Environmental Product Declaration for aggregates from Norrköping quarry – Skärlunda

According to EN 15804:2012+A2:2019/AC:2021, ISO 14025, ISO 14040 and ISO 14044
Programme operator: EPD International AB
EPD owner: NCC Industry Nordic AB

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The aggregates declared in the EPD are divided into 4 product groups. See Table 1 for all declared products in this EPD.

EPD INFORMATION	
Declared unit:	1000 kg product
PCR:	Product Category Rules PCR 2019:14 Construction products, version 1.11 of 2021-02-05.
Programme:	The International EPD® System, www.environdec.com

1. General product information

The products declared are aggregates manufactured by NCC Industry, Division Stone Materials. The declared site is Skärlunda in Norrköping, a medium-sized quarry with mobile crushing plants owned by NCC Industry in Sweden.

The declared products manufactured in Skärlunda (product list in Table 1) are intended to be used as, e.g. asphalt and concrete, filling material in civil engineering and railway macadam.

Aggregates are produced in various fractions; from blasted rock to finely crushed 0/2 mm material (grains between 0 and 2 mm in diameter). There are 26 types of aggregates declared in this EPD, representing the products manufactured at the declared site, see Table 1. The technical standards which the aggregates are compliant with are also presented. The aggregates consist of granite.

Table 1: Products manufactured at the declared site, classified into product groups and standards applicable.

Product group	Product names (English)	Product names (Swedish)	EN-12620 1)	EN-13242 2)	EN-13043 3)	EN-13450 4)
1	Blasted Rock	Råberg				
	Coarse Rock 200/500	Bergkross 200/500				
2	All-In Rock 0/150	Bergkross 0/150		X		
	All-In Rock 0/200	Bergkross 0/200				
	Subbase DCH 15	Förstärkningslager DCH 15		X		
	Macadam 100/200	Makadam 100/200				
3	All-In Rock 0/16	Bergkross 0/16		X		
	All-In Rock 0/32	Bergkross 0/32		X		
	All-In Rock 0/63	Bergkross 0/63		X		
	All-In Rock 0/90	Bergkross 0/90		X		
	All-In Rock 0/125	Bergkross 0/125				
	Macadam 16/32	Makadam 16/32		X	X	
	Macadam 32/63	Makadam klass 1 32/63				X
	Macadam 32/90	Makadam 32/90				
4	Rock Fines 0/2	Stenmjöl 0/2			X	
	Rock Fines 0/4	Stenmjöl 0/4			X	
	Rock Fines 0/8	Stenmjöl 0/8				
	Macadam 2/5	Makadam 2/5			X	
	Macadam 4/8	Makadam 4/8			X	
	Macadam 8/11	Makadam 8/11			X	
	Macadam 8/11 AN7	Makadam 8/11 AN7			X	
	Macadam 8/16	Makadam 8/16	X	X	X	
	Macadam 8/22	Makadam 8/22			X	
	Macadam 11/16	Makadam 11/16			X	
	Macadam 11/16 AN7	Makadam 11/16 AN7			X	
	Macadam 16/22	Makadam 16/22	X		X	

1) EN-12620+A1:2008 - Aggregates for Concrete
2) EN-13242+A1:2007 -Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction
3) EN-13043/AC:2006 - Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas
4) EN -13450/AC:2012 – Aggregates for railway ballast

The products are classified into product groups based on the consumption of diesel since it is the largest contributor to the environmental impact. Products in the same product group have the same diesel consumption and for energy, ancillary materials and waste, a conservative approach has been taken, so the product with the highest value within the product group have been used in the LCA calculation. The sectioning of the products in product groups simplifies the presentation of results in the EPD, which are declared per product group.

When extracting virgin rock at the site, the first step is to remove the overburden, like soil, moraine and vegetations, with an excavator to uncover the hard rock. Consideration is taken to animals inhabiting the site by avoiding felling vegetations during the breeding season. The overburden is normally stored within the quarry to be used in rehabilitation of the quarry at the end of life. After removal of the overburden, holes are drilled, filled with explosives and detonated. The number of holes drilled depends on the amount of rock to extract at each blast. The explosives are normally taken to the site by tanker trucks. The explosive is in most cases a two-component product that is mixed and activated when pumped down into the holes. Hence, no explosives are stored at site. After the blast, the raw 'material is fed into the production process using a combination of excavators, wheel loaders and/or dumper trucks.

The continued production process is a combination of material feeders, conveyor belts, crushers and screens that transports, breaks and sorts the material into different products. The production process set-up is illustrated in Figure 1.

