Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Witton Fell Masonry and Walling Stone

From

AD CALVERT STONE

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	EPD-IES-0024508
Publication date:	2025-06-19
Valid until:	2030-06-18

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): PCR 2019:14 Construction products, version 1.3.4. Together with EN 15804:2012+A2:2019/AC:2021
PCR review was conducted by: The Technical Committee of the International EPD® System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepcion, Chile. The review panel may be contacted via the Secretariat www.envirodec.com/contact
Life Cycle Assessment (LCA)
LCA accountability: *Dr Shashwat Ganguly, Looper Tech Ltd, Edinburgh, United Kingdom*
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: Stephen Forson, Viridis Pride Ltd, S.Forson@viridispride.com Approved by: The International EPD® System

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD:
A.D. Calvert Architectural Stone Ltd

Contact:
Allison Calvert, allison.calvert@calverts.co.uk

Description of the organisation:
Founded over 25 years ago, A D Calvert Architectural Stone Supplies is an independent, family-run quarry and masonry specialist based in the Yorkshire Dales. From the extraction of our proprietary, locally quarried and ethically sourced Witton Fell sandstone to precision CNC finishing and hand carving, every stage is carried out in-house, giving customers full traceability and a notably short, low-carbon supply chain. Our award-winning stone has been chosen for landmark conservation and new-build projects, including Knebworth House, the Lynn Building at Queen's University Belfast, McEwan's Hall in Edinburgh, Mitchell Library in Glasgow and St Philip's Church Litherland Liverpool, garnering multiple UK Natural Stone Awards. State-of-the-art CAD/CAM modelling, 3-D scanning and CNC technology sit alongside traditional craftsmanship to ensure dimensional accuracy, design flexibility and minimal material waste. We actively support Stone Federation Great Britain's sustainability initiatives and pursue continuous environmental improvement through responsible quarry management and resource efficiency. This EPD transparently reports the cradle-to-gate environmental impacts of our products, enabling architects, engineers and contractors to make informed, low- carbon material choices while preserving the UK's built heritage

Product-related or management system-related certifications:
Not applicable

Name and location of production site(s):

Quarry: Grey Yaud Quarry, Hammer Road, East Witton, HG4 4JF
Manufacturing site: The Stone Yard, Wensley Road, Leyburn DL8 5ED

Product information

Product name:
Witton Fell Masonry and Walling Stone

Product identification:
BS EN 771-6:2011 Natural Stone Masonry Units

Product description:
Witton Fell Masonry/Walling stone (split and pitch faced) products are versatile and reliable high-quality stone, expertly suited for intricate architectural elements such as sculptures, carvings and detailed mouldings. It is ideal for both interior and exterior applications including construction, masonry and restoration projects. Witton Fell has the ability to enhance a wide range of applications, from rustic homes to historic landmarks, bring lasting charm and distinctive character to each project. A technical lifespan of ≥ 100 years is assumed, consistent with UK masonry design guidance.

Table 1: *Product properties for Witton Fell Masonry/Walling products*

Physical state	**Solid**
Apparent density	2170 kg/m3
Compressive strength	63 MPa (mean)
Flexural strength: 3point	5.6 MPa
Porosity	17.4 %
Water absorption at Atmospheric Pressure	5.7%
Durability against freeze thaw	168 cycles without failure
Geological Type	Carboniferous Sandstone

UN CPC code:
151: Monumental or building stone

Geographical scope:
Quarry and factory – North Yorkshire, UK; electricity – Great Britain; transport – UK fleet averages

LCA information

Declared unit:
1 tonne (1000 kg) of finished masonry / walling stone, packaged and ready for despatch from the processing yard

