ENVIRONMENTAL DECLARATION

In accordance with EN 15804+A2 & ISO 14025

Street slab

RTS_458_26

Scope of the declaration

This environmental product declaration covers the environmental impacts of street slabs manufactured in Finland.
The environmental declaration has been prepared in accordance with standards EN15804:2012+A2:2019 and ISO 14025.
The RTS PCR method guide (Finnish version, 12.2.2024) has been used as additional guidance.
The environmental declaration describes the stages of the product's life cycle from cradle to gate with options.

xx.xx.2025

Rakennustieto RTS Building Information Foundation
Malminkatu 16 A
00100 Helsinki
https://www.rakennustieto.fi/

General information, purpose of the declaration and verification

1. **Owner of the declaration**
   Kivi ry,
   Paraatikatu 1, 15700 LAHTI
   Sini Laine, Executive Director
   +358 50 330 1630
   sini.laine@kivi.info

2. **Product name and number**
   Street slab manufactured in Finland.

3. **Data period**
   January 1, 2024–January 31, 2024

4. **Place of production and manufacturers**
   Place of production: Finland
   Manufacturers: Loimaan Kivi Oy, Tampereen Kovakivi Oy, Ylamaa Massive Granite Oy, Kymen Granite Oy, Polar Granit Oy, Iitin Graniitti Oy.

5. **EPD averaging**
   The EPD statement for street slabs is a production volume-weighted average of the manufacturing data reported by six different manufacturers.

6. **Further information**
   https://kivi.info/

7. **Product category rules and scope of the declaration**
   The EPD has been prepared in accordance with standards EN 15804+A2:2019 and ISO 14025. The RTS PCR method guide (Finnish version, 12.2.2024) has been used in the preparation.

   The scope of the EPD is from cradle to gate with options (A1-A4, A5 and C1-C4, D). The geographical representativeness is Finland.

   The manufacturer has sole ownership and responsibility for the EPD. EPDs belonging to the same product group but prepared with different programs are not necessarily comparable. EPDs for construction products are not necessarily comparable if they are not in accordance with EN 15804 and if they are not compared in a construction context.

8. **Author of the life cycle assessment and declaration**
   Olivia Kuronen and Sanni Mallat
   Sitowise Oy
   www.sitowise.com
   Date of study: August 5, 2025

9. **Verification**
   Independent, third-party verification of the environmental product declaration has been carried out in accordance with EN ISO 14025:2010, EN 15804+A2:2019, and RTS PCR standards. The impartial verifier is Valtteri Kainila, Ramboll. Date of verification: xx.xx.2025.

10. Date of issue and validity of the environmental declaration

xx.xx.2025 Valid: xx.xx.xx- xx.xx.xx

European standard EN 15804+A2:2019 serves as the core PCR
An independent verification body in accordance with the international standard EN ISO 14025:2010 is Internal ☑ External
Third-party verification has been carried out by: Valtteri Kainila Ramboll Finland Oy

Product information

11. Product descrption

This environmental declaration represents an average street paving stone slab made from Finnish natural stone in Finland.

12. Declared unit

1 ton of street slab.

13. Technical description of the product and its use

Street slabs are a covering material made from natural stone for paving streets, steps, flat slabs, and curbs. Surface treatment options are usually burnt, cross-cut, split, or polished.

14. Product standard

SFS-EN 1341:2013, Street slabs, Natural stone street slabs for outdoor use

15. Physical properties

Common widths for street slabs are 100–600 mm, with lengths of 200–1200 mm. Common thicknesses are 60, 80, and 100 mm.

16. Product raw materials

Main raw materials	Share	Usability			Origin
		Renewable	Non-renewable	Recycled	
Natural	100		X		Finland

17. Biogenic carbon

Biogenic carbon content of the product per unit declared, as reported at the factory gate.

Biogenic carbon contained in the product kg C	0
Biogenic carbon contained in the product packaging kg C	1.10 kg

18. List of REACH SVHC substances contained in the product according to the European Chemicals Agency (ECHA)

The product does not contain any SVHC substances listed in the REACH Regulation.

