

Methodology Validation Opinion

GHG Emission Footprint Calculation Methodology of Project Study Report
on the Pollution-Mitigation Benefits of Using the Utraphimuk Elevated Toll
Road (December 2024 Edition)

Developed by:

Don Muang Tollway Public Company Limited

40/40 Viphavadi Rangsit Road, Sanambin,
Don Muang, Bangkok 10210, Thailand

has been validated in accordance with ISO 14064-3:2019 as enabling
calculation of GHG Emission Footprint

For the carbon footprint assessment, this report quantifies:

- GHG emissions from traffic operations on the Utraphimuk Elevated Toll Road
- Avoided GHG emissions attributable to the Elevated Toll Road 's network effects

Authorized by



Montree Tangtermsirikul
General Manager

Date: 02 September 2025

This statement is valid from 09 July 2024 until 08 July 2027 subject to no change in the calculation tool algorithm and satisfactory surveillance audit on yearly basis

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SGS has been contracted by Don Muang Tollway Public Company Limited (hereinafter referred to as “DMT”), 40/40 Viphavadi Rangsit Road, Sanambin, Don Muang, Bangkok 10210 for the validation of GHG Emission Footprint calculation methodology of Project Study Report on the Pollution-Mitigation Benefits of Using the Utraphimuk Elevated Toll Road, developed by the organization to facilitate the process of GHG emissions from traffic operations on the Utraphimuk Elevated Toll Road and Avoided GHG emissions attributable to the Elevated Toll Road’s network effects, in accordance with

ISO 14064-3:2019

The version of the Project Study Report on the Pollution-Mitigation Benefits of Using the Utraphimuk Elevated Toll Road (hereinafter referred to as “report”) that has been assessed is version 1.0 (December 2024 Edition), consistent with the version available on the public at the time of validation.

Roles and responsibilities

The management of DMT is responsible for the design, development, maintenance of the Project Study Report on the Pollution-Mitigation Benefits of Using the Utraphimuk Elevated Toll Road, Project GHG information system, as well as of the development and maintenance of records in accordance with that system.

It is SGS’s responsibility to express an independent GHG validation opinion on the methodology of the report as provided by DMT with regards to the agreed criteria.

SGS conducted a third-party validation of the methodology of the report. The report and tools were checked against the calculation requirements of the WRI/WBCSD Greenhouse Gas (GHG) Protocol and Methodology for Vehicle Emission Rates (per Thailand’s Pollution Control Department). The validation engagement was conducted in the period 5 June 2025 to 6 June 2025. The validation was based on the validation scope, objectives and criteria as agreed between DMT and SGS on 22 April 2025.

Level of Assurance

The level of assurance agreed is that of limited assurance.

Scope

This engagement covers verification of emission from anthropogenic sources of greenhouse gases included within the organization's boundary and is based on ISO 14064-3:2019.

DMT has developed a report and tool to facilitate the process of calculating GHG emissions from traffic operations on the Utraphimuk Elevated Toll Road and Avoided GHG emissions attributable to the Elevated Toll Road's network effects.

DMT has commissioned SGS to independently validate the calculation methodology of its tool. This tool was developed by DMT to calculate GHG emissions from traffic operations on the Utraphimuk Elevated Toll Road, as well as the avoided emissions resulting from these activities. The validation aims to ensure compliance with various standards mentioned in the criteria. The scope of the validation as outlined below.

The engagement covers validation of the DMT's methodology of the report, based on ISO 14064-3:2019.

- The validation covered an independent review of the following:
 - The correct implementation of the calculation requirements in line with the criteria. The GHG emissions result produced from the tool was not subject of the validation audit process.
 - The appropriateness of collected foreground data and chosen background data.
 - The appropriateness of calculation tool functionality for its intended purpose.
- Reference to calculation methodology: Project Study Report on the Pollution-Mitigation Benefits of Using the Utraphimuk Elevated Toll Road (December 2024 Edition).
- Physical infrastructure, activities, technologies and processes of the organization: GHG Emission for Vehicle Operations on the Utraphimuk Elevated Toll Road and on Vibhavadi Rangsit Road.
- GHG sources, sinks and/or reservoirs included: Sources as presented in the Report, underlying data/calculation sheets provided by DMT.
- Types of GHGs included: CO₂
- Time period: The Methodology is not linked to any specific time period. It is intended to be used in conjunction with site-specific facility data provided by calendar year.
- Assumptions: Limitations and assumptions as presented in the Report and underlying data provided by DMT.

