Preliminary Assessment Public Summary

This is a *Preliminary Assessment Public Summary* prepared by Puro.earth, which contains general information about the CO2 Removal Supplier, a non-technical summary of the project, and a table containing details about the criteria assessed. The CO2 Removal Supplier has received an extended Preliminary Assessment Report that includes additional remarks and recommendations for the continuation of the certification journey.

1. Supplier and Project Information

CO_2 Removal Supplier	
Company name	UNDO Carbon Ltd
Company address	3rd Floor 86-90 Paul Street, London, England, EC2A 4NE
Business ID	GB412955595
KYC status	Completed
CO_2 Removal Project	
Methodology	**Enhanced Rock Weathering, Edition 2022, Version 2**
Production Facility name	UNDO Ontario 2024
Facility registration date	2025-03-26
Production Facility ID	220949
Production Facility location	6675 ON-15, Seeley's Bay, ON K0H 2N0, Canada
Host Country of removal	Canada
Has this facility been registered in another registry?	☒No ☐Yes, additional information:
Preliminary Assessment Details	
Date of assessment	22/05/2025
Status of assessment	Completed
Conclusion of assessment	Passed

The definition of CO_2 Removal Supplier and Production Facility can be found in the Puro Standard.

2. Non-Technical Project Summary*

Enhanced rock weathering is a climate solution that speeds up the natural breakdown of silicate rocks to capture carbon dioxide from the air. When these rocks dissolve, they react with CO_2, storing it in the soil or oceans. By spreading mineral-rich crushed silicate rock on local agricultural land, based in Ontario, this nature-based process is vastly accelerated while bringing co-benefits to farming communities including improved soil health and boosts crop growth.

Given that this is the acceleration of a natural process, there is no ongoing physical human intervention required to capture, manage or durably sequester the CO_2 beyond the sustainable sourcing, crushing, haulage and spreading of the rock. Once the rainwater reacts with the silicate rock, the carbon dioxide removal (CDR) process takes place naturally over time. UNDO is able to quantify the CDR resulting from the application of silicate rock through extensive in-field sampling.

*Filled by the supplier. Between 150-200 words.

3. Criteria Assessment Report

Reminder: Sub-criteria either concern the Production Facility's technical eligibility or its maturity and quality. There are three types of sub-criteria:

- **Required to be passed:** These correspond to the core criteria related to the eligibility of a Production Facility. Suppliers must meet these criteria, as they may otherwise be impossible or costly to change at a later stage of the certification journey.
- **Required to be assessed**: These criteria are important for evaluation but do not necessarily determine pass or fail at this stage, as it is understood that the suppliers may be at different stages of development.
- **Not required:** These criteria are optional at this stage. They may provide additional information about the project maturity but are not essential for passing the preliminary assessment.

For a facility to be considered eligible for listing, all the sub-criteria that condition eligibility must be met (i.e. passed or assessed). If one of those sub-criteria is not met, the facility in its current state of development is not eligible for listing.

Disclaimer: The assessment has been made against the criteria in the current version of the methodology. Puro.earth relied on the CO_2 Removal Supplier for the correctness of the provided information during the time of the preliminary assessment and will make no representation as to the accuracy or completeness of this report. The CO_2 Removal Supplier must undergo a third-party audit before issuing CO_2 Removal Credits (CORCs). **Passing the preliminary assessment does not guarantee a success in the third-party audit.**

Table 1. Criteria and sub-criteria assessment by Puro based on the documents submitted.