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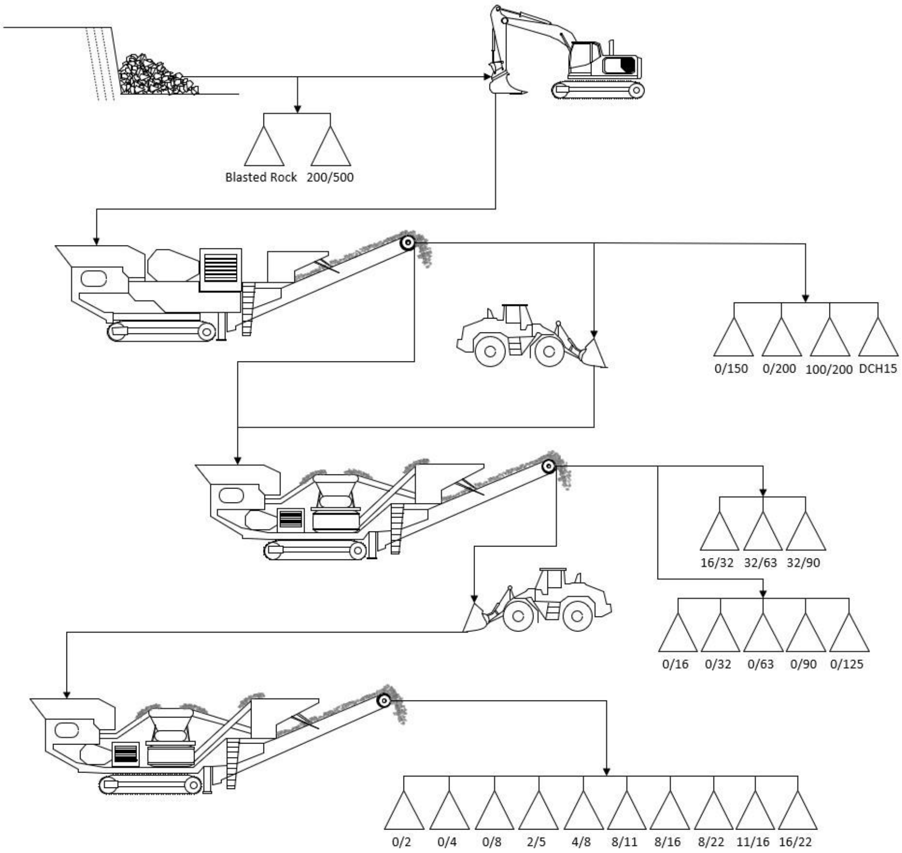

Figure 1: Process set-up for the production of aggregates at the declared site.

The products declared are classified according to the United Nations Central Product Classification (UN CPC) 15320. All materials are produced according to the Construction Products Regulation (CPR) within the EU regulation 305/2011.

The geographical location of the declared site is shown in Figure 2.

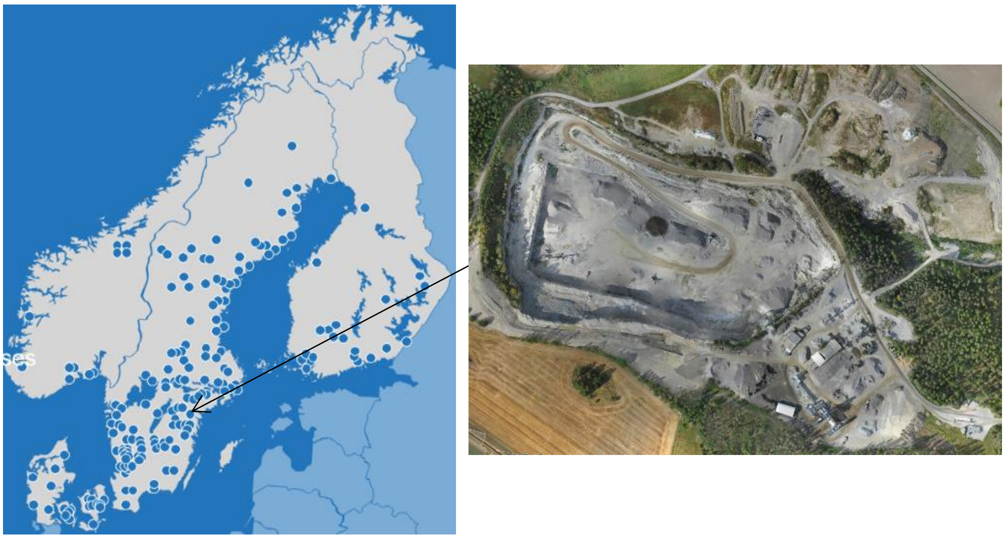

Figure 2: Map and picture showing the geographical location of the declared site.

