0.00	18.00	2.40	0.00
September	2023-09-20	44.70	37.30	0.00	18.00	2.40	0.00
October	2023-11-27	56.10	38.90	0.10	4.90	0.00	1.10
November	2023-11-27	56.10	38.90	0.10	4.90	0.00	1.10
December	2023-12-14	53.70	39.60	0.00	6.70	5.20	5.10
Average		**38.5**	**33.1**	**0.0**	**28.4**	**1.0**	**0.7**
HLGW050B							
January	2023-01-18	38.80	33.10	0.00	28.10	1.10	0.00
February	2023-03-09	60.30	39.70	0.10	N/A	0.00	1.90
March	2023-03-09	48.40	36.00	0.00	15.60	2.20	2.50
April	2023-04-05	44.80	35.60	0.00	19.60	1.50	1.10
May	2023-05-24	50.40	36.90	0.00	12.70	2.50	1.90
June	2023-06-20	54.30	38.60	0.00	7.10	5.40	5.10

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
July	2023-07-19	51.20	37.90	0.00	10.90	5.30	5.40
August	2023-09-19	50.10	37.60	0.00	12.30	2.10	2.40
September	2023-09-19	50.10	37.60	0.00	12.30	2.10	2.40
October	2023-11-15	59.80	40.20	0.00	0.00	2.50	5.30
November	2023-11-15	59.80	40.20	0.00	0.00	2.50	5.30
December	2023-12-14	31.10	30.50	0.00	38.40	5.70	0.00
Average		**49.9**	**37.0**	**0.0**	**14.3**	**2.7**	**2.8**
HLGW051B							
January	2023-01-18	44.10	35.40	0.00	20.50	3.10	0.00
February	2023-03-09	55.80	37.40	0.00	6.80	0.00	2.20
March	2023-03-09	44.00	34.80	0.00	21.20	5.90	1.10
April	2023-04-05	51.30	37.30	0.00	11.40	1.90	2.50
May	2023-05-24	43.80	34.80	0.00	21.40	2.90	0.00
June	2023-06-20	58.00	39.70	0.10	2.20	4.20	5.50
July	2023-07-19	40.60	34.10	0.00	25.30	4.20	3.40
August	2023-09-19	53.10	38.30	0.00	8.60	1.90	1.50
September	2023-09-19	53.10	38.30	0.00	8.60	1.90	1.50
October	2023-11-15	60.60	39.40	0.00	0.00	1.60	3.00
November	2023-11-15	60.60	39.40	0.00	0.00	1.60	3.00
December	2023-12-14	36.60	33.20	0.00	30.20	6.30	0.00
Average		**50.1**	**36.8**	**0.0**	**13.0**	**3.0**	**2.0**
HLGW0052							
January							
February	2023-03-29	57.30	42.70	0.00	0.00	4.20	7.10
March							
April	2023-04-25	31.10	33.30	0.40	35.20	0.00	0.00
May	2023-05-17	26.40	28.90	0.10	44.60	0.00	0.00
June	2023-06-21	56.80	40.20	0.10	2.90	0.00	1.90
July	2023-07-18	31.70	31.60	1.70	35.00	0.00	0.00
August							
September	2023-09-14	51.30	39.90	0.00	8.80	5.60	3.80
October	2023-11-23	58.50	40.80	0.60	0.10	0.00	0.50
November	2023-11-23	58.50	40.80	0.60	0.10	0.00	0.50
December							
Average		**46.5**	**37.3**	**0.4**	**15.8**	**1.2**	**1.7**
HLGW0053							
January	2023-01-13	56.60	43.30	0.10	0.00	4.80	4.90
February	2023-03-29	59.60	40.40	0.00	0.00	0.00	2.10
March	2023-03-29	53.00	41.10	0.00	5.90	12.40	10.60
April	2023-04-25	53.10	40.80	0.00	6.10	11.20	11.00

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
May	2023-05-15	53.70	41.10	0.00	5.20	12.90	7.40
June	2023-06-21	54.90	42.20	0.10	2.80	9.00	9.20
July							
August	2023-09-14	56.70	42.90	0.20	0.20	2.90	3.00
September	2023-09-14	56.70	42.90	0.20	0.20	2.90	3.00
October	2023-11-23	55.00	42.50	0.20	2.30	8.30	9.40
November	2023-11-23	55.00	42.50	0.20	2.30	8.30	9.40
December	2023-12-12	53.60	43.70	0.10	2.60	7.90	9.50
Average		**55.3**	**42.1**	**0.1**	**2.5**	**7.3**	**7.2**
HLGW0054							
January	2023-01-13	56.30	43.50	0.20	0.00	0.00	1.40
February	2023-03-29	58.40	41.60	0.00	0.00	3.50	3.40
March	2023-03-29	35.60	31.80	2.50	30.10	3.70	1.10
April	2023-04-25	53.30	41.20	0.00	5.50	1.50	1.40
May	2023-05-15	36.00	34.30	0.00	29.70	3.80	1.80
June	2023-06-21	56.90	42.90	0.10		1.90	4.30
July	2023-07-18	15.50	24.70	1.90	57.90	4.20	1.40
August	2023-09-14	56.20	43.10	0.00	0.70	3.90	3.50
September	2023-09-14	56.20	43.10	0.00	0.70	3.90	3.50
October	2023-11-23	55.50	44.20	0.20	0.10	0.00	2.80
November	2023-11-23	55.50	44.20	0.20	0.10	0.00	2.80
December	2023-12-12	54.50	44.10	0.00	1.40	1.30	1.80
Average		**49.2**	**39.9**	**0.4**	**11.5**	**2.3**	**2.4**
HLGW0055							
January							
February	2023-03-29	50.90	38.60	0.20	10.30	15.20	12.50
March	2023-03-29	48.00	37.00	0.20	14.80	2.60	2.40
April	2023-04-25	45.80	37.10	0.10	17.00	5.70	2.80
May	2023-05-15	42.60	35.70	0.20	21.50	4.90	2.50
June	2023-06-21	56.60	42.50	0.00	0.90	0.00	0.00
July	2023-07-18	44.80	37.20	0.30	17.70	3.20	2.90
August	2023-09-14	48.90	39.40	0.00	11.70	4.00	3.80
September	2023-09-14	48.90	39.40	0.00	11.70	4.00	3.80
October	2023-11-23	52.90	41.00	0.00	6.10	6.60	8.50
November	2023-11-23	52.90	41.00	0.00	6.10	6.60	8.50
December	2023-12-13	43.70	38.30	1.40	16.60	0.00	1.10
Average		**48.7**	**38.8**	**0.2**	**12.2**	**4.8**	**4.4**
HLGW0056							
January							
February							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
HLGW0057							
January	2023-01-13	55.90	40.30	0.00	3.80	13.90	14.00
February	2023-03-29	38.30	32.30	1.60	27.80	4.30	0.00
March	2023-03-29	56.90	40.00	0.10	3.00	10.80	12.30
April	2023-04-17	56.90	40.00	0.00	3.10	14.40	14.50
May	2023-05-12	54.30	39.80	0.00	5.90	12.40	12.40
June	2023-06-21	50.60	38.40	0.30	10.70	14.50	14.40
July	2023-07-17	46.10	37.30	0.10	16.50	13.90	11.50
August	2023-09-13	49.20	38.20	0.00	12.60	11.40	9.90
September	2023-09-13	49.20	38.20	0.00	12.60	11.40	9.90
October	2023-11-22	46.60	37.20	0.10	16.10	20.20	14.00
November	2023-11-22	46.60	37.20	0.10	16.10	20.20	14.00
December	2023-12-05	50.60	39.90	0.00	9.50	9.90	9.90
Average		**50.1**	**38.2**	**0.2**	**11.5**	**13.1**	**11.4**
HLGW0058							
January							
February							
March							
April	2023-04-25	16.40	17.60	9.90	56.10	15.50	1.20
May	2023-05-17	18.40	21.50	5.20	54.90	0.00	0.00
June	2023-06-27	18.90	20.50	6.00	54.60	0.00	0.00
July							
August	2023-09-13	17.80	18.70	7.60	55.90	15.30	0.00
September	2023-09-13	17.80	18.70	7.60	55.90	15.30	0.00
October	2023-11-23	21.10	21.40	7.50	50.00	17.00	2.00
November							
December							
Average		**18.4**	**19.7**	**7.3**	**54.6**	**10.5**	**0.5**
HLGW0059							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
January							
February	2023-03-30	57.90	42.00	0.10	0.00	6.50	8.00
March	2023-03-30	58.30	41.60	0.10	0.00	5.70	5.40
April	2023-04-17	43.60	35.50	0.00	20.90	8.50	1.80
May	2023-05-15	58.60	41.40	0.10	N/A	15.10	17.00
June	2023-06-21	35.00	32.20	0.90	31.90	14.80	1.10
July	2023-07-18	29.50	29.80	1.70	39.00	15.90	2.00
August	2023-09-14	58.70	41.10	0.20	0.00	5.60	7.10
September	2023-09-14	58.70	41.10	0.20	0.00	5.60	7.10
October	2023-11-23	55.20	37.50	3.30	4.00	0.00	11.30
November	2023-11-23	55.20	37.50	3.30	4.00	0.00	11.30
December							
Average		**51.1**	**38.0**	**1.0**	**11.1**	**7.8**	**7.2**
HLGW0060							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
HLGW0061							
January							
February	2023-03-29	54.30	45.00	0.60	0.10	0.00	3.80
March	2023-03-29	58.30	41.60	0.10	0.00	9.40	11.80
April	2023-04-25	55.60	41.00	0.00	3.40	19.70	19.80
May	2023-05-15	53.50	40.90	0.00	5.60	18.90	18.90
June	2023-06-21	53.80	41.70	0.00	4.50	9.70	21.00
July	2023-07-18	49.10	39.40	0.00	11.50	21.50	21.30
August	2023-09-14	48.20	40.00	0.00	11.80	25.10	25.00
September	2023-09-14	48.20	40.00	0.00	11.80	25.10	25.00
October	2023-11-23	55.30	42.10	0.20	2.40	15.50	17.50
November	2023-11-23	55.30	42.10	0.20	2.40	15.50	17.50
December	2023-12-28	44.00	38.30	0.10	17.60	13.50	5.30

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
Average		**52.3**	**41.1**	**0.1**	**6.5**	**15.8**	**17.0**
HLGW0062							
January	2023-01-13	56.20	43.40	0.40	0.00	4.30	4.20
February	2023-03-30	33.80	36.90	0.80	28.50	12.90	0.50
March	2023-03-30	35.50	35.20	1.90	27.40	9.60	4.40
April	2023-04-25	47.30	41.50	0.00	11.20	0.00	1.80
May	2023-05-15	38.70	36.80	0.00	24.50	8.80	3.60
June	2023-06-21	52.70	44.30	0.00	3.00	0.00	6.70
July	2023-07-18	26.60	31.20	0.50	41.70	9.20	5.30
August							
September	2023-09-14	16.90	26.70	0.00	56.40	1.50	0.40
October	2023-11-23	53.10	45.40	0.00	1.50	0.00	2.80
November	2023-11-23	53.10	45.40	0.00	1.50	0.00	2.80
December	2023-12-12	52.00	45.60	0.00	2.40	12.50	14.30
Average		**42.4**	**39.3**	**0.3**	**18.0**	**5.3**	**4.3**
HLGW0063							
January	2023-01-13	58.20	41.60	0.20	0.00	0.00	0.00
February	2023-03-29	53.30	39.30	0.00	7.40	11.30	11.20
March	2023-03-29	57.00	42.90	0.10	0.00	2.20	1.90
April	2023-04-25	50.40	41.00	0.00	8.60	3.70	3.60
May	2023-05-15	53.70	42.00	0.00	4.30	1.00	1.20
June	2023-06-21	47.10	40.40	0.00	12.50	2.70	2.30
July	2023-07-18	38.20	36.40	0.00	25.40	0.00	0.00
August	2023-09-14	52.40	42.80	0.00	4.80	0.90	0.80
September	2023-09-14	52.40	42.80	0.00	4.80	0.90	0.80
October	2023-11-23	52.30	42.70	0.00	5.00	2.20	3.00
November	2023-11-23	52.30	42.70	0.00	5.00	2.20	3.00
December	2023-12-12	53.80	44.80	0.00	1.40	1.80	1.80
Average		**51.8**	**41.6**	**0.0**	**6.6**	**2.4**	**2.5**
HLGW064B							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
November							
December							
Average							
HLGW065A							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
HLGW065B							
January	2023-01-31	56.20	40.40	0.20	3.20	0.00	0.00
February	2023-03-02	54.80	39.80	0.00	5.40	47.50	0.00
March							
April	2023-04-17	43.30	34.70	0.10	21.90	0.00	0.00
May	2023-05-29	48.60	36.10	0.00	15.30	0.00	1.80
June	2023-06-21	44.70	35.40	0.50	19.40	0.00	0.00
July	2023-07-19	25.60	27.20	2.10	45.10	4.10	0.00
August							
September							
October	2023-11-22	58.70	41.20	0.10	0.00	0.00	3.40
November	2023-11-22	58.70	41.20	0.10	0.00	0.00	3.40
December							
Average		**48.8**	**37.0**	**0.4**	**13.8**	**6.5**	**1.1**
HLGW066A							
January	2023-01-10	41.10	35.90	0.00	23.00	0.00	0.00
February	2023-03-02	16.60	24.90	1.90	56.60	0.00	0.00
March	2023-03-02	58.00	42.00	0.00	0.00	0.00	9.00
April							
May	2023-05-09	42.00	36.00	0.00	22.00	3.60	3.50
June	2023-06-15	45.60	37.90	0.10	16.40	1.50	2.90
July	2023-07-13	35.80	33.80	0.00	30.40	1.40	1.70
August	2023-09-06	25.60	26.80	1.40	46.20	0.40	0.00

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
September	2023-09-06	25.60	26.80	1.40	46.20	0.40	0.00
October	2023-11-14	41.50	35.30	0.20	23.00	0.00	0.00
November	2023-11-14	41.50	35.30	0.20	23.00	0.00	0.00
December	2023-12-11	49.10	40.00	0.10	10.80	0.00	0.00
Average		**38.4**	**34.1**	**0.5**	**27.1**	**0.7**	**1.6**
HLGW066B							
January	2023-01-31	14.30	23.20	1.40	61.10	0.00	0.00
February							
March							
April	2023-04-25	38.60	32.30	2.00	27.10	0.00	0.00
May	2023-05-29	24.20	19.90	11.00	44.90	0.00	0.00
June	2023-06-21	14.70	11.50	14.60	59.20	0.00	0.00
July	2023-07-19	9.20	8.30	16.30	66.20	0.00	0.00
August	2023-09-14	38.50	32.70	2.60	26.20	0.00	0.00
September	2023-09-14	38.50	32.70	2.60	26.20	0.00	0.00
October	2023-11-22	47.40	36.10	2.00	14.50	0.00	0.00
November	2023-11-22	47.40	36.10	2.00	14.50	0.00	0.00
December	2023-12-12	56.10	42.50	0.10	1.30	0.00	0.00
Average		**32.9**	**27.5**	**5.5**	**34.1**	**0.0**	**0.0**
HLGW067A							
January	2023-01-10	57.60	42.20	0.20	0.00	26.50	29.80
February	2023-03-02	48.40	37.90	0.00	13.70	0.00	0.00
March	2023-03-02	56.10	41.40	0.10	2.40	22.80	22.80
April	2023-04-17	57.60	42.40	0.00	0.00	21.00	23.30
May	2023-05-09	54.60	41.20	0.00	4.20	19.20	19.20
June	2023-06-15	51.80	39.10	0.00	9.10	54.60	56.90
July	2023-07-13	49.40	38.90	0.40	11.30	19.30	19.30
August	2023-09-06	51.20	40.00	0.60	8.20	20.20	20.60
September	2023-09-06	51.20	40.00	0.60	8.20	20.20	20.60
October	2023-11-14	56.60	43.40	0.00	0.00	12.10	20.70
November	2023-11-14	56.60	43.40	0.00	0.00	12.10	20.70
December	2023-12-11	44.30	38.10	1.90	15.70	33.90	21.20
Average		**53.0**	**40.7**	**0.3**	**6.1**	**21.8**	**22.9**
HLGW067B							
January							
February	2023-03-02	45.20	36.40	1.20	17.20	0.00	0.00
March							
April							
May	2023-05-29	17.00	17.10	9.20	56.70	0.80	1.00
June	2023-06-21	31.80	24.30	1.40	42.50	0.00	0.00

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
July							
August	2023-09-14	23.10	21.80	8.50	46.60	0.00	0.00
September	2023-09-14	23.10	21.80	8.50	46.60	0.00	0.00
October	2023-11-22	23.10	24.90	7.40	44.60	1.20	1.10
November							
December							
Average		**27.2**	**24.4**	**6.0**	**42.4**	**0.3**	**0.4**
HLGW068B							
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
RWHGW01A							
January	2023-01-10	40.80	33.60	1.80	23.80	0.00	0.00
February	2023-03-02	54.70	40.20	0.10	5.00	0.00	1.40
March	2023-03-02	54.50	41.60	0.00	3.90	1.60	1.60
April	2023-04-03	51.70	40.50	0.00	7.80	1.50	1.50
May	2023-05-09	46.90	38.80	0.00	14.30	2.40	2.30
June	2023-06-28	53.20	41.10	0.00	5.70	1.10	1.80
July	2023-07-13	28.00	26.70	4.60	40.70	3.80	0.00
August							
September							
October	2023-11-16	43.40	33.60	0.40	22.60	0.00	0.00
November	2023-11-16	43.40	33.60	0.40	22.60	0.00	0.00
December							
Average		**46.3**	**36.6**	**0.8**	**16.3**	**1.2**	**1.0**
RWHGW01B							
January							
February							
March							
April							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
May							
June							
July							
August							
September							
October							
November							
December							
Average							
HLGW070A							
January	2023-01-10	57.90	41.80	0.20	0.10	20.10	23.00
February	2023-03-02	55.70	40.40	0.20	3.70	22.30	22.20
March	2023-03-02	56.20	40.70	0.10	3.00	24.30	24.30
April	2023-04-17	58.50	41.40	0.20	N/A	14.80	19.90
May	2023-05-09	55.00	40.10	0.00	4.90	20.10	18.10
June	2023-06-15	50.60	38.80	0.10	10.50	22.00	20.10
July	2023-07-11	53.50	39.00	0.10	7.40	23.30	27.10
August	2023-09-05	51.80	39.00	0.10	9.10	18.00	18.00
September	2023-09-05	51.80	39.00	0.10	9.10	18.00	18.00
October	2023-11-14	57.80	41.40	0.10	0.70	14.60	18.50
November	2023-11-14	57.80	41.40	0.10	0.70	14.60	18.50
December	2023-12-05	55.10	41.90	0.20	2.80	15.30	22.00
Average		**55.1**	**40.4**	**0.1**	**4.7**	**19.0**	**20.8**
HLGW071A							
January	2023-01-10	57.90	42.10	0.10	N/A	9.10	11.40
February	2023-03-02	18.70	25.70	1.50	54.10	0.00	0.00
March	2023-03-02	53.10	39.40	0.50	7.00	7.80	8.00
April	2023-04-17	58.70	41.30	0.00	0.00	5.60	9.30
May	2023-05-09	34.00	27.50	5.30	33.20	13.90	5.10
June	2023-06-15	35.00	31.60	1.20	32.20	21.20	14.70
July	2023-07-11	46.90	35.40	1.20	16.50	7.00	7.00
August	2023-09-05	47.90	36.70	1.00	14.40	5.80	5.80
September	2023-09-05	47.90	36.70	1.00	14.40	5.80	5.80
October	2023-11-14	42.50	35.30	0.90	21.30	0.00	0.00
November	2023-11-14	42.50	35.30	0.90	21.30	0.00	0.00
December							
Average		**44.1**	**35.2**	**1.2**	**21.4**	**6.9**	**6.1**
HLGW072A							
January	2023-01-10	57.50	41.00	0.20	1.30	21.80	21.00
February	2023-03-02	48.00	37.70	0.60	13.70	24.80	19.60

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
March	2023-03-02	58.00	41.00	0.10	0.90	15.40	19.60
April	2023-04-17	59.30	40.70	0.00	0.00	15.60	17.80
May	2023-05-09	50.90	38.10	0.50	10.50	17.00	16.90
June	2023-06-15	51.90	39.10	0.00	9.00	31.80	32.90
July	2023-07-11	51.50	38.70	0.00	9.80	20.70	20.70
August	2023-09-05	46.20	37.30	0.10	16.40	26.20	18.70
September	2023-09-05	46.20	37.30	0.10	16.40	26.20	18.70
October	2023-11-14	52.40	40.40	0.00	7.20	14.80	14.90
November	2023-11-14	52.40	40.40	0.00	7.20	14.80	14.90
December							
Average		**52.2**	**39.2**	**0.1**	**8.4**	**20.8**	**19.6**
HLGW073A							
January	2023-01-10	56.70	41.10	0.20	2.00	48.30	52.40
February	2023-03-02	58.40	41.60	0.00	0.00	11.70	15.00
March	2023-03-02	55.40	40.70	0.10	3.80	45.10	49.70
April	2023-04-17	56.30	40.30	0.00	3.40	41.80	43.30
May	2023-05-09	55.40	40.60	0.00	4.00	33.80	36.10
June	2023-06-15	53.50	40.20	0.00	6.30	35.90	43.40
July	2023-07-11	50.70	39.30	0.00	10.00	37.60	45.30
August	2023-09-05	46.00	38.00	0.10	15.90	42.30	36.50
September	2023-09-05	46.00	38.00	0.10	15.90	42.30	36.50
October	2023-11-14	55.50	41.90	0.00	2.60	11.50	24.60
November	2023-11-14	55.50	41.90	0.00	2.60	11.50	24.60
December	2023-12-11	47.50	39.70	0.10	12.70	30.50	13.70
Average		**53.1**	**40.3**	**0.1**	**6.6**	**32.7**	**35.1**
HLGW074A							
January	2023-01-10	49.20	35.80	3.20	11.80	0.00	0.00
February	2023-03-02	58.40	40.80	0.00	0.80	21.70	25.60
March	2023-03-02	27.20	27.20	9.70	35.90	0.00	0.00
April	2023-04-03	14.60	22.90	11.80	50.70	0.00	0.00
May	2023-05-09	52.80	40.40	0.00	6.80	0.00	1.60
June	2023-06-15	51.20	40.60	0.00	8.20	5.60	2.80
July	2023-07-11	46.80	34.90	2.70	15.60	0.00	0.00
August	2023-09-05	52.10	39.00	0.70	8.20	0.00	0.00
September	2023-09-05	52.10	39.00	0.70	8.20	0.00	0.00
October	2023-11-14	33.80	31.30	2.70	32.20	0.00	0.00
November	2023-11-14	33.80	31.30	2.70	32.20	0.00	0.00
December	2023-12-11	43.90	36.00	1.90	18.20	0.00	0.00
Average		**43.0**	**34.9**	**3.0**	**19.1**	**2.3**	**2.5**
HLGW075B							