ID	Criteria / Sub-criteria	Outcome	Comment	Evidence reviewed	Requirement for listed	Purpose of criteria
C1	**Weathering material(s) is(are) eligible**	**Passed**			*Passed if required sub-criteria are met*	
C1.1	*Types of weathering material are identified*	Passed	The identified weathering material is wollastonite skarn deposit, mainly composed of diopside, albite and wollastonite.	UNDO_PURO Weathering Material Composition Data Analysis Ontario 2024 Pre Assessment.pdf	Required to be passed	Technical eligibility
C1.2	*Sources of weathering material (e.g. mine, quarry, recycling) are identified*	Passed	The weathering material will be extracted from Saint Lawrence Wollastonite Deposit mine/quarry in Ontario, Canada.	UNDO_CW ERW Environmental Risk Assessment Approach_.pdf; UNDO_Canadian Wollastonite Services Agreement-_Redacted.pdf	Required to be passed	Technical eligibility
C1.3	*Composition of the weathering materials is characterized*	Passed	UNDO provided a mineralogical breakdown (Calcite 3.8%; Wollastonite 28.4%; Diopside 37.1%; Albite 17.4%; Quartz 13.3%) used for initial simulations, and initial characterization confirms the absence of toxic elements like asbestos. As mentioned in the preliminary Monitoring Plan,	Appendix 4_Asbestos Free Certification (FOR REVIEW).pdf;UNDO_CW ERW Environmental Risk Assessment Approach_.pdf; Results of model simulation UNDO Ontario 2024 Pre-	Required to be passed	Technical eligibility

			ICP-MS analyses have been conducted, chemical characterization laboratory data will be submitted for the Audit.	assessment,pdf; UNDO_PURO Weathering Material Composition Data Analysis Ontario 2024 Pre Assessment.pdf		
c1.4	*Economic leakage related to use of weathering material is minimal*	Assessed	The weathering material is extracted from the Saint Lawrence Wollastonite Deposit in quantities that are negligible relative to the deposit's total capacity and annual production capacity; therefore, economic leakage is deemed minimal.	Economic Leakage UNDO Ontario 2024 Pre Assessment.pdf	Required to be assessed	Technical eligibility
c1.5	*Sourcing of weathering material is legal and rightful (e.g. permits, authorisations)*	Assessed	UNDO is partnering with Canadian Wollastonite (CW) to oversee operations at the Saint Lawrence Wollastonite Deposit. A Closure Plan for the CW's deposit, approved by Ontario's Ministry of Northern Development and Mines, has been submitted, covering both operational activities and site rehabilitation.	Appendix 5_Statement of Certification _Environmental Engineering sign off for completion of Mine Operating and Closure Plan (FOR REVIEW).pdf	Required to be assessed	Technical eligibility
c1.6	*Sourcing of weathering material is secured (e.g. letters of intent, contracts)*	Assessed	UNDO is partnering with CW to oversee operations at the Saint Lawrence Wollastonite Deposit. An agreement for the Provision of Enhanced Weathering Services between UNDO and CW has been provided, securing the sourcing of weathering material.	UNDO_Canadian Wollastonite Services Agreement-_Redacted.pdf	Required to be assessed	Maturity & Quality
c1.7	*Weathering material logistics (e.g. storage, transport) and processing (e.g. crushing, grinding) are planned or defined*	Assessed	Operational logistics have been outlined, including wollastonite rock mining, crushing, transport and application to the agricultural sites.	UNDO_CW ERW Environmental Risk Assessment Approach_.pdf; UNDO_Canadian Wollastonite Services Agreement-_Redacted.pdf	Required to be assessed	Maturity & Quality
c2	**Application sites are identified, characterized, or secured**	**Passed**			*Passed if required sub-criteria are met*	
c2.1	*Potential eligible application sites are identified in the facility area*	Passed	Application sites will be located in Ontario, Canada within a 450 km radius of the quarry where the weathering material is sourced. Four application sites have been explicitly identified, of which the exact spatial extent has been shared in the form of geo-spatial data. Additional sites will be added in the future.	UNDO Production Facility Ontario 2024 Pre Assessment .pdf; UNDO_CW ERW Environmental Risk Assessment Approach_.pdf; Shapefile folders	Required to be passed	Technical eligibility
c2.2	*Characterisation of application sites (e.g. baseline soil sampling) is planned or conducted*	Assessed	Baseline sampling has been conducted, but not reported yet. Identified application sites are located in a region with a humid continental climate, classified as Dfb under the Köppen climate classification system. Small plot monitoring sites have been selected to assess soil conditions representative of the various application sites.	UNDO Production Facility Ontario 2024 Pre Assessment .pdf; Monitoring Plan UNDO Ontario 2024 Pre Assessment.pdf	Required to be assessed	Technical eligibility

