

# ENVIROCore 201 EPD

## NORTH ISLAND – ONEHUNGA – ENVIROCORE 201

In accordance with ISO 14025 and EN15804:2012+A2:2019/AC:2021

**Program:** The International EPD® System |  
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# PROGRAM-RELATED INFORMATION AND VERIFICATION

CEN standard EN 15804:2012+A2:2019/AC:2021 served as the core PCR

|                                                                                                |                                                                                                                                                            |                                                                                                                                                                                                                                                             |
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| Product group classification                                                                   | <b>UN CPC 374</b>                                                                                                                                          |                                                                                                                                                                                                                                                             |
| Geographical Scope                                                                             | New Zealand                                                                                                                                                |                                                                                                                                                                                                                                                             |
| Reference Year for Data                                                                        | 2021 Plant Data, 2025 Mix/Materials Data                                                                                                                   |                                                                                                                                                                                                                                                             |
| Product category rules                                                                         | c-PCR-001 Cement and Building Lime (EN16908), 2024-04-30<br>PCR 2019:14 Construction Products and Construction Services, Version 1.3.4, 2024-04-30         |                                                                                                                                                                                                                                                             |
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## Programme-related information and verification

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. 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.



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| Revision Number | Revision Date | Description of Changes |
|-----------------|---------------|------------------------|
| 1.0             | 2025-06-13    | N/A                    |

# INTRODUCTION

Cement is a key ingredient in the most commonly used building material in the world. Each year in New Zealand, over 1.5 million tonnes of traditional cement is used, generating 1.23 million tonnes of CO<sub>2</sub>.<sup>1</sup>

This clearly demonstrates both the essential need for construction materials now and in the future, as well as the necessity for the construction materials industry to be a leading part of the solution addressing climate change.

With Aotearoa committed to net zero by 2050, Holcim New Zealand is building progress for a lower carbon footprint in the built environment.

For us, building progress means a complete range of green, high-performance, and specialty cement and cement binders suitable for Aotearoa's homes, buildings, and infrastructure. It means advice, tools and resources to help you specify your next project with confidence. It means solutions that are right for you each and every time.

**Together, we can build better  
to help decarbonise Aotearoa.**

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<sup>1</sup> International Energy Agency (IEA) report *"The Future of Cement in a Carbon-Constrained World"* (2018); Cement and Concrete Association of New Zealand - Key Facts and Figures; The International Energy Agency (IEA) Cement Technology Roadmap 2009 estimates that the production of 1 tonne of cement results in the emission of approximately 0.82 tonnes of CO<sub>2</sub>. Using the conversion factor of 0.82 tonnes of CO<sub>2</sub> per tonne of cement, the production of 1.5 million tonnes of cement in New Zealand would result in the emission of approximately 1.23 million tonnes of CO<sub>2</sub>. The actual amount of CO<sub>2</sub> emissions may vary.

# ABOUT HOLCIM NEW ZEALAND

## BUILDING PROGRESS

Holcim New Zealand (NZ) is a leading solutions provider for your design and construction needs in New Zealand, dating back to 1888. Today, we supply essential construction materials from import terminals, depots, and quarries to customers. Our cement and aggregates are used in ready-mix concrete, engineered precast concrete, and prestressed concrete solutions for various projects throughout the country.

This EPD provides our stakeholders with confidence about the environmental impact of our products.

Globally, Holcim is 60,000 people around the world who are passionate about building progress for people and the planet through four business segments: Cement, Ready-Mix Concrete, Aggregates and Solutions & Products.

Sustainability is at the core of our global strategy, with our industry's first 2030 and 2050 net-zero targets validated by the Science Based Targets initiative for all scopes. We are leading the transition towards low-carbon construction and driving a circular economy by providing materials and solutions that are re-shaping the way our industry builds. Holcim NZ has developed a range of green cements and cement replacements specifically for the New Zealand market.



# HOLCIM NZ'S CEMENT AT A GLANCE

Holcim NZ provides project-specific, on-demand Environmental Product Declarations (EPDs) to customers. This capability represents a significant step in Holcim NZ's sustainability journey and embodies our multi-disciplinary approach to embedding sustainability into our organisation and operations. With the introduction of our cement blends, third-party verified data will underpin our capability to work with our customers from tender through to design and construction to optimise sustainability performance.