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Average							
HLGW079A							
January	2023-01-10	57.80	42.10	0.20	N/A	14.70	17.00
February	2023-03-02	54.50	39.60	0.00	5.90	45.50	46.70
March	2023-03-02	58.70	41.30	0.00	0.00	14.60	17.40
April	2023-04-17	58.80	41.10	0.10	0.00	15.10	17.10
May	2023-05-09	55.00	39.80	0.00	5.20	17.30	17.30
June	2023-06-15	49.80	38.30	0.20	11.70	22.10	18.20
July	2023-07-11	55.10	39.50	0.10	5.30	19.00	23.20
August	2023-09-05	54.20	39.70	0.10	6.00	17.10	18.30
September	2023-09-05	54.20	39.70	0.10	6.00	17.10	18.30
October	2023-11-14	57.10	40.20	0.30	2.40	17.70	18.60
November	2023-11-14	57.10	40.20	0.30	2.40	17.70	18.60
December	2023-12-11	44.70	36.30	1.90	17.10	23.00	14.90
Average		**54.8**	**39.8**	**0.3**	**5.6**	**20.1**	**20.5**
HLGW080A							
January	2023-01-10	57.60	42.40	0.00	0.00	18.50	23.40
February	2023-03-02	53.10	38.40	0.70	7.80	0.00	0.00
March	2023-03-02	58.50	41.00	0.50	0.00	11.50	19.80
April	2023-04-17	58.80	41.20	0.00	0.00	20.40	24.70
May	2023-05-09	50.20	39.10	0.00	10.70	24.10	20.50
June	2023-06-15	49.40	38.50	0.00	12.10	25.80	24.90
July	2023-07-11	55.00	39.90	0.00	5.10	22.40	25.40
August	2023-09-05	58.40	41.40	0.00	0.20	19.90	22.10
September	2023-09-05	58.40	41.40	0.00	0.20	19.90	22.10
October	2023-11-14	58.00	42.00	0.00	0.00	12.80	12.50
November	2023-11-14	58.00	42.00	0.00	0.00	12.80	12.50
December	2023-12-11	56.40	41.70	0.00	1.90	17.50	17.40

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
Average		56.0	40.8	0.1	3.2	17.1	18.8
HLGW081A							
January	2023-01-10	58.60	40.80	0.60	0.00	32.70	35.80
February	2023-03-02	39.30	34.10	1.20	25.40	20.70	10.70
March	2023-03-02	58.90	40.70	0.40	0.00	32.70	35.70
April	2023-04-17	58.90	40.20	0.20	0.70	26.70	33.20
May	2023-05-09	52.50	37.70	1.00	8.80	35.40	33.00
June	2023-06-15	48.90	36.30	1.50	13.30	45.30	39.00
July	2023-07-11	52.20	36.80	1.60	9.40	30.60	36.90
August	2023-09-05	53.70	39.00	0.70	6.60	32.90	35.20
September	2023-09-05	53.70	39.00	0.70	6.60	32.90	35.20
October	2023-11-14	57.20	40.60	0.30	1.90	12.20	32.10
November	2023-11-14	57.20	40.60	0.30	1.90	12.20	32.10
December	2023-12-11	48.10	37.40	1.80	12.70	21.90	19.20
Average		**53.3**	**38.6**	**0.9**	**7.3**	**28.0**	**31.5**
HLGW082A							
January	2023-01-10	58.40	40.80	0.70	0.10	12.60	16.10
February	2023-03-02	58.60	41.20	0.10	0.10	23.40	24.90
March	2023-03-02	52.20	37.20	2.20	8.40	10.30	10.20
April	2023-04-17	58.60	41.40	0.00	0.00	8.70	13.60
May	2023-05-09	59.10	40.90	0.00	0.00	9.80	13.60
June	2023-06-15	58.50	41.30	0.00	0.20	5.10	10.30
July	2023-07-11	51.70	38.20	0.70	9.40	14.80	18.50
August	2023-09-05	58.00	41.70	0.00	0.30	11.10	19.10
September	2023-09-05	58.00	41.70	0.00	0.30	11.10	19.10
October	2023-11-14	57.70	42.30	0.00	0.00	10.40	27.40
November	2023-11-14	57.70	42.30	0.00	0.00	10.40	27.40
December	2023-12-11	37.10	32.20	3.00	27.70	35.20	22.20
Average		**55.5**	**40.1**	**0.6**	**3.9**	**13.6**	**18.5**
HLGW083A							
January	2023-01-10	56.50	41.00	0.00	2.50	24.30	24.40
February	2023-03-02	47.80	35.20	3.00	14.00	10.80	7.30
March	2023-03-02	56.00	40.70	0.00	3.30	19.90	19.90
April	2023-04-17	55.20	39.80	0.00	5.00	11.00	11.00
May	2023-05-09	55.00	40.10	0.00	4.90	5.50	5.50
June	2023-06-15	53.00	40.00	0.00	7.00	21.10	23.20
July	2023-07-11	52.50	39.50	0.00	8.00	26.40	26.20
August	2023-09-05	51.30	39.90	0.00	8.80	21.50	19.70
September	2023-09-05	51.30	39.90	0.00	8.80	21.50	19.70
October	2023-11-14	48.00	39.10	0.30	12.60	14.90	12.80

Appendix B2, continued

Month	Date	CH_4 %	CO_2 %	O_2 %	Balance %	Init. Flow SCFM	Adj. Flow SCFM
November	2023-11-14	48.00	39.10	0.30	12.60	14.90	12.80
December	2023-12-11	43.20	38.10	0.50	18.20	20.70	18.90
Average		**51.5**	**39.4**	**0.3**	**8.8**	**17.7**	**16.8**

Note: <<>> = under or over range of instrument

Appendix B3 2023 Hartland Landfill Gas Well Field Data Summary

Name	Refuse Lift (mASL)	Year Activated	Average Methane (% by vol)	Average Flow (scfm)	Months in Operation	Methane Annual Flow (scf)	Methane Flow (m3)	Energy (GJ)	Well Production (% of Total)	Cumulative Total (%)
HLGW016B	163	2012	52.2	109.7	12.0	30,104,933	852,481	30,604	16%	16%
HLGW028A	171	2017	53.5	34.6	12.0	9,731,211	275,559	9,893	5%	21%
HLGW073A	163	2019	53.1	32.7	12.0	9,114,742	258,102	9,266	5%	26%
HLGW081A	167	2019	53.3	28.0	12.0	7,839,517	221,992	7,969	4%	31%
HLGW0018	165	2013	53.1	26.6	12.0	7,408,191	209,778	7,531	4%	35%
HLGW067A	159 (3)	2018	53.0	21.8	12.0	6,070,683	171,904	6,171	3%	38%
HLGW079A	167	2019	54.8	20.1	12.0	5,773,737	163,495	5,869	3%	41%
HLGW070A	163	2019	55.1	19.0	12.0	5,489,167	155,437	5,580	3%	44%
HLGW072A	163	2019	52.2	20.8	11.0	5,236,092	148,270	5,323	3%	47%
HLGW080A	167	2019	56.0	17.1	12.0	5,038,693	142,681	5,122	3%	49%
HLGW0061	155(3)	2019	52.3	15.8	11.0	3,983,490	112,800	4,050	2%	52%
HLGW042B	175	2017	53.4	14.2	12.0	3,966,832	112,329	4,033	2%	54%
HLGW082A	167	2019	55.5	13.6	12.0	3,955,389	112,005	4,021	2%	56%
HLGW038B	175	2017	54.0	13.1	12.0	3,713,620	105,159	3,775	2%	58%
HLGW032B	171	2014	57.3	13.8	10.0	3,461,543	98,021	3,519	2%	60%
HLGW0057	155(3)	2019	50.1	13.1	12.0	3,449,868	97,690	3,507	2%	62%
HLGW008B	143	2006	38.9	17.9	11.0	3,358,606	95,106	3,414	2%	63%
HLGW028B	171	2015	52.9	11.5	11.0	2,931,438	83,010	2,980	2%	65%
VLGW0051	---	2011	52.8	10.5	11.0	2,671,934	75,661	2,716	1%	66%
HLGW049B	179	2018	52.9	9.0	12.0	2,492,492	70,580	2,534	1%	68%
HLGW033A	171	2014	52.6	8.9	12.0	2,448,044	69,321	2,489	1%	69%
HLGW030B	171	2014	52.2	10.4	10.0	2,377,422	67,321	2,417	1%	70%
HLGW031B	171	2014	56.2	7.9	10.0	1,951,670	55,265	1,984	1%	71%
HLGW0053	151(3)	2018	55.3	7.3	11.0	1,949,892	55,215	1,982	1%	72%
HLGW0059	155(3)	2019	51.1	7.8	10.0	1,737,093	49,189	1,766	1%	73%

Appendix B3, continued

Name	Refuse Lift (mASL)	Year Activated	Average Methane (% by vol)	Average Flow (scfm)	Months in Operation	Methane Annual Flow (scf)	Methane Flow (m3)	Energy (GJ)	Well Production (% of Total)	Cumulative Total (%)
VLGW027D	---	1997	67.2	7.1	8.0	1,681,997	47,629	1,710	1%	74%
HLGW021B	165	2013	54.4	6.4	11.0	1,670,208	47,295	1,698	1%	75%
VLGW032S	---	1997	51.5	11.2	6.0	1,508,236	42,709	1,533	1%	76%
HLGW047A	179	2017	51.2	6.7	10.0	1,493,893	42,303	1,519	1%	77%
HLGW071A	163	2019	44.1	6.9	11.0	1,471,057	41,656	1,495	1%	78%
VLGW012S	---	1996	51.3	6.1	10.0	1,373,302	38,888	1,396	1%	78%
VLGW024D	---	1997	68.6	15.0	3.0	1,350,708	38,248	1,373	1%	79%
VLGW028S	---	1997	48.0	7.9	8.0	1,333,598	37,763	1,356	1%	80%
VLGW003D	---	1996	61.0	4.1	12.0	1,314,523	37,223	1,336	1%	81%
HLGW043A	175	2017	52.6	4.7	11.0	1,196,740	33,888	1,217	1%	81%
HLGW041B	175	2017	46.1	4.9	12.0	1,188,216	33,647	1,208	1%	82%
VLGW0059	---	2011	51.9	5.0	10.0	1,130,571	32,014	1,149	1%	82%
HLGW034A	171	2014	51.9	4.5	11.0	1,127,491	31,927	1,146	1%	83%
HLGW0055	151(3)	2018	48.7	4.8	11.0	1,126,269	31,893	1,145	1%	84%
HLGW065B	159 (3)	2018	48.8	6.5	8.0	1,102,879	31,230	1,121	1%	84%
HLGW0062	155(3)	2019	42.4	5.3	11.0	1,090,218	30,872	1,108	1%	85%
VLGW008S	---	1996	64.1	3.2	12.0	1,089,452	30,850	1,108	1%	85%
HLGW040B	175	2018	52.9	3.7	12.0	1,032,825	29,246	1,050	1%	86%
HLGW048A	179	2017	51.8	3.4	12.0	929,864	26,331	945	1%	86%
VLGW026S	---	1997	58.5	4.0	9.0	919,886	26,048	935	0%	87%
HLGW044A	179	2017	50.7	3.3	12.0	880,250	24,926	895	0%	87%
VLGW029D	---	1997	61.5	3.6	9.0	871,808	24,687	886	0%	88%
HLGW039A	175	2017	37.1	4.3	12.0	836,594	23,690	850	0%	88%
HLGW040A	175	2017	49.9	3.1	12.0	812,741	23,014	826	0%	89%
VLGW030S	---	1997	36.1	7.2	7.0	791,260	22,406	804	0%	89%
HLGW051B	179	2017	50.1	3.0	12.0	779,096	22,062	792	0%	90%

Appendix B3, continued

Name	Refuse Lift (mASL)	Year Activated	Average Methane (% by vol)	Average Flow (scfm)	Months in Operation	Methane Annual Flow (scf)	Methane Flow (m3)	Energy (GJ)	Well Production (% of Total)	Cumulative Total (%)
VLGW027S	---	1997	43.8	6.5	6.0	752,426	21,306	765	0%	90%
HLGW050B	179	2018	49.9	2.7	12.0	719,035	20,361	731	0%	90%
HLGW0063	155(3)	2019	51.8	2.4	12.0	654,808	18,542	666	0%	91%
VLGW015D	---	1997	71.3	2.0	10.0	624,246	17,677	635	0%	91%
HLGW032A	171	2014	40.5	3.2	11.0	615,620	17,433	626	0%	91%
VLGW021D	---	1997	60.8	2.6	9.0	612,052	17,331	622	0%	92%
HLGW0054	151(3)	2018	49.2	2.3	12.0	596,092	16,880	606	0%	92%
VLGW019S	---	1997	53.1	2.6	10.0	592,972	16,791	603	0%	92%
VLGW016D	---	1997	60.4	2.2	10.0	568,569	16,100	578	0%	93%
VLGW015S	---	1997	61.9	2.2	9.0	547,465	15,503	557	0%	93%
VLGW007D	---	1996	65.1	1.6	12.0	544,404	15,416	553	0%	93%
VLGW003S	---	1996	62.0	1.6	12.0	526,325	14,904	535	0%	94%
HLGW074A	163	2019	43.0	2.3	12.0	513,787	14,549	522	0%	94%
HLGW0058	155(3)	2019	18.4	10.5	6.0	508,257	14,392	517	0%	94%
VLGW018D	---	1997	56.4	2.0	10.0	488,566	13,835	497	0%	94%
VLGW017S	---	1997	68.5	1.9	8.0	459,390	13,009	467	0%	95%
VLGW0055	---	2011	55.5	1.5	12.0	434,827	12,313	442	0%	95%
VLGW013S	---	1997	61.9	1.5	10.0	414,522	11,738	421	0%	95%
HLGW041A	175	2017	40.3	2.5	9.0	390,205	11,049	397	0%	95%
VLGW001D	---	1996	67.6	1.1	12.0	387,472	10,972	394	0%	96%
VLGW023S	---	1997	59.4	1.6	9.0	384,700	10,894	391	0%	96%
VLGW017D	---	1997	66.8	1.4	9.0	365,103	10,339	371	0%	96%
VLGW021S	---	1997	64.2	1.4	9.0	348,552	9,870	354	0%	96%
VLGW004S	---	1996	65.4	1.5	8.0	334,965	9,485	341	0%	96%
HLGW008A	143	2006	38.2	1.5	12.0	302,412	8,563	307	0%	96%
HLGW027A	171	2017	46.3	1.2	12.0	293,943	8,324	299	0%	97%

Appendix B3, continued

Name	Refuse Lift (mASL)	Year Activated	Average Methane (% by vol)	Average Flow (scfm)	Months in Operation	Methane Annual Flow (scf)	Methane Flow (m3)	Energy (GJ)	Well Production (% of Total)	Cumulative Total (%)
VLGW006D	---	1996	61.9	1.0	10.0	274,073	7,761	279	0%	97%
VLGW029S	---	1997	50.1	1.5	8.0	263,313	7,456	268	0%	97%
VLGW0052	---	2011	49.0	1.1	11.0	261,810	7,414	266	0%	97%
HLGW029A	171	2017	26.6	1.8	12.0	250,355	7,089	255	0%	97%
VLGW022D	---	1997	68.9	1.3	6.0	226,158	6,404	230	0%	97%
VLGW011S	---	1996	46.2	0.9	12.0	214,148	6,064	218	0%	97%
HLGW042A	175	2017	49.7	1.0	10.0	213,301	6,040	217	0%	98%
RWHGW01A	3	2020	46.3	1.2	9.0	210,740	5,968	214	0%	98%
HLGW039B	175	2017	54.6	2.2	4.0	210,335	5,956	214	0%	98%
HLGW027B	171	2015	36.9	1.1	12.0	206,669	5,852	210	0%	98%
VLGW019D	---	1997	50.3	0.9	10.0	204,820	5,800	208	0%	98%
HLGW050A	179	2017	44.9	0.9	11.0	203,072	5,750	206	0%	98%
VLGW016S	---	1997	59.7	0.8	10.0	200,430	5,676	204	0%	98%
HLGW0052	151(3)	2018	46.5	1.2	8.0	199,273	5,643	203	0%	98%
VLGW0050	---	2011	53.2	0.7	12.0	195,534	5,537	199	0%	98%
VLGW018S	---	1997	49.0	0.9	10.0	195,277	5,530	199	0%	99%
VLGW007S	---	1996	55.8	0.7	12.0	191,920	5,435	195	0%	99%
HLGW031A	171	2014	37.7	1.2	10.0	189,589	5,369	193	0%	99%
VLGW006S	---	1996	59.3	0.7	10.0	178,770	5,062	182	0%	99%
HLGW048B	179	2018	38.5	1.0	10.0	168,625	4,775	171	0%	99%
HLGW029B	171	2015	49.4	1.1	7.0	162,237	4,594	165	0%	99%
VLGW020S	---	1997	44.6	1.2	7.0	161,894	4,584	165	0%	99%
HLGW051A	179	2017	43.6	0.8	10.0	150,397	4,259	153	0%	99%
VLGW0060	---	2011	54.5	1.5	4.0	138,312	3,917	141	0%	99%
HLGW044B	179	2017	39.9	0.8	10.0	133,911	3,792	136	0%	99%
LHGW0013	151	2011	27.0	1.4	7.0	115,641	3,275	118	0%	99%

Appendix B3, continued

Name	Refuse Lift (mASL)	Year Activated	Average Methane (% by vol)	Average Flow (scfm)	Months in Operation	Methane Annual Flow (scf)	Methane Flow (m3)	Energy (GJ)	Well Production (% of Total)	Cumulative Total (%)
HLGW043B	175	2017	32.3	0.7	11.0	112,081	3,174	114	0%	99%
VLGW022S	---	1997	33.7	1.0	7.0	106,846	3,026	109	0%	99%
HLGW047B	179	2018	42.5	0.6	8.0	89,356	2,530	91	0%	100%
HLGW022B	165	2013	38.3	1.3	4.0	88,803	2,515	90	0%	100%
VLGW0056	---	2011	48.6	0.5	9.0	88,558	2,508	90	0%	100%
VLGW0049	---	2011	69.6	0.3	11.0	87,162	2,468	89	0%	100%
VLGW009D	---	1996	59.7	0.4	8.0	86,544	2,451	88	0%	100%
HLGW034B	171	2014	45.7	0.4	12.0	85,130	2,411	87	0%	100%
VLGW008D	---	1996	64.4	0.3	9.0	76,118	2,155	77	0%	100%
HLGW030A	171	2014	32.1	0.6	9.0	75,960	2,151	77	0%	100%
HLGW049A	179	2017	32.9	0.5	11.0	71,252	2,018	72	0%	100%
VLGW0054	---	2011	42.2	0.4	10.0	66,536	1,884	68	0%	100%
HLGW033B	171	2014	13.9	0.9	10.0	57,048	1,615	58	0%	100%
VLGW009S	---	1996	63.0	0.2	9.0	46,909	1,328	48	0%	100%
VLGW026D	---	1997	61.8	0.1	9.0	29,759	843	30	0%	100%
HLGW067B	159 (3)	2018	27.2	0.3	6.0	23,829	675	24	0%	100%
HLGW083A	167	2019	51.5	39.4	12.0		0	0	0%	100%
HLGW066B	159 (3)	2018	32.9	0.0	10.0	0	0	0	0%	100%
HLGW064B	155(3)	2018	0.0	0.0	0.0	0	0	0	0%	100%
HLGW025B	171	2016	0.0	0.0	0.0	0	0	0	0%	100%
HLGW075B	163	2019	0.0	0.0	0.0	0	0	0	0%	100%
HLGW037B	175	2017	0.0	0.0	0.0	0	0	0	0%	100%
HLGW068B	160 (3)	2018	0.0	0.0	0.0	0	0	0	0%	100%
HLGW024B	171	2016	0.0	0.0	0.0	0	0	0	0%	100%
HLGW036B	175	2017	0.0	0.0	0.0	0	0	0	0%	100%
VLGW031S	---	1997	58.5	0.0	8.0	0	0	0	0%	100%

Appendix B3, continued

Name	Refuse Lift (mASL)	Year Activated	Average Methane (% by vol)	Average Flow (scfm)	Months in Operation	Methane Annual Flow (scf)	Methane Flow (m3)	Energy (GJ)	Well Production (% of Total)	Cumulative Total (%)
VLGW042S	---	2003	0.0	0.0	0.0	0	0	0	0%	100%
VLGW023D	---	1997	0.0	0.0	7.0	0	0	0	0%	100%
VLGW005S	---	1996	0.0	0.0	8.0	0	0	0	0%	100%
VLGW010S	---	1996	41.2	0.0	3.0	0	0	0	0%	100%
HLGW0010	139	2008	0.0	0.0	0.0	0	0	0	0%	100%
HLGW006A	159	2005	34.0	0.0	8.0	0	0	0	0%	100%
RWHGW01B	3	2020	0.0	0.0	0.0	0	0	0	0%	100%
HLGW065A	159 (3)	2018	#N/A	#N/A	#N/A		0	0	0%	100%
HLGW0004	147	2003	0.0	0.0	0.0		0	0	0%	100%
HLGW026B	171	2015	0.0	0.0	0.0	0	0	0	0%	100%
VLGW0053	---	2011	44.9	0.0	11.0	0	0	0	0%	100%
HLGW0060	155(3)	2019	0.0	0.0	0.0		0	0	0%	100%
HLGW023B	165	2013	0.0	0.0	0.0	0	0	0	0%	100%
HLGW023B	165	2013	0.0	0.0	0.0	0	0	0	0%	100%
HLGW0013	147	2010	0.0	0.0	0.0	0	0	0	0%	100%
LHGW0019	---	2014	0.0	0.0	0.0		0	0	0%	100%
VLGW0058	---	2011	0.0	0.0	0.0		0	0	0%	100%
LHGW0023	159	2011	0.0	0.0	0.0	0	0	0	0%	100%
HLGW0003	139	2003	37.2	0.0	1.0	0	0	0	0%	100%
LHGW0022	159	2014	0.0	0.0	0.0		0	0	0%	100%
HLGW045B	179	2018	0.0	0.0	0.0	0	0	0	0%	100%
HLGW0014	155	2011	0.0	0.0	0.0	0	0	0	0%	100%
HLGW0001	139	2001	32.2	0.0	1.0	0	0	0	0%	100%
HLGW0012	147	2010	0.0	0.0	0.0	0	0	0	0%	100%
HLGW0005	147	2003	0.0	0.0	0.0		0	0	0%	100%
HLGW0009	139	2008	---	---	0.0		0	0	0%	100%