Technical lifespan:
100+ years

Time representativeness:
2024

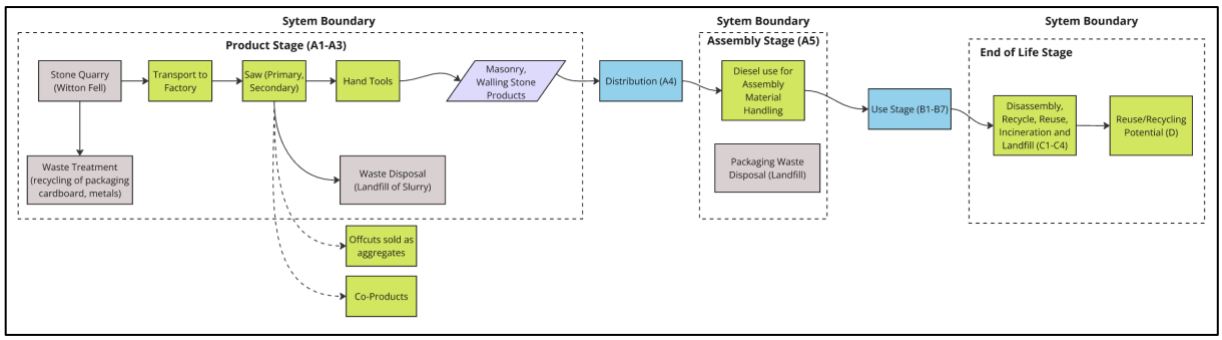
Database(s) and LCA software used:
Ecoinvent version 3.11 used with calculations based on spreadsheet

Description of system boundaries:
The EPD is of type (b) Cradle to gate with options, modules C1–C4, module D and with A5 declared as an optional module (A1–A3 + A5 + C + D), as per section 2.2.2 of PCR2019:14 Version 1.3.4.

System diagram:

A1: Raw Material Supply
Quarried at Witton Fell, the stones are characterised by their fine to medium grain, and boasts a buff hue interspersed with distinctive brown flecks and veins, offering versatility in its finish and a unique aesthetic that shifts from a light buff when dry to a deeper brown under wet conditions. The stones are extracted via a combination of explosives, drilling and excavation leading to some stone blocks directly sold on site and remaining stone blocks sent to a processing site to create various finished products. These are inspected for quality prior to transportation.

A2: Transportation
Transportation involves loading selected large stones onto purpose built, steel bodied tipping trailers for the short journey from the Witton Fell quarry to processing site at Leyburn. HGV articulated vehicles are used to maximise the payload of 25 tonne and minimise the number of road journeys required.



A3: Manufacturing
Stone processing involves cutting the boulders into rectangular blocks using diamond-tipped blades and the use of hand-tools for surface finishing. There is no diesel used for machinery operation, as all the requirement comes from electricity. The annual electricity used for all the production processes is sourced primarily from the grid but also from on-site solar panels.

A5: Assembly/Installation
The A5 stage involves the assembly of the stone products at construction site. It is assumed that this stage mainly corresponds to diesel used by diesel machine operation equivalent to a fraction of diesel used during the quarrying process (25% of diesel - 1.96L). All the impacts of packaging waste processing are also attributed to this module.

C1: Deconstruction and Demolition
The C1 stage involves the manual deconstruction and demolition of the stone products at the end of their useful life. It is assumed that the same amount of diesel is used for deconstruction / demolition, corresponding to material handling on-site via fork-trucks, as is assumed to be needed towards assembly / construction activities (A5).

C2: Transport
Once deconstructed, it is assumed that the stone products are transported an average of 50 km to a reuse or recycling facility, typically using large trucks (HGV, with about 25 tonnes loading capacity).

C3: Waste Processing
At the end of life, 80% of the stone products are expected to be reclaimed and reused in construction projects. While reclaimed stone requires no further processing, it is assumed that the aggregates are produced from stones using conventional stone crushing activity and a suitable background dataset from Ecoinvent is used to reflect this.

C4: Recycle - Disposal
For the 20% of stones not directly reused, landfilling is assumed.

D: Resource Recovery Stage

Because of the durability of Witton Fell Masonry and Walling stone products, 80% of the stones are assumed to be reclaimed at the end of their first use and reused in other construction projects. The remaining 20% are landfilled. This allows for credits due to the avoided extraction of new raw materials and processing towards stone products.

More information:
Name and contact information of LCA practitioner: Dr Shashwat Ganguly, Looper Tech Ltd, Edinburgh, United Kingdom.