Holcim NZ's cement blend is backed by an EPD Process Certification. Our EPD Process Certification is a stamp of approval to produce compliant EPDs in-house, opening up significant capability and flexibility in producing and using life cycle impact data to inform our operations and our customers.

To gain our EPD Process Certification, Holcim invested in embedding Life Cycle Assessment (LCA) into our systems and processes. We have satisfied a rigorous, third-party evaluation in accordance with the relevant ISO standards and guidelines of the International EPD Program and EPD Australasia.<sup>2</sup>

This EPD has been developed using our EPD Process Certification for ENVIROCore 201 with production occurring at Onehunga.



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<sup>2</sup> 5-6 and 8-12 in the References section.

# LCA INFORMATION

## Declared Unit

1 tonne of Supplementary Cementitious Material (SCM) - Fly Ash.

## Manufacturing Location

Onehunga Depot, Auckland, New Zealand.

## Reference Service Life (RSL)

The RSL is not specified as the scope is from cradle to gate (modules A1-A3).

## Time Representativeness

The plant data for the LCA is based on 2021 calendar year production data. The mix data for the LCA is based on 2023 calendar year production data.

## Databases and LCA Software Used

SimaPro® LCA software (v 10.2) was used for the LCA modelling which developed the LCA Calculator, used as per the certified EPD Process. It uses background data from:

- Ecoinvent 3.11 (2024) database was used as the primary source for inventory data. At the time of this report, this ecoinvent database version is less than 1 year old.

The environmental impacts modelled from the existing EPDs do not include impacts for the additional Green Star (v1.3) impact categories included in the environmental impact tables. The following impact categories were calculated manually for the foreground data:

- Use of renewable primary energy resources used as raw materials
- Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials
- Use of secondary materials
- Use of renewable secondary fuels
- Use of non-renewable secondary fuels

## LCA Methodology

This EPD has been produced in conformance with the requirements of:

- c-PCR-001 Cement and Building Lime (EN16908)
- Product Category Rules (PCR) 2019:14 v1.3.4
- EN 15804+A2
- General Program Instructions (GPI) v5.0
- Instructions of EPD Australasia v4.2
- EN 14040 and EN 14044

## Allocation

Allocation was necessary to proportion inputs and outputs to intermediate flows and processes at the plant level. As much as possible, intermediate flows were allocated physically based on the weight of cement.

Fly ash and ground granulated blast furnace slag were allocated economically. Please refer to the “Recycled Material” section for further detail.

## Cut-Off Criteria

No flows were excluded on the basis of cut-off criteria except for the infrastructure and personnel-related impacts.

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## Data Quality

Schemes for data quality assessment of generic and specific data from EN 15804+A2 are used to perform this data quality assessment activity.

Data quality for the foreground data was assessed in terms of geographic, technical and temporal representativeness. All data sources were scored good or very good. Background data sources were also assessed with respect to their timeliness, with all data sources being updated within the 10 years required under PCR 2019:14.

## Upstream processes

The upstream processes include those involved in Module A1 – raw material supply. This module includes:

- Extraction, transport, and manufacturing of raw materials.
- Generation of electricity from primary and secondary energy resources, also including their extraction, refining and transport for Modules A1.

## Core processes

The core processes include those involved in Module A2 and Module A3 – upstream raw material transport and manufacturing. They include:

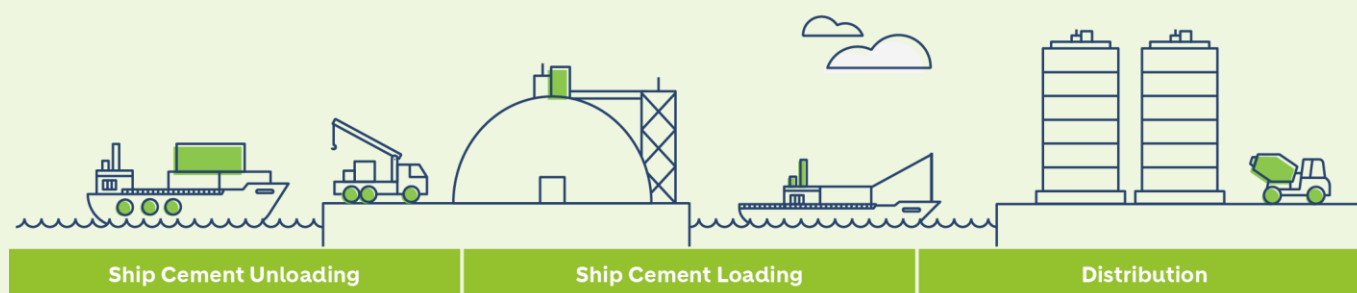
- External transportation of materials to the core processes and internal transport, via truck and ship.
- Manufacturing of cement, and packaging if needed.
- Transportation of materials for recycling and landfilling externally
- Treatment of waste and wastewater generated from the manufacturing processes.