c2.3	*Some application sites have been secured (e.g. signed contracts with landowner)*	Assessed	Application sites have been secured through contracts between landowners and CW. Contracts mention the relevant terms and disclosures between parties, including non-double claiming rules.	J-001455 Land Manager Contract.pdf; J-001460 Land Manager Contract.pdf; J-001589 Land Manager Contract.pdf; J-001638 Land Manager Contract.pdf	Required to be assessed	Maturity & Quality
c2.4	*Weathering material has been applied to selected sites*	Assessed	The project includes spreading activities that began in 2024 and will continue into 2025. Although a portion of the material has already been applied, the full quantity intended for the project has not yet been spread.	UNDO Production Facility Ontario 2024 Pre Assessment .pdf	Not required	Maturity & Quality
c3	**Weathering quantification approach, simulation model and empirical validation**	**Passed**	UNDO's quantification approach is based on intensively monitoring small monitoring sites that are used to extrapolate weathering results to operational sites with similar features, supported by infield data and modelling.		*Passed if required sub-criteria are met*	
c3.1	*A weathering simulation model is available, and its approach has been described in writing*	Passed	An open-source peer reviewed one-dimensional reactive transport model will be used for weathering simulations (Kelland et al. 2020), beside direct quantification of weathering on monitoring sites.	Model Description UNDO Ontario 2024 Pre Assessment.pdf	Required to be passed	Technical eligibility
c3.2	*The model takes in facility specific inputs (e.g. material properties, soil properties, weather data) as required*	Passed	Input parameters include weathering material parameters such as mineralogy, particle size and specific surface area. Soil parameters include local soil type, pH, and CEC. Climate data include local temperature and rainfall.	Model Description UNDO Ontario 2024 Pre Assessment.pdf Results of model simulation UNDO Ontario 2024 Pre-assessment	Required to be passed	Technical .eligibility
c3.3	*The model outputs weathering and carbon removal curves with an explicit time dimension as required*	Passed	Initial simulation results show outputs in tonnes of CO_2 per hectare and year as required, as well as other signals.	Results of model simulation UNDO Ontario 2024 Pre-assessment	Required to be passed	Technical eligibility
c3.4	*The model outputs weathering signals that can be validated by empirical inputs from monitoring as required*	Passed	The model outputs weathering signals that can be validated by empirical inputs from monitoring, including pH, cation concentrations (e.g., Mg^{2+}, Ca^{2+}, Na^{+}, K^{+}), and carbonate speciation, all of which are planned to be measured in the field.	Model validation UNDO Ontario 2024 Pre-assesment.pdf Monitoring Plan UNDO Ontario 2024 Pre Assessment.pdf	Required to be passed	Technical eligibility
c3.5	*The model includes weathering process losses (i.e. from strong acid weathering, plant uptake, riverine losses, and ocean losses)*	Passed	The model includes weathering processes, capturing short-term losses (strong acid weathering, plant uptake, and secondary precipitation in field). The model simulates the downward migration of water through a 30 cm soil profile. Empirical measurements will also be made to determine short-term in-field losses. Other riverine and ocean losses are deducted separately in the quantification approach.	Model Description UNDO Ontario 2024 Pre Assessment.pdf	Required to be passed	Technical eligibility
c3.6	*Model description includes discussion and calculation of uncertainties related to site-*	Assessed	A brief discussion on uncertainty was provided. Statistical bootstrapping is planned to be used to generate an empirical distribution of the uncertainty on the CDR values. Further	Model Description UNDO Ontario 2024 Pre Assessment.pdf	Required to be assessed	Technical eligibility

