



Verification Report

CAR521 Maple Hill Landfill

Reporting Periods: September 17, 2023 – September 16, 2024

September 17, 2024 – December 31, 2024

Prepared for:

AQC Environmental Brokerage Services, Inc.

August 19, 2025

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Table of Contents

Introduction.....	1
Project Background & Site Description	1
Responsible Party	1
Verification Team	1
Objectives.....	1
Scope	2
Verification Criteria	2
Verification Activities Summary	2
Verification Findings	3
Assessment of the GHG Emission Reductions Project Operations	3
GHG Project Boundary (sources, sinks and/or reservoirs)	3
Project Eligibility Criteria.....	4
Ownership of Generated Emission Reductions	5
GHG Monitoring and Management Systems	6
Instrument QA/QC	6
Assessment of GHG Emission Reductions Calculations	8
Variance	9
Verification Results.....	10
Verification Opinion	10

Introduction

AQC Environmental Brokerage Services, Inc. (AQC) contracted TÜV SÜD America Inc. (TÜV SÜD) to perform the verification of the Maple Hill Landfill (Project) for the reporting periods September 17, 2023 through September 16, 2024 and September 17, 2024 through December 31, 2024 to the Climate Action Reserve (Reserve) Landfill Project Protocol Version 6.0 (Protocol). The Project involves greenhouse gas (GHG) emission reductions from the capture and destruction of landfill gas (LFG) from the Maple Hill Landfill (Landfill) located near Macon, MO.

Project Background & Site Description

The Maple Hill Landfill is an active municipal landfill owned and operated by Advanced Disposal Services Maple Hill Landfill, LLC (ADS) that began operating in 1976. The Landfill has a permitted design capacity of 14.2 million cubic meters. A landfill gas (LFG) collection and control system was voluntarily installed in 2002 and currently consists of 41 LFG extraction wells with associated collection piping and a blower/flare station. Blowers are used to extract the LFG and send it to an open flare for destruction. TÜV SÜD confirmed that the project is not a bioreactor.

Responsible Party

Advanced Disposal Services Maple Hill Landfill, LLC is responsible for the preparation and fair presentation of the GHG statement in accordance with the criteria listed below in Table 1.

Project Developer & Landfill Owner: Advanced Disposal Services Maple Hill Landfill, LLC (ADS)

Technical Consultant: AQC Environmental Brokerage Services, Inc. (AQC)

Verification Team

TÜV SÜD is responsible for expressing an opinion on the GHG statement based on the verification. The TÜV SÜD verification team consisted of the following individuals who were selected based upon verification experience and knowledge of landfill gas destruction projects.

Lead Verifier: Garrett Heidrick

Team Members: Kelli Miller, Ashley Emery

Independent Reviewer: Zach Eyler

Objectives

The goal of the verification activities was to ensure that the claimed GHG emission reductions were complete, consistent, accurate, transparent, and permanent and that the Project was in compliance with the Reserve's project additionality, monitoring, and reporting requirements. Furthermore, the verification activities ensure that the data provided to TÜV SÜD are well documented and free of any material errors or omissions.

Scope

The scope of the verification consisted of the following independent and objective activities:

- Review the reporting period's Project Monitoring Plan;
- Conduct a site visit to the Project location;
- Review the Project data acquisition and quality control procedures;
- Review the Project's baseline emissions and confirm the baseline and Project boundaries;
- Review the Project's evidence of environmental and regulatory requirements to ensure that the Project is additional;
- Review the Project's emission reductions calculations;
- Review the Project documents and data against the criteria listed in Table 1;
- Issue requests for additional documentation, clarifications, and corrective actions as necessary; and
- Issue a verification report, verification statement, and list of findings to AQC and the Reserve.

Verification Criteria

Table 1 – Summary of Verification Criteria

Criteria	Details
Standard of Verification	• Climate Action Reserve Landfill Project Protocol, V6.0, June 2022 • Errata and Clarifications to the Protocol, V6.0, April 2023 • Reserve Verification Program Manual, February 2021 • Reserve Offset Program Manual, V9.2, April 2024
Verification Process	The Reserve Verification Program Manual and ISO 14064-3:2019 "Specification with guidance for the validation and verification of greenhouse gas statements."
Level of Assurance	Reasonable assurance
Materiality	99% accuracy level (less than 1% error) for the 2023 and 2024 reporting periods because emission reductions are >100,000 tCO ₂ e annually.