Cement manufacturing is undertaken at two plants and seven depots. GP cement is imported from Japan to Auckland and Timaru plants and can be sold directly to the customers in bulk. Seven depots are used for packaging. Holcim NZ provided data on the consumption of electricity, diesel, and natural gas at each plant and depot. Site specific manufacturing data was collected during FY21.

The electricity for manufacturing process is from the electricity grid in New Zealand, which comprises 58% of hydropower, 18% of geothermal, 12% of natural gas, 6% of wind power, and 6% of other energy sources. The GWP-GHG is 0.137 kg CO<sub>2</sub> eq./kWh of electricity.

## SYSTEM DIAGRAM

The processes included in the LCA are presented in a process diagram in the figure below.



## DESCRIPTION OF SYSTEM BOUNDARIES AND EXCLUDED LIFECYCLE STAGES

The scope of the LCA and EPD is from cradle to gate with options, including A1-A3 and additional module A4. Emissions from distribution (A4) and construction installation (A5) were excluded as this EPD does not include site-specific delivery and Holcim does not have operational control over the installation of products at the construction site. In addition, the following life cycle stages were also excluded: use stages (B1-B7), end of life stage (C1-C4), and benefits and loads beyond the system boundary (D)

Environmental impacts relating to personnel, infrastructure and production equipment not directly consumed in the process are excluded from the system boundary as per the Product Category Rules (2019:14 Construction Production and Construction Services).

|                        | Product Stage       |           |               | Construction Stage |                                   | Use Stage |                             |                        |                             |                               |                        |                       | End of Life Stage            |           |                  |                | Benefits & loads for the next product system |
|------------------------|---------------------|-----------|---------------|--------------------|-----------------------------------|-----------|-----------------------------|------------------------|-----------------------------|-------------------------------|------------------------|-----------------------|------------------------------|-----------|------------------|----------------|----------------------------------------------|
|                        | Raw Material Supply | Transport | Manufacturing | Transport          | Construction/Installation process | Use       | Maintenance incl. transport | Repair incl. transport | Replacement incl. transport | Refurbishment incl. transport | Operational Energy Use | Operational Water Use | De-construction & Demolition | Transport | Re-use Recycling | Final Disposal | Reuse, Recovery<br>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                    | ND                           | ND        | ND               | ND             | ND                                           |
| Geography              | GLO                 | GLO       | NZ            | -                  | -                                 | -         | -                           | -                      | -                           | -                             | -                      | -                     | -                            | -         | -                | -              | -                                            |
| Share of specific data | >90%                |           |               | -                  | -                                 | -         | -                           | -                      | -                           | -                             | -                      | -                     | -                            | -         | -                | -              | -                                            |
| Variation – products   | 0%                  |           |               | -                  | -                                 | -         | -                           | -                      | -                           | -                             | -                      | -                     | -                            | -         | -                | -              | -                                            |
| Variation – sites      | 0%                  |           |               | -                  | -                                 | -         | -                           | -                      | -                           | -                             | -                      | -                     | -                            | -         | -                | -              | -                                            |

ND: Not declared

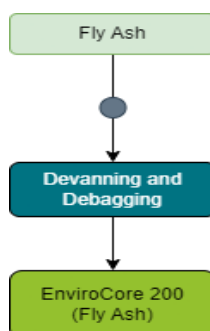
# EPD PRODUCT DESCRIPTION AND USE

## HOLCIM NZ'S CEMENTITIOUS PRODUCTS NORTH ISLAND – ONEHUNGA – ENVIROCORE 201

A detailed breakdown of the functional properties of the cement included in this EPD are provided below. Product environmental information should only be compared with consideration of the product's requisite function.