Appendix B3, continued

Name	Refuse Lift (mASL)	Year Activated	Average Methane (% by vol)	Average Flow (scfm)	Months in Operation	Methane Annual Flow (scf)	Methane Flow (m3)	Energy (GJ)	Well Production (% of Total)	Cumulative Total (%)
HLGW0011	0	2008	0.0	0.0	0.0		0	0	0%	100%
HLGW0015	155	2011	0.0	0.0	0.0		0	0	0%	100%
HLGW006B	159	2005	0.0	0.0	0.0		0	0	0%	100%
HLGW016A	159	2012	0.0	0.0	0.0		0	0	0%	100%
HLGW017A	163	2013	0.0	0.0	0.0		0	0	0%	100%
HLGW017B	163	2012	0.0	0.0	0.0	0	0	0	0%	100%
HLGW019B	165	2013	0.0	0.0	0.0		0	0	0%	100%
HLGW019C	165	2012	0.0	0.0	0.0		0	0	0%	100%
HLGW020B	165	2013	0.0	0.0	0.0		0	0	0%	100%
LHGW0003	147	2003	0.0	0.0	0.0		0	0	0%	100%
LHGW0004	147	2003	0.0	0.0	0.0		0	0	0%	100%
LHGW0006	143	2009	0.0	0.0	0.0		0	0	0%	100%
LHGW0007	143	2009	0.0	0.0	0.0		0	0	0%	100%
LHGW0008	143	2009	0.0	0.0	0.0		0	0	0%	100%
LHGW0009	143	2012	0.0	0.0	0.0		0	0	0%	100%
LHGW0010	143	2012	0.0	0.0	0.0		0	0	0%	100%
LHGW0017	163	2012	0.0	0.0	0.0		0	0	0%	100%
LHGW0020	159	2014	0.0	0.0	0.0		0	0	0%	100%
LHGW0021	159	2014	0.0	0.0	0.0		0	0	0%	100%
LHGW002A	147	2007	0.0	0.0	0.0		0	0	0%	100%
VLGW001S	---	1996	44.3	0.0	7.0	0	0	0	0%	100%
VLGW002D	---	1996	---	---	0.0		0	0	0%	100%
VLGW002S	---	1996	---	---	0.0		0	0	0%	100%
VLGW004D	---	1996	0.0	0.0	0.0	0	0	0	0%	100%
VLGW0057	---	2011	0.0	0.0	0.0	0	0	0	0%	100%
VLGW005D	---	1996	0.0	0.0	10.0	0	0	0	0%	100%

Appendix B3, continued

Name	Refuse Lift (mASL)	Year Activated	Average Methane (% by vol)	Average Flow (scfm)	Months in Operation	Methane Annual Flow (scf)	Methane Flow (m3)	Energy (GJ)	Well Production (% of Total)	Cumulative Total (%)
VLGW013D	---	1997	63.4	0.0	7.0	0	0	0	0%	100%
VLGW014D	---	1997	---	---	0.0		0	0	0%	100%
VLGW014S	---	1997	---	---	0.0		0	0	0%	100%
VLGW020D	---	1997	51.3	0.0	8.0	0	0	0	0%	100%
VLGW024S	---	1997	0.0	0.0	0.0		0	0	0%	100%
VLGW025D	---	1997	69.7	46.0	0.0		0	0	0%	100%
VLGW025S	---	1997	69.7	50.3	0.0		0	0	0%	100%
VLGW033S	---	1997	45.9	0.0	5.0	0	0	0	0%	100%
VLGW034S	---	1997	41.7	0.0	5.0	0	0	0	0%	100%
VLGW043S	---	2003	0.0	0.0	0.0	0	0	0	0%	100%
VLGW047S	---	2003	0.0	0.0	0.0		0	0	0%	100%
HLGW046B	179	2018	0.0	0.0	0.0	0	0	0	0%	100%
HLGW0056	151(3)	2018	0.0	0.0	0.0	0	0	0	0%	100%
HLGW066A	159 (3)	2018	38.4	0.7	11.0	0	0	0	0%	100%

APPENDIX C

Hartland Landfill Gas Collection Data

C1 Hartland Landfill Gas Collection Data

Appendix C1 Hartland Landfill Gas Collection Data

Date	Methane Daily Avg	Oxygen Daily Avg	Field Pressure ("H20)	Flare 1 Temp Avg	Flare 2 Temp Avg	Groundflare Daily Flow	Candlestick Flare 2 Daily Flow	Gen Flow	TotalFlow	Comments
1-Jan-23	53.69	0.52	-32.49	88.43	434.70	0	629,026	768112	1,397,138	
2-Jan-23	55.48	0.45	-32.09	87.22	419.00	0	639,964	740531	1,380,495	
3-Jan-23	55.28	0.48	-32.28	87.26	447.38	0	633,512	746470	1,379,982	
4-Jan-23	56.80	0.32	-29.90	87.28	450.49	0	651,768	726219	1,377,987	
5-Jan-23	52.94	0.37	-27.27	88.89	470.98	0	695,127	654757	1,349,884	
6-Jan-23	54.81	0.39	-29.31	89.62	436.91	0	642,903	753614	1,396,517	
7-Jan-23	57.04	0.28	-31.09	90.02	410.92	0	615,563	750012	1,365,575	
8-Jan-23	56.54	0.31	-30.89	88.58	436.48	0	620,697	743296	1,363,993	
9-Jan-23	56.60	0.42	-30.17	88.23	431.78	0	610,259	744280	1,354,539	
10-Jan-23	56.32	0.34	-29.07	86.28	416.14	0	644,351	748057	1,392,408	
11-Jan-23	55.70	0.39	-30.45	90.00	395.78	0	660,422	774047	1,434,469	
12-Jan-23	56.02	0.38	-30.70	89.96	408.99	0	668,354	770523	1,438,877	
13-Jan-23	56.73	0.32	-29.71	90.70	408.78	0	683,099	724940	1,408,039	
14-Jan-23	57.10	0.31	-29.30	87.42	431.56	0	648,179	737419	1,385,598	
15-Jan-23	56.89	0.36	-29.49	87.89	433.32	0	650,117	736251	1,386,368	
16-Jan-23	55.09	0.41	-29.77	88.67	390.43	0	646,964	767919	1,414,883	
17-Jan-23	56.31	0.34	-29.23	88.73	364.23	0	654,755	760789	1,415,544	
18-Jan-23	55.21	0.38	-28.51	86.18	428.17	0	755,171	663515	1,418,686	
19-Jan-23	53.27	0.44	-28.77	85.12	313.34	0	947,044	520153	1,467,197	
20-Jan-23	53.79	0.34	-29.08	88.10	402.22	0	710,377	789182	1,499,559	
21-Jan-23	53.70	0.66	-28.99	87.25	303.92	0	824,165	776038	1,600,203	
22-Jan-23	49.71	0.88	-27.97	84.51	247.32	0	902,472	715261	1,617,733	
23-Jan-23	51.18	0.68	-29.62	87.75	323.76	0	1,025,510	504047	1,529,557	
24-Jan-23	54.16	0.25	-31.48	88.00	366.94	0	998,682	460899	1,459,581	
25-Jan-23	53.64	0.26	-31.46	89.98	408.21	0	763,822	708381	1,472,203	
26-Jan-23	54.79	0.24	-31.50	89.41	373.59	0	731,829	747671	1,479,500	
27-Jan-23	55.73	0.29	-31.44	89.58	379.33	0	777,761	689380	1,467,141	
28-Jan-23	54.16	0.38	-31.48	84.68	524.36	0	685,294	777314	1,462,608	
29-Jan-23	---	---	-27.67	717.23	495.53	69,667	655,869	698163	1,423,699	
30-Jan-23	---	---	-29.10	928.20	382.70	422,901	544,984	499784	1,467,669	
31-Jan-23	52.50	1.60	-30.80	86.00	334.80	0	691,749	774487	1,466,236	
1-Feb-23	55.24	0.18	-30.71	86.67	331.23	0	945,454	529358	1,474,812	
2-Feb-23	55.73	0.19	-31.26	86.46	380.79	0	717,775	754056	1,471,831	
3-Feb-23	56.10	0.22	-30.41	88.87	386.35	0	1,059,281	388804	1,448,085	
4-Feb-23	56.02	0.16	-30.78	89.34	363.00	0	733,204	725562	1,458,766	
5-Feb-23	54.77	0.24	-30.76	88.00	405.21	0	712,833	739562	1,452,395	

Appendix C1, continued

Date	Methane Daily Avg	Oxygen Daily Avg	Field Pressure ("H20)	Flare 1 Temp Avg	Flare 2 Temp Avg	Groundflare Daily Flow	Candlestick Flare 2 Daily Flow	Gen Flow	TotalFlow	Comments
6-Feb-23	54.03	0.21	-31.49	87.36	391.61	0	715,064	748014	1,463,078	
7-Feb-23	55.44	0.21	-31.50	83.81	448.22	0	739,654	662865	1,402,519	
8-Feb-23	54.56	0.24	-31.48	85.85	374.96	0	966,871	419674	1,386,545	
9-Feb-23	56.79	0.15	-31.02	86.31	408.76	0	678,720	722947	1,401,667	
10-Feb-23	55.94	0.22	-30.68	84.66	440.48	0	699,371	729705	1,429,076	
11-Feb-23	55.33	0.19	-30.26	88.14	382.65	0	711,272	726499	1,437,771	
12-Feb-23	56.83	0.15	-30.16	87.83	412.72	0	708,918	715572	1,424,490	
13-Feb-23	58.08	0.16	-29.60	83.25	480.61	0	690,259	699213	1,389,472	
14-Feb-23	54.87	0.28	-30.35	78.67	434.25	0	684,643	730550	1,415,193	
15-Feb-23	54.72	0.27	-30.74	85.27	395.30	0	723,306	734459	1,457,765	
16-Feb-23	55.91	0.21	-30.85	86.50	404.28	0	739,537	721251	1,460,788	
17-Feb-23	55.38	0.23	-31.21	85.42	398.60	0	743,035	732926	1,475,961	---
18-Feb-23	55.73	0.23	-30.78	86.41	433.20	0	737,634	730986	1,468,620	---
19-Feb-23	55.82	0.23	-30.53	88.36	407.27	0	756,616	710975	1,467,591	---
20-Feb-23	---	---	-28.83	872.61	435.01	213,108	634,135	593266	1,440,509	---
21-Feb-23	56.80	0.00	-30.00	1,105.64	347.63	509,704	644,908	305167	1,459,779	Ground flare running - Gas concentrations removed
22-Feb-23	56.10	0.34	-31.51	81.79	508.81	0	866,694	607666	1,474,360	Ground flare running - Gas concentrations replaced with field readings
23-Feb-23	53.36	0.83	-30.92	79.33	554.35	0	750,025	710839	1,460,864	---
24-Feb-23	52.88	0.51	-31.55	77.79	512.23	0	762,350	719267	1,481,617	---
25-Feb-23	55.52	0.25	-31.47	83.94	345.64	0	783,676	636393	1,420,069	---
26-Feb-23	---	---	-29.89	993.59	398.55	349,373	566,140	535191	1,450,704	---
27-Feb-23	56.66	0.29	-31.45	83.46	395.61	0	743,330	727639	1,470,969	Ground flare running - Gas concentrations removed
28-Feb-23	54.70	0.30	-29.10	742.60	291.60	259,332	989,260	103572	1,352,164	---
1-Mar-23	58.10	0.10	-33.48	1,551.88	29.56	1,501,287	-	0	1,501,287	
2-Mar-23	55.80	0.40	-30.53	934.12	274.56	348,831	890,186	214569	1,453,586	Ground flare running - Gas concentrations replaced with field readings
3-Mar-23	56.60	0.40	-30.87	840.67	344.06	416,934	564,963	502541	1,484,438	Ground flare running - Gas concentrations replaced with field readings
4-Mar-23	56.66	0.33	-31.43	87.36	414.75	0	727,627	725690	1,453,317	Ground flare running - Gas concentrations replaced with field readings

Appendix C1, continued

Date	Methane Daily Avg	Oxygen Daily Avg	Field Pressure ("H20)	Flare 1 Temp Avg	Flare 2 Temp Avg	Groundflare Daily Flow	Candlestick Flare 2 Daily Flow	Gen Flow	TotalFlow	Comments
5-Mar-23	55.07	0.39	-31.42	86.53	473.65	0	703,033	745687	1,448,720	---
6-Mar-23	54.63	0.38	-31.51	87.53	445.08	0	714,364	746427	1,460,791	---
7-Mar-23	55.01	0.29	-31.48	85.99	406.80	0	729,394	735947	1,465,341	---
8-Mar-23	55.65	0.27	-31.41	84.15	453.68	0	745,782	722850	1,468,632	---
9-Mar-23	56.49	0.21	-29.88	88.15	455.44	0	741,419	712421	1,453,840	---
10-Mar-23	57.37	0.29	-30.20	86.24	424.39	0	822,085	630347	1,452,432	---
11-Mar-23	54.66	0.31	-30.81	87.02	389.98	0	845,941	644518	1,490,459	---
12-Mar-23	56.71	0.24	-31.21	87.67	343.46	0	780,609	648111	1,428,720	---
13-Mar-23	55.60	0.28	-31.15	80.74	382.15	0	823,133	645677	1,468,810	---
14-Mar-23	55.68	0.31	-31.30	85.74	344.98	0	1,028,941	444613	1,473,554	---
15-Mar-23	52.69	0.40	-31.54	83.26	416.73	0	715,769	780335	1,496,104	---
16-Mar-23	53.91	0.30	-31.55	82.32	439.65	0	734,915	763154	1,498,069	---
17-Mar-23	54.58	0.29	-31.52	83.88	413.36	0	724,543	741334	1,465,877	---
18-Mar-23	55.66	0.22	-31.22	84.16	393.24	0	722,876	724900	1,447,776	---
19-Mar-23	39.88	2.58	-29.11	87.61	387.36	0	585,278	535185	1,120,463	---
20-Mar-23	55.95	0.27	-31.27	90.40	404.12	0	715,896	729001	1,444,897	---
21-Mar-23	55.28	0.26	-31.16	87.47	383.79	0	704,779	737957	1,442,736	---
22-Mar-23	55.54	0.27	-30.89	83.44	480.12	0	690,415	740995	1,431,410	---
23-Mar-23	55.15	0.33	-31.23	85.95	482.05	0	695,454	741263	1,436,717	---
24-Mar-23	54.57	0.36	-31.47	82.49	437.38	0	707,928	742644	1,450,572	---
25-Mar-23	53.93	0.31	-31.30	83.98	438.03	0	682,151	768979	1,451,130	---
26-Mar-23	54.25	0.28	-30.56	86.83	470.49	0	676,356	762706	1,439,062	---
27-Mar-23	54.58	0.25	-31.22	83.25	501.07	0	679,943	764220	1,444,163	---
28-Mar-23	56.22	0.22	-30.98	83.67	532.37	0	676,065	751827	1,427,892	---
29-Mar-23	55.46	0.24	-31.18	82.29	466.77	0	693,651	757003	1,450,654	---
30-Mar-23	54.78	0.29	-31.39	82.36	409.13	0	741,581	733151	1,474,732	---
31-Mar-23	55.40	0.20	-31.50	86.70	392.80	0	765,523	714912	1,480,435	---
1-Apr-23	54.71	0.25	-31.34	82.50	428.39	0.00	761,176	699873	1,461,049	#N/A
2-Apr-23	55.21	0.23	-31.44	83.89	379.49	0.00	804,567	663920	1,468,487	---
3-Apr-23	54.51	0.23	-31.20	84.20	394.24	0.00	779,765	673481	1,453,246	---
4-Apr-23	54.66	0.19	-31.26	82.64	392.79	0.00	756,532	668881	1,425,413	---
5-Apr-23	54.40	0.19	-31.38	87.57	451.82	0.00	764,128	661059	1,425,187	---
6-Apr-23	57.61	0.17	-31.57	89.82	430.93	0.00	693,628	723586	1,417,214	---
7-Apr-23	56.92	0.19	-31.44	86.85	429.04	0.00	709,281	698932	1,408,213	---
8-Apr-23	56.49	0.18	-31.55	89.80	373.35	0.00	682,657	731761	1,414,418	---
9-Apr-23	56.07	0.19	-31.02	88.48	406.02	0.00	691,838	719035	1,410,873	---
10-Apr-23	56.45	0.17	-31.79	88.95	426.79	0.00	696,587	730841	1,427,428	---

Appendix C1, continued

Date	Methane Daily Avg	Oxygen Daily Avg	Field Pressure ("H20)	Flare 1 Temp Avg	Flare 2 Temp Avg	Groundflare Daily Flow	Candlestick Flare 2 Daily Flow	Gen Flow	TotalFlow	Comments
11-Apr-23	56.13	0.19	-32.47	84.78	388.58	0.00	931,996	495770	1,427,766	---
12-Apr-23	55.63	0.21	-32.43	84.19	476.69	0.00	692,967	744990	1,437,957	---
13-Apr-23	55.90	0.21	-31.82	86.04	390.63	0.00	748,991	678738	1,427,729	---
14-Apr-23	56.00	0.21	-32.33	87.05	456.44	0.00	708,430	717304	1,425,734	---
15-Apr-23	56.31	0.21	-32.37	90.16	456.63	0.00	700,839	732937	1,433,776	---
16-Apr-23	57.69	0.21	-32.16	87.44	430.59	0.00	698,110	726114	1,424,224	---
17-Apr-23	58.43	0.22	-31.88	87.31	426.80	0.00	694,866	726103	1,420,969	---
18-Apr-23	56.62	0.30	-31.77	85.85	435.72	0.00	683,434	749401	1,432,835	---
19-Apr-23	54.77	0.31	-32.29	87.28	444.70	0.00	681,546	767723	1,449,269	---
20-Apr-23	55.67	0.28	-32.54	87.47	416.48	0.00	718,263	742445	1,460,708	---
21-Apr-23	54.49	0.29	-32.50	87.11	403.10	0.00	704,494	735437	1,439,931	---
22-Apr-23	57.04	0.22	-32.50	89.82	407.62	0.00	759,550	663126	1,422,676	
23-Apr-23	57.64	0.24	-32.40	88.32	355.04	0.00	815,248	588302	1,403,550	
24-Apr-23	55.16	0.28	-32.47	87.49	344.43	0.00	1,093,189	299562	1,392,751	
25-Apr-23	56.15	0.26	-32.41	89.34	450.08	0.00	831,557	559841	1,391,398	
26-Apr-23	53.50	0.10	-31.14	765.30	397.65	300,801.00	680,860	428548	1,410,209	
27-Apr-23	54.40	0.30	-28.59	836.07	287.73	443,233.00	688,651	181661	1,313,545	
28-Apr-23	55.25	0.43	-29.84	78.26	406.34	0.00	686,879	674976	1,361,855	
29-Apr-23	53.97	0.57	-30.47	92.05	426.92	0.00	763,868	703187	1,467,055	
30-Apr-23	53.40	0.70	-30.40	90.30	392.70	0.00	825,715	624753	1,450,468	
1-May-23	53.70	0.71	-29.88	88.66	434.65	0.00	703,844	747,875	1,451,719	
2-May-23	54.02	0.65	-27.63	645.53	457.58	70,034.00	647,142	611,726	1,328,902	
3-May-23	58.21	0.21	-31.70	92.13	496.22	0.00	694,793	663,314	1,358,107	
4-May-23	57.83	0.22	-31.92	90.61	458.54	0.00	690,433	684,027	1,374,460	
5-May-23	57.69	0.22	-32.32	87.54	375.90	0.00	919,240	460,922	1,380,162	
6-May-23	57.57	0.23	-32.39	89.83	390.14	0.00	1,014,127	365,914	1,380,041	
7-May-23	56.99	0.25	-32.41	91.56	392.89	0.00	1,012,925	366,991	1,379,916	
8-May-23	57.21	0.24	-32.46	88.99	426.92	0.00	706,850	677,061	1,383,911	
9-May-23	57.14	0.23	-32.02	89.84	465.42	0.00	675,434	729,153	1,404,587	
10-May-23	56.91	0.25	-31.62	89.67	482.83	0.00	719,211	679,319	1,398,530	
11-May-23	56.88	0.23	-31.17	91.27	432.64	0.00	713,389	692,371	1,405,760	
12-May-23	55.81	0.18	-31.33	91.48	533.33	0.00	678,454	744,781	1,423,235	
13-May-23	55.51	0.22	-30.93	1,057.96	447.00	596,687.00	394,654	461,596	1,452,937	
14-May-23	---	---	-32.49	1,550.21	31.76	1,478,536.00	-	-	1,478,536	
15-May-23	53.40	0.20	-32.49	1,551.03	32.49	1,521,075.00	-	-	1,521,075	
16-May-23	50.00	0.80	-32.48	1,547.74	29.45	1,551,712.00	-	-	1,551,712	
17-May-23	52.60	0.20	-32.49	1,551.58	31.03	1,462,832.00	-	-	1,462,832	