2. Declared unit

The declared unit is 1 tonne (1000 kg) of aggregates.

3. System boundary

The system boundaries cover aspects such as temporal and geographical. The setting of system boundaries follows two principles according to EN 15804: (1) The “modularity principle” and (2) the “polluter pays principle”.

The EPD is based on an LCA model described in the background report and in the related annex (see reference list). The declared modules are A1-A3, C and D, see Table 2. The product system under study is presented in Figure 3.

For aggregates used in asphalt and concrete the declared modules are A1-A3 (i.e. “cradle-to-gate”). Exemptions in EN 15804 (chapter 5.2) are fulfilled permitting not to declare module C and D.

For aggregates used in other applications the declared modules are A1-A3, C and D (i.e. “cradle-to-gate with modules C1–C4, and module D”).

Data that represent the current production process at the site are used. All input data used in the LCA model (e.g. raw materials and production data) that NCC Industry has influence over are site specific data for the production year 2020. The geographical scope, i.e. location(s) of use and end-of-life performance, is Sweden.

The environmental impact from infrastructure, construction, production equipment and tools that are not directly consumed in the production process are not accounted for in the Life Cycle Inventory (LCI). Personnel-related impacts, such as transportation to and from work, are neither accounted for in the LCI.

Declaration of the RSL is only possible if B1-B5 are included, i.e. RSL is not assessed.

Table 2: Modules of the life cycle in the EPD, including models declared, geography, share of specific data (in GWP-GHG indicator) and data variation.

	Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundary
	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	SE	SE	SE	-	-	-	-	-	-	-	-	-	SE	SE	SE	SE	SE
Specific data	>90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	<10%**			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Only declared for products used in other applications than asphalt and concrete.
**Within each product group. The variation between different product groups are bigger, see result tables.

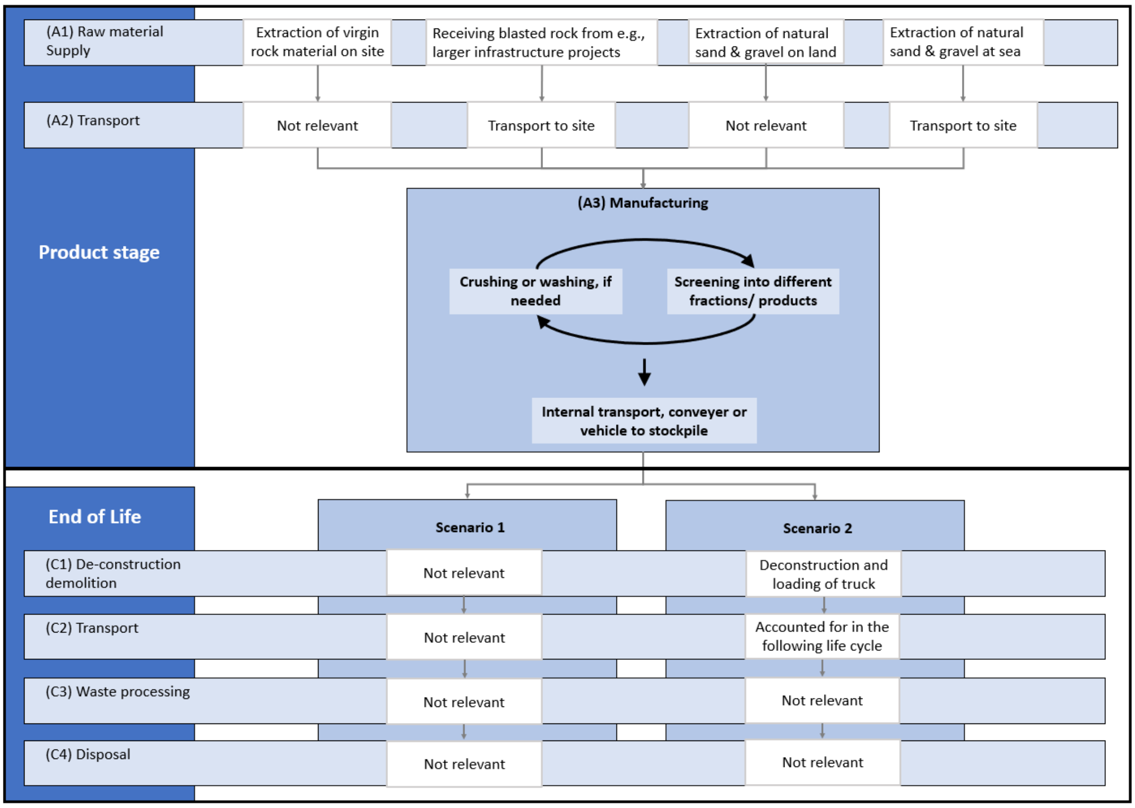

Figure 3: System boundaries for the studied product system.