ENVIROCore 201 is a Fly Ash compliant with AS/NZS 3582.1 Supplementary Cementitious materials Part1: Fly Ash.

### Manufacturing process and flow diagram



## Content Declaration

The following table provides a summary of the materials included in Holcim's cement and their relative composition by weight. The gross weight of this declared material makes up a minimum of 99% of the products covered by this EPD.

### Packaging

ENVIROCore 201 is delivered in bulk

### Recycled Material

The following materials relevant to the study are considered as co-products of their production process and the impacts for their production process are allocated according to PCR 2019:14 Construction Products and Construction Services (co-produced goods, multi-output allocation):

- Fly ash; and
- Ground granulated blast furnace slag

Economic allocation method was used to model the above co-products:

- Fly ash: fly ash in the modelling process only includes transport impacts. It is sourced directly from coal fired electricity generation, with no further processing required. Given its relatively low market value compared to the primary energy product, the environmental impacts of coal combustion allocated via economic allocation are negligible.
- Ground granulated blast furnace slag: No environmental impact is allocated to the granulated blast furnace slag at the point of its generation from steel production as a by-product. However, the specific energy and processing impacts associated with grinding the slag into GGBFS are included.

| Product component(s) | Hazardous content | Weight (%) | Post-consumer material (%) | Biogenic material (%) | Biogenic material (kg C/tonne of product) |
|----------------------|-------------------|------------|----------------------------|-----------------------|-------------------------------------------|
| Fly Ash              | ✓                 | 100        | 0                          | 0                     | 0                                         |

The product does not contain one or more substances that are listed in the "Candidate List of Substances of Very High Concern For Authorisation".

# ENVIRONMENTAL PERFORMANCE

The environmental impacts considered in this EPD are listed in the table below. They are aligned to and adopted from EN15804+A2 version of Environmental Footprint 3.1. All further tables from this point will contain abbreviation only. The potential environmental performance is calculated based on the input data and the emission factors from ecoinvent v3.11. The LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds and safety margins or risks.

The results generated by module A1-A3 should not be used in isolation. It is strongly advised that the outcomes produced by modules A1-A3 are considered alongside the results derived from module C to ensure comprehensiveness and accurate analysis.

| Impact Category                                                                                                     | Abbreviation     | Measurement                             | Assessment Method and Implementation                                |
|---------------------------------------------------------------------------------------------------------------------|------------------|-----------------------------------------|---------------------------------------------------------------------|
| <b>Potential Environmental Impacts</b>                                                                              |                  |                                         |                                                                     |
| Total global warming potential                                                                                      | GWPT             | kg CO <sub>2</sub> equivalents (GWP100) | Baseline model of 100 years of the IPCC based on IPCC 2021          |
| Global warming potential (fossil)                                                                                   | GWPF             | kg CO <sub>2</sub> equivalents (GWP100) | Baseline model of 100 years of the IPCC based on IPCC 2021          |
| Global warming potential (biogenic)                                                                                 | GWPB             | kg CO <sub>2</sub> equivalents (GWP100) | Baseline model of 100 years of the IPCC based on IPCC 2021          |
| Global warming potential (land use/ land transformation)                                                            | GWPL             | kg CO <sub>2</sub> equivalents (GWP100) | Baseline model of 100 years of the IPCC based on IPCC 2021          |
| Ozone depletion potential                                                                                           | ODP              | kg CFC 11 equivalents                   | Steady-state ODPs, WMO 2014                                         |
| Acidification potential                                                                                             | AP               | mol H <sup>+</sup> eq.                  | Accumulated Exceedance, Seppälä et al. 2006, Posch et al., 2008     |
| Eutrophication – aquatic freshwater                                                                                 | EP - freshwater  | kg P equivalent                         | EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe      |
| Eutrophication – aquatic marine                                                                                     | EP - marine      | kg N equivalent                         | EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe      |
| Eutrophication – terrestrial                                                                                        | EP – terrestrial | mol N equivalent                        | Accumulated Exceedance, Seppälä et al. 2006, Posch et al.           |
| Photochemical ozone creation potential                                                                              | POCP             | kg NMVOC equivalents                    | LOTOS-EUROS, Van Zelm et al., 2008, as applied in ReCiPe            |
| Abiotic depletion potential (elements)*                                                                             | ADPE             | kg Sb equivalents                       | CML (v4.8)                                                          |
| Abiotic depletion potential (fossil fuels)*                                                                         | ADPF             | MJ net calorific value                  | CML (v4.8)                                                          |
| Water Depletion Potential**                                                                                         | WDP              | m3 equivalent deprived                  | Available Water Remaining (AWARE) Boulay et al., 2016               |
| <b>Resource use</b>                                                                                                 |                  |                                         |                                                                     |
| Use of renewable primary energy excluding renewable primary energy resources used as raw materials                  | PERE             | MJ, net calorific value                 | Manual for direct inputs                                            |
| Use of renewable primary energy resources used as raw materials                                                     | PERM             | MJ, net calorific value                 | Manual for direct inputs <sup>3</sup>                               |
| Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) | PERT             | MJ, net calorific value                 | ecoinvent version 3.11 and expanded by PRé Consultants <sup>4</sup> |
| Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials          | PENRE            | MJ, net calorific value                 | Manual for direct inputs                                            |

