

# Environmental Product Declaration

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

## HYNDS PIPE SYSTEMS

## Hynds Precast Concrete Channels - Christchurch

EPD of multiple products, based on a representative product. The products covered in the EPD are listed on page 17.



**Programme:** The International EPD® System,  
[www.environdec.com](http://www.environdec.com)

**Programme operator:** EPD International AB

**Regional Programme:** EPD Australasia, [www.epd-australasia.com](http://www.epd-australasia.com)

**EPD registration number:** EPD-IES-0023131:001

**Publication date:** 2030-06-16

**Date of validity:** 2025-06-17

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

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# ABOUT US



Founded in 1973 by John and Léonie Hynds, the privately owned Hynds Group of Companies is New Zealand's premier product supplier for the management of water and water-based waste in the civil and rural infrastructure markets.

Hynds Pipe Systems Limited is the largest operating company within the Hynds Group, and is split into two operating divisions: Manufacturing and Sales & Distribution.

Hynds Concrete Manufacturing operates six factory sites across New Zealand, operating independently audited ISO9001 quality, ISO45001 health and safety, and ISO14001 environmental management systems (see [hynds.co.nz/about-us/](https://hynds.co.nz/about-us/) for certificates).

Hynds operates a sales & distribution network of 36 branches and 3 distribution centres throughout New Zealand supplying over 40 000 product types for drainage, watermain, environmental, industrial process and rural applications.

The Hynds' fleet of 70 delivery trucks ensure reliable stock availability and delivery to all corners of the country.

From its early inception five decades ago, Hynds has been focused on delivering positive change with industry-leading, sustainable solutions. The manufacture of products to support stormwater and wastewater treatment, and ultimately to protect the environment, remains at the heart of our product innovation today.

