

Final Verification Report

Regional District of Nanaimo (RDN)
Landfill Gas (LFG) Capture and
Combustion Greenhouse Gas (GHG)
Emission Reductions Project
(January 1, 2013 to April 15, 2015)

January 3, 2018

Prepared for:

Zerofootprint Software Inc.
392 Markham Street
Toronto, ON M6G 2K9

1. VERIFICATION OBJECTIVE AND DETAILS

The objective of the verification is to confirm data, controls and processes supporting the emission reduction or removal calculations as presented in the GHG Report and corresponding GHG Assertion according to the procedures set out in ISO 14064-3.

Additional objectives include confirming that the GHG Report and corresponding GHG Assertion conformed to the requirements and principles of ISO 14064-2 and are without material discrepancies.

Stantec Consulting Ltd (Stantec) was contracted by Zerofootprint Software Inc. (Zerofootprint) to conduct an independent third-party verification of the greenhouse gas (GHG) Project Report titled “Regional District of Nanaimo (RDN) Landfill Gas (LFG) Capture and Combustion Greenhouse Gas (GHG) Emission Reductions Project” dated December 2017 (the Project Report). This verification report is applicable to the January 1, 2013 - April 15, 2015 crediting period. Stantec relies on our previous work completed during the annual verification of emission reductions in forming our opinion. This Verification Report includes all previous findings and our conclusion is made on the GHG assertion in the Project Report as well as new findings related to the additional criteria and presentation of information as required by Canadian Standards Associate (CSA) CleanProjects® registry.

In this work, the Regional District of Nanaimo (RDN) was responsible for the collection of data used in the calculations and data management. RDN had previously retained XCG Environmental Engineers & Scientists (XCG) to complete the calculations and present information within Annual Project Reports for 2013, 2014, and 2015 (partial year). RDN was contractually required to transfer the ownership over the verified offset credits to the Federation of Canadian Municipalities (FCM) (through the Green Municipal Corporation [GMC]) for the January 1, 2013 - April 15, 2015 crediting period. Stantec verified the 2013, 2014, and 2015 (partial year) vintage offset credits under the GMC program in years 2014 to 2016; however, these credits were not registered by FCM under any program. The ownership of these credits was sold to Zerofootprint, who intends to register the offsets under the CSA CleanProjects registry. Zerofootprint retained Trinity Consultants to prepare the Project Report for the January 1, 2013 - April 15, 2015 crediting period.

1.1. Project title

The Project title is “Regional District of Nanaimo (RDN) Landfill Gas (LFG) Capture and Combustion Greenhouse Gas (GHG) Emission Reductions Project”.

1.2. Date when the project began

The Project began in 1997. This was verified by Stantec.

1.3. Verification Site Visit

Site visits were conducted by Stantec (Lead Verifier Daniel Hegg) during the previous verifications. Site visit dates for each vintage are:

- 2013: March 26, 2014;
- 2014: April 29, 2015; and
- 2015: February 24, 2016.

1.4. Expected lifetime of the project

The expected lifetime of the Project is at least 20 years after the application of final cover to the Regional District of Nanaimo landfill. However, the crediting lifetime of the Project ended December 31, 2015 as the Project is no longer additional to legislation.

1.5. Type of greenhouse gas emission reduction or removal project

The Project captures and combusts landfill gas to reduce releases of methane into the atmosphere. Stantec is accredited with the American National Standards Institute (ANSI) in accordance with ISO 14065 (Accreditation ID #0805) for the GHG emission reductions from fuel combustion scope.

1.6. Verification of appropriateness of the methodology being used for the project

The quantification protocol applied to the Project is the Green Management Corporation (GMC) Measurement, Monitoring, Reporting and Verification Protocol for Greenhouse Gas Emission Reductions from Designated Projects Funded Through the Green Municipal Fund (herein referred to as MVP). The MVP is suitable and applicable as it provides guidance for landfill gas capture and combustion emission reduction projects, including quantification, monitoring, quality assurance, and quality control. Because the Project was developed under the GMC program for sale of credits to GMC, the project developer was required to use the MVP.

The Project developer examined whether the Project was additional through a review of provincial regulations related to landfills. The developer determined that the Project ceased to be additional starting on January 1, 2016.

1.7. Legal land description of the project or the unique latitude and longitude

Latitude: 49.118950

Longitude: -123.896695

Stantec conducted site visits in 2014, 2015, and 2016 to the RDN landfill as part of the verifications. The Project was found to be operating at the RDN landfill. Further, the latitude and longitude provided in the Project Report were found to be correct based on a map.

1.8. Ownership verification

The ownership history of the emission reductions generated by the Project are shown in the Project Report. The original Project Developer, RDN, had a contractual obligation to sell the offsets generated by the Project to GMC. GMC subsequently entered an agreement to sell the Project offsets to Zerofootprint. Stantec verified that agreements transferring the ownership from RDN to GMC and from GMC to Zerofootprint are in place and have been executed.

Zerofootprint's ownership of the Project offsets is only applicable up to April 15, 2015. There is

Verification Report Template for GHG CleanProjects® Registry

Verison 2.0 - December 2011

Replaces

Version 1.0 - September 2009

currently no plan to quantify and register offsets for the period of April 16, 2015 to December 31, 2015.

1.9. Reporting, monitoring, and verification details

In the previous verification periods, Stantec examined the Project’s monitoring and GHG information systems for transparency, completeness, accuracy, consistency, and relevance. The Project uses measured LFG flows and methane concentrations to calculate emissions. Further, the Project collects information related to LFG flow, temperature, and pressure to determine whether the gas is being combusted at the flare or by the engines. The monitoring equipment are routinely calibrated. Stantec’s review of the monitoring and GHG information systems included visits to the site to witness monitoring equipment, data collection processes, calibration records, and weekly inspection checklists. Data stored for the Project are backed-up daily and retained on-site.

Stantec confirms that it is aware that this Verification Report for the Regional District of Nanaimo (RDN) Landfill Gas (LFG) Capture and Combustion Greenhouse Gas (GHG) Emission Reductions Project will be publicly posted on the CleanProjects Registry. The GHG Report verified is dated December 2017.

This verification report was issued January 3, 2018 and is version 1.1.

1.10. Level of assurance and verification summary

The GHG Project, its corresponding GHG Report and GHG Assertion(s) are fair and accurate and free from material discrepancy. The GHG Assertions for the vintage years 2013, 2014, and 2015 (partial year) are presented in Table 1.

Table 1 GHG Assertions

Year	Baseline Emissions (t CO₂e)	Project Emissions (t CO₂e)	Total (tonnes CO₂e)
January 1 - April 15, 2015	8,471	169	8,302
January 1 - December 31, 2014	29,206	584	28,622
January 1 - December 31, 2013	26,457	529	25,928

1.11. Roles and responsibilities

The verification team is identified in Table 2. As part of Stantec’s GHG Standard Operating Procedures (SOP), the competence and selection of the team is completed following ISO 14066 - Greenhouse Gases - Competence requirements for greenhouse gas validation teams and verification teams.

Table 2 Verification Team

Name	Role	Responsibilities / Contact Details
Daniel Hegg, M.Sc., CEM	Lead Verifier	Delegate desktop review, sampling plan execution and working paper completion, complete site visit and prepare verification report. Address: 400-655 Tyee Road, Victoria, BC V9A 6X5 Phone: (250) 389-2538 Email: Daniel.hegg@stantec.com
Nicole Flanagan, M.A.Sc., P.Eng.	Independent Peer & Quality Reviewer	Independent review of verification activities and conclusions. Review verification deliverables technical soundness and compliance with Stantec’s internal processes and the Verification Criteria. The independent reviewer confirms the verification activities have been completed and that the activities provide the required level of assurance. Address: 400-1331 Clyde Avenue, Ottawa, ON K2C 3G4 Phone: (613) 738-6086 Email: Nicole.flanagan@stantec.com
Christina Varner, P.Eng.	Verifier	Lead desktop review and prepare verification report. Address: 845 Prospect Street, Fredericton, NB E3B 4M8 Phone: (506) 457-3237 Email: Christina.varner@stantec.com

Cameos of the team members are provided below.

Daniel Hegg – Lead Verifier

Daniel is a Senior Sustainability Specialist and Western Canada/United States Discipline Lead for Stantec Consulting Ltd.’s Climate Change Service Line.

To help public and private sector clients successfully address their toughest sustainability challenges, Daniel has invested over a decade of time and effort to develop a knowledge base that offers unique perspectives and insights on integrated carbon, energy, and water management and strategy, triple bottom line business case development, and climate change risk assessment and planning. Daniel's approach is multi-faceted and dynamic; it is predicated on an ownership transition model in which the sense of responsibility and understanding evolves from his team to the client. This allows for the development of strategic sustainability plans that are focused, workable, and address all aspects of sustainability associated with business operations and product portfolios.

Daniel has developed and verified over 50 organizational and facility GHG inventories and offset projects for clients in a wide range of sectors. Daniel has also provided GHG consulting on strategy, policy advice, and the preparation of guidance documents and climate change plans for public and private sector organizations. He has directed pioneering projects in community and corporate visioning, as well as policy and strategic planning for sustainability. Daniel has consulted for, amongst others, the Federation of Canadian Municipalities (FCM), the Union of British Columbia Municipalities, the British Columbia Climate Action Secretariat, the Pacific Carbon Trust, Bell Alliant, TransAlta, Capital Power Corporation, Total E&P Canada, Teck, Connacher Oil and Gas, BC Transit, and Phillips 66.

Nicole Flanagan – Independent Peer Review

Nicole has 16 years of environmental engineering, twelve of which are with Stantec. Nicole's experience is specialized in air emissions under a variety of industrial, government and corporate settings. She is currently a senior practitioner and technical reviewer for greenhouse emission quantification, reporting and verification. Nicole was the lead verifier of some of the first regulatory greenhouse gas offsets sold in North America, has completed Environmental Compliance Approvals (ECAs), and National Pollutant Release Inventory reporting for a number of clients facilitating regulatory compliance. In addition, she has completed projects for various facilities developing voluntary greenhouse gas inventories, and emission/energy performance key metrics and identification of reduction opportunities. Her clients include major electric utilities, energy companies, petrochemical production facilities as well as oil & gas companies.

She also spent four years with Environment Canada working on program development and program delivery of greenhouse gas inventory and reduction programs, which included meeting with stakeholders and administering procedural processes. During this time, she developed a strong understanding of the workings of government from program administration (Greenhouse Gas, NPRI Reporting Division and Canada's Offset System) as well as regulatory and instrument development (development of regulations and Pollution Prevention Planning requirements).