Cut off criteria and allocation methods:
The allocation method applied in this study adheres to the guidelines of PCR 2019:14 Version 1.3.4 and EN 15804. The stone processing factory produces various products – Ashlar and Paving Stone, Masonry and Walling Stone, and all offcuts are processed and sold as aggregates. The environmental burdens associated with Witton Fell Masonry and Walling Stone product follow the cut-off approach as defined by the PCR.
For energy consumption, water consumption, consumables used, and emissions related to processing, physical allocation is applied based on the mass of actual usage per declared unit (1 tonne of Witton Fell Masonry and Walling Stone), as required by PCR 2019:14 Version 1.3.4.

The electricity is sourced from a mix of the UK national mix and on-site solar panels. The dataset for UK national grid used was from Ecoinvent version 3.11: “market for electricity, medium voltage; GB” with an emission factor of 0.251 kgCO2/kWh (GWP-GHG). The dataset for electricity generation from solar photovoltaic was from Ecoinvent version 3.11: “electricity production, photovoltaic, 570kWp open ground installation, multi-Si” with an emission factor of 0.251 kgCO2/kWh (GWP-GHG). According to the dataset, the shares of electricity technologies on this market have been calculated based on statistics from Ecoinvent electricity modelling statistics as per PCR 2019:14 Version 1.3.4. These are detailed in Table 1.

Table 1: *Electricity Grid mix for the Ecoinvent data point used in the study from Ecoinvent electricity modelling statistics*

Energy Source in the mix	Percentage (%)
Coal	3.03
Natural gas	37.77
Nuclear	7.32
Hydro	0.31
Wind, solar, etc.	5.71
Biofuels and waste	10.06
Oil	35.80

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	GLO	UK	-	UK	-	-	-	-	-	-	-	UK	GLO	GLO	GLO	GLO
Specific data used	<40%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Content information

Product components	Weight (kg)	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Natural Stone	1000	0%	0%
TOTAL	**1000**	0%	**0%**
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
Wood	0.9	0.09	0.44
Plastic (Polyethylene)	0.67	0.067	0.00
TOTAL	**1.57**	**0.157**	**0.44**

Dangerous substances from the candidate list of SVHC for Authorisation

No substances included in the Candidate List of Substances of Very High Concern for authorisation are present in the products above the threshold for registration with the European Chemicals Agency (more than 0.1% of the weight of the product).

Results of the environmental performance indicators

Note: The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

Mandatory impact category indicators according to EN 15804 (with EF 3.1 reference package)

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	3.71E+01	3.97E+00	3.97E+00	9.33E+00	2.23E+01	5.79E-04	-5.94E+02
GWP-biogenic**	kg CO_2 eq.	-2.79E-01	3.19E-01	7.49E-04	6.05E-03	4.20E-03	8.77E-08	-2.74E+00
GWP-luluc	kg CO_2 eq.	3.98E-02	4.03E-04	4.03E-04	3.15E-03	2.26E-03	6.76E-08	-1.03E+00
GWP-total	kg CO_2 eq.	3.69E+01	4.29E+00	3.97E+00	9.34E+00	2.23E+01	5.79E-04	-5.98E+02
ODP	kg CFC 11 eq.	1.05E-06	5.84E-08	5.83E-08	2.03E-07	3.27E-07	8.14E-12	-4.94E-06
AP	mol H^+ eq.	3.08E-01	1.74E-02	1.73E-02	2.00E-02	9.72E-02	5.05E-06	-3.44E+00
EP-freshwater	kg P eq.	2.30E-02	1.27E-04	1.26E-04	6.47E-04	7.10E-04	2.88E-08	-2.25E-01
EP-marine	kg N eq.	5.49E-02	7.61E-03	7.59E-03	4.83E-03	4.26E-02	2.28E-06	-9.99E-01
EP-terrestrial	mol N eq.	6.08E-01	8.34E-02	8.32E-02	5.21E-02	4.67E-01	2.49E-05	-1.05E+01
POCP	kg NMVOC eq.	2.20E-01	2.73E-02	2.72E-02	3.18E-02	1.53E-01	7.58E-06	-3.13E+00
ADP-minerals&metals*	kg Sb eq.	6.21E-03	1.42E-06	1.41E-06	3.27E-05	7.94E-06	2.14E-10	-5.62E-04
ADP-fossil*	MJ	6.00E+02	5.12E+01	5.12E+01	1.33E+02	2.87E+02	7.38E-03	-7.94E+03
WDP*	m^3	1.03E+01	1.32E-01	1.32E-01	7.04E-01	7.40E-01	1.99E-05	-1.63E+02
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption							