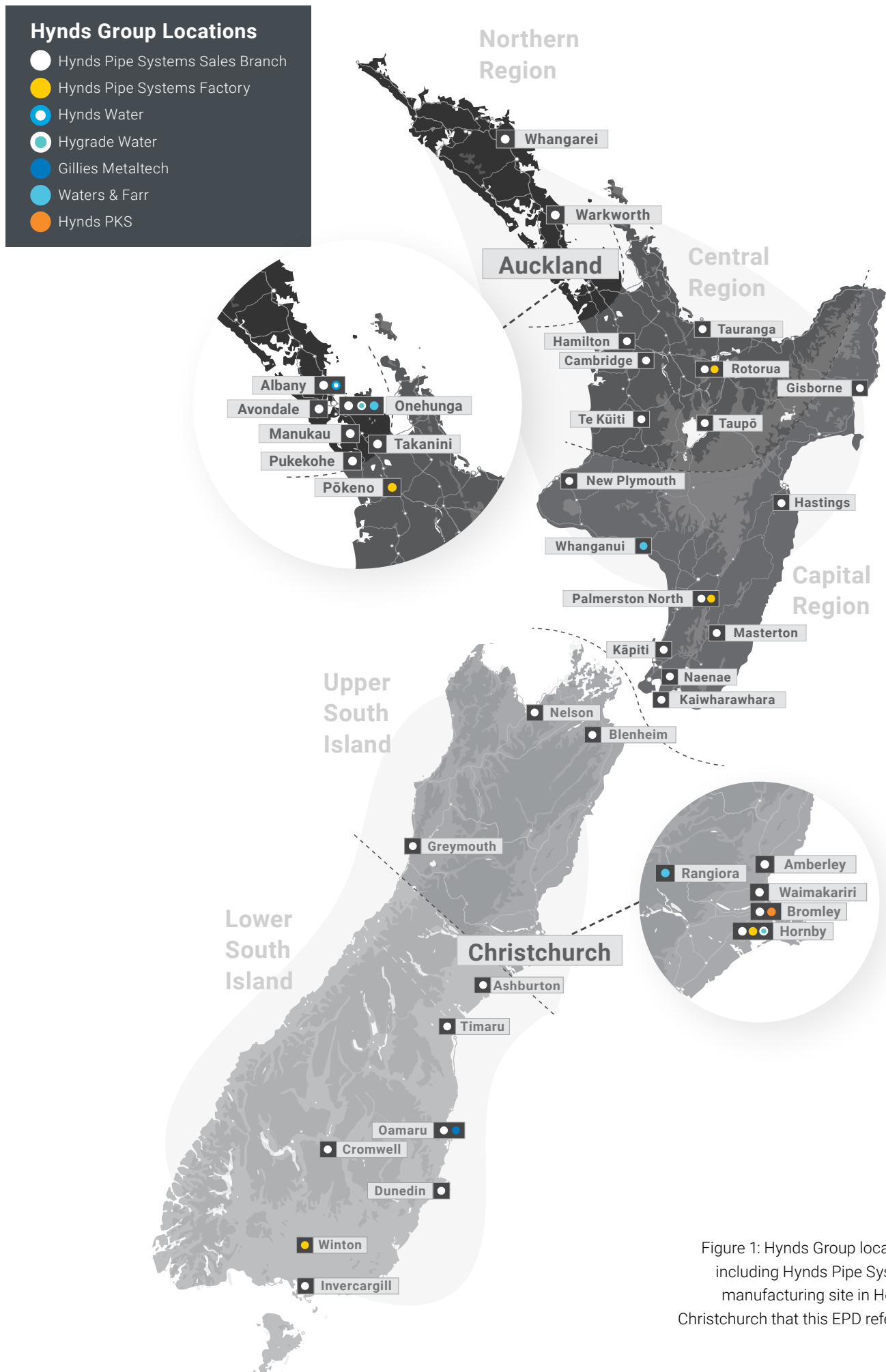


Figure 1: Hynds Group locations, including Hynds Pipe Systems manufacturing site in Hornby, Christchurch that this EPD refers to.

# HYNDS SUSTAINABILITY

Our business was built around finding sustainable solutions to support the three waters (*drinking water, wastewater and stormwater infrastructure services*) and ultimately keeping our country's waterways clean and our communities safe – both for today and for future generations.

Hynds has adopted a sustainability framework which focuses on three strategic pillars; the planet (our natural environment), people (our people but also our wider communities and stakeholders) and products (innovating and building resilience into what we do to meet the needs of future generations).

Addressing the effects of climate change is a huge challenge that we all face. Hynds believes that addressing climate change will make us better off and is committed to New Zealand's transition to a low-emissions economy. Hynds has committed to a 42% reduction in Scope 1 (direct) and Scope 2 (indirect) carbon emissions by 2032.

To support our customer's sustainability goals, Hynds now offers a lower carbon product range, HyndsLC®. The new HyndsLC® range assists our customers in meeting their sustainability requirements without compromising on quality and durability.

For more information on Hynds sustainability framework and HyndsLC® range, visit

**[hynds.co.nz/sustainability/](https://hynds.co.nz/sustainability/)**

**or email [sustainability@hynds.co.nz](mailto:sustainability@hynds.co.nz).**

**HYNDS<sup>®</sup>LC**  
Our low carbon future



# PRODUCT INFORMATION

## Products Covered by EPD

This EPD covers the Hynds Precast Concrete Channels manufactured at Hynds precast concrete manufacturing plant in Hornby, Christchurch. The full range of products covered by this EPD are given in the Product Mass Table (Table 16).

The Hynds Precast Concrete Channels range is generally only supplied to South Island projects.

## Product Description

As the leading manufacturer of reinforced concrete Chnannel in New Zealand, Hynds' channels are available in a wide range of sizes.

Hynds Precast Concrete Channels are manufactured using high strength concrete (50 MPa or greater), hard drawn steel wire. The concrete consists of coarse and fine aggregates, cement and chemical admixtures.

Hynds Precast Concrete Channels are designed to be used for water channels, cable ducting and pipe protection.

## Declared Unit

The declared unit for the EPD is one kg of reinforced concrete channels. A conversion table is provided with product weights for all products covered by this EPD, as required (see Table 16).

## Design Standard

Hynds Precast Concrete Channels are designed and manufactured to the requirements of NZS 3101 and NZS 3109.

The Standard ranges of Hynds Reinforced Concrete Channels have a specified intended service life of 100 years when correctly installed in a non - aggressive environment.

## Packaging

The product is transported without packaging.

## Dangerous Substances

All products covered by this study as supplied are non-hazardous, and do not contain any substances of very high concern as defined by European REACH regulation in concentrations >0.1% (m/m). Precast concrete products and pipes are classified as non-dangerous goods according to the Land Transport Rule: Dangerous Goods 2005. Provide this reference here (ECHA, 2022)

When concrete products are cut, sawn, abraded or crushed, dust is created which contains crystalline silica, some of which may be respirable (particles small enough to go into the deep parts of the lung when breathed in), and which is hazardous. Exposure through inhalation should be avoided. Dust from these products is classified as Hazardous under the Hazardous Substances and New Organisms Act 1996 (HSNO Act) and is subject to Workplace Exposure Standards (WorkSafe NZ WES-BEI indices Edition 13, April 2022).