19. Environmental impacts per 1 kg of product

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2 e	2,68E-01	1,94E-02	4,01E-03	0,00E+00	6,08E-03	5,13E-05	1,56E-03	-7,06E-02
ADP-minerals & metals[4)]	kg Sbe	3,64E-07	5,40E-08	1,45E-10	0,00E+00	1,70E-08	1,49E-10	2,48E-09	-8,02E-08
ADP-fossil resources	MJ	3,94E+00	2,81E-01	6,94E-04	0,00E+00	8,83E-02	1,42E-03	3,83E-02	-1,02E+00
Water use[5)]	m^3 e depr.	2,91E-02	1,39E-03	7,40E-05	0,00E+00	4,36E-04	3,63E-05	1,11E-04	-1,08E-02
Biogenic carbon content in the	kg C	0,00E+00	NA	NA	NA	NA	NA	NA	NA
Biogenic carbon content in the	kg C	1,10E+00	NA	NA	NA	NA	NA	NA	NA
Use of secondary material	kg/kg	0,00E+00	NA	NA	NA	NA	NA	NA	NA

System boundary

The modules whose information is presented in this report are marked with a tick below. Mandatory items to be reported are marked in blue in the table. The report type is "from cradle to factory gate option".

Product phase			Construction phase		Use phase							End of life				Impacts outside the life cycle		
A	A	A	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
X	X	X	X	X	NR	NR	NR	NR	NR	NR	NR	X	X	X	X	X	X	X
Raw material supply	Transport	Manufacturing	Transport	Construction – installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction, demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