<sup>3</sup> Calculated based on the lower heating value (LHV) of renewable raw materials. LHV is taken from <https://phyllis.nl/>, as recommended by SimaPro in compliance with EN15804+A2: <https://support.simapro.com/s/article/How-to-calculate-EN-15804-A2-indicators-in-desktop-SimaPro>

<sup>4</sup> Calculated as sum of renewable, biomass; renewable, wind, solar and geothermal, and renewable, water.

| Impact Category                                                                                                         | Abbreviation  | Measurement                             | Assessment Method and Implementation                                    |
|-------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------------------------|-------------------------------------------------------------------------|
| Use of non-renewable primary energy resources used as raw materials                                                     | PENRM         | MJ, net calorific value                 | Manual for direct inputs <sup>5</sup>                                   |
| Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) | PENRT         | MJ, net calorific value                 | ecoinvent version 3.11 and expanded by PRé Consultants <sup>6</sup>     |
| Use of secondary material                                                                                               | SM            | kg                                      | Manual for direct inputs                                                |
| Use of renewable secondary fuels                                                                                        | RSF           | MJ, net calorific value                 | Manual for direct inputs                                                |
| Use of non-renewable secondary fuels                                                                                    | NRSF          | MJ, net calorific value                 | Manual for direct inputs                                                |
| Use of net fresh water                                                                                                  | FW            | m3                                      | ReCiPe 2016                                                             |
| <b>Waste categories and Output flows</b>                                                                                |               |                                         |                                                                         |
| Hazardous waste disposed                                                                                                | HWD           | kg                                      | EDIP 2003 (v1.05)                                                       |
| Non-hazardous waste disposed                                                                                            | NHWD          | kg                                      | EDIP 2003 (v1.05) <sup>7</sup>                                          |
| Radioactive waste disposed/stored                                                                                       | RWD           | kg                                      | EDIP 2003 (v1.05)                                                       |
| Components for reuse                                                                                                    | CFR           | kg                                      | Manual for direct inputs                                                |
| Materials for recycling                                                                                                 | MFR           | kg                                      | Manual for direct inputs                                                |
| Materials for energy recovery                                                                                           | MFEE          | kg                                      | Manual for direct inputs                                                |
| Exported energy                                                                                                         | EE - e        | MJ per energy carrier                   | Manual for direct inputs                                                |
| Exported energy, thermal                                                                                                | EE - t        | MJ per energy carrier                   | Manual for direct inputs                                                |
| <b>Additional environmental impacts</b>                                                                                 |               |                                         |                                                                         |
| Global warming potential, excluding biogenic uptake, emissions and storage                                              | GWP-GHG       | kg CO <sub>2</sub> equivalents (GWP100) | Baseline model of 100 years of the IPCC based on IPCC 2021 <sup>8</sup> |
| Particulate matter                                                                                                      | PM            | disease incidence                       | SETAC-UNEP, Fantke et al. 2016 <sup>9</sup>                             |
| Ionising radiation - human health**                                                                                     | IRP           | kBq U-235 eq                            | Human health effect model                                               |
| Eco-toxicity (freshwater)*                                                                                              | ETP-fw        | CTUe                                    | Usetox                                                                  |
| Human toxicity potential - cancer effects*                                                                              | HTP-c         | CTUh                                    | Usetox                                                                  |
| Human toxicity potential - non cancer effects*                                                                          | HTP-nc        | CTUh                                    | Usetox                                                                  |
| Soil quality*                                                                                                           | SQP           | dimensionless                           | Soil quality index based on LANCA                                       |
| Global warming potential, aligned with the IPCC 2013 Fifth Assessment Report                                            | GWP-GHG (AR5) | kg CO <sub>2</sub> equivalents (GWP100) | Baseline model of 100 years of the IPCC based on IPCC 2013 AR5          |