Christina Varner - Verifier

Christina has practiced environmental engineering, specializing in atmospheric environment, for seven years. She is a lead GHG verifier at Stantec, having completed over 70 GHG validation and verification projects for clients in oil and gas, chemical manufacture, electricity generation, commercial operations, and municipal governments. Christina has completed desktop reviews, reporting, and site visits for facility and project GHG inventories under Alberta's SGER, British Columbia's Emissions Offset Regulation and Reporting Regulation, The Climate Registry, Verified Carbon Standard, Ontario's Environmental Protection Act 452/09, and Massachusetts' Mandatory Greenhouse Gas Reporting Regulation.

Christina has been involved in air quality studies such as dispersion modelling, noise monitoring, source emissions testing, and ambient air quality monitoring. Her clients include pulp and paper mills, petroleum refineries, electricity generating stations, and asphalt plants. She has performed data collection and analysis for environmental assessments. Christina has created emissions inventories to address regulatory requirements and permitting, including National Pollutant Release Inventory (NPRI) and Environment Canada Greenhouse Gas program reporting.

Contact information for the RDN, the GMC, the LFG utilization facility operator, XCG, and Trinity Consulting are provided in the Project Report. The contact for Zerofootprint is:

Ron Dembo
392 Markham Street
Toronto, ON M6G 2K9
Email: ron.dembo@zerofootprint.net
Phone: (416) 365-7557

2. VERIFICATION CRITERIA

Stantec has conducted sufficient and appropriate procedures in order to express a reasonable level of assurance opinion as to whether the Project, for the January 1, 2013 to April 15, 2015 crediting period, satisfies the requirements of the:

- Green Management Corporation (GMC) Measurement, Monitoring, Reporting and Verification Protocol for Greenhouse Gas Emission Reductions from Designated Projects Funded Through the Green Municipal Fund;
- ISO 14064 – Part 2 Greenhouse Gases: Specification with guidance at the Project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements (ISO 14064-2);
- Project Plan (November 5, 2012); and
- CSA CleanProjects Registry requirements, specifically:
 - Data supporting the GHG calculations have sufficient controls to be considered fair and accurate and without material discrepancy;
 - Calculations supporting the GHG assertion are sufficiently accurate to be considered fair and accurate and without material discrepancy; and
 - There are no competing claims to the ownership of the GHG Project and the resulting emission reductions or removals.

The verification was conducted in accordance with ISO 14064:3 and ISO 14065.

2.1. Scope

The verification is for the Project period of January 1, 2013 to April 15, 2015.

The verification covers the following gases: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulphur hexafluoride (SF₆), hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs). The total GHG emissions are reported as equivalent tonnes of carbon dioxide (t CO₂e) emissions.

The Regional District of Nanaimo (RDN) Landfill Gas (LFG) Capture and Combustion Greenhouse Gas (GHG) Emission Reductions Project is located approximately five kilometers (km) south of downtown Nanaimo, British Columbia. The Project involves biogas recovery, conditioning, and the destruction of the captured LFG.

Phase I of the Project was validated by Stantec to a limited level of assurance for the 2004-2008 period (positive finding). Phase I of the Project involved biogas recovery, conditioning, and flaring. At the end of 2008 and early 2009, significant remediation of the collection system and multiple upgrades and improvements to the facilities control plant, data recording and collection systems were implemented.

As per the Project Report, the LFG collection system is comprised of 31 active vertical gas collection wells, and 4 horizontal gas collection trenches. The control system has been digitized and the destruction system includes the use of both a flare and utilization facility. The utilization facility includes two Jenbacher J312GS internal combustion engines that combust LFG as feedstock. Each engine is coupled to an Emerson Electric 800 kW induction generator. The utilization facility is owned, constructed, maintained, and operated by Cedar Road LFG Inc. (Cedar Road). Cedar Road is a third party and does not have a claim on the emission reductions generated. The utilization facility only runs when the flare station is operating.

The relevant GHG sources within the Project boundary (the RDN landfill) were considered in the verification.

Sources of Project GHG emissions include:

- Electricity Production (CO₂e): production of electricity; and
- Facility Operation (CO₂, CH₄, and N₂O): natural gas, electricity, and other fuels used to run the landfill facility.

Sources of Baseline GHG emissions at the Project are:

- Material Treatment and Residue Decomposition and Methane Collection / Destruction (CH₄): mass of organic material sent for disposal resulting in emissions.

The quantification methodology used is the Green Management Corporation (GMC) Measurement, Monitoring, Reporting and Verification Protocol for Greenhouse Gas Emission Reductions from Designated Projects Funded Through the Green Municipal Fund (the MVP). The Project's baseline is venting of methane directly to the atmosphere (that would otherwise be captured and combusted in the flare or engines of the Project).

2.2. Materiality

A materiality limit of 5% for quantitative material discrepancies was set by Stantec for this verification. The materiality of quantitative discrepancies was calculated on an absolute basis (i.e., no mitigation of over- or under-reporting). Qualitative discrepancies were at the professional judgment of the verification body. Stantec planned and executed the verification accordingly.

3. VERIFICATION PLAN

Stantec developed verification plans, including risk assessments, specific to each vintage year verified during the past verifications. The final verification plans are in Appendix A.

For the verification, Stantec assessed the verification risk as Low. Details are provided in the following sections.

Inherent risk

Inherent risk is the risk of error that occurs as a result of the lack of capacity by staff; the size/complexity of the organization or GHG Project; the industrial sector; and/or, the technologies or processes being applied in the organization or GHG Project. We regard this risk as Low due to:

- The Project is straightforward with well-established boundaries (low risk).

Control risk

Control risk is the risk that the proponent's control system will not detect and rectify a misstatement. We regard this risk as Low due to:

- Zerofootprint's consultant, Trinity Consulting, has experience in quantifying GHG emissions for offset projects (low risk).
- Changes between the previous annual Project Reports and this Project Report are related to textual updates and do not include changes to the assertions claimed (low risk).
- Stantec previously issued positive verification reports for the 2013, 2014, and 2015 vintage credits. No changes to the asserted GHG emission reductions have occurred between those verification reports and the Project Report currently being verified (low risk).

Detection risk

Detection risk is the risk that Stantec will not identify a material misstatement. We regard this risk as Low due to:

- Stantec's Quality Management Procedures. Stantec is committed to providing exceptional service to our clients in accordance with our ISO 9001 and ISO 14065 accreditations. Stantec believes that quality is a basic principle and that quality management is an integral part of all its work. Stantec team members take systematic approach to quality management to ensure compliance with requirements and to achieve continual improvement. The cornerstone of Stantec's quality management system is an entrenched process of quality review which confirms that all deliverables have been vetted by senior and expert people in the firm (low risk).
- Level of Assurance. The reasonable level of assurance applied in this verification mandates that Stantec perform increased sampling to meet the assurance requirements. Because the verification is limited to assessing the Project Report against the CleanProjects requirements, the risk of a material error is low.

The risk assessment was used to inform the verification procedures. These procedures are shown in the final verification plans for the vintage years 2013 through 2015. For the current verification, the procedures undertaken include:

- Reviewed whether the GHG Assertions changed from the assertions previously verified.

- Reviewed the Project Report for a statement regarding offset credit ownership.
- Reviewed ownership evidence.
- Reviewed the Project Report and supporting documentation to assess whether the Project is additional to applicable landfill gas capture regulations.
- Review the Project Report for transparency, completeness, accuracy, and consistency.

Stantec has performed validation and verification for this Project since 2009 and can confirm that it has a complete understanding of the Project approach and the specifics of the quantification protocol. The verification team is competent to assess this Project against the verification criteria.

Stantec reviewed two versions of the GHG Report and associated GHG Assertions. The final version of the GHG Report and GHG Assertions is dated December 2017 (version 5.0). It is Stantec's understanding that this is the version that will be presented for registration.

Stantec's verification procedures related to ownership were:

- Confirm that the offsets that were previously verified were not subsequently registered on a Registry. This was accomplished by requesting and inspecting an attestation from GMC.
- Confirm that offset ownership transferred from RDN to GMC. This was accomplished by requesting and inspecting an agreement between RDN and GMC.
- Confirm that offset ownership transferred from GMC to Zerofootprint. This was accomplished by requesting and inspecting an agreement between GMC and Zerofootprint.
- Consider whether the utilization facility owner had a claim on the offsets. This was accomplished by interviewing the RDN personnel.

Stantec tested the monitoring systems during site visits by viewing the monitoring system's equipment, inspecting calibration records, and inspecting weekly inspection checklists. At the desktop level, Stantec performed trending to examine the LFG flow data, methane concentrations, and operating hours for anomalies.

Details on the terms of the engagement, level of assurance, objectives, criteria, scope, materiality threshold, and verification procedures performed during the historical verifications are presented in the final verification plans in Appendix A.

Stantec's verification procedures include inspection of documents or equipment, tracing of raw data to spreadsheets, inquiry of personnel, trending of data, and recalculation of emissions and emission reductions. The procedures performed are presented in the final verification plans in Appendix A.

Sampling plans for each year are established in our internal working papers. For each year, Stantec sampled the following:

- Recalculate emission reductions from all months, examine emission reduction calculations for select months, sample raw data for select months for FIT-130, FIT-160, PIT-102, TC1, TC2, and methane concentration.

The results of the procedures were positive, such that modifications to the sampling plan was not needed. Sampling was not needed for the current verification as no changes to the GHG Assertions were made.

Stantec's detailed working papers are available to be viewed on request by the Registry and upon execution of a confidentiality agreement. Following the completion of each procedure, Stantec

identified any misstatements, omissions, or errors by comparing the result of the procedure to the verification criteria. Material misstatements were brought to the project developer’s attention as soon as possible. Immaterial misstatements were summarized and included in the verification report for each vintage year.

Information on site visit dates and personnel interviewed are provided in each final verification plan in Appendix A.

A completed conflict of interest form is provided below.

Both material and immaterial misstatements were detected during the verification of the GHG Report. These are summarized in Table 3. Additional discrepancies during each of the three annual verifications were identified and, in some cases, were resolved by RDN. Discrepancies identified in each of the 2013, 2014 and 2015 (partial year) GHG Assertions under the GMC verification are provided in Tables 4, 5 and 6. In concluding on the accuracy of the GHG Report for CSA, Stantec considered the discrepancies from the current verification as well as unresolved discrepancies from the previous verifications.

Table 3 Identified Misstatements and Resolutions - 2017

Identified Misstatement	Material/Immaterial	2017 Resolution
The GHG Report is not transparent with respect to the source of LFG flow data. There are two flow meters shown on the process diagram; the meter used the calculation of the GHG Assertion is not clearly identified.	Immaterial qualitative	Resolved. An updated report was provided.
An LFG storage balloon was known to be operational during the 2013 – 2015 reporting period. However, this has not been disclosed in the project description, nor has the adjustments needed to the quantification due to the balloon been included in the methodologies section of the GHG Report.	Immaterial qualitative	Resolved. An updated report was provided.
The GHG Report does not disclose the transaction history of the offsets generated during the 2013-2015 period.	Material qualitative	Resolved. An updated report was provided.
The GHG Report does not disclose which entity(ies) currently retains ownership over the offsets generated during the 2013-2015 period, or who is registering the offsets on the CSA Registry.	Material qualitative	Resolved. An updated report was provided.
The GHG Report does not disclose that the Report is being re-prepared by Trinity Consultants as a result of the offsets being registered on the CSA Registry, and that the owner(s) of the offsets have attested to being aware of this fact.	Material qualitative	Resolved. An updated report was provided.