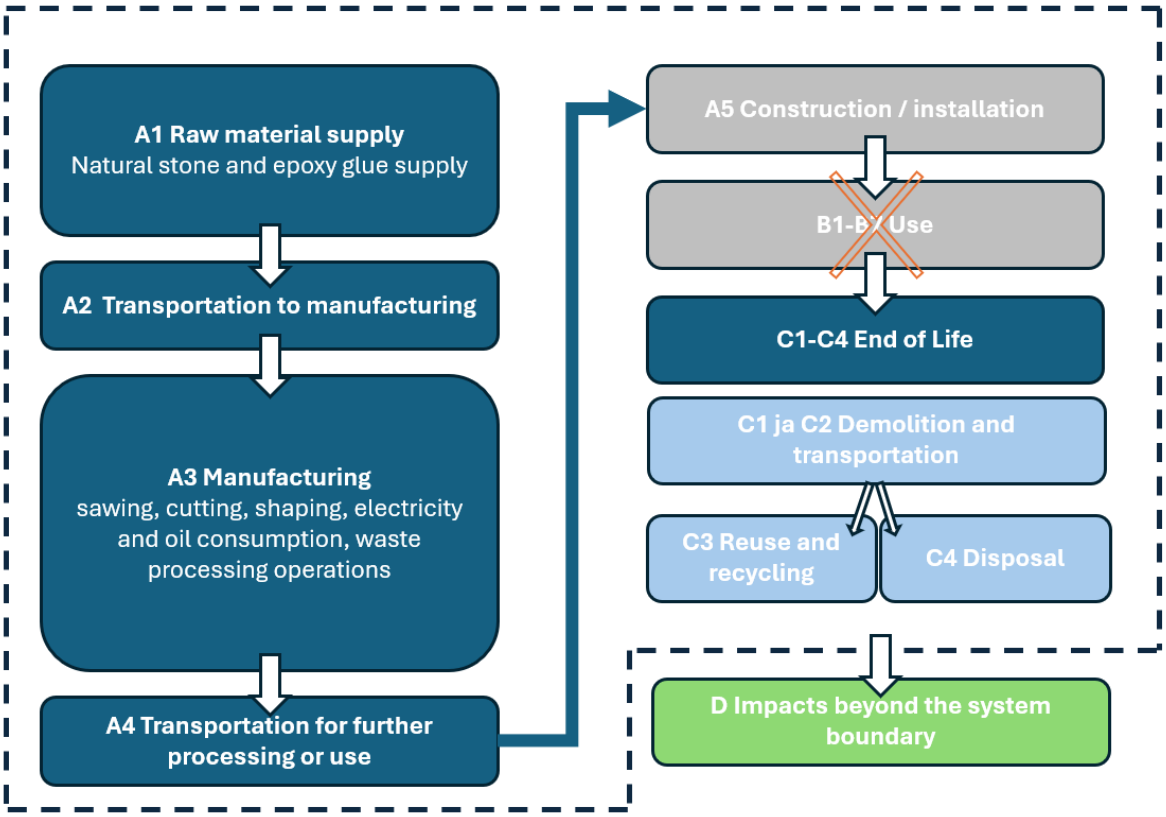
NR= not relevant

	Mandatory modules
	Mandatory in accordance with the rules and conditions in section 5.2 of the RTS EPD Methodology Guide
	Optional modules based on scenarios

20.Production process

The manufacturing process for paving stones begins with sawing the raw stone blocks into blanks and pre-treating the surface. The blanks are then cut into smaller pieces and the surface is finished. All stages consume electricity and generate waste stone.

The system boundaries of the process are presented below.



21.Cut off criteria

The study does not exclude any modules or processes that are mandatory based on the applied standards and the PCR. The study does not exclude hazardous materials or substances. The study takes into account all significant raw material and energy consumption. All inputs and outputs of unit processes for which data is available are included in the calculation, except for

- Steel strapping
- Plastic packaging
- Cardboard
- Liquefied petroleum gas
- Lubricating oil
- Oxygen

The amount of packaging materials listed was insignificant, but the most significant packaging materials, wood-based pallets and slats, were taken into account in the model. Only one operator reported using excluded production aids, and the amount was negligible, so the exclusion was not considered to have a significant impact on the results.

22.Allocation, estimates, and assumptions

Allocation is necessary if, for example, data on certain materials, energy, water, or waste cannot be measured separately for the product under investigation. In this study, allocation was used when the production data of different operators were averaged using a weighted average per reported unit.

Since some producers only manufacture street slabs and others also manufacture other building stone products, there is some difference in the allocation of source data from the annual level to the product level. For producers who only manufacture the products covered by this report, the tonnage-specific production data was compiled by dividing the annual consumption figures by the annual production volume. For producers who also manufacture other products, it was not possible to separate all flows by product, and

allocation had to be made between several products. In such cases, the flows were allocated between street slabs and other manufactured stone products using a coefficient created on the basis of product production volumes and sales prices. Due to this difference in allocation methods, there may be some variation in the flows of different producers.

If waste is generated in the processes and the waste has value and is sold on as side stone, the environmental impacts allocated to the side stone are taken into account in the processing of the source data.

The aggregate used as raw material is assumed to be aggregate in accordance with Kivi ry's aggregate EPD.

23.Averages and variation

The product consists of production data reported by six different producers, and the size and weight of the final product may vary. Raw materials per ton produced have been calculated using the weighted average principle.

24.LCA software and bibliography

This EPD was created using the One Click LCA EPD Generator software. The LCA and EPD were prepared in accordance with standards and ISO 14040/14044. The EPD Generator uses the Ecoinvent v3.10.1 database (allocation, Cut-off, EN 15804+A2) from 2024 as its source of environmental data.

Environmental impact data

The impacts are presented per declared unit, 1 ton of street slabs. The environmental impacts consist mainly of emissions from the energy used in the production phase. The results are presented in scientific form, example of data interpretation: 3.54E-2 = 3.54*10-2 = 0.0354.

