Statement of Verification

BREG EN EPD No.: 000676 Issue 01

This is to verify that the

Environmental Product Declaration

provided by:

Holcim UK Limited

BRE Global Verified EPD

is in accordance with the requirements of:

EN 15804:2012+A2:2019

and

BRE Global Scheme Document SD207

This declaration is for:

1 tonne of limestone aggregates

Company Address

Holcim UK Limited,
Bardon Hill,
Leicestershire,
England,
LE67 1TL

HOLCIM

Signed for BRE Global Ltd	Emma Baker Scheme Operator	10 April 2025 Date of this Issue
10 April 2025 Date of First Issue		09 April 2030 Expiry Date

BRE Global Verified EPD

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ECO PLATFORM EPD VERIFIED

Environmental Product Declaration

EPD Number: 000676

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE 2023 Product Category Rules (PN 514 Rev 3.1) for Type III environmental product declaration of construction products to EN 15804:2012 + A2:2019.
Commissioner of LCA study	**LCA consultant/Tool**
Holcim UK Limited, Bardon Hill, Leicestershire, England, LE67 1TL	LCA consultant: Chi Zhang/ Bala Subramanian Tool: BRE LINA A2
Declared/Functional Unit	**Applicability/Coverage**
1 tonne of limestone aggregates	Product Specific.
EPD Type	**Background database**
Cradle to Gate with Modules C and D	Ecoinvent 3.8

Demonstration of Verification
CEN standard EN 15804 serves as the core PCR [a]
Independent verification of the declaration and data according to EN ISO 14025:2010 ☐Internal ☒ External
(Where appropriate [b])Third party verifier: Flavie Lowers
a: Product category rules b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)

Comparability
Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A2:2019. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See Clause 5.3 of EN 15804:2012+A2:2019 for further guidance

Information modules covered

Product			Construction		Use stage							End-of-life					Benefits and loads beyond the system boundary
					Related to the building fabric					Related to the building							
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		D
Raw materials supply	Transport	Manufacturing	Transport to site	Construction – Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal		Reuse, Recovery and/or Recycling potential
☑	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☑	☑	☑		☑

Note: Ticks indicate the Information Modules declared.

Manufacturing site(s)

The Torr Works Quarry, located just 500 meters from the factory

Torr Works
East Cranmore,
Shepton Mallett,
Somerset,
BA4 4RA

Construction Product:

Product Description

Limestone aggregates are produced from a naturally occurring sedimentary rock body by blasting, crushing and screening to produce different size aggregates from 225mm gabion stone to -2mm crushed rock fines. They can be used in bound applications such as concrete production, asphalt pavements, precast concrete products, as well as unbound applications such as road base & sub-base layers, railway ballast, and drainage systems. The LCA analysis assesses the extraction and processing of raw limestone into limestone aggregates. This EPD covers 1 tonne of limestone aggregate from Torr Works Quarry, including all stages of the processes required to obtain the aggregates.

Technical Information

There are different types of limestone aggregates produced from the quarry, but all are covered by the results for 1 tonne of limestone aggregates. The test results listed below correspond to typical aggregates, including coarse, fine, and washed aggregates. For further details, please contact the Aggregate Industries technical team.

Coarse Aggregate:

Property	Test Standard	Results
Apparent Relative Density	BS EN 1097-6	2.71 Mg/m^3
S.S.D. Relative Density	BS EN 1097-6	2.67 Mg/m^3
Oven Dry Relative Density	BS EN 1097-6	2.65 Mg/m^3
Water Absorption (%)	BS EN 1097-6	0.80%
Aggregate Abrasion Value	BS EN 1097-8	7.1