Table 3 Identified Misstatements and Resolutions - 2017

Identified Misstatement	Material/Immaterial	2017 Resolution
The GHG Report does not disclose the baseline and project GHG emissions for each source/sink as required by ISO 14064:3.	Immaterial qualitative	Resolved. An updated report was provided.
The LFG balloon information inserted in Section 4.1 of the updated GHG Report indicates that the methane stored in the balloon, but not combusted at the vintage year end, is not removed from the calculation of emissions. However, Stantec's previous verification work for this project examined the calculations and determined that the storage correction did occur. Therefore, the GHG Report is not accurate with respect to treatment of stored LFG.	Immaterial qualitative	Not resolved.
A Word document error occurs in Section 4.2 of the updated GHG Report. This reduces the transparency of the Report.	Immaterial qualitative	Resolved. An updated report was provided.

Table 4 Identified Misstatements and Resolutions – 2015 Partial Vintage Year

Identified Misstatement	Material/Immaterial	2015 Resolution
A material misstatement was noted as the Annual Project Report which indicated that the Project ownership and emission reduction titles had not changed for the Project period of January 1, 2015 to December 31, 2015. This statement was incorrect as the ten year FCM / RDN contract, dated April 15, 2005, expired on April 15, 2015. On this basis, the Annual Project Report does not disclose the two offset credit periods and the associated GHG Assertions.	Material qualitative	Resolved.
According to the MVP, a verification report is required to be submitted on or before February 21 of year following the crediting year. This does not materially affect the assertion.	Immaterial qualitative	Not resolved.

Table 5 Identified Misstatements and Resolutions – 2014 Vintage Year

Identified Misstatement	Material/Immaterial	2014 Resolution
The methane emission factor (CH ₄) from 21 to 25 as per the most recent IPCC report was not updated thus; the RDN was underreporting 4,502 t CO ₂ e (18.7%).	Material quantitative	Resolved.
The Site and Project Description document was not included in the draft Annual Project Report. However, this document was included with the Project Plan.	Immaterial qualitative	Not resolved.
According to the MVP, a verification report is required to be submitted on or before February 21 of year following the crediting year. This does not materially affect the assertion.	Immaterial qualitative	Not resolved.

Table 6 Identified Misstatements and Resolutions – 2013 Vintage Year

Identified Misstatement	Material/Immaterial	2013 Resolution
A storage balloon was added in 2012 to store LFG prior to combustion in the engines. The implication this storage has on emission reductions is that the portion of methane stored in the balloon on December 31, 2012 at midnight should be subtracted from the calculated emissions. That is, the methodology assumes that the stored methane is combusted and the correction removes it from consideration. However, the calculated emissions appear to have been added to the GHG assertion. The magnitude of the discrepancy is approximately 4.37 t CO ₂ e or less than 0.002% of claimed reductions (over-reported).	Immaterial quantitative	Not resolved.
The Site and Project Description document was not included in the draft Annual Project Report. However, this document was included with the Project Plan.	Immaterial qualitative	Not resolved.
According to the MVP, a verification report is required to be submitted on or before February 21 of	Immaterial qualitative	Not resolved.

Table 6 Identified Misstatements and Resolutions – 2013 Vintage Year

Identified Misstatement	Material/Immaterial	2013 Resolution
year following the crediting year. This does not materially affect the assertion.		

3.1. Verification Records

Records generated by RDN, received from Zerofootprint, or generated during the verification will be retained by Stantec digitally for a minimum of seven (7) years.

3.2. Facts discovered after the verification

If facts are discovered after the verification that materially affect the assertion, Stantec reserves the right to update the Verification Report.

4. VERIFICATION STATEMENT

A verification statement is a succinct but descriptive statement which summarizes all findings of the verification process, outlines completeness or omissions of the project and conveys the level of assurance granted.

This verification report and the following statement is provided for the sole benefit of Zerofootprint. Stantec was contracted by Zerofootprint to conduct an independent third-party verification of the Project Report titled “Regional District of Nanaimo (RDN) Landfill Gas (LFG) Capture and Combustion Greenhouse Gas (GHG) Emission Reductions Project” dated December 2017 (the Project Report). This verification report and statement is applicable to the January 1, 2013 - April 15, 2015 crediting period.

The GHG Assertions verified are presented in Table 7.

Table 7 GHG Assertions

Year	Baseline Emissions (t CO₂e)	Project Emissions (t CO₂e)	Total (t CO₂e)
January 1 - April 15, 2015	8,471	169	8,302
January 1 - December 31, 2014	29,206	584	28,622
January 1 - December 31, 2013	26,457	529	25,928

The verification covered the following gases: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulphur hexafluoride (SF₆), hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs). The total GHG emissions are reported as equivalent tonnes of carbon dioxide (t CO₂e) emissions.

The verification was conducted in accordance with ISO 14064:3 and ISO 14065.

The verification criteria are:

- Green Management Corporation (GMC) Measurement, Monitoring, Reporting and Verification Protocol for Greenhouse Gas Emission Reductions from Designated Projects Funded Through the Green Municipal Fund;
- ISO 14064 – Part 2 Greenhouse Gases: Specification with guidance at the Project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements (ISO 14064-2);
- Project Plan (November 5, 2012); and
- CSA CleanProjects Registry requirements, specifically:
 - Data supporting the GHG calculations have sufficient controls to be considered fair and accurate and without material discrepancy;
 - Calculations supporting the GHG assertion are sufficiently accurate to be considered fair and accurate and without material discrepancy; and
 - There are no competing claims to the ownership of the GHG Project and the resulting emission reductions or removals.

Based on the procedures undertaken and described in this report, the Project Report for the Regional District of Nanaimo (RDN) Landfill Gas (LFG) Capture and Combustion Greenhouse Gas (GHG) Emission Reductions Project, for the January 1, 2013 to April 15, 2015 crediting period, satisfies the requirements of the verification criteria.

Stantec has undertaken all assignments in its role as an environmental engineering consulting firm using professional effort. Stantec has assessed the GHG Assertion for the Project using adequately ascertainable information, as defined by ISO 14064-3, obtained from a review of operational and regulatory records and available literature and documents. The assessment represents the conditions in the subject area at the time of the assessment. Stantec did not conduct direct GHG emissions monitoring or other environmental sampling and analysis in conjunction with this verification report. Stantec disclaims liability for use by any other party and for any other purpose.

Stantec will retain all Project documents for a minimum of seven (7) years.

This report entitled, “Final Verification Report–Regional District of Nanaimo (RDN) Landfill Gas (LFG) Capture and Combustion Greenhouse Gas (GHG) Emission Reductions Project (January 1, 2013 to April 15, 2015)” was produced by Daniel Hegg. The report was quality and peer reviewed by Nicole Flanagan.

Respectfully Submitted,

STANTEC CONSULTING LTD.

Daniel Hegg, M.Sc., CEM Signed on behalf of
 Lead Verifier Daniel Hegg
 Stantec Consulting Ltd.
 400 - 655 Tyee Road Victoria, BC V9A 6X5
 Phone: (250) 217-9729
 Email: daniel.hegg@stantec.com

Nicole Flanagan, M.A.Sc., P.Eng.
 Independent Peer & Quality Reviewer
 Stantec Consulting Ltd.
 400 - 1331 Clyde Avenue Ottawa, ON
 K2C 3G4
 Phone: (613) 738-6086
 Email: nicole.flanagan@stantec.com

CONFLICT OF INTEREST REVIEW CHECKLIST

	Yes	No	Details
<p>Independence</p> <p>Remain independent of the activity being verified, and free from bias and conflict of interest.</p> <p>Maintain objectivity throughout the verification to ensure that the findings and conclusions will be based on objective evidence generated during the verification.</p>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<p>Ethical conduct</p> <p>Demonstrate ethical conduct through trust, integrity, confidentiality and discretion throughout the verification process.</p>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<p>Fair presentation</p> <p>Reflect truthfully and accurately verification activities, findings, conclusions and reports. Report significant obstacles encountered during the verification process, as well as unresolved, diverging opinions among verifiers, the responsible party and the client.</p>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<p>Due professional care</p> <p>Exercise due professional care and judgment in accordance with the importance of the task performed and the confidence placed by clients and intended users. Have the necessary skills and competences to undertake the verification.</p>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Appendix A – Final Verification Plans



Stantec

Stantec Consulting Ltd.
400 - 655 Tyee Road
Victoria BC V9A 6X5
Tel: (250) 388-9161
Fax: (250) 382-0514

Template version 1.0 November 2013

VIA EMAIL < hblanken@rdn.bc.ca >

March 27, 2014
File: 123210283

Attention: Helmut Blanken, Superintendent Engineering & Disposal Operation

Regional District of Nanaimo
1105 Cedar Road
Nanaimo, B.C.
V9X 1K9

Dear Mr. Blanken,

RE: FINAL VERIFICATION PLAN - VERIFICATION PLAN FOR REGIONAL DISTRICT OF NANAIMO (RDN) LANDFILL GAS CAPTURE GHG EMISSION REDUCTIONS PROJECT

INTRODUCTION

Stantec Consulting Ltd. ("Stantec") has completed the initial desktop review for the verification of the Regional District of Nanaimo (RDN) Landfill Gas (LFG) Capture and Combustion Greenhouse Gas (GHG) Emission Reductions Project ("the Project") located in British Columbia. The project report for emission reductions was prepared using the quantification guidance of the Federation of Canadian Municipalities (FCM) Green Management Corporation ("the Program"). This verification plan outlines the terms of the engagement and the planned verification procedures. The verification plan also provides a list of data and documentation required to complete the planned procedures.

VERIFICATION OBJECTIVES

The purpose of the verification was to evaluate key assertions, data sources, methods, and procedures for the Project pertinent to compliance with the Program and criteria provided in Section 1.2. Stantec considers completeness, conservativeness, consistency, accuracy, and transparency as criteria to facilitate the assessment as to whether the project plan and greenhouse gas (GHG) assertions were presented fairly and substantiated by sufficient and appropriate evidence.

VERIFICATION CRITERIA

The objective of the verification was to assess whether the GHG data and information in the project plan are presented fairly, in all material respects, and are in accordance with the requirements of:

- Green Management Corporation ("GMC") Measurement, Monitoring, Reporting and Verification Protocol for Greenhouse Gas Emission Reductions from Designated Projects Funded Through the Green Municipal Fund; and



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- ISO 14064 – Part 2 Greenhouse Gases: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements (ISO 14064-2).