	specific spatial and temporal variability		work is needed, in particular on how this uncertainty calculation will be reported for deployment sites.			
c3.7	*Model description includes discussion of model uncertainty (i.e. assumptions made, aspects not covered by model)*	Assessed	An initial discussion on model uncertainty was added to the model description. Further refinements are possible regarding the limitations of the model, and the overall quantification approach.	Model Description UNDO Ontario 2024 Pre Assessment.pdf	Required to be assessed	Technical eligibility
c3.8	*Initial weathering simulations have been submitted for the planned application events*	Assessed	Initial simulations have been performed showing weathering of wollastonite within 2 years for the application site conditions.	Results of model simulation UNDO Ontario 2024 Pre-assessment	Not required	Maturity & Quality
c3.9	*A monitoring plan has been drafted for empirical validation of the weathering model*	Passed	A monitoring plan has been drafted. It includes the design of small plot monitoring sites (SPMS) for direct quantification of removals and model calibration. However, an explicit model validation has not been provided yet. For operational sites, the monitoring plan remains to be refined as well.	Monitoring Plan UNDO Ontario 2024 Pre Assessment.pdf; CORC Quantification Process UNDO Ontario 2024 Pre-assesment-2.pdf; Carbon Dioxide Stored UNDO Ontario 2024 Pre assessment.pdf	Required to be passed	Technical eligibility
c3.10	*The monitoring plan includes input parameters and output variables of the weathering model*	Passed	The monitoring plan includes both the input parameters and output variables of the weathering model. Input parameters typically include soil properties (e.g., pH, cation exchange capacity, clay, sand, and silt percentages) and mineral composition, while output variables include critical indicators such as changes in pH, cation release rates (e.g., Mg^{2+}, Ca^{2+}), and carbonate speciation.		Required to be passed	Technical eligibility
c3.11	*The monitoring plan specifies sampling temporal and spatial frequencies*	Passed	The monitoring plan specifies temporal and spatial sampling for soil, water and plant samples within the small plot monitoring sites. The level of detail can be improved. Additionally, a protocol for application site soil characterisation has been carried out, and will be submitted for the Audit.		Required to be passed	Technical eligibility
c3.12	*The monitoring plan specifies how empirical data will be used to corroborate and calibrate the weathering model*	Assessed	The current approach involves using a rate factor to adjust overall mineral dissolution rates based on the in-field data. This approach adjusts the model to better match field data before using the fitted model for CDR estimates in operational fields. While this calibration can be used for quantification; it is not a model validation for assessing the performance of the model. Additionally, UNDO plans to conduct model validation based on results from monitoring sites. Details of this will be shared for the Audit.		Required to be assessed	Technical eligibility
c3.13	*The monitoring plan includes protocol for monitoring possible*	Assessed	The monitoring plan includes pore water analyses for pH, EC, cation and anion concentrations, which allows for charge		Required to be assessed	Technical eligibility