\* Disclaimer 1 – 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 experience with the indicator.

\*\* Disclaimer 2 – 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 ionising radiation from the soil, from radon and from some construction materials is also not measured by this indicator.<sup>10</sup>

<sup>5</sup> Calculated based on the lower heating value (LHV) of non-renewable raw materials. LHV is taken from <https://phyllis.nl/>, as recommended by SimaPro in compliance with EN15804+A2: <https://support.simapro.com/s/article/How-to-calculate-EN-15804-A2-indicators-in-desktop-SimaPro>

<sup>6</sup> Calculated as sum of non-renewable, fossil and non-renewable, nuclear.

<sup>7</sup> Calculated as sum of Bulk waste and Slags/ash.

<sup>8</sup> 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<sub>2</sub> is set to zero.

<sup>9</sup> Fantke et al., Global Guidance for Life Cycle Impact Assessment Indicators: Volume 1. UNEP/SETAC Life Cycle Initiative, Paris, pp. 76-99

<sup>10</sup> Aligned with PCR 2019:14

## NORTH ISLAND – ONEHUNGA – ENVIROCORE 201 – MODULE A1-A3

The interpretation of results is presented in the following sections. Note that the use of results of modules A1-A3 or A1-A5, without considering the results of module C may mislead the communication and decision-making. The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

### Primary indicators – 1 tonne of cement blend

Table 1 | Core environmental impacts per tonne of ENVIROCore 201 - Onehunga (results are in accordance with EN15804+A2:2019)

| Indicator                                                | Indicator    | Unit                       | A1-A3    | A4 |
|----------------------------------------------------------|--------------|----------------------------|----------|----|
| Total global warming potential                           | GWP-Total    | kg CO <sub>2</sub> eq.     | 9.05E+01 | ND |
| Global warming potential (fossil)                        | GWP-Fossil   | kg CO <sub>2</sub> eq.     | 9.05E+01 | ND |
| Global warming potential (biogenic)                      | GWP-Biogenic | kg CO <sub>2</sub> eq.     | 4.42E-03 | ND |
| Global warming potential (land use/ land transformation) | GWP-Luluc    | kg CO <sub>2</sub> eq.     | 2.64E-03 | ND |
| Ozone depletion potential                                | ODP          | kg CFC 11 eq.              | 1.24E-06 | ND |
| Acidification potential                                  | AP           | mol H <sup>+</sup> eq.     | 2.38E+00 | ND |
| Eutrophication – aquatic freshwater                      | EP-F         | kg P eq.                   | 1.83E-04 | ND |
| Eutrophication – aquatic marine                          | EP-M         | kg N eq.                   | 5.47E-01 | ND |
| Eutrophication – terrestrial                             | EP-T         | mol N eq.                  | 6.10E+00 | ND |
| Photochemical ozone creation potential                   | POCP         | kg NMVOC eq.               | 1.66E+00 | ND |
| Abiotic depletion potential (elements)                   | ADPE         | kg Sb eq.                  | 1.35E-06 | ND |
| Abiotic depletion potential (fossil fuels)               | ADPF         | MJ                         | 1.12E+03 | ND |
| Water Depletion Potential                                | WDP          | m <sup>3</sup> eq deprived | 9.63E-01 | ND |

Table 2 | Additional mandatory environmental impacts per tonne of ENVIROCore 201 - Onehunga (results are in accordance with EN15804+A2:2019)

| Indicator                                                                  | Indicator | Unit                   | A1-A3    | A4 |
|----------------------------------------------------------------------------|-----------|------------------------|----------|----|
| Global warming potential, excluding biogenic uptake, emissions and storage | GWP-GHG   | kg CO <sub>2</sub> eq. | 9.05E+01 | ND |