An independent opinion as to whether the project plan and GHG assertions are presented fairly and substantiated by sufficient and appropriate evidence was provided in the verification statement.

VERIFICATION STANDARD

The verification was conducted in accordance with:

- ISO 14064 Part 3 – Greenhouse Gases: Specification with guidance for the validation and verification of greenhouse gas assertions;
- ISO 14065 – Greenhouse Gases: Requirements for greenhouse gas validation and verification bodies for use in accreditation and other forms of recognition; and

VERIFICATION SCOPE

The verification is for the period of January 1, 2013 to December 31, 2013.

Stantec understands the Project is described in the following manner. The reasonableness of this project description will be subject to verification by Stantec.

The Nanaimo Landfill Gas (LFG) Capture and Combustion GHG Emission Reductions Project is located approximately five kilometers (km) south of downtown Nanaimo, British Columbia. The project involves biogas recovery, conditioning and the destruction of the captured LFG. In 2003, the RDN installed 21 vertical wells, rehabilitated 4 vertical wells from an existing system, and installed a LFG control station. Between 2005 and 2010, additional vertical wells and horizontal collection trenches were added and others were decommissioned from the system.

Phase I of the Project was validated (positive finding) to a limited level of assurance for the 2004-2008 period. Phase I of the Project involved biogas recovery, conditioning and flaring.

At the end of 2008 and early 2009, significant remediation of the collection system and multiple upgrades and improvements to the facility's control plant, data recording and collection systems were implemented, thus requiring a separate Project Plan for the 2009-2012 period.

As per the 2009-2012 Project Plan, the LFG collection system is comprised of 31 connected vertical gas collection wells, and 4 horizontal gas collection trenches. The control system has been digitized and the destruction system includes the use of both a flare and utilization facility. The utilization facility includes two Jenbacher J312GS internal combustion engines that combust LFG as feedstock. Each engine is coupled to an Emerson Electric 800 kW induction generator. The utilization facility is owned, constructed, maintained, and operated by Cedar Road LFG Inc. (Cedar Road). Cedar Road is a third party and does not have a claim on the emission reductions generated. The utilization facility only runs when the flare is operating.



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The source of GHG emissions for the Baseline condition is venting of methane directly to the atmosphere (otherwise captured and combusted in the flare or engines of the Project). The relevant GHG sources within the project boundary (the RDN landfill) will be considered in the verification.

The following GHGs are included within the scope of the verification:

- carbon dioxide (CO₂);
- methane (CH₄);
- nitrous oxide (N₂O);
- hydrofluorocarbons (HFCs);
- perfluorocarbons (PFCs); and
- sulphur hexafluoride (SF₆).

The total equivalent GHG emissions are reported as tonnes carbon dioxide equivalent (t CO₂e). Sources of Project GHG emissions include:

- **Electricity Production (CO₂e):** production of electricity; and
- **Facility Operation (CO₂, CH₄, and N₂O):** natural gas, electricity and other fuels used to run the landfill facility.

Sources of Baseline GHG emissions at the Project are:

- **Material Treatment and Residue Decomposition and Methane Collection / Destruction (CH₄):** mass of organic material sent for disposal resulting in emissions.

ASSERTION

The fundamental assertion verified for the Project is that it meets the criteria above for the period of January 1, 2013 to December 31, 2013. The GHG assertion to be verified is the GHG emission reduction of 25,928 tCO₂e.

LEVEL OF ASSURANCE

Sufficient procedures were conducted in order to express a **reasonable level of assurance** opinion as requested by RDN.



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MATERIALITY

A materiality limit of 5% for quantitative material discrepancies has been set for this verification. The materiality of quantitative discrepancies was calculated on an absolute basis (*i.e.*, no mitigation of over- or under-reporting). Qualitative discrepancies were at the professional judgment of the verification body. Stantec planned and executed the verification accordingly.

VERIFICATION SCHEDULE

Table 1 presents the planned verification schedule.

Table 1 Planned Verification Schedule

Verification Activity	Responsible Party	Date of Completion
Kick-off Call with RDN	Stantec / RDN	March 4, 2014
Receive RDN Documentation	RDN	March 4 -10, 2014
Initial Desktop Review	Stantec	March 10-13, 2014
Internal Conference Call – Desktop Assessment Review	Stantec	NA
Provide Verification Plan to RDN (including additional data requests)	Stantec	March 13, 2014
Site visit	Stantec / RDN	March 26, 2014
Internal Site Visit Follow-up Conference Call	Stantec	NA
Draft Verification Report	Stantec	March 27, 2014
Address Follow-up Items	Stantec / RDN	March 27, 2014
Finalize Verification Report and Statement of Verification	Stantec	March 27, 2014

VERIFICATION TEAM: QUALIFICATIONS, ROLES AND RESPONSIBILITIES

Table 2 presents the verification team.

Table 2 Verification Team

Name	Role	Responsibilities
Daniel Hegg	Lead Verifier / Project Manager	Lead desktop review, sampling plan execution and working paper completion.
Vicki Corning	Senior Review	Review verification deliverables for adherence to ISO 14064-3 and regulatory compliance as well as technical soundness.
Joe Harriman	Peer Review	Independent review of verification report for consistency with Stantec templates, adherence to ISO 14064-3, and GMC compliance and technical soundness.



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TEAM PROFILE

Lead Verifier – Daniel Hegg, M.Sc., EMIT, ENV-SP

Daniel Hegg is a Senior Sustainability Specialist and Western Canada/US Discipline Lead for Stantec Consulting Ltd. Climate Change Service Line.

To assist public and private sector clients successfully address their toughest sustainability challenges, Daniel has invested over decade of time and effort in developing a knowledge base that offers unique perspectives and insights on integrated carbon, energy and water management and strategy, triple bottom line business case development and climate change risk assessment and planning. Daniel's approach is multi-faceted and dynamic; it is predicated on an ownership transition model in which the sense of responsibility and understanding evolves from his team to the client. This allows for the development of strategic sustainability plans that are focused, workable, and address all aspects of sustainability associated with business operations as well as product portfolios.

Daniel has developed and verified over 50 organizational and facility GHG inventories and offset projects for clients in a wide range of sectors. Daniel has also consulted across a wide variety of sectors directing pioneering projects in community and corporate visioning, policy and strategic planning for sustainability. He has provided strategy, policy advice, and has prepared a number of strategic guidance documents and plans on a number of climate change related topics to public and private sector organizations including the Federation of Canadian Municipalities (FCM), the Union of BC Municipalities (UBCM), the British Columbia Climate Action Secretariat, the Pacific Carbon Trust (PCT), Bell Alliant, TransAlta, Capital Power Corporation, Total E&P Canada, Teck, Connacher Oil and Gas, BC Transit, Phillips 66, amongst others.

Daniel oversaw the completion of the site visit, Verification and Sampling Plans, draft and final Verification Reports and Statement of Verifications. Daniel completed the site visit.

Senior Review – Vicki Corning, B.Sc.Eng., P.Eng.

Ms. Corning has a degree in chemical engineering and has since gained technical and management expertise in many environmental services in the field of atmospheric emissions. Ms. Corning is a GHG & Climate Services Regional Discipline Leader for Canada East with the responsibility for growth and continuous improvement of the service line. She has been involved in over 60 verifications for organizational inventories and GHG offset projects in western Canada, Ontario and the United States.

Ms. Corning has worked with clients in a variety of different industries in Canada and the US including: gas processing plants, oil refineries, SAGD facilities, pipeline operations, electrical generating stations (coal, gas, co-generation), manufacturing plants, chemical processing facilities, construction projects and pulp mills. Ms. Corning has managed the preparation of several policy reports on renewable energy for the New Brunswick Department of Energy, and authored technical content on carbon capture systems for coal facilities as part of an environmental report for Carbon Capture Nova Scotia. Ms. Corning has developed Stantec's internal GHG program competency training process and has also delivered course material on



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GHG verification, inventory and data management techniques through a contract with the Canadian Standards Association.

As an internal quality management practice, all Stantec deliverables are reviewed by a Senior Expert in the firm. Vicki provided the senior review for this project.

Independent Peer Reviewer – Joe Harriman, Ph.D., P.Chem.

Dr. Harriman is the Team Leader of Stantec's Atmospheric Environment team based in Saint John, NB. He is responsible for managing air quality, acoustics and climate components environmental baseline assessments, environmental assessments and environmental planning and permitting. In addition, Dr. Harriman is a Project Manager with substantial experience and background knowledge in the energy sector with respect to air quality and GHG emissions. He has been the project manager and technical lead on the development of numerous greenhouse gas (GHG) emission inventories for industrial, corporate, municipal and government clients.

Dr. Harriman is currently the Regional Discipline Leader for Climate Services at Stantec in Canada East (Ontario to Atlantic regions). He has substantial knowledge in developing technologies for renewable energy production and has been involved in considerable green energy assessments including wind, solar and tidal projects. Dr. Harriman is experienced in working under the Alberta, British Columbia, Ontario, Quebec and Massachusetts mandatory reporting regulations, as well as voluntary programs such as The Climate Registry, having participated in over 80 verifications since the inception of the these regulations and/or programs.

Joe had responsibility for ensuring the quality of the verification and acting as the independent peer reviewer in accordance with ISO14065.

RISK ASSESSMENT

Stantec assessed the potential risk associated with this verification assignment. The risk assessment is an internal procedure used to assess inherent, control, and detection risk. Based on the risk assessment in each of these categories, the Stantec team assigns an overall risk to the verification. The final risk for this verification has been assessed as **Low**. A summary of the risk assessment is provided in Table 3.

Table 3 Risk Summary

Risk Area	Preliminary Assessment	Final Assessment
Inherent Risk	Low	Low
Control Risk	Low	Low
Detection Risk	Low	Low
Overall Risk	Low	Low



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We consider the final inherent risk to be **Low** based on the following:

- Landfill gas collection and destruction technology is sound and widely understood. Although the Project has undergone some modifications and upgrades since commissioning, it still operates as intended (low risk).
- The Project being verified has been functioning since 2003 and the key management staff from that time has remained involved with the conception, construction, operation and maintenance of the Project (low risk).
- The Project verified by Stantec in 2012. This is the second year Stantec will be verifying the project (low risk).

We consider the final control risk to be **Low** based on the following:

- The methane concentration and landfill gas flow-rate are the key parameters for monitoring; quality assurance and control procedures are in place and supporting evidence has been provided and reviewed and deemed well controlled (low risk).
- The site has an Operation and Maintenance (O&M) manual that Stantec reviewed during the 2012 verification and deemed to be satisfactory for a reasonable level of assurance (low risk).
- Stantec examined the GHG information system during the validation project and did not detect any material discrepancies (immaterial discrepancies were resolved) (low risk).