Appendix C1, continued

Date	Methane Daily Avg	Oxygen Daily Avg	Field Pressure ("H20)	Flare 1 Temp Avg	Flare 2 Temp Avg	Groundflare Daily Flow	Candlestick Flare 2 Daily Flow	Gen Flow	TotalFlow	Comments
18-May-23	53.00	0.10	-30.63	1,293.14	198.80	1,312,951.00	178,161	5,519	1,496,631	
19-May-23	50.50	0.70	-30.80	862.04	346.66	751,490.00	475,955	339,702	1,567,147	
20-May-23	52.90	0.30	-31.05	1,336.70	32.22	1,438,944.00	-	-	1,438,944	
21-May-23	---	---	-31.09	1,318.66	30.68	1,479,760.00	-	-	1,479,760	
22-May-23	---	---	-31.47	1,544.77	32.11	1,530,986.00	-	-	1,530,986	
23-May-23	50.50	0.70	-30.96	1,261.00	31.46	1,343,605.00	-	7,931	1,351,536	
24-May-23	50.50	0.60	-31.48	1,546.02	31.37	1,564,082.00	-	5,590	1,569,672	
25-May-23	52.90	0.30	-31.47	1,550.70	31.53	1,585,797.00	-	2,151	1,587,948	
26-May-23	51.40	0.30	-31.48	1,551.15	31.16	1,633,168.00	-	-	1,633,168	
27-May-23	---	---	-31.48	1,546.20	30.62	1,666,873.00	-	-	1,666,873	
28-May-23	---	---	-31.49	1,549.76	30.90	1,665,173.00	-	-	1,665,173	
29-May-23	51.10	0.40	-31.49	1,549.93	31.74	1,672,918.00	-	1,518	1,674,436	
30-May-23	50.90	0.30	-31.49	1,548.07	30.34	1,669,915.00	-	5,462	1,675,377	
31-May-23	50.70	0.30	-31.50	1,550.00	32.20	1,673,768.00	-	-	1,673,768	
1-Jun-23	52.70	0.30	-30.43	1,320.97	178.81	1,559,615.00	132,355	16,662	1,708,632	
2-Jun-23	51.60	0.30	-29.55	1,078.19	267.66	1,091,388.00	490,175	99,833	1,681,396	
3-Jun-23	50.90	0.40	-29.97	687.96	313.06	479,705.00	929,519	264,524	1,673,748	
4-Jun-23	---	---	-30.95	1,371.23	197.22	1,190,380.00	518,602	3,024	1,712,006	
5-Jun-23	51.30	0.30	-29.86	1,202.40	247.17	937,901.00	681,907	47,798	1,667,606	
6-Jun-23	50.90	0.40	-31.47	1,546.70	30.62	1,744,792.00	-	-	1,744,792	
7-Jun-23	51.40	0.20	-29.21	1,164.47	268.95	1,184,021.00	319,477	154,570	1,658,068	
8-Jun-23	52.00	0.30	-29.21	1,007.03	313.94	528,206.00	724,769	374,923	1,627,898	
9-Jun-23	53.88	0.27	-30.48	96.13	294.99	0.00	978,599	729,751	1,708,350	
10-Jun-23	53.83	0.26	-29.88	93.98	260.39	0.00	946,088	743,493	1,689,581	
11-Jun-23	55.42	0.23	-28.26	93.89	299.23	0.00	886,349	749,256	1,635,605	
12-Jun-23	55.64	0.27	-27.76	94.89	287.85	0.00	873,996	742,089	1,616,085	
13-Jun-23	55.41	0.28	-27.91	93.90	326.90	0.00	881,375	755,603	1,636,978	
14-Jun-23	54.63	0.35	-27.65	94.56	285.27	0.00	1,111,836	508,840	1,620,676	
15-Jun-23	53.70	0.36	-28.74	94.53	296.45	0.00	941,121	752,716	1,693,837	
16-Jun-23	53.46	0.30	-29.42	94.87	300.29	0.00	977,762	726,063	1,703,825	
17-Jun-23	52.80	0.50	-28.68	790.36	317.18	463,814.00	912,855	282,780	1,659,449	
18-Jun-23	---	---	-30.49	1,545.13	30.75	1,713,556.00	-	3,662	1,717,218	
19-Jun-23	51.20	0.70	-28.99	943.35	305.06	630,038.00	709,258	330,669	1,669,965	
20-Jun-23	50.42	0.43	-28.91	93.20	290.96	0.00	940,813	729,621	1,670,434	
21-Jun-23	52.03	0.36	-27.99	94.63	319.29	0.00	912,960	741,890	1,654,850	
22-Jun-23	53.19	0.34	-27.30	94.55	329.36	0.00	1,046,940	604,092	1,651,032	
23-Jun-23	50.70	0.70	-29.15	1,025.86	271.25	657,128.00	643,146	441,694	1,741,968	

Appendix C1, continued

Date	Methane Daily Avg	Oxygen Daily Avg	Field Pressure ("H20)	Flare 1 Temp Avg	Flare 2 Temp Avg	Groundflare Daily Flow	Candlestick Flare 2 Daily Flow	Gen Flow	TotalFlow	Comments
24-Jun-23	49.90	0.60	-29.12	1,062.52	314.25	835,208.00	569,176	331,561	1,735,945	
25-Jun-23	50.52	0.38	-27.33	96.22	306.45	0.00	900,677	785,128	1,685,805	
26-Jun-23	51.19	0.37	-28.00	97.38	293.29	0.00	927,053	779,792	1,706,845	
27-Jun-23	51.08	0.41	-29.06	97.43	295.17	0.00	949,335	778,169	1,727,504	
28-Jun-23	51.68	0.19	-29.05	97.90	288.53	0.00	949,690	758,545	1,708,235	
29-Jun-23	51.53	0.20	-29.35	98.60	312.77	0.00	961,334	754,320	1,715,654	
30-Jun-23	50.90	0.20	-29.60	98.40	316.40	0.00	965,554	778,114	1,743,668	
1-Jul-23	50.75	0.24	-30.11	97.28	327.74	0.00	963,390	775,027	1,738,417	
2-Jul-23	50.97	0.21	-29.85	97.59	301.80	0.00	965,820	765,938	1,731,758	
3-Jul-23	50.62	0.22	-29.77	98.16	307.39	0.00	961,641	763,173	1,724,814	
4-Jul-23	51.18	0.19	-29.26	101.73	322.57	0.00	955,000	753,718	1,708,718	
5-Jul-23	51.77	0.17	-29.08	102.23	298.44	0.00	956,614	744,815	1,701,429	
6-Jul-23	51.71	0.22	-29.19	101.23	279.59	0.00	957,795	743,782	1,701,577	
7-Jul-23	52.71	0.22	-29.28	97.11	286.94	0.00	957,651	743,632	1,701,283	
8-Jul-23	51.68	0.47	-29.07	90.84	298.50	0.00	1,015,356	686,904	1,702,260	
9-Jul-23	51.04	0.24	-30.28	91.47	287.32	0.00	979,697	754,480	1,734,177	
10-Jul-23	50.78	0.29	-30.41	90.59	307.63	0.00	981,535	753,836	1,735,371	
11-Jul-23	51.85	0.26	-28.20	91.32	314.40	0.00	913,110	764,539	1,677,649	
12-Jul-23	51.69	0.27	-27.04	90.87	287.64	0.00	906,563	772,886	1,679,449	
13-Jul-23	51.46	0.29	-27.23	91.06	295.81	0.00	918,628	777,403	1,696,031	
14-Jul-23	51.02	0.24	-26.95	91.31	284.02	0.00	916,034	773,656	1,689,690	
15-Jul-23	52.00	0.30	-27.29	968.58	285.85	686,466.00	568,575	465,255	1,720,296	
16-Jul-23	---	---	-28.50	1,550.68	30.83	1,749,895.00	-	-	1,749,895	
17-Jul-23	49.20	0.50	-27.50	941.64	334.07	621,298.00	634,330	432,526	1,688,154	
18-Jul-23	51.53	0.29	-28.17	90.63	299.32	0.00	917,674	768,904	1,686,578	
19-Jul-23	52.30	0.23	-28.98	91.01	311.66	0.00	905,368	752,959	1,658,327	
20-Jul-23	48.30	0.20	-27.92	992.49	259.41	452,277.00	687,877	467,205	1,607,359	
21-Jul-23	53.29	0.21	-30.43	90.40	337.34	0.00	909,305	719,170	1,628,475	
22-Jul-23	52.62	0.21	-31.10	90.19	329.28	0.00	907,135	737,955	1,645,090	
23-Jul-23	52.85	0.21	-30.95	90.29	324.52	0.00	905,881	732,654	1,638,535	
24-Jul-23	51.38	0.28	-31.46	91.62	292.90	0.00	901,152	753,410	1,654,562	
25-Jul-23	50.80	0.25	-30.73	89.98	370.96	0.00	865,635	774,869	1,640,504	
26-Jul-23	52.84	0.22	-29.10	89.40	332.96	0.00	854,795	769,015	1,623,810	
27-Jul-23	53.49	0.21	-28.38	90.92	296.47	0.00	866,649	739,326	1,605,975	
28-Jul-23	54.08	0.23	-28.50	90.15	291.10	0.00	977,607	620,291	1,597,898	
29-Jul-23	---	---	-29.04	866.92	267.57	366,917.00	838,448	404,757	1,610,122	
30-Jul-23	---	---	-30.44	1,547.20	31.20	1,659,835.00	-	-	1,659,835	

Appendix C1, continued

Date	Methane Daily Avg	Oxygen Daily Avg	Field Pressure ("H20)	Flare 1 Temp Avg	Flare 2 Temp Avg	Groundflare Daily Flow	Candlestick Flare 2 Daily Flow	Gen Flow	TotalFlow	Comments
31-Jul-23	50.90	0.20	-28.20	1,044.80	336.50	787,406.00	532,823	310,842	1,631,071	
1-Aug-23	53.73	0.20	-27.96	91.45	303.25	0.00	966,749	588,697	1,555,446	
2-Aug-23	54.70	0.20	-28.56	1,065.27	236.00	589,861.00	748,713	235,711	1,574,285	
3-Aug-23	51.10	0.40	-28.42	1,209.44	254.94	952,852.00	396,284	242,666	1,591,802	
4-Aug-23	51.30	0.30	-28.12	1,014.81	287.30	293,499.00	804,691	452,795	1,550,985	
5-Aug-23	51.60	0.20	-29.99	1,547.73	32.72	1,648,657.00	-	-	1,648,657	
6-Aug-23	---	---	-29.99	1,548.23	32.65	1,684,270.00	-	-	1,684,270	
7-Aug-23	---	---	-30.00	1,549.34	31.29	1,683,850.00	-	457	1,684,307	
8-Aug-23	48.20	1.70	-29.99	1,551.75	31.74	1,689,246.00	-	-	1,689,246	
9-Aug-23	51.90	0.30	-29.99	1,556.62	31.94	1,696,301.00	-	3,416	1,699,717	
10-Aug-23	48.30	0.30	-30.01	1,548.36	31.14	1,670,688.00	-	-	1,670,688	
11-Aug-23	50.50	0.10	-30.01	1,550.32	31.18	1,638,903.00	-	-	1,638,903	
12-Aug-23	49.70	0.30	-30.23	1,552.50	31.44	1,648,202.00	-	798	1,649,000	
13-Aug-23	---	---	-31.00	1,549.40	31.68	1,681,364.00	-	-	1,681,364	
14-Aug-23	53.10	0.20	-29.14	1,222.91	241.17	1,145,766.00	295,686	8,932	1,450,384	
15-Aug-23	51.20	0.20	-31.00	1,551.85	31.29	1,711,529.00	-	-	1,711,529	
16-Aug-23	51.20	0.30	-31.00	1,548.84	30.94	1,728,800.00	-	423	1,729,223	
17-Aug-23	51.20	0.30	-31.00	1,548.87	31.11	1,725,424.00	-	-	1,725,424	
18-Aug-23	49.50	0.30	-31.00	1,547.18	30.44	1,720,497.00	-	1,009	1,721,506	
19-Aug-23	48.90	0.30	-31.00	1,552.51	32.41	1,759,994.00	-	308	1,760,302	
20-Aug-23	---	---	-31.01	1,541.51	32.54	1,706,081.00	-	-	1,706,081	
21-Aug-23	50.50	0.30	-30.99	1,548.16	31.51	1,699,041.00	-	862	1,699,903	
22-Aug-23	49.50	0.30	-28.59	879.84	315.34	632,786.00	738,546	229,648	1,600,980	
23-Aug-23	---	---	-26.84	974.68	366.68	478,352.00	894,582	179,437	1,552,371	
24-Aug-23	49.70	0.40	-30.62	1,553.54	30.58	1,682,931.00	-	1,859	1,684,790	
25-Aug-23	50.10	0.30	-29.99	1,545.81	34.03	1,658,469.00	-	-	1,658,469	
26-Aug-23	---	---	-29.99	1,539.20	31.50	1,665,105.00	-	-	1,665,105	
27-Aug-23	---	---	-30.00	1,548.64	31.29	1,668,563.00	-	-	1,668,563	
28-Aug-23	52.30	0.10	-28.14	1,068.08	289.59	578,569.00	662,912	351,615	1,593,096	
29-Aug-23	52.47	0.26	-29.25	92.67	293.48	0.00	830,395	809,001	1,639,396	
30-Aug-23	53.18	0.25	-28.35	89.48	336.48	0.00	802,639	808,123	1,610,762	
31-Aug-23	54.20	0.20	-28.00	89.60	343.70	0.00	801,697	781,382	1,583,079	
1-Sep-23	53.25	0.24	-28.72	87.36	339.97	0.00	832,312	777,484	1,609,796	
2-Sep-23	52.75	0.24	-29.88	88.14	304.37	0.00	880,115	764,844	1,644,959	
3-Sep-23	51.29	0.76	-29.88	89.57	304.39	0.00	886,202	775,591	1,661,793	
4-Sep-23	47.77	1.08	-29.60	88.71	322.65	0.00	884,994	819,069	1,704,063	
5-Sep-23	46.61	1.34	-29.24	87.06	324.22	0.00	882,276	819,617	1,701,893	

Appendix C1, continued

Date	Methane Daily Avg	Oxygen Daily Avg	Field Pressure ("H20)	Flare 1 Temp Avg	Flare 2 Temp Avg	Groundflare Daily Flow	Candlestick Flare 2 Daily Flow	Gen Flow	TotalFlow	Comments
6-Sep-23	49.90	0.88	-29.84	91.41	257.61	0.00	883,339	789,768	1,673,107	
7-Sep-23	51.78	0.32	-30.01	91.06	276.38	0.00	876,495	769,477	1,645,972	
8-Sep-23	52.61	0.30	-29.82	86.51	299.43	0.00	930,679	706,925	1,637,604	
9-Sep-23	51.40	0.29	-30.02	86.32	296.13	0.00	875,108	772,607	1,647,715	
10-Sep-23	51.63	0.27	-30.02	88.63	261.70	0.00	876,755	767,390	1,644,145	
11-Sep-23	51.13	0.29	-30.03	89.27	295.59	0.00	870,385	770,512	1,640,897	
12-Sep-23	51.66	0.34	-29.62	93.47	272.48	0.00	848,823	792,968	1,641,791	
13-Sep-23	51.51	0.33	-29.27	87.77	296.08	0.00	815,704	815,678	1,631,382	
14-Sep-23	51.37	0.34	-29.01	85.07	336.87	0.00	812,052	804,522	1,616,574	
15-Sep-23	52.40	0.30	-28.86	86.41	279.48	0.00	807,858	787,004	1,594,862	
16-Sep-23	52.34	0.32	-29.02	86.85	303.14	0.00	811,400	784,327	1,595,727	
17-Sep-23	51.96	0.38	-29.45	88.43	326.40	0.00	810,514	795,646	1,606,160	
18-Sep-23	51.52	0.41	-29.80	85.97	367.23	0.00	801,055	797,166	1,598,221	
19-Sep-23	52.41	0.39	-30.01	88.35	365.65	0.00	798,341	784,299	1,582,640	
20-Sep-23	51.53	0.39	-29.58	81.94	432.90	0.00	748,529	785,627	1,534,156	
21-Sep-23	53.30	0.38	-29.70	83.49	378.96	0.00	876,804	612,775	1,489,579	
22-Sep-23	51.60	0.50	-29.87	954.83	357.56	239,138.00	654,650	619,558	1,513,346	
23-Sep-23	50.60	0.60	-30.21	1,123.27	378.15	470,527.00	537,568	506,632	1,514,727	
24-Sep-23	53.64	0.42	-29.91	88.55	393.07	0.00	717,563	787,362	1,504,925	
25-Sep-23	53.76	0.45	-29.90	90.07	397.32	0.00	740,639	771,694	1,512,333	
26-Sep-23	52.20	0.49	-30.43	88.76	351.19	0.00	753,244	790,595	1,543,839	
27-Sep-23	52.66	0.40	-30.55	86.92	391.36	0.00	729,566	781,894	1,511,460	
28-Sep-23	---	---	-29.74	786.42	358.93	472,481.00	541,224	499,640	1,513,345	
29-Sep-23	51.58	1.08	-30.68	84.76	398.82	0.00	728,480	793,989	1,522,469	
30-Sep-23	52.60	0.30	-31.00	80.60	402.00	0.00	724,918	773,094	1,498,012	
1-Oct-23	---	---	-30.17	1,126.66	261.17	674,504.00	625,728	180,254	1,480,486	
2-Oct-23	---	---	-30.98	1,549.02	33.50	1,489,913.00	-	41,827	1,531,740	
3-Oct-23	50.00	0.10	-30.99	1,549.72	30.88	1,483,590.00	-	28,154	1,511,744	
4-Oct-23	49.00	0.20	-30.99	1,546.89	29.95	1,507,977.00	-	20,845	1,528,822	
5-Oct-23	50.10	0.40	-30.97	1,548.86	29.30	1,536,981.00	-	6,128	1,543,109	
6-Oct-23	50.80	0.40	-30.99	1,551.07	27.78	1,540,164.00	-	909	1,541,073	
7-Oct-23	51.40	0.30	-30.97	1,554.68	28.65	1,539,908.00	-	172	1,540,080	
8-Oct-23	---	---	---	1,551.20	30.96	1,529,919.00	-	867	1,530,786	
9-Oct-23	---	---	---	1,551.81	34.66	1,518,304.00	-	-	1,518,304	
10-Oct-23	52.60	0.30	-31.00	1,549.54	33.17	1,501,662.00	-	25,346	1,527,008	
11-Oct-23	50.70	0.60	-29.65	682.11	225.33	553,716.00	668,491	252,588	1,474,795	
12-Oct-23	52.75	0.34	-28.15	81.84	381.06	0.00	785,370	634,477	1,419,847	

Appendix C1, continued

Date	Methane Daily Avg	Oxygen Daily Avg	Field Pressure ("H20)	Flare 1 Temp Avg	Flare 2 Temp Avg	Groundflare Daily Flow	Candlestick Flare 2 Daily Flow	Gen Flow	TotalFlow	Comments
13-Oct-23	54.23	0.33	-28.56	85.85	382.12	0.00	724,601	762,477	1,487,078	
14-Oct-23	51.47	0.46	-30.32	89.49	358.07	0.00	768,145	791,407	1,559,552	
15-Oct-23	53.47	0.34	-29.31	88.45	346.62	0.00	756,869	777,033	1,533,902	
16-Oct-23	52.97	0.36	-29.80	87.22	365.81	0.00	777,248	773,377	1,550,625	
17-Oct-23	50.50	0.20	-30.53	1,196.54	339.09	527,956.00	507,030	529,997	1,564,983	
18-Oct-23	51.00	0.40	-30.99	1,548.78	33.34	1,517,965.00	-	37,833	1,555,798	
19-Oct-23	50.40	0.40	-30.97	1,549.54	32.84	1,506,633.00	-	17,293	1,523,926	
20-Oct-23	52.30	0.20	-30.20	1,014.42	234.95	766,786.00	501,024	229,520	1,497,330	
21-Oct-23	55.09	0.27	-30.96	87.34	300.29	0.00	882,037	618,305	1,500,342	
22-Oct-23	54.74	0.28	-30.96	85.29	292.54	0.00	858,643	632,121	1,490,764	
23-Oct-23	52.51	0.94	-30.87	84.76	329.45	0.00	1,046,207	437,352	1,483,559	
24-Oct-23	53.15	1.08	-30.53	78.52	427.33	0.00	716,205	784,245	1,500,450	
25-Oct-23	49.60	0.50	-27.81	981.11	423.99	407,973.00	507,966	559,233	1,475,172	
26-Oct-23	51.35	0.51	-30.92	79.84	399.83	0.00	690,754	808,691	1,499,445	
27-Oct-23	50.50	0.48	-30.99	76.41	456.95	0.00	670,210	823,656	1,493,866	
28-Oct-23	50.98	0.48	-31.18	75.86	417.35	0.00	675,779	825,674	1,501,453	
29-Oct-23	52.66	0.39	-31.72	78.83	402.10	0.00	720,542	791,914	1,512,456	
30-Oct-23	53.78	0.35	-30.75	81.81	232.62	0.00	1,426,072	48,704	1,474,776	
31-Oct-23	52.80	0.40	-30.30	1,316.90	188.20	661,973.00	781,761	-	1,443,734	
1-Nov-23	51.40	0.50	-31.98	1,550.94	32.72	1,494,763.00	-	72,814	1,567,577	
2-Nov-23	51.10	0.60	-31.98	1,548.00	33.00	1,473,642.00	-	60,693	1,534,335	
3-Nov-23	52.50	0.30	-31.98	1,550.49	33.34	1,465,305.00	-	56,343	1,521,648	
4-Nov-23	---	---	-31.98	1,551.08	31.24	1,451,100.00	-	28,929	1,480,029	
5-Nov-23	---	---	-31.99	1,549.27	34.25	1,492,480.00	-	51,928	1,544,408	
6-Nov-23	53.20	0.30	-31.98	1,549.09	33.67	1,432,330.00	-	45,658	1,477,988	
7-Nov-23	53.20	0.30	-26.93	937.53	30.23	579,566.00	-	33,314	612,880	
8-Nov-23	---	---	0.03	71.50	33.03	0.00	-	41,914	41,914	
9-Nov-23	---	---	-21.43	76.38	238.58	0.00	578,705	64,221	642,926	
10-Nov-23	56.60	0.10	-30.33	1,213.19	249.38	686,901.00	640,110	70,336	1,397,347	
11-Nov-23	---	---	-32.03	1,551.69	33.91	1,337,933.00	-	61,410	1,399,343	
12-Nov-23	---	---	-32.02	1,551.83	34.92	1,331,438.00	-	57,877	1,389,315	
13-Nov-23	---	---	-32.03	1,543.30	31.07	1,324,909.00	-	36,939	1,361,848	
14-Nov-23	53.80	0.10	-32.03	1,551.49	32.46	1,341,024.00	-	39,841	1,380,865	
15-Nov-23	53.80	0.20	-32.03	1,545.81	35.57	1,368,907.00	-	59,009	1,427,916	
16-Nov-23	52.60	0.20	-32.03	1,539.61	30.57	1,399,079.00	-	36,938	1,436,017	
17-Nov-23	53.70	0.10	-32.02	1,547.05	30.75	1,407,938.00	-	30,024	1,437,962	
18-Nov-23	54.76	0.30	-31.26	851.07	351.59	422,880.00	618,163	391,338	1,432,381	