Property	Test Standard	Results
Water Soluble Chloride salt Content	BS EN 1744-1	0.002%
Water Soluble Sulfate Content SO4	BS EN 1744-1	<0.01%
Acid Soluble Sulfate Content SO3	BS EN 1744-1	0.50%
Total Sulphur Content	BS EN 1744-1	0.10%
Total Potential Sulfate Content	BS EN 1744-1	0.29%
pH Value	BS 1377: 1990	8.7
Calcium Carbonate Content	BS EN 196-2:2013	68.59%
Micro Deval Coefficient	BS EN 1097-1	15
Los Angeles Coefficient	BS EN 1097-2	19
Drying Shrinkage	BS EN 1367-4	0.022%
Petrographical Examination	BS812 - 104	YES
Alkaline Silica Reaction - ASR	BS812 - 104	Normal
Magnesium Sulphate Soundness Value	BS EN 1367-2	11
Oxidisable Sulfides Content SO4	BS EN 1744-1	0.23%
Loss on Ignition	BS EN 1744-1	39.2%
Resistance to Thermal Shock	BS EN 1367-5	1.8
Affinity to Bituminous Binders	prEN 12697-11:2000	80%
Polished Stone Value	BS EN 1097-8	41
OMC	BS EN 13286-4	3.5%
Max Dry Density	BS EN 13286-4	2.14 Mg/m3
Plastic Limit	BS 1377 - 2	Non Plastic
Frost Heave	BS 812 -124	4.8mm

Fine Aggregate:

Property	Test Standard	Results
Apparent Relative Density	BS EN 1097-6	2.66 Mg/m^3
S.S.D. Relative Density	BS EN 1097-6	2.65 Mg/m^3
Oven Dry Relative Density	BS EN 1097-6	2.65 Mg/m^3
Water Absorption (%)	BS EN 1097-6	0.20%
Water Soluble Chloride salt Content	BS EN 1744-1	<0.001%
Water Soluble Sulfate Content SO4	BS EN 1744-1	<0.01%
Acid Soluble Sulfate Content SO3	BS EN 1744-1	0.10%
Total Sulphur Content	BS EN 1744-1	0.20%
Total Potential Sulfate Content	BS EN 1744-1	0.47%
pH Value	BS 1377: 1990	8.6
Calcium Carbonate Content	BS EN 196-2:2013	78.66%
Carbon Dioxide Content	BS EN 196-2:2013	34.61%

Property	Test Standard	Results
Drying Shrinkage	BS EN 1367-4	0.030%
Petrographical Examination	BS812 - 104	YES
Alkaline Silica Reaction - ASR	BS812 - 104	Normal
Methylene Blue (MB) Value	BS EN 933-9	1.7g/kg
Sand Equivalent (SE) Value	BS EN 933-8	32
Oxidisable Sulfides Content SO4	BS EN 1744-1	0.40%
Neutralizing Value	BS 6463-102	45.40%
Loss on Ignition	BS EN 1744-1	36.30%
Mass of lightweight contaminators	BS EN 1744-1	<0.1%
Humus Content	BS EN 1744-1	Negative
Relative Strength of aggregate mortar	BS EN 1744-1	103%
Change in stiffening time	BS EN 1744-1	15min

Washed Sand:

Property	Test Standard	Results
Apparent Relative Density	BS EN 1097-6	2.64 Mg/m^3
S.S.D. Relative Density	BS EN 1097-6	2.63 Mg/m^3
Oven Dry Relative Density	BS EN 1097-6	2.63 Mg/m^3
Water Absorption (%)	BS EN 1097-6	0.20%
Water Soluble Chloride salt Content	BS EN 1744-1	<0.001%
Water Soluble Sulfate Content SO4	BS EN 1744-1	<0.01%
Acid Soluble Sulfate Content SO3	BS EN 1744-1	0.04%
Total Sulphur Content	BS EN 1744-1	0.30%
Total Potential Sulfate Content	BS EN 1744-1	0.85%
pH Value	BS 1377-3: 2018	8.6
Calcium Carbonate Content	BS EN 196-2: 2013	71.41%
Carbon Dioxide Content	BS EN 196-2: 2013	31.42%
Drying Shrinkage	BS EN 1367-4	0.031%
Petrographical Examination	BS812 - 104	YES
Alkaline Silica Reaction - ASR	BS812 - 104	Normal
Methylene Blue (MB) Value	BS EN 933-9	0.7g/kg
Sand Equivalent (SE) Value	BS EN 933-8	74
Oxidisable Sulfides Content SO4	BS EN 1744-1	0.43%
Neutralizing Value	BS 6463-102	48.40%
Loss on Ignition	BS EN 1744-1	35.4%
Mass of lightweight contaminators	BS EN 1744-1	<0.1%
Humus Content	BS EN 1744-1	Negative