Detection risk is the risk that Stantec will not identify a material discrepancy. We regard this risk as **Low** due to:

- **Our Quality Management Procedures.** We are committed to providing exceptional service to our clients in accordance with our ISO 9001 and ISO 14065 accreditations. We believe that quality is a basic principle and that quality management is an integral part of all our work. We take systematic approach to quality management to ensure compliance with requirements and to achieve continual improvement. The cornerstone of our quality management system is an entrenched process of Senior Review which ensures all our deliverables have been vetted by senior and expert people in our firm (low risk).
- **Level of Assurance.** The reasonable level of assurance applied in this verification mandates that Stantec perform increased sampling to meet the assurance requirements, however, the level of assurance still increases the risk to Stantec as the risk-based verification approach means that not all information can be reviewed. Stantec has designed the sampling plan to target all potentially material items in the GHG information to minimize detection risk. At this stage we believe we should be able to sample sufficient evidence to come to a reasonable level of assurance (low risk).



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VERIFICATION PLAN

The objective of the verification plan is to facilitate the assessment of the completeness, conservativeness, consistency, accuracy, and transparency of the Project's GHG information and GHG Assertion.

With regards to the magnitude of potential errors, omissions and misrepresentations, the tracking of the amount of methane destructed represents the greatest risk of material error to the assertion.



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Table 4 shows the executed verification procedures.

Table 4 Planned Verification Procedures

Line Item	Verification Objective	Risk Identified	Type of Procedure	Description of Procedure
Greenhouse Gas Assertion	Completeness	Incompleteness of inventory.	Test of detail – inspection.	Conduct a site tour of the landfill gas facility to determine sources and compare with inventory.
Greenhouse Gas Assertion	Accuracy Classification	Information not appropriately disclosed.	Test of detail – inspection.	Inspect Project Report for correct reporting of emissions and related information.
Greenhouse Gas Assertion	Completeness	Incompleteness of Project Report.	Test of detail – inspection.	Inspect Project Report for missing information.
Greenhouse Gas Assertion	Accuracy Conservativeness	GHG Assertion is incorrect	Test of detail – inspection and reconciliation.	Check emission factors, quantification methodology and recalculate GHG assertion.
Greenhouse Gas Assertion	Occurrence	Document storage and retention practices may not be sufficient.	Test of detail – inquiry.	Inquire of Proponent the retention period of data used for GHG Assertion.
Material Decomposition and Methane Collection	Accuracy	Substantiating evidence does not match supporting data.	Test of detail – inquiry.	Interview waste disposal operators to confirm the characteristics of the landfill from which waste is diverted for the presence of LFG capture system and the type of material used to cover the landfill. Sample raw data and trace to GHG assertion.



RE: FINAL VERIFICATION PLAN - VERIFICATION PLAN FOR REGIONAL DISTRICT OF NANAIMO (RDN) LANDFILL GAS CAPTURE GHG EMISSION REDUCTIONS PROJECT

SITE VERIFICATION PROCEDURES

Stantec Verifier, Daniel Hegg, conducted a site visit to the RDN landfill gas facility on March 26, 2014. The following personnel were interviewed:

- Jane MacIntosh, Operator, Engineering and Disposal Operations, Regional District of Nanaimo; and
- Helmut Blanken (RDN, Superintendent Engineering & Disposal Operations).

Stantec conducted a tour of the site, led by RDN representatives with in-depth knowledge of the facility and the Project. During the tour, Stantec performed procedures to identify Project boundaries, confirmed GHG sources, looked for additional sources, visually confirmed the presence of methane capture and destruction activities, flow meters, as well as inquired about Project operations and project specific GHG data management systems.

INFORMATION REQUEST

Table 5 contains a list of documentation and data that Stantec required to complete the verification.

Table 5 Additional Information Requested

Additional Information Requested	Request Date	Obtained On
Confirm that the following manuals were still effective during the 2013 year: <ul style="list-style-type: none">• Landfill Gaswell Field Operations And Maintenance Manual (XCG File No. 4-2200-01-31); and• Landfill Gas Control Plant Operations And Maintenance Manual (XCG File No. 4-2200-01-31)	March 13, 2014	March 14, 2014
Raw data from the SCADA system (Excel format) of LFG flowrate, methane concentration, temperature, and pressure measurements for the following months: <ul style="list-style-type: none">• March• May• June• December	March 13, 2014	March 26, 2014



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Should you have any questions or require additional information, please contact me directly.

Sincerely,

STANTEC CONSULTING LTD.

Daniel Hegg, B.Comm, MSc. EMIT.
Lead Verifier
Phone: (250) 217-9729
Daniel.Hegg@stantec.com

This report was reviewed and approved for transmittal by:

Joe Harriman, P. Ph.D., P.Chem.
Peer Reviewer
Phone: (506) 642-9476
Joe.Harriman@stantec.com

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Stantec Consulting Ltd.
400 - 655 Tyee Road
Victoria BC V9A 6X5
Tel: (250) 388-9161
Fax: (250) 382-0514

Template version 1.0 November 2013

VIA EMAIL <MacIntosh@rdn.bc.ca>

May 8, 2015
File: 123220251

Attention: Jane MacIntosh, A/Superintendent of Landfill Operations
Regional District of Nanaimo
1105 Cedar Road
Nanaimo, B.C.
V9X 1K9

Dear Ms. MacIntosh,

RE: FINAL VERIFICATION PLAN - VERIFICATION PLAN FOR REGIONAL DISTRICT OF NANAIMO (RDN) LANDFILL GAS CAPTURE GHG EMISSION REDUCTIONS PROJECT

INTRODUCTION

Stantec Consulting Ltd. ("Stantec") completed the desktop review for the verification of the Regional District of Nanaimo (RDN) Landfill Gas (LFG) Capture and Combustion Greenhouse Gas (GHG) Emission Reductions Project ("the Project") located in British Columbia. The project report for emission reductions was prepared using the quantification guidance of the Federation of Canadian Municipalities (FCM) Green Management Corporation ("the Program"). This verification plan outlines the terms of the engagement and the planned verification procedures. The verification plan also provides a list of data and documentation required to complete the planned procedures.

VERIFICATION OBJECTIVES

The purpose of this verification is to evaluate key assertions, data sources, methods, and procedures for the Project pertinent to compliance with the Program and criteria provided in Section 1.2. Stantec considers completeness, conservativeness, consistency, accuracy, and transparency as criteria to facilitate the assessment as to whether the project plan and greenhouse gas (GHG) assertions are presented fairly and substantiated by sufficient and appropriate evidence.

VERIFICATION CRITERIA

The objective of this verification was to assess whether the GHG data and information in the project plan are presented fairly, in all material respects, and are in accordance with the requirements of:

- Green Management Corporation ("GMC") Measurement, Monitoring, Reporting and Verification Protocol for Greenhouse Gas Emission Reductions from Designated Projects Funded Through the Green Municipal Fund; and



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RE: FINAL VERIFICATION PLAN - VERIFICATION PLAN FOR REGIONAL DISTRICT OF NANAIMO (RDN) LANDFILL GAS CAPTURE GHG EMISSION REDUCTIONS PROJECT

- ISO 14064 – Part 2 Greenhouse Gases: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements (ISO 14064-2).

An independent opinion as to whether the project plan and GHG assertions are presented fairly and substantiated by sufficient and appropriate evidence was provided in the verification statement.

VERIFICATION STANDARD

The verification was conducted in accordance with:

- ISO 14064 Part 3 – Greenhouse Gases: Specification with guidance for the validation and verification of greenhouse gas assertions;
- ISO 14065 – Greenhouse Gases: Requirements for greenhouse gas validation and verification bodies for use in accreditation and other forms of recognition; and

Where necessary, Stantec may also rely on the International Standard for Assurance Engagements (ISAE) 3410 Assurance Engagements on Greenhouse Gases for additional technical guidance on audit procedure.

VERIFICATION SCOPE

The verification is for the period of January 1, 2014 to December 31, 2014.

Stantec understands the Project is described in the following manner. The reasonableness of this project description was subject to verification by Stantec.

The Nanaimo Landfill Gas (LFG) Capture and Combustion GHG Emission Reductions Project is located approximately five kilometers (km) south of downtown Nanaimo, British Columbia. The project involves biogas recovery, conditioning and the destruction of the captured LFG. In 2003, the RDN installed 21 vertical wells, rehabilitated 4 vertical wells from an existing system, and installed a LFG control station. Between 2005 and 2014, additional vertical wells and horizontal collection trenches were added and others were decommissioned from the system.

Phase I of the Project was validated (positive finding) to a limited level of assurance for the 2004-2008 period. Phase I of the Project involved biogas recovery, conditioning and flaring. At the end of 2008 and early 2009, significant remediation of the collection system and multiple upgrades and improvements to the facilities control plant, data recording and collection systems were implemented, thus requiring a separate Project Plan for the 2009-2012 period.

As per the new 2009-2012 Project Plan, the LFG collection system is comprised of 31 connected vertical gas collection wells, and 4 horizontal gas collection trenches. The control system has been digitized and the destruction system includes the use of both a flare and utilization facility. The utilization facility includes two Jenbacher J312GS internal combustion engines that combust LFG as feedstock. Each engine is coupled to an Emerson Electric 800 kW induction generator. The



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utilization facility is owned, constructed, maintained, and operated by Cedar Road LFG Inc. (Cedar Road). Cedar Road is a third party and does not have a claim on the emission reductions generated. The utilization facility only runs when the flare is operating.

Per the 2014 Project Report, Five vertical extraction wells (EX53 to EX57) were added in the Cell 1 to improve the LFG collection efficiency and reduce GHG emissions and four vertical extraction wells (EX06 to EX08, and EX27) were decommissioned.

The source of GHG emissions for the Baseline condition is venting of methane directly to the atmosphere (otherwise captured and combusted in the flare or engines of the Project). The relevant GHG sources within the project boundary (the RDN landfill) will be considered in the verification.

The following GHGs are included within the scope of the verification:

- carbon dioxide (CO₂);
- methane (CH₄);
- nitrous oxide (N₂O);
- hydrofluorocarbons (HFCs);
- perfluorocarbons (PFCs); and
- sulphur hexafluoride (SF₆).

The total equivalent GHG emissions are reported as tonnes carbon dioxide equivalent (t CO₂e). Sources of Project GHG emissions include:

- **Electricity Production (CO₂e):** production of electricity; and
- **Facility Operation (CO₂, CH₄, and N₂O):** natural gas, electricity and other fuels used to run the landfill facility.

Sources of Baseline GHG emissions at the Project are:

- **Material Treatment and Residue Decomposition and Methane Collection / Destruction (CH₄, and N₂O):** mass of organic material sent for disposal resulting in emissions.