Table 1: Industry classification

| Product           | Classification | Code | Category                                                                                                       |
|-------------------|----------------|------|----------------------------------------------------------------------------------------------------------------|
| Product name/type | UN CPC Ver.2   | 3755 | Prefabricated structural components for building or civil engineering, of cement, concrete or artificial stone |
|                   | ANZSIC 2006    | 2034 | Concrete Product Manufacturing                                                                                 |

## Content Declaration

Table 2: Composition of Hynds Precast Concrete Channels (per 1 kg)

| Product components   | Weight, kg                | Post-consumer recycled material, weight-% of product | Biogenic material, weight-% of product | Biogenic material, kg C/product or declared unit |
|----------------------|---------------------------|------------------------------------------------------|----------------------------------------|--------------------------------------------------|
| Ready mixed concrete | 0.987 (0.973 - 0.989)     | 0                                                    | 0                                      | 0                                                |
| Mesh                 | 0.0132 (0.00346 - 0.0228) | 0                                                    | 0                                      | 0                                                |
| <b>Total</b>         | <b>1</b>                  | <b>0</b>                                             | <b>0</b>                               | <b>0</b>                                         |

\*Individual masses may not sum to total due to rounding. See Table 16 for mass conversion factors.

No products declared within this EPD contain substances exceeding the limits for registration according to the European Chemicals Agency's "Candidate List of Substances of Very High Concern for authorisation" (European Union, 2024). Reinforced concrete wingwalls are not classified as dangerous goods according to the Land Transport Rule: Dangerous Goods 2005.

Table 3: Composition of packaging (per 1 kg product)

| Packaging materials | Weight, kg | Weight-% (versus the product) | Weight biogenic carbon, kg C/kg of product |
|---------------------|------------|-------------------------------|--------------------------------------------|
| Product's packaging | 0          | 0                             | 0                                          |
| <b>Total</b>        | <b>0</b>   | <b>0</b>                      | <b>0</b>                                   |

## Manufacturing Process

Hynds Precast Concrete Channels are manufactured at Hynds precast concrete manufacturing site in Hornby, Christchurch, using spun pipe technology.

Hynds Precast Concrete Channels are also manufactured using a manual wet-casting process, utilizing the latest European and

Japanese mould technology to ensure that the product meets strict quality requirements. This process uses high strength, wet-cast concrete batched on-site and controlled curing conditions to provide high quality durable products.



# HYNDS PROCESS



Diagram of Hynds process

## System boundaries

As shown in the table below, this EPD has a scope of cradle-to-gate with options, modules C1-C4, module D and with additional modules (type b). The additional module is A4.

Table 4: Modules included in the scope of the EPD

|                           | Product stage       |           |               | Construction process stage |                             | Use stage |             |        |             |               |                        |                       | End of life stage           |           |                  |          | Recovery stage                                       |
|---------------------------|---------------------|-----------|---------------|----------------------------|-----------------------------|-----------|-------------|--------|-------------|---------------|------------------------|-----------------------|-----------------------------|-----------|------------------|----------|------------------------------------------------------|
|                           | Raw material supply | Transport | Manufacturing | Transport                  | Construction / Installation | Use       | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | Deconstruction / demolition | Transport | Waste processing | Disposal | Future reuse, recycling or energy recovery potential |
| Module                    | A1                  | A2        | A3            | A4                         | A5                          | B1        | B2          | B3     | B4          | B5            | B6                     | B7                    | C1                          | C2        | C3               | C4       | D                                                    |
| Modules declared          | X                   | X         | X             | X                          | ND                          | ND        | ND          | ND     | ND          | ND            | ND                     | ND                    | X                           | X         | X                | X        | X                                                    |
| Geography                 | GLO                 | GLO       | NZ            | NZ                         | -                           | -         | -           | -      | -           | -             | -                      | -                     | NZ                          | NZ        | NZ               | NZ       | NZ                                                   |
| Share of specific data    | 87%                 |           |               | -                          | -                           | -         | -           | -      | -           | -             | -                      | -                     | -                           | -         | -                | -        | -                                                    |
| Variation: product groups | 9%                  |           |               | -                          | -                           | -         | -           | -      | -           | -             | -                      | -                     | -                           | -         | -                | -        | -                                                    |
| Variation: sites          | 0%                  |           |               | -                          | -                           | -         | -           | -      | -           | -             | -                      | -                     | -                           | -         | -                | -        | -                                                    |

X = included in the EPD; ND = Module not declared

\*Share of specific data is calculated based on the GWP-GHG results and A1-A3 processes. Energy data (e.g. electricity, LPG) and material data pertaining to primary resource inputs (e.g. concrete, slag, GGBFS, steel) is specific, however data pertaining to the consumables used in manufacturing are not specific. This is consistent across both manufacturing sites.

## Production (Modules A1-A3)

The production stage includes the environmental impacts associated with raw materials extraction and processing of inputs, transport to, between and within the manufacturing site, and manufacturing of average product at the exit gate of the manufacturing site. CO<sub>2</sub> absorption effects due to concrete carbonation during the products' life cycle are not taken into account in any of the declared modules.

## Transport to site (Module A4)

The average transport distance from Hynds Christchurch manufacturing site to customer sites is 100 km.