The environmental impacts of the product vary between -56% and 40% compared to the average.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2 e	2,68E+02	1,94E+01	4,01E+00	0,00E+00	6,08E+00	5,13E-02	1,56E+00	-7,06E+01
GWP – fossil	kg CO_2 e	2,72E+02	1,94E+01	6,12E-02	0,00E+00	6,08E+00	6,17E-02	1,56E+00	-7,05E+01
GWP – biogenic	kg CO_2 e	-3,94E+00	0,00E+00	3,95E+00	0,00E+00	0,00E+00	-1,06E-02	0,00E+00	0,00E+00
GWP – LULUC	kg CO_2 e	1,00E-01	8,67E-03	2,15E-05	0,00E+00	2,72E-03	1,83E-04	8,92E-04	-2,51E-02
Ozone depletion pot.	kg CFC_{-11} e	3,89E-06	2,86E-07	7,82E-10	0,00E+00	8,98E-08	1,03E-09	4,52E-08	-9,74E-07
Acidification potential	mol H^+ e	1,47E+00	6,61E-02	4,48E-04	0,00E+00	2,07E-02	3,11E-04	1,11E-02	-3,80E-01
EP-freshwater[2)]	kg Pe	5,68E-02	1,51E-03	1,70E-05	0,00E+00	4,73E-04	5,29E-05	1,28E-04	-1,50E-02
EP-marine	kg Ne	5,58E-01	2,17E-02	2,19E-04	0,00E+00	6,81E-03	5,47E-05	4,22E-03	-1,43E-01
EP-terrestrial	mol Ne	6,08E+00	2,36E-01	2,14E-03	0,00E+00	7,41E-02	4,82E-04	4,61E-02	-1,55E+00
POCP ("smog")[3)]	kg NMVOCe	1,86E+00	9,74E-02	5,92E-04	0,00E+00	3,06E-02	1,63E-04	1,65E-02	-4,75E-01
ADP-minerals & metals[4)]	kg Sbe	3,64E-04	5,40E-05	1,45E-07	0,00E+00	1,70E-05	1,49E-07	2,48E-06	-8,02E-05
ADP-fossil resources	MJ	3,94E+03	2,81E+02	6,94E-01	0,00E+00	8,83E+01	1,42E+00	3,83E+01	-1,02E+03
Water use[5)]	m^3 e depr.	2,91E+01	1,39E+00	7,40E-02	0,00E+00	4,36E-01	3,63E-02	1,11E-01	-1,08E+01

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Particulate emissions	Incidence	3,12E-05	1,94E-06	6,68E-09	0,00E+00	6,09E-07	1,41E-09	2,52E-07	-7,96E-06
Ionizing radiation[6)]	kBq U235e	3,54E+01	2,45E-01	6,86E-04	0,00E+00	7,69E-02	3,84E-02	2,41E-02	-9,28E+00
Ecotoxicity (freshwater)	CTUe	4,31E+02	3,98E+01	2,88E-01	0,00E+00	1,25E+01	1,57E-01	3,21E+00	-1,06E+02
Human toxicity, cancer	CTUh	5,71E-08	3,20E-09	6,84E-11	0,00E+00	1,00E-09	2,27E-11	2,88E-10	-1,14E-08
Human toxicity, non-carcinogenic	CTUh	1,57E-06	1,82E-07	4,56E-09	0,00E+00	5,71E-08	1,06E-09	6,61E-09	-3,97E-07
SQP[7)]	-	2,54E+03	2,83E+02	4,78E-01	0,00E+00	8,89E+01	2,44E-01	7,54E+01	-4,05E+02

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator; 7) SQP = Land use related impacts/soil quality.

USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	2,66E+02	3,85E+00	-3,74E+01	0,00E+00	1,21E+00	3,22E-01	3,70E-01	-5,08E+01
Renew. PER as material	MJ	3,46E+01	0,00E+00	-3,46E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	3,01E+02	3,85E+00	-7,20E+01	0,00E+00	1,21E+00	3,22E-01	3,70E-01	-5,08E+01
Non-re. PER as energy	MJ	3,82E+03	2,81E+02	6,94E-01	0,00E+00	8,83E+01	1,42E+00	3,83E+01	-9,92E+02
Non-re. PER as material	MJ	2,28E+00	0,00E+00	-2,28E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-re. PER	MJ	3,83E+03	2,81E+02	-1,59E+00	0,00E+00	8,83E+01	1,42E+00	3,83E+01	-9,92E+02
Secondary materials	kg	1,76E+00	1,20E-01	8,78E-04	0,00E+00	3,76E-02	8,73E-04	9,63E-03	-3,67E-01
Renew. secondary fuels	MJ	5,49E+00	1,52E-03	3,79E-06	0,00E+00	4,77E-04	9,48E-07	1,99E-04	-4,08E-01
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	2,83E+00	4,16E-02	5,01E-04	0,00E+00	1,30E-02	1,16E-03	3,98E-02	-8,05E-01