Verification Activities Summary

The Verification process consisted of the following activities as outlined in the evidence-gathering plan:

- TÜV SÜD completed a NOVA/COI form to identify any potential conflict of interest with the Project, the project developer, or the technical consultant. The NOVA/COI form was submitted to the Reserve and the COI assessment revealed no conflicts of interest and was approved by the Reserve on April 15, 2025.
- TÜV SÜD held a verification kick-off meeting with AQC on April 22, 2025. During the kick-off meeting TÜV SÜD reviewed the verification objectives and process, reviewed the verification schedule, and requested the verification background documents.

- TÜV SÜD performed a strategic analysis and risk assessment of the received data and support documents to understand the scope and areas of potential risk in the GHG emissions inventory.
- TÜV SÜD developed a risk-based verification plan and evidence-gathering plan based upon the strategic analysis and risk assessment. The evidence-gathering plan was used throughout the verification and was revised as needed based upon additional risk assessments.
- TÜV SÜD conducted a site visit on June 5, 2025. During the site visit TÜV SÜD performed key personnel interviews; inspected the Project equipment; and observed the onsite GHG management systems and data gathering, monitoring, and handling practices.
- TÜV SÜD performed a risk-based desktop review of the submitted verification documents. The desktop review included an assessment of the GHG calculation methods and inputs, source data completeness, GHG management and monitoring systems, evidence of regulatory compliance, and record retention practices.
- TÜV SÜD submitted requests for corrective actions, non-material findings, additional documentation, and clarifications, as necessary to AQC throughout the verification.
- TÜV SÜD's independent reviewer conducted a review of the verification plan and evidence gathering plan, report, and opinion.
- TÜV SÜD issued a final verification report, verification opinion, and list of findings.
- TÜV SÜD held an exit meeting with AQC.

Verification Findings

Assessment of the GHG Emission Reductions Project Operations

The Landfill currently collects LFG and destroys it via combustion in an open flare system. The LFG is pulled by blowers located at the flare skid through a gas collection system that consists of vertical wells and a leachate collection and removal system. Methane data were measured using a handheld methane analyzer on a weekly basis for the entire duration of the reporting periods. The Project correctly applied a 10% discount factor to the total quantity of methane collected and destroyed as required by the Protocol.

GHG Project Boundary (sources, sinks and/or reservoirs)

The Protocol designates that CO₂ and CH₄ are the only GHGs included from the baseline and Project activities. The project emissions must be deducted from the baseline emissions to calculate GHG emission reductions. The GHG SSRs include methane generated from biodegradation of the landfill waste vented to the atmosphere, methane consumed by soil bacteria through natural oxidation, incomplete combustion of methane via Project destruction devices, fossil fuel use, and electricity use. The SSRs reviewed during the verification of the Project are listed in Table 2.

Table 2 – Summary of the Project GHG Sources, Sinks and Reservoirs

Activity	GHG Sources, Sinks & Reservoirs
Baseline	• CH₄ vented to the atmosphere. • Percent CH₄ oxidized by soil bacteria. As the landfill is not covered with a synthetic liner, a 10% oxidation factor resulting from natural oxidation by soil bacteria was applied to the baseline emissions.
Project	• CH₄ from the incomplete combustion of LFG sent to the flare. • CO₂ from the combustion of fossil fuels used during operation and maintenance of the Project activity. • CO₂ resulting from the consumption of imported electricity.

Project Eligibility Criteria

The Protocol specifies four eligibility rules that a project must meet to register emission reductions with the Reserve: Location, Project Start Date, Additionality, and Regulatory Compliance. Below is a summary of the Reserve eligibility requirements and the Project's compliance to each requirement.

- **Eligibility Rule 1: Location**

The Project is a US-based landfill located near Macon, MO, USA. The Project therefore meets this eligibility requirement.