## End of Life (Modules C1-C4)

When infrastructure reaches the end of its functional life, it is typically demolished and disposed of making way for new infrastructure. Channel are a special case since they are typically buried and are often simply abandoned. Other options are for the channel to be exhumed and sent for recycling or exhumed and sent to landfill.

Scenarios shall be realistic and representative of one of the most probable alternatives and shall not include processes or procedures that are not in current use, or which have not been demonstrated to be practical.

This study assumes that the most likely scenario is that the channel will be abandoned. It is not economically feasible to remove and recover channel at the end of their service life. According to Hynds, decommissioned channels are usually left in ground. No additional processes are included at end-of-life to model the decommissioning of a channel.

## Recovery and Recycling potential (Module D)

Module D declares a potential credit or burden for the net scrap associated with a recycled product. As the channel is modelled as abandoned in the ground there is no credit for concrete or steel recycled. Default factors from PEF R2 values are therefore not used and are replaced with 0 (European Commission, 2020).

Table 5: End of life scenario and processes, per declared unit (1 kg)

| Scenario / Module            | Parameter               | Left in ground |
|------------------------------|-------------------------|----------------|
| <b>Deconstruction (C1)</b>   | Process and assumptions | n/a            |
|                              | kg collected            | 0              |
| <b>Transport (C2)</b>        | Process and assumptions | n/a            |
|                              | kg transported          | 0              |
| <b>Waste processing (C3)</b> | Process and assumptions | n/a            |
|                              | kg for re-use           | 0              |
|                              | kg for recycling        | 0              |
| <b>Disposal (C4)</b>         | Process and assumptions | n/a            |
|                              | kg disposed             | 0              |

## Life Cycle Inventory (LCI) Data and Assumptions

Primary data was used for all manufacturing operations up to the factory gate, including upstream data for general purpose (GP) cement. Primary data were collected based on output data from Hynds systems during July 2023 – June 2024, excluding the sourcing of steel reinforcing wire and mesh which uses 2023 calendar year data.

Background datasets were obtained from Environmental Product Declarations (EPD) specific to suppliers in the case of steel and cement (EPD details omitted because of confidentiality), and EPDs covering similar products i.e. admixtures. All other materials were from the ecoinvent database 3.11 (Wernet, 2016). The reference year for most datasets range from 2019-2024.

Steam curing using natural gas as an energy input, takes place based on the need to turn around a product to fulfill an order. Records associated with steam curing use on a product by product basis is not available. Therefore, natural gas use has been allocated according to the mass of the concrete.

### Electricity

Purchased electricity accounts for 100% of electricity use at Pokeno. It has been modelled using the residual electricity mix of the market.

The composition of the residual electricity grid mix of New Zealand is modelled in LCA FE based on published data for the year 1 April 2021 – 31 March 2022 (BraveTrace, 2023). The New Zealand residual electricity mix is made up of hydro (56.6%), geothermal (19.7%) natural gas (12.5%), wind (6.55%), coal (4.25%), biomass (0.266%) and biogas (0.160%).

Onsite consumption (3.00%), and the low voltage (<1kV) grid's transmission and distribution losses (6.73%) are calculated based on data from the Ministry of Business, Innovation & Employment (MBIE, 2023). The emission factor for the New Zealand residual grid mix for the GWP-GHG indicator is 0.151 kg CO<sub>2</sub>-eq./kWh (based on EF3.1).

### Transport

Primary transport data was collected for most input materials to the product. The transport data included the transport modes and distances from suppliers. Transport distances were mapped against each line of Bill of Material (BOM) data and used to calculate upstream transport impacts.

All auxiliary materials and minor input materials were estimated to travel 24 km by truck and be shipped 10 622 km (from Shanghai).

Transport modes:

- Transport, freight, lorry 7.5-16 metric ton, EURO5.
- Transport, freight, sea, container ship.

## Cut off criteria

thinkstep consistently exclude impacts from infrastructure, construction, production equipment, and tools that are not directly consumed in the foreground production process, ('capital goods') regardless of potential significance.

Infrastructure/capital goods are excluded from all MLC datasets. An important exception is the inclusion of capital goods for electricity generation, where the capital goods are very important for modelling of changes towards more renewable generation. Capital goods related to electricity generation are included in all MLC electricity datasets.

Note: The system boundaries on manufacturing of equipment and for employees are not regarded as limiting the scope of the inventory or as an incomplete inventory (i.e. a cut-off).

Cut-off criteria were applied to the following:

Cut-off was applied to the packaging of raw materials and the packaging materials which accompany the wooden dunnage (included) in minor quantities. Raw materials are delivered in bulk and represents a proportion below 1% of cumulative mass and environmental relevance of inputs to the product.