END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	1,73E+01	4,76E-01	1,50E-02	0,00E+00	1,50E-01	3,83E-03	4,23E-02	-4,58E+00
Non-hazardous waste	kg	3,82E+02	8,82E+00	2,28E+00	0,00E+00	2,77E+00	2,61E-01	5,00E+02	-9,96E+01
Radioactive waste	kg	8,26E-03	5,99E-05	1,69E-07	0,00E+00	1,88E-05	9,87E-06	5,87E-06	-2,16E-03

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,50E+02
Materials for recycling	kg	4,87E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,50E+02	0,00E+00	-1,22E-01
Materials for energy rec	kg	2,84E+00	0,00E+00	2,21E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-7,09E-01
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Scenario documentation and technical information

25.Manufacturing energy scenario documentation

Parameter	Value
Origin of electricity	Electricity, medium voltage, residual mix (Reference product: electricity, high voltage), Ecoinvent
Electricity CO_2 -eq. /kWh	0.67 kgCO2/kWh
Fuel oil	Diesel, burned in building machine (Reference product: diesel, burned in building machine), Ecoinvent
Fuel oil kg CO_2 eq. /MJ	0.1 kg CO_2 e / MJ

26.Additional technical information, transport to the construction site

Parameter	Value	Data quality and source
Specific emissions from transport	0.11 kg CO_2 eq. /tkm	Transport, freight, lorry >32 metric tons, EURO5. Ecoinvent 3.10.
Average transport distance for A4	180 km	Average product transport distance

27.End of life process description

Process description	Unit	Value kg/ton
Demolition process for the product and the amount of construction waste generated, broken down as follows:	kg collected as sorted	500
	kg collected as mixed construction waste	500
The construction waste recovery process and the construction waste generated, broken down as follows:	kg components for reuse (same purpose)	250
	kg for material recycling	250
	kg energy recovery	0
Construction waste disposal process and amount of waste to be disposed of	kg of product or material for final disposal	500
Waste transportation	km	The estimated transportation distance is 113 kilometers.

28. Review of producer-specific results

To ensure the transparency required by the program operator, it is important to indicate when presenting average results if the total global warming potential (GWP total A1-A3) of an individual product differs by more than 10 percent from the GWP result of the average product. To meet this requirement and to ensure the reliability of the results, a comprehensive sensitivity analysis has been carried out in the work. For the sensitivity analysis, a separate version of the LCA model has been created for each producer in the One Click LCA software, in which the flows of the A1-A3 stages have been adjusted to correspond to the producer-specific values.

It should be noted that since the average output data has been calculated by weighting the production volumes reported by different producers, the output data reported by individual producers for their products and thus the GWP results may differ significantly from the average of the main model. An individual producer may also not utilize all the material or resource flows used in the manufacturing of the average product.

The following table presents the producer-specific GWP values of the participating producers in relation to the average value, as well as a brief explanation of the differences in the producer-specific models.

Producer:	GWP total (kg CO2e/ 1 t of stone)	Difference from average (%)	Reason for difference:
Average result	2,68E+02		
Loimaan Kivi Oy	2,95E+02	10 %	Most significant difference: more quarry stone is used in production.
Tampereen Kovakivi Oy	2,49E+02	-7 %	Most significant difference: less quarry stone is used in production, but more electricity and fuel.
Kymen Granite Oy	1,39E+02	-48 %	Most significant difference: less quarry stone, less electricity, and less fuel are used in production.
Ylamaa Massive Granite Oy	2,84E+02	6 %	Most significant difference: more electricity is used in production. Unlike other manufacturers, liquefied petroleum gas is used in production.
Polar Granit Oy	1,18E+02	-56 %	Most significant difference: less waste rock and less electricity are used in production. No fuels are used in production.
Iitin Graniitti Oy	3,74E+02	40 %	Most significant difference: more electricity and fuel are used in production. Wood is used in production.

29. References

Ecoinvent Database version 3.10.1 (allocation, Cut-off, EN 15804+A2), 2024.

EN 15804:2012+A2:2019 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.

ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations. Principles and procedures.

ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.

ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.

LCA background report for stone products 5.8.2025.