Property	Test Standard	Results
Relative Strength of aggregate mortar	BS EN 1744-1	101%
Change in stiffening time	BS EN 1744-1	15 Min

Material Input	%
Limestone	100%

Manufacturing Process

The current EPD covers the following operations of Limestone aggregates at the Torr Works Quarry:

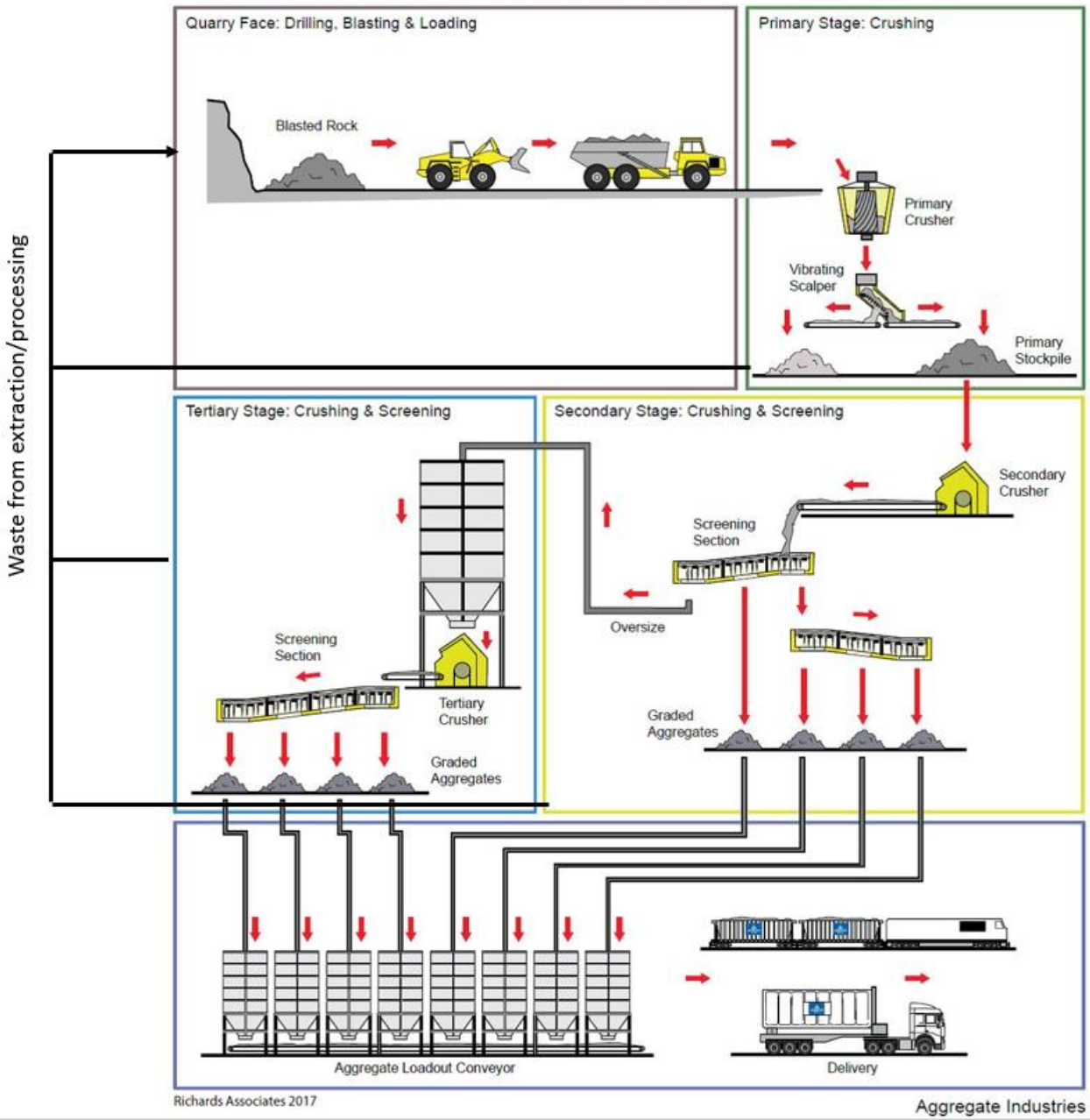
1. Quarrying and Primary Crushing - The sedimentary rock mass is drilled and then explosives are used to release several thousand tonnes of rock at a time. This rock which ranges in size from 2.5 meters to 0.5mm is loaded in to dump trucks and transported to a primary crusher to reduce larger pieces to 300 mm. The crushed material is subsequently stored in a primary stockpile.