ASSERTION

The fundamental assertion verified for the Project was that it met the criteria above for the period of January 1, 2014 to December 31, 2014. The GHG assertion verified is the GHG emission reduction of 28,622 tCO₂e.



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LEVEL OF ASSURANCE

Sufficient procedures were conducted in order to express a **reasonable level of assurance** opinion as requested by RDN.

MATERIALITY

A materiality limit of 5% for quantitative material discrepancies was set for this verification. The materiality of quantitative discrepancies was calculated on an absolute basis (*i.e.*, no mitigation of over- or under-reporting). Qualitative discrepancies were at the professional judgment of the verification body. Stantec planned and execute the verification accordingly.

VERIFICATION SCHEDULE

Table 1 presents the verification schedule.

Table 1 Verification Schedule

Verification Activity	Responsible Party	Date of Completion
Kick-off Call with RDN	Stantec / RDN	Feb 20, 2015
Receive RDN Documentation	RDN	April 7, 2015
Initial Desktop Review	Stantec	April 14 – 17, 2015
Provide Verification Plan to RDN (including additional data requests)	Stantec	April 23, 2015
Site Visit	Stantec / RDN	April 29, 2015
Draft Verification Report	Stantec	May 8, 2015
Address Follow-up Items	Stantec / RDN	May 8, 2015
Finalize Verification Report and Statement of Verification	Stantec	May 8, 2015

VERIFICATION TEAM: QUALIFICATIONS, ROLES AND RESPONSIBILITIES

Table 2 presents the verification team.

Table 2 Verification Team

Name	Role	Responsibilities
Daniel Hegg	Lead Verifier / Project Manager	Lead desktop review, sampling plan execution and working paper completion.
Vicki Corning	Senior Review	Review verification deliverables for adherence to ISO 14064-3 and regulatory compliance as well as technical soundness.
Joe Harriman	Peer Review	Independent review of verification report for consistency with Stantec templates, adherence to ISO 14064-3, and GMC compliance and technical soundness.



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RE: FINAL VERIFICATION PLAN - VERIFICATION PLAN FOR REGIONAL DISTRICT OF NANAIMO (RDN) LANDFILL GAS CAPTURE GHG EMISSION REDUCTIONS PROJECT

TEAM PROFILE

Lead Verifier – Daniel Hegg, M.Sc., EMIT, ENV-SP

Daniel Hegg is a Senior Sustainability Specialist and Western Canada/US Discipline Lead for Stantec Consulting Ltd. Climate Change Service Line.

To assist public and private sector clients successfully address their toughest sustainability challenges, Daniel has invested over decade of time and effort in developing a knowledge base that offers unique perspectives and insights on integrated carbon, energy and water management and strategy, triple bottom line business case development and climate change risk assessment and planning. Daniel's approach is multi-faceted and dynamic; it is predicated on an ownership transition model in which the sense of responsibility and understanding evolves from his team to the client. This allows for the development of strategic sustainability plans that are focused, workable, and address all aspects of sustainability associated with business operations as well as product portfolios.

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Daniel oversaw the completion of the site visit, Verification and Sampling Plans, draft and final Verification Reports and Statement of Verifications. Daniel completed the site visit.

Senior Review – Vicki Corning, B.Sc.Eng., P.Eng.

Ms. Corning has a degree in chemical engineering and has since gained technical and management expertise in many environmental services in the field of atmospheric emissions. Ms. Corning is a GHG & Climate Services Regional Discipline Leader for Canada East with the responsibility for growth and continuous improvement of the service line. She has been involved in over 60 verifications for organizational inventories and GHG offset projects in western Canada, Ontario and the United States.

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As an internal quality management practice, all Stantec deliverables are reviewed by a Senior Expert in the firm. Vicki provided the senior review for this project.

Independent Peer Reviewer – Joe Harriman, Ph.D., P.Chem.

Dr. Harriman is the Team Leader of Stantec’s Atmospheric Environment team based in Saint John, NB. He is responsible for managing air quality, acoustics and climate components environmental baseline assessments, environmental assessments and environmental planning and permitting. In addition, Dr. Harriman is a Project Manager with substantial experience and background knowledge in the energy sector with respect to air quality and GHG emissions. He has been the project manager and technical lead on the development of numerous greenhouse gas (GHG) emission inventories for industrial, corporate, municipal and government clients.

Dr. Harriman is currently the Regional Discipline Leader for Climate Services at Stantec in Canada East (Ontario to Atlantic regions). He has substantial knowledge in developing technologies for renewable energy production and has been involved in considerable green energy assessments including wind, solar and tidal projects. Dr. Harriman is experienced in working under the Alberta, British Columbia, Ontario, Quebec and Massachusetts mandatory reporting regulations, as well as voluntary programs such as The Climate Registry, having participated in over 80 verifications since the inception of the these regulations and/or programs.

Joe had responsibility for ensuring the quality of the verification and acting as the independent peer reviewer in accordance with ISO14065.

RISK ASSESSMENT

Stantec assessed the potential risk associated with this verification assignment. The risk assessment is an internal procedure used to assess inherent, control, and detection risk. Based on the risk assessment in each of these categories, the Stantec team assigns an overall risk to the verification. The final risk for this verification has been assessed as **Low**. A summary of the risk assessment is provided in Table 3.

Table 3 Risk Summary

Risk Area	Preliminary Assessment	Final Assessment
Inherent Risk	Low	Low
Control Risk	Low	Low
Detection Risk	Low	Low
Overall Risk	Low	Low

We consider the inherent risk to be **Low** based on the following:

- Landfill gas collection and destruction technology is sound and widely understood. Although the Project has undergone some modifications and upgrades since commissioning, it still operates as intended (low risk).



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- Stantec understands that the Project being verified has been functioning since 2003 and the key management staff from that time has remained involved with the conception, construction, operation and maintenance of the Project (low risk).
- The Project verified by Stantec in 2012 and 2013. This is the third year Stantec will be verifying the project (low risk).

We consider the control risk to be **Low** based on the following:

- The methane concentration and landfill gas flow-rate are the key parameters for monitoring; quality assurance and control procedures are in place and supporting evidence has been provided and reviewed and deemed well controlled (low risk).
- The site has an Operation and Maintenance (O&M) manual that Stantec reviewed during the 2012 verification and deemed to be satisfactory for a reasonable level of assurance (low risk).
- Stantec examined the GHG information system during the validation project and did not detect any material discrepancies (immaterial discrepancies were resolved) (low risk).

Detection risk is the risk that Stantec will not identify a material discrepancy. We regard this risk as **Low** due to:

- **Our Quality Management Procedures.** We are committed to providing exceptional service to our clients in accordance with our ISO 9001 and ISO 14065 accreditations. We believe that quality is a basic principle and that quality management is an integral part of all our work. We take systematic approach to quality management to ensure compliance with requirements and to achieve continual improvement. The cornerstone of our quality management system is an entrenched process of Senior Review which ensures all our deliverables have been vetted by senior and expert people in our firm (low risk).
- **Level of Assurance.** The reasonable level of assurance applied in this verification mandates that Stantec perform increased sampling to meet the assurance requirements, however, the level of assurance still increases the risk to Stantec as the risk-based verification approach means that not all information can be reviewed. Stantec has designed the sampling plan to target all potentially material items in the GHG information to minimize detection risk. At this stage we believe we should be able to sample sufficient evidence to come to a reasonable level of assurance (low risk).

VERIFICATION PLAN

The objective of the verification plan is to facilitate the assessment of the completeness, conservativeness, consistency, accuracy, and transparency of the Project's GHG information and GHG Assertion.

With regards to the magnitude of potential errors, omissions and misrepresentations, the tracking of the amount of methane destructed represents the greatest risk of material error to the assertion.



RE: **FINAL VERIFICATION PLAN - VERIFICATION PLAN FOR REGIONAL DISTRICT OF NANAIMO (RDN) LANDFILL GAS CAPTURE GHG EMISSION REDUCTIONS PROJECT**

Table 4 shows the verification procedures.

Table 4 Verification Procedures

Line Item	Verification Objective	Risk Identified	Type of Procedure	Description of Procedure
Greenhouse Gas Assertion	Completeness	Incompleteness of inventory.	Test of detail – inspection.	Conduct a site tour of the landfill gas facility to determine sources and compare with inventory.
Greenhouse Gas Assertion	Accuracy Classification	Information not appropriately disclosed.	Test of detail – inspection.	Inspect Project Report for correct reporting of emissions and related information.
Greenhouse Gas Assertion	Completeness	Incompleteness of Project Report.	Test of detail – inspection.	Inspect Project Report for missing information.
Greenhouse Gas Assertion	Accuracy Conservativeness	GHG Assertion is incorrect	Test of detail – inspection and reconciliation.	Check emission factors, quantification methodology and recalculate GHG assertion.
Greenhouse Gas Assertion	Occurrence	Document storage and retention practices may not be sufficient.	Test of detail – inquiry.	Inquire about the retention period of data used for GHG Assertion.
Material Decomposition and Methane Collection	Accuracy	Substantiating evidence does not match supporting data.	Test of detail – inquiry.	Interview waste disposal operators to confirm the characteristics of the landfill from which waste is diverted for the presence of LFG capture system and the type of material used to cover the landfill. Sample raw data and trace to GHG assertion.



RE: FINAL VERIFICATION PLAN - VERIFICATION PLAN FOR REGIONAL DISTRICT OF NANAIMO (RDN) LANDFILL GAS CAPTURE GHG EMISSION REDUCTIONS PROJECT

SITE VERIFICATION PROCEDURES

A site visit to the Regional District of Nanaimo (RDN) Landfill site office in Nanaimo, British Columbia was completed on April 29, 2015 by Daniel Hegg (Lead Verifier). The site visit included interviews with the following individuals:

- Jane MacIntosh, A/Superintendent of Landfill Operations, Regional District of Nanaimo; and
- Susan Katzka, LFG Maintenance, Regional District of Nanaimo.

The site visit involved a review of data collection, tracking, and retention and transfer procedures. Activities associated with operations, record keeping, data management and emissions sources were also reviewed to better understand the quantification calculations, data treatment and data management. Through interviews, and by attending the site visit, the site boundaries were evaluated by the verifier to confirm their veracity. The verification team assessed emission sources, sinks and reservoirs and evaluated the potential for additional sources that were excluded.

INFORMATION REQUEST

Table 5 contains a list of documentation and data required by Stantec to complete the proposed procedures and the outcome of the requests. This table will be updated as needed throughout the verification process to track requests. If we need to request additional information, Stantec will update Table 5 and will provide RDN with a copy via email.