## Allocation

It was not possible to discern the specific quantities of energy (natural gas, electricity, diesel), water, consumables, dunnage and wastes per product. Data was available at the site-wide level and is allocated to products.

Mass of concrete is used for allocation:

- Allocation of energy (natural gas, electricity and diesel) is based on mass of concrete per product as concrete production and movement is the main driver for on-site energy consumption.
- Water input is allocated based on mass of concrete as batching is the primary area of water use.
- Inputs and (outputs) such as consumables, dunnage and wastes (data collected at site-wide level) are allocated based on mass of concrete for consistency.

Waste generated by the site are not product specific and hence are allocated per product based on mass allocation (i.e. as a factor of specific product mass and total mass of products manufactured at the facility). Reinforcing steel wire and steel fibres including any steel scrap inputs is based on EPD data. The following allocation process occurred.

- Steel Supplier 1's reinforcing bar and wire co-product allocation is proportioned by physical mass according to EN15804 and ISO14044 guidance. Scrap steel input allocation is unclear and likely to have zero burden applied.
- Steel Supplier 2 did not require co-product allocation as data was provided for individual products. Scrap steel input was modelled with an environmental burden based on economic allocation.
- Steel fibre Supplier has a co-product allocation based on product mass basis (17% of total mass production in the manufacturer's facility). Scrap steel input allocation is unclear and likely to be zero burden.

Noting the above Steel Fibre Supplier and Steel Supplier 1 EPDs, PCR suggests that: “Some LCI databases include datasets that are described as being compliant with the allocation rules of EN 15804, but which have been modelled using cut-off allocation (i.e., waste allocation according to Section 4.5.2) for some production (A1-A3) scrap.... Such datasets can be used without adjustments, if the production scrap has no, negligible, or negative economic value (as co-product allocation then yields the same or nearly the same result as cut-off allocation, see Section 4.5.2) or if it can be justified that co-product allocation is not possible (if so, the use of cut-off allocation shall be declared in the EPD). Otherwise, such datasets shall be adjusted by manually adding an environmental burden in compliance with EN 15804 or as a conservative assumption” (section 4.5.5, (EPD International, 2024)).

In the case of Steel Supplier 1 and Steel Fibre Supplier EPDs (used as inputs for this study), any open scrap inputs into manufacturing remain unknown, and so have been treated as ‘burden free.’ This is not consistent with the PCR – however, adjusting Steel Supplier 1 and Steel Fibre Supplier EPDs is not possible. As per Section 4.5.2 of the PCR, if it can be justified that co-product allocation is not possible the use of cut-off allocation shall be declared in the EPD.

## Explanation of Representative Products & Variation

This is an EPD of multiple products, based on a representative product. The representative product is closest to or matches the sales-weighted average GWP-GHG impacts of the product group. The variation between individual products in the group is up to 9% for modules A1-A3, for the GWP-GHG indicator



# RESULTS

## Assessment Indicators

The results tables describe the different environmental indicators for each product per declared unit, for each declared module. The EN 15804 reference package based on EF 3.1 has been used.

The first section of each table contains the environmental impact indicators, describing the potential environmental impacts of the product as shown in Table 11. The second section shows the resource indicators, describing the use of renewable and non-renewable material resources, renewable and non-renewable primary energy and water, as shown in Table 12. The final section of each table displays the waste and other outputs, as shown in Table 13.

The use of primary energy is separated into energy used as raw material and energy used as energy carrier as per option C in Annex 3 of the PCR (EPD International 2024).

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.

Energy indicators (MJ) are always given as net calorific value.

Table 6: Indicators for life cycle impact assessment

| Impact category                                                     | Indicator      | Unit                        |
|---------------------------------------------------------------------|----------------|-----------------------------|
| Climate change – total                                              | GWP-total      | kg CO <sub>2</sub> -eq.     |
| Climate change – fossil                                             | GWP-fossil     | kg CO <sub>2</sub> -eq.     |
| Climate change – biogenic                                           | GWP-biogenic   | kg CO <sub>2</sub> -eq.     |
| Climate change – land use and land use change                       | GWP-luluc      | kg CO <sub>2</sub> -eq.     |
| Ozone depletion                                                     | ODP            | kg CFC-11 eq.               |
| Acidification                                                       | AP             | Mole of H <sup>+</sup> eq.  |
| Eutrophication aquatic freshwater                                   | EP-freshwater  | kgP eq.                     |
| Eutrophication aquatic marine                                       | EP-marine      | kgN eq.                     |
| Eutrophication terrestrial                                          | EP-terrestrial | Mole of N eq.               |
| Photochemical ozone formation                                       | POCP           | kgNMVOC eq.                 |
| Depletion of abiotic resources – minerals and metals <sup>1,2</sup> | ADP-m&m        | kgSb eq.                    |
| Depletion of abiotic resources – fossil fuels <sup>1</sup>          | ADP-fossil     | MJ                          |
| Water use <sup>1</sup>                                              | WDP            | m <sup>3</sup> world equiv. |