2. Secondary Crushing and Screening
   The material from the primary stockpile is fed into the secondary crusher for further size reduction. It then passes through a screening section to separate different size fractions, with oversized material being sent back for additional crushing.

3. Tertiary Crushing and Final Screening
   In the tertiary stage, the material undergoes final crushing in the tertiary crusher. It is then screened again to produce graded aggregates of various sizes. This additional screening step for smaller aggregates requires slightly more energy consumption.

4. Storage and Delivery
The graded aggregates are transported via loadout conveyors to storage bins. The finished products are then loaded onto trucks and trains for delivery to customers. This process ensures high-quality, consistent aggregates suitable for various construction applications.

Process flow diagram



End of Life

Limestone aggregate is used in bound and unbound applications. In this scenario, it's assumed as the limestone aggregate is used in the bound applications such as concrete products which is sent to the waste processing facility after the demolition.

Life Cycle Assessment Calculation Rules

Declared / Functional unit description

1 tonne of Limestone aggregate

System boundary

This is a cradle-to-gate with module C and D, LCA study that follows the modular design defined in EN15804:2012 + A2:2109, and the Life Cycle Assessment study has been performed in accordance with the requirements of BRE 2023 Product Category Rules (PN 514 Rev 3.1).

Data sources, quality and allocation

Specific primary data derived from Aggregate Industries' production process in Torr Works, have been modelled using the LINA A2 LCA and the ecoinvent 3.8 database. In accordance with the requirements of EN15804:2012 + A2:2019, the most current available data has been used. The manufacturer-specific data from Aggregate industries covers a period of one year (01/01/2022 – 31/12/2022). Secondary data has been obtained for all other upstream and downstream processes that are beyond the control of the manufacturer (i.e., raw material production) from the ecoinvent 3.8 database. All ecoinvent datasets are complete within the context used and conform to the system boundary and the criteria for the exclusion of inputs and outputs, according to the requirements specified in EN15804:2012+A2:2019. Aggregate industries' limestone aggregate is the only product manufactured at the Torr Works. Site-wide values for energy, water, and wastewater have been taken from bills. Allocation of energy, water, and waste has been done according to the provisions of the BRE PCR PN514 and EN 15804:2012 + A2:2019.

Quality Level Geographical - Specific UK datasets have been selected from the ecoinvent LCI for this LCA. The quality of the geographical representativeness is therefore Very good.

Technical Representativeness - Data from processes and products are under study. Same state of technology applied as defined in goal and scope (i.e. identical technology). Technical representativeness is therefore good.