Table 5 Information Requested

Information Requested	Request Date	Obtained On
Confirm that the following manuals were still effective during the 2013 year: <ul style="list-style-type: none">• Landfill Gaswell Field Operations And Maintenance Manual (XCG File No. 4-2200-01-31); and• Landfill Gas Control Plant Operations And Maintenance Manual (XCG File No. 4-2200-01-31)	April 23, 2015	April 29, 2015
Why is the RDN using an older emission factor for methane (CH ₄) when an updated, more appropriate, factor is now available? This results in the RDN under-reporting 3,029 tCO ₂ e (19.5%) and is deemed to be a material discrepancy.	April 23, 2015	May 4, 2015



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Should you have any questions or require additional information, please contact me directly.

Sincerely,

STANTEC CONSULTING LTD.

A handwritten signature in black ink, appearing to be 'D. Hegg', with a horizontal line extending to the right.

Daniel Hegg, B.Comm, MSc. EMIT.
Lead Verifier
Phone: (250) 217-9729
Daniel.Hegg@stantec.com

This report was reviewed and approved for transmittal by:

A handwritten signature in black ink, appearing to be 'J. Harriman', with a horizontal line extending to the right.

Joe Harriman, P. Ph.D., P.Chem.
Peer Reviewer
Phone: (506) 642-9476
Joe.Harriman@stantec.com

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Stantec

Stantec Consulting Ltd.
400 - 655 Tyee Road
Victoria BC V9A 6X5
Tel: (250) 388-9161
Fax: (250) 382-0514

Template version 1.0 November 2013

VIA EMAIL <MacIntosh@rdn.bc.ca>

March 24, 2016
File: 123220518

Attention: Jane MacIntosh, A/Superintendent of Landfill Operations
Regional District of Nanaimo
1105 Cedar Road
Nanaimo, B.C. V9X 1K9

Dear Ms. MacIntosh,

RE: FINAL VERIFICATION PLAN - VERIFICATION PLAN FOR REGIONAL DISTRICT OF NANAIMO (RDN) LANDFILL GAS CAPTURE GHG EMISSION REDUCTIONS PROJECT

INTRODUCTION

Stantec Consulting Ltd. (Stantec) has completed the initial desktop review for the verification of the Regional District of Nanaimo (RDN) Landfill Gas (LFG) Capture and Combustion Greenhouse Gas (GHG) Emission Reductions Project (the Project) located in British Columbia. The greenhouse gas (GHG) Assertion provided in the "RDN 2015 Annual Emission Reduction Report" dated March 23, 2016 (the Annual Project Report) was prepared using the quantification guidance of the Federation of Canadian Municipalities (FCM) Green Management Corporation (the Program). This verification plan outlines the terms of the engagement and the planned verification procedures. The verification plan also provides a list of data and documentation required to complete the planned procedures.

The Project is owned and operated by the Regional District of Nanaimo (RDN). In this work, the RDN was responsible for the collection of data used in the calculations and data management. XCG Environmental Engineers & Scientists (XCG) was responsible for the completion of the calculations, presentation of the information within the Annual Project Report, and for the supporting technical documents.

VERIFICATION OBJECTIVES

The purpose of this verification was to evaluate key assertions, data sources, methods, and procedures for the Project pertinent to compliance with the Verification Criteria. Stantec considers completeness, conservativeness, consistency, accuracy, and transparency as criteria to facilitate the assessment as to whether the Annual Project Report and the greenhouse gas (GHG) Assertion are presented fairly and substantiated by sufficient and appropriate evidence.

VERIFICATION CRITERIA

The objective of this verification was to review and conclude as to whether the GHG Assertion and the information contained within the Annual Project Report are presented fairly, in all material respects, and are in accordance with the requirements of:



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- Green Management Corporation (“GMC”) Measurement, Monitoring, Reporting and Verification Protocol for Greenhouse Gas Emission Reductions from Designated Projects Funded Through the Green Municipal Fund; and
- ISO 14064 – Part 2 Greenhouse Gases: Specification with guidance at the Project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements (ISO 14064-2).

An independent opinion as to whether the Annual Project Report and GHG Assertion are presented fairly and substantiated by sufficient and appropriate evidence was provided in the Verification Statement.

VERIFICATION STANDARD

The verification was conducted in accordance with:

- ISO 14064 Part 3 – Greenhouse Gases: Specification with guidance for the validation and verification of greenhouse gas assertions; and
- ISO 14065 – Greenhouse Gases: Requirements for greenhouse gas validation and verification bodies for use in accreditation and other forms of recognition.

VERIFICATION SCOPE

The verification was for the period of January 1, 2015 to December 31, 2015. While the Annual Project Report is applicable to the full calendar year, the GHG Assertion has been broken out according to ownership/contractual obligations. The RDN owns the offset credits generated by the Project and is contractually required to transfer the ownership over the verified offset credits to the Federation of Canadian Municipalities (FCM) for the January 1, 2015 – April 15, 2015 crediting period. This verification plan is applicable to the January 1, 2015 to December 31, 2015 crediting period.

The reasonableness of the following Project description was subject to verification by Stantec.

The Nanaimo Landfill Gas (LFG) Capture and Combustion GHG Emission Reductions Project is located approximately five kilometers (km) south of downtown Nanaimo, British Columbia. The Project involves biogas recovery, conditioning and the destruction of the captured LFG.

Phase I of the Project was validated (positive finding) to a limited level of assurance for the 2004-2008 period. Phase I of the Project involved biogas recovery, conditioning and flaring. At the end of 2008 and early 2009, significant remediation of the collection system and multiple upgrades and improvements to the facilities control plant, data recording and collection systems were implemented.

As per the Annual Project Report, the LFG collection system is comprised of 36 active vertical gas collection wells, and 6 horizontal gas collection trenches. The control system has been digitized and the destruction system includes the use of both a flare and utilization facility. The utilization



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facility includes two Jenbacher J312GS internal combustion engines that combust LFG as feedstock. Each engine is coupled to an Emerson Electric 800 kW induction generator. The utilization facility is owned, constructed, maintained, and operated by Cedar Road LFG Inc. (Cedar Road). Cedar Road is a third party and does not have a claim on the emission reductions generated. The utilization facility only runs when the flare station is operating.

Per the 2015 Annual Project Report, two vertical extraction wells (EX54 and EX57) were connected to Manifold Station 1 via separate lateral pipes. The vertical extraction wells were connected to further improve the LFG collection efficiency and reduce GHG emissions. In addition, the 2014 horizontal extraction trench was connected to Manifold Station 2 via a lateral pipe. The horizontal was connected to further improve the LFG collection efficiency and reduce GHG emissions.

The source of GHG emissions for the Baseline condition is venting of methane directly to the atmosphere (otherwise captured and combusted in the flare or engines of the Project). The relevant GHG sources within the Project boundary (the RDN landfill) were considered in the verification.

The following GHGs are included within the scope of the verification:

- carbon dioxide (CO₂);
- methane (CH₄);
- nitrous oxide (N₂O);
- hydrofluorocarbons (HFCs);
- perfluorocarbons (PFCs); and
- sulphur hexafluoride (SF₆).

The total equivalent GHG emissions are reported as tonnes carbon dioxide equivalent (t CO₂e).

Sources of Project GHG emissions include:

- **Electricity Production (CO₂e):** production of electricity; and
- **Facility Operation (CO₂, CH₄, and N₂O):** natural gas, electricity and other fuels used to run the landfill facility.

Sources of Baseline GHG emissions at the Project are:

- **Material Treatment and Residue Decomposition and Methane Collection / Destruction (CH₄, and N₂O):** mass of organic material sent for disposal resulting in emissions.



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ASSERTION

The fundamental GHG Assertion to be verified for the Project is that it met the criteria above for the period of January 1, 2015 to December 31, 2015. The GHG Assertions verified for the period of January 1, 2015 to April 15, 2015 was 8,302 tCO₂e and 21,123 tCO₂e for the period of April 16, 2015 to December 31, 2015.

LEVEL OF ASSURANCE

Sufficient procedures were conducted in order to express a **reasonable level of assurance** opinion as requested by RDN.

MATERIALITY

A materiality limit of 5% for quantitative material discrepancies was set for this verification. The materiality of quantitative discrepancies was calculated on an absolute basis (*i.e.*, no mitigation of over- or under-reporting). Qualitative discrepancies were at the professional judgment of the verification body. Stantec planned and executed the verification accordingly.

VERIFICATION SCHEDULE

Table 1 presents the verification schedule.

Table 1 **Verification Schedule**

Verification Activity	Responsible Party	Date of Completion
Kick-Off Meeting With RDN	Stantec / RDN	February 11, 2016
Receive RDN Documentation	RDN	February 11, 2016
Initial Desktop Review	Stantec	February 11 – 18, 2016
Provide Verification Plan To RDN	Stantec	February 17, 2016
Site Visit	Stantec / RDN	February 24, 2016
Receive Additional Information	RDN	March 1-23, 2016
Draft Verification Report	Stantec	March 23, 2016
Address Follow-Up Items	Stantec / RDN	March 24, 2016
Finalize Verification Report And Statement Of Verification	Stantec	March 24, 2016



RE: **FINAL VERIFICATION PLAN - VERIFICATION PLAN FOR REGIONAL DISTRICT OF NANAIMO (RDN) LANDFILL GAS CAPTURE GHG EMISSION REDUCTIONS PROJECT**

VERIFICATION TEAM: QUALIFICATIONS, ROLES AND RESPONSIBILITIES

Table 2 presents the verification team. As part of Stantec's GHG Standard Operating Procedures (SOP), the competence and selection of the team is completed following ISO 14066 - Greenhouse Gases – Competence requirements for greenhouse gas validation teams and verification teams.

Table 2 Verification Team

Name	Role	Responsibilities
Daniel Hegg, M.Sc., CEM	Lead Verifier	Lead desktop review, sampling plan execution and working paper completion, complete site visit and prepare verification report.
Nicole Flanagan, P.Eng	Peer & Quality Reviewer	Independent review of verification activities and conclusions. Review verification deliverables technical soundness and compliance with Stantec's internal processes and AEP criteria. The independent reviewer confirms the verification activities have been completed and that the activities provide the required level of assurance.

TEAM PROFILE

Lead Verifier – Daniel Hegg, M.Sc., EMIT, ENV-SP

Daniel Hegg is a Senior Sustainability Specialist and the Western Regional Technical Leader (climate and greenhouse gas (GHG)) for Stantec Consulting Ltd. Daniel offers unique perspectives and insights on integrated carbon, energy and water management and strategy, sustainable return on investment business case development and climate change risk assessment and planning for private and public sector clients. He has provided strategy, policy advice, and has prepared a number of climate-related strategic guidance documents and plans across a variety of sectors including buildings/real-estate, forestry, oil and gas, renewable energy, mining, local, regional and provincial governments. He was recently on secondment with the BC Ministry of Environment, Climate Investment Branch assisting with the due diligence of the Province's \$25 million dollar carbon offset portfolio. Daniel has also developed, validated and verified over 70 organizational and facility GHG inventories and offset projects for clients in a wide range of sectors.