4. Assumptions and approximations

Various oils and lubricants used in the production process, are approximated with a dataset for lubricants since no dataset or EPD were found for hydraulic oil or grease and the impact is judged to be similar.

Emulsion slurry and dynamite used for blasting, is approximated with a dataset for explosives since the impact is judged to be similar.

Fuse cables and fuse heads for igniting explosives has been estimated based on values from a previous LCI, since there was no current data available.

The manganese steel wear and a small amount of the Adblue has been approximated based on data from a previous EPDs developed by NCC, since there was no current data available.

A small amount of the consumables connected to blasting and the removal of soil and vegetation has been extrapolated since there was no current data available.

A conservative approach is taken considering recycling of non-hazardous waste due to lack of data, assuming 50 % plastic waste for energy recovery and 50 % scrap metal for material recycling.

Considering the waste treatment of hazardous waste 50 % is estimated for material recycling 50 % for energy recovery.

Transport distances have been approximated together with operational experts at the site. This is applied since the impact from the transport work has minor contribution almost independent of the distances the raw materials are transported.

5. Allocation

The production does not deliver any co-products.

The products are divided into different product groups (see Table 1) based on the consumption of diesel. Products in the same product group have the same diesel consumption and for energy, ancillary materials and waste, a conservative approach has been taken, so the product with the highest value within the product group have been used in the LCA calculation. The sectioning of the products in product groups simplifies the presentation of results in the EPD, which are declared per product group.

The consumption of explosives is allocated equally on all products originating from blasted rock, based on mass.

The electricity consumption is known for the production (crushing) process as a whole and allocation of electricity is made based on knowledge from the operational expert about the relative energy consumption of the machines using electricity.

The fuel consumption is known for the site as a whole. Allocation of the fuel consumption is made based on knowledge from the operational expert about which process steps each product goes through, and the amount of fuel consumed in each step during the data collection period. Fuel consumed in machines used for general activities on the site is allocated on all products produced, based on mass.

6. Cut-offs

The cut-off criteria are 1% of the renewable and non-renewable primary energy usage and 1% of the total mass input of the manufacture process (according to the EN 15804 standard).

In the assessment, all available data from the production process are considered, i.e. all raw materials used, utilised ancillary materials, and energy consumption using the best available LCI GaBi datasets.

The following cut-offs have been made:

- The amount of oil-contaminated soil due to spillage from machines/vehicles is very difficult to estimate. Based on internal expert knowledge, this amount is deemed negligible and very rarely occurring.
- The packaging for the input materials used in the production process are negligible.
- Fuse heads, fuse cables, glycol, anti-corrosion spray and washer fluid are used in such a low quantity that they are negligible.

7. Software and database

The LCA software GaBi Professional and its integrated database from Sphera has been used in the LCA modelling. See the list of references.

8. Data quality

The primary data collected by the manufacturer are based on the required materials and energy to manufacture the product. The data of the raw materials are collected per declared unit. All necessary life cycle inventories for the basic materials are available in the GaBi database or via EPDs. No generic selected datasets (secondary data) used are older than ten years. No specific data collected is older than five years and represent a period of about one year. The representativeness, completeness, reliability and consistency are judged as good.

9. About NCC

NCC is one of the leading construction and property development companies in the Nordic region, with sales of 54 billion SEK and approximately 14 500 employees in 2020. With the Nordic region as its home market, NCC is active throughout the value chain – developing commercial properties and constructing housing, offices, industrial facilities and public buildings, roads, civil engineering structures and other types of infrastructure. NCC also offers input materials used in construction and accounts for paving and road services.

NCC's vision is to renew our industry and provide superior sustainable solutions. NCC aims to be the leading society builder of sustainable environments and will proactively develop new businesses in line with this.

NCC works to reduce both our own and our customers' environmental impact and continues to further refine our offerings with additional products and solutions for sustainability. In terms of the environment, this entails that NCC, at every step of the supply chain, is to offer resource and energy-efficient products and solutions to help our customers reduce their environmental impact and to operate more sustainably.

NCC's sustainability work is based on a holistic approach with all three dimensions of sustainability – social, environmental and economical. In NCC sustainability framework, our focus areas with regards to sustainability are defined; Climate and Energy, Materials & Waste, Social Inclusion, Health & Safety, Compliance and Portfolio Performance. Our sustainability strategy includes the aim of being both a leader and a pioneer in these areas.