Time Representativeness - There are less than 5 years between the ecoinvent LCI reference year and the time period for which LCA was undertaken. The quality level of time representativeness is Good as the background LCI datasets are based on the ecoinvent LCI reference year and the time period for which the LCA was undertaken.

It is important to note that the LCA analysis uses electricity data from the GB National Grid, a detail that is integral to the system boundary of this assessment. This inclusion ensures that the environmental impacts associated with the use of electricity are accurately represented throughout the life cycle stages. According to Ecoinvent 3.8, the emissions factor for electricity generated from the UK grid (2022) is 0.239 kgCO2eq./kWh.

Cut-off criteria

This study includes the quarrying and manufacturing of Limestone aggregates which includes A1-A3, and the end-of-life scenarios of this product (module C and D) but excludes emission to air, water, and soil and no packaging included in the LCA analysis. In the production process of Limestone aggregates, ancillary materials such as conveyor belts, screens, explosives, and maintenance materials for lorries may be required. In the LCA analysis, the explosive used during quarrying activities are included. However, the quantities of other potential ancillary materials have been excluded from the LCA analysis. During the quarrying and production process, any Limestone wastages (overburden) are put back into quarry. It is hard to measure the quantity of overburden put back to the quarry site, however in the LCA analysis it is typically assumed as 1% of the output has been considered in the analysis.

LCA Results

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts									
			GWP-total	GWP-fossil	GWP-biogenic	GWP-luluc	ODP	AP	EP-freshwater
			kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CFC11 eq	mol H^+ eq	kg $(PO_4)^{3-}$ eq
Product stage	Raw material supply	A1	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	A2	1.02E-01	1.02E-01	8.68E-05	4.00E-05	2.36E-08	4.13E-04	6.56E-06
	Manufacturing	A3	4.27E+0	4.26E+0	1.13E-02	1.49E-03	7.59E-07	3.49E-02	2.96E-04
	Total (of product stage)	A1-3	4.38E+0	4.36E+0	1.14E-02	1.53E-03	7.83E-07	3.53E-02	3.03E-04
End of life	Deconstruction, demolition	C1	0.00E+0	0.00E+0	0.00E+0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	8.32E+00	8.31E+00	7.08E-03	3.26E-03	1.92E-06	3.37E-02	5.35E-04
	Waste processing	C3	3.82E+00	3.82E+00	1.35E-03	3.81E-04	8.16E-07	3.97E-02	1.18E-04
	Disposal	C4	2.64E-01	2.63E-01	2.61E-04	2.49E-04	1.07E-07	2.48E-03	2.41E-05
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-8.00E+00	-7.88E+00	-1.02E-01	-1.11E-02	-6.36E-07	-5.07E-02	-4.29E-03

GWP-total = Global warming potential, total;
GWP-fossil = Global warming potential, fossil;
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; and
EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts									
			EP-marine	EP-terrestrial	POCP	ADP-mineral& metals	ADP-fossil	WDP	PM
			kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ, net calorific value	m^3 world eq deprived	disease incidence
Product stage	Raw material supply	A1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	A2	1.24E-04	1.36E-03	4.16E-04	3.54E-07	1.54E+00	6.93E-03	8.79E-09
	Manufacturing	A3	1.44E-02	1.62E-01	4.31E-02	1.31E-05	7.19E+01	4.80E-01	8.47E-07
	Total (of product stage)	A1-3	1.46E-02	1.64E-01	4.35E-02	1.34E-05	7.35E+01	4.87E-01	8.56E-07
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	1.02E-02	1.11E-01	3.40E-02	2.89E-05	1.26E+02	5.65E-01	7.17E-07
	Waste processing	C3	1.76E-02	1.92E-01	5.29E-02	1.96E-06	5.24E+01	1.21E-01	8.13E-06
	Disposal	C4	8.61E-04	9.42E-03	2.74E-03	6.01E-07	7.35E+00	3.37E-01	4.99E-08
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.17E-02	-1.41E-01	-3.63E-02	-7.45E-05	-1.16E+02	-1.52E+01	-6.41E-07

EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment;
EP-terrestrial = Eutrophication potential, accumulated exceedance;
POCP = Formation potential of tropospheric ozone;
ADP-mineral&metals = Abiotic depletion potential for non-fossil resources;
ADP-fossil = Depletion potential of the stratospheric ozone layer;
WDP = Water (user) deprivation potential, deprivation-weighted water consumption; and
PM = Particulate matter.

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts							
			IRP	ETP-fw	HTP-c	HTP-nc	SQP
			kBq U^{235} eq	CTUe	CTUh	CTUh	dimensionless
Product stage	Raw material supply	A1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	A2	7.91E-03	1.20E+00	3.89E-11	1.26E-09	1.06E+00
	Manufacturing	A3	1.04E+00	3.98E+01	1.46E-09	2.87E-08	2.16E+01
	Total (of product stage)	A1-3	1.05E+00	4.10E+01	1.50E-09	2.99E-08	2.27E+01
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	6.46E-01	9.81E+01	3.18E-09	1.03E-07	8.63E+01
	Waste processing	C3	2.36E-01	3.06E+01	1.19E-09	2.22E-08	6.67E+00
	Disposal	C4	3.27E-02	4.64E+00	1.18E-10	3.05E-09	1.54E+01
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.80E+00	-1.34E+02	-7.81E-09	-1.41E-07	-1.07E+02

IRP = Potential human exposure efficiency relative to U235;
ETP-fw = Potential comparative toxic unit for ecosystems;
HTP-c = Potential comparative toxic unit for humans;
HTP-nc = Potential comparative toxic unit for humans; and
SQP = Potential soil quality index.

LCA Results (continued)

Parameters describing resource use, primary energy								
			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	A2	2.17E-02	0.00E+00	2.17E-02	1.51E+00	0.00E+00	1.51E+00
	Manufacturing	A3	6.51E+00	3.61E-03	6.52E+00	7.90E+01	2.10E-01	7.92E+01
	Total (of product stage)	A1-3	6.53E+00	3.61E-03	6.54E+00	8.05E+01	2.10E-01	8.07E+01
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	1.77E+00	0.00E+00	1.77E+00	1.23E+02	0.00E+00	1.23E+02
	Waste processing	C3	2.93E-01	0.00E+00	2.93E-01	5.14E+01	0.00E+00	5.14E+01
	Disposal	C4	6.27E-02	0.00E+00	6.27E-02	7.22E+00	0.00E+00	7.22E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.09E+01	0.00E+00	-1.09E+01	-1.16E+02	0.00E+00	-1.16E+02

PERE = Use of renewable primary energy excluding renewable primary energy 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 resource

LCA Results (continued)

Parameters describing resource use, secondary materials and fuels, use of water						
			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m^3
Product stage	Raw material supply	A1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	1.72E-04
	Manufacturing	A3	1.80E-02	2.21E-05	0.00E+00	1.56E-02
	Total (of product stage)	A1-3	1.80E-02	2.21E-05	0.00E+00	1.58E-02
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	1.40E-02
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	2.99E-03
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	7.88E-03
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	-3.58E-01

SM = Use of secondary material;
RSF = Use of renewable secondary fuels;
NRSF = Use of non-renewable secondary fuels;
FW = Net use of fresh water

LCA Results (continued)

Other environmental information describing waste categories					
			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	0.00E+00	0.00E+00	0.00E+00
	Transport	A2	1.70E-03	3.01E-02	1.04E-05
	Manufacturing	A3	9.94E-02	1.12E+01	5.12E-04
	Total (of product stage)	A1-3	1.01E-01	1.13E+01	5.22E-04
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	1.39E-01	2.46E+00	8.50E-04
	Waste processing	C3	6.87E-02	4.83E-01	3.62E-04
	Disposal	C4	7.65E-03	1.08E-01	4.82E-05
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-6.68E-01	-2.03E+01	-5.93E-04