Appendix C1, continued

Date	Methane Daily Avg	Oxygen Daily Avg	Field Pressure ("H20)	Flare 1 Temp Avg	Flare 2 Temp Avg	Groundflare Daily Flow	Candlestick Flare 2 Daily Flow	Gen Flow	TotalFlow	Comments
19-Nov-23	50.30	0.51	-32.85	81.59	463.03	0.00	684,321	772,920	1,457,241	
20-Nov-23	52.03	0.40	-32.44	84.29	411.93	0.00	701,641	772,011	1,473,652	
21-Nov-23	53.60	0.36	-31.72	85.62	361.01	0.00	905,616	555,149	1,460,765	
22-Nov-23	51.18	0.48	-32.57	83.37	434.32	0.00	668,037	822,356	1,490,393	
23-Nov-23	51.44	0.46	-32.04	80.81	494.86	0.00	655,797	838,933	1,494,730	
24-Nov-23	51.51	0.45	-31.76	80.29	464.86	0.00	653,680	837,391	1,491,071	
25-Nov-23	51.29	0.49	-32.46	80.07	446.42	0.00	676,066	829,728	1,505,794	
26-Nov-23	51.18	0.49	-32.97	81.88	431.62	0.00	678,381	833,085	1,511,466	
27-Nov-23	51.03	0.48	-32.83	80.47	423.82	0.00	677,555	833,225	1,510,780	
28-Nov-23	51.61	0.46	-32.96	85.79	436.13	0.00	679,866	828,099	1,507,965	
29-Nov-23	52.36	0.37	-32.92	85.66	400.52	0.00	681,368	816,591	1,497,959	
30-Nov-23	54.70	0.30	-31.90	86.10	393.20	0.00	727,072	700,464	1,427,536	
1-Dec-23	53.64	0.35	-31.27	83.68	384.23	0.00	767,042	682,837	1,449,879	
2-Dec-23	49.62	0.42	-32.43	82.59	426.82	0.00	712,049	724,473	1,436,522	
3-Dec-23	49.50	0.40	-32.93	85.87	448.80	0.00	626,932	764,920	1,391,852	
4-Dec-23	50.22	0.38	-32.78	86.80	425.25	0.00	654,227	759,693	1,413,920	
5-Dec-23	48.50	0.46	-30.56	87.91	453.79	0.00	649,018	717,400	1,366,418	
6-Dec-23	49.41	0.44	-33.04	87.00	440.16	0.00	641,775	738,828	1,380,603	
7-Dec-23	48.96	0.52	-32.46	83.16	428.36	0.00	620,661	756,820	1,377,481	
8-Dec-23	34.70	0.79	-31.23	78.00	379.68	0.00	921,228	286,579	1,207,807	
9-Dec-23	50.07	0.38	-33.05	84.97	376.63	0.00	1,046,150	382,737	1,428,887	
10-Dec-23	48.22	0.43	-33.05	84.48	443.85	0.00	646,976	732,950	1,379,926	
11-Dec-23	49.56	0.45	-33.01	83.31	492.06	0.00	616,849	752,056	1,368,905	
12-Dec-23	49.89	0.49	-32.03	84.20	459.35	0.00	606,699	776,982	1,383,681	
13-Dec-23	48.81	0.70	-31.16	84.54	450.60	0.00	621,226	793,589	1,414,815	
14-Dec-23	48.91	0.48	-32.48	84.27	414.36	0.00	668,262	729,344	1,397,606	
15-Dec-23	49.67	0.44	-32.01	83.08	400.55	0.00	687,518	722,123	1,409,641	
16-Dec-23	49.13	0.44	-32.04	84.51	443.72	0.00	669,764	752,203	1,421,967	
17-Dec-23	49.72	0.44	-32.04	84.94	423.18	0.00	675,234	751,426	1,426,660	
18-Dec-23	51.64	0.38	-32.01	86.32	404.40	0.00	685,740	734,647	1,420,387	
19-Dec-23	50.13	0.37	-31.04	86.63	386.97	0.00	694,860	723,222	1,418,082	
20-Dec-23	48.93	0.40	-32.44	86.64	401.47	0.00	668,666	769,013	1,437,679	
21-Dec-23	49.72	0.36	-32.06	88.22	409.28	0.00	662,572	770,369	1,432,941	
22-Dec-23	49.27	0.46	-32.06	83.68	449.57	0.00	659,509	773,336	1,432,845	
23-Dec-23	48.31	0.53	-31.99	79.50	397.71	0.00	670,876	776,479	1,447,355	
24-Dec-23	49.59	0.40	-31.95	83.41	408.18	0.00	668,392	770,222	1,438,614	
25-Dec-23	50.03	0.36	-31.75	86.17	459.07	0.00	666,897	763,783	1,430,680	

Appendix C1, continued

Date	Methane Daily Avg	Oxygen Daily Avg	Field Pressure ("H20)	Flare 1 Temp Avg	Flare 2 Temp Avg	Groundflare Daily Flow	Candlestick Flare 2 Daily Flow	Gen Flow	TotalFlow	Comments
26-Dec-23	48.77	0.44	-31.77	86.39	470.87	0.00	649,901	782,190	1,432,091	
27-Dec-23	49.65	0.35	-31.39	87.41	427.60	0.00	653,827	761,721	1,415,548	
28-Dec-23	47.89	0.39	-31.61	88.71	383.42	0.00	673,645	741,997	1,415,642	
29-Dec-23	49.9.	0.10	-29.72	733.81	380.67	129,605.00	597,473	657,416	1,384,494	
30-Dec-23	49.10	0.20	-30.25	743.14	414.07	364,590.00	464,566	526,999	1,356,155	
31-Dec-23	---	---	-31.10	743.70	394.30	142,756.00	577,640	660,570	1,380,966	
Total						**132,380,139**	**223,718,081**	**194,471,466**	**549,801,574**	
Daily Average	**53.0**	**0.4**	**-30.5**			**363,682**	**614,610**	**532,152**	**1,510,444**	
scfm						**253**	**427**	**370**	**1,049**	
normalize to 50% methane						**88,295**	**149,216**	**129,196**	**366,707**	

APPENDIX D

Subsurface Perimeter and Foundation Probe Monitoring

D1 Subsurface Perimeter and Foundation Probe Monitoring Methodology

D2 Probe Location and Completion Information

D3 Hartland Landfill Gas Monitoring Program 2023 Gas Probe Data

Appendix D1 Subsurface Perimeter and Foundation Probe Monitoring Methodology

The following is the subsurface probe and foundation monitoring field methodology, as outlined in *Hartland Landfill Standard Operating Procedures* (2019). All monitoring is completed with a LANDTEC Gas Analyzer and Extraction Monitor (GEM) 2000+.

CALIBRATION

Prior to each monitoring event, the gas analyzer is calibrated using the calibration gases at Hartland. Prior to calibration, the gas monitor is set to Gas Analyzer (GA) mode for ambient measurements.

Methane and carbon dioxide gases are used to calibrate the methane and carbon dioxide sensors, and zero the oxygen sensor. Oxygen gas is used to calibrate the oxygen sensor and zero the methane sensor. All calibration values should be recorded on the field sheet.

MONITORING

Weather conditions, including barometric pressure, precipitation and temperature are recorded prior to commencing work.

The following monitoring procedure is followed for each gas probe:

1. Zero pressure.
2. Connect tubing to the gas sample port (ensure pump is off), open valve, wait until pressure reading stabilizes and record value.
3. Turn on pump and wait at least 200 seconds.
4. Watch for any methane or carbon dioxide spikes.
5. At the end of 200 seconds, record the gas concentrations and any spikes on the field sheet.
6. Quickly navigate to the pressure screen and record the static pressure reading (this helps determine whether the screen is plugged/open, or water is covering the screen).
7. Disconnect the tubing from the sampling port and close the gas monitoring valve.
8. Open the water level monitoring port (not all wells will have a water level monitoring port).
9. Follow the same procedure (steps 1-8) for gas probe B.
10. Once monitoring for probe B is completed measure the water level for probe A, followed by probe B.
11. Before moving to the next station, ensure that all valves are closed.

At the end of the day, check gas levels using the calibration gas and record on the field sheet.

Appendix D2 Probe Location and Completion Information

Probe	Probe Location	Well Information
East Property Boundary Perimeter Probes		
GP-1A	90 m north of main gate	Depth: 10.37 m, Screen height: 2.91 m
GP-1B	90 m north of main gate	Depth: 5.82 m, Screen height: 2.91 m
GP-2A	70 m north of GP-1	Depth: 10.61 m, Screen height: 2.91 m
GP-2B	70 m north of GP-1	Depth: 6.36 m, Screen height: 2.91 m
GP-3A	120 m north of GP-1	Depth: 10.63 m, Screen height: 2.91 m
GP-3B	120 m north of GP-1	Depth: 4.83 m, Screen height: unknown
GP-11A	20 m north of main gate in mountain biking parking lot	Depth: 10.72 m, Screen height: unknown
GP-11B	20 m north of main gate in mountain biking parking lot	Depth: 5.23 m, Screen height: unknown
GP-12A	50 m north of GP-3 along perimeter road	Depth: 9.00 m, Screen height: unknown
GP-12B	50 m north of GP-3 along perimeter road	Depth: 5.72 m, Screen height: unknown
Horizontal Subsurface Building Gas Probes		
GP-4A	Southeast corner of workshop	2.4 m from southeast corner of building in gravel road
GP-5A	Admin building parking lot, behind mountain bike washrooms	3 m along west side of mountain bike washroom building
GP-6A	Northeast corner of admin building	15 m west along north side of building
GP-6B	Northeast corner of admin building	15 m west along north side of building
GP-7A	Against north wall of Hartland admin office	10 m south toward southeast corner of building
GP-7B	Against wall in southwest corner of Hartland admin building	Follows 'H' pattern under building extension
GP-8A	East side of auto-scale building	Unknown
GP-9A	West side of auto-scale building	Unknown
GP-13A	2 m south of Hartland workshop entrance	Unknown
GP-14A	West side of Hartland workshop	12 m along east side of workshop
GP-17A	North corner of Hartland Interpretive Centre (monitoring initiated January 2011)	Follows building perimeter
GP-18A	Northwest corner of the contractor's workshop	Follows building perimeter

Appendix D3 Hartland Landfill Gas Monitoring Program 2023 Gas Probe Data

GAS PROBE 01A

Reporting Year	Date	Time	Pressure/Vacuum (before) (P")	Static water level (m)	Exposed screen above water (m)	Methane (CH_4) % in air	Carbon Dioxide (Co_2) % in air	Oxygen (O_2) % in air	Pressure/Vacuum (after) (P")	Comment
2023	2023-03-29	12:26	0.00	3.9	0.99	0.0	0.0	21.00		Pump flow failed at 200 seconds.
2023	2023-08-24	11:06	0.08	5.45	5.45	0.0	0.2	20.50	-33.31	
2023	2023-12-21	9:46	---	3.55	0.64	0.0	0.1	21.70	---	

GAS PROBE 01B

Reporting Year	Date	Time	Pressure/Vacuum (before) (P")	Static water level (m)	Exposed screen above water (m)	Methane (CH_4) % in air	Carbon Dioxide (Co_2) % in air	Oxygen (O_2) % in air	Pressure/Vacuum (after) (P")	Comment
2023	2023-03-29	12:33	-3.27	4.12	1.21	0.0	0.0	21.10		
2023	2023-08-24	11:10	0.01	4.9	4.9	0.0	2.9	17.90	0.01	
2023	2023-12-21	9:50	---	3.84	0.93	0.0	2.8	14.10	---	

GAS PROBE 02A

Reporting Year	Date	Time	Pressure/Vacuum (before) (P")	Static water level (m)	Exposed screen above water (m)	Methane (CH_4) % in air	Carbon Dioxide (Co_2) % in air	Oxygen (O_2) % in air	Pressure/Vacuum (after) (P")	Comment
2023	2023-03-29	12:45	-0.10	5.35	2.44	0.0	0.0	21.30		
2023	2023-08-24	14:26	0.06	7.81	7.81	0.0	0.3	20.50	-80.78	
2023	2023-12-21	9:54	---	5.1	2.19	0.0	0.1	21.70	---	

GAS PROBE 02B

Reporting Year	Date	Time	Pressure/Vacuum (before) (P")	Static water level (m)	Exposed screen above water (m)	Methane (CH_4) % in air	Carbon Dioxide (Co_2) % in air	Oxygen (O_2) % in air	Pressure/Vacuum (after) (P")	Comment
2023	2023-03-29	12:50	-0.04	5.42	2.51	0.0	0.0	21.10		
2023	2023-08-24	14:33	-0.02	5.98	5.98	0.0	5.4	13.60	-0.06	
2023	2023-12-21	9:57	---	5.16	2.25	0.0	2.8	15.00	---	

GAS PROBE 03A

Reporting Year	Date	Time	Pressure/Vacuum (before) (P")	Static water level (m)	Exposed screen above water (m)	Methane (CH_4) % in air	Carbon Dioxide (Co_2) % in air	Oxygen (O_2) % in air	Pressure/Vacuum (after) (P")	Comment
2023	2023-03-29	13:35	0.02	9.51	6.6	0.0	0.0	21.10		
2023	2023-08-24	14:40	0.00	10.63	10.63	0.0	1.9	13.10	-0.76	Bottom/dry water level
2023	2023-12-21	10:04	---	8.09	5.18	0.0	0.2	21.20	---	

GAS PROBE 03B

Reporting Year	Date	Time	Pressure/Vacuum (before) (P")	Static water level (m)	Exposed screen above water (m)	Methane (CH_4) % in air	Carbon Dioxide (Co_2) % in air	Oxygen (O_2) % in air	Pressure/Vacuum (after) (P")	Comment
2023	2023-03-29	13:45	0.00	4.3	1.39	0.0	0.0	21.10		
2023	2023-08-24	14:46	0.00	4.76	4.76	0.0	2.1	19.00	-0.03	Water level was wet at the bottom of the well
2023	2023-12-21	10:02	---	4.73	1.82	0.0	0.2	21.40	---	

GAS PROBE 04A

Reporting Year	Date	Time	Pressure/Vacuum (before) (P")	Static water level (m)	Exposed screen above water (m)	Methane (CH_4) % in air	Carbon Dioxide (Co_2) % in air	Oxygen (O_2) % in air	Pressure/Vacuum (after) (P")	Comment
2023	2023-03-29	14:08	-0.05	---	---	0.0	0.0	21.40		
2023	2023-08-24	10:59	0.01	---	---	0.0	1.5	19.20	-0.04	
2023	2023-12-21	9:36	---	---	---	0.0	3.0	15.80	---	

GAS PROBE 05A

Reporting Year	Date	Time	Pressure/Vacuum (before) (P")	Static water level (m)	Exposed screen above water (m)	Methane (CH_4) % in air	Carbon Dioxide (Co_2) % in air	Oxygen (O_2) % in air	Pressure/Vacuum (after) (P")	Comment
2023	2023-03-29	11:47	0.01	---	---	0.0	0.5	21.00		
2023	2023-08-24	10:40	-0.01	---	---	0.0	1.3	19.50	-0.02	
2023	2023-12-21	8:53	---	---	---	0.0	0.8	20.20	---	

GAS PROBE 06A

Reporting Year	Date	Time	Pressure/Vacuum (before) (P")	Static water level (m)	Exposed screen above water (m)	Methane (CH_4) % in air	Carbon Dioxide (Co_2) % in air	Oxygen (O_2) % in air	Pressure/Vacuum (after) (P")	Comment
2023	2023-03-29	10:58	0.00	---	---	0.0	0.2	21.00		
2023	2023-08-24	9:50	-0.02	---	---	0.0	1.7	18.60	-0.05	
2023	2023-12-21	8:40	---	---	---	0.0	1.6	19.30	---	

GAS PROBE 06B

Reporting Year	Date	Time	Pressure/Vacuum (before) (P")	Static water level (m)	Exposed screen above water (m)	Methane (CH_4) % in air	Carbon Dioxide (Co_2) % in air	Oxygen (O_2) % in air	Pressure/Vacuum (after) (P")	Comment
2023	2023-03-29	11:05	0.00	---	---	0.0	0.3	21.10		
2023	2023-08-24	10:06	-0.03	---	---	0.0	0.8	19.70	-0.06	
2023	2023-12-21	8:45	---	---	---	0.0	2.1	18.80	---	

GAS PROBE 07A

Reporting Year	Date	Time	Pressure/Vacuum (before) (P")	Static water level (m)	Exposed screen above water (m)	Methane (CH_4) % in air	Carbon Dioxide (Co_2) % in air	Oxygen (O_2) % in air	Pressure/Vacuum (after) (P")	Comment
2023	2023-03-29	12:01	0.02	---	---	0.0	0.2	21.10		
2023	2023-08-24	10:35	0.02	---	---	0.0	0.5	20.30	0.04	
2023	2023-12-21	9:05	---	---	---	0.0	0.4	20.90	---	

GAS PROBE 07B

Reporting Year	Date	Time	Pressure/Vacuum (before) (P")	Static water level (m)	Exposed screen above water (m)	Methane (CH_4) % in air	Carbon Dioxide (Co_2) % in air	Oxygen (O_2) % in air	Pressure/Vacuum (after) (P")	Comment
2023	2023-03-29	11:56	-0.02	---	---	0.0	0.3	21.10		
2023	2023-08-24	10:30	-0.03	---	---	0.0	0.2	20.60	-0.07	
2023	2023-12-21	8:58	---	---	---	0.0	0.2	21.10	---	

Appendix D3, continued

GAS PROBE 08A

Reporting Year	Date	Time	Pressure/Vacuum (before) (P")	Static water level (m)	Exposed screen above water (m)	Methane (CH_4) % in air	Carbon Dioxide (Co_2) % in air	Oxygen (O_2) % in air	Pressure/Vacuum (after) (P")	Comment
2023	2023-03-29	12:10	0.03	---	---	0.0	0.2	21.00		
2023	2023-08-24	10:21	-0.02	---	---	0.0	0.3	20.80	-0.04	
2023	2023-12-21	9:12	---	---	---	0.0	0.1	21.40	---	

GAS PROBE 09A

Reporting Year	Date	Time	Pressure/Vacuum (before) (P")	Static water level (m)	Exposed screen above water (m)	Methane (CH_4) % in air	Carbon Dioxide (Co_2) % in air	Oxygen (O_2) % in air	Pressure/Vacuum (after) (P")	Comment
2023	2023-03-29	11:17	0.01	---	---	0.0	0.2	21.10		
2023	2023-08-24	10:25	-0.06	---	---	0.0	0.5	20.50	-0.05	
2023	2023-12-21	9:16	---	---	---	0.0	0.1	21.50	---	

GAS PROBE 11A

Reporting Year	Date	Time	Pressure/Vacuum (before) (P")	Static water level (m)	Exposed screen above water (m)	Methane (CH_4) % in air	Carbon Dioxide (Co_2) % in air	Oxygen (O_2) % in air	Pressure/Vacuum (after) (P")	Comment
2023	2023-03-29	11:31	0.10	4.19	1.28	0.0	0.1	21.20		Pump failed like last time, JH & DS informed.
2023	2023-08-24	10:12	0.01	5.76	5.76	0.0	0.2	20.90	-74.64	Under vacuum
2023	2023-12-21	9:22	---	3.94	3.94	0.0	0.1	21.50	---	

GAS PROBE 11B

Reporting Year	Date	Time	Pressure/Vacuum (before) (P")	Static water level (m)	Exposed screen above water (m)	Methane (CH_4) % in air	Carbon Dioxide (Co_2) % in air	Oxygen (O_2) % in air	Pressure/Vacuum (after) (P")	Comment
2023	2023-03-29	11:34	0.03	4.53	1.62	0.0	1.7	19.70		
2023	2023-08-24	10:15	-0.03	6.92	6.92	0.0	2.0	19.20	-0.04	
2023	2023-12-21	9:25	---	4.07	4.07	0.0	1.8	19.10	---	

Appendix D3, continued

GAS PROBE 12A

Reporting Year	Date	Time	Pressure/Vacuum (before) (P")	Static water level (m)	Exposed screen above water (m)	Methane (CH_4) % in air	Carbon Dioxide (Co_2) % in air	Oxygen (O_2) % in air	Pressure/Vacuum (after) (P")	Comment
2023	2023-03-29	13:53	0.03	8.11	5.2	0.0	0.0	21.20		
2023	2023-08-24	14:54	0.05	10.6	10.6	0.0	4.5	7.20	0.00	
2023	2023-12-21	10:10	---	6	6	0.0	0.4	21.30	---	

GAS PROBE 12B

Reporting Year	Date	Time	Pressure/Vacuum (before) (P")	Static water level (m)	Exposed screen above water (m)	Methane (CH_4) % in air	Carbon Dioxide (Co_2) % in air	Oxygen (O_2) % in air	Pressure/Vacuum (after) (P")	Comment
2023	2023-03-29	13:57	-0.47	6.3	3.39	0.0	0.0	21.30		
2023	2023-08-24	15:00	-0.03	6.56	6.56	0.0	8.5	13.00	-0.02	
2023	2023-12-21	10:14	---	5.09	5.09	0.0	5.4	9.50	---	

GAS PROBE 13A

Reporting Year	Date	Time	Pressure/Vacuum (before) (P")	Static water level (m)	Exposed screen above water (m)	Methane (CH_4) % in air	Carbon Dioxide (Co_2) % in air	Oxygen (O_2) % in air	Pressure/Vacuum (after) (P")	Comment
2023	2023-03-29	14:12	0.00	---	---	0.0	0.0	21.40		
2023	2023-08-24	10:51	0.00	---	---	0.0	5.3	15.40	0.00	
2023	2023-12-21	9:31	---	---	---	0.0	2.6	18.10	---	

GAS PROBE 17A

Reporting Year	Date	Time	Pressure/Vacuum (before) (P")	Static water level (m)	Exposed screen above water (m)	Methane (CH_4) % in air	Carbon Dioxide (Co_2) % in air	Oxygen (O_2) % in air	Pressure/Vacuum (after) (P")	Comment
2023	2023-03-29	14:19	-0.23	---	---	0.0	0.0	21.20		
2023	2023-08-24	10:46	-0.10	---	---	0.0	0.3	20.60	-0.05	Pump flow failed
2023	2023-12-21	9:38	---	---	---	0.0	0.1	21.60	---	

GAS PROBE 18A

Reporting Year	Date	Time	Pressure/Vacuum (before) (P")	Static water level (m)	Exposed screen above water (m)	Methane (CH_4) % in air	Carbon Dioxide (Co_2) % in air	Oxygen (O_2) % in air	Pressure/Vacuum (after) (P")	Comment
2023	2023-03-29	14:52	-0.04	---	---	0.0	0.0	21.10		
2023	2023-08-24	11:17	0.01	---	---	0.0	0.2	20.70	-0.01	
2023	2023-12-21	10:24	---	---	---	0.0	0.4	20.60	---	

APPENDIX E

Grid and Hot Spot Monitoring

E1 Grid and Hot Spot Monitoring Methodology

E2 2023 Grid and Z Point Monitoring Data

E3 Hartland Landfill Historical Z Point Data

Appendix E1 Grid and Hot Spot Monitoring Methodology

The following is the grid sampling field methodology, as outlined in *Hartland Landfill Standard Operating Procedures* (2012).