Table 7: Life cycle inventory indicators on use of resources

| Indicator                                                                                                  | Abbreviation | Unit           |
|------------------------------------------------------------------------------------------------------------|--------------|----------------|
| Use of renewable primary energy excluding renewable primary energy resources used as raw materials         | PERE         | MJ             |
| Use of renewable primary energy resources used as raw materials                                            | PERM         | MJ             |
| Total use of renewable primary energy resources                                                            | PERT         | MJ             |
| Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials | PENRE        | MJ             |
| Use of non-renewable primary energy resources used as raw materials                                        | PENRM        | MJ             |
| Total use of non-renewable primary energy resources                                                        | PENRT        | MJ             |
| Use of secondary material                                                                                  | SM           | kg             |
| Use of renewable secondary fuels                                                                           | RSF          | MJ             |
| Use of non-renewable secondary fuels                                                                       | NRSF         | MJ             |
| Total use of net fresh water                                                                               | FW           | m <sup>3</sup> |

Table 8: Life cycle inventory indicators on waste categories and output flows

| Indicator                     | Abbreviation | Unit |
|-------------------------------|--------------|------|
| Hazardous waste disposed      | HWD          | kg   |
| Non-hazardous waste disposed  | NHWD         | kg   |
| Radioactive waste disposed    | RWD          | kg   |
| Components for reuse          | CRU          | kg   |
| Materials for energy recovery | MER          | kg   |
| Materials for recycling       | MFR          | kg   |
| Exported electrical energy    | EEE          | MJ   |
| Exported thermal energy       | EET          | MJ   |

Table 9: Biogenic carbon content indicators

| Indicator                           | Abbreviation | Unit |
|-------------------------------------|--------------|------|
| Biogenic carbon content - product   | BCC-prod     | kg   |
| Biogenic carbon content - packaging | BCC-pack     | kg   |

Table 10: Additional Environmental Impact Indicators

| Indicator                                                  | Abbreviation | Unit                    |
|------------------------------------------------------------|--------------|-------------------------|
| <b>Climate Change<sup>3</sup></b>                          | GWP-GHG      | kg CO <sub>2</sub> -eq. |
| <b>Particulate Matter emissions</b>                        | PM           | Disease incidences      |
| <b>Ionising Radiation – human health<sup>4</sup></b>       | IRP          | kBq U235 eq.            |
| <b>Eco-toxicity (freshwater)<sup>5</sup></b>               | ETP-fw       | CTUe                    |
| <b>Human Toxicity, cancer<sup>5</sup></b>                  | HTP-c        | CTUh                    |
| <b>Human Toxicity, non-cancer<sup>5</sup></b>              | HTP-nc       | CTUh                    |
| <b>Land use related impacts / soil quality<sup>5</sup></b> | SQP          | Dimensionless           |

<sup>1</sup>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.

<sup>2</sup>The results of the impact categories abiotic depletion of minerals and metals, land use, human toxicity (cancer), human toxicity, noncancer and ecotoxicity (freshwater) may be highly uncertain in LCAs that include capital goods/ infrastructure in generic datasets, in case infrastructure/ capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used to quantify these indicators in currently available generic datasets sometimes lack temporal, technological and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.

<sup>3</sup> This indicator should be identical to GWP-total except that the CF for biogenic CO<sub>2</sub> is set to zero. It has been included in the EPD following the PCR (EPD International, 2024). In this study, it is calculated by subtracting the value of Climate change – biogenic (GWP-biogenic) from the value of Climate change – total (GWP-total) since the ecoinvent Excel LCIA results do not include the indicator.

<sup>4</sup> 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.