HWD = Hazardous waste disposed;
NHWD = Non-hazardous waste disposed;
RWD = Radioactive waste disposed

LCA Results (continued)

	Other environmental information describing output flows – at end of life								
			CRU	MFR	MER	EEE	EET	Biogenic carbon (product)	Biogenic carbon (packaging)
			kg	kg	kg	MJ per energy carrier	MJ per energy carrier	kg C	kg C
Product stage	Raw material supply	A1	0.00E+00	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+00
	Transport	A2	0.00E+00	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+00
	Manufacturing	A3	0.00E+00	3.84E-04	1.64E-07	4.03E-03	1.36E-02	0.00E+0	0.00E+00
	Total (of product stage)	A1-3	0.00E+00	3.84E-04	1.64E-07	4.03E-03	1.36E-02	0.00E+00	0.00E+00
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+00
	Waste processing	C3	0.00E+00	6.84E-05	1.09E-06	0.00E+0	0.00E+0	0.00E+0	0.00E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+00

CRU = Components for reuse;
MFR = Materials for recycling

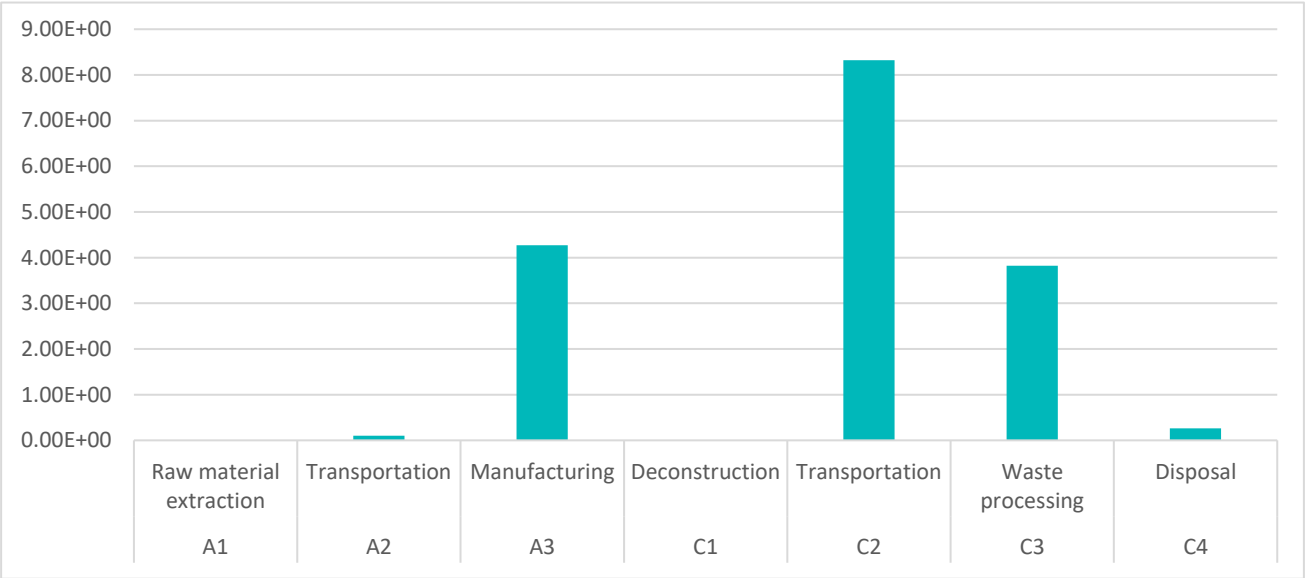
MER = Materials for energy recovery;
EE = Exported Energy