- **Eligibility Rule 2: Project Start Date**

TÜV SÜD verified the Project start date. The Project Submittal Form was submitted to the Reserve on September 16, 2002. The Project began gas destruction by flaring on September 16, 2002. TÜV SÜD reviewed the Project Submittal Form, original installation paperwork, and field notes from the first gas extraction to support this start date. TÜV SÜD also reviewed the Project Submittal Form for the second and third crediting periods. The third crediting period began on September 17, 2022 and will end on September 16, 2032.

- **Eligibility Rule 3: Additionality**

Performance Standard Test

Prior to the Project activity, the Landfill did not collect, vent, or destroy LFG. TÜV SÜD confirmed this through historical aerial photographs, onsite inspection, as well as interviews with Landfill personnel.

Thus, the Project passes the Performance Standard Test number 1 since it involves:

“Installation of a landfill gas collection system and a new qualifying destruction device at an eligible landfill where landfill gas has never been collected and destroyed prior to the project start date.”

Legal Requirement Test

During the site visit, TÜV SÜD interviewed ADS and landfill staff about the procedures to ensure that the Project meets environmental compliance requirements and passes the Legal Requirement Test. ADS monitors federal, local, and state regulations to ensure that the Project is in environmental compliance and that there is no mandate to collect and combust LFG. TÜV SÜD confirmed that there are currently no laws or ordinances requiring the Landfill to collect and destroy LFG.

The Landfill is a municipal solid waste (MSW) landfill with a design capacity above the 2.5 million megagrams (Mg) or 2.5 million cubic meters threshold as specified in the New Source Performance Standards (NSPS) codified in Title 40 of the Code of Federal Regulations (CFR) Part 60, Subpart WWW. The landfill is therefore subject to the requirements of the NSPS for MSW landfills.

Additionally, TÜV SÜD reviewed the “FINAL - Maple Hill 2023 Tier 2 NMOC Report” dated October 2023 in order to determine whether the Landfill is required to destroy LFG. The total NMOC generation rate for 2023 was estimated to be 27.63 Mg/year, which is below the mandatory threshold of 34 Mg/year.

During the review of the supporting evidence, TÜV SÜD did not observe any indication that the Landfill was mandated to destroy LFG. Additionally, there are no local, state, or federal requirements for the installation of a GCCS at the Landfill. Therefore, the results of the review indicated that the Landfill is following its established procedures to assure that it passes the Legal Requirement Test.

- **Eligibility Rule 4: Regulatory Compliance**

To confirm the Landfill and Project were within regulatory compliance TÜV SÜD searched the EPA’s Enforcement & Compliance History Online (ECHO) database on May 28, 2025 and reviewed the State of Missouri’s Department of Natural Resources’ (MDNR) online resources. No issues were identified in the ECHO database search.

An audit of the landfill conducted by MDNR in June of 2024 resulted in unsatisfactory ratings related to active cell 5 design and aesthetics related to windblown litter. A response was required by September 16, 2024. ADS responded in a letter addressing the concerns and detailing how the issues were resolved. Photos were included to corroborate the landfill’s efforts. TÜV SÜD confirmed that the issues noted were not related to project activities.

TÜV SÜD confirmed signature of the Attestation of Regulatory Compliance, after the end of the reporting period, which was uploaded to the Reserve.

Ownership of Generated Emission Reductions

TÜV SÜD reviewed evidence that ADS Maple Hill Landfill has ownership of the GHG emission reductions. Evidence included landfill permits listing the Landfill as the owner and operator of the

landfill. TÜV SÜD also reviewed the completed Attestation of Title which was uploaded to the Reserve following the end of the reporting period.

GHG Monitoring and Management Systems

TÜV SÜD reviewed the data management systems during the site visit and through the desktop review. TÜV SÜD completed the majority of the GHG management systems review during the site visit by observing the onsite procedures and interviewing the personnel responsible for the Project. The onsite review included an assessment of the Project data collection, processing and handling procedures, recordkeeping and data storage, quality control and assurance procedures, record retention systems, and a field tour of the Project equipment. The desktop review included a detailed review of the Project monitoring plan and its conformance to Protocol requirements.

LFG flow to the open flare, methane content of the LFG, and flare thermocouple temperature were the primary data gathered for the Project during the reporting period. The site used a combination of Seirra flow meters and Thermal Instruments flow meters to record LFG flow to the flare. As a result, flow meters SN# 220663, 238865, and L14111 were installed during the reporting periods. Documentation provided confirms all measure flow at 60°F and 1 atm. TÜV SÜD confirmed that the position of the flow meter is adequate to ensure laminar flow.