NCC reports on its sustainability progress each year and the report has been included in NCC's Annual Report since 2010. NCC applies Global Reporting Initiative (GRI) Standards, the voluntary guidelines of the GRI for the reporting of sustainability information. In addition to GRI, NCC also reports the Group's emission of greenhouse gases to the CDP each year. NCC is a member in BSCI (Business Social Compliance Initiative), which is the broadest business-driven platform for the improvement of social compliance in the global supply chain and has been a member of the UN Global Compact since 2010. The UN Global Compact is a strategic policy initiative for businesses that are committed to aligning their operations and strategies with 10 defined and universally accepted principles in the areas of human rights, labour, environment and anti-corruption.

Also visit: https://www.ncc.group/sustainability

10. EPD owner

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CONTENT DECLARATION INCLUDING PACKAGING

The products declared do not contain any substances of very high concern (SVHC) according to REACH. Table 3 presents the content declaration for the various product groups. The mass of biogenic carbon in the products is less than 5%. The packaging material is negligible.

Table 3: Content declaration of aggregates declared.

Product group	Product component	Weight, kg	Post-consumer material, weight-%	Renewable material weight-%
1	Granite	1000	0	0
2	Granite	1000	0	0
3	Granite	1000	0	0
4	Granite	1000	0	0
Product group	Packaging material	Weight, kg	Weight-% (versus the product)	
1-4	Negligible for all product groups	Negligible	Negligible	

The results of the life cycle assessment, based on the declared unit, can be found in Table 4 and 5 (core environmental indicators), Table 6 and 7 (resource use) and Table 8 and 9 (output flows and waste categories). The products are grouped into product groups based on the consumption of diesel. Products within the same product group carry the same impact. The deviation within each product group is less than 10% for any core environmental indicators, resource use and waste category.

Table 4: Results of the LCA (modules A1-A3) – Core environmental indicators per declared unit of the respective product group.

Core environmental indicators			Product group 1	Product group 2	Product group 3	Product group 4
			Blasted Rock, 200/500	0/150, 0/200, DCH15, 100/200	0/16, 0/32, 0/63, 0/90, 0/125, 16/32, 32/63, 32/90	0/2, 0/4, 0/8, 2/5, 4/8, 8/11, 8/11 AN7, 8/16, 8/22, 11/16, 11/16AN7, 16/22
Impact category		Unit	A1-A3	A1-A3	A1-A3	A1-A3
Climate change	Total	kg CO_2 eq	1.3	2.0	3.4	4.7
	Fossil	kg CO_2 eq	1.3	2.0	3.4	4.7
	Biogenic*	kg CO_2 eq	0	0	0	0
	Land use and land use change	kg CO_2 eq	6.1E-04	7.0E-04	8.9E-04	1.1E-03
	GWP-GHG**	kg CO_2 eq	1.3	2.0	3.4	4.7
Ozone depletion		kg CFC 11 eq	1.0E-15	1.1E-15	1.4E-15	1.7E-15
Acidification		mol H+ eq.	0.013	0.020	0.035	0.048
Eutrophication aquatic freshwater		kg P eq.	6.2E-07	8.0E-07	1.2E-06	1.5E-06
Eutrophication aquatic marine		kg N eq.	5.7E-03	9.5E-03	0.017	0.024
Eutrophication terrestrial		mol N eq.	0.068	0.11	0.19	0.27
Photochemical ozone formation		kg NMVOC eq.	0.016	0.026	0.048	0.068
Depletion of abiotic resources - minerals and metals		kg Sb eq.	5.9E-08	8.7E-08	1.4E-07	2.6E-07
Depletion of abiotic resources - fossil fuels		MJ, net calorific value	16	25	44	62
Water use		m^3 world eq. deprived	0.063	0.065	0.069	0.27

*This indicator is set to zero, due to inconsistencies in the dataset used delivered by Sphera. Though, net result over the life cycle is zero since carbon uptake and emission is zero during a life-cycle.
** The default value to use in the Swedish Transport Administration´s tool Klimatkalkyl is 4.0 kg per tonne aggregates (Trafikverket, 2021)

Table 5: Results of the LCA (modules C and D) – Core environmental indicators per declared unit of the respective product group.