Monitoring usually takes two full days, beginning at 0730 hours and ending between 1600 and 1630. Prior to each monitoring day, the gas analyzer must be calibrated using the calibration gases at Hartland. At the beginning of each field day, the fuel cell for the Flame Ionization Detector (FID) is filled with hydrogen gas and the unit is warmed up for at least 30 minutes before calibration. Calibration is conducted with two methane span gases (currently 500 ppm and 14,990 ppm methane), and a zero gas to generate a proper calibration slope. After successful calibration, as span check is completed and recorded on the calibration sheet. In addition, the Jerome sensor is regenerated at the beginning and end of each day to remove any residual hydrogen sulphide on the gold sensor.

The Jerome analyzer is factory calibrated and, therefore, does not require field calibration. After regeneration, the instrument is turned on for 30 minutes before zeroing. Once it is zeroed, the zero filter is attached to the unit and a sample is taken.

MONITORING

There is an established walking pattern over the grid points, and it denotes two distinct monitoring areas (Phase 1 and Phase 2/Active Face). These areas are monitored separately, due to the distinct differences in gas concentrations, level of landfilling activity, and placement of litter fences. This results in acquisition of data from a similar area under similar environmental conditions, as monitoring typically takes two days. In each area, the grid points are traversed alphabetically (e.g., B1, B2, B3, B4, etc.) where physically possible. In some cases, litter fences, controlled waste trenches or active filling areas limit or restrict access resulting in deviation from the standard protocol. These deviations should be recorded on the field sheet.

Weather conditions dictate when this monitoring can be completed. The FID cannot operate in rainy conditions and monitoring should be delayed until two consecutive days of dry weather are predicted. In addition, high to moderate winds blow gases away from their origin and dilute gas concentrations. These conditions are not representative of typical landfill conditions and monitoring does not take place on these days.

The following procedure is used to collect methane and H_2S readings at each grid point:

1. Place the hydrogen sulphide (H_2S) analyzer on the ground then press the “Sample” button.
2. The second staff person should place the FID intake controller 4 inches from the ground surface for 30 seconds.
3. Once the H_2S analyzer has reported a value (approximately 30 seconds), the methane value should be read from the FID and both values recorded on the field sheet.
4. The FID is programmed to alarm if methane levels exceed 100 ppm. If the alarm sounds while walking a traverse, staff must investigate the area for the source of elevated methane by means of a detailed 10-by-10 meter (m) grid. The 10-by-10 m grid should be traversed between all adjacent grid points. Obvious sources of methane include bird poles or a seam/edge of a temporary closure lining.
5. Once the source has been identified, record the source description, methane and H_2S values, as well as the location coordinates. This data represents a “hot spot” (>1,000 ppm of methane) or “Z-spot” (>12,500 ppm of methane), identified on figures 5 and 6 as a red, or purple, ‘X’, respectively.
6. If an obvious source cannot be identified, the location and data/observations from the highest localized reading should be recorded.
7. Continue with this method until all grid points, background stations, and pre-existing Z-spots have been monitored. Pre-existing Z-spots can be removed from the monitoring list if methane levels are below 1,000 ppm for three consecutive monitoring events.
8. At the end of each field day, a span check is completed on the FID and recorded on the field sheet.

Appendix E2 2023 Grid and Z Point Monitoring Data

Table 1. Hartland Landfill VOC & TRS Grid Data

August 2023		
WAYPOINT	Methane (ppm)	H2S
B1	0	0.002
B2	0	0.001
B3	0	0.003
B4	0	0.002
B5	0	0.002
B6	1	0.002
B7	0	0.001
B8	0	0.002
B9	0	0.003
B10	0	0.003
BACK-1	0	0.001
BACK-6	0	0.002
BACK-7	0	0.000
BACK-10	0	0.000
BACK-11	0	0.000
BACK-12	0	0.001
BACK-13	0	0.000
BACK-20	0	0.001
BACK-21	0	0.001
C1	0	0.002
C2	0	0.002
C3	0	0.003
C4	0	0.003
C5	0	0.001
C6	0	0.002
C7	0	0.003
C8	0	0.003
C9	0	0.003
C10	0	0.002
C11	0	0.003
D1	0	0.002
D2	0	0.002
D3	0	0.003

Appendix E2
Table 1, continued

August 2023		
WAYPOINT	**Methane (ppm)**	**H2S**
D4	0	0.003
D5	0	0.003
D6	0	0.004
D7	0	0.002
D8	35	0.002
D9	0	0.002
D10	0	0.002
D11	0	0.002
E1	0	0.001
E2	0	0.003
E3	0	0.003
E4	0	0.002
E5	0	0.002
E6	0	0.002
E7	2	0.002
E8	0	0.002
E9	---	---
E10	0	0.002
E11	202	0.002
F1	0	0.002
F2	0	0.002
F3	0	0.002
F4	0	0.001
F5	0	0.002
F6	13	0.001
F7	4	0.001
F8	1	0.003
F9	---	---
F10	34	0.005
F11	110	0.003
F12	---	---
G1	0	0.001
G2	0	0.001
G3	0	0.001
G4		---
G5	0	0.002
G6	1	0.002
G7	445	0.002
G8	2	0.002
G9	15	0.002
G10	2	0.001

Appendix E2
Table 1, continued

August 2023		
WAYPOINT	**Methane (ppm)**	**H2S**
G11	---	---
G12	61	0.001
G13	---	---
G14	---	---
G15	---	---
H1	0	0.001
H2	0	0.001
H3	0	0.001
H4	0	0.001
H5	0	0.001
H6	0	0.001
H7	0	0.001
H8	5	0.001
H9	7	0.001
H10	7	0.003
H11	0	0.001
H12	---	---
H13	---	---
I1	0	0.000
I2	0	0.000
I3	0	0.000
I4	0	0.001
I5	0	0.001
I6	0	0.001
I7	0	0.000
I8	13	0.001
I9	0	0.002
I10	12	0.001
I11	10	0.001
I12	165	0.003
I13	68	0.003
I14	46	0.002
I15	121	0.002
J1	0	0.001
J2	0	0.001
J3	0	0.001
J4	0	0.001
J5	0	0.001
J6	0	0.001
J7	0	0.001
J8	0	0.001

Appendix E2
Table 1, continued

August 2023		
WAYPOINT	**Methane (ppm)**	**H2S**
J9	0	0.002
K1	0	0.001
K2	0	0.001
K3	0	0.001
K4	0	0.001
K5	0	0.001
K6	0	0.001
K7	0	0.001
K8	0	0.002
K9	35	0.002
K10	4	0.001
K11	46	0.002
K12	2,800	0.018
K13	6	0.001
K14	15	0.003
K15	15	0.002
L1	0	0.001
L2	0	0.001
L3	0	0.002
L4	0	0.001
L5	0	0.001
L6	0	0.001
L7	0	0.001
L8	0	0.001
L9	0	0.001
L10	0	0.002
L11	0	0.003
L12	13	0.002
L13	2	0.002
L14	0	0.002
M1	0	0.001
M2	0	0.001
M3	0	0.000
M4	0	0.001
M5	0	0.001
M6	0	0.001
M7	0	0.001
M8	1	0.002
M9	0	0.001
M10	0	0.000
M11	7	0.001

Appendix E2
Table 1, continued

August 2023		
WAYPOINT	**Methane (ppm)**	**H2S**
M12	3	0.001
M13	2	0.001
M14	---	---
N1	0	0.002
N2	1	0.002
N3	1	0.002
N4	0	0.002
N5	0	0.002
N6	0	0.002
N7	0	0.002
N8	1	0.002
N9	0	0.003
N10	1	0.002
N11	1	0.003
N12	28	0.003
N13	0	0.005
P1	0	0.001
P2	0	0.001
P3	0	0.001
P4	3	0.001
Z88	5,500	0.000
Z94	12	0.580
Z100	5,600	0.001
Z106	0.02	0.065
Z108		
Z115		
Z117		
Z119	3,900	0
Z121		
Z122	180	0.004
Z123	10	0.001
Z124	2,900	0
Z125	1,600	0.013
Z126	130	0.002
Z127	6,600	0.650
Z128	7,600	0.26
Z129	1,800	0.000
Z130	2,900	0
Z131	950	0.000
Z132		
Z133		

Appendix E2
Table 1, continued

August 2023		
WAYPOINT	**Methane (ppm)**	**H2S**
Z134		
Z135		
Z136	4,400	0.009

Appendix E2, continued

Table 2. Hartland Landfill VOC from Walkabout

WAYPOINT	Methane (ppm)	Comments
Z88	12,200	Infrastructure hatch, north face closure at Toutle Valley
Z94	3	Buried
Z100	12,900	Hole in tarp beside black pipe, approximately 20 ft downhill of gas well
Z106	8,000	LFG infrastructure on North Face interim closure (box lid)
Z122	1,015	Concrete box infrastructure with black lid, across and up the road from wheel wash
Z123	0	Buried
Z125	5,034	Concrete box with metal hatch by road, adjacent to Z124, slightly south
Z126	14,000	Concrete box with metal hatch by road, uphill of Z125
Z127	7,100	Metal culvert parallel to road, flowing downhill into Toutle Valley
Z128	15,000	Inside casing of Gw well 90-2-1 (90-1-1 reading: 1.3ppm methane, 0.150ppm H2S in 2023)
Z130	3,300	Hole in tarp with metal poking out
Z131	3,300	Hole in tarp between bench roads, downhill of Z130. Rock poking out of hole in the tarp
Z133	0	Buried 2023
Z134	5	Flange on black pipe at top of slope
Z136	2,800	Large hole in black tarp with rotten stump tree stump sticking out of hole

Appendix E3 Hartland Landfill Historical Z-Point Data

Northing	Easting	Point	Sort Order	Created	Active?	Oct-2009	Jan-2010	Jun-2010	Jan-2011	Dec-2011	Mar-2012	May-2012	Jul-2012	Dec-2012	Mar-2013	Oct-2013	Mar-2014	Jul-2014	Mar-2015	Sep-2015	Sep-2016	Mar-2017	Aug-2017	Mar-2018	Mar-2019	Jul-2020	Jul-2021	Aug-2022	Aug-2023	Description (updated during latest survey)
5376376.24	465770.27	Z1	1	Apr-2001	NO																								
5376382.91	465752.09	Z2	2	Apr-2001	NO																								
5376390.19	465731.55	Z3	3	Apr-2001	NO																								
5376404.12	465695.20	Z4	4	Apr-2001	NO																								
5376409.56	465682.96	Z5	5	Apr-2001	NO																								
5376307.82	465646.30	Z6	6	Apr-2001	NO																								
5376379.40	465641.99	Z7	7	Apr-2001	NO																								
5376358.61	465629.59	Z8	8	Apr-2001	NO																								
5376294.56	465571.38	Z9	9	Apr-2001	NO																								
5376288.59	465571.74	Z10	10	Apr-2001	NO																								
5376301.61	465588.85	Z11	11	Apr-2001	NO																								
5376153.49	465921.77	Z12	12	Apr-2001	NO																								
5376069.56	465700.69	Z13	13	Jun-2003	NO																								
---	---	Z14	14	n/a	NO																								
---	---	Z15	15	n/a	NO																								
---	---	Z16	16	n/a	NO																								
---	---	Z17	17	n/a	NO																								
---	---	Z18	18	n/a	NO																								
---	---	Z19	19	n/a	NO																								
5376240.81	465682.72	Z20	20	Dec-2001	NO																								
5376249.22	465672.08	Z21	21	Nov-2002	NO																								
5376140.63	465682.91	Z22	22	Dec-2001	NO																								
5376199.46	465617.53	Z23	23	Dec-2001	NO																								
5376344.34	465719.78	Z24	24	Dec-2001	NO																								
5376341.83	465741.15	Z25	25	Dec-2001	NO																								
5376332.13	465767.23	Z26	26	Dec-2001	NO																								
5376157.75	465907.15	Z27	27	Jun-2003	NO																								
5376127.51	465683.22	Z28	28	Jun-2003	NO																								
5376305.09	465604.31	Z29	29	Nov-2003	NO																								
5376154.49	465756.65	Z30	30	Nov-2003	NO																								
5375849.50	465901.32	Z31	31	Dec-2004	NO																								
5376179.56	465851.44	Z32	32	Dec-2004	NO																								
5376200.63	465818.31	Z33	33	Dec-2004	NO																								

Appendix E3, continued

Northing	Easting	Point	Sort Order	Created	Active?	Oct-2009	Jan-2010	Jun-2010	Jan-2011	Dec-2011	Mar-2012	May-2012	Jul-2012	Dec-2012	Mar-2013	Oct-2013	Mar-2014	Jul-2014	Mar-2015	Sep-2015	Sep-2016	Mar-2017	Aug-2017	Mar-2018	Mar-2019	Jul-2020	Jul-2021	Aug-2022	Aug-2023	Description (updated during latest survey)
5376157.59	465835.86	Z34	34	Dec-2004	NO																								
5376147.38	465848.08	Z35	35	Dec-2004	NO																								
5376099.41	465792.74	Z36	36	Dec-2004	NO																								
5376298.24	465750.39	Z37	37	Dec-2004	NO					15																			
5376283.62	465801.38	Z38	38	Dec-2004	NO																								
5376322.83	465824.59	Z39	39	Dec-2004	NO																								
5375817.05	465744.70	Z40	40	Mar-2005	NO																								
5376147.36	465850.85	Z41	41	Sep-2005	NO																								
5376155.19	465838.23	Z42	42	Sep-2005	NO					14400		---	1285	1116	1442	667	---	565	---	4.27	10.56	DISCONTINUED							
5376256.03	465630.94	Z43	43	Mar-2005	NO																								
5376364.18	465792.37	Z44	44	Mar-2005	NO																								
5376338.64	465774.39	Z45	45	Feb-2006	NO																								
5376322.08	465752.91	Z46	46	Feb-2006	NO																								
5376175.39	465850.23	Z47	47	Feb-2006	NO					16700																			
5376101.47	465847.01	Z48	48	Feb-2006	NO					121																			
5375901.10	465848.17	Z49	49	Feb-2006	NO					13																			
5375953.93	465888.09	Z50	50	Feb-2006	NO					43																			
5376100.18	465962.24	Z51	51	Feb-2006	NO					3																			
5375975.37	465696.95	Z52	52	Feb-2006	NO					18																			
5376194.67	465817.08	Z53	53	Feb-2006	NO																								
5376112.28	465834.80	Z54	54	Feb-2007	NO					56																			
5376360.04	465590.39	Z55	55	Feb-2007	NO																								
5376230.52	465707.61	Z56	56	Feb-2007	NO																								
5376146.42	465711.45	Z57	57	Feb-2007	NO					13500																			
5376156.98	465740.43	Z58	58	Feb-2007	NO					14																			
5376179.09	465731.85	Z59	59	Feb-2007	NO																								
		Z60	60	n/a	NO																								
5375826.01	465743.17	Z61	61	Mar-2007	NO																								
		Z62	62	n/a	NO																								
5376202.48	465808.02	Z63	63	Mar-2007	NO					432																			
5376222.89	465785.18	Z64	64	Mar-2007	NO					61300	1020	23500		467		52	53				34.34	DISCONTINUED							
5376022.24	465735.25	Z65	65	Mar-2007	NO																								
5376254.13	465648.75	Z66	66	Mar-2007	NO																								

Appendix E3, continued

Northing	Easting	Point	Sort Order	Created	Active?	Oct-2009	Jan-2010	Jun-2010	Jan-2011	Dec-2011	Mar-2012	May-2012	Jul-2012	Dec-2012	Mar-2013	Oct-2013	Mar-2014	Jul-2014	Mar-2015	Sep-2015	Sep-2016	Mar-2017	Aug-2017	Mar-2018	Mar-2019	Jul-2020	Jul-2021	Aug-2022	Aug-2023	Description (updated during latest survey)
5376200.88	465678.92	Z67	67	Mar-2007	NO					10100																			
5376231.00	465640.00	Z68	68	Nov-2007	NO					17																			
5376259.00	465772.00	Z69	69	Mar-2008	NO					2																			
5376112.00	465801.00	Z70	70	Nov-2007	NO																								
5376097.00	465704.00	Z71	71	Sep-2008	NO					573																			
5376153.49	465921.77	Z72	72	Sep-2008	NO																								
5376307.59	465739.45	Z73	73	Sep-2008	NO					3																			
5376230.77	465743.00	Z74	74	Sep-2008	NO																								
5375953.74	465849.99	Z75	75	Sep-2008	NO					26																			
5376050.48	465710.00	Z76	76	Feb-2009	NO					33																			
5376051.20	465820.81	Z77	77	Feb-2009	NO					13																			
5376222.29	465772.39	Z78	78	Feb-2009	NO					97																			
5376120.72	465805.84	Z79	79	Feb-2009	NO					88																			
5376199.66	465562.00	Z80	80	Oct-2009	NO					26800	13100	48600	21100	15000	12500	14	66.1	5048	326	5032	MISSED	MISSED	0	79	72	DISCONTINUED				DISCONTINUED
5376249.92	465708.55	Z81	81	Oct-2009	NO					106																			
5376240.56	465727.11	Z82	82	Oct-2009	NO																								
5376354.32	465720.64	Z83	83	Oct-2009	NO					5																			
5375847.24	465856.80	Z84	84	Jan-2010	NO					56		9890	3706	12000	886	12	174	DISCONTINUED											
5375908.06	465797.51	Z85	85	Jan-2010	NO					24																			
5376299.34	465738.10	Z86	86	Jan-2010	NO					21000	11700	32200	28800	2798	4	38	18600	3076	8	35	4.01	DISCONTINUED							
5376293.64	465535.40	Z87	87	Jan-2010	NO					60000	51700	38000	11700	15000	7200	29	10800	20800	1326	13	0.7	MISSED	10.27	MISSED	DISCONTINUED				
5376317.71	465627.16	Z88	88	Jan-2010	ACTIVE		50000	0.121	2395	15000	22000	15000	10300	15000	8720	3600	41700	8919	10500	15400	15700	4700	10300	6370	874	6816	311	5500	12,200	Infrastructure hatch, north face closure at Toutle Valley
		Z89	89		NO					170																			
		Z90	90		NO					3028																			
		Z91	91		NO					364																			
		Z92	92		NO					1049		15000	19200	52	463	discontinued													
		Z93	93		NO					23		3791				56	70.9												
5376339.03	465598.07	Z94	94	Jan-2011	ACTIVE				12500	20000	15000	15000	79700	15000	12500	MISSED	23800	73200	42100	41400	134	14000	11300	16700	2859	8600	2	12	3.1	Buried
		Z95	95		NO					1490	34400	34400		3	29	12	DISCONTINUED												
		Z96	96		NO					927			3668	423	261	28	DISCONTINUED												
		Z97	97		NO					1750			2280	2	5	37	DISCONTINUED												
		Z98	98		NO					5364			1032	7	1	1	DISCONTINUED												
		Z99	99		NO					3800					---														
5376298.15	465682.45	Z100	100	Dec-2011	ACTIVE					2300	15000	15000	10800	15000	12500	1088	18900	314	5685	11200	3.21	MISSED	MISSED	MISSED	7	1511	MISSED	5600	12,900	Hole in tarp beside black pipe,

Appendix E3, continued

Northing	Easting	Point	Sort Order	Created	Active?	Oct-2009	Jan-2010	Jun-2010	Jan-2011	Dec-2011	Mar-2012	May-2012	Jul-2012	Dec-2012	Mar-2013	Oct-2013	Mar-2014	Jul-2014	Mar-2015	Sep-2015	Sep-2016	Mar-2017	Aug-2017	Mar-2018	Mar-2019	Jul-2020	Jul-2021	Aug-2022	Aug-2023	Description (updated during latest survey)
																													approximately 20 ft downhill of gas well
5376283.35	465708.83	Z101	101	Dec-2011	NO					11700	23.05	17800	30900	15000	12500	127	14500	17600	2803	28200	52	8500	85.81	1400	39	2	22	DISCONTINUED	DISCONTINUED	DISCONTINUED
		Z102	102		NO						9657	14700		352	360	13	3	DISCONTINUED											
		Z103	103		NO						13700	15000	6400	2531	12500	27	5.4	DISCONTINUED												
5376171.21	465831.76	Z104	104	Mar-2012	NO						32500	18000	19400	5325	12500	2510	36500	12300	19700	1168	84	6600	172	4	4	DISCONTINUED				DISCONTINUED
		Z105	105		NO							6766	3865	1531	360	88	36	DISCONTINUED											
5376327.32	465654.99	Z106	106	May-2012	ACTIVE							61300	35700	42000	12500	6566	2693	9300	2072	8086	50300	11000	1989	0	3950	3800	5007	2000	8,000	LFG infrastructure on North Face interim closure (box lid)
5376291.17	465680.05	Z107	107		NO							1600	3376		25	113	25000	12200	83	23500	7.8		0	MISSED	9	1	DISCONTINUED			DISCONTINUED
		Z108	108		ACTIVE										12500	7	0.31	15500	3							Missed	DISCONTINUED			DISCONTINUED
5376181.69	465671.86	Z109	109	Dec-2012	NO									1800	88	52	7559	13	30100	3	7924	13000	1199	1	0	33	DISCONTINUED			DISCONTINUED
		Z110	110		NO																						DISCONTINUED			DISCONTINUED
5376292.76	465689.88	Z111	111	Dec-2012	NO									138900	10900	4200	53.2	26900	385	5270	84	1200	1127	2	0	2	DISCONTINUED			DISCONTINUED
		Z112	112		NO										12500	12	76800	32	48400	7000	105		MISSED	1	0	1	DISCONTINUED			DISCONTINUED
5376254.68	465641.39	Z113	113	Oct-2013	NO											9466	5900	30000	31600	MISSED	26700	25000	17300	9	38	65	DISCONTINUED			DISCONTINUED
5376257.42	465644.69	Z114	114	Oct-2013	NO											48400	---	34400	11400	MISSED	185	25000	13100	12	0	4	DISCONTINUED			DISCONTINUED
5376257.97	465597.96	Z115	115		Y											61800	---	6560	12900	MISSED	1	MISSED	MISSED	MISSED	MISSED	MISSED	MISSED		DISCONTINUED	DISCONTINUED
5376251.73	465651.90	Z116	116	Mar-2013	NO												---	MISSED	MISSED	MISSED	MISSED	25000	23500	21	48	24	DISCONTINUED			DISCONTINUED
		Z117	117		NO												26500	MISSED	30700	MISSED	6	MISSED	MISSED	9	0	MISSED	DISCONTINUED			DISCONTINUED
5376314.21	465611.88	Z118	118	Jul-2014	ACTIVE												12600	3600	MISSED	9639	10	25.4	1032	1407	2487	369	2		MISSED	Hole in tarp
5376296.43	465718.43	Z119	119	Jul-2014	ACTIVE												15900	15900	16200	7000	4773	6966	8890	3100	9632	700	2400		MISSED	4 holes along LFG pipe
5376250.71	465549.48	Z120	120	Mar-2015	NO														16900	MISSED	2	17000	-0.66	4	0	DISCONTINUED				DISCONTINUED
5376150.60	465840.36	Z121	121	?	NO															1000	MISSED	MISSED	MISSED	MISSED	MISSED	MISSED	MISSED	DISCONTINUED		DISCONTINUED
5375891.79	465602.61	Z122	122	Mar-2017	ACTIVE																MISSED	8,500	7,224	MISSED	65	2,444	1,077		1,015	Concrete box infrastructure with black lid, across and up the road from wheel wash
5375891.79	465602.61	Z123	123	Mar-2017	ACTIVE																MISSED	8,400	365	MISSED	28747	25,600	0	0	0.0%	Buried
5376156.54	465848.29	Z124	124	Mar-2017	ACTIVE																MISSED	6,300	6,645	3,288	MISSED	2,043	693	2,900	MISSED	Concrete box with metal hatch by road
5376155.12	465848.01	Z125	125	Mar-2017	ACTIVE																MISSED	14,000	3,002	5,028	MISSED	10,100	700	1,600	5,034	Concrete box with metal hatch by road, adjacent to Z124, slightly south
5376147.43	465854.57	Z126	126	Jul-2020	ACTIVE																					9,400	456	130	14,000	Concrete box with metal hatch by road, uphill of Z125
5376276.39	465621.81	Z127	127	Aug-2020	ACTIVE																					21,400	75,000	6,600	7,100	Metal culvert parallel to road, flowing downhill into Toutle Valley