The site used multiple Elkins Earthworks Gas Analyzers for all weekly methane readings during the reporting periods. TÜV SÜD confirmed a 10% discount was properly applied in equation 5.3 to account for methane measurements that were less than continuous and more than weekly, in accordance with the Protocol.

The operation and temperature of the flare is continuously monitored by a thermocouple. The flow and temperature data are recorded continuously via a SCADA 3000 data transmitter which uploads to a cloud data server at least every 15 minutes and is periodically transferred via USB mass storage device to an independent computer for additional backup.

TÜV SÜD reviewed the data storage and retention policies of the Landfill and AQC and verified they were in conformance with the Protocol requirements and followed the Monitoring Plan. All data are kept for a period of at least ten years after the information is generated or seven years after the last verification in accordance with the Reserve's Verification Program Manual.

Instrument QA/QC

TÜV SÜD reviewed evidence that the LFG flow meters and methane analyzers met instrument QA/QC requirements as outlined in the Protocol for cleaning, inspection, and field calibration checks. The dates for the cleanings, inspections, and field calibration checks for each piece of monitoring equipment are listed in Table 3. Cleanings and inspections were conducted quarterly with activities and results documented. Sierra and Thermal Instruments do not recommend cleaning schedules for their flow meters. Cleaning and inspecting the flow meters on a quarterly basis goes above and beyond what the manufacturer recommends.

Sierra flow meter SN# 220663 was installed from September 17, 2023 to February 7, 2024, which is greater than 60 days, and is subject to the QA/QC removal requirements in the Protocol's errata and clarifications. The meter must be calibrated after September 16, 2022 and prior to the beginning of verification services. The meter was calibrated on November 16, 2023 and was within the +/-5% accuracy threshold, meeting the removal QA/QC requirements.

Sierra flow meter SN# 238865 was installed from February 7, 2024 to October 1, 2024, which is greater than 60 days, and is subject to the QA/QC removal requirements in the Protocol's errata and clarifications. The meter must be calibrated after February 7, 2023 and prior to the beginning of verification services. The meter was calibrated on January 9, 2024 and was within the +/-5% accuracy threshold, meeting the removal QA/QC requirements. The flow meter was installed through the end of the first reporting period and is required to be checked for accuracy two months prior to or after the end date of the reporting period (September 16, 2024). The flow meter was not checked for accuracy and a variance was requested (see *Variance*).

Thermal Instruments flow meter SN# L14111 was installed from October 1, 2024 to December 31, 2024. The flow meter was calibrated on September 10, 2024 and February 17, 2025 and were used as the end of reporting period accuracy checks. Both are within two months of the end date of each reporting period (September 16, 2024 and December 31, 2024). Both calibrations were within the protocol required +/-5% accuracy threshold.

Table 3 outlines the cleanings, inspections, and calibrations performed during the verification period.

Table 3 – Cleaning and Inspection, Accuracy Checks, and Factory Calibrations					
Monitoring Equipment	Regular Maintenance Inspections				
Sierra Flow Meter 220663	11/29/2023				
Sierra Flow Meter 238865		2/7/2024	6/4/2024	9/4/2024	
Thermal Instruments Flow Meter L14111					10/1/2024
Elkins ENV200 Handhelds	Calibrated before each use				
Monitoring Equipment	Factory Calibration(s)				
Sierra Flow Meter 220663	January 7, 2022 and November 16, 2023				
Sierra Flow Meter 238865	January 9, 2024				
Thermal Instruments Flow Meter L14111	September 10, 2024 and February 17, 2025				
Elkins ENV200 Handheld 1806207B	August 2, 2023 and August 19, 2024				
Elkins ENV200 Handheld 1703206B	July 15, 2024				

The Sierra flow meter manual recommends a calibration frequency of 24 months. Sierra flow meter SN# 220663 was calibrated with as-found conditions reflecting <5% drift on January 7, 2022 and November 16, 2023 and does not require recalibration until November 15, 2025. The recalibration on November 16, 2023 was to ensure compliance with the Reserve's removal requirements. TÜV SÜD confirmed that the results of the calibrations conducted on the flow meter prior to the current reporting period were within the +/-5% threshold required by the Protocol.