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*
*** Disclaimer: The results of modules A1-A3 (A1-A5 for services) is advised to be used with consideration of the results of module C.*

Additional mandatory and voluntary impact category indicators (with EF 3.1 reference package)

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]*	kg CO_2 eq.	3.71E+01	3.97E+00	3.97E+00	9.33E+00	2.23E+01	5.79E-04	-5.94E+02

Resource use indicators (with EF 3.1 reference package)

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	1.35E+02	3.22E-01	3.21E-01	2.19E+00	1.80E+00	6.53E-05	-8.41E+02
PERM	MJ	6.34E+00	-6.34E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.42E+02	3.22E-01	3.21E-01	2.19E+00	1.80E+00	6.53E-05	-8.41E+02
PENRE	MJ	5.77E+02	5.12E+01	5.12E+01	1.33E+02	2.87E+02	7.38E-03	-7.94E+03
PENRM	MJ	2.38E+01	-2.38E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	6.00E+02	5.12E+01	5.12E+01	1.33E+02	2.87E+02	7.38E-03	-7.94E+03
SM	kg	1.30E-02	5.56E-05	5.55E-05	7.89E-04	3.12E-04	8.11E-09	-6.78E-03
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	3.16E-01	2.12E-02	2.12E-02	6.01E-02	1.19E-01	2.97E-06	-1.42E+00
FW	m^3	2.49E-01	3.28E-03	3.28E-03	1.62E-02	1.84E-02	4.91E-07	-3.82E+00
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water							

[1] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

*Disclaimer: The results of modules A1-A3 (A1-A5 for services) is advised to be used with consideration of the results of module C.

Waste indicators (with EF 3.1 reference package)

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	1.03E+02	8.38E-01	8.36E-01	4.13E+00	4.69E+00	1.70E-04	-1.10E+03
Non-hazardous waste disposed	kg	3.43E+00	5.75E-02	5.74E-02	1.93E-01	3.22E-01	2.00E+02	-4.55E+01
Radioactive waste disposed	kg	1.06E+02	5.36E-06	5.35E-06	4.32E+00	3.00E-05	1.81E-04	-1.60E-02

Output flow indicators (with EF 3.1 reference package)

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.00E+02	0.00E+00	0.00E+00
Material for recycling	kg	2.17E-01	2.28E-04	2.28E-04	1.61E-03	1.28E-03	3.72E-08	-4.14E-01
Materials for energy recovery	kg	0.00E+00	7.28E-07	7.28E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	0.00E+00	2.42E-03	2.42E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	1.14E-03	1.13E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Additional environmental information

Typical Usage:
Witton Fell Masonry/Walling stone (split and pitch faced) products are versatile and reliable high-quality stone, expertly suited for intricate architectural elements such as sculptures, carvings and detailed mouldings. It is ideal for both interior and exterior applications including construction, masonry and restoration projects. Witton Fell has the ability to enhance a wide range of applications, from rustic homes to historic landmarks, bring lasting charm and distinctive character to each project.

References

General Programme Instructions of the International EPD® System. Version 4.0.

PCR 2019:14, Product Category Rules for Construction Products, Version 1.3.4

EN ISO 9001, Quality Management Systems - Requirements

EN ISO 14001, Environmental Management Systems - Requirements

ISO 45001, Occupational Health & Safety Management System - Requirements

ISO 14020:2000, Environmental Labels and Declarations - General principles

EN 15804:2012+A2:2019/AC:2021, Sustainability in construction works - Environmental Product Declarations - Core rules for the product category of construction products, 2014

ISO 14025:2006 Environmental labels and declarations - Type Ill environmental declarations - Principles and procedures

ISO 14040:2006, Environmental management - Life cycle assessment - Principles and framework

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

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