- Data sources and quality: Data sources as presented in the Research Manual, Report, underlying data, and Data Quality Assessment dated 5-6 June 2025 provided by DMT.
- The version of Research Manual /Methodology document: Project Study Report on the Pollution-Mitigation Benefits of Using the Utraphimuk Elevated Toll Road (December 2024 Edition)
- Intended user of the verification statement: For DMT internal use and external publication as required.

Objective

The purposes of this validation exercise are, by review of objective evidence, to independently review: The calculation methodology of the Report is in accordance with the requirements and criteria used herein.

Criteria

Criteria against which the verification assessment is undertaken are the principles of GHG Protocol

Materiality

Not applicable to this validation engagement, as there is no statement made regarding the result of the GHG emission footprint.

Limitations

The following limitations have been applied to the validation:

- SGS validated the calculation methodology described in the Project Study Report on the Pollution-Mitigation Benefits of Using the Utraphimuk Elevated Toll Road (Version 1.0, December 2024 Edition) and the associated tool logic for intended use. The engagement did not validate or express an opinion on:
 - any quantitative GHG results produced by the tool or report,
 - the completeness/accuracy of activity data used in illustrative calculations, or
 - the performance of the Elevated Toll Road in practice.
- The methodology depends on emission factors from Thailand's Pollution Control Department (PCD), GHG Protocol requirements, and selected global warming potentials (GWPs). Updates to any of these sources (e.g., PCD tables, IPCC GWPs) may materially change calculated outcomes. Consistency of GWPs between the Report and any external statements lies with the organization.

- Modeling assumptions and counterfactual uncertainty: Estimates of avoided emissions attributable to network effects (e.g., congestion relief, idling reductions, route diversion) are model-based and sensitive to assumptions about vehicle mix, speeds, queue/distribution parameters, and traffic assignment. Alternate defensible assumptions or scenarios could yield different results.

Conclusion

DMT provided the GHG Emission Footprint calculation methodology of the Report based on the principles of relevance, completeness, consistency, accuracy, and transparency.

SGS's approach is risk-based, drawing on an understanding of the risks associated with modelling GHG emissions information and the controls in place to mitigate these risks. Our examination includes assessment, on a sample basis, of evidence relevant to the methodology and selected emission factors.

Based on the work performed, in SGS's opinion the presented GHG Emission Footprint Methodology as described Project Study Report on the Pollution-Mitigation Benefits of Using the Utraphimuk Elevated Toll Road (December 2024 Edition),

- Have been found to comply in all material respects with the applicable requirements and standards used herein.

Disclaimer:

- The scope of our assurance was limited to the calculation methodology of the Report. The results generated by the tool itself are outside the scope of this assurance.
- Calculation tool's functionality was validated by evaluating its output for a selection of example Carbon footprint calculations.

Confidentiality

The reports and attachments may contain relevantly confidential information of the clients. In addition to being submitted as governmental application or certification documents, the reports and attachments are not allowed to be edited, duplicated, or published without the clients' agreement in written form.

Avoidance of Conflict of Interest

The reports and attachments are completely complied with the standards and procedures that related authorities established. The reports and attachments of auditing process are conduct with fairness and honesty. If not, the auditing institution not only has to bear the relevant compensation duties, but also to receive legal charge and punishment.

This statement shall be interpreted with the Project Study Report on the Pollution-Mitigation Benefits of Using the Utraphimuk Elevated Toll Road (December 2024 Edition) of DMT listed above as a whole.

Note: This statement is issued, on behalf of Client, by SGS (Thailand) Ltd. ("SGS") under its its General Conditions for Greenhouse Gas Verification Services available at http://www.sgs.com/terms_and_conditions.htm. The findings recorded hereon are based upon an audit performed by SGS. A full copy of this statement, the findings and the supporting GHG Assertion may be consulted at Don Muang Tollway Public Company Limited, 40/40 Viphavadi Rangsit Road, Sanambin, Don Muang, Bangkok 1021. This Statement does not relieve Client from compliance with any bylaws, federal, national or regional acts and regulations or with any guidelines issued pursuant to such regulations. Stipulations to the contrary are not binding on SGS and SGS shall have no responsibility vis-à-vis parties other than its Client.