Sierra flow meter SN# 238865 was calibrated with as found conditions reflecting <5% drift on January 9, 2024 and does not require recalibration until January 8, 2026.

The Thermal Instruments flow meter manual recommends a calibration frequency of 18 months. Thermal Instruments flow meter SN# L14111 was factory calibrated on September 10, 2024 and February 17, 2025 and does not require recalibration until August 16, 2026.

The Elkins ENV200 handheld methane analyzer manual recommends a calibration frequency of 12 months. Elkins SN# 1712212B was calibrated on July 15, 2024 and does not require recalibration until July 14, 2025. Elkins SN# 1606207B was calibrated on August 2, 2023 and August 19, 2024. The handheld analyzers were factory calibrated by Elkins Earthworks, LLC with as-found conditions reflecting <5% drift. Weekly handheld methane readings were taken throughout the reporting periods and were used for all emission reductions calculations.

Handheld analyzer 1806207B missed its annual calibration by seventeen days. However, no methane readings from the analyzer were used outside of its annual calibration date, thus it is still in compliance with Protocol Section 6.2.

TÜV SÜD confirmed that the handheld gas analyzers were calibrated with calibration gas prior to each use. Additionally, TÜV SÜD confirmed any weekly methane measurements that did not include a calibration were recorded as "0" so that the destruction data were removed from the calculations.

Assessment of GHG Emission Reductions Calculations

The emission reductions calculation assessment included a review of Project assumptions, raw data inputs, and accuracy of calculations. TÜV SÜD first assessed the completeness of the raw data and how the data are transferred to the calculation spreadsheet. Next, TÜV SÜD reviewed the formulas and raw data inputs for accuracy and compliance with Protocol requirements. Lastly, TÜV SÜD recalculated the GHG emission reductions and compared the results to AQC's Project calculations and determined that the GHG emission reductions calculations were materially correct.

During the desktop review, TÜV SÜD compared the raw data to the LFG flow volumes, gas methane analysis, and temperature readings in AQC's emission reductions spreadsheet. The fossil fuel use and electricity data were also compared to the information in AQC's GHG emissions calculations. TÜV SÜD's review consisted of data transcription tests, data completeness review, spreadsheet functionality tests, and confirmation of calculation accuracy.

Within the emission reductions spreadsheet, data were eliminated when the flare temperature was below a threshold temperature of 500 °F. A 96% destruction efficiency was correctly assigned to the

open flare. Because the landfill is not covered with a synthetic liner, a 10% discount was applied to the baseline scenario for oxidation of methane by soil bacteria.

The net amount of methane destroyed by the Project was calculated, summed for the reporting period, and converted into CO₂ equivalents (CO₂e). Project emissions consisted of indirect emissions of CO₂ from electricity consumption and direct emissions of CO₂ from the combustion of propane, which is used as pilot fuel for the flare. The project emissions were calculated from the product of activity data multiplied by an appropriate emission factor. The total Project GHG reductions in CO₂e were calculated by subtracting the project emissions from the net amount of methane destroyed by the Project in CO₂e.

The total emission reductions for the September 17, 2023 – September 16, 2024 reporting period increased by approximately 18% when compared to the verified total from the previous reporting period due increased flow from the addition of a horizontal well.

TÜV SÜD reviewed the Project GHG emissions and reductions calculations for compliance with the Protocol’s calculation methodologies. There are no material misstatements in the final Project GHG reductions calculations and results (see Table 4).

TÜV SÜD confirmed there was no missing data during the reporting period.