	re-emissions (e.g. strong acid weathering)		balance calculations and estimation of strong acid weathering.			
c3.14	*Measurement devices needed for monitoring have been identified or procured*	Assessed	A preliminary list of equipment requiring calibration was shared.	Equipment requiring calibration UNDO Ontario Pre Assessment.xlsx	Not required	Maturity & Quality
c4	**Facility has monitoring, reporting, and LCA capabilities or plans**	**Passed**			*Passed if required sub-criteria are met*	
c4.1	*Information system used to keep data records is prepared*	Assessed	An overview of UNDO's proprietary information system (NEWTON) has been shared. The system allows the logging of all events relevant to the activity, from rock sourcing to rock application, monitoring, calculations and simulations.	Data Management Overview Pre Assessment UNDO Ontario 2024.pdf	Required to be assessed	Maturity & Quality
c4.2	*A monitoring plan has been drafted for monitoring of parameters needed for LCA calculations*	Assessed	The LCA Report and its appendices include explicit parameters that are monitored during the activity, enabling calculation of project emissions due to rock supply and application, as well as monitoring of the weathering.	UNDO_Puro Canada LCA Report UNDO Ontario 2024 Pre Assessment.pdf (and appendices)	Required to be assessed	Maturity & Quality
c4.3	*An LCA model specific to the facility's operation is prepared*	Assessed	The LCA Model described in UNDO's LCA Report is implemented in UNDO data management system (NEWTON). Based on the descriptions and equations in the LCA Report, the model seems to include the relevant components for calculation of project emissions.	UNDO_Puro Canada LCA Report UNDO Ontario 2024 Pre Assessment.pdf (and appendices)	Required to be assessed	Maturity & Quality
c5	**Environmental and social safeguards are ensured**	**Passed**		Possibly passed, many documents submitted	*Passed if required sub-criteria are met*	
c5.1	*An environmental risk assessment (ERA) specific to the facility has been drafted or completed*	Passed	An ERA has been completed, covering the scope required by the methodology as well as other aspects. The ERA includes specific monitoring actions that UNDO commits to follow and report upon to ensure low risks.	UNDO_CW ERW Environmental Risk Assessment Approach_.pdf (and appendices)	Required to be passed	Technical eligibility
c5.2	*The ERA has been externally reviewed*	Assessed	The ERA has been externally reviewed by a competent consultancy. The reviewer considered both local regulation and the Puro methodology in its review. The ERA, after minor revision, was approved by the reviewer.	2024-04-16 LTR UNDO_CW ERA Review (Final).pdf	Required to be assessed	Maturity & Quality
c5.3	*A monitoring plan has been drafted for monitoring potentially toxic elements (PTEs) in line with the ERA*	Assessed	The monitoring plan draft includes measurement of toxic elements for every 5000 tonnes of material sourced. Analyses are expected to include heavy metal contents and radionuclides, as per the ERA. UNDO deems risks of asbestos not relevant for the selected quarry based on earlier tests conducted at the quarry in 2005.	UNDO_CW ERW Environmental Risk Assessment Approach_.pdf (and appendices); Monitoring Plan UNDO Ontario 2024 Pre Assessment.pdf	Required to be assessed	Maturity & Quality

c5.4	*Selected weathering materials and soils has been analysed for PTEs, enabling risk characterisation in line with the ERA*	Assessed	The weathering material and soil samples have not yet been fully analyzed for PTEs. However, UNDO has already shared preliminary data from the quarry, specifically on asbestos (2005) and approval by local authorities for use as fertilizer.	Monitoring Plan UNDO Ontario 2024 Pre Assessment.pdf; Appendix 6_Canadian Food Inspection Agency Approval (FOR REVIEW),pdf; Canadian Organic Standards CW Organic Material Review Institute Certification.pdf; UPDATED Appendix 6 CFIA_ACIA - #21078225 - v1 - 2019140M registration form 24April2024.pdf	Required to be assessed	Maturity & Quality
c5.5	*Stakeholder consultations have been planned or conducted*	Assessed	Stakeholder consultations have been conducted with farmers, partner contractors, and local communities, in the form of focus groups, site visits, and electronic questionnaires. Besides, UNDO participates in various other events like conferences. Consultations are expected to continue with local stakeholders as activities expand.To the best of UNDO's knowledge, working with farmers on existing agricultural land has not affected Indigenous communities. However, to ensure their perspectives are considered in ongoing operations, UNDO plans to consult with the Office of Indigenous Initiatives and the Ministry of Indigenous Affairs and First Nations Economic Reconciliation.	Puro Stakeholder Engagement Report UNDO Ontario 2024 Pre Assessment.pdf; Procedures for Grievances UNDO Ontario 2024 Pre Assessment.pdf; Puro Environmental and Social Safeguards UNDO Ontario 2024 Pre Assessment.pdf	Required to be assessed	Maturity & Quality
c5.6	*Regulation applicable to facility has been identified*	Assessed	A list of applicable regulations has been submitted, covering aspects specific to weathering activities in Ontario, Canada (e.g. fertilizer regulations, naturally occurring radioactive materials, quarrying/mining).	UNDO Canada List of applicable regulations ERW.xlsx	Required to be assessed	Maturity & Quality
c5.7	*Procedures to acquire relevant permits have been identified, started, or completed*	Assessed	UNDO has worked with a Canadian-based, environmental consultancy to ensure its activities are in line with applicable national and local laws. A permit for the quarry (Canadian Wollastonite) was also provided. No other permits seem to be necessary to operate in Ontario, Canada.	Puro Environmental and Social Safeguards UNDO Ontario 2024 Pre Assessment.pdf; Appendix 3_Section 9.b St Lawrence Wollastonite_FILED_2012-12-10 (FOR REVIEW).pdf	Required to be assessed	Maturity & Quality
c5.8	*Occupational health and safety measures/policies have been planned or developed*	Assessed	A document outlining safe working procedures has been developed, offering general guidance for material delivery, loading, and spreading. It also includes a link to the material safety data sheet for Canadian Wollastonite.	Appendix 1_CW_UNDO ERA_ Safe Working Practices .docx.pdf	Not required	Maturity & Quality
c6	**Additionality is demonstrated**	**Passed**			*Passed if required sub-criteria are met*	
c6.1	*Carbon storage additionality to baseline*	Passed	Without the project, the weathering material (wollastonite) would remain in the quarry, exposed to minimal natural weathering. With the project, the material will be extracted	Baseline and Additionality Assessment UNDO Ontario 2024 Pre Assessment.pdf;	Required to be passed	Technical eligibility