Core environmental indicators			All product groups				
Impact category		Unit	C1 (S1/S2)	C2	C3	C4	D (S1/S2)
Climate change	Total	kg CO_2 eq.	NR/0.90	NR	NR	NR	NR/-0.91
	Fossil	kg CO_2 eq.	NR/0.89	NR	NR	NR	NR/-0.91
	Biogenic	kg CO_2 eq.	NR/0	NR	NR	NR	NR/0
	Land use and land use change	kg CO_2 eq.	NR/7.5E-03	NR	NR	NR	NR/2.4E-03
	GWP-GHG	kg CO_2 eq.	NR/0.90	NR	NR	NR	NR/-0.91
Ozone depletion		kg CFC 11 eq.	NR/1.2E-16	NR	NR	NR	NR/-9.5E-16
Acidification		mol H+ eq.	NR/0.010	NR	NR	NR	NR/-0.012
Eutrophication aquatic freshwater		kg P eq.	NR/2.7E-06	NR	NR	NR	NR/4.6E-07
Eutrophication aquatic marine		kg N eq.	NR/5.1E-03	NR	NR	NR	NR/-5.6E-03
Eutrophication terrestrial		mol N eq.	NR/0.056	NR	NR	NR	NR/-0.067
Photochemical ozone formation		kg NMVOC eq.	NR/0.015	NR	NR	NR	NR/-0.015
Depletion of abiotic resources - minerals and metals		kg Sb eq.	NR/7.0E-08	NR	NR	NR	NR/-3.1E-08
Depletion of abiotic resources - fossil fuels		MJ, net calorific value	NR/12	NR	NR	NR	NR/-11
Water use		m^3 world eq. deprived	NR/8.0E-03	NR	NR	NR	NR/-0.059

Table 6: Results of the LCA (modules A1-A3) – Resource use per declared unit of the respective product group.

Use of resources		Product group 1	Product group 2	Product group 3	Product group 4
		Blasted Rock, 200/500	0/150, 0/200, DCH15, 100/200	0/16, 0/32, 0/63, 0/90, 0/125, 16/32, 32/63, 32/90	0/2, 0/4, 0/8, 2/5, 4/8, 8/11, 8/11AN7, 8/16, 8/22, 11/16, 11/16AN7, 16/22
Parameter	Unit	A1-A3	A1-A3	A1-A3	A1-A3
Use of renewable primary energy excl. renewable primary energy resources used as raw materials	MJ, net calorific value	1.4	1.4	1.6	19
Use of renewable primary energy as raw materials	MJ, net calorific value	0	0	0	0
Total use of renewable primary energy	MJ, net calorific value	1.4	1.4	1.6	19
Use of non-renewable primary energy excl. non-renewable primary energy resources used as raw materials	MJ, net calorific value	16	25	45	62
Use of non-renewable primary energy as raw materials	MJ, net calorific value	0	0	0	0
Total use of non-renewable primary energy	MJ, net calorific value	16	25	45	62
Use of secondary material	kg	0	0	0	0
Use of renewable secondary fuels	MJ, net calorific value	0	0	0	0
Use of non-renewable secondary fuels	MJ, net calorific value	0	0	0	0
Use of net fresh water	m^3	4.0E-03	4.1E-03	4.3E-03	0.049

Table 7: Results of the LCA (modules C and D) – Resource use per declared unit of the respective product group.

Use of resources		All product groups				
Parameter	Unit	C1 (S1/S2)	C2	C3	C4	D (S1/S2)
Use of renewable primary energy excl. renewable primary energy resources used as raw materials	MJ, net calorific value	NR/0.68	NR	NR	NR	NR/-1.1
Use of renewable primary energy as raw materials	MJ, net calorific value	NR/0	NR	NR	NR	NR/0
Total use of renewable primary energy	MJ, net calorific value	NR/0.68	NR	NR	NR	NR/-1.1
Use of non-renewable primary energy excl. non-renewable primary energy resources used as raw materials	MJ, net calorific value	NR/12	NR	NR	NR	NR/-11
Use of non-renewable primary energy as raw materials	MJ, net calorific value	NR/0	NR	NR	NR	NR/0
Total use of non-renewable primary energy	MJ, net calorific value	NR/12	NR	NR	NR	NR/-11
Use of secondary material	kg	NR/0	NR	NR	NR	NR/0
Use of renewable secondary fuels	MJ, net calorific value	NR/0	NR	NR	NR	NR/0
Use of non-renewable secondary fuels	MJ, net calorific value	NR/0	NR	NR	NR	NR/0
Use of net fresh water	m^3	NR/7.8E-04	NR	NR	NR	NR/-3.7E-03

Table 8: Results of the LCA (modules A1-A3) – Waste categories and output flows per declared unit of the respective product group.