Daniel oversaw the completion of the site visit, Verification and Sampling Plan, draft and final Verification Report and Statement of Verifications. Daniel completed the site visit.

Independent Review/Quality Review – Nicole Flanagan, M.A.Sc., P.Eng.

Nicole Flanagan, M.A.Sc., P.Eng. has 13 years of environmental engineering, nine of which were with Stantec. Nicole's experience with specialization in air emissions under a variety of industrial, government and corporate settings. She is currently a senior practitioner and technical reviewer for greenhouse emission quantification, reporting and verification. Nicole was the lead verifier of some of the first regulatory greenhouse gas offsets sold in North America, has completed Environmental Compliance Approvals (ECAs), Section 71 Reports and National Pollutant Release



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Inventory reporting for a number of clients facilitating regulatory compliance. Her air emission and verification clients have included major electric utilities, energy companies, petrochemical production facilities as well as oil & gas companies. She also spent four years with Environment Canada working on program development and program delivery, which included meeting with stakeholders and administering procedural processes. During this time, she developed a strong understanding of the workings of government from program administration (Greenhouse Gas, NPRI Reporting Division and Canada's Offset System) as well as regulatory and instrument development (development of regulations and Pollution Prevention Planning requirements).

Nicole completed an independent peer review. As an internal quality management practice, all Stantec deliverables are reviewed by a Senior Expert in the firm. Nicole provided the quality review for this Project.

RISK ASSESSMENT

Stantec completed an assessment of the potential risk associated with this verification assignment. The risk assessment is an internal procedure used to assess inherent, control, and detection risk which uses the following equation:

$$\text{Audit Risk} = \text{Inherent Risk} \times \text{Control Risk} \times \text{Detection Risk}$$

The risk assessment is an internal procedure used to assess inherent, control, and detection risk. **Detection risk** is the risk that Stantec will not uncover a material discrepancy (e.g., the misstatement was present in the GHG Assertion and was not identified during the verification). The assessment of detection risk impacts the nature, timing and extent of the verification procedures that are to be performed by Stantec. **Inherent Risk** is the risk of a material misstatement that arises due to error or omission as a result of factors that are outside of the failure of controls. Inherent risk is generally considered to be higher where a high degree of judgment and estimation is involved or where GHG emissions data collection and processing are highly complex and involved processes. Organizations must have adequate internal controls in place to prevent and detect instances of error, misstatements, and omissions. **Control Risk** is the risk of a material misstatement arising due to absence or failure in the operation of relevant GHG system controls. Control risk is considered to be high where the Project does not have adequate internal controls to prevent and detect misstatements in the GHG Assertion.

There is an inverse relationship between the inherent and control risks, and the detection risk. If the inherent and control risks are high, Stantec will perform verification and sampling procedures that reduce detection risk so that the final verification risk is maintained at a low level. Higher control and inherent risk equates to more rigorous investigation and sampling. It typically results in additional detailed on and off-site sampling, additional information requests and staff interviews. Detection risk is lowered by more rigorous sampling; however sampling is always done as per the Verification Criteria and Standards.

Based on the risk assessment in each of these categories, the Stantec team assigns an overall risk to the verification. The preliminary overall risk for this verification was assessed as **Low** and the final verification risk was updated to **Low**. A summary of the risk assessment is provided in Table 3.



RE: **FINAL VERIFICATION PLAN - VERIFICATION PLAN FOR REGIONAL DISTRICT OF NANAIMO (RDN) LANDFILL GAS CAPTURE GHG EMISSION REDUCTIONS PROJECT**

Table 3 Risk Summary

Risk Area	Preliminary Assessment	Final Assessment
Inherent Risk	Low	Low
Control Risk	Low	Low
Detection Risk	Low	Low
Overall Risk	Low	Low

We consider the inherent risk to be **Low** based on the following:

- Landfill gas collection and destruction technology is sound and widely understood. Although the Project has undergone some modifications and upgrades since commissioning, it still operates as intended (low risk).
- Stantec understands that the Project being verified has been functioning since 2003 and the key management staff from that time has remained involved with the conception, construction, operation and maintenance of the Project (low risk).
- The Project verified by Stantec in 2012, 2013 and 2014. This is the fourth year Stantec will be verifying the Project (low risk).

We consider the control risk to be **Low** based on the following:

- The methane concentration and landfill gas flow-rate are the key parameters for monitoring; quality assurance and control procedures are in place and supporting evidence has been provided and reviewed and deemed well controlled (low risk).
- The site has an Operation and Maintenance (O&M) manual that Stantec reviewed during the prior years verifications and deemed to be satisfactory for a reasonable level of assurance (low risk).
- Stantec examined the GHG information system during the past verifications and did not detect any material discrepancies (immaterial discrepancies were resolved) (low risk).

Detection risk is the risk that Stantec will not identify a material discrepancy. We regard this risk as **Low** due to:

- **Stantec's Quality Management Procedures.** Stantec is committed to providing exceptional service to our clients in accordance with our ISO 9001 and ISO 14065 accreditations. Stantec believes that quality is a basic principle and that quality management is an integral part of all its work. Stantec team members take systematic approach to quality management to ensure compliance with requirements and to achieve continual improvement. The cornerstone of Stantec's quality management system is an entrenched process of quality review which ensures that all deliverables have been vetted by senior and expert people in the firm (low risk).



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- **Level of Assurance.** The reasonable level of assurance applied in this verification (as required by the RDN) mandates that Stantec perform increased sampling to meet the assurance requirements, however, the level of assurance still increases the risk to Stantec as the risk-based verification approach means that not all information can be reviewed. Stantec has designed the sampling plan to target potentially material items in the GHG information to minimize detection risk (low risk).

VERIFICATION PLAN

The verification and sampling plan is intended to facilitate the assessment of completeness, conservativeness, consistency, accuracy, and transparency of the responsible party's GHG information and confirm the GHG Assertion as identified in the Annual Project Report. The verification team established and modified the sampling plan to verify that sufficient and appropriate evidence was available to support the Annual Project Report and GHG Assertion presented. Further, any discrepancies that contributed to the GHG Assertion were assessed.

With regards to the magnitude of potential errors, omissions and misrepresentations, the tracking of the amount of methane destructed represents the greatest risk of material error to the GHG Assertion.



RE: **FINAL VERIFICATION PLAN - VERIFICATION PLAN FOR REGIONAL DISTRICT OF NANAIMO (RDN) LANDFILL GAS CAPTURE GHG EMISSION REDUCTIONS PROJECT**

Table 4 shows the verification procedures.

Table 4 Verification Procedures

Line Item	Verification Objective	Risk Identified	Type of Procedure	Description of Procedure
Greenhouse Gas Assertion	Completeness	Incompleteness of inventory.	Test of detail – inspection.	Conduct a site tour of the landfill gas facility to determine sources and compare with inventory.
Greenhouse Gas Assertion	Accuracy Classification	Information not appropriately disclosed.	Test of detail – inspection.	Inspect Project Report for correct reporting of emissions and related information.
Greenhouse Gas Assertion	Completeness	Incompleteness of Project Report.	Test of detail – inspection.	Inspect Project Report for missing information.
Greenhouse Gas Assertion	Accuracy Conservativeness	GHG Assertion is incorrect	Test of detail – inspection and reconciliation.	Check emission factors, quantification methodology and recalculate GHG Assertion.
Greenhouse Gas Assertion	Occurrence	Document storage and retention practices may not be sufficient.	Test of detail – inquiry.	Inquire about the retention period of data used for GHG Assertion.
Material Decomposition and Methane Collection	Accuracy	Substantiating evidence does not match supporting data.	Test of detail – inquiry.	Interview waste disposal operators to confirm the characteristics of the landfill from which waste is diverted for the presence of LFG capture system and the type of material used to cover the landfill. Sample raw data and trace to GHG Assertion.



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RE: FINAL VERIFICATION PLAN - VERIFICATION PLAN FOR REGIONAL DISTRICT OF NANAIMO (RDN) LANDFILL GAS CAPTURE GHG EMISSION REDUCTIONS PROJECT

SITE VISIT

A site visit to the Regional District of Nanaimo (RDN) Landfill site office in Nanaimo, British Columbia was completed on February 24, 2016 by Daniel Hegg (Lead Verifier). The site visit included interviews with the following individuals:

- Jane MacIntosh, A/Superintendent of Landfill Operations, Regional District of Nanaimo; and
- Susan Katzka, LFG Maintenance, Regional District of Nanaimo.

The site visit involved a review of data collection, tracking, and retention and transfer procedures. Activities associated with operations, record keeping, data management and emissions sources were also reviewed to better understand the quantification calculations, data treatment and data management. Through interviews, and by attending the site visit, the site boundaries were evaluated by the verifier to confirm their veracity. The verification team assessed emission sources, sinks and reservoirs and evaluated the potential for additional sources that were excluded.

INFORMATION REQUEST

Table 5 contains a list of documentation and data that was required by Stantec to complete the proposed procedures and the outcome of the requests. This table was updated as needed throughout the verification process to track requests.

Table 5 Information Requested

Information Requested	Request Date	Obtained On
Confirm that the following manuals were still effective during the 2015 reporting year: <ul style="list-style-type: none">• Landfill Gaswell Field Operations And Maintenance Manual (XCG File No. 4-2200-01-31); and• Landfill Gas Control Plant Operations And Maintenance Manual (XCG File No. 4-2200-01-31)	February 16, 2016	February 24, 2016
Provide the Q3, Q4 and Annual GHG Emissions Report and supporting GHG emissions calculator.	February 16, 2016	February 24, 2016



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RE: **FINAL VERIFICATION PLAN - VERIFICATION PLAN FOR REGIONAL DISTRICT OF NANAIMO (RDN) LANDFILL GAS CAPTURE GHG EMISSION REDUCTIONS PROJECT**

CLOSURE

Should you have any questions or require additional information, please contact me directly.

Sincerely,

STANTEC CONSULTING LTD.

A handwritten signature in black ink that reads "Daniel Hegg".

Daniel Hegg, B.Comm, MSc. CEM.
Lead Verifier
Stantec Consulting Ltd.
400 - 655 Tyee Road Victoria, BC V9A 6X5
Phone: (250) 217-9729
Email: daniel.hegg@stantec.com

This report was reviewed and approved for transmittal by:

A handwritten signature in black ink that reads "Nicole Flanagan".

Nicole Flanagan, M.A.Sc., P.Eng.
Independent Peer & Quality Reviewer
Stantec Consulting Ltd.
400 - 1331 Clyde Avenue Ottawa, ON K2C
3G4 Phone: (613) 738-6086
Email: nicole.flanagan@stantec.com