Appendix E3, continued

Northing	Easting	Point	Sort Order	Created	Active?	Oct-2009	Jan-2010	Jun-2010	Jan-2011	Dec-2011	Mar-2012	May-2012	Jul-2012	Dec-2012	Mar-2013	Oct-2013	Mar-2014	Jul-2014	Mar-2015	Sep-2015	Sep-2016	Mar-2017	Aug-2017	Mar-2018	Mar-2019	Jul-2020	Jul-2021	Aug-2022	Aug-2023	Description (updated during latest survey)
5376286.65	465651.33	Z128	128	Sep-2020	ACTIVE																					3,400	2,120	7,600	15,000	Inside casing of Gw well 90-2-1 (90-1-1 reading: 1.3ppm methane, 0.150ppm H2S in 2023)
5376281.02	465652.79	Z129	129	Oct-2020	ACTIVE																					8,900	2,670	1,800	MISSED	Large hole in black tarp with metal pole sticking out, 50ft south of well #90
5376282.15	465729.97	Z130	130	Nov-2020	ACTIVE																					1,686	1,111	2,900	3,300	Hole in tarp with metal poking out
5376286.60	465730.09	Z131	131	Dec-2020	ACTIVE																					1,430	1,905	950	3,300	Hole in tarp between bench roads, downhill of Z130. Rock poking out of hole in the tarp
5376359.74	465654.26	Z132	132	Jan-2021	ACTIVE																					2,302	391	MISSED	MISSED	Hole in tarp (large rock poking through), near bench road and black pipe
5376209.99	465672.68	Z133	133	Jul-2021	ACTIVE																						3,000	MISSED	0	Buried 2023
5376197.89	465653.66	Z134	134	Jul-2021	ACTIVE																						14,000	MISSED	5	Flange on black pipe at top of slope
5376280.91	465730.54	Z135	135	Jul-2021	ACTIVE																						2,200	MISSED	MISSED	Hole in tarp with metal rebar
5376338.40	465659.67	Z136	136	Aug-2022	ACTIVE																							4,400	2,800	Large hole in black tarp with rotten stump tree stump sticking out of hole
Existing hot spots surveyed						0	1	1	2	44	12	19	18	22	25	29	32	26	23	23	28	23	25	25	24	29	23	18	21	
Missed (m)						0	0	0	0	0	0	0	0	0	0	1	0	2	2	6	7	6	5	7	4	4	3	4	6	
Active z pts at start						0	1	1	2	44	12	19	18	22	25	29	32	26	23	23	28	26	25	25	25	32	33	20	23	
Added - new (n)						4	5	0	1	2	1	1	0	2	1	2	0	2	0	0	0	4	0	0	0	1	3	0	0	
Discontinued at end of survey						0	0	0	0	0	0	0	0	0	0	1	4	4	0	0	0	3	0	0	1	3	10	2	2	
Max Methane Concentration						0	50,000	0	12,500	61,300	51,700	61,300	79,700	138,900	12,500	61,800	76,800	73,200	48,400	41,400	50,300	25,000	23,500	16,700	28,747	25,600	75,000	7,600	15,000	

AF	Active Face - waypoint could not be measured because it was in the Active Face at the time of the survey
CW	Controlled Waste - waypoint could not be measured because it was in the Controlled Waste trench at the time of the survey
DISCONTINUED	Hotspot is no longer measured - hotspots are removed from the active list after 3 consecutive surveys with results <1,000 ppm methane
MISSED	Waypoint not visited/measured this survey
Z Point	A waypoint with a methane result >1,000 ppm

Notes:

	Methane over 1,000 ppm
	Methane under 1,000 ppm

APPENDIX F

Upcoming Project: Biogas Upgrading Facility

F1 Biogas Upgrading Facility Specifics

F2 Equipment Specifics

F3 Overview of the process from CRD to Fortis

F4 Hartland Biogas Upgrading Facility - General Layout

F5 Hartland Biogas Upgrading Facility - Site Plan and Interconnection Station / Pipeline

F6 Isometric View and Piping Plan

F7 Hartland Flare System Design

F8 High Level Schematic for Temporary Flare and Blower System

F9 Certificates of Calibrations

Appendix F1 Biogas Upgrading Facility Specifics

Parameter	Unit	Landfill Gas Characteristics
Methane (CH_4)	%-vol	Minimum 30
Sand, dust, gums, oil and other impurities	-	Any
Hydrogen Sulphide (H_2S)	mg/m^3 (ppm)	0 - 280 (0 - 200)
H_2O	mg/m^3 (%-vol)	0-49,8401 (0-7)*
Hydrocarbon dew point	-	Any
Total Sulphur	mg/m^3	<130
Carbon dioxide (CO_2)	%-vol	25 - 45
Oxygen (O_2)	%-vol	<3.5
Temperature	Degree C	0 - 40*
Total Siloxanes	mg/m^3	0 - 200
Carbon Monoxide	%-vol	ND (<0.05)
Ammonia	mg/m^3	<3
Nitrogen (N_2)	%-vol	≤30%
Bacteria and pathogens	Impurity Filter	Any
Pressure (Vacuum)	Inches of Water Column	20 - 40

*LFG Parameters H_2O and Temperature are based on typical LFG characteristics and not data collected from the Hartland Landfill site.

Data Room:
- Bacteria and Pathogens
- Hydrocarbons and Dust

Appendix F2 Equipment Specifics

Equipment	Specifics
Enclosed Flare	EFR 96-30 Series Temp Controlled Enclosed Flare
Candlestick Flare	Anguil Hero Flare F25U4 Utility Flare
Blower	Continental Industrie, model 051A.06

Appendix F3 Overview of the process from CRD to Fortis

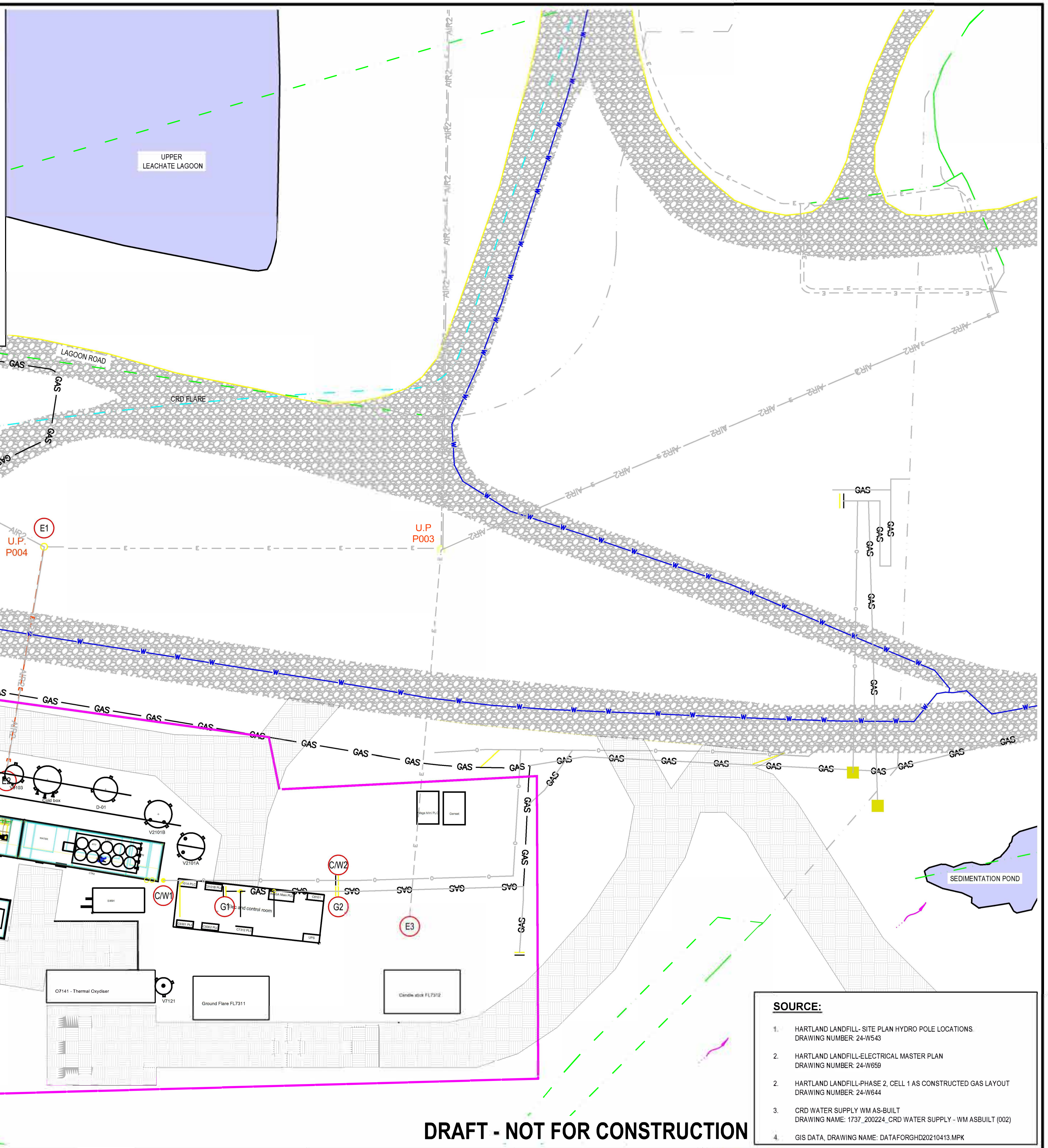
Appendix F4 Hartland Biogas Upgrading Facility - General Layout

LEGEND:

- SCOPE LIMITS
- ELECTRICAL COMMUNICATION CONDUIT
- ELECTRICAL
- GAS PIPE
- POTABLE WATER
- CONDENSATE/WASTEWATER
- LEACHATE MAIN
- DITCH (OR SWALE)
- CLEANOUT
- TEE
- UTILITY POLE
- CONDENSATE DRAIN CLEANOUTS
- ROADWAY
- GRANULAR PATH

TIE-IN LEGEND:

- E — AVAILABLE TIE-IN LOCATIONS
- G — AVAILABLE LFG FEED TIE-IN LOCATIONS
- C/W — AVAILABLE CONDENSATE/WASTEWATER TIE-IN LOCATIONS
- R — AVAILABLE RNG TIE-IN LOCATION
- O — AVAILABLE OFF SPECIFICATION/REJECT GAS TIE-IN LOCATION
- C — AVAILABLE COMMUNICATION TIE-IN LOCATION



DRAFT - NOT FOR CONSTRUCTION

SOURCE:

1. HARTLAND LANDFILL- SITE PLAN HYDRO POLE LOCATIONS
   DRAWING NUMBER: 24-W543
2. HARTLAND LANDFILL-ELECTRICAL MASTER PLAN
   DRAWING NUMBER: 24-W659
2. HARTLAND LANDFILL-PHASE 2, CELL 1 AS CONSTRUCTED GAS LAYOUT
   DRAWING NUMBER: 24-W644
3. CRD WATER SUPPLY WM AS-BUILT
   DRAWING NAME: 1737_200224_CRD WATER SUPPLY - WM ASBUILT (002)
4. GIS DATA, DRAWING NAME: DATAFORGHD20210413.MPK

BY	DATE	REVISION HISTORY - COLUMN 1	ENG.	BY	DATE	REVISION HISTORY - COLUMN 2	ENG
ADW	01/19/2023	Updating for more readibility					
ADW	12/08/2022	Updating position of burners					
ADW	11/16/2022	Changing colors font + applying comment from 60 % design					

SEAL

No.	DATE	ISSUE
6	01/19/23	Issue for revision
5	08/07/22	Scale updated
4	03/30/22	Storage container + future extentions details
3	01/0/22	Update with electricals cabinets details
2	01/25/22	PRELIMINARY PLOT PLAN

WAGA ENERGY

DESIGNED	NNO	SURVEYED	N/A
DRAWN	NNO	START	01/02/21
SCALE HORIZONTAL	1: 200	CHECKED	
SCALE VERTICAL	1: 200	APPROVED	

HARTLAND RNG

HARTLAND BIOGAS UPGRADING FACILITY
OVERALL PLAN DRAWING

PROJECT REFERENCE	DRAWING NUMBER	ISSUE	SHT. No.
XXXX	[illegible]-DW-2022-[illegible]	6	01 OF 01

Appendix F5 Hartland Biogas Upgrading Facility - Site Plan and Interconnection Station / Pipeline

LEGEND:

- SCOPE LIMITS
- ELECTRICAL COMMUNICATION CONDUIT
- ELECTRICAL
- GAS PIPE
- POTABLE WATER
- CONDENSATE/WASTEWATER
- LEACHATE MAIN
- PROPOSED FORTIS BC PIPE (APPROXIMATE)
- DITCH (OR SWALE)
- CO — CLEANOUT
- TEE
- U.P — UTILITY POLE
- CONDENSATE DRAIN CLEANOUTS
- ROADWAY
- GRANULAR PATH
- FIBER OPTIC

TIE-IN LEGEND:

- E — AVAILABLE TIE-IN LOCATIONS
- G — AVAILABLE LFG FEED TIE-IN LOCATIONS
- C/W — AVAILABLE CONDENSATE/WASTEWATER TIE-IN LOCATIONS
- R — AVAILABLE RNG TIE-IN LOCATION
- O — AVAILABLE OFF SPECIFICATION/REJECT GAS TIE-IN LOCATION
- C — AVAILABLE COMMUNICATION TIE-IN LOCATION

N

UPPER LEACHATE LAGOON

LAGOON ROAD

U.P P011

INTERCONNECTION STATION LIMITS (APPROXIMATE) (BY OTHERS)

R O C

NORTH TOE ROAD

U.P. P004

E1

FUTURE FIBER OPTIC INSTALLATION

U.P P003

APPROXIMATE LOCATION OF FUEL GAS SERVICE CONNECTION

AVAILABLE LOCATION FOR TRENCH TO INTERCONNECTION STATION (INCLUSIVE OF RNG PRODUCT LINE, REJECT GAS LINE, HARDWIRE COMMUNICATION)

E2

CO C/W1 G1 C/W2 G2

E3

SEDIMENTATION POND

BIOGAS UPGRADING FACILITY (BUF) LIMITS (APPROXIMATE)

MAY 27 2022

FOR INFORMATION ONLY

SOURCE:

1. HARTLAND LANDFILL- SITE PLAN HYDRO POLE LOCATIONS. DRAWING NUMBER: 24-W543
2. HARTLAND LANDFILL-ELECTRICAL MASTER PLAN DRAWING NUMBER: 24-W659
3. HARTLAND LANDFILL-PHASE 2, CELL 1 AS CONSTRUCTED GAS LAYOUT DRAWING NUMBER: 24-W644
4. CRD WATER SUPPLY WM AS-BUILT DRAWING NAME: 1737_200224_CRD WATER SUPPLY - WM ASBUILT (002)
5. GIS DATA, DRAWING NAME: DATAFORGHD20210413.MPK

CONSULTANT: GHD

BY	DATE	REVISION HISTORY - COLUMN 1	ENG.	BY	DATE	REVISION HISTORY - COLUMN 2	ENG.

SEAL

No.	DATE	ISSUE
1	02/19/21	SITE PLAN AND AVAILABLE TIE-IN LOCATIONS

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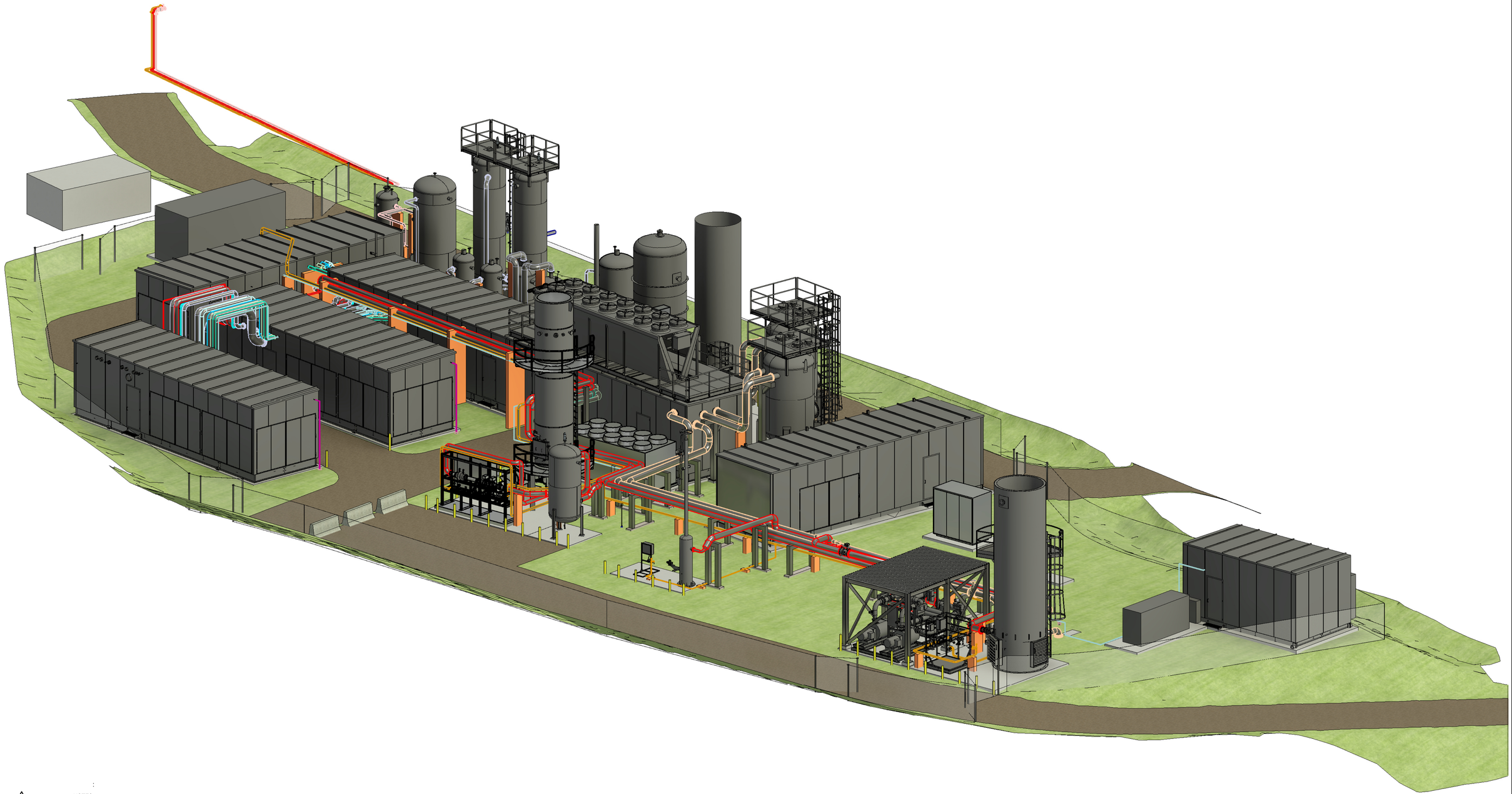
DESIGNED	J.W.	SURVEYED	N/A
DRAWN	S.H.	START	01/02/21
SCALE HORIZONTAL	1: 200	CHECKED	R.L.
SCALE VERTICAL	1: 200	APPROVED	D.B.

HARTLAND RNG INITIATIVE

HARTLAND BIOGAS UPGRADING FACILITY
SITE PLAN

PROJECT REFERENCE 11219924-03-01 | DRAWING NUMBER FIGURE 3 | ISSUE A | SHT. No. 01 OF 01

Filename: J:\ARCHIVE\CENTRAL\24W\24W1045\MAY27 2022_REVISED_FIGURE 3 -HARTLAND BIOGAS UPGRADING FACILITY SITE PLAN.DWG Last saved by: HLOCKE(2022-05-27) Last Plotted: 2022-05-27



NOT FOR CONSTRUCTION

:

NOTES

1. ELEVATIONS AND DIMENSIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
2. FOR PIPING MATERIALS PLEASE REFER TO HRRG P&ID LEGEND WE-PID-2020-100-3 SHEETS 1 THROUGH 3.