Scenarios and additional technical information

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
C1 - Deconstruction	Limestone aggregate is used in bound and unbound applications. In this scenario, it's assumed as the Limestone aggregate is used in the bound applications such as concrete products which is sent to the waste processing facility after the demolition. Based on the actual practice, the energy required for this process is negligible compared to the energy for demolishing the entire building. Therefore, no data is included for this module.		
C2 – End of life transport	A distance of 50 km by road has been modelled for Module C2, reflecting a typical industry practice for transporting materials from the demolition site to the factory. End-users of this EPD can use this information to calculate the impacts of a custom transport distance for Module C2 if it required.	km	50
C3 – Waste Processing	At the waste processing facility, the waste concrete in which the Limestone aggregates are embedded, will be crushed and used as the secondary material in the new system. According to the BRE 2023 Product Category Rules (PN 514 Rev3.1), at the end of life, 95% of aggregates are typically recycled.	Kg	950
C4 - Disposal	According to the BRE 2023 Product Category Rules (PN 514 Rev3.1), at the end of life, 5% of aggregates are typically landfilled	Kg	50
Module D	In accordance with the BRE 2023 Product Category Rules (PN 514 Rev3.1). This module demonstrates that 95% of the aggregate can be recycled for future production. Based on a unit of 1000 kg in this EPD, this equates to 950 kg of recyclable aggregate.		

Interpretation of results

The bulk of the environmental impacts are attributed to the extraction/processing and waste treatment of granite aggregates, covered by information modules A1-A3 and C1-C4 of EN15804:2012+A2:2019. According to the percentage analysis of GWP, the module A3, the highest–emission stage in the aggregate production process at Torr Works Quarry and Module C2 (transportation of waste aggregates to the waste processing facility) have the highest impacts at the end-of-life stage and the Module C3 (Recycling) have significant contribution in the CO2 emissions.



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BS EN 1097-6 –Tests for mechanical and physical properties of aggregates - Determination of particle density and water absorption

BS EN 1097-8 - Tests for mechanical and physical properties of aggregates - Determination of the polished stone value

BS EN 1744-1 - Tests for chemical properties of aggregates - Chemical analysis

BS EN 1097-1– Tests for mechanical and physical properties of aggregates - Determination of the resistance to wear (micro-Deval)

BS EN 1097-2 -Tests for mechanical and physical properties of aggregates - Methods for the determination of resistance to fragmentation

BS EN 1367-4 Tests for thermal and weathering properties of aggregates. Determination of drying shrinkage

BS EN 932-3 Tests for general properties of aggregates - Procedure and terminology for simplified petrographic description

ASTM Standard C1260-14 Standard test method for potential alkali reactivity of aggregates (mortar-bar method)

BS EN 1367-2 Tests for thermal and weathering properties of aggregates - Magnesium sulfate test

BS EN 1367-5 Tests for thermal and weathering properties of aggregates - Determination of resistance to thermal shock

BS EN 12697-11 Bituminous mixtures. Test methods - Determination of the affinity between aggregate and bitumen

BS 812-111 - Testing aggregates - Methods for determination of ten per cent fines value (TFV)

BS EN 933-9 - Tests for geometrical properties of aggregates - Assessment of fines. Methylene blue test

BS EN 1744-1 Tests for chemical properties of aggregates - Chemical analysis

BS 1377-2 Methods of test for soils for civil engineering purposes - Classification tests

BS EN 196-2 Method of testing cement - Chemical analysis of cement

BS 812-104 Testing aggregates - Method for qualitative and quantitative petrographic examination of aggregates

BS EN 13286-4 Unbound and hydraulically bound mixtures - Test methods for laboratory reference density and water content. Vibrating hammer

BS 812-2 Testing aggregates - Methods for determination of density

BS EN 12697 - Bituminous mixtures. Test methods

BS EN 933-8 - Tests for geometrical properties of aggregates - Assessment of fines. Sand equivalent test