<sup>5</sup>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



# Environmental performance per 1 kg of Hynds Precast Concrete Channels

Table 11: Core environmental indicators

| Indicator             | Unit                       | A1-A3    | A4       | C1       | C2       | C3       | C4       | D        | A-C    |
|-----------------------|----------------------------|----------|----------|----------|----------|----------|----------|----------|--------|
| <b>GWP-total</b>      | kg CO <sub>2</sub> -eq.    | 2.33E-01 | 2.55E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.68%  |
| <b>GWP-fossil</b>     | kg CO <sub>2</sub> -eq.    | 2.31E-01 | 2.55E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.72%  |
| <b>GWP-biogenic</b>   | kg CO <sub>2</sub> -eq.    | 1.39E-03 | 1.20E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.989% |
| <b>GWP-luluc</b>      | kg CO <sub>2</sub> -eq.    | 1.43E-04 | 1.11E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.42%  |
| <b>ODP</b>            | kg CFC11-eq.               | 1.16E-09 | 3.14E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.76%  |
| <b>AP</b>             | Mole of H <sup>+</sup> eq. | 9.85E-04 | 8.49E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 29.9%  |
| <b>EP-freshwater</b>  | kg P eq.                   | 3.38E-05 | 2.78E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 28.1%  |
| <b>EP-marine</b>      | kg N eq.                   | 2.49E-04 | 2.64E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 19.5%  |
| <b>EP-terrestrial</b> | Mole of N eq.              | 2.77E-03 | 2.87E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 19.2%  |
| <b>POCP</b>           | kg NMCOC eq.               | 8.10E-04 | 1.13E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 19.7%  |
| <b>ADP-m&amp;m</b>    | kg Sb-eq.                  | 1.16E-06 | 8.59E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.75%  |
| <b>ADP-fossil</b>     | MJ                         | 1.60E+00 | 3.47E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 18.4%  |
| <b>WDP</b>            | m <sup>3</sup> world eq.   | 1.14E+00 | 1.76E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.386% |

Table 12: Resource use indicators

| Environmental Impact | Unit           | A1-A3    | A4       | C1       | C2       | C3       | C4       | D        |
|----------------------|----------------|----------|----------|----------|----------|----------|----------|----------|
| <b>PERE</b>          | MJ             | 3.15E-01 | 5.08E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| <b>PERM</b>          | MJ             | 1.22E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| <b>PERT</b>          | MJ             | 3.15E-01 | 5.08E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| <b>PENRE</b>         | MJ             | 1.52E+00 | 3.47E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| <b>PENRM</b>         | MJ             | 1.09E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| <b>PENRT</b>         | MJ             | 1.53E+00 | 3.47E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| <b>SM</b>            | kg             | 1.34E-02 | 1.45E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| <b>RSF</b>           | MJ             | 4.55E-05 | 1.77E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| <b>NRSF</b>          | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| <b>FW</b>            | m <sup>3</sup> | 3.72E-03 | 4.48E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

The results for A1-A3 should not be analysed without considering the impacts represented by module C

Table 13: Waste output flow indicators

| Waste and output flows | Unit | A1-A3    | A4       | C1       | C2       | C3       | C4       | D        |
|------------------------|------|----------|----------|----------|----------|----------|----------|----------|
| <b>HWD</b>             | kg   | 6.69E-03 | 7.89E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| <b>NHWD</b>            | kg   | 1.41E-01 | 1.55E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| <b>RWD</b>             | kg   | 7.39E-07 | 2.07E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| <b>CRU</b>             | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| <b>MFR</b>             | kg   | 9.74E-05 | 3.95E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| <b>MER</b>             | kg   | 2.95E-06 | 2.90E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| <b>EEE</b>             | MJ   | 2.75E-04 | 2.84E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| <b>EET</b>             | MJ   | 2.42E-04 | 3.16E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

Table 14: Additional indicators

| Waste and output flows | Unit                    | A1-A3    | A4       | C1       | C2       | C3       | C4       | D        |
|------------------------|-------------------------|----------|----------|----------|----------|----------|----------|----------|
| <b>GWP-GHG</b>         | kg CO <sub>2</sub> -eq. | 2.31E-01 | 2.55E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| <b>PM</b>              | Disease incidences      | 1.01E-08 | 1.73E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| <b>IRP</b>             | kBq U235 eq.            | 2.86E-03 | 2.84E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| <b>ETP-fw</b>          | CTUe                    | 6.10E-01 | 6.93E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| <b>HTPc</b>            | CTUh                    | 8.66E-11 | 4.05E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| <b>HTPnc</b>           | CTUh                    | 1.68E-09 | 2.03E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| <b>SQP</b>             | Pt                      | 5.72E-01 | 1.77E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

Table 15: Biogenic carbon indicators

| Indicators                                  | Units | A1 - A3 |
|---------------------------------------------|-------|---------|
| <b>Biogenic carbon content in product</b>   | kg C  | 0       |
| <b>Biogenic carbon content in packaging</b> | kg C  | 0       |

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO<sub>2</sub>

The results for A1-A3 should not be analysed without considering the impacts represented by module C.