CONSULTANT

ISSUE	DATE	BY	REVISION DESCRIPTION	ENG.
-	-	-	-	

SEAL

No.	DATE	ISSUE
0	JUL. 2023	ISSUED FOR CONSTRUCTION

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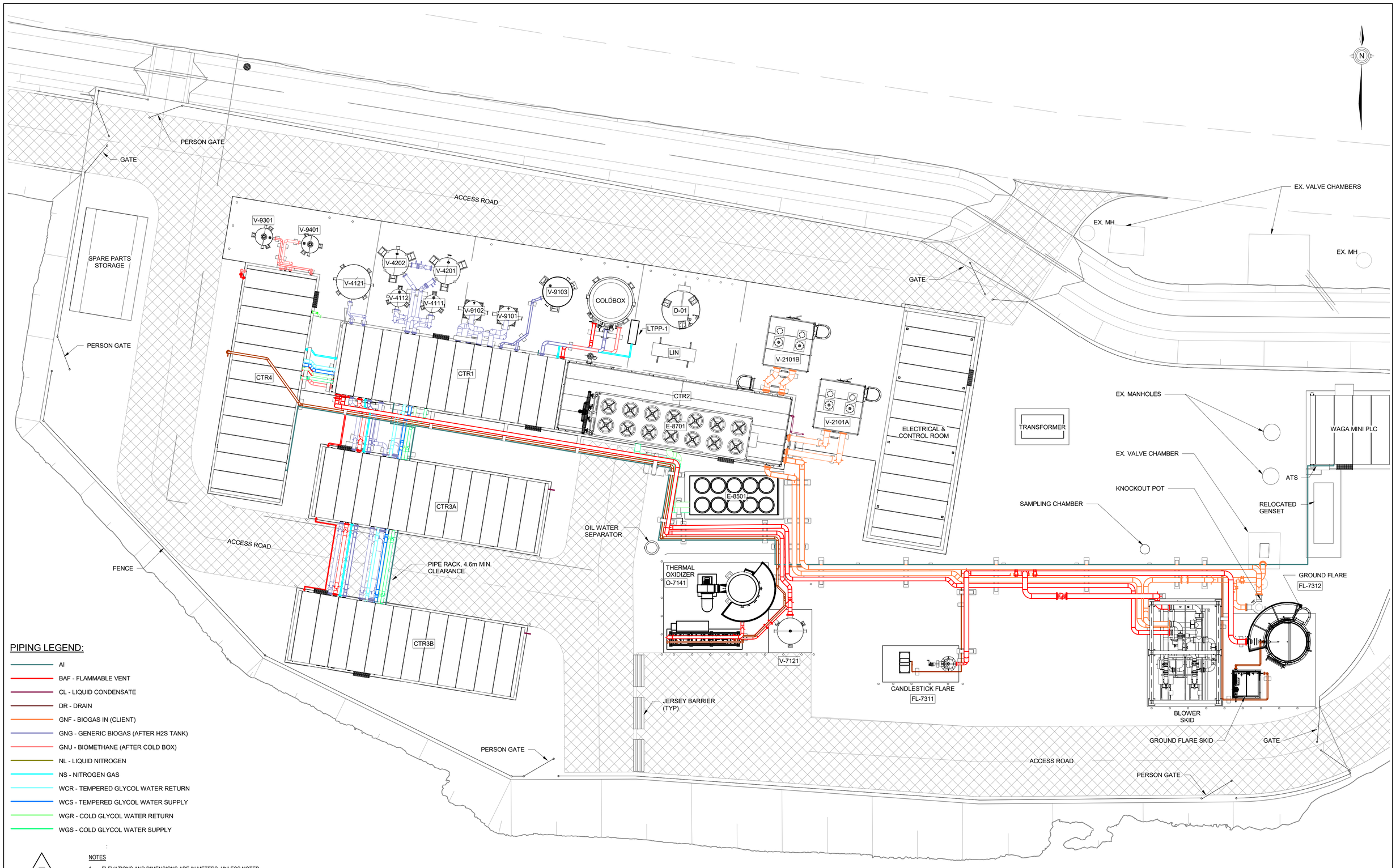
DESIGNED	K.H.	SURVEYED	-
DRAWN	C.F.	START	11/21/22
SCALE HORIZONTAL	N.T.S.	CHECKED	B.K.
SCALE VERTICAL	-	APPROVED	B.K.

HARTLAND LANDFILL GAS UPGRADING FACILITY

ISOMETRIC VIEW

PROJECT REFERENCE	DRAWING NUMBER	ISSUE	SHT. No.
ERM 2022-008 WSP WW22032091	M100	0	OF



PIPING LEGEND:

- AI
- BAF - FLAMMABLE VENT
- CL - LIQUID CONDENSATE
- DR - DRAIN
- GNF - BIOGAS IN (CLIENT)
- GNG - GENERIC BIOGAS (AFTER H2S TANK)
- GNU - BIOMETHANE (AFTER COLD BOX)
- NL - LIQUID NITROGEN
- NS - NITROGEN GAS
- WCR - TEMPERED GLYCOL WATER RETURN
- WCS - TEMPERED GLYCOL WATER SUPPLY
- WGR - COLD GLYCOL WATER RETURN
- WGS - COLD GLYCOL WATER SUPPLY

:

NOT FOR CONSTRUCTION

NOTES

1. ELEVATIONS AND DIMENSIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
2. FOR PIPING MATERIALS PLEASE REFER TO HRRG P&ID LEGEND WE-PID-2020-100-3 SHEETS 1 THROUGH 3.

GRAPHIC SCALE: 1:100

CONSULTANT

ISSUE	DATE	BY	REVISION DESCRIPTION	ENG.
-	-	-	-	

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No.	DATE	ISSUE
0	JUL. 2023	ISSUED FOR CONSTRUCTION

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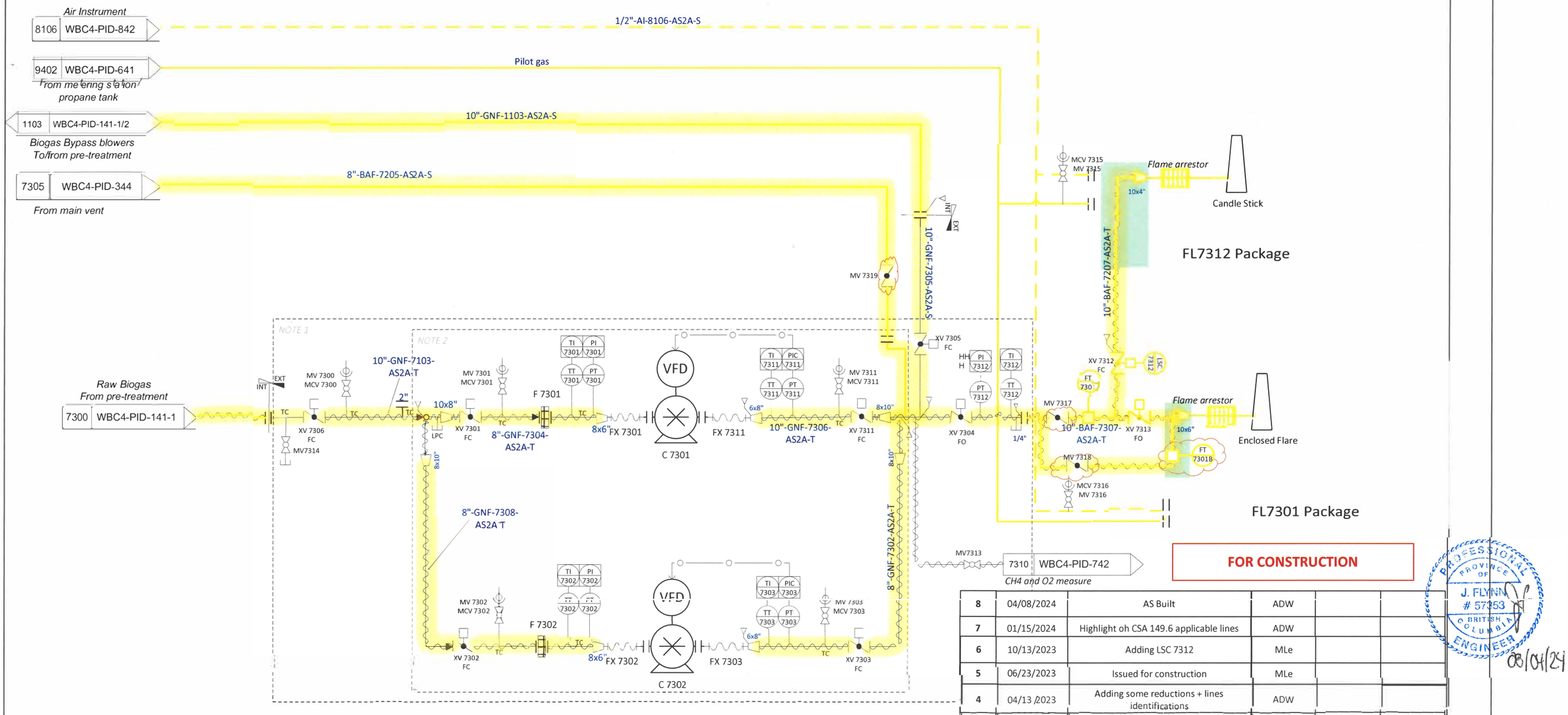
DESIGNED	K.H.	SURVEYED	-
DRAWN	C.F.	START	11/21/22
SCALE HORIZONTAL	1 : 100	CHECKED	B.K.
SCALE VERTICAL	-	APPROVED	B.K.

HARTLAND LANDFILL GAS UPGRADING FACILITY

PRELIMINARY INTERCONNECTING PIPING LAYOUT PLAN

PROJECT REFERENCE	ERM 2022-008 WSP WW22032091	DRAWING NUMBER	M101	ISSUE	0	SHT. No. OF

Appendix F7 Hartland Flare System Design



Note 1 : Flare skid
Note 2: - Lines to be symetric from the entry to the exit of the blowers
- All lines to be insulated and traced

Indice (Issue)	Date (Date)	Evolution du document (Document Evolution)	Dessiné (Drawn)	Vérifié (Checked)	Approuvé (Approved)
8	04/08/2024	AS Built	ADW		
7	01/15/2024	Highlight oh CSA 149.6 applicable lines	ADW		
6	10/13/2023	Adding LSC 7312	MLe		
5	06/23/2023	Issued for construction	MLe		
4	04/13 /2023	Adding some reductions + lines identifications	ADW		
3	01/05/2023	Issue for revision	ADW		

WAGA ENERGY
1250, avenue de la Station
(Local 2-501D) G9N 8K9
Shawinigan, Québec
Tel : 819-531-5334

Client / *Customer*: **HARTLAND - CRD**

Projet / *Project*: **WBC4 – Hartland Flare System**

Numéro de document / *Document number*: **WBC4-PID-144**

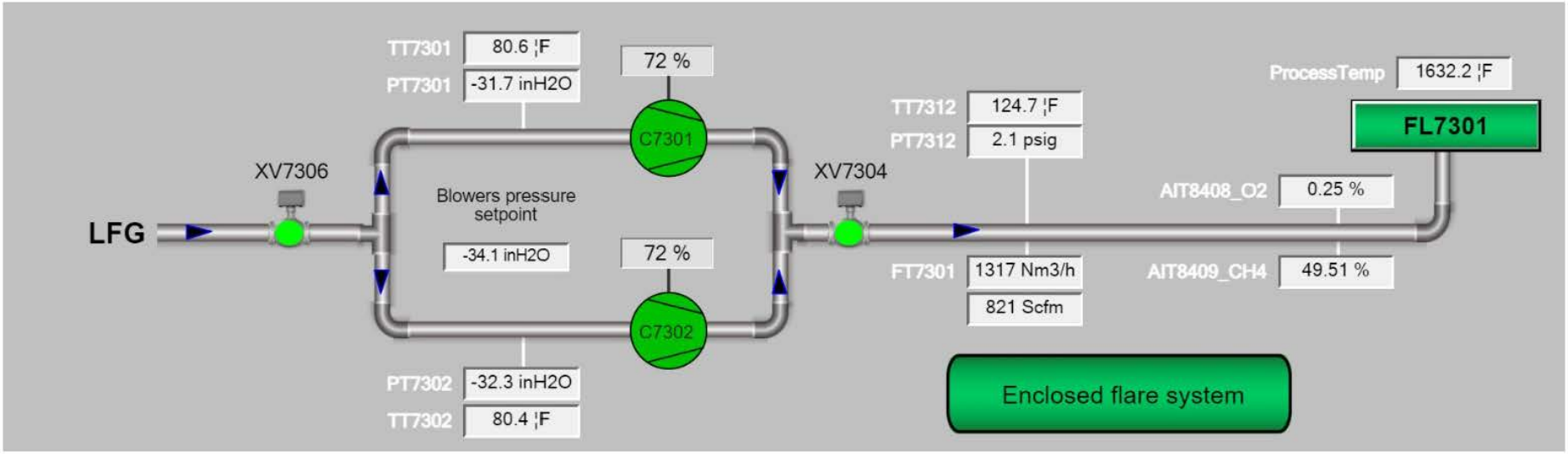
Indice / *Issue*: 8

Format: A2 | Echelle / *Scale*: NA | Page / *Sheet*: 1/1

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA J. FLYNN # 57353

08/04/24

Appendix F8 High Level Schematic for Temporary Flare and Blower System



Appendix F9 Certificates of Calibrations

eurofins | MET Labs

Certification Record

Listing#: E115016
Report #: 106486 c1 108665
Original Certification Date: March 10, 2020
Revised Certification Date: August 3, 2020

MET c US

This Certification is issued to:
Vaisala Oy
Vanha Nurmijärventie 21
FI-01670 Vantaa

Stating that the product(s):
Vaisala Multigas Probe,
Model MGP261, MGP262, and MGP263

Achieved Certification to the following standard(s):
UL & CSA C22.2 No. 61010-1 STANDARD FOR SAFETY Electrical Equipment for Measurement, Control and Laboratory Use; 3rd Edition, 2012 Rev April 2016
UL & CSA C22.2 No. 60079-0 STANDARD FOR SAFETY Explosive Atmospheres – Part 0: Equipment – General Requirements; UL 7th edition, CSA 4th 3edtion.
UL & CSA C22.2 No. 60079-7 STANDARD FOR SAFETY Explosive Atmospheres – Part 7: Equipment protection by increased safety "e"; UL 5th edition, CSA 2nd edition.
UL & CSA C22.2 No. 60079-11 STANDARD FOR SAFETY Explosive Atmospheres – Part 11: Equipment Protection by Intrinsic Safety "i"; UL 6th edition, CSA 2nd edition.
UL & CSA C22.2 No. 60079-18 STANDARD FOR SAFETY Explosive Atmospheres – Part 18: Equipment Protection by Encapsulation "m"; UL 4th edition, CSA 2nd edition.
UL & CSA C22.2 No. 60079-26 STANDARD FOR SAFETY Explosive Atmospheres – Part 26: Equipment with Equipment Protection Level (EPL) Ga; UL 3rd edition, CSA 1st edition.

Cedric Valiente
Project Engineer,
Eurofins MET Labs Safety Laboratory

All changes proposed in the previously identified product that affects the above information must be submitted to Eurofins MET Labs for evaluation prior to implementation to assure continued MET Certification status.

The covered product(s) shall be subject to follow-up inspections to ensure that the Certified product(s) are identical to the product sample evaluated by Eurofins MET Labs and that all manufacturer's responsibilities are being fulfilled

SAFJ TEMP-130-0, NRTLC Certification Record
6-25-2019

Page 1 of 1

SERVOMEX
a spectris company

SERVOTOUGH Oxy Analyser Test Sheet

Customer Order: 631077920 Product Type: 01910B1 Serial Number: 16752

Customer Name: VANKO ANALYTICS LTD

Works Order: 1268984 Quantity: 3 of 3

Transducer 1: Pm03601/000 Serial No:230460166

Included Sub-assemblies	Serial No:	Included Sub-assemblies	Serial No
01910907	C67930-0005	01910908	
01910911	C73667-0125	01910915	C69152-0026
01910921		01910960	
01910965	757132	01910936	100412
01910475 FP Casting	28/18	01910999G	19189

Performance Data

Gas	Value	Actual Reading	mA Output
Nitrogen	0.00	0.00	4.00
Oxygen	100.00	100.00	20.00
Air	20.95	20.95	7.36

Customer Voltage Selected 100-120Vac

All performance testing has been carried out in accordance with Standard Operating Procedure: 01910/617OP/5 with reference to Test Specification 01910B/000S/7

Chart Recorder Data: Channel: B7 On: 23/05/2023 08:00 Off: 30/05/2023 08:00

Test Technician Full Name:	Adam Lackenby	Date:	30/05/2023

Special Customer Configuration/Additional Tests SIPS Ref:

The above instrument has been inspected/tested in accordance with the relevant check list, test documentation and can be released for shipment.

Test Technician Full Name:	Adam Lackenby	Date:	30/05/2023

Form No: 4441/51 Issue 14

SERVOMEX
a spectris company

SERVOTOUGH Oxy Quality Check List

Following satisfactory completion of all tests contained in the relevant Test Procedure / Specification for all completed Instruments a final check of points listed below shall be made by authorised personnel prior to release.

Final Assembly Checks

Continuity test completed.	Yes
Flash test completed.	Yes
Leak Test	Yes
Interconnect cable type:	G

Finishing Off Checks

All terminal block screws are tight and wiring correctly dressed.	Yes
All connectors are correctly inserted and retained.	Yes
All pipe work is secure and any customer connections are capped as required	Yes
Gaskets and sealing rings are intact and not deformed.	Yes
Free from manufacturing debris.	Yes
Windows and external finishes are not scratched or pitted.	Yes
Labels, Certification are correct to Customer's order and adequately fitted.	Yes
Labels, General and WEEE directive are correct and adequately fitted.	Yes
Voltage is set to customer's requirement.	Yes
Pump fitted as required by Customer order and voltage correct.	Not Applicable
Customer configurations have been completed as required.	Yes
Product Manual is of the correct issue including Supplements.	Yes
All accessories and loose items as required by the order are present and correct. Loose items list signed and dated.	Yes
The Test Result Sheet is complete and a copy has been supplied with the instrument.	Yes
Any additional information such as Certificates of Conformity is completed.	Yes

Form No: 4441/51 Issue 14

SERVOMEX
a spectris company

SERVOTOUGH Oxy Analyser Test Sheet

Customer Order: 631077920 Product Type: 01910B1 Serial Number: 16752

Customer Name: VANKO ANALYTICS LTD

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01910965	757132	01910936	100412
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Labels, Certification are correct to Customer's order and adequately fitted.	Yes
Labels, General and WEEE directive are correct and adequately fitted.	Yes
Voltage is set to customer's requirement.	Yes
Pump fitted as required by Customer order and voltage correct.	Not Applicable
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Product Manual is of the correct issue including Supplements.	Yes
All accessories and loose items as required by the order are present and correct. Loose items list signed and dated.	Yes
The Test Result Sheet is complete and a copy has been supplied with the instrument.	Yes
Any additional information such as Certificates of Conformity is completed.	Yes

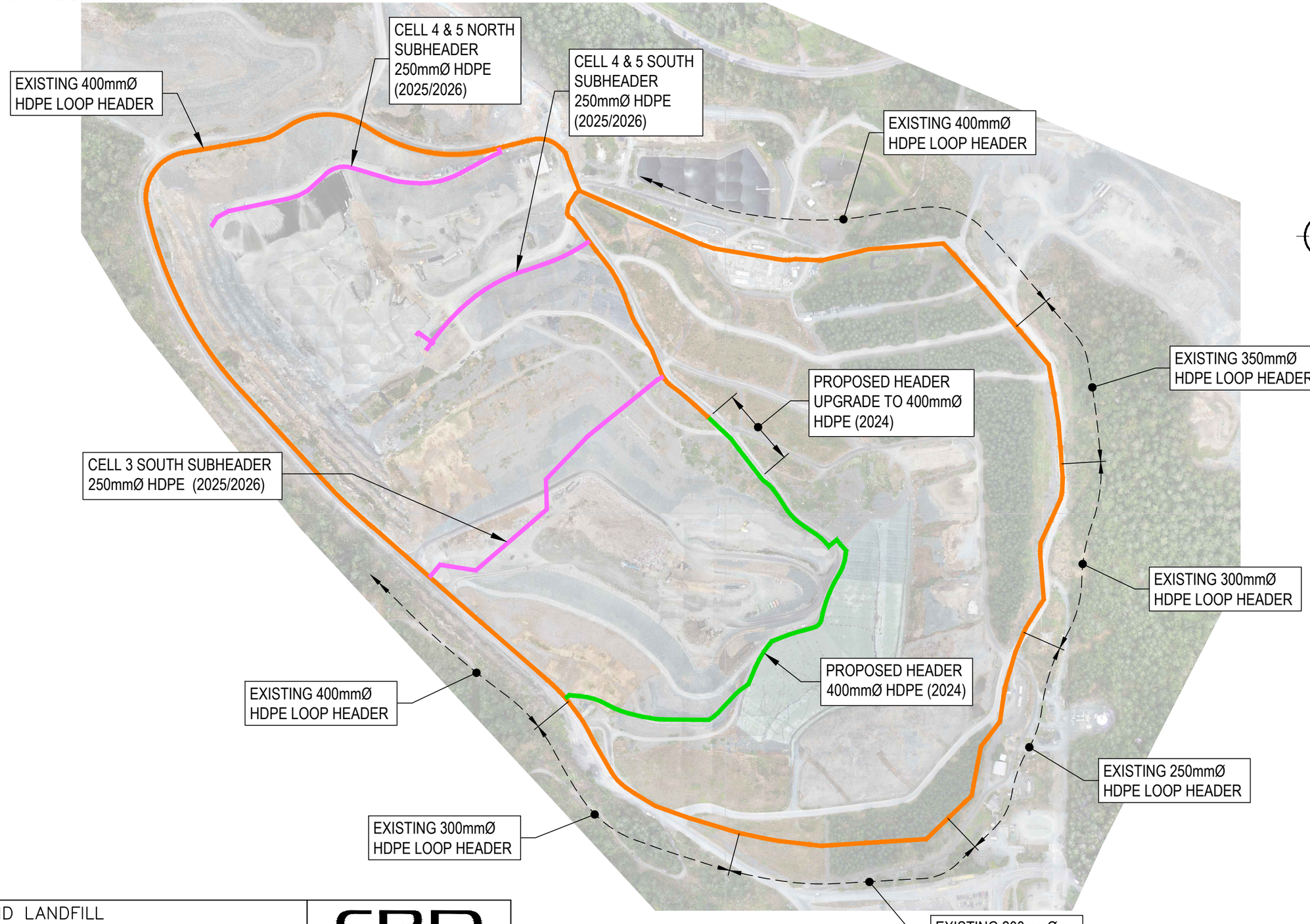
Form No: 4441/51 Issue 14

APPENDIX G

Overview of the design for the gas sub-headers for Cells 3 to 6 and proposed completion timelines

G1 Hartland Landfill Gas Header Site Plan

Appendix G1 **Hartland Landfill Gas Header Site Plan**



SITE PLAN

HARTLAND LANDFILL			Making a difference...together EGBC PERMIT No. 1003385			
LANDFILL GAS HEADER SITE PLAN						
APPROVED	DATE	DWG. NO.	DESIGNED	DRAWN	SCALE	CHECKED
	18/07/24	24–W1111–SK1		HL	NTS	SR

Capital Regional District | Parks & Environmental Services