## NORTH ISLAND – ONEHUNGA – ENVIROCORE 201 – MODULE A1-A3

### Additional indicators 1 tonne of cement blend

Table 3 | Additional voluntary environmental impacts per tonne of kg CO<sub>2</sub> eq. (results are in accordance with EN15804+A2:2019)

| Indicator                                                                    | Indicator     | Unit                   | A1-A3    | A4 |
|------------------------------------------------------------------------------|---------------|------------------------|----------|----|
| Particulate matter                                                           | PM            | disease incidence      | 2.50E-06 | ND |
| Ionising radiation - human health                                            | IRP           | kBq U-235 eq           | 9.02E-02 | ND |
| Eco-toxicity (freshwater)                                                    | ETP-fw        | CTUe                   | 4.54E+01 | ND |
| Human toxicity potential - cancer effects                                    | HTP-c         | CTUh                   | 1.34E-08 | ND |
| Human toxicity potential - non cancer effects                                | HTP-nc        | CTUh                   | 2.00E-07 | ND |
| Soil quality                                                                 | SQP           | dimensionless          | 2.24E+00 | ND |
| Global warming potential, aligned with the IPCC 2013 Fifth Assessment Report | GWP-GHG (AR5) | kg CO <sub>2</sub> eq. | 9.07E+01 | ND |

## NORTH ISLAND – ONEHUNGA – ENVIROCORE 201 – MODULE A1-A3

### Resource use parameters - 1 tonne of cement blend

Table 4 | Resource use per tonne of ENVIROCore 201 - Onehunga (results are in accordance with EN15804+A2:2019)

| Indicator                                                                                                               | Indicator | Unit              | A1-A3    | A4 |
|-------------------------------------------------------------------------------------------------------------------------|-----------|-------------------|----------|----|
| Use of renewable primary energy excluding renewable primary energy resources used as raw materials                      | PERE      | MJ <sub>Ncv</sub> | 5.48E+01 | ND |
| Use of renewable primary energy resources used as raw materials                                                         | PERM      | MJ <sub>Ncv</sub> | 0.00E+00 | ND |
| Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)     | PERT      | MJ <sub>Ncv</sub> | 5.48E+01 | ND |
| Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials              | PENRE     | MJ <sub>Ncv</sub> | 1.09E+03 | ND |
| Use of non-renewable primary energy resources used as raw materials                                                     | PENRM     | MJ <sub>Ncv</sub> | 0.00E+00 | ND |
| Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) | PENRT     | MJ <sub>Ncv</sub> | 1.09E+03 | ND |
| Use of secondary material                                                                                               | SM        | kg                | 1.00E+03 | ND |
| Use of renewable secondary fuels                                                                                        | RSF       | MJ <sub>Ncv</sub> | 0.00E+00 | ND |
| Use of non-renewable secondary fuels                                                                                    | NRSF      | MJ <sub>Ncv</sub> | 0.00E+00 | ND |
| Use of net fresh water                                                                                                  | FW        | m <sup>3</sup>    | 2.48E-02 | ND |

## NORTH ISLAND – ONEHUNGA – ENVIROCORE 201 – MODULE A1-A3

### Waste categories and output flows - 1 tonne of cement blend

Table 5 | Waste generated and output flows per m3 of ENVIROCore 201 - Onehunga (results are in accordance with EN15804+A2:2019)

| Indicator                         | Indicator | Unit | A1-A3    | A4 |
|-----------------------------------|-----------|------|----------|----|
| Hazardous waste disposed          | HWD       | kg   | 3.68E-04 | ND |
| Non-hazardous waste disposed      | NHWD      | kg   | 4.97E-03 | ND |
| Radioactive waste disposed/stored | RWD       | kg   | 2.44E-06 | ND |
| Components for reuse              | CRU       | kg   | 0.00E+00 | ND |
| Materials for recycling           | MFR       | kg   | 0.00E+00 | ND |
| Materials for energy recovery     | MFRE      | kg   | 0.00E+00 | ND |
| Exported energy                   | EE - e    | MJ   | 0.00E+00 | ND |
| Exported energy, thermal          | EE - t    | MJ   | 0.00E+00 | ND |

# PREVIOUS VERSION

N/A

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