Table 4. Comparison of Emission Reductions (MTCO₂e)

Vintage	TÜV SÜD	AQC	% Difference
2023	31,434	31,460	0.08%
2024	102,319	102,278	0.04%
Total	133,753	133,738	0.01%

Percent difference was calculated using the following equation:

$$\text{Percent Error} = \text{abs} \left(\frac{\text{Stated reductions} - \text{Verified reductions}}{\text{Verified reductions}} \right) \times 100$$

Variance

Maple Hill submitted a variance to the Reserve on July 23, 2025 for missing the Protocol required accuracy check within two months of the end date of the reporting period for the Sierra flow meter SN# 238865. Maple Hill requested to use the January 9, 2024 calibration in lieu of the accuracy check as proof that the meter was recording data accurately. The Reserve granted the variance pursuant to the following conditions:

1. The third-party calibration performed on January 9, 2024 has “as-found” and “as-left” conditions within the +/-5% accuracy threshold;
2. The quarterly inspections performed indicate that the meter was functioning properly;
3. The flow meter was underreporting flow rates compared to the loaner meter that replaced it;
4. The loaner meter was calibrated prior to its installation with “as-left” conditions within the +/-5% accuracy threshold;
5. The monitoring plan is updated to ensure all QA/QC requirements are met in the future.

TÜV SÜD confirmed that all variance conditions were met.

Verification Results

AQC provided sufficient documentation of its emission reductions, data collection procedures, and monitoring and quality control procedures. The verification process focused on verifying the emission reductions claimed and the source data used by AQC and the Landfill to quantify the emission reductions in accordance with the Reserve Landfill Project Protocol Version 6.0. The following is a summary of the verification results.

The Project reported emission reductions of 102,022 metric tons of CO₂e from September 17, 2023 to September 16, 2024 and 31,716 metric tons of CO₂e from September 17, 2024 to December 31, 2024. During the final review, TÜV SÜD identified no material misstatements in the data or emission reductions calculations. The emission reductions verified are listed in Table 5 and 6. During the verification process, TÜV SÜD made requests for corrective actions, non-material findings, additional documentation, and clarifications, as necessary to complete the verification. AQC sufficiently addressed all requests and remedied the material findings. The details of these requests are documented in TÜV SÜD's List of Findings provided to the Reserve and AQC.

Verification Opinion

TÜV SÜD America, Inc. conducted the verification of the CAR521 Maple Hill Landfill (Project) according to the requirements found in ISO 14064-3:2019, 14065:2020, and 17029:2019. The objective of this verification was to ensure that the GHG statement is materially correct and conforms to all relevant criteria. The GHG statement is the responsibility of AQC. A summary of the GHG statement is as follows:

- GHG-related activity: Methane destruction at the Maple Hill Landfill
- GHG statement period: September 17, 2023 – September 16, 2024 and September 17, 2024 – December 31, 2024
- Criteria:
 - o Reserve Offset Program Manual, V9.2, April 2024
 - o Reserve Verification Program Manual, February 2021
 - o Reserve U.S. Landfill Project Protocol, V6.0, June 2022
 - o Errata and Clarifications to the Protocol, V6.0, April 2023
 - o Policy Memo: Use of Global Warming Potential Values for All Offset Protocols, July 13, 2022

The data and information supporting the GHG statement were historical in nature.

Based upon TÜV SÜD's review, the GHG statement does not meet all requirements of the criteria including missing the end of reporting period accuracy check for meter SN# 238865.

TÜV SÜD has ensured AQC's effective use of controls related to the GHG statement. TÜV SÜD concludes that there is sufficient and appropriate evidence to support AQC's GHG statement and is issuing a Modified Opinion.

TÜV SÜD confirms that the GHG statement has been prepared:

- Without material discrepancy,
- In accordance with all applicable criteria, except for those listed above, and
- Verified to a reasonable level of assurance.

Emissions reductions are stated by vintage year and reporting period in Tables 4 and 5.

Table 4 – Emission Reductions MT CO₂e Verified by Vintage Years

Year	Baseline Emissions	Project Emissions	Emission Reductions
2023	31,495	34	31,460
2024	102,403	126	102,278
Total	133,898	160	133,738

Table 5 – Emission Reductions MT CO₂e Verified by Reporting Periods

Reporting Period	Baseline Emissions	Project Emissions	Emission Reductions
September 17, 2023 – September 16, 2024	102,147	125	102,022
September 17, 2024 – December 31, 2024	31,751	35	31,716
Total	133,898	160	133,738

Note: Due to rounding, individual values might not equal totals and values are not representative of raw data used in the emission reductions calculation.

Lead Verifier Signature



Garrett Heidrick

Independent Reviewer Signature



Zach Eyler