Waste categories & output flows		Product group 1	Product group 2	Product group 3	Product group 4
		Blasted Rock, 200/500	0/150, 0/200, DCH15, 100/200	0/16, 0/32, 0/63, 0/90, 0/125, 16/32, 32/63, 32/90	0/2, 0/4, 0/8, 2/5, 4/8, 8/11, 8/11AN7, 8/16, 8/22, 11/16, 11/16AN7, 16/22
Parameter/Indicator	Unit	A1-A3	A1-A3	A1-A3	A1-A3
Hazardous waste disposed	kg	1.2E-03	1.2E-03	1.2E-03	1.2E-03
Non-hazardous waste disposed	kg	0.061	0.062	0.065	0.070
Radioactive waste disposed	kg	1.1E-04	1.3E-04	1.6E-04	1.9E-04
Components for re-use	kg	0	0	0	0
Materials for recycling	kg	0.024	0.024	0.024	0.024
Materials for energy recovery	kg	0.034	0.034	0.034	0.034
Exported energy	MJ per energy carrier	0	0	0	0

Table 9: Results of the LCA (modules C and D) – Waste categories and output flows per declared unit of the respective product group.

Waste categories & output flows		All product groups				
Parameter/Indicator	Unit	C1 (S1/S2)	C2	C3	C4	D (S1/S2)
Hazardous waste disposed	kg	NR/6.2E-10	NR	NR	NR	NR/-1.2E-03
Non-hazardous waste disposed	kg	NR/1.8E-03	NR	NR	NR	NR/-0.060
Radioactive waste disposed	kg	NR/1.5E-05	NR	NR	NR	NR/-1.0E-04
Components for re-use	kg	NR/*	NR	NR	NR	NR/0
Materials for recycling	kg	NR/NR	NR	NR	NR	NR/-0.024
Materials for energy recovery kg	kg	NR/NR	NR	NR	NR	NR/-0.034
Exported energy	MJ per energy carrier	NR/NR	NR	NR	NR	NR/0

* Product group 1-4: 1000.

Table 10: Additional environmental impact indicators are only declared in the Annex to General background report.

Additional environmental impact indicators		
Impact category	Unit	Module A1-D
Particulate Matter emissions	Disease incidence	ND in EPD, see Annex
Ionizing radiation, human health	kBq U235 eq.	ND in EPD, see Annex
Eco-toxicity (freshwater)	CTUe	ND in EPD, see Annex
Human toxicity, cancer effects	CTUh	ND in EPD, see Annex
Human toxicity, non-cancer effects	CTUh	ND in EPD, see Annex
Land use related impacts/Soil quality	dimensionless	ND in EPD, see Annex

Table 11: Classification of disclaimers to the declaration of core and additional environmental impact indicators.

ILCD classification	Indicator	Disclaimer
ILCD Type 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
ILCD Type 2	Acidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	None
	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD Type 3	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2
	Potential Soil quality index (SQP)	2
Disclaimer 1 – 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.		
Disclaimer 2 – The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.		

1. General information

Virgin aggregates, especially glaciofluvial sand and gravel, is a finite resource. To extract rock from bedrock or sand and gravel from natural deposits will affect the environment through use of land which means changed conditions in existing habitats.

The extraction may have a negative impact on surrounding freshwaters and underlying groundwaters and the operations require equipment and vehicles running on fossil and renewable energy. The operations, including transports, cause emissions to air, water and soil and disturbances such as noise, vibrations and dust.

Therefore, quarries, gravel pits and terminals need to be environmentally assessed in accordance with current legislation. During the application procedure consultations are held with interested parties. Decisions and permits can be appealed.

All sites in NCC Industry, Division Stone Materials, are operated according to a given permit/decision from actual authority which include different conditions. Those conditions might regulate e.g. distance to groundwater level, noise, vibrations, dust, emissions to water and air, and rehabilitation of the finalized operation area.

The sites in Denmark, Finland and Sweden are certified according to ISO 14001. The Business Management System in NCC Industry, including Norway, contains routines corresponding to this standard.

However, aggregates are important when building the future society since aggregates is a core building material in residential buildings, offices, public buildings and infrastructure. Building a normal sized single-family house requires about 100 tonnes of aggregates (SGU, 2018).

The average yearly European demand of aggregates is about 5 tonnes per capita (UEPG, 2018). In the Nordic countries the demand is higher; 8-13 tonnes per capita and year, mainly due to a lower population density.

If aggregates are not contaminated, they may be reused many times through recycling which is key in resource efficiency. At many of our sites NCC recycle smaller amounts of aggregates, concrete, asphalt, bricks and different soils. Recycled materials can then be used again. In the end of life, aggregates are usually reused as filling material in construction projects.