# WEIGHT CONVERSION TABLE

Table 16: Hynds Precast Concrete Channels products covered by this EPD and their weights for conversion.

| Product code    | Product full name                                      | Product mass (kg per 1 unit of pipe) | Representative product |
|-----------------|--------------------------------------------------------|--------------------------------------|------------------------|
| CC100050150H    | Channel Conc 1000Wx500Hx1500Lmm HDuty (CCL100175150H)  | 1 338                                |                        |
| CC100050150L    | Channel Conc 1000Wx500Hx1500Lmm LDuty (CCL100150150L)  | 1 102                                |                        |
| CC100075150H    | Channel Conc 1000Wx750Hx1500Lmm HDuty (CCL100175150H)  | 1 633                                |                        |
| CC100075150L    | Channel Conc 1000Wx750Hx1500Lmm LDuty (CCL100150150L)  | 1 349                                | Yes                    |
| CC100100150H    | Channel Conc 1000Wx1000Hx1500Lmm HDuty (CCL100175150H) | 1 955                                |                        |
| CC100100150L    | Channel Conc 1000Wx1000Hx1500Lmm LDuty (CCL100150150L) | 1 625                                |                        |
| CC100125150H    | Channel Conc 1000Wx1250Hx1500Lmm HDuty (CCL100175150H) | 2 294                                |                        |
| CC125050150H    | Channel Conc 1250Wx500Hx1500Lmm HDuty (CCL125200150H)  | 1 463                                |                        |
| CC125050150L    | Channel Conc 1250Wx500Hx1500Lmm LDuty (CCL125150150LH) | 1 343                                |                        |
| CC125075150H    | Channel Conc 1250Wx750Hx1500Lmm HDuty (CCL125200150H)  | 1 782                                |                        |
| CC125100150H    | Channel Conc 1250Wx1000Hx1500Lmm HDuty (CCL125200150H) | 2 096                                |                        |
| CC125125150H    | Channel Conc 1250Wx1250Hx1500Lmm HDuty (CCL125125150H) | 2 444                                |                        |
| CC150050150H    | Channel Conc 1500Wx500Hx1500Lmm HDuty (CCL150050150H)  | 1 844                                |                        |
| CC150075150H    | Channel Conc 1500Wx750Hx1500Lmm HDuty (CCL150200150H)  | 2 161                                |                        |
| CC150100150H    | Channel Conc 1500Wx1000Hx1500Lmm HDuty (CC150100150H)  | 2 502                                |                        |
| CC150150150H    | Channel Conc 1500Wx1500Hx1500Lmm HDuty (CCL150200150H) | 3 221                                |                        |
| CC150175150H    | Channel Conc 1500Wx1750Hx1500Lmm HDuty (CCL150200150H) | 3 636                                |                        |
| CCCOH.TYPE123   | Outlet Headwall Structure                              | 4 181                                |                        |
| CCL100150150L   | Channel Lid Conc 1000Wx150Hx1500Lmm LDuty              | 726                                  |                        |
| CCL100175150H   | Channel Lid Conc 1000Wx175Hx1500Lmm HDuty              | 893                                  |                        |
| CCL125150150L   | Channel Lid Conc 1250Wx150Hx1500Lmm LDuty              | 862                                  |                        |
| CCL125200150H   | Channel Lid Conc 1250Wx200Hx1500Lmm HDuty              | 1 200                                |                        |
| CCL150200150H   | Channel Lid Conc 1500Wx200Hx1500Lmm HDuty              | 925                                  |                        |
| CCL200250150HN  | Channel Lid Conc 2000Wx250Hx1500Lmm HN-HO-72           | 2 217                                |                        |
| CH2251500DISH   | Channel Conc Ø225 LD                                   | 109                                  |                        |
| CH3002251500HD  | Channel Conc 1500Lx300Wx225Hmm HDuty                   | 397                                  |                        |
| CH600400LDLID   | Channel Lid Conc 2400Lx600Wx125Hmm LD                  | 553                                  |                        |
| CH6005001200HD  | Channel Conc 1200Lx600Wx500Hmm HDuty                   | 578                                  |                        |
| CH6005002400LD  | Channel Conc 2400Lx600Wx500Hmm LD                      | 886                                  |                        |
| CH600500HDLID   | Channel Lid Conc 1200Lx600Wx150Hmm HDuty               | 351                                  |                        |
| CH75070015HDLID | Channel Lid Conc 750x175x1500mm Heavy Duty             | 703                                  |                        |

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# General information

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CEN standard EN 15804+A2 served as the core PCR

PCR:

PCR 2019:14 Construction Products, version 1.3.4 (published on 2024-04-30, valid until 2025-06-20)

c-PCR-003 (to 2019:14) Concrete and concrete elements, version 1.0.0 (published on 2025-04-08)

PCR review was conducted by:

The Technical Committee of the International EPD System.  
See www.environdec.com for a list of members.

Chair:

The most recent review chair: Claudia Peña, PINDA LCT SpA.  
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:

☒ EPD verification (by individual verifier)

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Procedure for follow-up of data during EPD validity involved third-party verifier

☐ Yes

☒ No

An Environmental Product Declaration, or EPD, is a standardised and verified way of quantifying the environmental impacts of a product based on a consistent set of rules known as a PCR (Product Category Rules).

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.

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

**HYNDS**

A thick, bright yellow curved line that starts under the 'H' and ends under the 'S', resembling a stylized smile or a swoosh.