			and applied to agricultural land, also replacing limestone which has a lower carbon storage potential. Therefore, carbon storage is deemed additional to the baseline.	UNDO_CW ERW Environmental Risk Assessment Approach_.pdf		
c6.2	*Financial additionality of facility*	Passed	The activity has no other revenues than carbon finance; and UNDO provided a simple cost analysis for an example rock application event.	Baseline and Additionality Assessment UNDO Ontario 2024 Pre Assessment.pdf; (PRIVATE) Financial additionality assessment (Canada).xlsx	Required to be passed	Technical eligibility
c6.3	*Regulatory additionality*	Passed	The project is not mandated by existing laws, regulations, or other binding obligations in Canada.	Baseline and Additionality Assessment UNDO Ontario 2024 Pre Assessment.pdf	Required to be passed	Technical eligibility
c7	**Facility has likely co-benefits and positive SDG impacts**	**Passed**			*Passed if required sub-criteria are met*	
c7.1	*Facility-specific co-benefits have been identified*	Assessed	Identified co-benefits include improved soil health, increased crop yield, and enhanced pest resistance, potential reduction reliance on costly chemical fertilizers. Additionally, equitable access to green jobs and training opportunities in local communities were also mentioned.	Puro Project Description UNDO Ontario 2024 Pre Assessment.pdf	Required to be assessed	Maturity & Quality
c7.2	*Facility-specific SDG targets or indicators have been identified*	Assessed	UNDO intends to demonstrate two Puro SDG Attributes, namely: *improved agricultural productivity using enhanced rock weathering* (contributing to SDG Target 2.4) and *increase in the buffer capacity of the ocean* (contributing to SDG Target 14.3). Monitoring details for these attributes have been drafted but remain to be finalized in the SDG Reporting documents.	Puro Project Description UNDO Ontario 2024 Pre Assessment.pdf; Audit Document Index - UNDO Ontario 2024 Pre Assessment; Annex E Yield via Crop Biomass and Plant Cation Uptake.docx	Required to be assessed	Maturity & Quality
c8	**Facility team has access to relevant knowledge and skills**	**Passed**			*Passed if required sub-criteria are met*	
c8.1	*Relating to weathering material sourcing, handling, processing*	Assessed	UNDO's team has several year experiences with enhanced rock weathering deployments, including geologists with experience in the mine industry.	UNDO_PURO Team Expertise Ontario 2024 Pre Assessment.pdf	Required to be assessed	Maturity & Quality
c8.2	*Relating to geochemical reactions occurring during weathering of materials and its modelling*	Assessed	The team has several experts with geochemical knowledge background and PhDs in relevant areas such as geochemistry, geology, mineralogy and field trial specialists.		Required to be assessed	Maturity & Quality
c8.3	*Relating to environmental monitoring and carbon accounting*	Assessed	UNDO's team includes experts in data management systems, as well as carbon accounting and software development.		Required to be assessed	Maturity & Quality