When a quarry/gravel pit is opened the existing habitats changes and the area looks sterile. The soil is normally poor in nutrients and different parts of the area are often exceptionally sunlit or shady, conditions that are appreciated by many species. Within a relatively small operational area that is disrupted continuously, like the quarry/gravel pit, the natural environments are often more varied than in the pristine neighboring area. This makes many of our sites unique and creates opportunities to benefit biodiversity both during operation and when rehabilitating.

Explanatory material is given in the background report to this EPD.

To read more about NCCs general sustainability work, please refer to our webpage:
https://www.ncc.group/sustainability

2. Release of dangerous substances to indoor air, soil and water during use stage

According to EN 15804, the EPD does not need to give this information if the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonised test methods according to the provisions of the respective technical committees for European product standards are not available. This criterion is fulfilled for aggregates.

3. Scenario information

For modules other than A1-A3, scenario-based information shall be declared for the products, see Table 12.

Module C (not for aggregates used in asphalt or concrete)

Scenario 1:

The majority of the aggregates (excluding the asphalt and concrete applications) stay in the construction for a long time period (more than 100 years). Thus, it is assumed that the aggregates do not reach the end-of-life stage.

Scenario 2:

A minor part of the aggregates is relocated, for example at the road where it is located. The material could for instance be used to fill an embankment in the proximity. This is expected to occur within a 100-year time horizon.

Table 12: Scenario-based information for end of life.

Scenario information	Unit (per declared unit)	Scenario 1	Scenario 2
Collection process specified by type	kg collected separately	NA	1000
	kg collected with mixed construction waste	NA	0
Recovery system specified by type	kg for re-use	NA	1000
	kg for recycling	NA	0
	kg for energy recovery	NA	0
Disposal specified by type	kg product or material for final disposal	NA	0
Assumptions for scenario development, e.g. transportation	Units as appropriate	Further scenario-based information is presented in the Annex of the Background Report	

Module D

Information in module D aims at transparency of the environmental benefits or loads resulting from reusable products, recyclable materials and/or useful energy carriers leaving a product system e.g. as secondary materials or fuels.

Loads are assigned to module D for materials and fuels where further processing occur after the end-of-waste state is reached. This, in order to replace primary material or fuel input in another product systems.

Benefits are assigned to module D for materials and fuels (that have left the system in any of the modules A4-C4) that can substitute primary material of fuels that do not need to be produced. A functional equivalence must be reached.

The substitution effect is only calculating the resulting net output flow. The net output flow for the aggregates declared are shown in Table 13.

Table 13: Net output flow for module D per declared unit.

Product groups	Mass (kg)
1	1000
2	1000
3	1000
4	1000

Scenario 1 (Net loads and net benefits):
Not relevant.

Scenario 2 (Net loads and net benefits):
The net load relates to the transport of the excavated material. This is assumed to be 3 km transported by a small truck (approximately 9 tonnes payload capacity).

The benefit gained is equal to the virgin aggregates that are substituted. This is assumed to replace the product group with the lowest environmental impact declared in the EPD (module A1-A3) (conservative assumption).

PROGRAMME INFORMATION

This EPD is developed by NCC Industry Nordic AB. It is a result from an EPD certification process verified by Bureau Veritas. The EPD is valid for five years (after which it can be revised and reissued). NCC Industry Nordic AB is the declaration owner and has the liability and responsibility for the EPD.

EPDs of construction products may not be comparable if they do not comply with EN 15804. EPDs within the same product category but from different programmes may not be comparable.

The aim of this EPD is that it shall provide objective and reliable information on the environmental impact of the production of the declared product.

Table 14: Verification details.

CEN standard EN 15804 served as the core Product Category Rules (PCR)	
Product Category Rules (PCR):	PCR 2019:14 Construction products, version 1.11
PCR review was conducted by:	The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.
Independent third-party verification of the declaration and data, according to ISO 14025:2006:	☒ EPD process certification (Internal) ☐ EPD verification (External)
Certification body:	Bureau Veritas
Accredited:	SWEDAC
Procedure for follow-up of data during EPD validity involves third party verifier:	☒ Yes ☐ No

Address of programme operator: EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: info@environdec.com

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SS-EN 13043:2002/AC:2006 - Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas

SS-EN 13242+A1:2007 - Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction

SS-EN 13450/AC:2012 – Aggregates for railway ballast

SS-EN ISO 14025:2010 Environmental labels and declarations - Type III environmental declarations - Principles and procedures (ISO 14025:2006)

SS-EN ISO 14040:2006 Environmental management - Life cycle assessment - Principles and framework (ISO 14040:2006)

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Table 15: Versions of this EPD.

Date of revision	Description of difference versus previous versions
2021-12-16	Original version